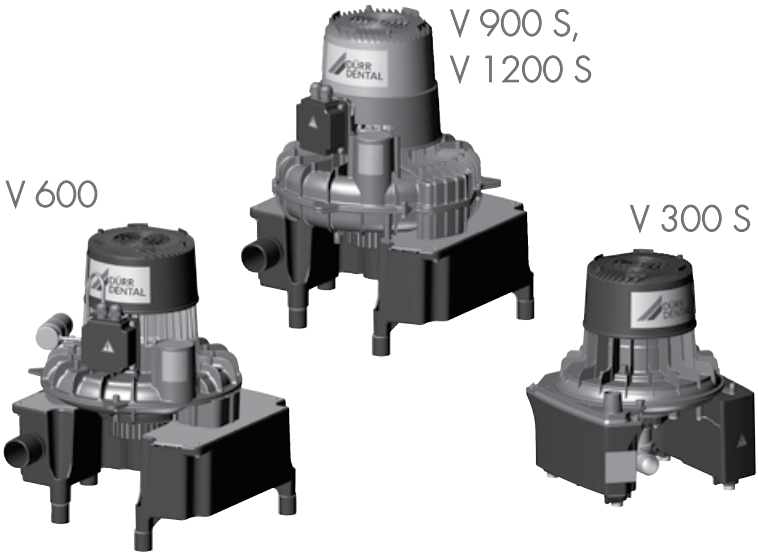
Suction units



EN

Installation and Operating Instructions

CE 0297

9000-606-89/30

DÜRR DENTAL

1711V001

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1 About this document

These installation and operating instructions form 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.

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.


Comply with the Operating Instructions.


Wear hand protection.


Wear protective goggles.


Switch off and de-energise the unit (e.g. unplug from mains).


Protective ground connection


CE labelling with the number of the notified body



Order number



Serial number


Manufacturer

1.2 Copyright information

All names of circuits, processes, names, software programs and units used 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.

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2 Safety

Dürr Dental has designed and constructed this device so that when used properly and for the intended purpose there is no danger to people or property. Nevertheless, residual risks can remain. You should therefore observe the following notes.

2.1 Intended purpose

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

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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 other usage or usage beyond this scope is deemed to be improper. The manufacturer accepts no liability for damages resulting from this. In these cases the user/operator will bear the sole risk.

- Do not use this device to aspirate flammable or explosive mixtures.
- 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 following suction units must not be set up in the patient environment (within a radius of 1.5 m): V 600, V 900 S and V 1200 S.

2.4 General safety information

- When operating this device always observe all guidelines, laws, and other rules and regulations that are applicable at the site of operation.
- Prior to each use, check condition of the device and make sure it is in perfect working order.
- Do not convert or modify the units.
- Observe the Installation and Operating Instructions.
- Make the Installation and Operating Instructions available to the person operating the device 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 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 installed within other medical supply equipment, the requirements set out in Directive 93/42 EEC and the relevant standards must be complied with.

A copy of the system manufacturer‘s declaration in accordance with Article 12 of Directive 93/42/EEC can be found in our download section at www.duerrdental.com (document no. 9000-461-264).

2.6 Qualified personnel

Operation

Persons who operate the units must ensure safe and correct handling based on their training and knowledge.

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

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 Protection from electric shock

› When working on the units observe all the relevant electrical safety regulations.

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

› Immediately replace any damaged lines and connections.

Observe the EMC rules concerning medical devices

› Observe specific precautionary measures relating to electromagnetic compatibility (EMC) for medical devices, see "15 Information about EMC in accordance with EN 60601-1-2".

2.8 Only use genuine parts

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

› Only use only genuine working parts and spare parts.

2.9 Transport

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

If required, original packaging for the unit can be ordered from Dürr Dental.

Dürr Dental does 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

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.

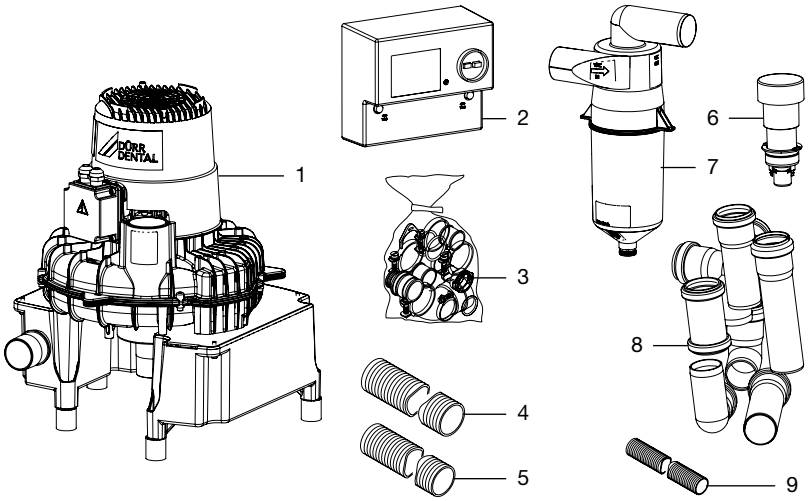
› Uncontaminated parts (e.g. electronics, plastic and metal parts etc.) should be disposed of in accordance with the local waste disposal regulations.

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

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3 Overview



1 Suction unit
2 Control box
3 Set of connection fittings
4 Suction hose
5 Exhaust air hose
6 Auxiliary air valve
7 Condensation separator
8 Connection pipes
9 Waste hose LW 20

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 300 S, 230 V, 1~, 50 Hz 7119-01/002

V 300 S, 230 V, 1~, 50/60 Hz 7119-02/002
- Set of connection fittings
- Suction hose LW 30, grey
- Exhaust air hose LW 30, aluminium
- Waste hose LW 20
- Condensation separator

V 600, 230 V, 1~, 50 Hz 7127-01/002

V 600, 400 V, 3~, 50/60 Hz 7127-02/002

V 600, 230 V, 3~, 50/60 Hz 7127-02/003
- Control box
  0700-500-50 for model 7127-01/002
  0732-100-52 for model 7127-02/002
  0732-100-53 for model 7127-02/003
- Set of connection fittings
- Suction hose LW 50
- Exhaust air hose LW 50 (aluminium)
- Condensation separator

V 900 S, 230 V, 1~, 50 Hz 7131-01/002

V 900 S, 400 V, 3~, 50 Hz 7131-02/002

V 900 S, 230 V, 3~, 50 Hz 7131-02/003
- Control box
  0732-100-50 for model 7131-01/002
  0732-100-52 for model 7131-02/002
  0732-100-58 for model 7131-02/003
- Set of connection fittings
- Suction hose LW 50
- Exhaust air hose LW 50 (aluminium)
- Condensation separator

V 1200 S, 400 V, 3~, 50 Hz 7136-02/002

V 1200 S, 230 V, 3~, 50 Hz 7136-02/003

V 1200 S, 400 V, 3~, 60 Hz 7136-03/002
- Control box
  0732-100-54 for model 7136-02/002
  0732-100-53 for model 7136-02/003
  0732-100-54 for model 7136-03/002
  0732-100-58 for model 7136-03/003
- Set of connection fittings
- Suction hose LW 50
- Exhaust air hose LW 50 (aluminium)
- Condensation separator

3.2 Special accessories

The following optional items can be used with the device:

V 300 S

Wall bracket 7130-190-00
Noise reduction hood 7122200000
Condensation separator kit for housing 7119-701-20
Bacteria filter with accessories . . . 7120-143-00
Ventilation kit for cabinet installation. 7122-981-51

V 600, V 900 S, V 1200 S

Wall bracket 7130-190-00
Console for floor-mounted installation. 7130-191-00
Noise reduction hood 7131-991-00
Bacteria filter. 0705-991-50
Noise reduction for exhaust air . . . 0730-991-00
Ventilation kit for cabinet installation. 7122-981-50

3.3 Disposable materials

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 spare parts

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

Information on spare parts can be found on the website portal for authorised specialist dealers under: www.duerrdental.net.

4 Technical data

4.1 V 300 S

Electrical data		7119-01	7119-02	
Nominal voltage	V	230, 1~	230, 1~	
Mains frequency	Hz	50	50	60
Nominal current	A	2.9	2.9	3.7
Starting current	A	8.2	8.2	9.1
Motor protection		Motor winding overheat protector 160 °C (±5 °C)		
Rated power	W	580	580	800
Type of protection			IP 24	
Protection class			I	
Protective low voltage	V		24 ~	
Output	VA		4	
Connections				
Vacuum connection DürrConnect Special	mm		∅ 30	
Exhaust air connection (external)	mm		∅ 30	
Media				
Max. unimpeded flow rate	l/min	670	670	800
Max. suction system pressure *	mbar/hPa		-200	

* Depending on unit type

General data				
Speed	rpm	2750	2750	3200
Duty cycle	%		100	
Dimensions (H x W x D) *	cm		37 x 31 x 31	
Weight, approx.				
without housing	kg		12.5	
with housing	kg		21	
Noise level ** approx.				
without housing	dB(A)	63	63	65
with housing	dB(A)	54	54	56

* Values without accessories and add-on parts

** Noise levels in acc. with EN ISO 1680 "airborne noise emissions"; measured in a sound-proofed room. The levels are average values with a tolerance of ±3 dB(A). Higher values may be obtained in rooms with reverberating sound characteristics.

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 Directive (93/42/EU)		Class IIa

4.2 V 600

Electrical data		7127-01
Nominal voltage	V	230, 1~
Mains frequency	Hz	50
Nominal current	A	5.0
Starting current	A	22
Motor protection *	A	-
Rated power	W	1100
Type of protection		IP 24
Protection class		I

EN

* Recommended setting values. As the motor protection switch is subject to tolerances, current levels should be measured during installation and the motor protection setting adjusted accordingly.

Connections		
Vacuum connection (external)	mm	∅ 50
Exhaust air connection (external)	mm	∅ 50

Media		
Max. unimpeded flow rate	l/min	1500
Max. suction system pressure *	mbar/hPa	-160

* 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	2850
Duty cycle	%	100
Dimensions (H x W x D)	cm	50 x 42 x 41
Weight, approx.	kg	25
Noise level* c.		
without housing	dB(A)	63
with housing	dB(A)	55

* Noise levels in acc. with EN ISO 1680 "airborne noise emissions"; measured in a sound-proofed room. The levels are average values with a tolerance of ±3 dB(A). Higher values may be obtained in rooms with reverberating sound characteristics.

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 Directive (93/42/EU)	Class IIa

4.3 V 600

Electrical data		7127-02			
Nominal voltage	V	400, 3~		230, 3~	
Mains frequency	Hz	50	60	50	60
Nominal current	A	1.8	2.3	3.1	4.1
Starting current	A	8		9	
Motor protection *	A	2.5	4.0	3.5	4.5
Rated power	W	1000		1420	
Type of protection		IP 24			
Protection class		I			

* Recommended setting values. As the motor protection switch is subject to tolerances, current levels should be measured during installation and the motor protection setting adjusted accordingly.

Connections					
Vacuum connection (external)	mm	∅ 50			
Exhaust air connection (external)	mm	∅ 50			

Media					
Max. unimpeded flow rate	l/min	1500	1700	1500	1700
Max. suction system pressure *	mbar/hPa	-160			

* 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	2850	3300	2850	3300
Duty cycle	%	100			
Dimensions (H x W x D)	cm	50 x 42 x 41			
Weight, approx.	kg	25			
Noise level* c.					
without housing	dB(A)	63	68	63	68
with housing	dB(A)	55	58	55	58

* Noise levels in acc. with EN ISO 1680 "airborne noise emissions"; measured in a sound-proofed room. The levels are average values with a tolerance of ±3 dB(A). Higher values may be obtained in rooms with reverberating sound characteristics.

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 Directive (93/42/EU)	Class IIa

EN

4.4 V 900 S

Electrical data		7131-01	7131-02	
Nominal voltage	V	230, 1~	230, 3~	400, 3~
Mains frequency	Hz	50	50	
Nominal current	A	7.4	6.3	3.6
Starting current	A	32	42	25
Motor protection *	A	10	6.3	4.0
Rated power	W	1680	1970	
Type of protection			IP 24	
Protection class			I	

EN

* Recommended setting values. As the motor protection switch is subject to tolerances, current levels should be measured during installation and the motor protection setting adjusted accordingly.

Connections			
Vacuum connection (external)	mm	∅ 50	
Exhaust air connection (external)	mm	∅ 50	

Media				
Max. unimpeded flow rate	l/min		2300	
Max. suction system pressure *	mbar/hPa	-170		-170

* 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	2780		2870
Duty cycle	%		100	
Dimensions (H x W x D)	cm		55 x 42 x 41	
Weight, approx.	kg		32	
Noise level* c.				
without housing	dB(A)	65		65
with housing	dB(A)	60		60

* Noise levels in acc. with EN ISO 1680 "airborne noise emissions"; measured in a sound-proofed room. The levels are average values with a tolerance of ±3 dB(A). Higher values may be obtained in rooms with reverberating sound characteristics.

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 Directive (93/42/EU)	Class IIa

4.5 V 1200 S

Electrical data		7136-02		7136-03	
Nominal voltage	V	230, 3~	400, 3~	230, 3~	400, 3~
Mains frequency	Hz	50		60	
Nominal current	A	6.5	3.8	6.8	3.9
Starting current	A	43	25	-	26
Motor protection *	A	6.3	4.0	7.0	4.0
Rated power	W	2000		2400	
Type of protection		IP 24			
Protection class		I			

* Recommended setting values. As the motor protection switch is subject to tolerances, current levels should be measured during installation and the motor protection setting adjusted accordingly.

Connections		
Vacuum connection (external)	mm	∅ 50
Exhaust air connection (external)	mm	∅ 50

Media			
Max. unimpeded flow rate	l/min	2400	2900
Max. suction system pressure *	mbar/hPa	-170	-160

* 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	2860	3180
Duty cycle	%	100	
Dimensions (H x W x D)	cm	55 x 42 x 41	
Weight, approx.	kg	32	
Noise level* c.			
without housing	dB(A)	65	68
with housing	dB(A)	60	63

* Noise levels in acc. with EN ISO 1680 "airborne noise emissions"; measured in a sound-proofed room. The levels are average values with a tolerance of ±3 dB(A). Higher values may be obtained in rooms with reverberating sound characteristics.

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

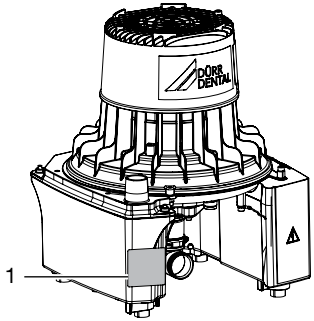
Classification	
Medical Devices Directive (93/42/EU)	Class IIa

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4.6 Type plate

V 300 S

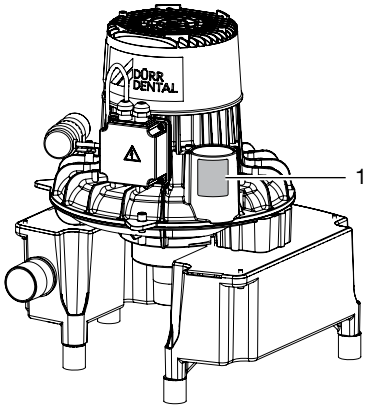
The type plate is is located on the noise reduction hood.



1 Type plate

V 600

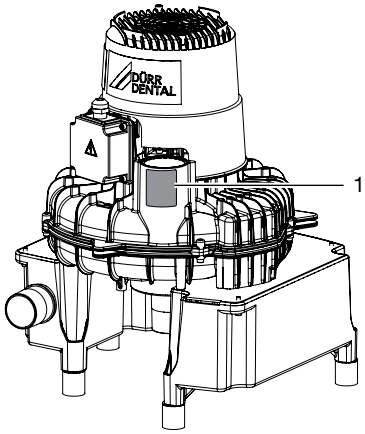
The type plate is located on the top part of the turbine housing.



1 Type plate

V 900 S, V 1200 S

The type plate is located on the top part of the turbine housing.

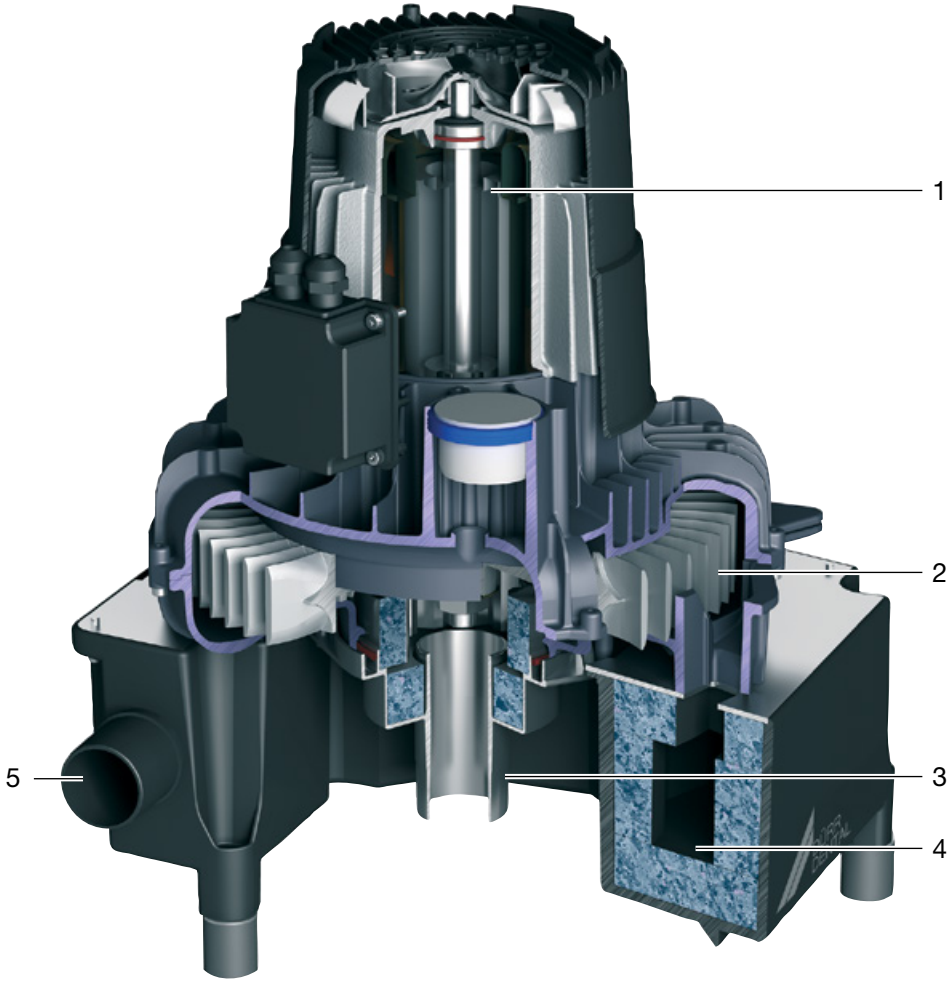


1 Type plate

4.7 Conformity assessment

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



1 Motor
2 Turbine wheel
3 Intake nozzle
4 Exhaust air muffler
5 Exhaust air connection

Functional description using example of V 900 S

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 according to the side channel compressor principle.

On the vacuum side the V-suction unit is equipped with a condensate separator that collects any condensation arising within the pipe system and transports it away to the outside. An auxiliary air valve in the condensate separator (V 600, V 900 S, V 1200 S models only) protects the suction unit from overheating, and also ensures smooth and even suction power.

When an appropriate vacuum for the machine is applied, approx. 300 l air/min. is sucked in through the suction cannula.

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.

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 number 9000-617-03/..

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)

Ambient and environmental conditions must be taken into account. Do not operate the unit in damp or wet conditions.

– 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:

– Wall installation using a Dürr Dental wall mounting
– In a ventilated cabinet
– In a Dürr Dental noise reducing housing

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
– Completely PVC hoses
– 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.

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The following table lists the minimum diameters of the connections in relation to the current consumption:

Current consumption of unit [A]	Cross-section [mm²]
> 10 and < 16	1.5
> 16 and < 25	2.5
> 25 and < 32	4
> 32 and < 40	6
> 40 and < 50	10
> 50 and < 63	16

EN

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 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.

7.2 Bacteria 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.

7.3 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.

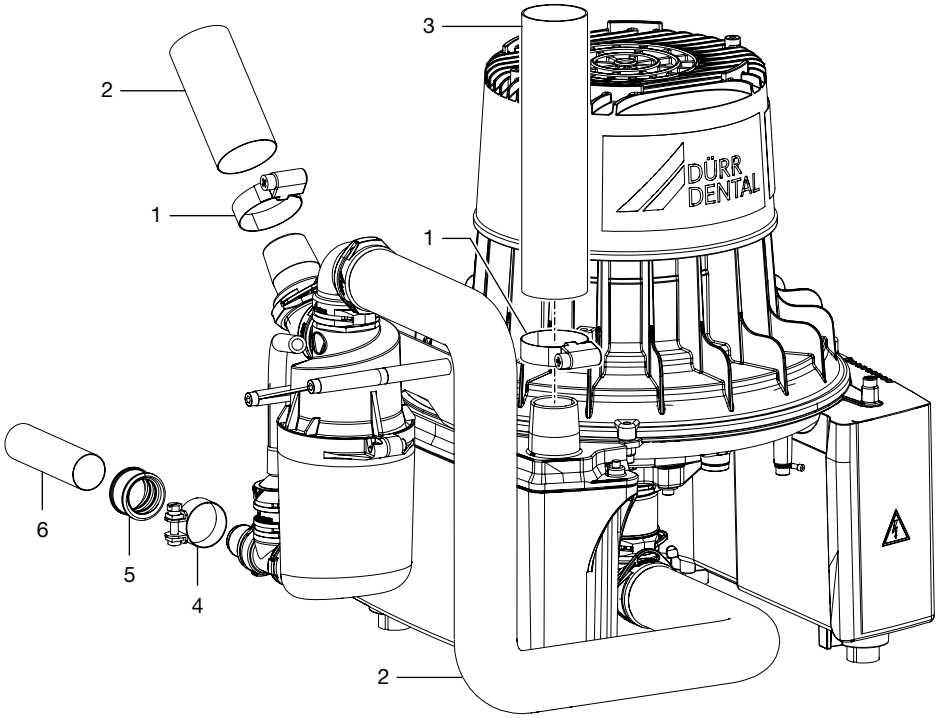
8.1 Installation and routeing of hoses and pipes

› 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.

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

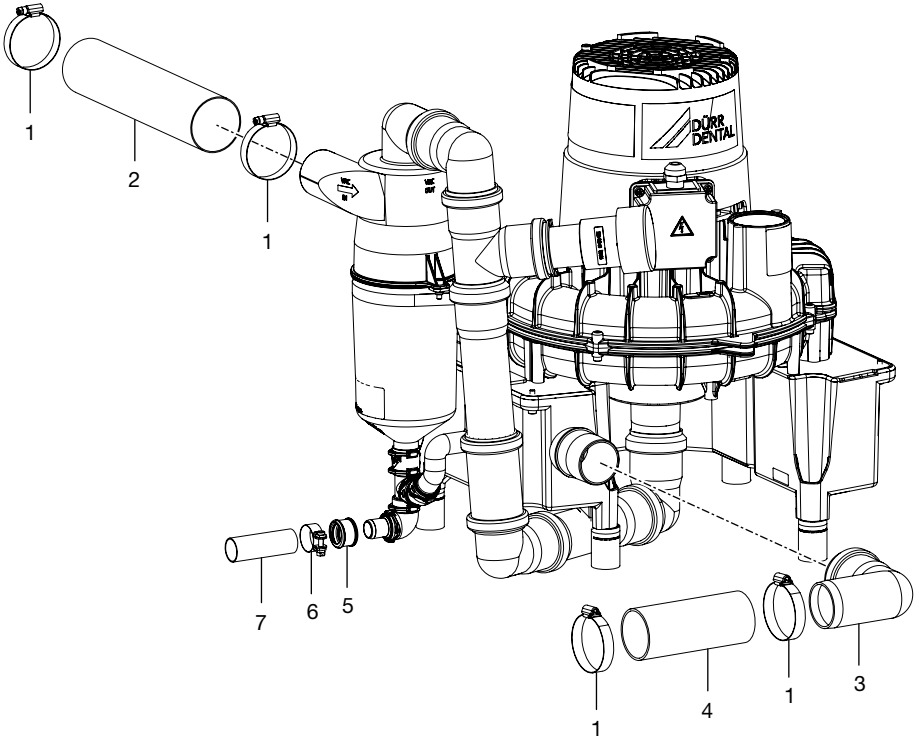
› Waste water connections must be implemented in accordance with applicable local and national regulations.

V 300 S



1 Hose clamp 25-40 mm
2 Suction hose ∅ 30 mm (internal)
3 Waste air pipe (aluminium)∅ 30 mm inside
4 Hose clip ∅ 28 mm
5 Hose sleeve
6 Waste water hose ∅ 20 mm (internal)

V 900 S, V 1200 S

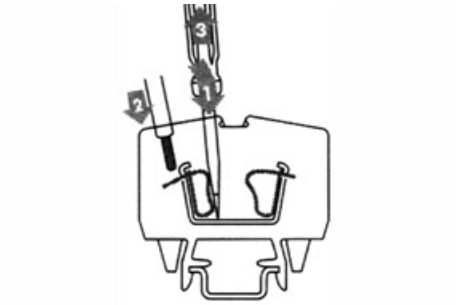


1 Hose clamp 40-60 mm
2 Suction hose ∅ 50 mm
3 Elbow DN 50 / 87
4 Waste air pipe (aluminium)∅ 50 mm inside
5 Hose sleeve
6 Hose clip ∅ 28 mm
7 Waste water hose ∅ 20 mm (internal)

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.
› The connection of the unit to the mains power supply must be done by means of a permanent connection.
› Only connect the unit to an original control box.
› Connect the power supply line from the control box to the appropriate terminals in the motor terminal box.



› Insert screwdriver into terminal strip to open spring clamp.
› Insert stranded wire into spring clamp.
› Remove screwdriver.

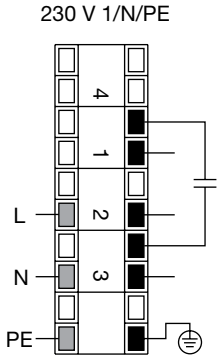


Figure 1: Terminal assignment for 1-phase units

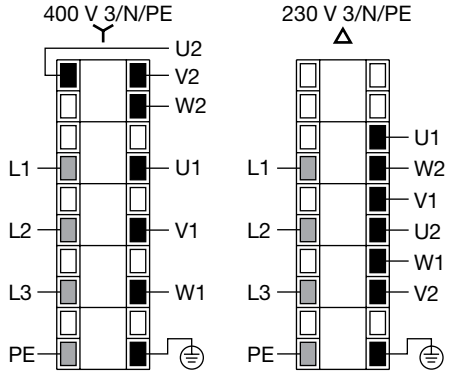
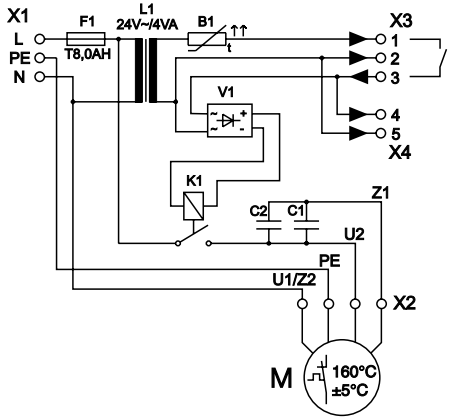


Figure 2: Terminal assignment for 3-phase units

9.1 Unit with integrated control electronics

› Connect control line to control connection.
› Connect mains cable to mains connection.



X1 Mains connection
X2 Motor connection
X3 Control connection 24 V AC / max. 80 mA
X4 Control signal output
24 V AC / max. 20 mA

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10 Commissioning and first start-up

- 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.

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

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, e.g. household cleaning agents or instrument disinfection agents.
› Do not use abrasive cleaners.
› Do not use agents containing chlorine.
› Do not use any solvents like acetone.

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:
– Material-compatible, non-foaming disinfection/cleaning agents with Dürr Dental approval, e. g. Orotol plus.
– 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 prophylaxis powders) 1x daily before the midday break

The following are required for cleaning:
– Material-compatible, non-foaming special cleaning agents that have been approved by Dürr Dental, e.g. MD 555 Cleaner
– 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

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

Prior to working on the device or in case of danger, disconnect it from the mains (e. g. pull the mains plug).

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).

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12.1 V 300 S

Maintenance interval	Maintenance work
Every 1-2 years	Replace bacteria filter (where fitted).
Every 2 years	Check waste valve on condensation separator and replace it if necessary. *

* Only by customer services service technicians.

12.2 V 600, V 900 S, V 1200 S

Maintenance interval	Maintenance work
Every 1-2 years	Replace bacteria filter (where fitted). *
Every 2 years	Check auxiliary air valve function and clean or replace it if necessary. * Check waste valve on condensation separator and replace it if necessary. *

* Only by customer services service technicians.

13 Tips for operators and service technicians

Any repairs above and beyond routine maintenance must only be carried out by suitably qualified personnel 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 device or in case of danger, disconnect it from the mains (e. g. pull the mains plug).

Fault	Probable cause	Solution
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 condensate in the exhaust air line	› Check the pipe system; avoid over-cooling. *

Fault	Probable cause	Solution
Suction performance too low	Coarse filters in system clogged (e.g. at separator devices)	› Clean coarse filters.
	Leak in the suction line	› Check and if necessary establish leak-tightness of suction system and connections. *
	Mechanical sluggishness of turbine caused by soiling	› Disassemble the unit and clean the turbine. *

* Only by customer services service technicians.

EN

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.

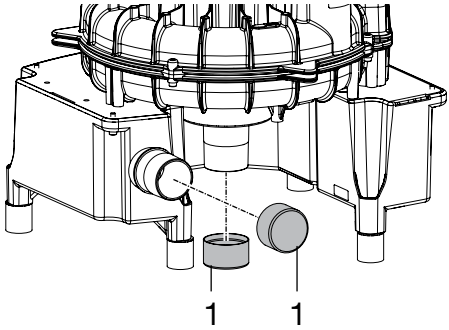


Figure 3: V 900 S, V 1200 S

1 Sealing cap

The following information only applies to the V 300 S.

15 Information about EMC in accordance with EN 60601-1-2

15.1 General information

The information in this leaflet includes excerpts from the relevant European standards for electrical, medical devices. It must be observed when installing Dürr Dental devices or combining them with products of other manufacturers. If you are uncertain about anything, please refer to the complete standard.

15.2 Abbreviations

EMC	Electromagnetic compatibility
HF	High frequency
U_T	Rated voltage of the device (supply voltage)
V_1, V_2	Compliance level for the test in acc. with IEC 61000-4-6
E_1	Compliance level for the test in acc. with IEC61000-4-3
P	Rated power of the transmitter in Watts (W) in accordance with the specifications of the transmitter manufacturer
d	Recommended safety distance in metres (m)

15.3 Guidelines and manufacturer's information

Electromagnetic emissions for all devices and systems

The device is designed for operation in an electromagnetic environment as specified below. The customer or operator of the device should ensure that the device is operated in such an environment.

Interference emission measurements	Compliance	Electromagnetic environment - guidelines
HF emissions in accordance with CISPR 11	Group 1	The suction unit uses HF energy exclusively for internal functions. For this reason, HF emissions are very low and it is unlikely that any interference will be caused to neighbouring electronic devices.
HF emissions in accordance with CISPR 11	Class B	The suction unit is suitable for use in all facilities including those in living areas and areas that are directly connected to the public mains electricity supply that also supplies buildings used for residential purposes.
Harmonics in acc. with IEC 61000-3-2	Class A	
Voltage fluctuations/flickers in acc. with IEC 61000-3-3	Compliant	

Resistance to electromagnetic interference (immunity) for all devices and systems

The device is designed for use in electromagnetic environments specified below. The customer or operator of the device should ensure that the device is operated such an environment.

Interference immunity tests	IEC 60601 - test level	Compliance level	Electromagnetic environment - guidelines
Electrostatic discharge (ESD) in acc. with IEC 61000-4-2	±6 kV contact discharge ±8 kV air discharge	±9 kV contact discharge ±9 kV air discharge	Floors should be made of wood or cement, or covered with ceramic tiles. If the floor is covered by synthetic material, then the relative humidity must be at least 30%.
Electrical fast transient/burst immunity test in accordance with IEC 61000-4-4	±2 kV for mains cables ±1 kV for input and output cables	±2.5 kV for mains cables ±2.5 kV for input and output cables	The quality of the supply voltage should correspond to a typical commercial or hospital environment.
Voltage surge in accordance with IEC 61000-4-5	±1 kV voltage outer conductor/outer conductor ±2 kV voltage outer conductor/earth	±1 kV push-pull voltage ±2 kV common mode voltage	The quality of the supply voltage should correspond to a typical commercial or hospital environment.
Voltage drops, short-term interruptions and fluctuations of the supply voltage in accordance with IEC 61000-4-11	< 5% U_T (> 95% drop in U_T) for 1/2 period 40% U_T (60% drop in U_T) for 5 periods 70% U_T (30% drop in U_T) for 25 periods < 5% U_T (> 95% drop in U_T) for 5 s	< 5% U_T (> 95% drop in U_T) for 1/2 period 40% U_T (60% drop in U_T) for 5 periods 70% U_T (30% drop in U_T) for 25 periods < 5% U_T (> 95% drop in U_T) for 5 s	The quality of the supply voltage should correspond to a typical commercial or hospital environment. If the operator of the device needs the unit to continue working even if the mains power supply is interrupted, we recommend powering the device from an uninterruptible power supply (UPS) or from a battery.
Magnetic field for a supply frequency (50/60 Hz) in accordance with IEC 61000-4-8	3 A/m	30 A/m	The magnetic fields at electrical frequency should be within the range of typical values encountered in a commercial or hospital environment.

Table 1: Resistance to electromagnetic interference (immunity) for all devices and systems

Electromagnetic interference immunity for devices or systems that are not life-sustaining

Portable and mobile communication devices should not be used any closer to the unit (including cables) than the recommended safety distance, which is calculated based on the applicable formula for the transmission frequency.

Interference immunity tests	IEC 60601 - test level	Compliance level	Recommended safety distance
Conducted HF disturbance variables in accordance with IEC 61000-4-6	3 V_{eff} 150 kHz to 80 MHz	$[V_1]$ = 10 V	$d = 0.35 \cdot \sqrt{P}$
Emitted HF disturbance variables in accordance with IEC 61000-4-3	10 V/m 80 MHz up to 2.7 GHz	$[E_1]$ = 10 V/m	$d = 0.35 \cdot \sqrt{P}$ for 80 MHz to 1000 MHz $d = 0.7 \cdot \sqrt{P}$ for 1000 MHz to 2.7 GHz

Table 2: Electromagnetic interference immunity for units or systems operated in healthcare facilities

P Rated power of the transmitter in Watts (W) in accordance with the specifications of the transmitter manufacturer

d Recommended safety distance in metres (m)



The field strength of stationary communication devices should be lower than the compliance level for all frequencies based on inspections on site[a].[b]

Interference is possible in the environment of units that have the following symbols.

Comment 1 The higher frequency range applies for 80 MHz and 800 MHz.

Comment 2 These guidelines may not apply in all cases. The propagation of electromagnetic radiation is affected by absorption and reflection on the building, objects and people.

[a] The field strength of stationary transmitters, such as the base stations of mobile phones and land mobile radios, amateur radio stations, AM and FM radio and television broadcasters, for example, cannot be accurately predicted. In order to determine the electromagnetic environment with regard to stationary transmitters, a study of electromagnetic phenomena at the site should be considered. If the measured field strength at the location where the unit is used exceeds the compliance levels stated above, the unit should be monitored to verify that it works as intended. If unusual performance characteristics are observed additional measures may be required, such as a changing the orientation of the unit or moving it to a different location.

[b] Over the frequency range of 150 kHz to 80 MHz, the field strength should be less than $[V_1]$ V/m.

Recommended safety distance between portable and mobile HF communication devices and the unit

The device is designed for use in the electromagnetic environments specified below, in which the HF disturbance variables are controlled. The customer or the operator of the device can help to prevent electromagnetic interference by maintaining the minimum distances between mobile HF communication equipment (transmitters) and the device as recommended below in accordance with the maximum output line of the communication equipment.

Keep a minimum distance of 30 cm between the device and mobile communication devices.

Rated power of the transmitter (W)	Safety distance based on the transmission frequency (m)		
	150 kHz to 80 MHz $d = 0.35 \cdot \sqrt{P}$	80 MHz to 1000 MHz $d = 0.35 \cdot \sqrt{P}$	1000 MHz to 2.7 GHz $d = 0.7 \cdot \sqrt{P}$
0.1	0.11	0.11	0.22
1	0.35	0.35	0.7
10	1.11	1.11	2.21
100	3.5	3.5	7

Table 3: Recommended safety distance between portable and mobile HF communication devices and the unit

For transmitters whose maximum rated power is not specified in the table shown above, the recommended safety distance d in metres (m) can be determined from the formula that belongs to the respective column where P is the maximum rated power of the transmitter in watts (W) in accordance with the specifications of the transmitter manufacturer.

Comment 1 The higher frequency range applies for 80 MHz and 800 MHz.

Comment 2 These guidelines may not apply in all cases. The propagation of electromagnetic waves is affected by absorption and reflection on the building, objects and people.

Hersteller/Manufacturer:
DÜRR DENTAL SE
Höpfigheimer Str. 17
74321 Bietigheim-Bissingen
Germany
Fon: +49 7142 705-0
www.duerrdental.com
info@duerrdental.com

DÜRR DENTAL