V 2400

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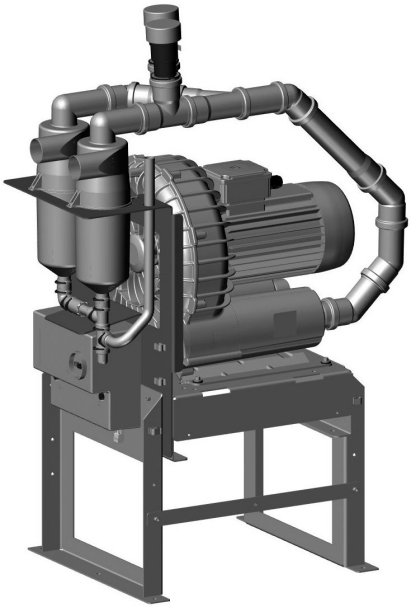

Installation and operating instructions

CE 0297

9000-606-97/30

DÜRR DENTAL

1911V001

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Important information

Product description

Assembly

Usage

Troubleshooting

Appendix

Important information

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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:
V 2400
Order number: 7137-02

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


Biohazard warning

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.


Wear protective gloves.


Wear protective goggles.


Disconnect all power from the unit.


Observe the operating instructions.


Refer to the accompanying electronic documents.

Lower and upper temperature limits

Lower and upper humidity limits


Fuses


Protective ground connection

CE xxxx CE labelling with the number of the notified body

REF Order number

SN Serial number

MD Medical device

HIBC Health Industry Bar Code (HIBC)

Manufacturer

1.2 Copyright information

All circuits, processes, names, software programs and units mentioned in this document are protected by copyright.
The Installation and Operating Instructions must not be copied or reprinted, neither in full nor in part, without written authorisation from Dürr Dental.

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

2.1 Intended purpose

The suction unit provides the dental treatment unit with vacuum and volume flow.

2.2 Intended use

Working in combination with the suction unit with treatment unit, suction handpiece and cannula, the media used in dental treatment (e.g. water, saliva, dentine and amalgam) are removed by suction for disposal.
This unit is technically suitable for the aspiration of nitrous oxide (laughing gas). However, when assembling a system for aspiration of nitrous oxide, it is important to ensure that the other components in the system are also suitable for this purpose. Those responsible for setting up the system must assess this and approve and release the system for the aspiration of nitrous oxide.

Operation with nitrous oxide is only permitted if the exhaust air is transported from the unit to the outside of the building.

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.

› Do not use this device to aspirate flammable or explosive mixtures.

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- The unit must not be used as a vacuum cleaner.
- Do not use chemicals containing chlorine or foaming chemicals.
- Operation in operating theatres of explosive areas is not permissible.
- The suction unit must not be set up in the patient environment (with a radius of 1.5 m).

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 Combining devices safely

Take care when connecting units together or to parts of other systems as there is always an element of risk (e.g. due to leakage currents).

- Only connect units when there can be no question of danger to operator or to patient.
- Only connect units when it is safe to do so and when there is no risk of damage or harm to the surroundings.
- If it is not 100% clear from the unit data sheet that such connections can be safely made or if you are in any doubt, always get a suitably qualified person (e.g. the manufacturer) to verify that the setup is safe.

Where applicable, the requirements for medical products have been taken into account in the development and construction of the device. As a result, this device is suitable for installation within medical supply equipment.

- Where this device is integrated in other medical supply equipment, the requirements of European Union Medical Device Regulation 2017/745 and the relevant standards must be observed.

2.6 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.

2.7 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.

2.8 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 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.

2.10 Transport

The original packaging provides optimum protection for the unit during transport.
If required, original packaging for the unit can be ordered from Dürr Dental.

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 unit in its original packaging.
› Keep the packing materials out of the reach of children.

2.11 Disposal

The unit may be contaminated. Instruct the company disposing of the waste to take the relevant safety precautions.

› Decontaminate potentially contaminated parts before disposing of them.
› Uncontaminated parts (e.g. electronics, plastic and metal parts etc.) should be disposed of in accordance with the local waste disposal regulations.
› 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).

Product description

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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):
V 2400, 400 V, 3~, 50/60 Hz with control box 7137-02

- Suction unit
- Set of connection parts + hoses
- Control box (fastened to the floor brackets)
- 2 condensate separators
- Auxiliary air valves (50 or 60 Hz)
- Installation and operating instructions

3.2 Optional items

The following optional items can be used with the device:

Noise reduction for exhaust air . . . 0730-991-00
Bacteria filter 0705-991-50
Bacteria filter (cartridge) 0705-991-05
Separation container with pump . . 7137400100

3.3 Consumables

The following materials are consumed during operation of the device and must be ordered separately:

Orotol plus (2.5 litre bottle) CDS110P6150
MD 555 cleaner (2.5 litre bottle) . CCS555C6150

3.4 Wear parts and replacement parts

The following working parts need to be changed at regular intervals (refer to the "Maintenance" section):

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

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4 Technical data

Electrical data		7137-02	
Rated voltage	V	400, 3~	
Mains frequency	Hz	50	60
Nominal current	A	5.0	6.3
Start-up current	A	44	48
Motor protection	A	7.2	8.1
Type of protection		IP 21	
Protection class		I	

Connections		
Suction connection (outside)	mm	2 x ∅ 50 (DN50)
Exhaust air connection (external)	mm	∅ 50 (DN50)
Condensate connection (DürrConnect)	mm	∅ 20

Media			
Max. flow rate with unimpeded flow	l/min	4300	4700
Max. suction system pressure *	mbar/hPa	-220	-220

* The pressure in the suction system is limited by the supplied auxiliary air valve. The suction unit is capable of generating greater pressure. The auxiliary air valve is adjusted to the suction unit and must not be altered.

General data			
Speed	rpm	2900	3400
Duty cycle	%	100 (S1)	
Dimensions (H x W x D)	cm	115 x 79 x 48	
Weight, approx.	kg	68	
Noise level*	dB(A)	70	

* Noise level in accordance with ISO 3744

Ambient conditions during storage and transport		
Temperature	°C	-10 to +60
Relative humidity	%	< 95

Ambient conditions during operation		
Temperature	°C	+10 to +40
Relative humidity	%	< 70

Classification	
Medical devices class	IIa

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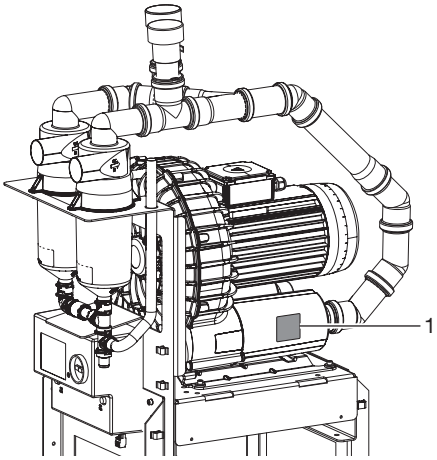
4.1 Type plate

The model identification plate is located on the turbine housing.



1 Type plate

4.2 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.

5 Operation

The V-suction unit is suitable for use in dry air suction systems. The advantage of this system is that the suction unit, regardless of the actual connection layout, can be installed in any available and suitable room (including upper floors or basements). The necessary air flow and vacuum are generated by a rapidly rotating impeller.
When an appropriate vacuum for the machine is applied, approx. 300 l/min of air is sucked in through the suction cannula.
On the vacuum side the V-suction unit is equipped with a condensation separator that collects any condensation arising within the pipe system and transports it away to the outside. An auxiliary air valve in the condensation separator protects the suction unit against overheating and provides uniform suction power.
The exhaust air from the suction unit should be guided out of the building (via the roof where possible). We recommended the installation of a bacteria filter in the exhaust air line. In addition, it is possible to install a noise-reducing muffler in the exhaust air line in order to reduce the amount of noise generated by the unit and by the air flow.

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Assembly

6 Requirements

The unit can be installed either on the same level as the surgery or on a floor below.

Further information can be found in our suction planning information leaflet. Order number9000-617-03/..

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)
– When installing in a cabinet the inlet and outlet ventilation slots must be present; minimum free cross-section at least 120 cm^2.
– Forced ventilation (fan) must be provided if there is a risk that the recommended room air temperature could be exceeded. The air flow performance must be at least 2 m^3/min.
– Do not cover cooling slots or openings with housing installations; ensure sufficient clearance to the openings to permit sufficient cooling.

6.2 Setup options

The following options for setting up the unit are available:

– Setup on a special console on the floor.
– In a ventilated cabinet

6.3 Pipe materials

Only use vacuum-sealed HT-waste pipes manufactured from the following materials:

– Polypropylene (PP),
– Chlorinated polyvinyl chloride (PVC-C),
– Unplasticized polyvinyl chloride (PVC-U),
– Polyethylene (PE).

The following materials must not be used:

– Acrylonitrile-butadiene-styrene (ABS),
– Styrene copolymer blends (e.g. SAN + PVC).

6.4 Hose materials

For waste connections and suction lines only use the following hose types:

– Flexible spiral hoses made of PVC with integrated spiral or equivalent hoses
– Hoses that are resistant to dental disinfectants and chemicals

Plastic hoses will display signs of ageing over time. Therefore, they should be inspected regularly and replaced as necessary.

The following types of hoses must not be used:

– Rubber hoses
– Hoses made completely of PVC
– Hoses that are not sufficiently flexible

6.5 Information about electrical connections

› Ensure that electrical connections to the mains power supply are carried out in accordance with current valid national and local regulations and standards governing the installation of low voltage units in medical facilities.
› Install an all-pole disconnect switch with a contact opening width of at least 3 mm in the electrical connection to the mains power supply.
› Observe the current consumption of the devices that are to be connected.

Electrical fusing

LS switch 16 A, characteristic B, C and D in accordance with 60898.

6.6 Information about connecting cables

The diameter of the connections depends on the current consumption, length of line and the ambient temperature of the unit. Information concerning the current consumption can be found in the Technical Data supplied with the particular unit to be connected.
The following table lists the minimum diameters of the connections in relation to the current consumption:

Current consumption of unit [A]	Cross-section [mm^2]
> 10 and < 16	1.5
> 16 and < 25	2.5

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Current consumption of unit [A]	Cross-section [mm²]
> 25 and < 32	4
> 32 and < 40	6
> 40 and < 50	10
> 50 and < 63	16

Mains supply cable

Installation type	Line layout (minimum requirements)
Fixed installation	– Plastic sheathed cable (e.g. type NYM-J)
Flexible	– PVC flexible line (e.g. H05 VV-F) or – Rubber connection (e.g. H05 RN-F or H05 RR-F)

Control cable

24 V protective low voltage for:
- Hose manifold
- Place selection valve
- Spittoon valve

Installation type	Line layout (minimum requirements)
Fixed installation	– Shielded sheathed cable (e.g. (N)YM (St)-J)
Flexible	– PVC data cable with shielded cable sheathing, as used for telecommunications and IT processing systems (e.g. type LiYCY) or – Lightweight PVC control cable with shielded cable sheathing

7 System components

The system components listed below are required or recommended for various procedures or for installation.

7.1 Condensate separator

Two condensate separators are installed on the suction machine.

The condensate separator must be installed at the lowest point in the pipe system. If the suction unit is not installed at the lowest point in the pipe system (e.g. cellar), unscrew the condensation separator from the motor console and attach it at the lowest point in the pipe system.

7.2 Control box

The unit is connected via a control box. The control box is either included in the scope of delivery or must be ordered separately. In some units, the control system is built in.

The adjustment range of the control box is matched to the suction unit for a mains frequency of 50 Hz. This must be taken into account if the unit is operated with a mains frequency of 60 Hz or if the suction unit or control box are replaced.

7.3 Exhaust air filter

For hygienic reasons, we recommend the installation of a bacteria filter in the exhaust air line. If the unit is installed in the surgery and the exhaust air cannot be discharged to the outdoors, it is essential to install a bacteria filter. Depending on the type and condition of the bacteria filter, it will need to be replaced every 1-2 years at the latest.

The separation integrated in the system does not retain bacteria; this is why we recommend installing a suitable filter in the exhaust air system.

7.4 Noise reduction

If the noise level from the exhaust air vent or the flow noise generated is too high, noise reduction can be installed in the exhaust air line.

8 Installation

The actual connection can vary depending on the chosen installation option. The connection shown is only an example.

8.1 Installation and routeing of hoses and pipes

› Detach the suction machine from the transport pallet and position it in the required position for installation. Remove the transport locks.

› Drill at least two mounting points in the floor, fit anchors and bolt down the suction machine.

Take care to avoid any pipes or electric cables in the floor.

› Connect the waste water drain hose to the condensation separator and route it to the building waste water system. A suitable waste water collecting container can also be used if no building waste water drainage system is available. This then needs to be emptied on a regular basis. Make sure staff in the surgery or clinic are told about this.

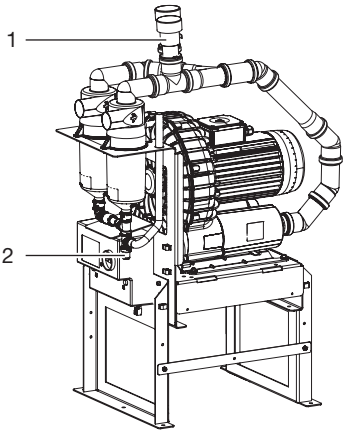
› Remove the blind plugs at the two T-pieces between the condensation separator and the suction unit.

› Use the correct auxiliary air valves depending on the mains frequency:
For 50 Hz: 0729-060-00
For 60 Hz: 7137-060-00

› Push on the pipe bends at the condensate separators and at the exhaust air connection.

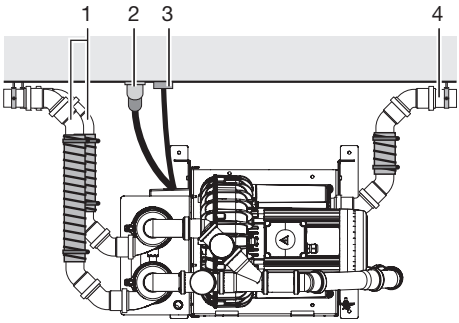
› Establish connections between the pipe system and the unit using the flexible hoses supplied. This will prevent vibrations from being transmitted to the pipe system.
- Plastic hoses on the suction side.
- Aluminium hose on the exhaust air side.

› The connection between the pipe line and unit suction connection should be kept as short as possible and straight, without bends.



1 Auxiliary air valve
2 Waste water outlet

Connections V 2400



1 Suction connections
2 Power supply
3 Control line
4 Exhaust air line

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9 Electrical connections

NOTICE

Short circuit due to defective lead

› Do not route wires near hot surfaces.

› Before connecting, check that the power supply voltage matches the voltage specifications on the type plate.

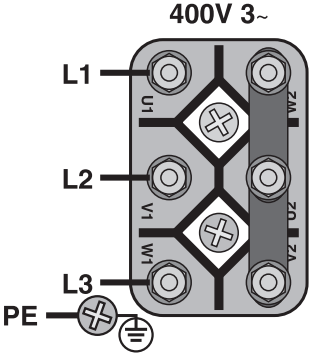
› Connect the control line from the building installation to the control box.

The corresponding connection plans and circuit diagrams can be found in the installation and operating instructions of the control box.

› Connect the mains plug.

Connection in the motor terminal box:

› Connect the power supply line from the control box to the appropriate terminals in the motor terminal box.



10 Commissioning

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 a function check of the system.

› Check all connections for leak tightness.

› Carry out an electrical safety check in accordance with applicable regulations (e.g. regulations concerning set up, operation and application of medical devices) and record the results as appropriate, e.g. in the technical log book.

› Carry out and document the instruction and handover for the unit.

A sample handover report is included in the attachment.

Usage

11 Disinfection and cleaning

NOTICE

Device malfunctions or damage due to use of incorrect media

Guarantee claims may become invalid as a result.

› Do not use any foaming agents such as household cleaning agents or instrument disinfectants.
› Do not use abrasive cleaners.
› Do not use agents containing chlorine.
› Do not use any solvents like acetone.

Dürr Dental recommends
– For disinfection and cleaning: Orotol plus or Orotol ultra
– For cleaning: MD 555 cleaner

Only these products have been tested by Dürr Dental.
When using prophy powders, Dürr Dental recommends the water-soluble Lunos prophy powders in order to protect the Dürr Dental suction systems.

11.1 After every treatment

› Aspirate a glass of cold water through the large and the small suction hoses. Do this even if only the small suction hose was actually used during treatment.

Suction through the large suction hose causes a large amount of air to be drawn up, thereby considerably increasing the cleaning effect.

11.2 Daily after the end of treatment

After higher workloads before the midday break and in the evening

The following are required for disinfection/cleaning:
✓ Non-foaming disinfectant/cleaning agent that is compatible with the materials.
✓ Unit care system, e.g. OroCup
› To pre-clean, suck up 2 litres of water with the care system.
› Aspirate the disinfection/cleaning agent with the care system.

11.3 Once or twice a week before the midday break

Under harsher conditions (e.g. hard water or frequent use of prophy powders) 1x daily before the midday break

The following are required for cleaning:
✓ Special non-foaming detergent for suction units that is compatible with the materials.
✓ Unit care system, e.g. OroCup
› To pre-clean, suck up 2 litres of water with the care system.
› Aspirate the cleaning agent with the care system.
› Rinse with ca. 2 l water after the application time.

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12 Maintenance

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All maintenance work must be performed by a qualified expert or by one of our Service Technicians.

WARNING

Infection due to contaminated unit

- Clean and disinfect the suction before working on the unit.
- Wear protective equipment when working (e. g. impermeable gloves, protective goggles and mouth and nose protection).

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

Maintenance interval	Maintenance work
Every 1-2 years	› Replace the exhaust air filter (where fitted). *
Every 2 years	› Check the waste valve on the condensation separator for correct operation and replace it if necessary. * › Check the auxiliary air valve for correct operation and clean/replace it as required. *

* Only to be performed by service technicians.

Troubleshooting

13 Tips for operators and service technicians

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

WARNING

Infection due to contaminated unit

- Clean and disinfect the suction before working on the unit.
- Wear protective equipment when working (e. g. impermeable gloves, protective goggles and mouth and nose protection).

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

Error	Possible cause	Remedy
Device does not start	No mains voltage	› Check the mains supply voltage. * › Check the fuses and replace if necessary. *
	Undervoltage	› Measure the supply voltage; call an electrician if necessary. *
	Motor protection switch set too low	› Measure current, set the motor protection switch to the measured value plus safety margin. *
	Motor protection switch defective	› Check the motor protection switch; replace if defective. *
	Capacitor defective	› Measure capacitance and replace if necessary. *
	Turbine is blocked by solid particles or sticky soiling	› Disassemble the unit and clean the turbine. *
The unit generates unusual noises	Solid particles in the turbine chamber	› Disassemble the unit and clean the turbine and housing. *
Water leaking from the exhaust air connection	Foam in turbine due to use of incorrect cleaning and disinfectant agents	› Use non-foaming cleaning and disinfectant agents.
	Build-up of condensation in the exhaust air line	› Check the pipe system; avoid over-cooling. *
Suction performance too low	Coarse filters in system clogged (e.g. at separator devices)	› Clean coarse filters.

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Error	Possible cause	Remedy
	Leak in the suction pipe	› Check and if necessary establish leak-tightness of suction pipe and connections. *
	Mechanical sluggishness of turbine caused by soiling	› Disassemble the unit and clean the turbine. *
	Defective waste water valve on the condensation separator	› Replace the waste water valve. *

* Only to be done by service technicians.

14 Transporting the unit

WARNING

Infection due to contaminated unit

› Disinfect the unit before transport.

› Close all media connections.

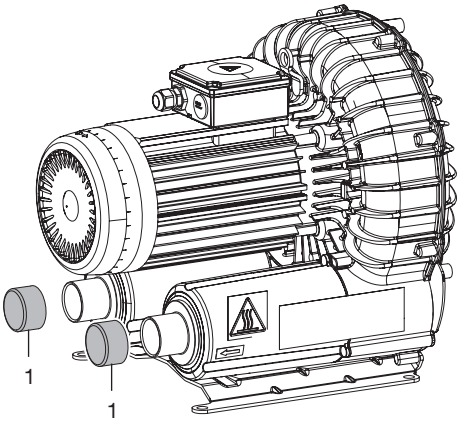
Wear protective equipment to avoid any risk of infection (e.g. liquid-tight protective gloves, protective goggles, face mask).

› Before disassembly, clean and disinfect the suction unit and the unit using a suitable disinfectant approved by Dürr Dental.

› Disinfect a defective unit using a suitable surface disinfection agent.

› Seal all connections with sealing caps.

› Pack the unit securely in preparation for transport.



1 Sealing cap

Appendix

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15 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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