VIN2 nitrogen generator user guide

about us

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.

nano

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VIN2 nitrogen generators

1.1 general information

range: VIN2 nitrogen generators
models: 090, 110, 130
doc no: 17-137-0141
issue: 001

1.2 manufacturers details and support

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001

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.

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

1.3 document introduction

This manual provides factory prescribed installation and maintenance procedures for the VIN2 nitrogen generators. 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 generator. This document should be permanently available at the dryer installation site and be kept in an easily accessible place alongside the generator.

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 generator 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.

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 generator is exclusively intended for the production of nitrogen gas from 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 generator 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 10 barg (87 to 145 psig). It is not suitable for pressures in excess of 10 barg (145 psig).

IMPORTANT: It is essential that the system into which the generator 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 10 barg (145 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 electrically 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.

1.11 technical description

The nitrogen generator operates on the pressure swing adsorption (PSA) principle to produce a continuous stream of nitrogen gas from clean dry compressed air.

- Inlet filtration removes water, oil aerosols and particles (Inlet filtration supplied separately).
- Clean dry compressed air enters the generator through the inlet valve and is directed into one of the columns.
- Each column contains a densely packed bed filled with carbon molecular sieve.
- Air then passes through the carbon molecular sieve (CMS) bed where oxygen is preferentially absorbed, allowing the nitrogen to pass.
- After a pre-set time the control system automatically switches the bed where the online bed pressure is switched to regenerative mode and oxygen is vented from the CMS.
- A small portion of the outlet nitrogen gas is expanded into the bed to accelerate the regeneration. At the same instant the second bed comes on-line and takes over the separation process.
- The CMS beds alternate between online and regeneration modes to ensure continuous and uninterrupted nitrogen production.

1.12 product contents

when ordering a VIN2 nitrogen generator you will receive the following;

- 1 x generator support base and box cover
- 1 x VIN2 nitrogen generator
- 1 x user guide
- 1x declaration of conformity

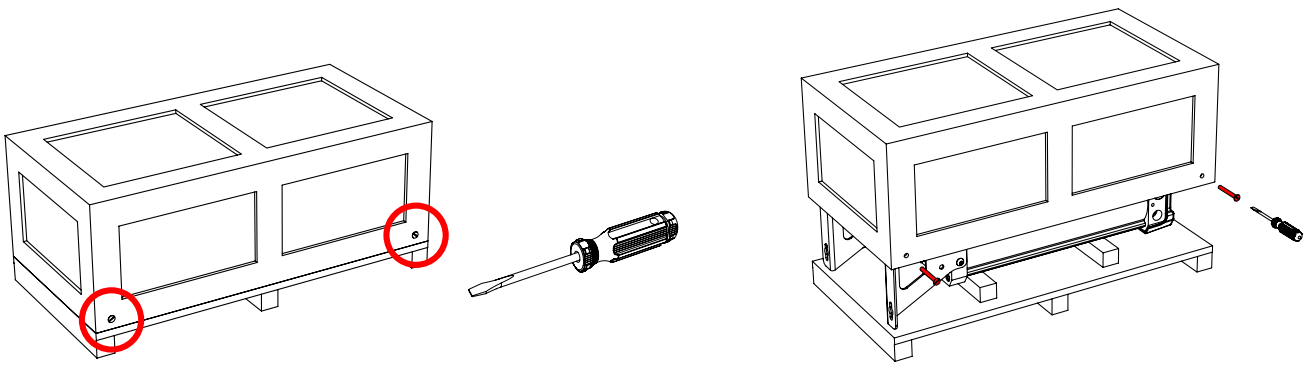


Figure 1: Contents Layout

VIN2 nitrogen generators

2.1 technical specification

specifications	standard	optional
minimum operating pressure	6 barg (87 psig)	-
maximum operating pressure	10 barg (145 psig)	-
recommended operating temperature range	5 to 35°C (41 to 95°F)	-
design operating temperature range	5 to 50°C (41 to 122°F)	-
power supply requirements	100 to 240V AC @ 50 or 60 Hz	24V DC

All generators should be proceeded by a coalescing filter regardless of oil or oil free applications, a 0.01mg/m1 grade coalescing filter must be installed on the inlet to the generator.

2.2 flow rates

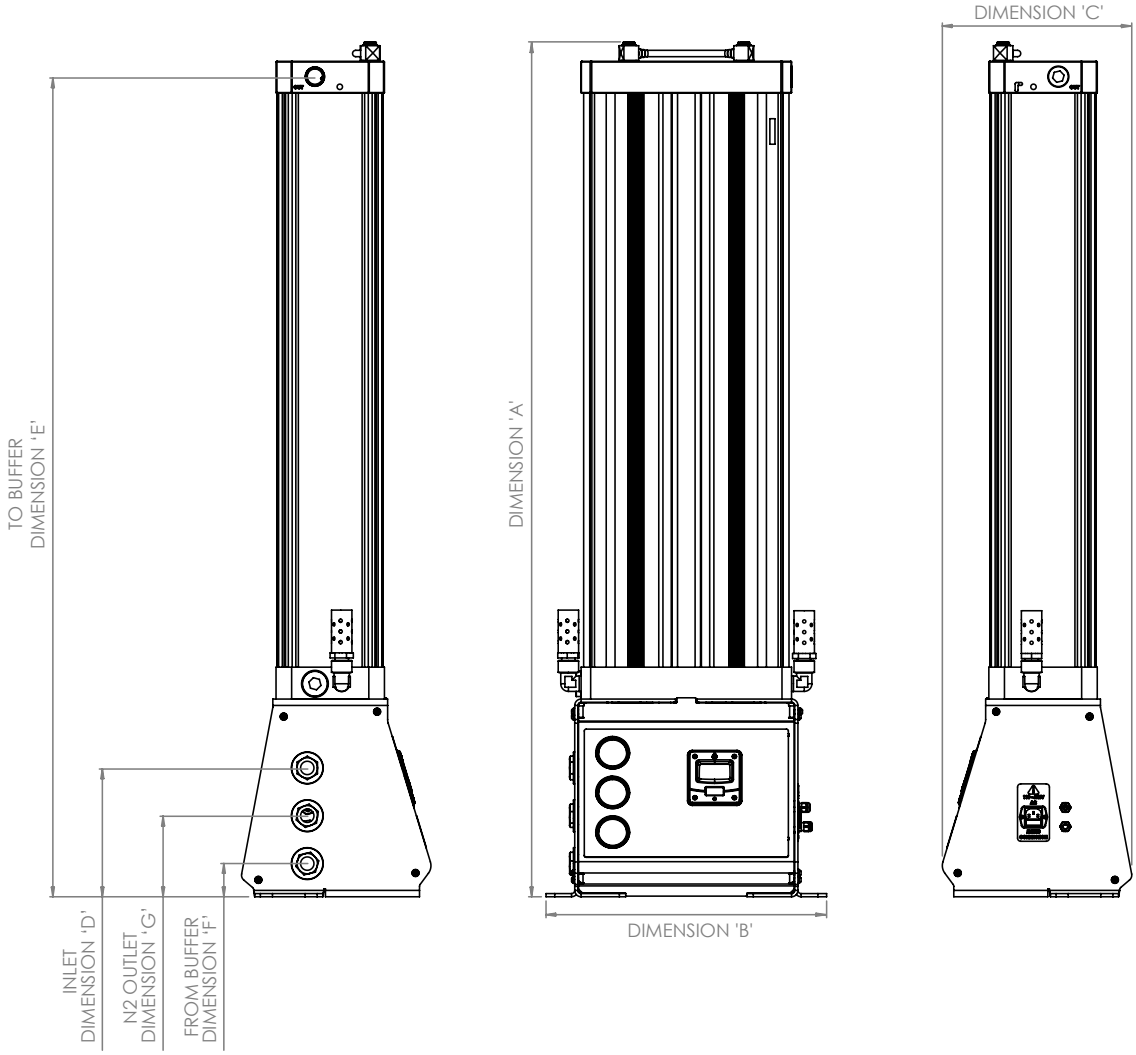
model	rated outlet flow for nitrogen purity outlet (maximum oxygen content)													
	99.9% (0.1%)		99.5% (0.5%)		99% (1%)		98% (2%)		97% (3%)		96% (4%)		95% (5%)	
	Nm^3/hr	scfh	Nm^3/hr	scfh	Nm^3/hr	scfh	Nm^3/hr	scfh	Nm^3/hr	scfh	Nm^3/hr	scfh	Nm^3/hr	scfh
VIN2-090	1.4	49.4	2.2	77.7	2.7	95.3	3.7	130.6	4.6	162.4	5.3	187.1	5.9	208.3
VIN2-110	2.4	87.7	3.4	120.0	4.3	151.8	5.8	204.8	7.2	254.2	8.4	296.6	9.4	331.9
VIN2-130	4.0	141.2	5.6	17.7	7.1	250.7	9.6	339.0	12.0	423.7	13.9	490.8	15.5	547.3

2.3 correction factors

inlet air pressure	barg	6	7	8	9	10
	psig	87	101	116	130	145
correction factor		0.88	1.00	1.10	1.20	1.20

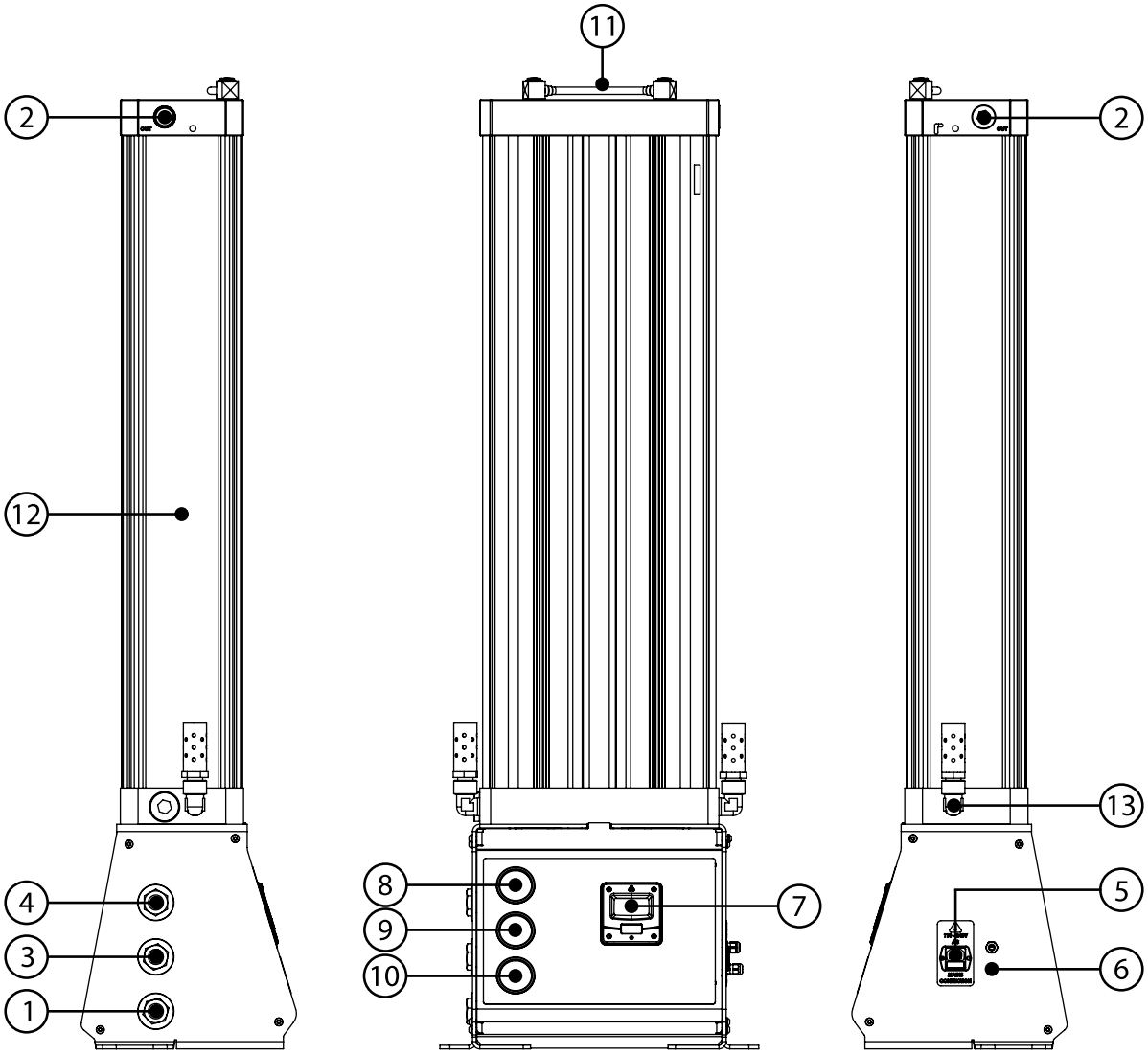
inlet air temperature	°C	5	10	15	20	25	30	35	40	45	50
	°F	41	50	59	68	77	86	95	104	113	122
correction factor		0.80	0.90	0.94	1.00	1.00	0.98	0.95	0.90	0.85	0.72

2.4 product dimensions



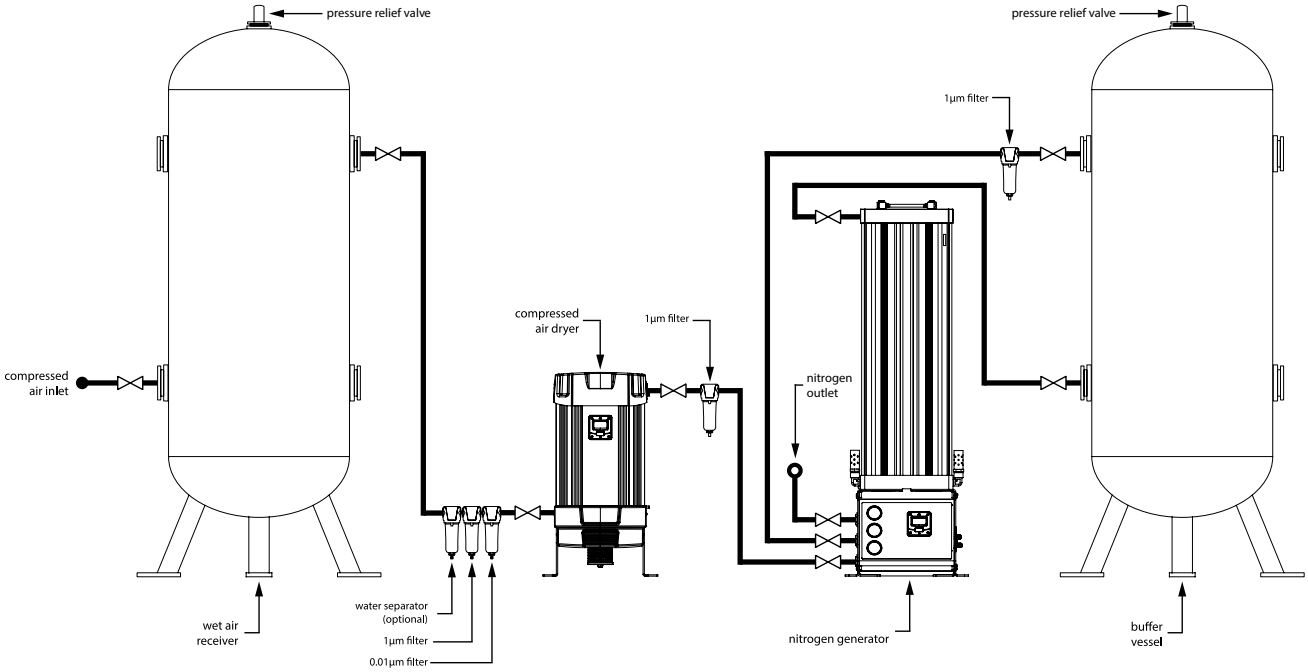
model	dimension													
	A		B		C		D		E		F		G	
	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
VIN2-090	1016	39.99	440	17.32	297	11.69	202	7.95	961	37.83	52	2.04	127	
VIN2-110	1341	52.79	440	17.32	297	11.69	202	7.95	1286	50.62	52	2.04	127	4.99
VIN2-130	1941	76.37	440	17.32	297	11.69	202	7.95	1886	74.25	52	2.04	127	

2.5 product overview



number	description	number	description
1	compressed air inlet (1/2” BSPP)	8	regulated outlet pressure gauge
2	to buffer (1” BSPP or NPT)	9	online column pressure gauge
3	from buffer (1/2” BSPP)	10	compressed air inlet pressure gauge
4	nitrogen outlet (1/2” BSPP)	11	purge flow control
5	mains inlet (electrical supply)	12	generator column
6	remote start/stop & alarm features	13	exhaust silencer
7	control panel display		

2.6 typical system layout



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

2.7 site location

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

- The site should be located indoors on a flat surface protected from weather or other harmful conditions.
- The ambient temperature must not drop below 5°C (41°F) or exceed 50°C (122°F).
- Ensure sufficient space around the product, we recommend at least 1m around the generator to allow access for operation and maintenance.
- Take into account the noise generated when in use when considering the final location.
- Due to the nature of operation there is a possibility of oxygen enrichment surrounding the generator. Ensure the area surrounding the generator is adequately ventilated.

2.8 electrical installation

To install the mains power cable:

- Remove the IEC plug from the controller socket
- Unscrew the cap head screw to remove the IEC plug top cover.
- Wire the mains power cable into the IEC plug
- Once the mains cable is correctly wired into the IEC plug, re-fit the IEC plug top cover and cap head screw.
- Reattach the IEC plug into the controller socket, securing with the swing clip.

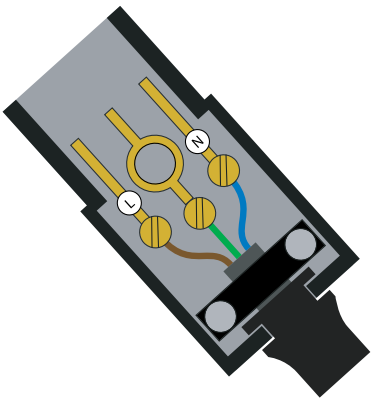


Figure 1

2.9 remote start/stop control

To gain access to the remote start/stop feature:

- Remove the two M5 screws from each side of the enclosure (see figure 2).

- Open the front cover (see figure 3) and locate the flying lead on the bottom of the control plate and remove the insulating sheath.

- There are six wires;
  1. Red Wire -
  2. Black Wire - Remote Start/Stop
  3. Blue Wire - Alarm Output (Zero volt contact)
  4. White Wire - Alarm Input (Zero volt contact)
  5. Green Wire - 24V DC Output
  6. Yellow Wire - 24V DC Output

- To set up the Remote Start/Stop control, remove/break the connection between the Black wires and green wires connect externally to a remote switch or relay.

- A 24V DC Output must be connected to the Black wire to enable the dryer to operate, if the connection is broken or if there is no voltage the generator will switch off and revert to shutdown mode, displaying “REMOTE STOP ACTIVE” on the controller display.

Under no circumstances should an external voltage or current be applied to any of these wires, as damage to the control system will occur, negating the warranty.

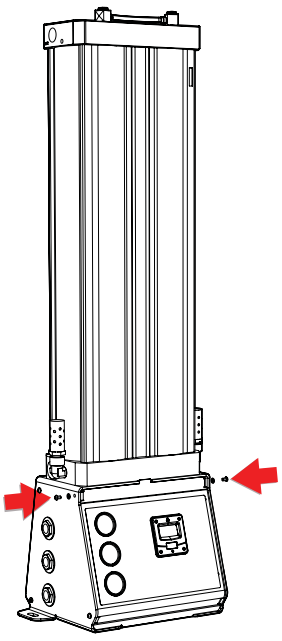


Figure 2

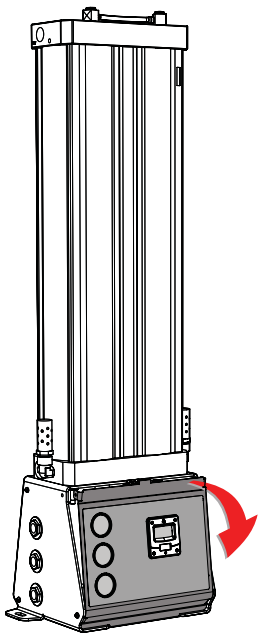


Figure 3

2.10 start-up procedure

- Ensure the inlet air temperature is between 5°C and 50°C (41°F and 122°F).
- Ensure that all isolation valves are fully closed before operating.
- Power up the generator, this will automatically start the generator.
- Slowly open the air inlet valve (page 10/11) and check for any leaks. Continue to open the air inlet valve until fully open.
- Allow the generator to cycle at least two times.
- Slowly open the 'To buffer tank' isolation valve (page 10/11) until the buffer tank is at full pressure (this will take a few cycles)
- Slowly open the 'From buffer tank' isolation valve (page 10/11). At this point the generator control system will be able to operate fully.

Beware, it can take up to two hours to clean the buffer tank.

2.11 shutdown procedure

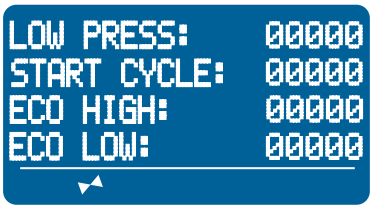
- Isolate all connections to the nitrogen generator and buffer vessel.

The generator will still be pressurized! In order to depressurize the generator; ensure the generator is isolated from the compressed air supply source.

- Allow the generator to depressurize.
- Allow the generator to operate until the display indicated low inlet pressure.
- Isolate the mains power.

2.12 control panel displays

1	Power-up Display (only visable on power start-up for 10 seconds)	
	During power-up the screen will display: • Program number followed by the revision. • Total hours dryer has operated.	STARTING 99-100-0210-M01 Total Hours: 00000 x10,000: 00000
2	Power-up Display Continued	
	During power-up the screen will display: • Remote stop active will only appear if the remote start connection has been broken or the external relay/switch is not active • Low inlet pressure will only appear if the inlet pressure is below the desired set-point • Hours the generator has run between services • Hours the generator has run in Economy mode	LOW INLET PRESSURE HOURS RUN - 00000 ECO HOURS - 00000 REMOTE STOP ACTIVE HOURS RUN - 00000 ECO HOURS - 00000
3	Start-up Sequence	
	During the start-up sequence the screen will display: • Start-up will be displayed until the half cycle count has met the desired set-point • Column 'A' status and Column 'B' status, this will be shown as online • Hours the generator has run between services • Hours the generator has run in Economy mode	START-UP Column A - ONLINE HOURS RUN - 00000 ECO HOURS - 00000
4	Normal Operation Display	
	During normal operation, if the generator enters economy mode the screen will display: • economy mode indicator to let you know it has shutdown, this will only occur when the desired outlet pressure reaches the set-point • Hours the generator has run between services • Hours the generator has run in Economy mode Speak to the manufacturer about your requirements.	ECONOMY MODE HOURS RUN - 00000 ECO HOURS - 00000

5	Set-points Adjustment Display	
	Hold down buttons A & B to begin adjusting the set-points the screen will display; • Low Press is the low inlet pressure set-point in which the generator will shutdown if this occurs • Start Cycle is the number of start-up cycles the generator must complete prior to giving gas • ECO High is the pressure set-point in which the generator enters economy Mode • ECO Low is the pressure set-point in which the generator exits economy mode To adjust these set-points hold down buttons A & B for 10 seconds, this will open the adjustment display. Once open you can use the up and down buttons to select which set-point you wish to adjust, simply press ok until the number is flashing then using the up and down buttons adjust the number to the desired set-point. Press OK to confirm then exit using the ESC button.	

3.1 maintenance

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.
- 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 before operation.

3.2 cleaning

Clean the equipment with a damp cloth only and avoid excessive moisture around any electrical connections. 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 generator for any external damage.
  (*assess and eliminate any defects found*)
- If the red service light appears, the generator must be serviced to ensure the best quality possible.
  (*contact the service provider and request a service kit for the product)*
- Remove any loose dust or dirt from the generator, 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 generator before operation.

3.4 servicing guidelines

- Maintenance operation should only be conducted when the system has been shut down and fully depressurized.
- Isolate the generator from the compressed air and electrical supply ensuring the system is in a safe condition for maintenance to be carried out on.
- All connections must be removed with care, paying particular attention to the areas that become pressurized.
- All gasket seals removed during maintenance operations must be replaced with new gaskets.
- Only certified and approved replacement parts should be used.
- Do not modify or adjust the control settings.
- Always check all connections and sealing faces for cleanliness and secure seating prior to assembly.
- Ensure all components are re-fitted to the product before operation.
- Always check all connection and sealing faces for any leakage, if any found resolve and check again.
- Ensure the dryer is left operating in a safe working condition after completion of maintenance.

3.5 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		✓		✓		✓		✓

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

- **Service A** - Every 1 year 12 months)
  Replace external exhaust silencers

- **Service B** - Every 2 year (24 months)
  Replace exhaust valves
  Replace inlet valves
  Replace nitrogen outlet valve
  Replace outlet valves
  Replace solenoid coils

3.6 service kits and spares

model	service A	service B
VIN2-090	ESK-110	EVKC-130 + IVKC-100 + NOVK-130 + OVK-130 + RCK-024
VIN2-110		
VIN2-130		

kit number	description	kit contents
ESK-110	Replacement exhaust silencers	(x2) Exhaust Silencers
EVKC-130	Replacement exhaust valves	(x2) Exhaust Valves
IVKC-100	Replacement normally closed inlet valves	(x2) N/C Inlet Valves
NOVK-130	Replacement nitrogen outlet valve	(x1) Complete Outlet Valves
OVK-130	Replacement outlet valves	(x2) Complete Outlet Valves
OVSK-130	Replacement outlet valve seals	(x2) Outlet Valve Seal Set
RCK-024	Replacement solenoid coils	(x2) 24V DC Coils

4.1 service record

part number	serial number
installed by	**installation date**

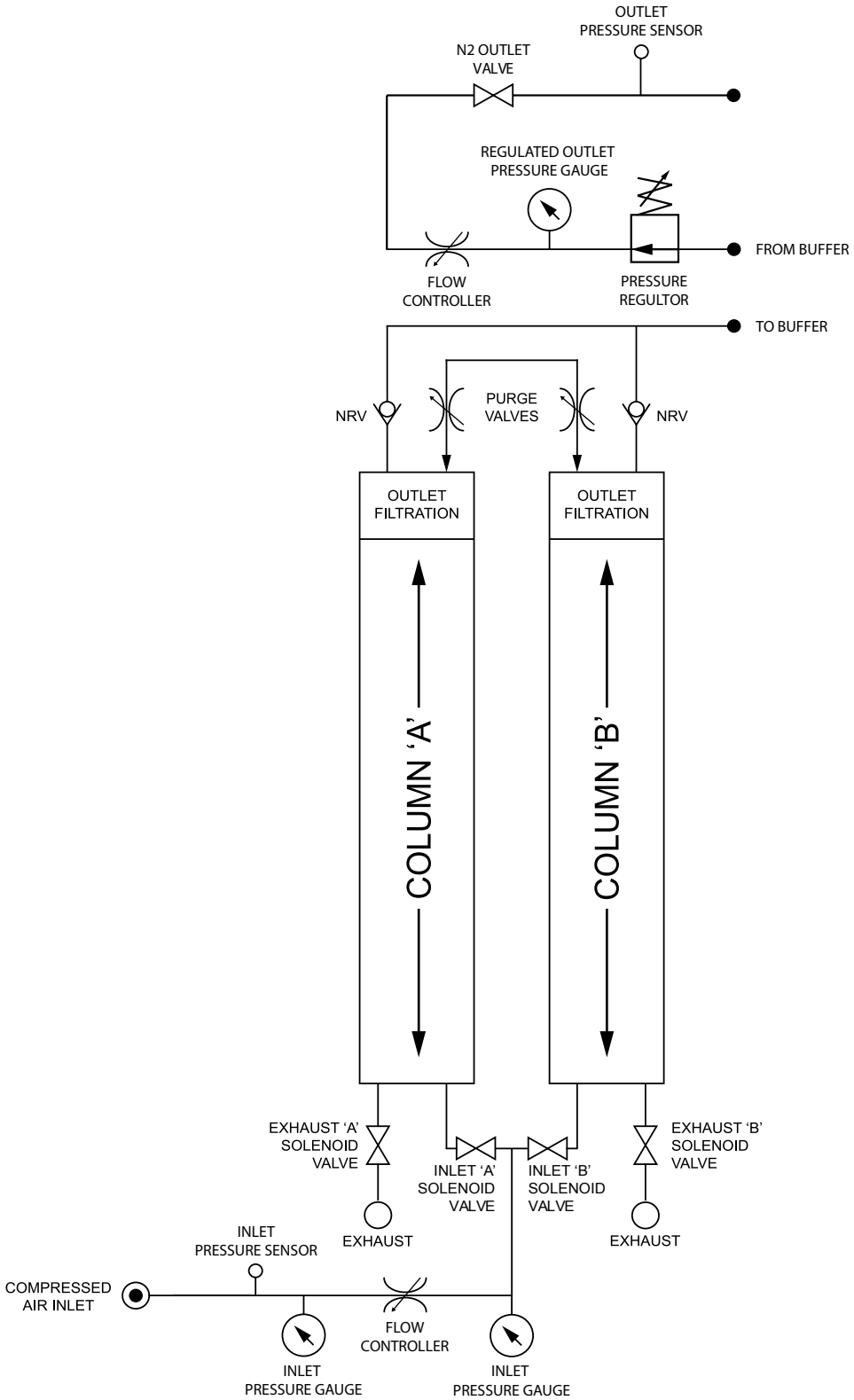
service interval	hours run (if applicable)	date	serviced by		comments / observations
			print	sign	
year 1					
year 2					
year 3					
year 4					
year 5					
year 6					
year 7					
year 8					
year 9					
year 10					
year 11					
year 12					

4.2 trouble shooting

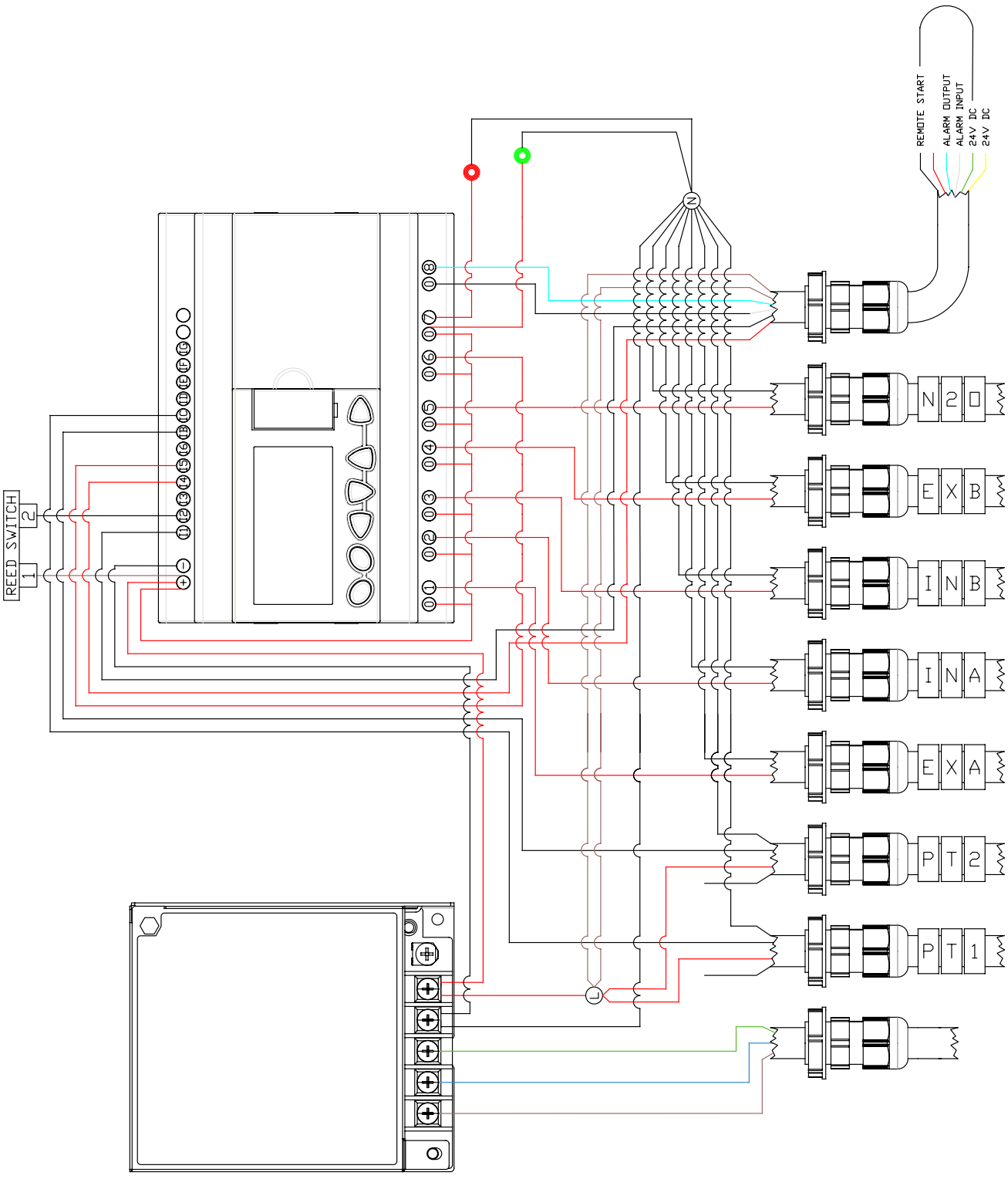
problem	problem caused	solution
Poor performance	Insufficient inlet pressure	Inlet pressure should be a minimum of 6barg (87psig) if not then adjust inlet pressure settings.
	Electrical fault	Ensure the power is on and the generator front panel is illuminated; check the generator is cycling correctly
	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 to cycle	controller not functioning correctly	ensure the controller is powered up, check the on screen column status to ensure it is powering the solenoid valves during operation
	insufficient inlet pressure	Inlet pressure should be a minimum of 6barg (87psig) if not then adjust inlet pressure settings.
	controller not illuminated	Check power supply to the dryer, check fuse and replace.
	failure to de-pressurize when cycling	Solenoid valve not functioning correctly; if there is power to the coil, replace valve.
	outlet flow stops	Check inlet air supply
	failure to initialize	Ensure that all isolation valves are fully closed, power up the generator, slowly open the air inlet valve and allow the generator to cycle.
	erratic air flow from exhaust	Faulty or damaged valves, carry out service

VIN2 nitrogen generators

4.3 process and instrumentation diagram



4.4 wiring diagram



notes

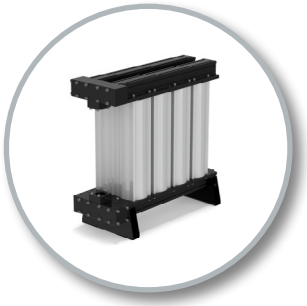
F-series industrial filters

D-series desiccant dryers

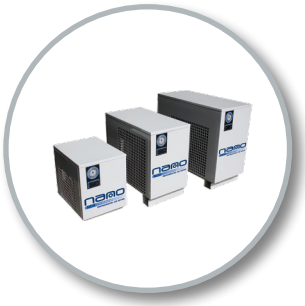
B-series breathing air purifiers

GEN$_2$-series nitrogen generators

ECO GEN$_2$-series nitrogen generators



V-series oil vapour removal systems



R-series refrigeration dryers

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