Maintenance & Service Manual

GEN2 i4.0 nitrogen gas generator

revision: REV;2022-045 document: 17-100-0660

www.n-psi.co.uk

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.

GEN_2 i4.0

nitrogen gas generator

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1. general information

range: GEN2 i4.0 nitrogen gas generators
models: GEN2 i4.0 -1110/2110/3110 & GEN2 2130/3130/4130/6130/8130/10130/12130
doc no: 17-100-0660
issue: 003

1.1 document introduction

This manual provides factory prescribed maintenance procedures for a nano purification solutions GEN_2 i4.0 Nitrogen Generator. The procedures illustrated in this document are only to be performed by authorised personnel. For further information regarding the procedures outlined in this document contact nano purification solutions before proceeding. Read this document carefully before attempting to install, service or operate the generator.

1.2 support and manufacture details

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Gateshead
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D-47839 Krefeld
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telephone: +49 2151 4828 418
internet: www.n-psi.de
e-mail: sales@n-psi.de

1.3 general safety

For your own safety, when carrying out maintenance work on the generator, all relevant national safety regulations must be complied with relating to pressurised and electrical systems. Only authorised, competent and trained personnel should maintain the generator, this service 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.

LLOYD'S REGISTER · LRQA
ISO 9001
UKAS MANAGEMENT SYSTEMS
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.*

2. recommended tools

The following tools will be required to service the generator

- Terminal screw driver
- 3mm flat screwdriver
- Various metric allen keys/sockets
- Various metric spanners
- Torque wrench (0-40nm)
- Food grade lubricating grease

3. maintenance guidelines

- Maintenance operations only to be conducted when the system has been shut down and fully depressurised.
- All connections must be undone with care, paying particular attention to the areas that become pressurised.
- Do not modify or adjust the control settings.
- Only certified nano-purification solutions approved replacement parts to be used.
- Always check all connections for leakage and secure seating before operation.
- Ensure all loose parts removed during maintenance are refitted correctly before operation.

4. shut down procedure before maintenance

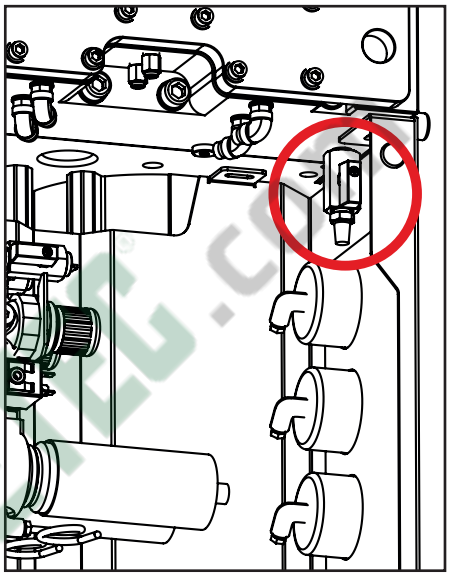
If only Service A is to be carried out, only step 1 to 7 is required.

1. Isolate the buffer tank inlet and outlet.
2. Isolate the inlet air supply
3. Isolate the Nitrogen outlet
4. Allow unit to shutdown on low inlet pressure, unit shutdown will take approximately 2 minutes to complete a full shutdown
5. Press the Start / Stop button on the controller
6. Remove mains power from the generator.
7. Open the generators door to gain access to the control panel
8. Open both service valves mounted on the inlet & outlet manifolds.
9. Allow the unit to stand until no venting sound is heard from both valves before carrying out any service work on the generator.

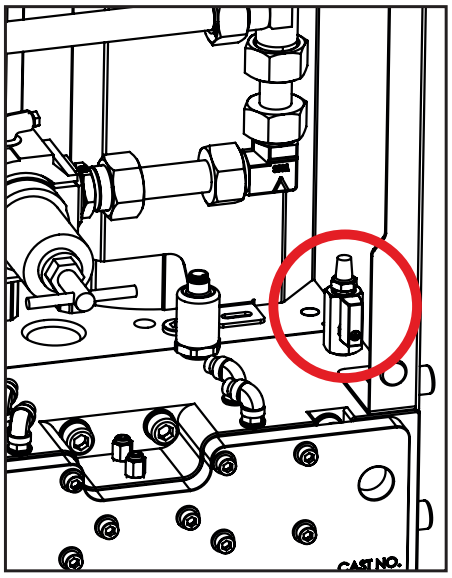
Characteristics of the CMS, pressure can build up to 2 Barg after being shut-down

Before performing any maintenance or service operations on this product, ensure the product is isolated from the compressed air supply and fully depressurised. Also, ensure the product is switched off and isolated from the mains power.

The configuration and orientation may vary per model



Service Valve Top



Service Valve Bottom

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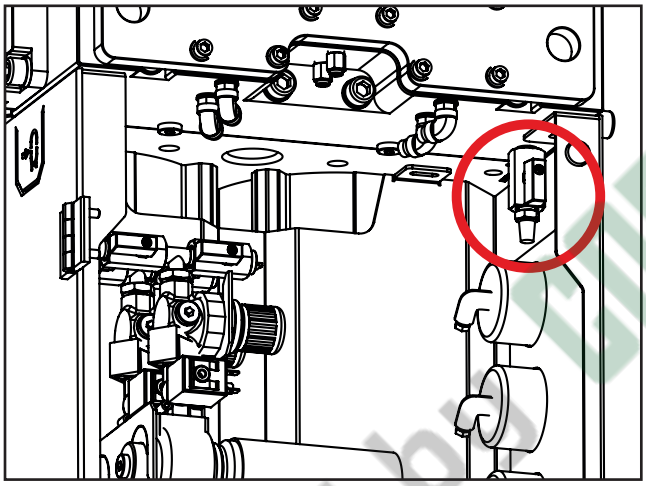
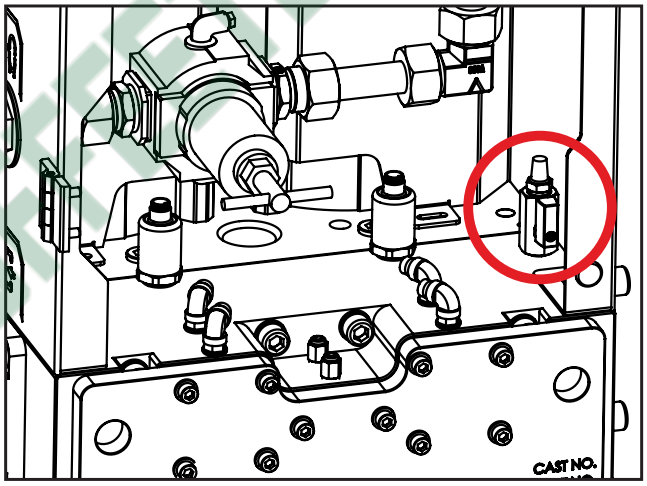
5. start up procedure after maintenance

Test and ensure no leaks with in the unit and system after every step after step 5

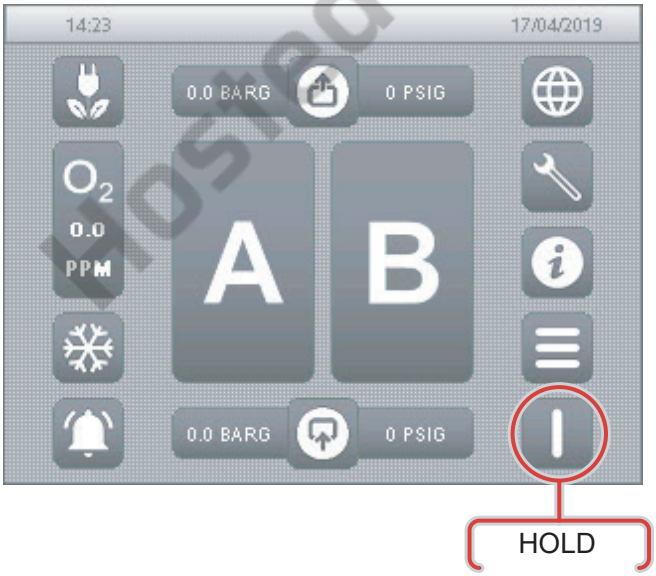
1. Ensure all serviced parts and assemblies are secured (excluding the electronic panel on 110 units)
2. Connect mains power supply
3. Close the 2 service valves
4. Press and hold the 'Start-up' button on the front screen
5. Slowly open the compressed air inlet valve, allow to cycle for 2 minutes
6. Slowly open the buffer tank inlet and outlet valves
7. Slowly open the Nitrogen Outlet Valve
8. Allow the unit to cycle to set purity.
   Note; A high purity alarm may occur
9. Final internal leak check
10. Secure the electronic panel (on 110 units)
11. Close door



Service Valve Top



Service Valve Bottom



The configuration and orientation may vary per model

6. service intervals

The following table details the recommended service intervals for this product and the service kits to be used.

Service	Recommended Service Intervals				
	1 Year (or 8,000 running hours)	2 Year (or 16,000 running hours)	3 Year (or 24,000 running hours)	4 Year (or 32,000 running hours)	5 Year (or 40,000 running hours)
A	✓	✓	✓	✓	✓
B		✓		✓	
C				✓	
D					✓
Oxygen Analyser Recommended Service Intervals					
F (Zirconia)					✓

Nitrogen Generator Model	Service Code				
	A		B	C	D
	6 - 12 Barg (87 - 174 psig)	6 - 16 Barg (87 - 232 psig)			
GEN$_2$ - 01110	A-BSP-110 A-NPT-110	A-BSP-130HP A-NPT-130HP	B-PVSK-130	C-SSVK-130 C-CVK-130	D-GCR-PPM
GEN$_2$ - 02110					
GEN$_2$ - 03110					
GEN$_2$ - 02130	A-BSP-130 A-NPT-130				
GEN$_2$ - 03130					
GEN$_2$ - 04130					
GEN$_2$ - 06130					
GEN$_2$ - 08130					
GEN$_2$ - 10130					
GEN$_2$ - 12130					

Service A - (A-XXX-1X0)	1" external exhaust silencer/muffler
Service A - (A-XXX-130HP)	2" external exhaust silencer/muffler
Service B - (B-PVSK-130)	All piston valve seals are to be replaced
Service C - (C-SSVK-130)	O_2 Sensor solenoid valves
Service C - (C-CVK-130)	All control valves are to be replaced
Service D - (D-GCR-PPM)	Percentage/ppm oxygen zirconia sensor

The serial/part number of the nitrogen generator must be supplied when requesting any of the services listed above, this is to ensure the correct service parts are selected.

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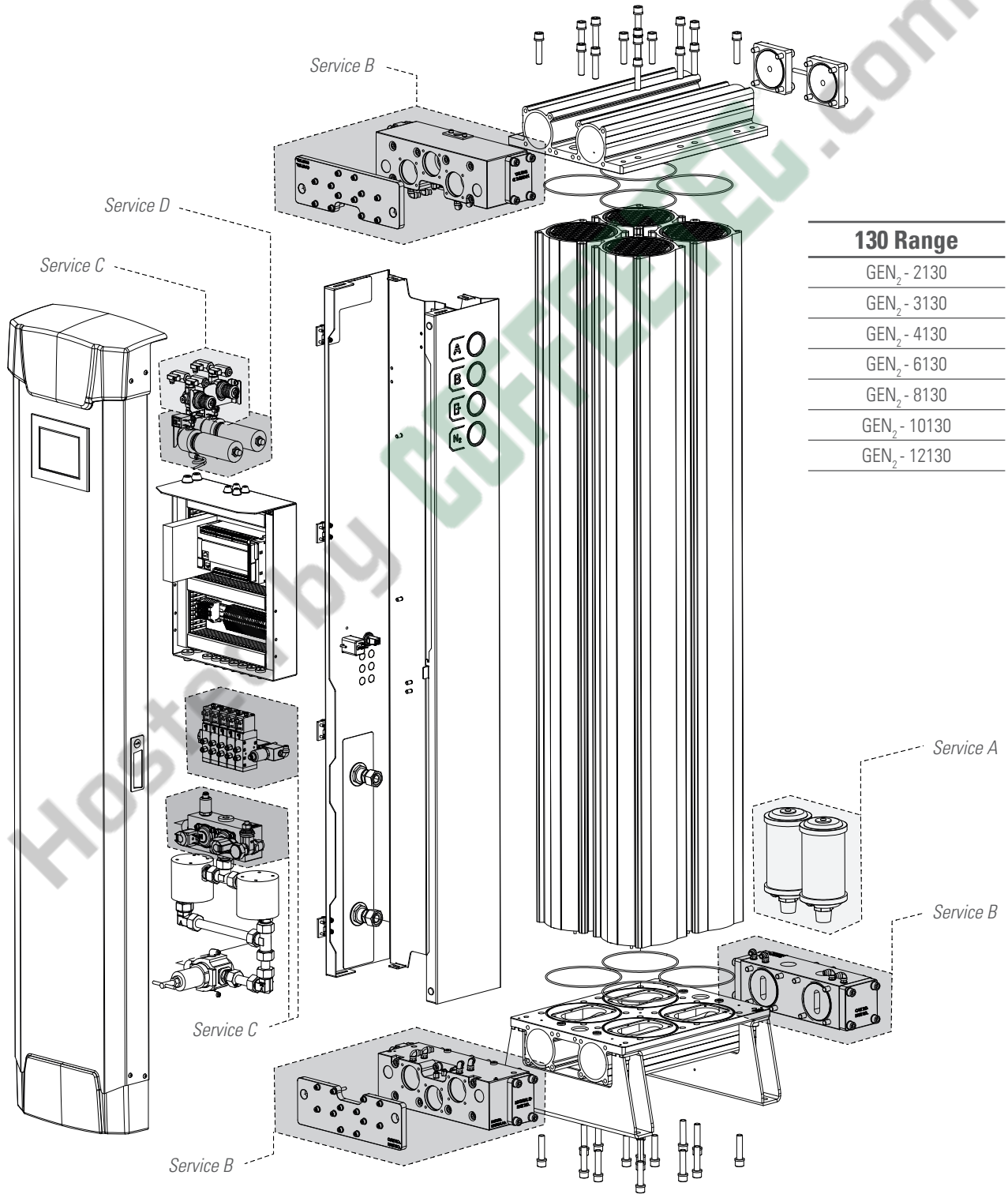
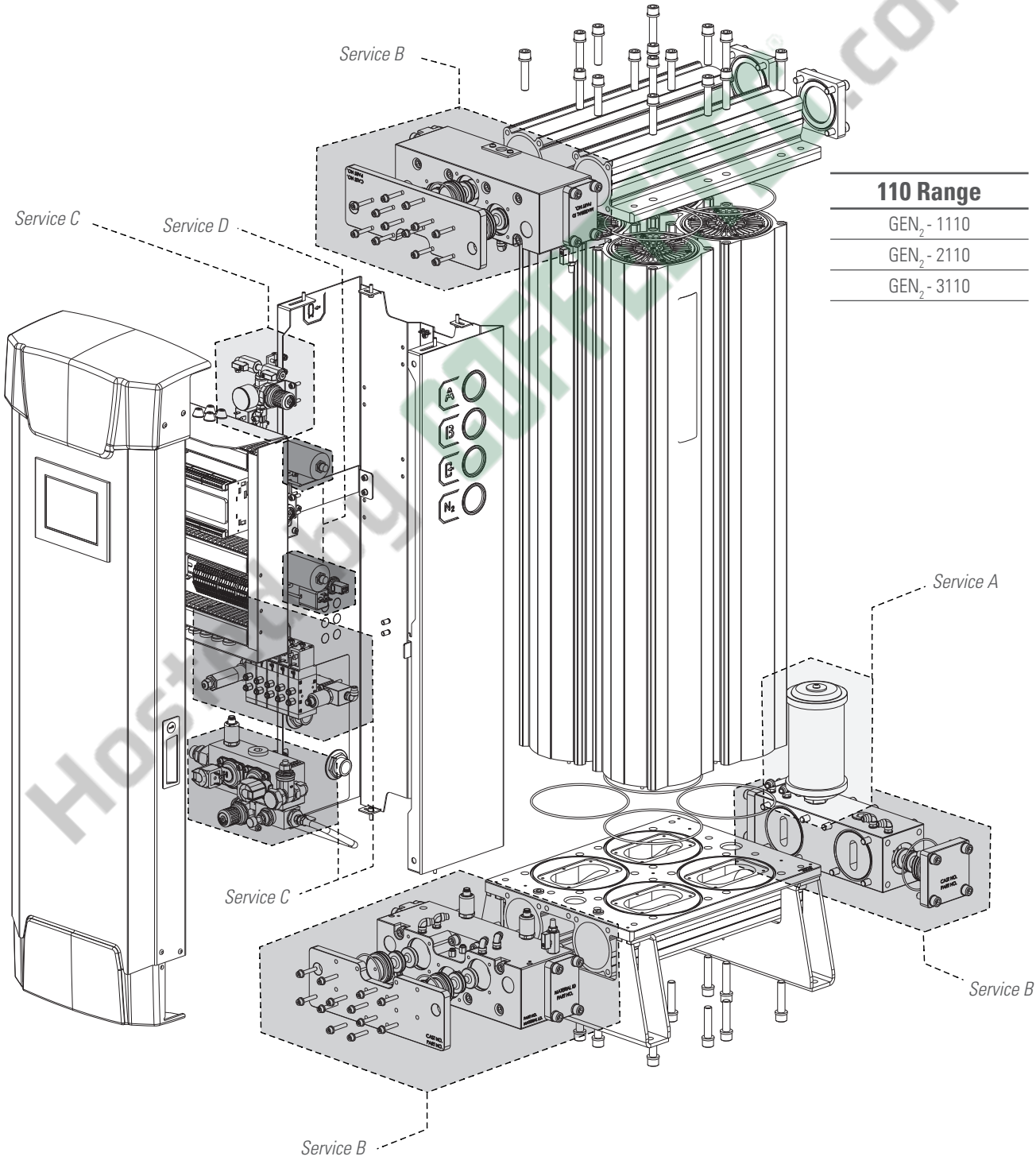
7. product assemblies - 130



130 Range
GEN_2 - 2130
GEN_2 - 3130
GEN_2 - 4130
GEN_2 - 6130
GEN_2 - 8130
GEN_2 - 10130
GEN_2 - 12130

7.1 product assemblies - 110



110 Range
GEN$_2$ - 1110
GEN$_2$ - 2110
GEN$_2$ - 3110

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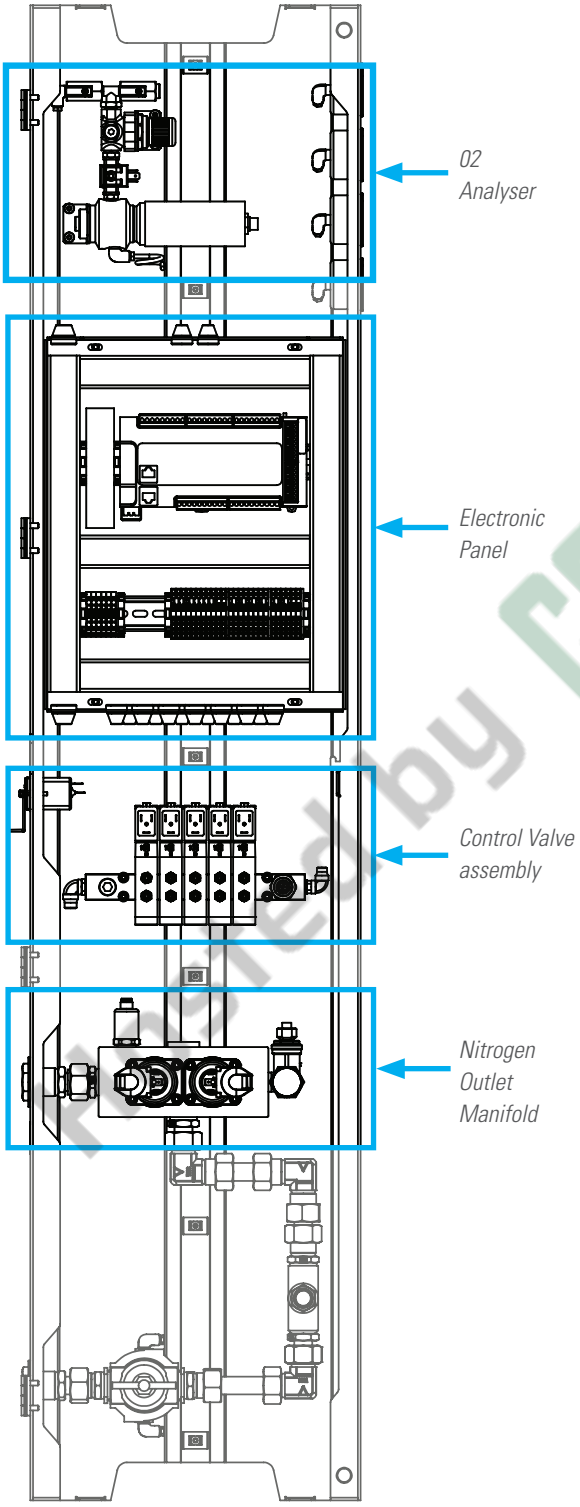
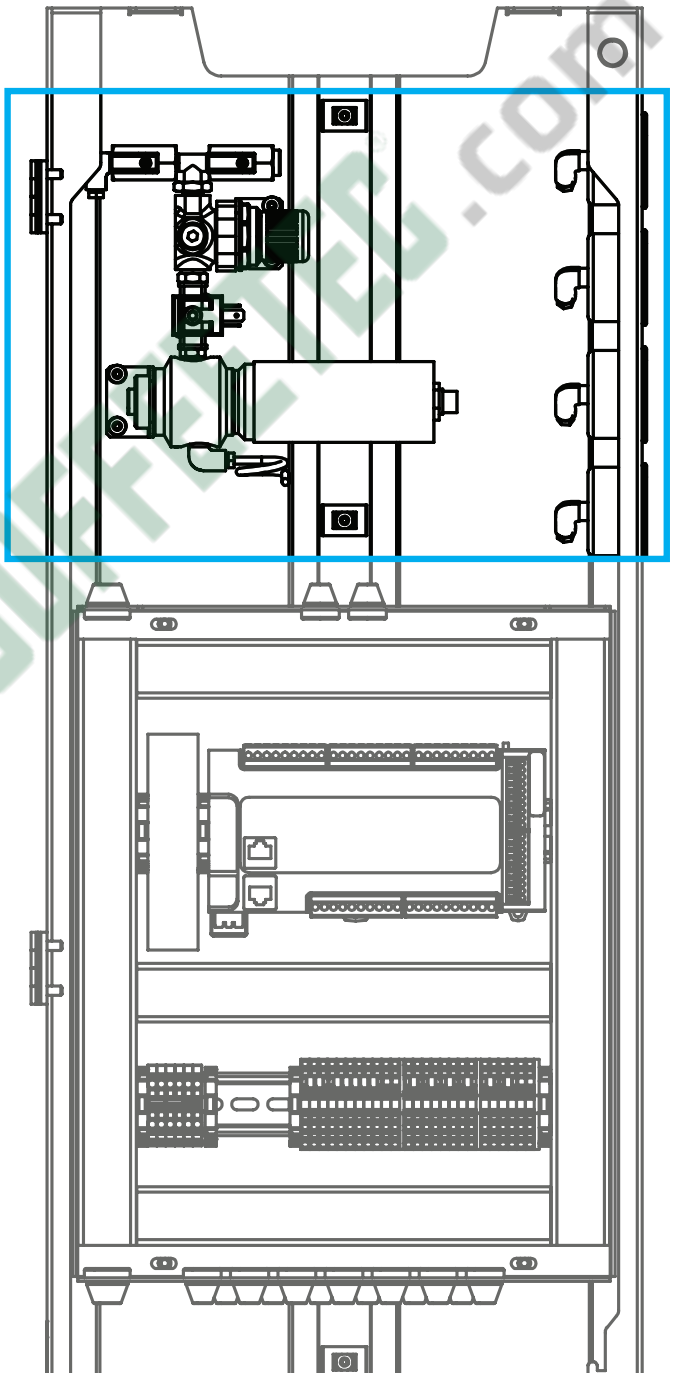
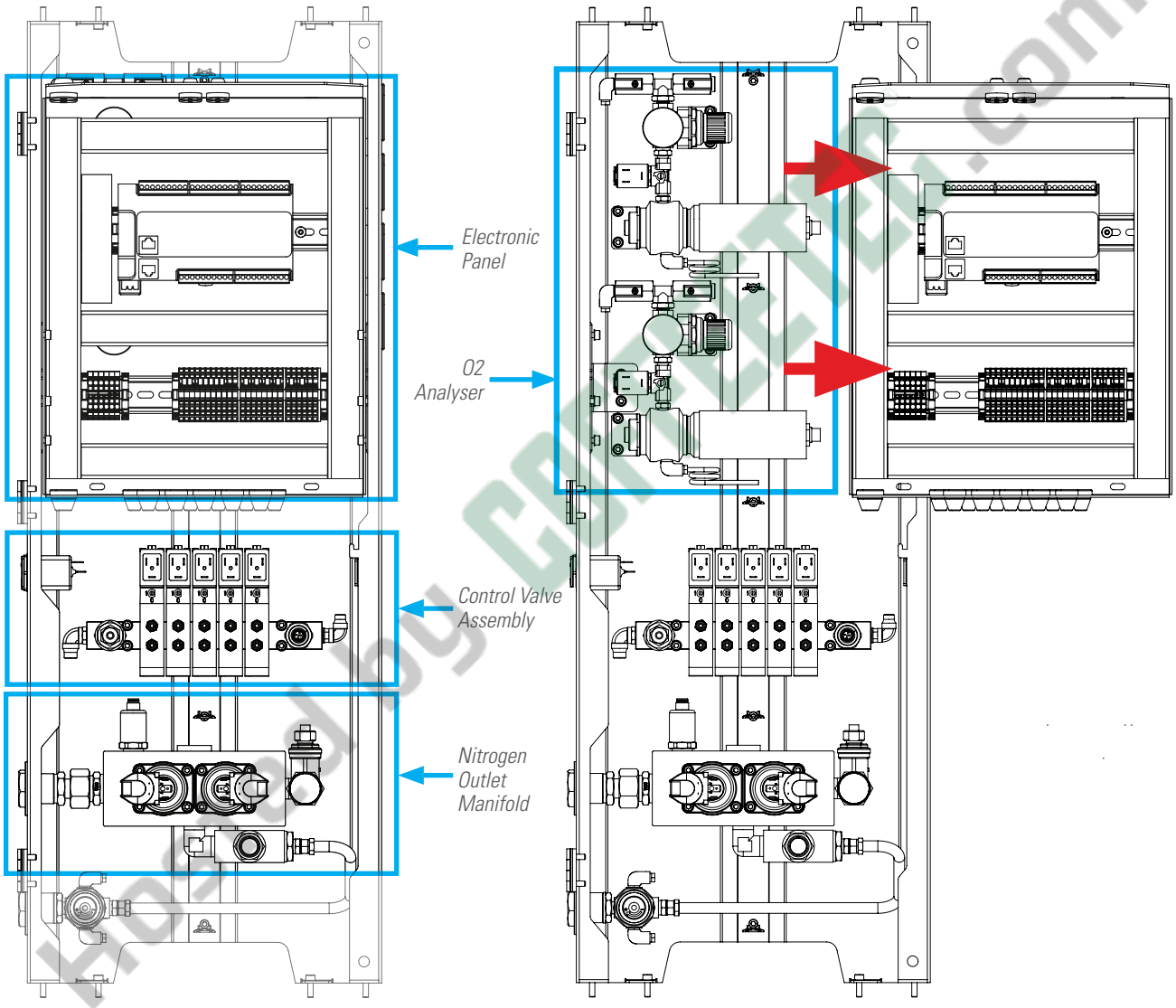
7.2 panel configuration - 130





Control tubing and wiring is not shown

7.3 panel configuration - 110



Control tubing and wiring is not shown

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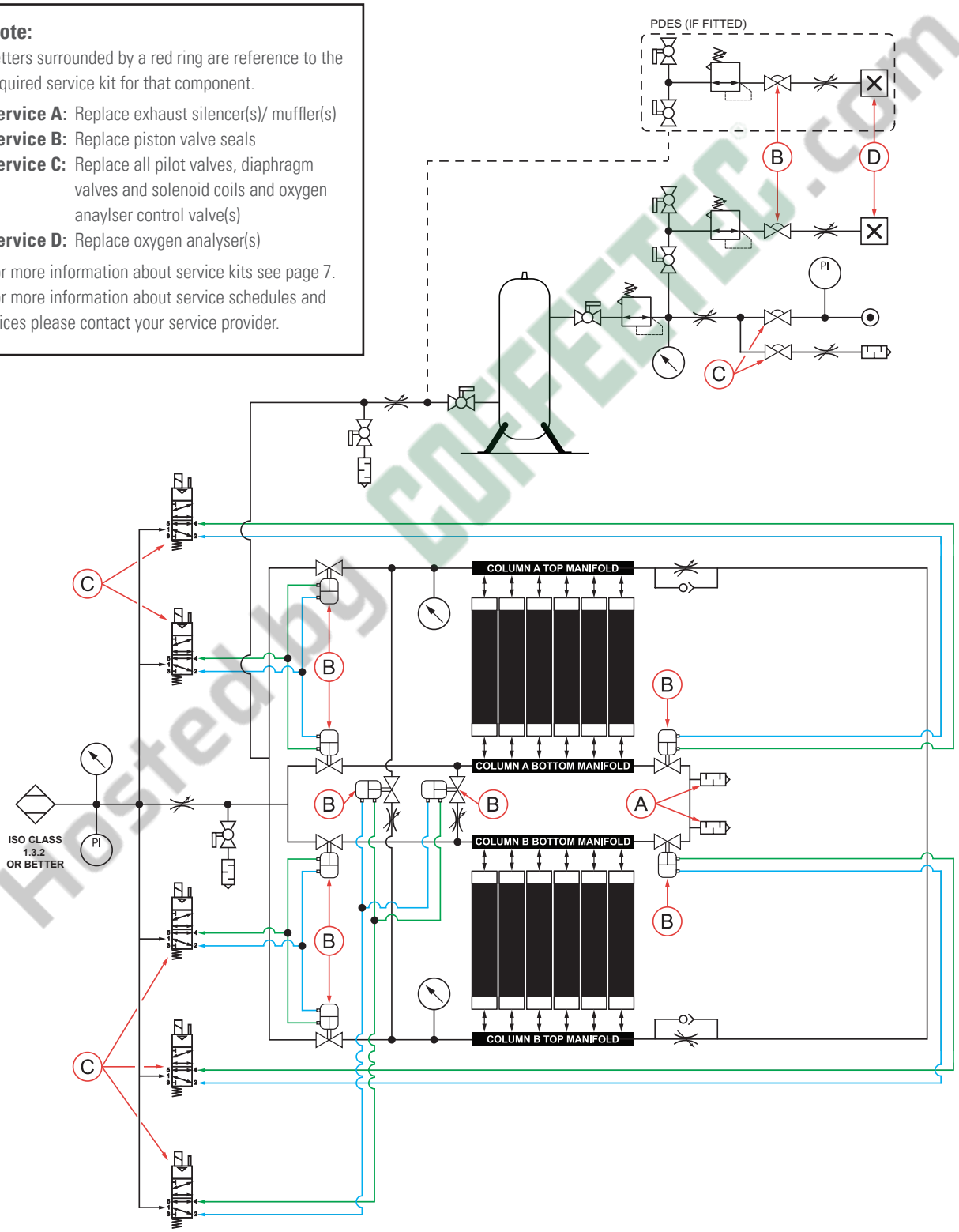
7.4 process diagram

Note:
Letters surrounded by a red ring are reference to the required service kit for that component.

Service A: Replace exhaust silencer(s)/ muffler(s)
Service B: Replace piston valve seals
Service C: Replace all pilot valves, diaphragm valves and solenoid coils and oxygen anaylser control valve(s)
Service D: Replace oxygen analyser(s)

For more information about service kits see page 7.
For more information about service schedules and prices please contact your service provider.



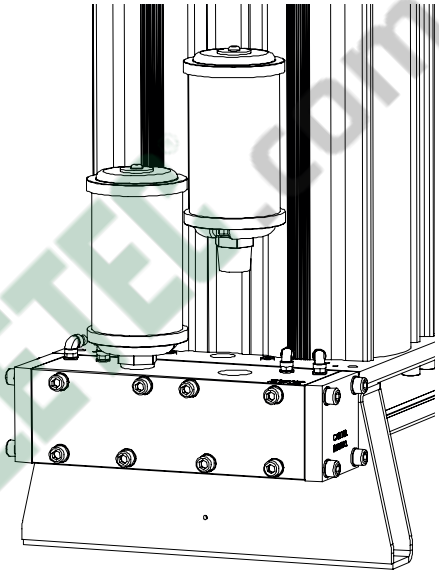
8. service 'A' instructions - external exhaust silencer/muffler(s)

(A-XXX-1X0)
(A-XXX-1X0HP)

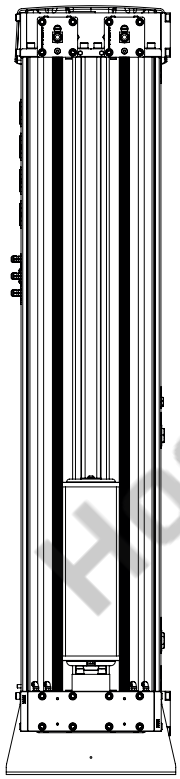
Recommended tools;

- 35mm Spanner (1inch silencer)
- 70mm Spanner (2inch silencer)
- Strap wrench if available
- Thread sealing material

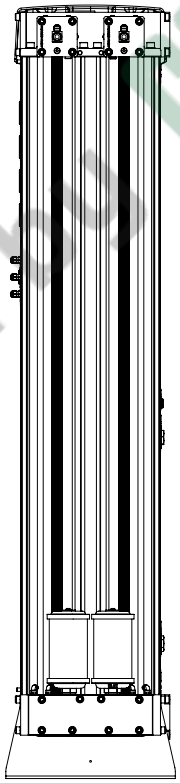
1. Carry out step 1-7 of the 'Shut Down Procedure Before Maintenance' (page 5)
2. Remove Exhaust Silencer/Muffler(s) from the unit
3. Clean the thread and remove any sealing material debris from exhaust block
4. Apply new thread sealing material to new Exhaust Silencer/ Muffler(s)
5. Attach Exhaust Silencer/Muffler(s), ensuring they are tight.



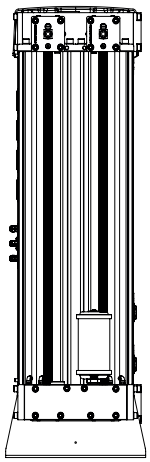
Do Not Over Tighten



High Pressure
6 - 16 Barg
GEN$_2$ HP 130 build
1 x 2 inch silencer/muffler



Standard Pressure
6 - 12 Barg
GEN$_2$ 130 build
2 x 1 inch silencer/muffler



Standard & High Pressure
6 - 12 & 6 - 16 Barg
GEN$_2$ 110 build
1 x 1 inch silencer/muffler

There are two 1inch silencer variants, please consult customer service

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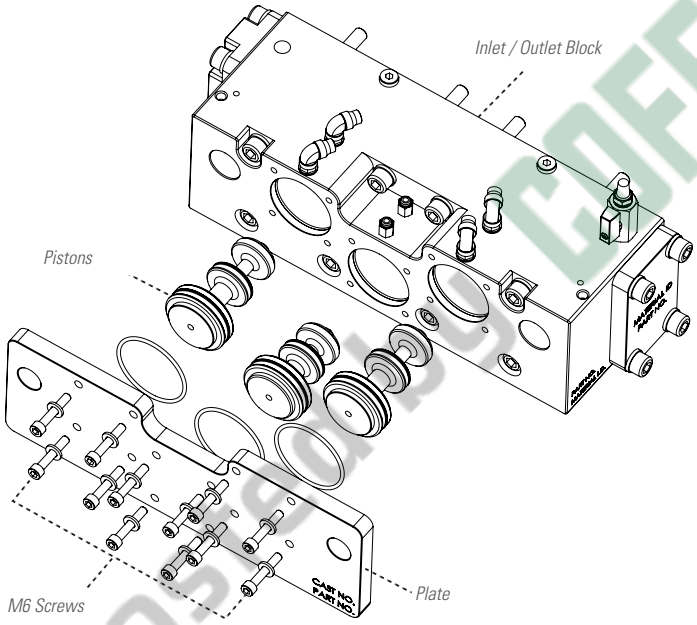
9. service ‘B’ instructions; piston valve seals - inlet / outlet block

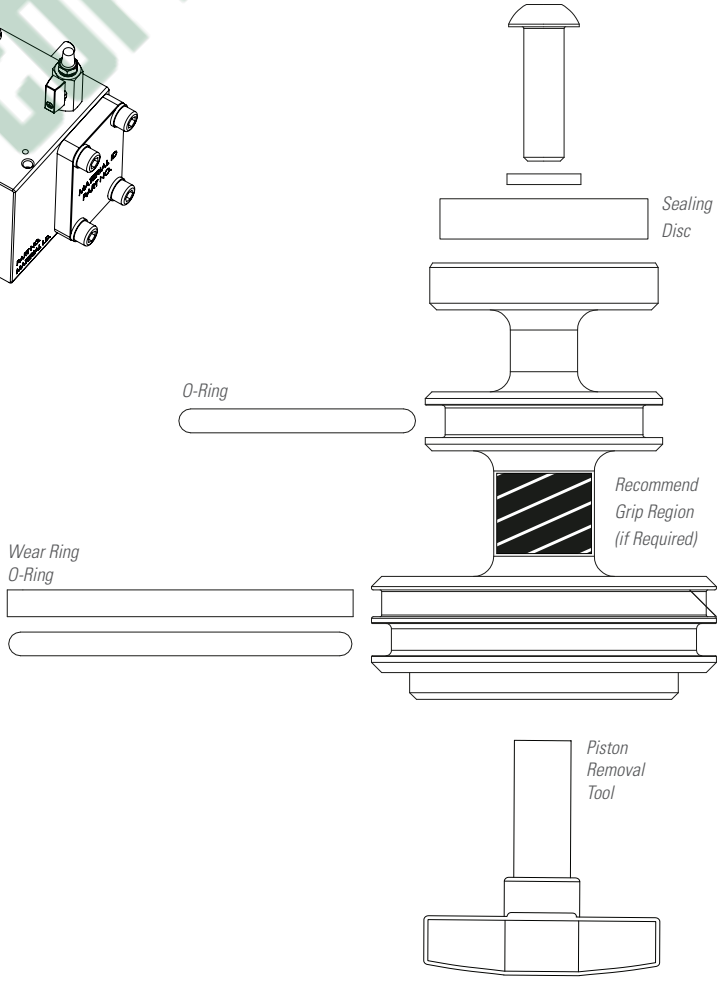
(B-PVSK-130)

Recommended tools;

- 5mm, 8mm, Allen Key Attachments
- Torque Wrench (7-40Nm)
- Piston Removal Tool

1. Carry out all steps of the ‘Shut Down Procedure Before Maintenance’ (page 5)
2. Remove the front plates (12x M6 screws)
3. Screw the Piston Removal Tool into the rear of the piston and pull
   - Take note of the piston positioning
4. Discard the O-rings, wear rings and sealing disc.
5. Clean the piston
6. Grease the new O-rings and apply to the piston
7. Clean and lightly regrease piston bore
8. Refit the pistons into the manifold
   - The small piston is located in the center hole
9. Re-attach the front plates. The 6mm bolts torqued setting; 7Nm
10. Carry out all the start up procedure steps on page 6





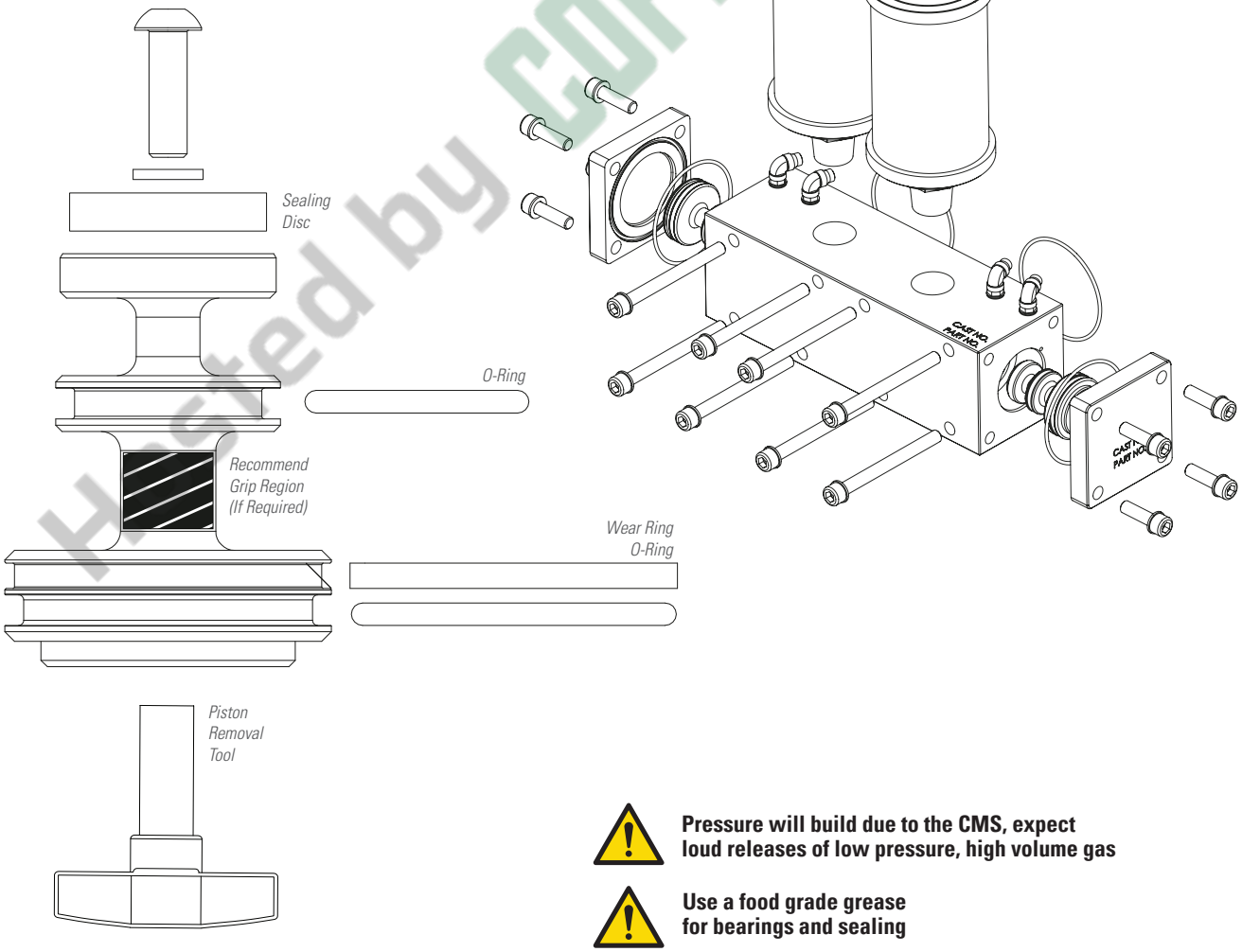
Pressure will build due to the CMS, expect loud releases of low pressure, high volume gas

9.1 service 'B' instructions - exhaust block

Piston Servicing
Recommended tools;

- 5mm, 8mm, Allen Key Attachments
- Torque Wrench (7-40Nm)
- Piston Removal Tool

1. Carry out all steps of the 'Shut Down Procedure Before Maintenance' (page 5)
2. Remove the end plates (4x M10 screws)
3. Screw the Piston Removal Tool into the rear of the piston and pull
   - Take note of the piston positioning
4. Discard the O-rings, wear rings and sealing disc.
5. Clean the piston
6. Grease the new O-rings and apply to the piston
7. Clean and lightly regrease piston bore
8. Refit the pistons into the manifold
   - The small piston is located in the center hole
9. Re-attach the front plates. The 10mm bolts torque setting; 40Nm
10. Carry out all the start up procedure steps on page 6



Pressure will build due to the CMS, expect loud releases of low pressure, high volume gas

Use a food grade grease for bearings and sealing

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10. service 'C' instructions - O_2 sensor solenoid valve(s)

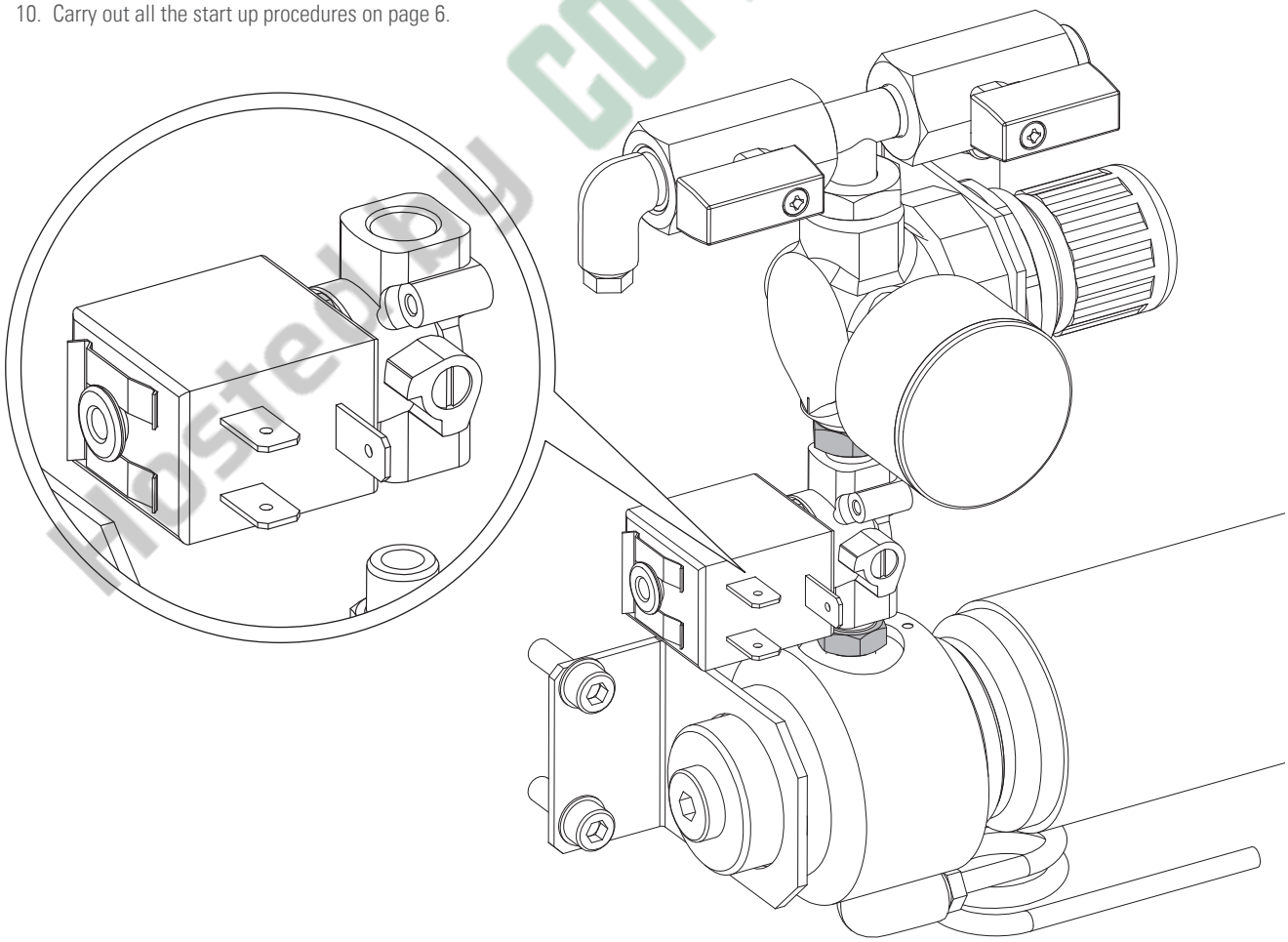
(C-SSVK-130)

Recommended tools;

- Various spanners
- Thread sealing material
- Terminal Screw Driver

It is recommended that the analyser is not left open to atmospheric oxygen for prolonged time periods, it is advised to complete the service in a timely manner.

1. Carry out all steps of the 'Shut Down Procedure Before Maintenance' (page 5)
2. Identify the type and location of the O_2 analyser
3. Take note of the positioning of the electronic connections, and remove
4. Release the clip retaining the sensor and carefully angle away the assembly from the unit.
5. Loosen the fittings highlighted to release the sensor
6. Discard the solenoid valve(s)
7. Clean the threads and reapply sealing material
8. Fit the new solenoid valve(s)
9. Replace the assembly in place
10. Carry out all the start up procedures on page 6.



11. service 'C' instructions - control valves

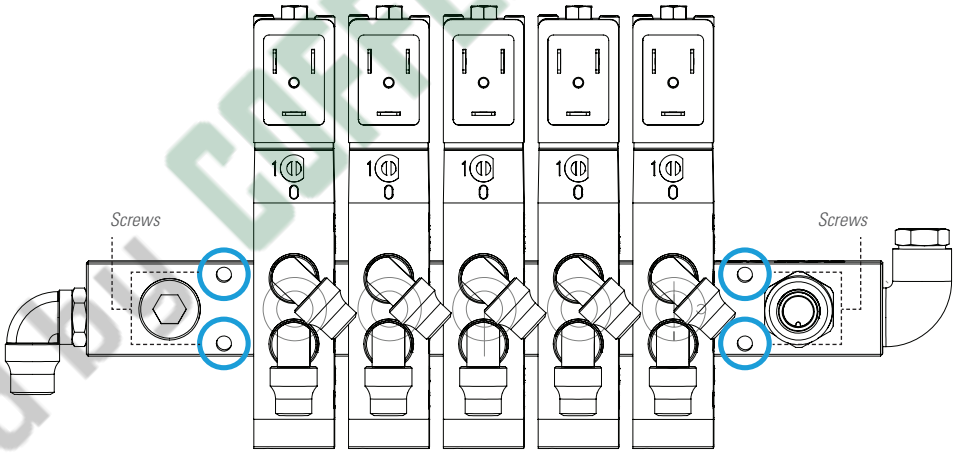
(C-CVK-130)

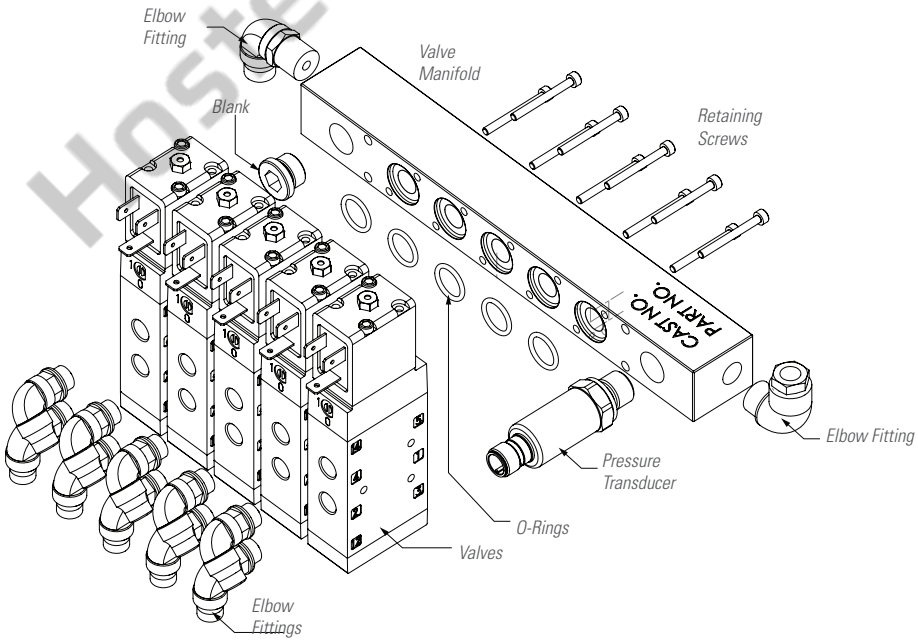
Recommended tools;

- 3mm Flat screw driver
- 11mm spanner
- Food safe lubrication grease
- Thread sealing material
- Terminal Screw driver

Part 1 - Control valves

1. Carry out all steps of the 'Shut Down Procedure Before Maintenance' (page 5)
2. Release the assembly by the four screws on the base of the control valve assembly (circled)
3. We recommend to service a valve one by one
4. Disconnect the electronic connection on the valve
5. Remove retaining screws to release a control valve
6. Unscrew the fittings from valve, take note of removed connections
7. Discard the valve and O-ring from the control valve manifold
8. Lightly grease and fit the new O-ring into the control valve manifold
9. Attach the new valve with the push-fits and electronic connection
10. Repeat until all valves have been serviced
11. Fit the Control valve manifold assembly back into the unit





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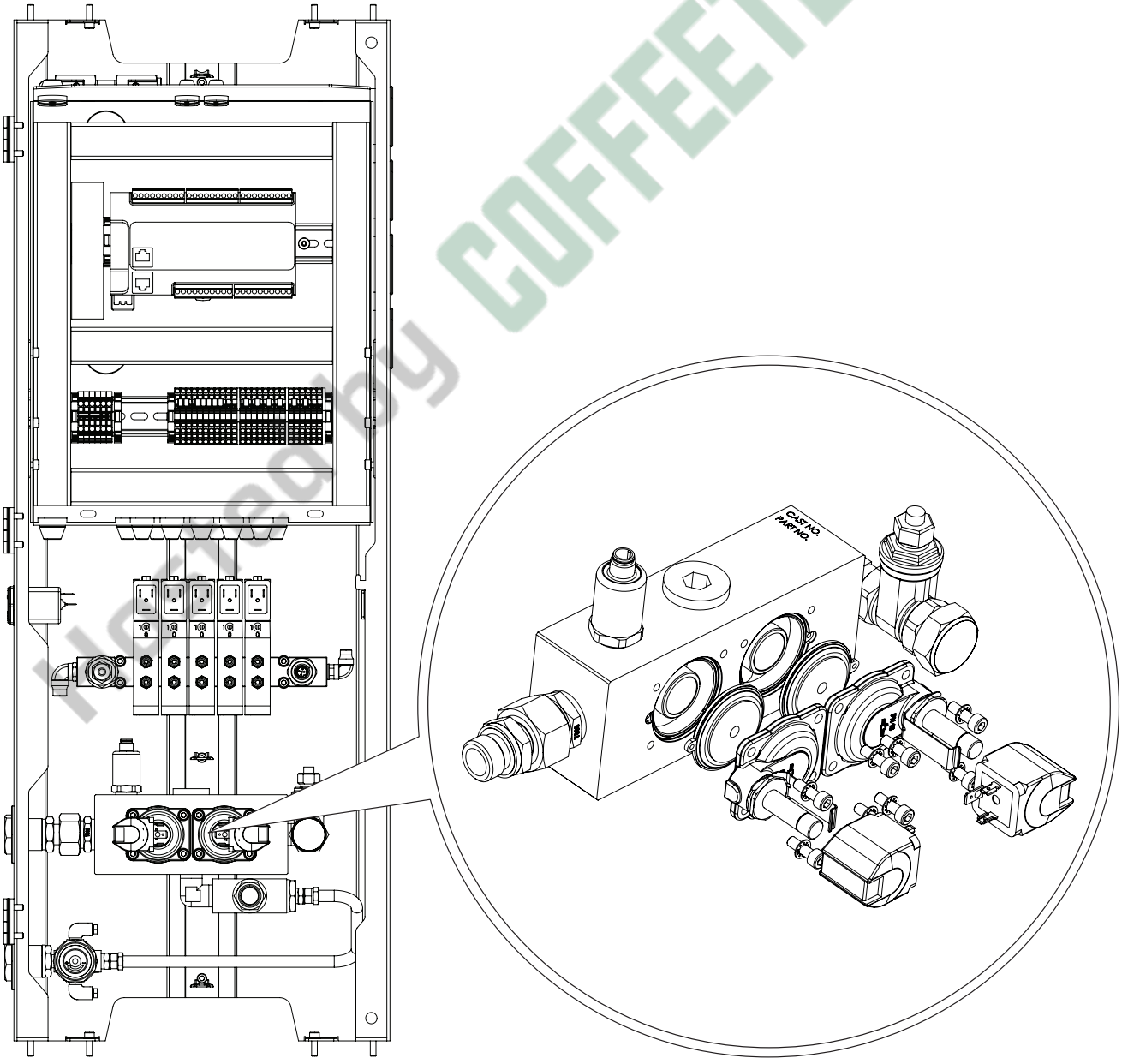
11.1 service 'C' instructions - control valves

C-CVK-130

Part 2 - Nitrogen outlet manifold control valves

1. Disconnect the electrical connectors
2. Remove the solenoid coils
3. Evenly and slowly (1 full revolution per screw), loosen the 4 screws around the 2 valves. This will release any trapped gas
4. Allow gas to vent.
5. Once the venting has reduced, fully remove the screws
6. Take note of the positioning of the valve bonnet direction and diaphragm
7. Discard the valves and solenoids
8. Place the new valve bonnet and diaphragm
9. Torque the 8 screws to 7Nm
10. Connect the solenoid coils and electrical connector to valves
11. Carry out all the start up procedure steps on page 6

Typical 130 Build



12. service 'D' instructions - percentage/ppm oxygen zirconia sensor

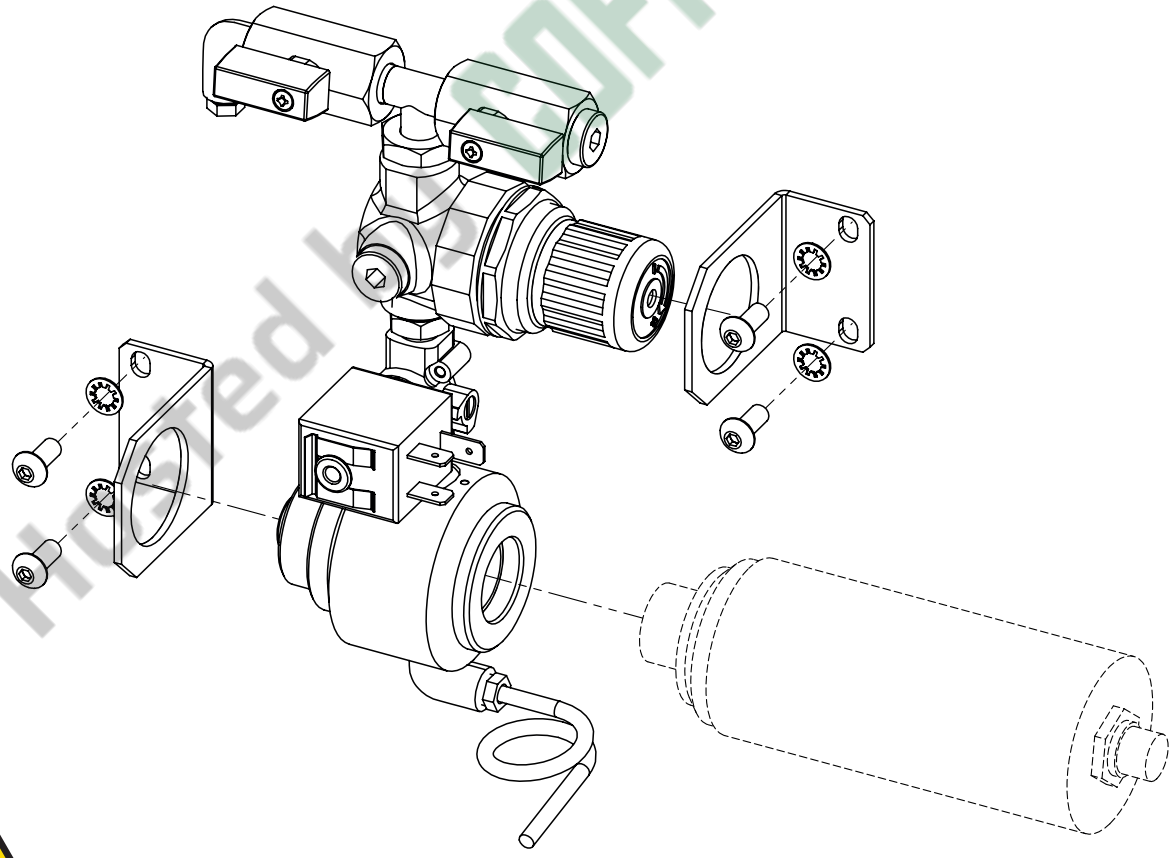
(D-GCR-%) SEN ZTX %
(D-GCR-PPM) SEN-ZTX ppm

Recommended tools;

- 3mm Allen Key

It is recommended that the analyser is not left open to atmospheric oxygen for prolonged time periods, It is advised to complete the service in a timely manner.

1. Carry out all steps of the 'Shut Down Procedure Before Maintenance' (page 5)
2. Undo electrical connection
3. Unscrew Sensor Cell
4. Discard the expired sensor cell - On PPM sensors, take note of the 'Offset' located on the side of the new sensor cell.
5. Hand tighten the new sensor cell.
6. Reconnect electronic connection
7. For PPM sensors, reconnect the mains power, and follow calibration instructions from the manufactures supplied manual.
8. Carry out all the start up procedure steps on page 6



Atmospheric Oxygen degrades the sensor

The configuration and orientation may vary per model

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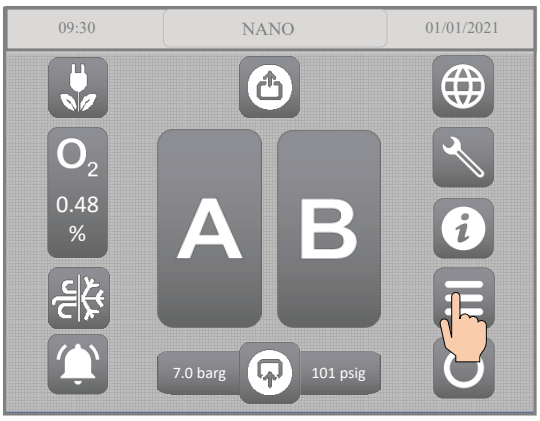
13. GEN_2 i4.0 service reset

1 Home Screen



2 Select your required access level

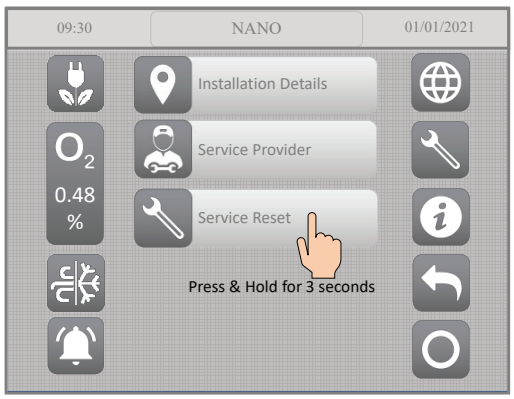
3 Press the password input section

4 Enter the password then press the Enter button.

5 Press the unlock key.

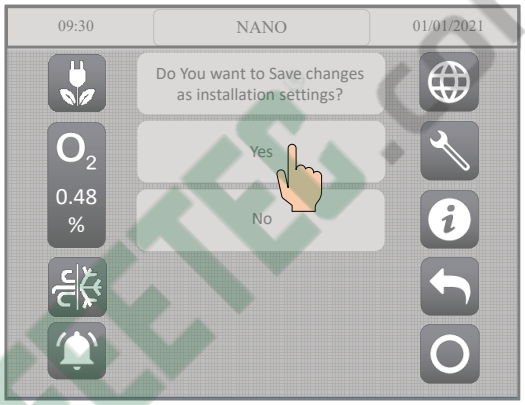
6 Press “Service Details”

7 Press and hold “Service Reset” for 3 seconds



8 Reset complete

9 Saving will update the restore to installation data.



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13.1 troubleshooting

Problem	Problem Caused	Solution
Poor N^2 Purity or Product Performance	Insufficient inlet Pressure	Adjust inlet pressure settings.
	Electrical Fault	Ensure the power is on and the generator display panel is illuminated; check the generator is cycling correctly
	Moist or contaminated CMS	Eliminate the cause of contamination, check the external inlet filtration (water separator etc.) for failed auto-drains or condensate build up. Replace inlet AMT dryer cartridge (were fitted) & CMS - Do not reuse.
	Excessive air consumption	Ensure the performance of the generator matches the system and required N^2 outlet delivery. Check for leaks through out the unit and system
	Excessive inlet air temperature	Check against technical specifications (remove heat source)
	Insufficient purge air	Consult service personnel to adjust settings
	Exhaust silencer blocked	Replace silencer/muffler & consult service personnel if problem persists
Failure of generator to cycle	Control not functioning correctly	Ensure the generator is powered; check the control solenoids valves are cycling correctly
	Controller not illuminated	Check power to unit & fuse
	Insufficient inlet pressure	Check rating plate for set operating pressures
	Failure to de-pressurised when cycling	Solenoid valve not functioning correctly; check if there is no power to coil, replace valve if faulty. A correctly working valve outputs an audible click when it energises.
	Outlet flow stops	Check inlet air supply, purity valve & N^2 Purity (check alarm status)
Constant pressurisation	Failure to cycle	Switch off, allow for 30 seconds and turn on.
	Erratic air flow from exhaust	Faulty or damaged valve; service required

Reference to known misuses;

Opening the inlet valve too quickly

- Valve should be opened slowly allowing the pressure to build up gradually

Inlet/outlet head pipe

- Pipe diameter too small or pipe work unsupported
- Inlet pipe work from low point in system allowing bulk water to collect and enter the generator

Electrical Controller

- Incorrect fuse fitted or fuse blow. Check the main IEC connection for fuse

Additional Items:

- Use of non-authorised components
- Untrained/unauthorised maintenance/installation personnel used
- Cleaning the unit with cleaning products that could damage the components or the CMS.
- No direct contact with water, i.e.. a water hose.
- Covers removed or loose during operation.
- Located outside without appropriate protection
- Failure to carry out a service when indicated by the product.

14. notes

Experience. Customer. Service.

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