

RDH-HP Series

Pressure-Swing Desiccant Type Compressed Air Dryers
Models: RDH-HP-715G, RDH-HP-1550G, RDH-HP-5200G

FORM NO.: 3245430 REVISION: 04/2014

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.

MODELS	RATED FLOW	REFER AS MODELS
RDH-HP-715G	715 SCFM	715
RDH-HP-1550G	1550 SCFM	1550
RDH-HP-5200G	5200 SCFM	5200

WARRANTY

The manufacturer warrants the product manufactured by it, when properly installed, operated, applied, and maintained in accordance with procedures and recommendations outlined in manufacturer's instruction manuals, to be free from defects in material or workmanship for a period of one (1) year from the date of shipment to the buyer by the manufacturer or manufacturer's authorized distributor, or eighteen months from the date of shipment from the factory, whichever occurs first, provided such defect is discovered and brought to the manufacturer's attention within the aforesaid warranty period. The manufacturer will repair or replace any product or part determined to be defective by the manufacturer within the warranty period, provided such defect occurred in normal service and not as a result of misuse, abuse, neglect or accident.

The warranty covers parts and labor for the warranty period. Repair or replacement shall be made at the factory or the installation site, at the sole option of the manufacturer. Any service performed on the product by anyone other than the manufacturer must first be authorized by the manufacturer. Normal maintenance items requiring routine replacement are not warranted. Unauthorized service voids the warranty and any resulting charge or subsequent claim will not be paid. Products repaired or replaced under warranty shall be warranted for the unexpired portion of the warranty applying to the original product. The foregoing is the exclusive remedy of any buyer of the manufacturer's product. The maximum damages liability of the manufacturer is the original purchase price of the product or part.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR STATUTORY, **AND IS EXPRESSED IN LIEU OF THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.** THE MANUFACTURER SHALL NOT BE LIABLE FOR LOSS OR DAMAGE BY REASON OF STRICT LIABILITY IN TORT OR ITS NEGLIGENCE IN WHATEVER MANNER INCLUDING DESIGN, MANUFACTURE OR INSPECTION OF THE EQUIPMENT OR ITS FAILURE TO DISCOVER, REPORT, REPAIR, OR MODIFY LATENT DEFECTS INHERENT THEREIN. THE MANUFACTURER, HIS REPRESENTATIVE OR DISTRIBUTOR SHALL NOT BE LIABLE FOR LOSS OF USE OF THE PRODUCT OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES INCURRED BY THE BUYER, WHETHER ARISING FROM BREACH OF WARRANTY, NEGLIGENCE OR STRICT LIABILITY IN TORT.

The manufacturer does not warrant any product, part, material, component, or accessory manufactured by others and sold or supplied in connection with the sale of manufacturer's products.

**AUTHORIZATION FROM THE SERVICE DEPARTMENT IS NECESSARY
BEFORE MATERIAL IS RETURNED TO THE FACTORY OR IN-WARRANTY REPAIRS ARE MADE.**

CONTENTS

1.0 DESCRIPTION.....	4
2.0 INSTALLATION.....	6
3.0 OPERATION	12
4.0 MAINTENANCE	16
5.0 TROUBLESHOOTING	18
6.0 REPLACEMENT PARTS.....	19

GENERAL SAFETY INFORMATION

- 1. Pressurized devices:** This equipment is a pressure containing device. Do not exceed maximum operating pressure as shown on equipment serial number tag. Make sure equipment is depressurized before working on or disassembling it for service.
- 2. Electrical:** This equipment requires electricity to operate. Install equipment in compliance with national and local electrical codes. Standard equipment is supplied with NEMA 4, 4x electrical enclosures and is not intended for installation in hazardous environments. Disconnect power supply to equipment when performing any electrical service work.
- 3. Breathing Air:** Air treated by this equipment may not be suitable for breathing without further purification. Refer to OSHA standard 1910.134 for the requirements for breathing quality air.
- 4. Noise:** Do not operate dryer without mufflers installed.
- 5. High Velocity Air:** Do not stand near mufflers during tower depressurization.



IMPORTANT: READ PRIOR TO STARTING THIS EQUIPMENT

A. UNPACKING

This shipment has been thoroughly checked, packed and inspected before leaving our plant. It was received in good condition by the carrier and was so acknowledged.

1. Check for Visible Loss or Damage. If this shipment shows evidence of loss or damage at time of delivery to you, insist that a notation of this loss or damage be made on the delivery receipt by the carrier's agent.
2. Check for Concealed Loss or Damage. When a shipment has been delivered to you in apparent good order, but concealed damage is found upon unpacking, notify the carrier immediately and insist on his agent inspecting the shipment. Fifteen days from receipt of shipment is the maximum time limit for requesting such inspection. Concealed damage claims are not our responsibility as our terms are F.O.B. point of shipment.

B. MOVING CAUTION:

Do not lift by piping. Use lifting lugs or fork lift.

MINI INSTRUCTIONS

For complete instructions on installation, operation and maintenance, consult manual.

I. INSTALLATION

1. Install on level surface.
2. Ambient temperature range: 35 to 120°F (1.7 to 49°C)
[if low ambient package supplied: -10 to 120°F (-23 to 49°C)]
3. Install purge mufflers if shipped separately.
4. Connect air from compressor to inlet.
 - Maximum compressed air temperature: 120°F (49°C)
 - Maximum compressed air pressure: Refer to serial number tag.
 - Minimum compressed air pressure: 100 psig (6.9 barg)
5. Connect outlet to air system.
6. Refer to serial number tag for correct voltage. Make electrical connection to terminal strip in control panel. Connect line to position 5, neutral to position 6 and ground to position 7.
7. Verify voltage selector switch (115V or 230V). Position should match voltage on Serial Number Tag.

II. START UP

1. Set or verify controller settings. See section 3.1.1.
2. SLOWLY pressurize unit.
3. Energize dryer by turning on/off switch on. ("I" is on; "O" is off)
4. Adjust purge air flow rate. Turn purge rate valve until Purge Pressure Gauge reads as shown in the following table.
NOTE: One tower must be purging when setting purge pressure.

III. OPERATIONAL CHECKPOINTS

1. **Check that dryer is energized (indicating lights are illuminated)**
2. **MOISTURE INDICATOR - Indicator should be green** (Allow 4 hours after start up for indicator to turn green).
3. **TOWER PRESSURE GAUGES -**
 - Tower on line should read line pressure
 - Tower off line should read 2 psig (0.14 barg) or less while purging. If pressure exceeds 2 psig (0.14 barg) replace purge muffler elements.
- NOTE:** An extra set of elements is shipped with dryer.
4. **PURGE PRESSURE GAUGE - Verify proper setting.**
5. **CHECK FOR ALARM CONDITION.**

IV. DEPRESSURIZATION

Isolate dryer. Run timer until both tower pressure gauges read 0 psig (0 kgf/cm²)(test mode may be used to speed up cycle).

1.0 DESCRIPTION

1.1 Function

1.1.1 Dryer

Dual tower regenerative desiccant dryers are an economical and reliable way to dry compressed air to dew points below the freezing point of water (dew points as low as -150°F (101°C) [1 ppb @ 100 psig, 7.0 barg] are possible) or reduce the moisture content of compressed air when used in critical process applications.

These dryers continuously dry compressed air by using two identical towers, each containing a desiccant bed. While one tower is on-stream drying the compressed air, the other tower is off-stream being regenerated (reactivated, i.e., dried out). The towers are alternated on- and off-stream so that dry desiccant is always in contact with the wet compressed air. In this way a continuous supply of dry air downstream is possible.

Desiccant dryers lower the dew point of compressed air by adsorbing the water vapor present in the compressed air onto the surface of the desiccant. Desiccant is a highly porous solid containing extensive surface area.

Adsorption occurs until the partial pressure of the water vapor in the air and that on the surface of the desiccant come into equilibrium. As adsorption occurs, heat is released (referred to as the heat of adsorption) and is stored in the bed for use during regeneration.

Desiccant is regenerated by driving off (desorbing) the water collected on its surface. Pressure-swing (also called heatless or heaterless because no outside heat is added) dryers regenerate by expanding a portion (approximately 14 - 15% at 100 psig, 7 barg) of the dried air to atmospheric pressure. This "swing in pressure" causes the expanded air to become very dry (have a very low vapor pressure). This very dry air (called purge air) plus the stored heat of adsorption allows the moisture to desorb from the desiccant. The purge air then carries the desorbed water out of the dryer.

1.2 Description of Operation

1.2.1 Dryer (Refer to Figure 1A.)

Compressed air flows through inlet switching valve (3A) (normally open) to tower (4A) where the air is dried. After the air is dried it flows through check valve (5A) and then to the dryer outlet.

A portion of the dry air, the purge stream, branches off from the main air stream prior to the outlet. The purge stream flow rate is controlled by the adjustable purge rate valve (6) and the purge orifice (7).

The purge flow, which has been throttled to near atmospheric pressure, is directed through check valve (5D) to tower (4B). As the purge flow passes over the desiccant in tower (4B), it removes the water vapor which was deposited there while the tower was on-line drying. The purge air then passes through purge and repressurization valve (9B) (normally closed) and purge muffler (10B) to the atmosphere.

After regeneration, purge and repressurization valve (9B) (normally open) closes allowing tower (4B) to repressurize slowly. Adequate repressurization time is allowed so that tower 4B is fully repressurized before switchover. After a controlled time period, air inlet switching valve (3B) (normally open) opens and inlet switching valve (3A) (normally open) closes, purge and repressurization valve (9A) (normally closed) then opens.

(Refer to Figure 1B.) Tower (4B) is now drying the main air stream while tower (4A) is being regenerated by the purge air stream. The operation of the inlet switching (normally open) and purge and repressurization valves (normally closed) is sequenced by the control system located in the electrical box.

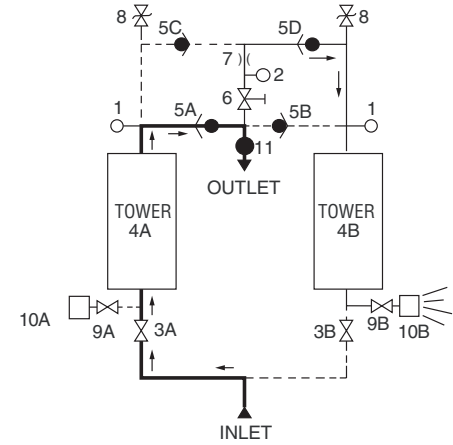


FIGURE 1A
TOWER 4A DRYING: TOWER 4B REGENERATING

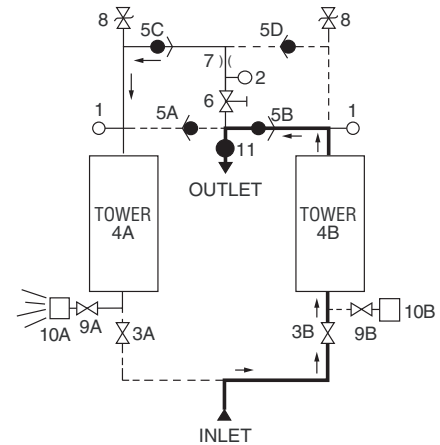


FIGURE 1B
TOWER 4B DRYING: TOWER 4A REGENERATING

- | | |
|--------------------------------|------------------------------------|
| 1. Pressure Gauges | 7. Purge Orifice |
| 2. Purge Pressure Gauge | 8. Pressure Relief Valves |
| 3. Inlet Switching Valves | 9. Purge / Repressurization Valves |
| 4. Desiccant Drying Towers | 10. Purge Mufflers |
| 5. Check Valves | 11. Moisture Indicator |
| 6. Adjustable Purge Rate Valve | |

Purge Stream - - - - -

Process Stream —————

2.0 INSTALLATION

2.1 Location in the compressed air system.

NOTE: Air Compressor should be adequately sized to handle air system demands as well as purge loss. Failure to take this into account could result in overloading air compressors and/or insufficient air supply downstream.

NOTE: It is desirable to install dryer where compressed air is at the lowest possible temperature (downstream of aftercoolers) and the highest possible pressure (upstream of pressure reducing valves) without exceeding the maximum working pressure. (Refer to Figure 2A)

(A) AFTERCOOLER/SEPARATOR - Compressed air entering dryer must be cooled to at least 120°F (49°C). Use aftercooler and separator if higher temperatures are present.

NOTE: Installation of a refrigerated dryer ahead of a pressure-swing desiccant dryer does not increase desiccant dryer capacity or reduce purge flow requirements. However a cooling unit installed ahead of the desiccant dryer reduces the inlet air temperature and outlet air dew point.

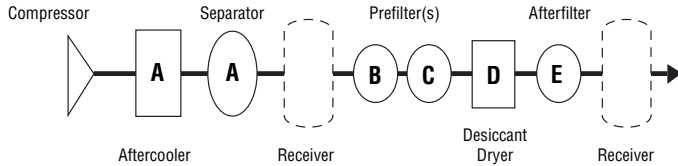


FIGURE 2A

(B & C) PREFILTERS - Adequate filtration is required upstream of the dryer in order to protect the desiccant bed from contamination. The following filtration is recommended:

B - Particulate/Gross Liquid Removal - On heavily contaminated systems use a gross contaminant filter to remove solids and high inlet liquid concentrations.

C - Oil Aerosol Removal - On systems with lubricated compressors, use an oil removal filter to remove oil aerosols and protect desiccant bed from oil contamination.

(D) DESICCANT DRYER

(E) AFTERFILTER - To ensure downstream air purity (prevent desiccant dust from traveling downstream) adequate filtration downstream of the dryer is required. Typically 1 micron filtration is specified although finer filtration is available.

OR

Oil Vapor Adsorber - Use as an afterfilter to remove oil vapor and its subsequent taste and odor and to protect down-stream components from solid particles 0.01 micron and larger.

NOTE: By-pass lines and isolation valves are recommended so that maintenance work can be performed without shutting off the air supply.

2.2 Physical Location

Dryer must be installed with suitable overhead protection.

2.3 Minimum & Maximum Operating Conditions

The compressed air supply inlet should be checked periodically to ensure that equipment design specifications are not exceeded. Normally the compressor installation includes intercoolers, aftercoolers, separators, receivers, or similar equipment which adequately pretreat the compressed air supply in order to avoid excessively high air temperatures and liquid slugging of downstream equipment.

2.3.1 Compressed air conditions

2.3.1.1 Maximum working pressure: Refer to Serial Number Tag.

WARNING

Do not operate the dryer at pressures above the maximum pressure shown on the tag.

2.3.1.2 Minimum working pressures: 100 psig (7 barg)

2.3.1.3 Maximum inlet compressed air temperature: 120°F (49°C)

NOTE: If inlet air is higher than 120°F (49°C) the air must be pre-cooled with an aftercooler.

2.3.2 Ambient temperatures:

Minimum:

Standard units: 35°F (1.7°C)

Units with optional low ambient package: - 10°F (-23°C)

Maximum: 120°F (49°C)

NOTE: If dryer is installed in ambients below 35°F (1.7°C) heat tracing of the prefilters and inlet piping and valves is necessary to prevent condensate from freezing. If installing heat tracing, observe electrical class code requirements for type of duty specified.

2.4 Mounting

Install dryer on a level pad on floor. Holes are provided in the floor stand base angles for floor anchors if desired.

NOTE: Floor anchors must be used if area is subject to vibrations.

2.5 Piping

2.5.1 Inlet and Outlet connections

Observe location of inlet and outlet connections as indicated in Figure 2C or 2D and connect inlet and outlet piping.

NOTE: All piping must be supported so as not to bear on the dryers or filters.

2.5.2 Isolation valves

If isolation valves are installed, it is recommended that gate valves be used to ensure that dryer is pressurized slowly. This is particularly true if isolation valves are placed before and after pre- and afterfilters where rapid pressurization could cause excessive pressure drop across filter elements.

Icon identification

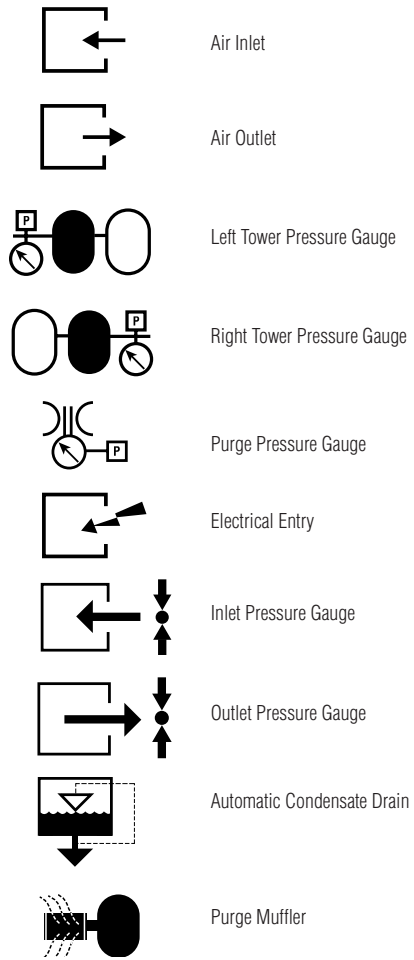


FIGURE 2B

FIGURE 2C Model 715G

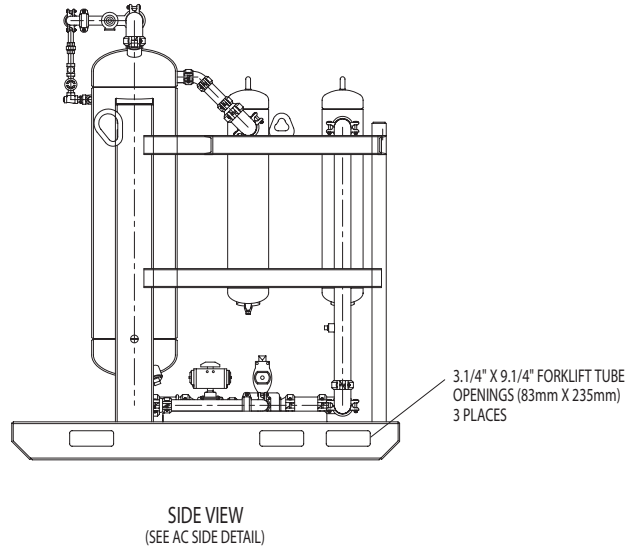
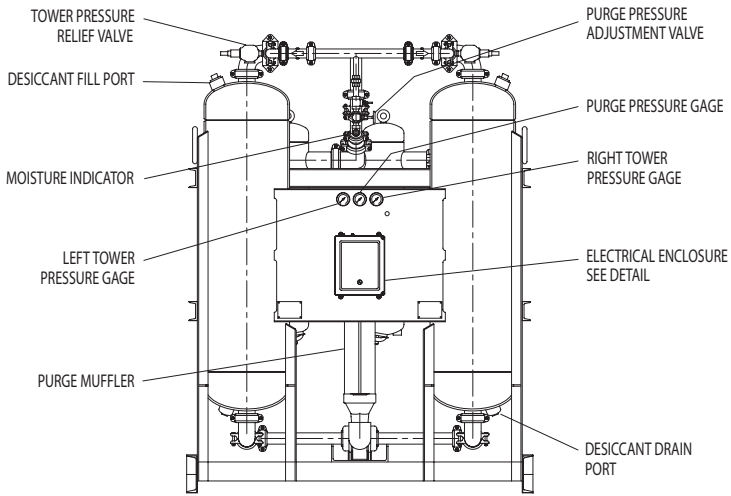
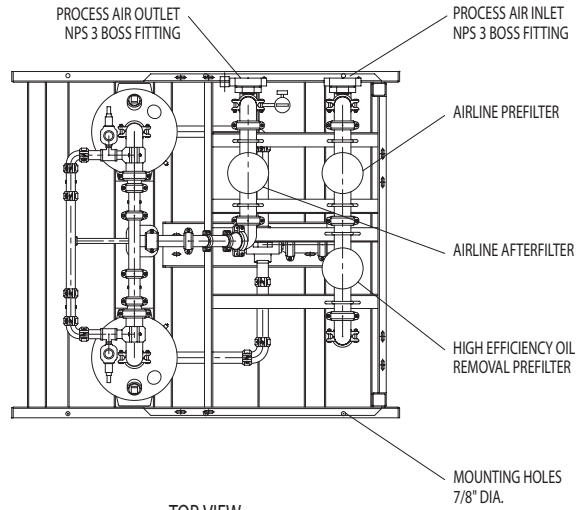
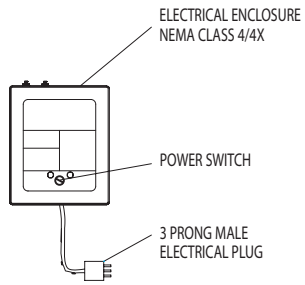
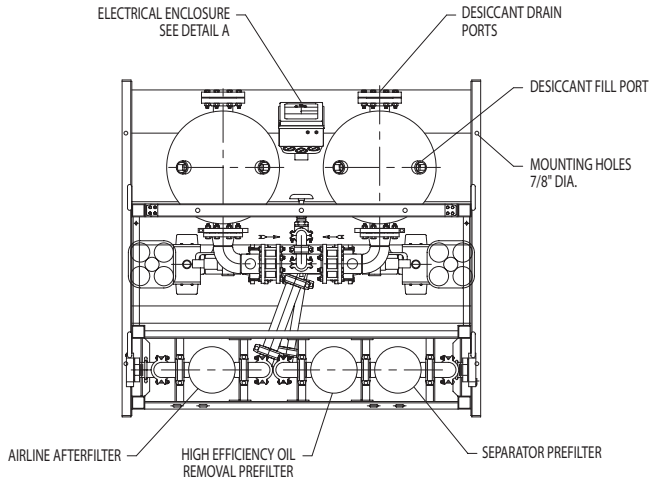
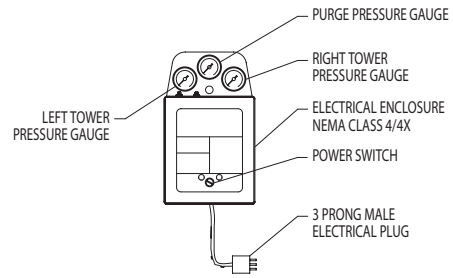


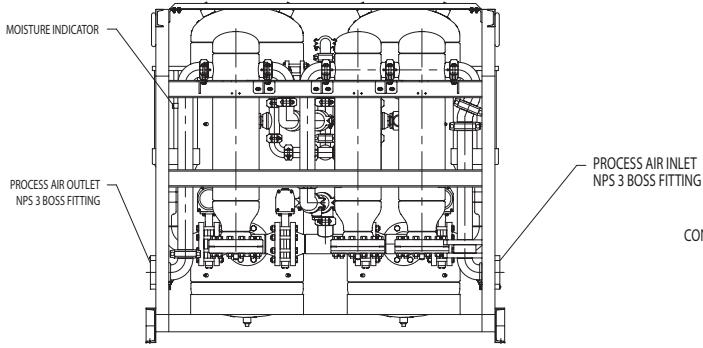
FIGURE 2D Model 1550G



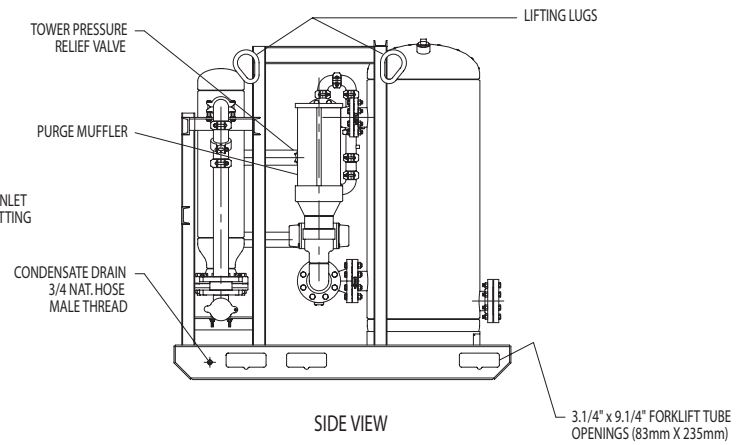
TOP VIEW



DETAIL A

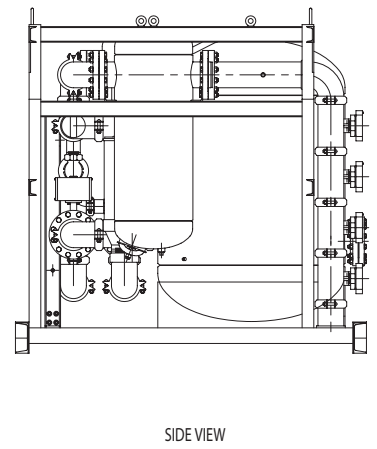
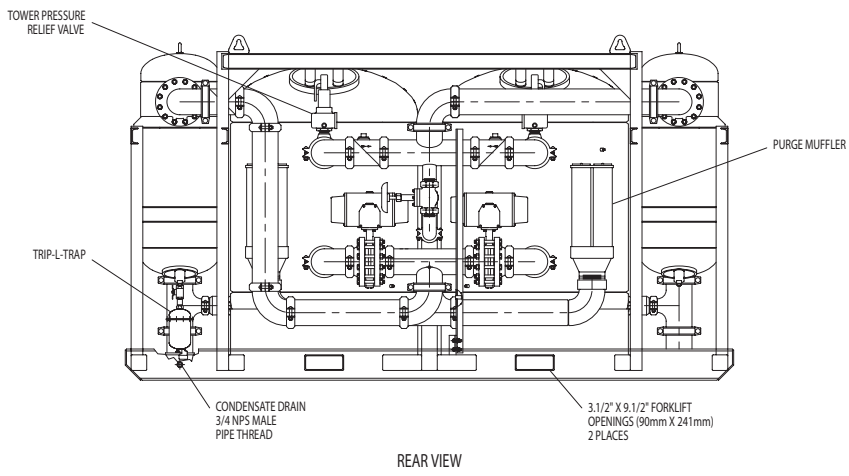
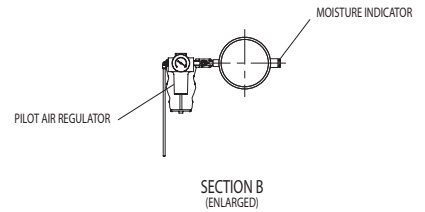
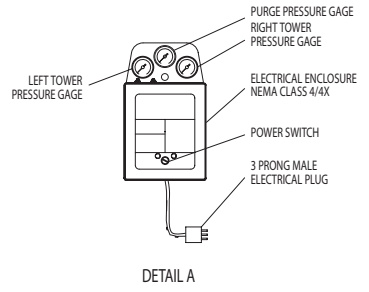
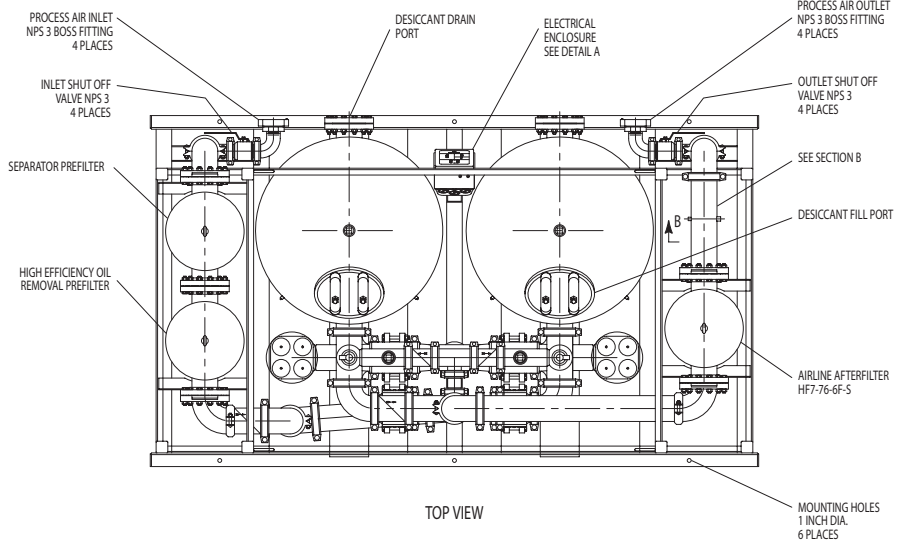


REAR VIEW OF DRYER



SIDE VIEW

FIGURE 2E Model 5200G



2.6 Electrical Connections

Standard and Automatic Purge Saving

2.6.1 Power Connections

NOTE: Check Serial Number Tag for correct voltage.

Connect wires to terminal strip. Connect L1 (line) to position 5, L2 (neutral) to position 6, and ground to position 7. Do not make connections to terminals labeled with grounding symbol or labeled with RS.

Set the voltage selection switch located at the lower edge of the control board for the proper supply voltage.

Electrical entry is 7/8" dia. hole for 1/2" nominal conduit entry.

2.6.2 Alarm Connections -

Dry contacts for a remote alarm are supplied at terminals 20, 21, 22. When the unit is energized and no alarms are in effect, continuity should exist between terminals 20 and 21, with no continuity between terminals 21 and 22. Alarm contact is common for switching failure alarm and optional high humidity alarm.

Maximum contact rating is:

240 VAC - 5.0 amps

50 VDC - 1.0 amps

NOTE: Check Serial Number Tag for electrical values.

2.7 Provisions for Purge Exhaust

Purge exhaust must be routed through the factory supplied mufflers or piped to a remote location.

2.7.1 Purge mufflers - If shipped separately, install purge exhaust mufflers in the locations shown in Figure 2C, 2D, or 2E.

2.7.2 If purge exhaust is piped to a remote location, choose a pipe size large enough so that back pressure through the piping is not created.

WARNING

Do not operate dryer without one of the above measures. Exhausting air will result in noise levels above OSHA permissible levels and exhausting gas could potentially cause harm to persons or property.



2.8 Initial Desiccant Charge

The dryer is shipped complete with desiccant and ready to operate after piping and electrical connections are made.

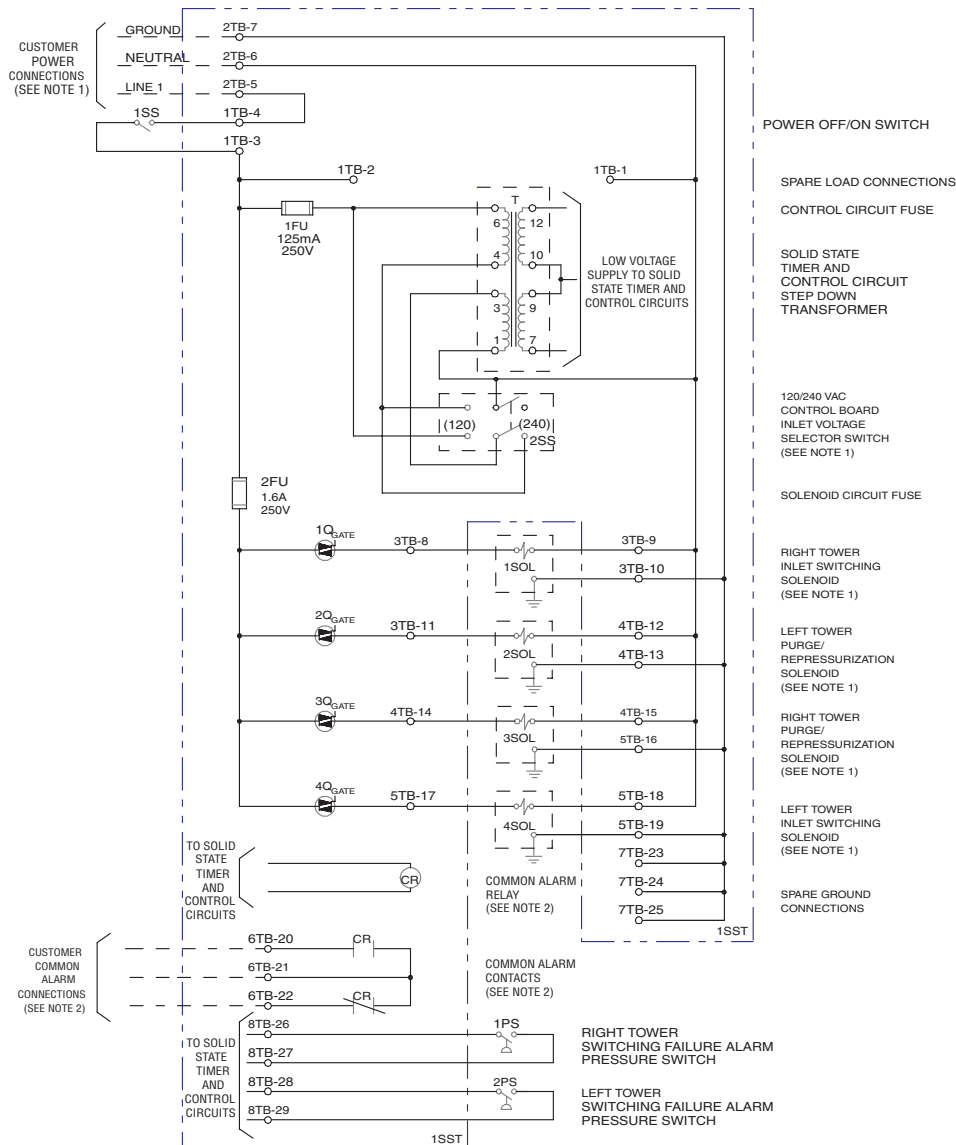


FIGURE 2E Electrical Schematic (Standard Dryers)

3.0 OPERATION

3.1 Start-up

3.1.1 Controller Settings- Set or verify settings on controller

3.1.1.1 Standard Control Board

WARNING

Enclosure may have live electric parts.
De-energize dryer before opening enclosure.



3.1.1.1.1 Voltage Selection -

Set the voltage selection switch located at the lower edge of the power board for the proper voltage.

3.1.1.1.2 Dip Switch Settings - (Refer to Table 3A)

NOTE: For ON DIP switch is up; OFF DIP switch is down
To select Test Mode - place switch 5 and 6 in ON position

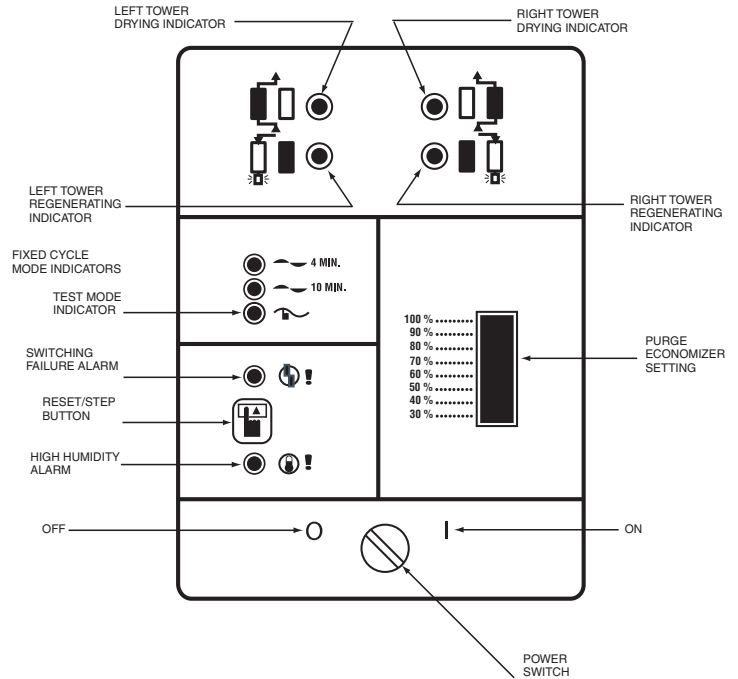


FIGURE 3A
Standard Control Panel

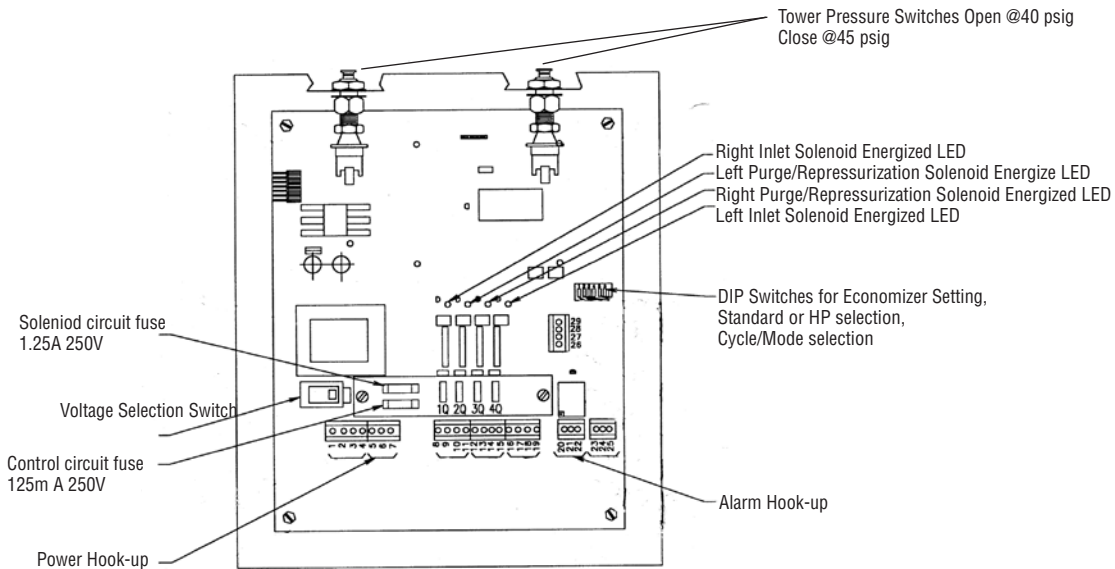


FIGURE 3B
Standard Control Board

3.1.2 SLOWLY pressurize dryer to full line pressure (open inlet isolation valve, outlet isolation valve remains closed).

NOTE: During initial start-up check entire system for leaks. If necessary, depressurize and correct any leaks.

3.1.3 Energize dryer using the power switch located on the control panel.

NOTE: Switching failure alarm: alarm (light) may be activated if unit is energized before it is pressurized. To deactivate alarm, allow dryer to cycle to next step and press the reset button.

3.1.4 Adjust the purge rate valve.

3.1.4.1 Determine:

- 1) Maximum working pressure (MWP) of dryer from the dryer serial number tag
- 2) Air pressure at inlet to dryer

3.1.4.2 Refer to Table 3A for proper purge rate pressure setting at the conditions found in 3.1.4.1

3.1.4.3 Adjust purge rate valve until purge flow indicator reads required pressure setting.

NOTE: Adjustment must be made while a tower is purging (air exhausting from muffler).

IMPORTANT

INSUFFICIENT PURGE AIR WILL EVENTUALLY RESULT IN SATURATION OF DESICCANT BED AND WET AIR DOWNSTREAM. MAKE CERTAIN THAT CYCLE TIME, PURGE ECONOMIZER SWITCH, AND PURGE PRESSURE ARE CORRECTLY SET.

3.1.5 Establish normal flow through dryer (open outlet isolation valve). Close air by-pass valve if present.

NOTE: When dew points below -40°F (-40°C) are required, the dryer must be run with an inlet flow rate of less than 50% of maximum until the desired dew point is attained. Depending on the initial dryness of the desiccant, this can take as long as 2 to 3 days. This stabilization period is required on initial startup, after dryer has been shutdown for extended periods of time, or after dryer maintenance (desiccant change, etc.).

3.1.6 With the inlet pressure to the dryer at its minimum level, readjust the purge pressure as determined in 3.1.4.

NOTE: Adjustment must be made while a tower is purging (air exhausting from muffler).

3.2 Operational Check Points

3.2.1 Standard Unit

3.2.1.1 Power to unit -

Check periodically that there is power to the unit (indicating lights illuminated).

3.2.1.2 Moisture Indicator -

Every four hours check moisture indicator. Indicator should be green. Outlet relative humidity of the desiccant dryer is indicated by the color change humidity indicator. Green indicates a R.H. below 3% and yellow indicates a R.H. above 3%. Table 3C (page 16) indicates outlet dew point when moisture indicator changes from green to yellow at various inlet temperatures.

NOTE: During start-up the indicator may be yellow, however, it should begin to change to green within four hours.

3.2.1.3 Purge Flow Indicator -

Every four hours check the purge pressure and adjust as required. Adjustment should be made when the inlet pressure to the dryer is at its minimum level.

NOTE: Adjustment must be made while a tower is purging (air exhausting from muffler).

Units with Standard Board Operation

3.2.1.4 Alarms

Periodically check for flashing red alarm light. Alarm light will flash if either tower fails to pressurize or depressurize to the required levels at the proper time or if optional high humidity alarm indicates high exiting dewpoint.

NOTE: Alarm will activate if dryer is energized without being pressurized. If this occurs allow dryer to cycle to next step and press reset button.

NOTE: Alarm light will continue to flash even if fault clears. To clear alarm, press reset button.

NOTE: If the tower being regenerated fails to repressurize, the dryer will not switch towers. The switching failure alarm will be activated and the dryer will remain in this mode until the tower repressurizes.

Switching Failure

The switching failure alarm operates by sensing tower pressures after tower changeover. If towers have failed to pressurize or depressurize to the required levels, an alarm condition exists. The alarm light blinks while the alarm condition exists. Depressing the reset switch will extinguish the light, but will not interrupt the drying cycle.

If the tower being regenerated fails to repressurize, the dryer will not switch towers. The switching failure alarm will be activated and the dryer will remain in this mode until the tower repressurizes.

3.2.1.5 Tower Status Lights -

Illuminated light indicates which tower is on-line drying or off-line regenerating.

3.2.1.6 Tower pressure gauges

3.2.1.6.1 Periodically check tower pressure gauges to verify that tower pressure gauge of tower on-line reads line pressure and tower pressure gauge of tower off-line reads below 2 psig.

NOTE: Read off-line tower gauge when tower is purging (air exhausting from muffler)

3.2.1.6.2 Check mufflers for back pressure

Excessive back pressure may result due to the accumulation of dust in the muffler. This sometimes occurs after start-up because of dusting of the desiccant during tower filling and dryer transport.

If the tower pressure gauge of the off-stream tower rises out of the black area on the gauge dial, muffler elements should be replaced. A set of purge exhaust muffler replacement elements is supplied with the dryer.

3.2.3 All MODELS - Determine if air control valves are operating and sequencing correctly.

3.2.3.1 Inlet switching and purge/repressurization valves.

- 1) Tower pressure gauge of tower on-line should read line pressure. No air should be leaking from purge/repressurization valve of the on-line tower.
- 2) Tower pressure gauge of tower off-line should read below 2 psig while tower is purging. If excessive purge air is exhausting during purge cycle, inlet valve may have failed to close or a check valve may be sticking.

3.2.3.2 Check valves

Check valve sticking will result in excessive air discharge through a muffler. If excessive air is discharged through the muffler on the left, check if valve 5a or 5d is sticking. If excessive air is discharged through the muffler on the right, check if valve 5b or 5c is sticking.

3.3 Shut Down

3.3.1 Depressurize dryer

- 3.3.1.1** Open by-pass valve (if one is installed) and close inlet and outlet isolation valves.

- 3.3.1.2** Run timer through a tower change cycle until pressure gauges on both towers read 0 (test mode may be used to speed this up).

3.3.2 De-energize dryer

Turn dryer off using on-off switch (indicating lights extinguished).

3.4 Loss of Power

Control valves are designed so that upon loss of power the air dryer is capable of drying air until the desiccant exposed to the air flow is saturated.

3.5 Verify that dryer is operating within design parameters

3.5.1 Maximum working pressure:

Refer to Serial Number Tag to determine maximum working pressure of dryer.

WARNING

Do not operate dryer at pressures above the maximum pressure shown on the tag.

- 3.5.2 Minimum working pressures: 100 psig (7 barg)**

TABLE 3A

Model RDH-HP											
Inlet Temperature 100°F		Outlet Pressure Dew Point: -40°F 10 Minute Cycle					Outlet Pressure Dew Point: -100°F 4 Minute Cycle				
Inlet Pressure (psig)	Inlet Pressure Correction Factor *	Purge Time (seconds)	Repress Time (seconds)	Timer board DIP Switch Settings	Purge Orifice Pressure (psig)	Maximum Purge Flow Factor **	Purge Time (seconds)	Repress Time (seconds)	Timer board DIP Switch Settings	Purge Orifice Pressure (psig)	Maximum Purge Flow Factor **
350	1.78	139	155	1 = OFF 2 = ON 3 = OFF 4 = ON 5 = OFF 6 = ON	42	0.166	29	85	1 = ON 2 = ON 3 = OFF 4 = ON 5 = ON 6 = OFF	89	0.318
340	1.76	139	155		43	0.168	29	85		90	0.322
330	1.73	139	155		44	0.170	29	85		92	0.327
320	1.71	139	155		44	0.173	29	85		93	0.333
310	1.68	139	155		45	0.176	29	85		95	0.337
300	1.66	139	155		46	0.178	29	85		97	0.342
290	1.63	139	155		47	0.181	29	85		98	0.348
280	1.60	139	155		48	0.184	29	85		100	0.353
270	1.58	139	155		49	0.188	29	85		102	0.360
260	1.55	139	155		50	0.191	29	85		104	0.366
250	1.52	139	155	51	0.194	29	85	106	0.373		
250	1.52	174	120	1 = OFF 2 = OFF 3 = OFF 4 = ON 5 = OFF 6 = ON	39	0.155	42	72	1 = OFF 2 = OFF 3 = OFF 4 = ON 5 = ON 6 = OFF	70	0.257
240	1.49	174	120		40	0.158	42	72		72	0.262
230	1.46	174	120		41	0.162	42	72		74	0.268
220	1.43	174	120		42	0.165	42	72		75	0.273
210	1.40	174	120		43	0.169	42	72		77	0.279
200	1.37	174	120		44	0.172	42	72		79	0.286
190	1.34	174	120		46	0.177	42	72		81	0.293
180	1.30	174	120		47	0.181	42	72		84	0.300
170	1.27	174	120		48	0.186	42	72		86	0.308
160	1.23	174	120		50	0.191	42	72		89	0.317
150	1.20	174	120	52	0.197	42	72	92	0.326		
150	1.20	234	60	1 = OFF 2 = OFF 3 = OFF 4 = OFF 5 = OFF 6 = ON	36	0.146	66	48	1 = OFF 2 = OFF 3 = OFF 4 = OFF 5 = ON 6 = OFF	55	0.208
140	1.16	234	60		38	0.151	66	48		57	0.214
130	1.12	234	60		39	0.156	66	48		59	0.222
120	1.08	234	60		41	0.162	66	48		62	0.230
110	1.04	234	60		43	0.168	66	48		65	0.239
100	1.00	234	60		45	0.175	66	48		68	0.249
100	1.00	234	60		45	0.175	66	48		68	0.249
Dryer Model		Inlet Flow Rating @ 100 psig (scfm)			* (Inlet Flow rating @ P) = (Inlet Pressure Correction factor @ P) X (Inlet Flow Rating @ 100 psig)						
RDH-HP-715		715			** (Maximum Purge Flow @ P) = (Maximum Purge Flow Factor @ P) X (Inlet Flow Rating @ 100 psig)						
RDH-HP-1550		1550									
RDH-HP-5200		5200									

TABLE 3B Inlet Temperature Correction Factor

INLET TEMPERATURE	°F	100 and below	105	110	115	120	125	130	135	140
	°C	38 and below	41	43	46	49	52	54	57	60
MULTIPLIER		1.0	0.98	0.96	0.93	0.91	0.85	0.81	0.76	0.70

TABLE 3C Outlet pressure dew points at moisture indicator color change

INLET TEMPERATURE	°F	35	40	50	60	70	80	90	100	110	120
	°C	1.7	4.4	10.1	15.6	21.1	26.7	32.2	37.8	43.3	48.9
OUTLET P.D.P.	°F	-34	-28	-22	-16	-10	-4	3	9	15	21
	°C	-36.7	-33.4	-30.0	-26.7	-23.4	-20.0	-16.1	-12.8	-9.5	-6.1

4.0 MAINTENANCE

WARNING

The heatless desiccant dryer is a pressure containing device. Depressurize before servicing. (See Section 3.3)

4.1 Desiccant Replacement

NOTE: The use of the correct replacement desiccant is necessary for proper dryer operation. Never use hygroscopic salts of the type commonly used in “deliquescent” type dryers.

4.1.1 Frequency of desiccant replacement

Desiccant should be replaced whenever the required dew point cannot be maintained while the dryer is being operated within its design conditions and there are no mechanical malfunctions. Refer to section 5.0 for troubleshooting hints.

NOTE: Desiccant life is determined by the quality of the inlet air. Proper filtering of the inlet air will extend the life of the desiccant. Typically desiccant life is 3 to 5 years.

4.1.2 Procedure for Desiccant Charge Replacement

4.1.2.1 Depressurize and de-energize the dryer. (See section 3.3)

4.1.2.2 Remove the fill and drain plugs from desiccant tower and drain the spent desiccant. Place a container at the base of the vessel to collect the desiccant. If necessary tap the sides of the vessels with a rubber mallet to loosen desiccant.

4.1.2.3 Replace the drain plug using teflon tape sealant or equivalent.

4.1.2.4 Fill the desiccant drying tower as full as possible with dry desiccant. Do not tamp desiccant.

4.1.2.5 Replace the fill plug using teflon tape sealant or equivalent.

4.1.2.6 Repeat this procedure for the other tower.

4.1.3 Insuring desiccant dryness

4.1.3.1 Replacement desiccant is shipped in air tight containers. Keep the covers on these containers tightly closed until use to avoid moisture contamination. If desiccant is exposed to air it can be heated in an oven at 400°F (204°C) for four hours before use, or the procedure in 4.1.3.2 can be used.

4.1.3.2 If the dryer is not refilled with dry desiccant, it will be necessary to operate the dryer with an inlet flow rate of less than 50% of maximum to dry the desiccant. To do this, set the Economizer Switch for 100%, and the purge pressure for 45 psig. (3.2 kgf/cm²)

4.1.3.3 Purge mufflers should be changed annually.

4.1.3.4 Valve(s) should be checked annually.

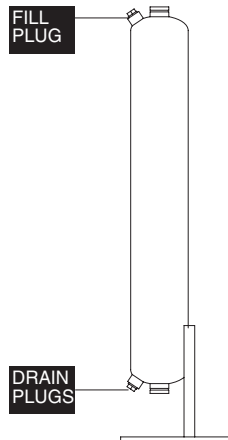


FIGURE 4A

4.2 Pilot Air Filter - Element Replacement - Models 370 scfm and larger

4.2.1 Frequency of replacement -

Pilot air filter contains a filter element which should be changed yearly or sooner if pressure drop across cartridge prevents valves from actuating. Pilot air pressure must not drop below 60 psig (4.2 kgf/cm²).

4.2.2 Procedure for element replacement.

Follow instructions supplied with replacement element.

WARNING

THIS SEPARATOR IS A PRESSURE CONTAINING DEVICE. DEPRESSURIZE BEFORE SERVICING. IF SEPARATOR HAS NOT BEEN DEPRESSURIZED BEFORE DISASSEMBLY, AN AUDIBLE ALARM WILL SOUND WHEN THE BOWL BEGINS TO BE REMOVED FROM THE HEAD. IF THIS OCCURS, STOP DISASSEMBLY, ISOLATE AND COMPLETELY DEPRESSURIZE SEPARATOR BEFORE PROCEEDING.

1. Shut off air supply.
2. Depressurize Dryer.
3. Remove bowl.
 - a. Push bowl up, turn bowl 1/8th turn to your left, and pull bowl straight down
4. Clean filter bowl
5. Replace element
 - a. Pull off old element and discard
 - b. Make certain o-ring inside top of replacement element is in place and push element onto filter head.

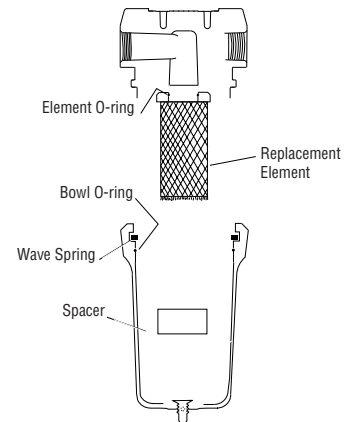


FIGURE 4B

NOTE: Make certain o-ring is generously lubricated.

6. After making certain that bowl o-ring is in place, reassemble bowl to head.

NOTE: Wave spring ends should be pointed down to prevent the wave spring from interfering with reassembly.

4.3 Fuse Replacement

4.3.1 Fuses are located on board in electrical enclosure. See figure 3B for Standard Control Board and 3C for Automatic Purge Saving System.

4.4 Test Mode

WARNING

Enclosure contains electricity.
Use caution when working inside box.



4.5.1 Test Mode - Standard Control Panel

- 4.5.1.1** Wait until point in cycle when right tower is drying and left tower has completed regeneration and repressurization (both towers at full line pressure).
- 4.5.1.2** De-energize dryer (on/off switch off, "0"); Select Test Mode by placing DIP switches 5 and 6 (found inside enclosure) in the ON (up) position; Re-energize dryer (1) (2).
- 4.5.1.3** Use Reset/step button to step through the operating cycle in the order shown in Table 4B.
- 4.5.1.4** Complete all 9 steps, allow the left tower to fully repressurize and de-energize dryer. (1) (3).
- 4.5.1.5** Reset DIP switches 5 and 6 to operating mode desired (10 min. cycle - 5 is OFF, 6 is ON or 4 min. cycle - 5 is ON, 6 is OFF); Re-energize dryer.

- (1)** Do not de-energize dryer unless both towers are at line pressure.
- (2)** If Test Mode is selected without de-energizing dryer, Test Mode light will blink until tower on line has completed drying. Dryer will then enter Test Mode and light will glow steadily.
- (3)** If another operating mode is selected without de-energizing dryer and before all 9 steps are completed, selected mode light will blink and dryer will automatically complete a cycle. Dryer will then operate in selected mode and light will glow steadily. You may also use the Reset/step button to manually step through the cycle until the left tower drying light illuminates and pressing the Reset/step button will not advance through further steps.

Test Mode

TABLE 4B

STEP NUMBER	WHAT OCCURS	TOWER STATUS				VALVE POSITION				SOLENOID/TERMINALS ENERGIZED (light illuminated)			
		MODE		PRESSURE		L P/R	L IN	R P/R	R IN	L P/R	L IN	R P/R	R IN
		LT	RT	LT	RT								
Start		D	D	LP	LP	C	O	C	O				
1	R IN closes	D	-	LP	LP	C	O	C	C				E
2 (1)	R P/R opens	D	R	LP	<2	C	O	O	C			E	E
3	No change	D	R	LP	<2	C	O	O	C			E	E
4 (2) (3)	R P/R closes	D	-	LP	REP	C	O	C	C				E
5	R IN opens	D	D	LP	LP	C	O	C	O				
6	L IN closes	-	D	LP	LP	C	C	C	O		E		
7 (1)	L P/R opens	R	D	<2	LP	O	C	C	O	E	E		
8	No change	R	D	<2	LP	O	C	C	O	E	E		
9 (2) (3)	L P/R closes	-	D	REP	LP	C	C	C	O		E		

NOTES:

- (1) Close purge rate valve during this step to check for any valve leaks. No air should exhaust through the muffler. If air is exhausting through the muffler, check all valves for leaks. After testing for leaks or fixing any leaks, be sure to open the purge pressure valve and reset the purge pressure.
- (2) Do not go to the next step until the tower is repressurized.
- (3) Switching failure alarm circuit is energized during this step (alarm light should flash until pressure exceeds 40 psig).

CODES:

R IN - Right inlet valve
R P/R - Right purge/repressurization valve
L IN - Left inlet valve
L P/R - Left purge/repressurization valve
LT - Left tower
RT - Right tower

D - Drying
R - Regenerating
LP - Line Pressure
<2 - Less than 2 psig
REP - Repressurizing
C - Closed
O - Open

E - Energized

5.0 TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
5.1 Indicator lights not illuminated	No power to unit On/Off Switch off Switch malfunctioning	Check voltage at terminal board. Turn on. Replace switch.
5.2 Moisture Indicator turns yellow (elevated outlet dew points)	Maximum flow being exceeded Design conditions being exceeded Desiccant not adsorbing a. Useful service life has ended b. Desiccant is contaminated (e.g. with oil) c. Premature exhaustion (saturated with water)	Refer to Table 3A to determine maximum flow. Refer to Section 3.5 to determine if dryer is being operated within its design limitations. Change desiccant. Take corrective action. Refer to Section 2.1 to determine proper prefiltration then change desiccant. Refer to 5.3 for corrective action. Desiccant beds may be reactivated by running at reduced flow until desired outlet dewpoint is achieved.
5.3 Desiccant being exhausted prematurely	Insufficient purge rate a. Improper purge rate b. Tower not completely depressurized during purge cycle (Tower pressure gauge should read lower than 2 psig) 1. Clogged exhaust muffler 2. Purge valve won't open 3. Check valve stuck open Insufficient purge time a. Improper set points b. Faulty Timer	Refer to Section 3.1.4 to determine correct Purge Pressure Indicator Setting. Replace muffler inserts. Check power to valve to determine if valve or timer at fault. Check pilot air line for obstruction. Repair valve. Refer to Section 3.1.1 to determine correct Economizer Switch and Cycle Settings. Refer to Section 3.2.3 to verify proper time sequence.
5.4 Tower fails to pressurize to line pressure	Purge repressurization valve won't close Excessive downstream air demand	Check valve for obstruction. This valve is normally closed. Check pilot solenoid valve and pilot air line for obstruction.
5.5 Tower fails to depressurize to less than 2 psig	Purge rate valve open too far Clogged muffler Check valve stuck open Purge repressurization valve won't open	Check Section 3.1.4 for purge rate indicator setting. Replace muffler. Repair valve. Check power to valve to determine if valve or timer is at fault. Check pilot valve, pilot air line, and purge repressurization valve for obstruction.
5.6 Excessive purge air is discharged during purge cycle	Inlet valve won't close Check valve sticking	Check power to valve to determine if valve or timer is at fault. Check valve for obstruction. Check pilot valve and pilot air line for obstruction. Repair Valve
5.7 Excessive desiccant dust downstream	Faulty timer Purge rate valve closed	Refer to Section 3.2.3 to verify proper time sequence. Refer to Section 3.1.4 to determine Correct Purge Pressure setting.
5.8 Switching Failure Unit did not depressurize in time (24 sec) or below 10# Unit did not repressurize in time (24 sec) or not above 40#	Clogged mufflers, faulty check valve, faulty inlet valve or purge valve, or faulty pressure switch. Make sure dryer has air pressure, check purge pressure setting, faulty purge valve, or faulty pressure switch.	Replace mufflers or defective parts. Provide proper air pressure. Replace defective parts. Set purge pressure per section 3.1.4.

6.0 REPLACEMENT PARTS

Description	Model HP-715G	Model HP-1550G	Model HP-5200G	Quantity
Power On/Off Selector Switch	3158486	3158486	3158486	1
Pressure Switch	7417131	7417131	7417131	1
Switching Valve Pilot Solenoid Valve (coil only)	4009808	4009808	4009808	2
Purge Pilot Solenoid Valve (coil only)	4009808	4009808	4009808	2
Switching Valve Pilot Solenoid Valve Rebuild Kit	3153703	3153703	3153703	1
Moisture Indicator	4003167	4003167	4003168	1
Pressure Gauge, 0 - 400PSIG	4011115	4011115	4011115	3
Pressure Gauge, 0 - 100PSIG	4011100	4011100	4011100	1
Purge Muffler Replacement Core	3097672	—	—	1
Purge Muffler Replacement Core	—	72378	72378	8
Aftercooler Air Filter-Silencer Replacement Core	3211091	3211091	3211091	1
Aftercooler Temperature Gauge	4011137	4011137	4011137	1
Packaged Oil (for Aftercooler option)	3164064	3164064	3164064	1

Filtration Replacement Elements	Quantity per Dryer		
3174776, High Efficiency Oil Removal Prefilter (Grade 5)	2	3	11
3174855, Air Line Afterfilter (Grade 7)	2	3	11
3174934, Separator Prefilter (Grade 9)	2	3	11

Desiccant	Quantity per Dryer		
3153517, 10# container	2	—	—
7405937, 17# container	2	2	—
3146257, 50# container	2	—	—
3146259, 150# container	—	12	4
3146260, 350# container	2	—	4
3146261, 2000# sack	—	—	2



RDH-HP SERIES

Pressure-Swing
Desiccant Type
Compressed Air Dryers

Models: **RDH-HP-715G**
RDH-HP-1550G
RDH-HP-5200G

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