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BY JOHNSON CONTROLS

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Service Instructions
BARE ROTARY SCREW COMPRESSOR REPLACEMENT

Models TDSH/TDSL - XJS/XJF - SGC

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TDSH/TDSL COMPRESSOR REPLACEMENT

The following procedure is required when a compressor is replaced in the field:

NOTE: Refer to current Installation-Operation-Maintenance Manual of your unit for detailed shutdown/start-up instructions.

1. Verify that main power to the unit is disconnected. Lockout and tag the switch.

2. Close suction and discharge service valves, also liquid injection and economizer service valves, as applicable.

3. Slowly vent separator to low-side system pressure using the bypass line on suction trap.

NOTE: Recover or transfer all refrigerant vapor, in accordance with local ordinances, before opening to atmosphere. The separator must be equalized to atmospheric pressure.

⚠ CAUTION **To prevent injury or damage to components, and for complete details regarding pressurized refrigerant vapor transfer and recovery, see the current Installation-Operation-Maintenance Manual for your unit.**

4. Remove all tubing, piping, and wiring that is connected to the compressor.

5. Disconnect the coupling from the motor shaft.

6. Support the compressor by attaching a crane, or other appropriate lifting device, to the lifting eyebolts supplied with the compressor. Remove bolts from the compressor feet and discharge flange. Carefully remove compressor from base. See Table 7 for compressor weights. Save any existing shims.

7. Thoroughly clean the replacement compressor and motor feet and mounting pads of burrs and other foreign matter to ensure firm seating of the compressor.

8. Clean the discharge flange surfaces on the compressor and separator. Clean mounting surfaces of compressor feet.

9. Support the new compressor in the same fashion as the old compressor. Remove the solid plate from the discharge flange. The new gasket between the flange and solid plate will be used to seal the compressor to the separator flange. Make sure the gasket does not restrict gas flow. (Contact Baltimore Parts Center for replacement gaskets, Ph:800-336-7264)

10. Tighten bolts in the discharge flange connection to the compressor using a star pattern. Lube bolts then finger tighten all bolts, then torque to 1/3 of value (See Table 1) in star pattern increasing by 1/3's to full torque. Measure the clearance between the compressor feet and the base plate with a feeler gauge. If no clearance is evident, remove compressor and install a second gasket on discharge flange. Retorque flange.

11. Measure the clearance between the compressor feet and the base plate with a feeler gauge. Shim any compressor feet that exhibit a gap (gauge reading + .002″). A pry or jack can be used to lift the compressor .002″. Reinstall and tighten bolts in feet to the support base and torque the mounting bolts to 250 ft-lb.

12. Install tubing, piping and wiring. Use the suction gasket supplied with the new compressor. It is located between solid plate and suction port. Refer to the Installation, Operation and Maintenance manual for P & I diagram.

13. Reinstall drive coupling. See current Installation-Operation-Maintenance Manual of your unit for coupling alignment procedure and bolt torques.

NOTE: If motor was disconnected or changed, motor rotation must be checked before drive coupling is installed.

14. The shaft alignment must be measured and aligned to .004″ total indicator reading. Verification of the alignment is necessary after the compressor is operated for approximately four hours.

NOTE: Failure to follow this procedure could result in binding of internal parts, i.e. slide valve, slide stop, and bearings which could result in improper operation or premature failure of machine.

TDSH 163 and 193 ECONOMIZER PLUGS

On TDSH 163mm and 193mm machines built after January 1994, Figure 2, the economizer port and plug configuration is different than that shown in Figure 1.

On the latter mentioned machines one piece of machined steel incorporates the economized cover and plug. This is also true for the XJS and XJF compressors. On the TDS_ 163mm and TDS_ 193mm machines only, the plug is inserted through the discharge casing, perpendicular to the economizer port.

The economizer plug is held in place by a straight-thread O-ring plug. A spring is used between the straight-thread plug and the economizer plug to keep the economizer plug from rattling if the economizer port is not used. Both the spring and the economizer plug must be removed in order for the vapor to flow through the economizer port and into the compressor. The existence of the economizer plug would block all flow of vapor through the economizer port.

Figures 1 & 2. Legend:

SV-1	**Economizer**
SL-1	**Low Vi Liquid Injection & Economizer**
SL-2	**High Vi Liquid Injection**

NOTE: All hardware shown should be left intact.

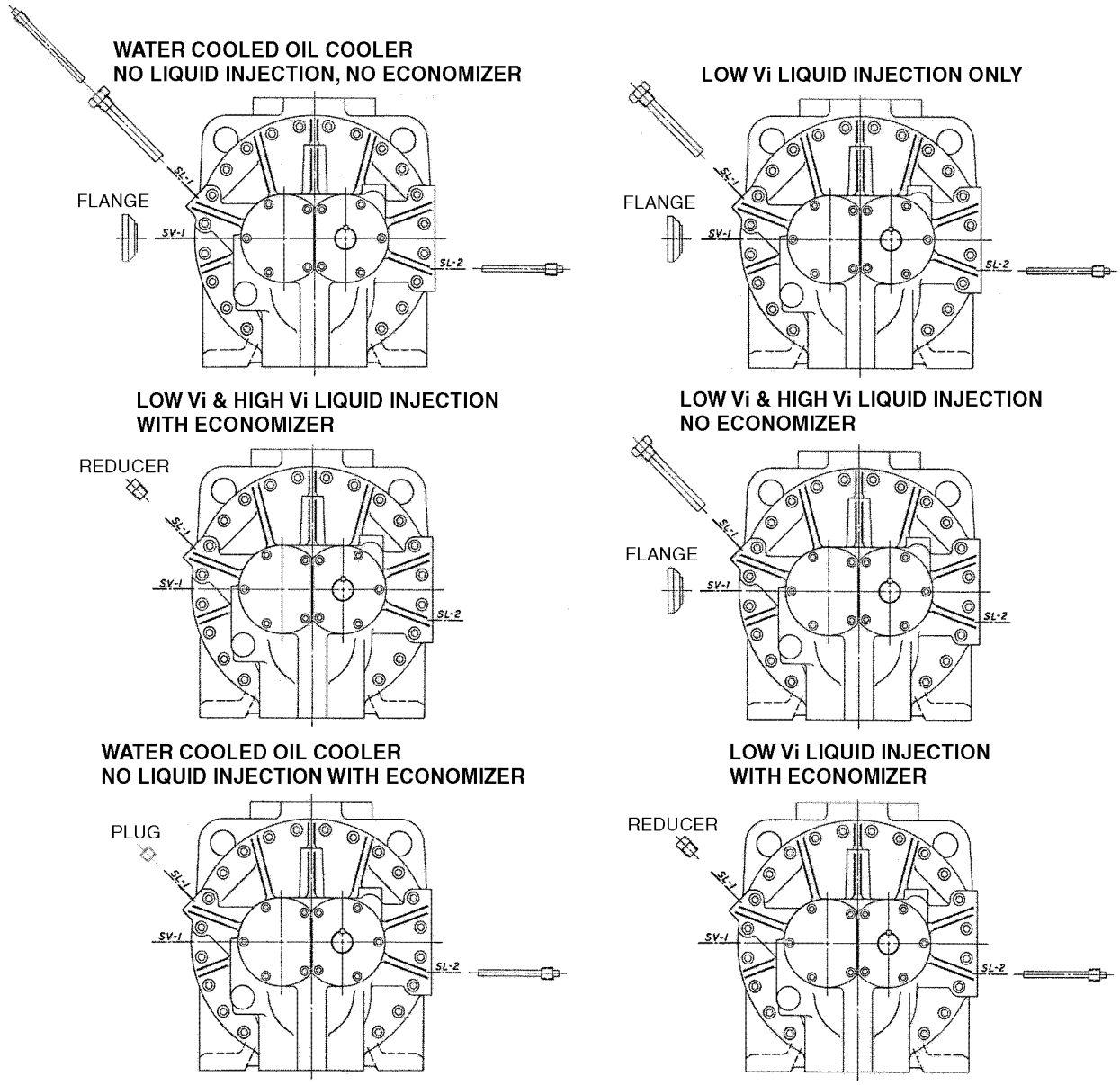


Figure 1. TDSH 163 & 193 Liquid Injection and Economizer Plugs before January 1994

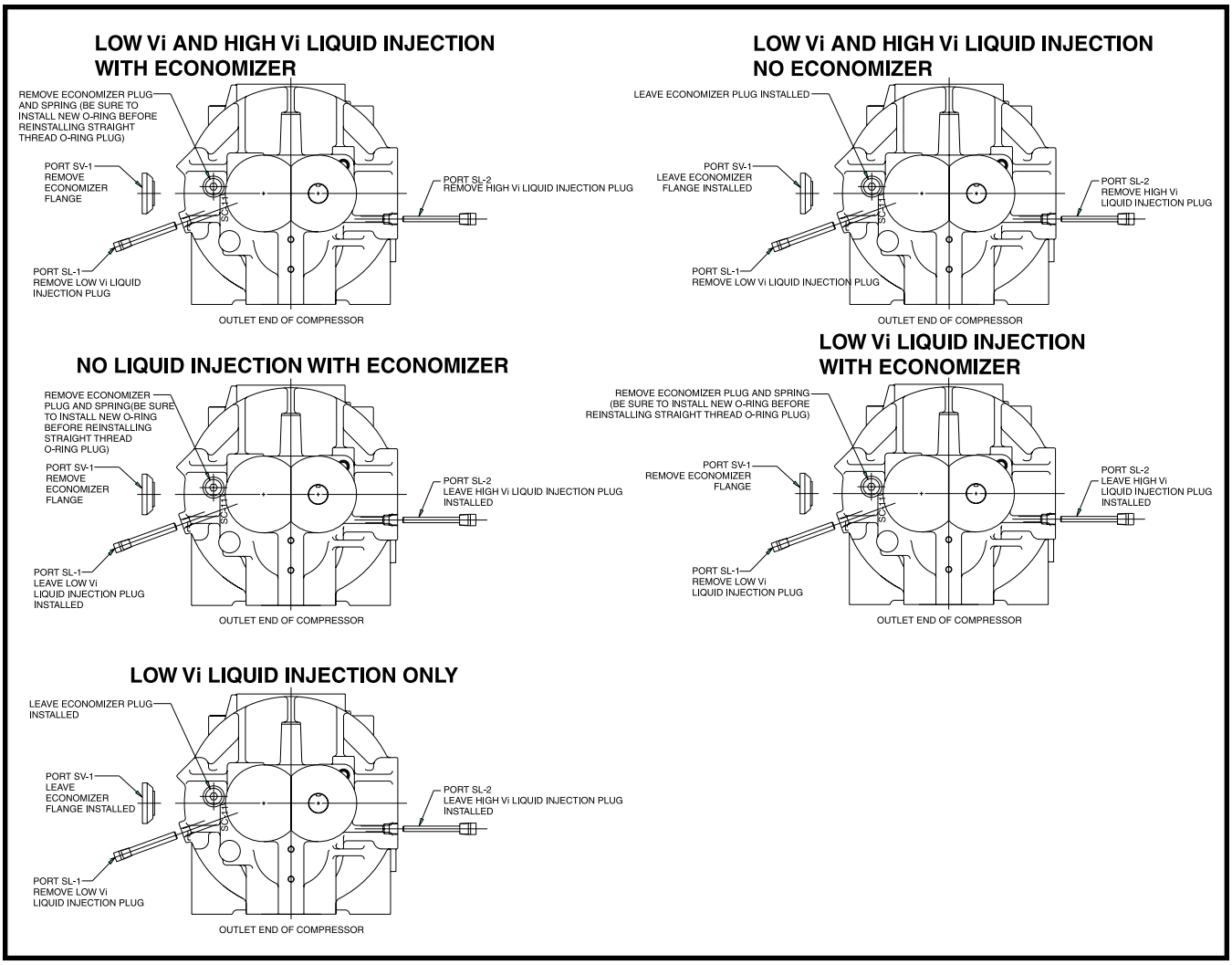


Figure 2. TDSH 163 & 193mm Economizer Port and Plug after January 1994

RWBII MODEL	Compressor Model	Discharge Flange to Separator Flange		Suction Flange	
		Bolt Size (in.)	Torque (ft-lb)	Bolt Size (in.)	Torque (ft-lb)
60	163S	M20 X 205	100	M16 X 2.0	120
76	163L	M20 X 205	100	M16 X 2.0	120
100	193S	M20 X 2.5	140	M20 X 2.5	180
134	193L	M20 X 2.5	140	M20 X 2.5	160
177	233S	M20 X 2.5	160	M20 X 2.5	160
222	233L	M20 X 2.5	160	M20 X 2.5	200
270	233XL	M20 X 2.5	160	M22 X 2.5	220
316	283S	M22 X 2.5	230	M22 X 2.5	220
399	283L	M22 X 2.5	230	M22 X 2.5	220
480	283SX	M22 X 2.5	230	M24 X 3.0	220
496	355S	M24 X 3.0	240	M30 X 3.5	350
676	355L	M24 X 3.0	240	M30 X 3.5	350
856	355XL	M24 X 3.0	240	M30 X 3.5	350

Table 1. TDSH Flange Bolt Torque

NOTE:

1. The bolt torque requirements for the compressor flange to separator flange are based on:

a. Gaskets: Garlock® Blue-Gard® 3300

b. Bolts: class 8.8 or stronger hex head bolts, lightly oiled and clean

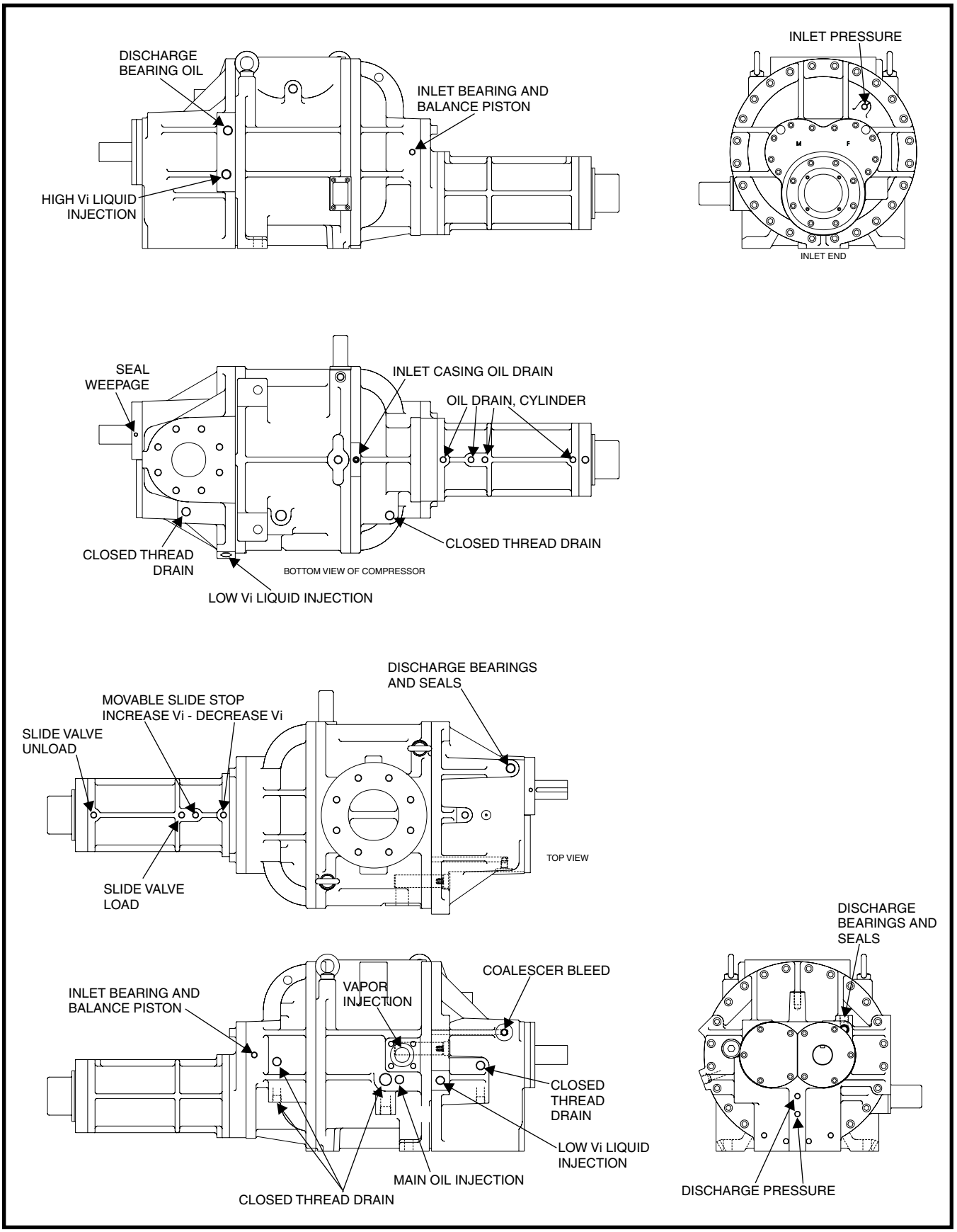
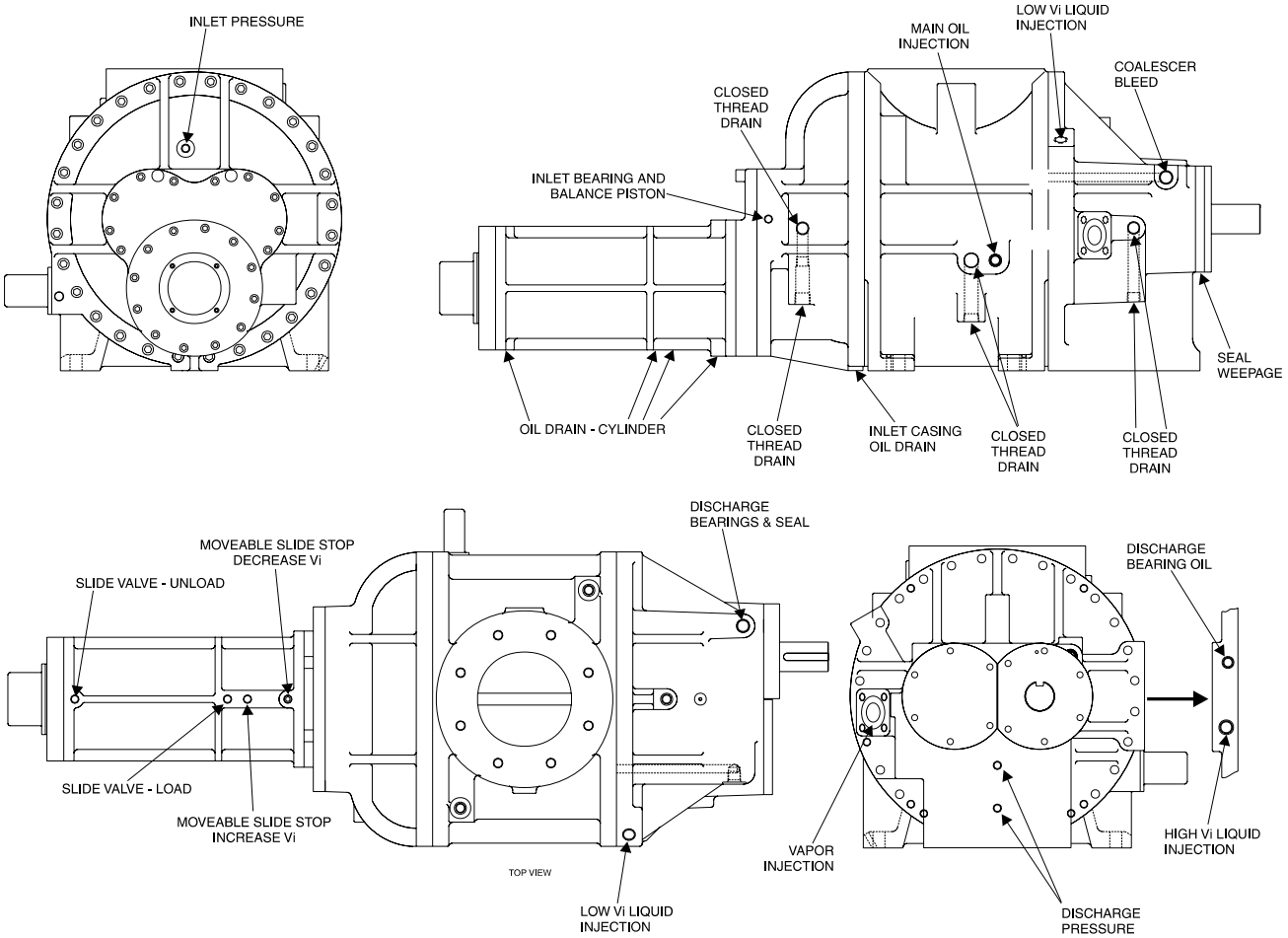
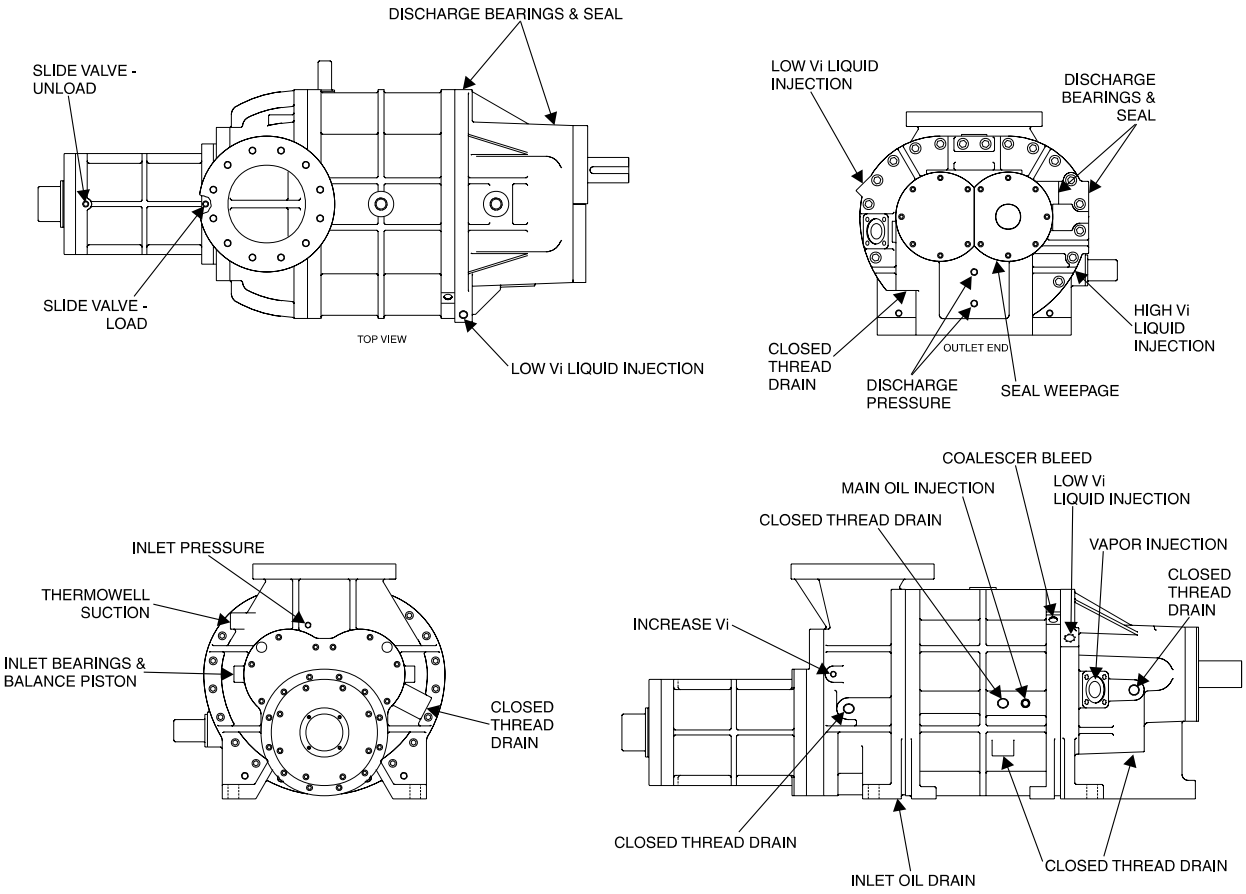


Figure 3. 163/193mm Compressor Ports Locations



SB-2	Inlet Bearing & Balance Piston
SB-3	Discharge Bearings & Seal
SC-1	Slide Valve - Unload
SC-2	Slide Valve - Load
SC-3	Moveable Slide Stop
SC-4	Moveable Slide Stop
SC-5	Inlet Pressure
SC-6	Discharge Pressure
SC-7	Seal Weepage
SC-8	Closed Thread Drain Connection
SC-9	Inlet Oil Drain
SC-10	Discharge Bearing Prelube (OPT)
SC-11	Oil Drain Connection (OPT)
SC-12	Discharge Bearing Prelube (OPT)
SC-13	Oil Drain Cylinder
SE-1	Electrical Connection
SE-2	Electrical Connection
SL-1	Liquid Injection Low Vi
SL-2	Liquid Injection High Vi
SM-1	Main Oil Injection
SV-1	Vapor Injection (Economizer)
SD-1	Coalescer Bleed Str Thd O-Ring Port

Figure 4. 233mm Compressor Ports Locations



SB-2	Inlet Bearing & Balance Piston
SB-3	Discharge Bearings & Seal
SC-1	Slide Valve - Unload
SC-2	Slide Valve - Load
SC-3	Moveable Slide Stop
SC-4	Moveable Slide Stop
SC-5	Inlet Pressure
SC-6	Discharge Pressure
SC-7	Seal Weepage
SC-8	Closed Thread Drain Connection
SC-9	Inlet Oil Drain
SC-10	Discharge Bearing Prelube (OPT)
SC-11	Oil Drain Connection (OPT)
SC-12	Discharge Bearing Prelube (OPT)
SC-13	Oil Drain Cylinder
SE-1	Electrical Connection
SE-2	Electrical Connection
SL-1	Liquid Injection Low Vi
SL-2	Liquid Injection High Vi
SM-1	Main Oil Injection
SV-1	Vapor Injection (Economizer)
SD-1	Coalescer Bleed Str Thd O-Ring Port

Figure 5. 283mm Compressor Ports Locations

REPLACING TDSL 3-STEP WITH A 4-STEP COMPRESSOR

When replacing a three-step RDB/TDSL compressor with a four-step machine, the increased heat of rejection while running at 25% to 50% capacity must be considered.

If the oil cooling process, or oil flow, is not sufficient to counter this increase in heat rejection, the first plug valve from the discharge end of the machine will need to be piped direct to the oil supply as shown in Fig. 6 & 8. When the machine starts, SP-3 will be closed, and will stay closed for the duration of the run. By piping the valve direct, there will be no need to add the third solenoid or make changes to the control sequence. For sequence see Table 2.

If the cooling process and oil flow is sufficient for this increase in heat rejection, and the customer would like to take advantage of the third plug valve, the following steps will need to be taken to utilize the third plug:

- On an RDB Plus panel the E-Prom Chips (U-4 & U-5) will need to be replaced with four-step chips to actuate the third solenoid valve. On a Quantum controller you will need to contact your Frick Factor to access "Factory Setup" and change the compressor to "RDB 4-Step."

- A third solenoid valve will need to be mounted to the package. Oil supply will need to be tubed to the solenoid valve and from the solenoid valve to the third plug valve. See Figures 7 & 9.

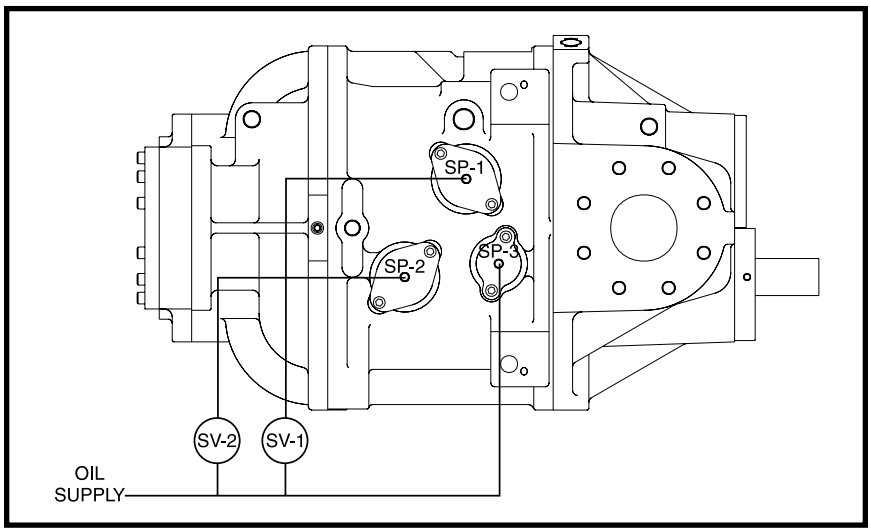


Figure 6. TDSL 283S & 283L 3-Step P & I Diagram with 4-Step Machine (bottom view)

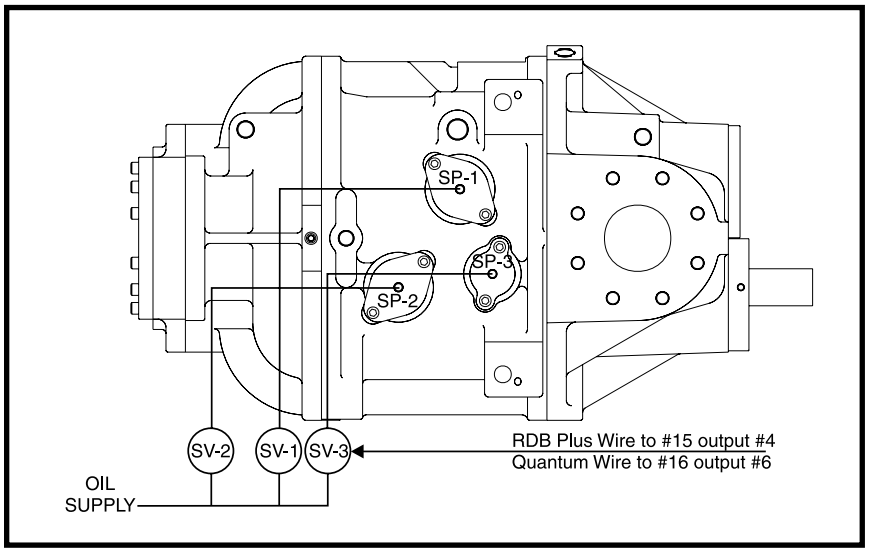


Figure 7. TDSL 283S/283L 4-Step P & I Diagram with 4-Step Machine (bottom view)

- On an RDB Plus panel, wire the added solenoid valve to wire #15, output four. On a Quantum™ controller, wire the solenoid to wire #16, output six. See Figure 7 & 9.

- On an RDB 546 with TDSL 283XL compressors, there are two plugs for each load position for a total of six. The plugs are identified as SP1 and SP1a; SP2 and SP2a; SP3 and SP3a as shown in Figures 8 & 9. When piping to these plugs, ensure that each set are piped together as shown. The SP3 port on the TDSL 283XL can be connected independently to obtain the 25% as shown in Figure 6.

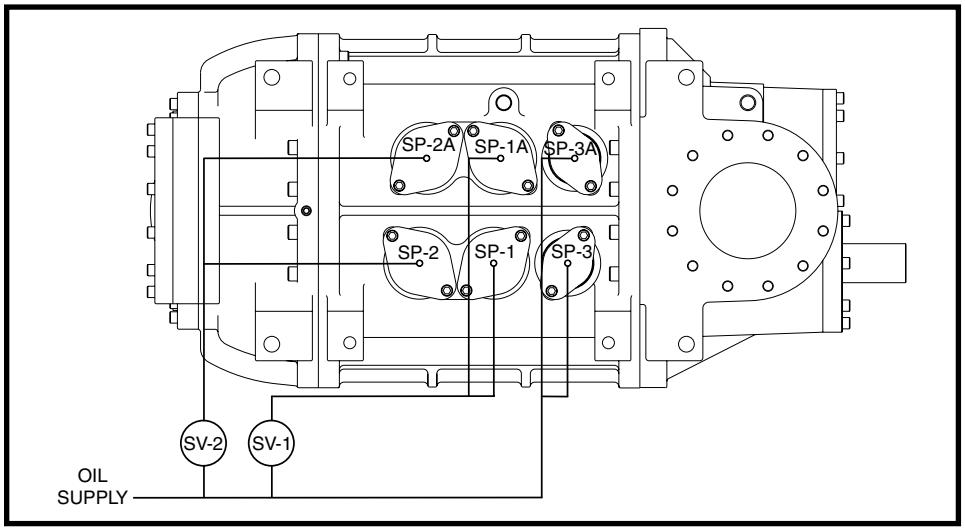


Figure 8. TDSL 283XL 3-Step P & I Diagram with 4-Step Machine (bottom view)

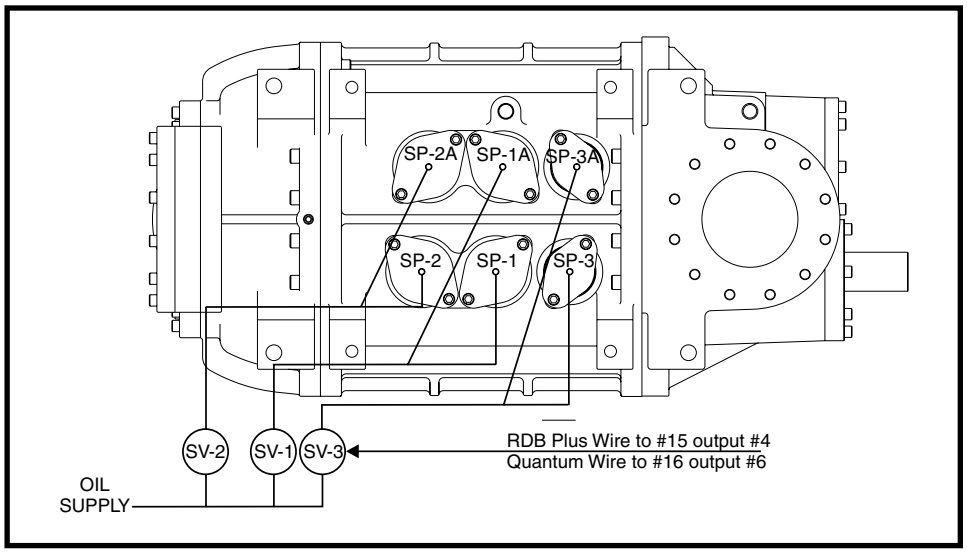


Figure 9. TDSL 283XL 4-Step P & I Diagram with 4-Step Machine (bottom view)

CAPACITY CONTROL SEQUENCE				
	% FULL LOAD CAPACITY			
PORT	25%	50%	75%	100%
Sol. - YY1	Deenergized	Deenergized	Energized	Energized
Port SP-1**	Open	Open	Closed	Closed
Sol. - YY2	Deenergized	Deenergized	Deenergized	Energized
Port SP-2**	Open	Open	Open	Closed
Sol. - YY3	Deenergized	Energized	Energized	Energized
Port SP-3**	Open	Closed	Closed	Closed

*Condition at start-up.

**RDB 546 unit has two capacity control piston assemblies per step of control.

When loading from minimum capacity (25% to 50% to 75% to 100%), solenoid YY1 must be energized before YY2.

When unloading from full load (100% to 75% to 50% to 25%), YY2 must be deenergized before YY1or YY3.

Table 2. RDB/TDSL Capacity Control Sequence

REPLACING TDSH 355 WITH TDSB 355

Due to the difference in the thrust bearing arrangement between the TDSH 355mm and TDSB 355mm compressors, changes to the balance piston piping and microprocessor chips are required. The following procedure explains the changes that must be completed:

OIL PIPING (See Figure 10 & Figure 11)
Remove the oil piping arrangement to the balance piston. TDSH 355 compressors in a high stage application are equipped with a regulating valve, solenoid valve and external orifice in the piping to the balance piston. A TDSH 355 compressor in a booster application has only a .125 inch orifice installed in the balance piston port SB-2. When replacing a TSDH 355 compressor used in either a booster, or high stage application with a TDSB 355, the balance piston piping must be changed to allow direct oil pressure from the oil manifold to the balance piston port SB-2. The regulating valve, solenoid valve, and orifice must be removed. A section of tubing needs to be installed in place of the valve arrangement removed. In the booster application, the orifice fitting at port SB-2 (Figure 10) must be removed and a standard size fitting installed. Port SB-2 is a 3/4 x 14 inch NPT connection.

PLUS MICROPROCESSOR
High stage TDSH 355 compressor units equipped with a RWBII Plus Microprocessor operates with a special program that monitors the balance piston regulating devices. When installing a TDSB 355 compressor, the U-4 and U-5 micro chips must be replaced with new chips without the balance piston monitoring function. To order new chips, contact the Controls Department, at 717-762-2121. You will need to supply the information printed on the original chips, advise that the balance piston control function must be eliminated, and provide a purchase order number. A request can be made by fax to 717-762-0654 "E-Prom Chips Ordering."

QUANTUM™ MICROPROCESSOR
The "Balance Piston Setup" must be disabled. This can be done through the "Factory Setup" function. For "Factory Setup" function, contact your Frick® Factor.

REPLACING TDSH 355 WITH TDSH 355

In some cases*, packages were built with the bypass orifice (see Figure 10) sized to 3/16″ instead of 1/8″. This will not allow correct balance piston pressure when installing a new TDSH 355 compressor. It is important to then change the bypass orifice to 1/8″. If in doubt the 1/8″ orifice is acceptable in all applications using the TDSH 355 compressor. Remanufactured compressors do have the 1/8″ orifice installed.

* TDSH 355 balance piston orifice was changed from 1/8″ to 3/16″ in December 1999. In July 2001 it was changed back to 1/8″.

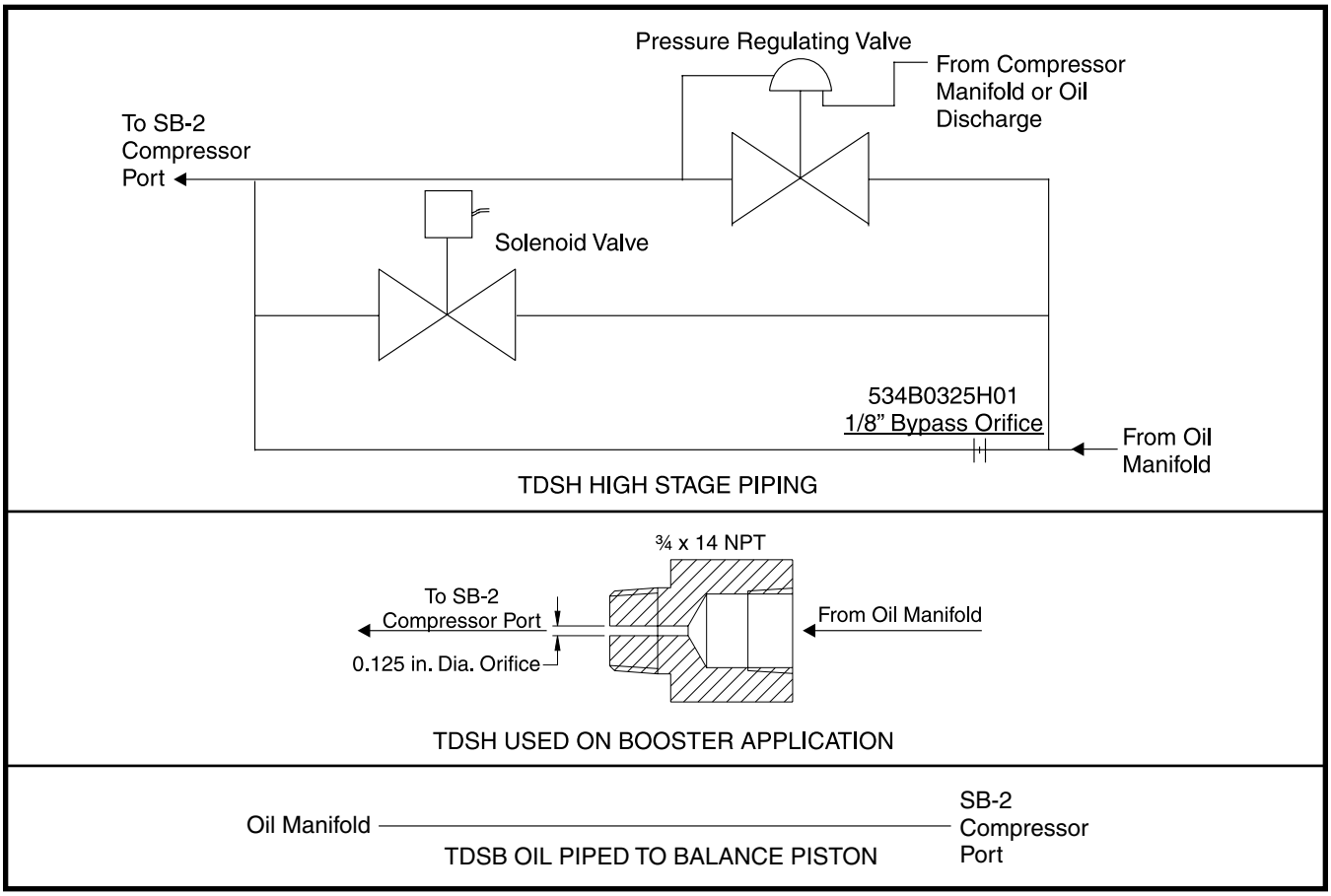
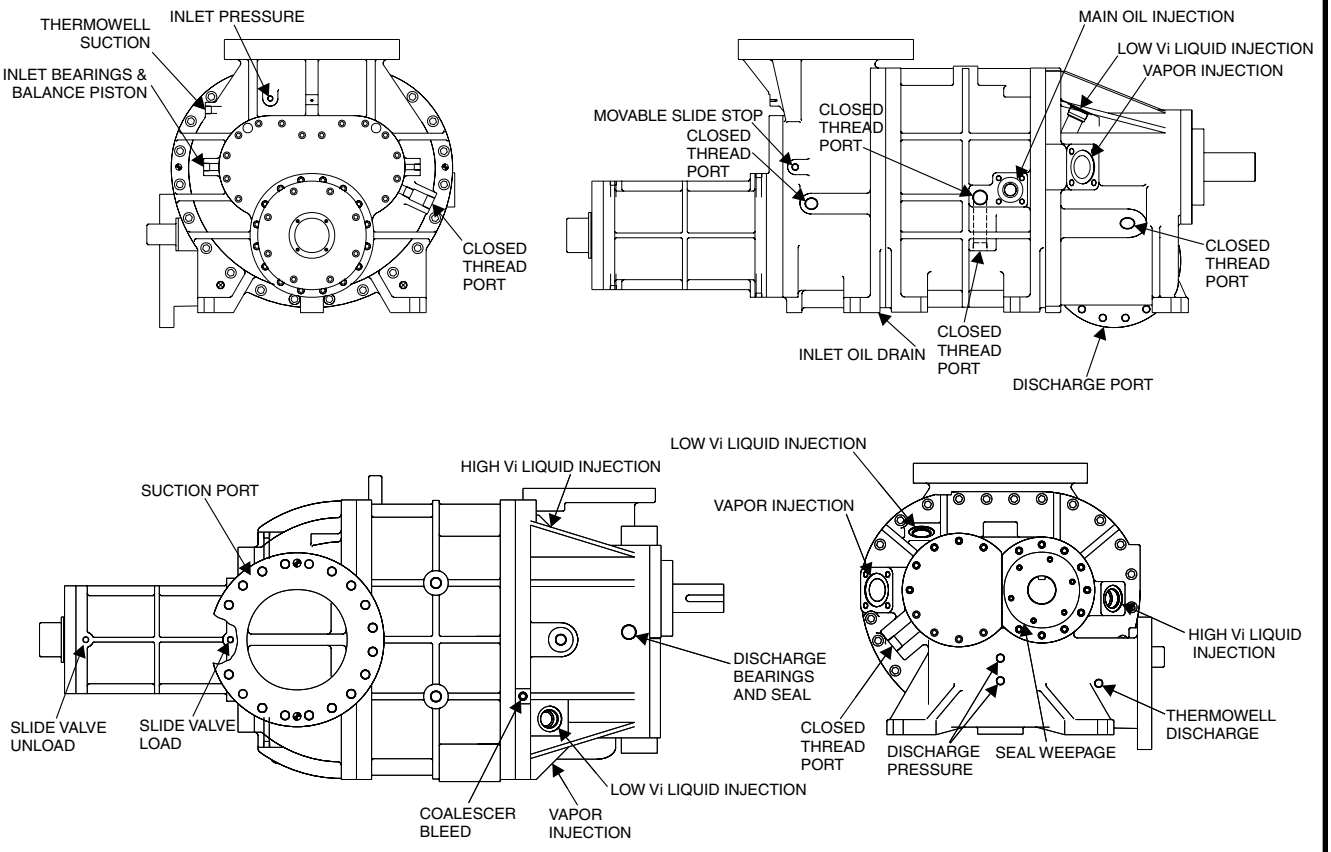


Figure 10. Booster 1/8" Orifice Fitting



SB-2	Inlet Bearing & Balance Piston
SB-3	Discharge Bearings & Seal
SC-1	Slide Valve - Unload
SC-2	Slide Valve - Load
SC-3	Moveable Slide Stop
SC-4	Moveable Slide Stop
SC-5	Inlet Pressure
SC-6	Discharge Pressure
SC-7	Seal Weepage
SC-8	Closed Thread Drain Connection
SC-9	Inlet Oil Drain
SC-10	Discharge Bearing Prelube (OPT)
SC-11	Oil Drain Connection (OPT)
SC-12	Discharge Bearing Prelube (OPT)
SC-13	Oil Drain Cylinder
SE-1	Electrical Connection
SE-2	Electrical Connection
SL-1	Liquid Injection Low Vi
SL-2	Liquid Injection High Vi
SM-1	Main Oil Injection
SV-1	Vapor Injection (Economizer)
SD-1	Coalescer Bleed Str Thd O-Ring Port

Figure 11. 355mm Compressor Ports Locations

XJS COMPRESSOR REPLACEMENT

The following procedure is required when a compressor is replaced in the field:

NOTE: Refer to current Installation-Operation-Maintenance Manual of your unit for detailed shutdown/start-up instructions.

1. Verify that main power to the unit is disconnected. Lockout and tag the switch.

2. Close suction and discharge service valves, also liquid injection and economizer service valves, as applicable.

3. Slowly vent separator to low-side system pressure using the bypass line on suction trap.

NOTE: Recover or transfer all refrigerant vapor, in accordance with applicable ordinances, before opening to atmosphere. The separator must be equalized to atmospheric pressure.

⚠ CAUTION **To prevent injury or damage to components, and for complete details regarding pressurized refrigerant vapor transfer and recovery, see the current Installation-Operation-Maintenance Manual for your unit.**

4. Remove all tubing, piping, and wiring that is connected to the compressor.

5. Disconnect the coupling from the motor shaft.

6. Support the compressor by attaching a crane, or similar lifting device, to the lifting eyebolts supplied with the compressor. Remove bolts from the compressor feet and discharge flange. Carefully remove compressor from base. See Table 7 for compressor weights.

7. Thoroughly clean the replacement compressor and motor feet and mounting pads of burrs and other foreign matter to ensure firm seating of the compressor.

8. Clean the discharge flange surfaces on the compressor and separator flange.

9. Support the new compressor in the same fashion as the old compressor. Remove the solid plate from the discharge flange. The gasket between the flange and solid plate will be used to seal the compressor to the separator flange. Make sure the gasket does not restrict gas flow. **(Contact Baltimore Parts Center for replacement gaskets, Ph:800-336-7264)**

10. Measure the clearance between the compressor feet and the base plate with a feeler gauge. Shim any compressor feet that exhibit a gap (gauge reading + .002″). A pry or jack can be used to lift the compressor .002″. Reinstall and tighten bolts in feet. Prior to tightening discharge and suction flanges, check compressor feet for "soft foot". Tighten bolts in the discharge flange connection to the compressor using a star pattern. Lube bolts then make finger tight on all bolts. Next torque to 1/3 of table value in star pattern increasing by 1/3's to full torque. See Table 4. XJS/XJF Flange Bolt Torque.

11. Install tubing, piping and wiring. Use the suction gasket supplied with the new compressor. It is located between solid plate and suction port. Refer to the Installation, Operation and Maintenance manual for P & I diagram.

12. Reinstall drive coupling. See current Installation-Operation-Maintenance Manual of your unit for coupling alignment procedure.

NOTE: If motor was disconnected or changed, motor rotation must be checked before drive coupling is installed.

13. The shaft alignment must be measured and aligned to .004" total indicator reading. Verification of the alignment is necessary after the compressor is operated for approximately four hours.

NOTE: Failure to follow this procedure could result in binding of internal parts, i.e. slide valve, slide stop, and bearings which could result in improper operation or premature failure of machine.

XJS/XJF SLIDE VALVE SOLENOID VALVES

All replacement XJS/XJF compressors have a 2-1/4 x 2 inch block mounted on top of the discharge housing. This block covers the ports for the slide valve solenoid valve. If the compressor being replaced has the solenoid mounted on the discharge housing, remove the solenoid from the old compressor and remount on the new compressor. See Figure 12.

If the compressor being replaced has the slide valve solenoid mounted on the base of the unit, DO NOT remount the solenoid on the discharge housing. Reconnect the solenoid tubing in the same ports as was removed from the old compressor. See Figure 13.

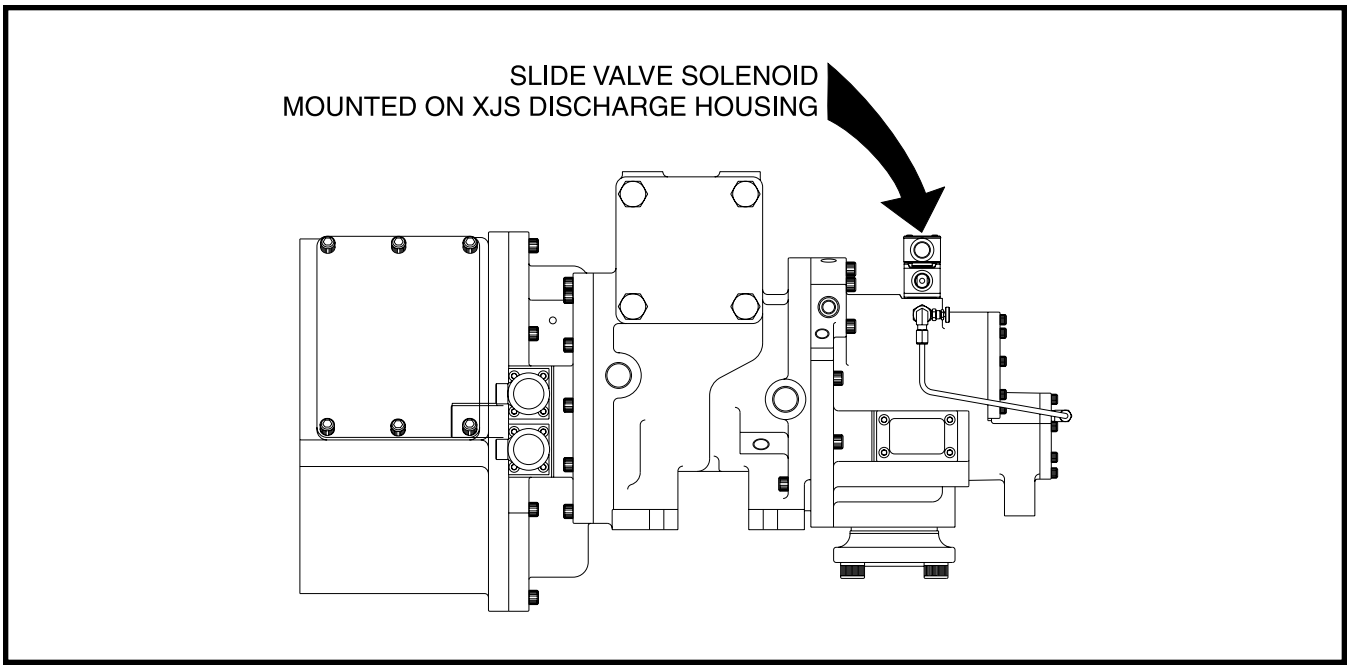


Figure 12. XJS Discharge Housing Mounted Solenoid

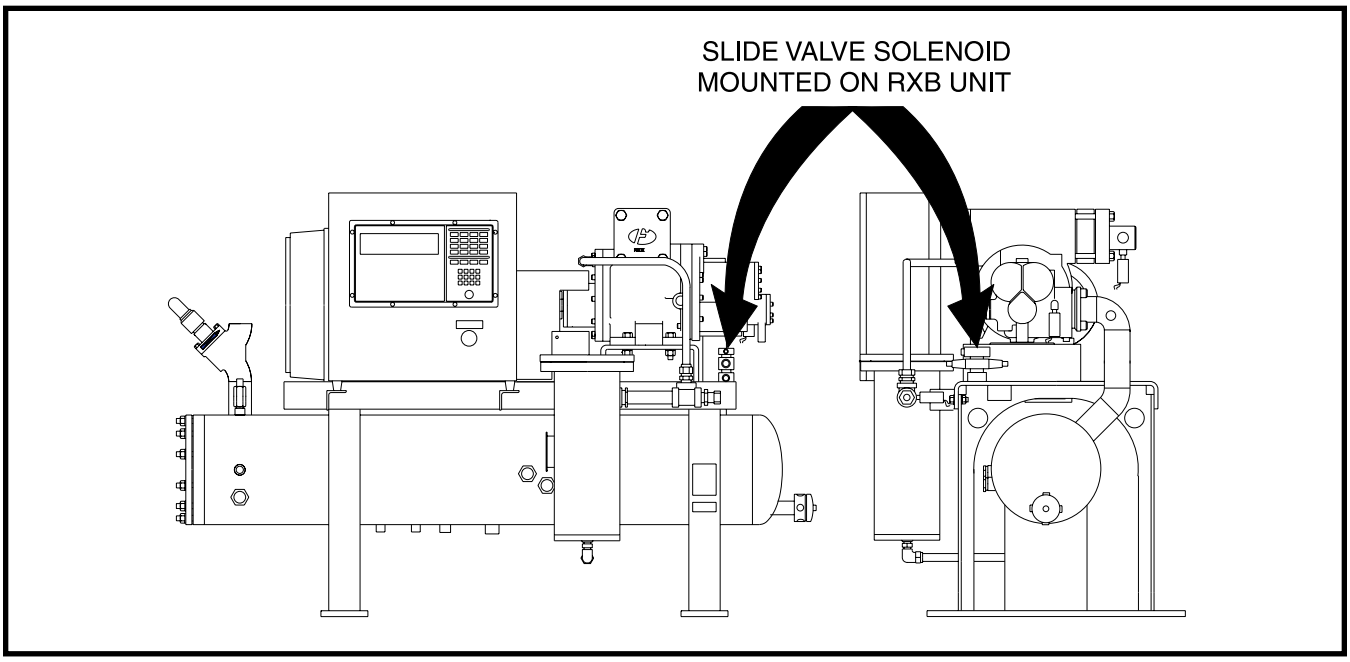


Figure 13. RXB Unit Housing Mounted Solenoid

RXF/XJF MOTOR & COMPRESSOR REPLACEMENT PROCEDURE

The purpose of this procedure is to outline the process for mounting replacement motors and compressors on RXF packages in the field. The goal is to ensure a stress-free compressor and motor arrangement to assure the designed life of the bearings and shaft seals. In addition, a stress-free arrangement will yield proper slide valve operation and minimize vibration.

Motor Replacement Procedure:

1. Verify that main power to the unit is disconnected. Lockout and tag the switch.

2. Prior to removing the motor from the RXF package, the compressor must be blocked up and properly supported. The entire weight of the compressor and tunnel must be supported. Reference Table 7 for compressor weights. Do not unbolt the compressor from the oil separator.

3. Remove the bolts between the motor and the compressor tunnel while supporting the motor weight. Then lift the motor from the compressor package. Reference Table 3 for motor weights.

4. Using a spring scale, weigh the replacement motor prior to assembly to the compressor. Reference Figure 14. If a spring scale is not available, contact factory or the motor manufacture for the weight of the motor (Table 3 may also be used as a guide).

5. Align the D-flange or C-face motor holes to the compressor tunnel holes while supporting the weight of the motor.

6. Insert the bolts through the flanged motor holes and into the compressor tunnel and tighten by hand.

7. Continue to support the motor weight by maintaining the same weight on the spring scale. If a spring scale and/or overhead support is not available, then a hydraulic piston may be used underneath the motor. Reference Figure 15. **(Contact the Baltimore Parts Center for a Hydraulic Pump Kit, p/n 720A0029G01 - Ph:800-336-7264)**

NOTE: The motor weight must be supported to avoid stressing the compressor or motor. Do not over or under support the motor. The scale or pressure gage reading must be within +/- 10% of the motor weight.

8. If a hydraulic piston is used, then proceed with the following guidelines:
   a. Determine the area of the piston (Pressure = πr^2) or (Piston Area = Pi * Piston Diameter^2 / 4).
   b. Calculate the required pressure (Pressure = Weight of motor / Piston Area). The cylinder manufacturer's website will show a chart giving the effective area.
   c. Using a pressure gage between the hydraulic piston and pump, increase the pressure until the gage reaches the calculated required pressure.

9. Torque the bolts between the motor and compressor tunnel to the required specification. Reference Table 4.

10. While the motor is still supported, shim the motor feet to less than .002 inch gap between each motor foot and the support base. Then, bolt the motor to the mounting base and torque the motor mounting bolts to 250 ft-lb.

11. The overhead support or hydraulic piston may now be removed. The blocks supporting the compressor may also be removed.

12. Verify motor rotation with coupling removed.

Figure 14. Weigh replacement motor

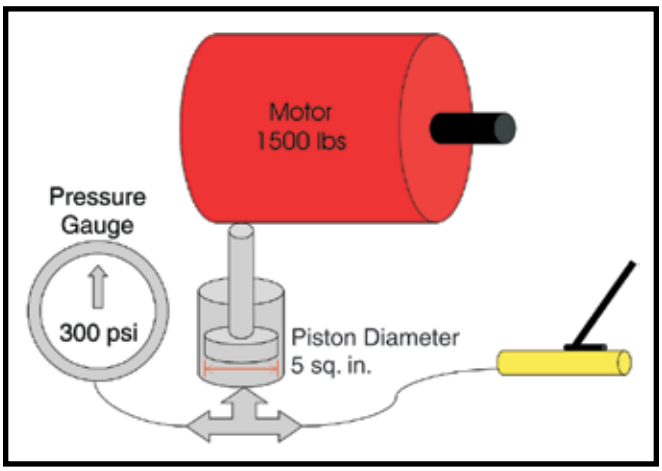


Figure 15. Hydraulic piston supports motor weight

Compressor Replacement Procedure:

1. Verify that main power to unit is disconnected. Lockout and tag the switch. Disconnect all wiring from the motor.

2. For compressor replacement, the motor and compressor must be removed as one assembly from the RXF Package.

3. Disconnect all tubing and pipe connections from the compressor. Support the assembly, including tunnel and motor. Support microprocessor as needed. Reference Table 3 & 7 for compressor and motor weights. Remove bolts and lift the assembly from the package. Tag and reuse any motor feet shims.

⚠ CAUTION **To prevent injury or damage to components, and for complete details regarding pressurized refrigerant vapor transfer and recovery, see the current Installation-Operation-Maintenance Manual for your unit.**

4. Place a new gasket on the oil separator flange. **(Contact the Baltimore Parts Center for replacement gaskets, Ph:800-336-7264).** Assemble the new compressor to the tunnel and hand tighten the bolts in a star pattern. Then torque to 1/3 of table value in star pattern increasing by 1/3's to full torque. Refer to Table 4 for torque specifications.

5. Set the replacement compressor and motor assembly on the separator flange and align the oil separator flange bolt holes to the compressor discharge flange bolt holes while supporting the assembly with a hydraulic piston underneath the motor. Reference Figure 17. The hydraulic piston must support the motor weight plus 1/2 the compressor weight. Reference Table 3 & 7 for motor and compressor weights. Follow the guidelines as outlined in step 7 of the motor mounting procedure above.

6. Insert the bolts through the oil separator flange and into the compressor discharge flange. Tighten bolts using a star pattern. Lube bolts then finger tight on all bolts, then torque to 1/3 of table value in star pattern increasing by 1/3's to full torque. Reference Table 4. XJS/XJF Flange Bolt Torques.

7. The motor feet should rise above the support base. If not, remove the compressor, add another gasket on top of the oil separator flange and repeat steps 4 & 5.

8. While the assembly is still supported, measure the clearance between the motor feet and base plate with a feeler gage. Shim the motor feet to gage reading plus .002″ gap between each motor foot and the support base. Then, bolt the motor to the mounting base and torque the motor mounting bolts to 250 ft-lb. Reference Figure 16.

9. Reconnect all tubing and pipe connections to the compressor and all wiring to the motor.

10. Remove the lifting assembly.

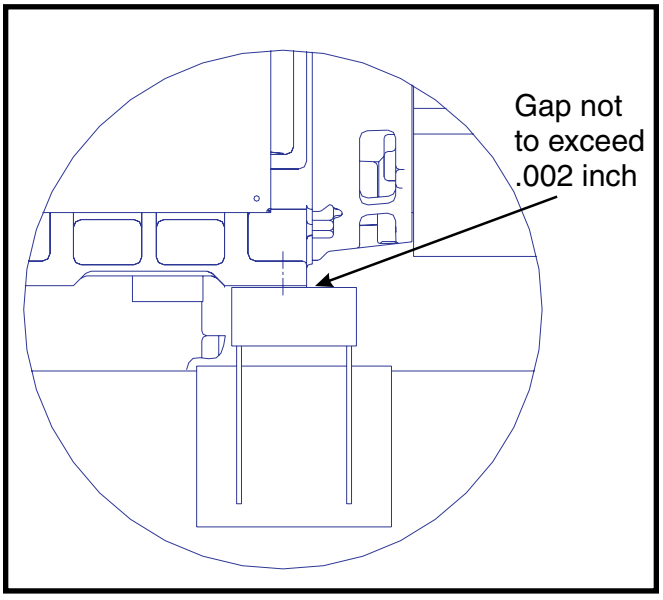


Figure 16. Shim motor feet to less than .002 inch gap

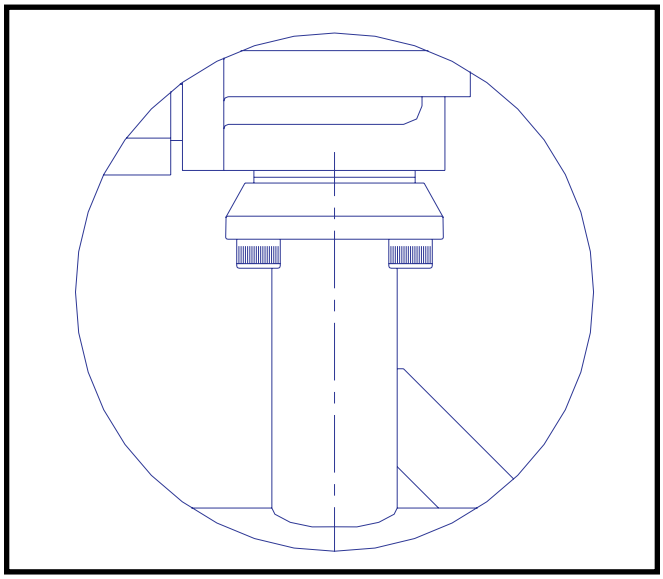


Figure 17. Set replacement compressor and motor assembly on separator flange

Motor HP	Frame	Approximate Wt. lbs (kg)
75	364TSC	630 (286)
100	365TSC	730 (331)
125	404TSC	930 (422)
125	LN405TDZ	1,000 (454)
134	LN405TDZ	1,000 (454)
150	405TSC	1,060 (481)
150	LN405TDZ	1,070 (485)
154	LN405TDZ	1,070 (485)
175	LN405TDZ	1,080 (490)
200	LN405TDZ	1,080 (490)
235	LN445TDZ	1,440 (653)
250	LN445TDZ	1,540 (699)
263	LN445TDZ	1,540 (699)
284	LN447TDZ	1,630 (739)
300	LN447TDZ	1,730 (785)
305	LN447TDZ	1,730 (785)
335	LN447TDZ	1,730 (785)
350	LN447TDZ	1,880 (853)
368	LN447TDZ	1,880 (853)
400	LN449TDZ	2,180 (989)
407	LN449TDZ	2,180 (989)
437	LN449TDZ	2,180 (989)
450	LN449TDZ	2,310 (1048)

Table 3. XJS/XJF Motor Weights

NOTE: The weights listed are for reference only and are approximate based on standard open drip proof motors operating at 60 Hz. Contact factory or the motor manufacture to confirm the motor weight.

RXF Model	Compressor Model	Motor Flange to Compressor Tunnel		Compressor Flange to Separator Flange	
		Bolt Size (in.)	Torque (ft-lb.)	Bolt Size	Torque (ft-lb.)
12	XJF 95S	1/2 or 5/8	58	M20 X 2.5	107
15	XJF 95M	1/2 or 5/8	58	M20 X 2.5	107
19	XJF 95L	1/2 or 5/8	58	M20 X 2.5	107
24	XJF 120S	1/2 or 5/8	58	M20 X 2.5	150
30	XJF 120M	1/2 or 5/8	58	M20 X 2.5	150
39	XJF 120L	1/2 or 5/8	58	M20 X 2.5	150
50	XJF 120S	1/2 or 5/8	58	M20 X 2.5	150
58	XJF 151A	5/8 or 3/4	144	M22 X 2.5	167
68	XJF 151M	5/8 or 3/4	144	M22 X 2.5	167
85	XJF 151L	5/8 or 3/4	144	M22 X 2.5	167
101	XJF 151N	5/8 or 3/4	144	M22 X 2.5	167

Table 4. XJS/XJF Flange Bolt Torque

NOTE:

1. The bolt torque requirements for the motor flange to compressor tunnel are based on metal to metal contact.

2. The bolt torque requirements for the compressor flange to separator flange are based on:

a. Gaskets: Garlock® Blue-Gard® 3300

b. Bolts: class 8.8 or stronger hex head bolts, lightly oiled and clean

SLIDE VALVE POTENTIOMETERS vs LINEAR TRANSMITTERS FOR RXF/RXB UNITS.

Remanufactured XJF compressors are supplied with a slide valve linear transmitter. The linear transmitter is used only with the Quantum™ / Quantum™ LX microprocessor.

RXF/RXB Plus Microprocessors or Mini-micros:

If you are replacing an older compressor that has an RXF/RXB Plus microprocessor, or a Mini-micro, remove the slide valve potentiometer assembly and indicator rod assembly (See Fig. 18a) prior to returning the compressor. Save these parts. Remove the linear transmitter (See Fig. 18c) from the remanufactured compressor. Replace it with your parts saved from the original compressor.

It is recommended that you retain the old compressor until the new compressor is installed. However, if you have shipped the original compressor back before removing the parts, and the unit does **not** have a Quantum™ / Quantum™ LX microprocessor, you will need to order the following parts. (See Figure 18a):

Description	XJF 95	XJF 120	XJF 151	Item
Slide Valve Potentiometer Service Kit	111Q0045464	111Q0045464	111Q0045464	1
Indicator Rod	534B0185H01	534B0235H01	534B0516H01	2
Indicator Rod Guide	534C0382H01	534C0382H01	534C1064H01	3
Spring	534A0148H01	534A0148H01	534A0148H01	4
O-ring (Internal)	980A0012A11	980A0012A11	980A0012A11	5
O-ring (External)	980A0012K62	980A0012K62	980A0012K62	6

Quantum™ Controls:

If the original unit has a Quantum™ / Quantum™ LX microprocessor with a slide valve potentiometer, the linear transmitter (See Fig. 18c) on the remanufactured compressor may be used in place of the potentiometer. It will be necessary to install links or jumpers (P/N 333Q0001419) at link location J14, J16, and pins 1 & 2 of J15 on the older style analog board (May 2003 and earlier). If the Quantum™ has the current style analog board (June 2003 and later), this is done with a channel type selection in Factory Setup. Contact your Frick® Factor for access and instruction. The linear transmitter needs to be set to 0-20 mA. It will also be necessary to have a DIN connector (P/N 649A0890H01) and Gasket (P/N 649A0890H11) to connect the existing wire to the transmitter. Make sure the connector is wired as shown in publication S90-010 M Quantum™ Control Panel Maintenance or 090-020 M Quantum™ LX Control Panel Maintenance for the RXF unit. (See Figure 18b).

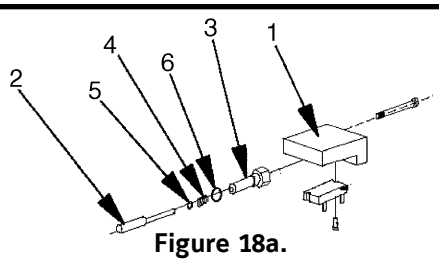


Figure 18a.

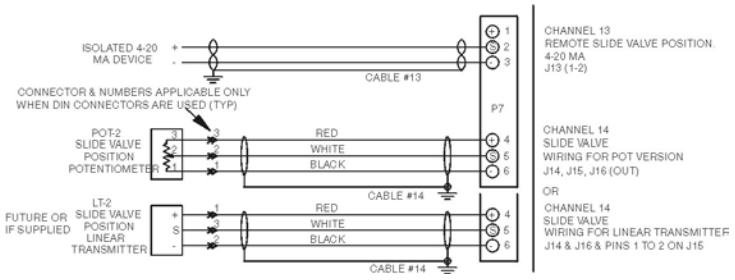


Figure 18b.

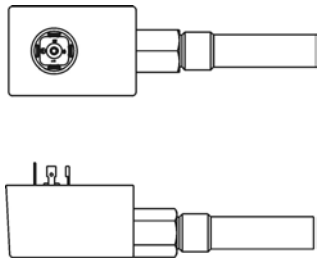


Figure 18c.

Figure 18. Slide Valve Potentiometers vs Linear Transmitters on Remanufactured XJF Compressors

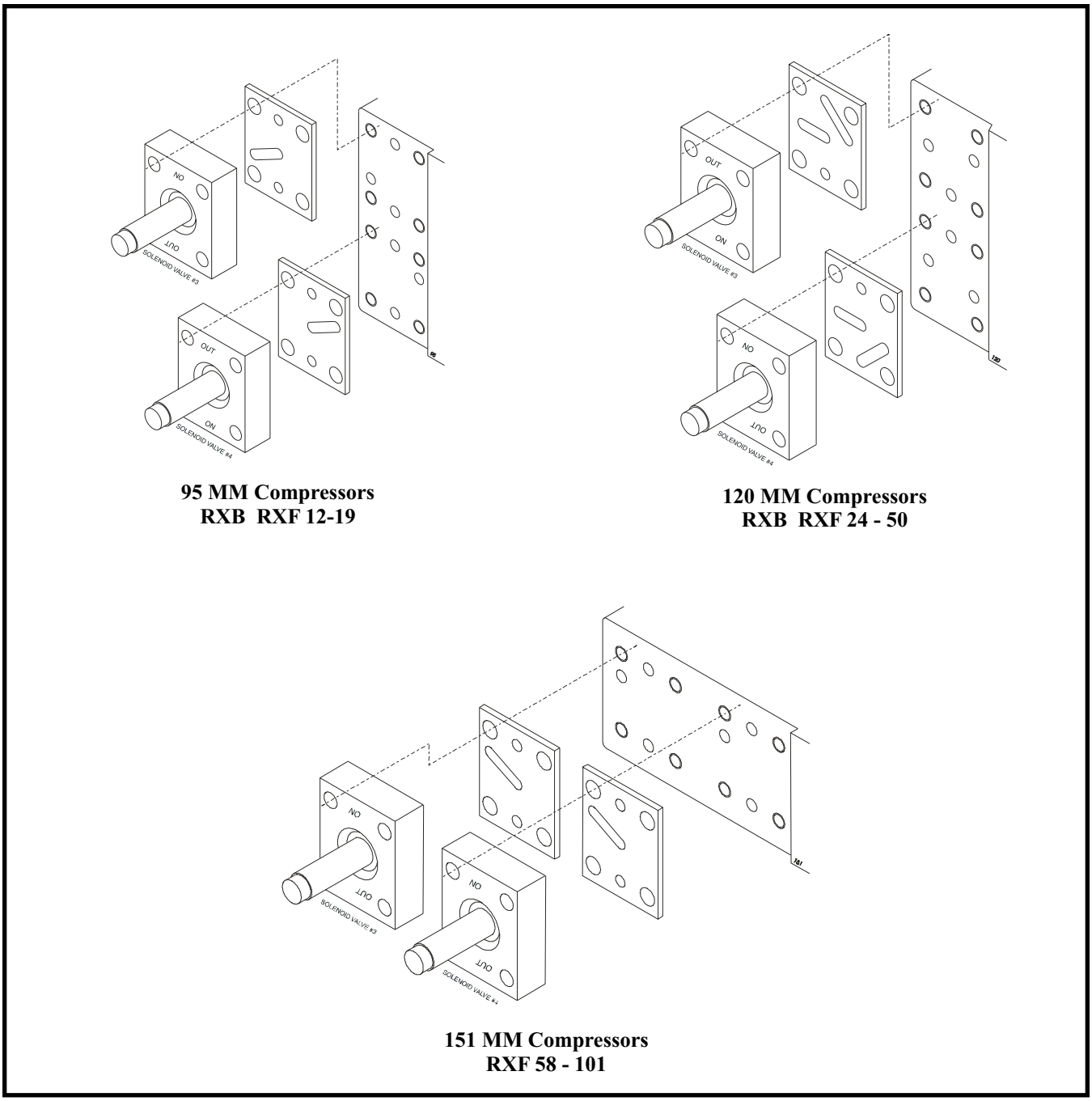


Figure 19. Installation of Precision Engineering Vi Control Valves and Gaskets, RXB & RXF Pkgs

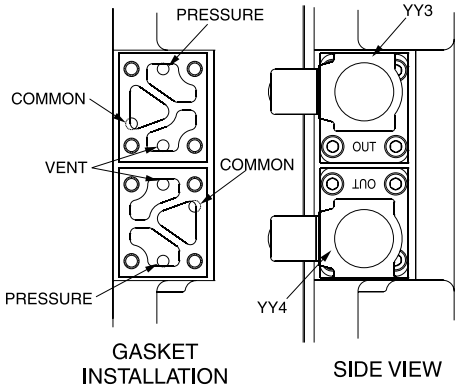
Vi CONTROL VALVES AND GASKETS

Proper installation of the Vi control valves and gaskets on XJS and XJF compressor models (RXB and RXF packages) is essential to the operation of this equipment. Incorrectly installed parts may cause the compressor to operate at the wrong Vi, or to load or unload improperly. Operation at the wrong compressor Vi can cause excessive power consumption, noise, vibration, or excessive oil foaming.

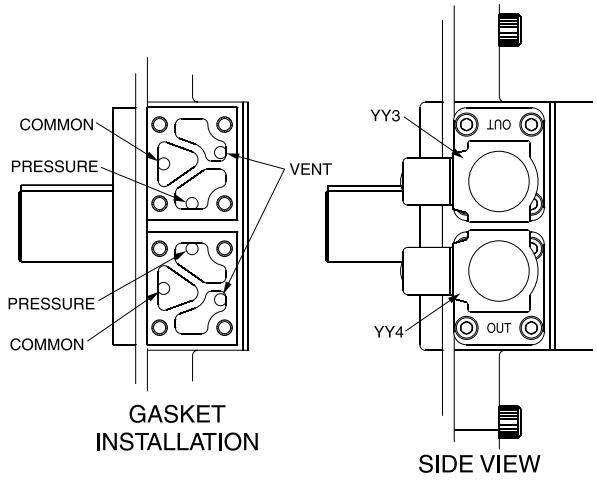
The following chart provides the logic of solenoid valve operation to adjust the compressor volume ratio. Solenoid valve #3 and #4 are referenced in the IOM manuals as YY3 and YY4 or SV3 and SV4 respectively. Figures 19 and 20 show the correct installation of gaskets and valves. Note the "NO" (normally open) and "OUT" (vent) labels on the solenoid valves. Position valves as shown to insure proper operation of compressor.

Vi	Solenoid Valve #3	Solenoid Valve #4
2.2	Energized	Energized
3.5	De-Energized	Energized
5	De-Energized	De-Energized

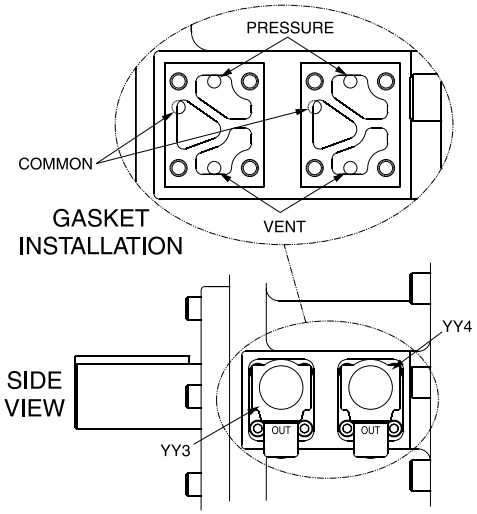
NOTE: Valve positions are different on the different compressor sizes.



95 MM Compressors RXF 12 - 19



120 MM Compressors RXF 24 - 50



151 MM Compressors RXF 58 - 101

Figure 20. Installation of Danfoss Vi Control Valves and Gaskets, RXB & RXF Pkgs

RWF MOTOR & COMPRESSOR REPLACEMENT PROCEDURE

The purpose of this procedure is to outline the process for mounting replacement motors and compressors on RWF packages in the field. The goal is to ensure a stress-free compressor and motor arrangement to assure the designed life of the bearings and shaft seals. In addition, a stress-free arrangement will yield proper slide valve operation and minimize vibration.

Motor Replacement Procedure:

1. Verify that main power to the unit is disconnected. Lockout and tag the switch.

2. Prior to removing the motor, the compressor must be blocked up and properly supported. The entire weight of the compressor and tunnel must be supported. Reference Table 7 Compressor Weights. Do not unbolt the compressor from the separator.

3. Remove the bolts between the motor and compressor tunnel while supporting the motor weight. Then lift the motor from the compressor package. Reference Table 5. Motor Weights

4. Using a spring scale, weigh the replacement motor prior to assembly to the compressor. Reference Figure 22. If a spring scale is not available, contact Frick or the motor manufacture for the weight of the motor (Table 5 may also be used as a guide).

5. Align the D-flange or C-face motor holes to the compressor tunnel holes while supporting the weight of the motor.

6. Insert the bolts through the flanged motor holes and into the compressor tunnel and tighten by hand.

7. Continue to support the motor weight by maintaining the same weight on the spring scale. If a spring scale and/or overhead support is not available, then a hydraulic piston may be used underneath the motor. Reference Figure 22. **(Contact the Baltimore Parts Center for a Hydraulic Pump Kit, p/n 720A0029G01 - Ph:800-336-7264)**

NOTE: The motor weight must be supported to avoid stressing the compressor or motor. Do not over or under support the motor. The scale or pressure gage reading must be within +/- 10% of the motor weight.

8. If a hydraulic piston is used, then proceed with the following guidelines:
   a. Determine the area of the piston (Pressure = πr^2) or (Piston Area = Pi * Piston Diameter^2 / 4).
   b. Calculate the required pressure (Pressure = Weight of motor / Piston Area). The cylinder manufacturer's website will show a chart giving the effective area.
   c. Using a pressure gage between the hydraulic piston and pump, increase the pressure until the gage reaches the calculated required pressure.

9. Torque the bolts between the motor and compressor tunnel to the required specification (Reference Table 6).

10. While the motor is still supported, shim any feet that exhibit a gap (gauge reading + .002″). A pry or jack can be used to lift the compressor .002″. Reinstall and tighten bolts in feet. Then, bolt the motor to the mounting base and torque the motor mounting bolts to 250 ft-lb. Reference Figure 23.

11. The overhead support or hydraulic piston may now be removed.

Figure 21. Weigh replacement motor

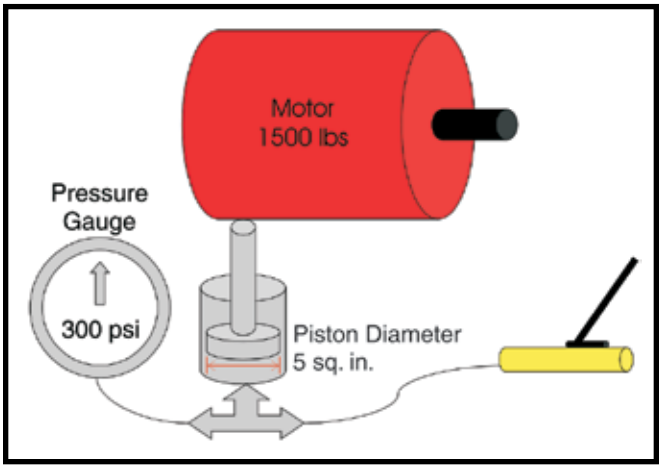


Figure 22. Hydraulic piston supports motor weight

Compressor Replacement Procedure:

1. Verify that main power to unit is disconnected. Lockout and tag the switch. Disconnect all wiring from the motor.

2. The motor must be blocked up and properly supported prior to removing the compressor from the RWF package. The entire weight of the motor must be supported.

3. Disconnect all tubing and pipe connections from the compressor. Remove the bolts and the drive coupling, and lift the compressor and tunnel assembly from the package. Reference Table 7 for compressor weights. The tunnel must be disconnected from the motor.

⚠ CAUTION **To prevent injury or damage to components, and for complete details regarding pressurized refrigerant vapor transfer and recovery, see the current Installation-Operation-Maintenance Manual for your unit.**

4. Place a new gasket on the oil separator flange. **(Contact the Baltimore Parts Center for replacement gaskets, Ph:800-336-7264)**

5. Set the new compressor on the support base and align the oil separator flange bolt holes to the compressor discharge flange bolt holes.

6. Insert the bolts through the oil separator flange and into the compressor discharge flange. Torque the bolts to the required specification (reference Table 6).

7. The compressor feet should rise above the support base. If not, remove the compressor, add another gasket on top of the oil separator flange and repeat steps 4 & 5.

8. Shim any compressor feet that exhibit a gap (gauge reading + .002″). A pry or jack can be used to lift the compressor .002″. Reinstall and tighten bolts in feet. Reference Figure 24. Then, bolt the compressor to the support base and torque the mounting bolts to 250 ft-lb.

9. Reconnect all tubing and pipe connections to the compressor.

10. Follow the motor mounting procedure as outlined above for attaching the motor to the compressor.

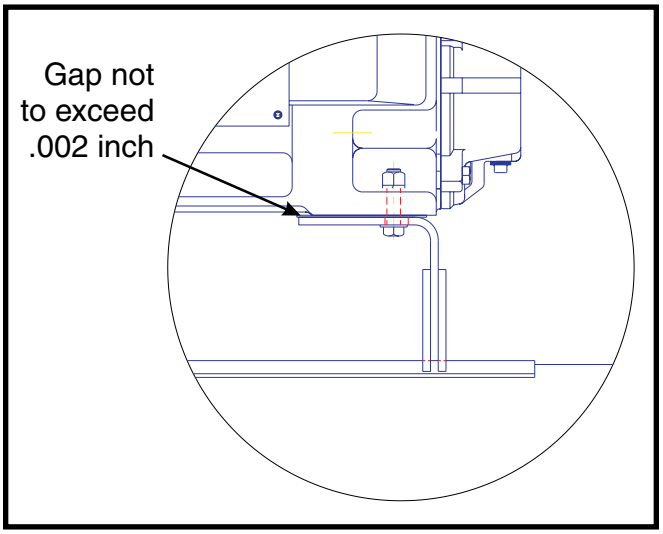


Figure 23. Shim motor feet to less than .002 inch gap

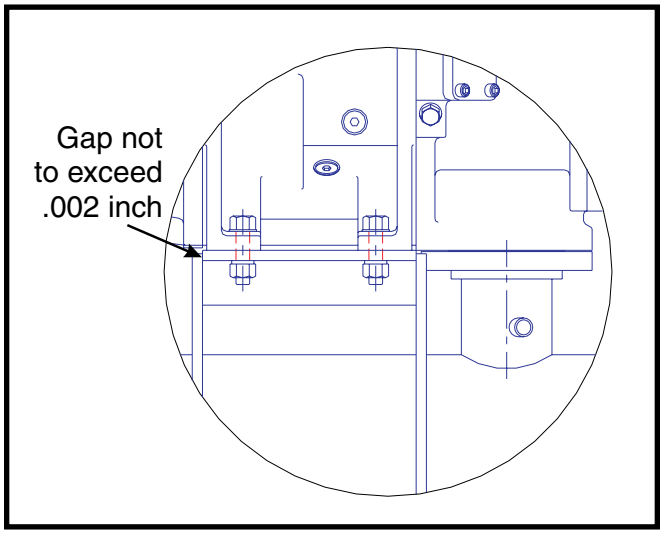


Figure 24. Set replacement compressor and motor assembly on separator flange

Motor HP	Frame	Aprox. Wt. lbs (Kg)
125	LN405TDZ	1,000 (454)
134	LN405TDZ	1,000 (454)
150	LN405TDZ	1,070 (485)
154	LN405TDZ	1,070 (485)
175	LN405TDZ	1,080 (490)
200	LN405TDZ	1,080 (490)
235	LN445TDZ	1,440 (653)
250	LN445TDZ	1,540 (699)
263	LN445TDZ	1,540 (699)
284	LN447TDZ	1,630 (739)
300	LN447TDZ	1,730 (785)
305	LN447TDZ	1,730 (785)
335	LN447TDZ	1,730 (785)
350	LN447TDZ	1,880 (853)
368	LN447TDZ	1,880 (853)
400	LN449TDZ	2,180 (989)
407	LN449TDZ	2,180 (989)
437	LN449TDZ	2,180 (989)
450	LN449TDZ	2,310 (1048)
482	LN449TDZ	2,310 (1048)
500	LN449TDZ	2,310 (1048)
529	LN449TDZ	2,310 (1048)
570	LN5008DZ	3,200 (1451)
600	LN5008DZ	3,200 (1451)
643	LN5010DZ	3,450 (1565)
687	LN5010DZ	3,990 (1810)

Table 5. SGC Motor Weights

NOTE: The weights listed are for reference only and are approximate based on standard open drip proof motors operating at 60 Hz. Contact factory or the motor manufacturer to confirm the motor weight.

RWF Model	Compressor Model	Motor Flange to Compressor Tunnel		Discharge Flange to Separator Flange		Suction Flange	
		Bolt Size (in.)	Torque (ft-lb)	Bolt Size	Torque (ft-lb)	Bolt Size	Torque (ft-lb)
100	SGC 1913	3/4-10 UNC	144	M20 X 2.5	140	M20 X 2.5	180
134	SGC 1918	3/4-10 UNC	144	M20 X 2.5	140	M20 X 2.5	160
177	SGC 2313	3/4-10 UNC	144	M20 X 2.5	160	M20 X 2.5	160
222	SGC 2317	3/4-10 UNC	144	M20 X 2.5	160	M22 X 2.5	230
270	SGC 2321	3/4-10 UNC	144	M20 X 2.5	160	M22 X 2.5	230
316	SGC 2813	3/4-10 UNC	144	M22 X 2.5	230	M22 X 2.5	230
399	SGC 2817	3/4-10 UNC	144	M22 X 2.5	230	M24 X 3.0	240
480	SGC 2821	3/4-10 UNC	144	M22 X 2.5	230	M24 X 3.0	240
546	SGC 2824	3/4-10 UNC	144	M22 X 2.5	230	M24 X 3.0	240
496	SGCB/H 3511	3/4-10 UNC	144	M24 X 3.0	240	M30 X 3.5	350
676	SGCB/H 3515	3/4-10 UNC	144	M24 X 3.0	240	M30 X 3.5	350
856	SGCB/H 3519	3/4-10 UNC	144	M24 X 3.0	240	M30 X 3.5	350
1080	SGCB/H 3524	3/4-10 UNC	144	M24 X 3.0	240	M30 X 3.5	350

Table 6. SGC Flange Bolt Torque

NOTE:

1. The bolt torque requirements for the motor flange to compressor tunnel are based on metal to metal contact.

2. The bolt torque requirements for the compressor flange to separator flange are based on:

a. Gaskets: Garlock® Blue-Gard® 3300

b. Bolts: class 8.8 or stronger hex head bolts, lightly oiled and clean

RETURNING THE OLD COMPRESSOR

1. Prior to returning a compressor to the factory, a Return Material Authorization Number (RMA) must be obtained by calling Baltimore Parts Center, at 800-336-7264. Attach the RMA to the compressor. Ship the compressor prepaid to:

   Johnson Controls
   100 C.V. Ave.
   Waynesboro, PA 17268
   Attn: RMA # _ _ _ _ _ _ _
2. Do not return the old compressor until the new compressor arrives. External components from the old compressor will need to be installed on the new compressor.
3. Mount the old compressor on the wooden skid in which the new compressor arrived.
4. Ensure that all openings are plugged prior to returning the compressor. Utilize pipe plugs and blank flanges received on the new compressor.

IMPORTANT: Do not attempt to dismantle and reassemble compressor prior to shipping. Improper assembly may result in injury to our technicians during disassembly.

Comp. Model TDSH	Approx. Weight lbs.	Approx. Weight kg
163S	1,220	555
163L	1,280	580
193S	1,720	780
193L	1,895	860
233S	2,670	1,210
233L	2,950	1,340
233XL	3,300	1,500
283S	4,100	1,860
283L	4,400	2,000
283SX	4,700	2,136
355S	7,200	3,400
355L	8,240	3,740
355XL	9,200	4,172
355UL	10,200	4,625
TDSL	**lbs.**	**kg**
193S	1,640	744
193L	1,800	816
233S	2,570	1,166
233L	2,850	1,293
283S	3,750	1,701
283L	4,000	1,814
283XL	4,710	2,136
XJS/XJF	**lbs.**	**kg**
95	600	272
120	845	383
151	1,210	549
SGC	**lbs.**	**kg**
1913	2,071	939
1918	2,291	1,039
2313	2,965	1,345
2317	3,265	1,481
2321	3,918	1,777
2813	4,906	2,225
2817	5,256	2,384
2821	6,406	2,906
2824	6,675	3,028
3511	9,005	4,085
3515	9,275	4,207
3519	9,715	4,407
3524	10,155	4,606

Table 7. Compressor Weights (less coupling)

Index

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S

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Form 070-660 SM (2008-11)
Supersedes: S70-660 SM (2003-12)
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