Filtrations-Separations-Technik

Product Data Sheet
Adsorption Dryer DPM

Version: 1.7.0 | Author: Christian Ruff | Date: 06.04.2017

Field of application

DPM series adsorption dryers are designed for drying compressed air and nitrogen down to pressure dew-points of -25°C (DPM standard) to -40°C (DPM+ version) at operating pressures of 4 bar to 10 bar.

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 DPM series a certain quantity of dried compressed air is drawn off at the dryer outlet. 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 dry and thus extracts the moisture stored in the desiccant and discharges it to the atmosphere via a silencer (heatless regeneration).

An after-filter is integrated into the dryer vessels, which cleans the dry compressed air from dust.

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Features

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

A combination of coarse separator and demister is installed on the inlet side of the adsorber vessel. This separator combination effectively removes liquid impurities and thus reduces the service life of the desiccant.

A fine filter element is installed on the outlet side of the adsorber vessel. This integrated after-filter eliminates dust particles in the compressed air flow exiting the dryer. A complex after-filtration and its piping are no longer required.

The switch-over between the vessels is carried out by one single valve. This highly integrated design avoids complicated piping arrangements and minimizes leakage potentials. Generously sized flow cross sections minimize pressure losses.

In the event of a power failure the valve enters a safe normal position, thus avoiding an unintentional interruption of the compressed air flow.

The quantity of regeneration air can be individually adjusted via needle valves, which allows the adjustment of optimized compressed air consumption depending on the individual operating conditions.

Two silencers ensure an effective reduction of the expansion noise.

DPM series dryers are controlled by a programmable microcontroller. The switch-over intervals between the vessels can be adapted individually.

The DPM+ version offers an additional valve for compressor synchronization.

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Basic data

Model	Nominal volume flow (VN) *1	Min./Max. allowable operating pressure	Min./Max. allowable operating temperature
DPM 02	2.0 m³/h	4 - 10 bar	+2°C - +50°C
DPM 04	4.0 m³/h		

*1 - refers to 1 bar(a) and 20°C at 7 bar operating pressure, inlet temperature 35°C and pressure dew-point at outlet -25°C (DPM) / -40°C (DPM+)

Purity classes according to ISO 8573-1

Contamination	DPM
Solid particles *2	Class 2
Water content *2	Classes 2-3 *3
Total oil content	---

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

Volume flow conversion factors

«F1» - Pressure in bar (g)

4	5	6	7	8	9	10
0.63	0.75	0.88	1.00	1.13	1.25	1.38

«F2» - Inlet temperature in °C

25	30	35	40	45	50
1.00	1.00	1.00	0.97	0.87	0.80

Calculation of the converted volume flow

Converted volume flow VK	Nominal required volume flow VN_{min}
$VK = VN \times F1 \times F2$	$VN_{min} = VK / F1 / F2$

VK : Converted volume flow calculated for the operating conditions
VN_{min}: Nominal required volume flow calculated for the operating conditions, based on the volume flow at operating conditions

Maintenance rules

	Maintenance interval and maintenance activities
All Models	■ Once a week : Check the container change by means of the plug LED and the expansion noises ■ After 8000 operating hours, at the latest after two years: - Replace container with desiccant filling and filter element. *5 - Check expansion silencer, replace if necessary - Replace the valve(s)

*5 – 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.

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Product specific data

Specification	
Pressure dew-points	-25°C (version DPM) / -40°C (version DPM+) *6
Electrical connection	24V DC
Power consumption	DPM < 4 W ; DPM+ < 20 W
Protection Class	IP 54

*6 - in case of using an oil lubricated compressor a pre-filter for oil separation is required

Materials

Component	
Vessel	Stainless steel cylinder with aluminium plug
Demister	PU foam
Valve body, valve seats	Aluminium anodized, NBR and PU, various (with version DPM + also brass)
Pipe connection	PU hose ; connectors nickel plated brass
Wall brackets	Aluminium
Desiccant filling	80% molecular sieve 4A ; 20% silica gel
Integrated after-filter	see product data sheets for filter elements type ZN

Connections, dimensions and weight

Model	Connection	Height	Width	Depth *7	Weight
DPM 02	Ø 8mm	263 mm	150 mm	95 mm	1.5 kg
DPM 04	Ø 8mm	403 mm	150 mm	95 mm	2.3 kg

*7 – without internal tube connections

Classification according to Pressure Equipment Directive 2014/68/EU for group 2 fluids

Model	Volume	Category	Marking	Commissioning inspection *8	Routine inspection *8
DPM 02	0.4 litre	Art.4 Par.3	---	---	---
DPM 04	0.7 litre	Art.4 Par.3	---	---	---

*8 - In Germany defined by the Ordinance on Industrial Safety and Health of September 27th, 2002 (BGBI. I p. 3777) §14 and §15
*9 - Inspection by Authorised Person (AP) or Notified Body (NB)

Other Directives

Model	
All models	■ Machinery Directive 2006/42/EEC and Low Voltage Directive 2014/35/EU are not applicable. ■ The RoHS Directive 2011/65 / EU applies only to the electrical components (control, cable, valve coil). ■ The remaining components of the dryer must be disposed of separately from the electrical components.

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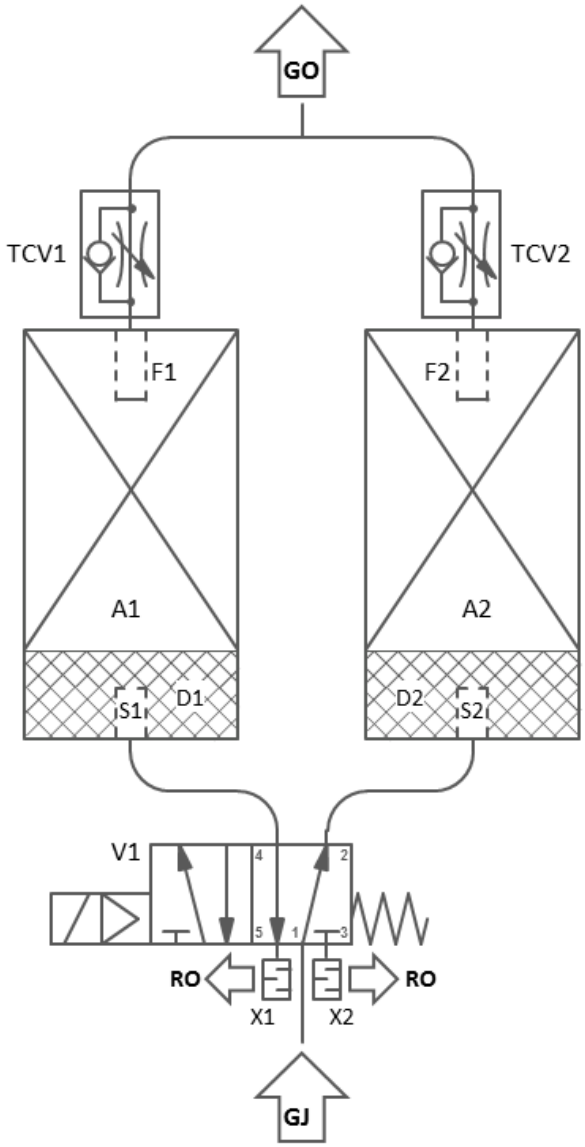
Flow diagram (PID) DPM



A	dryer container + demister + filter
F	filter
S	flow distributor
D	demister tissue
V	5-2-way valve
TCV	throttle check valve
X	expansion silencer
GJ	gas entry
GO	gas outlet
RO	regeneration gas outlet

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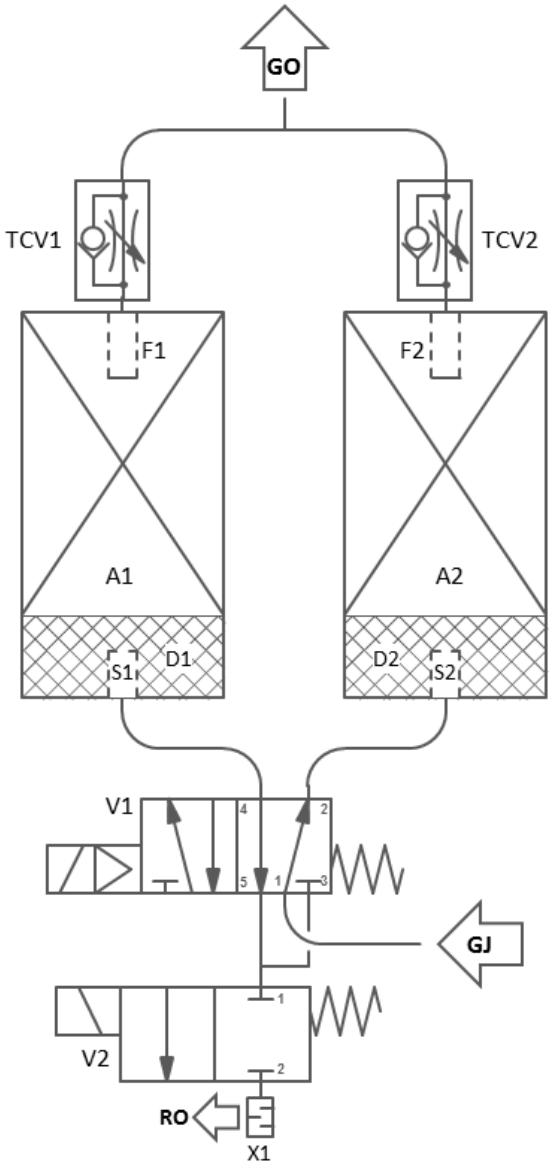
Flow diagram (PID) - DPM+



A	dryer container + demister + filter
F	filter
S	flow distributor
D	demister tissue
V1	5-2-way valve
V2	2-2-way valve
TCV	throttle check valve
X	expansion silencer
GJ	gas entry
GO	gas outlet
RO	regeneration gas outlet

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DPM 02

DPM 04

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DPM 02 Plus

DPM 04 Plus

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