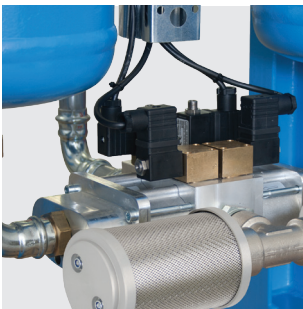


B-DRY 110-1000

F-DRY 1200-6500

Heatless regenerated adsorption dryers





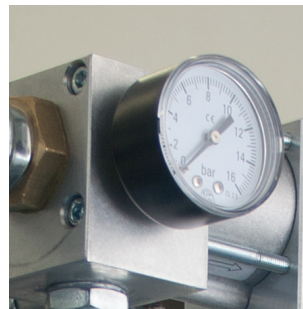
Four individually controlled valves

To provide optimum control over the complete drying process four high quality electromagnetic valves are used. Individual control of each valve results in column switch-over without any pressure peaks.



Compact control blocks

Compact and robust design of upper and lower control valve block assures reliable operation. Purge air line is mounted on upper check valve block so that purge air nozzle can be replaced if required. During maintenance complete block can be removed from the dryer in one piece.



Manometers

Two manometers positioned on front side of the upper control block give reliable information about the pressure inside of each column. In combination with LCD display indication on the controller manometers are excellent tool for diagnostics.



Controller

Robust SIEMENS PLC assures reliable and stable operation and offers variety of settings. Fixed cycle operating mode can be switched to dew point dependent control mode if dryer is equipped with dew point sensor. The controller is equipped with LCD display which provides all the necessary information about the operation.

BACKGROUND

Compressed air contains contaminants such as water, oil and particulates which must be removed or reduced to the acceptable level based on specific application requirements. Standard ISO8573-1 specifies air purity/quality classes for these contaminants. Humidity (water vapor content) is expressed in the terms of Pressure Dew Point (PDP), where Dew point is the temperature at which air is 100% saturated with moisture. When the temperature of the air is reduced to or below the dew point, condensation will occur.

Reduction of water content down to pressure dew point $+3^{\circ}\text{C}$ is usually achieved with refrigerant dryers while for lower pressure dew points adsorption (also called desiccant) dryers are typically used.

ADSORPTION

Adsorption is a process where specific molecules adhere to the surface of a highly porous solid (adsorbent/desiccant) by electrostatic and molecular forces. The adsorbent is normally formed in sphere form beads. Process of adsorption takes place while air flows through column filled with the beads. Rate of adsorption depends on several factors (type of adsorbent, relative humidity, inlet temperature, contact time, face velocity) and therefore adsorption process is usually set/optimized for every individual application.



High quality two layer desiccant bed

B-DRY and F-DRY series adsorption dryers are filled with a high quality robust desiccant which results in a stable operation with a low energy input for the regeneration. Primary desiccant is a molecular sieve with an extremely high drying potential. To prevent potential degradation of primary desiccant due to liquid water, bottom part of the column is filled with a water resistant silica gel.



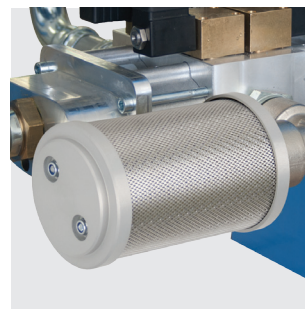
Flow distributing inserts

Inlet and outlet of each column are equipped with a special flow distributing strainer insert which prevents adsorbent to leave the column. This inserts evenly spread the air stream after it enters the column meaning that so called "quiet" zones with no flow through adsorbent are reduced to the minimum. Evenly distributed air stream also reduces the movement of desiccant.

ADSORPTION DRYER

Typical applications for the adsorption dryers are outdoor installations where the risk of freezing occurs and applications with high quality requirements in terms of air dryness ($\text{PDP} < +3^{\circ}\text{C}$) such as the process air in process industry (food and beverage, pharmaceutical, electronic, chemical, ...).

The most common adsorption dryers are heatless regeneration adsorption dryers due to their simplicity, reliability and relatively low investment costs.



Silencer

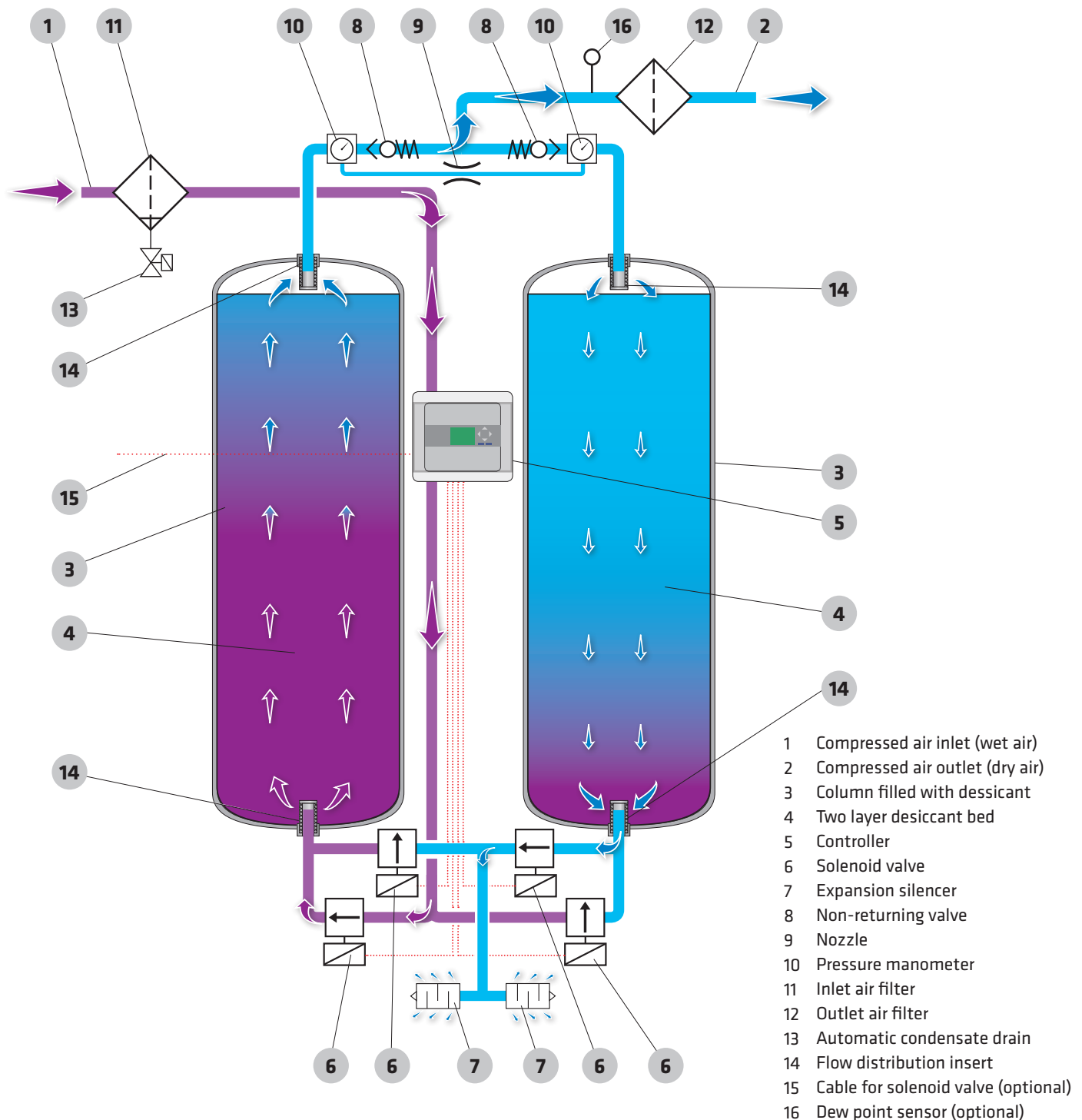
High quality silencers assure low noise operation and excellent interception of dust with low backpressure.



High efficiency intake and outlet filters

Standard version of B-DRY series dryer is equipped with high efficiency filters. Super fine coalescing filter at the inlet prevents contamination of the adsorbent while a dust filter at the outlet intercepts the dust generated by the process.

Components



B-DRY and F-DRY adsorption dryers have been designed for continuous separation of water vapor from the compressed air thus reducing the pressure dew point.

B-DRY and F-DRY series dryer consists of two columns, filled with desiccant beds, controller with LCD display, valves, manometers, support construction and suitable filter housings with the required filter element.

Adsorption takes place under pressure in the first column while the second column regenerates with a portion of already dried compressed air at the ambient pressure.

When the first column is saturated to a certain level column switch-over is carried out and the process of adsorption continues in the second column without any drop of pressure at the outlet of the dryer.

Regeneration of saturated desiccant is possible because a small portion of already dry compressed air is decompressed and when expanded it becomes extremely dry.

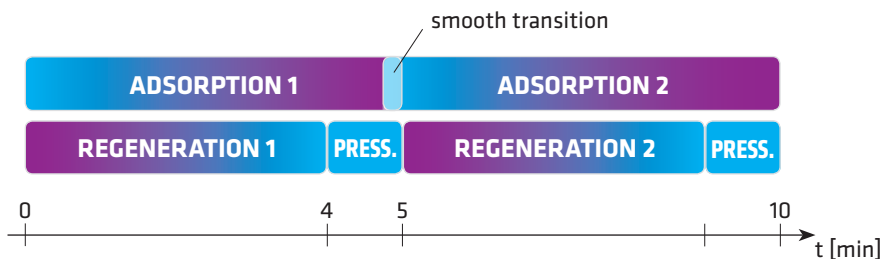
This portion of extremely dry decompressed air also called "purge air" is then fed through the saturated column in the reverse flow direction in order to remove the adsorbed water molecules from the desiccant and release them back to the ambient.

10 min operating cycle

When FIX operating cycle is selected or when the dryer is not equipped with a dew point sensor it will operate in pre-set operating cycles meaning length of adsorption and regeneration will be fixed. Energy losses are directly related with an amount of purge air which is used for regeneration. B-DRY and F-DRY energy losses have been optimized due to the 10 minute operating cycle:

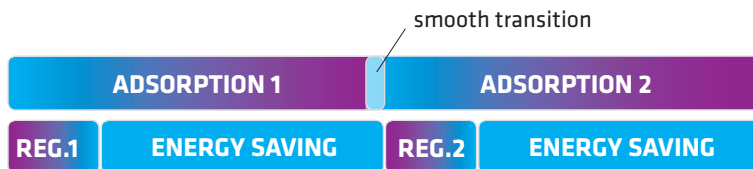
- 5 min = Adsorption
- 4 min = Regeneration
- 1 min = Pressure build up

Extended operating cycle with 12 switch overs per hour also reflects in less wear and thus more reliable operation. If the dryer is equipped with a Dew point sensor it can operate in a dew point dependent control. In this case the energy losses can be reduced to the minimum required value.



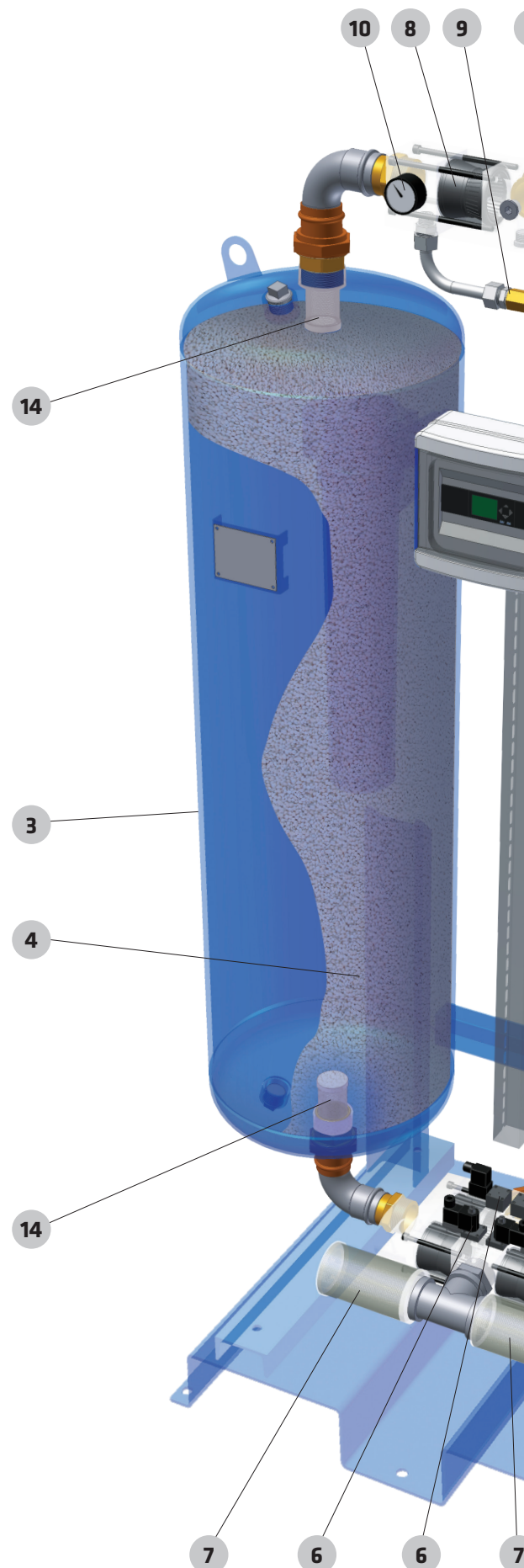
Energy saving dew point dependent control (DPD)

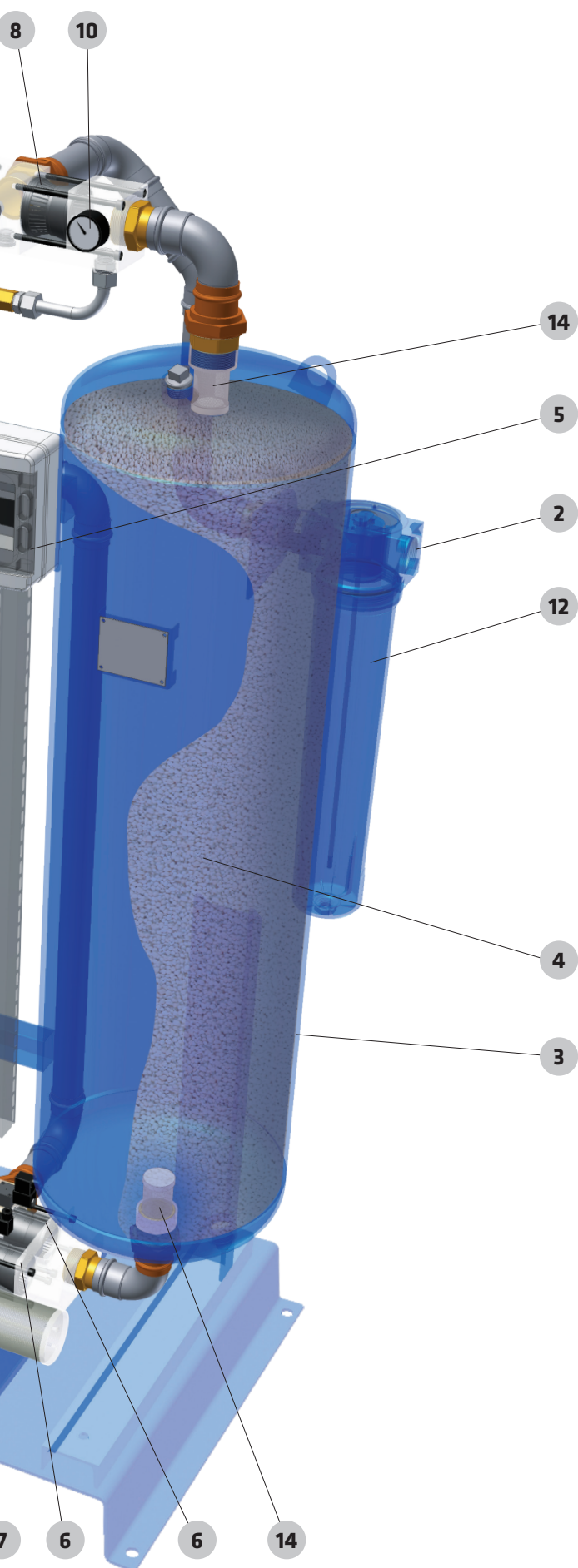
B-DRY and F-DRY dryers are designed for "full load" at pre-determined operating conditions (flow, pressure, temperature). However in reality "full load" is typically not present all the time meaning that the dryer operates with a partial load. In this case the amount of "purge air" used for regeneration can be proportionally decreased. B-DRY and F-DRY dryers are equipped with the dew point dependent sensor (available as optional equipment). It can detect the reduced load and the controller automatically adjusts cycles so that energy losses are reduced to the minimum.



Energy saving (stand-by)

B-DRY series adsorption dryers have an option to receive a stand-by signal from the compressor or other compressed air supply. While in the stand-by the air can flow freely through both towers in direction from the inlet to the outlet of the adsorption dryer. Meanwhile the adsorption dryer controller is in the stand-by mode and ready to resume with the normal operation as soon as it gets the appropriate signal. The stand-by signal is relayed to the B-DRY adsorption dryer through a stand-by contact on the controller by a connected switch.



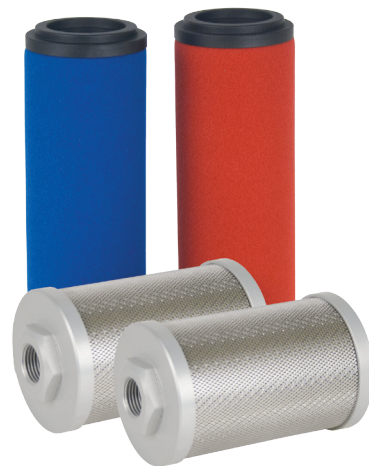


Easy maintenance

Upper and lower control valve can be removed from the dryer in one piece. All components that are subject to wear are easily accessible and replaceable.

STANDARD YEARLY MAINTENANCE

refers to components such as filter elements and expansion silencers



TWO YEAR SERVICE KIT

refers to valve components and sealings



FOUR YEAR SERVICE KIT

refers to replacement of adsorbent, valve components and sealings



Technical data

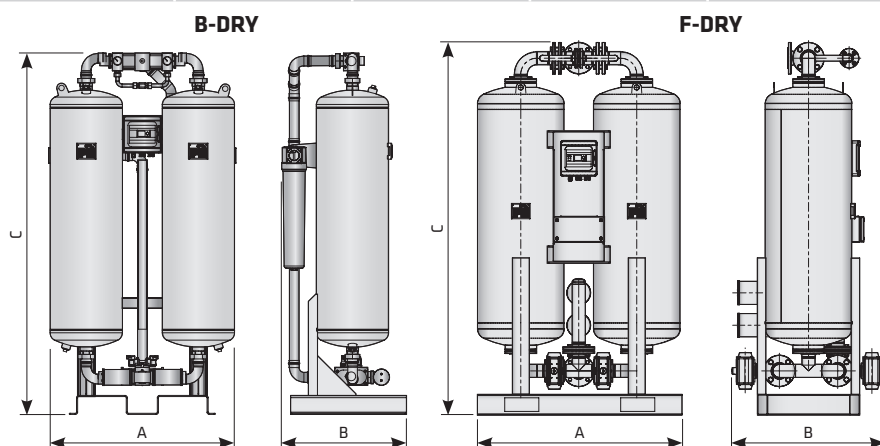
TECHNICAL DATA B-DRY 110-1000

Type	Connection IN/OUT	Nominal volume flow		Dimensions			Mass
		Inlet ¹	Outlet ²				
	"	[Nm ³ /h]	[Nm ³ /h]	A [mm]	B [mm]	C [mm]	kg
B-DRY 110	G 1"	110	86,0	719 ±5	422	1647	140
B-DRY 150	G 1"	150	117,5	707 ±5	422	1897	156
B-DRY 200	G 1"	200	157,0	707 ±5	471	1664	196
B-DRY 250	G 1"	260	204,0	707 ±5	471	1914	236
B-DRY 300	G 1 1/2"	320	251,0	860 ±5	535	1742	274
B-DRY 400	G 1 1/2"	410	321,5	854 ±5	535	1989	295
B-DRY 600	G 1 1/2"	590	462,5	854 ±5	671	2051	392
B-DRY 800	G 2"	770	603,5	1059 ±5	701	2080	507
B-DRY 1000	G 2"	1000	784,0	1051 ±5	701	2140	597

TECHNICAL DATA F-DRY 1200-6500

Type	Connection IN/OUT	Nominal volume flow		Dimensions			Mass
		Inlet ¹	Outlet ²				
	DN	[Nm ³ /h]	[Nm ³ /h]	A [mm]	B [mm]	C [mm]	kg
F-DRY 1200	DN50	1200	936	1210	850	2170	820
F-DRY 1500	DN65	1500	1170	1535	950	2210	980
F-DRY 2000	DN65	2000	1560	1685	980	2330	1550
F-DRY 2500	DN80	2500	1950	1785	1120	2260	1680
F-DRY 3000	DN80	3000	2340	1875	1120	2400	1850
F-DRY 3750	DN100	3750	2925	2025	1230	2490	2300
F-DRY 5000	DN100	5000	3900	2235	1230	2600	2850
F-DRY 6500	DN125	6500	5070	2420	1430	2730	3750

Operating pressure range	4 to 16 bar
Operating temperature range	+1,5 °C to +60 °C
Pressure dew points	-40 °C (-25°C, -70°C)
Voltage, frequency	230V, 50/60 Hz
Power consumption	<60 W
Protection class	IP 65
Filter (inlet)*	super fine - 0,01 µm
Filter (outlet)	dust filter; 1 µm
DPD control	optional
Input for stand-by	standard



OPERATING PRESSURE - CORRECTION FACTORS - C_{OP}

Operating pressure [bar]	4	5	6	7	8	9	10	11	12	13	14	15	16
Operating pressure [psi]	58	72	87	100	115	130	145	160	174	189	203	218	232
Correction factor C _{OP}	0,63	0,75	0,88	1	1,13	1,25	1,38	1,50	1,63	1,75	1,88	2,00	2,13

OPERATING TEMPERATURE - CORRECTION FACTORS - C_{OT}

Operat. temperature [°C]	25	30	35	40	45	50	55	60
Operat. temperature [°F]	77	86	95	104	113	122	131	140
Correction factor C _{OT}	1	1	1	0,97	0,87	0,80	0,64	0,51

DEW POINT - CORRECTION FACTORS - C_D

Operat. temperature [°C]	-25	-40	-70
Operat. temperature [°F]	-13	-40	-94
Correction factor C _D	1,1	1	0,7

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

⁽²⁾ Outlet flow refers to typical assumption during regeneration phase for operating at nominal inlet flow conditions. Outlet flow includes average air losses of approximately 17,3 %.

* If dryer is supplied without inlet filter compressed air class 1 (ISO 8753-1) for solid particles and oil should be provided to the inlet of the dryer.

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