Control Unit for Clinic Suction Unit V 6000 - V 18000

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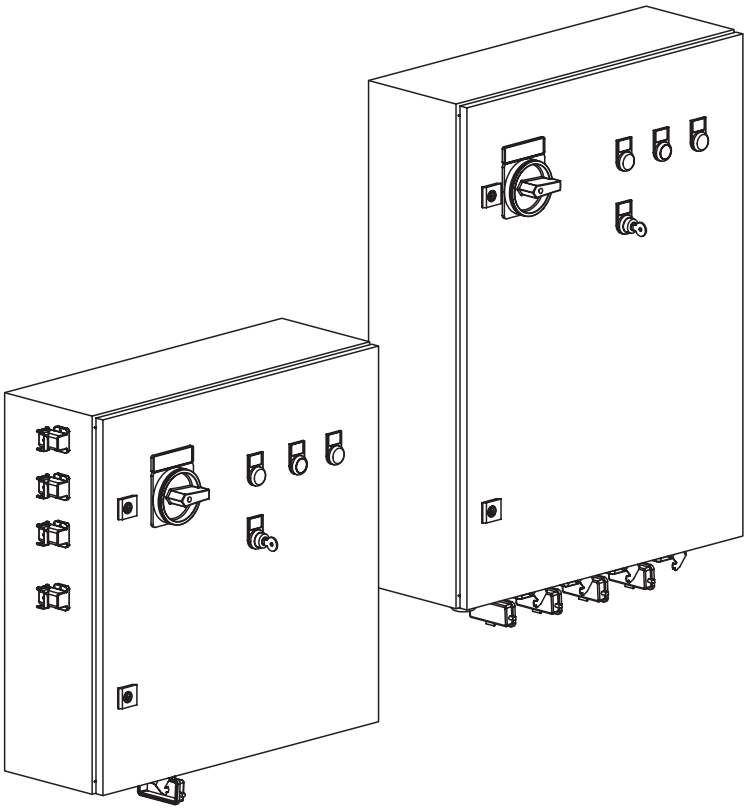

Assembly instructions

CE

9000-606-103/01

DÜRR DENTAL

2011/10

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EN

Important information

1. General

1.1 Note on Conformity

This product has been tested in line with the relevant guidelines laid down by the European Union concerning conformity and has been found to fulfill all requirements therein.

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1.2 General Notes

- The Installation and Operating Instructions are a basic component of the unit. They must be kept close to the unit at all times. Precise observance of these instructions is a precondition for use of the unit for the intended purpose and for its correct operation.
  New personnel must be made aware of the contents, and they should be passed on to future operating staff.
- Safety for operators and trouble-free operation of the unit can only be ensured by the usage of original equipment manufactured parts. Additionally, only parts specifically referred to in these Installation and Operating Instructions or accessories specifically recommended by Dürr Dental may be used. If other accessories are used with this appliance, Dürr Dental cannot guarantee safe operation or proper functioning. No liability on the part of the manufacture will be accepted in the case that damage arises through the use of non-approved accessories.
- Dürr Dental cannot be held responsible for the unit in connection with safety, reliability and function where installation, readjustments, alterations, extensions or repairs are not carried out by Dürr Dental or by one of their authorised agents, or where the unit is not operated exactly as stipulated in the Installation and Operating Instructions.
- The Installation and Operating Instructions conform to the particular model of the unit and the state of technology at the time of first operation. All circuits, processes, names, software and appliances quoted are protected under industrial property rights.
- This translation of the Installation and Operating Instructions has been carried out in good faith. No liability can be accepted for mistakes in the translation. The enclosed German version of these Installation and Operating Instructions is the reference version. If there is any doubt about the translation please consult your dealer.
- Copying of the Installation and Operating Instructions, or excerpts therefrom, requires prior written approval of Dürr Dental.
- The original packing material should be retained for possible return of the unit. Ensure that the packaging is stored away from children. Only the original pakkaging provides adequate protection during transport of the unit.
  Should return of the product to the manufacturers be necessary during the guarantee period, Dürr Dental accepts no responsibility for damage occurring during transport where the original packaging was not used!

1.3 Appliance Disposal

The EU Directive 2002/96/EG - WEEE (Waste Electric and Electronic Equipment) of 27th January 2003 and its current version in national law states that dental products are covered by this directive and, within the European Union, must be disposed of as special waste.
If you have any questions regarding the correct disposal of this product please contact Dürr Dental or your usual dental supplier who will be happy to help.

1.4 Correct usage

This control unit is designed exclusively for the regulation of Dürr Dental clinic suction units.

1.5 Incorrect usage

Any use of this appliance/these appliances above and beyond that laid down in the Installation and Operating Instructions is deemed to be incorrect usage. The manufacturer cannot be held liable for any damage resulting from incorrect usage. The operator will be held liable and bears all risks.

1.6 Combining different units

This control unit may ony be used in combination with suction units explicitly approved by Dürr Dental. In order to guarantee the safety of patients, operators or any third party, all installation procedures must be carried out by suitably qualified staff or technicians.

2. Safety

2.1 General safety notes

This appliance has been so designed and developed by Dürr Dental that under correct usage that there can be no danger to operator or patient. In spite of this, we feel it is our duty to mention the following safety measures in order to prevent any possible danger.

- When operating the appliance observe all local rules and regulations!
  Converting or modifying the appliance in any way is strictly prohibited. In such cases, any and all guarantees immediately become invalid. The operation of modified appliances can be punishable by law. In the interests of trouble-free operation the operator is responsible for observing these regulations.
- Installation must be carried out by suitably qualified personell.
- The operator must ensure before every application of the appliance that the functional safety and the proper working condition of the appliance are guaranteed.
- The operator must be familiar with the operation of the appliance.
- This product is not designed for operation in an area at risk through explosion, or where the atmosphere could contribute to combustion arising. An area at risk through explosion can arise where combustible anaesthetic substances, cleaning agents, oxygen and disinfectants are being used or stored.

2.2 Safety instructions on protection from electrical power

- Before connecting the appliance it is required to check that the supply voltage and the supply frequency of the unit correspond to the values of the mains power supply.
- Before initial start up all equipment and supply lines must be checked for signs of damage. Damaged supply lines and connections must be replaced immediately.
- When workting on the appliance the relevant electrical safety procedures must be observed.

3. Warning and symbols

In the operating instructions the following warnings and symbols have been used:

Information and/or mandatory regulations or prohibitions for the prevention of personal injury or substantial property damage

Special instructions concerning the economical usage of the appliance or other Instructions.

Warning! Dangerous electrical voltage

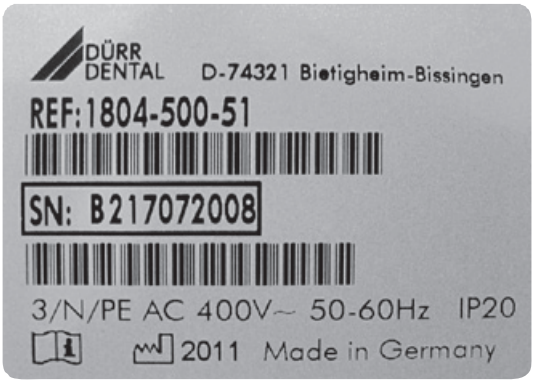
Appliance fuse

Off

On

3.1 Model identification plate

The model identification plate can be found on the inside door of the control unit



REF Order no. / Model no.

SN Serial No.

Observe accompanying documentation!

Dispose of appropriately as under EU Directive (2002/96/EG-WEE)

4. Delivery contents

4.1 Control unit for V 6000 - V 9000

Model 1802-500-51

400 V model type, 3~, 50/60 Hz

– Installation and Operating Instructions for V 6000 - V 18000 clinic suction control unit
– Key to control unit
– Key to key operated switch

4.2 Control unit for V 12000 - V 18000

Model 1804-500-51

400 V model type, 3~, 50/60 Hz

– Installation and Operating Instructions for V 6000 - V 18000 clinic suction control unit
– Key to control unit
– Key to key operated switch

4.3 Accessories

SPS . . . . . 5922-520-51 display panel

4.4 Special accessories

Power unit for display panel 9000-150-54
Switch (Network distributor) 5922-521-51

5. Technical data

5.1 Control unit for V 6000 - V 9000

Typ		**1802-500-51**
Voltage	V	400 / 3~
Frequency	Hz	50 / 60
Power requirement *	A	max. 20 / 25
Motor protection switch setting ranges	A	6,3 - 10
External machine fault display	V A	max. 230 max. 10
Switch contact X4	kW	max. 1
Dimensions		
W x H x D	cm	60 x 60 x 21
Weight	kg	58

5.2 Control unit for V12000 - V 18000

Typ		**1804-500-51**
Voltage	V	400 / 3~
Frequency	Hz	50 / 60
Power requirement *	A	max. 35 / 40
Motor protection switch setting ranges	A	6,3 - 10
External machine fault display	V A	max. 230 max. 10
Switch contact X4	kW	max. 1
Dimensions		
L x H x D	cm	60 x 80 x 21
Weight	kg	65

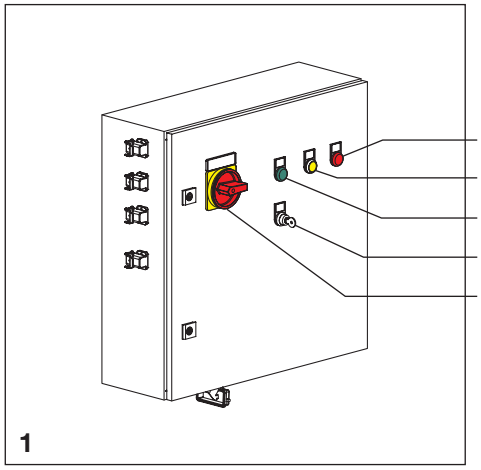
* Current consumption depends greatly on the units connected.

5.3 General

Protection class (with grounding conductor) I
Fuse type. . . . . IP 20

Ambient conditions during operation
Temperature (°C) . . . . . +10 to +40
Relative humidity (%) . . . . . max. 70

Ambient conditions during storage and transport
Temperature (°C) . . . . . -10 to +60
Relative humidity (%) . . . . . max. 95



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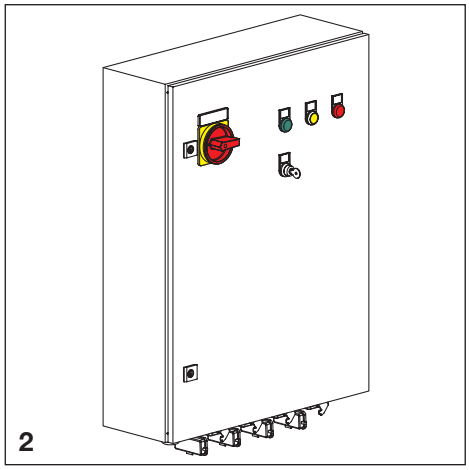
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6. Functional Description

The control unit is adapted to the clinic suction unit used. There are two different control box versions. One control unit for V 6000 - V 9000 models and one control unit for V 12000 - V 18000 models. Before initial start-up check the supply voltage with the voltage information on the model identification plate.
The electrical connection to the mains power supply must be carried out with a circuit containing an all pole disconnect switch (all-pole switch or all-pole breaker for line protection (fuse)) with >3 mm contact opening width.

1 Main power switch

2 Key operated switch with two possible positions:

0 - Main standard operation
Taking one of the suction hoses from the treatment unit will cause the first suction unit to begin operation. The remaining suction units switch on or off dependent on vacuum present. The actual vacuum is monitored by a sensor integrated in the system.

I - Emergency mode
If the control unit (SPS) no longer functions then a key operated switch can be used to change to **emergency mode**. This will then regulate the first suction unit and the auxiliary air valve. The number of treatment stations that can be operated simultaneously is now limited. In this operating mode the vacuum regulation is no longer regulated and increased vacuum can arise.

3 Green LED: operational

4 Yellow switch: fault reset

5 Red LED: fault

6.1 Supply voltage

Connection to a mains supply voltage of 400 V 3/N/PE AC 50-60 Hz can be carried out by using terminal strip X1 and clamps: L1, L2, L3, N, PE.
The fusing and the cross-section of supply lines to the control unit must be suited to the actual current consumption of the clinic suction unit, the length of the supply lines and any local regulations in force. Where more than one suction unit group is being operated, then each unit must be secured as described individually.

6.2 Sensor monitoring

Where one or more suction units are running in main operation and the vacuum falls below 10 mbar for longer than 35 seconds then the unit will automatically switch to "Sensor Defect Mode".
In the "Sensor Defect Mode" only the the first suction unit and the auxiliary air valve are operated. As soon as the vacuum rises above 10 mbar again the yellow RESET - key S1 should be pressed in order to return to main operating mode.

6.3 Hose holder - control signal

The control signal from the suction unit relay in the treatment unit is connected by using the connectors X14 and X15 to the clamps 1 and 3.
Refer to the circuit diagram.

6.4 External machine fault display

Switching elements have been integrated into the control board which allow remote control of the operating status of the suction unit system.
Where required a line can also be set up for a control lamp from the control unit, terminal strip X4 and clamps 1, 2, 3 using NYM 5 x 1.5^2 wire, to a suitable room (e.g. clinic technical equipment room).

Mounting

7. Set-up

7.1 Room for set-up

– installation in purpose built rooms, e.g. in boiler room, must first be checked against current building regulations etc.
– installation in wet rooms is not permitted.

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7.2 Set-up alternatives

The control unit can be installed two ways:
– directly mounted on suction unit frame
– on the wall in the vicinity of the suction unit (electrical supply lines may need to be extended)

8. Electrical connections

All electrical connections to the mains power supply must be carried out according to current national and local regulations.
Electrical connection to the mains power supply must be carried out using an all pole disconnect switch (all-pole switch or circuit breaker) with >3 mm contact opening width.

8.1 Diameter of the connections

The diameter of the connections will depend on the current consumption, length of line and the ambient temperature of the suction unit. Information concerning the current consumption can be found in the suction unit technical data sheet.

The following table presents the minimum required line cross sections.

Current consumption of unit A	Cross-section mm²
> 10 but ≤ 16	1.5
> 16 but ≤ 25	2.5
> 25 but ≤ 32	4
> 32 but ≤ 40	6
> 40 but ≤ 63	10

8.2 Notes on connection lines

400 V permanently connected to power supply
– NYM-J (5-wire)

400 V flexible connection to mains supply
– PVC-sleeved cable H05VV-F 5G (5-wire)

or rubber
– H05 RN-F 5G (5-wire),
– H05 RR-F 5G (5-wire)

230 V permanently connected to power supply
– NYM-J 3x1.5 mm²

230 V flexible connection to mains supply
– PVC-sleeved cable H05VV-F 3G 1.5 mm²

or rubber
– H05 RN-F 3G1.5 mm²,
– H05 RR-F 3G1.5 mm²

Protective wire connection
The control unit and the suction unit frame must be directly connected to each other using a protective wire connection. This is true for both mounting on the suction unit frame as well as for wall mounting of the control unit.
The diameter of the connection should be a minimum of 10 mm².

24 V control line, protective low voltage
Hose manifold

Fixed connection
– (N)YM (St)-J 4x1.5 mm² plastic-sheathed cable.

Flexible connection
– LiYCY 4x1.0 mm² sheathed cable as used for telephone and IT units

or
– Light-PVC sheathed cable control line.

Lines longer than 40 m should have a cross-section 2.5 mm² greater.

24 V control line for display panel (in combination with an amalgam separator)

Fixed connection
– CAT 5.e network cable

Flexible connection
– Cat 5.e Network Patch-cable (from amalgam separator to network socket)
– ISDN-Standard cable with connector (from network socket to display panel, supplied with the unit)

9. Installation of control unit

The control unit can be mounted in a variety of ways. The method chosen will depend largely on the environmental conditions and the accessibility of the suction unit.

– standard installation on the front of the suction unit frame.

– attached to the side of the suction unit frame.

– on the wall in the vicinity of the suction unit (electrical supply lines may need to be extended)

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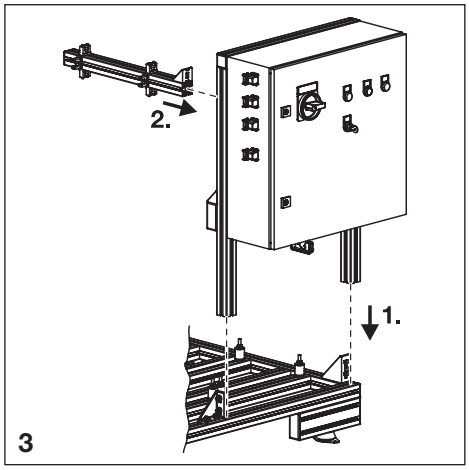

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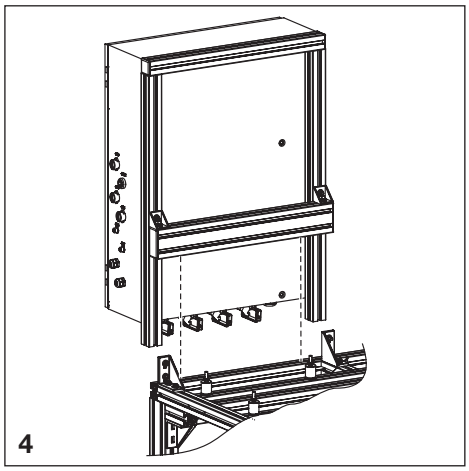
9.1 Fixing the control unit to V 6000 - V 9000 suction unit frame

- Place the control unit onto the suction unit frame next to the prepared angle bracket.
- Position the nuts for the angle bracket through the slots of the aluminium frame struts and tighten with the bolts.
- Fix cable ties to the frame of the control unit.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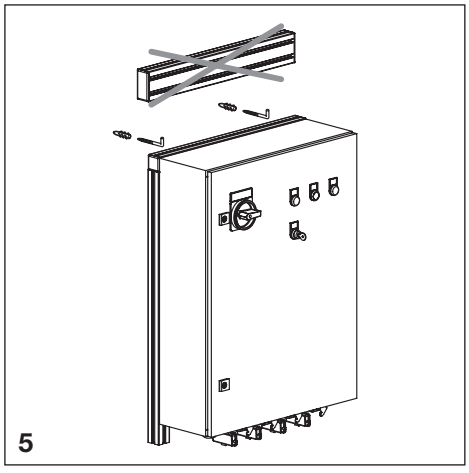
9.2 Fixing the control unit to V 12000 - V 18000 suction unit frame

- Place the control unit with the cross struts onto the frame of the suction unit.
- Position the nuts for the angle bracket through the slots of the aluminium frame struts and tighten with the bolts.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9.3 Fixing the control unit to wall mounting

- Remove the cross strut from the rear of the controller unit, so it can lie flush against the wall.
- Screw the fixture to the wall.
- Hang the controller unit onto the aluminium strut on the wall.

10. Overview of connections

Not all connections may be required depending on the particular model of suction unit (dry / wet) and the number of suction units actually operated.

The original circuit diagrams can be found in the control box and should always be kept there.

The sequence of motor and machine group described below should be adhered to exactly and not changed in any way. If the sequence shown here is not observed this will make any trouble-shooting in combination with the display panel more difficult, as the motor allocations will no longer be accurate.

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10.1 V 6000 / V 9000 Controller

Connections on left hand side

X22 Suction unit M1
X23 Suction unit M2
X24 Suction unit M3
X25 Condensation pump M7.1

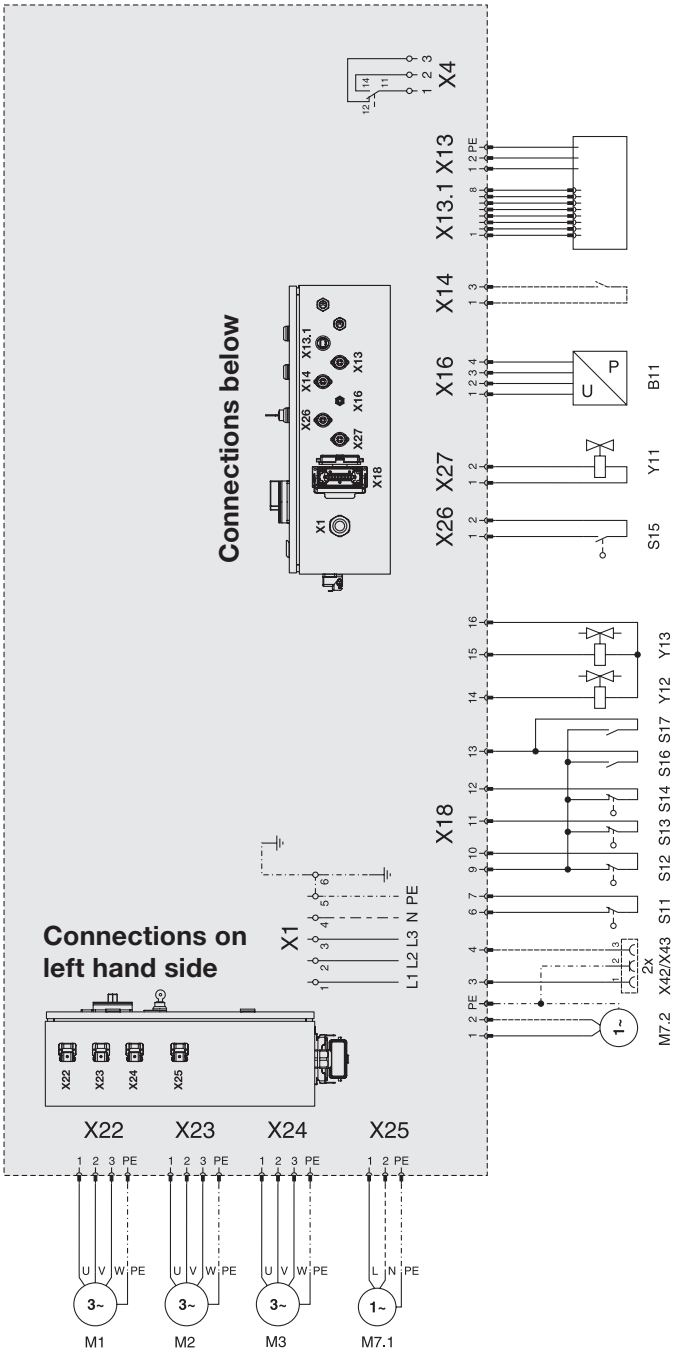
Connections below

X1 Power supply to suction unit
X4 External fault display
Max. permitted power requirements:
230 V, 10 A, 1 kW
X13 Power supply to display panel
X13.1 Signal line display panel (network cable)
X14 Control line (manifold signal)
X16 Pressure sensor B11
X18 Separation tank connection (16-pin):

For dry air suction systems an adapter is required over the connection.

Waste water pump M7.2
Socket-outlet for amalgam separator X42/X43
Float monitor 75%, tank, emergency operation S11
Float monitor 50%, tank S12
Float monitor 75%, tank S13
Float monitor for disinfectant S14
Amalgam separator 1 (CA 4, X6), tank S16
Amalgam separator 2 (CA 4, X6), tank S17
Valve water rinse Y12
Valve disinfection Y13

X26 Float monitor for condensate S15
X27 Switch valve for auxiliary air Y11



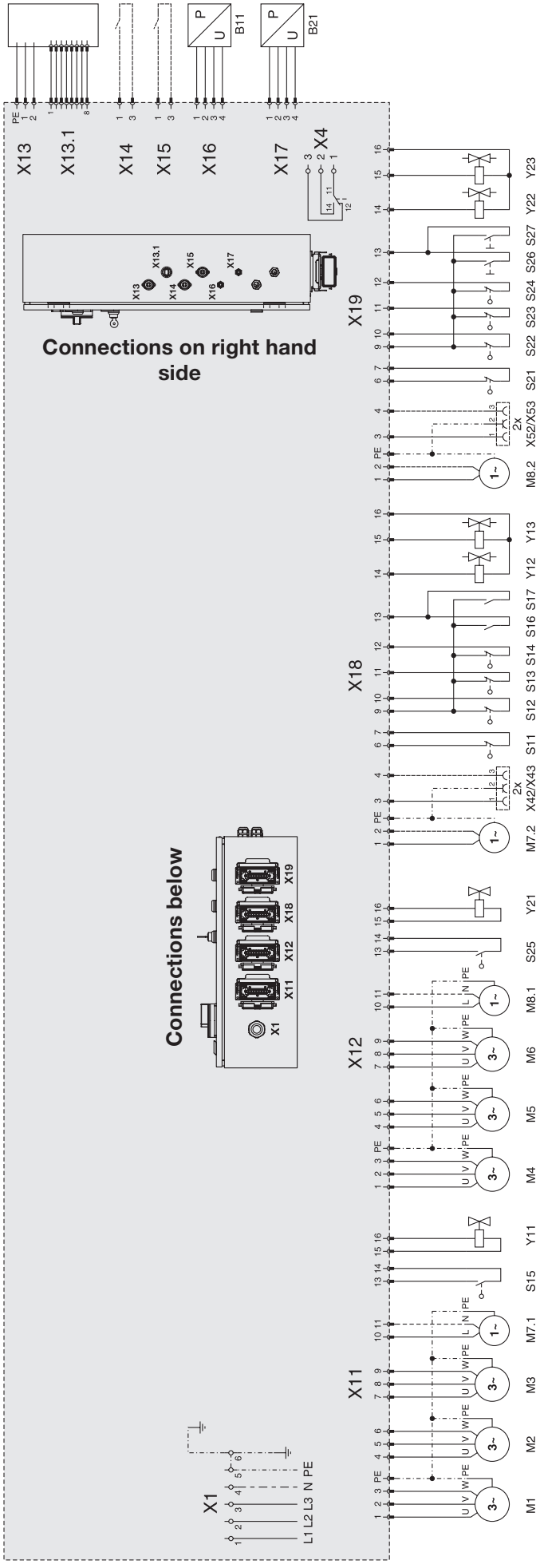
10.2 V 12000 / V 18000 Controller

Connections on right hand side

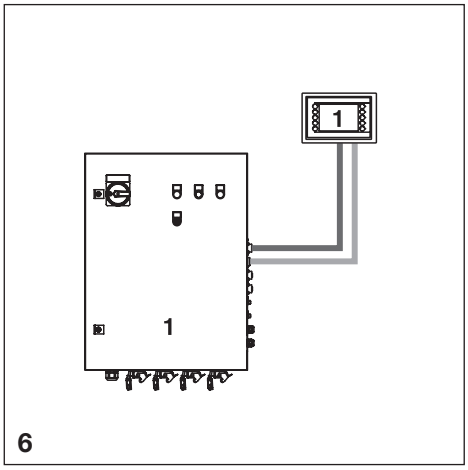
X4 External fault display
Max. permitted power requirements:
230 V, 10 A, 1 kW
X13 Power supply to display panel
X13.1 Signal line display panel (network cable)
X14 Control line (manifold signal 1)
X14 Control line (manifold signal 2)
X16 Pressure sensor 1, B11
X17 Pressure sensor 2, B21

Connections below

X1 Power supply to suction unit
X11 Suction unit group 1 (16-pin)
Suction unit M1-M3
Condensation pump M7.1
Condensate float monitor S15
Auxiliary air valve Y11
X11 Suction unit group 2 (16-pin)
Suction unit M4-M6
Condensation pump M8.1
Condensate float monitor S25
Auxiliary air valve Y21
X18 Separation tank connection (16 pin)
Waste water pump M7.2
Socket-outlet for amalgam separator X42/X43
Float monitor 75%, tank, emergency operation S11
Float monitor 50%, tank S12
Float monitor 75%, tank S13
Float monitor for disinfectant S14
Amalgam separator 1 (CA 4, X6), tank S16
Amalgam separator 2 (CA 4, X6), tank S17
Valve water rinse Y12
Valve disinfection Y13
X19 Separation tank connection (16 pin)
Waste water pump M8.2
Socket-outlet for amalgam separator X52/X53
Float monitor 75%, tank, emergency operation S21
Float monitor 50%, tank S22
Float monitor 75%, tank S23
Float monitor for disinfectant S24
Amalgam separator 1 (CA 4, X6), tank S26
Amalgam separator 2 (CA 4, X6), tank S27
Valve water rinse Y22
Valve disinfection Y23



For dry air suction systems an adapter connector is placed on each of the connections X18/X19.
For connection of a separation tank to X18 the adapter connector on X19 should also be removed.



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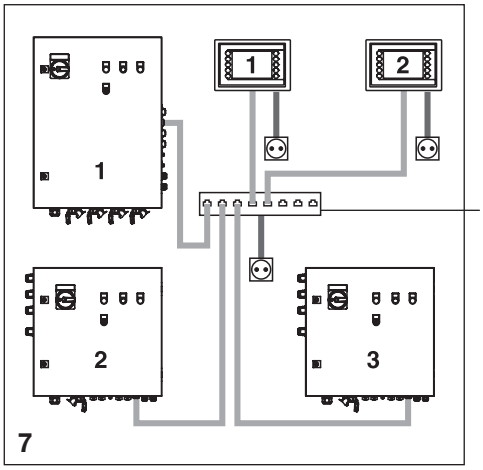

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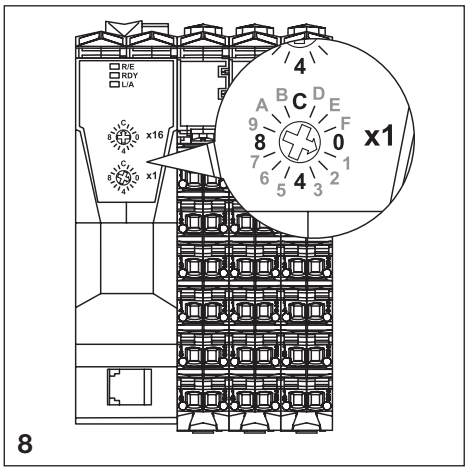

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11. Suction unit configuration

11.1 Connect display panel

- Connect the power supply from display panel to X13 of the controller unit.
- Connect signal line (network cable) to X13.1 on the controller unit.

Where several control units are connected to one display panel, then a separate power line can be connected to the display panel.

11.2 Display panel and controller unit networking

Several controller units can be connected to one or more display panels. The controller units and the display panels are connected together to form a network using a switch (10). The controller units and the display panels must all be assigned a consecutive number (node). This number enables the identification of the individual units within the network. Using the same number for similar unit types in the network is not permitted. The factory setting for each controller or display panel is 1.
Further information on display panels can be found in the Installation and Operating Instructions supplied with the appliance.

11.3 Setting up numeration in the control unit

To the front of the SPS in the control unit there are two small rotating switches for setting the consecutive numbering. Up to 15 controller units can be installed within the network.
Use only the rotating switch marked with **x1**.

Leave the rotating switch marked **x16** in Position **0**.

Switch position	**1**	**2**	**..**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
Number	1	2	..	9	10	11	12	13	14	15

Example:

No.	**Unit**	**Description**
1	SPS in controller 1	V 12000
2	SPS in controller 2	V 9000
3	SPS in controller 3	V 9000
1	Display panel 1	Machine room
2	Display panel 2	Monitoring centre

11.4 Table of Numeration

No.	Unit	Description

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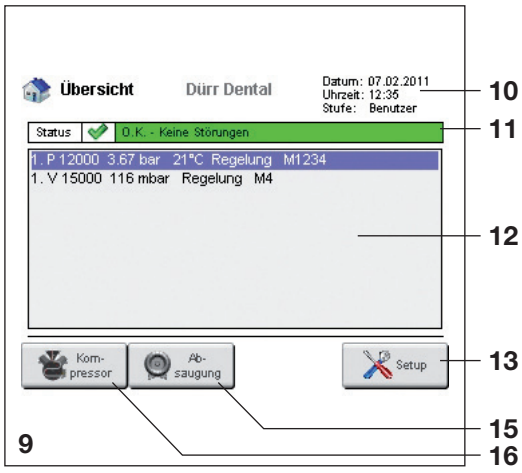

11.5 Set SPS of control unit to that of the connected unit

Before start-up and first use of the unit the SPS controller must be informed as to which suction unit it is connected to. T**his allocation can be done using the display panel**.

After a short delay after switching on the display panel the main menu will appear. To return to this display from the various subroutines press the key **Home**.

10 Displays date, time and user status.
11 Status display for all connected systems.
12 Display window of connected units with a display of their operating state.
13 P**ress Setup** key to open the setup menu.
15 P**ress Suction** key for status report of the suction units connected.
16 P**ress Compressor** key for status report of the compressor units connected

Further information on administration and operation of the units using the display panel can be found in the display panel operating instructions.

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