GERLACH TECHNIK
Solutions for intelligent foot care

Service Manual

Foot care suction device
LUNA AT MICRO

As of S/N 24.1312013 (Model LUNA 2013)

Contents

1 General

1.1 Purpose

This service manual is intended to help authorized workshops to service and repair the LUNA AT MICRO foot care device, as off model year 2013.

The handpiece attachment (FH40A) is not described in this document. Please refer to separate service manuals available for these items. See also chapter 3.2 Further documents.

1.2 Qualification of personnel

Service work on the LUNA AT MICRO foot care device may only be carried out by qualified and authorized specialists. Qualified specialist personnel are persons who, due to their specialist training, knowledge and experience, as well as their knowledge of the relevant safety regulations, are able to carry out the work safely and to recognize and avoid possible dangers. Advanced technical knowledge and basic knowledge of occupational safety are required. The local accident prevention regulations and the general safety regulations apply. The relevant safety regulations of DIN, EN, and VDE must be observed.

1.3 Safety

	DANGER! Contact with mains voltage. Danger to life from electric shock. Pull the mains plug before opening the device.

	ATTENTION! Electrostatic sensitive devices (ESD). Open the device only in an ESD-protected environment.

- After repair or replacement of electrical components, the electrical system must be checked in accordance with EN 62353 / VDE 0751-1. The documentation of the test must be proven, when required.

- The device may only be opened by the manufacturer or by authorized specialists. Unauthorized changes to the device are not permitted.

	DANGER! Contact with germs. Risk of infection from grinding dust that may contain pathogens. Wear protective goggles, dust protection mask and protective gloves when cleaning the device.

- Make sure that there is no grinding dust in the device before servicing. If necessary, clean the device before servicing.
  ATTENTION! Blow-out with compressed air may only be carried out in a closed dust suction cabin.

1.4   Contact

The technical service of Eduard Gerlach GmbH will be happy to assist you, if you have any further questions.

Eduard Gerlach GmbH
Bäckerstraße 4 – 8
D-32312 Lübbecke
Germany

Telefon: 0049 5741 / 330-0
Technical Service International: technical-service@gehwol.de

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Revision: E01

2   Tools and equipment

In addition to the usual workshop equipment, the following special tools are required for certain work.

	704207448 Adjustment kit for AT devices Required to adjust the suction function and the dust bag full indicator. contents: • Adjustment cover • Pressure tube with adapter • Handpiece test attachment 6,3 mm
	704207366 Tool for magnet shaft Tool for assembling and disassembling the magnetic shaft on the suction motor. Required when changing the suction motor.

Measuring equipment

The following measuring equipment is required:

- Optical tachometer up to min. 50,000 min^{-1}, DAkkS calibrated
  for example VOLTCRAFT DT10L
- Test pin for rotation speed measurement
- Testo 512 pressure gauge, 0 - 200 hPa, DAkkS calibrated

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	In accordance with the agreement "Measuring equipment required for GERLACH service partners", the measuring devices for speed and vacuum measurement must be calibrated according to the DAkkS standard.

3 Technical changes

3.1 Overview of technical changes

Serial number	Software version	Change / Comments
24.1312013	LUN 001	Product introduction of the LUNA 2013 model.
24.1312178	LUN 002	• Brightness of display reduced. Known issues: • Switching threshold for automatic overload shutdown too low. The device sometimes switches off too early (OFF-Problem).
24.1412353	LUN 003	• Minor hardware changes. • Corrected switching threshold for automatic overload shutdown.
24.1412952		• Change from medical to non-medical device. The device is identical to the previous version, but is no longer classified as a medical device (October 2014).
24.1513267	LUN 4.2	• Torque of handpiece motor improved. • Start-up defaults: clockwise rotation, last used speed, suction level 2.
24.1513786		• Improved rubber foam sound insulation.
24.1513863		• New power supply MPS-65-27 (replaces MPS-45-27).
24.1513877	LUN 4.3.2	• New Service Menu functions: U4 – Show software version U7 - Automatic adjustment of dust bag indicator, rubber foam insulation • Ambient air pressure is measured and used for automatic adjustment • Internal vacuum values displayable.
24.1715133		• Both sound absorber pads reduced to 30 x 53 x 10 mm size.
24.1815657		• New vacuum controller ATGV 2F replaces ATGV 2E. All ATGV 2x controller are compatible.
24.1915908	LUN 4.4.1	• New Service Menu functions: U1 – operating hours counter for dust bag indicator Function deactivated ex works, by setting "00".
24.1916032	LUN 4.4.2	U1 function deactivated by default.

3.2   Changes from the previous model

Externally, the LUNA 2013 model can be distinguished from the previous version by its white LED display. Further changes and developments are:

- New flat module AT2012
- New, more powerful and soldered in processor
- Temperature sensor ATGT removed
- Service Interval indicator as one LED
- Display board connects with flat flexible cable (FFC)
- Different cable connectors
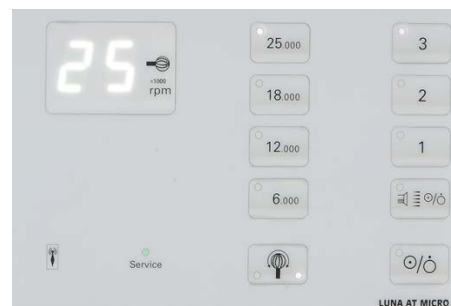
3.3 Compatibility

The following components are not compatible with the previous LUNA model (with red display):
- Flat module AT2012, foil keyboard, display board
- Cable FH40A, cable to vacuum controllers, cable to power supply

3.4   Medical device / non-medical device

SIRIUS devices from S/N 24.1312013 to 24.1412951 are medical devices. Later devices are identical in construction, but were no longer subjected to the conformity assessment procedure and were therefore classified as non-medical device.

3.5 Sound insulation types

	(New) rubber foam sound insulation The new improved sound insulation made of rubber foam is used as of S/N 24.1513786.
	(Old) polystyrene sound insulation The polystyrene sound insulation was used until S/N 24.1513785 Non-medical devices from S/N 24.1412952 to 24.1513785 can be retrofitted to the new rubber foam sound insulation.

4 General information
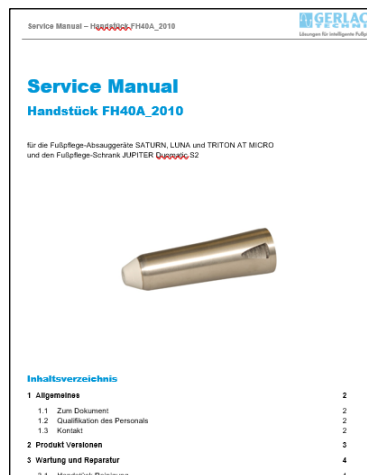
4.1 User manual

> **Note:** Also read the user manual. It contains important information on the operation and maintenance of the device.

Please note that after replacing the flat module, a newer software version than that indicated by the serial number of the device may be installed.

4.2 Further documents

The handpiece attachment and the motor-handpiece (including hose) is not described in this document. Please refer to separate service manuals available for these items.

4.3 Lack of cleaning

If the device to be serviced lacks cleaning and maintenance, please remind the user to follow the cleaning and maintenance instructions in the user manual.

- Remind the user how important regular handpiece cleaning is. Cleaning weekly is recommended.
- Demonstrate the correct cleaning of the handpiece.
- If necessary, remind the user to use only new and original dust bags and filters.

4.4 Flat module replacement

New or spare flat modules are delivered with the latest software version. When replacing the flat module, please label the device accordingly. Place a sticker with the software version (LUN xx) next to the nameplate. Inform the user about changes in the operation, if necessary.

4.5 Electrostatic-sensitive devices (ESD)

> **CAUTION!** Electrostatic-sensitive devices (ESD).
> Open the device only in an ESD-protected environment.

Use a grounding mat and an antistatic wrist strap when working on electronic components.

4.6   Disconnecting cables

Most of the cable connections are secured with locking or latches and must not be loosened with force.

Disconnecting flexible flat cables (FFC)

Be careful when disconnecting the flexible flat cables (FFC) from the flat module. The connector bracket can break easily. Push it gently and alternately left and right so that it does not tilt.

If the connector bracket is broken, the entire flat module must be replaced!
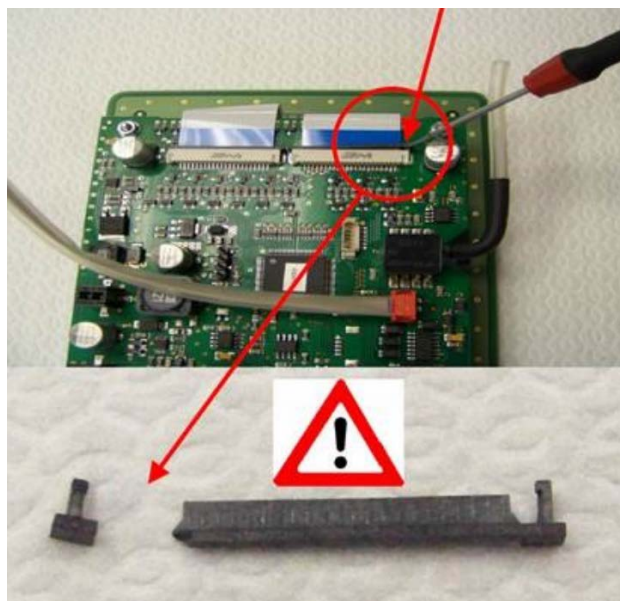
4.7   Service LED

The Service LED is intended to show the user when a service inspection is recommended.

	Service LED does not light up	Normal operating mode, < 400 operating hours.
	Service LED flashes	The device has 400 - 500 operating hours.
	Service LED lights up permanently	The device has over 500 operating hours. A service inspection is recommended

4.8   Handpiece unit not connected

If the handpiece is activated without a handpiece unit being connected, the device shuts off automatically and shows "OF" in the display.

4.9   Internal vacuum values

As of software version LUN 4.3, the readings of the internal vacuum sensor can be displayed, by placing a small magnet below the service LED. The value is shown as a 3-digit hex value. Since LUNA only has a 2-digit display the first digit is shown in binary, indicated by lit LEDs in the speed buttons.

Button 6,000 = 1 ; 12,000 = 2 ; 18,000 = 4 ; 25,000 = 8

If several LEDs light up at a time, the numbers must be added. The second and third digits is shown in the speed display. After switching the device off and on, the rotation speed is displayed again.

4.10 Interference with UV lamp 704513400

If the LUNA device is operated next to the UV lamp, art.no. 704513400, switching the lamp can unintentionally trigger functions in the device. This UV lamp was used in AT/NT Clean cabinets and in JUPITER Duomatic units until March 2016. The problem was solved with a new version of the lamp.
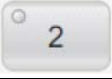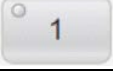
5   Service Menu

Basic settings can be made in the Service Menu.

5.1   Overview and operation

Menu	Function	Access level	Software version
U0	Set remote foot switch channel	User	all
U1	Counter for dust bag indicator	User	>LUN 4.4.1
U2	Reset Service LED	User	all
U4	Show software version	User	>LUN 4.3.2
U5	Adjust suction power	Service	all
U6	Automatic adjustment of dust bag indicator, polystyrene insulation	Service	all
U7	Automatic adjustment of dust bag indicator, rubber foam insulation	Service	> LUN 4.3.2
Ub	Manual adjustment of dust bag indicator	Service	all
UF	Exit Service Menu	Service	all

Button assignment

Button	Usage in Service Menu
3	**execute**
2	**+**
1	**−**

Start the Service Menu and select a function

- Hold down the **direction of rotation** button while switching on the device with the mains switch.

- The display now shows "U0".

- Use the **1** (-) and **2** (+) buttons to select the desired function U0 to UF.

- Only for functions with access level "Service": Hold a small magnet under the Service LED to unlock. Successful unlocking is indicated by blinking of the LED.

- Press the **3** button to execute the selected function.
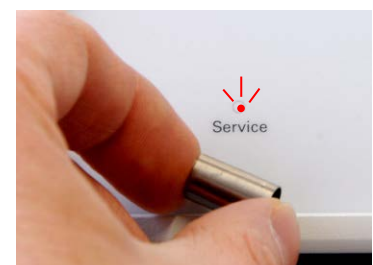
Exit the Service Menu

- To exit the service menu, select function UF and press the **3** button.

5.2 Functions

U0 - Set remote foot switch channel
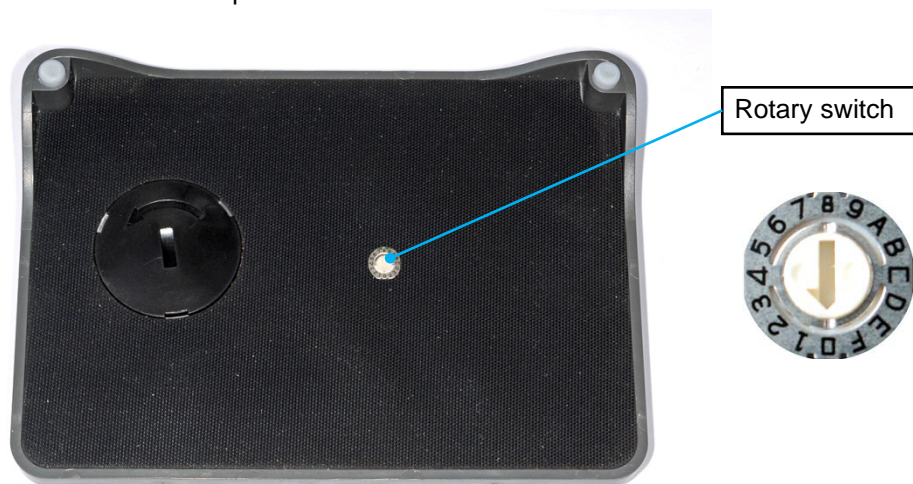
LUNA, SATURN and TRITON devices are set to channel 0 at the factory. If multiple devices are operated with a remote foot switch (no. 304204310), it is necessary to set individual channel for each device.

On the remote foot switch: Set the channel with the rotary switch on the underside of the foot switch. The switch is hidden under a pre-cut rubber cover.

Rotary switch

On the device: Set the same channel with Service Menu function U0:

- Start the Service Menu and execute function U0.

- The display shows the channels 0 to F which is currently set.
  For example, "C 0" for channel 0.

- Use the **1** (-) and **2** (+) buttons to set the same channel as set on the foot switch.

- Check the remote connection by pressing a button on the foot switch.
  The remote signal indicator lights up when the device receives a signal from the remote.

- Press **3** to confirm the channel setting.

- To exit the Service Menu, select UF and press the **3** button.

Remote foot switch channel – factory settings	Channel
LUNA, SATURN und TRITON	0
SIRIUS und NEPTUN	7
JUPITER Duomatic	F

U1 – Counter for dust bag indicator (not used)

(available as of LUN 4.4.1.)
This function is not used. It allows to set an operating hours counter for the dust bag full indicator. It is set to "00" by default to have it deactivated.

U2 – Reset Service LED

This function resets the operating hours counter of the Service LED.

- Start the Service Menu and select function U2.
- Press the **3** button to reset the operating hours counter
  The device then returns in operation mode.

U4 – Show Software Version

(available as of LUN 4.3.2)
This function shows the software version of the device.

- Start the Service Menu and select function U4.
- Press the **3** button to show the software version.
- The first two digits are shown on the display.
  The third digit (if available) is shown in a binary format indicated by lit LEDs in the speed buttons:
  6.000 = 1, 12.000 = 2, 18.000 = 4, 25.000 = 8,
  If several LED are lit the numbers have to be added.

U5 – Adjust suction power

This function is used to adjust the suction power. See chapter Adjustment instruction for details.

U6 – Automatic adjustment of dust bag indicator, polystyrene insulation

This function does an automatic adjustment of the dust bag full indicator on devices with the old polystyrene sound insulation (S/N 24.1312013 - 24.1513785). See chapter Adjustment instruction for details.

U7 – Automatic adjustment of dust bag indicator, rubber foam insulation

(available as of LUN 4.3.2)
This function does an automatic adjustment of the dust bag full indicator on devices with the new rubber foam sound insulation (as of S/N 24.1513786). See chapter Adjustment instruction for details.

Ub – Manual adjustment of dust bag indicator

This function allows to do a manual adjustment of the dust bag full indicator. See chapter Adjustment instruction for details.

UF – Exit the Service Menu

- To exit the Service Menu, select UF and press the **3** button.
  The device returns to operation mode.

Functions U3, U8, U9, UA, UC, Ud and UE are not used on LUNA devices.
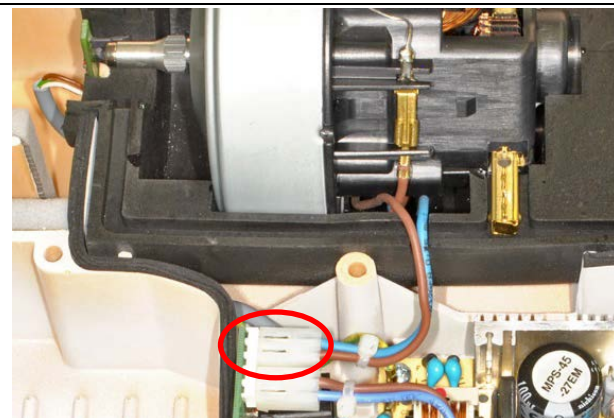
6 Maintenance and repairs

6.1 Check vacuum controller and suction motor

If the suction does not work, the output voltage of the vacuum controller should be checked first.

Switch on the suction and measure the output voltage of the vacuum controller. It should be approximately 90 V- on the lowest suction setting and approximately 120 V- on the highest suction setting. ⚡ **Danger!** Contact with mains voltage. There is 230 Volt mains voltage on the input side.	
If there is no output voltage, the vacuum controller should be replaced.	*704207422 Vacuum controller ATGV 2E/F*

Then check the suction motor.

Switch off the device and pull out the mains plug.	
Open the sound insulation and unplug the suction motor from the vacuum controller.	
Check the temperature fuse. The resistance should be close to 0 ohms. Then test the motor on an external power supply with 20 - 40 volts DC. The motor should run smoothly, quietly and without excessive sparking on the collector.	
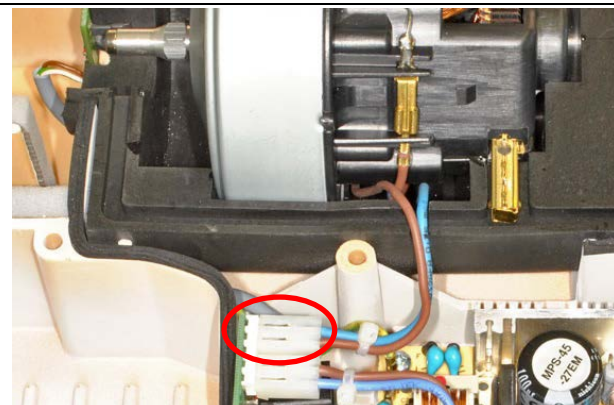
6.2 Replace suction motor

Defective or worn suction motors have to be replaced (order-no. 704203808). Spare carbon brushes are not available. New suction motors are supplied without magnetic shaft, without temperature fuse and without cable. These parts must be reused from the old motor. A special tool is required to install the magnetic shaft to the motor.

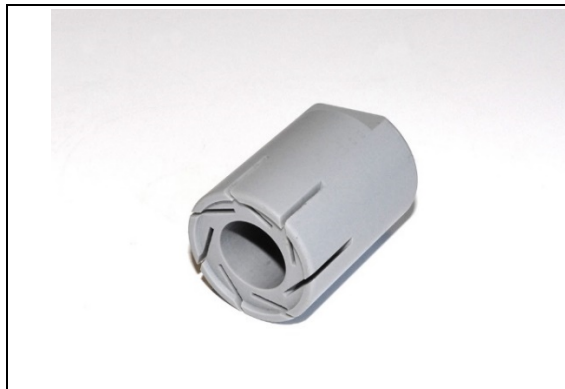|	704207366 Tool for magnet shaft Intended to hold back the rotor blades when installing the magnet shaft on the suction motor.

	Note: The holders of the carbon brushes are fragile and can easily bend. Handle the suction motor with care.

Unplug the power cord and open the device.	
Open the sound insulation. Unplug the suction motor from the vacuum controller. Take out the suction motor.	
Prepare the new suction motor. Drill or file the holder for the temperature fuse to about 3mm. **Caution**: The material is brittle and can easily break.	
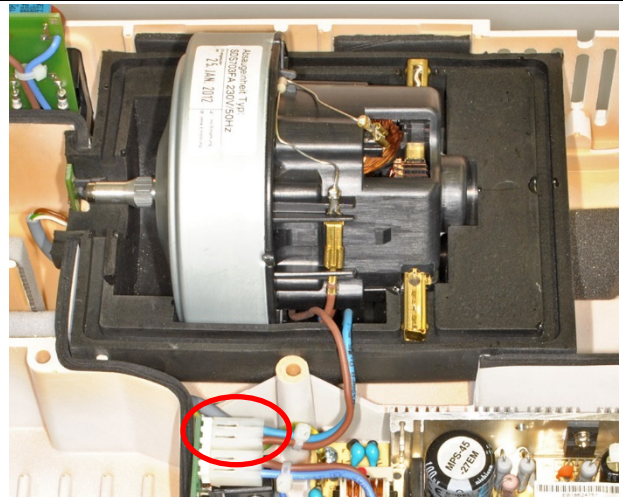
Bend both connectors downwards.	
Take the temperature fuse and the connecting cable from the old motor and mount them on the new motor. If necessary, narrow the cable lugs slightly so that they are firmly attached to the connectors. Note: Check the temperature fuse. It should be close to 0 ohms.	
Put the „*704207366 Tool for magnet shaft*" on the rotor blades of the suction motor.	
Use an SW10 socket wrench to loosen / fasten the magnetic shaft and an SW24 open-end wrench to hold it back. Remove the magnetic shaft from the old motor. Then remove the nut on the new motor and mount the magnetic shaft there.	
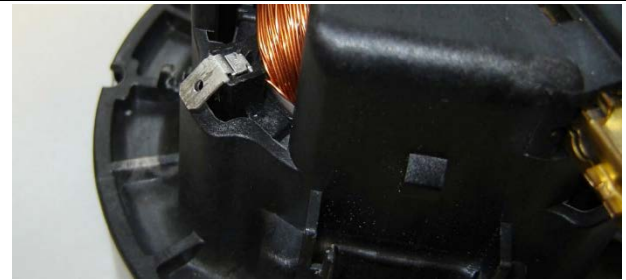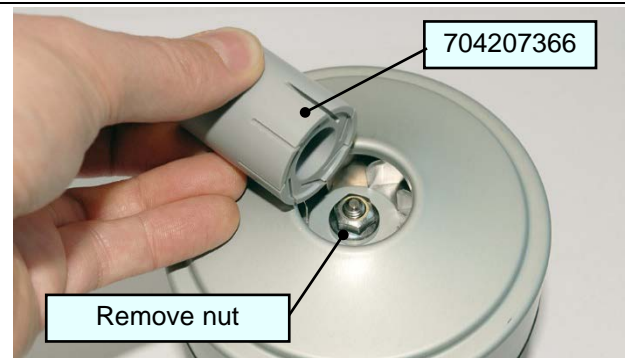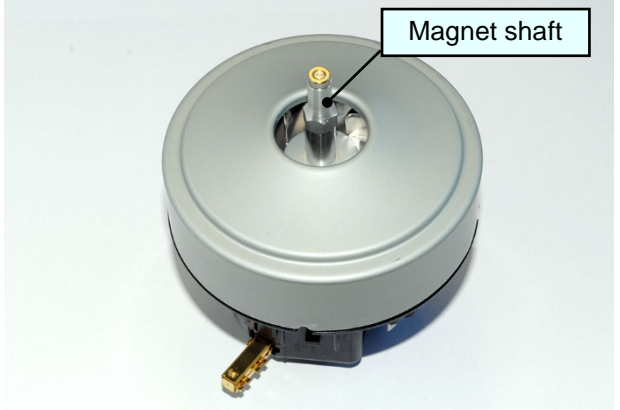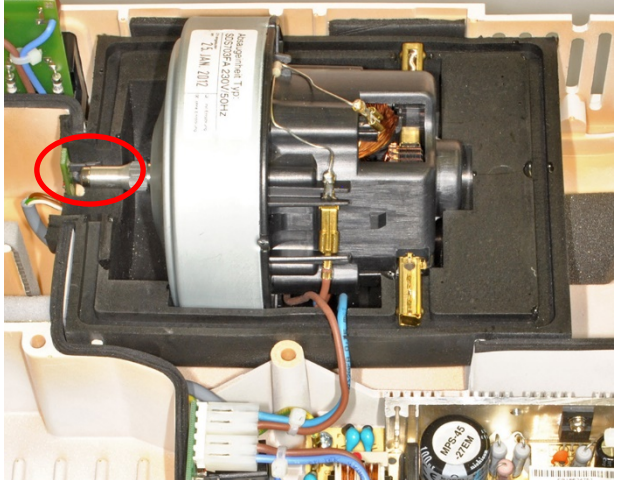
Suction motor with magnet shaft installed.	Magnet shaft
Insert the new motor and connect it to the vacuum controller. Make sure that sound insulation and motor are seated correctly and that the magnetic shaft is correctly aligned with the speed sensor. (see also the following chapter "Checking and gluing sound insulation") **Note**: On devices with older polystyrene sound insulation use a strip of double-sided adhesive tape to fix the motor.	
Let the new suction motor run in for a few minutes.	
If the motor is running loudly and screeching, the carbon brushes may not sit flat on the commutator. Try to bend the carbon brush holder minimally (in the 1/10 millimeter range) until the noise subsides. **Attention**: The holders of the carbon brushes are very sensitive and can easily be damaged. Be very careful and use minimal force.	
Put the top of the sound insulation back on. It should click into place and close tightly all around.	
Reassemble the device and carry out a safety check.	

6.3 Glue in the sound insulation

If the sound insulation has come loose (e.g. due to improper transport), it must be glued into the housing.

Note: Applies only to devices with rubber foam sound insulation (> S/N 24.1513786). The older polystyrene sound insulation does not have to be glued in.

Check that the lower half of the sound insulation is firmly seated in the housing.	
The flange of the sound insulation lies all around on the housing wall and the circuit board of the speed sensor sits in the corresponding recess. The motor is firmly seated in the sound insulation and the magnetic shaft is correctly aligned with the speed sensor (distance approx. 2 - 4 mm).	
If the sound insulation is not properly seated, remove the motor and the sound insulation. Stick in a strip of double-sided tape (approx. 100 x 50mm) …	
… or use a trace of silicone adhesive to glue in the sound insulation.	
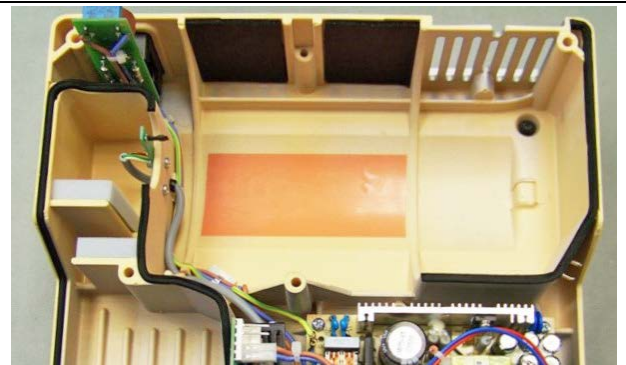
Reinsert the lower part of the sound insulation and the motor. Make sure both are correctly seated as described at the beginning of the instructions. **Note**: On devices with older polystyrene sound insulation use a strip of double-sided adhesive tape to fix the motor.	
Put the top of the sound insulation back on. It should click into place and close tightly all around.	

7 Adjustment instructions

The following adjustment instructions are used to adjust the suction power and the dust bag indicator. An adjustment should be carried out if the flat module, the suction motor or the vacuum controller have been replaced or repaired or during a routine service inspection.

> The suction power can be adjusted either with vacuum measurement or with volume flow measurement.

Measuring equipment

The following measuring equipment is required:

- Optical tachometer up to min. 50,000 min^{-1}, DAkkS calibrated
  for example VOLTCRAFT DT10L
- Test pin for rotation speed measurement
- Testo 512 pressure gauge, 0 - 200 hPa, DAkkS calibrated
- 704207448 Adjustment kit for AT devices

> In accordance with the agreement "Measuring equipment required for GERLACH service partners", the measuring devices for speed and vacuum measurement must be calibrated according to the DAkkS standard.

Preparation

Before the adjustment, the device must warm up for approx. 10 minutes with the following settings:
- Handpiece motor switched on, speed 20,000 min^{-1}, clockwise rotation
- Suction switched on, suction level 2

7.1 Check motor speed

Check the motor speed values given in table 1 with an optical tachometer. You can use a GERLACH test bur with half of the ball painted black.

Display	Error limit	minimal rpm	maximal rpm
6.000	+/- 10%	5.400 min^{-1}	6.600 min^{-1}
12.000	+/- 10%	10.800 min^{-1}	13.200 min^{-1}
18.000	+/- 5%	17.100 min^{-1}	18.900 min^{-1}
25.000	+/- 5%	23.750 min^{-1}	26.250 min^{-1}
30.000	+/- 5%	28.500 min^{-1}	31.500 min^{-1}

Table 1: Values for motor speed

7.2 Adjustment of suction power

The suction power can be adjusted either with vacuum measurement or with volume flow measurement.

Adjustment of suction power with vacuum measurement
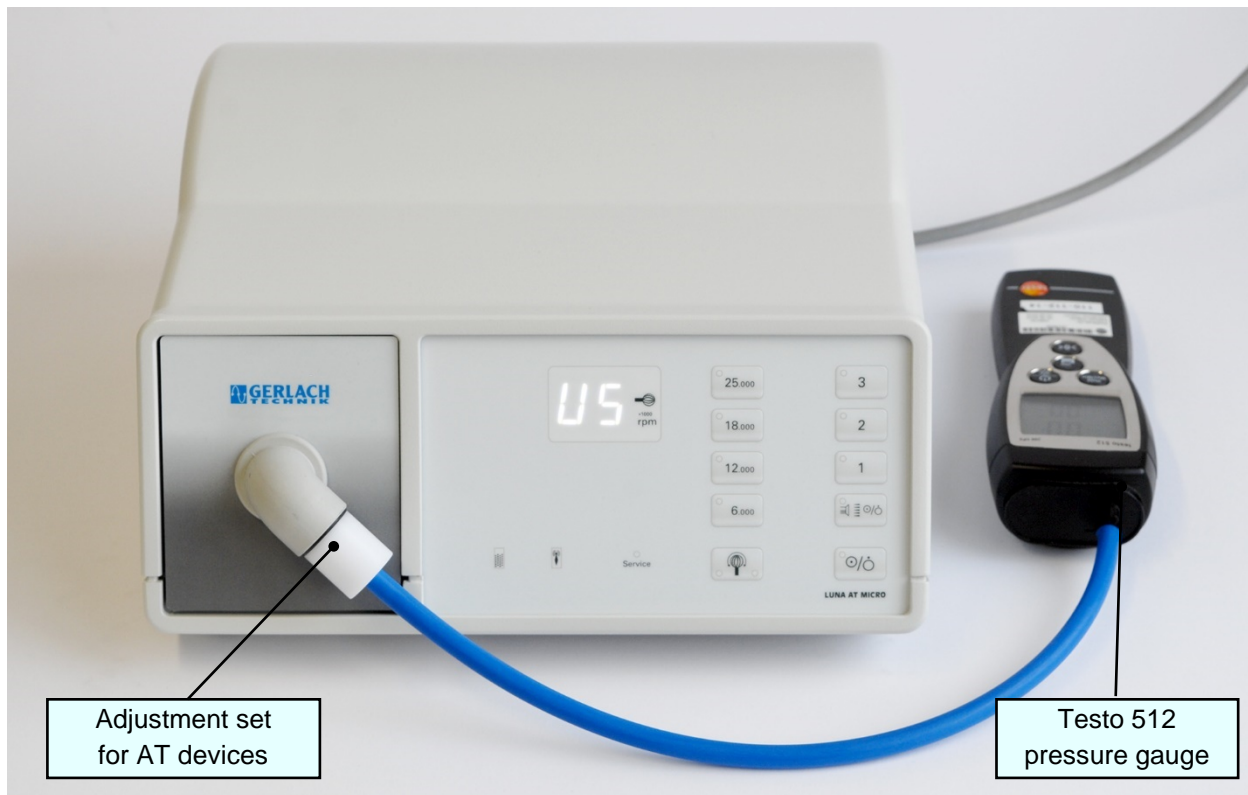
Adjustment set
for AT devices

Testo 512
pressure gauge

- Let the device (with handpiece attached) run for approximately 10 min on suction level 2.
  Then switch it off with the power switch.

- Remove the handpiece unit and install the cover and pressure hose from the "Adjustment set for AT devices (Art.No. 704207448)".

- Connect the pressure hose to the "-" connection of the pressure gauge.

- Set the gauge to hectopascal "hPa". Place the measuring device in the position of use and press the >0< key for zero adjustment.

- Start the Service Menu by holding down the **direction of rotation** button while switching on the device with the mains switch. The speed display now shows "U0".

- Press the **[2]** button five times to select function "U5".

- Unlock function "U5" by holding a small magnet under the service LED. The LED blinks when unlocked.

- Now press the **[3]** button to start the automatic adjustment.
  It starts with suction level 1.
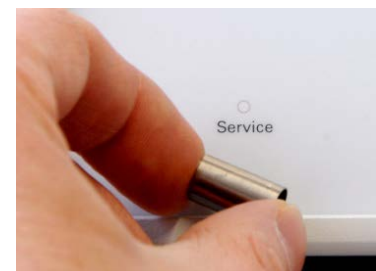
- Read the pressure gauge and adjust the suction power with buttons **[1]** (-) and **[2]** (+) to the values given in table below.
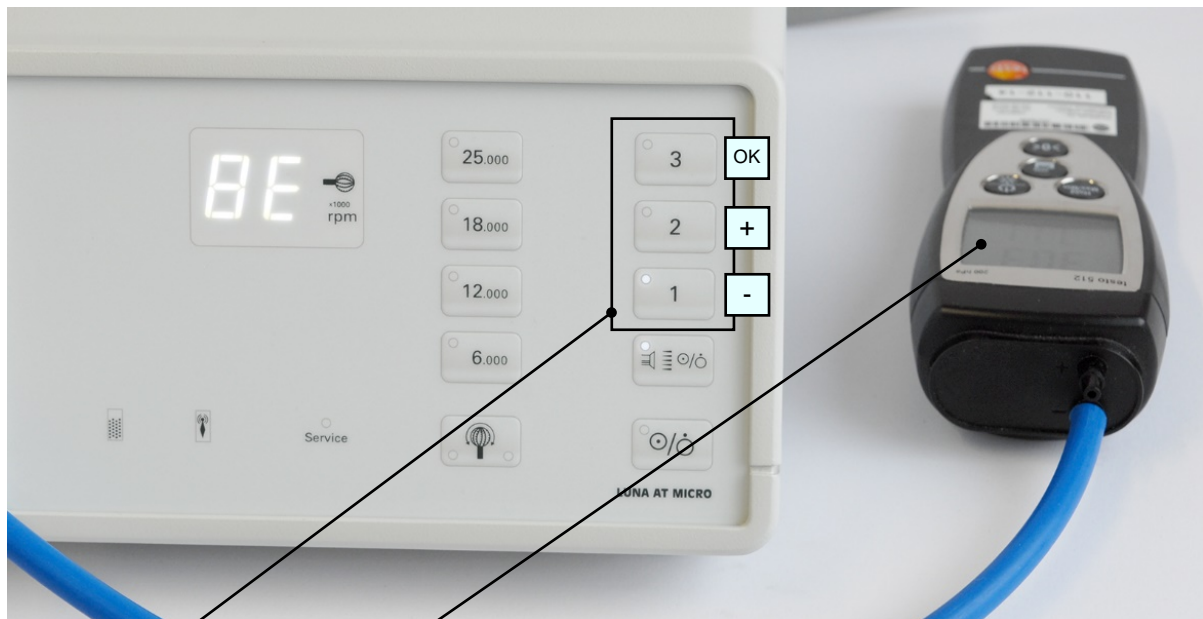
Suction level	Vacuum (in hPa)	Error limit +/- 7,5%	Corresponding volume flow value (in l/min)
1	30 hPa	28 – 32 hPa	153 l/min
2	36 hPa	33 – 39 hPa	167 l/min
3	48 hPa	44 – 52 hPa	187 l/min

Table 2: Vacuum values

- Confirm the set value by pressing the **[3]** button. The device then switches to the next suction level.

- Adjust the further suction levels to the values given in the table.

- When the adjustment is finished, the suction motor switches off and the device goes back to the Service Menu.

- To exit the Service Menu, select "UF" and press the **[3]** button.

- Switch off the device and reconnect the handpiece unit.

> At the factory the suction power is adjusted with the volume flow method. The different methods can lead to slight differences in the gradation of the suction power.

Adjustment of suction power with volume flow measurement

At the factory and at the Gerlach workshop, the suction power is adjusted with a Schmidt SS 30.300 volume flow meter.

- Let the device (with handpiece attached) run for approximately 10 min on suction level 2. Then switch it off with the power switch.

- Insert the handpiece into the flow meter unit. Make sure that the suction hose runs in a wide radius and is not kinked.

- Start the Service Menu by holding down the **direction of rotation** button while switching on the device. The display shows "U0".

- Select function "U5" and unlock it by holding a small magnet under the service LED. It blinks when unlocked.

- Then press the **[3]** button start the adjustment. It starts with suction level 1.

- Read the flow meter and adjust with the **[1]** (-) and **[2]** (+) buttons to values given in table below.

Suction level	Volume flow (in l/min)	Error limit +/- 7,5%
1	153 l/min	142 – 164 l/min
2	167 l/min	154 – 180 l/min
3	187 l/min	173 – 201 l/min
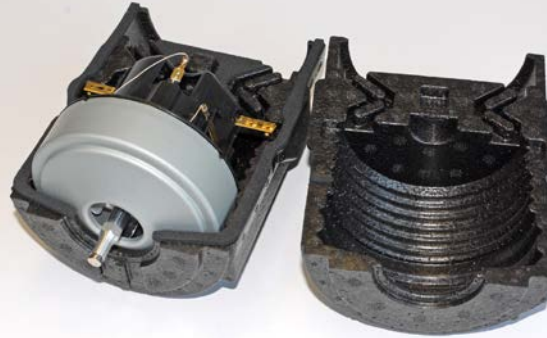
Table 3: Volume flow values

- Confirm the set value by pressing the **[3]** button. The device then switches to the next suction level.

- Adjust the further suction levels to the values given in the table.

- When the adjustment is finished, the suction motor switches off and the device goes back to the Service Menu.

- To exit the Service Menu, select "UF" and press the **[3]** button.

- Switch off the device and reconnect the handpiece unit.

7.3   Adjustment of the dust bag indicator

When the suction power has been adjusted, also the threshold for the dust bag indicator should be adjusted. The adjustment procedure depends on the type of sound insulation:

	Devices with rubber foam sound insulation • SATURN as of S/N 14.156908 • LUNA as of S/N 24.1513786 ➡ Adjust with **U7** and handpiece attached.
	Devices with polystyrene sound insulation • SATURN from S/N 14.146567 to 14.156907 • LUNA from S/N 24.1312013 to 24.1513785 ➡ Adjust with **U6** and adjustment cover.

Adjustment with U7 and handpiece attached

- Let the device run for approximately 10 min on suction level 2.

- Place the handpiece freely on the worktop. Lay the suction hose so that it runs as straight as possible or within a large radius.

- Start the Service Menu and select function U7. Wait at least 10 seconds before executing the function, so that the device can measure the ambient pressure.

- Press the **[3]** button to start the adjustment. The adjustment runs automatically. It ends when the suction motor stops and the device switches back to the service menu.

- Exit the Service Menu, switch off the device and wait at least 5 seconds before switching it on again.

Adjustment with U6 and adjustment cover

- Let the device run for approximately 10 min on suction level 2.

- Remove the handpiece unit and insert the adjustment cover. Unplug the pressure hose and the hose adapter from the adjustment cover.

- Start the Service Menu and select function U6. Wait at least 10 seconds before executing the function, so that the device can measure the ambient pressure.

- Press the **[3]** button to start the adjustment. The adjustment runs automatically. It ends when the suction motor stops and the device switches back to the service menu.

- Exit the service menu, switch off the device and reconnect the handpiece unit.

7.4 Check dust bag indicator

To check the dust bag indicator, the handpiece test attachment 6.3 mm is placed on the handpiece.

- Switch off the power switch and wait at least 5 seconds.

- Switch on again and wait at least 10 seconds so that the device can measure the ambient pressure.

- Now check the dust bag indicator in all suction levels.

  - o Handpiece open: The dust bag indicator must not flash.

  - o Handpiece test attachment 6.3mm on the handpiece: The dust bag indicator should be around its threshold. It may flash.

  - o Additionally restrict the air inlet: The dust bag indicator must now flash.

- If the dust bag indicator does not react as desired, redo the automatic adjustment or adjust manually with function Ub.

7.5 Manual adjustment of the dust bag indicator

Depending on the use of the device and the consistency of the material in the dust bag, it may be necessary to adjust the threshold of the dust bag indicator manually.

- Start the Service Menu and select function Ub. Wait at least 10 seconds before executing the function, so that the device can measure the ambient pressure.

- Press the **[3]** button to start the manual adjustment. It starts with suction level 1.

- Adjust the threshold with the **[2]** (+) and **[1]** (-) buttons as required.
  Adjust in small steps only. The dust bag indicator has a delay.

- Confirm the set value by pressing the **[3]** button. The device then switches to the next suction level.

- Adjust the other suction levels.

- After the last setting, the motor stops and the device switches back to the service menu.

- Exit the Service Menu and switch off the device.

8 Troubleshooting

Error	Cause	Action
Handpiece motor is not running	Motor defective	Replace motor
	Motor connector piece broken	Replace motor
	Bad contact	Check motor connector
	Bad contact to hose connector plate	Check and clean the spring connectors
		Re-drill the centring hole on the connector plate
		Replace connectors
	Cable break	Replace motor cable
	Button defective	Replace foil keyboard
	Flat module defective	Replace flat module
Handpiece motor stops and display shows „OF"	Motor overload protection triggered	Switch off the device, let it cool down and switch it on again. Reduce load and check the handpiece.
	Motor overload protection to sensitive (LUN001/002 only)	Update flat module
Handpiece motor slows down or stops. Display does <u>not</u> show "OF"	Flat module defective	Replace flat module
Handpiece motor does not run properly. Has to be cranked up	A phase is missing due to bad contact	Check spring connectors on hose connector plate
	A phase is missing due to a cable break in the motor cable	Replace motor cable
	Handpiece motor defective	Replace motor
Handpiece motor has drop outs	Cable break in the motor cable	Replace motor cable
	Flat module defective	Replace flat module
	Handpiece motor defective	Replace motor
Suction motor does not run	Suction motor defective	Replace motor
	Temperature fuse blown	Replace fuse and check suction motor
	Vacuum controller defective	Replace vacuum controller
	Bad connector	Check connectors
Suction motor runs unevenly	Suction motor worn or defective	Replace motor
	Rotation sensor not aligned	Check position of rotation sensor
	Suction motor out of place	Reposition sound insulation and motor
	Vacuum controller defective	Replace vacuum controller
Suction motor is noisy	Suction motor worn or defective	Replace motor
	Suction to adjusted to high	Adjust suction
	sound insulation out of place	Reposition sound insulation
Dust bag full indicator triggered to late	Threshold set to low	Adjust dust bag indicator
	Suction power to low	Adjust suction power

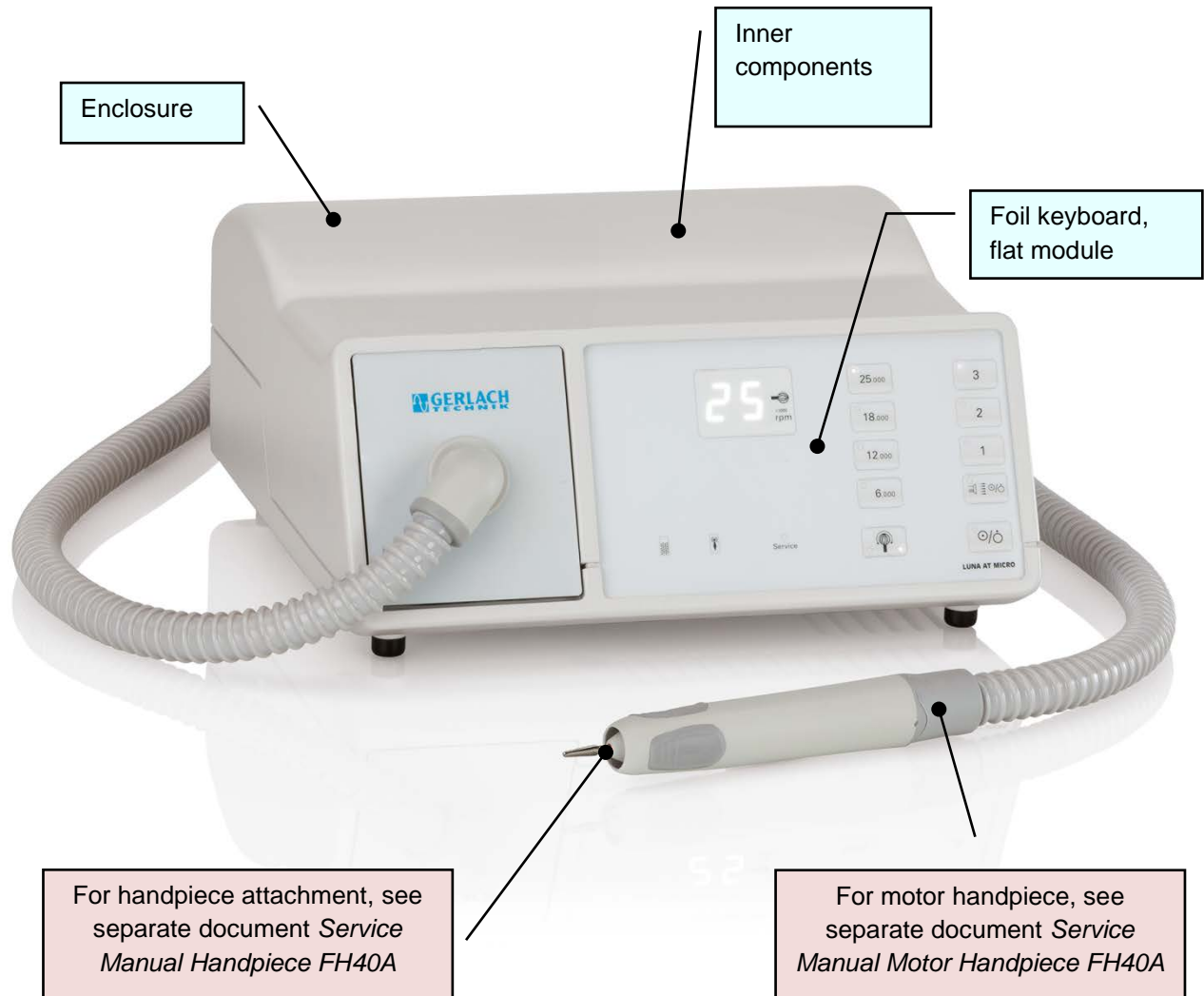| Error	Cause	Action
Dust bag full indicator triggered to early	Dust bag clogged	Very fine dust can clog the pores of the dust bag, before it is filled up. Replace dust bag.
	Threshold set to high	Adjust dust bag indicator
	Suction power to high	Adjust suction power
	Suction hose obstructed	Clean hose
	Suction hose obstructed by rubber grommet	Reposition rubber grommet on the handpiece motor
Button does not work	Foil keyboard defective	Replace foil keyboard
Device does not work, no display	Mains cable defective	Check mains cable
	Mains socket defective	Check mains socket with a different device
	Loose connector	Check connectors
	Power supply defective	Replace power supply
	Flat module defective	Replace flat module
	Foil keyboard defective	Replace foil keyboard

9 Test plan

The following points should be checked during a service inspection of a LUNA foot care device:

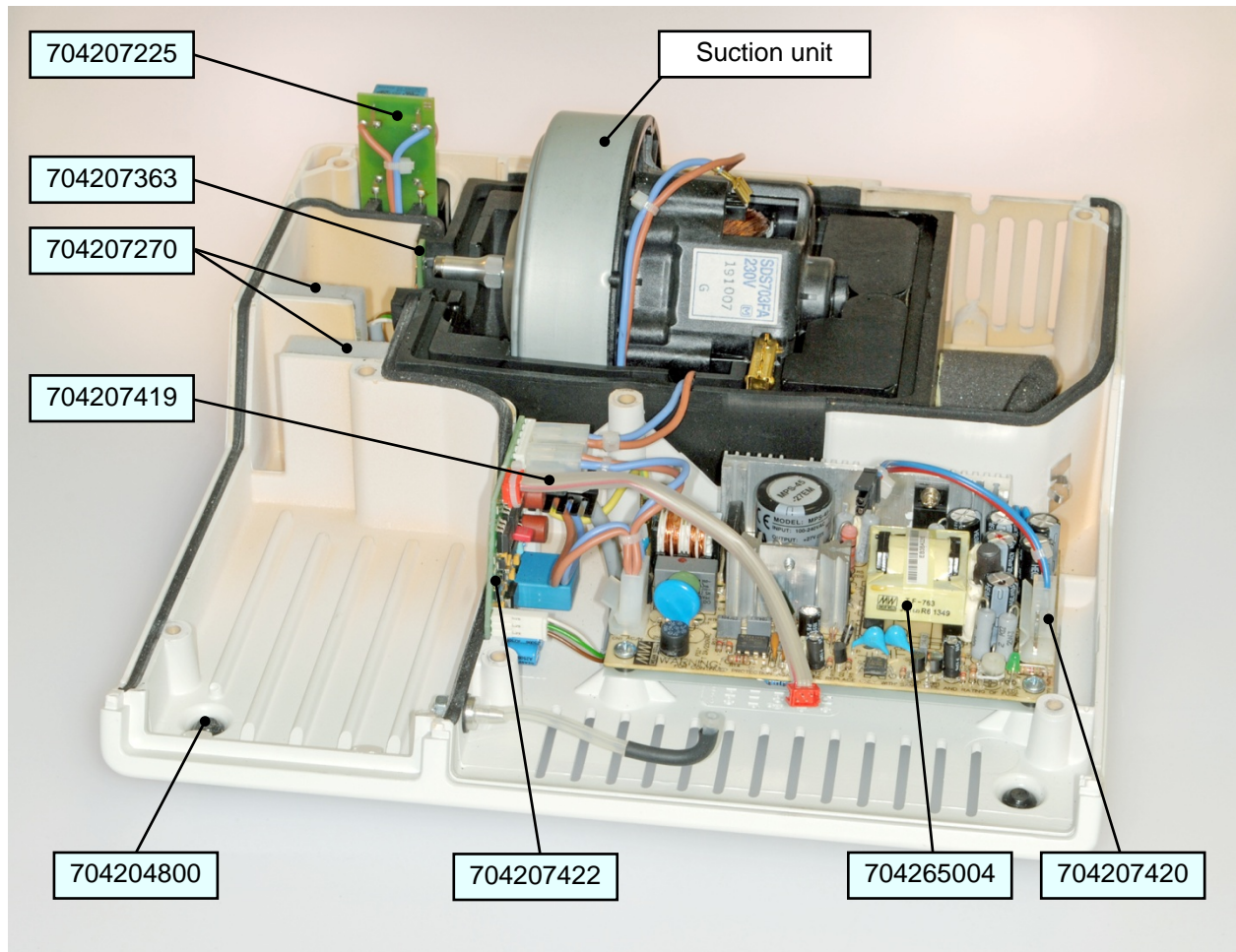| Component	Test case / action	Tested / done
Device enclosure	The enclosure is undamaged, clean and dust-free. All screws are present.	
Mains switch	Mains switch is working properly.	
Suction hose	The suction hose is undamaged, tight and clean. Check for leaks and background noises.	
Handpiece cleaning	The handpiece was disassembled and cleaned.	
Running characteristics	Handpiece motor and attachment run smoothly and without noise, in clockwise and counter-clockwise rotation.	
Chuck	The burs hold well in the chuck and do not slip.	
Display	All display segments are working.	
Buttons and LEDs	All buttons and LEDs are working.	
Remote foot switch	Remote foot switch is working (if available).	
Handpiece speed	Rotation speed of the handpiece motor was checked according to the adjustment instructions.	
Adjustment of suction power	The suction power was checked and adjusted according to the adjustment instructions.	
Adjustment of dust bag indicator	The dust bag indicator was checked and adjusted according to the adjustment instructions.	
Service LED	Operation hour counter of the Service LED has been reset with function U2.	
Dust bag	A new dust bag is installed.	
Power cable	Power cable is undamaged (if available).	
Sealing sticker	Applied new screw hole sealing stickers (if broken for repairs).	
Test for electrical safety	A test after the repair of medical electrical devices according to DIN EN 62353 / VDE 0751-1 has been carried out. The test result is filed.	

LUNA AT MICRO	Testing workshop (company stamp):	Date:
Serial number: **24.**		Sign:
Customer:		

10 Spare parts

Overview

Enclosure

Inner components

Foil keyboard, flat module

For handpiece attachment, see separate document *Service Manual Handpiece FH40A*

For motor handpiece, see separate document *Service Manual Motor Handpiece FH40A*

10.1 Inner components

Order-No.	Item	Note
704204800	Rubber foot	
704207225	Mains socket	With filter board
704207270	Sound absorber pad 30 x 53 x 10 mm	Replaces pad 30 x 57 x 10 mm
704207363	Rotation sensor board ATGS	
704207419	Cable, flat module – vacuum controller	
704207420	Cable, flat module – power supply	
704207422	Vacuum controller ATGV 2E/F	
on request	Vacuum controller ATGV 2E/F, in exchange	
704265004	Power supply MPS-65-27	Replaces MPS-45-27, if installed
on request	Please order enclosure parts according to color	

* „in exchange" parts are remanufactured parts. They can only be ordered after returning an old part.

10.2 Filter
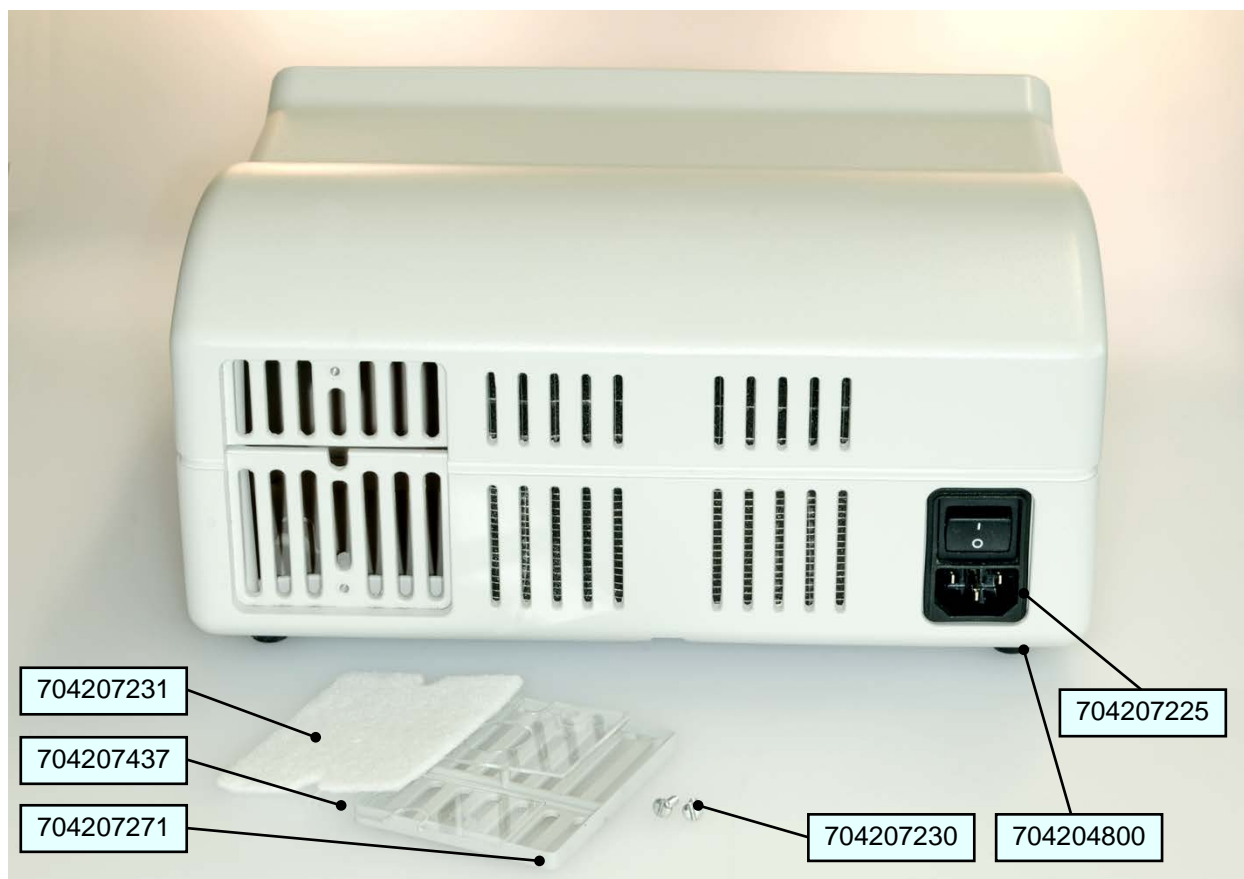
Order-No.	Item	Note
704204800	Rubber foot	
704207225	Mains socket	
704207230	Flat headed screw M3x8 DIN85A	
704207231	Fine dust filter	
704207271	Filter grille	
704207437	Filter cover, 2-piece	> S/N 24.1513789 (with rubber foam sound insulation)

10.3 Spring contact connector

Enclosure, upper part

704207218

704207324

704207323
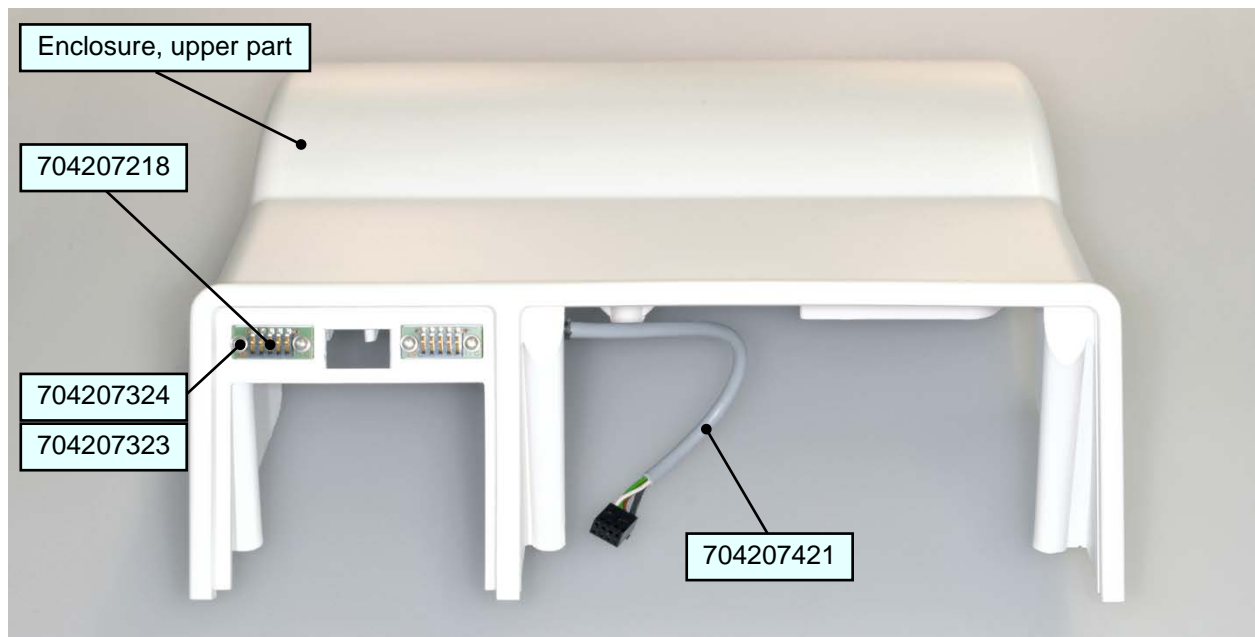
704207421

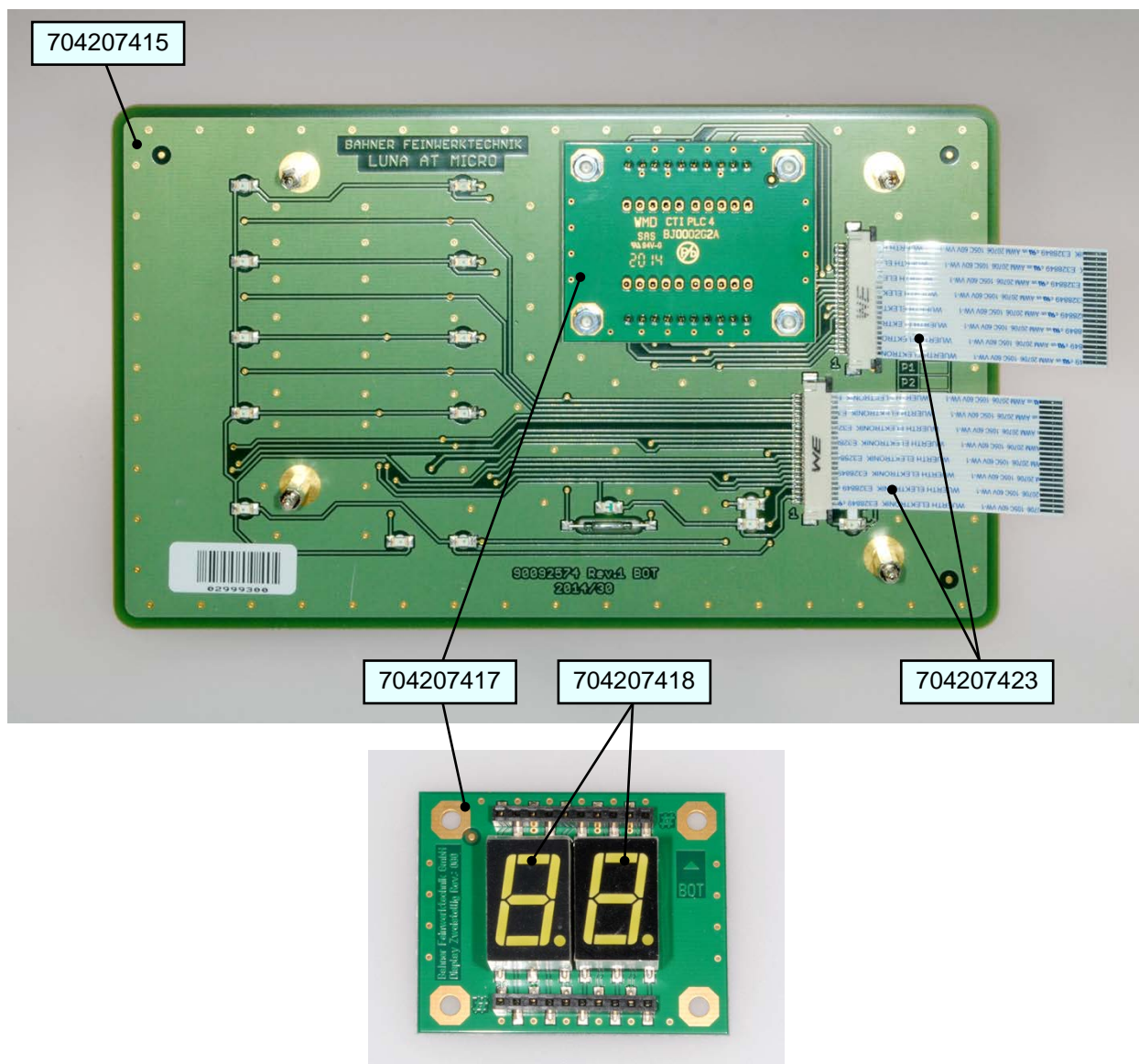| Order-No.	Item
704207218	Connector board, FCON SAT02-03, with cable
704207323	Spring for connector board
704207324	Locating pin for connector board
704207421	Cable for connector board
on request	Please order enclosure parts according to color

10.4 Flat module

704207415

704207416
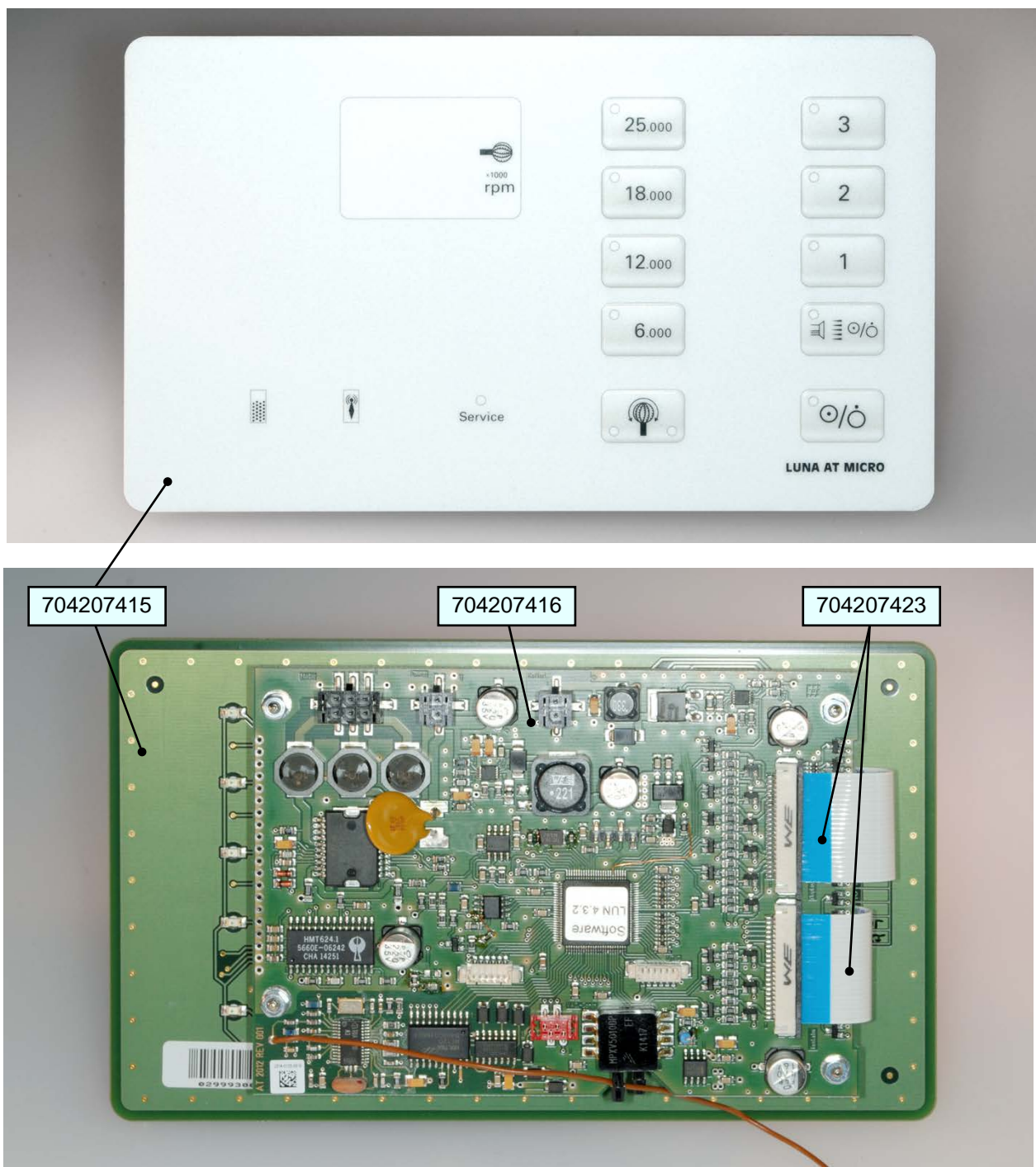
704207423

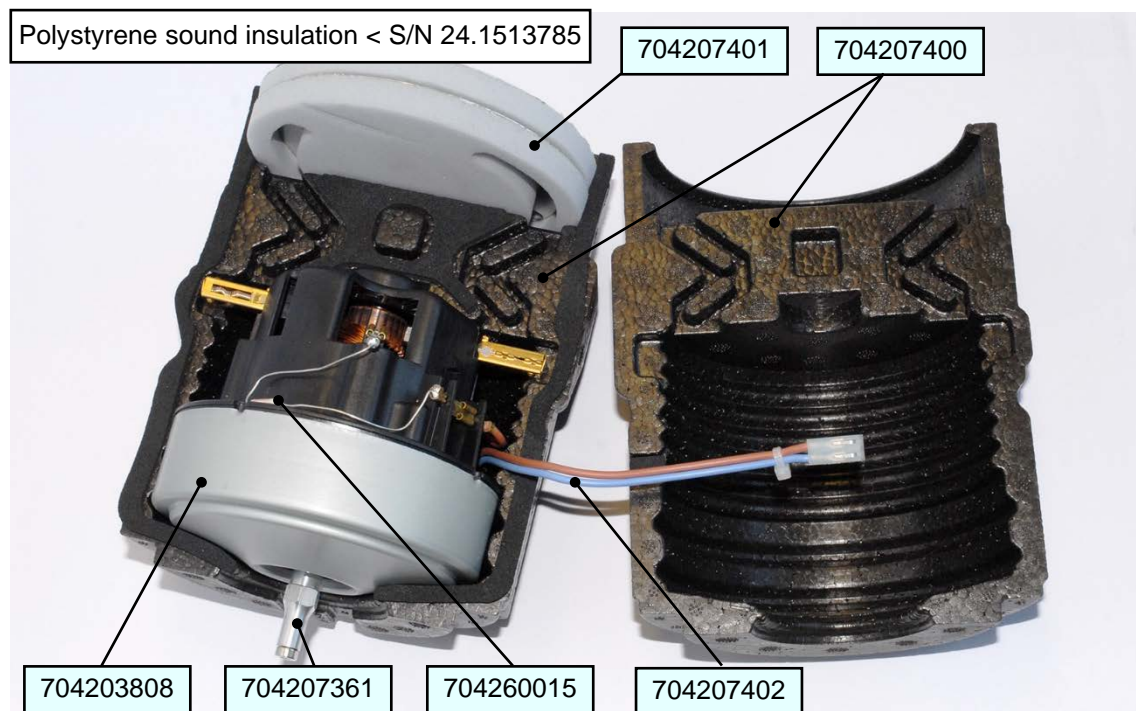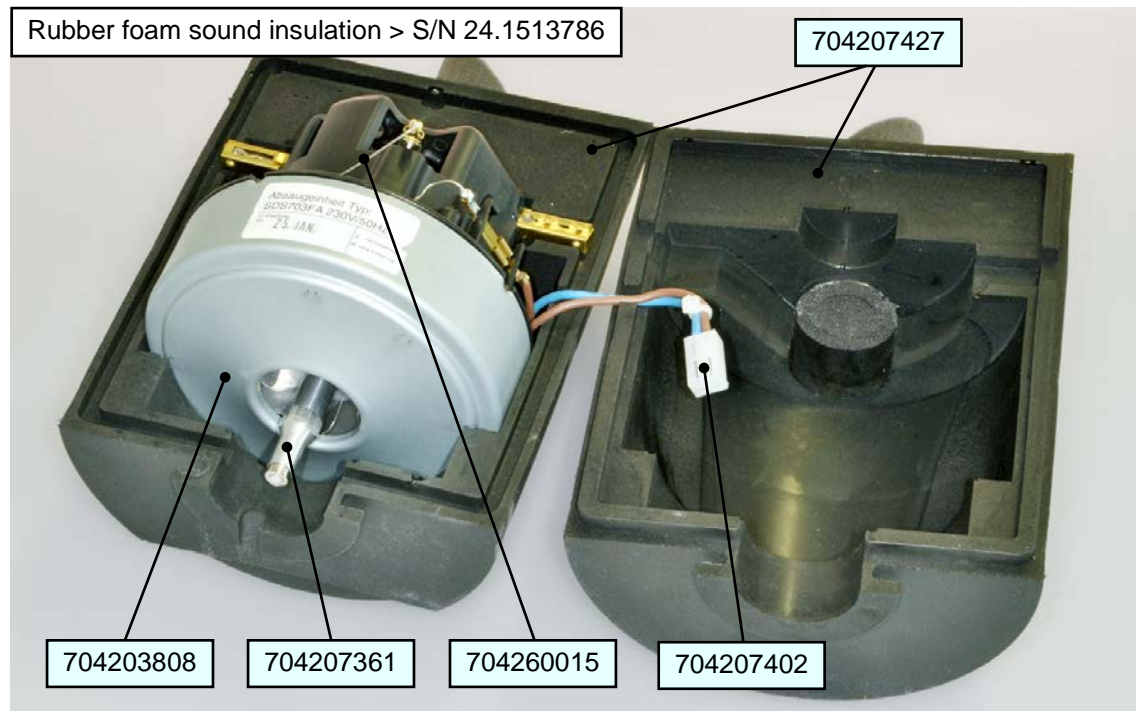| Order-No.	Item
704207415	Foil keyboard Luna 2013
704207416	Flat module Luna AT 2013
on request	Flat module Luna AT 2013, in exchange
704207423	Flexible flat cable, FFC 22-pol., 50mm

* „in exchange" parts are remanufactured parts. They can only be ordered after returning an old part.

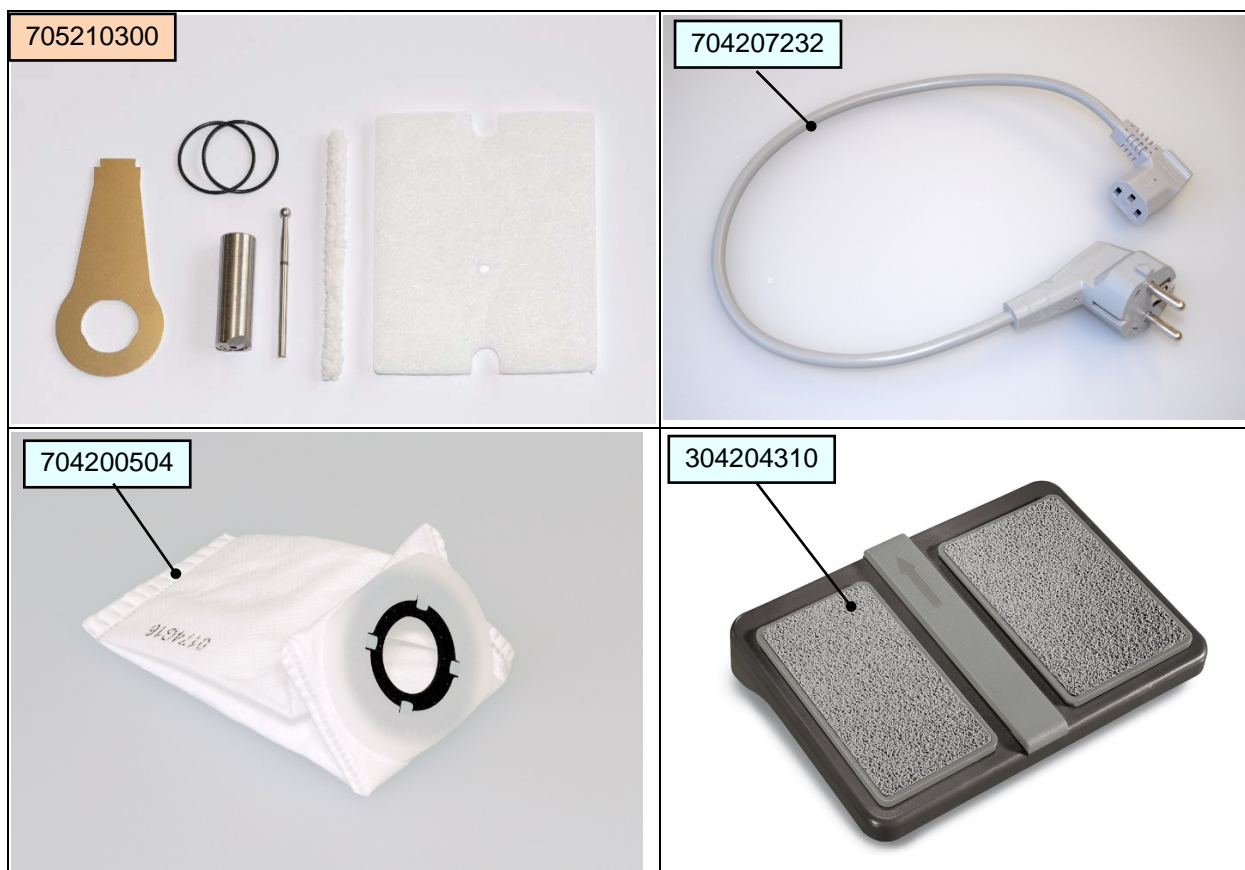## 10.5 Foil keyboard

Order-No.	Item	Note
704207415	Foil keyboard Luna V.2013	
704207417	Display board, for 2 display	Board only
704207418	7-segment display, 1-digit, white, CA14	
704207423	Flexible flat cable, FFC 22-pol. 50mm	

10.6 Suction motor

Rubber foam sound insulation > S/N 24.1513786

704207427

704203808 | 704207361 | 704260015 | 704207402

Polystyrene sound insulation < S/N 24.1513785

704207401   704207400

704203808 | 704207361 | 704260015 | 704207402

Order-No.	Item	Note
704203808	Suction motor, type P 230 V / 50 Hz	motor without fuse, magnet shaft and cable
704260015	Temperature fuse for suction motor	
704207361	Magnet shaft for suction motor	
704207402	Cable for suction motor	
704207427	Rubber foam sound insulation	> S/N 24.1513786
704207400	Polystyrene sound insulation	< S/N 24.1513785
704207401	Sound absorbing pad	2 pcs, for polystyrene sound insulation

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10.7 Accessories

705210300

704207232

704200504

304204310

Order-No.	Item	Note
704207235	Service pack	complete service pack
704207231	Fine dust filter	
N/A	Pipe cleaner	
704207234	Cleaning wrench, universal	
704207233	O-ring 20 x 1 mm	
704207322	Bur shank testing gauge	
705110200	Test bur	
704207232	Power cable, 50cm	CEE 7/7
704200504	Dust bag, type V	
304204310	Remote foot switch, FM, channel 0	