

START UP PROCEDURES

FOR GARDNER DENVER ROTARY SCREW COMPRESSORS

IMPORTANT!

These procedures cover the basic steps to follow, when starting up a Gardner Denver Rotary Screw Compressor. For full details and complete safety precautions, consult the operator's manual for the machine that you are starting up.

1. SERVICE MANUAL AND PARTS LIST	Have a copy – and be familiar with the operator's manual for the machine you are starting up.
2. START-UP CHECKLIST	Carefully fill out – the official Gardner Denver Start Up Check List/Warranty Registration Form.
3. OVERALL APPEARANCE	Examine the overall appearance – of the compressor. Check for damage that may have occurred during transit. Repair and report any damage or missing parts as soon as possible. Any transportation damage must be resolved with the carrier.
4. INSTALLATION	Is the unit serviceable? – The compressor should be installed in a clean, well lighted area, with ample space for air circulation, maintenance and repairs. Is there adequate space? – for an overhead hoist or tow motor to properly operate? Is there space to remove the air end or motor if needed?
5. FOUNDATION	A smooth, solid surface – is needed. It must be able to support the weight of the compressor. The floor should make 100% contact with the rails of the base of the compressor.
6. FASTENERS	Check bolts – for tightness.
7. PIPING	Visually inspect – piping. No weight should be bearing on the unit. Piping should run down and away from the compressor, to drain condensate. If inlet piping is used – thoroughly clean and shot blast welded lines. Coat internally, by galvanizing or painting with moisture and oil proof sealing lacquer (PVC may be used). For proper inlet size – refer to the operator's manual.
8. PRESSURE RELIEF VALVE	Must be installed – anywhere in front of piping that can be obstructed or closed. Also, on the receiver – and before any aftercooler or dryer. Sizing – Make sure it is sized correctly.
9. MOTOR NAMEPLATE	Write down – the motor manufacturer, serial number, horsepower, voltage, service factor and nameplate amps.
10. STARTER NAMEPLATE	Record – starter manufacturer, starter size and heater size.
11a. ON COUPLED UNITS	Check the spacing – between the coupling halves. Needs to be between 1/8" and 5/32".
11b. ON BELT DRIVEN UNITS	Check the drive alignment & belt tension. Sheaves should align straight across the front with a straight edge or string. To check tension, use a spring scale. Apply a perpendicular force to each belt at the midpoint of the span. Acceptable deflection readings are in the manual.
12. ROLL THE AIR END	Over by hand – check for tight spots or drag on the motor air end. CAUTION: Turn in the direction of the arrow stamped on the housing.
13. AIR FILTER	Disassemble air filter – to make sure all parts are present. If remote filter is used – make sure ambient conditions are clean and acceptable and that there is access for servicing. Orifice may be needed, with units that have Auto Sentry S controller.

14. POUR OIL IN THE INLET (Oil flooded units)	With air filter removed – pour oil, drained from the unit into the inlet opening. Make sure brass inlet valve is in the open position. Do not pour oil down the inlet of an oil free Twistair, since it is water injected!
15. CHECK OIL ON OIL FLOODED UNITS ON WATER INJECTED UNITS	<p>Recommended Lubricant – is clearly marked on the decals on the separator. There is also a decal with fill instructions and information on when to check the oil level.</p> <p>DO NOT OVERFILL.</p> <p>Never mix lubricants.</p> <p>Remote coolers – will require more oil to fill the lines. Consult the factory.</p> <p>Oil breather cap – must be installed on start up.</p>
16. ROLL THE AIR END	Over by hand, again – to pre-lube the compressor.
17. CHECK WIRING	<p>Compare the wiring diagram – to the wiring on the machine. Trace wiring numbers and verify that the unit is wired correctly.</p> <p>Check for loose wires.</p>
18. RECORD VOLTAGE	Check and record line voltage – making sure all three legs are checked.
19. GROUNDING	The unit must be grounded – in accordance with Table 250-95 of the National Electrical Code.
20. JOG THE MOTOR	<p>To check for correct rotation – as indicated by the arrow on the unit.</p> <p>To change rotation – interchange any two incoming wire leads.</p> <p>WARNING! Do not interchange the wrong motor leads or you will damage the motor.</p>
21a. FAN ROTATION AIR COOLED UNITS	Fan should blow through – the cooler.
21b. FAN ROTATION WATER COOLED UNITS	<p>On Oil flooded units – the air is drawn into the unit at the top of the enclosure and is exhausted out the motor side.</p> <p>On Oil-free units – the fan exhausts the air out of the cabinet.</p> <p>A water shutoff valve – should be installed. See the manual for proper installation instructions. Valve should open when compressor runs, and close when compressor stops.</p>
22. START THE COMPRESSOR	With service valve closed – start the unit by pushing one of the operation mode buttons.
23. RUN THE UNIT	<p>For about one minute – then open the service valve.</p> <p>When operating temperature – is reached, check to see if proper pressure is being achieved.</p>
24a. SETTING PRESSURE WITH S CONTROLLER	<p>By adjusting the subtractive pilot:</p> <ol style="list-style-type: none"> 1. Turn the unit off. 2. Loosen locknut on the pilot. 3. Back out the adjusting screw several turns, so the subtractive pilot fully unloads the compressor before the unload pressure set point of the microprocessor is reached. 4. Close the service valve. 5. Start the unit in constant run. 6. Allow the subtractive pilot to fully unload the compressor. 7. Turn in the adjusting screw until the unload set point is reached and the microprocessor controller allows the unit to blow down. 8. Turn the adjusting screw an additional 1/8 turn and tighten locknut. 9. Using the service valve, cycle the unit between load & unload several times to be sure unit blows down when it reaches unload pressure setpoint.

24b. SETTING PRESSURE WITH ES CONTROLLER	Program the set pressure at nameplate and no higher.
25a. CHECK AUTOMATIC START/ STOP FUNCTION WITH S CONTROLLER	<ol style="list-style-type: none"> 1. Start the unit in the automatic mode. 2. Close the service valve and allow the unit to unload. 3. Unit will shut down in 10 minutes, provided unit does not reload.
25b. CHECK AUTOMATIC START/ STOP FUNCTION WITH ES CONTROLLER	<ol style="list-style-type: none"> 1. Start the unit in the automatic mode. 2. Close the service valve and allow the unit to unload. 3. Unit will shut down as programmed (between 5 and 30 minutes) but only after the compressor has blow down, and is timed out.
26. CHECK SAFETY FEATURES	<p>High temperature shutdown – can be checked on units with auto sentry ES controllers by lowering the High Temp value. When the compressor reaches this temperature and shuts down, you know the shutdown device is working.</p> <p>Manually trip fan and motor overloads – The display should show a shut down and prevent unit from starting. To start unit, reset the overloads and controller and push an operation mode button.</p>
27. MINIMUM PRESSURE VALVE	<p>Must maintain 65 psig – minimum pressure. On units with adjustable minimum pressure valves:</p> <ol style="list-style-type: none"> 1. Loosen the locknut on the adjusting screw. 2. Turn the adjusting screw in to increase, and out to decrease the pressure.
28. CHECK WATER TEMPERATURE (WATER COOLED UNITS)	<p>Incoming water – should be between 60–90°F.</p>
WATER INJECTED UNITS	<p>Discharge water – must not exceed 110°F.</p> <p>Recirculating water – Must meet EPA standards for drinking water, and be within hardness limits, as stated in the manual.</p> <p>The minimum pressure – for injection water supply is 30 psig.</p>
29. CHECK OIL TEMPERATURE	<p>Minimum inlet oil temperature – See the Operator's Manual for the minimum inlet temperature for your compressor.</p>
30. SET PRESSURE REGULATOR ON UNITS WITH ES CONTROLLER	<p>Set pressure regulator – between 25–30 psig.</p>
31a. MEASURE PRESSURE DIFFERENTIAL WITH S CONTROLLERS (Oil Flooded Units)	<p>Follow these steps:</p> <ol style="list-style-type: none"> 1. Make sure the unit is at full load. 2. Press the operation mode that the unit is currently running in. 3. The alternate reading will appear in the pressure display, indicated by a decimal point in the lower right hand corner. This is pressure measured before the separator. 4. Subtract the discharge pressure reading from this alternate reading (separator reading) to get the Delta P. (Pressure Differential).
(Oil-free Units)	<p>There is no separator element – in the oil-free units. Instead, the pressure differential is measured across the recirculating water filter. The change water filter light will flash as advisory at 30 psid, with the unit shutting down at 40 psid.</p>
31b. MEASURE PRESSURE DIFFERENTIAL WITH ES CONTROLLERS	<p>Follow these steps –</p> <ol style="list-style-type: none"> 1. Make sure the unit is at full load. 2. Simply push either arrow key until the separator differential pressure appears in the display.

**32. RUN UNIT, FULL LOAD,
FOR ½ HOUR**

Then record - - Discharge pressure.

Discharge air temperature.

Amperage on the three legs going into the overloads.

Compare this amperage to what full load amps should be.

To determine full load amps – use this formula:

$$\text{Full Load Amps} = \frac{\text{BHP}}{\text{Motor Nameplate HP}} \times \text{Nameplate Amps}$$

NOTE: Brake HP can be found in an Engineering Data sheet or in the sales literature.

Record phase to phase voltage – by measuring all 3 legs.

33. CHECK UNLOADED AMPERAGE

With the compressor unloaded – check unloaded amperage.

**34. DESCRIBE OPERATING
ENVIRONMENT**

Record ambient conditions – Is the room clean? What is the ambient temperature?

Record everything around the compressor and quality of the incoming air.

**35. LEAKS
LEAKS (Oil-free Units)**

Make sure the unit is leak free – check all connections for tightness.

Floating carbon rings – are designed to allow some leakage, which is captured by a tray and piped to drain out.

**36. REVIEW OPERATING PROCEDURES
AND MAINTENANCE**

With the operator –make sure to cover

1. Starting and stopping procedures.

2. How to program the controller.

3. Safety precautions.

4. Basic Maintenance procedures, emphasizing that daily maintenance is based on 8 hours of operation not 24.

5. Review each section of the manual, emphasizing the need to sit down, read and become familiar with the manual.

37. LEAVE A SET OF MANUALS

In the control cabinet.

38. DISCUSS WITH THE OWNER

Or the owner's representative – any discrepancies that you have noticed when performing the start up.

39. OBTAIN A SIGNATURE

From the owner – or owner's representative. The signature should be written at the bottom of the Start Up Checklist/Warranty Registration form.

29. MAIL FORM

To the factory—A start up is not complete until the form has been completed and mailed to the factory service department.
