

Concept WVM 40-1450

Efficient compressed-air adsorption dryer with vacuum regeneration



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ZDMC2

Brief description

Heat-regenerating adsorption dryers of the WVM 40-1450 series dry industrial compressed air reliably and efficiently up to a pressure dew point of -25 to -40 °C (PDP -70 °C on request). Parker Zander developed – and today still uses – energy-efficient vacuum drying for regeneration and therefore avoids any loss of flushing gas (zero purge).

Dryers from the WVM series are equipped with a dew point controller as standard which enables switching between vessels where required. The switching of the vessels only takes place once the required pressure dew point exceeds a preset threshold value. This allows for an extension to the drying period and a restriction to the energy actually required for regeneration.

The twin vessels allow for continuous operation: while the compressed air is dried in one vessel by the moisture accumulating around the desiccant – a double-layered silica gel filling – dehumidification of the desiccant (regeneration) takes place in the second vessel. Ambient air is sucked in through a heater for this. During the heating phase, the heated air flows through the desiccant bed from the bottom upwards and carries the moisture outwards. When the heater is switched off, the ambient air that was sucked in continues to flow through the desiccant bed and cools it down so the desiccant becomes receptive again.



Regeneration in a partial vacuum lowers the evaporation energy required and also prevents the emission of fan heat into the system and, together with the needs-adjusted dew point controller, allows for optimum energy use. A considerable advantage of the suction flow from the

bottom upwards is the complete residual drying right at the upper part of the desiccant bed: the pressure dew points are attained at this point, which are also stably low during the switchover, so the already dried process air does not have to have purge air removed from it.

Purchased parts package:

adsorption dryer for pressure dew points of -25 to -40 °C including dew point controller, prewired and ready for installation. The installation of a prefilter (coalescence microfilter) for the removal of drops of moisture and an afterfilter for the removal of dust particles is recommended (both filters available as options). As an alternative set-up, dryers of the WVM series are also available with insulation which has energy-saving benefits (avoiding loss of heat through convection).

Upon request, adsorption dryers are available for higher capacities, operating pressures and inlet temperatures, lower pressure dew points, designs for very humid environments (in the closed-loop process with coolers) and designs for alternative regenerative heat sources (e.g. process steam with steam heat exchangers).

Product specifications

Adsorption dryers of the Concept WVM 40-1450 series

Order and performance details

Model	Standard order no.	Alternative with insulation order no.	Performance ² in m ³ /h		Nominal width ¹ (nb)	Nominal pressure in bar _e
			PDP -25°C	PDP -40°C		
WVM 40	W40/10VM4-F400CT	W40/10VM4-F400CT/I	420	406	40	10
WVM 50	W50/10VM4-F400CT	W50/10VM4-F400CT/I	510	486	40	10
WVM 65	W65/10VM4-F400CT	W65/10VM4-F400CT/I	640	630	50	10
WVM 85	W80/10VM4-F400CT	W80/10VM4-F400CT/I	850	830	50	10
WVM 120	W120/10VM4-F400CT	W120/10VM4-F400CT/I	1180	1160	80	10
WVM 150	W150/10VM4-F400CT	W150/10VM4-F400CT/I	1500	1470	80	10
WVM 200	W200/10VM4-F400CT	W200/10VM4-F400CT/I	1980	1940	80	10
WVM 235	W235/10VM4-F400CT	W235/10VM4-F400CT/I	2350	2300	100	10
WVM 300	W300/10VM4-F400CT	W300/10VM4-F400CT/I	2930	2870	100	10
WVM 355	W355/10VM4-F400CT	W355/10VM4-F400CT/I	3550	3480	100	10
WVM 410	W410/10VM4-F400CT	W410/10VM4-F400CT/I	4100	4020	150	10
WVM 475	W475/10VM4-F400CT	W475/10VM4-F400CT/I	4740	4650	150	10
WVM 525	W525/10VM4-F400CT	W525/10VM4-F400CT/I	5250	5150	150	10
WVM 620	W620/10VM4-F400CT	W620/10VM4-F400CT/I	6210	6090	150	10
WVM 710	W710/10VM4-F400CT	W710/10VM4-F400CT/I	7100	6960	150	10
WVM 800	W800/10VM4-F400CT	W800/10VM4-F400CT/I	8000	7840	200	10
WVM 920	W920/10VM4-F400CT	W920/10VM4-F400CT/I	9200	9020	200	10
WVM 1080	W1080/10VM4-F400CT	W1080/10VM4-F400CT/I	10800	10580	200	10
WVM 1230	W1230/10VM4-F400CT	W1230/10VM4-F400CT/I	12300	12050	250	10
WVM 1450	W1450/10VM4-F400CT	W1450/10VM4-F400CT/I	14500	14210	250	10

¹ relating to EN 1092-1

² m³ relating to 1 bar(a) and 20 °C; relating to the suction performance of the compressor, compression at 7 bar_e and 35 °C dryer inlet temperature, at 25 °C ambient temperature, 60 % relative humidity.

Scope of application

Installation location	Internal installation in non aggressive atmospheres;				
Max. ambient humidity	25% rel. hum. at 40°C	37% rel. hum. at 35°C	50% rel. hum. at 30°C	70% rel. hum. at 25°C	90% rel. hum. at 20°C
Max. ambient temperature	40 °C for intake air for regeneration; otherwise 50 °C				
Min. ambient temperature	1.5 °C; for temperatures < 15 °C or in the event of draught the dryer will have to be insulated.				
Operating pressure	4 to 10 bar _e				
Flow medium	Compressed air and gaseous nitrogen				

Electrical connection

Standard mains voltage	400 V, 50 Hz
Protection class	IP54

Product specifications

Adsorption dryers of the Concept WVM 40-1450 series

Correction factors f according to actual minimum operating pressure in bar_e and inlet temperature in °C

Minimum operating pressure in bar _e	Dryer inlet temperature in °C		
	30	35	40
	for pressure dew point PDP -25 °C/-40 °C ¹		
4	0.69	0.44	0.28
5	0.80	0.62	0.42
6	0.90	0.80	0.59
7	1.02	1.00	0.70
8	1.06	1.05	0.79
9	1.17	1.16	0.88
10	1.29	1.28	0.96

¹ Correction factors relating to the respective, nominal performance at PDP -25 or -40 °C.

Example for a maximum suction-side volume flow of 4095 m³/h, at a minimum of 9 bar_e, 30 °C inlet temperature:

4095 m³/h: 1.17 = 3500 m³/h

model WVM 355 selected for a pressure dew point of -25 °C or model WVM 410, selected for a pressure dew point of -40 °C

Materials

Vessels, pipe bends	Normal steel, welded
Valves	Various
Seals	Various
Fill	100% silica gel

Approvals for pressure equipment

EU	Approval for fluid group 2 according to Pressure Equipment Directive 97/23/EC, modules B+D (category IV)
Others	Upon request, including ASME VIII, Div.1; TR (formerly GOST-R), SELO (China Stamp), DNV, GL

Quality assurance

Development / manufacture	DIN EN ISO 9001, DIN EN ISO 14001
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Air purity class as per ISO 8573-1:2010

Solid particles	-
Moisture (gaseous)	Class 3 (PDP -25 °C), class 2 (PDP -40 °C); upon request class 1 (PDP -70 °C)
Total oil content	-

Product key

Series	Size*	/ nominal pressure	Model	Generation	- connection	Mains voltage	Control	/ Option
W	40 to 1450	/10	VM	4	- F	400	CT	/I

* variable figures

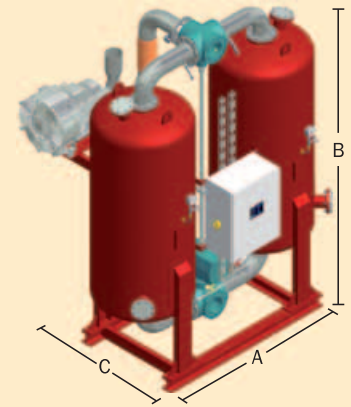
Examples								
W	200	/10	VM	4	- F	400	CT	
WVM 200 basic model, ZDMC2 – control with dew point sensor ZHM100, DN80 (EN 1092-1), 400 V / 50 Hz								
W	800	/10	VM	4	- F	400	CT	/I
WVM 800 alternative model with insulation, DN200 (EN 1092-1) 400 V / 50 Hz								

Product specifications

Adsorption dryers of the Concept WVM 40-1450 series

Energy requirements, dimensions and weights of the standard models

Model	installed power kW	Power consumption ¹ kWh/h	Performance ² vacuum pump m ³ /h	A mm	B mm	C mm	Weight kg
WVM 40	5.55	3	125	1140	2230	990	570
WVM 50	5.55	4	125	1140	2230	990	600
WVM 65	9.7	5	210	1260	2300	1110	770
WVM 85	9.7	7	210	1260	2300	1110	800
WVM 120	13.4	8	300	1460	2690	1160	1150
WVM 150	18.2	11	375	1540	2700	1200	1300
WVM 200	23.7	12	550	1605	2750	1405	1650
WVM 235	36.7	16	750	2025	2870	1490	2000
WVM 300	36.7	20	750	2050	2890	1565	2250
WVM 355	43.7	24	900	2160	2960	1750	2650
WVM 410	43.7	28	900	2430	3230	1710	3250
WVM 475	48.7	30	1150	2490	3260	1710	3650
WVM 525	63.2	32	1460	2550	3265	1775	4050
WVM 620	73.2	44	1460	2570	3540	1865	4700
WVM 710	84.2	47	1800	2635	3560	1900	5050
WVM 800	89.2	56	1900	3085	3625	2110	6450
WVM 920	114.2	63	2190	3125	3645	2235	7500
WVM 1080	125.2	72	2480	3225	3710	2285	8700
WVM 1230	151.2	84	2920	3475	4050	2350	11500
WVM 1450	172.2	98	3440	3500	4200	2380	13500



¹ Average energy requirements with dew point controller for orientation (also dependent on installation and load conditions)

² Volume flow (regeneration air) relating to a pressure difference of 100 mbar.

All of the above are approximate figures. Figures for alternative models with insulation differ.



Product specifications

Adsorption dryers of the Concept WVM 40-1450 series

ZDMC2: features of the PLC

Display	Touch screen (TFT, 16-bit colour)		
CPU	Siemens 315		
Programming language	STEP7 (Siemens Simatic Software)		
Memory storage	24MB internal, 2GB micro SD memory card		
Data recording	Continuously in 5-minute steps for the prior 4 weeks as binary code		
Interfaces	Modbus RS485 (configurable via touch screen)	Ethernet RJ45 (configurable via touch screen)	Profibus (slave) (optional, configuration ex factory)
Protocols	Modbus RTU (RS485) (configurable via touch screen) Siemens S7COM (Ethernet) (configurable via touch screen)	Modbus TCP (Ethernet) (configurable via touch screen)	DP V0 (Profibus) (configurable via STEP7)
Analogue inputs	Quantity: 4	4-20 mA (potential-free)	2 times pressure B1/B2 1 times pressure dew point 1 times reserve
	Quantity: 4	PT100 (potential-free)	1 times heater outlet 1 times regen. air outlet 2 times reserve
Analogue outputs	Quantity: 2	4-20 mA (potential-free)	2 times reserve
Potential-free contacts	Quantity: 2		1 times collective fault 1 times operating notification
Digital inputs	Quantity: 16	Non-isolated 8 times 0 - 4 V 8 times 7.5 - 30 V	1 times vacuum pump error 1 times heater temp. limiter 1 times remote on / off 2 times regen. flaps open / closed 11 times reserve
Dig. transistor outputs	Quantity: 16	Non-isolated 24 V, max. 0.5 A	2 times main valves 2 times regen. flaps open / closed 1 times pressure build-up valve open 1 times expansion valve open (amongst others)
Digital relay outputs	Quantity: 6	230 V, max. 3 A	1 times vacuum pump connect. 3 times heater stages 1-3 connect. 2 times reserve



Excellent operation overview with the colour TFT display of the new **ZDMC2** PLC, which clearly and continuously shows all measured values at a glance:

- Pressure per vessel
- Heating temperature
- Regen. air outlet temperature
- Pressure dew point
- 3 x reserve (2 x PT100 and 1 x 4-20 mA)

Product specifications

Adsorption dryers of the Concept WVM 40-1450 series

Service kits: preventive wear parts kits

For model	Order no.	Maintenance interval	Purchased parts package
WVM 40-1450	SKW40-W1450/VM4/12	12 / 36 months	Element for control air filter, pilot valves
WVM 40-355	SKW40-W355/VM4/24	24 months	Control air filter element, pilot valves, wear parts kit for the expansion valve (V5), wear parts kit for the pressure build-up valve (V4)
WVM 410-710	SKW410-W710/VM4/24		
WVM 800-1080	SKW800-1080/VM4/24		
WVM 1230-1450	SKW1230-W1450/VM4/24		
WVM 40-50	SKW40-W50/VM4/48	48 months	Control air filter element, magnet valve, wear parts kit for the expansion valve (V5), wear parts kit for the pressure build-up valve (V4), wear parts kit for the regeneration gas flap (V3), check valve (RV)
WVM 65-85	SKW65-W85/VM4/48		
WVM 120-200	SKW120-W200/VM4/48		
WVM 235-355	SKW235-W355/VM4/48		
WVM 410-710	SKW410-W710/VM4/48		
WVM 800-1080	SKW800-W1080/VM4/48		
WVM 1230-1450	SKW1230-W1450/VM4/48		

Desmix: requisite wear parts per model for preventive maintenance after 48 months

Desmix package contents: all fill materials, seals and flow distributors

For model	Order no.	For model	Order no.
WVM 40	WVM40DESMIX	WVM 410	WVM410DESMIX
WVM 50	WVM50DESMIX	WVM 475	WVM475DESMIX
WVM 65	WVM65DESMIX	WVM 525	WVM525DESMIX
WVM 85	WVM85DESMIX	WVM 620	WVM620DESMIX
WVM 120	WVM120DESMIX	WVM 710	WVM710DESMIX
WVM 150	WVM150DESMIX	WVM 800	WVM800DESMIX
WVM 200	WVM200DESMIX	WVM 920	WVM920DESMIX
WVM 235	WVM235DESMIX	WVM 1080	WVM1080DESMIX
WVM 300	WVM300DESMIX	WVM 1230	WVM1230DESMIX
WVM 355	WVM355DESMIX	WVM 1450	WVM1450DESMIX

Product specifications

Adsorption dryers of the Concept WVM 40-1450 series

Additional spare parts (single)

For model	Order no.	Quantity	Maintenance interval	Purchased parts package
Filter elements for pre- and afterfilters all have to be replaced after 12 months: for suitable types see the following table 'Replacement filter elements for pre- and afterfilters'				
WVM 40-355	SDD-25/AL	1	12 months	Silencers
WVM 410-1080	SDD-25/AL	2		Silencers
WVM 1230-1450	SDD-25/AL	6		Silencers
WVM 40-1450	ZHM100/450	1		Dew point sensor, optional
WVM 40-50	RKSCD-F40/16/VA	2		Flow distributor vessel outlet
WVM 65-85	RKSCD-F50/16/VA	2		Flow distributor vessel outlet
WVM 120-200	RKSCD-F80/16/VA	2	48 months	Flow distributor vessel outlet
WVM 235-355	RKSCD-F100/16/VA	2		Flow distributor vessel outlet
WVM 410-710	RKSCD-F150/16/VA	2		Flow distributor vessel outlet
WVM 800-1080	RKSCD-F200/16/VA	2		Flow distributor vessel outlet
WVM 1230-1450	RKSCD-F250/16/VA	2		Flow distributor vessel outlet
WVM 40-50	GASKIT40W	1		Flat gaskets DN40
WVM 65-85	GASKIT50W	1		Flat gaskets DN50
WVM 120-200	GASKIT80W	1		Flat gaskets DN80
WVM 235-355	GASKIT100W	1		Flat gaskets DN100
WVM 410-710	GASKIT150W	1		Flat gaskets DN150
WVM 800-1080	GASKIT200W	1		Flat gaskets DN200
WVM 1230-1450	GASKIT250W	1		Flat gaskets DN250

Replacement filter elements for pre- and afterfilters

Filter size	Element size	Filter size	Element size	Filter size	Element size	Quantity
Element grades VL, ZL, XL, A		Element grades V, ZP, XP, A		Element grades V, ZP, XP, A		
GL12_	CP4040_	G12_	2030_	F14_	3050_	1
GL13_	CP4050_	G13_	2050_	F17_	3075_	1
GL14_	CP4065_	G14_	3050_	F19_	5075_	1
GL17_	CP5065_	G17_	3075_	F20_	3075_	2
GL19_	CP5080_	G18_	5060_	F30_	3075_	3
		G19_	5075_	F40_	3075_	4
				F60_	3075_	6
				F80_	3075_	8
				F100_	3075_	10
				F120_	3075_	12

The underscore _ is to be replaced by the element grade. Example:
filter GL14XL with filter element CP4065XL or
filter F19XP with filter element 5075XP.

Product specifications

Adsorption dryers of the Concept WVM 40-1450 series

Accessories as loose parts: recommended pre- and afterfilters

For model	Prefilter order no.	Afterfilter order no.	Filter performance ² in m ³ /h	Filter nominal width ¹ (nb)
WVM 40-85	F14XPD	F14ZPDH	1200	50
WVM 120-150	F17XPD	F17ZPDH	1850	80
WVM 200	F19XPD	F19ZPDH	2920	80
WVM 235-355	F20XPD	F20ZPDH	3700	100
WVM 410-710	F40XPD	F40ZPDH	7400	150
WVM 800-1080	F80XPD	F80ZPDH	14800	200
WVM 1230-1450	F120XPD	F120ZPDH	22200	250

Accessories as loose parts: start-up devices

For model	Order no.	Purchased parts package
WVM 40-50	VASVPB/10/40	Start-up device PN10, connection DN40 (EN 1092-1)
WVM 65-85	VASVPB/10/50	Start-up device PN10, connection DN50 (EN 1092-1)
WVM 120-200	VASVPB/10/80	Start-up device PN10, connection DN80 (EN 1092-1)
WVM 235-355	VASVPB/10/100	Start-up device PN10, connection DN100 (EN 1092-1)
WVM 410-710	VASVPB/10/150	Start-up device PN10, connection DN150 (EN 1092-1)
WVM 800-1080	upon request	Start-up device PN10, connection DN200 (EN 1092-1)
WVM 1230-1450	upon request	Start-up device PN10, connection DN250 (EN 1092-1)

Recommended adsorber for removal of oil vapours

For model	Adsorber ³ order no.	Filter performance ² in m ³ /h	Adsorber nominal width ¹ (nb)
WVM 40-85	A120/10DG1-F	1200	50
WVM 120-200	A250/10DG1-F	2500	80
WVM 235-355	A380/10DG1-F	3800	100
WVM 410-475	A500/10DG1-F150	4850	150
WVM 525	A600/10DG1-F150	6100	150
WVM 620-1450	upon request		

¹ relating to EN 1092-1

² m³ relating to 1 bar(a) and 20 °C; relating to the suction performance of the compressor, compression at 7 bar_a and 35 °C inlet temperature

EMEA Product Information Centre

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