

Adsorption Dryer



***ZEH
Externally Heated
Compressed Air Dryers***

ZEH Externally Heated Air Dryers

Compressed air is polluted with dirt particles, water, oil, oil vapor and condensate. These contaminants result in high maintenance costs, premature wear, spoiled products and the failure of control systems.

A ZANDER series ZEH externally heated twin tower dryer will effectively remove these contaminants.

The adsorption principle used in this design is simple, robust and flexible. Continuous drying is accomplished by the operation of two desiccant towers. Compressed air is dried through one tower while the other desiccant tower is being regenerated. The regeneration heating cycle of the desiccant is accomplished using a dry air purge flow heated by an external electric heater. The regeneration cooling cycle is performed using the same flow of dry compressed air taken from the dryer outlet to ensure dewpoint performance.

High levels of reliability are achieved by the use of proven engineering technology and components.

How Series ZEH Dryers Work

The compressed air first passes through a high efficiency inlet filter which removes solid and liquid particles down to a size of 0.01 micron/0.01 ppm. An automatic drain valve removes the condensate. After being filtered, the compressed air is directed by an inlet switching valve into one of the towers that is filled with a moisture adsorbent desiccant material. To ensure even distribution through the tower, the desiccant is supported by a self cleaning stainless steel support screen.

The compressed air adsorption drying cycle is performed in a downflow process. During the drying phase, the moisture in the compressed air is adsorbed by the desiccant material. Dried, clean air is then directed through a check valve at the dryer outlet and through a ZANDER 1.0 micron pleated particulate after filter into the plant distribution system.

As tower A is drying the compressed air, tower B is being regenerated. During the regeneration of tower B a dry air purge flow heated by an externally mounted electric heater is passed upwards (counter current to drying) through the wet desiccant bed. The heated dry air purge flow strips the adsorbed moisture from the desiccant and is then exhausted through the purge exhaust valve into the atmosphere.

Energy efficient regeneration is provided using a temperature controlled regeneration process for the heating and cooling cycles.

The heating cycle is terminated when the proper regeneration temperature has been reached, as detected by a temperature sensor located at the regeneration exhaust. Immediately following the heating cycle the cooling of the desiccant bed is achieved by flowing the same dry compressed air flow across the heated desiccant bed until the desiccant bed has been cooled. For maximum efficiency, again, the cooling cycle is terminated on the basis of the desiccant bed temperature.

The use of dry air cooling will ensure a constant -40°F (-40°C) pressure dewpoint during the entire drying cycle.

Fully Automatic Operation

The dryer operations are performed automatically on a fixed time cycle controlled by a Siemens programmable logic controller (Allen-Bradley optional). Standard dryers operate on a fixed 8 hour NEMA time cycle, with 4 hours drying, and 4 hours regeneration including the heating and cooling cycle. Drying and regenerating changeover from one tower to the other is fully automatic. In order to prevent pressure surges and to minimize desiccant attrition, changeover from one tower to the other is carried out when both are at equal pressure.

Ecotronic Control

Compressed air systems are rarely constant and the dryer regeneration cycle frequency is dependent upon the actual inlet flow, pressure and temperature. Operation under inlet conditions where there is lower than design flow and temperature and or higher pressure, will result in less regeneration cycles and a maximum reduction in the cost of utilities.

The ecotronic dewpoint dependent switching provides a precision demand cycle control which terminates the adsorption (drying) cycle on the basis of the dryer dewpoint performance. This results in the full adsorptive capacity of the desiccant bed being utilized prior to switch over and regeneration.

Ecotronic is built into the dryer control system, with a precision hygrometer producing a continuous display of the outlet dewpoint. The preset contacts of the instrument are utilized to initiate desiccant tower changeover based upon the maximum allowable dewpoint being achieved at the dryer outlet.



Features:

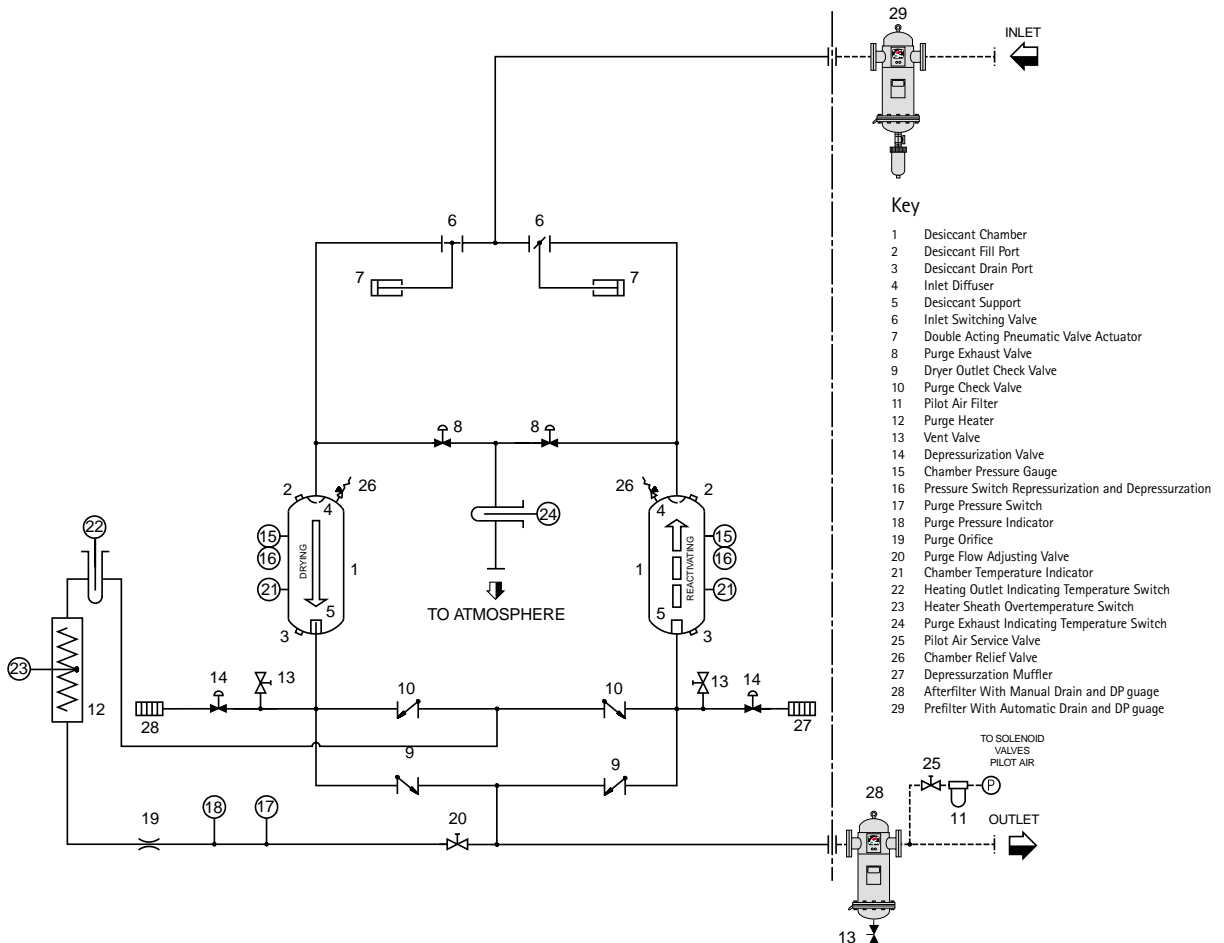
- Constant pressure dewpoint of -40°F (-40°C) PDP.
- Fully automatic, interlocked operation controlled by PLC on a fixed 8 hour NEMA time cycle.
- Dryers operate between zero and full rated capacity without adjustment.
- Electric heater with low watt density incoloy sheath elements.
- Energy efficient temperature controlled heating and cooling cycles.
- Separate low and high voltage control panels.
- Heater housing and hot air lines are insulated to conserve utilities.
- Dryer cycling and heater are totally interlocked with the controls to eliminate the possibility of system malfunction.
- NEMA 4 electrical class.
- Designed generally in accordance with ASME VIII Div. 1. and ANSI 31.1 Other approvals on request.
- Unique ZANDER high-efficiency pleated pre-and after filters included as standard. (Supplied loose)

5 Year Warranty On All Automatic Switching Valves

Options:

- Filters mounted option - (Models ZEH100-ZEH600) filters mounted on dryer. (Models ZEH750-ZEH5000) filters mounted on separate steel skid to be located next to dryer. Piping from filter skid to dryer skid provided.
- Bypass options - Using ductile iron bodied butterfly valves with stainless steel internals.
 - a. 3 Valve dryer system with filter block and bypass.
 - b. 6 Valve filter block and bypass.
 - c. 9 Valve filter and dryer block bypass
- Limit Switch Package - Available on Models ZEH750 - ZEH5000. The inlet and purge outlet switching valves provided with limit switches to allow for further interlocking of each dryer step with the PLC.
- Gauge Panel - The chamber and purge pressure gauges panel mounted.
- Rigid Instrument and Pilot Air Tubing Packages.
 - Copper tubing with brass compression fittings.
 - Stainless steel tubing with Swagelok stainless steel tube fittings.
- Silicon Controlled Rectifier (SCR) for precise control of the heater outlet temperature for optimum energy efficiency and maximum component life.
- Non Destructive Examination for Piping to ASME B31.3.
- Electric/steam - regeneration heater.
- Ecotronic dewpoint dependent switching system for full operational economy and energy management.

TYPICAL FLOW SCHEMATIC ZEH DRYER



Technical Data - ZEH Dryers

Flow Range @ 100 PSIG (7 Bar G): up to 5000 SCFM (140 M ³ /Min)	Maximum Operating Pressure: 150 psig (10.3 bar g) Minimum Operating Pressure: 60 psig (4.1 bar g)
Pressure Dewpoint: -40°F (-40°C) PDP Nominal	Standard Inlet Temperature: 100°F (38°C) Maximum Inlet Temperature: 120°F (49°C) Minimum Inlet Temperature: 50°F (10°C)
Air Quality Class: ISO 8573.1 Class 1.2.1 Nominal	

Performance and Specifications

Basic Model Number	Capacity, SCFM at 100 PSIG and 100°F	Heater kW (approx)	Connection
ZEH 400	400	6	2"
ZEH 500	500	8	2"
ZEH 600	600	10	2"
ZEH 750	750	12	3"
ZEH 1000	1000	17	3"
ZEH 1250	1250	21	3"
ZEH 1500	1500	25	3"
ZEH 1800	1800	28	4"
ZEH 2100	2100	32	4"
ZEH 2500	2500	36	4"
ZEH 3000	3000	47	6"
ZEH 3500	3500	53	6"
ZEH 4000	4000	64	6"
ZEH 5000	5000	75	6"

NOTES

- 1) Capacities given are for inlet pressures at 100 PSIG (7 Bar G) and 100°F (38°C) inlet temperature.
- 2) Heater kW listed may change with specific applications.
- 3) Larger capacities are available upon request.

Technical Features

- 575V/3ph/60Hz or 460V/3ph/60Hz electrical input – please specify
- Chamber and purge air pressure gauges
- Chamber relief valves
- Chamber and purge air temperature indicators
- Pilot air filter
- Switching failure alarm
- Heater failure alarm
- High heater sheath temperature alarm + shutdown
- Dryer status indication – chamber drying/chamber heater/dryer in standby
- Common dryer alarm contacts and alarm panel indication

Authorized Distributor:



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