

nano

D1 SERIES

HEATLESS COMPRESSED AIR DRYER



MAINTENANCE & SERVICE MANUAL

www.n-psi.co.uk

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1. GENERAL INFORMATION

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Product: D1 Series - Heatless Compressed Air Dryer
Models: NDL -010, 020, 030, 040, 050 (Including ES Model)
Doc no: 17-100-0115
Issue: 002

1.1 Document Introduction

This manual provides factory prescribed installation and maintenance procedures for a nano-purification solutions D1 Series compressed air dryer. The procedures illustrated in this document are only to be performed by fully trained competent 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 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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Gateshead, Tyne and Wear,
United Kingdom, NE11 0PZ

Telephone: +44 (0) 191 497 7700

Internet: www.n-psi.co.uk

E-mail: sales@n-psi.co.uk

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 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.



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 limited.

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.

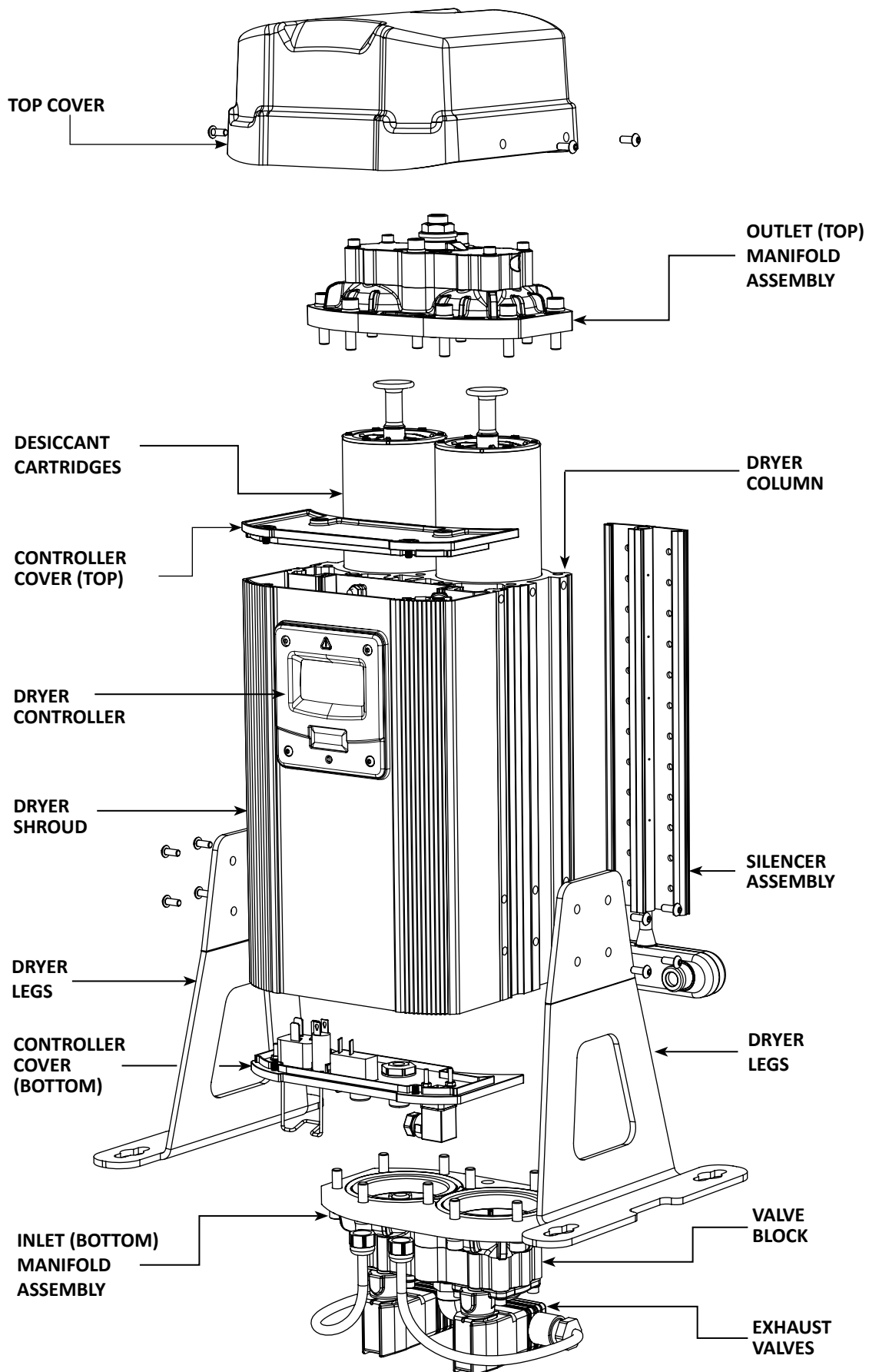
SERVICE TYPE	RECOMMENDED SERVICE INTERVALS					
	2 Years (12000 Hrs)	4 Years (24000 Hrs)	6 Years (36000 Hrs)	8 Years (48000 Hrs)	10 Years (60000 Hrs)	12 Years (72000 Hrs)
A	✓	✓	✓	✓	✓	✓
B		✓		✓		✓

SERVICE TYPE	ADDITIONAL FOR ES MODELS ONLY					
	ANNUALLY					
C	✓					

DRYER MODEL	REQUIRED SERVICE KITS		
	Service A	Service B	Service C
NDL-010	NDK-010	NDK-010 & NVK-050	
NDL-020	NDK-020	NDK-020 & NVK-050	
NDL-030	NDK-030	NDK-030 & NVK-050	
NDL-040	NDK-040	NDK-040 & NVK-050	
NDL-050	NDK-050	NDK-050 & NVK-050	
ALL ES			NSK-130

3. PRODUCT ASSEMBLY

MODELS: NDL-010, 020, 030, 040, 050



2. 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 depressurised. Also ensure the product is switched off and isolated from the mains power.

PROCEDURES

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

- o Close the inlet and outlet valves (refer to Page 19. System layout)
 - 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.

6. 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.

7. SERVICE 'A' INSTRUCTIONS

MODELS: NDL-010, 020, 030, 040, 050

NDK-010, 020, 030, 040, 050

(Every 12,000 hrs or 24 months)

OUTLET MANIFOLD SERVICE

(refer to figure.1)

1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work. (See page 7-8)
2. Remove the 4x M5 dome head screws to release the top cover and lift from assembly.
3. Remove the 2x M6 long cap head screws and washers as shown from the outlet (top) manifold assembly.
4. Remove the 4x M4 cap head screws and washers from the purge block and remove it from the outlet (top) manifold assembly.
5. Remove and discard the 3x O rings sat on the underside of the purge block. (refer to figure 4. page 11.)
6. Insert the new O rings from the service kit provided and replace into the grooves on the underside of the purge block. (refer to figure 4. page 11.)
7. Remove the 8x M6 short cap head screws to remove the outlet (top) manifold from the dryer column.
8. Remove the gasket seal from the underside of the outlet (top) manifold.

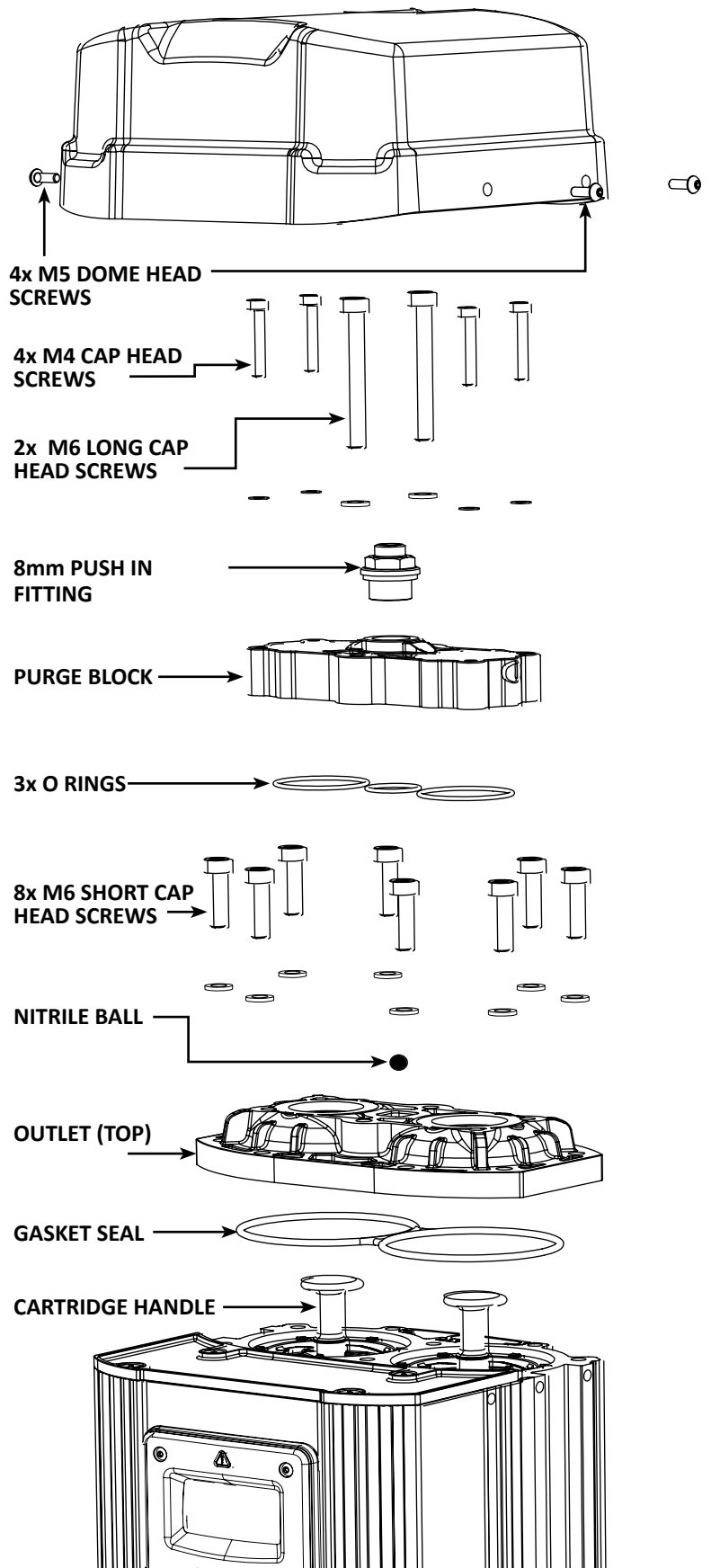


Figure 1.

7. SERVICE 'A' INSTRUCTIONS

MODELS: NDL-010, 020, 030, 040, 050

DESICCANT CARTRIDGE REPLACEMENT AND INLET MANIFOLD SERVICE

- 9. Remove the 2x cartridges using the handle to withdraw them from the column.
- 10. Check and clean the outlet (top) manifold and dryer column as required paying particular attention to the gasket sealing areas.

On the underside of the dryer

(refer to figure 2.)

- 11. Unclip the solenoid plug from the valve stem. (See figure 2 & 3 on page 13)
- 12. Remove the 4x M4 long cap head screws and washers from the valve block only, to retain the exhaust valves in position.
- 13. Remove the 2x M6 long cap head screws to release the valve block from the inlet manifold.
- 14. Remove and discard the 3x O rings on the underside of the valve block.
- 15. Insert the new O rings from the service kit and replace into the grooves on the underside of the valve block. (refer to figure 5 on page 12)
- 16. Remove the 8x M6 cap head screws from the inlet manifold to release it from the dryer.
- 17. Remove and discard the nitrile ball from the inlet manifold.
- 18. Replace the nitrile ball from the service kit and replace into the 3 way valve orifice. (refer to figure 6 on page 12)
- 19. Remove and discard the gasket seal from the underside of the inlet manifold.
- 20. Insert the new gasket seal from the service kit into the gasket seal grooves on the underside of the inlet manifold.

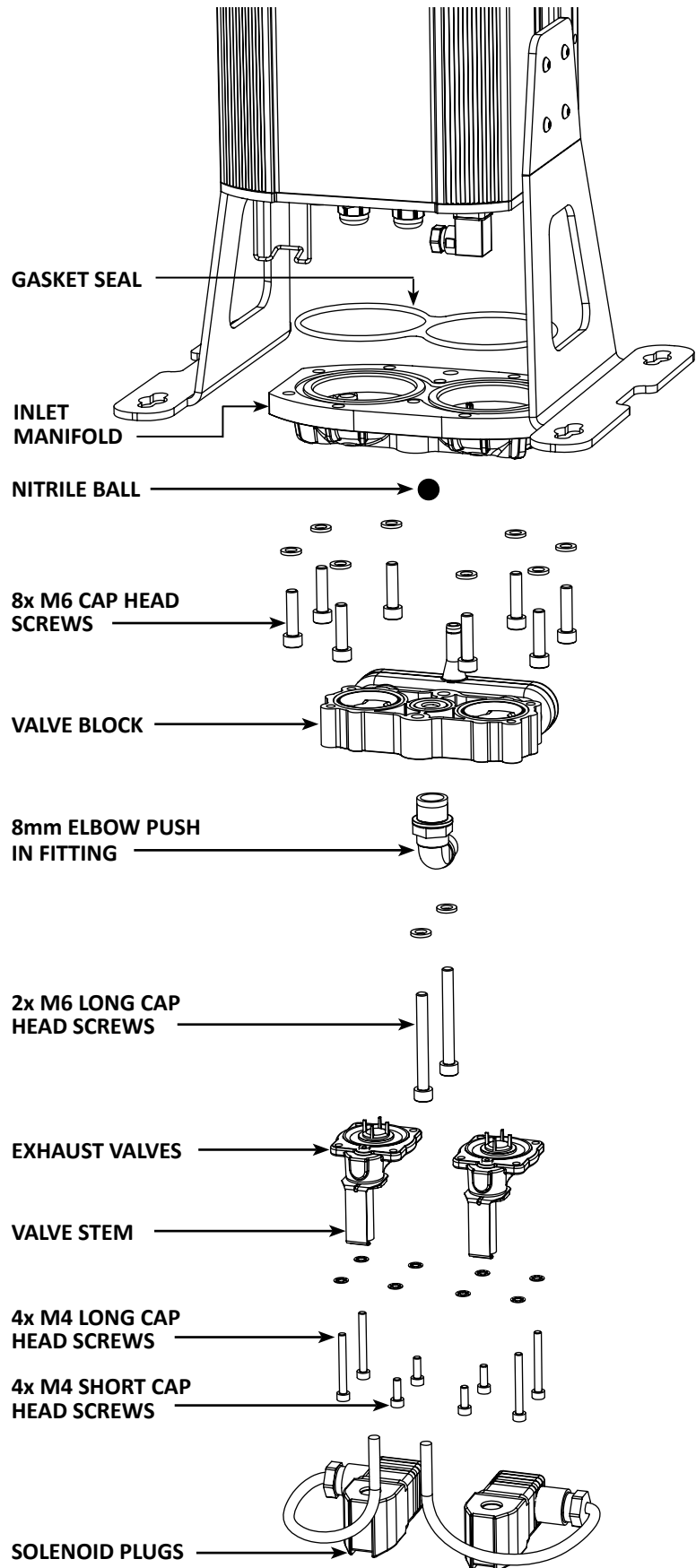


Figure 2.

7. SERVICE 'A' INSTRUCTIONS

MODELS: NDL-010, 020, 030, 040, 050

(Refer to figure 4.)

21. To reassemble, place the valve block on top of the inlet manifold ensuring the profiles of the screw holes line up correctly. Ensure the nitrile ball does not fall out.

22. Insert 4x M4 long cap head screws through both exhaust valves and tighten at a torque setting of 3Nm. Refer to the page 18 and follow the correct tightening sequence.

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

24. Insert the 8x M6 cap head screws into the inlet manifold and tighten to a torque setting of 5Nm. Refer to the page 18 and follow the correct tightening sequence.

25. Stand dryer upright.

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

27. Remove the new cartridges from the service kit provided.

28. 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 (refer to figure 3).

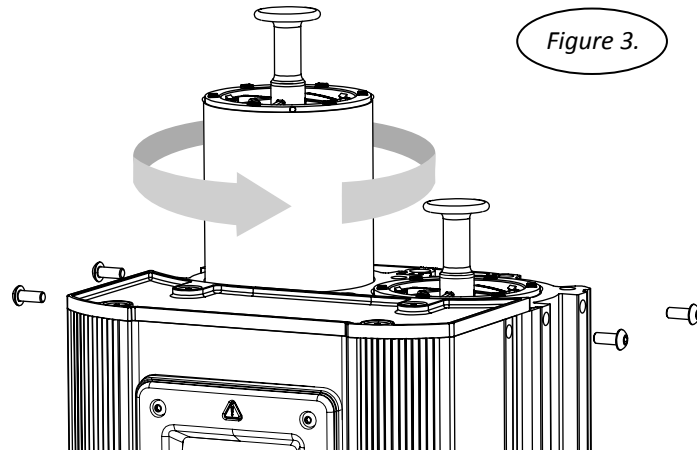


Figure 3.



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

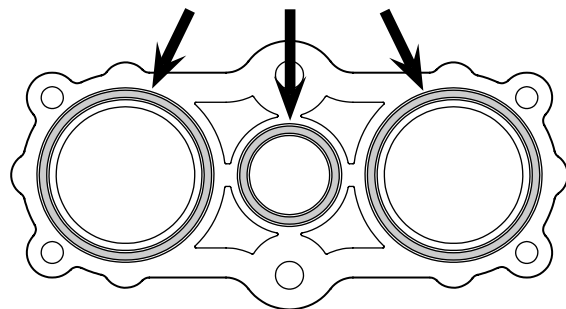


Figure 4.

7.SERVICE 'A' INSTRUCTIONS

MODELS: NDL-010, 020, 030, 040, 050

INLET MANIFOLD SERVICE

NDK-010, 020, 030, 040, 050

(Every 12,000 hrs or 24 months)

29. Insert the new gasket seal into the gasket groove on the underside of the outlet (top) manifold ensuring it is fully retained.

30. Remove and discard the nitrile ball from the outlet manifold.

31. Replace the nitrile ball from the service kit, into the 3 way valve orifice.

32. Sit the purge block back on top of the outlet manifold and replace the 4x M4 cap head screws at torque setting of 3Nm. Refer to page 18 for the correct tightening sequence.

33. Replace the outlet (top) manifold assembly back on top of the dryer column and secure with the 2x M6 long and 8x M6 short cap head screws tightening to a torque setting of 5Nm. Refer to the page 18 and follow the correct tightening sequence.

34. 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.

35. 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.

NOTE: Ensure you refer to the page 18 and follow the correct tightening sequences.

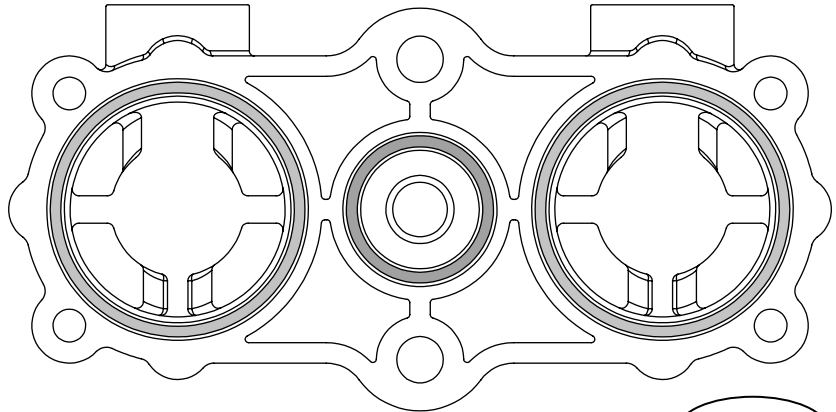


Figure 5.

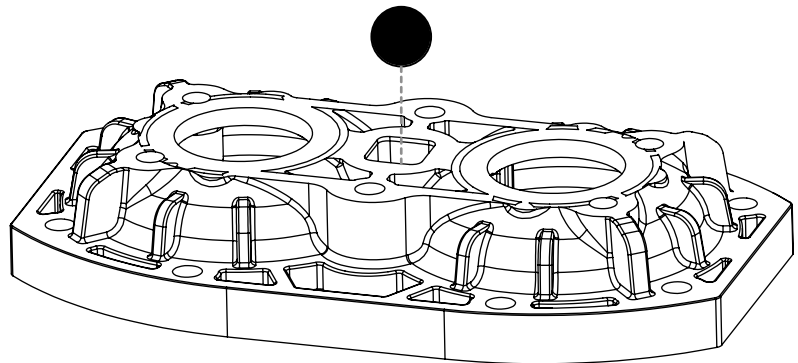


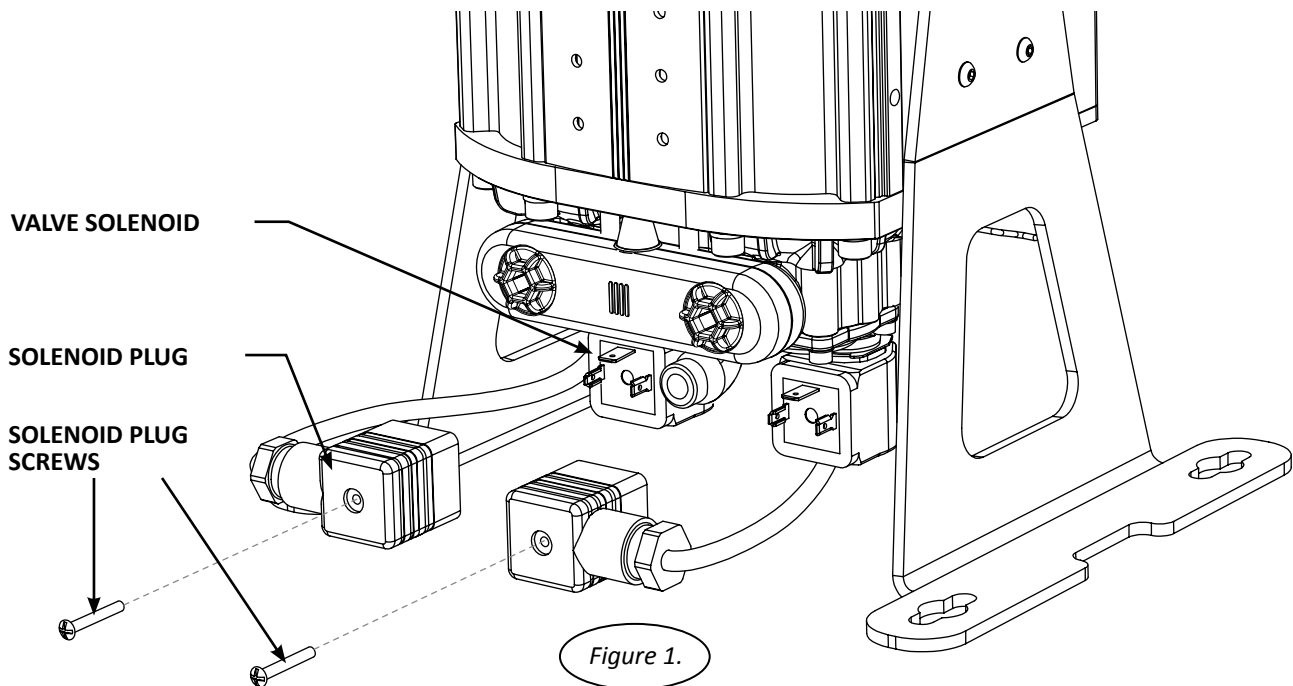
Figure 6.

EXHAUST VALVE REPLACEMENT

(Every 24,000 hrs or 4 Years)

8. SERVICE 'B' INSTRUCTIONS MODELS: NDL-010, 020, 030, 040, 050

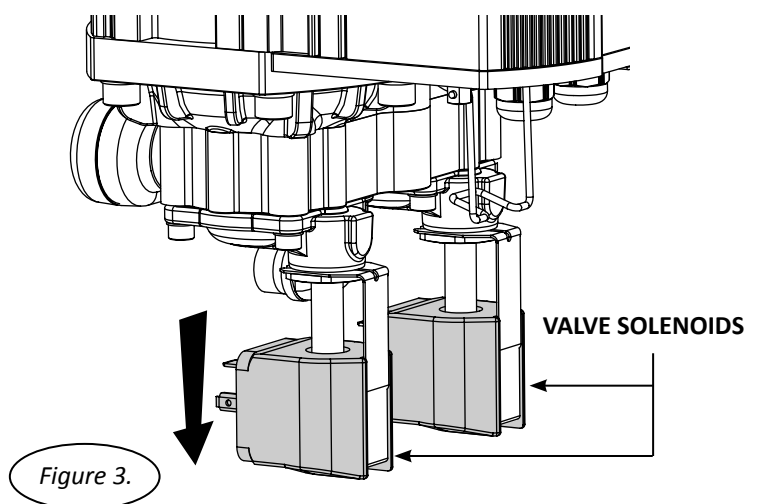
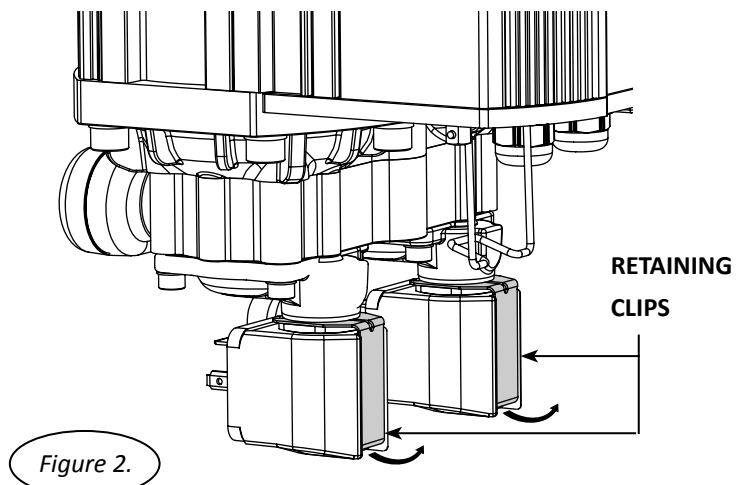
NDK-010~050 & NVK-050



1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work. (See page 7-8)

2. Remove the solenoid plugs by removing the plug screws and pulling the plug free from the valve 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)



8. SERVICE 'B' INSTRUCTIONS MODELS: NDL-010, 020, 030, 040, 050

EXHAUST VALVE REPLACEMENT

NDK-010~050 & NVK-050

(Every 24,000 hrs or 4 Years)

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

(See figures 4 & 5)

M4 SPRING WASHERS

M4 LONG SOCKET HEAD SCREWS

M4 SHORT SOCKET HEAD SCREWS

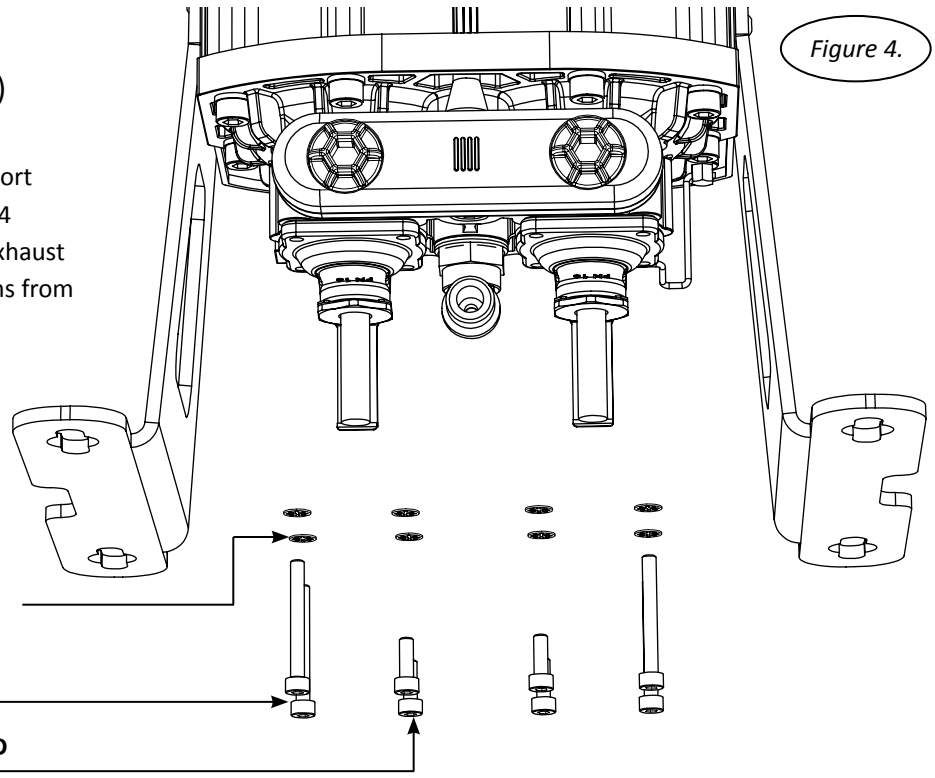


Figure 4.

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 18 and follow the correct tightening sequence.

When service B is complete reset the dryer, refer to page 17.

EXHAUST VALVE BODY

VALVE DIAPHRAGM

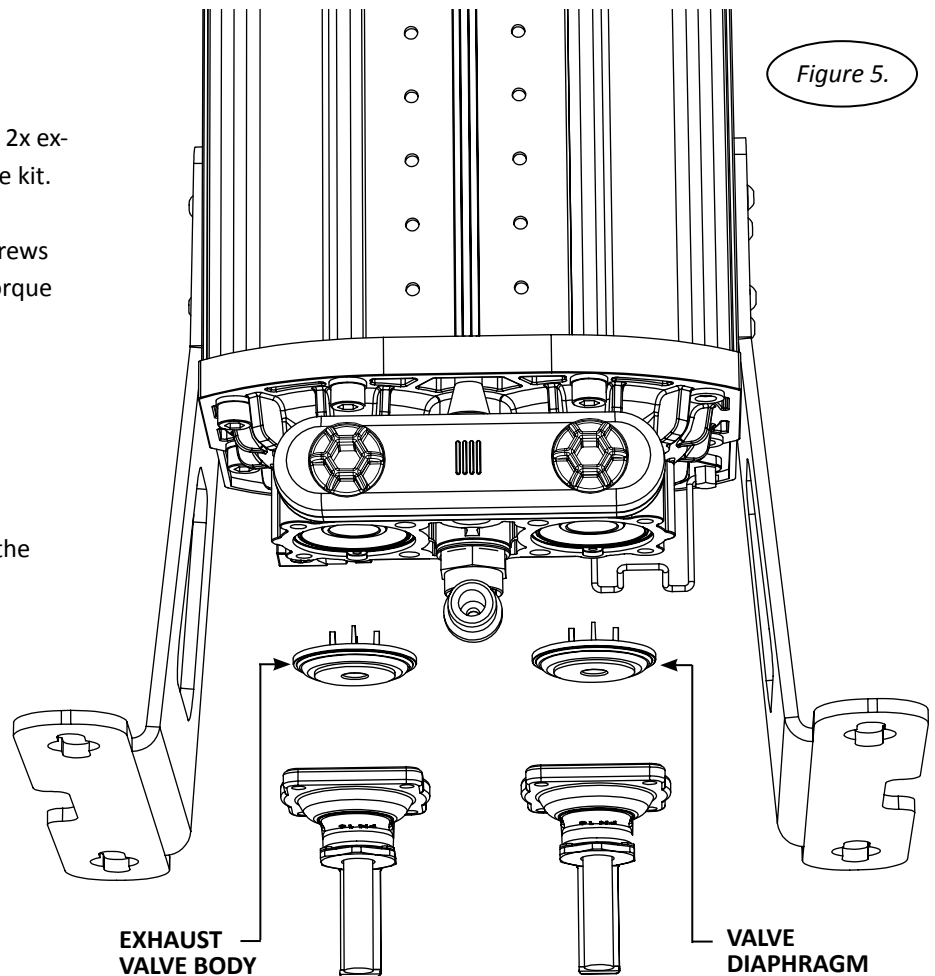


Figure 5.

9. SERVICE 'C' INSTRUCTIONS MODELS: ES MODELS ONLY

DEWPOINT SENSOR REPLACEMENT

NSK-130

(Every 6,000 hrs or 12 months)

1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work. (See page 7-8)

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

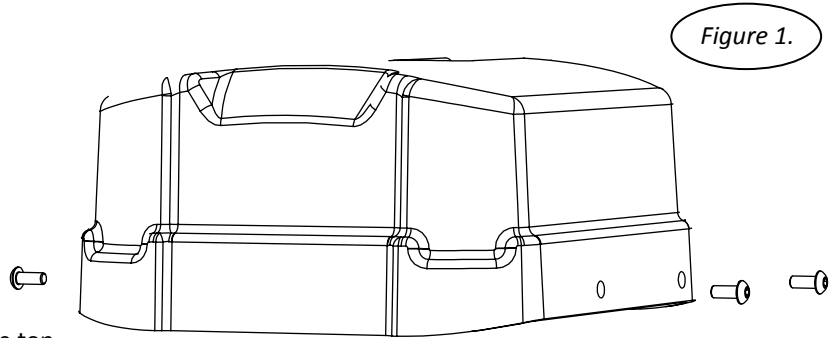
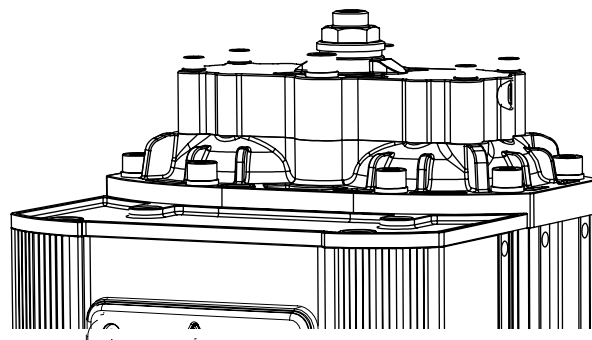


Figure 1.

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 figures 3 & 4)

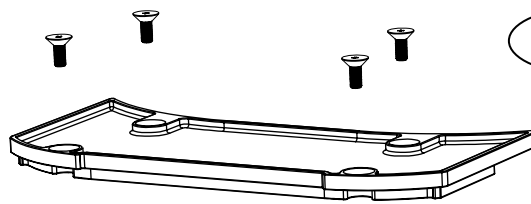


Figure 2.

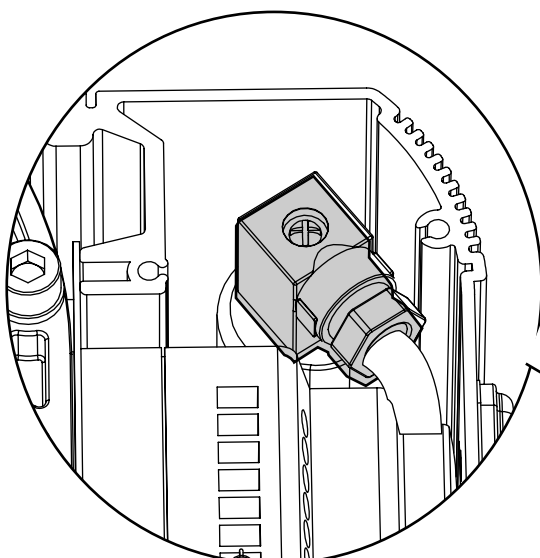


Figure 3.

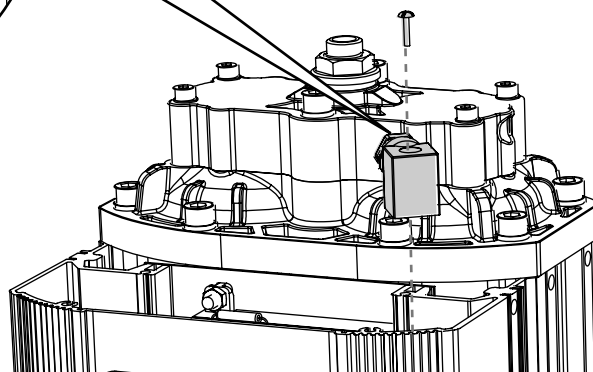
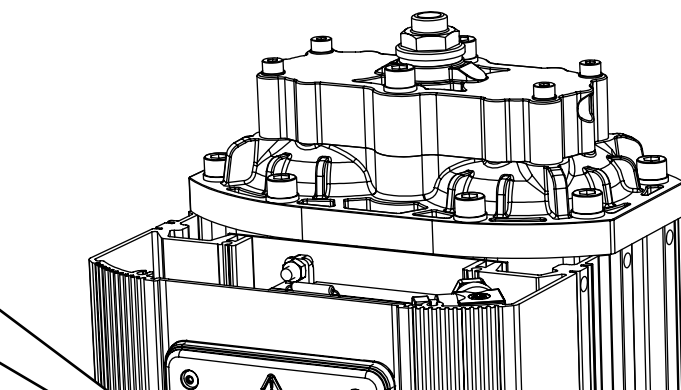


Figure 4.

9. SERVICE 'C' INSTRUCTIONS

MODELS: ES MODELS ONLY

DEWPOINT SENSOR REPLACEMENT

NSK-130

5. 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 5 & 6)

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

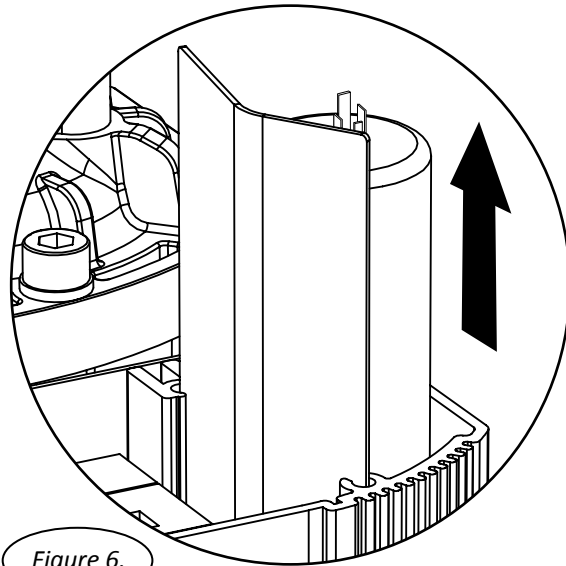


Figure 6.

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

8. 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.

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

10. Replace the controller cover.

11. Replace the dryer top cover.

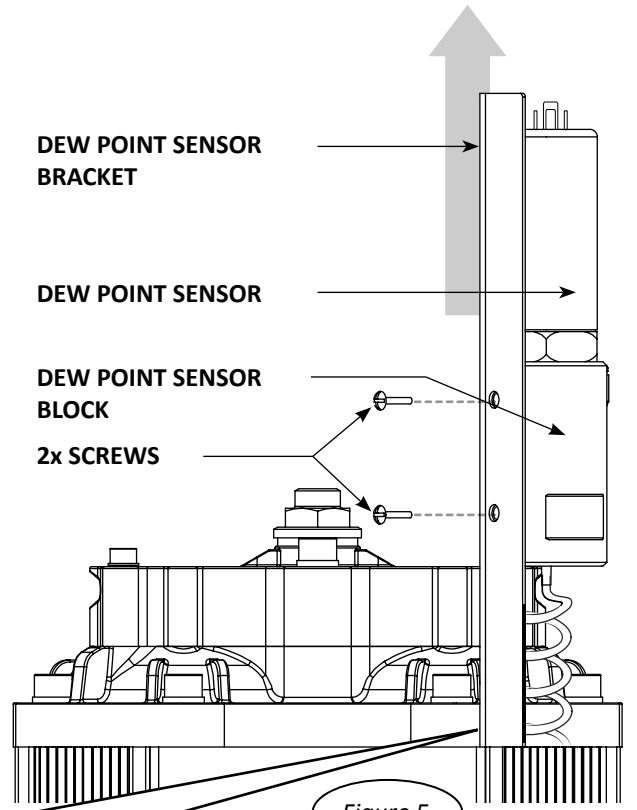


Figure 5.

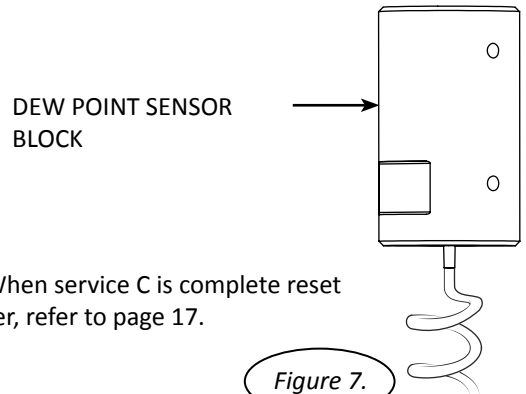
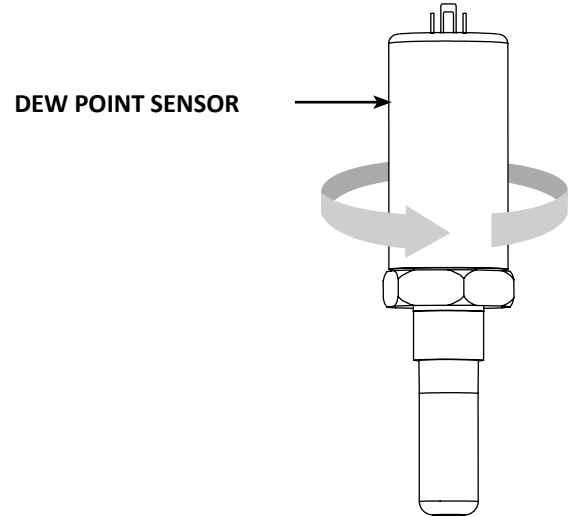
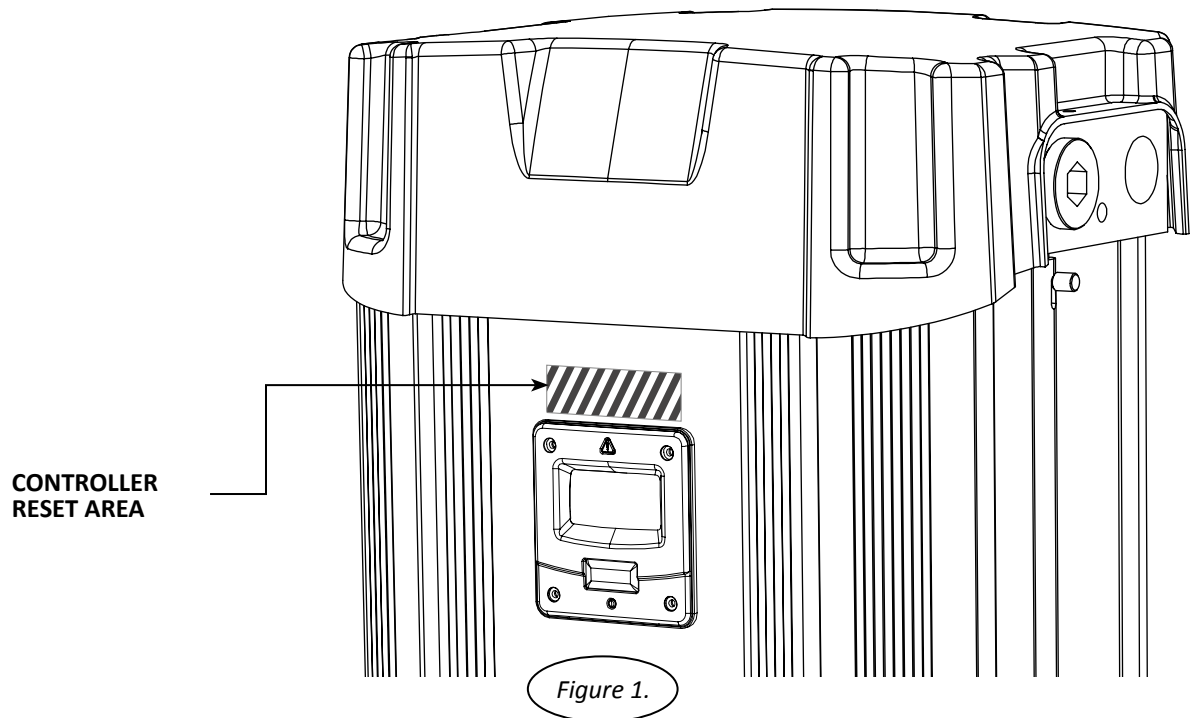


Figure 7.

Note: When service C is complete reset the dryer, refer to page 17.

10. RESETTING DRYER CONTROLLER

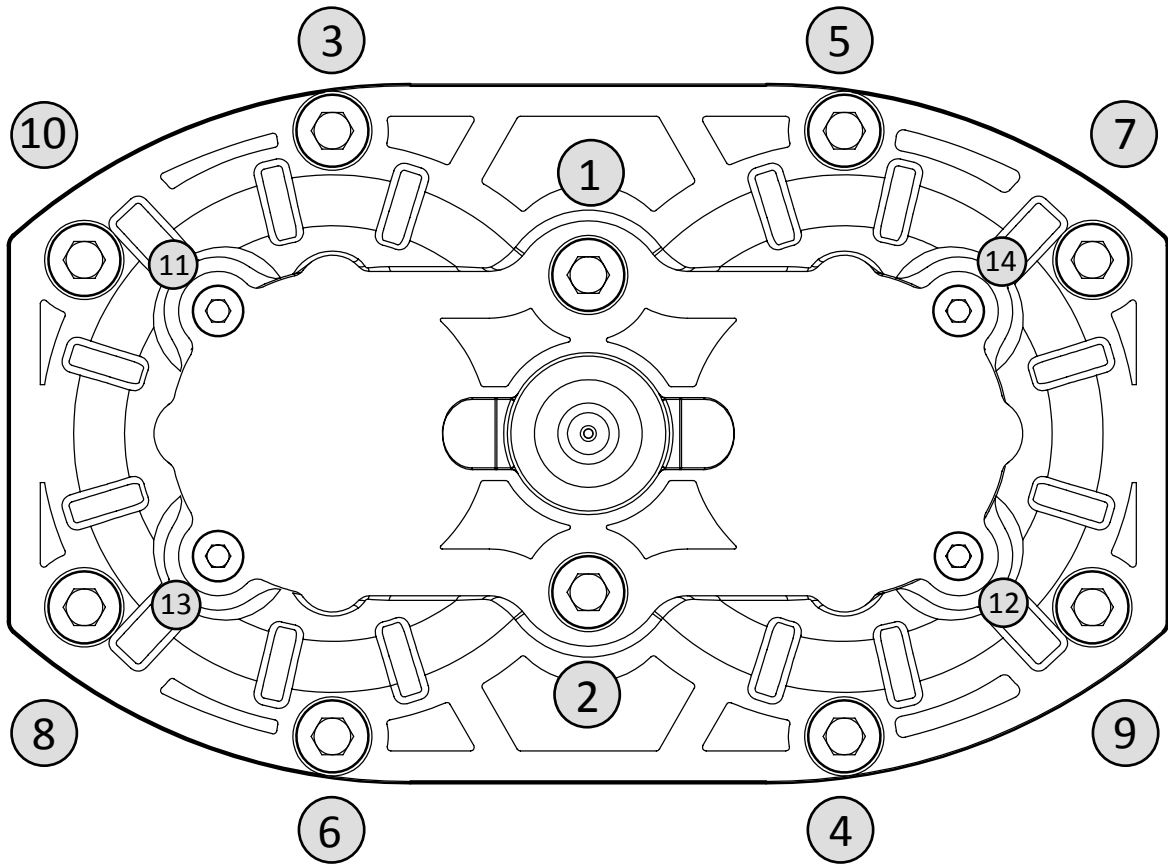


1. Ensure the dryer is on and running, see dryer start up procedure on page 19.
2. Place a magnet over the controller reset area shown in Figure 1 for 8-10 seconds until the dryer re-sets. (See Figure 1)
3. Once re-set the hours run counter will show '00000'.

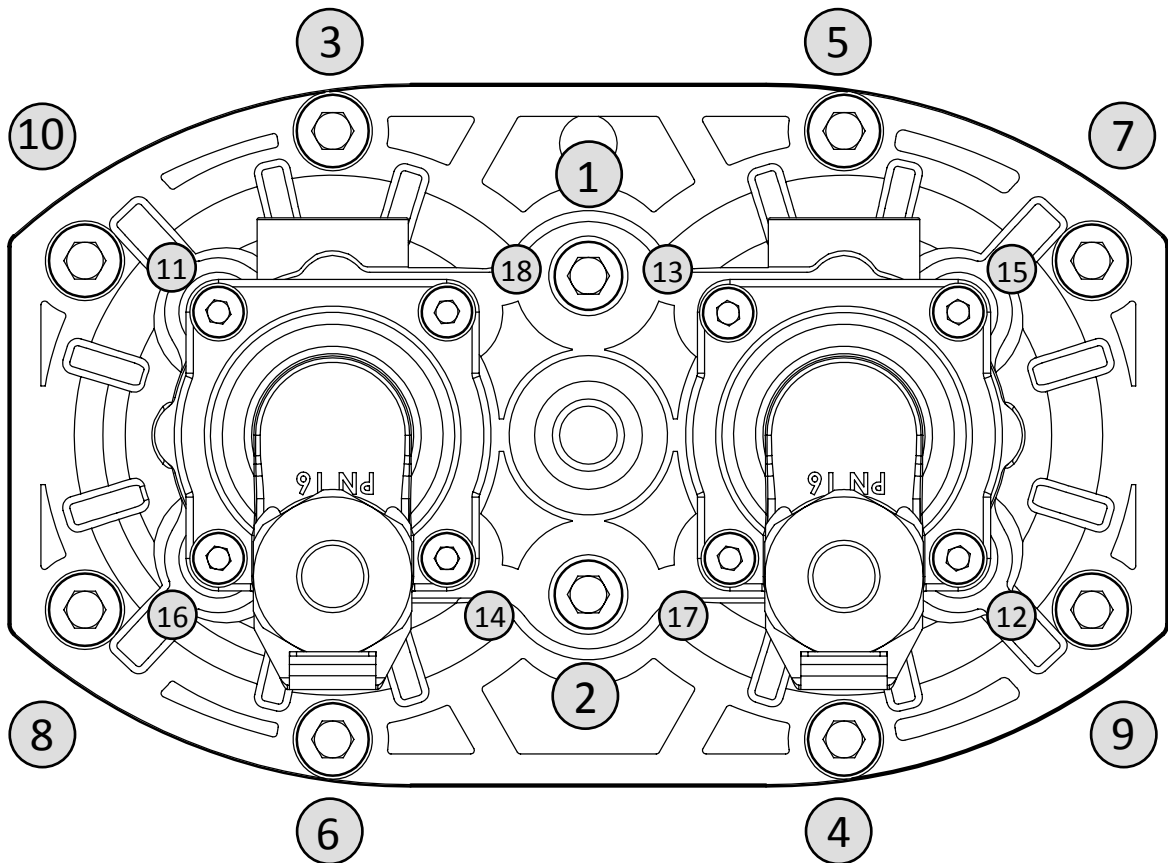


NOTE: Magnet not included in the service kit.
(magnet used: Eclipse part no. E846)

11. MANIFOLD TIGHTENING SEQUENCE



Outlet (top) manifold



Inlet (bottom) manifold

12. DRYER START-UP PROCEDURE

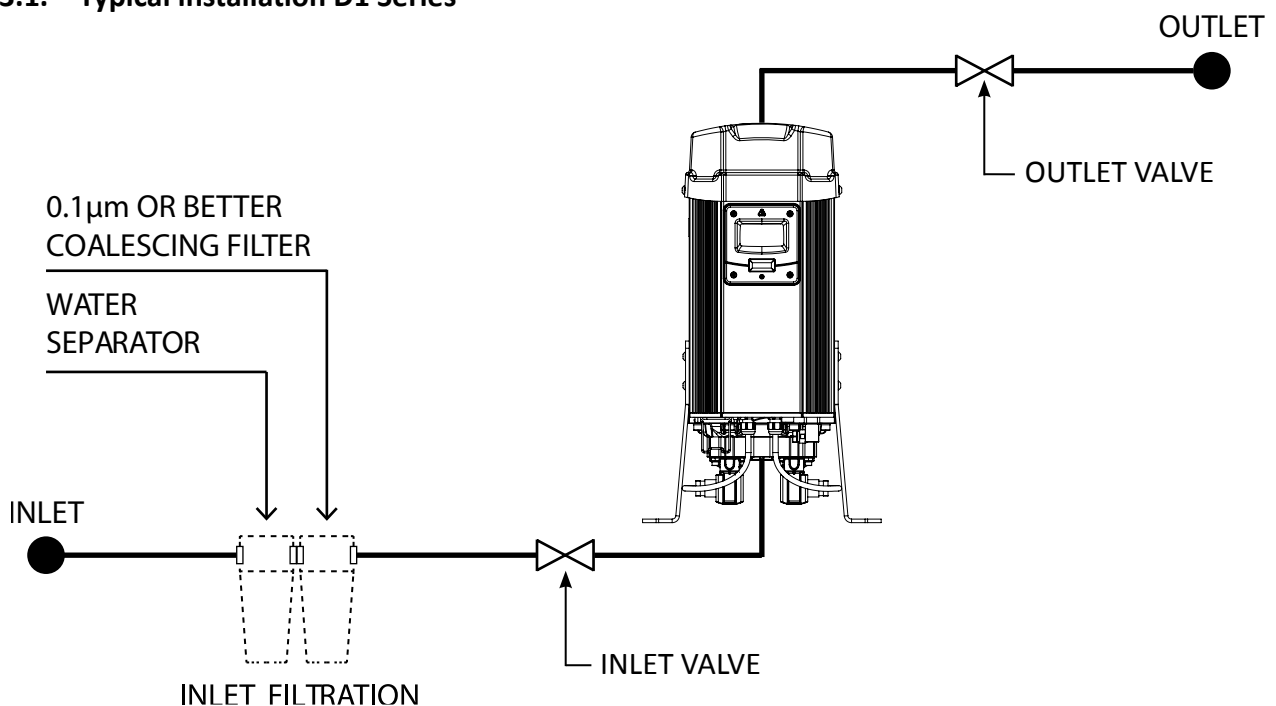


Do not allow the dryer to flow air unless powered up, switched on and cycling.
Resulting effect could be cartridge contamination; requiring replacement cartridges.

- Connect to mains power.
- Connect all pipe work, ensure inlet & outlet valves closed.
- Ensure the inlet operating pressure parameters are between 6-16 barg (58 - 232 psig).
- Ensure the inlet air temperature is between 1.5°C - 50°C (35°F - 122°F).
- Slowly open the inlet valve.
- Turn on the electrical power to the dryer.
- Slowly open the outlet valve.
- The dryer will display its status and commence normal operation.
- Software version number will be displayed on the screen for the first 5 seconds

13. SYSTEM LAYOUT

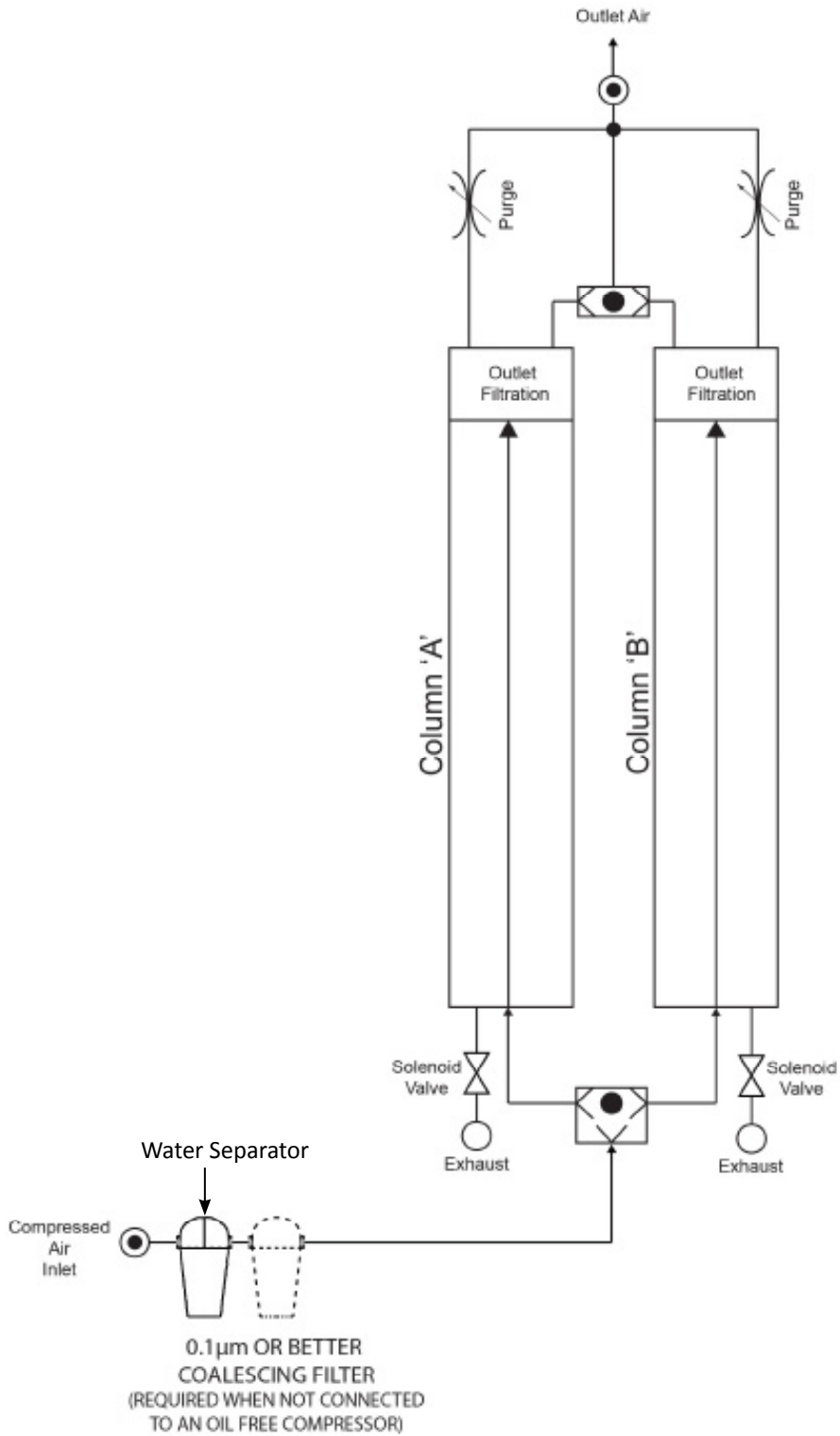
13.1. Typical installation D1 Series



IMPORTANT: It is essential that the system into which the dryer 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 16 barg (232 psig) from being exceeded.

14. PROCESS & INSTRUMENTATION DIAGRAM

14.1. NDL-010 ~ 050



15. 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 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.
- Ensure all loose parts are removed or secured to the dryer before operation.

16. 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-pressurise 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 energises.
	12. Outlet flow stops	12. Check inlet air supply.
Constant depressurisation	13. Failure to initialise dryer	13. Switch off and restart dryer. Ensure dryer is pressurised before powering dryer to allow dryer to initialise 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 / 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.

17. 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



nano-purification solutions limited

Dukesway, Team Valley Trading Estate,
Gateshead, Tyne and Wear,
United Kingdom, NE11 0PZ

Telephone: +44 (0) 191 497 7700

Internet: www.n-psi.co.uk

E-mail: sales@n-psi.co.uk