

nano

PURIFICATION SOLUTIONS SERIES 2

BREATHING AIR PURIFIER



MAINTENANCE & SERVICE MANUAL

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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 nano-purification solutions. It may not be distributed through the internet or computer bulletin board systems without prior consent from nano-purification solutions limited.

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Product: Series 2 - Breathing Air Purifier

Models: NBA-070, 090, 110, 120.

Doc no: 17-110-0491

Issue: 001

1.1 Document Introduction

This manual provides factory prescribed installation and maintenance procedures for a nano-purification solutions Series 2 Breathing air dryer. The procedures illustrated in this document are only to be performed by fully trained competent authorized 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 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.

1.2 Support and Manufacturers Details

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11330 Vanstory Drive
Huntersville, NC 28078
USA

Telephone: (704) 897-2182

Fax: (704) 897-2183

Internet: www.n-psi.com

E-mail: 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.



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

1.3 General Safety

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



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



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

1.4 Warranty Guidelines

All products are supplied with a 2 year manufacturer's warranty from the date of purchase, when purchased with or without an ES (Energy Saving) system when installed and maintained in accordance with the manufacturers guidelines. Only genuine service parts should be used and no modifications made. For further information please contact nano-purification solutions.

1.5 Packaging

All dryers are securely packaged in a bespoke moulded packing system. The dryer module will be secured in a horizontal position using two specifically moulded support cushions.

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.

2. SERVICE INTERVALS

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

SERVICE TYPE	RECOMMENDED SERVICE INTERVALS		
	1 Year (6000 Hrs)	2 Years (12000 Hrs)	4 Years (24000 Hrs)
A	✓	✓	✓
B	✓		
C			✓

SERVICE TYPE	ADDITIONAL FOR ES MODELS ONLY
	ANNUALLY
D	✓

SERVICE A

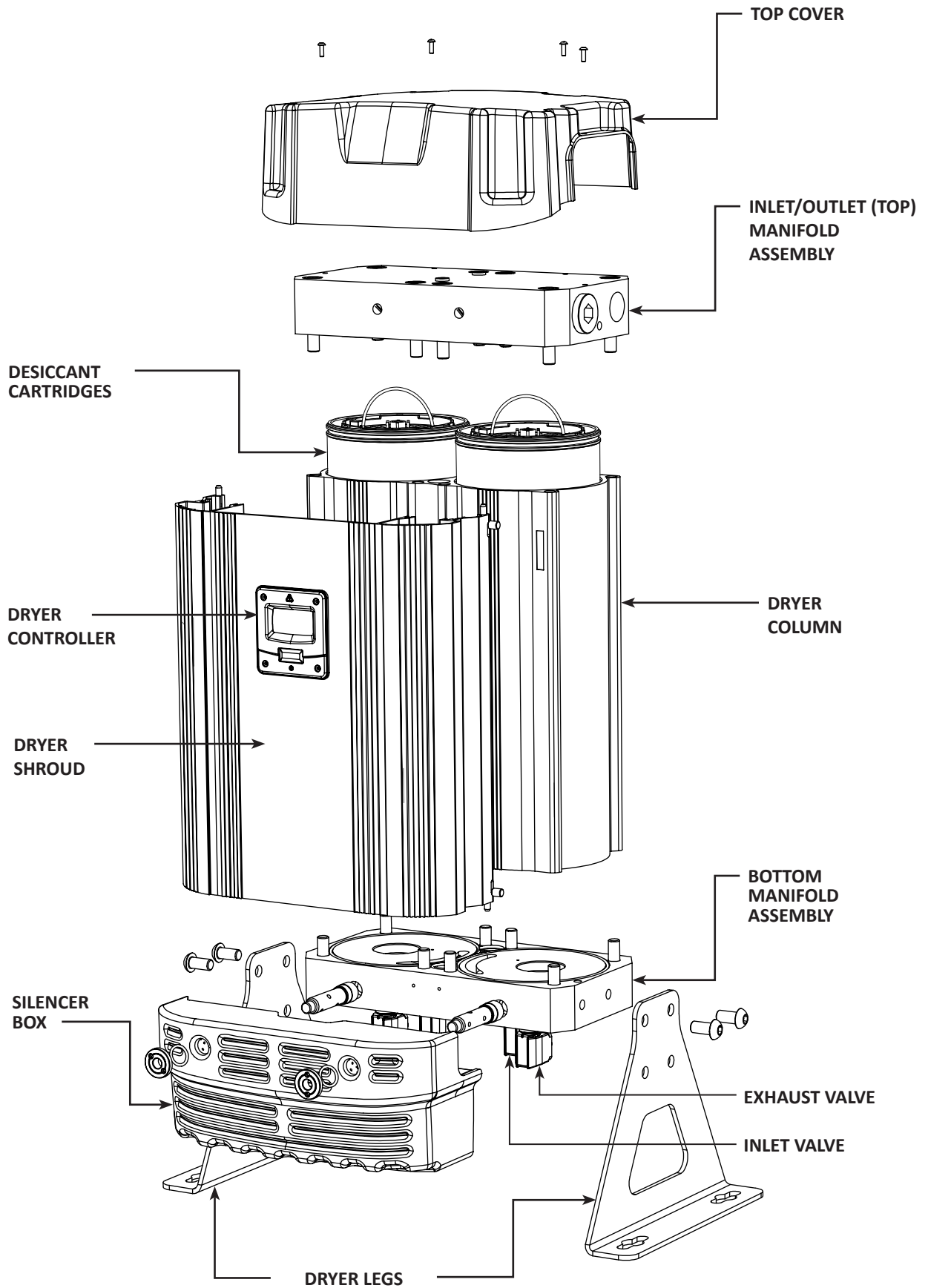
Replace all external filter elements (pre and post filters)

Please contact an n-psi representative for filter servicing information.

DRYER MODEL	REQUIRED SERVICE KITS		
	Service B	Service C	Service D
NBA-070	NBK-060	NVK-090 (EVK-130 & CVK-130 & IVK-090)	
NBA-090	NBK-080	NVK-090 (EVK-130 & CVK-130 & IVK-090)	
NBA-110	NBK-110	NVK-130 (EVK-130 & CVK-130 & PVK-130)	
NBA-120	NBK-120	NVK-130 (EVK-130 & CVK-130 & PVK-130)	
ALL ES			NSK-130

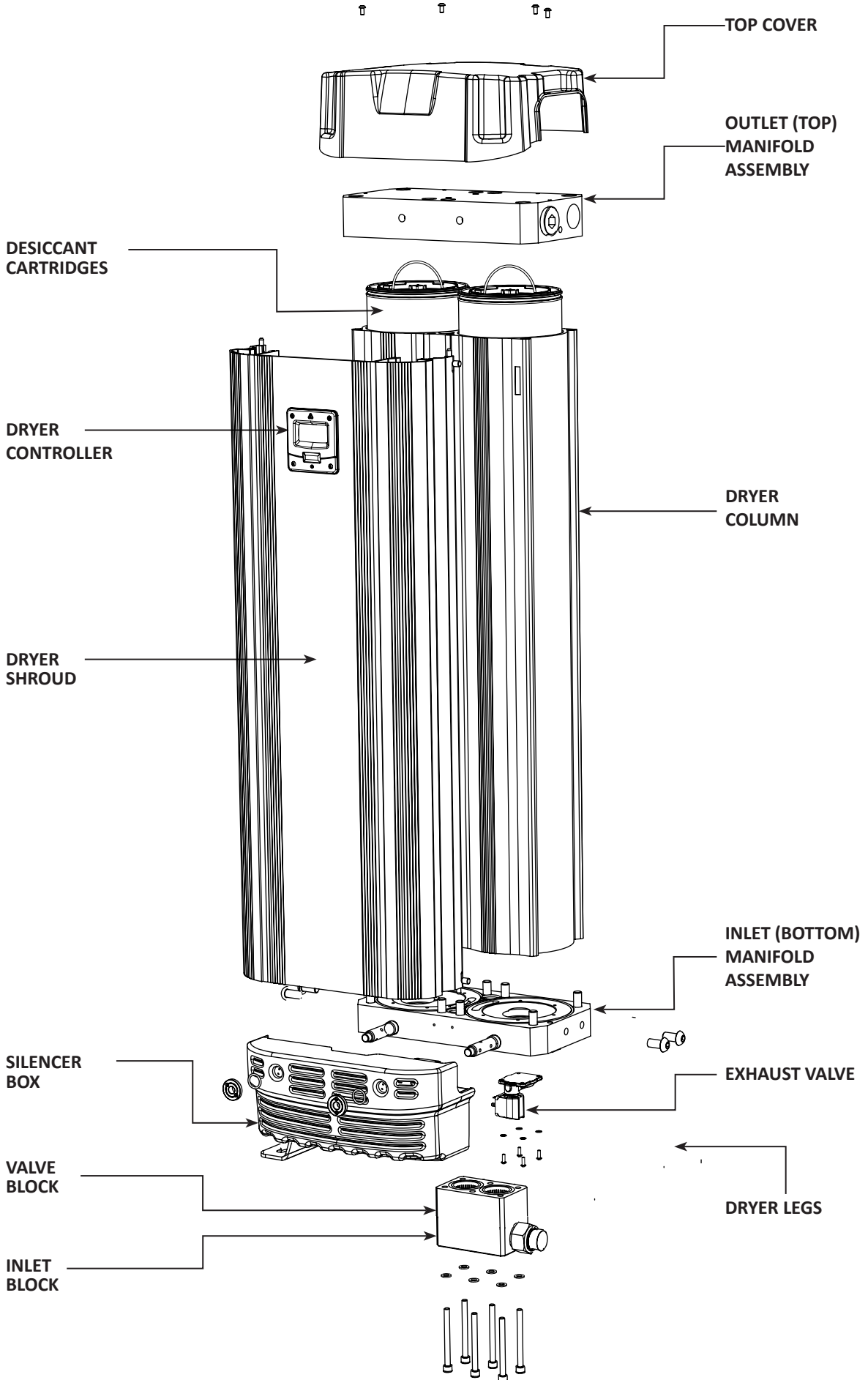
3. PRODUCT ASSEMBLY

MODELS: NBA-070, 090



3.1 PRODUCT ASSEMBLY

MODELS: NBA-110, 120



4. RECOMMENDED TOOLS

The following tools will be required to service the dryer:

TERMINAL SCREW DRIVER
 ALLEN KEY 3mm
 ALLEN KEY 4mm
 ALLEN KEY 6mm
 ALLEN KEY 8mm
 TORQUE WRENCH (8-60NM)
 TORQUE SOCKET 6mm/10mm
 20mm PIN SPANNER
 VALVE EXTRACTION TOOL
 INTERNAL CIRCLIP PLIERS
 MAGNET (for re-setting controller)
 PETROLEUM JELLY (VASOLINE)

5. DRYER SHUT DOWN PROCEDURE



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

PROCEDURES

The dryer might still be pressurized! In order to depressurize the dryer; ensure the dryer is isolated from the compressed air source:

- o Close the inlet and outlet valves
 - o Cycle the dryer twice to ensure the dryer exhausts and is completely depressurized.
 - o When fully depressurized the 'clicking' of the exhaust valves will be heard but no air exhausted.
- When the dryer is fully depressurized, isolate from the power supply.

6. MAINTENANCE GUIDELINES

- Maintenance operations only to be conducted when the system has been shut down and fully depressurized.
- All connections must be undone with care, paying particular attention to the areas that become pressurized.
- Do not modify or adjust the control settings.
- Only certified nano-porous 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.

7. SERVICE 'A' INSTRUCTIONS

MODELS: NBA-070, 090, 110, 120

DESICCANT CARTRIDGE REPLACEMENT

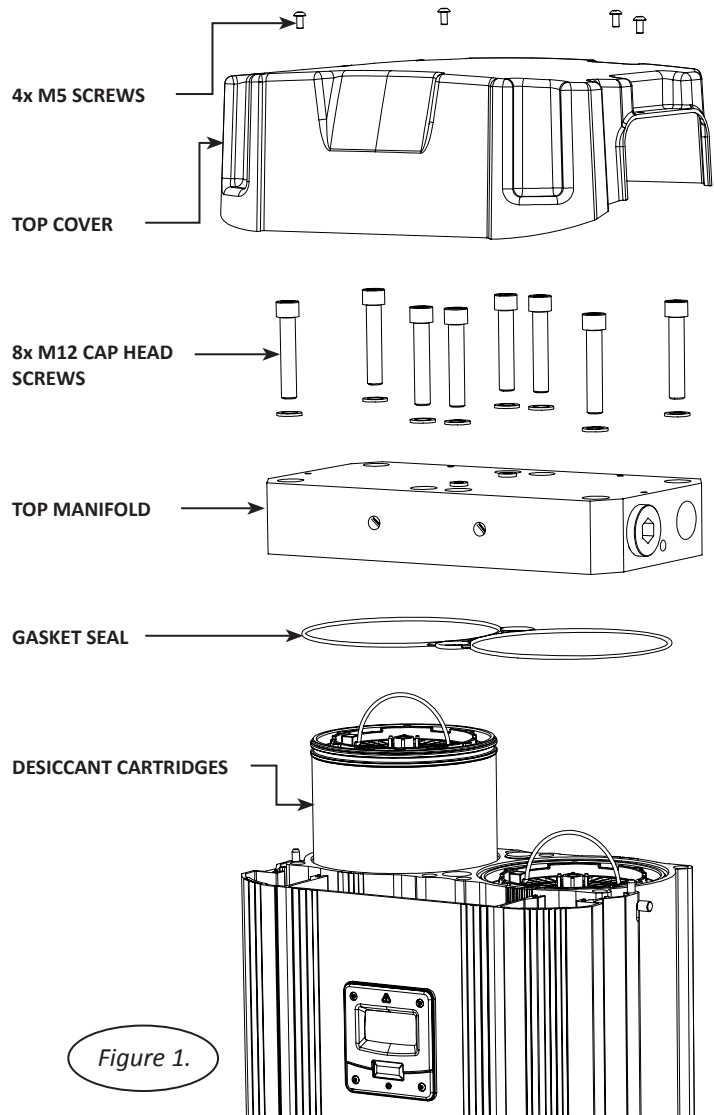
NBK-060, 080, 110, 120

(Every 6,000 hrs or 12 months)

1. Ensure the dryer is shutdown and fully depressurized before attempting any maintenance work.

Refer to: **CH. 6.MAINTENANCE GUIDELINES**

2. Remove the 4x M5 screws as shown to remove the dryer top cover.
3. Remove the 8x M12 cap head screws and 8x washers to remove the top manifold from the dryer column and support front shroud.
4. Discard the gasket seal.
5. Lift the wire handle and remove the cartridge from the dryer column.
6. Check and clean the top manifold and dryer column as required, paying particular attention to the gasket sealing faces.
7. Remove the new cartridges and gasket seal from the service kit provided.
8. Insert 2x new desiccant cartridges and press them down until they stop and the cartridge is below the top surface of the dryer column.
9. Insert the new gasket seal placing it into the gasket groove in the top manifold ensuring it is fully retained.
10. Ensure both handles are folded flat.
11. Replace the top manifold and secure with the 8x M12 cap head screws tightening to a torque setting of 80Nm.



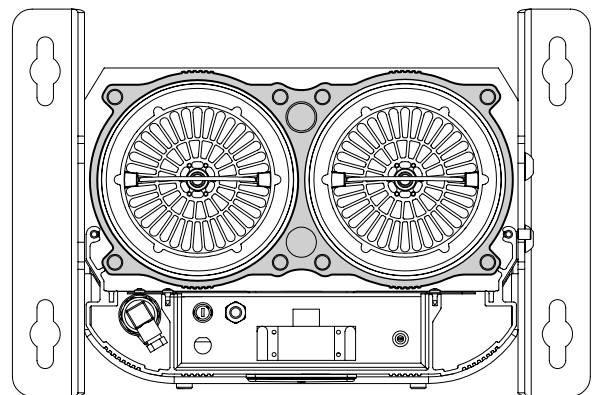
NOTE: Refer to:

CH. 14. MANIFOLD TIGHTENING SEQUENCES and follow the correct tightening sequence.

12. The seal between the dryer column and top manifold should be checked for leaks prior to fitting the top cover and operating the dryer.
13. Replace the dryer top cover and secure with the 4x M5 screws. These screws should be hand tightened only or tightened to a torque setting of less than 1Nm.

If service A is complete reset the dryer,
Refer to:

CH. 13. RESETTNG DRYER CONTROLLER



NOTE: Care must be taken when removing the desiccant cartridges not to damage the top face of the dryer column. This is a sealing face!
(Sealing face shown as the shaded area)

8. SERVICE 'B' INSTRUCTIONS

MODELS: NBA- 070, 090, 110, 120

OUTLET VALVE REPLACEMENT

CVK-130

(Every 24,000 hrs or 4 Years)

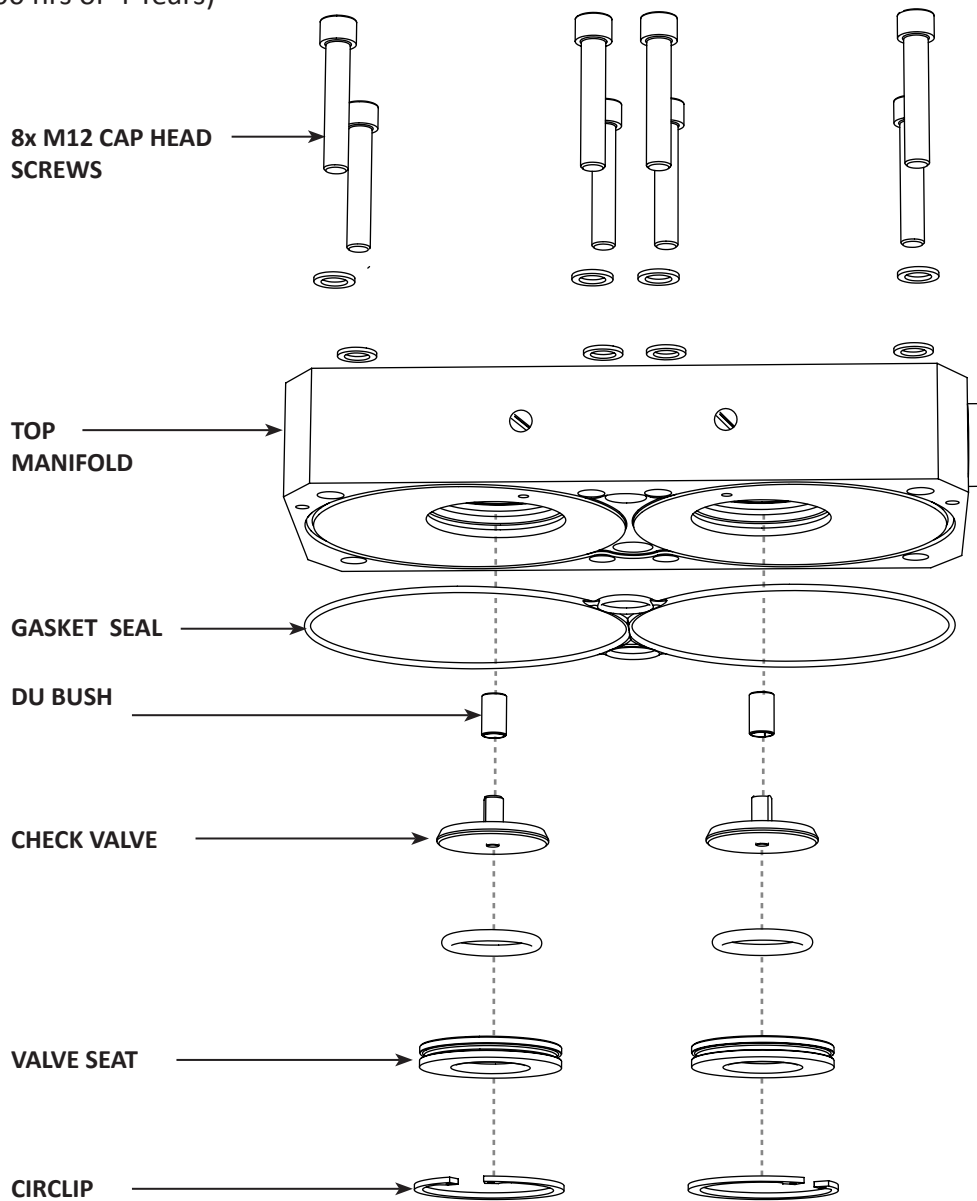
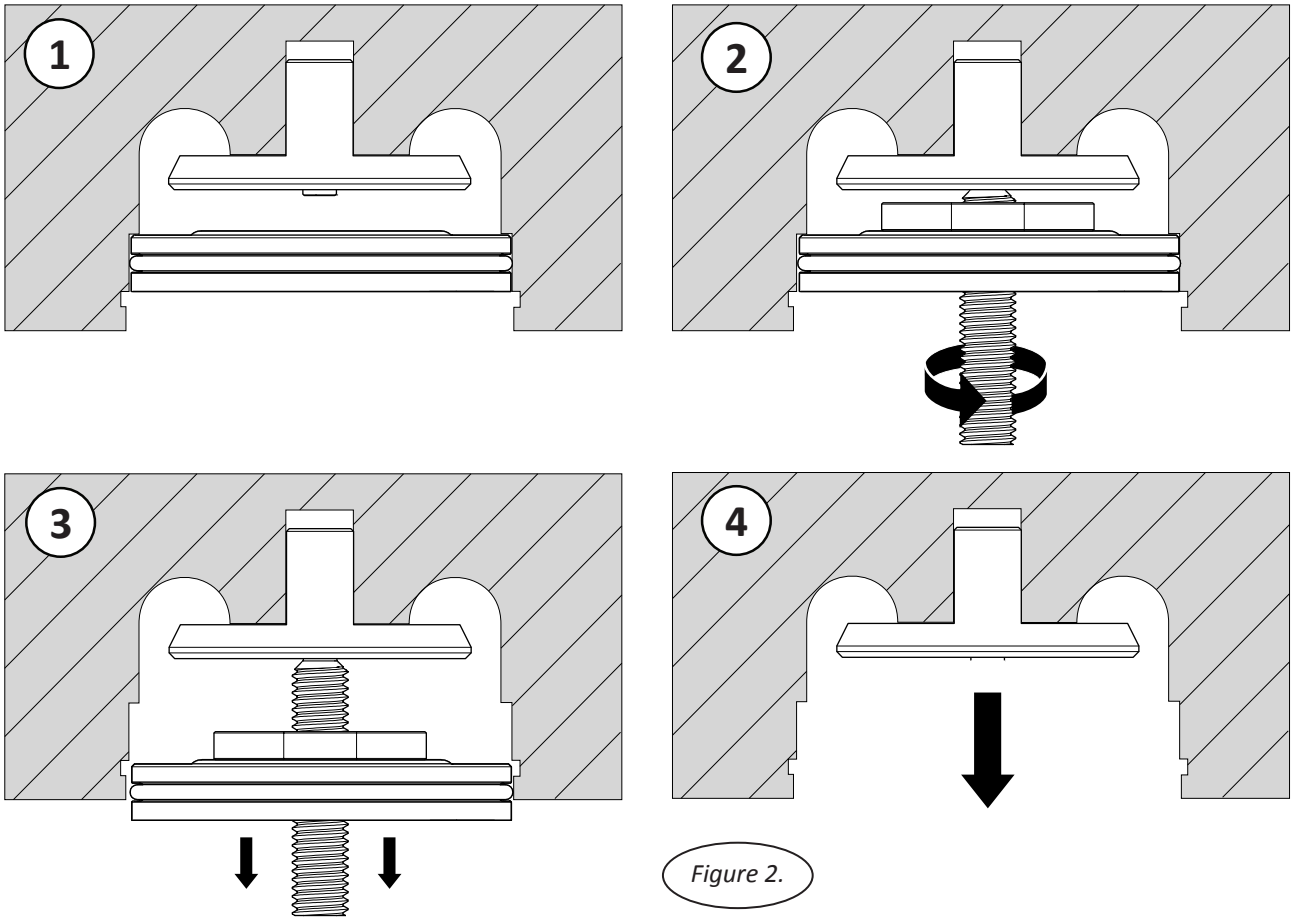


Figure 1.

Please refer to figure 1

1. Ensure the dryer is shutdown and fully depressurized before attempting any maintenance work. Refer to: **CH. 6.MAINTENANCE GUIDELINES**
2. Remove the 4x M5 screws to remove the dryer top cover.
3. Remove the 8x M12 cap head screws and 8x washers to remove the top manifold from the dryer column and support front shroud.
4. Using a pair of circlip pliers, remove each circlip.



5. Remove the valve seat by inserting the valve extraction tool through the middle of the seat valve, resting the narrow end of the tool on the dome point of the check valve.
6. Rotate the thread of the tool, moving the plate attached to it and forcing the check valve out of the valve orifice within the outlet manifold.
7. Once the valve seat is removed, remove the check valve by hand.
8. Remove the DU bush and replace it from the NVK-CHK service kit.
9. Replace the check valve firstly from the service kit, then secondly replace valve seat.
10. Replace the circlip from the service kit.
11. Replace the seal between the dryer column and top manifold.
12. Place the manifold back on top of the dryer column and insert the 8x M12 cap head screws and 8x washers and tighten at a torque setting of 80Nm.



NOTE: Refer to **CH. 14. MANIFOLD TIGHTENING SEQUENCES** and follow the correct tightening sequence.

13. Replace the top cover and insert the 4x M5 screws to secure it in place. Hand tighten these screws only or tighten to a torque setting of less than 1Nm.

When service B is complete reset the dryer, Refer to:

CH. 13. RESETTING DRYER CONTROLLER

9. SERVICE 'B' INSTRUCTIONS

INLET AND EXHAUST VALVE REPLACEMENT

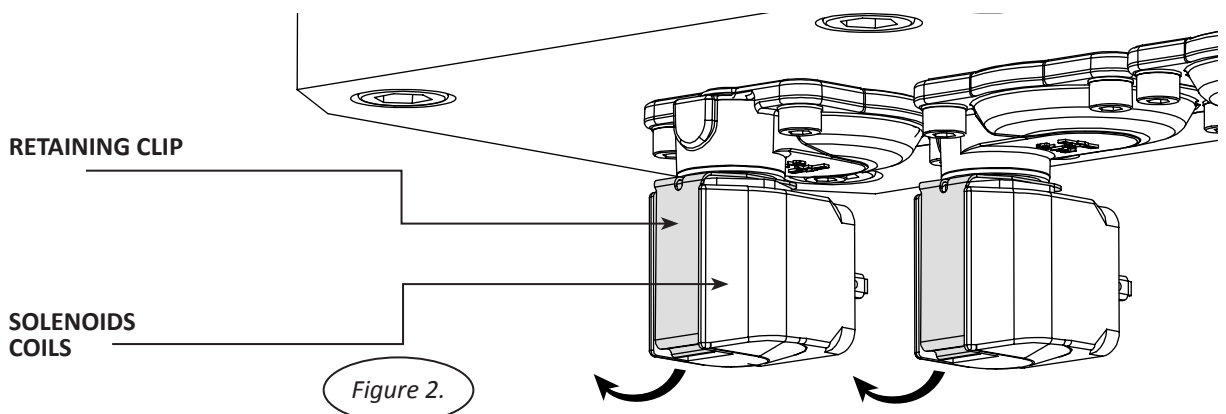
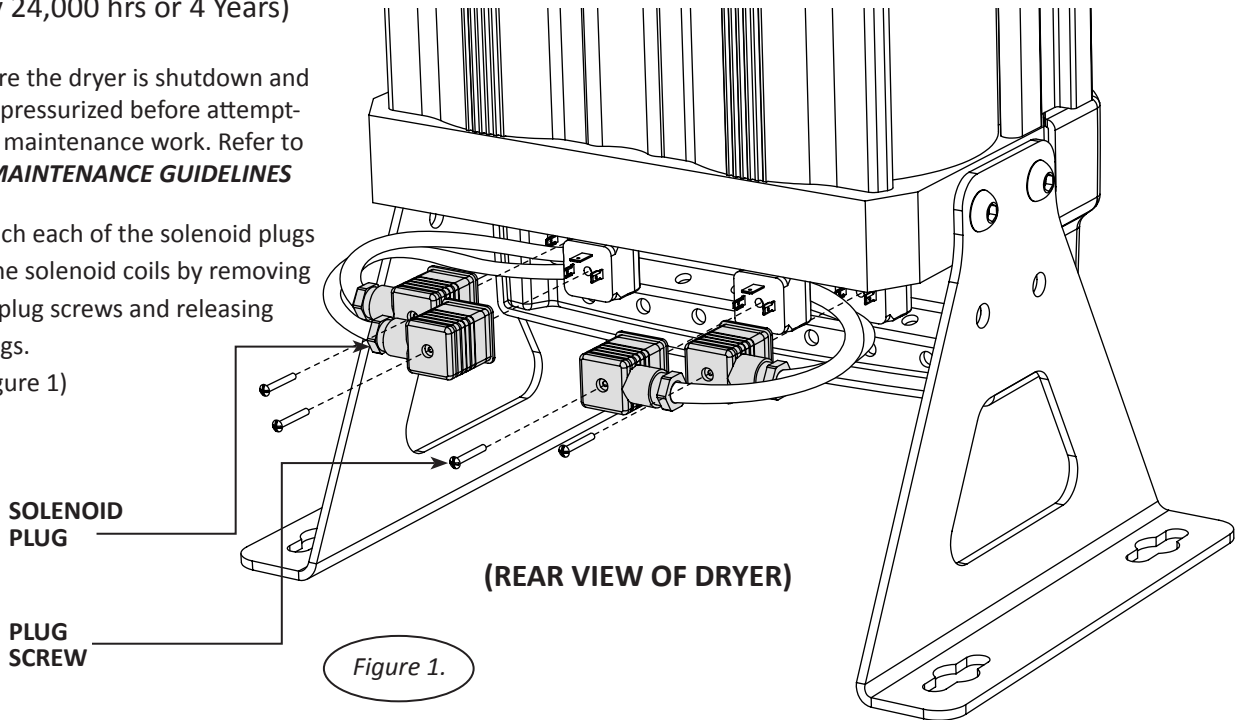
IVK-090 & EVK-130 & CVK-130

(Every 24,000 hrs or 4 Years)

1. Ensure the dryer is shutdown and fully depressurized before attempting any maintenance work. Refer to **CH. 6.MAINTENANCE GUIDELINES**

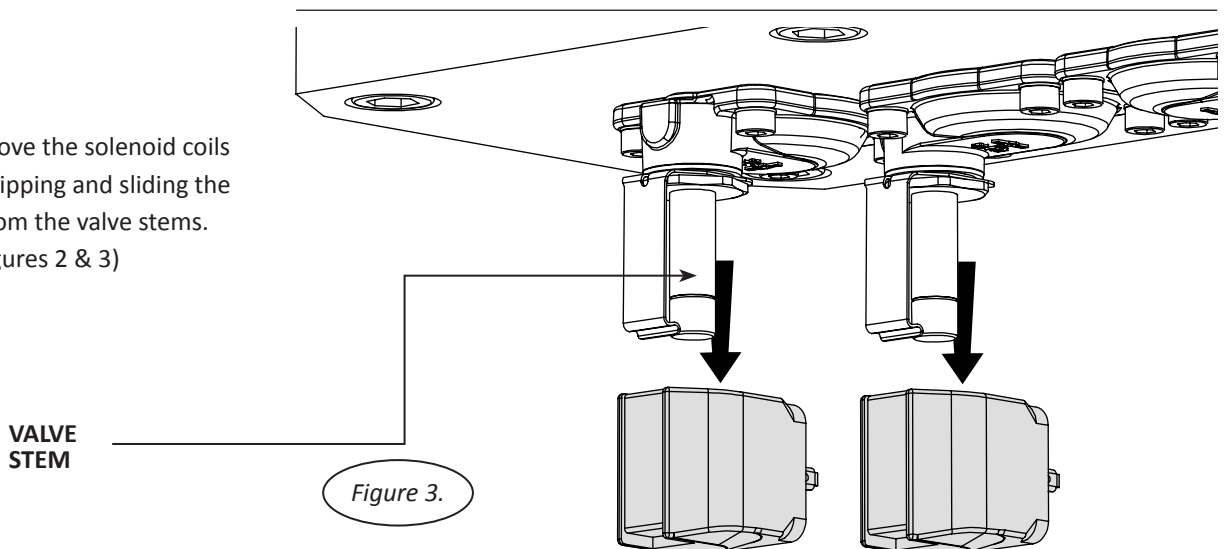
2. Detach each of the solenoid plugs from the solenoid coils by removing the 4x plug screws and releasing the plugs.

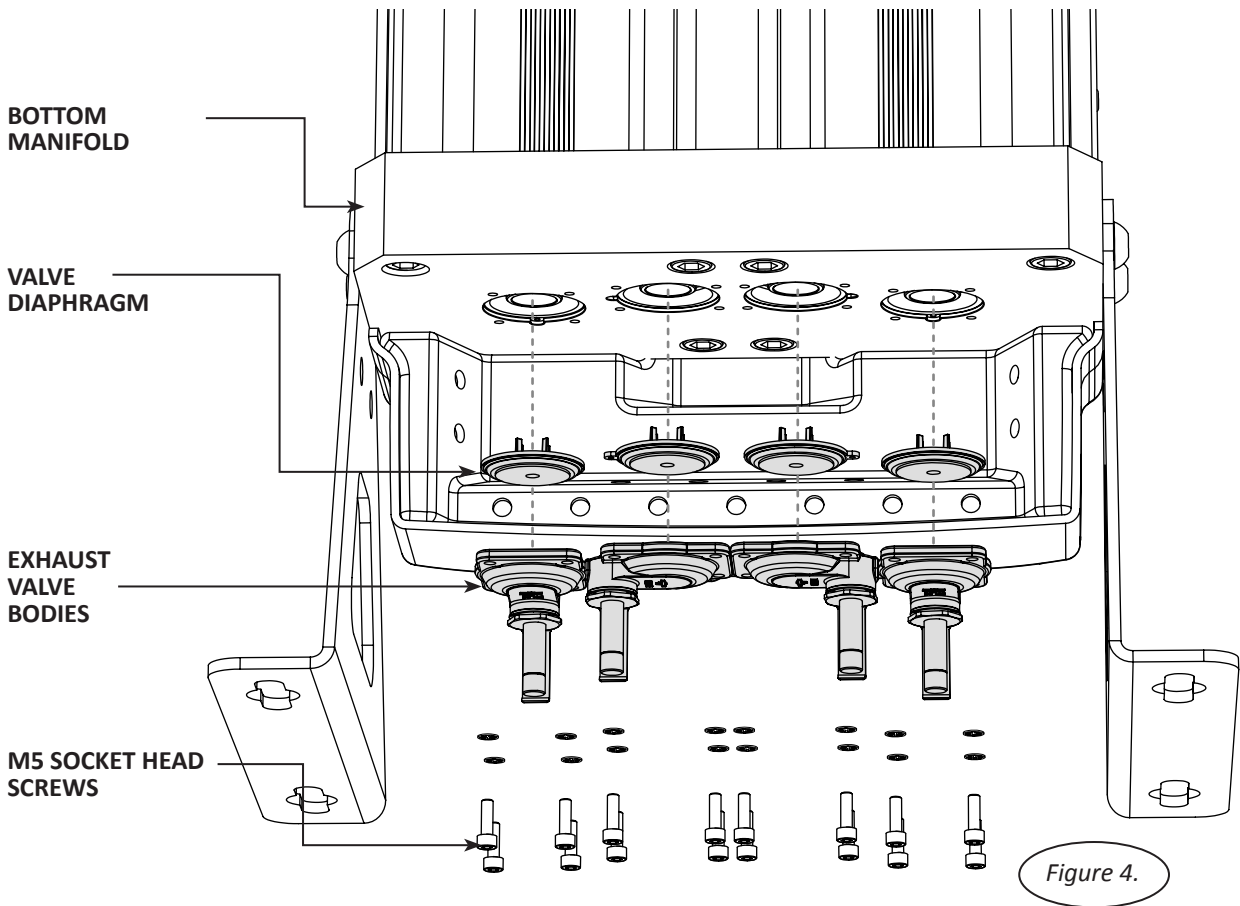
(See figure 1)



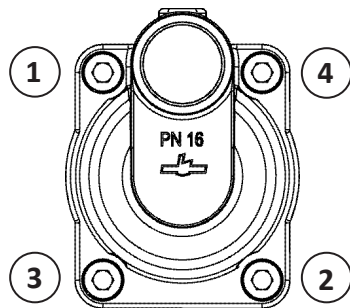
3. Remove the solenoid coils by unclipping and sliding the coils from the valve stems.

(See figures 2 & 3)





NOTE: correct valve screw tightening sequence shown.



4. Remove the 16x M5 socket head screws and the 16x spring washers and discard them. Remove and discard the valve bodies from the bottom manifold. (See figure 4)
5. Remove and discard the 4x diaphragms from the bottom manifold. (See figure 4)
6. Replace the 4x diaphragms and 4x valves from the service kit and replace the 16x M5 socket head screws and spring washers from the service kit and tighten to a torque setting of 6Nm. (See figure 4)
7. Reattach the 4x solenoid coils and 4x solenoid plugs. (See figure 1)

When service B is complete reset the dryer.

Refer to:

CH. 13. RESETTING DRYER CONTROLLER

10. SERVICE 'B' INSTRUCTIONS

EXHAUST VALVE REPLACEMENT

CVK-130 & EVK-130 & PVK-130

(Every 24,000 hrs or 4 Years)

1. Ensure the dryer is shutdown and fully depressurized before attempting any maintenance work. Refer to **CH. 6.MAINTENANCE GUIDELINES.**

2. Unscrew the silencer fixing nut using a 20mm pin spanner and remove the O ring to release the silencer box from the assembly.
(See Figure 1)

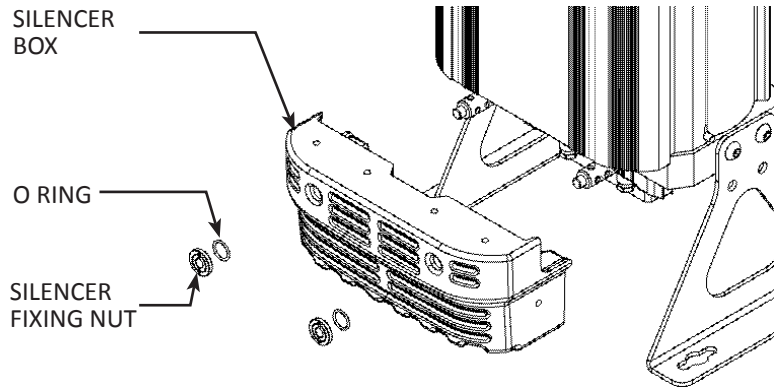
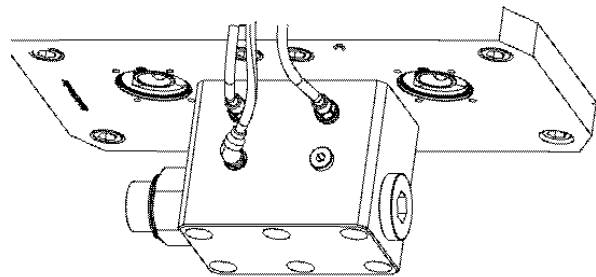


Figure 1.

3. Remove the 8x M5 socket head screws and the 8x spring washers and remove the exhaust valve bodies and diaphragms from the inlet (bottom) manifold.
(See Figure 2)



4. Replace the 2x diaphragms and 2x exhaust valves from the service kit.

5. Replace the 8x M5 socket head screws and spring washers and tighten at a torque setting of 6Nm. Reattach the 2x solenoid valves and 2x plugs.
(See Figure 2)

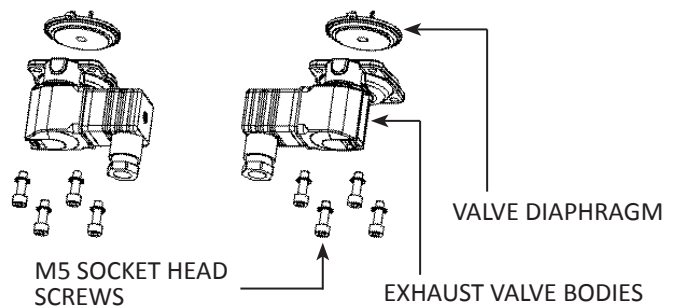
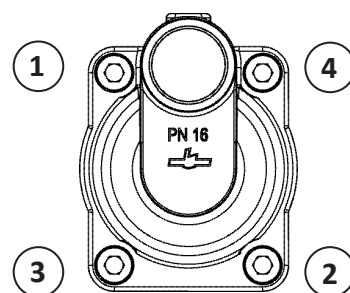


Figure 2.

NOTE: correct valve screw tightening sequence shown.



11. SERVICE 'B' INSTRUCTIONS

MODELS: NBA- 110, 120

INLET PILOT CONTROL VALVE REPLACEMENT

CVK-130 & EVK-130 & PVK-130

(Every 24,000 hrs or 4 Years)

1. Ensure dryer is shutdown and fully depressurized before maintenance work. Refer to:

CH. 6.MAINTENANCE GUIDELINES.

2. Detach solenoid plugs from solenoid coils by removing the 2x plug screws and releasing plugs.

(See figure 1)

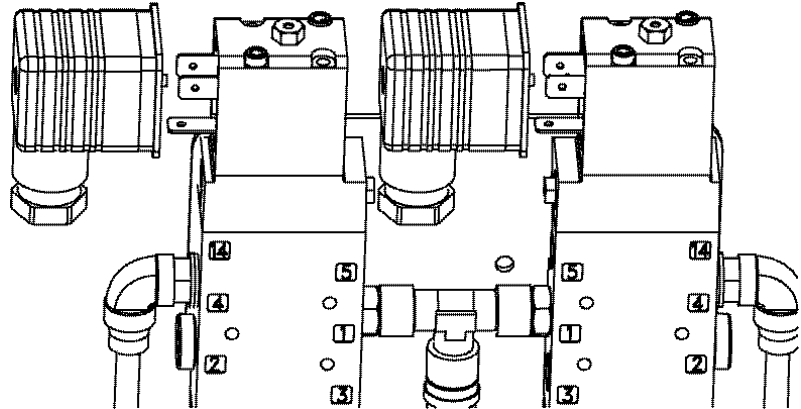


Figure 1.

3. Detach inlet valve tubes 1,2,3 from block.

(See figure 2)



NOTE: Label tubes when removing manifold.

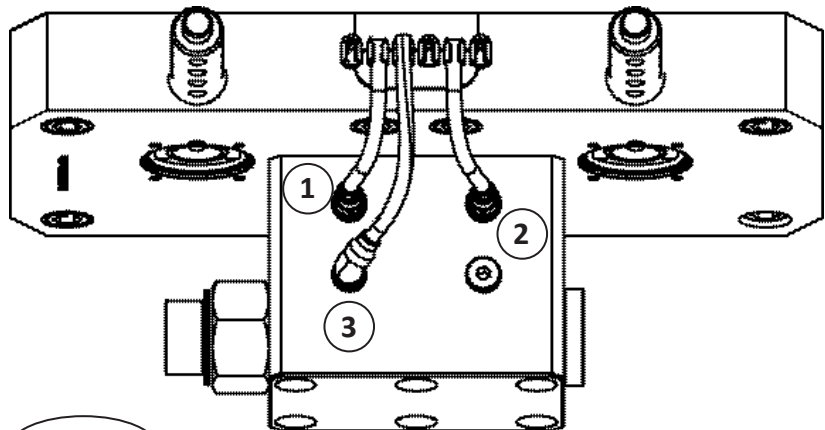


Figure 2.

4. Remove Inlet valve mount bracket screws 2x (M3x 12) and detach bracket assy from dryer.

(See figure 3)

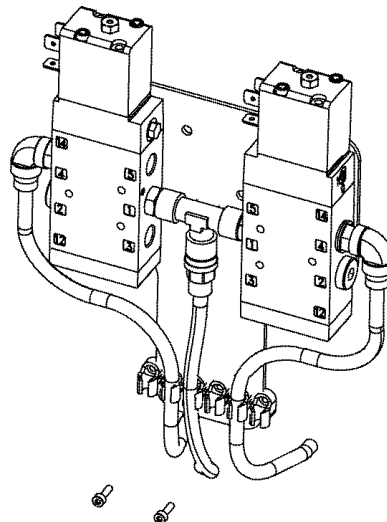


Figure 3.

5. Remove 6x (M3x30) screws, nuts, washers and detach valves from bracket.
(See figure 4)

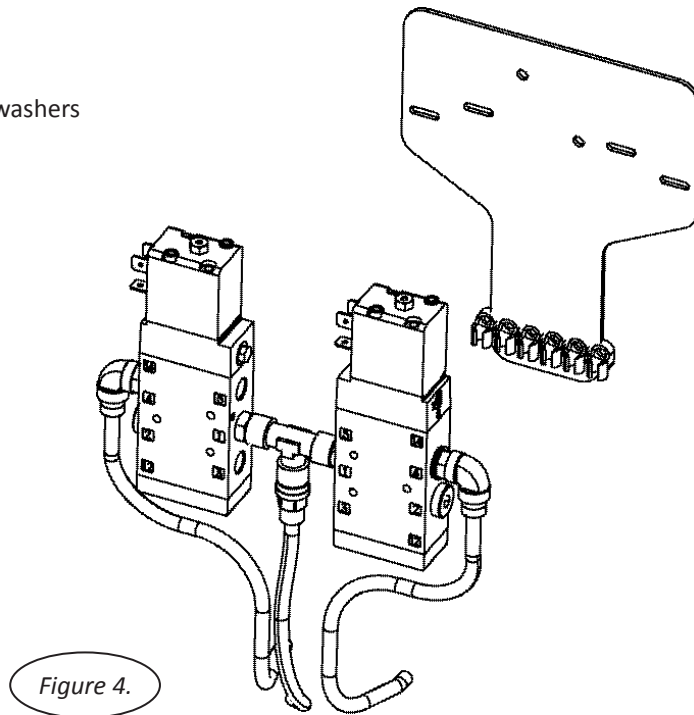


Figure 4.

6. Remove 2x elbows, 1x tee, 2x blanking plugs from valves.
(See figure 5)

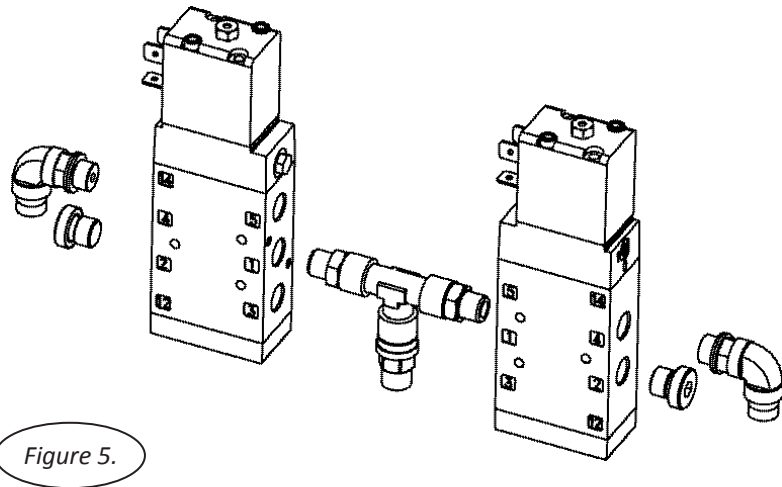


Figure 5.

Assemble opposite to dis-assembly as follows:

1. Replace 2x valves.
2. Re-fit 2x elbows, 1x tee.
3. Re-fit 2x blanking plugs.
4. Re-fit valves to bracket.
5. Re-fit valve bracket assy to dryer.
6. Attach inlet valve tubes to block.
7. Attach solenoid plugs to solenoid coils.
8. Re-fit Silencer box (**refer to 10:2**)

12. SERVICE 'C' INSTRUCTIONS

ES MODELS ONLY

DEWPOINT SENSOR REPLACEMENT

NSK-130

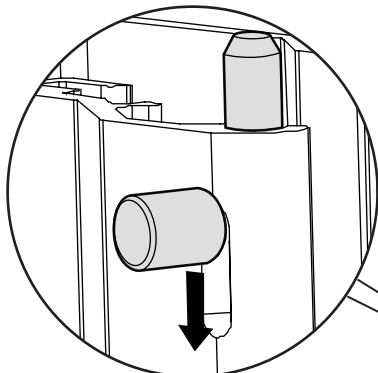


Figure 2.

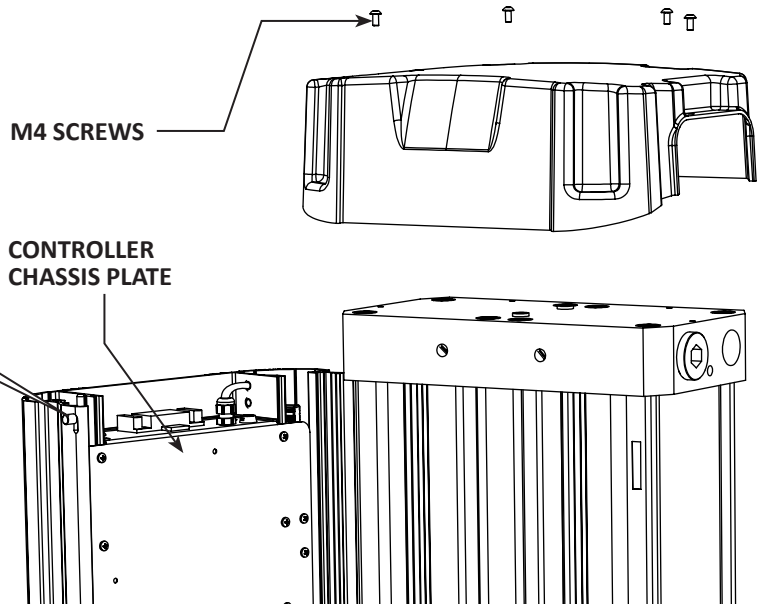


Figure 1.

(Every 6,000 hrs or 12 months)

1. Ensure the dryer is shutdown and fully depressurized before attempting any maintenance work. Refer to: **CH. 6.MAINTENANCE GUIDELINES.**

2. Loosen the 4x M5 screws to remove the top cover. (See Figure 1)

3. Release the catches located at the top and bottom of the shroud to open it. (See Figure's 1 & 2)

4. Remove the screw from the sensor plug and detach it from the dew point sensor assembly. (See Figure 3 & 4)

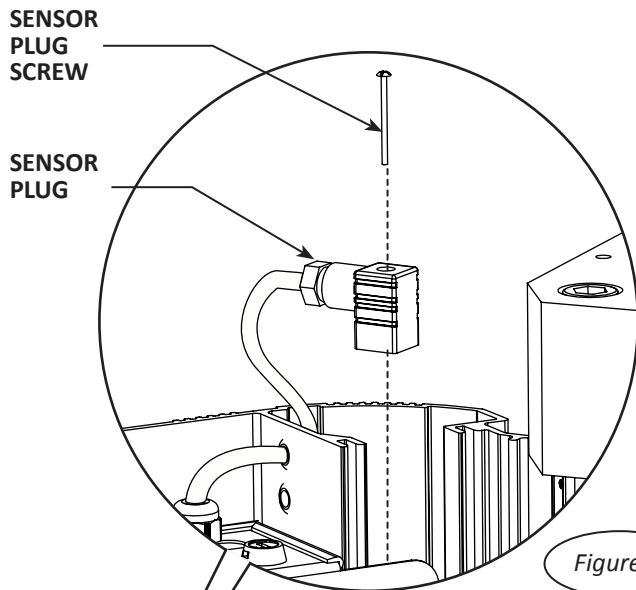


Figure 4.

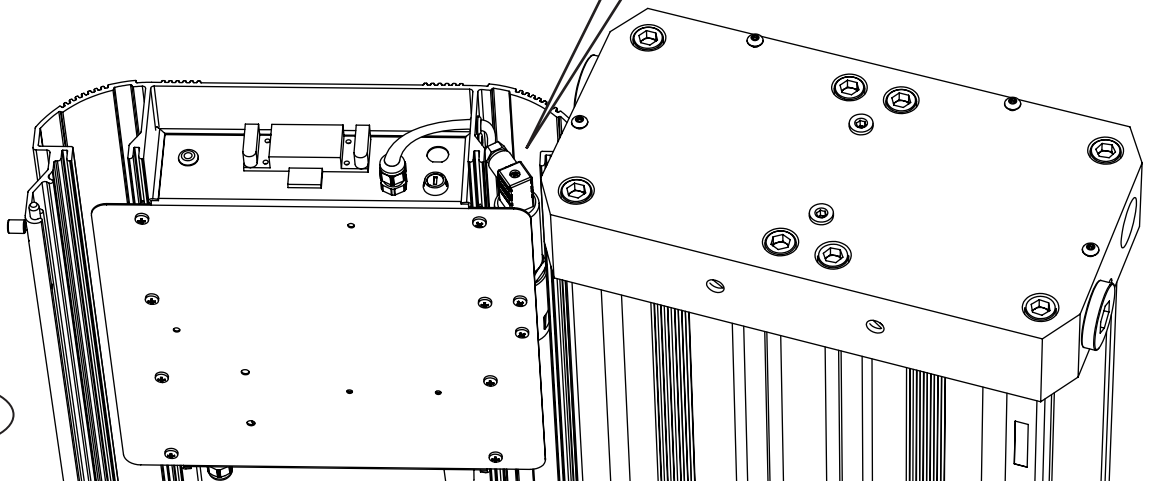


Figure 3.

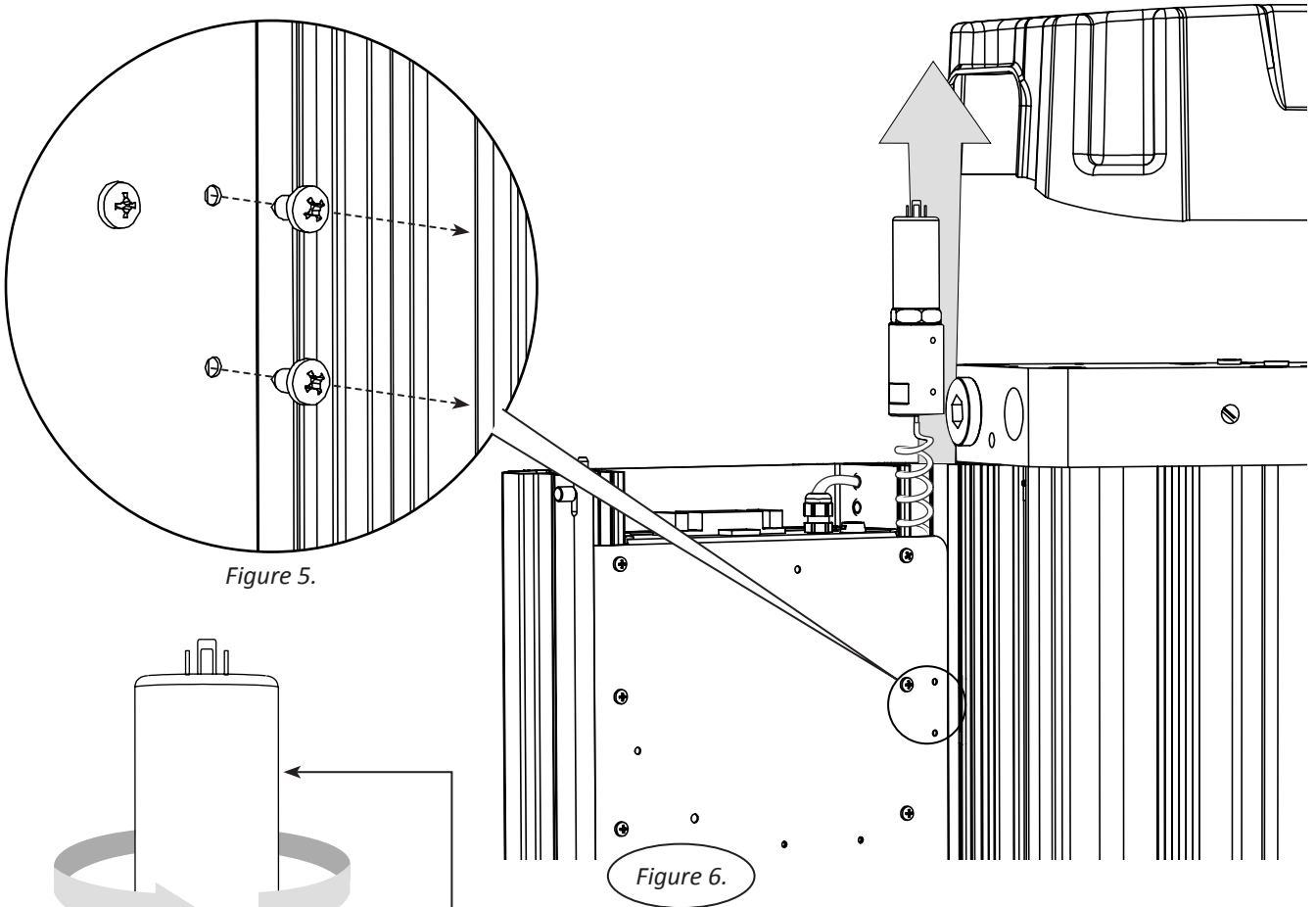


Figure 5.

Figure 6.

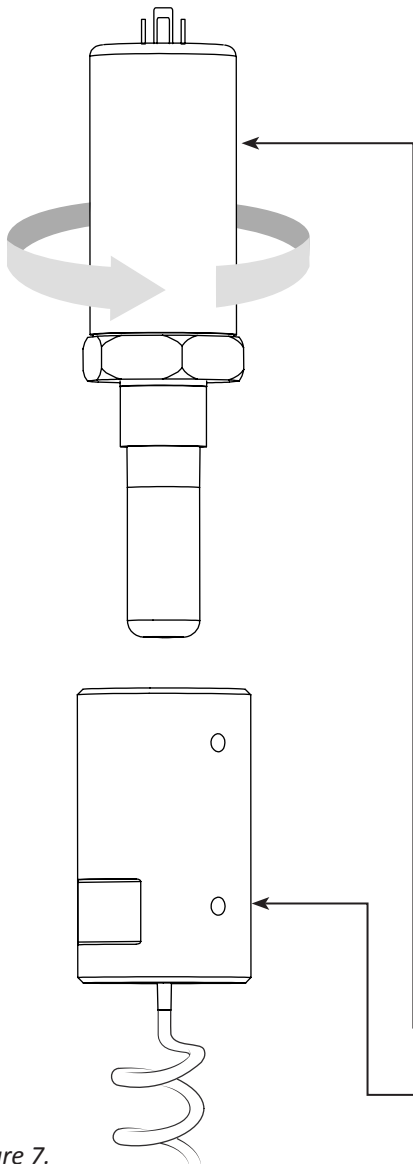


Figure 7.

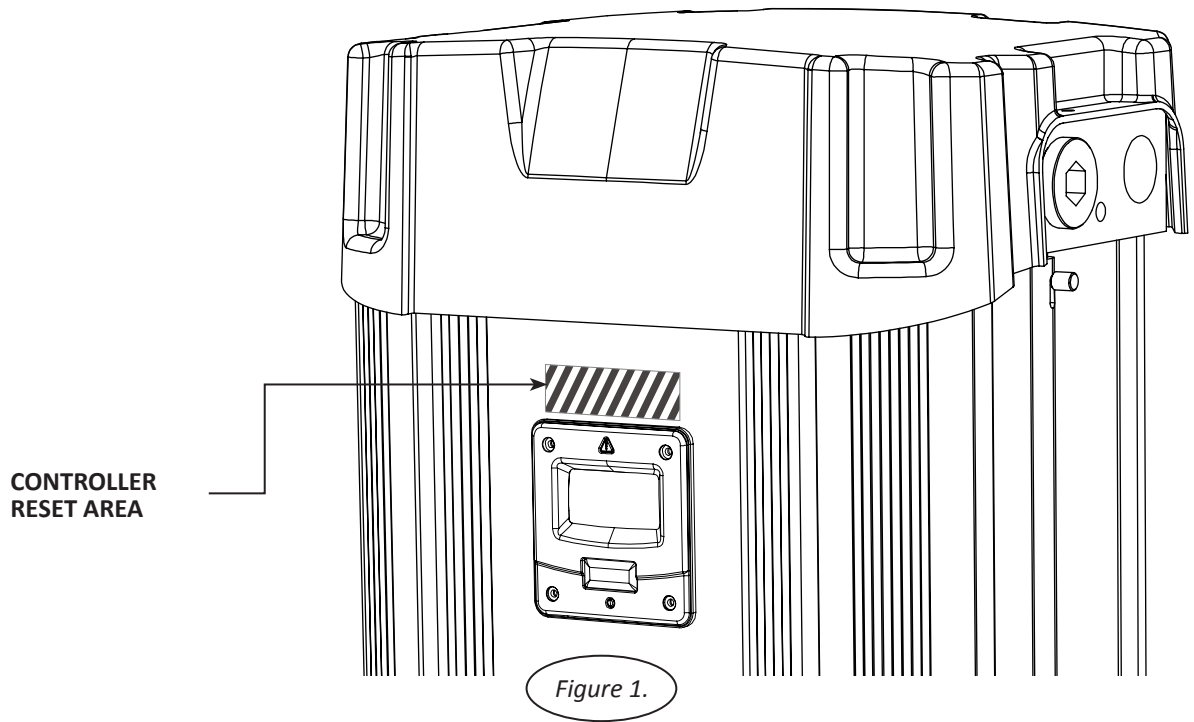
5. Remove the 2x fixing screws from the controller chassis plate and release the dew point sensor assembly. (See Figure 5 & 6)
6. Unscrew the dew point sensor from the sensor block and replace with the new or re-calibrated sensor. (See Figure 7)
7. Reattach the new or re-calibrated dew point sensor and sensor block assembly to the controller chassis plate using the 2x fixing screws.
8. Replace the sensor plug and screw to complete the sensor assembly. (See Figure 3 & 4)
9. Close the shroud and ensure the latches are in position.
10. Replace the top cover and insert the 4x M5 screws. These screws should be hand tightened only. (See Figure 1)

When service C is complete reset the dryer, refer to:
CH. 13. RESETTING DRYER CONTROLLER

NOTE: Allow sensor to stabilize, this may take several hours.

DEW POINT SENSOR
 SENSOR BLOCK

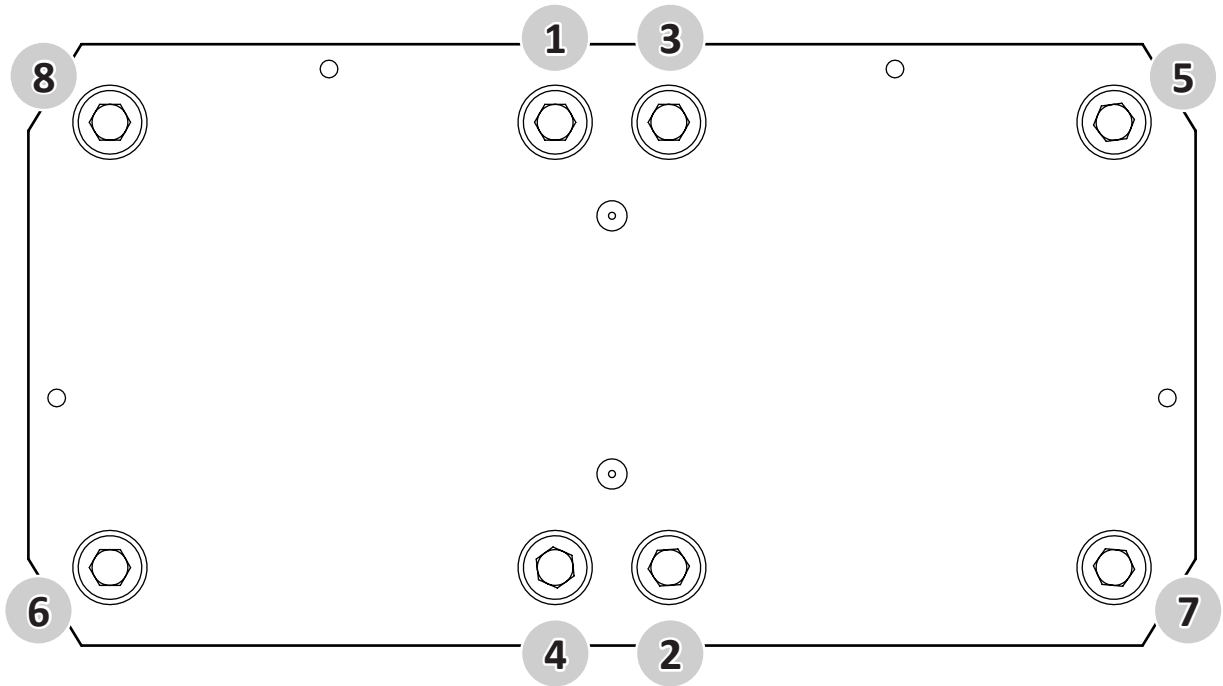
13. RESETTING DRYER CONTROLLER



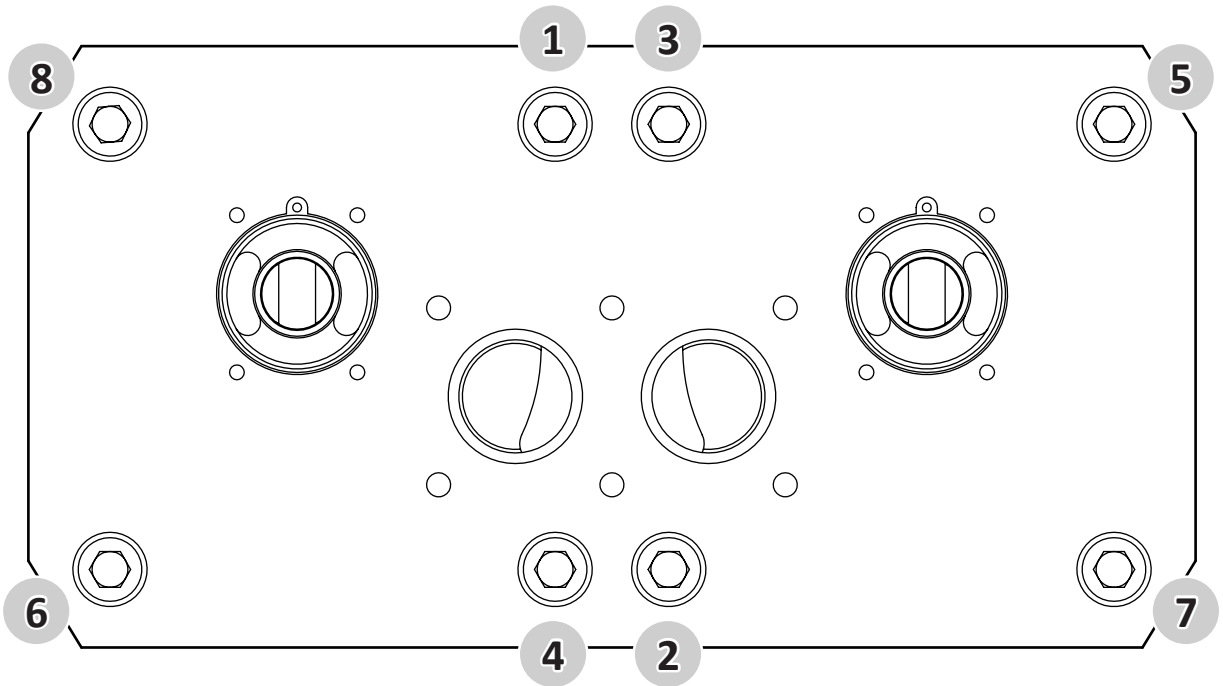
1. Ensure the dryer is on and running, Refer to: **CH. 15. DRYER START-UP PROCEDURE**
2. Place a magnet over the controller reset area shown in Figure 1 for 8-10 seconds until the dryer re-sets. (See Figure 1)
3. Once re-set the hours run counter will show '00000'.

NOTE: Magnet not included in the service kit.

14. MANIFOLD TIGHTENING SEQUENCES



Top manifold



Bottom manifold

15. DRYER START-UP PROCEDURE



Do not allow the dryer to flow air unless powered up, switched on and cycling.

Resulting effect could be cartridge contamination; requiring replacement cartridges.

- Connect to mains power.
- Connect all pipe work, ensure inlet & outlet valves closed.
- Ensure the inlet operating pressure parameters are between 4-16 barg.
- Ensure the inlet air temperature is between 1.5°C - 50°C (35°F - 122°F).
- Turn on electrical power to the dryer.
- Slowly open inlet valve.
- The dryer will display its status and commence normal operation.
- Inspect dryer for leaks.
- Slowly open outlet valves.
- Leave in safe working condition before handing to customer.

16. OTHER DRYER CHECKS & NON-SERVICEABLE ITEMS

DAILY CHECKS

Visual and functional check of the dryer should be carried out daily:

- Check the dryer for any external damage.
Assess and eliminate any defects found.
- If the red service light appears, the dryer must be serviced.
Contact the service department and request required service kit.
- Remove any loose dust or dirt from the dryer; clean all surfaces that appear to have attracted unwanted contaminants.
- Check the dewpoint sensor display (where applicable). If the dew point is not achieved the dewpoint reading on the display will alternate with “dewpoint alarm” every 5 seconds. The no-volt alarm will also activate.

Contact the service department and request a product service.

MAINTENANCE GUIDELINES

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

17. TROUBLESHOOTING

Problem	Problem Cause	Solution
Poor dew point performance	1. Insufficient inlet pressure	1. Inlet pressure min 4 barg. If not adjust inlet pressure settings.
	2. Electrical Fault	2. Ensure the power is on and the dryer front panel is illuminated; check the dryer is cycling correctly.
	3. Moist or contaminated desiccant	3. Eliminate the cause of contamination. Replace cartridges – do not re-use.
	4. Too high air consumption	4. Ensure the performance of the dryer matches the required system air consumption.
	5. Excessive inlet air temperature	5. Check against technical specification.
	6. Insufficient purge air	6. Purge incorrectly adjusted. Consult service personnel to adjust settings (Factory pre-set).
	7. Exhaust silencer blocked	7. Consult service personnel.
Failure of dryer to cycle	8. Controller not functioning correctly	8. Ensure the controller is powered; check the on screen column status to ensure it is powering the solenoid valves during normal cyclic operation.
	9. Controller not illuminated	9. Check power to unit & fuse: T2A 250V (located at Fig 8.A).
	10. Insufficient inlet pressure	10. Inlet pressure = min 4 barg. If not adjust inlet pressure settings.
	11. Failure to de-pressurize when cycling	11. Solenoid valve not functioning correctly; if there is power to the coil, replace valve. A correctly working valve outputs an audible click when it energizes.
	12. Outlet flow stops	12. Check inlet air supply.
Constant depressurisation	13. Failure to initialize dryer	13. Switch off and restart dryer. Ensure dryer is pressurized before powering dryer to allow dryer to initialize before commencing operation.
	14. Erratic air flow from exhaust	14. Faulty or damaged valve; service required.

REFERENCE TO KNOWN ISSUE

Opening the inlet valve too quickly

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

Inlet/outlet head pipe

Diameter too small.

Pipe work unsupported.

Inlet pipe work from low point in system, allowing bulk water to collect and enter the dryer.

Electrical controller

Incorrect fuse fitted or fuse blown. Check the plug and fuse located on top of the controller back plate inside the dryer front cover.

Additional Items

Use of non-authorized components.

Untrained / unauthorized maintenance / installation personnel used.

Increase in air consumption without relation to the flow capacity of the dryer.

Purging the dryer with cleaning agents that could damage the components or the desiccant.

Covers removed or loose during operation.

Failure to carry out a service when indicated by the dryer.

Do not allow the dryer to flow air unless powered up, switched on and cycling. Resulting effect could be cartridge contamination; requiring replacement cartridges.

nano

PURIFICATION SOLUTIONS

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