



Donaldson
FILTRATION SOLUTIONS

Dryer Systems

Heat Regenerating Adsorption Dryers

Ultradryer HRS-L 1000 - 13600

MAIN FEATURES & BENEFITS

- 15 sizes available, matching to the compressor flow capacities
- Energy-efficient regeneration (desorption) in counter-current flow
- Applicable in all climate zones due to cooling with blower air (zero purge) running in circular flow (loop)
- Pressure dewpoint of -40°C as standard, individual cases down to -70°C possible
- Robust design with welded steel vessels and flanged pipelines
- Service-friendly design of butterfly valves and pressure reducing valves for fast replacement of wearing parts
- Robust, efficient programmable controller of the latest generation, for which service and support are guaranteed beyond the next decade
- Touch Panel with a high operational comfort; The main menu shows a system overview with the operational data such as pressure, temperature, cycle of the vessels etc.
- Comprehensive option package: dewpoint dependent capacity control, start-up-device, free of silicone and parting agents, bypass line, filter extension etc.
- Suitable high-efficiency filters as pre- and afterfilter (option) ensure a low differential pressure for the complete unit and thus small operating costs



HRS-L 2750

INDUSTRIES



- Chemical and electrical industry



- Machine building industry and plant engineering / construction



- Automotive industry

Donaldson Filtration Deutschland GmbH
Büssingstr. 1
D-42781 Haan
Tel.: +49 (0) 2129 569 0
Fax: +49 (0) 2129 569 100
E-Mail: CAP-de@donaldson.com
Web: www.donaldson.com

Donaldson®
Ultrafilter

PRODUCT DESCRIPTION

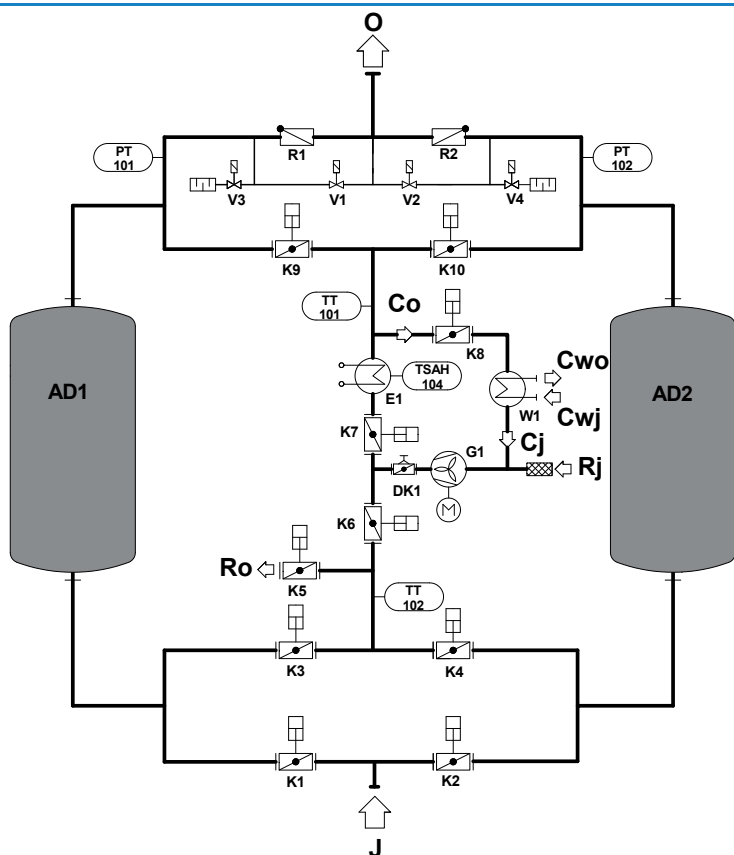
The externally heat regenerated adsorption dryers HRS-L 1000-13600 work according to the dynamic adsorption principle. Wet compressed air streams through a desiccant bed. While streaming through, moisture is drawn out of the compressed air. Since the adsorption capacity of the desiccant is limited, the flow direction has to be changed before the desiccant is completely saturated. Using two parallel adsorption vessels (adsorbers **AD1 + AD2**) with alternating function, the permanent supply of dried air for consumers is guaranteed.

One adsorber is always available for drying the compressed air. The second adsorber is regenerated at the same time. The activation time respectively the regeneration time is always shorter than the loading time of the working adsorber. The regeneration of the saturated desiccant is realized in two steps:

1. Desorption in counter-current flow to the adsorption direction with externally heated blower air
2. Cooling of the heated desiccant with blower air running in circular flow (loop)

Typical applications for the adsorption dryers HRS-L are:

- **Central compressed air purification**
Generation of dry, oil-free and particulate-free compressed air (with option pre- and afterfilter)
- **Point-of-use applications**
Drying and purification of control and instrument and process air
- **Automotive industry**
Purification of compressed air for painting applications



- J: Wet air - inlet
- O: Dry air - outlet
- Rj: Desorption air - inlet
- Ro: Desorption air - outlet
- Cj: Cooling air - inlet
- Co: Cooling air - outlet
- Cwj: Cooling water - inlet
- Cwo: Cooling water - outlet

PRODUCT SPECIFICATIONS

| Features: | Benefits: |
|---|--|
| 15 sizes available, matched to the compressor flow capacities | Custom made solutions possible, matching exactly customer's requirements; no oversizing of compressors necessary, due to no regeneration air requirements |
| Energy-efficient regeneration (desorption) in counter-current flow | Low desorption temperature, less energy consumption, no compressed air consumption (zero purge) |
| Cooling of the heated desiccant with blower air running in circular flow (loop) | Independent of ambient temperature and humidity, applicable in tropical environment, no compressed air consumption (zero purge), if necessary also very low dewpoints (PDP -70°C) realizable |
| Welded steel vessels and flanged pipelines | Robust service-friendly design |
| Easy accessibility of all components. Service-friendly design of pressure reducing valves and butterfly valves (two-piece housings) | Fast replacement of wearing parts ensure low service and maintenance cost and reduced downtime |
| Programmable logic controller Simatic S7-1200 | Robust, efficient controller of the latest generation, custom made solutions possible |
| Touch Panel KTP700 | High operational comfort due to self-explaining menu. All operational data on one view. Indication of current dewpoint (option) and function status as well as alarm and service messages on the main menu ensures high operating safety of the adsorption dryer |
| Comprehensive option package: Dewpoint depending control, start-up device, free of silicone and parting agents, bypass, filter extension etc. | Flexibility in application, well thought option package for economic operation and safe system installation in the compressed air network |
| Suitable high-efficiency filters as pre- and afterfilter available (option) | Low differential pressure of the complete unit and thus small operating costs |
| Ultraconomy version including dewpoint dependent capacity control (option) | Saving of energy and operational costs due to adaption of the adsorption cycle to the current operating conditions |

| Technical Data | |
|------------------------------------|---|
| Adsorption vessel | |
| Material: | Carbon steel |
| Design data: | 11 bar (g), 230°C for 1000 - 2750 10 bar (g), 200°C for 3500 - 13600 |
| Design, manufacturing and testing: | acc. to AD 2000 |
| Approval: | acc. to PED 2014 / 68/ EU |
| Gas distributor: | Stainless steel |
| Piping | |
| Nominal pressure: | PN 16 |
| Material: | Carbon steel |
| Design, manufacturing and testing: | acc. to AD 2000 |
| Approval: | acc. to PED 2014 / 68 / EU |

PRODUCT SPECIFICATIONS

| Standard conditions | | |
|--------------------------------------|--|--|
| Pressure dewpoint: | -40°C (-70°C) | Selection at different operating conditions by correction factor f according to table "sizing" |
| Operating pressure: | 7 bar (g) | |
| Inlet temperature: | +35°C (+25°C) | |
| Inlet humidity: | saturated | |
| Operating limits | | |
| Media: | Compressed air/ Nitrogen | Design for operating conditions beyond specified application limits on request |
| Operating pressure: | 4 - 10 bar (g) | |
| Inlet temperature: | 5 - 40°C (5 - 30°C) | |
| Ambient temperature: | 5 - 40°C | |
| Max. blower inlet: | 35°C/ 85% r. h. to 40°C/ 70% r. h. | |
| Installation: | indoor | |
| Controller (standard version) | | |
| Design: | acc. to VDE/ IEC | Special versions on request |
| Power supply: | 3 Phases / 400V - 50 Hz | |
| Control voltage: | 24 VDC / 230 VAC - 50 Hz | |
| PLC: | Siemens S7-1200 with CPU 1214C | |
| Text display: | Siemens KTP 700 | |
| Protection class: | IP 54, acc. to IEC 529 | |
| Control box: | C-steel sheet, powder coated, RAL 7035 | |
| Potential free common alarm contact: | incl. | |
| Main switch: | incl. | |

SIZING

| Type | Pressure Dewpoint (PDP) | Inlet temperature | Operating pressure (bar) | | | | | | |
|-------|-------------------------|-------------------|--------------------------|------|------|------|------|------|------|
| | | | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| HRS-L | -40°C | 30°C | 0,72 | 0,92 | 1,09 | 1,25 | 1,36 | 1,45 | 1,51 |
| | | 35°C | 0,55 | 0,70 | 0,86 | 1,00 | 1,12 | 1,25 | 1,37 |
| | | 40°C | 0,33 | 0,45 | 0,58 | 0,71 | 0,82 | 0,92 | 1,03 |
| | -70°C | 20°C | 0,79 | 0,92 | 1,02 | 1,14 | 1,22 | 1,34 | 1,45 |
| | | 25°C | --- | 0,88 | 0,97 | 1,10 | 1,18 | 1,30 | 1,42 |
| | | 30°C | --- | --- | 0,86 | 1,00 | 1,12 | 1,25 | 1,35 |
| | | | Correction factors (f) | | | | | | |

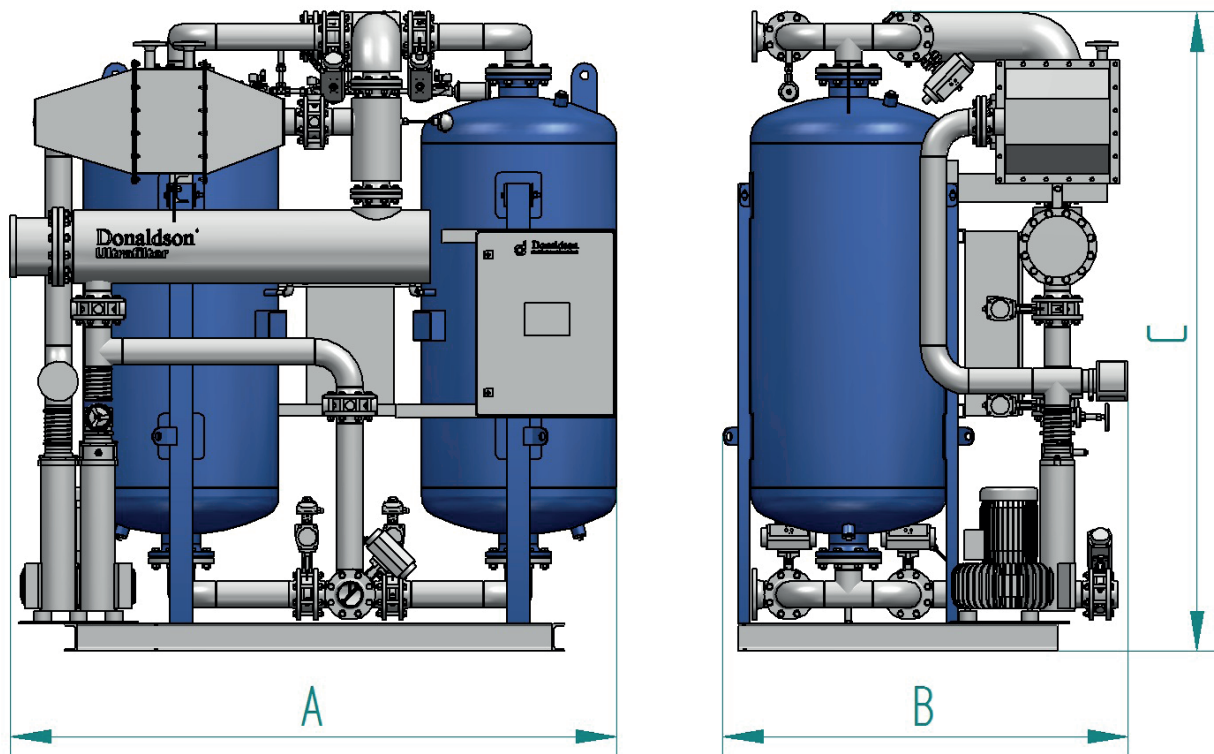
Example:

$\dot{V}_{nom} = 3990 \text{ m}^3/\text{h}$, inlet temperature = 40°C, operating pressure = 6 bar (g), PDP = -40°C

$$\dot{V}_{korr} = \frac{\dot{V}_{nom}}{f} = \frac{3990 \text{ m}^3/\text{h}}{0,58} = 6879 \text{ m}^3/\text{h}$$

**Calculated dryer size:
Type HRS-L 7000**

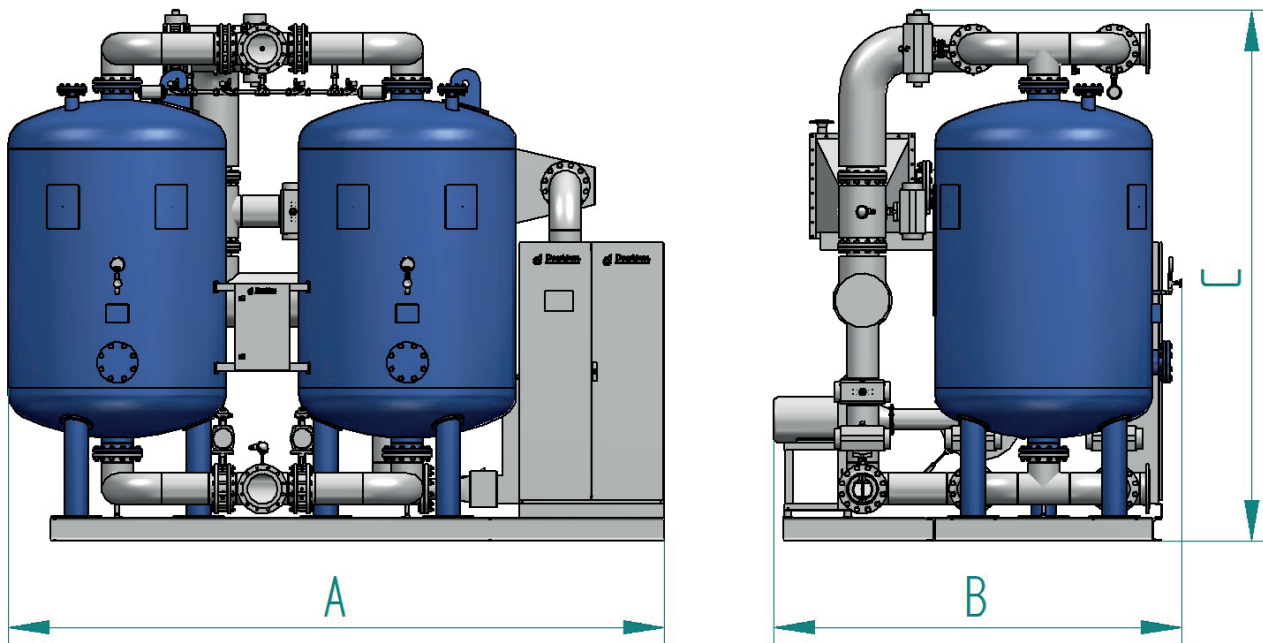
DIMENSIONS



| Type | \dot{V}_{nom} at 7 bar (g) | | Connections PN 16, DIN EN 1092 | Installed Power kW | Dimensions | | | Weight kg |
|------|------------------------------|------|-----------------------------------|-----------------------|------------|------|------|--------------|
| | m ³ /h | cfm | | | A mm | B mm | C mm | |
| 1000 | 1000 | 590 | DN 80 | 18,2 | 2080 | 1290 | 2460 | 1640 |
| 1350 | 1350 | 800 | DN 80 | 24,0 | 2150 | 1450 | 2580 | 1850 |
| 1650 | 1650 | 975 | DN 80 | 28,0 | 2240 | 1510 | 2630 | 2130 |
| 1950 | 1950 | 1150 | DN 100 | 32,5 | 2310 | 1630 | 2720 | 2570 |
| 2250 | 2250 | 1330 | DN 100 | 38,0 | 2380 | 1680 | 2740 | 2720 |
| 2750 | 2750 | 1620 | DN 100 | 42,5 | 2640 | 1770 | 2790 | 3200 |

\dot{V}_{nom} in m³/h related to compressor inlet at 20°C and 1 bar (a), an operating pressure of 7 bar (g) and a compressed air inlet temperature of +35°C (saturated).

DIMENSIONS



| Type | \dot{V}_{nom} at 7 bar (g) | | Connections PN 16, DIN EN 1092 | Installed Power kW | Dimensions | | | Weight kg |
|--------------|------------------------------|------|-----------------------------------|-----------------------|------------|------|------|--------------|
| | m ³ /h | cfm | | | A mm | B mm | C mm | |
| 3500 | 3500 | 2065 | DN 100 | 52,5 | 3620 | 1990 | 3000 | 3990 |
| 4000 | 4000 | 2360 | DN 150 | 67,5 | 3660 | 2020 | 3210 | 4850 |
| 5000 | 5000 | 2945 | DN 150 | 71,0 | 3880 | 2290 | 3310 | 5990 |
| 6000 | 6000 | 3535 | DN 150 | 86,0 | 4020 | 2390 | 3190 | 6900 |
| 7000 | 7000 | 4125 | DN 150 | 95,0 | 4220 | 2490 | 3250 | 7480 |
| 8750 | 8750 | 5155 | DN 200 | 115,0 | 4520 | 2820 | 3660 | 10050 |
| 10500 | 10500 | 6185 | DN 200 | 135,0 | 5400 | 2870 | 3390 | 13650 |
| 11500 | 11500 | 6770 | DN 200 | 153,0 | 5600 | 2980 | 3450 | 14700 |
| 13600 | 13600 | 8010 | DN 200 | 178,5 | 6000 | 3190 | 3390 | 16500 |

\dot{V}_{nom} in m³/h related to compressor inlet at 20°C and 1 bar (a), an operating pressure of 7 bar (g) and a compressed air inlet temperature of +35°C (saturated).