



# RS Series

## OIL-INJECTED ROTARY SCREW COMPRESSORS

### OPERATOR MANUAL

RS-50D	RS-60	RS-75
RS-100	RS-125	RS-150
RS-200	RS-250	RS-300



### **WARNING**

Personal injury and/or equipment damage will result by failing to pay attention to the vital safety information and instructions in this manual. Carefully read, understand, and retain all safety information and instructions before operating this compressor.

# FOREWORD

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The Curtis-Toledo R/SD Series compressor unit utilizes a single stage rotary screw air end, direct driven by an electric motor. The package includes the oil injected compressor (air end), motor, motor controls, air intake system, air/oil separator, cooling system and compressor instrumentation.

Curtis-Toledo designs the R/SD Series compressors for indoor installation. They are available with or without an enclosure.

This manual is written to aid the user in the installation, maintenance and daily operation of your compressor. We urge you to read and follow these instructions for the safe and economical operation of this unit.

Electricity and compressed air have the potential to cause severe personal injury and or property damage. Before installing, wiring, starting, operating or making any adjustments identify the components of the air compressor using this manual as a guide.

Qualified personnel adequately equipped with the proper tools should perform maintenance. Follow the maintenance schedules as outlined in this manual to insure problem free operation after initial start-up.

The operator should use common sense and good working practices while operating and maintaining this unit.

Safety instructions in this manual are bold-faced for emphasis. The signal words **DANGER**, **WARNING**, **CAUTION** and **NOTICE** are used to indicate hazard seriousness levels as follows:



## **DANGER**

**Danger is used to indicate the presence of a hazard that will cause severe personal injury or death and /or substantial property damage.**



## **WARNING**

**Warning is used to indicate the presence of a hazard that can cause severe personal injury and /or substantial property damage.**



## **CAUTION**

**Caution is used to indicate the presence of a hazard that can cause personal injury and/or property damage.**

## **NOTICE**

**Notice is used to inform the user of installation, operation or maintenance information that is important but not of a hazardous nature.**

## ENGINEERING DATA

MODEL	R/SD 50	R/SD 60	R/SD 75	R/SD 100	R/SD 125	R/SD 150	R/SD 200	R/SD 250	R/SD 300
OIL (GAL.) CAPACITY	8	15	15	15	25	25	40	50	50
AIR (IN.) CONNECTION	1 ½	1 ½	2	2	2	2	2 ½	3	3
OIL G.P.M.	20	25	28	32	46	50	55	65	90
MOTOR RPM	1750	3500	1450	3500	1750	1750	1750*	1750	1750
BTU/M OIL COOLER	2000	2100	2900	3850	4900	5860	7500	9400	11250
BTU/M AFTERCOOLER	300	400	550	750	915	1100	1500	1850	2200
COOLING FAN CFM	8000	9500	12500	16000	18000	22500	22500	28000	28000
MOTOR STARTS/HR MAX	6	5	5	4	3	3	3	2	2

**SUBJECT TO CHANGE WITHOUT NOTICE**

**\*MOTOR RPM 3500 ON NON-GEARED MODEL**

## STANDARD EQUIPMENT

1. Dry Type Inlet Filter / Silencer	13. Separate Fan Motor and Starter on Air cooled
2. Oil Filter	14. Hour meter
3. Motor / Compressor Drive Coupling	15. High Temperature Shut Down Switch with Light
4. Drive Guard	16. Oil Level Sight Glass
5. Multi Stage Oil Separator Unit	17. Start – Stop Push Buttons
6. ODP Motor, 60 Hz, 1.15 SF	18. Modulating Control
7. Safety Valve	19. Water Temperature Control Valve and on Water Cooled Units
8. Pressure Gauge	20. Minimum Pressure Valve
9. Temperature Gauge	21. Factory Fill Lubricants
10. Oil Cooler	22. Thermostatic Oil Valve
11. Nema 1 Control	23. Low Unloaded H.P. Blow Down System
12. 115 Volt Control Transformer	24. Steel Base with Isolated Motor / Compressor Base

## REPAIR PARTS ORDERING

When ordering repair parts specify compressor model and serial number (see the nameplate located on the control panel and note in the space provided below).

Consult the appropriate parts list specific to your compressor. This parts list was packed with your compressor when it was shipped from the factory.

Contact your local Curtis – Toledo authorized dealer who can supply you with the correct genuine Curtis replacement part.

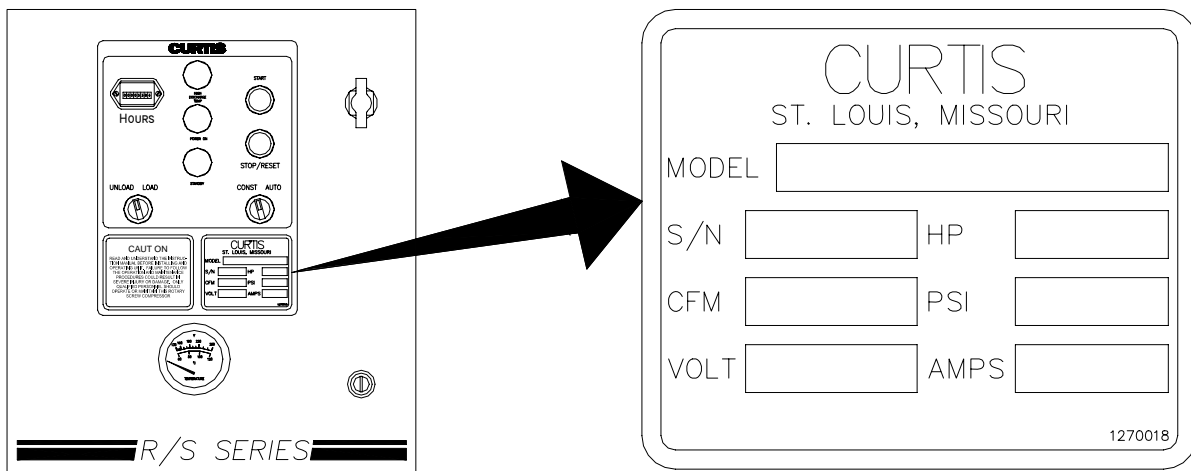
Your authorized local distributor can supply you with the following services:

- Factory warranty service.
- A full line of **CurtisLubePlus** factory tested compressor lubricants specifically formulated for use in Curtis compressors.
- Repair and maintenance kits with the necessary parts to get your compressor up and running with a minimum of down time.

For the name of your local Curtis distributor contact:

**Curtis – Toledo Inc.**  
**1905 Kienlen Ave.**  
**St. Louis, Missouri 63133**  
**Phone: 314-383-1300**  
**Fax: 314 381 1439**  
**E-mail: [info@curtistoledo.com](mailto:info@curtistoledo.com)**

**Note your model and serial number here for reference when ordering parts or calling for service:**



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# SECTION 1

## GENERAL SAFETY

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As with any piece of rotating equipment common sense safety precautions should be used in the operation of this rotary screw air compressor. Carelessness can be very hazardous to personnel.

In addition to the obvious safety rules we recommend additional safety precautions as listed below. Please read and follow these precautions for the safe day-to-day operation of your compressor.

1. Read and understand all the instructions found in this manual before operating this compressor.
2. Disconnect the main power source before working on or performing any maintenance procedures on this unit.
3. Do not attempt to remove any parts, break any connection, loosen oil fill plug or drain plug until the unit has been shut down and air pressure has been relieved.
4. Do not operate the compressor in excess of its rated pressures and speeds indicated on the compressor nameplate,
5. Do not remove guards, shields, or screens while the compressor is in operation. If removed for maintenance replace before resuming operation.
6. Observe the delivery pressure gauge daily to be sure the automatic control system is operating within proper limits.
7. Periodically check all safety and relief devices for proper operation.
8. Do not play with compressed air. Pressurized air can cause serious injury to personnel.
9. Be sure that no tools, rags or loose parts are left on the compressor or drive parts.
10. Do not use flammable solvents for cleaning parts.
11. Exercise cleanliness during maintenance and when making repairs. Keep dirt away from parts and exposed openings by covering with clean cloth or Kraft paper.
12. Do not install a shut-off valve in the discharge line without installing a pressure relief valve between the shut-off and the compressor package.
13. Do not operate the compressor in areas where there is a possibility of ingesting flammable or toxic gases.
14. Never disconnect (or jump) the air discharge temperature switch and attempt to operate the compressor.
15. Know what mode of operation the compressor is in before working around the unit. The power may be on but the machine not running if it is in the auto restart mode.

Make sure to investigate the local code requirements in your area to ensure compliance prior to installing the compressor.

**The owner, lessor or operator of this compressor is hereby notified and forewarned that failure to observe these safety precautions may result in injury and/or property damage.**

Curtis-Toledo does not mean to imply that the pre-

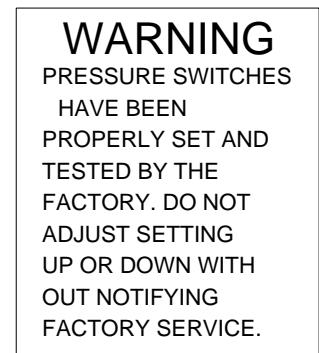
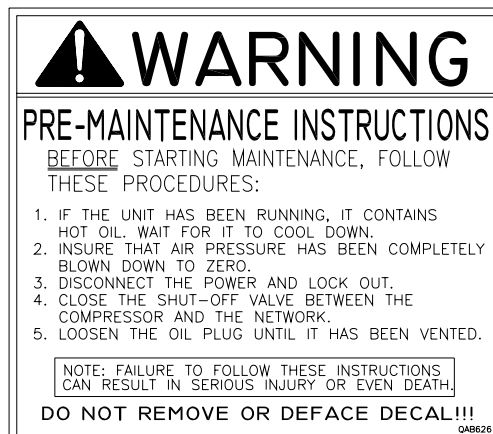
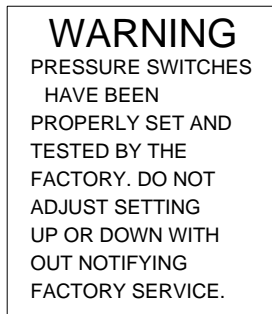
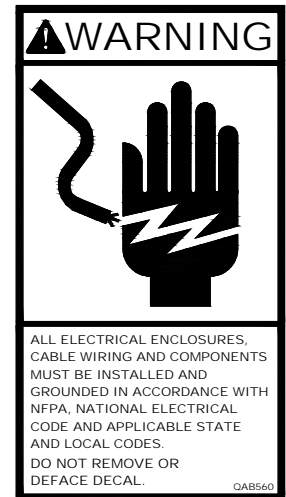
ceding list of safety precautions is all-inclusive or that the observance of this list will prevent all injury or property damage.

Curtis-Toledo expressly disclaims responsibility or liability for any injury or property damage caused by failure to follow these specified precautions or by failure to exercise ordinary caution and due care required in operating or handling this equipment even though not expressly specified.

**SAFETY DECALS**

Your compressor is posted with several safety decals to inform the user of hazards associated with its operation. These decals are positioned

where the hazard is most prevalent on the compressor. The decals used are shown below.




**WARNING**



UNIT CAN AUTOMATICALLY RESTART.  
CAN CAUSE PERSONAL INJURY  
DISCONNECT ALL POWER SUPPLIES TO ALL COMPONENTS BEFORE OPENING ENCLOSURE OR SERVICING.  
DO NOT REMOVE OR DEFACE DECAL.

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**CAUTION**



FAILURE TO FOLLOW THE OPERATING AND MAINTENANCE PROCEDURES OF THE INSTRUCTION MANUAL COULD RESULT IN INJURY OR DAMAGE.

- FOLLOW REQUIRED PROCEDURES AND INTERVALS FOR MAINTENANCE.
- MAINTENANCE SHOULD BE PERFORMED BY QUALIFIED PERSONNEL.
- RELIEVE PRESSURE AND SECURE TO PREVENT COMPRESSOR ROTATION BEFORE SERVICING.
- USE CORRECT TOOLS/SPECIFIED TORQUES.
- USE ONLY APPROVED REPLACEMENT PARTS.

DO NOT REMOVE OR DEFACE DECAL.

QAB558

**CAUTION**

**OIL CHANGE INTERVAL**

Recommended oil change intervals are based on oil temperature. The following table indicates how oil life is affected by temperature:

Discharge Temperature	RS8000 Change Interval
Up to 180° F	8000 Hrs.
180 to 190° F	6000 Hrs.
190 to 200° F	4000 Hrs.
200 to 210° F	2000 Hrs.

Sustained operation above 210° F could cause varnishing and damage to the compressor.

In addition, high humidity and unclean operating conditions require more frequent oil changes. Appearance of the oil must be examined periodically and oil change intervals adjusted by the user.

Oil must be changed a minimum of once a year or more often as indicated above in order to maintain warranty coverage. It is highly recommended to use Curtis RS8000 Oil which has been specially formulated for use with this compressor

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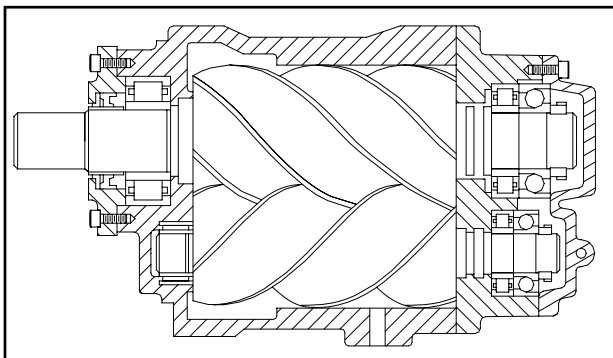


## SECTION 2

### GENERAL DESCRIPTION

#### COMPRESSOR

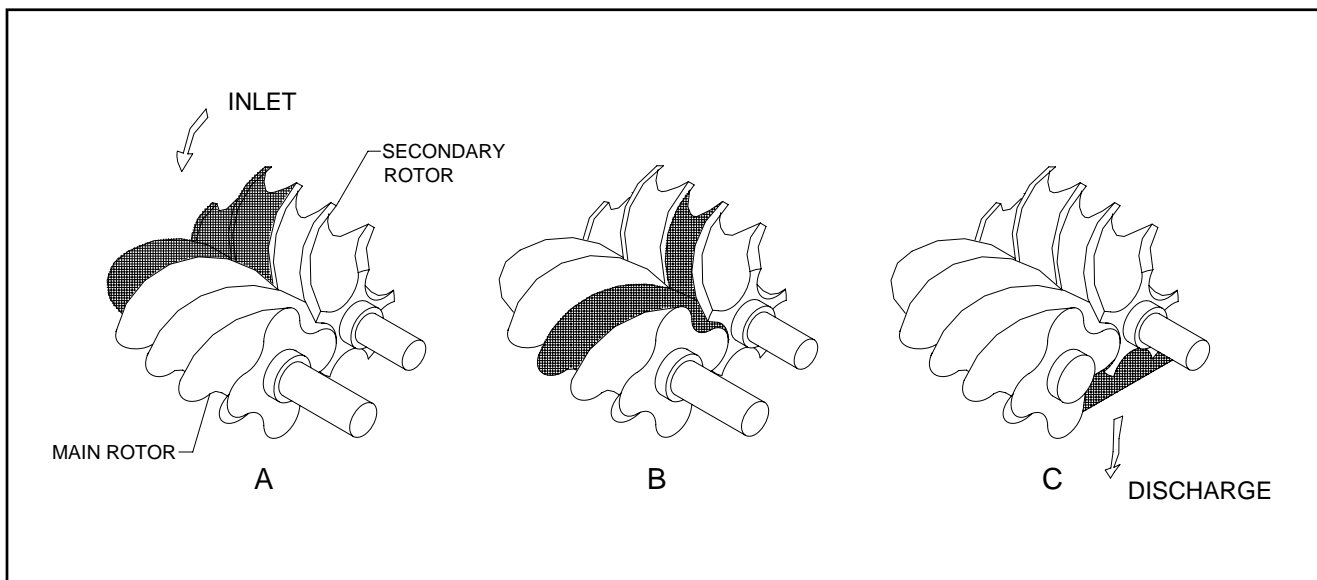
The compressor assembly is an oil flooded, positive displacement, single stage, helical screw type unit consisting of two rotors or screws supported axially by roller bearings and enclosed in a housing or stator as depicted in the sectional view Figure 2-1.



**Figure 2-1**  
Compressor Assembly

In operation as depicted below in the compression cycle (Ref. Figure 2-2), air entering the compressor through the inlet port becomes trapped between the helical lobes of the main rotor and the matching grooves of the secondary rotor (A). As the rotors turn air is trapped in the cavity created by the mashing lobe and groove and reduced in volume or "compressed". It is then pushed through the successive cavities (B) until it reaches the discharge end of the compressor (C) and is sent to the oil separator.

During the compressor cycle, oil is injected into the compressor for the purpose of dissipating the heat of compression and to seal the internal clearances. The compressed air laden with oil leaves the compressor through the discharge port and enters a reservoir where the oil and air are separated. This process delivers a smooth flow of compressed air at the desired pressure.



**Figure 2-2**  
Compression Cycle

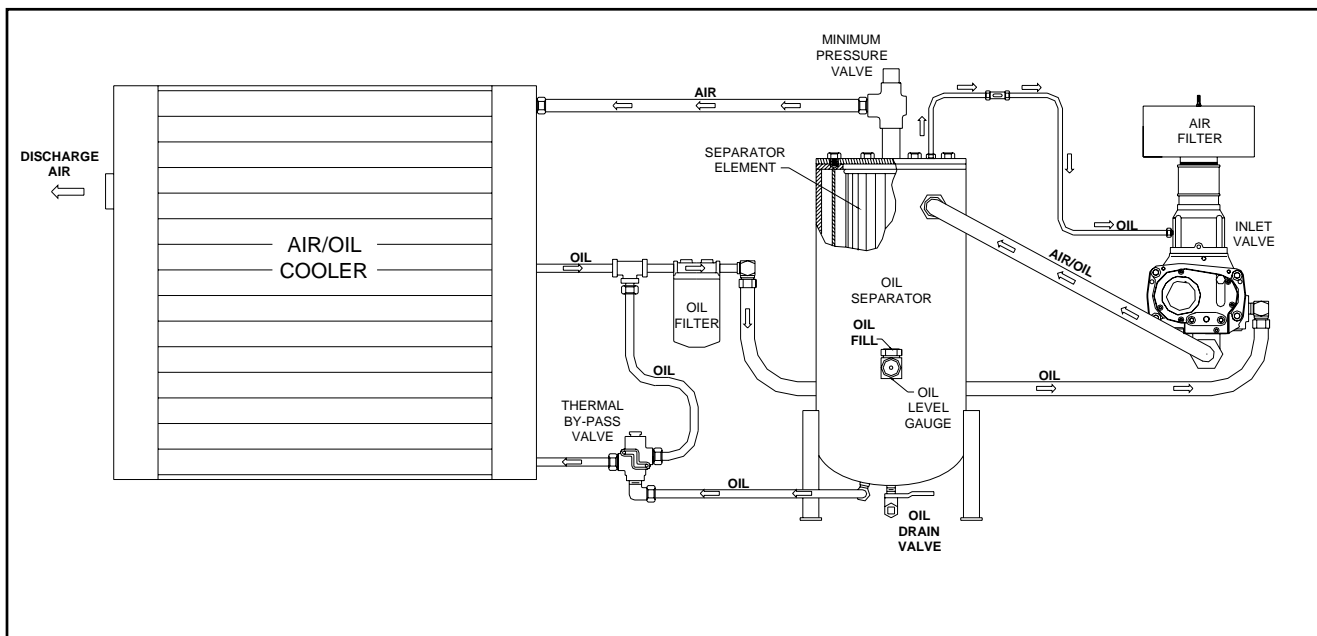
## AIR/OIL FLOW

Air enters the compressor through the air filter and air inlet valve where it is mixed with oil. After compression the air/oil mixture is discharged into the oil separator where its velocity is reduced causing most of the oil to drop to the bottom. The remaining oil is removed as the air passes through the separator element. Oil collected at the bottom of the separator element is returned to the inlet of the compressor through the scavenger line that is equipped with a sight glass for monitoring the flow of oil to determine when separator replacement is necessary. The coalesced air then passes through the minimum pressure valve set to maintain a minimum of 70 PSI in the oil separator to ensure a sufficient flow of oil to the compressor. The compressed air then enters the aftercooler where it is

cooled and discharged to its point of usage.

A sufficient amount of oil is stored in the oil separator tank and is forced by the pressure of compression from the sump to the thermal by-pass valve, which regulates its flow into the oil cooler depending on the temperature of the oil. The thermal valve will open when the oil reaches a predetermined temperature allowing the hot oil to enter the cooler. Oil, which has not reached this temperature setting, will by-pass the cooler.

The oil is then filtered and sent to the compressor to initiate the compression cycle. The oil also serves as lubrication for the compressor bearings.



**Figure 2-3**  
**Air/Oil Flow**

## SECTION 3

### INSTALLATION

#### GENERAL

Upon receipt of your compressor inspect for freight damage. Report any damage as soon as possible. See "FREIGHT DAMAGE PROCEDURES" at the end of this section.

We recommend that the compressor remain on its shipping skid until it reaches the final installation site.

The base of the compressor is equipped with lifting notches for forklift removal from the shipping skid. If a crane is used to lift the compressor we recommend the use of a spreader bar and chains.

#### CAUTION

**Lift the compressor unit by the base plate only. Do not attempt to lift the unit using such places as the motor, compressor or discharge piping as lifting points.**

#### DANGER

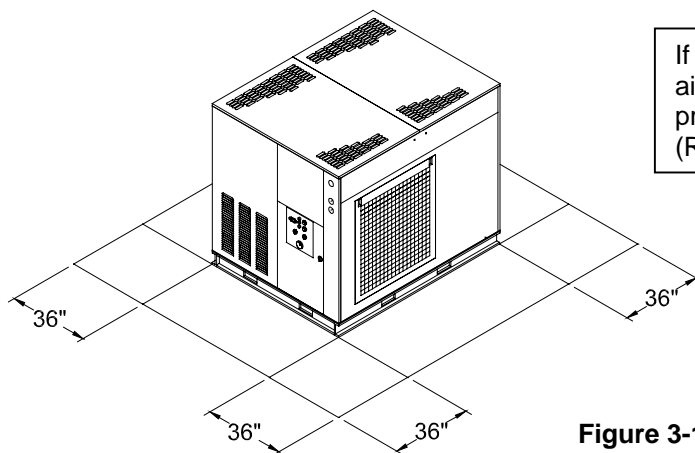
**The eyebolts provided on the motor are for lifting the motor only and should not be used to lift any additional weight.**

#### LOCATION & FOUNDATION

Careful planning is required prior to the installation of the compressor unit. Choosing an improper installation location may cause unnecessary trouble or damage to the operation of the compressor resulting in poor performance and low quality of compressed air.

Your Curtis Rotary Screw compressor unit does not require a special foundation to operate. However, it is necessary that the floor be level and that the base of the unit be adequately supported. Consult the "SPECIFICATIONS" section of this manual for the weight and dimensions of your model. We also recommend the compressor be bolted to the floor.

Allow at least three (3) feet clearance on all sides of the compressor to facilitate maintenance and allow for free circulation of air. The unit should be located in a clean, well-lighted area with low relative humidity. The environment temperature should not exceed 105°F. The reason for this is that the higher the temperature the smaller the output of air the compressor is capable of producing. (Reference Figure 3-1)



If the compressor is installed in an airtight room, it is necessary to provide plenum exhaust ventilation. (Reference Figure 3-2)

**Figure 3-1**  
**Compressor Location**

**OUTDOOR INSTALLATION** – The standard R/S Series was designed for indoor installation only. Installation in an outdoor, unsheltered area should be avoided. The unit must be protected against rain, snow and freezing temperatures. If outdoor installation is unavoidable contact the factory for modifications. Failure to obtain factory approval will void the warranty.

Any unsheltered installation must have at least the following modifications

- NEMA 4 controls
- TEFC motors
- Weather resistant cabinet
- Freeze protection (if applicable, see “COLD WEATHER OPERATION”

**COLD WEATHER OPERATION** – The unit should be installed inside a shelter heated to temperatures above freezing (32°F) If installation must be in an unheated area the following conditions must be met to keep the compressor warranty intact:

1. All control lines and drain lines must be heated to avoid freezing.
2. The oil separator must be heated to maintain viscosity during idle periods.
3. CURTIS LUBE PLUS RS-8000 synthetic oil must be used.

Low temperature kits are available through the factory. Contact your local Curtis compressor distributor for details.

**INLET AIR**

A clean air supply is required for the satisfactory operation of your compressor.

<b>⚠ DANGER</b>
<b>Inlet air must not contain any flammable or toxic gases. These gases will be concentrated by the compressor and could result in property damage, personal injury or death.</b>

The inlet air filter supplied with the compressor is of sufficient size and design to meet all normal operating conditions.

<b>⚠ WARNING</b>
<b>Inlet air containing reactive gases will cause failure of the lubricant and compressor. Insure an air supply that is well clear of any reactive gases.</b>

If it is necessary for inlet air to be taken from an outside source, the piping should be at least the diameter of the air filter inlet. If the distance is over twenty (20) feet the diameter needs to be enlarged to reduce restriction. The piping must be corrosion resistant and cleaned thoroughly after fabrication. The inlet must be protected to prevent rainwater and small animals from entering the inlet piping.

**COOLING SYSTEM (Air Cooled Units)**

Your compressor is equipped with an air/oil cooler. On air-cooled units the cooling fan is of sufficient size to provide adequate cooling of the compressed air and the compression oil passing through this cooler. We recommend a thorough cleaning of the cooler fins periodically by vacuum or compressed air to insure a restriction free flow of air from the cooling fan through the oil/air cooler. Refer to Figure 3-2 for minimum airflow through the unit.

<b>⚠ CAUTION</b>
<b>Inadequate airflow will cause the compressor to run hot which can cause damage to the compressor and increase oil carryover.</b>

<b>Minimum Air Flow</b>		
<b>Model</b>	<b>CFM</b>	<b>M<sup>3</sup>/Min</b>
50AD	11,600	328
50D	11,600	328
60D	11,700	331
75D	14,400	408
100D	18,800	532
125D	28,600	810
150D	28,800	816
200D	31,000	878
250D	35,200	997
300D	35,300	1,000

**Figure 3-2  
Air Flow Rates**

**WATER COOLED UNITS**

The cooling water supply should be checked to make sure the flow is sufficient. The chart shown in FIGURE 3-3 lists approximate minimum water flow rates in U.S. gallons per minute at various temperatures into the heat exchanger(s). The water flow rate shown will cool the compressor oil to approximately 140° F. The compressor operating temperature should be maintained at 160° F to 180° F under most conditions. The water outlet temperature from the heat exchanger will be

approximately 110° F, which is the maximum recommended to prevent heat exchanger tube fouling and corrosion. Higher than listed water flow rates will decrease the water outlet temperature.

HP	Inlet Water Temperature			
	60°F	70°F	80°F	90°F
50	5.5	6.5	8.5	13.0
60	7.0	8.5	11.5	16.5
75	7.8	10.0	13.0	19.0
100	11.0	13.5	17.5	26.0
125	14.0	18.0	23.5	35.5
150	17.0	21.0	28.0	41.5
200	24.0	30.0	40.0	59.0
250	32.0	38.0	48.0	67.0
300	40.0	47.0	58.0	81.0

**FIGURE 3.3**  
**Water Flow Rates (U.S. gal/min)**

The size of the incoming water supply piping should be at least equal to the connections provided with the compressor

**⚠ WARNING**

**Water-cooled units must not be exposed to freezing temperatures below 40°F., 4.4°C.**

### ELECTICAL CONNECTIONS

All internal wiring has been done at the factory. Wiring of the power supply to the compressor should be done by a qualified electrician to comply with the National Electric Code, state code, and any local codes in accordance with the wiring diagram specific to your compressor model shown in the "SPECIFICATIONS" section of this manual.

**⚠ DANGER**

**Electrical shock can cause severe injury or death. Disconnect all power supplies, lockout and tag before working on unit.**

The power supply should be adequate and free of parasitic loads that will cause an under voltage condition during compressor operation.

The power source should be connected through a fusible disconnect and properly grounded in accordance with the National Electric Code and any other applicable codes.

**⚠ WARNING**

**Failure to properly ground the compressor unit could result in controller malfunction.**

We recommend the use of a fusible disconnect for isolating the unit. The fuse should be sized per article MEC1430.52. Consult the Code if using another style of branch circuit protection.

### COMPRESSOR ROTATION

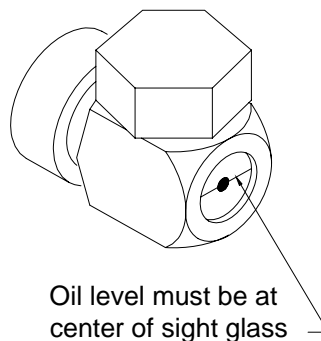
After the electrical wiring has been properly connected check for proper rotation by momentarily starting and stopping the motor. A directional arrow is affixed to the compressor drive end.

**⚠ WARNING**

**Reverse rotation will cause air end damage. Never allow the compressor to run in reverse rotation as property damage or personal injury may occur.**

### OIL LEVEL CHECK

Your compressor was shipped from the factory charged with the correct amount of compressor oil. However, the oil level must be checked at installation and again prior to start-up. The combination oil fill and sight glass is located on the side of the separator tank. The oil level should be at the center of the mark when the unit is off. (See FIGURE 3-4)



Oil level must be at center of sight glass

**FIGURE 3-4**  
**Oil Fill – Sight Glass**

## STORAGE

In some cases it may be necessary to store the compressor for extended periods of several months before putting it into service. When this is required observe the following recommendations.

1. Cover and seal all machine openings to prevent the entrance of water and dirt.
2. Cover all openings in open drip proof motors.
3. If the storage conditions are below freezing, drain the aftercooler, traps, water-cooled heat exchangers and attendant piping. We do not recommend outside storage.
4. Cover with a waterproof tarpaulin that can easily be removed for in storage maintenance.
5. While in storage, rotate the compressor and motor by hand every thirty to sixty days to prevent flat spots on the bearings that will lead to premature failure.

At the end of the storage period follow the uncrating and start-up procedures. If the unit has been stored for more than eighteen months contact the factory before starting the compressor

6. Curtis-Toledo will accept the shipment back, repair the damage (under normal conditions) and return the unit within (7) working days.
7. We will invoice the customer for the repair, which will then become part of your claim. The invoice must be presented to the trucking company claim department along with their completed claim form.

If the damage can be repaired at the receiving point follow procedure steps 1 through 4a. Repair the unit and present a detailed invoice to the trucking company showing labor hours, labor rate, materials used and cost of the materials.

## FREIGHT DAMAGE PROCEDURES

1. The customer, at the receiving point, **MUST** inspect each shipment for damage.
2. If the shipment is damaged, the customer should so note the damage on the freight bill.
3. The customer should request an inspector from the freight company inspect the equipment immediately. It is best to send a confirming letter with the following information.
  - a. Freight bill number.
  - b. Date delivered.
  - c. Shippers name and address.
  - d. Description of damage (a photograph if possible).
  - e. A copy of your invoice for the equipment
4. After inspection (before the inspector leaves).
  - a. Get a copy of the inspection report.
  - b. Request the unit be shipped back "free astray"
  - c. Request a credit for the original freight bill.
5. Call the factory and:
  - a. Get a Return Material Authorization (RMA number).
  - b. Give a purchase order for repair. The P.O. should refer to the item and trucker claim.

## SECTION 4

### OPERATION

#### GENERAL

Every Curtis Rotary Screw compressor has been prewired for the voltage specified at the time the order was placed.

The unit has been thoroughly tested at the factory to assure it will operate at its rated capacity and is in good working order. The user need only to connect the unit to the correct power supply and to the compressed air system (and to the appropriate water supply on water cooled units, refer to SECTION 3 "INSTALLATION").

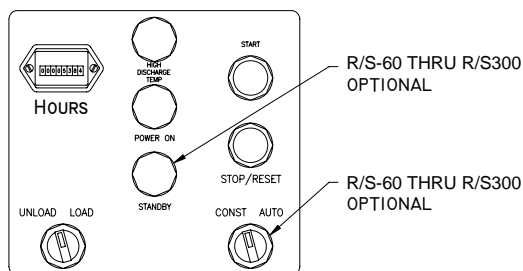
The purpose of this section is to familiarize the user with the controls, their function and how they operate. We strongly suggest that you read and understand this section before starting your compressor.

#### OPERATING MODES

The R/S-50D and R/S-50AD models are equipped with an automatic dual control operating system consisting of a load/unload control (constant) and a start-stop control with delay off timer (auto).

The mode of operation is selected using the switch marked CONST/AUTO located on the compressor control panel. (Ref. Figure 4-1)

Models R/S-60 thru R/S-300 utilize the constant operating mode as standard equipment with start stop control as optional.



**FIGURE 4-1**  
**Control Panel**

#### NOTICE

**For Airtron microprocessor or VFD operation instruction see respective manuals.**

#### CONSTANT OPERATING MODE (Standard on RS 60 – RS 300)

Selecting the CONST position puts the unit into the on line/off line control mode which allows the motor to run continuously while the compressor loads and unloads as determined by the high and low settings of the pressure switch. This mode of operation is best used in high air demand systems to reduce energy consumption.

#### MODULATION CONTROL

This control method is accomplished with the same components as the constant/auto system with the addition of a modulation valve and is standard equipment on models R/S 25-R/S 50.

See FIGURE 4-6 "Modulation Control".

In the constant operating mode the modulation valve allows the compressor to unload and then load gradually to meet system air demand. As demand decreases and system pressure increases above the modulation valve low setting, pressure is passed to the inlet valve piston, which closes enough to match the air system demand.

When the system air demand falls below 20% the pressure switch de-energizes the 3-way solenoid valve. This will activate the blow down valve and close the inlet valve allowing the separator to blow down.

When system pressure falls below the low setting of the pressure switch it will close, energizing the 3-way solenoid valve which will in turn close the blow down valve and open the inlet valve to allow the compressor to pump up to system pressure.

In the AUTO position the compressor utilizes the same features as constant run but with the automatic start-timed stop control. This operating mode is best used in applications where air demand varies widely or there are periods of no demand.

#### AUTO OPERATING MODE (RS 50D & RS 50AD)

With the selector switch in the AUTO position the motor is allowed to load & unload as dictated by the pressure switch. When system pressure reaches the high setting of the pressure switch a timer is

energized which will shut down the unit after a selected time period (factory set at 10 minutes) if system pressure does not fall to the low setting of the pressure switch. If the system is allowed to shut down the amber standby light on the control panel will illuminate to alert personnel that the unit may restart at any time. When the system pressure does fall to the low setting the unit will restart turning off the standby light.

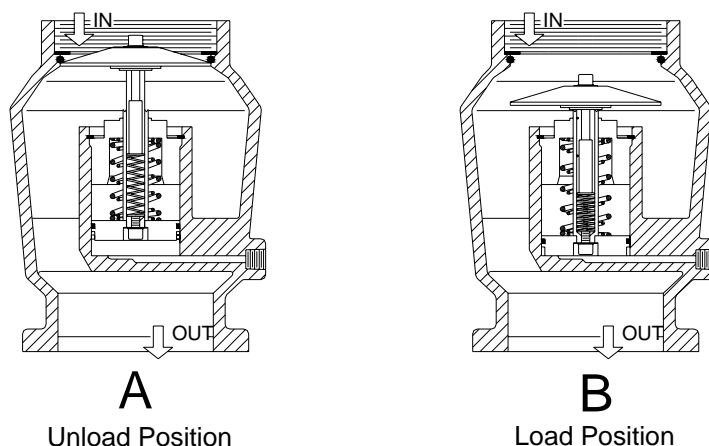
**COMPONENT DESCRIPTION**

The components discussed in the “Operating Modes” portion of this section along with the other standard components of the compression cycle are described below to give the user an overview of their function in the system.

**INLET VALVE**

This valve controls the loading and unloading of the compressor in conjunction with the pressure switch and the 3-way solenoid valve.

The inlet valve, as depicted in FIGURE 4-2, in its idle position is normally open requiring air pressure to close (A). On initial start-up the LOAD/UNLOAD switch located on the control panel (FIGURE 4-1) should be in the UNLOAD position which closes the valve to inlet air (B). The valve will remain closed until the selector switch is switched to the LOAD position at which time the valve will fully open (C) allowing the compressor to achieve the maximum air pressure setting of the pressure switch. The pressure switch then de-energizes the 3-way solenoid valve allowing control air to close the inlet valve to the unload position (B).

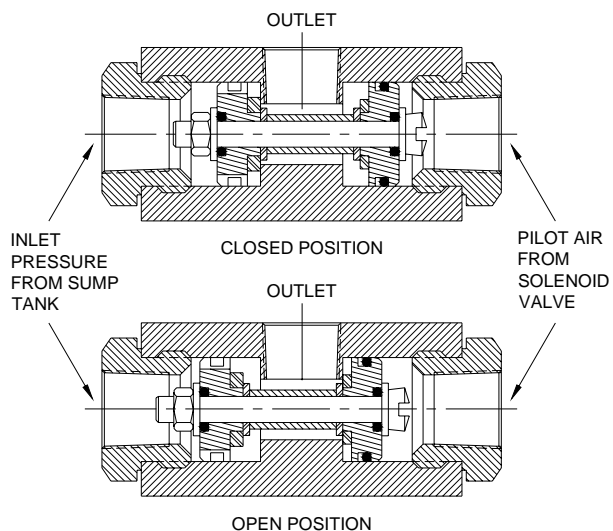


**FIGURE 4-2  
Inlet Valve**

**BLOW DOWN VALVE**

The function of the blow down valve is to relieve the sump pressure when the pressure switch opens at the set operating pressure.

While the compressor is loading the valve remains in the closed position until system pressure is achieved. The 3-way solenoid valve is then de-energized allowing the control air pressure to enter the “pilot” port opening the valve and allowing pressure from the sump at the “inlet” port to exit through the “outlet” port to the inlet valve. (Ref. FIGURE 4-3)

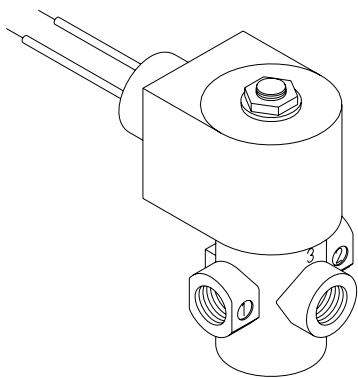


**FIGURE 4-3  
Blow Down Valve**



### 3-WAY SOLENOID VALVE

The R/S Series compressors utilize a 3-way normally open solenoid valve to provide control air for the load/unload cycle (Ref. FIGURE 4-4). This valve de-energizes or opens when the maximum air pressure setting of the pressure switch is achieved allowing control air to enter the solenoid at port #3 and exit at port #2 which connects to the inlet valve piston and the blow down valve. This closes the inlet valve to the unload position and opens the blow down valve to relieve pressure on the sump. When system pressure is reduced to the low setting of the pressure switch the solenoid valve will energize or close allowing pressure in the control lines to exit at exhaust port #1 to the open inlet valve.



**FIGURE 4-4**  
**3-Way Solenoid Valve**

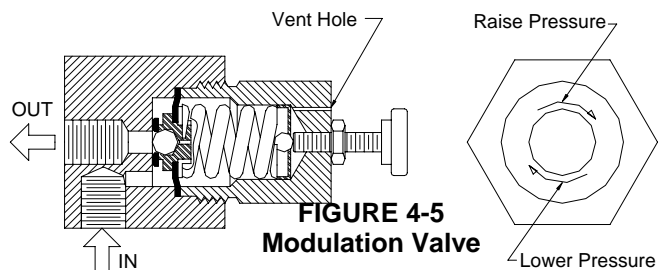
### MODULATION VALVE

The function of the modulation valve is to control the amount of air passed to the inlet valve piston allowing the compressor to load and unload gradually as discussed under “MODULATION CONTROL”.

The modulation valve is set at the factory for requested pressure at time of order. If working pressure is changed the valve must be adjusted to the new pressure setting by turning the screw in the valve dome, clockwise to raise the pressure and counter-clockwise to lower the pressure. This adjustment should be made slowly. The pressure switch settings should be set prior to adjusting the modulation valve. The modulation valve is set to “weep” air from the vent hole in the valve dome at 8 PSI less than cutout pressure switch setting. The (Ref. FIG. 4-5)

### **NOTICE**

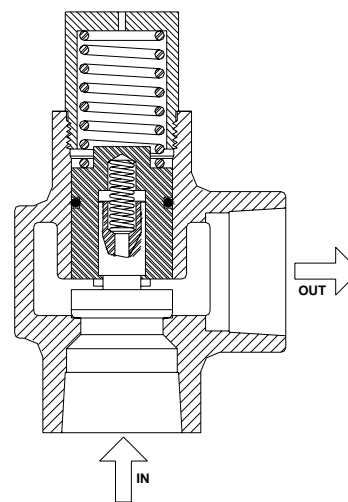
**Use a light touch when adjusting the modulation valve as the metal diaphragm in the valve can be damaged if too much pressure is applied to the adjusting screw.**



**FIGURE 4-5**  
**Modulation Valve**

### MINIMUM PRESSURE VALVE

This is an internally loaded check valve that prevents the back flow of air from system pressure when the unit stops, unloads or shuts down. The standard cracking pressure of this valve is approximately 50 to 80 psi depending on the compressor model. (Ref. FIGURE 4-6)



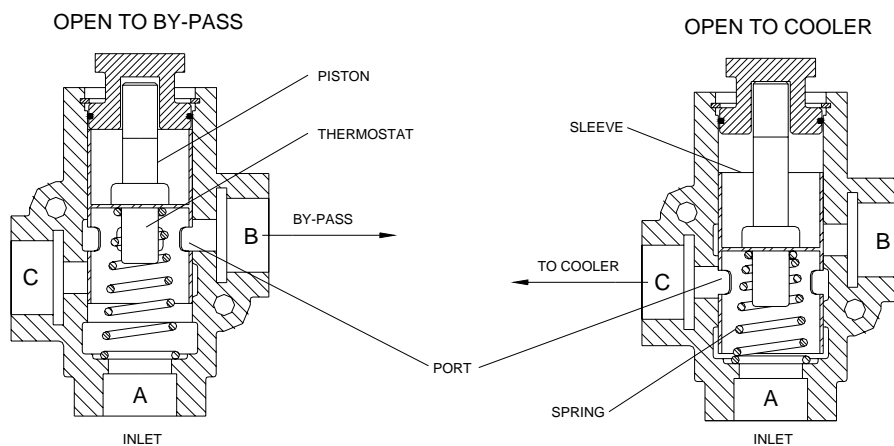
**FIGURE 4-6**  
**Minimum Pressure Valve**

**THERMOSTATIC CONTROL VALVE**

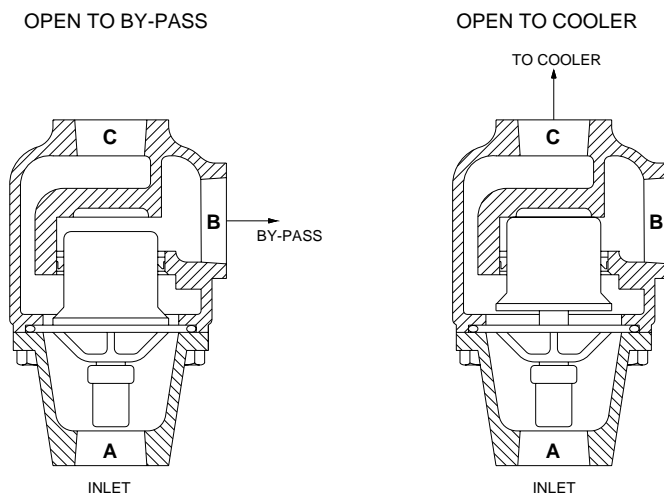
This valve, located in the oil return line (Ref. FIGURE 2-3), incorporates a thermostat to control the temperature of the compressor lubricant.

When the compressor is started and the unit is cold the valve is open to the by-pass at port B allowing the oil entering at port A to flow directly from the oil separator through the oil filter to the compressor.

As the oil heats up the thermostat senses the temperature and gradually closes the valve to port B and opens it to port C through which the heated oil will flow to the oil cooler before entering the oil filter and compressor. The thermostat is set to maintain a minimum oil temperature of 170° F to prevent moisture contamination in the oil system. (Ref. FIGURE 4-7 & 4-8)



**FIGURE 4-7  
Thermostatic Control Valve  
(RS 50D & RS 50AD)**



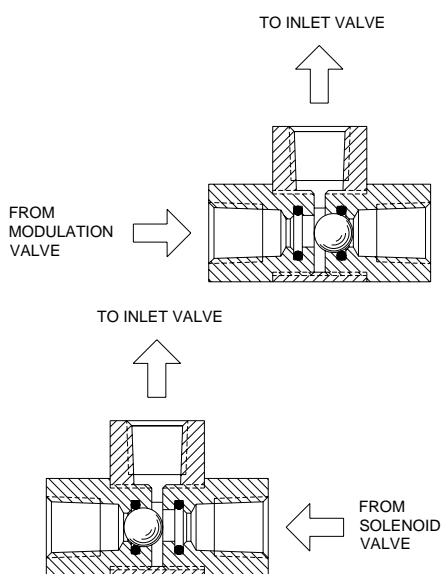
**FIGURE 4-8  
Thermostatic Control Valve  
(RS 60D THRU RS 300D)**

### SHUTTLE VALVE

Inlet pilot air from the modulation valve shifts the shuttle ball due to zero pressure from the unloader solenoid valve during loaded-modulation operation. This allows the inlet valve to open and close according to system CFM demand.

In the event the unit reaches unload pressure, the air from the solenoid valve which is greater than the pilot air from the modulation control valve shifts the shuttle ball closing the pilot air port from the modulation valve sending the air pressure to the inlet valve piston which in turn closes the inlet valve plate allowing the unit to fully unload.

(Ref. FIGURE 4-9)



**FIGURE 4-9**  
Shuttle Valve

### PRESSURE SWITCH

In operation a low friction, straight in-line mechanism operates a snap action switch at a predetermined pressure setting. An increase in pressure causes the normally closed circuit to open and the normally open circuit to close. This is known as the "trip" pressure. When the pressure returns to a lower predetermined setting, the circuit will reset. This is known as the "reset" pressure. The difference between the "trip" and "reset" pressure is known as the differential.

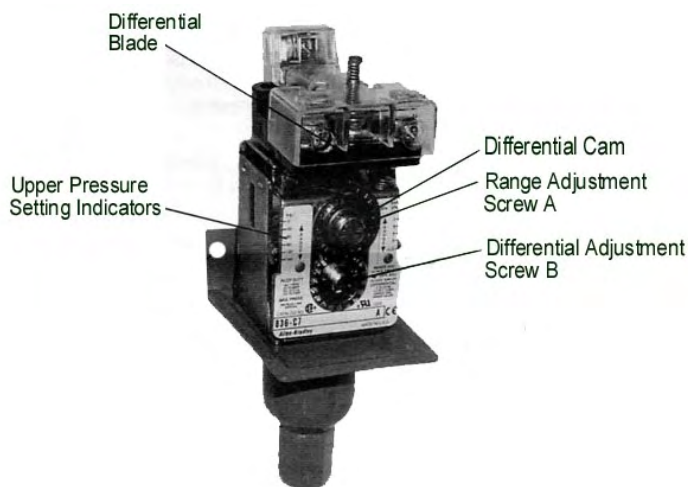
The pressure switch is set at the factory to the operating range specified when the unit was ordered. The differential is set at 25 psi.

The following procedures should be used to set the control to a new requirement: (Ref. FIGURE 4-10)

Operating range adjustment – Turn range adjustment screw A counterclockwise to lower the upper and lower pressure settings. The approximate upper pressure setting is shown on the indicator.

Differential adjustment – To increase the differential, turn adjustment screw B counterclockwise. This will decrease the lower pressure setting only. To decrease the differential, turn the adjustment screw B clockwise. This will raise the lower setting only.

**Note:** The use of a pressure gauge is desirable when setting the control.



**FIGURE 4-10**  
Pressure Switch

## INITIAL START-UP

After completing the initial start-up checks, as noted in SECTION 3 "INSTALLATION", the machine is ready to start. Turn the switch marked UNLOAD /LOAD to the unload position then press the START button. When the unit reaches full speed, turn the UNLOAD/LOAD switch to the load position (Ref. FIGURE 4-1). The minimum pressure valve will allow 60-65 PSI to build in the air/oil separator before releasing down stream.

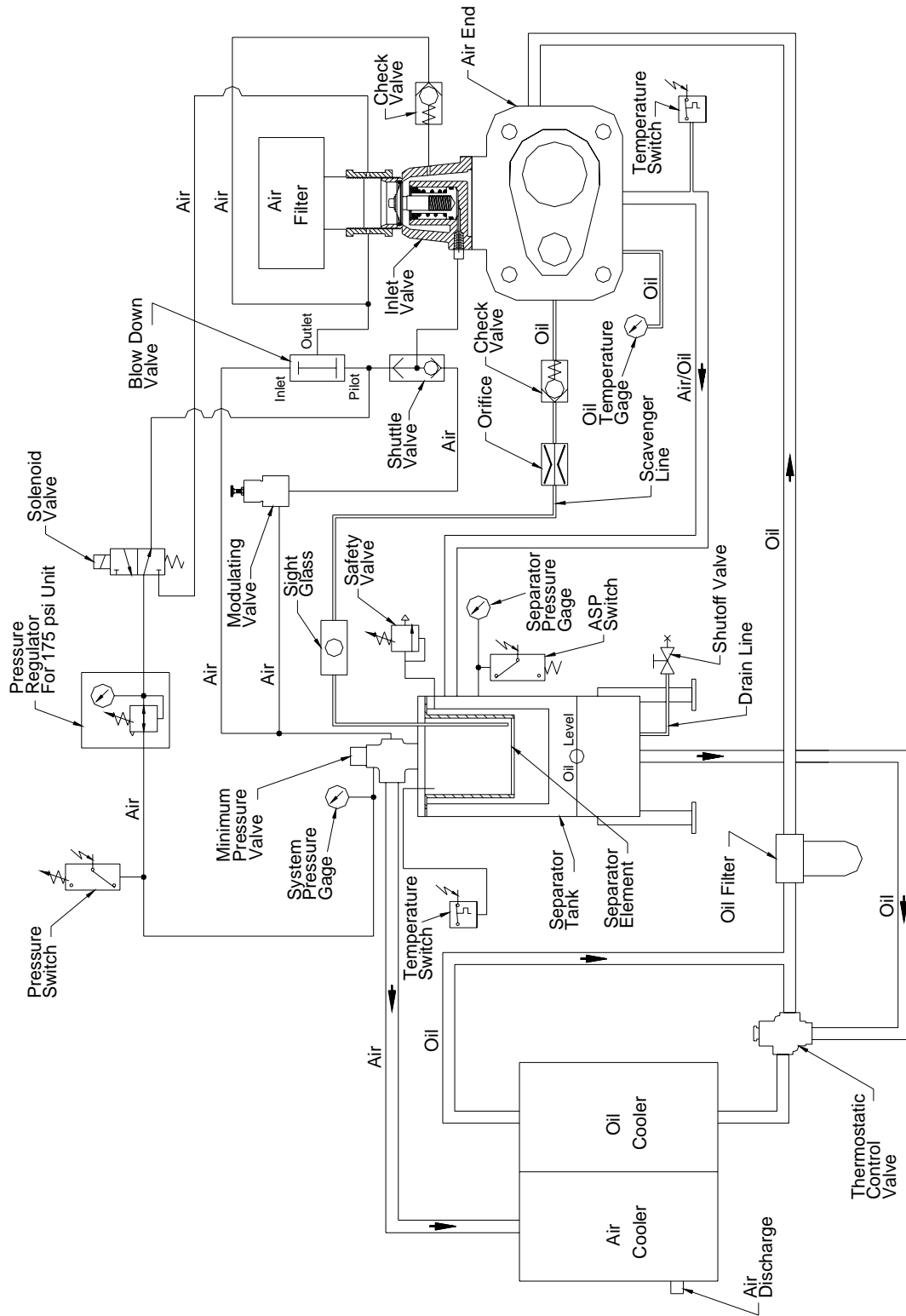
Watch the following measurements carefully at the instrument panel while the compressor is running:

1. Compressor discharge temperature should range between 160° to 180° F when running at full speed.
2. Separator tank pressure should not be more than 3-5 PSI higher than the system pressure.

## SHUTTING DOWN THE COMPRESSOR

Before shutting down the compressor, turn the UNLOAD/LOAD switch to unload and allow the separator tank time to blow down for 45 to 60 seconds. When the separator tank pressure gauge reads 20-30 PSIG press the Stop button to turn off the compressor.

 <b>WARNING</b>
<b>Failure to follow this procedure when shutting down the compressor will lead to oil carry over.</b>



**Figure 4-11**  
**Flow Diagram**  
**Modulation Control**

## SECTION 5

### MAINTENANCE

#### GENERAL

Your Curtis rotary screw compressor has been designed to require a minimum amount of maintenance. However, as with any piece of mechanical equipment, the implementation of a good maintenance program is recommended for smooth day-to-day operation of your compressor and for the longevity of your compressed air system.

This section will provide the user with instructions for maintenance and/or replacement of the serviceable components.

NOTE: Some components of your unit may be equipped with service indicators that alert the user when service on these items is required.

#### **⚠ DANGER**

**Before performing any maintenance be sure the electrical supply has been cut off, locked and tagged and that all pressure has been relieved from the compressed air system.**

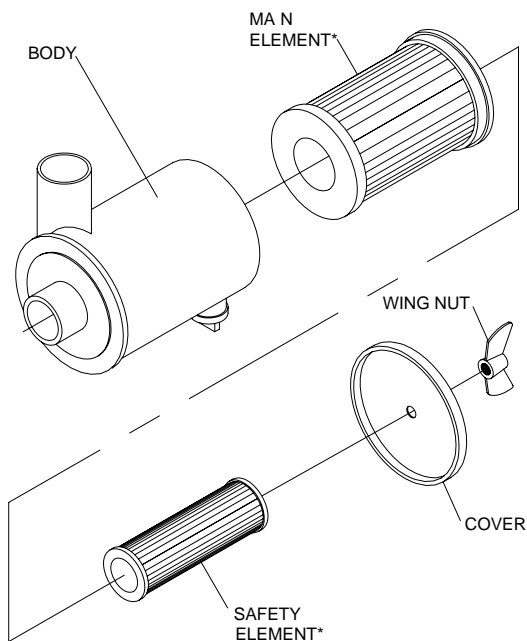
#### AIR FILTER

Frequency of servicing the air filter will depend on the environmental conditions under which the compressor is operating. Service the air filter element under any of the following conditions which ever comes first.

- Check the air filter element weekly and change if outside surface of the element appears to be coated with dust.
- Change every two thousand (2000) hours of operation or every six (6) months.
- Under unusually dirty ambient conditions change the element as required.
- When service indicator or differential pressure gauge reads 15", service is required.

#### Heavy-duty air filter replacement (Figure 5-1)

1. Clean the exterior surfaces of the filter canister.
2. Loosen the wing nut and remove the filter cover.
3. The heavy-duty filter consists of two elements, a main element with a safety element inside. Remove the safety element from inside the main element then the main element from the filter body.
4. Using a damp cloth clean the interior surfaces of the filter body and cover. Do not attempt to blow dirt out with compressed air.
5. Inspect and/or replace the elements.
6. Replace the cover and tighten the wing nut.
7. Reset the maintenance indicator if applicable.



\*Consult appropriate parts list for element part numbers

**Figure 5-1**

## Air filter inspection and cleaning

It is recommended that the air filter elements be changed every six (6) months or 2000 hours. However the filter element(s) should be inspected and cleaned if necessary on a weekly basis in conjunction with your maintenance program. Instructions for inspecting the element(s) are as follows:

1. Shine a bright light through the element from the inside to inspect for damage. If cracks or pinholes are detected discard the element.
2. If elements appear in good condition return them to the filter housing per previous filter replacement instructions.

## LUBRICANT

Your compressor has been tested and shipped with a full charge of **CURTIS LUBEPLUS RS-8000** synthetic oil. This lubricant has been specially formulated to extend the service life of your compressor and is advantageous for high temperature operation, easy start-up when cold, reduced sludge and lacquer buildup and is completely compatible with all seals, gaskets and other compressor materials.

Change the lubricant as noted in the "Maintenance Schedule" located on page 25 of this manual. Between changes check the oil level daily and add as necessary.

When operating in severe conditions it will be necessary to change the lubricant more frequently. Temperature of operation has the most significant effect on the life of the lubricant. The following chart shows the decrease in interval based on temperature.

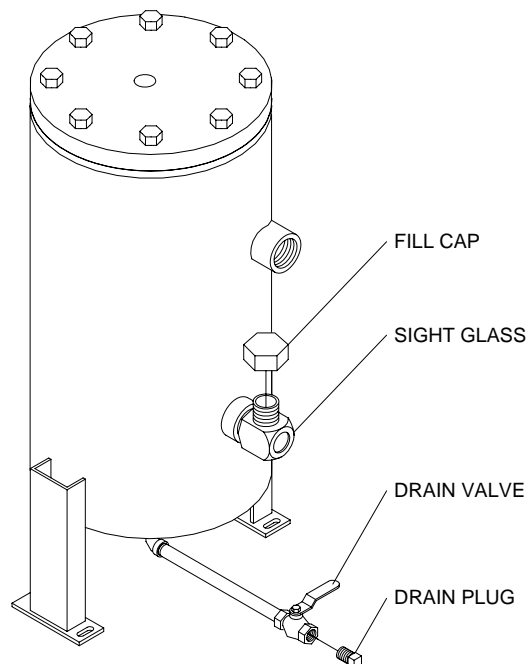
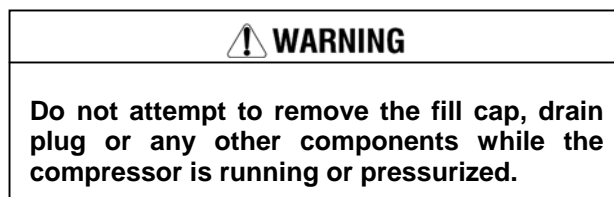
Discharge Temperature	RS-8000
Up to 180° F	8000 Hrs.
180° to 190° F	6000 Hrs.
190° to 200° F	4000 Hrs.
200° to 210° F	2000 Hrs.

## **⚠ DANGER**

**Hot oil under pressure can cause severe injury, death and/or property damage. Be sure the compressor is shutdown and the pressure is relieved before attempting to change or add lubricant.**

**Checking level and adding compressor oil. (Ref. Fig. 5-2)**

1. Shut down the unit.
2. Wait one (1) minute after the compressor stops to allow the pressure to be relieved and the lubricant to settle.
3. Observe the lubricant level. It should be at the center of the sight glass.
4. To add lubricant, disconnect the power, lockout and tag to prevent accidental restarting.
5. Clean dirt from around the fill cap.
6. Loosen the cap and make sure any additional pressure is relieved through the vent hole, then remove.
7. Add lubricant to the proper level.
8. Replace cap and tighten securely.



**Figure 5-2**

### Changing lubricant (Ref. Fig. 5-2)

1. Shut down the unit; disconnect the power, lockout and tag to prevent accidental restarting.
2. Wait one (1) minute after the compressor stops to allow the pressure to be relieved.

3. Clean the dirt from around the fill plug.
4. Loosen the fill plug and make sure any additional pressure is relieved through the vent hole, then remove.
5. Remove the drain plug from the end of the drain line at the bottom of the separator tank.
6. Open the ball valve and allow the oil to drain.
7. When the oil has completely drained close the ball valve and replace the drain plug.
8. Refill with **CURTIS LUBEPLUS R/S 8000** Compressor lubricant. (Consult the specifications section for the proper amount of lubricant for your model).
9. Replace the fill cap and tighten securely.
10. Restart the unit and allow the lubricant to circulate through the system.
11. Shutdown the unit and follow the steps for checking the oil level.

**⚠ CAUTION**

Over filling the oil reservoir can cause oil carryover and damage the compressor. Do not fill above the full mark in the sight glass.

**⚠ CAUTION**

Mixing lubricants can damage the compressor and will void the warranty. Use only CURTIS lubricants.

### Oil filter replacement

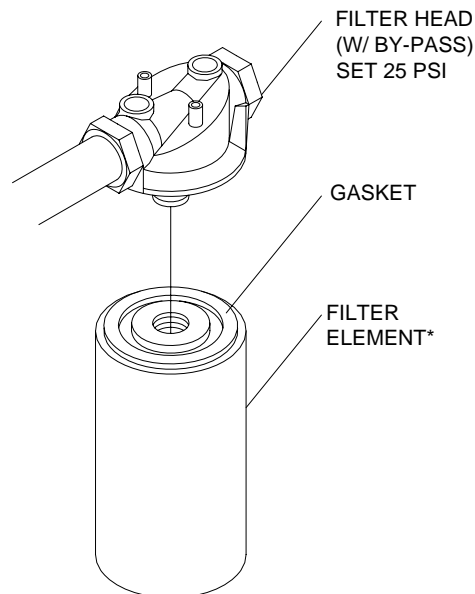
Change the oil filter element after the first one hundred (100) hours of operation. Then under any of the following conditions:

- Every six (6) months or one thousand (1000) hours whichever occurs first,
- Every lubricant change
- As indicated by the maintenance indicator.

Change as follows: (Ref. Fig. 5-3)

1. Shut down the unit; disconnect the power, lockout and tag to prevent accidental restarting.
2. Wait one (1) minute after the compressor stops to allow for the pressure to be relieved.
3. Using a strap wrench remove the old filter from the filter head.
4. Clean the gasket contact surface on the inside of the filter head.

5. Apply a light film of the compressor oil to the gasket surface on the new element.
6. Hand tighten the new element until the gasket is seated in the gasket groove.
7. Continue tightening the element by hand an additional  $\frac{1}{2}$  to  $\frac{3}{4}$  turn.
8. Restart the unit and check for leaks.



\*Consult appropriate parts list for correct element part number.

**Figure 5-3**

**NOTE: R/S200 and above utilize double element spin on filter heads. Change both per above instructions.**

### SEPARATOR ELEMENT

The air/oil separator element never “wears out” but it does lose its effectiveness due to being plugged with dirt. To obtain long separator life, it is important to change the air inlet filter and the lubricant filter as suggested in the maintenance schedule.

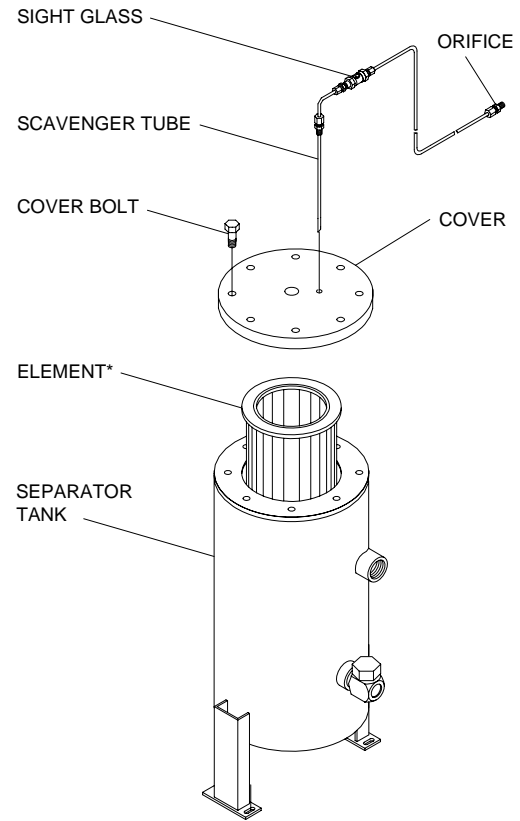
Change the separator element under any of the following conditions, whichever comes first:

- Whenever pressure drop between system and separator exceeds 10 PSI.
- Once a year.
- Every four thousand (4000) hours.
- When excessive oil appears in the air discharge line.
- As indicated by the maintenance indicator



### Separator element replacement (Ref. Fig. 5-4)

1. Shut down the unit; disconnect the power, lockout and tag to prevent accidental restart.
2. Allow one (1) minute after the compressor stops to allow the pressure to be relieved and the oil in the sump to settle.”
3. Disconnect the main airline and the scavenger tube from the separator cover.
4. Disconnect the control airlines after noting their connection points. Tag the lines if necessary.
5. Use a suitable wrench and remove the bolts that hold the separator cover and lift the cover from the separator tank.
6. Lift the element up and out of the separator tank and discard.
7. Carefully lower the new element into the separator tank and center.
8. Clean and replace the cover, align the holes and install the bolts. Tighten the bolts in a cross pattern to prevent over tightening one side of the cover (See bolt torque specifications).
9. Install the main airline and the control airlines.
10. Install the scavenger tube making sure the end is touching the bottom of the separator element.
11. Clean the orifice located at the end of the scavenger tube where it enters the inlet valve or air end.
12. Reconnect the power, restart the unit and check for leaks.



\*Consult appropriate parts list for element part no.

**Figure 5-4**

### **⚠ DANGER**

**Separator, piping and control lines may be very hot immediately after shut down. Allow the unit to cool before attempting service.**

### SCAVENGER LINE OIL SIGHT GLASS

During loaded operation there should be a visible mist of lubricant in the sight glass. If no flow is visible then the orifice is blocked or restricted. The orifice is located in the scavenger line where it enters the inlet valve or air end. (Ref. Figure 5-4)

NOTE: After installation of a new separator element, lubricant will not necessarily appear in the sight glass for the first several hours of operation. If clogging is suspected remove the orifice and clean in a suitable solvent.

### THERMOSTATIC CONTROL VALVE

In normal operation the thermal by-pass valve controls the oil temperature and prevents moisture contamination of the oil. Malfunction of this valve may result in moisture in the oil system that can damage the compressor and cause oil carry-over. A failure of the element in the closed position will divert the lubricant from the oil cooler and result in the unit shutting down due to high temperature.

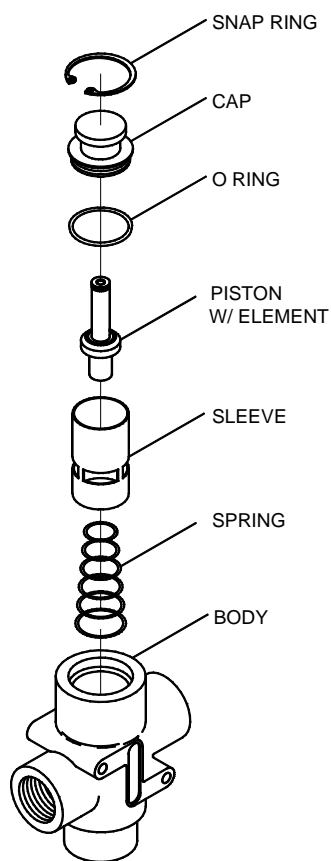
A repair kit is available for this valve to replace the wearable components. Consult the parts list for your compressor to obtain the part number for this repair kit.

### **⚠ DANGER**

**Before performing any maintenance be sure the electrical supply has been cut off, locked and tagged and that all pressure has been relieved from the compressor system.**

### Thermostatic Control Valve Repair (R/S 50D & R/S 50AD) (Ref. Fig. 5-5)

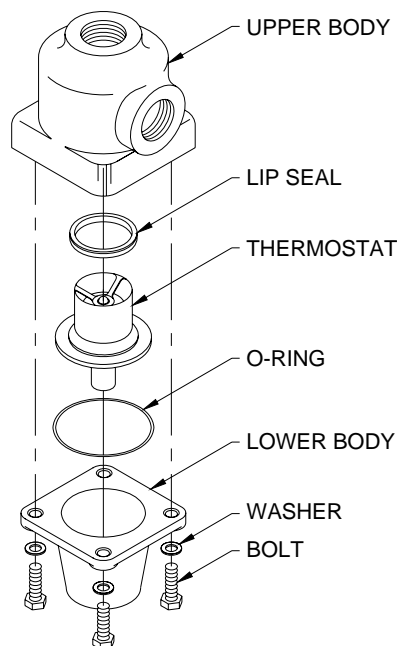
1. Place a spill pan under the valve.
2. Remove the snap ring from the top of the valve body. The valve is spring loaded and the cap may pop up when the ring is removed.
3. Remove the cap and internal parts taking care note the orientation of the spring, piston and element.
4. Reassemble with the renewal parts. Take care when replacing the cap not to cut the "O" ring or put undue stress on the attached piping.
5. Replace any lost lubricant.
6. Return the unit to service.



**Figure 5-5**

### Thermostatic Control Valve Repair (R/S 60D thru R/S 300D) (Ref. Fig. 5-6)

1. Place a spill pan under the valve
2. Disconnect lines from cooler and sump and remove valve from the system.
3. Loosen the 4 bolts and washers and separate the lower body from the upper body.
4. Remove thermostat lip seal and "O" ring from the upper body.
5. Reassemble with renewal parts. Make sure the "O" ring is properly seated in recess in the upper body.
6. Replace valve in system and reconnect the cooler and sump lines.
7. Replace any lost lubricant.
8. Return unit to service.



**Figure 5-6**

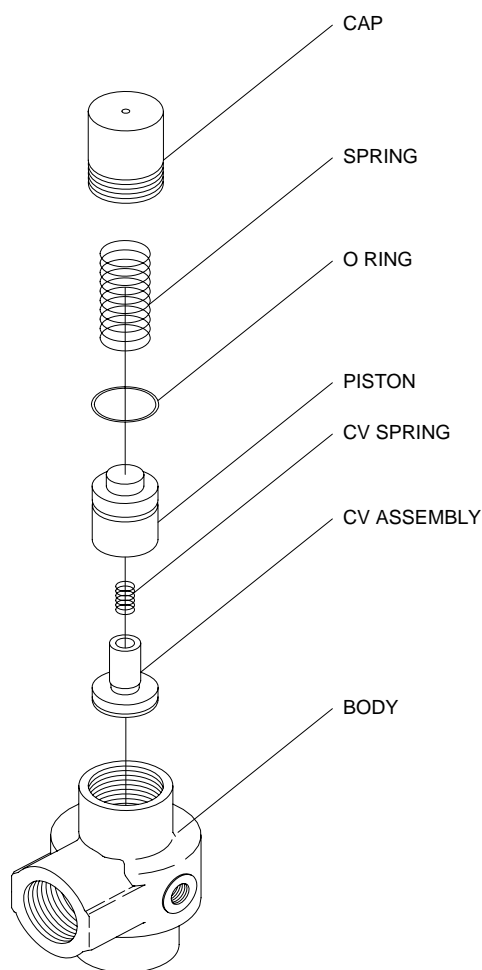
### MINIMUM PRESSURE VALVE

The minimum pressure valve is a non-adjustable spring loaded check valve designed to maintain approximately 65 psi in the separator tank and prevent the backflow of air from the system to the separator.

Air exiting the vent hole in the cap indicates "O" ring failure-allowing air to leak into the spring cavity inside the cap, which will effect the operation of the valve.

Consult the appropriate parts list kit available to repair this valve, depicted in Figure 5-7, as follows.

1. Carefully unscrew the spring loaded valve cap.
2. Remove the piston and seat assembly.
3. Inspect the valve body for scratches and deterioration of the seating surfaces.
4. Replace the "O" ring on the piston taking care not to damage it.
5. Reassemble the piston with the new seat assembly and spring and replace in the valve body.
6. Replace the spring and tighten the cap.
7. Return the unit to service



**Figure 5-7**

## ⚠ DANGER

**Before performing any maintenance be sure the electrical supply has been cut off, locked and tagged and that all pressure has been relieved from the compressed air system.**

### FAN

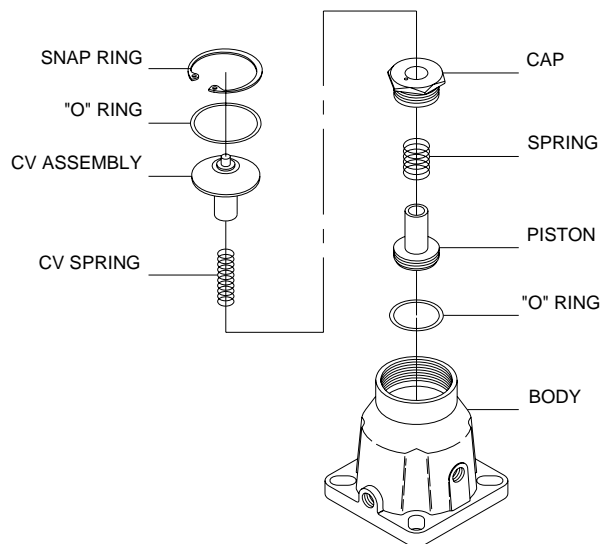
Check the fan for cracking, loose screws, and loose blades. Make sure that it is securely mounted to the shaft. Tighten the mounting screws if loose. Replace a damaged fan immediately.

### INLET VALVE

The inlet valve opens and closes in relation to the air demand. A malfunction of this valve will affect the capacity control system. The inner assembly should be checked periodically for wear on its replaceable components. Replacement of these components is recommended after twelve thousand (12,000) hours of operation. Repair kits are available from your authorized Curtis distributor.

#### **Inlet valve repair (R/S 50AD) (Ref. Figure 5-8)**

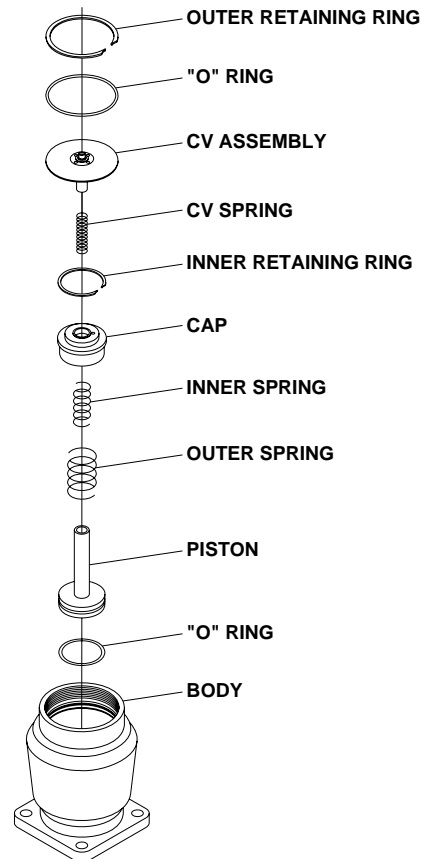
1. Shut down the unit; disconnect the power, lockout and tag to prevent accidental restarting.
2. Wait one (1) minute after the compressor stops to allow the pressure to be relieved.
3. Remove the inlet filter assembly.
4. Remove the snap ring, "O" ring, cv assembly and spring.
5. Unscrew the piston cap and remove the piston and spring.
6. Carefully replace the "O" ring on the piston.
7. Reinstall the piston in the valve body along with the new piston spring taking care not to damage the "O" ring.
8. Re-seat and tighten the piston cap.
9. Replace the cv spring and re-seat the cv assembly.
10. Carefully install the new "O" ring and secure the complete assembly with the upper snap ring.
11. Re-install the air filter assembly.



**Figure 5-8**

**Inlet valve repair (R/S 50D thru R/S 200D)  
(Ref. Figure 5-9)**

1. Shut down the unit; disconnect the power, lockout and tag to prevent accidental restarting.
2. Wait one (1) minute after the compressor stops to allow the pressure to be relieved.
3. Remove the inlet filter assembly.
4. Remove the outer retaining ring, "o" ring, cv assembly and cv spring.
5. Remove the inner retaining ring, cap and inner and outer spring and piston.
6. Replace the inner and outer springs and piston "o" ring and re-install them in the valve.
7. Replace the cap and secure with the inner retaining ring.
8. Replace the cv spring and re-install the cv assembly.
9. Carefully install the new "o" ring and secure the complete assembly with the outer retaining ring.
10. Re-install the air filter assembly.



**Figure 5-9**

**Air/Oil COOLER (Air Cooled Models)**

The air/oil cooler fins **MUST** be cleaned periodically. Frequency of cleaning depends on surroundings and environmental conditions. Dirt and dust buildup on the cooling fins will cause a decrease in thermal efficiency and cooling capacity. This will ultimately lead to overheating and potential compressor failure.

## DRIVE SYSTEM

Routine examination of the drive system is recommended to insure maximum compressor life. Check the drive coupling periodically for wear. We recommend the coupling be replaced at 12,000 hours of operation.

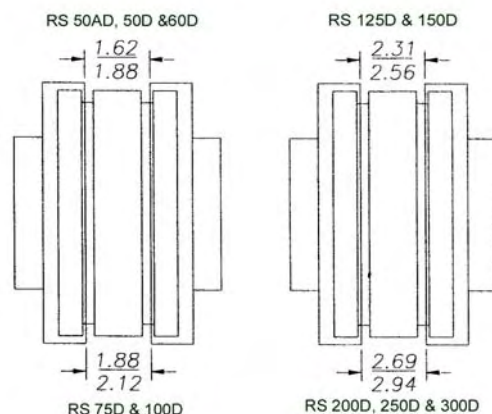
### **⚠ DANGER**

**Do not operate the compressor with the coupling guard removed. Exposed coupling can cause injury to personnel**

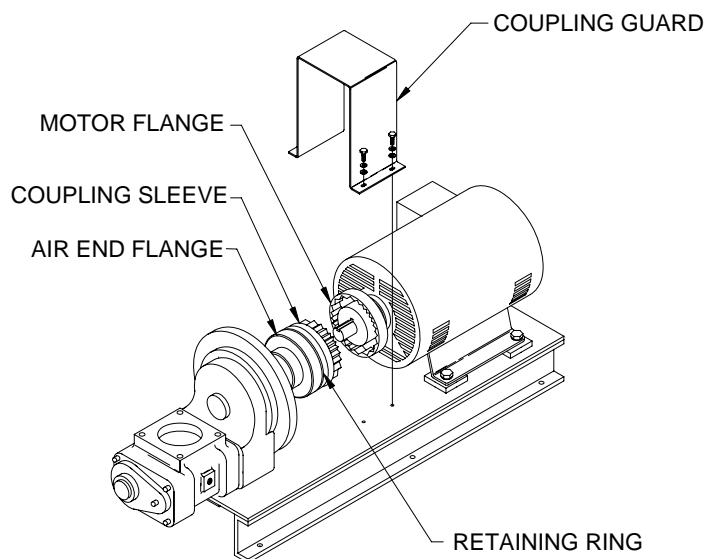
### Coupling Replacement (Ref. Figure 5-10)

1. Disconnect the power and relieve all pressure to the system.
2. Remove the coupling guard held to the motor base by 4 bolts.
3. Loosen the setscrew on the motor flange and pry the flange away from the coupling sleeve.
4. Remove the wire retaining ring holding the two-piece coupling sleeve. It may be necessary to pry the ring loose with a blunt screw driver
5. Remove worn sleeve and replace with the new sleeve and force the retaining ring into its groove in the center of the sleeve. Again it may be necessary to pry the ring into position with a blunt screwdriver.

6. Slide the motor flange into position on the sleeve and using the dimension shown in Figure 5-11 set the gap between the flanges. The flanges will extend about 1/16" over the teeth. **Note: Do not bottom flange against coupling element, leave 1/16" clearance.**
7. Apply Loctite 242 and tighten the setscrew on the motor flange.
8. Re-install the coupling guard and securely tighten the 4 bolts holding it to the motor base.
9. Return the unit to service.



**Figure 5-11**



**Figure 5-10**

# RS Series (50 hp – 300 hp) MAINTENANCE SCHEDULE\*

DESCRIPTION	PART N <sup>o</sup>	QTY	DAILY	WEEKLY	YEARLY	SERVICE INTERVALS (HOURS)													
						EVERY 500	2 000	4 000	6 000	8 000	10 000	12 000	14 000	16 000	18 000	20 000	22 000	24 000	
Check sump oil level (fill if necessary)			•																
Check oil scavenger line for oil flow			•																
Check/clean scavenger line orifice								•		•		•		•		•		•	
Check pressure safety valve for operation <sup>3</sup>				•															
Check load/unload cycle; Check all electrical connections							•	•	•	•	•	•	•	•	•	•	•	•	•
Drain condensate from air receiver			•					•		•		•		•		•		•	
Inspect air inlet filter element; check hose(s) for wear <sup>4</sup>				•															
Check belt tension / alignment			• <sup>5</sup>				•												
Check/clean finned heat exchangers				•															
Check for loose fittings and fasteners							•												
Drain condensate from separator tank				•															
Change oil filter							• <sup>1</sup>												
Oil sample	VO701-POL						• <sup>1</sup>		•		•		•		•		•		•
2000 HR Service Kit	RS50D	VGA713																	
	RS60D, RSD-75	VGA716																	
	RSD-100	VGA720						•		•		•		•		•		•	
	RS125D, RS150D	VGA723																	
	RS200D	VGA726																	
	RS250D, RS300D	VGA729																	
4000 HR Service Kit	RS50D	VGA714																	
	RS-60D, RSD-75	VGA717																	
	RSD-100	VGA721																	
	RS125D, RS150D	VGA724							•			•		•		•		•	
	RS200D	VGA727																	
	RS250D	VGA730																	
6000 HR Service Kit	RS300D	VGA732																	
	RS50D	VGA713																	
	RS60D, RSD-75	VGA716																	
	RSD-100	VGA720																	
	RS125D, RS150D	VGA723																	
	RS200D	VGA726																	
8000 HR Service Kit	RS250D, RS300D	VGA729																	
	RS50D	VGA715																	
	RS60D	VGA718																	
	RSD-75	VGA719																	
	RSD-100	VGA722																	
	RS125D, RS150D	VGA725																	
Change lubricant <sup>2</sup> CURTISLUBEPLUS FSC-8000	RS200D	VGA728																	
	RS250D	VGA731																	
	RS300D	VGA733																	
	RS50D		8 USG																
	RS60D, RSD-75, RSD-100		15 USG																
	RS125D, RS150D		25 USG			•													
RS200D		40 USG																	
RS250D, RS300D		50 USG																	

Notes:

- 1) Initial 500 h or 30 days; whichever occurs first. Follow regular intervals thereafter.
  - 2) Change oil yearly if operating under 8000 h. Lubricant may require more frequent changes depending on operating environment and running conditions.
  - 3) Do not tamper with safety valve setting - it is factory set - only check operation! Tampering will void warranty and result may cause severe injury or death.
  - 4) Replace as necessary or every 5 years.
  - 5) Initial check for proper tensioning @ 100 h. Follow regular 500 h interval thereafter.
- \* The maintenance intervals described herein are for normal operating condition in clean and well ventilated environments. Frequency of intervals will increase for non-standard environments. Please contact your authorized FSCURTIS distributor for more information and recommendations.

Service Kits:

2000 and 6000 Hour Kit: inlet air filter + oil-filter, 4000 Hour Kit: inlet air filter + oil-filter + air/oil separator, 8000 Hour Kit: inlet air filter + oil-filter + air/oil separator + inlet valve. kit + thermo-valve kit + min. pres. valve. kit.

## TROUBLESHOOTING

<b>Symptom</b>	<b>Probable Cause</b>	<b>Remedy</b>
<b>Failure to start</b>	Power not turned on.  Blown main circuit fuse.  Blown control circuit fuse.  Safety circuit shutdown-high discharge temperature   Overloaded motor, thermal overload, Relay tripping.	Turn power on by connecting main disconnect switch or circuit breaker.  Replace fuse.  Replace fuse.  Correct situation per remedy described under “High Discharge Air Temperature” symptom of this troubleshooting guide, then press the manual reset button on the high discharge temperature switch, restart compressor.  Press reset button on motor starter.
<b>Unscheduled shut down</b>	High discharge temperature.    Overloaded motor, Thermal Overload relay tripping.	Correct situation per remedy described under “High Discharge Air Temperature” symptom of this troubleshooting guide, then press the manual reset button on the high discharge temperature switch, restart compressor.  Press reset button on motor starter.
<b>Low receiver pressure</b>	Excessive air demand  Excessive leaks in service lines.  Inlet valve not fully open.   Dirty inlet air filter.  Air pressure switch not set Correctly.  Faulty receiver pressure gauge.	Re-evaluate air demand.  Repair service lines.  Correct situation as per remedy described in “Malfunctions in the capacity system” (A) “Inlet valve not opening or closing in relation to air demand” section of this troubleshooting guide.  Clean air filter element or replace with a new element.  Readjust air pressure switch to desired cut-in and cutout pressure.  Check and replace if found faulty.

## TROUBLESHOOTING (CONT.)

<b>Symptom</b>	<b>Probable Cause</b>	<b>Remedy</b>
<b>High discharge air temperature</b>	<p>Not enough cooling water flowing through the cooler (water cooled models).</p> <p>Inadequate circulation of cooling air at cooler (air cooled models).</p> <p>Low oil level in separator.</p> <p>Dirty oil filter.</p>	<p>Check water system for possible restriction, including water regulator valve.</p> <p>Check location of cooler to make sure there is no restriction to free circulation of cooling air. Also check the fins of the cooler and if found dust laden, clean with compressed air while the machine is not running.</p> <p>Add oil and bring to recommended level. Also check oil system for possible leaks.</p> <p>Replace oil filter element.</p>
<b>Low air delivery</b>	<p>Dirty air filter.</p> <p>Excessive leaks in service line.</p> <p>Inlet valve not opening completely.</p>	<p>Clean air filter element(s) or replace with new element(s).</p> <p>Repair service lines.</p> <p>Correct situation per remedy described under "Malfunctions in the capacity control system" – (A) "Inlet valve not opening or closing in relation to air demand" section of this trouble shooting guide.</p>
<b>Safety valve blows</b>	<p>Air pressure switch not set correctly.</p> <p>Inlet valve not closing properly in relation to air demand.</p> <p>Dirty separator.</p> <p>Faulty receiver pressure gauge.</p> <p>Faulty safety valve.</p>	<p>Readjust pressure switch so that the compressor unloads at the desired pressure.</p> <p>Correct situation per remedy described under "Malfunctions in the capacity control system" – (A) "Inlet valve not opening or closing in relation to air demand" section of this trouble-shooting guide.</p> <p>Replace with new air/oil separator element.</p> <p>Check gauge for accuracy.</p> <p>Check safety valve for correct pressure setting. Replace valve if leaking.</p>
<b>Excessive oil consumption</b>	<p>Separator tank overfilled.</p> <p>Blocked scavenger line.</p> <p>Faulty oil filter.</p>	<p>Drain oil in separator to full mark on oil level gauge.</p> <p>Clean scavenger line and orifice.</p> <p>Replace oil filter element.</p>



## TROUBLESHOOTING (CON'T.)

<b>Symptom</b>	<b>Probable Cause</b>	<b>Remedy</b>
	<p>Oil breakdown.</p> <p>Wrong oil being used.</p> <p>Rapid start/stop or load/unload cycle.</p> <p>Excessive oil foaming.</p> <p>Scavenger line does not extend to bottom of separator.</p> <p>Operating pressure to low.</p> <p>Faulty or damaged separator element.</p> <p>Leak in oil line.</p> <p>Shaft seal failure.</p> <p>Rapid pressure loss in system.</p> <p>Starting the unit before the separator has been blown down.</p>	<p>Correct situation per remedy described in "Oil breakdown" section of this troubleshooting guide.</p> <p>Refer to SPECIFICATIONS section of this manual for correct oil.</p> <p>Correct situation per remedy described in "Malfunctions in the capacity control system" - (C) "Rapid cycling" section of this troubleshooting guide.</p> <p>Same as above.</p> <p>Check scavenger line connections on separator tank.</p> <p>Receiver pressure should not drop below 100 PSIG when running loaded. Leak in system or air consumption is too great.</p> <p>Change air/oil separator.</p> <p>Check for leaks and correct.</p> <p>Replace necessary components of the seal or complete seal if necessary.</p> <p>Look for applications using large amounts of air very quickly. An air receiver should be installed in the system.</p> <p>Change procedure and instruct operators on proper use.</p>
<b>Frequent air filter clogging</b>	<p>Faulty air filter or inadequate filter for the environment.</p>	<p>Replace faulty air filter element. If air filter is inadequate replace it with a heavy-duty air filter.</p>
<b>Oil breakdown</b>	<p>Extreme operating conditions such as high oil injection and compressor discharge temperatures, high ambient temperature with high humidity and high receiver pressure.</p> <p>Contaminated oil.</p>	<p>Operate compressor at recommended receiver pressure and oil injection temperature.</p> <p>Service air filter element and oil filter element in accordance with maintenance schedule.</p>

## TROUBLESHOOTING (CON'T.)

Symptom	Probable Cause	Remedy
	Negligence in draining condensate from the separator.	Drain condensate from the separator periodically. More frequent draining might be necessary when operating at high ambient temperature and high humidity environment.
	Mixing of different brands of oil.	DO NOT MIX DIFFERENT BRANDS OF OIL.
	Wrong type of oil being used.	Refer to SPECIFICATIONS section of this manual for correct oil.
Malfunctions in the capacity control system		
<b>(A) Inlet valve not opening or closing in relation to air demand.</b>	Improper setting of the air pressure switch or faulty switch.	Readjust air pressure switch to proper setting. Replace if faulty.
	Faulty unloader solenoid valve.	Replace solenoid valve.
	Jammed inlet valve.	Check inlet valve assembly.
	Pressure regulator set to low.	Adjust pressure regulator to 100 PSI minimum (175 PSI units).
<b>(B) Compressor does not unload when there is no air demand.</b>	Air pressure switch not set correctly.	Readjust air pressure switch setting.
	Faulty solenoid valve.	Check wiring and solenoid valve.
	Faulty air pressure switch.	Replace air pressure switch.
	Leaks in service lines.	Repair leaks.
<b>(C) Rapid cycling between Load and Unload</b>	Too small volume of air in service line.	Provide sufficient volume by adding air receiver.
	Using too much air.	Add larger compressor, check system for air leaks
	Cut-in cutout pressure set too close in pressure switch.	Readjust cut-in and cutout pressure settings.
<b>Oil coming out through air filter at shutdown</b>	Faulty inlet valve.	Inspect valve. If necessary, replace.
<b>Oil coming out through blow down valve</b>	Oil level too high in separator.	Bring the oil to recommended level by draining the separator. Use the oil level gauge as a guide.
	Cycling too often between load and unload.	Correct situation as per solutions described under "MALFUNCTIONS IN THE CAPACITY CONTROL SYSTEM" – "(C) Too rapid cycling between load and unload" section of this guide.

# SECTION 6

## SPECIFICATIONS

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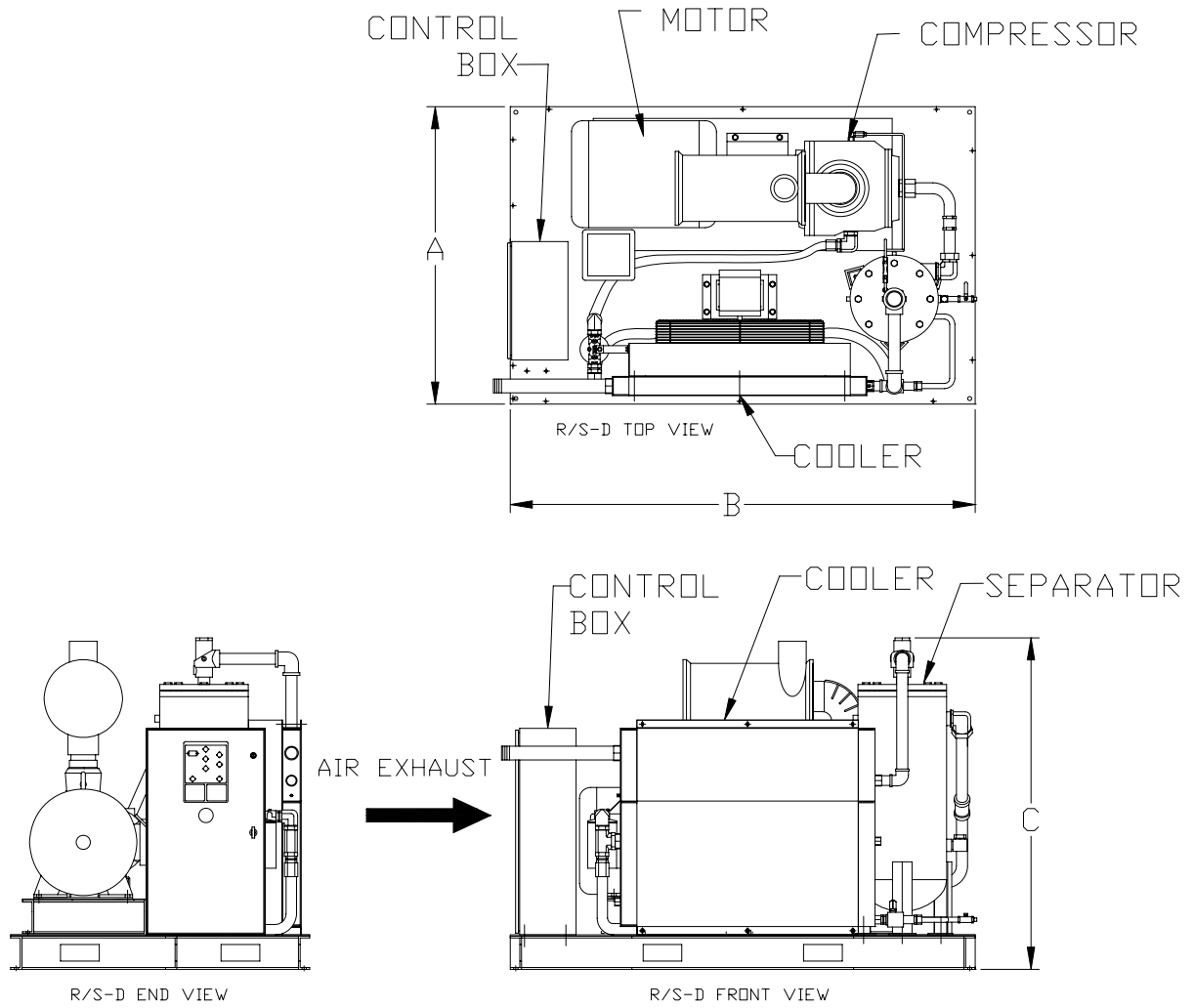
### ENGINEERING DATA

MODEL	R/SD 50	R/SD 60	R/SD 75	R/SD 100	R/SD 125	R/SD 150	R/SD 200	R/SD 250	R/SD 300
<b>OIL(GAL.) CAPACITY</b>	8	15	15	15	25	25	40	50	50
<b>AIR (IN.) CONNECTION</b>	1 ½	1 ½	2	2	2	2	2 ½	3	3
<b>OIL G.P.M.</b>	20	25	28	32	46	50	55	65	90
<b>MOTOR RPM</b>	1750	3500	1450	3500	1750	1750	1750*	1750	1750
<b>BTU/M OIL COOLER</b>	2000	2100	2900	3850	4900	5860	7500	9400	11250
<b>BTU/M AFTERCOOLER</b>	300	400	550	750	915	1100	1500	1850	2200
<b>COOLING FAN CFM</b>	8000	9500	12500	16000	18000	22500	22500	28000	28000
<b>MOTOR STARTS/HR MAX</b>	6	5	5	4	3	3	3	2	2

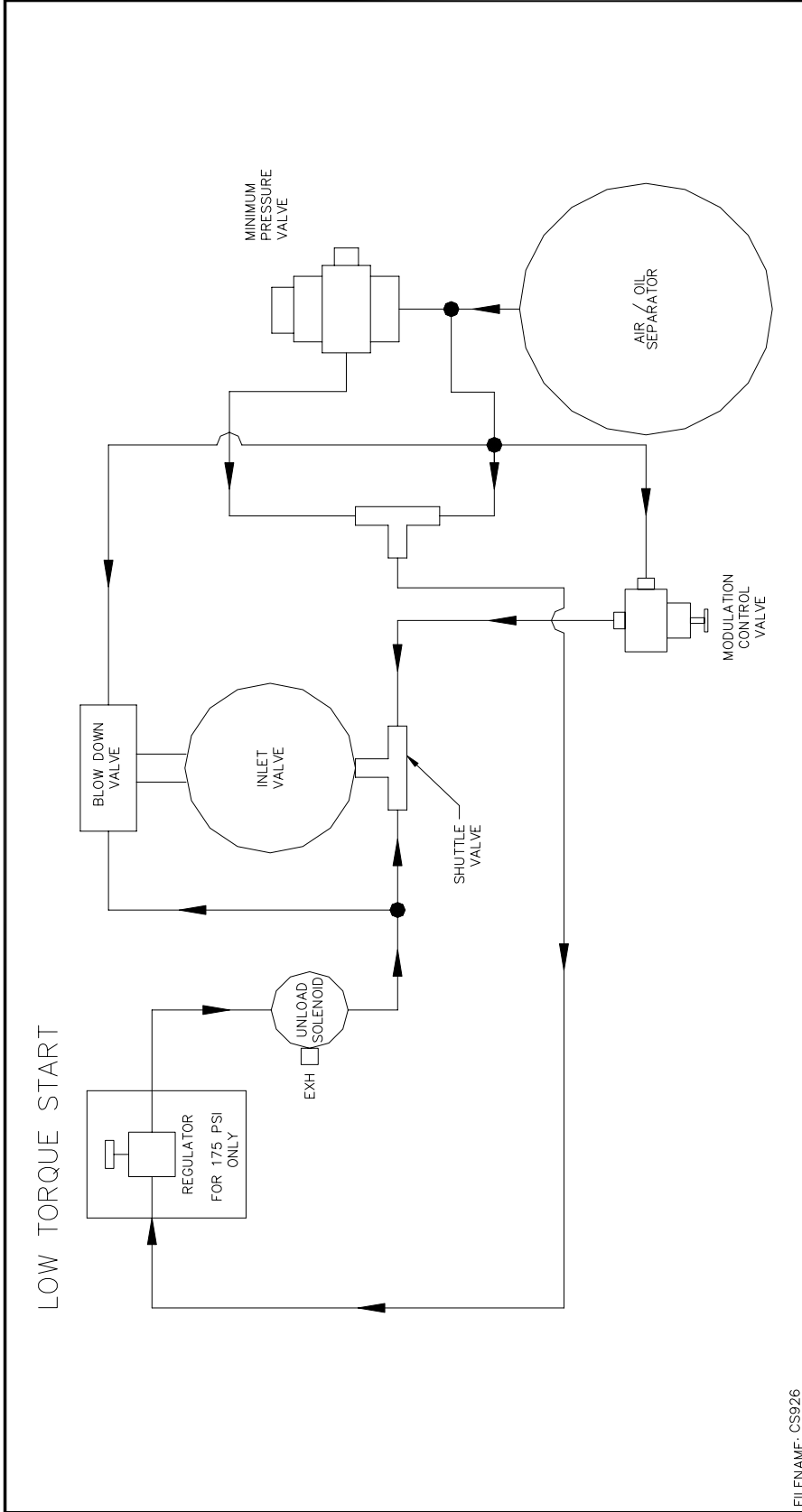
**SUBJECT TO CHANGE WITHOUT NOTICE**

**\*MOTOR RPM 3500 ON NON-GEARED MODEL**

**DIMENSIONAL DATA**



R/S-D	A	B	C	WT. ENCL.	WT.LESS ENCL.	HP	CFM / PSI*				AIR OUT
MODEL	IN.	IN.	IN.	LBS.	LBS.	--	100	125	150	175	NPT
R/S50-D	42	72	44	2130	1925	50	240	222	195	165	1 1/2"
R/S60-D	48	76	60	2570	2170	60	280	275	236	212	1 1/2"
R/S75-D	54	84	60	3140	2690	75	365	329	305	270	2"
R/S100-D	54	84	60	3400	2950	100	465	458	363	340	2"
R/S125-D	66	84	64	5320	4520	125	600	570	516	440	2"
R/S150-D	66	84	64	5550	4750	150	760	706	583	546	2"
R/S200-D	70	90	64	5850	5150	200	960	860	770	680	2 1/2"
R/S250-D	75	96	78	9500	8800	250	1170	1073	970	N/A	3"
R/S300-D	75	96	78	9800	9100	300	1450	1298	1150	N/A	3"



LOW TORQUE START

FILENAME: CS926

THE INFORMATION ON THIS DRAWING IS PROPRIETARY AND CONFIDENTIAL, AND SHALL NOT BE DISCLOSED OR DUPLICATED WITHOUT WRITTEN CONSENT OF CURTIS-TOLEDO, INC.		06/10/02		9725	A	NEW RELEASE		FJS
		DATE	CHG	SYM	REVISION		BY	APP
REQ	ASSEMBLY	R/S100D		MODEL		CURTIS - TOLEDO INC. 1905 KIENLEN AVE ST. LOUIS, MO 63133		
MATERIAL		PNEUMATIC DIAGRAM FOR WYE/DELTA LOW TORQUE START						
FINISH		DRN	FJS	CHK	SCALE	NEXT ASSEMBLY		
HEAT TREAT		DATE	06/10/02	SHEET		NO. CS926		
		1 OF 1						
		TOLERANCE UNLESS NOTED DECIMALS xx = ±.010; xxx = ±.005 FRACTIONS FORMED OR CAST = ±1/32 MACHINED = ±1/64 ANGULAR AND PARALLELISM FORMED OR CAST = ±.5' MACHINED = ±1' ✓ SURFACE FINISH REMOVE ALL BURRS DO NOT SCALE DRAWING						

FORM CA-117 Rev. A

## Recommended Bolt HHCS Torque Specification\*

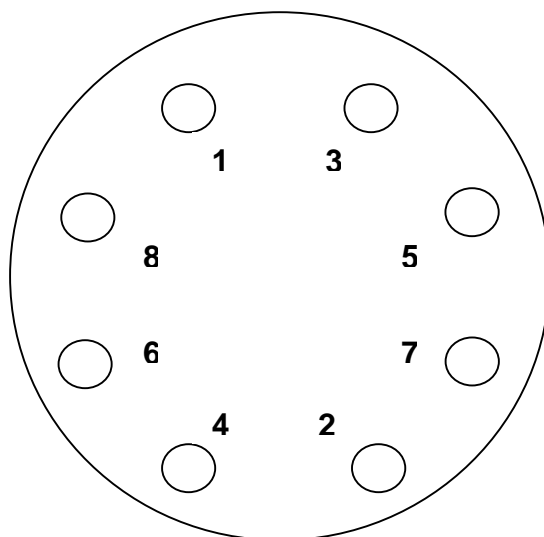
HHCS SAE 5	Tightening Torque
1/4-20UNC	10 ft-lbs
5/16-18UNC	21 ft-lbs
3/8-16UNC	37 ft-lbs
1/2-13UNC	90 ft-lbs
5/8-11UNC	180 ft-lbs

\***Note:** these values are for stiff metal-to-metal joints when SAE 10 oil is used as lubricant.

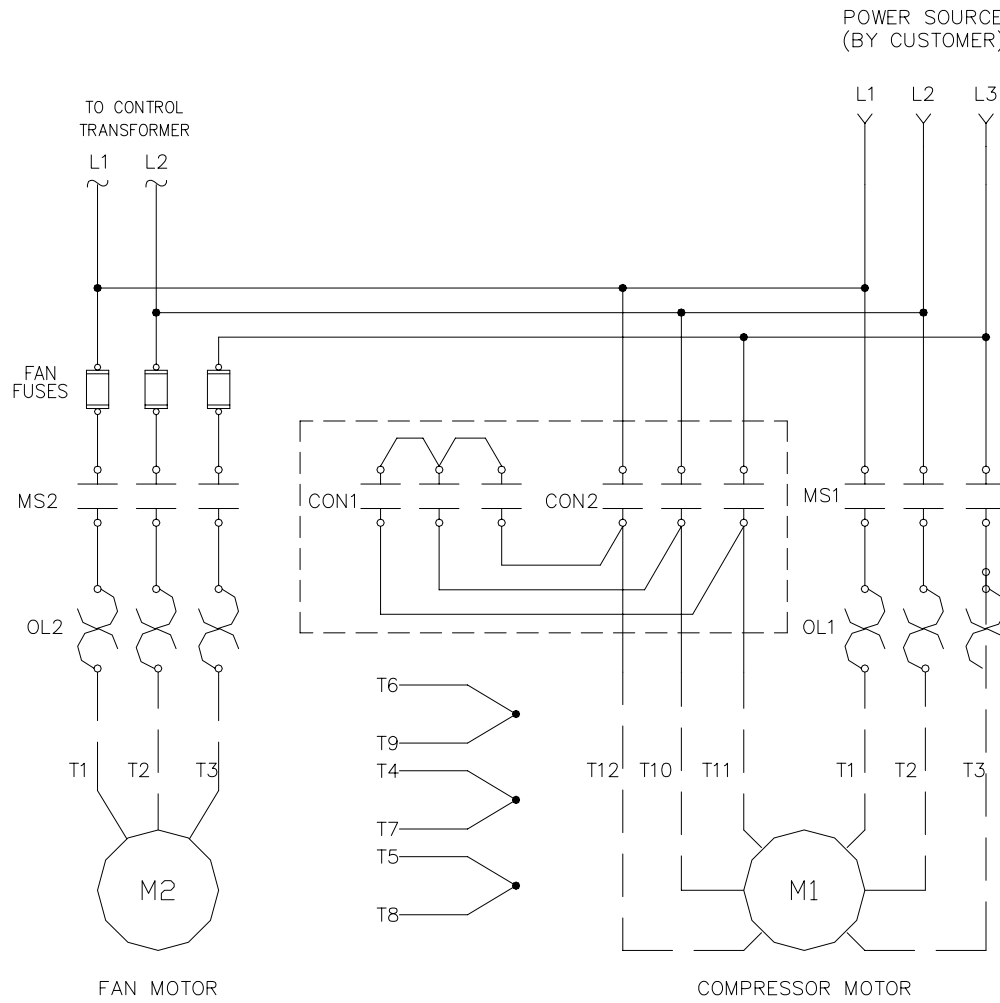
## Separator Tank Lid Bolt Torque Specifications

SEPARATOR TANK NUMBER	UNIT USED ON	BOLT SIZE AND QUANTITY	BOLT TORQUE (FT-LBS.)
RN10222-2	R/S 50D, 50AD	5/8"-11 (8)	80
RN10223	R/S 60D-100D	3/4"-10 (8)	80
RN10224-1	R/S 125D, 150D	7/8"-9 (8)	80
RN10226	R/S 200D	1"-8 (8)	80

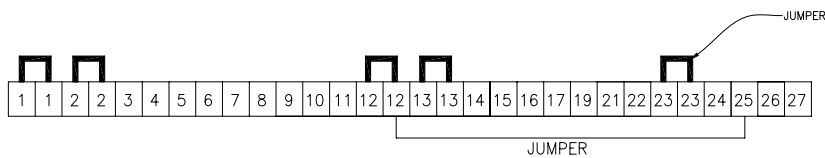
## Bolt Torque Sequence



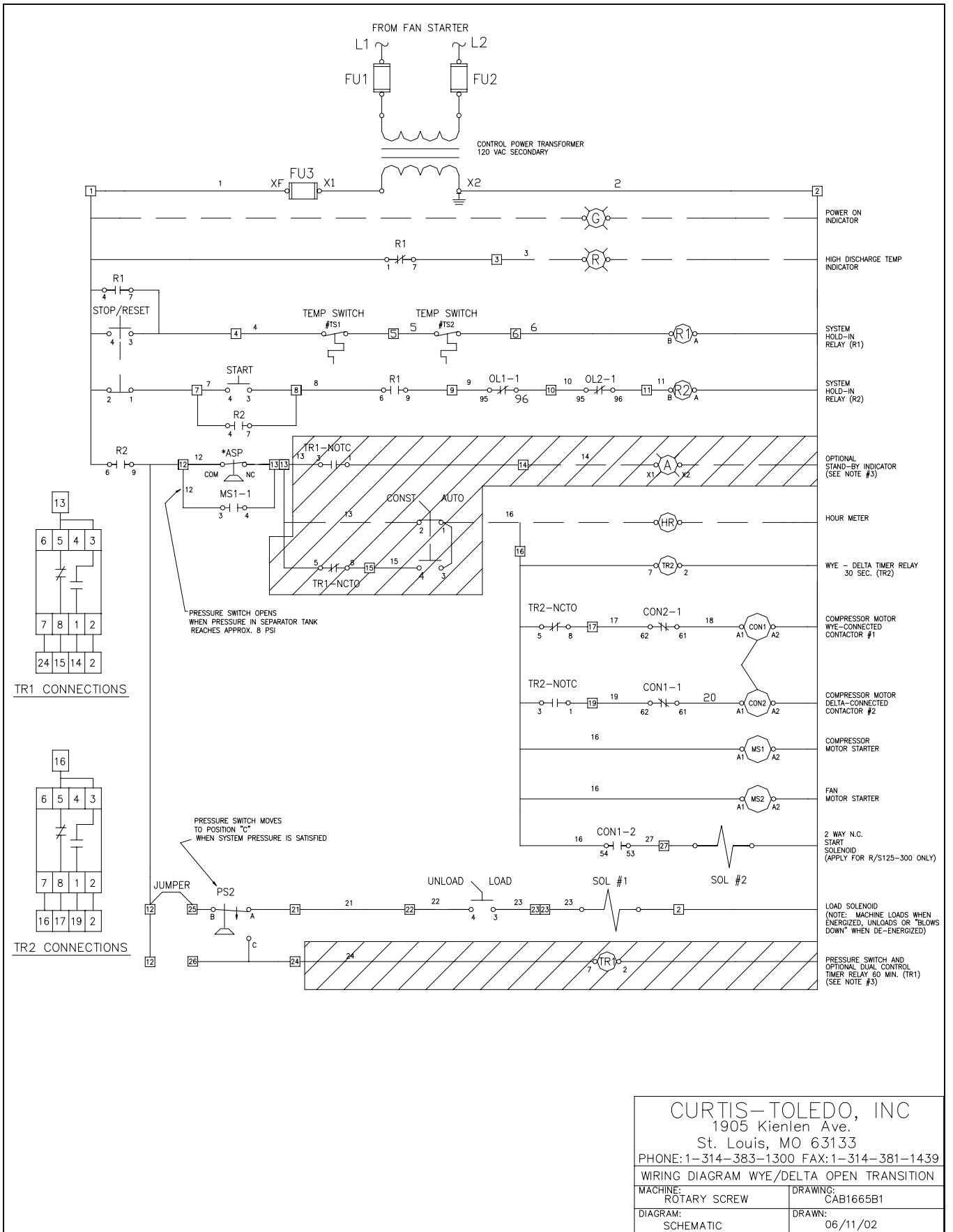
CUSTOMER TO SUPPLY PROPERLY PROTECTED  
POWER SOURCE AS PER LOCAL CODES  
(USE 60 C OR 75 C COPPER WIRE ONLY)



- NOTE 1: DASHED LINES INDICATE PANEL-DOOR WIRING OR FIELD WIRING
- NOTE 2: TERMINAL STRIP WILL BE SET UP AS SHOWN BELOW:
- NOTE 3: OPTIONAL TIMED DUAL CONTROL WIRING & COMPONENTS SHOWN IN SHADED BOX

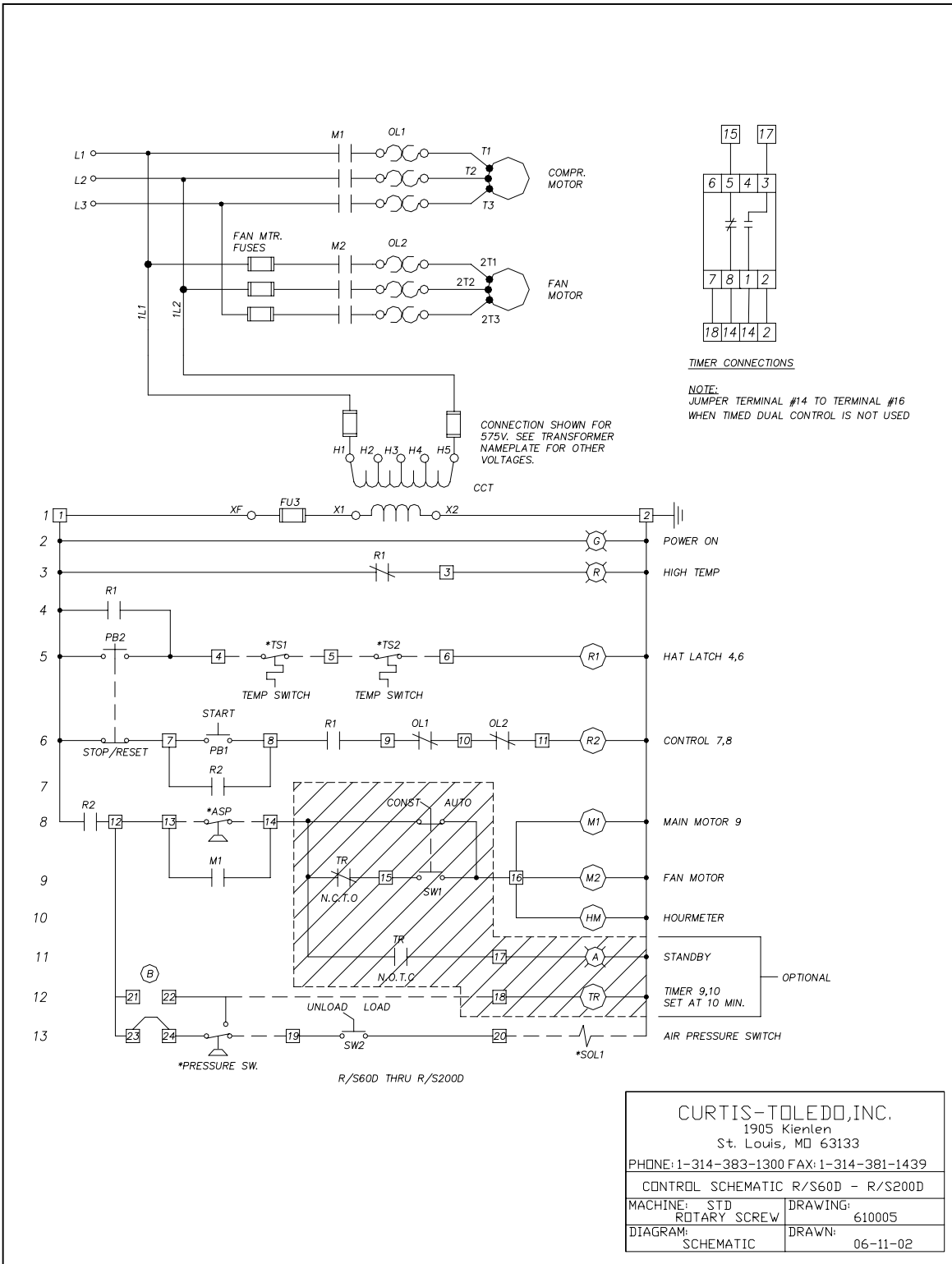


CURTIS-TOLEDO, INC. 1905 Kienlen Ave. St. Louis, MO 63133 PHONE: 1-314-383-1300 FAX: 1-314-381-1439	
WIRING DIAGRAM WYE/Delta OPEN TRANSITION	
MACHINE: ROTARY SCREW	DRAWING: CAB1665B1
DIAGRAM: SCHEMATIC	DRAWN: 06/11/02



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WIRING DIAGRAM WYE/DELTA OPEN TRANSITION  
MACHINE: ROTARY SCREW DRAWING: CAB1665B1  
DIAGRAM: SCHEMATIC DRAWN: 06/11/02





# COMPRESSOR MAINTENANCE LOG

MODEL \_\_\_\_\_

SERIAL NUMBER \_\_\_\_\_

REFER TO THE COMPRESSOR INSTRUCTION MANUAL FOR COMPLETE MAINTENANCE INFORMATION AND SCHEDULE. THE COMPRESSOR INSTRUMENT PANEL LISTS A BRIEF MAINTENANCE OUTLINE

DO NOT REMOVE LOG FROM THIS UNIT

Record date in Date Column and hourmeter reading in the column under each item on which maintenance is performed. Record pressure differential gauge readings when any other maintenance is performed to provide running record of approaching oil filter of separator change.

DATE	AIR FILTER		PRESSURE DROP		OIL FILTER CHANGED	OIL CHANGED	OIL SEPARATOR CHANGED	OIL COOLER CLEANED	
	CLEANED	CHANGED	OIL FILTER	OIL SEPARATOR				RADIATOR CORE	HEAT EXCHANGER TUBES

## **CURTIS-TOLEDO, INC.**

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*Sales representatives in principal cities.*