VSA 300 S

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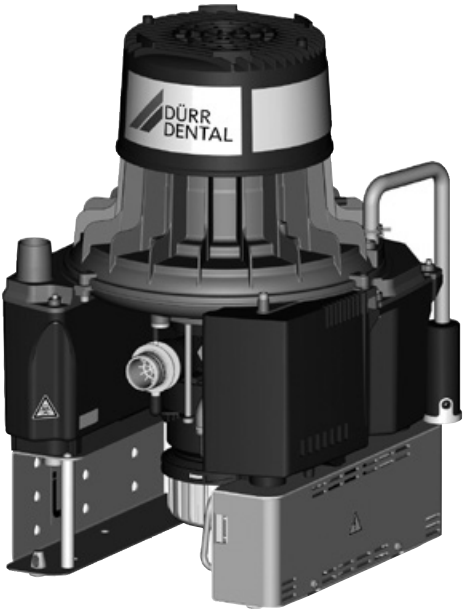

Installation and Operating Instructions

CE 0297

9000-606-31/30

DÜRR DENTAL

1707V001QC

Contents

Important information

Product description

Installation

EN

EN

Operation

Troubleshooting

Appendix

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).

CE xxxx CE labelling with the number of the notified body

REF Order number

SN 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.

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.

The suction unit fulfills the requirements of both the German Waste Water Regulations (Appendix 50, Dental Treatment) and ISO 11143.

The separation efficiency exceeds 95 % under flow conditions of max. 5 l/min.

The amalgam sludge is collected in a disposable amalgam collecting vessel.

The waste water from the device must be able to run off with a slope.

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.

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 "20 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

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):

VSA 300 S, 230 V AC, 50 Hz 7125-01/002

VSA 300 S, 230 V AC, 50 Hz with installed rinsing unit. 7125-03/002

VSA 300 S, 230 V AC, 60 Hz 7125-04/002

– Set of connection fittings
– Suction hose LW 30, grey
– Hose LW 20
– Hose LW 30, aluminium
– Disposable amalgam container
– Installation and operating instructions
– Operating Handbook
– OroCup

3.2 Accessories

The following articles are necessary for the operation of the unit, depending on the application:

Rinsing unit conversion set for
VSA 300 S 7100-120-51
Rinsing unit II 7100-250-50

3.3 Special accessories

The following optional items can be used with the device:

Noise reduction hood 7122-200-00
Ventilation kit for
cabinet installation 7122-981-51
Exhaust air filter with accessories . 7120-143-00

3.4 Disposable materials

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

Disposable amalgam container . . . 7110-033-00
Orotol plus
4 x 2.5 l bottles/carton CDS110P6150
MD 550 spittoon bowl cleaner
6 x 800 ml bottles/cardboard
box. CCS550A4750
MD 555 cleaner
4 x 2.5 L bottle / carton CCS555C6150

3.5 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

Electrical data		7125-01 7125-03	7125-04
Nominal voltage	V	230, 1~	230, 1~
Electrical frequency	Hz	50	60
Nominal current	A	2.9	3.4
Motor protection		Motor winding overheat protector 160 °C (±5 °C)	
Rated power	W	580	770
Type of protection		IP 21	
Protection class		I	
Protective low voltage	V	24 ~	
Output	VA	4	
Connections			
Vacuum connection DürrConnect Special	mm	∅ 30	
Exhaust air connection (external)	mm	∅ 30	
Waste connections DürrConnect	mm	∅ 20	
Media			
Max. number of therapists		1	
Usable volume of collector vessel, approx.	ccm	150	
Replacement interval	Months	6 - 9	
Max. unimpeded flow rate	l/min	670	770
Max. suction system pressure	mbar/hPa	-180	-190
Max. rate of flow of fluids	l/min	5	
Max. suction height	cm	50	
General data			
Speed	min^{-1}	2750	3120
Duty cycle	%	100 (S1)	
Dimensions (H x W x D) *	cm	48 x 31 x 31	
Weight, approx.			
without housing	kg	14	
with housing	kg	21.5	
Noise level ** approx.			
without housing	dB(A)	63	65
with housing	dB(A)	54	56

* Values without accessories and add-on parts

** Noise levels in acc. with EN ISO 1680 "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.

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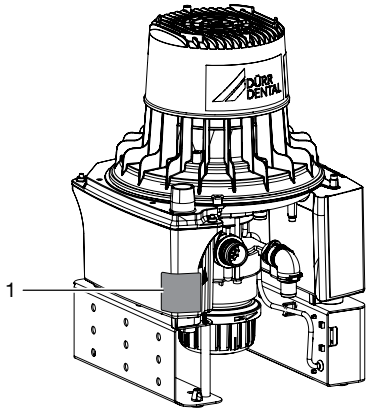
Network connection		
LAN technology		Ethernet
Default		IEEE 802.3u
Data rate	Mbit/s	100
Connector		RJ45
Type of connection		Auto MDI-X
Cable type		≥ CAT5
Ambient conditions during storage and transport		
Temperature	°C	-10 to +60
Relative humidity	%	< 95
Ambient conditions during operation		
Temperature	°C	+10 to +40
Relative humidity	%	< 70
Classification		
Medical Devices Directive (93/42/EU)		Class IIa

4.1 Type plate

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



1 Type plate

4.2 Conformity assessment

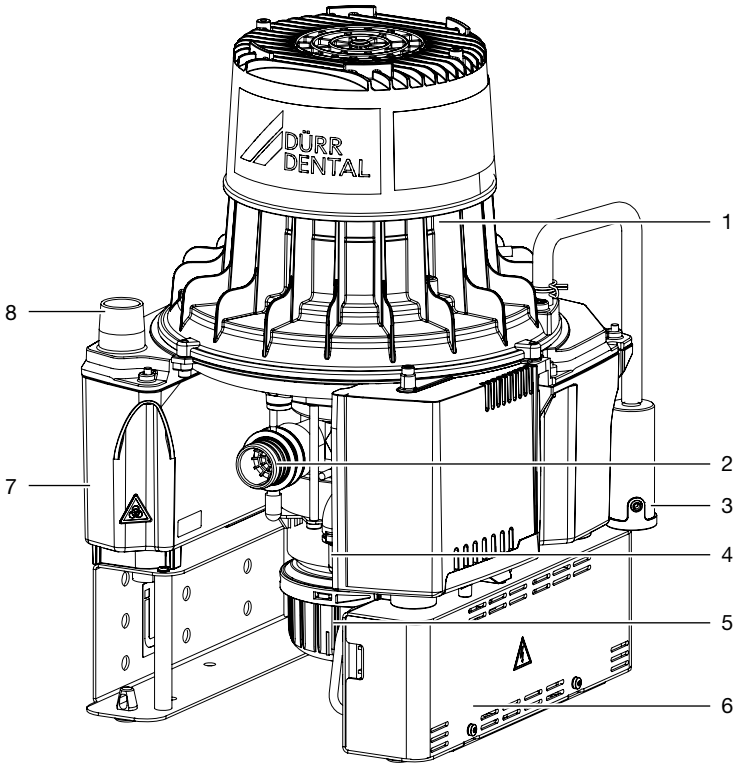
This device has been subjected to conformity acceptance testing in accordance with the current relevant European Union guidelines. This equipment conforms to all relevant requirements.

4.3 Approvals

Centre of Competence in Civil Engineering, Berlin	
Test number	Z-64.1-15

Separation method compliant with standard	
ISO 11143	Type 1

5 Operation



1 Motor
2 Inlet connection with protective coarse filter
3 Auxiliary air nozzle
4 Waste water connection
5 Amalgam collecting container
6 Control electronics
7 Exhaust air muffler
8 Exhaust air connection

The mixture of liquids, solid particles and air drawn in passes through the inlet connection and into the suction unit. The coarse filter holds back the solid particles.

Inside the separation, the aspirated fluids and solid particles pass through a two-stage separation system and are separated from the suction air. This separation system consists of a cyclone separator and a separation turbine.

The aspirated mixture flows into the cyclonic separator, where it is set into a spiral motion. In this first stage, the resulting centrifugal forces force the fluid constituents and any remaining solid particles against the outside wall of the separation chamber of the cyclone separator. This initially only effects a "coarse separation" of the fluid. In the subsequent second stage, the separation turbine effects "fine separation" of the remaining liquid from the air flow which has carried it so far.

The fluid and solids accreting in the separation chamber are continuously fed to the amalgam centrifuge, where the amalgam particles are removed. The fluid extracted via the centrifuge is fed through the waste water valve and the outlet connection into the central waste-water system.

Under the centrifuge there is an interchangeable collecting container into which the separated amalgam particles fall once the motor is switched off.

A sensor checks the fill level in the collecting container, and when it is full, an LED on the display panel indicate that the collecting container needs to be replaced. Depending on the type of work carried out and the amount of amalgam arising, the collector vessel should be changed approx. every 6-9 months. A secure twist cap makes the replacement and closing of the collector vessel easier.

A pump connected to the centrifuge keeps the fluid level constant in the collecting container. This prevents accidental overflow when replacing the collecting container.

The air separated from the liquid is sucked off by the vacuum pressure generated by the turbine wheel. The air is then blown through the noise reduction hood and over the exhaust air connection and out of the machine.

The turbine wheel, separation turbine and amalgam centrifuge are driven by the motor.

An auxiliary air nozzle is connected to the turbine housing. The auxiliary air nozzle restricts the vacuum in the system and under certain circumstances, takes in additional cooling air.

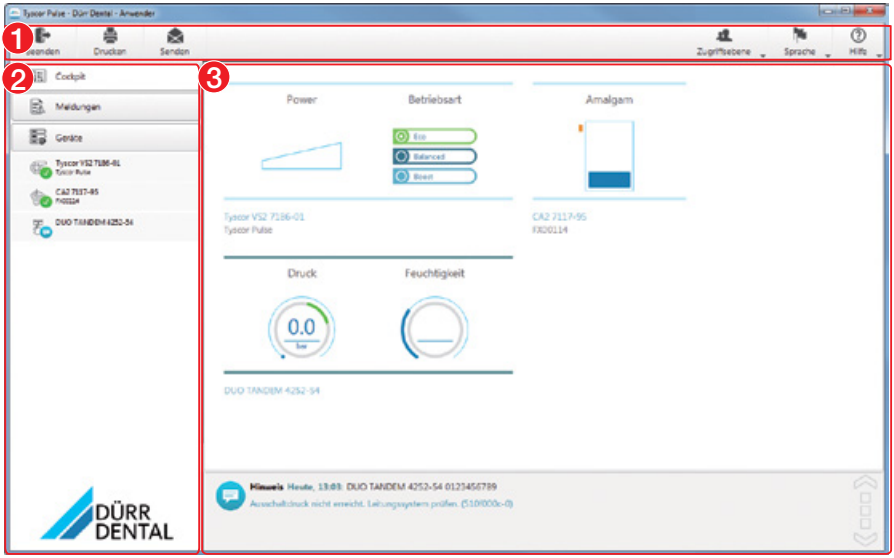
5.1 Tyscor Pulse (optional)

The software is connected via the network to the devices from Dürr Dental and displays the current status as well as messages and errors.

All messages are logged and can be printed or sent.

The *cockpit* shows the devices with the current characteristic data and provides a quick overview of the functional status of the devices.

The software interface consists of the menu bar, the side bar and the contents area.



1 Menu bar
2 Side bar
3 Contents area

The contents area depends on the tab selected on the side bar. The current messages are always displayed in the lower part of the contents area.

If there are several current messages, then the mouse wheel or the  or  buttons can be used to scroll through the messages.

The views and rights depend on the selected access level (Operator, Administrator or Service Technician).

While the software is running (even if the software window is closed), the access level is visible in the task bar (or Mac OS menu bar). The symbol shows the current status of the devices (see "14 Monitoring the device with Tyscor Pulse"). If a new message appears, a speech bubble tip also appears.

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6 Requirements

The unit can be installed on the same level as the surgery room or in 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

When installed in a basement or a similar room, the unit must be placed on a base or be fixed to the wall at a minimum height of 30 cm above the floor.

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 Installation and routeing of hoses and pipes

› Execute the on-site pipe installation in accordance with the applicable local regulations and standards.
› Lay the hose installation of the drains to or from the unit at a sufficient incline.

If incorrectly laid, the hoses can become blocked with sedimentation.

EN

6.6 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.

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Electrical fusing

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

6.7 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 [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

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)

Display panel

Installation type	Line layout (minimum requirements)
Fixed installation	– CAT5.e network cable
Flexible	– ISDN standard cable with connectors or – Network patch cable

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 Rinsing unit

In the absence of a spittoon or rinsing unit in the treatment unit, it is absolutely essential that a rinsing unit be installed in the VSA 300 S. In addition, for surgical procedures and for procedures using airflow a rinsing unit must always be installed in the treatment unit to supply a small amount of water to the system during aspiration. Any secretions present will thus be diluted and can be transported away more easily.

For further information, refer to the rinsing unit installation and operating instructions

7.2 Flow accelerator

In order to keep the suction system free of deposits, a flow accelerator can be fitted in conjunction with a spittoon valve. When using a bowl rinse system, water will collect before the flow accelerator. The next time suction takes place using the large cannula, the collected fluid is transported in surges and at high speed to the suction system. This ensures automatic cleaning of the suction pipes.

7.3 Exhaust air filter

For reasons of hygiene, we recommend the installation of an exhaust air filter in the exhaust air line.

If the unit is installed in the surgery and the exhaust air cannot be directed to the outside, it is essential to install an exhaust air filter.

Depending on the design and condition of the exhaust air filter, it will need to be replaced after 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

› 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.

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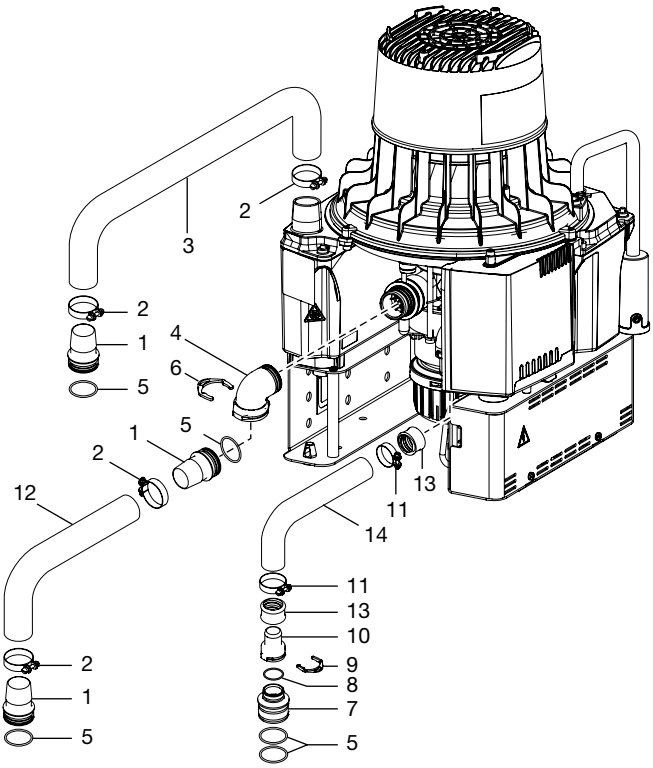


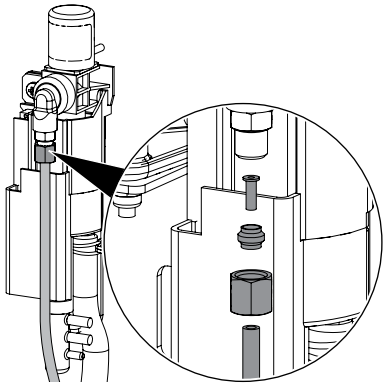
1 Hose connector ∅ 30 mm
2 Hose clamp 25-40 mm
3 Waste air pipe (aluminium)∅ 30 mm inside
4 Angled connector piece DN 30
5 O-ring ∅ 30x2 mm
6 Ring clamp
7 Connector ∅ 36 mm (external)
8 O-ring ∅ 20x2 mm
9 Ring clamp
10 Hose sleeve ∅ 20 mm

11 Hose clip ∅ 28 mm
12 Suction hose ∅ 30 mm (internal)
13 Hose sleeve
14 Waste water hose ∅ 20 mm (internal)

8.2 Rinsing unit water connections

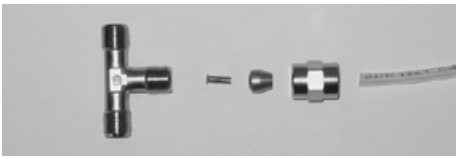
Check the water pressure for the rinsing unit. The water pressure should be between 2 and 4 bar.

› Screw the Tecalan hose with sleeve piece, double-tapered ring and locking nut onto the rinsing unit.



› Apply the T-piece for Tecalan water hose with ∅ 4 mm or ∅ 6 mm in the water supply.

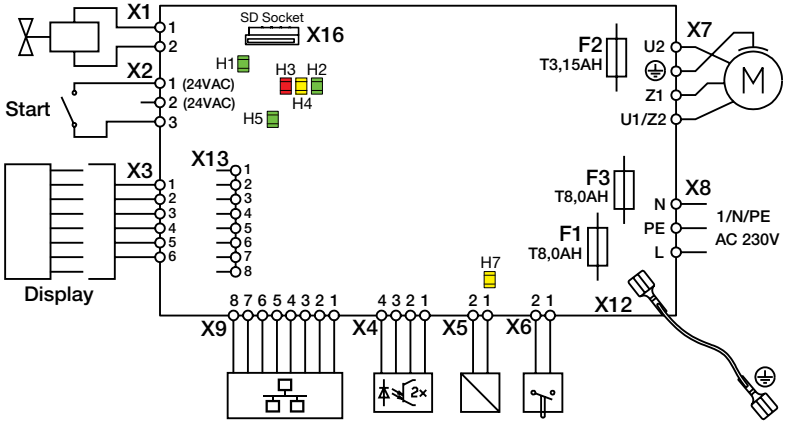
› Apply the Tecalan hose with sleeve piece, double-tapered ring and locking nut to the T-piece.



› Alternatively, apply the Tecalan hose with adapter piece, seal, R3/4" screw connection, sleeve piece, double-tapered ring and locking nut onto a water tap.

8.3 Electrical connections

› Connect the control line.
› Connection the display panel.
› Connect the network cable (optional when using Tyscor Pulse).
› Establish the electrical connection to the supply network (230 V).



X1 Voltage supply for the rinsing unit
X2 24V output voltage and switching contact to suction unit in the treatment unit
X3 Display panel
X4 Sediment sensor light barriers
X5 Sediment sensor lifting magnet
X6 Collecting container safety switch
X7 Motor connection
X8 Mains connection
X9 Network connection (when using Tyscor Pulse)
X12 Ground contact to the unit housing
X13 Display panel
X16 SD card holder (for Micro SD
F1 Main fuse
F2 Brake fuse
F3 Main fuse
H1 Rinsing unit
H2 Display green (as with display panel)
H3 Display red (as with display panel)
H4 Display yellow (as with display panel)
H5 Switching contact control signal suction unit in the treatment unit
H7 Sediment sensor lifting magnet

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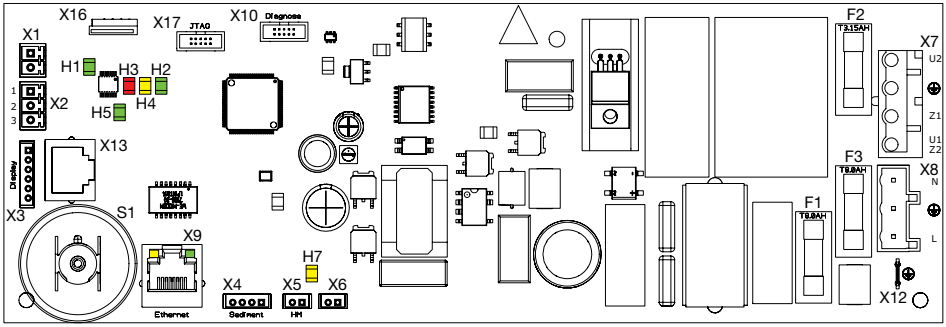
8.4 Connections and displays of the control



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X1 Voltage supply for the rinsing unit
X2 24V output voltage and switching contact to suction unit in the treatment unit
X3 Display panel
X4 Sediment sensor light barriers
X5 Sediment sensor lifting magnet
X6 Collecting container safety switch
X7 Motor connection
X8 Mains connection
X9 Network connection (when using Tyscor Pulse)
X10 Diagnosis
X12 Ground contact to the unit housing
X13 Display panel
X16 SD card holder (for Micro SD
X17 JTAG programming interface
S1 Pressure sensor for motor monitoring
F1 Main fuse
F2 Brake fuse
F3 Main fuse
H1 Rinsing unit
H2 Display green (as with display panel)
H3 Display red (as with display panel)
H4 Display yellow (as with display panel)
H5 Switching contact control signal suction unit in the treatment unit
H7 Sediment sensor lifting magnet

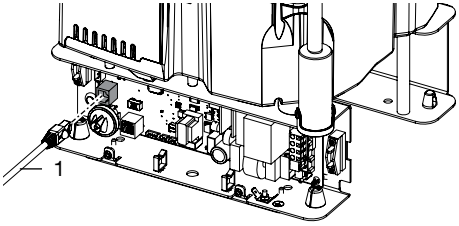
8.5 Display panel connection

There must be a direct line connecting the network socket on the unit and the network socket on the display panel. Do not toggle network units (e. g. switch or router).

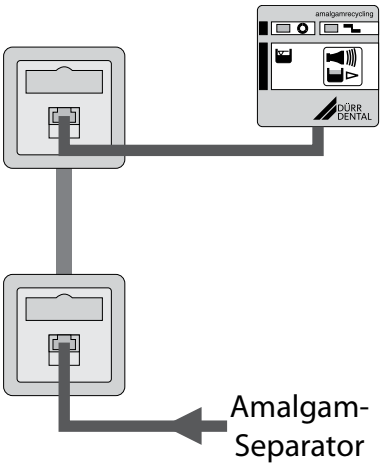
Observe the resistance of the network cable between the network sockets. The maximum length should not exceed 50 m.

› Connect the network cable in the network socket to the VSA 300 S in the network bushing (X13).

› Connect the display panel and network socket using the ISDN cable supplied.



1 Network cable



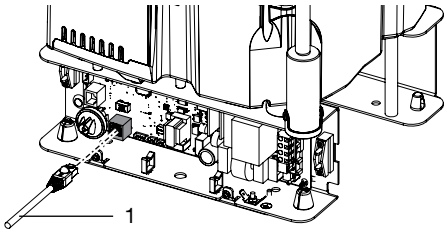
8.6 Network connection

Purpose of the network connection

The network connection is used to exchange information or control signals between the unit and a software installed on a computer, in order to, e. g.:

– Display parameters
– Select operating modes
– Indicate messages and error situations
– Change unit settings
– Activate test functions
– Transmit data for archiving
– Provide documents concerning the units

› Plug the network cable for the Tyscor Pulse into the network connection (optional when using Tyscor Pulse).



1 Network cable

EN

9 Commissioning and first start-up

NOTICE
Interference caused by larger particles such as pieces of tooth or fillings
› Do not operate the unit without a coarse filter

EN

› Check that the coarse filters are installed in the suction system (e.g. in the spittoon).
› Turn on the unit power switch or the main surgery switch.
› Carry out a function check of the device.
› 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.

9.1 Monitoring the device with Tyscor Pulse

Combining devices safely

› Safety and essential performance features are independent of the network. The device is designed for operation independent of a network. However, some of the functions are not available in this case.
› Incorrect manual configuration can lead to significant network problems. The expert knowledge of a network administrator is required for configuration.
› The data connection utilizes part of the bandwidth of the network. Interactions with other medical devices cannot be completely excluded. Apply the IEC 80001-1 standard for risk assessment.
› The device is not suitable for direct connection to the public internet.
› When connecting the unit to other devices,-such as a PC system,comply with the requirements set out in section 16 of IEC 60601-1 (EN 60601-1).
› When setting up the PC system in the vicinity of the patients:
Only connect components (e.g. computer, monitor, printer) that comply with the standard IEC 60601-1 (EN 60601-1).
› When setting up the PC system outside of the vicinity of the patients:
Connect components (e.g. computer, monitor, printer) that comply at least with the standard IEC 60950-1 (EN 60950-1) at least.

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).

Network configuration

Various options are available for network configuration:
– Automatic configuration via DHCP (recommended).
– Automatic configuration via Auto-IP for direct connection of unit and computer.
– Manual configuration.
› Configure the network settings of the unit using the software or, if available, the touch screen.
› Check the firewall and release the ports, if applicable.

Further information on Tyscor Pulse can be found in the software help and in the Tyscor Pulse manual, order number 0949100001.

Network protocols and ports

Port	Purpose	Service
45123 UDP, 45124 UDP	Unit recognition and configuration	
1900 UDP	Service indicator	SSDP / UPnP
502 TCP	Unit data	
514[1)] UDP	Event protocol data	Syslog
22 TCP, 23 TCP	Diagnosis	Telnet, SSH
123 UDP	Time	NTP

1) The port can vary depending on the configuration.

The following requirements must be met in order to monitor the unit with the software on the computer:

– Unit connected to the network
– Software Tyscor Pulse (version 3.2 or higher) installed on computer

Add device

Requirements:

– Unit switched on and connected to the network
– Administrator or service technician access level selected in the software

› Working in the menu bar, click on *Device Manager*.

The list of units appears. A symbol displays the connection status to the software:

The device is present in the network and connected to the software.

The device is present in the network but not connected to the software.

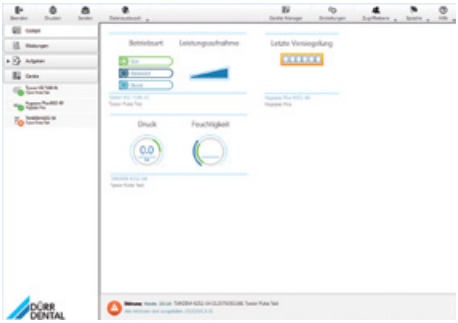
The network connection between the software and the device is interrupted, e.g. the device is switched off.

The new unit that is not yet connected, is displayed with the connection status .

› Select the unit and click on .

The unit appears in the side bar.

Adding the device in the cockpit



All devices that are connected to the software can be added to the cockpit. When the unit is first connected to the software, the unit is automatically added to the cockpit.

Requirements:

– Administrator or Service Technician access level selected.

› Click on the device in the device list with the left mouse button and keep the mouse button pressed.
› With the mouse key pressed, drag the unit onto the cockpit.
› Release the mouse key.

The block with the current characteristic data and the name of the device appear in the cockpit.

› To change the position of the device block, click on the block and, with the mouse key pressed, drag it to the required location.

EN

EN

Manually starting the device

Manually starting the device for testing.
Requirements:

– Service technician access level selected.

› Select the device in the device list.

› Click on the Start button with the left mouse key; on some devices you will need to keep it pressed.

10 Adjustment options

10.1 Setting the afterrun delay time

The delay time can be set via Tyscor Pulse.
Requirements:

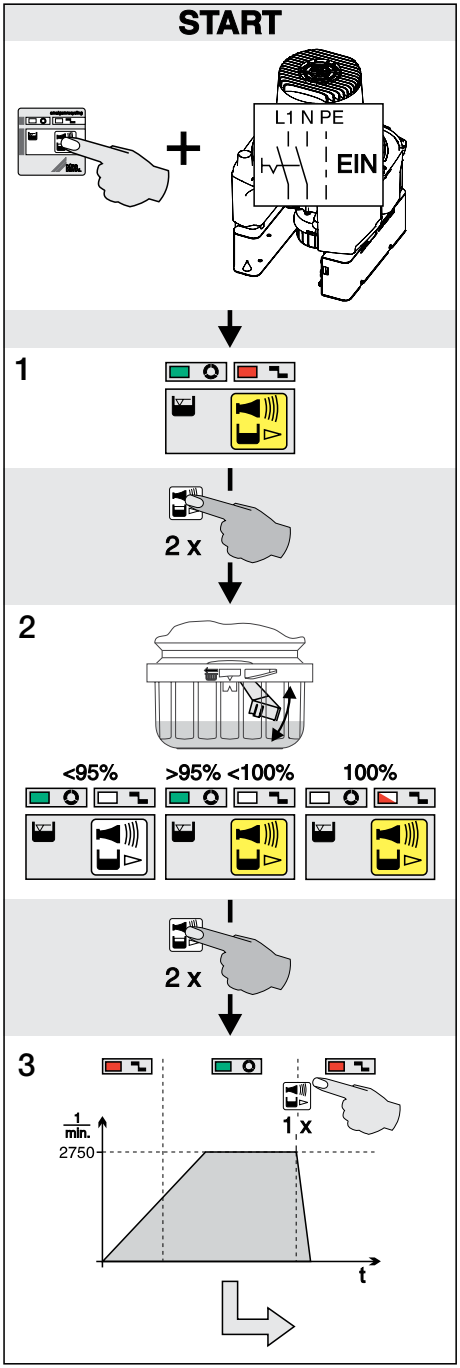
– Administrator or Service Technician access level selected.

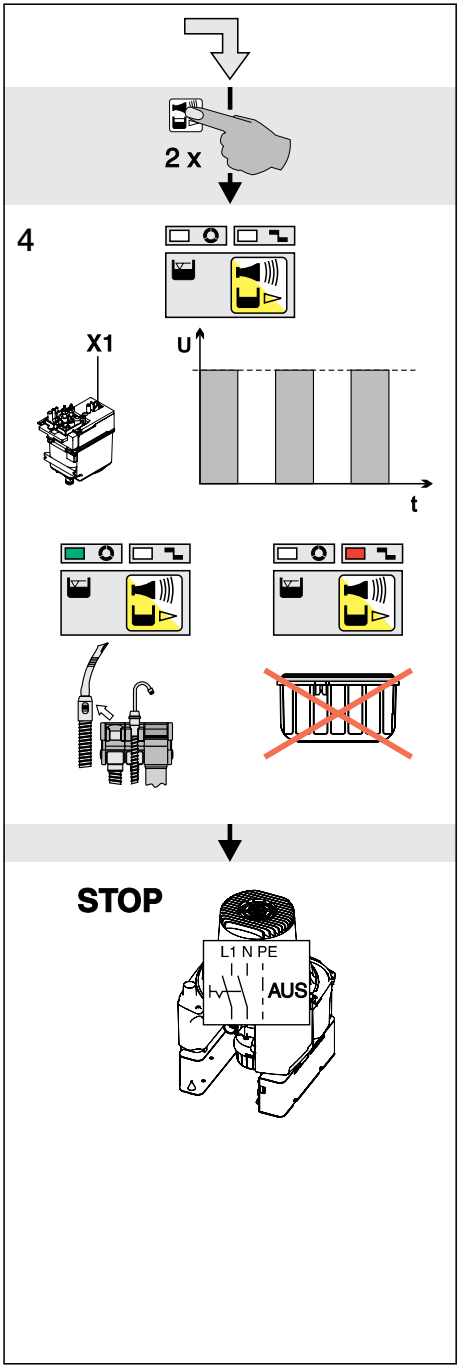
› Select the device in the list of devices.

The block with the current button parameters and the name of the device appear in the Contents area.

› Use the "+" and "-" buttons to adjust the time in increments of 1 s.

11 Service program





12 Description of the service program

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

The various unit functions can be checked with the aid of the service program.

The individual program steps are:

– Display test
– Sediment level measurement
– Motor start and motor braking with rpm check
– Input and output signals

Function of the service key:

– By pressing the service key twice the next individual program step is called up.
– By pressing the service key once that program step is repeated.

A press of the service key is confirmed by an audible signal.

12.1 Service program ON/OFF

On

– Press the service key and switch on the voltage supply to the unit.
– As soon as a signal melody can be heard, release the service key.
  The green, yellow and orange LEDs on the display panel light up (display test) and the service program is activated.

Off

Switch off the main supply to the unit.

12.2 Display test

The display test is activated as soon as the service program is started.
The LEDs on the display panel are checked. All three LEDs must come on. There is also an audible signal, which can be switched off by pressing the service button.

12.3 Sediment level measurement

While the service program is activated, the safety check for the collector vessel is deactivated.

The sediment level measurement can be used to check the function of the sediment sensor and the function of the LEDs.

Every time the service key is pressed, the sediment level is checked. If a test container is used, the different 95% and 100% filling level on the display panel can be revealed.

12.4 Motor start - motor braking

The drive motor starts up and is automatically braked after the delay time. If the service key is pressed before the end of the delay time, the motor will immediately be braked.

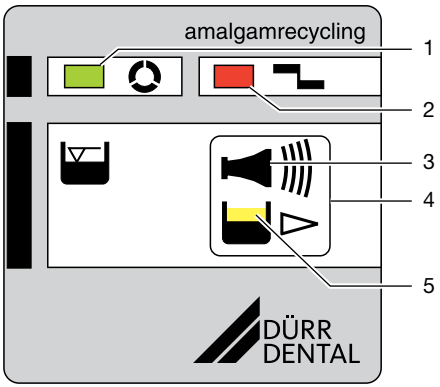
This procedure can be repeated by pressing the service key 1x again.

As a result of the rpm monitoring, the LED will go from orange to green on start-up and from green to orange during braking.

12.5 Input and output signals

– After activating the program point, the yellow LED on the display panel flashes.
– A cycled DC voltage (c. 22-30 V) can be measured on the rinsing unit connection (X1).
– Opening the collecting container causes the orange display to illuminate on the display panel.
– If a start signal is applied to socket X2 (lift out the suction hose on the hose manifold) the green LED illuminates on the display panel.

13 Display/handling



1 GREEN LED
2 RED display
3 Audible signal/melody
4 Reset/service key
6 YELLOW LED

13.1 Ready for operation

GREEN LED illuminates

13.2 Amalgam collector vessel is 95% full

Yellow LED is on

GREEN LED illuminates

Audible signal melody sounds

– At a fill level of 95%, the signal melody can be switched off by pressing the reset button. The device is then ready for operation again.
– The yellow LED comes on as a reminder that the amalgam collector vessel is due to be changed. The level display is repeated every time the unit is switched on at the main power switch.

We recommend changing the amalgam collector vessel when it reaches 95% full.

13.3 Amalgam collector vessel is 100% full

Yellow LED is on

Red display flashes

Audible signal melody sounds

– At a fill level of 100% the signal melody can no longer be switched off by pressing the reset button.
– The collector vessel needs to be replaced.

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

– The separator will not be ready for operation again until the amalgam collector vessel has been replaced

13.4 Amalgam collector vessel not in position

Red display flashes

Audible signal

– Press the reset button briefly to switch off the audible signal.
– Switch off the device.
– Insert the collector vessel.
– Switch on the unit.
– Green LED lights up – "Ready for operation“

If this error message occurs when the collector vessel is correctly inserted, this indicates that there is a technical defect – inform your Service Technician.

EN

13.5 Motor fault

Red display and

green LED flash alternately

Audible signal

Occurs during the start-up of the amalgam separator.

– Press the reset button briefly to switch off the audible signal.
– If the reset button is pressed for longer than 2 seconds the unit can be restarted.

If this problem happens again on the same day, the amalgam separator will no longer be operational - notify the service technician.

13.6 Brake monitoring

Red display and

green LED flash alternately

Occurs upon braking action of amalgam separator.

– The amalgam separator is still operational.

If this problem occurs on several consecutive days, the braking must be checked by a service technician.

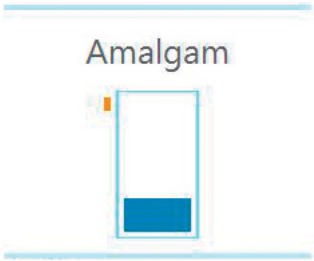
14 Monitoring the device with Tyscor Pulse

As the monitoring system of the device, the software must deliver acoustic signals. Audio output on the computer must be activated.

Further information on Tyscor Pulse can be found in the software help and in the Tyscor Pulse manual, order number 0949100001.

14.1 Monitoring operation

The device must have been added to the cockpit for the graphical device block to be shown in the cockpit.



The following is shown in the appliance block of the amalgam separator:
– Fill levels in the collector vessel

14.2 Querying messages

Trouble-free operation

Fault
Operation of the device interrupted

Warning
Operation of the device restricted

Note
Important information about the device

Information

Establishing a connection to the device

Connection to the device interrupted

If a message occurs for an device, the symbol next to the device in the side bar changes. The message appears in the cockpit and in the device details.

If several messages occur, the symbol of the highest message level in each case is displayed.

As soon as a message concerning a device occurs, the symbol in the task bar (or Mac OS menu bar) also changes to the relevant message symbol. If required by the message an acoustic signal also sounds.

› To query the message details, switch to the cockpit or to the device.

14.3 Creating a report

You can print out a current report or sent it via e-mail.

The report contains all messages and a screenshot of the view that is displayed when the report is created.

15 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.

15.1 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.

15.2 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.

EN

15.3 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.

16 Replace the amalgam collector vessel

WARNING
Risk of contamination if the amalgam collector vessel is reused since the collector vessel is not water-tight.
› Do not use the collector vessel more than once (disposable item).

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

We strongly recommend that the amalgam collector vessel should only be changed in the morning before the start of work. This will prevent fluid from dripping out of the drum while it is being changed.

› Disconnect all power from the device.
› Remove the full amalgam collecting container and from the device.
› Pour disinfectant for suction units (e.g. Orotol plus, 30 ml) into the full amalgam collector vessel.
› Close and secure the full amalgam collector vessel using the cap. Observe the markings on the cap and on the collector vessel.
› Place the securely closed amalgam collector vessel into its original packaging and seal.
› Insert a new amalgam collector vessel in the unit and clamp it in position. Only use original amalgam collector vessels.
› Switch on the power supply. The device is ready for operation again.

16.1 Disposal of amalgam collecting container

The contents of the amalgam collecting container are contaminated with heavy metals and must not be disposed of as household waste or the environment.

– Collection and waste disposal by a waste management company specialised in surgery waste.
– Collection and waste disposal by an approved waste management company.

17 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).

EN

Maintenance interval	Maintenance work
Dependent upon the level of usage of the device	› Replace the amalgam collecting container when a fill level of 95% or 100% is indicated on the display panel **Notes concerning prophy powders:** The amalgam separator is not functionally affected by conventional prophy powders. Under certain circumstances however, increased soiling of lines and hoses and a more frequent changing of the amalgam collecting container can be expected.
Annually	› Cleaning of the suction unit in accordance with the operating instructions. › Check the inlet and outlet hoses for signs of deposits/blockage or cracks and replace where necessary. › Check the outflow valve and replace if necessary. › Replace the exhaust air filter (depending on the installation conditions).

17.1 Tests

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).

EN

In some countries the owner is required to keep an operating handbook. This operating handbook must document all maintenance work, service work, checks and amalgam disposal.

Annual inspection
This inspection should only be carried out by suitably trained staff.

Work steps to be performed:
› General functional check (e.g. aspiration, spittoon inlet)
› Service program

Tyscor Pulse (optional)
This test should be performed as an additional test if the device is monitored with Tyscor Pulse.
Requirements for the test:
– Device connected to the network.
– Tyscor Pulse has been started.

Work steps to be performed:
› Check whether any messages are displayed on the PC monitor.
› Check the acoustic signal.

Inspection of the general operating condition every 5 years
This inspection must be carried out every 5 years (in accordance with the German Waste Water Regulations, Annex 50, Dental Treatment) by an inspector in accordance with national regulations.
For inspection, the following are required:
– Test vessel
– Measuring beaker

Work steps to be performed:
› Remove the collector vessel. The orange LED on the display panel should flash and an audible signal should be issued.
› Insert the test collector vessel.
› Press the service key on the display panel.
› Suck up c. 1 L water.
› Once the device has switched off, remove the test vessel and measure the remaining amount of water.

The unit is working correctly if:
– there is at minimum content of 70 ml in the test vessel.

If there is less fluid, clean the centrifuge drum or check the operation of the unit.

18 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. *
	Control electronics defective	› Replace the electronics. *
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	Membrane valve blocked	› Check the membrane valve at the waste water connection and if necessary clean or replace. *
	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. *
Suction performance too low	Coarse filter blocked	› Clean the coarse filter at the intake connection.
	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 to be performed by a qualified specialist or customer service.

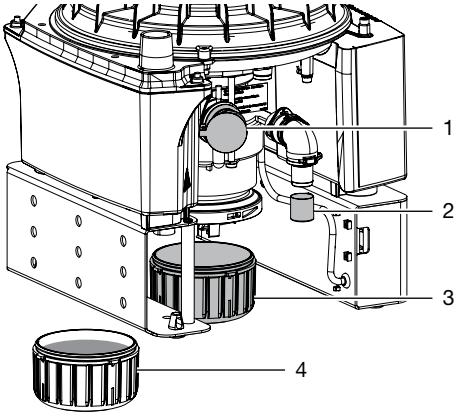
19 Transporting the unit

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).

EN

› 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 Suction connection sealing caps
2 Water outflow sealing cap
3 Amalgam collecting container EMPTY
4 Amalgam collecting container

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

20.1 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.

20.2 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)

20.3 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 transmissions 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	±6 kV contact discharge ±8 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 kV for mains cables ±1 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 mains 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 800 MHz $d = 0.7 \cdot \sqrt{P}$ for 800 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.

EN

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.

EN

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 800 MHz $d = 0.35 \cdot \sqrt{P}$	800 MHz to 2.5 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.

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