SULLAIR®

SD Heatless Desiccant Compressed Air Dryer

User Manual

For Model Series SD-820 to -1710

With Dewpoint Dependent Switching

This dryer includes equipment options as selected (X) below:

- [x] DDS OPTION
- [ ] EDP OPTION
- [ ] 3V OPTION

CONTAMINANT REMOVAL SYSTEMS

This Manual is part number 02250159-760
Applicable for dryers serial number 13982 and up
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FOREWORD

Reading this user manual will fully familiarize you with the Sullair adsorption dryer. You will be better able to run this equipment in accordance with its intended use.

This manual contains important information for safe, proper and economic dryer installation, start-up, operation and maintenance. Always keep it within reach where the adsorption dryer is being used.

It is necessary to follow all instructions as written. Careful reading will avert danger, avoid unnecessary downtime, and minimize work for yourself and wear on the equipment.

In addition to carefully reading this technical manual in its entirety, you must understand your National, State and local rules and regulations regarding safety in the workplace, their necessary precautions and procedures.

Each person responsible for the set-up, start-up, operation, maintenance or repair of this adsorption dryer must have first read and understood this user manual – including all the safety tips.

NOTE: Sullair recommends that installation, start-up and maintenance be carried out by its factory-trained technicians in a regularly scheduled, site-dedicated program. This will ensure the safety of personnel, the integrity of equipment and the surety of warranty coverage.

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1. INTRODUCTION

1.1 GENERAL

This dryer includes the latest technology and safety features. Its use, however, can endanger life and limb and can lead to considerable damage to the equipment and other material assets if:

- it is operated by personnel not instructed in its use,
- it is improperly used,
- it is improperly maintained or serviced.

Furthermore, ignorance of its use and maintenance can result in the loss of any claim for damage.

This adsorption dryer is designed for neutral media (such as air or nitrogen) which is free of aggressive water, oil and solid elements. Sullair accepts no liability for corrosion damage or malfunctions caused by aggressive media.

Applications other than those mentioned in this manual must be agreed to by Sullair and confirmed in writing.

This dryer additionally requires the installation of Sullair pre- and afterfilters (refer to paragraph 1.8) which are shipped separately.

Sullair reserves the right to make changes at any time as may be necessary for increasing safety or efficiency, or in the interests of further product development.

1.2 PRODUCT INFORMATION

The adsorption dryer is used for the purpose of drying compressed air and other gases according to its contracted design. Depending on certain conditions at the inlet, and with pre- and afterfilters properly installed, it provides pure, dry and oil-free compressed air or gases. The standard model of adsorption dryer is equipped with two desiccant vessels.

This specific model of dryer includes a Dewpoint Dependent Switching (DDS) system that provides automatic monitoring and control of the work/regeneration cycle to optimize equipment efficiency. This manual also includes references to optionally available Enhanced Dew Point (EDP) and 3-Valve Bypass (3V) systems/assemblies which may or may not be provided. Selected options included with this dryer are indicated on the cover page by an “X” mark in the box.

1.2.1 PRESSURE VESSEL REGULATIONS

The pressure vessels are designed and built to meet the American Society of Mechanical Engineers (ASME) standards. They fulfill the test of the certifying procedure and carry the ASME symbols **U** or **UM**.

RANGE OF APPLICATION

Design Pressure	Max: 150 psig
Design Temperature	Max: 500 °F (260 °C) Min: -20 °F (-29 °C)

1.2.2 LEAK TEST

Each Sullair adsorption dryer is subjected to, and must pass, a leak test prior to shipment.

1.3 SAFETY INSTRUCTIONS

This manual contains basic tips which must be followed during set-up, operation and servicing. It is of utmost importance that it be read by the assembly technician before installation and start-up as well as by the specialist/operator in charge. It must always be within reach at the place where the adsorption dryer is being used.

1.3.1 IDENTIFICATION OF SIGNS AND SYMBOLS IN THIS MANUAL

The safety tips contained in this manual, whose disregard could endanger people and equipment, are indicated by a general danger sign and the additional markings **Danger!** or **Attention!** or **Warning!**

Danger! / Attention!

Safety sign in accordance with DIN 4844 - W9

Warning – high voltage!

Safety sign in accordance with DIN 4844 - W8

Safety tips printed directly on the adsorption dryer must be heeded at all times and must be kept completely legible.

1.3.2 General Safety Tips for Assembly, Inspection and Maintenance

The purchaser is to ensure that all assembly, maintenance and inspection work is carried out by personnel qualified to do it.

The personnel involved in assembly, operation, maintenance and inspection must have the corresponding qualifications to do this work. Areas of responsibility and supervision of the personnel must be clearly established by the purchaser. Should the personnel not possess the necessary knowledge, then they must be instructed. If need be, this training may be carried out by the manufacturer/supplier at the request of the purchaser. Further, the purchaser is to ensure that all personnel completely understand and follow the content of this manual.

Attention!

- Never make structural changes to the adsorption dryer
- Only use recommended spare parts as listed in section 5
- Never weld on a pressure vessel or change it in any way
- Carry out maintenance only when the adsorption dryer is OFF, depressurized and disconnected from the electric power supply.

Danger!

- Wear protective clothing and goggles when working with the desiccant
- If desiccant comes into contact with the eyes, rinse eyes immediately with a lot of clear water
- If the desiccant is spilled, clean up without causing swirls of dust
- In case of fire, there is no restriction on the use of fire extinguishing material on the desiccant; the reaction with water and foam is defined as strong
- A mask must be worn whenever handling desiccant.

1.4 TECHNICAL DATA SHEET

All values given in the table below assume a standard dryer with a standard scope of supply and standard operating conditions.

	SD-820	SD-1050	SD-1200	SD-1450	SD-1710
Process medium	Air, free of aggressive elements				
Flange (150#) connections (inches)	3	3	3	3	3
Flow capacity (1) (SCFM)	820	1050	1200	1450	1710
Flow capacity with EDP option (2) (SCFM)	574	735	840	1015	1197
Desiccant	Activated alumina				
Qty of desiccant per chamber (pounds)	460	600	700	800	952
Recommended filter size (SCH/SCR)	910	1315	1315	2120	2120
Controls	Printed Circuit Board				
Operating electrical power	110, 115, 120 Vac / 1 Phase / 50, 60 Hertz				
Drying time per tower	Standard: 5 minutes With EDP Option: 2 minutes (2)				
DDS activation setting	Standard: -41.8°F (-41°C) With EDP Option: -101°F (-74°C) (2)				
High humidity alarm setting	Standard: -32.8°F (-36°C) With EDP Option: -96°F (-69°C) (2)				

(1) *NOTE*: At standard inlet conditions of 100°F, 100 psig, and providing a –40°F pressure dew point according to DIN ISO 7183.

(2) *NOTE*: EDP Option indicates a dryer which has been specifically set up at the factory to obtain a pressure dewpoint of -100°F. Paragraph 1.2 identifies the options provided with this dryer. This option requires reduction of the rated flow. Contact Sullair for details.

1.5 OVERLOADING

Attention!

Protect the adsorption dryer from overloading!

The adsorption dryer can become overloaded if:

- The flow volume of the medium to be dried increases
- The temperature of the air at entry and, correspondingly, its humidity increases
- The minimum operating pressure decreases
- The prefiltration and separation of impurities are not sufficient or the filter drain fails
- Introduction of oil into the air stream.

1.6 TRANSPORT

Immediately upon delivery of the dryer, it must be checked for any damage that may have occurred during transport. If necessary, the damage must be recorded on the shipping waybill/receipt. Liability for such damage usually rests with the shipper. Contact Sullair to arrange for any required service or replacement parts.

Attention!

For transport within your company site, only the skid of the adsorption dryer may be used for lifting. Lifting at any other points on the equipment will void the warranty and damage the equipment.

1.7 STORAGE

If the adsorption dryer is to be stored for a long period of time, its place of storage must be dry and free of dust. The ambient temperature must not go below 33°F (+1°C).

1.8 USE OF A PREFILTER AND AFTERFILTER

In order to prevent droplets of condensate, oil and dirt from getting into the desiccant, a Sullair SCH 0.01-micron coalescing prefilter with an automatic condensate drain must be installed upstream of the adsorption dryer. Otherwise an oil film on the desiccant would reduce the drying capacity and adversely affect performance.

In order to prevent breakdown in downstream consumers caused by material that has been abraded from the desiccant bed, a Sullair SCR 1-micron particulate afterfilter must be mounted downstream of the adsorption dryer. Since no condensate accumulates in the afterfilter, this filter is normally equipped with a manual vent valve.

1.8 USE OF A PREFILTER AND AFTERFILTER (CONTINUED)

Both filters should be equipped with an incident monitor (i.e., differential pressure indicator) to advise of premature blockage of the filter elements. Elements must be changed annually regardless of the reading on the indicator.

2. INSTALLATION

2.1 GENERAL

Ensure that the installation site is free of dust, dirt and litter. The site floor must be level and strong enough to support the equipment. The site itself must ensure that the equipment will not, under any circumstances, experience ambient temperatures below freezing.

Ensure that the Sullair dryer is carried only by its skid base frame. It must be positioned so that the side from which it is to be operated is easily accessible. The piping is to be connected at a slightly downward slope toward the prefilter. Install isolation valves on the inlet and outlet sides of the dryer. Also, a bypass pipe with an additional valve should be mounted around the dryer to allow for an uninterrupted supply of compressed air when it requires maintenance or repair. The bypass assembly is optionally provided (see paragraph 1.2) or can be customer furnished. If vibration occurs at the installation site, the adsorption dryer skid frame must be placed onto vibration dampers.

2.2 ELECTRICAL CONNECTION

Since the adsorption dryer has already been completely wired at the factory, the customer only has to connect the power supply cable to the terminal strip according to the supplied wiring diagrams (see section 7).

Warning – high voltage!

Be sure that power is removed from the line feed before making connection between the site drop and the equipment.

This Sullair adsorption dryer is normally controlled with a printed circuit board. The set times are adjusted at the factory during the test run. **Do not change these adjustments!**

NOTE: Contact Sullair if you have any questions.

2.3 FILTERS

If not already factory installed, you must install a 0.01-micron coalescing (SCH) prefiliter with an automatic condensate drain upstream of the desiccant dryer and 1 micron particulate (SCR) afterfilter with manual vent valve downstream of the desiccant dryer. Refer to the filter manual for proper installation.

2.4 PURGE EXHAUST

The purge exhaust may be piped to an open vent. Noise levels at the dryer may be reduced by extending the purge exhaust piping to a remote location. Refer to the purge piping selection chart below to prevent excessive backpressure which may adversely affect dryer performance.

EXTENDED LENGTH	PIPE SIZE REQUIRED
TO 10 FEET	SAME SIZE AS DRYER EXHAUST
TO 25 FEET	1 SIZE LARGER THAN DRYER EXHAUST
TO 50 FEET	2 SIZES LARGER THAN DRYER EXHAUST
TO 100 FEET	3 SIZES LARGER THAN DRYER EXHAUST

Extending purge exhaust piping must not cause excessive back pressure on the chamber being regenerated. A pressure reading of 3-psig there is considered too high for the dryer to regenerate efficiently.

2.5 DDS CONTROL CONNECTION

Check that the sample line (1/8-in Teflon tube) is connected from the dryer outlet (see flow schematic in section 7) to the inlet valve on the humidity probe sample cell. The humidity probe comes in a transport container found inside the control panel. Remove probe from container and install it in the sample humidity cell (see figure 1). Close the container and keep it inside the control panel for future maintenance.

Connect the coaxial cable to the humidity probe.

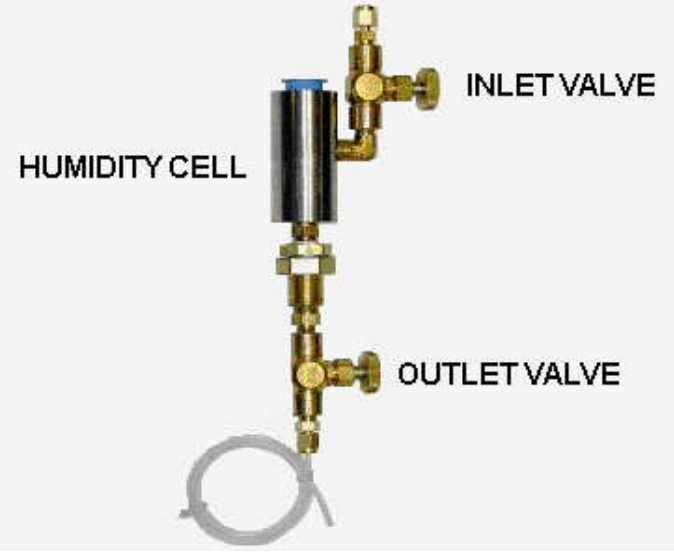

FIGURE 1 – HUMIDITY CELL ASSEMBLY

3. EQUIPMENT OPERATION

3.1 GENERAL OPERATING PRINCIPLES

This Sullair dryer has two parallel adsorption chambers filled with desiccant. While the medium is being dried flowing bottom-up in one chamber, regeneration takes place from the top down in the other chamber. The changeover from one chamber to the other is controlled by the Dewpoint Dependent Switching system that monitors desiccant performance by measuring the outlet air dew point. It operates continuously and is fully automatic.

The standard dryer with DDS has a cycle time of 10 minutes. Dryers with the Enhanced Dew Point option have a 4-minute cycle time. In each case, half the cycle time is dedicated to air drying and the other half to desiccant regeneration, with one chamber working to dry the air while the other regenerates. The cycle time affects air flow and air quality. The longer cycle time allows greater saturation of the desiccant, thereby decreasing its drying capacity over the period of the cycle. The faster cycling provided with the EDP option ensures that the desiccant is regenerated more frequently, thereby enhancing its drying performance. The dryer is configured at the factory. The principles of operation are the same for both the standard (with DDS) and the EDP dryers.

Wet air enters the working desiccant chamber (it can be either the left or right) at the inlet switching valve (bottom) and is dried as it flows upward through the desiccant bed. Dry air exits the dryer through the outlet check valve.

At the outlet of the working chamber, a portion of the dry air (i.e., purge air) is diverted to the regenerating chamber. That purge air, at near atmospheric pressure, will remove previously adsorbed moisture as it flows downward through the desiccant bed and exits through the purge exhaust muffler.

The purge air is controlled by a purge adjusting valve and purge orifices located in the purge line. Purge pressure is indicated on the purge pressure gauge. Refer to Appendix B for instructions on adjusting the purge rate.

Near the end of each half cycle, the chamber being regenerated will be repressurized. For this to occur, the exhaust valve of the chamber being regenerated closes while purge air continues to flow. Repressurizing the regenerated chamber to operating pressure before placing it into service minimizes fluidization of the desiccant and helps prevent desiccant abrasion which causes desiccant dust to prematurely block pilot filter and afterfilter elements.

Chamber switchover takes place when both towers are fully pressurized. This minimizes desiccant movement which, in turn, minimizes creation of dust.

When switchover is complete, the regenerated tower will be placed into service and the exhausted tower will begin a depressurization/regeneration cycle.

When sized correctly, the Sullair type SD air dryer with DDS is designed to provide a specific pressure dewpoint performance (generally -40°F (-40°C)) at worst-case operating conditions (maximum flow at lowest pressure and highest inlet temperature). The regeneration purge flow rate required for the dryer is adjusted to achieve that dewpoint based on those conditions.

For example, for dryers operating at 100 psig (690 kPa) and 100°F (38°C), the purge flow rate is approximately 15% of the specified maximum inlet flow. Dryers operating under less severe inlet conditions will introduce a reduced humidity load. The DDS controls have been factory programmed to monitor the dryer outlet dewpoint so that regeneration will only begin when low desiccant performance registers.

Sullair SCH high-efficiency prefilters and SCR reverse-flow afterfilters are designed to remove solids, oil and water condensate from compressed air and other neutral, compressed gases. These filters provide high flows and low differential pressures.

Solids are filtered out by impact or by the effect of inertia, whereas oil particles and drops of moisture are filtered out by the effect of coalescence. Contaminants collect in the bottom of the filter vessel and are drained either automatically or manually.

Filters are provided separately unless the 3-Valve Bypass option has been purchased (see paragraph 1.2).

3.2 OPERATOR CONTROLS

This adsorption dryer includes a Dewpoint Dependent Switching system that monitors the dryer outlet dewpoint performance to set the optimum chamber changeover cycle for desiccant regeneration.

The operator electrical control panel features the following indicators/controls:

- Dryer nameplate – the nameplate information identifies your dryer
- Three-way selector switch on the left side of the operator control panel:
  - DRYER OFF
  - DRYER ON
  - DDS ON.
- Digital operations status display (see figure 2) used for system monitoring:
  - **ECONOMY CYCLE** light emitting diode (LED) – lit when DDS is on

3.2 OPERATOR CONTROLS (CONTINUED)

- **DEW POINT** liquid crystal display (LCD) – shows the currently measured dew point. The display flashes **+20** when the measured dew point exceeds the factory-set alarm limit.
- **POWER** LED – lit when the dryer is powered
- Flow direction LEDs – identify which dryer chamber is drying or regenerating. The LED lit at an up arrow shows that chamber is drying. The LED lit at a down arrow indicates that the chamber is in regeneration mode. A chamber which is finished regenerating, and is standing by, will have no LED lit.

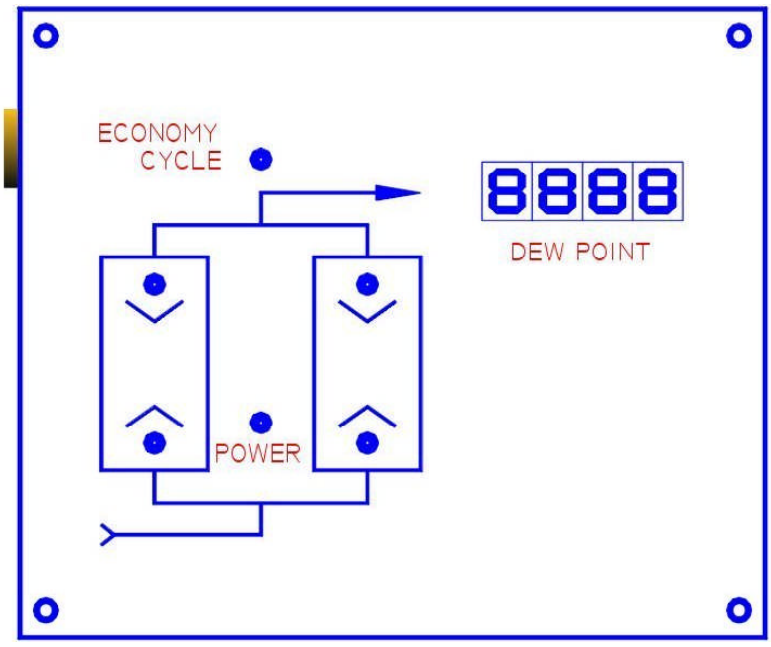

FIGURE 2 – STATUS DISPLAY

There are two Sullair filter assemblies also required for proper dryer operation. The prefilter housing has an incident monitor (also known as differential pressure indicator) and an automatic drain. The afterfilter housing has an incident monitor and manual vent valve.

Each desiccant chamber has a thermal pressure relief valve at the top (for pressure relief due to thermal expansion in a shut-in condition), a pressure gauge and desiccant fill/drain (top/bottom) ports.

3.3 INITIAL START-UP

Attention!

All pipes and wire connections must be tightened!

Furthermore, before start-up:

- The pipes must be cleaned of scale**,** abraded material from the threading, or other similar impurities.
- All isolation valves upstream of the prefilter and downstream of the afterfilter should be closed. The bypass valve (if installed) should be open.
- The ambient temperature must not be less than 33°F.

NOTE: Failure resulting from faulty installation or start-up does not fall under the Sullair warranty obligation. Start-up by factory trained personnel is highly recommended.

Perform the following tasks in sequence for the initial start-up:

- Remove purge exhaust mufflers for the initial 1 to 2 hours of operation
- Slowly open the inlet isolation valve and observe the pressure build-up on the chamber pressure gauge of the adsorption dryer. Avoid an abrupt pressure build-up as this may damage the dryer.
- Turn the switch to the DRYER ON position.

NOTE: Do not switch to* DDS ON *during the first eight hours of operation.

- The adsorption dryer must be powered approximately 3 to 4 hours with the isolation valve downstream of the afterfilter closed. This regenerates the desiccant.
- After the regeneration phase, open the shut-off valve behind the afterfilter slowly while observing the chamber pressure gauge. If the shut-off valve is opened abruptly, it could put a stress on the system. Close the bypass valve (if installed).

The adsorption dryer is now ready for operation and functions continuously and fully automatically. After eight hours of operation, it is appropriate to engage the DDS feature:

- Fully open the inlet valve to the sample cell
- Partially open the discharge valve of the sample cell to bleed off a small amount of sample air. Do not fully open discharge valve.

- Perform a soap bubble test to check for leaks on all parts of the sample line, connections and the humidity sample cell.
- The digital display will read the dew point of the dryer system. It will take a period of time for a humidity probe to be purged of humidity and read the correct dew point.

NOTE: ***The dryer should be operated in the* DRYER ON *position at the time of initial start-up and at all times when the hygrometer or humidity probe are removed for service.***

3.4 SHORT-TERM SHUT-DOWN

Follow this sequence when switching off the adsorption dryer:

- First close all the isolation valves up- and downstream of dryer
- Then immediately switch DRYER OFF.

Danger!

Dryer will remain pressurized.

3.5 SHUT-DOWN IN CASE OF A FAULT OR FOR MAINTENANCE

Follow this sequence when switching off the adsorption dryer:

- First close all the isolation valves up- and downstream of the adsorption dryer,
- Depressurize the dryer by using the manual vent valve at the bottom of the afterfilter,
- Then immediately switch DRYER OFF.

Danger!

Before any kind of maintenance or repair work is done, the dryer must be depressurized and disconnected from the power source.

3.6 RESTARTING

- Close the manual vent valve at the bottom of the afterfilter
- Slowly open the inlet isolation valve and pressurize the adsorption dryer up to the regular operating pressure by keeping the isolation valve mounted downstream of the afterfilter closed.
- Switch DRYER ON.

NOTE: If the dryer is restarted after a long standstill, proceed as for an initial start-up (see paragraph 3.3).

3.7 ALARMS

3.7.1 HYGROMETER FAILURE ALARM

If the hygrometer probe fails, then a fault will be triggered by the hygrometer. The **DEW POINT** display on the operator control panel will read **999**.

If the hygrometer itself fails or loses power, the **DEW POINT** display will read either **sens** or **-999**.

3.7.2 HIGH HUMIDITY ALARM

The hygrometer has been programmed to initiate an alarm if the dryer outlet dew point rises above the setting shown in section 1.4. The **DEW POINT** display on the operator control panel will read **+20**.

3.7.3 COMMON ALARM RELAY

If any alarms are activated, the common alarm relay will also be activated. The alarm relay does not convey the nature of the alarm, it only provides an output that an alarm has occurred. The alarm relay is usually connected by the purchaser to a remote monitoring station.

4. MAINTENANCE

4.1 CHECKLIST

These checks are to be carried out by the operator during the routine operations cycle.

4.1.1 DAILY CHECK

- Carry out a general visual check of fittings, listen for any sound which may identify an air leak, and watch out for changes in indicated values during operation
- Read the **DEW POINT** display and check the maintenance record
- Check function by manually operating the automatic condensate drain on the prefilter.

NOTE: Should the need for spare parts or service arise during work on the adsorption dryer, then the dryer model and serial number must be conveyed to Sullair. This information is given on the nameplate mounted on the control cabinet.

4.1.2 WEEKLY CHECK

- Check the incident monitor on the prefilter. A value in the red suggests the element has become blocked by excessive debris. Elements must be replaced annually for proper performance regardless of the incident monitor reading (see paragraph 4.2).
- Check the incident monitor on the afterfilter. A value in the red suggests the element has become blocked by excessive debris. Elements must be replaced annually for proper performance regardless of the incident monitor reading.
- Check the back pressure of the muffler behind the inlet valve assembly by reading the gauge on the chamber that is being regenerated; it should not exceed 3 psig.
- Drain pilot air filter housing of any condensate (see figure 3).

Figure 3 – Pilot Air Filter

4.1.3 WHICHEVER IS FIRST: AFTER EACH 2,500 OPERATING HOURS OR ANNUALLY

- Check the desiccant for impurities and change it if necessary (see paragraph 4.3). Any brownish/yellowish tone indicates that it has been soiled with oil. The desiccant has a normal lifetime of about 10,000 operating hours.
- Check the outlet desiccant screens installed in the desiccant chambers for impurities and, if necessary, clean them.
- Check the function of the inlet valve by manually sending it electrical control signals.
- Check the seat O-rings on the outlet check valves.
- Contact Sullair to recalibrate the dewpoint sensor humidity probe.

NOTE: In order to ensure continuous and trouble-free operation, a maintenance agreement with your authorized Sullair distributor is recommended.

4.2 CHANGING THE FILTER ELEMENT

- The filter elements must be changed annually
- Depressurize the dryer and move the power switch to DRYER OFF

Danger!

Change filter elements only when the housing is fully depressurized

- Separate the lower part of the housing from the upper part
- Loosen and remove the element by hand
- Install the new element and replace the O-ring/gasket, making sure that the element seats perfectly
- Refit the filter housing.

NOTE: Filter elements cannot be cleaned or reused.

Attention!

Filter elements may contain pollutants as appropriate to their function. Dispose of used filter elements in accordance with your local, state and federal regulations.

4.3 REPLACEMENT OF THE DESICCANT

Desiccant life is determined by the care with which it is handled, the quality of filtered inlet air provided and by its time in use. Be careful to not abrade (i.e., wear down) the desiccant when installing it. Proper filtering of inlet air, and constant pressure and temperature, will also extend its life. In order to ensure trouble-free operation, we recommend replacing the desiccant every 10,000 operating hours, or every 3 years.

The following considerations determine the life expectancy of desiccant:

- Care in installation
- Quality of input gas (e.g., air)
- Constancy of flow and temperature
- Whether full-service cycling or low-demand usage
- Time in service.

The following clues will suggest that you examine the desiccant and consider its replacement:

- Discolorization of desiccant (e.g., oil residue, other contaminants): a brown or yellow tinge indicates that the adsorbancy capacity of the desiccant has been diminished
- Frequent afterfilter replacement due to desiccant dust accumulation
- Performance dew point rises.

Refer to paragraph 1.4 to determine the desiccant quantity required for your model of dryer.

- Close dryer inlet/outlet isolation valves
- Depressurize and move the power switch to DRYER OFF

Danger!

- Wear protective equipment when handling desiccant

- Remove the desiccant drain port plug on each desiccant chamber and empty the old desiccant into a container

Danger!

- Desiccant may contain pollutants.
- Desiccant is to be disposed of in accordance with local, state and federal regulations.

- Replace the desiccant drain port and fill with new desiccant from the fill port above
- Start the dryer in accordance with paragraph 3.3 for initial start-up.

4.4 CHANGING THE PURGE REGENERATION ORIFICE

- Depressurize the dryer and switch DRYER OFF
- The regeneration orifice is integrated into pipe fittings that are threaded directly into the top manifold
- Unscrew the orifice fittings
- Remove regeneration orifice and re-install new orifice as required
- Verify that all pipe connections are properly secured.

NOTE: Consult Sullair for recommendations and/or replacement of the purge regeneration orifice. Modification of the regeneration orifice can lead to performance deterioration of the dryer.

5. SPARE PARTS LIST

5.1 SD-820 TO SD-1050

Description	SD-820		SD-1050	
	Part #	Qty	Part #	Qty
Consumables				
Prefilter (Element Only)	Refer to filter Nameplate or Consult Sullair	1	Refer to filter Nameplate or Consult Sullair	1
Afterfilter (Element Only)		1		1
Moisture Indicator	02250130-254	1	02250130-254	1
Activated Alumina – Pounds (50-lb bag)	02250140-346	810	02250140-346	920
Muffler	02250138-851	2	02250138-851	2
Inlet Valve				
Inlet Valves Kit	02250159-653	1	02250159-653	1
Solenoid Block	02250159-642	1	02250159-642	1
Inlet Valve	02250159-652	2	02250159-652	2
Outlet Valve				
Check Valve Kit	02250159-630	1	02250159-630	1
Gasket, 3-inch	02250159-622	4	02250159-622	4
Check Valve	02250130-326	2	02250130-326	2
Purge Valve				
Purge Valve Kit	02250138-847	2	02250138-847	2
Solenoid Block	02250159-641	1	02250159-641	1
Purge Valve	02250138-846	2	02250138-846	2
3V Bypass Option				
Manual Butterfly Valve Kit	02250159-645	3	02250159-645	3
Gasket, 3-inch	02250159-622	4	02250159-622	4
Bypass Valve	02250159-644	3	02250159-644	3
DDS				
Probe Recalibration	Consult Sullair	1	Consult Sullair	1
Power Selector Switch	02250159-602	1	02250159-602	1
Motherboard	02250159-591	1	02250159-591	1
Interface Board With Display	02250159-590	1	02250159-590	1
Connection Cable 6'	02250149-694	1	02250149-694	1
Replacement Parts				
Pressure Gauge	02250159-572	3	02250159-572	3
Relief Valve	02250130-298	2	02250130-298	2
Solenoid Valve Connection Cable	02250159-607	4	02250159-607	4

5.2 SD-1200 TO SD-1710

Description	SD-1200		SD-1450		SD-1710	
	Part #	Qty	Part #	Qty	Part #	Qty
Consumables						
Prefilter (Element Only)	Refer to Filter Nameplate or Consult Sullair	1	Refer to Filter Nameplate or Consult Sullair	1	Refer to Filter Nameplate or Consult Sullair	1
Afterfilter (Element Only)		1		1		1
Moisture Indicator	02250130-254	1	02250130-254	1	02250130-254	1
Activated Alumina – Pounds (50-lb bag)	02250140-346	1400	02250140-346	1600	02250140-346	1904
Muffler	02250138-851	2	02250138-851	2	02250138-851	2
Inlet Valve						
Inlet Valves Kit	02250159-653	1	02250159-653	1	02250159-653	1
Solenoid Block	02250159-642	1	02250159-642	1	02250159-642	1
Inlet Valve	02250159-652	2	02250159-652	2	02250159-652	2
Outlet Valve						
Check Valve Kit	02250159-630	1	02250159-630	1	02250159-630	1
Gasket, 3-inch	02250159-622	4	02250159-622	4	02250159-622	4
Check Valve	02250130-326	2	02250130-326	2	02250130-326	2
Purge Valve						
Purge Valve Kit	02250138-847	2	02250138-847	2	02250138-847	2
Solenoid Block	02250159-641	1	02250159-641	1	02250159-641	1
Purge Valve	02250138-846	2	02250138-846	2	02250138-846	2
3V Bypass Option						
Manual Buitterfly Valve Kit	02250159-645	3	02250159-645	3	02250159-647	3
Gasket	02250159-622	4	02250159-622	4	240621-010	4
Bypass Valve	02250159-644	3	02250159-644	3	02250159-646	3
DDS						
Probe Recalibration	Consult Factory					
Power Selector Switch	02250159-602	1	02250159-602	1	02250159-602	1
Motherboard	02250159-591	1	02250159-591	1	02250159-591	1
Interface Board With Display	02250159-590	1	02250159-590	1	02250159-590	1
Connection Cable 6'	02250149-694	1	02250149-694	1	02250149-694	1
Replacement Parts						
Pressure Gauge	02250159-572	3	02250159-572	3	02250159-572	3
Relief Valve	02250130-298	2	02250130-298	2	02250130-298	2
Solenoid Valve Connection Cable	02250159-607	4	02250159-607	4	02250159-607	4

6. FAULTS AND TROUBLESHOOTING

6.1 DEW POINT TOO HIGH

POSSIBLE CAUSE	SOLUTION
Operating pressure too low, air flow volume too high	Increase operating pressure, reduce air flow capacity
Air inlet temperature too high	Reduce temperature or install an air cooler upstream
Differential pressure at the prefilter is too high	Replace the filter element
Condensate drain is not functioning	Check operation of the condensate drain and replace if necessary
Desiccant is soiled or has disintegrated	Replace the prefilter element and the desiccant. Dispose of the old desiccant

Danger!

- Wear protective equipment and clothing when handling desiccant

Volume of regeneration gas too low	Check regeneration orifice for soiling, clean if necessary; check operation of muffler and depressurization valve, replace if necessary.
Back pressure in regenerating vessel	Check if mufflers are clogged or if there is a valve leak.

6.2 TOWERS DO NOT SWITCH OVER

POSSIBLE CAUSE	SOLUTION
Chamber pressure switch contact is defective	Verify switch contact and replace if necessary.
Chamber pressure below pressure switch settings	Set switch 30 PSIG below normal operating pressure.
Exhaust valve not fully closed	Verify valve for obstruction. Verify pilot air to exhaust valve is removed during the repress stage.
Solenoid valve leaks	Verify for air leakage on non-activated solenoid.
Purge isolation valves partially open or closed	Purge isolation valves (2) are to be fully open at all times
Inlet valve failed to operate position	Verify there is pilot air to inlet valve actuator. Verify solenoid valve operation.

Inlet/exhaust valve failed to activate	Verify wiring to terminal strip Verify wiring connector on the solenoid valve assembly Verify pilot air service valve is open Verify pilot air filter element is not soiled
Outlet check valve failed to close	Verify bushings on check valve are worn Verify spring on check valve Verify check valve seat O-ring

6.3 BACK PRESSURE TOO HIGH DURING REGENERATION

POSSIBLE CAUSE	SOLUTION
Muffler is blocked	Clean or replace muffler
Outlet check valve failed	Verify springs and bushings on valves Verify seat O-ring is not damaged
Exhaust valve not fully open	Verify operation of pneumatic actuator Verify pilot air to actuator Verify if valve is obstructed
Inlet valve leaks across ports	Remove valve and test for across port leakage Install new seals
Inlet valve not fully positioned	Verify the pneumatic actuator for 90° operation Verify for leaks across vane of actuator Pilot air pressure failed due to plugged pilot filter or damaged pilot line.

Attention!

If you are not able to repair a fault, call your local Sullair distributor or the Sullair Service Department to arrange for service. A service technician will help you with the problem or, if necessary, will be sent to your site.

7. DRAWINGS

APPENDIX A – DRYER OPERATING SEQUENCE

This dryer uses a printed circuit board (PCB) as its standard controller. In the event of a power failure, the inlet valves will open and the dryer will pressurize both chambers. Since this control panel uses retentive programming, the dryer will return to the step in the cycle where dryer was before power was removed.

NOTE: If power failure occurs to the dryer or unit is turned off, both exhaust valves will close. Both inlet valves will remain open.

Set switch to DRYER ON. The electrical circuit is energized. Table A-1 presents the dryer operating logic.

TABLE A-1 DRYER STEP SEQUENCE

STEP	FUNCTION	PROCESS
1	SELECT LEFT CHAMBER DRYING	De-energize solenoid EV-1R. Energize solenoid EV-1L. Inlet valve positioned for left chamber drying. When 3 seconds have passed, go to next step.
2	DEPRESSURIZE RIGHT CHAMBER	Keep EV-1L energized. If in DRYER ON mode: • Energize EV-2R opening right chamber dump/exhaust valve. If in DDS ON mode and dew point is better than hygrometer set point: • EV-2R does not energize. When regeneration time has passed, go next step.
3	REPRESSURIZE RIGHT CHAMBER	Keep EV-1L energized. De-energize EV-2R: close right chamber dump/exhaust valve. The repressurization timer begins a countdown of 40 seconds. Inlet valve remains in current position. When repressurization time has passed, go to next step
NOTE: EV-3 and repressurization valves may be used if dryer is operating at pressure above 125 psig and/or dryer is operating on a timing cycle other than the 10-minute cycle. Refer to paragraph 1.4 in this manual or to section 7, the flow schematic.		
4	SELECT RIGHT CHAMBER DRYING	De-energize solenoid EV-1L. Energize solenoid EV-1R. Position inlet valve for right chamber drying. When 3 seconds have passed, go to next step.

TABLE A-1 DRYER STEP SEQUENCE (CONT'D)

STEP	FUNCTION	PROCESS
5	DEPRESSURIZE LEFT CHAMBER	Keep EV-1R energized. If in DRYER ON mode: • Energize EV-2L opening left chamber dump/exhaust valve. If in DDS ON mode and dew point is better than hygrometer set point: • EV-2L does not energize. When regeneration time has passed, go next step.
6	REPRESSURIZE LEFT CHAMBER	Keep EV-1R energized. De-energize EV-2L: close left chamber dump/exhaust valve. The repressurization timer begins a countdown of 40 seconds. Inlet valve remains in current position.

NOTE: The actual timer setting may differ from the previously noted sequence. Example: A dryer requiring 30 seconds to repressurize the regenerating chamber will have a regeneration time of 4 minutes and 30 seconds. The half-cycle time will remain at 5 minutes and full cycle at 10 minutes.

The regeneration and repressurization times shall be adjusted by Sullair trained personnel only. Changing the factory settings will result in loss of dew point and/or failure to repressurize before changeover.

APPENDIX B – DRYER FLOW CAPACITY

1. DRYER FLOW CAPACITY

The specific size/model of your dryer was selected to meet performance requirements based on an analysis of air supply and demand capacities. The model selection chart provided following should confirm that this dryer remains suitable for its intended use.

MODEL SELECTION CHART

MODEL	Rated inlet air flow (scfm) at given pressures (psig) (Based upon 100°F inlet air temperature)						
	80	90	100	110	120	130	140
SD-820	640	735	820	890	960	1035	1105
SD-1050	830	960	1050	1215	1325	1410	1590
SD-1200	980	1095	1200	1305	1415	1520	1615
SD-1450	1110	1280	1450	1510	1700	1825	1950
SD-1710	1325	1515	1710	1810	1945	2080	2230

NOTE: Higher pressures available as an option. Consult factory

2. CORRECTION FACTOR FOR INLET TEMPERATURE

TEMP DEGREES F	80	90	100	105	110	115	120
Correction Factor	1.1	1.1	1.0	0.83	0.69	0.565	0.455

To correct for an inlet temperature other than 100°F multiply dryer capacity by the temperature correction factor listed above.

Example: To size for an inlet flow of 950 scfm @ 105°F and 110 psig.

- Select models that produce at least 950 scfm at 110 psig. This case would be the SD-1050 which can dry 1215 scfm.
- Multiply pressure-corrected flow by the temperature correction factor to obtain the flow of the dryer corrected for pressure and temperature:
- 1215 X (0.83) = 1008 scfm
- Confirm model selection. Model SD-1050 can flow 1008 scfm at the inlet conditions specified. The requirement of 950 scfm is less, so model SD-1050 is correct.

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