DIELECTRIC®

Small capacity 2400/3200 Central Office Air Dryers

Instruction and operation manual

MODEL 2400/3200 CENTRAL OFFICE AIR DRYERS IB - 255 REV. K PART NUMBER 47605

SPX®

Notes, Cautions, and Warnings herein this manual are used to prevent personal injury.

Warning: To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture. For Indoor use only.

Warning: If the equipment is used in a manner not specified herein, the protection provided by the equipment may be impaired.

Warning: Turn off Power, Isolate power by unplugging or by locking separate disconnect before servicing.

Warning!: High Voltage Disconnect Power before working within

Caution: This Unit may start automatically at any time

NOTE: All machinery must be fitted with means to isolate it from electrical energy sources. The isolator must be capable of being locked where the operator is unable from any of the points to which he/she has access to check that the energy is off!

Caution: Use care when lifting compressor as compressor weight exceeds 60 lbs. (27.3 kg)

ATTENTION: Observe Precautions for Handling Electrostatic Sensitive Devices

Important Safety Instructions

1. Read and follow all instructions
2. Keep these instruction with the equipment
3. Heed all warnings, cautions and notes
4. Do not block any ventilation openings
5. Install in accordance with instructions
6. Do not defeat the safety purpose of the grounding type plug
7. Protect the power cord from being walked on or pinched
8. Use Wrist Strap when handling ESD Sensitive Circuit Boards

WARNING! Risk of Electrocution
Isolate power by unplugging or by locking separate disconnect.


WARNING - RISK OF ELECTROCUTION


CAUTION - REFER TO ACCOMPANYING DOCUMENTS


WARNING - HOT SURFACE


ATTENTION - ELECTROSTATIC SENSITIVE DEVICE.
OBSERVE PRECAUTIONS FOR HANDLING


CAUTION - LIFTING HAZARD


PROTECTIVE CONDUCTOR TERMINAL

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Table II
SPECIFICATIONS

CHARACTERISTIC	MODEL 2400	MODEL 3200
NORMAL CAPACITY	2400 SCFD	3200 SCFD
EMERGENCY CAPACITY	3500 SCFD	4100 SCFD
WEIGHT	155 lbs.	175 lbs.
ELECTRICAL OPTIONS	115v, 60hz, 1 ph.	115v, 60hz, 1 ph.
	110v, 50hz, 1 ph.	----------
	230v, 60hz, 1 ph.	230v, 60hz, 1 ph.
	220v, 50hz, 1 ph.	220v, 50hz, 1 ph.
AIR COMPRESSOR SIZE	3/4 hp.	3/4 hp.
OPERATING CURRENT	115v - 11 amps	115v - 13 amps
	230v - 5.5 amps	230v - 6.5 amps
COMPRESSOR CIRCUIT PROTECTION	115V =15 amp C.B.	115v =20 amp C.B.
	230v =7.5amp C.B.	230v =10 amp C.B.
CONTROL CIRCUIT PROTECTION	115v =1 amp C.B.	115v =1 amp C.B.
	230v =0.5amp C.B.	230v =0.5amp C.B.

SPECIFICATIONS COMMON TO ALL MODELS

DRY AIR DEWPOINT . . . . . Below -40^{0}F. (below -40^{0}C.)

DESICCANT DRYER TYPE . . . . . DRY-PAK® twin-tower heatless dryer. Efficient, internal check-ball valving, purge controlled by two-way solenoid valves.

OPERATING PRESSURE . . . . . DRY-PAK® and compressor 60 PSIG (414 kPa), independent of tank pressure. On Model 3200s 60 HZ only the operating pressure is 50 PSIG.

TANK PRESSURE RANGE . . . . . 25 PSIG (172 kPa) (compressor start) to 60 PSIG (414 kPa) (compressor stop). On Model 3200s 60 hz only the tank pressure range is 50 PSIG (stop).

AIR COMPRESSOR TYPE . . . . . Oilless, direct drive, motors are thermally protected.

REGULATED LINE PRESSURE . . . . Adjustable 2 TO 20 PSIG (14 - 138 kPa)

ALARMS - GENERAL . . . . . Five independent alarm circuits can be monitored individually or as a single C.O. alarm. Excepting Power alarm, each signaled by red alarm light on front panel. Common, NO and NC terminals are provided.

HUMIDITY ALARM . . . . . Operates at 2% RH., protects storage tank via Wet Air Bypass solenoid valve. Clears automatically when below 2% RH.

LOW LINE PRESSURE ALARM . . . Adjustable pressure switch, factory set @ 7 PSIG (48 kPa), range 2 to 20 PSIG (14 - 138 kPa).

HIGH LINE PRESSURE ALARM . . . Adjustable pressure switch, factory set @ 13 PSIG (90 kPa), range 2 to 20 PSIG.(14 - 138 kPa)

EXCESS RUN ALARM . . . . . Adjustable, solid state timer, factory set @ 10 min. Range to 15 min.

POWER ALARM . . . . . Active in event of service interruption, compressor or control-circuit breaker overload or unit turned off manually.

CABINET DIMENSIONS . . . . . H 47 in. x W 17 1/4 in. x D 17 1/4 in. (119 cm x 43.8 cm x 13.8 cm)

AIR TANK . . . . . 1 cu/ft (28 L) - Mechanical 2nd agency rated

AIR TANK RELIEF VALVE . . . . . Pop-off 75-80 PSIG (517 - 552 kPa)

1.0 Introduction

1.1 This manual covers installation, operation, and maintenance with spare parts lists for the Model 2400 and 3200 C.O. air dryers.

1.2 These Models from SPX Dielectric feature modular construction and incorporate reliable components. The electrical control module, DRY-PAK dryer module, and the compressor module can each easily and quickly be removed for maintenance when necessary. Cabinet flow-through forced air ventilation and vibration isolation optimize service life. Special consideration has been given to accessibility and ease of service.

1.3 BEFORE INSTALLING - - -

READ THE MANUAL THOROUGHLY, then, with the manual as a reference, examine the air dryer. Learn to recognize the various components and the function performed by each. Section 5 of this manual provides guidelines for selection of a good installation site.

2.0 Principal of Operation

2.1 The Model 2400 and 3200 SMALL C.O. Air Dryers are heatless, automatic regeneration, self contained units.The two models differ only in Heatless dryer and compressor capacity. the following descriptions are applicable to both.

2.2 Ambient air is taken in by the compressor and compressed to approximately 60 PSIG (415 kPa). (50 PSIG on Model 3200s 60 Hz only) The compressed air flows through the heat exchanger where it is cooled by the cabinet ventilation fan.

2.3 The cabinet ventilation fan and the compressor always operate at the same time. The high capacity of the cabinet ventilation fan allows continuous compressor operation without overheating.

2.4 An adjustable delay timer monitors compressor operation. If the compressor operates continually for approximately 10 minutes the timer causes the Excess Run Alarm to be active. The timer is adjustable from 1 to 15 minutes.

2.5 Next, the cooled, compressed air flows to the

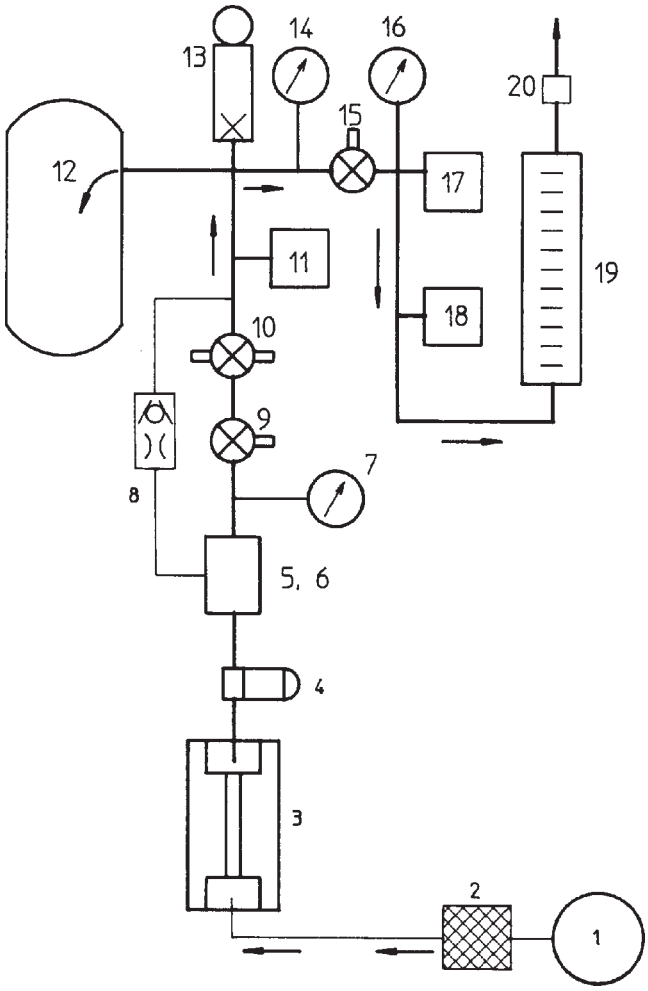

Figure 2
Air Flow Diagram

1. Motor Compressor
2. Heat Exchanger
3. Dryer Assembly
4. 5 Micron Filter
5. Manifold Block
6. Humidity Sensing Element
7. Back Pressure Gauge
8. Orifice/Low Flow Valve
9. Back Pressure Regulator
10. Humidity Bypass Solenoid Valve
11. Pressure Switch Start/Stop
12. Reservoir Tank
13. Pressure Relief Valve
14. Tank Pressure Gauge
15. Line Pressure Regulator
16. Line Pressure Gauge
17. Low Line Pressure Switch
18. High Line Pressure Switch
19. Flow Meter
20. Dry Air Outlet Fitting

inlet fitting of the DRY-PAK® heatless dryer.

2.6 Moisture is removed from the compressed air by the DRY-PAK® dryer (see figure 3 and section 3.0 for explanation of the DRY-PAK® operation). When the air leaves the DRY-PAK®, it is at a dewpoint of -40˚F (-40˚C) or lower, which equals less than 1% RH. at 20˚C. Air exiting the DRY-PAK® passes through a 5 micron after-filter which removes remaining impurities from the dry air.

2.7 The solid state dryer timer memory remains active whenever the dehydrator power switch is ON. The timer controls the complete drying cycle of the DRY-PAK® dryer. The cycle progresses only when the compressor is operating.

2.8 The moisture content of the air is monitored by a humidity sensor which is located in the manifold block. The humidity sensor will activate the humidity alarm if the relative humidity of the dry, compressed air rises above approximately 2% RH..

2.9 The dry air flows from the humidity sensor manifold and through the adjustable back pressure regulator, set to keep the pressure in the DRY-PAK® at a minimum of 60 PSIG (415 kPa) (50 PSIG on Model 3200s 60Hz only) during operation. The adjusted pressure of the back pressure regulator is shown on the back pressure gauge ONLY WHEN THE COMPRESSOR IS OPERATING. Maintaining a minimum of 60 PSIG (415 kPa)(50 PSIG on Model 3200s 60 HZ only) pressure when the compressor is operating insures efficient dryer performance.

2.10 The dry air passes through the automatic humidity bypass solenoid valve and into the dry air storage tank. The humidity bypass solenoid is controlled by the humidistat. If there is moisture in the air stream, the bypass solenoid valve vents the air to atmosphere and does not allow moisture to go into the storage tank.

2.11 The humidity sensor manifold is kept pressurized when the compressor is not operating. The purpose is to prevent false humidity alarms (which otherwise may result) if the compressor does not operate for long periods of time. Manifold pressurization is accomplished by an orifice located inside the back pressure regulator. The small orifice allows only sufficient reverse air flow to maintain manifold pressure nearly equal to the tank pressure. A check valve prevents forward air flow through the orifice when the compressor is operating.

2.12 When the dehydrator is in service, the upper and lower limits of the tank pressure are controlled by the tank pressure switch. The tank pressure switch interrupts DRY-PAK® dryer and compressor operation when 60 PSIG (415 kPa) (50 PSIG on Model 3200s 60 Hz only) tank pressure is reached. The compressor and DRY-PAK® start again when the tank pressure declines to 25 PSIG (172 kPa)(20 PSIG on 3200s 60Hz only). The tank pressure gauge is located on the dehydrator front panel.

2.13 The tank is equipped with a mechanical and agency rated safety valve which is set at 80 ± 5 PSIG (552 ± 35 kPa). Dry air flows from the tank to the adjustable line pressure regulator. The regulator maintains the required cable pressure, as shown on the line pressure gauge located on the front panel. The air flow rate (measured in standard cubic feet per day, or SCFD) is shown on the output air flow meter.

2.14 The low line pressure alarm switch and high line pressure alarm switch (both located on the electric module) monitor the outlet air pressure.

2.15 The frequency and duration of compressor-dryer operation is determined by leakage of air from the cable system.

3.0 Operating Cycle Of The Dry-Pak®

3.1 The two-way purge solenoid valves of the DRY-PAK® handle only the purge air. Both the wet main air flow from the compressor and the dried air are controlled by the ball checks without appreciable pressure loss. This very low pressure drop is the key to the high efficiency of the DRY-PAK® dryer.

The DRY-PAK® construction and cycle phases are shown in Figure 3.

There are four distinct phases of the one minute DRY-PAK® cycle. Because the DRY-PAK® operates only when the compressor is operating, the cycle may be interrupted during any cycle phase if the tank pressure reaches 60 PSIG (415 kPa)(50 PSIG on Model

Major details of construction:

1,2.... Left and right desiccant towers.
3,4.... Inlet and outlet check balls.
5,6.... Left and right inlet valve seat.
7,8.... Left and right outlet valve seat.
9,10... Left and right calibrated purge air flow orifice
11,12. Left and right purge solenoid valves.

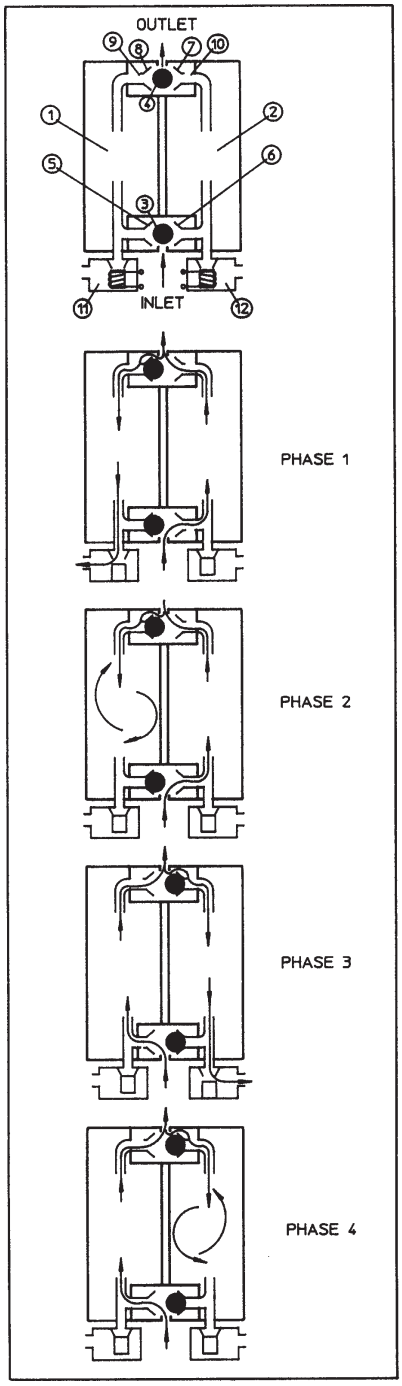

Figure 3
Dry-Pak® Cycle

3200s 60 Hz only) and the compressor stops. When the tank pressure declines to 25 PSIG (172 kPa) (20 PSIG on Model 3200s 60 Hz only) and the compressor restarts, the DRY-PAK® will resume cycling in the same cycle phase as when it was interrupted.

Cycle phase 1..Right dehydration and left tower purge ..duration 25 seconds:

The right purge solenoid valve is closed, the left is open, venting the left desiccant tower to atmosphere. The check balls are held against the left valve seats by the higher pressure in the right desiccant tower. While most of the air being dried by the right tower leaves the outlet, a portion of the high pressure dry air passes through the orifice and expands at low pressure in the left tower which was wetted in the previous cycle. The expanding air flow picks up the moisture and carries it through the open purge solenoid valve outlet to atmosphere. At completion of cycle phase 1, the elapsed cycle time is 25 seconds.

Cycle phase 2..Right dehydration and left dwell..duration 5 seconds:

Both purge solenoid valves are closed and dry air continues to flow through the calibrated purge orifice until the air pressure in the left tower is equal to the air pressure in the right tower. At completion of cycle phase 2, the elapsed cycle time is 30 seconds.

Cycle phase 3.. Left dehydration and right tower purge..duration 25 seconds:

The left purge solenoid valve is closed, the right is open, venting the right desiccant tower to atmosphere. most of the air being dried by the left tower leaves the outlet, a portion of the high pressure dry air passes through the orifice and expands at low pressure in the right tower which was wetted in the previous cycle. The expanding air flow picks up the moisture and carries it through the open purge solenoid valve outlet to atmosphere. At completion of cycle phase 3, the elapsed cycle time is 55 seconds.

Cycle phase 4..Left dehydration and right dwell..duration 5 seconds:

Both purge solenoid valves are closed and dry air continues to flow through the calibrated purge orifice until the air pressure in the right tower is equal to the air pressure in the left tower. At completion of cycle phase 4, the elapsed cycle time is 60 seconds.

4.0 Receiving And Inspection

4.1 Shipping damage is unusual but not totally avoidable. Open the shipping container upon receipt and inspect the contents for hidden damage. If damage is evident, promptly file a hidden damage claim with the delivering transportation company.

5.0 Site Requirements

5.1 The SMALL C.O. DRYER require a firm, level site with a minimum of 6 inches (150 mm) clearance at the rear for ventilation. Front clearance should be at least 3 feet (one meter). The space above the cabinet should be open. Do not stack objects on the cabinet or otherwise restrict the free flow of air upward from the cabinet rear surface.

5.2 The temperature at the installation site must be within the range of 32˚ F to 120˚ F. (50˚ C). BEST PERFORMANCE WILL OCCUR AT 68˚ F (20˚ C).

5.3 No water drain is required as purge moisture is evaporated by cabinet air flow and normal operating temperature.

5.4 The dryer location should be close to the cables to be pressurized. This will avoid unnecessary pressure loss in the regulated pressure line.

6.0 Installation And Start-Up

6.1 Position the SMALL C.O. DRYER as per section 5.0. Open the cabinet front door. Remove the accessory kit from the cabinet.

6.2 Inspect for damage inside the cabinet (section 4.1). Be sure that the inlet air opening below the cabinet floor, at the rear, is not obstructed. Verify that the Cabinet Ventilation Fan exhaust opening at the rear is not obstructed.

6.3 Remove the four shipping hold-down bolts (red tagged) at the corners of the compressor mounting frame. Check that the compressor mounting frame is floating on the four shock mounts.

6.4 Install the proper power cord plug.

6.5 Remove the 1/4 npt x 3/8 inch O.D. tube fitting (flare or poly) from the accessory kit. Apply pipe sealant to the fitting pipe threads and install into the air outlet fitting at the top, rear of the cabinet. **DO NOT connect the air outlet to the cable system at this time.**

6.6 Connect the air dryer power cord to an electrical outlet which is compatible to the electrical requirement of the dryer. Refer to the dryer serial number plate and the specifications to determine the electrical specification of the dryer.

NOTE: An External Surge Protection Device should be used when operating this equipment. This equipment is suitable for Common Ground bonding or Isolated Bonding Network Equipment and network Telecommunication Facilities and locations where NEC applies.

6.7 Turn on the POWER and COMPRESSOR circuit breakers on the front panel. Verify that the BACK-PRESSURE GAUGE on the lower inside of the front door shows 60 to 65 PSIG (415 to 450 kPa)(50 to 55 PSIG on Model 3200s 60 Hz only) pressure while the compressor is operating. If outside this pressure range refer to: ***8.2 Adjust Back-Pressure.***

6.8 Verify the purge cycling of the DRY-PAK at the bottom of the door. When the compressor is operating a purge occurs at 30 second intervals, first from one and then the other DRY-PAK® Purge Solenoid Valve. The purge air blast is audible and can be felt as it escapes from the plastic silencer on the purge solenoid valve. After the initial purge blast, a steady flow of purge air continues for 25 seconds. After 5 additional seconds, the opposite purge will occur. If the cycling is not as described, refer to section ***9.3 DRY-PAK® Troubleshooting.*** Close the cabinet door to insure maximum ventilation.

6.9 A humidity alarm is a common condition at initial start-up. This is due to an extended period of dryer inactivity, consequent to storage and shipping. The initial humidity alarm will normally clear automatically in 60 minutes (or less) of operation. For in depth information, refer to ***9.2 Humidity Alarm Troubleshooting.***

6.10 After the humidity alarm is cleared, loosen the lock-nut on the threaded stem of the line pressure regulator adjustment knob. Adjust the line pressure regulator to allow air to escape the outlet air fitting at a rate of approximately 50% of dehydrator capacity as shown on the outlet air flow meter. Temporarily lock the regu-

lator lock-nut to maintain this flow rate. When the tank pressure reaches 60 ± 2 PSIG (415 ± 15 kPa)(50 PSIG on Model 3200s 60 Hz only) the compressor will stop. The compressor will start again when the tank pressure declines to 25 ± 2 PSIG (172 ± 15 kPa)(20 PSIG on Model 3200s 60 Hz only). If the tank pressure range exceeds these limits refer to: ***8.1 Tank Pressure Switch Adjustment.*** NOTE: The humidity alarm may become active when the compressor is not operating. Operate the dehydrator in this mode for not less than six hours after the humidity alarm remains permanently cleared.

6.11 Plug the air outlet fitting on the rear of the cabinet with your finger and increase the line pressure to clear the low pressure alarm. Continue to increase the line pressure and note the pressure at which the High Line Pressure alarm becomes active. Lower the line pressure and note the pressure at which the Low Line Pressure alarm becomes active. If you wish to change these factory settings refer to: ***8.3 Check or change alarm pressure switch adjustment.***

6.12 Install a 3/8 inch O.D. tube from the air outlet fitting to the user system.

6.13 Adjust the line pressure regulator to achieve the desired pressure as indicated on the line pressure gauge. When the line pressure is satisfactory, lock the setting by means of the regulator lock-nut.

PROCEDURE	Ref. Para.	1000 Hrs	2000 Hrs	3000 Hrs	4000 Hrs
Verify Dry-Pak Cycling	7.1	X	X	X	X
Verify Back Pressure	7.2	X	X	X	X
Verify Tank Pressure Switch Adjustment	7.3	X	X	X	X
Verify High & Low Pressure Switch Adjustment	7.4	X	X	X	X
Replace Inlet Air Filter Elements	7.5		X		X
Test Humidity Alarm Circuit	7.6		X		X
Replace Compressor Rings & Valves	7.7				X

TABLE III - MAINTENANCE CHART

6.14 Connect the remote alarm wires to the alarm terminal board on the rear of the cabinet. For alarm wiring options, refer to: ***8.5 Alarm Wiring Options***. This completes the start up procedure.

7.0 General Maintenance

Periodic maintenance must be performed to ensure continued reliable and efficient operation of the SMALL C.O. DRYER. (Refer to Table III for graphic schedule)

7.1 At intervals of 1000 hours of operation: Verify that the DRY-PAK® dryer is cycling correctly. Refer to: 8.9 DRY-PAK® Cycling Test.

7.2 At intervals of 1000 hours of operation: Verify that the back pressure regulator is correctly adjusted. Refer to section 8.2.

7.3 At intervals of 1000 hours of operation: Verify the adjustment of the Tank Pressure Switch. Refer to section 8.1.

7.4 At intervals of 1000 hours of operation: Verify the adjustment of the high and low line pressure alarm switches. Refer to section 8.3.

7.5 At intervals of 2000 hours of operation: Replace the compressor inlet filter elements. Refer to section 8.6.

7.6 At intervals of 2000 hours of operation: Test the humidity alarm circuit. Refer to section 8.7.

7.7 At intervals of 4000 hours of operation: Replace the compressor rings and valves. Refer to: 8.8.

8.0 Adjustments And Tests

8.1 Check or Change Tank Pressure Switch Seting adjustment.

NOTE:

Acceptable tank pressure at compressor start is 25 ± 2 PSIG (172 ± 15 kPa)(20 PSIG on Model 3200s 60 Hz only) and stop at 60 ± 2 PSIG (415 ± 15 kPa).

8.1.1 The Tank Pressure Switch has been factory adjusted. Observe and record the start and stop pressures for reference before continuing.

WARNING!

RISK OF ELECTROCUTION - Disconnect from electrical power before starting this procedure.

8.1.2 The Tank Pressure Switch cover is held by a single 5/16 inch (approx. 8mm) hex nut. The cover can be seen just below the front panel when the cabinet door is open. With the cover removed, two adjuster nuts are visible. To adjust both the start and stop pressures (the total tank pressure range) turn only the nut on the **center** adjuster. About 2 1/8 FULL REVOLUTIONS of the adjuster nut changes the set-point 5 PSIG (35 kPa). Clockwise raises, counterclockwise lowers the setting. Replace the switch cover after adjustment and close the cabinet door.

8.1.3 Connect the power cord to the electric outlet and restart the dehydrator. Again check the start and stop pressure to verify the Tank Pressure Switch adjustment.

8.2 Check or Change Back Pressure Regulator Adjustment

8.2.1 PREPARATION: Adjust the back pressure regulator only -- *WHILE THE COMPRESSOR IS OPERATING AND THE TANK PRESSURE IS BETWEEN 29 AND 50 PSIG (200 AND 350 Kpa).*

Loosen the outlet air tube at the rear of the cabinet to increase the air flow rate. This will help to give more time to perform and validate the adjustment. Pull the Back Pressure Regulator adjuster knob about 1/4 inch to the unlocked position.

8.2.2 Wait until a purge blast occurs from one of the purge solenoid valve silencers. Turn the adjustment knob clockwise to raise, or counterclockwise to lower the Back Pressure. The acceptable adjustment range is 60 to 65 PSIG (415 to 450 kPa)(50 to 55 PSIG on Model 3200s 60 Hz only).

8.2.3 Continue to observe the back pressure gauge for not less than one full minute more. The first purge valve to purge after your adjustment will have purged a second time. This assures that you have observed the full timing cycle of the DRY-PAK.

8.2.4 If the compressor stopped operating, or, if the tank pressure varied from the specified range before you completed your observation, repeat 8.2.3.

8.2.5 It is normal for the back pressure to rise slightly before a purge, or to fall slightly when the purge occurs. The normal extremes are approximately ± 5 PSIG (± 35 kPa). If the back pressure was much more erratic (± 20 PSIG (± 150 kPa) or more) proceed to section 9.3.

8.3 Check or Change Alarm Pressure Switch Adjustment.

8.3.1 Both the High and Low line pressure alarm pressure switches are located on the inner shelf of the electrical module, close to the door latch. Both may be adjusted while in normal operation.

8.3.2 Test the alarm switch operation before making an adjustment. Close the air valve at the pipe panel or meter panel supplied with dry air from the dryer. Reduce the line pressure and note the pressure at which the low pressure alarm occurs. Increase the line pressure and note the pressure at which the high line pressure alarm occurs. If either HIGH or LOW alarm switch operating pressure is incorrect, proceed to 8.3.3. If no adjustment is required, open the panel air flow valve.

8.3.3 The alarm pressure switches are identified by labels. Use a small screw driver and turn the adjustment screw GENTLY clockwise to increase or counterclockwise to reduce the pressure setting. Affirm the adjustment by means of the line pressure regulator, changing pressure slowly to obtain precision. Verify that any or all panel flow valves are opened when adjustment and tests are completed.

8.4 Check or Change Excess Run Alarm Timer Adjustment.

8.4.1 The Excess Run Alarm Timer (T2) is located, and identified, on the Electrical Module. Before making adjustment, cause the dryer to run continually and measure the time delay from compressor start to alarm activation.

WARNING!

RISK OF ELECTROCUTION - Before performing this procedure: Disconnect from the electrical power source

8.4.2 After the power is disconnected, push and re-

lease the two fasteners at the top of the electrical module on the door. The excess run timer is labeled T2. The adjustment range and direction of increase/decrease are shown on the timer label. Make only very minor adjustment at any one time and then check the alarm delay as in 8.4.1. If the alarm does not function, replacement of the delay timer is indicated.

8.5 Alarm wiring options

8.5.1 ALARM OUTPUT OPTION 1:

A summary "close in alarm" remote warning that one or more of the alarm circuits is active. To utilize this option leave the alarm terminal board as configured at the factory. Yellow jump wires connect "common" terminals in series, blue jump wires connect "close in alarm" terminals in series. Connect your remote alarm pair to terminals #1 and #15.

8.5.2 ALARM OUTPUT OPTION 2:

Segregated alarms using a single common provide discrete indication of each alarm circuit, either close or open in alarm, but all at one potential. To utilize this option remove the blue jumps from the terminal board, leave the yellow jumps (which connect commons in series) in place. Connect your remote alarm common wire to terminal #1 and your remaining remote alarm wires to selected "Close In Alarm" or Open In Alarm" terminals as you prefer.

8.5.3 ALARM OUTPUT OPTION 3:

A summary "open in alarm" remote warning that one or more of the alarm circuits is active. To utilize this option move only one end of each yellow jump wire from its location in a "common" terminal to the adjacent "open in alarm" terminal as follows: yellow jump #1 to #4 becomes #2 to #4 and move the remaining yellow jumps to connect #5 to #7, #8 to #10 and #11 to #13. Remove the blue jumps from the terminal board. Connect your remote alarm pair to terminals #1 and #14.

8.5.4 ALARM OUTPUT OPTION 4:

A completely segregated alarm output wherein a separate voltage or frequency may be used for any or each alarm function. Remove both the yellow and the blue jump wires from the alarm terminal board. Connect your remote alarm wires to each alarm function terminal set to obtain "Open In Alarm" or "Close In Alarm", output as you prefer.

8.6 Replace Compressor Filters.

WARNING!

RISK OF BURNS - Normal compressor operation will cause head temperature to exceed 212 ^{0}F (100^{0}C). Parts may be HOT.

8.6.1 **Power off before starting this procedure.** Press the black filter cap downward and turn it counterclockwise. Remove the cap, discard the old filter and wipe the cap clean with a rag. Install the new filter element and reassemble in reverse order. Each cylinder has one filter element.

8.7 Humidity Alarm Moisture Test

8.7.1 Turn the dehydrator off and vent all the air pressure from the Sensor Manifold test valve. When the back pressure gauge indicates 0 PSIG, remove the sensor by turning the large hex nut at the top of the manifold counterclockwise. Remove the sensor carefully so that the sealing O-ring is not lost.

8.7.2 Blow on the Sensor Element to make it moist and then return it to the manifold. Be sure that the O-ring is in place, then hand-tighten the large hex nut (do not use a wrench).

8.7.3 Start the dehydrator and verify that the Humidity Alarm is active and that air escapes through the open port (port 3) of the Humidity Bypass Solenoid Valve.

8.7.4 While the alarm is active, move the humidistat test toggle to "TEST CLEAR" for a few seconds. Verify that the humidity alarm clears until the test toggle is released. Close the cabinet door. After several minutes of operation the alarm will clear automatically.

8.8 Compressor Rebuild

WARNING!

RISK OF ELECTROCUTION- Disconnect from the electrical power source: Before disconnecting compressor electrical quick-connect from cabinet electrical harness:

WARNING!

RISK OF BURNS - Normal compressor operation will cause head temperature to exceed 212 ^{0}F

(100^{0}C). Be very careful when handling a hot compressor.

8.1.1 Do not lubricate any part of the compressor. Do not allow petroleum products, caustics or solvents to contact any part of the compressor. Parts may be cleaned with soap and water followed by wipe down with a cloth dampened with clean water.

8.8.2 To remove the compressor from the cabinet:

a. Disconnect the flexible hose from the compressor outlet using two wrenches (11/16 inch and 3/4 inch open end or comparable adjustable wrenches).
b. Disconnect the electrical quick connect (S4/J4) which joins the compressor electrical harness to the cabinet electrical harness.
c. Loosen the nuts from the four support-shock mounts with a 1/2 inch open end wrench. Remove the nuts and washers.
d. Lift the compressor assembly free of the shock mounts and remove the compressor/mounting frame assembly from the cabinet. Remove the four 5/16 inch nuts, lock washers, flat washers and bolts holding the compressor to its frame.

8.8.3 Refer to Figure 8, COMPRESSOR - EXPLODED VIEW before disassembly of the compressor. Item numbers given in this procedure refer to Figure 8 and to Table V, LIST of SIZE and/or VOLTAGE SPECIFIC PARTS.

8.8.4 ***DO NOT*** REMOVE THE INLET FILTER ASSEMBLIES (1) FROM THE CYLINDER HEADS.

8.8.5 Loosen the four #2 Phillips screws and remove the plastic Compressor Fan Shroud (39).

8.8.6 Use a 3/4 inch open end wrench to loosen the manifold nuts (41) on the manifold tube (42) between the left and the right cylinder heads (20). DO NOT REMOVE THE MANIFOLD TUBE UNTIL ONE HEAD HAS BEEN REMOVED!

8.8.7 Use a 3/16 inch Allen hex wrench to remove the cylinder head and valve components (22, 23 and 24) from one cylinder. Next remove the manifold tube, and then the opposite cylinder head. It may be necessary to use a knife or razor blade to remove the gasket material (21 and 25) from the head and cylinder. Be very careful not to scratch the aluminum surfaces.

8.8.8 Remove the two Cylinder Screws (27) which hold each Cylinder (26) and slide the cylinders outward, over the Pistons (30). Remove the Piston Rings (28), Piston Seals (29) and Piston Rider Rings (31) from the pistons.

8.8.9 Examine the heads, pistons and cylinders for scratches or scars on working surfaces. Clean the parts only with a cloth and soapy water if they are dirty or greasy. Do not reuse scratched components.

8.8.10 Install a new piston seal in one ring grove of one piston and hold it in place by installing a piston ring over the seal. Place the joint in the piston ring opposite to the joint in the piston seal. Be sure that the ring covers the entire seal all around the piston. Repeat with each of the 3 remaining seals and rings. If the joints of the piston rings on either piston are nearly aligned, rotate one ring until its joint is not less than 45 angular degrees from the adjacent ring joint.

8.8.11 Place a Piston Rider Ring (31) on one piston and slide a cylinder gently over the piston rings and rider ring. Be sure that no part of the rider ring protrudes from the cylinder, and that the cylinder will slide smoothly on the piston. Attach the cylinder to the motor front bracket, using two screws. Tighten the screws ONLY FINGER TIGHT. Repeat for the opposite cylinder of the compressor.

8.8.12 Rotate the motor shaft and move the pistons to the extreme outward position (top dead center). Move each cylinder so that it is even with the top of the piston. Torque the cylinder screws to 150 pound-inches (18.44 Nm). Place a flat bar vertically across the open cylinder. Rotate the motor shaft. The piston should contact the flat bar without lifting the bar from the cylinder surface. The cylinder gasket (25), when added, will provide the correct piston-to-valve clearance when the head assembly is secured.

8.8.13 The aluminum head, the head gasket and the outlet valve, each have 4 bolt holes at the corners and a single, smaller hole, (a “pilot” hole) for reference in aligning the components correctly. The aluminum valve plate, the inlet valve and the cylinder gasket each have 4 bolt holes at the corners, and two smaller holes (“pilot holes”) for the same purpose.

Follow this simple procedure when reassembling the head and valve components and the parts will be correctly positioned:

8.8.14 Hold the head in one hand, with its inside up, and with two head bolts protruding upward through the head. Align the pilot hole in the head gasket and the outlet valve, with the pilot hole in the head and place them on the head. The pilot hole in the head must still be visible through the pilot holes in the components. The outlet valve has a "finger" on one side, an oblong hole in the opposite side. The inside of the head must still be visible through the oblong hole in the outlet valve.

8.8.15 Place the aluminum valve plate on next, so one pilot hole aligns with that in the head, the outlet valve finger can be moved by pushing gently with a pencil through the outlet air passages of the aluminum plate and so that the inside of the head is still visible through the inlet air passages of the aluminum plate. Next add the inlet valve so that its finger covers the inlet air passages and the outlet valve finger can still be seen and can be moved with a pencil through the outlet air passages. Add the cylinder gasket, then loosely connect the assembly to the cylinder. Loosely install the manifold on the first head, after installing new Manifold Sleeves (40). DO NOT TIGHTEN the head bolts at this time. Repeat with the opposite head.

8.8.16 Tighten the four Allen head screws of each head finger tight. Torque the screws to 120 pound-inches (13.83 Nm) using a 3/16 inch Allen hex wrench.

8.8.17 Install the Compressor Fan Shroud with the four screws and washers previously removed.

8.8.18 Position the manifold and tighten the manifold nuts with a wrench, 1/2 to 3/4 turns more than hand tight.

NOTE!

Minor air leakage at the head-valve-cylinder joints is normal. DO NOT SEAL the gaskets with joint compound or sealant as damage to the assembly will occur. Do not attempt to eliminate leakage by exceeding recommended torque values as distortion will result.

8.8.19 Replace the compressor on its frame with the four 5/16 inch bolts passing upward through the frame, riser blocks and compressor base plate. Install flat washers, lock washers and nuts on the bolts. Torque the nut/bolt assemblies to 20 pound-feet (27.5 Nm).

8.8.20 Carefully reinstall the compressor into the cabinet so that the frame rests on all four shock mounts. Install the four lock washers and nuts, tighten to not more than 70 pound-inches (8 Nm). Hold the outlet air fitting with a wrench while tightening the flexible hose nut. Reconnect the electrical quick-connect (J4/S4) before restoring the cabinet power cord connection.

8.9 DRY-PAK® Cycling Test

8.9.1 The DRY-PAK® only cycles when the compressor is operating. Loosen the air outlet tube at the rear of the cabinet, if necessary, to cause the dehydrator to continue operating for several minutes.

8.9.2 With the compressor operating and the back pressure adjusted as per section 8.2, an audible purge should be heard each 30 seconds. A blast of air from the purging valve silencer can be felt simultaneously. 30 seconds later the opposite purge valve will provide the same indications. This is indication that the DRY-PAK® dryer is cycling normally. If cycling is normal, tighten the air outlet tube. If trouble shooting, refer to section 9.3.

9.0 Troubleshooting

9.1 Line Pressure Alarm, Low or High

9.1.1 Perform adjustment procedures as per section 8.3 to verify that a malfunction exists. Close the valve or valves at the meter panel (s) supplied by the dehydrator.

a. To check the terminals of TB1, leave the dehydrator in normal operation and use the ohm-meter ONLY AT THE ALARM TERMINAL BOARD TB1, while the remote device connection wires are DISCONNECTED.

b. To check any of the alarm circuit except a. above, TURN THE DEHYDRATOR OFF AND DISCONNECT FROM THE ELECTRICAL POWER SOURCE BEFORE USING AN OHM METER TO CHECK THE CAUSE OF MALFUNCTION.

c. To check either alarm pressure switch: Remove the white/red wire terminal from the COMMON terminal of the suspect pressure switch. If checking the Low Line Pressure Alarm switch, remove the violet

(purple) wire terminal. If checking the High Line Pressure Alarm switch, remove the gray wire terminal.

9.1.2 **SYMPTOM:** The (high or low) line pressure alarm light (schematic symbol LT3 or LT4) on the front panel WILL NOT ILLUMINATE and the remote alarm terminals (schematic symbol TB1-7,8,9 OR TB1-10,11,12) of the effected circuit DO NOT respond TO SWITCH ADJUSTMENT:
CORRECTIVE ACTION: Disconnect power and replace the effected pressure switch (P/N 46752) and adjust per section 8.3.

9.1.3 **SYMPTOM:** The (high or low) line pressure alarm light (schematic symbol LT3 or LT4) on the front panel REMAIN ILLUMINATED/WILL NOT CLEAR and the remote alarm terminals (schematic symbol TB1-7,8,9 OR TB1-10,11,12) of the effected circuit WILL NOT RESPOND TO SWITCH ADJUSTMENT:

CORRECTIVE ACTION: Disconnect power and replace the effected pressure switch (P/N 46752) and adjust per section 8.3.

9.1.4 **SYMPTOM:** The (high or low) line pressure alarm light (schematic symbol LT3 or LT4) on the front panel WILL NOT ILLUMINATE but the remote alarm terminals (schematic symbol TB1-7,8,9 OR TB1-10,11,12) of the effected circuit DO RESPOND TO SWITCH ADJUSTMENT:

CORRECTIVE ACTION: Replace the effected light.

9.1.5 **SYMPTOM:** The (high or low) line pressure alarm light (schematic symbol LT3 or LT4) on the front panel WILL ILLUMINATE AND CLEAR but the remote alarm terminals (schematic symbol TB1-7,8,9 OR TB1-10,11,12) of the effected circuit DO NOT RESPOND TO SWITCH ADJUSTMENT:

CORRECTIVE ACTION: First verify that the alarm wires are connected to the correct terminals of TB1. If the malfunction persists replace the effected relay.

9.2 Humidity Alarm Condition

9.2.1 The following is a list of conditions which can cause a humidity alarm and the order in which to proceed:

a: Test for faulty alarm circuit (section 9.2.2).

b: Test for low back pressure (section 8.2).

c: Test for DRY-PAK® dryer not cycling - refer to: *8.9 DRY-PAK® Cycling Test.* and to: *9.3 TROUBLE SHOOTING DRY-PAK® CYCLING INTERRUPTION*.

d: Back pressure falls to near 0 PSIG while compressor is operating. Refer to: *9.3.3 PRESSURE FLUCTUATION*.

e: Continual humidity alarm, but DRY-PAK® cycle, back pressure and operating duty cycle are normal. Refer to: section 9.3.4.

f: Intermittent humidity alarm. Humidity alarm clears automatically after a period of continual operation. After a period of alarm free operation the humidity alarm reoccurs. Refer to section 9.4.

g: If you have found and corrected an obvious cause of the humidity alarm and yet the alarm persists, refer to section 9.4.1.

9.2.2 Humidity Circuit Test

9.2.2.1 When trouble shooting a humidity alarm, first verify the operation of the humidistat, located on the electrical module at the top of the door.

9.2.2.2 If the humidity alarm is active and the amber (yellow) LED ON THE HUMIDISTAT is lit, VERIFY THE ALARM by moving the test toggle to “Test Alarm”. If this action temporarily clears an amber alarm, the humidistat is operating correctly. Refer to 9.2.3 “Valid Open Alarm”. If the test toggle will not temporarily clear the amber LED when it is lit, replace the humidistat.

9.2.2.3 If the humidity alarm is active and the red LED ON THE HUMIDISTAT is lit: VERIFY THE ALARM by moving the test toggle to “Test Clear”. If this action temporarily clears the alarm, the humidistat is operating correctly. Refer to 9.2.3: “Valid Humidity

Alarm". If the test toggle will not temporarily clear the red LED when it is lit, replace the humidistat.

9.2.3 Valid Open Alarm
If the amber LED on the humidistat is lit and the test toggle will temporarily clear it, (section 9.2.2.2) there is an open condition in the sensor circuit. Check for a loose connection between the humidistat and sensor. If connections are ok, the sensor itself has an open circuit and must be replaced. Do not test the sensor with a direct current ohm meter, as sensor calibration will be destroyed.

9.2.4 Humidity Bypass with no Humidity Alarm

9.2.4.1 If air is venting out of the Humidity Bypass Valve with no indication of a Humidity Alarm, Check to see if Line Voltage is present at the Coil. Check Coil Resistance. For 240V is 220 +/- 20 OHMS. If no Voltage is observed, Check / Replace the Humidistat .

9.2.4.2 If LineVoltage is confirmed at the coil, then the Valve needs to be rebuilt . Use P/N 0024815021 Bypass Valve Kit.

9.3 Dry-Pak® Cycling Interruption

9.3.1 Having found the dryer cycle to be interrupted (refer to section 8.9), TURN THE DEHYDRATOR OFF AND DISCONNECT FROM POWER SOURCE BEFORE CONTINUING! Disconnect one wire lead of each purge solenoid valve coil from the electrical connector in the dryer base plate. Measure the resistance of each coil with an ohmmeter. Normal coil resistance is 260 ± 30 ohms. If either coil is open or shorted, replace the coil assembly. Be sure coil connections are secure when finished. If when the dehydrator is restarted, normal cycling is resumed, proceed to 9.4.1, if not, to 9.3.2.

9.3.2 If cycle interruption continues, replace the timer. When cycling is restored, proceed to 9.4.

9.3.3 PRESSURE FLUCTUATION. If the back pressure falls to 0 PSIG at any time when the compressor is operating it indicates that one purge solenoid valve has failed to closed. This can be corrected by installing valve repair kit P/N 0024815021. Install kits in both valves so that both are in new condition. When the valve repair is completed and cycling is restored, proceed to section 9.4.

9.3.4 If DRY-PAK® cycling and back pressure are normal and if the dehydrator operates more than once each hour, replace the purge mufflers. If the purge noise is noticeably more sharp with the new mufflers installed, go to section 9.4.1. If all operational checks reveal no reason for the alarm condition, but the alarm persists, replace the sensing element. If the alarm persists, go to 9.4.

9.3.5 If the humidity alarm repeatedly occurs and automatically clears after a period of continual operation, increase the back pressure regulator setting to 69 PSIG (475 kPa). This type of humidity alarm is often the result of an exceptionally high-capacity compressor or of infrequent DRY-PAK® operation. In either case the extra back pressure will eliminate the problem.

9.4 Dry-down after repair

If the cause of a valid humidity alarm has been corrected, the unit must operate after repairs are completed for perhaps an hour or more in order to dry the desiccant towers and clear the humidity alarm. If a defective sensor element was the cause of alarm, it will normally clear after 5 to 15 minutes of operation with a new sensor in place.

9.4.1 The desiccant used in the drying towers is molecular sieve, which has a normal useful life equal to the dehydrator. Reduced service life can occur due to air borne contaminants (hydrocarbons, acids etc.) which may plug or degrade the desiccant. This is seldom the cause of a high humidity condition, but if all other possible causes for a high humidity condition have been ruled out, and especially after years of service, replacement of the DRY-PAK® desiccant towers is recommended.

9.4.2 If none of the above procedures solve the humidity alarm, replace the DRY-PAK®.

TABLE IV - SPARE PARTS LIST

Item	Description	Application	Part No.	Qty
1	Electrical Module Assembly complete	see TABLE V		1
2	Humidistat	All Models	34709	1
3	Air Quick-connect fitting - Male	All Models	0020507002	1
4	Air Quick-connect fitting - Female	All Models	0020507001	1
5	Alarm Relay (k2 through k4)	see TABLE V		3
6	Solid State Timer	see TABLE V		1
7	Excess Run Alarm Timer	see TABLE V		1
8	Line Pressure Alarm Switch, high or low	All Models	46752	2
9	Brass Barbed Connector (part of P/N 46752)	All Models	36696	2
10	Gasket (part of P/N 46752)	All Models	40679	2
11	Nut, sensing element retainer	All Models	0020525001	1
12	O-ring, sensing element connector seal	All Models	89795	1
13	Shrader Valve for pressure testing	All Models	0017495001	6
14	Back Pressure Gauge (100 PSIG / 700 kpa)	All Models	0017221082	1
15	Humidity Sensor Element	All Models	15688	1
16	Humidity Sensor Pressure Plug	All Models	30986	1
17	Back Pressure Regulator	All Models	0020523003	1
17a	Back Pressure Regulator Diaphragm	All Models	0020523012	1
18	Humidity Bypass Solenoid Valve	see TABLE V		1
19	Humidity Bypass Solenoid Valve Repair Kit	All Models	0024815021	1
20	Humidity Bypass Solenoid Valve Spare Coil	see TABLE V		1
21	Humidity Manifold Assembly (includes 11 thru 20)	see TABLE V		1
22	Air-Flow Check Valve	All Models	104300	1
22a	Bypass Orifice (inside tubing under tie wrap)	All Models	32174	1
23	Heatless Dryer Assembly	see TABLE V		-
24	After Filter Assembly	All Models	44002	1
25	Replacement After Filter Element	All Models	44177	1
26	Heat Exchanger	All Models	44746	1
27	Shock Mount, Compressor support	All Models	47045	4
28	Compressor Module	see TABLE V		1
29	Compressor Flexible Air Hose	All Models	0045024505	1
30	Line Pressure Regulator	All Models	0047976001	1
31	Cabinet Foot (rubber)	All Models	49277	4
32	Tank Pressure Switch (controls Start/Stop)	All Models	0060353003	1
33	Cabinet Ventilation Fan	see TABLE V		1
34	On/Off Control Circuit Breaker	see TABLE V		1
35	Compressor Circuit Breaker	see TABLE V		1
36	Outlet Air Flow Meter	see TABLE V		1
37	Line Pressure Gauge (30 PSIG / 200 kpa)	All Models	0005390070	1
38	Tank Pressure Gauge (160 PSIG / 1100 kpa)	All Models	0005390071	1
39	Light, Power On (white)	see TABLE V		1
40	Light, Alarm (red)	see TABLE V		1
41	Air Storage Tank	All Models	0060129001	2
42	Cabinet Ventilation Fan Guard		40484	1
43	Dry Air Outlet (location reference only)	All Models		
44	Remote Alarm Terminal Board	(location only)		
45	Tank Pressure Relief Valve	All Models	0021085001	1
46	Compressor Contactor K1	see TABLE V		1
47	Elapsed Timer (Hour Meter)	see TABLE V		1
48	Relay Timer	All Models	99325	1

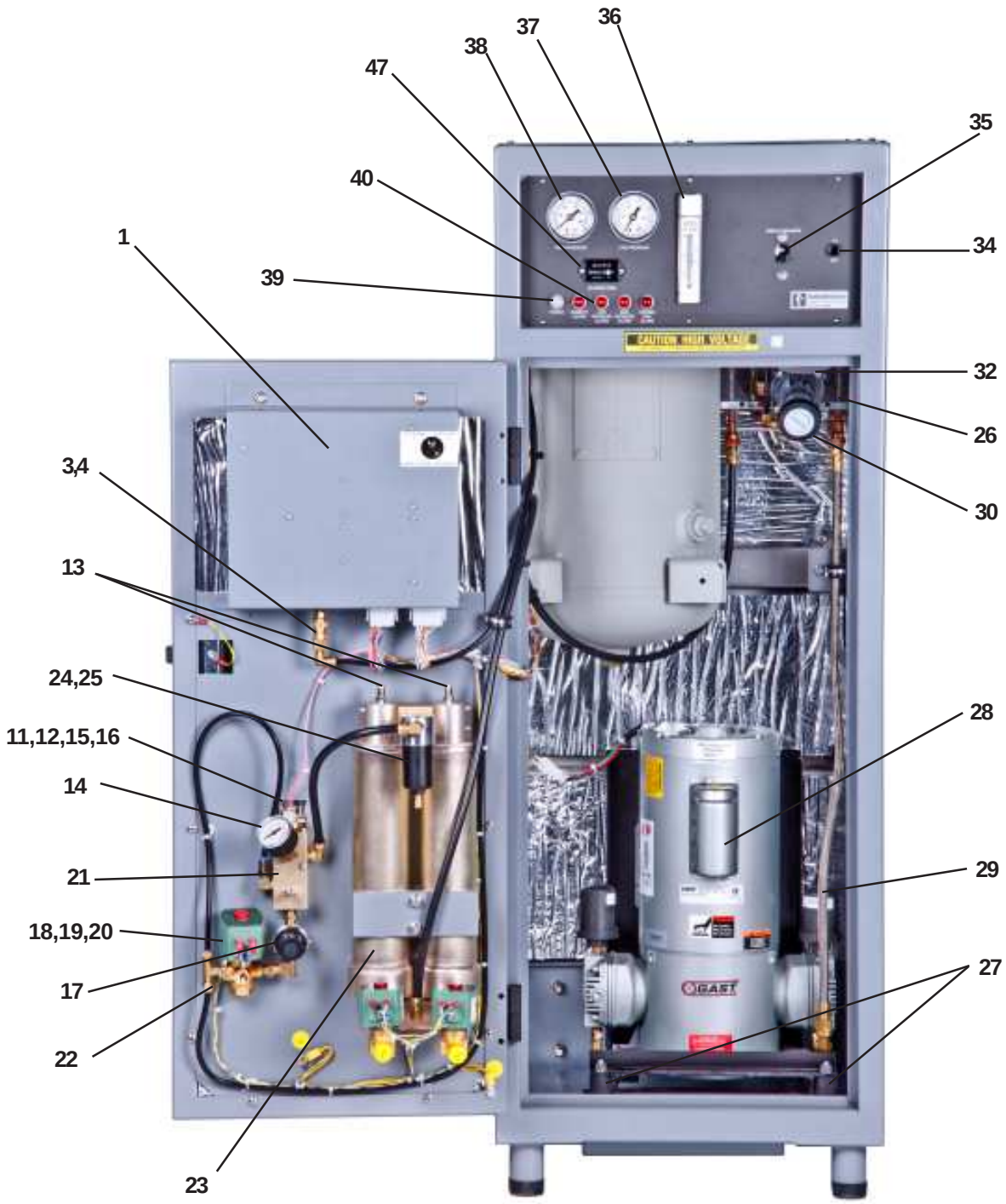

Figure 4
Small C.O. Dryer (front open)

TABLE V

SIZE and/or VOLTAGE SPECIFIC PARTS LIST

Item	Description	Part No.
1a	Electrical Module for 115/110v, 60/50 hz Model 2400 PN 47216 Model 3200	80791
1b	Electrical Module for 230/220v, 60/50 hz Model 2400 PN 55212 Model 3200	80792
5a	Alarm Relay for 115/110v, 60/50 hz Models 2400 & 3200	14126
5b	Alarm Relay for 230/220v, 60/50 hz Models 2400 & 3200	14127
6a	Solid State Timer for all 2400 series and 3200 (50Hz)	63309
6b	Solid State Timer for all 3200 (60Hz)series	13334
7a	Excess Run Alarm Timer for All Models 115/110v, 60/50 hz	47919
7b	Excess Run Alarm Timer for All Models 230/220v, 60/50 hz	105149
18a	Humidity Bypass Valve for 115/110v, 60/50 hz Models 2400 & 3200	47049
18b	Humidity Bypass Valve for 230/220v, 60/50 hz Models 2400 & 3200	47048
20a	Bypass Valve Coil for All 115/110v, 60/50 hz Models	47318
20b	Bypass Valve Coil for All 230/220v, 60/50 hz Models	47317
21a	Manifold Assembly for All 115/110v, 60/50 hz Models	47206
21b	Manifold Assembly for All 230/220v, 60/50 hz Models	47205
23a	Heatless Dryer Assembly- 115/110v, 60/50 hz Model 2400	47211
23b	Heatless Dryer Assembly- 230/220v, 60/50 hz Model 2400	47210
23c	Heatless Dryer Assembly for 115v, 60 hz Model 3200	60826
23d	Heatless Dryer Assembly for 230v, 60 hz Model 3200	60827
23e	Heatless Dryer Assembly for 220v, 50 hz Model 3200	47208
28a	Compressor Module for 115v, 60 hz Model 2400	47224
28b	Compressor Module for 110v, 50 hz Model 2400	47223
28c	Compressor Module for 230v, 60 hz Model 2400	47226
28d	Compressor Module for 220v, 50 hz Model 2400	47225
28e	Compressor Module for 115v, 60 hz Model 3200	60830
28f	Compressor Module for 230v, 60 hz Model 3200	60831
28g	Compressor Module for 220v, 50 hz Model 3200	47228
33a	Cabinet Ventilation Fan for ALL 115/110v, 60/50 hz Models	47218
33b	Cabinet Ventillation Fan for ALL 230/220v, 60/50 hz Models	47217
34a	On/Off Switch/Circuit Breaker 1.0 amp,1 pole for ALL 115/110v, 60/50 hz Models	14204
34b	On/Off Switch/Circuit Breaker 0.5 amp,2 pole for All 230/220v, 60/50 hz Models	37977
35a	Compressor Circuit Breaker 1 pole - 115/110v - Model 2400 (15 amp)	47118
35b	Compressor Circuit Breaker 2 pole - 230/220v - Model 2400 (7.5 amp)	47116
35c	Compressor Circuit Breaker 1 pole - 115/60 hz Model 3200 (20a)	47117
35d	Compressor Circuit Breaker 2 pole - 230/220v Model 3200 (10a)	44018
36a	Outlet Air Flow Meter for Model 2400	0024970001
36b	Outlet Air Flow Meter for Model 3200	47572
39a	Light, Power On (white) for ALL 115/110v, 60/50 hz Models	13226
39b	Light, Power On (white) for ALL 230/220v, 60/50 hz Models	41136
40a	Light, Alarm (red) for ALL 115/110v, 60/50 hz Models	13225
40b	Light, Alarm (red) for ALL 230/220v, 60/50 hz Models	41135
46a	Compressor Contactor (K1) for ALL 115/110V,60/50 hz Models	47052
46b	Compressor Contactor (K1) for ALL 230/220V,60/50 hz Models	47053
46c	Relay Timer 115v only	99325
47a	Elapsed Timer (Hour Meter) for ALL 115/110v, 60/50 hz Models	92007
47b	Elapsed Timer (Hour Meter) for ALL 230/220v, 60/50 hz Models	92007

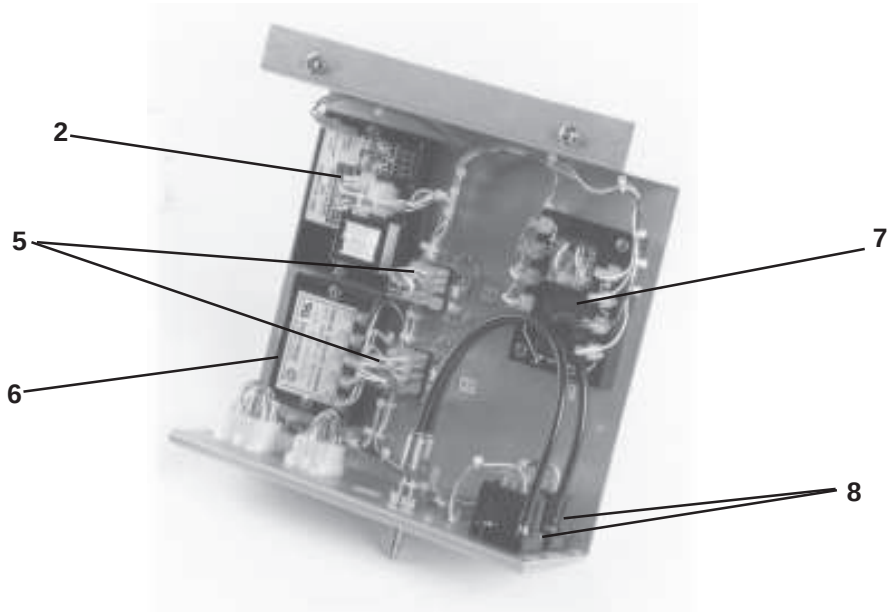

Figure 5
Electrical Module

Strip insulation off wire
Insert tip of screwdriver blade
Push down and insert wire then release

Figure 6
Small C.O. Dryer (rear view)

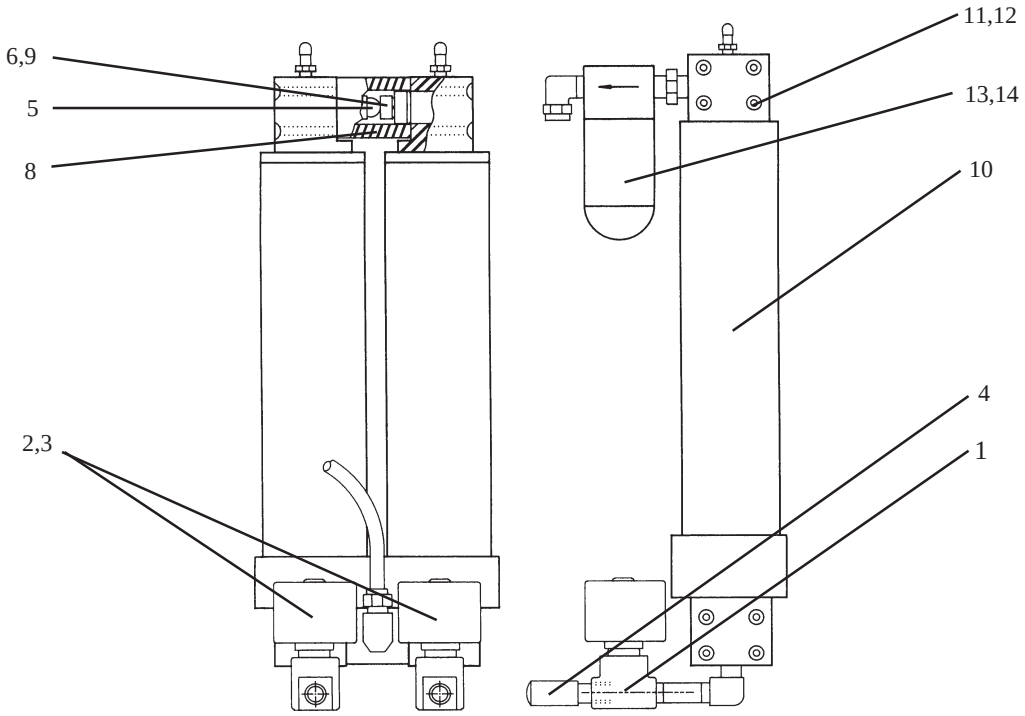

Figure 7
DRY-PAK® Dryer Assembly

1a	Purge Valve -All 115/110v Models (2 required)	47047
1b	Purge Valve -All 230/220v Models (2 required)	47046
2	Valve Repair Kit (mechanical parts)-ALL MODELS (2 required)	0024815022
3a	Purge Solenoid Valve Electric Coil 115/110v, 60/50 hz	47316
3b	Purge Solenoid Valve Electric Coil 230/220v, 60/50 hz	47315
4	Purge Solenoid Valve Silencer (2 required)	0022646001
5	Ball Check (2 required)	0015903003
6a	Top Ball Valve Seat with drilled orifice for All Model 2400 (2 required)	47314
6b	Top Ball Valve Seat with drilled orifice for Mod. 3200 220v, 50 hz (S/A Mod. 2400)	47314
6c	Top Ball Valve Seat with drilled orifice for Model 3200 115v, 60 hz 2 required)	60841
7	Bottom Ball Valve Seat (for All Models, no orifice, 2 required)	37393
8	Center Block	37392
9	Valve Seat O-ring Seal	0014000115
10a	Desiccant Cylinder Assembly for Model 2400 (2 required)	47114
10b	Desiccant Cylinder Assembly for Model 3200 (2 required)	45992
11	Desiccant Cylinder Socket Head Cap Screws	0011032150
12	Lock Washer for item 11	0161000000

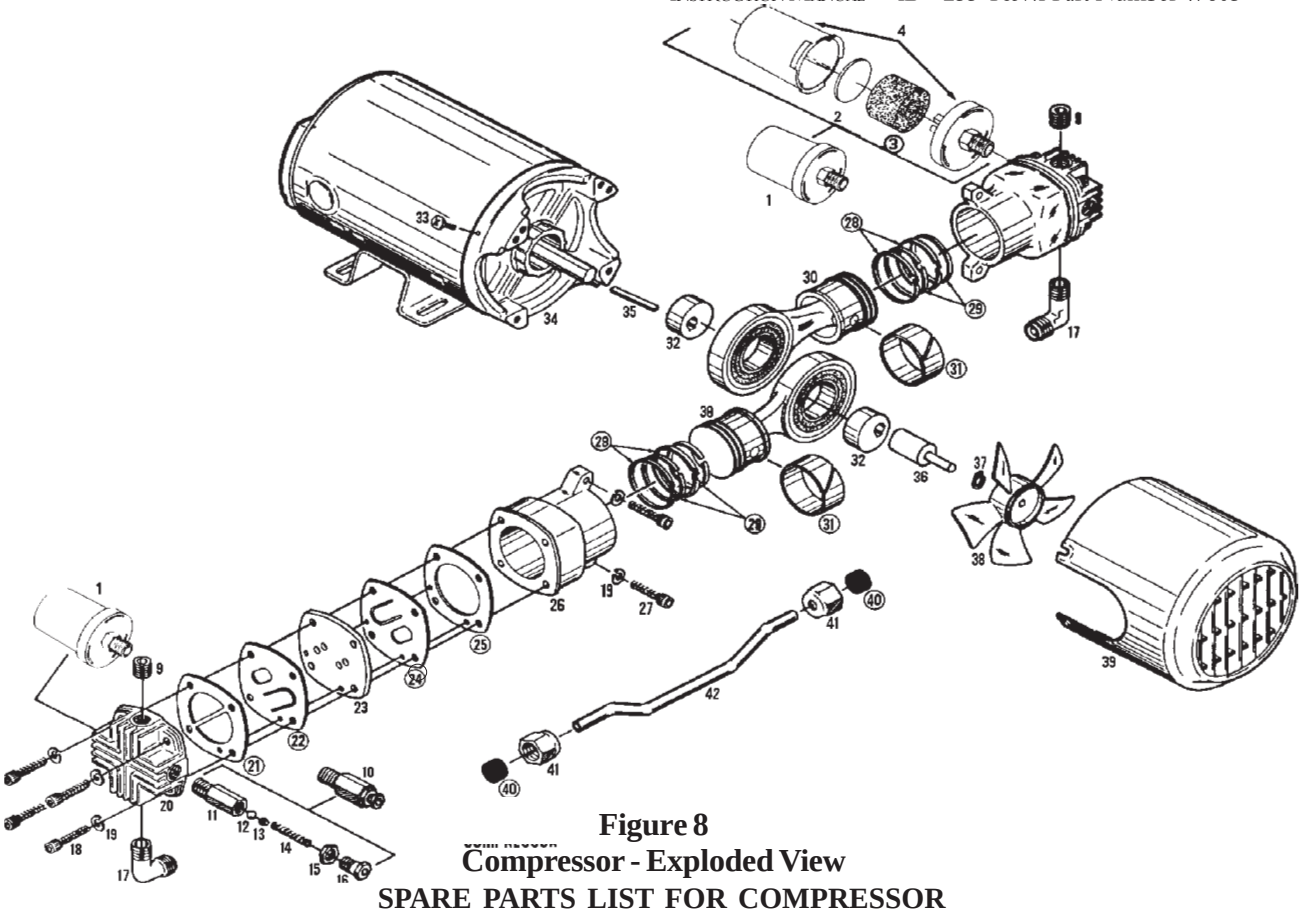

Figure 8
Compressor - Exploded View

SPARE PARTS LIST FOR COMPRESSOR

Item	Description	Qty	Part Number
1	Inlet Filter Assembly	2	0023601002
*3	Replacement Felt Element for Inlet Filter	2	0021990001
9	Pipe Plug	2	Reference
10	Safety Valve (3/4 hp)	1	0023630001
	Safety Valve (1 hp)	1	0023630002
17	Manifold Elbow	2	Reference
18	Head Screw	8	Reference
19	Lock washer	12	Reference
20	Cylinder Head	2	0023631001
*21	Head Gasket	2	Reference
*22	Valve, Outlet	2	Reference
*23	Valve Plate	2	Reference
*24	Valve, Inlet	2	Reference
*25	Cylinder Gasket	2	Reference
26	Cylinder	2	0023637001
27	Cylinder Screw	4	Reference
*28	Piston Ring	4	Reference
*29	Piston Seal	4	Reference
30	Piston Rod Assembly with eccentric (For 3200)	2	Reference
	Piston Rod Assembly with eccentric (For 2400)	2	Reference
*31	Piston Rider Ring	2	Reference
38	Fan Blade	1	0023643001
	Fan Blade (50 Hz)	1	0023643003
39	Fan Shroud (3/4 hp)	1	0041688025
	Fan Shroud (1 hp)	1	0024398001
*40	Manifold Sleeve	2	Reference
41	Manifold Nut	2	Reference
42	Manifold Tube	1	Reference

* = Parts contained in Maintenance Kit P/N 0027406501, for the routine maintenance of one compressor per kit.

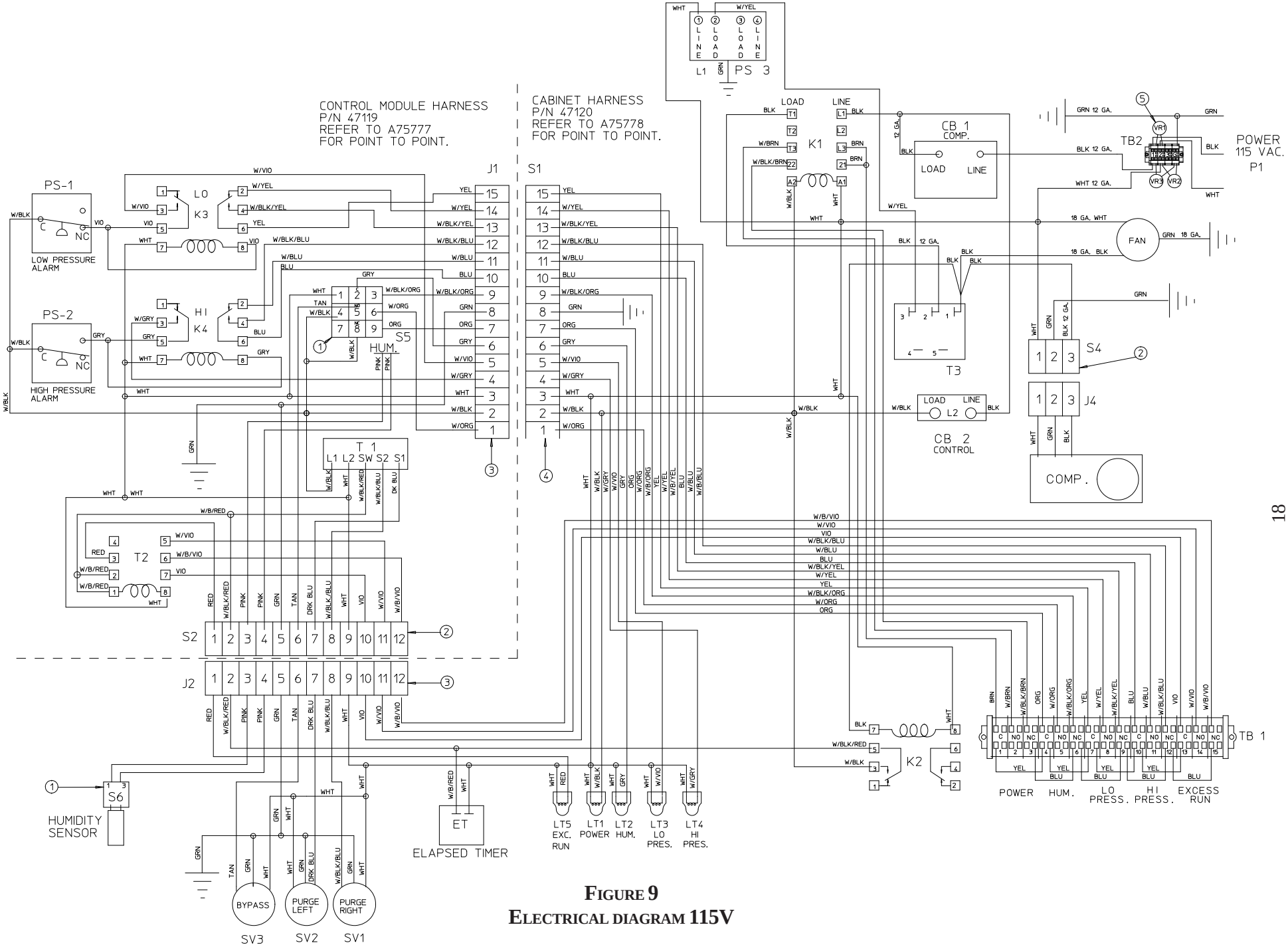

FIGURE 9
ELECTRICAL DIAGRAM 115V

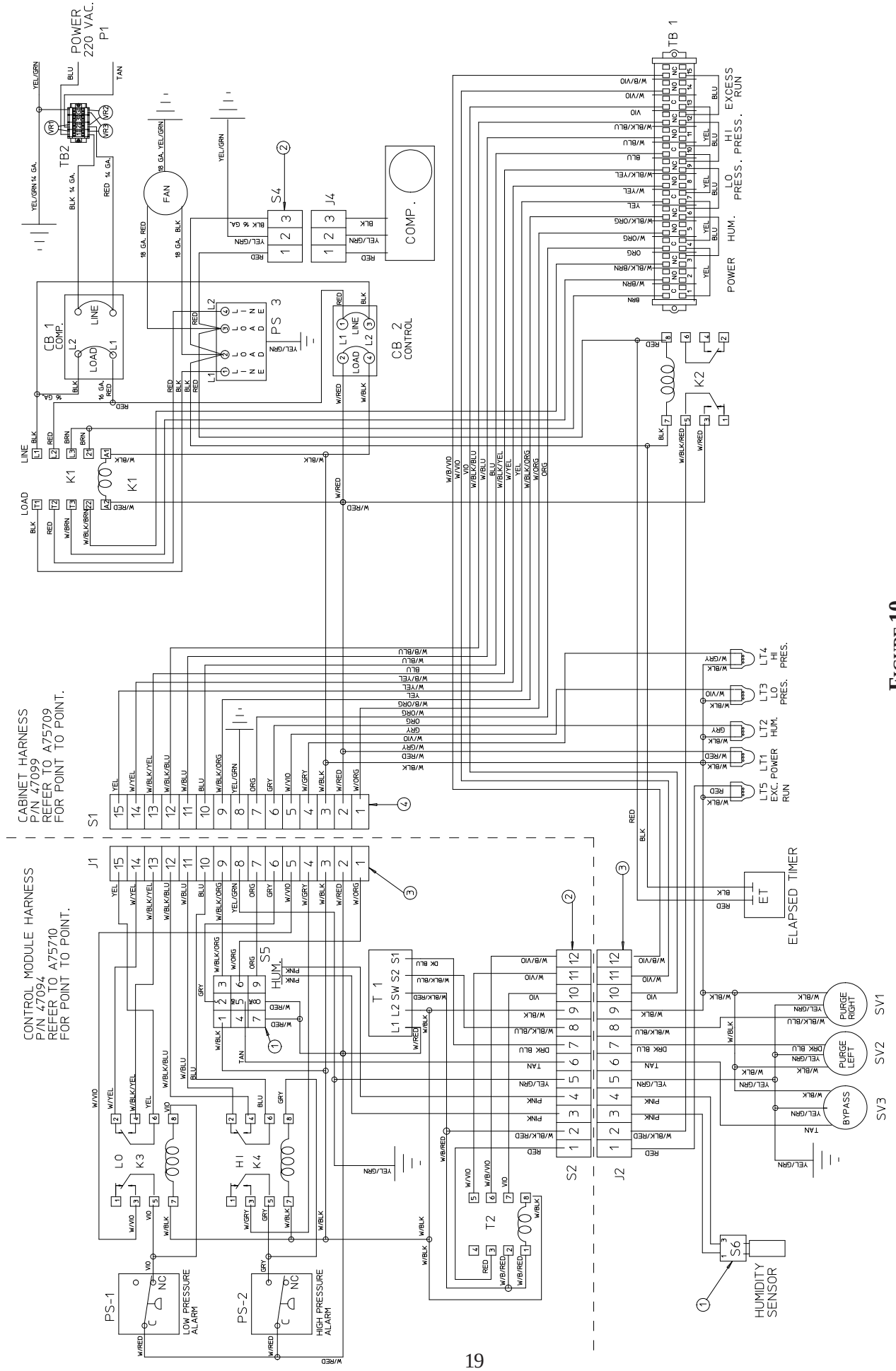

FIGURE 10
ELECTRICAL DIAGRAM 220V

TABLE VI
ELECTRICAL PARTS - LOCATIONS and FUNCTIONS

CB 1 --- 10 amp, 2 pole COMPRESSOR CIRCUIT BREAKER, located on the front control panel -- provides current to CB-2 and to compressor via K1 and PS-3

CB 2 --- 0.5 amp, 2 pole CONTROL CIRCUIT BREAKER, located on the front control panel -- provides current to LT1, coil of K1, to ET and also to SW terminal of T1 via K2.

COMP.--- OIL FREE COMPRESSOR/MOTOR ASSEMBLY, located in cabinet base.

FAN --- Cabinet Ventilation Fan, located on cabinet rear surface --- powered by PS3.

HUM.— HUMIDISTAT, located on the electrical module -- provides current to SV3 when clear OR to LT2 if in alarm. Dry contacts (HUM/S5-3,-6,-9) report alarm condition to TB1-4,-5,-6.

J1/S1--- POLARIZED JACK AND SOCKET CONNECTOR, 15 pin - connect cabinet electrical harness to ELECTRICAL MODULE.

J2/S2--- POLARIZED JACK AND SOCKET CONNECTOR, 12 pin - connect cabinet electrical harness to ELECTRICAL MODULE.

J4/S4--- POLARIZED JACK AND SOCKET CONNECTOR, 3 pin - connect cabinet harness to COMPRESSOR harness.

ET — ELAPSED TIMER (HOUR METER), located on the front control panel -- shows the total hours of DRY-PAK and compressor operation.

K1 --- CONTACTOR, located behind the front control panel -- provides current to compressor via PS-3 and dry contacts (K1-21,-22,-t3) report alarm condition to TB1-1,-2,-3 when the power is interrupted.

K2 --- RELAY, located behind the front control panel --- powers hour meter and T1-SW when PS 3 is closed.

K3 --- LOW LINE PRESSURE ALARM RELAY, located on electrical module --- provides power to LT3 and dry contacts (K3-2,-4,-6) report alarm condition to TB1-7,-8,-9 when PS-1 senses low line pressure.

K4 --- HIGH LINE PRESSURE ALARM RELAY, located on electrical module --- provides power to LT4 and dry contacts (K4-2,-4,-6) report alarm condition to TB1-10,-11,-12 when PS-2 senses high line pressure.

LT1 --- POWER ON INDICATOR (clear), located on front control panel --- illuminated via CB1 and CB2.

LT2 --- HUMIDITY ALARM INDICATOR (red), located on front control panel --- illuminated by S5-2 (HUMIDISTAT).

LT3 --- LOW LINE PRESSURE ALARM INDICATOR (red), located on front control panel --- illuminated by K3-3.

LT4 --- HIGH LINE PRESSURE ALARM INDICATOR (red), located on front control panel --- illuminated by K4-3.

LT4 --- Excess Run indicator (red), located on fron control panel --- illuminated by T2

PS-1 --- ADJUSTABLE LOW LINE PRESSURE ALARM SWITCH, located on electrical module --- "NC" terminal powers K3-8 and K3-5 when in alarm.

PS-2 --- ADJUSTABLE HIGH LINE PRESSURE ALARM SWITCH, located on electrical module --- "NO" terminal powers K4-8 and K4-5 when in alarm.

PS-3 --- START/STOP TANK PRESSURE SWITCH, located behind and slightly below front control panel --- closes to operate compressor, hour meter, fan, and DRY-PAK when tank pressure declines to 25 PSIG (172 kpa). The tank pressure switch opens when tank pressure increases to 60 PSIG (415 kpa).

T1 --- DRY-PAK CYCLE TIMER, located on electrical module --- provides 25 seconds of current and 5 seconds of "dwell" (current interruption) alternately to SV1 and SV2 of the DRY-PAK dryer. L1 and L2 of T1 are continually energized when the dehydrator is powered, providing the uninterrupted memory function which balances the work load on the desiccant towers of the DRY-PAK dryer.

T2 --- Excess Run Alarm Timer, located on electrical module --- provides power to LT5 and dry contacts report alarm condition to TB1-13,-14,-15 when compressor operates beyond adjusted limit.

S5 --- POLARIZED SOCKET CONNECTOR, 9 sockets, located on the electrical module - connects module harness to HUMIDISTAT jack (J5, not shown).

S6 --- NON-POLARIZED SOCKET CONNECTOR, 3 sockets (center not used), located at HUMIDITY MANIFOLD inside cabinet door - connects to HUMIDITY SENSOR PRESSURE PLUG (J6, not shown).

SV1 --- Normally closed PURGE SOLENOID VALVE, located at base of DRY-PAK - operated by T1-S2.

SV2 --- Normally closed PURGE SOLENOID VALVE, located at base of DRY-PAK - operated by T1-S1.

SV3 --- 3 way BYPASS SOLENOID VALVE, located at lower left inside cabinet door - electrically energized by HUMIDISTAT (S5-5) when humidity alarm is clear, allowing dry air to flow to storage tank. Vents wet air through port #3 if in humidity alarm.

TB-1 --- ALARM TERMINAL BOARD, located on rear of cabinet --- terminals for connection to remote alarm device.

HUMIDITY SENSOR- Located inside manifold (17), connects to HUMIDITY SENSOR PRESSURE PLUG (J6, The sensor responds electrically to any change in moisture content of the dry air from the DRY-PAK.

10.0 GLOSSARY of TERMS

Altitude: The distance which the installation is above sea level expressed in feet/meters, used interchangeably with elevation.

Ambient: The environment surrounding the dehydrator. Ambient factors which can influence a dehydrator include the temperature, the relative humidity, the atmospheric pressure and quantity of various pollutants which are present.

Desiccant: The component within the dryer towers which is used alternately to retain, then to expel moisture from the process air. SPX Radiodetection dryers employ desiccant which is totally inert, that is; it undergoes no chemical or physical change in normal use.

Dew Point: Expressed in °F., the temperature at which dew or frost would form at 14.7 PSIA. The dew point of a given air sample rises with increased pressure. In 1943 SPX Radiodetection established a dew point of -40^0F. as standard for their compressor / dehydrators and for the pressurization of the communications equipment which is produced at SPX Radiodetection. NOTE: -40^0 is the one point at which the fahrenheit and celsius scales are numerically equal.

Dry Pak: A patented dryer design and registered trade mark of SPX Radiodetection which describes the most simple and efficient heatless air dryer. A Dry Pak consists of two desiccant towers, two maintenance free ball checks and two direct acting solenoid valves controlled by a solid state timer. The main air flow is handled by the ball checks without measurable pressure loss. Only the purge air flows through the two way solenoid valves, providing high efficiency and long trouble free service.

Elevation: The distance which the installation is above sea level expressed in feet/meters, used interchangeably with altitude.

Line Pressure: The pressure of the low pressure outlet system, which is controlled by the adjustment of the Line Pressure Regulator, is displayed on the Line Pressure Gauge, and is monitored by the adjustable Low and High Pressure Alarm Switches.

PSIA/kPaa: Pounds per Square Inch Absolute / kilopascal Absolute. The measure of the pressure of a gas or liquid, expressed in pounds per square inch, relative to a total vacuum. Standard atmosphere at sea level equals 14.7 PSIA (approx.). / 101 kPaa (approx)

PSIG/kPa: Pounds per Square Inch Gauge. The measure of the pressure of a gas or liquid within a component or system, to the degree it is greater than that of the surrounding atmosphere, expressed in pounds per square inch. The internal pressure as shown on the gauges used on air dryers.

SCFD/SCMD: Standard Cubic Feet per Day. A rate of air flow measured in cubic feet at 14.7 PSIA and 68^0 F. One SCFD when subjected to 10 PSIG (without temperature change) would occupy a space equivalent to 0.6 cubic feet.

Segregated Alarm: An alarm circuit which provides separate terminations for each alarm function within the dehydrator. Segregated alarms can provide to a remote location the information necessary for establishment of maintenance priorities. Alarm terminations which either close in alarm or open in alarm, or dual function terminations may be available, dependent on design parameters.

Std. conditions: Standard operating conditions imply a reasonably clean environment at 70°F.(21°C.) and sea level. Ambient conditions impact dryer maintenance needs.

Summary Alarm: An alarm which does not identify an individual condition, but which can indicate an active state of one or more alarm sensors within the dehydrator. Alarm terminations which either close in alarm or open in alarm, or dual function terminations may be available, dependent on design parameters.

System Pressure: The pressure at which the compressors and the drying towers (desiccant towers) operate. System Pressure determines the quantity of compressed air flow, the quantity of purge air and the moisture load on the desiccant towers.

11.0 Service Information

Should you need to contact us please call our Customer service department on (207) 655-8525 or Toll Free at (877) 247-3797

When returning a unit for factory service, Call the customer service department for a service return authorization number (SRA). The device should be boxed securly and contain contact information, contact telephone number, billing information, and return shipping information. if the device is being sent to the factory for service, a written statement of the problem of symptoms should be included. The SRA number must be on the outside of the package or indicated on the shipping label.

NOTE: Do not ship equipment contaminated with any type of hazardous/harmful substance.

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NOTES

WARRANTY

The Manufacturer warrants that all goods supplied hereunder, whether or not of its own manufacture, will be of the kind described herein or in any specification and drawing approved by the Manufacturer and free from defects in material or workmanship under normal use and prescribed maintenance for a period of one (1) year, with the exception of air dryers utilizing water sealed compressors as well as the compressors themselves which shall be for two (2) years. Neither this warranty nor any other, expressed or implied, shall apply to goods delivered hereunder which have been damaged or subjected to alteration or negligence after delivery. The Manufacturer's only obligation for breach of this warranty shall be the repair, without charge, or the furnishing EX Works Raymond Maine, of a similar part to replace any part which within one (1) year, with the exception as noted above, from date of shipment is proven to have been defective, provided that (i) the Purchaser shall have notified the Manufacturer within ten (10) days of the discovery of such defect and not later than ten (10) days after the last day of this warranty, and (ii) the Manufacturer shall have the option of requiring the return of the defective material (transportation prepaid) to establish the claim. The Manufacturer shall not in any event be liable for the Purchaser's manufacturing costs, loss of profits, good will or any other special, consequential, incidental, or other damages resulting from such defects. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THE WARRANTY SET FORTH HEREIN.

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