

Product Data Sheet

Adsorption Dryer DPS 10-100 (A)

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Field of application

Adsorption dryers of the DPS series are designed for drying compressed air and nitrogen to pressure dew points of -25°C to -70°C (depending on the design) at operating pressures of 4 bar to 16 bar. On request design pressures up to 63 bar are possible.

Function

For drying the compressed air, i.e. "adsorption", the compressed air flow is led through a vessel filled with desiccant. The desiccant extracts moisture from the compressed air and stores it in its structure until the desiccant is saturated with moisture. The saturated desiccant then has to be regenerated, i.e. the moisture stored in the structure has to be "removed" before the desiccant can be used for drying again.

Continuous operation of an adsorption dryer therefore requires two vessels that are operated alternately. One vessel is used for drying the compressed air (adsorption) and the other vessel for regenerating the desiccant. For the DPS series the change interval between adsorption and regeneration is 5 minutes at nominal conditions.

For the DPS series a certain quantity of dried compressed air is drawn off at the dryer outlet (*approx. 15% of the nominal volume flow rate at nominal conditions*). This amount of compressed air is expanded to atmospheric pressure and is led through the vessel to regenerate the desiccant. The dried, decompressed air is extremely moisture-subsaturated and thus extracts the moisture stored in the desiccant and discharges it to the atmosphere via a silencer (heatless regeneration).



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Features

The desiccant has a high drying capacity for moisture and a long service life of several years. This ensures permanently low and stable pressure dew points.

The valves and flow paths required for vessel chamber switch-over are completely installed in valve blocks. This integrated design eliminates the need for time-consuming piping installation and minimises the leak potential. Air flow cross-section sizes above average minimise the pressure loss.

The solenoid valve combination consists of 4 pilot-controlled diaphragm valves. Thanks to the individual control option for each valve, overlapping switch-over and a defined flow path is ensured at any time. The non-return valve combination consisting of 2 non-return valves is also installed in a leak-free aluminium valve block. A silencer is used for effective reduction of the expansion noise.

The valves of the DPS series are controlled by means of a type "C1" processor control system with a 2-line clear text display and 3 operating keys. The control system is installed in a plastic housing with IP65 protection. The clear text display is used for direct and easy-to-understand indication of the operating state, errors, runtimes, service messages etc. If a pressure dew point sensor (option H) is connected, the current pressure dew point of the compressed air is also directly shown on the display and provided as a 4-20 mA signal. The pressure dew point measurement (option H) allows for dew-point dependent operation of the dryer. Depending on the load of the dryer, the adsorption cycle may be extended, i.e. the switch-over frequency is adapted to the operating situation. This minimises the regeneration air consumption and thus the energy costs are minimised. In addition, the control system provides a compressor synchronising contact. It is used for synchronous operation of the dryer and a compressor which additionally reduces the regeneration air consumption. This function can also be used in conjunction with dew point-dependent operation. If a differential pressure monitoring system with alarm contact is fitted to the prefilter and afterfilter (option), the alarm contacts can be connected to the control system, displayed and processed.



As standard, the dryer is provided with a prefilter (fine filter) which prevents solid and liquid contaminants from entering the dryer. This increases the service life of the dryer. An afterfilter (general purpose filter) is also provided as standard. It is used to prevent desiccant dust from entering the downstream system. The filters are directly flanged to the upper valve block. Therefore, piping material is not required.

The dryers comply with the requirements of the Pressure Equipment Directive 97/23/EC, and have the CE marking of this European directive.

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Basic data

Model	Nominal volume flow ^{*1}	Min./Max. allowable operating pressure	Min./Max. allowable operating temperature
DPS 10 (A)	110 m ³ /h	4 - 16 bar (higher design pressures up to 63 bar on request)	+2°C - +60°C
DPS 15 (A)	150 m ³ /h		
DPS 20 (A)	200 m ³ /h		
DPS 25 (A)	260 m ³ /h		
DPS 30 (A)	320 m ³ /h		
DPS 40 (A)	410 m ³ /h		
DPS 60 (A)	590 m ³ /h		
DPS 80 (A)	770 m ³ /h		
DPS 100 (A)	1,000 m ³ /h		

*1 - referred to 1 bar(a) and 20°C at 7 bar operating pressure, inlet temperature 35°C and pressure dew point at outlet -40°C

Purity classes according to ISO 8573-1

Contamination	DPS..	DPS..A
Solid particles ^{*2}	(Class 2)	
Water content ^{*2}	Class 1-3 ^{*3}	
Total oil content ^{*2}	Class 1 ^{*4}	Class 0-1

*2 - typical result, on the assumption that the suitable inlet concentrations and operating and marginal conditions are given

*3 - depending on the design

*4 - the oil vapour content is not taken into account, it may reduce the purity class

Volume flow conversion factors (cf)

Pressure in bar (g)

4 ^{*5}	5	6	7	8	9	10	11	12	13	14	15	16
0.63	0.75	0.88	1.00	1.13	1.25	1.38	1.50	1.63	1.75	1.88	2.00	2.13

*5 - in the event of operating pressures below 5 bar, an external instrument air supply must be provided

Inlet temperature in °C

25	30	35	40	45	50	55	60
1.00	1.00	1.00	0.97	0.87	0.80	0.64	0.51

Calculation: $max. actual volume flow = nominal volume flow * cf pressure * cf inlet temperature$

$Nominal needed volume flow = actual volume flow / cf pressure / cf inlet temperature$

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Maintenance rules

	Maintenance interval and maintenance activities
All Models	<ul style="list-style-type: none"> ■ Once a week : <ul style="list-style-type: none"> - Check differential pressure on the prefilter and afterfilter - Check function of the condensate drain on the prefilter ■ Every 12 months : <ul style="list-style-type: none"> - Replace filter elements on prefilter and afterfilter - Check expansion silencer, clean or replace, if required - Replace activated carbon and oil indicator tube (type DPS..A) ^{*7} - Calibrate dew point sensor (option H) (interchange principle possible) ■ Every 24 months: <ul style="list-style-type: none"> - Replace non-return valves and solenoid valves ■ Every 48 months: <ul style="list-style-type: none"> - Replace desiccant, sleeve cylinder and seals ^{*6 *7} ■ Every 5 /10 years (for DPS 40 – DPS 100) <ul style="list-style-type: none"> - Pressure vessel inspection acc. to Ordinance on Industrial Safety and Health of September 27th, 2002 (BGBl. I p. 3777) §15, - Inside check every 5 years, carried out by an authorised inspection agency - Strength test (hydrostatic) every 10 years, carried out by an authorised inspection agency, see page 5

*6 – The regular service life of the desiccant is 3 - 5 years, however, it is very much depending on the contamination level of the incoming compressed air and the operating temperature. In order to achieve the specified service life of the desiccant, it is vital to exchange the filter elements as described above.

*7 – The desiccant and the activated carbon must be disposed of according to the European waste code. A possible oil contamination must be taken into account.

Product specific data

Specification	
Pressure dew points	-25°C / -40°C / -70°C
Electrical connection	230V 50/60 Hz, alternative 115V 50/60Hz or 24V DC
Power consumption	< 50 Watt
Protection Class	IP 65 (Nema 4)
Valve switching power (for each valve)	20 Watt

Materials

Component	
Vessel and supports	Steel (P265GH, ST37.0, St35.8)
Coating	Outside : sand blasted SA2,5 (ISO8501) ; 1-component primer on alkyd resin base ; dry thickness approx 40 µm (e.g. DuPont PercoTop 021, or similar product) 2-component acrylic resin paint ; dry thickness approx 40 µm (e.g. DuPont PercoTop 9600, or similar product)
Desiccant support screen	Stainless steel 304
Pipe connections (fittings)	Steel, galvanized
Valve body	Aluminium
Valve seats	Brass (Ms58), reinforced plastic
Sealing materials	HNBR
Screws	5.6 steel, zinc-plated (on valve blocks 8.8 stainless 304)
Desiccant filling	80% Molecular sieve 4A und 20% Silica gel

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Mounted prefilter and afterfilter	See product data sheets for filter housing and filter elements
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Connections, dimensions and weight (including prefilter and afterfilter)

DPS

Model	Connection	Height	Width	Depth	Weight
DPS 10	G 1	1460 mm	675 mm	515 mm	126 kg
DPS 15	G 1	1700 mm	675 mm	515 mm	142 kg
DPS 20	G 1	1710 mm	675 mm	515 mm	180 kg
DPS 25	G 1	1735 mm	675 mm	515 mm	220 kg
DPS 30	G 1 1/2	1825 mm	745 mm	520 mm	255 kg
DPS 40	G 1 1/2	1840 mm	755 mm	525 mm	275 kg
DPS 60	G 1 1/2	1870 mm	775 mm	575 mm	355 kg
DPS 80	G 2	2045 mm	1050 mm	695 mm	470 kg
DPS 100	G 2	2060 mm	1050 mm	730 mm	560 kg

DPS..A

Model	Connection	Height	Width	Depth	Weight
DPS 10 A	G 1	1460 mm	955 mm	515 mm	173 kg
DPS 15 A	G 1	1700 mm	955 mm	515 mm	195 kg
DPS 20 A	G 1	1710 mm	955 mm	515 mm	250 kg
DPS 25 A	G 1	1735 mm	955 mm	515 mm	300 kg
DPS 30 A	G 1 1/2	1825 mm	1130 mm	520 mm	350 kg
DPS 40 A	G 1 1/2	1840 mm	1140 mm	525 mm	395 kg
DPS 60 A	G 1 1/2	1870 mm	1200 mm	575 mm	525 kg
DPS 80 A	G 2	2045 mm	1470 mm	695 mm	630 kg
DPS 100 A	G 2	2060 mm	1520 mm	730 mm	740 kg

Classification according to Pressure Equipment Directive 97/23/EC for group 2 fluids

Model	Volume	Category	Marking	Commissioning inspection ^{*8}	Routine inspection ^{*8}
DPS 10 (A)	21 litres	II	CE 0525	NB ^{*9}	---
DPS 15 (A)	26 litres	II	CE 0525	NB ^{*9}	---
DPS 20 (A)	34.5 litres	II	CE 0525	NB ^{*9}	---
DPS 25 (A)	44.5 litres	II	CE 0525	NB ^{*9}	---
DPS 30 (A)	55.6 litres	II	CE 0525	NB ^{*9}	---
DPS 40 (A)	71 litres	III	CE 0525	NB ^{*9}	NB ^{*9}
DPS 60 (A)	101 litres	III	CE 0525	NB ^{*9}	NB ^{*9}
DPS 80 (A)	132 litres	III	CE 0525	NB ^{*9}	NB ^{*9}
DPS 100 (A)	175 litres	III	CE 0525	NB ^{*9}	NB ^{*9}

*8 - In Germany defined by the Ordinance on Industrial Safety and Health of September 27th, 2002 (BGBl. I p. 3777) §14 and §15

*9 - Inspection by Authorised Person (AP) or Notified Body (NB)

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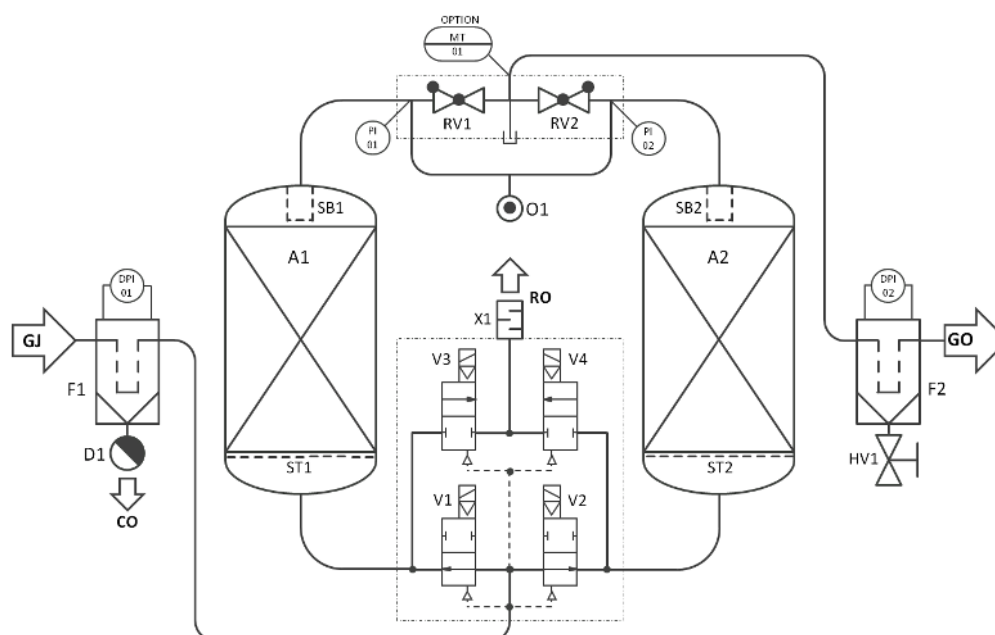
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Other Directives

Model	
All Models	<p>EMC-Standard (inspection scope for control system, solenoid valves and dew point measurement): <i>Emitted interference acc. :</i> EN 55011:1998 + A1:1999 + A2:2002 (limit value class: B) EN 61000-3-2:2006-04, EN61000-3-3:2008 <i>Interference resistance acc. :</i> EN 61000-6-2:2005</p> <p>Machinery Directive 2006/42/EC is not applicable.</p>

Flow diagram (PID) for DPS



A	Dryer vessel
F	Filter
V	Valve
HV	Manual valve
RV	Non return valve
SB	Sleeve cylinder
ST	Support screen
X	Silencer for expansion
D	Condensate drain
O	Orifice for regeneration air flow
PI	Pressure gauge
DPI	Differential pressure gauge
MT	Pressure dew point transmitter
GJ	Gas inlet
GO	Gas outlet
RO	Regeneration air outlet
CO	Condensate outlet

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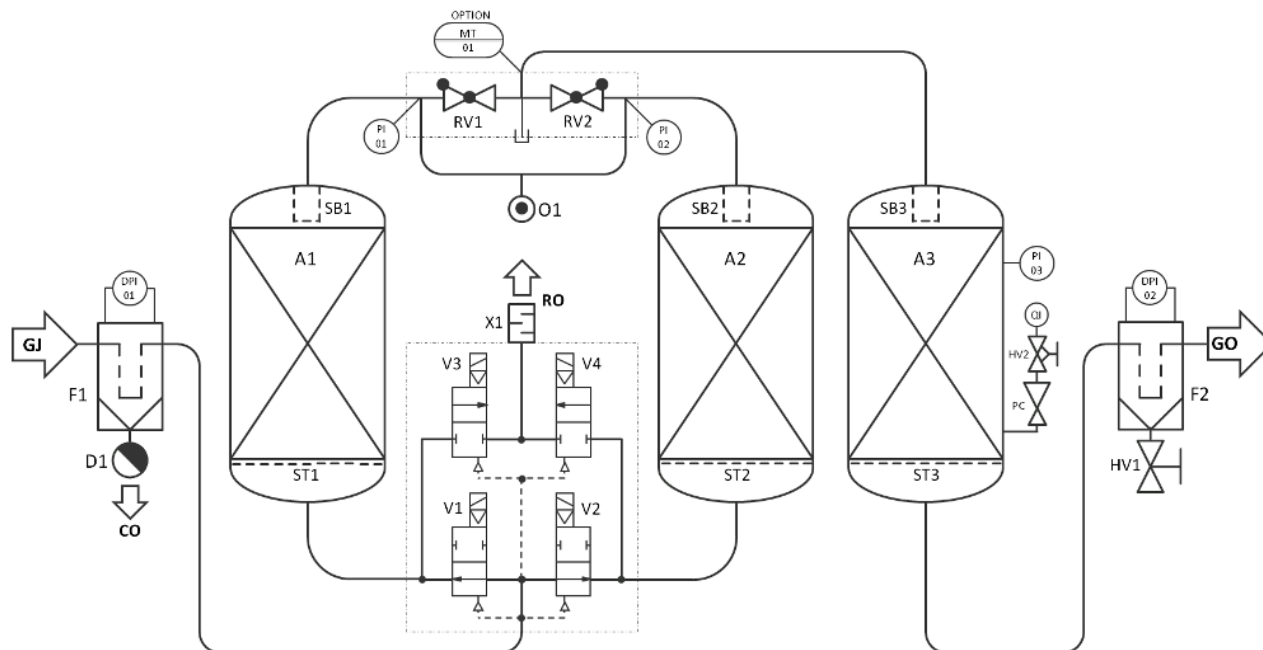
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Flow diagram (PID) for DPS..A

A



A	Dryer vessel
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V	Valve
HV	Manual valve
RV	Non return valve
SB	Sleeve cylinder
ST	Support screen
X	Silencer for expansion
D	Condensate drain
O	Orifice for regeneration air flow
PI	Pressure gauge
DPI	Differential pressure gauge
QI	Oil-Indicator with throttle valve
PC	Pressure regulator 7bar[g]
MT	Pressure dew point transmitter
GJ	Gas inlet
GO	Gas outlet
RO	Regeneration air outlet
CO	Condensate outlet

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Accessories

Apart from the pressure dew point measurement (and dew point dependent control), as well as electronic condensate drains, for pre filters there is still further useful accessories available.



The DA-CM1-230 switch-over control system is used to control two redundant compressed air dryers in a compressed air system. These dryers can then be automatically operated alternately. All the dryers provided with a "remote start/stop contact" or a "compressor synchronisation contact" can directly be connected to and controlled by the switch-over control system without the need for modifications.

In addition, the required shut-off valves for stopping the air flow of each dryer (e.g. solenoid valves or valves with actuating drive, 230 VAC design each), provided by the customer, are supplied with supply voltage and controlled by the switch-over control system. Furthermore, additional input signals can be integrated in the group error message of the relevant dryer. Power supply and alarm inputs for condensate drains and differential pressure gauges are prepared for.



The GSM Module DA-ETR-107 is a very simple extension to send in case of a dryer alarm a SMS message to one or up to 6 receivers on their mobile, or if a provider were selected also to an email address. With the message the dryer type, and the serial no. will be transmitted. The programming of the equipment can be done with a standard mobile phone, a condition is of course that the pin code of the SIM card is known. The equipment can be installed directly to the C1 control, and supplied with voltage 24VDC. Further the module has a 120 hours buffer battery, and an integrated antenna. For areas with low signal reception an external antenna could be added to the module. (SIM card is not scope of supply)



Start up device (minimum pressure valve) DA-VPM-...

To protect a dryer against high velocity during start up of the system, while the operating pressure is not yet reached in the net.

For sizes G ½" – G2 ½" (DA-VPM-B../16) a spring loaded angle valve, which opens at 3 - 5 bar(g) (Standard-setting is 3,5 bar (ü)).

For sizes DN80 – DN250 (DA-VPM-F../11) a not sealing butterfly valve, with pneumatic actuator. The actuator opens directly by the system pressure. Opening starts at 3 bar(g) and will be full open at 4 bar(g). Special version with adjustable opening pressure between 3 and 10 bar(g) is also available.



Differential pressure gauge FAD01C with voltage free alarm contact.

The dryer control C1 is already prepared to connect two voltage free alarm contacts, and to show the alarms on the display (if desired) and to consider them in the common alarm output. Further an alarm delay could be programmed in the C1-control, so that an alarm will only display if the differential pressure drop is longer present than the programmed time delay.

...and much more, please contact us.