

PRODUCT DATA SHEET

Adsorption Dryer

HR-ZERO

Heat regenerated by blower conveyed ambient air in counterflow direction to the adsorption process, cooling by ambient blower air



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Adsorption dryer **HR-ZERO** - heat regenerated

HR-ZERO - Drying at its best

The heat regenerated adsorption dryers in the HR-ZERO series are uniquely innovative, unbeatably efficient, and remarkably reliable. They can also be individually adapted to any requirements and conditions. Premium quality, made in Germany.

The composition and continuous further development of existing, proven drying technologies are the foundation of the new VESTEC HR-ZERO series of adsorption dryers. Using the state-of-the-art control systems and continuously optimized drying processes guarantee the technical advantage for these novel system solutions, which will once again define the market for adsorption dryers. When selecting components, reliability and durability are given the highest priority. Products from leading German and European manufacturers that

demonstrably meet high quality standards for several decades are used exclusively. The result is an extremely high operational safety, unique reliability, and very low energy costs: an added value for any compressed air station.

With the modular design concept, standardized systems can be individually adapted to customer-specific requirements or local conditions, such as environmental factors. An elaborated concept and optimized production procedures sustainably reduce the production complexity and associated manufacturing costs, so that a customized system solution from regularly has lower investment costs than a comparable off-the-shelf adsorption dryer available in the market.

Wet becomes Dry

After compressed air is cooled and condensate is removed, it leaves the compressor in a moisture-saturated condition. As the compressed air cools down further in the downstream pipework, additional condensate is usually formed. This leads to negative side effects such as corrosion, icing, and consequently to high maintenance costs for the compressed air system. Drying compressed air is therefore a mandatory requirement of any compressed air purification system. If lower pressure dew points are required, adsorption dryers are applied. In an adsorption dryer the compressed air to be dried flows through a layer of desiccant removing the moisture by adsorption. The adsorption capacity of the desiccant is limited. Therefore a changeover to the second alternating adsorption vessel takes place before the critical load limit is reached. The adsorption vessel that is fully loaded with moisture is entering the regeneration process after switch over is completed. The regeneration time is always shorter than the adsorption time of the operating vessel, so that the continuous supply of dried compressed air to the point of use is guaranteed all the time.



Adsorption - Regeneration

Compressed air in a moisture-saturated condition enters the adsorption and passes through the desiccant of the vessel in adsorption phase from the bottom to the top. While the wet air passes the vessel, the moisture is adsorbed by the desiccant. The adsorption process is time or dew point controlled.

In the same time the desiccant already saturated from the previous adsorption phase in the other vessel is being regenerated. Ambient air conveyed by a blower and heated up by a heater is used for the regeneration process. The hot air passes the desiccant from top to

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bottom in counterflow direction to the adsorption process, vaporizing the moisture from the desiccant. By this process the blower air is cooled down to the desorption temperature and leaves the dryer in moisture saturated condition by the exhaust to atmosphere. As soon as the desorption process is completed the temperature at the exhaust rises, detected by dryers control system for switch over to cooling process. The cooling process is performed by ambient blower air, taking up the heat from the desiccant and released to atmosphere. As soon as the desiccant is cooled down the regenerated

vessel remains in stand-by.

When the vessel in adsorption phase becomes saturated, detected by rising dew point (dew point control mode) or when the time setting for adsorption is reached (time control mode), the switch over process is initiated automatically. The regenerated vessels enters the adsorption phase, while the just saturated vessels enters the desorption phase.

Heat regenerated high-end adsorption dryer

including:

- PLC SIMATIC S7-1200 incl. touch panel KTP700
- Switch over control (proximity switches for valves K1 and K2)
- Special power supply 380 V - 500 V, 50 Hz - 60 Hz

Capacity volume flow: up to 9500 m³/h*

Pressure dew point: -40°C

Media: compressed air, gases of fluid group 2

max. operating pressure: 11 bar g (size HR-ZERO 700 ... 3000)

10 bar g (size HR-ZERO 3500 ... 9500) min.

operating pressure: 4 bar g

Connection: fl ange acc. DIN EN 1092-1 (DIN 2633)

Options

- Dew point control system
- Isulation
- PLC SIMATIC S7-1200
- Switch over control for other valves
- Profibus
- ...



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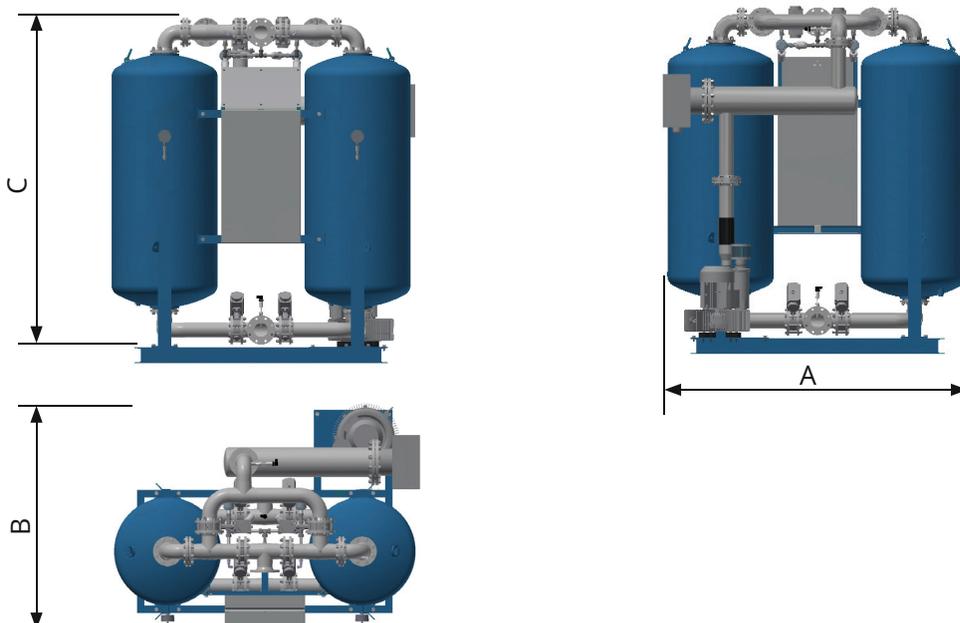
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Capacities and features

Type	Capacity* m ³ /h	Connection	Dimensions (mm)			Weight kg
			width A	depth B	height C	
HR-ZERO 0400	400	DN 50	1750	1030	2260	1200
HR-ZERO 0700	700	DN50	1860	1180	2310	1400
HR-ZERO 1000	1000	DN80	1920	1280	2390	1500
HR-ZERO 1400	1400	DN80	1920	1320	2420	1900
HR-ZERO 1700	1700	DN 80	2120	1450	2480	2300
HR-ZERO 2000	2000	DN 80	2180	1480	2550	2800
HR-ZERO 2500	2500	DN 100	2400	1520	2640	3400
HR-ZERO 3000	3000	DN 100	2400	1540	2630	3600
HR-ZERO 3500	3500	DN 100	2750	1900	2790	4000
HR-ZERO 4000	4000	DN 150	2800	1990	2890	4800
HR-ZERO 5000	5000	DN 150	2910	2040	2870	5600
HR-ZERO 6000	6000	DN 150	3400	2350	3000	6300
HR-ZERO 7000	7000	DN 150	3500	2280	3000	7200
HR-ZERO 8200	8200	DN 150	3600	2500	3100	8000
HR-ZERO 9500	9500	DN 200	3800	2600	3300	9000

* calculated at 1 bar (abs.) and 20°C at 7 bar g operating pressure and 35 °C compressed air inlet temperature (saturated condition)

Dimensional drawings



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Conversion factors

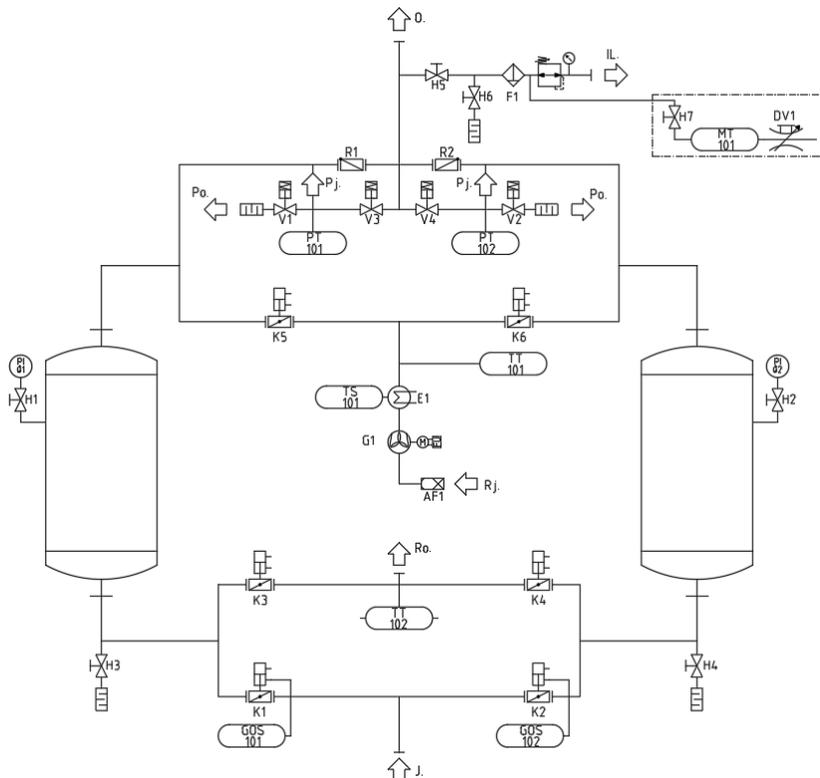
Conversion factors K1		Operating pressure (bar g)						
		4	5	6	7	8	9	10
Eintr. temp. (°C) Inlet temp. (°C)	30	0,71	0,86	1,00	1,15	1,18	1,25	1,37
	35	0,62	0,75	0,87	1,00	1,12	1,25	1,37
	40	0,38	0,53	0,67	0,82	0,92	1,07	1,21
	43	---	0,33***	0,45**	0,54**	0,61*	0,72	0,80

* PDP -30 °C, ** PDP -25 °C, *** PDP -20 °C

Guidance for determining the dryer size:

Inlet volume flow V_{eff} :	2.000 m ³ /h	
Operating pressure:	7 bar g	$V_{corr} = V_{eff} / K1 = (2.000 \text{ m}^3/\text{h}) / 0,82$
Inlet temperature:	40 °C	$V_{corr} = 2.439 \text{ m}^3/\text{h}$
Required PDP:	-40 °C	
Conversion factor K1 :	0,82	selected size: HR-ZERO 2500

P&I diagram



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Easy to use

The heat regenerated adsorption dryers in the series HR-ZERO are equipped with a PLC type Siemens SIMATIC S7 1200 with 7" touch panel, providing easy access to status, settings, alarm messages and diagnosis information of the drying system. The access to the touch panel is characterized by an advanced user-friendly menu guidance. The panel shows the current operating status with all relevant operating parameters, such as operating pressure in each vessel, operating temperatures in the regeneration process and pressure dew point at the outlet of the system. Operating parameters can be adapted by authorized staff after entering a key to access the service menu. Several additional functions can be activated without the requirement for modification of the PLC program. For diagnostic purposes all alarm and warning messages occurred are listed and stored, accessible in the menu. Also trend curves of temperatures and dew point are available for the previous time period up to 24 hours.

