TOPRING

HEATLESS REGENERATIVE AIR DRYER

INSTRUCTION MANUAL

1. General Information

1.1 Document Introduction

This manual provides factory prescribed installation and maintenance procedures for a **TOPRING** compressed air dryer. 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 **TOPRING** 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

For North American Support please contact:

TOPRING

Manufacturer's Details

TOPRING

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

The packing support cushions within the package permits longitudinal stacking; however the central section of the packing box is not load bearing.

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.

2. General safety

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.

2.1. Intended use of the Product

The dryer 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. The dryer must be operated only in accordance with the data on the rating label. Any operations that do not comply with those stated on the product rating label will render the warranty void.

This product is only designed to operate at pressures of between 58 - 232 psig (4 - 16 barg)
It is not suitable for pressures in excess of 232 psig (16 barg).

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 232 psig (16 barg) from being exceeded.

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.

2.2. Personnel

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. Safe Handling

Please ensure the relevant safe engineering practices and handling procedures are employed when handling, installing and operating this product. Ensure that the equipment is depressurized and electrically isolated prior to carrying out any of the scheduled maintenance instructions specified within this user guide.

A suitable lifting aid must be used to minimize the risk of physical injury or damage to the product.

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.

3. Technical Description

The dryer uses the pressure swing adsorption principle of drying compressed air, utilizing two identical columns each containing a hygroscopic desiccant bed.

- Wet air enters the dryer through the inlet valve and is directed into one of the columns.
- Each column contains a unique (patented) desiccant cartridge.
- Bulk liquids and particles are removed by the filtration stage on the inlet to the cartridge.
- Water is retained in a collection chamber until the column is regenerated (Vented to atmosphere as the column is depressurized).
- Air then passes through the desiccant bed where any remaining moisture is adsorbed.
- The dry air passes out through the final particulate (<1micron/ISO8573.1 Class 2).
- Simultaneously, a small amount of dry filtered air is counter flowed down through the other cartridge and exhausted to atmosphere. Removing the moisture and regenerating the desiccant bed.
- The dryer controller periodically switches columns after top end repressurization; ensuring a continuous supply of dry air at constant pressure.
- The dryer can also be controlled using a Zero Volt signal from the compressor. This energy saving (eco) mode senses when the compressor is switched off and stops the dryer operation until the compressor restarts.

4. Technical Specification

Specification	
ISO 8573 - 2:2001 Quality Classes	Class 2: Water: -40°F (-40°C) PDP Class 2: Dirt: 1µm
Minimum working pressure	58 psig (4 barg)
Maximum working pressure	232 psig (16 bar)
Power Supply	100 - 240v AC / 50 - 60Hz
Minimum inlet temperature	34.7°F (1.5°C)
Maximum inlet temperature	122°F (50°C)
Ambient Temperature	34-122°F (1-50°C)
IP Rating	IP54 / NEMA 3
Power	38W
Noise	<80dB (A)

- Where the air source is from an oil lubricated compressor, a 0.1µm or better coalescing filter must be used on the inlet to the dryer.

1. Series 1 Compressed Air Dryer

2. 1 x North America IEC cable

3. Dryer stand components:

- 2 x Brackets
- 8 x M5 socket button head screws
- 1 x Allen key

4. Documentation:

- 1 x User Guide
- 1 x Quick Start Guide
- 1 x Declaration of Conformity

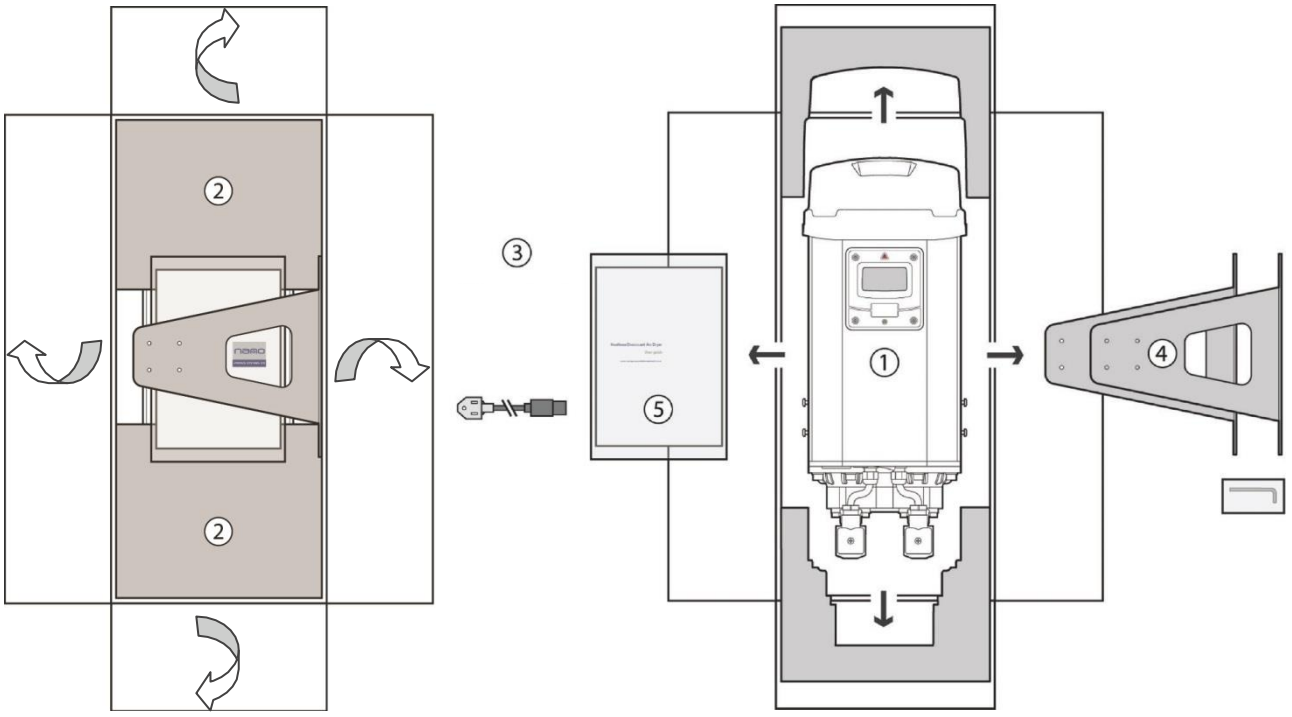
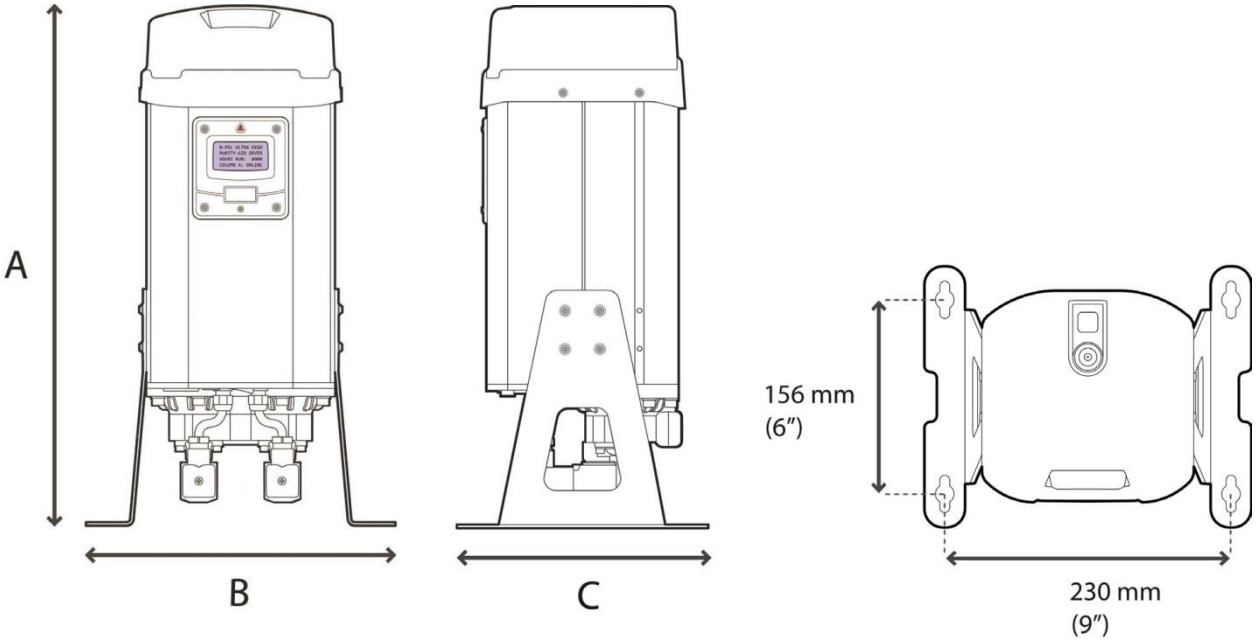


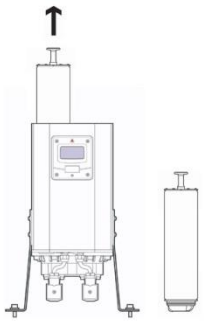
Figure 1: Contents Layout

5. Product Dimensions

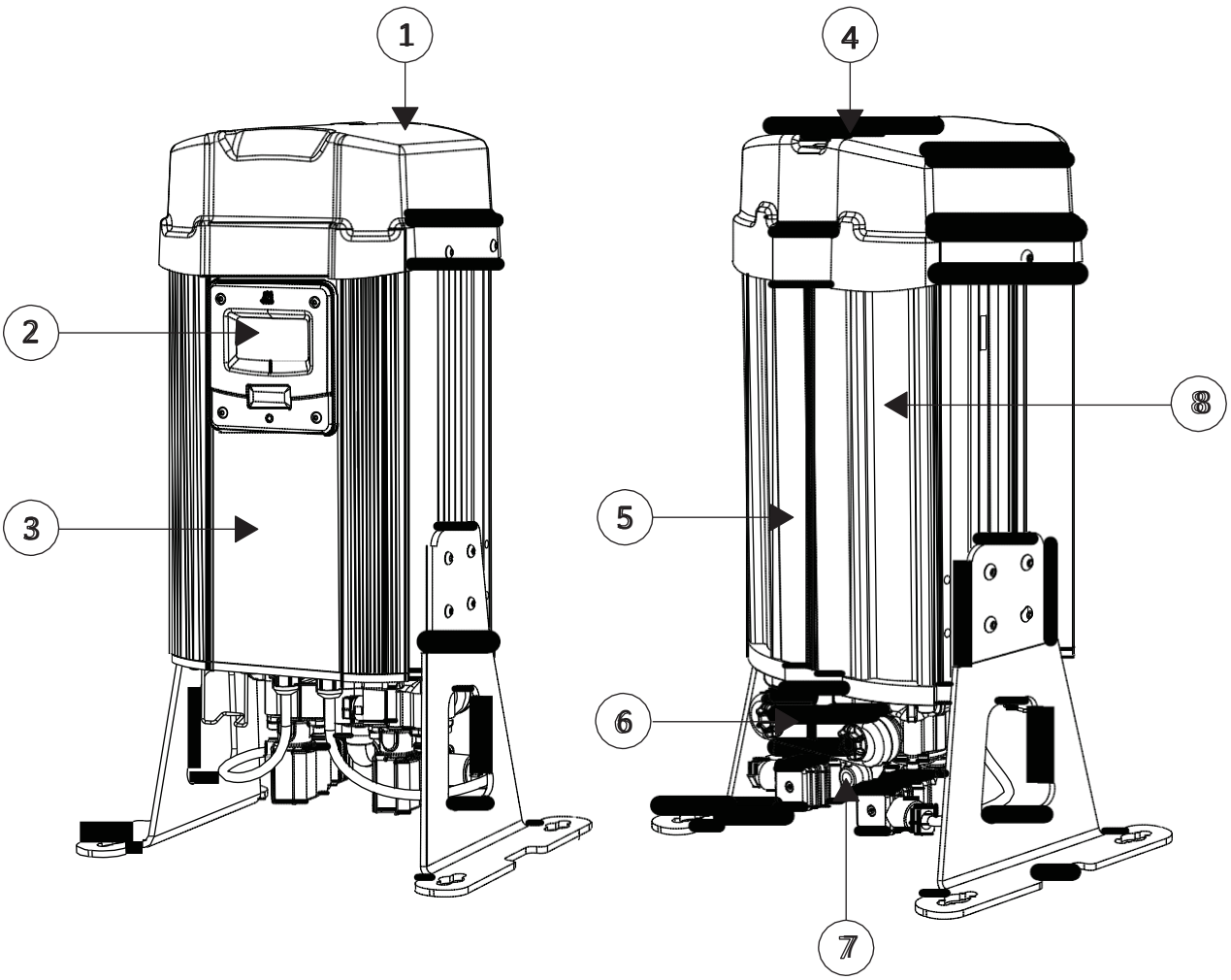


Model	Inlet Flow Rate		Connection (Push-in)	Dimension			Weight Lbs (kg)
	$\frac{Nm^3}{h}$	scfm		A ins (mm)	B ins (mm)	C Ins (mm)	
54.306	5.1	3	G3/8'' (Inlet & Outlet)	17 (447)	9 (241)	6 (160)	18.2 (8.3)
57.308	8.5	5		17 (447)	9 (241)	6 (160)	18.2 (8.3)
54.310	17	10		25 (647)	9 (241)	6 (160)	28.2 (12.8)
54.312	25.5	15		35 (897)	9 (241)	6 (160)	36.1 (16.4)
54.314	40.8	24	G1/2'' (Inlet & Outlet)	43 (1097)	9 (241)	6 (160)	42.5 (19.3)

- Flow rate based on air inlet pressure of 100 psig (7.0 barg) and temperature of 95°F (35°C).



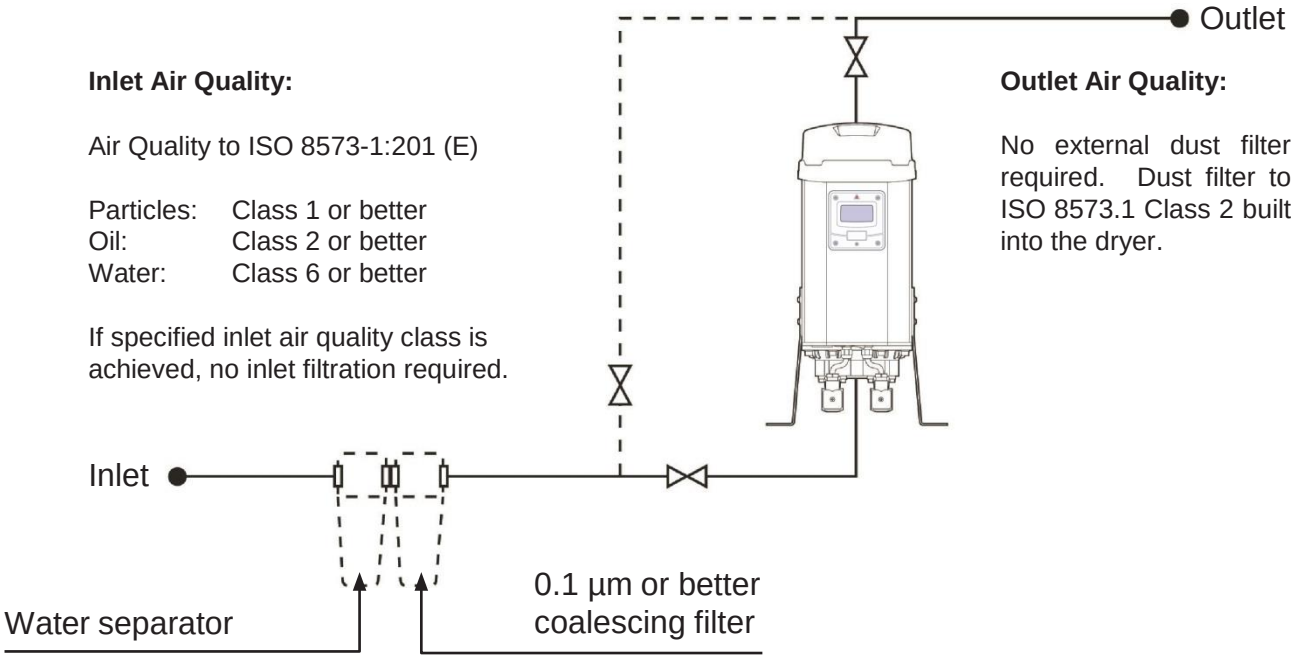
Cartridge Removal Clearance (min)		
Dryer Model	mm	in
54.306	310	13
54.308	310	13
54.310	520	21
54.312	760	30
54.314	1060	42



1	Dryer Top Cover	2	Controller Display Unit
3	Front Shroud	4	Air Outlet
5	Integrated Silencer	6	Silencer Box
7	Air Inlet	8	Dryer Column

6. System Layout

6.1. Typical installation 54.306 to 54.314



Inlet Air Quality:

Air Quality to ISO 8573-1:201 (E)

Particles: Class 1 or better
Oil: Class 2 or better
Water: Class 6 or better

If specified inlet air quality class is achieved, no inlet filtration required.

Outlet Air Quality:

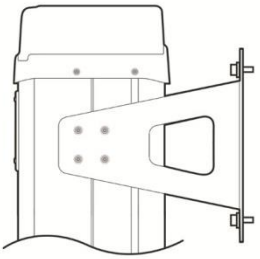
No external dust filter required. Dust filter to ISO 8573.1 Class 2 built into the dryer.

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 232 psig (16 barg) from being exceeded.

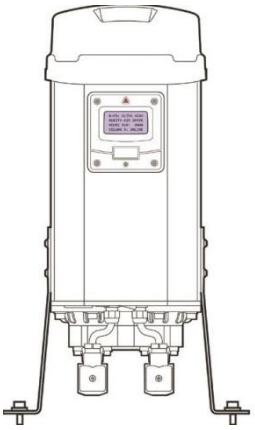
6.2. Site Location

When selecting an installation site for the dryer,
ensure the following conditions are met:

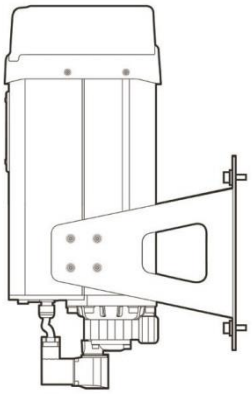
- Installation site should be protected from the weather and other harmful conditions.
- The ambient temperature must not drop below +1°C (33.8°F).
- The installation site should be level and able to support the weight of the dryer.
- Ensure sufficient space around the dryer, to allow access for operation and maintenance.
- Dryer must be mounted vertically as shown.



Wall Mounted*
54.312 & 54.314
Using additional top bracket



Floor Mounted



Wall Mounted

Note: Floor and wall mounting bolts not supplied. *Additional wall mounting brackets supplied separately.

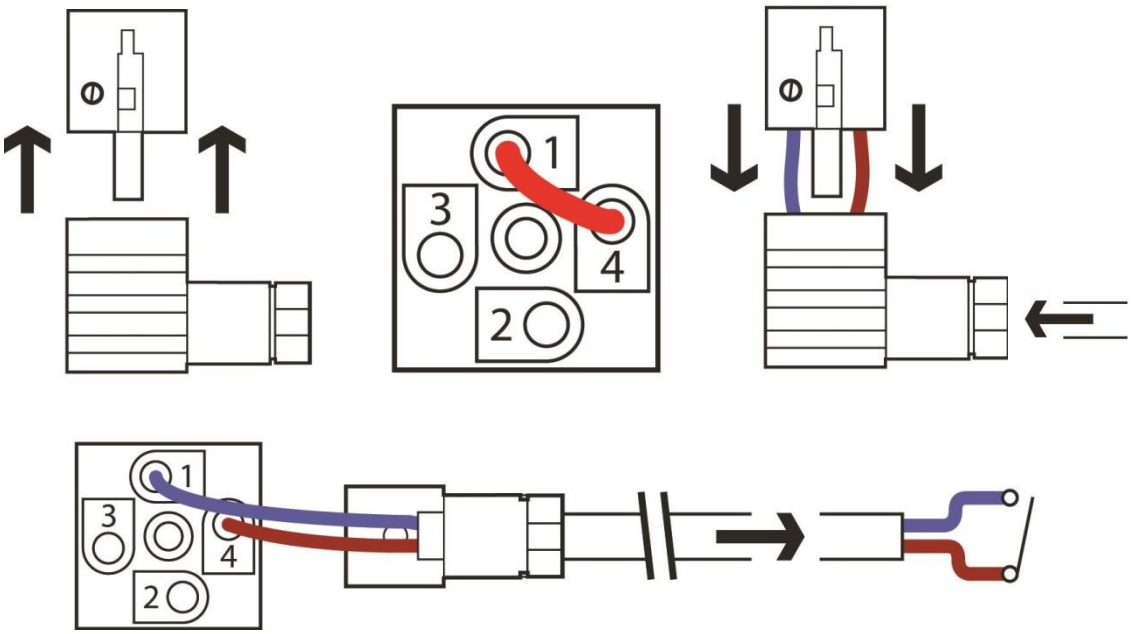
7. Dryer Operation

7.1. Dryer Remote Control (if required)

- Locate the DIN connector on the underside of the dryer. To set up for compressor eco mode, remove the link between pins 1 and 4 in the electrical connector. A zero volt switching signal from the compressor needs to be connected between pins 1 and 4.

- When the connection is made, the dryer will operate normally. If the connection is broken, i.e. the dryer has been remotely switched off; the dryer will also stop cycling and go into standby mode, displaying “STANDBY” on the display.

Electrical Connector Configuration



Under no circumstances should external voltage/current be applied to pins 1 and 4, damage to the controller will occur, negating the warranty.

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

General Alarm Output

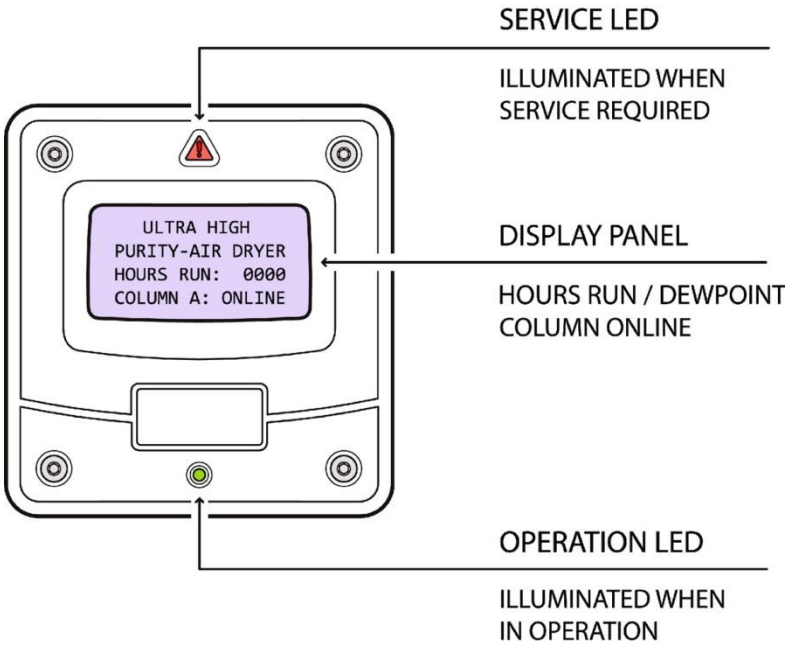
- Pins 2 & 3 on the electrical connector provide a zero volt alarm output for customer control panel indication. These pins are connected to a relay within the controller which will close when service, dewpoint (optional) and pressure alarm (optional) conditions arise.

7.2. Dryer Start-up

- Connect the IEC power supply underneath the dryer using the retaining clip to secure in position. connect the product plug to the mains supply.

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

- Connect all pipe work.
- Ensure the inlet operating pressure parameters are between 58-232 psig (4-16 barg).
- Ensure the inlet air temperature is between 35°F - 122°F (1.5°C - 50°C).
- Slowly open the inlet valve and allow dryer to pressurize.
- Turn on the power to the dryer.
- Open the outlet valve.
- The dryer will display its status and commence normal operation. When the dryer is powered up the display will show “initializing dryer” for approximately 20 seconds, ensuring the dryer is in equilibrium state before commencing operation.



7.3. Monitoring dryer performance (ES / ESP Energy Saving Option)

- The dewpoint is displayed on the control display panel. When the dewpoint displayed is better than -54.4°F (-48°C) PDP the dryer will switch into economy mode and stop cycling. When the dewpoint degrades to -43.6°F (-42°C) PDP the dryer will restart cycling ensuring the dewpoint is maintained at or better than -40°F (-40°C) PDP.

- If the dryer dewpoint degrades above -22°F (-30°C) PDP the alarm output will be indicated on the front screen. Pins 2 and 3 in the electrical connector (see page 11) are no volt alarm outputs which will activate. Permitting, for example, the end user to provide a 4-20mA closed loop signal through this switch to a remote monitoring station.

- If the ESP option is fitted ‘PRESSURE’ will be shown on the display panel. Pins 2 and 3 in plug are no volt alarm outputs which will activate if the pressure is outside the specified 58 - 232 psig (4-16 barg) range.

7.4. Shutdown Procedure

- Close the inlet and outlet valves.

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

- Cycle the dryer at least twice to ensure the dryer exhausts and is completely depressurized.

- When fully depressurized the ‘clicking’ of the exhaust valves will be heard but no air exhausted.

- When the dryer is fully depressurized, isolate from the power supply.

8. Maintenance

Maintenance operations should only be carried out by authorized, suitably trained personnel.

8.1. Maintenance Guidelines

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

8.2. Cleaning

Clean the equipment with a damp cloth only and avoid excessive moisture around any electrical sockets. If required a mild detergent may be used, however do not use abrasives or solvents as they may cause damage.

8.3. 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.

- Ensure the dryer is operating within specification; parameters, pressure, temperature and flow.

- Check the dewpoint sensor display (if installed). If the dewpoint is not maintained at <-22°F (-30°C) the reading on the display will alternate with “dewpoint alarm” every 5 seconds. The no-volt alarm will also activate.
  Please see section 13. Troubleshooting for additional information.

9. Servicing

Maintenance operations should only be carried out by authorized, competent and suitably trained personnel.

9.1. Serving Guidelines

- Maintenance operations only to be conducted when the system has been shut down, fully depressurized and isolated completely from the compressed air and electrical supply.
- Ensure the system is in a safe condition for maintenance to be carried out on.
- Dismantle and assemble with care, paying particular attention to the areas that become pressurized.
- All gaskets removed during maintenance operations must be replaced with new gaskets.
- Do not modify or adjust the control settings.
- Only certified approved replacement parts to be used.
- Always check all connections / sealing faces for cleanliness and secure seating prior to assembly.
- Ensure all components are refitted to the product before operation.
- Ensure the dryer is left operating in a safe working condition after completion of maintenance.

9.2. Service Procedures

A dryer service should take place every 2 years or 12,000 hours of operation (whichever occurs first). Service kits are available which include: replacement desiccant cartridges, seals and valves. Please contact the manufacturer or distributor for service kit information.

- **Service A - 12,000 hours (or every 2 years).**
  Replace desiccant cartridges (54.406 – 54.414)
  Replace internal ball valves
  Replace all gaskets and seals removed whilst servicing the dryer (included in relevant service kits).

- **Service B - 24,000 hours (or every 4 years).**
  Service as above.

- **Service C - 36,000 hours (or every 6 years).**
  Service as above
  Replace exhaust valves

MODEL	SERVICE A	SERVICE B
54.306	54.406	54.406
54.308	54.408	54.408
54.310	54.410	54.410
54.312	54.412	54.412
54.314	54.414	54.414

Please refer to the Series 1 Dryer service guide for instruction regarding carrying out a service.

10. 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 58 psig (4 barg). If not adjust inlet presure settings. 2. Ensure the power is on and the dryer display panel is illuminated; check the dryer is cycling correctly. 3. Eliminate the cause of contamination. Replace desiccant 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. Controller not illuminated 10. Insufficient inlet pressure 11. Failure to de-pressurize when cycling. 12. 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 58 psig (4 barg). If not adjust inlet presure settings. 10. Check power to unit & fuse. 11. Solenoid valve not functioning correctly; if there is power to the coil, replace valve. A correctly working valve outputs an audible click when it energizes. 12. Check inlet air supply.
Constant depressurization	13. Failure to initialize dryer 14. Erratic air flow from exhaust	13. Switch off and restart dryer. Ensure dryer is pressurized before powering dryer to allow dryer to initialize before commencing operation. 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 the underside of the dryer.

Additional Items

Use of non-authorized components.
Untrained / unauthorized maintenance / installation personnel used.
Increase in air consumption without relation to the flow capacity of the dryer.
Purging the dryer with cleaning agents that could damage the components or the desiccant.
Covers removed or loose during operation.
Failure to carry out a service when indicated by the dryer service light.
Do not allow the dryer to flow air unless powered up, switched on and cycling. Resulting effect could be desiccant contamination; requiring replacement desiccant cartridges.