

# nano



## ultra-high purity compressed air dryers

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# D<sup>1|2|3</sup>

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Leading edge technology and hundreds of years of **experience**...nano-purification solutions, your world-class manufacturer of state-of-the-art compressed air and gas solutions to industry.

Our commitment at nano is to work alongside our **customers** and provide unique solutions with the highest quality products to solve your specific challenges.

A wealth of experience and leading edge products are only part of the equation. nano recognise that world-class customer **service** is the most important component to any successful business.

Experience. Customer. Service... **nano**



## clean and dry

Clean and dry compressed air is essential in every efficient and profitable manufacturing and process operation worldwide. nano's vast experience includes food, beverage, chemical, laboratory, medical and natural gas applications.

nano understand your needs and has created the nano range of high-performance, energy-saving compressed air and gas purification products to provide clean and dry compressed air and gases at an affordable price with unrivaled reliability.



## design

Our experienced team of design engineers are world leading specialists in the design of new and unique industrial compressed air treatment products and compressed air dryers.



## research & development

A core element of our capabilities - founded on cumulative decades of practical engineering expertise - our R&D team is continually looking for improved performance and reliability.



## manufacture

Ultra-high purity compressed air dryers are manufactured at our state of the art facility to the highest standards of build quality to ensure equipment reliability and high levels of performance.

# nano D<sup>1|2|3</sup> compressed air dryers

Clean and dry compressed air is easily achieved with nano ultra-high purity compressed air dryers.

nano dryers reliably give you:

- more for your money - everything needed for installation is in the box
- moisture and particulate protection of your production process
- lower life cycle costs - low energy costs and simplified maintenance
- built in dew point monitoring (optional)
- space saving - models up to 301 Nm<sup>3</sup>/hr (177 scfm) can be easily wall mounted
- safe and quiet operation
- flows from 5 to 1,886 Nm<sup>3</sup>/hr (3 to 1,110 scfm) at 7 barg operating pressure
- peace of mind - the most reliable product of its kind

Designed for use in the compressor room, at the point of application or integrated into your original equipment, nano dryers are an effective solution to the problems caused by contaminated compressed air.



**reliability is built in...** and backed by our 2 year product warranty

## benefits - get more for your money

### guaranteed performance

- nano dryers have been 100% function and performance tested at the factory to ensure the highest standard of performance, delivering compressed air purity in accordance with ISO8573-1.2010, Class 2 dirt (1 micron) and Class 2 water (-40°C pressure dew point)

### reliable operation

- high efficiency moisture removal and reliable operation with PLC controlled solenoid valves
- integral volumetric flow limiter prevents overflow ensuring consistent dew point performance

### quiet depressurisation

- unique exhaust air silencers significantly reduce noise levels

### energy saving design

- energy saving dew point monitoring option can save up to 60% during reduced inlet moisture loading

### PLC controls and digital display

- a clear digital display provides a full view of PLC operation and monitoring data

### high quality construction

- 100% leak, function and dew point performance tested

### easy to install space saving design

- easy to install & ready for use, the D<sup>1</sup> packages include mounting brackets for either floor or wall mounting (optional for D<sup>2</sup>)
- the compact design allows installation in spaces too small for a traditional dryer

### easy to maintain

- patented, combined filter and desiccant cartridges (D<sup>1</sup> & D<sup>2</sup>) can be serviced in less than 15 minutes
- integrated inlet moisture separator (D<sup>1</sup> only) and outlet filtration
- convenient service kits for easy and efficient maintenance

# nano dryers – D<sup>1</sup> & D<sup>2</sup> in detail

## patented combined filter & desiccant cartridges

- built in inlet water separator (D<sup>1</sup> only) eliminates the cost and pressure drop of installing a separate inlet water separator in small oil-free compressor applications\*
- desiccant and outlet filtration are integrated into a single cartridge (eliminates the cost and pressure drop of installing a separate after filter)
- high density filled desiccant provides maximum adsorption capacity
- easy to replace cartridges simplify maintenance requirements

## PLC controlled operation

- the dryer is operated by a robust and reliable PLC control system offering valuable features including 'power on', 'hours run' and 'service required' indicators
- memory retention built into the PLC enables the controller to pick up where it left off in the drying cycle, ensuring consistently clean and dry air downstream
- compressor synchronisation is a standard energy saving feature which starts and stops the dryer with a signal from the compressor or point-of-use equipment to eliminate purge loss when drying is not required

## energy saving dew point control option

- with this option, a dew point sensor is incorporated into the dryer providing the ultimate in energy savings
- the outlet dew point is constantly monitored allowing the cycle time to be adjusted depending on the actual moisture load - saving valuable purge air
- easily field retrofit; includes dew point display
- the -ES option reduces valve actuation, increasing service life



## floor or wall installation

- can be floor or wall mounted - simply by rotating the feet 90° (standard on D<sup>1</sup>, optional on D<sup>2</sup>)

## optimum dew point performance

- dryers are provided as standard set for a -40°C dew point. Optional dew points from -20°C to -70°C are available
- air velocity and, therefore, air to desiccant contact time, is carefully controlled via a pressure maintaining device to ensure optimum dew point performance (standard on D<sup>1</sup>, optional on D<sup>2</sup> & D<sup>3</sup>)

## constant flow and pressure

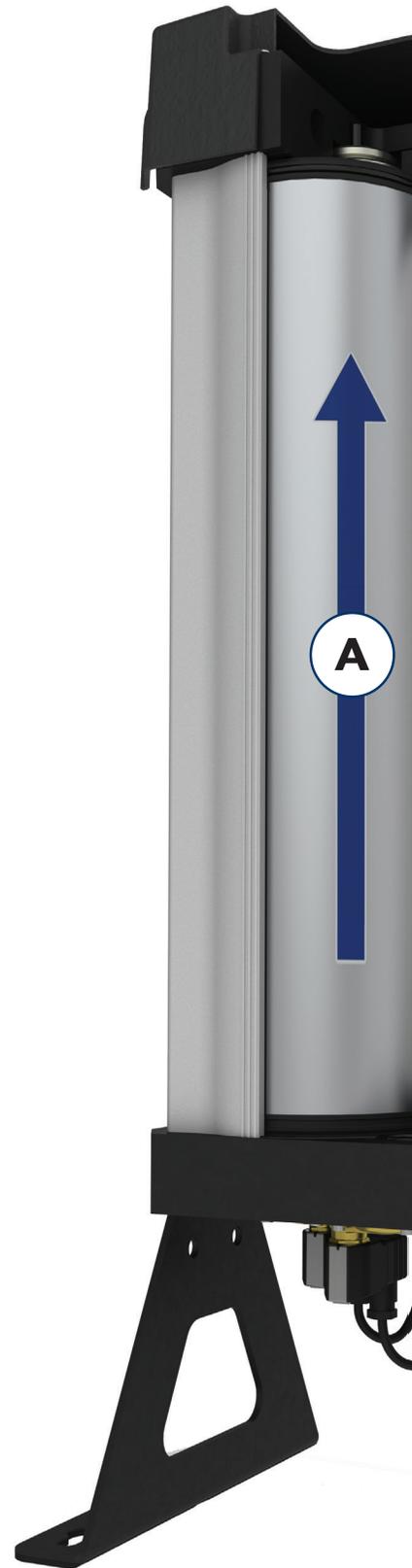
- pressure is equalised before switching columns to ensure uninterrupted compressed air and consistent air pressure. Equalisation also ensures long desiccant life due to minimised desiccant attrition

## reliable high performance valves

- NDL 010 to 050 use integrated check valves and two pilot operated solenoid valves for proven performance and reliability
- NDL 060 to 130 use four pilot operated solenoid valves

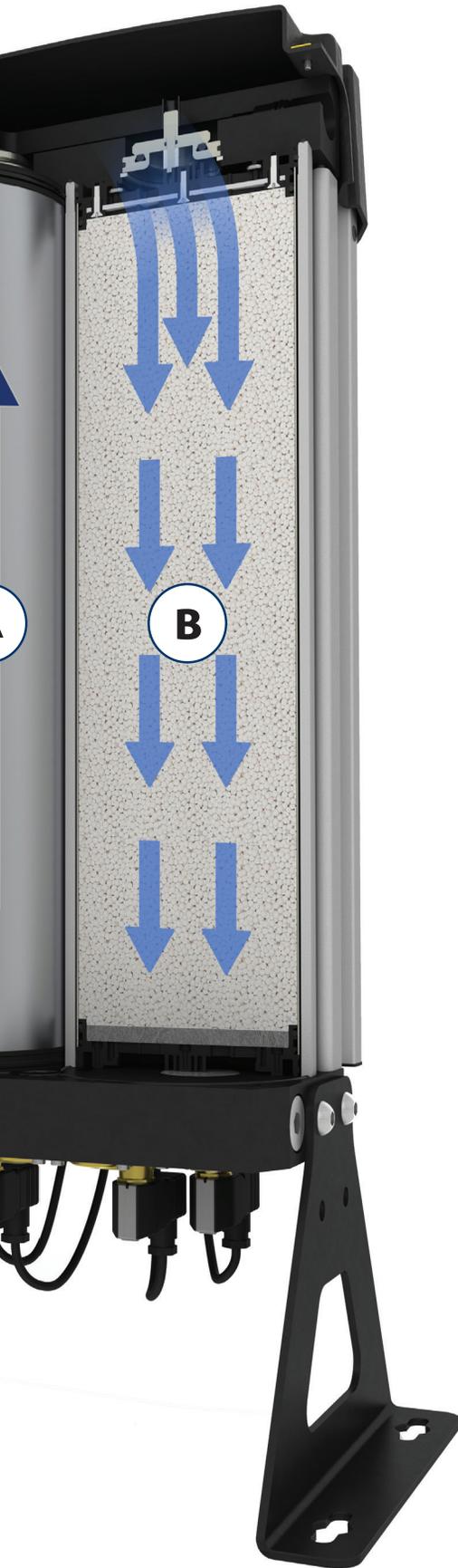
## maximum corrosion protection

- high tensile aluminium columns are corrosion protected then externally powder coated to provide maximum protection for corrosive environments



\* applies to the D<sup>1</sup> only. For oil flooded compressors, an upstream nano F1 M01 coalescing pre-filter is required

## system performance



These advanced dryers use the pressure swing adsorption principle to efficiently dry compressed air. They use a heatless twin tower configuration (see diagram opposite) housed in a modular design. Each column contains a unique (and patented) desiccant cartridge which incorporates an inlet separator (D<sup>1</sup> only) and outlet filtration.

Wet air from the compressor aftercooler enters the dryer and is directed into column A. nano can provide F1 water separators and coalescing pre-filters to ensure trouble-free operation for nano D-Series dryers.

D<sup>1</sup> only: Bulk liquids (water) and particles are removed by the separator on the inlet of the cartridge. Water is retained within the dryer until the column is regenerated, when it will be vented to atmosphere as it is depressurised.

D<sup>1</sup> & D<sup>2</sup>: Air passes through the desiccant bed where moisture vapor is adsorbed. Then the dry air passes through a particle filter which retains any desiccant particles (< 1 micron / ISO8573.1 class 2 for dust).

Simultaneously, a small amount of dry air is counter-flowed down through cartridge B and exhausted to atmosphere, removing the moisture and regenerating the desiccant.

The dryer is controlled by a PLC which periodically switches the solenoid valves, reversing the function of each column and therefore ensuring the continuous supply of dry air.

Visit [www.n-psi.co.uk](http://www.n-psi.co.uk) to download a technical paper describing the performance limitations of typical twin tower desiccant dryers and how the unique design of the nano D<sup>1/2/3</sup> overcomes them to provide effective and efficient dehydration of compressed air.



unique patented cartridge design



PLC controls with clear text display



flexible piping & installation options



mount on the floor or the wall

# nano dryers – D<sup>3</sup> in detail

## combined desiccant & after filter column

- high density filled desiccant columns provides maximum adsorption capacity
- built in after filter ensures reliable downstream air quality

## PLC controlled operation

- the dryer is operated by a robust and reliable PLC control system, offering valuable features including 'power on', 'hours run' and 'service required' indicators
- memory retention built into the PLC enables the controller to pick up where it left off in the drying cycle, ensuring consistently clean and dry air downstream
- compressor synchronisation is a standard energy saving feature which starts and stops the dryer with a signal from the compressor or point-of-use equipment to eliminate purge loss when drying is not required

## energy saving dew point control option

- with this option, a dew point sensor is incorporated into the dryer providing the ultimate in energy savings
- the outlet dew point is constantly monitored allowing the cycle time to be adjusted depending on the actual moisture load saving valuable purge air
- dew point is conveniently displayed on the PLC
- the -ES option reduces valve actuation, increasing service life



## optimum dew point performance

- dryers are provided as standard set for a -40°C dew point. Optional dew points from -20°C to -70°C are available

## constant flow and pressure

- pressure is equalised before switching columns to ensure uninterrupted compressed air and consistent air pressure. Equalisation also ensures long desiccant life due to minimised desiccant attrition

## two stage maintenance free silencer

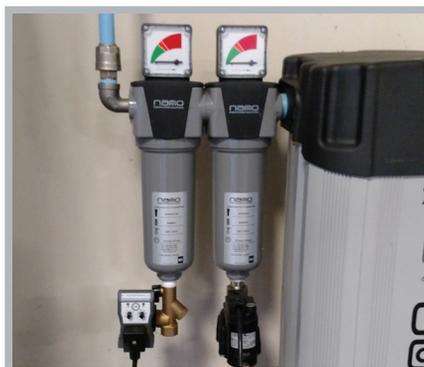
- exhaust air is directed into easily maintained silencers behind the lower manifold. The air is then directed under the dryer away from operators and traffic lanes in the compressor room

## maximum corrosion protection

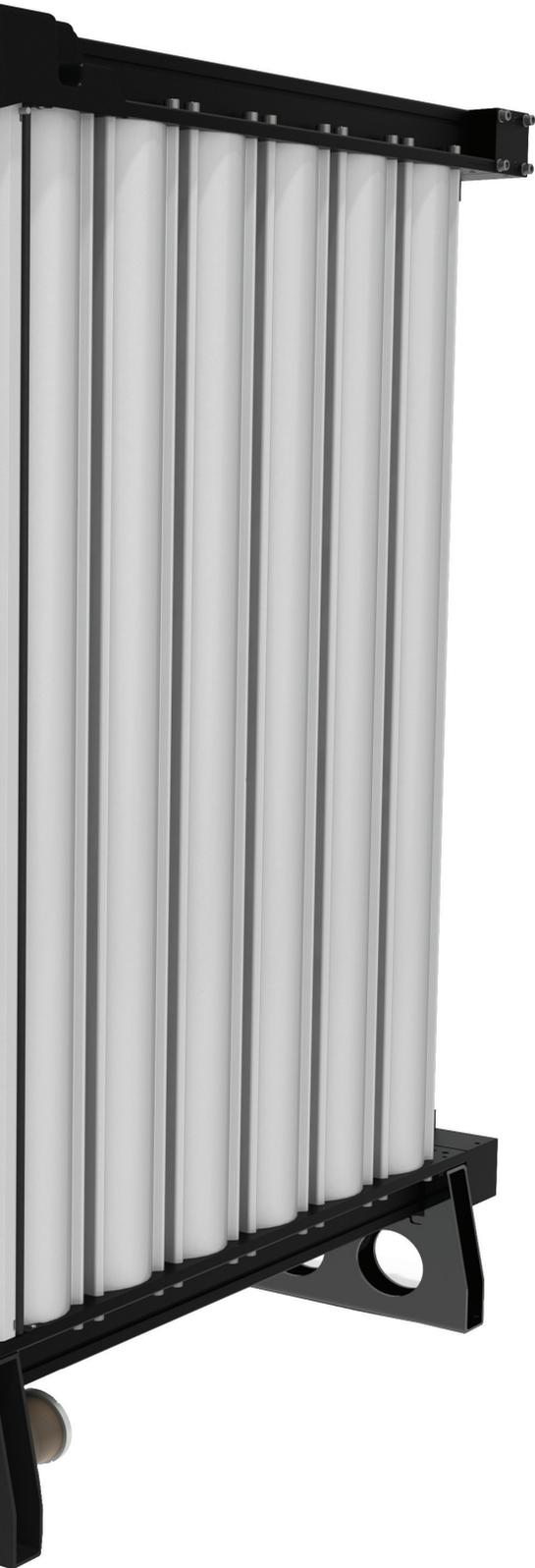
- high tensile aluminium columns are corrosion protected then externally powder coated to provide maximum protection for corrosive environments



PLC controller with clear text display

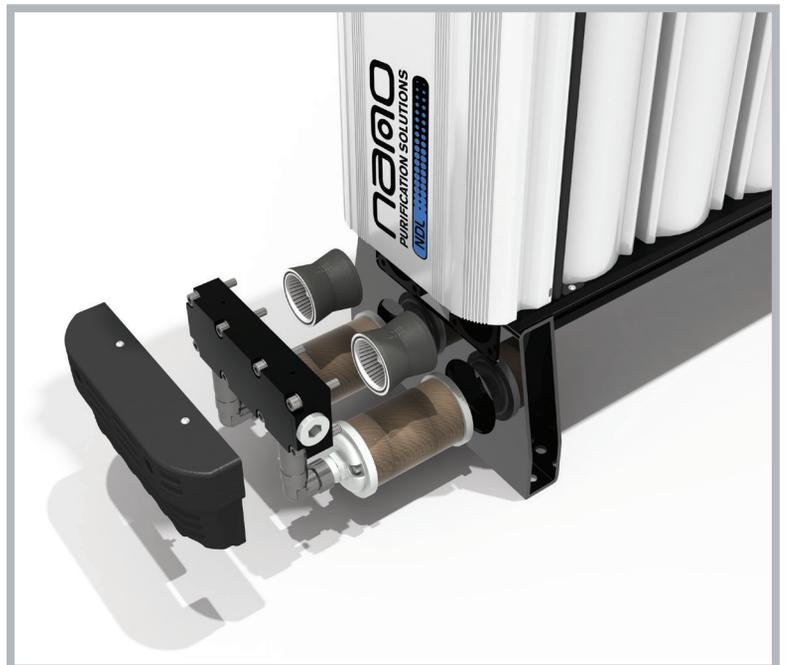


performance validated nano F<sup>1</sup> filtration



### flexibility is built right in

We've designed the D<sup>3</sup> with simplicity of service in mind. As standard, the columns are high density filled and include a built in after filter for reliable downstream air quality. For even greater ease of service, pre-filled and pre-assembled desiccant / after filter cartridges are available as a time saving option.



### reliable high performance valves

Inlet, exhaust and outlet air are controlled using coaxial flow valves integrated into the upper and lower manifolds. The valves provide unrestricted flow capacity and are designed for durability, ease of maintenance and long service life.

# sizing & specifications

dryer model	inlet & outlet		rated flow <sup>(2)</sup>		dimensions (mm)			approx. weight	recommended pre filter <sup>(3)</sup>
	BSPP <sup>(4)</sup>	Nm <sup>3</sup> /h	scfm	A	B	C	kgs	part no.	
<b>D<sup>1</sup></b>									
NDL 010	8 mm PTC <sup>(4)</sup>	5.1	3	432	229	254	9	NFB 0008 M01	
NDL 020	8 mm PTC <sup>(4)</sup>	8.5	5	432	229	254	9	NFB 0008 M01	
NDL 030	8 mm PTC <sup>(4)</sup>	17	10	635	229	254	14	NFB 0015 M01	
NDL 040	8 mm PTC <sup>(4)</sup>	26	15	889	229	330	19	NFB 0015 M01	
NDL 050	12 mm PTC <sup>(4)</sup>	41	24	1092	229	330	26	NFB 0025 M01	
<b>D<sup>2</sup></b>									
NDL 060	1"	58	34	743	426	283	47	NFB 0050 M01	
NDL 070	1"	70	41	743	426	283	47	NFB 0050 M01	
NDL 080	1"	90	53	923	426	283	58	NFB 0070 M01	
NDL 090	1"	112	66	923	426	283	58	NFB 0070 M01	
NDL 100	1"	150	88	1098	426	283	71	NFB 0090 M01	
NDL 110	1"	180	106	1248	426	283	83	NFB 0135 M01	
NDL 120	1"	224	132	1498	426	283	96	NFB 0135 M01	
NDL 130	1"	301	177	1848	426	283	118	NFB 0175 M01	
<b>D<sup>3</sup></b>									
NDL 2110	2"	360	212	1194	305	635	166	NFB 0290 M01	
NDL 2120	2"	469	276	1448	305	635	200	NFB 0290 M01	
NDL 2130	2"	680	400	1778	305	635	248	NFB 0400 M01	
NDL 3130	2"	951	560	1778	305	787	353	NFB 0700 M01	
NDL 4130	2 ½"	1274	750	1778	305	965	458	NFB 0850 M01	
NDL 6120	2 ½"	1407	828	1448	305	1295	524	NFB 0850 M01	
NDL 6130	2 ½"	1886	1110	1778	305	1295	668	NFB 1250 M01	

specifications	standard	optional
maximum particle size (ISO class) <sup>(4)</sup>	class 2 (1 micron)	class 1 (0.01 micron)
maximum water content (ISO class) <sup>(4)</sup>	class 2 (-40°C pdp)	class 1 (-70°C)
minimum operating pressure	4 barg	-
maximum operating pressure	10 or 16 barg <sup>(5)</sup>	consult factory
recommended operating temp range	1.5 to 35°C <sup>(6)</sup>	-
design operating temperature range	1.5 to 50°C <sup>(6)</sup>	-
power supply requirements	100 to 240 VAC / 50 or 60 Hz	24 VDC

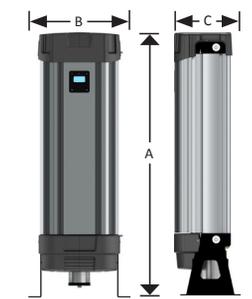
pressure correction factors <sup>(7)</sup>												
inlet air pressure (barg)	4	5	6	7	8	9	10	11	12	13	14	16
correction factor	0.63	0.75	0.88	1	1.13	1.25	1.38	1.50	1.63	1.75	1.88	2.13

temperature & dew point correction factors <sup>(7)</sup>									
inlet air temperature (°C)	24	37	40	45	50	pressure dew point (°C)	-20	-40	-70
correction factor	1	1	0.97	0.88	0.73	correction factor	1.10	1.00	0.70

- (1) NDL 010 to 050 have push to connect fittings on the inlet and outlet. All other models have BSPP threaded connections
- (2) at inlet conditions of 7 barg and 35°C and a -40°C outlet pressure dew point. For all other conditions refer to the correction factors above
- (3) recommended for all applications. Required when dryer is to be installed immediately downstream of an oil lubricated compressor.
- (4) per ISO 8573.1:2010 (E)
- (5) NDL 010 to 130 are 16 barg MAWP as standard. NDL 2110 to 6130 are 10 barg MAWP as standard. Higher pressures available
- (6) NDL 010 to 090 have a minimum recommended operating and design temperature of 4°C
- (7) to be used as a rough guide only. All applications should be confirmed by n-psi. Contact sales@n-psi.co.uk

**service guidelines**

- desiccant cartridges should be changed every 2 years
- valves should be changed every 4 years
- dew point meters should be serviced every 1 year (optional)
- refer to user guide for full service details



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