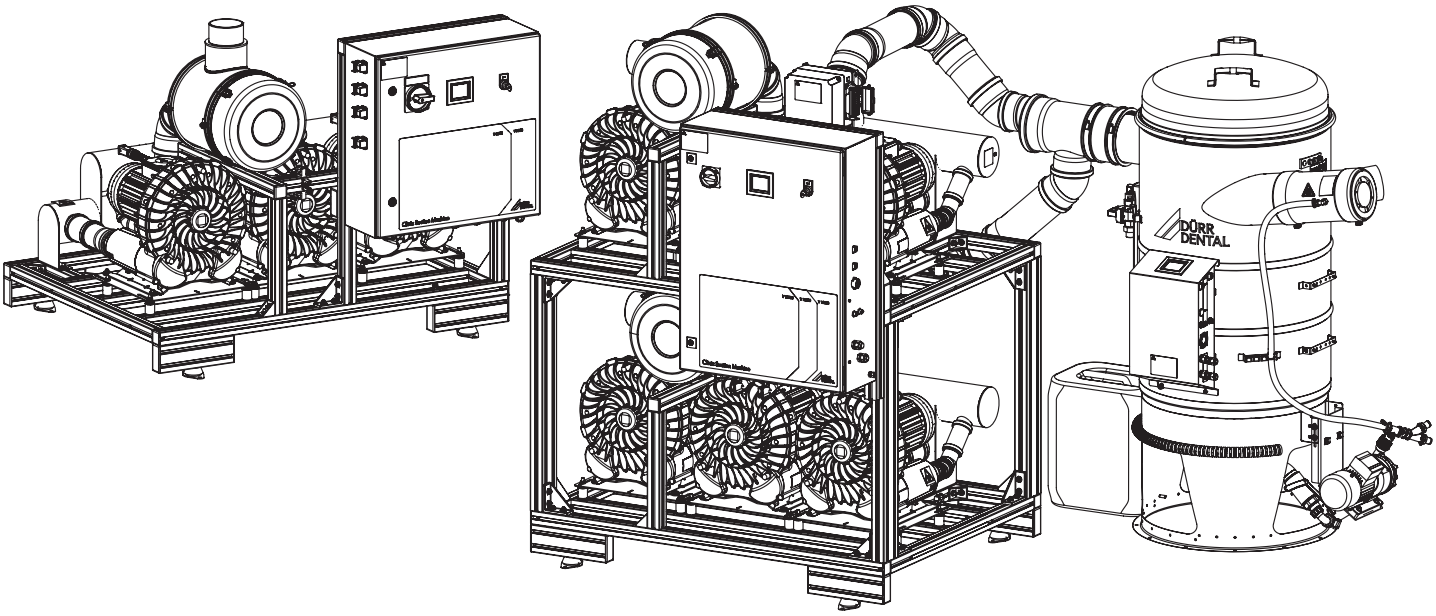
Clinic suction systems

V 6000, V 9000, V 12000, V 15000, V 18000



EN Installation and operating instructions for dry and semi-dry suction systems

CE 0297

DÜRR DENTAL

1806100009L02 2308V002

The latest version of the operating instructions is available in the Download Center:

https://qr.duerrdental.com/1806100009

Contents

Important information

1 About this document

These installation and operating instructions form part of the unit.

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

The German version of the operating instructions is the original manual. All other languages are translation of the original manual.
These installation and operating instructions apply to:
V 6000:
REF: 1802-51; 1802100051
V 9000:
REF: 1803-51; 1803100051
V 12000:
REF: 1804-51
V 15000:
REF: 1805-51
V 18000:
REF: 1806-51

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.

Observe the operating instructions.

Wear protective gloves.

Wear ear protectors.

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

Off

On

Air

Water

CE xxxx CE labelling with the number of the notified body

UA.TR.099 Ukrainian conformity mark with registration number

CH REP Authorised representative for Switzerland

REF Order number

SN Serial number

MD Medical device

HIBC Health Industry Bar Code (HIBC)

Manufacturer

1.2 Copyright information

2 Safety

The unit has been developed and designed in such a way that dangers are effectively ruled out if used in accordance with the Intended Use.
Despite this, the following residual risks can remain:
– Personal injury due to incorrect use/misuse
– Personal injury due to mechanical effects
– Personal injury due to electric shock
– Personal injury due to radiation
– Personal injury due to fire
– Personal injury due to thermal effects on skin
– Personal injury due to lack of hygiene, e.g. infection

2.1 Intended purpose

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

2.2 Intended use

Working in combination with the suction unit with treatment unit, suction handpiece and cannula, the media used in dental treatment (e.g. water, saliva, dentine and amalgam) are removed by suction for disposal.
A semi-dry suction system always requires a central separation unit to ensure separation of the air and fluid/solid particles upstream of the suction unit.
A dry suction system always requires a separation container to ensure separation of the air and fluid/solid particles upstream of the suction unit.
In addition, a condensation separator needs to be installed upstream of the vacuum inlet of the suction unit to collect any condensate that accumulates in the pipe system and direct it outwards.
This unit is technically suitable for the aspiration of nitrous oxide (laughing gas). However, when assembling a system for aspiration of nitrous oxide, it is important to ensure that the other components in the system are also suitable for this purpose. Those responsible for setting up the system must assess this and approve and release the system for the aspiration of nitrous oxide.

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

2.3 Improper use

Any use of this appliance / these appliances above and beyond that described in the Installation and Operating Instructions is deemed to be incorrect usage. The manufacturer cannot be held liable for any damage resulting from incorrect usage. The operator will be held liable and bears all risks.
› Do not use this device to aspirate flammable or explosive mixtures.
› The unit must not be used as a vacuum cleaner.
› Do not use chemicals containing chlorine or foaming chemicals.
› Operation in operating theatres of explosive areas is not permissible.
› The suction unit must not be set up in the immediate surroundings of the patient (minimum distance: 1.5 m).

2.4 General safety information

› Always comply with the specifications of all guidelines, laws, and other rules and regulations applicable at the site of operation for the operation of this unit.
› Check the function and condition of the unit prior to every use.
› Do not convert or modify the unit.
› Comply with the specifications of the Installation and Operating Instructions.
› The Installation and Operating Instructions must be accessible to all operators of the unit at all times.
› Wear ear protectors when performing any work involving start-up (e.g. commissioning, maintenance work).

2.5 Specialist personnel

Operation

Unit operators must use their training and knowledge to ensure safe and correct handling.
› Instruct or have every operator instructed in the handling of the unit.

The following groups are not permitted to operate or use a commercially operated unit:
– People without the necessary experience and knowledge
– People with reduced physical, sensory or mental capabilities
– Children

Installation and repairs

› Have the manufacturer or a qualified company authorised by the manufacturer perform mounting, new installations, modifications, expansions and repairs.

2.6 Notification requirement of serious incidents

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

2.7 Electrical safety

› Observe and comply with all the relevant electrical safety regulations when working on the unit.
› Replace any damaged cables or plugs immediately.

2.8 Only use original parts

› Only use accessories and optional articles named or authorised by the manufacturer.
› Only use only original wear parts and replacement parts.

The manufacturer and distributor accept no liability for damages or injury resulting from the use of non-approved accessories, optional accessories, or from the use of non-original wear parts or replacement parts.
The use of non-approved accessories, optional accessories or non-genuine wear parts / replacement parts (e.g. mains cables) can have a negative effect in terms of electrical safety and EMC.

2.9 Transport

WARNING
Infection due to contaminated unit
› Disinfect the unit before transport.
› Close all media connections.

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

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

› Only transport the unit secured to the pallet from the original packaging.
› Transport the unit using a forklift truck or pallet truck.
› 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.

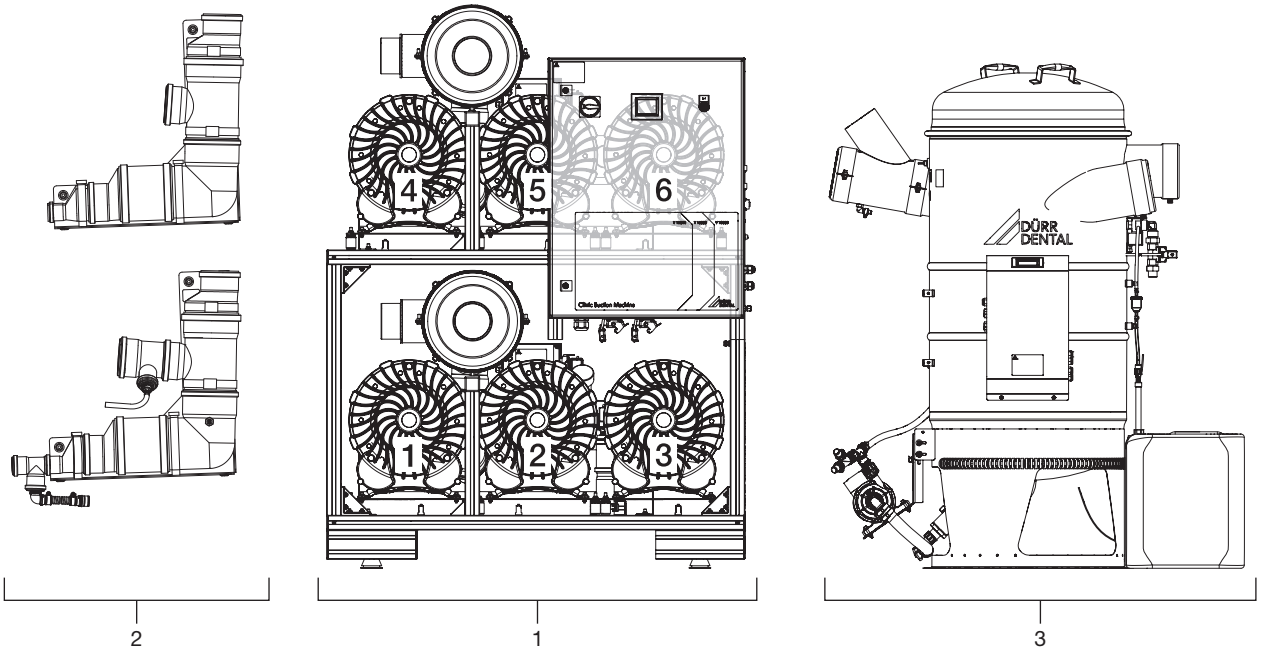
› Decontaminate potentially contaminated parts before disposing of them.
› Uncontaminated parts (e.g. electronics, plastic and metal parts etc.) should be disposed of in accordance with the local waste disposal regulations.
› If you have any questions about the correct disposal of parts, please contact your dental trade supplier.

An overview of the waste keys for Dürr Dental products can be found in the download area:

http://qr.duerrdental.com/P007100155

Product description

3 Overview



1 Clinic suction system (V 18000)
2 Condensation separator for a dry system
3 Central separation unit (CS 60) for a semi-dry system

3.1 Scope of delivery

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

V 6000 1802-51
- Clinic suction system with 2 suction units
- Control unit for a maximum of 3 suction units
- HT pipes
- Installation materials
- Operating instructions

V 6000 1802100051
- Clinic suction system with 2 suction units (can be expanded to V 18000)
- Control unit for a maximum of 6 suction units
- HT pipes
- Installation materials
- Operating instructions

The corresponding technical data must be taken into account if you are planning an upgrade to a maximum of 6 suction units.

V 9000 1803-51
- Clinic suction system with 3 suction units
- Control unit for a maximum of 3 suction units
- HT pipes
- Installation materials
- Operating instructions

V 9000 1803100051
- Clinic suction system with 3 suction units (can be expanded to V 18000)
- Control unit for a maximum of 6 suction units
- HT pipes
- Installation materials
- Operating instructions

The corresponding technical data must be taken into account if you are planning an upgrade to a maximum of 6 suction units.

V 12000 1804-51
- Clinic suction system with 4 suction units
- Control unit
- HT pipes
- Installation materials
- Operating instructions

V 15000 1805-51
- Clinic suction system with 5 suction units
- Control unit
- HT pipes
- Installation materials
- Operating instructions

V 18000 1806-51
- Clinic suction system with 6 suction units
- Control unit
- HT pipes
- Installation materials
- Operating instructions

3.2 Optional items

The following items are required for operation of the device, depending on the application:

Dry:

Condensation separator for V 6000, V 9000 1802-01

Condensation separator for V 12000, V 15000, V 18000 1804-01

Semi-dry:

Central separation unit CS 60 with waste water pump and vessel rinse set A704400068

or

Central separation unit CS 60 with waste water pump and siphon trap set 0704-400-67

The following optional items can be used with the device:

General:

Noise reduction hood for V 6000, V 9000 1802-150-51

Noise reduction hood for V 12000, V 15000, V 18000 1804-150-51

Suction unit for retrofitting 1803-490-51

Auxiliary air valve set 1802150060

Two sets are required for V 12000, V 15000 and V 18000.

3.3 Consumables

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

Cartridge for bacteria filter 0705-991-05

3.4 Wear parts and replacement parts

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

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

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

4 Technical data

4.1 V 6000

Type		1802-51 1802100051	
Workplaces SF * 100% / 60%		20 / 30	25 / 40
Flow rate p = 0 mbar / hPa p = -160 mbar / hPa	l/min l/min	7000 4500	9000 6000

* SF = simultaneity factor

Electrical data			
Rated voltage	V	400/3/N/PE AC	
Mains frequency	Hz	50	60
Nominal current	A	9.2	11.5
Motor protection switch settings	A	2 x 6.3	2 x 7
Mains fuses *	A	16	20
Type of protection		IP 20	
Protection class		I	
Max. permissible mains impedance in accordance with EN 61000-3-11 **	Ω	0.331 + j 0.207	

* The minimum tripping level for the mains fuse can be calculated by multiplying the number of suction units by the value set at the motor protection switch.

** Mains impedance at 6 switching cycles per hour. If the number of switching cycles per hour is higher a lower mains impedance is required.

Connections	
Vacuum connection	DN 110
Exhaust air connection	DN 110

General data			
Duty cycle	%	100	
Dimensions (H x W x D) 1802-51 with noise reduction hood *	 cm cm	 115 x 130 x 130 ** 115 x 140 x 125	
Dimensions (H x W x D) 1802100051 with noise reduction hood *	 cm cm	 180 x 130 x 130 ** 210 x 140 x 125	
Additional space required: Front and sides: Rear	 cm cm	 100 50	
Weight, approx. 1802-51 1802100051	 kg kg	 175 199	
Noise level *** with noise reduction hood	dB(A) dB(A)	72 58	74 61 ****

* The control unit is not mounted on the frame of the suction unit if a noise reduction hood is used.

** incl. control unit

*** according to ISO 3746

**** additional auxiliary air valves required

Classification	
Medical Device Class (MDR)	IIa

4.2 V 9000

Type		1803-51 1803100051	
Workplaces SF * 100% / 60%		30 / 50	37 / 60
Flow rate p = 0 mbar / hPa p = -160 mbar / hPa	 l/min l/min	 10500 6600	 13500 9000

* SF = simultaneity factor

Electrical data			
Rated voltage	V	400/3/N/PE AC	
Mains frequency	Hz	50	60
Nominal current	A	14.0	18.0
Motor protection switch settings	A	3 x 6.3	3 x 7
Mains fuses *	A	20	25
Type of protection		IP 20	
Protection class		1	
Max. permissible mains impedance in accordance with EN 61000-3-11 **	Ω	0.331 + j 0.207	

* The minimum tripping level for the mains fuse can be calculated by multiplying the number of suction units by the value set at the motor protection switch.
** Mains impedance at 6 switching cycles per hour. If the number of switching cycles per hour is higher a lower mains impedance is required.

Connections	
Vacuum connection	DN 110
Exhaust air connection	DN 110

General data			
Duty cycle	%	100	
Dimensions (H x W x D) 1803-51 with noise reduction hood *	 cm cm	 115 x 130 x 130 ** 115 x 140 x 125	
Dimensions (H x W x D) 1803100051 with noise reduction hood *	 cm cm	 180 x 130 x 130 ** 210 x 140 x 125	
Additional space required: Front and sides: Rear	 cm cm	 100 50	
Weight, approx. 1803-51 1803100051	 kg kg	 215 248	
Noise level *** with noise reduction hood	dB(A) dB(A)	74 63	75 66 ****

* The control unit is not mounted on the frame of the suction unit if a noise reduction hood is used.
** incl. control unit
*** according to ISO 3746
**** additional auxiliary air valves required

Classification	
Medical Device Class (MDR)	IIa

4.3 V 12000

Type		1804-51	
Workplaces SF * 100% / 60%		40 / 70	50 / 80
Flow rate p = 0 mbar / hPa p = -160 mbar / hPa	 l/min l/min	 14000 9000	 18000 12000

* SF = simultaneity factor

Electrical data			
Rated voltage	V	400/3/N/PE AC	
Mains frequency	Hz	50	60
Nominal current	A	18.9	23.4
Motor protection switch settings	A	4 x 6.3	4 x 7
Mains fuses *	A	25	32
Type of protection		IP 20	
Protection class		1	
Max. permissible mains impedance in accordance with EN 61000-3-11 **	Ω	0.331 + j 0.207	

* The minimum tripping level for the mains fuse can be calculated by multiplying the number of suction units by the value set at the motor protection switch.
** Mains impedance at 6 switching cycles per hour. If the number of switching cycles per hour is higher a lower mains impedance is required.

Connections		
Vacuum connection	2x DN 110	
Exhaust air connection	2x DN 110	

General data			
Duty cycle	%	100	
Dimensions (H x W x D) with noise reduction hood *	cm cm	180 x 130 x 130 ** 210 x 140 x 125	
Additional space required: Front and sides: Rear	 cm cm	 100 50	
Weight, approx.	kg	335	
Noise level *** with noise reduction hood	dB(A) dB(A)	74 61	76 62 ****

* The control unit is not mounted on the frame of the suction unit if a noise reduction hood is used.
** incl. control unit
*** according to ISO 3746
**** additional auxiliary air valves required

Classification	
Medical Device Class (MDR)	IIa

4.4 V 15000

Type		1805-51	
Workplaces SF * 100% / 60%		50 / 80	62 / 100
Flow rate p = 0 mbar / hPa p = -160 mbar / hPa	 l/min l/min	 17500 11100	 22500 15000

* SF = simultaneity factor

Electrical data			
Rated voltage	V	400/3/N/PE AC	
Mains frequency	Hz	50	60
Nominal current	A	23.6	29.1
Motor protection switch settings	A	5 x 6.3	5 x 7
Mains fuses *	A	32	32
Type of protection		IP 20	
Protection class		1	
Max. permissible mains impedance in accordance with EN 61000-3-11 **	Ω	0.331 + j 0.207	

* The minimum tripping level for the mains fuse can be calculated by multiplying the number of suction units by the value set at the motor protection switch.
** Mains impedance at 6 switching cycles per hour. If the number of switching cycles per hour is higher a lower mains impedance is required.

Connections	
Vacuum connection	2x DN 110
Exhaust air connection	2x DN 110

General data			
Duty cycle	%	100	
Dimensions (H x W x D) with noise reduction hood *	cm cm	180 x 130 x 130 ** 210 x 140 x 125	
Additional space required: Front and sides: Rear	 cm cm	 100 50	
Weight, approx.	kg	375	
Noise level *** with noise reduction hood	dB(A) dB(A)	76 63	77 65 ****

* The control unit is not mounted on the frame of the suction unit if a noise reduction hood is used.
** incl. control unit
*** according to ISO 3746
**** additional auxiliary air valves required

Classification	
Medical Device Class (MDR)	IIa

4.5 V 18000

Type		1806-51	
Workplaces SF * 100% / 60%		60 / 100	75 / 120
Flow rate p = 0 mbar / hPa p = -160 mbar / hPa	 l/min l/min	 21000 13200	 27000 18000

* SF = simultaneity factor

Electrical data			
Rated voltage	V	400/3/N/PE AC	
Mains frequency	Hz	50	60
Nominal current	A	28.7	35.6
Motor protection switch settings	A	6 x 6.3	6 x 7
Mains fuse *	A	40	40
Type of protection		IP 20	
Protection class		1	
Max. permissible mains impedance in accordance with EN 61000-3-11 **	Ω	0.331 + j 0.207	

* The minimum tripping level for the mains fuse can be calculated by multiplying the number of suction units by the value set at the motor protection switch.
** Mains impedance at 6 switching cycles per hour. If the number of switching cycles per hour is higher a lower mains impedance is required.

Connections	
Vacuum connection	2x DN 110
Exhaust air connection	2x DN 110

General data			
Duty cycle	%	100	
Dimensions (H x W x D) with noise reduction hood *	cm cm	180 x 130 x 130 ** 210 x 140 x 125	
Additional space required: Front and sides: Rear	 cm cm	 100 50	
Weight, approx.	kg	415	
Noise level *** with noise reduction hood	dB(A) dB(A)	76 65	78 68 ****

* The control unit is not mounted on the frame of the suction unit if a noise reduction hood is used.
** incl. control unit
*** according to ISO 3746
**** additional auxiliary air valves required

Classification	
Medical Device Class (MDR)	IIa

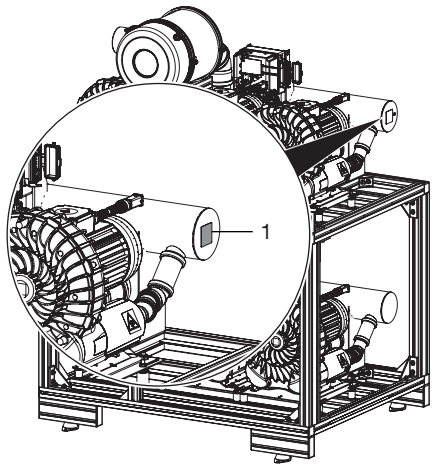
4.6 Ambient conditions

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

Ambient conditions during operation		
Temperature	°C	+10 - +40
Relative humidity	%	< 70
Air pressure	hPa	690 - 1030

4.7 Type plate

The type plate is located on the side on the manifold.

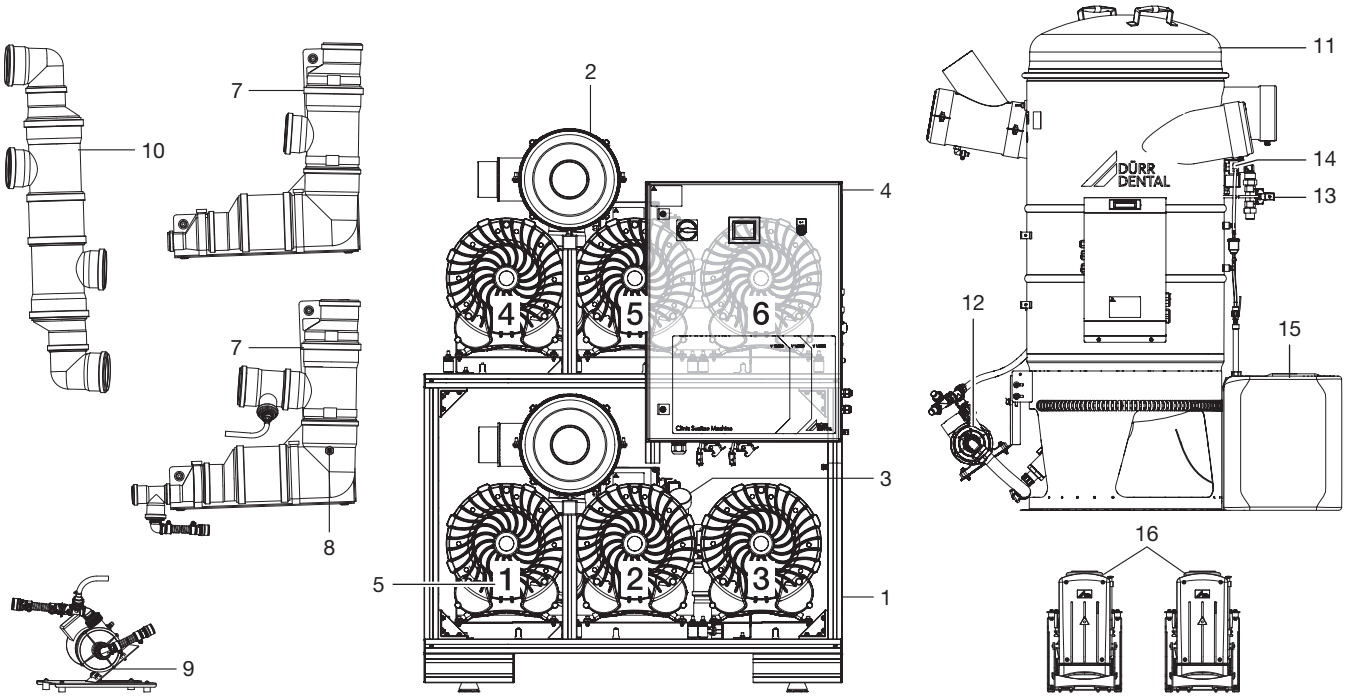


1 Type plate

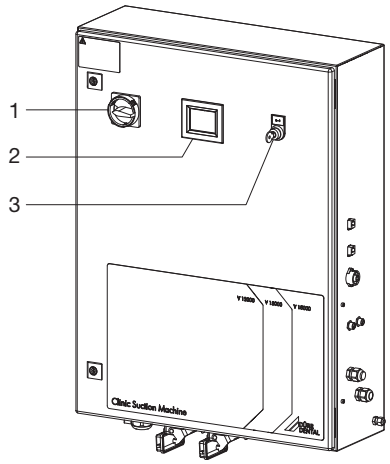
4.8 Evaluation of conformity

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

5 Operation



1 Clinic suction unit
2 Exhaust air filter
3 Auxiliary air valve
4 Control unit
5 Number and position of the suction units
7 Condensation separator
8 Float switch
9 Condensation pump
10 Manifold
11 Central separation unit
12 Waste water pump
13 Container rinsing
14 Orotolvalve
15 Orotolcontainer
16 Amalgam separator



1 Main power switch
2 Display
3 Key-operated switch for emergency mode

5.1 Clinic suction system

Clinic suction units are used in combination with “dry” or “semi-dry” suction systems. This means that a separation stage must be connected upstream before the air enters the clinic suction unit. During this separation, the aspirated fluids are separated from the air content.
For dry air suction systems the separation occurs at each treatment unit, e.g. using an integrated Dürr Dental CS 1 or CAS 1.
In a semi-dry suction system the separation takes place via a central separation unit. Multiple treatment units can be connected to a single central separation unit.
During patient treatment fluids (saliva and blood) or even larger particles (amalgam, dentine, plastic particles) are aspirated and drawn into the cannula. Therefore a fine filter is usually installed in the vicinity of the treatment unit in order to hold back the larger particles.
Clinic suction units operate on the side channel principle and are driven by robust three-phase current motors.
As the exhaust air from the suction unit contains bacteria and germs, we recommend that the exhaust air pipes are routed to the roof and then to the outside. Additionally, for hygienic reasons an exhaust air bacterial filter should be fitted. After approx. 3500 operating hours the display of the control unit will show an instruction to change the filter cartridge in the exhaust air bacteria filter.
On clinic suction units, a controller is integrated that uses a pressure sensor to switch the individual suction units on or off as required based on demand to provide smooth and even suction power.
For aspiration of fluids from the patient's mouth with a rate of flow of approx. 3000 l/min. (approx. 10 users), one suction unit is in operation. Depending on the vacuum, an electromechanical auxiliary air valve is actuated if required. The auxiliary air actively limits the prevailing vacuum and has an additional cooling effect on the suction units.
If the number of operators using the system increases and the vacuum falls below a certain level as a result, a further suction unit will be switched on. In this way, multiple suction units can be operational at the same time. A nonreturn valve on the exhaust air side of each suction unit prevents air from entering the turbine of an idle suction unit, which would otherwise lead to a loss of suction performance.
The controller is equipped with an intelligent selector switch function, which regularly changes the order in which the suction units are actuated depending on how many operating hours each one has accumulated. This ensures that the different suction units are operated for the same length of time.
If the control unit fails, it is possible to switch to emergency mode using a key-operated switch. Two positions can be chosen using the key-operated switch:
0 - Normal operation
I - Emergency mode
In emergency mode, only one suction unit and the auxiliary air valve are activated. This means the number of treatment units that can be used simultaneously is limited. In this operating mode the vacuum is only limited mechanically via the auxiliary air valve, which can lead to an excessive build-up of vacuum.

If the system is operated semi-dry together with a central separation unit then the emergency mode is only permitted to be activated if the separation unit does not have a malfunction.

5.2 Condensate separator

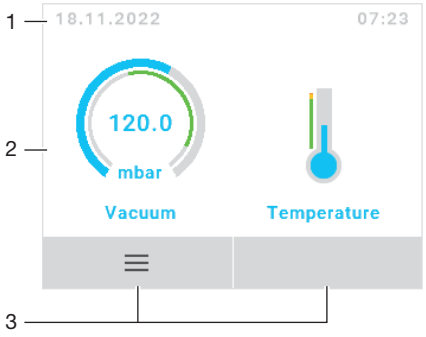
Depending on the particular model, either one or two condensation separators need to be installed upstream of the clinic suction unit depending on the model (as accessories only for dry air suction systems). On the version with two condensation separators, a collector pipe must be installed upstream of the condensation separators. Depending on the temperature gradients in the pipes, the condensation separators hold back accumulating condensation water in order to protect the clinic suction unit from damage.
In the condensation separator there is a level sensor that, at max. fill level, outputs a signal to switch on the condensation pump. The condensation pump them empties the condensation separator.
If the condensation separator is not emptied, a fault report is triggered, As soon as the cause has been remedied, the fault report can be reset again.

5.3 Central separation unit CS 60

A central separation unit is used in semi-dry suction systems. The purpose of the central separation unit is to separate the fluid/air mixture accumulated from the treatment units – i.e.the air is separated from the fluid and transported to the suction unit. The fluid is fed to the central waste water network.
The central separation unit can be equipped with up to 2 suction inlets and has a connection to the suction unit. The tangential suction inlets allow a flow rate of up to 18000 l/min. Each of the suction inlets has a coarse filter, which needs to be cleaned regularly.
On the central separation unit there is a fresh water connection with a solenoid valve. The connection can be made as required depending on the rinsing and disinfection requirements. (The amount of water and disinfectant depends on the installation and the number of treatment units.)
The central separation unit has a total volume of approx. 300 l. When the fill level reaches approx. 50%, a float switch activates the waste water pump . The waste water pump sucks the fluid out of the central separation unit against the vacuum of the suction system and pumps it into the central waste water network. A safety shut-off is triggered at a level of approx. 75% via a second float switch, i.e. the suction unit is switched off until the fill level has been lowered.

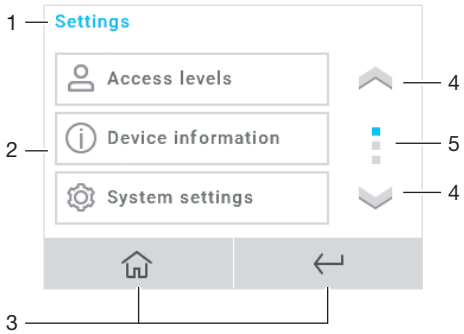
5.4 Overview of the touch screen user interface

Standard display



1 Context area (e.g. messages)
2 Content area
3 Navigation buttons

Settings



1 Title bar / submenus
2 Content area
3 Navigation buttons
4 Scroll button
5 Page indicator

Assembly

6 Requirements

The installation options will vary according to model type and/or the particular building restrictions. On systems with a central separation unit, this must be positioned at the lowest point in the system.

Further information can be found in our planning information leaflet for clinic suction systems, which is available separately.

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)

6.2 Pipe materials

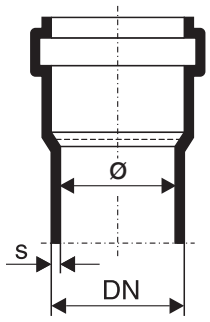
Only use vacuum-sealed HT-waste pipes manufactured from the following materials:
- Polypropylene (PP),
- Chlorinated polyvinyl chloride (PVC-C),
- Plasticizer-free polyvinyl chloride (PVC-U),
- Polyethylene (PE).

The following materials must not be used:
- Acrylonitrile-butadiene-styrene (ABS),
- Styrene copolymer blends (e.g. SAN + PVC).

6.3 Pipe dimensions

Diameters

The diameters of the pipes are designated with **DN**. If no pipes with the corresponding DN sizes are available then pipes with similar internal diameters can be used. The following is a table with the relevant **mm** values:



DN	s [mm]	ø [mm] *
40	1.8	36
50	1.8	46
75	1.9	71
90	2.2	86
110	2.7	105
125	3.1	119
160	3.9	154

* Values rounded

Waste water pipe
- **DN 50**, gradient of at least 2% in accordance with DIN EN 12056, parts 1 and 2
- or choose a pipe diameter in line with national and local regulations.

Suction and exhaust pipes

Pipes of varying diameters are chosen corresponding to the suction power of the suction units. The diameters are given in the planning examples.

6.4 Hose materials

For waste connections and suction lines only use the following hose types:
- Flexible spiral hoses made of PVC with integrated spiral or equivalent hoses
- Hoses that are resistant to dental disinfectants and chemicals

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

The following types of hoses must not be used:
- Rubber hoses
- Hoses made completely of PVC
- Hoses that are not sufficiently flexible

6.5 Information about electrical connections

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

› The connection to the mains supply must be a fixed connection that cannot be disconnected without the use of tools. Plug-in connections (power outlet/plug) are not permissible.

› Install an all-pole disconnection unit (all-pole switch) in the electrical connection to the mains power supply. This must include the clearance and creepage distances defined in IEC 61058-1 for a mains voltage peak of 4 kV.
It must be possible to secure the disconnect switch so that it cannot be inadvertently switched back on again.

The disconnection unit (switch) must be easily accessible without danger.

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

6.6 Information about connecting cables

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

Current consumption of unit [A]	Cross-section [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)

Control cable

Installation type	Line layout (minimum requirements)
Fixed installation	– Shielded sheathed cable (e.g. (N)YM (St)-J)

Installation type	Line layout (minimum requirements)
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

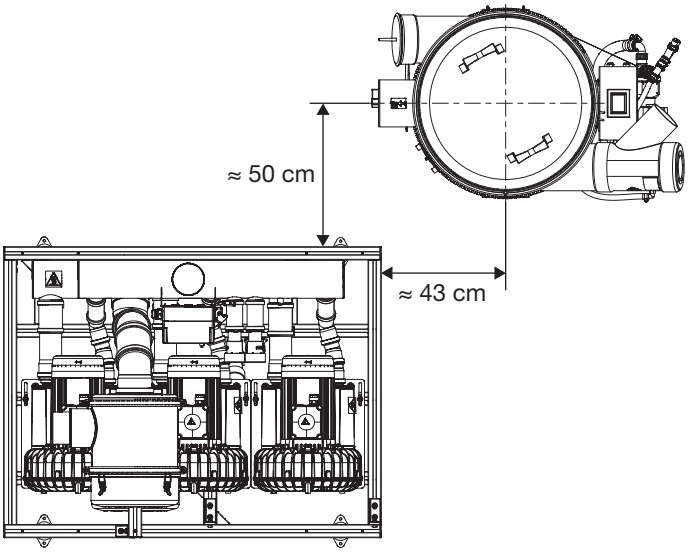
Connect the shielding of the cables in accordance with the regulations.

7 Installation

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

7.1 Semi-dry suction systems

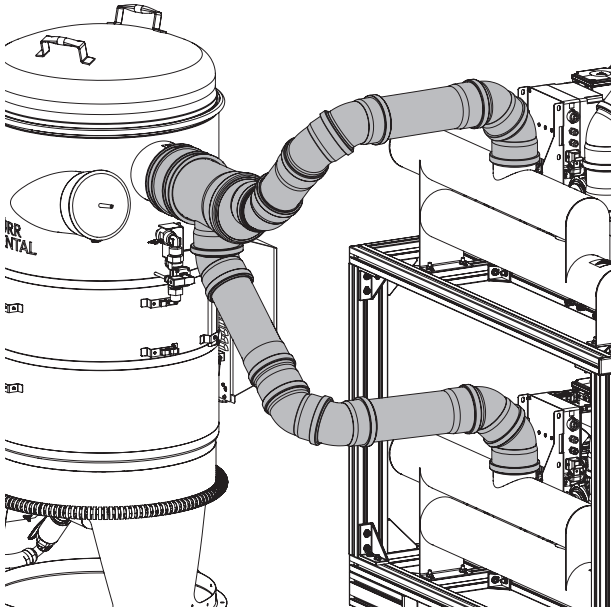
› Position the suction unit and the central separation unit at corresponding intervals in the intended installation location.



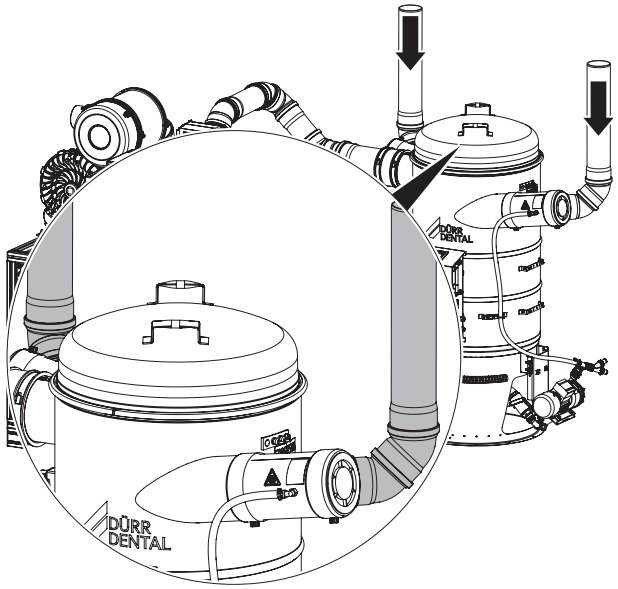
1 Suction unit
2 Central separation unit

› Use the adjustable feet to adjust the suction unit so that it is horizontal. In the process, make sure it has a secure and safe footing.

› Connecting the suction system and the central separation unit with high-temperature pipes

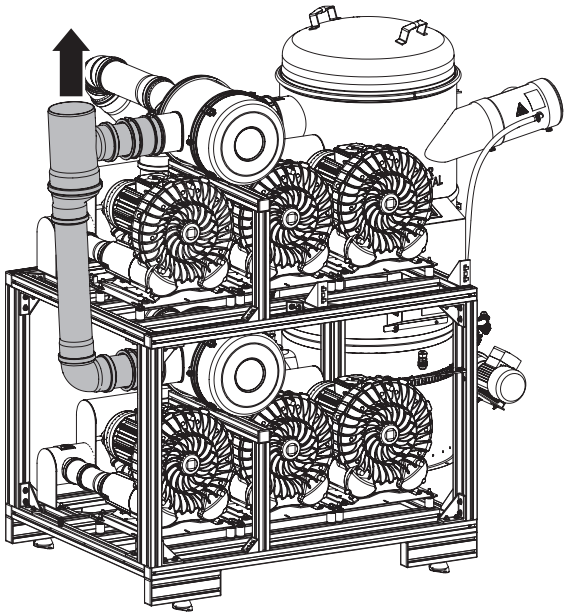


› Route the suction pipes from the in-house installation to the central separation unit and push them onto the suction connections.



› Connect the connection pieces of the exhaust air filters to the manifold and then connect to the in-house installation.

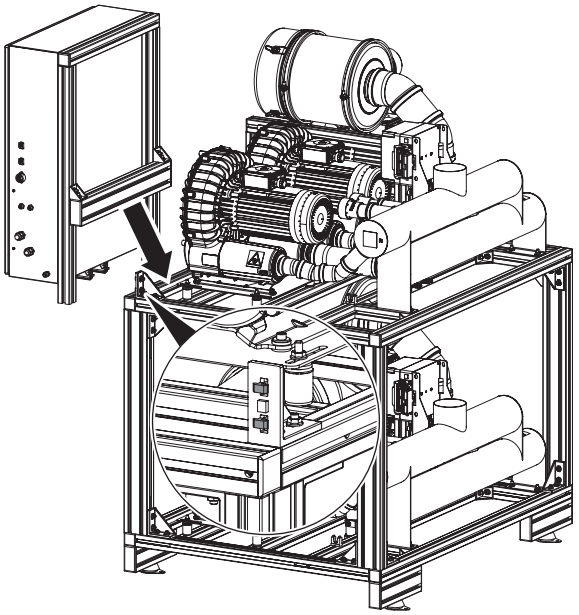
The exhaust air must always be directed out of the building into the open.



7.2 Installing the control unit

› Loosen the T-head bolts and rotate them to the cross position.
› Place the control unit with the cross strut on the frame.
› Rotate the T-head bolts so they are upright (on edge).

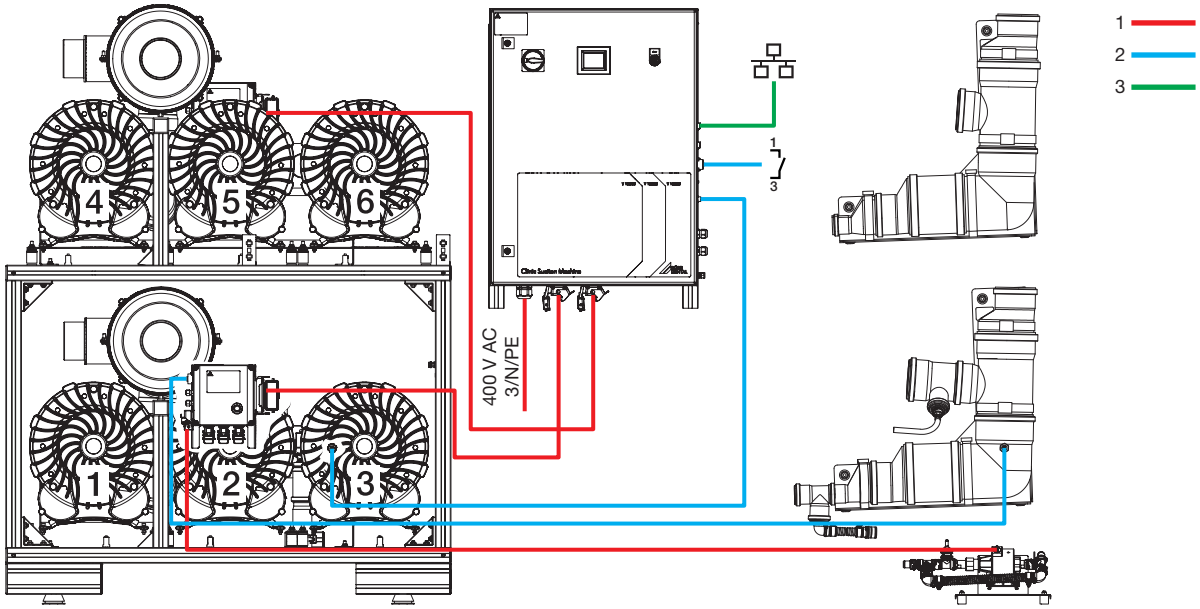
› Tighten the nuts.



8 Electrical connections

8.1 Connection overview – dry suction system

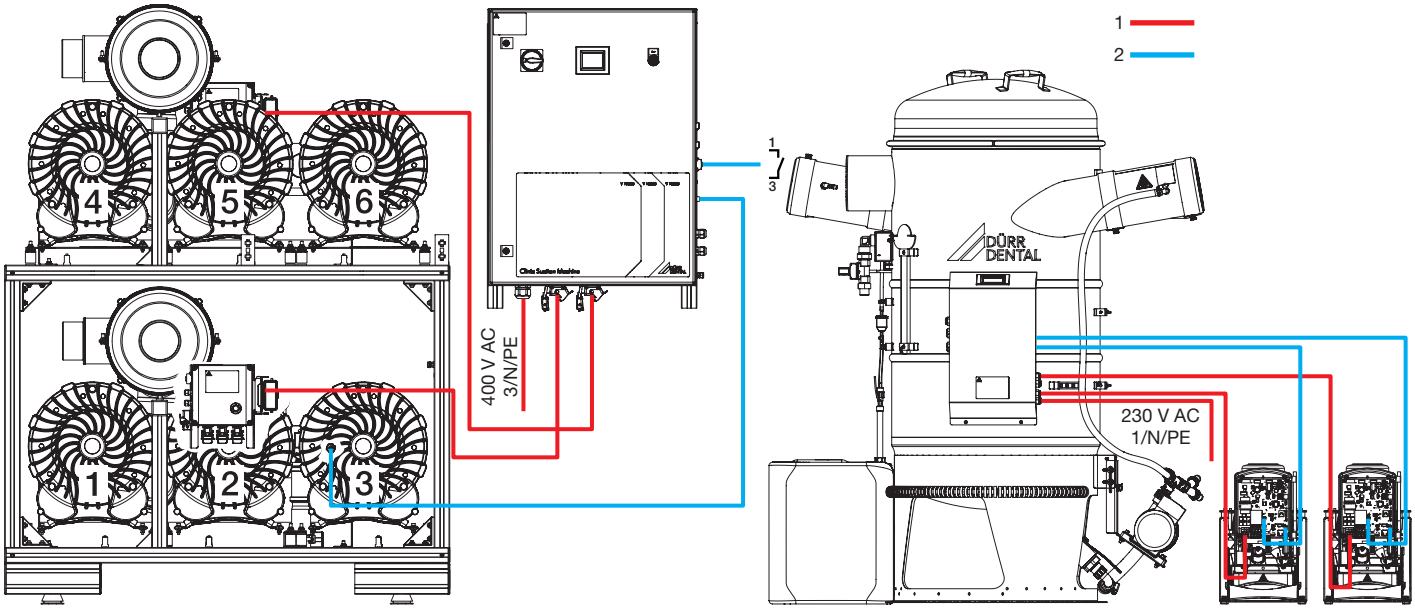
Connection overview – complete



1 Power supply
2 Controller
3 Network

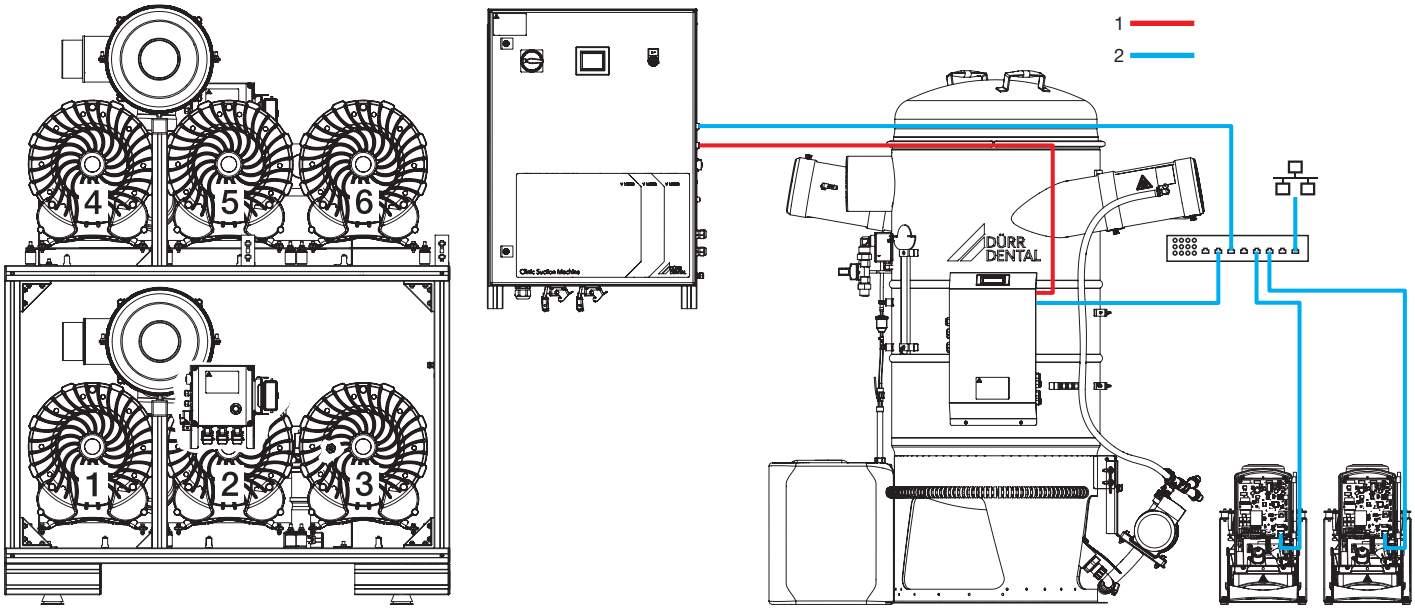
8.2 Connection overview – semi-dry suction system

Power supply and control line



1 Power supply
2 Controller

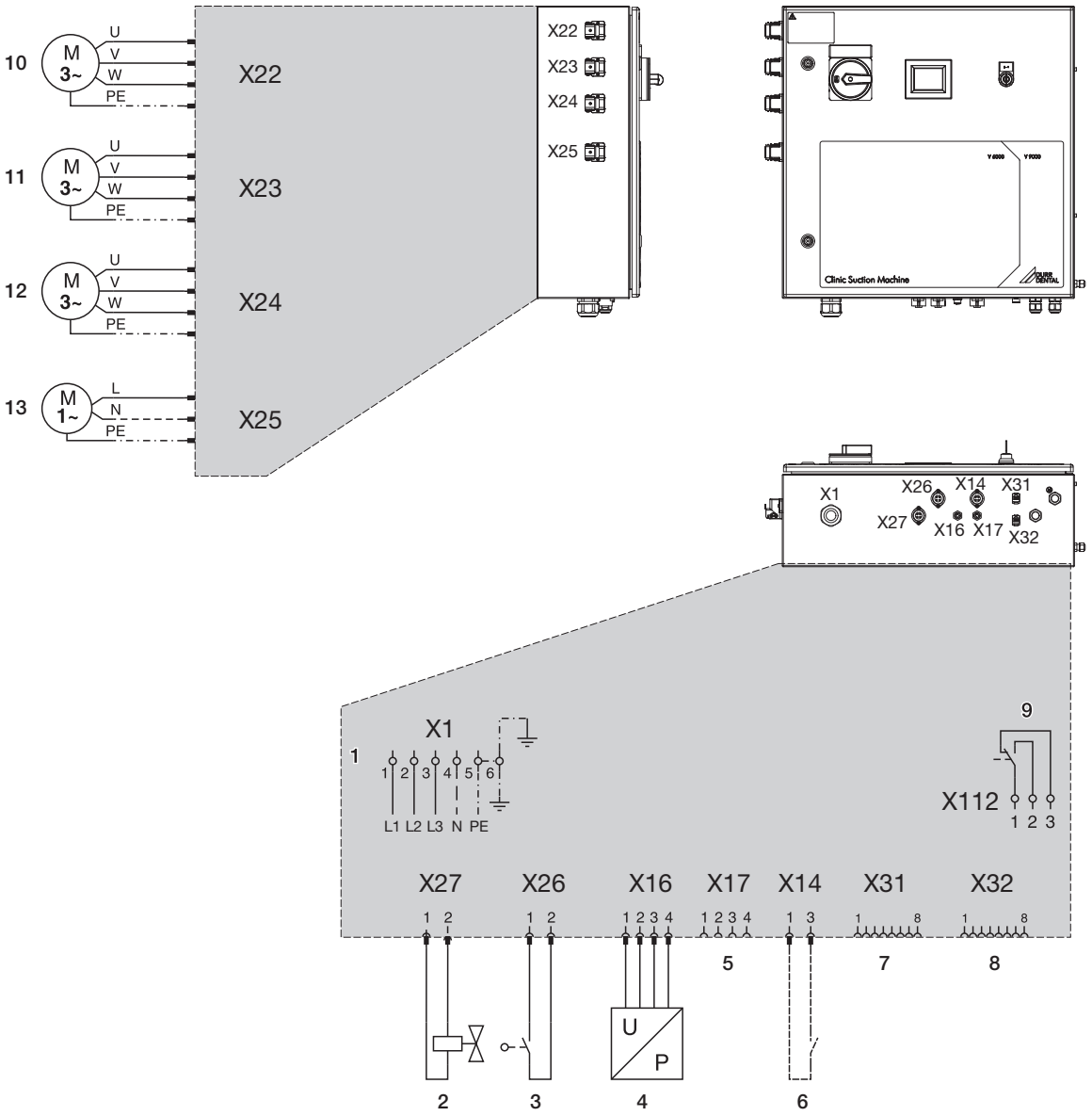
CAN bus and network



1 CAN bus
2 Network

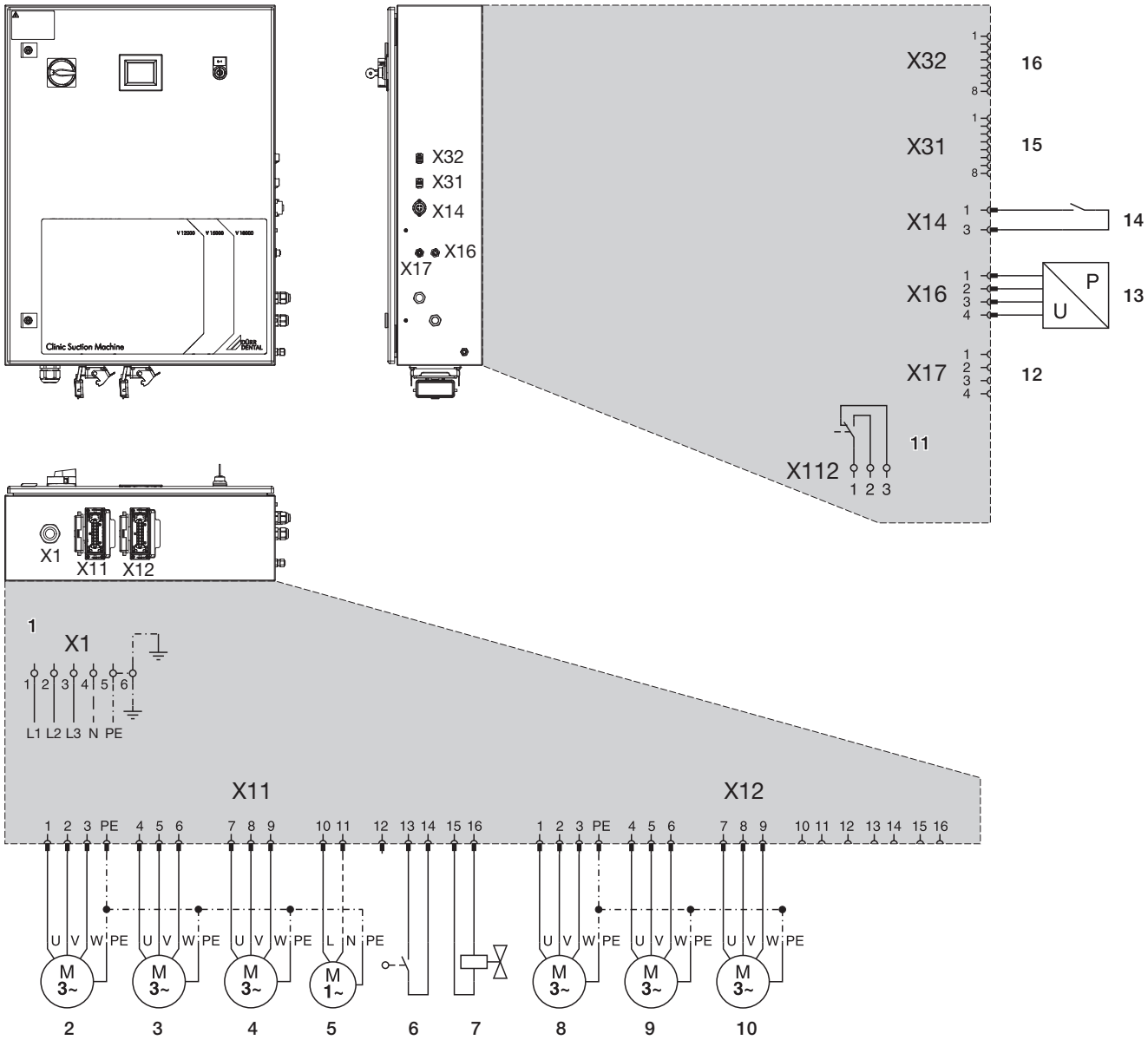
8.3 Connection overview – control unit

Control unit V 6000 – V 9000



1 Power supply
2 Auxiliary air valve
3 Condensate separator float switch
4 Pressure sensor
5 Analogue input (reserve)
6 Connection of support signal
7 CAN bus
8 Network
9 External fault report, max. permissible connected load: 24 V DC, 1 A (resistive)
Wiring in accordance with country-specific requirements.
10 Suction unit 1
11 Suction unit 2
12 Suction unit 3
13 Condensation pump

Control unit V12000 – V 18000



1 Power supply
2 Suction unit 1
3 Suction unit 2
4 Suction unit 3
5 Condensation pump
6 Condensate separator float switch
7 Auxiliary air valve
8 Suction unit 4
9 Suction unit 5
10 Suction unit 6
11 External fault report, max. permissible connected load: 24 V DC, 1 A (resistive)
Wiring in accordance with country-specific requirements.
12 Analogue input (reserve)
13 Pressure sensor
14 Connection of support signal
15 CAN bus
16 Network

8.4 Clinic suction system

WARNING

Electric shock

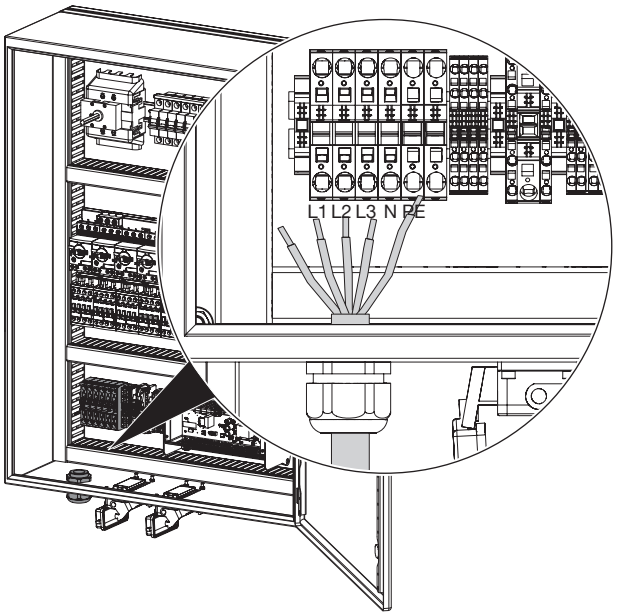
› The device may only be connected to a supply system with a earthed power outlet.

For the installation, a main power switch must be available in the building installation that satisfies the requirements for the separation of medical devices from the mains power supply.

› Guide the mains supply cable through the strain relief and tighten the strain relief.

› Connect the mains supply cable to the corresponding terminals.

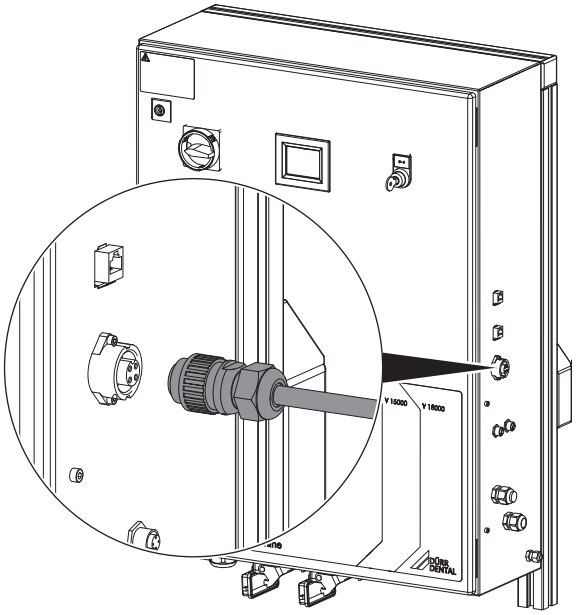
Keep the cores of the mains supply cable short – they must not touch any other cables.



8.5 Control cable

› Connect the control cable for starting the suction units to the connector as shown in the circuit diagram.

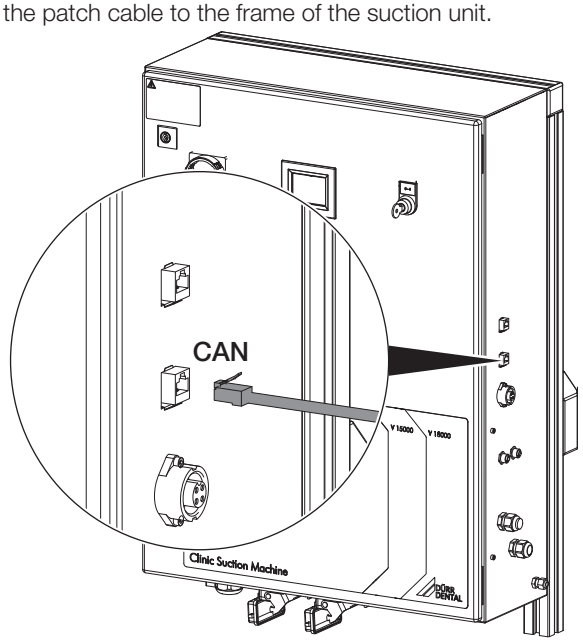
› Plug in the connector at the control unit.



8.6 CAN bus

› Route the patch cable to the control unit and plug it in at the control unit.

› Fix the patch cable to the frame of the suction unit.



8.7 Network connection

Purpose of the network connection

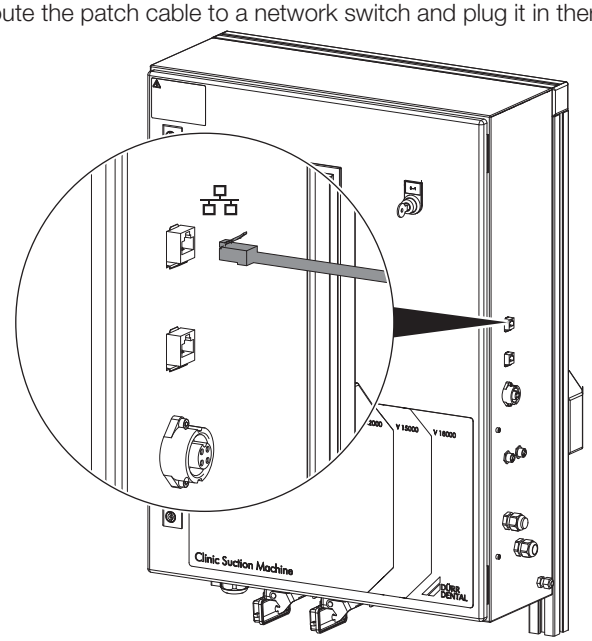
The network connection is used to exchange information or control signals between the unit and a software installed on a computer, in order to, e. g.:

– 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

› Route the patch cable to the control unit and plug it in at the control unit.

› Fix the patch cable to the frame of the suction unit.

› Route the patch cable to a network switch and plug it in there



9 Commissioning

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

› Turn on the unit power switch or the main surgery switch.
› Carry out an electrical safety check in accordance with applicable local regulations (e.g. the German Ordinance on the Installation, Operation and Use of Medical Devices / Medizinprodukte-Betreiberverordnung) and record the results as appropriate, e.g. in the technical log book.
› Carry out a functional inspection of the system and check the connections for leaks.
› Attach and screw on the covers.
› Carry out and document the instruction and handover for the unit.

A sample handover report is included in the attachment.

9.1 Monitoring the unit via the network

The following requirements must be met in order to monitor the unit on the computer:
– Unit connected to the network
– Current monitoring software installed on the computer

Combining devices safely

– The overall safety of the unit and its main 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 utilises part of the bandwidth of the network. Interactions with other medical devices cannot be completely ruled out. Apply the IEC 80001-1 standard for risk assessment.
– The device is not suitable for direct connection to the public Internet.

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.

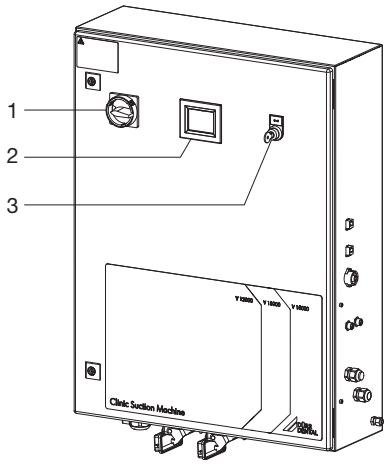
Network protocols and ports

Port	Purpose	Service
45123 UDP, 45124 UDP	Unit recognition and configuration	
502 TCP	Device data	
514[1)] UDP	Event log data	Syslog
23 TCP	Diagnosis	Telnet
123 UDP	Time	NTP

1) The port may vary depending on the configuration.

Usage

10 Operation



1 Main power switch
2 Display
3 Key-operated switch for emergency mode

Switch on the suction system at the main switch. As soon as the standard display is shown on the display panel the system is ready for operation.
In the event of a fault in the system, set the key-operated switch to emergency mode. In emergency mode only one suction unit is actuated.

If the system is operated semi-dry together with a central separation unit then the emergency mode is only permitted to be activated if the separation unit does not have a malfunction.

10.1 Overview on the touch screen

The buttons at the bottom edge of the screen can be used to switch between the different menus.

Switches to the menu *Settings*

Next — Switches between the two start screens (only when a device is configured as the "main unit")

Switches to the start screen

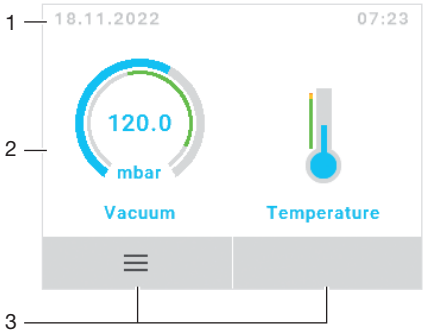
Switches to the next higher menu level

10.2 "Home" screen

Once the system is switched on, the display will show the standard display. The navigation buttons can be used to jump to a different screen or to select further menu items for adjustment of the system. The menu structure is shown below in a table.

Changes to the settings of the system should only be made by properly trained personnel.

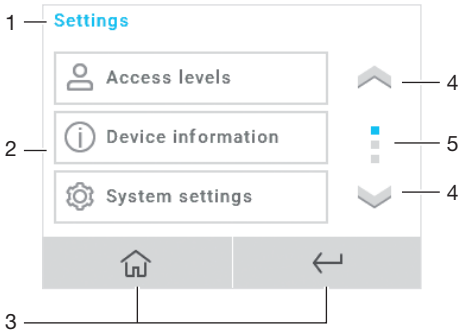
Standard display



1 Context area (e.g. messages)
2 Content area
3 Navigation buttons

10.3 "Settings" display

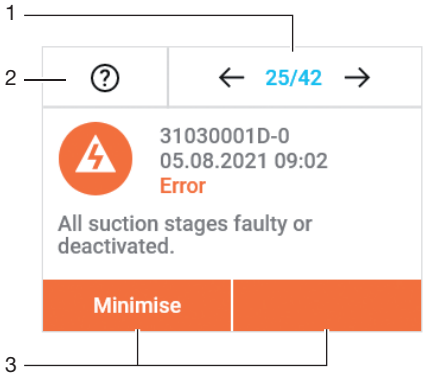
In the Settings screen you can query information and adjust settings.
To access the individual menu items, tap the relevant button. If there are multiple pages, the arrow buttons are used to scroll through the pages.



1 Title bar / submenus
2 Content area
3 Navigation buttons
4 Scroll button
5 Page indicator

10.4 "Messages" screen

Any incidents that occur in the unit are shown in the Messages screen. The messages can be confirmed by tapping the navigation button. The messages are then displayed in the context area of the Home screen until the incident has been remedied.



1 Scrolling between messages
2 Detailed information about the message
3 Navigation buttons

Severity of the messages:

Information

Note
Important information about the device

Notice
Operation of the device restricted

Fault
Operation of the device interrupted

11 Disinfection and cleaning

NOTICE

Device malfunctions or damage due to use of incorrect media

Guarantee claims may become invalid as a result.

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

As a general rule use:
– for disinfection and cleaning:
  Orotol plus or Orotol ultra
– for cleaning:
  MD 555 cleaner

Only these products have been tested by Dürr Dental.
When using prophy powders, water-soluble Lunos Prophy Powders are recommended in order to protect the suction systems (Dürr Dental).

11.1 After every treatment

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

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

11.2 Daily after the end of treatment

After higher workloads before the midday break and in the evening

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

11.3 Once or twice a week before the midday break

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

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

12 Maintenance

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

WARNING

Infection due to contaminated unit

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

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

12.1 Clinic suction system

Maintenance interval	Maintenance work
12 months	› Functional check: vacuum control and activation of suction units › Check of the operating hours on the display › Measurement of the flow rate at the large suction hose: 250-350 l/min
24 months or 3500 hours	› Replacement of the filter cartridge of the exhaust air filter
24 months	› Inspection of the noise reducers of the suction units, replacement as required › Inspection of the nonreturn valves on the exhaust air side of the suction units, replacement as required › Auxiliary air valve – mechanical check › Auxiliary air valve – electrical check

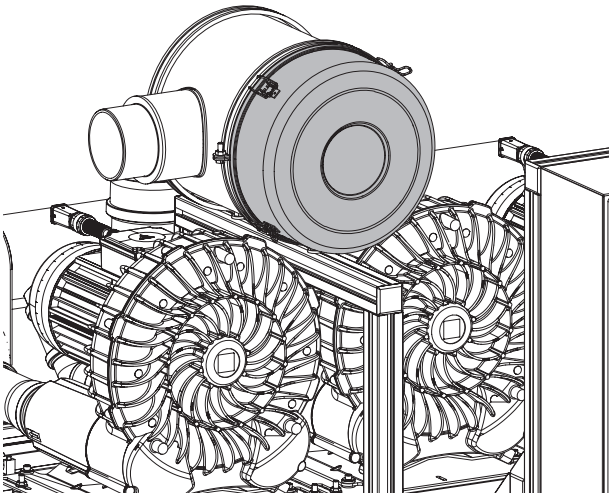
12.2 Condensate separator

Maintenance interval	Maintenance work
12 months	› Inspection of the condensation separator › Check and clean the level switch in the condensation separator, replacement as required › Check and clean the filter upstream of the condensation pump › Check the nonreturn valves of the condensation pump, replacement as required

12.3 Change the filter cartridge of the exhaust air filter

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

› Release the four clamps on the lid of the exhaust air filter.
› Remove the cover.
› Pull out the cartridge.
› Insert a new cartridge in the filter housing.
› Position the lid and fasten it with the clamps.



Troubleshooting

13 Tips for operators and service technicians

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

To prevent the risk of hearing damage, always wear ear defenders when working on noisy units.

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

Error	Possible cause	Remedy
System not working. No display on the display panel.	Controller not functioning due to voltage outage	› Check the fuses F1. *
	Power supply unit defective	› Check the power supply; if necessary replace the power supply or control box. *

* Only to be done by service technicians.

Appendix

14 Menu structure

Start screen	*Vacuum, temperature*			
Settings	Access levels	Operator		
		Administrator		
		Service Technician [PIN]	XXXXXX	
	Device information	Device data	REF	
			SN	
			Firmware	1.0.x
			PCB serial number	
			Library version	
			File	
		Device usage data *	Unit 1 Runtime [1]	
			Unit 2 Runtime	
			Unit 3 Runtime	
			Unit 4 Runtime	
			Unit 5 Runtime	
			Unit 6 Runtime	
			Unit 1 Starts [2]	
			Unit 2 Starts	
			Unit 3 Starts	
			Unit 4 Starts	
			Unit 5 Starts	
			Unit 6 Starts	
			Unit 1 Utilisation [2]	
			Unit 2 Utilisation	
			Unit 3 Utilisation	
			Unit 4 Utilisation	
			Unit 5 Utilisation	
			Unit 6 Utilisation	
	System settings	Language	Deutsch, English, Français, Español, Português	
		Date, time [1]	Time zone	UTC
			Automatic	
			Date	DD MM YYYY
			Time	HH MM
		Network [1]	DHCP	
			IP address	
			Netmask	
			Gateway	
		System of units [1]	Metric	
			Imperial	

Settings (continued)	System settings (continued)	Device configuration [2]	Device type	V 6000
				V 9000
				V 12000
				V 15000
				V 18000
			Manual operation on-time	
			Cluster settings	Main unit
				Auxiliary unit
			Separation unit configuration	Separation unit
				Condensation separator
		Factory settings [2]	Delete message history	
	Parameters [2]	Pressure settings for main unit	Start-up pressure 1	
			Start-up pressure 2	
			Cut-out pressure	
		Pressure settings for auxiliary unit	Start-up pressure 1	
			Start-up pressure 2	
			Cut-out pressure	
	Message history [1]	List of messages	Message information	
	Maintenance [2]	Bacteria filter	Bacteria filter replaced	
	Service [2]	Manual operation *	Unit position 1	Start
				Stop
			Unit position 2	Start
				Stop
			Unit position 3	Start
				Stop
			Unit position 4	Start
				Stop
			Unit position 5	Start
				Stop
			Unit position 6	Start
				Stop
		Reset statistics *	Unit position 1	Reset
			Unit position 2	Reset
			Unit position 3	Reset
			Unit position 4	Reset
			Unit position 5	Reset
			Unit position 6	Reset

* The number of units displayed depends on the device configuration.
1 only as Administrator
2 only as Service Technician

15 Handover record

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

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

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

Notes:

Name of person receiving instruction:	Signature:

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

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

16 Country representatives

Country		Address
UA	UA.TR.099	**Уповноважений представник в Україні:** Приватне підприємство “Галіт” вул. 15 квітня, 6Є, с. Байківці, Тернопільський р-н, 47711, Україна тел.: 0800 502 998; +38 050 338 10 64 www.galit.te.ua; e-mail: office@galit.te.ua Виробник: Дюрр Дентал ЕсЕ Хьопфігхаймер Штрассе 17, Д-74321 Бітігхайм-Біссінген, Німеччина email: info@duerrdental.com
CH	CH REP	**Schweizer Bevollmächtigter:** DÜRR DENTAL SCHWEIZ AG Grabenackerstraße 27 8156 Oberhasli Switzerland
CN		**备**案人/生**产**企**业**： DÜRR DENTAL SE 德国迪珥**齿**科股份公司 住所/生**产**地址： Höpfigheimer Str. 17, 74321 Bietigheim-Bissingen, Germany **联**系方式： **电话**： + 49 7142 705-0 **邮**箱： info@duerrdental.com 网址： www.duerrdental.com 代理人/售后服**务单**位：迪珥医**疗**器械（上海）有限公司 住所：上海市**长**宁区天山路 641 号 2 号楼 (20 幢) 303 室 **联**系方式： **电话**：+ 86 21 6381 0270 **传**真：+ 86 21 6381 0290 **邮**箱：info@duerr.cn 网址：http://www.duerrdental.com

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