

nao



User Guide

D² pneumatic heatless desiccant dryer

revision: REV;2022-019 document: 17-100-0119

© 2022 Air & Gas Solutions LLC.

www.n-psi.co.uk



Experience.

Our team is comprised of and supported by individuals spanning all disciplines from research & development, engineering & manufacturing, marketing & sales and service & support. Our backgrounds are in air and gas purification and our experience in this field spans a wide range of industries. We combine this knowledge and experience to ensure our products and services are designed and provided to meet the objectives and expectations of you - our Customer



Customer.

We recognise that our Customers are not only our valuable distribution partners who sell and support our products or the machine builders who depend on them as protection for their equipment. They are the contractors who install them, the manufacturers who use them in their processes and the service people who maintain them. At nano we have developed our products, packaging and support materials to ensure they exceed all of our Customers' expectations.



Service.

At nano we recognise that world-class customer service is the most important component to any successful business. Your business needs to exceed your customers' expectations to stand out from your competitors and our service must positively impact your business so you can be successful in doing so. Our commitment is simple... we will stand behind our products and ensure that our customer service is unrivaled in the industry.



Experience. Customer. Service.

table of contents

section	description	page
1	1.1 general information	4
	1.2 manufacturer details and support	
	1.3 document introduction	5
	1.4 warranty guidelines	
	1.5 packaging	
	1.6 damage to packaging	
	1.7 general safety	6
	1.8 intended use of the product	
	1.9 personnel	
	1.10 safe handling	
2	2.1 technical specification	7
	2.2 flow rates	
	2.3 correction factors	8
	2.4 product dimensions	
	2.5 product overview	9
	2.6 system layout	10
	2.7 site location	
3	3.1 maintenance and servicing	11
	3.2 cleaning	
	3.3 daily checks	12
	3.4 service schedule and breakdown	
	3.5 service kits and spares	
4	4.1 service record	14
	4.2 trouble shooting	15
	4.3 process and instrumentation diagram	16
	4.4 notes	17



D2

pneumatic heatless desiccant dryer

1.1 general information

This manual is copyrighted, all rights reserved. It may not, in whole or in part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine readable form without prior consent in writing from Air & Gas Solutions LLC. It may not be distributed through the internet or computer bulletin board systems without prior consent from Air & Gas Solutions LLC.

range: series 2 heatless desiccant pneumatically operated air dryers
models: NDM-060, 070, 080, 090, 100, 110, 120, 130 - PNU
doc no: 17-100-0119
issue: 002

1.2 manufacturers details and support

nano-purification solutions ltd. (Manufacturer)

address: Dukesway
Team Valley Trading Estate Gateshead
NE11 0PZ
United Kingdom
telephone: +44 (0) 191 497 7700
internet: www.n-psi.co.uk
email: sales@n-psi.co.uk

germany - nano-purification solutions GmbH.

address: Erkelenz
Germany
telephone: +49 2151 4828 418
internet: www.n-psi.de
email: sales@n-psi.de

usa - nano-purification solutions inc.

address: 5509 David Cox Road
Charlotte,
NC 28269
USA
telephone: +1 (704) 897-2182
internet: www.n-psi.com
email: support@n-psi.com

canada - nano-purification solutions inc.

address: 7 Petrie Street
St. Catharines,
Ontario
L2P 3J6
Canada
telephone: +1 (905) 684-626
internet: www.n-psi.com
email: support@n-psi.com



annotations



CAUTIONS: Indicate any situation or operation that may result in potential damage to the product, injury to the user, or render the product unsafe.



WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and/or birth defects or other reproductive harm. For more information, go to www.P65Warning.ca.gov.



NOTES: Highlight important sections of information where particular care and attention should be paid.



pneumatic heatless desiccant dryer

1.3 document introduction

This manual provides factory prescribed installation and maintenance procedures for a series 2 heatless desiccant compressed air dryer. The procedures illustrated in this document are only to be performed by authorized personnel. For further information regarding the procedures outlined in this document contact the manufacturer before proceeding. Be sure to read this document carefully before attempting to install or operate the dryer. This document should be permanently available at the dryer installation site and be kept in an easily accessible place alongside the dryer.

1.4 warranty guidelines

All products are supplied with a 2 year manufacturer's warranty from the date of purchase, when installed and maintained in accordance with the manufacturers guidelines. Only genuine service parts should be used and no modifications made.

1.5 packaging

All products are securely packaged in a specifically designed wooden packing box. The dryer will be held in a horizontal position by wooden struts; using straps to secure the product to the box base. The box top cover can be removed by removing the 4 fixing screws and lifting off in one piece.

1.6 damage to packaging

Check immediately to establish whether damage has occurred to the external packaging and if the damage extends to the product inside. If there is damage to a product, contact the relevant supplier immediately.



In no circumstances must a damaged product be used in operation. Using damaged products can lead to irreparable functional faults or cause serious physical harm.



The support packing box permits limited longitudinal stacking; however the central section of the packing box should not be considered load bearing.



D2

pneumatic heatless desiccant dryer

1.7 general safety

No modifications must be made to the product. Any modifications may reduce the operational safety of the product and invalidate the manufacturer's warranty. This could potentially result in damage to the product and serious personal injury.

For your own safety, when carrying out work on this product, all relevant national safety regulations must be complied with relating to pressurized and electrical systems.

1.8 intended use of the product

The dryer is exclusively intended for the treatment of compressed air, which is free from bulk water, oil and solid matter constituents. The product should be located within a building and protected from extreme conditions and weather. The dryer must be operated only in accordance with the data on the rating plate. Any operations that do not comply with those stated on the product rating label will render the warranty void.



This product is only designed to operate at pressures of between 6 to 16 barg (58 to 232 psig). It is not suitable for pressures in excess of 16 barg (232 psig).



IMPORTANT: *It is essential that the system into which the dryer is installed is fitted with a pressure limiting/relief device. This device should be between the compressor and the dryer. The device must be set to prevent the maximum working pressure of 16 barg (232 psig) from being exceeded.*

1.9 personnel

Only authorized, competent and trained personnel are permitted to work on this product. This user guide is intended solely for such personnel and is to be used only as a reference; it should not be used to replace conventional training.

1.10 safe handling

Please ensure the relevant safe engineering practices and handling procedures are employed when handling, installing and operating this product. Ensure that the equipment is depressurized and isolated prior to carrying out any of the scheduled maintenance instructions specified within this user guide.



In no circumstances must a damaged product be used in operation. Using damaged products can lead to irreparable functional faults or cause serious physical harm.



A suitable lifting aid must be used to minimize the risk of physical injury or damage to the product.



pneumatic heatless desiccant dryer

2.1 technical specification

specifications	standard
maximum water content (ISO class) (4)	class 2 -40°C (-40°F) pdp
minimum operating pressure	6 barg (87 psig)
maximum operating pressure	16 barg (232 psig)
recommended operating temp range	1.5 to 35°C (35 to 95°F)
design operating temperature range	1.5 to 50°C (35 to 122°F)



All dryers should be preceded by a coalescing filter regardless of oil or oil free applications, a 0.01mg/m³ grade coalescing filter must be installed on the inlet to the dryer.

2.2 flow rates

model	inlet flow rate		connection	
	Nm ³ /hr	scfm	inlet	outlet
NDM-060-PNU	58	34.1	1" BSPP or NPT	1" BSPP or NPT
NDM-070-PNU	70	41.2		
NDM-080-PNU	90	52.9		
NDM-090-PNU	112	65.9		
NDM-100-PNU	150	88.2		
NDM-110-PNU	180	105.9		
NDM-120-PNU	224	131.8		
NDM-130-PNU	301	177		

2.3 correction factors

inlet air pressure (barg)	6	7	8	9	10	11	12	13	14	16
correction factor	0.88	1.00	1.13	1.25	1.38	1.50	1.63	1.75	1.88	2.13

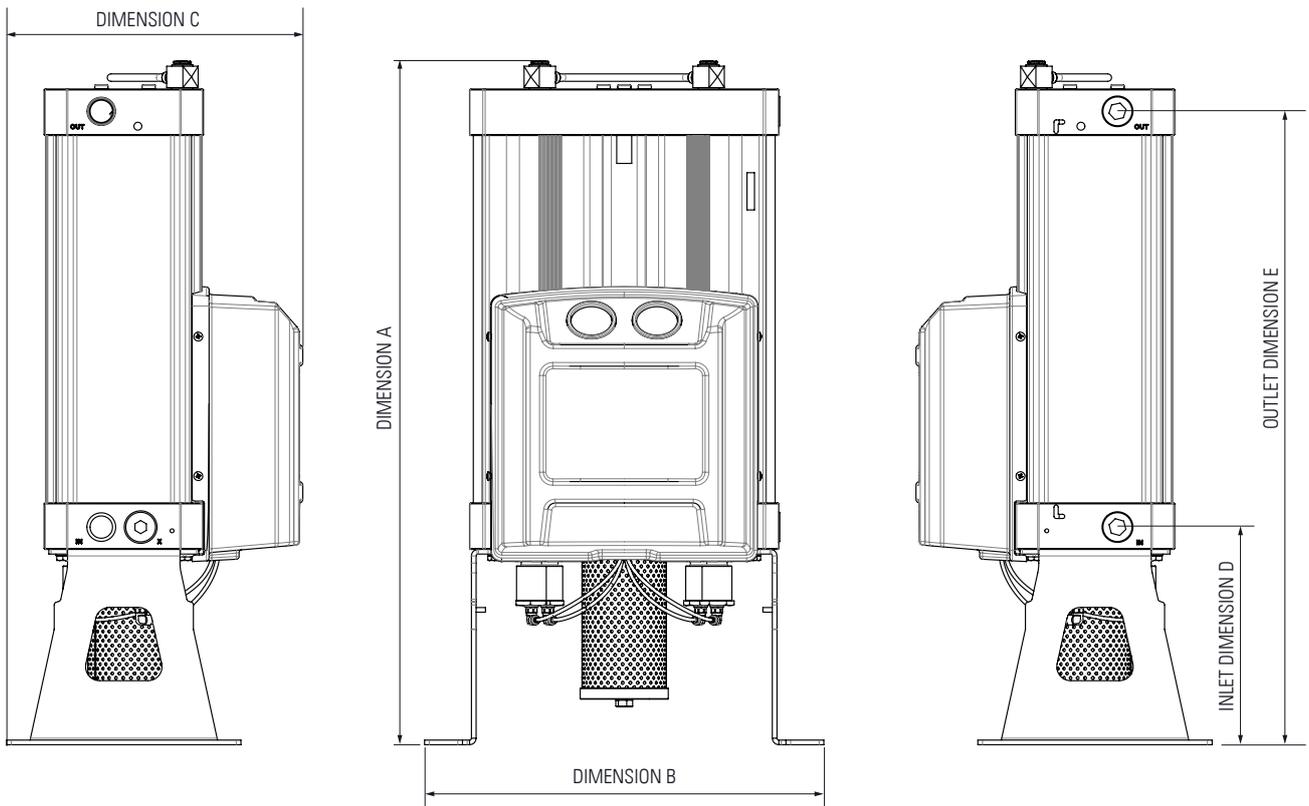
inlet air temperature	°C	25	30	35	40	45	50
	°F	77	86	95	104	113	122
correction factor		1.00	1.00	1.00	0.97	0.88	0.73



D2

pneumatic heatless desiccant dryer

2.4 product dimensions

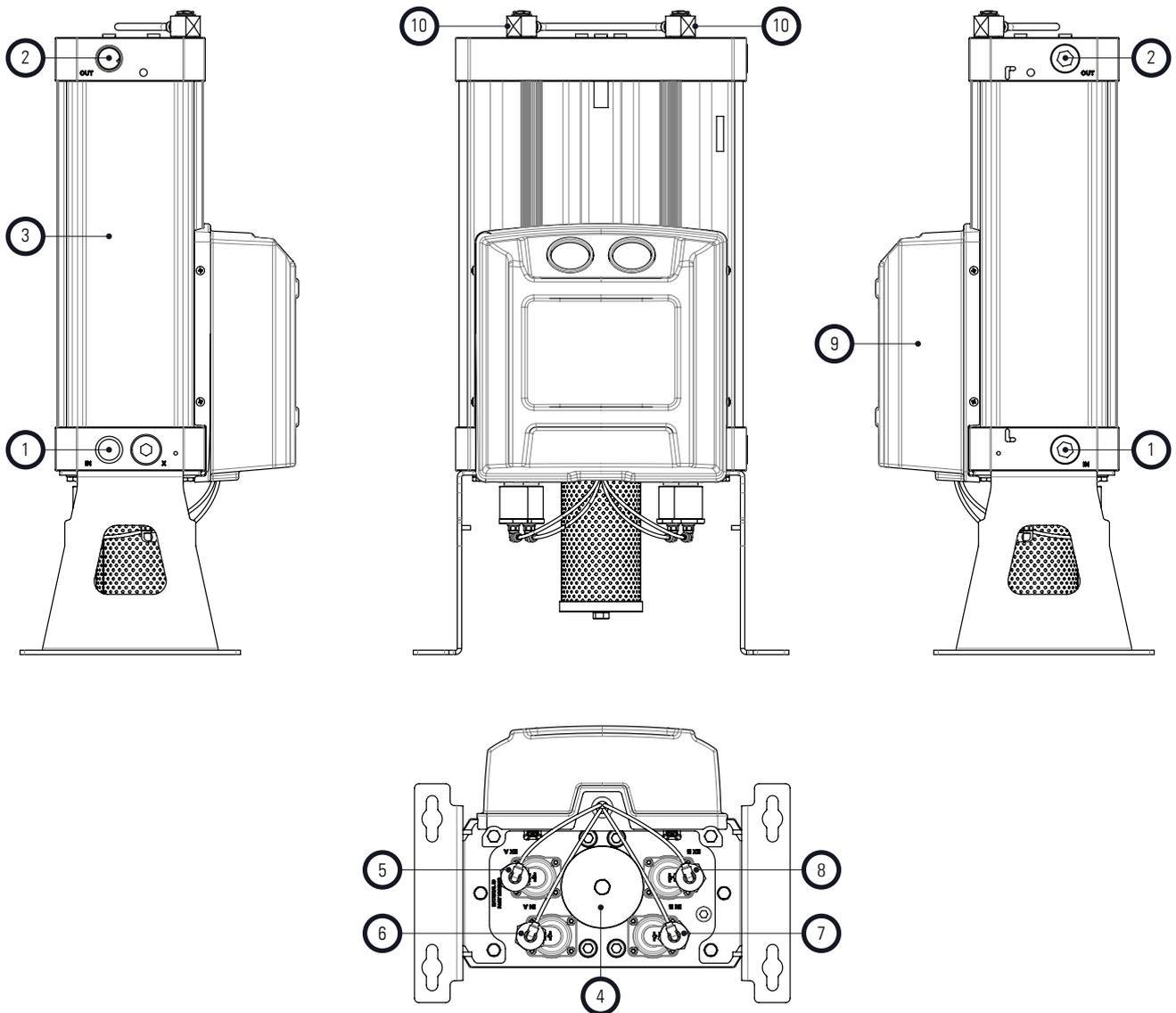


model	A		B		C		D		E		weight	
	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	kg	lbs
NDM-060-PNU	735	28.9							681	26.81	44.0	97
NDM-070-PNU	735	28.9							681	26.81	44.0	97
NDM-080-PNU	915	36.0							861	33.89	54.0	119
NDM-090-PNU	915	36.0							861	33.89	54.0	119
NDM-100-PNU	1090	42.9	426	16.7	316	12.4	234	9.2	1036	40.78	64.0	141
NDM-110-PNU	1240	48.8							1240	48.81	77.0	169
NDM-120-PNU	1490	58.6							1490	58.66	89.0	196
NDM-130-PNU	1840	72.4							1840	72.44	109.0	240



pneumatic heatless desiccant dryer

2.5 product overview



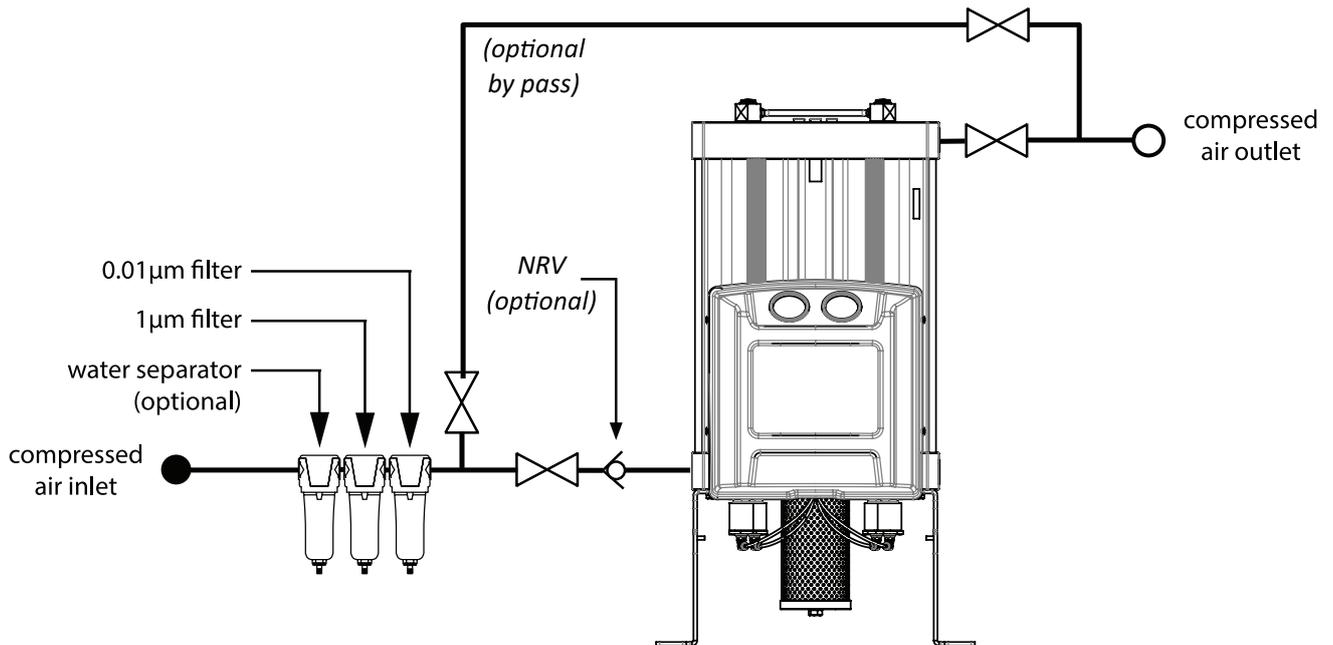
number	description	number	description
1	compressed air inlet	6	inlet valve 'A'
2	compressed air outlet	7	inlet valve 'B'
3	dryer column	8	exhaust valve 'B'
4	exhaust silencer	9	pneumatic control box
5	exhaust valve 'A'	10	purge control



D2

pneumatic heatless desiccant dryer

2.6 system layout



IMPORTANT: It is essential that the system into which the dryer module is installed is fitted with a pressure limiting/relief device. This device should be installed between the compressor and the dryer module.

2.7 site location

When selecting an installation site for the dryer, ensure the following conditions are met:

- Installation site should be located indoors on a flat surface protected from the weather and other harmful conditions.
- The ambient temperature must not drop below 1°C (33.8°F) or exceed 50°C (122°F).
- The installation site should be level and able to support the weight of the product
- Ensure sufficient space around the product, to allow access for operation and maintenance.
- Take into account the noise generated by the dryer exhausting while in use when considering location.



pneumatic heatless desiccant dryer

3.1 maintenance and servicing



Maintenance operations should only be carried out by authorized, suitably trained personnel.

- Maintenance operation should only be conducted when the system has been shut down and fully depressurized.
- Isolate the dryer from the compressed air supply ensuring the system is in a safe condition for maintenance to be carried out.
- All gasket seals removed during maintenance operations must be replaced with new gaskets.
- All connections must be isolated and removed with care, paying particular attention to the areas that become pressurized.
- Do not modify or adjust the control settings.
- Only certified and approved replacement parts should be used.
- Always check all connections for leakage and secure seating.
- Ensure all loose parts are removed or secured to the dryer and it is in safe working condition before operation.

3.2 cleaning

Clean the equipment with a damp cloth only and avoid excessive moisture. If required a mild detergent may be used, however do not use abrasives or solvents as these may cause damage.

3.3 daily checks

- Check the dryers for any external damage.
(assess and eliminate any defects found)
- Remove any loose dust or dirt from the dryer, clean all surfaces that appear to have attracted unwanted contaminants.
- Always check all connections for leakage and secure seating.
- Ensure all loose parts are removed or secured to the dryer before operation.



D2

pneumatic heatless desiccant dryer

3.4 service schedule and breakdown

service	year 1 (12 months)	year 2 (24 months)	year 3 (36 months)	year 4 (48 months)	year 5 (60 months)	year 6 (72 months)	year 7 (84 months)	year 8 (96 months)
A	✓	✓	✓	✓	✓	✓	✓	✓
B		✓		✓		✓		✓
C				✓				✓



When contacting your service provider be sure to provide the part number and serial number of your dryer, this can be found on the rating plate located top right hand side of the dryer.

- **Service A** - Every 1 year (12 months)
Replace external exhaust silencer/muffler element
- **Service B** - Every 2 years (24 months)
Replace desiccant cartridges
Replace top manifold gasket seals
- **Service C** - Every 4 year (48 months)
Replace exhaust valve diaphragms
Replace inlet valve diaphragms
Replace outlet check valve seals



pneumatic heatless desiccant dryer

3.5 service kits and spares

model	service A	service B	service C
		standard -40°F (-40°F)	
NDM-060-PNU		NDK-060	
NDM-070-PNU		NDK-070	(x1) OVSK-130
NDM-080-PNU		NDK-080	or
NDM-090-PNU		NDK-090	(x2) NDB-100
NDM-100-PNU	ESK-130	NDK-100	
NDM-110-PNU		NDK-110	(x1) OVSK / (x1) NDB-100
NDM-120-PNU		NDK-120	or
NDM-130-PNU		NDK-130	(x1) NDB-130

kit number	description	kit contents
ESK-130	Replacement exhaust silencer/muffler element	(x1) Exhaust Silencer/Muffler Element
NDK-060	Replacement desiccant cartridges for NDM-060	
NDK-070	Replacement desiccant cartridges for NDM-070	
NDK-080	Replacement desiccant cartridges for NDM-080	
NDK-090	Replacement desiccant cartridges for NDM-090	(x2) Desiccant Cartridge (x2) Gasket Seals
NDK-100	Replacement desiccant cartridges for NDM-100	
NDK-110	Replacement desiccant cartridges for NDM-110	
NDK-120	Replacement desiccant cartridges for NDM-120	
NDK-130	Replacement desiccant cartridges for NDM-130	
OVSK-130	Replacement outlet valve seals	(x2) Outlet Valve Seal Set
NDB-100	Valve Diaphragm Kit	(x2) Valve Diaphragms
NDB-130	Valve Diaphragm Kit	(x2) Valve Diaphragms

Replacement parts

RCK PNU-NC	Pneumatic Pilot Operator	(x2) Normally closed actuators
RCK PNU-NO	Pneumatic Pilot Operator	(x2) Normally open actuators



D2

pneumatic heatless desiccant dryer

4.1 service record

part number

serial number

installed by

installation date

**service
interval**

**hour run
(if applicable)**

date

serviced by
print sign

comments / observations

year 1

year 2

year 3

year 4

year 5

year 6

year 7

year 8

year 9

year 10

year 11

year 12



pneumatic heatless desiccant dryer

4.2 trouble shooting

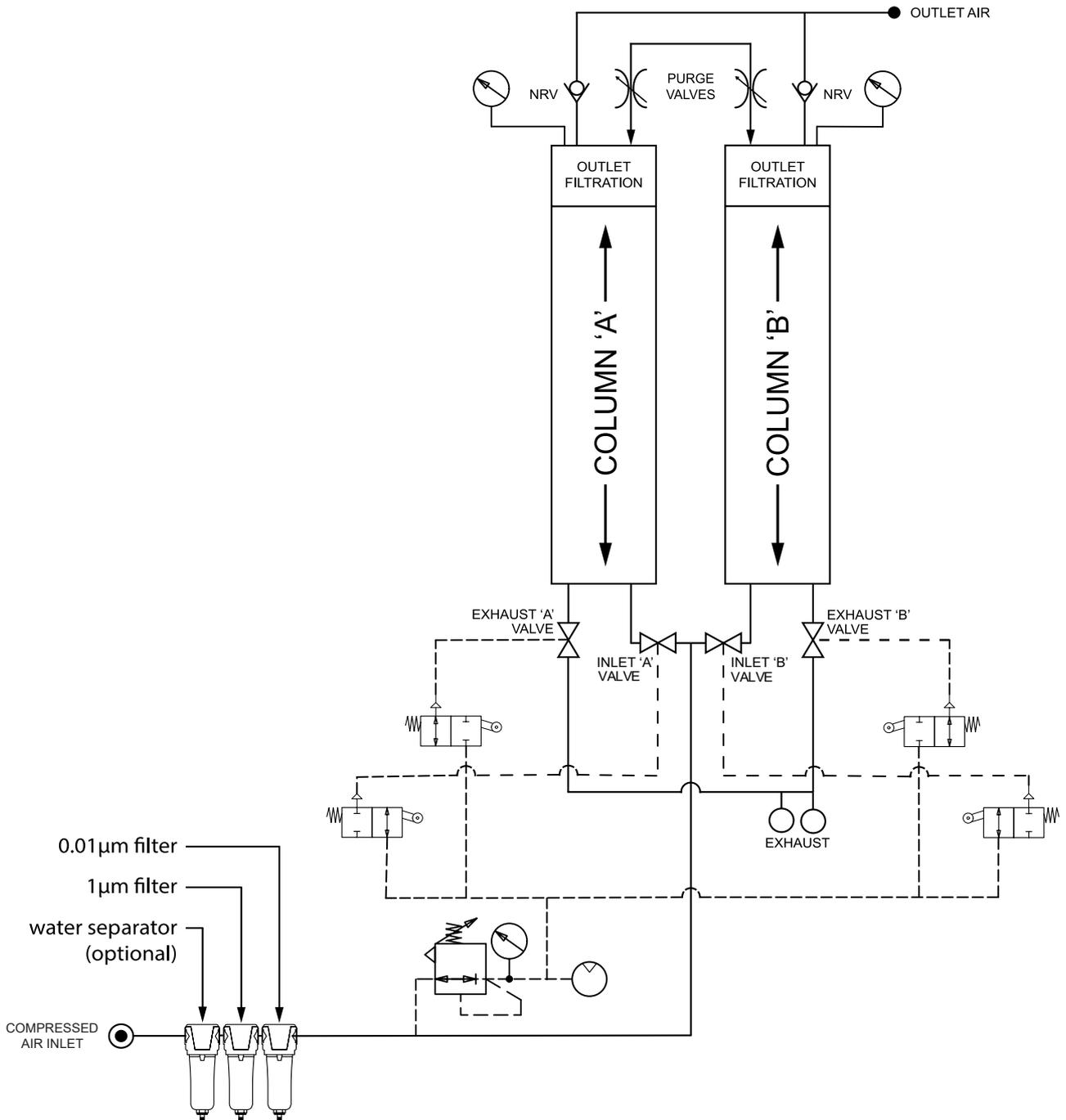
problem	problem caused	solution
Poor dew-point performance	Insufficient inlet pressure	Inlet pressure should be a minimum of 6 barg (87 psig) if not then adjust inlet pressure settings.
	Moist or contaminated desiccant	Eliminate the cause of contamination, replace desiccant cartridges (do not re-use).
	Excessive inlet air temperature	Check against the technical specification
	Insufficient purge air	Purge incorrectly adjusted, consult the service personnel to adjust settings (factory pre-set).
	Exhaust silencer blocked	Replace exhaust silencer/muffler element.
Failure of dryer to cycle	Controller not functioning correctly	Ensure the controller is functioning correctly and cams are turning
	insufficient inlet pressure	Inlet pressure should be a minimum of 4 barg (58 psig) if not then adjust inlet pressure settings.
	failure to de-pressurize when cycling	Exhaust valve functioning correctly; replace valve
	outlet flow stops	Check inlet air supply
	erratic air flow from exhaust	Faulty or damaged valves, carry out service



D2

pneumatic heatless desiccant dryer

4.3 process and instrumentation diagram





nano

Experience. Customer. Service.



nano-purification solutions

gateshead, united kingdom
tel: +44 (0) 191 497 7700
sales@n-psi.co.uk
www.n-psi.co.uk



nano-purification solutions

erkelenz, germany
tel: +49 (0) 2151 482 8218
sales@n-psi.de
www.n-psi.de



nano-purification solutions

st. catharines, ontario, canada
tel: +1 905 684 6266
support@n-psi.com
www.n-psi.com



nano-purification solutions

new bethlehem, pennsylvania
tel: +1 724 297 3416
airtak@airtak.com
www.airtak.com



nano-purification solutions

charlotte, north carolina
tel: +1 704 897 2182
support@n-psi.com
www.n-psi.com