



# AIR DRYER

# Manual



**MODELS:** EDR1150029 EDR2300460  
EDR1150050 EDR4600460  
EDR1150115 EDR4600700  
EDR1150130 EDR4600850  
EDR2300280 EDR4601500  
EDR4600280 EDR4602000



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## GENERAL SAFETY INFORMATION

### Safety

This manual contains very important information on SAFETY and how to PREVENT EQUIPMENT PROBLEMS. The following will help in understanding this information:

**▲ DANGER** DANGER INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

**▲ WARNING** WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**▲ CAUTION** CAUTION indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury.

**NOTICE** NOTICE indicates important information that if not followed, may cause damage to equipment.



Read all manuals included with this product carefully. Be thoroughly familiar with the controls and the proper use of

**▲ WARNING** To avoid serious personal injury or damage to unit:

- Don't exceed maximum operating pressure as shown on equipment serial number tag. This equipment is a pressure-containing device.
- Disconnect power supply to equipment when performing any electrical service work.

## READ PRIOR TO STARTING THIS EQUIPMENT

1. This equipment has been thoroughly checked, packed and inspected before leaving our plant.
2. This equipment is shipped to accommodate a forklift truck. Use a forklift when moving and installing this equipment. Never lift it by hooking on to the air inlet and outlet connections.
3. **Clearances:** Leave at least 24 inches or more (61 cm) on either side of the cabinet for free air flow. Air-cooled units need adequate, free-flowing ambient air to flow across the refrigeration condenser, so do not block. The ambient temperature is to be within the operating parameters of 34°F (1°C) to 100°F (38°C).
4. Refrigerant capacities are posted on the data plate, on the outside of the unit.

## DESCRIPTION

### Function

Compressed air enters the air-to-air heat exchanger and is pre-cooled by the chilled outgoing air of the compressor. The air then enters the air-to-refrigerant heat exchanger where it is further cooled by the refrigeration system. As the air is cooled, water vapor condenses into water droplets. The air and water droplets then enter the separator where water is removed. In addition, the air is filtered of all solid particles 0.01 micron and larger. Clean, dry compressed air leaving the dryer minimizes maintenance and repair, and also reduces internal dryer contamination.

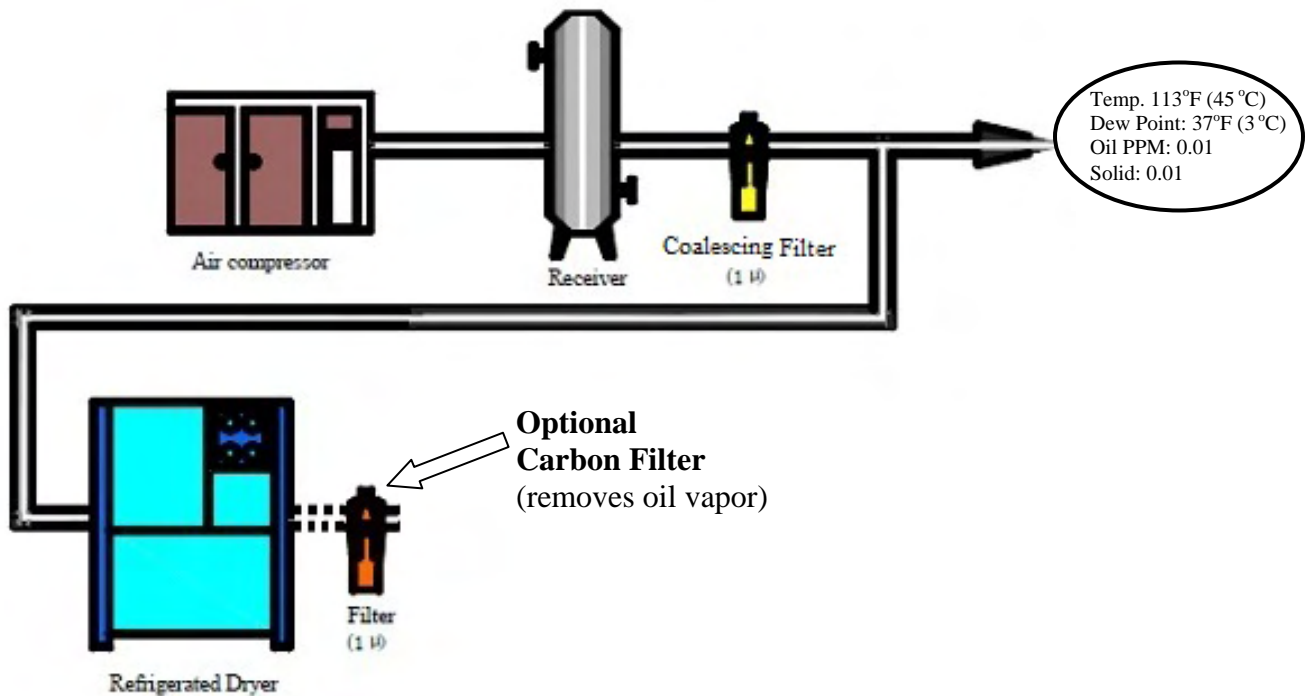
## Working Flow

Compressed air, saturated with water vapor, enters the dryer and is pre-cooled by the outgoing refrigerated air in an air-to-air heat exchanger (pre-cooler). In the pre-cooler, the warm incoming air is pre-cooled and the outgoing refrigerated air is warmed, this reduces the amount of heat that will have to be removed later by the refrigeration system, providing a more energy efficient dryer. The Pre-Cooled air enters the evaporator, where heat from the compressed air is transferred to the cold refrigerant. The compressed air is therefore cooled to 37°F (3°C) allowing water vapor to condense into water droplets. The compressed air then flows to the moisture separator, where the condensed moisture, oil and solids are separated from the compressed air and discharged from the system by an automatic condensate drain trap. The cold compressed air enters the shell side of pre-cooler. By removing heat from the incoming air, the outgoing air is reheated. In the refrigeration system, the compressor compresses low temperature, low-pressure refrigerant into high temperature, high-pressure gas. The compressed refrigerant gas flows through the discharge line to a condenser, where the gaseous refrigerant is condensed into a high-pressure liquid, by exchanging heat to the cooling airflow. The high-pressure liquid refrigerant reduces to a low pressure, low temperature mixture of liquid and vapor after passing through the thermostatic expansion valve and evaporator as it takes heat from the compressed air. The low-pressure refrigerant gas leaves the evaporator and flows to the liquid refrigerant accumulator, ensuing that only gas is returned to compressor. The accumulator prevents liquid refrigerant from entering the compressor and causing severe damage to the compressor. Refrigerant travels through the suction line to the compressor where the refrigeration cycle again starts.

# INSTALLATION

## Mounting

1. A dry, well-ventilated area is the best location for installation of the dryer. It also should be in an area where the ambient temperature will not exceed 100°F (38°C) or fall below 34°F (1°C).
2. A flexible hose should be added between the dryer and the air compressor in order to prevent stress to the inlet heat exchanger from the vibration of the compressor.
3. Mount dryer on firm level surface.
4. Automatic drain outlet should be connected to the plant drainage system in order to prevent condensate from polluting plant.
5. For typical placement in a compressed air system, see drawing below.



## Typical Piping connection

Three-valve bypass line should be installed before the dryer air inlet valve and after the dryer air outlet valve. This valve always permits the continued use of the plant compressed air system during any dryer maintenance or servicing operations.

## Power and electrical connections

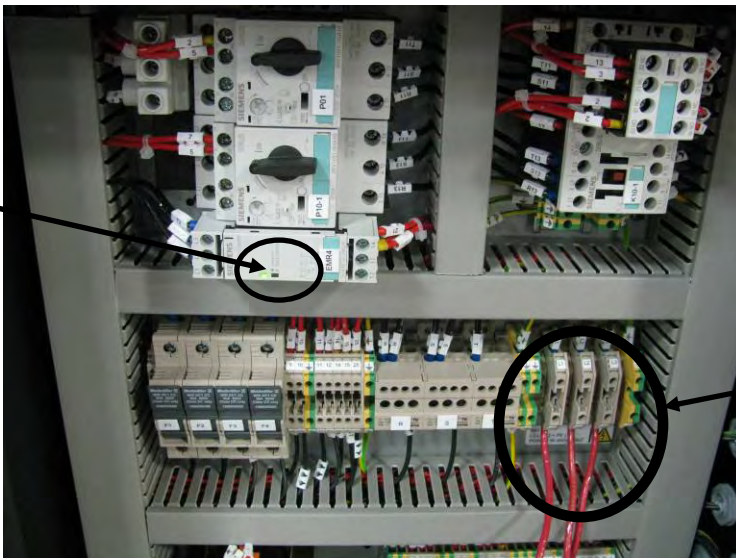
**⚠ DANGER**



**TO PREVENT DEATH OR SERIOUS INJURY, ONLY TRAINED AND AUTHORIZED PERSONNEL SHOULD INSTALL AND MAINTAIN THIS COMPRESSOR IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES, STANDARDS AND REGULATIONS. FOLLOW ALL NEC (National Electric Code) STANDARDS ESPECIALLY THOSE CONCERNING EQUIPMENT GROUNDING CONDUCTORS.**

1. Be sure that voltage to unit is as marked on unit serial number tag.
2. Range of voltage fluctuation will not exceed 10% of rated voltage.
3. Electrical entry in through electrical connection entry hole in electrical enclosure. Connect power to proper terminals.

Green light indicates proper phase wiring.



**NOTICE**

Be sure the power wires, L1, L2, & L3 match the labeled terminal block. If any of these wires are reversed, the fan turns the wrong direction and won't keep the system cool.



## **OPERATION**

### **Preparation for start-up**

1. Be sure that voltage to unit, air inlet pressure, air inlet temperature, air flow is as marked on unit serial number tag.
2. Blow off the compressed air lines for a few minutes to remove welding slag.

### **Start-up Checks:**

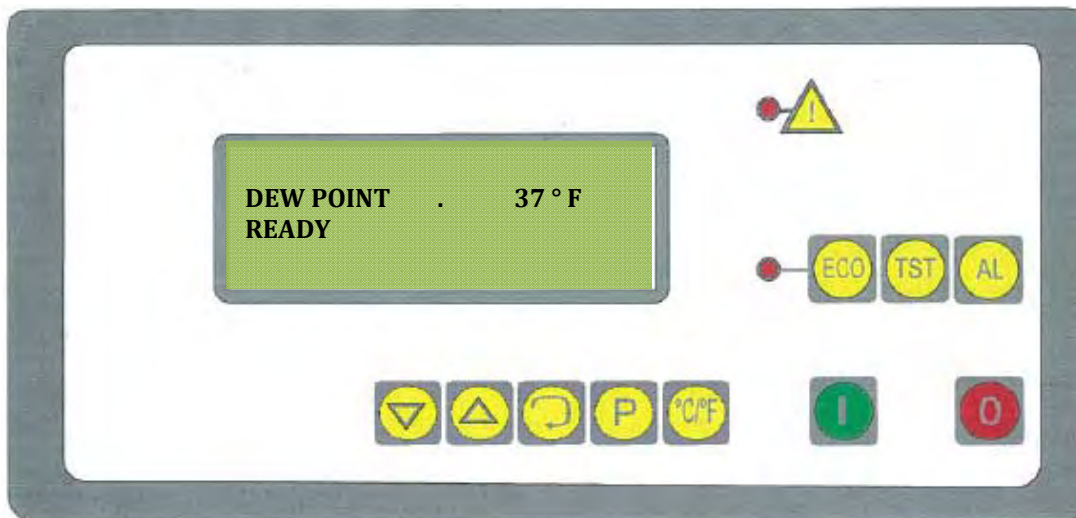
1. Check the low refrigeration pressure gauge, it should indicate higher than 36 psi (0.25MPa).
2. Press the control button “ON” to start and make sure condenser fan is blowing air outward.

## During Operation

The current models use R134A refrigerant. Units with refrigeration dew-point gauges (models below 400 CFM), make sure reading is in the yellow and green area. If unit has a PLC (models 400 CFM & above), make sure the display shows 37°F (3 °C ).



(Below 400 CFM units)



(400 CFM and above units)

If dew-point temperature is below this range, the heat exchanger will freeze-up. Call Eaton Compressor's Rotary Screw Tech Support Department for help.

### Notice proceeding

1. Don't start-up and shutdown frequently, dryers should be restarted after 10 minutes.

### Shutdown

Press OFF switch to shutdown dryer. Dryer should be turned off when air flow is not going through the dryer.

## MAINTENANCE

### ▲ WARNING



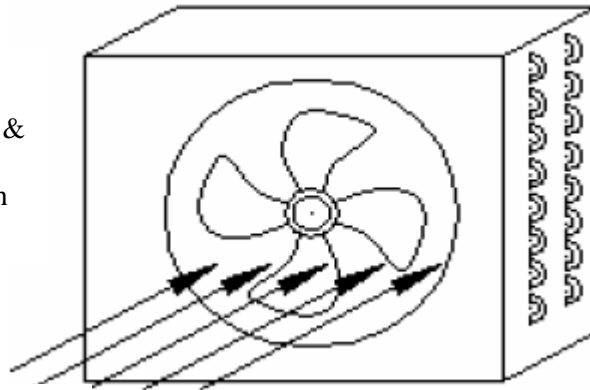
To avoid shock and serious personal injury, disconnect, tag and lock out power source then release all pressure from the system before attempting to install, service, relocate or perform ANY maintenance or troubleshooting.

### Air-cooled condenser

Ambient air should be free to flow across the refrigeration condenser for heat exchanging. Do not locate the dryer in direct sunlight. Air-cooled condenser should be cleaned with compressed air periodically.

### NOTICE

Periodically blow-out dirt & debris from condenser to prevent shut-down on high temp.



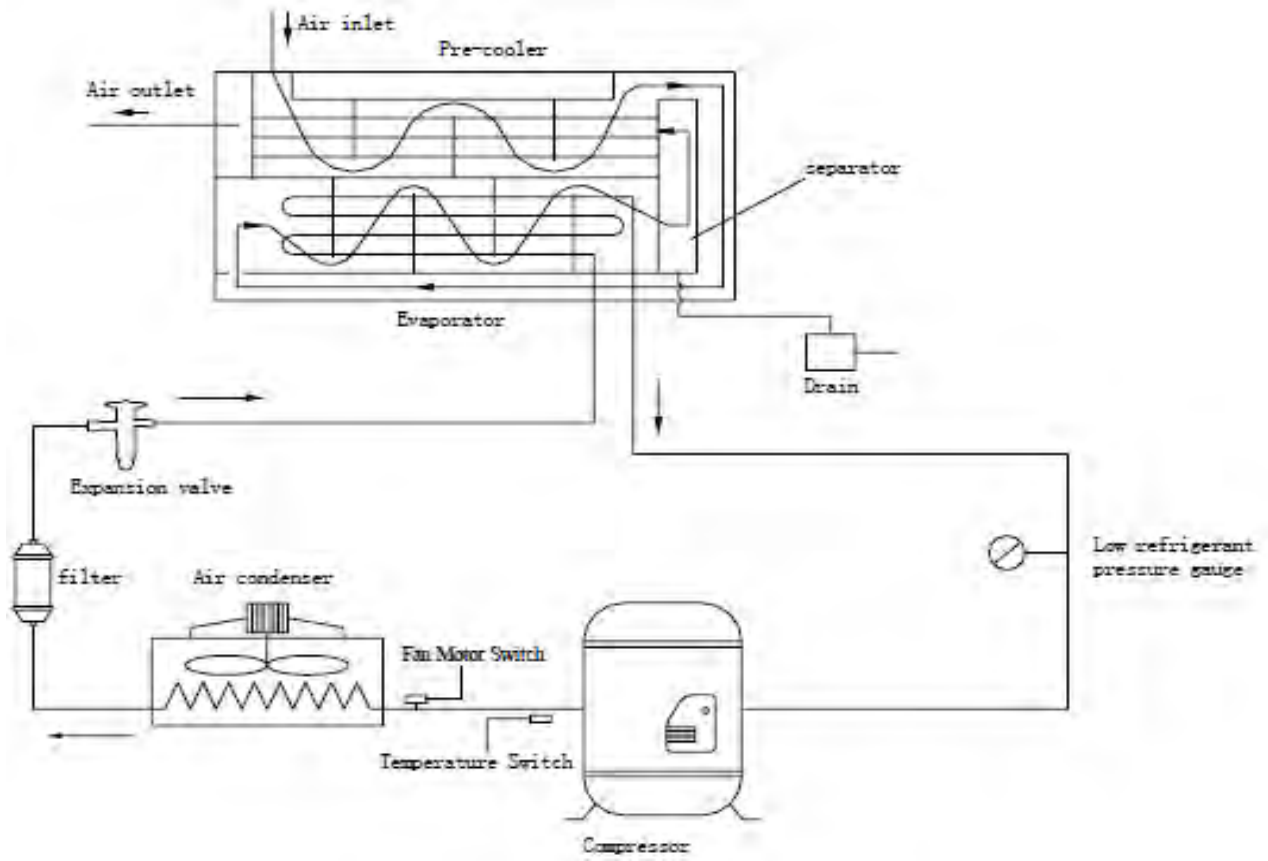
Compressed Air

### Resetting the Filter Alarm



Units with PLC control, have an automatic alarm when the filter needs changed. Once the filter is changed, the alarm needs reset by following these procedures:

- Crossover the terminals 1 & 27 on electrical panel.
- Push “P” button 3 seconds and enter the password as “10” to reach the service menu.
- Go to Time Parameters and Filter Change Time
- Push “up arrow” and “down arrow” buttons simultaneously to reset the timer

# FLOW SCHEMATIC



# TROUBLESHOOTING

Problem	Possible Cause	Repair	Comments
Dryer is switched on, indicator light is lit but the refrigerant compressor does not turn on.	3-phase dryers: The connection has inverted phases	Invert two phases	3-phase dryers are equipped with a phase controller to avoid the fans from turning in the opposite direction
	Refrigeration unit is not functioning	Check amount of refrigeration in compressor	Several factors can cause compressor failure. A qualified refrigeration technician needs to check all the electrical and refrigerant circuit and controls.
	The refrigerant high pressure protection has tripped	<p><b>1-phase dryer:</b> Units vary. Some 1 phase models are manual reset, some reset automatically. If unit is manual reset, wait 20 minutes for dryer to cool and then press the reset on the switch (check for switch in electrical panel on door)</p> <p><b>3-phase dryer:</b> Wait 20 minutes for dryer to cool and then press the reset on the switch (check for switch in electrical panel on door)</p>	<p>The dryer is protected against excessively high refrigerant pressure. If the condenser efficiency has been reduced, the switch will trip on 100 CFM units and under. See arrow in photo below.</p>  <p>For units over 100 CFM check the high pressure switch.</p> 
High ambient temperature	High ambient temperature	It is recommended that dryer is working in temperatures lower than 105°F (40°C)	A high ambient temperature may cause the refrigerant system to operate at higher than normal pressures, and results in higher than normal evaporator temperature.

## TROUBLESHOOTING

<b>Problem</b>	<b>Possible Cause</b>	<b>Repair</b>	<b>Comments</b>
Dryer is switched on, indicator light is lit but the refrigerant compressor does not turn on. (Continued)	Excessive temperature on crankcase of compressor. The hot gas bypass valve may be out of adjustment, faulty valve or low on refrigerant	Allow time for compressor to cool. Check hot gas bypass adjustment and amount of refrigerant. Then reset refrigerant high pressure switch. If system seems low on refrigerant, evacuate the refrigerant, weigh the refrigerant and add refrigerant as needed.	
	Clogged condenser fins or clogged water condenser.	Clean fins with compressed air or clean condenser of all obstructions.	The clogged fins in the condenser restrict the air passage and, causes high temperatures in the evaporator.
	Condenser fan not running	Check voltage to fan and check for faulty fan	Check & clean air condensers periodically.
	Possible loss of phase	Have a qualified electrician, or refrigeration contractor check phase & voltage	
	Possible low voltage causing overload trip	Have a qualified electrician or refrigeration contractor check the circuit	
	Possible failed compressor	Check & replace compressor if necessary	
	Too much compressed air flow.	Check actual flow through the dryer.	The dryer allows for a maximum air flow at design conditions. If too much compressed air goes into the dryer, system is overloaded, resulting in water carryover down-stream in the compressed air. Check the CFM rated output for the air compressor.
	Faulty electrical wiring	Have a qualified electrician or refrigeration contractor inspect the circuit	
	High amp draw has caused a relay or breaker to trip.	Reset the high amp protection.	Dryer is protected against high amp draw by an overload relay that can trip if circuit is overloaded. Reset, but if trips again, have an electrician or qualified refrigeration contractor check the circuit.
	Faulty high pressure switch	Replace switch	

# TROUBLESHOOTING



<b>Problem</b>	<b>Possible Cause</b>	<b>Repair</b>	<b>Comments</b>
Dryer not running. No Power	Power failure	Check power to unit	
	Faulty wiring, loose terminals	Request assistance from a qualified electrician or refrigeration contractor.	
	Magnetic contactor damage	Have contactor checked by a qualified electrician or refrigeration contractor & replace contactor if necessary	
Dryer-on light is lit but fan is not running.	Fan automatically runs if refrigerant high pressure reaches upper set point.	Check amount of refrigerant.	Fan operates automatically to keep refrigerant pressure below the high pressure switch setting. The fan can stop if pressure is under the recommended pressure setting.
		Check that fan blades are free to move.	
		Check fan pressure switch.	
	Excessive compressed air inlet temperature.	Check voltage to fan motor and faulty fan	The dryer should be working within designed specifications (see description in this manual). If conditions are exceeded, the dryer overworks, dew point goes up and protecting switches turn off.
Excessive vibration and mechanical noise.	Compressor is slugging (liquid refrigerant shock) at start- up.	Be sure to preheat the dryer at least 4 hours for dryers equipped with a crankcase heater.	Refrigerant may move between receivers when refrigerant compressor is stopped and not heated, especially if stopped for a long time. This migration may cause liquid shock (slugging) in valves especially on large dryers containing more refrigerant.
	Compressor sounds abnormal	Check compressor and replace if necessary	
	Noisy thermostatic expansion valve	Check refrigerant capacity and replace filter	
Evaporate pressure too low	Refrigerant leak	Repair leak and add refrigerant	
Evaporate pressure too high	Thermostatic expansion valve opened too much	Adjust thermostatic expansion valve to proper setting	
	Faulty thermostatic expansion valve	Replace thermostatic expansion valve	
Condense pressure too low	Fan motor switch not set properly	Set fan switch properly	

# TROUBLESHOOTING

<b>Problem</b>	<b>Possible Cause</b>	<b>Repair</b>	<b>Comments</b>
Condense pressure too high	High ambient temperature	Check minimum/maximum temperature ranges	
	Fan motor switch not set properly	Set fan switch properly	
	Air-cooled models – Dirty, clogged condenser fins, obstructed airflow across condenser	Clean condenser and check for good air flow	
	Too much refrigerant	Release excessive refrigerant	
	Air in refrigerated cycle system	Remove air in system	
	Faulty fan motor	Check voltage to motor	
Refrigeration system not functioning properly	Low inlet air pressure	Check dryer selection	
	High ambient temperature		
	High inlet air temperature from air compressor		
	High air flow		
	Air bypass valve open	Close air bypass valve	
	Drain Troubleshooting: a) Manual valve not open b) Drain clogged or damaged c) Drain line higher than drain condensate outlet	Open manual valve	
		Clean or replace drain	
Install condensate line properly			




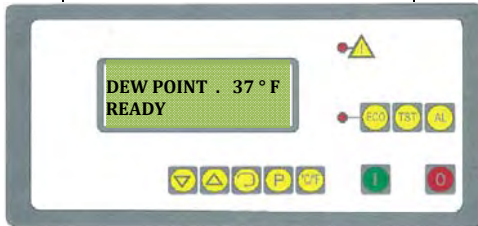
# TROUBLESHOOTING

Problem	Possible Cause	Repair	Comments
Water in system	Inlet and outlet connections are reversed. (compressed air)	Check inlet and outlet connections. 	This dryer is designed for air flow in one direction only. Inlet and outlet directions are identified on the dryer.
	Drain system is clogged or inoperative.	Free drain of obstructions, or repair drain, and make sure condensate water drains properly.	Drain system may be a timed solenoid valve, pneumatically assisted or zero loss condensate (float) drain. Adjust solenoid in accordance with operating conditions of your compressed air system.  Check & clean the solenoid valve strainer periodically.
	Bypass system is open	Check the valves	<b>Important:</b> Install bypass piping around the dryer so the dryer can be isolated for service without shutting down the air supply. During dryer operation, valves must be set so all air goes into the system.
	Excessive air flow	Check actual flow through the dryer.	The dryer allows for maximum air flow. If too much air is pumped into the dryer, water removal capacity may not be sufficient, resulting in water carry-over downstream in the compressed air system. Check the rated flow of the air compressor.

# TROUBLESHOOTING

<b>Problem</b>	<b>Possible Cause</b>	<b>Repair</b>	<b>Comments</b>
Water in system	Excessive moisture in compressed air	Check the separator and drain system and compressor after cooler ahead of the dryer.	In some systems moisture accumulates in the line ahead of the dryer. If this moisture is pumped into the dryer intermittently, the water removal capacity may not be sufficient. It's recommended that air from compressor is piped to air tank first. If plumbed directly to the dryer, install a water separator in the line before the dryer.
	Excessive compressed air inlet temperature.	Be sure that dryer is working lower than design conditions	The dryer works according to calculated design conditions. If the conditions are exceeded, the dryer will be overworked, dew point goes up and protecting devices may switch off.
	Clogged condenser fins	Clear fins of all obstructions	Clogged condenser fins restricts air flow and reduces refrigerant capacity, and increased refrigerant temperature, causing water downstream. Check & clean fins periodically.
	Shortage of refrigerant	Fix the leak and add a charge of refrigerant.	Loss of refrigerant causes improper functioning. Have a qualified, refrigeration specialist make the necessary repairs, or contact factory if unit is in warranty.
	Refrigeration system is not functioning	Check to be certain refrigerant compressor is running	Check compressor on-light and check compressor is running. The fan may be operating but not the compressor. Several factors causes a compressor not to run. Have a qualified refrigeration technician to check all refrigerant and electrical controls
	Excessive pressure dew point	Readjust refrigerant evaporating pressure	A label on the unit identifies the pressure adjustment valve. Some models that valve is not adjustable. On adjustable models, turn the adjustment screw counter-clockwise to decrease the refrigerant pressure and lower the dew point. Adjust valves in 1/4 turn increments to allow 15 minutes for pressure stabilization with air flowing. Be sure that gauge indicates that pressures stay in green zone.

# TROUBLESHOOTING

Problem	Possible Cause	Repair	Comments
High pressure drop	Excessive compressed air flow or too low air inlet pressure.	Check actual pressure and flow through the dryer. Install larger dryer, if needed	This dryer is designed for a maximum air flow. If too much air is pumped into the dryer, water removal capacity may not be sufficient, resulting in water carry-over downstream. Check the rated flow of the air compressor.  Frosting of the lines indicates the controls are set too low. The following should be done by an experienced refrigeration technician: Controls may be adjusted in the field by means of the hot gas bypass valve.
	Freeze up	Compressor room ambient is above 41°F(5°C). Fan switch failed in closed position keeping fan on.	
		Check status of Dew Point Gauge:  Units with PLC, check status of Dew Point on display :	
			
	Clogged heat exchanger	Heat exchanger needs cleaned and flushed	Dryers are to be used with compressed air free of any aggressive contaminants. Installing a coalescing filter on the inlet side is required for warranty and service. Changed a clogged filter, or contact a qualified, refrigeration specialist
	<ul style="list-style-type: none"> <li>• Pipeline too small diameter;</li> <li>• Pipeline too long;</li> <li>• Too many elbows</li> </ul>	Check piping and make adjustments as necessary	
	Inlet/Outlet valve not opened completely	Make sure valve is opened completely	
	Pipeline leak	Do a leak test and repair leak	

## TROUBLESHOOTING

<b>Problem</b>	<b>Possible Cause</b>	<b>Repair</b>	<b>Comments</b>
The unit stops running during operation or cycles off and on.	Excessive compressed air inlet temperature.	Design conditions and correction factors are described in this manual. Be sure that dryer is working in ambient temperatures below design conditions.	The dryer is designed for working into calculated design conditions, and if those conditions are exceeded, the dryer will be overworked, dew point goes up and protecting devices may trip.
	High ambient temperature	Designed conditions are described in dryer data plate. Be sure that dryer is working lower than design conditions.	A high ambient temperature may cause the refrigerant system to operate at higher than normal pressures, and results in a higher than normal evaporator temperature. <b>Important:</b> Adequate air circulation around the dryer, and proper ventilation in the equipment room should guarantee a low enough ambient temperature.
	Clogged condenser fins	Clear fins of all obstructions.	Clogged fins in the condenser restricts the air passage and reduces the refrigeration capacity, causing high temperatures in the evaporator. Check & clean fins periodically.
	Shortage of refrigerant	Fix the leak, if necessary and add a charge of refrigerant.	Loss of refrigerant causes improper functioning. Dryers are equipped with a temperature switch to regulate the amount of refrigerant to maintain proper cooling of the compressor. A shortage of refrigerant causes suction lines to become very hot, causing the temperature switch to trip. Have a qualified refrigeration technician make all the repairs or contact factory if unit is in warranty
Green start indicator light won't stay on when pressed and compressor won't start.	Shortage of refrigerant	Fix the leak, if necessary and add a charge of refrigerant.	

# WIRING DIAGRAMS

All units are shipped with the wiring diagrams inside the units. The smaller units, the diagrams are attached to the inside of pull-off panel on the side of the electrical components. The diagrams for the larger units are on the inside of the electrical control box, which has to be removed with a Phillips-head screwdriver.

