oertli®
SWITZERLAND

Faros™
SERVICE MANUAL

VV016035E
VC840100/VC840101
Up to SN 5169xxxx / 5269xxxx

EYE SURGERY. SWISS MADE.

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

CE
0297

Document no: VV016035E
Version: 13
Date of publication: 2022-05-12
Original service manual

Contact and service:
Oertli Instrumente AG
Customer Service and Support
Hafnerwisenstrasse 4
CH – 9442 Berneck, Switzerland
Tel: +41 (0)71 747 42 00
Fax: +41 (0)71 747 42 90
E-mail: css@oertli-instruments.com
Website: www.oertli-instruments.com

Contents

1. About this document

The service manual is a supplement to VV016034 faros instructions for use and describes safe and appropriate service and maintenance of the device.

The service manual is a supplement to VV016034 Faros instructions for use and describes safe and appropriate service and maintenance of the device. This manual is valid for all Faros devices from serial no. 51600001 / 51600001 to 86690001 / 87690001

This service manual is valid for Faros software 3.x.x.
The procedure for updating the software from 2.1.1 to 3.x.x is described in chapter ♦10 <Software Update>.

The technical data of the unit can be found in the technical data chapter in the Instructions for Use.

Repairs to the device may only be performed by service technicians authorised by Oertli Instrumente AG and based on the last valid version of the service manual.

1.1 Warnings and symbols in this manual

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

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

WARNING!
Indication of the source/cause of the hazard.
Indication of the nature of the hazard.
► Steps to take to avoid the hazard.

Symbol	Meaning
	Safety sign
	Electrostatic sensitive devices
	Information that facilitates easier handling of the device

1.2 Warnings and symbols on the unit

Symbol	Meaning
	Refer to VV016034 Faros instructions for use

2 Safety instructions

DANGER!

Electric shock

Risk of death or serious injury

► Unplug mains power cord before opening the unit!

WARNING!

Faulty device is put into operation.

Improper repairs can endanger the safety of staff and patients.

► Repairs may only be carried out by authorised service technicians.

NOTE!

ESD protection not provided.

Electronics suffer ESD damage.

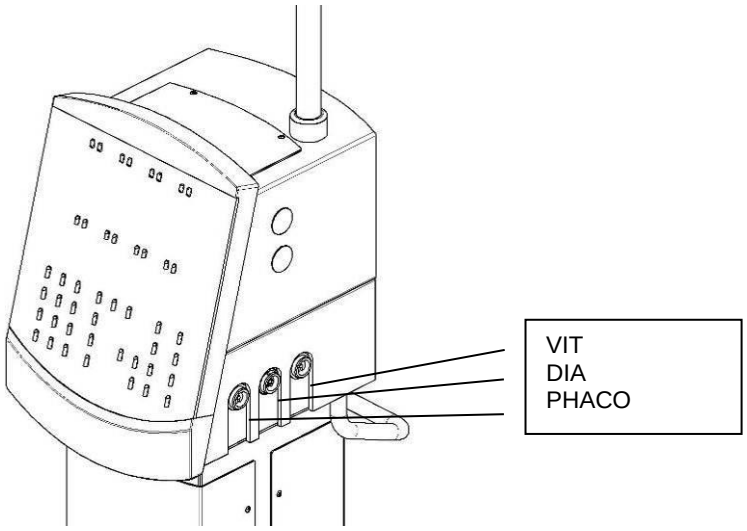
► ESD protection must be ensured before repair by the service technician. It is very important that both you and the device are earthed at all times.

3 Device overview / versions

3.1 Anterior segment version VC840100

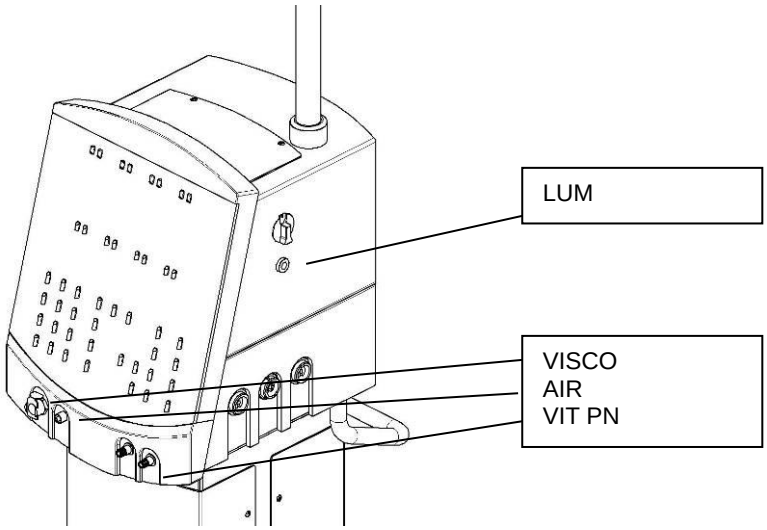
This version is like the posterior segment version VC840101 but without the functions VIT PN, AIR, INJCT, EXTR and LUM. These connections are not provided.

The respective buttons are present on the control panel and also on the remote control to some extent but they are not activated. Nothing happens when one of these buttons is pressed. Inactive buttons are not illuminated.

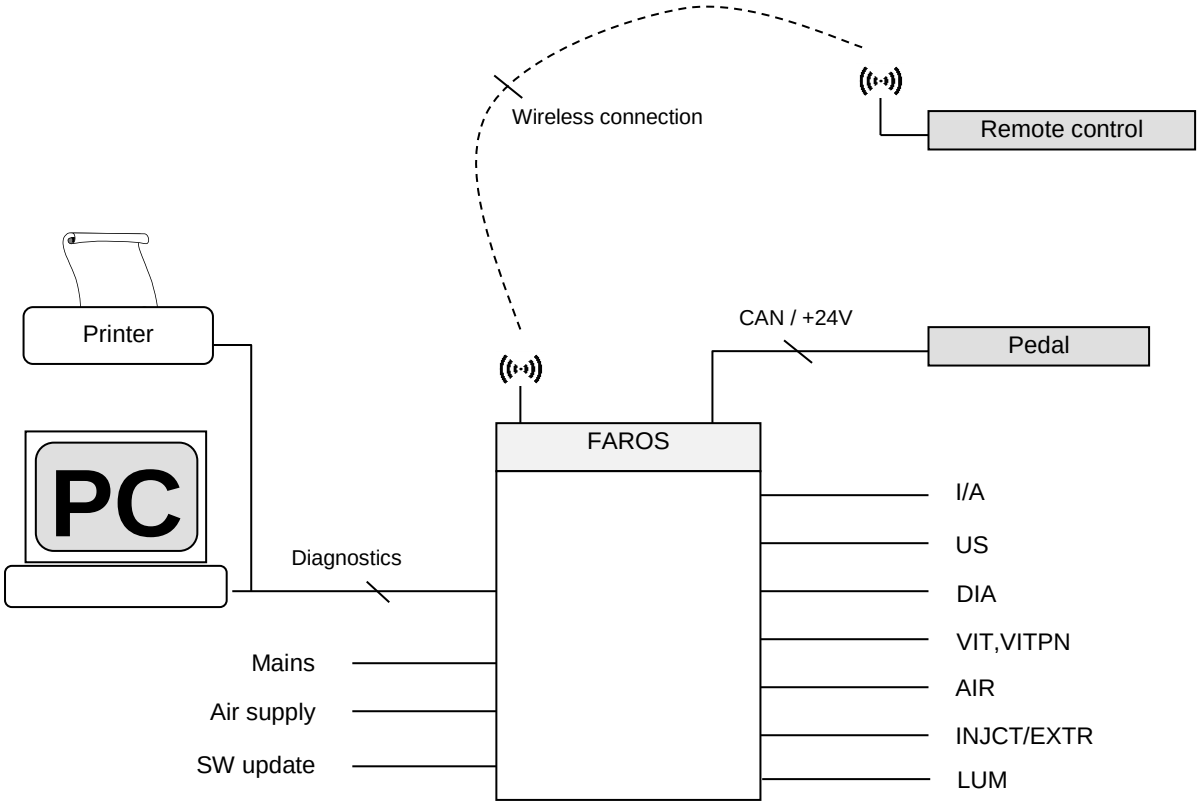


3.2 Posterior segment version VC840101

This version includes all of the functions described in these instructions.



4 Block diagram



5 Installation

5.1 General Remarks

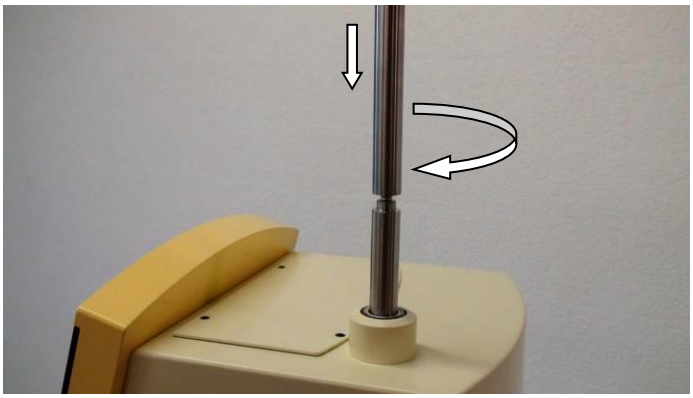
Place the device in such a way that there is a minimum of 20cm space around the ventilation openings. Do not cover the device when in operation.

5.2 Power Supply / Air Supply

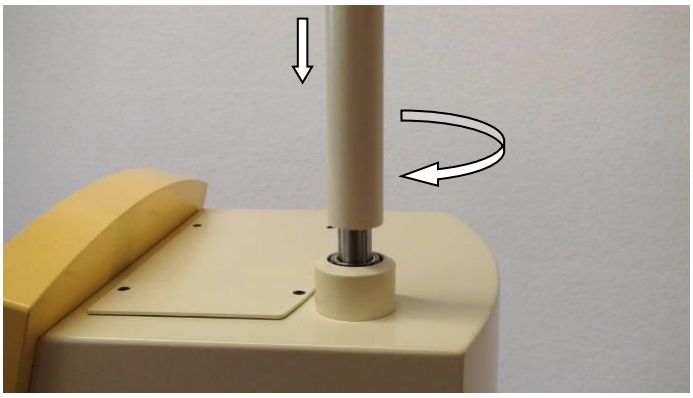
Type	Value	
Supply system	Frequency: Voltage: Input:	50 / 60Hz 100V – 240VAC 280W nominal
Air pressure	Pressure: Minimum flow required: Air connection, as per norm:	6.5 .. 10 bar, Dried and oil-free compressed air 25 l/min NIST EN-739

5.3 Rod Drive

The drive system for the rod drive and the gear rod was installed at the plant. Both can stay in the device and must not be removed.

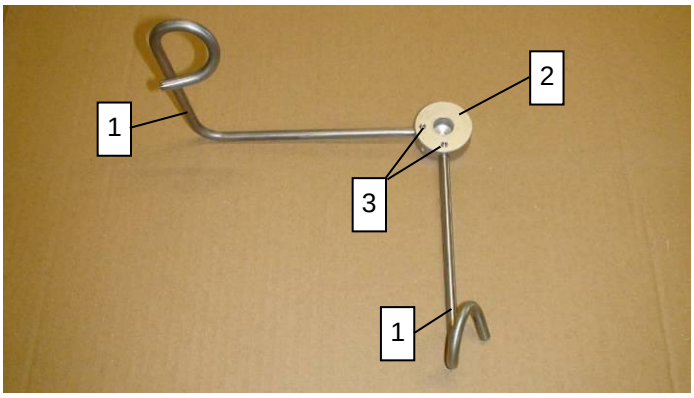


1. Screw IV pole to gear rod.

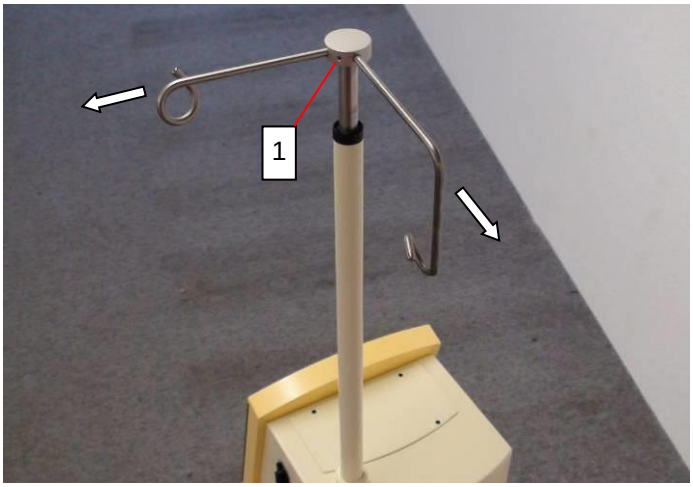


2. Mount protective tube with wiper. To do this, screw the tube into the provided receptacle.

Do not tighten the tube excessively!



3. Insert infusion hooks [1] into the infusion block [2] and fix them with the screws [3].

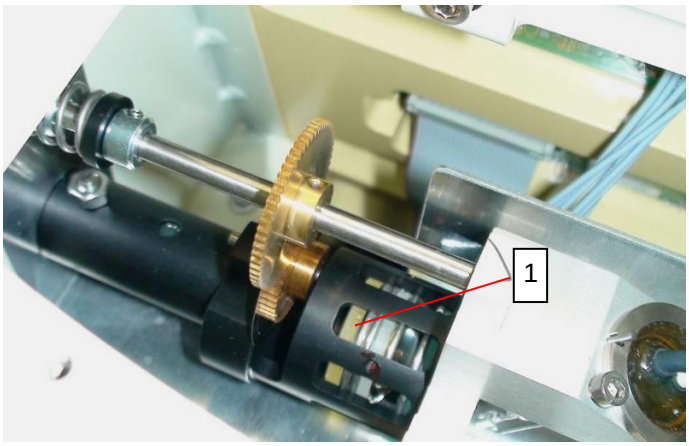


4. Place the infusion block with the hooks onto the IV pole and fix with screw [1].

The hooks point away to the RIGHT and to the REAR!

5.4 Light (halide only)

Access to the light module and the installation of light bulbs are described in section ♦9.2.



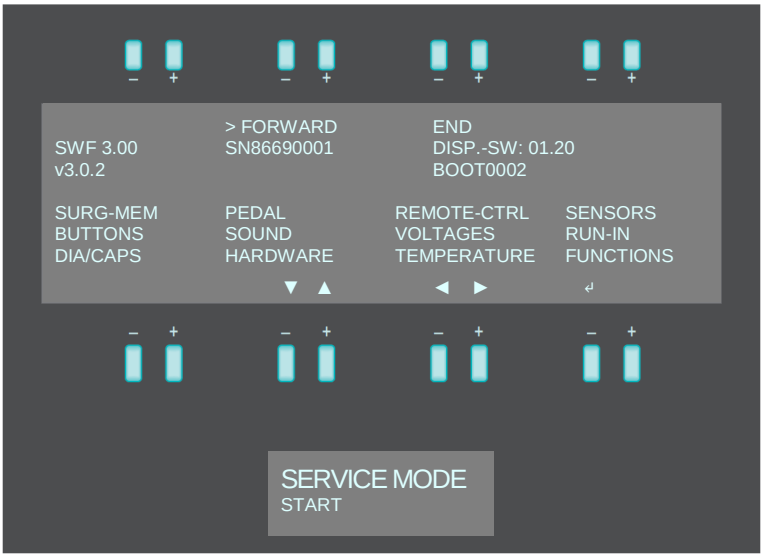
1. Unscrew light cover.
2. Check the filter [1] for defects.
3. Replace the light cover.

WARNING!
Faulty device is put into operation.
An operation with damaged/defective filters can lead to injuries of the retina!
► Check the filter [1] for defects.

6 Service mode operation

6.1 Login and main menu

Reset or turn on the device and enter the service mode by simultaneously pressing the AUX and INJECT keys for at least three seconds. The main menu appears.

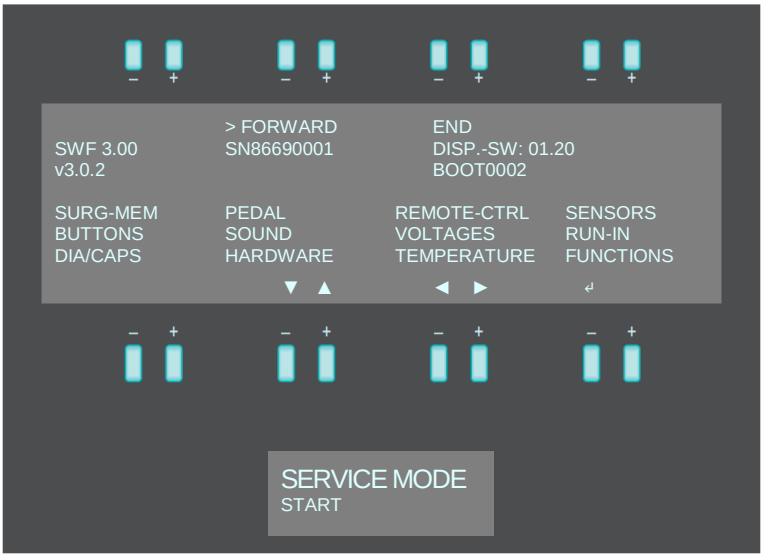


Service mode is divided up into different sub-sections:

Sub-section	Description
SURG-MEM	Resetting of surgeon data Internal copying of surgeon data Saving and retrieving data with USB stick. Copying of surgeon data from USB stick.
PEDAL	Calibration of the pedal.
REMOTE-CTRL	Integrate and scan remote control
SENSORS	Calibration of the various sensors.
BUTTONS	Test of the buttons on the front panel.
SOUND	Test of the sound system.
VOLTAGES	Display of current device voltages.
RUN-IN	Routine for device check in production.
DIA/CAPS	Setting of the offsets for DIA and CAPS.
HARDWARE	Status display and configuration of various components.
TEMPERATURE	Internal device temperatures.
FUNCTIONS	Generating request code, installing and uninstalling additional functions.

6.2 Navigation

To navigate, use the buttons above and below the display.



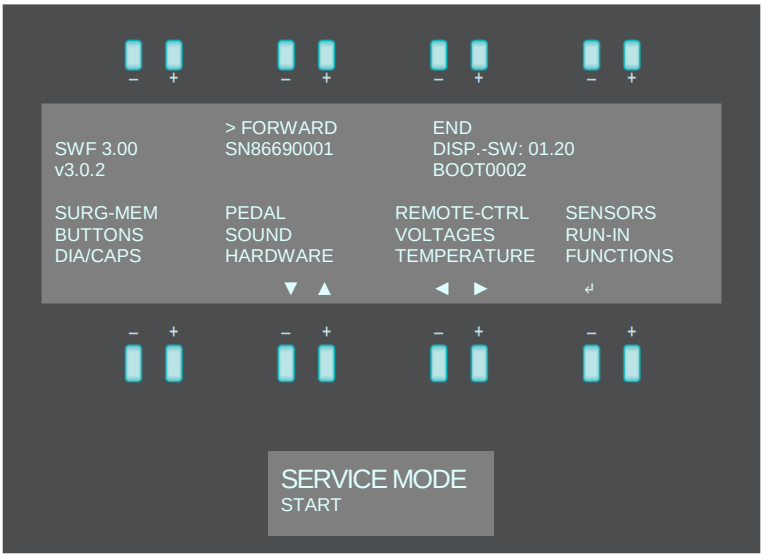
Navigation key	Description
< BACK	Navigate to previous sub-section
> FORWARD	Navigate to subsequent sub-section
END	Exit service mode
EXIT	Navigate to start screen
Navigation keys ◀ and ▶	Navigate the cursor to the left or right
Navigation keys ▲ and ▼	Navigate the cursor up or down
Enter key ↲	Select / confirm marked parameter

The function selected with the cursor flashes.

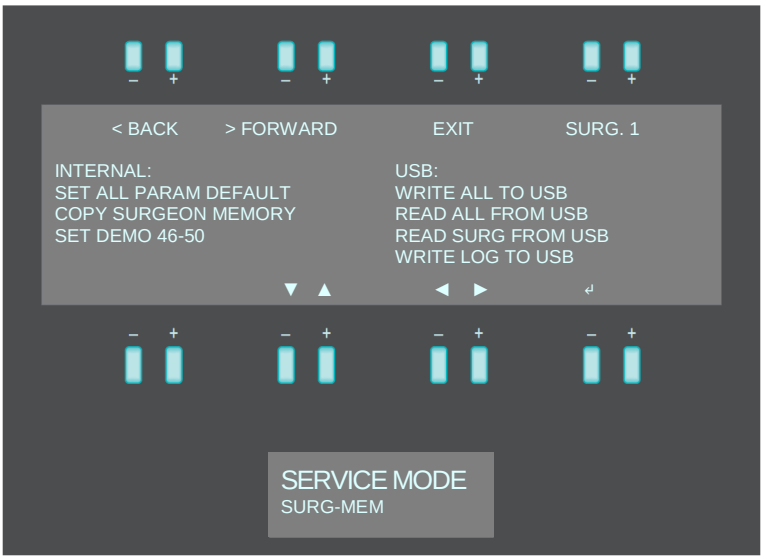
6.3 Display software (SW) version and serial number

The SW version and the device serial number will be displayed after entering the service mode:

SNxxyynnnn	serial number
SWF x.xx:	software version main application (major and minor release number)
v3.0.2:	software tag main application (major, minor and micro release number)
BOOTxxxx:	software version of boot application
DISP.-SW: xx.xx:	firmware version of vfd-display



6.4 Surgeon memory



6.4.1 Setting surgeon memory to default

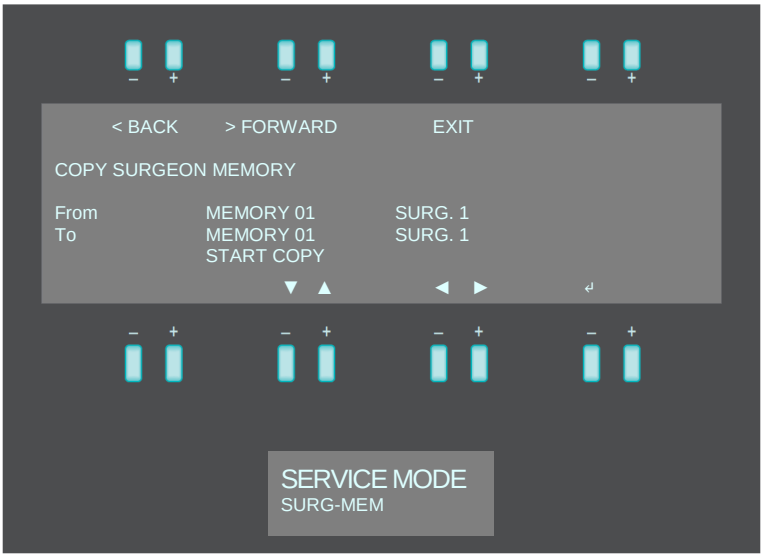
All limit values (stored values), pedal control and ParaProg settings can be reset to the values recommended by the manufacturer in the SURG-MEM sub-section.

Select surgeon storage location or choose <ALL> for all surgeons
Confirm <SET ALL PARAM DEFAULT> by pressing the enter key (↲)
Confirm <CONFIRM DEFAULT> by pressing the enter key (↲)

6.4.2 Copy surgeon memory

Values (settings, ParaProg, pedal settings) of a surgeon memory can be copied to another surgeon memory. The surgeons name from the destination will not be changed.

1. Confirm <COPY SURGEON MEMORY> in the sub-section SURG-MEM by pressing the enter key (↲). A new sub-section opens.
2. Select surgeon memory source by pressing the navigation keys (◀ and ▶)
3. Select target surgeon memory by pressing the navigation keys (◀ and ▶)
4. Confirm <START COPY> by pressing the enter key (↲)



6.4.3 Set demo settings

Standard values for demonstration that are recommended by the manufacturer can be set to the surgeon memory location 46-50.

Confirm <SET DEMO 46-50> by pressing the enter key (↵)
Confirm <CONFIRM DEMO> by pressing the enter key (↵)

6.4.4 Export and import surgeon data to/from USB

It is possible to store all surgeon and system parameters on a USB flash drive in the sub-section SURG-MEM.

Only use an Oertli service USB flash drive in conjunction with the Faros

Backup the physician data regularly, at least before and after each repair.

WRITE ALL TO USB
All data (limit values, ParaProg settings, pedal settings and system parameters) from all surgeons will be stored on the USB flash drive.

Insert USB flash drive to service USB port.
Confirm <WRITE ALL TO USB> by pressing the enter key (↵).
After all data is successfully stored on the USB flash drive, the following message <Data saved; Remove Memorystick> appears.
Unplug USB flash drive.

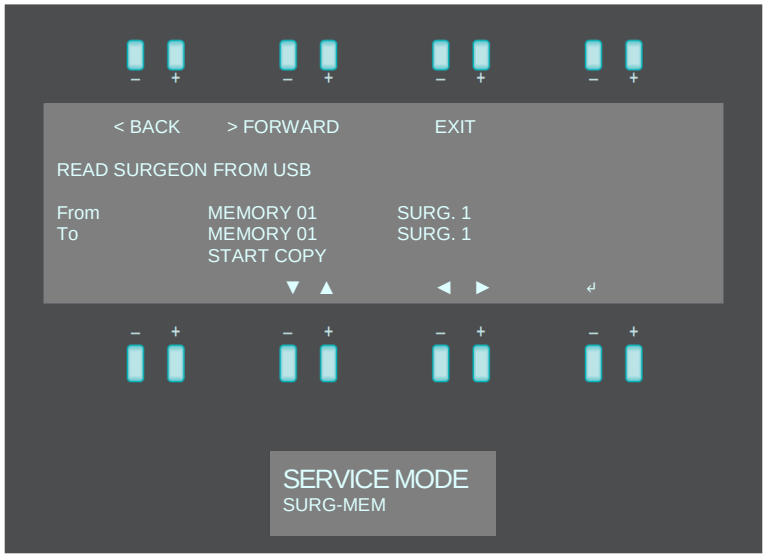
READ ALL FROM USB
All surgeon data (settings, ParaProg, pedal settings, surgeon name) of all surgeons memory locations will be restored from the USB flash drive.

1. Insert USB flash drive with surgeon memory to service USB port.
2. Confirm <READ ALL FROM USB> by pressing the enter key (↵).
   After all data is successfully stored on the Faros device, the message <Data saved; Remove Memorystick> appears.
3. Unplug USB flash drive.

READ SURG FROM USB
Surgeon data (settings, ParaProg, pedal settings) of only one surgeon will be copied from the USB flash drive to a specified surgeon memory in the Faros device. The surgeon name in Faros will not be changed.

1. Insert USB flash drive with surgeon memory to service USB port.
2. Confirm <READ SURG FROM USB> by pressing the enter key (↵).

The following menu appears:



3. Select surgeon memory source by pressing the navigation keys (◀ and ▶).
4. Select target surgeon memory by pressing the navigation keys (◀ and ▶).
5. Confirm <START COPY> by pressing the enter key (↵).
6. Confirm <CONFIRM COPY> by pressing the enter key (↵).
7. Message <COPY DONE> appears. Unplug USB flash drive.

Make sure that the software version in the destination unit is equal or higher than the software version in the unit with the source data.

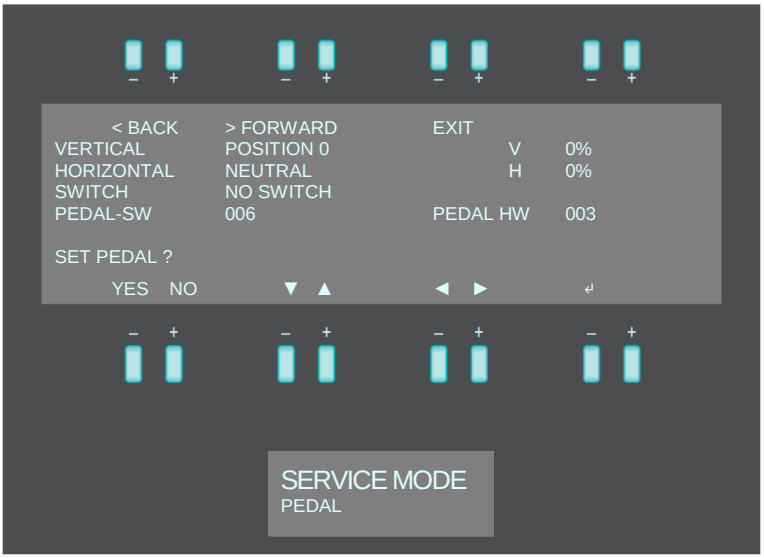
6.4.5 Write log files to USB

The log files of Faros can be exported to a USB flash drive.

1. Insert USB flash drive to service USB port.
2. Confirm <WRITE LOG TO USB> by pressing the enter key (↵).
   After all data is successfully stored on the USB flash drive, the message <Data saved; Remove Memorystick> appears.
3. Unplug USB flash drive.

6.5 Pedal calibration

In the PEDAL sub-section pedal settings can be checked and re-calibrated.



Check pedal status

When activating any sections or buttons at the pedal, the pedal status is displayed in the sub-section PEDAL.

Parameter	Values
VERTICAL (Position)	0 = Neutral 1 = IRR 2 = Aspiration 3 = Instrument activation 4 = Reflux
V (vertical deflection)	0 – 100% (per pedal position)
HORIZONTAL (Position)	NEUTRAL = horizontal central LEFT = horizontal left RIGHT = horizontal right
H (horizontal deflection)	0 – 100% (left or right)
SWITCH	HEEL LEFT HEEL RIGHT TOP LEFT TOP RIGHT

Calibrate pedal

The pedal calibration involves harmonising the mechanical positions of the pedal with the sensor values. The calibrated values are stored in the pedal so that a calibrated pedal can be used with different Faros devices.

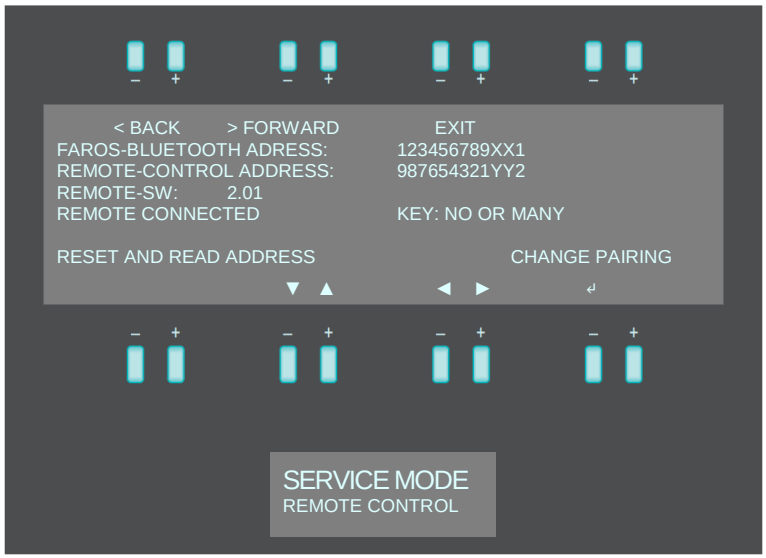
1. Connect pedal with cable to the Faros device.
2. Confirm <SET PEDAL?> with YES.
3. Confirm <REALLY CHANGE SETTINGS?> with YES.
4. Follow the instructions on the display.
   Press the appropriate pedal positions up to the end and confirm each position by pressing the enter key (↵).
5. At the end of calibration the message <PEDAL SETTING OK!> appears. Confirm by pressing the enter key (↵).
6. After calibration check the pedal status and ensure that the 100% end value can be read off for the horizontal and vertical deflection in every section (otherwise repeat the calibration).
7. If the pedal calibration fails, the message <PEDAL SETTINGS NOT OK!> appears. Press the enter key (↵) to repeat the calibration procedure.

CataRhex 3 or SwissTech pedals can also be used in conjunction with Faros without the heel switch functionality. OS 4 pedals cannot be operated with Faros. Faros automatically detects whether another type of pedal is connected.

6.6 Remote control

6.6.1 Buttons on remote control

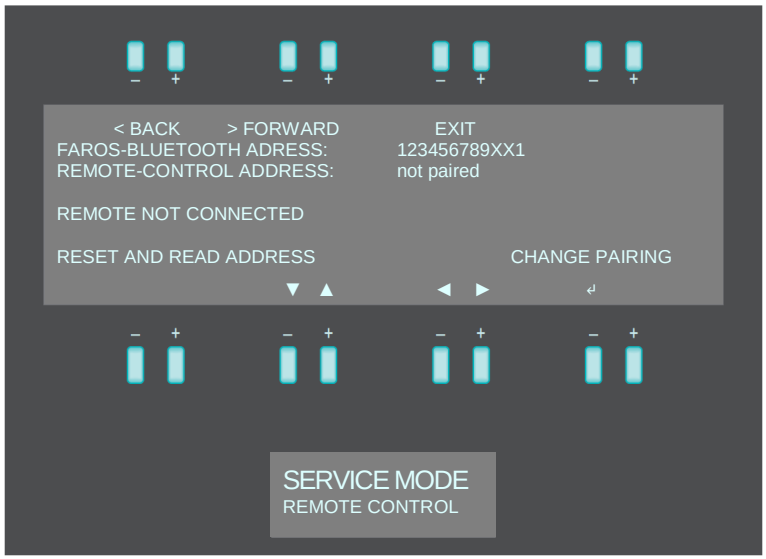
If a remote control is paired and connected to a device, the connection parameters and software version are displayed in the sub-section REMOTE CONTROL. Additionally, all keys on the remote control can be tested.



Testing keys on remote control:

1. Press key on the remote control.
2. If key is functioning, the name of the activated key is displayed.
   If key is not working or no key is pressed, <NO OR MANY> is shown on the display.

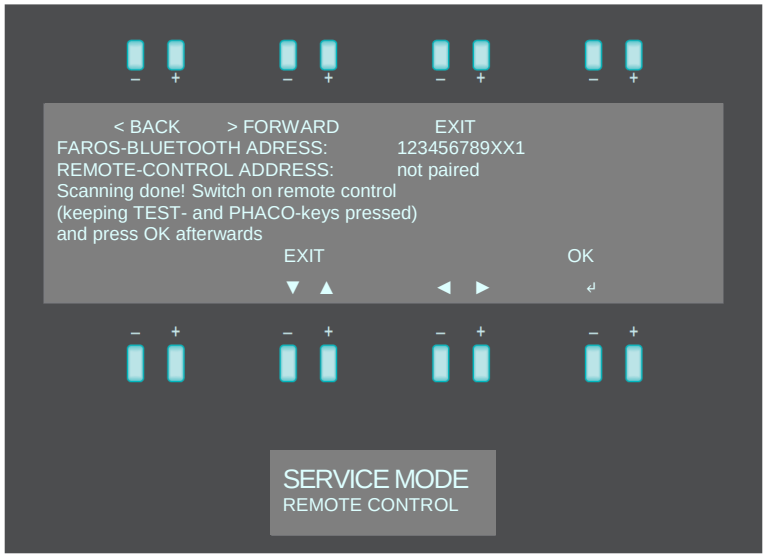
6.6.2 Pairing of remote control



1. Switch off remote control.
2. Dial into CHANGE PAIRING and confirm by pressing the enter key (↲).
3. Confirm <Switch off remote control and press OK afterwards> with OK.

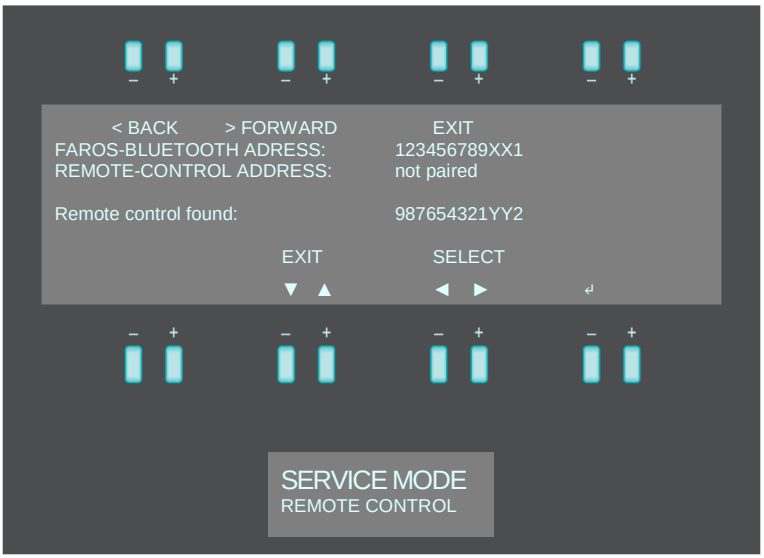
The existing pairing is now deleted!

The message <SCANNING… PLEASE WAIT…> appears.



4. As soon as the request appears, hold the PHACO and TEST key on the remote control pressed and switch it on by pressing the ON/OFF key. Afterwards confirm with <OK> on the display.

   The remote control changes to service mode, which is indicated by the alternating glow of POWER ON and BATTERY.



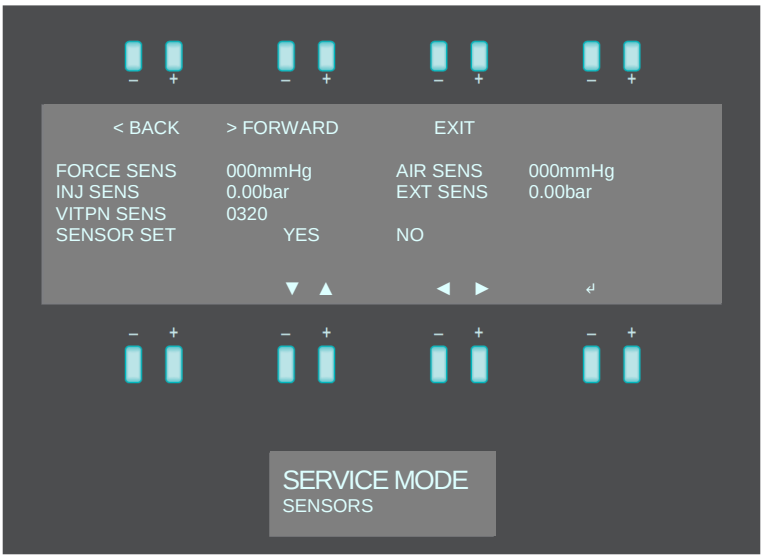
5. Message <REMOTE CONTROL FOUND> appears, including the appropriate address.
6. Confirm with <SELECT>
   Message <Pairing in process…> appears.
7. After a successful pairing, the message <Pairing successful!> appears.

6.7 Sensor calibration

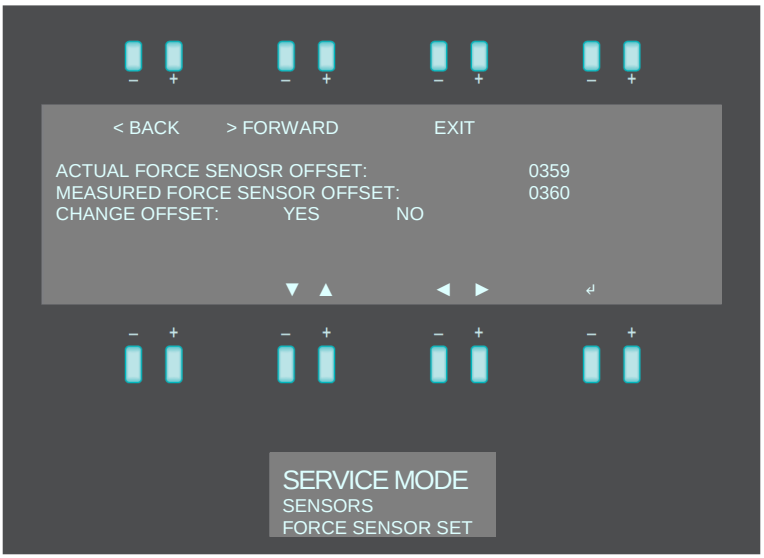
Every replacement or installation of components with an integrated sensor requires calibration. This applies to the following components:

- Coupling plate
- Vit-PN module
- Air-Visco unit
- Air-Visco board

DANGER!
Incorrect calibration.
Risk of NOT reversible eye damage to the patient.
► No instruments shall be connected to the device while calibrating sensors.



1. Move the cursor to <SENSOR SET> and confirm with <YES> by pressing the enter key (↵).
2. Select the appropriate sensor and confirm the calibration with <YES> by pressing the enter key (↵).
   A new window with the actual offset (latest adjustment) and the measured offset values for the selected sensor appears.

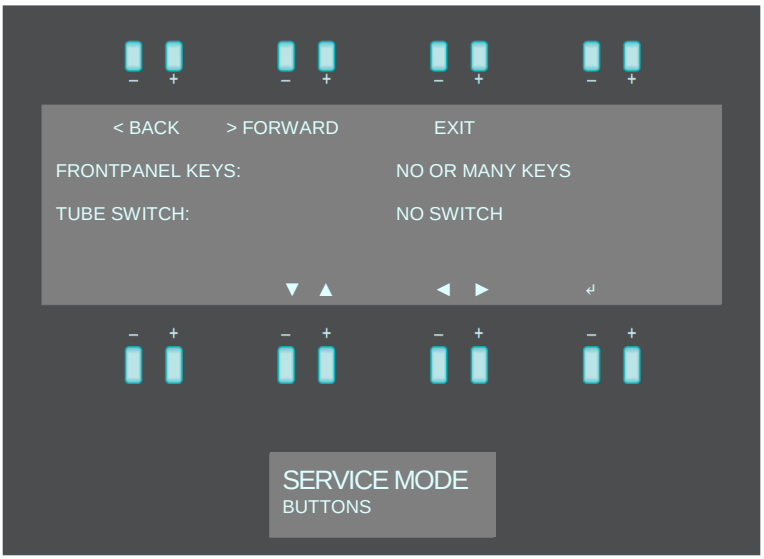


3. Move the cursor to <CHANGE OFFSET>. Select <YES> and press the enter key (↵).
4. In case of a force sensor calibration, remove the tubing system, select <STORE> and confirm by pressing the enter key (↵). The success message <OFFSET CHANGED!> appears.
5. To change the gain value (only air sensor, injection sensor, extraction sensor), select <GO TO GAIN> and confirm by pressing the enter key (↵).
6. Move the cursor to <CHANGE GAIN>. Select <YES> and press the enter key (↵).

DANGER!
Incorrect calibration.
Risk of NOT reversible eye damage to the patient.
► Contact Oertli service before changing gain values.

6.8 Buttons

In the sub-section BUTTONS all keys on the control panel and tube switches can be tested.



Testing keys on control panel

1. Press key on the control panel.
2. If the key is functioning, the name of the activated key is displayed.

If the key is not working or no key is pressed, <NO OR MANY KEYS> is shown on the display.

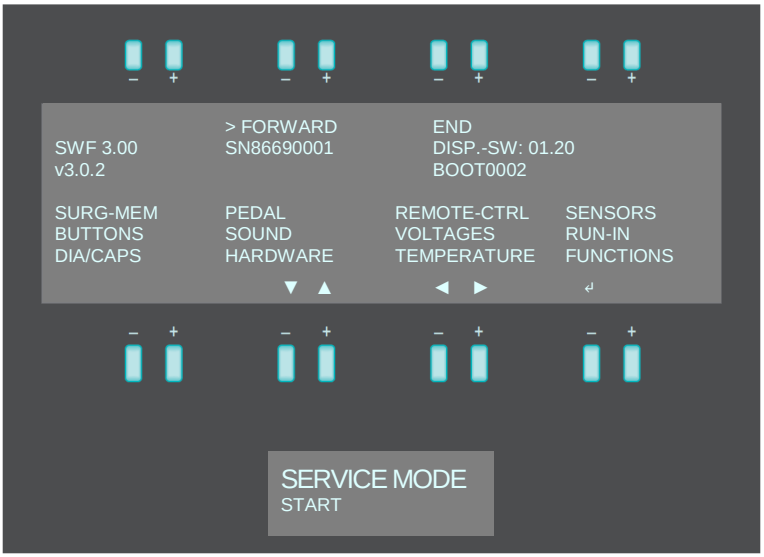
3. Exit the sub-section BUTTONS by pressing the enter key (↵).

Testing tube switches

1. Insert the tubing system.
2. If the tube system is correctly inserted, <BOTH TUBE SWITCHES> appears on the display.
   If the tube system is only partially inserted, <TUBE SWITCH 1> or <TUBE SWITCH 2> appears on the display.
   If the tube system is not inserted, <NO SWITCH> appears on the display.
3. Exit the sub-section BUTTONS by pressing the enter key (↵)).

6.9 Sound test

The loudspeaker of Faros can be tested in the sub-section SOUND.

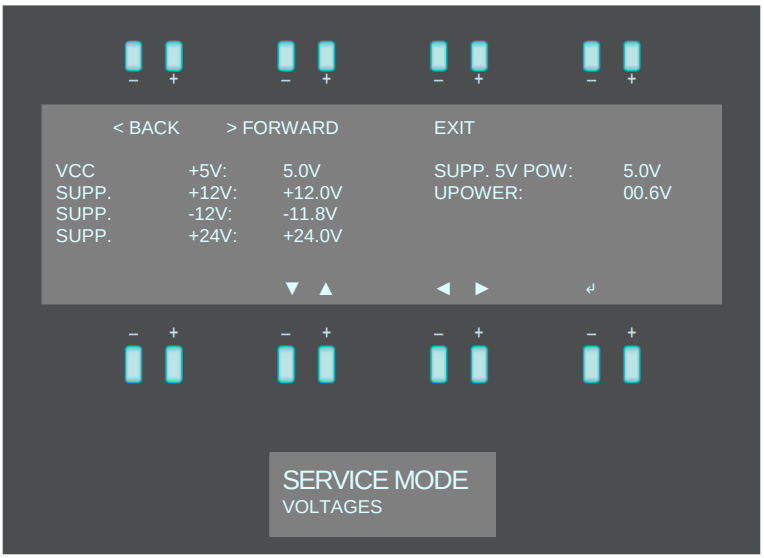


1. Select sub-section <SOUND> in the main menu.
2. Press the enter key (↵).

A clear, loud acoustic signal can be heard as long as the enter key is pressed.

6.10 Voltages

The operating voltages can be checked in the VOLTAGES sub-sections.



The following limit values and tolerances apply:

+ 5.0V ±0.3V
+12.0V ±0.5V
- 12.0V ±0.5V
+24.0V ±1.0V

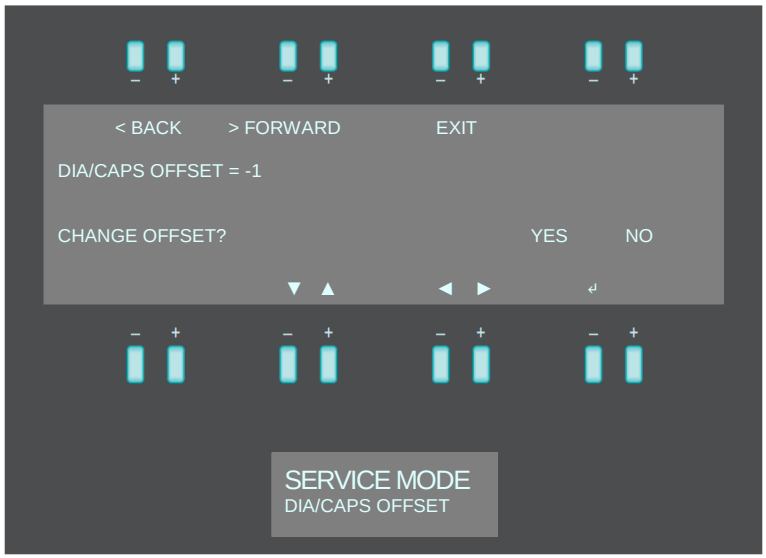
6.11 Run-In

When entering the sub-section RUN-IN a routine for device testing in production is started (only relevant for manufacturer).

6.12 DIA/CAPS offset

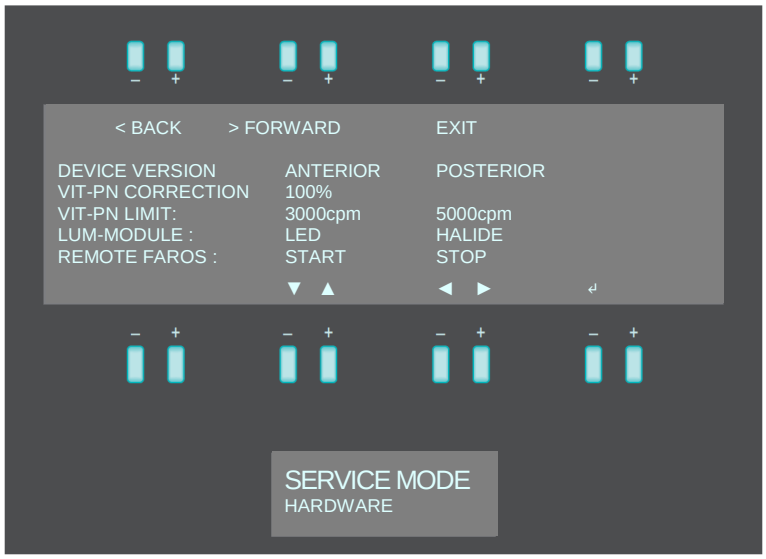
In the sub-section DIA/CAPS offset, the DIA and CAPS output power can be adjusted to a specific value.

Do not set a new offset value without the confirmation of the manufacturer!



1. Confirm <CHANGE OFFSET?> with YES by pressing the enter key (↵).
2. Confirm <REALLY CHANGE SETTINGS?> by selecting YES and pressing the enter key (↵).
3. Type in value confirmed by manufacturer.
4. Confirm <FINSIH?> with YES by pressing the enter key (↵).

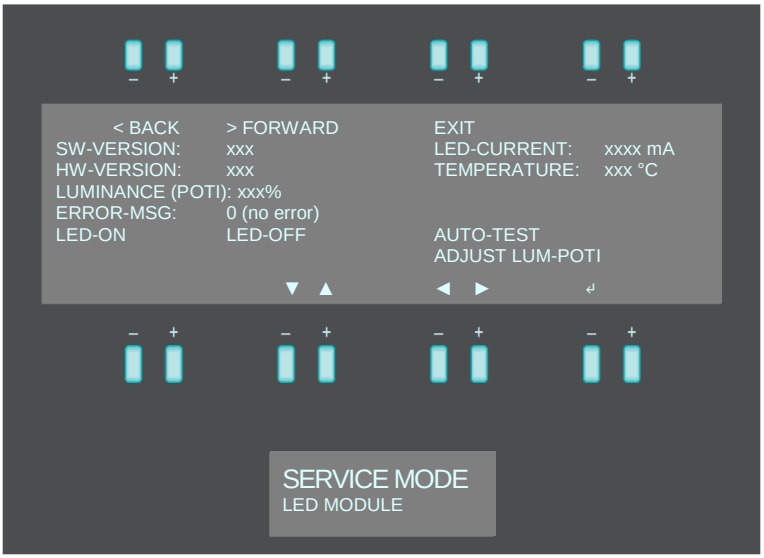
6.13 Hardware



Parameter	Description	Values
DEVICE VERSION	Select present device version.	– ANTERIOR – POSTERIOR
VIT-PN CORRECTION	Set the correction factor of the opening and closing times for the built-in VIT-PN unit. Always adjust this parameter in case of the exchange of a VIT-PN unit in the anterior segment device variant. The adjustment of opening and closing times can also be carried out by the VIT test when using the anterior/posterior device variant.	100 %
VIT-PN LIMIT	Set limit for maximum cutting rate with single blade cutter.	– 3000cpm – 5000cpm
LUM-MODULE	Select installed light source. As soon as LED is selected, a new window with LED settings opens (see chapter ♦6.13.1)	– LED – HALIDE
REMOTE FAROS	Testing of remote control (only relevant for manufacturer).	– START – STOP

6.13.1 LED module

As soon as the LED module is selected in the sub-section HARDWARE, the status of the LED module is displayed.

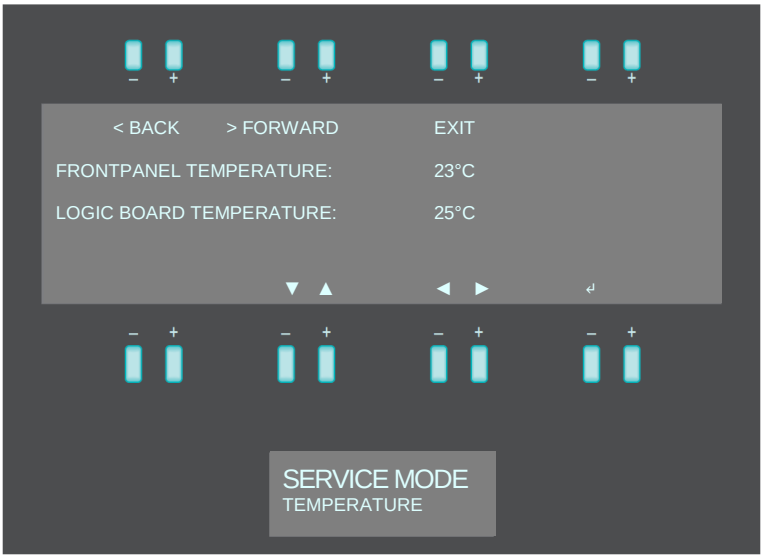


To test the functionality of the LED module, carry out the following steps:

1. Select LED-ON and confirm by pressing the enter key (↲). The LED light source is turned on.
2. Select LED-OFF and confirm by pressing the enter key (↲). The LED light source is turned off.
3. Select AUTO-TEST and confirm with the enter key (↲). An automated test of the LED light source starts.

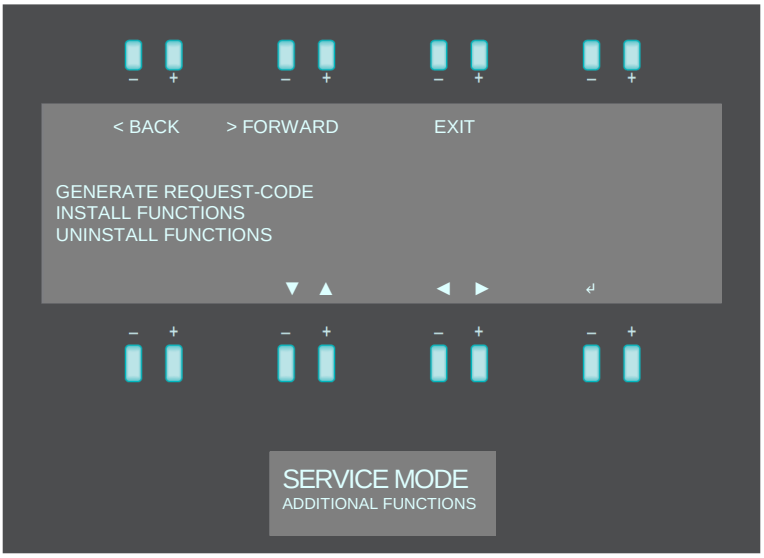
6.14 Temperature

The temperature in the device can be controlled in the sub-section TEMPERATURE.
The sensors are located on the login board and on the front panel. The temperature in the device must not exceed 55°C.



6.15 Additional functions

In the sub-section ADDITIONAL FUNCTIONS, request codes for the requirement of installation keys for additional functions can be generated. Moreover, the desired additional functions can be released using an installation key. A function that has been released can also be uninstalled again.



Generate a request code:

1. Move the cursor to <GENERATE REQUEST CODE> and press the enter key (↲).
2. Select the desired function and press the key below <GENERATE>.
3. The request code will appear on the display.
4. Insert a USB flash drive.
5. Press the button underneath <TO USB>. The request code will be stored on the USB flash drive.
6. Wait until <Data saved; Remove Memorystick> appears on the display.
7. The request code is now saved on the USB flash drive in the file <FREQCODE.BIN>.
8. Send the request code to your Oertli sales administration contact to receive the installation key.

Install additional functions:

1. Make sure that you have received the installation key from your Oertli sales administration contact. If you have received a file named FACTKEY_XXYYNNNN.BIN, save it on a USB flash drive.
2. Move the cursor to <INSTALL FUNCTIONS> press the enter key (↵).
3. Choose one of these options to install the additional function:
   a. Select <ENTER KEY> to manually type in the installation key and press the enter key (↵) to confirm. Type in the installation key with the use of the navigation keys (▲ and ▼).
   b. Select <READ KEY FROM USB> to upload the installation key from a USB flash drive and press the enter key (↵) to confirm. The installation key will be read from the USB stick and appear on the display.
4. Press the button below <INSTALL>. The installation key will be checked and, provided it is valid, installed. Otherwise <INVALID> will appear on the display.

Uninstall additional functions:

1. Move the cursor to <UNINSTALL FUNCTIONS> and press the enter key (↵).
2. Select the desired function and press the button underneath <REMOVE>.
3. Confirm uninstallation by pressing the button below <CONFIRM>.

6.16 Exit service mode

Service mode can be exited at any time by pressing the RESET button or END on the start screen of service mode.

7 Service Tool

The Service Tool only works with Faros software version 3.0.2 or higher.

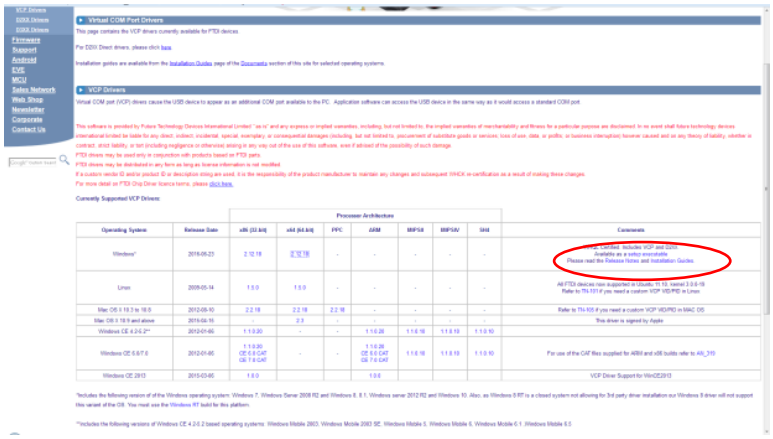
To use the service tool, the driver of the USB interface cable VX400343 must be installed once.

The following equipment is required for Service Tool:

- Laptop with Windows 7 or newer, two USB interfaces and an installed driver software (♦7.1)
- USB interface cable VX400343
- USB stick with Service Software (Oertli_Service_Tool.exe).
- Faros Device
- Pressure gauge with connection to the AIR port

7.1 Installation of the driver software

The following chapter describes the installation of the driver software required for the Oertli USB interface cable VX400343. The driver software is required for loading adjustment values onto the device. It has to be installed only once for each laptop. It is the pre-condition for using the Oertli USB interface cable VX400343.



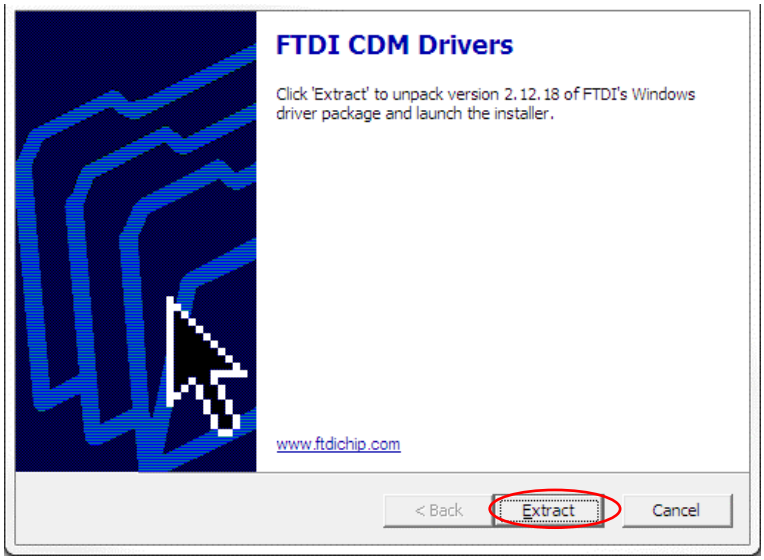
Install driver software

To perform the following steps, administrator permissions are required for the computer on which the drivers are to be installed!

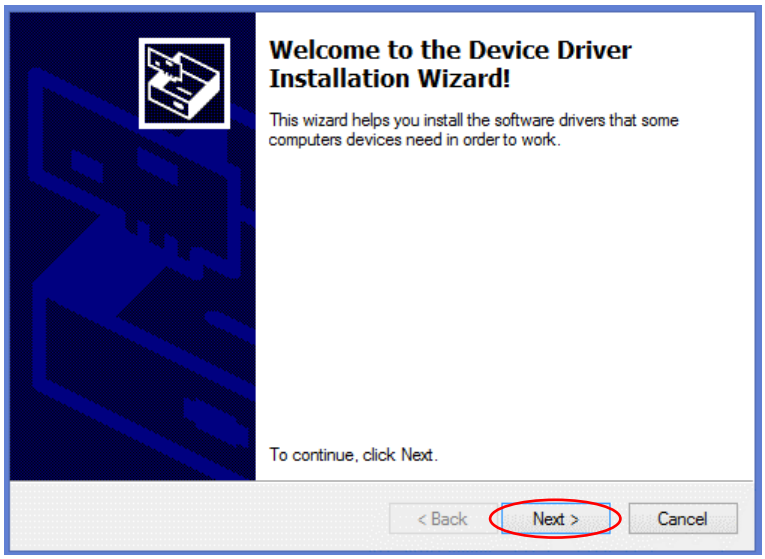
The following steps must be performed on the laptop on which the USB interface cable VX400343 will subsequently be operated.

Download the latest driver for the installed operating system and process architecture from the website from FTDI.

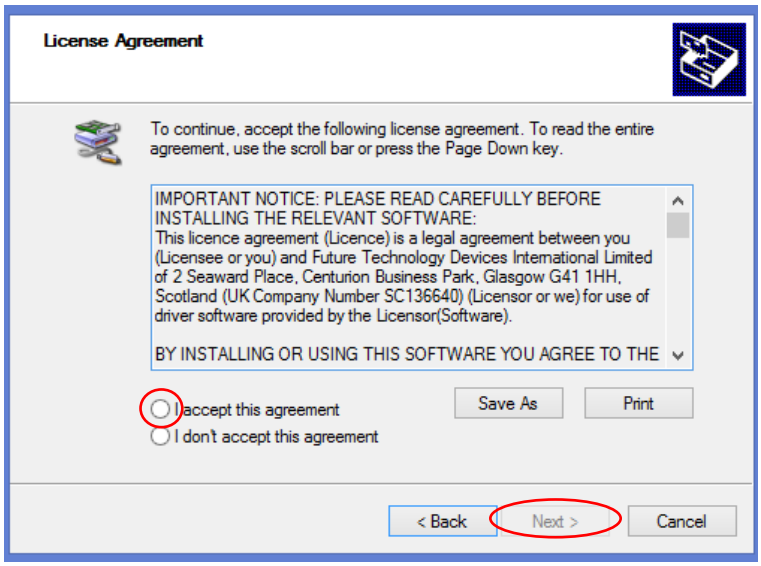
1. Call up website http://www.ftdichip.com/Drivers/VCP.htm
2. Click on the <setup executable> option in the <Comments> section.
3. Store the file locally on the laptop.
4. Unzip the file.
5. Start the setup by double-clicking on the unzipped .exe-file (CDM<Version>_Setup.exe). The following window will open up.



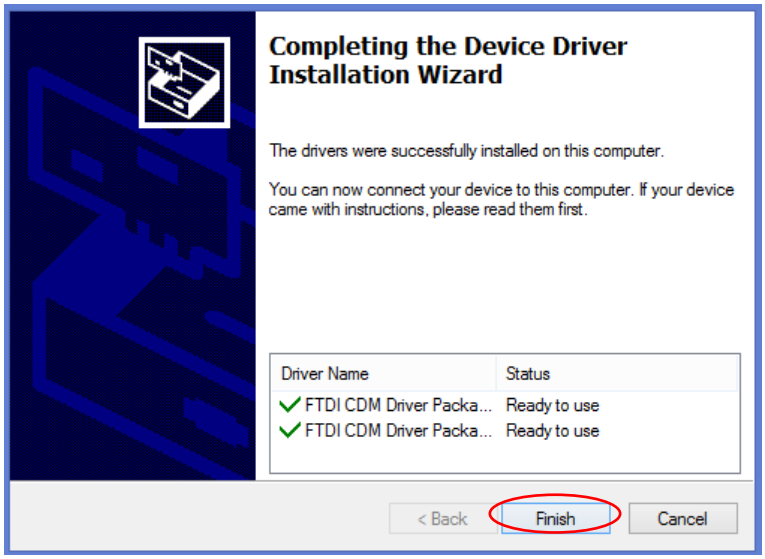
6. Click on the <Extract> button. The device operator installation assistant will appear.



7. Click on the button <Next>.

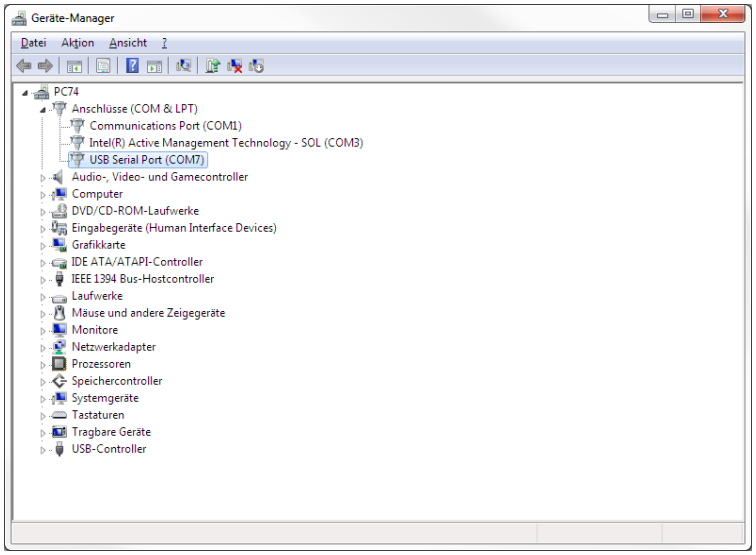


8. Agree to the licence agreement in the following dialog box and click on <Next>.



9. A successful installation is confirmed by the following window. Click on <Finish> and restart the laptop.

7.1.1 Check interface

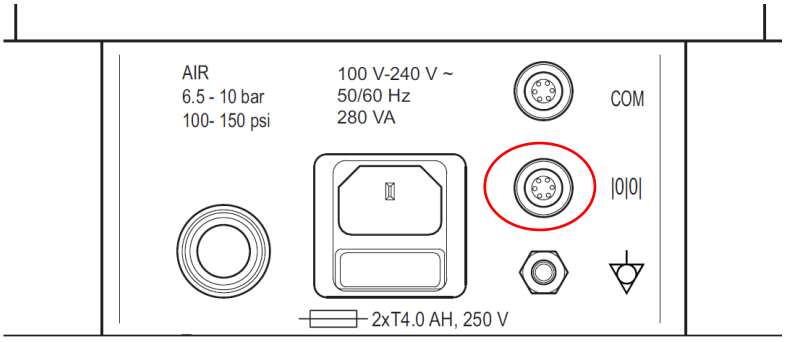


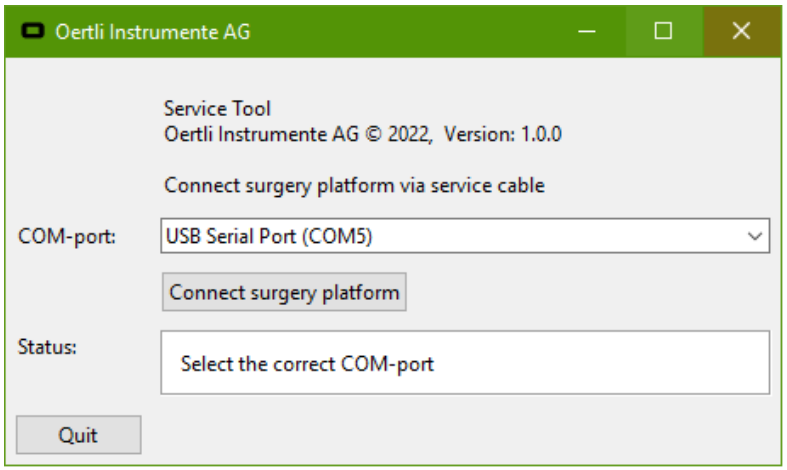
1. Connect the USB interface cable VX400343 with the laptop.
2. Start the device manager under system control / device manager.
3. Check if there is an entry <USB Serial Port (COMx)> in the <Connections (COM & LPT)> menu.
4. If you have more than one <USB Serial Port>, you can unplug the USB cable and plug it in again. In the <device manger>, this COM port will also disappear and become visible again. This way you can evaluate which is the correct COM port.

7.2 General procedure

The condition is that the driver software for the Oertli USB interface cable VX400343 (♦7.1) has previously been installed on the laptop.

The service tool software does not have to be installed. Simply copying the software onto laptop or executing it directly from the USB stick is enough.





The driver software must have been installed previously (♦7.1).

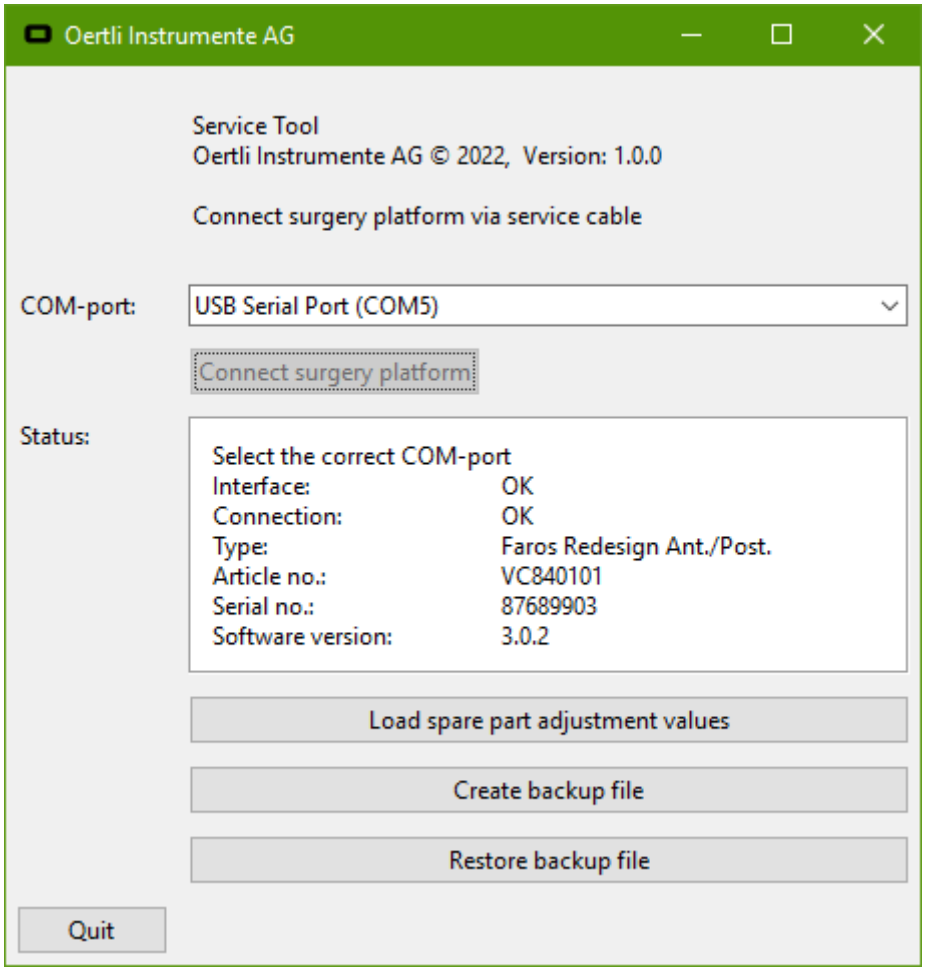
1. Connect USB interface cable with the laptop.
2. Connect the USB interface cable with the plug <I0I0I> on the CORE print.
3. Insert the USB stick with stored adjustment values into the USB port of the laptop.
4. Switch on the device.
5. Set Faros to service mode [RESET], [INJECT] + [AUX].
6. Start the service tool software. Double-click on <Oertli_Service_Tool.exe>
7. Select COM port of the USB interface cable. The correct COM port should have been selected as default already. Normally, the description of the COM port is <USB Serial Port>.
   If the correct COM port is not indicated:
   - Check if the USB interface cable has been correctly connected (after plugging it into the laptop, it may take a few seconds before the cable is correctly recognised by the operating system).
   - Restart the service tool and/or reconnect the USB interface cable into the USB port of the laptop.
8. In case of difficulties as to which port is the correct one, see ♦7.1.1.
9. Press the Button <Connect surgery platform>
   A connection with the Faros is established. The device type, serial number and software version are displayed.

7.3 Create a backup file

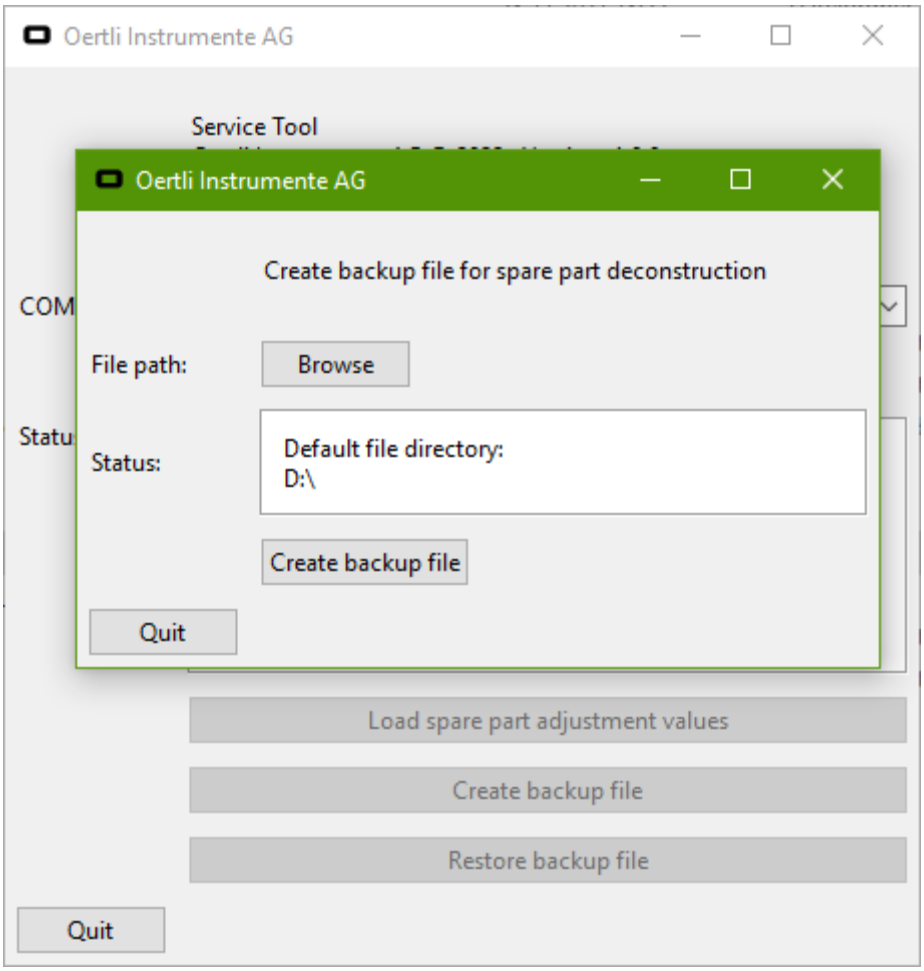
A backup file contains all the calibration values and functions of the device.
The backup file can only be loaded onto the device with which it was created.
Before changing a spare part, a backup file should be created so that a possible reconstruction with the correct adjustment values is guaranteed.

Tip:
After a successful replacement of a spare part with a passed <A) Safety check ♦14> and <B) Functional test ♦15>, a new backup should be created and stored so that the current status can always be restored.

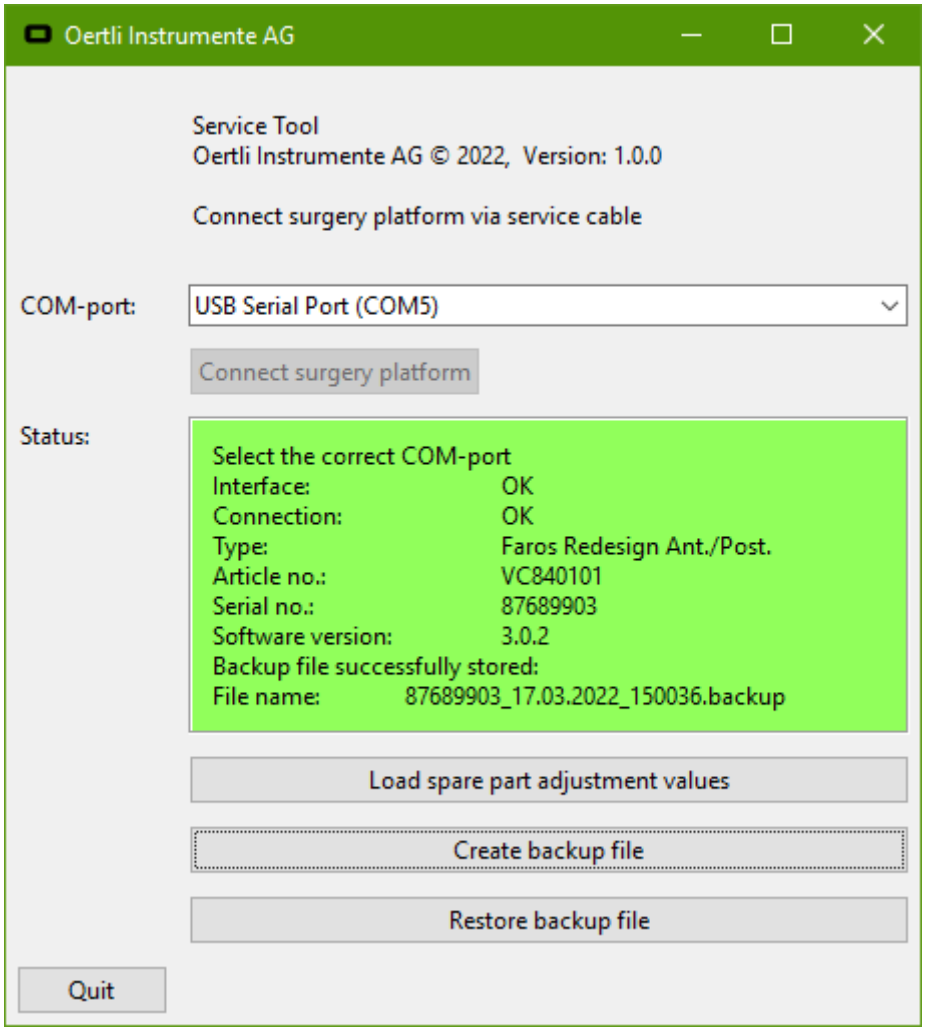
This chapter describes how to create a backup file.



1. Execute <General procedure> according to ♦7.2
2. <Create backup file>



3. The default location is always where the file <Oertli_Service_Tool.exe> is located. The storage location can be changed via <Browse>.
4. Via <Create backup file> the backup file is stored in the desired location.
5. The application runs through and the <pop-up> closes again if no error has occurred.



6. At the specified location there is now a file, the backup file, with the same name as in the bottom line (87689903_17.03.2022_ 150036.backup).
7. The tool can now be closed via <Quit> or further <actions> can be carried out.

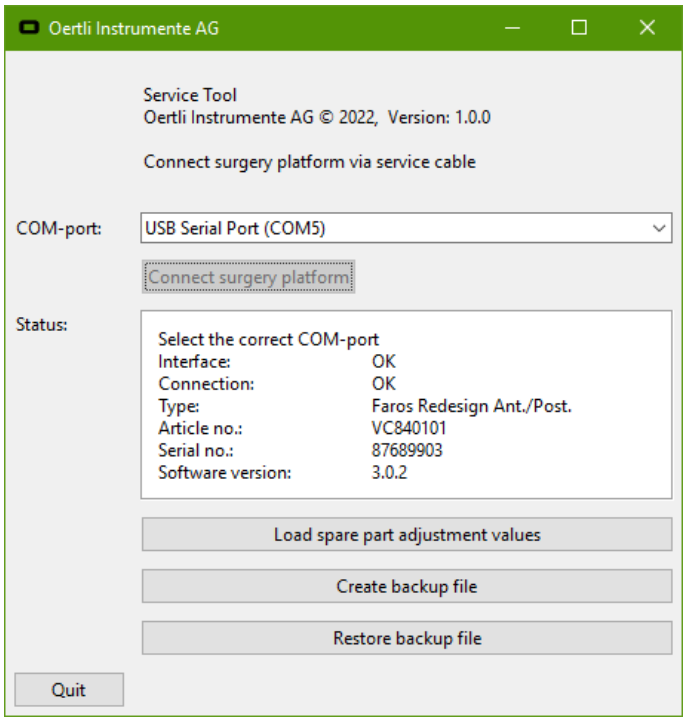
7.4 Loading of adjustment values

The spare part must be installed in the device before adjustment values can be loaded.

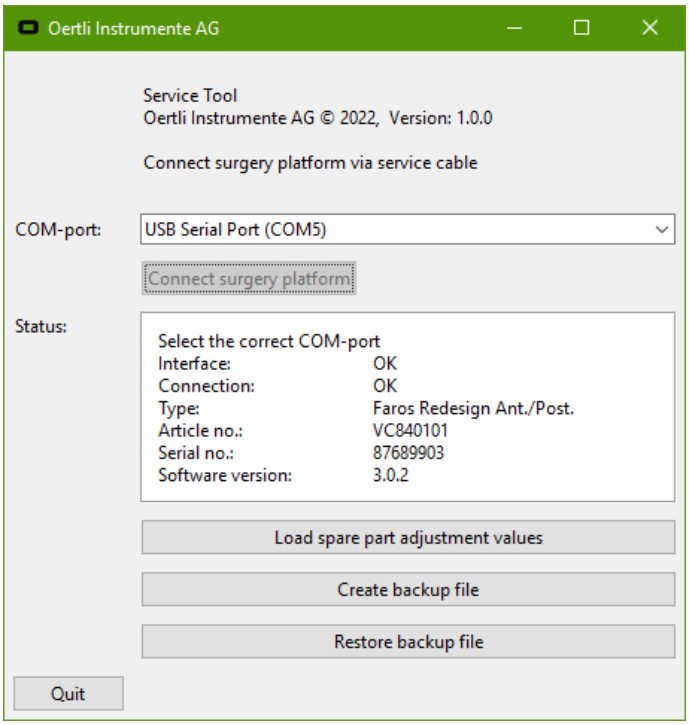
In the case of some specific spare parts, the Faros requires calibration values tuned to the relevant spare parts following completed installation. After an exchange of components, these values have to be loaded onto the device by means of an USB interface cable and a software provided for this purpose.

Important: First create a backup file according to ♦7.3 so that it is possible to rebuild the spare part and have the correct adjustment values again.

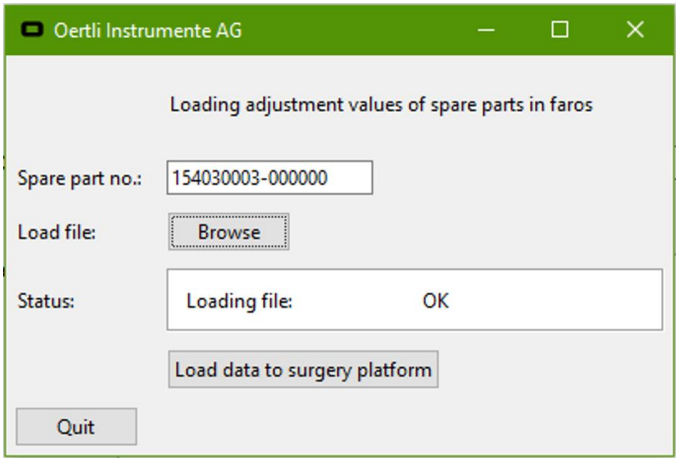
This chapter describes the procedure when loading adjustment values onto the Faros in the case of spare parts.



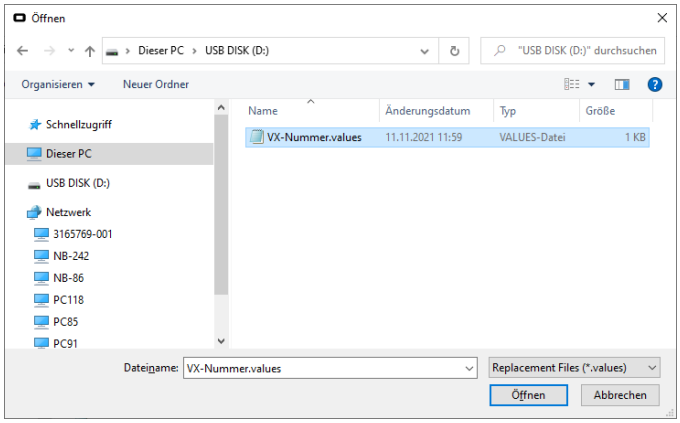
1. Execute <General Procedure> according to ♦7.2.



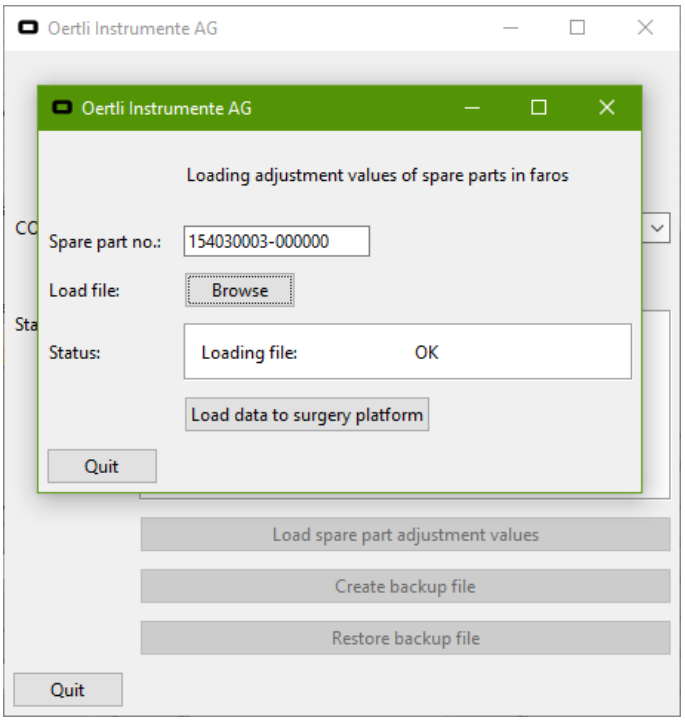
2. Press the Button <Load spare part adjustment values>. The spare part adjustment tool is started.



3. Enter the serial number of the spare part in the field <Spare part no.>. This number must be read off the spare part. Important: Enter the number including the hyphen. Example: 154030003-0000000

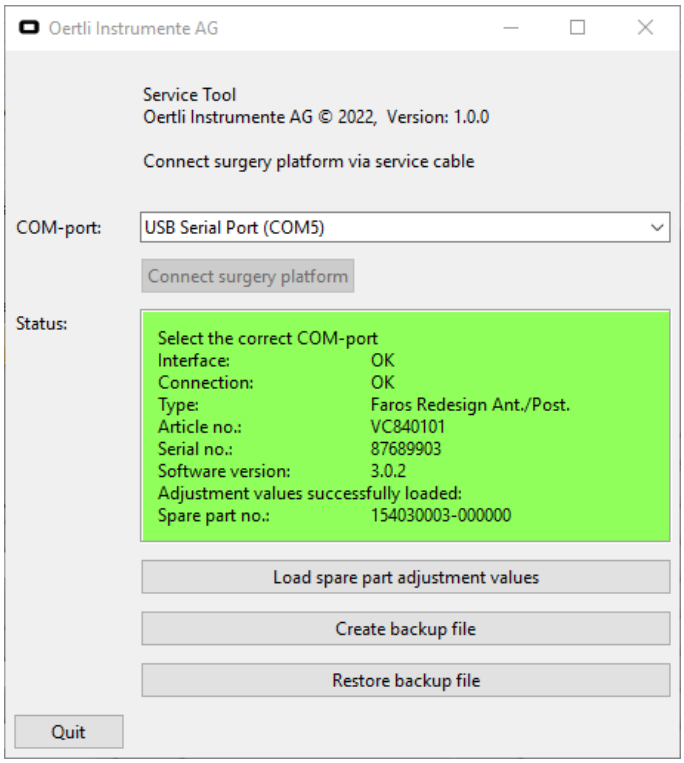


4. Load the file with the stored adjustment values by clicking the <Browse> button. Select the file <VX-Number.values> on the USB stick and press <Open>.



5. When the correct file is successfully loaded, the message <Loading file: OK> appears in the status field.

6. Load data into the device by clicking on the button <Load data to surgery platform>.

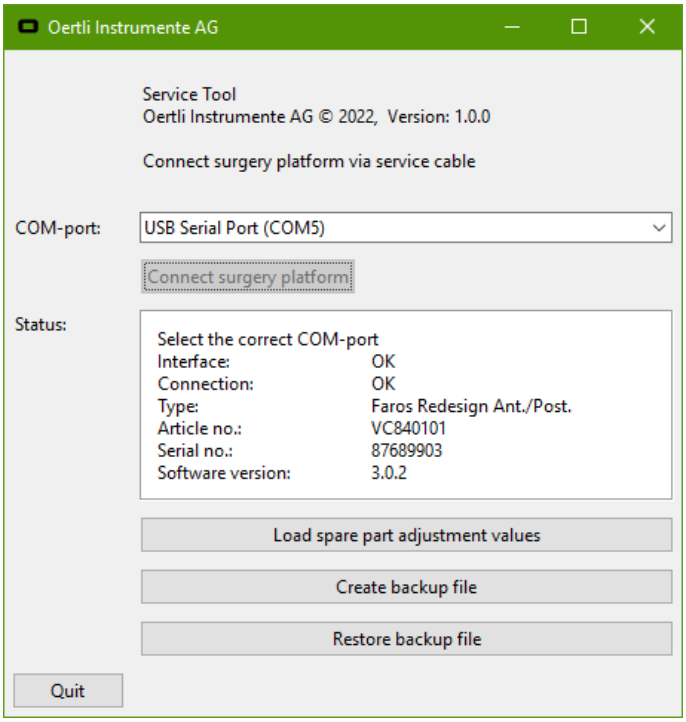


7. A successful data transfer from the laptop onto the device is confirmed by automatic closing of the spare part adjustment tool, by the message <Adjustment values successfully loaded> and additionally the green background in the status field.

8. The tool can now be closed via <Quit> or further <actions> can be carried out.

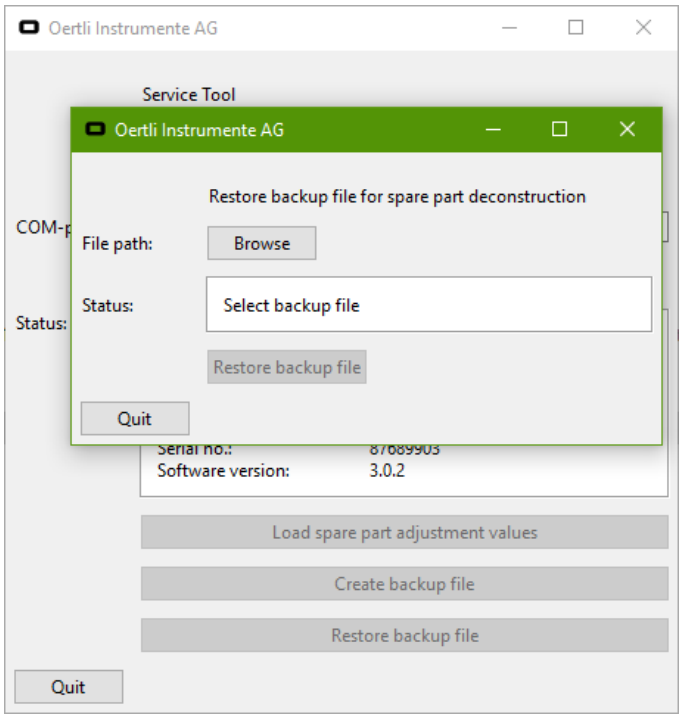
7.5 Restore a backup file

This chapter describes how to load a backup file.

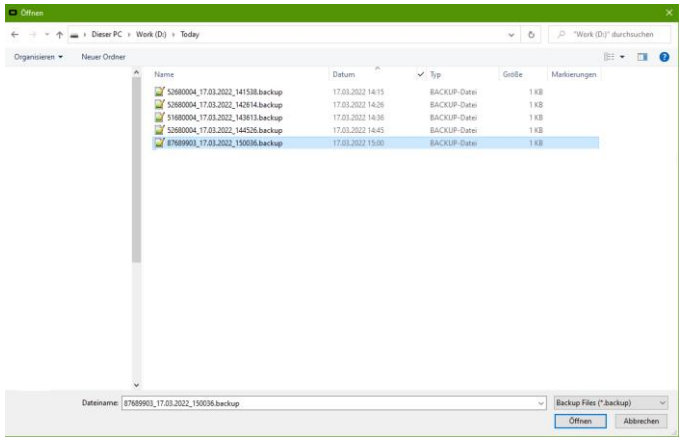


1. Execute <General procedure> according to ♦7.2.

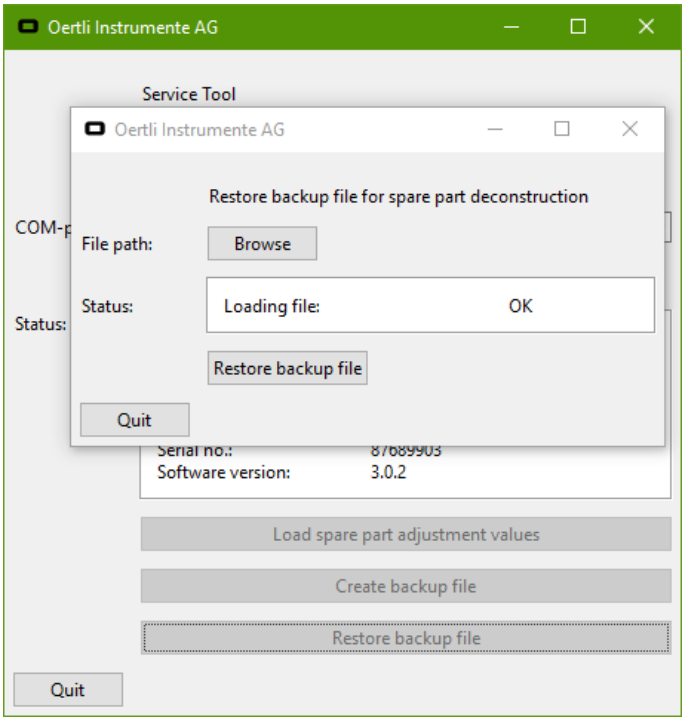
2. Press <Restore backup file>.



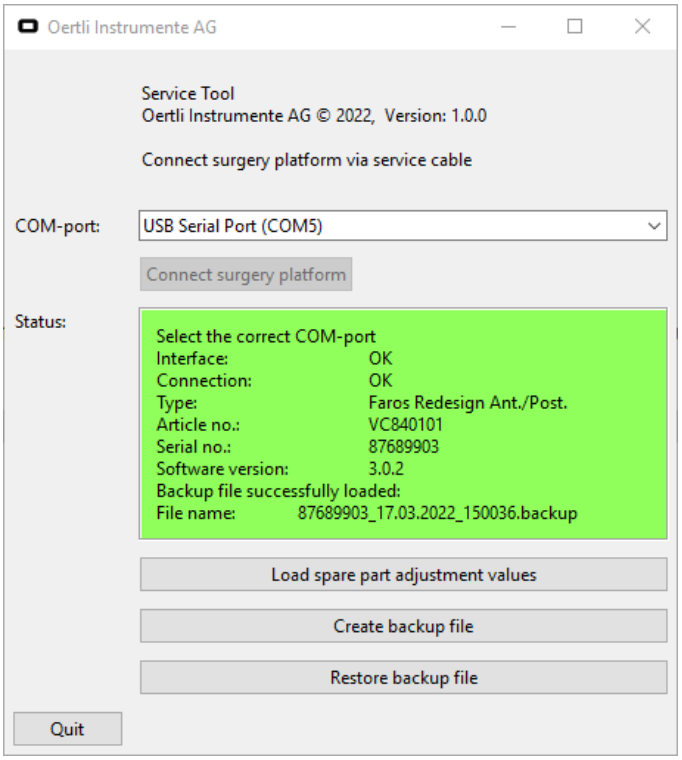
3. Press <Browse>



4. Select the desired backup file and click <Open>.



5. With <Restore backup file> the data is loaded into the device -> the application runs through and if no error was found, the pop-up closes again.



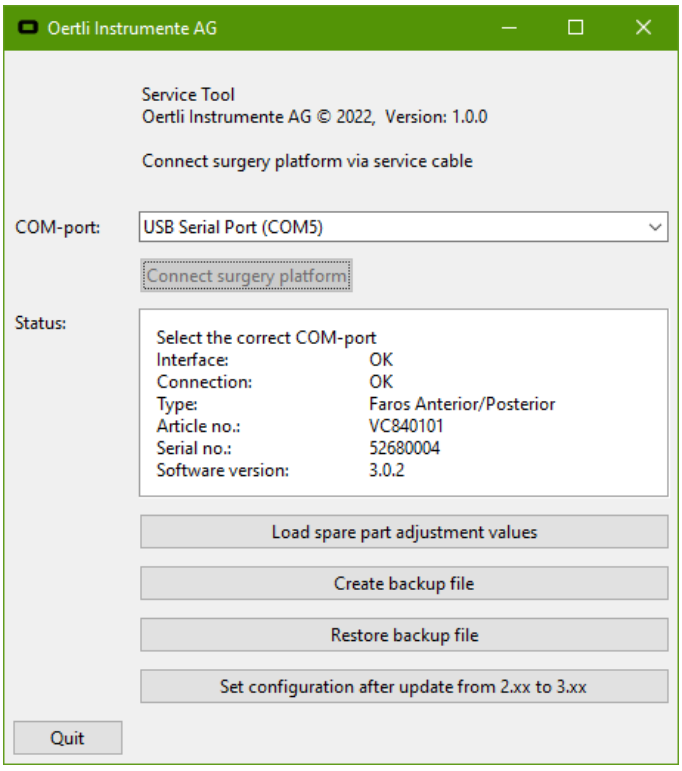
6. The tool can now be closed via <Quit> or further <actions> can be carried out.

7.6 Set configuration after update from 2.xx to 3.xx

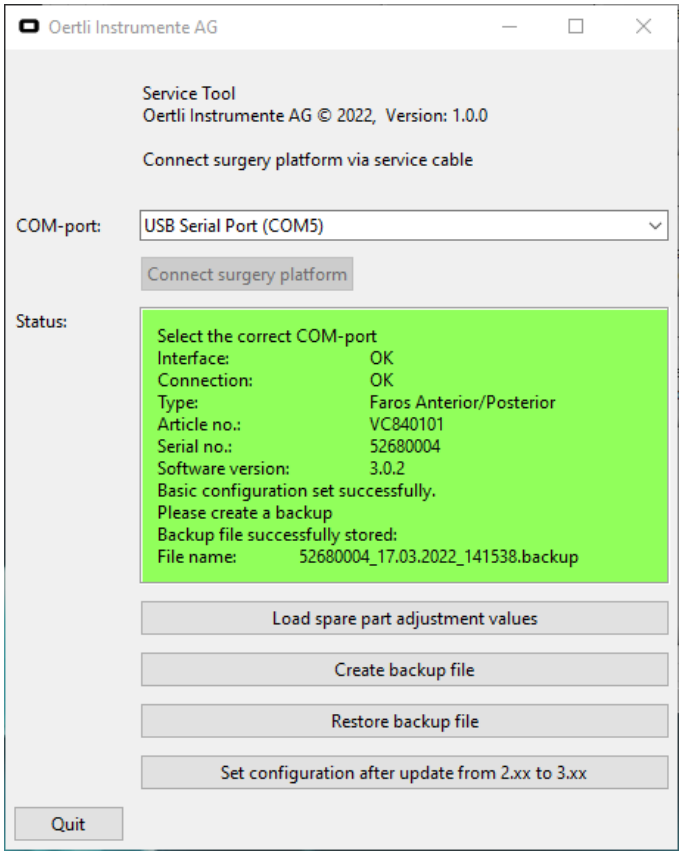
If a software update from 2.xx to 3.xx is carried out on a Faros with serial number 51... or 52..., the error message [DEVICE CONFIGURATION ERROR 27] appears on the Faros display.

With the service tool function [Set configuration after update from 2.xx to 3.xx], the Faros can be configured correctly after the software update.

This chapter describes how to set the configuration.



1. Execute <General procedure> according to ♦7.2.
2. Press <Set configuration after update from 2.xx to 3.xx>.



3.1 **Faros with serial number 51...** A pop-up appears, after approx. 15s it closes again and the service tool returns to the "main window".

3.2 **Faros with serial number 52...** A pop-up appears, after approx. 15s a new pop-up opens. Follow the instructions and calibrate the VIT-PN.

4. A request to create a backup follows, this must be created according to chapter ♦7.3.

5. A successful configuration is confirmed by the message <Basic configuration set successfully> and additionally the green background in the status field.

6. After restarting the Faro, the error [DEVICE CONFIGURATION ERROR 27] is corrected.

7.7 Trouble shooting

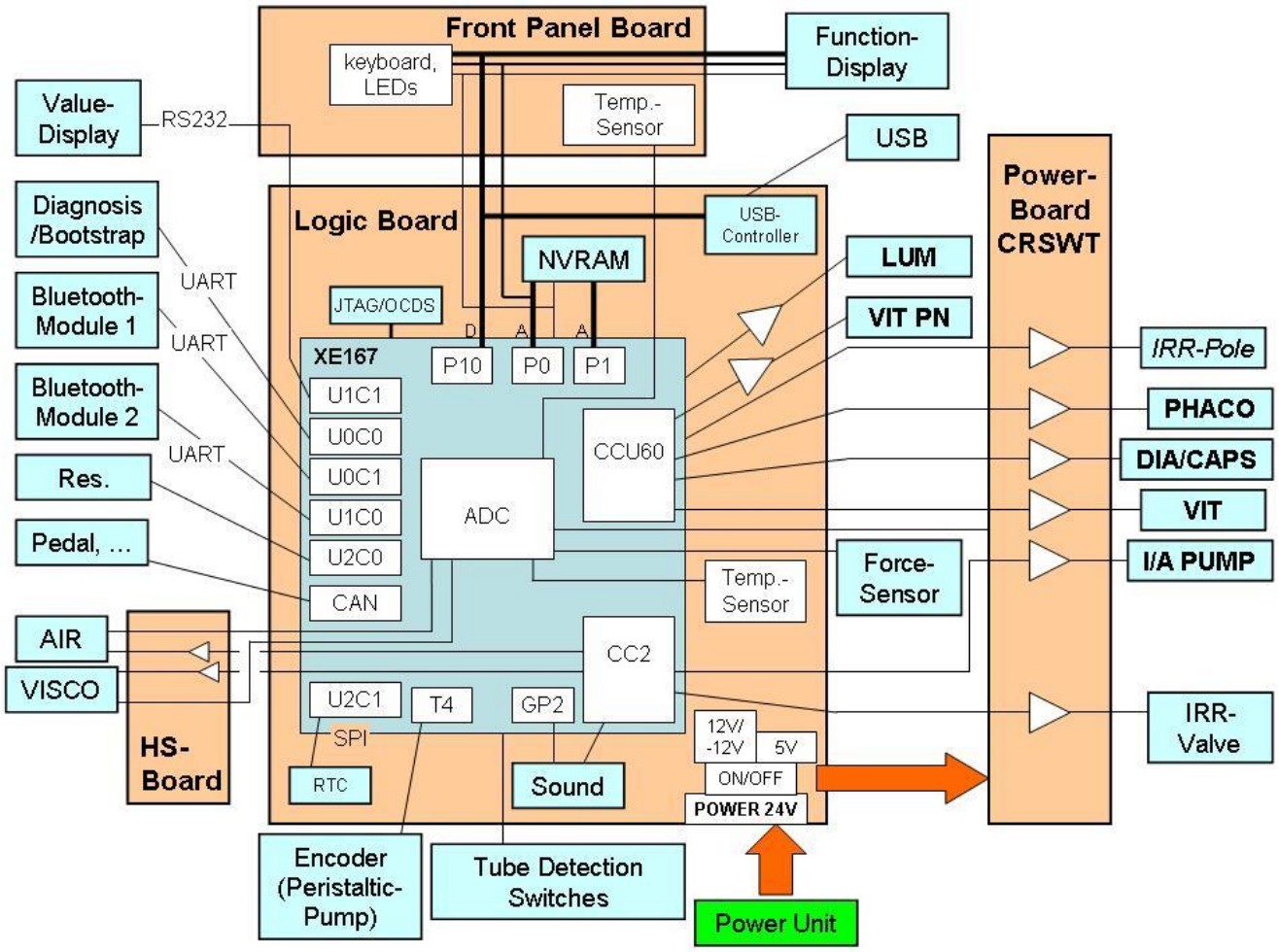
Error message	Description	Solution
Choose correct file	No or incorrect file has been selected.	Select valid file.
Loading file: FAILED	File could not be correctly loaded.	
Checksum 1: FAILED	Checksum 1 of the file is not OK (file has either been manipulated or file is corrupt).	
Checksum 2: FAILED	Checksum 2 of the file is not OK (file has either been manipulated or file is corrupt).	
File format: FAILED	File format of the file does not correspond with file format required by the tool.	Use the correct version of the tool.
Values: FAILED	For the values in the file, there is no counterpart in the script.	Error in the tool. Check tool version. If need be, request for tool again at Oertli Instrumente AG.
Serial number: FAILED	Serial number entered does not correspond with the number in the file.	Enter correct serial number (e.g. 84660001-010101 including the hyphen).
Could not open port	Serial interface could not be started.	Select correct COM port (normally <USB Serial Port>) If correct COM port does not occur in the list, close tool, check USB interface cable and restart tool.
Surgery platform not answering	There is no response from the device.	Connect the device correctly with the USB interface cable and switch the device on. Set Faros to service mode [RESET], [INJECT] + [AUX].
Writing serial number: FAILED	Error occurred when writing the serial number into the device.	Try to load data onto the device again. In the case of repeated failure, there may be a defect on the CORE print. Contact Support at Oertli Instrumente AG.
Writing data: FAILED	Error occurred when writing the adjustment data into the device.	
Checking data: FAILED	Faulty calibration data on the device.	
Calibrating offset: FAILED	Only concerns the fluidics spare part: Offset could not be calibrated. Either error in communication or calibration value outside tolerance range.	Connect required equipment as described in the tool and start tool again.
Calibrating gain: FAILED	Only concerns the fluidics spare part: Gain could not be calibrated. Either error in communication or calibration value outside tolerance range.	Connect required equipment as described in the tool and start tool again.
Spare part not defined	For this spare part, there is no counterpart in the tool.	Use correct version of the tool.
File stored: FAILED	Cannot save the backup file.	Most likely, your user does not have write access to the specified path. Choose a different storage location.

General assistance:

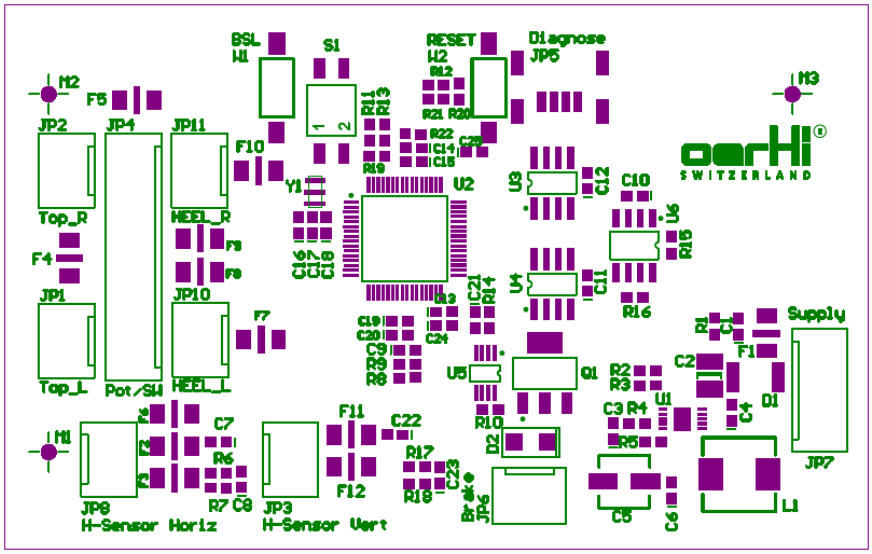
1. Try to perform the action again
1. Check that the USB connection is correctly connected.
2. Check that the Faros is in service mode [RESET], [INJECT] + [AUX].
3. Close the Service Tool and restart it (if the Service Tool does not close, use the Task Manager to close it).
4. Disconnect the Faros from the power supply and reconnect it.
5. Check the air pressure at the Faros air connection.

8 Device composition

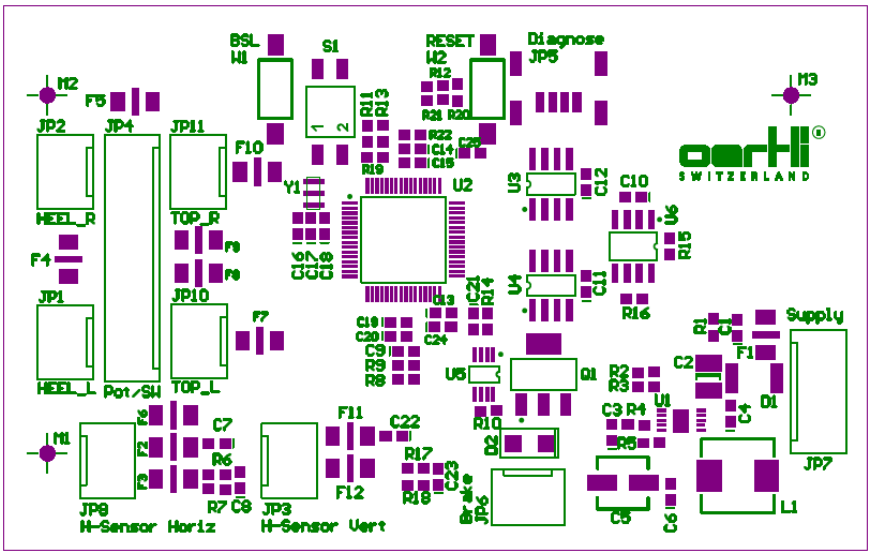
8.1 Block diagram



8.2 Pedal PCB (VE830011)

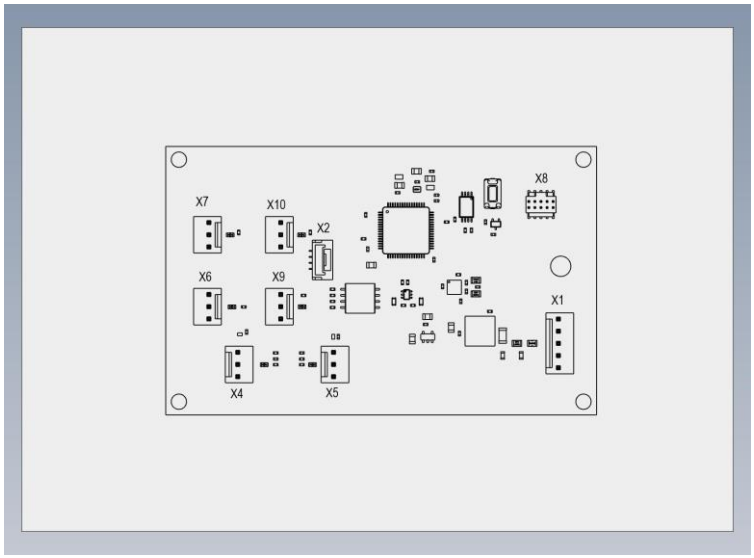


Index C



Index D

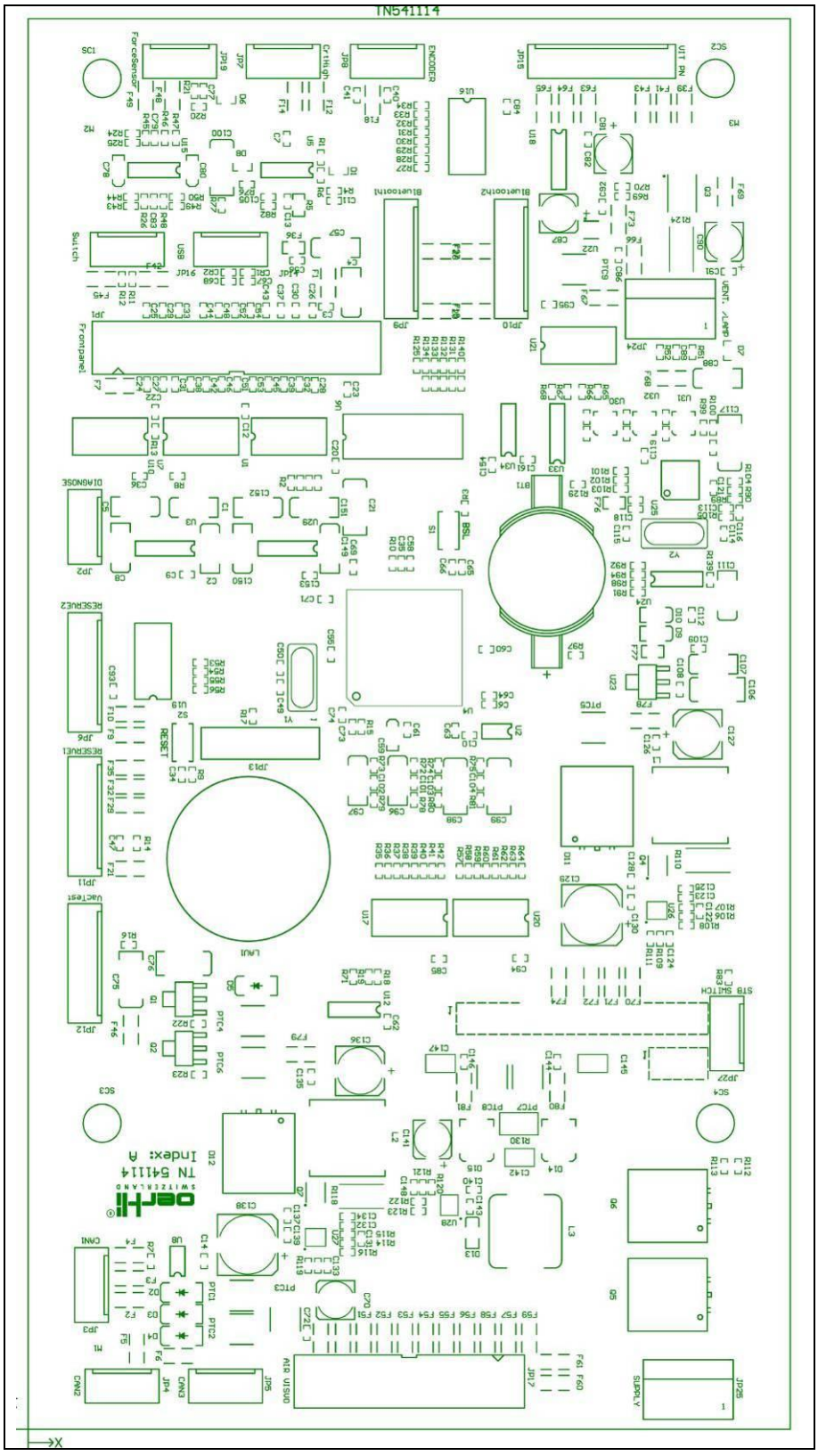
Number	Abbreviation	Function
JP1	Heel_L	Switch in carrying handle, heel left
JP2	Heel_R	Switch in carrying handle, heel right
JP3	H Sensor	vertical angle sensor, left and right directional switch
JP4	Pot/software	Remains open
JP5	Diagnosis	RS232 interface: Remains open (only for manufacturer)
JP6	Brake	Remains open
JP7	Supply	CAN, +24V of the OS3 Base Unit
JP8	H Sensor	horizontal angle sensor
JP10	Top_L	Switch in carrying handle, top left
JP11	Top_R	Switch in carrying handle, top right



Index A

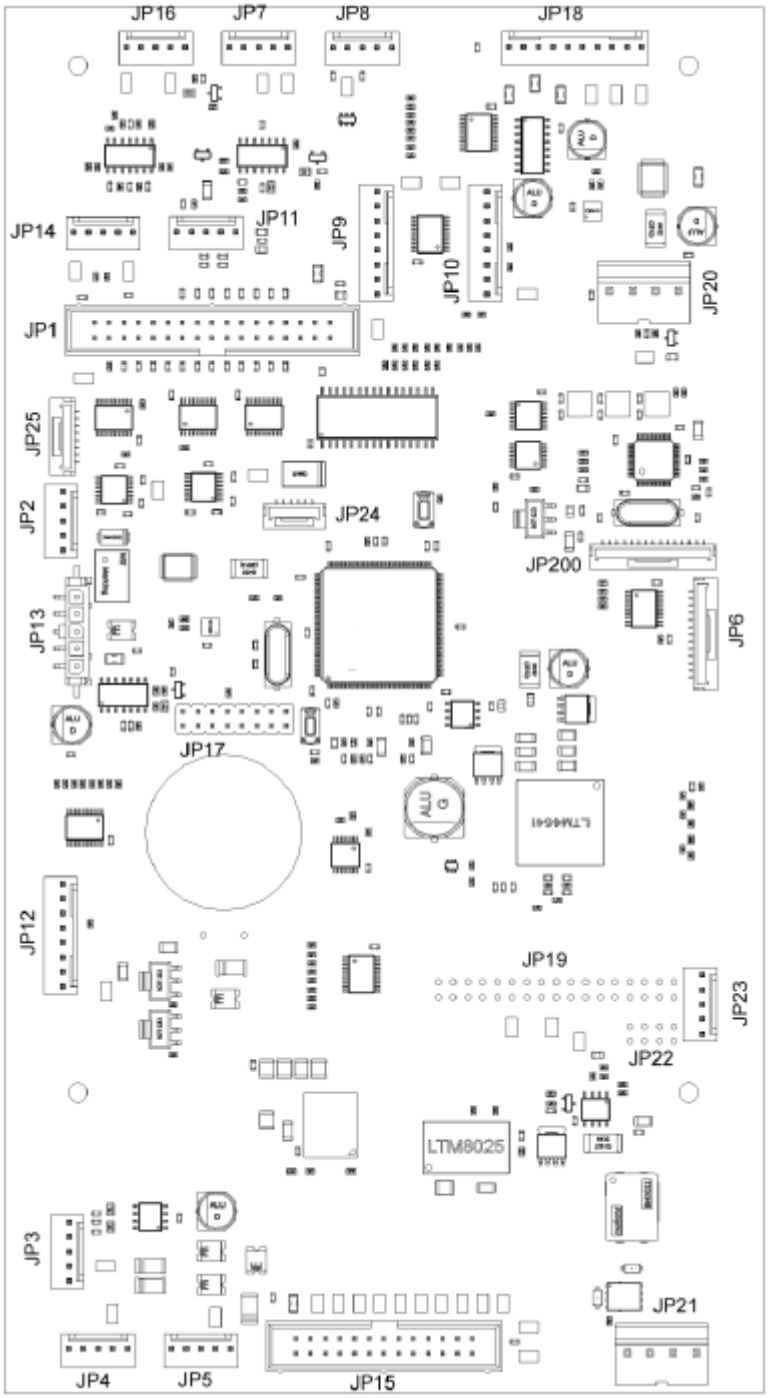
From	To
X1	Pedal Cable
X2	-
X3	-
X4	Horizontal sensor
X5	Vertical sensor
X6	Heel switch left
X7	Heel switch right
X8	-
X9	Top switch left
X10	Top switch right

8.3 Logic PCB



Connections:

JP1:	Front panel PCB
JP2:	Diagnosis
JP3:	CAN1
JP4:	CAN2
JP5:	CAN3
JP6:	Reserve 2
JP7:	Poti rod drive
JP8:	Pump encoder
JP9:	Bluetooth module 1
JP10:	Bluetooth module 2
JP11:	Reserve 1
JP12:	VacTest
JP13:	Empty
JP14:	USB
JP15:	Vit-PN module
JP16:	Tube detector
JP17:	Air-Visco module
JP19:	Force sensor
JP24:	Lamp
JP25:	Feed
JP27:	On-off switch / LED


JP16
JP7
JP8
JP18
JP14
JP11
JP9
JP10
JP20
JP1
JP25
JP2
JP24
JP200
JP13
JP6
JP17
JP12
JP19
JP23
JP22
LTM8025
JP3
JP21
JP4
JP5
JP15

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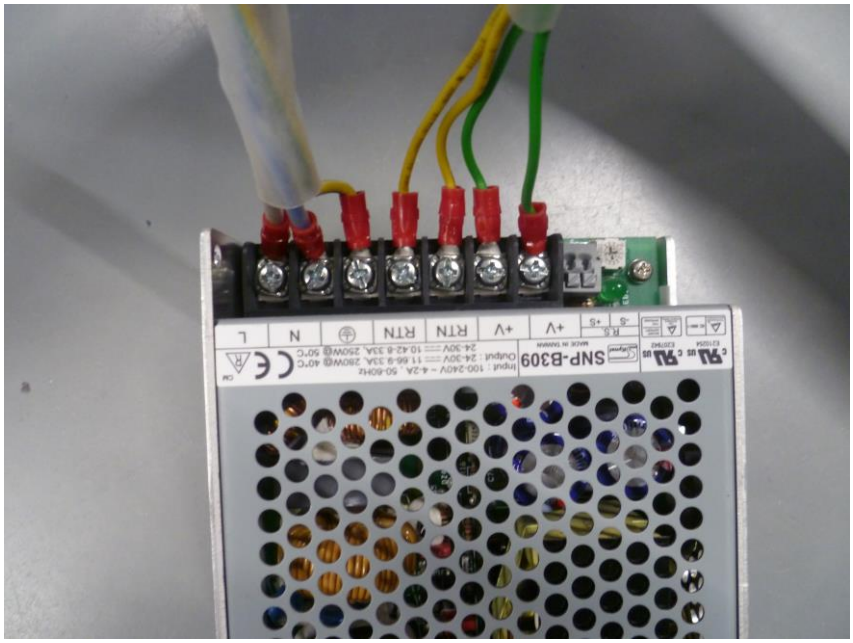
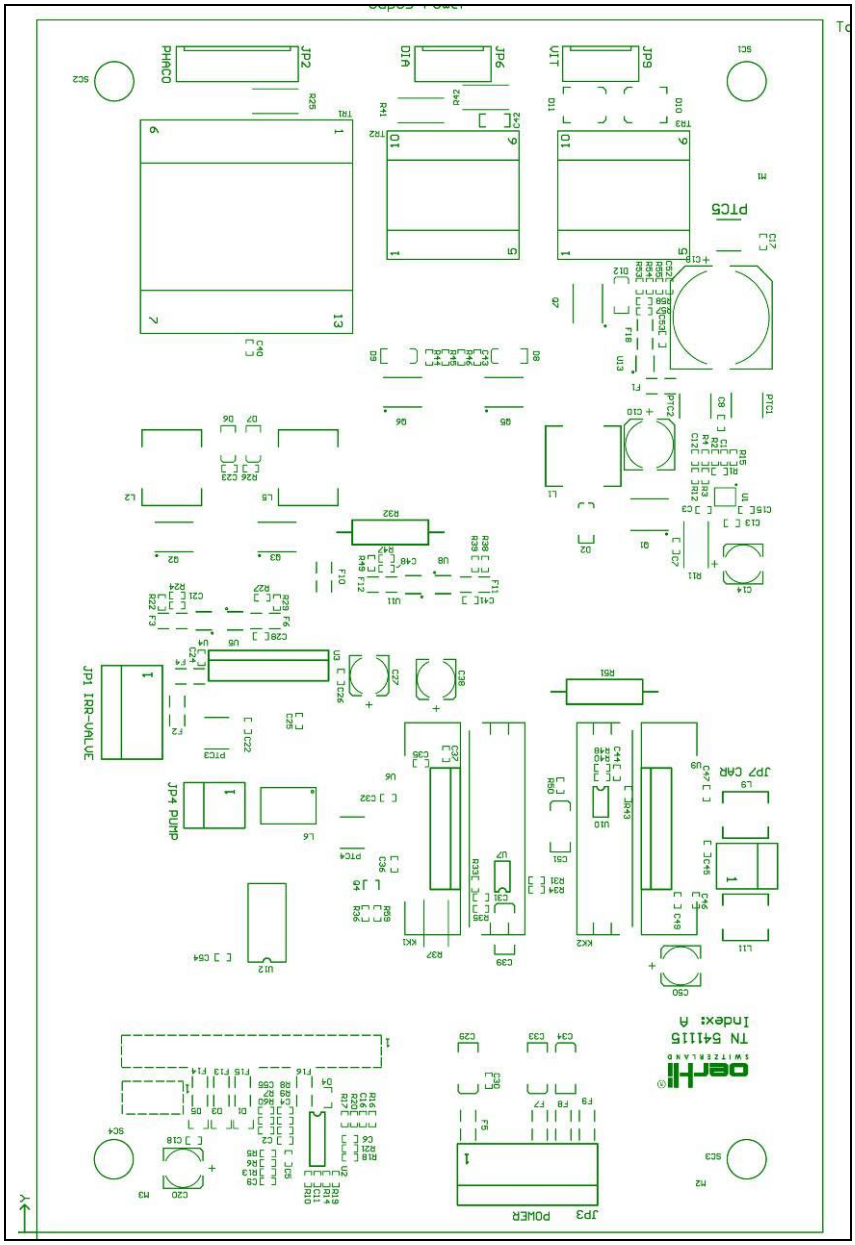
8.4 Power Supply



Pos.	Abbr.	Colour
V+	GN	Green
V+	GN	Green
RTN	YE	Yellow
RTN	YE	Yellow
Ground Symbol	GN/YE	Green/Yellow
N	BU	Blue
L	BN	Blue

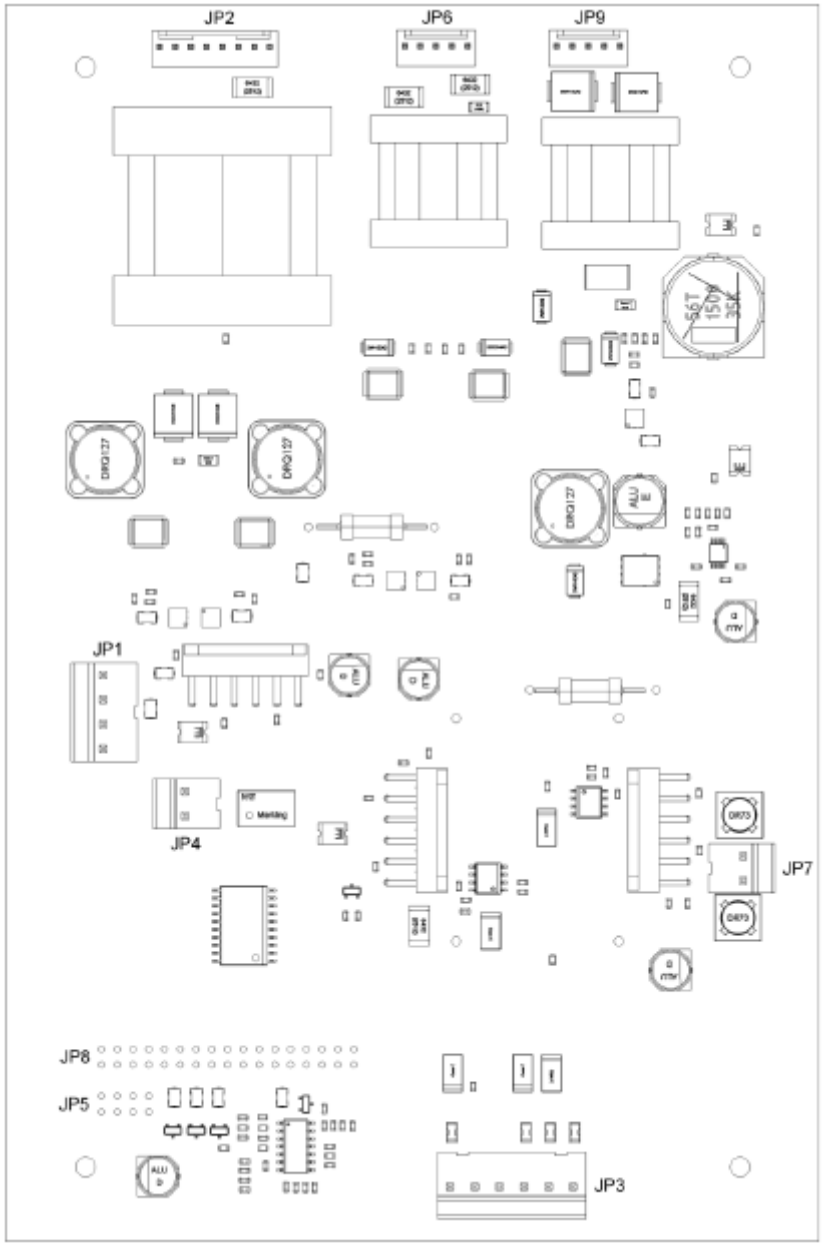
Colour abbreviations according to IEC 60757.

8.5 Power PCB



Connections:

JP1: Irrigation valve
JP2: Phaco
JP3: Power
JP4: Pump
JP6: Dia
JP7: Rod drive
JP9: Electric Vit



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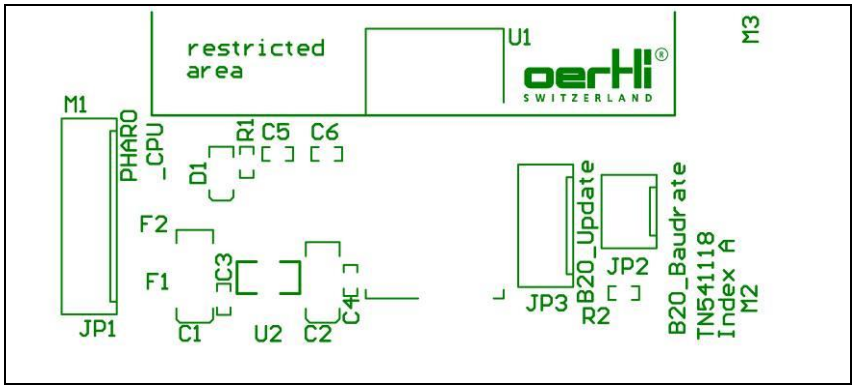
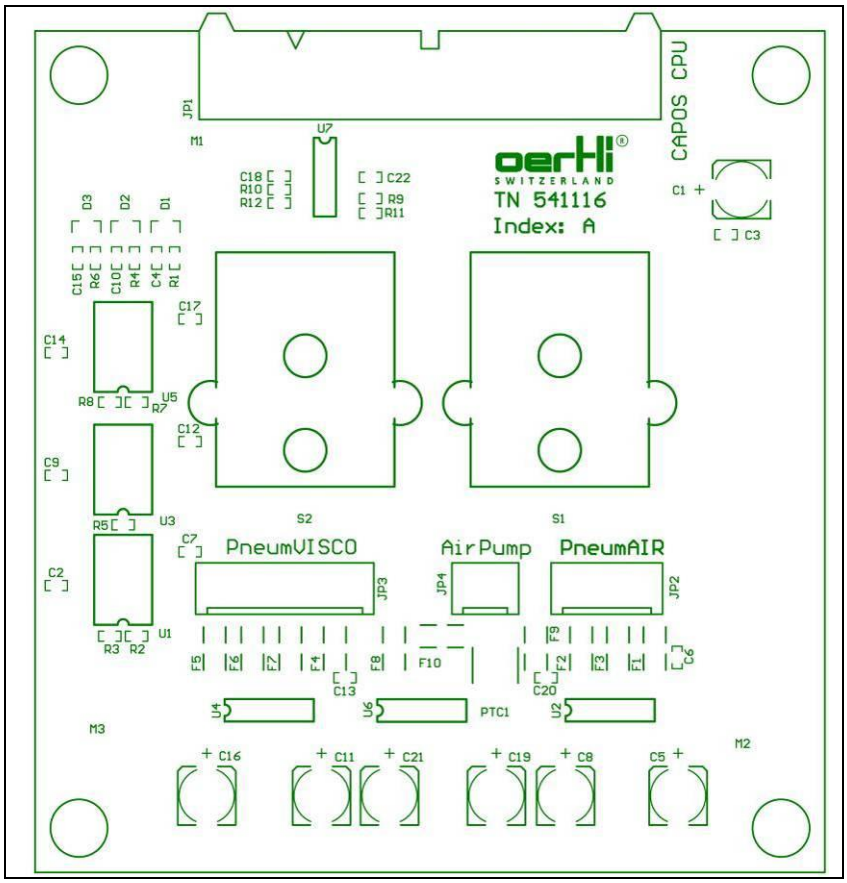
8.6 Bluetooth PCB



Connections:

JP1: Connection to logic PCB
JP2: Empty
JP3: Empty

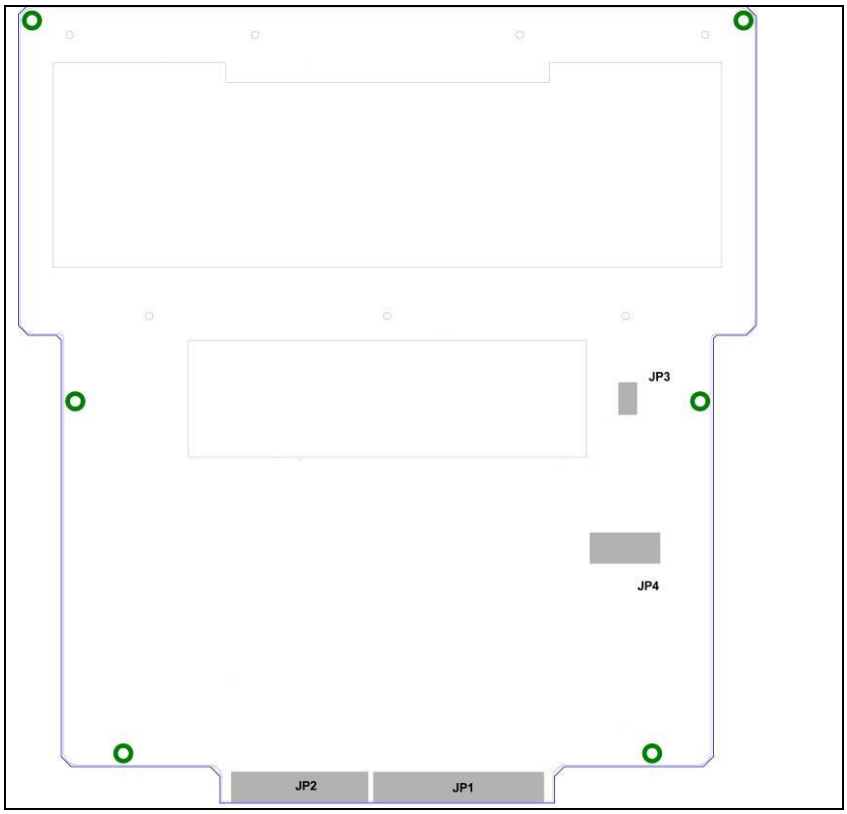
8.7 Air-Visco PCB



Connections:

JP1: Connection to logic PCB
JP2: AIR module valves
JP3: VISCO unit
JP4: AIR module pump

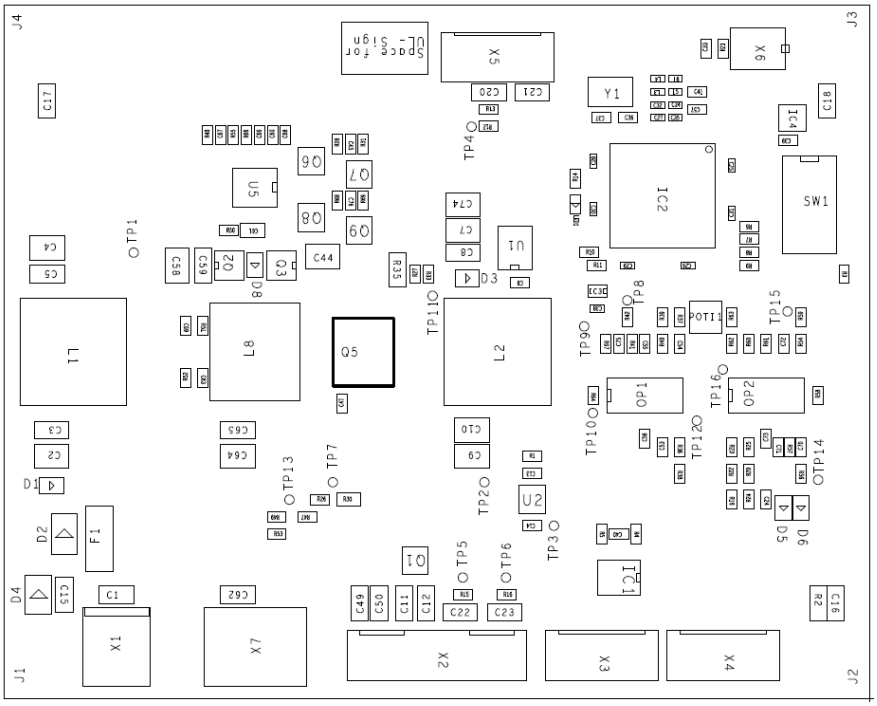
8.8 Front Panel PCB



Connections:

JP1: Connection to logic PCB
JP2: Function display signal
JP3: Function display feed
JP4: Value display

8.9 (Power) LED Control PCB



Connections:

X1: Connection to logic PCB
X2: Connection to LED module
X3: CAN
X4: CAN
X5: Connection to potentiometer
X6: Reserve
X7: Connection to cooling

9 Installing and uninstalling of device components

DANGER!
Electric shock.
Danger to life or serious injury.
► Carry out a visual inspection of the earth connections after each repair according to ♦14 to end.

WARNING!
Repair not performed correctly.
Risk of reversible eye damage to the patient.
► A function test must be performed after each repair according to ♦15 to end.

Confirm activities performed on the device on the report sheet according to ♦15.

NOTE!
Incorrect handling of the Würth plugs.
Plugs can be damaged.
► Slightly lift the locking tab during unplugging.
► When unplugging, pull on the plug and not on the cable.
► When unplugging and plugging in, do not tilt the plug sideways.

NOTE!
Faulty plug connections.
Malfunction or destruction of the device.
► Perform a visual inspection of plugs and cables according to ♦8.

NOTE!

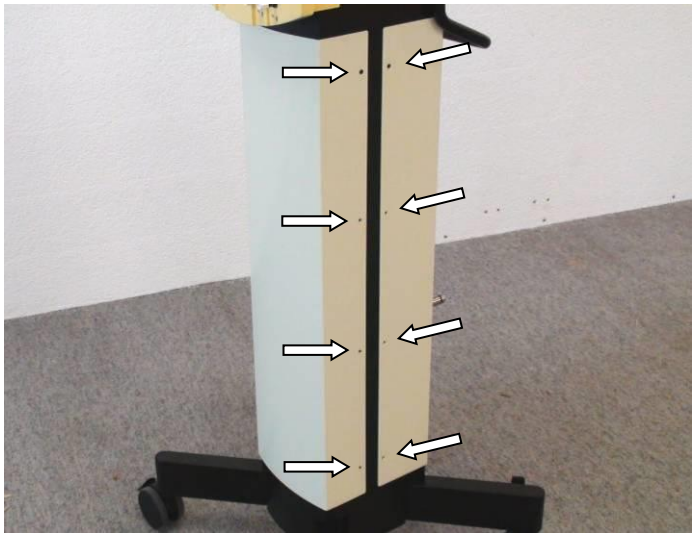
NVRAM data not saved.

NVRAM data is lost, therefore limited device repair.

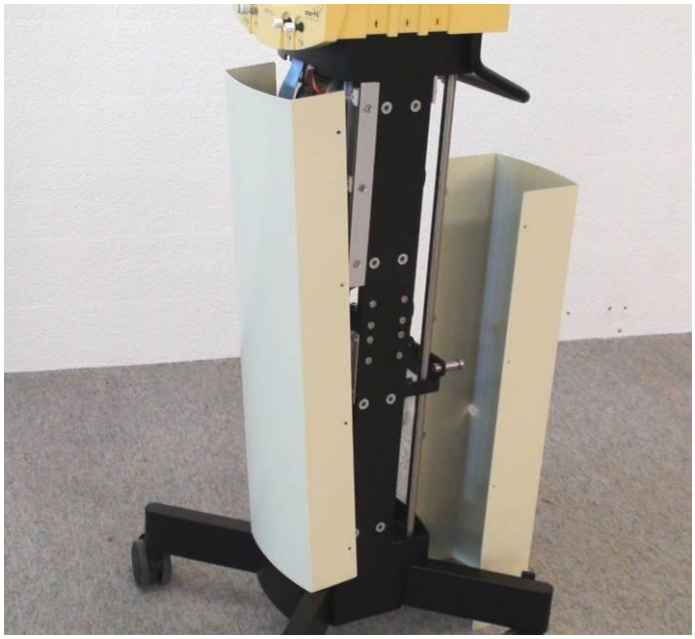
► NVRAM data must be backed up before and after each repair according to ♦7.3.

The installation of components is done in the reverse order of their deinstallation. Each respective section specifically indicates any points which are important to observe.

9.1 Housing

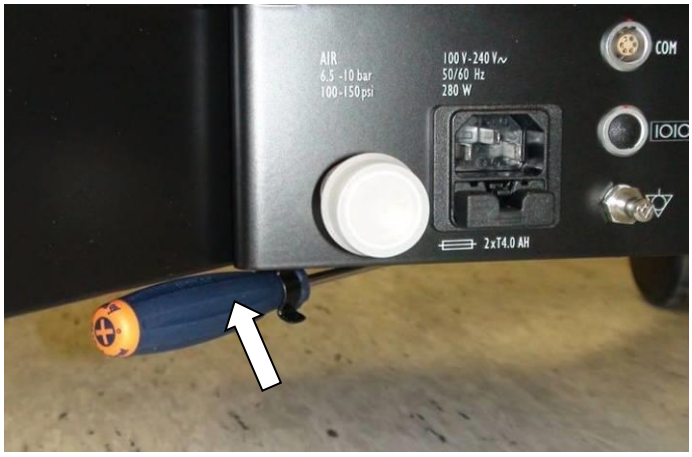


1. Unscrew the eight screws on the front and rear covering plate.

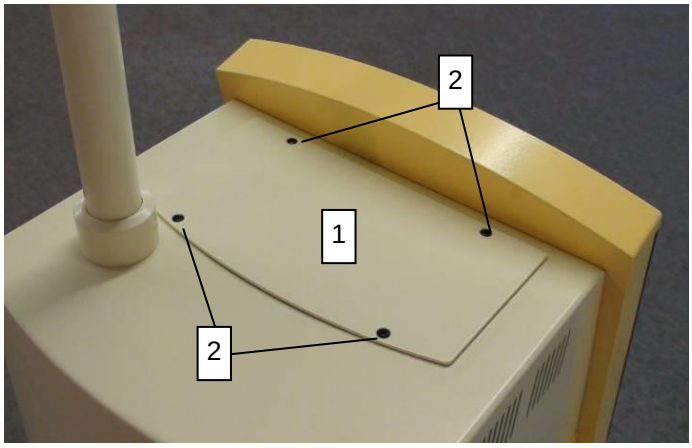


2. Remove the covering plates to the front and rear.

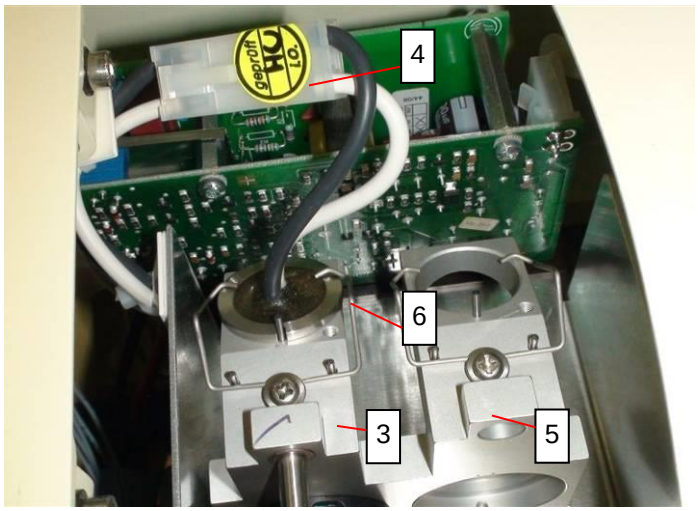
9.2 Lamp (halide only)



1. Take screwdriver out of the holder.

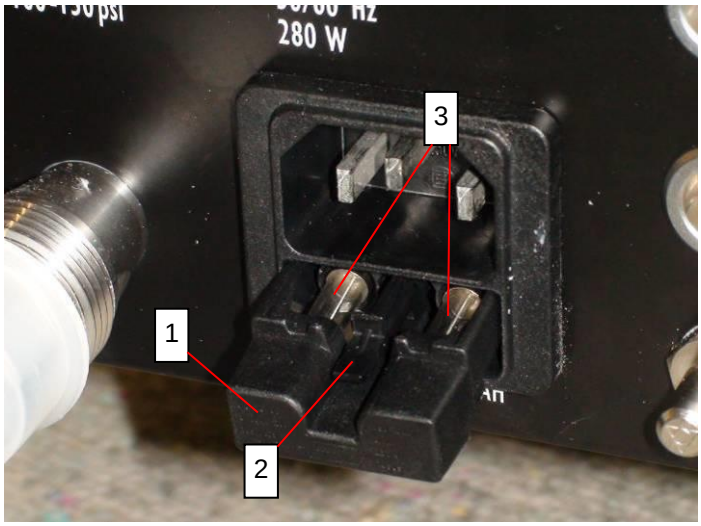


2. Unscrew the light cover [1]; unscrew these screws [2] to do this.
3. Remove the cover and seal.



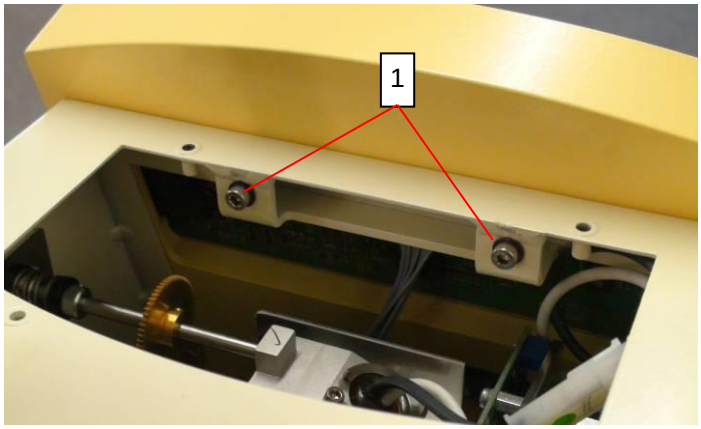
4. Bend back the holder [6] so that the lamp is unrestricted.
5. Unplug lamp [4] and pull it out of the holder [3]. Dispose of the bulb.
6. Insert spare lamp into the holder and plug in.
7. Fix the lamp with the holder.
8. Replace the cover and the seal and screw on.
9. Order a reserve light and place it into the reserve holder as soon as possible.

9.3 Fuses

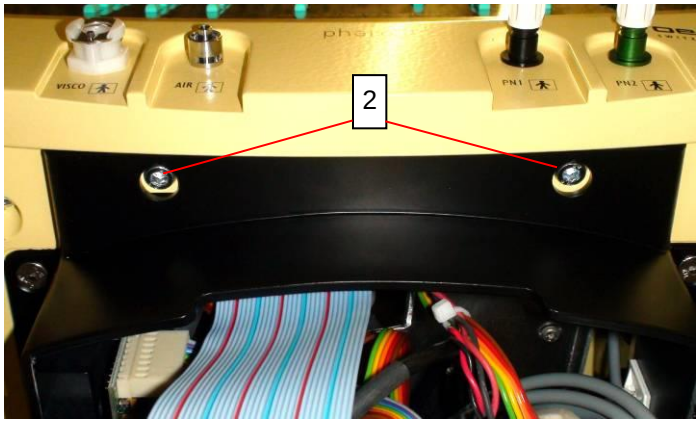


1. Take out the fuse drawer [1]. To do this, press down on the lug [2] at the top of the drawer.
2. Replace defective fuses [3] with new ones of the same kind. The technical information for the fuses is printed on the device underneath the power socket.
3. Insert the fuse drawer and plug in the power cable.

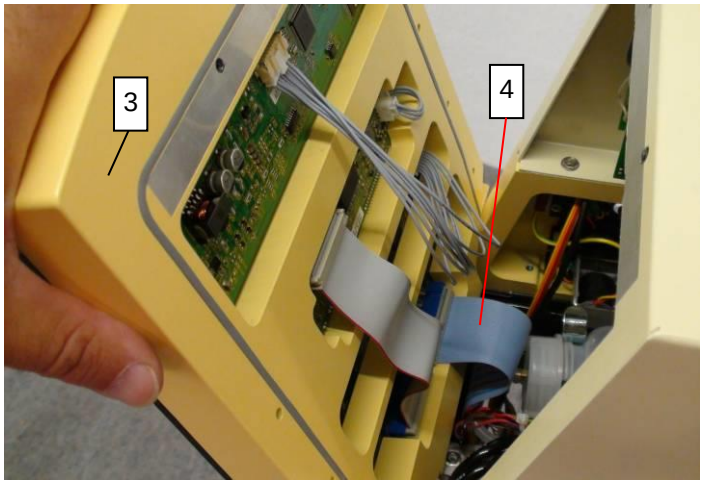
9.4 Front Panel (version with top lid)



1. Remove the four screws on the light cover.
2. Remove the cover and seal.
3. Unscrew the screws [1]. The screws cannot be lost because they are permanently fastened.



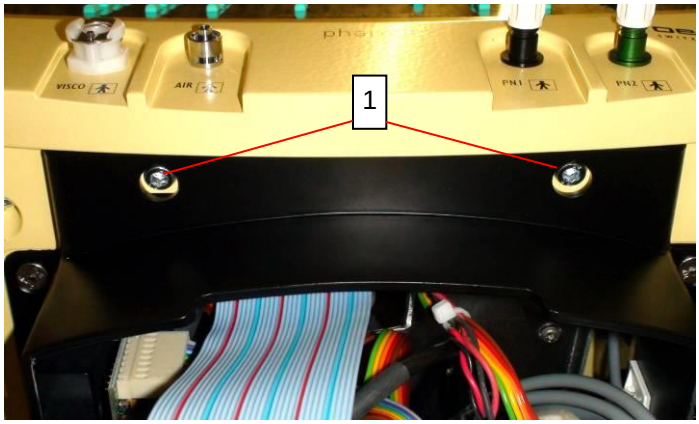
4. Remove screws [2].



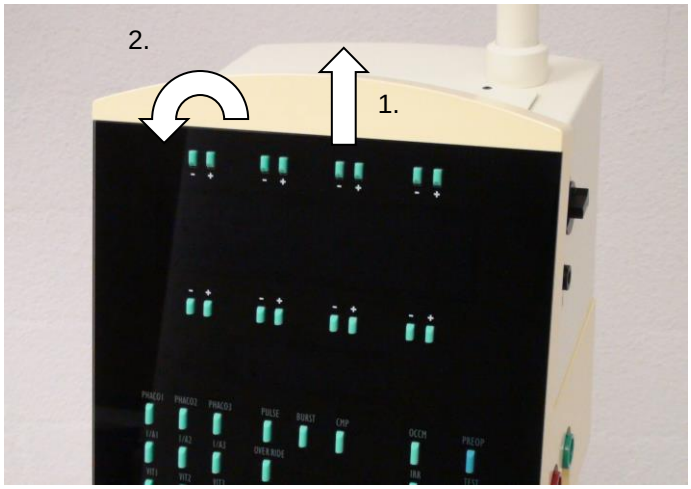
5. Slightly incline the front plate [3] forwards. The connection cable [4] to the PCB can be removed (the wider of the two ribbon cables).

6. Take the front plate out of the lower holder.

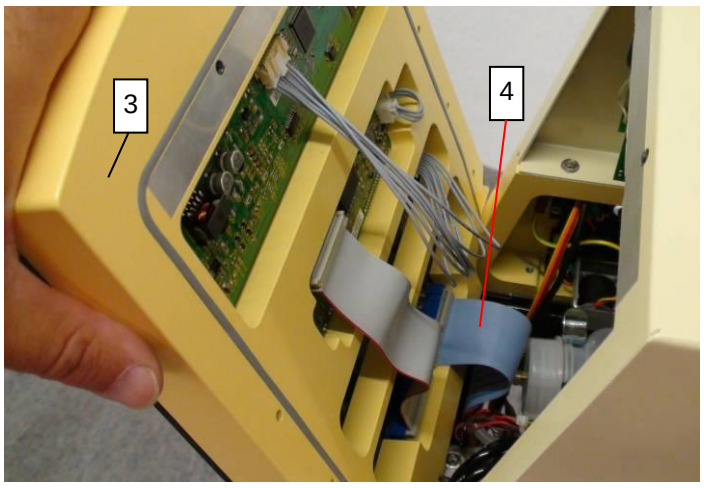
9.5 Front Panel (version without top lid)



1. Remove screws [1].



2. Pull front panel to the top, then push lightly to the front.

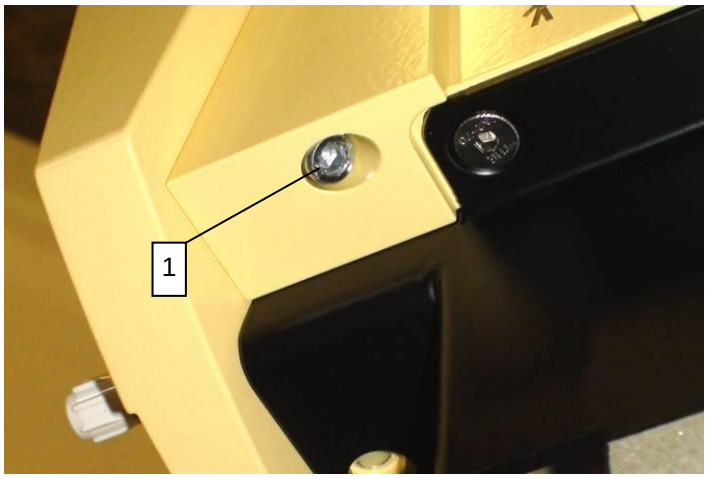


3. Slightly incline the front plate [3] forwards. The connection cable [4] to the PCB can be removed (the wider of the two ribbon cables).

4. Take the front plate out of the lower holder.

9.6 Front Cover

Only applies to the anterior segment version. Refer to <VIT-PN Module> for the posterior segment version.

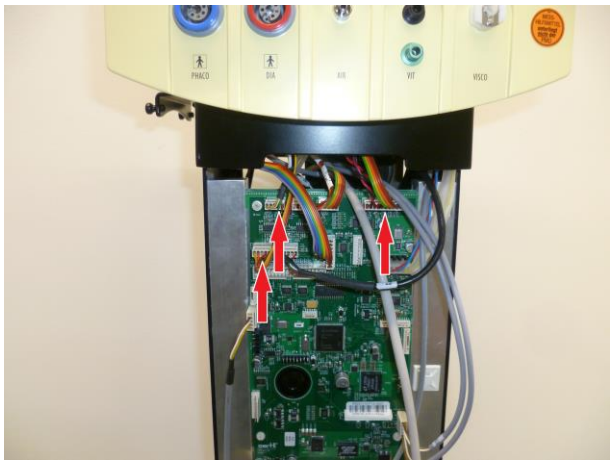


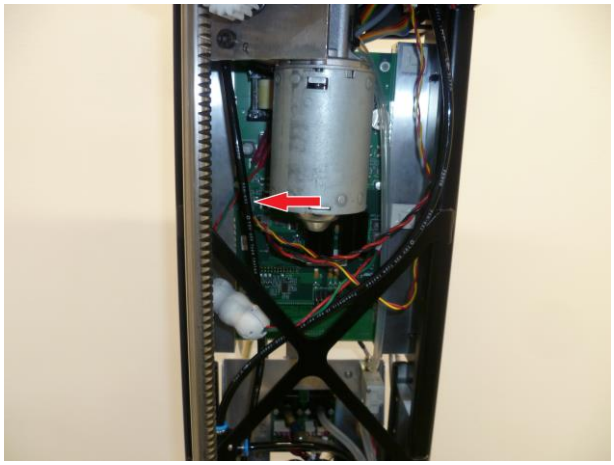
1. Remove the screws [1] on both sides.
2. The front cover can be taken off.

Take care that the seal stays in its correct position when putting this together again.

9.7 Coupling plate

VX541168A



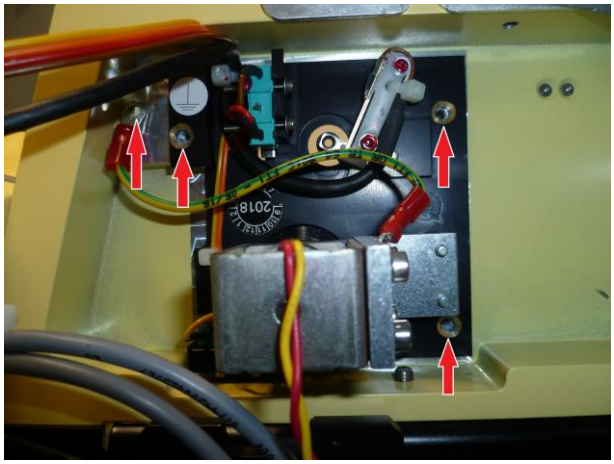


Step 1:

1. Remove housing according to ♦9.1.
2. Remove display according to ♦9.4 or ♦9.5.
3. Remove cable.

Step 2:

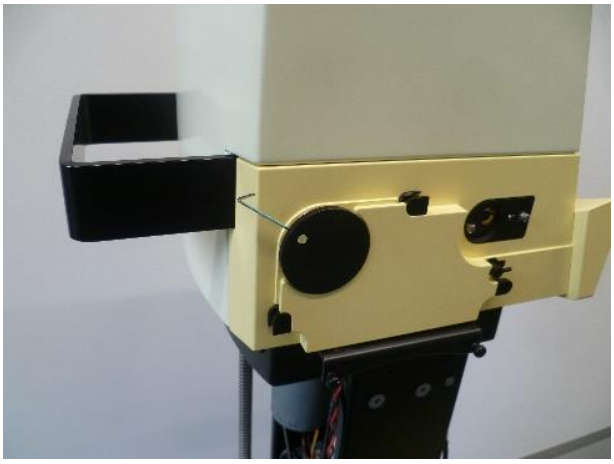
4. Remove the VIT-PN unit.



Step 3:

5. Remove the coupling plate.
6. Reinstall in reverse order.

9.8 Pump Wheel



Step 1:

1. Turn the pump wheel until the stud points to the side.
2. Unscrew stud with Allen wrench.

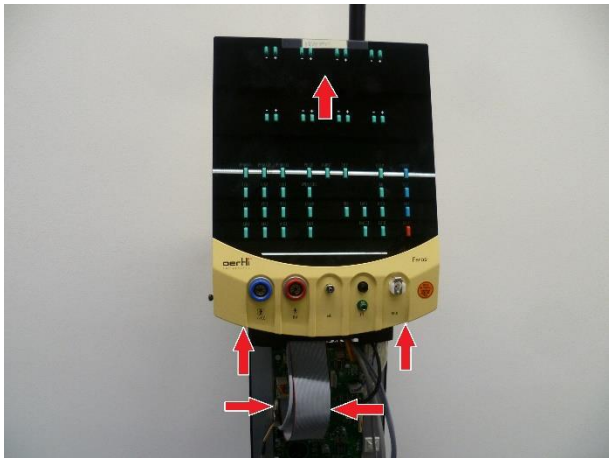
Before removing the Pump wheel, apply heat to the middle of the wheel and heat it up between 70° and 90° for a smooth removal.

3. Remove pump wheel.
4. Attach pump wheel with pump rollers to motor axis.
5. Attach pump wheel with stud and secure with Loctite 243.

NOTE!
Pump wheel touches the frame Malfunction of the peristaltic system.

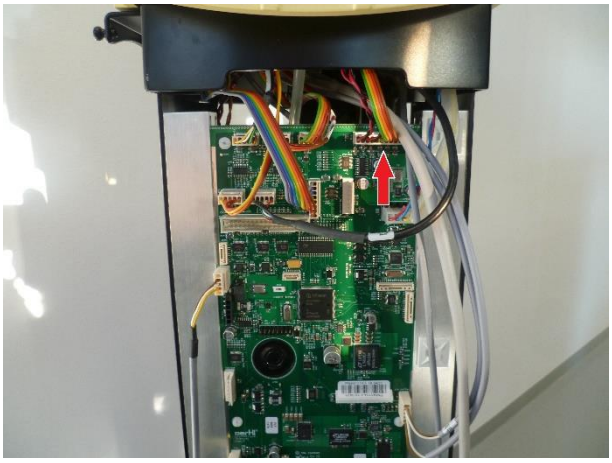
► The distance between the pump rollers and the front frame must be set to 0.2 mm!

9.9 Pump Motor



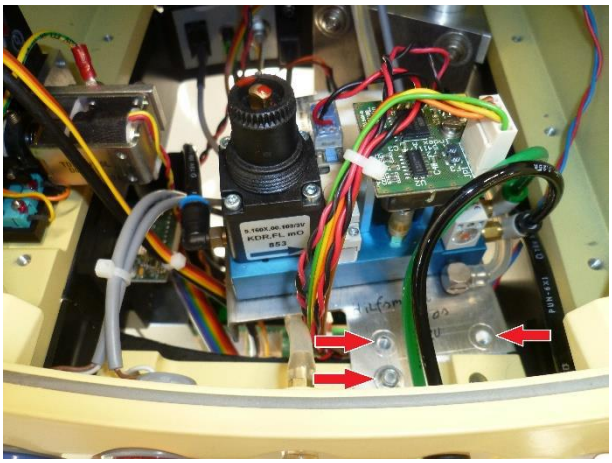
Step 1:

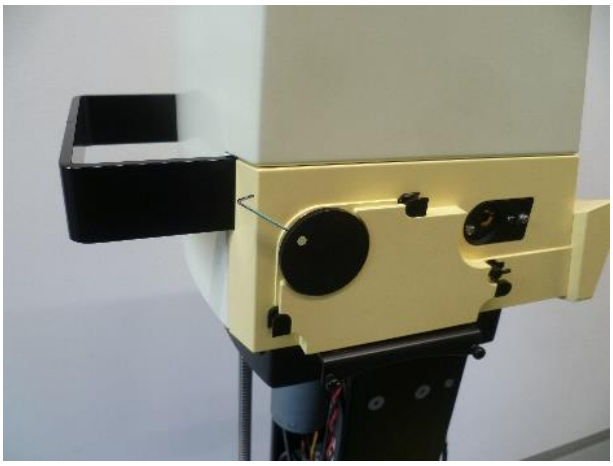
1. Remove housing according to ♦9.1.
2. 2 screws on the front must be unscrewed. Then the cables must be unplugged. Next, the display must be pushed up. Then the display can be removed.



Step 2:

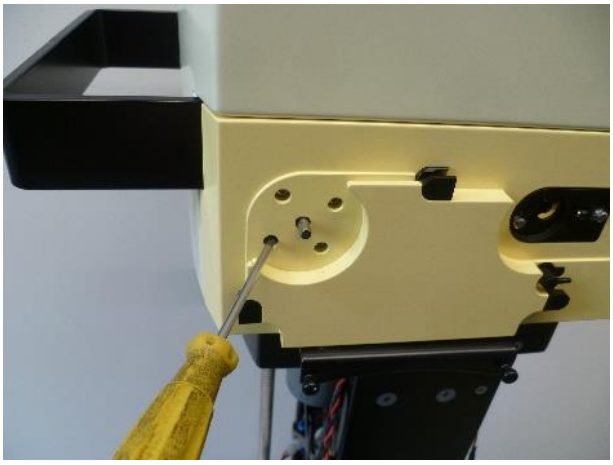
3. Remove the Vit-PN module according to ♦9.16.
   - Unplug cables and hoses.
   - Remove the VIT-PN module by unscrewing 3 screws.





Step 3:

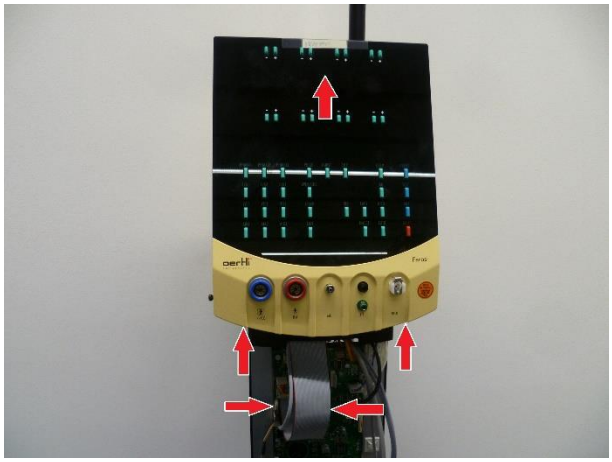
4. Remove pump wheel according to ♦9.8.
   - Unscrew stud with Allen wranch.
   - Remove pump wheel.



Step 4:

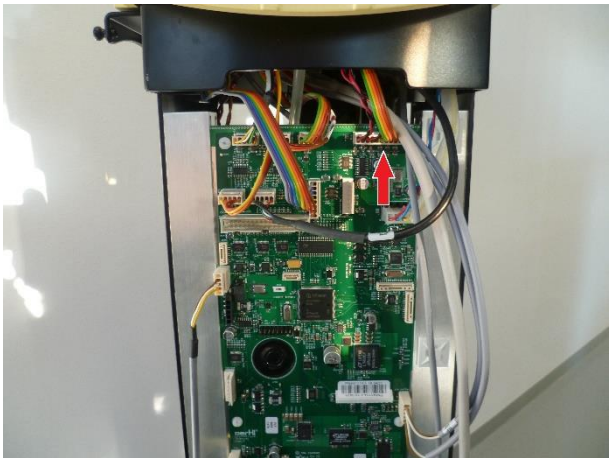
5. Unscrew the four screws on the side and remove the pump motor.
6. Install the new pump motor in reverse order.

9.10 Switch with LED



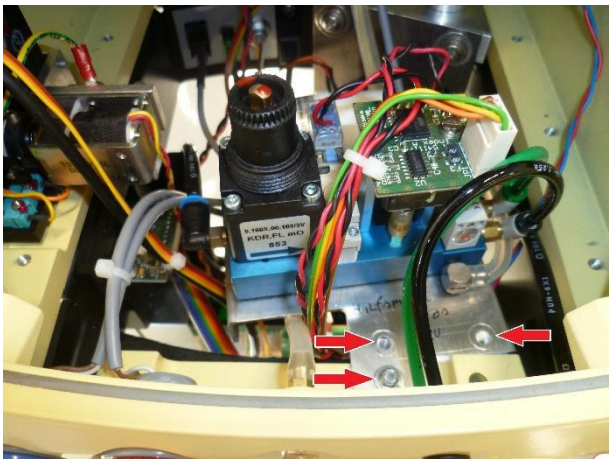
Step 1:

1. Remove housing according to ♦9.1.
2. 2 screws on the front must be unscrewed. Then the cables must be unplugged. Next, the display must be pushed up. Then the display can be removed.



Step 2:

3. Remove the Vit-PN module according to ♦9.16.
   - Unplug cables and hoses.
   - Remove the VIT-PN module by unscrewing 3 screws.

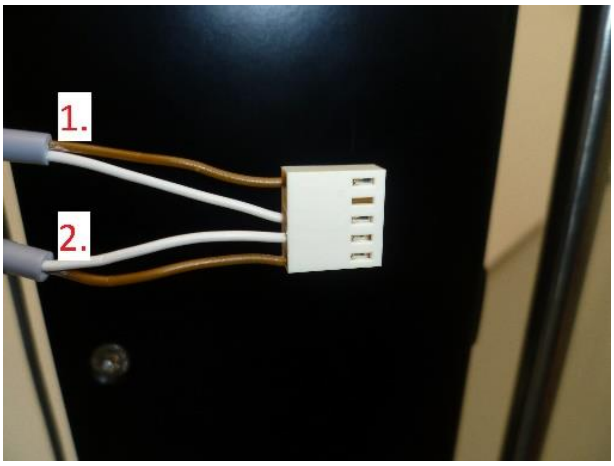


Step 3:

4. Unplug the cable and cut the cable.

Step 4:

5. Unlock the switch and push it out of the machine.
6. Unscrew the LED light and push it out of the machine.
7. Install the switch and LED in reverse order.



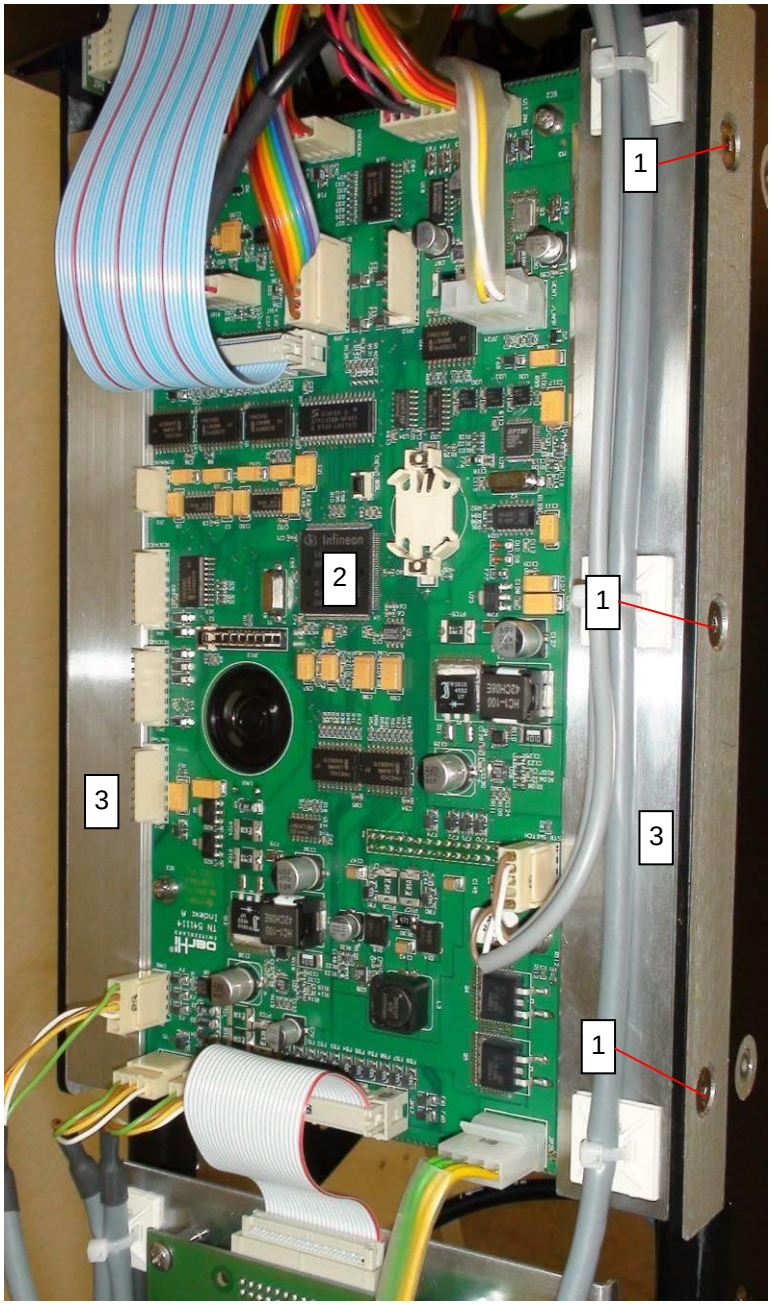
Step 5:

8. Plug the cables into the connector according to the photo.
   - 1. – light
   - 2. - switch
9. Plug in the cable.

9.11 Logic and power print

VX400178

If possible, a backup must be created before the repair, according to ♦7.3.



1. Open the housing at the front and back.
2. Unplug all cables on the logic PCB and power PCB. Refer to section ♦8.3 and ♦8.5 or an overview of the interfaces.
3. Release the cable retainers on the cables attached to the side bars [3].
4. Undo the three screws [1] of the holding bars on each side. Take the system board [2] together with the bars [3] out of the frame.
5. The system board is clipped into the bars. Pull the bars out to the sides to remove.

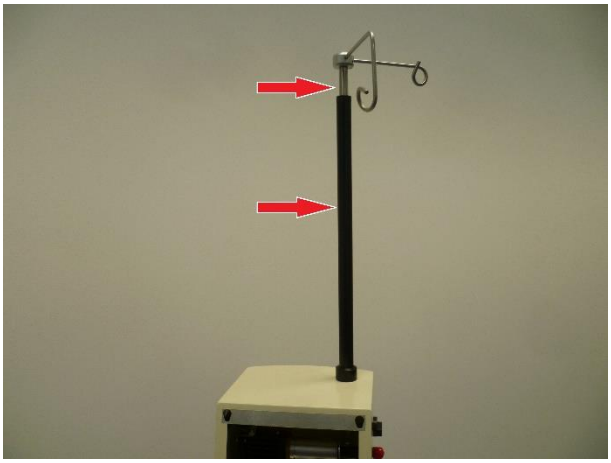
WARNING!
Adjustment values not updated.
Risk of reversible eye damage to the patient.

- ► Restore backup according to ♦7.5.
- ► If no backup is available, set logic and power print adjustment values according to ♦7.4.

9.12 Rod drive

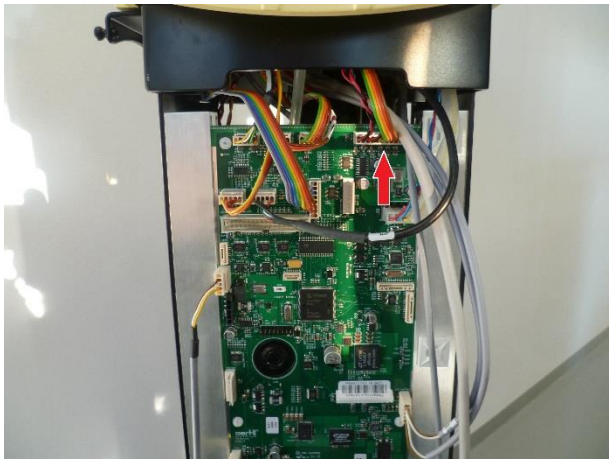
VX210089

Removal:



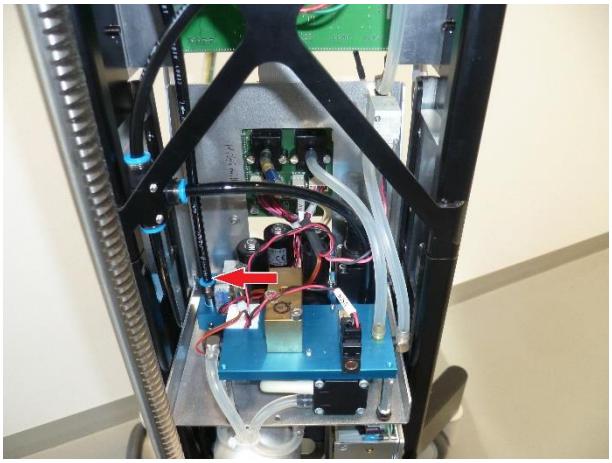
Step 1:

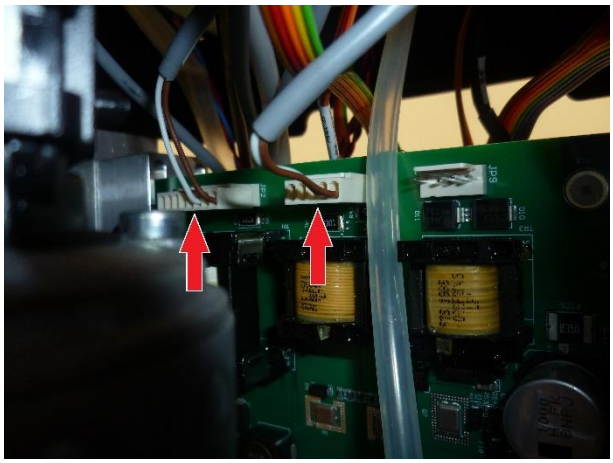
1. Remove housing according to ♦9.1.
2. Remove display according to ♦9.4 or ♦9.5.
3. Remove the infusion pole and the protective tube (unscrew both).
4. Remove front.

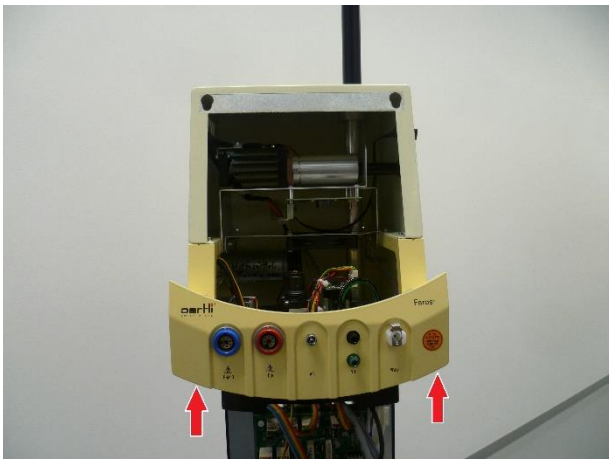


Step 2:

5. Remove front panel.
6. To remove the front panel, you need to follow all the steps:
7. Picture 1: Unplug the cables
8. Picture 2: Unplug the hoses (black and green).
9. Picture 3: Unplug the black hose.
10. Picture 4: Remove the cables shown in the picture.
11. Picture 5: Loosen 2 screws on the front.

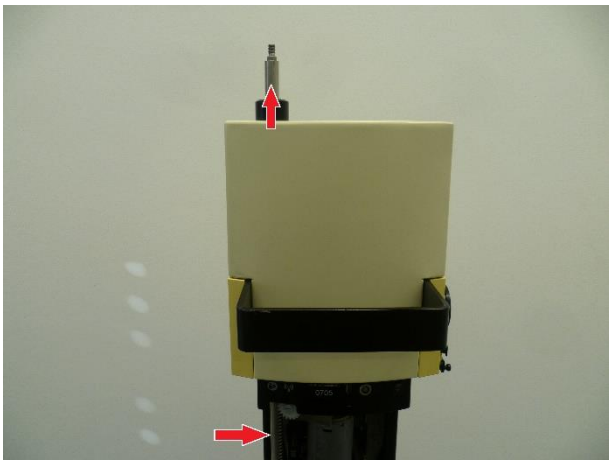






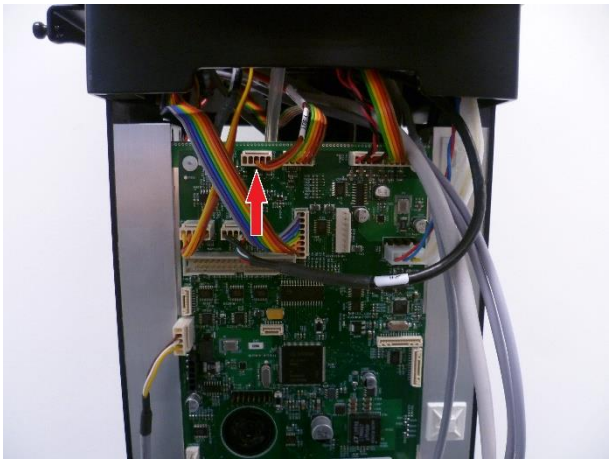
Step 3:

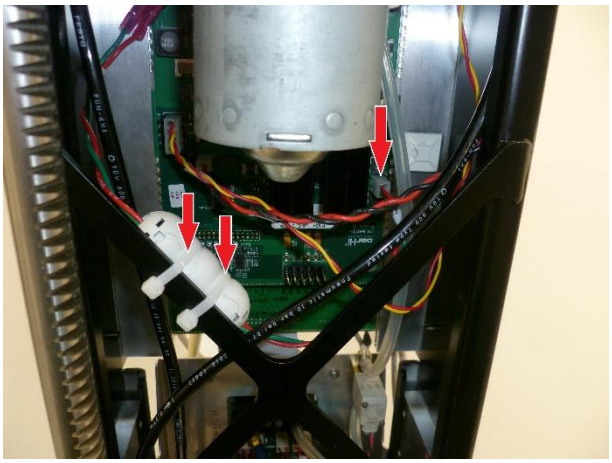
12. Loosen the screw on the gear wheel. Then the gear wheel can be removed.



Step 4:

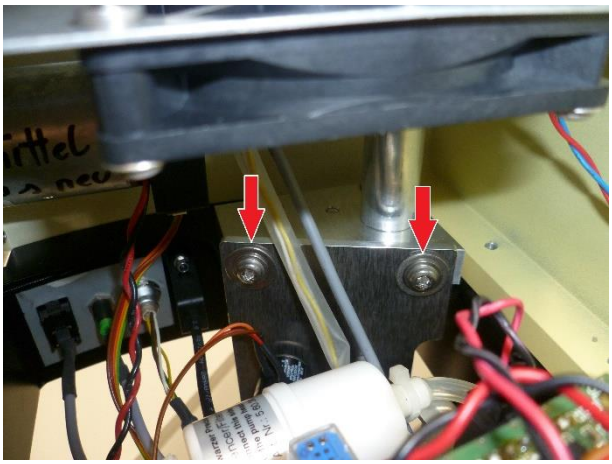
13. Extend the infusion pole.





Step 5:

14. Unplug the cable and cut off the cable tie.



Step 6:

15. To remove the motor, loosen the screws shown in the picture.

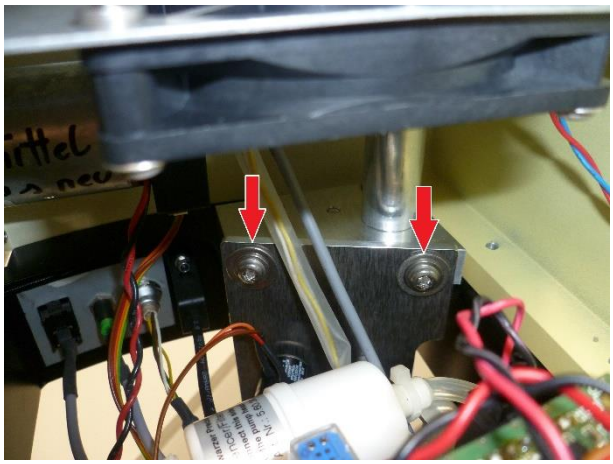
Installation:

Step 1:

1. Tool required: LH002451. It is needed for the rod entry so that the rod cannot fall through.

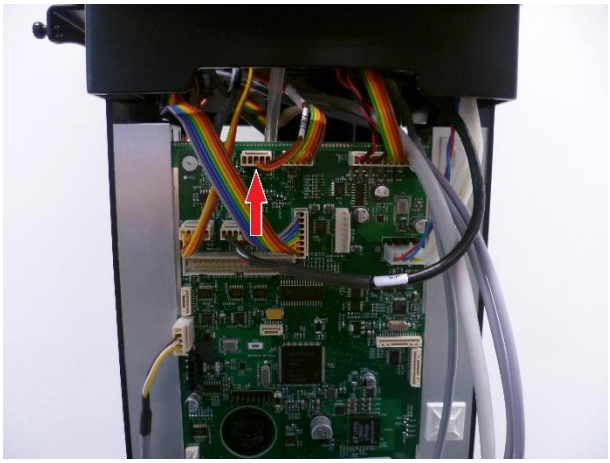
Step 2:

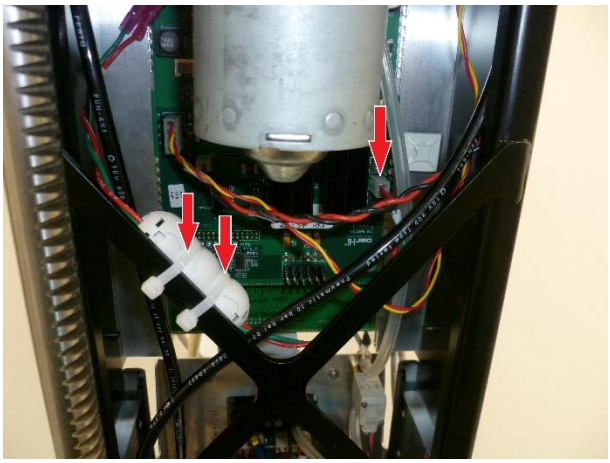
2. Insert rod.



Step 3:

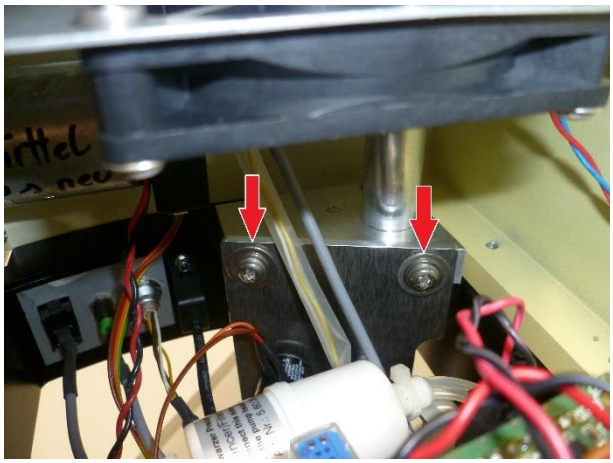
3. Install the motor (do not tighten the screws).





Step 4:

4. Plug in the cable in the right place and attach the cable tie.



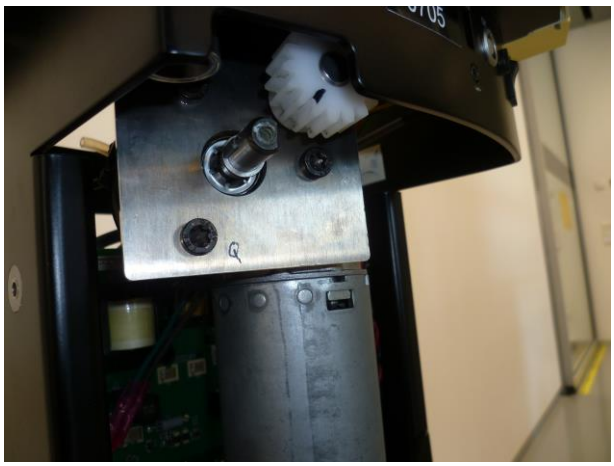
Step 5:

5. Adjust the play of the rod (slight play during rotation). Tighten the screws.

Step 6:

6. Remove the gear wheel.
7. Extend the rod.

Adjust potentiometer:



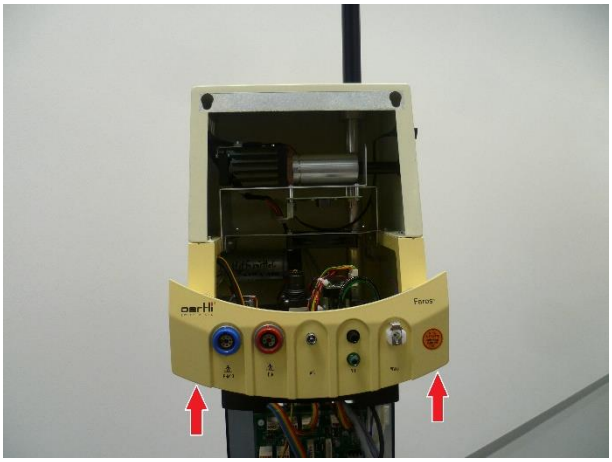
Step 1:

1. Turn to the stop (direction does not matter). Turn 5 turns in the opposite direction.

Step 2:

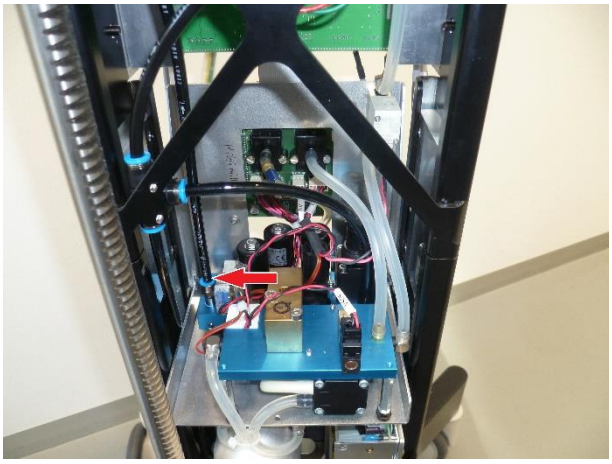
2. Mount the gear wheel (Attention: Do not lose the crescent when mounting the gear wheel). Secure the screw with Loctite 243.

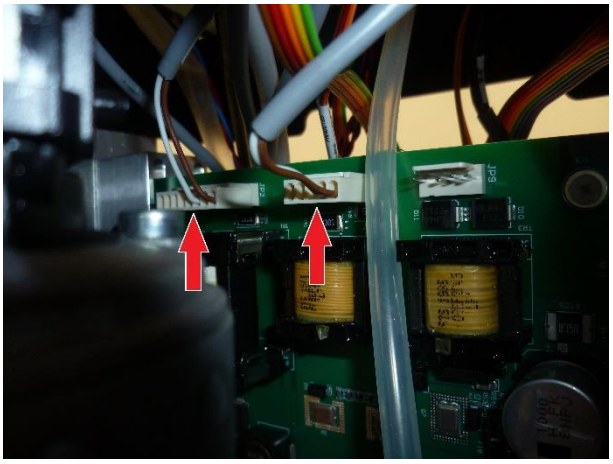
Mounting the front:

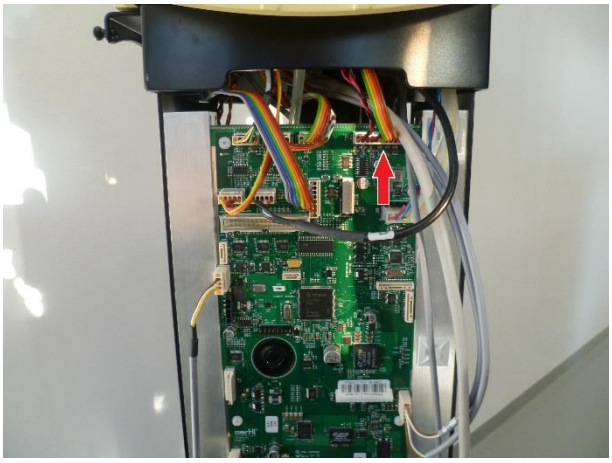


Step 1:

1. Mount the front.
2. Picture 1: Tighten 2 screws.
3. Picture 2: Plug in the cable shown.
4. Picture 3: Insert the black hose.
5. Picture 4: Plug in the hoses shown.
6. Picture 5: Plug in the cable





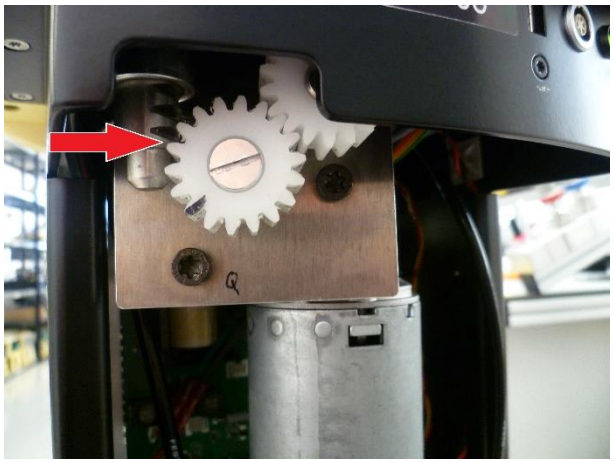


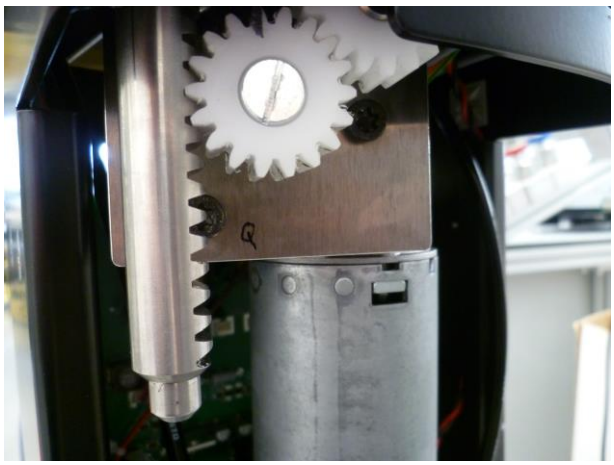
Step 2:

7. Mount the display according to ♦9.4 or ♦9.5.
8. Switch on the device -> Service Mode (INJECT+AUX).
9. Start IRR Pole menu -> INJECT+AUX+HFDS+IRR. Press for 5 seconds.

Step 3:

10. Press Insert Pole -> Yes -> Follow instructions on display (Caution: Danger of crushing, moving parts).





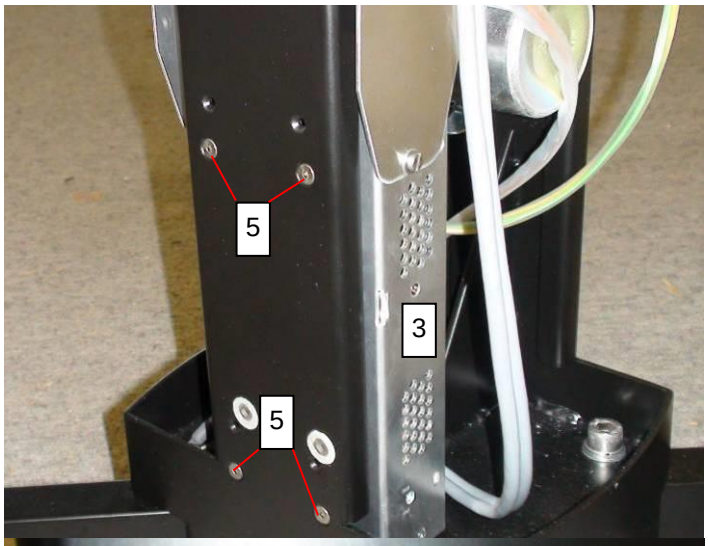
Step 4:

11. Before automatically retracting the rod, make sure that the teeth of the rod are aligned with the gear.
12. Follow the instructions on the display.
13. Reset -> dismantle auxiliary tool -> check for function.

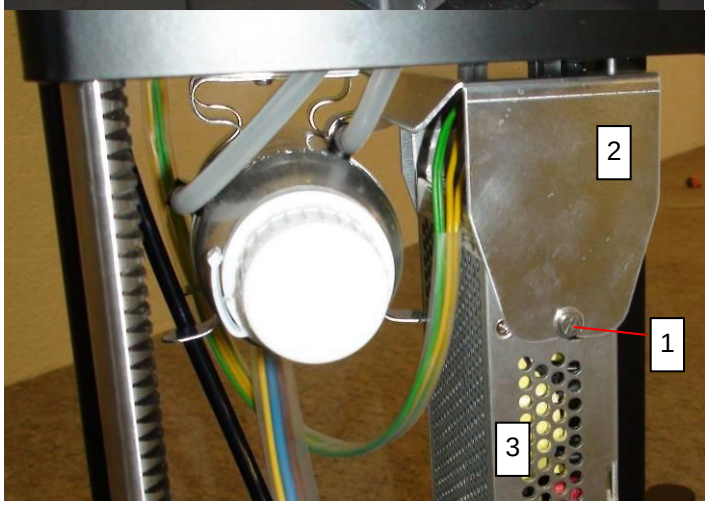
WARNING!
Risk of crushing.
Mild to severe injury.
► Follow repair instructions for rod drive.

9.13 Power Supply 24VDC

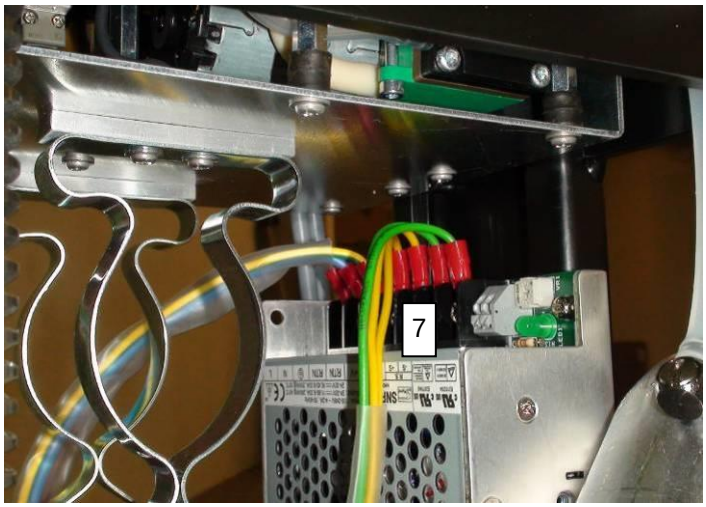
VX320012



1. Undo four screws [5] on the power supply unit holder and take out the power supply unit [3].



2. Take off the protective plate [2] from the power supply unit [3] by undoing the two screws on the sides [1].



3. Unplug the cables [7]. The cable allocations are marked on the power supply unit.

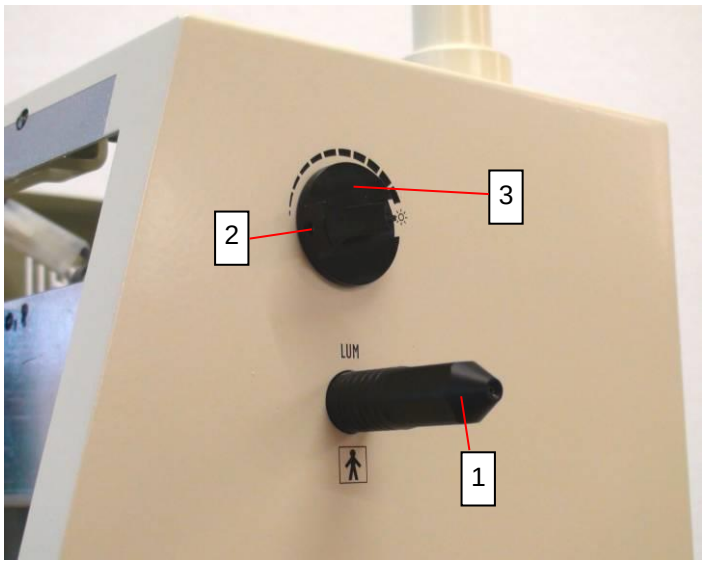
Cable to logic board:
- green: 24V+
- yellow: RTN / GND

CAUTION!
Wrong screws mounted.
Risk of electric shock.
► Only the original screws may be used for fastening the power supply unit.

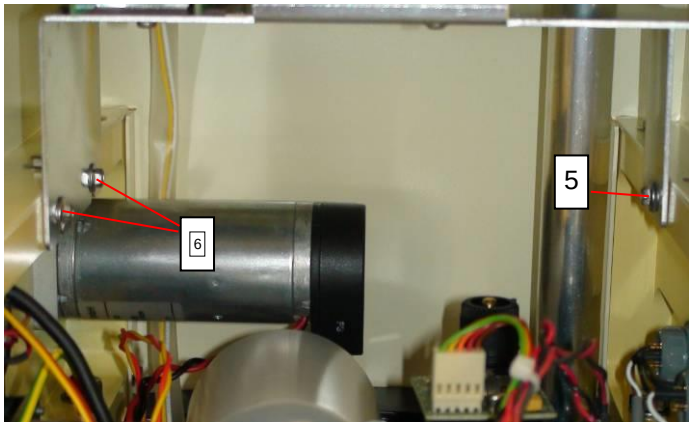
NOTE!
The cables on the 24VDC power supply unit can be connected the wrong way round.
Malfunction or destruction of the device.
► Perform Visual inspection according to ♦8.4.

9.14 LIGHT Module - HALIDE

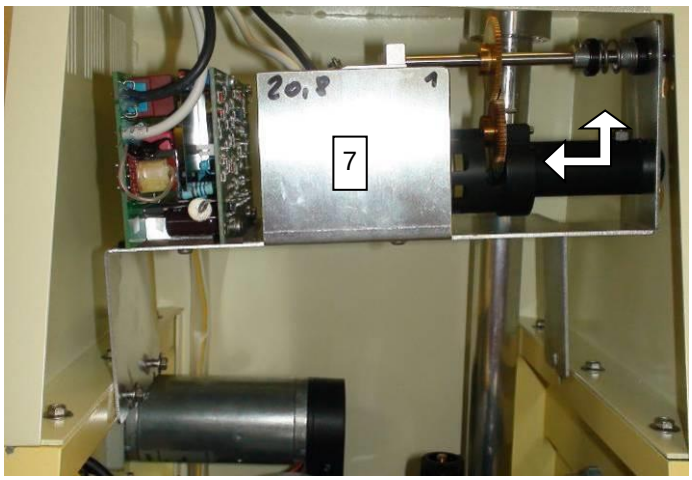
Only applies to the posterior segment version.



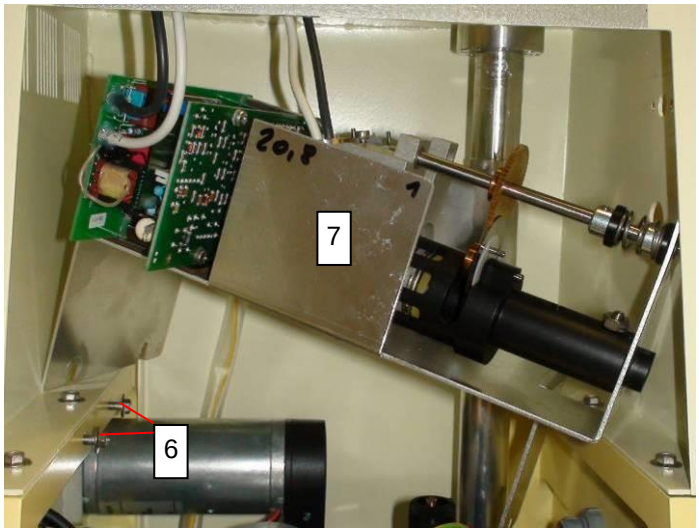
1. Take off the front panel.
2. Remove the adapter [1].
3. Loosen headless screw [2] in the rotary knob [3]. Take this off together with the washer behind it.



4. Unplug the supply cable from the logic PCB for the lamp module and move away.
5. Remove screw [5], loosen screws [6].



6. Press the light tube and the rotary axis into the hood. At the same time, turn the module [7] to the right and upwards until it is free.

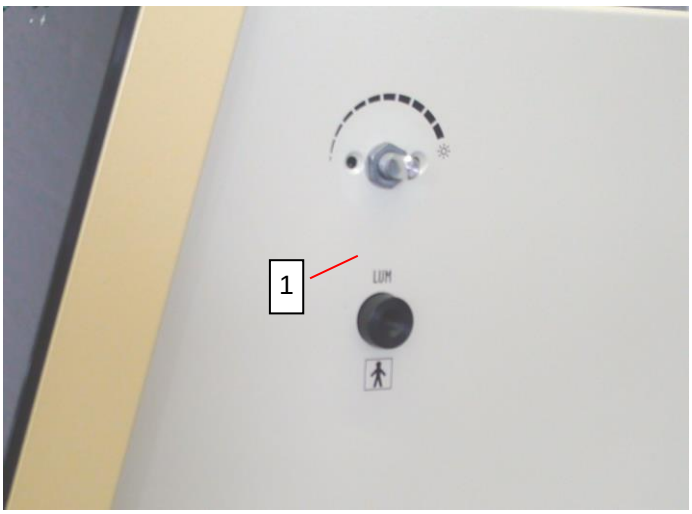


7. Move the module [7] upwards out of the screws [6] and remove.

9.15 Power LED module

Only applies to the posterior segment version.

VX100944



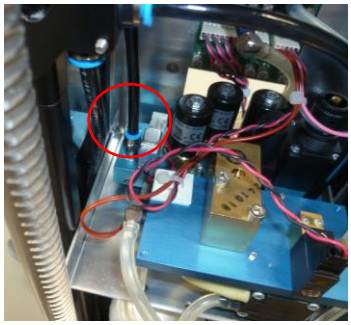
Step 1:

1. Take off the front panel.
2. Loosen headless screw in the rotary knob. Take this off together with the washer behind it.
3. Remove nut of potentiometer [1].

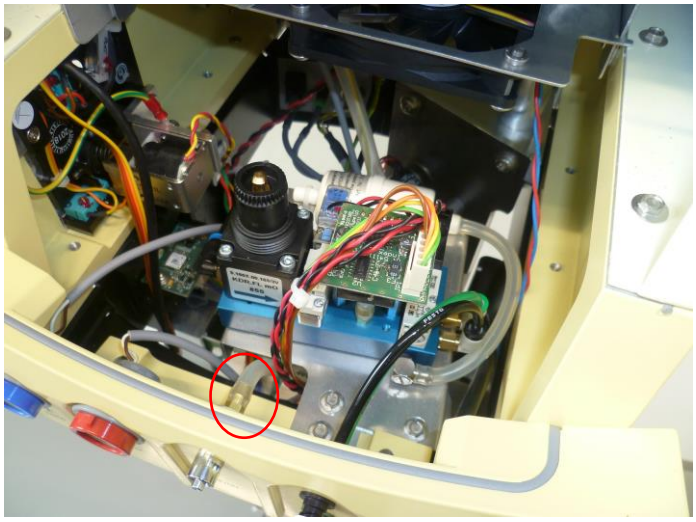
4. Remove the housing according to ♦9.1.

5. Disconnect the VIT-PN cable.

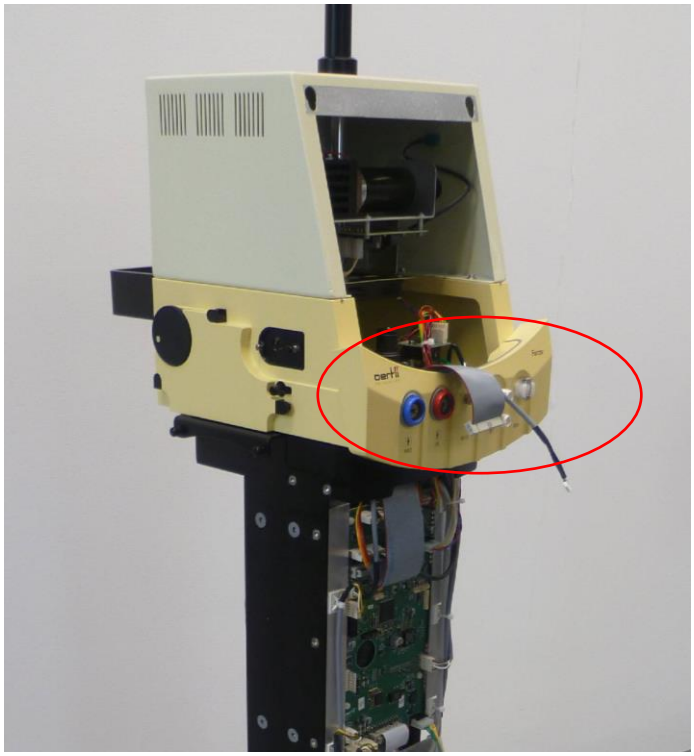
6. Remove the cable tie.



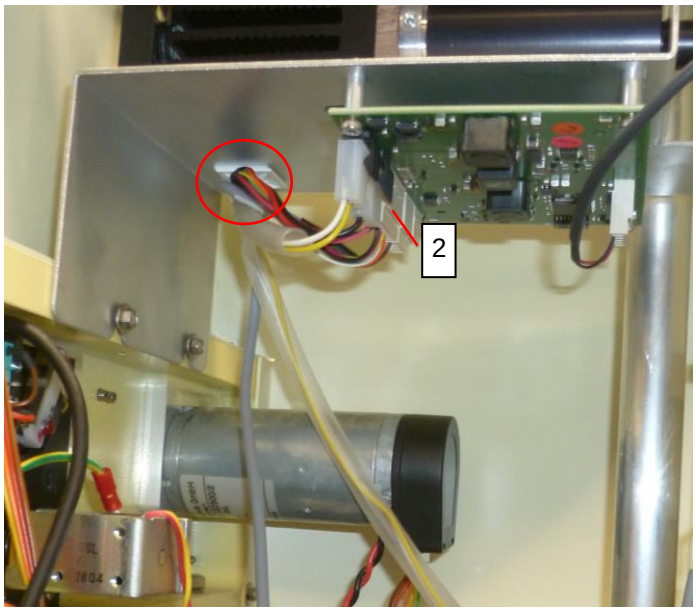
7. Disconnect the black tubes.



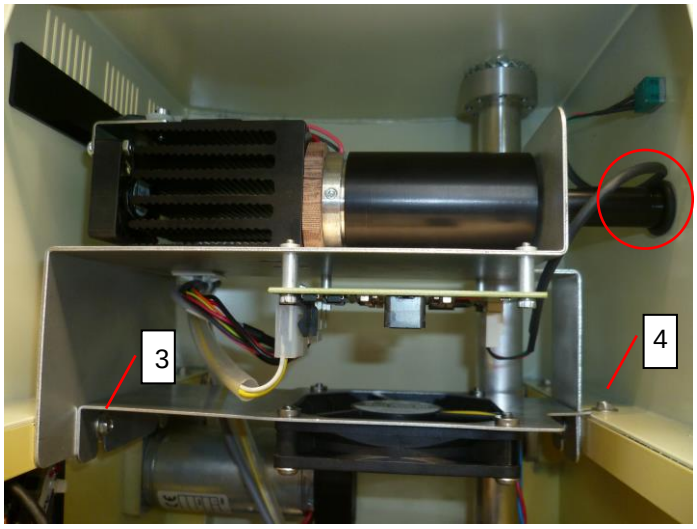
8. Disconnect the air tube.



9. Remove the front plate.



10. Unplug the supply cable and CAN cable [2] from the module print for the lamp module.
11. Remove the cable tie.



12. Loosen the screw on the left [3] and completely remove the screw on the right [4]. Now the LED module can be pulled out.
13. Install the new Power LED module in reversed order.

Ensure that the O-ring on the LED module is placed on the sidewall of the Faros.

CAUTION!
Malfunction of the LED module.
Risk of reversible eye damage to the patient.

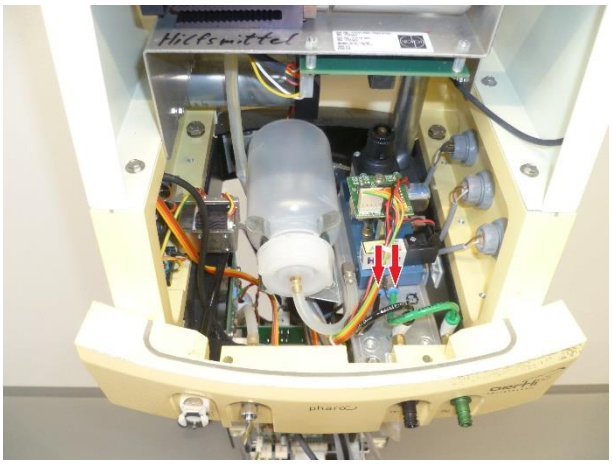
► Align rotary knob with potentiometer on scale and tighten screw on potentiometer and rotary knob.

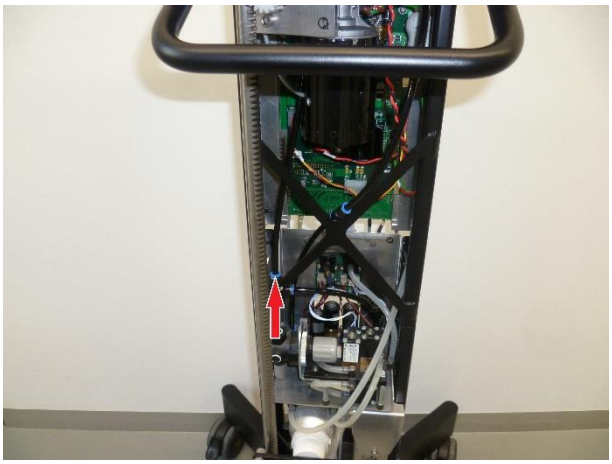
9.16 VIT-PN module

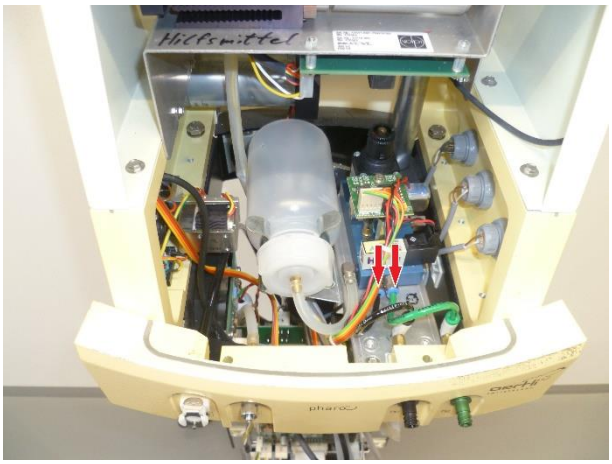
VX210087

Step 1:

1. Remove housing according to ♦9.1.
2. Remove display according to ♦9.4 or ♦9.5.
3. Disconnect cables and hoses.
4. Picture 1: Unplug the cables.
5. Picture 2: Unplug the hoses (black and green).
6. Picture 3: Unplug the black pneumatic hose.







Step 2:

7. Loosen 3 screws, then the VIT-PN unit can be removed.
8. Reinstall in reverse order.

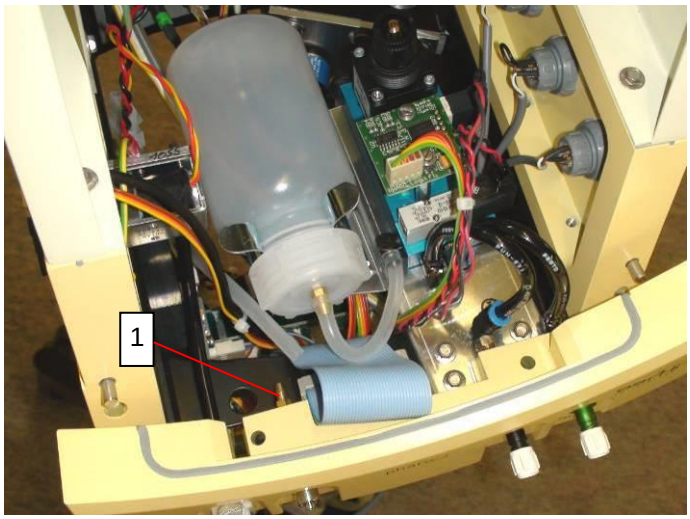
NOTE!
VIT-PN hoses can be interchanged.
VIT-PN function restricted.
► Perform a visual inspection of the VIT-PN hoses.

WARNING!
Adjustment values not updated.
Risk of reversible eye damage to the patient.
► Calibrate Vit-PN module rear segment according to ♦7.4.

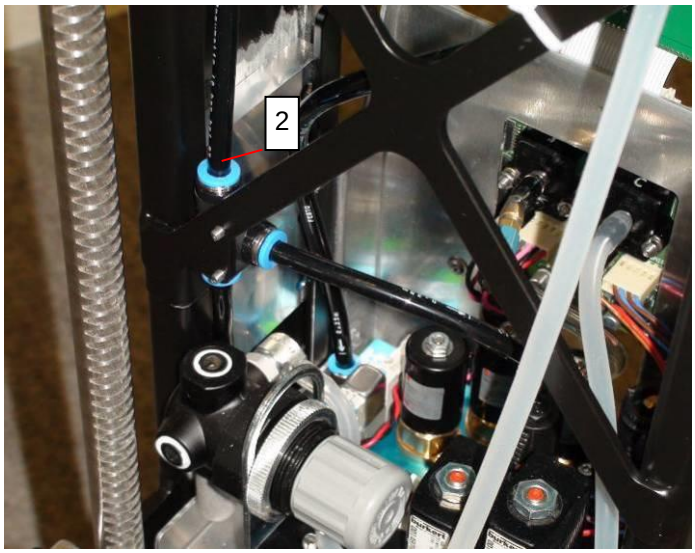
9.17 Air-Visco module

VX210221

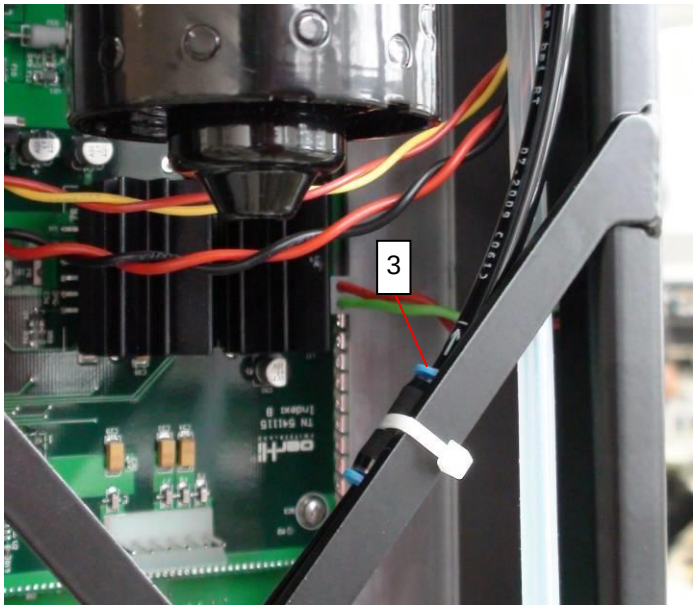
Only applies to the posterior segment version.

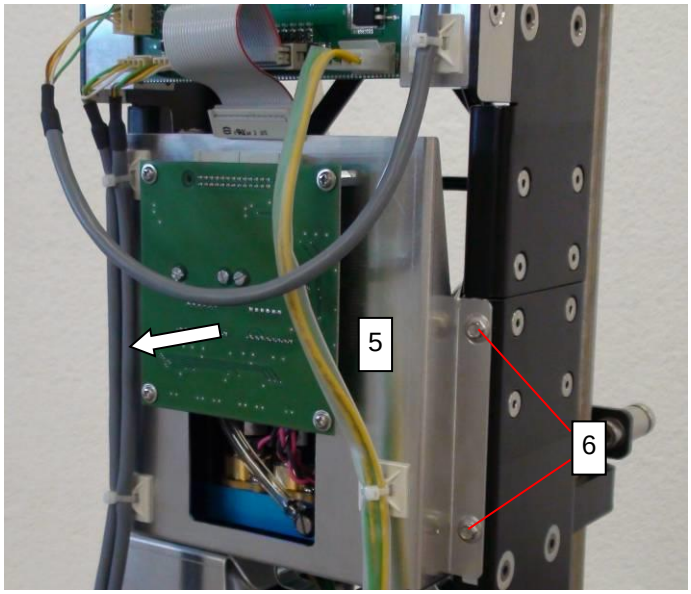


1. Open the housing at the front and back.
2. Unplug the ribbon cable to the system board.
3. Take off the tube [1] which leads from the AIR module to the cover.



4. On the VISCO module take off the air supply of the Vit-PN module [2] and the air tube to the cover [3].





5. Unplug the ribbon cable to the logic PCB.
6. Release the cable retainers on the cables attached to the module.
7. Remove the screws [4] on both sides and pull out the module [5] to the front.

Take care when reinstalling that no tubes are bent or jammed in anywhere!

Integrating new PCBs requires that the sensors be calibrated. Refer to section 10.

WARNING!
Adjustment values not updated.
Risk of reversible eye damage to the patient.
► Calibrate Air-Visco module according to ♦7.4.

9.18 Split ferrite

VX281029

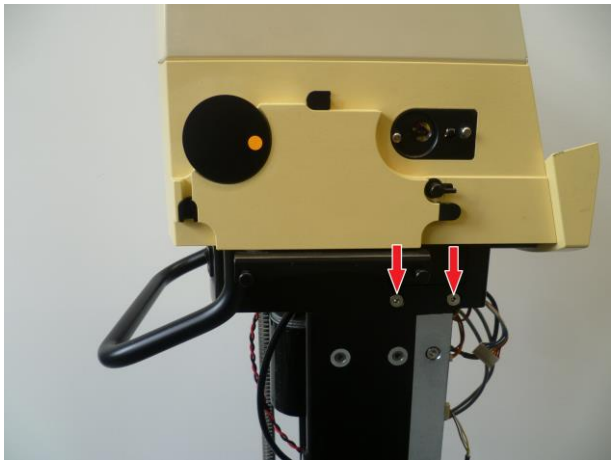
1. Remove the back housing, refer to 8.1
2. Place the red and green wire, from the drive for infusion pole, in the split ferrite.
3. Secure the split ferrite with the cable tie to the frame.

9.19 Wireless module

VX541118A

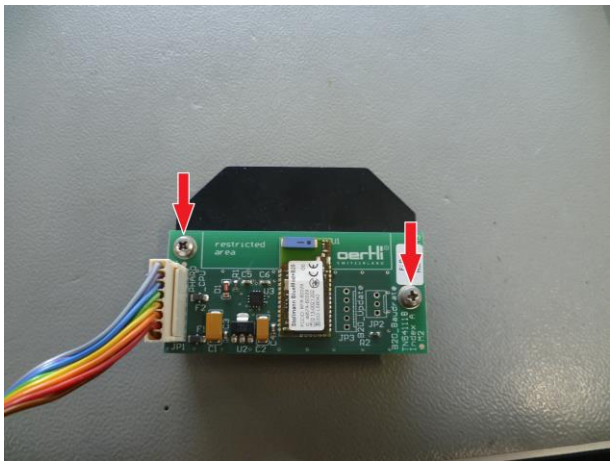
Step 1:

1. Remove housing according to ♦9.1.
2. Remove display according to ♦9.4 or ♦9.5.
3. Unplug cable.



Step 2:

4. To remove the wireless module, these screws must be loosened.



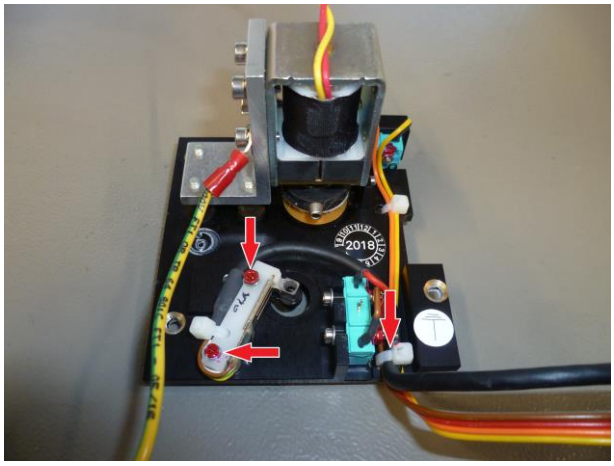
Step 3:

5. Loosen 2 screws on the wireless module.

After replacing the wireless module, the remote control must be taught-in, according to ♦6.6.

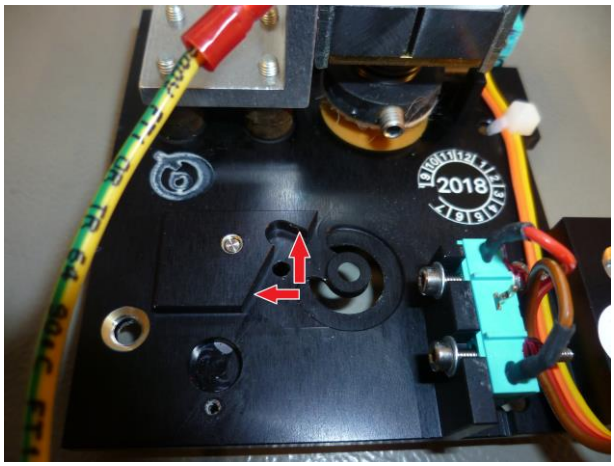
9.20 Force sensor

VX400191



Step 1:

1. Remove housing according to ♦9.1.
2. Remove display according to ♦9.4 or ♦9.5.
3. Remove the coupling plate according to ♦9.7.
4. Remove the force sensor.



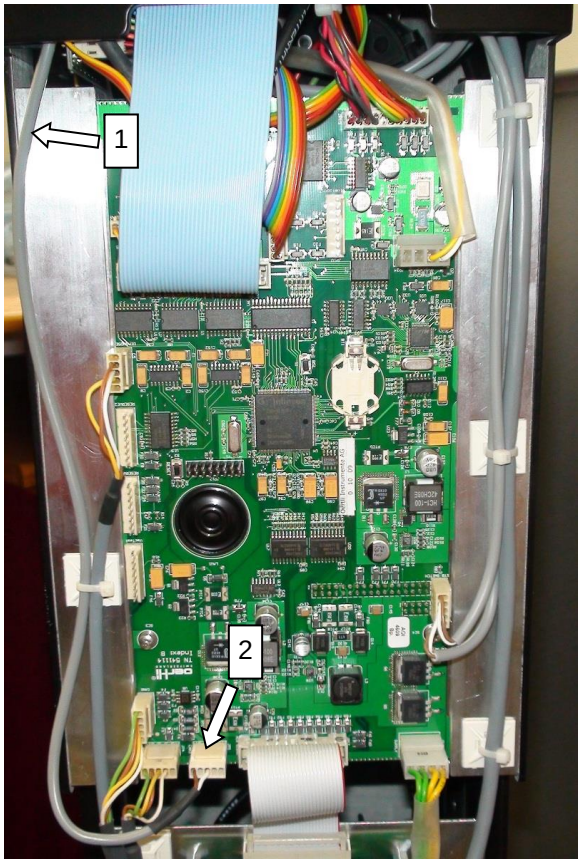
Step 2:

5. Install the force sensor. The force sensor must be pressed to the stop and mounted.
6. Reinstall in reverse order.

9.21 Converting Halide Light Version to LED Light Version (VX100944)

Devices with a HALIDE light source can be upgraded with an LED light. Refer to section ♦6.13 for a description of the individual steps.

1. Take off the front panel according to ♦9.4.
2. Take off the front cover according to ♦9.6.
3. Uninstall the HALIDE light module according to ♦9.14.
4. Install the LED light module according to ♦9.15. Installing is done in reverse order of deinstallation.
5. Install the CAN cable [1] between logic PCB [2] and light module
6. Alter the parameter <Lum Module> from <Halide> to <LED> in the service menu <HARDWARE>.
7. Completely check the device with the functional test.



10 Software Update

10.1 Device

A compatible USB flash drive including new software can be ordered at the manufacturer:

VX541995

The USB port with the name <Service> is to be used as interface. This is a standard USB interface.

WARNING!
Non-approved devices connected to the USB port.
Can endanger the safety of staff and patients.
► Only connect devices approved by Oertli.

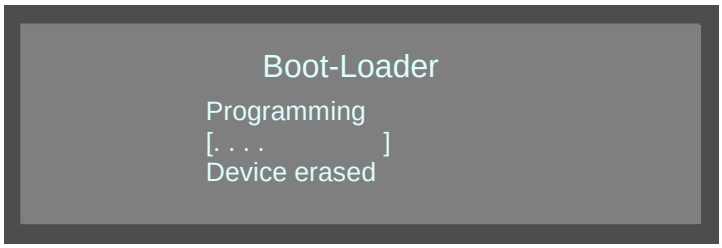
Only use an Oertli service USB flash drive in conjunction with the Faros.

10.1.1 Software update procedure

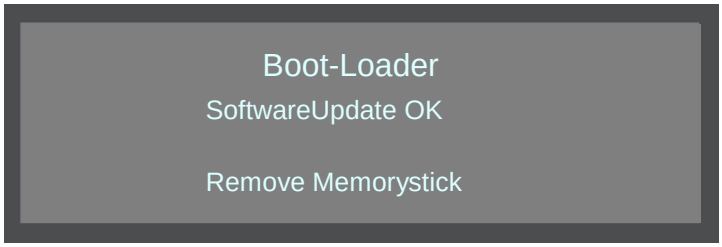
A downgrade of the software is not permitted

A started update of a package must not be aborted by pressing reset, switching the device off or removing the USB flash drive. Otherwise the device may be left in an undefined state rendering it unusable.

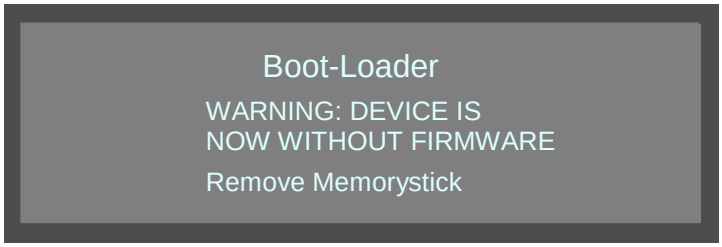
If, for some reason, the update procedure cannot be completed successfully, the partially programmed firmware on the device will be deleted. The device cannot be operated anymore until new software has been installed.



1. Switch unit off.
2. Plug USB flash drive into the service USB port.
3. Switch unit on and simultaneously hold the RESET key pressed until Faros enters the boot loader (approx. 4s).
4. The update procedure starts automatically.
   The current operation, progress bar and recently finished operation are displayed.



5. After a successful software update the message <Softwareupdate OK> appears.



6. If, for some reason, the update procedure cannot be completed successfully, the partially programmed firmware on the device will be deleted.
7. Remove USB flash drive.
8. Retry to install new software according to this procedure and complete software update.

10.2 Versions

This chapter contains information about the released software versions including, if necessary, a specific updating procedure

10.3 Update from 2.1.1 to 3.x.x

1. Update the operating system package according to ♦10.1.1.
2. After restarting the Faros, the error message [DEVICE CONFIGURATION ERROR 27] appears.
3. After updating from 2.1.1 to 3.x.x, the configuration of the system must be set once according to ♦7.6.

10.4 Version 3.0.2

File
FAROS_APP_3.0.2.BIN

Displayed in Service Mode when installed:
App: v3.0.2

10.5 Version 3.1.1

File
FAROS_APP_3.1.1.BIN

Displayed in Service Mode when installed:
App: v3.1.1

10.6 Pedal / remote control

New software for pedal and remote control is installed by the manufacturer.

11 Installing and uninstalling of Pedal components

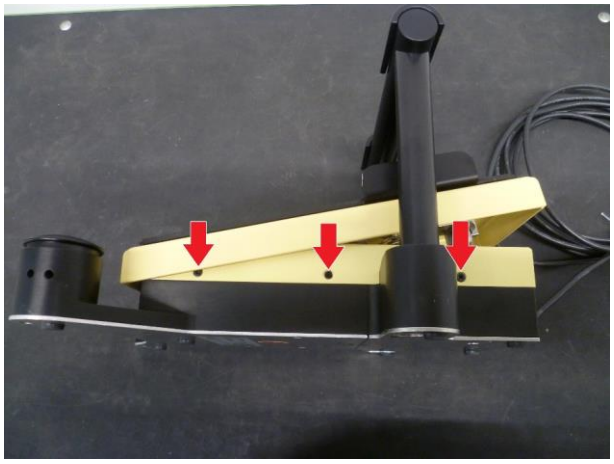
WARNING!
Adjustment values not updated.
Risk of reversible eye damage to the patient.
► Calibrate pedal after each repair according to ♦6.5.

WARNING!
Repair not carried out correctly.
Risk of reversible eye damage to the patient.
► Carry out a function test after each repair according to ♦15.

Confirm activities performed on the pedal on the report sheet according to ♦15.

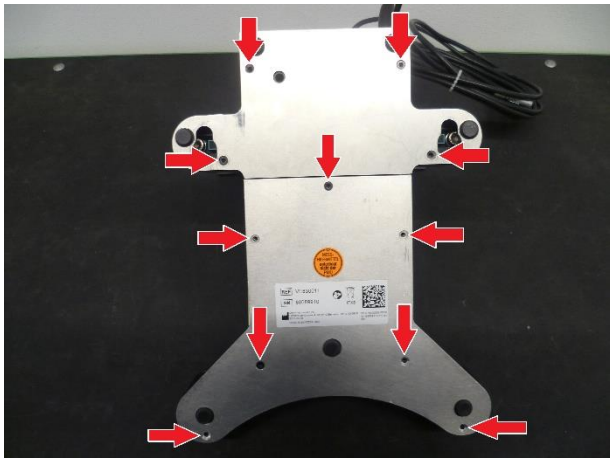
CAUTION!
Improper sealing of the pedal.
Risk of reversible eye damage to the patient.
► Seal pedal after repair according to ♦11.2.

11.1 Pedal housing



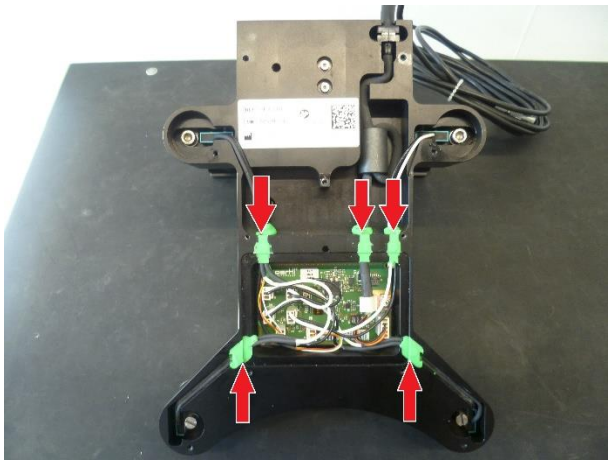
Step 1:

1. Remove the cover plate.



Step 2:

2. Remove the base plate.

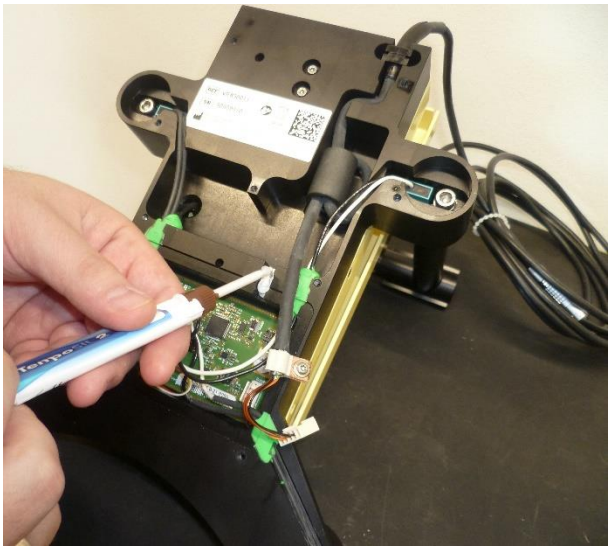


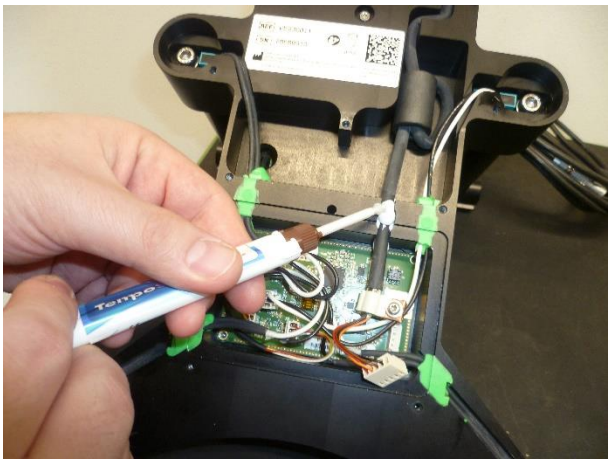
Step 3:

3. Remove the sealing compounds if necessary.

11.2 Pedal sealing

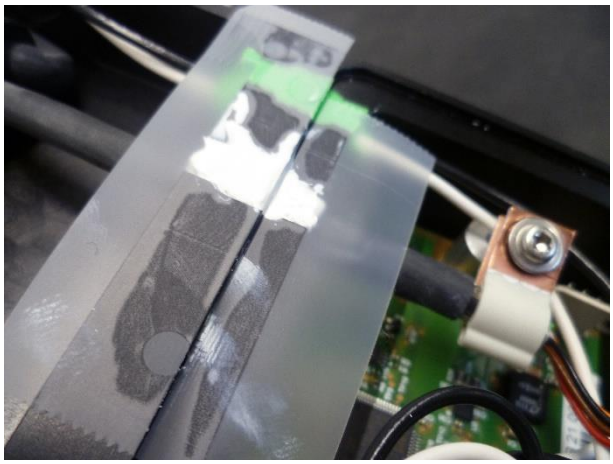
With 1 piece TEMPO SIL2 white.





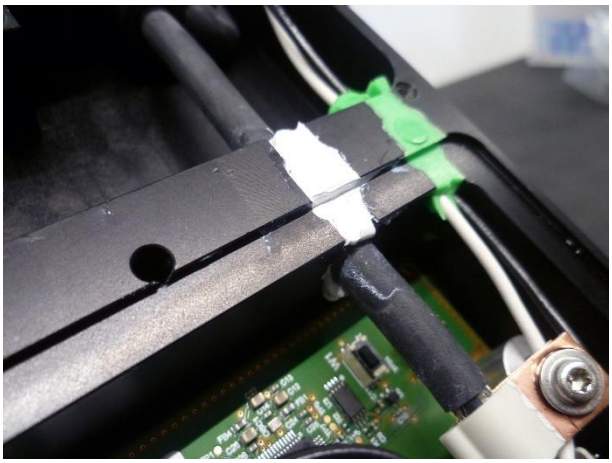
Step 1:

1. Remove the pedal covers according to ♦11.1.
2. Seal the pedal with TEMPO SIL 2 in 3 steps:
   a. Fill empty chamber a little.
   b. Then press the cable into the chamber
   c. Fill up again with sufficient TEMPO SIL 2.



Step 2:

3. Place adhesive tape on uncoated area and wait until TEMPO SIL 2 has cured (approx. 2 minutes).

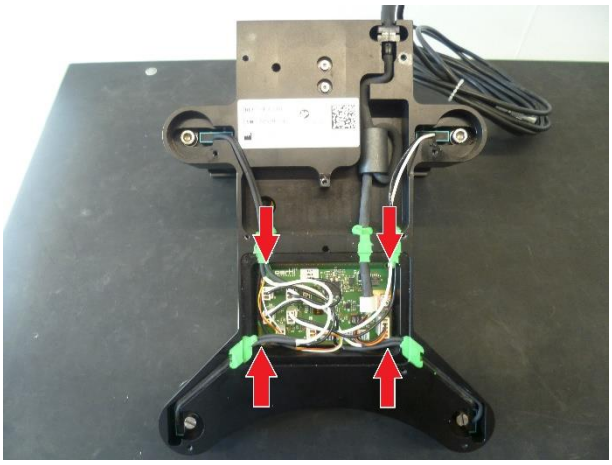


Step 3:

4. Remove adhesive and use a sharp razor blade to remove excess.
5. Plug in all cables to the pedal print.
6. Place sealing
7. Mount base plate according to procedure described in ♦11.1.

11.3 Pedal PCB

VX541199

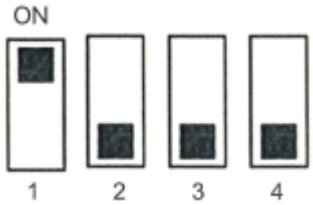


Step 1:

1. Remove the pedal covers according to ♦11.1.
2. Take a photo of how the print is equipped.
3. Remove all cables.
4. Remove pedal print.
5. Reinstall the new pedal print in reverse order.

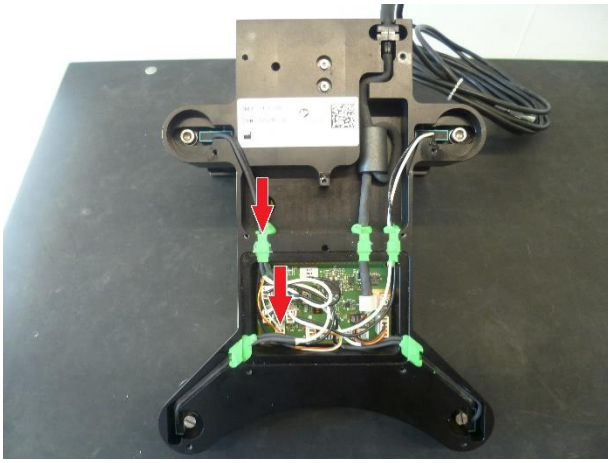
CAUTION!
Incorrect pedal signals transmitted to the device.
Risk of reversible eye damage to the patient.

► Visual inspection of pedal print: Function buttons (top and heel) are correctly plugged in. Hall sensors are correctly plugged in. Pedal cable is correctly plugged in. Refer to point ♦8.2 Pedal PCB.



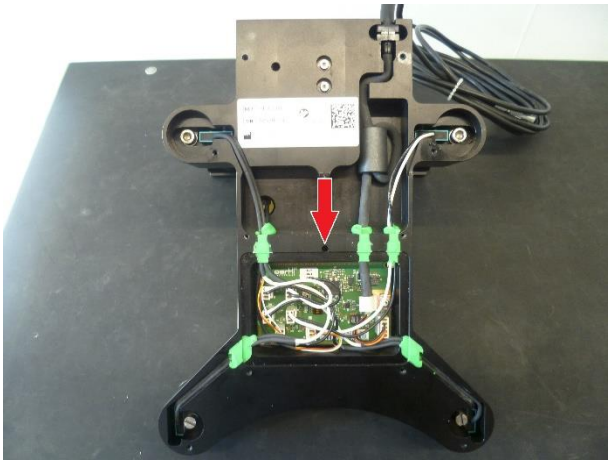
Visual inspection: Check the position of the pedal switch.
If the switch positions have to be changed, this may only be done in a de-energised state.

11.4 Remove rocker



Step 1:

1. Remove the pedal covers according to ♦11.1.
2. Disconnect the horizontal sensor from the print pedal.



Step 2:

3. Loosen the grub screw.

Step 3:

4. Remove axle.
5. Remove rocker.
6. Reinstall in reverse order.

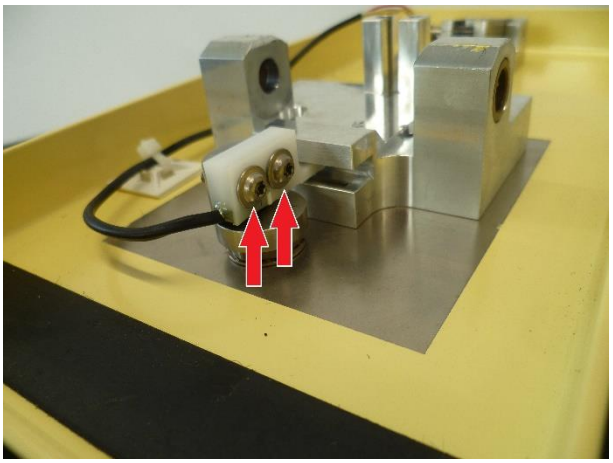
CAUTION!
Incorrectly mounted screws.
Risk of reversible eye damage to the patient.

- ► Perform a visual inspection of the splitter with the following points:
- ► Do not forget the thrust washer.
- ► Axle must be greased.
- ► Tighten the central screw.

11.5 Sensors

11.5.1 Pedal sensor horizontal

VX310060



Step 1:

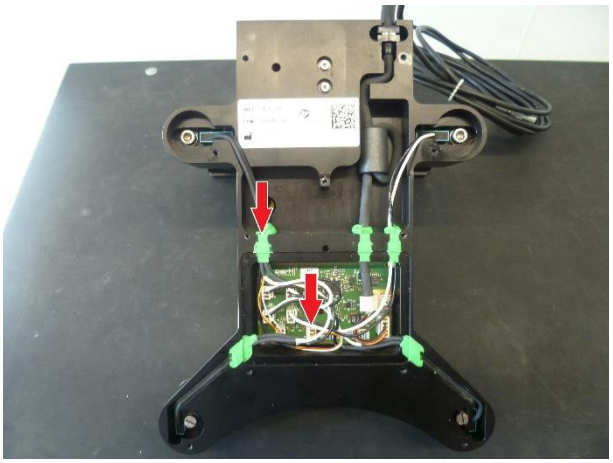
1. Remove the pedal covers according to ♦11.1.
2. Remove rocker according to ♦11.4.
3. Remove sensor.
4. Reinstall the new sensor in reverse order.

CAUTION!
Incorrect pedal signals transmitted to the device.
Risk of reversible eye damage to the patient.

- ► Perform a visual inspection:
- ► Fasten the cable tie to the sensor cable.
- ► Relieve the tension on the sensor cable.
- ► Tighten the screws on the sensor.

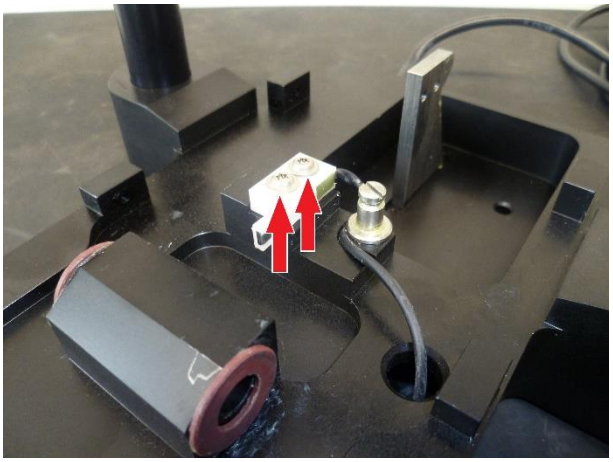
11.5.2 Pedal sensor vertical

VX310060



Step 1:

1. Remove the pedal covers according to ♦11.1.
2. Remove rocker according to ♦11.4.
3. Remove the sensor from the print.



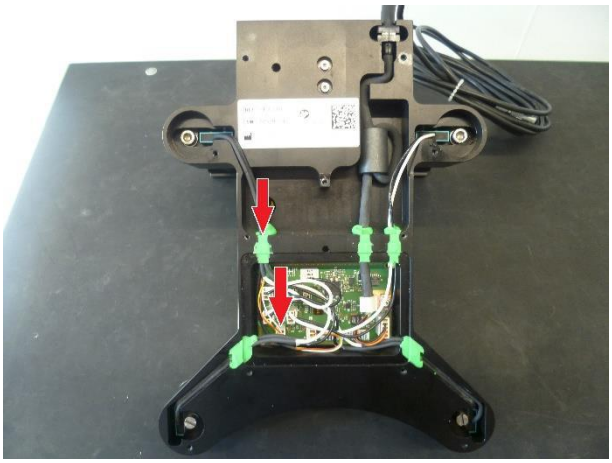
Step 2:

4. Remove sensor.
5. Reinstall the new sensor in reverse order.

CAUTION!
Incorrect pedal signals transmitted to the device.
Risk of reversible eye damage to the patient.

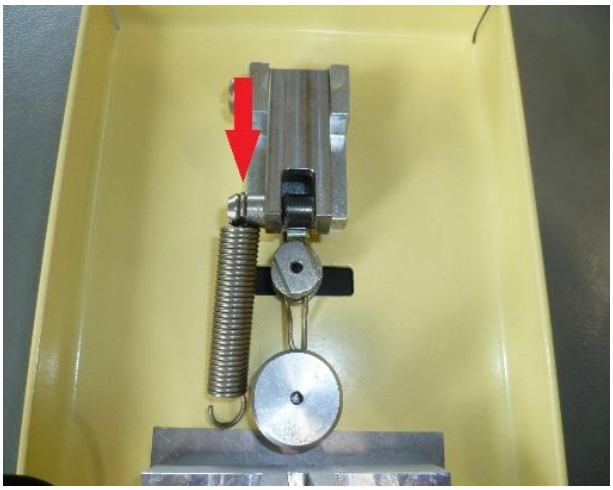
- ► Perform a visual inspection:
- ► Fasten the cable tie to the sensor cable.
- ► Relieve the tension on the sensor cable.
- ► Tighten the screws on the sensor.

11.6 Spring for vertical deflection



Step 1:

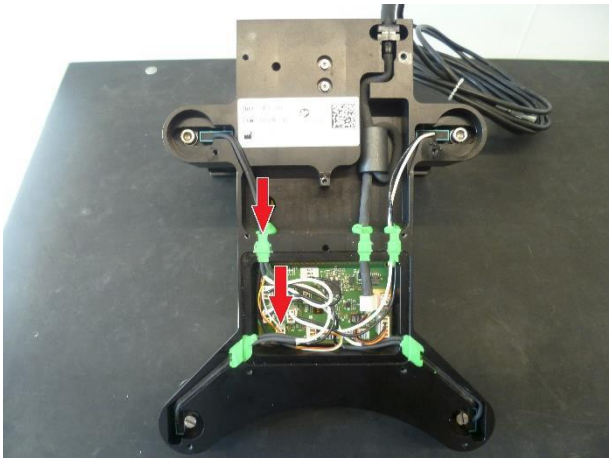
1. Remove pedal housing according to ♦11.1.
   - Remove the sealing mat.
   - Do only remove the necessary sealants.
2. Remove rocker according to ♦11.4.



Step 2:

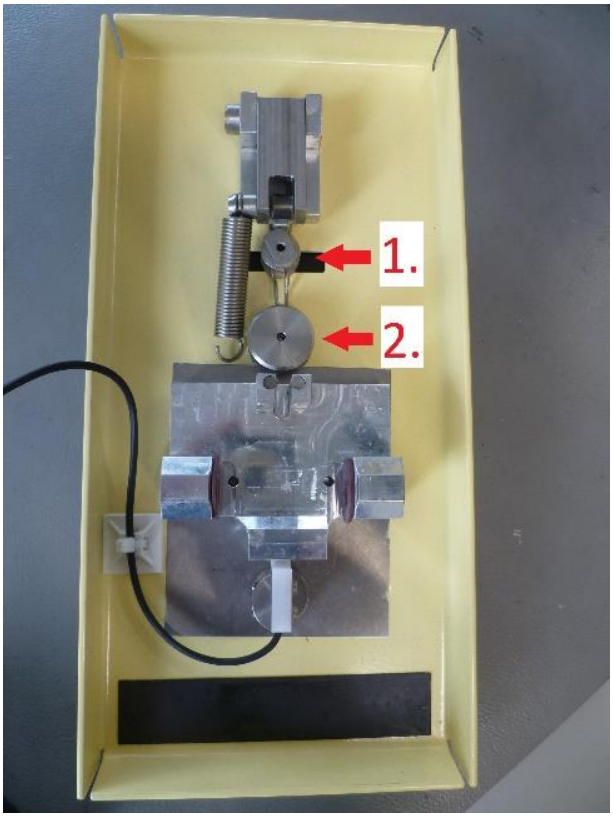
3. Replace the spring for vertical deflection.
4. Assemble the pedal in reverse order, apply a new sealing mat and seal the pedal according to ♦11.2.

11.7 Spring for horizontal deflection



Step 1:

1. Remove pedal housing according to ♦11.1.
   - Remove the sealing mat.
   - Do only remove the necessary sealants.
2. Remove rocker according to ♦11.4.

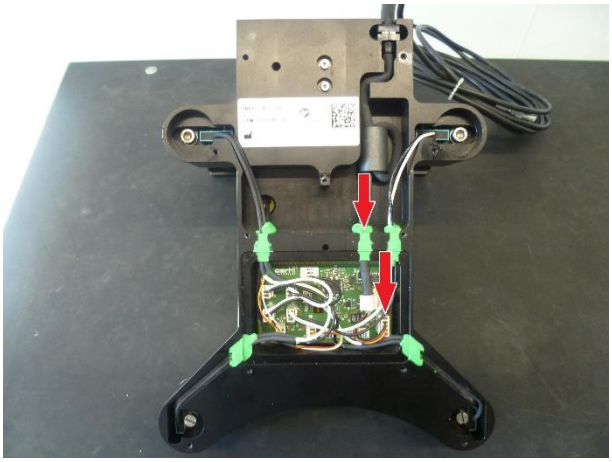


Step 2:

3. Remove the rubber mat.
4. Remove the Stop bolt with the screw (1.).
5. Remove the spring holder with the screw (2.).
6. Replace the springs for horizontal deflection
7. Assemble the pedal in reverse order, apply a new sealing mat and seal the pedal according to ♦11.2.

11.8 Pedal cable

VX400210



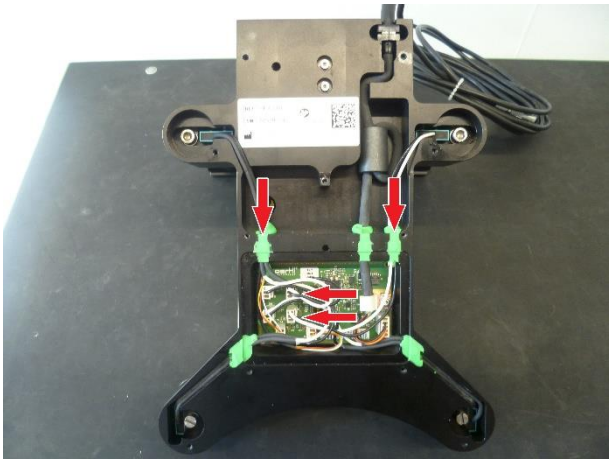
Step 1:

1. Remove the pedal covers according to ♦11.1.
2. Remove the pedal cable from the print.
3. Remove the pedal cable.
4. Reinstall the new pedal cable in reverse order.

11.9 Pedal switch

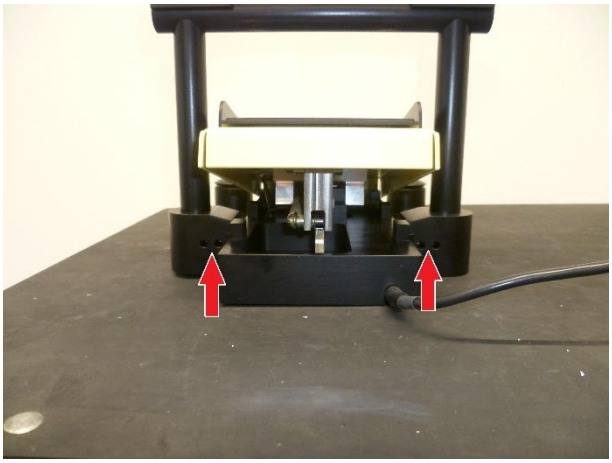
11.9.1 Top button switch

VX400175



Step 1:

1. Remove the pedal covers according to ♦11.1.
2. Remove the top button switch from the print.



Step 2:

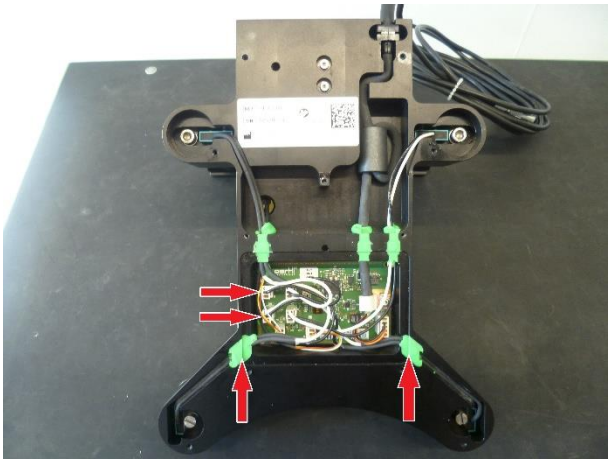
3. Remove the top button switch from the pedal.
4. Reinstall the top button switch in reverse order.

CAUTION!
Incorrect pedal signals transmitted to the device.
Risk of reversible eye damage to the patient.

- ► Perform a visual inspection of pedal switch:
- ► Tighten the screws on the sensor.

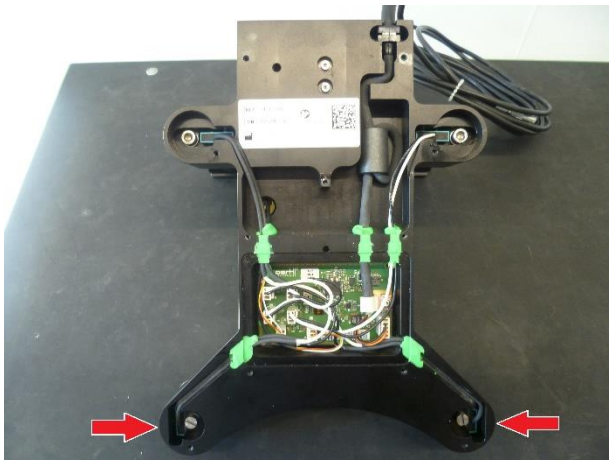
11.9.2 Lift button switch

VX400175



Step 1:

1. Remove the pedal covers according to ♦11.1.
2. Remove the lever switch from the print.



Step 2:

3. Remove the lever switch from the pedal.
4. Reinstall the lever switch in reverse order.

CAUTION!
Incorrect pedal signals transmitted to the device.
Risk of reversible eye damage to the patient.

- ► Perform a visual inspection of pedal switch:
- ► Tighten the screws on the sensor.

12 Order numbers for replacement parts

12.1 Spare parts for the device

The device serial number and SW version must be communicated to Oertli when placing an order for the following spare parts:

► VX400178

Article No.	Descripton	Packaging Unit
VX100944	Power LED module, spare part for Faros	1
VX101007	Hook for infusion pole, spare part for OS3 and Faros up to SN 5169xxxx / 5269xxxx	1
VX102062	Control knob for LED, spare part for Faros	1
VX120017	Castor wheel, spare part Faros up to SN 5169xxxx / 5269xxxx	1
VX120048	Visco connector, spare part for Faros	1
VX210087	VIT-PN module, spare part for Faros posterior	1
VX210089	Drive for infusion pole, spare part for Faros	1
VX210093	Control panel LED, spare part for Faros from SN 52620017 / 51620006 up to SN 5169xxxx / 5269xxxx	1
VX210221	Air-Visco module, spare part for Faros up to SN 5169xxxx / 5269xxxx	1
VX281029	Split ferrite, spare part for Faros	1
VX320012	Power supply unit, spare part for Faros up to SN 5169xxxx / 5269xxxx	1
VX400178	Logic- and power print, spare part for Faros	1
VX400182	Cable encoder pump motor, spare part for Faros	1
VX400186	Cable CAN-LOGIC (Pedal socket), spare part for Faros	1
VX400187	Cable socket to DIA transformer, spare part for Faros	1
VX400191	Force sensor Würth, spare part for CataRhex and Faros from SN 51600001	1
VX400200	Diagnostic socket, spare part for Faros	1
VX400334	Cable socket to Phaco transformer, spare part for Faros	1
VX400343	Diagnostic cable, service tool for Faros	1
VX520011	Replacement fuses 4.0AT, high breaking capacity, box of 10	10
VX520355	Cable LOGIC-USB, spare part for Faros	1
VX541118A	Wireless module, spare part for Faros up to SN 5169xxxx / 5269xxxx	1
VX541168A	Coupling plate complete, spare part for CataRhex and Faros from SN 51600001	1
VX541995	Software update Faros SW version: 3.1.1	1
VX101412	Set of gear wheels for infusion pole, spare part for OS3 and Faros	1
VX310070	Bottle holder with fastening screw, spare part for Faros	1
VX101865	Rack to irrigation rod, spare part for Faros	1
VX101833	Upper part for irrigation rod, spare part for Faros	1
VX101832	Protective tube for top irrigation rod (complete), spare part for Faros	1
VX340007	Pump motor, spare part for Faros	1
VX400170	Cable: Logic / Standby - switch, spare part for Faros	1
VX101838	Powder-coated front cover plate, spare part for Faros	1
VX103022	Rear cover plate, spare part for Faros	1
VX102110	Vit connection Luer black and green, spare part	1

12.2 Spare parts for the pedal

Article No.	Descripton	Packaging Unit
VX101236	Rubber mat for pedal, spare part for OS3 and Faros	1
VX101405	Mechanics heel switch for pedal, spare part for OS3 and Faros	1
VX310060	Pedal sensor, Würth connector, white, spare part for OS3 and Faros (SN 69xxxxxx / 88xxxxxx)	1
VX400175	Switch for top and heel button for pedal, spare part for OS3 and Faros	1
VX400210	Cable for pedal, spare part for OS3 and Faros (SN 69xxxxxx / 88xxxxxx)	1
VX520164	Rubber buffer for pedal, spare part for OS3 and Faros, box of 7	1
VX541199	Pedal print, spare part for OS3 and Faros	1
VX950043	Set of spare screws, spare part for pedal OS3 and Faros	1
VX103021	Bolt for pedal suspension, spare part for Faros	1
VX102888	Pedal rocker powder-coated, spare part for Faros	1
VX102887	Buttons to heel keys, spare part for Faros	1
VX102885	Bottom plate (upper and lower part), spare part for Faros	1
VX102917	Spring horizontal deflection, spare part for Faros	1
VX102892	Spring vertical deflection, spare part for Faros	1

12.3 Error Messages / Messages

Message	Explanation
Select surgeon	Prompts you to select the desired surgeon.
System ready	Successful completion of the system check when starting up the system.
Insert tube	Tube system is not in place (2 detection switches).
Fill, rinse PREOP 100%	PREOP running, progress displayed in per cent.
PREOP cancelled	PREOP procedure was cancelled.
SOUND 100%	The volume can be adjusted with the AUX button.
No pedal	The pedal is not connected or improperly connected.
Phaco test active	The Phaco test is running, nothing else can operate.
Phaco test O.K.	The Phaco test was completed successfully.
Repeat Phaco test	The test was cancelled and must be restarted.
Connect handpiece	The handpiece is not connected.
Test handpiece	The handpiece is performing poorly.
Defective handpiece	The handpiece won’t operate.
Check tip	The tip is not screwed on properly.
Set values	Values will be saved (user must continue to press button)
Values set	Values are saved (user can release button)
Not set	Values not saved (pressed on button not long enough).
Check compressed air	Compressed air tube not connected.
Compressed air too low	The pressure level on the compressed air connection is too low (less than 3bar), VIT PN cannot function properly. Check system pressure; possibly replace filter (service manual).
Pressure change	INJ: Pressure change more than 0.5bar. EXTR: Vacuum change more than 0.1bar too high, or 0.3 bar too low.
Replace lamp	Lamp defective.
Light on	Confirmation that the light was switched on.
Light off	Confirmation that the light was switched off.
Lamp hot, wait	Wait approx. 30s before switching on the light again.
Temperature too high	The temperature is higher than 55 degrees Celsius.
ERROR NNN TEXT1 TEXT 2	Error message, refer to table <Error messages>.

Error number	Meaning	Solution
Error 1	+12V, -12V, +24V, +5V not within tolerance Warning 'CALL ' 'SERVICE'	Call up service (error in internal voltage). The device cannot be operated.
Error 2	Impossible sensor calibration values: Peristaltic or DIA calibration Warning 'Adjust ' 'Unit '	Call up service (pressure measurement error). The device cannot be operated.
Error 3	Pedal not calibrated or incorrectly calibrated Message in display: ' ADJUST PEDAL'	Call up service. The pedal is incorrectly calibrated (impossible reference values for pedal positions). The device cannot be operated.
Error 4	Graphic display defect Warning 'GRAPHIC ' 'DISPLAY' '	Call up service (function display is defective).
Error 5	GRAPHIC DISPLAY	Value display not ready.
Error 8	Undefined condition Warning 'Programme' 'Failure ' '	Call up service; the device cannot be operated.
Error 9	NV-RAM defective or missing Warning 'NV-RAM' 'FAILURE' '	Call up service; the device cannot be operated.
Error 10	Pump not reacting, pump not turning Message 'PUMP' 'FAILURE' 'ERROR 10'	Call up service (disruption in the pump regulation circuit). The device cannot be operated.
Error 11	U_{pow} too low (PTC2 was triggered) or U_{vit} too low (PTC4 was triggered) Warning 'OVERLOAD'	PHACO, DIA, CAPS – final stage: Too heavy demand, wait until the affected circuit has cooled, message disappears.
Error 12	Warning 'IRR MOTOR'	Block or current limiting of the rod drive.
Error 13	Pump not reacting, pump not turning (at normal operation) Message 'PUMP FAILURE' 'ERROR 13'	Disruption in the pump regulation circuit or high resistance at pump wheel. Check tubing set. Message disappears after approx. 10 seconds.
Error 15	Force sensor defective Warning 'FORCE SENSOR'	Ascertain whether the force sensor is plugged in or whether there is a severed cable; call up service.
Error 17	Offset force sensor false 'ADJUST FORCESENS'	Test the force sensor values for validity.
Error 20	Warning 'EXTR DEVIATION'	Pressure instead of vacuum.
Error 21	Warning 'ADJUST VISCO'	Impossible VISCO sensor value.
Error 22	Warning 'ADJUST AIR'	Impossible AIR sensor value.
Error 23	VIT PN SENSOR ERROR	Sensor to Vit PN defective. Limit cutting rate to below 3000 cuts per minute.
Error 24	LED Error	Call service, hardware error at the light module or too little cooling power. Light cannot be operated.
Error 25	LUM Hardware Error	Call service, wrong light module type has been chosen in the service mode. Light cannot be operated.

13 Authorised Service Points

Oertli Instrumente AG
Customer Service and Support
Hafnerwisenstrasse 4
CH – 9442 Berneck, Switzerland
Tel.: +41 (0)71 747 42 00
E-mail: css@oertli-instruments.com
Website: www.oertli-instruments.com

Contact Oertli Instrumente AG for information on authorized service points in your country.

13.1 Sending defective device, instrument or part to Oertli

1. Clean, disinfect and sterilize reusable instruments and surgical platforms according to TN999042 before returning them to the service point.
2. Fill out the QMF 17.09_Return form, and additionally for reusable instruments QMF 17.15_Hygiene status of reusable instruments.
3. Send device, instrument or part in appropriate packaging to the service point.

14 Appendix A) Safety check

Please see form on next page.

Safety Check
Faros

Customer	
Address:	
Contact person:	

Faros device	
Article no.:	
Serial no.:	
Software version:	

Test device			
Brand / Model:		Serial no.:	

Perform safety check

		not OK	OK
1. Check protective earth connections.	according to IEC 60601-1	❑	❑
2. Check leakage currents.	according to IEC 60601-1	❑	❑

Work completed:	❑ yes	❑ no	Installation accepted:	❑ yes
Needs follow up:	❑ yes	❑ no	Service accepted:	❑ yes

Field engineer:		**Customer:**	
Name:		Name:	
Date:		Date:	
Signature:		Signature:	
Comments:			

Oertli Instrumente AG CH-9442 Berneck Switzerland Phone +41 (0)71747 42 00
Fax +41 (0)71 747 42 90 www.oertli-instruments.com info@oertli-instruments.com

15 Appendix B) Functional test

Please see form on next page.

Functional Test
Faros

Customer

Address:	

Contact person:	

Data of Faros device

Article no.:		
Serial no. Faros device:		
Software version Faros device:		
Serial no. Faros pedal:		
Software version Faros pedal:	SW:	HW:

Functional test

1. User data and log files

		OK
1.1	Save user data on a USB flash drive according to the Faros service manual (VV016035E), chapter ♦6.4.4. Notice: _____	☐
1.2	Save log files on a USB flash drive according to the Faros service manual (VV016035E), chapter ♦6.4.5. Notice: _____	☐

2. Software

		OK
2.1	Latest software version installed? Notice: _____	☐

3. Settings in service mode

Pedal OK

3.1 Heel and top switch, each left/right, is correctly displayed. ☐

Notice: _____

3.2 Neutral position: no deflection is displayed. ☐

Notice: _____

3.3 Vertical Pos. 1, Pos. 2, Pos. 3 and Pos. 4: sectors from 0 to 100 % are correctly displayed and correspond to the mechanical transition. ☐

Notice: _____

3.4 Horizontal left and right: Sectors from 0 to 100 % are correctly displayed. ☐

Notice: _____

Sensors

Without tubing system! OK

3.5	Force sensor	0 ±10 mmHg	Current value: _____ mmHg	New value: _____ mmHg	☐
	Notice: _____				
3.6	Air sensor	0 ±10 mmHg	Current value: _____ mmHg	New value: _____ mmHg	☐
	Notice: _____				
3.8	Injection sensor	0 ±0.05 bar	Current value: _____ bar	New value: _____ bar	☐
	Notice: _____				
3.9	Extraction sensor	0 ±0.05 bar	Current value: _____ bar	New value: _____ bar	☐
	Notice: _____				
3.10	VIT PN sensor	0 ±0020 digit	Current value: _____ digit	New value: _____ digit	☐
	Notice: _____				

Only calibrate in case of a deviation from tolerance!

Buttons OK

3.11 Check the buttons on the control panel. ☐

Notice: _____

4. Visual and mechanical inspection

OK

4.1 Pump wheel: check pump reels. ☐
Notice: _____

4.2 Check infusion hooks and holder for drainage bag for a tight fit. ☐
Notice: _____

4.3 Check castor wheels for smooth running. ☐
Notice: _____

4.4 Pedal mechanical OK (rubber buffer, switch, rubber mat, etc.) ☐
Notice: _____

4.5 Check mains cables and power socket with fuses for mechanical damages. ☐
Notice: _____

4.6 Check compressed air connection for stability and impermeability. ☐
Notice: _____

4.7 Measure input pressure (in the building) | Range of compressed air 6.5-10 bar | Measured value: _____ bar ☐
Notice: _____

4.8 Check the connection between the device equipotential bonding and the device power plug. ☐
Notice: _____

4.9 Check the connection between the device equipotential bonding and the device frame. ☐
Notice: _____

For all subsequent tests, the device must be connected to the compressed air net.

5. Irrigation pole

OK

5.1 Vary IOP height by means of pedal and screen. ☐
Notice: _____

5.2 Entire path runs without any scratching noises (clean sealing ring). ☐
Notice: _____

6. Peristaltic and SPEEP® pump system

Insert tubing system, connect I/A tubes, connect infusion tube to filled infusion bottle or immerse in liquid.

			OK
6.1	Select I/A function, peristaltic pump system. Notice: _____		☐
6.2	Generate occlusion with I/A values from surgeons‘ memory. Notice: _____	Reaches set values	☐
6.3	Generate occlusion with a maximum of 50 ml / min flow and 600 mmHg vacuum. Notice: _____	Reaches maximum values in approx.< 2.5 s	☐
6.4	Hold occlusion and get pedal to neutral position. Notice: _____	Peristaltic pump is lowering pressure	☐

Open I/A tubings and hold them into an empty vessel.

			OK
6.5	Activate reflux. Notice: _____	Aspiration flows back	☐
6.6	Activate reflux and generate occlusion. Notice: _____	Pump stops (audibly)	☐
6.7	Press <IRR> key and release pedal. Notice: _____	Irrigation is retained (liquid is flowing from irrigation tube)	☐
6.8	Activate reflux. Notice: _____	Irrigation stops	☐

7. Phaco

Assemble phaco handpiece with phaco tip and test chamber and install tubing system!

			OK
7.1	Select phaco, press <TEST> key. Notice: _____	Phaco test is performed	☐
7.2	After completion of the phaco test, the notice <Test OK> appears. Notice: _____		☐
7.3	Activate maximum phaco power output. Notice: _____	Reaches 100 %, hisses	☐
7.4	Activate pulse, burst and CMP. Notice: _____	Function OK, hisses	☐

7.5	Generate occlusion with surgeons‘ values and undo occlusion.	Test chamber remains stable	☐
	Notice: _____		

8. HF: DIA, CAPS, HFDS

Connect HF instrument and immerse any HF tip in liquid! OK

8.1	Activate DIA	Function OK, sound correct	☐
	Notice: _____		
8.2	Activate CAPS	Function OK, sound correct	☐
	Notice: _____		
8.3	Activate HFDS (if installed only)	Function OK, sound correct	☐
	Notice: _____		

9. VIT

Connect cutter! OK

9.1	Select VIT and press the <TEST> key	VIT test is performed / cutter is running	☐
	Notice: _____		
9.2	After completion of the VIT test, the notice <Test OK> appears (only anterior/posterior version)		☐
	Notice: _____		

Activate cutter via pedal and release pedal after cutter activation! OK

9.3	Loosen green tube at the cutter / device connection.	Air escapes from the connection. After approx. 2s it stops.	☐
	Notice: _____		
9.4	Activate VIT with maximum cutting rate.	Function OK	☐
	Notice: _____		
9.5	Check light: Brightness regulation	Function OK	☐
	Notice: _____		

10. Remote Control

10.1	If available, establish a wireless connection according to ♦6.6.	☐
	Notice: _____	

11. Measurements conducted with pressure gauge (without any liquid)

11.1 Check the following pressure values:

Function	Setting value	Tolerance	Measured value
Peristaltic and Speep® pump system (set maximum flow)	Reflux +150 mmHg (Activate reflux several times)	± 30 mmHg	_____ mmHg
	- 150 mmHg	± 30 mmHg	_____ mmHg
	- 300 mmHg	± 60 mmHg	_____ mmHg
	- 450 mmHg	± 90 mmHg	_____ mmHg
	- 600 mmHg	± 120 mmHg	_____ mmHg
Air	30 mmHg	± 5 mmHg	_____ mmHg
	60 mmHg	± 6 mmHg	_____ mmHg
	90 mmHg	± 9 mmHg	_____ mmHg
	120 mmHg	± 12 mmHg	_____ mmHg
Injection	0.5 bar	± 0.2 bar	_____ bar
	2.5 bar	± 0.2 bar	_____ bar
	5.0 bar	± 0.2 bar	_____ bar
Extraction	- 0.2 bar	± 0.1 bar	_____ bar
	- 0.5 bar	± 0.1 bar	_____ bar
	- 0.8 bar	± 0.16 bar	_____ bar

12. Safety Check

OK

12.1 Check protective earth connections according to IEC 60601-1. ☐

Notice: _____

12.2 Check leakage currents according to IEC 60601-1. ☐

Notice: _____

Used replacement parts

Description	Article no.	Serial no. / version	Quantity	Remark

Work completed:	❑ yes	❑ no	Service accepted:	❑ yes
Adjustments completed:	❑ yes	❑ no		
Needs follow up:	❑ yes	❑ no		
Needs estimate of costs:	❑ yes	❑ no	Send to:	
Functional test performed:	❑ yes	❑ no		
Pedal has been sealed:	❑ yes	❑ no		
ESD protection was ensured:	❑ yes	❑ no		

Field engineer:		**Customer:**	
Name:		Name:	
Date:		Date:	
Signature:		Signature:	

Comments / recommendations:

Oertli Instrumente AG
Hafnerwisenstrasse 4
9442 Berneck
Switzerland

T +41 71 747 42 00
F +41 71 747 42 90

www.oertli-instruments.com

VV016035E 2022-05-12 Rev 13