EN Service and Repair Instructions for devices of type WM 110 TD and WM 120 TD

prisma VENT30
prisma VENT30-C
prisma VENT40
prisma VENT50

Ventilators

LÖWENSTEIN
medical

Contents

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1 Introduction

1.1 About this document

The objective of these Servicing and Repair Instructions is to familiarize you with the function, technology, servicing and repair of the device. This will allow you to:

- Eliminate faults
- Perform function checks
- Perform repairs

Observe the information below when doing so.

- **Repairs/servicing work may only be carried out by Löwenstein Medical or by expert trained specialists with a valid certificate. You are responsible for repairs carried out yourself and for guaranteeing them!**
- **Use only genuine Löwenstein Medical replacement parts.**
- **Comply with accompanying documents (Instructions for Use).**

If you have any questions or feedback, please contact our Technical Service team:

T: +49 40 54 70 2-100

e-mail: TechnischerServiceHC@loewensteinmedical.de

1.2 Navigation in this document

The buttons explained below provide a quick way to navigate through this document:

- To view the last page you looked at, click the **Back** button.
  Example: If you are on page 30 and the last page you viewed was page 20, clicking the **Back** button will take you back to page 20.
- To return to the page you were viewing prior to clicking the **Back** button, click the **Forward** button.
  Example: If you were on page 20 and you clicked the **Back** button to skip back to page 10, clicking the **Forward** button would return you to page 20.
- Click the **Contents** button to go to the Table of Contents.
- Click the **Previous Page** button to go to the previous page
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1.3 Warnings in this document

Warnings indicate information relevant to safety.

Within procedures, you will find warnings in front of a step which contains a hazard to persons or objects.

There are three levels of warning depending on the degree of hazard:

⚠ DANGER	***Danger!*** Indicates an unusually significant hazardous situation. If you ignore this instruction, severe irreversible injuries or death will result.
⚠ WARNING	***Warning!*** Indicates an unusually significant hazardous situation. If you ignore this instruction, severe irreversible or fatal injuries may result.
⚠ CAUTION	***Caution!*** Indicates a hazard. If you ignore this instruction, mild or moderate injuries may result.
NOTICE	***Notice!*** Indicates a harmful situation. If you ignore this instruction, material damage may result.
	Indicates useful information within procedures.

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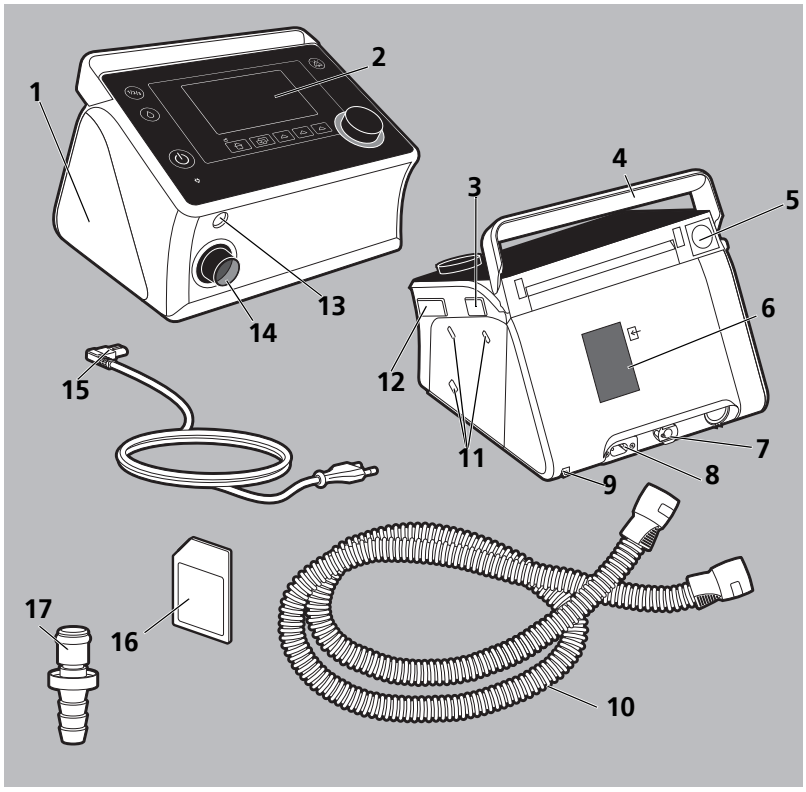
2 Product description

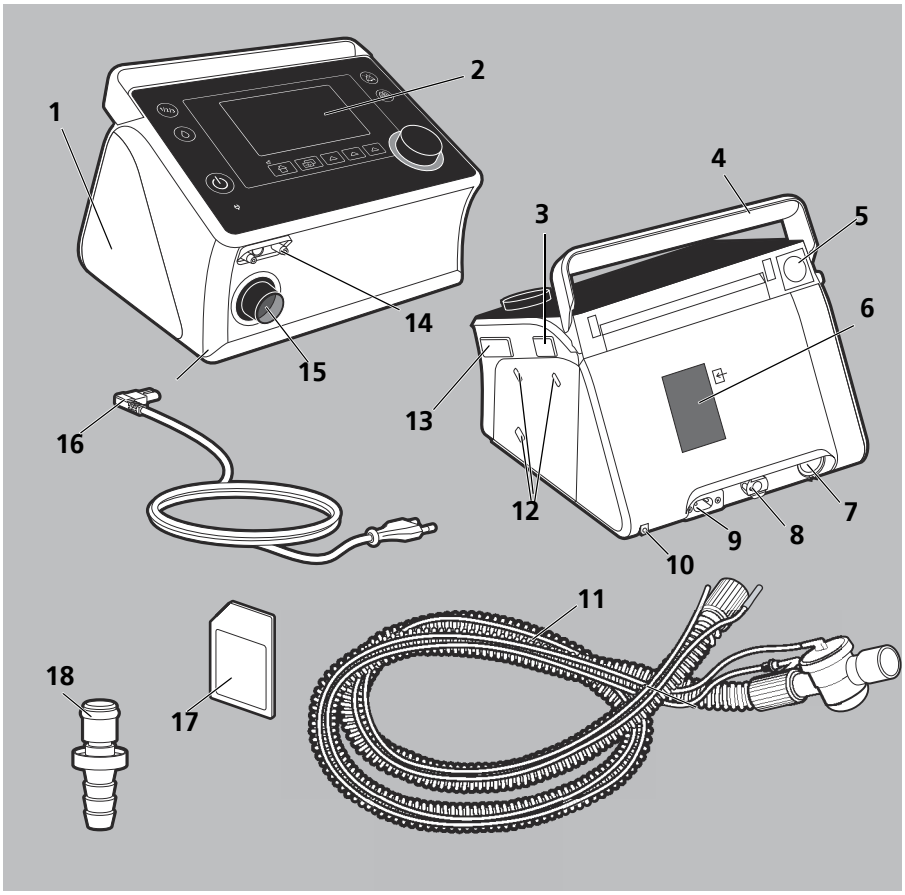
2.1 Overview

2.1.1 prisma VENT30, prisma VENT30-C, prisma VENT40



1 Humidifier connection with cover
2 Control panel with display
3 System interface for connecting modules
4 Handle
5 Release catch
6 Filter compartment with air filter (and optional pollen filter)
7 O_2 supply (option)
8 Connection for power supply cable
9 Facility for connecting optional strain relief
10 Breathing tube with connection for breathing mask
11 Latching bores for connecting modules
12 SD card slot
13 Connection for tube heater
14 Device outlet port
15 Power cord
16 SD card
17 O_2 connector (option)

2.1.2 prisma VENT50



1 Humidifier connection with cover

2 Control panel with display

3 System interface for connecting modules

4 Handle

5 Release catch

6 Filter compartment with air filter (and optional pollen filter)

7 Cooling air opening

8 O_2 supply

9 Connection for power supply cable

10 Facility for connecting optional strain relief

11 Breathing tube with connection for breathing mask

12 Latching bores for connecting modules

13 SD card slot

14 Connection for tube heater, valve control tube and pressure measuring tube

15 Device outlet port

16 Power cord

17 SD card

18 O_2 connector

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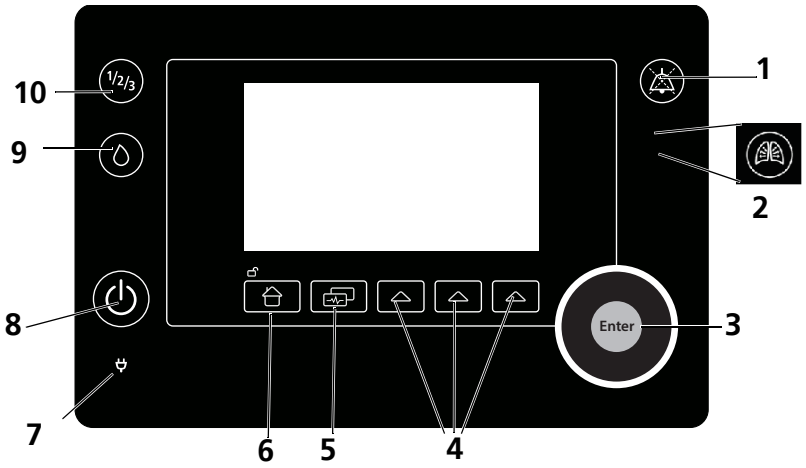
2.2 Control panel



1 Alarm acknowledgment key - mutes an alarm for 2 minutes
2 LIAM key (only present on prisma VENT50)
3 Dial for navigating in the menu
4 Function keys - have different functions
5 Monitor key for switching between different screen views
6 Home key - switches the view back to the start screen
7 Power supply indicator
8 On/off key
9 Humidifier key
10 Program key for selecting preconfigured programs

2.3 Symbols in the display

SYMBOL	DESCRIPTION
	Device in patient mode. Expert area disabled.
	Expert area enabled.
Ø15	Set tube diameter 15 mm
Ø22	Set tube diameter 22 mm
	Device on standby. The blower is off.
	Air filter change required.
	Servicing required (only if servicing function is activated).
	Humidifier connected but not active (gray symbol)
	Humidifier switched on (green symbol)
	Humidifier empty (orange symbol)
	Operation with bacteria filter set in the menu
	Pulse rate (if pulsoximetry sensor connected)
SpO2	SpO_2 sensor connected

SYMBOL	DESCRIPTION
	prisma2CLOUD module connected
	prismaCONNECT module module connected
	prisma CHECK module connected
	prismaPSG module connected
	Network connection present.
	SD card inserted.
	Indicates respiratory status: Arrow pointing upward: Inspiration Arrow pointing downward: Exhalation S: Spontaneous breath T: Mandatory breath
	Target volume switched on.
	AirTrap Control switched on.
	5 segments green: Battery capacity above 85 %
	4 segments green: Battery capacity above 65 %
	3 segments green: Battery capacity above 45 %
	2 segments green: Battery capacity above 25 %
	1 segment orange: Battery capacity below 25 %
	1 segment red: Battery capacity below 10 %
	0 segments: Battery capacity below 5 %
	Battery fault
	Low-priority alarm triggered.
	Medium-priority alarm triggered.
	High-priority alarm triggered.
	Alarm/alarms deactivated.
	Acoustic signal for alarm paused for 2 minutes.
	Acoustic signal for alarm deactivated.

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2.4 Description of function

2.4.1 Therapy devices

Therapy devices of type WM 110 TD and WM 120 TD essentially consist of the following components:

- Housing
- Blower
- Main board
- Valve control board (only prisma VENT50)
- Pressure build-up valve (only prisma VENT50)
- Pressure drop valve (only prisma VENT50)
- Display
- Control panel and dial (encoder)
- Power supply unit

The electronically-controlled blower draws in ambient air through a filter, compresses the air and delivers it to the device outlet port at therapy pressure. From here, air flows through the patient circuit and the patient/ventilator interface (nasal cannula, tracheostomy, tube) to the patient. The exhalation system upstream of the patient/ventilator interface or optionally integrated in the patient/ventilator interface prevents CO_2-enriched exhaled air accumulating in the patient circuit.

Sensors on the main board enable the therapy device to determine and analyze the pressure and respiratory flow signal at the patient/ ventilator interface and in the patient circuit, as well as in the respiratory phase switch. The blower accordingly provides the respiratory volume and the ventilation pressures prescribed by the physician. The pressure sensors are connected to the device outlet port via tubes and a Y-piece, allowing pressure to be measured close to the device.

The flow sensor is connected directly to the flow element via 2 seals. The air flowing through the flow element is guided through a large number of fins which forces a laminar flow pattern. A drop in pressure results from this laminar flow pattern in accordance with the laws of flow mechanics. Differential pressure is determined by the flow sensor and flow is calculated with the aid of other status variables such as absolute pressure, for example. The sensors are calibrated when the main board is manufactured and do not need to be recalibrated.

Pressure, flow, leakages and volumes can be saved and/or (synchronously) output to a PSG system in analog form via the prismaCONNECT module.

The therapy data are stored in the device and on an SD card for monitoring therapy. In order to save the therapy data even if there is no power supply in the device, the memory component is supplied with power by a buffer battery. The buffer battery can be replaced if required, it is inserted in a battery holder on the main board.

The device is operated by keys and a dial.

The device can be controlled remotely via the prismaTS therapy software. In the event of a power failure, the settings are retained and therapy is continued once the power supply is restored.

2.4.2 Control PEEP valve (only prisma VENT50)

The PEEP control takes place via a pressure build-up and pressure drop valve. The valves are controlled by the valve control board.

The patient-related therapy pressure and the PEEP control pressure are recorded via a pressure sensor on the valve control board.

During the inspiratory phase, the pressure drop valve is closed and the pressure build-up valve is opened: thereby a secondary flow of the therapy pressure built up by the blower builds up the control pressure required to close the PEEP valve via the pressure-side connection of the central part of housing.

As soon as the required control pressure is reached and the PEEP valve is closed, the pressure build-up valve is also closed and the pressure is maintained.

When changing the respiratory phase to expiration, the pressure drop valve is opened and the PEEP control pressure builds up via the suction side connection to the central part of housing and the PEEP valve opens.

2.4.3 Main board

The main board forms the heart of the therapy device. It includes important components such as the flow sensor and pressure sensor, memory component and controller, for example. The controller is programmed with the relevant device firmware which comprises the complete algorithm for controlling the device.

The main board performs the whole energy management process for the device.

2.4.4 Display

The display measuring 4.3" is for displaying all information. It is permanently connected (bonded) to the front wall of the housing.

2.4.5 Blower

The blower is a radial blower with a finely-weighted fan wheel and a 3-phase motor with Hall sensors to detect speed continuously. The blower is actuated by the main board, with blower speed dependent on current pressure requirements and current leakage.

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2.5 Navigating in the device

ACTION	RESULT	
	IN THE MENU	WITHIN A MENU ITEM
Press function key 	Function is displayed directly in the display via the key (e.g. **System** or **Back** menu).	
Turn dial to the left	Navigate upward	Reduce value
Turn dial to the right	Navigate downward	Increase value
Press the dial	Select menu item	Confirm set value
Press Home key 	Back to start screen	
Press Monitor key 	Switches between different screen views.	

3 Servicing

3.1 General information

Servicing, safety checks [Sicherheitstechnische Kontrollen or STKs] and maintenance measures such as servicing and repairs may only be performed by the manufacturer or by specialists expressly so authorized by the manufacturer.

3.2 Intervals

The therapy device is designed for a service life of 6 years.

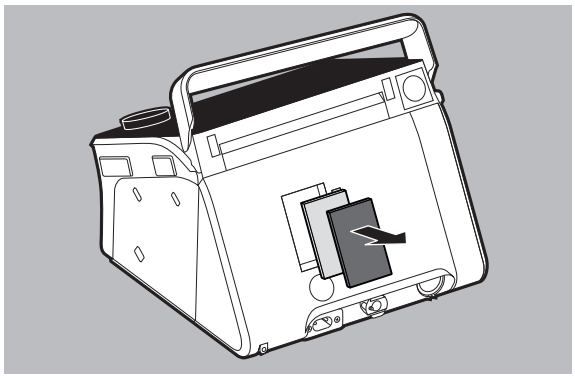
Once these 6 years have elapsed, a complete final check (see "5 Final check", page 21) should be performed.

In the event of use in accordance with purpose in line with the Instructions for Use, the therapy device requires no maintenance.

In the event of use in accordance with purpose in line with the Instructions for Use, the humidifier requires no maintenance.
If used and cleaned daily, the humidifier can be used for > 6 months.

In Germany, an STK [sicherheitstechnische Kontrolle or safety check] is a legal requirement under §11 MPBetreibV [the German law governing the owners of medical devices] and must be performed every 2 years (see "5 Final check", page 21).

3.3 Change filters



1. Remove air filter WM 29651.
2. If present: Remove pollen filter WM 29389.
3. Put in new pollen filter WM 29389.
4. Put in new air filter WM 29651.

Reset filter change interval

You must set the filter change interval to zero when you have changed the air filter and the reminder to change the air filter is activated.

1. Switch on therapy device.
2. To call up the Expert area, keep Home key depressed for > 3 seconds.
3. Press the **System** function key.
4. Select **Device settings**.
5. **Select Timer Filter:** Select **On**.
6. Select **Reset**.
7. Confirm entry with **Yes**.

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8. To exit the Expert area, keep Home key depressed for > 3 seconds.

Reset service indicator

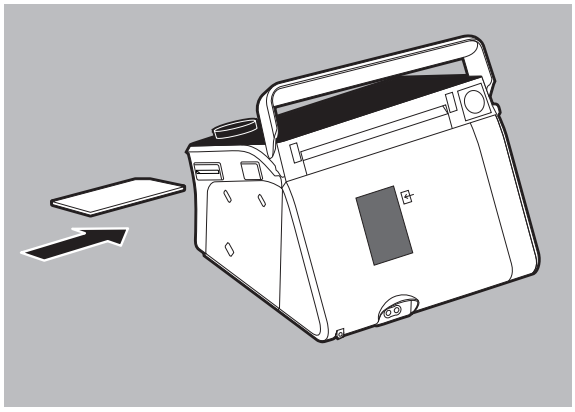
Applies only when service indicator is activated: You must reset the service indicator after every service and every hygiene treatment in order to zero the hours counter for servicing.

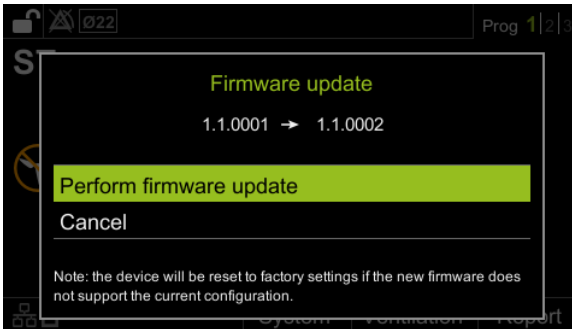
1. To call up the Expert area, keep Home key depressed for > 3 seconds.
2. Press the **System** function key.
3. Select **Device settings**.
4. Select **Service timer** and set the number of months until the next reminder.
5. Select **Reset**.
6. Confirm entry with **Yes**.

3.4 Perform firmware update

Requirement
The therapy device is disconnected from the power supply or completely switched off during battery operation.

1. Save the current firmware for the therapy device to a separate SD card. You will find the up-to-date firmware available to download from the login area of the manufacturer's Internet site.
2. Insert SD card in the SD card slot.
3. Connect power supply or for battery pack operation, switch to operating state **Standby**.





4. Confirm **Perform firmware update** with the dial.
The device automatically installs the new firmware.

4 Hygiene treatment

4.1 General information

- **This product may contain disposable items. Disposable items are intended to be used only once.** Therefore, use these items only once and do **not** reprocess them. Reprocessing disposable items may impair the functionality and safety of the product and lead to unforeseeable reactions due to ageing, embrittlement, wear, thermal load, the effects of chemical processes etc.
- Wear appropriate safety gear for the disinfecting process.
- Refer to the Instructions for Use for the disinfectant used.
- The Instructions for Use for the device, the components and the accessories should also be followed.
- If there is evidence of contamination with critical germs (MRSA, 3Mrgn etc.) of the parts inside the device which carry air, the device must be reprocessed in line with the Keredusy method or disposed of. Reprocessing in line with the Keredusy method can be performed up to 5 times (also in the course of regular processing). Please follow the manufacturer's instructions for this process (www.medizinservice-sachsen.de). Air filter WM 29651 and the pollen filter (if present) must also be replaced. Once the Keredusy method has been used 5 times, components must be replaced in line with the set for change of patient, WM 15913.

4.2 Hygiene treatment for therapy device

4.2.1 Hygiene treatment in use

Follow the Instructions for Use for the therapy device.

4.2.2 Hygiene treatment on repair

1. Disinfect external housing and power cord by wiping them down.
2. Clean or replace the following parts in accordance with the Instructions for Use (depending on condition):
   - Breathing tube WM 24445
   - Mask with headgear
3. Open therapy device (see "7.2 Open therapy device", page 36).
4. Clean extremely soiled areas.
5. Change filters (see "3.3 Change filters", page 12).
6. Close therapy device (see "7.3 Close therapy device", page 39).

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4.2.3 Hygiene treatment on change of patient

⚠ WARNING

Risk of infection when the device is used again!
If the device is used by several patients, infections may be transmitted to the next patient.
⇒ Use of a bacteria filter is obligatory when the device is used for several patients.

Requirement

The device was used with a bacteria filter.

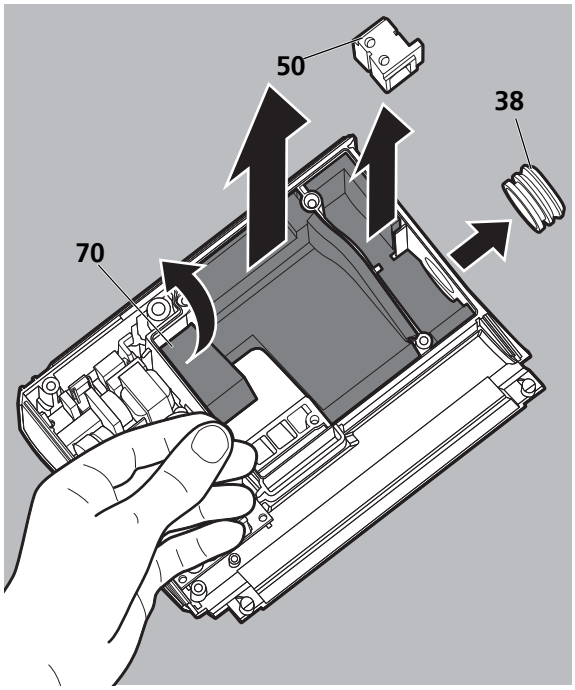
1. Disinfect the following parts by wiping:
   - Housing, handle and device outlet port
   - Power cord
2. Replace the following parts:
   - Breathing tube WM 24445
   - Mask with headgear
   - Carrying bag WM 29337
3. Set device to factory settings to clear all previous settings.
4. Clear therapy data.
5. Recommended: Perform a complete final check (see "5 Final check", page 21).

4.2.4 Enhanced cleaning in the context of hygiene treatment

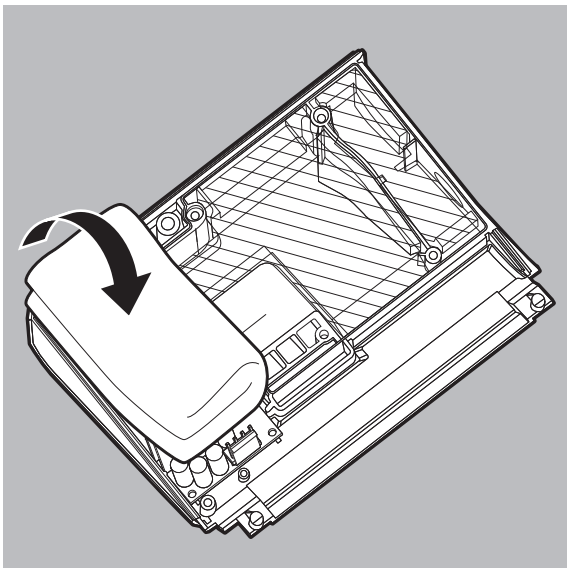
All parts replaced here can be found in the set for cleaning WM 15913 or WM 15916 (depending on device type).

1. Open therapy device (see "7.2 Open therapy device", page 36).
2. Remove blower (see "7.11.1 Remove blower", page 58).

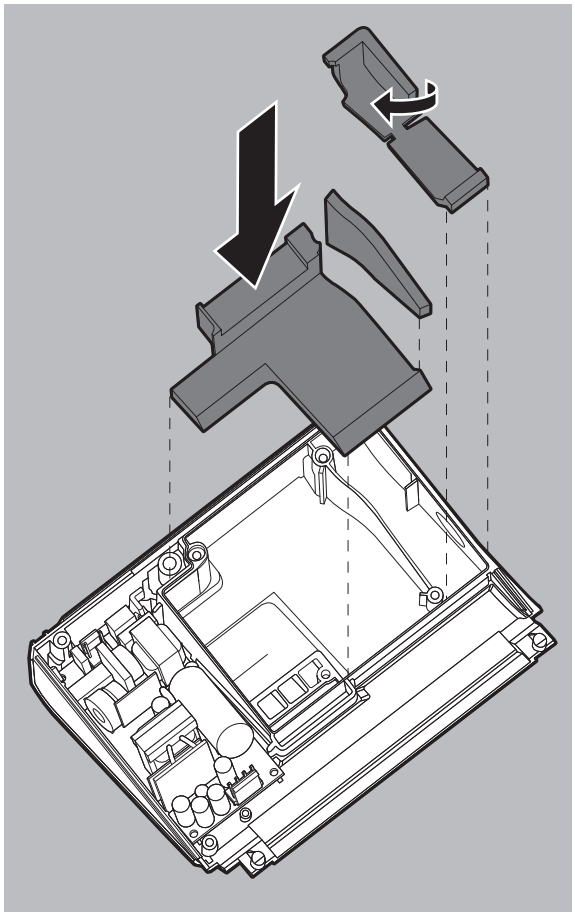
Clean rear of housing



1. Remove flow element **50**.
2. Remove sealing ring for rear of housing **38**.
3. Remove insulating elements from rear of housing. In doing so, please note: Insulating element **70** is glued on and needs to be pulled off carefully.



4. Cover the power supply unit.
5. Disinfect the rear of the housing by spraying it.



6. Insert new insulating elements.

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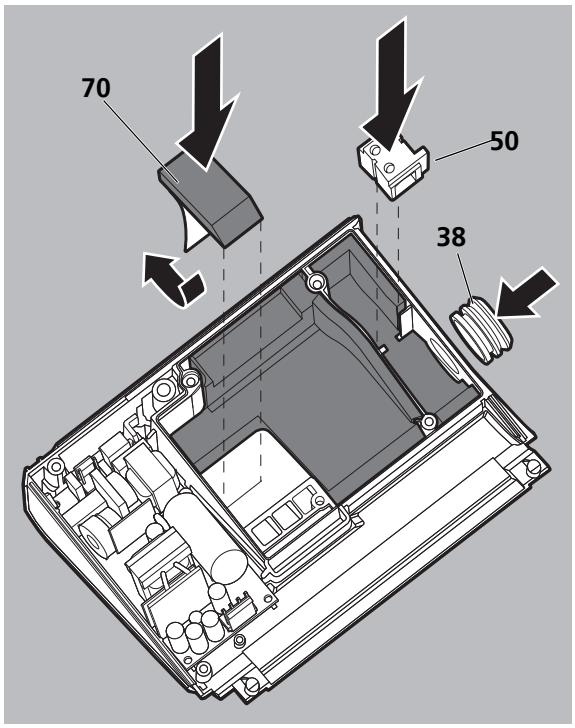
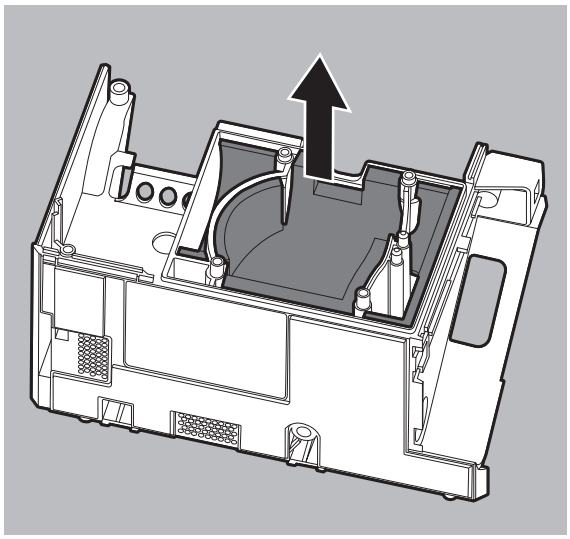
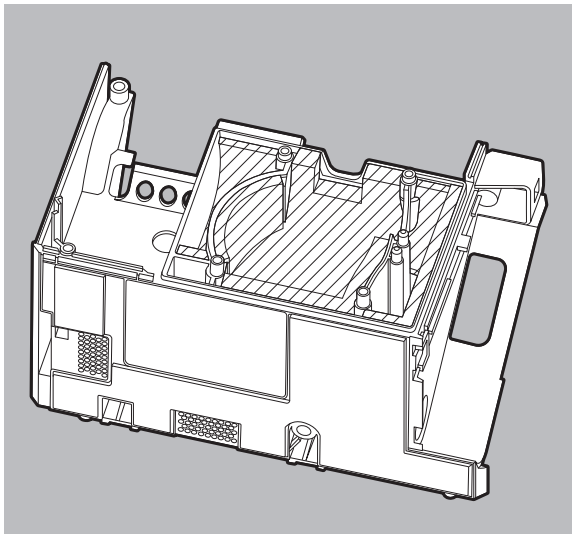


7. Glue on insulating element **70** so that half of it is located on the insulating element below it and half is located on the housing wall. There is a line on the housing wall to align the insulating element correctly.
8. Insert new sealing ring for rear of housing **38**.
9. Insert new flow element **50**.

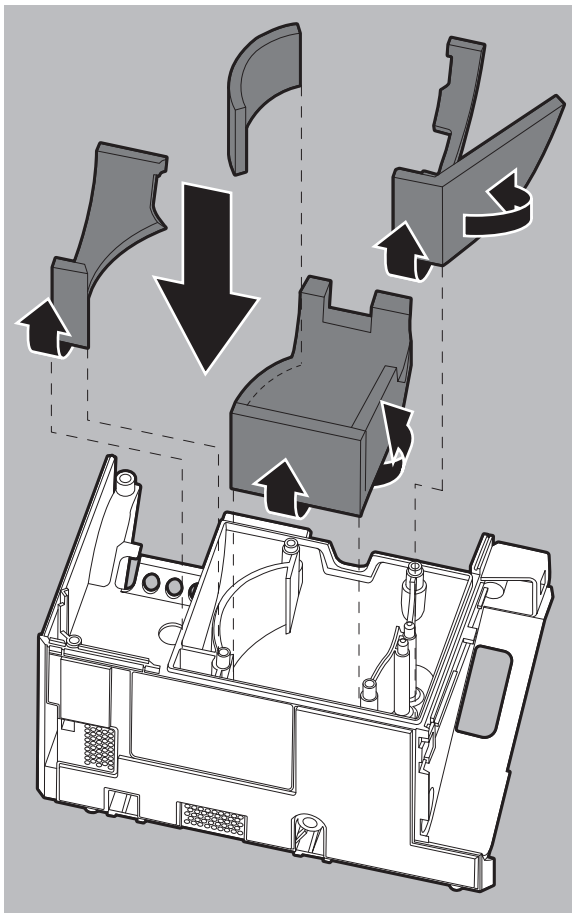
Clean central part of housing



1. Remove insulating elements from the central part of the housing.

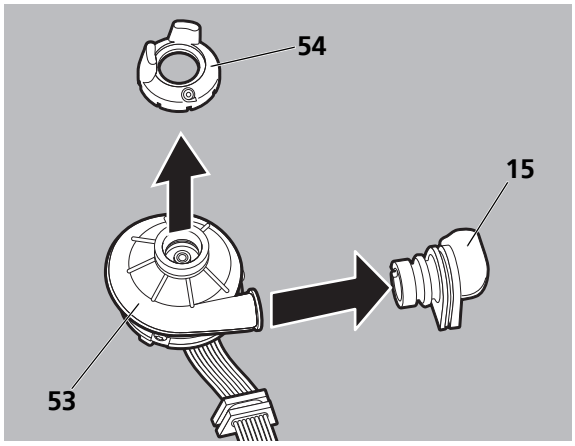


2. Disinfect the central part of the housing by spraying it.

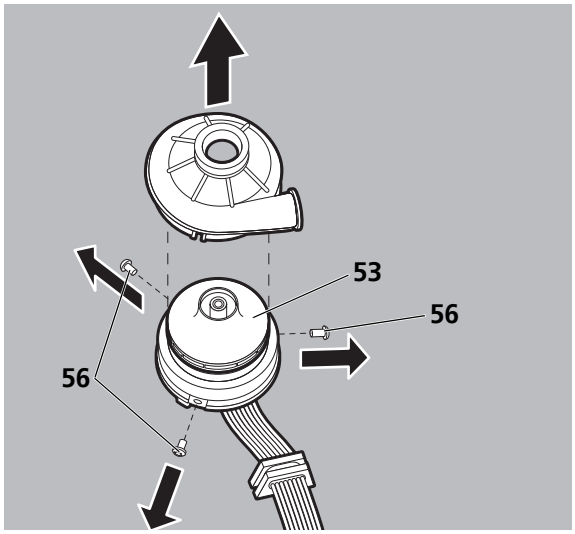


3. Insert new insulating elements.

Clean blower



1. Release decoupling tube **15** and spacer **54** from blower **53**.



2. Undo and remove 3 screws **56** on blower **53**.
3. Remove blower cap from blower **53**.
4. Disinfect the following parts by wiping:
   - Mass body
   - Blower cable
5. Disinfect the blower cap and the fan wheel by spraying.

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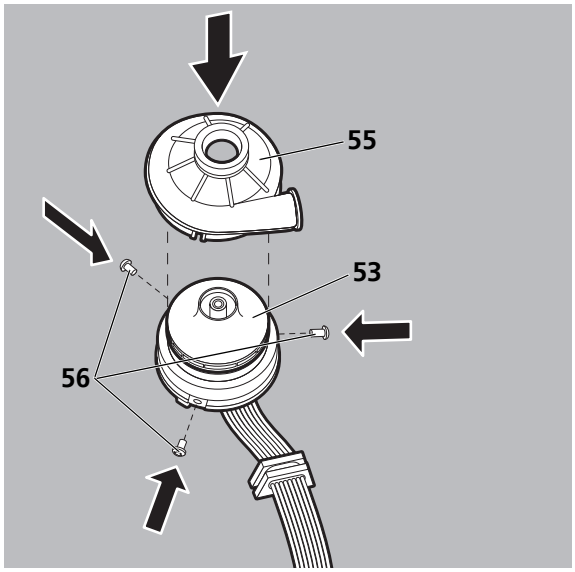
NOTICE

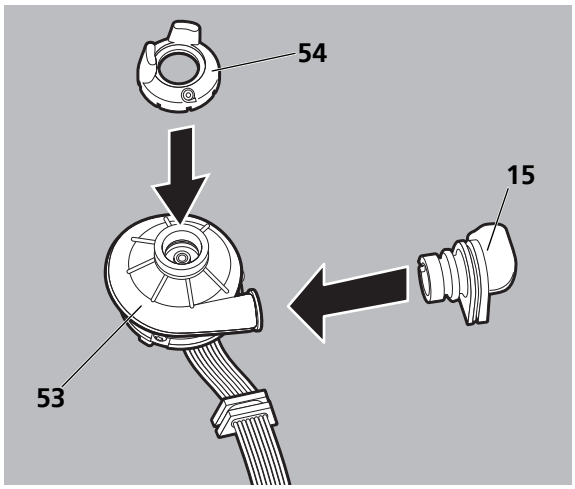
Material damage if screws are tightened against the blower cap!

The blower cap may be damaged when screws are tightened.

⇒ Only tighten screws against the blower cap gently.



6. Replace blower cap **55** on blower **53**.
   Ensure correct positioning as you do so.
7. Secure the blower cap with the 3 new screws **56**.



8. Attach the new decoupling tube **15** and new spacer **54** to disinfected blower **53**.
   Ensure correct positioning as you do so.
9. Fit blower (see "7.11.2 Fit blower", page 59).
10. Close therapy device (see "7.3 Close therapy device", page 39).
11. Replace air filter and pollen filter (if present) (see "3.3 Change filters", page 12).
12. Reset therapy device to factory settings.
13. Check therapy device (see "5 Final check", page 21).

4.3 Hygiene treatment for humidifier

4.3.1 Hygiene treatment in use

Follow the Instructions for Use for the therapy device.

4.3.2 Hygiene treatment on change of patient

Requirement

The therapy device was previously used without a bacteria filter.

1. Check plastic parts and replace if damaged (e.g. cracked).
2. If plastic parts and heater rod are heavily scaled: Offer new device.
3. Use the set for change of patient, WM 29974, for the hygiene treatment.
4. Remove the upper part of the humidifier.
5. Remove the humidifier insert.
6. Unscrew the heating element from the lower part of the humidifier.
7. Release the O-ring from the heating element.
8. Disinfect the heating element and the upper part of the humidifier by wiping them.
9. Place a new O-ring on the heating element.
10. Screw the heating element into the new lower part of the humidifier.
11. Insert the new humidifier insert into the upper part of the humidifier.
12. Close the humidifier.

4.3.3 Hygiene treatment on change of patient and if used with bacteria filter

Follow the Instructions for Use for the therapy device.

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5 Final check

5.1 General information

To simplify the test sequence, the therapy device has a programmed step-by-step test. This is available in activated Service mode (see "5.4.2 Perform step-by-step test", page 25).

The step-by-step test comprises all the test steps necessary to check the functionality of the therapy device.

The test sequence is independent of current therapy device settings, i.e. patient parameters are retained unchanged.

Other service functions are furthermore available in Service mode (see "5.2 Activating service mode", page 21).

- Perform a final check:
  - After every service
  - After every repair
  - After every hygiene treatment
- In the final step of the step-by-step test, there is the option of having an electronic test record generated in PDF format. The test record can be saved on the SD card of the device.
- If you find faults or deviations from specified values during the final check, do not use the therapy device again until the faults have been rectified.
- Note that the final check is only possible from firmware version 1.3.0 upwards. Perform a firmware update if there is a lower version of the firmware on the device (see "3.4 Perform firmware update", page 13).
- Use the final check to troubleshoot. A summary of possible faults can be found in the section entitled “Faults” (see "6 Faults", page 31).
- The auxiliary equipment required can be found in the section entitled “Auxiliary equipment required” (see "11 Auxiliary equipment required", page 70).

5.2 Activating service mode

The therapy device has a Service mode which can be activated with the aid of service connector WM 29917 which is available to trained service engineers.

1. Switch the device off completely.
2. Disconnect the power supply.
3. Connect service connector to the system interface.
4. Connect power supply.
5. Switch device to **Standby**.

The service menu appears after approximately 10 seconds. The service menu is only available in English and contains the functions below:

FUNCTION	TAB	PARAMETER	DESCRIPTION	SETTING OPTION
Versions, Types	Versions, types	Device type	Displays the device type activated.	
		Device Branding	Displays the startup logo activated.	
		Battery support	Indicates whether the device can be supplied by an internal battery	
		Battery installed	Indicates whether a battery is inserted.	Battery inserted yes/no
		Device serial number	Displays the serial number of the therapy device.	Enter serial number once if current serial number is "0".
		Main board serial number	Displays the serial number of the main board.	Enter serial number once if current serial number is "0".
		Blower Index	Index of blower design	Currently "0"
	Versions	Mainboard HW version	Displays the hardware version of the main board.	Automatic
		Display HW version	Displays the hardware version of the display.	Automatic
		FW version	Displays the current firmware version.	Automatic
Display/ Buttons	Display	Display test	For testing the color reproduction of the display and any pixel faults.	Only for test purposes; selection of different color tones.
		Display brightness test	Test display brightness	
	Alarm LEDs	Alarm button. Red LED. LC	Test alarm LEDs	
		Alarm button. Yellow LED. LC		
		Alarm button. Red LED. MC		
		Alarm button. Yellow LED. MC		
	LEDs	Program button LED	Tests the backlighting of the individual keys	
		Humidifier button LED		
		Power button LED		
		Home button LED		
		Info button LED		
		1 button LED		
		2 button LED		
		3 button LED		
	Rotary encoder	Start rotary encoder test	Tests encoder function	
	Buttons	Start buttons and LEDs test	Tests key function	
Beeper control		Beeper test main controller	Tests beeper	
		Beeper test associated controller		

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FUNCTION	TAB	PARAMETER	DESCRIPTION	SETTING OPTION
Motor, humidifier	Motor & pressure control	Flow, l/min	Displays current flow	
		Ambient pressure	Displays current ambient pressure	
		Mask pressure	Displays current mask pressure	
		Pressure sensor 1	Displays the measured value from pressure sensor 1	
		Pressure sensor 2	Displays the measured value from pressure sensor 2	
		Motor speed	For testing flow/pressure as a function of set blower speed.	For test purposes only; motor speed
		Mask pressure	For testing flow/pressure as a function of a certain pressure.	For test purposes only; specified pressure
		Motor current test status	Tests the current consumption of the blower	
		Blower using time, hours	Resets blower running time.	
	Humidifier and hose heater control	Humidifier current	Displays the current consumption of the heating element.	
		Humidifier voltage	Tests the power supply to the heating element.	For test purposes only; different voltages
		Hose heater connection	Indicates whether a heatable hose is connected.	
		Hose heater	For activating hose heating.	
	Voltages	Power supply voltage	Displays the current operating voltage of the therapy device.	
		Humidifier voltage	Displays the current supply voltage of the heating element.	
		Battery voltage	Displays the current supply voltage of the battery.	
		Goldcap voltage	Displays the current voltage of the Goldcap capacitor.	
		Motor voltage	Displays the current supply voltage of the blower.	
	Valves (prisma VENT50 only)	Magnetic valve	Used for manual opening/closing.	
		Piezo valve	Used for infinitely variable opening/ closing.	
		Airway pressure	Displays the current respiratory tract pressure.	%-indication
		Pilot pressure	Displays the current control pressure.	
Date, time reminders	Date, time	Current date/ time	Displays the current setting of the Real Time Clock.	Date, time
	Using time/ service dates	Device operating hours	Displays the total operating hours of the therapy device.	Current total operating hours if currently < 10
		Next device service	Indicates the date of the next service.	Reset service indicator
		Device service period, months	Optional service reminder and specification of the service interval if service reminder is activated.	Activation and setting of the optional service interval between 1 and 48 months
		Next filter change	Displays the date of the next filter change.	Reset filter change indicator.
		Filter change reminder	Optional activation of the filter change indicator.	Activates the filter change reminder (interval 1 month)

FUNCTION	TAB	PARAMETER	DESCRIPTION	SETTING OPTION
External interfaces	Storage interfaces	SD card test status	Tests the SD card	Tests card access
		SD card	Tests the card reader	
	External interfaces	PSG UART test status	Tests the PSG UART	Tests PSG UART communication
		Second MCU UART test status	Tests the second MCU UART	Tests the second MCU UART
		I2C test status	Tests I2C communication with the accessory part module	Tests I2C communication, accessory part must be connected
		Com. Module on USB	Tests communication with accessory part	
		Pulsox. module on USB	Pulsoximetry module connection	Tests pulsoximetry module communication
Service files			Fault memory	Clears fault memory.
Clear, copy, format		Delete therapy data	Clears patient usage times.	
		Format SD card	Clears the SD card.	Clears the SD card.
		Factory settings	Reset to factory settings.	
		Copy data on SD card	Transfer data to SD card.	Start transfer.
		Import data from SD card	Adopt data from SD card.	Start transfer.
		Copy service protocol on SD card	Save test record to SD card	Start transfer.
Battery control			Display of battery and charge status	
Step by step test			Programmed test sequence	
SW update		Device SW version	Displays the current firmware version of the device.	
		SW version of update file on SD card	Displays the firmware version on the SD card.	
		Status	Indicates the status of the SD card.	
		SW update	Starts a software update	

5.3 Conduct test

5.3.1 Check housing

Requirement
Power cord is connected.

1. Check general condition of housing (visual inspection).
2. If the housing is damaged or faulty: Replace housing (see "7.12 Replace power supply unit and its connecting cable", page 61).

5.3.2 Check power cord

1. Check power cord.

Requirement:

- The insulation is OK.
- The cable is undamaged.

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- There are no loose contacts.

2. If one of the requirements is not met: Replace power cord.

5.4 Perform function check/TSC in line with §11 of the MP BetreibV [German law governing the owners of medical devices]

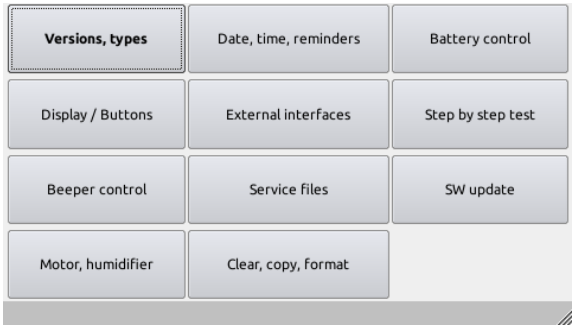
5.4.1 Check therapy device

Requirement
The patient has been disconnected from the therapy device.

1. Check therapy device for external damage.
   If damaged: Do not use therapy device.
2. Check connectors and cables for external damage.
   If damaged: Replace parts.

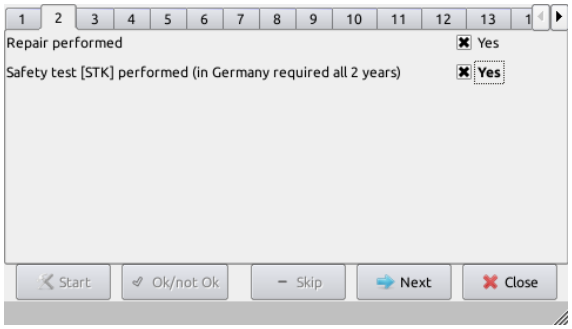
5.4.2 Perform step-by-step test

1. Activate Service mode: Connect service connector WM 29917 to the system interface.
2. Connect power cord and supply power.
   The Service menu opens after approximately 3 seconds.



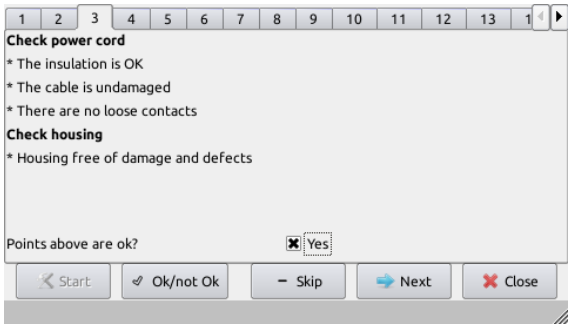
3. Select **Step by step test** field.

4. **Step 1:** Enter tester name or insert SD card with tester data.
   - Turn knob until the **Tester name** field is highlighted yellow.
   - Press knob and enter the name.
   - Confirm entry with a tick.
   - Select **Next**.



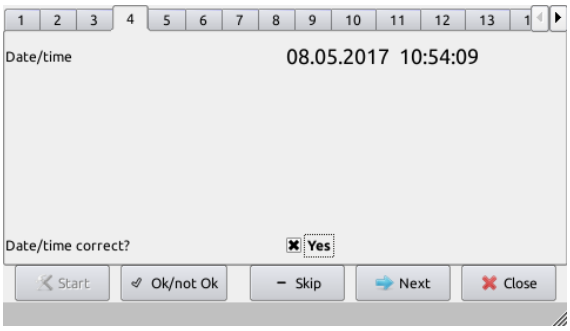
5. **Step 2:** Select type of test.
   - Select and confirm the desired type of testing.
   - Select **Next**.

Note: The TSC in line with §11 MPBetreibV [German law governing the owners of medical devices] is only a legal requirement in Germany and must be carried out every 2 years.



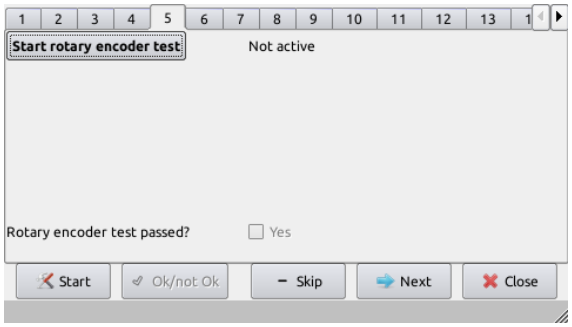
6. **Step 3:** Visual inspection of external condition of housing and power cord.
   - Check general condition of housing (visual inspection).
   - Check power cord.

   Requirement:
   Housing is in good condition and undamaged.
   Insulation of the power cord is in good condition.
   The cable is undamaged.
   There are no loose contacts.
   - Select **Next**.



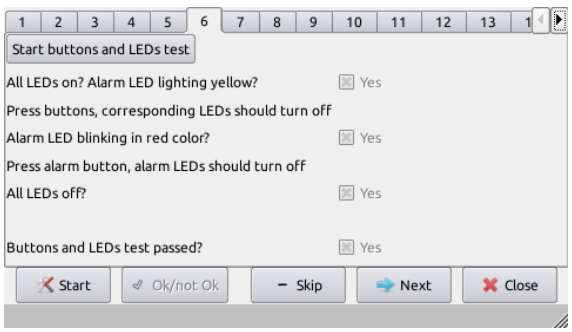
7. **Step 4:** Check date and time.
   - Compare date and time to a reference clock.

   Requirement:
   Date and time are correct.
   - Confirm selection **Date/time correct?** with **Yes**.
   - Select **Next**.



8. **Step 5:** Check knob/encoder.
   - Select **Start rotary encoder test**.
   - Follow the instructions in the display.

   Requirement:
   The selection **Rotary encoder test passed?** is automatically confirmed with **Yes**.
   - Select **Next**.



9. **Step 6:** Check keys and LEDs.
   - Select **Start buttons and LEDs test**.

   Requirement:
   All the LEDs behind the keys light up. The alarm key lights up orange.
   - Select **Yes** to confirm the requirement.
   - Press all the keys one after another.

   Requirement:
   The illumination behind each key pressed goes out. The Alarm key switches from orange to red and starts flashing.
   - Confirm that the Alarm key is flashing by selecting **Yes**.
   - Press the Alarm key to stop the flashing.

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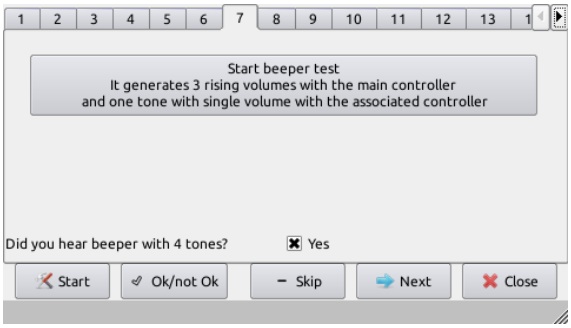
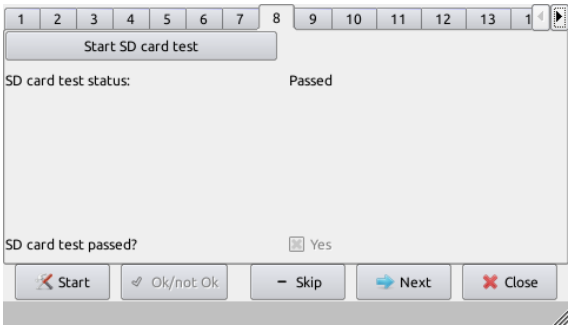
Requirement:
All the LEDs are off.

- Confirm the requirement with **Yes**.
  The selection **Buttons and LED test passed?** is automatically confirmed with **Yes**.
- Select **Next**.



10. **Step 7:** Test alarm.
    - Select **Start beeper test**.

    Requirement:
    Alarms of varying volume are heard.
    - **Confirm Did you hear beeper with 4 tones?** with **Yes**.
    - Select **Next**.

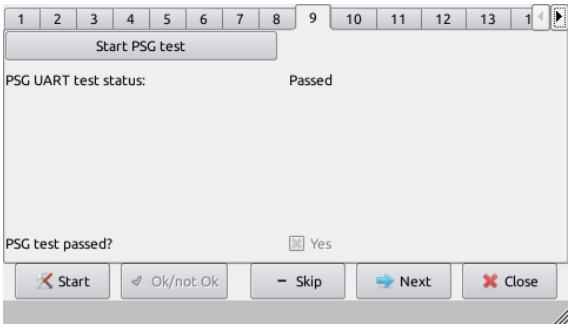


11. **Step 8:** Check the SD card.
    - Select **Start SD card test**.

    Requirement:
    Display: **SD card test status -> Passed**
    (if SD card present)
    or
    Display: **SD card test status -> SD card not recognized**
    (if no SD card present)

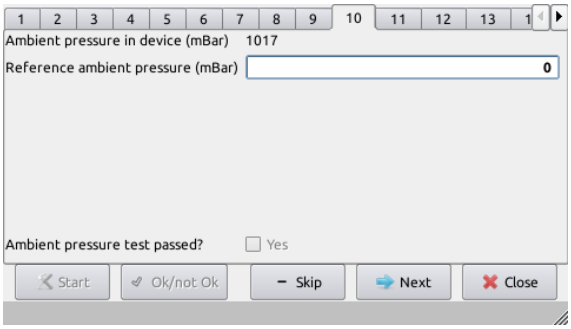
    - If no SD card present:
      Insert SD card and select **Start SD card test**.

    Requirement:
    Display: **SD card test status -> Passed**
    The selection **SD card test passed?** is automatically confirmed with **Yes**.
    - Select **Next**.



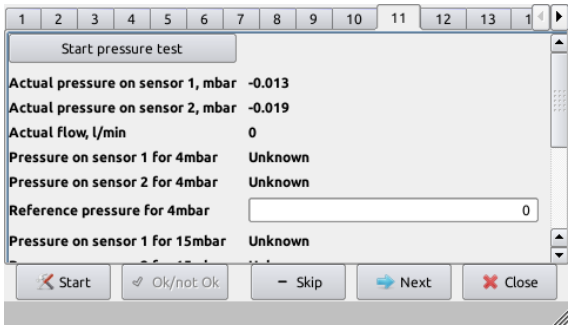
12. **Step 9:** Check PSG/system interface.
    - Select **Start PSG test**.

    Requirement:
    Display: **PSG UART test status -> Passed**
    (UART = Universal Asynchronous Receiver Transmitter)
    The selection **PSG test passed?** is automatically confirmed with **Yes**.
    - Select **Next**.



13. **Step 10:** Check ambient pressure sensor.
    - Enter current ambient pressure in the **Reference ambient pressure (mBar)** field.

    Requirement:
    The ambient pressure displayed corresponds to current air pressure. Deviation may not exceed 20 mbar.
    The selection **Ambient pressure test passed?** is automatically confirmed with **Yes**.
    - Select **Next**.

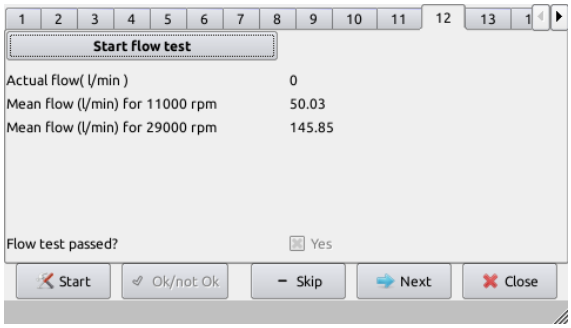


14. **Step 11:** Check specified pressure values.
    - Plug pressure measurement adapter onto the device outlet port and seal it off.
    - Connect the lateral connector of the pressure measurement adapter to a pressure measurement device.
    - Select **Start pressure test**.
    - Read measured value off pressure measurement device at 4 mbar and enter it in the **Reference pressure for 4 mbar** field.
    - Read measured value off pressure measurement device at 15 mbar and enter it in the **Reference pressure for 15 mbar** field.

NOTICE	The leak flow may be a maximum of 2 l/min.

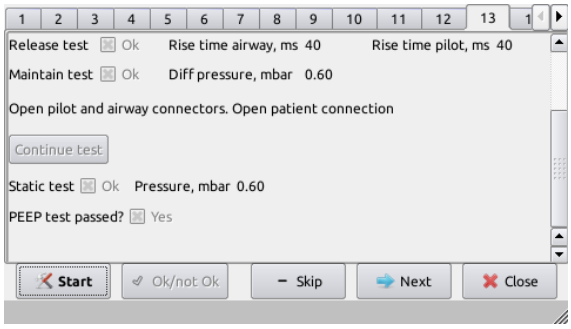
    - Read measured value off pressure measurement device at 40 mbar and enter it in the **Reference pressure for 40 mbar** field.

    Requirement:
    The pressure values measured are within tolerance. The selection **Pressure test passed?** is automatically confirmed with **Yes**.
    - Remove pressure measurement adapter from device outlet port.
    - Select **Next**.



15. **Step 12:** Check flow values
    - If present: Remove adapter or breathing tube from device outlet port.
    - Select **Start flow test**.

    Requirement:
    The flow values displayed are within the specified tolerance. The selection **Flow test passed?** is automatically confirmed with **Yes**.
    - Select **Next**.



16. **Step 13:** PEEP test (only prisma VENT50).
    - Close device outlet port with suitable plug.
    - Connect pressure measurement port and connection valve control with suitable tube.
    - Select **Start PEEP test**.

    Requirement:
    The first three test steps are confirmed with **OK**.
    - Open the device outlet port.
    - Remove connecting tube.
    - Select **Continue test**.

    Requirement:
    The individual test steps are confirmed with **OK**. The selection **PEEP test passed** is automatically confirmed with **Yes**.
    - If the test fails, perform pressure sensor check.
    - Select **Next**.

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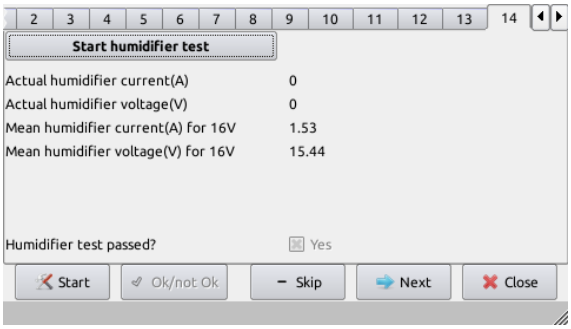
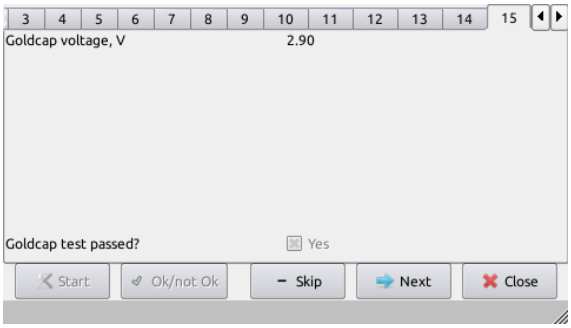


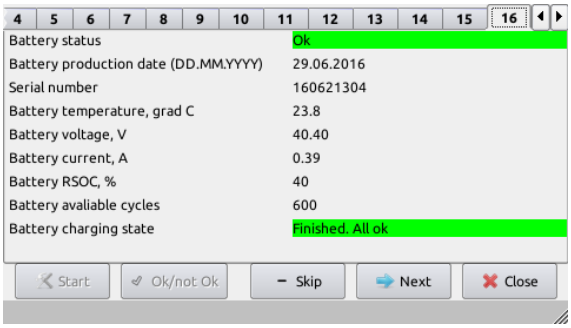
17. **Step 14:** Check humidifier interface (heating element).
    - Connect the humidifier.
      or
      Remove side cover and connect individual heating element to the jack on the therapy device.
    - Select **Start humidifier test**.

    Requirement:
    The voltage and current consumption displayed are each within the specified tolerance. The selection **Humidifier test passed?** is automatically confirmed with **Yes**.
    - Select **Next**.



18. **Step 15:** Check Goldcap voltage.
    - The device automatically checks whether the Goldcap voltage is within the specified tolerance.

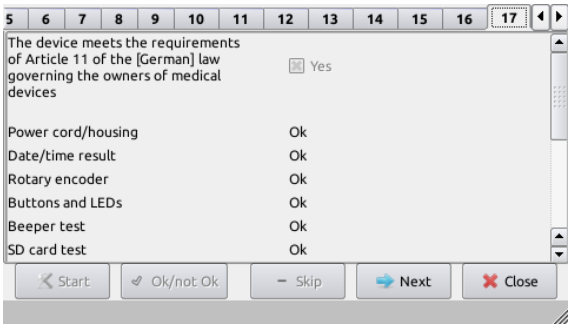
    Requirement:
    The selection **Goldcap test passed?** is automatically confirmed with **Yes**.
    - Select **Next**.



19. **Step 16:** Check battery (if present)
    - The device automatically checks the status of the battery.

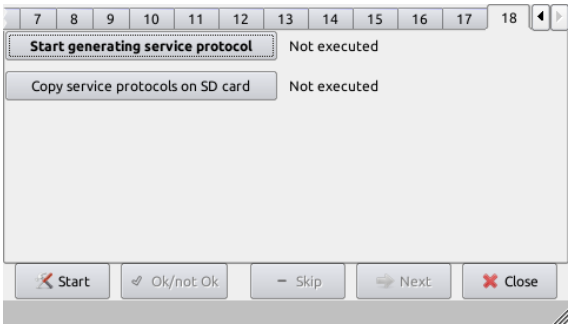
    Requirement:
    Display **Battery status OK**

    The test duration and operating state of the device may vary depending on the battery level.
    - Select **Next**.



20. **Step 17:** Check summary of test result.
    - The test results of each individual test item are displayed.

    Requirement:
    All test items have the status OK.
    As confirmation that the requirements of §11 MPBetreibV [German law governing the owners of medical devices] have been met, the selection **The device meets the requirements of Article 11 of the [German] law governing the owners of medical devices** is automatically confirmed with **Yes**.
    - Select **Next**.



21. **Step 18:** Record the test results.
    - In order to generate a test record in PDF format, select **Start generating service protocol**.
    - To copy existing test records to the SD card, select **Copy service protocols on SD card**.

22. Disconnect the service connector from the therapy device to exit the Service menu.

Result The function check is complete.

5.4.3 Check humidifier

Requirement

- The patient has been disconnected from the therapy device.
- The therapy device is connected to the power supply.
- The therapy device is on **Standby**.

1. Check the housing of the humidifier for cracks, damage and severe soiling.
2. If there are cracks, damage or soiling: Replace housing parts or humidifier insert.
3. Fill humidifier with water up to the mark.
4. Check whether the humidifier has any leaks.
   If the humidifier leaks: Replace damaged parts.
5. Pour out water.
6. Fill humidifier with 200 ml water.
7. Connect humidifier to the therapy device.
8. Switch on humidifier.
9. Set the highest humidifier stage on the therapy device.
10. Check whether the humidifier is heating up.
    If the humidifier does not heat up slightly after 10 minutes: Replace heating element or main board (see "7.7 Replace main board", page 49).

Result The function check is complete.

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6 Faults

If you are unable to eliminate faults immediately with the help of the table, contact the manufacturer. To avoid exacerbating the damage, do not continue operating the device.

FAULT	CAUSE OF FAULT	REMEDY
No running noise, nothing in the display.	No power supply.	Check that the power cord is securely connected. Check function of socket. Check the power supply with a different device (e.g. a lamp). If necessary: Replace power cord. If necessary: Replace power supply unit (see 7.12, p. 61).
	Fuse faulty.	Replace main board (see 7.7, p. 49).
No running noise after display comes on.	Blower not running.	Replace main board (see 7.7, p. 49).
		Replace blower (see 7.11, p. 58).
Therapy cannot be started by taking a breath.	Autostart function not activated.	Activate autoSTART-STOP function.
	autoSTART function may be restricted in the case of accessories with a high resistance.	Contact your specialist dealer.
Therapy device does not reach therapy pressure.	Air filter dirty.	Clean air filter. If necessary: Replace filter (see "4 Hygiene treatment", page 14).
	Breathing mask leaking.	Adjust headgear so that the mask is tight. If necessary, replace faulty mask.
Keys cannot be operated.	Control panel faulty.	Replace front wall of housing (see 7.9, p. 55).

6.1 Humidifier faults

FAULT	CAUSE	REMEDY
Humidifier does not warm up.	Humidifier heating switched off.	Adjust humidifier heating.
	Humidifier is faulty.	Replace humidifier.
Humidifier is leaking.	Heater element seal is faulty.	Replace seal.
	Humidifier insert is not inserted correctly.	Insert humidifier insert correctly.
	Humidifier insert is faulty.	Replace humidifier insert.
	Cracks in lower part of humidifier.	Replace lower part of humidifier.
Humidifier switches off.	No water present in the humidifier.	Fill humidifier with water.

6.2 Display messages

If the message **Error (xxx): Please follow the instructions in the Instructions for Use** appears in the display, look in the table (see "6.3.1 Open/clear fault memory", page 32) for the fault code displayed. Remedy the fault in accordance with the description.

6.3 Fault memory

The therapy device has an internal fault memory which can store up to 100 fault entries. Once the maximum number of entries has been reached, the oldest entry is overwritten.

Fault entries are displayed as follows:

date - time - number of fault message - description

6.3.1 Open/clear fault memory

1. Activate Service mode (see 5.2)
2. Select **Service files**.
3. To delete the error memory: Select **Delete all**.
4. Confirm the confirmation prompt with **Yes**.
   or
5. Select **No** to cancel.

The causes of the individual faults can be found in the table below.

FAULT NUMBER	DESCRIPTION	CAUSE	REMEDY
101	Sensor fault	Main board faulty	Replace main board
102	Sensor fault	Main board faulty	Replace main board
103	Sensor fault	Main board faulty	Replace main board
		Device outlet port incorrectly assembled	Check device outlet port assembly
104	Sensor fault	Main board faulty	Replace main board
105	Sensor fault	Main board faulty	Replace main board
106	Sensor fault	Main board faulty	Replace main board
107	Sensor fault	Main board faulty	Replace main board
108	Real Time Clock fault	Time not set	Set date and time so that the course of therapy is set correctly.
		Battery on main board discharged	Replace battery on main board
		Main board faulty	Replace main board
109	Real Time Clock fault	Main board faulty	Replace main board
110	Real Time Clock fault	Main board faulty	Replace main board
111	Real Time Clock fault	Main board faulty	Replace main board
113	Self-test fault	Main board faulty	Replace main board
		Blower faulty	Replace blower
151	Sensor fault	Main board faulty	Replace main board
152	Sensor fault	Main board faulty	Replace main board
201	Blower speed fault	Main board faulty	Replace main board
		Blower faulty	Replace blower
202	Blower speed fault	Main board faulty	Replace main board
		Blower faulty	Replace blower
203	Sensor fault	Main board faulty	Replace main board
		Pressure measurement tube kinked/ blocked	Check position of pressure measurement tube/remove blockage, replace tube
205	Voltage supply fault	Main board faulty	Replace main board
		Power supply unit faulty	Replace power supply unit
206	Module fault	prismaCONNECT module module faulty	Replace prismaCONNECT module module

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FAULT NUMBER	DESCRIPTION	CAUSE	REMEDY
207	Module fault	Main board faulty	Replace main board
		PSG module faulty	Replace PSG module
		prisma CHECK faulty	Replace prisma CHECK
		Connecting cable faulty	Replace connecting cable
251	Blower speed fault	Blower faulty	Replace blower
252	Sensor fault	Tubing for the pressure sensors faulty	Check tubing and position of pressure measurement tubes
		Main board faulty	Replace main board
253	Sensor fault	Main board faulty	Replace main board
		Pressure measurement tube kinked/ blocked	Check position of pressure measurement tube/remove blockage, replace tube
254	Flow fault	Main board faulty	Replace main board
255	Power supply fault	Main board faulty	Replace main board
256	Power supply fault	Main board faulty	Replace main board
257	Power supply fault	Main board faulty	Replace main board
258	Power supply fault	Main board faulty	Replace main board
259	Power supply fault	Main board faulty	Replace main board
260	Humidifier fault	Humidifier faulty	Replace humidifier
		Main board faulty	Replace main board
261	Humidifier fault	Humidifier faulty	Replace humidifier
		Main board faulty	Replace main board
500	Controller fault	Main board faulty	Replace main board
501	Controller fault	Main board faulty	Replace main board
502	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
504	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
505	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
507	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
508	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
509	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
510	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
550	Battery fault	Battery capacity < 5%	Connect the device to the power supply
551	Battery fault	Battery capacity < 10%	Connect the device to the power supply.
552	Battery fault	Battery faulty	Replace battery
553	Battery fault	Battery not present	Fit battery
554	Battery fault	Third-party battery	Fit genuine battery
		Battery faulty	Replace battery
555	Battery fault	Battery temperature on limit value	Operate device at an ambient temperature of 5 °C to 40 °C
556	Battery fault	Battery temperature too high	Operate device at an ambient temperature of 5 °C to 40 °C

FAULT NUMBER	DESCRIPTION	CAUSE	REMEDY
557	Battery fault	Battery stored for too long	Connect the device to the power supply. If fault is still being displayed after 8 h, replace battery
558	Battery fault	Battery cannot be charged	Replace battery
559	Battery fault	Battery cannot be charged due to high temperature	Operate device at an ambient temperature of 5 °C to 40 °C
560	Battery fault	Battery cannot be charged due to low temperature	Operate device at an ambient temperature of 5 °C to 40 °C
561	Battery fault	Battery service life at an end	Replace battery
580	Power supply fault	All power supplies have failed	Provide power supply
581	Power supply fault	Device in battery mode	Press alarm acknowledgment key. The device is in battery mode.
582	Power supply fault	Battery on main board discharged	Replace battery on main board
583	Power supply fault	Main board faulty	Replace main board
701	Pressure measurement section fault	Humidifier or cover not connected without leaks	Connect humidifier or cover correctly
		Main board faulty	Replace main board
		Pressure measurement tube not connected	Connect pressure measurement tube
		Pressure measurement tube kinked/ blocked	Check position of pressure measurement tube/remove blockage, replace tube
702	Flow section fault	Breathing tube kinked	Check position of breathing tube or replace breathing tube
		Device outlet port blocked	Remove blockage at device outlet port
		Main board faulty	Replace main board
		Assembly fault	Check flow section assembly
		Restrictor faulty	Replace restrictor
703	Flow section fault	Intake area blocked	Remove blockage in intake area or replace air filter
		Blower faulty	Replace blower
751	Power supply fault	Humidifier or cover not connected without leaks	Connect humidifier or cover correctly
		Main board faulty	Replace main board
		Pressure measurement tube not connected	Connect pressure measurement tube
		Pressure measurement tube kinked/ blocked	Check position of pressure measurement tube/remove blockage, replace tube
752	VBS fault	Disconnection for > 2 min.	Check connection from device to the patient/ventilator interface at the patient via the breathing tube
753	VBS fault	Leakage too low	Check exhalation system
754		Fault as a consequence of 701, 203, 751, 253, 252	Remedy primary fault
793	Module fault	SpO_2 alarms active and no SpO_2 module present when ventilation starts	Deactivate SpO_2/pulse alarms or reconnect Prisma Check
801	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
802	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
804	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board

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FAULT NUMBER	DESCRIPTION	CAUSE	REMEDY
805	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
806	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
809	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
810	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
811	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
821	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
824	Initialization fault	Further investigation required	Send therapy device to the manufacturer or replace main board
851	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
852	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
853	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
854	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
860	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
861	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
862	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
870	Controller fault	Delay when firmware is started	If only listed in the service files, no further action is required
		Further investigation required	Send therapy device to the manufacturer or replace main board
871	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
872	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
880	Controller fault	Further investigation required	Send therapy device to the manufacturer or replace main board
897	Update fault	Further investigation required	Send therapy device to the manufacturer or replace main board
898	Update fault	Further investigation required	Send therapy device to the manufacturer or replace main board
899	Update fault	Update SD card removed before files could be copied	Insert update SD card again and restart update

7 Repair

7.1 General information

- Follow the Instructions for Use and the Service and Repair Instructions when carrying out repairs. Follow the safety instructions in the Instructions for Use in particular.
- Perform repairs only at an ESD workstation.
- Make sure the workstation is clean.
- Only perform repairs described in these Service and Repair Instructions.
- Perform a final check after any repair (see "5 Final check", page 21).
- Use only genuine Löwenstein Medical replacement parts.
- The auxiliary equipment required can be found in the section entitled "Auxiliary equipment required".
- The item numbers in this section are identical to the item numbers in the section entitled "Replacement parts".
- Use a sorting aid for screws and washers.

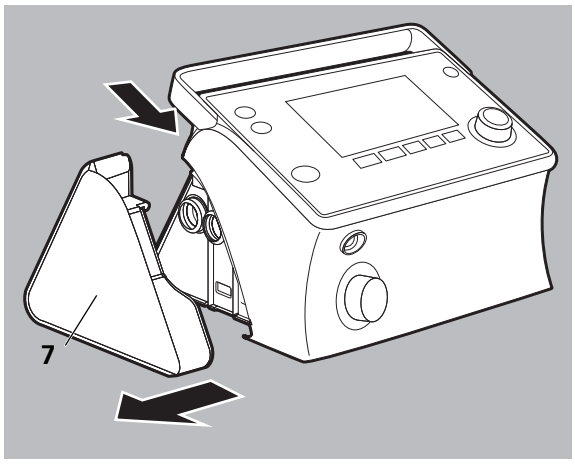
7.2 Open therapy device

⚠ CAUTION

Risk of injury from electric shock!
Opening the therapy device with the power supply connected may lead to electric shocks.

⇒ Disconnect the power supply before opening.

Disconnect the power cord from the therapy device before opening the device.



1. Press the catch key and remove cover **7**/humidifier from the therapy device sideways.

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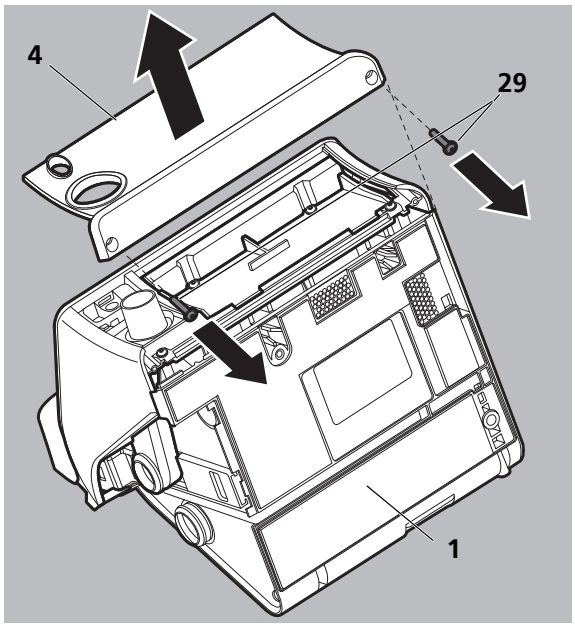
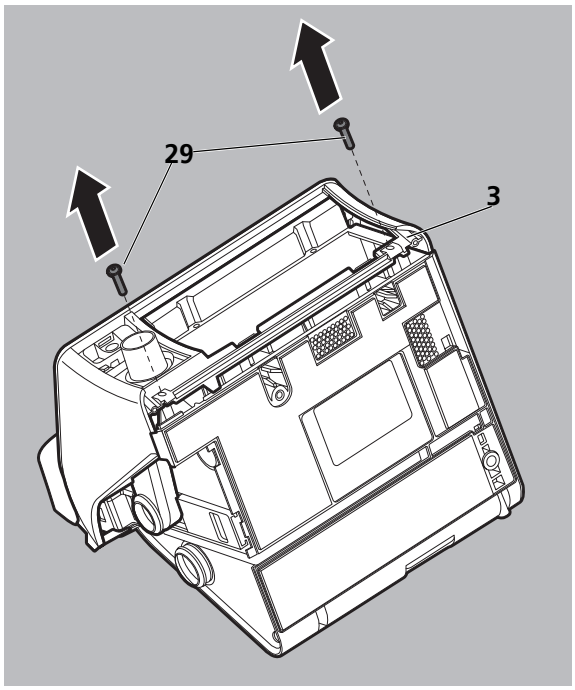
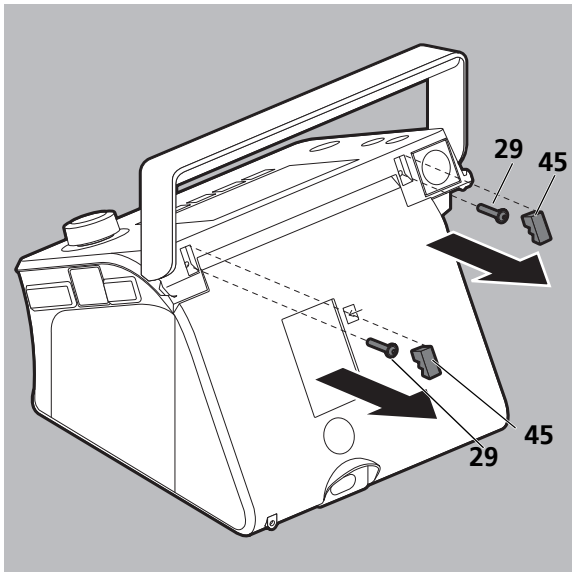


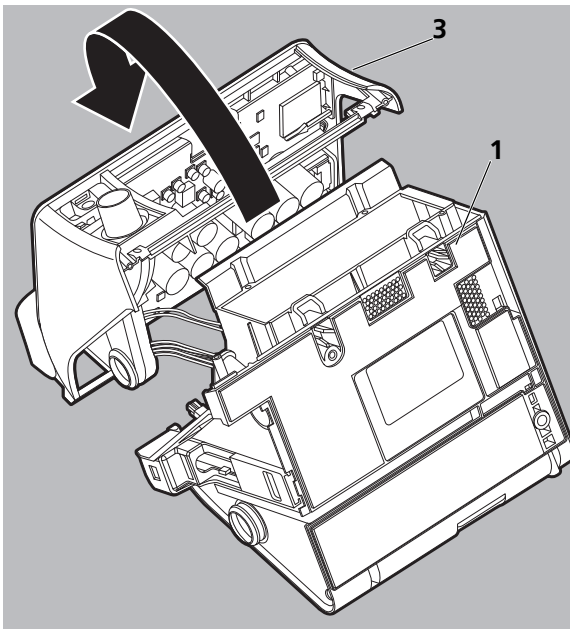
2. Place the device on the table so that the rear of the housing **1** faces downwards.
3. Undo the two screws **29** of front panel **4** on the underside of the device.
4. Take panel **4** off upwards.
5. If present: Remove internal battery (see "7.5.1 Removing the internal battery", page 44).



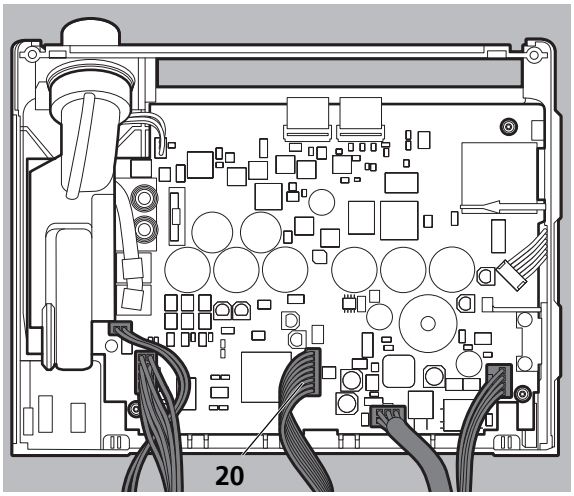
6. Undo the 2 screws **29** of the front of the device **3**.



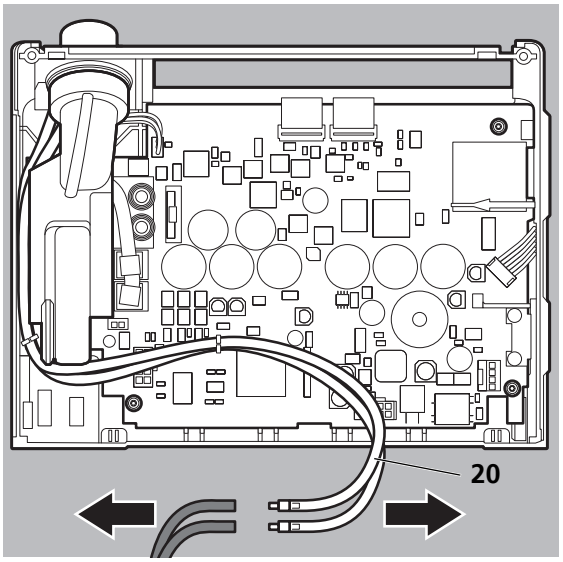
7. Place the device on its underside and remove the 2 plugs **45** on the rear of the device.
8. Undo 2 screws **29**.



9. Swivel the front of the device **3** away upwards and lay the device on its rear **1**.



10. Detach connectors **X1300**, **X1500**, **X302**, **X1501**, **X300** and connection line main board->valve control board **20** (only prisma VENT50).



11. Only prisma VENT50: Detach tube connection for double patient circuit pressure measurement/PEEP control **21** to the tube connectors.

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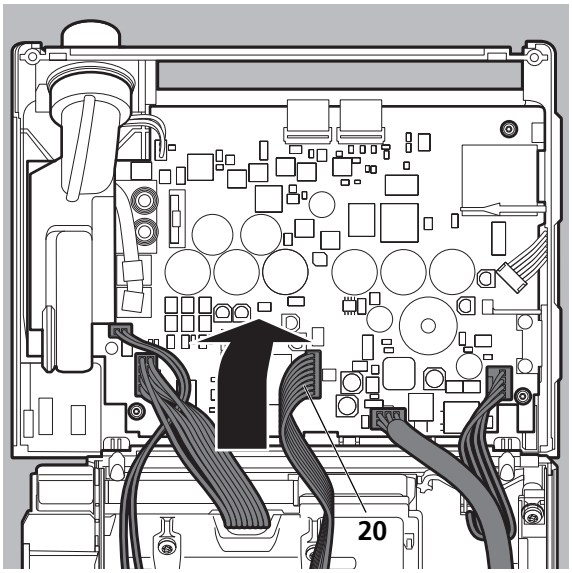
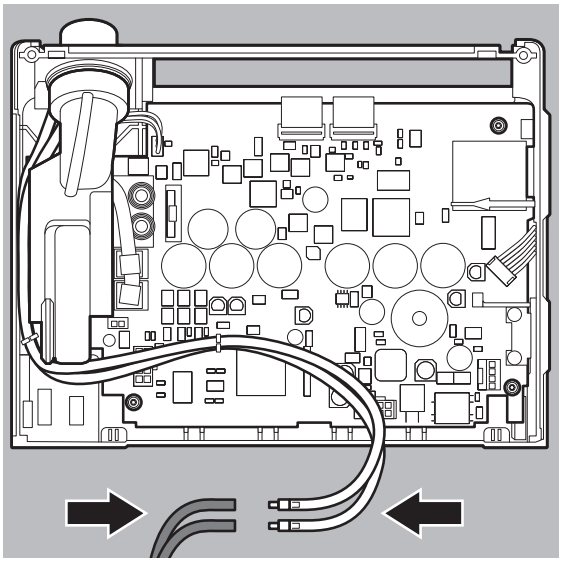
7.3 Close therapy device

When closing the device, ensure that connecting cable for the battery main board **14** is attached to the central part of the housing with cable tie **61** (see "7.10.2 Fit central part of housing", page 56).

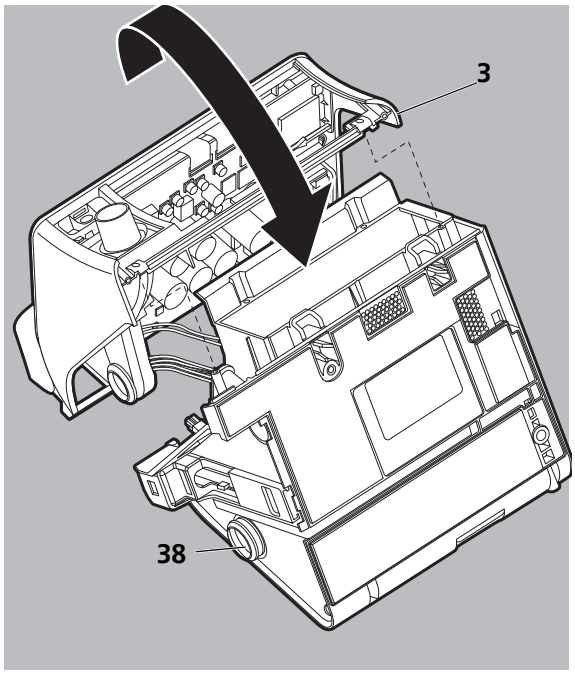
1. Place the front of the housing on the table with the display side in front of the blower box.
2. Connect the connectors **X1300**, **X1500**, **X302**, **X1501**, **X300** and connection line main board->valve control board **20** (only prisma VENT50).



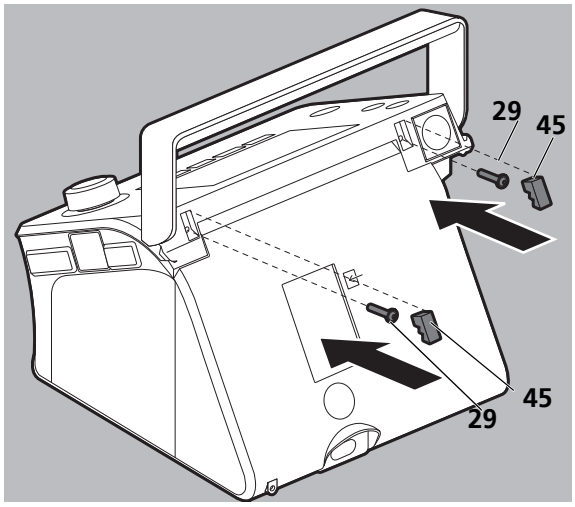


3. Only prisma VENT50: Connect tube connection for double patient circuit pressure measurement/PEEP control **20** to the tube connectors.

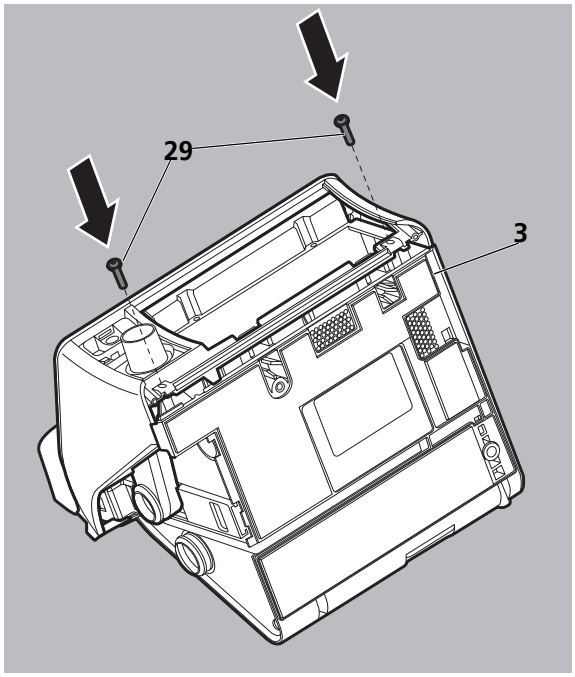
   Warning:
   Pay attention to color coding, do not mix up tubes!



4. Hold the front of housing **3** up against the top edge of the blower box and join both parts together. In doing so, please note:
   - The cable guide and guidance for the pressure-side tube must be correct.
   - The sealing ring for the rear of the housing **38** must engage in the device outlet port.



5. Place the device on its underside and insert the 2 screws **29** on the rear of the device and tighten them up.
6. Insert 2 plugs **45**.



7. Insert 2 screws **29** on the front of the front wall of the housing **3** and tighten them up.
8. If present: Fit internal battery (see "7.5.2 Installing the internal battery", page 45).

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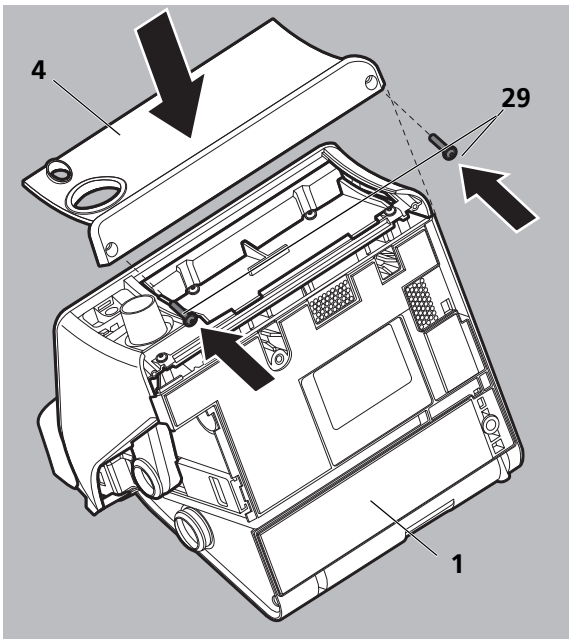
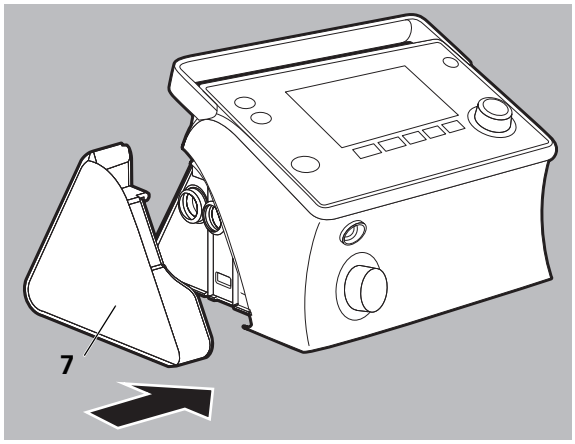


9. Insert panel **4** on the front of the device.
10. Place the device on its rear **1** and insert and tighten the 2 screws **29** on the underside of the device.

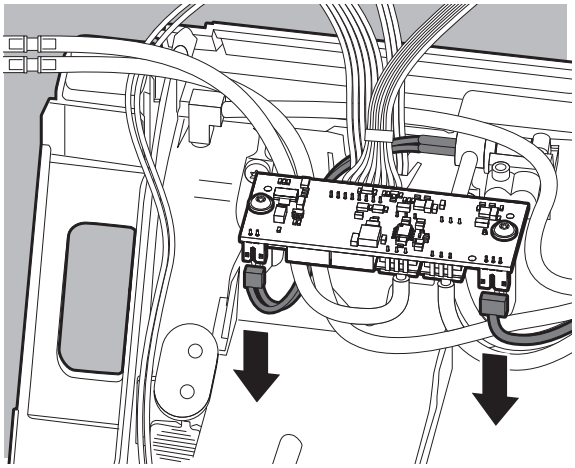


11. Insert cover **7**/humidifier.

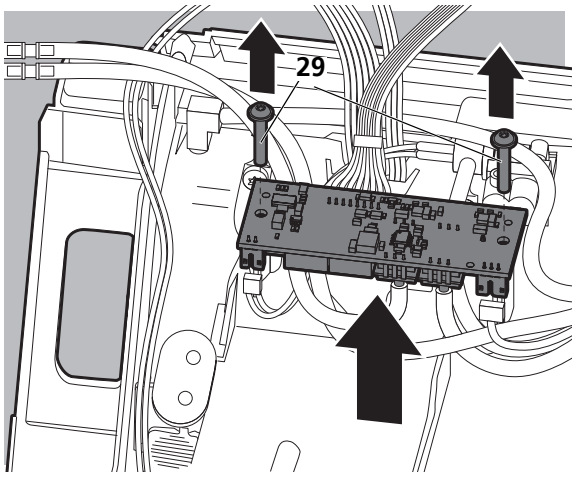
7.4 Replacing the valve control board (only prisma VENT50)

7.4.1 Removing the valve control board

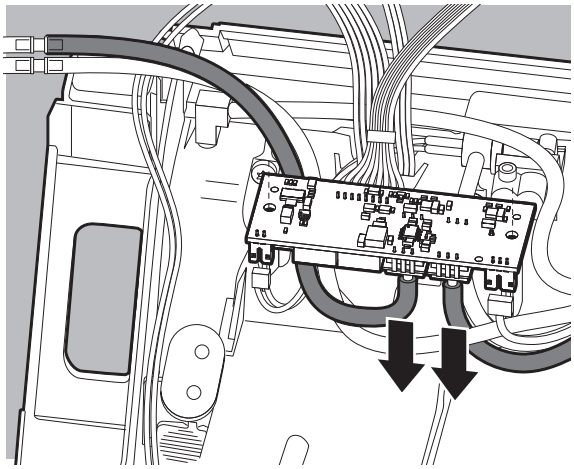
1. Open therapy device (see "7.2 Open therapy device", page 36).



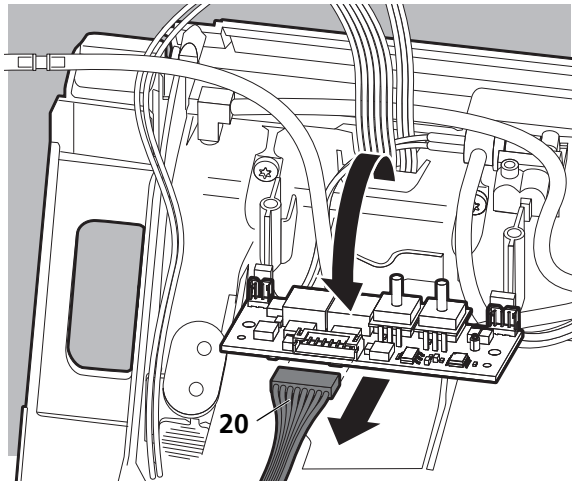
2. Disconnect plug connection to the pressure drop valve (gray cable) and to the pressure build-up valve (black cable).



3. Undo 2 screws **29** from the valve control board **28**.
4. Remove valve control board **28**.



5. Remove both pressure measurement tubes from the pressure sensors.



6. Connection line to valve control board - > main board **20** on the connection.

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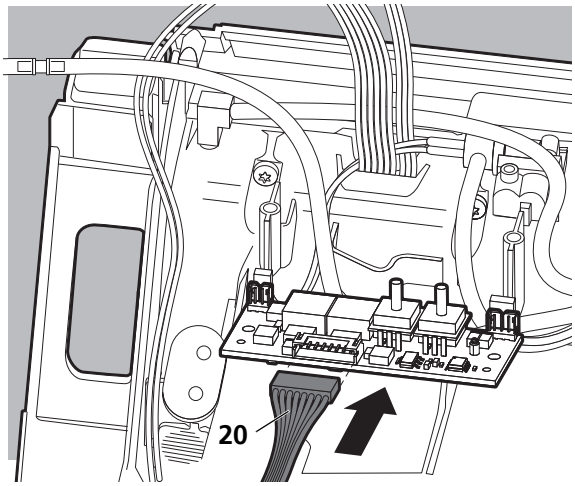
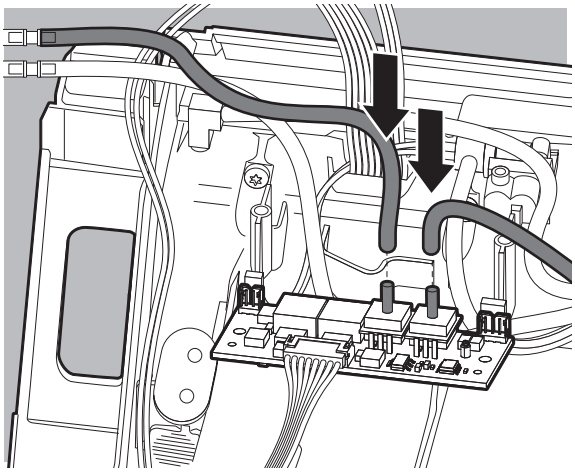
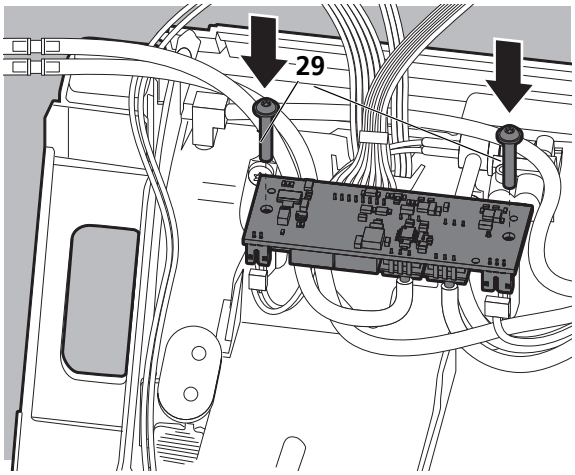
7.4.2 Installing the valve control board



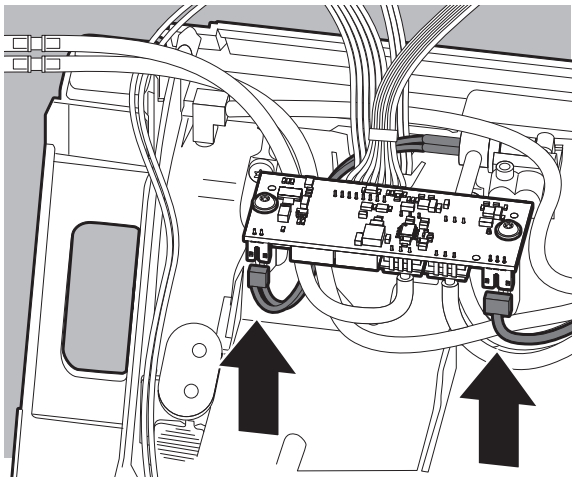
1. Connect the connector of the connection line for the valve control board -> main board **20** to the new valve control board **28**.



2. Connect the tube marked blue to the sensor **B400** and the tube without marking to the sensor **B401**.



3. Insert valve control board **28**. Pay attention to the correct position of the tubes and connecting cables.
   Secure with 2 screws **29**.

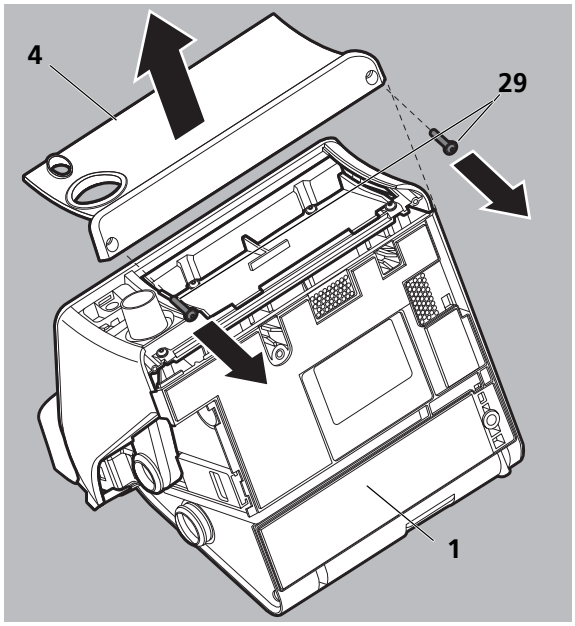


4. Connect the connecting cables from pressure build-up and pressure drop valve.
5. Close therapy device (see "7.3 Close therapy device", page 39).

7.5 Replacing the internal battery

7.5.1 Removing the internal battery

If a device that was previously operated with an internal battery will be used in the future without an internal battery, the configuration in the service menu needs to be changed (**Versions,types** > **SN,types** > **Battery installed** > **select** „**No**“).



1. Place the device on the table so that the rear of the housing **1** faces downwards.
2. Undo the two screws **29** of front panel **4** on the underside of the device.
3. Take panel **4** off upwards.

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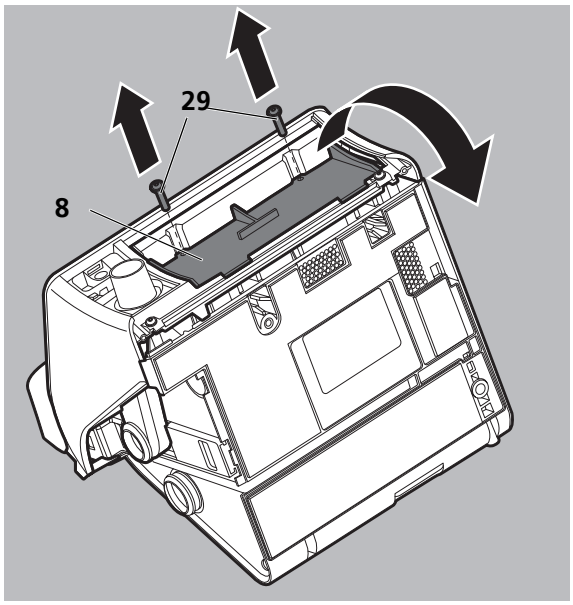


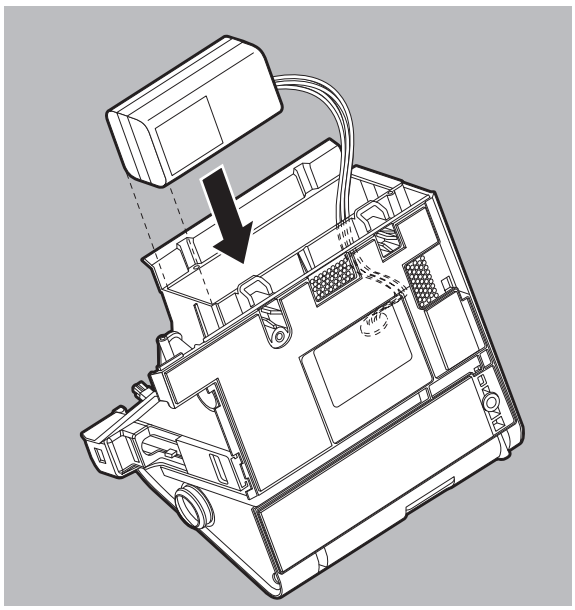
4. Undo 2 screws **29** of the cover for battery compartment **8** and remove the cover.
5. Remove battery and disconnect plug connection.

7.5.2 Installing the internal battery

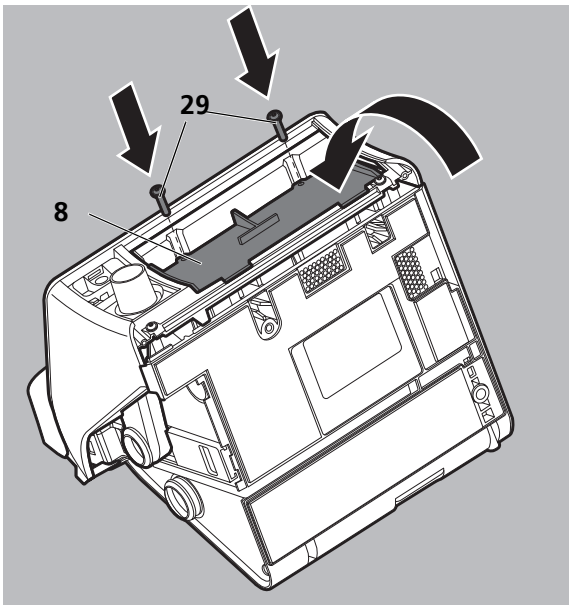
If a device that has previously been operated without an internal battery will be retrofitted with a rechargeable battery, the battery is detected automatically by the device, no manual configuration or activation is required.

NOTICE

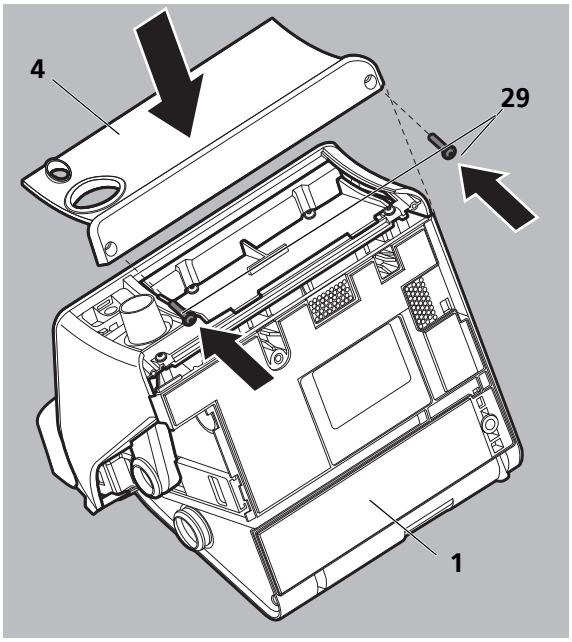
Material damage due to incorrect battery!
Batteries with a serial number below 20,000 do not provide adequate ESD protection and may damage the device.
Only fit batteries with a serial number > 20,000.



1. Connect the battery to the connection line and insert it into the battery compartment.



2. Insert battery compartment cover **8** and insert and tighten up the 2 screws **29**.



3. Insert panel **4** on the front of the device.
4. Place the device on its rear **1** and insert and tighten the 2 screws **29** on the underside of the device.

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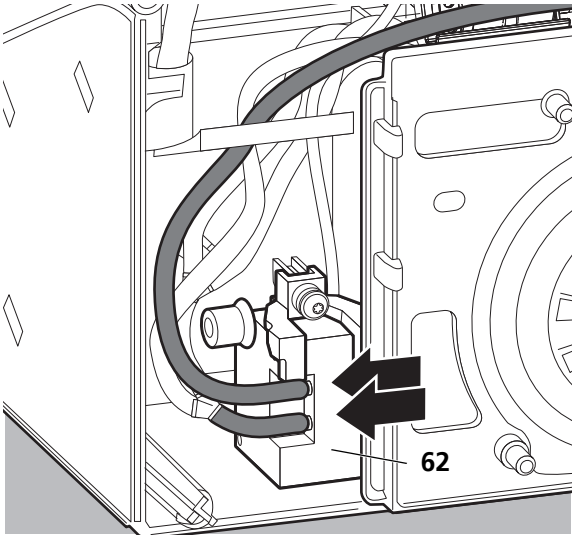
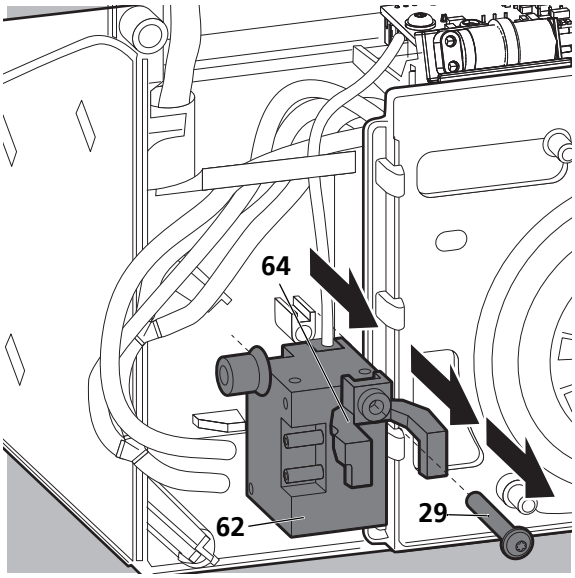
7.6 Replacing the pressure build-up valve (only prisma VENT50)

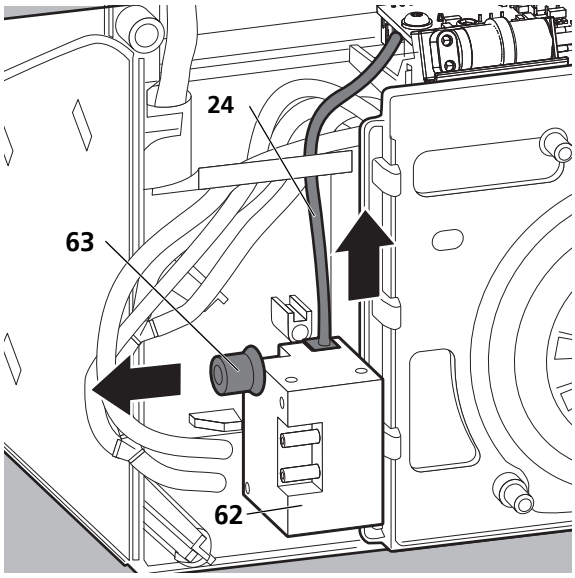
7.6.1 Removing the pressure build-up valve

1. Open therapy device (see "7.2 Open therapy device", page 36).
2. Removing the central part of housing (see "7.10.1 Remove central part of housing", page 55).
3. Pull off tubes from pressure build-up valve **62**.



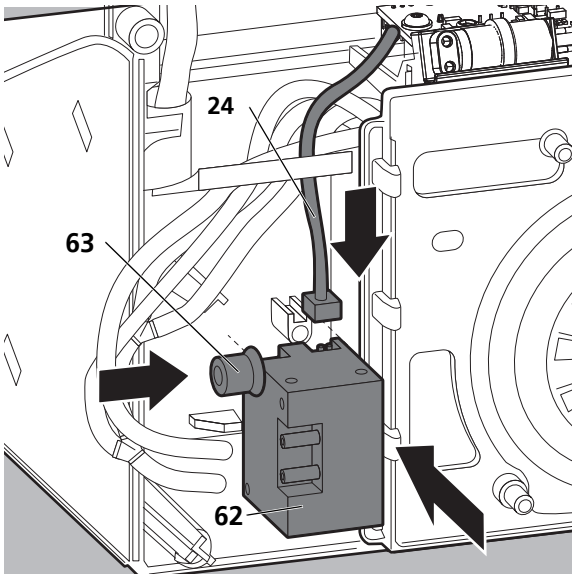


4. Undo screw **29** from holder of pressure build-up valve **64** and remove together with the holder.
5. Remove pressure build-up valve **62** from the central part of the housing.

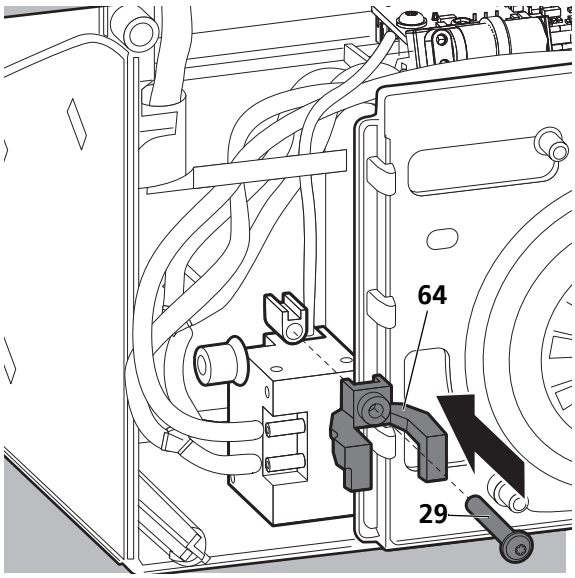


6. Undo connection line of pressure build-up valve to valve control board **24** from the pressure build-up valve **62**.
7. Remove plug **63** from connection 3 to pressure build-up valve **62**.

7.6.2 Installing the pressure build-up valve (only prisma VENT50)



1. Connect plugs **63** to connection 3 of the pressure build-up valve **62**.
2. Connect the connection line of pressure build-up valve to valve control board **24** to the pressure build-up valve **62**.
3. Insert pressure build-up valve **62** to the central part of housing.



4. Insert holder of pressure build-up valve **64** with the screw and tighten screw **29**.

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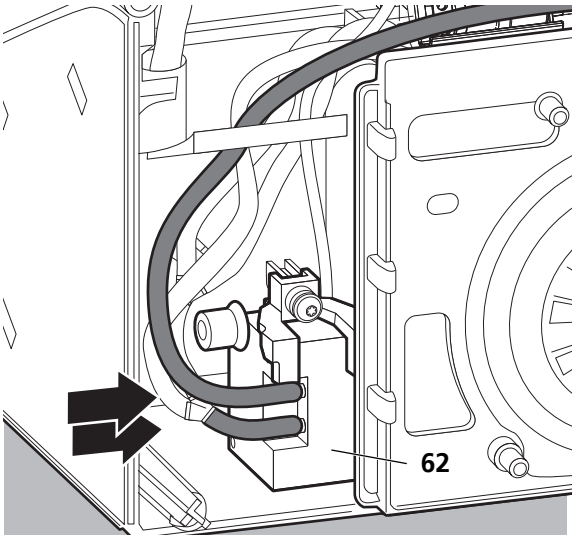
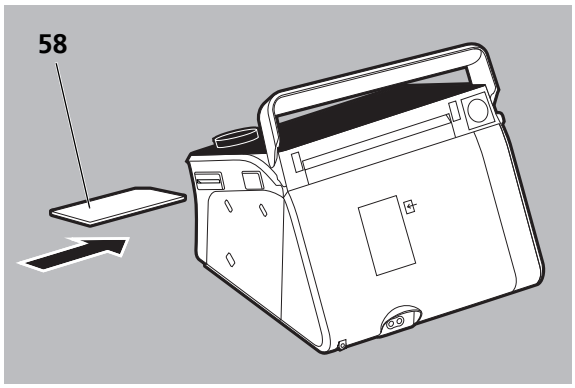


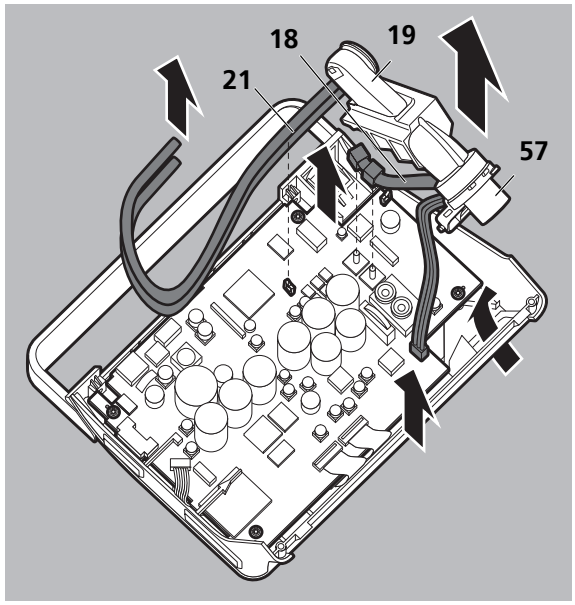
5. Connect the tube with the Y-connectors to the lower connection of the pressure build-up valve **62**.
6. Connect the 2nd tube to the upper connection of the pressure build-up valve **62**.
7. Fit central part of housing (see "7.10.2 Fit central part of housing", page 56).
8. Close therapy device (see "7.3 Close therapy device", page 39).

7.7 Replace main board

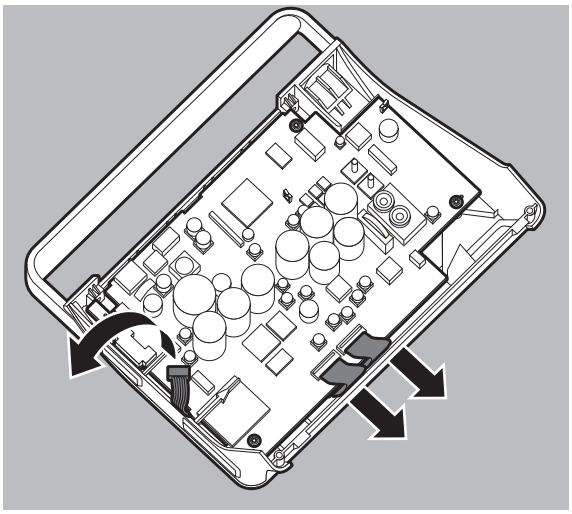
7.7.1 Remove main board



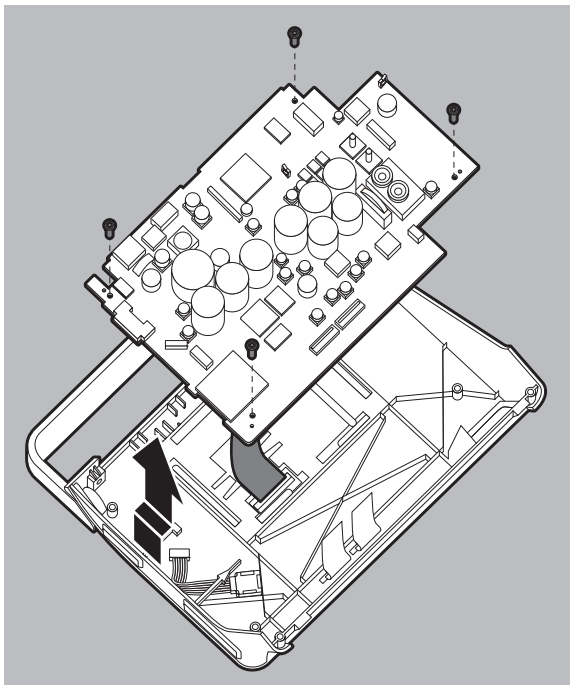
1. Remove SD card **58** from the SD card slot.
2. Open therapy device (see "7.2 Open therapy device", page 36).



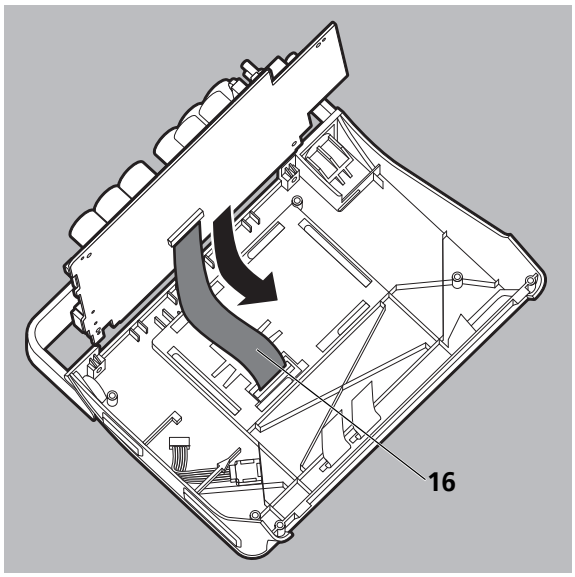
3. Remove pressure measuring tube **18** from the pressure sensors.
4. Undo pressure-side tube **19** from device outlet port **57** and remove.
5. Remove double patient circuit for pressure measurement/ PEEP control **21** from the holders (only prisma VENT50).
6. Disconnect plug connection **X1401**.



7. Release connecting cables **X1900**, **X1901** and **X1902**.



8. Undo 4 screws **32** from the main board.



9. Lift the main board at the side and release the ribbon cable for display **16** on the underside of the main board.
10. Remove the main board from the front of the device.

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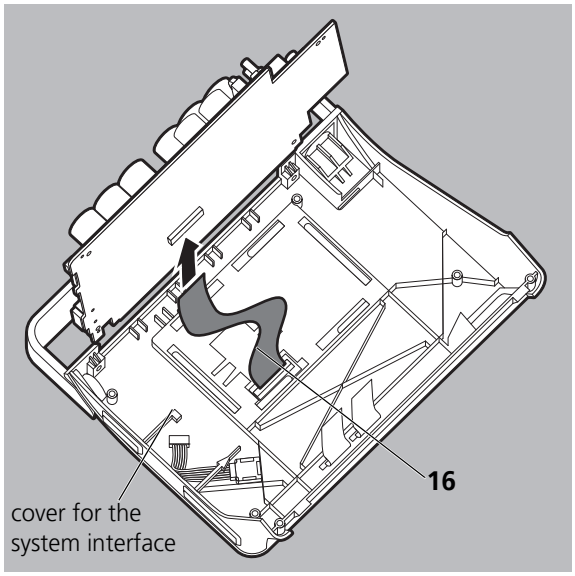
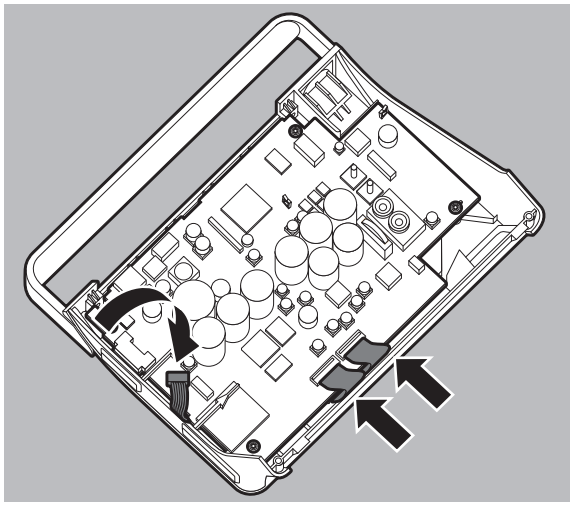
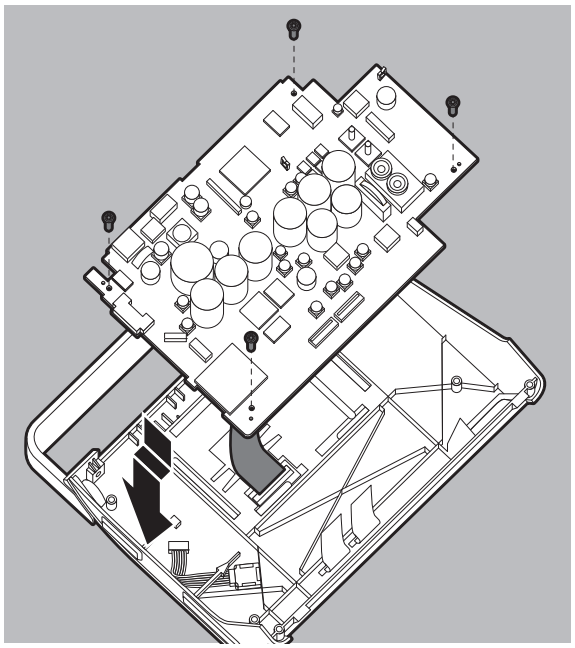
7.7.2 Fit main board



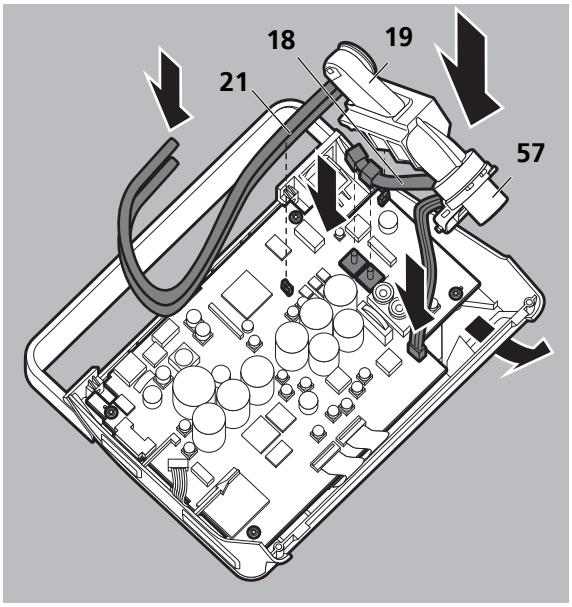
1. Connect the ribbon cable for the display **16** on the underside of the main board.
2. Insert the main board in the front of the housing at an angle. In doing so, please note: The cover for the system interface must be inserted.



3. Connect connecting cables **X1900**, **X1901** and **X1902**.



4. Fix the main board in position using the 4 screws **32**.

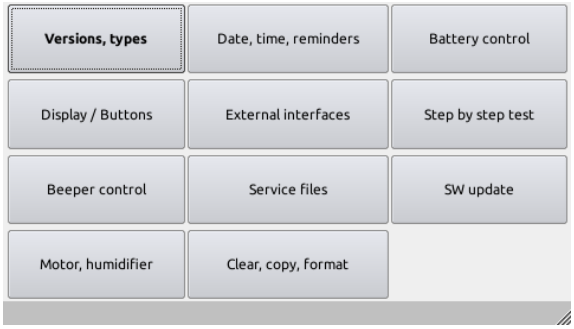


5. Connect connecting cable **X401**.
6. Connect pressure-side tube **19** to device outlet port **57**.
   Only prisma VENT50: Insert double patient circuit **21** into both holders.
7. Connect pressure measuring tube **18** to pressure sensors.
8. Close therapy device (see "7.3 Close therapy device", page 39).

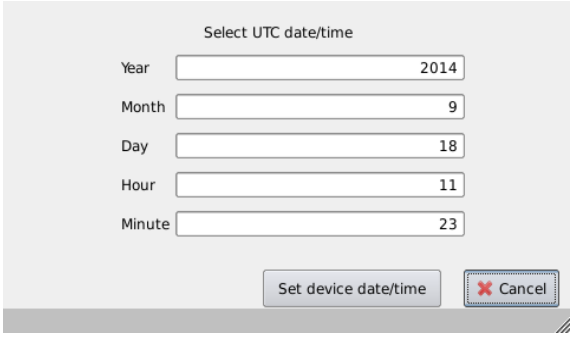
If required

If the message **Code 113** appears on the therapy device after the main board has been replaced, complete the following steps:

9. Activate Service mode: Connect service connector WM 29917 to the system interface.
10. Connect the power supply unit to the therapy device and provide a power supply.
    The Service menu opens after approximately 3 seconds.



11. Select the **Date, time, reminders** field.



12. Select **Set other** field.
13. Set date and time.
14. Select **Set device date/time** field.
15. Disconnect the power supply unit from the therapy device.
16. Disconnect the service connector from the therapy device to exit the Service menu.
17. Connect the power supply unit to the therapy device.

Result

The message **Code 113** is no longer displayed.

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7.7.3 Enter serial number of the device

Note: The serial number can only be set once and cannot be overwritten.

1. Activate Service mode (see "5.2 Activating service mode", page 21).
2. Connect the power supply unit to the therapy device and provide a power supply.
   The Service menu opens after approximately 3 seconds.
3. Select **Versions, types** field.
4. Read serial number off label on side of device and enter under **Device serial number**.

7.7.4 Adopt configuration and usage times

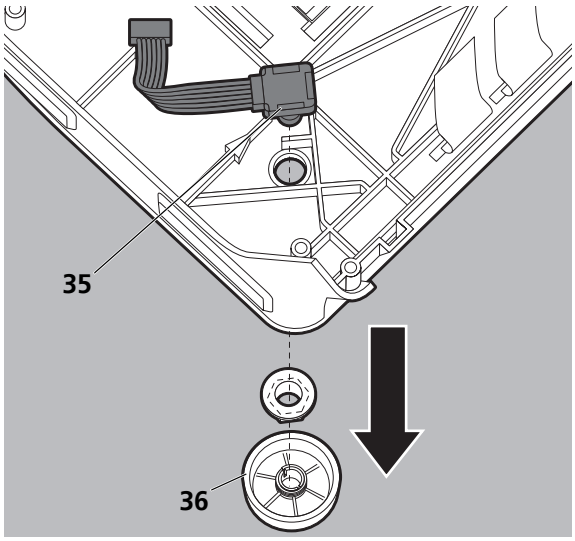
After the main board has been replaced, the saved configuration and usage times from the original main board can be adopted.

1. Take the SD card out of the old main board and insert it in the new main board.
2. Select **Clear, copy, format**.
3. Select **Import compliance&config from SD card**.
4. **Done** appears.

7.8 Replacing the knob/encoder

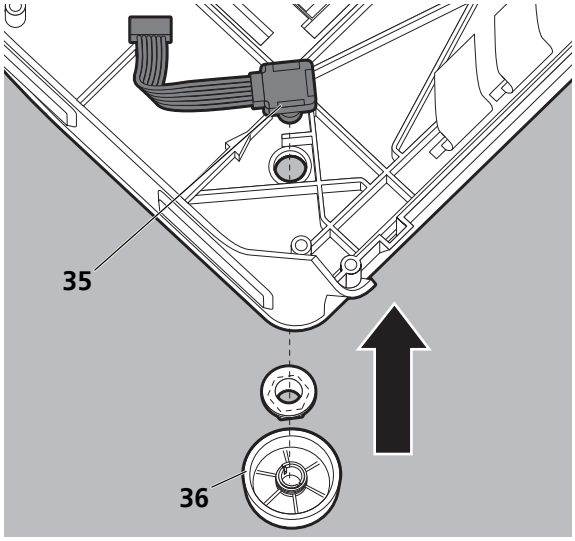
If you just want to replace the knob of the encoder, simply pull it off the front of the device and replace it with a new one.

7.8.1 Removing the encoder



1. Open therapy device (see "7.2 Open therapy device", page 36).
2. Remove main board (see "7.7.1 Remove main board", page 49).
3. Pull dial **36** off the front of the device.
4. Undo and remove hexagon nut on the outside of the front of the device.
5. Take out encoder **35** from the inside.

7.8.2 Installing the encoder



1. Insert encoder **35** into the front wall of the housing from the inside.
2. Insert and tighten up hexagon nut on the outside of the front of the device.
3. Press dial **36** onto the axle.
4. Fit main board (see "7.7.2 Fit main board", page 51).
5. Close therapy device (see "7.3 Close therapy device", page 39).

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7.9 Replace front wall of housing with display

7.9.1 Remove front wall of housing

1. Open therapy device (see "7.2 Open therapy device", page 36).
2. Remove main board (see "7.7.1 Remove main board", page 49).
3. Remove dial (see "7.8.1 Removing the encoder", page 53).
4. Replace front wall of housing.

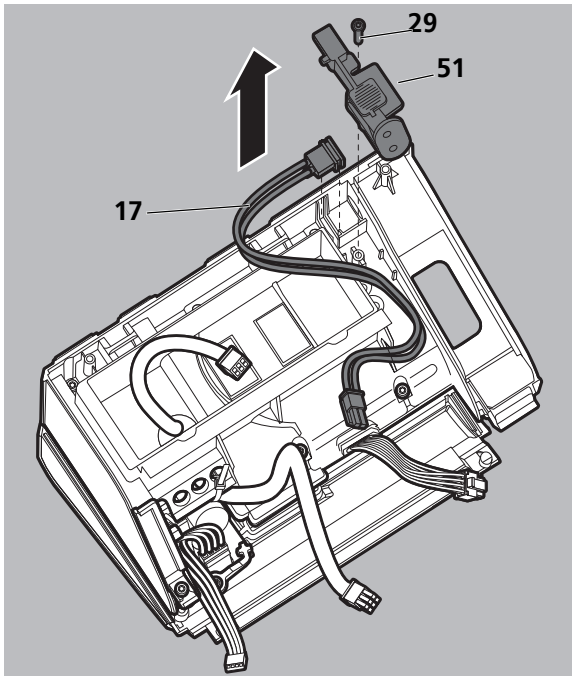
7.9.2 Fit front wall of housing

1. Fit dial in new front wall of housing (see "7.7.1 Remove main board", page 49).
2. Fit main board (see "7.7.2 Fit main board", page 51).
3. Close therapy device (see "7.3 Close therapy device", page 39).

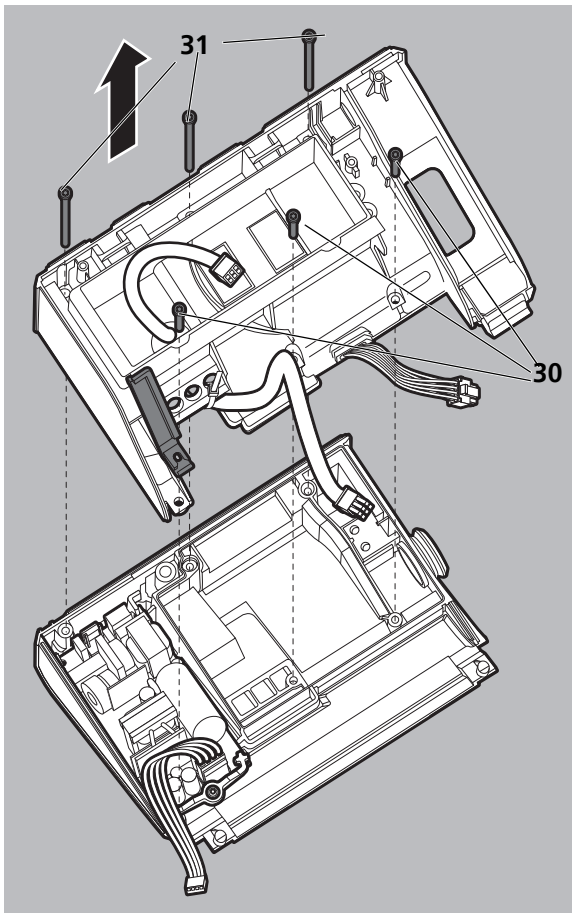
7.10 Replace central part of housing

Starting from SN 10.000, for prisma VENT30/prisma VENT40 the central part of housing of prisma VENT50 is also used. When replacing, make sure that the connector stubs for venting the PEEP control valve and the connector stubs for the pressure drop valve are closed with the plugs.
The connection line of the battery main board of prisma VENT30/ prisma VENT40 before SN 10.000 is somewhat longer, but it can also continue to be used with the new central part of housing.

7.10.1 Remove central part of housing



1. Open therapy device (see "7.2 Open therapy device", page 36).
2. Undo screw **29** on flow measurement adapter **51**.
3. Remove flow measurement adapter **51**. In the process, ensure that the blue O-rings do not get stuck in the central part of the housing.
4. Remove humidifier connecting cable **17**.



5. Only prisma VENT50: Removing the valve control board (see "7.4.1 Removing the valve control board", page 41).
6. Undo and remove 3 screws **31**.
7. Undo and remove 3 screws **30**.
8. Remove the central part of the housing from the rear of the device.
9. Only prisma VENT50: Remove pressure drop valve **66**.
10. Only prisma VENT50: Remove pressure build-up valve (see "7.6.1 Removing the pressure build-up valve", page 47).
11. Remove blower (see "7.11.1 Remove blower", page 58).
12. Remove connection line of battery main board **14** from the old central part of housing.

7.10.2 Fit central part of housing

1. Insert the connecting cable for battery for main board **14**.
2. Fit blower (see "7.11.2 Fit blower", page 59).
3. Only prisma VENT50: Install pressure build-up valve (see "7.6.2 Installing the pressure build-up valve (only prisma VENT50)", page 48).
4. Only prisma VENT50: Insert pressure drop valve **66**.

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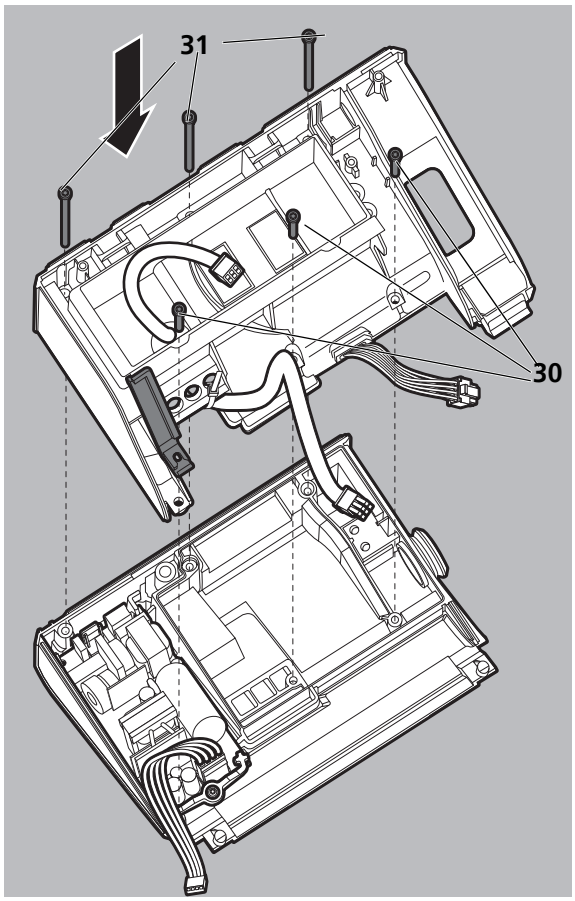
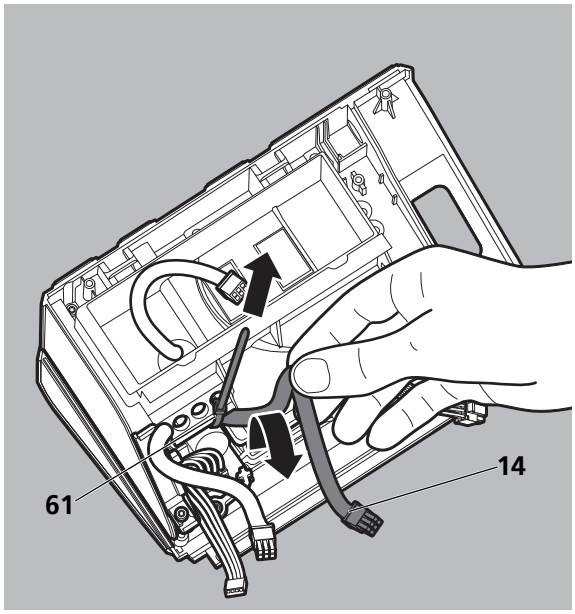
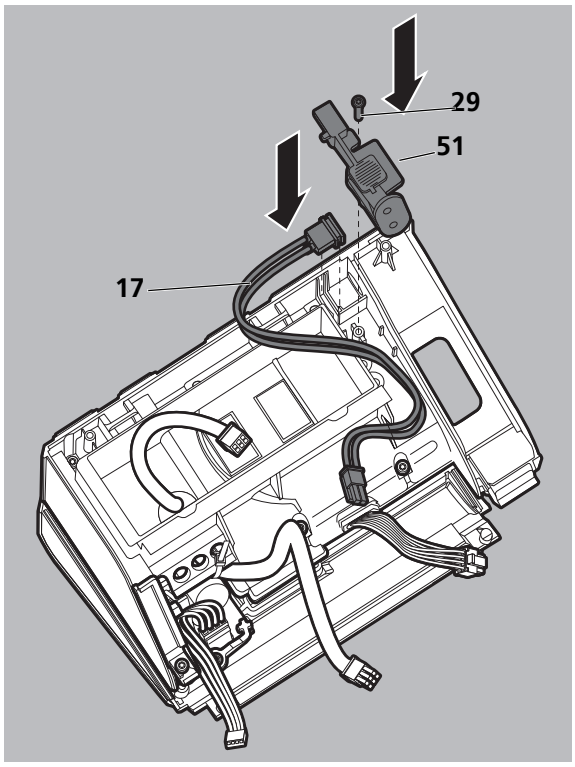


5. Place central part of housing on the rear of the device and fix in position on rear with 3 screws **31**.
6. Fix central part of housing in position at the front with 3 screws **30**.



7. If connecting cable for the battery main board **14** is not yet attached with cable tie **61**:
   - Attach connecting cable for the battery main board **14** using cable tie **61**.
   - Kink connecting cable for the battery main board **14** at the level of the central screwed connection.

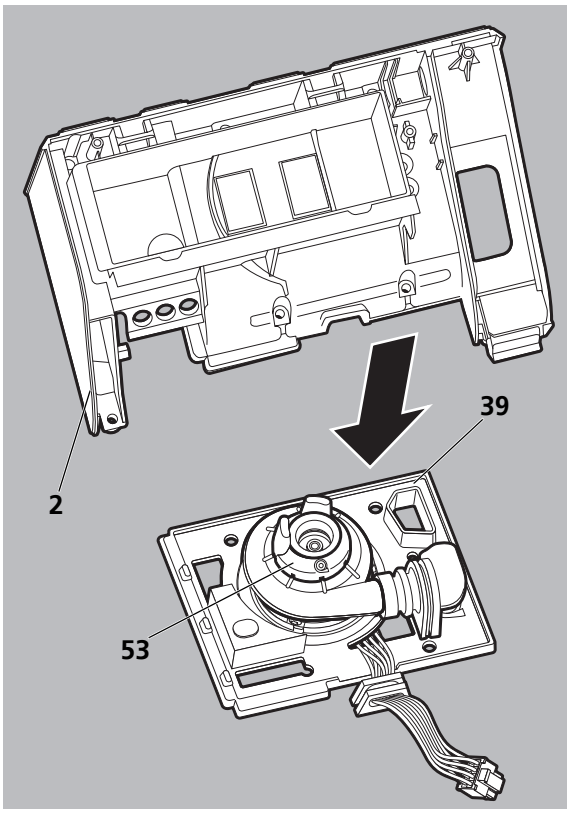


8. Insert humidifier connecting cable **17**.
9. Insert flow measurement adapter **51**. In the process, ensure that the blue O-rings are correctly positioned on the adapter.
10. Fix flow measurement adapter **51** in position with screw **29**.
11. Close therapy device (see "7.3 Close therapy device", page 39).

7.11 Replace blower

7.11.1 Remove blower

1. Open therapy device (see "7.2 Open therapy device", page 36).
2. Remove central part of housing (see "7.10.1 Remove central part of housing", page 55).
3. Remove blower with membrane **39** from central part of housing **2**.



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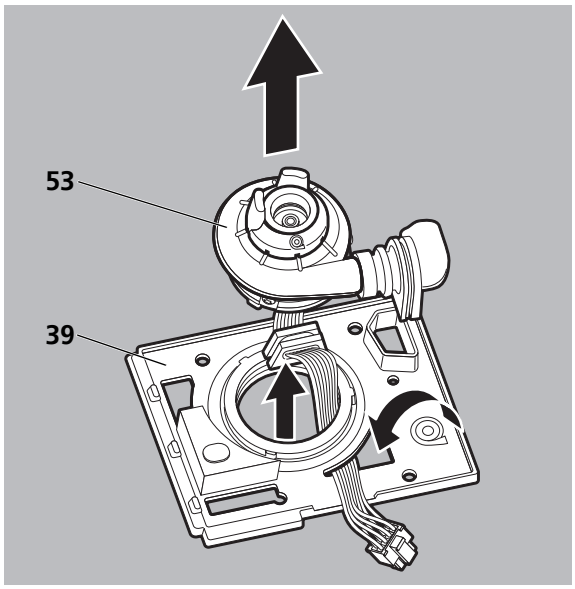
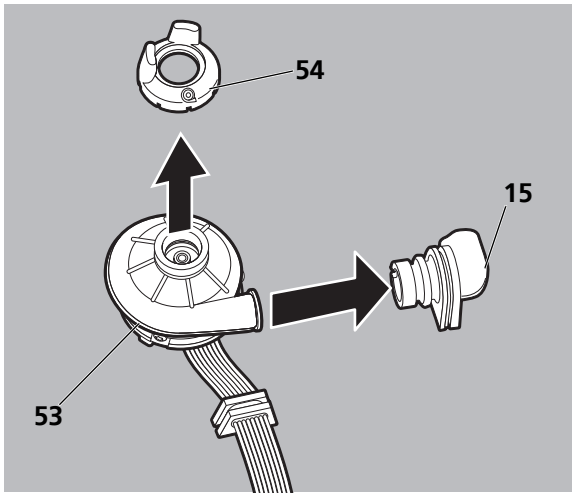
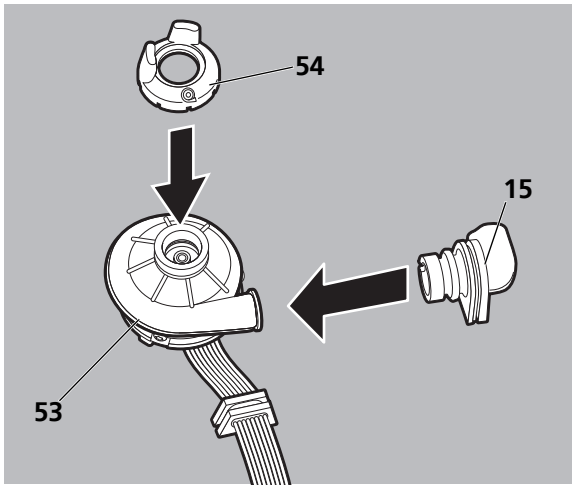


4. Remove blower **53** from membrane **39**.

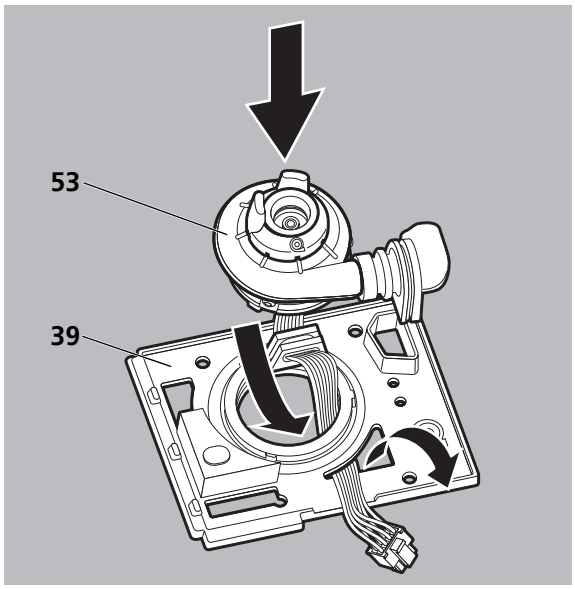


5. Release decoupling tube **15** and spacer **54** from blower **53**.

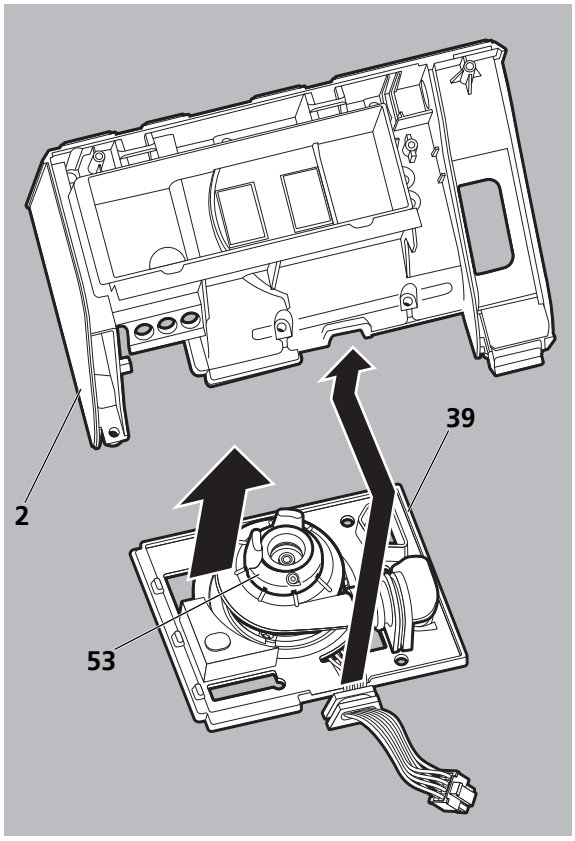
7.11.2 Fit blower



1. If necessary: Attach new decoupling tube **15** and new spacer **54** to new blower **53**.
   Ensure correct positioning as you do so.



2. Insert blower **53** in membrane **39**.
   In doing so, please note: The markings on the membrane must line up with the screws on the blower.



3. Insert blower with membrane in the central part of the housing.
4. Insert decoupling tube and cable duct in central part of housing.
   In doing so, please note: The decoupling tube may not be kinked or trapped.
5. Fit central part of housing (see "7.10.2 Fit central part of housing", page 56).
6. Close therapy device (see "7.3 Close therapy device", page 39).

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7.12 Replace power supply unit and its connecting cable

⚠ WARNING

Risk of injury from electric shock!
Voltage may still be present in the power supply unit after the power supply has been disconnected.

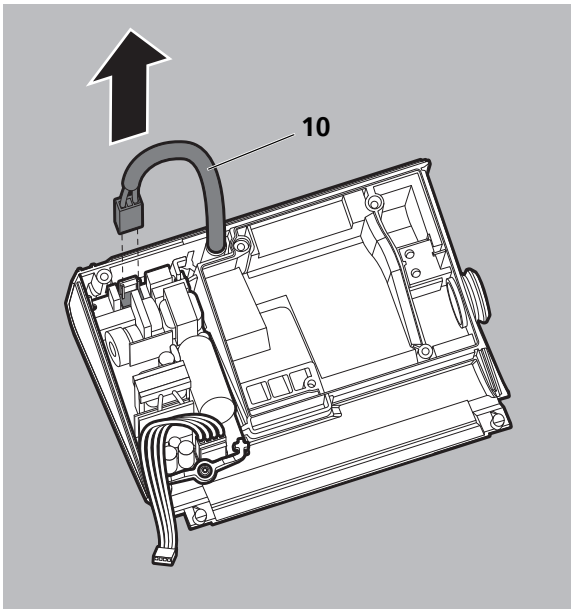
⇒ Do not touch intact power supply units for at least 60 seconds after disconnecting the power supply.

⇒ Do not touch faulty power supply units for at least 12 hours after disconnecting the power supply.

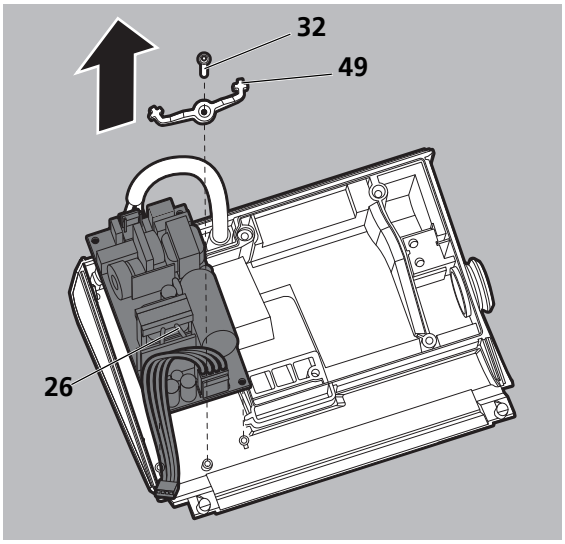
⇒ Wear suitable safety gear (e.g. insulating gloves).

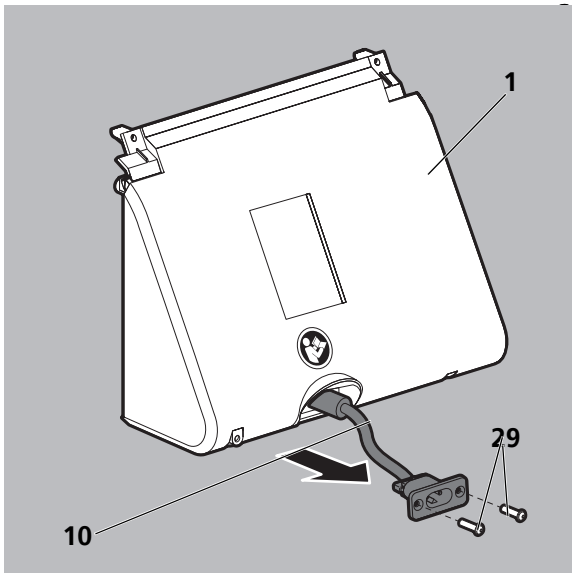
7.12.1 Remove switched power supply unit

1. Open therapy device (see "7.2 Open therapy device", page 36).
2. Remove central part of housing (see "7.10.1 Remove central part of housing", page 55).
3. Disconnect power input connector **10**.



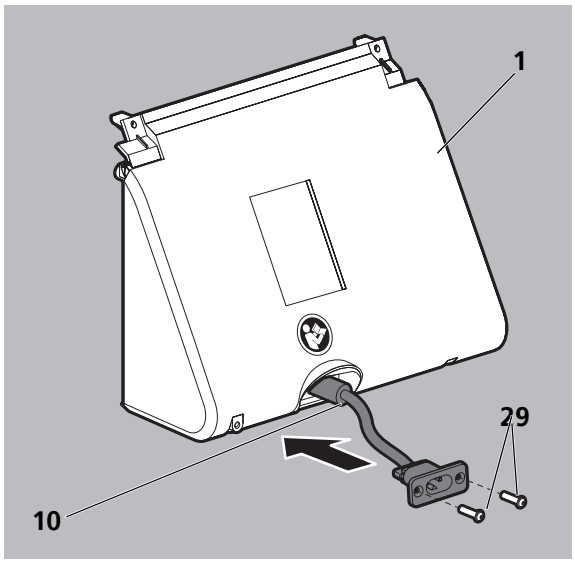
4. Undo screw **32** on switched power supply unit **26**.
5. Remove clamping bar **49** and switched power supply unit **26**.
6. Remove EMC protective board **27**.



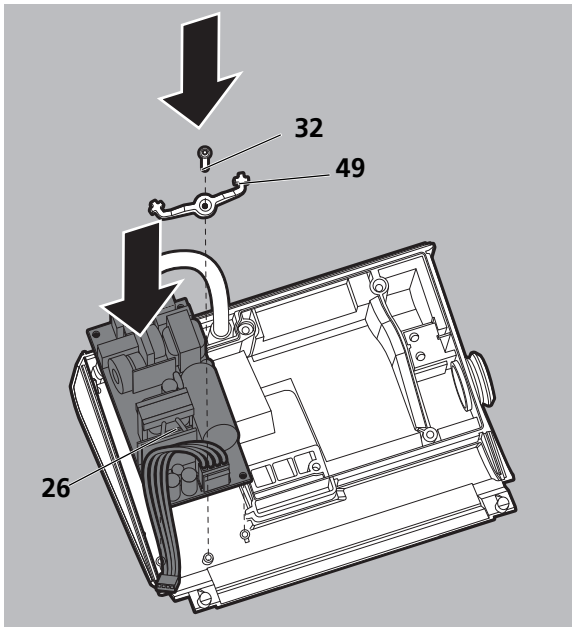


7. Undo and remove 2 screws **29** from power supply input connector **10** on the rear of the housing **1**.
8. Pull power supply input connector out of the rear of the housing **1**.

7.12.2 Fit switched power supply unit



1. Insert power supply input connector **10** in the rear of the housing **1** and secure with the 2 screws **29**.



2. Insert EMC protective board **27** and new switched power supply unit **26**.
3. Secure new switched power supply unit **26** with screw **32** and clamping bar **49**.

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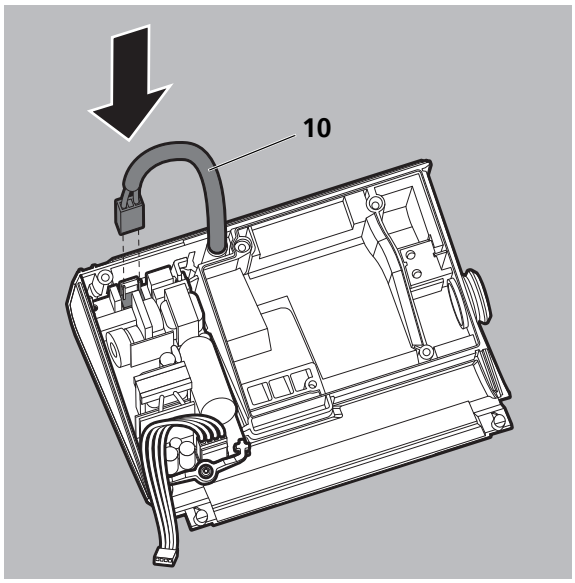
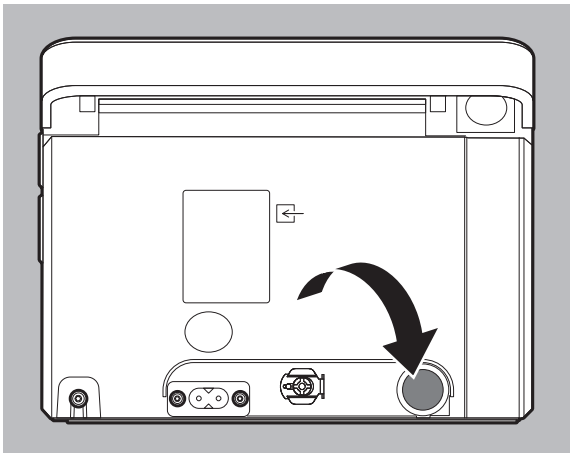


4. Connect power supply input connector **10**.
5. Fit central part of housing with blower (see "7.10.2 Fit central part of housing", page 56).
6. Close therapy device (see "7.3 Close therapy device", page 39).

7.13 Replace rear of housing



Starting from SN 10.000, for prisma VENT30/prisma VENT40 the housing rear wall of prisma VENT50 is used. The spare part assembly includes a plug and a baffle. When used for prisma VENT30/prisma VENT40, the rear opening in the housing rear wall must be closed with the plug, when used for prisma VENT50, the silencer must be used at this point. prisma VENT30/prisma VENT40 devices with SN < 10.000 receive through the exchange of the housing rear wall a connection for the direct O_2 introduction. In this case, the existing patient's instructions for use must be replaced with current instructions for use.

7.13.1 Remove rear of housing

1. Open therapy device (see "7.2 Open therapy device", page 36).
2. Remove central part of housing (see "7.10.1 Remove central part of housing", page 55).
3. Remove power supply unit (see "7.12.1 Remove switched power supply unit", page 61).
4. Replace rear of housing.

7.13.2 Fit rear of housing

1. Fit power supply unit in new rear of housing (see "7.12.2 Fit switched power supply unit", page 62).
2. Fit central part of housing with blower (see "7.10.2 Fit central part of housing", page 56).
3. Close therapy device (see "7.3 Close therapy device", page 39).

8 Storage and disposal

8.1 Storage

8.1.1 General information

Store the device under the specified ambient conditions (see section entitled “Technical data”).

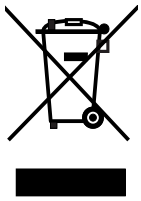
8.1.2 Store therapy device

1. Switch off therapy device.
2. Disconnect the therapy device from the power supply.
3. Clean therapy device, components and accessories.
4. Store therapy device, components and accessories in a dry place.

Result Store the therapy device, the components and the accessories in a dry place.

If the device has an internal battery which is always supposed to be ready for use, leave the device connected to the power supply. This ensures that the battery is always fully charged.
If the device is not connected to the power supply for an extended period, the battery will discharge. We recommend checking charge status regularly and recharging with the aid of the device (if necessary).

8.2 Disposal



Do not dispose of the product with domestic waste. To dispose of properly, contact a licensed, certified electronics scrap disposal merchant. This address is available from your Environment Officer or from your local authority.
The device packaging (cardboard and inserts) can be disposed of in paper recycling facilities.

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9 Replacement parts

9.1 Replacement parts list

The item numbers in this section are identical to the item numbers in the sections entitled "Hygiene treatment" and "Repair".

POSITION	DESIGNATION	ITEM NUMBER
HOUSING PARTS		
1	Set housing rear wall for WM 110 TD/WM 120 TD	WM 15919
2	Central part of housing, preassembled	WM 30672
3	Front wall of housing, preassembled for WM 110 TD Front wall of housing, preassembled for WM 120 TD	WM 29332 WM 30684
4	Panel for WM 110 TD with Weinmann logo with Löwenstein-Medical logo Panel for WM 120 TD	WM 29381WM0 WM 29381 WM 30686
5	Handle, fitted	WM 29355
6	Release catch	WM 29313
7	Cover	WM 29358
8	Cover with seal for battery pack compartment	WM 29378
9	Strain relief for power supply cable	WM 29322
CABLES / CONNECTIONS / TUBES		
10	Power supply inlet connector	WM 29388
11	Power cord	WM 24177
12	Connecting cable for tube heating	WM 29944
13	Connecting cable for switched power supply unit for main board	WM 29333
14	Connecting cable for battery for main board for WM 110 TD Connecting cable for battery for main board for WM 120 TD	WM 29351 WM 30639
15	Decoupling tube	WM 29646
16	Ribbon cable for display	WM 29308
17	Connecting cable for humidifier	WM 29307
18	Pressure measurement tube	WM 29365
19	Tube, pressure side	WM 29328
20	Connection line of main board valve control board for WM 120 TD	WM 30653
21	Double patient circuit for WM 120 TD	WM 30693
22	Tube with elbow connector for WM 120 TD	WM 30698
23	Tube valve unit for WM 120 TD	WM 30695
24	Connection line of pressure build-up valve, valve control board for WM 120 TD	WM 30654

POSITION	DESIGNATION	ITEM NUMBER
PCBS		
25	Main board prisma VENT30 prisma VENT30-C prisma VENT40 prisma VENT50	 WM 35118 WM 35128 WM 35119 WM 35209
26	Switched power supply unit for WM 110 TD Switched power supply unit for WM 120 TD	WM 29352 WM 30642
27	EMC protective board with spacer	WM 29517
28	Valve control board	WM 35140
SCREWS / NUTS / WASHERS		
29	Screw EJOT DELTA PT 30x14 WN 5451	WM 50572
30	Screw EJOT DELTA PT 40x25 WN 5452	WM 50563
31	Screw EJOT DELTA PT 40x68 WN 5452	WM 50557
32	Screw EJOT DELTA PT 25x8 WN 5451	WM 50564
33	Screw EJOT DELTA PT 25x12 WN 5451	WM 50551
34	Washer ISO 7089-4-200HV-A2	WM 50242
ENCODER		
35	Encoder	WM 29334
36	Dial for encoder	WM 29314
37	Bezel for encoder prisma VENT30 prisma VENT30-C prisma VENT40 prisma VENT50	 WM 29341 WM 29343 WM 29342 WM 30647
SEALS		
38	Sealing ring for rear of housing	WM 29658
39	Membrane	WM 29644
40	Insulating element	WM 29606
41	Seal for flow element	WM 29677
42	Seal for flow sensor	WM 29678
43	Seal for system interface	WM 29656
44	Seal for SD card slot	WM 29648
MISCELLANEOUS		
45	Plug for screwed connection for front wall of housing	WM 29362
46	Cover	WM 29371
47	Spacer for insulating element	WM 29613
48	Foam for main board	WM 27418
49	Clamping bar for switched power supply unit	WM 29374
50	Flow element	WM 29676
51	Flow measurement adapter	WM 29321
52	O-ring for flow measurement adapter	WM 29367

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POSITION	DESIGNATION	ITEM NUMBER
53	Fan, complete for WM 110 TD Blower, complete with NTC for WM 120 TD	WM 29375 WM 30665
54	Spacer for blower	WM 29376
55	Blower cap	WM 29607
56	Tallow-drop screw M3x4 for blower cap	WM 53017
57	Device outlet port for WM 110 TD Device outlet port for WM 120 TD	WM 29329 WM 30657
58	SD card	WM 29794
59	Air filter	WM 29651
60	Pollen filter	WM 29389
61	Cable tie	WM 12479
62	Pressure build-up valve	WM 30682
63	Sealing plug	WM 29518
64	Holder for pressure build-up valve for WM 120 TD	WM 30662
65	Attachment for pressure drop valve for WM 120 TD	WM 30663
66	Pressure drop valve for WM 120 TD	WM 30667
67	Baffle for WM 120 TD	WM 30661

9.2 Service sets

POSI-TION	DESIGNATION	ITEM NUMBER
SET, SPARE RECHARGEABLE BATTERY		**WM 15876**
SET, CLEANING FOR WM 110 TD **SET, CLEANING FOR WM 120 TD**		**WM 15913** **WM 15916**
38	Sealing ring for rear of housing, pressure side	WM 29658
19	Tube, pressure side	WM 29328
41	Seal for flow element	WM 29677
50	Flow element	WM 29676
39	Membrane	WM 29644
40	Insulating element, membrane	WM 29606
47	Spacer for insulating element, membrane	WM 29613
15	Decoupling tube	WM 29646
54	Spacer for blower	WM 29376
7	Cover, white	WM 29358
51	Flow measurement adapter	WM 29321
52	O-ring for flow measurement adapter (2 off)	WM 29367
45	Plug for cover, screwed connection for front wall of housing	WM 29362
59	Air filter	WM 29651
68	Label, reprocessing	WM 75070
Set, insulating elements for rear of housing		
69	Insulating element 1	WM 29661
70	Insulating element 2	WM 29984

POSI-TION	DESIGNATION	ITEM NUMBER
71	Insulating element 3	WM 29663
72	Insulating element 4	WM 29664
Set, insulating elements for central part of housing		
73	Insulating element 6	WM 29666
74	Insulating element 7	WM 29667
75	Insulating element 8	WM 29668
76	Insulating element 9	WM 29669
SET FOR CHANGE OF PATIENT WM 100 TH		**WM 29974**
77	Humidifier insert	WM 29683
78	Lower part of humidifier	WM 29682
79	O-ring 8-1.5	WM 1145/190
80	Label, set for change of patient	WM 77161

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10 Components and accessories

DESIGNATION	ITEM NUMBER
Breathing tube with 19 mm diameter	WM 24445
Breathing tube with 19 mm diameter, can be autoclaved	WM 24667
Breathing tube with 15 mm diameter	WM 29988
Bacteria filter	WM 27591
Set, 12 pollen filters	WM 29652
prismaBAG advanced	WM 29337
prismaCONNECT module, communication module	WM 29670
prismaPSG, PSG module	WM 29690
prismaAQUA	WM 29490
SD card	WM 29794
prismaTS, therapy software, complete with USB data cable	WM 93335
prisma CHECK	WM 29390
prisma2CLOUD	WM 29620

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11 Auxiliary equipment required

11.1 Tools

- Torx screwdriver size T 20
- Torx screwdriver size T 10
- Torx screwdriver size T 9
- Torx screwdriver size T 8
- ESD workstation
- Socket wrench 11 mm

11.2 Test equipment

- Manual pressure gage
  Measuring range 0 - 40 hPa
- Ambient pressure measuring device/barometer
- Prisma therapy software
- ESD workstation
- Pressure measurement adapter (WM 23456)
- Sound insulation (WM 23685)
- Service connector (WM 29917)

11.3 Disinfectants

- terralin® protect
- gigasept FF® (new)
- MIKROZID LIQUID

can be ordered from:
Schülke & Mayr GmbH
Robert-Koch-Str. 2
22851 Norderstedt, Germany
Tel.: +49 40 52 100-0
Fax: +49 40 52 100-318
Internet: www.schuelkemayr.de

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