delair®

Delair® DB Compressed Air Dryers

FLAIR
A United Dominion Company

Introduction

Flair is the worlds largest manufacturer of air and gas purification equipment. With well known brands such as **Delair®**, **Deltech®**, **Dollinger®**, **Pneumatic Products®** and **Technolab®**, Flair has over 70 years of experience in the design and development of air dryers and filters.

As a consequence, Flair offers the widest range of compressed air products, from air/oil separators, standard filters, desiccant dryers and refrigeration dryers, to engineered systems.

Flair is a United Dominion Company. United Dominion Industries is a world scale industrial enterprise, comprising of leading edge companies who are number one in their respective fields.
Flair is ISO 9001 certified.

Why adsorption dryers?

Water Ruins Operation

Water can be a real problem in a compressed air system. The air outlet temperature of a compressor/aftercooler package is typically 25-50°C and saturated with water vapour, which results in significant amounts of liquid downstream. Water in a compressed air system can cause serious problems ranging from product spoilage to equipment malfunction, thus making an air dryer a critical component in any compressed air system.

The Adsorption Solution

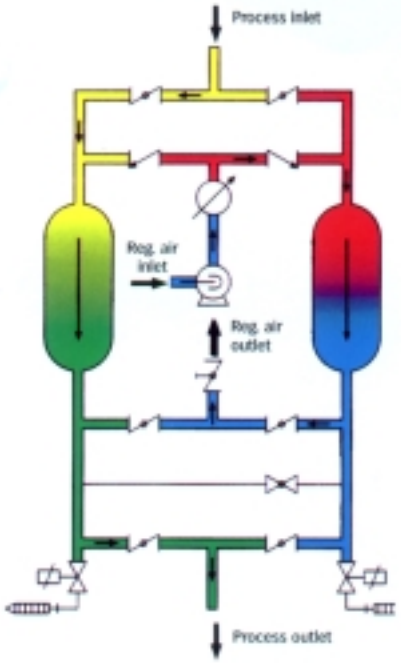
Pressure dewpoint is a measure of the moisture content of compressed air, it is the temperature at which water vapour will begin to condense.
The Delair® DB compressed air dryer reduces the concentration of water vapour and decreases the pressure dewpoint of the air to -40°C.

How Delair® DB Compressed Air Dryers Work

The Delair® DB compressed air dryers use porous materials (desiccants) to adsorb water molecules from the compressed air. Periodically, the desiccant is regenerated (adsorbed water driven off) for re-use.

To allow continuous operation, two desiccant towers are used, one adsorbing moisture while the other is being regenerated.

For regeneration, heated ambient air is used instead of expensive purge air to desorb moisture from the regenerating bed.
No purge loss means: Dryer "in" is dryer "out".



Why Delair® DB Compressed Air Dryers?

- **no purge air loss and no dewpoint peak**
- **pressure drop below 0.1 bar**
- **low power consumption**
- **compact and maintenance friendly**
- **operation by PLC system**
- **many options**

No purge air loss and no dewpoint peak

Regeneration is carried out by means of heated ambient air. Therefore no purge air is used, so dryer "in" is dryer "out".
Pressure dewpoint and outlet temperature of the dried compressed air will not exceed the specified conditions (no peaks during switch-over), due to Flair's regeneration system, co-current cooling and parallel drying.

Pressure drop below 0.1 bar

Due to the unique design of the compressed air dryer, i.e. vessels, piping, strainers and butterfly valves, this type of dryer has a pressure drop below 0.1 bar.

Low power consumption

The adsorbers and the regeneration heater are insulated so that the heater achieves optimum energy efficiency. The regeneration of the air dryer is thermostatically ended. The electrical energy consumption is matched to actual moisture loading of the desiccant. As the required heat for regeneration is equally distributed over the desiccant bed, no "hot spots" can occur, and excessive aging of the desiccant will be avoided.

Compact and maintenance friendly

The Delair® DB dryer is skid mounted and includes PLC control and all equipment for continuous trouble-free duty. The regeneration heater is 2-stage with thermostatic control of the second stage and it includes a safeguard against overheating.
Pressurization and depressurization before and after regeneration is a part of the dryer cycle.
This prevents damage and wear and tear to the valve seals and any reduction in life-time of the desiccant due to pressure shocks.
The components used, such as butterfly, solenoid valves and actuators, require a minimum of maintenance.

Operation by PLC system

The Delair® DB dryer is operated by sophisticated PLC system for automatic control of all dryer functions and alarms. In addition, the PLC system allows easy integration of feature options.

Many options

Filters

Should the compressed air be oversaturated, contain oil/water drops or be contaminated with dust and rust particles, a Flair pre-filter is required.
The dried compressed air can carry a small amount of dustparticles. To remove those dustparticles, a Flair dustfilter downstream the compressed air dryer must be installed.

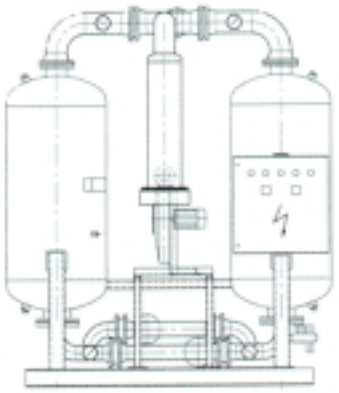
Energy savings

- **Dewpoint change-over**
  The Delair® DB compressed air dryer has a tower change-over after 6 hours of drying. Alternatively, the change-over can be based on dewpoint measurement. When the dryer is not operating at maximum conditions, this will result in an extension of drying time and a considerable reduction in the energy consumption. This dewpoint analyzer fitted to the air dryer monitors the dewpoint of the dried compressed air and in addition provides a 4-20 mA alarm signal for remote monitoring.

Technical data Delair® DB Compressed Air Dryers

Performance

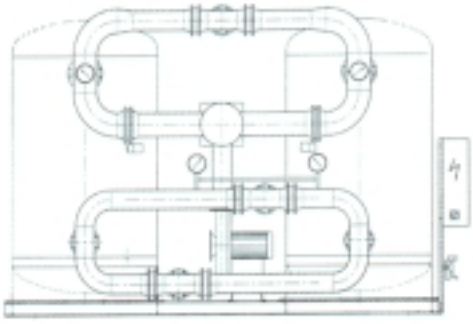
- Fully automatic and continuous operation
- Skid provided with foundation holes
- Two pressure vessels wtih filling and removal parts
- Blower wtih electric motor
- Sheet steel control box manufactured to IP-54
- Two temperature indicators on top of the adsorbers
- Two pressure indicators with block valves
- Pressurizing system to be used before switching over
- Compressor start/stop contact for extension of the drying period
- PLC operation, wtih the following features:
  - locking of the status of the program at control voltage switch off or power failure
  - fast run of the program to check the sequence
  - reset possibility of the program
- Electrical heater with control thermostat
- Heat insulation of heater, vessels and hot piping, 50 mm glasswool covered with aluminium sheet, 1 mm thick
- Terminals for remote general alarm
- Painting: Epoxy enamel 70 µm, colour RAL 9001 white
- Piping: Carbon steel
- Pilot airlines: copper



Delair® DB 22-30

Options

- Pressure dewpoint - 70°C (see DB-LD leaflet)
- Various power supplies
- Pre-and after filters
- Energy savings
  * Dewpoint change-over
  * Steam regeneration
- operation safety features
  * Limit switches
  * Pressure control device
- Maintenance features
  * By-passes
  * Outdoor location adaptions
  * Instrumentation



Delair® DB 31-35

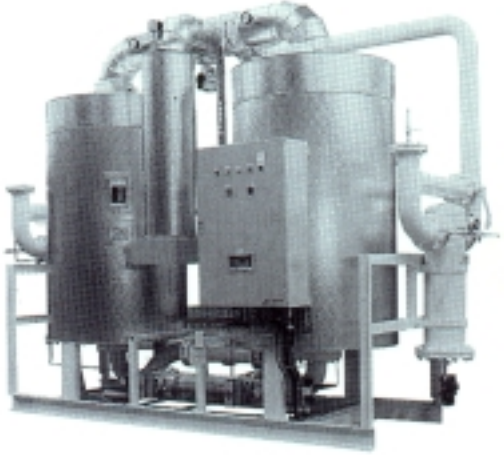
Standard working conditions

- Pressure dewpoint : -40°C
- Nominal inlet pressure : 7 bar g*
- Inlet temperature : +35°C*
- Relative humidity : 100%
- Power supply : 400V-3-50Hz

* Use the multipliers when the conditions are different from these. Refer to the tables on the other side of this page.

Design data

- Inlet pressure : minimum 5 bar g
  : maximum 10 bar g
- Inlet temperature : minimum +5°C
  : maximum +45°C
- Ambient temperature : minimum 0°C
  : maximum +40°C



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Technical data Delair® DB Compressed Air Dryers

Model	Dimensions, mm			Weight	Connection*
	Width	Depth	Height	kg	mm
DB-22	1980	1180	2780	1150	DN 50
DB-23	2080	1260	2930	1250	DN 80
DB-24	2130	1260	2930	1550	DN 80
DB-25	2200	1470	2810	2000	DN 100
DB-26	2700	1460	3010	2450	DN 100
DB-27	2800	1510	2970	3200	DN 100
DB-28	3350	1680	3380	4100	DN 150
DB-29	3550	1840	3160	5250	DN 150
DB-30	3800	2070	3370	7000	DN 150
DB-31	5120	2365	3535	10500	DN 150
DB-32	5320	2465	3565	11500	DN 200
DB-33	5420	2565	3565	12500	DN 200
DB-34	5520	2665	3565	13500	DN 200
DB-35	5720	2765	3565	14500	DN 200

* Connection available in ANSI and DIN

Model	Capacity, m3/min*	Rating, kW		max. kWh.**
		Regen. Fan.	Heater	per hour
DB-22	10.8	1.1	8.1	5.9
DB-23	16.3	2.2	12.0	8.9
DB-24	25.3	2.2	18.3	13.1
DB-25	32.8	2.2	23.4	16.5
DB-26	43.0	2.2	30.6	21.3
DB-27	54.8	2.2	38.7	26.7
DB-28	72.2	4.0	51.0	35.7
DB-29	93.5	5.5	66.3	46.5
DB-30	115.8	7.5	81.6	57.5
DB-31	140.2	7.5	100.8	70.3
DB-32	158.2	7.5	113.4	78.7
DB-33	183.7	11.0	132.3	92.8
DB-34	201.5	11.0	144.9	101.2
DB-35	228.7	11.0	163.8	113.8

* at 1 bar a and +20˚C
**Average power consumption at full load at desibn conditions and cycle 2×6 hours

The following data can be used to convert the inlet conditions to required dryer capacities.

Multiplier for various inlet temperature [˚C] ànd inlet pressure [bar g]

Inlet temperature	Inlet pressure [bar g]					
[˚C]	5	6	7	8	9	10
30	0.97	1.13	1.30	1.49	1.62	1.78
35	0.69	0.85	1.00	1.12	1.25	1.37
40	0.43*	0.60	0.74	0.85	0.95	1.02

* pressure dewpoint of -30˚C
Lower and higher inlet pressure, higher inlet temperature, higher capacity and lower dewpoints on request

Example :

Capacity : 55 m3/min
Inlet pressure : 8 bar g
Inlet temperature : +40˚C
Pressure dewpoint : - 40˚C
V1 : Actual capacity at revised conditions
V2 : Actual capacity [at 1 bar a/20˚C]

Calculation :

$$V1 = \frac{V2}{\text{multiplier}} = \frac{55}{0.85} = 64.7 \text{ m}^3\text{/min}$$

Dryer model Delair DB-28 is suitable

* Subject to technical alterations

DSDB9605ENG

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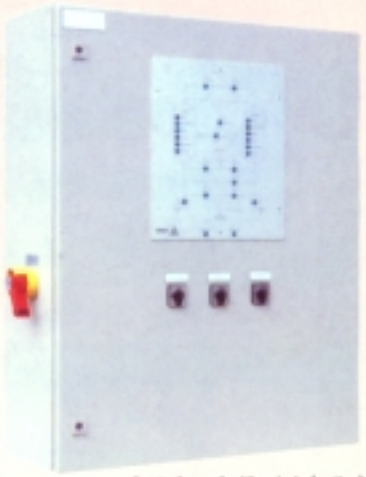
- **Steam regeneration**
  If steam is available, the Delair® DB compressed air dryer can be manufactured with a steam/air heatexchanger instead of an electrical heater.

Operation safety features

- **Limit switches**
  The Delair® DB dryer switching valves can be provided with limit switches. The valve positions can be displayed on a mimic.
- **Pressure safety device**
  The Delair® DB dryer can be provided with pressure switches to control the pressurizing and depressurizing of the adsorbers.

Maintenance features

- **By-passes**
  To facilitate maintenance on dryer and/or filters a by-pass, including corresponding block valves, can be provided.
- **Outdoor location**
  Models for outdoor locations and/or hazardous environments are available on request.
- **Instrumentation**
  If required, the Delair® DB dryer can be supplied with extra instrumentation, e.g. differential pressure gauges, temperature gauges etc.



Control panel with mimic (option)

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Cross reference:
Filters
Heatless air dryers
Refrigerant air dryers
Energyless air dryers
Engineered products (gas and air)

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