Technical Data Sheet

BORA High Pressure Fridge Dryers

Technical alterations reserved / R01/2012/11/08

The compressed air is being fed into the dryer and being pre-cooled in the air-to-air heat exchanger by the outgoing cold compressed air. The pre-cooled air then passes through the refrigerant-to-air heat exchanger where it is being further cooled down to the required pressure dew point. The moisture in the compressed air condenses out and gathers and discharges automatically. Finally, the cold discharged air is being reheated by the incoming compressed air. This saves energy and prevents any moisture forming beyond the dryer in the compressed air system. The cooling capacity of the refrigeration cycle is being controlled by a hot gas bypass which assures the dryer functionabilty for partial loads, too.

	volume flow*		press. drop	power supply	protec. Class	power cons.**	cooling air requir.**	air con.	weight
	m³/h	m³/min	bar	V/Ph/Hz		kW	m³/h	BSP	kg
DHP 0025 AX	25	0,42	0,25	230/1/50-60	IP 20	0,16	200	3/8”	28
DHP 0045 AX	45	0,75	0,24	230/1/50-60	IP 20	0,18	200	3/8”	29
DHP 0075 AX	72	1,20	0,25	230/1/50-60	IP 20	0,22	300	3/8”	32
DHP 0090 AX	90	1,50	0,23	230/1/50-60	IP 20	0,23	300	3/4”	38
DHP 0135 AX	135	2,25	0,23	230/1/50 or 60	IP 20	0,46	300	3/4”	39
DHP 0180 AX	180	3,00	0,24	230/1/50 or 60	IP 30	0,69	380	3/4”	50
DHP 0240 AX	240	4,00	0,24	230/1/50 or 60	IP 30	0,75	380	3/4”	53
DHP 0315 AX	315	5,25	0,20	230/1/50 or 60	IP 40	0,70	450	1”	89
DHP 0450 AX	450	7,50	0,22	230/1/50 or 60	IP 40	0,84	450	1”	101
DHP 0615 AX	615	10,25	0,22	230/1/50 or 60	IP 40	1,10	1900	1”	115
DHP 0810 AX	810	13,50	0,23	230/1/50 or 60	IP 40	1,45	2500	1.1/2”	156
DHP 1010 AX	1.008	16,80	0,22	400/3/50 or 460V/3/60	IP 40	2,17	3400	1.1/2”	188
DHP 1260 AX	1.260	21,00	0,22	400/3/50 or 460V/3/60	IP 42	2,55	5400	2”	252
DHP 1620 AX	1620	27,00	0,23	400/3/50 or 460V/3/60	IP 42	2,85	7200	2”	265
DHP 2280 AX	2.280	38,00	0,20	400/3/50 or 460V/3/60	IP 42	3,50	7400	2”	391

* according to ISO 7183 @ 40 bar g **at 50 Hz frequency

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Subject to change 11/2012

Donaldson® Ultrafilter

DHP 0025 AX - DHP 2280 AX

Features of Bora dryer DHP 0025 AX - DHP 2280 AX	Benefits
Copper brazed stainless steel heat exchanger (DHP0025AX-DHP0075AX coaxial copper HE)	Designed for low pressur drop and high cooling performance
High overload capacity to a pressure dew point of approx.+20 °C	In case of overload, the dryer will only switch off at a dew point above than appr. +20 °C
All dryer in metal cabinet construction	Optimum protection against mechanical damage and against dirt
Lightweight & compact design	Minimum space requirement (on stock, for transport and for the installation in the compressed air network)
Potetential free alarm contact (from DHP 0090 AX)	Economical operation and safe system installation in the compressed air network
RS485 serial port (from DHP 1260 AX)	Remote control. Connection to supervisors system or PC.

Product descritption

Complete compressed air drying system with timed solenoid valve condensate drain, electronic dew point indicator, metal housing, all units air cooled, enviromental friendly refrigerant.

Colour: RAL 5019 Capri blue.

Operating Pressure :
DHP 0025 AX - DHP 1010 AX : max. 50 bar g
DHP 1260 AX - DHP 2280 AX : max. 45 bar g

Refrigerant :
DHP 0025 AX - DHP 0135 AX : R134a
DHP 0180 AX - DHP 2280 AX : R407C

Air inlet temperature :
max. 65 °C

Sound pressure level (at a distance of 1m)
DHP 0025 AX - DHP 1010 AX : < 70 dB(A)
DHP 1260 AX - DHP 2280 AX : < 75 dB(A)

Ambient temperature :
min. +2°C / max. +50 °C

Declaration of conformity:
acc. to 2006/42/EC

Pressure dew point :
+3 °C

Sizing

Comp. air inlet temp.	°C	25	30	35	40	45	50	55	60	65
Factor	fti	1,20	1,12	1,00	0,83	0,69	0,59	0,50	0,44	0,39

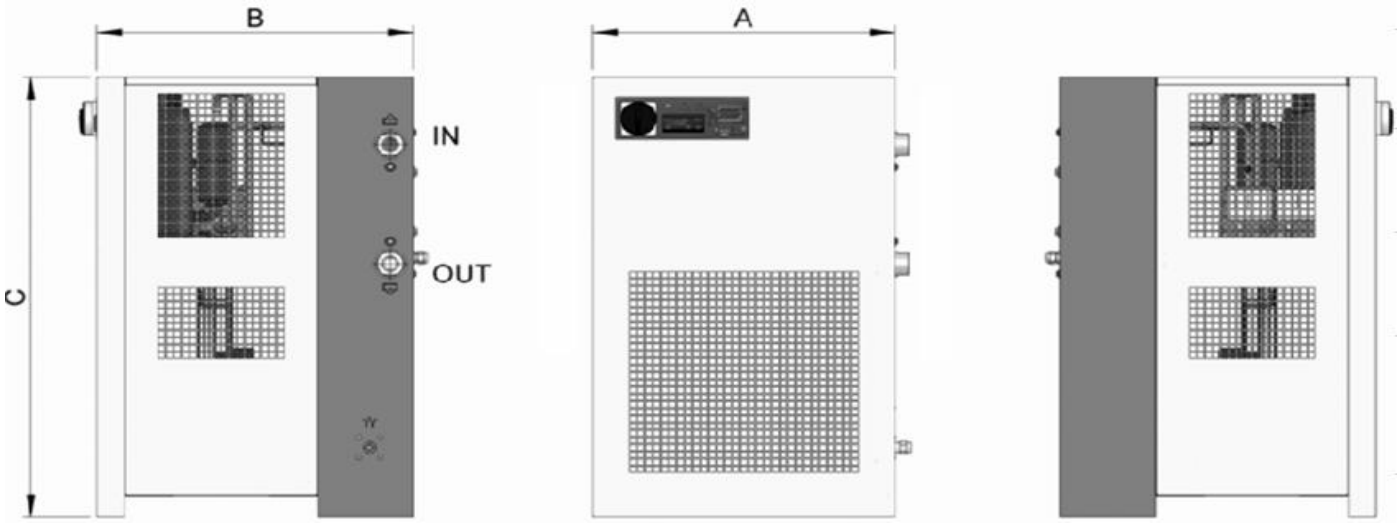
Pressure dew point	°C	3	5	7	10
Factor	ftpd	1,00	1,09	1,19	1,37

Working overpressure	bar (g)	15	20	25	30	35	40	45	50
Factor	fp	0,57	0,70	0,80	0,88	0,94	1,00	1,05	1,10

Temperature of cooling air	°C	25	30	35	40	45	50
Factor	fte	1,00	0,96	0,90	0,82	0,72	0,60

$$V_{korr} = \frac{V}{fti \times ftpd \times fp \times fte}$$

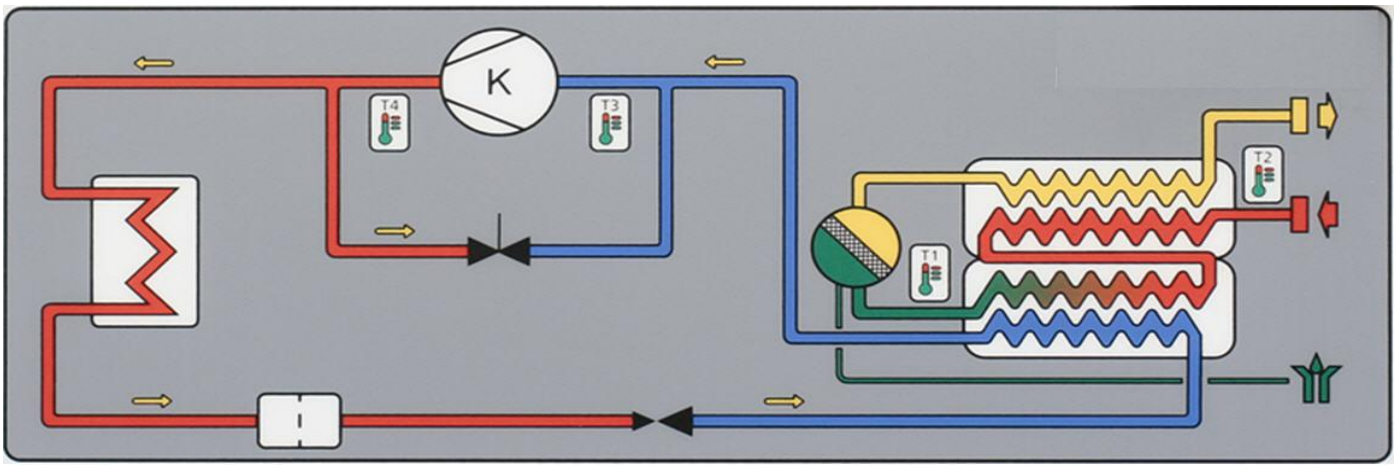
DHP 0025 AX - DHP 2280 AX



Size	A wight mm	B depth mm	C height mm	location of air connection
1	370	515	475	back side
2	345	420	740	right side
3	485	455	825	right side
4	555	580	885	right side
5	665	725	1105	back side
6	790	725	1105	right side

For detailed dimensions please request the dimension sheet.

Function diagram (exemplary)



Bora
DHP 2400 - DHP 6000 AX / WX
Air cooled / water cooled
High Pressure Refrigeration Dryers

Air cooled version
DHP 2400 - DHP 6000 AX

Water cooled version
DHP 2400 - DHP 6000 WX

MAIN FEATURES & BENEFITS

- Refrigerated compressed air dryer for safe and economical compressed air drying for operating pressures up to 45 bar
- 5 sizes for nominal volume flows of 2.430 bis 6.060 m³/h allow an accurate selection of the appropiate refrigeration compressed air dryer to the respective operating volume flow
- Hot gas bypass control in conjunction with pressure and temperature monitoring for safe operation and constant pressure dew point under different load conditions
- Automatic condensate drain on the heat exchanger ensure reliable condensate drainage depending on the amount of condensate
- The electronic controller including a display and indication of the current pressure dewpoint, operating hours, service messages, alarm messages with multiple possible individual settings
- Compact und space-saving design with robust steel housing
- Scroll compressor In the cooling circuit ensures a reliable compression of the refrigerant at high running, low vibration and low noise operation

PRODUCT DESCRIPTION

Bora DHP 2400 - DHP 6000

The new Bora DHP refrigerators are now available for the energy-conscious user. These compressed air dryers are designed for operating pressures 45 bar and thus cover a wide range of applications in various industries. The dew point is controlled by a hot gas bypass, which ensures a constant dew point even under different load conditions. The electronic control system in conjunction with pressure and temperature sensors continuously monitors the operating conditions in the cooling circuit and indicates any alarm conditions on the control display or activates the potential-free alarm contact. Both the air cooled and the water cooled version are equipped with an automatic condensate drain on the heat exchanger, which ensures a safe condensate discharge.

INDUSTRIES

- Chemical and electrical industry
- Maschine building industry and plant engineering/ construction
- Automotive industry

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PRODUCT DESCRIPTION

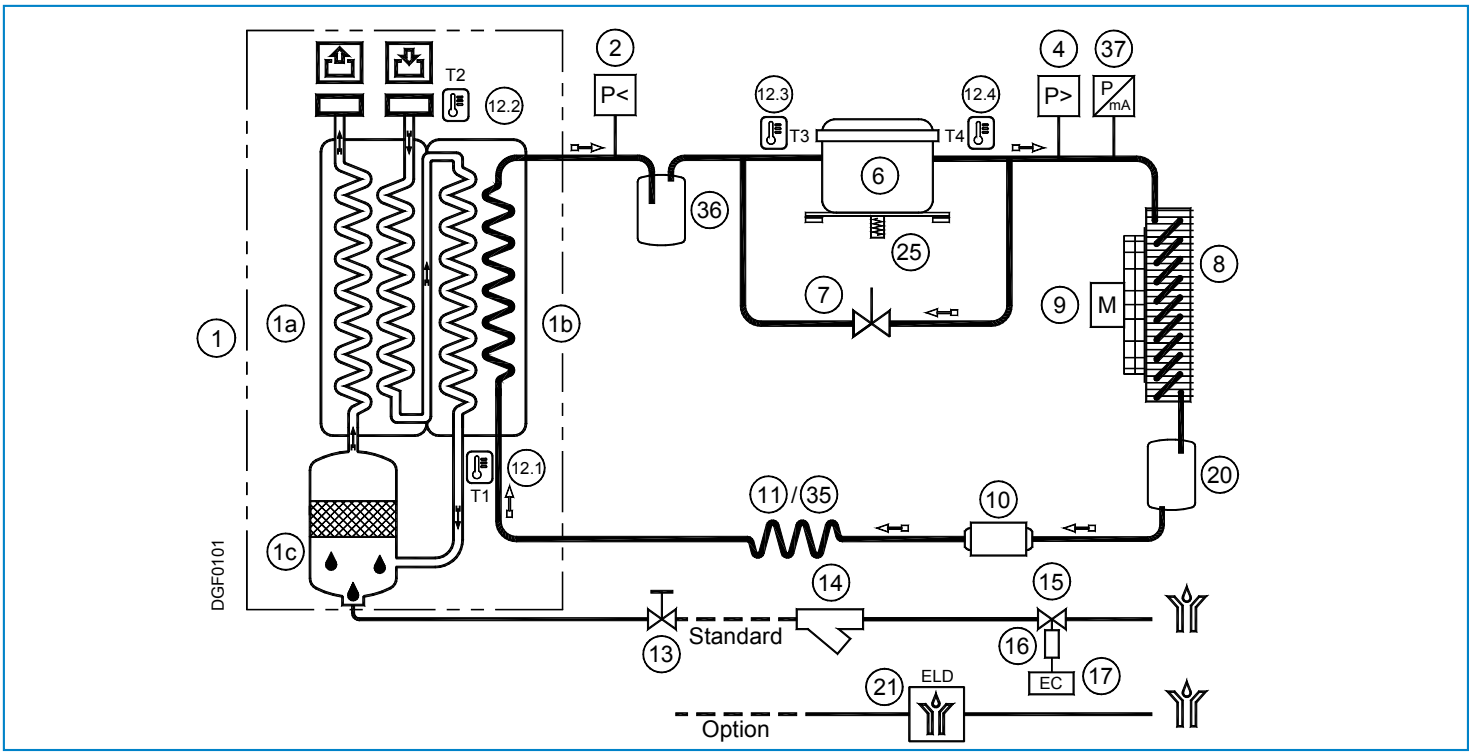
Function Description (air cooled version)

The warm, moisture-laden compressed air enters the air/ air heat exchanger and is precooled there by the incoming compressed air. The compressed air then flows into the air / refrigerant heat exchanger (**1b**). There, it is cooled to approx. 2°C, whereby water vapor is condensed and the liquid water is separated in the water separator and is discharged from the system via the electronically-controlled condensate drain (**21**). The cool, saturated compressed air then flows back through the air-to-air heat exchanger (**1a**) and is heated by the incoming compressed air and thus is under-saturated. The pressure dewpoint achieved depends on the design and operating conditions and is + 3°C at nominal operating conditions.

In the refrigeration circuit, the refrigerant is compressed in the refrigerant compressor (**6**) and then liquefied with the fan (**9**) in the condenser (**8**). Via a capillary tube (**11**) the liquid refrigerant is expanded and injected in the Air/ refrigerant heat exchanger (**1b**). The warm compressed air evaporates the refrigerant and the pressure is reduced and cooled by this phase change, which also cools the compressed air. The expanded and gaseous refrigerant is returned to the compressor.

Main Components

- Air/ air (**1a**) and air/ refrigerant heat exchanger (**1b**) with integrated water separator (**1c**)
- Electronic level-controlled condensate drain (**21**)
- Refrigerant compressor with switch on/ off control (**6**)
- Refrigerant condenser (**8**) with fan (**9**)
- Hotgas bypass control valve (**7**)
- Capillary tube (**11**)
- Dewpoint-temperature sensor (**12.1**)



PRODUCT SPECIFICATIONS

Features	Benefits
Intelligent over-all concept	Type range, integrated monitoring and control functions as well as automatic condensate drain adapted for the use in central compressed air applications. Available in air or water cooled versions
5 sizes for nominal volume flows of 2.430 to 6.060 m³/h	Accurate selection of the appropriate refrigeration compressed air dryer to the respective operating volume flow
Dew point control via hot gas bypass control	Robust and safe control of the dew point even under different load conditions
Automatic condensate drain on the heat exchanger	Safe condensate drainage depending on the amount of condensate
Compact and space-saving design with robust steel housing	Low space requirements at the installation site, low storage space requirement and low transport costs
Electronic controller including a display and indication of the current pressure dewpoint, operating hours, service messages, alarm messages with multiple possible individual settings.	Reliable monitoring of the operating status and timely display of required maintenance work
Scroll compressor in refrigeration circuit	Reliable compression of the refrigerant at high running, low vibration and low noise operation
Stainless steel heat exchanger	No corrosion inside the heat exchanger due to contact with moist compressed air; Good heat transfer properties at low weight

PRODUCT SPECIFICATIONS

Type	Volume flow m^3/h	Volume flow $m^3/min.$	Differential pressure mbar	Cooling air requirement m^3/h	Cooling water requirement (15°C) m^3/h	Power consumption kW	Power supply
Air cooled version							
DHP 2400 AX	2430	40,5	250	10800	—	4,3	3~/ 400V/ 50Hz (±10%)
DHP 3000 AX	3030	50,5	250	14400	—	4,8	3~/ 400V/ 50Hz (±10%)
DHP 4000 AX	4020	67	250	14400	—	5,6	3~/ 400V/ 50Hz (±10%)
DHP 5000 AX	5010	83,5	260	14800	—	6,4	3~/ 400V/ 50Hz (±10%)
DHP 6000 AX	6060	101	250	22200	—	8,4	3~/ 400V/ 50Hz (±10%)
Water cooled version							
DHP 2400 WX	2430	40,5	250	—	0,45	3,8	3~/ 400V/ 50Hz (±10%)
DHP 3000 WX	3030	50,5	250	—	0,47	3,9	3~/ 400V/ 50Hz (±10%)
DHP 3000 WX	4020	67	250	—	0,56	4,65	3~/ 400V/ 50Hz (±10%)
DHP 5000 WX	5010	83,5	260	—	0,67	5,5	3~/ 400V/ 50Hz (±10%)
DHP 6000 WX	6060	101	250	—	0,92	7,0	3~/ 400V/ 50Hz (±10%)

Operating pressure:	max. 45 bar g
Operating temperature:	max. 65°C
Ambient temperature:	+1°C...+50°C

SIZING

Operating pressure (bar g)	15	16	20	25	30	35	40	45	50
Correcion factor fp	0,57	0,60	0,70	0,80	0,88	0,94	1,00	1,05	1,10

Compressed air inlet temperature (°C)	≤ 25	30	35	40	45	50	55	60	65
Correcion factor fte	1,20	1,12	1,00	0,83	0,69	0,59	0,50	0,44	0,39

Temperature of cooling air or cooling water (°C)	≤ 25	30	35	40	45	50
Correction factor ftu	1,00	0,96	0,90	0,82	0,72	0,60

Pressure dewpoint (°C)	3	5	7	10
Correction factor ftpd	1,00	1,09	1,19	1,37

Example:

$\dot{V}_{nom}$ = 3500 m^3/h (intake volume flow of the compressor), compressed air inlet temperature = 40°C,

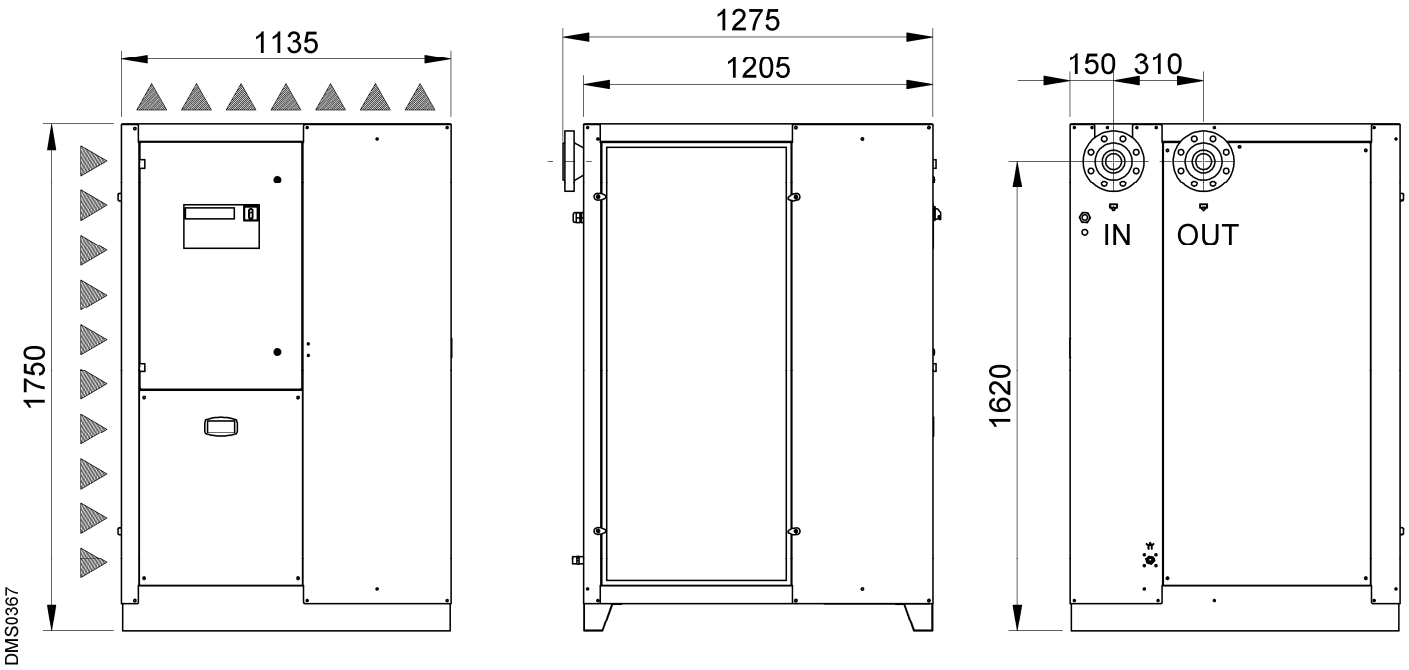
cooling water temperature = 35°C, operating pressure = 35 bar, pressure dewpoint = +3°C

$$\dot{V}_{korr} = \frac{\dot{V}_{nom}}{f} = \frac{3500\ m^3/h}{0,94 \times 0,83 \times 0,90 \times 1,00} = 4984\ m^3/h$$

Calculated dryer size:
DHP 5000 WX

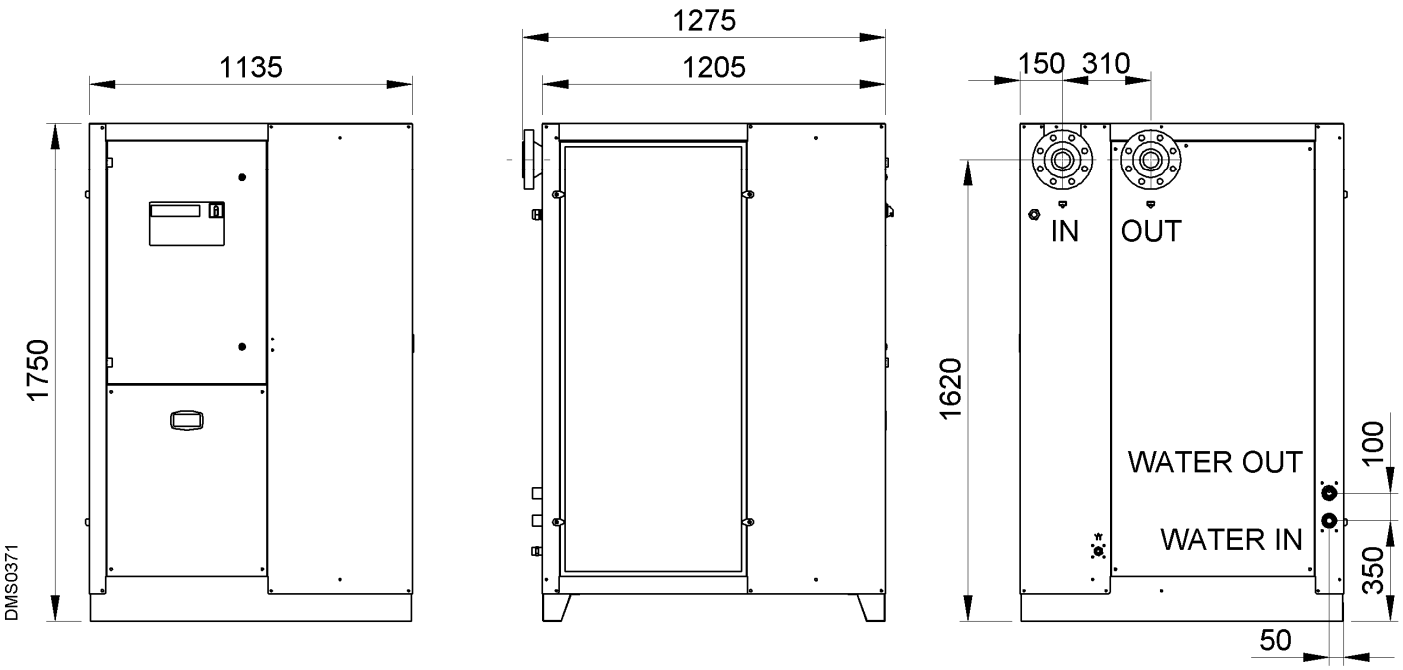
Donaldson® Ultrafilter

DIMENSIONS



Type	Weight kg	Air Connections ANSI	Condensate Connections BSP-F
DHP 2430 AX	444	3"	G 1/2"
DHP 3000 AX	461	3"	G 1/2"
DHP 4000 AX	486	3"	G 1/2"
DHP 5000 AX	552	3"	G 1/2"
DHP 6000 AX	754	3"	G 1/2"

DIMENSIONS



Type	Weight kg	Air Connections ANSI	Water Connections BSP-F	Condensate Connections BSP-F
DHP 2430 WX	435	3"	G 1"	G 1/2"
DHP 3000 WX	452	3"	G 1"	G 1/2"
DHP 4000 WX	480	3"	G 1"	G 1/2"
DHP 5000 WX	540	3"	G 1"	G 1/2"
DHP 6000 WX	740	3"	G 1 1/2"	G 1/2"

Technical Datasheet: BORA

High pressure refrigeration compressed air dryers for volume flows from 2700 to 4200 m³/h

The compressed air is being fed into the dryer and being pre-cooled in the air-to-air heat exchanger by the outgoing cold compressed air.The pre-cooled air then passes through the refrigerant-to-air heat exchanger where it is being further cooled down to the required pressure dew point. The moisture in the compressed air condenses out and gathers and discharges automatically. Finally, the cold discharged air is being reheated by the incoming compressed air. This saves energy and prevents any moisture forming beyond the dryer in the compressed air system.
The cooling capacity of the refrigeration cycle is being controlled by a hot gas bypass which assures the dryer functionabilty for partial loads, too.

type	volume flow*	volume flow*	pressure drop	power supply	power consumption	cooling water requirement	air connection	weight
	m³/h	m³/min	bar	V/Ph/Hz	kW	m³/h	BSP	kg
DHP 2700 W	2700	45.00	0.36	400/3/50	2.40	0.7	DN 80	430
DHP 3500 W	3500	58.33	0.30	400/3/50	4.70	1.31	DN 80	455
DHP 4200 W	4200	70.00	0.38	400/3/50	4.90	1.37	DN 80	615
* according to ISO 7183 @ 40 bar g								

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Subject to change 01/2012

DHP 2700 W - DHP 4200 W

Features of Bora dryer DHP 2700 W - DHP 4200 W	Benefits
Stainless steel heat exchanger	Designed for high operation pressure
High overload capacity to a pressure dew point of approx.+20 °C	In case of overload, the dryer will only switch off at a dew point above than appr. +20 °C
All dryer in metal cabinet construction	Optimum protection against mechanical damage and against dirt
Lightweight & compact design	Minimum space requirement (on stock, for transport and for the installation in the compressed air network)
Options: air cooling, special color, type plate made of brass, non-halogen lines, external operating voltage transformer, air cooling	Flexibility in application and customized solutions for economical operation and safe system installation in the compressed air network

Product descritption
Complete compressed air drying system with electronic level controlled condensate drain, dew point indicator, metal housing, power plug, dry contacts for operation and alarm signals, water cooled

Refrigerant:
R134a

Noise level:
< 80 dB (A)

Operating pressure:
max. 50 bar (g)

Protection class:
IP 54

Medium temperature:
max. +60 °C

Declaration of conformity:
acc. to 2006/42/EC Annex II A

Medium:
Compressed air

Ambient temperature:
min. +2 °C / max. +50 °C

Sizing

Comp. air inlet temp.	°C	30	35	40	45	50	55	60
Factor	f_{te}	1.20	1.00	0.83	0.75	0.55	0.45	0.35

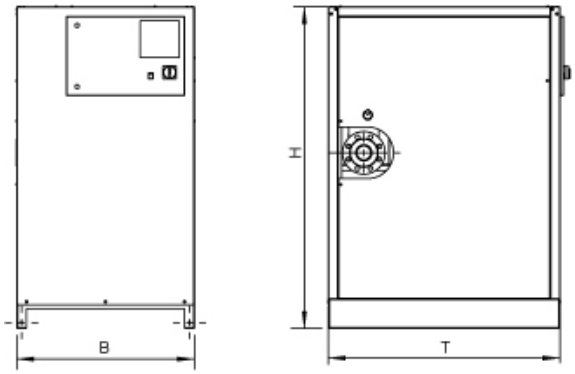
Pressure dew point	°C	3	5	7	10	15
Factor	f_{tpd}	1.00	1.07	1.14	1.22	1.35

Working overpressure	bar (g)	15	20	25	30	35	40	45	50
Factor	f_{pg}	0.43	0.55	0.72	0.81	0.90	1.00	1.05	1.10

Temperature of cooling water	°C	25	30	35	40	45	50
Factor	f_{tu}	1.00	0.97	0.94	0.87	0.75	0.50

Corrected dryer capacity =
Standard dryer capacity x f_{te} x f_{tpd} x f_{pg} x f_{tu}

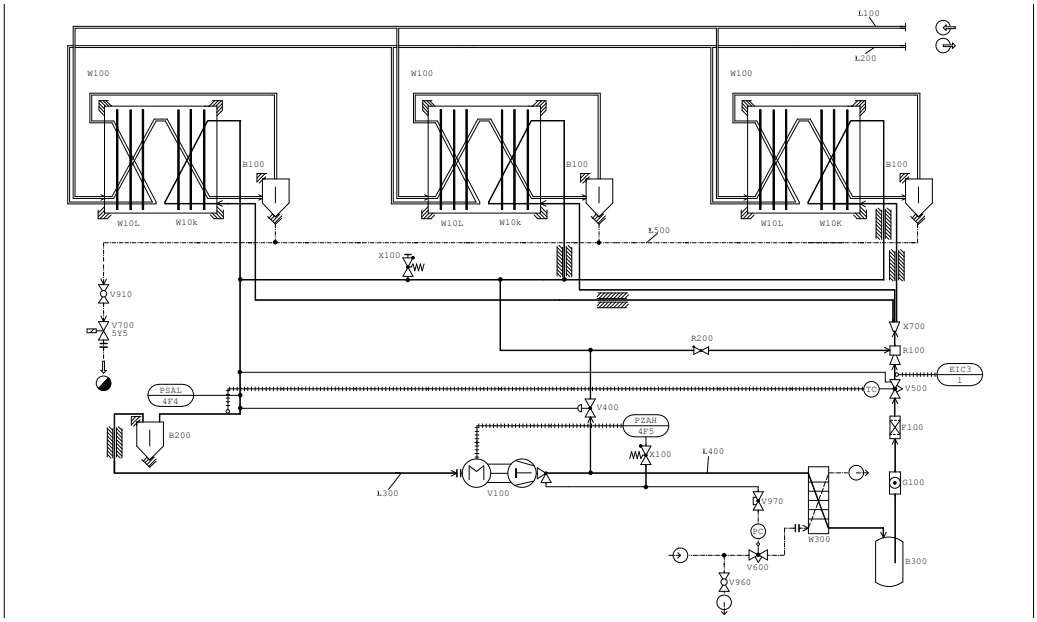
DHP 2700 W - DHP 4200 W



DHP 2700 W - DHP4200 W

Size	B	H	T
	mm	mm	mm
DHP 2700 W - DHP 4200 W	900	1624	1174

Function diagram (exemplary)



Dimensions