

Industrial Gases

Heatless Adsorption Dryer Ultrapac HL - MSD/ALD 0100 -1000



PRODUCT DESCRIPTION

The Ultrapac HL - range is designed for drying of compressed air and nitrogen in a pressure range up to 16 bar.

The drying process is based on adsorption of water molecules out of a gas stream on hygroscopic desiccant materials. With this drying concept pressure dewpoints of -40°C (at 7 bar) or lower can be achieved.

The regeneration of saturated desiccant is done by using a partial stream of dry compressed air for the desorption of water.

Pre filter with automatic electronical condensate drain and after filter are included in the Ultrapac purification system.

An electrical circuit board controller enables automated control of all phases of the drying and regeneration cycle. It includes the dewpoint monitoring and control system Ultraeconomy for energy efficient and reliable operation in the Superplus models.

MAIN FEATURES & BENEFITS

- **Heatless-regenerated adsorption dryer**

Robust and efficient drying concept for achieving low pressure dewpoints in even high ambient temperature and humidity conditions.

- **Pre- and after-filters with UltraPleat technology**

Complete purification system including high-efficiency filters for removal of oil and water aerosols as well as solid particles.

- **Superplus models with Ultraeconomy dewpoint control**

Monitoring and control of dewpoint ensure full utilization of desiccant capacity and is the trigger to start regeneration process. High energy and cost saving opportunity as well as full drying performance control.

- **Automatic electronical zero-loss condensate drain with alarm function included**

No loss of compressed air during drain process; continuous control of drain function for reliable and safe operation.

- **Robust and reliable design and components**

Pressure vessels and pipelines made of steel material. Piping system in press-fitting design. Robust, long-life shuttle valves in main pipe and solenoid membrane valves in regeneration pipe.

INDUSTRIES



- Industrial Machinery



- Food Processing



- Electronics



- Automotive

PRODUCT DESCRIPTION

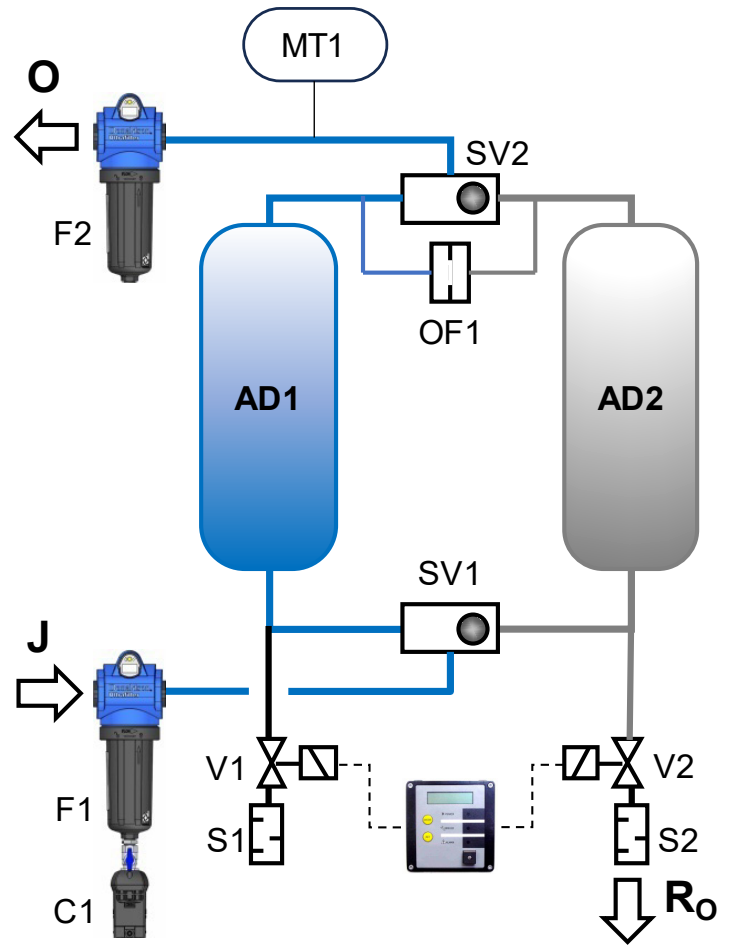
The adsorption dryer is consisting of two adsorber vessels (AD1 / AD2) filled with desiccant. While one adsorber is in drying phase, the other adsorber is being regenerated.

In the drying phase compressed air is entering the unit at the wet air inlet (J) and passes the coalescing type pre filter F1 where oil and water aerosols are removed. Condensate is collected in the condensate drain C1 and automatically drained-off the system. The wet air is led through the lower 2/2-way shuttle valve (SV1) into the adsorber AD1 (example shown here). It flows through the adsorber from bottom to top and adsorbs the humidity on the desiccant. Via the upper 2/2-way shuttle valve (SV2) it flows to the dry air outlet (O). The dewpoint is measured by the dewpoint transmitter MT1 (for Superplus models).

While adsorber AD1 is in drying phase, adsorber AD2 is being regenerated. Therefore, the pressure in adsorber AD2 is released via valve V2 (V1) and immediately a partial flow of dry air is expanded through the orifice OF1 and flows from top to bottom through adsorber AD1. The dry regeneration air is picking-up the water from the desiccant and is released via the silencer S2 (S1) to the regeneration outlet Ro.

At the end of the regeneration phase valve V2 (V1) is closed and through the orifice OF1 pressure is building-up in adsorber AD2 again until it is on the same pressure level as in adsorber AD1.

The switch-over for the adsorbers AD1 and AD2 from drying to regeneration or vice versa is triggered either in time-controlled mode (standard models) or by controlling the dewpoint on transmitter MT1, when the dewpoint limit value is exceeded (Superplus models).



- J = Wet air inlet
- O = Dry air outlet
- Ro = Regeneration air outlet

PRODUCT DESCRIPTION

FEATURES	BENEFITS
Heatless-regenerated adsorption dryer with purge regeneration concept	Robust and efficient drying concept for achieving low pressure dewpoints in even high ambient temperature and humidity conditions.
2 selectable model types ALD and MSD	ALD for moderate operating temperatures and pressure dewpoint -40°C (Class 2 acc. to ISO 8573-1:2010); MSD for high temperature applications and pressure dewpoints down to -70°C (Class 1 acc. to ISO8573-1:2010 achievable at appropriate sizing and operating conditions).
Pre and after filter with UltraPleat technology included	Complete purification package with high oil- and water aerosol retention efficiency on pre- filter and high particulate retention efficiency on after filter at very low differential pressure included.
Pre-filter with electronic level-controlled condensate drain incl. function control and alarm message	No compressed air loss through condensate drain, therefore reducing of operating costs; continuous control of drain function for reliable and safe operation.
Ultraconomy dewpoint control (Superplus models)	Monitoring and control of dewpoint ensure full utilization of desiccant capacity. High energy and cost saving opportunity as well as full drying performance control.
Electrical controller including visualization of dryer status, alarm and service messages. Standard version with time-controlled operating mode; Superplus version with text display and dewpoint monitoring including Ultraconomy capacity control mode.	Efficient and reliable control of dryer operation and continuous monitoring of dryer status. High energy-saving opportunity by using Ultraconomy capacity control.
Remote On/Off contact (intermittent operation)	Remote control of dryer operation and link to compressor on/off-load contact possible to save purge air when compressor is not running.
10 dryer sizes up to 1000 m ³ /h nominal flow capacity	Wide range of dryer flow capacities and connection sizes matching to user requirements.
Welded steel vessels and frame; press-fitting pipeline design	Robust, long-life, leakage-proof and service-friendly design
Shuttle valves and regeneration valves with flanged housings	Quick replacement of wear parts to reduce service and maintenance cost and lead to reduced downtime.
Economter differential pressure indicators on pre and after filters	Monitoring of filter particle contamination and enabling of on time replacement of contaminated filter elements.

PRODUCT DESCRIPTION

In addition to the features already included in the standard dryer configuration, a range of defined standard options are available.

OPTIONS	DESCRIPTION AND BENEFITS
Power supply voltages	230 V AC (50-60 Hz) power supply available as standard; 24 VDC, 115VAC (50-60 Hz) as option
Packaging options	Seaworthy packaging and vertical or horizontal wooden box packaging options available for special transport / storage conditions.
Purge orifice for specific operating pressure	Selection of specific orifice for dryer model, size and pressure
4...20 mA output signal	Dewpoint signal can be transferred to on-site control or monitoring system (available for Superplus models).
Tropical version	Operation at short cycle mode allows selection of appropriate dryer model for operation at high inlet temperatures up to 50°C.
-70°C pressure dewpoint measuring system	Dewpoint measuring system in stainless steel material for precise and reliable measuring of extreme low dewpoints.
Further options on request	Individual dryer configuration as per customer's requirements and tailor-made solutions, also for other industrial gases available on request.

PRODUCT DESCRIPTION

TECHNICAL DATA

Adsorber Vessel

Pressure Vessel Material	Carbon steel
Design Data	Design pressure: 16 bar g, Design temperature: -10°C / +60°C
Design, Manufacturing and Testing	Acc. to AD2000 / PED 2014/29/EU
Flow Distributor Material	Stainless steel

Piping

Design Data	Flange pressure rating: PN16 Design pressure: 16 bar g Design Temperature: 60°C
Piping Material	Carbon steel, galvanized
Design, Manufacturing and Testing	Acc. to PED 2014/68/EU

Filters

Design Data	Design pressure: 16 bar g Design temperature: 65°C
Filter Housing Material	Aluminium
Design, Manufacturing and Testing	Acc. to PED 2014/68/EU

Electrical Controller

Design	Circuit board controller with LED indicators (Standard) or LCD text display (Superplus)
Power Supply	230 V AC 50-60 Hz (Standard), 24 V DC (optional), 115 V AC 50-60Hz (optional)
Protection Class	IP 54, acc. to IEC/EN 60529
Potential-Free Alarm Contact	Included
Remote On/Off Contact	Included

PRODUCT DESCRIPTION

TECHNICAL DATA

Nominal Standard Conditions

Pressure Dewpoint	ALD: -40°C (at 7 bar g), MSD-70°C...-40°C (depending on sizing and operating conditions)
Operating Inlet Pressure	7 bar g
Operating Inlet Temperature	35°C
Inlet Humidity	100% saturated

Compressed Air Purity

Compressed Air Purity Classes acc. to ISO 8573-1:2010	ALD: 1-2 : 2 : 2 MSD: 1-2 : 1-2 : 2
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Operating Limits

Media	Compressed Air / Nitrogen
Operating Pressure	4 – 16 bar g
Operating Temperature	5 – 50°C
Ambient Temperature	5 – 50°C
Installation	Indoor

PRODUCT DESCRIPTION

Technical Data							
HL-ALD HL-MSD	Nominal Volume Flow (1 bar, 20°C) m³/h ¹⁾	Pure Air Consumption, average m³/h (1 bar, 20°C)		Volume Flow Outlet, Min. m³/h (1 bar, 20°C)		Differential Pressure, initial mbar	Pre- and after-filter UltraPleat S
		ALD	MSD	ALD	MSD		
0100	100	15.0	20	81.6	75.4	7.8	0210
0150	150	23.0	30	121.7	113.1	11.2	0210
0175	175	26.3	35	142.7	132.0	11.2	0210
0225	225	34.0	45	183.2	170.0	14.2	0450
0300	300	45.0	60	244.7	226.2	14.2	0450
0375	375	56.0	75	306.1	282.8	20.0	0450
0550	550	83.0	110	447.9	414.7	24.0	0600
0650	650	98.0	130	529.5	490.1	32.5	0750
0850	850	128.0	170	692.6	640.9	32.5	1100
1000	1000	150.0	200	815.5	754.0	38.0	1100

¹⁾ Nominal flow at 7 bar g, 35°C; ²⁾ at nominal flow

SIZING

Type	Pressure Dewpoint (PDP)	Residual water content	Inlet Temp.	Operating Pressure (bar g)												
				4	5	6	7	8	9	10	11	12	13	14	15	16
ALD	-40°C	0,11 g/m³	25°C	0.75	0.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.55
			30°C	0.69	0.83	0.96	1.10	1.24	1.38	1.51	1.65	1.79	1.93	2.06	2.20	2.34
			35°C	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
MSD	≤ -40°C* DTP ≥ -70°C*	0,11 g/m³	25°C	0.75	0.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.55
			30°C	0.69	0.83	0.96	1.10	1.24	1.38	1.51	1.65	1.79	1.93	2.06	2.20	2.34
			35°C	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
			40°C	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70
			45°C	0.44	0.53	0.61	0.70	0.79	0.88	0.96	1.05	1.14	1.23	1.31	1.40	1.49
		0,0027 g/m³	50°C	0.31	0.38	0.44	0.50	0.56	0.63	0.69	0.75	0.81	0.88	0.94	1.00	1.06
* on request			Correction factors (f)													

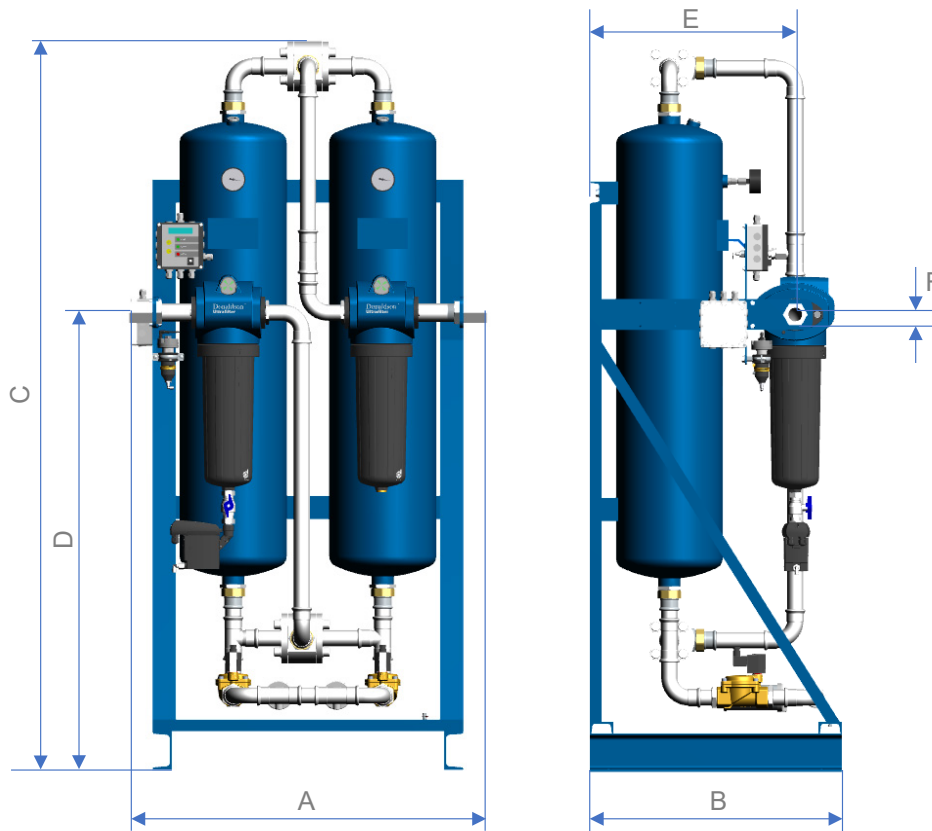
Example:

V_{nom} = 200 m³/h, inlet temperature = 30°C, operating pressure = 10 bar (g), DPD = -40°C

$$V_{corr} = \frac{V_{nom}}{f} = \frac{200 \text{ m}^3/h}{1.51} = 132.5 \text{ m}^3/h$$

Calculated dryer size:
ALD, Type 0150

DIMENSIONS / WEIGHT



HL-ALD HL-MSD	A mm	B mm	C mm	D mm	E mm	F BSP	Weight kg
0100	705	450	1600	900	370	1"	155
0150	705	450	2025	1100	370	1"	185
0175	910	650	1900	1185	530	1"	245
0225	920	650	1900	1185	530	1 1/2"	245
0300	920	650	1890	1185	530	1 1/2"	290
0375	920	650	2220	1300	520	1 1/2"	370
0550	1190	750	2220	1370	635	2"	400
0650	1190	750	2220	1370	635	2"	475
0850	1320	850	2320	1500	730	2"	565
1000	1320	850	2340	1500	730	2"	646