

# Breathing star BSP-MT 1-8

Efficient compressed air treatment system for industrial and medical breathing-air



## Short description

BSP-MT1-8 heatless adsorption dryers with integral purification and catalytic stages are designed to treat compressed air reliably and efficiently to meet the medical breathing air requirements of the European Pharmacopia and other relevant specifications. The units are constructed in a compact manner and designed to be free-standing. They are equipped with built-on pre- and after filtration and are sized for volumetric flows of up to 139 m<sup>3</sup>/h (suction capacity of the compressor referring to a compression of 13 bar<sub>e</sub>).

Compressed air first enters the validated GL pre-filter into one of two twin-profiles; both filled with a specific drying-agent. One chamber dries and removes harmful vapours from the compressed air while the other chamber undergoes regeneration. At the start of the drying-cycle, this chamber is open to atmosphere and a small proportion of dried compressed air passes through the adsorption bed, transporting the humidity and harmful vapours out. When this procedure is complete, the vessel is re-pressurised in readiness to repeat the drying procedure. Continuous, uninterrupted operation is maintained utilising so-called pressure-swing technology together with individually operated main- and exhaust valves.



Dry compressed air subsequently enters the integral purification and catalytic stage where oil-vapour, odours, gaseous vapours and traces of carbon-monoxide are reliably removed. Finally, the clean, treated air exits via the validated GL after-filter into the downstream compressed air network.

The BSP-MT1-8 Breathing-air treatment system operates a fixed, timed changeover-cycle between the two

dryer chambers. Where the application requires additional monitoring, the installation of a dew point sensor is available as an option: The chosen pressure dew point settings (change-over set-point) allow the changeover times of the individual vessels to be adjusted to meet operating requirements whilst providing reliable monitoring of the dryers performance. An adjustable alarm is available via voltage-free signal.

### Scope of supply:

Breathing-air treatment system with GL pre- and after filtration; available with optional dew point dependent switching (DDS).

# Product Specification

Breathing star BSP-MT 1-8 for industrial & medical breathing air

## Ordering – and performance data

Modell	Order No.	Volumetric flow <sup>1)</sup> in m <sup>3</sup> /h	Nominal pipe size <sup>2)</sup>	1. Pre-filter	2. Pre-filter	After-filter	Nominal Pressure in bar <sub>e</sub>	Nominal Temp. °C
BSP-MT 1	K1/16BP2-G230M	13	1/4	GL2ZL	GL2XL	GL2ZLH	16	50
BSP-MT 2	K2/16BP2-G230M	24	1/4	GL2ZL	GL2XL	GL2ZLH	16	50
BSP-MT 3	K3/16BP2-G230M	40	1/4	GL2ZL	GL2XL	GL2ZLH	16	50
BSP-MT 4	K4/16BP2-G230M	56	1/4	GL2ZL	GL2XL	GL2ZLH	16	50
BSP-MT 6	K6/16BP2-G230M	90	1/2	GL5ZLD	GL5XLD	GL5ZLDH	16	50
BSP-MT 7	K7/16BP2-G230M	116	1/2	GL5ZLD	GL5XLD	GL5ZLDH	16	50
BSP-MT 8	K8/16BP2-G230M	139	3/4	GL7ZLD	GL7XLD	GL7ZLDH	16	50

<sup>1)</sup> m<sup>3</sup>/h, relating to 1 bar<sub>a</sub> and 20 °C at the compressor suction capacity. Subsequently compressed to 13 bar<sub>e</sub> and 35 °C inlet temperature to the dryer at 100% relative humidity – for pressure dew point of -40 °C.

<sup>2)</sup> In accordance with DIN ISO 228 (BSP-P); alternative ANSI B 1.20.1 (NPT-F)

## Operating range

Site selection	frost-free indoor installation in a non-hazardous environment
Ambient temperature	1.5 to 50 °C
Compressed air inlet temperature	25 to 50 °C
Operating pressure	5 to 16 bar <sub>e</sub>
Medium	Compressed air

## Optional dew point sensor ZHM100

Pressure dew point at 7 bar <sub>e</sub>	Changeover point: -45 °C ex-factory setting; adjustable via the menu from -25 to -50 °C in 5 °C. steps Alarm set-point: -40 °C ex-factory setting; always 5 °C above the changeover-point.
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## Electrical connections

Mains voltage	230 V, 50-60 Hz
Alternative voltage	115 V, 50-60 Hz and 24 V DC
Protection class	IP65

## Materials of construction

Filters	See product-specification regarding GL filter ref: ZL and XL
Pressure vessels	Aluminium
Valve blocks	Aluminium
Seals	NBR
Dryer filling	Mixture of aluminium-silicates and activated alumina
Purifier filling	Mixture of activated carbon and catalyst

## Pressure vessel approvals

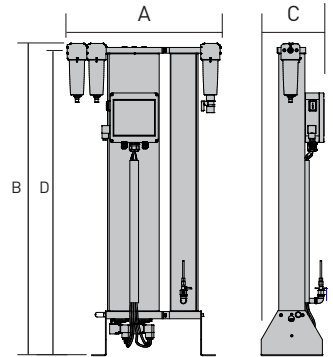
EU	Approval for fluid group 2 in accordance with the pressure equipment Directive 97/23/EC product range BSP-MT 1 and 2 in accordance with article 3, paragraph 3; product range BSP-MT 3 to 8 in accordance with category I (module A).
USA	Approval to ASME VIII Div. 1 not required
AUS	Approval to AS1210 not required
GUS	TR (formerly GOST-R)

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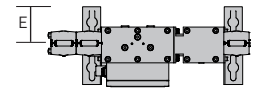
## Dimensions (mm) and weight (kg)

Model	A	B	C	D	E	Weight
BSP-MT 1	533	400	216	217	101	16.5
BSP-MT 2	533	575	216	217	101	21.5
BSP-MT 3	533	825	216	217	101	29.0
BSP-MT 4	533	1075	216	217	101	36.0
BSP-MT 6	736	1203	300	255	132	75.0
BSP-MT 7	736	1428	300	255	132	85.0
BSP-MT 8	736	1628	300	255	132	97.0



## Quality assurance

Development/Manufacture DIN EN ISO 9001, DIN EN ISO 14001



## Limits for breathing air

	Industrial breathing-air				BSP-MT Breathing-air unit	Medical air
	Europe	UK	USA	Australia		Europe
	EN 12021	BS 4275	ANSI/CGA	AS 1715		European Pharmacopia
Carbon monoxide CO	< 15 ppm	< 5 ppm	< 10 ppm	< 10 ppm	< 2 ppm	< 5 ppm
Carbon dioxide CO <sub>2</sub>	< 500 ppm	< 500 ppm	< 1000 ppm	< 800 ppm	< 150 ppm	< 500 ppm
Humidity H <sub>2</sub> O	< 5 °C *	< 5 °C *	< 10 °F *	< 100 mg/m <sup>3</sup>	< 15 ppm **	< 67 ppm
Oxygen O <sub>2</sub>	21 (±1) %	20 – 23 %	21.5 %	–	20.8 – 21,1 %	20.4 – 21,4 %
Oil fraction	< 0.5 mg/m <sup>3</sup>	< 0.5 mg/m <sup>3</sup>	< 0.5 mg/m <sup>3</sup>	< 1.0 mg/m <sup>3</sup>	< 0.003 mg/m <sup>3</sup>	< 0.1 mg/m <sup>3</sup>
Odours/Tastes	Odourless/ Tasteless	Odourless/ Tasteless	Odourless/ Tasteless	Odourless/ Tasteless	Odourless/ Tasteless	Odourless/ Tasteless
Sulphur dioxide SO <sub>2</sub>	–	–	–	–	< 0.1 ppm	< 1 ppm
Nitrous gases NO/NO <sub>2</sub>	–	–	–	–	< 1 ppm	< 2 ppm

\* Pressure dew point below inlet temperature ; \*\*Corresponding pressure dew point -45 °C to -40 °C at 13 bar<sub>e</sub>.  
All values refer to customary concentration levels present in the inlet air

## Correction factor (f) in accordance with the actual minimum operating pressure in bar<sub>e</sub>

Minimum operating pressure in bar <sub>e</sub>	Breathing-air system – Inlet temperature in °C					
	25	30	35	40	45	50
5	0.47	0.46	0.44	0.40	0.36	0.34
6	0.55	0.54	0.52	0.45	0.40	0.38
7	0.63	0.62	0.60	0.50	0.44	0.43
8	0.72	0.70	0.68	0.60	0.54	0.52
9	0.79	0.78	0.75	0.63	0.60	0.55
10	0.87	0.86	0.80	0.65	0.63	0.61
11	0.80	0.79	0.75	0.64	0.61	0.59
12	0.92	0.91	0.89	0.78	0.73	0.67
13	1.03	1.02	1.00	0.91	0.82	0.79
14	1.16	1.15	1.13	1.00	0.94	0.86
15	1.30	1.28	1.26	1.08	1.03	0.99

Example: maximum inlet volumetric flow of 32 m<sup>3</sup>/h at a minimum pressure of 11 bar<sub>e</sub> and 40 °C inlet temperature:  
32 m<sup>3</sup>/h : 0.64 = 50 m<sup>3</sup>/h – suitable model BSP-MT 4.

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## Product key

Series	Range*	Nominal pressure	Version	Generation	Connections*	Mains voltage*	Controls	Options*
K	1 - 8	/16	BP	2	-G	230	M	T
K	1 - 8	/16	BP	2	-G	24D	M	
K	1 - 8	/16	BP	2	-N	115	M	

### Examples

K	3	/16	BP	2	-G	230	M	
BSP-MT 3 standard version, with G1/4" (BSP-P) connections, 230V/50-60Hz Multitronic-plus controls								
K	3	/16	BP	2	-N	115	M	T
BSP-MT 3 with NPT G1 1/4" connections, 115V/50-60Hz Multitronic-plus controls and mounted dew point sensor ZHM100								

\* variable information

## Service-kits: Preventative maintenance kits

Order No.	Suitability	Interval	Scope of supply
SKK1-K4/BP2/12	BSP-MT 1 - 4	12 and 36 month	Re-set module, silencer and filter elements
SKK1-K4/BP2/24	BSP-MT 1 - 4	24 month	Re-set module, wear part set for in-/outlet valves, silencer and filter elements
SKK1-K4/BP2/48	BSP-MT 1 - 4	48 month	Re-set module, wear part set for in-/outlet valves, solenoid-coils, non-return valves, Demister, perforated plate, perforated plate gaskets, silencer and filter elements
SKK6-K7/BP2/12	BSP-MT 6 - 7	12 and 36 month	Re-set module, silencer and filter elements
SKK6-K7/BP2/24	BSP-MT 6 - 7	24 month	Re-set module, wear part set for in-/outlet valves, silencer and filter elements
SKK6-K7/BP2/48	BSP-MT 6 - 7	48 month	Re-set module, wear part set for in-/outlet valves, solenoid-coils, non-return valves, Demister, perforated plate, perforated plate gaskets, silencer and filter elements
SKK8/BP2/12	BSP-MT 8	12 and 36 month	Re-set module, silencer and filter elements
SKK8/BP2/24	BSP-MT 8	24 month	Re-set module, wear part set for in-/outlet valves, silencer and filter elements
SKK8/BP2/48	BSP-MT 8	48 month	Re-set module, wear part set for in-/outlet valves, solenoid-coils, non-return valves, Demister, perforated plate, perforated plate gaskets, silencer and filter elements

## DESPAC: Required quantity of adsorption material packs per model for preventative maintenance after 12 months

Pressure vessel	Order No.	BSP-MT 1	BSP-MT 2	BSP-MT 3	BSP-MT 4	BSP-MT 6	BSP-MT 7	BSP-MT 8
<b>Dryer</b> (Vessel 1+2)	DESPAC2EF	1	2	3	4	6	9	11
<b>Purifier</b> (Vessel 3)	DESPAC3AK	1	1	1	1	1	2	2
	DESPAC1KTY	1	2	3	4	7	8	
	DESPAC4KTY							1

## Accessories (lose)

Order No.	Function	Suitability	Order No.	Function	Suitability
VASRGR/K1-K8	Purge-air return	BSP-MT 1 - 8	VASVPB/K6-K7/15	Start-up device G1/2i	BSP-MT 6 - 7
VASPDP/K1-K95	Dew point measurement	BSP-MT 1 - 8	VASVPB/K8/20	Start-up device G3/4i	BSP-MT8
VASMBS420	Signal duplicator 4-20 mA	BSP-MT 1 - 8	VASF3/K1-K4	Fine-filter silencer	BSP-MT 1 - 4
VASNOZ/K1-K95	Purge-orifice-kit	BSP-MT 1 - 8	VASF5/K6-K8	Fine-filter silencer	BSP-MT 6 - 8
VASVPB/K1-K4/08	Start-up device G1/4i	BSP-MT 1 - 4			

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BULBSPMT1-8-03-EN

### EMEA Product Information Centre

Free phone: 00 800 27 27 5374

(from AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, IE, IL, IS, IT, LU, MT, NL, NO, PL, PT, RU, SE, SK, UK, ZA)

### US Product Information Centre

Toll-free number: 1-800-27 27 537

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