Duo Tandem / Quattro Tandem

EN

Installation and operating instructions

CE 0297

9000-610-72/30

DÜRR DENTAL

1811V006

Contents

Important information

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1 About this document

These installation and operating instructions represent 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 risks of personal injury or material damage.

The following warning symbols are used:


General warning symbol


Warning – dangerous high voltage


Warning – hot surfaces


Warning - automatic start-up of the unit

The warnings are structured as follows:

SIGNAL WORD

Description of the type and source of danger

Here you will find a description of 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
– **ATTENTION**
  Risk of extensive material/property damage

Other symbols

These symbols are used in the document and on or in the unit:

Note, e.g. specific instructions regarding efficient and cost-effective use of the unit.


Observe the operating instructions.

CE labelling with the number of the notified body


Manufacturer

Order number

Serial number


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


Air


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

1.2 Copyright information

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2 Safety

Dürr Dental has designed and constructed this unit so that when used properly and for the intended purpose it does not pose any danger to people or property. Nevertheless, residual risks can remain. You should therefore observe the following notes.

2.1 Intended purpose

The compressor is designed to supply compressed air for dental applications.

2.2 Intended use

The air supplied by the compressor is suitable for driving dental tools.

The compressed air generated by the compressor is delivered to the pipeline system of the surgery. The entire compressed air system must be designed in such a way that the quality of the compressed air generated by the compressor is not impaired.

With this prerequisite, the air provided by the compressor is also suitable for blow-drying tooth preparations.

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 improper use. In these cases the user/operator will bear the sole risk.

WARNING
Risk of explosion due to ignition of combustible materials

› Do not operate the unit in any rooms in which inflammable mixtures may be present, e.g. in operating theatres.

› The unit is not suitable for providing an air supply to respirators.

› This unit is not suitable for drawing up fluids or for compressing aggressive gases or potentially explosive gases.

2.4 General safety information

› Always comply with the specifications of all guidelines, laws, and other rules and regulations applicable at the site of operation for the operation of this unit.

› Check the function and condition of the unit prior to every use.

› Do not convert or modify the unit.

› Comply with the specifications of the Installation and Operating Instructions.

› The Installation and Operating Instructions must be accessible to all operators of the unit at all times.

2.5 Qualified personnel

Operation

Unit operating personnel 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.

2.6 Electrical safety

› Observe and comply with all the relevant electrical safety regulations when working on the unit.

› Replace any damaged cables or plugs immediately.

2.7 Only use original parts

› Only use Dürr Dental parts or accessories and special accessories specifically approved by Dürr Dental.

› Only use only original wear parts and replacement parts.

2.8 Transport

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

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

Dürr Dental will 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 unit in its original packaging.

› Keep the packing materials out of the reach of children.

2.9 Disposal

Unit

The unit must be disposed of properly. Within the European Union, the unit must be disposed of in accordance with EU Directive 2012/19/EU (WEEE).

› If you have any questions about the correct disposal of parts, please contact your dental trade supplier.

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3 Overview

3.1 Scope of delivery

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

Duo Tandem

Duo Tandem with 1 unit and membrane drying unit, 400 V, 3~ 4152-54*

Duo Tandem with 2 units and membrane drying unit, 400 V, 3~ 4252-54*

– Connection parts
– Collector tray
– Network cable, 3 m
– Installation and operating instructions
– Appliance log book

* with sterile filter

Quattro Tandem

Quattro Tandem with 1 unit and membrane drying unit, 400 V, 3~ . . . 4642-54*

Quattro Tandem with 2 units and membrane drying unit, 400 V, 3~ . . . 4682-54*

Quattro Tandem with 2 units and membrane drying unit, 400 V, 3~ 4682100001*

– Pressure tank
– Compressor unit
– Connection parts
– Vibration dampers
– Collector tray
– Network cable, 3 m
– Installation and operating instructions
– Appliance log book

* with sterile filter

3.2 Optional accessories

The following optional items can be used with the device:

Pressure reducer. 6040-992-00
Sterile filter 1640-981-00
Network cable 3 m 9000-119-071

3.3 Wear parts and replacement parts

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

Air intake filter 0832-982-00
Fine filter 1610-121-00
Sterile filter 1640-981-00
Sintered filter. 1650-101-00

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

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

If the mains cable of this unit is damaged it must only be replaced by an original mains cable from the manufacturer.

4 Technical data

4.1 Duo Tandem

Electrical data		4152-54		4252-54	
Rated voltage	V	400		400	
Mains frequency	Hz	50	60	50	60
Nominal current at 8 bar (0.8 MPa)	A	3.1	2.5	6.2	5.0
Speed	rpm	1410	1690	1410	1690
Type of protection		IP 21		IP 21	
Mains fuses *	A	10		10	

* Circuit breaker fuse characteristics B, C or D in acc. with EN 60898-1

General technical data					
Pressure tank volume	l	50		50	
Suction power, approx.	l/min	210	255	420	505
Delivery at 5 bar (0.5 MPa)	l/min	115	130	230	260
Pressure build-up phase 0 - 7.5 bar (0 - 0.75 MPa) c.	s	173	-	99	-
Duty cycle	%	100		100	
Start-up pressure	bar (MPa)	5.5 (0.55)		5.5 (0.55)	
Cut-off pressure	bar (MPa)	7.5 (0.75)		7.5 (0.75)	
Cut-off pressure, max. adjustable	bar (MPa)	9.0 (0.9)		9.0 (0.9)	
Safety valve, maximum permissible operating pressure	bar (MPa)	10 (1)		10 (1)	
Pressure dew point at 7 bar (0.7 MPa) *	°C	≤ +5		≤ +5	
Dimensions (H x W x D) **	cm	76 x 75 x 52		76 x 79 x 52	
Weight	kg	64		90	
Noise level ***	dB(A)	68	70	69	74

* Value determined at an ambient temperature of +40 °C

** Values without accessories and add-on parts

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

Filter mesh size		
Compressor air intake filter	µm	3
Fine filter for membrane drying unit	µm	3
Sterile filter for membrane drying unit	µm	0.01
Sintered filter for membrane drying unit	µm	35

Network connection		
LAN technology		Ethernet
Standard		IEEE 802.3u
Data rate	Mbit/s	100
Connector		RJ45
Type of connection		Auto MDI-X
Cable type		≥ CAT5

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Ambient conditions during storage and transport		
Temperature	°C	-10 to +55
Relative humidity	%	max. 95

Ambient conditions during operation		
Temperature	°C	+10 to +40
Ideal temperature	°C	+10 to +25
Relative humidity	%	max. 95

Classification	
Medical Devices Directive (93/42/EEC)	Class IIa

4.2 Quattro Tandem

Electrical data		4642-54		4682-54 4682100001	
Rated voltage	V	400		400	
Mains frequency	Hz	50	60	50	60
Nominal current at 8 bar (0.8 MPa)	A	4.4	4.8	8.8	9.6
Speed	rpm	1440	1700	1440	1700
Type of protection		IP 21		IP 21	
Mains fuses *	A	16		16	
Max. permissible mains impedance in accordance with EN 61000-3-11 **	Ω	≤ 0.18		≤ 0.18	

* Circuit breaker fuse characteristics B, C or D in acc. with EN 60898-1

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

General technical data					
Pressure tank volume	l	90		90	
Suction power, approx.	l/min	420	505	845	1010
Delivery at 5 bar (0.5 MPa)	l/min	215	240	430	480
Pressure build-up phase 0 - 7.5 bar (0 - 0.75 MPa) c.	s	156	-	77	-
Duty cycle	%	100		100	
Start-up pressure	bar (MPa)	5.5 (0.55)		5.5 (0.55)	
Cut-off pressure	bar (MPa)	7.5 (0.75)		7.5 (0.75)	
Cut-off pressure, max. adjustable	bar (MPa)	9.0 (0.9)		9.0 (0.9)	
Safety valve, maximum permissible operating pressure	bar (MPa)	10 (1)		10 (1)	
Pressure dew point at 7 bar (0.7 MPa) *	°C	≤ +5		≤ +5	
Dimensions (H x W x D) **	cm	82 x 102 x 62		82 x 102 x 62	
Weight	kg	98		143	
Noise level ***	dB(A)	70	73	74	77

* Value determined at an ambient temperature of +40 °C

** Values without accessories and add-on parts

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

Filter mesh size		
Compressor air intake filter	µm	3
Fine filter for membrane drying unit	µm	3
Sterile filter for membrane drying unit	µm	0.01
Sintered filter for membrane drying unit	µm	35

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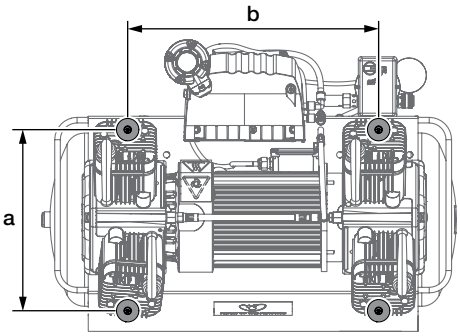
Network connection		
LAN technology		Ethernet
Standard		IEEE 802.3u
Data rate	Mbit/s	100
Connector		RJ45
Type of connection		Auto MDI-X
Cable type		≥ CAT5
Ambient conditions during storage and transport		
Temperature	°C	-10 to +55
Relative humidity	%	max. 95
Ambient conditions during operation		
Temperature	°C	+10 to +40
Ideal temperature	°C	+10 to +25
Relative humidity	%	max. 95
Classification		
Medical Devices Directive (93/42/EEC)		Class IIa

4.3 Distance between rubber feet

Distances between the rubber feet for different pressure vessel volumes:

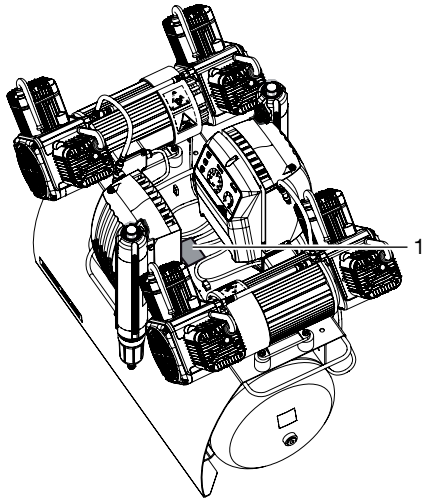


	a (cm)	b (cm)
20 l	23	27
50 l	32.5	45
90 l	32.5	59

4.4 Type plate

Complete system

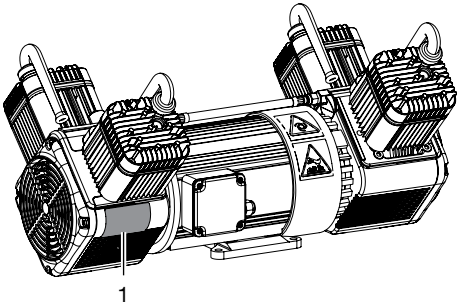
The type plate for the complete system is located on the pressure tank.



1 Type plate for the complete system

Compressor unit

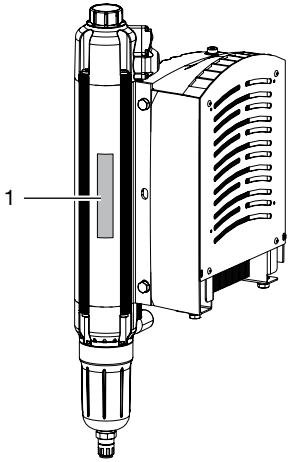
The type plate of the compressor unit is located on the crankcase below the cylinder.



1 Compressor unit type plate

Membrane drying unit

The type plate of the membrane drying unit is located on the side of the membrane drying unit.



1 Membrane drying unit type plate

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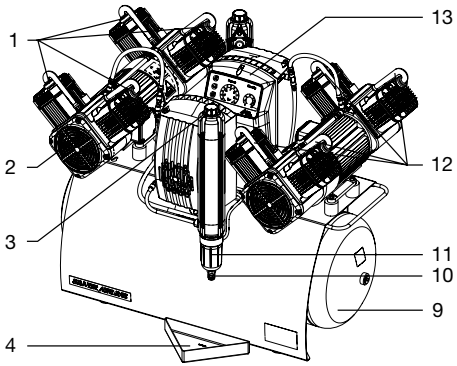
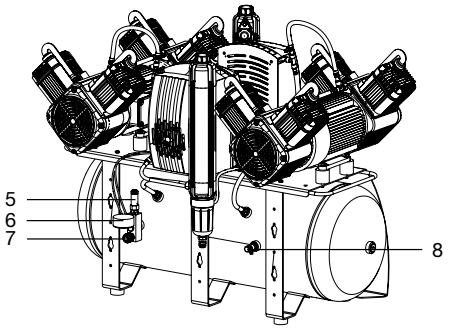
5 Operation

5.1 Duo Tandem / Quattro Tandem





1 Air intake filter
2 Compressor unit
3 Fine filter or sterile filter, membrane drying unit
4 Collector tray
5 Safety valve
6 Pressure gauge/display
7 Compressed air connection (quick release coupling)
8 Condensate drain valve
9 Pressure tank
10 Automatic/manual condensate drain valve,membrane drying unit
11 Sintered filter for membrane drying unit
12 Intake connector
13 Controller

The compressor unit draws in atmospheric air and compresses it without oil. It then transports the oil-free compressed air to the membrane drying unit. The cooler and the membrane dryer extract moisture from the compressed air. The oil-free, hygienic and dry air is stored in the pressure tank ready for use in connected devices.

All of the measurement data for the unit comes together in the control (e.g. pressure in the pressure tank, temperature of the motor windings), where it is then evaluated. Likewise, various settings (e.g. switch on/cut off pressure) can be adjusted, or the unit can be connected via the network to Tyscor Pulse.

5.2 Start-up behaviour

On compressors with an electronic controller, the compressor units are switched on with a time delay. The time delay depends on the operating mode selected on the controller.

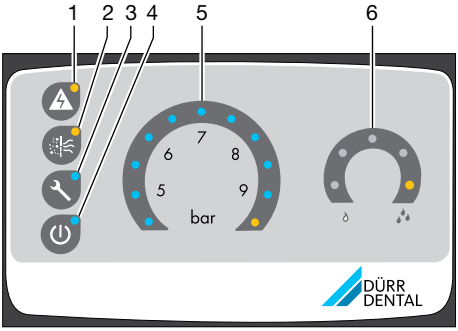
Operating mode:

– Eco: 180 s
– Balanced: 60 s
– Boost: 10 s

Alternating control:

The compressor unit with the shortest operating time since the compressor was connected to voltage is started. This distributes the operating time more or less uniformly between the compressor units. If the compressor is disconnected from the voltage and is then reconnected to the power supply, compressor unit 1 will start first again.

5.3 Operating panel



1 Fault button with orange LED
2 Filter change button with orange LED
3 Service key with blue LED
4 Standby button with blue LED
5 Pressure range display/adjustment
6 Pressure dew point display

Different messages and the status of the unit are displayed on the operating panel. In addition, different functions can be started via the buttons.

5.4 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.

6 Requirements

The unit must not be set up or operated within the vicinity of the patients (within a radius of 1.5m).

The unit can be installed either at the same level as the surgery room or on a floor below (e.g.cellar).

Due of the amount of noise generated, we recommend that the unit is installed in an adjoining room.

The pipes provided on-site must at least meet the country-specific requirements for drinking water.

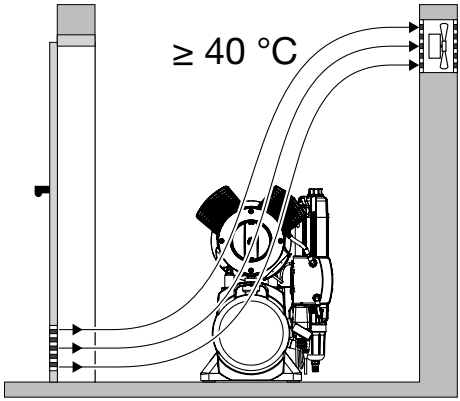
Further information can be found in our separate planning information leaflet for compressed air.

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)
– If the unit is installed in a machine room, e.g.in an adjoining room or cellar, the requirements set out in ISO-TS22595 must be complied with.

NOTICE
Risk of overheating due to insufficient ventilation
The units generates heat. Possibility of heat damage and/or reduced service life of the unit.
› Do not cover the unit.
› Install a fan for auxiliary ventilation in rooms where ambient temperatures exceed ≥40 °C while the unit is in operation.



6.2 Setup

The following conditions must be taken into account for installation:

The air is filtered when it is sucked in. This does not alter the composition of the air. For this reason it is important to keep the sucked-in air free of harmful substances (e.g.do not suck in exhaust gases or contaminated exhaust air).

– Clean, level and sufficiently stable subsurface (note the weight of the unit).
– Type plate easy to read.
– Unit easy to access for operation and maintenance.
– Easy-to-access power outlet to which the unit is connected.
– Maintain sufficient distance to the wall (at least 20cm).
– The compressed air pipe should be routed as closely as possible to the place of installation (note the length of the hose supplied).

6.3 Information about electrical connections

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

7 Transport

WARNING
Risk of explosion of the pressure tank and pressure hoses
› The pressure tank and the pressure hoses must be vented before they are stored or transported.

› Protect the unit against moisture, dirt and extreme temperatures during transport ("4 Technical data").
› Always make sure that the condensate collector chamber is empty before transporting the unit ("15 Taking out of use").
› Always transport the unit in an upright position.
› Only transport the unit using the transport handles provided.
› Check the unit for transport damage.

8 Installation

8.1 Remove the transport locks

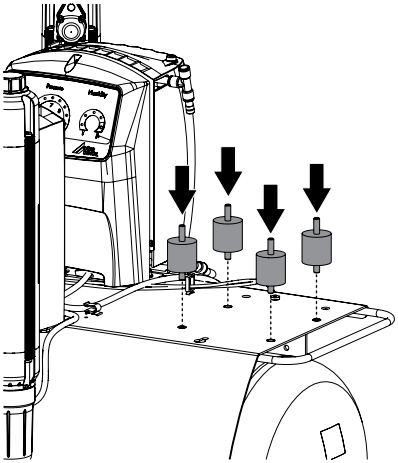
The transport locks only need to be removed on the Duo Tandem, as the compressor units are delivered separately for the Quattro Tandem.

For safe transport, the appliance is securely protected with two foam blocks and a retaining strap.
› Cut and remove the retaining strap.
› Remove the foam blocks.
› Check the unit for transport damage.

8.2 Installing the compressor unit

The compressor units only need to be installed on the Quattro Tandem.

› Screw the vibration reducers with short threaded bolts into the retaining plate.



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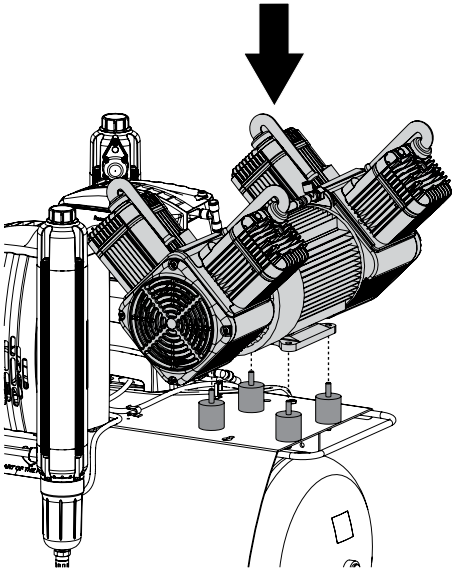
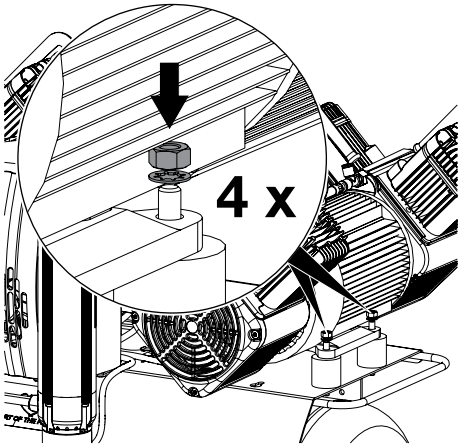
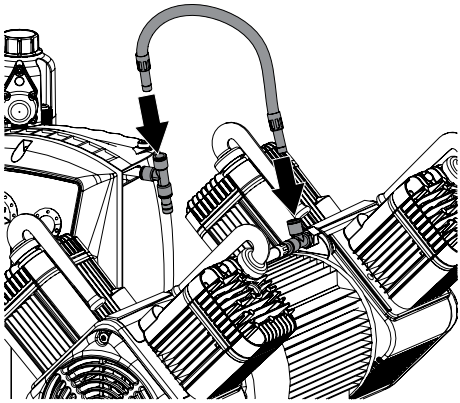
› Place the compressor units on the vibration reducers with the motor terminal box facing towards the control.



› Attach the compressor unit with the lock washers and nuts.



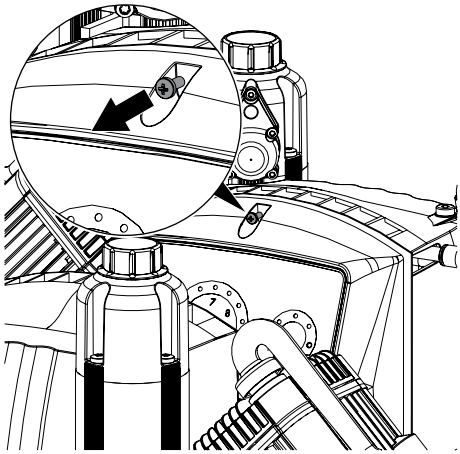
› Connect the compressor unit with the membrane drying unit via the pressure hose.



Warning – risk of dangerous electric voltages

› The mains plug must not be plugged in. If it is plugged in, unplug it.

› Unscrew the fastening screws of the cover for the control.



NOTICE

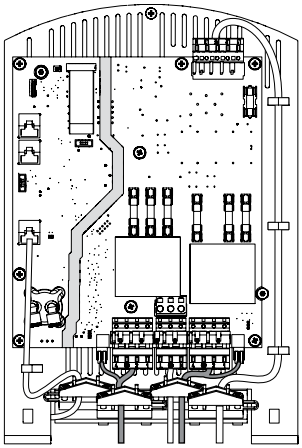
The operating panel cable is very short and can damage the PCB when the cover is removed.

› Carefully remove the cover of the control.

› Unplug the operating panel cable.

When routeing the cables, maintain the correct gaps between control cables and supply cables.

› Guide the cables of the compressor units through the strain relief and fasten.



› Plug the connector of the temperature sensor and power supply of the compressor unit into the sockets provided.

Connecting the network cable for Tyscor Pulse

A network connection is only required when using Tyscor Pulse software.

› Connect the network cable to the network socket.

Installation of the cover

› Connect the operating panel cable again.

› Attach the cover of the control again and fasten it with the screw.

DANGER
Risk of electric shock due to defective mains cable

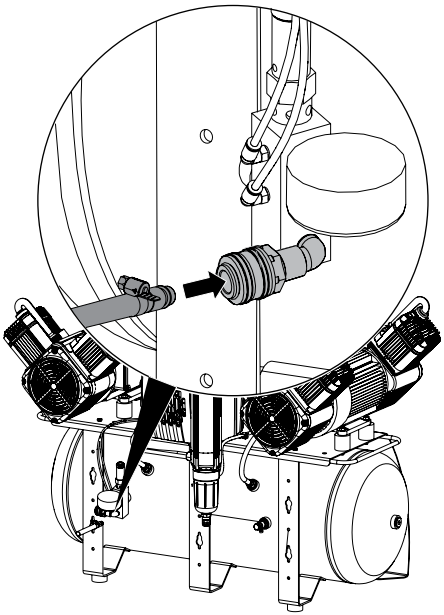
› Mains cables must not be allowed to come into contact with any hot surfaces on the unit.

› Attach the cables using the cable clips.

8.3 Establishing the compressed air connection

The supplied flexible pressure hose between the pipe system and the compressor prevents vibrations from being transmitted and thus reduces noise. This ensures safe and reliable operation.

› Connect the premounted connecting sleeve on the pressure hose to the quick release coupling of the distributor block.



› Measure the required length of pressure hose and shorten the pressure hose if necessary.

› Slide the second hose nozzle in place and secure with a hose clip.

› Connect the connecting sleeve on the pressure hose to the piping system.

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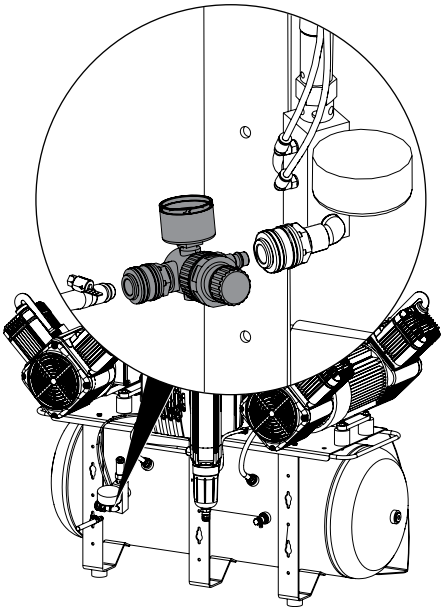
8.4 Pressure reducer

› Insert the pressure reducer into the quick release coupling.

› Insert the pressure hose into the quick release coupling on the pressure reducer.

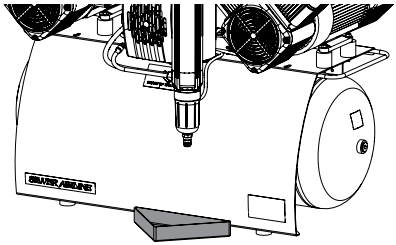


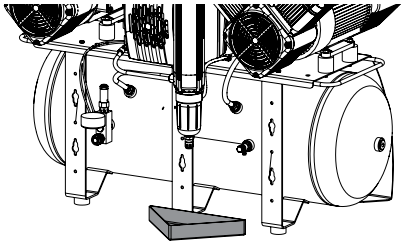
8.5 Place a collector tray underneath

During operation, condensed water is continuously collected in the membrane drying unit and drained off automatically. In order to prevent water damage due to drained condensation water, it is collected in the collector tray.

As an option, the condensed water can be removed via a hose that is connected to the waste water system.

› Place a collector tray under every membrane drying unit.





8.6 Network connection

Purpose of the network connection

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

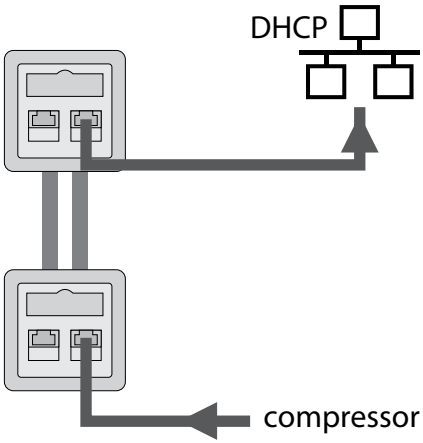
– Display parameters
– Select operating modes
– Indicate messages and error situations
– Change unit settings
– Activate test functions
– Transmit data for archiving
– Provide documents concerning the units

Tyscor Pulse (optional)

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

› Plug the network cable into the control and into a network socket.

› Connect to the computer network with the network cable.



8.7 Electrical connections

Safety when making electrical connections

The unit has no main power switch. For this reason it is important that the unit is be set up in such a way that the plug can be easily accessed and unplugged if required.

› The unit must only be connected to a correctly installed power outlet.
› Make sure that none of the electrical cables leading to the unit are under any mechanical tension.
› Before initial start-up check that the mains supply voltage and the voltage stated on the type plate match (see also "4. Technical data").

Establishing the electrical connections

DANGER
Risk of electric shock due to defective mains cable
› Mains cables must not be allowed to come into contact with any hot surfaces on the unit.

› Connect the mains plug to an earthed power outlet.

The unit will start immediately when the mains plug is connected.

› Check whether the power outlet is switched via the surgery main power switch.

This ensures that the unit starts up automatically after the surgery main switch is routinely switched off and back on again.

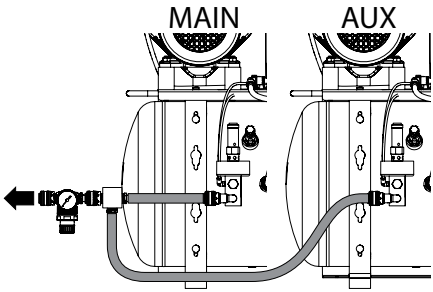
8.8 Two devices in a single compressed air network

With the compressor it is possible for two units to be connected to a single compressed air network. To do this,
– the pressure vessels need to be connected to each other;
– the controllers of the compressors need to be connected to each other;
– the controllers need to be set up accordingly.

Connecting pressure vessels

If two devices are connected to a single compressed air network, pressure equalisation must take place between the pressure vessels. To do this, the pressure vessels need to be connected to each other.

So that the pressure can be equalised, no non-return valves must be installed between the pressure vessels.



1 Main device (MAIN)
2 Auxiliary device (AUX)

M/S AUX for main device / auxiliary device

The two electronic controllers of the compressors are connected to each other via a network cable.

When routing the cables, maintain the correct gaps between control cables and supply cables.

› Connect the network cable to the network socket X10.

› Guide the cable through the cable holder and the tension relief and secure it.

› Working in the controller of the compressor to be operated as the primary compressor, check whether the switch S1 is in the right-hand position. If it is not, move it to the right (main control).

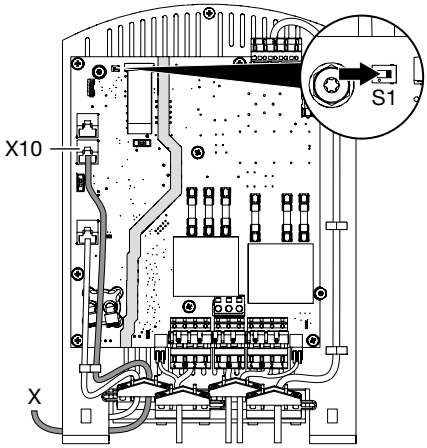


Figure 1: Main controller

› Working in controller of the compressor to be operated as the secondary compressor, move the switch S1 to the left-hand position (auxiliary control).

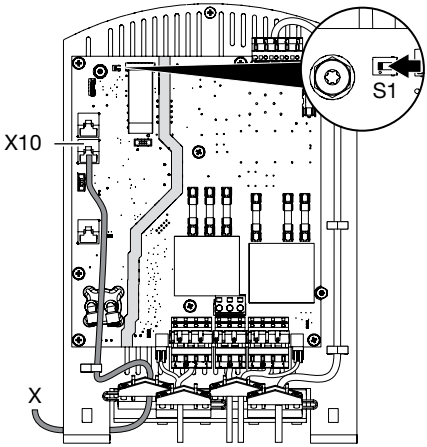


Figure 2: Auxiliary controller

The device is operated via the operating panel of the main control. The auxiliary control is inactive (standby button flashing) and cannot be operated.

9 Commissioning

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

› 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.

9.1 Checking the switch-on/cut-off pressure

The switch-on/cut-off pressure is preset at the factory. Check the adjustment during first start-up.

When the mains plug is connected the compressor will start after a short delay.

› Read off the cut-off pressure from the pressure gauge.

› Drain the air from the pressure tank (e.g. via the condensate drain valve) until the unit starts and then close it again.

› Read off the pressure when the unit starts up.

If the readings deviate from the values preset at the factory, adjust the values to the factory settings. If other pressure values are required, take care to observe the maximum pressure difference.

9.2 Checking the safety valve

The safety valve must be checked to establish that it is working correctly when the unit is started up for the first time.

At the factory, the safety valve is set to 10bar (1hPa), checked and stamped.

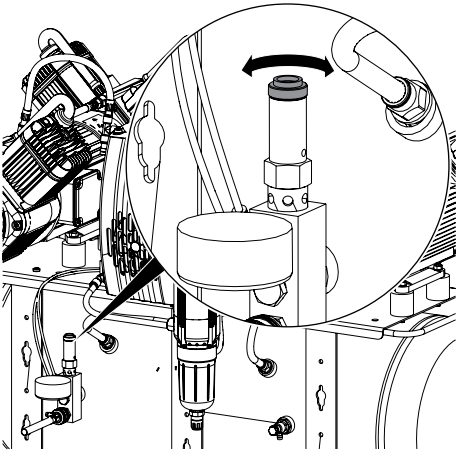
DANGER
Risk of explosion of the pressure tank and pressure hoses

› Do not change the safety valve settings.

› Fill the pressure tank to the cut-off pressure.

WARNING
Risk of damage to the safety valve
Risk of explosion of the pressure tank and pressure hoses due to a defective safety valve
› Do not use the safety valve to vent the pressure tank.

› When the cut off pressure is reached, turn the screw of the safety valve several turns anti-clockwise until the valve begins to blow. Only allow the safety valve to blow for a short period.



› Turn the screw clockwise as far as it will go. The valve must now be closed again.

Checking the safety valve – alternative method:

With this function the safety valve will open suddenly and emit a very loud blow-off noise

› Press and hold the service key until the safety valve triggers.

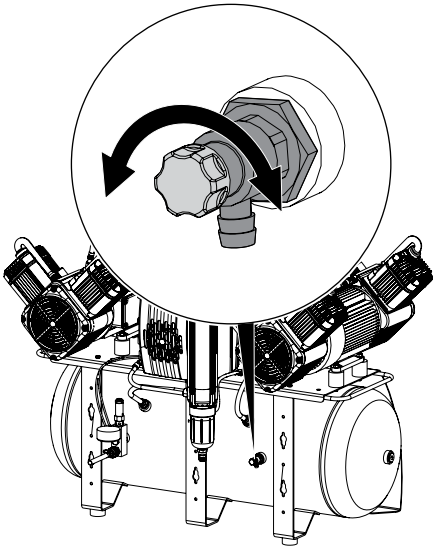
The compressor units keep running as long as the button is pressed. The defined cut off pressure is not taken into account.

9.3 Draining the condensation water

During transport, condensation water can accumulate in the pressure tank due to changes in temperature.

This also applies to compressors with a membrane drying unit.

› At maximum tank pressure, open the condensate drain valve.



› Close the condensate drain valve as soon as all of the condensation water has been blown out.

9.4 Adjusting the rate of flow at the pressure reducer

The pressure reducer regulates the rate of flow in the system and adjusts it to the required operating pressure. In order to adjust the rate of flow air needs to be extracted via a consumer.

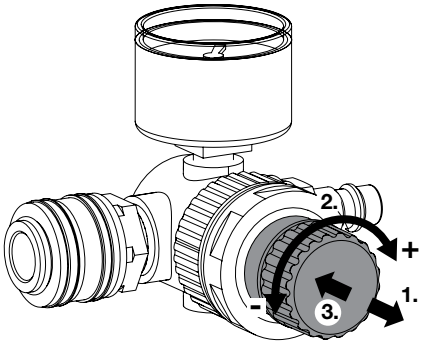
› Activate the air consumer unit.
› Lift the rotary knob at the pressure reducer.
› Adjust the rate of flow via the rotary knob.

Turn the knob in the "+" direction to increase the rate of flow.

Turn the knob in the "-" direction to reduce the rate of flow.

EN

› Press in the rotary knob until it engages and cannot be adjusted.



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9.5 Monitoring the device with Tyscor Pulse

Combining devices safely

– The overall safety of the unit and its main performance features are independent of the network. The device is designed for operation independent of a network. However, some of the functions are not available in this case.
– Incorrect manual configuration can lead to significant network problems. The expert knowledge of a network administrator is required for configuration.
– The data connection utilises part of the bandwidth of the network. Interactions with other medical devices cannot be completely ruled out. Apply the IEC 80001-1 standard for risk assessment.
– The device is not suitable for direct connection to the public internet.

Network configuration

Various options are available for network configuration:

– Automatic configuration via DHCP (recommended).
– Automatic configuration via Auto-IP for direct connection of unit and computer.
– Manual configuration.

› Configure the network settings of the unit using the software or, if available, the touch screen.

› Check the firewall and release the ports, if applicable.

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 detection	SSDP / UPnP
502 TCP	Unit data	
514[1)] UDP	Event protocol data	Syslog
22 TCP	Diagnosis	Telnet, SSH
123 UDP	Time	NTP

1) The port can vary depending on the configuration.

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

– Unit connected to the network
– Latest Tyscor Pulse software installed on computer

Add device

Requirements:

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

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

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

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

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

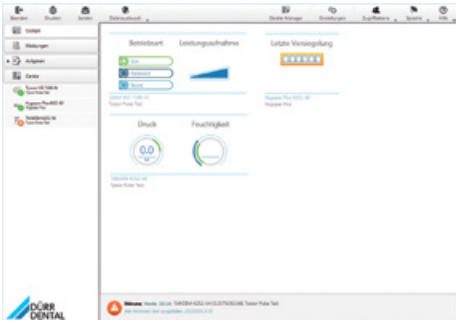
The network connection between the software and the device is interrupted, e.g. the device is switched off.

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

› Select the unit and click on .

The unit appears in the side bar.

Adding the device in the cockpit



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

Requirements:

– Administrator or Service Technician access level selected.

› Click on the device in the device list with the left mouse button and keep the mouse button pressed.

› With the mouse key pressed, drag the unit onto the cockpit.

› Release the mouse key.

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

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

Manually starting the device

The compressor can be manually started with the aid of Tyscor Pulse.

Requirements:

– Administrator or Service Technician access level selected.

› Select the device in the list of devices.

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

› Use the mouse to click the ***Start*** button next to Compressor Test.

The compressor unit will continue to run for as long as the mouse button is pressed.

› Release the mouse button.

EN

10 Adjustment options

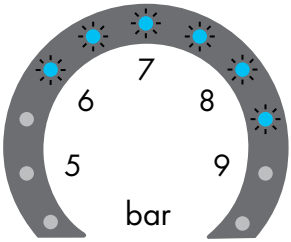
10.1 Adjustment of the switch-on/ cut off pressure

WARNING
Risk of explosion of the pressure vessel
The pressure vessels used in the compressors are designed to withstand continuous pressure changes of 2bar and can be used continuously under these pressure changes.
› For load changes > 2bar (max. permissible: 3bar), comply with the maximum load change cycles specified in the operating instructions of the pressure vessel.

The pressure adjustment is performed in standby mode.

› Standby button: press for at least 2 seconds.
› Service key: press for at least 2 seconds.

The blue LEDs in the operating panel flash. They are touch-sensitive and can be adjusted accordingly.



The pressure adjustment is performed in 0.5 bar increments by touching the LED.

› Touch the first flashing LED with your finger and swipe to the required **switch on pressure**.
› Touch the last flashing LED with your finger and swipe to the required **cut off pressure**.
› Use the service key to confirm.

If no touch pulse is received for 30 seconds, the system will automatically switch to standby operation. The settings are not saved.

Tyscor Pulse

With the aid of Tyscor Pulse the pressure of the compressor can be adjusted as required.

Requirements:

– Administrator or Service Technician access level selected.

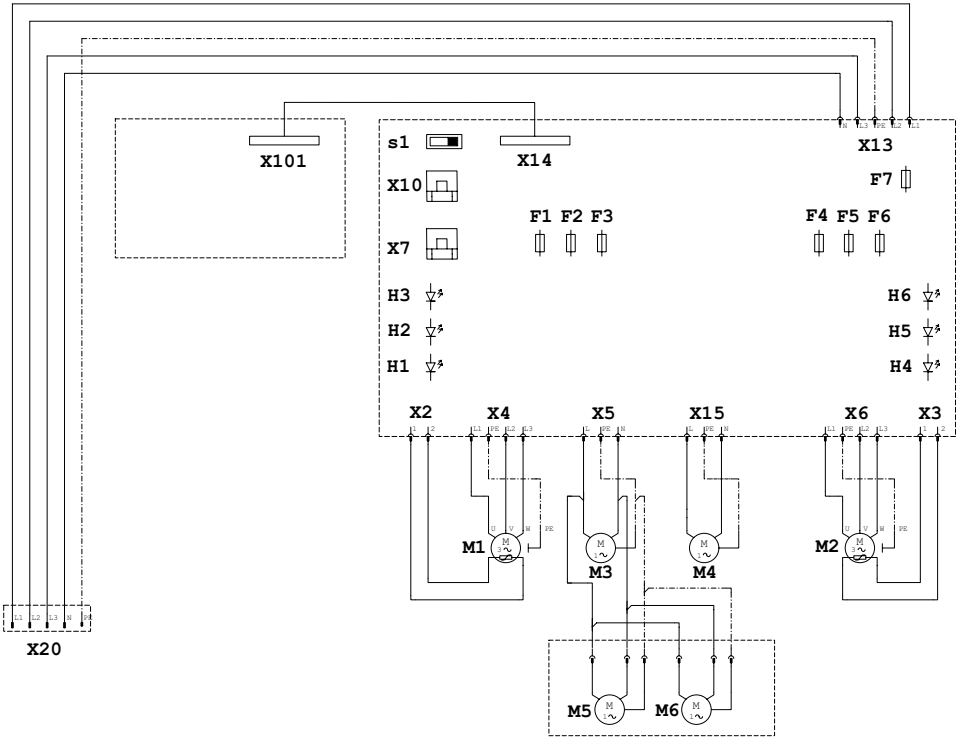
› Select the device in the list of devices.

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

› Use the "+" and "-" buttons to adjust the pressure in increments of 0.1bar.

If other pressure values are required, it is also possible to enter the value directly in the corresponding fields.

11 Controller



F1 - F6 Fuse T10AH
F7 Fuse T1.6AH
H1 - H3 Status indicator LEDs for temperature sensor, compressor unit 1
H4 - H6 Status indicator LEDs for temperature sensor, compressor unit 2
M1 Compressor unit 1
M2 Compressor unit 2
M3 Cooling fan motor, membrane drying unit 1
M4 Cooling fan motor, membrane drying unit 2 (Quattro Tandem only)
M5 - M6 Fan motor, compressor cabinet (Duo Tandem only)
S1 Switch, main controller/auxiliary controller
X2 Temperature sensor, compressor unit 1
X3 Temperature sensor, compressor unit 2
X4 Connection, compressor unit 1
X5 Connection, cooling fan motor, membrane drying unit 1
X6 Connection, compressor unit 2
X7 Network connection
X10 Network connection for connection to main controller/auxiliary controller
X13 Mains connection
X14 Operating panel connection on the control board
X15 Connection, cooling fan motor, membrane drying unit 2 (Quattro Tandem only)
X20 Mains connection 3/N/PE AC 400 V, 50 Hz - 60 Hz
X101 Connection, operating panel

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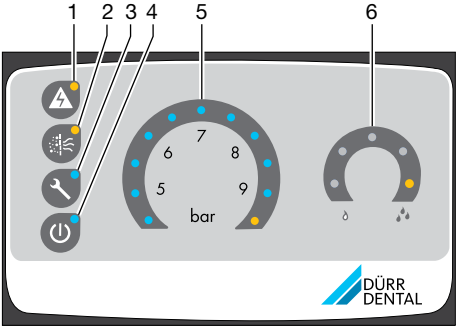
12 Operation

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

12.1 Operating panel



1 Fault button with orange LED
2 Filter change button with orange LED
3 Service key with blue LED
4 Standby button with blue LED
5 Pressure range display/adjustment
6 Pressure dew point display

Different messages and the status of the unit are displayed on the operating panel. In addition, different functions can be started via the buttons.

The device is operated via the operating panel of the main control. The auxiliary control is inactive (standby button flashing) and cannot be operated.

Buttons

Fault button
Display of alarm messages with different levels of importance. This can be faults, warning messages and information (see "12.7 Fault""12.8 Emergency mode").

Filter replacement button
"Maintenance required" display for the various filters (see "14.2 Changing the filter").

Service key
Check of the safety valve and adjustment of the pressure range (see "9.2 Checking the safety valve" and "10.1 Adjustment of the switch-on/cut off pressure").

Standby button
Switching between normal operation and standby mode (see"12.3 Normal operation") and "12.4 Standby mode").

Pressure range

The pressure is displayed and can be adjusted in this area.

The pressure is displayed via:

1. Blue LED (≤ 4.5 bar):
only illuminates while the pressure is building up during start-up operation

2. - 10. Blue LEDs (= 5 - 9 bar):
these indicate the pressure status in increments of 0.5 bar

11. Orange LED (> 9 bar):
the pressure in the container is too high (i.e. outside the adjustment range).

Adjustment options (see "10.1 Adjustment of the switch-on/cut off pressure").

Pressure dew point

The current pressure dew point temperature is displayed in this area. The compressed air can cool down to this temperature without the water condensing.

The pressure dew point is displayed via:

4 blue LEDs: 0°C / 5°C / 10°C / 15°C

1-2 blue LEDs light up when the system is running in the normal working range.

1 orange LED: ≥ 20°C, i.e. dry compressed air is no longer ensured.

As soon as the orange LED lights up the blue LEDs go out.

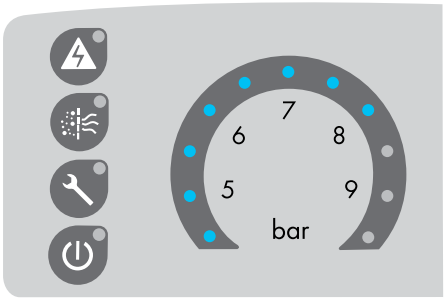
12.2 Switching the unit on/off

› Switch the unit on and off via the surgery main switch.

The compressor unit will start up automatically and fill the pressure tank. When the cut-off pressure is reached the compressor unit switches itself off automatically.

12.3 Normal operation

The unit is in normal operation as soon as the plug is inserted in the power outlet. The compressor runs until the cut off pressure is reached. The LEDs light up in the pressure range display.



12.4 Standby mode

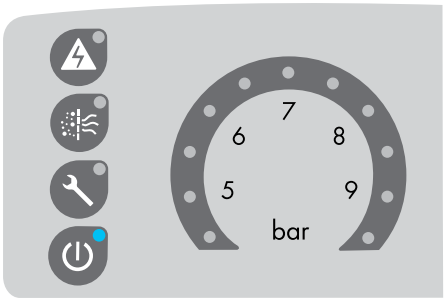
The following are possible in standby mode:

– you can switch off the unit without disconnecting it from the mains.
– You can switch to set-up mode.

› Switching from normal mode to standby mode:

Standby button: press for at least 2 seconds.

The LED comes on.



› Press the standby button again to switch to normal mode.

12.5 Auxiliary operation

If two compressors are operated in a singled compressed air network, then the two controls need to be configured as a main control and an auxiliary control.

Operation is deactivated on the control configured as the "auxiliary control" and the standby button flashes.

12.6 Set-up mode

The following can be carried out in set-up mode:

– Adjusting the pressure range (see "Tyscor Pulse").
– Confirming filter replacement (see "14.2 Changing the filter").
– Deactivating emergency mode (see "12.8 Emergency mode").

› In standby mode, press the service key as well to go into set-up mode.

12.7 Fault

The control monitors the functions of the unit and signals faults according to their importance. Faults, warnings or information can be displayed. Faults are triggered as a result of faults in component assemblies or as a result of sensor defects. The unit is switched off and the LED of the fault button flashes or lights up.

Fault button, orange LED *flashes*

Normal mode or emergency mode can be activated, see "12.8 Emergency mode").

Fault button, orange LED *lights up*

As well as faults, the LED on the fault button also lights up to indicate warning messages and information.

The unit continues to operate in normal mode.

This keeps the operator informed about emergency mode, humidity, leaks or overheating.

Warning messages and information are automatically deactivated after the fault has been rectified, with exception of emergency mode.

EN

12.8 Emergency mode

If a unit fails, the compressor can be switched to emergency mode:

Fault button, orange LED flashes.

1 aggregate has failed.

› Flashing fault button: press the button.
The compressor continues to run with one unit. The fault button lights up to indicate that emergency mode is active.

› Have the necessary repairs to the unit carried out.

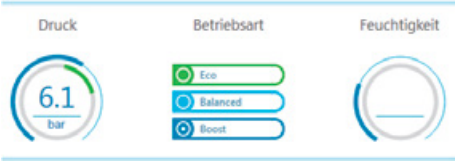
EN

13 Monitoring the device with Tyscor Pulse

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

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 unit block of the compressor:

– Current pressure in the pressure tank
– Selected operating mode
– Humidity in the pressure tank

Symbols

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.

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

13.2 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.

13.3 Creating a report

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

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

14 Maintenance

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

CAUTION
Risk of infection due to burst filters
Particles enter the compressed air network and can therefore enter the mouth of the patient.
› Replace filters in accordance with the maintenance schedule.

14.1 Maintenance schedule

NOTICE
Risk of damage to the unit due to blocked filters
Continuous running due to reduced delivery. Damage to the unit due to burst filters.
› Replace filters in accordance with the maintenance schedule.

Maintenance interval	Maintenance work
At regular intervals	› Empty the collector tray under the membrane drying unit (the interval may vary depending on the ambient conditions and method of working; empty it daily if the humidity is high).
Annually	› Replace the air intake filter in the compressor unit – every six months if the concentration of dust is high. › Replace the fine or sterile filter. › Replace the sintered filter.
Every 4 years	› Replace the vibration dampers.
In accordance with national law	› Check the safety valve. › Carry out recurring safety inspections (e.g. pressure tank inspections, electrical safety inspections) in accordance with applicable national laws.

14.2 Changing the filter

NOTICE
Shortened service life, bad air quality, reduced delivery
› Replace the filter 1x per year or as soon as the yellow LED lights up.

Filter replacement button, yellow LED lights up.

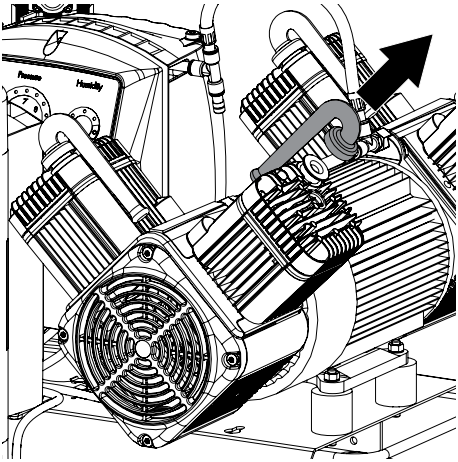
As soon as the LED lights up, it can be temporarily switched off by pressing the button. Every time the unit is switched back on the LED comes on again.
The LED only goes out permanently once replacement of the filter has been confirmed in set-up mode.

Disconnecting the unit from the mains

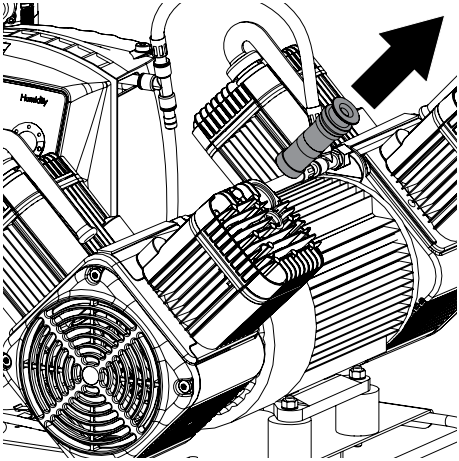
› Standby button: press for at least 2 seconds.
› Unplug the mains plug.

Replacing the air intake filter

› Remove the noise reducer.



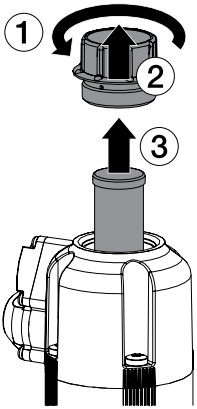
› Remove the air intake filter.



› Insert a new air intake filter.
› Replace the noise reducer.

Changing the fine/sterile filter of the membrane drying unit

› Switch off the unit.
› Disconnect all power from the device.
› Unscrew and remove the filter cover.
› Remove the fine/sterile filter.
› Insert the new fine/sterile filter.
› Replace the filter cover and close.



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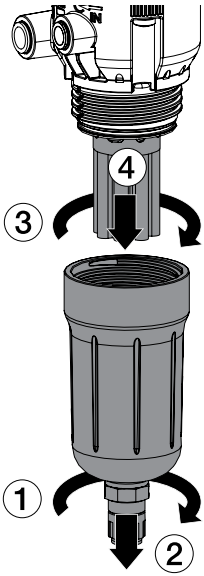
Replacing the sintered filter of the membrane drying unit

› Unscrew and remove the filter housing.
› Remove the sintered filter.
› Insert a new sintered filter.
› Replace the filter housing and close.



Confirming the filter replacement

› Connect the mains plug.
› press for at least 2 seconds.
› press for at least 2 seconds. The unit is now in setup mode.
Orange LED flashes
› Press to confirm filter replacement.

Resetting the unit to normal operation

› Touch.

Resetting the unit to standby mode

› Touch.

15 Taking out of use

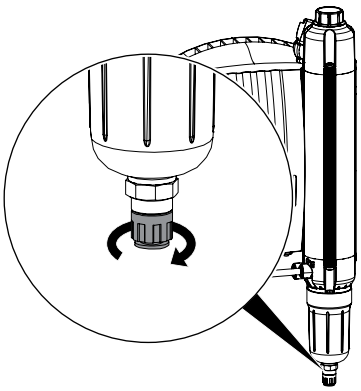
15.1 Taking the unit out of use

If the compressor is not to be used for a longer period of time, it is recommended that the unit be properly shut down and taken out of operation.

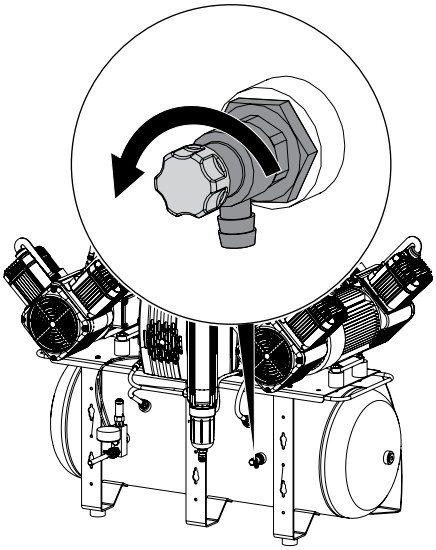
To do so, any accumulated condensation water must be drained from the pressure tank and from the membrane drying unit.

The compressor must be running in order to drain the remaining condensation water in the water separator of the membrane drying unit.

› Open the condensate drain valve on the membrane drying unit (approx. 3 turns).



› Open the condensate drain valve on the pressure tank.



Once the start-up pressure has been reached the compressor will switch on.

On Quattro-Tandem models (2 membrane drying units) both units must switch on.

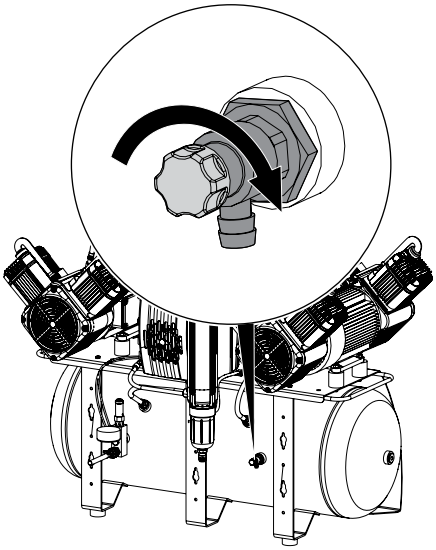
› Wait until condensation water stops escaping from the condensate drain valve on the membrane drying unit.

› Switch off the unit - press for at least 2 seconds.

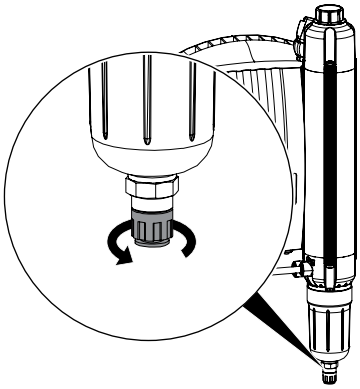
› Wait until air stops escaping from the condensate drain valve (pressure tank empty).

› Unplug the mains plug.

› Close the condensate drain valve on the pressure tank.



› Close the condensate drain valve on the membrane drying unit.



› Disconnect the compressor from the pipe system.

EN

15.2 Storage of the unit

WARNING
Risk of explosion of the pressure tank and pressure hoses
› The pressure tank and the pressure hoses must be vented before they are stored or transported.

› Protect the unit against moisture, dirt and extreme temperatures during transport (refer to the section on "Ambient conditions").
› Only store the unit when it has been completely emptied.

EN

16 Tips for operators and service technicians

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

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

Fault	Probable cause	Solution
LED on the filter replacement button lights up	Filter replacement required	› Replace the intake filter, fine/sterile filter and sintered filter (see "14.2 Changing the filter").
Compressor will not start	No display on the operating panel No mains voltage	› Check the main power switch, mains fuse and mains voltage, inform an electrician if necessary.
	Fault button flashes (if compressor is equipped with 2 units) Emergency mode possible	› Activate emergency mode: Press the fault button, (see "12.8 Emergency mode"). Compressor runs with 1 unit. › Inform a service technician
	Fault button lit up Compressor defective	› Disconnect the mains plug and inform a service technician.
Compressor starts up, no display on the operating panel	Operating panel defective	› Disconnect the mains plug and inform a service technician.

Fault	Probable cause	Solution
Compressor does not switch off or has difficulty reaching the cut off pressure	Excessive air extraction	› Check air requirements and dimensioning of the compressor.
	Air intake filter dirty	› Replace the air intake filter.
	Leak in the compressed air pipe network	› Check the compressed air pipe network, if necessary disconnect the mains plug and inform a service technician.
	Leak in the compressed air lines of the compressor station	› Check the pressure hoses on the compressor, membrane drying unit and distributor block; if necessary disconnect the mains plug and inform a service technician.
	Flow noise at the membrane drying unit	› Check the pressure hoses on the compressor; if necessary inform a service technician.
	Change in the delivery of the compressor unit	› Disconnect the mains plug and inform a service technician.
	Compressor blows via the safety valve, The container pressure is not displayed correctly on the operating panel	› Disconnect the mains plug and inform a service technician.
Compressor switches on without any compressed air being extracted	Leak in the compressed air pipe system	› Check the compressed air pipe system; if necessary disconnect the plug and inform a service technician.
	Leak in the compressed air lines of the compressor	› Check the pressure hoses on the compressor, membrane drying unit and distributor block; if necessary disconnect the mains plug and inform a service technician.
Fault button flashing	Compressor unit defective	› Activate emergency mode: press the fault button, (see "12.8 Emergency mode"). Compressor runs with 1 unit › Inform a service technician.
Fault button lit up	Unit is defective	› Unplug the mains plug. › Inform a service technician.
Knocking or loud noises on the compressor	Compressor unit defective	› Inform a service technician.

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