Amalgam separator CA 4

CTOMAPT
DENTAL SOLUTIONS

EN

Installation and Operating Instructions

CE

9000-606-44/30

DÜRR DENTAL

1406V001

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Important information

1 Documentation

These Installation and Operating Instructions form an integral part of the unit. They conform to the relevant version of the equipment and the status of technology valid at the time of first operation.

Dürr Dental cannot guarantee smooth operation and safe function of the unit and will not accept any liability where the instructions and notes contained in these installation and operating instructions are not strictly observed.

This translation has been carried out in all good faith. The original German version is decisive. Dürr Dental accepts no liability for incorrect translation.

1.1 Warnings and symbols

Warnings

The warnings in this document are there to point out possible injury to persons or damage to machinery.

The following warning symbols are used:


General warning symbol


Warning - dangerous electrical voltage


Biohazard warning


Warning - the unit starts up automatically

The warnings are structured as follows:


SIGNAL WORD

Description of type and source of danger

Possible consequences of ignoring the safety warning here

- Measures to be taken to avoid any possible danger.

The signal word differentiates between different levels of danger:

– **DANGER**
  High risk of danger of serious injury or death
– **WARNING**
  Possible risk of danger of serious injury or death
– **CAUTION**
  Risk of danger of minor injuries
– **NOTICE**
  Risk of serious damage

Further symbols

These symbols are used within the documentation and on the unit itself:


Notes, e.g. special instructions concerning economical use of the unit.


Observe the accompanying documentation.


CE-labeling


Date of manufacture


Only use once.


Monitor ambient conditions


Wear protective gloves


Wear protective glasses (goggles).


Switch off the appliance (i. e. unplug and disconnect from mains).


Unit in operation


Unit stops working


An audible signal/melody sounds

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1.2 Notes on copyright

2 Safety

Dürr Dental has designed and constructed this appliance so that when used correctly there is no danger to people or property. Nevertheless, there are residual risks. Please follow the instructions below carefully.

2.1 Correct use

The CA 4 Amalgam Separator is designed to separate out and retain any heavy metal particles and amalgam dust in the form of drilled fillings, which are aspirated using the suction unit.

The CA 4 Amalgam Separator is designed to be installed in the waste water system after the separation, the fluids must flow without pressure. This fulfills the requirements of both the German Waste Water Regulations (Appendix 50, Dental Treatment) and ISO 11143.

The separation efficiency exceeds 95 % under flow conditions of max. 16 l/min.

The amalgam sludge is received in an amalgam collecting vessel in the separator.

When connected to a VS suction unit, a surge tank must be fitted between the VS suction unit and the amalgam separator.

Water ring pumps must be equipped with a downstream air release vent. After the separation, the pipe diameter should be 140 mm in order to prevent any back draught.

2.2 Incorrect use

Any use of this appliance above and beyond that specifically described in these instructions will be deemed to be as not according to the intended use. The manufacturer cannot be held liable for any damage resulting from incorrect usage. The user bears all risks.

WARNING

Risk of explosion due to inflammation of combustible materials

- Do not use the appliance in rooms in which combustible mixtures may be present, e.g. in operating theatres.

2.3 General safety notes

- Before using the appliance observe any and all guidelines, laws, regulations and other restrictions which may apply to the appliance.
- Before each use check the function and condition of the appliance.
- Do not convert or change the appliance in any way.
- Observe the Installation and Operating Instructions precisely.
- Keep the Installation and Operating Instructions in an accessible place so that the operator has instant access to them.

2.4 Qualified personnel

Instructions for use

Persons who operate the appliance must, on the basis of their training and knowledge, ensure safe and correct handling of the appliance.

- Ensure personnel are trained in the correct usage of the appliance.

Installation and repair

- Installation, resetting, alterations, extensions and repairs must be carried out by Dürr Dental or by qualified personnel specifically approved and authorized by Dürr Dental.

2.5 Protection against electrical current

- When working on and with the appliance always observe the local electrical safety procedures.
- Never come into contact with patients and open plug-in connections on the appliance at the same time.
- Damaged supply lines and connections must be replaced immediately.

Observe guidelines for electro-magnetic compatibility for medical devices

- Observe any special preventive measures concerning electro-magnetic compatibility (EMC) for medical devices. "Information on EMC according to EN 60601-1-2 for Dürr Dental appliances" (order number 9000-606-67/..) is available from Dürr Dental and in the download pages at www. duerr.de.

2.6 Only use original parts

- Only use accessories and special accessories stipulated or approved by Dürr Dental.
- Only use original working parts and spare parts.

Dürr Dental accepts no liability for damage or injury caused by the use of accessories, special accessories or parts other than original working parts and spare parts which were not specifically approved by the manufacturer.

2.7 Transport

The original packaging offers the optimum protection for the appliance during transport.

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

Dürr Dental cannot accept any liability for damage caused during transport by the use of unsuitable packaging, this is also valid during the warranty term.

- Only transport the appliance in its original packaging whenever possible.
- Keep the packing materials out of the reach of children.

2.8 Disposal

Appliance

The unit may still be contaminated. Inform the waste management company so that they can take all necessary safety steps.

- Non-contaminated parts (e.g. electronics, plastic and metal parts etc.) should be disposed of according to all valid waste disposal regulations.
- If you have any questions concerning the correct disposal of parts please contact your dental trade supplier.

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3 Overview

CA 4 Amalgam Separator

230 V model type / 1~, 50 Hz 7805-100-50
230 V model type / 1~, 50 Hz, for installation in a PTS 7805-200-50
230 V model type / 1~, 60 Hz 7805-200-60

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3.1 Delivery Contents

The following articles are included in the scope of delivery (possible variations due to country-specific conditions and/or import regulations):

CA 4 Amalgam Separator . . . . . 7805-..

– Amalgam separator
– Set of connector parts
– Hose ø 20 mm
– Display panel
– Cable for display panel, 1 m
– Cable for display panel, 5 m
– Amalgam collecting vessel
– Tyscor Pulse software (CD)
– Installation and Operating Instructions
– Operating Handbook

3.2 Special accessories

The following items can be optionally used with the appliance:

Noise reducing hood 7122-200-00
Rinsing unit II 7100-250-50
Cable for display panel, 3 m 9000-119-042
OroCup care system 0780-350-00
Adapter PCB for remote display . . 7805-993-00
Wall mounting 7130-190-00

3.3 Disposable materials

The following materials are used when operating the appliance and must be ordered separately:

Amalgam collecting vessel 7805-033-00
Orotol plus
4 x 2.5-liter bottles/cartons CDS110P6150
MD 550 spittoon bowl cleaner
6 x 800 ml bottle/cardboard box CCS550A4750
MD 555 special suction unit cleaner
4 x 2.5-liter bottles/cartons CCS555C6150

3.4 Working parts and spare parts

The following working parts are subject to wear and tear and must be replaced regularly (refer also to section on maintenance):

Pump propeller 7805-100-20
Fluid sensor 7805-104-00E
Centrifugal drum 7805-100-10E
Nonreturn valve (3x pack) 7128-100-03E

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

4 Technical data

Electrical data		7805-100-50	7805-200-60
Voltage	V	230	230
Electrical frequency	Hz	50	60
Rated power	W	210	260
Nominal current	A	1.0	1.2
Starting current; approx.	A	4,5	5
Mains fusing *	A	16	
Type of protection		IP 21	
Protection class		I	
Overvoltage category		II	

* Line circuit breaker 16 A, characteristic B in accordance with EN 60898

Electrical data, electronics		
Signal output switching performance		
Voltage; max.	V	24 AC/DC
Nominal current; max.	mA	120
Signal input from hose manifold	V	24 AC/DC

Media and connections		
Waste performance, total	l/min	≤ 16
Effective volume of amalgam collecting vessel	ccm	approx. 600
Dürr Connect inlet and outlet connections		Hose, 20 mm (internally)

General data			
Speed	rpm	2900	3470
Duty cycle	%	95 (S5)	
Dimensions (W x H x D)	cm	25 x 41 x 30	
Weight	kg	10	
Noise levels **			
without housing; approx.	dB(A)	55	56
with housing; approx.	dB(A)	46	47
Separation rate	%	≥ 95	99 **

* Noise levels according to EN ISO 1680 Airborne noise; measured in a soundproofed room. In rooms with poor soundproofing characteristics, higher values may be obtained.

** according to ISO 11143

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

Umgebungsbedingungen bei Betrieb		
Temperatur	°C	+10 to +40
Rel. humidity	%	< 70

4.1 Model identification plate

The model identification plate can be found on the side of the amalgam separator motor.

REF Order number/Model number
SN Serial number

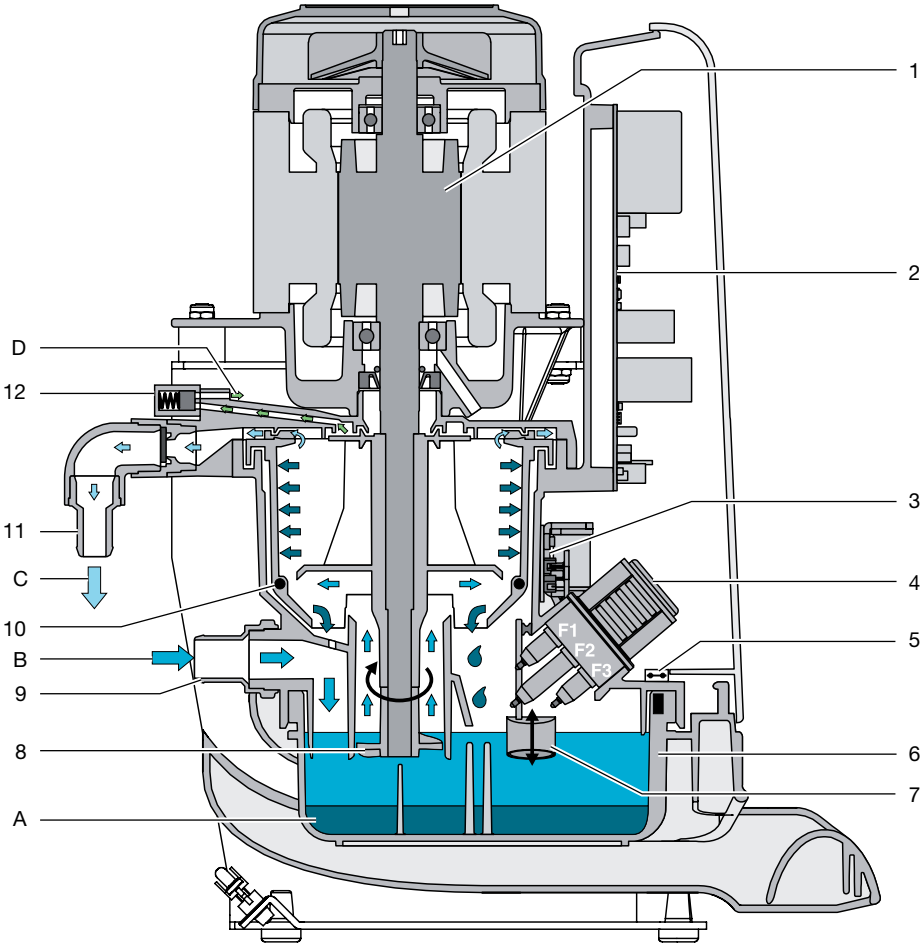
4.2 Note on Conformity

This appliance has been tested according to the relevant directive of the European Union and the required conformity acceptance procedure. This appliance meets all the necessary requirements.

4.3 Approval

Centre of Competence in Civil Engineering, Berlin	
Test number	Z-64.1-22

5 Function



1 Motor
2 Electronics
3 Sediment PCB with sediment sensor and light barriers
4 Sensor block
F1 Emergency start sensor
F2 Reference sensor
F3 Water start sensor
5 Safety end switch on sediment PCB
6 Collector vessel
7 Sediment sensor
8 Levelling pump
9 Inlet connecting piece
10 Magnets for RPM monitoring
11 Drainage connecting piece
12 Relief valve

A Amalgam sludge
B Fluid with amalgam
C Waste water, cleaned
D Vent

The amalgam separator works according to the centrifugal principle and is driven by an electromotor.

Each time the unit is supplied with power, level measuring is carried out at the amalgam separator using the sediment sensor. The level detected then appears on the display panel. If the power supply to the amalgam separator is not actually turned off (e.g. in clinics), an integrated timer carries out sediment measurement again after 24 hours.

If the sensor (conductance probe) controlling the water start is already submerged on switching on the amalgam separator, the drive motor starts first and the sediment measurement will be carried out in the next idling phase.

If the fluids in the collector vessel are not recognised by the sensors, the sensitivity of the sensors can be increased using the electronics.

Fluids from the treatment unit flow through the water inlet directly into the amalgam collecting vessel. A coarse filter with a mesh of max. 3 mm must be fitted before the amalgam separator (e.g. in the treatment unit). Large particles undergo pre-sedimentation in the amalgam collecting vessel. If the water start-up sensor is bridged by fluid, the drive motor to the centrifugal drum and the levelling pump (which are located on the drive shaft) starts after a short delay. The levelling pump feeds the fluids from the amalgam collecting vessel into the centrifugal drum. The amalgam floating in the fluid will then be separated using centrifugal force.

If the sensing device for the water start detects no sign of fluid for approx. 30 seconds, the drive motor is switched off and braking applied. The inertia of the rotating ring of water rinses the separated particles downwards out of the centrifugal drum towards the amalgam collecting vessel. After extremely short working phases, it is not necessary to brake the centrifugal drum. To avoid this, a timer begins immediately after the last braking phase which prevents the brake action being operated again in the next minute.

Where fluids flow continuously to the amalgam separator (e.g. on installation behind a VS suction unit or a water ring pump), the drive motor will be switched on briefly every 10 minutes using a timer, subjected to braking and started again. This braking action serves to rinse the centrifugal drum free. Hereby, the separation rate will be maintained up to the max. rated volume flow of 16 l/min.

Where installation is carried out after the VS suction unit, it is possible to start the amalgam separator simultaneously with the suction unit using the input for an external start signal.

The cover of the centrifuge housing is equipped with a solenoid valve. It remains open as long as the amalgam separator is ready for operation but closes in the event of a fault. This ensures sufficient air intake and venting of the amalgam separator during operation.If the water start sensor is defective, the amalgam separator is monitored by a further sensor (emergency start sensor) and started. If the emergency start sensor is not pumped free within a set period of time, an LED flashes on the display panel and there is an audible signal, which can be turned off at the service key. The amalgam separator is still operational. Once the emergency start sensor is free again, the flashing LED signal goes off.

If the event that the motor breaks down, there is a malfunction or the drain is blocked, the amalgam separator is monitored using the emergency start sensor and there will be an optical and an acoustic alarm. The drive motor is switched off. It is possible to start the motor three times using the service key and then the motor is no longer operational.

To restart, the service key must be pressed for more than 2 seconds.

A hose enables the amalgam separator to be emptied in the event of a fault so that no water can escape when opening the amalgam collecting vessel.

5.1 Tyscor Pulse (optional)

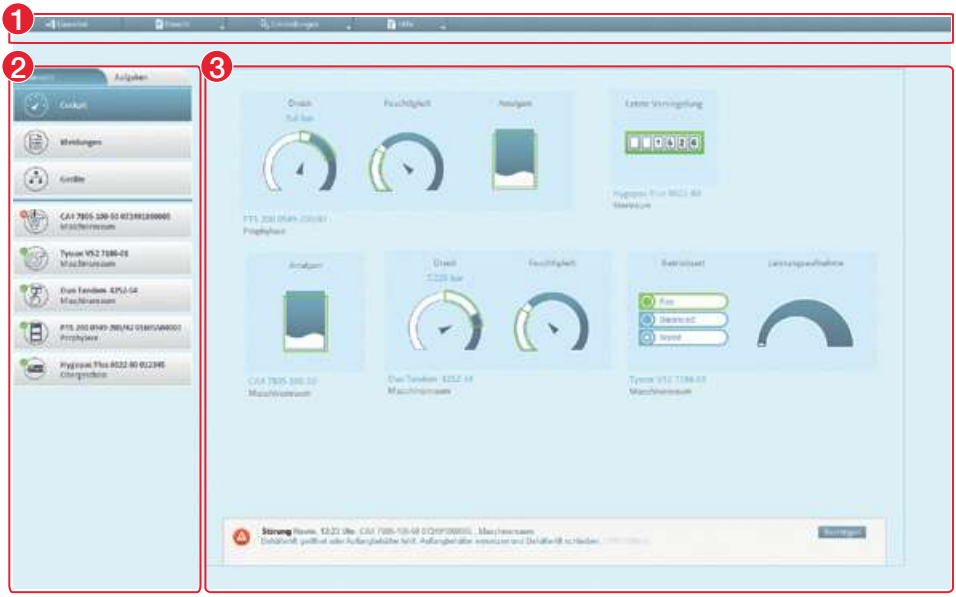
The software is connected to the appliances from Dürr Dental over the network, and displays the current status as well as messages and errors.

All messages are logged and can be printed or sent.

The regular maintenance and care is managed in the tasks. Reminders signal when a task is due.

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

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), the access level is visible in the task bar. The symbol shows the current status of the appliances. If a new message appears, a speech bubble tip also appears.

6 Prerequisites

6.1 Area of installation

The room for set-up must satisfy the following requirements:

– Closed, dry, and well ventilated room.
– Installation in special purpose rooms, e. g. in boiler room, must be checked first against prevailing building regulations.
– Appropriate ambient temperatures "4 Technical data".

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

NOTICE

Risk of overheating due to insufficient ventilation

The appliance gives off heat. This can lead to damage due to high temperatures and/or to a reduction in the lifespan of the unit.

- Do not cover the appliance.
- Install auxiliary ventilation for the room where ambient temperatures exceed > 40 °C.

6.2 Set-up alternatives

When setting up the unit, the following alternatives are available:

– In a side room, together with a combination suction unit or a suction unit in a wet suction system with downstream separation.
– As a central amalgam separator in a dry suction system.
– In a ventilated cabinet (e.g. Power Tower) or noise reducing hood.
– Upright on a horizontal floor.
– Mounted upright on a Dürr wall holder.

6.3 Plumbing materials

Only use vacuum-sealed HT-waste pipes manufactured from the following plumbing materials:

– Polypropylene (PP, Polypropen),
– chlorinated polyvinyl chloride (PVC-C),
– unplasticised polyvinyl chloride (PVC-U),
– polyethylene (PEh).

The following hose materials may not be used:

– acrylonitrile-butadiene-styrene copolymer (ABS),
– Styrene copolymer blends (e.g. SAN + PVC).

6.4 Hose materials

For waste connections and suction lines only use the following hose types:

– flexible spiral hoses of PVC with integrated spiral or equivalent hoses
– hoses of a material which is resistant to the dental disinfectants and chemicals

Hoses of plastic undergo an ageing process. Therefore, they should be inspected regularly and replaced as necessary.

The following hose materials may not be used:

– rubber hoses
– completely PVC hoses
– hoses which are not sufficiently flexible

6.5 Pipe/hose installation

- Carry out the on-site pipe installation according to the currently valid 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 block with sedimentation.

6.6 Notes on electrical connections

- Ensure that electrical connections to the mains power supply are carried out according to current valid national and local regulations and standards governing the installation of low voltage units in medical facilities.
- Insert an all pole disconnect switch (all-pole switch) with >3 mm contact opening width into the electrical connection to the mains power supply.
- Observe the current consumption of the units to be installed.

The diameter of the connections will depend on the current consumption, length of line and the ambient temperature of the suction unit. Information concerning current consumption of the units to be installed can be found in the relevant Technical Data.

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 < 63	10

6.7 Notes on connection lines

Mains line

Type of layout	Line properties (minimum requirements)
fixed	– Light plastic sheathed cable (e.g. NYM-J)
flexible	– PVC-flexible line (e.g. H05 VV-F) or – rubber connection (e.g. H05 RN-F or H05 RR-F

Display panel

Installation method	Line version (minimum requirements)
fixed	– CAT5.e network cable
flexible	– ISDN standard cable with connectors or – Network patch cable

control line

Type of layout	Line properties (minimum requirements)
fixed	– Shielded light plastic-sheathed cable (e.g. (N)YM (St)-J)
flexible	– PVC data cable with sheathing as used for data and IT (e.g. LiYCY) or – Light-PVC-control line with sheathed cable

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7 System components

7.1 Rinsing unit

For surgical work and for the use of powder jet devices, a rinsing unit in the treatment unit is absolutely essential. The rinsing unit provides a small amount of water during aspiration. This dilutes the aspirated fluids (blood, saliva, rinsing water, etc.) that can then be transported more effectively.

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

7.2 Surge tank

The combination of a suction unit together with an amalgam separator requires the installation of a surge tank. The surge tank reduces pressure peaks caused by the suction unit's waste water pump and acts as a buffer against temporary rises in the volume of water.

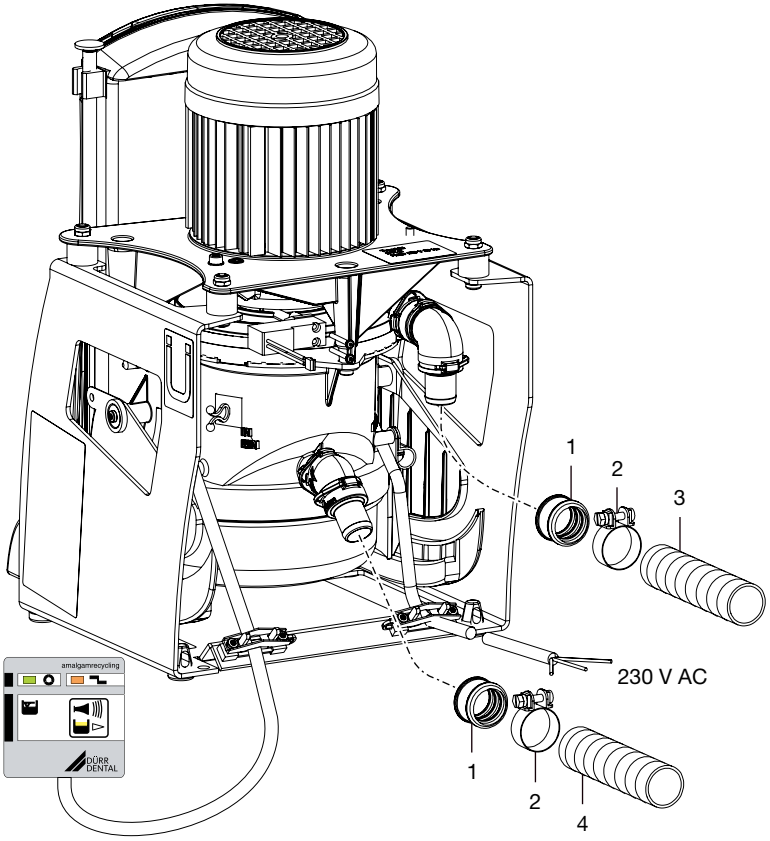
The surge tank can also be used to supply the waste water directly into the building waste water system. In this case the suction unit waste water is diverted to the building drainage system under zero pressure.

8 Installation

8.1 Connect the hoses and lay correctly

Lay hoses so they are as short as possible and with sufficient incline.

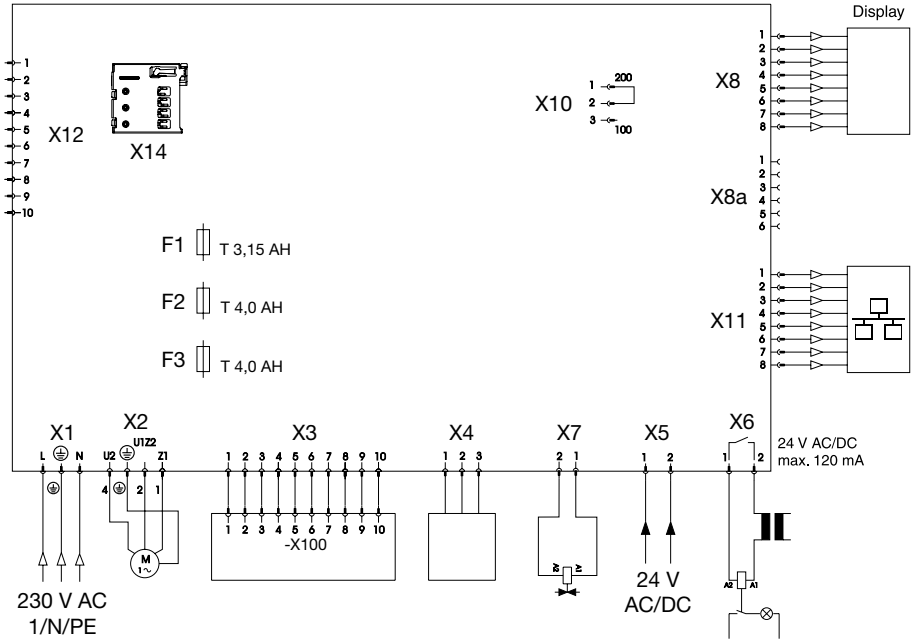
- Cut the hoses to the necessary length.
- Screw hose sleeves onto the hose ends.
- Connect the hoses to the DürrConnect connections and secure with hose clips.
- Connect the hoses on the inlet and outlet sides.



1 Hose sleeve
2 Hose clip
3 Outlet hose ø 20 mm
4 Inlet hose ø 20 mm

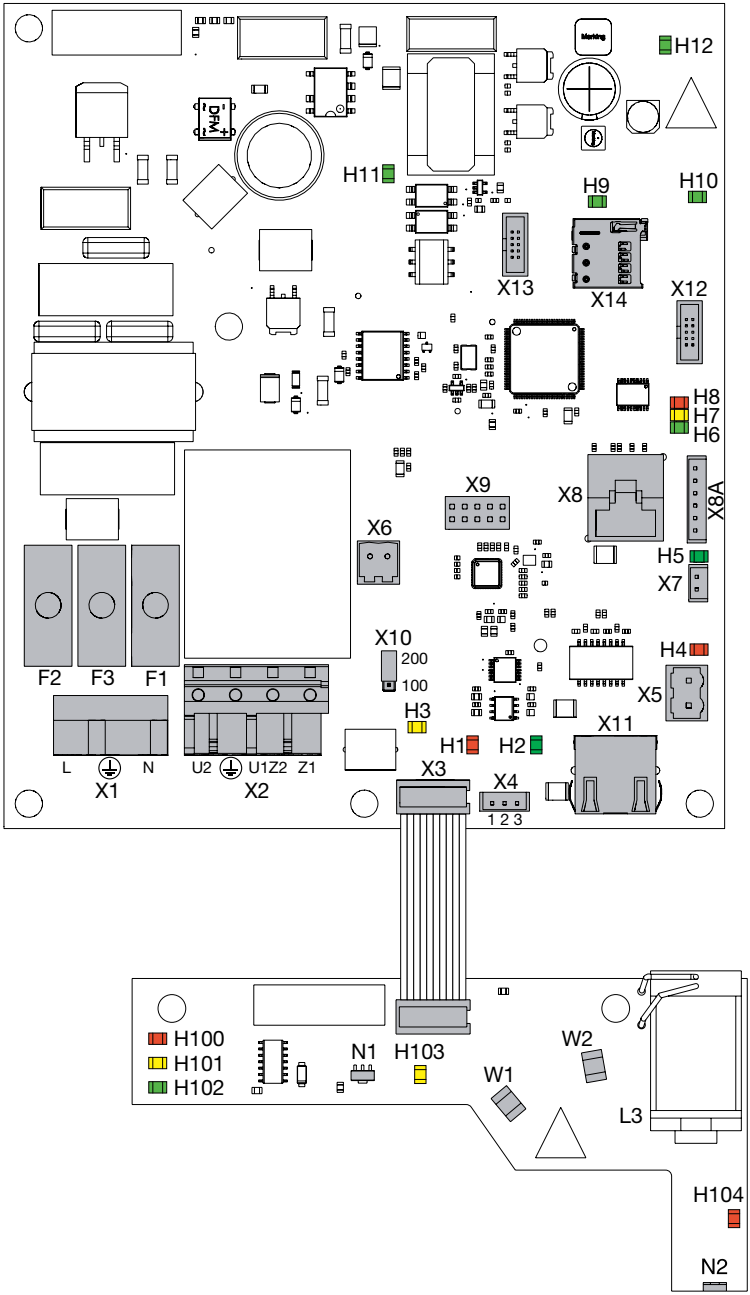
8.2 Electrical connection

- Establish the electrical connection to the supply network (230 V).
  - To a Dürr control box.
  - With a connector to a socket-outlet using the surgery main switch.
- Connect the display panel.
- Connect the start externally (optional).
- Connect the alarm externally (optional).
- Connect the network (when using Tyscor Pulse).



X1 230 V AC power supply
X2 Motor connection
X3 Sensor system connection
X4.1 Emergency start sensor
X4.2 Reference sensor
X4.3 Water start sensor
X5 External start (optional input, protective low voltage 24 V, AC/DC)
X6 External alarm (switching capacity max. 24 V, 120 mA, AC/DC)
X7 Relief valve connection
X8 Display panel connection (RJ45 connector)
X8a Display panel connection (6-pin connector)
X10 Sensitivity of the sensor conductance 100/200 µS
X11 100 Mbit network connection
X12 Diagnostic connector
X14 Micro SD card holder
F1 Fuse, brake T 3.15 AH (IEC 60127-2)
F2 Fuse, T 4.0 AH (IEC 60127-2)
F3 Fuse, T 4.0 AH (IEC 60127-2)

8.3 Connections and displays of the control



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X1 230 V AC power supply
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X4.2 Reference sensor
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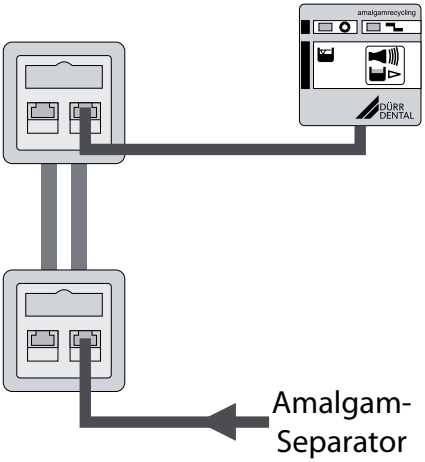
X5 External start (optional input, protective low voltage 24 V, AC/DC)
X6 External alarm (switching capacity max. 24 V, 120 mA, AC/DC)
X7 Relief valve connection
X8 Display panel connection (RJ45 connector)
X8a Display panel connection (6-pin connector)
X9 Bus module
X10 Sensitivity of the sensor conductance 100/200 µS
X11 100 Mbit network connection (when using Tyscor Pulse)
X12 Diagnostic connector
X13 Programming connector (J link)
X14 Micro SD card holder for datalogger and update
F1 Fuse, brake T 3.14 AH (IEC 60127-2)
F2 Fuse, T 4.0 AH (IEC 60127-2)
F3 Fuse, T 4.0 AH (IEC 60127-2)
H1 Emergency start, water (red)
H2 Normal water start (green)
H3 Sediment coil (yellow)
H4 External start (red)
H5 Relief valve (green)
H6 Display panel (green)
H7 Display panel (yellow)
H8 Display panel (red)
H9 - H12 Internal power supplies (green)
W1+2 Sediment measurement light barriers
N1 Hall sensor RPM monitoring
N2 Hall sensor collector monitoring
H100 100 % fluid level W1+2 disconnected
H101 95 % fluid level W1 disconnected
H102 Ready for operation W1+2 free
H103 Motor RPM frequency display
H104 Collector monitoring display

8.4 Display panel connection

New installation with network sockets

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

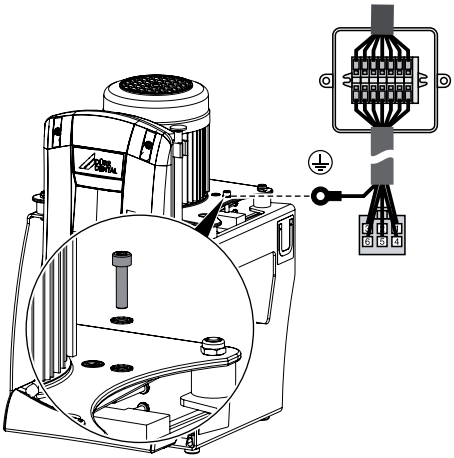
- Connect the display panel and network socket using the ISDN cable supplied.
- Connect the network cable in the network socket and in network socket (X8) on the amalgam separator.



Replacement of an existing amalgam separator

Where a model 7801 amalgam separator is replaced by a CA 4, the display panel can be connected using the adapter cable provided. The shielding of the display panel cable on site must be reconnected.

- Connect the yellow adapter cable to the X8a on the electronics.
- Connect the yellow adapter cable to the on-site display cable.
- Connect the shielding of the display cable to the ground point on the motor carrier.
- Fix the display cable to the floor plate of the amalgam separator using the strain relief.



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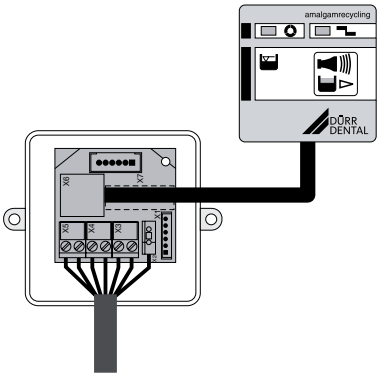
Replacement of the large display panel present with a new and smaller display panel

Where a model 7801 amalgam separator is replaced by a CA 4 and the smaller display panel supplied is to be used, this can be connected with the help of an adapter PCB (7805-993-00).

- Disconnect the wiring of the large display panel from the terminal box and remove the terminal strip (note the colouring arrangement carefully).
- Connect the on-site display cable to the terminals of the adapter PCB.
  – X2 ground
  – X3, X4, X5 screw connections (WH = white, YE = yellow, BU = blue, BN = brown, PK = pink, GY = grey)
- Clamp the ISDN connecting cable of the display panel to connector X6 on the adapter PCB.
- Mount the display panel in a suitable position.



9 Operation

In many countries technical medical products and electrical devices are subject to regular checks at set intervals. The owner should be informed about this.

- Switch on the unit power switch or the main surgery switch.
- Carry out an electrical safety check according to national and local regulations (e.g. any and all regulations concerning set up, operation and application of medical products) and record the results as appropriate, e.g. in the technical log book.
- Check that the coarse filter is installed in the appliances before the amalgam separator.
- Carry out a functional check.
- Check the appliance and connections for leak tightness.
- Fill out the Operating Handbook.

In various countries, an operating handbook must be maintained by the owner. This operating handbook must document all maintenance work, service work, checks and the amalgam disposal.

9.1 Monitoring the appliance with Tyscor Pulse

For further information on Tyscor Pulse, refer to the software help and in the Tyscor Pulse handbook (order number 9000-619-22).

To monitor the appliance with the software on the computer, the following prerequisites must be fulfilled:

– The appliance is connected to the network
– Tyscor Pulse software from Version 2.1 installed on the computer

As the monitoring system of the appliance, the software must deliver acoustic signals. The audio output on the computer must be activated.

Add appliance

Prerequisite:

✓ The appliance is switched on and connected with the network

✓ Administrator or service technician access level selected in the software

- Click on the *Appliances* tab on the side bar.

  The list of the appliances that are connected or can be connected with the software over the network appears. The new, not yet connected appliance is displayed in dark blue.

- Select the appliance and click on *Use*.

  The appliance appears on the side bar.

Add the appliance to the cockpit

All appliances that are connected with the software can be added to the cockpit.

Prerequisite:

✓ Administrator or service technician access level selected.

- Click on the appliance in the appliance list with the left mouse key and keep the mouse key pressed.
- Keeping the mouse button pressed, drag the appliance onto the cockpit.
- Release the mouse key.

  The block with the current characteristic data and the name of the appliance appears in the cockpit.

- In order to change the position of the appliance block, click on the block and, with the mouse key pressed, drag it to the required location.

Start the appliance manually

Start the appliance manually for testing.

Prerequisite:

✓ Service technician access level selected.

- Select the appliance in the appliance list.
- Click on the Start button with the left mouse key (possibly also keep it pressed depending on the appliance).

Transfer the maintenance schedule into the software

It is recommended to transfer the tasks from the maintenance schedule (see "17 Maintenance") into the maintenance schedule of the software.

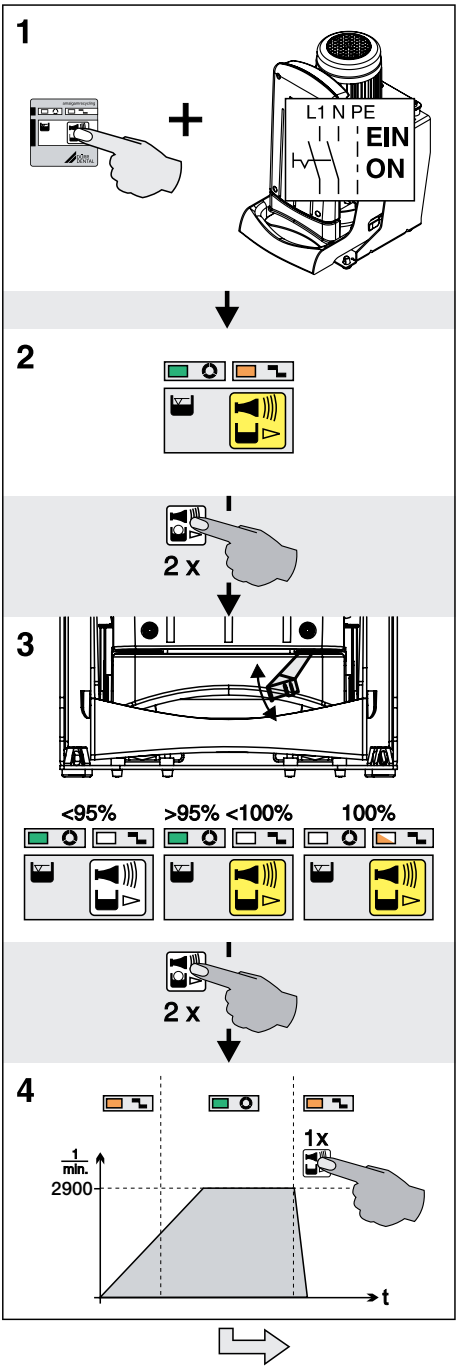
- Select the *Tasks* view in the software.
- Add task.

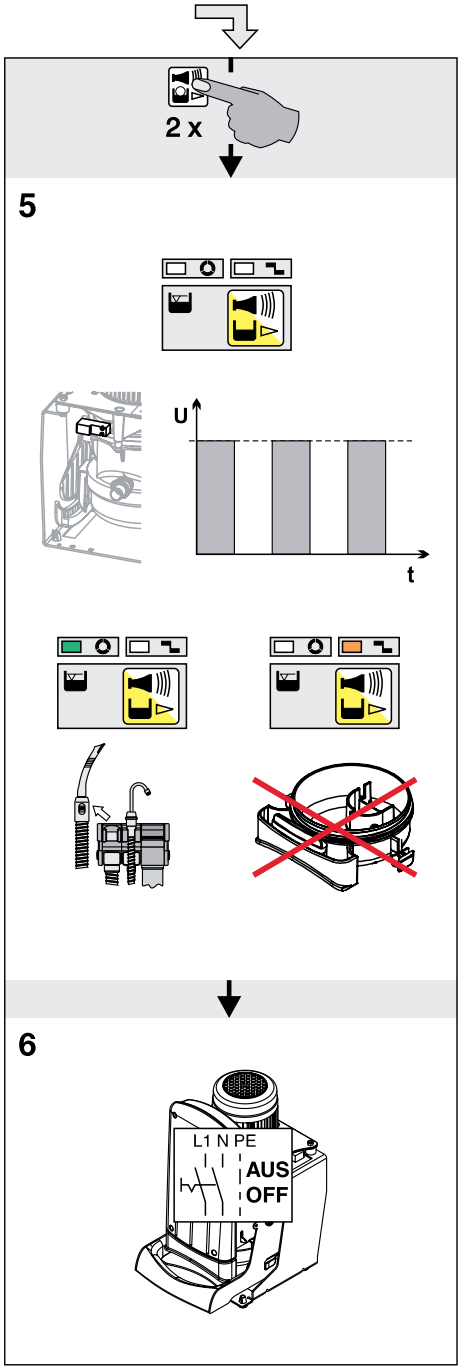
Result:

The task appears on the side bar and in the maintenance schedule.

EN

10 Service program





11 Service program description

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

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

The individual program steps are:

– Display test
– Sediment level measuring
– 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.

Pressing the service key is confirmed by an audible signal.

11.1 Service program ON/OFF

ON

– Press the service key and switch on the main supply to the unit.
– As soon as a signal melody can be heard, let go of the service key.
  The green, yellow and orange illuminated displays on the display panel (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 illuminated displays of the display panel are checked. All three displays must light. There is also an audible signal: This can be switched off by pressing the service button.

11.3 Sediment level measuring

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

The sediment level test 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 tested. Lift the bar on the sediment sensor, various fluid stand levels can be simulated. The various fluid levels are shown by LEDs H100-H102 on the sediment measuring PCB:

H100 = 100 % fluid level

H101 =>95 % fluid level

H102 => 95 % fluid level

Testing:

– Lift the strap on the sediment level sensor until H100 (red LED = 100 % level) lights. Release bar.
– Press the service key on the display panel.
– Wait a short time until the appropriate display appears on the display panel.
– Repeat the process for H101 and H102.

11.4 Motor start - motor braking

The drive motor starts up and after approx. 30 seconds is automatically subjected to braking. If the service key is pressed during this time period, the motor will immediately undergo braking.

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

The drive motor starts up.

Throughout the RPM monitoring while the motor is running, the LED will go from orange to green on start-up and from green to orange during braking.

11.5 Input and output signals

– After activating the program point, the yellow LED on the display panel flashes. In addition, H5 and H7 flash on the main PCB.
– A clocked DC voltage (approx. 22-30 V) can be measured at the connection for the ventilation solenoid valve (X7).
– Opening the collector vessel causes the orange LED on the display panel to light and H8 on the main PCB and H104 on the PCB for the sediment measurement.
– If voltage is supplied to connector X5 (external start), the green LED on the display panel lights as well as H4 and H6 on the main board.

12 Tests

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

In various countries, an operating handbook must be maintained by the owner. This operating handbook must document all maintenance work, service work, checks and the amalgam disposal.

12.1 Annual check

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

Work to be carried out:

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

12.2 Check of correct working order after 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 according to national regulations.

For inspection, the following are required:

✓ Empty collector vessel
✓ Measuring beaker

Work to be carried out:

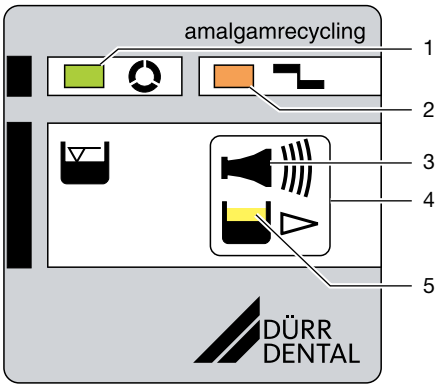
- Insert the collector vessel filled with water in the appliance (min. 900 ml).
- Start the unit and wait until the unit has switched off again.
- After the unit has switched off, remove the collector vessel and measure the remaining amount of water.

The unit is functioning normally if:

– Min. 550 ml contents in the amalgam collecting vessel.

If there is less fluid, clean the centrifugal drum or check the functioning of the unit.

13 Display/Handling



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

13.1 Ready

Green LED lights

13.2 Amalgam collecting vessel is 95 % full

Yellow LED lights

Green LED lights

An audible signal sounds

– At a filling level of 95 %, the signal melody can be switched off by pressing the reset key. The unit is ready again.
– The yellow LED lights as a reminder that a change of the amalgam collecting vessel is due. The level display is repeated every time the unit is switched on at the main power switch.

We recommend the amalgam collecting vessel be changed at 95 % full.

13.3 Amalgam collecting vessel is 100 % full

Yellow LED lights

Orange LED flashes

An audible signal sounds

– At a filling level of 100 %, the signal melody cannot be switched off by pressing the reset key.
– The collector vessel must be replaced.

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

– Only once the replacement of the amalgam collecting vessel has been carried out can the separator be "operated" again

13.4 Amalgam collecting vessel not in position

Orange LED flashes

An audible signal sounds

– Pressing the reset key briefly switches off the audible signal.
– Switch off the unit.
– Insert the collector vessel.
– Switch on the unit.
– Green LED lights "Ready“

If this error message occurs when the collector vessel is correctly inserted, there is a technical defect - inform your service technician.

EN

13.5 Motor defect

Orange LED and

green LED flash alternately

An audible signal sounds

Occurs on start-up of the amalgam separator.

– Pressing the reset key briefly switches off the audible signal.
– When the reset key is pressed for longer than 2 seconds, the unit can be started again.

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

13.6 Brake monitoring

Orange LED and

green LED flash alternately

Occurs upon braking action of amalgam separator.

– The amalgam separator is still operational.

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

13.7 Emergency start sensor in overflow position

Yellow LED flashes

Green LED lights

– The yellow LED goes out when the emergency start sensor is free again.

If the yellow LED flashes for a prolonged period, check whether any foam is present in the collector vessel.

14 Monitoring the appliance with Tyscor Pulse

As the monitoring system of the appliance, the software must deliver acoustic signals. The audio output on the computer must be activated.

14.1 Monitor the function

The appliance must have been added to the cockpit so that the graphical appliance block is shown in the cockpit.

The following is shown in the appliance block of the CA 4 amalgam separator:

– Filling levels in the collector vessel

14.2 Querying the messages

Trouble-free operation

Fault
Operation of the appliance interrupted

Warning
Operation of the appliance restricted

Note
Important information on the appliance

Information

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

If several messages occur, basically the symbol of the respective highest message level is displayed.

As soon as a message concerning an appliance occurs, the symbol in the task bar also changes to the relevant message symbol. If the message requires it, an acoustic signal also sounds.

- In order to query the message details, switch to the cockpit or to the appliance.

14.3 Carry out 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), so that it can only be confirmed from this access level.

- Carry out the task.
- Confirm the task in the software.

Result:

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

14.4 Creating a report

A current report can be printed or sent per e-mail.

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

15 Disinfection and cleaning

NOTICE

Unit interference or damage by using incorrect agents

This will lead to loss of any claims under the guarantee.

- Do not use any foaming agent, e.g. household cleaning agent or instrument disinfection agent.
- Do not use abrasive cleaners.
- Do not use agents containing chlorine.
- Do not use any sort of solvent such as acetone.

15.1 For reasons of hygiene and perfect function, after every patient treatment

- Aspirate a glass of cold water through the large and the small suction hoses. Carry out this, even when for example only the small suction hose was actually used during treatment.

Aspiration using the larger suction hose allows a greater amount of fresh air to be drawn up and this increases considerably the cleaning efficiency.

EN

15.2 Daily after completing treatment

After higher workloads before the midday break and evenings

For disinfection/cleaning you require:

- ✓ Material-compatible, non-foaming disinfection/cleaning agents as approved by Dürr Dental , e.g. Orotol® plus.
- ✓ Unit care system, e.g. OroCup
- As pre-cleaning suck up 2 liters of water with the care system.
- Aspirate the disinfection/cleaning agent together with the care system material.

15.3 Once or twice a week before the midday break

In more intense conditions (e.g. hard or calcareous water or frequent use of prophylaxis powders) 1 x daily before the midday break

For cleaning you require:

- ✓ Material-compatible, non-foaming special cleaning agents as approved by Dürr Dental , e.g. MD 555 cleaner
- ✓ Unit care system, e.g. OroCup
- As pre-cleaning suck up 2 liters of water with the care system.
- Aspirate the cleaning agent together with the care system material.
- Rinse with ca. 2 liters water after the application time.

16 Exchange amalgam collecting vessel

WARNING

Danger of contamination on repeated use of the amalgam collecting vessel when collector vessel not water tight.

- Do not use the collector vessel more than once (disposable item).

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

We strongly recommend that the amalgam collecting vessel should be changed in the morning before surgery opens. This reduces the chances that fluid escapes from the drum during the change.

- Disconnect all power to the unit.
- Release the full amalgam collecting vessel and remove from the unit.
- Pour suction unit disinfectant (e.g. Orotol plus, 30 ml) into the full amalgam collecting vessel.
- Close and secure the full amalgam collecting vessel using the cap. Observe the markings on the cap and on the collector vessel.
- Place the securely closed amalgam collecting vessel in its original packaging and seal.
- Place a new amalgam collecting vessel into the unit and clamp in position. Only use original amalgam collecting vessels.
- Switch on the main supply. The unit is ready again.

16.1 Disposal of amalgam collecting vessel

The contents of the amalgam collecting vessel are contaminated with heavy metals and must not be disposed of as household waste and are special waste!

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

17 Maintenance

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

Maintenance interval	Maintenance work
Depending on the use of the unit	• At a filling level of 95 % or 100 % on the display panel, replace the amalgam collecting vessel **Notes concerning prophylactic powders:** The amalgam separator is not functionally affected by conventional prophylactic powders. However, in certain circumstances, increased dirt affecting lines and hoses and a more frequent changing of the amalgam collecting vessel can be expected.
Annual	• Cleaning of the suction unit according to the operating instructions. • Check the fluid sensors for signs of dirt and clean where necessary. • Check the inlet and outlet hoses for signs of deposits/blockage or cracks and replace where necessary. • Check the pump propeller for any signs of damage and replace if necessary. • Check the nonreturn valve and replace if necessary.
Every 3 years	• Replace the fluid sensor.
Every 5 years	• Check the centrifugal drum sits tightly on shaft and for signs of dirt and replace where necessary.

18 Tips for Operators and Technicians

Repairs above and beyond simple maintenance may only be carried out by a qualified technician or one of our service technicians.

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

EN

18.1 General errors

Problem	Probable cause	Solution
Unit does not start	No supply voltage	• Check the supply voltage. • Check the fusing, replace if necessary.
	Under voltage	• Measure the supply voltage, if necessary call an electrician.
	Control electronics defect	• Replace electronics
The appliance is not "ready" **No display on the display panel.**	The main power switch of the treatment unit or surgery is not switched on	• Main power switch ON
	Where an external display panel is fitted, the cable is not correctly installed	• Check the cable connections
	Fuses have triggered	• Replace the fuses on the control PCB
The appliance does not start upon inlet of the fluid	Fluid is not detected by the sensor (occurs mainly with very soft water quality)	• Change the sensitivity of the sensor (X10 connector) or add approx. 20-30 ml Orotol or similar disinfectant to improve the conductance of the fluid in the collector vessel.
The appliance does not switch off	Start signal arising from sensor, e.g. caused by dirt	• Clean the sensing device
	Fluid in the collector vessel is not pumped out	• Check the pump propeller is firmly attached and for damage, replace if necessary
Water escapes from the relief valve when switched on	The appliance is flooded by water from the waste water system	• Check the waste water system has sufficient incline and is not blocked
	The appliance is flooded by water from the suction unit	• Check the suction unit for signs of leaks

Problem	Probable cause	Solution
Display panel does not function or faulty	Terminals not correctly allotted	• Check the terminal assignment and connect correctly
	Cable length too long (line resistance too high)	• Replace the existing cable with one of greater cross-section

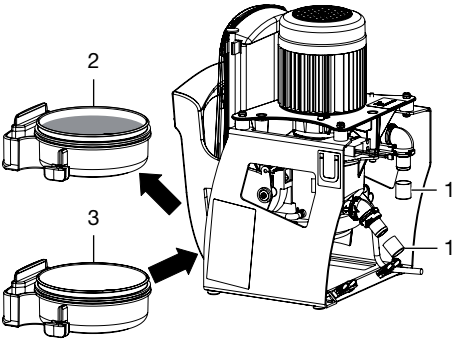
19 Transporting the unit

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

- Before disassembly, clean and disinfect the suction unit and the suction system using a disinfectant approved by Dürr Dental.
- Disinfect a defective unit using a suitable surface disinfection agent.
- Close all connections where fluids could possibly seep out using a cap.
- Pack the unit securely in preparation for transport.

EN

19.1 Close CA 4



1 Sealing cap (order number 9000-412-98)
2 Filled collector vessel
3 Empty collector vessel

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