

nano



Maintenance & Service Manual

heatless desiccant air dryer

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www.n-psi.co.uk

about us

The logo for nano, featuring the word "nano" in a stylized, lowercase, blue font. The letters are bold and modern, with a slight shadow effect. The logo is centered within a large, light gray circle that has a subtle drop shadow.

Experience.

Our team is comprised of and supported by individuals spanning all disciplines from research & development, engineering & manufacturing, marketing & sales and service & support. Our backgrounds are in air and gas purification and our experience in this field spans a wide range of industries. We combine this knowledge and experience to ensure our products and services are designed and provided to meet the objectives and expectations of you - our Customer.



Customer.

We recognise that our Customers are not only our valuable distribution partners who sell and support our products or the machine builders who depend on them as protection for their equipment. They are the contractors who install them, the manufacturers who use them in their processes and the service people who maintain them. At nano we have developed our products, packaging and support materials to ensure they exceed all of our Customers' expectations.



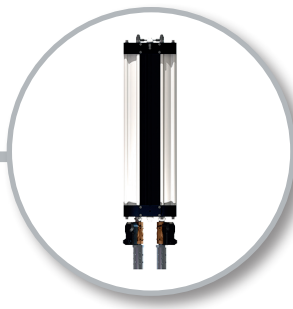
Service.

At nano we recognise that world-class customer service is the most important component to any successful business. Your business needs to exceed your customers' expectations to stand out from your competitors and our service must positively impact your business so you can be successful in doing so. Our commitment is simple... we will stand behind our products and ensure that our customer service is unrivaled in the industry.



Experience. Customer. Service.

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1. manufacturers details and support

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2. general information

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2.1 document introduction

This manual provides factory prescribed maintenance procedures for the heatless desiccant air dryers. The procedures illustrated in this document are only to be performed by authorized personnel. For further information regarding the procedures outlined in this document contact the manufacturer before proceeding.

2.2 general safety

No modifications must be made to the product. Any modifications may reduce the operational safety of the product and invalidate the manufacturer's warranty. This could potentially result in damage to the product and serious personal injury.

For your own safety, when carrying out work on this product, all relevant national safety regulations must be complied with relating to pressurized and electrical systems.

Only authorized, competent and trained personnel are permitted to work on this product. 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.

2.3 packaging

All products are securely packaged in a specifically designed wooden packing box. The dryer will be held in a horizontal position by wooden struts; using straps to secure the product to the box base. The box top cover can be removed by removing the 4 fixing screws and lifting off in one piece.

2.4 intended use of the product

The heatless desiccant air dryers is exclusively intended for the treatment of compressed air, which is free from bulk water, oil and solid matter constituents.

The product should be located within a building and protected from extreme conditions and weather. The heatless desiccant air dryers must be operated only in accordance with the data on the rating plate. Any operations that do not comply with those stated on the product rating label will render the warranty void.



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.



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2.5 service schedule and breakdown

service	year 1 (12 mths)	year 2 (24 mths)	year 3 (36 mths)	year 4 (48 mths)	year 5 (60 mths)	year 6 (72 mths)	year 7 (84 mths)	year 8 (96 mths)
A	✓	✓	✓	✓	✓	✓	✓	✓
B		✓		✓		✓		✓
C				✓				✓
E (ES MODELS ONLY)	✓	✓	✓	✓	✓	✓	✓	✓

Service A - Every 1 year (12 months)
Replace external exhaust silencer/muffler element(s)

Service B - Every 2 year (24 months)
Replace integrated filters
Replace exhaust valves
Replace inlet valves
Replace outlet valve seals
Replace top manifold gasket seals

Service C - Every 4 year (48 months)
Replace control valves [inc. solenoid coils]

Service E - Every 1 year (12 months)
Calibrate dew-point sensor
(Applicable to ES models only)



When contacting your service provider be sure to provide the part number and serial number of your dryer, this can be found on the rating plate.



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2.7 service kits and spares

model (example)	kit number	description
Service A - Replace external exhaust silencers / mufflers		
40-110- G ** *-0000-**	BSP - 130	BSPT exhaust silencer element
40-110- A ** *-0000-**	NPT - 130	NPT exhaust silencer element
Service B - Desiccant replacement kit		
40-110-** T -2110-**	NDA-110 (x2)	loose fill desiccant and gaskets
40-110-** T -2120-**	NDA-120 (x2)	
40-110-** T -2130-**	NDA-130 (x2)	
40-110-** T -3130-**	NDA-130 (x3)	
40-110-** T -4130-**	NDA-130 (x4)	
40-110-** T -6120-**	NDA-120 (x6)	
40-110-** T -6130-**	NDA-130 (x6)	
40-110-** S -2110-**	NDK-110 (x2)	desiccant cartridge and gaskets
40-110-** S -2120-**	NDK-120 (x2)	
40-110-** S -2130-**	NDK-130 (x2)	
40-110-** S -3130-**	NDK-130 (x3)	
40-110-** S -4130-**	NDK-130 (x4)	
40-110-** S -6120-**	NDK-120 (x6)	
40-110-** S -6130-**	NDK-130 (x3)	
40-110-** L -2110-**	NDA-110-LDP (x2)	low point desiccant (LDP) cartridge and gaskets
40-110-** L -2120-**	NDA-120-LDP (x2)	
40-110-** L -2130-**	NDA-130-LDP (x2)	
40-110-** L -3130-**	NDA-130-LDP (x3)	
40-110-** L -4130-**	NDA-130-LDP (x4)	
40-110-** L -6120-**	NDA-120-LDP (x6)	
40-110-** L -6130-**	NDA-130-LDP (x6)	
40-110-** M -2110-**	NDK-110-LDP (x2)	loose fill low dew point (LDP) desiccant and gaskets
40-110-** M -2120-**	NDK-120-LDP (x2)	
40-110-** M -2130-**	NDK-130-LDP (x2)	
40-110-** M -3130-**	NDK-130-LDP (x3)	
40-110-** M -4130-**	NDK-130-LDP (x4)	
40-110-** M -6120-**	NDK-120-LDP (x6)	
40-110-** M -6130-**	NDK-130-LDP (x6)	



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model (example)	kit number	description
Service C - Valve servicing (NOTE; you may require more than one kit)		
all models	EVK-6130	2 internal exhaust valves
all models	IVK-6130	2 internal inlet valves
all models	OVK-6130	2 internal outlet valves
40-***-** O *-0000-Q*	PVKO-6130-024	24v pilot normally open operation valves
40-***-** O *-0000-S*	PVKO-6130-240	240v pilot normally open operation valves
40-***-** O *-0000-R*	PVKO-6130-110	110v pilot normally open operation valves
40-***-** C *-0000-Q*	PVKC-6130-024	24v pilot normally closed operation valves
40-***-** C *-0000-S*	PVKC-6130-240	240v pilot normally closed operation valves
40-***-** C *-0000-R*	PVKC-6130-110	110v pilot normally closed operation valves
Service C - Overhall kits		
40-***-** O *-0000-Q*	NOKO-6130-024	PVKO-6130-024, EVK-6130, IVK-6130 & OVK-6130
40-***-** O *-0000-S*	NOKO-6130-240	PVKO-6130-240, EVK-6130, IVK-6130 & OVK-6130
40-***-** O *-0000-R*	NOKO-6130-110	PVKO-6130-110, EVK-6130, IVK-6130 & OVK-6130
40-***-** C *-0000-Q*	NOKC-6130-024	PVKC-6130-024, EVK-6130, IVK-6130 & OVK-6130
40-***-** C *-0000-S*	NOKC-6130-240	PVKC-6130-240, EVK-6130, IVK-6130 & OVK-6130
40-***-** C *-0000-R*	NOKC-6130-110	PVKC-6130-110, EVK-6130, IVK-6130 & OVK-6130
Service D - Dew point sensors (optional)		
40-***-*** S -0000-*E 40-***-*** T -0000-*E	NSK-130	Dew point sensor calibration for standard -40C (-40F)
40-***-*** L -0000-*E 40-***-*** M -0000-*E	NSK-130-LDP	Dew point sensor calibration for standard -70C (-95F)
Energy saving upgrade kits		
40-***-*** S -0000-*** 40-***-*** T -0000-***	ESU-130	Energy saving upgrade kit; Dewpoint sensor and accessories
40-***-*** L -0000-*** 40-***-*** M -0000-***	ESU-130-LDP	Energy saving upgrade kit; Low-dewpoint sensor and accessories



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2.8 shutdown procedure

Isolate unit from compressed air system.



**The unit will still be pressurized
Ensure the unit is fully depressurized and isolated**

To fully depressurize, following the steps below;

- Once isolated from the compressed air source
- Cycle the dryer at least twice to ensure the unit exhausts and is completely depressurized.
- When fully depressurized the 'clicking' of the exhaust valves will be heard but no air exhausted.
- When the unit is fully depressurized, isolate from the electrical supply.
- Press **O** to return to I.



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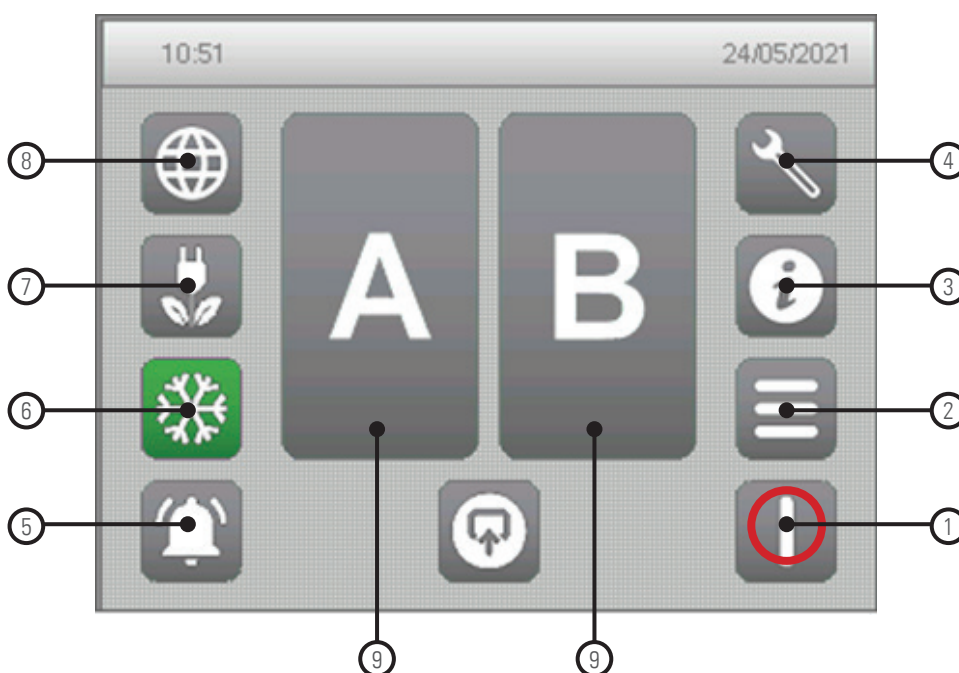
heatless desiccant air dryer

2.9 start-up and operation



Do not allow the unit to flow air unless switched on and cycling. Resulting effect could be desiccant contamination; requiring a desiccant service.

- Ensure all pipe work is connected as per the typical layout
- The unit is connected with a power supply as stated on the rating label.
- Ensure the inlet air pressure is within limits as stated on the rating label on the product.
- Ensure the inlet air temperature is within limits as stated on the rating label on the product.
- Slowly open the inlet ball valve and allow the unit to pressurize
- Turn on the unit, the unit will display its' status. Press 1
- Allow the unit to cycle at least 2 times before slowly opening the outlet flow.



This unit must be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This unit is equipped with a cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances. Do not modify the plug provided; if it does not fit the outlet, have the proper outlet installed by a qualified electrician.



After 10 minutes of inactivity, the HMI will enter an energy saving mode where the HMI screen will go black. A green LED will remain lit at all times to indicate the HMI is still fully functional. If at any point the HMI detects human interaction the energy saving mode will deactivate and the screen will revert back to the main display seen above.

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No.	symbol	description
1		start button; the dryer is ready to start-up. Press to Start.
		stop button; the dryer is ready to shutdown. Press to Stop.
2		menu; access to the menu structure.
3		general information view the model number, serial number, build date and installation date.
4		service information; access total hours, hours run since last service and service provider details.
		service reminder; the dryer will require a service soon.
		service required the dryer requires a service.
5		alarm records; access alarm and event logs such as low inlet pressure and high purity alarm.
		alarm records; minor alarm is active.
		alarm records; major alarm is active

No.	symbol	description
6		dew point status; access to the outlet dew point measurement (optional extra)
7		economy; access total hours in economy, percentage savings
		economy; if flashing green the dryer is in energy saving mode
8		language selection; access to different languages such as french and german.
9		column status; when grey. column A and/or B is offline.
		column status; when amber, column A and B is equalising.
		column status; when green, column A or B is online and producing gas.
10		remote start/stop; the generator is/has shutdown due to the remote start connection being broken



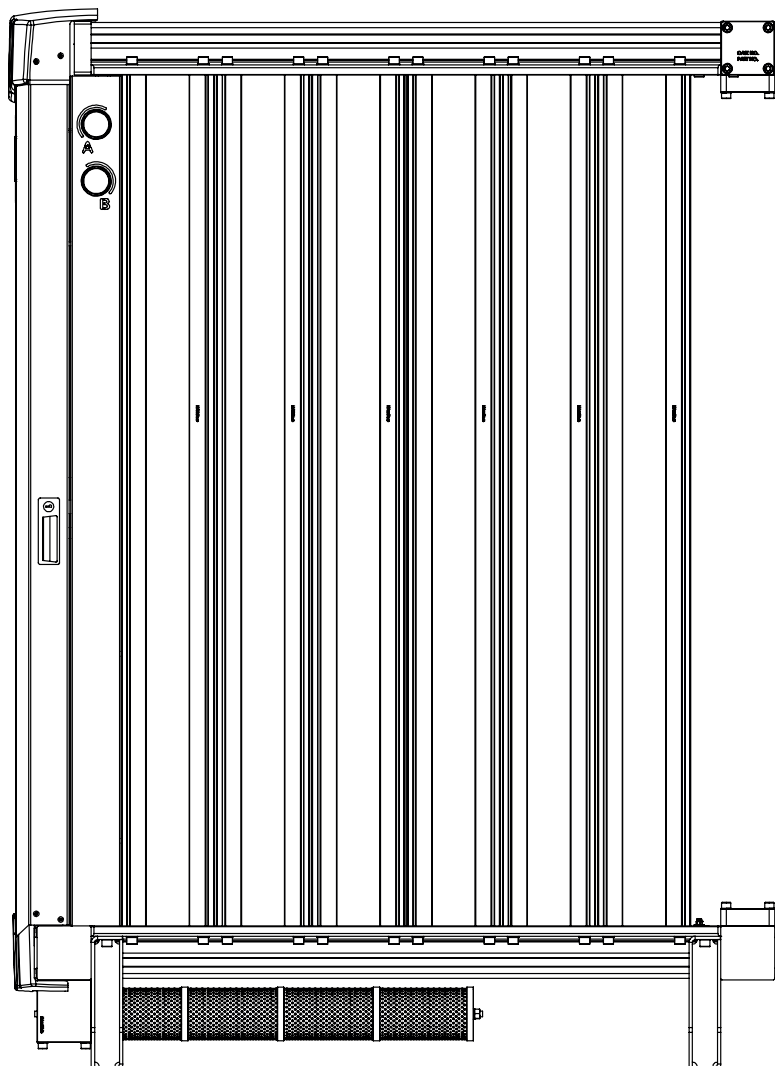
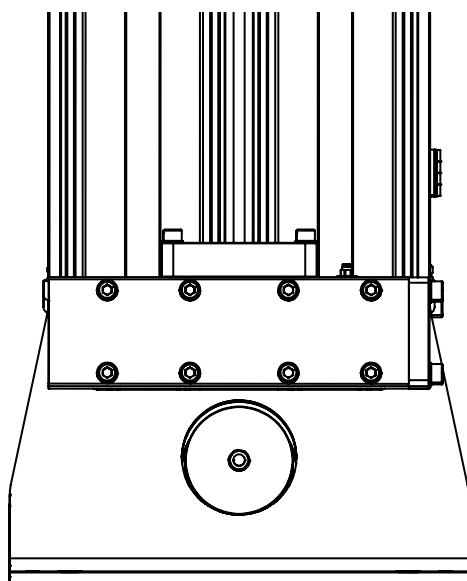
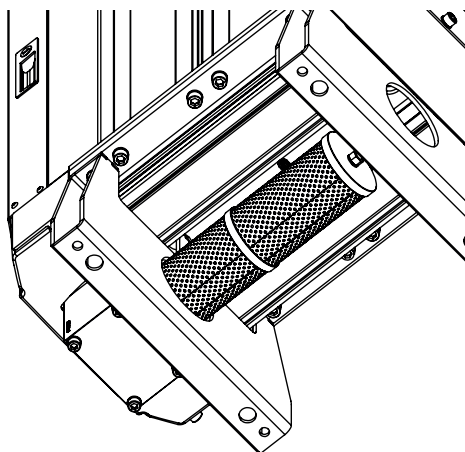
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3. service 'A' instructions - silencers/mufflers

Replace external exhaust silencers/mufflers (every year or 6,000 hours)

1. Ensure the dryer is shut down and fully depressurised. See Page 8, section 4.1.
2. Remove Exhaust Silencer/Mufflers from the unit and discard (figure A.1)
3. Clean the thread and remove any sealing material debris from external exhaust elbow (figure A.3)
4. Apply new thread sealing material to new Exhaust Silencer/Mufflers, shown in figure A.4
5. Attach Exhaust Silencer/Mufflers, ensuring they are tight.





4. service 'B' instructions - desiccant change

Replacing desiccant contents - (every 2 years or 12,000 hours)

1. Ensure the dryer is shut down and fully depressurised.
2. Remove the 4 x M10 bolts from the outlet connection flange at the rear of the dryer.

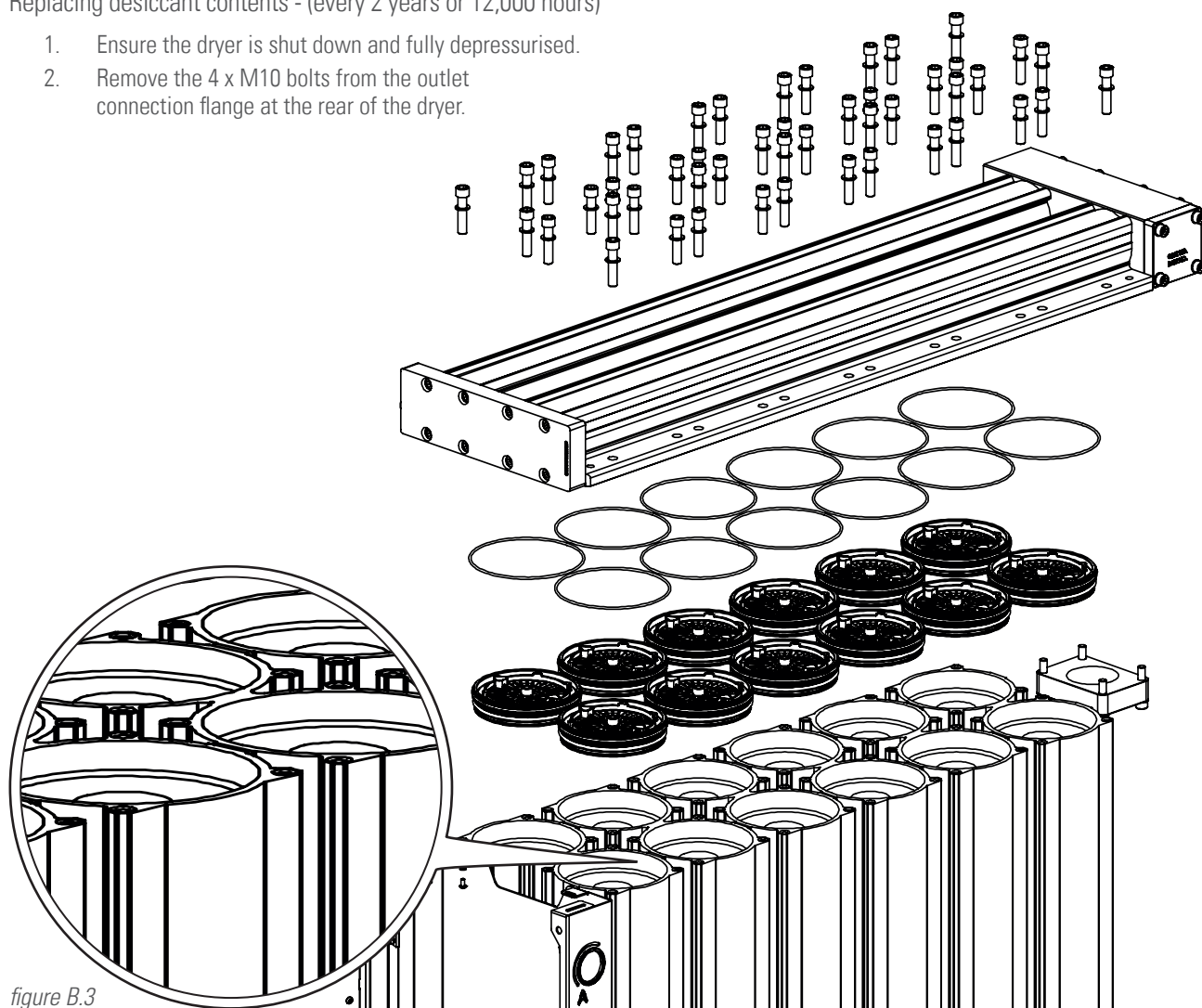


figure B.3

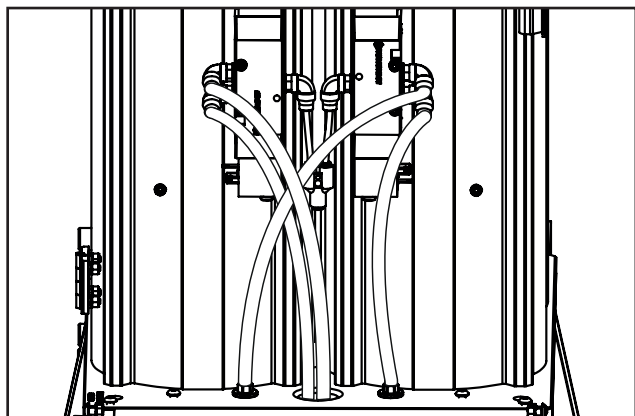


figure B.1

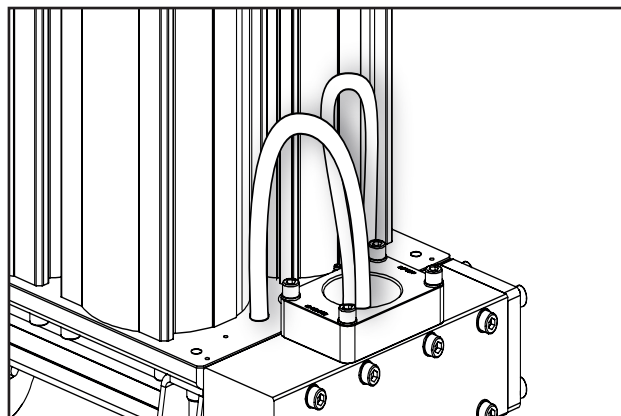


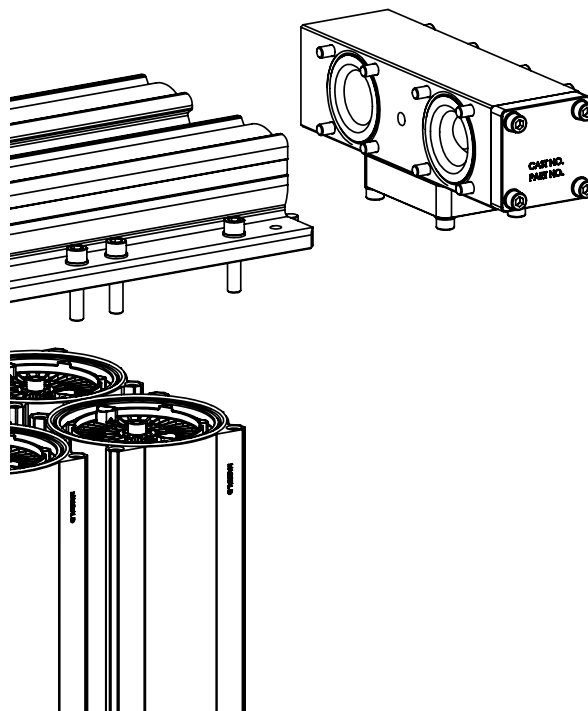
figure B.2



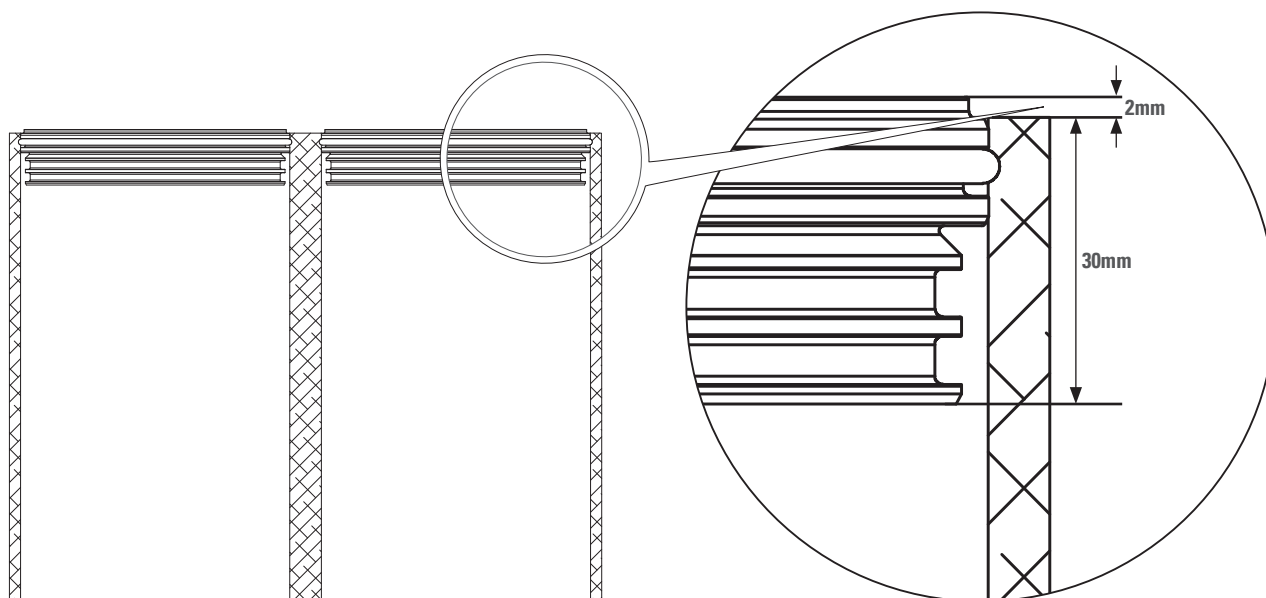
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3. If a dewpoint sensor is fitted, disconnect the nut attached at outlet block and pull through the tubing, (maintain attachment to the sensor assembly).
4. Undo the M12 retaining bolts from the top manifold. (8 bolts per column)
5. Remove the top manifold (care should be taken not to damage the sealing face).
6. Remove all of the column caps exposing the drying media.
7. Using a suitable vacuum cleaner, remove the expended dessicant media from each column.
8. Remove any contaminants from the columns internal surface.
9. Using a nano suitable snow storm filler, replace the dessicant media ensuring continuous filling is maintained. A gap of 30mm must be left free at the top of each column for the column cap [figure B.5].
10. Install a new 150mm diameter media disc onto the top of the dessicant fill and fit column caps.
11. New column top caps must be installed. (Caps should stand approx. 2mm above column length).
12. Clean top manifold and replace all gaskets (use a suitable grease to hold gaskets into place).
13. Ensure all column sealing faces are clean and free from dust.
14. Reassemble the dryer by replacing the top manifold ensuring it is lined up correctly with the columns, using Guide Pins (see parts list). Insert all M12 bolts and torque to a setting of 80Nm following the correct tightening sequence on page 19-20.



15. Refit the door.
16. Re-connect the outlet manifold connection using 4 x M10 bolts.
17. Start up the Dryer (see page 8)





4.1 service 'C' instructions - exhaust valves

replacing exhaust valves - (every 4 years or 24,000 hours)

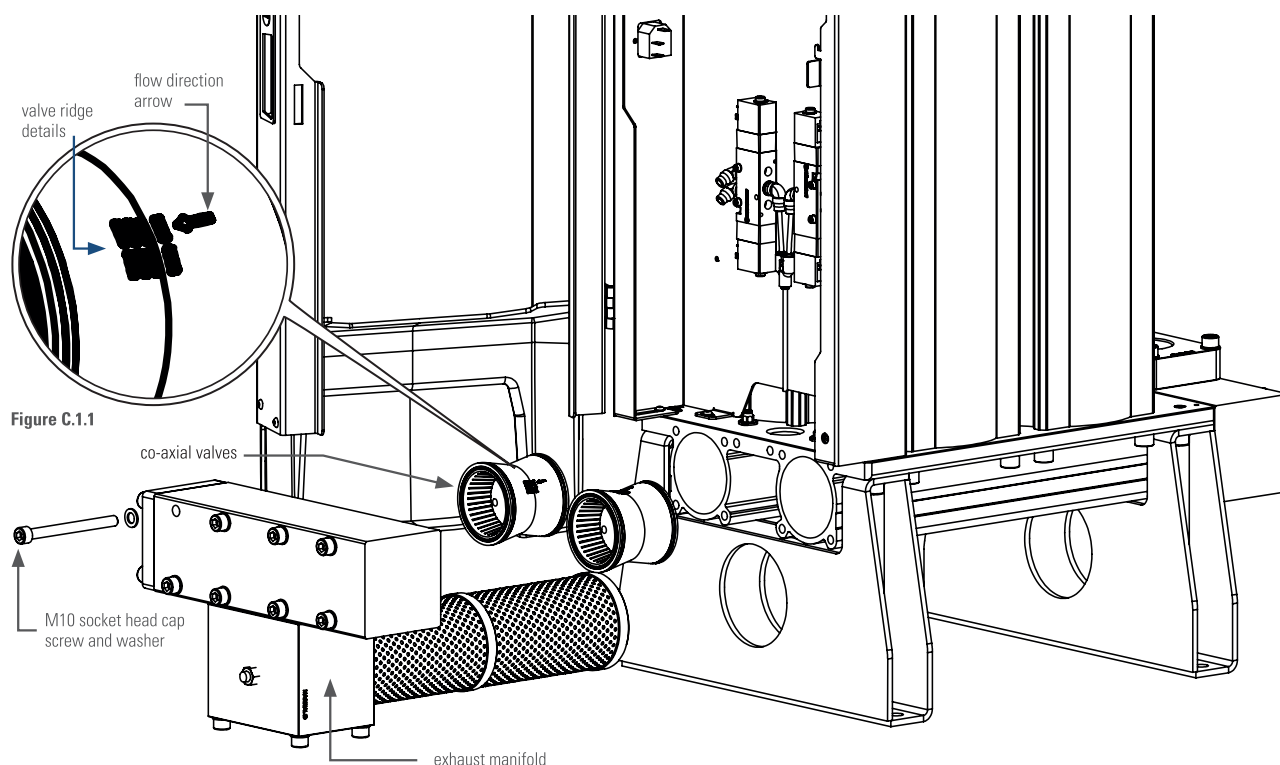
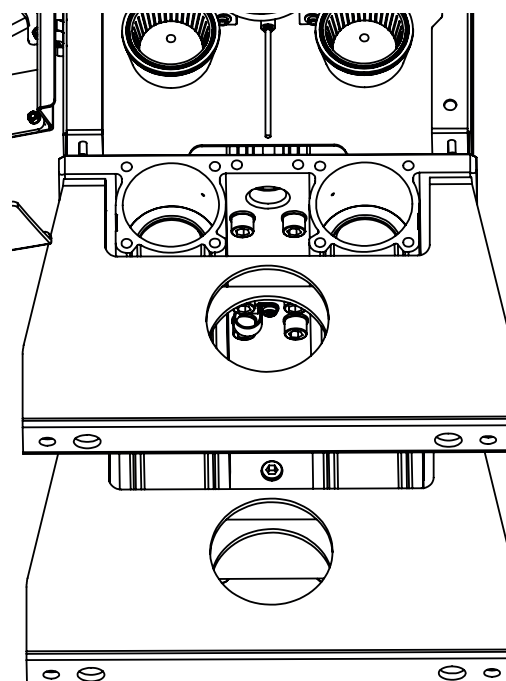


Figure C.1.1

If the exhaust valves are not intended to be serviced, continue to page 13.

1. Ensure the dryer is shut down and fully depressurised (See page 8, section 4.1).
2. remove the bottom cover attached by 3 screws.
3. remove the 8 x M10 socket head cap screws and 8 x washers to release the valve block from the bottom manifold (figure C.1).
4. remove the co-axial valves from the valve orifice within the bottom manifold and discard.
5. lightly grease and insert the new inlet valves into the valve block ensuring the flow direction arrow is pointing as shown and the valve ridge details cover the spill port. (See figures C.1.1, and C.1.2).
6. Reassemble valve block to the bottom manifold (torque setting; 40Nm). Refer to page 19-20 and follow the correct tightening sequence when replacing block.
7. Refit the bottom cover.
8. Start up the Dryer (page 8), or continue to complete service C



The spill ports are 1.5mmØ holes within the bottom manifold.

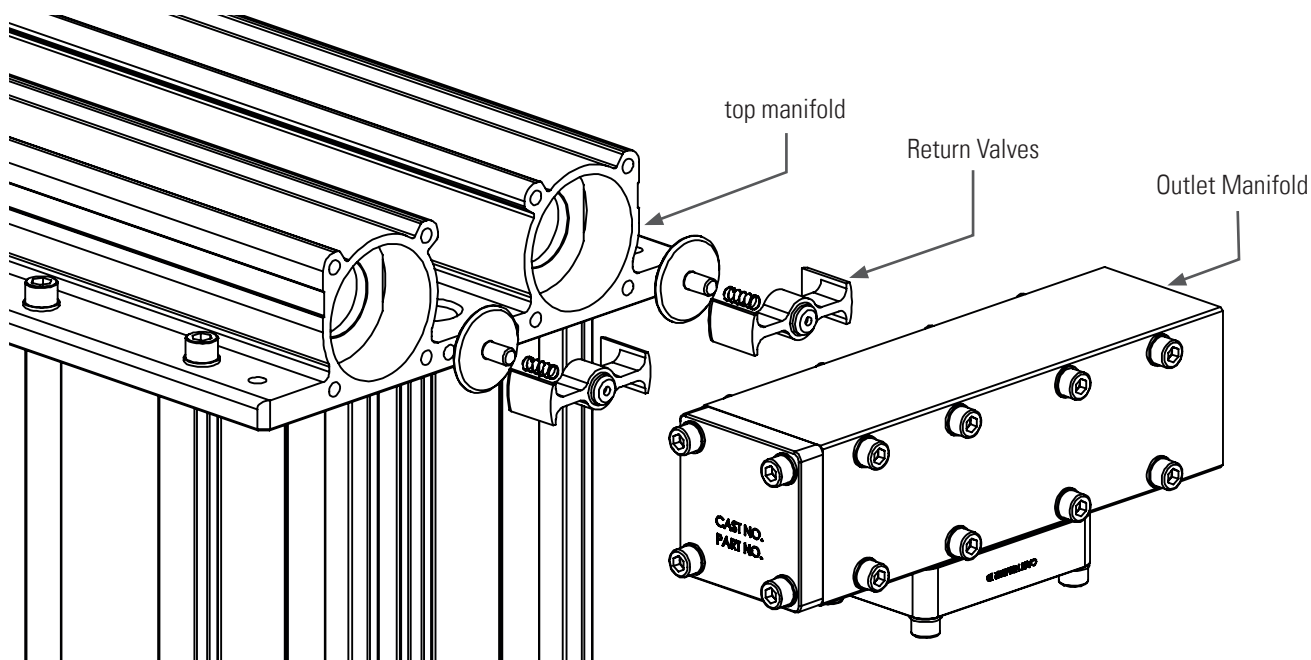


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4.2 service 'C' instructions - outlet valves

replacing outlet non-return valves - (every 4 years or 24,000 hours)



If the Outlet valves are not intended to be serviced, continue to page 14

1. Ensure the dryer is shut down and fully depressurised (See page 8, section 4.1).
2. Remove the 8 x M10 socket head cap screws and 8 x washers to release the outlet manifold from the top manifold.
3. Remove 4 x M10 bolts holding the outlet flange
4. Remove the non return valve from the valve orifice within the top manifold and discard.
5. Lightly grease and insert the new non return valves into the valve orifices within the top manifold ensuring the valve has been insert in the correct orientation. Refer to figure C.2.1
6. Place the valve block to the top manifold and insert the 8 x M10 socket head cap screws and the 8 x washers to complete the assembly. Refer to page 21-22 and follow the correct tightening sequence when replacing the valve block
7. Refit the flange
8. Start up the Dryer (page 8), or continue to complete service C



4.3 service 'C' instructions - inlet valve

replacing inlet control valves - (Every 4 years or 24,000 hours)

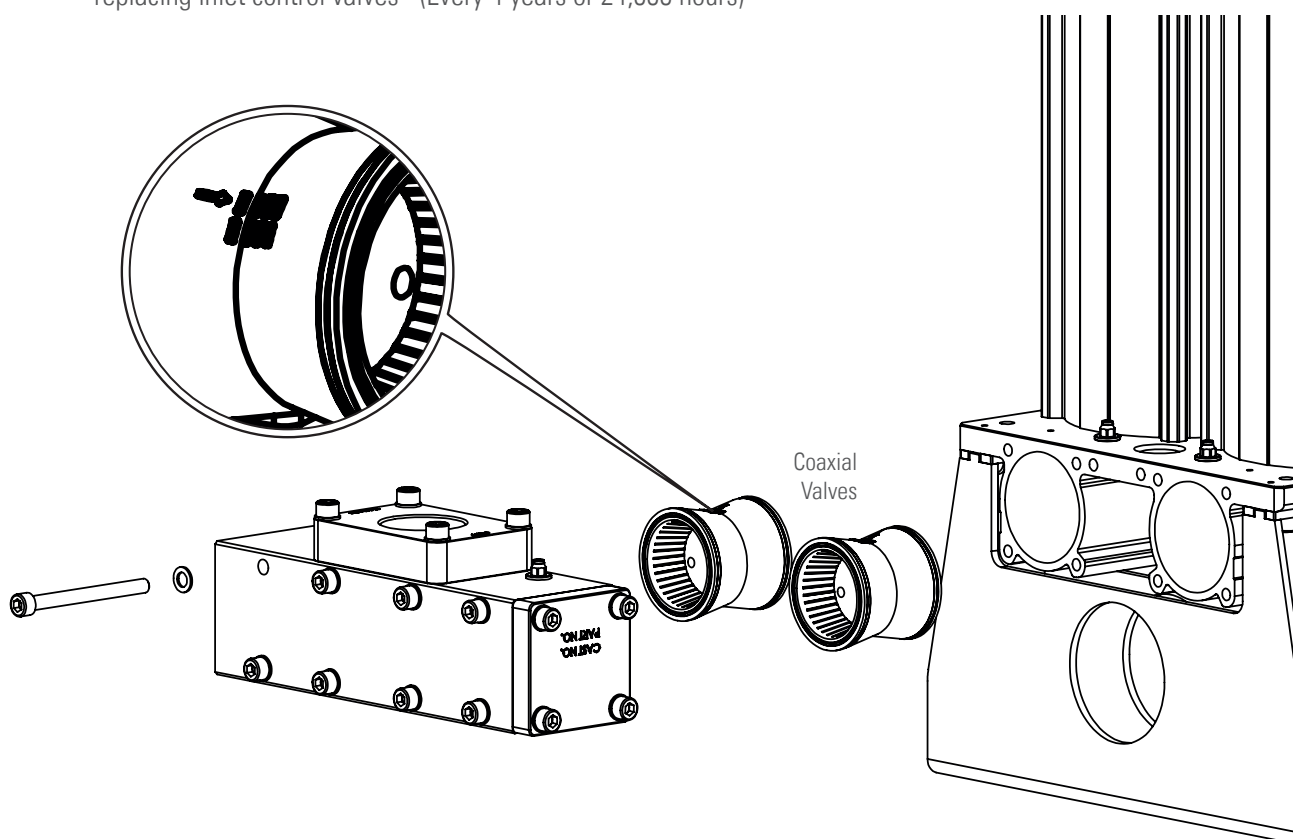
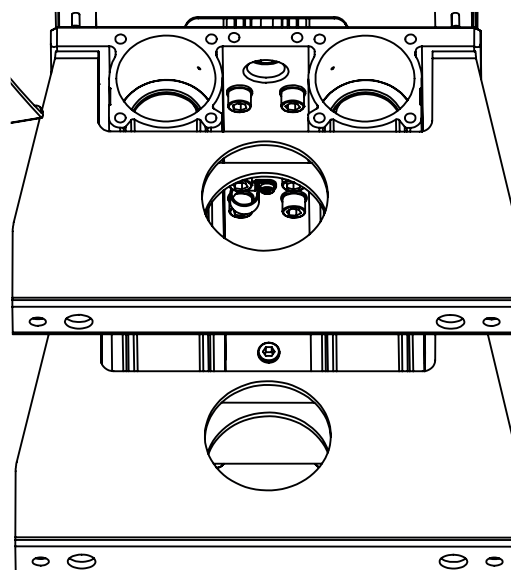


Figure C.3 - If the Inlet valves are not intended to be serviced, continue to page 15

1. Ensure the dryer is shut down and fully depressurised (See page 8, section 4.1).
2. Remove the flange and remove the 8 x M10 socket head cap screws and washers to release the valve block from the bottom manifold.
3. Remove the inlet valves from the orifice within the bottom manifold and discard.
4. Light grease and insert the valves into the orifices within the bottom manifold ensuring the flow direction arrow is pointing as shown and the valve ridge details [Fig C.3.1] cover the spill port. (See figure C.3.2).
5. Place the valve block to the bottom manifold and insert the 8 x M10 socket head cap screws and the 8 x washer, tightening to a torque setting of 40Nm. Refer to page 19-20 and follow the correct tightening sequence when replacing the valve block.
6. Refit the inlet flange and start up the Dryer (page 8)



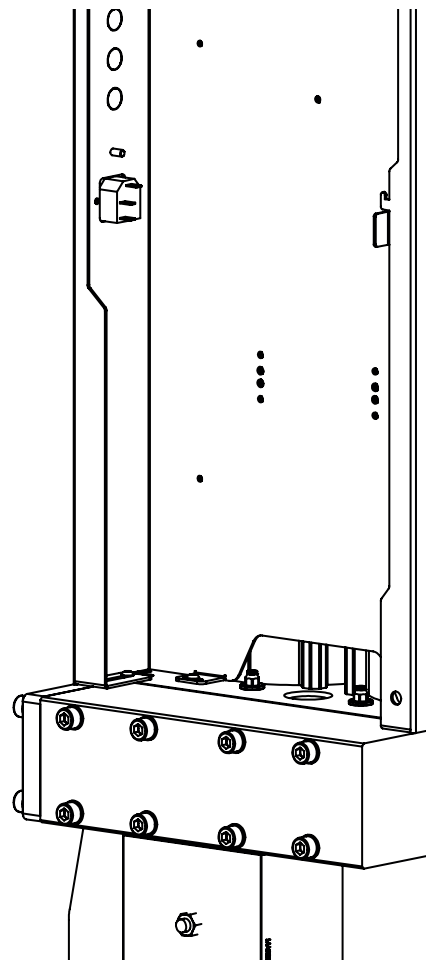
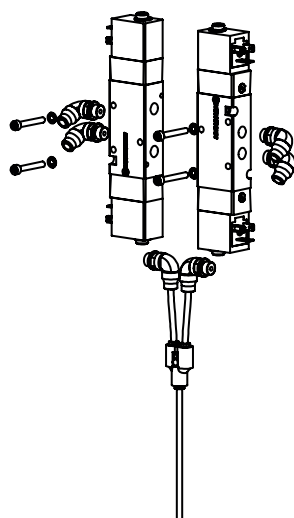
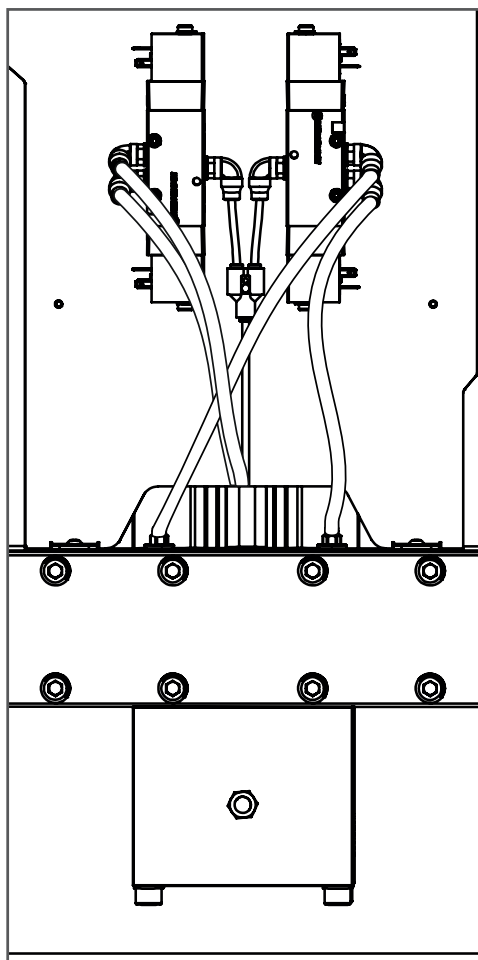


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4.4 service 'C' instructions - pilot valves

replacing pilot valves - (Every 4 years or 24,000 hours)



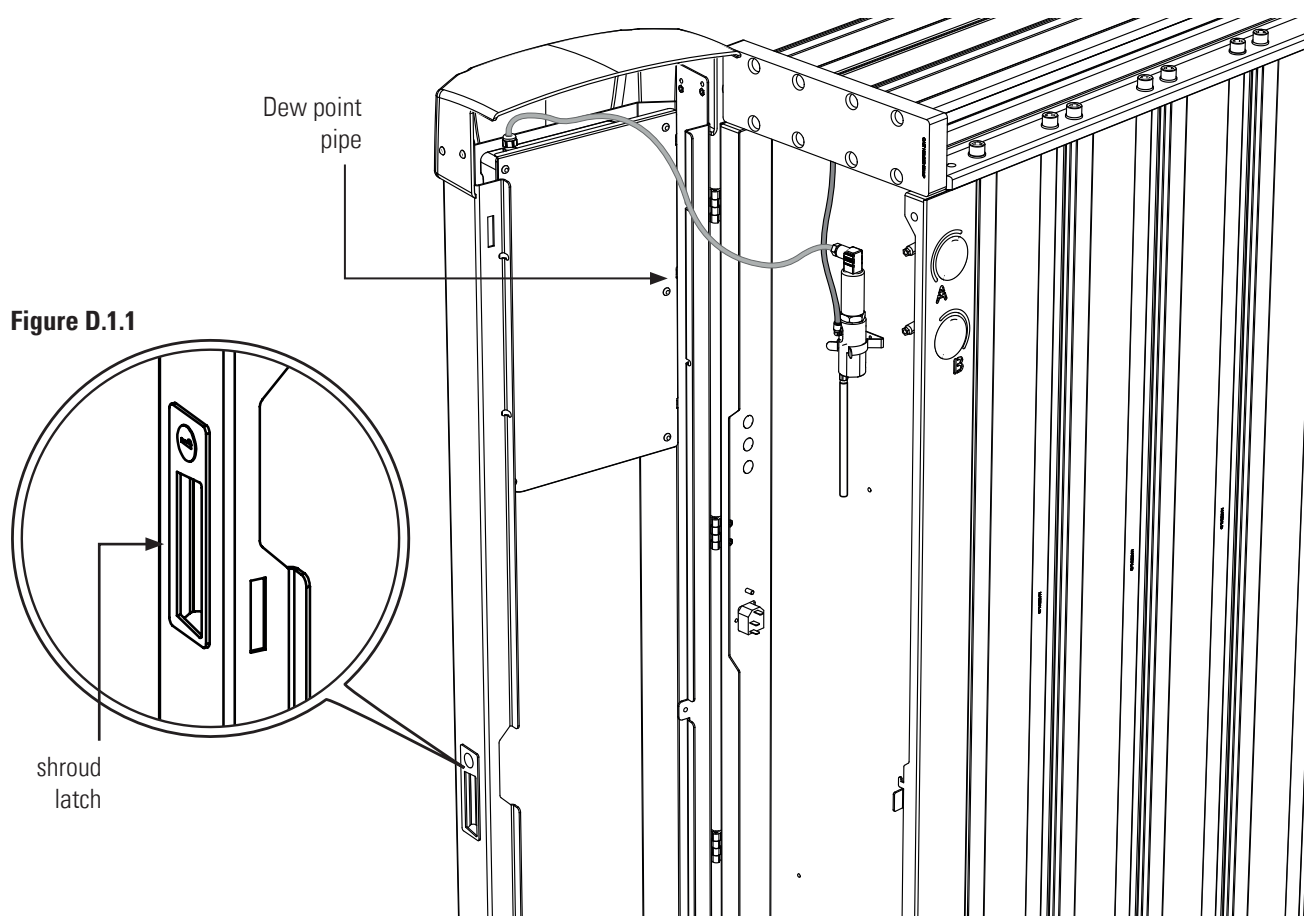
1. Ensure the dryer is shut down and fully depressurised (See page 8, section 4.1)
2. Disconnect and note configuration of the tubing, cables and variation between the pilot valves (Normally Open and/or Normally Closed)
3. Remove the 4 screws to release the pilot valve assembly
4. Remove the elbows and joints
5. Refit the elbows and joints with thread sealing material to the new pilot valve if required
6. Refit the pilot valve assembly and tubing
7. Start up the Dryer (page 8)



5. service 'd' instructions - dew point sensor

replacing or recalibrating the dew point sensor - es models only (every 1 year or 6,000 hours)

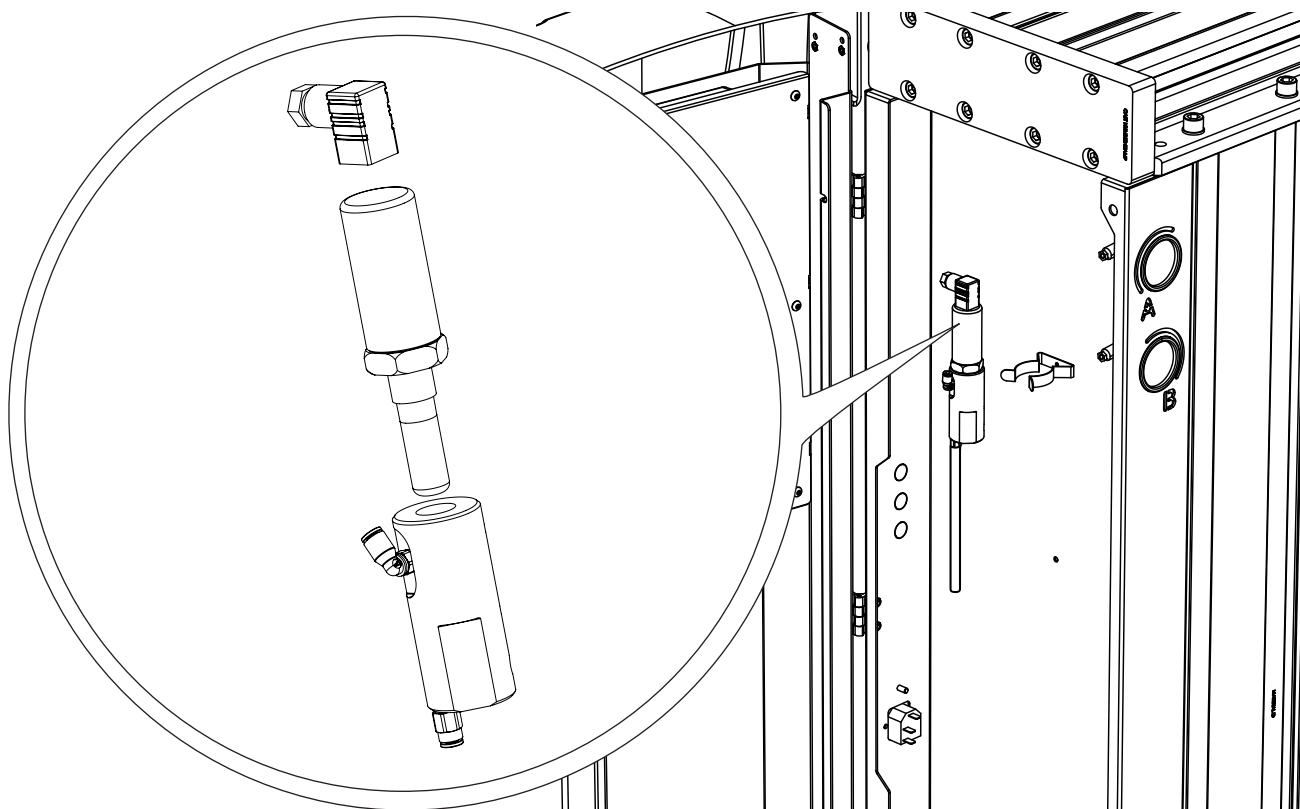
1. Ensure the dryer is shut down and fully depressurised before attempting any maintenance work.(See Page 8, section 4.1)
2. Release the catch located on the right side of the shroud to open it (See Figure D.1.1)





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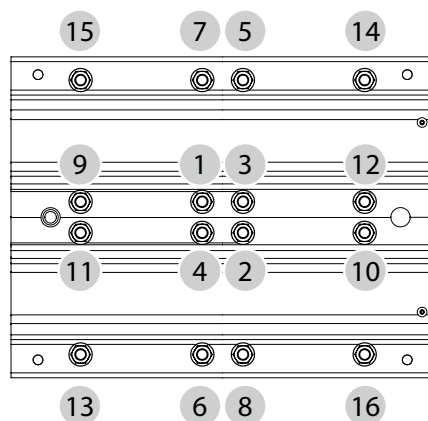
3. Remove the screw from the sensor plug (Figure D.2) and detach it from the dew point sensor assembly. (See Figure D.2.1)
4. Unscrew the dew point sensor from the sensor block and replace with the new or re-calibrated sensor making sure the mating surfaces are clean. (See Figure D.3.2)
5. Reattach the new or re-calibrated dew point sensor and sensor block assembly to the controller chassis plate using the 2x fixing screws.
6. Replace the sensor plug and screw to complete the sensor assembly.
7. Close the shroud and ensure the latches are in position.
8. Start up the Dryer (page 8)
9. Allow for sensor 'bedding in' time.



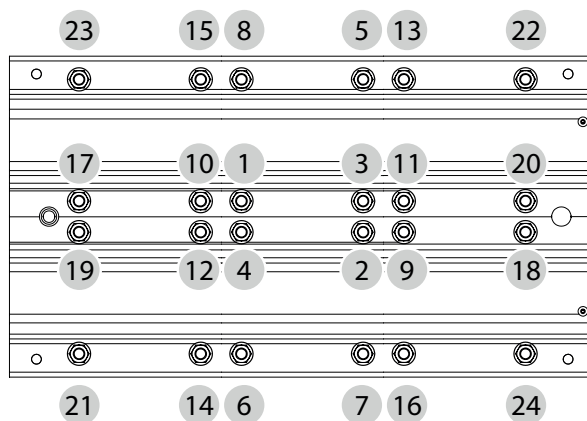
heatless desiccant air dryer

5.1 top & bottom manifold tightening sequence

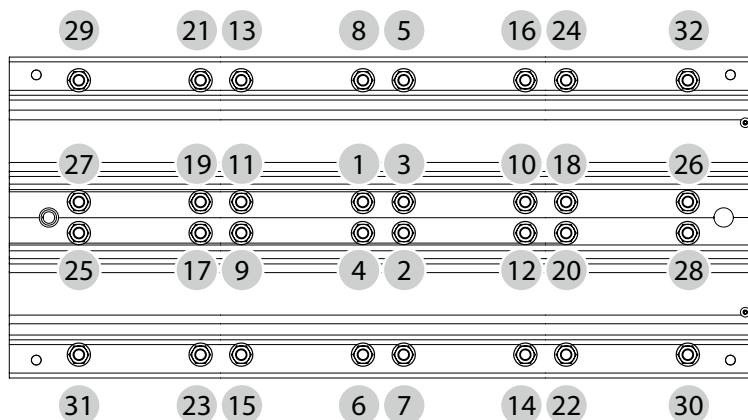
Models: NDL-2110, NDL-2120 & NDL-2130



Model (s): NDL-3130



Model (s): NDL-4130

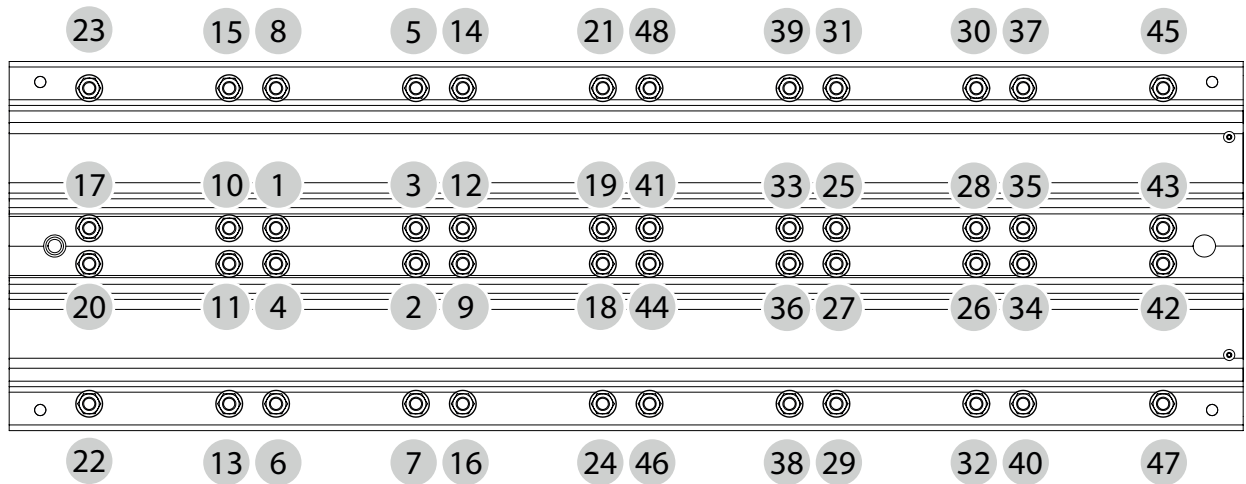




D3

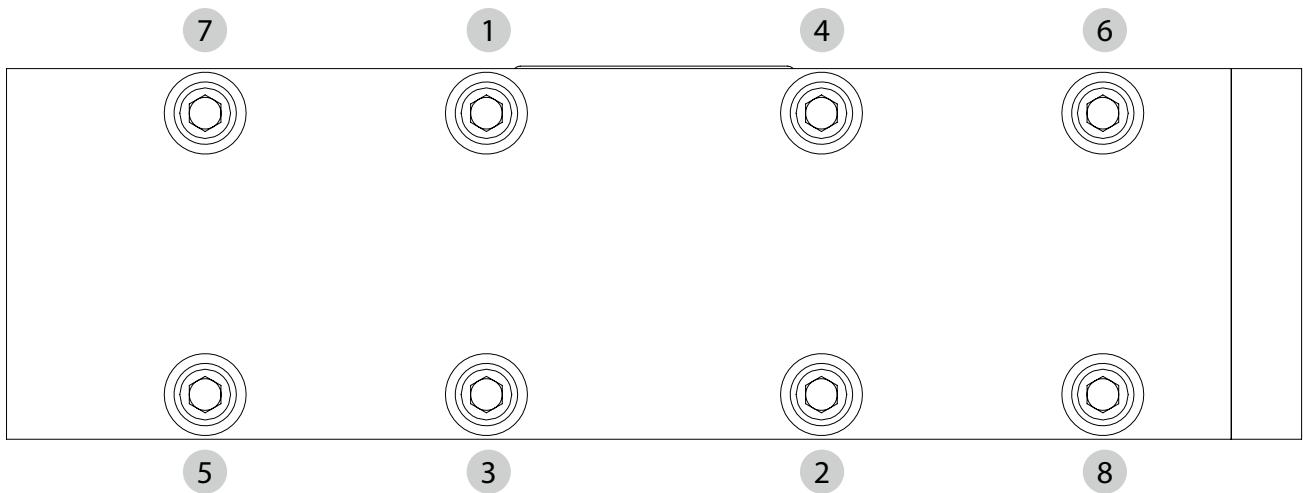
heatless desiccant air dryer

Model (s): NDL-6120 & NDL-6130



5.2 valve block tightening sequence

All Models:





heatless desiccant air dryer

6. other dryer checks & non-service item

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 distributor service department and re-quest 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 distributor service department and request a product service.

maintenance guidelines

- Maintenance operations only to be conducted when the system has been shut down, fully depressurised and isolated from the power and air supply.
- 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.



D3

heatless desiccant air dryer

7. trouble shooting

problem	problem caused	solution
poor performance	Insufficient inlet pressure	Inlet pressure min 4 barg. If not adjust inlet pressure settings.
	Electrical Fault	Ensure the power is on and the dryer front panel is illuminated; check the dryer is cycling correctly.
	Moist or contaminated desiccant	Eliminate the cause of contamination. Replace desiccant – do not re-use.
	Too high air consumption	Ensure the performance of the dryer matches the required system air consumption.
	Excessive inlet air temperature	Check against technical specification.
	Insufficient purge air	Purge incorrectly adjusted. Consult service personnel to adjust settings (Factory pre-set).
failure to cycle	Exhaust silencer blocked	Consult service personnel.
	Controller not functioning correctly	Ensure the controller is powered up, check the on screen column status to ensure it is powering the solenoid valves during operation
	Controller not illuminated	Check power supply to the dryer, check fuse and replace.
	Insufficient inlet pressure	Inlet pressure should be a minimum of 4 barg (58psig) if not then adjust inlet pressure settings.
	Failure to de-pressurize when cycling	Solenoid valve not functioning correctly; if there is power to the coil, replace valve.
	Outlet flow stops	Check inlet air supply
constant depressurisation	Failure to initialize	Ensure that all isolation valves are fully closed, power up the generator, slowly open the air inlet valve and allow the generator to cycle.
	Erratic air flow from exhaust	Faulty or damaged valves, carry out service

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 bottom of the controller back plate inside the dryer front door.

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 dessicant contamination; requiring replacement dessicant.

D2



heatless desiccant air dryers

notes



notes

D2



heatless desiccant air dryers

notes



notes



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