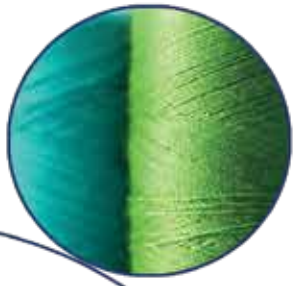
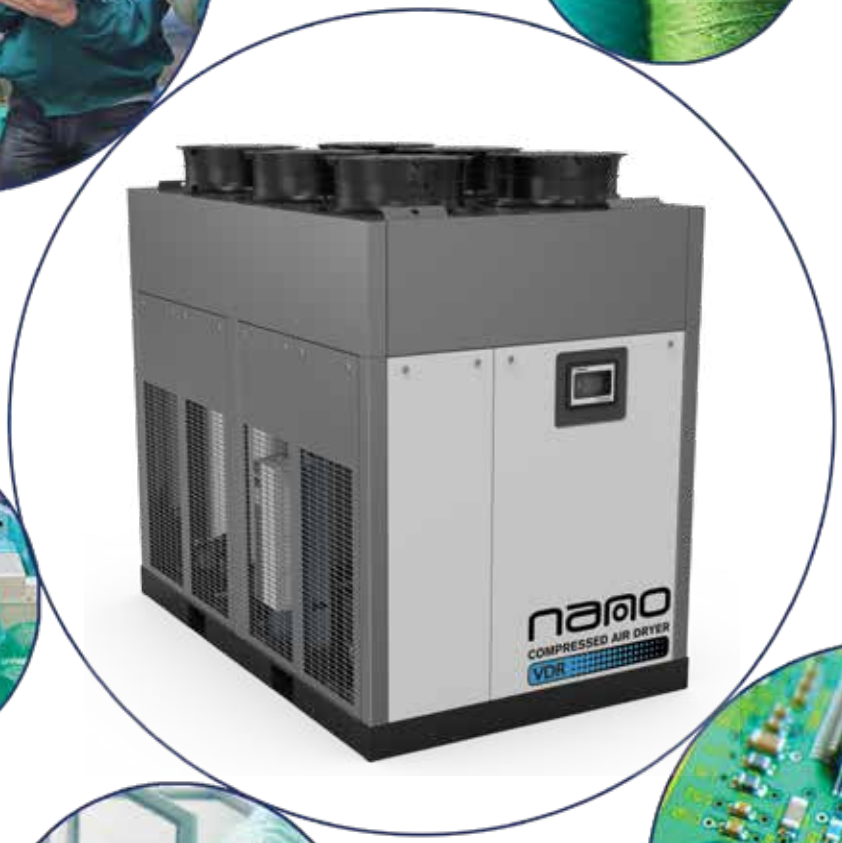




variable speed cycling refrigerated air dryers

flow capacity: 2650 to 8475 scfm (4500 to 14400 Nm^3/hr)

“The VDR was the most efficient option available and eligible for rebates from our power company.”

industrial manufacturer - eastern US

In order to provide dry air under variable operating conditions refrigerated air dryers should be sized to handle their worst-case operating conditions - which means the maximum system flow at the highest inlet temperature on the hottest day of the year. This leads to the dryer being oversized when it is operating at more typical conditions leading to a far great power consumption. Non-cycling dryers operate at 100% power consumption, regardless of conditions or demand and other cycling dryer technology can provide some savings but the R^6 VDR range takes power savings to the next level.

nano R^6 VDR variable speed refrigerated air dryers

- clean, dry compressed air at ISO class 4, 5 or 6 as necessary
- saves energy by reducing refrigerant compressor speeds during reduced flow and under low temperature conditions
- lowest pressure drop
- steady, reliable pressure dew point
- rebate-friendly

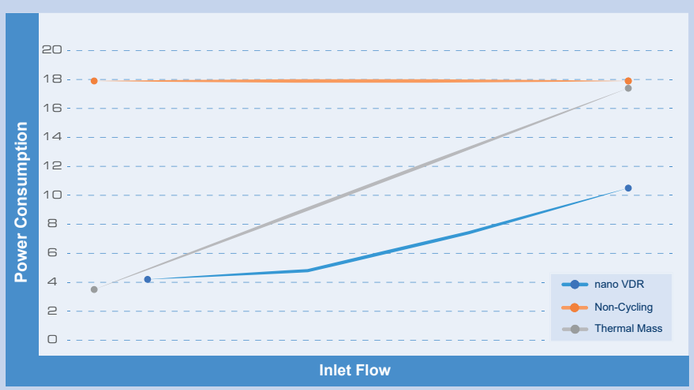
variable speed cycling technology

Variable speed cycling dryers save money when they're running full load and save money when they're not. To find out how much you can save, ask nano for a simple power study!

saves money

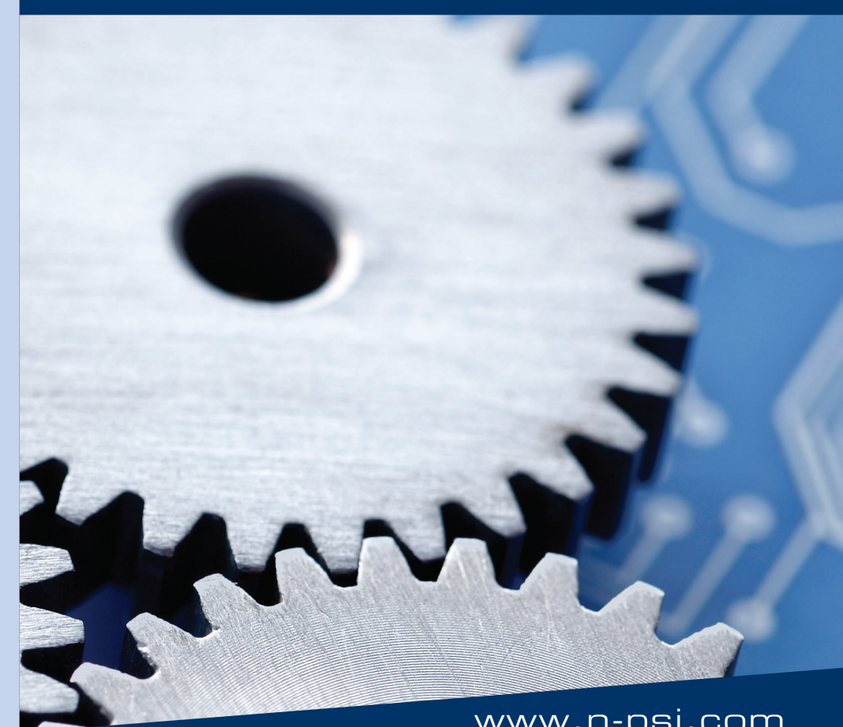
In most applications, the air flow varies significantly throughout the day reaching peak demand only for a very short time. Often this demand can be close to zero overnight or during breaks. The VDR matches its power consumption to the air flow demand providing optimal energy savings vs other refrigeration dryer technologies. (example shown to right)

*For a 2650 scfm application with an electricity cost of $0.10 per kWh for a plant running 24/7, the VDR dryer saves the company $13750 in electrical costs annually versus a direct expansion dryer or $1166 versus a thermal mass dryer.



dryer used	electrical consumption	actual air flow
VDR	10.5 kW	2650 scfm
thermal mass	17.4 kW	2650 scfm
direct expansion	17.9 kW	2650 scfm

working	duration	VDR	thermal mass	direct expansion
100%	0.5 hours	5.3 kWh	8.7 kWh	9 kWh
75%	1.5 hours	11.2 kWh	19.6k kWh	26.9 kWh
50%	5.0 hours	23.9 kWh	43.5 kWh	89.5 kWh
25%	3.0 hours	12.6 kWh	13.1 kWh	53.7 kWh
0%	14.0 hours	0 kWh	0 kWh	250.6 kWh
daily total	24.0 hours	52.9 kWh	84.8 kWh	429.6 kWh
annual running costs		$1930	$3096	$15,680
VDR annual savings		-	$1166	$13,750



BENEFITS

consistent dew point & low pressure drop

- heat exchanger with integrated water separator with unique design reduces pressure drop and adds to the high performance of the dryer, providing full protection against air condensation. No water in your compressed air system means extended life for your equipment

optimum energy efficiency

- lower electrical consumption from 0% to 100% duty cycle and low pressure drop

easy to install space saving design

- thanks to the small footprint and its "all in one design" the VDR dryer is delivered ready for use and its installation is straightforward, minimizing costs and downtime

verified performance

- designed in-house and tested according to ISO 7183:2007

robust construction

- powder coated steel panels are corrosion resistant

total accessibility

- all panels can be removed to facilitate maintenance

environmentally friendly

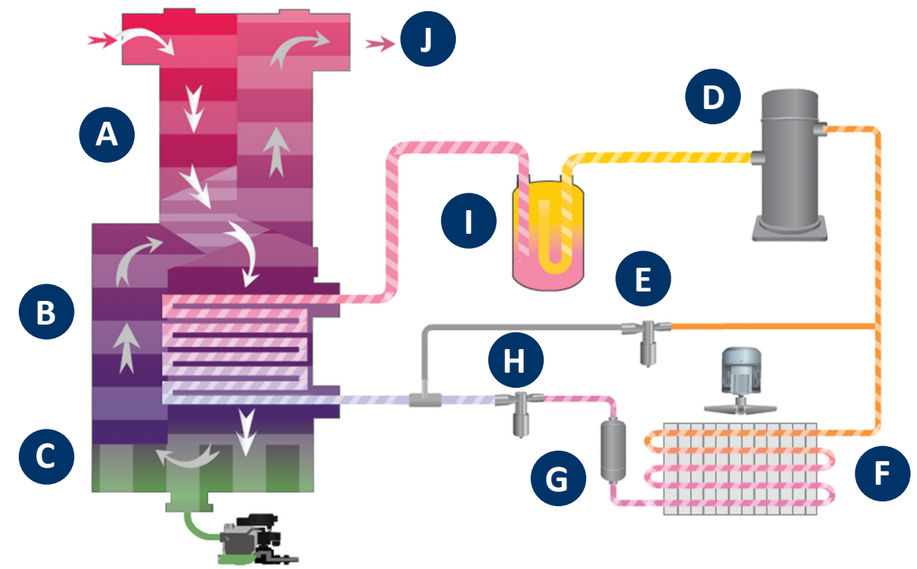
- by using R410A refrigerant the nano VDR dryers are impressively efficient not only in terms of power consumption, but also in terms of environmentally friendliness. In addition to zero ozone depletion, the low amount of the R410A refrigerant results in ultimately low CO2 equivalent making VDR dryers one the most ecological refrigerant solution available on the market today

HOW IT WORKS

A refrigerant dryer uses a refrigerant circuit and heat exchangers to cool compressed air so that it condenses the moisture in the air. They can provide a pressure dew point (PDP) as low as +37.4°F and consume no compressed air in the process.

Unlike direct expansion dryers which run continuously at full speed, the nano VDR's variable speed refrigeration compressors only run at the speed required to dry your process air to the dew point set point of the dryer.

Dryer demand is a function of both required air flow and ambient conditions. Unless both of these variables are at their maximums at the same time, there are energy savings to the had. The R6 takes advantage of this savings opportunity by significantly reducing power consumption to match actual demand.



A hot, moist compressed air enters the separate air to air heat exchanger where it is precooled

B precooled compressed air then enters the air to refrigerant evaporator where it reaches its coldest point and achieves its lowest dew point

C the moisture is collected by the integrated water separator and evacuated by the electronic zero loss drain

D variable speed refrigerant compressor increases the refrigerant pressure while matching the flow rate to the dryer load

E electronic hot gas bypass valve allows for precise dew point control

F condenser coverts the high pressure refrigerant to a liquid (air cooled shown)

G refrigerant filter protects the entire system from water and solid particles

H electronic thermostatic expansion valve reduces the refrigerant temperature

I separator prevents any liquified refrigerant from entering the compressor

J outlet flow switch stops the refrigeration circuit when no air flow is detected

FEATURES

high efficiency heat exchanger

- aluminum block heat exchanger provides optimal heat transfer leading to reduced energy consumption from refrigerant compressor
- built in high efficiency water separator prevents condense water from leaving the heat exchanger
- completely insulated to reduce thermal leakages
- enhanced air to air section means more heat is taken from the compressed air before it enters the refrigerant evaporator so a lower energy refrigerant compressor can be used to dry the air

energy efficient and reliable rotary scroll compressors

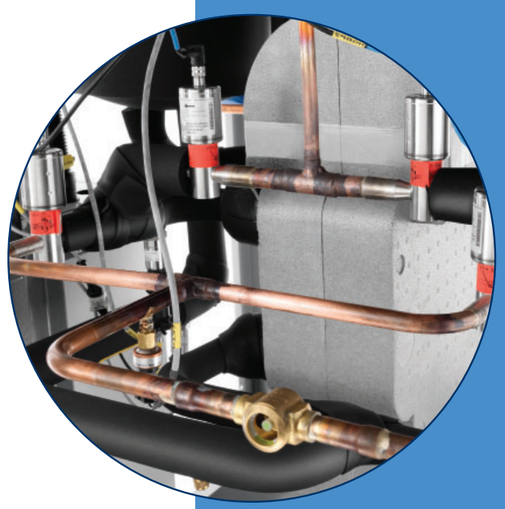
- sized for optimal performance across the full range of operational conditions it consumes an average of 30% less power than the reciprocating technology refrigerant compressors

simple to use nano Vision 01 digital microprocessor

- for complete control and operation of the unit. Provides unit performance details and sensor readouts.

electronic valves

- compared to traditional mechanical type or solenoid valves, the VDR utilizes electronic hot gas by pass and thermal expansion valves providing a new level of reliability and regulation efficiency. Smooth modular regulation results in significant increase of the valve's life time and provide the most efficient unit regulation and dew point stability.



zero air loss drain

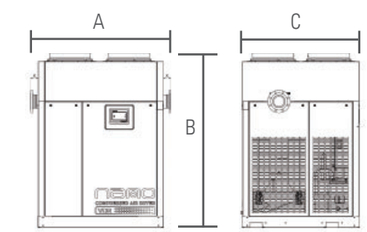
- dedicated drain with each heat exchanger

performance validated filtration

- pre- and after-filter filter packages available to provide additional energy savings and improved air quality

SPECIFICATIONS

dryer model	inlet & outlet	rated flow (1)		absorbed power (2)	dimensions (inches)				approx. weight	power supply
	Flg	scfm	Nm³/h	kW	A	B	C	X (3)	lbs	460/60/3
air-cooled										
VDR 2600A	6"	2600	4417	9.9	62.2	90.4	58	5	1940	•
VDR 3105A	6"	3150	5352	10.5	62.2	90.4	58	5	2061	•
VDR 3700A	6"	3700	6286	11.3	62.2	90.4	58	5	2172	•
VDR 4200A	6"	4200	7136	14.2	62.2	90.4	58	5	2183	•
VDR 5050A	6"	5050	8580	19.1	62.2	90.4	58	5	2183	•
VDR 6350A	8"	6350	10789	23.9	62.2	90.4	98.5	6	3726	•
VDR 8450A	8"	8450	14357	28.1	62.2	90.4	98.5	6	4012	•
water-cooled										
VDR 2600W	6"	2600	4417	6.1	62.2	67.9	58	5	1764	•
VDR 3105W	6"	3150	5352	6.6	62.2	67.9	58	5	1797	•
VDR 3700W	6"	3700	6286	7.5	62.2	67.9	58	5	1885	•
VDR 4200W	6"	4200	7136	8.3	62.2	67.9	58	5	1907	•
VDR 5050W	6"	5050	8580	12.8	62.2	67.9	58	5	1918	•
VDR 6350W	8"	6350	10789	14.4	62.2	68.3	98.5	6	3109	•
VDR 8450W	8"	8450	14357	19.7	62.2	68.3	98.5	6	3395	•



specifications	
design operating pressure range	30 to 203 psig
maximum inlet temperature	158°F
design ambient temperature	45 to 114.8°F

pressure correction factors (4)										
operating pressure (psig)	70	80	90	100	110	120	130	150	175	200
correction factor	0.81	0.87	0.93	1.00	1.03	1.08	1.12	1.19	1.26	1.30

inlet temperature correction factors (4)											
inlet air temperature (°F)	85	90	95	100	105	110	115	120	125	130	140
correction factor	1.22	1.15	1.07	1.00	0.93	0.84	0.77	0.70	0.63	0.55	0.41

ambient temperature correction factors (4)								
ambient temperature (°F)	70	80	90	100	105	110	115	120
correction factor	1.26	1.18	1.08	1.00	0.95	0.90	0.87	0.82

(1) rated flow capacity: conditions for rating dryers are in accordance with ISO7183 (Option A2). Compressed air at dryer inlet: 100 psig (7 bar) and 100°F (38°C); ambient air temperature: 100°F (38°C); operating on 60Hz power supply
(2) nominal absorbed power at rated operating conditions using 460/3/60
(3) X = flang standoff distance - see drawings for specific flange positions
(4) to be used as a rough guide only. All applications should be confirmed by n-psi sizing software. Contact support@n-psi.com for sizing assistance
(5) technical specifications subject to change without notice. Direct inquiries to support@n-psi.com or contact 704.897.2182

EXPERIENCE. CUSTOMER. SERVICE.

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 recognize that world-class customer *service* is the most important component to any successful business.

DESIGN

Our experienced team of design engineers are always looking for new and unique technologies and products to bring you the highest level of performance and lowest overall operating cost.

RESEARCH & DEVELOPMENT

Our R&D team endeavor to provide solutions that go beyond developing an existing product. They are continually researching new technologies which can provide unique advantages over competitive offerings.

MANUFACTURE

The reliable and energy saving nano R^6 range of variable speed cycling refrigerated air dryers are manufactured in our state-of-the-art facility to the highest standards of build quality to ensure equipment reliability and high levels of performance.

ENVIRONMENTALLY FRIENDLY

Through both product development and manufacturing, we strive to produce high quality products compliant to both local and global environmental legislation. Reduction of carbon footprint through energy saving products and use of environmentally friendly components are our commitment to you.

MEMBER OF CAGI Compressed Air & Gas Institute

©2022 Air and Gas Solutions LLC
publication ref. n-psi-R6-2022-00-us

nano-purification solutions
Charlotte, North Carolina
United States

nano-purification solutions
New Bethlehem, Pennsylvania
United States

nano-purification solutions
St. Catharines, Ontario
Canada

nano-purification solutions ltd
Gateshead, Tyne and Wear
United Kingdom

nano-purification solutions GmBh
Erkelenz, Germany

nano-purification solutions Asia
Singapore

tel: 704.897.2182
fax: 704.897.2183
email: support@n-psi.com
web: www.n-psi.com

www.n-psi.com