



EVAPORATOR PRESSURE REGULATING VALVES

Installation & Service Instructions

PILOTED INTERNALLY (S)ORIT-PI-2, (S)ORIT-PI-3, (S)ORIT-PI-4 and (S)ORIT-PI-5

INSTALLATION INSTRUCTIONS

To insure optimum performance, evaporator pressure regulating valves must be selected and applied correctly. This is covered thoroughly in Bulletin 90-20-2. However, proper installation procedures are equally important. The entire Application Section in Bulletin 90-20-2 should be reviewed before installing (S)ORIT-PI valves.

VALVE LOCATION – The (S)ORIT-PI must be installed upstream of any other suction line controls or accessories. They may be installed in a horizontal or vertical position, whichever best suits the application and permits easy accessibility. However, consideration should be given to locating these valves so they don't act as an oil trap, and to prevent solder from entering the internal parts during soldering in the suction line.

Reverse flow for defrost is permissible on the SORIT-PI models. Therefore, a high to low side gas defrost line can be connected either upstream or downstream of the SORIT-PI. The solenoid stop coil must be de-energized during defrost (the electric open solenoid coil must also be de-energized if applicable).

INSTALLATION AND SOLDERING PROCEDURES – It is not necessary to disassemble the valve when soldering to connecting lines. Sporlan recommends the use of silver tin solders on replaceable components in refrigeration system suction or liquid lines that **do not** exceed 150°F or that use hot gas for defrost or bypass loading. The advantage of silver tin solders with a 4% or higher silver content is the low temperature at which they become fluid (approx. 400° to 500°F). There is far less chance of damage to a valve during the installation due to the lower temperature required compared to brazing. Their lower working temperatures eliminate the weakening of base metals caused by annealing from high brazing heat. In addition, silver tin solders can be used to join any combination of copper, brass, steel, and stainless fittings.

It is important - regardless of the solder used - to direct the flame away from the valve body and avoid excessive heat on the diaphragm of the pilot valve. As an extra precaution, a damp cloth may be wrapped around the diaphragm during the soldering operation.

TEST PRESSURES AND DEHYDRATION TEMPERATURES – For better leak detection, an inert dry gas such as nitrogen or CO₂ may be added to an idle system.

CAUTION: Inert gases must be added to the system carefully through a pressure regulator. Unregulated gas pressure can seriously damage the system and endanger human life. Never use oxygen or explosive gases.

Excessive pressure can shorten the life of the pilot regulator valve diaphragm. The maximum low side test pressure that can safely be applied is 400 psig. The maximum pressure is well above the minimum field leak test pressures for low side listed in the ANSI/ASHRAE Standard 15 - 1994.

The maximum dehydration temperature to which the valve body can be subjected without damage is 250°F.

UNDERWRITERS LABORATORIES - UL and UL_c – The (S)ORIT-PI valves are listed components for use with common refrigerants excluding ammonia. The maximum fluid temperature is 120°F and the maximum rated pressure is 400 psig.

VALVE SETTING AND ADJUSTMENT – The standard adjustment range is 0/100 psig with a standard factory setting of 70 psig. An adjustment range of 75/150 psig is also available and the standard factory setting is 85 psig. The main function of the (S)ORIT-PI valve is to keep the evaporator pressure above some given point at minimum load conditions. Therefore, even though the valves are selected on the basis of pressure drop at full load conditions, they should be adjusted to maintain the minimum allowable evaporator pressure under the actual minimum load conditions.

When adjusting both evaporator pressure regulating valves and thermostatic expansion valves, the following procedure is recommended.

With the thermostatic expansion valve at the Sporlan factory setting or at a manufacturer's predetermined set point, and under the actual minimum load condition, the evaporator pressure regulating valve should be adjusted to the desired setting. Finally, if necessary, the thermostatic expansion valve or valves can be adjusted to the desired superheat setting while under the normal operating load condition.

The (S)ORIT-PI should be adjusted to a setting **above the desired set point** before start up. This will result in an immediate response from the valve if it is adjusted from a higher setting to a lower setting. When an evaporator pressure regulating valve has been operating for a

period of time at a given setting and an **increase** in the setting is required, as much as 30 minutes may be required for a new balance to take place after an adjustment has been made.

To adjust the (S)ORIT-PI valves, turn the adjustment screw with a 3/8" hex wrench. A clockwise rotation increases the valve setting, while a counterclockwise rotation decreases the setting. One full turn of adjustment is approximately equivalent to a 16 psi change in the set point on the 0/100 psig range and a 22 psi change in the set point on the 75/150 psi range. To obtain the desired setting, a pressure gauge should be utilized on the inlet side of the valve so the effects of any adjustments can be observed.

When (S)ORIT-PI valves are installed in parallel, each should be adjusted the same amount to obtain optimum performance. If one valve has been adjusted more than the other, both valves should be adjusted all the way in before resetting them an equal amount.

SERVICE INSTRUCTIONS

The (S)ORIT-PI valves can be easily disassembled for inspection and cleaning, or for replacement of the pilot valve assembly or internal parts. The pilot valve assembly kit is

available with or without the solenoid stop feature. **The solenoid stop is not available separately and should not be removed from the pilot assembly, nor should a standard solenoid valve be added to the pilot assembly to achieve the stop feature.**

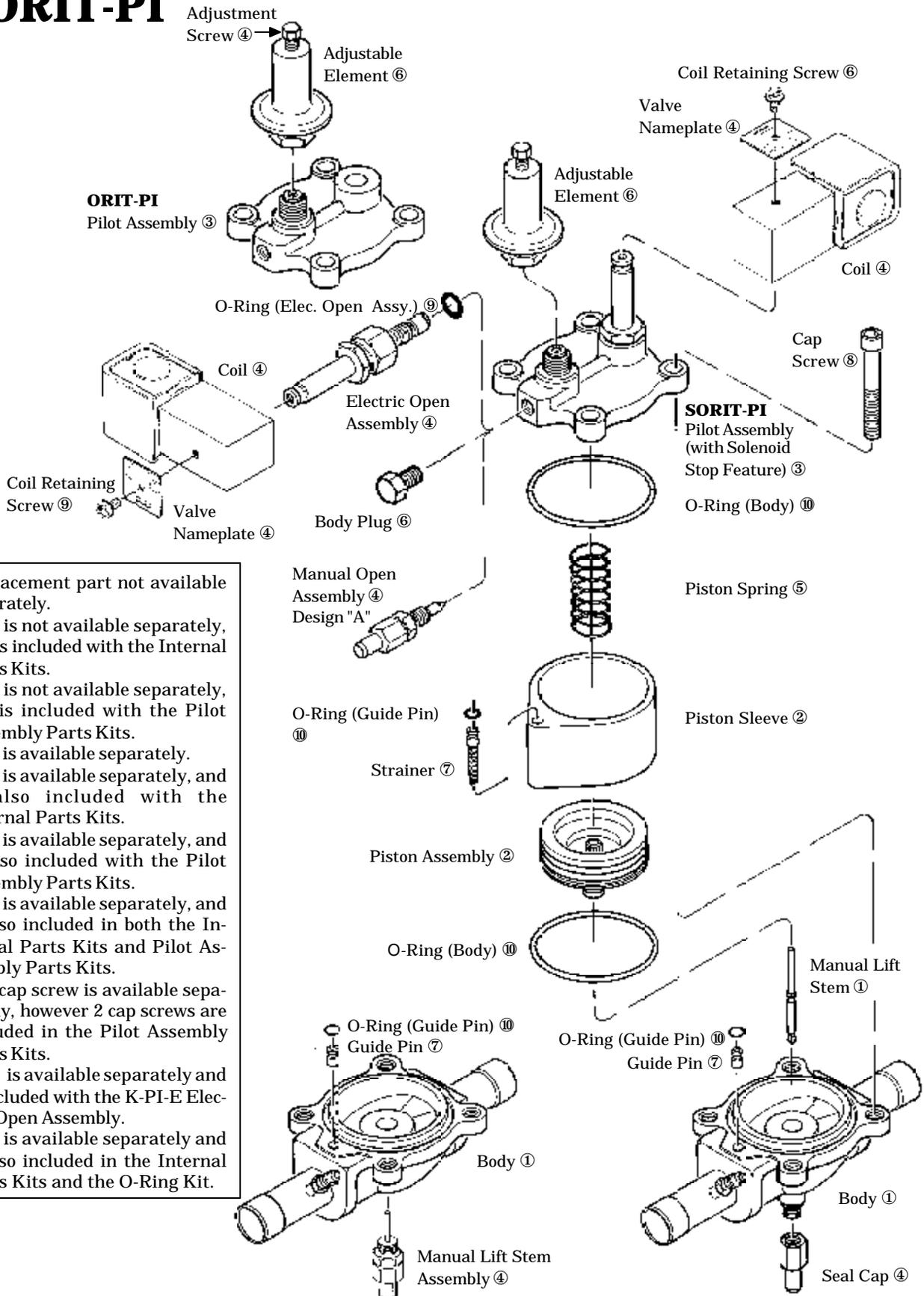
CAUTION: The valve should be isolated from inlet and outlet pressures before disassembly.

PILOT VALVE ASSEMBLY REPLACEMENT INSTRUCTIONS

1. Loosen the 4 cap screws evenly and remove the pilot valve assembly, piston sleeve and piston assembly.
2. Replace the guide pin O-Ring, guide pin and body O-Ring between the valve body and the piston sleeve. Reassemble the piston sleeve and piston assembly and place it on the valve body. **Be sure to insert the piston into the piston sleeve only from the bottom**, otherwise the cup seal will be damaged. Replace the piston spring. Replace the strainer. Replace the guide pin O-Ring and body O-Ring between the piston sleeve and pilot valve flange.
3. Place the new pilot valve assembly on top of the piston sleeve and replace the cap screws. Screw the flange down evenly. Torque the cap screws to 25 ft. lbs. The pilot valve assembly replacement is now complete.

PART NUMBER	REPLACEMENT PARTS AND PARTS KITS	VALVE TYPE	
		ORIT-PI	SORIT-PI
DESCRIPTION		QUANTITY REQUIRED	
REPLACEMENT PILOT ASSEMBLY PARTS KITS			
K-ORIT-PI	All kits include: Pilot Valve Assembly, Adjustable Element, Strainer, O-Rings (Body), O-Rings (Guide Pin), Guide Pin, (2) Cap Screws and Body Plug. The K-SORIT-PI kit also includes the Coil Retaining Screw.	1	-
K-SORIT-PI		-	1
REPLACEMENT INTERNAL PARTS KITS			
KS-(S)ORI-PI-2	All kits include: Piston Sleeve, Piston Assembly, Piston Spring, O-Rings (Body), O-Rings (Guide Pin), Guide Pin and Strainer.	1	1
KS-(S)ORI-PI-3			
KS-(S)ORI-PI-4			
KS-(S)ORI-PI-5			
REPLACEMENT O-RING KIT			
KG-(S)ORIT-PI	Kit includes: O-Rings (Body) and O-Rings (Guide Pin).	1	1
REPLACEMENT PARTS SOLD SEPARATELY			
JP-2518-000	Access Valve Core (Not shown)	1	1
A-4-0/100	Adjustable Element	1	1
A-4-75/150	Adjustable Element	1	1
1806-002	Adjustment Screw	1	1
4089-000	Body Plug	1	1
JP-2520-003	Cap, Access Valve (Not shown)	1	1
506-008	Cap Screws-Stainless Steel	4	4
MKC-1	Coil, specify voltage and frequency	-	1
1390-000	Coil Retaining Screw	-	1
K-PI-E	Electric Open Assembly (Includes Nameplate, Coil Screw & O-Ring)	1	1
3743-000	Guide Pin	1	1
2000-10	Manual Open Stem Assembly (Required for Design "A" Only)	1	1
2000-11	Manual Lift Stem Assembly (Available for Design "A" Only)	1	1
621-143	O-Ring - Body	2	2
621-010	O-Ring - Guide Pin	2	2
621-010	O-Ring - Electric Open Assembly	1	1
4323-000	Gasket - Enclosing Tube (Not shown) For Date Codes 3598 to Present	-	1
621-016	O-Ring - Enclosing Tube (Not shown) For Date Codes Through 3498	-	1
4323-000	Gasket - Electric Open Enclosing Tube (Not shown) For Date Codes 3798 to Present	1	1
621-016	O-Ring - Electric Open Enclosing Tube (Not shown) For Date Codes Through 3698	1	1
3742-000	Piston Spring	1	1
4169-000	Seal Cap	1	1
4269-000	Strainer (200 Mesh)	1	1
14115-1	Valve Nameplate	-	1

(S)ORIT-PI



- ① Replacement part not available separately.
- ② Part is not available separately, but is included with the Internal Parts Kits.
- ③ Part is not available separately, but is included with the Pilot Assembly Parts Kits.
- ④ Part is available separately.
- ⑤ Part is available separately, and is also included with the Internal Parts Kits.
- ⑥ Part is available separately, and is also included with the Pilot Assembly Parts Kits.
- ⑦ Part is available separately, and is also included in both the Internal Parts Kits and Pilot Assembly Parts Kits.
- ⑧ The cap screw is available separately, however 2 cap screws are included in the Pilot Assembly Parts Kits.
- ⑨ Part is available separately and is included with the K-PI-E Electric Open Assembly.
- ⑩ Part is available separately and is also included in the Internal Parts Kits and the O-Ring Kit.

(S)ORIT-PI-2, -3, -4
 Manufactured 1995 - 1997
 Design "A"

(S)ORIT-PI-2, -3, -4
 Manufactured 1996 - Present
(S)ORIT-PI-5
 Manufactured 1998 - Present
 Design "B"

PISTON REPLACEMENT INSTRUCTIONS

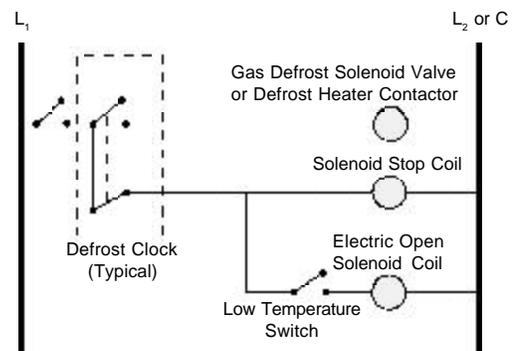
1. Remove the pilot valve assembly as described in Step 1 of the pilot valve assembly replacement instructions.
2. Replace the guide pin O-Ring, guide pin and body O-Ring between the valve body and the piston sleeve. Place the new piston sleeve containing the new piston assembly on the valve body. **Be sure to insert the piston into the piston sleeve only from the bottom**, otherwise the cup seal will be damaged. Replace the piston spring. Replace the strainer. Replace the guide pin O-Ring and body O-Ring between the piston sleeve and pilot valve flange.
3. Place the pilot valve assembly on top of the piston sleeve and replace the cap screws. Screw the flange down evenly. Torque the cap screws to 25 ft. lbs. The piston replacement is now complete.

SERVICE TIPS

MALFUNCTION	CAUSE	REMEDY
Failure to open	<ol style="list-style-type: none"> 1. Dirt or foreign material has restricted or plugged the orifice through the piston. 2. Dirt or foreign material holding the pilot port open. 3. Coil failure on solenoid stop feature. 4. Piston cup seal damaged. (Nicked, torn or insufficient flare) 5. Setting of (S)ORIT-PI is below the desired set point. 6. Dirt or foreign material holding solenoid pilot port open. 	<ol style="list-style-type: none"> 1. Disassemble and clean the orifice. 2. Replace the pilot valve assembly. 3. Replace the solenoid coil. Use the MKC-1 with the proper voltage. 4. Replace piston sleeve and piston assembly. 5. Turn the adjustment screw in the clockwise direction to raise the setting above the desired set point. Allow case to warm up (if necessary) and re-adjust to desired set point. 6. Replace the pilot valve assembly.
Does not regulate or regulates sluggishly	<ol style="list-style-type: none"> 1. Dirt or foreign material restricting the orifice in the piston nose piece. 2. Dirt or foreign material in the pilot port. 3. Strainer is plugged. 4. Dirt or foreign material in sleeve and piston assembly causing high friction. 	<ol style="list-style-type: none"> 1. Disassemble and clean the orifice. 2. Replace the pilot valve assembly. 3. Disassemble and clean or replace the strainer. 4. Disassemble and clean sleeve and piston assembly or replace.
Failure to close or defrost	<ol style="list-style-type: none"> 1. Manual open stem is turned in. 2. Electric open solenoid is energized. 3. Manual lift stem is turned in. 4. Dirt or foreign material is holding the solenoid pilot port closed. 5. Dirt or foreign material is restricting the drilled passageway in the solenoid pilot. 6. Strainer is plugged. 	<ol style="list-style-type: none"> 1. Turn the stem counterclockwise. 2. De-energize the electric open solenoid. 3. Turn the stem counterclockwise. 4. Replace the pilot valve assembly. 5. Replace the pilot valve assembly. 6. Disassemble and clean or replace the strainer.

HELPFUL HINTS: If it is necessary to disassemble and clean the internal parts of the (S)ORIT-PI, common cleaning practices should be employed taking care not to damage the cup seal. Be sure to reinstall the piston from the **bottom side of the sleeve**. Also, **DO NOT** use abrasive material when cleaning any parts. The piston bleed orifice can be cleaned by spraying a solvent into the passageway on the top side of the piston and allow it to drain through the bleed orifice. A small strand of copper wire can then be carefully inserted into the bleed orifice to assure that it is clear. Always inspect and clean or replace the strainer if required. The body O-Rings do tend to swell after exposure to refrigerant and may be troublesome to reinstall. In most cases the O-Ring can be manipulated back into place, provided the O-Ring is not damaged or has not taken a set. However, it may be desirable to have replacement body O-Rings available when disassembly is required. The O-Rings are included in the O-Ring kit or may be ordered as separate parts.

Typical Wiring Diagram – Electric Open (Two Temperature Application)



ELECTRIC OPEN OPERATION (TWO TEMPERATURE - ELECTRIC) – To maintain the (S)ORIT-PI in the full open position, both the electric open solenoid coil and the solenoid stop coil must be energized. A typical wiring diagram for an electric open application is shown above.

