

# INSTRUCTION MANUAL FOR WILKERSON MODELS DE0, DE1 AND DE2 COMPACT HEATLESS AIR DRYERS

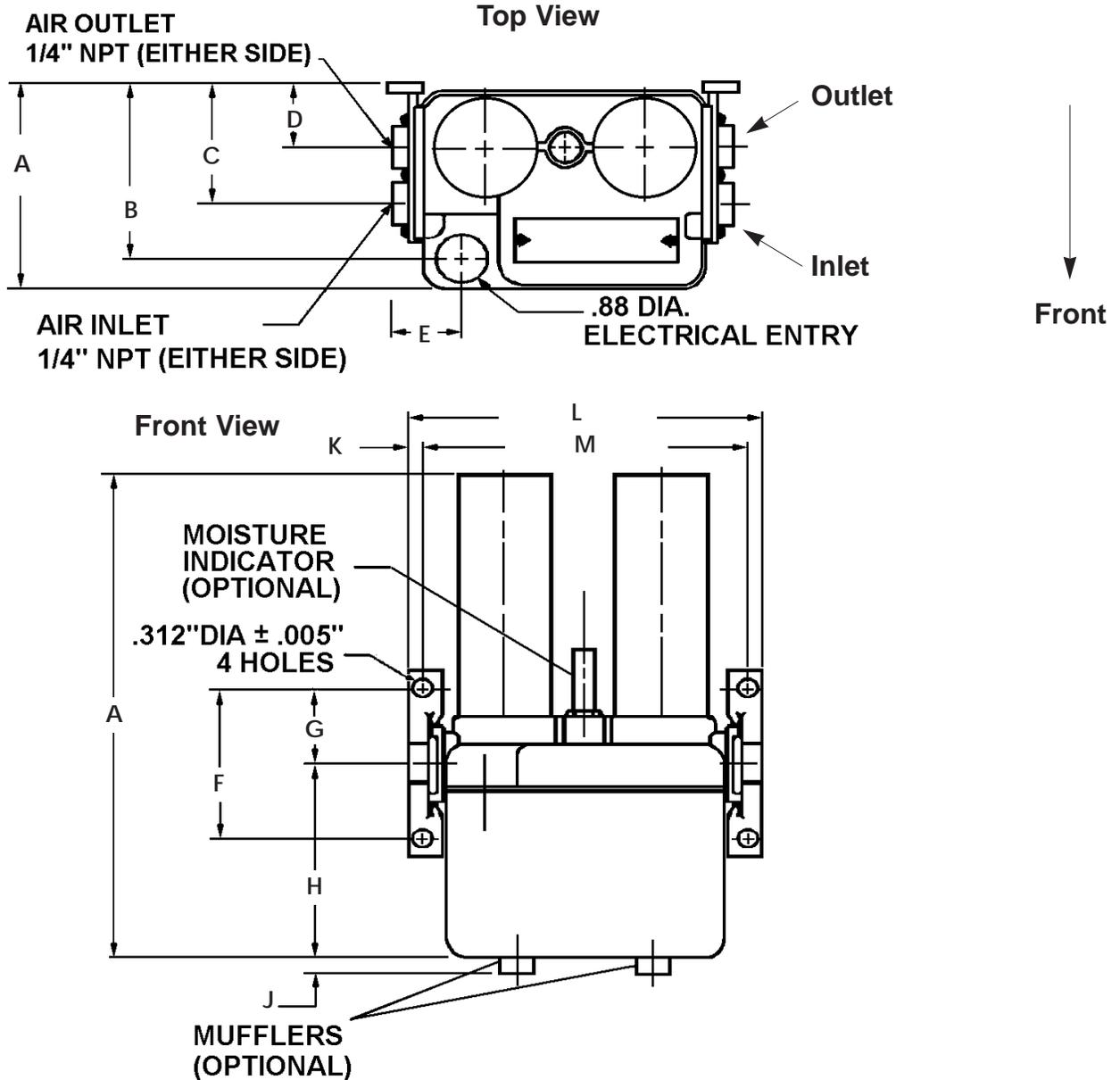
DE0 - DE2



**WILKERSON**<sup>®</sup>  
OPERATIONS

**GENERAL**

This instruction manual covers the installation, operation, maintenance and troubleshooting guide for the Wilkerson compact heatless air dryers, models DE0, DE1 and DE2. These dryers are designed to be installed into a compressed air system, providing ultra-dry compressed air to continuous feed, point-of-use applications.



Model Number	A	B	C	D	E	F	G	H	J	K	L	M	Approx. Wt. (lbs.)
DE0	10.875	4.0	2.72	1.50	1.82	3.375 ± .005	1.688 ± .016	4.38	.25	.438 ± .016	8.125	7.219	6 3/4
DE1	13.875												7 3/4
DE2	16.875												8 3/4

**Outline Dimensions**  
Figure 1

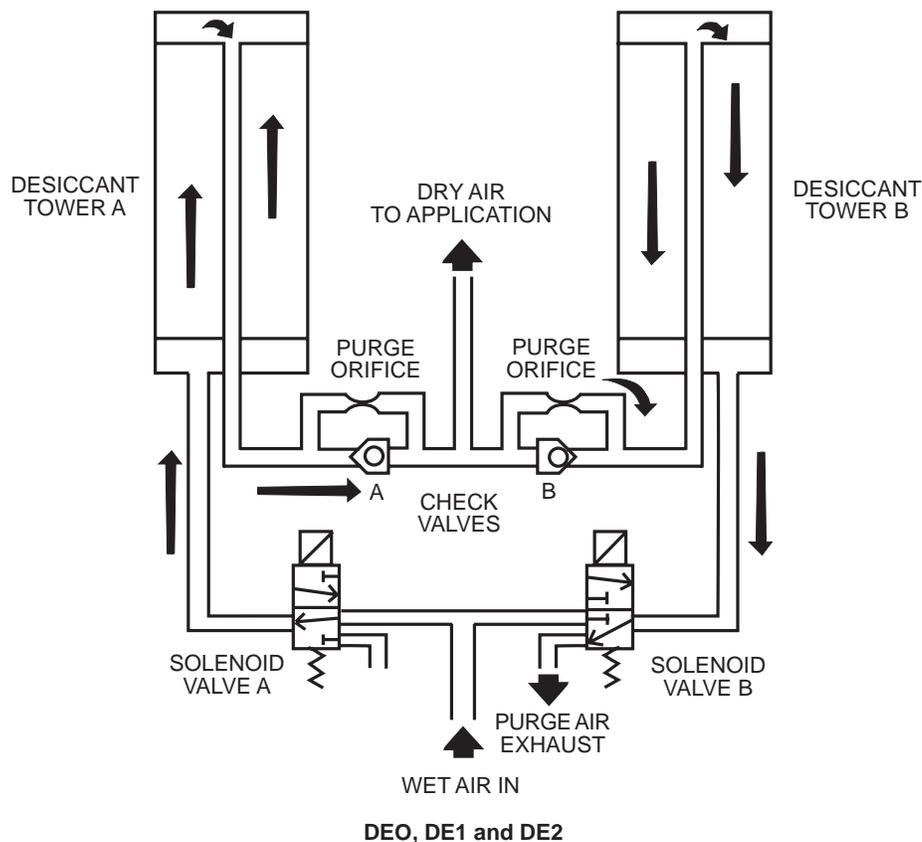
## DESCRIPTION OF OPERATION

Wilkerson DE series compact heatless air dryers employ the principles of pressure swing adsorption (PSA). The operation is fully automatic and relatively little maintenance is required.

The dryers utilize two identical desiccant towers, metering orifices, two 3-way DC operated solenoid valves controlled by a solid state electronic timer. Wet air at line pressure enters and flows through one of the towers where nearly all the water vapor is adsorbed while the other tower is being regenerated. Every 30 seconds, the process is reversed, providing a continuous flow of dry air.

In the flow schematic shown below, Valve A (energized) directs the inlet air to flow into Tower A (drying). A portion of the dry outlet air is allowed to flow through an orifice into Tower B. This dry purge air expands to nearly atmospheric pressure, sweeping the water out of the desiccant as it flows through Tower B (regenerating) and out of the Valve B (de-energized) exhaust port. The timer controls the cycling of normally closed solenoid valves.

The orifices are fixed and are sized by the factory based on flow, pressure and dew point required.



**Flow Schematic**  
Figure 2

## INSTALLATION AND OPERATION

### NOTE

*Wilkerson DE series compact heatless dryers have been thoroughly inspected and tested at the factory and are in proper working condition.*

- A. Initial Inspection** – Remove the air dryer from the shipping carton. Inspect the exterior and remove the electrical cover and inspect the interior components for any shipping damage.

### NOTE

*Any damage noticed at this time must be brought to the immediate attention of the carrier and a freight claim must be filed.*

- B. Warranty** – Please read this instruction manual carefully before installing the air dryer. Failure to follow proper instructions could result in damage to the equipment and may void the product warranty.



### CAUTION



EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service and use with any other gas or liquid is a misapplication. Use with or injection of certain hazardous liquids or gases in the system (i.e., alcohol or liquid petroleum gas) could be harmful to the unit and result in a combustible condition or cause hazardous external leakage. Manufacturers' warranties are void in the event of a misapplication and manufacturer assumes NO RESPONSIBILITY for any resulting loss. Before using equipment with fluids or gases other than air, or for non-industrial applications, consult Wilkerson Corporation for written approval.

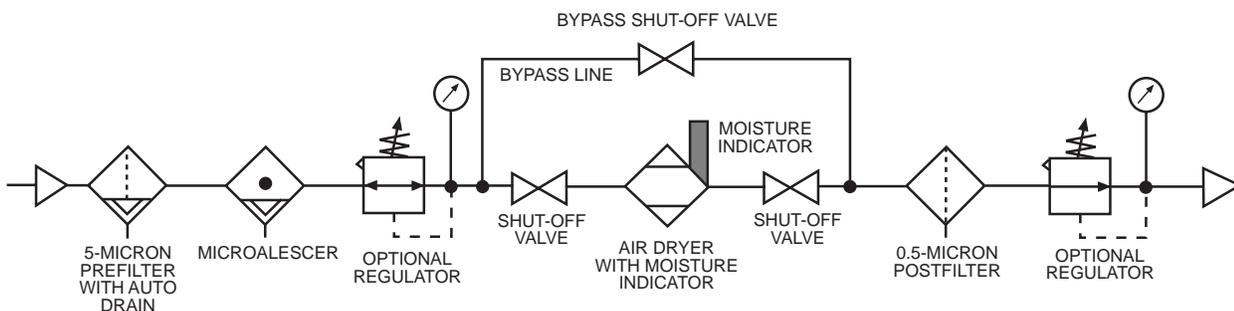
- C. Installation/Mounting** – The DE series air dryers are designed for either wall or in-line mounting. Models DE0, DE1, and DE2 allow for four alternate methods of piping. All dryers require a clean ambient environment for proper operation. Normally, most locations where ambient temperatures range between 40°F and 125°F are suitable for installation since drying efficiency is more dependent on the temperature of the compressed air flowing through the unit. Operating a unit at temperatures which could result in freezing may cause damage to the dryer. Do not operate at temperatures so low that freezing is a possibility. The heat of internal desiccant adsorption and normal solenoid valve operation may cause the unit to become warm. This is normal and does not indicate a malfunction of the unit. The warm temperature is more pronounced in a dryer operating at low flow rate.
1. Install dryer where ambient temperatures are between 40°F (4.4°C) and 125°F (52°C).
  2. Mount dryer in a vertical position and with the desiccant towers at the top.

- Piping connections: For maximum flow, INLET and OUTLET piping should be schedule 40 pipe or equivalent I.D. tubing. DE0, DE1 and DE2 inlet and outlet porting is 1/4" female NPT, purge porting is 1/8" female NPT.

**NOTE**

If purge air is required to be piped to a remote location, it is necessary to use slightly oversized tubing to prevent back-pressure. Restricting the purge flow can cause the dryer to malfunction.

- Use Teflon tape or pipe sealant on threads. Check all air connections for leakage, using soap solution prior to putting dryer into permanent service.
- It is recommended that a bypass line with shut-off valves be installed to provide constant air flow, should the dryer require servicing.
- Always install a 5-micron particulate prefilter and a coalescing filter upstream to remove entrained particulates, moisture and oil. A 0.5-micron afterfilter should be installed downstream to remove any desiccant dust that may migrate from the desiccant towers.

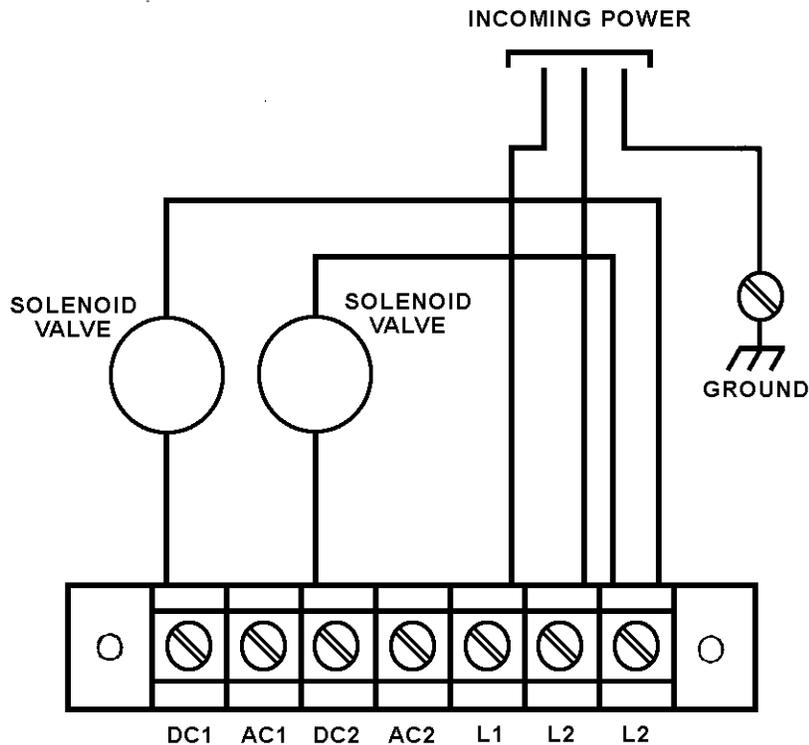


**Factory Recommended Dryer Installation**

Figure 3

- D. **Operating Specifications** – The DE0, DE1, and DE2 series compact heatless dryers can be sized to operate from 40 to 150 PSIG (2,7 to 10,3 bar).
- The dryers must be operated in accordance with the factory sizing charts and original customer requirements in order to achieve desired dewpoints. Inlet pressure, inlet temperature, and outlet flow conditions are always specified when purchased.
  - Maximum inlet air temperature is 125°F (52°C).
  - Do not operate dryers in temperatures so low that freezing is a possibility.
- E. **Electrical Connections** – Before wiring, check the dryer nameplate for electrical characteristics. Standard electrical characteristics are 115 Volt, 50/60Hz operation. Models operating on 230 Volt, 50/60Hz operation are available.

1. **⚠ IMPORTANT! No overload protection is provided in the dryer and unit should be wired into a protected circuit. A knockout hole is provided for electrical connection.**
  2. The dryer can be grounded by attaching a ground wire to the timer assembly bracket screw. See wiring diagram.
- G. **Solid State Timers** – The solid state timers used in the DE series dryers permit the simultaneous switching of the solenoid valves every 30 seconds. The timers are equipped with a one hour memory capability. If power is interrupted, the dryer will resume operation at the same point in the cycle when power is restored.



**Wiring Diagram  
Figure 4**

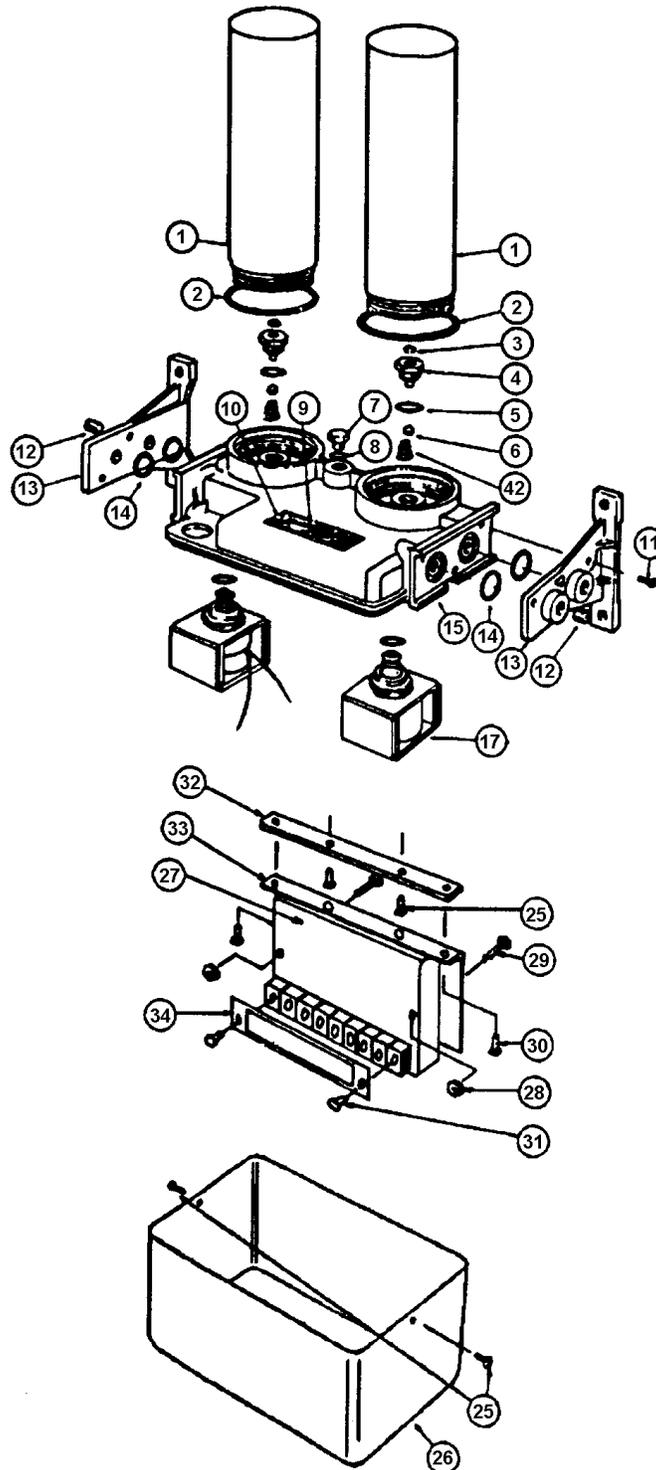
## MAINTENANCE INSTRUCTIONS

- A. **Field Adjustments** – Following proper installation of the Wilkerson DE heatless air dryer, no field adjustments are necessary. No lubrication is required on the dryer.
- B. **Six-Month Check** – It is recommended that every 6 months of operation, unit be thoroughly inspected. Inspection should include audible inspection of the towers switching and purge flow. Visual inspection should include checking for excessive dirt or oil fouling and for desiccant attrition at the outlet and purge exhaust area. This involves removal of the manifold cover. Remove mufflers, if installed, and check for excessive pressure drop by blowing through the muffler. If large resistance is felt, mufflers should be replaced.
- C. **One-Year Check** – Annual inspections should be more thorough and should include removal of the solenoid valves and purge orifice glands for in-depth inspection of internal wear or deterioration of the solenoid valve parts, Viton check balls, and for plugging of the purge orifices.
- D. **Purge Orifices** – If the operating conditions change from the label specifications (eg. inlet pressure, outlet flow), it is necessary to replace the purge orifices. There are two orifices in the DE series air dryers. The orifices are extremely critical parts in determining the performance of the dryer and no attempt should be made to enlarge or reduce the hole size on the side of the hex orifice gland. Orifices of the proper size must be obtained from your local Wilkerson distributor. The label on the dryer should also be changed, noting the present operating conditions. Purge orifices are screwed into the manifold beneath the desiccant chambers. To change orifices, unscrew the hex orifice glands using a standard 7/8" socket wrench.
- E. **Cycle Timer** – The solid state cycle timer requires no maintenance and can be replaced in field.
- F. **Desiccant Towers** – Improper packing of the desiccant chambers can cause channeling of the air stream and improper drying. For this reason, **NO ATTEMPT SHOULD BE MADE TO REPACK DESICCANT CHAMBERS IN THE FIELD.** Replacement chambers should be obtained from your local Wilkerson distributor.
- G. **Operating Air Dryer Improperly** – Following improper dryer operation, i.e., low inlet pressure, high air temperature or high outlet flow, shut off the outlet flow from the air dryer for several hours to allow the dryer to operate, purging the desiccant towers of excessive moisture. If this does not restore dryer to proper working order, consult the troubleshooting guide at the end of this instructional manual.
- H. **Oil Contamination** – Oil contamination of the desiccant towers will cause complete loss of drying capability. If oil is detected in the desiccant towers or any other components, it will be necessary to install replacement towers in order to restore dryer to normal operation.
- I. **Replacement Parts** – Contact your local authorized Wilkerson distributor for dryers or replacement parts.

**IMPORTANT INFORMATION:  
The installation of parts not supplied by  
Wilkerson will void the warrant of our air dryers.**

For replacement part information, contact Wilkerson Applications Engineering toll free at 1-888-223-5126.

## DE0, DE1 AND DE2 PARTS IDENTIFICATION



**Parts Identification**  
**Figure 5**

PARTS DESCRIPTION – WILKERSON HEATLESS DRYERS				
ITEM NO.	PART NUMBER	QTY. PER DRYER	PART DESCRIPTION	INCLUDES ITEMS
1	DRP-94-101	2	Desiccant Tower, 6" New, DE0	2
	DRP-94-102	2	Desiccant Tower, 9" New, DE1	2
	DRP-94-103	2	Desiccant Tower, 12" New, DE2	2
	DRP-94-104	2	Desiccant Tower, 6" REPACK W/EXCHANGE, DE0	2
	DRP-94-105	2	Desiccant Tower, 9" REPACK W/EXCHANGE, DE1	2
	DRP-94-106	2	Desiccant Tower, 12" REPACK W/EXCHANGE, DE2	2
2		2	O-RING TOWER	
3		2	O-RING, INNER ORIFICE	
4*	DRP-94-2XX	2	PURGE ORIFICE ASSY. (SPECIFY ORIFICE NUMBER)	3,5
5		2	O-RING, OUTER ORIFICE	
6	DRP-94-161	2	BALL, VITON CHECK VALVE	
7	DRP-94-163	1	HEX PLUG, INDICATOR PORT	8
8		1	O-RING, INDICATOR PORT	
9		1	NAMEPLATE	
10		2	DRIVE SCREW	
11		6	SCREW, #10-24 X 5/8, PAN HD	
12	DRP-94-164	2	PIPE PLUG, 1/4-18 SOCKET HD.	
13	DRP-94-187	2	MOUNTING BRACKET	
14		4	O-RING, BRACKET	
15	DRP-94-166	1	MANIFOLD WITH BRACKETS	11, 13, 14
17	DRP-94-185	2	SOLENOID VALVE, 53 VDC (115 VAC DRYERS)	36-41
	DRP-94-186	2	SOLENOID VALVE, 106 VDC (230 VAC DRYERS)	36-41
25		4	SCREW #6-32 X 3/8 PAN HD.	
26	DRP-94-184	1	MANIFOLD COVER	
27	DRP-94-181	1	TIMER, SOLID STATE (115 VAC DRYERS)	
	DRP-94-182	1	TIMER, SOLID STATE (230 VAC DRYERS)	
28		2	NUT, KEPS 8-32	
29		2	SCREW, 8-32 X 1" BH	
30		2	SCREW, 8-32 X 1/4" BH	
31		2	SCREW, 6-32 X 1/2" BH	
32		1	PLATE, ADAPTER SS TIMER	
33		1	BRACKET, MTG SS TIMER	
34		1	COVER, TERMINAL	
42	DRP-94-162	2	SPRING, CHECK VALVE	
NOT SHOWN	DRP-94-151	1	O-RING KIT	2,3,5,8,14
NOT SHOWN	DRP-94-169	1	MOISTURE INDICATOR	
NOT SHOWN	DRP-94-173	1	MAINTENANCE KIT, DRYER	2,3,5,6 17(REBUILD PARTS ONLY), 42
NOT SHOWN	DRP-94-188	2	EXHAUST MUFFLER	

When ordering parts, always state the dryer Model Number and Serial Number.  
\*Orifice number must be specified. This can be obtained from nameplate data.

<b>MODELS DE0, DE1 AND DE2 TROUBLESHOOTING GUIDE</b>			
<b>A</b>	<b>PROBLEM: AIR DRYER DELIVERS WET AIR</b>		
	<b>POSSIBLE CAUSE</b>	<b>CHECK</b>	<b>CORRECTIVE ACTION</b>
<b>A1</b>	High inlet air temperature.	Inlet air temperature should not exceed sizing criteria stated at purchase (usually 70°F or 100°F).	Reduce inlet air temperature.
<b>A2</b>	Air demand in excess of rated capacity of air dryer.	Check downstream flow demand with flowmeter.	Reduce air usage downstream.
<b>A3</b>	Low inlet pressure.	Verify actual inlet pressure vs. nameplate operating pressure.	Increase inlet pressure or call factory to resize dryer for inlet conditions.
<b>A4</b>	Dirty or obstructed inlet air filter.	Check filter element.	Replace.
<b>A5</b>	Purge orifice plugged.	Remove and inspect purge orifice.	Clean hole of debris. Use air gun to clean.
<b>A6</b>	Solenoid coil burned out.	Check magnetic field from coil operation.	Remove cover, place iron or steel material (screwdriver or nail) on exposed end of solenoid base to feel the magnetic effect, indicating proper operation. (Note: each coil should be energized for 30 seconds).
<b>A7</b>	Oil contamination of desiccant beds.	Verify particle/coalescing inlet filtration is adequate and functioning. Inspect inside of desiccant towers for oily residue.	Towers must be replaced if contamination is suspected.
<b>A8</b>	Timer not operating properly.	Check for proper voltage across L2 and DC1 and across L2 and DC2. Verify timing cycle is 30 seconds per side. Voltage should read 53 volts DC on a 115 volt AC unit or 106 volts DC on a 230 volt AC unit.	Replace timer if voltage is present at either DC terminal continuously or not at all during the 1 minute cycle -or- if wrong voltage is measured.
<b>A9</b>	Purge flow restricted.	Check mufflers for excessive back pressure.	Replace mufflers. If purge air is piped away from unit, oversized piping should be used and length of run should be as short as possible.
<b>A10</b>	Desiccant attrition	Remove the desiccant chambers from the air manifold. Check if perforated disc at open end of the chambers can be depressed more than 1/4" from the retaining ring.	Install new towers or have towers repacked at the factory.
<b>A11</b>	Solenoid core spring broken.	Remove solenoid valve, inspect core assembly.	Spring should be seated on core and not broken. Replace if necessary.

<b>MODELS DE0, DE1 AND DE2 TROUBLESHOOTING GUIDE</b>			
<b>B</b>	<b>PROBLEM: RESTRICTED FLOW THROUGH UNIT</b>		
	<b>POSSIBLE CAUSE</b>	<b>CHECK</b>	<b>CORRECTIVE ACTION</b>
<b>B1</b>	Incoming power interrupted.	Check the power supply. Measure for voltage at the cycle timer.	If voltage is present, replace timer.
<b>B2</b>	Improper operating conditions.	See A1, A2, A3 above.	
<b>B3</b>	Dirty or obstructed inlet air filter.	See A4 above.	
<b>B4</b>	Improper plumbing.	Make sure inlet and outlet connections are not reversed.	Correct plumbing.
<b>B5</b>	Plugged air passage.	Check inlet and outlet air passages and piping for blockages.	Clear restrictions.
<b>B6</b>	Solenoid coil burned out.	See A6 above.	
<b>B7</b>	Timer not operating properly.	See A8 above.	
<b>B8</b>	Solenoid core spring broken.	See A11 above.	