Tornado 4

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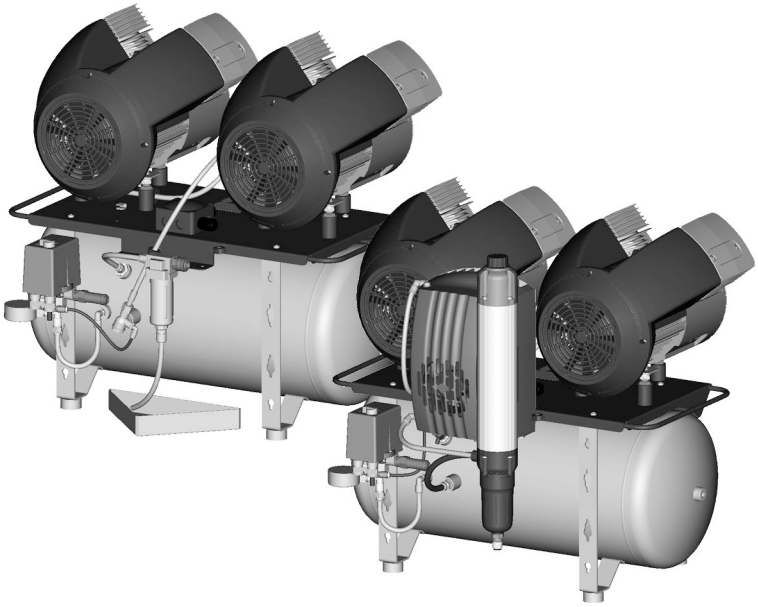

Installation and operating instructions

CE 0297

9000-610-77/02

DÜRR DENTAL

1909/009

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Important information

1 About this document

These installation and operating instructions represent part of the unit.

If the instructions and information in these installation and operating instructions are not followed, Dürr Dental will not be able to offer any warranty or assume any liability for the safe operation and the safe functioning of the unit.

The German version of the installation and operating instructions is the original manual. All other languages are translation of the original manual. These installation and operating instructions apply to:

Tornado 4

Order number: 4280-01; 4280100022; 4282-01; 4282-03; 4282100006

1.1 Warnings and symbols

Warnings

The warnings in this document are intended to draw your attention to possible injury to persons or damage to machinery.

The following warning symbols are used:


General warning symbol


Warning – dangerous high voltage


Warning – hot surfaces


Warning - automatic start-up of the unit

The warnings are structured as follows:

SIGNAL WORD

Description of the type and source of danger

Here you will find the possible consequences of ignoring the warning

› Follow these measures to avoid the danger.

The signal word differentiates between four levels of danger:

- **DANGER**
  Immediate danger of severe injury or death
- **WARNING**
  Possible danger of severe injury or death
- **CAUTION**
  Risk of minor injuries
- **NOTICE**
  Risk of extensive material/property damage

Other symbols

These symbols are used in the document and on or in the unit:

Note, e.g. specific instructions regarding efficient and cost-effective use of the unit.


Observe the operating instructions.


Disconnect all power from the unit.


Refer to the accompanying electronic documents.


Air


Filter symbol


Dispose of correctly in accordance with EU Directive 2012/19/EU (WEEE).

CE labelling with the number of the notified body

Order number

Serial number

Medical device

Health Industry Bar Code (HIBC)


Manufacturer

EN

1.2 Copyright information

2 Safety

Dürr Dental has designed and constructed this unit so that when used properly and for the intended purpose it does not pose any danger to people or property.
Despite this, the following residual risks can remain:

- Personal injury due to incorrect use/misuse
- Personal injury due to mechanical effects
- Personal injury due to electric shock
- Personal injury due to radiation
- Personal injury due to fire
- Personal injury due to thermal effects on skin
- Personal injury due to lack of hygiene, e.g. infection

WARNING

The development of emphysema

Soft tissue can be damaged as a result of careless handling.

› Do not dwell in the area being treated for any longer than is necessary.

2.1 Intended purpose

The compressor is designed to supply compressed air for dental applications.

2.2 Intended use

The air supplied by the compressor is suitable for driving dental tools.
The compressed air generated by the compressor is delivered to the pipeline system of the surgery. The entire compressed air system must be designed in such a way that the quality of the compressed air generated by the compressor is not impaired.
With this prerequisite, the air provided by the compressor is also suitable for blow-drying tooth preparations.

2.3 Improper use

Any use of this appliance / these appliances above and beyond that described in the Installation and Operating Instructions is deemed to be incorrect usage. The manufacturer cannot be held liable for any damage resulting from incorrect usage. The operator will be held liable and bears all risks.

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WARNING

Risk of explosion due to ignition of combustible materials

› Do not operate the unit in any rooms in which inflammable mixtures may be present, e.g. in operating theatres.

› The unit is not suitable for providing an air supply to respirators.

› This unit is not suitable for drawing up fluids or for compressing aggressive gases or potentially explosive gases.

2.4 General safety information

› Always comply with the specifications of all guidelines, laws, and other rules and regulations applicable at the site of operation for the operation of this unit.

› Check the function and condition of the unit prior to every use.

› Do not convert or modify the unit.

› Comply with the specifications of the Installation and Operating Instructions.

› The Installation and Operating Instructions must be accessible to all operators of the unit at all times.

2.5 Specialist personnel

Operation

Unit operating personnel must ensure safe and correct handling based on their training and knowledge.

› Instruct or have every user instructed in handling the unit.

The following groups are not permitted to operate or use a commercially operated unit:

– People without the necessary experience and knowledge

– People with reduced physical, sensory or mental capabilities

– Children

Installation and repairs

› Installation, readjustments, alterations, upgrades and repairs must be carried out by Dürr Dental or by qualified personnel specifically approved and authorized by Dürr Dental.

2.6 Electrical safety

› Comply with all the relevant electrical safety regulations when working on the unit.

› Never touch the patient and unshielded plug connections on the device at the same time.

› Replace any damaged cables or plugs immediately.

2.7 Notification requirement of serious incidents

The operator/patient is required to report any serious incident that occurs in connection with the device to the manufacturer and to the competent authority of the Member State in which the operator and/or patient is established/resident.

2.8 Only use original parts

› Only use Dürr Dental parts or accessories and special accessories specifically approved by Dürr Dental.

› Only use only original wear parts and replacement parts.

Dürr Dental accepts no liability for damages or injury resulting from the use of non-approved accessories or optional accessories, or from the use of non-original wear parts or replacement parts.

The use of non-approved accessories, optional accessories or non-genuine wear parts / replacement parts (e.g. mains cable) can have a negative effect in terms of electrical safety and EMC.

2.9 Transport

WARNING

Risk of explosion of the pressure tank and pressure hoses

› The pressure tank and the pressure hoses must be vented before they are stored or transported.

EN

The original packaging provides optimum protection for the unit during transport.

Dürr Dental will not accept any responsibility or liability for damage occurring during transport due to the use of incorrect packaging, even where the unit is still under guarantee.

› Only transport the device in its original packaging.
› Keep the packing materials out of the reach of children.

2.10 Disposal

Unit

The unit must be disposed of properly. Within the European Union, the unit must be disposed of in accordance with EU Directive 2012/19/EU (WEEE).

› If you have any questions about the correct disposal of parts, please contact your dental trade supplier.

An overview of the waste keys for Dürr Dental products can be found in the download area at www.duerrdental.com (document no. P007100155).

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Product description

3 Overview

3.1 Scope of delivery

The following items are included in the scope of delivery (possible variations due to country-specific requirements and/or import regulations):

Tornado 4 compressor 4280-01
Tornado 4 compressor 4280100022
Tornado 4 compressor with membrane drying unit 4282-01
Tornado 4 compressor with membrane drying unit 4282-03
Tornado 4 compressor with membrane drying unit 4282100006

– Fabric reinforced hose
– Hose nozzle
– Hose clip
– Collector tray
– Installation and operating instructions
– Appliance log book

3.2 Optional items

The following items can optionally be used with the unit; these items do not bear the CE mark:

Pressure reducer 6040-992-00
Sterile filter 1640-981-00

3.3 Wear parts and replacement parts

The following working parts must be replaced at regular intervals (refer also to "Maintenance"); these articles do not bear the CE mark:

Air intake filter 5180-982-00
Fine filter 1610-121-00
Sintered filter 1650-101-00
Sterile filter 1640-981-00
Fleece filter 4280-982-00
Cup seal repair set 5180-981-00

Information about replacement parts is available from the portal for authorised specialist dealers at: www.duerrdental.net.

If the mains cable of this unit is damaged it must only be replaced by an original mains cable from the manufacturer.

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4 Technical data

4.1 Tornado 4

Electrical data		4280-01 4280100022	
Rated voltage	V	230	
Mains frequency	Hz	50	60
Nominal current at 8 bar (0.8 Mpa)	A	14.9	13.5
Motor protection		Motor winding overheating protector and thermal protection switch	
Speed	rpm	1390	1650
Type of protection		IP 24	
Mains fuses *	A	16	
Max. permissible mains impedance in accordance with EN 61000-3-11	Ω	0.0956	

* LS switch fuse characteristics C and D in accordance with DIN EN60898

General data			
Pressure tank volume	l	50	
Suction power, approx.	l/min	525	630
Delivery at 5 bar (0.5 MPa)	l/min	235	270
Pressure build-up phase 0 - 7.5 bar (0 - 0.75 MPa) c.	s	77	-
Duty cycle	%	100 (S1)	
Start-up pressure	bar (MPa)	6 (0.6)	
Cut-off pressure	bar (MPa)	7.8 (0.78)	
Cut-off pressure, max. adjustable	bar (MPa)	9.5 (0.95)	
Safety valve, maximum permissible operating pressure	bar (MPa)	10 (1)	
Dimensions (H x W x D) *	cm	71 x 76 x 52	
Weight	kg	84	
Noise level **	dB(A)	70	73

* Values without accessories and add-on parts
** In accordance with ISO 3746.

Filter mesh size		
Compressor unit intake filter	µm	3
Fleece filter for automatic condensate drain	µm	5

Ambient conditions during storage and transport		
Temperature	°C	-10 to +55
Relative humidity	%	max. 95

Ambient conditions during operation		
Temperature	°C	+10 to +40
Ideal temperature	°C	+10 to +25
Relative humidity	%	max. 95

Classification		
Medical devices class		IIa

EN

4.2 Tornado 4 with membrane drying unit

Electrical data		4282-01 4282-03 4282100006	
Nominal voltage	V	230	
Electrical frequency	Hz	50	60
Nominal current at 8 bar (0.8 Mpa)	A	15.0	13.6
Motor protection		Motor winding overheating protector and thermal protection switch	
Speed	rpm	1390	1650
Type of protection		IP 24	
Mains fuses *	A	16	
Max. permissible mains impedance in accordance with EN 61000-3-11	Ω	0.0956	

* LS switch fuse characteristics C and D in accordance with DIN EN60898

General data			
Pressure tank volume	l	50	
Suction power, approx.	l/min	525	630
Delivery at 5 bar (0.5 MPa)	l/min	205	230
Pressure build-up phase 0 - 7.5 bar (0 - 0.75 MPa) c.	s	103	-
Duty cycle	%	100 (S1)	
Start-up pressure	bar (MPa)	6 (0.6)	
Cut-off pressure	bar (MPa)	7.8 (0.78)	
Cut-off pressure, max. adjustable	bar (MPa)	9.5 (0.95)	
Safety valve, maximum permissible operating pressure	bar (MPa)	10 (1)	
Pressure dew point at 7 bar (0.7 MPa) *	°C	≤ +5	
Dimensions (H x W x D) **	cm	72 x 76 x 59	
Weight	kg	90	
Noise level ***	dB(A)	70	73

* Value determined at an ambient temperature of +40°C
** Values without accessories and add-on parts
*** In accordance with ISO 3746.

Filter mesh size		
Compressor unit intake filter	µm	3
Fine filter for membrane drying unit	µm	3
Sterile filter for membrane drying unit	µm	0.01
Sintered filter for membrane drying unit	µm	35

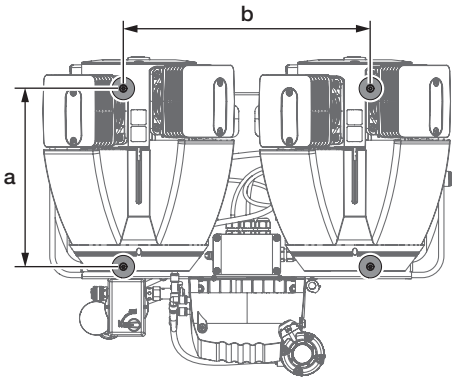
Ambient conditions during storage and transport		
Temperature	°C	-10 to +55
Relative humidity	%	max. 95

Ambient conditions during operation		
Temperature	°C	+10 to +40
Ideal temperature	°C	+10 to +25
Relative humidity	%	max. 95

Classification		
Medical devices class		IIa

EN

4.3 Distance between rubber feet

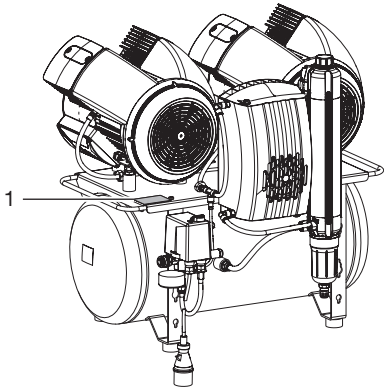


	a (cm)	b (cm)
50 l	32.5	45

4.4 Type plate

Complete system

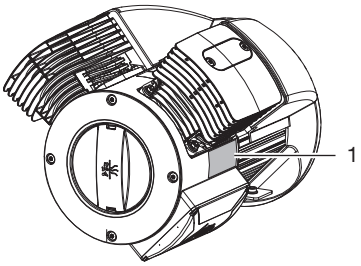
The type plate for the complete system is located on the motor support plate between the units.



1 Type plate for the complete system

Compressor unit

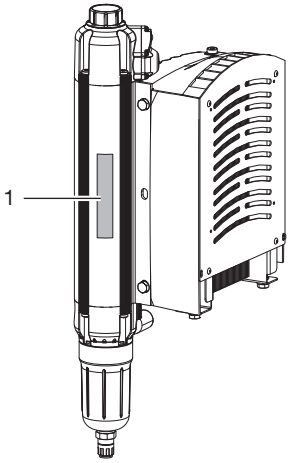
The type plate of the compressor unit is located on the crankcase below the cylinder.



1 Compressor unit type plate

Membrane drying unit

The type plate of the membrane drying unit is located on the side of the membrane drying unit.



1 Membrane drying unit type plate

4.5 Evaluation of conformity

This device has been subjected to conformity acceptance testing in accordance with the current relevant European Union guidelines. This equipment conforms to all relevant requirements.

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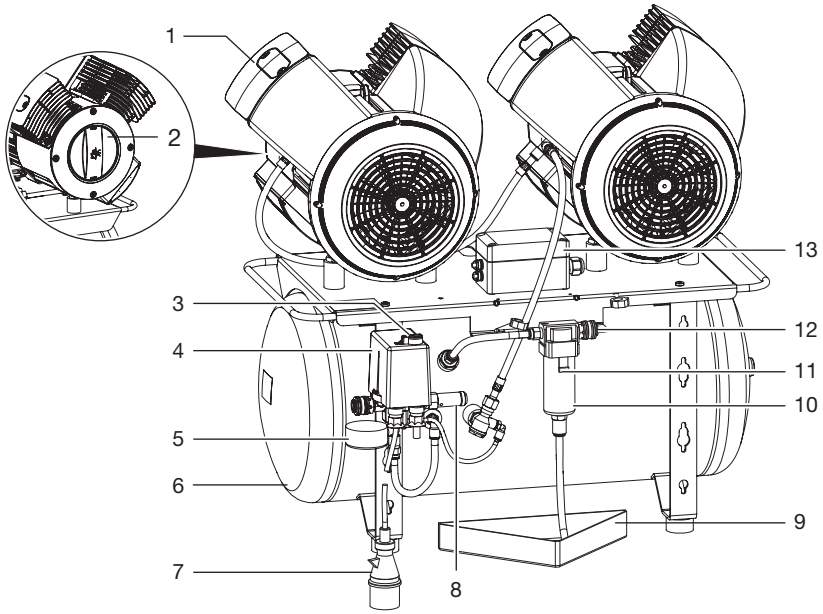
5 Operation

5.1 Tornado 4 type 4280-..



1 Compressor unit
2 Air intake filter
3 On/off switch
4 Pressure switch
5 Pressure gauge/display
6 Pressure tank
7 Mains connection for CEE connector 230 V / 16 A
8 Safety valve
9 Collector tray
10 Condensate separator
11 Fleece filter in condensate separator
12 Compressed air connection (quick release coupling)
13 Thermal protection switch

NOTICE

Risk of corrosion of the unit

Moisture can lead to premature corrosion.

› Retrofit a membrane drying unit.

The compressor unit draws in atmospheric air and compresses it without oil. The oil-free compressed air is then transported directly to the pressure tank. The oil-free and hygienic air is made available to the consumers in the pressure tank.

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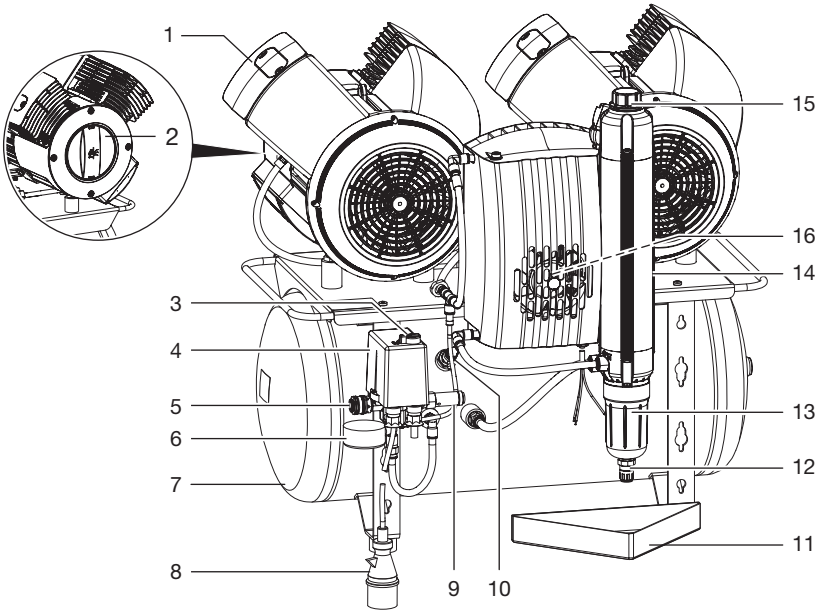
An automatic condensate separator is installed between the pressure tank and the compressed air connection. When removing air, the condensate is collected from the pressure tank into the condensate separator. As soon as a specific fill level is reached in the condensate separator, the condensate is discharged automatically.

5.2 Tornado 4 type 4282-..



1 Compressor unit
2 Air intake filter
3 On/off switch
4 Pressure switch
5 Compressed air connection (quick release coupling)
6 Pressure gauge/display
7 Pressure tank
8 Mains connection for CEE connector 230 V / 16 A
9 Safety valve
10 Condensate drain valve
11 Collector tray
12 Automatic/manual condensate drain valve, membrane drying unit
13 Sintered filter for membrane drying unit
14 Membrane drying unit
15 Fine filter or sterile filter, membrane drying unit
16 Thermal protection switch (behind the membrane drying unit)

The compressor unit draws in atmospheric air and compresses it without oil. It then transports the oil-free compressed air to the membrane drying unit. The cooler and the membrane dryer extract moisture from the compressed air. The oil-free, hygienic and dry air is stored in the pressure tank ready for use in connected devices.

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Assembly

6 Requirements

The unit must not be set up or operated within the vicinity of the patients (within a radius of 1.5 m).

The unit can be installed either at the same level as the surgery room or on a floor below (e.g. cellar).
Due of the amount of noise generated, we recommend that the unit is installed in an adjoining room.
The pipes provided on-site must at least meet the country-specific requirements for drinking water.

Further information can be found in our separate planning information leaflet for compressed air.

6.1 Installation/setup room

The room chosen for set up must fulfil the following requirements:

- Closed, dry, well-ventilated room
- Should not be a room made for another purpose (e. g. boiler room or wet cell)
- If the unit is installed in a machine room, e.g. in an adjoining room or cellar, the requirements set out in ISO-TS 22595 must be complied with.

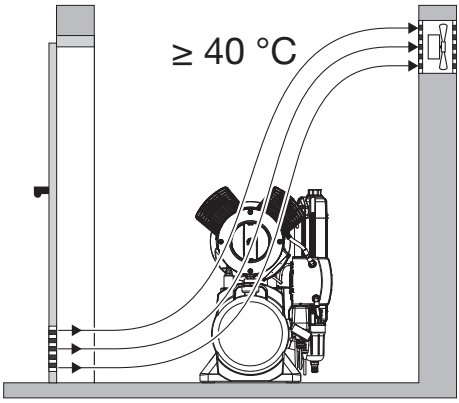
NOTICE

Risk of overheating due to insufficient ventilation

The units generates heat. Possibility of heat damage and/or reduced service life of the unit.

› Do not cover the unit.

› Install a fan for auxiliary ventilation in rooms where ambient temperatures exceed ≥40 °C while the unit is in operation.



6.2 Setup

The following conditions must be taken into account for installation:

The air is filtered when it is sucked in. This does not alter the composition of the air. For this reason it is important to keep the sucked-in air free of harmful substances (e.g. do not suck in exhaust gases or contaminated exhaust air).

- Clean, level and sufficiently stable subsurface (note the weight of the unit).
- Type plate easy to read.
- Unit easy to access for operation and maintenance.
- Easy-to-access power outlet to which the unit is connected.
- Maintain sufficient distance to the wall (at least 20 cm).
- The compressed air pipe should be routed as closely as possible to the place of installation (note the length of the hose supplied).

6.3 Information about electrical connections

› Ensure that the electrical connections to the mains power supply are established in accordance with current valid national and local regulations and standards governing the installation of low voltage units in medical facilities.

› Observe the current consumption of the devices that are to be connected.

EN

7 Transport

WARNING

Risk of explosion of the pressure tank and pressure hoses

› The pressure tank and the pressure hoses must be vented before they are stored or transported.

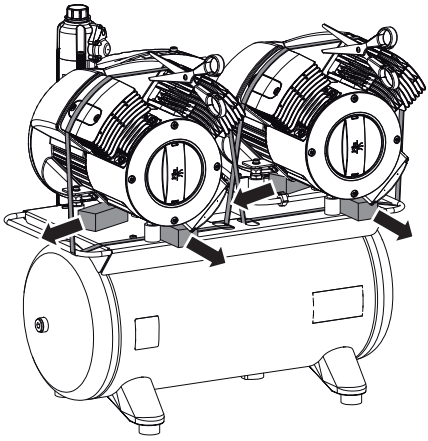
› Protect the unit against moisture, dirt and extreme temperatures during transport ("4 Technical data").
› Always make sure that the condensate collector chamber is empty before transporting the unit ("14 Taking out of use").
› Always transport the unit in an upright position.
› Only transport the unit using the transport handles provided.
› Check the unit for transport damage.

8 Installation

8.1 Remove the transport locks

For safe transport, the unit is secured with foam padding blocks and a transport strap.

› Cut and remove the transport strap.
› Remove the foam padding blocks.



8.2 Establishing the compressed air connection

The supplied flexible pressure hose between the pipe system and the compressor prevents vibrations from being transmitted and thus reduces noise. This ensures safe and reliable operation.

› Connect the pre-assembled connecting sleeve of the pressure hose to the quick release coupling.
› Measure the required length of the pressure hose and shorten if necessary.
› Press a fitting hose connector (not included in the scope of delivery) onto the pressure hose (internal diameter 10 mm) and secure it with a hose clip.
› Connect the connecting sleeve of the pressure hose to the compressed air tube.

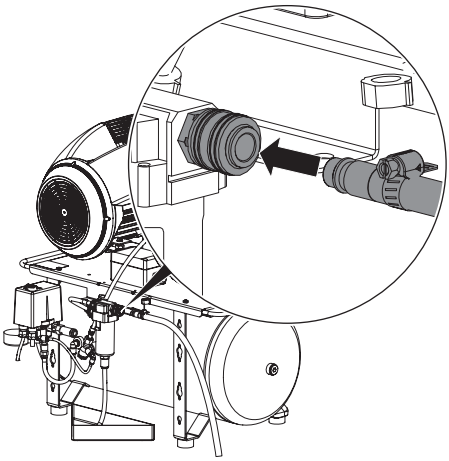


Fig. 1: Tornado 4 type 4280-..

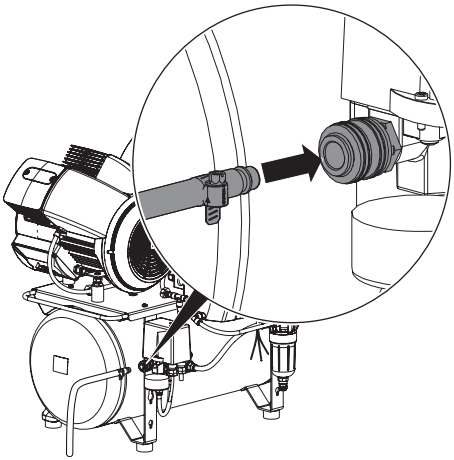


Fig. 2: Tornado 4 type 4282-..

8.3 Place a collector tray underneath

During operation, condensation water on the unit is continuously separated and automatically drained. In order to prevent water damage due to drained condensation, it is collected in the collector tray.

As an option, the condensation can also be drained through a hose into the waste water system. Always comply with applicable national regulations for waste water systems.

› Place a collector tray under the condensate separator or the membrane drying unit (depending on type).

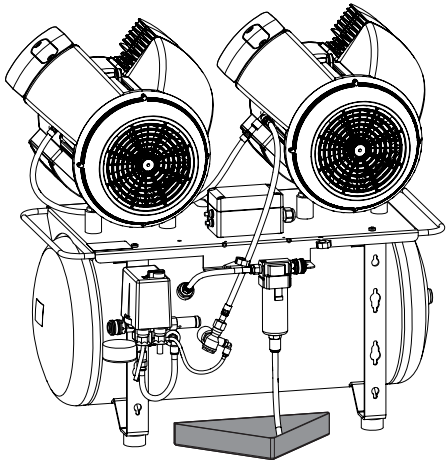


Fig. 3: Tornado 4 type 4280-..

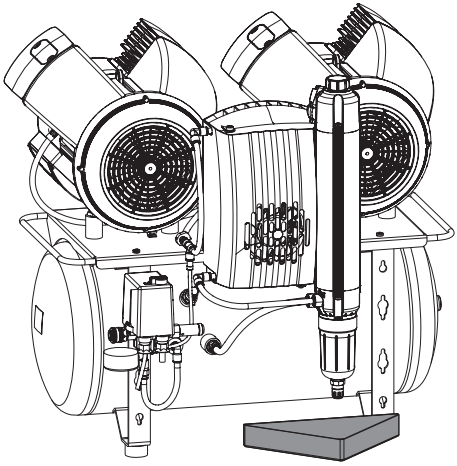


Fig. 4: Tornado 4 type 4282-..

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8.4 Electrical connections

Safety when making electrical connections

The unit has no main power switch. For this reason it is important that the unit is be set up in such a way that the plug can be easily accessed and unplugged if required.

› The unit must only be connected to a correctly installed power outlet.
› Make sure that none of the electrical cables leading to the unit are under any mechanical tension.
› Before taking the unit into operation for the first time, check that the power supply voltage matches the voltage specifications on the type plate.

Establishing the electrical connections

DANGER

Risk of electric shock due to defective mains cable

› Mains cables must not be allowed to come into contact with any hot surfaces on the unit.

› Plug the CEE connector into the power outlet.

9 Commissioning

› Before taking the unit into operation, check for any damage. Damaged units must not be used.

In many countries technical medical products and electrical devices are subject to regular checks at set intervals. The owner must be instructed accordingly.

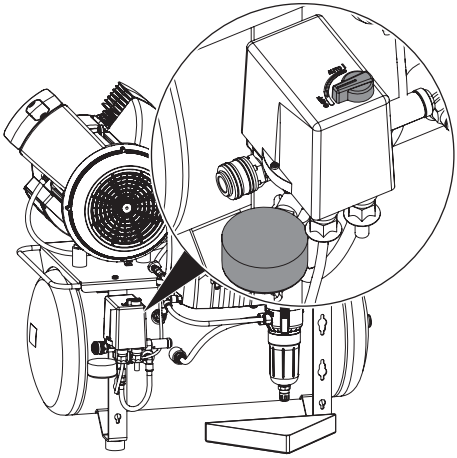
› Turn on the unit power switch or the main surgery switch.
› Carry out an electrical safety check in accordance with applicable local regulations (e.g. the German Ordinance on the Installation, Operation and Use of Medical Devices / Medizinprodukte-Betreiberverordnung) and record the results as appropriate, e.g. in the technical log book.

9.1 Checking the switch-on/cut-off pressure

The switch-on/cut-off pressure is preset at the factory. Check the setting during first start-up.

› Switch on the unit at the pressure switch by rotating it to the position "I AUTO".
› Read off the cut-off pressure from the pressure gauge.
› Drain the air from the pressure tank (e.g. via the condensate drain valve) until the unit starts and then close it again.

› Read off the pressure when the unit switches on.
If the readings deviate from the values preset at the factory, adjust the pressure switch to the factory settings.



9.2 Checking the safety valve

Correct operation of the safety valve must be checked when the unit is started up for the first time and again subsequently at regular intervals.

At the factory, the safety valve is set to 10 bar (1 hPa), checked and stamped.

DANGER

Risk of explosion of the pressure tank and pressure hoses

› Do not change the safety valve settings.

› Switch on the unit at the pressure switch and fill the pressure tank to the cut-off pressure.

WARNING

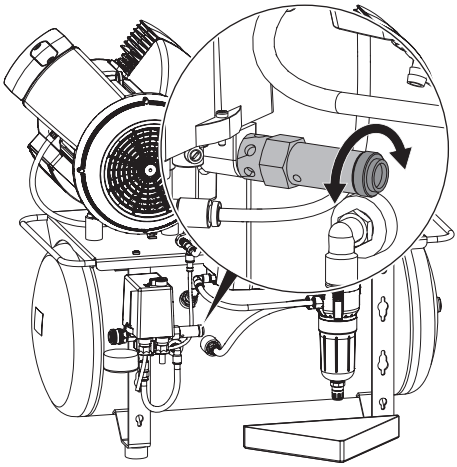
Risk of damage to the safety valve

Risk of explosion of the pressure tank and pressure hoses due to a defective safety valve

› Do not use the safety valve to vent the pressure tank.

› To open, rotate the screw of the safety valve anti-clockwise until the valve begins to blow off. Only allow the safety valve to blow for a short period.

› Then turn the screw clockwise as far as it will go to close the valve. The valve must now be closed again.



9.3 Draining the condensation water

Temperature changes during transport may cause condensation water to accumulate in the pressure tank. The condensation water can only be drained from the pressurised pressure tank.

› Switch on the unit at the pressure switch and wait until the cut-off pressure is reached.

Type 4280-..

› At maximum tank pressure, unscrew the bottom screw fitting on the condensate separator.

› Close the screw connection as soon as all of the condensate has been blown out.

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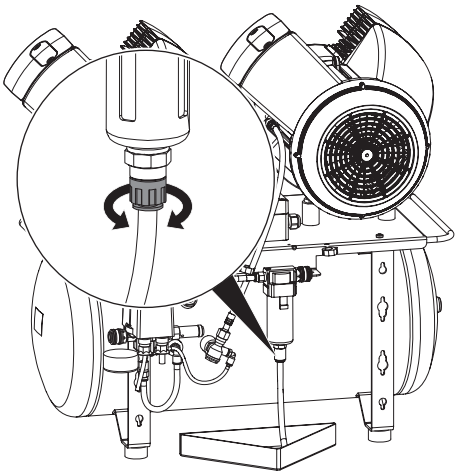
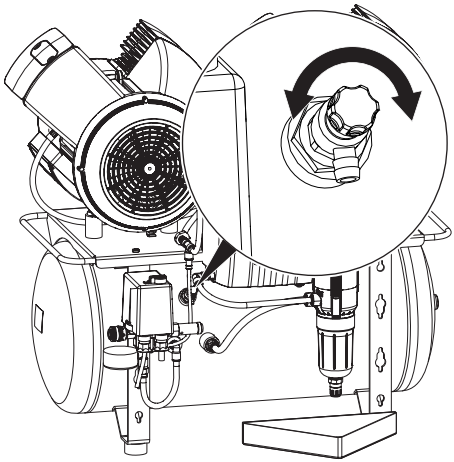


Type 4282-..

Pressure tank

› At maximum tank pressure, slowly open the condensate drain valve.

› Close the condensate drain valve as soon as all of the accumulated condensation water has been blown out.



10 Adjustment options

10.1 Adjusting the pressure switch

WARNING

Risk of explosion of the pressure vessel

The pressure vessels used in the compressors are designed to withstand continuous pressure changes of 2 bar and can be used continuously under these pressure changes.

› For load changes > 2 bar (max. permissible: 3 bar), comply with the maximum load change cycles specified in the operating instructions of the pressure vessel.

DANGER

Exposed live parts

Risk of electric shock due to live parts

› Disconnect all power from the device.

› Use insulated tools.

› Do not touch live parts.

The cut-off pressure must be at least 0.5 bar (0.05 hPa) below the maximum pressure of 10 bar (1 hPa) of the safety valve. Otherwise the safety valve can open too early, which will prevent the compressor unit from attaining the cut-off pressure, as a result of which it will run continuously. The maximum permitted pressure is marked by a red line on the attached pressure gauge.

If the read-off values differ from the factory settings or if other settings are required, the cut-off pressure of the compressor can be adjusted at the adjusting screw on the pressure switch. The start-up pressure can then be adjusted using the pressure difference Δp.

› Take off the pressure switch cover.

› Adjust the cut-off pressure P at the adjustment screw.
The cut-off pressure increases in the "+" arrow direction and decreases in the "-" arrow direction. The pressure difference Δp is also influenced by this adjustment.

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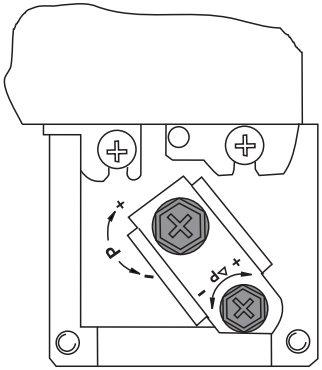
› Adjust the start-up pressure via the pressure difference Δp at the adjustment screw.
The pressure difference increases in the "+" arrow direction and decreases in the "-" arrow direction.
The maximum permissible pressure difference must not be set to more than 3 bar.



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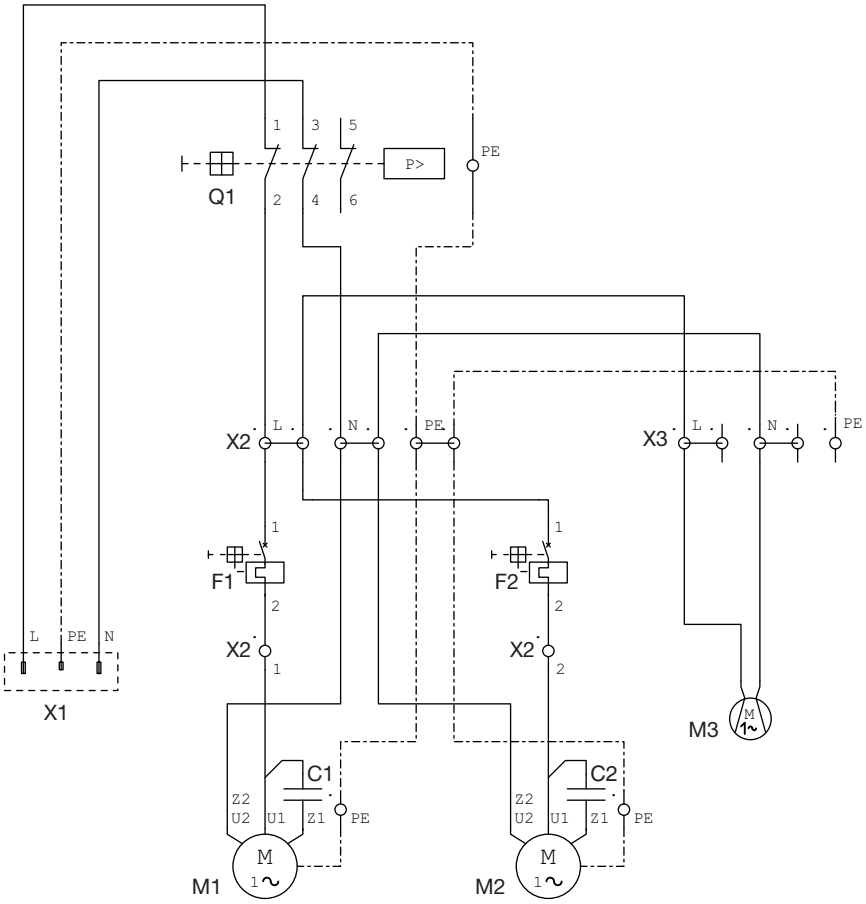
11 Circuit diagram



X1 Mains connection for CEE connector 230 V / 16 A
X2 Distributor for compressor units
X3 Distributor for membrane drying unit (type 4282-... only)
Q1 Pressure switch
F1 Thermal protection switch, nominal current 12 A for M1
F2 Thermal protection switch, nominal current 12 A for M2
C1 Motor capacitor
C2 Motor capacitor
M1 Compressor unit
M2 Compressor unit
M3 Fan motor for membrane drying unit (type 4282-... only)

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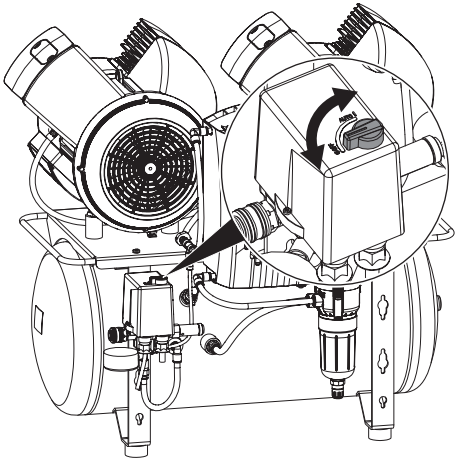
Usage

12 Operation

Prior to working on the unit or in case of danger, disconnect it from the mains.

12.1 Switching the unit on/off

› Switch on the unit at the pressure switch by rotating it to the position "I AUTO".
The compressor unit will start up automatically and fill the pressure tank. When the cut-off pressure is reached the compressor unit switches itself off automatically.
› The unit can be switched off when required by turning the pressure switch to the "0 OFF" setting.



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13 Maintenance

Prior to working on the unit or in case of danger, disconnect it from the mains.

CAUTION

Risk of infection due to burst filters

Particles enter the compressed air network and can therefore enter the mouth of the patient.

› Replace filters in accordance with the maintenance schedule.

13.1 Maintenance schedule

NOTICE

Risk of damage to the unit due to blocked filters

Continuous running due to reduced delivery. Damage to the unit due to burst filters.

› Replace filters in accordance with the maintenance schedule.

Every time you work with the unit, check it visually for damage to ensure safe and reliable operation. Damaged units must not be taken back into use.

Type 4280-..

Maintenance interval	Maintenance work
At regular intervals	› Empty the collector tray under the condensate separator (the interval may vary depending on the ambient conditions and method of working; empty it daily if the humidity is high).
Annually	› Replace the air intake filter in the compressor unit – do this every six months if there is a high concentration of dust. › Replace the fleece filter in the condensate separator.
Every 5 years	› Replace the vibration dampers. › Change the cup seal.
In accordance with national law	› Check the safety valve. › Carry out recurring safety inspections (e.g. pressure tank inspections, electrical safety inspections) in accordance with applicable national laws.

Type 4282-..

Maintenance interval	Maintenance work
At regular intervals	› Empty the collector tray under the membrane drying unit (the interval may vary depending on the ambient conditions and method of working; empty it daily if the humidity is high).
Annually	› Replace the air intake filter in the compressor unit – do this every six months if there is a high concentration of dust. › Replace the fine or sterile filter. › Replace the sintered filter.

Maintenance interval	Maintenance work
Every 5 years	› Replace the vibration reducers. › Change the cup seal.
In accordance with national law	› Check the safety valve. › Carry out recurring safety inspections (e.g. pressure tank inspections, electrical safety inspections) in accordance with applicable national laws.

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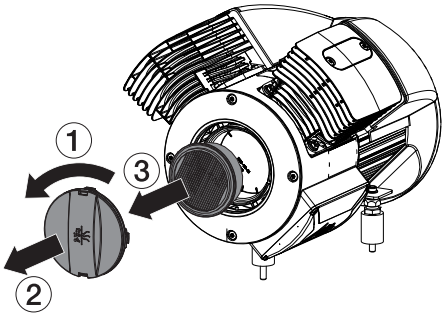
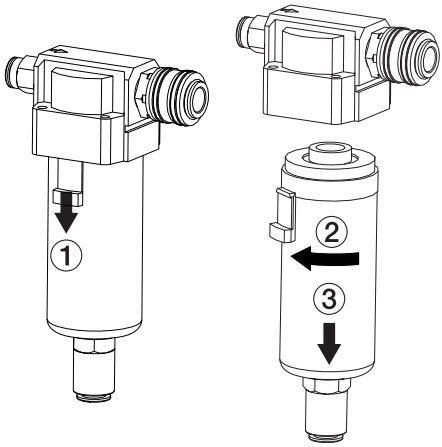
13.2 Replacing the air intake filter

› Switch off the compressor at the pressure switch.
› Disconnect all power from the device.
› Release the filter cover by rotating it **anti-clockwise** and then take it off.
› Remove the air intake filter.
› Insert a new air intake filter.
› Place the filter cover in position and lock it by turning it **clockwise**.

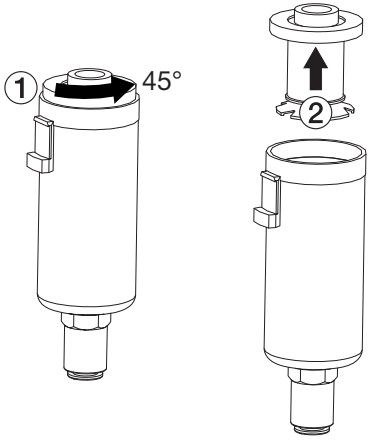


13.3 Replacing the filter in the condensate separator

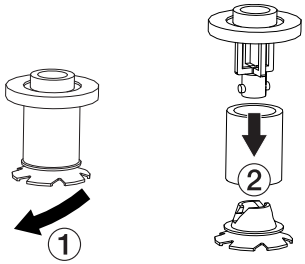
› Switch off the compressor at the pressure switch.
› Unplug the mains plug.
› Release the pressure from the pressure tank. To do this, unscrew the bottom screw fitting on the condensate separator.
› Push the slider of the housing locking mechanism downwards.
› Open the housing by rotating and pulling downwards.



› Rotate the black filter mount (approx. 45°).
› Remove the filter mount upwards from the water accumulation chamber.



› Unscrew the rejected part downwards.
› Remove the filter element.



› Replace the filter element.

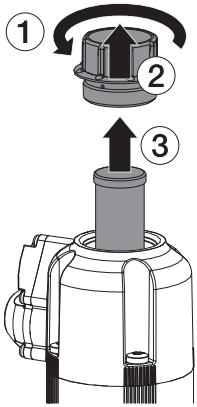
› Re-assemble the condensate separator.

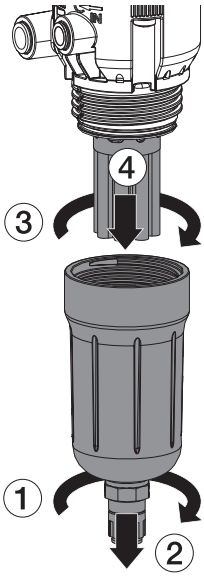
During assembly pay attention to detents and markings.

13.4 Replacing the filter of the membrane drying unit

Fine/sterile filter

› Switch off the unit.
› Disconnect all power from the device.
› Unscrew and remove the filter cover.
› Remove the fine/sterile filter.
› Insert the new fine/sterile filter.
› Replace the filter cover and close.





Sintered filter

› Unscrew and remove the filter housing.
› Remove the sintered filter.
› Insert a new sintered filter.
› Replace the filter housing and close.

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14 Taking out of use

14.1 Taking the unit out of use

If the unit is not to be used for a prolonged period of time, we recommend that it is properly shut down and taken out of use.
To do this, the accumulated condensation water from the unit must be drained.

› Switch on the unit and wait until the cut-off pressure is reached.

Condensate separator

› Open the condensate drain valve on the condensate separator.
Once the start-up pressure has been reached the compressor will switch on.

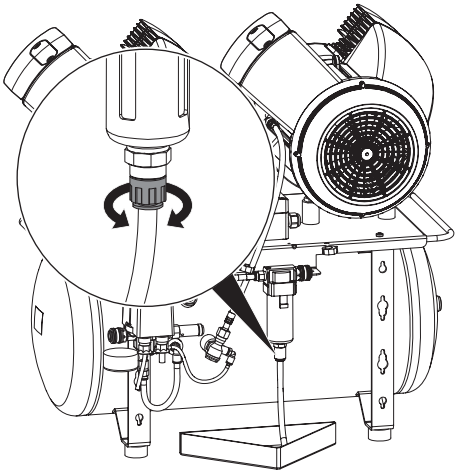
› With the compressor switched on and the condensate drain valve open, wait until no more condensation water emerges.

› Switch off the unit.

› Close the condensate drain valve when no more air emerges.

› Disconnect the mains plug.

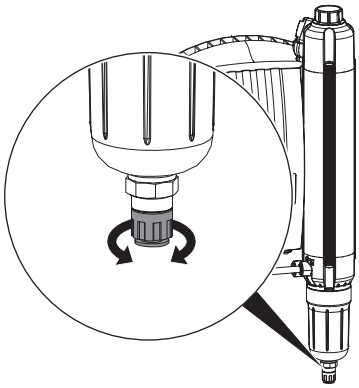
› Disconnect the compressed air connection on the quick release coupling.



Membrane drying unit

› While the compressor unit is running, open the condensate drain valve on the membrane drying unit. When no more condensation water emerges, close the condensate drain valve.

› Switch off the device.



Pressure tank

› Open the condensate drain valve.
Once the start-up pressure has been reached the compressor will switch on.

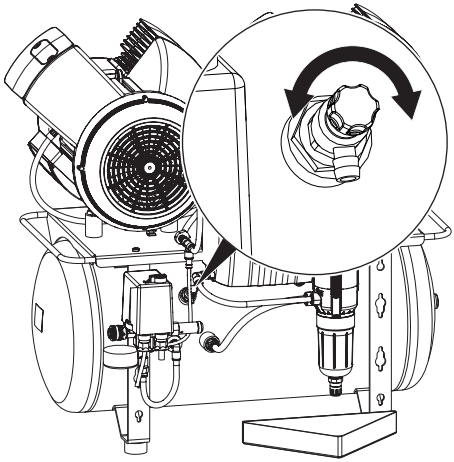
› With the compressor switched on and the condensate drain valve open, wait until no more condensation water emerges.

› Switch off the unit.

› Close the condensate drain valve when no more air escapes.

› Disconnect all power from the device.

› Disconnect the compressed air connection on the quick release coupling.



14.2 Storage of the unit

WARNING

Risk of explosion of the pressure tank and pressure hoses

› The pressure tank and the pressure hoses must be vented before they are stored or transported.

› Protect the unit against moisture, dirt and extreme temperatures during transport (refer to the section on "Ambient conditions").

› Only store the unit when it has been completely emptied.

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Troubleshooting

15 Tips for operators and service technicians

Any repairs exceeding routine maintenance may only be carried out by qualified personnel or our service.

Prior to working on the unit or in case of danger, disconnect it from the mains.

Error	Possible cause	Remedy
Compressor will not start	No mains voltage	› Check the mains fuse; if necessary, switch the circuit breaker back on. If the fuse is defective, replace it.
	Undervoltage or overvoltage	› Measure the supply voltage; call an electrician if necessary.
	Pressure switch not switched on	› Switch on the pressure switch. › Inform a service technician.
	Motor winding overheating protector tripped (overheating)	› Allow the unit to cool down. › Inform a service technician.
	Thermal protection switch tripped	› Inform a service technician. › Reset the protection switch.
Humming noise from motor	Motor capacitor is defective	› Replace the capacitor.
Compressor does not switch off	Wrong size of compressor, air intake too high	› Calculate the air requirement (this can be up to 50 l/min per treatment unit), if necessary install a larger compressor.
	Leak in the compressed air system	› Locate and seal the leak. › Inform a service technician.
	Defective membrane drying unit	› Check whether there is an increased flow of air at the filter housing of the membrane drying unit (bottom), if necessary replace the membrane drying unit.
Compressor switches on from time to time even though no air is being taken for a consumer unit	Leak in the compressed air system	› Locate and seal the leak. › Inform a service technician.
Knocking or loud noises on the compressor	Compressor unit defective	› Disconnect all power from the device and inform a service technician.

Error	Possible cause	Remedy
Reduced delivery. Compressor needs longer to charge the pressure tank, see charging times in "4 Technical data"	Air intake filter dirty	› Replace the air intake filter at least 1x per year. The air intake filter must never be cleaned.
	Defective membrane drying unit	› Replace the membrane drying unit. › Inform a Service Technician.
	Cup seal worn at the piston or defective	› Replace the cup seal or the entire piston.
Water dripping from air consumers	Maintenance work not carried out regularly (without membrane drying unit)	› Regularly drain the condensation water from the pressure tank, see "9.3 Draining the condensation water"
	Defective membrane drying unit	› Inform a service technician.
Working cycles of the compressor are very short, even if only small amounts of air are removed	Condensed water in the tank	› Drain off condensed water › The dry air units of compressors fitted with dry air units need to be checked and replaced, if applicable.

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Appendix

16 Handover record

This document confirms that a qualified handover of the medical device has taken place and that appropriate instructions have been provided for it. This must be carried out by a qualified adviser for the medical device, who will instruct you in the proper handling and operation of the medical device.

Product name	Order number (REF)	Serial number (SN)

- ☐ Visual inspection of the packaging for any damage
- ☐ Unpacking the medical device and checking for damage
- ☐ Confirmation of the completeness of the delivery
- ☐ Instruction in the proper handling and operation of the medical device based on the operating instructions

Notes:

Name of person receiving instruction:	**Signature:**

Name and address of the qualified adviser for the medical device:

Date of handover:	**Signature of the qualified adviser for the medical device:**

Hersteller/Manufacturer:

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