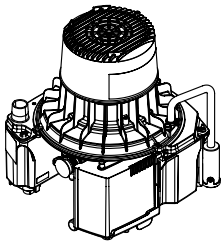
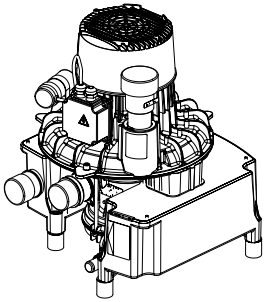
Combination suction unit

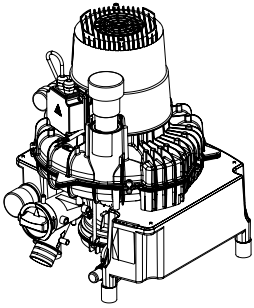
VS 300 S



VS 600



VS 900 S / VS 1200 S



EN

Installation and operating instructions

CE 0297

9000-606-79/30

DÜRR DENTAL

2015/07

Content

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Important information

1. General information

1.1 Evaluation of conformity

The product was subject to a conformity acceptance process under the European Union guidelines covering this type of device and conforms with the essential requirements of these regulations.

EN

1.2 General notes

- These Installation and Operating Instructions form an integral part of the unit. They must be kept close to the unit at all times for the operator. Precise observance of these installation and operating instructions is a prerequisite for use of the unit for the intended purpose and for its correct operation; new personnel must be sufficiently trained and instructed in its use. New personnel must be made aware of the contents of the installation and operating instructions, and they should be passed on to future operating staff.
- Safety for the operator as well as trouble-free operation of the unit are only ensured if use is made of original equipment parts. In addition, only those accessories may be used which are specifically mentioned in the Installation and Operating Instructions or have been authorised by Dürr Dental. If other accessories are used with this appliance, Dürr Dental cannot guarantee safe operation or proper functioning. No liability on the part of the manufacturer will be accepted in the case that damage arises through the use of non-approved accessories.
- Dürr Dental are only responsible for the equipment with regard to safety, reliability and proper functioning where installation, resettings, changes or modifications, extensions and repairs have been carried out by Dürr Dental or an agency authorised by Dürr Dental and if the equipment is used in conformity with the Installation and Operating Instructions.
- These Installation and Operating Instructions conform to the relevant version of the equipment and the underlying safety standards valid at the time of going to press. All circuits, processes, names, software and appliances quoted are protected under industrial property rights.
- Any reprinting of the installation and operating instructions, in whole or in part, is subject to prior approval of Dürr Dental being given in writing.
- Retain the packaging for possible return of the product to the manufacturer. **Ensure that the packaging is stored away from children**. Only the original packaging provides adequate protection during transport of the unit. Should return of the product to the manufacturer be necessary during the guarantee period, Dürr Dental accepts no responsibility for damage occurring during transport where the original packaging was not used.

1.3 Notes on medical products

- This product is a technical medical appliance and, as such, may only be operated by such persons who, as a result of training or experience, can be confidently expected to operate it correctly.

1.4 Notes on EMC for medical products

Medical products should be treated with respect when it comes to electromagnetic compatibility and special safety measures must be taken. Special instructions concerning electromagnetic compatibility for medical products can be found in our special leaflet, order number 9000-606-67/30, or the information can be found on the internet (www.duerr.de) in the Technical Documentation download pages.

1.5 Correct usage

The suction unit is designed to provide vacuum pressure in order to aspirate saliva, rinsing water and other fluids which are present during dental treatment and to transport them into the waste water system.
The suction unit should be cleaned and disinfected carefully according to the manufacturer's instructions.
Correct usage infers the strict observance of the Installation and Operating Instructions and all notes concerning setup, operation and maintenance.

Installation within other medical supply equipment:

During the development and construction of the suction unit, care has been taken to incorporate all requirements of medical products as far as possible. As a result, this appliance is suitable for installation within medical supply equipment. Where this appliance is installed within other medical supply equipment, the installation and assembly must meet all requirements of directive 93/42 EWG as well as any and all relevant standards.
This unit is also technically suitable for the aspiration of nitrous oxide (laughing gas). When designing a system that will also aspirate nitrous oxide, 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.

Operating in combination with nitrous oxide is only permitted when the exhaust air is transported to the outside of the building.

1.6 Incorrect usage

- Do not use this appliance to aspirate inflammable or explosive gas mixtures.
- The units are not suitable for use as vacuum cleaners.
- Setting up the unit close to the patient is not permitted.

Any use of this appliance/these appliances above and beyond that laid down 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.

1.7 Use of peripheral units

- Appliances may only be connected together or connected to any other assemblies where the safety of the patients, operators and staff and of the environment will not be affected in any way.
  Where any doubts remain concerning safety when connecting to other units, the operator is obliged to ascertain that such connection can in no way affect the safety of operators, patients or other staff by referring to the manufacturer or a fully qualified and competent expert.

2. Safety

2.1 General safety notes

This appliance has been designed and constructed by Dürr Dental so that correct usage of the appliance is virtually free of any possible injury or danger. In spite of this, we feel it is our duty to mention the following safety measures in order to prevent any possible danger.

- When operating the appliance, observe all local rules and regulations.
  Converting or modifying the appliance in any way is strictly prohibited. In such cases, any and all guarantees will immediately become invalid. The operation of modified appliances can be punishable by law. In the interests of trouble-free operation, the owner and operator is responsible for observing these regulations.
- Installation must be carried out by suitably qualified personnel.
- Before every use, the operator must check the functional safety and condition of the appliance.
- The operator must be knowledgeable in the operation of the appliance.
- This product is not designed for operation in an area at risk from explosion, or where the atmosphere could contribute to combustion arising. Areas where explosions could occur are those areas where flammable anaesthetic material, skin cleansers, oxygen and skin disinfectants are present.

2.2 Safety notes concerning protection from electrical current

- This appliance may only be connected to a correctly installed Dürr control box (VS 600, VS 900 S, VS 1200 S).
- Before connecting the appliance, it is necessary to check that the supply voltage and the electrical frequency of the appliance correspond to the values of the mains power supply.
- Before commissioning and first start up, all equipment and supply lines must be checked for signs of damage. Damaged supply lines and connections must be replaced immediately.
- Never come into contact with patients and open plug-in connections on the appliance at the same time.
- When working on and with the appliance, always observe the local electrical safety procedures.

3. Warnings and symbols

The following terminology and symbols are used in these Installation and Operating Instructions to denote especially important information:

ATTENTION
Instructions or regulations and warnings regarding the safety of persons and damage avoidance.

Warning of dangerous electrical voltage.

Automatic start-up

Hot surface

Biohazard warning

Information and/or instructions or prohibitions regarding personal safety or extensive material damage

To avoid any danger of infection, protective clothing should be worn (e.g. protective gloves, protective eyewear, face mask).

Take environmental and ambient conditions into account.

Ground connection

Order no./Model no.

Serial no.

Observe the Operating Instructions

Manufacturer

EN

4. Overview

The parts listed as special accessories are **not** part of the standard scope of delivery but can be ordered separately.

4.1 VS 300 S scope of delivery

The following articles are included in the scope of delivery (deviations are possible due to country-specific regulations and import provisions):

V 300 S in 230 V, 1~, 50 Hz
with control box 7122-01/002
V 300 S in 230 V, 1~, 60 Hz
with control box 7122-02/002
V 300 S in 100 V, 1~, 50 -60 Hz
with control box 7122-05/003

- Combination suction unit
- Set of connector parts
- Suction hose LW 30, grey
- Hose, LW 20
- Hose LW 30, aluminium
- OroCup (not Japan)

4.2 Special accessories

Wall mounting bracket. 7130-190-00
Housing 7122-200-00
Exhaust air bacteria filter with
accessories 7120-143-00
Rinsing unit. 7100-250-50
Ventilation kit. 7122-981-51

4.3 VS 600 scope of delivery

The following articles are included in the scope of delivery (deviations are possible due to country-specific regulations and import provisions):

V 600 in 230 V, 1~, 50 Hz
with control box 230 V, 1~. 7128-01/002
V 600 in 400 V, 3~, 50-60 Hz
with control box 400 V, 3~. 7128-02/002
VS 600 in 230 V, 3~, 50-60 Hz
with control box 230 V, 3~. 7128-02/003

- Combination suction unit
- Control box
  for model 7128-01/002 0700-500-50
  for model 7128-02/002 0732-100-56
  for model 7128-02/003 0732-100-57
- Set of connector parts
- Hose LW 40
- Hose LW 50
- Hose, LW 20
- OroCup

4.4 Special accessories

Noise reducing hood 7131-991-00
Surge tank 7112-101-00
Wall mounting bracket 7130-190-00
Console for floor setup 7130-191-00
Exhaust air bacteria filter 0705-991-53
Noise reducer for exhaust air 0730-991-00
Rinsing unit 7100-250-50
Ventilation kit 7122-981-50

4.5 VS 900 S scope of delivery

The following articles are included in the scope of delivery (deviations are possible due to country-specific regulations and import provisions):

V 900 in 230 V, 1~, 50 Hz
with control box 230 V, 1~. 7134-01/002

V 900 in 400 V, 3~, 50 Hz
with control box 400 V, 3~. 7134-02/002

V 900 in 230 V, 3~, 50 Hz
with control box 230 V, 3~. 7134-02/003

– Combination suction unit
– Control box
  for model 7134-01/002 0732-100-55
  for model 7134-02/002 0732-100-56
  for model 7134-02/003 0732-100-59
– Hose, LW 20
– Hose, LW 50 (0.6 m)
– Hose, LW 50 (1.5 m)
– OroCup

4.6 Special accessories

Noise reducing hood. 7131-991-00
Surge tank 7130-991-00
Wall mounting bracket. 7130-190-00
Console for floor setup 7130-191-00
Exhaust air bacteria filter 0705-991-53
Noise reducer for exhaust air. 0730-991-00
Rinsing unit. 7100-250-50
Ventilation kit. 7122-981-50

4.7 VS 1200 S scope of delivery

The following articles are included in the scope of delivery (deviations are possible due to country-specific regulations and import provisions):

V 1200 in 400 V, 3~, 50 Hz
with control box 400 V, 3~. 7138-02/002

V 1200 in 230 V, 3~, 50 Hz
with control box 230 V, 3~. 7138-02/003

V 1200 in 400 V, 3~, 60 Hz
with control box 400 V, 3~. 7138-03/002

V 1200 in 230 V, 3~, 60 Hz
with control box 230 V, 3~. 7138-03/003

– Combination suction unit
– Control box
  for model 7138-02/002 0732-100-61
  for model 7138-02/003 0732-100-57
  for model 7138-03/002 0732-100-61
  for model 7138-03/003 0732-100-59
– Set of connector parts
– Hose, LW 20
– Hose, LW 50 (0.6 m)
– Hose, LW 50 (1.5 m)
– OroCup

4.8 Special accessories

Noise reducing hood. 7131-991-00
Surge tank 7130-991-00
Wall mounting bracket. 7130-190-00
Console for floor set up. 7130-191-00
Exhaust air bacteria filter 0705-991-53
Noise reducer for exhaust air. 0730-991-00
Rinsing unit. 7100-250-50
Ventilation kit. 7122-981-50

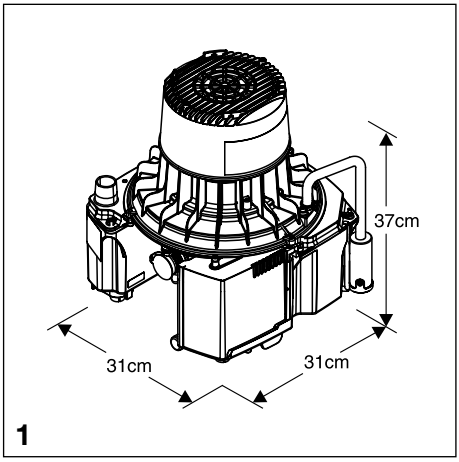
5. Technical data

5.1 VS 300 S suction unit

EN

Model 7122		-01	-02	-05
Voltage	V	230 / 1~	230 / 1~	100, 1~
Frequency	Hz	50	60	50-60
Nominal current	A	2.9	3.7	8.0-10
Starting current	A	8.2	9.1	21-20.5
Motor protection switch		Motor winding overheat protector 160 °C (±5 °C)		
Power output	W	580	800	650-850
Speed	rpm	2750	3100	2810-3200
Duty cycle	%		100	
Type of protection			IP 24	
Protection class			I	
Medical device			Class IIa	
Max. volume of fluid	l/min		4	
Unimpeded flow rate	l/min	670	800	670-800
Weight				
without housing	kg		Approx. 12.5	
with housing	kg		Approx. 21	
Noise level **				
without housing	dB(A), ±1.5	63 - 64	64 - 65	63 - 65
with housing	dB(A), ±1.5	53 - 54	54 - 64	53 - 55
Vacuum connection			DürrConnect Special Ø 30 mm	
Exhaust air connection			Ø 30 mm (external)	
Waste water connection			DürrConnect Ø 20 mm	
Operating pressure	mbar		-	
Protective low voltage	V		24 ~	
Output	VA		4	

** Tested according to EN ISO 1680 Noise emissions; measured in a soundproof room.
In rooms with poor soundproofing characteristics, higher values may be obtained.



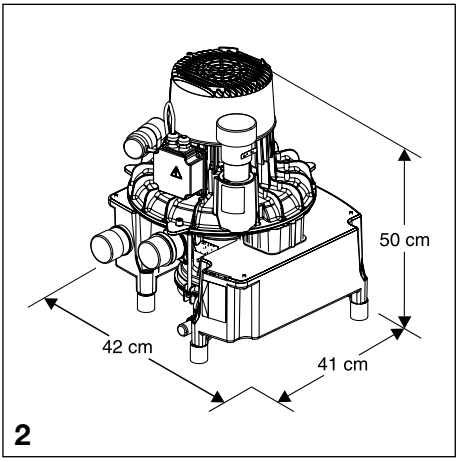
1

5.2 VS 600 suction unit

Model 7128		**-01**	**-02**	
Voltage	V	230 / 1~	400, 3~	230, 3~
Frequency	Hz	50	50-60	50-60
Nominal current	A	5.0	1.8-2.3	3.1-4.1
Starting current	A	22	8	9
Motor protection switch *	A	-	2.5-4.0	3.5-4.5
Power output	W	1100	1000	1420
Speed	rpm	2850	2850/3300	
Duty cycle	%		100	
Type of protection			IP 24	
Protection class			I	
Medical device			Class IIa	
Max. volume of fluid	l/min		10	
Unimpeded flow rate	l/min	1500	1500-1700	
Weight	kg		approx. 25	
Noise level **				
without housing	dB(A), ±1.5	63	63-68	
with housing	dB(A), ±1.5	-	-	
Vacuum connection			Ø 40 mm (external)	
Exhaust air connection			Ø 50 mm (external)	
Waste water connection			DürrConnect Ø 20 mm	
Operating pressure	mbar / hPa		approx. 170	

* Recommended setting values. As the motor protection switch is subject to a small amount of tolerance, the current should be measured during installation and the motor protection setting adjusted accordingly.

** Tested according to EN ISO 1680 Noise emissions; measured in a soundproof room. In rooms with poor soundproofing characteristics higher values may be obtained.



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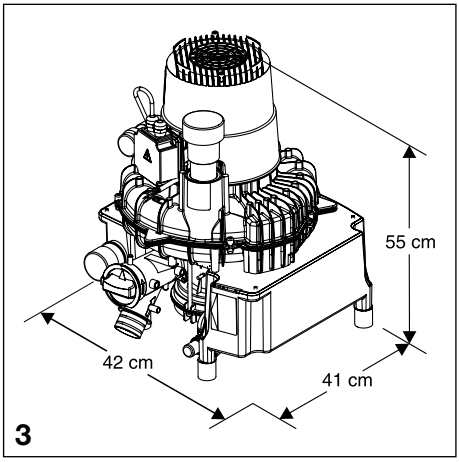
5.3 VS 900 S suction unit

Model 7134		-01	-02
Voltage	V	230 / 1~	230/400, 3~
Frequency	Hz	50	50
Nominal current	A	7.4	6.5/3.8
Starting current	A	32	42/25
Motor protection switch *	A	10	6.3/4
Power output	W	1680	1970
Speed	rpm	2780	2870
Duty cycle	%	100	
Type of protection		IP 24	
Protection class		I	
Medical device		Class IIa	
Max. volume of fluid	l/min	16	
Unimpeded flow rate	l/min	2300	
Weight	kg	approx. 32	
Noise level **			
without housing	dB(A), ±1.5	65	
with housing	dB(A), ±1.5	60	
Vacuum connection		Ø 50 mm (external)	
Exhaust air connection		Ø 50 mm (external)	
Waste water connection		DürrConnect Ø 20 mm	
Operating pressure	mbar / hPa	approx. 170	

* Recommended setting values. As the motor protection switch is subject to a small amount of tolerance, the current should be measured during installation and the motor protection setting adjusted accordingly.

** Tested according to EN ISO 1680 Noise emissions; measured in a soundproof room. In rooms with poor soundproofing characteristics higher values may be obtained.



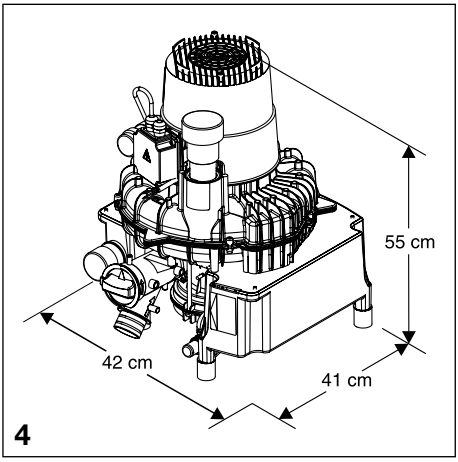
3

5.4 VS 1200 S suction unit

Model 7138		-02	-03
Voltage	V	230/400, 3~	230/400, 3~
Frequency	Hz	50	60
Nominal current	A	6.5/3.8	6.8/3.9
Starting current	A	43/25	26
Motor protection switch *	A	6.3/4	7/4
Power output	W	2000	2400
Speed	rpm	2860	3180
Duty cycle	%	100	
Type of protection		IP 24	
Protection class		I	
Medical device		Class IIa	
Max. rate of flow of fluids	l/min	24	
Unimpeded flow rate	l/min	2400	2900
Weight	kg	approx. 32	
Noise level **			
without housing	dB(A), ±1.5	66	67
with housing	dB(A), ±1.5	61.5	62
Vacuum connection		Ø 50 mm (external)	
Exhaust air connection		Ø 50 mm (external)	
Waste water connection		DürrConnect Ø 20 mm	
Operating pressure	mbar / hPa	approx. 170	approx. 160

* Recommended setting values. As the motor protection switch is subject to a small amount of tolerance, the current should be measured during installation and the motor protection setting adjusted accordingly.

** Tested according to EN ISO 1680 Noise emissions; measured in a soundproof room. In rooms with poor soundproofing characteristics, higher values may be obtained.



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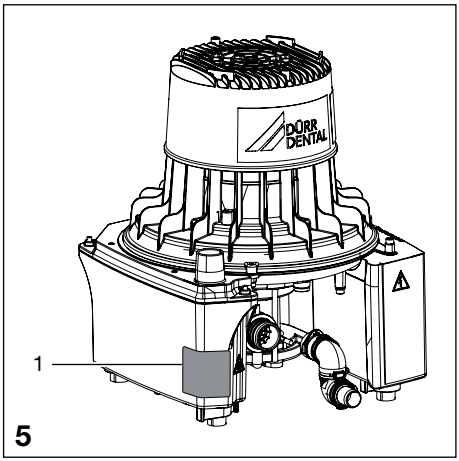
5.5 Ambient conditions

Take environmental and ambient conditions into account. Do not operate the unit in damp or wet conditions.

Storage and transport
Temperature: ..... –10 °C to +60 °C
Rel. humidity: ..... max. 95 %

Operation
Temperature:..... +10 °C to +40 °C
Rel. humidity: ..... max. 70 %

EN



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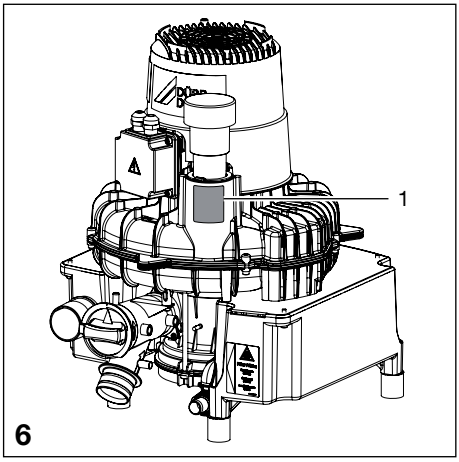
5.6 Model identification plate

VS 300 S
The model identification plate is located on the sound insulated housing

1 Model identification plate



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VS 600, VS 900 S, VS 1200 S
The model identification plate is located on the top part of the turbine housing.

1 Model identification plate

6. Functional description

Example showing VS 900 S suction unit

Inside the suction unit, the aspirated fluids and solid particles are passed through a **two-step** separation system and separated from the suction air. This separation system consists of a cyclone separator and a separation turbine.
The suction operation functions continuously. The mixture drawn in, consisting of fluids, solid particles and air, passes through the inlet connection (D) and into the suction unit. The coarse filter (B) serves to hold back the solid particles. The rest of the mixture passes to the cyclone separator (I) and is set into a spiral motion. In this **first step,** the centrifugal forces generated cause the fluid and smaller particles remaining to be thrown against the outside wall of the separation chamber of the cyclone separator. This initially creates a coarse separation of the fluid waste.
In the **second stage**, the separation turbine (J) effects a fine separation of the remaining fluid from the flow of air which has carried it so far. The waste water pump (H) feeds the fluid emanating from the centrifuge stage and, together with the finer solid particles, through the waste water system connection (E) into the central waste water network.
The air which has been separated from the fluid mix in the second stage is drawn in by the vacuum pressure which is created by the turbine wheel (K) and can now be passed through the exhaust air connection (C).
Both the turbine wheels and the waste water pump are driven by the motor (L).

In order to separate out any dental amalgam present, it is necessary to have an amalgam separator, e.g. model CA 4, located behind the waste water connection (E).

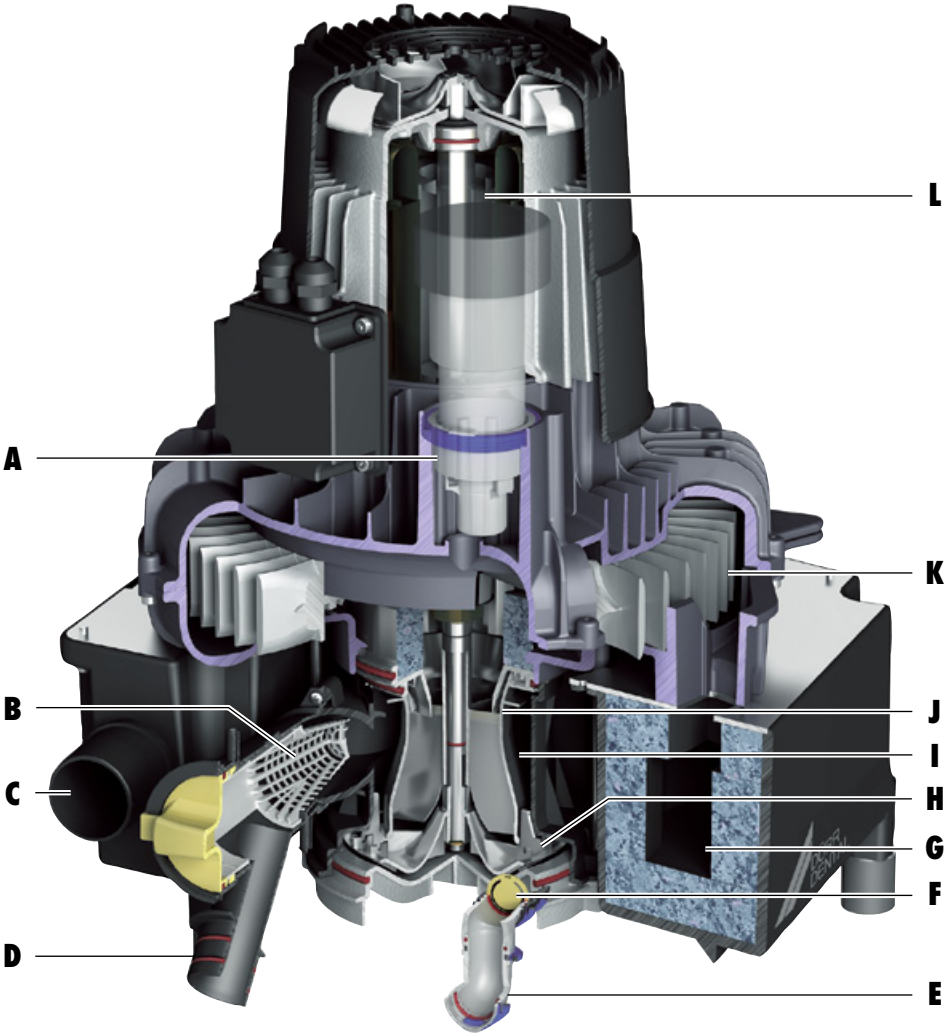
As the separation step of the VS 1200 S is approved for use with up to 24 l fluid, a second CA 4 must be connected to this unit depending on the particular installation and national regulations. The maximum permitted water volume of 16 l/min for one CA 4 must not be exceeded.

Where an amalgam separator provided by a different manufacturer is connected, the max. fluid flow volume of the suction unit must be strictly observed.

EN

7. Functional diagram

EN



A Auxiliary air valve
B Coarse filter
C Exhaust air connection
D Intake nozzle
E Waste water connection
F Membrane valve
G Exhaust air muffler
H Waste water pump
I Cyclone separator
J Separation turbine
K Turbine wheel
L Motor

Installation

8. Setup

More information can be found in the planning information for suction units.

8.1 Room for setup

- Installation in special purpose rooms, e.g. in the boiler room, must be checked first against prevailing building regulations.
- Installation in wet rooms is not permitted.
- Installation outside is not permitted.
- When installed in a cabinet or machine room, sufficient intake and exhaust air openings must be provided; they must have a clear cross-section of at least 120 cm^2.
  Where ventilation is not sufficient, a ventilation fan must be provided with a performance of at least 2 m^3/min; appropriate slots to allow the intake of cool air must also be provided.
  When cabinet installation is preferred, a special ventilation kit can be used.

8.2 Setup alternatives

- On the same level as the surgery room or in a room on a floor below.

VS 300 S

Where installation of the VS 300 S is carried out in a cellar or similar room, the unit must be set up on a platform or fixed to the wall at a height of 30 cm above the floor level.

- Setup on the floor and in combination with an amalgam separator should be carried out using a floor unit or platform.

The suction unit itself should be set up at least 20 cm above any installed Dürr amalgam separator that might be present.

- For wall mounting, we recommend the Dürr wall mounting bracket.
- In a well ventilated cabinet (e.g. Dürr PTS).
- In the Dürr housing (VS 300 S only) as an extension of the treatment unit.

Information on installation can be found in the installation instructions provided with the floor unit or the wall mounting bracket.

8.3 Bacteria filter / Noise reducer

Bacterial filter: For reasons of hygiene, we strongly recommend that a bacteria filter is provided in the exhaust air connection. Where the suction unit is installed in the surgery rooms and the exhaust air cannot be fed to the outside of the building, a bacteria filter must be fitted.
Depending on the model type and condition of the bacteria filter, it must be replaced every 1-2 years at the latest.
Noise reducer: If the noise of the exhaust air extraction at the outlet is too loud, a reducer can be installed in the exhaust air line.

8.4 Installation of the surge tank in combination with an amalgam separator

- Suction units VS 600, VS 900 S and VS 1200 S require the installation of a surge tank when used in combination with an amalgam separator.

Information on installation can be found in the installation instructions supplied with the surge tank.

Where a VS 900 is replaced by a VS 900 S or VS 1200 S, we also strongly recommend replacing the syphon with a surge tank. (For the order number, see Special accessories.)

8.5 Rinsing unit

When carrying out surgical treatments, we recommend using a rinsing unit together with the suction unit; this provides a small amount of water during the aspiration phase which then serves to thin the secretions that arise and makes it easier to transport them through the system.
The rinsing unit should be installed within the treatment unit itself or set up in the vicinity of the suction unit.

EN

8.6 Plumbing materials

The following materials may NOT be used:
Acrylonitric butadiene styrene or styrol copolymer blends (e. g. SAN+PVC).

Only the following plumbing materials may be used:
Airtight HT waste water tubes of polypropylene (PP), chlorinated polyvinyl chloride (PVC-C), unplasticised polyvinyl chloride (PVC-U) and polyethylene (PEh).

EN

8.7 Hose materials

The following materials may NOT be used:
Hose materials which are not resistant to dental disinfectants and chemicals, rubber hoses or full PVC hoses which are not sufficiently flexible.

For waste water systems and suction connections, only flexible spiral PVC hoses with integrated spiral or hoses of a comparable quality may be used.

As all plastic hoses are subject to deterioration with age, they must be checked and inspected frequently and replaced when necessary. When a suction unit is replaced, we recommend also replacing all hose connections at the same time.

8.8 Hose and pipe laying

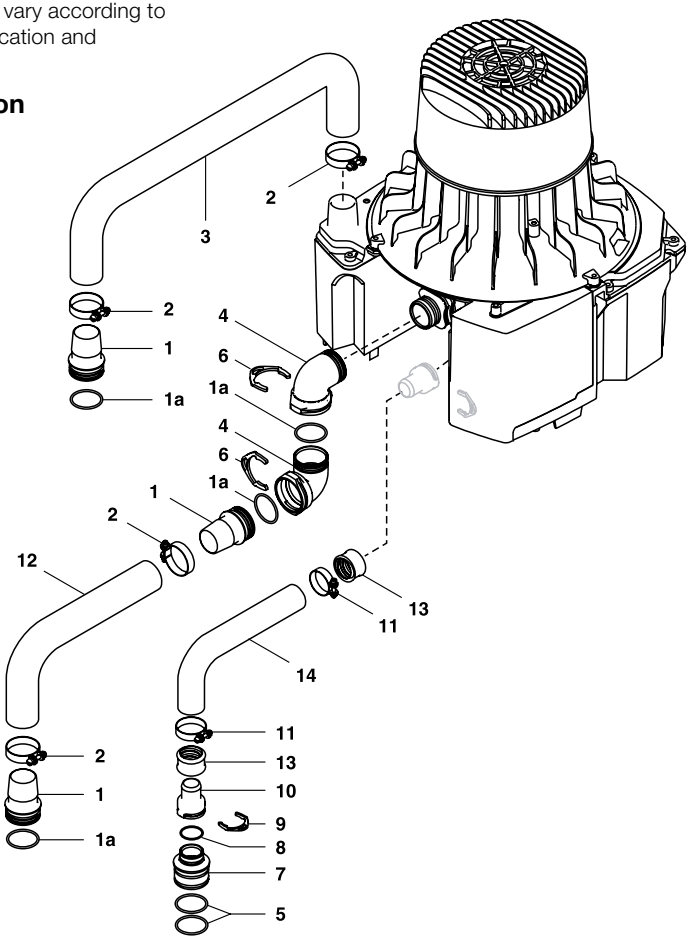
- **Waste water connections** must be executed according to local and national building regulations.

The connection between the pipe line and connection to the suction unit should be kept straight, without bends, and as short as possible using the flexible hoses provided. This will reduce the level of vibration in the plumbing system.

9. Connection possibilities

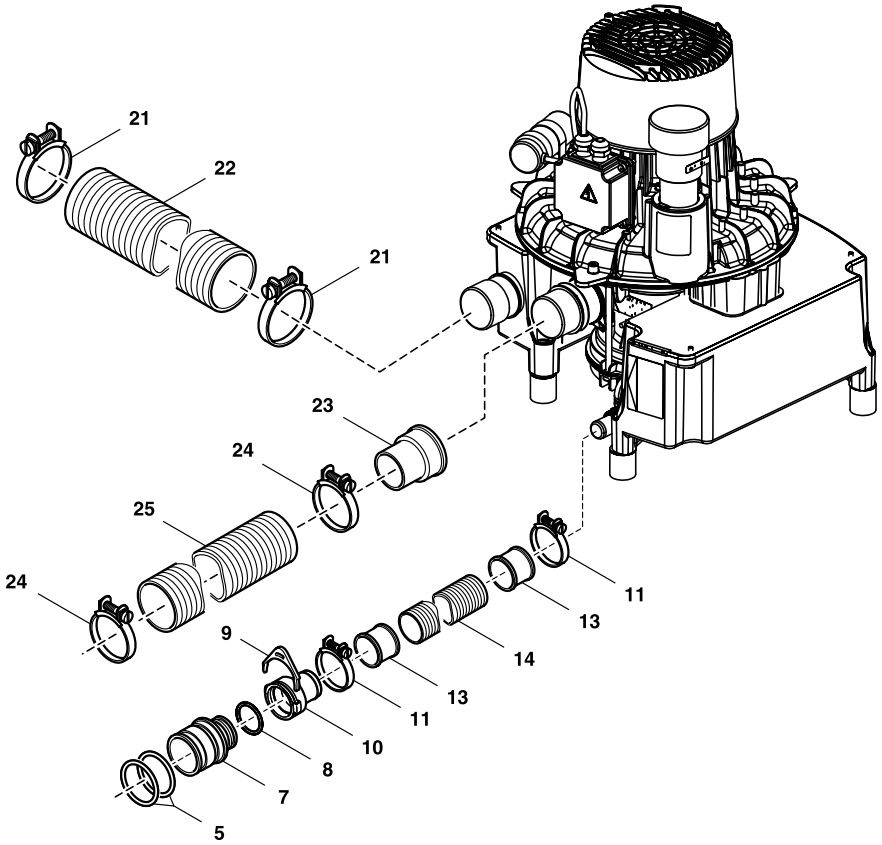
The alternative setup arrangements shown here only indicate the range of possibilities which will vary according to the particular setup location and conditions.

9.1 VS 300 S connection



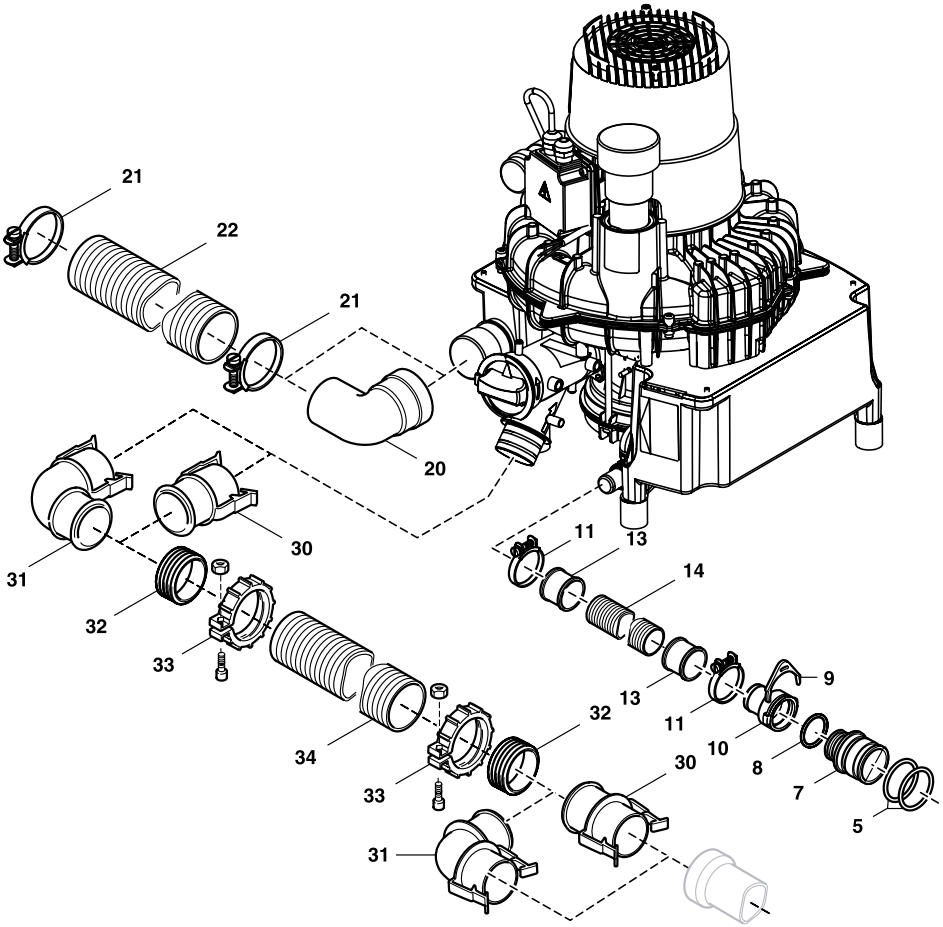
1 Connector 30/36
1a O-ring
2 Hose clamp Ø30 mm
3 Exhaust air hose (aluminium) Ø30 mm internal
4 Elbow piece DN 30
5 O-ring 30x2
6 Safety clamp
7 Connector Ø36 mm, external
8 O-ring 20x2.0
9 Safety clamp
10 Hose joint piece Ø25 mm
11 Hose clamp Ø28 mm
12 Suction hose Ø30 mm, internal
13 Hose sleeve
14 Waste water hose Ø20 mm, internal

9.2 VS 600 connection



5 O-ring 30x2
7 Connector Ø36 mm, external
8 O-ring 20x2.0
9 Safety clamp
10 Hose joint piece Ø20 mm
11 Hose clamp Ø28 mm
13 Hose sleeve
14 Waste water hose Ø20 mm, internal
21 Hose clamp Ø55 mm
22 Exhaust air hose Ø50 mm, internal
23 Hose connections DN 40/50
24 Hose clamp Ø46 mm
25 Suction hose Ø40 mm

9.3 VS 900 S / VS 1200 S connection



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5 O-ring 30x2
7 Connector Ø36 mm, external
8 O-ring 20x2.0
9 Safety clamp
10 Hose joint piece Ø20 mm
11 Hose clamp Ø28 mm
13 Hose sleeve
14 Waste water hose Ø20 mm, internal
20 Elbow piece DN 50
21 Hose clamp Ø55 mm
22 Exhaust air hose Ø50 mm, internal
30 Straight inlet connection
31 Curved inlet connection
32 Sealing sleeve
33 Locking nut
34 Suction hose Ø55 mm, internal

10. Electrical connection

The electrical connections must be carried out observing any and all technical regulations concerning the setup of low voltage systems in areas used for medical purposes.

The motor connection cable must be laid in such a way that it does not come into contact with hot surfaces.

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- Before start-up, check the mains voltage against the voltage indicated on the model identification plate.
- When connecting to the mains electricity supply, ensure that the circuit is fitted with an all-pole disconnect switch (all-pole switch) with contact opening width >3 mm.
- Suction units can only be connected to the mains power supply using a fixed cable connection.
- The suction unit is operated using the controller located in the external control box.

Circuit protection: LS switch 16 A, characteristics B, C and D according to EN 60898

10.1 Notes on connection lines

100–110 V / 230 V / 400 V power supply line (to mains, fixed supply line):

- NYM-J 3 x 1.5 mm² / 5 x 1.5 mm²

100–110 V / 230 V / 400 V power supply line (to mains, flexible supply line):

The connection of the control box and suction unit or between the appliance socket and suction unit must be made using PVC hose connection:
H05 VV-F 5G1.5 mm² / 5G1.5 mm²
or rubber connection:
H05 RN-F 3G1.5 mm² / 5G1.5 mm²,
H05 RR-F 3G1.5 mm² / 5G1.5 mm².
The connection of the VS 300 S allows reduction of the cross-section to 1 mm².

24 V control line, VS 600, VS 900 S, VS 1200 S

Protective low voltage for:
- Hose manifold
- Station selection valve
- Spittoon valve

Fixed laying: (N)YM (St)-J 4 x 1.5 mm² shielded plastic sheathed cable.

Flexible laying: Data cable LiYCY 4 x 1.0 mm² with shielded cable as used for IT purposes or a light PVC control line with shielded casing.

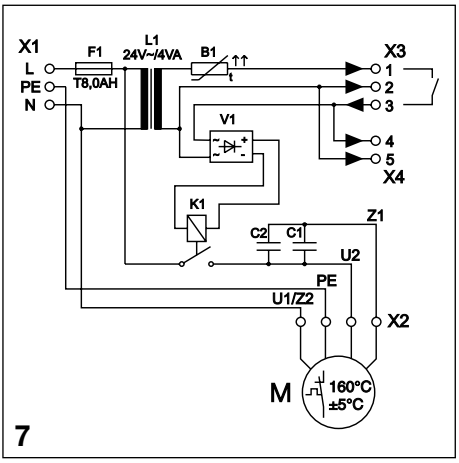
24 V control line for VS 300 S

Flexible laying: PVC data transmission cable LiYY 3 x 0.5 mm²
Order number 9000-118-83

10.2 Control box (VS 600, VS 900 S, VS 1200 S)

The suction unit can be connected to a control box which is either part of the scope of delivery or, if not, can be ordered as a special accessory. Connection plans and circuit diagrams can be found in the Control Box Installation and Operating Instructions.

The control box is factory set for connection to the suction unit; this should be kept in mind when replacing the suction unit with a unit of a different size.



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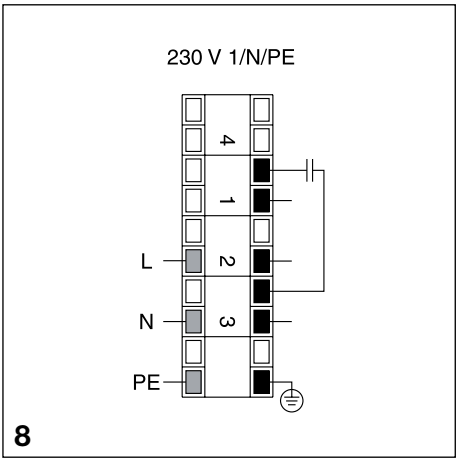
10.3 Motor terminal box connections

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

10.3.1 VS 300 S

1/N/PE AC 230 V, with control box integrated in a soundproof housing.

X1 Power supply connection
X2 Motor connection
X3 Hose manifold 24 V AC / max. 80 mA connection
X4 Control signal output 24 V AC / max. 20 mA



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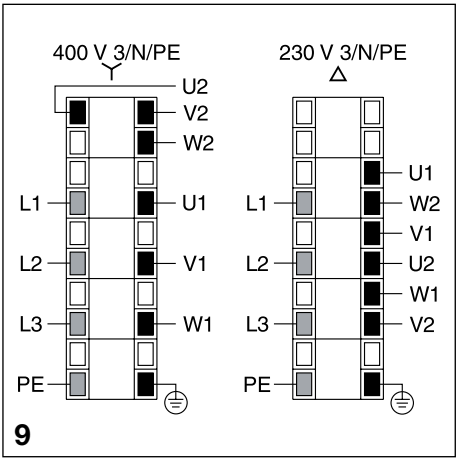
10.3.2 VS 600, 230 V 1~ VS 900 S, 230 V 1~



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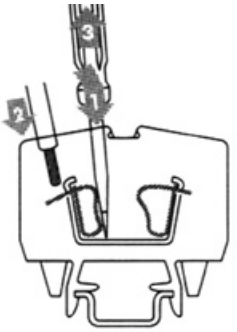
10.3.3 VS 600, 230 V/400 V 3~ VS 900 S, 230 V/400 V 3~ VS 1200 S, 230 V/400 V 3~



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Handling terminal strip in terminal box of VS 600, VS 900 S and VS 1200 S

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11. Commissioning and first start-up

The suction unit must not be operated without the coarse filter, otherwise larger particles such as bits of broken tooth or fillings could cause damage to the unit.

- Check that the coarse filters (e.g. in the spittoon) have been placed in position.
- Turn on the unit power switch or the main surgery switch.
- Carry out a function control of the suction unit and the control box.
  Check the motor rotation direction (3/N/PE AC)
  Set the motor protection switch in the control box.
- Check all connections for signs of leakage.
- Carry out an electrical safety check of the control box and the suction unit according to national and local regulations (e.g. any and all regulations concerning setup, operation and application of medical products) and record the results as appropriate, e.g. in the technical log book.

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

Use

12. Cleaning and disinfection of the suction unit

Do not use any foaming agents, e.g. household cleaning agents, instrument disinfection agents or abrasive cleaners.

Do not use agents containing chlorine or any sort of solvent such as acetone. These agents can affect the materials. This will lead to loss of any claims under the guarantee.

After every patient treatment
One glass of cold water should be aspirated through both the larger and the smaller of the suction hoses - even if only the saliva extractor was used for aspiration.

Aspiration using the larger suction hose allows a larger amount of fresh air (~300 l/min) to be drawn up and this increases considerably the cleaning efficiency.

Before the lunch break and at the end of the day
The suction unit should be carefully cleaned and disinfected by aspirating a suitable and cleaning and disinfecting agent (e.g. OROTOL Ultra or OROTOL Plus) approved by Dürr Dental.

Further information can be found in the operating instructions "Disinfection and Cleaning of Suction Units", order number 9000-605-10/.. or in our information sheet on the cleaning of contaminated suction units, order number P007-235-01.

Weekly
Where the local water contains high levels of lime, we recommend the application of Dürr MD 555 specialised cleaner for suction units once a week, preferably before the midday break.

13. Maintenance

To avoid any danger of infection, protective clothing should be worn (e.g. protective gloves, protective eyewear, face mask).

Every 4 weeks (for VS 600, VS 900 S, VS 1200 S every 3 months) the filter located at the suction connection of the suction unit should be checked and cleaned if necessary. To do this, slide the suction hose from the suction unit connection. If required, take the filter out of the suction connection piece and clean.

A service technician is required to check the condition of the waste connection valves (e.g. signs of leakage or ageing) at least once a year and to replace them if necessary.

Every two years (VS 600, VS 900 S, VS 1200 S) the auxiliary air valve must be checked and cleaned and/or replaced as necessary.

The exhaust air bacteria filter (when present) should be replaced every **12-24 months**.

The integrated separation unit within the suction unit does not hold back bacteria, which is why it is strongly recommended to install a bacteria filter in the exhaust air system.

The bacteria filter is delivered together with a memo sticker; this should be stuck into the surgery planner to remind staff when the filter change is imminent.

14. Tips for operators and service technicians

Any repairs above and beyond routine maintenance must be carried out by suitably qualified personnel or one of our service technicians.

Prior to beginning the troubleshooting, disconnect the unit from the mains.

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Problem	Probable cause	Solution
1. Suction unit does not start up.	• No mains voltage.	• Check the mains fusing, fuse in control box or on the PCB and replace if necessary. Check the supply voltage.
	• Undervoltage or overvoltage.	• Measure the supply voltage; call an electrician if necessary.
	• Motor protection switch set too low (for values, see Technical Data).	• Measure the current. Set the motor protection switch to the measured value plus safety margin.
	• Motor protection switch defective.	• Check motor protection switch; replace if defective.
	• Capacitor defective	• Measure the capacitance and replace if necessary.
	• Turbine is blocked due to solid particles or dirt (e.g. by using unsuitable cleaning and disinfectant agents); motor protection switch activated.	• Disassemble the suction unit and clean the turbine.
2. Suction unit makes unusual noises.	• Solid particles in turbine.	• Disassemble the suction unit and clean the turbine.
3. Water leaks from the exhaust air connection.	• Membrane valve blocked.	• Check the membrane valve at the waste water connection and if necessary clean or replace.
	• Foam in the turbine due to using an incorrect cleaning agent or disinfectant.	• Do not use foaming cleaning and disinfectant agents.
	• Condensed water build-up in the exhaust air line	• Check the plumbing system, avoid sudden cooling

Problem	Probable cause	Solution
4. Suction unit performance too low.	• Mechanical sluggishness of the turbine caused by dirt.	• Disassemble the suction unit and clean the turbine.
	• Coarse filter blocked.	• Clean the coarse filter at the intake nozzle.
	• Suction connection not waterproof.	• Check the suction system and connections for leaks and correct as necessary.

Disposal

15. Unit disposal

The unit could possibly be contaminated. Inform the waste management company so they can take all necessary safety steps.

Non-contaminated plastic parts of the suction unit can be disposed of in the recycling.

The control box, electronics (PCB) and components are electronic waste and must be disposed of as appropriate. Other metal parts (e.g. turbine housing) can be disposed of as metal waste.
When returning the appliance, e.g. to your dealer's depot or to Dürr Dental, be sure to close all connections.

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