



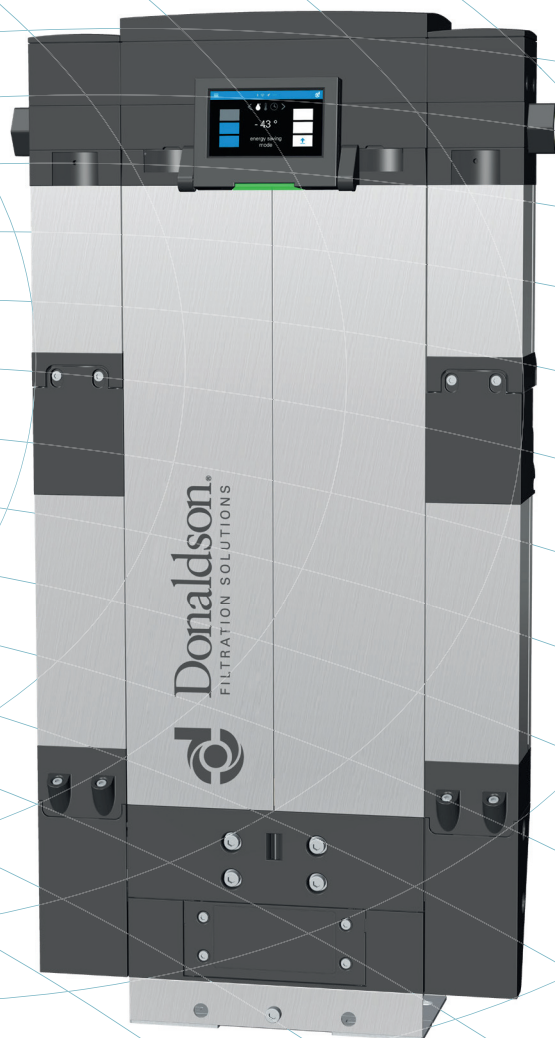
Donaldson®
FILTRATION SOLUTIONS

OPERATION MANUAL

Installation, operation and service informations

Ultrapac™ Smart / Ultrapure Smart / Oilfreepac Smart

Standard / Superplus 03 - 60



EN

Donaldson®
FILTRATION SOLUTIONS

F118905-05-2026-US-IOM-OILFREEPAC-SMART-03-60-RE14

Introduction

As the user / operator, you should make yourself familiar with this operation manual in terms of the safety, construction, function, maintenance and servicing of the heatless regenerating adsorption dryer.

A basic prerequisite for safe working with and error-free operation of the equipment is a knowledge of the basic special safety features.

This operation manual includes the required safety information in order to operate this equipment safely.

This operation manual and especially the safety information, are to be followed by all persons working on this equipment. It is imperative that this operation manual is made freely available at all times to machine operators and is to be kept at the place where the equipment is installed.

Explanation of the symbols used



Touch display

Marks the required pressure on certain areas of the touch display.



Important

Marks the required pressure on certain areas of the touch display.



Caution

This pictogram denotes imminent danger to the life and health of people. Failure to comply with this advice can lead to serious health problems through to life-threatening injuries.



Dangers due to electrical energy

Denotes a risk of electric shock. Failure to comply may result in electric shock and could endanger your life.



Danger from pressurized parts of the equipment

Depressurize the equipment before starting service work.



Blow off noise during pressure release

Wear ear protectors for your own safety.



Wear suitable gloves



Environmental protection

With this sign you get tips for environmentally-friendly working.



Waste must be disposed of in accordance with local regulations



Starting up / pressurizing the equipment



Shutting down / depressurizing the equipment

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1 The manufacturer

The manufacturer of the equipment is:

Donaldson Filtration Deutschland GmbH

Büssingstr. 1

D-42781 Haan, Germany

www.donaldson.com

The manufacturer reserves the right to make changes and improvements without prior notice.

2 Recommendations for work protection

The manufacturer explicitly excludes all responsibility or liability for damage and / or injury caused by failure to follow these special points requiring attention, or others, or by failing to pay the necessary attention when operating and handling these adsorption dryers, even if this is not explicitly stated in individual cases.

In order to ensure proper operation of the equipment, please pay attention to all safety advice and general information given in this operation manual.

All safety information is always intended to ensure your personal safety!

All relevant regulations for industrial safety, general safety rules and information included in the operation manual, apply to the operation of the adsorption dryer. The adsorption dryer was designed and constructed according to the generally recognized safety regulations.

Design / development, production, installation and after-sales service of the equipment are subject to a certified quality assurance system as per DIN EN ISO 9001.

2.1. General safety information



Use the equipment as intended!

The equipment may only be operated for its intended purpose. The adsorption dryer is built exclusively for the drying of compressed air or nitrogen (except Ultrapure Smart). Any other use of the equipment, or one which deviates from the one stated, shall be considered inappropriate.



When drying nitrogen do not operate the system in enclosed spaces, ensure adequate ventilation, if necessary dissipate /extract the regeneration air, as well as observing additional country-specific regulations when dealing with gaseous nitrogen.

The manufacturer shall not be liable, where this is permitted under law, for any damage incurred as a result of misuse.

The medium to be dried must not contain any corrosive components which could cause corrosion in the material of the pressure equipment in an unacceptable way.

Pressure and temperature of the medium must correspond to the specifications on the type plate and the operation manual!

The pressure unit is not designed for traffic, wind and earthquakes loads. In the case of the occurrence of these loads, the pressure unit must be protected by suitable measures against these loads.



Leave the operating manual at the usage site!

Ensure that the operating manual is always with the equipment and is accessible to the operating personnel.



Use correct tools!

When maintaining as well as servicing the equipment you may only use faultless tools approved for the usage purpose. If special tools are required for some work this is to be clarified with the manufacturer beforehand.



Do not make any structural changes to the equipment!

Structural changes to the equipment may only be carried out by the manufacturer, or after consultation with the manufacturer.

All work on the pressure vessels and pipelines, such as welding, structural changes, installation work, etc. without previous consultation with the manufacturer and, if necessary, with the notified body, is forbidden and results in invalidation of the declaration of conformity. Failing to observe this prohibition can place you and your fellow workers in grave danger.



Do not deactivate any protective devices on the equipment!

Protective devices against exceeding the maximum allowable operating conditions, such as pressure and temperature are not part of the standard scope of supply. Never disable the optional protective devices of the equipment. Never attempt to by-pass the protective devices.

Non-functional protective devices mean the greatest possible danger for you and your fellow-workers and can cause malfunctions in the equipment.



Protection against exceeding the pressure / temperature!

It must be ensured that the pressure of the components of the equipment should under no circumstances be able to exceed the permissible operating pressures.

As standard it is the responsibility of the operator to protect against exceeding the pressure. It must be ensured that the pressure generating compressor and, if necessary, the compressed air network downstream of the adsorption dryer are protected accordingly.

The operating process ensures that the temperature at operating pressure cannot exceed the maximum permissible operating temperatures of the equipment components. The operator must ensure that the temperature of the loads cannot exceed the permissible operating values of the equipment with suitable measures.

If the pressure equipment is under operating pressure, it must be guaranteed by suitable measures, that the permissible operating temperatures are not exceeded by the environmental conditions at the place of installation.



Pressure vessels – recurring approvals / demands of alternating stress

Because of the cycle times of the pressure equipment, the alteration of loads per year is dependent on the type. The design takes a lifetime of 10 years into consideration.

Sizes 20 - 60:

An examination of the pressure-bearing walls (internal check) must take place after 5 years, at the latest in Germany, a strength test (pressure test) after 10 years, at the latest. Otherwise the operator must observe the national regulations at the respective installation site and determine the test limits in consultation with the responsible body named.



Fire risk!

Safety devices against exceeding the pressure due to fire are not part of the standard scope of the equipment.

If there are potential fire risks at the place of installation of the equipment the operator must ensure relevant protective measures against exceeding the permissible operating parameters.

2.2. Safety information for transport and installation



Dangers during transport!

The equipment should be fastened and lifted at the points provided with suitable lifting equipment. The equipment must not be transported by the pipelines, because this could cause damage to them. This can lead to leaks in the equipment piping through to serious malfunctions of the equipment, also see chapter 6.



Avoid introducing external forces and torques!

Ensure that no additional forces or torques are transmitted to the adsorption dryer via the connected pipelines, which could exceed the permissible load capacity of the system. If necessary, the operator has to guarantee this with suitable evidence and/or on-site measures.

Ensure that no impermissible vibration or pulsation from other units or machinery is transmitted to the adsorption dryer. If necessary, prevent them with appropriate on-site measures.

2.3. Safety measures during operation

Safe working conditions and proper operation of the equipment can be achieved with knowledge of and adherence to the national working, operating and safety regulations. Furthermore, any internal plant regulations must be followed.

Check the equipment for visible external damage at regular intervals.

Malfunctions or faults, which can compromise safety, must be resolved immediately. Follow the advice given (chapter 11) in the event of malfunctions. If the measures listed there do not lead to a correction of the malfunction contact the manufacturer.

Only allow properly trained personnel to operate the controller or the equipment.



Blow out noises during pressure release!

Wear ear protectors for your own protection!

2.4. Dangers due to electrical energy



Work on the electrical supply is to be carried out in accordance with DIN VDE Provisions (or comparable country-specific regulations) and according to the regulations of the respective power supply company by a trained and authorised specialist.

There is the risk of a deadly electrical shock if you come into contact with the mains voltage.

Danger from electrical voltage on electrical components!

Please note: Switch the operating switch off before opening the device.

The device may only be connected to a properly installed electrical network.

If work is required on live parts a second person is to be called in who switches off the main switch and secures it against switching back on. The working area must be made safe by isolating the area and posting warning signs. Only insulated tools should be used to service the electrical components.

The electrical parts of the equipment must be checked regularly. Only use original fuses for the rated current and voltage.

2.5. Dangers due to desiccant

The adsorbents used are located in the adsorber cartridge.

The selection of adsorbent depends on the type of processing equipment. Only the manufacturer's adsorption cartridges may be used.

Adsorbents are chemicals and thus, are subject to standard safety measures (safety data sheet). The type of adsorbent used here is not subject to any labeling requirements as per the Hazardous Substances Ordinance.

Categorically only store adsorber cartridges there where access is only possible for trained personnel.

2.6. Safety measures during maintenance, servicing and repair work

All personnel working for the user who are involved with installation, start-up, operation, servicing, repair work of the equipment must read and understand the operation manual beforehand, with special reference to the safety information. Contact the manufacturer in case of any questions.

The manufacturer is not liable for damage caused by inappropriate installation and start-up of the equipment. The user bears all the risk in such a case.

The responsibility for maintenance and servicing work must be clearly established. Operating personnel must be informed before the start of maintenance and service.

Preventive maintenance should be performed at the recommended intervals by the manufacturer's after-sales service.

All the maintenance and service must be carried out on the equipment as per the operation manual instructions.



The equipment must be powered down and must not be live or pressurized during some types of maintenance or servicing work. You endanger yourself and others if you carry out this work on the running system.

- Shut down the equipment properly.
- Depressurize the equipment.
- To switch off the system disconnect it from the mains and secure it against being switched back on.
- Post a warning sign to prevent the equipment from being switched on again.



If removing the existing contact safety insulation, care should be taken that the equipment has sufficiently cooled down. Replace the insulation before restarting the equipment.

Replace the consumable parts according to the intervals stated in the "Equipment and spare parts list" or the chapter 15.2 "Service sets". This list is part of the operation manual.

Only use original spare parts and accessory parts from the manufacturer. There is no guarantee that non-original parts have been designed and manufactured to meet the safety and operational requirements of the equipment.



Replace damaged parts with new ones. Pressurized equipment must be taken out of operation immediately if its parts are badly damaged.

For your safety we recommend the manufacturer's after sales service replace worn or damaged parts from a equipment.

After maintenance has been performed, a leakage test must be carried out.



When replacing larger assemblies, carefully fasten it to the lifting gear making sure it is secure!

Only use suitable lifting gear and load-bearing members that are in perfect condition and have adequate load-bearing capacity!

If carrying out installation work above head height, use suitable and safe working platforms! Never use machine parts as climbing aids; risk of falling! Use safety lines to protect against falling when carrying out maintenance work at heights above 1.80 meters!

2.7. Environmental protection



Dispose of used substances and materials properly according to the regional (national) disposal regulations.

The separate environmentally-friendly disposal of materials requires the recycling of materials.



It is absolutely necessary that the desiccant cartridge/cleaner cartridge is disposed of properly.

2.8. Requirements for the operator

The operator should ensure that the equipment is operated by trained personnel familiar with safety stipulations and the handling of the equipment. In detail, these are as follows:

Safety

- Accident prevention regulations
- Safety information (both general and specific to the equipment)
- Safety devices of the equipment
- Emergency procedures

Operation of the equipment

- Measures for equipment start-up
- Behavior in the event of malfunctions
- Equipment shutdown

2.9. Requirements for personnel

All persons who are entrusted with the operation of the equipment are required to

- follow the basic regulations for safety at work and accident prevention,
- have read and understood the operation manual,
- follow the measures provided in this manual.

2.10. Warranty and liability

Claims for warranty and liability concerning personal injury or material damage become void if caused by one or more of the following reasons:

- Inappropriate use or application of the equipment
- Incorrect installation, start-up, operation and maintenance of the equipment
- Operation of noticeably defective equipment
- Failure to follow operation manual procedures regarding transport, storage, installation start-up and maintenance of the equipment
- unauthorized structural modifications to the equipment
- Inadequate monitoring of parts on the equipment that are subject to wear
- Improper repairs
- Use of non-original parts

Please also note the general warranty conditions for the manufacturers products.

3 Basic function

The heatless regenerating adsorption dryer is implemented in three different versions:

Ultrapac™ Smart

The Ultrapac Smart is a heatless regenerating adsorption dryer for the drying and processing of compressed air or nitrogen. The adsorption dryer includes a prefilter and an afterfilter.

Ultrapure Smart

The Ultrapure Smart is a breathing air system based on the adsorption dryer, Ultrapac Smart. The adsorption dryer was expanded by a processing stage with more specialized adsorbents. The breathing air equipment includes a prefilter and an afterfilter.

Oilfreepac Smart

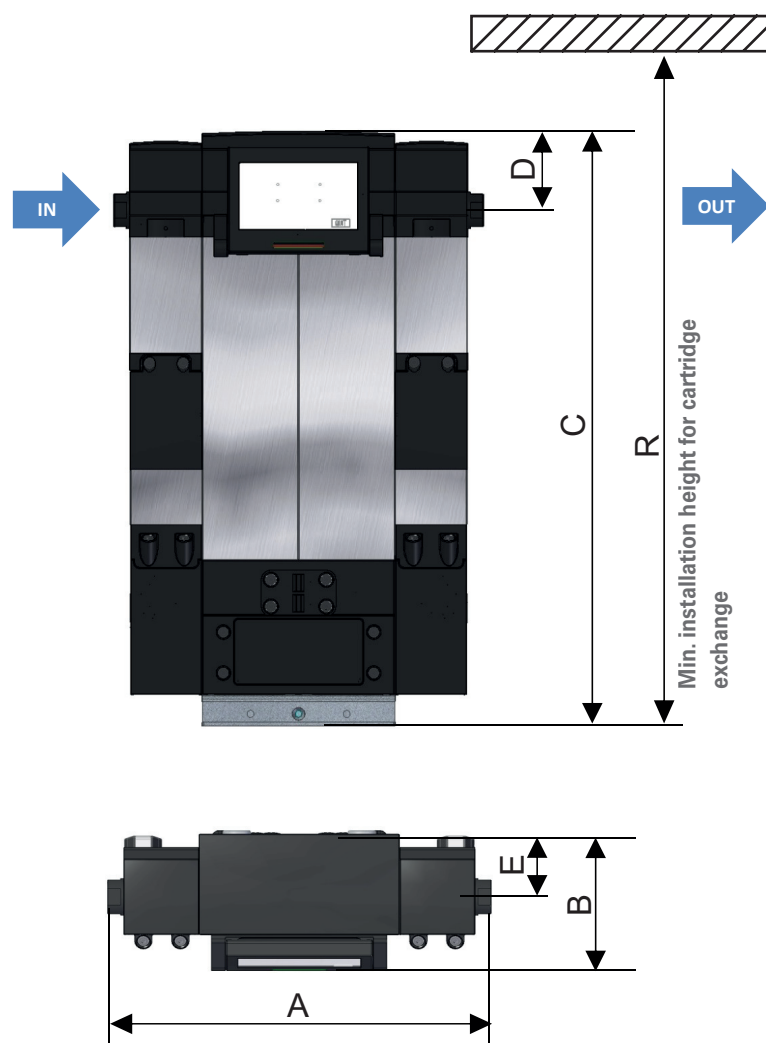
The Oilfreepac Smart is a processing system based on the adsorption dryer Ultrapac Smart. The adsorption dryer was expanded by a processing stage with more specialized activated carbon. The processing equipment includes a prefilter and an afterfilter.

4 Technical data

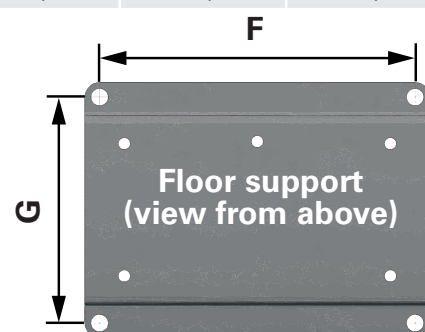
Ultrapac / Ultrapure / Oilfreepac Smart 03 - 60	
Functional principle	Fully automatic, heatless regenerating for continuous operation
Power supply	
Supply depending on design	220-230VAC / 50-60Hz, 110-115VAC / 50-60Hz, 24VDC
Power cord	AC: 3 x 1,0mm ² / DC: 2 x 1,0mm ²
Power consumption and internal fuse	Standard: 24V DC = 12W, AC = 15 VA / 12W
	Superplus: 24V DC = 16W, AC = 19VA / 16W
Internal fuse	2A time-lag, 250V, ceramic tube fuse
Nominal voltage of solenoid valves contact	230 V AC / 115 V AC / 24 V DC
Nominal current of solenoid valves contact	5 A (ohmic load)
Nominal voltage of alarm relay contact	40 V
Nominal current of alarm relay contact	1 A (ohmic load)
Protection class	IP65 UL50 E Type 5
Overvoltage category	II
Design data	
Medium	Compressed air/ nitrogen
Operating overpressure	Ultrapac Smart: min. 58 psi / max. 232 psi (typ 03 to 15), 174 psi (type 20 to 60) Oilfreepac Smart / Ultrapure Smart: min. 58 psi / max. 232 psi (typ 03 to 15), 174 psi (type 20 to 60)
Medium temperature	min. 41°F / max. 131°F
Pressure dew point	min.- 40 °F (further pressure dew point options on request)
Ambient temperature	min. +41°F / max. +122°F
Ambient humidity	max. 60% at 122°F
Place of location	0-6562 ft above sea level (indoor area)
Noise emission (1 m distance)	60 db(A)
Pollution level	2
Pressure vessel	
Design overpressure	Ultrapac Smart: min. 58 psi / max. 232 psi (typ 03 to 15), 174 psi (type 20 to 60) Oilfreepac Smart / Ultrapure Smart: min. 58 psi / max. 232 psi (typ 03 to 15), 174 psi (type 20 to 60)
Tested overpressure	348 psi
Design temperature	32°F to +131°F
Purity of the compressed air at the dryer inlet	
Water vapor content dependent on temperature and degree of saturation	5 :-: 4 according to ISO 8573-1:2010
Purity of the air at the dryer outlet	
Ultrapac Smart:	1-2 :-: 2*:-: 2 according to ISO 8573-1:2010
Ultrapure Smart / Oilfreepac Smart:	1-2 :-: 2*:-: 1 according to ISO 8573-1:2010
* Class 1 with corresponding design	

5 Dimensions

5.1. Dimensions Ultrapac Smart



Size	C inch		Weight lbs
	Standard	Superplus	
03	19,3	19,6	22,0
06	29,8	30,1	33,0
09	40,3	40,6	46,2
12	50,8	51,1	57,2
15	61,3	61,6	68,2
20	33,4	34,1	74,8
30	43,8	44,5	99,0
40	54,2	54,9	125,4
50	64,6	65,3	149,6
60	75,0	75,7	173,8

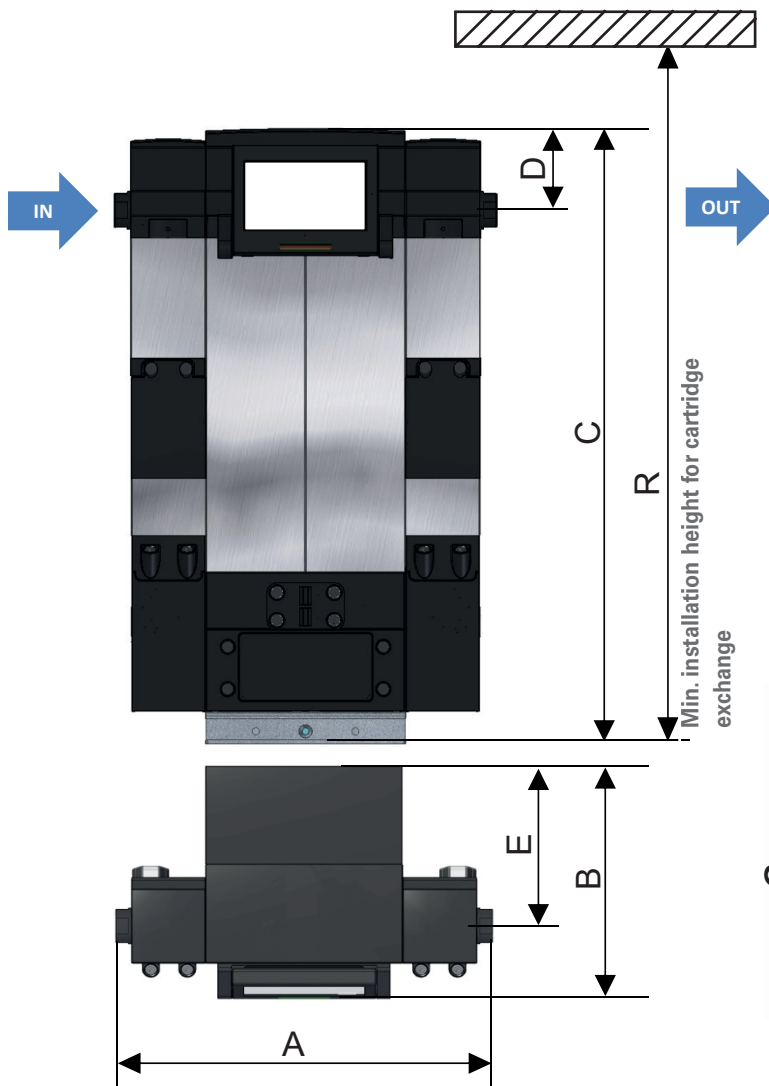


Size	F inch	G inch
03-15	5,4	4,6
20-60	9,3	6,7

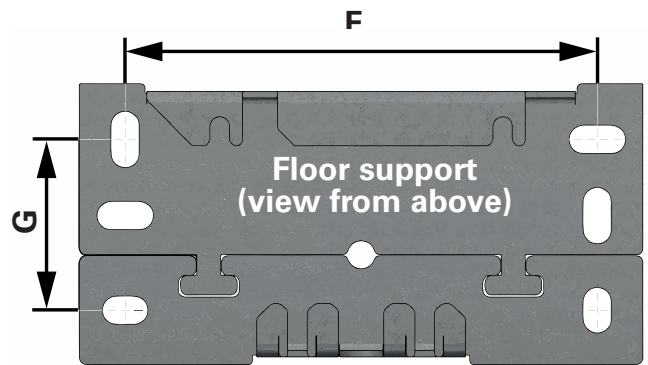
Size	Connections	A inch	B* inch		D inch	E inch	R inch
			Standard	Superplus			
03	1/2"	12,4	5,4	4,5	2,7	2,1	35,3
06	1/2"	12,4	5,4	4,5	2,7	2,1	45,8
09	1/2"	12,4	5,4	4,5	2,7	2,1	56,3
12	1/2"	12,4	5,4	4,5	2,7	2,1	66,9
15	1/2"	12,4	5,4	4,5	2,7	2,1	77,4
20	1"	18,3	7,5	6,6	3,9	3,8	49,8
30	1"	18,3	7,5	6,6	3,9	3,8	60,2
40	1"	18,3	7,5	6,6	3,9	3,8	74,6
50	1"	18,3	7,5	6,6	3,9	3,8	81,0
060	1"	18,3	7,5	6,6	3,9	3,8	91,4

*total depth incl. floor bracket

5.2. Dimensions Ultrapure Smart / Oilfreepac Smart



Size	C inch		Weight lbs
	Standard	Superplus	
03	19,3	19,6	22
06	29,8	30,1	33,0
09	40,3	40,6	46,2
12	50,8	51,1	57,2
15	61,3	61,6	68,2
20	33,4	34,1	74,8
30	43,8	44,5	99,0
40	54,2	54,9	125,4
50	64,6	65,3	149,6
60	75,0	75,7	173,8



Size	F mm	G mm
03-15	5,2	1,7
20-60	8,5	3,1

Size	Connections	A inch	B* inch		D inch	E inch	R inch
			Standard	Superplus			
03	1/2"	12,4	6,8	7,5	2,7	5,5	35,3
06	1/2"	12,4	6,8	7,5	2,7	5,5	45,8
09	1/2"	12,4	6,8	7,5	2,7	5,5	56,3
12	1/2"	12,4	6,8	7,5	2,7	5,5	66,9
15	1/2"	12,4	6,8	7,5	2,7	5,5	77,4
20	1"	18,3	10,9	11,5	3,9	6,9	49,8
30	1"	18,3	10,9	11,5	3,9	6,9	60,2
40	1"	18,3	10,9	11,5	3,9	6,9	74,6
50	1"	18,3	10,9	11,5	3,9	6,9	81,0
60	1"	18,3	10,9	11,5	3,9	6,9	91,4

*total depth incl. floor bracket

6 Before installation

6.1. Transport and installation

Here you will find information on:

- how to correctly and safely transport and set up the equipment

The adsorption dryers Ultrapac/ Ultrapure/ Oilfreepac Smart 03-06 are packed in a cardboard box. In the sizes 09-60 the dryers are additionally delivered on a wooden pallet. Please make a note of the symbols on the packing.

6.1.1. Safety hints during transport



Take special care while loading and unloading the equipment during transport!
Never use force!

Ensure that the maximum safe loading limits of the load-bearing members are never exceeded at the place of installation.

If using a fork-lift truck for transport, ensure that the equipment is only lifted by the carrying frame for the equipment or under the wooden pallet.

Beware of unequally-distributed loads! This can cause severe injuries when transporting with lifting gear!



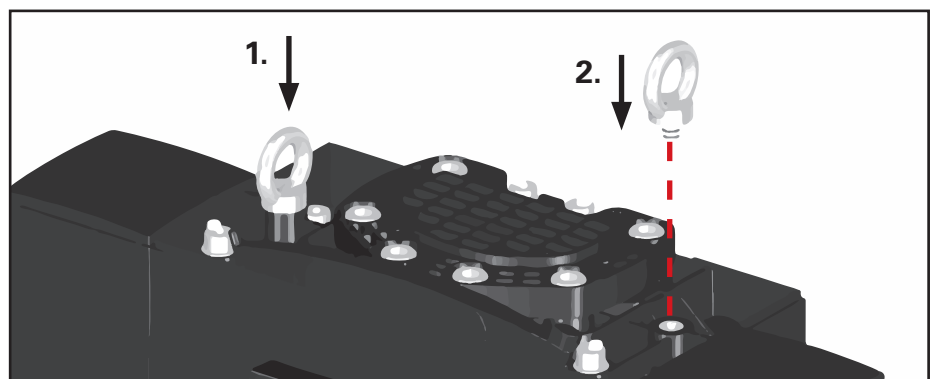
Ensure that the angle from the horizontal to the position of the ropes is never less than 45°.

Otherwise it could cause leaks in the piping of the equipment and even lead to serious malfunctioning of the dryer.

Under no circumstances may the equipment be transported by the pipework, otherwise it could be damaged. This could lead to leaks in the pipework system of the equipment and even lead to serious malfunctioning of the dryer. Use the **crane lugs** instead.

In the Standard version M6 crane lugs (03-15) or M8 (20-60) are available. For Standard the corresponding crane lugs are optionally available.

Mounting the crane lugs:



7 Installation



The operator of the equipment is responsible for the correct installation and layout of the piping leading to and from the equipment.



The manufacturer is not responsible for the installation of protection devices to protect against power surges, short-circuits, and overloads.

7.1. General hints

- If the equipment is to be integrated into an existing pipeline, take into consideration that the existing piping sections may still be contaminated after the installation prior to initial start-up and commissioning. If necessary, these piping sections and components must be cleaned or replaced.
- Never remove individual filters or desiccant cartridges from the system, without first replacing them before recommissioning. Otherwise, this could lead to limited functionality of the equipment.
- The high performance dryer can, taking the labeled flow direction into account, basically be set-up vertically or horizontally*.
- Ensure that the dryer is not set up so the direction of airflow is reversed (exception: intermittent operation).
- The dryer may not be started up under large volumes of atmospheric pressure or a vacuum (see also chapter 4). This can be prevented by using an automatic starting device (optional).
- In the same way, avoid parallel switching of multiple dryers without separate volume flow limiters.
- If the compressor is not operated continuously, it is possible to couple the compressor controller and the dryer controller (operating mode: intermittent operation, chapter 7.5). In all cases, ensure that the current regeneration cycle is completed after switching off the compressor.
- The straight inner thread according to DIN EN ISO 228-1 may only be used with a straight outer thread, whereby the seal is achieved on the sealing surface around the connection thread. To prevent overtightening, the following maximum tolerances may be applied:
Mini: 30 Nm
Midi: 50 Nm
- The conical NPT inner thread according to ANSI B 1.20.1 must be sealed with suitable thread sealants (e.g. DIN EN 751) and a maximum of the following tolerances may be applied when screwing in a conical outer thread:
Mini: 30 Nm
Midi: 50 Nm

* Horizontal setup only possible after conversion of the filter. Please contact manufacturer's customer service!

7.2. Installation variants

7.2.1. General

Standard

The floor support is already mounted on the dryer at delivery.

Superplus

The floor / wall support (2 parts) are unmounted in the packaging.

~~ALG Smart
OFP Smart~~



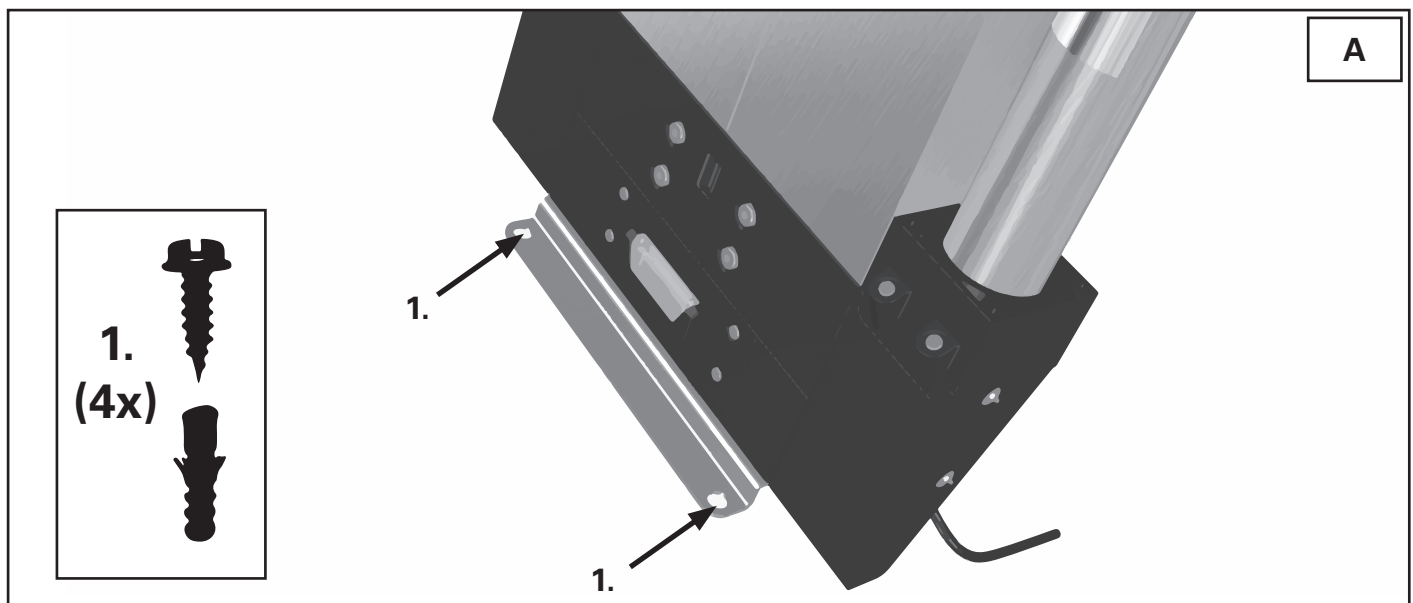
The floor must be even and sufficiently load bearing for installation of the adsorption dryer.

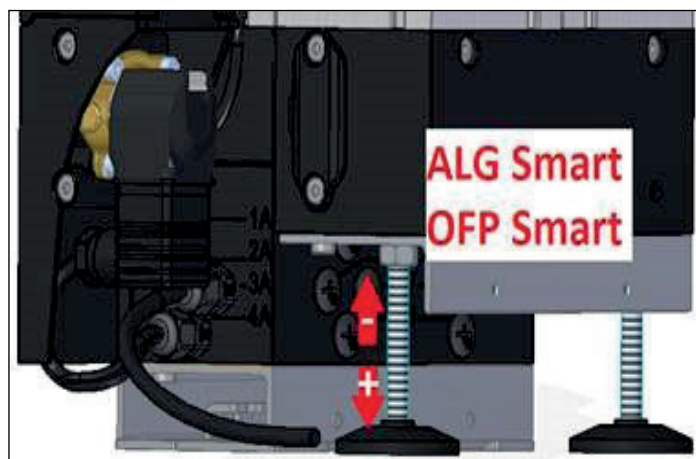
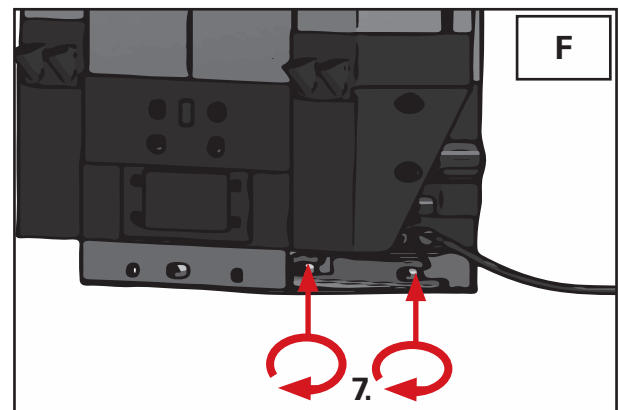
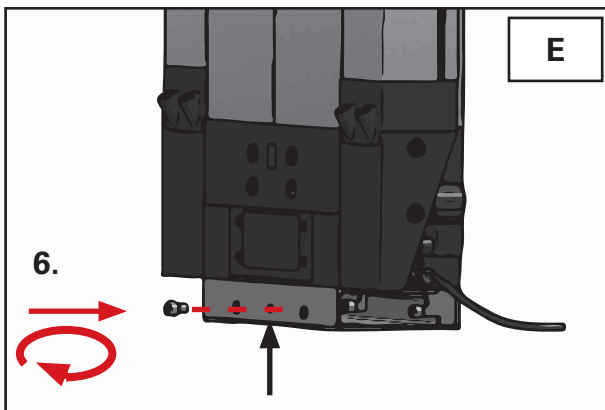
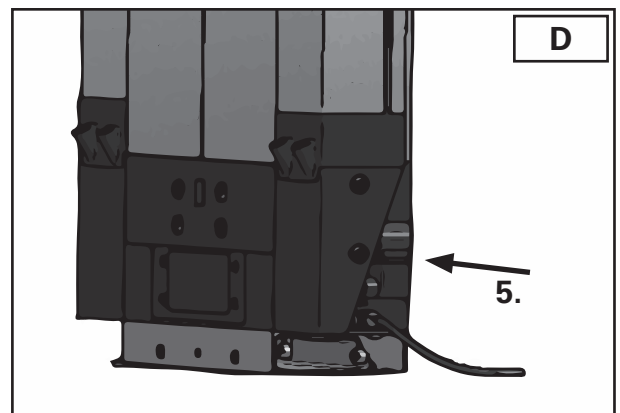
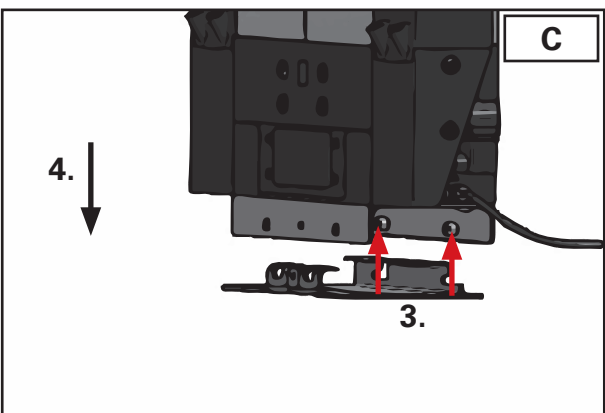
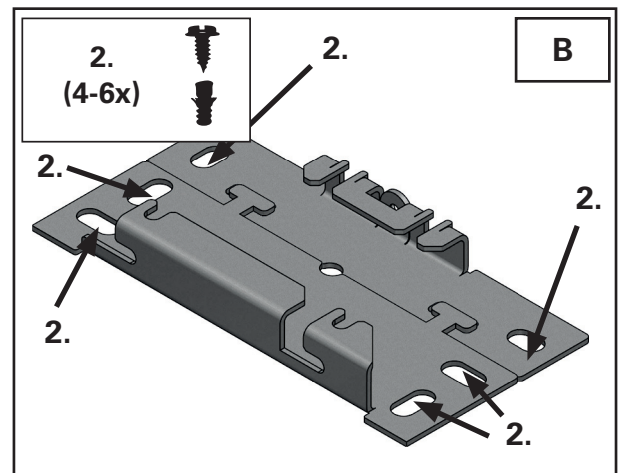
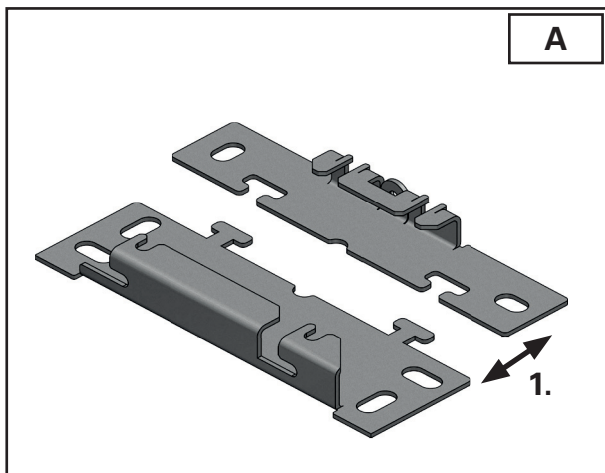
The same applies for the wall mounting of the adsorption dryer.

Sufficiently dimensioned screws and dowels must be used to attach the floor/wall support.

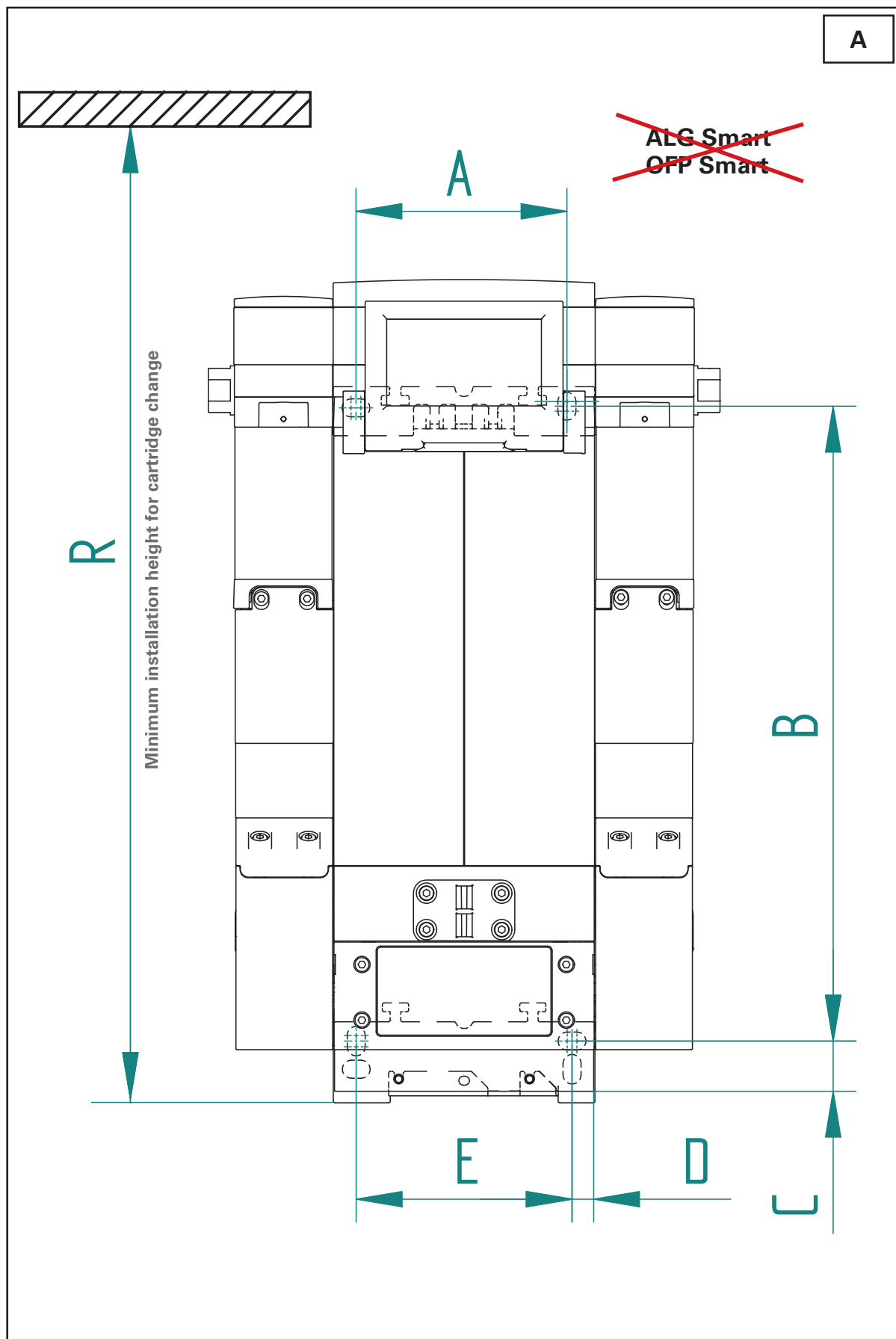
When mounted on the floor the adsorption dryer must be protected against driving into and secured against tipping over when mounted on racks. If necessary, install an interception device.

7.2.2. Floor mounting (Ultracac Standard)

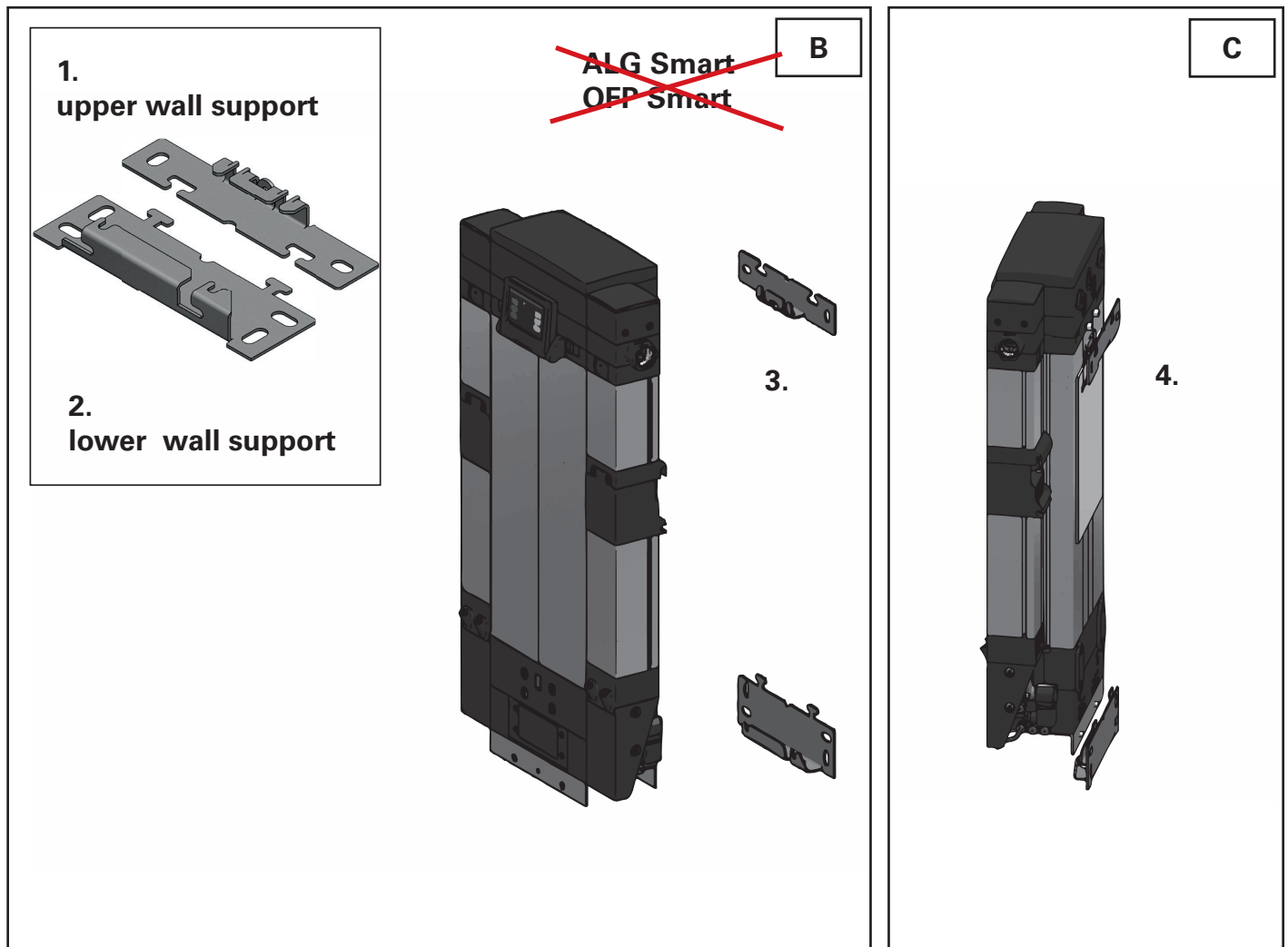


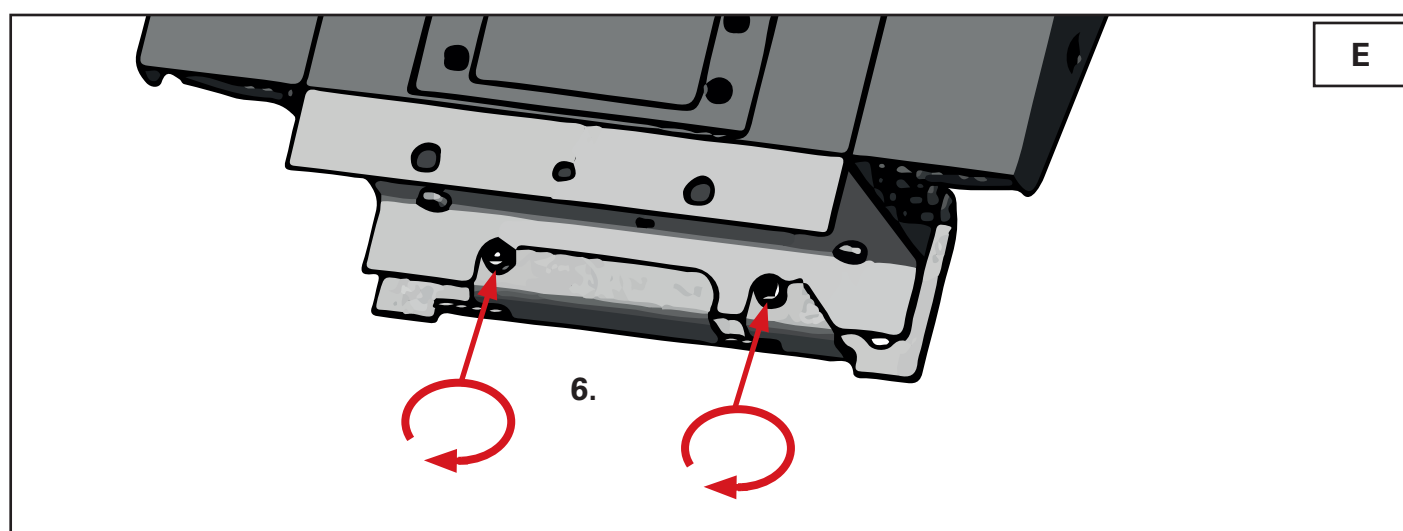
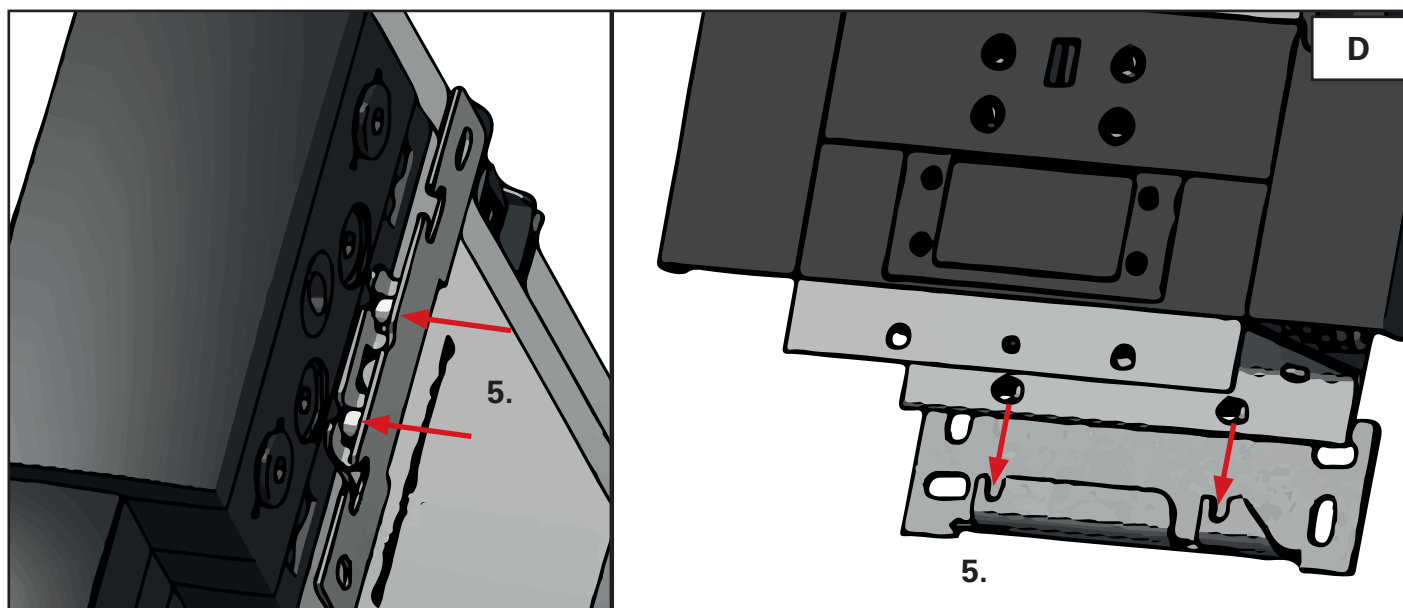


7.2.4. Wall mounting (Superplus)



Size	A inch	B inch	C inch	D inch	E inch	R inch
03	5,1	15,3	1,2	0,5	5,1	35,3
06	5,1	25,8	1,2	0,5	5,1	45,8
09	5,1	36,3	1,2	0,5	5,1	56,3
12	5,1	46,8	1,2	0,5	5,1	66,9
15	5,1	57,3	1,2	0,5	5,1	77,4
20	8,6	27,3	2,0	0,8	8,6	49,8
30	8,6	37,7	2,0	0,8	8,6	60,2
40	8,6	48,1	2,0	0,8	8,6	74,6
50	8,6	58,5	2,0	0,8	8,6	81,0
60	8,6	68,9	2,0	0,8	8,6	91,4





7.3. Installation tips

- During installation ensure that the system is well accessible for service and repair work.
- The equipment can be supplied with compressed air from all conventional compressors available on the market. Also ensure that the inlet conditions for the compressed air are guaranteed at the system inlet as per the design. The inlet of the compressor may not be located at a point where there are excessive contaminants and pollutants (in direct proximity of machine exhaust gases or other sources of contamination).

Removing the packing

Remove the packing with care!

Immediately report any damaged machine parts or missing parts as a result of transport to the manufacturer and the transporting company.

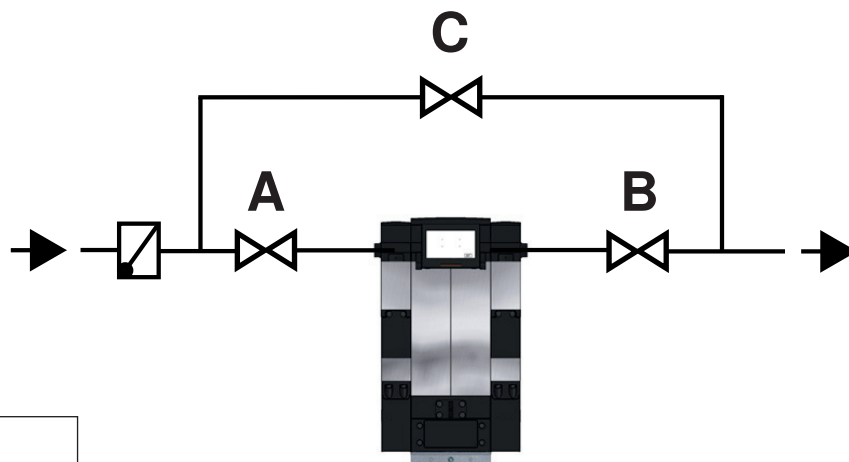
Document any possible equipment damage and inform the manufacturer immediately.

Setup location

- Ensure that the installation site is clean and make it accessible from all sides of the equipment. Take special care that there is a sufficient room to swap over the equipment or perform maintenance on it.
- Ensure that the load-bearing capacity of the floor corresponds to the equipment weight, and that the floor is flat and even.
- Ensure that any vibration or pulsation from other equipment or machinery is not transmitted to the dryer.
- The system is to be setup so that the power socket (if using the connection cable supplied) or the mains isolator (for external supply) are well accessible.

Bypass line

A bypass line should be installed around the equipment so the compressed air can still be supplied to the network if maintenance work is being performed on the equipment.



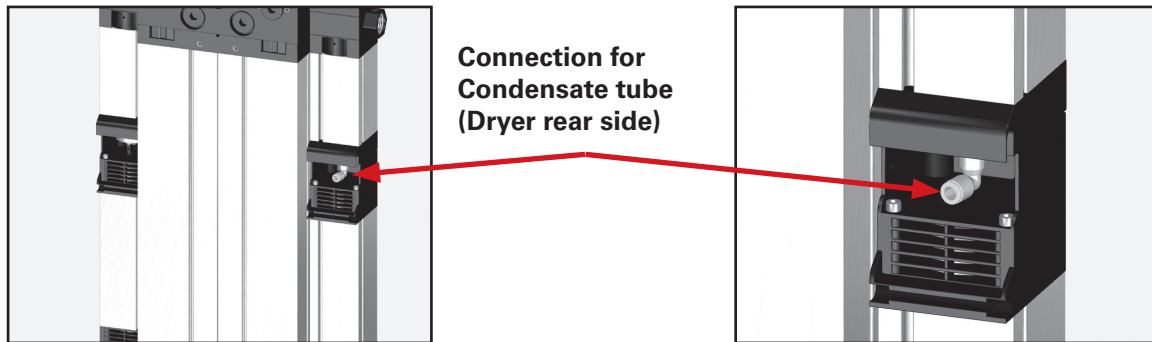
Connecting the condensate drain

Connection to the condensate drain takes place via a 6 mm hose plug-in connection.

Condensate treatment / disposal:

As the condensate can contain contaminants and oil deposits, it is to be collected and prepared and disposed of according to regulations. Under no circumstances may the condensate end up in the sewage or trickle into the ground.

For proper efficient processing of the condensate we recommend our oil/water separation systems. Contact Donaldson Service in case of queries.



Adjustment to the operating pressure

The adsorption dryers are factory equipped for operating conditions 102 psig / 95°F. Standard dryers are additionally supplied with a 58-87 psig throttle. In Superplus version, dryers are additionally supplied with throttles 131-189 psig and 189-232 psig.

If other operating conditions prevail at the setup site the throttle element must be replaced (see chapter 15.3.6).



Caution!

When making adjustments to the operating pressure for Standard sizes, a change in settings must be made by Donaldson Service



Caution!

At pressures under 102 psi a change of the throttle elements must be made. Otherwise the dryer is at risk!

At pressures over 102 psi a change of the throttle elements must be made for efficiency reasons.

Throttle set	Throttle number			
	58 - 87 psig	102 - 116 psig	131 - 189 psig	189 - 232 psig
5	6	3	2	1
10	11	7	5	4
15	16	9	8	7
20	20	12	11	8
25	24	14	13	10
35	25	17	14	n/a
50	29	21	19	n/a
65	31	25	23	n/a
80	32	27	26	n/a
60	33	30	28	n/a

*only for dryer sizes 03 - 15

If the deviating conditions at the usage site are known to Donaldson the dryer is equipped with the corresponding throttle in the factory. In this case no further throttles are included in the delivery scope.

7.4. Connection to the compressed air network

Properly connect the equipment to the moist gas inlet and to the dry gas outlet. Check that all screw connections have been installed properly.

The straight inner thread according to DIN EN ISO 228-1 may only be used with a straight outer thread, whereby the seal is achieved on the sealing surface around the connection thread. To prevent overtightening, the following maximum tolerances may be applied:

Mini: 30 Nm; **Midi:** 50 Nm

The conical NPT inner thread according to ANSI B 1.20.1 must be sealed with suitable thread sealants (e.g. DIN EN 751) and a maximum of the following tolerances may be applied when screwing in a conical outer thread:

Mini: 30 Nm; **Midi:** 50 Nm

Compressed air quality Ultrapac Smart

- The maximum permissible residual oil content in the compressed air before entering the dryer is 3 mg/m³. An additional prefilter should be installed if higher residual oil contents are encountered.
- If oil-free compressed air is required, an oil vapor adsorber AKC Smart should be installed after the dryer.
- If sterile compressed air is required, a high-performance sterile filter can be installed after the dryer.

Compressed air quality Ultrapure / Oilfreepac Smart

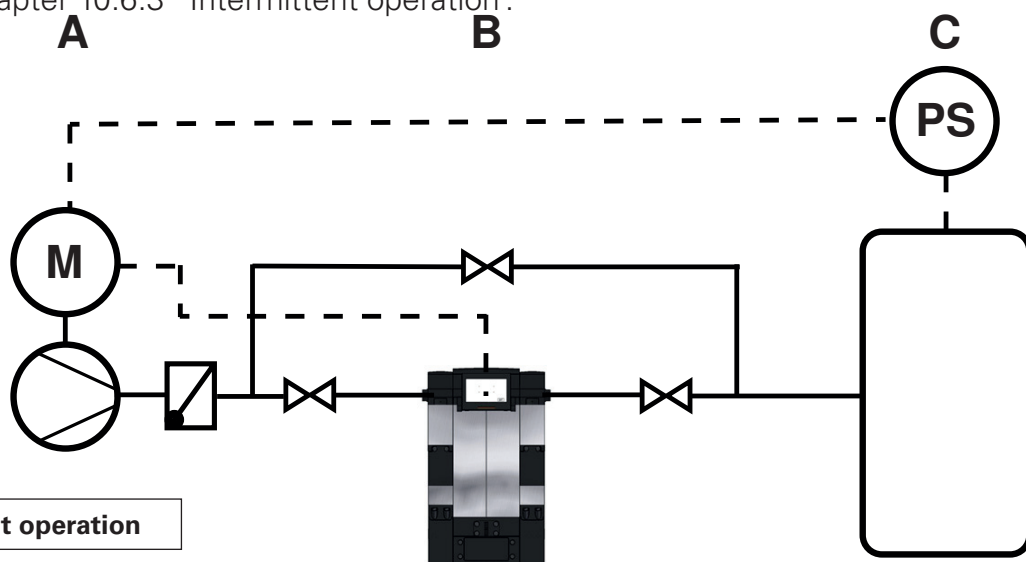
- If sterile compressed air is required, a high-performance sterile filter can be installed after the dryer.

7.5. Intermittent operation

If the high performance dryer is operating in the "intermittent operation" mode, the installation must be performed as per fig. "intermittent operation" in the following sequence: compressor (A) – dryer (B) – reservoir tank (C).

Ensure that the dryer can be back-flushed!

Also see chapter 10.6.3 "Intermittent operation"



7.6. Electrical connection



Work on the electrical supply is to be carried out according to the country-specific provisions and the regulations of the respective power supply company by a trained specialist.

The system is always supplied with the mains cable (1.5 m without plug) connected. Depending on the design the system is to be supplied with a voltage of 220-230VAC / 50-60Hz, 110-115VAC / 50-60Hz, 24VDC (also refer to Chapter 4 "Technical data").

A new, longer power supply cable must have a cross section of 3 x 1,0 mm² (AC voltage) or 2 x 1,0 mm² (DC voltage).

To connect a new power cable the inspection cover of the dryer must be removed. The mains cable is connected to terminal X1 (see following page).

- Before the electrical connection ensure that the permissible network voltage range of the controller matches that of the local mains voltage.
- For a stationary mains connection of the controller provide an all-pole disconnecting device with corresponding back-up fuse as per IEC/EN 60947. You will find the required connection data on the type plate. The plug connection or disconnecting device must be accessible at all times.
- If the device is disconnected from the mains, the disconnection device must be lockable or the disconnection point is to be monitored at all times.
- A new installation of the connection, changes in the system or an inspection of the protective earth including determination of the correct fusing may only be undertaken by a recognised electrical specialist.

Important!

The cable ends to be connected to the control system must be provided with wire end sleeve (with the tools provided for the purpose).

Removing the inspection cover

The inspection cover must be released if:

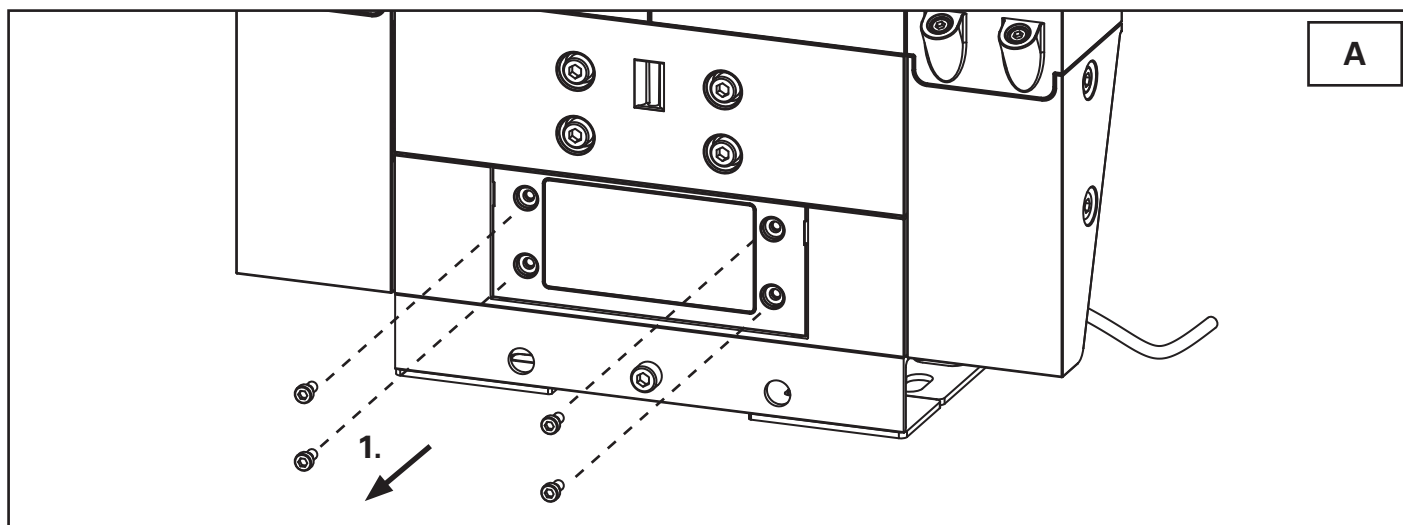
- the mains cable is replaced
- the cover is replaced (including power supply)
- alarm contact is used
- intermittent operation is used
- the fuse is replaced
- the battery is replaced



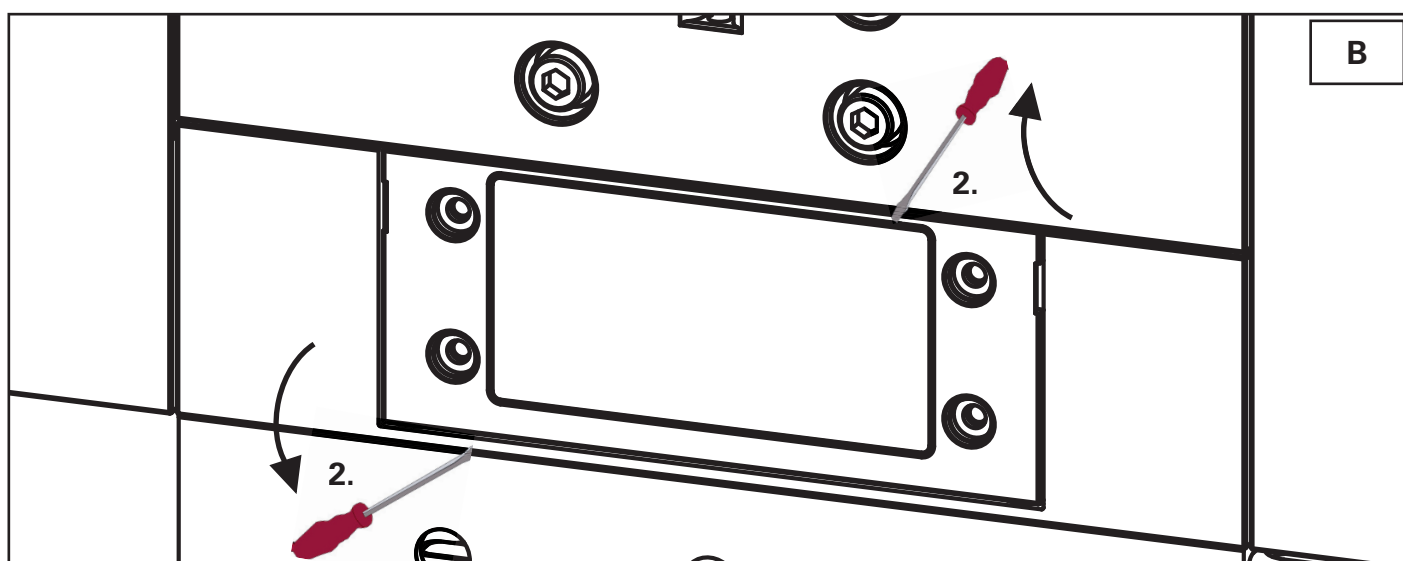
Caution!

Disconnect system from the mains before starting work!

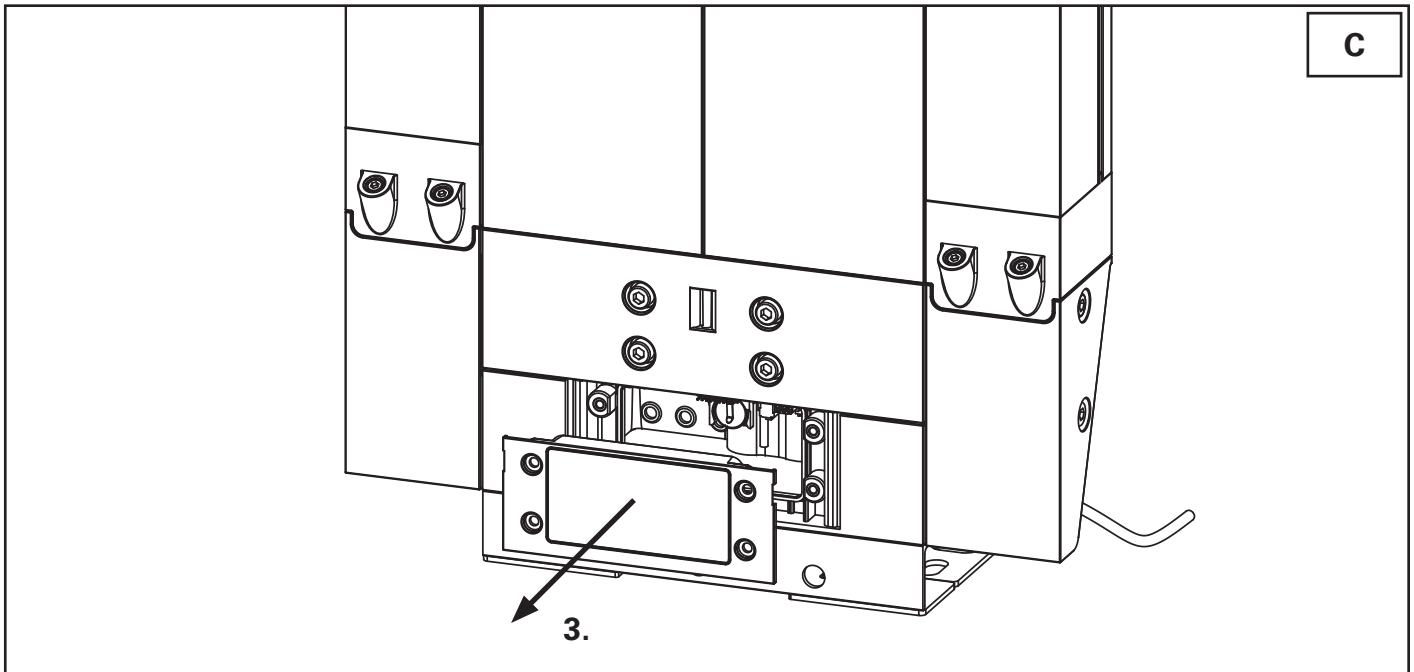
Otherwise the controlling system may be damaged and/or data loss may occur!



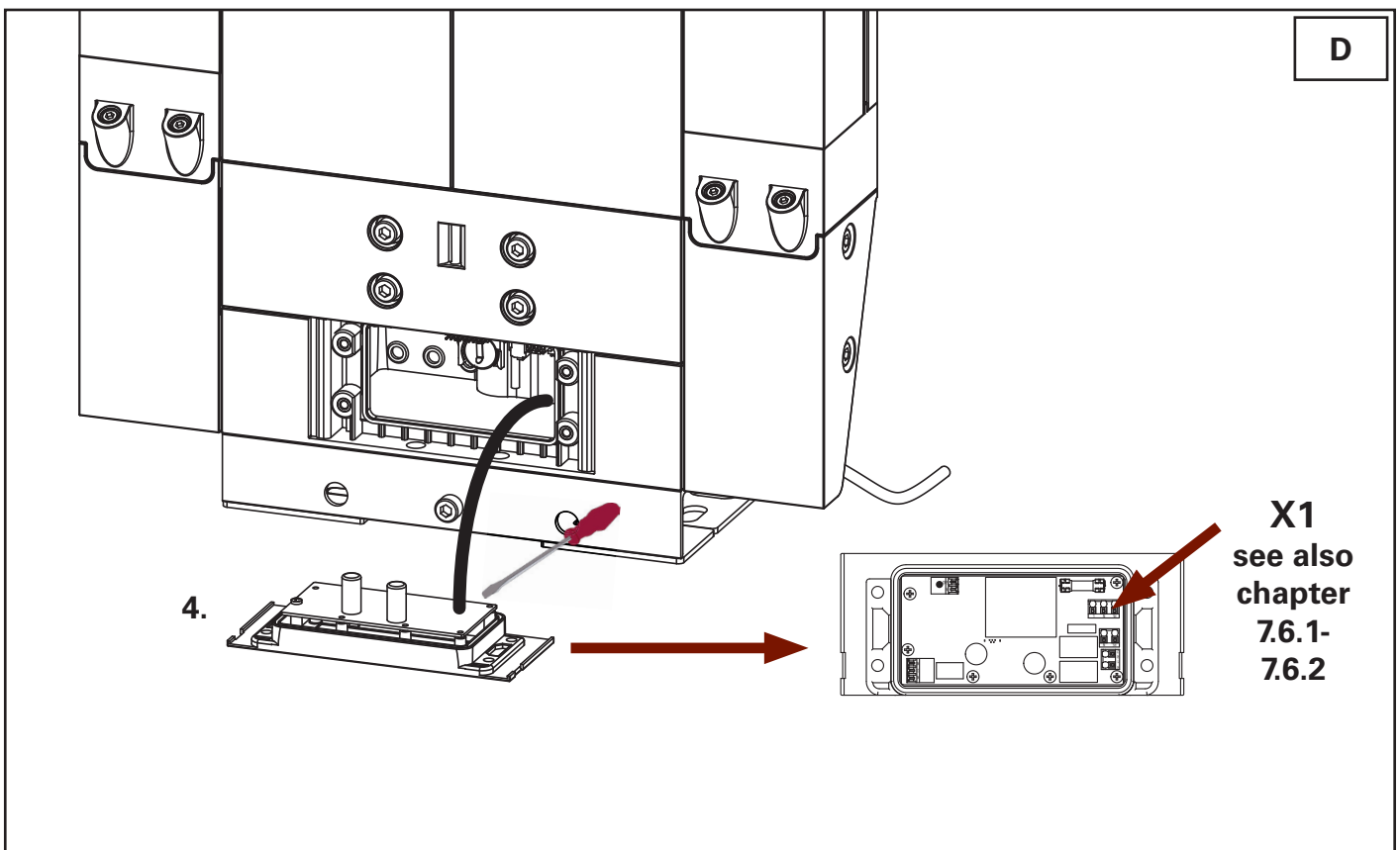
1. Release the 4 screws on the inspection cover by turning counter-clockwise.



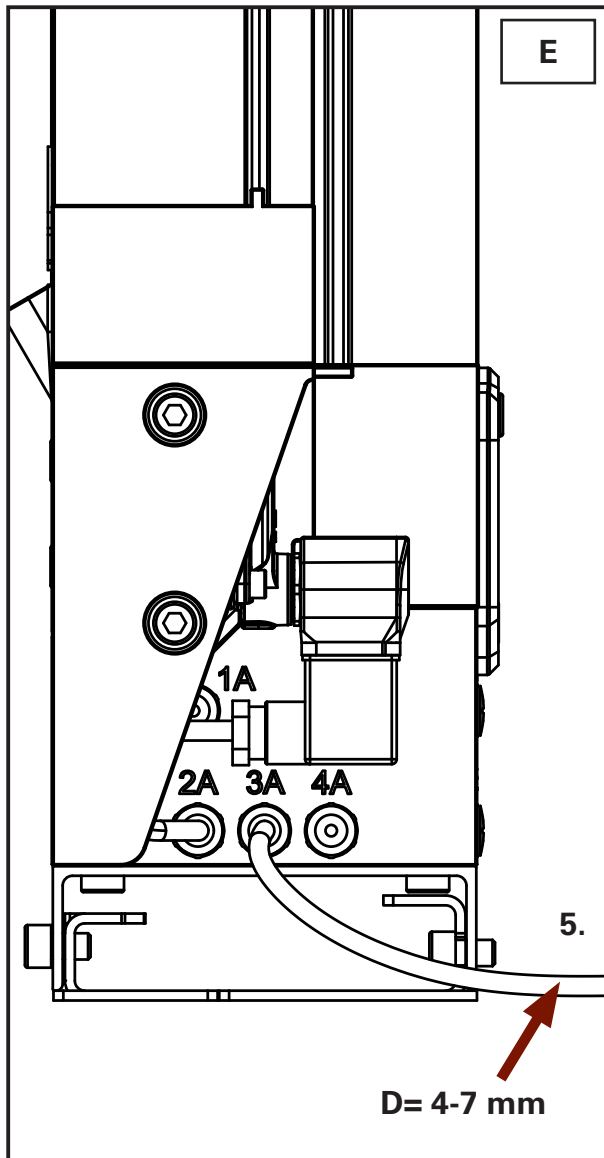
2. With the aid of a flat screwdriver carefully lift the inspection cover at the notches indicated left and right by careful rocking. While doing so ensure that the plastic frame of the inspection cover board is not damaged.



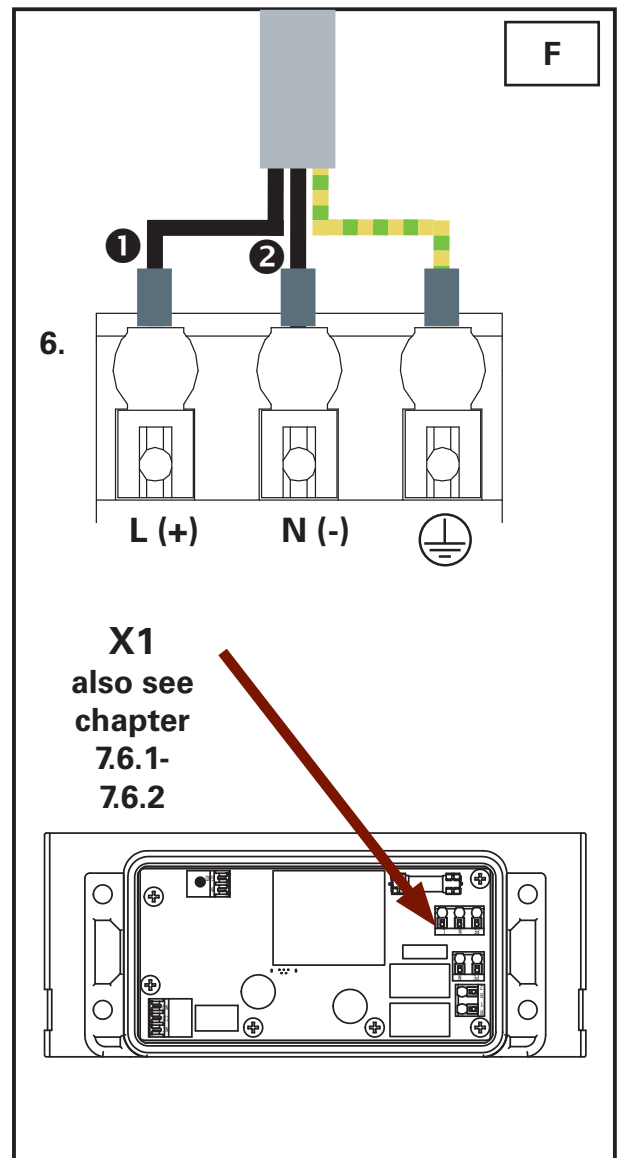
3. Pull the inspection cover forwards.



4. Release the available mains cable from terminal X1 of the inspection cover board with the aid of a screwdriver.



- 5.** Pull the existing mains cable from the screw joint (3A) on the right side of the dryer.
Run the new mains cable through the screw joint (3A).



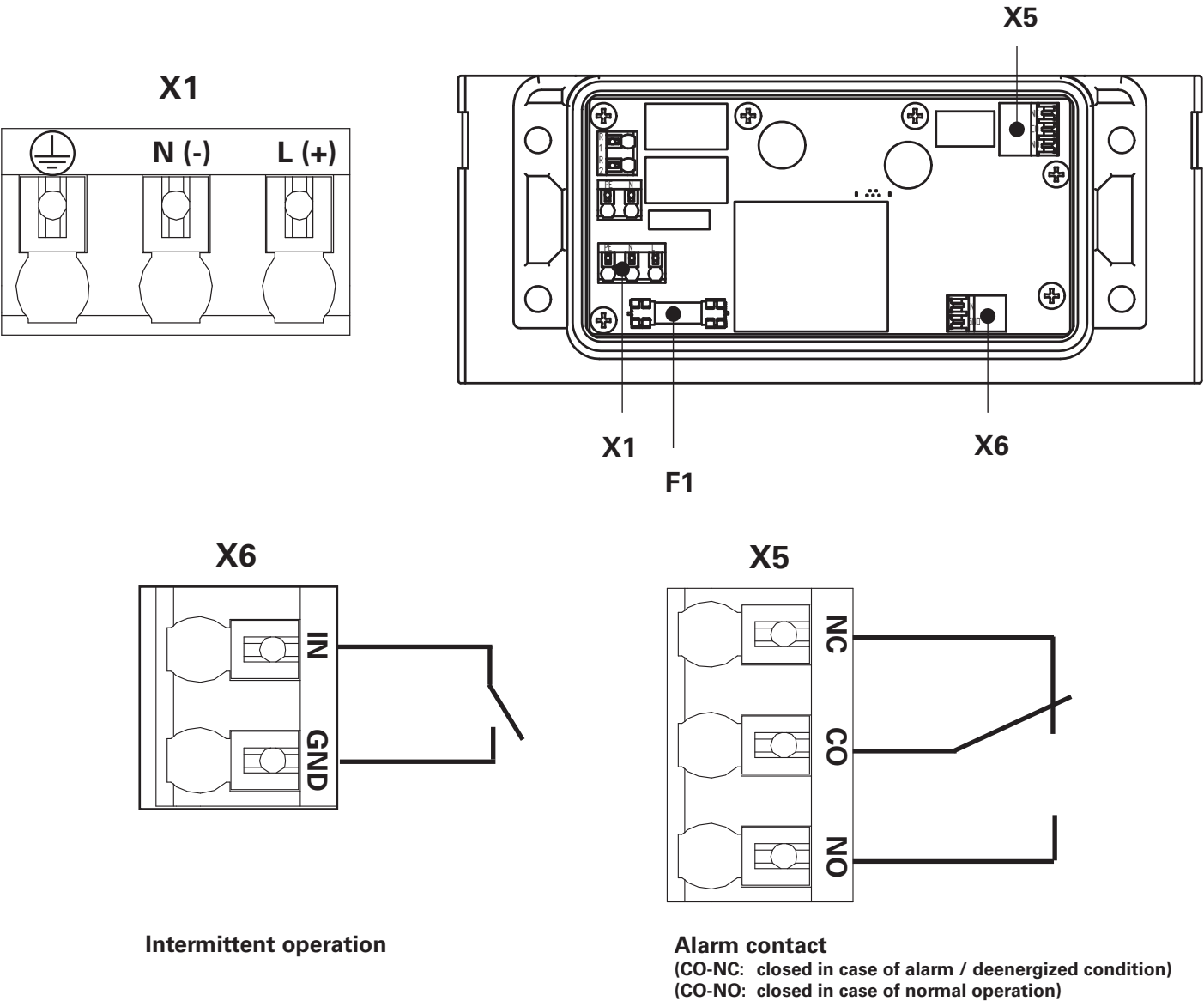
- 6.** Then connect the ends of the new mains cable provided with wire end sleeves to terminal X1 of the inspection cover board.

The installation takes place in reverse order.

For the precise position of terminal X1 of the inspection cover board for the different versions Standard / Superplus see chapter 7.6.1- 7.6.2.

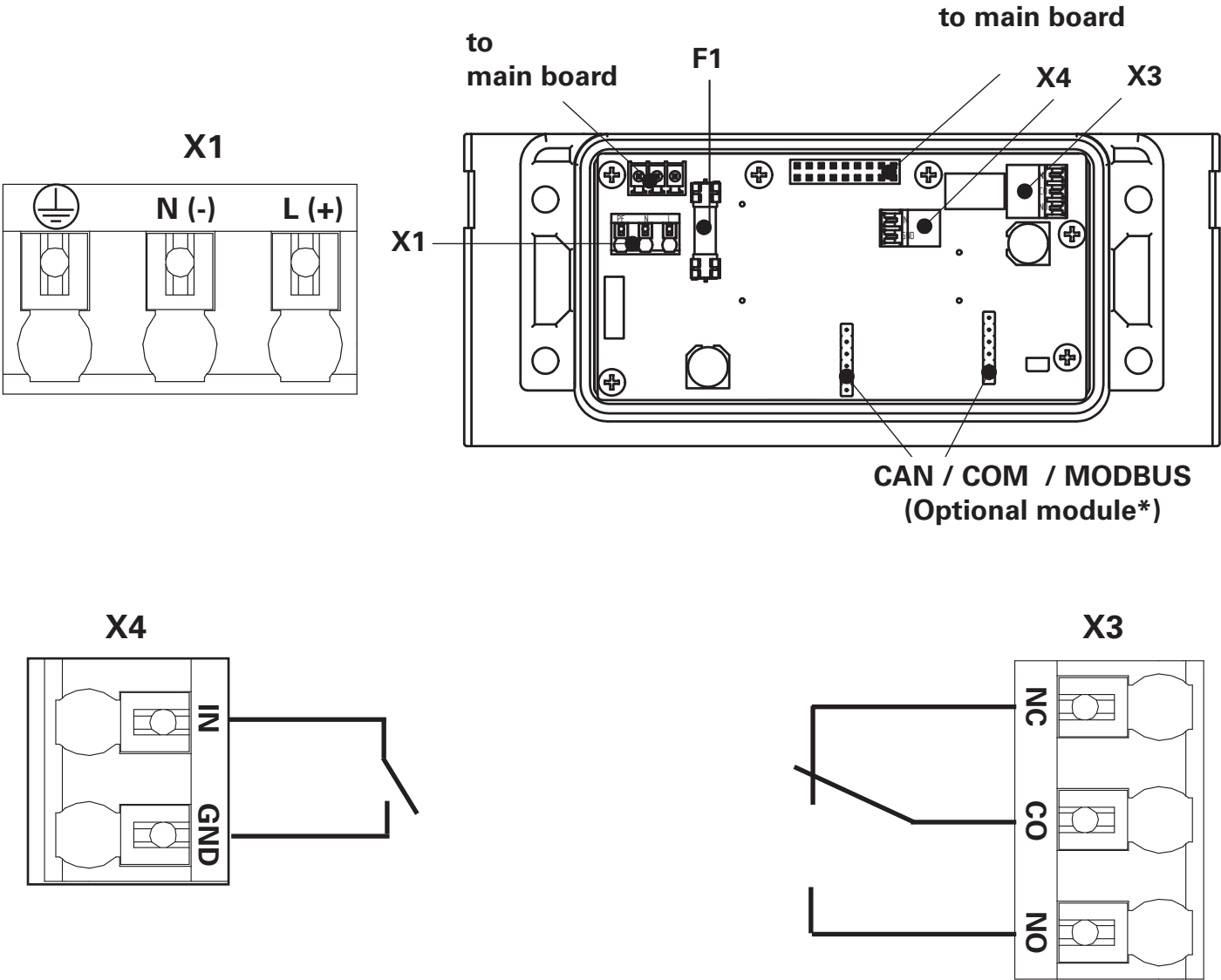
All electrical connections are to be checked before start-up. The electrical connection work is only to be performed by qualified specialist personnel.

7.6.1. Standard inspection cover board



Component / terminal strip	Terminal	Terminal assignment	Function
X1		Ground	Power supply
	N	➊ Neutral (-)	
	L	➋ Phase (+)	
X5	NC	Opener	Alarm contact
	CO	Common	
	NO	Closer	
X6	IN	Neutral	Intermittent operation
	GND	Ground	
F1	—	—	Mains fuse, 2A time-lag, 250 V AC ceramic

7.6.2. Superplus inspection cover board



Intermittent operation

Alarm contact
(CO-NC: closed in case of alarm / deenergized condition)
(CO-NO: closed in case of normal operation)

Component / terminal strip	Terminal	Terminal assignment	Function
X1		Ground	Power supply
	N	② Neutral (-)	
	L	① Phase (+)	
X3	NC	Opener	Alarm contact
	CO	Common	
	NO	Closer	
X4	IN	Neutral	Intermittent operation
	GND	Ground	
F1	—	—	Mains fuse, 2A time-lag, 250 V AC ceramic

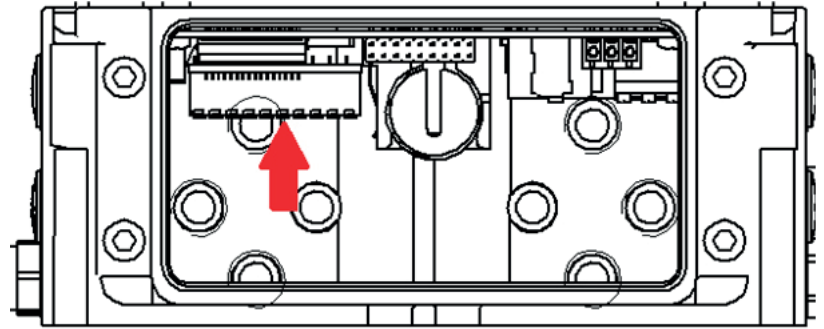
* More detailed information can be found in the operation manual for the corresponding module.

7.6.3. Superplus sensor board

For installation the inspection cover must be removed (see chapter 7.6).

Horizontal position of the dryer and removal of the dryer foot simplify the process.

Then the sensor board (red arrow) can be removed from under the main board.



Sensor board terminal connection X3:

Analog 2-wire or 3-wire sensors can be connected via a small flat screwdriver.

Terminal assignment examples:

2-wire:

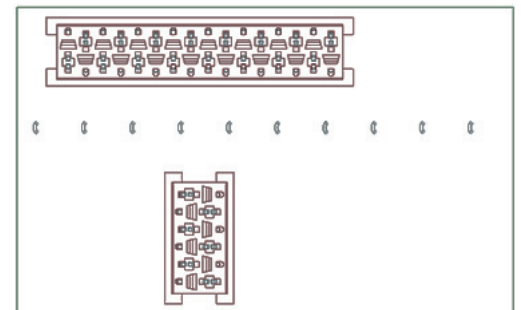
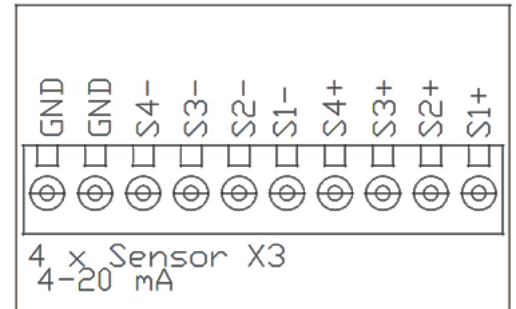
S1+ = power supply
S1- = Signal against ground

3-wire:

S2+ = power supply
S2- = Signal against ground
GND = additional Ground connection

During installation ensure that both red red plugs on the underside of the board are aligned as depicted in the following:

Orientate the sensor board precisely so that (long plug) is inserted on the main board bushings and pressed in with moderate pressure up to the stop. The board may not dip otherwise it does not sit properly.



Component / terminal strip	Terminal	Function
Sensor board X3	GND	Additional GND connection
	GND	Additional GND connection
	S4-	Signal against Ground Sensor 4
	S3-	Signal against Ground Sensor 3
	S2-	Signal against Ground Sensor 2
	S1-	Signal against Ground Sensor 1
	S4+	Power supply sensor 4
	S3+	Power supply sensor 3
	S2+	Power supply sensor 2
	S1+	Power supply sensor 1

7.6.4. Replacing the battery on the mainboard (Superplus)

**Caution!****Disconnect system from the mains before starting work!**

Note the safety advice in Chapter 2.4 and 7.6.

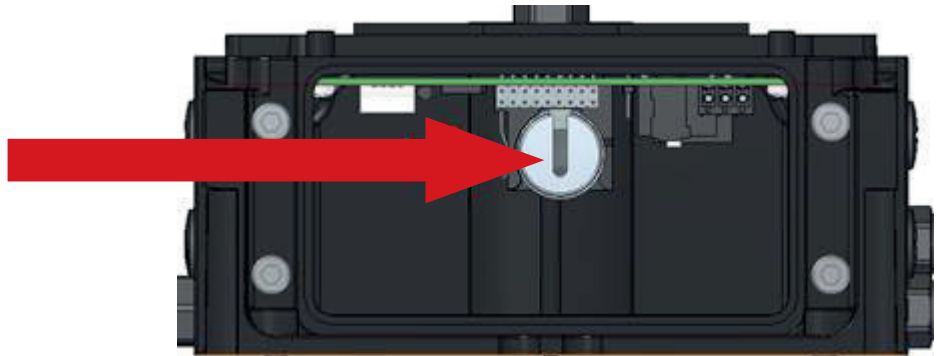
The battery is located on the mainboard. The lifetime is about 5 years.

It is a lithium button cell **CR2032** (Panasonic / Varta / Energizer).

If the battery is changed while the dryer is in a de-energized state, the date and time must be reset!

Batterie CR2032

-Varta CR2032
MH29980
-Energizer CR2032
MH29980
-Panasonic CR2032
MH29980

**Note!**

- Replace used batteries immediately.
- The used batteries must be disposed of separately from the rest of the device.
- Used batteries must be disposed of a special waste according to the legal regulations.

8 Start-up

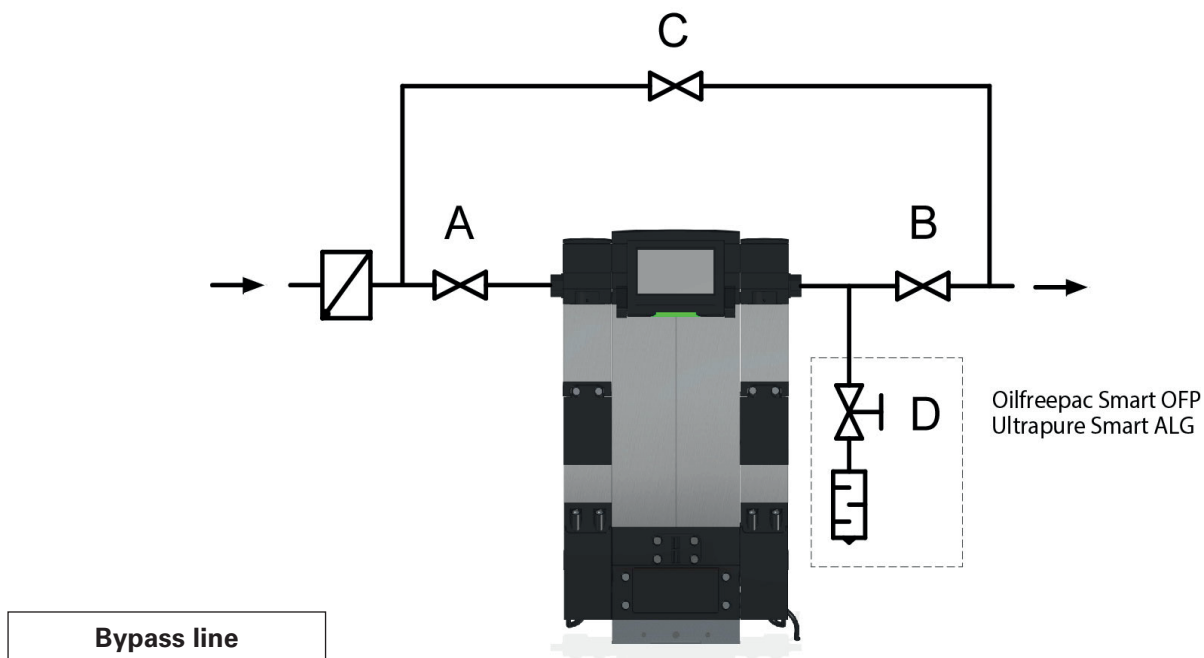
8.1. Initial start-up

Before start-up of the system the pressure vessel, if required, must be provided with the required safety devices, such as safety devices against exceeding the pressure, safety valve etc. These items are not part of the scope of supply of the manufacturer.

It is recommended that the initial start-up be performed by the manufacturer's customer service.

Taking in account the information (in chapter 6.1), follow the initial start-up procedure in the sequence described below:

1. Verify that valves A and B in the bypass line (optional) are closed and that the electrical controller is switched off.



2. Slowly build up the pressure in the dryer by gradually opening valve A.
3. Check the pressure. Both adsorbers must be at operating pressure.
4. Now apply power to the electrical controller.
5. The controller starts with the pressure build-up phase in both adsorbers. Then, the regeneration phase begins in one of the adsorbers and the adsorption phase in the other adsorber.

6. Note that moisture from the environment may have entered the desiccant or the activated carbon / catalyst (for Oilfreepac Smart OFP or Ultrapure Smart ALG) during transport or storage of the dryer. Therefore, the desiccant should be regenerated for at least 3 hours before the shut-off valve B to the compressed air network is opened. The dryer should only be operated in time-controlled mode.
 - a. **Additionally for Oilfreepac Smart OFP and Ultrapure Smart ALG**
 Since the activated carbon stage on the Oilfreepac Smart OFP or the activated carbon/catalyst stage on the Ultrapure Smart ALG are not regenerated, this stage should be purged with dry compressed air before start-up. For this purpose, a partial flow of compressed air can be discharged, e.g. via a needle valve D with exhaust air silencer (optional) installed at the outlet of the dryer, until the desired pressure dew point is completely reached. The time required to dry the stages can vary depending on the desired pressure dew point, the outflow volume and the amount of water absorbed.
7. Slowly open valve B to integrate the dryer into the compressed air network.
8. Close valve C if open during start-up.
9. Close valve D if open during start-up.

Thus the dryer is properly put into operation and now work fully automatically and continuously. Please note that depending on operating conditions and specified pressure dew point it can take some time until all parts of the dryer, as well as the connected compressed air system are completely dry and the desired pressure dew point is reached.

The following mechanical dangers can occur during equipment operation:



Violent depressurization of pressurized components via the blow out silencer.



Blow-off noises when depressurizing the components.

8.2. Shutdown

1. For dryers which run in continuous operation the following steps are required for the shut down:
2. Close the shut-off valve after the dryer (valve B, see fig. "Bypass line" in chapter 8.1).
3. Leave the controller in operation so long until both adsorbers have regenerated fully.
4. Terminate the operation of the controller by disconnecting the control box from the mains power supply.

Under no circumstances, should compressed air continue to flow through the dryer after shut-down. Failure to comply may cause the desiccant to overload, and therefore, cannot be regenerated again within the dryer equipment

8.3. Depressurizing the equipment

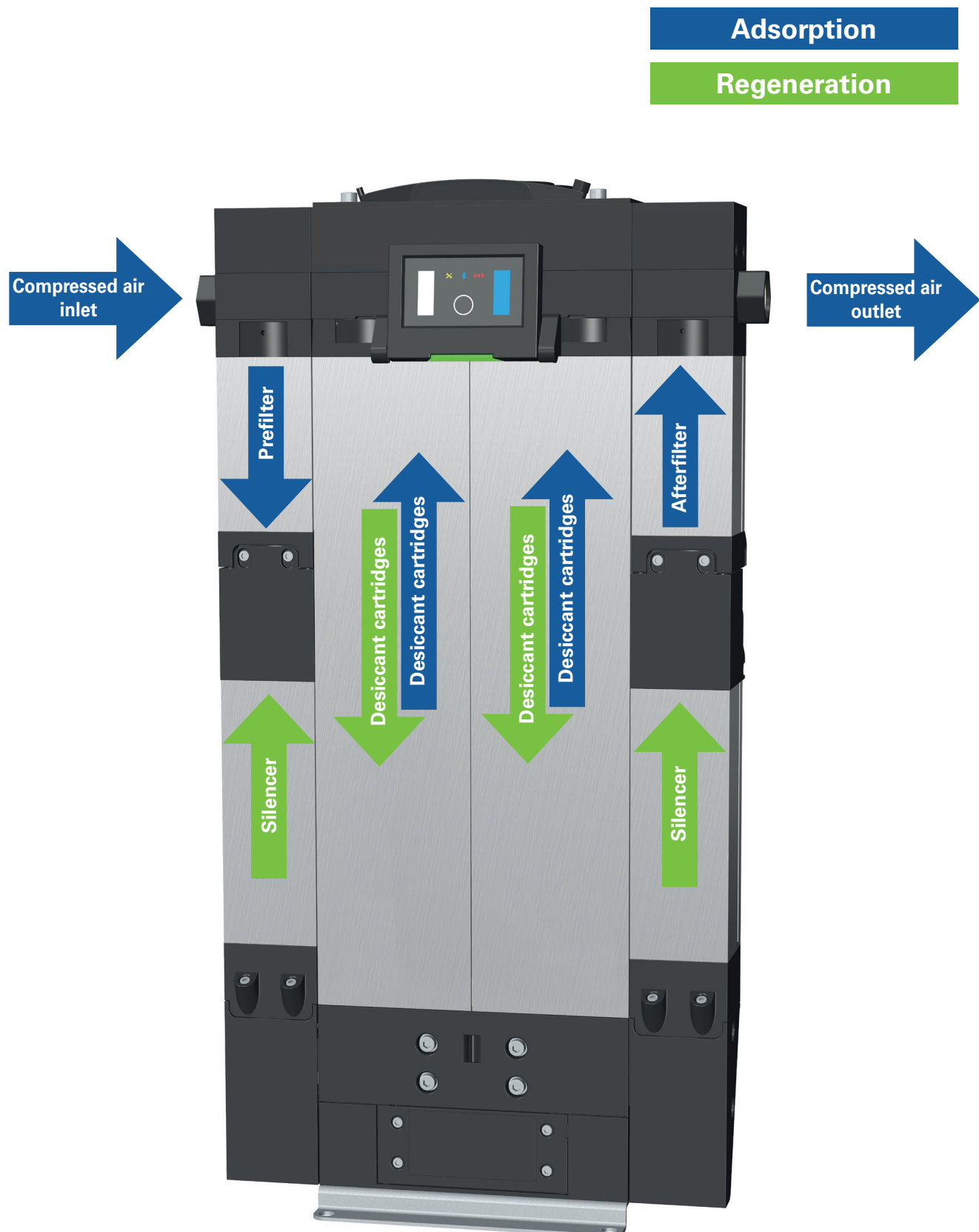
1. Shut down the equipment properly (see chapter 8.2).
2. Close shut-off valve A (see fig. "Bypass line" in chapter 8.1).
3. Depressurize the equipment.



Loud discharge noises during depressurization! Wear ear protectors for your own protection!

9 Description of the system

9.1. Schematic representation

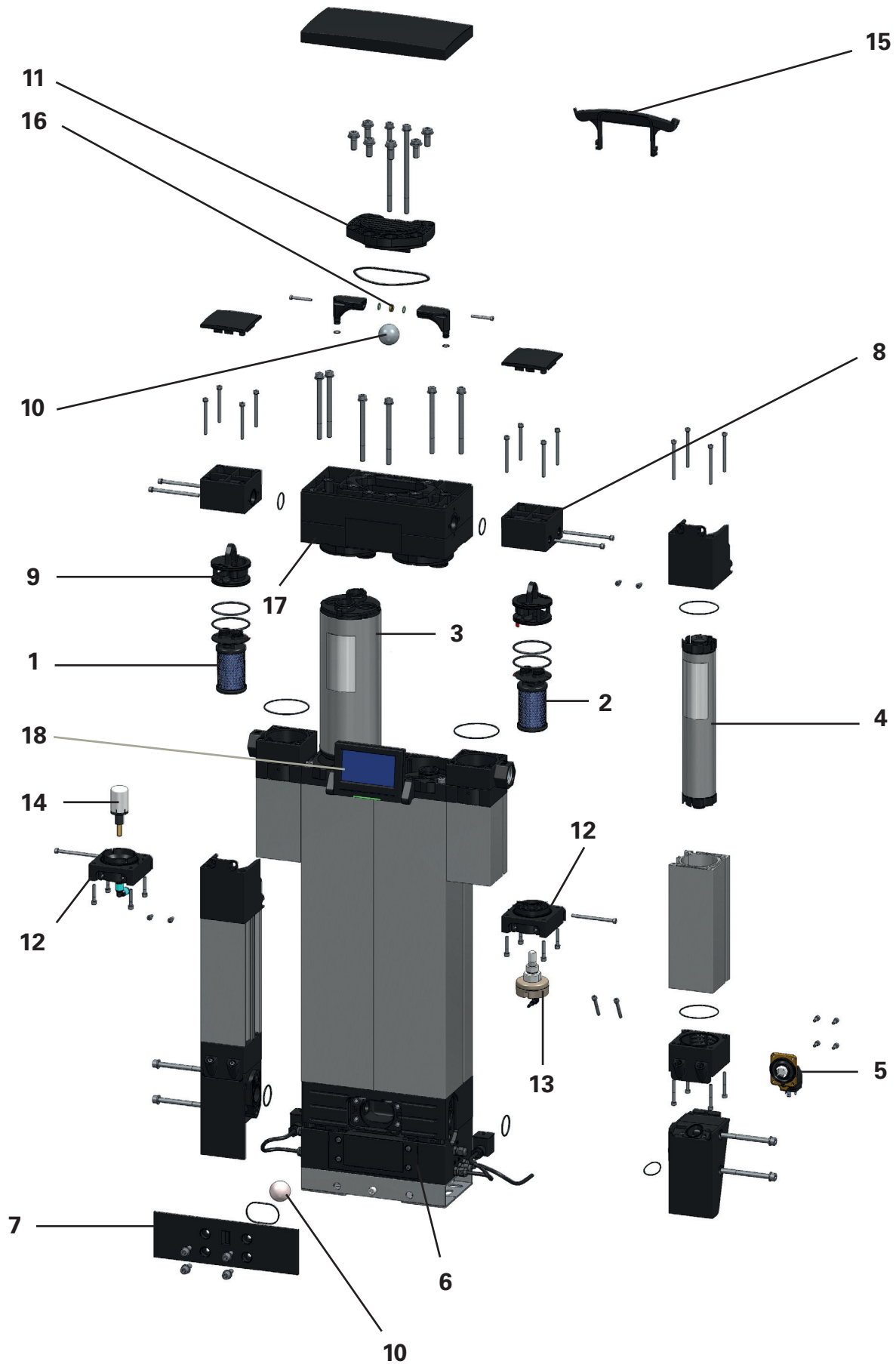


9.2. System parts

9.2.1. System parts Ultrapac Smart 03 - 60

Drawing number	Component	Quantity
01	Prefilter	1
02	Afterfilter	1
03	Desiccant cartridge	2-16 *
04	Silencer	2-4 *
05	Valve membrane	2
06	Electronic control	1
07	Lower cover shuttle valve	1
08	Upper filter cover	2
09	Filter insert	2
10	Shuttle valve ball	2
11	Upper cover shuttle valve	1
12	Floor filter	2
13	Dew point transmitter	1
14	Condensate drain	1
15	Cartridge lifter	1
16	Regeneration air nozzle	1
17	Adsorber cover	1
18	Display (only Superplus)	1

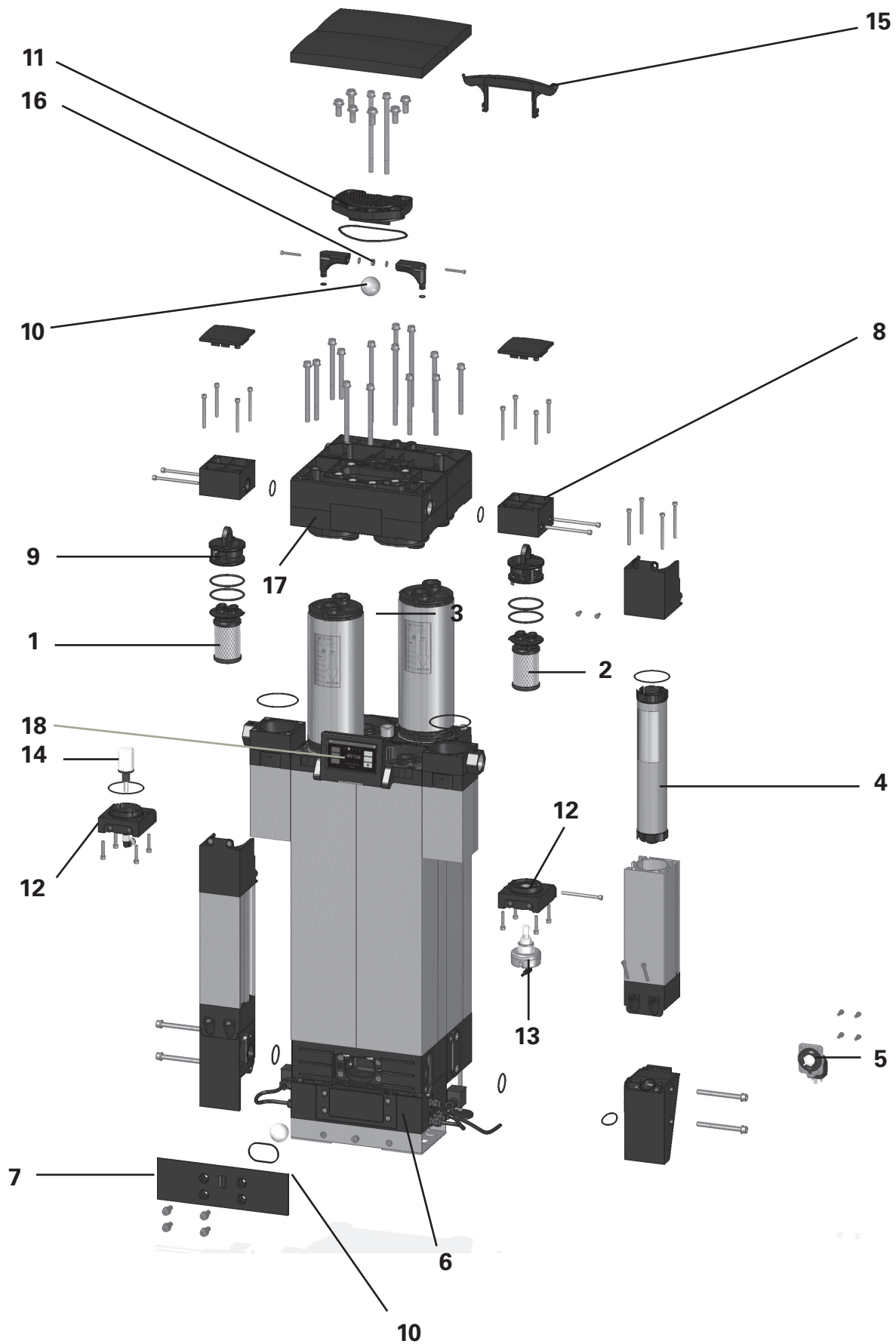
* depending on installation size



9.2.2. System parts Ultrapure / Oilfreepac Smart 03 - 60

Drawing number	Component	Quantity
01	Prefilter	1
02	Afterfilter	1
03	Desiccant cartridge	2-16 *
04	Silencer	4
05	Valve membrane	2
06	Electronic control	1
07	Lower cover shuttle valve	1
08	Upper filter cover	2
09	Insert	2
10	Shuttle valve ball	2
11	Upper cover shuttle valve	1
12	Floor filter	2
13	Dew point transmitter	1
14	Condensate drain	1
15	Cartridge lifter	1
16	Regeneration air nozzle	1
17	Adsorber cover	1
18	Cleaner cartridge	4-16 *
19	Display (only Superplus)	1

* depending on installation size



10 Functionality of the system

10.1. Function

The compressed air travels via the prefilter (2) with condensate drain (10) to the shuttle valve (8). Depending on its position the air is directed to one of the two adsorbers, passes its moisture to the desiccant within the adsorption time defined, and reaches the outlet dry and clean via the second shuttle valve and the afterfilter. The water vapor content of the compressed air is reduced down to the specified pressure dew point of -40°C . Part of the dried compressed air flow over the throttle elements in the other adsorber, which is in regeneration mode, extracts the moisture for its desiccant and carries it over the regeneration valve assigned which is in open state and the silencer (6) out of the dryer. After expiry of the regeneration time saved in the control system the open regeneration valve closes. The pressurization takes place in the regenerated container time-controlled. After expiry of the pressurization the regeneration valve opens the previously adsorbed container. The shuttle valves are switched by the available pressure in the second position.

10.2. Adsorption

The adsorption dryer works with alternating adsorption and regeneration phases. In both adsorbers (1) alternately in each of the adsorbers the medium is dried, while the other adsorber is regenerated. This process guarantees a continuous operation. The medium to be dried arrives at the wet gas inlet of the prefilter (2). Here condensate (10) and dirt particles are separated in the microfilter. The medium flows through the lower shuttle valve (8) from top to bottom through one of both adsorbers.

Ultrapac Smart

On the top section of the adsorber the dried medium goes through the upper shuttle valve (7) to the afterfilter (3). Here fine dust and possibly occurring desiccant wear are separated on the dust filter and the dried and cleaned medium from the dry gas outlet (O) reaches the pipeline network.

Ultrapure Smart

On the top section of the adsorber the dried medium goes through the upper shuttle valve (7) into the downstream AK/OX adsorber (1.1).

In the two successive steps in the AK/OX adsorber first via activated carbon, the oil vapors and the hydrocarbons are removed, then afterwards the CO is removed in a catalyzer stage. Afterwards the cleaned air flows through the afterfilter (3). Here fine dust and possibly occurring desiccant (activated carbon) wear are separated and the dried and cleaned medium from the dry gas outlet (O) reaches the pipeline network.

Oilfreepac Smart

On the top section of the adsorber the dried medium goes through the upper shuttle valve (7) into the downstream AK adsorber (1.1). In this stage via active carbon, oil vapors and hydrocarbons are removed. The cleaned air subsequently flows through the afterfilter (3). Here fine dust and possibly occurring desiccant (activated carbon) wear are separated and the dried and cleaned medium from the dry gas outlet (O) reaches the pipeline network.

10.3. Regeneration (dryer stage)

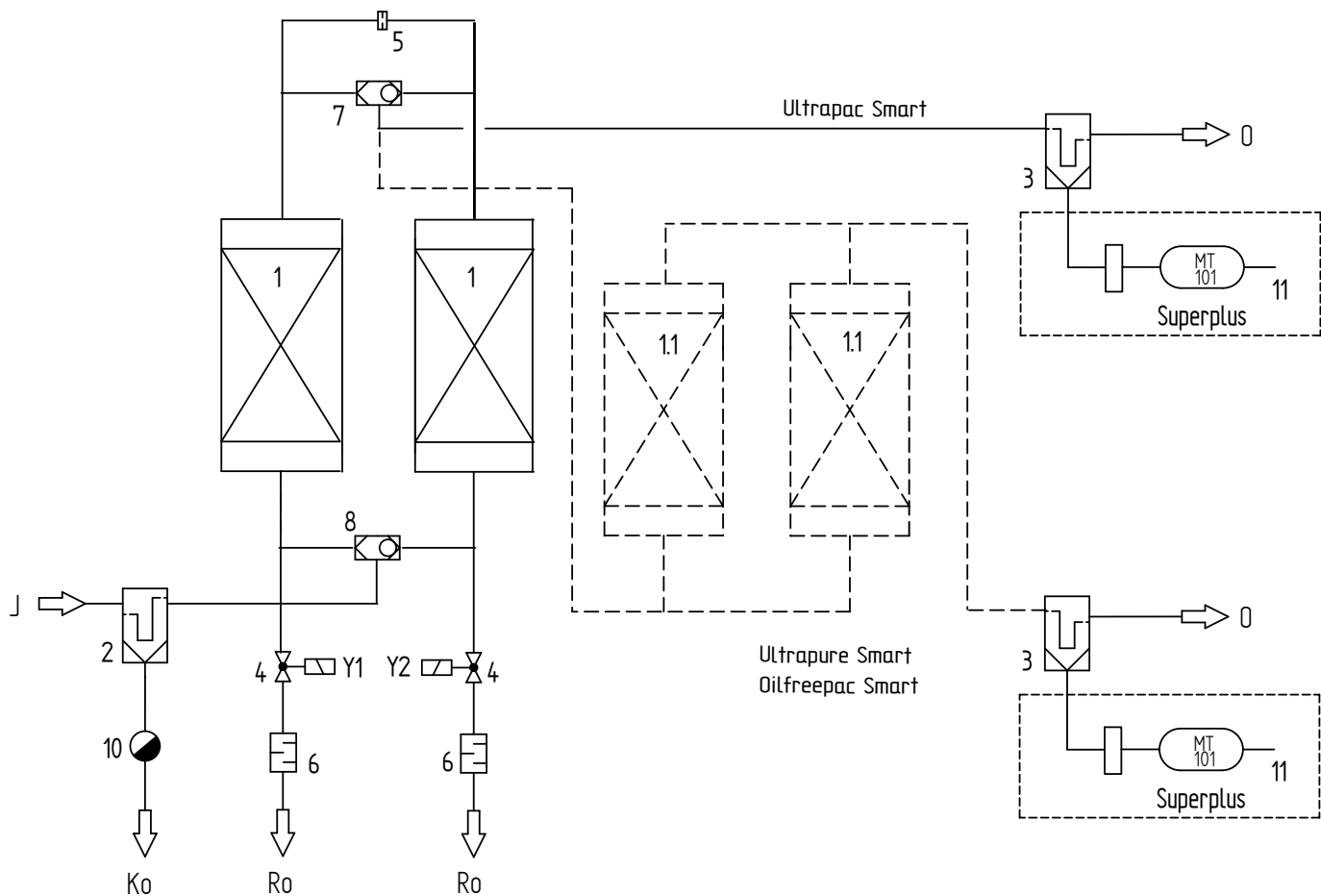
Regeneration of the moisture-laden desiccant is achieved with a partial flow of the dried medium. At the start of regeneration the solenoid valve on the regeneration gas outlet is opened. In this way the adsorber is brought down to atmospheric pressure. The compressed air travels out of the system via the silencer. A partial flow of the dried medium flows from the adsorbing adsorber, over the bypass line in the top pipeline, from top to bottom through the regenerating adsorber and through the silencer (6) to the atmosphere. The required regeneration gas quantity is limited by the throttle (5).

10.4. Pressurization (dryer stage)

At the end of the regeneration phase, the solenoid valve at the regeneration gas outlet is closed. The pressure builds up in the regenerating adsorber via the bypass line in the upper pipe. The regenerated adsorber is in „stand-by“ under operating pressure until the switchover process is initiated.

10.5. Switchover process (dryer stage)

According to the configuration of the equipment, the switching-over procedure can either be done on a timed or load-dependent basis (see chapter 10.6).



P&ID - flow chart

10.6. Function of the electronic control system

10.6.1. Timing (time control) (Standard)

The Standard version of the electronic control unit has an LED display that shows the "Operation", "Intermittent operations", "Service" and "Alarm" statuses. The control system has an isolated collective alarm. Furthermore the control system offers, as described in chapter 7.5 "Intermittent operation", the option of being coupled with the compressor. The dryer only works when the compressor also runs.

The adsorption cycle for an adsorber is defined as 2 minutes. The adsorption time is given from the regeneration time of 60 s and the pressurization time of 20 s for the respective regenerating adsorber. To set this operating mode see chapter 12.3.2.

10.6.2. Dew point control (Superplus)



The control is set to the load-dependent operating mode at the factory.

The electronic control system offers numerous configuration options via a touch display, in order to optimally adjust the dryer to the individual requirements.

In conjunction with the dew point sensor not only is a reduction of the energy costs achieved, but also an optimum utilization of the desiccant capacity, in which the drying time is extended, without this leading to an unwanted dew point peak.

To set this operating mode see chapter 12.3.2.

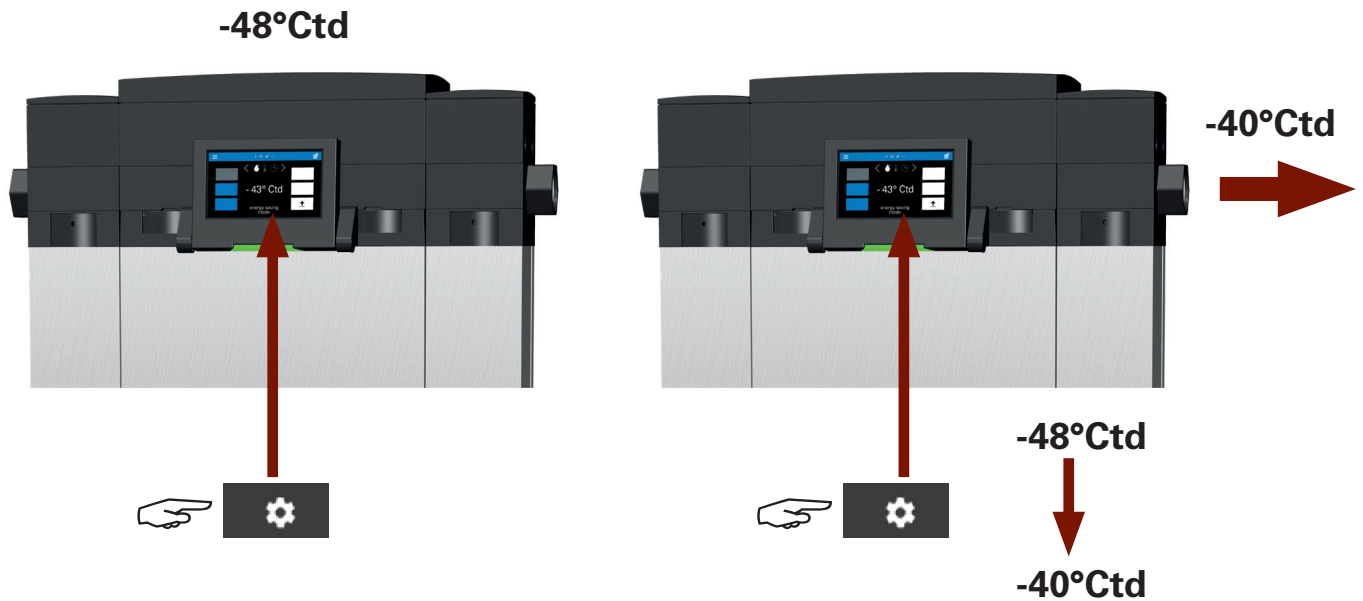
As part of the criteria for extending the adsorption-cycle, the pressure dewpoint is measured at the dry-air-outlet of the adsorption dryer. A dewpoint transmitter determines the pressure dewpoint. The load-dependent control is managed through the „work-window“ in the control-program. This work-window is defined by two temperature set points.

The standard setting values for switching-over point A is - 54.4°F and for switching-over point B is - 45.4°F. Note: Switch-over point B is set automatically by the control. These values will be used if there are no special customer requests.

If the mode „dewpoint control“ is set, the adsorption-dryer adsorbs moisture in one of the two adsorbers as long as the pressure dewpoint has reached the dry-air-outlet value that was set for switch-over point B.

Once reaching the switch-over point B value of -45.4°C, the controller operates in time-controlled mode until the switch-over point A value of -54.4°F is reached. The controller operates in the load-dependent cycle again until the pressure dewpoint at the dry-air-outlet is once again, at the set value for switch-over point B.

During the standby-phase (in load-dependent extended cycle), the regenerated adsorber remains under operating pressure allowing an immediate switch over to the regenerated side. The current standby-time is indicated on the display.



10.6.3. Intermittent operation

If the high-performance dryer is operated in intermittent operation installation must take place in accordance with the fig. in chapter 7.5.

During discontinued (intermittent) operation of the compressor there is the option of coupling the control system of the dryer with the control system of the compressor. This ensures that the regeneration of the dryer is not interrupted. After completion of pressurization the dryer remains in stand-by, if no compressed air is used. The coupling of the dryer control system with the compressor control system is done by connecting the isolated normally open contact on the compressor to the terminal strip (digital input) of the control board. The contact must be closed when the compressor is not running. The "STAND-BY" status of the Superplus control system is shown on the display as clear text (with the Standard control system via a green flashing status display). This operating mode can only be used when the dryer is installed directly behind the compressor and a reservoir tank is downstream of the dryer, which has to be dimensioned so that the regeneration of the adsorption dryer can be ended, without restarting the compressor.

If an isolated contact of the compressor is connected (open, when compressor running), then the intermittent operation is active.

From the start of the pressurization phase now the compressor runtime is cumulative. At the end of the adsorption phase is then evaluated whether the runtime is greater or less than the factor set of 1 min, for example. If this time is fallen below the control system closes the regeneration valves and goes into STAND-BY operation. If the compressor starts the pressurization again (air is extracted again) then the program sequence runs again and the control system continues its operation.

10.6.4. Control system behavior in case of power failure

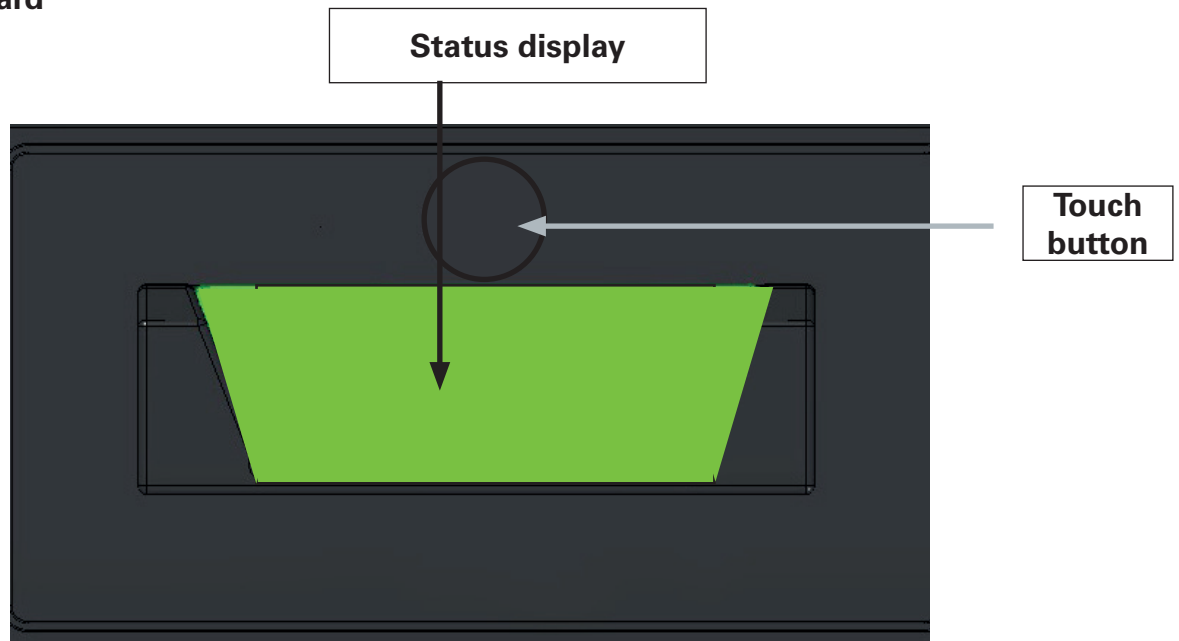
The control system has an intelligent data backup system. If the mains voltage collapses or even fails completely, then the control system carries out a data backup. All required data is saved. After switching the mains voltage back on the control system carries out a pressurization and continues working at the point where the interruption took place.

11 Operation Standard

After start-up has taken place the current operating statuses of the system is shown on the display via LEDs

Control takes place fully automatically, no further operating steps are required.

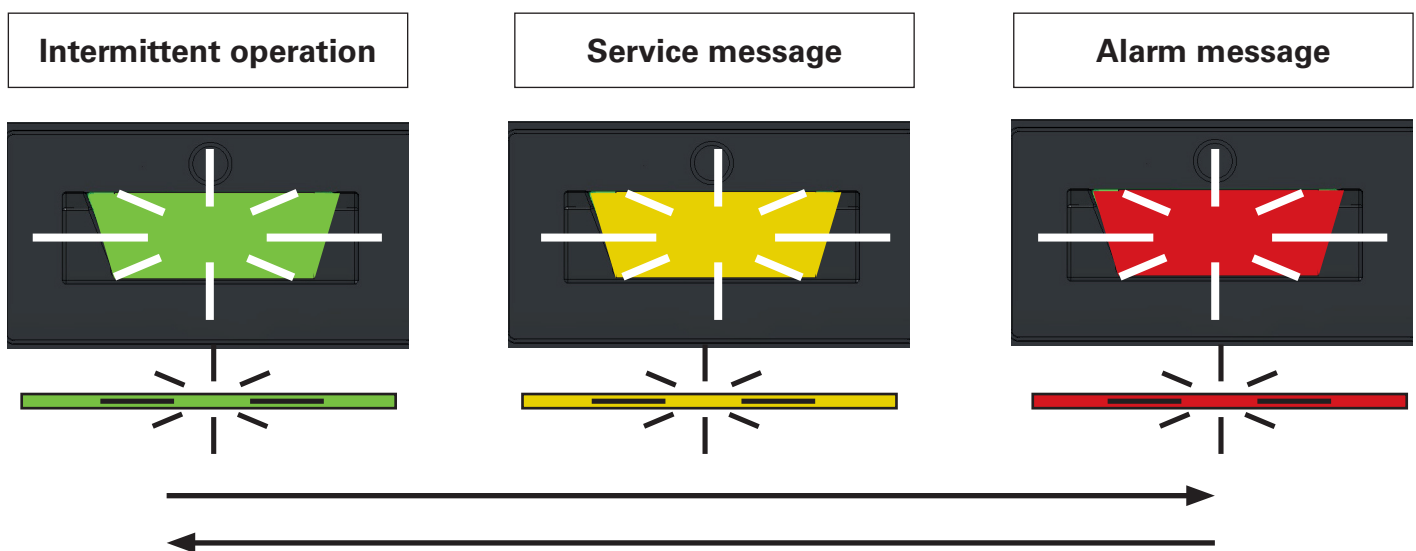
Display Standard



Display Standard

In normal operating the status display is illuminated continuously green, in intermittent operation it flashes continuously.

In alarm/service case the status display flashes yellow or red (depending on the type of message). With the touch button the service messages can be reset or acknowledged (see chapter 13 "Service and alarm messages"). Alarm messages automatically go out as soon as the malfunctions are fixed.



Display Standard

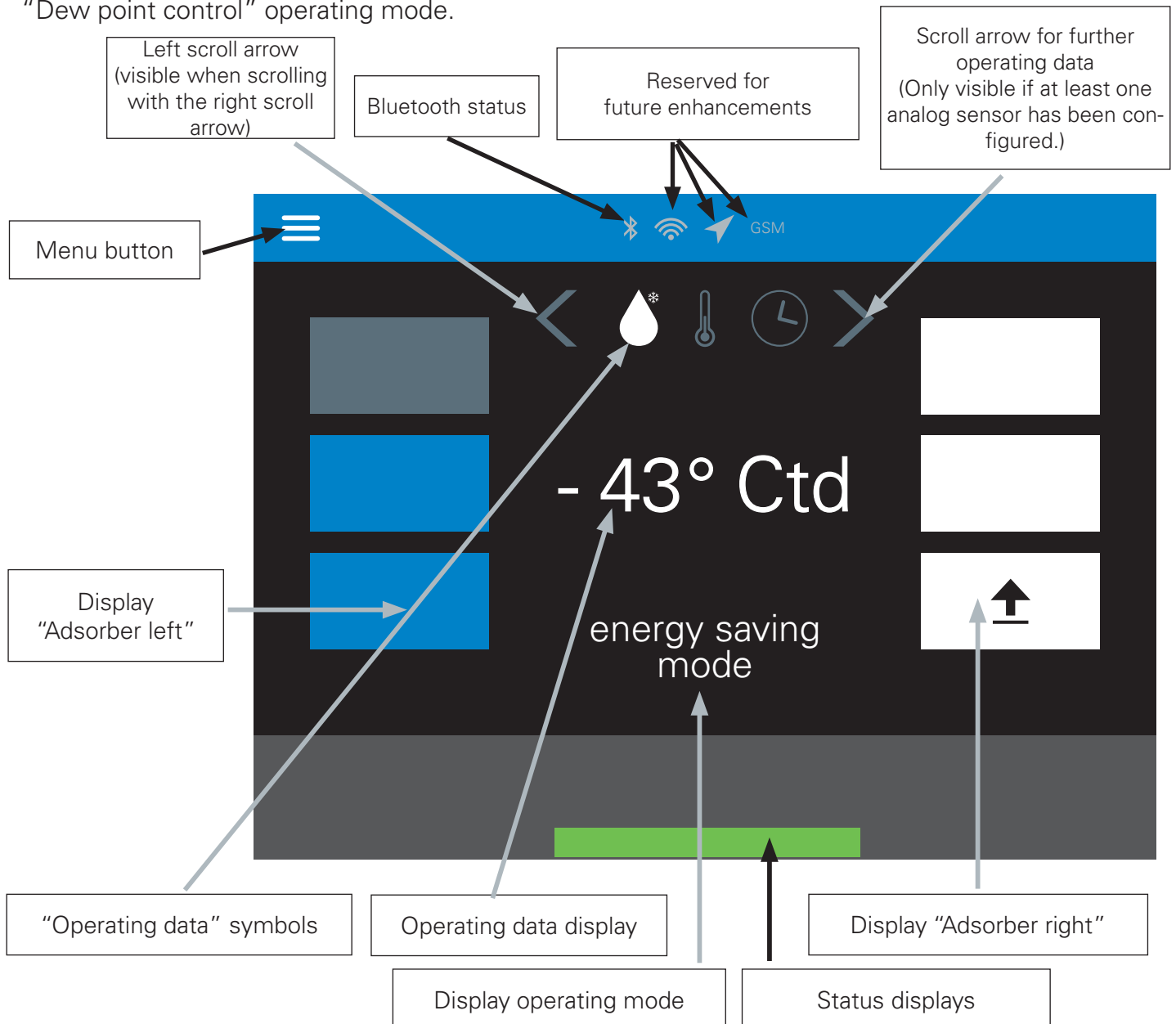
All three messages of the status displays can appear one after the other, if by chance all events occur at the same time.

12 Operation Superplus

After start-up has taken place initially for a few seconds a start screen is displayed with the company logo.



The the display switches to the Home screen. Here the current operating statuses are shown on the display after pressurization of the system. The example shows the Home screen set for the "Dew point control" operating mode.



The adsorber displays change color depending on operating status:

Blue	=	adsorption cycle
Gray	=	adsorption cycle not yet completed
White	=	regeneration cycle

The black arrow marks the pressurization/depressurization.

- Arrow pointing down = Depressurization.

- Arrow pointing up = Pressurization.

With the UP Smart there is no pressurization time, the arrow serves only for the visualization for 2 seconds after switching.

Status displays:

Normally the status display is permanently illuminated green.

In intermittent operation the status display flashes green.

In service case the status display flashes yellow.

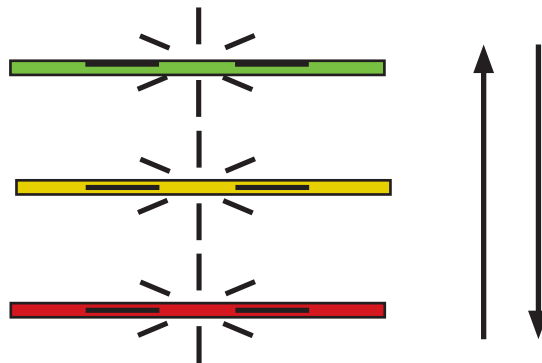
In alarm case the status display flashes red.

For more information see chapter 13.3 "Service and alarm messages Superplus".

Intermittent operation:

Service message:

Alarm message:



All three messages of the status displays can appear one after the other, if by chance all events occur at the same time.

Alarm messages automatically go out as soon as the malfunctions are fixed.

Alarm messages can also be acknowledged via the alarm message window.

Menu button:

Leaves the Home screen and displays the Main menu overview (see chapter 12.2).

Bluetooth status:

Displays the current Bluetooth status.

Bluetooth is always on by default and should not be turned off.

Displays operating mode:

Displays the current operating mode (in this example "dew point control").

Further information can be found in chapter 12.3 "Setting".

Operating data symbols:

Switching the operating data. With the right scroll arrow other operating data (if available) can be displayed. If the left scroll arrow is visible can scroll back with it.

Possible operating data symbols:



TIME



DEW POINT



VOLUME FLOW



TEMPERATURE



PRESSURE



DIFFERENTIAL PRESSURE



CO



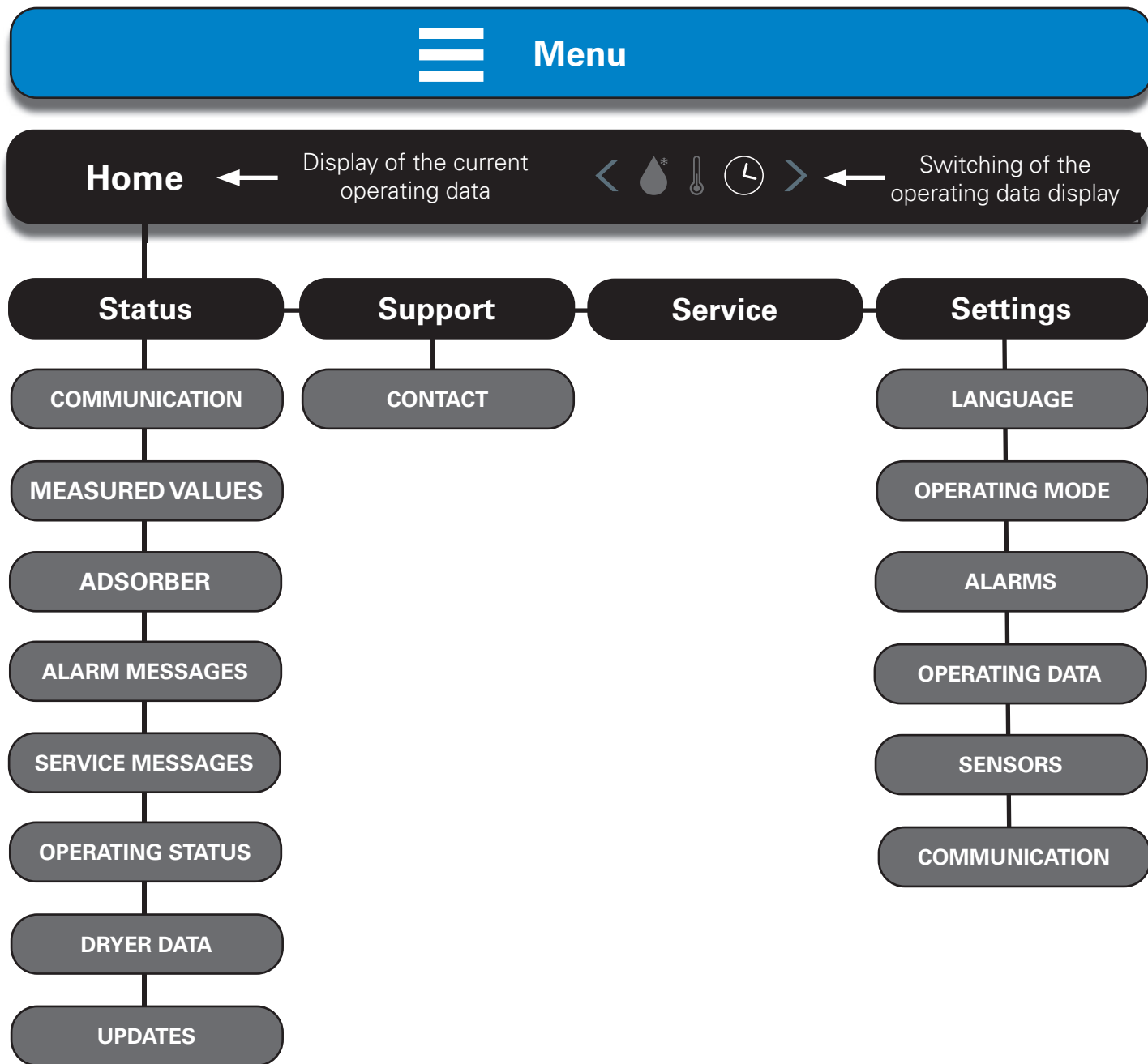
CO₂

By pressing on these symbols the current operating data is displayed on the Home screen.

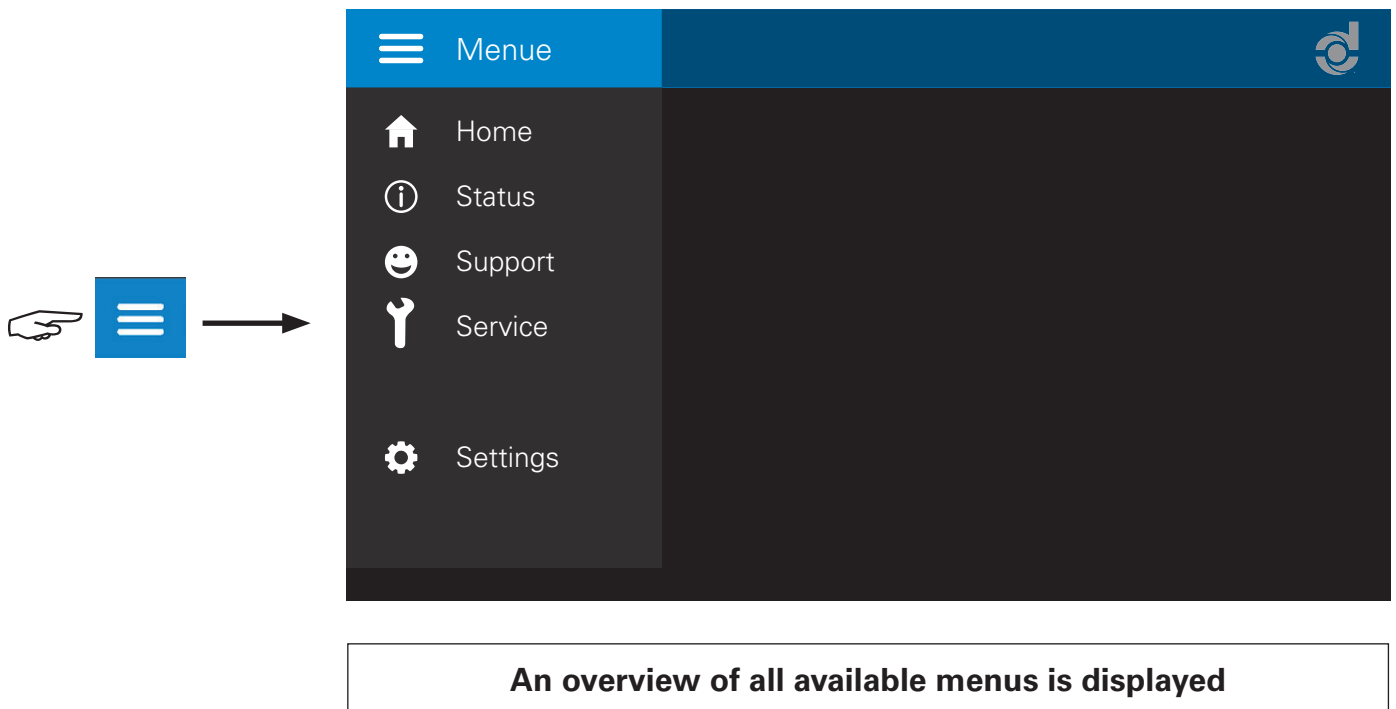
Note:

Some symbols can only be seen after corresponding fitting with sensors.

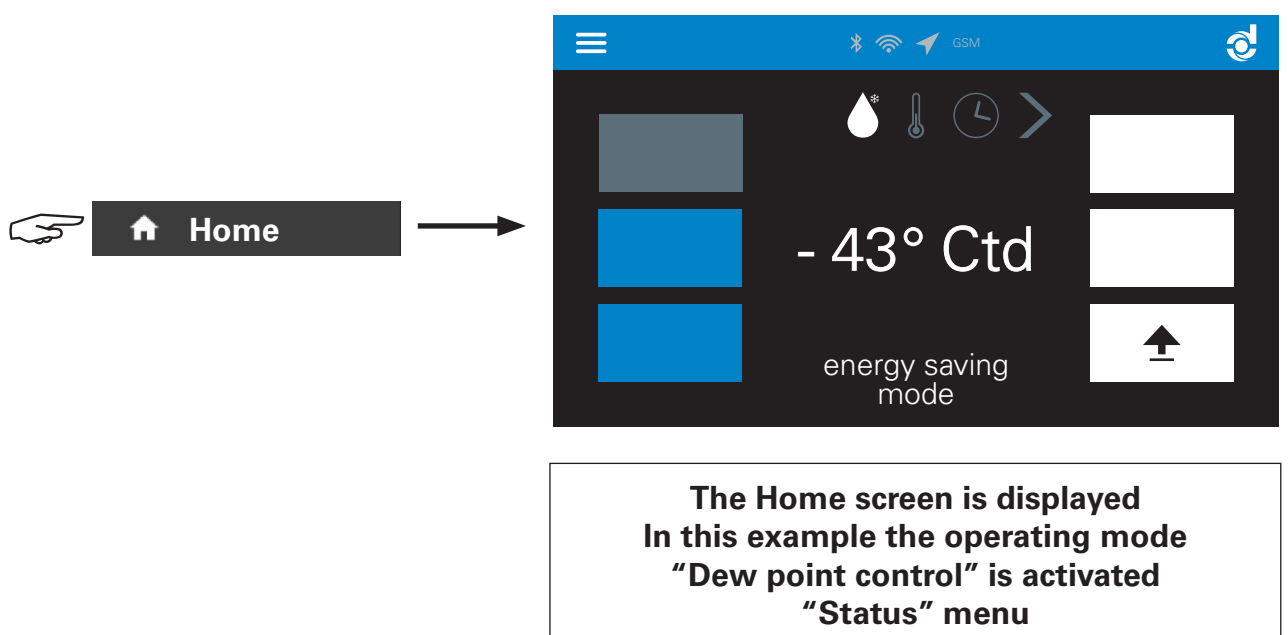
12.1. Graphical menu structure



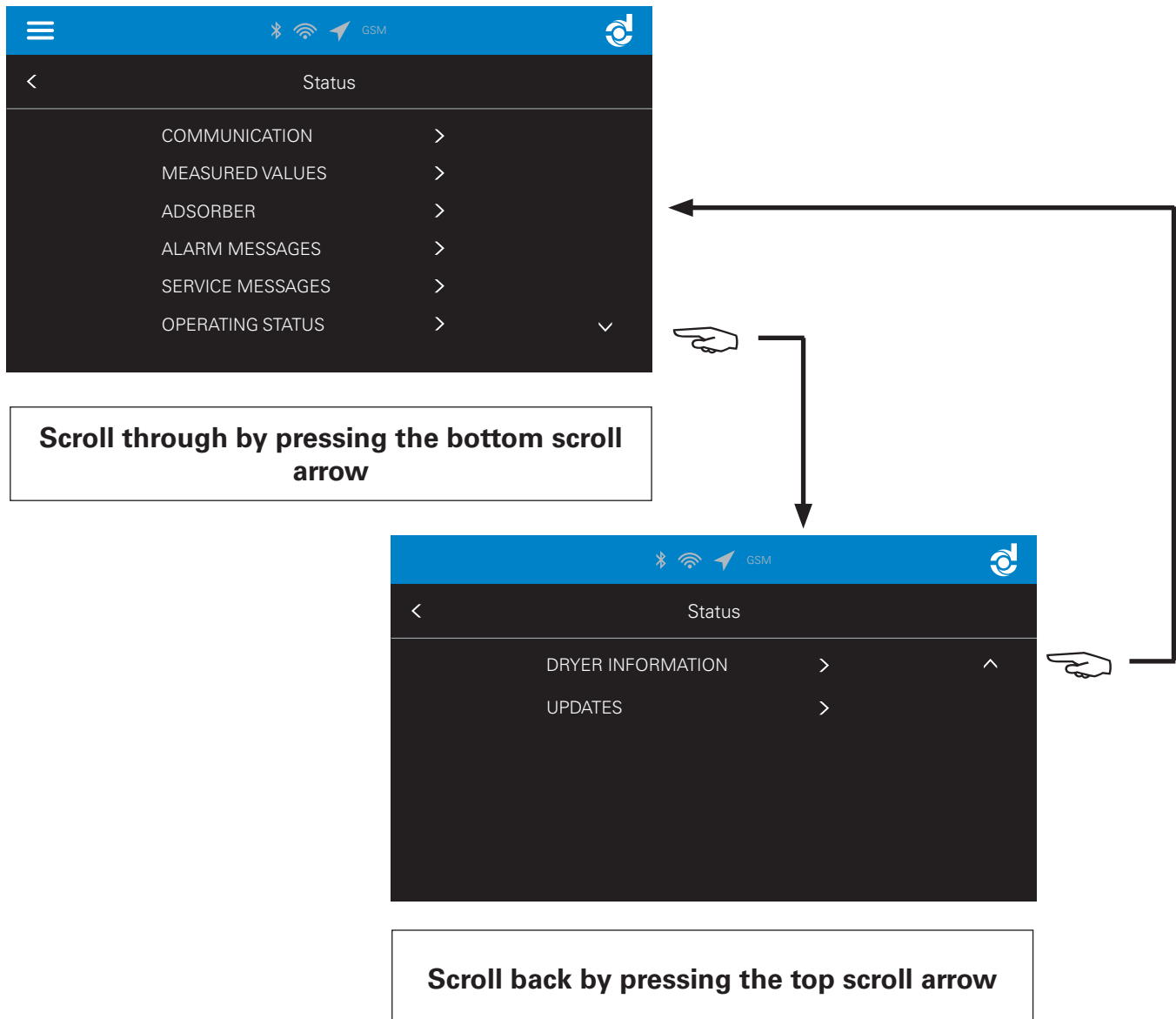
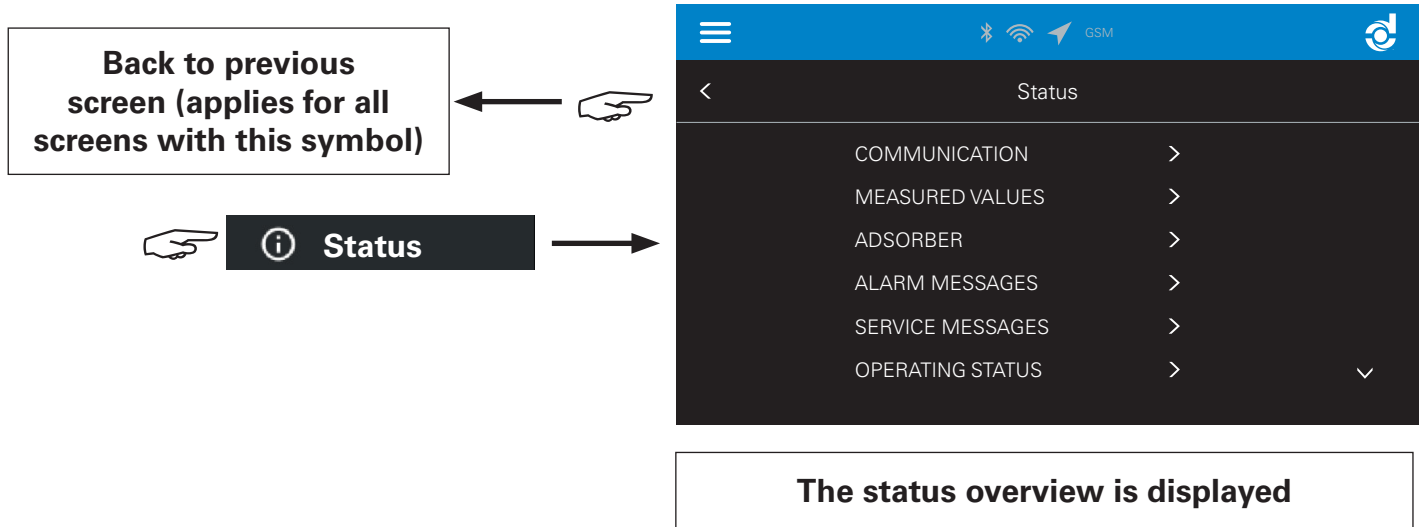
12.2. Main menu overview



12.2.1. „Home“ menu



12.2.2. Menu „Status“



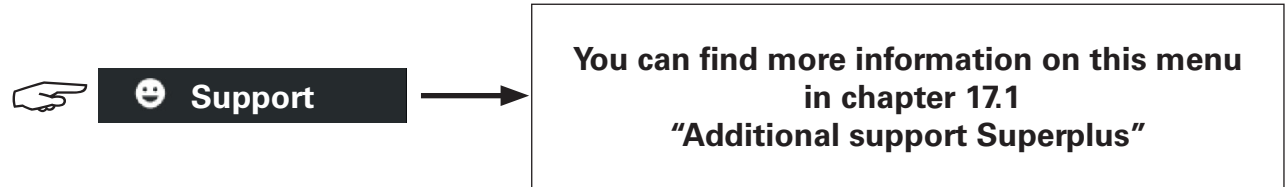
12.2.3. Tabular „STATUS“ menu overview

Tabular overview of all available status displays of the Superplus control system.

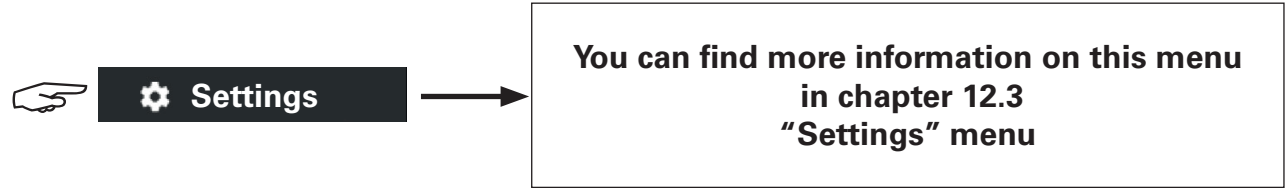
„STATUS“ MENU OVERVIEW		
MAIN MENU	Submenu	Displays
COMMUNICATION >	BLUETOOTH	Bluetooth on/off MAC address
MEASURED VALUES >	UDM515 DEW POINT	°Ctd depending on configuration of the sensor
	UDM515 TEMPERATURE	°C depending on configuration of the sensor
	SENSOR 1-4 (analog)	Display depending on the configuration of the Sensors. The additionally configured sensors are displayed here, e.g. Dew point 1 connected to Analog 1 etc.
ADSORBER >	TOT. ADSORPTION CYCLES SINCE LAST MAINTENANCE	Numerical display
	TOT. ADSORPTION CYCLES	
	TOT. ADSORPTION TIME	
ALARM MESSAGES >	DATE TIME ALARM	List of all alarm messages see chapter 13.3.2
SERVICE MESSAGES >	DATE TIME SERVICE	List of all service messages
		Reset = Reset to default values
OPERATING STATUS >	DEW POINT CONTROL	Here the current operating status of the dryer is displayed, e.g. dew point control, time control, data logging or intermittent operation etc.
	ECO TIME >	In conjunction with dew point control: ECOTime appears when clicking on the clock symbol or via Status > Operating Status. Energy savings (regeneration stops) occur when the dew point value is better than the setpoint value. Functionality see chapter 10.6.2

"STATUS" MENU OVERVIEW		
MAIN MENU	Submenu	Displays
DRYER DATA ➤	SERIAL NUMBER	Display of the dryer data
	ARTICLE NUMBER	
	MANUFACTURING DATE	
	DRYER TYPE	
	DRYER SIZE	
	NOMINAL CAPACITY	
	PREFILTER 1	
	Afterfilter	
	SILENCER	
UPDATES ➤	FW M	Display the version number
	FW D	
	GUI	
	LAST UPDATE	Display the date

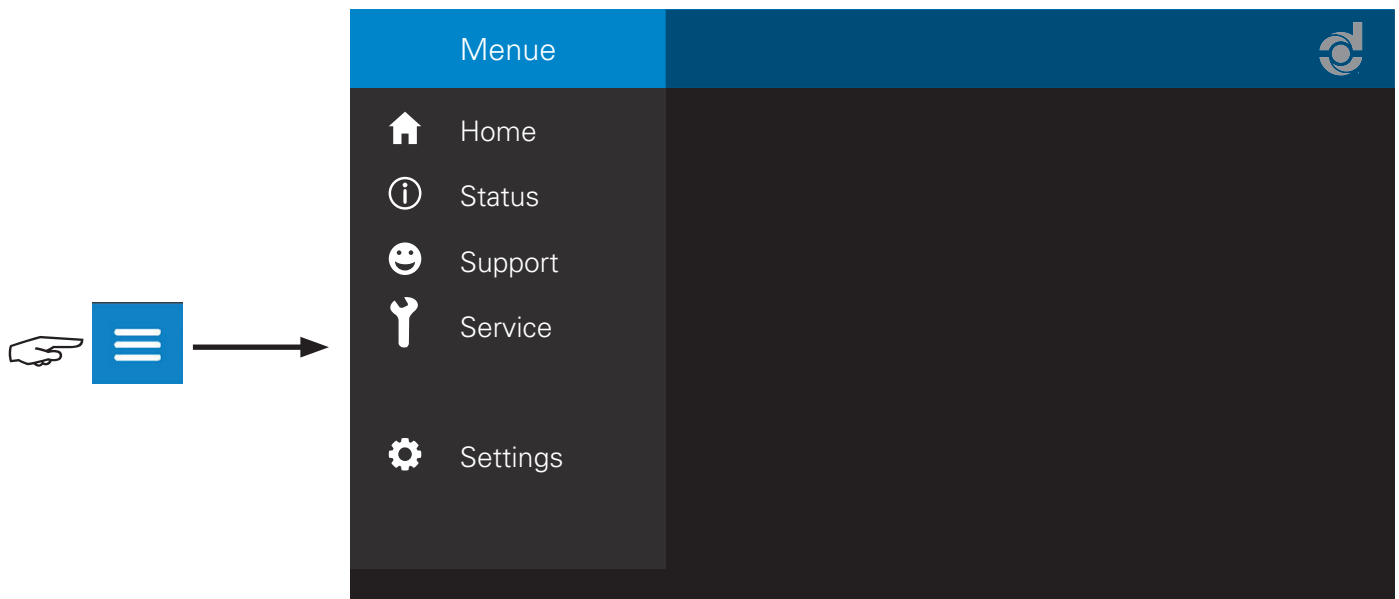
12.2.4. „Support“ menu



12.2.5. Settings menu

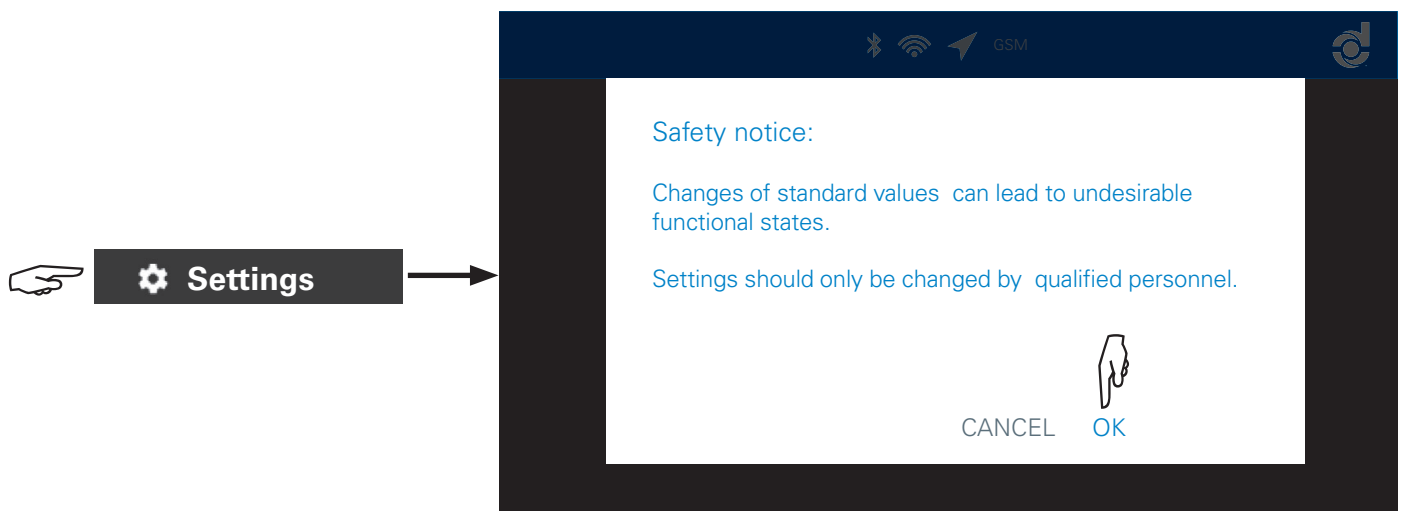


12.3. "Settings" menu



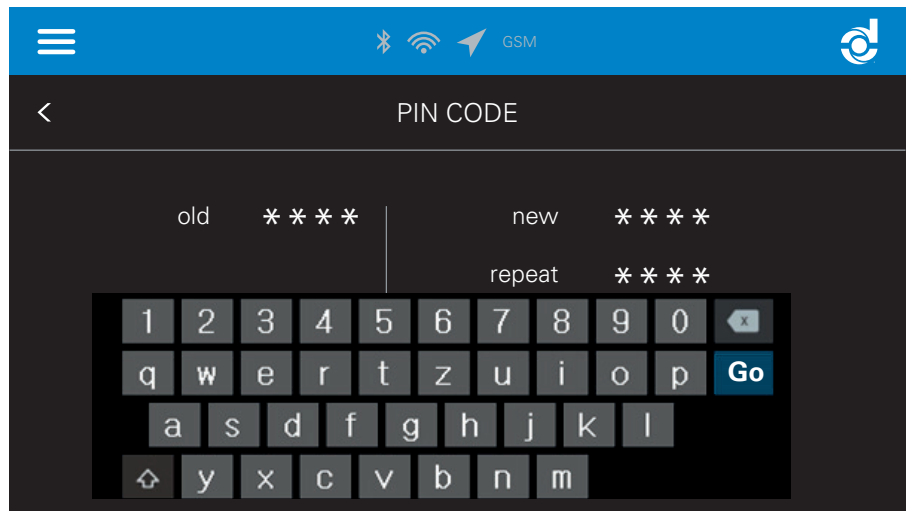
An overview of all available menus is displayed

12.3.1. PIN code



**To abort this function press "CANCEL,
to continue press "OK".**



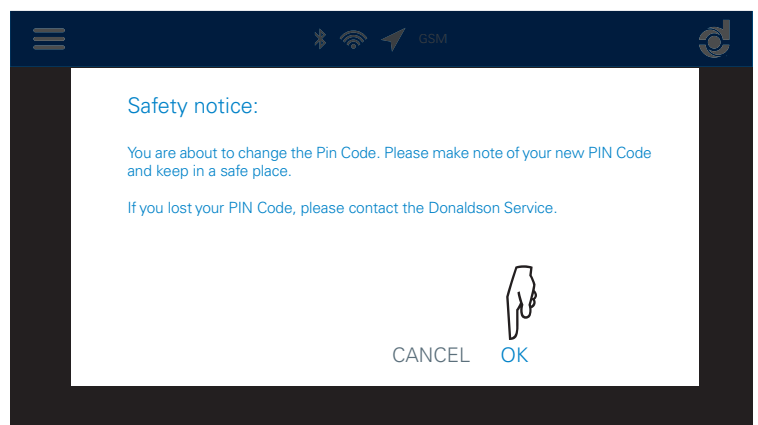


Replace the factory-set PIN code.

- 1) enter the old PIN in the field "old" 2) enter the new PIN in the field "new" (only 4 numbers may be entered) 3) enter the new PIN in the repeat field 4) confirm with the "Go" button

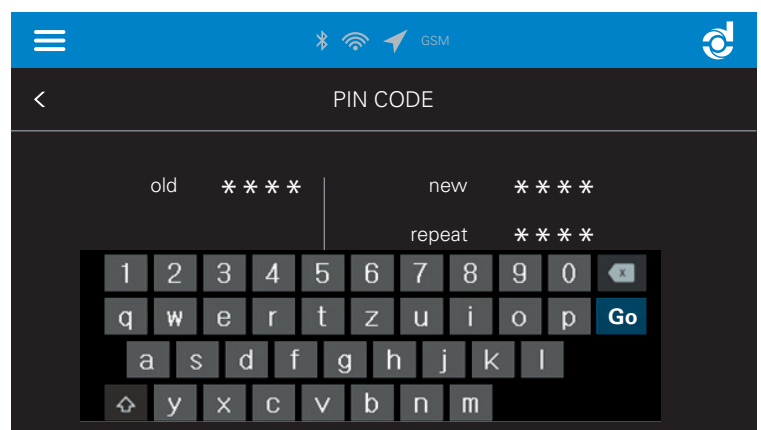


The factory set PIN code of "0000" should be fundamentally altered for security reasons!

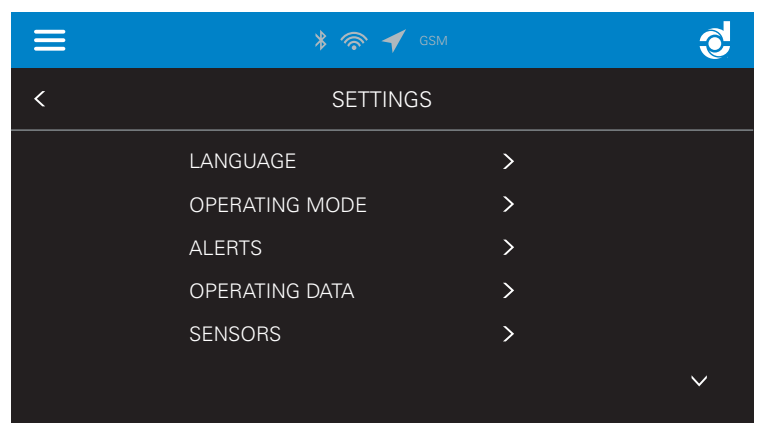


To abort this function press "CANCEL, to continue press "OK".

Confirmation display for a few seconds



Enter the new PIN code in the “old” field and press “Go”.



An overview of all available settings options will be displayed. Details see chapter 12.3.2

12.3.2. Tabular "SETTINGS" menu overview

Tabular overview of all available setting options of the Superplus control system.

You can find detailed descriptions of the various setting options in the corresponding table of the given chapters.

"SETTINGS" MENU OVERVIEW			
MAIN MENU	Submenu	Chapter	Setting options / displays
LANGUAGE >		12.3.3	22 of 28 languages (country abbreviation) selectable
OPERATING MODE >	TIMING		Individually selectable (selected operating mode is displayed in blue)
	DEW POINT CONTROL		
ALARMS >	DEW POINT	12.3.5	Here alarms are displayed for the configured sensors, such as dew point etc., for example. Is also displayed whether the value is digital or analog as already described in chapter 12.2.3.
OPERATING DATA >	DEW POINT		Display of the interfaces and the assigned dew points
	REL. MOISTURE INLET	12.3.4	Numerical entry
	min. OPERATING PRESSURE	12.3.4	Numerical entry
	max. TEMPERATURE COMPRESSED AIR		Numerical entry
	Max. VOLUME FLOW		only displays in m³/h
	NOZZLE		Display / manual selection 0-23
	CYCLE TIMES >		
	ADSORPTION	12.3.4	only display
	REGENERATION		Numerical entry
	PRESSURIZATION		
	PRESSURE RELIEF		
	DELAY		
	INTERMITTENT LAG ACTIVATION	12.3.5	activation via on/off switch
	FORCED COMMUTATION		Numerical entry
	DATE & TIME		Numerical entry
	FACTORY SETTINGS	12.3.5	Confirmation Yes/No

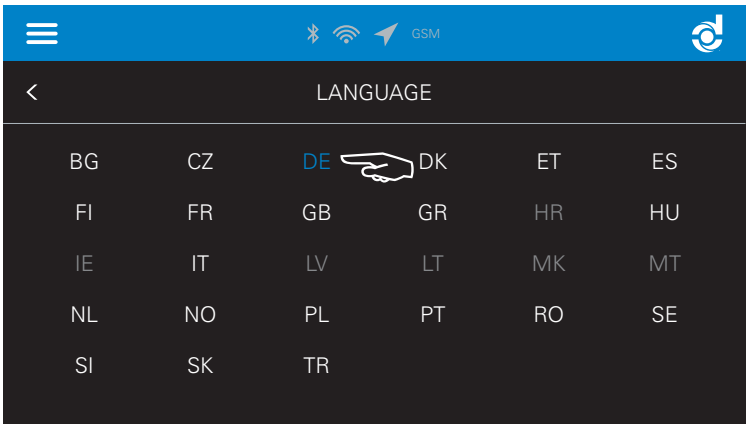
MAIN MENU	Submenu	Chapter	Setting options / displays
SENSORS >	ANALOG 1	12.3.6	Selection option of the individual sensors (if connected). The designation of the sensors can be individually adapted via keyboard.
	ANALOG 2		
	ANALOG 3		
	ANALOG 4		
	DIGITAL		
	SENSOR TYPE	12.3.7	---- = unassigned
			Dew point
			Pressure
			Differential pressure
			Temperature
			Flow rate
			CO ₂
			CO
			 = user defined
	SCALING +20 > -80 > °Ctd >	12.3.6	Numerical entry
	INTERFACE 4-20mA	12.3.6	Selection of the units
			Range limit adjustable
	INTERFACE MODBUS >		Sensor fault not adjustable
	ID	12.3.6	Numerical entry
	BAUD		Select baud rate
	STOP		only display
	PARI		
	WORDORDER		
	REGISTER >		
	SERIAL NUMBER		not adjustable
	DEW POINT		adjustable
	TEMPERATURE		
	PRESSURE		
	DIFFERENTIAL PRESSURE		
COMMUNICATION >	BLUETOOTH*	12.3.5	Activation via on/off switch

*Here all installed communication modules are listed. Standard = BLUETOOTH

12.3.3. "LANGUAGE" setting

Confirm the entry or back to previous screen (applies for all screens with this symbol) 

 LANGUAGE 



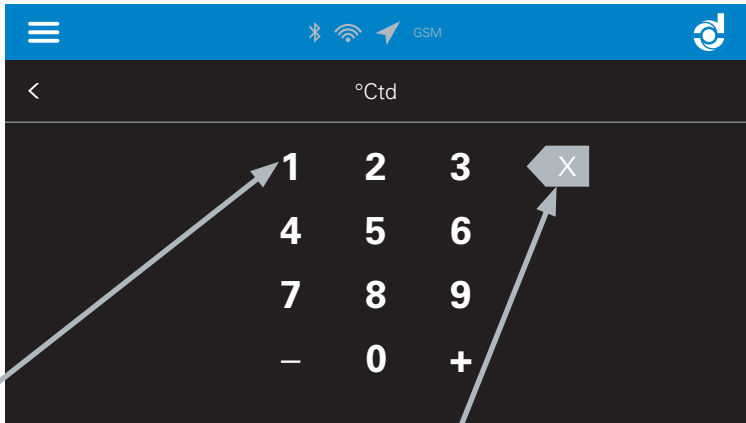
Select desired language, it is then marked blue

BG	CZ	DE	DK	ET	ES
FI	FR	GB	GR	HR	HU
IE	IT	LV	LT	MK	MT
NL	NO	PL	PT	RO	SE
SI	SK	TR			

12.3.4. Example for numeric settings

Confirm the entry or back to previous screen (applies for all screens with this symbol) 

 DEWPOINT 

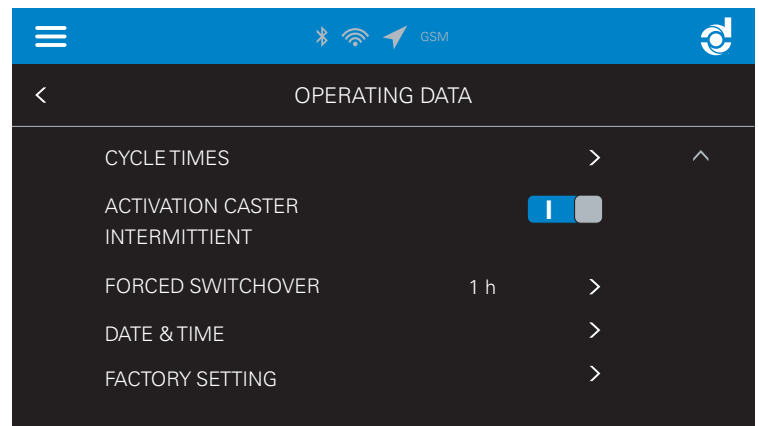


Numerical entry of the desired value

Delete button

12.3.5. Example for activation via on/off switch

ACTIVATION CASTER
INTERMITTENT



In the example above by pressing the on/off switch the lag for intermittent operation is activated (position "1") or deactivated (Position "0")

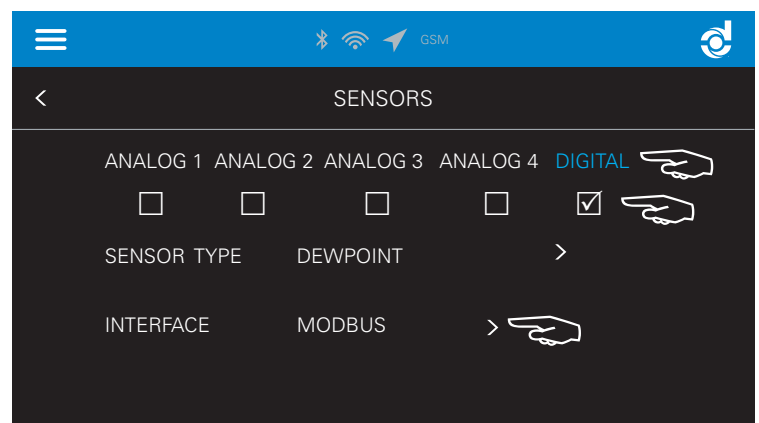
12.3.6. Examples for "SENSORS" setting

SENSORS

MODBUS INTERFACE (digital)

UDM 515 = DIGITAL (Standard)
Pressing on the arrow behind "MODBUS" opens a settings menu (Setting options also see chapter 12.3.2):

ID
BAUD
STOP
PARI
WORDORDER
REGISTER



Pressing on "ANALOG 1...4" or "DIGITAL" marks the text blue. Via the checkbox is selected which sensor is responsible for the drying cycle ("DIGITAL" in the example above).

SENSORS

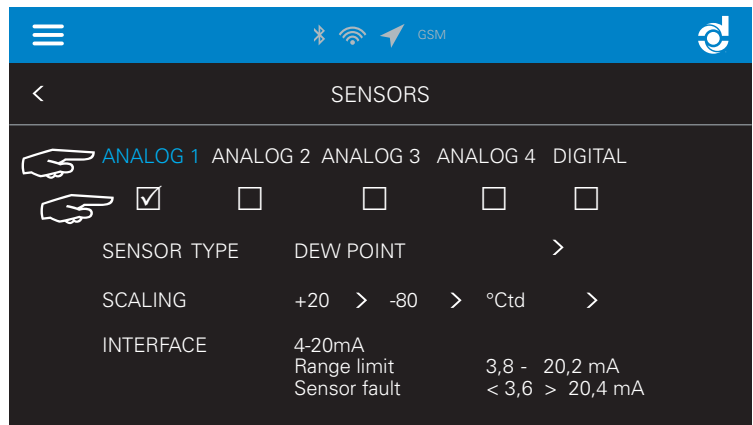
INTERFACE 4-20 mA (analog):

Examples:

Dewpoint = Analog 1

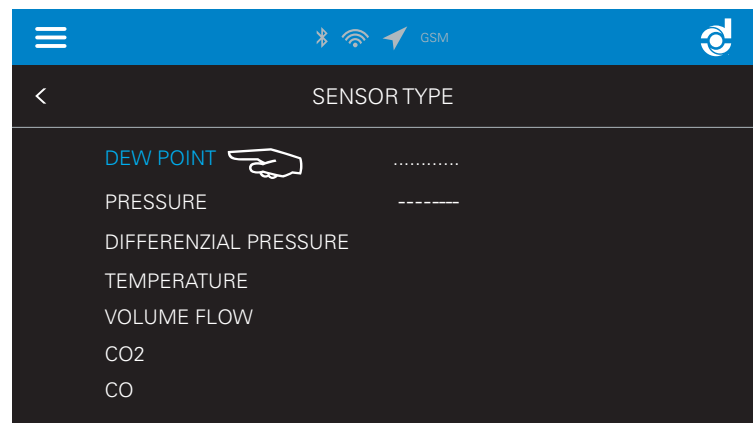
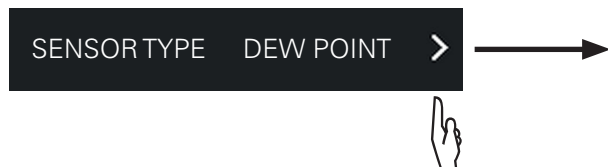
Frost protection = Analog 2 (temperature sensor)

The range limit (tolerance threshold) can be set. The sensor error is calculated automatically. If the calculated sensor error exceeds / falls below the threshold, an alarm message is generated.



Pressing on “ANALOG 1...4” or “DIGITAL” marks the text blue. Via the checkbox is selected which sensor is responsible for the drying cycle (“ANALOG 1” in the example above).

12.3.7. Examples for “SENSOR TYPE” setting



By pressing on a sensor type this is marked blue.

By pressing the dotted line, a keyboard appears with which the name of the sensor can be freely selected.

In the home screen no symbol appears but a “u” for user defined.

Pressing the dashed line cancels the selection of the sensor.

13 Service and alarm messages

13.1. Service message (Standard)

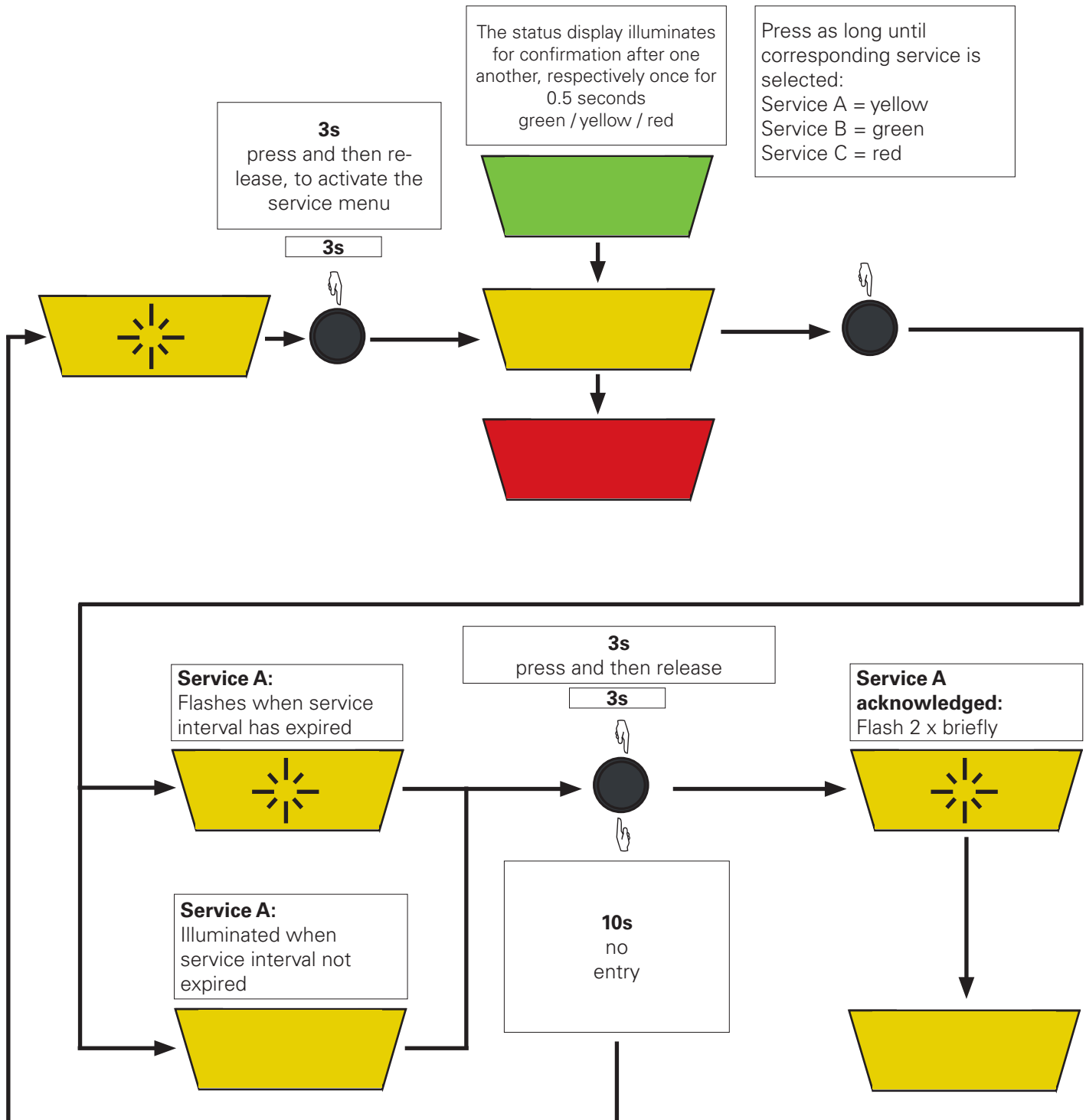
In service case the status display flashes yellow.

Standard



Service A

Replacement of filter elements and desiccant cartridges. The displays shows the "Standard" status display. Replacement intervals see chapter 15.1 "Service intervals".



Service B (green) and Service C (red) are reset using the same procedure.

Service B (only Ultrapure Smart / Oilfreepac Smart)

Replace the filter elements, desiccant cartridges and cleaner cartridges.

Service C

Replace the desiccant cartridges and comp. Service A and Service B.

13.2. Alarm messages (Standard)

In alarm case the status display flashes red. **After troubleshooting it automatically goes out.**

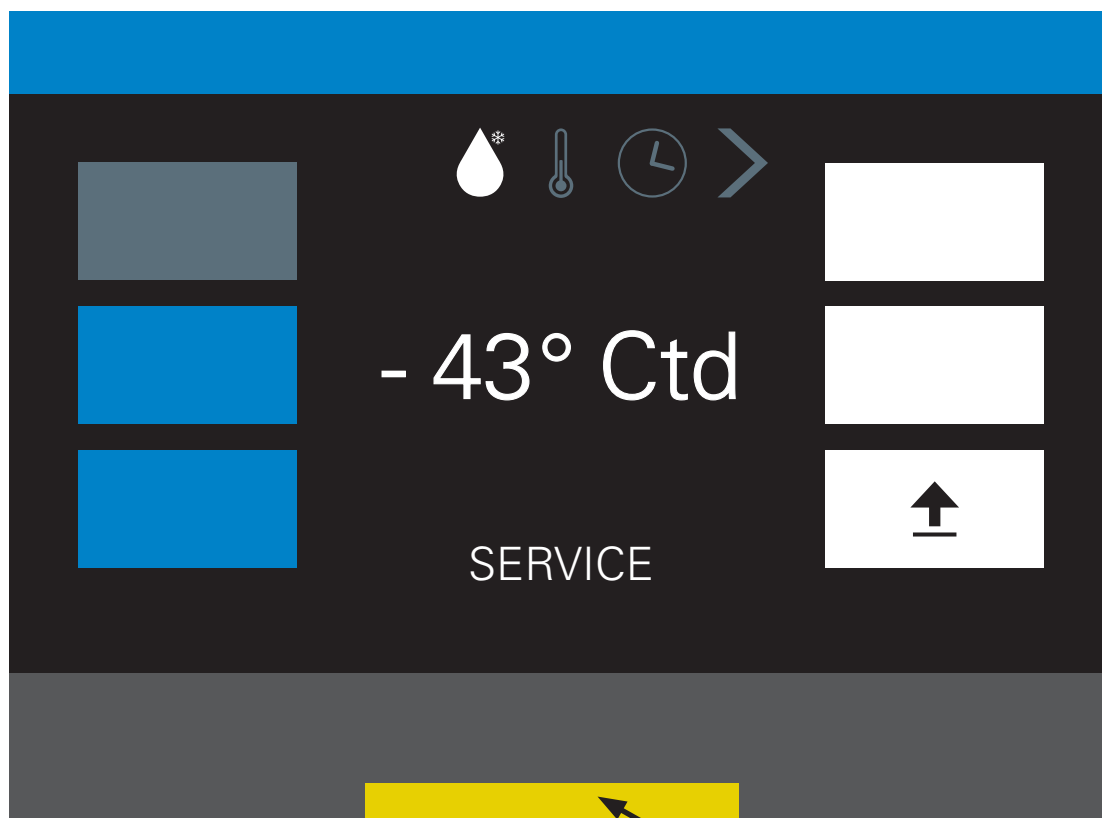
Advice on fault causes and troubleshooting can be found in chapter 14.2 “Troubleshooting”.

Standard



13.3. Service and alarm messages (Superplus)

In case of service the status LED flashes yellow and "SERVICE" is shown on the display.
In case of alarm the status LED flashes red and "ALARM" is shown on the display.



Status displays

Service message:



see chapter 13.3.1

Alarm message:



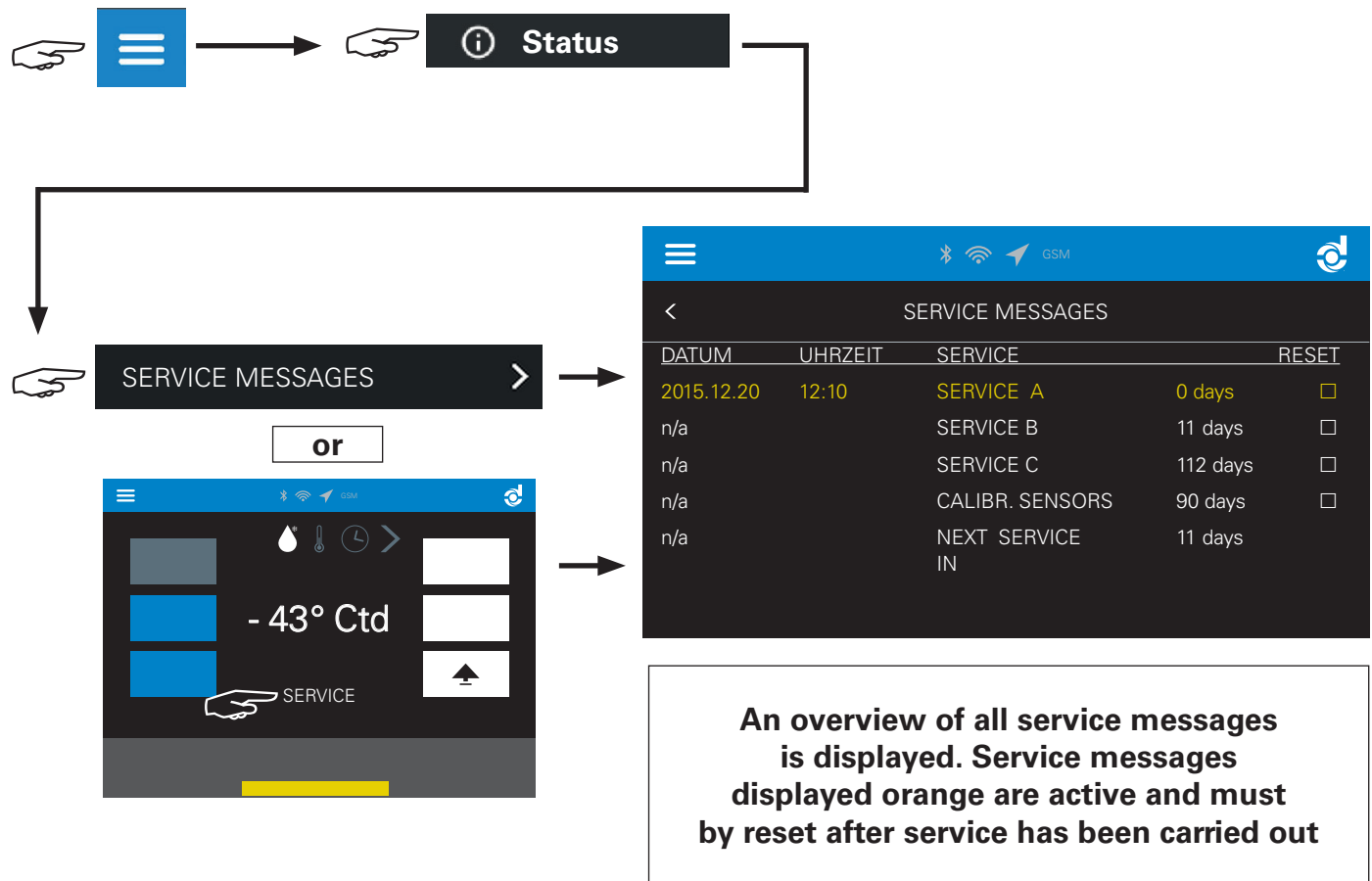
see chapter 13.3.2

13.3.1. Service messages

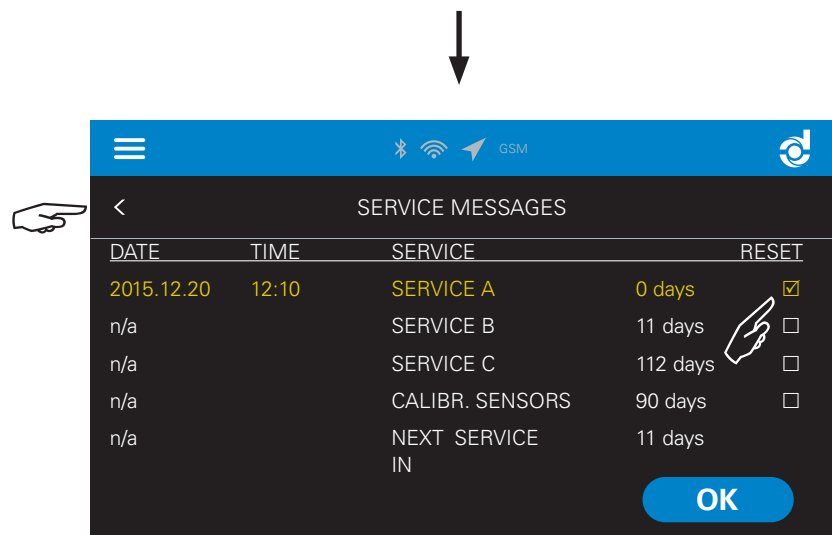
Possible service messages		
Service message		Action
SERVICE A	0 days	Replacement of filter elements and desiccant cartridges
SERVICE B	0 days	only Ultrapure Smart / Oilfreepac Smart. Replace the filter elements, desiccant cartridges and cleaner cartridges
SERVICE C	0 days	Replace the desiccant cartridges incl. comp. Service A and Service B (Service B only for Ultrapure Smart / Oilfreepac Smart)
CAL. SENSORS	0 days	Sensors should be recalibrated at the prescribed intervals so that their full functionality is ensured.
The service intervals prescribed by the manufacturer can be found in chapter 15.1 "Service intervals"		

Calling up the service messages

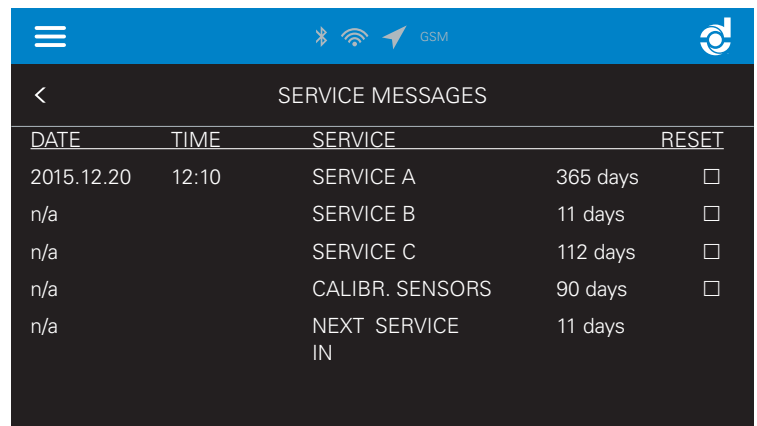
Set the status display to "Status messages"



Leaving the menu
"Service messages"

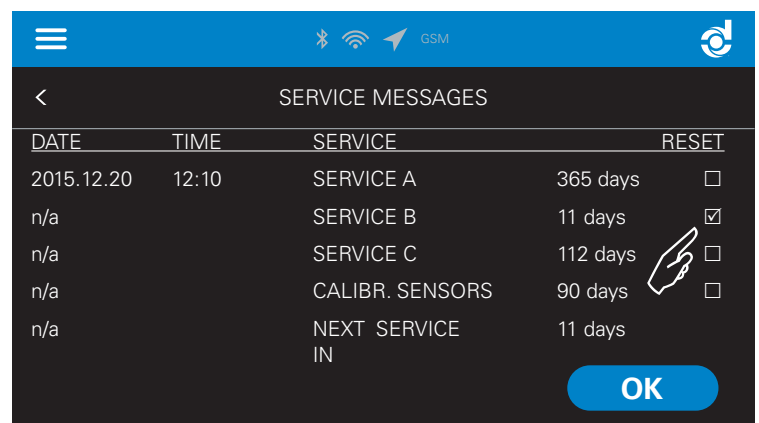


By pressing on the Reset symbol it is provided with a check mark and when pressing the "OK" button which appears it is reset.



DATE	TIME	SERVICE	RESET
2015.12.20	12:10	SERVICE A	365 days ☐
n/a		SERVICE B	11 days ☐
n/a		SERVICE C	112 days ☐
n/a		CALIBR. SENSORS	90 days ☐
n/a		NEXT SERVICE IN	11 days

After pressing the "OK" button the message that was previously orange is now displayed white and the full number of days (365) until the next service is displayed.

DATE	TIME	SERVICE	RESET
2015.12.20	12:10	SERVICE A	365 days ☐
n/a		SERVICE B	11 days ☒
n/a		SERVICE C	112 days ☐
n/a		CALIBR. SENSORS	90 days ☐
n/a		NEXT SERVICE IN	11 days

OK

It is also possible to reset a Service which has not yet been reached, e.g. There are only a few days until expiry of the next service (in the example "Service B" = 11 days). It therefore makes sense to carry out Service B at the same time as "Service A"

13.3.2. Alarm messages

Possible alarm messages		
Alarm message (examples)*	Alarm value	Possible cause
DEW POINT D (D001) ("Digital" sensor)	xx °Ctd	Alarm messages are output, when the alarm contact switches: Dew point > preset Dew point pre-alarm > preset (= alarm contact does not switch) Pressure < 4 bar Differential pressure > preset Temperature > preset CO > preset CO₂ > preset Volume flow > preset Freely definable sensor type (Setting > Sensors > Sensor type) 1 > preset 2 > preset 3 > preset 4 > preset
DEW POINT D (D001) ("Digital" sensor)	-256°Ctd	Sensor not connected
DEW POINT 2 (Sensor "Analog 1...4")	3.6 mA	Sensor error or open transmitter
DEW POINT 2 (Sensor "Analog 1...4")	20.4 mA	Sensor error or short-circuited transmitter
Further instructions on fault finding and troubleshooting can be found in chapter 14.2 "Troubleshooting"		

* The designations of the sensors can be freely defined (see chapter 12.3.7.)

Alarms only occur if alarm messages have been activated under Settings.

The alarm contact can be activated, i.e. whether it switches on alarm or not.

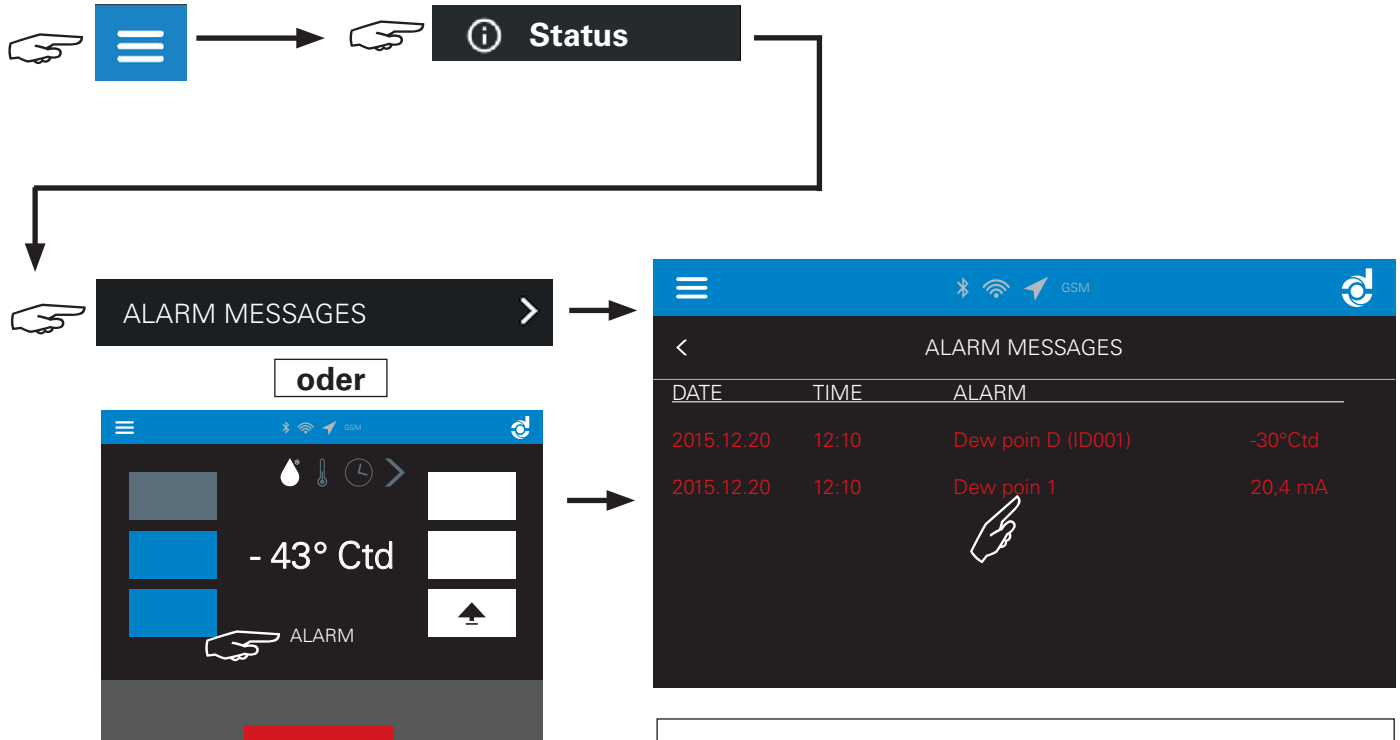
In the event of a power failure / cable break, an alarm can be generated via the alarm contact, but there is no display on the dryer.

An unconnected or defective sensor shows "-" without value.

Calling up the alarm messages

Set the status display to "Alarm messages".

Set the status display to "Alarm messages". Alarms only occur if alarm messages have been activated under Settings. A click on the alarm message acknowledges it and deletes the alarm message. If the cause is not eliminated, the alarm message is repeated after a preset time, e.g. 30s. If required, the history can be displayed via the menu item Service >Analysis>History.



If the cause of the malfunction is rectified, the alarm message will be displayed message and automatically disappears. No manual reset is required.

An overview of all current alarm messages will be displayed. Cause and fixing the malfunctions see chapter 14.2 "Troubleshooting". By clicking on one of the messages the "History" screen will be displayed.

Leaving the menu "Alarm messages"

With the "Search" button in all occurring alarm messages can search by date and search value E.g.: Ads time...



HISTORY				
DATE	TIME	VALUE	OLD	NEW
2015.10.20	12:10	Ads Time		140 sec
2015.12.28	19:23	Dew point Alert		-45°C
2016.01.04	6:55	Activation Service A		off

An overview of all current and past alarm messages will be displayed.

14 Malfunctions

In this chapter we will explain to you:

- which faults can occur
- the causes of problems
- which measures must be taken to correct problems.

You can get an overview of this in the corresponding overview list.

List all fault messages, operating states and parameters settings at the time of the malfunction.

In some troubleshooting instances, it is necessary to power down the equipment.

In such a case, please follow these steps:

- Shut-down the equipment.
Carry out the shut-down procedure as described previously (see also chapter 8.2).
Put up a warning sign: Start-up of the equipment forbidden!
- Depressurize the equipment as necessary (also see chapter 8.3).
- Restore the equipment back to its original state after working on it.

Important:

Troubleshooting may only be taken by instructed or trained specialist personnel!

14.1. Possible causes of faults

Before identifying the cause of the malfunction, ensure the following areas are checked and in proper condition:

- Is there external equipment damage or missing parts?
- Any power to the equipment? Does the power being used correspond to the type listed on the type plate?
- Is the power supply to all electrical components and modules within the equipment guaranteed?
- Was the start-up process carried out properly (also see chapter 8.1)?
- Are all external shut-off valves in their correct positions (also see chapter 8.1)?
- Do the input parameters (max. throughput, min. operating pressure, max. inlet temperature) correspond to the data used for the design calculation?

14.2. Troubleshooting

Symptom	Possible cause		Solution
Dew point is too high	Setting deviates from dryer conditions		Set the dryer (Superplus)
	Maximum service life of the cartridges exceeded		Replace the cartridges
	Throttle dirty or incorrect		Check throttle
	Defective shuttle valves or Regeneration valves		Check valves, replace if necessary
	Silencer dirty		Replace silencer
	External condensate drain blocked		Clean
High pressure loss Strong air flow around silencer	Shuttle valve does not work	Ball damaged	Replace ball
	Pressurization incomplete	Membranes of the Regeneration valves defective	Replace regeneration valves
		Incorrect or defective Throttle element	Replace throttle element
		dirty Throttle elements	Reset pressure and temperature (only Superplus) Clean the throttle element
		Pressurization duration too short	Reset the pressure and temperature
		wrong sequence during the start-up	1. Step: Pressurization 2. Step: Switch on control system
After electrical connection no function	Control system has no operating voltage	Connection not connected to the connecting terminals on the inspection cover board	Check the contact pins
		P/SP only: The inspection cover is not properly attached to the housing	Check the inspection cover
LEDs or display not functioning	Display board defective		Call customer service
	Cable connection to display board broken		
	Mainboard defect		
No condensate drainage	Condensate drain defective		Replace condensate drain

Symptom	Possible cause		Solution
Only Superplus: Alarm message Digital sensor (UDM515)*	Sensor signals outside the permissible range	Incorrect scaling under settings > sensors could be error cause for an incorrect measuring value	Check the scaling. It must correspond to the sensor manufacturers specifications
Only Superplus: Alarm message Sensor Analog* 1...4	Sensor signals outside the permissible range (4 -20 mA)		
Only Superplus: Alarm message Sensor xxxx* 20.4 mA	Sensor defective	Short circuit in the supply line to the sensor or in the sensor	Check sensor, Check supply lines to sensor, replace if necessary
Only Superplus: Alarm message Sensor xxxx* 3.6 mA	Sensor defective	Supply line to sensor broken or sensor not connected	Check sensor, Check supply lines to sensor, replace if necessary

* The designation of the sensors can be freely chosen by the user.
The scaling of the UDM515 can only be set by the manufacturer.

15 Maintenance and servicing

15.1. Maintenance intervals

Filter elements

In order to ensure proper equipment operation, the filter elements should be changed when prompted by the message on the display or after a maximum of 8,760 operating hours or 1 year.

Desiccant cartridge

Oil in a liquid form can destroy the desiccant and significantly restrict equipment functioning. It is therefore necessary to ensure that the filter elements are replaced regularly.

Failure to observe proper operating conditions (inlet temperature too high or operating pressure too low) can lead to desiccant overload which in turn can cause equipment malfunction. In order to ensure proper equipment operation, the desiccant cartridge should be changed when prompted by the message on the display or after a maximum of 17,500 operating hours or 2 years.

Cleaner cartridges (Ultrapure Smart)

The cleaner cartridges must be replaced after approx. one year (maximum 10,000 operating hours) or as soon as odors or flavors are noticeable in the breathing air.

Cleaner cartridges (Oilfreepac Smart)

The cleaner cartridges must be replaced after approx. 2 years (maximum 17,500 operating hours).

Breathing air tests are recommended at regular intervals!

Service inspection scope Ultrapac Smart / Ultrapure Smart / Oilfreepac Smart

1. Visually check the adsorption dryers and filters
2. Checking of the prefilter and afterfilter elements and exchange of the filter elements
3. Test and clean the condensate drains
4. Check all valves, clean and lubricate as required
5. Check the silencer and replace if needed
6. Check all electrical components and signal lamps
7. Check adsorbent cartridge and exchange according to service schedule
8. Test leakage under pressure
9. Test run and final controller
10. Check the alternating switch over of the adsorption dryer
11. Restart the dryer
12. Check compressed air quality
13. Record data and inspection information in a service report

The manufacturer recommends the following maintenance schedule within the stated maintenance intervals:

MAINTENANCE INTERVALS					
Product	Type Remark	1 year / 12 month	2 years / 24 month	3 years / 36 month	4 years / 48 month
Ultracpac Smart Ultracpure Smart Oilfreepac Smart	03 - 60				
Service inspection	Check/ cleaning of: Condensate drain on prefilter Silencer Shuttle valves Solenoid valve	X		X	
Recalibration Dew point transmitter	Only Superplus	X		X	
Ultracpac Smart	03 - 60				
Service-Kit A (Service A)		X		X	
Carepac 1 (Service C)			X		X
Ultracpure Smart	03 - 60				
Carepac 3 (Service A / B)		X		X	
Carepac 4 (Service C)			X		X
Oilfreepac Smart	03 - 60				
Service-Kit A (Service A)		X		X	
Carepac 2 (Service B / C)			X		X

15.2. Service sets

15.2.1. Service sets Ultrapac Smart

Article no. Service-Sets Ultrapac Smart		
Type	Service.Kit A	Carepac 1
03	1C606060-KIT	1C606070-KIT
06		1C606071-KIT
09		1C606072-KIT
12		1C606073-KIT
15		1C606074-KIT
20	1C606065-KIT	1C606075-KIT
30	1C606065-KIT	1C606076-KIT
40	1C606067-KIT	1C606077-KIT
50	1C606068-KIT	1C606078-KIT
60	1C606068-KIT	1C606079-KIT

Content of Service sets Ultrapac Smart		
Type	Service Kit A	Carepac 1
03 - 60	Filter elements O-rings Set of wear parts solenoid valves Set of wear parts drains Wear parts for shuttle valves	Filter elements O-rings Set of wear parts solenoid valves Set of wear parts drains Silencer Wear parts for shuttle valves Desiccant cartridge

15.2.2. Service sets Ultrapure Smart

Article no. Service sets Ultrapure Smart		
Typ	Carepac 3	Carepac 4
03	1C606670-KIT	1C606690-KIT
06	1C606671-KIT	1C606691-KIT
09	1C606672-KIT	1C606692-KIT
12	1C606673-KIT	1C606693-KIT
15	1C606674-KIT	1C606694-KIT
20	1C606675-KIT	1C606695-KIT
30	1C606676-KIT	1C606696-KIT
40	1C606677-KIT	1C606697-KIT
50	1C606678-KIT	1C606698-KIT
60	1C606679-KIT	1C606699-KIT

Content of Service sets Ultrapure Smart		
Type	Carepac 3	Carepac 4
03 - 60	Filter elements O-rings Set of wear parts solenoid valves Sets of wear parts drains Sets of wear parts shuttle valves Cleaner cartridges	Filter elements O-rings Set of wear parts solenoid valves Sets of wear parts drains Silencer Sets of wear parts shuttle valves Desiccant cartridge Cleaner cartridges

15.2.3. Service sets Oilfreepac Smart

Article no. Service sets Oilfreepac Smart		
Type	Service Kit A	Carepac 2
03	1C606060-KIT	1C606360-KIT
06		1C606361-KIT
09		1C606362-KIT
12		1C606363-KIT
15		1C606364-KIT
20	1C606065-KIT	1C606365-KIT
30	1C606065-KIT	1C606366-KIT
40	1C606067-KIT	1C606367-KIT
50	1C606068-KIT	1C606368-KIT
60	1C606068-KIT	1C606369-KIT

Content of Service sets Oilfreepac Smart		
Type	Service Kit A	Carepac 2
03 - 60	Filter elements O-rings Set of wear parts solenoid valves Sets of wear parts drains Sets of wear parts shuttle valves	Filter elements O-rings Set of wear parts solenoid valves Sets of wear parts drains Silencer Sets of wear parts shuttle valves Desiccant cartridge Cleaner cartridges

15.3. Maintenance



Maintenance work by only be carried out by qualified and specially trained personnel.



Take the system out of operation before starting any maintenance work (see chapter 8.2 / 8.3).



After completing all maintenance work put the system back into operation (see chapter 8).



For all maintenance work, such as filter change or cartridge replacement wear suitable gloves.



Waste must be disposed of in accordance with local regulations. It is absolutely necessary that the desiccant cartridge/ cleaner cartridge is disposed of properly.



When replacing the desiccant cartridge/cleaner cartridge the filter elements should also be replaced. Steps 15.3.1, 15.3.2 and 15.3.3 (additionally 15.3.4 for Ultrapure/ Oilfreepac Smart) are to be carried out together.



Cleaning of the dryer:

The touch screen (Superplus) may only be cleaned with special cleaning cloths for TFT panels.

Never use flammable solvents to clean the components. Ensure suitable safety precautions against poisonous vapours from cleaning fluids. Please only use gentle cleaning agents, such as commercially available domestic cleaners or glass cleaner. Make sure that the type label is not damaged by the detergent.

Ensure suitable safety precautions against poisonous vapours from cleaning fluids.



Tightening torques of screws

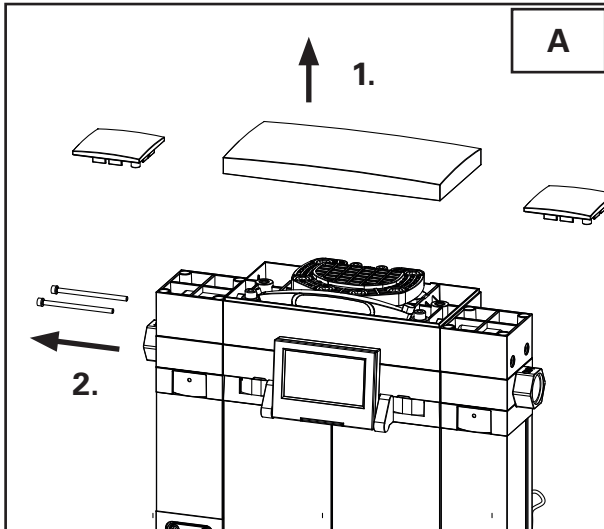
Screw size	Tightening torque (Nm)
M4	3,2
M5	4,0
M8	11,0
M10	11,0

15.3.1. Prefilter cartridge replacement

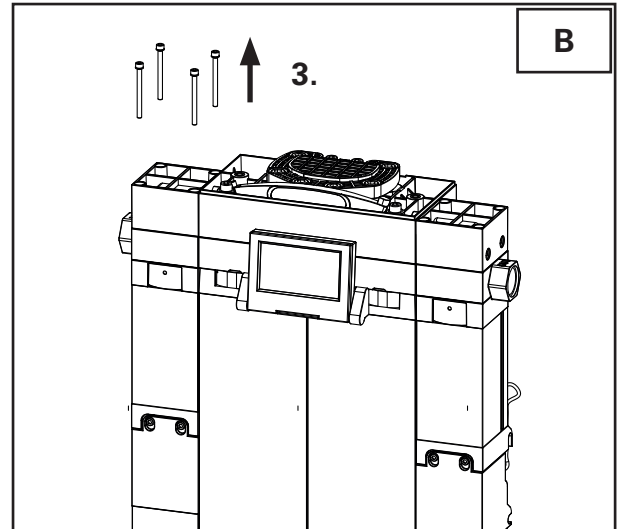
Interval: 365 days



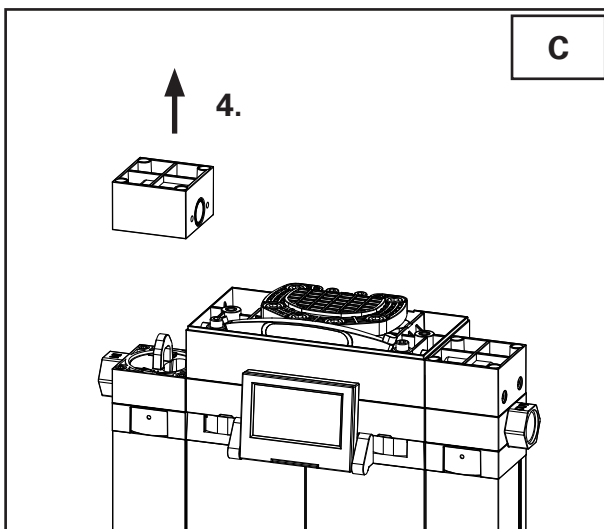
Observe the advice in chapter 15.3



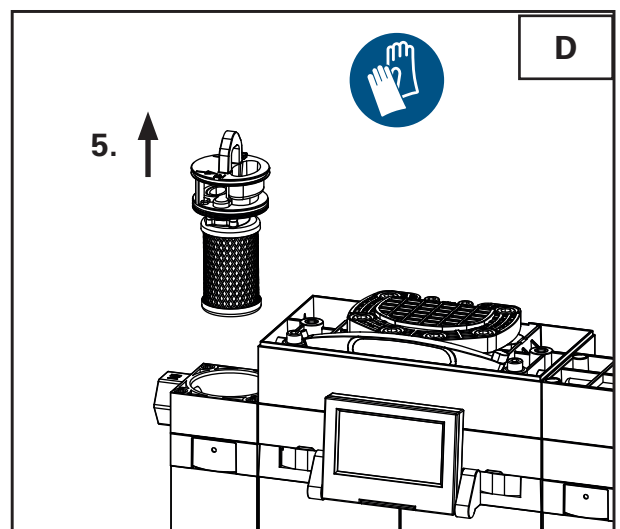
1. Pull out the upper covers and cartridge, prefilter and afterfilter (covers are magnetically fastened).
2. Release 2 side screws of the prefilter cover by turning counter-clockwise.



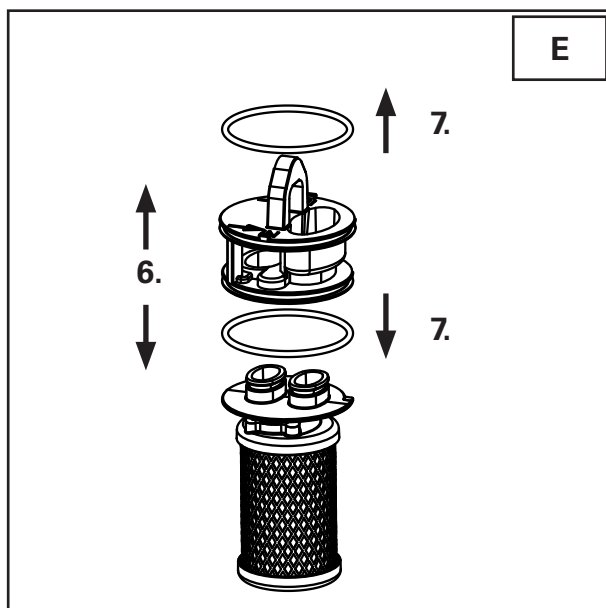
3. Remove 4 screws of the prefilter cover by turning counter-clockwise.



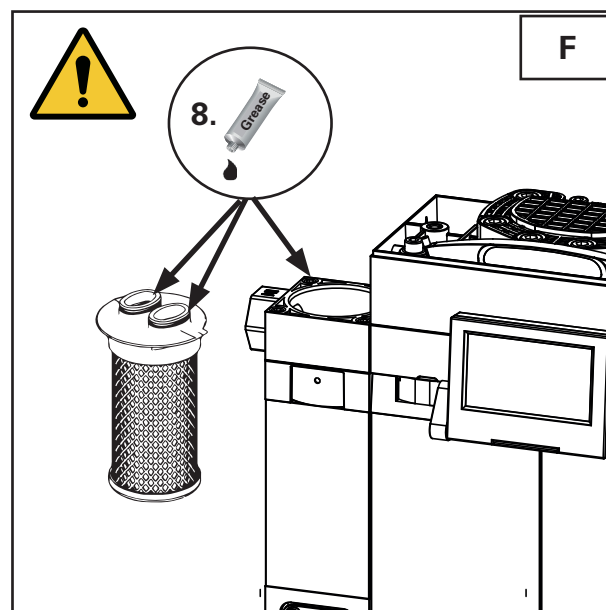
4. Remove prefilter cover.



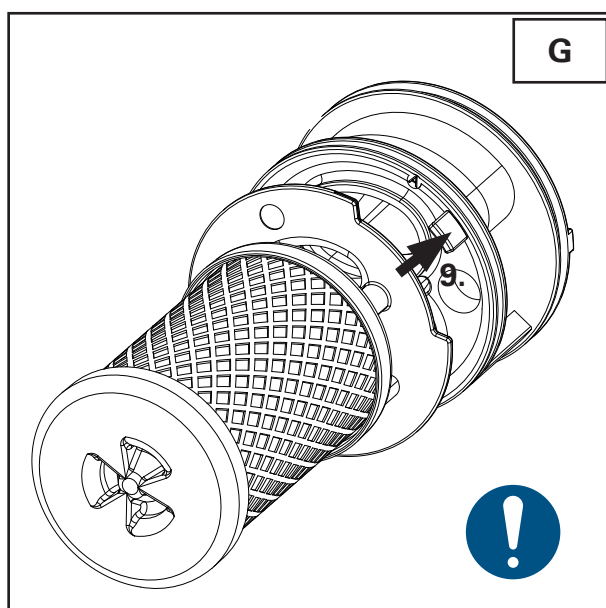
5. Pull prefilter cartridge out of the filter housing.



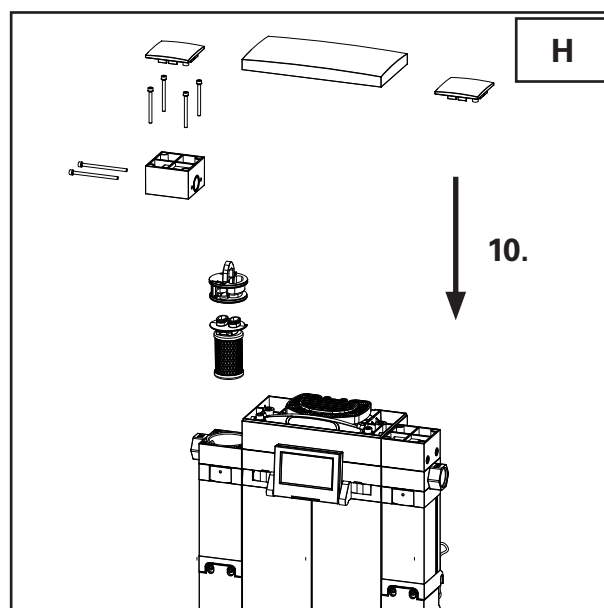
- 6.** Separate prefilter cartridge from insert.
- 7.** Remove both O-rings of the inserts and replace them with new ones.



- 8.** Grease the seals of the filter cover and the filter element with suitable lubricant!



- 9.** Connect new prefilter element with the insert. Ensure that the notch of the filter element matches the nose of the insert.



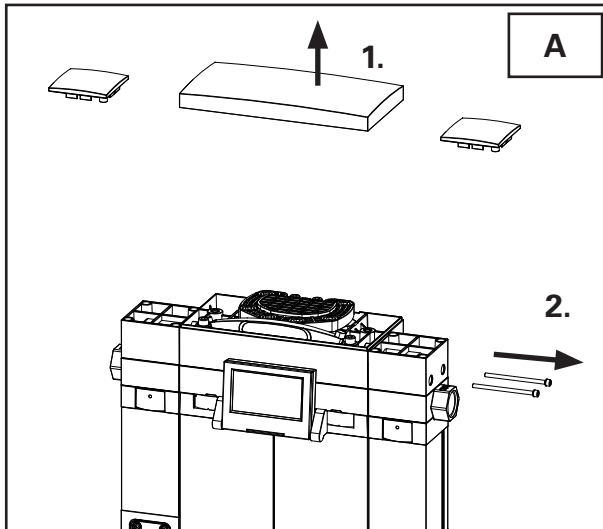
- 10.** Re-assemble parts in reverse order (Steps A to G).

15.3.2. Afterfilter cartridge replacement

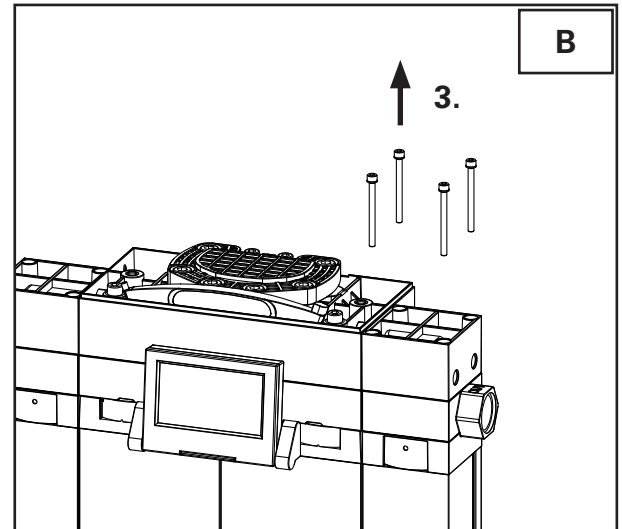
Interval: 365 days



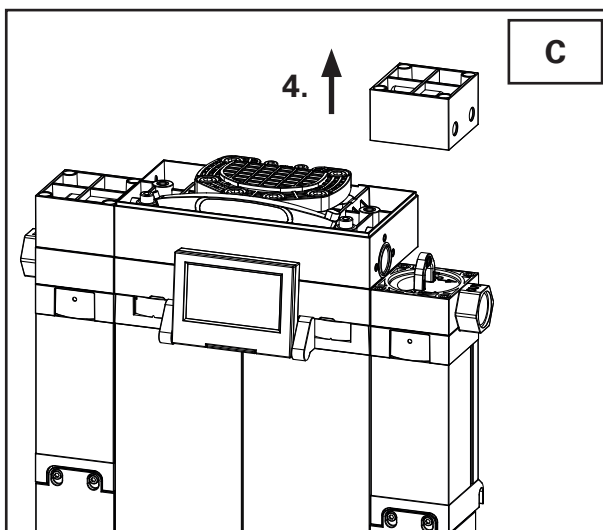
Observe the advice in chapter 15.3



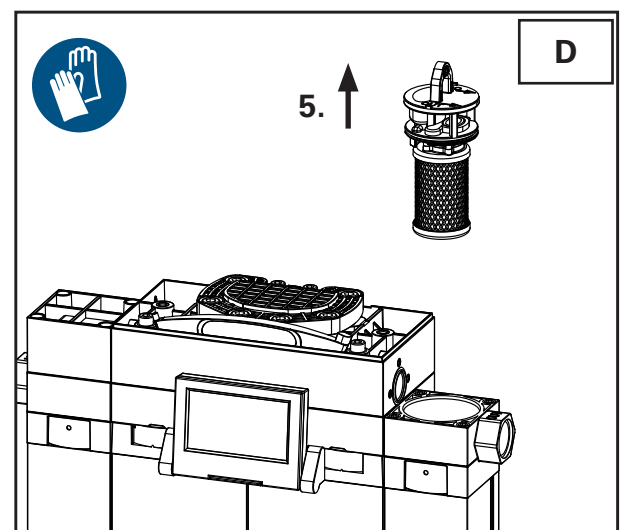
1. Pull out the upper covers and cartridge, prefilter and afterfilter (covers are magnetically fastened).
2. Release 2 side screws of the afterfilter cover by turning counter-clockwise.



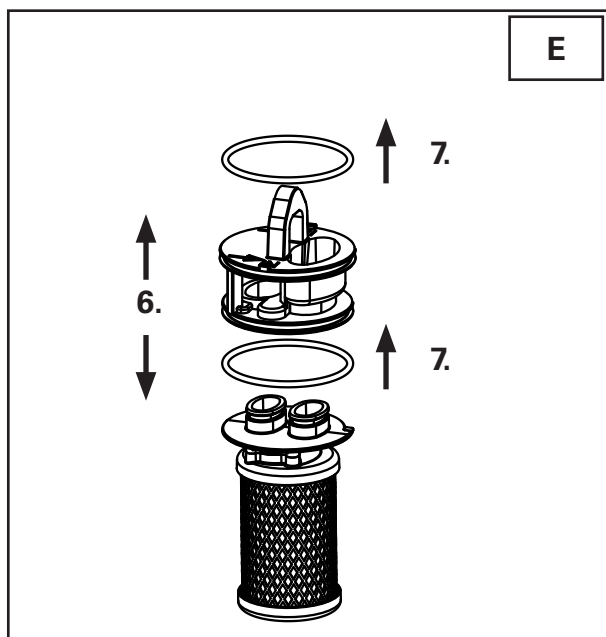
3. Loosen 14 upper screws (Mini / Midi = 16) of the adsorber cover and the filter covers by turning them counter-clockwise.



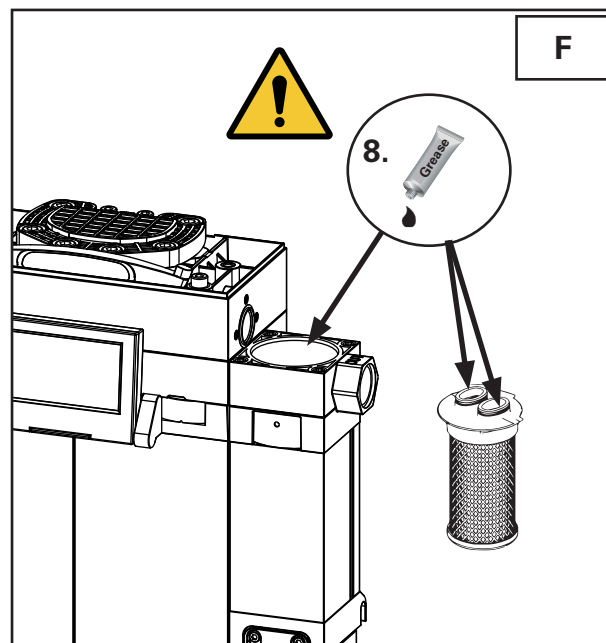
4. Remove afterfilter cover.



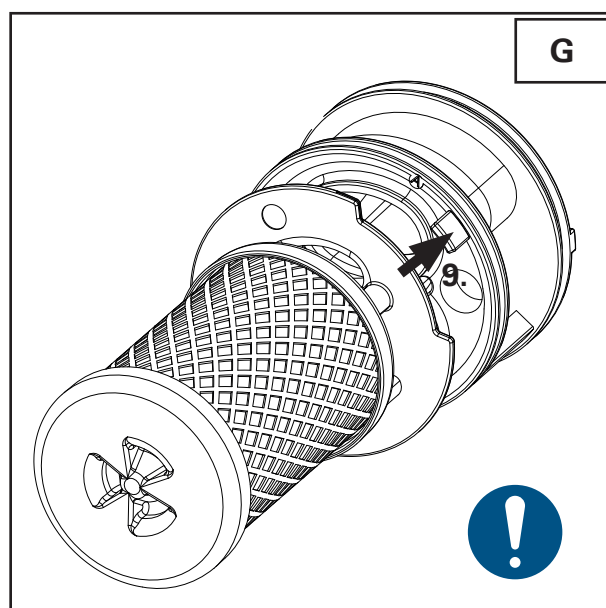
5. Take afterfilter element out of the filter housing.



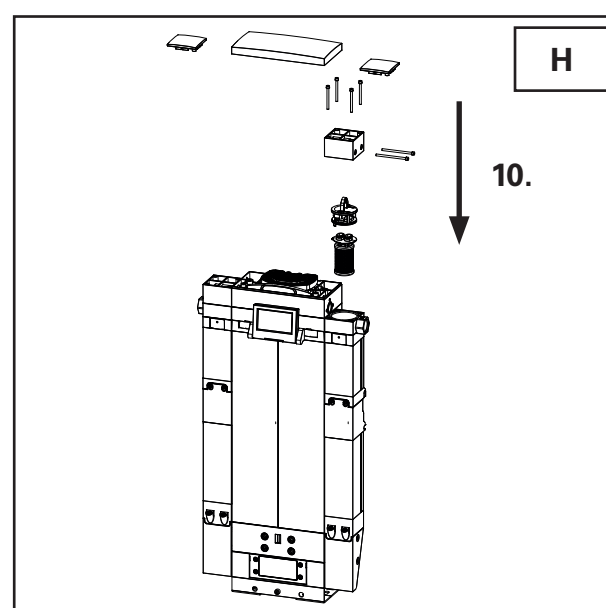
- 6.** Separate afterfilter cartridge from insert.
- 7.** Remove both O-rings of the inserts and replace them with new ones.



- 8.** Grease the seals of the filter cover and the filter element with suitable lubricant!



- 9.** Connect new afterfilter element with the insert. Ensure that the notch of the filter element matches the nose of the insert.



- 10.** Re-assemble parts in reverse order (Steps A to G).

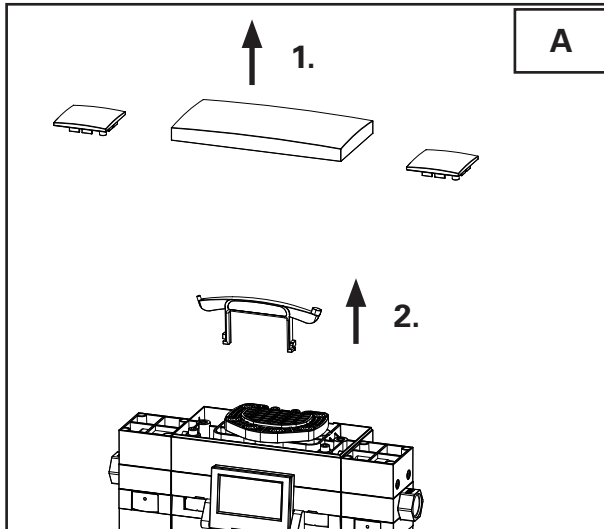
15.3.3. Desiccant cartridge replacement

Interval: 730 days

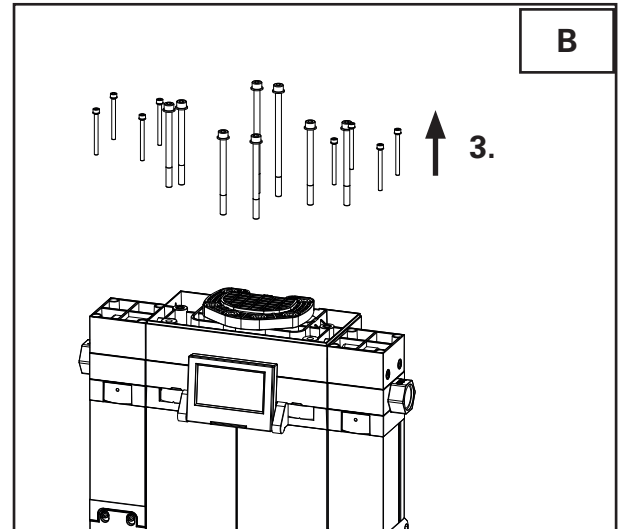


Observe the advice in chapter 15.3

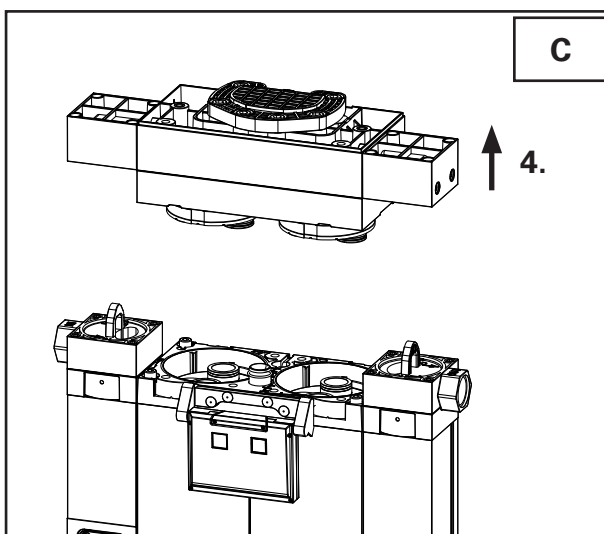
Removing the cartridges!



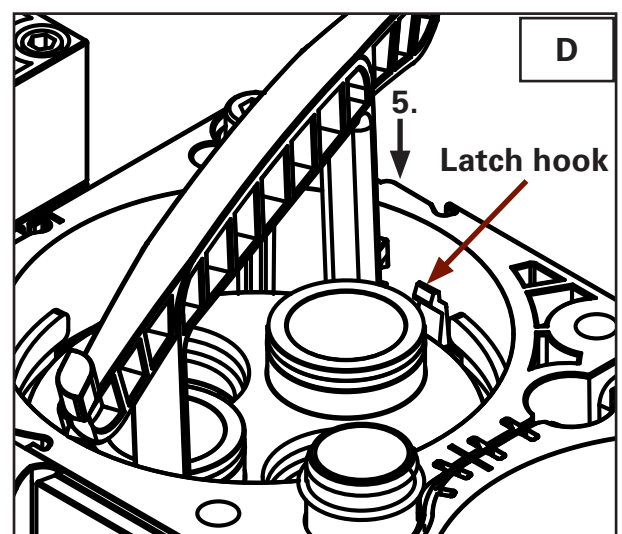
1. Pull out the upper covers and cartridge, prefilter and afterfilter (covers are magnetically fastened).
2. Remove the cartridge lifter from the top and lay to one side



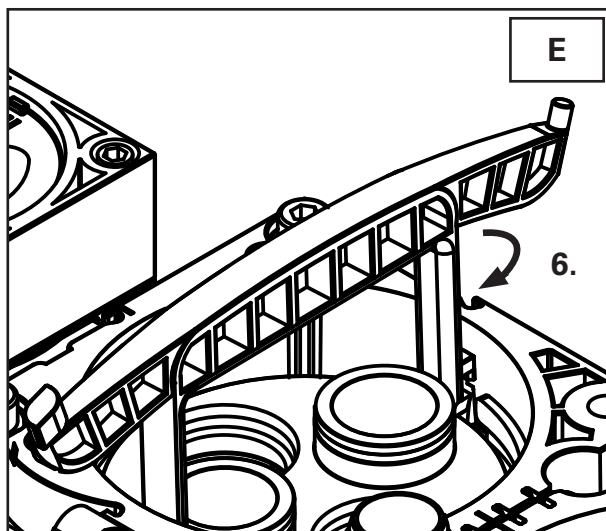
3. 14 Loosen upper screws (Mini / Midi = 16) of the adsorber cover and the filter covers by turning them counter-clockwise.



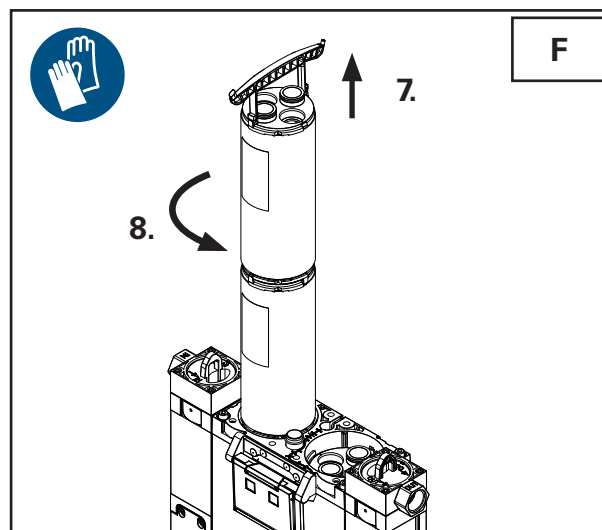
4. Remove the adsorber cover together with the filter covers.



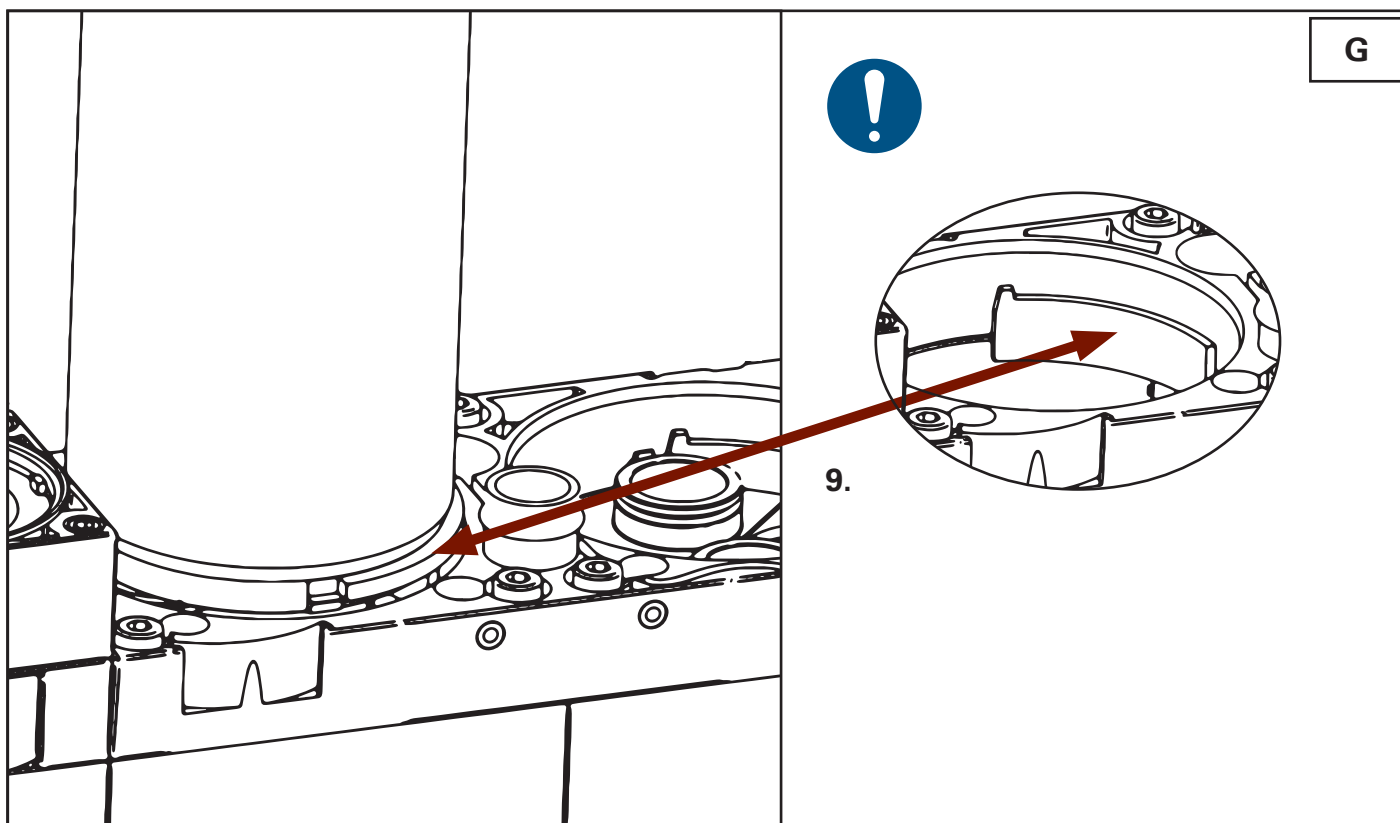
5. Insert the cartridge lifter on the top part of the 1st cartridge next to the latch hook.



6. Turn cartridge lifter clockwise, until the nose of the cartridge lifter is under the latch hook of the cartridge.

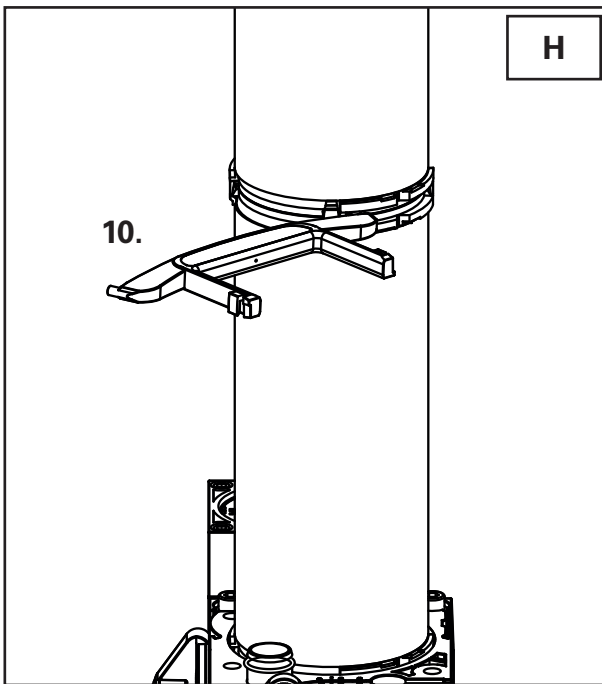


7. Pull out first two cartridges so that the lower cartridge protrudes slightly from the cartridge profile.
8. Turn cartridge 1/4 turn counter-clockwise.

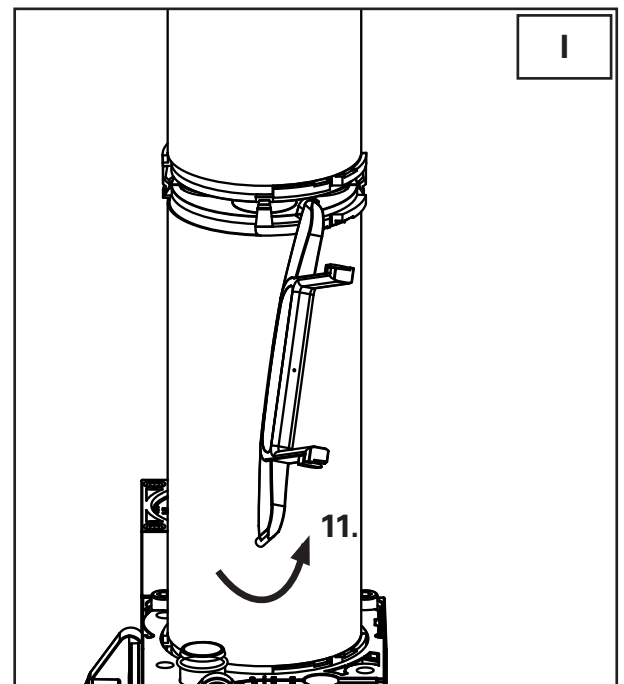


9. Important!

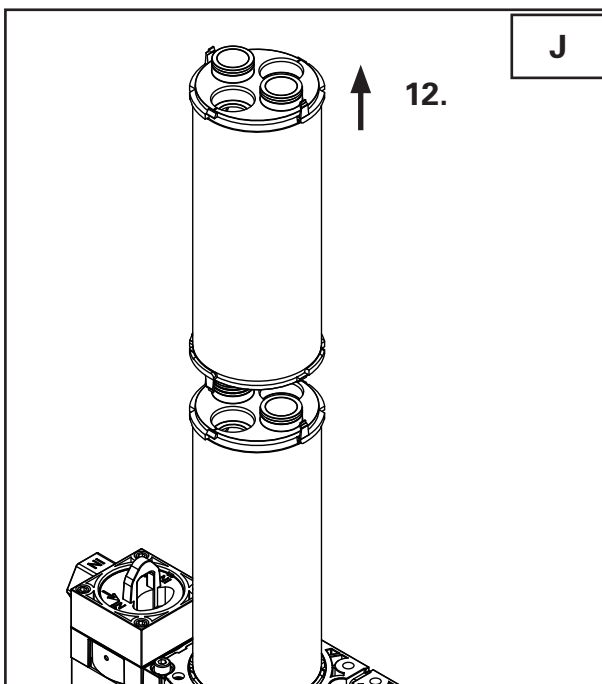
The lower cartridge must sit on the collar of the adsorber upper section, so that it does not fall back into the adsorber profile.



10. Push the cartridge lifter between the 1st and 2nd cartridge.

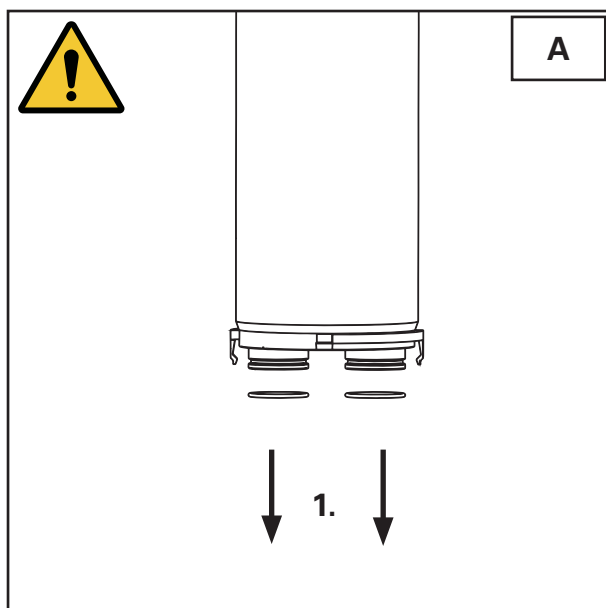


11. Turn the cartridge lifter 90° counter-clockwise, to release the cartridges from one another.

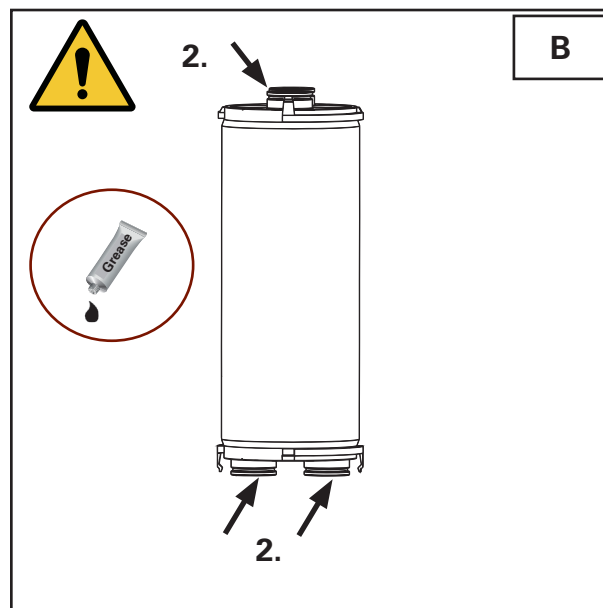


12. Remove the upper cartridge.
Repeat steps D to J to remove the remaining cartridges.

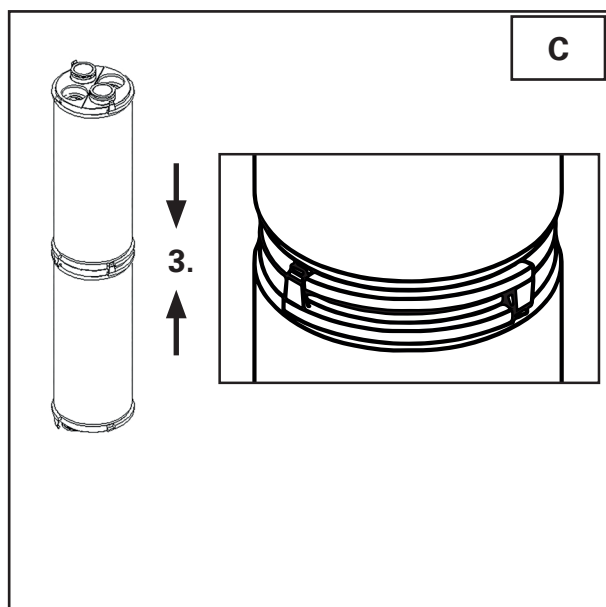
Montage of the new cartridges!



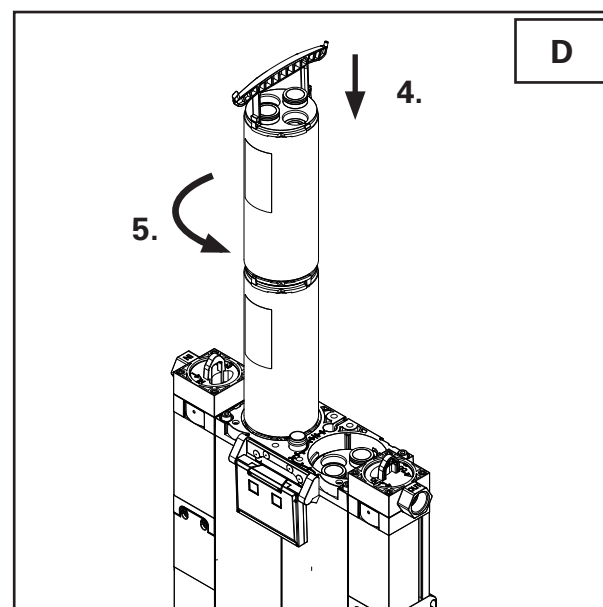
1. Remove the bottom seals of the **lowest** cartridge.



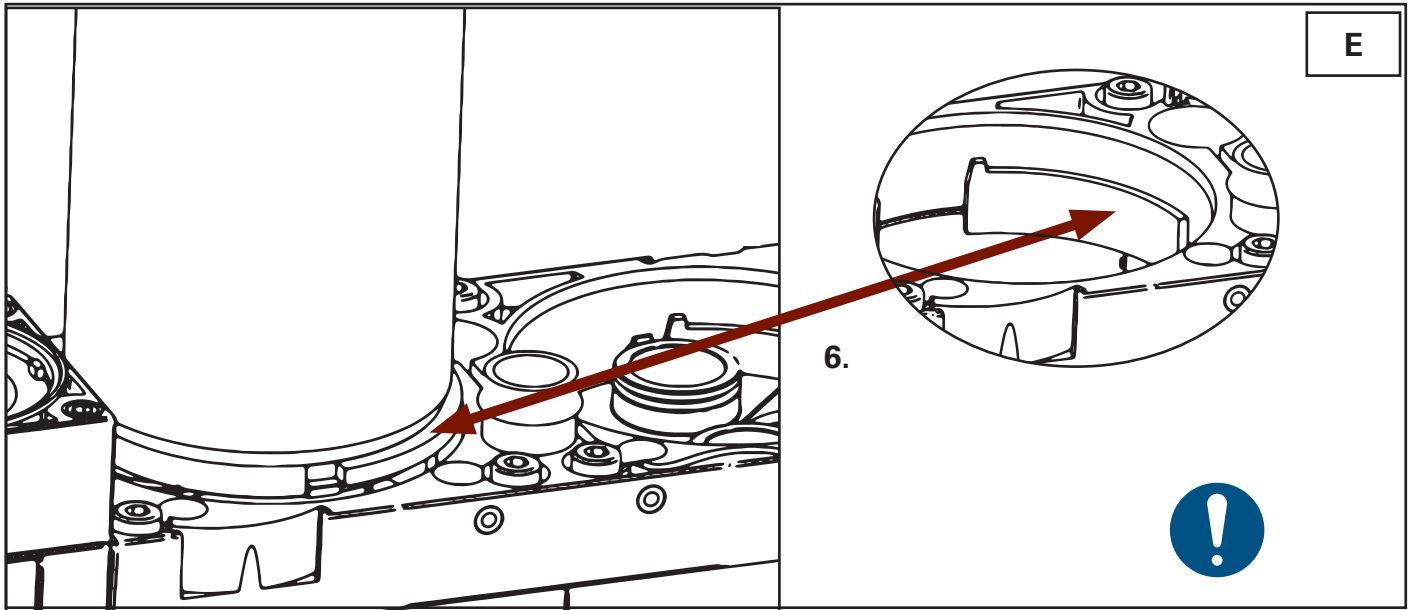
2. Grease the seals of all cartridges **lightly with suitable** lubricant!



3. Connect 2 cartridges together. Ensure that for the bottom cartridge the lower seals (see **Step A**) were removed.

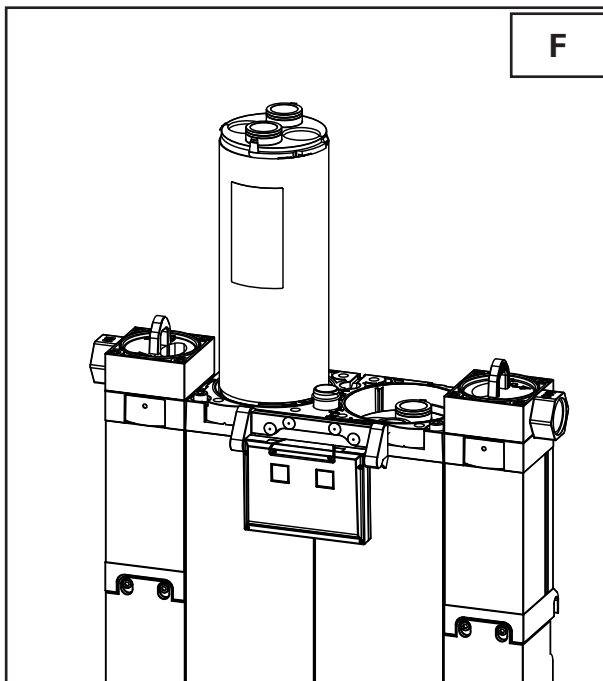


4. Push both cartridges into the adsorber profile with the aid of the cartridge lifter.
5. Turn cartridge 1/4 turn counter-clockwise.

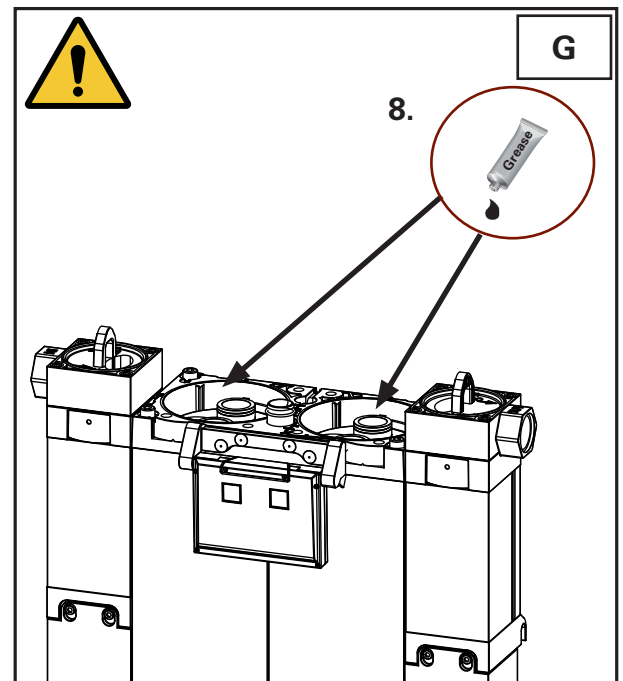


6. Important!

The upper cartridge must sit on the collar of the adsorber upper section, so that it does not fall back into the adsorber profile.

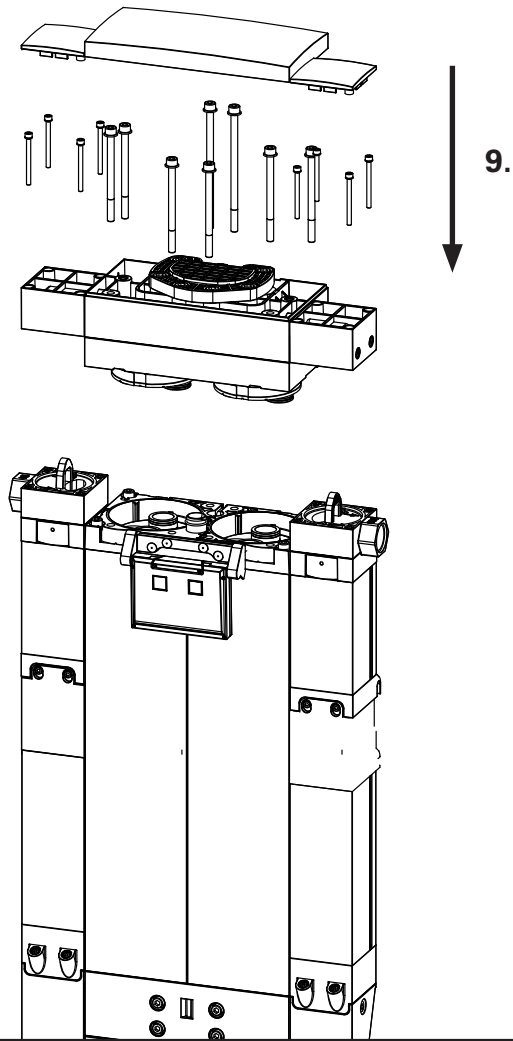


7. Repeat Steps **A** to **F** to install the remaining cartridges.
For the lowest cartridge of the second adsorber vessel especially observe step A!



8. Grease the seals of the adsorber cover with suitable lubricant!

H



- 9.** Fasten adsorber cover, filter cover and upper covers with 14 (Midi = 16) screws.
Do not forget the washers.

15.3.4. Cleaner cartridge replacement (Ultrapure Smart / Oilfreepac Smart)

Interval: 365 days



Observe the advice in chapter 15.3

Removing the cartridges!

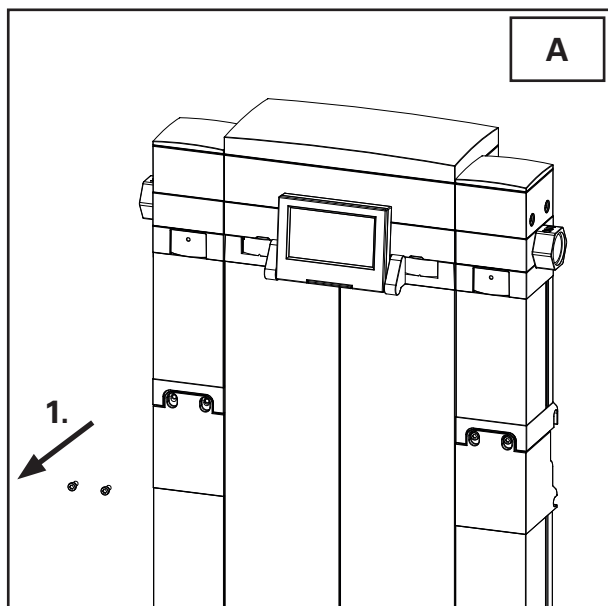
Replacement of the purifier cartridges is carried out in the same manner as described in chapter 15.3.3 (desiccant cartridge replacement).

15.3.5. Condensate drain maintenance

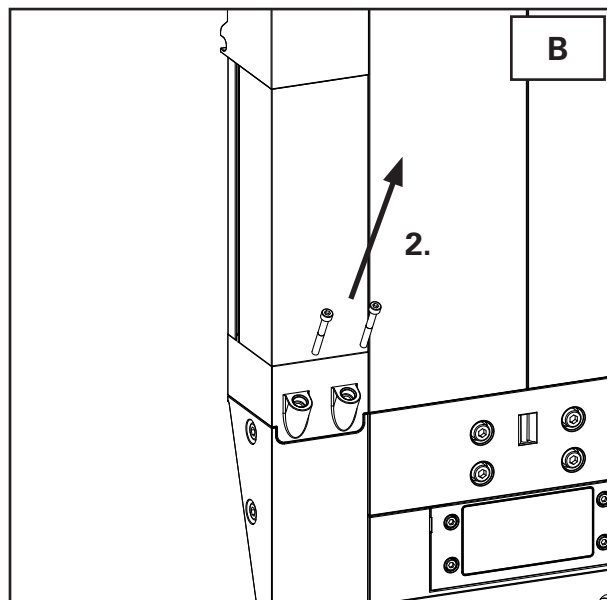
Interval: 365 days



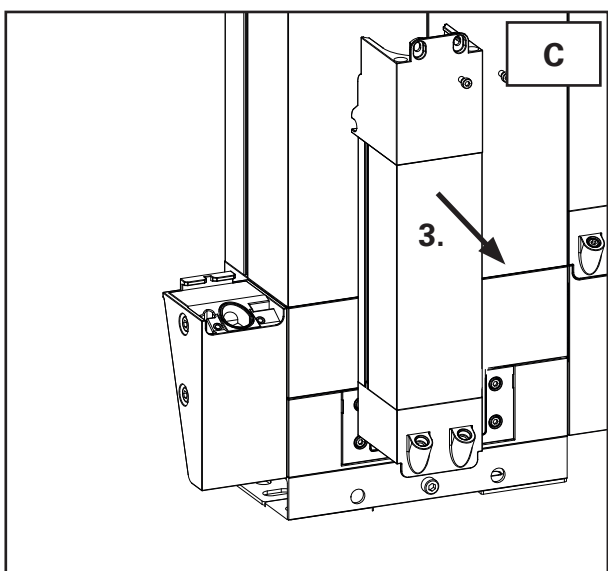
Observe the advice in chapter 15.3



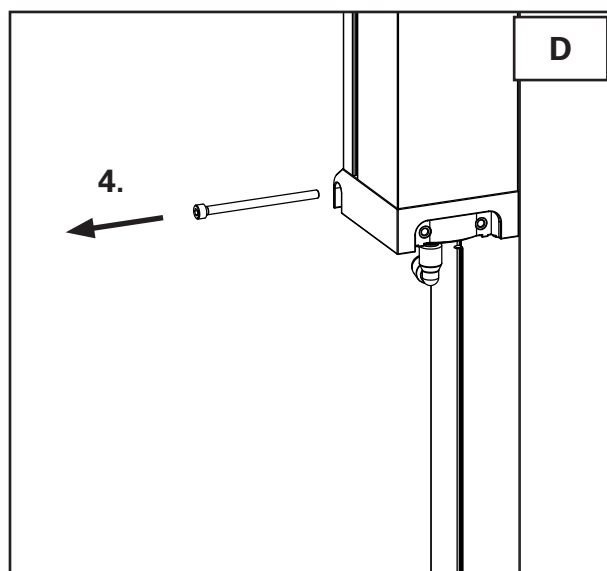
1. Release the two upper screws of the left silencer housing by turning counter-clockwise.



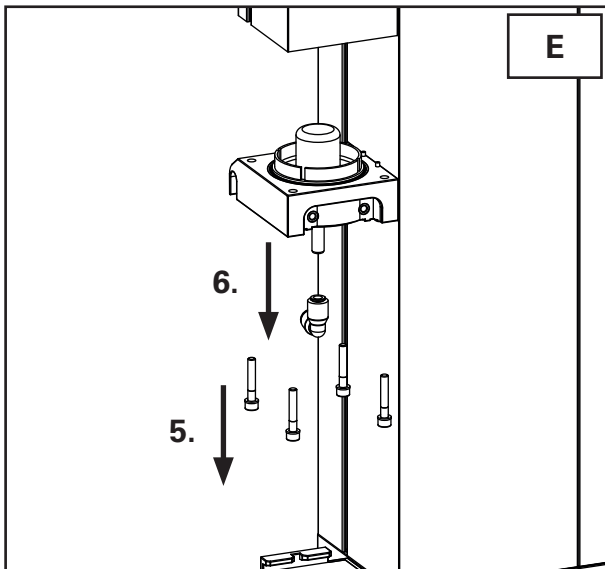
2. Release the two bottom screws of the silencer housing by turning counter-clockwise.



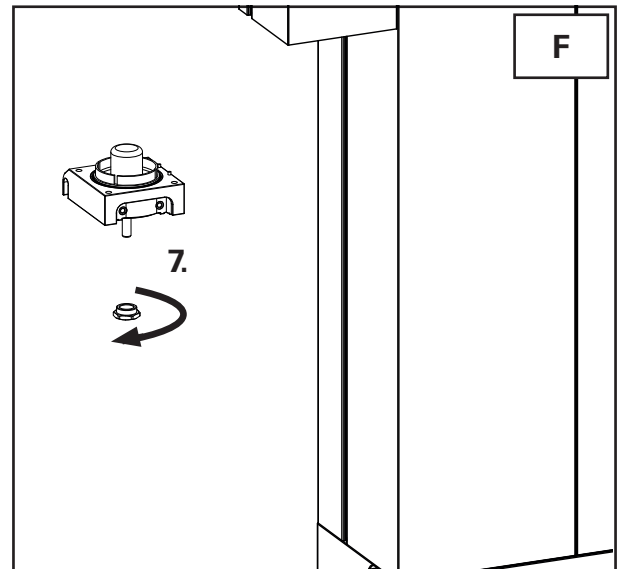
3. Remove silencer housing.



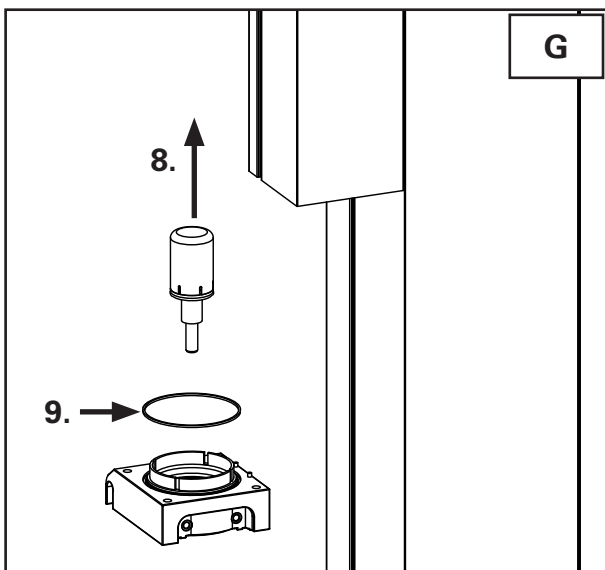
4. Release the 1 screw of the filter floor by turning counter-clockwise.



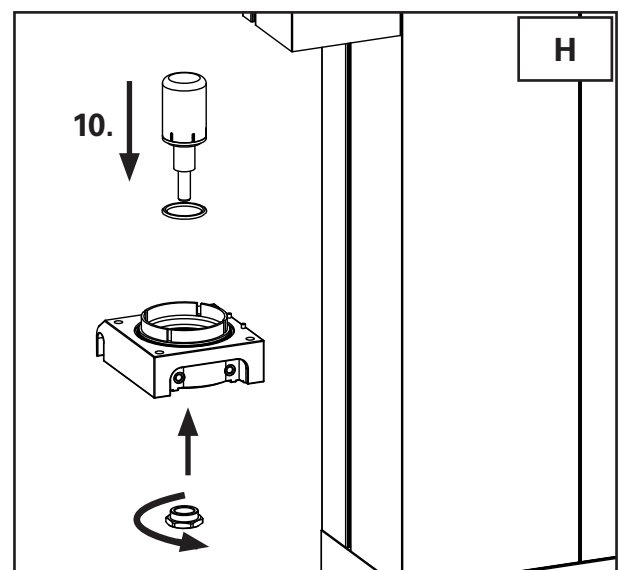
5. Release the four screws of the filter floor by turning counter-clockwise.
6. Remove the filter floor, thus pulling the condensate tube



7. Release the locking nut of the condensate drain by turning counter-clockwise.



8. Remove the condensate drain.
9. Replace the O-ring of the filter floor



10. Assemble the new condensate drain together with the new O-ring and fix it to the filter floor along with the locking nut.

The installation takes place in reverse order.

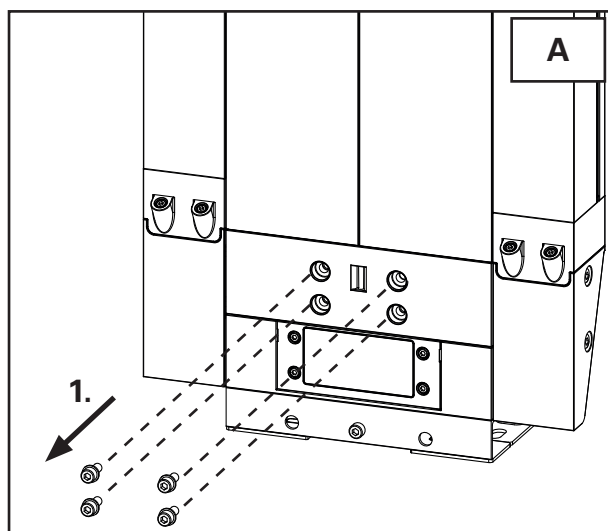
15.3.6. Shuttle valves maintenance/ throttle replacement

Interval: 365 days

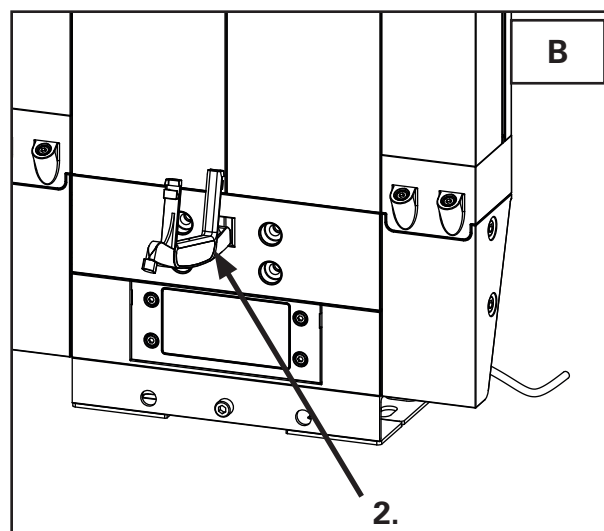


Observe the advice in chapter 14.3

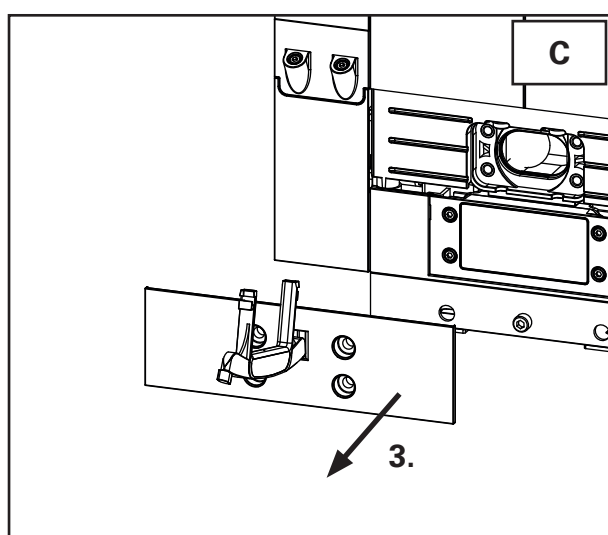
Lower shuttle valve!



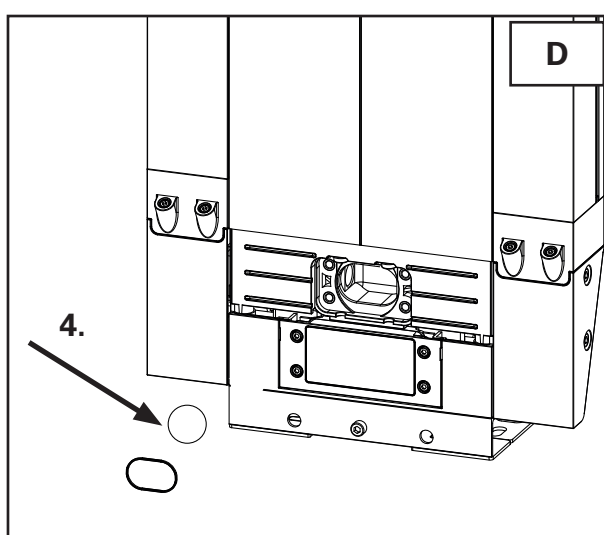
1. Remove the 4 screws of the lower shuttle valve cover.



2. Insert the cartridge lifter in the recess of the lower shuttle valve cover.



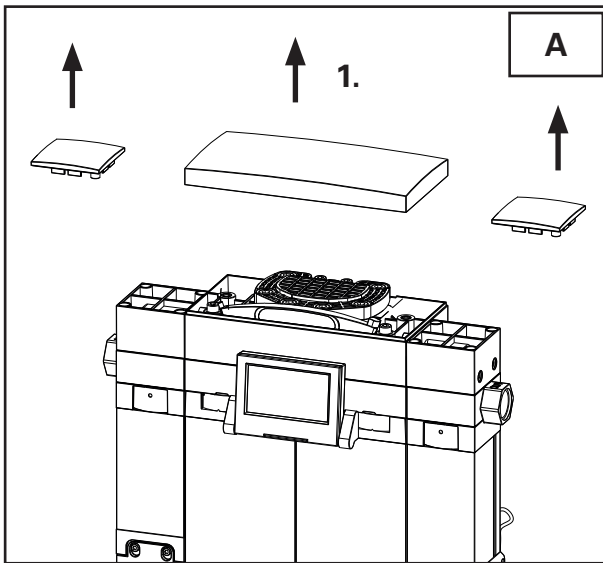
3. Remove the cartridge lifter together with the shuttle valve cover.



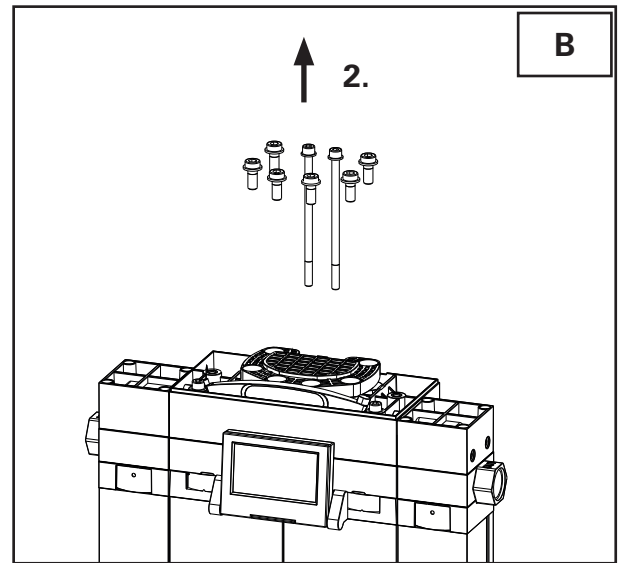
4. Remove the shuttle valve ball and replace with a new one.

The installation takes place in reverse order.

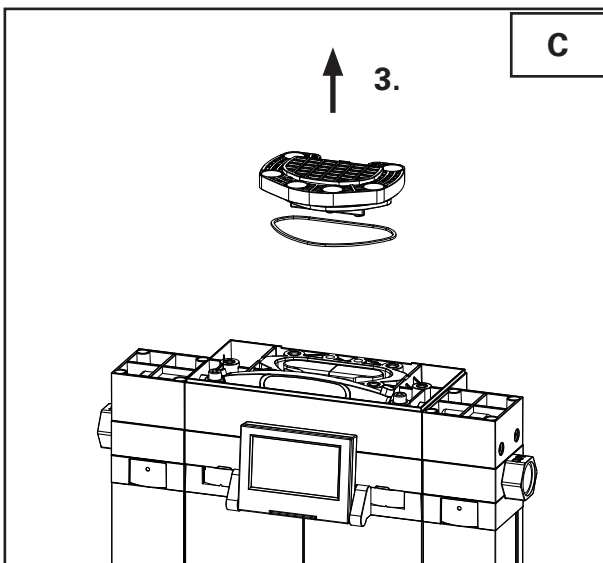
Upper shuttle valve / replace throttle



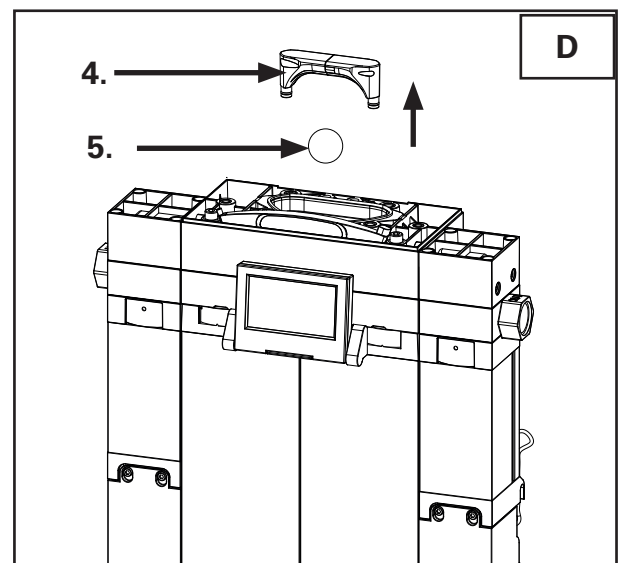
1. Pull out the upper covers and cartridge, prefilter and afterfilter (covers are magnetically fastened).



2. Release the 8 screws of the upper shuttle valve cover by turning counter-clockwise and remove them.



3. Remove the upper shuttle valve cover.



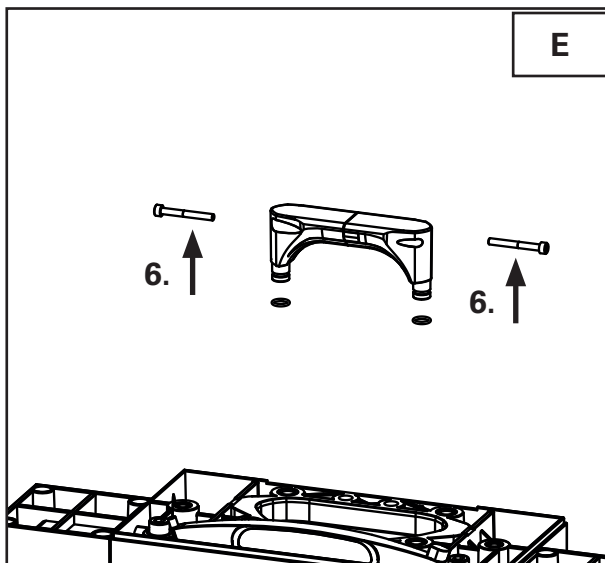
4. Pull out throttle housing.
5. Remove the shuttle valve ball and replace with a new one.

The installation takes place in reverse order.

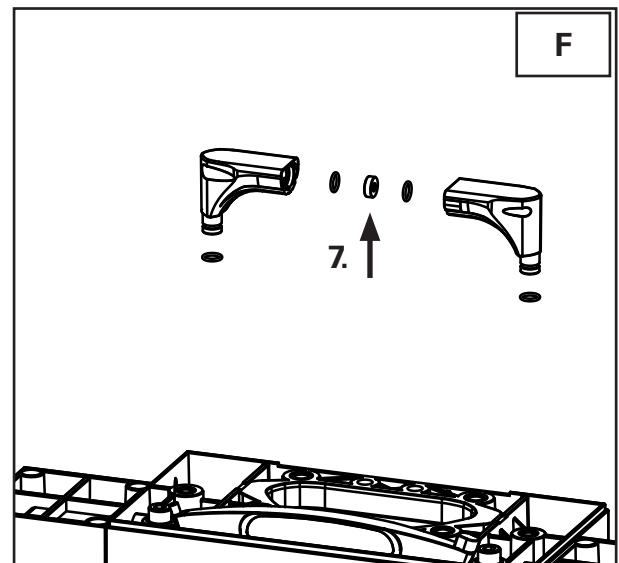
Note washer.

If the throttle should be replaced, please continue with the following steps E and F

Replace throttle!



- 6.** Release the 2 screws of the throttle housing.



- 7.** Dismantle throttle housing and replace throttle.



The throttle type depends on the operating pressure. Please ensure that the correct throttle type is used in accordance with chapter 7.3.

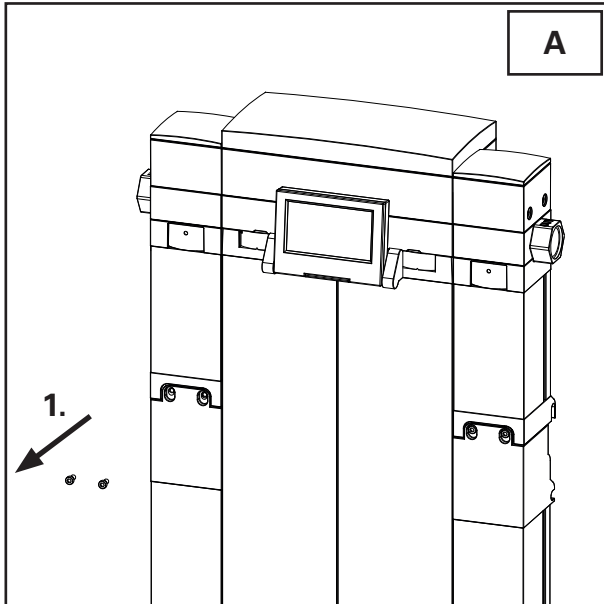
The installation takes place in reverse order.

15.3.7. Solenoid valves maintenance

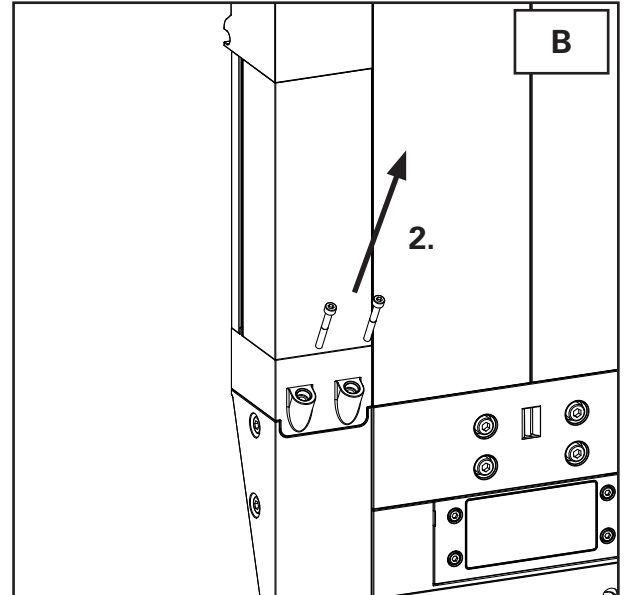
Interval: 365 days



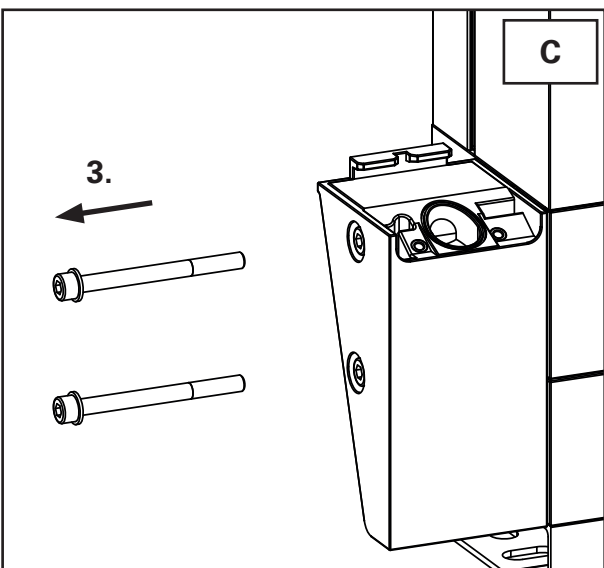
Observe the advice in chapter 15.3



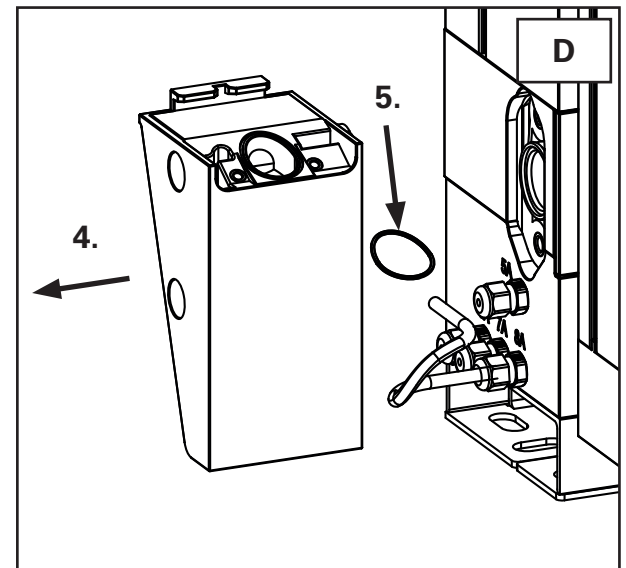
1. Release the two upper screws of the left silencer housing by turning counter-clockwise.



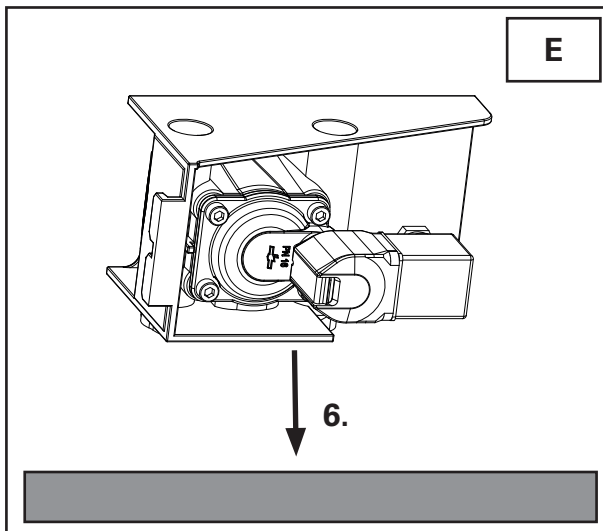
2. Release the two bottom screws of the silencer housing by turning counter-clockwise.



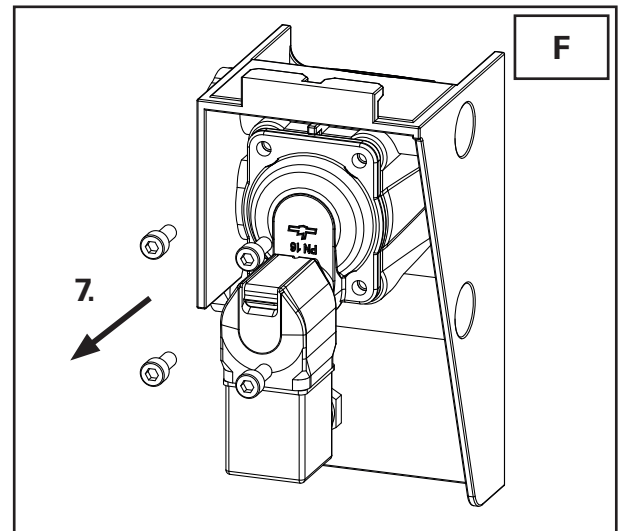
3. Release the two screws on the valve support by turning counter-clockwise.



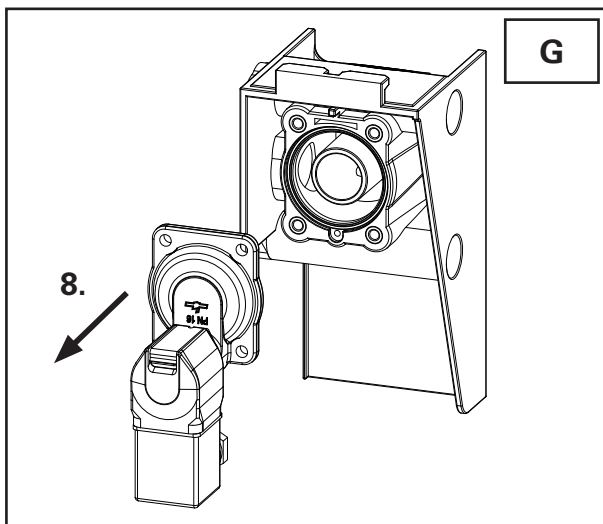
4. Remove valve support and, if possible, lay on a table.
5. Ensure that the O-ring does not get lost.



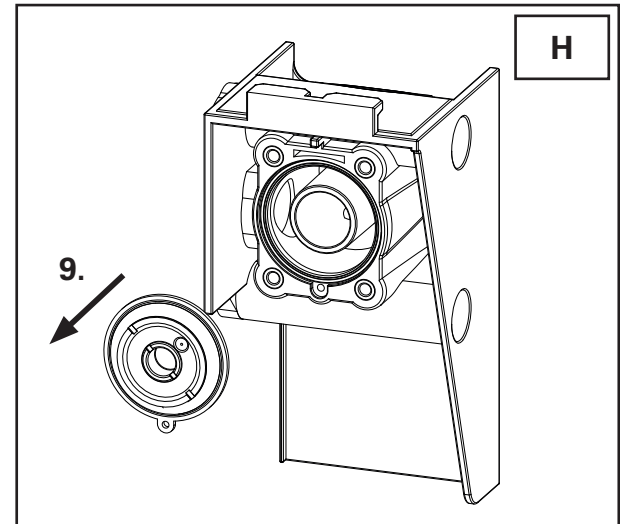
- 6.** If possible, lay the valve support on a table.



- 7.** Release the 4 screws of the membrane cover by turning counter-clockwise.



- 8.** Remove valve cover



- 9.** Remove the old membrane and insert the new one. Repeat steps A to G with the right solenoid valve.

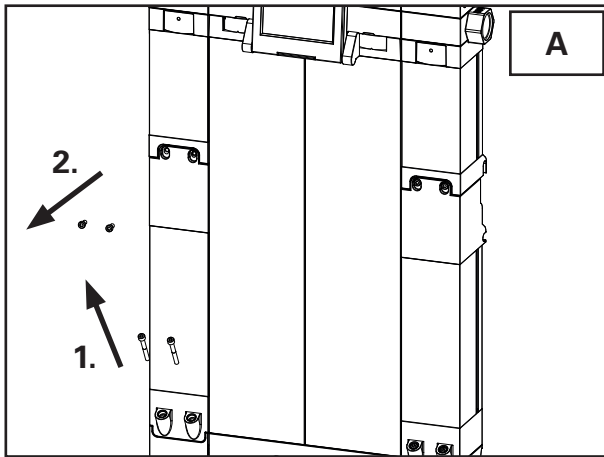
The installation takes place in reverse order.

15.3.8. Silencer maintenance

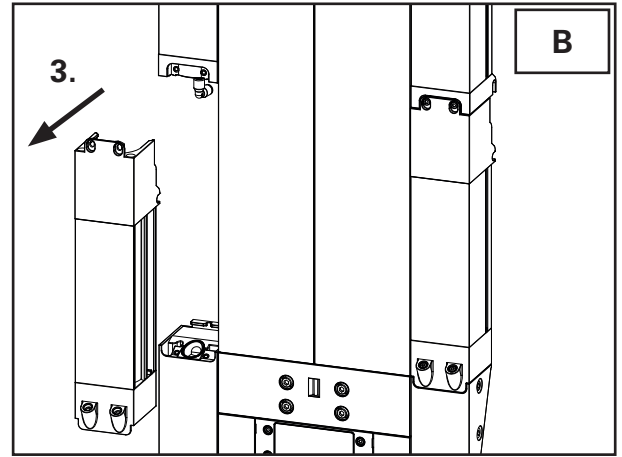
Interval: 730 days



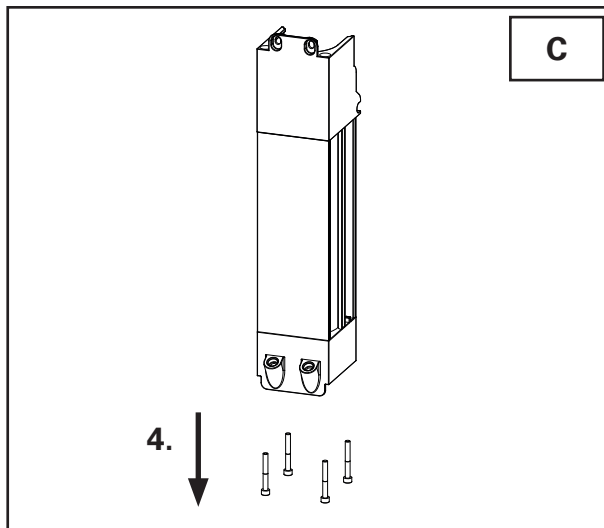
Observe the advice in chapter 14.3



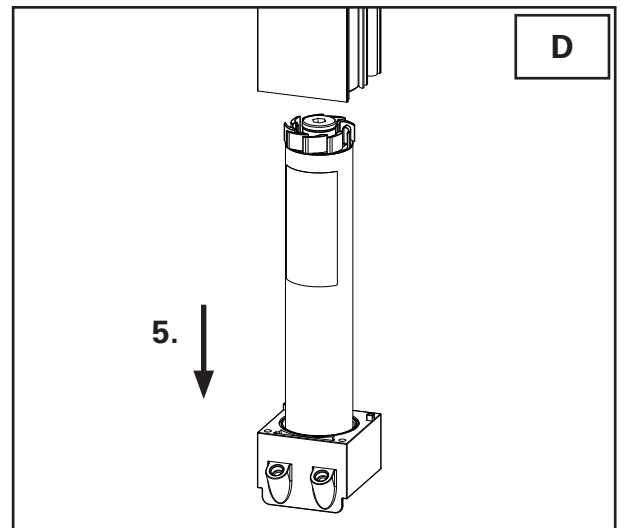
1. Release the two lower screws of the silencer housing by turning counter-clockwise.
2. Release the two upper screws of the left silencer housing by turning counter-clockwise.



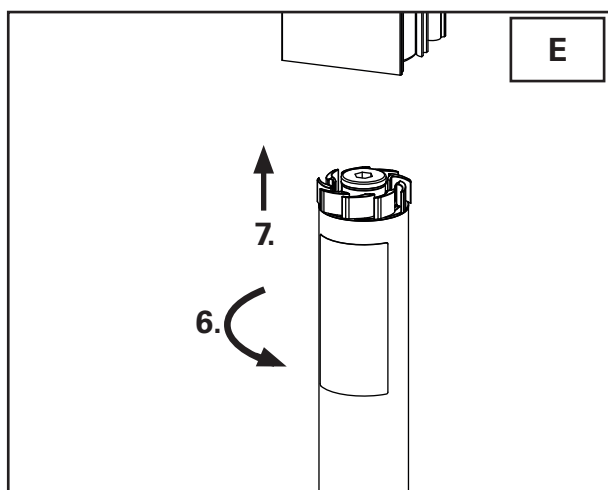
3. Pull the silencer housing forwards.



4. Release the four bottom screws of the silencer housing by turning counter-clockwise.

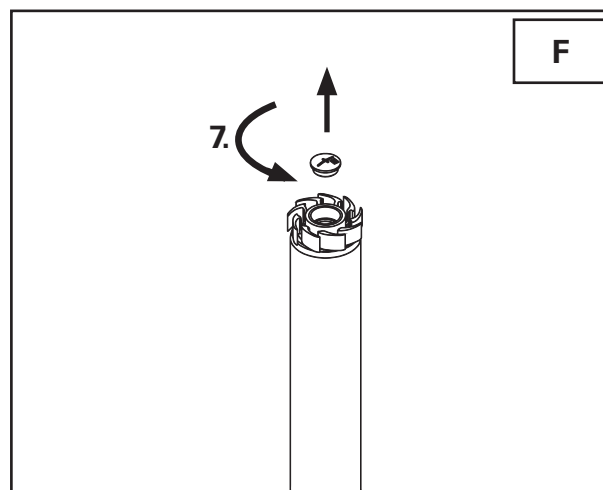


5. Remove the silencer floor comp. with the silencer.



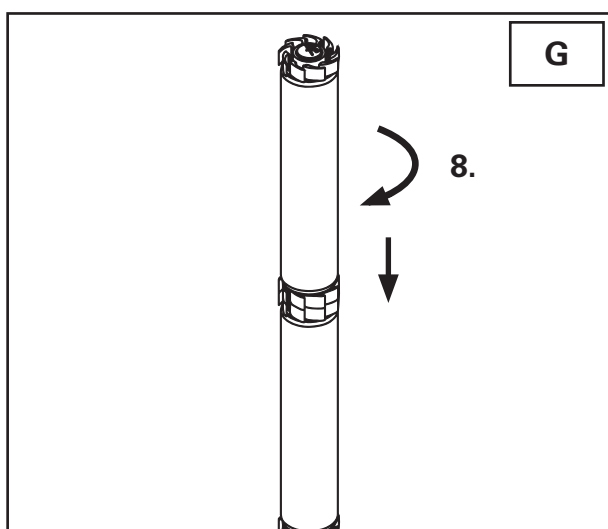
6. Release the silencer by turning counter-clockwise.

7. Remove silencer.

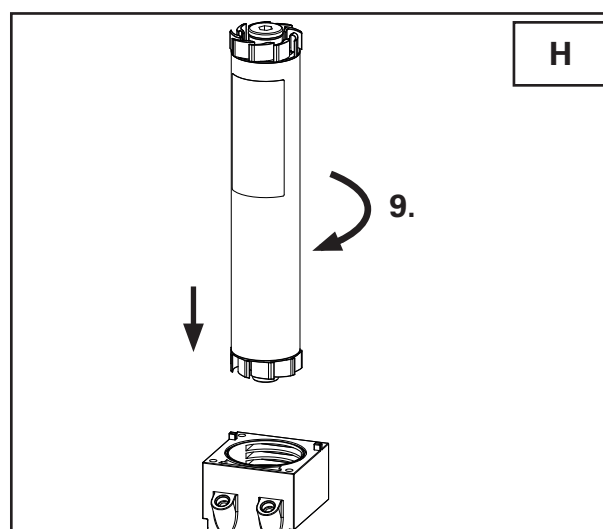


7. If several silencers are connected to one another, unscrew the cap of one of the new silencers by turning counter-clockwise. The cap is no longer required and can be disposed of.

IMPORTANT: With the top silencer the cap may **not** be removed.



8. Screw one (depending on size) of the two silencers into the first one by turning clockwise



9. Screw in the new silencer by turning clockwise.

Repeats steps A to H with the left silencer.

The installation takes place in reverse order.

16 Technical support

In case of technical queries please contact the following address:

Donaldson Filtration Deutschland GmbH

Industrial Filtration Solutions
Büssingstr. 1
D-42781 Haan

Tél. : +49 2129 569 xxxx

www.donaldson.com

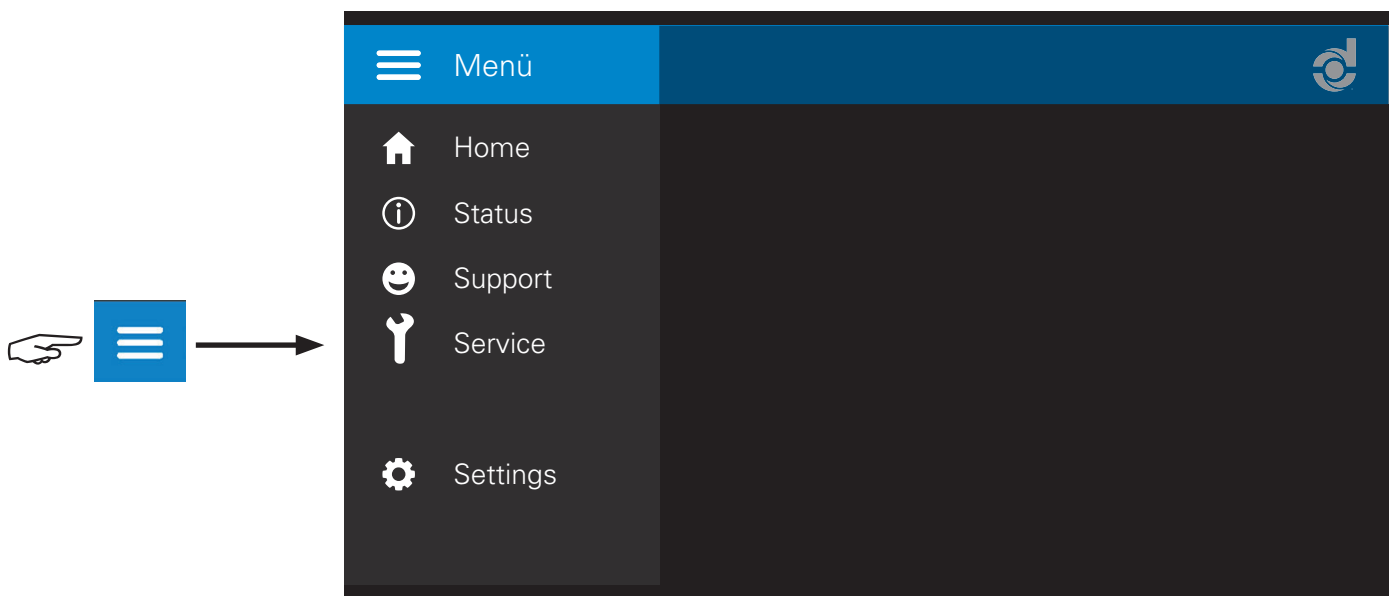
In any correspondence or telephone calls with us please give us the following data:

- **Dryer type**
- **Serial number***
- **Year of construction***

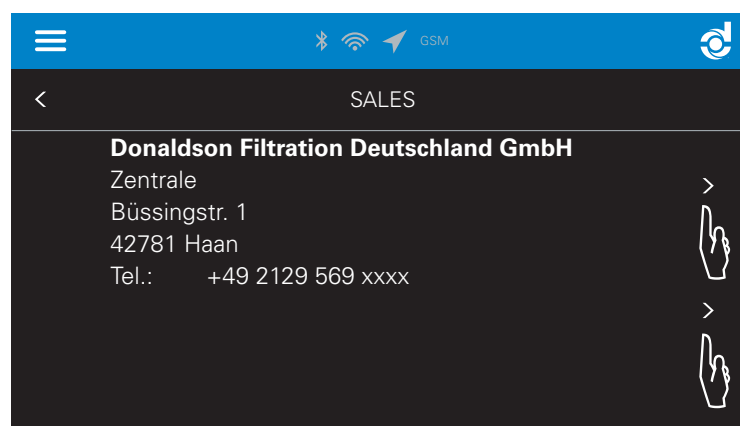
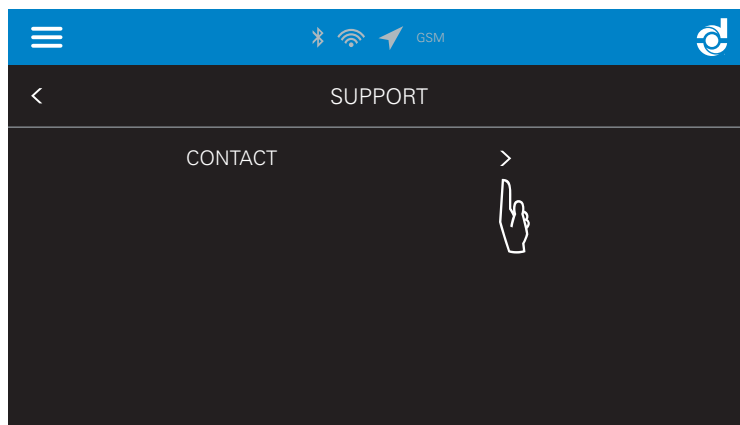
* You can find serial number and year of construction of your system on the type plate.

16.1. Additional technical support Superplus

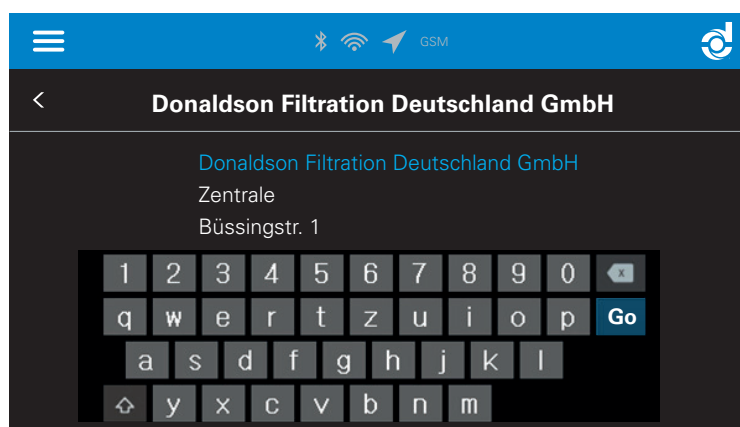
You can also call up the support addresses on the touch display of the Superplus control system.



An overview of all available menus is displayed



The contact address is displayed



By pressing on the right arrow the keyboard screen opens, to enter your own data.

17 Firmware updates



Firmware updates should only be carried out by Donaldson Customer Service. Please contact Donaldson Customer Service.

All technical changes and errors reserved!

Translation of original German instructions



Donaldson.
FILTRATION SOLUTIONS

Donaldson Filtration Deutschland GmbH

Büssingstraße 1

42781 Haan

Tel +49 (0)21 29 56 90 • Fax +49 (0)21 29 56 91 00

CAP-de@donaldson.com • www.donaldson.com