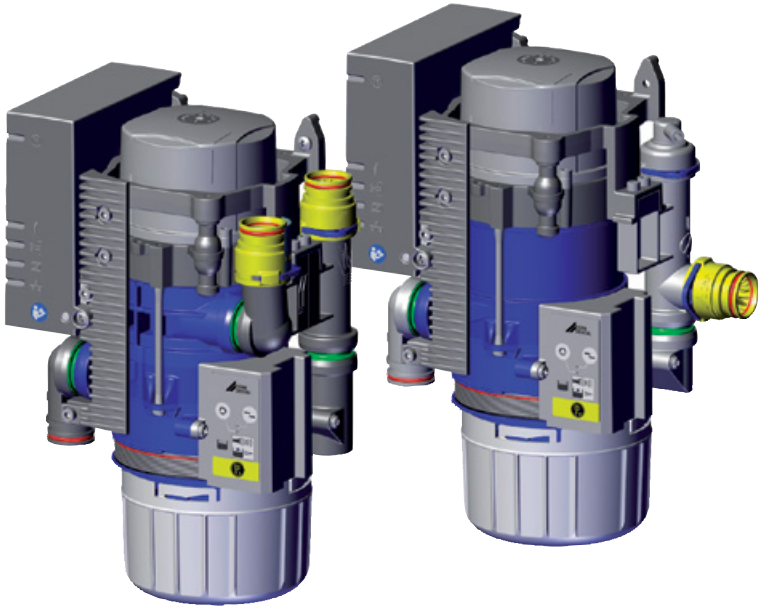


CAS 1 / CA 1 / CA 2 Basic Unit



EN

Installation and Operating Instructions



9000-606-26/30



1708V004

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Important information

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

 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.


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


 Hose manifold connection


 Spittoon connections

 Suction unit connection


 Drain connection

 Connection for supply with filter

 Unit in operation

 Unit operation interrupted

 Audible signal/melody sounds

 Do not reuse

 CE labelling

 Order number

 Serial number

 Manufacturer

1.2 Copyright information

All names of circuits, processes, names, software programs and units used in this document are protected by copyright.

The Installation and Operating Instructions must not be copied or reprinted, neither in full nor in part, without written authorisation from Dürr Dental.

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

CAS 1

The CAS 1 Combi-Separator is designed for continuous separation of liquids and air and for separation of amalgam from the entire waste water from dental treatment units.

CA 1 / CA 2 basic unit

The amalgam separator is designed for the separation of amalgam from the entire waste water from dental treatment units.

2.2 Intended use

Installation in accordance with the requirements of the water authorities in the German Federal States or in accordance with local regulations. In accordance with the installation regulations of DIBT Berlin.

The amalgam separator CA 1 is designed for installation immediately downstream of an air/water separation unit and is used to separate amalgam from the waste water from a single treatment unit.

The CAS 1 Combi-Separator is designed for the separation of liquids and air as well as for the separation of amalgam from the waste water from a single treatment unit in a dry system.

Installation in dental treatment units and in practice rooms (housing version). Positioned in the suction line after the spittoon and manifold.

The minimum volume of waste water that can be supplied to the unit is 0.1 l/min, but must not exceed 4.0 l/min. Here, a separation efficiency of at least 95% is maintained with amalgam.

A rinsing unit with fresh water can be installed in the suction line upstream of the Combi-Separator.

Installation, servicing and repairs must only be performed by qualified personnel specifically approved and authorized by Dürr Dental.

The disposable amalgam containers must only be used once.



For surgical treatments and when the Airflow is being used, the CAS 1 Combi-Separator requires a rinsing unit to be installed, which feeds a small amount of water to the device during aspiration. This thins any liquid (e.g. saliva, blood) that occurs so it can be transported more easily.

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.

The Combi-Separator / Amalgam Separator must only be used to process liquids from the oral cavity. It must not be used for the aspiration of any other substances, such as dust, sludge, plaster or similar.

Only chemicals and disinfectants that will not damage the materials, e.g. Orotol Plus or equivalent, must be used.

The unit is not suitable for installation downstream of 2 or more workplaces (exception: 7117-95 CA 2 Amalgam-Separator 230 V). The max. water volume of 4.0 l/min must not be exceeded.

The device must not be run in continuous operation; the braking process after the end of the run is required in order to keep the centrifuge drum clean.

The device must not be installed with the drain higher than the connection piece on the device. Do not use any risers. All pipes must have a downward gradient.

Not suitable for wet rooms. Do not use this device to aspirate flammable or explosive mixtures. Do not use the unit in a potentially explosive environment.

2.4 Systems, connection with other devices

Additional devices connected with medical electrical devices must be proven to conform with their corresponding IEC or ISO standards. All configurations must continue to comply with the standard requirements for medical systems (see IEC 60601-1-1 or section 16 of the 3rd edition of IEC 60601-1 respectively).

Whoever connects additional devices to medical electrical devices automatically becomes the system configurator and is responsible for

ensuring that the system corresponds with the standard requirements for systems. Local laws take priority over the requirements outlined above.

2.5 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.

2.6 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 "19 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.



DÜRR MEDICAL accepts no liability for damages or injury resulting from the use of non-approved accessories or special accessories, or from the use of non-genuine working parts or spare parts.

The use of non-approved accessories, special accessories or non-genuine working parts / spare parts (e.g. mains cable) can have a negative effect in terms of electrical safety and EMC.

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

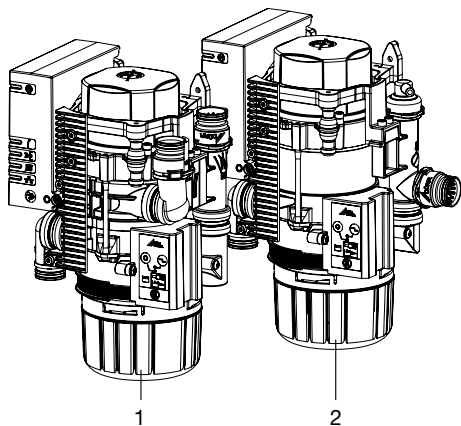


The unit may be contaminated. Instruct the company disposing of the waste to take the relevant safety precautions.

- › Decontaminate potentially contaminated parts before disposing of them.
- › Untamminated 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.




3 Overview



- 1 CAS 1 Combi-Separator
- 2 CA 1 Amalgam Separator

3.1 Scope of delivery

 Depending on the variant, the scope of delivery can vary slightly.

The following items are included in the scope of delivery:

CAS 1 **7117-100-5x**
or

CAS 1 **7117-100-6x**

- Combi-Separator
- or Combi-Separator incl. station selection valve
- Rinsing unit
- Replacement disposable amalgam container
- Installation and Operating Instructions
- Operating Handbook

CA 1 **7117-100-9x**

- Amalgam separator
- Surge tank
- Housing
- Replacement disposable amalgam container
- Installation and Operating Instructions
- Operating Handbook

3.2 Special accessories

The following optional items can be used with the device:

Various installation sets are available on request.

- Display panel 7805-116-00E
- Cable for display panel, 1 m 9000-119-043
- Cable for display panel, 3 m 9000-119-042
- Station selection valve..... 7560-500-60
- Station selection valve for
CAS 1 / CS 1 7560-500-80
- Rinsing unit II 7100-250-50
- Vario rinsing unit 7100-260-50
- Housing 7117-800-51
- Safety transformer 24 V, 100VA. . . 9000-150-46
- Surge tank for CA 1 7117-800-60
- OroCup care system 0780-350-00
- Test vessel 7117-064-00

3.3 Disposable materials

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

- Disposable amalgam container . . . 7117-033-00
- Disposable amalgam container for
CA 2. 7117-037-00
- DürrConnect protective strainer,
5 pieces 0700-700-18E
- DürrConnect protective strainer,
5 pieces 0700-700-28E
- 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

3.4 Wear parts and spare parts

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

Bellows. 7117-420-25E
Service kit (3-year interval). 7117-980-32
Service kit (5-year interval). 7117-980-30



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

4 Technical data

4.1 CAS 1 Combi-Separator

Electrical data – centrifuge motor

| | | |
|-----------------|----|---------|
| Nominal voltage | V | 24 AC |
| Frequency | Hz | 50 / 60 |
| Rated power | VA | 100 |

Electrical data – electronics

| | | |
|-------------------------------------|---|----------|
| Nominal voltage | V | 24 AC |
| Nominal current | A | 0.2 |
| Signal input from the hose manifold | V | 24 AC/DC |

Media

| | | |
|---|----------|--------------|
| Air flow volume | l/min | ≤ 300 |
| Flow rate | | high |
| The suction system must be suitable for a high flow rate in accordance with EN ISO 10637. | | |
| Max. pressure | hPa/mbar | -160 |
| Min. volume of aspiration fluid | l/min | ≥ 0.1 |
| max. | l/min | ≤ 1.0 |
| Water supply, spittoon | l/min | ≤ 3 |
| Total flow of waste liquids | l/min | ≤ 4 |
| Usable volume in amalgam collecting container | ccm | c. 90 |
| Replacement interval | | 4 - 6 months |

General data

| | | |
|---------------------------|-------|-----------------|
| Drive motor nominal speed | rpm | 2800 |
| Operating mode | | S5 95% DC* |
| Type of protection | | IP 20 |
| Protection class | | II |
| Noise level ** approx. | dB(A) | 56 |
| Dimensions (H x W x D) | mm | 255 x 151 x 110 |
| Weight, approx. | kg | 2.7 |
| Separation rate | % | ≥ 95 |
| Medical device (class) | | I |

* DC = duty cycle

** Noise levels in acc. with EN ISO 1680 "airborne noise emissions"; measured in a sound-proofed room. The levels are average values with a tolerance of ±1.5 dB(A). Higher values may be obtained in rooms with reverberating sound characteristics.

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 |

4.2 CA 1 Amalgam Separator

Electrical data – centrifuge motor

| | | |
|-----------------|----|---------|
| Nominal voltage | V | 24 AC |
| Frequency | Hz | 50 / 60 |
| Rated power | VA | 60 |

Electrical data – electronics

| | | |
|-------------------------------------|---|----------|
| Nominal voltage | V | 24 AC |
| Nominal current | A | 0.2 |
| Signal input from the hose manifold | V | 24 AC/DC |

Media

| | | |
|---|-------|--------------|
| Fluid amount, minimum | l/min | ≥ 0.1 |
| Total flow of waste liquids | l/min | ≤ 4 |
| Usable volume in amalgam collecting container | ccm | c. 90 |
| Replacement interval | | 4 - 6 months |

General data

| | | |
|---------------------------|-------|----------------|
| Drive motor nominal speed | rpm | 2800 |
| Operating mode | | S5 95% DC* |
| Type of protection | | IP 20 |
| Protection class | | II |
| Noise level ** approx. | | |
| without housing | dB(A) | 53 |
| with housing | dB(A) | .. |
| Dimensions (H x W x D) | mm | 255 x 151 x110 |
| Weight | kg | c. 2.7 |
| Separation rate | % | ≥ 95 |
| Medical device (class) | | I |

* DC = duty cycle

** Noise levels in acc. with EN ISO 1680 "airborne noise emissions"; measured in a sound-proofed room. The levels are average values with a tolerance of ±1.5 dB(A). Higher values may be obtained in rooms with reverberating sound characteristics.

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 |

4.3 CA 2 basic unit

Electrical data – centrifuge motor

| | | |
|-----------------|----|---------|
| Nominal voltage | V | 24 AC |
| Frequency | Hz | 50 / 60 |
| Rated power | VA | 60 |

Electrical data – electronics

| | | |
|-------------------------------------|---|----------|
| Nominal voltage | V | 24 AC |
| Nominal current | A | 0.2 |
| Signal input from the hose manifold | V | 24 AC/DC |

Media

| | | |
|---|-------|--------------|
| Fluid amount, minimum | l/min | ≥ 0.1 |
| Total flow of waste liquids | l/min | ≤ 4 |
| Usable volume in amalgam collecting container | ccm | c. 180 |
| Replacement interval * | | 4 - 6 months |

* Depending on the level of use of the connected treatment units.

General data

| | | |
|---------------------------|-------|-----------------|
| Drive motor nominal speed | rpm | 2800 |
| Operating mode | | S5 95% DC* |
| Type of protection | | IP 20 |
| Protection class | | II |
| Noise level ** approx. | dB(A) | 53 |
| Dimensions (H x W x D) | mm | 277 x 151 x 110 |
| Weight | kg | c. 2.7 |
| Separation rate | % | ≥ 95 |
| Medical device (class) | | I |

* DC = duty cycle

** Noise levels in acc. with EN ISO 1680 "airborne noise emissions"; measured in a sound-proofed room. The levels are average values with a tolerance of ±1.5 dB(A). Higher values may be obtained in rooms with reverberating sound characteristics.

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

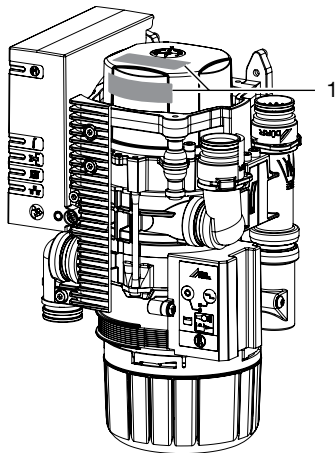
| | | |
|-------------------|----|------------|
| Temperature | °C | -10 to +60 |
| Relative humidity | % | < 95 |

Ambient conditions during operation

| | | |
|-------------------|----|------------|
| Temperature | °C | +10 to +40 |
| Relative humidity | % | < 70 |

4.4 Type plate

The type plates are located on the cover of the motor.



1 Type plate

4.5 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.

4.6 Approvals

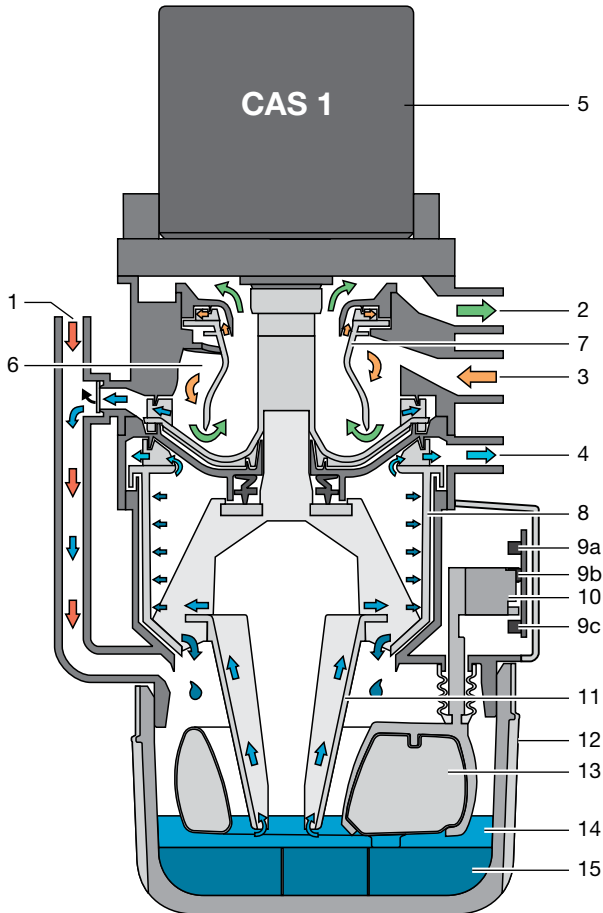
**Centre of Competence in Civil Engineering,
Berlin**

| | |
|-------------|-----------|
| Test number | Z-64.1-20 |
|-------------|-----------|

**Separation method compliant with stand-
ard**

| | |
|-----------|--------|
| ISO 11143 | Type 1 |
|-----------|--------|

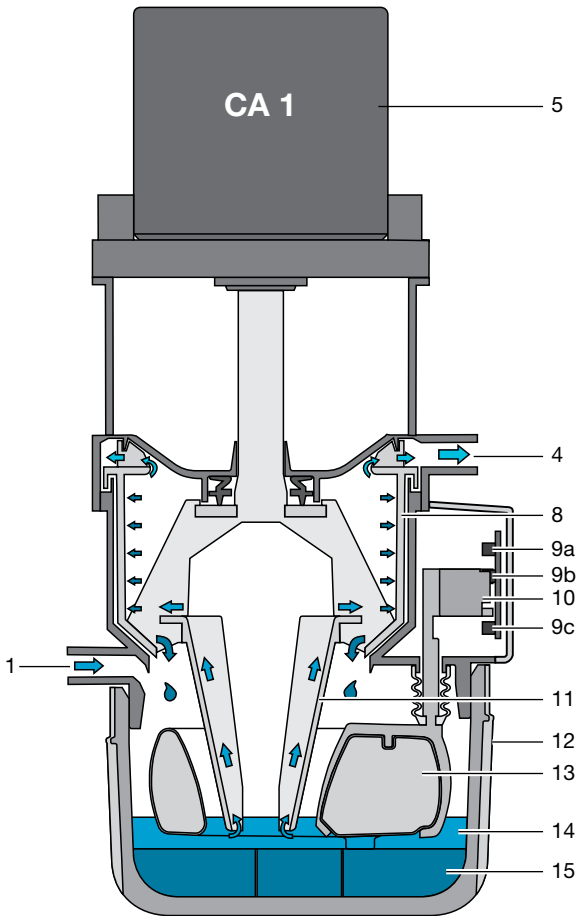
5 Operation



- 1 Fluid intake
- 2 Vacuum, to suction unit
- 3 Aspiration input
- 4 Fluid output
- 5 Motor
- 6 Separation
- 7 Separation rotor
- 8 Centrifuge
- 9 Light barriers (3x)
- 10 Sensor enclosure
- 11 Cone pump
- 12 Amalgam collector vessel
- 13 Float sensor
- 14 Fluids
- 15 Amalgam particles



EN



- 1 Fluid intake
- 4 Fluid output
- 5 Motor
- 8 Centrifuge
- 9 Light barriers (3x)
- 10 Sensor enclosure
- 11 Cone pump
- 12 Amalgam collecting container
- 13 Float sensor
- 14 Fluids
- 15 Amalgam particles

5.1 Operation

CAS 1 Combi-Separator

The task of the CAS 1 combi-separator is to provide continuous separation of secretions and air as well as the amalgam separation of all the waste water from the treatment unit.

The waste water flows through the connection (1) from the spittoon directly into the centrifuge (8) and amalgam separation.

During the suction phase the aspirated secretions are separated from the aspirated air in the separation unit (6). The secretions accumulating in the separation unit are continuously transported to the centrifuge (8), where the amalgam particles are then separated.

Underneath the centrifuge is a replaceable amalgam collector vessel (12), into which the separated amalgam particles (15) are rinsed once the centrifuge (8) is switched off. A float sensor (13) checks the level within the collector vessel and sends a signal to the display panel when it needs replacing. In combination with a light barrier (9c), this float sensor also monitors whether a collector vessel is in use.

The compact size of the CAS 1 Combi-Separator allows it to be installed in dental treatment units. This results in short secretion carrying lines. After the centrifuge is switched off, the braking cycle triggers a self-cleaning process. This self-cleaning process also leads to smooth and silent running, as well as providing a separation efficiency of more than 95%, even under heaviest loads.

CA 1 Amalgam Separator / CA 2 Basic Unit

The task of the CA 1 Amalgam Separator / CA 2 Basic Unit is to separate amalgam from all of the waste water of the treatment unit.

During the aspiration process, the aspirated secretions are separated from the aspirated air in the separation chamber of the upstream separation unit. The secretions accumulating in the separation chamber are continuously fed via the connection (1) to the centrifuge (8), where the amalgam particles are then separated out.

Underneath the centrifuge is a replaceable amalgam collector vessel (12), into which the separated amalgam particles (15) are rinsed once the centrifuge is switched off. A float sensor (13) checks the level within the collector vessel and sends a signal to the display panel when it needs replacing. In combination with a light barrier (9c), this float sensor also monitors whether a collector vessel is in use.

Once the centrifuge is switched off, a self-cleaning process is triggered by the braking cycle.

This self-cleaning process also leads to smooth and silent running, as well as providing a separation efficiency of more than 95%, even under heaviest loads.

5.2 Separation

At the inlet connection (3) of the CAS 1, the aspirated fluid/air mix is accelerated and set into a spiral motion in the separation unit (6). The resulting centrifugal forces sling the aspirated particles against the outer wall. The air is continuously separated from the fluid and escapes via the spinning separation rotor (7) to the suction unit.

The aspirated air is subject to high centrifugal forces by the separation rotor (7), which is driven by the motor (1), which ensures that no fluid or blood foam can be carried into the suction unit.

The spiral motion feeds the separated fluid continuously to the pump wheel, which transports the fluid into the collector vessel. The fluid is transported to the centrifuge (8) via a pump cone (11).

An external station selection valve connects the CAS 1 with the suction unit via the vacuum connection (2).

5.3 Spittoon connections

The waste water from the spittoon flows through a protective strainer on the fluid inlet (1) and into the collector vessel (12). Once sufficient fluid has been collected, the float sensor (13) activates a light barrier (9a) and (9b) via a sensor housing (10) and switches on the motor (1). The fluid is transported to the centrifuge (8) via a pump cone (11).

5.4 Station selection valve / safety valve


The station selection valve has 2 tasks:

1st task:

The station selection valve interrupts the suction flow between the hose manifold and the suction unit. As soon as a suction hose is removed from the hose manifold, a solenoid valve opens the station selection valve and suction flow is enabled.

2nd task:

The station selection valve also acts as a safety valve. If the CAS 1 is over-full or not functioning properly, the system will perform a safety shutdown. This safety shutdown prevents fluids from being drawn into the dry suction pipe.

 For single station suction systems, the station selection valve takes over the function of the safety valve.

In various types, a station selection valve is already integrated in the CAS 1. The station selection valve is on the connection (2) of the CAS 1.

5.5 Amalgam separation

The switches in the hose manifold or the light barrier of the sensor system switch on the motor and the associated centrifuge (8).

The fluid containing amalgam particles flows continuously to the collector vessel (12). The fluids ejected by the centrifuge are pumped through the fluid output (4) to the central waste water system.

As soon as no further fluid is fed to the amalgam separator, e.g. when the suction hose is placed back in the hose manifold, the centrifuge drum is switched off after a short delay time. This switch-off brakes the motor, as a result of which the ring of water, which continues to rotate due to inertia, rinses the separated particles out of the centrifuge (8) downwards into the collector vessel.

The separated amalgam particles form a sediment in the replaceable collector vessel. The level of fluid in the collector is regulated by the pump cone so that the risk of fluid escaping when the collector vessel is changed can be avoided.

5.6 Sediment level measurement

The fill level in the collector vessel (12) is checked by a float sensor (13) every time the main power switch is switched on.

The centrifuge motor starts, fluid is transported via the pump cone to the centrifuge drum (8) and provides a constant level of fluid (underside of the cone pump) in the collector vessel. The float sensor sinks. Two light barriers (9a) and (9b) measure the fluid level. Once the level reaches 95% in the collector vessel, this is displayed on the display panel.

5.7 Operating problems

If the unit is not ready for operation due to a fault, this will be indicated on the display panel via illuminated LEDs and an audible signal.

5.8 Service key

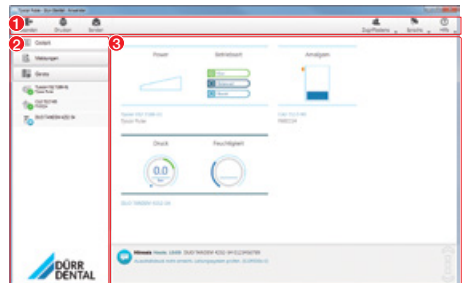
On the display panel there is a service key that can be used to switch off the audible signal in the event of a fill level warning or if a fault message is indicated. This button can also be used to start the device manually. To do this, press the button for longer than 2 seconds until the drive motor starts up.

5.9 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.

 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), it can be seen in the task bar. The symbol shows the current status of the devices. If a new message appears, a speech bubble tip also appears.



6 Requirements

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 Setup options

CAS 1 Combi-Separator

- Directly in the treatment unit.
- In a special housing in an extension of the treatment unit.

CA 1 Amalgam Separator

- In a special housing in an extension of the treatment unit.
- In a side room, together with a combination suction unit or a suction unit in a wet suction system.

6.3 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

6.4 Installation and routing 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.

6.5 Information about electrical connections

- › Ensure that electrical connections to the mains power supply are carried out in accordance with current valid national and local regulations and standards governing the installation of low voltage units in medical facilities.
- › Install an all-pole disconnect switch with a contact opening width of at least 3 mm in the electrical connection to the mains power supply.
- › Observe the current consumption of the devices that are to be connected.
- › Install electrical lines without mechanical tension.
- › Make the electrical connection via the main power switch of the treatment unit or via the main power switch of the practice.

6.6 Information about connecting cables

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) |
| 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 |

Wire cross-section

Unit feed:

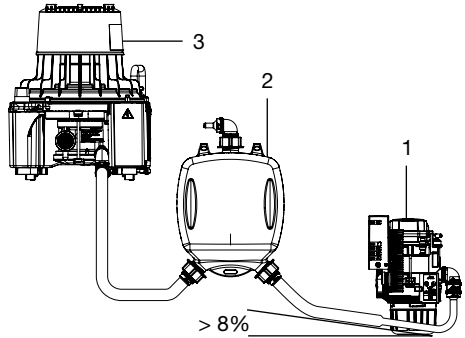
– 0.75 mm²

Connection external valves / units:

– 0.5 mm²

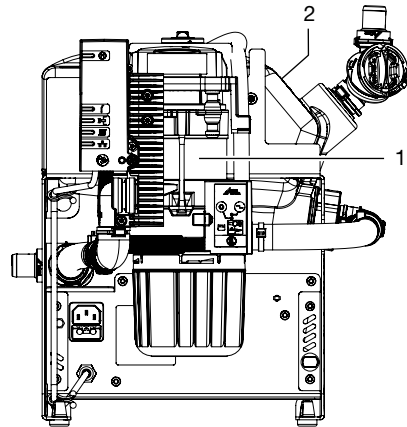
7 Combination variants

7.1 Single-station combination suction unit



- 1 CA 1
- 2 Surge tank
- 3 VS 300 S combination suction unit

7.2 With buffer vessel as CA 2



- 1 CA 2 basic unit
- 2 Buffer vessel

8 Installation



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

8.1 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.



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).

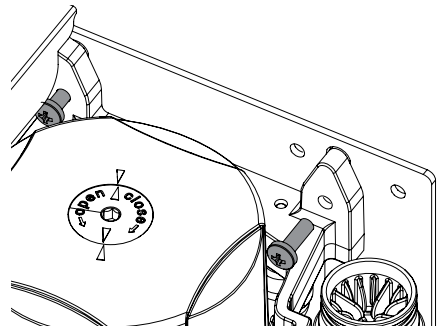
8.2 Installation of the CAS 1 in treatment units



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).

Attach the unit vertically at a suitable position in the treatment unit. The unit is mounted on rubber pads and suspended in a metal frame. This mounting arrangement prevents the transmission of any vibrations to the treatment unit while the device is running. Vibrations may occur if the unit is not positioned vertically. A minimum distance of 3 mm must be maintained to the surroundings.



Station selection valve

In various types, the station selection valve is directly mounted on the CAS 1. The station selection valve (for separate installation) should be fitted in the suction pipe in the treatment unit, preferably near the end connection in the floor socket. In some installation setups the station selection valve also functions as a safety valve, so its actuation must be implemented via the CAS 1.

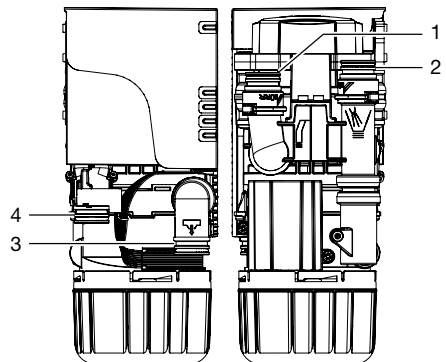
For further information, refer to the station selection valve installation and operating instructions

Inlet and outlet hoses

Connect and attach the inlet and outlet hoses with DürrConnect connectors to the relevant connections on the unit. Route the hoses at an incline.

Recommended diameter of the connection hoses: \varnothing 25 mm.

The minimum nominal width for the outlet hose is 15 mm.



- 1 Hose manifold
- 2 Spittoon
- 3 Outlet
- 4 Suction unit

Spittoon connections

In some dental units it is possible that noises can be heard at the spittoon, which are amplified by the funnel shape of the spittoon itself. In this case, the outlet between spittoon and CAS 1 should be bled. A corresponding siphon trap with ventilation is available as a special accessory.


Rinsing unit

It is recommended that the suction system is equipped with a rinsing unit, e.g. in the treatment unit. The rinsing unit provides a small amount of water during aspiration. This dilutes the aspirated fluids (blood, saliva, rinsing water, etc.), which can then be transported more effectively.

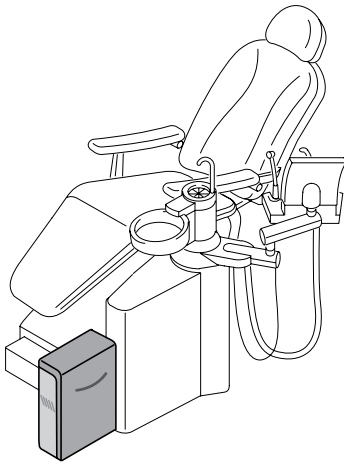
For further information, refer to the rinsing unit installation and operating instructions

Installation sets

Installation sets and detailed documentation for various installation situations are available from the manufacturers.

 When installed in a housing, ventilation slits should be provided to avoid heat build-up in the housing.


8.3 Installation in a housing



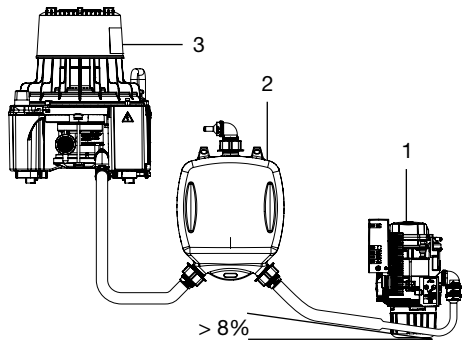
Unit in a housing, e.g. next to the treatment unit. See "Installation information CAS 1 in a housing"

8.4 Installation of the CA 1 next to the suction unit

› If possible, place the unit directly next to the suction unit; max. distance 30 cm.

 If the distance between the unit and suction unit is too large, there is a risk of sedimentation forming and the outlets becoming blocked if the hoses are installed and routed unfavourably.

Surge tank



- 1 CA 1
- 2 Surge tank
- 3 VS 300 S combination suction unit

The fluid must flow without pressure to the CA 1. To ensure this, a surge tank must be installed between the suction unit and CA 1.

A suitable surge tank is available as a special accessory.

8.5 Electrical connections, controller

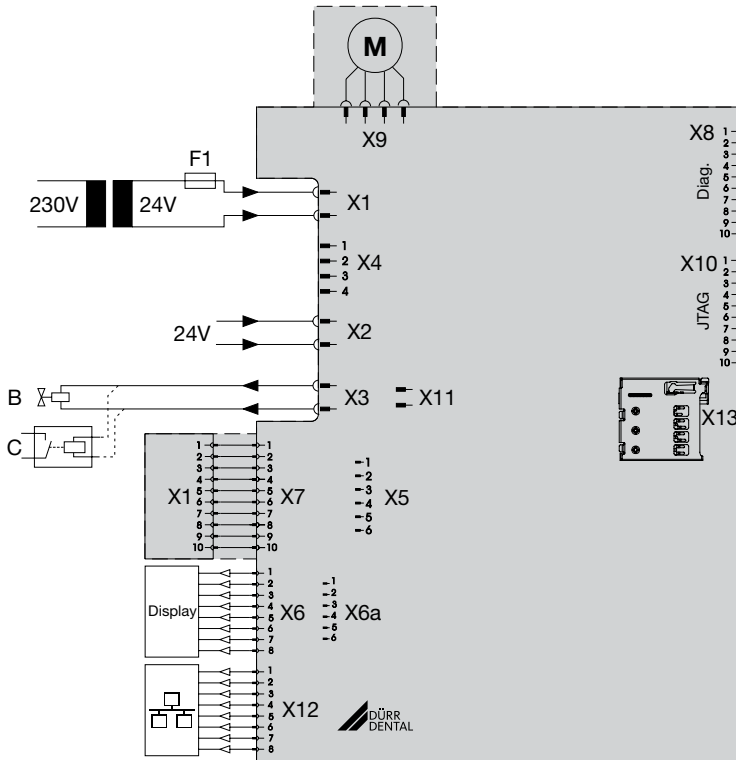
Power supply:

– Safety transformer order number: 9000-150-46

or

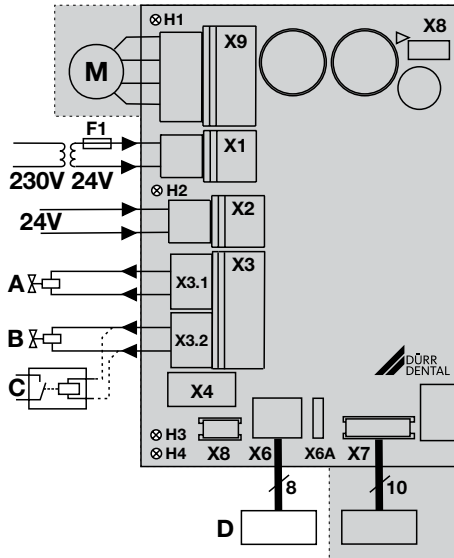
– Safety transformer 24 V AC with a with an isolator consisting of two means of patient protection (MOPP) between the mains circuit and secondary circuit, min. 100 VA, secondary fuse T 4 AH (or IEC 60127-2/V T 4 AH, 250 V)

Control with network connection



- X1 Power supply in accordance with EN 60601-1, 24 V AC
- X2 Signal input 24 V AC/DC
- X3 Rinsing unit or place selection valve / safety valve (CAS 1 only)
- X4 CAN bus
- X6 Display panel, external (X6a = connection for predecessor model)
- X7 Sensor technology
- X9 Motor
- X11 Integrated place selection valve / safety valve (CAS 1 only)
- X12 Network connection (when using Tyscor Pulse)
- F1 Fuse 4 A
- B Rinsing unit
- C Suction unit relay (alternative)

Control without network connection



- X1 Power supply in accordance with EN 60601-1, 24 V AC
- X2 Signal input 24 V AC/DC
- X3.1 Place selection valve / safety valve (only CAS 1, max. output 8 W)
- X3.2 Rinsing unit (CAS 1 only)
- X4 CAN bus
- X6 Display panel, external (X6A = connection for predecessor model)
- X7 Sensor technology
- X8 Production interface
- X9 Motor
- H1 Motor control display
- H2 Manifold control display
- H3 Place selection valve control display
- H4 Control display, collecting container missing
- A Place selection valve
- B Rinsing unit
- C Suction unit relay (alternative)
- D Display panel, external


8.6 Electrical connections

Station selection valve / safety valve


- › Connect the station selection valve / safety valve using a 2-core wire with connector to the X3 connection of the control.

Rinsing unit

- › Connect the rinsing unit using a 2-core wire with connector to the X3 connection of the control.

 At the connection for the rinsing unit, a suction unit relay, for example, can be connected if there is no isolation present between the suction unit signal and station selection valve in the treatment unit. Note the power consumption of the suction unit relay.

Display panel


 The display panel is used to indicate messages acoustically and visually (via LEDs).

A display panel is already integrated in the unit and should be visible/audible at all times.

If the display panel is not visible/audible, fit an additional display panel in an easily visible location. The display panel is connected to the X6 socket (RJ-45 socket). An existing Dürr Dental display panel with a 6-pin connector can be connected to the X6A connector when replacing an older device.

If the installation of the amalgam separator in a neighbouring room or in the basement results in distances of more than 3 m, we recommend installing a shielded network cable with RJ-45 sockets.

8.7 Network connection


 All connected IT units must correspond to the currently-valid edition of IEC 60950.

Purpose of the network connection

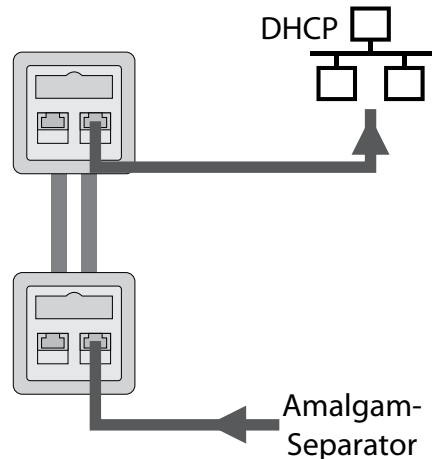
The network connection is used to exchange information or control signals between the unit and a software installed on a computer, in order to, e. g.:

- 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

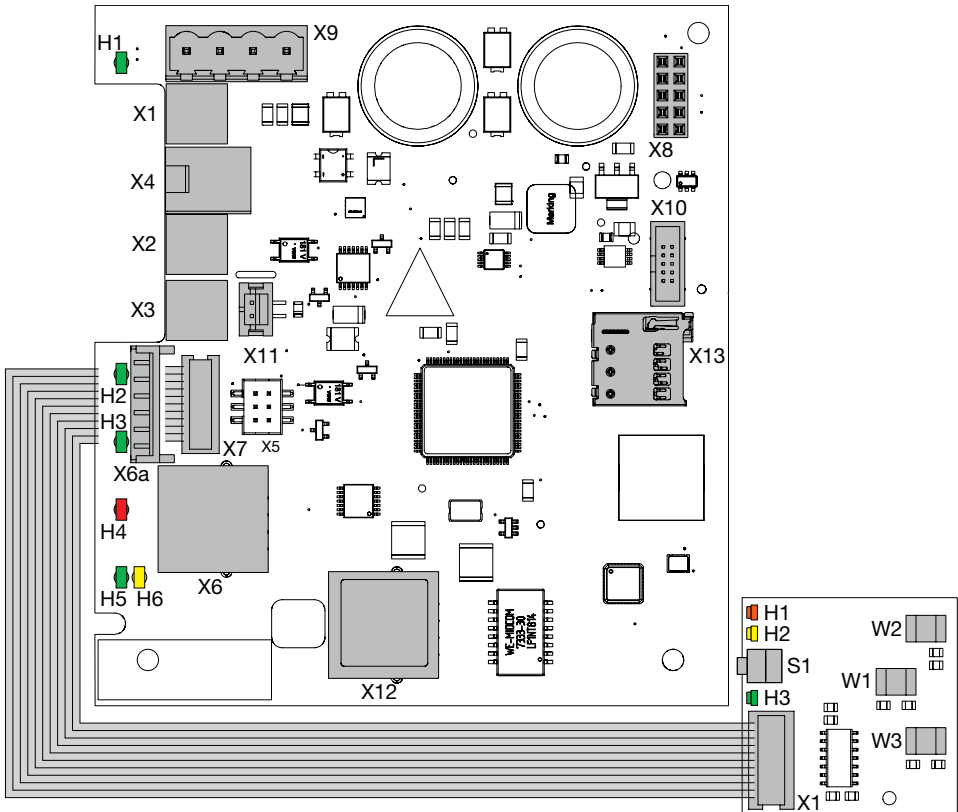
Connecting the unit to the network

 During initial installation, a router or server with DHCP is recommended so the unit is detected in the network.

- › Remove the cover from the electronics.
- › Plug the network cable into the electronics and into a network socket.
- › Attach the network cable to the device.
- › Create a connection to the network in the surgery with the network cable.



8.8 Connections and displays of the control



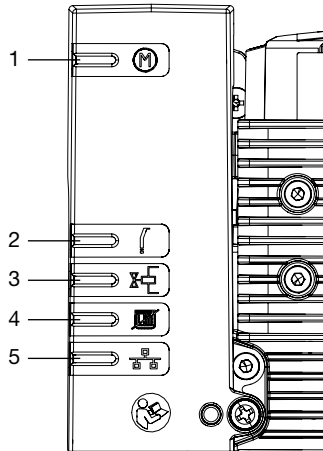
Main PCB (main board)

- X1 Power supply in accordance with EN 60601-1, 24 V AC
- X2 Signal input 24 V AC/DC (optional for CA 1 + 2)
- X3 Rinsing unit or place selection valve / safety valve (CAS 1 only)
- X4 CAN bus
- X6 Display panel, external (X6a = connection for predecessor model)
- X7 Sensor technology
- X8 Production interface
- X9 Motor
- X10 JTAG programming interface
- X11 Integrated place selection valve / safety valve (CAS 1 only)
- X12 Network connection (when using Tyscor Pulse)
- X13 SD card holder (for Micro SD), optional
- H1 Motor display
- H2 Manifold display
- H3 Display, place selection valve
- H4 Display, collecting container missing
- H5 Network display
- H6 Network display

Sensor PCB

- X1 Main PCB (main board)
- H1 Display red
- H2 Yellow LED display
- H3 Green LED display
- S1 Service key
- W1 Fork light sensor
- W2 Fork light sensor
- W3 Fork light sensor

8.9 LEDs and symbols



- 1 Motor (H1)
- 2 Manifold (H2)
- 3 Station selection valve (H3)
- 4 Collector vessel missing (H4)
- 5 Network (H5, H6)

9 Commissioning and first start-up

i 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.
- › Check the aspiration function.
- › Check the start function via the spittoon.
- › Check the connections, hoses and device for leaks.

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.

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.

i 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, 8080 ¹⁾ TCP, 2005 TCP | Unit data | |
| 514 ¹⁾ UDP | Event protocol data | Syslog |
| 22 TCP, 23 TCP | Diagnosis | SSH, Telnet |
| 123 UDP | Time | NTP |
| 2006 | Diagnosis | |

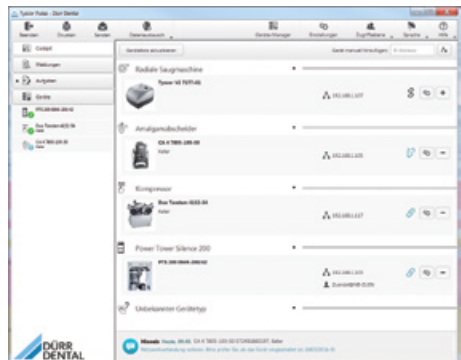
¹⁾ The port can vary depending on the configuration.

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

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

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:

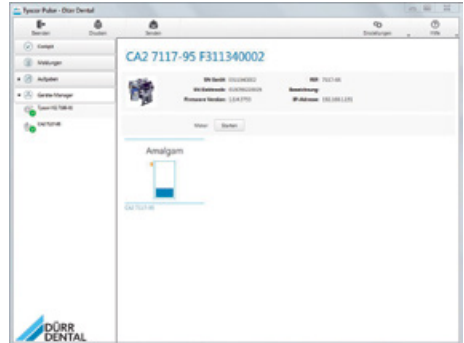
- Administrator or Service Technician access level selected.
- › Click on the device in the device list with the left mouse button and keep the mouse button pressed.
- › With the mouse key pressed, drag the unit onto the cockpit.

- › 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.

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 Service program

1

2

3

4

5

6

11 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.

11.1 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.

11.2 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.

11.3 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 collector vessel is used for this, the different levels can be scanned and made visible on the display panel.

While changing the collectors (collector vessel - test collector vessel) in the service program the unit remains in the ON state.

11.4 Motor start - motor braking

The drive motor starts and, after approx. 5 seconds, braking is applied. If the service key is pressed during these 5 seconds, the motor will immediately be braked.

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

The drive motor starts up.

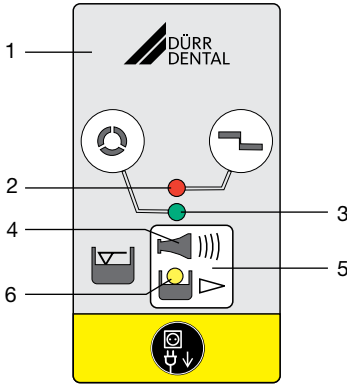
As a result of the rpm monitoring, the LED will change from orange to green upon start-up and from green to orange upon braking.

11.5 Input and output signals

- After this program item is activated, the yellow LED flashes and a cycled DC voltage (approx. 22-30 V) can be measured at the terminal for the rinsing unit.
- If the suction hose is lifted off the hose manifold the green LED will also come on.
- Removal of the collecting container causes the red LED to illuminate.



12 Display/handling



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

12.1 Ready for operation

- Green LED is on

12.2 Amalgam collector vessel is 95% full

- Yellow LED is on
- Green LED is on

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.

12.3 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 collecting container needs to be replaced. Wear protective equipment to avoid any risk of infection (e.g. liquid-tight protective gloves, protective goggles, face mask).
- 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 collecting container has been replaced



12.4 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 collecting container.
- Switch on the unit.
- Green LED lights up – "Ready for operation"


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

12.5 Motor fault


-  Red display and
-  green LED flash alternately

 Audible signal

- 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.
- Green LED lights up – "Ready for operation"

 If, after pressing the reset button repeatedly, the fault report reappears again each time, this indicates a technical defect – inform your Service Technician.

13 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.

13.1 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

13.2 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.

13.3 Completing the task

Due tasks appear as a message in the cockpit.



 The task can be assigned to an access level (operator, administrator or service technician), which then means that it can only be confirmed from this access level.

- › Perform the task.
- › Confirm the task in the software.

Result:

The due date of the task is set to the next date.

13.4 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.

14 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.

14.1 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.

14.2 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.

14.3 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 Dürer 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.

15 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.

15.1 Disposal of the collector vessel



Used amalgam collector vessels must not be sent in the post!




Dürr Dental is not a waste management company and is not allowed by law to accept any filled amalgam collector vessels.


- › Arrange to have filled amalgam collector vessels collected from the surgery by a local waste management company.
- › New amalgam collector vessels should be ordered from your specialist dental equipment retailer.
- › Document the replacement and legally compliant disposal of the filled waste amalgam collector vessel in the Operating Handbook.



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.

16 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).

| Maintenance interval | Maintenance work |
|---|--|
| Dependent upon the level of usage of the device | <ul style="list-style-type: none"> › Replace the amalgam collecting container when a fill level of 95% or 100% is indicated on the display panel › Clean or replace protective sieves during replacement of the amalgam collecting container. At the latest, do this when the suction or draining power of the device decreases. |
| Annually | <ul style="list-style-type: none"> › Cleaning of the suction unit in accordance with the operating instructions. › Clean the float. * › Replace the bellows. * |
| Every 3 years | <ul style="list-style-type: none"> › Replace the rubber grommets on the connections. * › Replace the float. * |
| Every 5 years | <ul style="list-style-type: none"> › Replace the centrifuge drum and seal. * › Replace all O-rings (from the replacement parts kit) in the device. * › Replace the rubber grommets on the connections. * › Replace the float. * |

* Only by customer services service technicians.

16.1 Additional maintenance work for CA 2

| Maintenance interval | Maintenance work |
|----------------------|--|
| Monthly | <ul style="list-style-type: none"> › Check the yellow filter at the inlet of the buffer vessel and clean if necessary. |
| Annually | <ul style="list-style-type: none"> › Check the throttle at the inlet of the CA 2 basic unit for contamination and clean if necessary. * |
| Every 3 years | <ul style="list-style-type: none"> › Replace the throttle with ventilation. * › Replace the ventilation valve. * › Replace the nonreturn valve. * |

* Only by customer services service technicians.

16.2 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).



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.

For inspection, the following are required:

- Test vessel

Work steps to be performed:

- › General functional check (e.g. aspiration, spittoon inlet)
- › Service program

The following measurement times apply to fill level measurements with a test vessel:

- For a fill level of 95%, the measurement result is displayed after approx. 30 sec, whereby the drive motor is briefly switched off during the measurement.
- At a fill level of 100% the measurement result is displayed after approx. 90 sec continuous running.

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:

- › Fill the test vessel with water and insert it into the unit.
- › Start the device and wait until it switches off again.
- › 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 140 ml in the **test vessel**.

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



17 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.



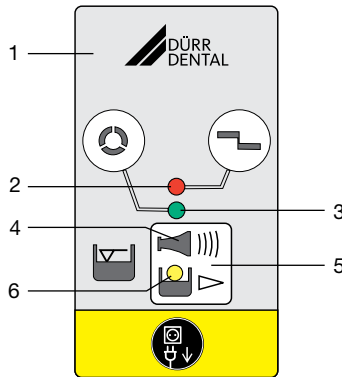
WARNING

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).



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

| Fault | Probable cause | Solution |
|--|---|--|
| Device not "ready for operation" No display on the display panel. | The main power switch of the treatment unit or surgery is not switched on | › Main power switch ON. |
| | If an external display panel is fitted: cable not correctly connected | › Check cable connections. |
| | Fuses have tripped | › Replace the fuses of the transformer. * › Replace the fuses in the cold-device plug (CA 2). |
| | Mains cable not plugged in (CA 2) | › Check the mains cable connections. |

| Fault | Probable cause | Solution |
|--|--|---|
| Yellow display is on GREEN LED illuminates Audible signal melody sounds | Amalgam collecting container is 95% full | ➤ Change the amalgam collecting container. |
| | Float sensor dirty or blocked | ➤ If this display occurs repeatedly even when the collecting container is empty, check that the float sensor can move freely. |
| Yellow display is on Red display flashes Audible signal melody sounds | Amalgam collecting container is 100% full | ➤ Change the amalgam collecting container. Audible signal can no longer be switched off. |
| | Float sensor dirty or blocked | ➤ If this display occurs repeatedly even when the collecting container is empty, check that the float sensor can move freely. |
| | Waster water line/siphon trap dirty | ➤ Clean the waste water line/siphon trap. * |
| The RED and GREEN displays flash alternately Audible signal | Motor is dirty or defective | ➤ Check motor for smooth running; replace the centrifuge if necessary. * ➤ Replace the device. * |
| | Contact problems at X9 | ➤ Plug in the connector correctly. * ➤ Replace the PCB main board and connector on the motor. * |
| Orange LED flashes Audible signal | | Press the service key briefly to switch off the audible signal |
| | Amalgam collecting container not correctly in position | ➤ Switch OFF the device. ➤ Insert the amalgam collecting container in the correct position. ➤ Switch ON the device. |
| | Float sensor missing | ➤ Insert the float sensor. * |
| Water accumulating in the spittoon | Coarse sieve in the fluid inlet blocked | ➤ Clean the coarse sieve. |
| | Outlet ineffective or not vented | ➤ Check or retrofit the ventilation. * |
| Suction power too weak or interrupted | Coarse sieve is blocked on the inlet of the aspiration | ➤ Clean the coarse sieve. |
| | Place selection valve not or incompletely open | ➤ Check the control voltage. * ➤ Clean the place selection valve. * |
| Device running continuously | Float sensor blocked in water start position | ➤ Clean the float. * ➤ Free up the float sensor linkage so that it can move freely. * |
| | Start signal at the signal input (X2) | ➤ Check the control voltage. * |
| | Waster water line/siphon trap dirty | ➤ Clean the waste water line/siphon trap. * |
| Noise at the spittoon | Outlet ineffective or not vented | ➤ Check or retrofit the ventilation. * |

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| Fault | Probable cause | Solution |
|---|---|--|
| Increased vibration of the device | Pump cone dirty | › Clean or replace the pump cone. * |
| | Centrifuge dirty | › Clean or replace the centrifuge. * |
| | Water supply too low | › Introduce water into the suction pipe. › Retrofit the rinsing unit. * › Check the rinsing unit for its correct installation position. * › Check the function of the rinsing unit. * |
| | | |
| | | |
| Backlog at the inlet of the buffer vessel, or insufficient draining of water from the buffer tank (CA 2) | Unit was suspended at an angle or is not horizontal | › Suspend or stand the unit horizontally. * |
| | Yellow filter in the filter unit dirty | › Clean the filter. * |
| | Poor ventilation | › Check the ventilation at the throttle, clean it if required. * › Check the relief valve. * |
| | | |
| | Water inlet too high | › Reduce the amount of water. |
| Throttle at the CA 2 basic unit dirty | › Clean the throttle and hose to the throttle. * | |
| Water cannot be pumped away or only insufficiently | Centrifuge dirty | › Clean or replace the centrifuge. * |
| | Nonreturn valve on the waste water outlet is defective (CA 2) | › Replace the nonreturn valve. * |
| | Waster water line/siphon trap dirty | › Clean the waste water line/siphon trap. * |

* Only by customer services service technicians.

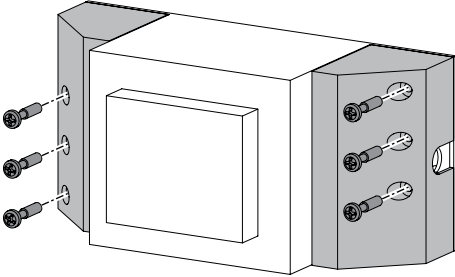
17.1 Replacing the fuse



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

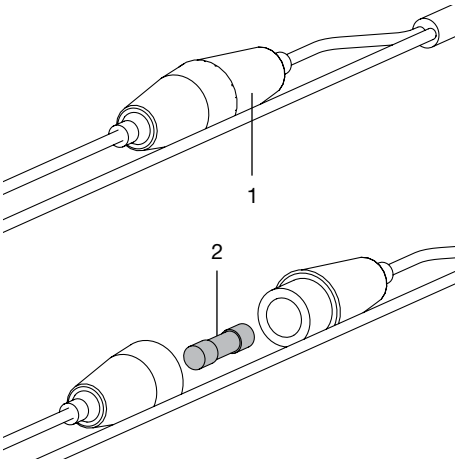
Transformer

- › Unscrew and remove the safety cover.
- › Replace the fuse.



Fuse housing

- › Turn the fuse housing to open it.
- › Replace the fuse.



- 1 Fuse housing
- 2 Fuses

18 Transporting the unit



WARNING

Infection due to contaminated unit

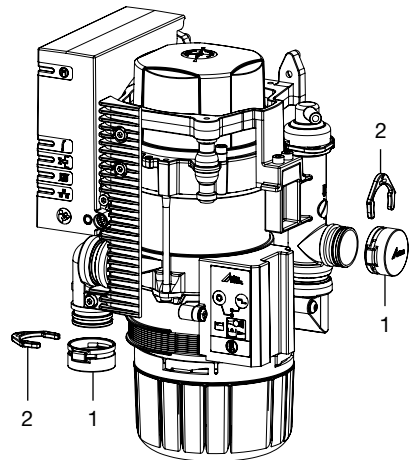
- › Disinfect the unit before transport.
- › Close all media connections.



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

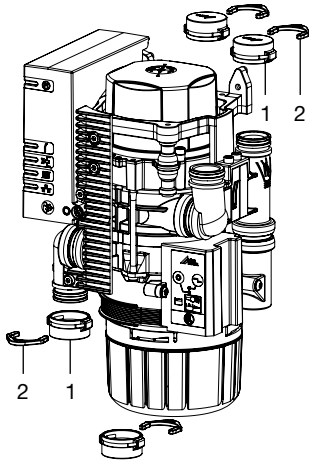
- › Before disassembly, clean and disinfect the suction unit and the unit using a suitable disinfectant approved by Dürr Dental.
- › Disinfect a defective unit using a suitable surface disinfection agent.
- › Seal all connections with sealing caps.
- › Pack the unit securely in preparation for transport.

18.1 Close CA 1



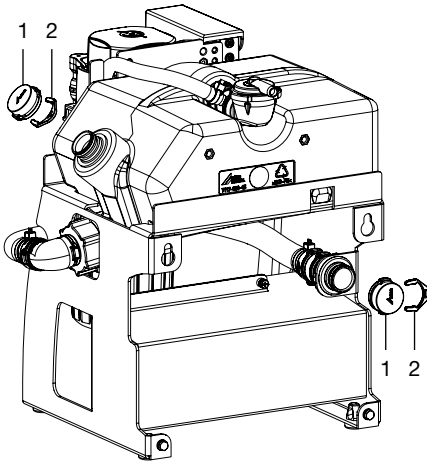
- 1 DürConnect dummy bushing
- 2 Ring clamp

18.2 Close CAS 1



- 1 Dummy bushing
- 2 Ring clamp

18.3 Close CA 2



- 1 Dummy bushing
- 2 Ring clamp

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

19.1 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.

19.2 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) |

19.3 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 separator uses HF energy exclusively for internal functions. For this reason, HF emissions are very low and it is unlikely that any interference will be caused to neighbouring electronic devices. |
| HF emissions in accordance with CISPR 11 | Class B | The separator is suitable for use in all facilities including those in living areas and areas that are directly connected to the public mains electricity supply which also supply 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 | ±8 kV contact discharge ±2; 4; 8; 15 kV air discharge | ±8 kV contact discharge ±2; 4; 8; 15 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 | ±0,5; 1 kV voltage outer conductor-outer conductor | ±0.5; 1 kV symmetrical 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 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 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 | 30 A/m | 30 A/m | The magnetic fields at electrical frequency should be within the range of typical values encountered in a commercial or hospital environment. |

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

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

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

| Interference immunity tests | IEC 60601 - test level | Compliance level | Recommended safety distance |
|---|--------------------------------------|-------------------------|---|
| Conducted HF disturbance variables in accordance with IEC 61000-4-6 | $3 V_{\text{eff}}$ 150 kHz to 80 MHz | $[V_1] = 3 \text{ V}$ | $d = 1.2 \cdot \sqrt{P}$ |
| Emitted HF disturbance variables in accordance with IEC 61000-4-3 | 3 V/m 80 MHz to 2.5 GHz | $[E_1] = 3 \text{ V/m}$ | $d = 1.2 \cdot \sqrt{P}$ for 80 MHz to 800 MHz $d = 2.3 \cdot \sqrt{P}$ for 800 MHz to 2.5 GHz |

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

d Recommended safety distance in metres (m)



The field strength of stationary communication devices should be lower than the compliance level for all frequencies based on inspections on site^{a, b}

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

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

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

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

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

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

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



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

| Rated power of the transmitter (W) | Safety distance based on the transmission frequency (m) | | |
|------------------------------------|---|---|--|
| | 150 kHz to 80 MHz $d = 1.2 \cdot \sqrt{P}$ | 80 MHz to 800 MHz $d = 1.2 \cdot \sqrt{P}$ | 800 MHz to 2.7 GHz $d = 2.3 \cdot \sqrt{P}$ |
| 0.1 | 0.38 | 0.38 | 0.73 |
| 1 | 1.2 | 1.2 | 2.3 |
| 10 | 3.8 | 3.8 | 7.3 |
| 100 | 12 | 12 | 23 |

Table 2: 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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