



The Science of Compressed Air

Desiccant Air Dryers



HEATED PURGE
BLOWER PURGE

OPERATOR'S MANUAL

65501-1

DATE OF PURCHASE:
MODEL:
SERIAL NO.:
Record above information from nameplate. Retain this information for future reference.

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GENERAL INFORMATION

The Quincy Drying System is designed to remove moisture from compressed air.

When properly installed, the unit requires little maintenance or adjustment.

A list of service parts is provided on the attached parts list.

WARNING

DO NOT install, operate, maintain, adjust or service this unit without thoroughly reading this manual.

This manual contains important safety information. Read THOROUGHLY and follow the Safety Instructions provided in this manual and posted on the unit. Keep this manual near the unit and in a safe place. Replace this manual if it becomes torn or dirty and cannot be properly used.

Please read the Installation & Operation section of this manual before attempting to operate the unit.

Please read the Maintenance and Troubleshooting sections of this manual before beginning any maintenance or service work on this unit.

RECEIVING – INSPECTION

Inspect equipment. Any concealed shipping damage must be reported to the carrier immediately. Damage claims should be filed by the consignee with the carrier.

SERVICE INQUIRIES: Provide Model No., Serial No., Operating Pressure, Inlet Temperature, Nature of Problem. See Dryer Specification Tag located on the control panel.

SAFETY INSTRUCTIONS

When using air compressors and compressed air accessories, basic safety rules and precautions must always be followed, including the following:

1. **READ ALL INSTRUCTIONS FULLY.**
2. **WIRING & BREAKERS**
Wiring, breakers and other electrical equipment must conform to local and national electrical codes. Do not operate this unit with damaged wiring or after the unit or air handling parts have been dropped or damaged in any manner. Notify authorized service facility for examination, repair or other adjustments.

WARNING

Comply with the National Electrical Code, Federal, State and Local Codes when installing or operating this unit.

3. **USE SUITABLE PARTS & ACCESSORIES**
Do not use air pressurized accessories or parts in the air system not suitable for the maximum air pressure used. Be sure maximum pressure specified by the accessory manufacturer is well above the working pressure of your compressor.
4. **RELEASE AIR PRESSURE SLOWLY**
Fast moving air will stir up dust and debris, which may be harmful. Release air pressure slowly when depressurizing your system to avoid bodily injury.

5. **SECURE DRAIN LINES**

Fasten drain lines from prefilter/separator to floor or drain. Pressurized air will periodically pass through drain lines, which will cause an unsecured line to whip and may cause bodily injury.

 **WARNING**

Air from compressor and from Quincy Air Drying System, as equipped, is *not* safe for human respiration (breathing).

To provide safe, breathable air, compressor must be capable of producing at least Grade D breathing air as described in Compressed Gas Association Commodity Specification G7.1-1966. Special filtering, purifying and associated alarm equipment must be used to convert compressed air to "Breathing Air." Other special precautions must also be taken.

Refer to OSHA 29 CFR 1910.134.

DISCLAIMER OF WARRANTY

If this unit is used to produce breathing air, the special equipment and precautions expressed in OSHA 29 CFR 1910.134 for specifications of the necessary equipment and special precautions to make Breathing Air **MUST BE** used or any warranties are VOID and manufacturer disclaims any liability whatsoever for loss, personal injury or damage.

 **CAUTION**

Connect oil coalescing prefilter with automatic drain before the dryer to prevent any oil or slugs of water carryover into the desiccant. Connect particulate afterfilter downstream of the dryer to retain any desiccant dust flowing into the process air lines.

DESICCANT REPLACEMENT PROCEDURES

Quincy uses Activated Alumina Grade A desiccant for all standard heated purge and blower purge air dryers. Dryers up to 1500 SCFM are factory filled with desiccant. Dryers 1800 SCFM and larger are supplied with loose desiccant in 50 lb. bags. The dryer must be filled with desiccant before start-up. Dryers ranging from 35 SCFM to 500 SCFM use 1/8" diameter desiccant. Dryers 650 SCFM and larger use a mix of 1/8" and 1/4" size desiccant. See the dryer specification sheet or dryer data tag for amounts per tower.

FILLING PROCEDURE

1. Make sure the dryer is depressurized.
2. Remove the plugs or flanges from the fill ports located on the top of the pressure vessels.
3. Using a flashlight, inspect the inside of each vessel to be sure they are empty.
4. Verify that the desiccant drain port located in the bottom of the pressure vessel is closed tightly.
5. Desiccant is available in 50# bags, or 300# barrels. Divide the desiccant into equal amounts for each tower, and verify the correct amount by the specification tag located on the electrical panel. Towers can be filled manually with desiccant bags. A fork lift or overhead crane should be used when filling with 300# barrels.
6. Dryers 650 SCFM and larger use two sizes of desiccant. For QDHP & QDBP dryers, fill the tower with the 1/4" diameter Activated Alumina first, followed by 1/8" Activated Alumina. The large desiccant size is used to disperse the inlet air flow.
7. Close the fill ports and put the dryer in service. Refer to the Start-Up Procedure listed in this manual.

MOLECULAR SIEVE OPTION (LOW DEWPOINT)

Dryers with optional Molecular Sieve are filled with the Activated Alumina **first** and the Molecular Sieve **last**. The Molecular Sieve is used as a polishing agent to lower the dewpoint temperature.

NOTE: The proper amount of desiccant may or may not fill the vessel to the top.

DRAINING PROCEDURE

The desiccant can be removed by the two methods listed below. **MAKE SURE THE DRYER IS DEPRESSURIZED PRIOR TO REMOVING THE FILL OR DRAIN PORT.**

Method #1 – Remove the drain port and drain the desiccant into buckets which are then poured into the proper dumpster or receptacle.

Method #2 – Usually used for large dryers (1000 SCFM and larger). An industrial dry vacuum cleaner is required for this method.

1. Remove the desiccant fill port.
2. Using an industrial vacuum cleaner, remove the desiccant from the vessel.
3. Open the desiccant drain port and remove the remaining desiccant.

DESICCANT DISPOSAL

Desiccant is not considered a hazardous waste, unless contaminated with oil or other toxic substances. Disposal of the desiccant should be handled by a local waste management company.

INSTALLATION & OPERATION

COMPRESSED AIR SYSTEM
RECOMMENDED INSTALLATION
FLOW DIAGRAM

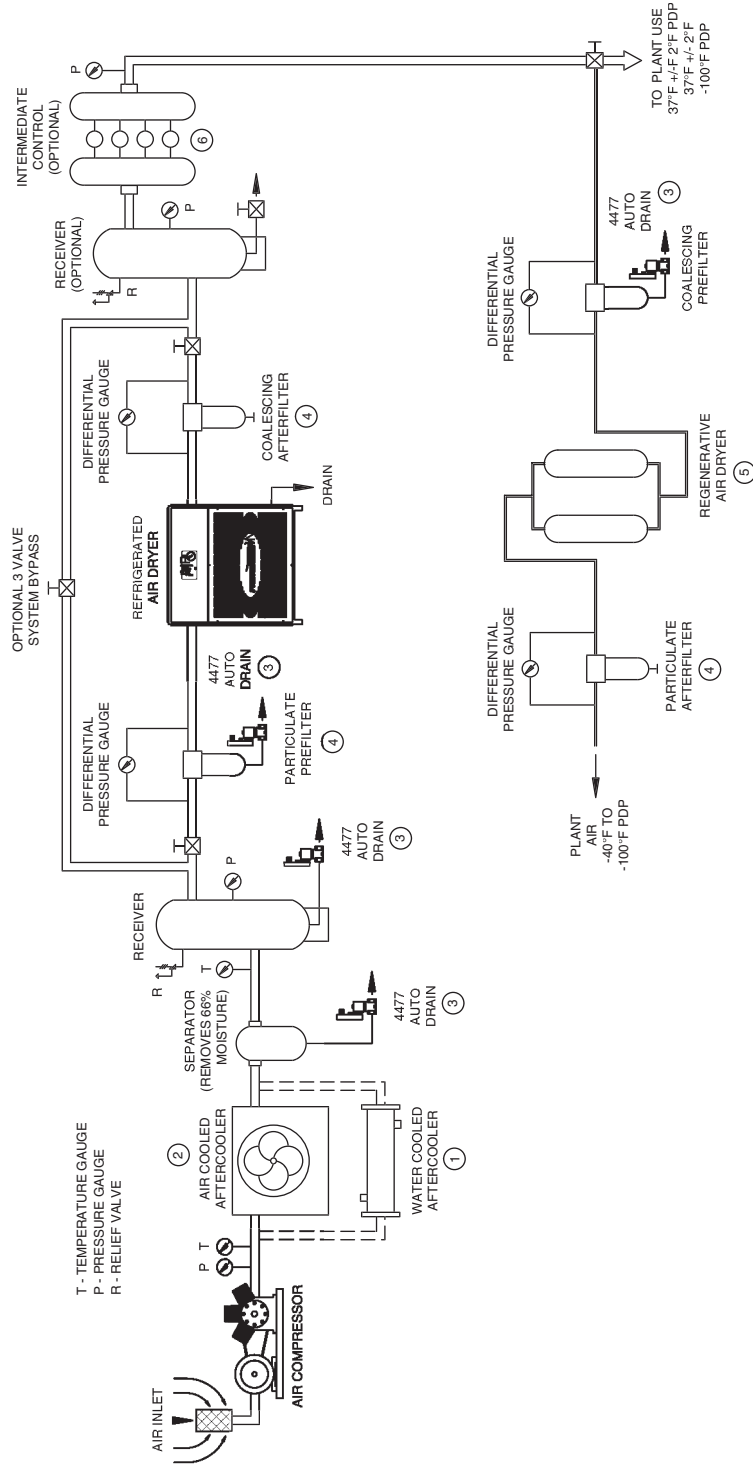


FIGURE 1 — COMPRESSED AIR SYSTEM RECOMMENDED INSTALLATION FLOW DIAGRAM

QDHP SERIES HEATED PURGE AIR DRYER INSTALLATION & OPERATION

General

1. Install dryer on a level base, indoors or under a shed.
2. During shipment, flange and connecting bolts can come loose. All bolts should be checked and tightened as needed.
3. Make sure when the piping is in place that no undue stress is placed on dryer connections. Union joints or flexible connections are recommended to relieve stress. Also, properly support the pipes as needed with hangers or brackets. Air piping must be installed by an experienced pipe fitter.
4. Equip dryer with inlet and outlet isolation valves and a bypass valve for ease of servicing and start-up.
5. Connect electric power to the dryer through a properly sized fused disconnect switch.
6. Reactivation exhaust may be piped away from the dryer, making sure proper pipe size is used. The pipe size should be increased by one size at the valve, and one additional pipe diameter size for every ten-foot run to reduce back pressure.
7. **Electrical Connections:** Follow the recognized local and municipal electrical codes. All components must be load rated as approved by NEC, NEMA, CSA and UL.
8. During shipment, wire connections may become loose. Per U.L. specification, torque screws inside enclosure to 20 in-lbs.
9. **GROUNDING:** It is mandatory that the dryer be grounded. Use an adequate ground with the conductor sized to NEC.
10. **STORAGE:** In case of extended storage period before the installation, follow these simple procedures:
 - a. Seal or cover all the parts
 - b. Wrap the electrical enclosure
 - c. Wrap the mufflers
 - d. If the desiccant is shipped loose, store it inside to avoid any rain or water damage.
- e. Prior to start-up, check the heater element resistance. The element (phase) to ground should exceed the resistance value by 20 megohms. If this value is not indicated, energize the heater at low voltage to drive the moisture from the element insulation. Remove the cover to vent the moisture from the heater terminal enclosure.
11. **STEAM CONNECTIONS:** For units with optional steam heat exchanger, the steam connections are supplied as flanges for both inlet and condensate return.
12. **WATER CONNECTIONS:** For units with optional watercooled aftercooler, connect the water supply and drain lines.
13. **LOW PRESSURE SHUTDOWN FEATURE:** The electrical control on the air dryer system is set up with low pressure shutdown switch. The controls and the heater shall stay de-energized as long as the dryer system is not pressurized above 50 PSIG. This feature safeguards the system against the loss of air flow.
14. **LEAK TEST:** All the dryers are tested at the factory for any leaks before shipment. An air leak could develop during transportation or installation. Pressurize the system and check for any leaks.

Start-Up Procedure

1. Leave the power switch in the OFF position.
2. Keeping the dryer isolation outlet valve closed, slowly pressurize both the adsorbent chambers to the line pressure.
3. Check for any leaks in the system.
4. When both adsorbent chambers are at line pressure, turn the power switch to the ON position.
5. One inlet valve will close, and one purge valve will open and depressurize one adsorbent chamber. This may take as long as 10 minutes.
6. Adjust the purge pressure to the recommended setting, and lock the valve locking mechanism in place.
7. Slowly open the dryer isolation outlet valve to pressurize the downstream system.
8. To check proper operation of the dryer, use the manual advance button to cycle the dryer through the valve sequences. When an event occurs (i.e. valve opening or closing) wait until complete before again manually advancing the cycle.

Adjustments & Settings

1. Standard Settings
 - a. Adjust the purge pressure to the recommended level _____ PSIG.
 - b. Set heater thermostat TH1. 390°F. (Located in the bottom of the heater shell)
 - c. Set over temperature thermostat TH2. 200°F. (Located in the top of the heater shell)
 - d. Set desiccant bed thermostat TH3/TH4. 250°F.
 - e. Set heater failure thermostat TH5. 300°F. (Located in the bottom of the heater shell)
Optional
 - f. Set heater failure time delay relay 3 HRS.
Optional
 - g. Set failure to shift time delay relay TDR 5 HRS.
Optional
 - h. Check and set the dewpoint monitor Setpoint Settings. Settings are factory preset. See dewpoint display settings on Page 19.
 - i. Open the bleed valve on the optional dewpoint sensor probe.
 - j. Demand Control Setpoint (): _____
High Humidity Alarm Setpoint (): _____
MicroBurst Regeneration Setpoint (): _____
2. Settings for models with optional MicroBurst Regeneration (MBR)
 - a. Heater control thermostat TH1. 390°F (Located in the bottom of the heater shell.)
 - b. Over temperature thermostat TH2. 500°F (Located in the top of the heater shell.)
 - c. Dessiccant bed thermostat TH3/TH4. 250°F
 - d. Heater failure thermostat TH5. 300°F (Located in the bottom of the heater shell.) Optional
 - e. Failure to shift time delay relays (TDR). 5 hours
Optional

Microprocessor Control with Sequence Display

Available on most standard units

INTRODUCTION

1. **GENERAL:** The Quincy Microprocessor Control (MC) is a ten (10) channel sequence timer with LCD and LED display features. The MC consists of the main control unit and the remote LCD, LED and I/O module. The two units are connected via ribbon cable.

2. **SEQUENCE OF OPERATION:** The sequence of operation is based on an 8 hour NEMA Cycle, with one-half of the total time being for adsorption of moisture from the process gas and one-half for desiccant regeneration. Specifics of the timing sequence are detailed in Figure 2, the Sequence of Operation Diagram (SDG-1), on Page 11. If power is interrupted, the MC electronically stores the point in the timing cycle at which power was removed. When power is reapplied, timing will resume from that point in the cycle. At all times during operation, the current status of the timing cycle is indicated graphically by the LEDs and textually on the LCD screen.

FEATURES

- LCD screen indicating right/left tower heating/cooling, right/left tower temperature, actual sequence time, low pressure alert, demand cycle indication (opt.), fail to shift alert (opt.).
- LED sequence annunciator indicating R/L tower drying/regenerating, heater on, low pressure alarm, demand cycle indicator (opt.), high humidity alarm (opt.), fail to shift alarm (opt.).
- Timer and setting memory
- Time cycle advance button
- Open thermocouple protection

MODE OF OPERATION

1. **START UP:** The Microprocessor Control will start to operate as soon as the power is supplied and the unit is turned on. The load outputs will recycle on and off based on an 8 hour NEMA Cycle. The sequence will proceed according to the Sequence of Operation Diagram SDG-1. See Figure 2. The point at which the timing starts depends on where the cycle stopped when power was last turned off.
2. **MANUAL CYCLE ADVANCE:** The backside of the remote I/O module contains an "ADVANCE" push button. Each time the "ADVANCE" push button is pressed, the timing cycle advances by 1 minute. If the "ADVANCE" push button is held continuously for 5 seconds, the current time will advance by 30 minutes for every additional second it is held. The "ADVANCE" push button is disabled whenever the timing is stopped by an inhibit switch.

LOW PRESSURE: All heated regenerative dryers are supplied with Low Pressure Switch Inhibit. When the low pressure is detected, all timing functions stop and all loads are de-energized. The red LED on the remote I/O module will light up and "LOW PRESSURE" will be displayed on the LCD screen. This function will put dryer operation in the fail-safe mode. Both the inlet valves will fail OPEN and the purge valves will fail CLOSED. As soon as the pressure is restored, the normal functions will resume. The Low Pressure inhibit is set to operate when the pressure in the dryer drops to 50 PSIG (3.4 BarG)

RELAY OUTPUTS (DRY CONTACTS): There are two relay outputs for remote annunciation. The output is normally open rated for 10 AMPS resistive at 125VAC, 5 AMPS resistive at 30VDC. The outputs are for the inhibit Failure to Switch and High Humidity. If one or both inhibits are made, the relays will be energized and the LED on the remote I/O will light up.

HEATER TEMPERATURE CONTROL

1. **THERMOCOUPLE INPUTS (3):**

- T.C.1 – Heater temperature.
- T.C.2 – Left Tower desiccant bed temperature.
- T.C.3 – Right Tower desiccant bed temperature.

2. **TEMPERATURE DISPLAY:** The temperature measured at each thermocouple can be displayed, one at a time, on the LCD screen of the remote I/O module. Pressing the "TEMP DISPLAY" button on the remote I/O module will display the temperature. Each press of the "TEMP DISPLAY" button will advance the thermocouple temperature displayed to the next thermocouple in the above order. Pressing the button a fourth time will display the current cycle in minutes.

3. **TEMPERATURE UNITS:** The temperature measured can be indicated in °C or °F. The unit can be selected by changing the "UNITS" slide switch on the back side of the remote I/O module.

4. **TEMPERATURE SETPOINTS:** For each location at which a temperature is measured, there is a high temperature setpoint. If the temperature for a given area rises above its setpoint, the heater (LOAD 5) will be disabled. The heater will be re-energized when the temperature drops to the setpoint less the specified hysteresis.

- a. To set the high temperature setpoints move the slide switch on the back of the module to the "TEMP SET" position.

- b. The high temperature set point to be adjusted will be displayed on the LCD. Use the "TEMP DISPLAY" button to choose which of the three high temperature setpoints to change.
- c. The high temperature setting will be displayed on the LCD. Use the "UP" and "DOWN" push buttons on the back of the remote I/O module to set the temperature in 1°C increments.
- d. The new high temperature setpoint will not take effect until the selector switch is returned to "RUN" mode.

5. **OPEN THERMOCOUPLE PROTECTION:** If an open (disconnected or disabled) thermocouple is detected, the heater will be disabled and a blinking error message will appear on the LCD indicating which thermocouple is open.

CAUTION

This unit may be damaged by electrostatic discharge. Follow procedures for static sensitive parts when handling, shipping or installing this unit.

OPTIONAL CONTROLS AND ALARMS

- 1. **DEMAND CONTROL:** The demand control mode function will be operational if there are 5 minutes before the end of the drying cycle, and the dewpoint is below the preset level. When in the demand control mode, all of the timing functions stop. The yellow LED on the remote I/O module will light up and "DEMAND CYCLE" will be indicated on the LCD. When the dewpoint reaches the preset dewpoint level, the towers will switch and the normal mode cycle will commence. The demand control mode function will be disabled if the dewpoint is above the preset level.
- 2. **HIGH HUMIDITY:** The high humidity alarm function is indicated by a red LED on the remote I/O module. The high humidity relay will energize for remote annunciation. All the normal functions will be maintained.

3. **FAIL TO SHIFT:** The fail to shift inhibit will be energized if the inhibit switch remains closed for 30 minutes beyond the normal cycle. Fail to shift will be indicated by the red LED on the remote I/O module and the fail to shift relay will be energized for remote annunciation. The fail to shift inhibit is an indication of a malfunction of the tower switching valves or purge exhaust valves.
4. **MicroBurst Regeneration (MBR) with Demand Control:** QDHP series dryers with optional MicroBurst Regeneration (MBR) are controlled by a Programmable Logic Controller (PLC) instead of the standard Sequence Display Control. MBR utilizes an 8 hour drying/regeneration cycle but changes the purge cycle from continuous purge to a 30-minute purge period. After the purge period, the tower is pressurized with hot dry air for a 30-minute hold period. After the 30-minute hold period, the dryer depressurizes and repeats the 30-minute purge period. This cycle (MBR) repeats three times followed by a 30-minute cooling period which cools the desiccant bed to line temperature before the towers switch. The MBR mode reduces the purge cycle by 50% and significantly reduces heater run time. All MBR functions are controlled by the PLC. If for any reason the system should experience a deteriorating dewpoint, the PLC will default to the standard cycle until full performance recovery has been achieved. When the system senses full recovery, it will automatically switch to MBR mode. The default mode ensures performance integrity. MBR is packaged with Demand Control and High Humidity alarm for maximum energy savings. The following hour meters are provided to indicate savings: Heater Run Time, Dryer Run Time, Demand Time.

Sequence of Operation

The sequence of operation of the Heated Purge Regenerative Dryer can be readily followed by referring to the following flow schematic and timing sequence.

During initial start-up with the power switch in the OFF position, and the towers pressurized with air, both inlet valves stay in the OPEN position (standard with models QDHP-300 and larger) and the purge valves stay in the CLOSED position. This type of fail safe valve operation allows the air to dry through both the towers, without any purge in the event of loss of power to dryer. This will give you extended drying time until desiccant chambers are saturated.

The desiccant is designed to handle air saturated with water vapor only. Any liquids or slugs of water tend to decrease the efficiency of the desiccant and retard the regeneration process to provide the designed dewpoint.

With the power switch in the ON position at time equal to 0.0 hrs., the left tower air inlet valve is open to allow the air to pass through the left tower. The right tower inlet valve is closed. The saturated compressed air/gas passes through the desiccant in the left tower where the desiccant adsorbs the moisture, and the dry air at a pressure dewpoint of -40°F or less exits through the left outlet check valve and goes out into the plant air system through the afterfilter.

At time equal to 5 minutes, the right lower purge valve depressurizes the right tower so that the desiccant is not disturbed (on high pressure dryers depressurization is accomplished by a designated valve). At the same time the heater is energized to commence the heating cycle.

NOTE: As soon as the purge valve has opened, adjust the purge adjustment valve to the recommended purge control setting. This adjustment should only be required once, and then the locking mechanism should be locked in place.

The temperature of the purge air is controlled by the heater control thermostats to maintain the preset temperature. The hot and dry purge air passes through the right purge flow check valve and enters the desiccant bed at the top of the tower and removes the previously adsorbed water vapor from the desiccant and purges out through the right purge valve, and is exhausted into the atmosphere through the exhaust muffler.

NOTE: During the regeneration air flow through the desiccant bed, the tower pressure gauge should read 0 PSIG. Any higher pressure is an indication of a plugged muffler, which will retard the regeneration of desiccant. During the heating cycle, the bed temperature should rise to 250°F (121°C) in approximately two hours. The heater control thermostats will cycle the heater to maintain this 250°F bed temperature.

At time equal to 2 hr. 30 minutes, the heater is de-energized, and the cooling cycle begins to reduce the temperature in the desiccant bed and prepare it for the drying cycle.

At time equal to 3 hr. 50 minutes, the right tower purge valve will close. With this valve closed, the flow of purge air repressurizes the right tower and prepares it for switch-over.

At time equal to 4 hr., the right tower inlet valve opens, and the left tower inlet valve closes, so the flow of wet air/gas is switched from left chamber to the right chamber.

At time equal to 4 hr. 5 minutes, the left tower purge valve opens and depressurizes the left tower. The above sequence is then repeated on the opposite towers.

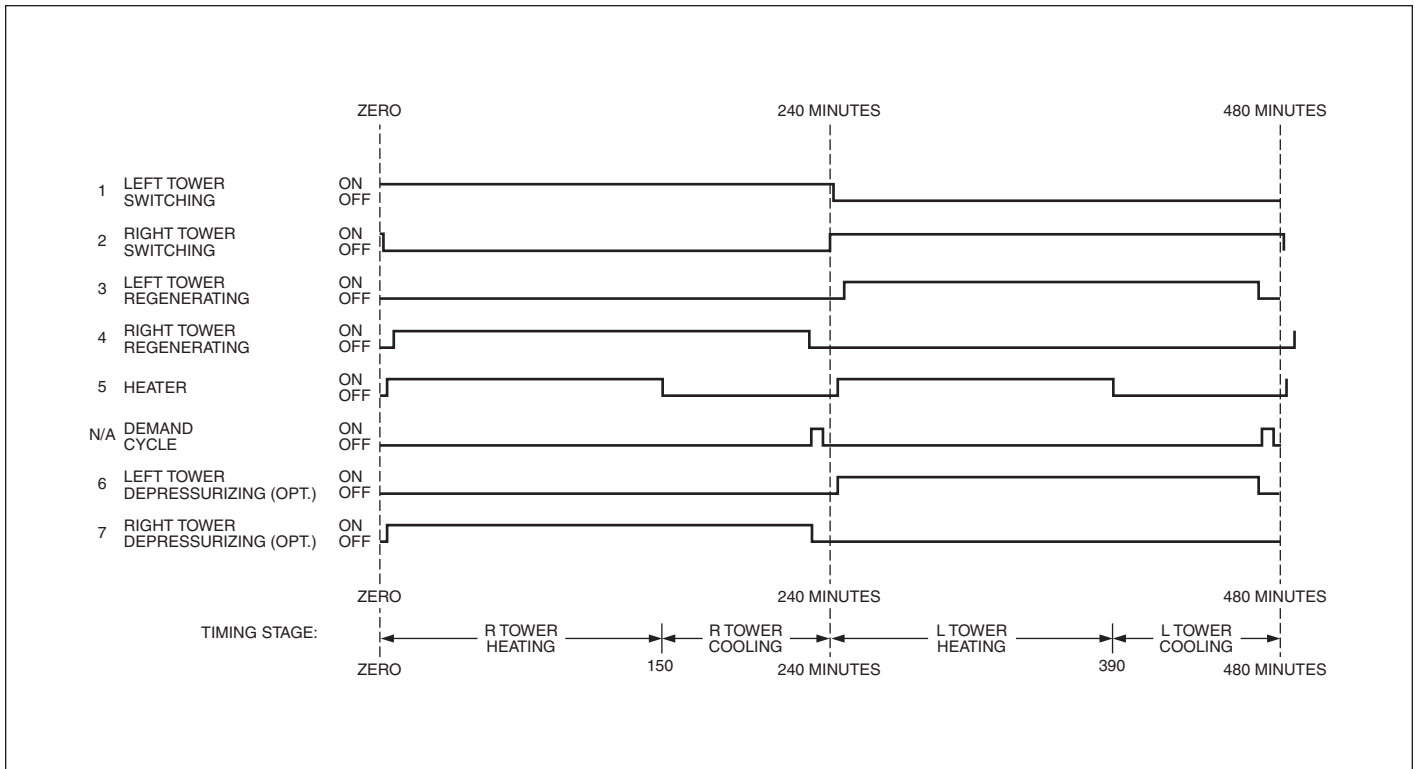


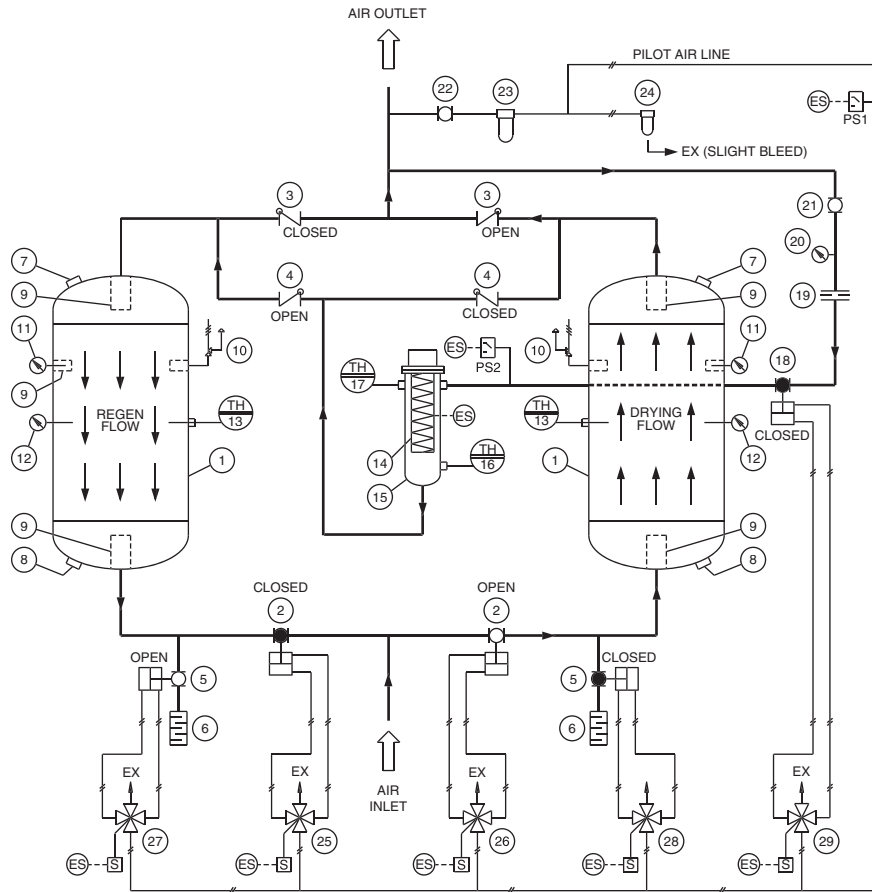
FIGURE 2 — SDG-1: SEQUENCE OF OPERATION DIAGRAM

Shutdown Procedure

Heated Purge dryers are typically installed in 24 Hr. operations. The dryers operate on a standard time cycle of 8 hours, 4 hours drying and 4 hours regenerating. This cycle should not be interrupted (except for servicing). If the dryer needs to be shut down for a certain shift or weekend; the dryer should be turned off at the end of the 4 hour regenerating cycle, and with both towers at line pressure. If servicing is required advance the time sequence so the purge valves close, and pressurize both towers. At this time, the dryer can be turned off.

1. **If the compressed air system has been piped with a bypass around the dryer, then the following should be completed:**
 - a. Open the bypass valve to allow process flow to continue downstream, then close the dryer outlet isolation valve.
 - b. Turn the dryer ON/OFF switch to the OFF position.
 - c. Close the dryer inlet isolation valve on the dryer bypass piping. At this time the dryer is isolated and can be depressurized for servicing.
2. **If the compressed air system has not been piped with a bypass, then the following should be completed:**
 - a. Turn the power switch to the OFF position.
 - b. The tower switching valves are normally open valves; therefore, with the power off the inlet valves to the towers will be open, and the purge valves will close. This will give you extended drying time until desiccant chambers are saturated.

TYPICAL QDHP SERIES FLOW DIAGRAM



- | | |
|---------------------------|---|
| 1. PRESSURE VESSEL | 16. HEATER CONTROL THERMOSTAT |
| 2. AIR INLET VALVE | 17. OVER TEMPERATURE THERMOSTAT |
| 3. AIR OUTLET CHECK VALVE | 18. PURGE ISOLATION VALVE (OPTIONAL) |
| 4. PURGE FLOW CHECK VALVE | 19. PURGE ORIFICE ASSEMBLY |
| 5. PURGE VALVE | 20. PURGE ADJUSTMENT PRESSURE GAUGE |
| 6. MUFFLER | 21. PURGE ADJUSTING VALVE |
| 7. DESICCANT FILL PORT | 22. PILOT AIR SHUT-OFF VALVE |
| 8. DESICCANT DRAIN PORT | 23. PILOT AIR FILTER |
| 9. DESICCANT SCREEN | 24. MOISTURE INDICATOR (OPTIONAL) |
| 10. PRESSURE RELIEF VALVE | 25. 4 WAY LEFT TOWER SWITCHING SOLENOID |
| 11. PRESSURE GAUGE | 26. 4 WAY RIGHT TOWER SWITCHING SOLENOID |
| 12. TEMPERATURE GAUGE | 27. 4 WAY LEFT TOWER PURGE SOLENOID |
| 13. DESICCANT THERMOSTAT | 28. 4 WAY RIGHT TOWER PURGE SOLENOID |
| 14. ELECTRIC HEATER | 29. 4 WAY PURGE ISOLATION SOLENOID (OPTIONAL) |
| 15. HEATER CHAMBER | |

NOTES: 1. THIS PROCESS & INSTRUMENT DRAWING IS NOT AN ISOMETRIC DRAWING. THE RELATIVE POSITION OF VARIOUS EQUIPMENT IS PURELY SCHEMATIC.
2. VALVE POSITION SHOWN IN THIS DRAWING IS AT DRYER OPERATION THROUGH THE RIGHT TOWER.

EX - EXHAUST
ES - ELECTRICAL SIGNAL
PS1 - LOW PRESSURE SWITCH
PS2 - PURGE ISOLATION PRESSURE SWITCH (OPTIONAL)

FIGURE 3 — QDHP SERIES FLOW DIAGRAM

QDBP SERIES BLOWER PURGE AIR DRYER INSTALLATION & OPERATION

General

1. Install dryer on a level base, indoors or under a shed.
2. During shipment flange and connecting bolts can come loose. All bolts should be checked and tightened as needed.
3. Make sure when the piping is in place that no undue stress is placed on dryer connections. Union joints or flexible connections are recommended to relieve stress. Also, properly support the pipes as needed with hangers or brackets. Air piping must be installed by an experienced pipe fitter.
4. Equip dryer with inlet and outlet isolation valves and a bypass valve for ease of servicing and start-up.
5. Connect electric power to the dryer through a properly sized fused disconnect switch.
6. Reactivation exhaust may be piped away from the dryer, making sure proper pipe size is used. Pipe size should be increased by one size at the valve, and one additional pipe diameter size for every ten-foot run to reduce back pressure.
7. **Electrical Connections:** Follow the recognized local and municipal electrical codes. All components must be load rated as approved by NEC, NEMA, CSA and UL.
8. During shipment, wire connections may become loose. Per U.L. specification, torque screws inside enclosure to 20 in-lbs.
9. **GROUNDING:** It is mandatory that the dryer be grounded. Use an adequate ground with the conductor sized to NEC.
10. **STORAGE:** In case of extended storage period before the installation, follow these simple procedures:
 - a. Seal or cover all the parts
 - b. Wrap the electrical enclosure
 - c. Wrap the mufflers
 - d. If the desiccant is shipped loose, store it inside to avoid any rain or water damage.
- e. Prior to start-up, check the heater element resistance. Element (phase) to ground should exceed the resistance value by 20 megohms. If this value is not indicated, energize the heater at low voltage to drive the moisture from the element insulation. Remove the cover to vent the moisture from the heater terminal enclosure.
11. **STEAM CONNECTIONS:** For units with optional steam heat exchanger, the steam connections are supplied as flanges for both inlet and condensate return.
12. **WATER CONNECTIONS:** For units with optional watercooled aftercooler, connect the water supply and drain lines.
13. **BLOWER MOUNTING BOLTS:** Loosen the blower mounting bolts to serve as riding pins only.
14. **BLOWER ROTATION:** When making electrical connections, check the rotation of blower for proper operation. Momentarily energize the blower to check for the rotation. In case of reverse rotation, disconnect the power and change two leads on the blower starter to change the direction of rotation.
15. **LEAK TEST:** All the dryers are tested at the factory for any leaks before shipment. An air leak could develop during transportation or installation. Pressurize the system and check for any leaks.

Start-Up Procedure

1. Leave the power switch in the OFF position.
2. Keeping the dryer outlet isolation valve closed, slowly pressurize both the adsorbent chambers to the line pressure.
3. Check for any leaks in the system.
4. Open blower outlet/throttling valve.
5. Engage the blower starter to test the rotation according to the direction-of-rotation arrow which is affixed to the blower casing. (If incorrect switch any two leads to reverse the rotation.)
6. When the towers are at line pressure, turn the power switch to the ON position.
7. One inlet valve will close, and the chamber purge valve will open and depressurize. This may take as long as 10 minutes.
8. When the blower motor turns off and the dry air sweep begins, adjust the cooling flow pressure to the recommended setting, and lock the valve locking mechanism in place.

9. Slowly open the dryer outlet isolation valve to pressurize the downstream system.
10. Use the manual advance button to cycle the dryer through the valve sequences.

Adjustments & Settings

1. At start-up note the blower pressure. The intake filter should be changed when there is a significant drop in blower pressure.
2. Adjust the cooling flow pressure at the recommended level _____ PSIG.
3. Set heater thermostat TH1. 390°F (Located in the bottom of the heater shell)
4. Set over temperature thermostat TH2. 200°F. (Located in the top of the heater shell)
5. Set desiccant bed thermostat TH3/TH4. 250°F.
6. Set heater failure thermostat TH5. 300°F. (Located in the bottom of the heater shell) Optional
7. Set heater failure time delay relay 3 HRS. Optional
8. Set failure to shift time delay relay 5 HRS. Optional
9. Check and set the dewpoint monitor Setpoint Settings. Settings are factory preset. See dewpoint display setting on Page 19.
10. Open the bleed valve on the optional dewpoint sensor probe.
11. Demand Control Setpoint (SP1): _____
12. High Humidity Alarm Setpoint (SP2): _____

Sequence of Operation

The sequence of operation of the Blower Purge Dryer can be readily followed by referring to the following flow schematic and timing sequence.

During initial start-up with the power switch in the OFF position, and the towers pressurized with air, both inlet valves stay in the OPEN position and the purge valves stay in the CLOSED position. This type of fail safe valve operation allows the air to dry through both the towers, without any purge in the event of loss of power to dryer. This will give you extended drying time until desiccant chambers are saturated.

The desiccant is designed to handle air saturated with water vapor only. Any liquids or slugs of water tend to decrease the efficiency of the desiccant and retard the regeneration process to provide the designed dewpoint.

With the power switch in the ON position at time equal to 0.0 hrs., the left tower air inlet valve is open to allow the air to pass through the left tower. The right tower inlet valve is closed. The saturated compressed air/gas passes through the desiccant in the left tower where the desiccant adsorbs the moisture, and the dry air at a pressure dewpoint of -40°F or less exits through the left outlet check valve and goes out into the plant air system through the afterfilter.

At time equal to 5 minutes, the right tower purge valve depressurizes the right tower so that the desiccant is not disturbed.

At time equal to 10 minutes, the blower and heater are energized to commence the regeneration cycle.

The temperature of the purge air is controlled by the heater control thermostats to maintain the preset temperature. During the heating cycle, the bed temperature should rise to 250°F (121°C) in approximately two hours. The heater control thermostats will cycle the heater to maintain this 250°F bed temperature. The hot purge air passes through the right purge flow check valve and enters the desiccant bed at the top of the tower. The hot purge air removes the previously adsorbed water vapor from the desiccant and purges out through the right purge valve, and is exhausted into the atmosphere through the exhaust muffler.

NOTE: During the regeneration air flow through the desiccant bed, the tower pressure gauge should read 0 PSIG. Any higher pressure is an indication of a plugged muffler, which will retard the regeneration of desiccant. In the event of a leaking valve or check valve a back pressure will develop. A significant back pressure will cause the blower amps to increase and kick off the blower on high overloads.

At time equal to 3 hrs., the blower and heater are de-energized, and the cooling flow valve opens to start the cooling cycle to reduce the temperature in the desiccant bed and prepare it for the drying cycle.

NOTE: As soon as the cooling cycle begins, adjust the purge adjustment valve to the recommended purge control setting. This adjustment should only be required once, and then the locking mechanism should be locked in place.

Dry Air Sweep

In order to maintain constant dewpoint, the Blower Purge dryer uses a dry air sweep during the cool down cycle.

At time equal to 3 hr. 50 minutes, the purge valve will close, and the flow or purge air repressurizes the right tower and prepares it for switch-over.

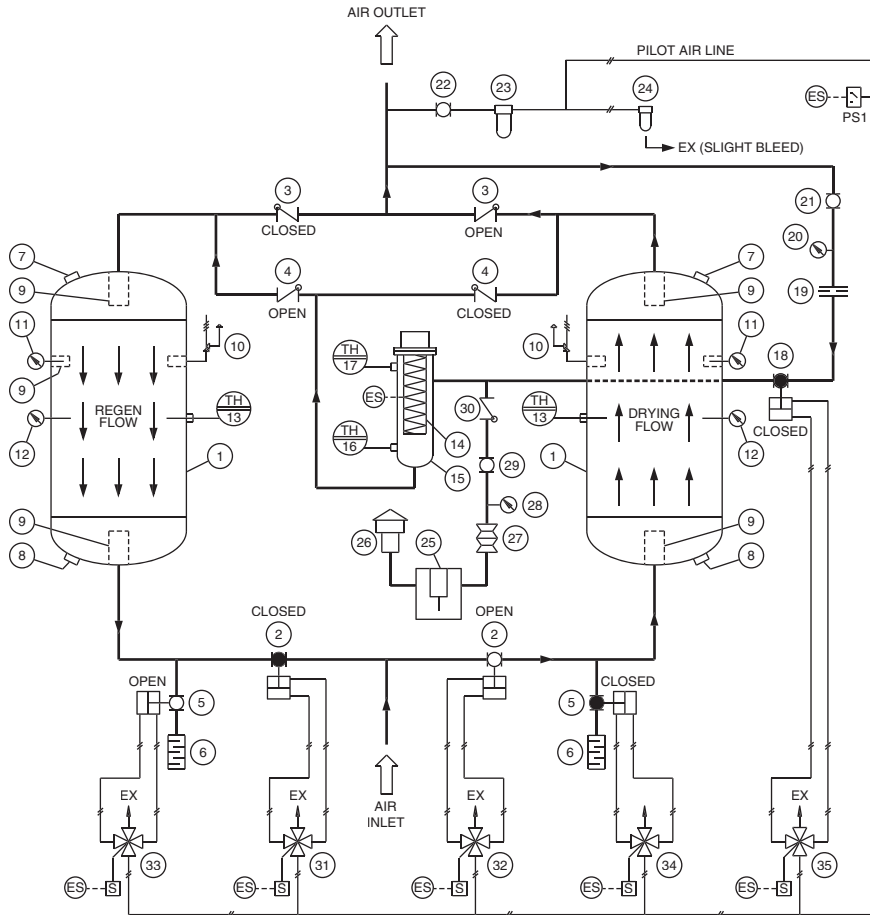
At time equal to 4 hr., the right tower inlet valve opens, and the left tower inlet valve closes, so the flow of wet air/gas is switched from left chamber to the right chamber. The above sequence is then repeated on the opposite towers.

Shutdown Procedure

Blower Purge dryers are typically installed in 24 Hr. operations. The dryers operate on a standard time cycle of 8 hours, 4 hours drying and 4 hours regenerating. This cycle should not be interrupted (except for servicing). If the dryer needs to be shut down for a certain shift or weekend; the dryer should be turned off at the end of the 4 hour regenerating cycle, and with both towers at line pressure. If servicing is required advance the time sequence so the purge valves close and both towers pressurize. At this time, the dryer can be turned off.

1. **If the compressed air system has been piped with a bypass around the dryer, then the following should be completed:**
 - a. Open the bypass valve to allow process flow to continue downstream, then close the dryer outlet isolation valve.
 - b. Turn the dryer ON/OFF switch to the OFF position.
 - c. Close the dryer inlet isolation valve on the dryer bypass piping. At this time the dryer is isolated and can be depressurized for servicing.
2. **If the compressed air system has not been piped with a bypass, then the following should be completed:**
 - a. Turn the power switch to the OFF position.
 - b. The tower switching valves are normally open valves; therefore, with the power off, the inlet valves to the towers will be open, and the purge valves will close. This will give you extended drying time until desiccant chambers are saturated.

TYPICAL QDBP SERIES FLOW DIAGRAM



- | | |
|---------------------------------------|--|
| 1. PRESSURE VESSEL | 19. PURGE ORIFICE ASSEMBLY |
| 2. AIR INLET VALVE | 20. PURGE ADJUSTMENT PRESSURE GAUGE |
| 3. AIR OUTLET CHECK VALVE | 21. PURGE ADJUSTING VALVE |
| 4. PURGE FLOW CHECK VALVE | 22. PILOT AIR SHUT-OFF VALVE |
| 5. PURGE VALVE | 23. PILOT AIR FILTER |
| 6. MUFFLER | 24. MOISTURE INDICATOR (OPTIONAL) |
| 7. DESICCANT FILL PORT | 25. BLOWER & MOTOR ASSEMBLY |
| 8. DESICCANT DRAIN PORT | 26. INTAKE FILTER/SILENCER |
| 9. DESICCANT SCREEN | 27. FLEX CONNECTOR |
| 10. PRESSURE RELIEF VALVE | 28. PRESSURE GAUGE |
| 11. PRESSURE GAUGE | 29. THROTTLING VALVE |
| 12. TEMPERATURE GAUGE | 30. BACK FLOW PREVENTION CHECK VALVE |
| 13. DESICCANT THERMOSTAT | 31. 4 WAY LEFT TOWER SWITCHING SOLENOID |
| 14. ELECTRIC HEATER | 32. 4 WAY RIGHT TOWER SWITCHING SOLENOID |
| 15. HEATER CHAMBER | 33. 4 WAY LEFT TOWER PURGE SOLENOID |
| 16. HEATER CONTROL THERMOSTAT | 34. 4 WAY RIGHT TOWER PURGE SOLENOID |
| 17. OVER TEMPERATURE THERMOSTAT | 35. 4 WAY COOLING FLOW/REPRESSURIZING SOLENOID |
| 18. COOLING FLOW/REPRESSURIZING VALVE | |

NOTES: 1. THIS PROCESS & INSTRUMENT DRAWING IS NOT AN ISOMETRIC DRAWING. THE RELATIVE POSITION OF VARIOUS EQUIPMENT IS PURELY SCHEMATIC.
2. VALVE POSITION SHOWN IN THIS DRAWING IS AT DRYER OPERATION THROUGH THE RIGHT TOWER.

EX - EXHAUST
ES - ELECTRICAL SIGNAL
PS1 - LOW PRESSURE SWITCH

FIGURE 4 — QDBP SERIES FLOW DIAGRAM

QDHP SERIES HEATED PURGE AIR DRYER MAINTENANCE

WARNING

Disconnect power and depressurize the dryer completely before starting maintenance procedures.

General

During the first month, clean or replace the pilot air filter element and repeat periodically. Also clean the exhaust mufflers. Replace mufflers if the tower pressure gauge reads any back pressure during the regeneration cycle.

No lubrication is required for any system.

Daily

Check auto drain on prefilter every shift.

Weekly

1. Check the dryer's sequence of operation, and valve operation.
2. Check the purge control setting.
3. Check the operating conditions; inlet pressure, inlet temperature and the flow rate.
4. Check the moisture indicator. BLUE color indicates DRY conditions. If the color is PINK, refer to the moisture indicator chart on alarm conditions for probable cause. (Optional equipment.)
5. Check the purge mufflers for blockage. Possible indication is back pressure on tower under regeneration. Replace if necessary.
6. Check the pressure drop across prefilter and after-filter. Replace the elements when the differential reaches 5-10 PSID.

Monthly

Check the pilot air filter element. Replace if necessary.

Three Months

1. Every three (3) months, close the purge adjusting valve momentarily to check for any leaks in the inlet and/or check valves indicated by air coming through the exhaust mufflers.
2. Check the prefilter and afterfilter elements for excessive clogging or possible damage. Replace as necessary.
3. Blow down relief valves.
4. Check outlet dewpoint conditions.

Twelve Months

1. Close the inlet and outlet valves on the dryer or bypass the dryer and completely depressurize the dryer system. Open the desiccant fill port and check visually. If desiccant is contaminated with oil or broken, replace the desiccant.
2. Check for leaking check valves per Table 1 symptoms C & D in Troubleshooting Guide. Repair or replace as necessary.
3. Check the heater thermostats and heater operation. Repair or replace as necessary.
4. Inspect the pilot air cylinders for leaks or worn out seals. Repair or replace as necessary.
5. Check repressurizing valve. Repair or replace as necessary.
6. Check pilot air solenoid valves for possible defects.
7. Replace diaphragms in valves. See parts list for sizing. For premium switching valves, clean or replace worn out seats and seals as necessary.

Dewpoint Sensor (Optional)

It is recommended to recalibrate the sensor probe annually to maintain accuracy. Contact your local distributor or factory for exchange policy.

Calibration: To maintain accuracy, replace the probe every two years.

Probe Replacement: Turn the normal/demand selector switch to the normal position. This will disable the contacts for Demand Control. Isolate and depressurize the probe chamber. Remove, and replace the probe. Pressurize the probe chamber and connect the sensor cable. A small amount of sample air (approximately 2-10 SCFH) should expel out the chamber needle valve.

Mufflers

Purge mufflers are installed to reduce the noise level. The mufflers tend to plug up and increase back pressure over time due to oil carryover and contaminants from compressor, or due to desiccant dust at the initial start-up. To eliminate back pressure, replace muffler after three months, or when the back pressure increases in the regenerating tower.

QDBP SERIES BLOWER PURGE AIR DRYER MAINTENANCE

WARNING

Disconnect power and depressurize the dryer completely before starting maintenance procedures.

General

During the first month clean or replace the pilot air filter element and repeat periodically. Also clean the exhaust mufflers. Replace mufflers if the tower pressure gauge reads any back pressure during the regeneration cycle.

No lubrication is required for any system.

Check intake filter on the blower, replace if necessary.

Daily

Check auto drain on prefilter every shift.

Weekly

1. Check the cooling flow pressure setting.
2. Check the dryer's sequence of operation and valve operation.
3. Check the operating conditions; inlet pressure, inlet temperature and the flow rate.
4. Check the moisture indicator. BLUE color indicates DRY conditions. If the color is PINK, refer to the moisture indicator chart on alarm conditions for probable cause.
5. Check the purge mufflers for blockage. Possible indication is back pressure on tower under regeneration. Replace if necessary.
6. Check the pressure drop across prefilter and after-filter. Replace the elements when the differential reaches 5-10 PSID.

Monthly

1. Check the pilot air filter element. Replace if necessary.
2. Check the blower intake filter. Replace if necessary.

Three Months

1. Every three (3) months, check for any leaks in the inlet and/or check valves indicated by air coming through the exhaust mufflers when the blower is off.
2. Check the prefilter and afterfilter elements for excessive clogging or possible damage. Replace as necessary.
3. Blow down relief valves.
4. Check outlet dewpoint conditions.

Twelve Months

1. Close the inlet and outlet valves on the dryer or bypass the dryer and completely depressurize the dryer system. Open the desiccant fill port and check visually. If desiccant is contaminated with oil or broken, replace the desiccant.
2. Check for leaking check valves per Table 1 symptoms C & D in Troubleshooting Guide. Repair or replace as necessary.
3. Check the inlet switching valves and purge exhaust valves for leaks. Clean and replace worn out seats and seals.
4. Inspect the pilot air cylinders for leaks or worn out seals. Repair or replace as necessary.
5. Check repressurizing valve. Repair or replace as necessary.
6. Check pilot air solenoid valves for possible defects.

Dewpoint Sensor (Optional)

It is recommended to recalibrate the sensor probe annually to maintain accuracy. Contact your local distributor or factory for exchange policy. See Page 17 for calibration and sensor probe replacement information.

Mufflers

Purge mufflers are installed to reduce the noise level. The mufflers tend to plug up and increase back pressure over time due to oil carryover and contaminants from compressor, or due to desiccant dust at the initial start-up. To eliminate back pressure, replace muffler after three months, or when the back pressure increases in the regenerating tower.

DEWPOINT DISPLAY KEY FUNCTIONS

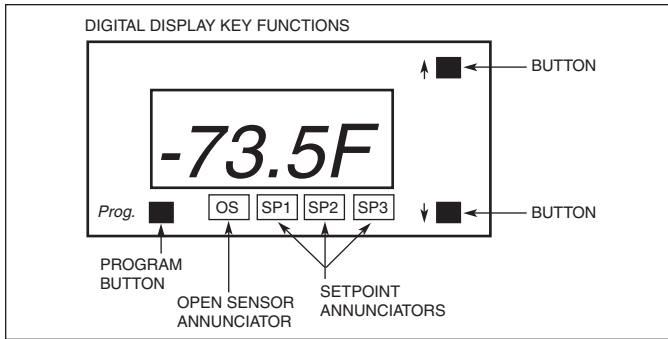


FIGURE 5 — DIGITAL DISPLAY

There are 3 buttons on the front of the hygrometer:

Prog.	Used to enter Programming Mode, to scroll through setup prompted, or to enter a selection or value into memory.
↑	Used to increase a displayed value. Press and hold this button to increase the displayed value.
↓	Used to decrease a displayed value. Press and hold this button to decrease the displayed value.

SETPOINT PROGRAMMING

(Setpoints are factory preset)

Standard Settings

1. Press **PROG** and (↓) buttons simultaneously to enter into the Setpoint Setting Mode.
2. **SP1** Adjust value for the Setpoint 1, press **PROG** to continue. SP1 set at -40°F (Demand Control).
3. **SP2** Adjust value for the Setpoint 2, press **PROG** several times to exit. SP2 set at -20°F (High Humidity Alarm).
4. **SP3** Not used.

Settings for models with Low Dewpoint option

1. **SP1** set at -90°F (Demand Control)
2. **SP2** set at -60°F (High Humidity Alarm)
3. **SP3** Not used.

Settings for models with MicroBurst Regeneration (MBR) option

1. **SP1** set at -50°F (Demand Control)
2. **SP2** set at -40°F (Standard Cycle Mode)
3. **SP3** set at -20°F (High Humidity Alarm)

OPEN SENSOR CONDITION

When message **oPEn1** is displayed, the dewpoint sensor is likely to be disconnected from the hygrometer.

SETPOINT LIMIT INDICATION

Setpoint limit message is the flashing number within operating range of the hygrometer.

OVER RANGE AND UNDER RANGE INDICATION

For Ceramic Sensor Probes:

1. When the hygrometer detects the maximum value of the Measurement range, +68°F flashes on the display.
2. When the hygrometer detects the minimum value of the Measurement range, -148°F flashes on the display.

PEAK/VALLEY INDICATION

1. Press (↑) several times to get message **PEAK** and the value flashing.
2. Press (↓) several times to get message **VALY** and the value flashing.
3. Press (↓) and (↑) simultaneously to reset the Peak or Valley value while displayed.

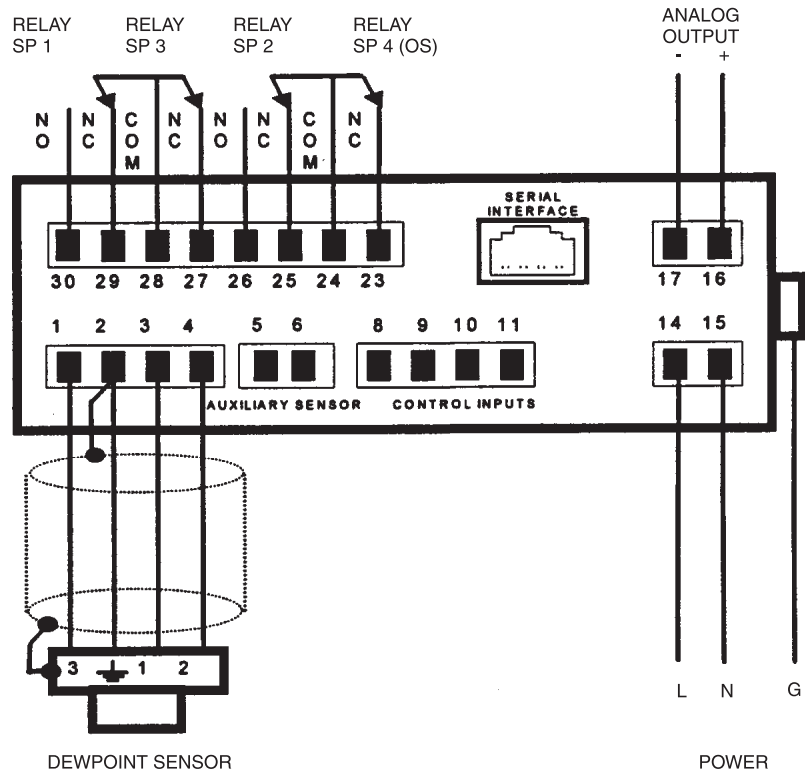


FIGURE 6 — DEWPOINT DISPLAY CONTROL WIRING

OPTIONS LISTING WITH EXPLANATION

AUDIBLE ALARM

The Audible Alarm consists of a buzzer with reset push button and ON/OFF selector switch.

The audible alarm provides an audible warning to alert an operator that the dryer is not functioning properly. This option is used with options such as "Failure to Shift Alarm" or "High Humidity Alarm."

FAILURE TO SHIFT ALARM

The Failure to Shift Alarm consists of an alarm light that illuminates if the desiccant towers fail to shift at a prescribed time. Dry contacts are provided for remote annunciation.

HEATER FAILURE ALARM

The Heater Failure Alarm consists of an alarm light that illuminates if the heater fails to reach design temperature during regeneration. The time delay relay shall be set at 3 hrs. and the thermostat set at 200°F. Dry contacts are provided for remote annunciation.

HIGH HUMIDITY ALARM

The High Humidity Alarm consists of an alarm light controlled by a hygrometer that senses the dewpoint at the outlet of the air dryer. This alarm illuminates when the dewpoint reaches -20°F and above. A small amount of sample air is required for operation. Dry contacts are provided for remote annunciation.

Calibration: To maintain accuracy, replace the probe every two years.

Probe Replacement: Turn the normal/demand selector switch to the normal position. This will disable the contacts for Demand Control. Isolate and depressurize the probe chamber. Replace the probe. Pressurize the probe chamber and turn the power back on.

MOISTURE INDICATOR

The moisture indicator consists of a small, clear, polycarbonate filter filled with a color change silica gel. It is located at the outlet of the dryer. When the dewpoint is below -10°F, the desiccant is blue. When the dewpoint is above -10°F, the desiccant is pink. A small amount of sample air is required for operation.

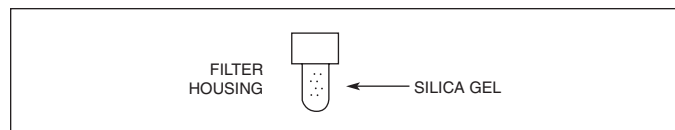


FIGURE 7 — MOISTURE INDICATOR

OVER/HI TEMPERATURE ALARM

The Over/Hi Temperature Alarm consists of an alarm light that illuminates when the temperature at the inlet of the heater shell exceeds 200°F. Probable cause for this would be reduced purge flow or no purge flow during the heating cycle. Dry contacts are provided for remote annunciation.

PANEL LIGHTS

The Panel Light option consists of four lights: Left Tower Drying, Right Tower Drying, Left Tower Regenerating, and Right Tower Regenerating. These lights are for dryer sequence indication.

PLC CONTROLLER

PLC Controller is standard on QDBP Series dryers and with the MicroBurst Regeneration option. It can also be added to control the operation of standard regenerative dryers. Typically Square D or Allen Bradley PLCs are used.

DEMAND CONTROL "DC"

The Demand Control is an energy saver that can extend the drying cycle *without purging*, during periods of lower moisture loads. The Demand Control system offers, in one compact package, the utmost in flexibility and accuracy sensing the actual dewpoint of the outlet air. The hygrometer senses the dewpoint at the outlet of the dryer at the end of the drying cycle, and extends the drying cycle until the preset adjustable dewpoint setpoint is reached. During this extended drying cycle, the purge valves are closed and the opposite tower is pressurized and prepared for the drying cycle. The demand control option reduces purge loss and extends valve life. This option consists of the following:

- Digital Dewpoint Display
- Adjustable Setpoints
- Demand Cycle Light
- High Humidity Alarm Light with Dry Contact
- 4-20mA Output

Calibration: To maintain accuracy, the probe should be recalibrated **annually**. Recalibrated probes are available through your local distributor.

Probe Replacement: Isolate and depressurize the probe chamber. Disconnect the sensor cable from the sensor. Remove, and replace the probe. Pressurize the probe chamber and connect the sensor cable. A small amount of sample air (approximately 2-10 SCFH) should expel out the chamber needle valve.

MICROBURST REGENERATION (MBR) WITH DEMAND CONTROL (DC)

(QDHP Series only)

MicroBurst Regeneration systems use the same NEMA cycle of 8 hours as QDHP Series dryers except during the regeneration cycle, instead of continuously flowing 7% of the purge air and blowing it out into the atmosphere, the purge air is cycled at 30 minute intervals during the 4 hour regeneration period. It is observed that this method of purging and holding greatly enhances the regeneration process and considerably reduces the period the heater is energized, and also cuts down the purge flow by approximately 50%, since purging and holding during the regeneration cycle is equal.

MicroBurst Regeneration (MBR) with Demand Control is designed to achieve the maximum energy savings benefits of MBR at loaded conditions. At low load conditions, Demand Control takes over for added energy savings. The amount of time that the unit is in demand is proportional to the moisture load. This cycle is only recommended for continuous operation.

This system is controlled by a PLC which has a nonvolatile memory. The program is stored in the E-PRom memory.

A dewpoint monitor with High Humidity Alarm and three hour meters are provided to monitor the system and show savings. The hour meters display "Heater Run Time", "Dryer Run Time" and "Demand Time".

TROUBLESHOOTING

Table 1 — Troubleshooting Guide for Regenerative Dryers

Symptoms	Cause	Remedy
<p>A. Elevated Dewpoint.</p>	<ol style="list-style-type: none"> 1. Low purge flow. 2. Low inlet pressure. 3. Excess moisture carryover. 4. High inlet temperature. 5. Excess air/gas inlet flow. 6. Desiccant coated with oil. 7. Regeneration temperature low. 8. Dewpoint monitor out of calibration. 	<ol style="list-style-type: none"> 1. Reset purge pressure at the recommended pressure. 2. Recalculate purge pressure setting from the chart. 3. Check prefilter element. Check drains at prefilter and afterfilter. 4. Check aftercooler operation. 5. Check total output of compressors. 6. Depressurize dryer and inspect desiccant. 7. *See B. 8. Recalibrate probe.
<p>B. Regeneration temperature low (Normal 250°F).</p>	<ol style="list-style-type: none"> 1. Thermostat faulty or set too low. 2. Low purge flow. 3. Back pressure on regenerating tower. 4. Heater burnout. 5. Contactor faulty. 6. No power. 7. Insufficient heating period. 	<ol style="list-style-type: none"> 1. Reset thermostat or replace if necessary. 2. *See A1. 3. *See C1. 4. Check heater, replace if necessary. 5. Replace heater contactor. 6. Check for continuity. 7. (Contact factory).
<p>C. High back pressure on regenerating tower.</p> <p>NOTE: The tower should be at '0' PSIG during regeneration cycle. Any back pressure will result in improper regeneration.</p>	<ol style="list-style-type: none"> 1. Muffler plugged. 2. Check valves leaking. <p>NOTE: To test for leaking check valves during regeneration cycle, shut the purge adjusting valve. If gas is still passing through, it is an indication of leaking check valves.</p> <ol style="list-style-type: none"> 3. Excess purge flow. 4. Restricted purge exhaust piping. 5. Too high purge. 6. Diaphragms ruptured in valves (QDHP models). 	<ol style="list-style-type: none"> 1. Replace mufflers. 2. Repair or replace faulty check valves. 3. Check and reset the purge pressure. 4. Remove obstruction or replace with larger size pipe. 5. Check purge calibration, plot and reset. 6. Replace diaphragms.

Table 1 — Troubleshooting Guide for Regenerative Dryers, continued

Symptoms	Cause	Remedy
D. Excessive flow through mufflers.	1. Check valves leaking. NOTE: To test for leaking, check valves during regeneration cycle, shut the purge adjusting valve. If gas is still passing through, it is an indication of leaking check valves. 2. Inlet valves did not switch. 3. Purge valve stays open. 4. Repressurizing valve does not close. 5. Diaphragms ruptured in valves (QDHP models).	1. Repair or replace faulty check valves. 2. See F1 to F4. 3. Check purge solenoid and valve. Repair or replace faulty purge valve or solenoid. 4. Check repressurizing solenoid and valve. Repair or replace faulty repressurizing valve or solenoid. 5. Replace diaphragms.
E. No gas flow through the dryer.	1. Both inlet valves closed due to low inlet pressure.	1. Manually open the inlet valve by turning the shaft or the ON actuator.
F. Failure to switch alarm light.	1. Inlet valves did not switch. 2. Faulty timer. 3. Insufficient pilot air pressure. 4. Cylinder leaking or seized up.	1. Check pilot air solenoid valve. Repair if necessary. 2. Replace timer. 3. Clean or replace pilot filter element. 4. Repair or replace pilot air cylinder.
G. High pressure drop in dryer.	1. Desiccant retainer screens plugged. 2. Excess flow. 3. High purge flow. 4. Purge valve stays open. 5. Repressurizing valve stays open.	1. Replace desiccant retainer screens. 2. Check inlet flow conditions. 3. Check and reset purge pressure. 4. Check repressurizing solenoid valve, repair or replace if necessary. Check timer. 5. See D4.
H. Dryer fails to purge.	1. Orifice plate plugged. 2. Purge valve fails to open. 3. Purge valve closed. 4. Purge check valve blocked.	1. Clean the orifice plate. 2. See G3. 3. Reset proper purge pressure. 4. Inspect purge check valve. Replace if necessary.
I. High dewpoint alarm light.	See chart on alarm conditions.	
J. Moisture indicator color turned pink (wet conditions).	1. Bleed valve closed. 2. See probable cause on #1.	1. Open the bleed valve to allow small amount of air to constantly flow through the gel.
K. Tower fails to pressurize.	1. Purge valve stays open. 2. Repressurizing valve faulty. 3. Diaphragms ruptured in valves (QDHP models).	1. See G3. 2. See D4. 3. Replace diaphragms.

Table 1 — Troubleshooting Guide for Regenerative Dryers, continued

Symptoms	Cause	Remedy
L. Tower does not pressurize fully.	<ol style="list-style-type: none"> 1. Inlet pressure low. 2. Purge pressure too low. 3. Repressurizing period too short. 	<ol style="list-style-type: none"> 1. Calibrate and plot purge pressure and reset. 2. Reset proper purge pressure. 3. Check timer sequence of operation.
M. Excess desiccant dust. NOTE: If the regenerating tower does not pressurize fully, desiccant attrition takes place at the time of tower switch-over.	<ol style="list-style-type: none"> 1. See K & L. 2. Excess flow due to greater demand in process or addition of extra compressors. 	<ol style="list-style-type: none"> 2. Check outlet flow.
N. Dewpoint Spike. NOTE: Blower purge dryers may spike during normal operation due to blower cooling.	<ol style="list-style-type: none"> 1. Excessive residual heat in newly regenerated tower. 	<ol style="list-style-type: none"> 1. Lower heater thermostat settings.

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