

# nano

## D2 SERIES

### HEATLESS COMPRESSED AIR DRYER

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## MAINTENANCE & SERVICE MANUAL

[www.imi-precision.com](http://www.imi-precision.com)

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# 1. GENERAL INFORMATION

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**Product:** D2 Series - Heatless Compressed Air Dryer  
**Models:** NDL-060, 070, 080, 090, 100, 110, 120, 130 (Including ES Model)  
**Doc no:** 17-100-0121  
**Issue:** 001

## 1.1 Document Introduction

This manual provides factory prescribed installation and maintenance procedures for a nano-porous solutions D2 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-porous 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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Team Valley Trading Estate,  
Gateshead NE11 0PZ.  
Tel: +44 (0) 1543 265 000  
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### 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 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-porous solutions.

### 1.4 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.

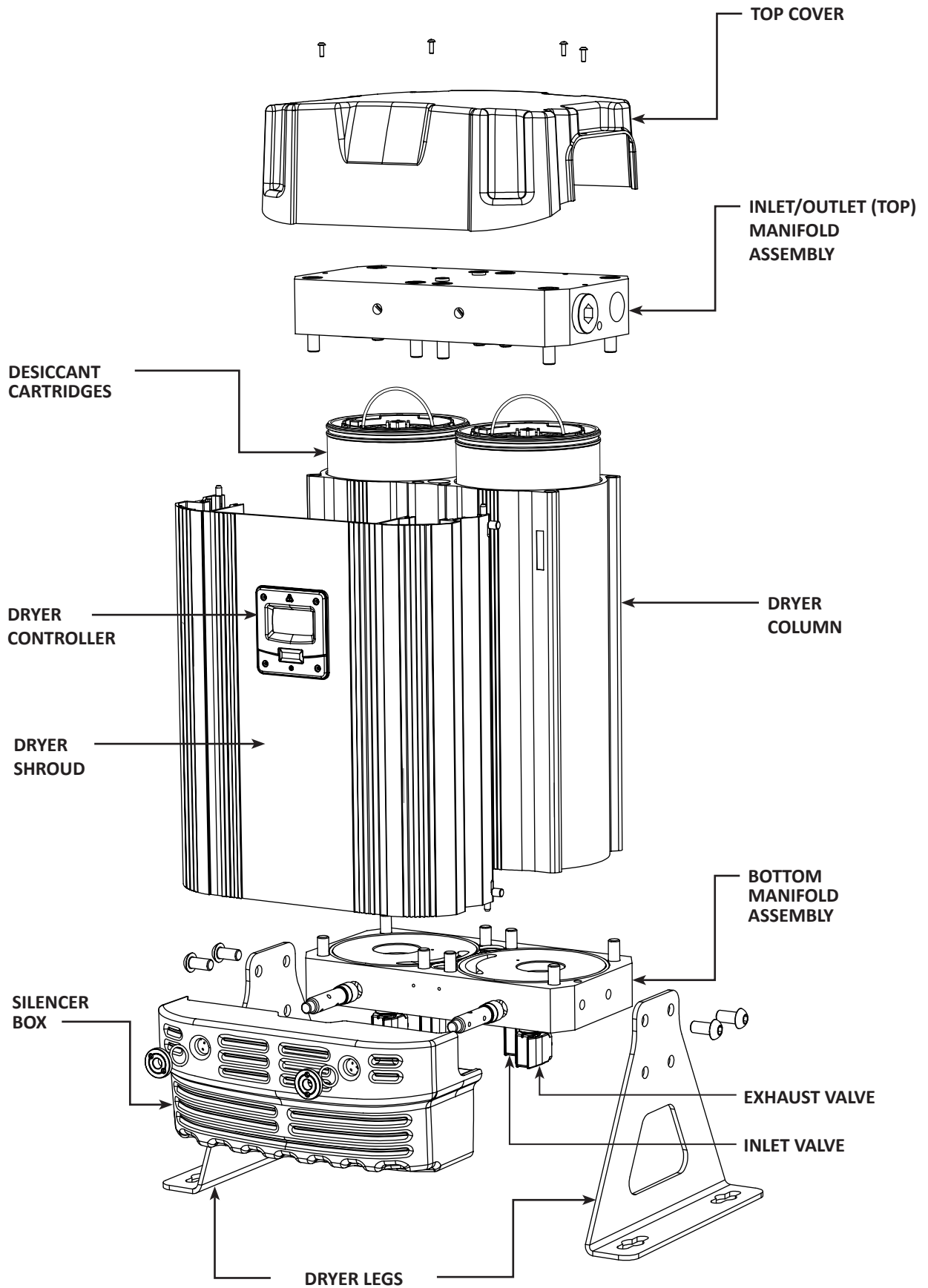
SERVICE TYPE	RECOMMENDED SERVICE INTERVALS					
	2 Years (12000 Hrs)	4 Years (24000 Hrs)	6 Years (36000 Hrs)	8 Years (48000 Hrs)	10 Years (60000 Hrs)	12 Years (72000 Hrs)
A	✓	✓	✓	✓	✓	✓
B		✓		✓		✓

SERVICE TYPE	ADDITIONAL FOR ES MODELS ONLY					
	ANNUALLY					
C	✓					

DRYER MODEL	REQUIRED SERVICE KITS		
	Service A	Service B	Service C
NDL-060	NDK-060	EVK-130 & CVK-130 & IVK-090	
NDL-070	NDK-070	EVK-130 & CVK-130 & IVK-090	
NDL-080	NDK-080	EVK-130 & CVK-130 & IVK-090	
NDL-090	NDK-090	EVK-130 & CVK-130 & IVK-090	
NDL-100	NDK-100 & IVK-130	EVK-130 & CVK-130 & PVK-131	
NDL-110	NDK-110 & IVK-130	EVK-130 & CVK-130 & PVK-131	
NDL-120	NDK-120 & IVK-130	EVK-130 & CVK-130 & PVK-131	
NDL-130	NDK-130 & IVK-130	EVK-130 & CVK-130 & PVK-131	
ALL ES			WD3D-KITQS

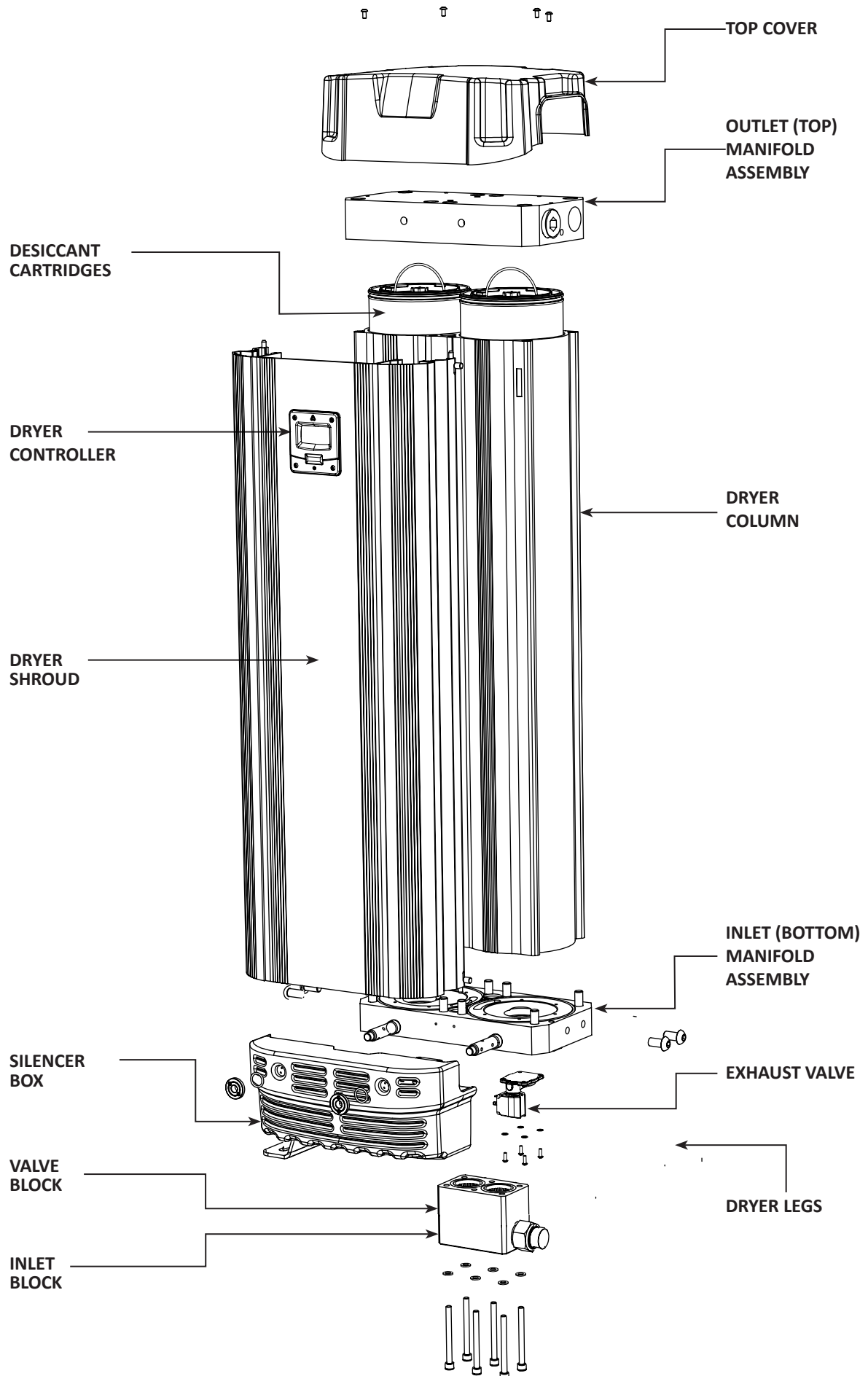
### 3. PRODUCT ASSEMBLY

MODELS: NDL-060, 070, 080, 090, 100, 110, 120, 130



### 3.1 PRODUCT ASSEMBLY

MODELS: NDL-100, 110, 120, 130





## 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 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
  - 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-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: NDL-050, 060, 070, 080, 090  
NDL-100, 110, 120

### DESICCANT CARTRIDGE REPLACEMENT

NDK-060, 070, 080, 090

NDK-100, 110, 120

(Every 12,000 hrs or 24 months)

1. Ensure the dryer is shutdown and fully depressurised before attempting any maintenance work. (See page 8-9)
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.

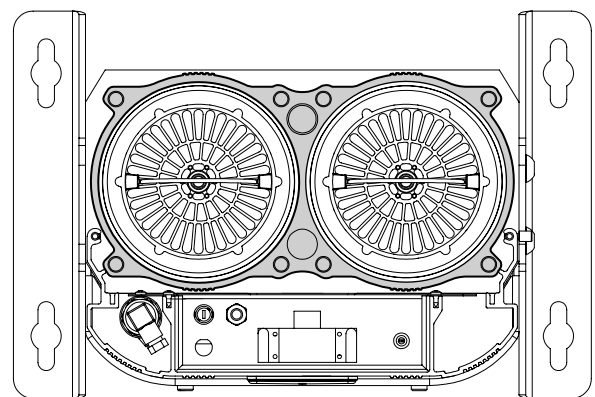
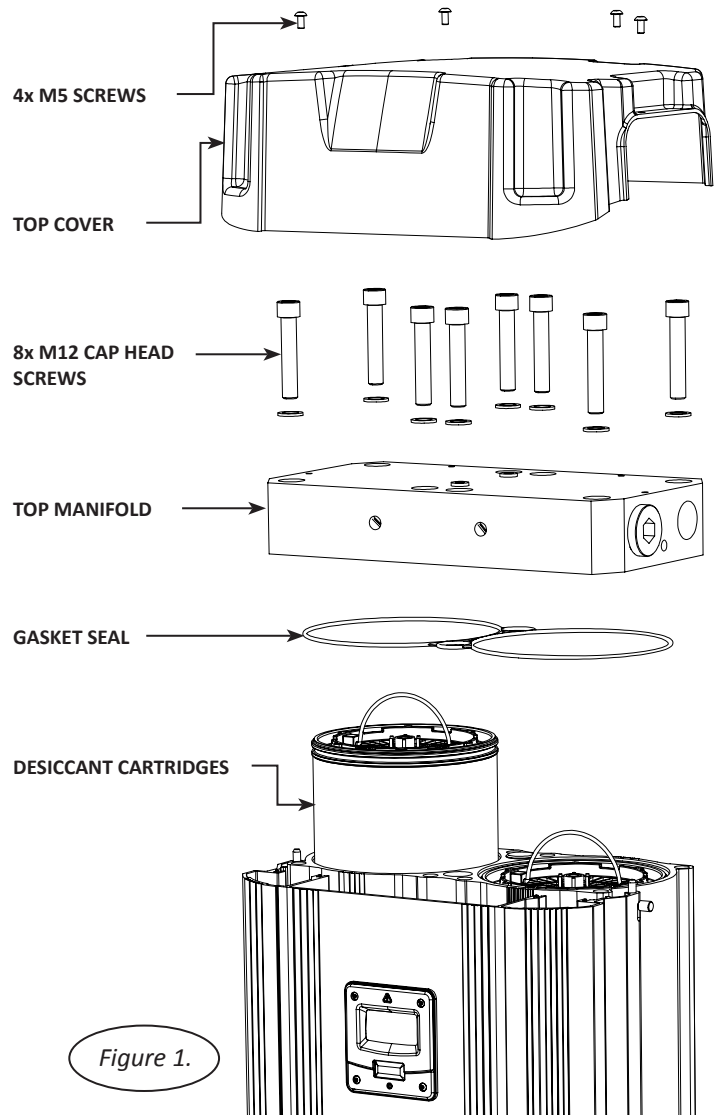


**NOTE:** Refer to the page 24 and follow the correct tightening sequence.

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 page 23.



**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)

## 7.1 SERVICE 'A' INSTRUCTIONS

MODELS: NDL-130

### DESICCANT CARTRIDGE REPLACEMENT

NDK-130

(Every 12,000 hrs or 24 months)

Please refer to Service 'A' instructions on page 10 of this service guide.

**NOTE:** NDL-130 dryer has 2x cartridges per side.

(See figure 2)

#### REPLACING DESICCANT CARTRIDGES

1. Lift wire handle and withdraw cartridge, resistance will be felt until the cartridge disengages from the joining rings.  
Discard cartridges on removal.
2. Remove the lower cartridges from the dryer and discard.
3. Remove and discard the 'O' ring seals from each of the cartridge joining rings and replace them from the service kit.
3. Identify upper and lower cartridges from the service kit.
4. Insert joining ring into the head of the lower cartridge.
5. Slowly insert lower cartridges separately into dryer.
6. Slowly insert upper cartridges separately into dryer, ensure fully engaged into joining rings.
7. See page 10 for reassembling top manifold.

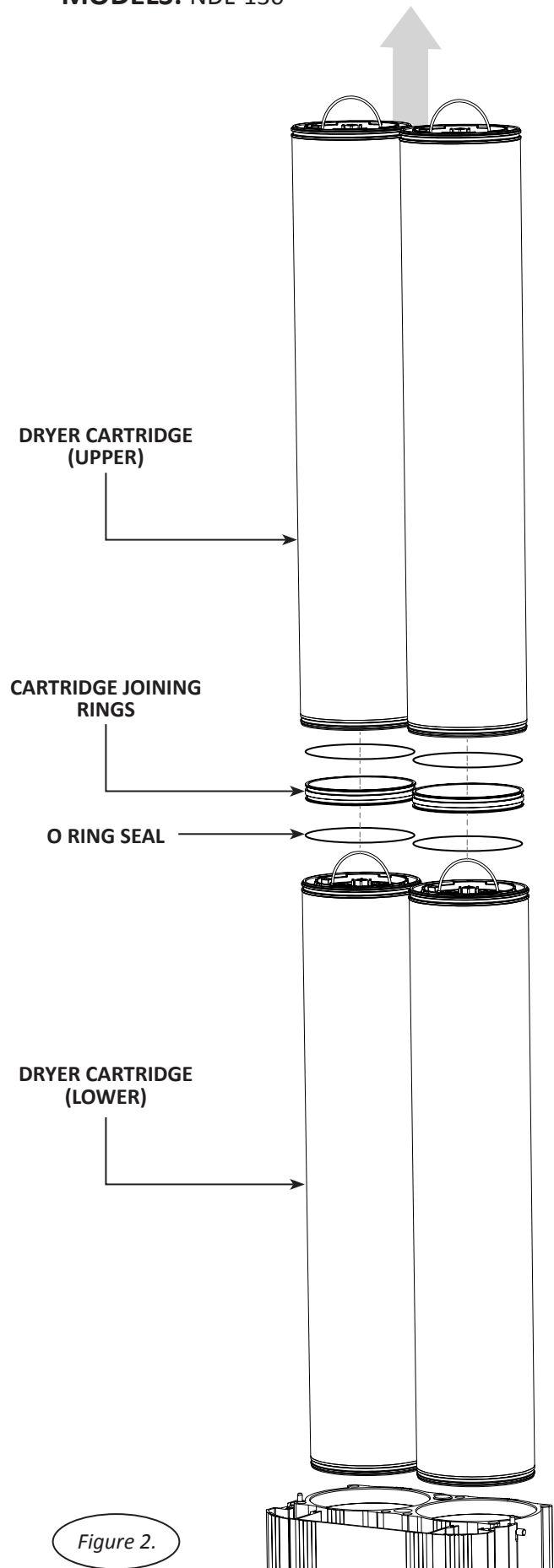


Figure 2.

## 8. SERVICE 'A' INSTRUCTIONS

MODELS: NDL-100, 110, 120, 130

### INLET VALVE REPLACEMENT

IVK-130

1. Ensure dryer is shut down and fully depressurised before attempting any maintenance work. (See page 8-9)

1.1 Remove silencer box (See page 18:2)

2. Detach inlet valve tubes 1,2,3 from block. (See figure 1)

**NOTE:** Label tubes when removing manifold.

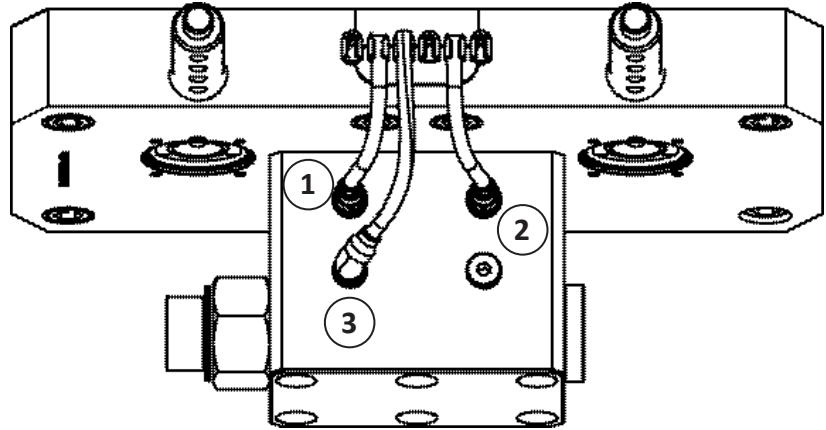
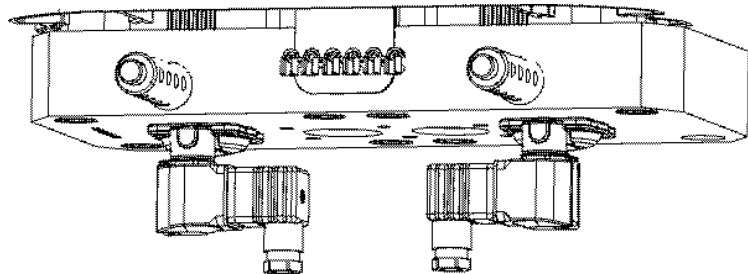


Figure 1.

3. Remove 6x M8 socket head cap screws and 6x washers from inlet block to release from dryer bottom manifold. (See figure 2)



INLET BLOCK

6x M8 HEAD CAP SCREWS

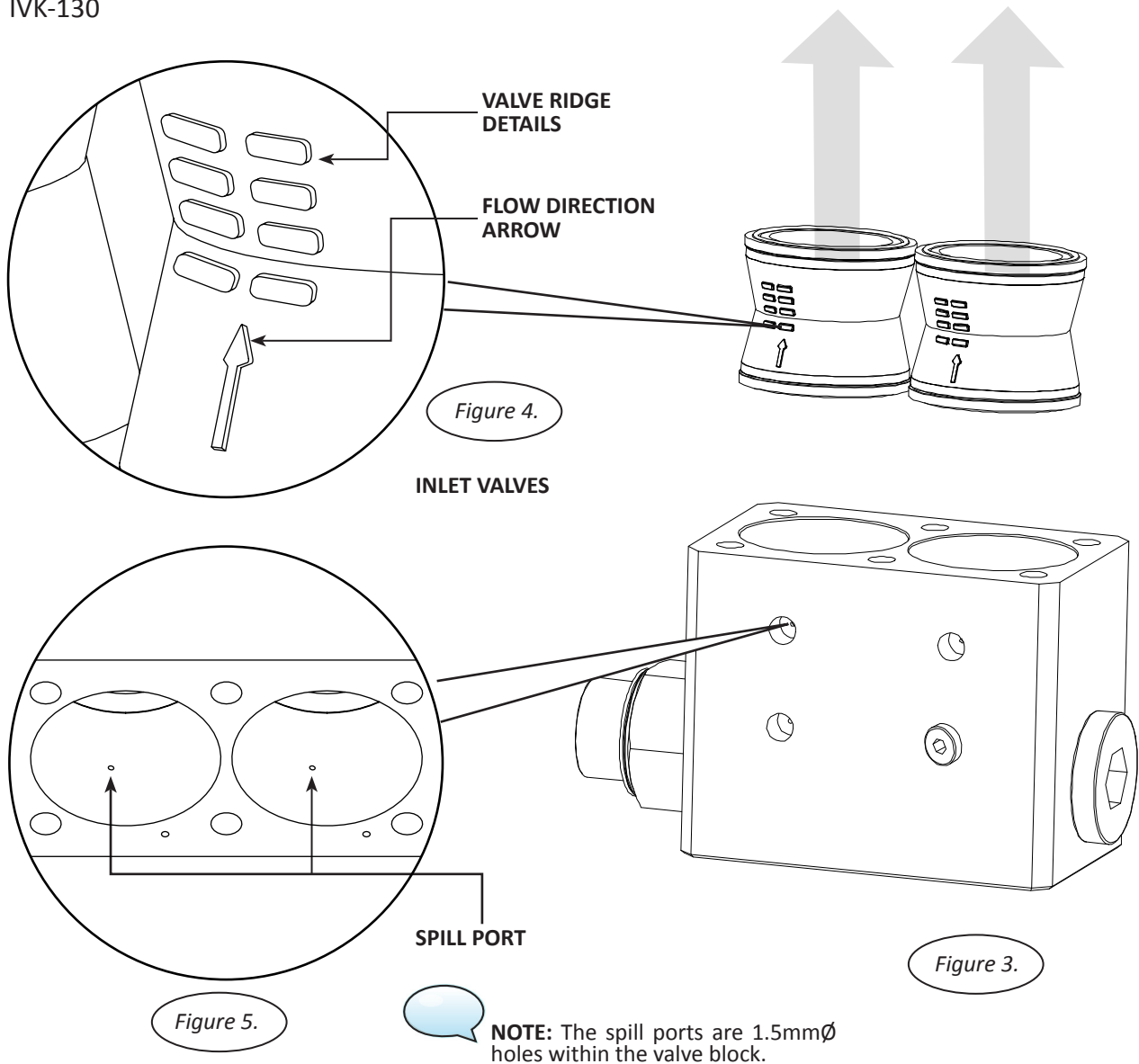
Figure 2.

## 8. SERVICE 'A' INSTRUCTIONS

MODELS: NDL-100, 110, 120, 130

### INLET VALVE REPLACEMENT

IVK-130



4. Remove inlet valves from valve block (push out). (See figure 3).

5. Discard old inlet valves.

6. Insert new inlet valves into valve block ensuring flow direction arrow is pointing as shown and the valve ridge details cover the spill port. (See figures 4 & 5)

7. Replace the 6x M8 socket head cap screws and 6x washers tighten at a torque setting of 20Nm. (See figure 2)

When service A is complete reset the dryer, refer to page 21.

# 9. SERVICE 'B' INSTRUCTIONS

MODELS: NDL-060, 070, 080, 090  
NDL-100, 110, 120, 130

## OUTLET VALVE REPLACEMENT

CVK-130

(Every 24,000 hrs or 4 Years)

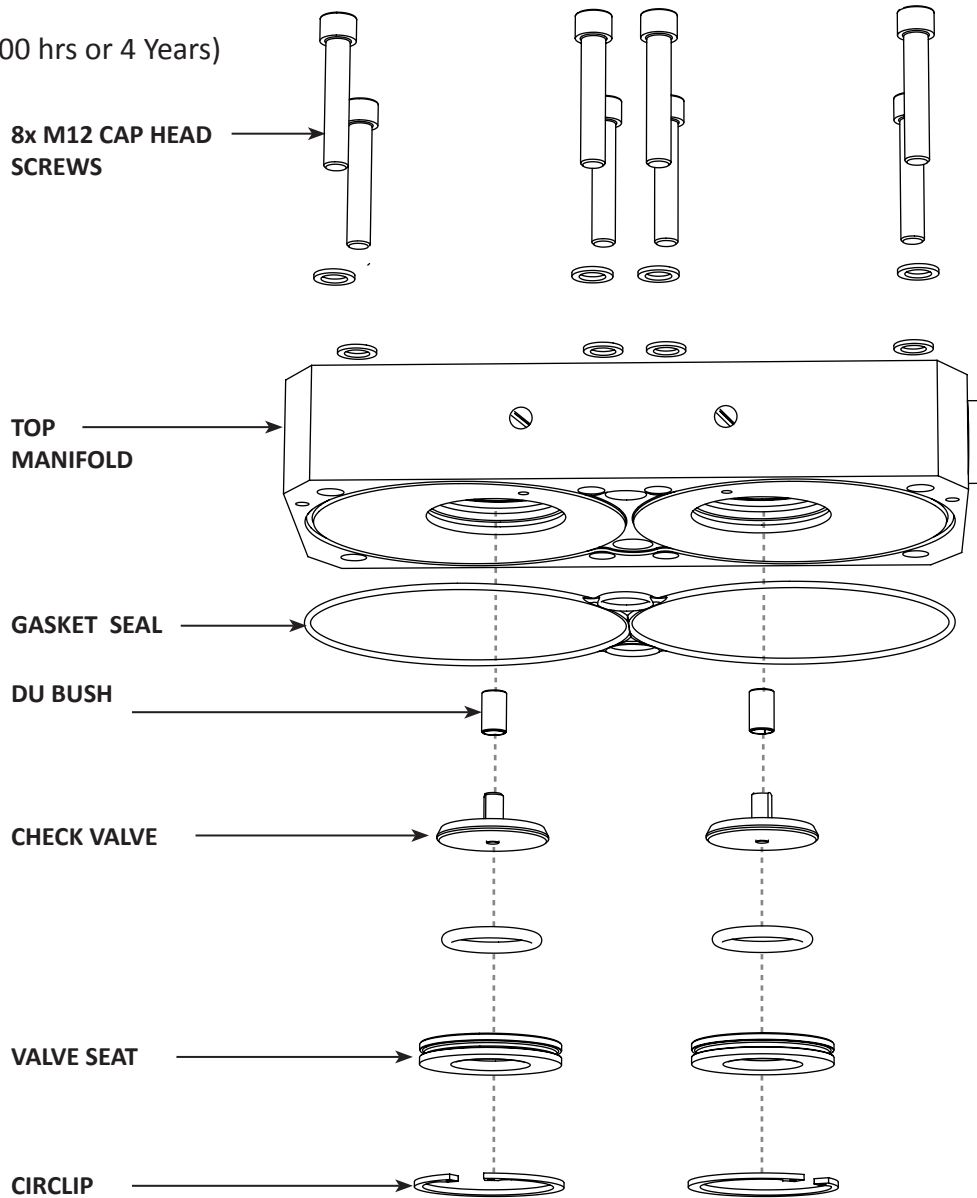


Figure 1.

Please refer to figure 1

1. Ensure the dryer is shutdown and fully depressurised before attempting any maintenance work. (See page 8-9)
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.

## 9. SERVICE 'B' INSTRUCTIONS

MODELS: NDL-060, 070, 080, 090  
NDL-100, 110, 120, 130

### OUTLET VALVE REPLACEMENT

CVK-130

(Every 24,000 hrs or 4 Years)

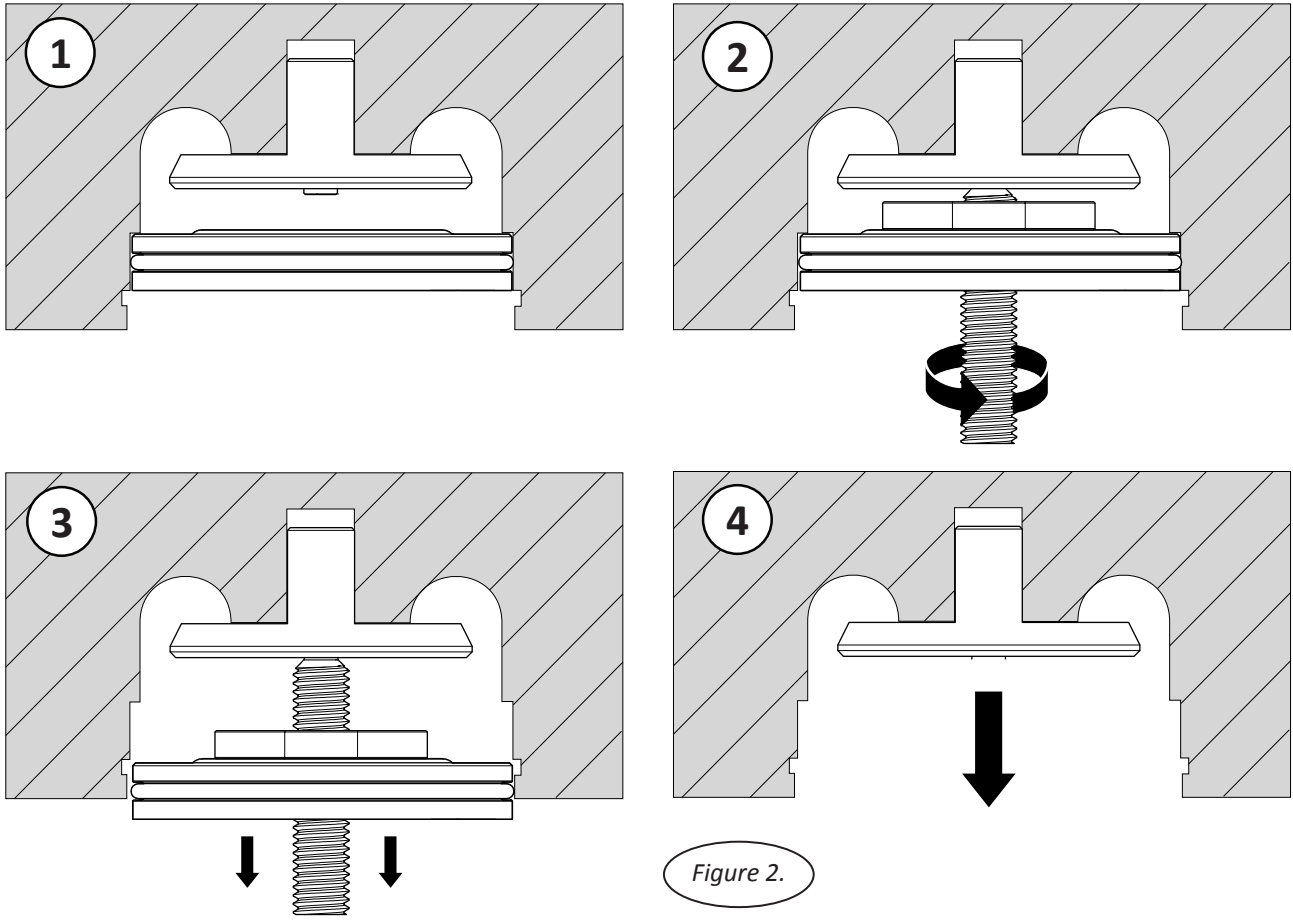


Figure 2.

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 the page 24 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 page 23.

# 10. SERVICE 'B' INSTRUCTIONS

MODELS: NDL-060, 070, 080, 090

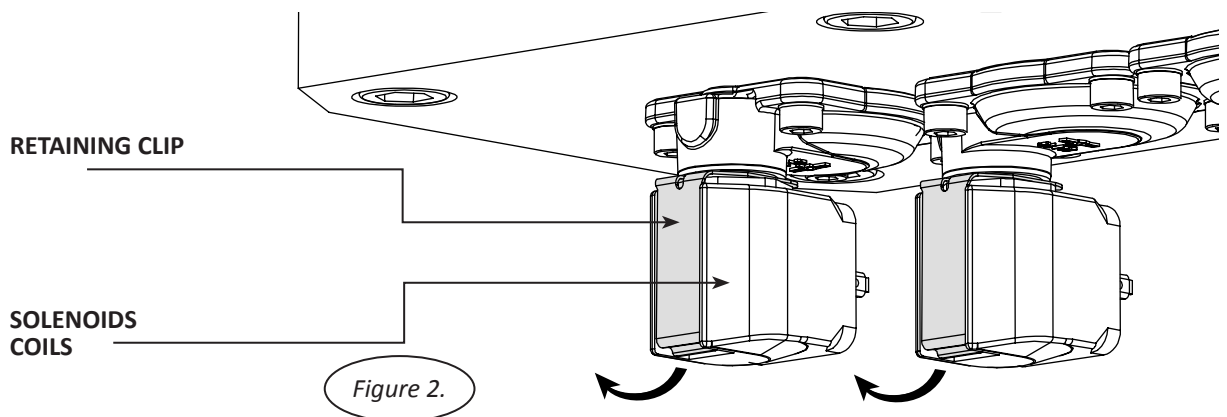
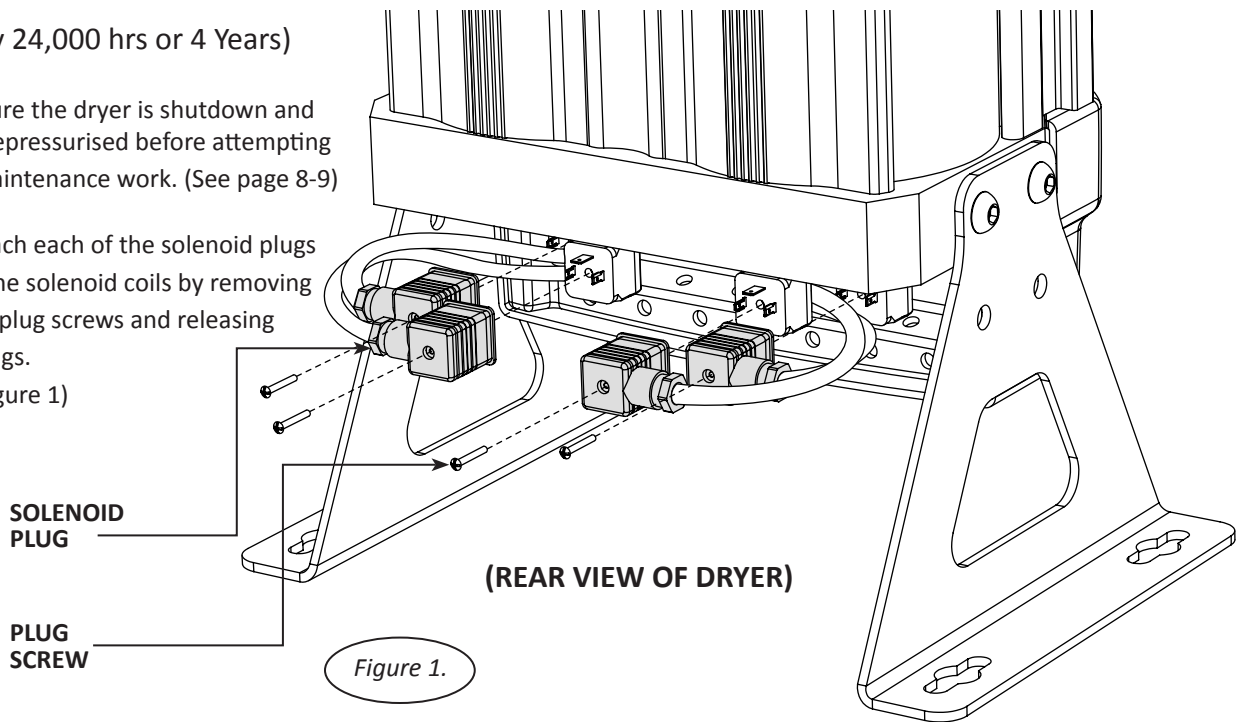
## INLET AND EXHAUST VALVE REPLACEMENT

IVK-090 & EVK-130 & CVK-130

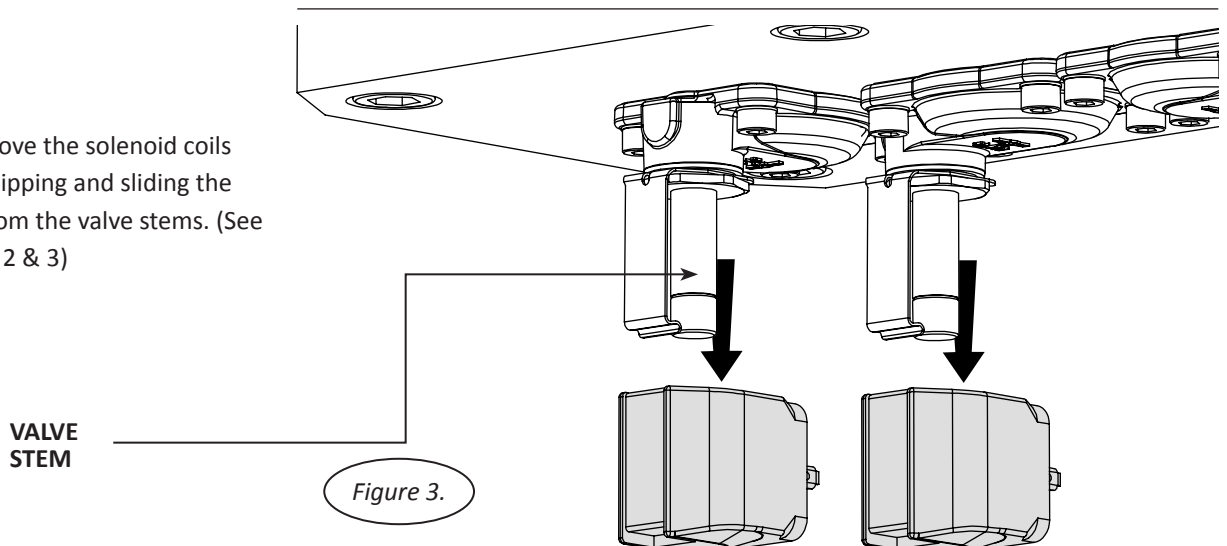
(Every 24,000 hrs or 4 Years)

1. Ensure the dryer is shutdown and fully depressurised before attempting any maintenance work. (See page 8-9)

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)





# 10. SERVICE 'B' INSTRUCTIONS

MODELS: NDL-060, 070, 080, 090

## INLET AND EXHAUST VALVE REPLACEMENT

IVK-090 & EVK-130 & CVK-130

(Every 24,000 hrs or 4 Years)

BOTTOM MAN-IFOLD

VALVE DIAPHRAGM

EXHAUST VALVE BODIES

M5 SOCKET HEAD SCREWS

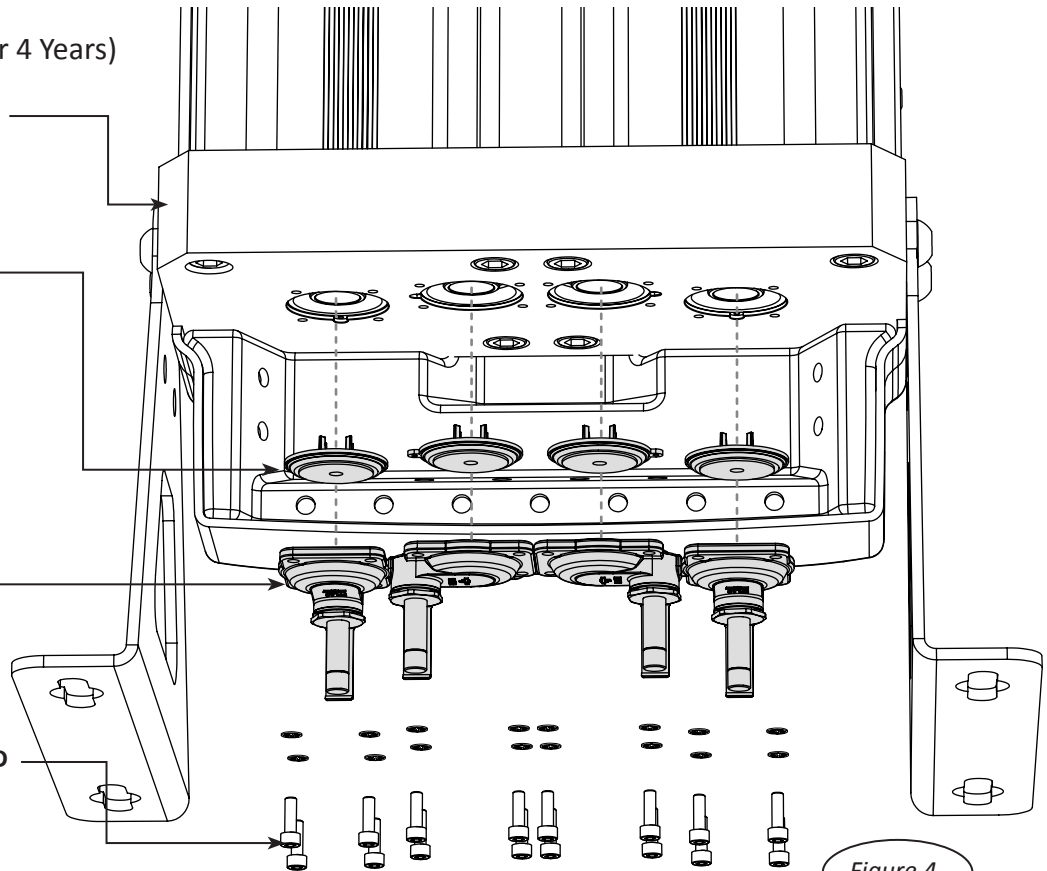
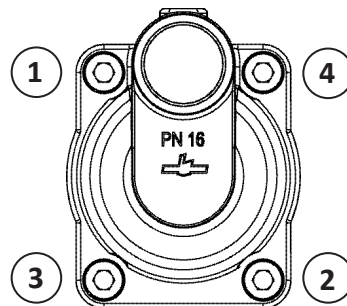


Figure 4.



**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 page 23.

# 11. SERVICE 'B' INSTRUCTIONS

MODELS: NDL-100, 110, 120, 130

## EXHAUST VALVE REPLACEMENT

CVK-130 & EVK-130 & PVK-131

(Every 24,000 hrs or 4 Years)

1. Ensure the dryer is shutdown and fully depressurised before attempting any maintenance work. (See page 8-9)

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)

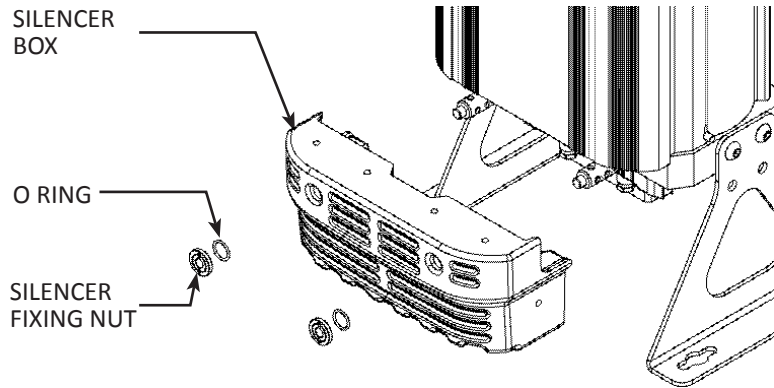
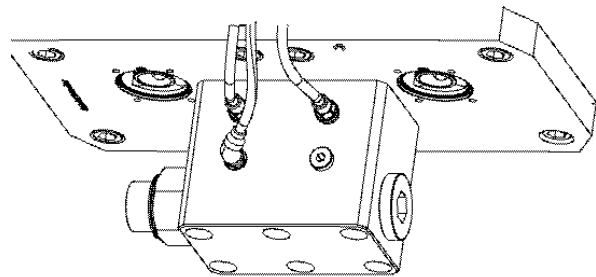


Figure 1.

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)

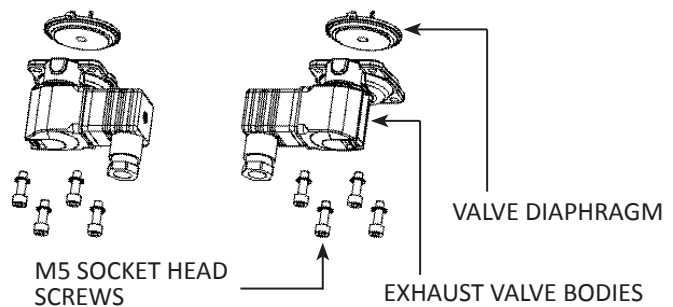
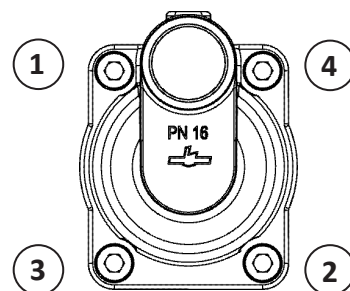


Figure 2.



**NOTE:** correct valve screw tightening sequence shown.



## 12. SERVICE 'B' INSTRUCTIONS

MODELS: NDL-100, 110, 120, 130

### INLET PILOT CONTROL VALVE REPLACEMENT

CVK-130 & EVK-130 & PVK-131

(Every 24,000 hrs or 4 Years)

1. Ensure dryer is shutdown and fully depressurised before maintenance work. (See page 8-9)

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

(See figure 1)

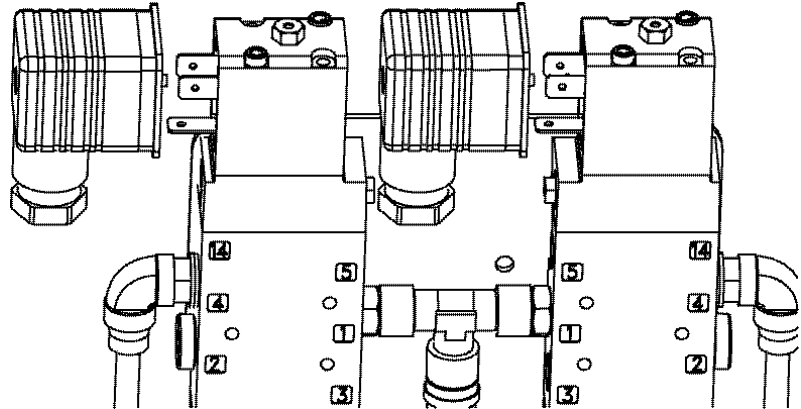


Figure 1.

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

(See figure 2)



**NOTE:** Label tubes when removing manifold.

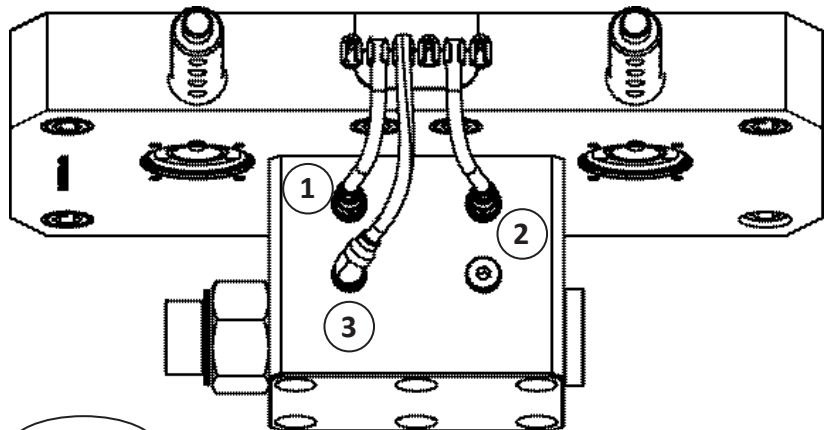


Figure 2.

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

(See figure 3)

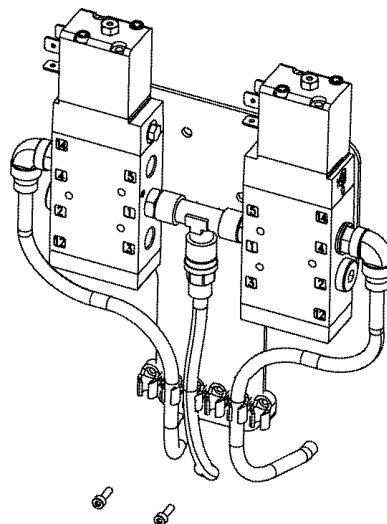


Figure 3.

## 12. SERVICE 'B' INSTRUCTIONS

MODELS: NDL-100, 110, 120, 130

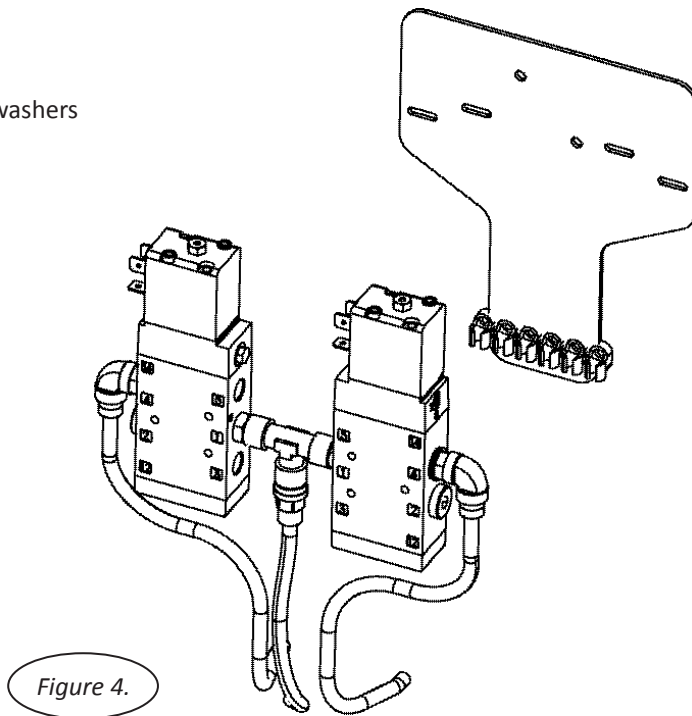
### INLET PILOT CONTROL VALVE REPLACEMENT

CVK-130 & EVK-130 & PVK-131

(Every 24,000 hrs or 4 Years)

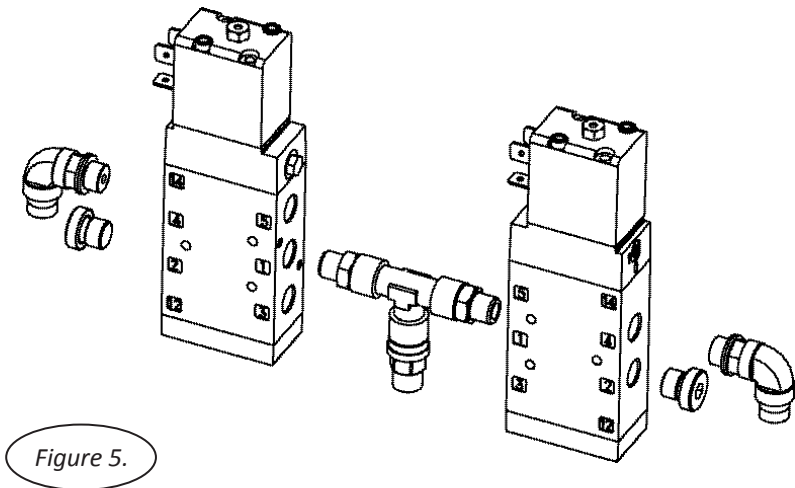
5. Remove 6x (M3x30) screws, nuts, washers and detach valves from bracket.

(See figure 4)



6. Remove 2x elbows, 1x tee, 2x blanking plugs from valves.

(See 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 Page 18:2)

# 13. SERVICE 'C' INSTRUCTIONS

ES MODELS ONLY

## DEWPOINT SENSOR REPLACEMENT

(Every 6,000 hrs or 12 months)

NSK-130

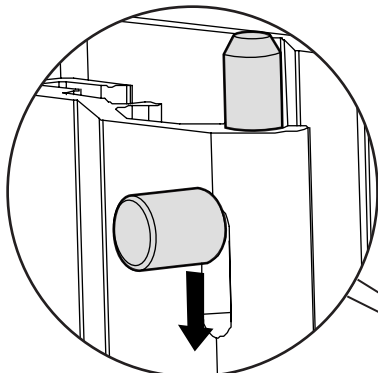


Figure 2.

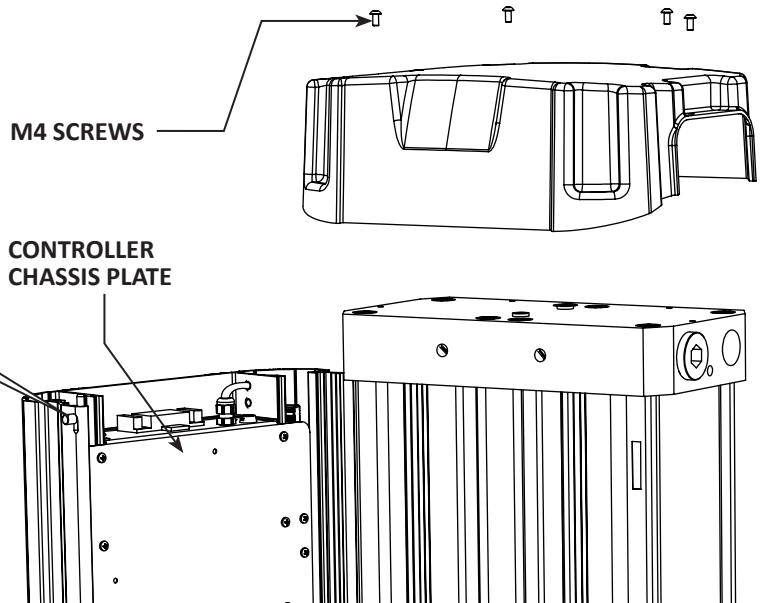


Figure 1.

1. Ensure the dryer is shutdown and fully depressurised before attempting any maintenance work. (See page 8-9)
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)

SENSOR PLUG SCREW

SENSOR PLUG

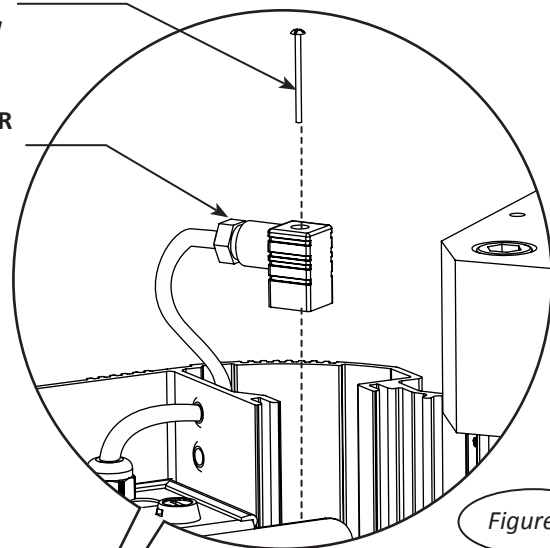


Figure 4.

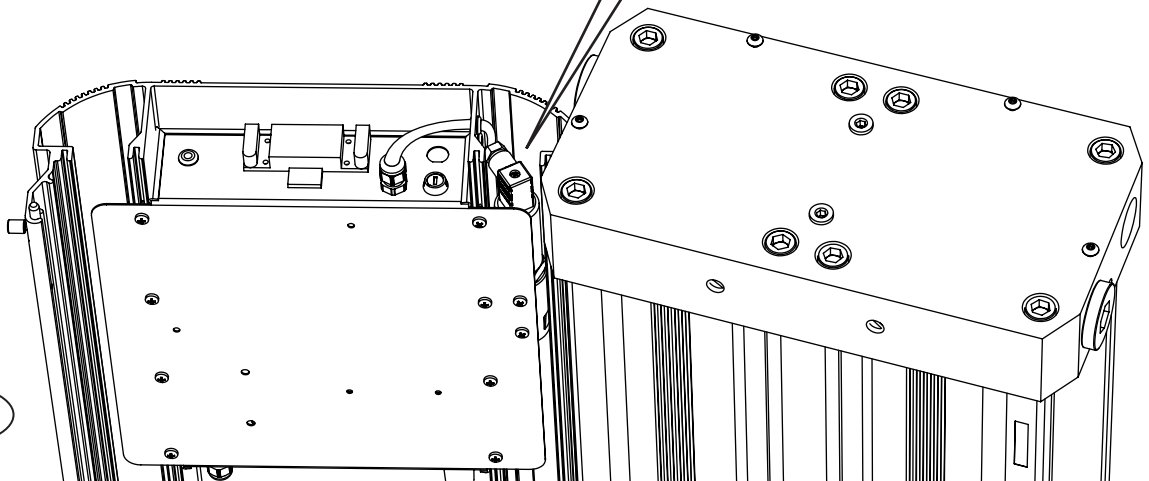


Figure 3.

# 13. SERVICE 'C' INSTRUCTIONS

ES MODELS ONLY

## DEWPOINT SENSOR REPLACEMENT

(Every 6,000 hrs or 12 months)

NSK-130

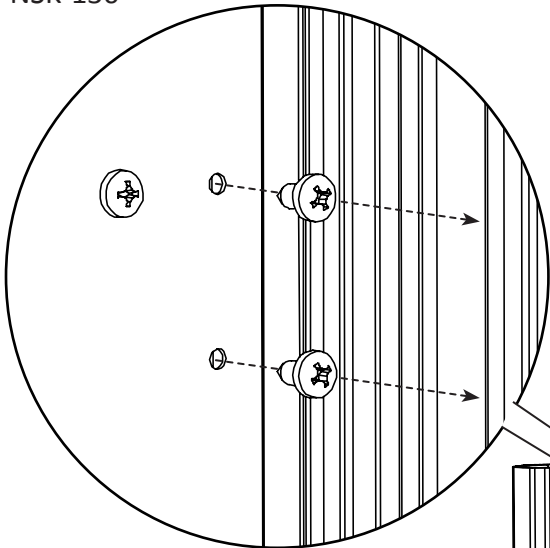


Figure 5.

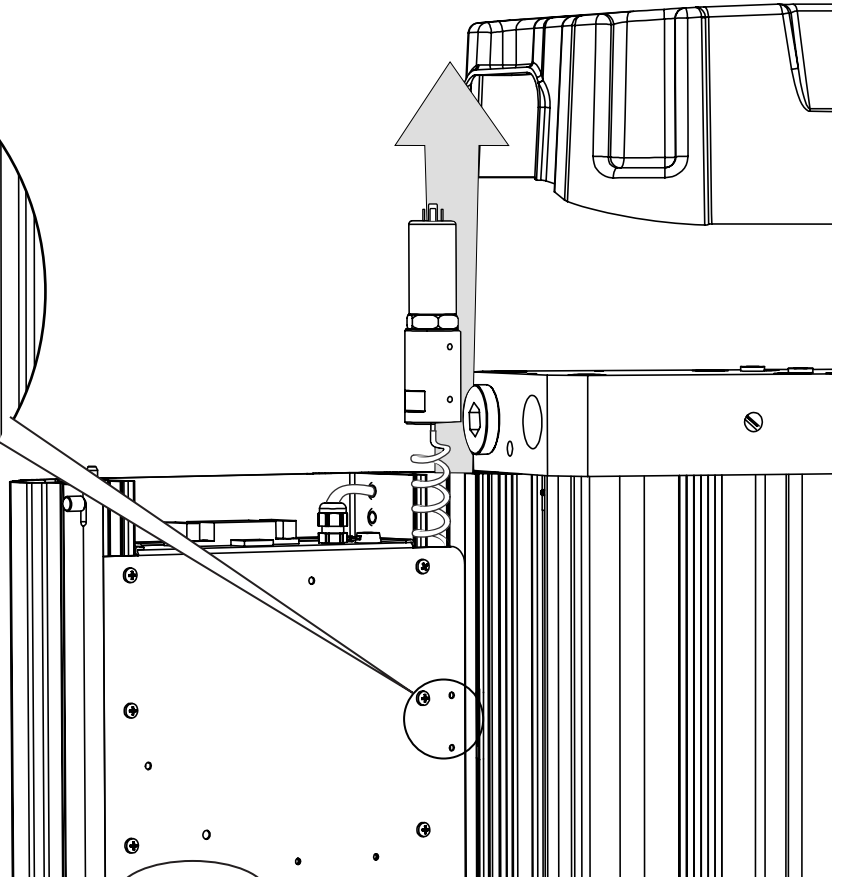
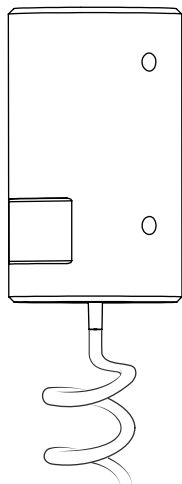
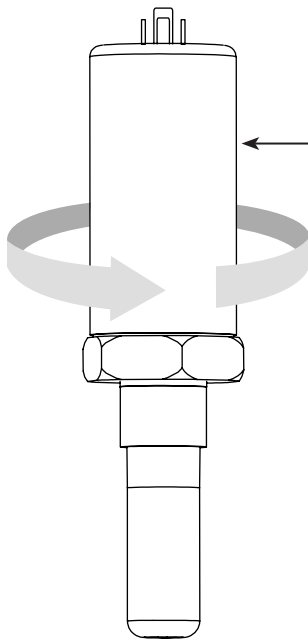


Figure 6.



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 page 23.

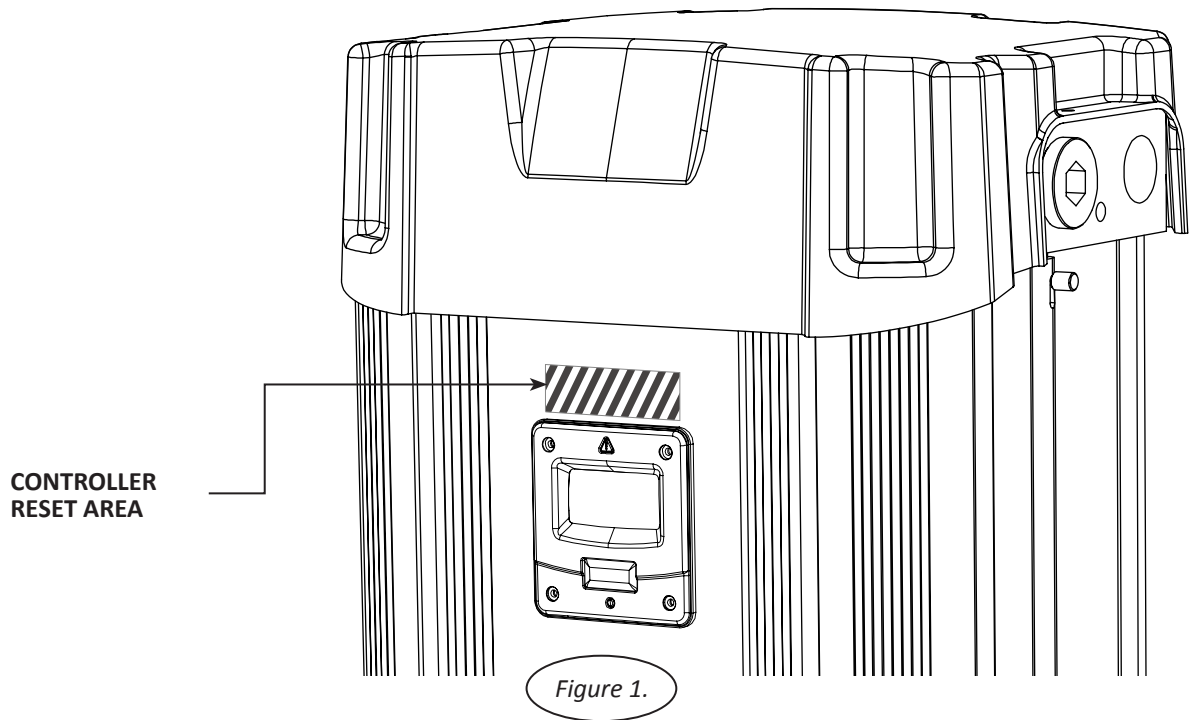
**NOTE:** Allow sensor to stabilise, this may take several hours.

DEW POINT SENSOR

SENSOR BLOCK

Figure 7.

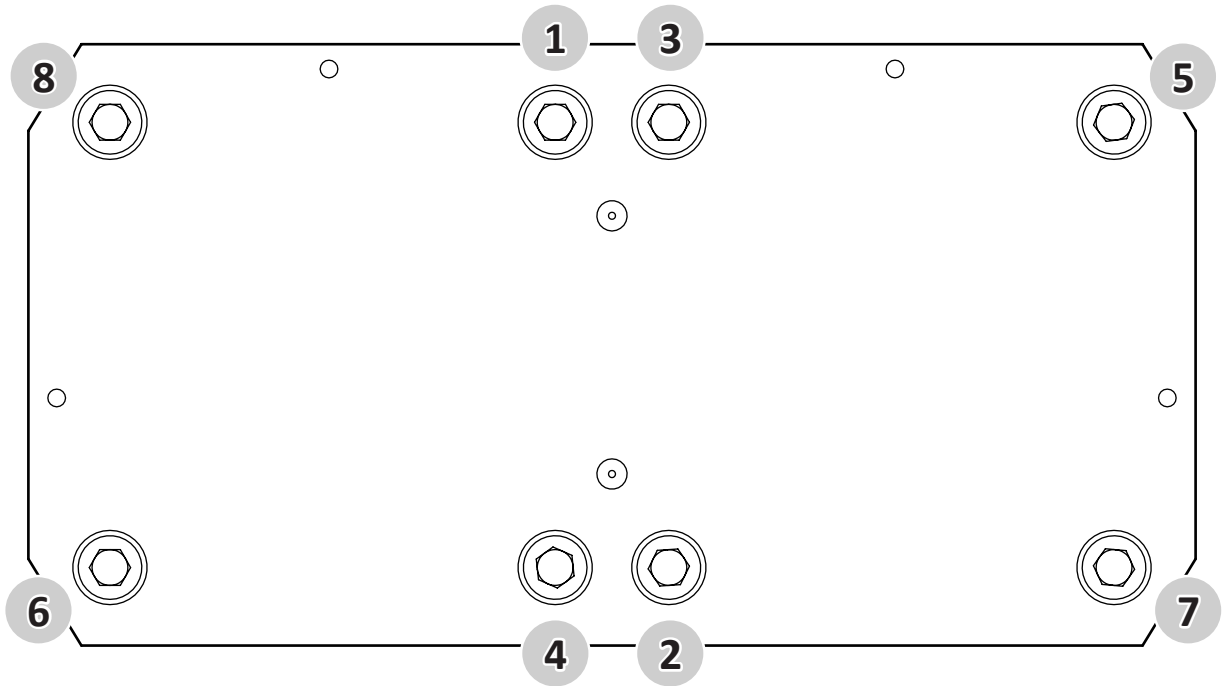
## 14. RESETTING DRYER CONTROLLER



1. Ensure the dryer is on and running, see dryer start up procedure on page 25.
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'.

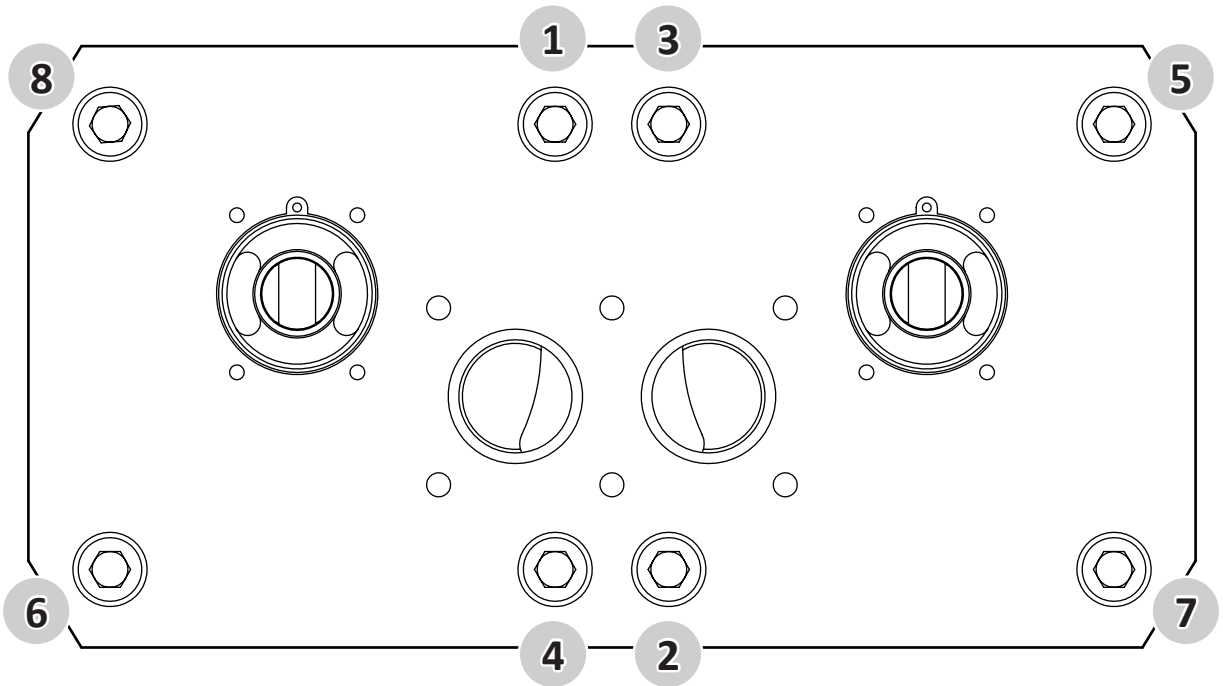
**NOTE:** Magnet not included in the service kit.

# 15. MANIFOLD TIGHTENING SEQUENCES



*Top manifold*

---



*Bottom manifold*

---



## 16. 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.

## 17. 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-porous 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.

## 18. TROUBLESHOOTING

Problem	Problem Cause	Solution
<b>Poor dew point performance</b>	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.
<b>Failure of dryer to cycle</b>	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.
<b>Constant depressurisation</b>	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.

## 19. 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.

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



# nano

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