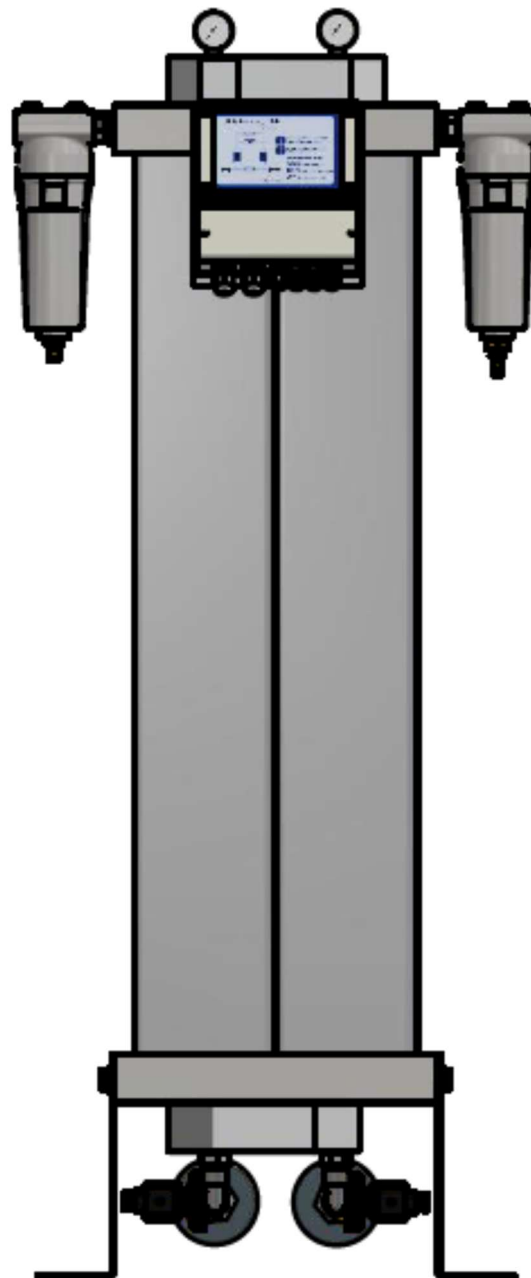


ECOTROC DDAP 6 - 65

Operating manual

Adsorption Dryer

Rev. 02_0324



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1 General information

Please complete the following information according to the type plate, vessel plate and contract documents. This enables the manufacturer to clearly identify the dryer and makes it easier to give advice if there are queries. It also simplifies the provision of spare parts and support. This may correspond to separate pieces of equipment for the individual devices.

1.1 System data

Model: _____

Order No.: _____

Vessel No.: _____

Serial No.: _____

Year of manufacture: _____

Date of commissioning: _____

1.2 Contact data

Company: _____

Address: _____

Phone: _____

E-Mail: _____

1.3 Accompanying documents

Applicable documents which are not included with this documentation:

- Installation drawing
- Documentation for additional equipment parts
- Controller documentation
- Calibration certificate (if dewpoint controller is installed)

1.4 Warranty notes

For the conditions necessary for compliance with the warranty, please refer to our "General Terms of Sale and Delivery"

The warranty shall be void if:

- The adsorption dryer is used for anything other than its intended use.
- The instructions in this operating manual are not observed.
- External influences (e.g. aggressive substances) cause damage to the adsorption dryer.
- Maintenance intervals are not adhered to.
- Damage is caused due to incorrect or defective maintenance.
- The adsorption dryer is operated although defects are evident.
- An unfavorable or incorrect installation is selected.
- The necessary process conditions are not stipulated by the system concept (e.g. highly undersaturated compressed air at the inlet).

1.5 Operating manual

This operating manual will help clarify any outstanding questions concerning the setup, installation, operation, maintenance, repair, and disposal of the dryer. It contains useful tips and advice.

It is not only written for the operator who is responsible for monitoring the daily operation of the device, but also for the service personnel who performs the installation and service. Maintenance and repair work may only be carried out by qualified personnel!










This operating manual must be read before any installation and maintenance work is started. All safety instructions must be observed!

The operating manual must be kept in the vicinity of the adsorption dryer.

As already mentioned in the warranty notes, the manufacturer accepts no liability for damages resulting from disregard of the operating manual.

1.6 Signs and symbols used

The following symbols are listed in this manual and/or are affixed to the construction:

Symbol	Meaning
	Tip This symbol indicates tips for the efficient use of the adsorption dryer!
	Note This symbol indicates instructions for the safe handling of the adsorption dryer.
	Caution / Warning This symbol indicates general hazards or dangerous situations.
	Danger! Compressed air This symbol warns of dangers due to compressed air.
	Danger! High voltage This symbol warns of dangers due to electric voltage.
	Slip hazard This symbol warns of the risk of slipping.
	Personal protective equipment – Ear protectors Wear ear protectors
	Personal protective equipment – Respiratory protection Wear respiratory protection
	Personal protective equipment – Goggles Wear goggles

2 Intended purpose / use

The adsorption dryer is designed for removing humidity from compressed air by adsorption in industrial compressed air systems. It requires the supply of saturated compressed air from a supply source.

The main task is to reduce vaporous water components in the compressed air. Upstream filters and dryers ensure that only particles and drop shapes are separated.

The desiccant which is specifically designed for this purpose is used to store the water vapor molecules from the compressed air in the open pores of the adsorbent, thereby reducing the moisture content of the compressed air.

2.1 Intended use

The adsorption dryer is exclusively designed for drying compressed air! If the adsorption dryer is to be used with other gases, this must be agreed with the manufacturer. Other safety guidelines may apply here!

The adsorption dryer must be set up at a site indoors:



- which is suitable for the weight,
- weatherproof (exposure to sun should be avoided),
- dry,
- frost-free,
- vibration-free,
- not in potentially explosive atmospheres,
- which can be accessed for maintenance and servicing,
- which at best has little dust exposure,
- which is free from dangers due to the expansion factor or airflow sounds,
- which is free from aggressive or corrosion-promoting substances.



The adsorption dryer must only be operated within the allowable operating conditions. These are defined on the type plate and vessel plate. Any other use is considered improper and the manufacturer accepts no liability.

The adsorption dryer must not be converted in any way and its components must not be modified. The use of components other than the original ones from the manufacturer is not permitted, unless this has been agreed with the manufacturer.

The values shown on the vessel plate are the maximum permissible values as per the pressure equipment directive. These values are not meant for the operating conditions. The maximum operating conditions can be found on the type plate of the adsorption dryer.

For the nominal performance data of the adsorption dryer, please refer to the Section "Performance data".

Exceeding or even significantly undercutting the design data can lead to bad pressure dewpoints!

The compressed air supplied to the adsorption dryer must be of the following quality:

- Free from aggressive and corrosive substances
- Free from particles and solids
- Moisture-saturated
- Must be within the temperature conditions for the design.



In principle, the adsorption dryer can also be operated without any pre-treatment, but this may be detrimental to the service life of the adsorbent. Droplets of oil and particles are stored in the open pores and reduce the adsorption capacity of the adsorbent.



Where temperatures are above 131 °F, previously collected moisture can be released again or can no longer be absorbed!

2.2 Performance data

The performance data of the individual types of devices is shown in the table below. The data are based on the operating conditions of the compressed air temperature + 95°F and 102 psi operating pressure, and a moisture content of the compressed air of 100 %.

Type	Nominal volumetric flow rate cfm	Connection
DDAP6	6	3/8" NPT
DDAP12	12	3/8" NPT
DDAP20	20	3/8" NPT
DDAP30	30	3/8" NPT
DDAP35	35	1/2" NPT
DDAP40	40	1/2" NPT
DDAP55	55	1/2" NPT
DDAP65	65	1/2" NPT

Refers to 14,5 psi (a) and 68 °F

Supply voltage	115 V, 50-60 Hz
Protection class	IP 54
Min. / Max. allowable pressure	DDAP 6-55: 58 psi / 232 psi DDAP 65: 58 psi / 196 psi
Sound pressure level (free-field measurement at 1.5 m)	up to 80 dB (A)
Min. / Max. temperature	+36 to 122 °F

i According to the definition in the pressure equipment directive, pressure vessels are not subject to repeated tests. If necessary, regional or national specifications can be applied in addition or as supplementary. The adsorption dryers are inspection-free, according to the definition of the pressure equipment directive.

3 Safety notes

The DDAP adsorption dryers have been built according to state-of-the-art technology and the latest safety regulations. However, there is still a risk of danger during operation, maintenance, installation and servicing, and during transport and setup. In particular, the disregard of safety regulations when handling compressed air may result in serious injury or death. Expertly trained personnel and those trained in safety should therefore only use the system.



- Observe the safety notes in this manual and on the adsorption dryer.
- Observe all safety notes, even those in the individual chapters.
- Observe all legal guidelines and safety regulations (the latter may vary from region to region!)
- Observe all local site regulations which are stipulated for the field of application.

3.1 Signs and symbols

The following sign can be found on the adsorption dryer:

Type plate (on the right side of the vessel)

It shows details of the type, year of manufacture, serial number of the device, performance data, weight and filters installed.

Only once on the adsorption dryer:

Type plate:

ECOTROC Adsorptionstrockner Adsorption Dryer <small>KS1 (Energieeffizient) Gewäss Wilsch</small> <small>www.kst.eu</small>			
Typ / Type	max. Druck / max. Pressure		
S-Nr. / S-No.	Spannung / Voltage		
Leistung / Capacity	Vorfilter / Prefilter		
Baujahr / Built	Nachfilter / Final filter		
Gewicht / Weight (kg)			
		Made in Germany <small>Gefahr durch Druckluft Danger! Compressed air</small>	
<small>Lesen Sie die Betriebsanleitung und Service des Handbuchs lesen. Read the manual before operation and service.</small>			

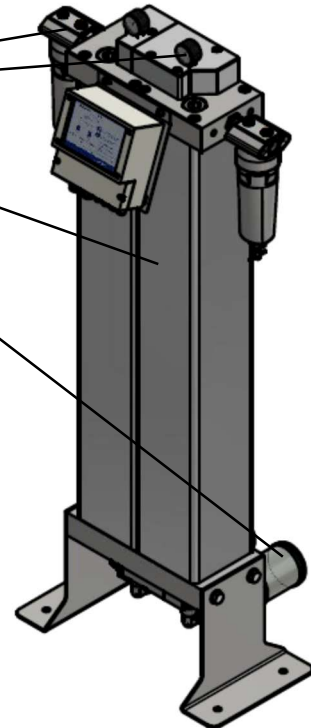
The type plate on the device shows important information. Please make sure that they are always legible and that they can be accessed.

3.2 *Danger zones*

Risk due to pressure-bearing parts



Risk of slipping due to spilt desiccant on the floor



- Never operate the adsorption dryer outside of the load limits shown on the vessel plate.
- Never carry out work if the adsorption dryer is under pressure.
- Do not modify the structure of the adsorption dryer or change its function.
- Only use the adsorption dryer for its intended purpose.
- Do not climb onto the adsorption dryer.
- Do not carry out welding work on pressure-bearing parts.
- Wear respiratory protection and eye protection when changing the desiccant.
- Risk of slipping due to spilt desiccant.
- Always check that the silencers are secure and wear eye protection.
- Never operate the adsorption dryer if there is apparent damage.
- Avoid sparks and open flame in the vicinity of the desiccant.
- Never hold on to pieces of the equipment to lift the adsorption dryer, but always exclusively use its base sections, profiles and plates.
- Only carry out work on the adsorption dryer if it has been disconnected from the power supply.

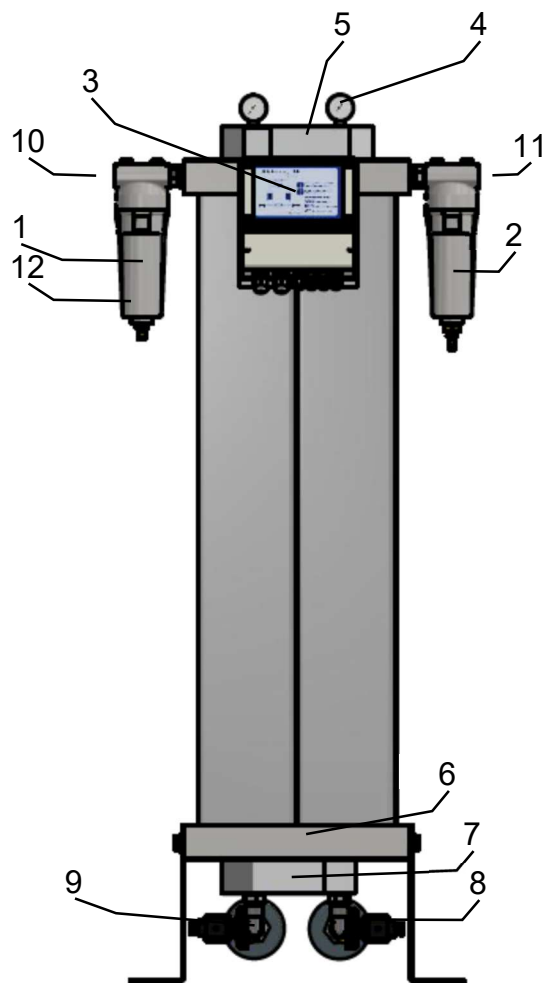
Desiccants

The desiccants used do not fall into the hazardous substances group and are therefore not subject to labelling requirements. Nevertheless, please observe all common safety measures about using chemicals. Please also wear your personal protective equipment (goggles and respiratory protection). Please also note that the material accumulates contaminants, including oil vapor parts. This can cause additional dangers. If you require further information, contact the manufacturer to receive a copy of the safety datasheet of the desiccant.

4 Technical product data

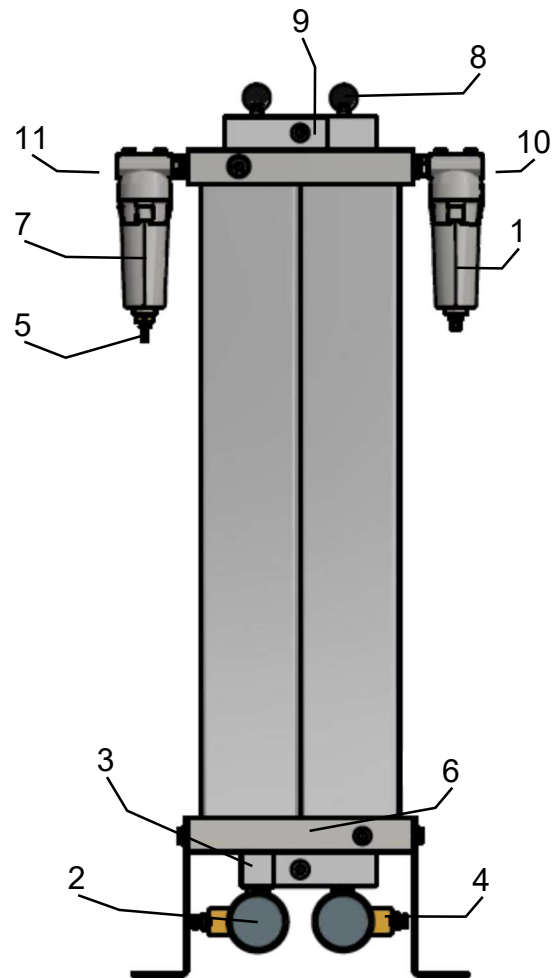
4.1 Equipment overview, front view

- 1 Pre filter
- 2 Final filter
- 3 Control unit
- 4 Manometer
- 5 Piston block top
- 6 Bottom plate
- 7 Piston block bottom
- 8 Solenoid valve expansion
- 9 Silencer
- 10 Inlet
- 11 Outlet
- 12 Condensate drain pre filter



4.2 Equipment overview, rear view

- 1 Pre filter
- 2 Silencer
- 3 Piston block bottom
- 4 Solenoid valve
- 5 Manual drain final filter
- 6 Condensate drain
- 7 Final filter
- 8 Manometer
- 9 Piston block top
- 10 Inlet
- 11 Outlet



4.3 Function description



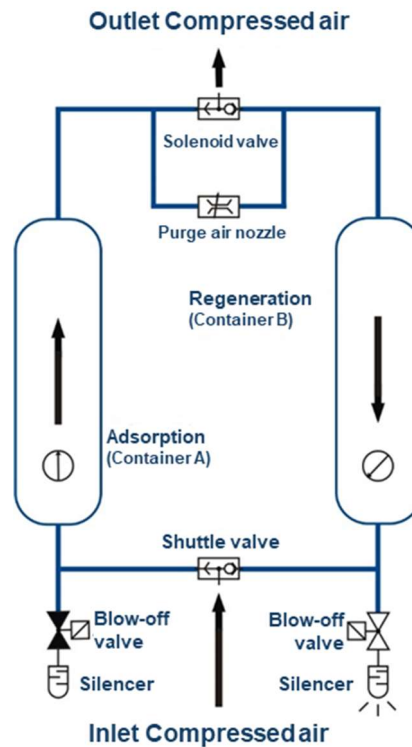
From the filled adsorbent material, (desiccant in this case), moisture is stored in the large, open pores of the adsorbent material, thus reducing the moisture content in the compressed air.

Through the joining pipe and possible pre-treatment, the compressed air is fed via the inlet into the diffuser (flow distributor and sieve). The compressed air is hereby distributed over the whole vessel cross-section for optimum efficiency. Based on the laws of physics and a calculated and required contact time, the abovementioned moisture content is stored in the open pores of the desiccant. The cleaned compressed air then exits the vessel again through a sieve on the outlet.

As the temperatures rise, the performance of the desiccant is reduced since the so-called adsorption heat builds up in the desiccant as the amount of moisture increases and as temperatures exceed 131 °F, the stored moisture is then released again from the agent, i.e. no more moisture is stored.

The moisture stored in the desiccant gradually saturates the material. During the defined adsorption phase, the desiccant bed is optimally used. After a predetermined time, the desiccant is then desiccated again following the counter-flow principle using the dried compressed air, which is removed from the dry output flow through a nozzle. This process constantly switches between the two vessels. With the appropriate compressed air quality at the inlet, it is possible for the service life of the desiccant to exceed well over 10,000 hours.

Operating principle:



5 Monitoring the operation

The following components are provided for regular monitoring:

The pressure gauges display the operating pressure. They provide information about the regular switch-over of the adsorption dryer.



The Ecomatic control display (shown on the right here), uses LEDs to inform you of the status or phase which the adsorption dryer is currently in.



If a dewpoint controller (shown on the right here) is used, then the operating status is also shown. Arrow keys can be used to display much information about the current status.



When daily checks are carried out, be mindful of any noises which are caused by the regeneration process. The pressure gauges should also be taken into consideration here. The expansion and noises of the purging air should always be regular. Brief interruptions in the flow noises for example indicate a defective solenoid valve or control fault.

6 Transport, storage and setup

6.1 Transport



Although great care is taken, please check immediately whether the adsorption dryer has been damaged in any way. Any kind of transportation damage must be pointed out immediately to the deliverer and manufacturer.

- Suitable hoisting equipment must be provided for the transportation, loading and unloading process.
- The device must only be lifted at the designated points: crane hook or transport pallet.
- Take the weight of the adsorption dryer into account and provide suitable assistive equipment.
- Do not remove the packaging material until the device is moved to its place of installation.
- Only appropriately qualified personnel may carry out the abovementioned tasks.
- Observe all regulations on accident prevention.

6.2 Storage



If the adsorption dryer needs to be stored before being commissioned, ensure that the storage site fulfils the following requirements:

- Indoors only
- Dry
- Frost-free
- Protected against weather impact.



If the device is stored after having been commissioned, please proceed as follows:

- Depressurize the adsorption dryer.
- Disconnect the adsorption dryer from the compressed air system.
- Close the compressed air inlet and outlet.

6.3 Setup



Please refer to the setup conditions described in Section 2.1. The basic data required for the setup can be found in the Performance data in Section 2.2.

When setting up, make sure

- that the ground is level and capable of bearing the weight.
- Make sure there is enough space around the adsorption dryer to carry out the servicing and maintenance work. We recommend at least 0.8 m.
- Make sure that the adsorption dryer can be reached and accessed by the lifting gear.
- The adsorption dryer must not be accessible to non-experts, or warning signs should be affixed for inexperienced persons.
- The adsorption dryer cannot be rammed by haulage vehicles.
- The signage is clearly visible at all times.

There are mounting holes in the base section of the adsorption dryer. These should be used to anchor the device into the ground, as long as the ground allows it.

7 Installation

7.1 Recommendations for installation



Proper installation is the basic prerequisite for the safe and problem-free operation of the DDAP series.

We recommend the installation of shut-off devices both upstream and downstream of the adsorption dryer. The adsorption dryer can thereby be disconnected from the compressed air system during maintenance. If operation cannot be interrupted during maintenance, a by-pass line must be provided. It should at least include a filter combination MFO and SMA to prevent a contamination of moisture in liquid form downstream of the adsorption dryer.



We recommend installation after a corresponding pre-treatment. Filters and separators should already be installed prior to this to prevent rapid saturation of the prefilter, which is part of the delivery. The adsorption dryer is usually installed behind an air cauldron.

A filter with a separation degree of 0.01μ must be installed immediately in front of the adsorption dryer (included in the delivery) to collect any possible additional liquid drops and solids, which would otherwise close up the open pores of the adsorbent material for the drying process.

Installing the device behind an air cauldron also has the advantage in that pulsating compressed air is buffered and the temperature at the inlet of the adsorption dryer is lower, because it cools down in the air cauldron.

Choose a place of installation with the lowest possible compressed air temperature and with the highest level of saturated compressed air. This then increases the service life of the desiccant and the adsorption dryer works most efficiently.

When installing an air cauldron, make sure that:

- There is no reverse flow (e.g. install a non-return valve)
- The compressed air inlet temperature does not exceed the maximum permissible value
- Pressure shocks or pulsating compressed air are buffered by the corresponding filters
- The condensate separation of the prefiltration works properly

7.2 Demands on the installation

Prior to installation, check the following points:



- The compressed air system and the adsorption dryer must be free from pressure.
- For compressed air systems which need to remain under pressure, shut-off devices have to be protected against unintentional opening.
- The operating pressure in the system cannot be higher than the maximum permissible operating overpressure of the adsorption dryer.
- There must be no pressure surges in the system in the desiccant (e.g. from valves which open abruptly).
- The pipelines are designed for the operating pressure, nominal width and volume.
- No possible vibration transmission or vibration.
- No residue left in the pipeline from mechanical processing.

7.3 Elimination of hazards

Please refer to the installation related hazards:



- Do not work on parts which are under pressure.
- The pipelines must be held in place with brackets; the adsorption dryer is not designed to act as a support for the pipes.
- The adsorption dryer must only be used in the predetermined operating conditions (see vessel plate), it is the operator's duty to observe these values.

8 Commissioning



All work on DDAP adsorption dryers and on the feeder and drainage systems must only be carried out by expertly trained persons and by those with experience in the field of compressed air!

Additional note on commissioning:

We recommend operating the dryer for 2 cycles without the silencers during the initial start-up, as a small amount of desiccant dust can develop during transport. This could cause the mufflers to clog faster. However, hearing protection and safety goggles should be worn for personal protection

8.1 Commissioning prerequisites

The following points must be checked immediately prior to commissioning:



- The maximum operating values must not be exceeded.
- Upstream and downstream shut-off devices are closed.
- All connections and screw connections are secure. Check this and tighten if necessary using a suitable tool.
- Visually check again for any signs of damage. Do not use the adsorption dryer if it is damaged in any way.

8.2 Pressurisation



Only if you have successfully completed all the checks mentioned in previous section “Commissioning prerequisites” perform the following steps in the order given.



Wear ear protection for this, as the flow noise can get very loud.

- Make sure that the compressed air system is under pressure upstream of the adsorber.
- Slowly open the cut-off valve upstream of the adsorption dryer until you hear the flow noise.
- Keep an eye on the pressure gauge on the vessel. Pressurisation must rise slowly.
- At 58 psi, close the shut-off device again at the inlet. Check all connections for leaks. If leaks are found, the adsorption dryer must be rendered pressureless again and the leaks must be repaired.
- If no further flow noises can be heard and if the pressure gauge does not indicate any further increase in pressure, you can open the cut-off valve completely.
- Only then switch on the adsorption dryer controller.

8.3 System operation

Pressurisation has been successful. Check whether the compressed air system downstream of the adsorption dryer can be opened safely. Then proceed as follows:



- Slowly open the cut-off valves at the outlet of the adsorption dryer until you hear the flow noise.
- Keep an eye on the pressure gauge. Should the pressure suddenly drop, check whether any tapping points are still open.
- If the pressure remains stable and you no longer hear any flow noise, the cut-off valve downstream of the adsorption dryer can be opened completely.
- Start the controller. Once switched on, it can take 1 minute until the first valve is opened.
- Keep an eye on the pressure gauges. The operating pressure must be virtually "0" on the expanding side. The expansion noise is loud, only quiet flow noises should be perceived after this.
- Once regeneration has been completed, pressurisation starts. During this time, the previously opened valve must be closed and pressurisation must start again.
- Once the pressurisation time has passed, the pressure on both vessels must be virtually the same.
- Now also take into account the expansion (regeneration) on the other side. If this also works as described above, the adsorption dryer is ready for operation.

8.4 Disconnecting from the system



Should you have to disconnect the adsorption dryer from the system, e.g. for a maintenance operation, make sure that this work is only carried out when the device is free from pressure.



Wear your personal protective equipment. Proceed as follows:

- Close the cut-off valves at the inlet and outlet of the adsorption dryer.
- Open the manual drain on the after-filter housing.
- Keep an eye on the pressure gauge and wait until it displays "0" psi before starting work.
- Then close the manual cock again.

**Manual
drain
cock**



Instead of using the manual drain cock, you can also depressurise the adsorber dryers by allowing the controller to continue to run upstream and downstream of the dryer if the shut-off devices are closed, until both sides are depressurised.

The adsorption dryer is now disconnected from the mains.

9 Maintenance



Maintenance work may only be carried out by suitably qualified personnel! Make sure that the device is free from pressure before starting work and observe the applicable accident prevention regulations for the place of installation!

9.1 Regular maintenance work

The following table gives an overview of the intervals and scope of the maintenance work:

Maintenance of	Activity	Daily	Every month	12 months	24 months	48 months
Pressure gauge and control device	Visual check, functional check	X				
Control box	Check that the cables and terminals are securely fixed			X		
Silencer	Clean			X		
	Replace				X	
Pre and final filter element	Replace the filter element			X		
Desiccant	Replace					X
O-rings of filter housings	Replace				X	
Pistons	Replace				X	
Solenoid valves	Replace				X	
Pressure dew point sensor (if installed)	Recalibrate				X	

9.2 Daily checks

The following points should be checked every day:

- The difference in the operating pressure upstream and downstream of the adsorption dryer is not more than 7.3 psi.
- Open the manual drain slightly on the after-filter. It must not drip.
- Check if you can hear any unusual or loud noises.
- Check for leaks.
- If prefilters are installed, check that the condensate drains work properly.

9.3 Checking the pressure dew point

If a pressure dewpoint controller is installed, the pressure dewpoint is displayed. You can then set the pressure dewpoint according to your requirements.

With the standard package, the ECOMATIC (time control only) is already installed. Since this controller can't measure the pressure dewpoint, you should measure it externally from time to time.

Determine a measuring point behind the dryer and connect an external measuring device. Make sure that this measurement is used in accordance with the manufacturer specifications and that it is suitable for the pressure dewpoint range of the adsorption dryer which is to be measured. Record these values in order to be able to track the course of the pressure dewpoint.

9.4 Overview of maintenance parts

9.4.1 Annual maintenance

Type	Component	Description	Interval	Activity
DDAP6	APE-DDAP6-30	Filter element	12 months	Replace
DDAP12	APE-DDAP6-30	Filter element	12 months	Replace
DDAP20	APE-DDAP6-30	Filter element	12 months	Replace
DDAP30	APE-DDAP6-30	Filter element	12 months	Replace
DDAP35	APE-DDAP35-55	Filter element	12 months	Replace
DDAP40	APE-DDAP35-55	Filter element	12 months	Replace
DDAP55	APE-DDAP35-55	Filter element	12 months	Replace
DDAP65	APE-DDAP65	Filter element	12 months	Replace

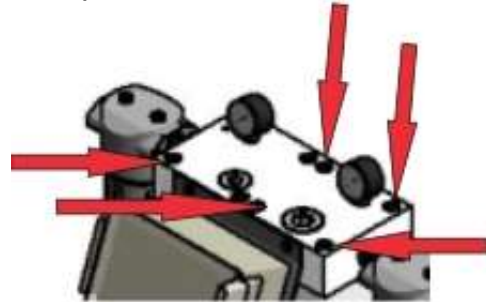
9.4.2 Two- and four-year maintenance

Type	Component	Description	Interval	Activity
DDAP6	FT-DDAP6-12	Functional components set	24 months	Replace
	F-DDAP6	Desiccant filling	48 months / when required	Replace
DDAP12	FT-DDAP6-12	Functional components set	24 months	Replace
	F-DDAP12	Desiccant filling	48 months / when required	Replace
DDAP20	FT-DDAP20-35	Functional components set	24 months	Replace
	F-DDAP20	Desiccant filling	48 months / when required	Replace
DDAP30	FT-DDAP20-35	Functional components set	24 months	Replace
	F-DDAP30	Desiccant filling	48 months / when required	Replace
DDAP35	FT-DDAP20-35	Functional components set	24 months	Replace
	F-DDAP35	Desiccant filling	48 months / when required	Replace
DDAP40	FT-DDAP40-65	Functional components set	24 months	Replace
	F-DDAP40	Desiccant filling	48 months / when required	Replace
DDAP55	FT-DDAP40-65	Functional components set	24 months	Replace
	F-DDAP55	Desiccant filling	48 months / when required	Replace
DDAP65	FT-DDAP40-65	Functional components set	24 months	Replace
	F-DDAP65	Desiccant filling	48 months / when required	Replace

9.4.3 Two-year maintenance / Tighten the screws

Due to the fact that DDAP dryers use the pressure swing process at least every 2 years the screws should be controlled. Please tighten the screws exclusively with a torque wrench. Check all screws on the top and bottom plate!

DDAP 6-12	22.5 NM
DDAP 20-35	44.0 NM
DDAP 40-65	74.0 NM



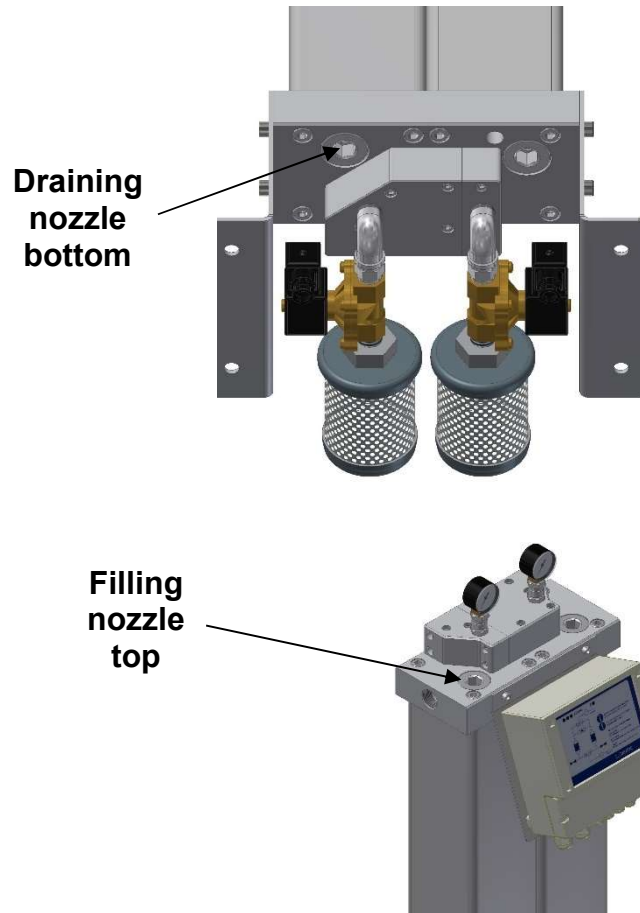
9.5 Replacing the filter elements

The prefilter of the adsorption dryer retains particles and liquid forms of oil and water, thereby protecting the desiccant against contamination.

The job of the after-filter is to stop any abrasion dust that has built up from the desiccant. Proceed as follows to replace these filter elements:

- Close the cut-off valves upstream and downstream of the adsorption dryer.
- Open the manual drain cock on the filter and wait until the pressure gauge on the adsorption dryer shows "0" psi.
- Turn the bottom part of the filter in a clockwise direction to open it. Unscrew it completely and carefully put it down.
- Now you can remove the filter element out of the filter.
- Use a damp cloth to clean inside the filter housing.
- Check whether the O-ring in the filter head is OK. Replace if necessary.
- Please fit the new filter element into the three pockets, on the inside of the filter bowl.
- Screw the bottom part of the filter back in again and close the manual drain cock.
- Slowly open the shut-off device at the outlet and check for leaks.
- Once the pressure is back to normal again, slowly open the shut-off device at the outlet.

9.6 Replacing the desiccant



When replacing the desiccant, make sure to wear your personal protective equipment, namely the respiratory protection and goggles.



Risk of slipping if material is spilt!



The service life of the desiccant is heavily dependent on the quality of the compressed air at the inlet of the adsorption dryer. Strain from oil vapour significantly reduces the service life. In favourable conditions, the service life can exceed well over 10,000 hours. Proceed as follows to replace the desiccant:



- Depressurise the adsorption dryer.
- First, open the sealing plug on the top.
- Place a collecting vessel underneath the bottom sealing plug and remove it.
- Collect the desiccant as it runs out.
- Empty the vessel completely. (you can also empty the vessel using a vacuum cleaner).
- Blow through the sieves inside the vessel.
- Close up the bottom sealing plug again and pour the new adsorption material through the top opening. Depending on its use, the desiccant can consist of several layers. Make sure that you add the

materials in the correct order. WS and alumina materials generally form the water protective layer and must be added first.

- Once you've reached the filler plug, condense the material through slight vibration of the sheath of the adsorption dryer and then top up again until the desiccant no longer condenses, even with vibration.
- Screw the top sealing plug back in again.



We recommend that you only change the filter element after the desiccant has been changed. Likewise, only change, or at least clean the solenoid valves after the trial run. To do so, allow the adsorption dryer to run for half an hour. The dust particles that accumulate are hereby captured in the after-filter element which is to be replaced. Only then replace the filter element.

As a rule, the adsorption dryer needs several cycles before it reaches the desired pressure dewpoint. Take into account that the piping system behind the adsorption dryer may become contaminated with moisture during this phase. You may need to provide a blow-off line during the installation operation.



Contaminated desiccant must be disposed of in accordance with the local regulations! As a rule, the disposal code is:

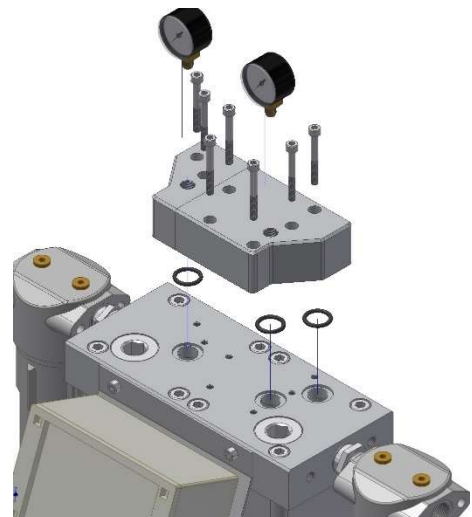
"Used, non-contaminated desiccant" with the disposal code number: 06 08 99

If other toxic or hazardous substances have been stored, this must be determined by the operator and the desiccant must be disposed of taking the type of contamination into consideration!

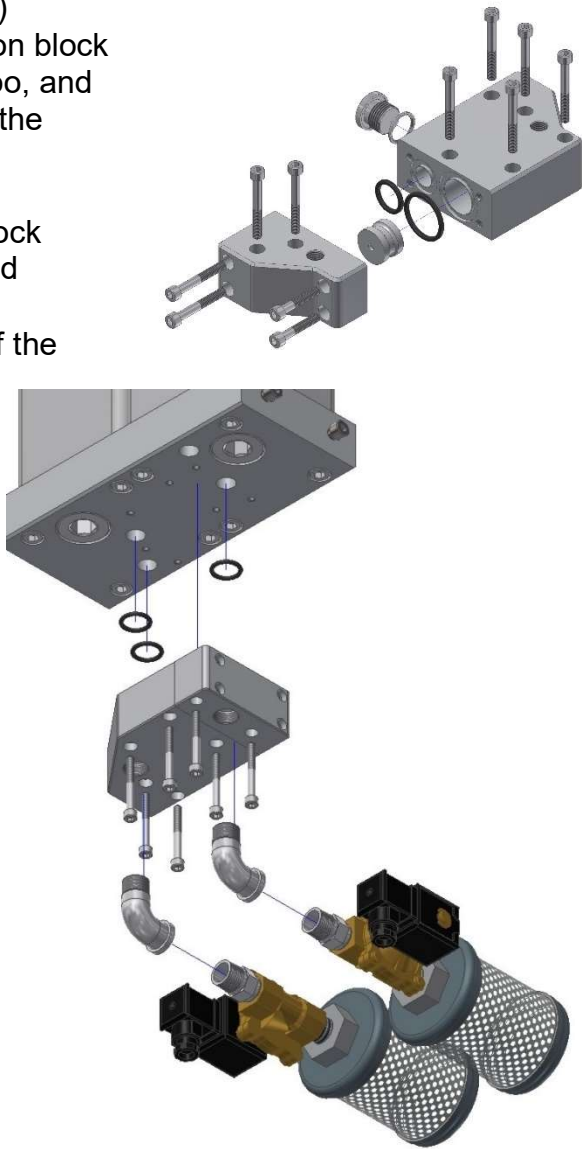
9.7 *Piston replacement*

The shuttle valve pistons in DDAP dryers are integrated in the top and bottom plate. The pistons suffer from mechanical stress so they need to be replaced every 2 years. To exchange them, mind the following procedure:

- Depressurise the adsorption dryer.
- Make sure that the pressure gauges show "0" and that the adsorption dryer is fully depressurised.
- Switch off the control device.
- Loosen the top screws first.
- Make sure that nothing can get into the opening.



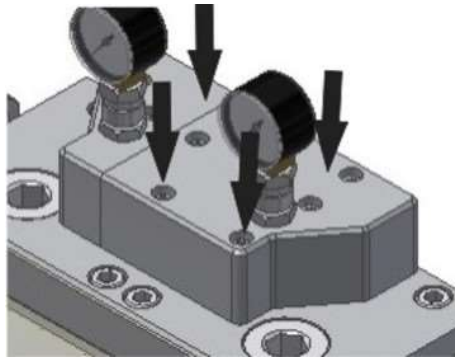
- Remove the screws on the side and exchange the piston. (ATTENTION! The piston with a nozzle needs to be on top)
- The socket on the back side of the piston block can stay closed. Replace the o-rings, too, and remount the block onto the plate. Lube the screws.
- Remove the solenoids from the valves. Afterwards you can disassemble the block completely or demount the silencers and solenoid valves first.
- Then, remove the screws on the side of the block, too. Exchange the piston and the O-rings. Reassemble the block and fix it below the plate.
- Remount the solenoid valves and the silencers and attach the solenoids to the valves.
- Slowly open the shut-down valves in front of the dryer and check for
- leakages by rising the pressure up to 58 psi. Only open the valves
- completely if there are no more leakages.



ATTENTION!



At assemble the block again please take care that the tightening torque of the screws is not higher than DDAP 6-12 max. 7 Nm; DDAP 20-35 max. 12 Nm; DDAP 40-65 max. 23 Nm

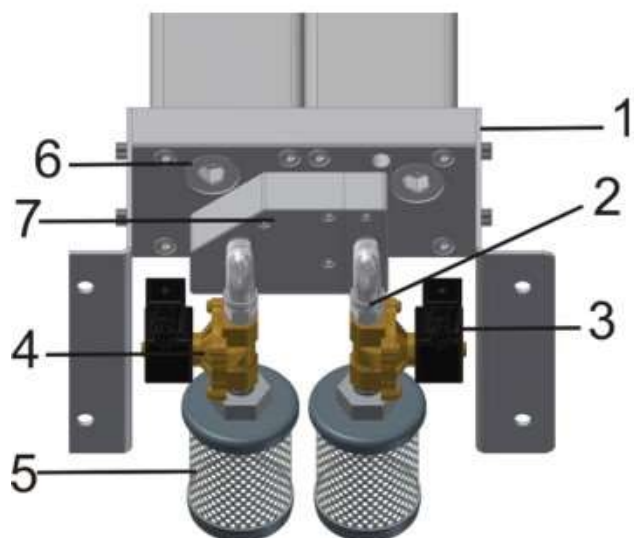


9.8 Replacing the solenoid valves

The solenoid valves are supplied fully assembled and should also be replaced as such. These valves are also subject to a mechanical load and must be replaced after two years. Proceed as follows to replace them:

- Depressurize the adsorption dryer.
- Make sure that the pressure gauges show "0" and that the adsorption dryer is fully depressurized.
- Switch off the controller by disconnecting the mains power plug.
- Loosen the solenoid valve plug.
- Loosen the removable screw connections.
- Remove the exhaust bridge.
- Dismantle and replace the solenoid valves.
- Fit the exhaust bridge back in place. Tighten all screw connections again.

- 1 bottom plate
- 2 removable connection
- 3 solenoid valve plug
- 4 solenoid valve
- 5 silencer
- 6 desiccant nozzle bottom
- 7 piston block bottom



9.9 Replacing the silencers

The silencers lessen the noise generation of the regeneration process. In these silencers, proportionate desiccant abrasion in the form of dust is retained. Combined with the outgoing moist air, the silencers become clogged with dust over time and must be replaced. Proceed as follows to replace them:

- This work must only be carried out after the device has been depressurised.
- To do so, close the inlet and outlet shut-off devices.
- Switch off the controller by disconnecting the mains power plug.
- Unscrew the silencers from the threads in anticlockwise direction.
- Wrap a few layers of Teflon around the thread of the new silencer to make it easier to dismantle it later on. Then screw the new silencer back in again in a clockwise direction until hand-tight.
- If the desiccant also has to be replaced, replace this first, then the silencers, then perform a trial run.

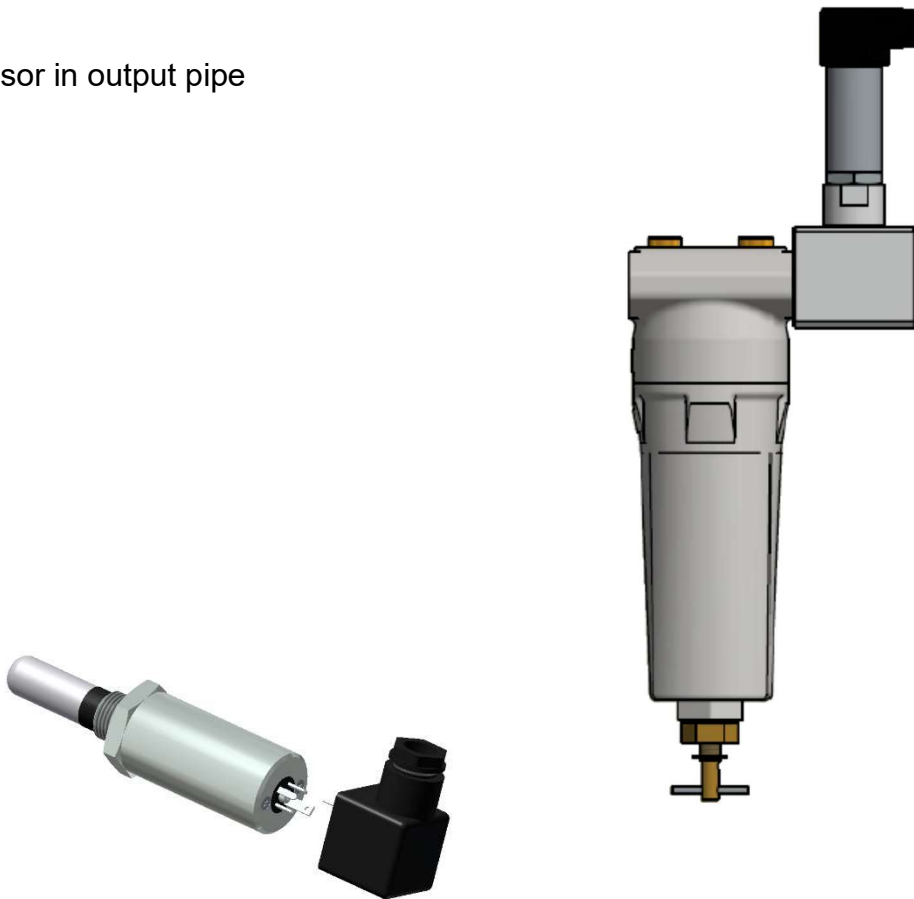


9.10 Replacing the pressure dewpoint sensor

If you've chosen the "ECOTROconomy" option, you must replace the sensor element every two years. Desiccant abrasion and oil vapours can cause the accuracy of the sensors to drift. This sensor element must therefore be replaced as follows:

- This work must only be carried out after the device has been depressurised.
- To do so, close the inlet and outlet shut-off devices.
- Switch off the controller by disconnecting the mains power plug.
- Loosen the cubic plug of the sensor element.
- Unscrew the sensor element in the counter-clockwise direction.
- Fit the new sensor element by screwing it in the clockwise direction.
- Screw the cubic plug back onto the sensor.
- Slowly open the inlet shut-off device until both vessels are pressurised again.
- Check for leaks on the screw connection. If there is a leak, seal it.
- Then start up the controller and open the shut-off device on the outlet.

Sensor in output pipe



Sensor element with cubic plug

10 Faults

The following faults may occur:

Error	Possible cause	Corrective action
Device does not switch on	No power supply	Check supply voltage
	Microfuse defective	Replace fuse
Dryer does not regenerate	Controller does not work	Call Maintenance
	No power supply	Check supply voltage
	Compressor synchronisation circuit is active	Set DIL switch No. 8 to "1" (for ECOMATIC)
	Solenoid valve does not open	Check cable connection / terminals
Replace magnetic coil if necessary		
Dryer does not reach the pressure dewpoint	Desiccant not sufficiently regenerated yet	Allow it to keep running (after 48 hours at the latest, the pressure dewpoint should be reached)
	Water breakdown / oil breakthrough	Call Maintenance, replace desiccant if necessary
	Defect condensate drain	Check prefilter for build-up of condensate
	Inlet conditions incorrect (pressure, temperature)	Call Maintenance
	Compressed air extremely undersaturated	Apply moisture
	Check input parameters, possible by-pass build-up in the desiccant due to flow rate being too low	Call Maintenance
	Silencer blocked	Replacement
No pressure according to pressure gauge on dryer	Inlet to dryer closed	Open the supply line
Differential pressure indicator is in red zone	Filter element is clogged	Call Maintenance
Dryer keeps returning to alarm status	Reverse flow through by-pass, reverse flow via oil vapour adsorber	Change by-pass, install non-return valve, call Maintenance
Compressors start up too frequently	Leaks	Call Maintenance
No pressurisation	Piston in undefined position	Switch off controller, allow pressurisation to take place, then switch controller back on again

11 Manufacturer's declaration

Manufacturer's declaration

We, the manufacturer,

KSI Filtertechnik GmbH
Siemensring 54-56
D-47877 Willich

hereby declare that for the assemblies listed below:

Adsorption dryer ECOTROC DDAP Type 6 to 12

the harmonised standards:

DIN EN ISO 12100-1-2; DIN EN ISO 14121-1; DIN EN 55011; DIN EN 61000-6-2,
61000-3-2, 61000-3-3 have been adhered to.

The pressure vessels which are part of these assemblies have been manufactured in construction and design conforming to the European Guideline 2014/68/EU Appendix I for pressure equipment as per the technical rules and also according to guide line 2014/29/EU for simple pressure vessel and construction based on the AD2000 instruction sheets.

These devices may not be labeled with the CE-marking as they fall under article 4 (3) of the guideline.

Dryer size	Amount of chambers	Max. operating pressure (psi)	Volume per chamber	Category (PED)	Module
DDAP6	2	232	1.85 L	Art. 4 (3)	Art. 4 (3)
DDAP12	2	232	2.31 L	Art. 4 (3)	Art. 4 (3)

Willich, 01.06.2019

Signed:



Holger Krebs,

Managing Director

12 EU Declaration of conformity

EU Declaration of conformity

We, the manufacturer,

KSI Filtertechnik GmbH
Siemensring 54-56
D-47877 Willich

hereby declare that for the assemblies listed below:

Adsorption dryer ECOTROC DDAP Type 20 to 65

the harmonised standards:

DIN EN ISO 12100-1-2; DIN EN ISO 14121-1; DIN EN 55011; DIN EN 61000-6-2,
61000-3-2, 61000-3-3 have been adhered to.

The conformity assessment procedure was completed in accordance with Module A.

The pressure vessels which are part of these assemblies have been manufactured in construction and design conforming to the European Guideline 2014/68/EU Appendix

I

for pressure equipment as per the technical rules of the AD2000 instruction sheets.

Any modifications made to the equipment which has not been approved by the manufacturer will annul this declaration.

Dryer size	Amount of chambers	Max. operating pressure (psi)	Volume per chamber	Category (PED)	Module
DDAP20	2	232	5.21 L	I	A
DDAP30	2	232	6.2 L	I	A
DDAP35	2	232	7.2 L	I	A
DDAP40	2	232	9.55 L	I	A
DDAP55	2	232	11.74 L	I	A
DDAP65	2	196	14.56 L	I	A

Willich, 01.06.2019

Signed:



Holger Krebs,
Managing Director