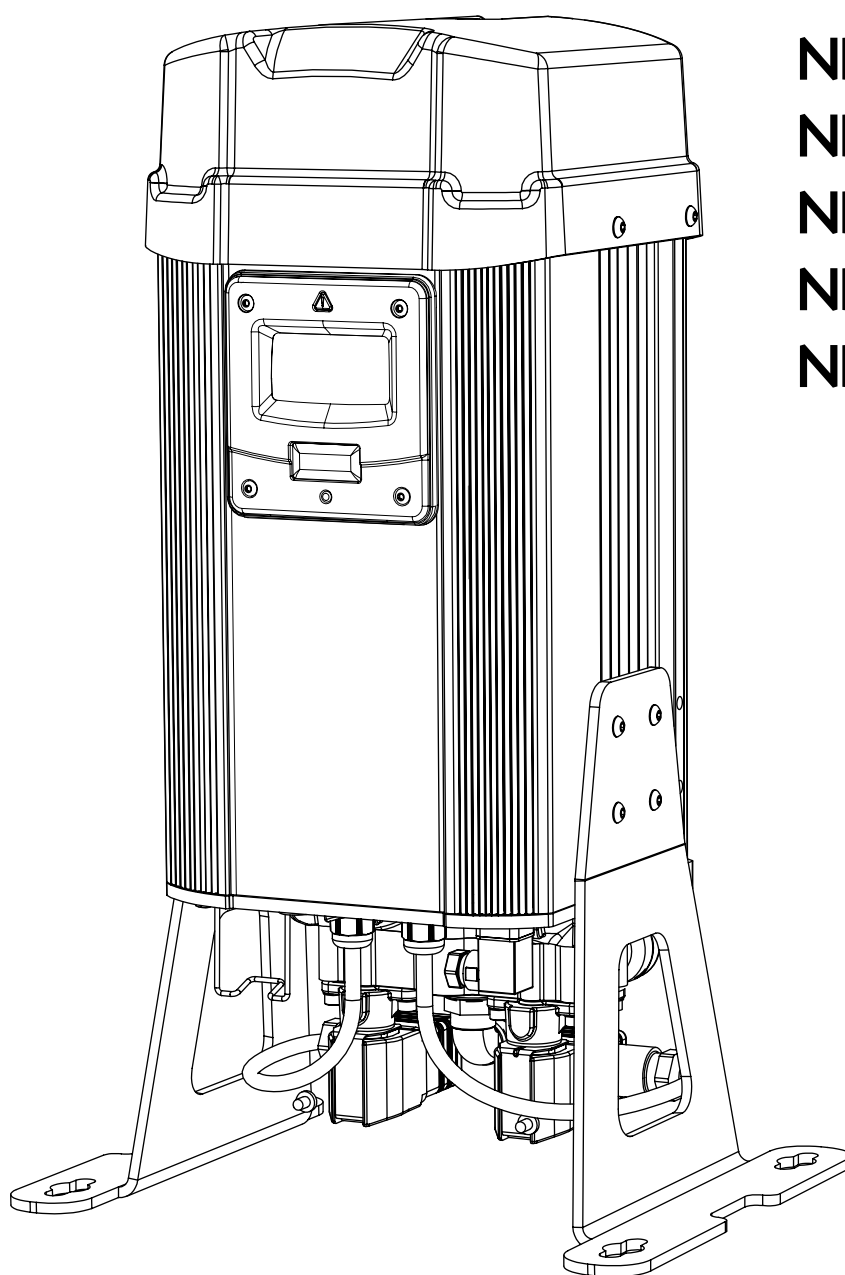


nano

D-Series¹

HEATLESS COMPRESSED AIR DRYER



NDL-010

NDL-020

NDL-030

NDL-040

NDL-050

MAINTENANCE & SERVICE MANUAL

www.n-psi.com

GENERAL INFORMATION

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Heatless Desiccant Air Dryer: D-Series1 (010-050) Service Manual

Models: NDL-010, 020, 030, 040, 050 (Including ES Option)

Document number: n-psi-D1(010-050)-OM-US-01

Issue: 001

Document Introduction

This manual provides manufacturers prescribed procedures for the maintenance and service procedures for a nano-purification solutions compressed air dryer. 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 service the dryer.

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 pressurised and electrical systems. Only authorised, 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.



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

Warranty guidelines

All dryers are supplied with a 5 year manufacturer's warranty from the date of purchase. The dryer should be installed, operated and maintained in accordance with the manufacturer's guidelines. Only genuine service parts should be used and no modifications should be made. For further information please contact us at support@n-psi.com.

MANUFACTURERS DETAILS

nano-purification solutions

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Huntersville, NC 28078

Telephone: (704) 897-2182

Internet: www.n-psi.com

E-mail: support@n-psi.com



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1. SERVICE INTERVALS

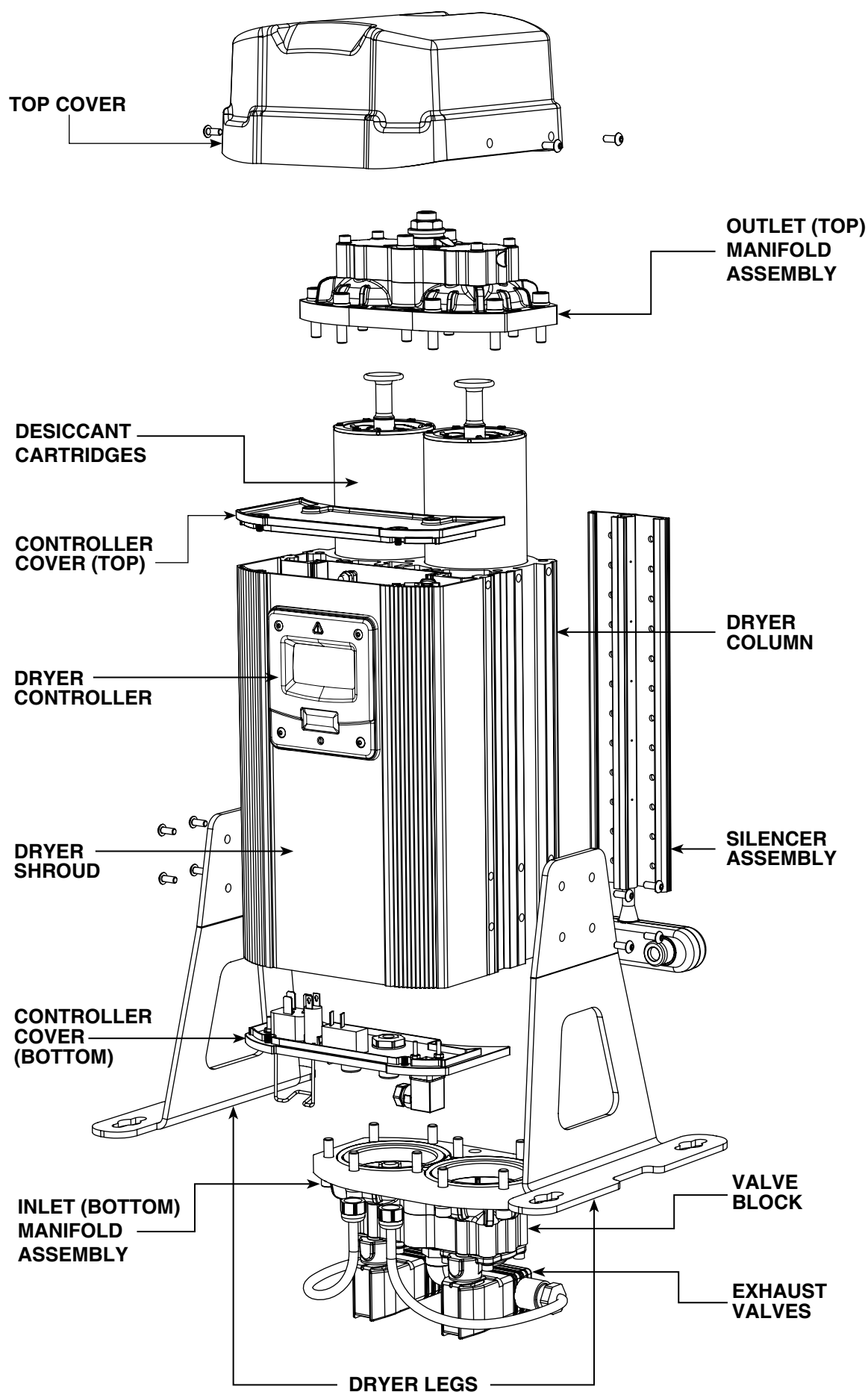
The following table details the recommended service intervals for this product and the service kits to be used.

Service Type	Recommended Service Intervals											
	2 Years (12,000 Hrs)	4 Years (24,000 Hrs)	6 Years (36,000 Hrs)	8 Years (48,000 Hrs)	10 Years (60,000 Hrs)	12 Years (72,000 Hrs)						
A	✓	✓	✓	✓	✓	✓						
B			✓			✓						
Additional For ES Models Only												
C	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Dryer Model	Required Service Kits		
	Service A	Service B	Service C
NDL-010	NDK-010	NDK-010 + NVK-050	NSK-130
NDL-020	NDK-020	NDK-020 + NVK-050	NSK-130
NDL-030	NDK-030	NDK-030 + NVK-050	NSK-130
NDL-040	NDK-040	NDK-040 + NVK-050	NSK-130
NDL-050	NDK-050	NDK-050 + NVK-050	NSK-130

2. PRODUCT ASSEMBLY

MODELS NDL-010 TO NDL-050



3. RECOMMENDED TOOLS

The following tools will be required to service the dryer:

SOCKETS: 5.5mm, 7mm and 17mm
ALLEN KEY SOCKETS: 3mm, 5mm and 8mm
SCREWDRIVER
TORQUE WRENCH (0-10NM)
ALLEN KEY 4mm
SPANNER 17mm
SPANNER 19mm

4. 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 de-pressurised. Also ensure the product is switched off and/or isolated from the mains electrical power.

PROCEDURES

- Close the inlet and outlet valves.

The dryer might still be pressurised! In order to de-pressurise the dryer; ensure the dryer is isolated from the compressed air source:

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

5. SERVICE 'A' INSTRUCTIONS:

REPLACING DESICCANT CARTRIDGES NDL-010 to NDL-050

(Every 12,000 hrs or 24 months)

Please refer to figure 1

1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work. (See page 6)
1. Remove the 4x M5 dome head screws to release the top cover and lift from assembly.
2. Remove the 2x M6 cap head screws as shown from the outlet (top) manifold.
3. Remove the 8x M6 cap head screws to remove the outlet (top) manifold from the dryer column.
4. Remove the gasket seal.
5. Remove the 2x cartridges using the handle to withdraw them from the column.
6. Check and clean the outlet (top) manifold and dryer column as required paying particular attention to the gasket sealing areas.
7. Remove the new cartridges and gasket seal from the service kit provided.
8. Insert the new gasket seal into the gasket groove on the underside of the outlet (top) manifold ensuring it is fully retained.
9. Insert the 2x new desiccant cartridges and rotate until they sit correctly into place . Then press down until they stop and the cartridge is below the top surface of the dryer column (See Figure's 2 & 4).
10. Replace the outlet (top) manifold and secure with the 10x M6 cap head screws tightening to a torque setting of 5Nm. Refer to the page 16 and follow the correct tightening sequence.
11. The seal between the dryer column and outlet (top) manifold should be checked for leaks prior to fitting the top cover and operating the dryer.
12. Replace the dryer top cover and secure with the 4x M5 screws. These screws should be hand tightened or tightened at a torque setting of less than 1Nm.

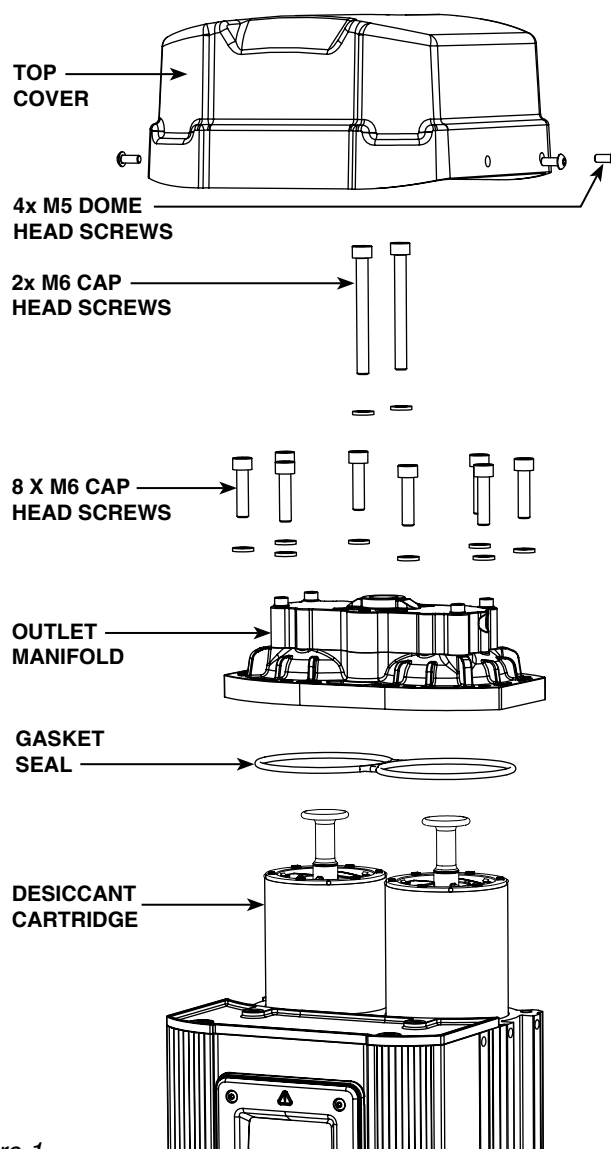


Figure 1.

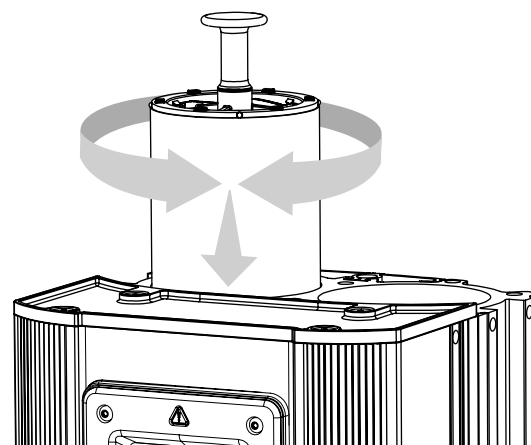


Figure 2.

Insert desiccant cartridge and rotate until it sits correctly within the dryer column then push downwards until you hear a click.

5.1 SERVICE 'A' INSTRUCTIONS

REPLACING O RINGS AND NITRILE BALL WITHIN THE OUTLET MANIFOLD

(Every 12,000 hrs or 24 months)

Please refer to figure 4.

1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work. (See page 6)
 2. Remove the 4x M5 dome head screws to release the top cover and lift from assembly.
 3. Remove the 2x M6 x 50 and the 8x M6 x 25 cap head screws as shown from the outlet (top) manifold to release it from the assembly.
 4. Remove the 4x M4 cap head screws and washers to remove the purge block from the outlet (top) manifold.
 5. Remove and discard the 3x O rings sat on the underside of the purge block. (See Figure 3.)
 6. Insert the new O rings from the service kit provided and replace into the grooves on the underside of the purge block. (See Figure 3.)
 7. Remove and discard the nitrile ball from the outlet manifold.
 8. Replace the nitrile ball from the service kit, into the 3 way valve orifice.
 9. Sit the purge block back on top of the outlet manifold and replace the 4x M4 cap head screws at torque setting of 3Nm.
 10. Sit the manifold assembly back on top of the dryer column and replace the 2x M6 x 50 and 8x M6 x 25 cap head screws at a torque setting of 5Nm.
- NOTE:** Refer to the page 16 and follow the correct tightening sequences.

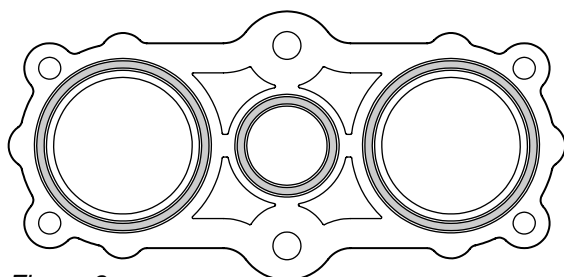


Figure 3.

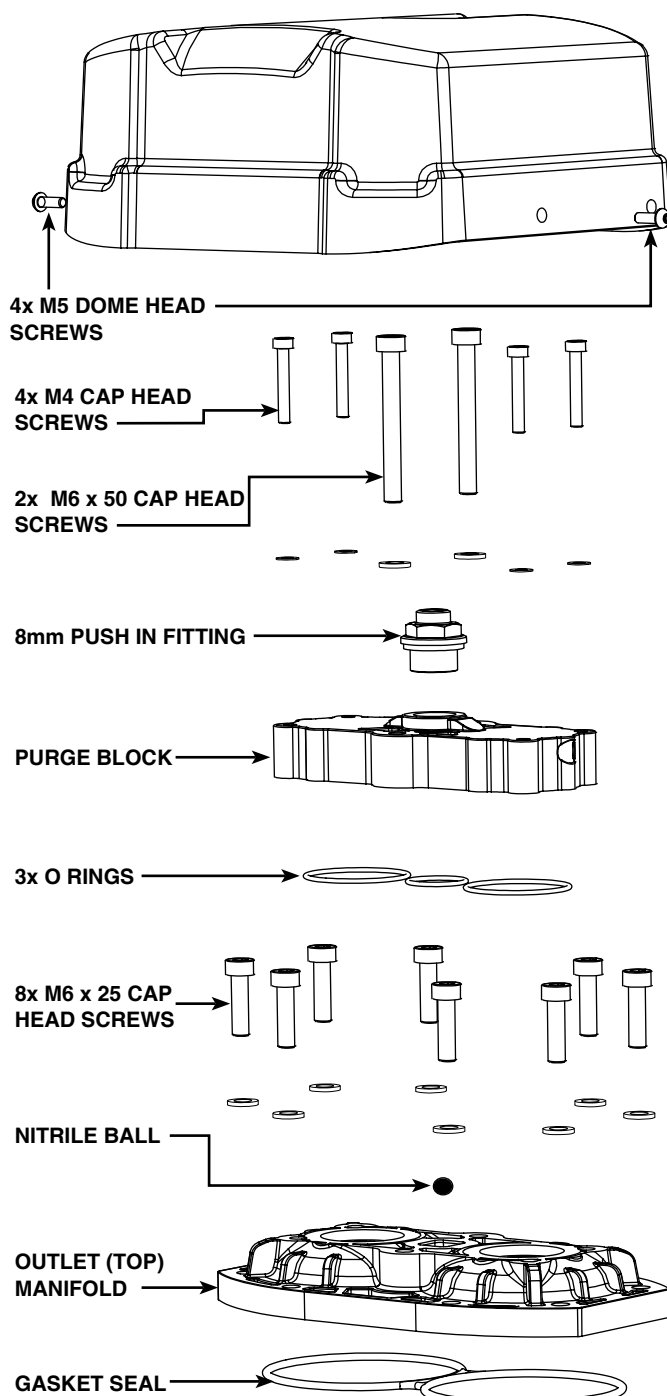


Figure 4.

5.2 SERVICE 'A' INSTRUCTIONS

REPLACING O RINGS, NITRILE BALL AND GASKET SEAL WITHIN THE INLET MANIFOLD

(Every 12,000 hrs or 24 months)

Please refer to figure 5.

1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work. (See page 6)

2. Unclip the solenoid plug from the valve stem.

(See Figure 2 & 3 on page 11)

3. Remove the 8x M4 cap head screws and washers from the valve block to release the exhaust valves.

4. Remove the 2x M6 cap head screws to release the valve block from the inlet manifold.

5. Remove and discard the 3x O rings on the underside of the valve block.

6. Insert the new O rings from the service kit and replace into the grooves on the underside of the valve block.
(See Figure 6 on page 10)

7. Remove the 8x M6 cap head screws from the inlet manifold to release it from the dryer.

8. Remove and discard the nitrile ball from the inlet manifold.

9. Replace the nitrile ball from the service kit and replace into the 3 way valve orifice. (See Figure 7 on page 10)

10. Remove and discard the gasket seal from the underside of the inlet manifold.

11. Insert the new gasket seal from the service kit into the gasket seal grooves on the underside of the inlet manifold.

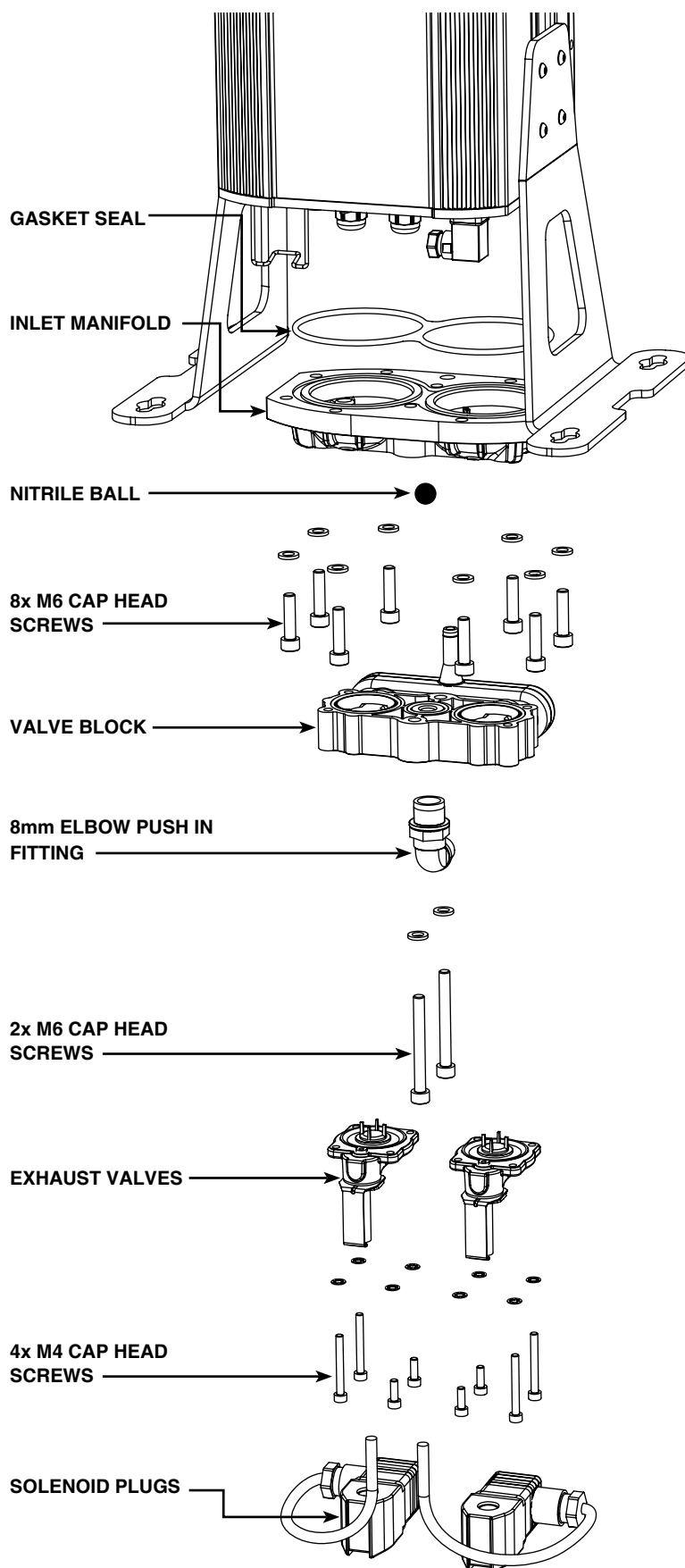


Figure 5.

5.2 SERVICE 'A' INSTRUCTIONS

REPLACING O RINGS, NITRILE BALL AND GASKET SEAL WITHIN THE INLET MANIFOLD

(Every 12,000 hrs or 24 months)

Please refer to figure 4.

12. To reassemble, place the valve block on top of the inlet manifold ensuring the profiles of the screw holes line up correctly.

13. Sit the exhaust valves on top of the valve block, ensuring the profiles of the screw holes line up correctly.

14. Insert 4x M4 cap head screws through both exhaust valves and tighten at a torque setting of 3Nm. Refer to the page 16 and follow the correct tightening sequence.

15. Place the manifold assembly back onto the dryer and insert the 2x M6 cap head screws through the valve block tightening at a torque setting of 5Nm.

16. Insert the 8x M6 cap head screws into the inlet manifold and tighten to a torque setting of 5Nm. Refer to the page 16 and follow the correct tightening sequence.

17. To finish the assembly reattach the solenoid plugs to the exhaust valve.

When service A is complete reset the dryer, refer to page 15.

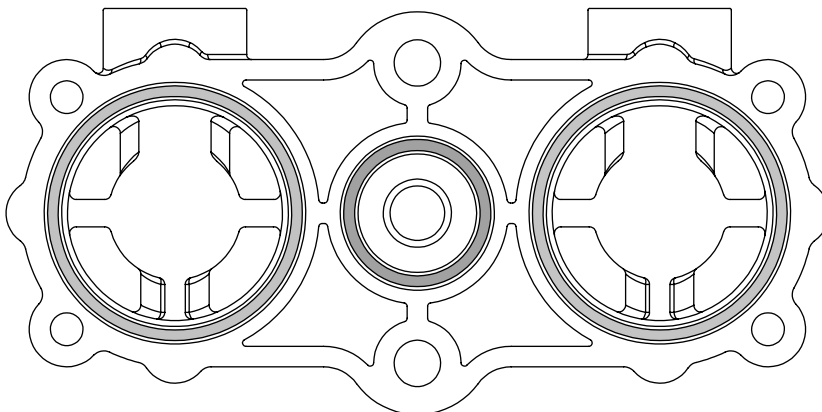


Figure 6.

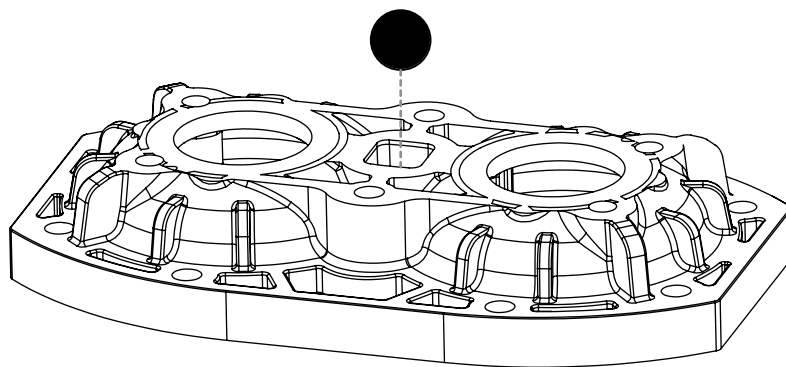


Figure 7.

6. SERVICE 'B' INSTRUCTIONS

REPLACING EXHAUST VALVES (NDL-010 TO NDL-050)

(Every 36,000 hrs or 60 months)

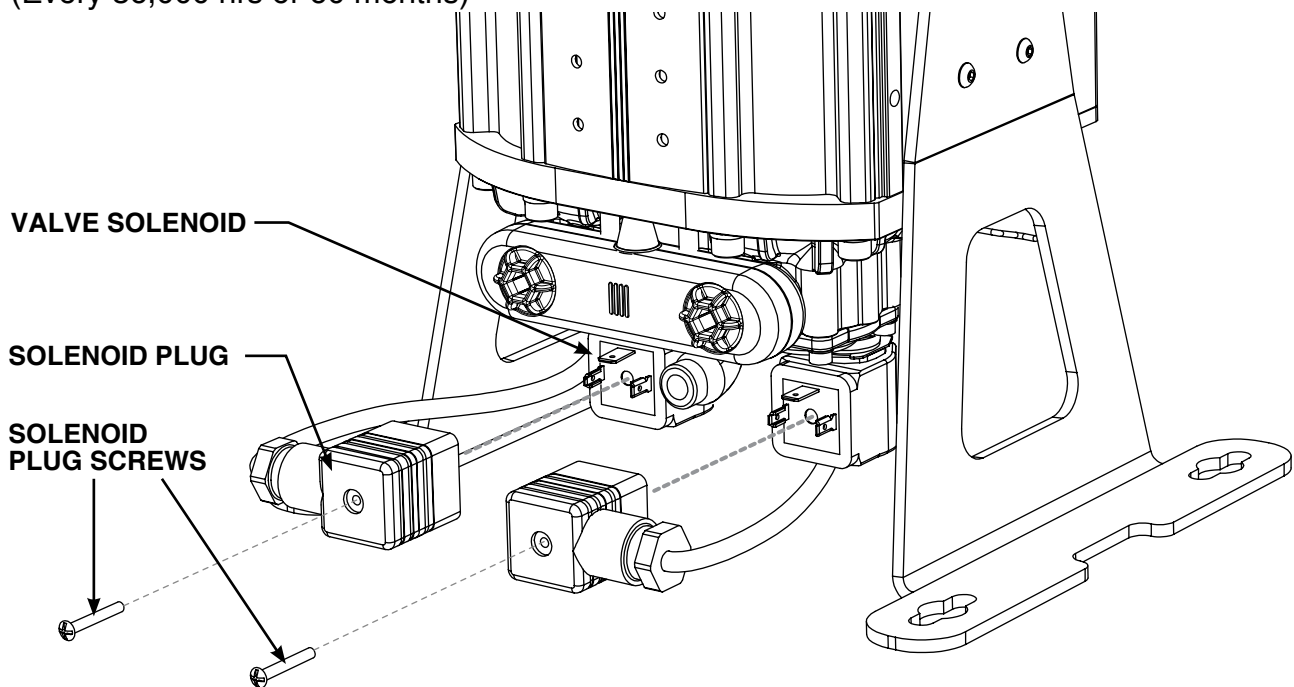


Figure 1.

1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work. (See page 6)
2. Remove the valve solenoid plugs by removing the plug screws and pulling the plug free from the solenoid. (See Figure 1)
3. Remove the valve solenoids by unclipping the retaining clips and sliding the solenoids down and free from the valve stems. (See Figures 2 & 3)

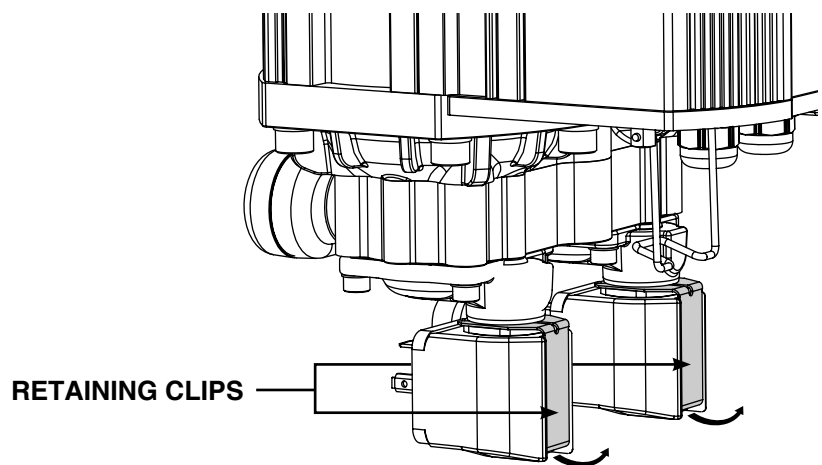


Figure 2.

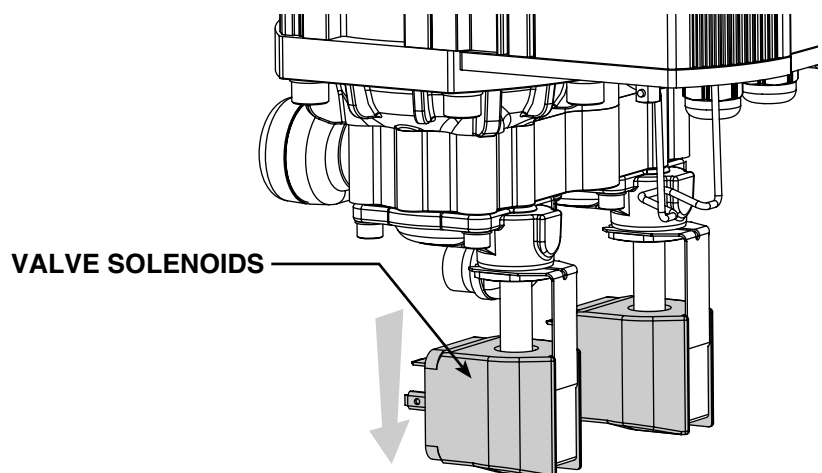


Figure 3.

6. SERVICE 'B' INSTRUCTIONS

REPLACING EXHAUST VALVES (NDL-010 TO NDL-050)

(Every 36,000 hrs or 60 months)

4. Remove the 8x M4 socket head screws and the 8x M4 spring washers and release the exhaust valve bodies and diaphragms from the inlet manifold.

(See Figures 4 & 5)

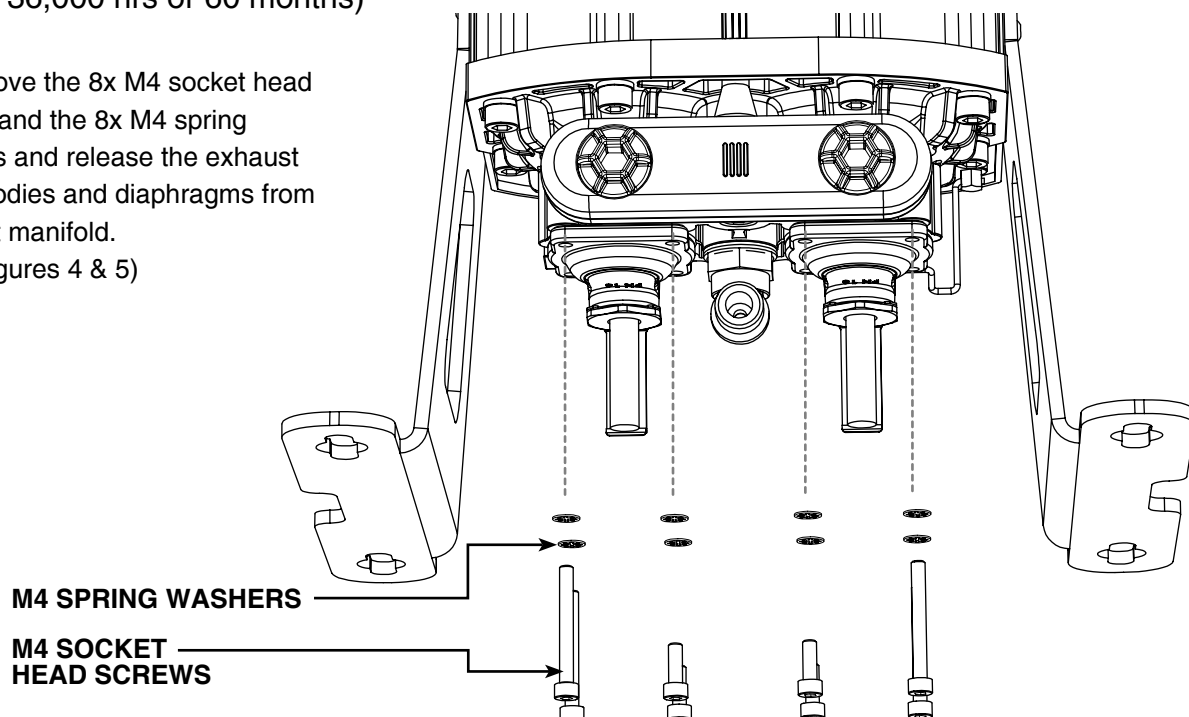


Figure 4.

5. Replace the 2x diaphragms and 2x exhaust valve bodies from the service kit.

6. Insert the 8x M4 socket head screws and 8x washers and tighten to a torque setting of 3Nm.

NOTE: Refer to the page 16 and follow the correct tightening sequence.

When service B is complete reset the dryer, refer to page 15.

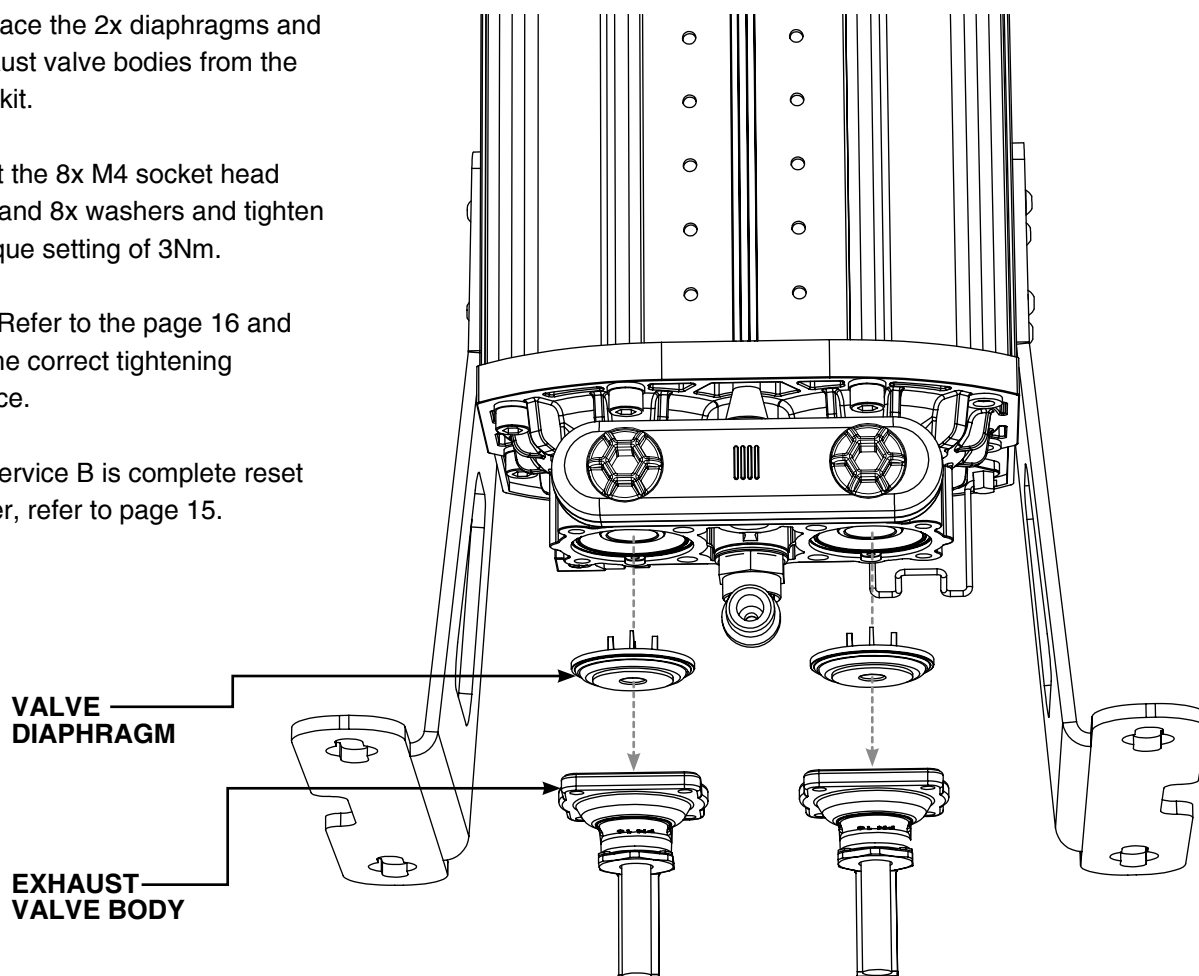


Figure 5.

7. SERVICE 'C' INSTRUCTIONS

REPLACING OR RE-CALIBRATING THE DEW POINT SENSOR (ES MODELS ONLY)

(Every 6,000 hrs or 12 months)

1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work. (See page 6)

2. Remove the 4x M5 screws to release the top cover and lift from assembly. (See Figure 1)

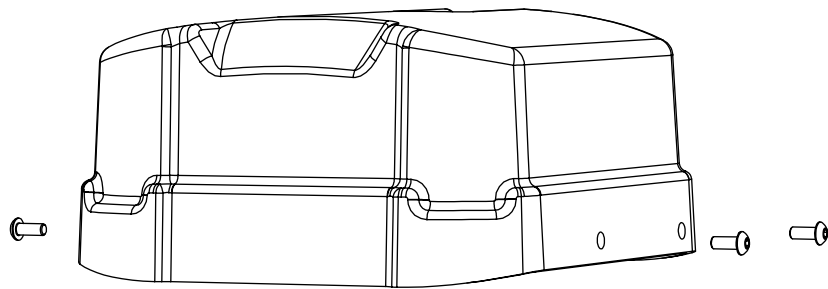
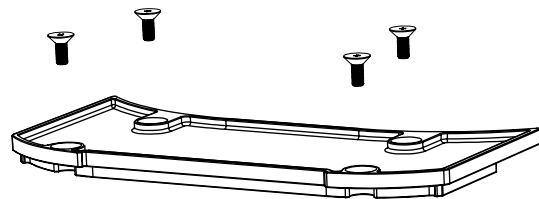


Figure 1.

3. Remove the controller top over by removing the 4x screws. (See Figure 2)



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

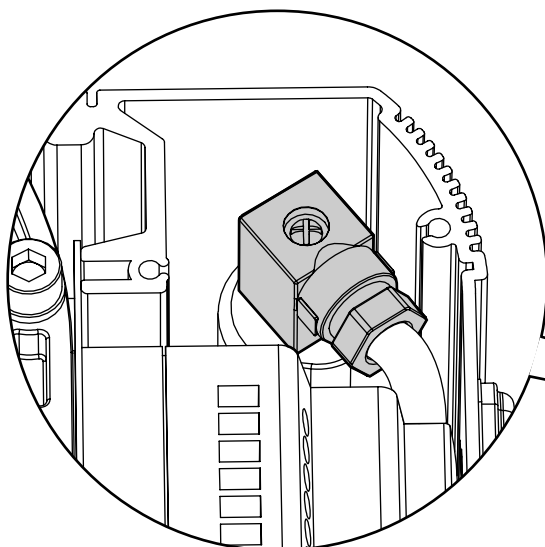
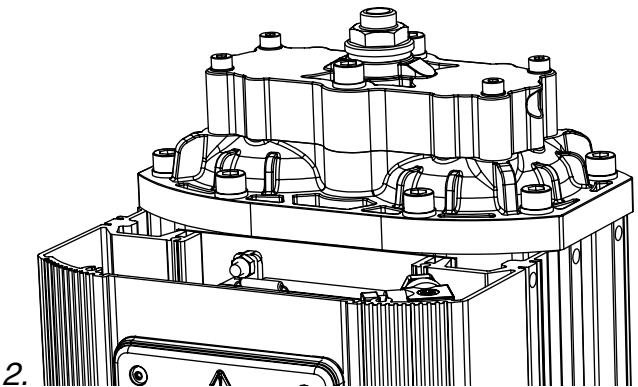


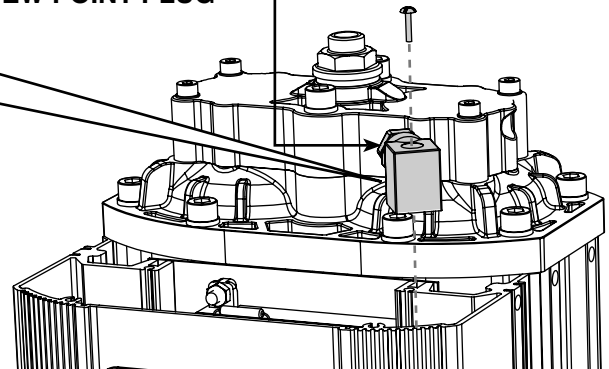
Figure 3.

Figure 2.



DEW POINT PLUG

Figure 4.



8. SERVICE 'C' INSTRUCTIONS

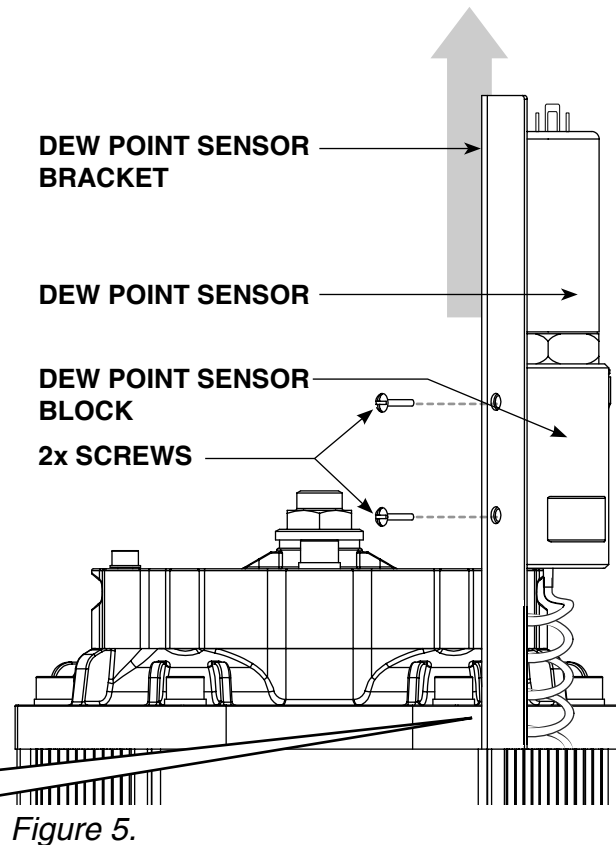
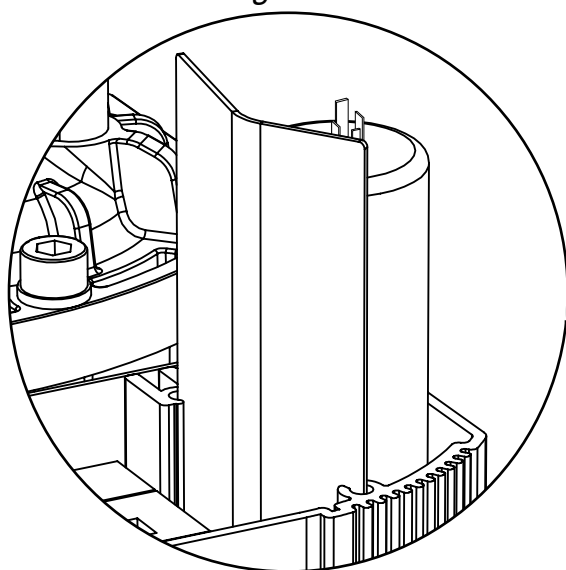
REPLACING OR RE-CALIBRATING THE DEW POINT SENSOR (ES MODELS ONLY)

(Every 6,000 hrs or 12 months)

4. Remove the dew point sensor assembly by sliding the sensor bracket upwards from the dryer shroud to expose the sensor block fixing screws. (See Figure 4 & 5)

5. Remove the 2x fixing screws from the assembly to detach the sensor from the bracket. (See Figure 5)

Figure 6.



6. Unscrew the dew point sensor from the sensor block and replace it with the new or re-calibrated sensor. (See Figure 7)

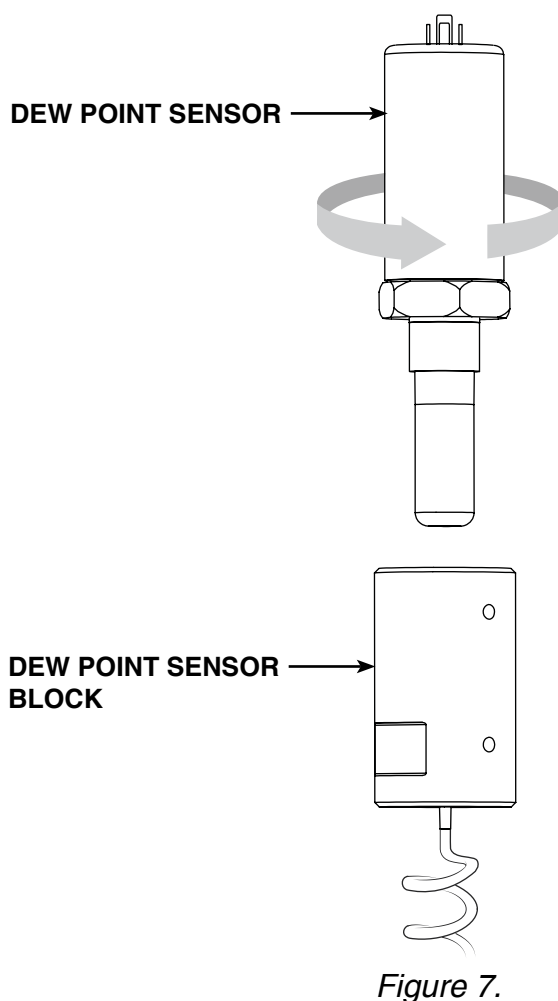
7. Re-attach the dew point sensor to the sensor bracket using the 2x fixing screws and replace the dew point sensor assembly by sliding the bracket back into the dryer shroud.

8. Replace the dew point sensor plug and plug screw.

9. Replace the controller cover.

10. Replace the dryer top cover.

When service C is complete reset the dryer, refer to page 15.



9. RE-SETTING THE DRYER CONTROLLER

1. Ensure the dryer is on and running, see dryer start up procedure on page 17.

2. Remove the 4x M5 to release the top cover. (See Figure 1)

3. Place a magnet on the marked area in Figures 1 & 2 (re-set area) for 8 - 10 seconds until the controller resets. (See Figure's 1 & 2)

4. Once re-set the hours run counter will show '00000'.

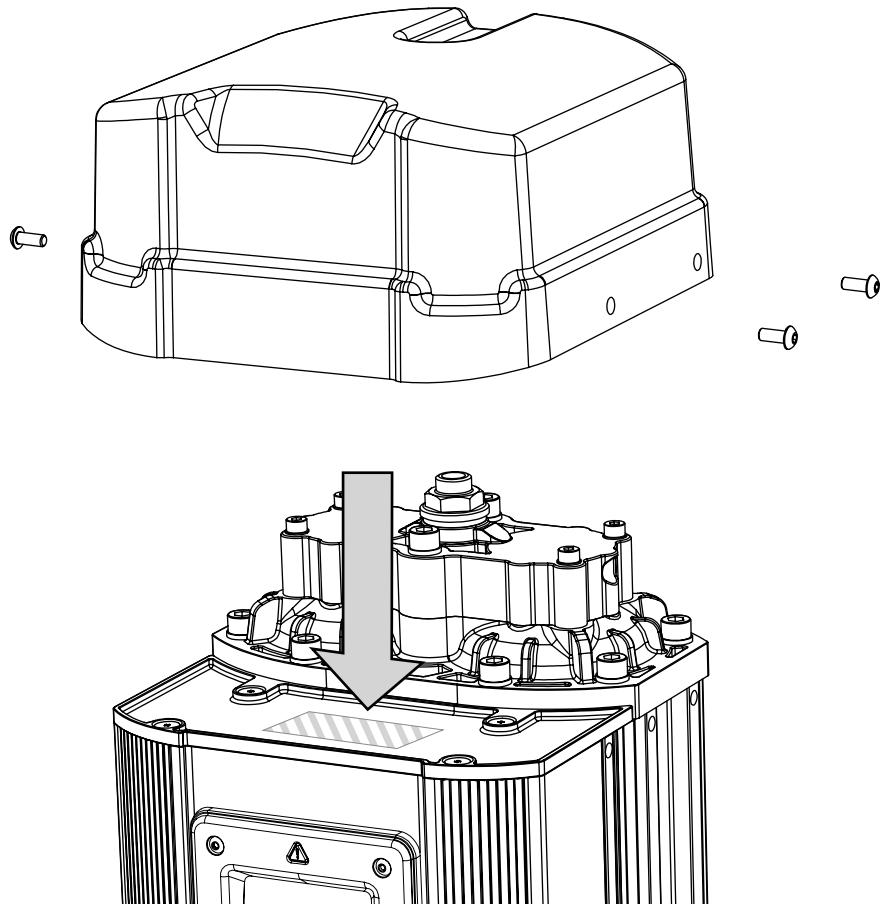


Figure 1.

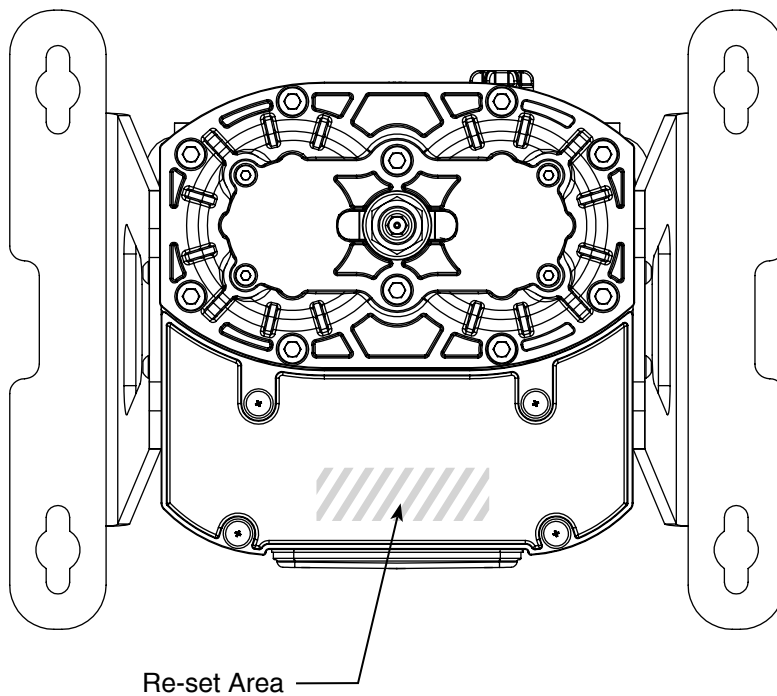
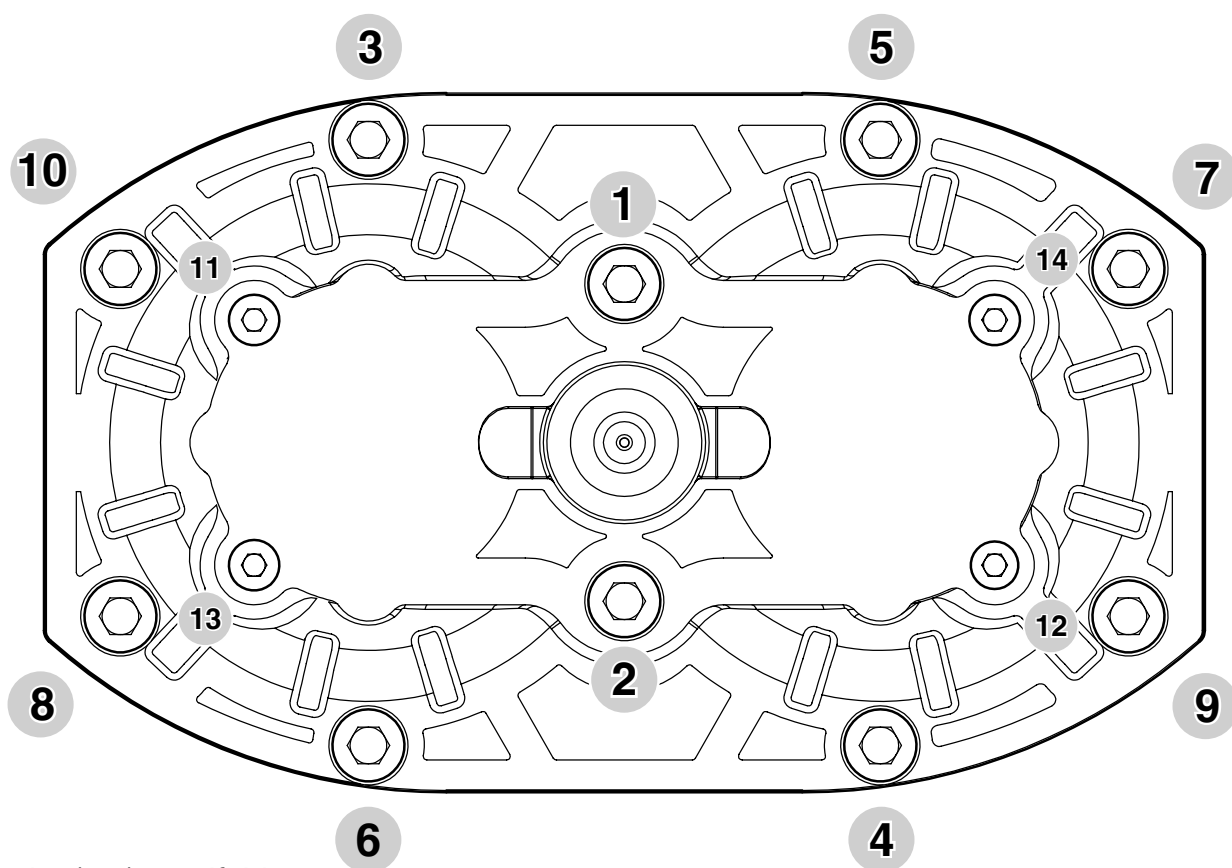


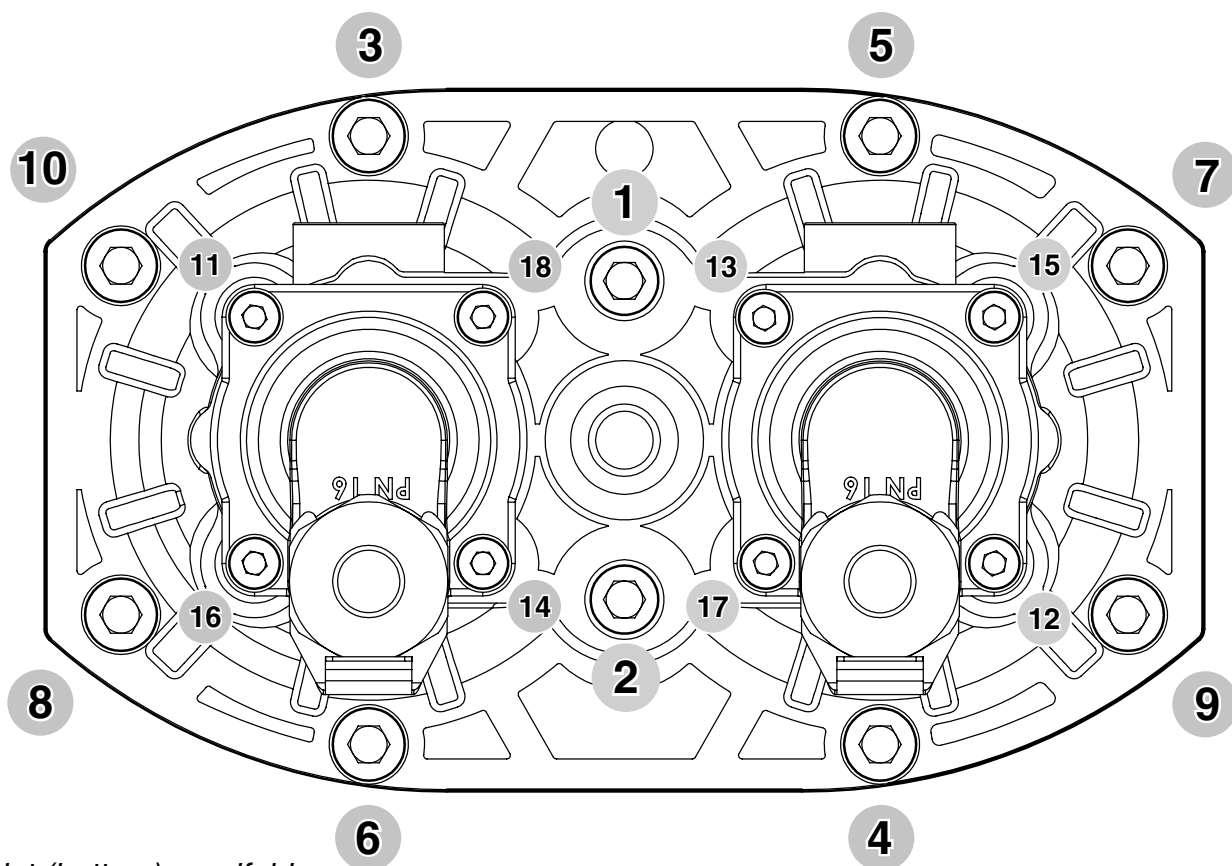
Figure 2. (Top view with cover off)

10. MANIFOLD TIGHTENING SEQUENCES

NDL-010 TO NDL-050



Outlet (top) manifold



Inlet (bottom) manifold

10. 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 all pipe work.
 - Ensure the inlet operating pressure parameters are between 4-16 barg.
 - Ensure the inlet air temperature is between 1.5°C-50°C.
- Connect the IEC power supply underneath the dryer using the retaining clip to secure in position.
- Open the inlet and outlet valves.
- Turn on the dryer using the switch located underneath the front of dryer body.
- The dryer will display its status and commence normal operation. When the dryer is powered up the display will show “initialising dryer” for approximately 20 seconds, ensuring the dryer is in equilibrium state before commencing operation.

11. 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 a dryer 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 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 n-psl 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.

12. TROUBLESHOOTING

Problem	Problem Caused	Solution
Poor dew point performance	1. Insufficient inlet pressure 2. Electrical Fault 3. Moist or contaminated desiccant 4. Too high air consumption 5. Excessive inlet air temperature 6. Insufficient purge air 7. Exhaust silencer blocked	1. Inlet pressure min 4 bar. If not adjust inlet pressure settings. 2. Ensure the power is on and the dryer front panel is illuminated; check the dryer is cycling correctly. 3. Eliminate the cause of contamination. Replace cartridges – do not re-use. 4. Ensure the performance of the dryer matches the required system air consumption. 5. Check against technical specification. 6. Purge incorrectly adjusted. Consult service personnel to adjust settings (Factory pre-set). 7. Consult service personnel.
Failure of dryer to cycle	8. Controller not functioning correctly 9. Insufficient inlet pressure 10. Failure to de-pressurise when cycling 11. Outlet flow stops	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. Inlet pressure = min 4 barg. If not adjust inlet pressure settings. 10. Solenoid valve not functioning correctly; if there is power to the coil, replace valve. A correctly working valve outputs an audible click when it energises. 11. Check inlet air supply.
Constant depressurisation	12. Failure to initialise dryer 13. Erratic air flow from exhaust	12. Switch off and restart dryer. Ensure dryer is pressurised before powering dryer to allow dryer to initialise before commencing operation. 13. 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-authorised components.

Untrained / unauthorised 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.

13. SERVICE RECORD & NOTES

The following table allows the customer to document the service history of the product and to make notes related to each service.

DRYER SERVICE RECORD			
PRODUCT CODE:		PRODUCT SERIAL NO.	
.....		
SERVICE TYPE A / B / C	DATE	SERVICED BY (PRINT/SIGN)	NOTES

NOTES:

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