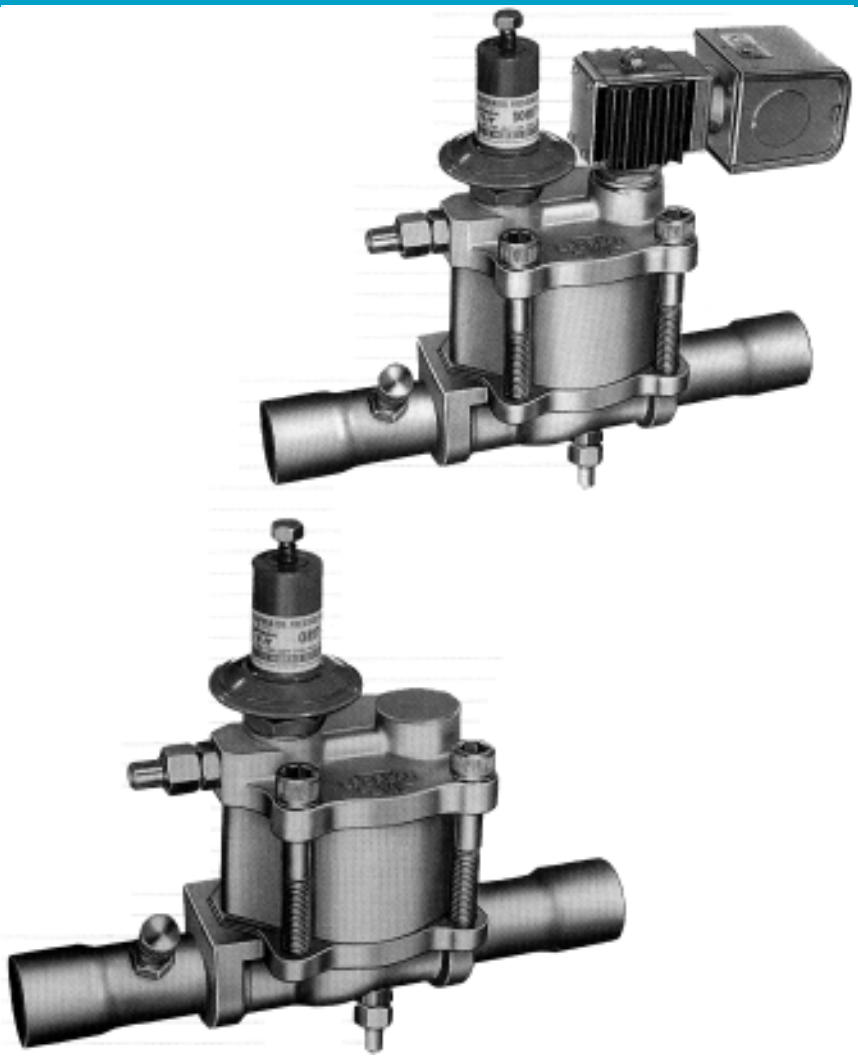
January 1996 / **BULLETIN 90-20-2**

SPORLAN

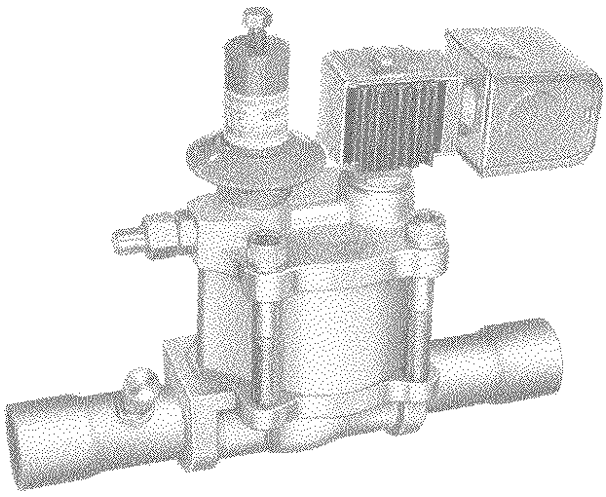
NEW

EVAPORATOR PRESSURE REGULATING VALVES

PILOTED INTERNALLY



EVAPORATOR PRESSURE REGULATING VALVES PILOTED INTERNALLY-(S)ORIT-PI-2, (S)ORIT-PI-3 AND (S)ORIT-PI-4



The (S)ORIT-PI Design Features and Benefits

- *Piloted Internally - No high side pressure required to operate the valve*
- *Brass body, stainless steel cap screws and powder coated adjustment housing for superior corrosion resistance*
- *Solenoid stop feature available for gas defrost applications*
- *Standard features include a manual lift stem, inlet pressure tap and a manual open stem*
- *Two temperature feature can be accomplished either manually or electrically*
- *No flare connections required*
- *Pilot Valve is protected from foreign material by a 100 mesh strainer*
- *Designed for today's environmental concerns*
- *Proven reliable coil design*
- *Compact size and weight make it easy to install*
- *Various port and fitting sizes available to accommodate industry requirements*
- *UL and ULc Listed, Safe Working Pressure of 400 psig*
- *Compatible with refrigerants 12, 22, 134a, 401A, 401B, 402A, 404A, 502, and 507*

The evaporator pressure regulating valve automatically throttles the vapor flow from the evaporator to prevent evaporator pressure from falling below a predetermined set point. Sporlan's new line of internally piloted evaporator pressure regulating valves includes three models;**(S)ORIT-PI-2, (S)ORIT-PI-3 and (S)ORIT-PI-4** to match customer requirements. All models are available with the optional solenoid stop feature. The electric open feature (E) for two temperature applications is also an option. The standard manual open feature can also be used on two temperature applications. The standard adjustment range is 0 to 100 psig. The standard factory setting is 30 psig. The SORIT-PI models utilize the MKC-1 solenoid coil for the solenoid stop feature. The MKC-1 is also used for the electric open feature on any model.

OPERATION

PILOT PORT - The (S)ORIT-PI pilot valve indirectly controls the modulation of the main piston. **Figure 1** shows the three pressures that control the modulation of the pilot valve: the inlet or evaporator pressure (P1), the adjustment spring pressure (P2) and the bottom spring pressure (P3). Inlet pressure (P1) enters the pilot valve through a passageway in the valve body. It also enters the chamber underneath the diaphragm of the pilot valve through two passageways on either side of the pushrod. The adjustment spring pressure is opposed by the inlet pressure plus the bottom spring pressure acting on the underside of the diaphragm in the closing direction.

PRIMARY PORT - The three pressures that control the modulation of the main piston are the inlet pressure (P1) acting underneath the main piston, the piston spring (P5), and the pressure on the top of the piston (P4). See **Figure 1**. The inlet pressure is opposed by the piston spring pressure plus the pressure on top of the main piston acting in the closing direction. The pilot valve regulates the pressure on top of the main piston during normal operation.

Normal Operation — Valve modulating

(Figure 1) - Evaporator Pressure Regulating Valves respond to variations in inlet pressure (evaporator pressure). The basic designation for the Sporlan (S)ORIT-PI describes the operation: **O**pen on **R**ise of **I**nlet Pressure or **ORI**. The pilot valve adjustment spring pressure **(P2)** should be set to control the minimum evaporator pressure. When the evaporator pressure rises above the valve setting, the inlet pressure **(P1)** combined with the bottom spring pressure **(P3)**, closes the pilot port which prevents the inlet pressure from entering the chamber above the piston. The pressure above the piston **(P4)** then drops by bleeding through the orifice in the piston nose piece to outlet pressure. Therefore, pressure on top of the main

Normal Operation-Valve Modulating

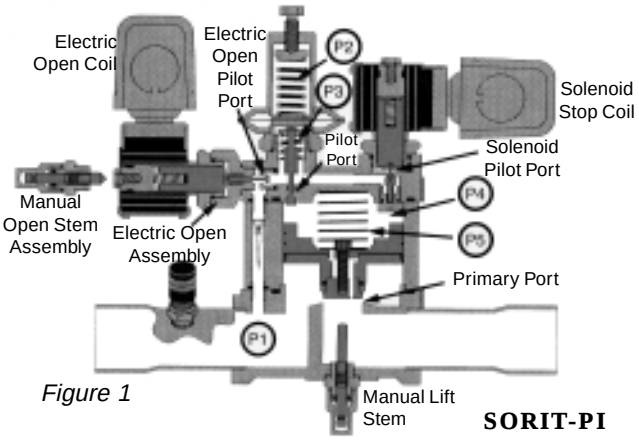


Figure 1

SORIT-PI

piston is decreased and the primary port modulates open. If the optional solenoid stop feature is used, the coil must be energized during normal operation.

When the inlet pressure falls below the set point of the valve, the pilot port opens, allowing evaporator pressure to enter the chamber above the main piston, thus raising the pressure. This pressure **(P4)** combined with the piston spring pressure **(P5)** moves the main piston in the closing direction. Modulating the main piston in the closing direction prevents the evaporator pressure from falling below the valve set point.

Defrost Operation-Valve Closed

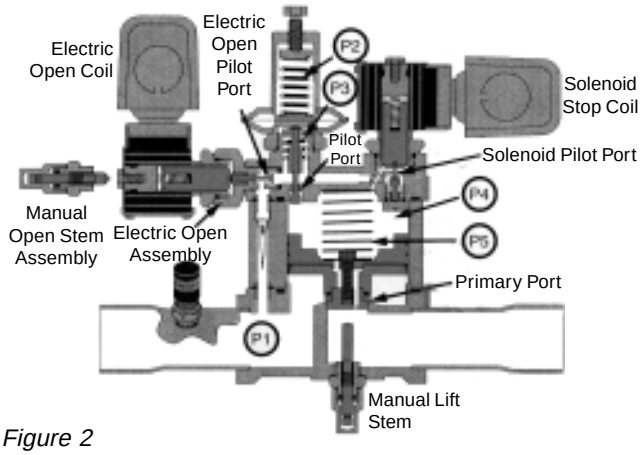


Figure 2

SORIT-PI

Defrost Operation - Valve closed (Figure 2) - When the valve is used with the solenoid stop feature, the operation for gas defrost is as follows: The solenoid stop coil is de-energized, which allows the inlet pressure to enter the chamber on top of the main piston **(P4)** through the solenoid port and through a drilled passageway independent of the pilot valve. The flow into the chamber is greater than the flow leaving through the orifice in the piston nose piece. This causes pressure **(P4)** to rise, and combined with the piston spring **(P5)**, tightly closes the valve. The defrost solenoid valve can be simultaneously energized at the time the solenoid stop coil of the SORIT-PI is de-energized to provide the complete control package for defrost.

When the defrost is complete, the solenoid stop coil is energized, which stops the unregulated pressure to the top of the main piston. The pressure then bleeds through the bleed hole in the main piston, reducing the pressure on top of the main piston. The pilot valve then begins to modulate the pressure on top of the main piston for normal operation.

Manual Open Operation — (Two temperature - manual) — The manual open stem is located beneath the seal cap on the side of the pilot valve. Turning the manual open stem clockwise, until it stops, allows the main piston to move to the full open position. The manual open stem closes the port in the pilot valve flange plate. Therefore, inlet pressure can no longer enter the pilot valve. The pressure above the main piston **(P4)** equalizes to outlet pressure through the orifice in the piston nose piece. This pressure combined with the piston spring pressure is less than the opposing inlet pressure acting underneath the main piston, allowing the valve to remain full open. The full open position allows the evaporator pressure to pull down to the common suction pressure.

Full Open Operation - Valve Open

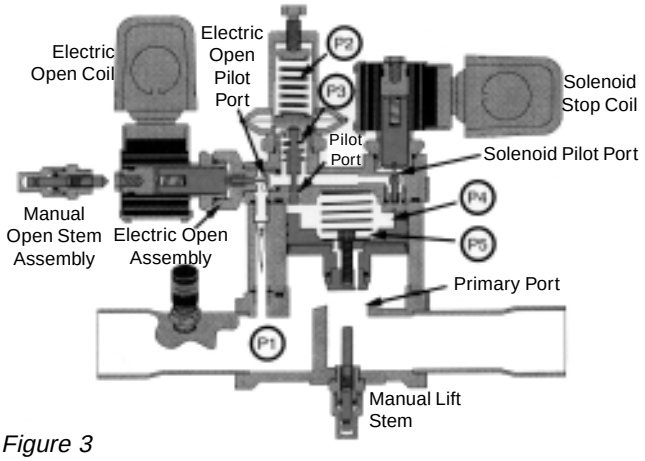


Figure 3

SORIT-PI

Electric Open Operation (Figure 3 — Two temperature - electric) — The electric open feature is available as an option and will be located on the side of the pilot valve. The electric open feature takes the place of the manual open stem. When the electric open solenoid coil is energized, the port in the pilot valve flange plate is closed. Therefore, inlet pressure can no longer enter the pilot valve. The pressure above the piston (P4) equilizes to outlet pressure through the orifice in the piston nose piece. The pressure combined with the piston spring pressure is less than the opposing inlet pressure acting underneath the main piston, allowing the valve to remain full open. It is important to also

energize the solenoid stop coil to maintain the valve in the full open position. The full open position allows the evaporator pressure to pull down to the common suction pressure.

Manual Lift Stem — The manual lift stem is located in the bottom of the main valve body. Turning the manual lift stem clockwise will lift the main piston off the seat. This feature will ***simplify servicing*** by permitting a vacuum to be pulled through the valve.

APPLICATION

The basic function of the (S)ORIT-PI valve is to prevent the evaporator pressure from falling below the setting of the valve. Proper application of the valve involves several system factors.

One type of application is the single evaporator system. Special consideration must be given to these applications because the suction pressure could pull to an undesirable low level when the (S)ORIT-PI throttles to maintain the evaporator pressure. Discharge gas bypass can be successfully applied to the suction line in conjunction with the (S)ORIT-PI for this application to falsely load the compressor. This application has special considerations and is discussed further in Sporlan Bulletin 90-40 covering Discharge Bypass Valves.

Another type of system is the multi-evaporator, multi-compressor refrigeration system with evaporators operating at different temperatures. A (S)ORIT-PI may be required on one or more of the evaporators to maintain pressures higher than the common suction pressure. Some multi-temperature systems may require an (S)ORIT-PI on each evaporator, depending on the type of product being refrigerated.

Pilot Operated Evaporator Pressure Regulating Valves with a solenoid stop feature are often applied on systems using gas defrost methods. Defrost solenoid valves are shown in Figure 4 for illustrative purposes only. Gas defrost begins when the defrost solenoid coil is energized (valve open) and the SORIT-PI solenoid stop coil is de-energized (valve closed). Discharge gas flows through the defrost solenoid valve and then flows in reverse through the evaporator. The gas condenses during the cycle and continues to flow in reverse around the thermostatic expansion valve through a check valve and through the liquid line to the liquid header until the defrost terminates. Upon termination, the defrost solenoid coil is de-energized (valve closed), and the SORIT-PI solenoid stop coil is energized (valve modulating). Normal operation then resumes.

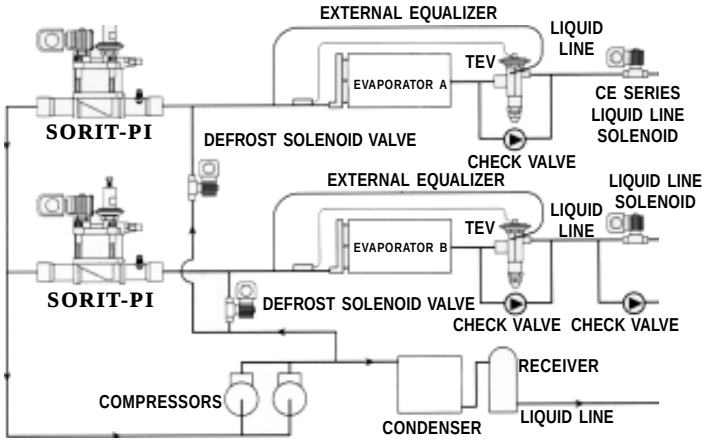


Figure 4

Figure 4 is a piping schematic only to illustrate the general location of the (S)ORIT-PI valves in the system. Sporlan recommends that recognized piping references be consulted for assistance in piping procedures. Sporlan is not responsible for system design, any damage arising from faulty system design, or for misapplication of its products. If these valves are applied in any manner other than as described in this bulletin, the Sporlan warranty is void.

SELECTION PROCEDURE

The selection of an (S)ORIT-PI is based on the evaporator (or evaporators) design capacity. The available pressure drop across the valve at design load is a function of the system involved. On single evaporator systems the valve selection should be made directly from the capacity table at the applicable conditions, and the desired pressure drop. On multiple evaporator systems, the ***natural pressure drop*** across the valve must be considered. The ***natural pressure drop*** is the difference between the higher evaporator pressure and the common suction pressure. An example is a R-404A system with a 20°F (55.7 psig) evaporator and a 15°F (49.4 psig) common suction temperature. The ***natural pressure drop*** in this instance for a (S)ORIT-PI is 55.7 minus 49.4 which equals 6.3 psi.

EXAMPLE: Select an evaporator pressure regulator for a 2.5 ton, 30°F evaporator temperature, R-134a evaporator with a common suction temperature of 25°F and a liquid temperature of 60°F. This is a multi-evaporator system, therefore the ***natural pressure drop*** should be calculated. The saturated suction pressure at 30°F is 26.1 psig. The saturated suction pressure at 25°F is 22.1 psig. Therefore the ***natural pressure drop*** is 26.1 minus 22.1 and is equal to 4.0 psi.

From the table, the (S)ORIT-PI-2 has a capacity of 2.62 tons at a 3 psi pressure drop and a 30°F evaporator temperature. Therefore the SORIT-PI-2 (with the appropriate connection size specified) would be the appropriate selection for this application.

(S)ORIT-PI CAPACITIES - Tons of Refrigeration

Based on 60°F saturared liquid temperature, 0°F superheat at the evaporator, installation of the valve in the machine room with 25°F superheated return gas.*

VALVE TYPE	Evap. Temp. °F	R-12						R-22						R-134a					
		Pressure Drop Across Valve-psi																	
		0.5	1	2	3	5	10	0.5	1	2	3	5	10	0.5	1	2	3	5	10
(S)ORIT-PI-2	40	1.06	1.50	2.10	2.54	3.22	4.32	1.56	2.19	3.08	3.76	4.80	6.59	1.24	1.74	2.44	2.95	3.74	5.00
	30	0.96	1.35	1.88	2.28	2.87	3.82	1.41	1.99	2.80	3.40	4.33	5.92	1.02	1.55	2.17	2.62	3.30	4.36
	20	0.81	1.21	1.68	2.03	2.55	3.34	1.28	1.80	2.52	3.06	3.89	5.27	0.90	1.37	1.91	2.31	2.88	3.74
	15	0.75	1.14	1.59	1.91	2.39	3.10	1.20	1.70	2.39	2.90	3.68	4.96	0.86	1.29	1.79	2.16	2.69	3.45
	10	0.71	1.08	1.50	1.80	2.24	2.88	1.07	1.62	2.26	2.74	3.47	4.66	0.83	1.21	1.68	2.02	2.50	3.16
	5	0.67	1.01	1.41	1.69	2.09	2.66	0.99	1.53	2.14	2.59	3.27	4.36	0.79	1.13	1.57	1.88	2.31	2.88
	0	0.64	0.95	1.32	1.58	1.95	2.44	0.94	1.44	2.02	2.44	3.07	4.07	0.69	1.06	1.46	1.74	2.14	2.61
	-10	0.58	0.84	1.16	1.38	1.68	2.02	0.87	1.28	1.79	2.16	2.70	3.51	0.37	0.89	1.28	1.51	1.82	2.12
	-15	0.50	0.79	1.08	1.28	1.55	1.82	0.84	1.21	1.68	2.02	2.52	3.23	—	—	—	—	—	—
	-20	0.35	0.72	1.00	1.19	1.42	1.62	0.76	1.13	1.57	1.89	2.34	2.97	—	—	—	—	—	—
	-25	0.26	0.65	0.93	1.10	1.30	1.43	0.60	1.04	1.47	1.76	2.17	2.71	—	—	—	—	—	—
	-30	0.22	0.64	0.86	1.01	1.18	1.25	0.41	0.95	1.37	1.64	2.01	2.45	—	—	—	—	—	—
	-35	0.21	0.59	0.79	0.92	1.06	1.10	0.32	0.86	1.28	1.52	1.84	2.20	—	—	—	—	—	—
(S)ORIT-PI-3	40	2.11	2.97	4.17	5.06	6.44	8.73	3.09	4.35	6.10	7.31	9.19	13.2	2.46	3.46	4.85	5.89	7.47	10.10
	30	1.90	2.68	3.75	4.55	5.76	7.73	2.80	3.95	5.56	6.70	8.42	11.9	2.19	3.08	4.31	5.23	6.61	8.84
	20	1.71	2.40	3.35	4.06	5.12	6.79	2.53	3.57	5.01	6.10	7.69	10.6	1.94	2.73	3.81	4.61	5.80	7.64
	15	1.61	2.27	3.17	3.83	4.81	6.34	2.40	3.39	4.75	5.78	7.35	10.0	1.79	2.57	3.58	4.32	5.41	7.07
	10	1.52	2.14	2.98	3.60	4.51	5.90	2.28	3.21	4.50	5.47	6.94	9.40	1.56	2.41	3.35	4.04	5.04	6.52
	5	1.44	2.02	2.81	3.38	4.23	5.47	2.16	3.04	4.26	5.17	6.54	8.82	1.34	2.26	3.13	3.77	4.68	5.98
	0	1.30	1.90	2.64	3.17	3.95	5.05	2.04	2.87	4.02	4.87	6.16	8.25	1.05	2.11	2.92	3.50	4.33	5.45
	-10	0.97	1.67	2.31	2.77	3.41	4.24	1.69	2.55	3.57	4.31	5.42	7.16	0.72	1.86	2.56	3.05	3.72	4.51
	-15	0.75	1.57	2.16	2.58	3.16	3.85	1.48	2.40	3.35	4.04	5.07	6.63	—	—	—	—	—	—
	-20	0.62	1.46	2.01	2.40	2.91	3.47	1.21	2.26	3.14	3.79	4.73	6.11	—	—	—	—	—	—
	-25	0.46	1.37	1.87	2.22	2.67	3.09	0.90	2.12	2.94	3.53	4.39	5.61	—	—	—	—	—	—
	-30	0.35	1.27	1.73	2.04	2.44	2.72	0.80	1.98	2.75	3.29	4.07	5.11	—	—	—	—	—	—
	-35	0.37	1.12	1.60	1.88	2.21	2.39	0.51	1.85	2.56	3.06	3.76	4.63	—	—	—	—	—	—
(S)ORIT-PI-4	40	2.35	3.80	5.32	6.47	8.20	11.10	3.56	5.56	7.83	9.54	12.2	16.8	2.49	4.36	6.19	7.51	9.52	12.80
	30	1.98	3.30	4.79	5.80	7.33	9.82	3.11	5.05	7.10	8.64	11.0	15.1	2.10	3.64	5.50	6.67	8.41	11.20
	20	1.66	2.77	4.28	5.18	6.51	8.61	2.61	4.56	6.40	7.78	9.90	13.5	1.51	3.10	4.87	5.88	7.38	9.68
	15	1.50	2.72	4.04	4.88	6.12	8.03	2.36	3.93	6.07	7.37	9.37	12.7	1.30	2.88	4.56	5.50	6.88	8.94
	10	1.28	2.49	3.81	4.59	5.74	7.46	2.20	3.73	5.75	6.98	8.85	11.9	1.16	2.64	4.27	5.14	6.40	8.23
	5	1.08	2.28	3.58	4.31	5.37	6.91	1.95	3.62	5.43	6.59	8.34	11.2	1.05	2.31	3.99	4.80	5.94	7.53
	0	0.94	2.13	3.36	4.04	5.01	6.37	1.64	3.28	5.13	6.21	7.84	10.5	0.92	2.09	3.72	4.46	5.50	6.86
	-10	0.77	1.69	2.95	3.53	4.33	5.32	1.24	2.83	4.55	5.50	6.90	9.06	0.64	1.60	3.26	3.88	4.71	5.63
	-15	0.67	1.55	2.75	3.28	4.00	4.82	1.13	2.51	4.20	5.15	6.45	8.38	—	—	—	—	—	—
	-20	0.55	1.38	2.56	3.04	3.68	4.32	1.01	2.24	3.85	4.82	6.01	7.72	—	—	—	—	—	—
	-25	0.45	1.13	2.38	2.81	3.37	3.84	0.85	2.05	3.75	4.50	5.58	7.07	—	—	—	—	—	—
	-30	0.38	0.94	2.21	2.59	3.07	3.37	0.69	1.73	3.50	4.19	5.16	6.43	—	—	—	—	—	—
	-35	0.35	0.82	2.04	2.38	2.78	2.96	0.57	1.42	3.26	3.89	4.76	5.81	—	—	—	—	—	—

REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

Refrigerant Liquid Temperature °F. ➡		0	10	20	30	40	50	60	70	80	90	100
R-12	Correction Factor	1.24	1.20	1.16	1.12	1.08	1.04	1.00	0.95	0.92	0.87	0.83
R-22		1.22	1.18	1.15	1.11	1.07	1.04	1.00	0.96	0.92	0.88	0.84
R-134a		1.26	1.22	1.18	1.14	1.09	1.05	1.00	0.95	0.90	0.86	0.81

*ARI standard capacities are based on 100°F saturated liquid temperature. Use the correction factor for 100°F liquid temperature and the capacities at 40°F evaporator temperature to determine ARI standard capacity ratings.

Example: The capacity of a (S)ORIT-PI-3 using R-22, evaporator temperature of 20°F, 2 psi pressure drop across the valve, and a liquid temperature of 50°F, is equal to (5.01 x 1.04) 5.2 tons.

These factors correct for net refrigerating effect and are based on an average temperature of 0°F However, they may be used for any evaporator temperature from -35°F to 40°F since the variation in the actual factors across this range is insignificant.

(S)ORIT-PI CAPACITIES - Tons of Refrigeration

Based on 60°F saturared liquid temperature, 0°F superheat at the evaporator, installation of the valve in the machine room with 25°F superheated return gas.*

VALVE TYPE	Evap. Temp. °F	R-401A (MP39)						R-401B (MP66)						R-402A (HP80)					
		Pressure Drop Across Valve-psi																	
		0.5	1	2	3	5	10	0.5	1	2	3	5	10	0.5	1	2	3	5	10
(S)ORIT-PI-2	40	1.23	1.76	2.47	2.99	3.78	5.08	1.29	1.82	2.55	3.10	3.93	5.29	1.47	2.07	2.91	3.55	4.54	6.27
	30	1.03	1.58	2.20	2.66	3.36	4.44	1.07	1.63	2.28	2.77	3.49	4.65	1.32	1.86	2.62	3.19	4.07	5.60
	20	0.93	1.40	1.96	2.36	2.95	3.85	0.96	1.46	2.03	2.45	3.08	4.04	1.18	1.67	2.35	2.85	3.64	4.96
	15	0.89	1.32	1.84	2.21	2.76	3.56	0.91	1.37	1.91	2.31	2.88	3.75	1.12	1.58	2.22	2.69	3.43	4.66
	10	0.86	1.24	1.73	2.07	2.57	3.28	0.88	1.29	1.80	2.16	2.69	3.46	1.06	1.49	2.09	2.54	3.22	4.37
	5	0.79	1.17	1.62	1.94	2.39	3.00	0.84	1.21	1.68	2.02	2.51	3.18	1.00	1.40	1.97	2.39	3.03	4.08
	0	0.63	1.07	1.51	1.81	2.22	2.73	0.74	1.14	1.58	1.89	2.33	2.91	0.94	1.32	1.85	2.24	2.84	3.81
	-10	0.34	0.89	1.31	1.56	1.88	2.21	0.38	0.94	1.37	1.62	1.99	2.38	0.79	1.17	1.63	1.97	2.48	3.28
	-15	0.31	0.81	1.22	1.44	1.72	1.96	0.32	0.86	1.28	1.51	1.82	2.13	0.72	1.09	1.53	1.84	2.31	3.03
	-20	0.30	0.73	1.12	1.32	1.56	1.72	0.31	0.77	1.18	1.39	1.66	1.88	0.67	1.02	1.42	1.72	2.15	2.79
	-25	0.30	0.77	1.04	1.21	1.41	1.50	0.30	0.70	1.09	1.28	1.51	1.64	0.63	0.96	1.33	1.60	1.99	2.55
	-30	0.28	0.71	0.95	1.10	1.26	1.31	0.29	0.75	1.01	1.17	1.36	1.43	0.60	0.89	1.24	1.48	1.84	2.32
	-35	0.31	0.65	0.87	1.00	1.12	1.13	0.33	0.69	0.92	1.07	1.21	1.24	0.58	0.83	1.15	1.37	1.69	2.10
(S)ORIT-PI-3	40	2.48	3.50	4.91	5.96	7.57	10.30	2.57	3.62	5.08	6.18	7.85	10.70	2.91	4.11	5.62	6.74	8.46	12.50
	30	2.23	3.13	4.39	5.32	6.72	9.01	2.31	3.25	4.55	5.52	6.99	9.41	2.62	3.70	5.11	6.13	7.70	11.20
	20	1.98	2.79	3.90	4.71	5.93	7.84	2.06	2.90	4.05	4.90	6.18	8.23	2.35	3.32	4.63	5.55	6.97	9.96
	15	1.74	2.63	3.67	4.43	5.55	7.28	1.89	2.73	3.81	4.61	5.80	7.65	2.22	3.13	4.40	5.28	6.63	9.37
	10	1.53	2.47	3.44	4.15	5.19	6.74	1.66	2.57	3.58	4.33	5.42	7.10	2.10	2.96	4.16	5.01	6.29	8.79
	5	1.27	2.32	3.23	3.88	4.83	6.20	1.44	2.42	3.36	4.05	5.06	6.56	1.98	2.79	3.92	4.75	6.05	8.23
	0	0.94	2.18	3.02	3.62	4.49	5.68	1.14	2.27	3.15	3.79	4.71	6.03	1.87	2.63	3.68	4.47	5.68	7.69
	-10	0.54	1.90	2.63	3.13	3.84	4.68	0.73	1.99	2.75	3.29	4.04	5.01	1.65	2.32	3.25	3.93	4.97	6.66
	-15	0.50	1.74	2.44	2.90	3.52	4.20	0.50	1.85	2.56	3.05	3.72	4.52	1.55	2.17	3.04	3.68	4.64	6.17
	-20	0.57	1.49	2.26	2.68	3.22	3.72	0.52	1.64	2.37	2.82	3.41	4.04	1.45	2.03	2.84	3.43	4.32	5.69
	-25	0.68	1.22	2.09	2.46	2.93	3.26	0.61	1.40	2.20	2.60	3.11	3.56	1.35	1.90	2.65	3.20	4.01	5.23
	-30	0.79	0.87	1.92	2.25	2.64	2.84	0.72	1.07	2.03	2.38	2.82	3.11	1.19	1.77	2.47	2.97	3.71	4.78
	-35	0.95	0.74	1.76	2.05	2.36	2.46	1.00	0.84	1.86	2.18	2.54	2.70	1.02	1.65	2.29	2.75	3.42	4.35
(S)ORIT-PI-4	40	2.43	4.03	6.27	7.61	9.65	13.00	2.57	4.47	6.49	7.88	10.00	13.60	3.62	5.25	7.39	9.01	11.50	16.00
	30	2.00	3.73	5.60	6.78	8.56	11.40	2.19	3.86	5.81	7.04	8.91	12.00	3.05	4.72	6.65	8.10	10.40	14.30
	20	1.44	3.14	4.97	6.01	7.55	9.94	1.59	3.28	5.17	6.25	7.87	10.40	2.79	4.24	5.96	7.25	9.25	12.70
	15	1.28	2.91	4.68	5.64	7.06	9.21	1.37	3.06	4.86	5.88	7.38	9.69	2.55	4.00	5.63	6.84	8.72	11.90
	10	1.16	2.60	4.33	5.29	6.60	8.51	1.23	2.81	4.57	5.51	6.90	8.98	2.35	3.78	5.31	6.45	8.21	11.20
	5	1.05	2.31	4.11	4.94	6.14	7.82	1.12	2.47	4.20	5.16	6.43	8.28	2.19	3.55	5.00	6.07	7.71	10.50
	0	0.89	2.12	3.85	4.61	5.70	7.15	0.99	2.24	4.02	4.82	5.98	7.60	2.00	3.27	4.70	5.71	7.24	9.77
	-10	0.60	1.48	3.34	3.98	4.86	5.66	0.66	1.68	3.50	4.18	5.12	6.29	1.61	2.65	4.14	5.02	6.33	8.44
	-15	0.52	1.26	3.11	3.69	4.46	5.23	0.56	1.39	3.25	3.87	4.71	5.65	1.45	2.60	3.88	4.69	5.90	7.81
	-20	0.48	1.12	2.88	3.40	4.07	4.62	0.50	1.20	3.02	3.58	4.32	5.03	1.21	2.36	3.62	4.38	5.49	7.20
	-25	0.44	1.00	2.66	3.12	3.69	4.03	0.46	1.08	2.79	3.30	3.93	4.42	1.00	2.14	3.38	4.07	5.09	6.61
	-30	0.41	0.82	2.44	2.85	3.32	3.51	0.43	0.94	2.57	3.02	3.56	3.85	0.87	1.98	3.15	3.78	4.71	6.04
	-35	0.66	0.65	2.24	2.59	2.96	3.05	0.70	0.75	2.37	2.75	3.19	3.35	0.78	1.74	2.92	3.50	4.34	5.48

REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

Refrigerant Liquid Temperature °F. ➡		0	10	20	30	40	50	60	70	80	90	100
R-401A	Correction Factor	1.23	1.19	1.15	1.12	1.08	1.04	1.00	0.96	0.92	0.88	0.84
R-401B		1.23	1.19	1.15	1.12	1.08	1.04	1.00	0.96	0.92	0.88	0.84
R-402A		1.33	1.27	1.22	1.17	1.11	1.06	1.00	0.94	0.88	0.82	0.75

*ARI standard capacities are based on 100°F saturated liquid temperature. Use the correction factor for 100°F liquid temperature and the capacities at 40°F evaporator temperature to determine ARI standard capacity ratings.

Example: The capacity of a (S)ORIT-PI-3 using R-401A, evaporator temperature of 20°F, 2 psi pressure drop across the valve, and a liquid temperature of 40°F, is equal to (3.90 x 1.08) 4.2 tons.

These factors correct for net refrigerating effect and are based on an average temperature of 0°F However, they may be used by any evaporator temperature from -35°F to 40°F since the variation in the actual factors across this range is insignificant.

(S)ORIT-PI CAPACITIES - Tons of Refrigeration

Based on 60°F saturared liquid temperature, 0°F superheat at the evaporator, installation of the valve in the machine room with 25°F superheated return gas.*

VALVE TYPE	Evap. Temp. °F	R-404A (HP62, FX-70)						R-502						R-507 (AZ-50)					
		Pressure Drop Across Valve-psi																	
		0.5	1	2	3	5	10	0.5	1	2	3	5	10	0.5	1	2	3	5	10
(S)ORIT-PI-2	40	1.51	2.12	2.99	3.64	4.66	6.42	1.33	1.87	2.64	3.21	4.10	5.65	1.46	2.06	2.89	3.53	4.51	6.23
	30	1.35	1..91	2.68	3.27	4.17	5.72	1.20	1.69	2.38	2.89	3.69	5.06	1.31	1.85	2.60	3.17	4.04	5.55
	20	1.21	1.71	2.40	2.91	3.71	5.05	1.08	1.52	2.13	2.60	3.30	4.49	1.17	1.66	2.33	2.83	3.60	4.92
	15	1.14	1.61	2.26	2.75	3.49	4.74	1.02	1.44	2.02	2.45	3.12	4.22	1.11	1.56	2.20	2.67	3.40	4.62
	10	1.08	1.52	2.13	2.59	3.28	4.43	0.97	1.36	1.91	2.32	2.94	3.96	1.05	1.48	2.07	2.52	3.19	4.33
	5	1.02	1.43	2.00	2.43	3.08	4.14	0.91	1.28	1.80	2.18	2.76	3.71	0.99	1.39	1.95	2.37	3.00	4.04
	0	0.96	1.35	1.88	2.28	2.88	3.85	0.86	1.21	1.69	2.05	2.59	3.46	0.93	1.31	1.83	2.22	2.81	3.77
	-10	0.78	1.18	1.65	2.00	2.51	3.30	0.73	1.07	1.50	1.81	2.27	2.98	0.77	1.15	1.61	1.95	2.45	3.24
	-15	0.72	1.11	1.55	1.86	2.33	3.04	0.66	1.01	1.40	1.69	2.12	2.76	.071	1.08	1.51	1.82	2.28	2.99
	-20	0.68	1.04	144	1.74	2.16	2.79	0.62	0.94	1.31	1.58	1.97	2.53	0.66	1.01	1.41	1.70	2.12	2.75
	-25	0.65	0.97	1.34	1.61	2.00	2.55	0.58	0.88	1.22	1.47	1.83	2.32	0.63	0.94	1.31	1.58	1.96	2.51
	-30	0.62	0.90	1.25	1.49	1.84	2.31	0.56	0.82	1.14	1.37	1.69	2.11	0.60	0.88	1.22	1.46	1.81	2.28
	-35	0.57	0.84	1.15	1.38	1.69	2.08	0.54	0.77	1.06	1.27	1.55	1.91	0.57	0.82	1.13	1.35	1.66	2.06
(S)ORIT-PI-3	40	2.99	4.22	5.80	6.95	8.73	12.80	2.63	3.72	5.09	6.10	7.67	11.30	2.89	4.08	5.59	6.70	8.42	12.50
	30	2.69	3.79	5.26	6.31	7.92	11.50	2.38	3.36	4.65	5.57	6.99	10.10	2.60	3.67	5.08	6.09	7.65	11.10
	20	2.40	3.39	4.76	5.70	7.16	10.10	2.14	3.02	4.22	5.06	6.35	9.03	2.33	3.29	4.60	5.51	6.92	9.88
	15	2.27	3.20	4.50	5.41	6.80	9.53	2.03	2.86	4.02	4.82	6.05	8.50	2.20	3.11	4.37	5.24	6.58	9.28
	10	2.14	3.02	4.24	5.13	6.55	8.93	1.92	2.70	3.79	4.58	5.87	7.98	2.08	2.93	4.12	4.97	6.24	8.71
	5	2.02	2.84	3.99	4.84	6.15	8.34	1.81	2.55	3.58	4.35	5.52	7.48	1.96	2.76	3.88	4.71	5.99	8.15
	0	1.90	2.67	3.75	4.55	5.77	7.78	1.71	2.41	3.37	4.09	5.19	7.00	1.85	2.60	3.65	4.43	5.62	7.61
	-10	1.67	2.35	3.29	3.99	5.03	6.71	1.52	2.13	2.98	3.61	4.55	6.07	1.63	2.29	3.21	3.89	4.92	6.58
	-15	1.57	2.20	3.08	3.73	4.69	6.20	1.42	2.00	2.80	3.38	4.25	5.62	1.53	2.15	3.00	3.64	4.58	6.09
	-20	1.47	2.06	2.87	3.47	4.36	5.71	4.34	1.88	2.62	3.16	3.96	5.19	1.43	2.01	2.81	3.39	4.26	5.62
	-25	1.31	1.92	2.68	3.23	4.04	5.24	1.25	1.76	2.44	2.95	3.68	4.77	1.33	1.88	2.61	3.16	3.95	5.16
	-30	1.13	1.79	2.49	2.99	3.73	4.78	1.11	1.64	2.28	2.74	3.41	4.37	1.15	1.75	2.43	2.93	3.65	4.71
	-35	0.93	1.67	2.31	2.77	3.43	4.33	0.96	1.53	2.12	2.54	3.15	3.97	0.98	1.63	2.26	2.71	3.36	4.28
(S)ORIT-PI-4	40	3.65	5.39	7.59	9.25	11.80	16.40	3.27	4.75	6.69	8.15	10.40	14.40	3.57	5.21	7.34	8.95	11.50	15.90
	30	3.07	4.84	6.81	8.30	10.60	14.60	2.74	4.29	6.03	7.35	9.39	12.90	2.96	4.69	6.60	8.04	10.30	14.20
	20	2.77	4.33	6.08	7.41	9.44	12.90	2.54	3.86	5.42	6.60	8.40	11.50	2.76	4.20	5.91	7.19	9.17	12.60
	15	2.54	4.09	5.74	6.98	8.89	12.10	2.33	3.65	5.13	6.23	7.93	10.80	2.50	3.97	5.58	6.78	8.64	11.80
	10	2.37	3.85	5.41	6.57	8.36	11.40	2.14	3.45	4.84	5.89	7.48	10.10	2.32	3.75	5.26	6.39	8.13	11.10
	5	2.18	3.55	5.09	6.18	7.84	10.60	2.01	3.25	4.57	5.55	7.04	9.51	2.16	3.50	4.95	6.02	7.64	10.40
	0	1.91	3.34	4.78	5.80	7.35	9.88	1.84	3.00	4.31	5.22	6.61	8.88	1.95	3.22	4.66	5.65	7.17	9.67
	-10	1.59	2.81	4.20	5.09	6.41	8.51	1.48	2.43	3.80	4.60	5.80	7.69	1.58	2.64	4.10	4.96	6.26	8.35
	-15	1.34	2.58	3.93	4.75	5.97	7.86	1.34	2.40	3.57	4.31	5.41	7.12	1.40	2.57	3.83	4.64	5.83	7.72
	-20	1.11	2.33	3.67	4.42	5.54	7.23	1.13	2.19	3.34	4.03	5.04	6.57	1.16	2.31	3.58	4.32	5.42	7.11
	-25	0.95	2.15	3.42	4.11	5.13	6.62	0.94	1.99	3.12	3.75	4.68	6.03	0.97	2.11	3.34	4.02	5.02	6.52
	-30	0.85	1.92	3.17	3.81	4.73	6.03	0.81	1.84	2.91	3.49	4.33	5.51	0.85	1.94	3.10	3.73	4.64	5.95
	-35	0.76	1.66	2.94	3.53	4.35	5.45	0.73	1.63	2.70	3.24	4.00	5.00	0.76	1.68	2.88	3.45	4.27	5.39

REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

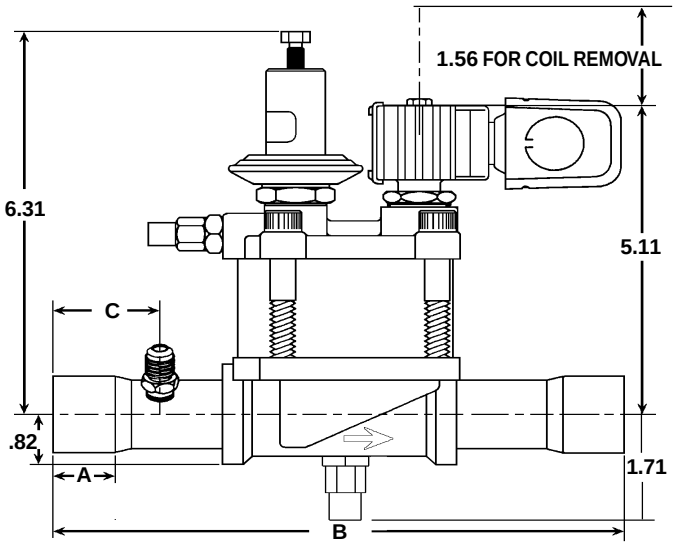
Refrigerant Liquid Temperature °F. ➡		0	10	20	30	40	50	60	70	80	90	100
R-404A	Correction Factor	1.33	1.28	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.81	0.74
R-502		1.31	1.26	1.21	1.16	1.11	1.05	1.00	0.94	0.89	0.83	0.77
R-507		1.34	1.29	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.82	0.75

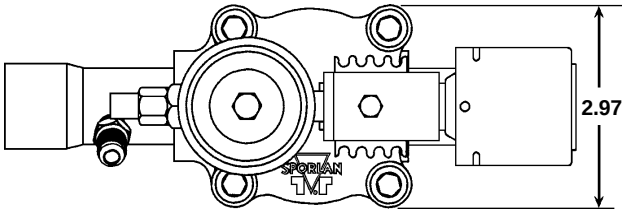
*ARI standard capacities are based on 100°F saturated liquid temperature. Use the correction factor for 100°F liquid temperature and the capacities at 40°F evaporator temperature to determine ARI standard capacity ratings.

Example: The capacity of a (S)ORIT-PI-3 using R-404A, evaporator temperature of 20°F, 2 psi pressure drop across the valve and a liquid temperature of 40°F, is equal to (3.75 x 1.12) 4.2 tons.

These factors correct for net refrigerating effect and are based on an average temperature of 0°F However, they may be used for any evaporator temperature from -35°F to 40°F since the variation in the actual factors across this range is insignificant.

SPECIFICATIONS				
VALVE TYPE	PORT SIZE (inches)	CONNECTIONS ODF SOLDER (inches)	SOLENOID COILS (Solenoid Stop & Electric Open)	NET WEIGHT (pounds)
(S)ORIT-PI-2	1/2	5/8, 7/8, 1-1/8, 1-3/8	MKC-1	5.8
(S)ORIT-PI-3	3/4	7/8, 1-1/8, 1-3/8, 1-5/8		
(S)ORIT-PI-4	1	1-1/8, 1-3/8, 1-5/8		





CONNECTION SIZE (Inches)	A	B	C
5/8 ODF	.50	8.50	1.70
7/8 ODF	.78	8.50	1.70
1-1/8 ODF	.91	8.50	1.70
1-3/8 ODF	1.00	10.80	2.54
1-5/8 ODF	1.09	10.80	2.54

DESIGNATION/ORDERING INSTRUCTIONS

S ORI T — PI — 2 7 S E —0/100 —120/50-60

- **Solenoid Stop Feature** (optional)
- **Basic Type** Open on Rise of Inlet Pressure
- **Pressure Tap on Inlet Connection**
- **Piloted Internally**
- **Port Size in 1/4 of an Inch**
- **Fitting Size in 1/8 of an Inch**
- **Solenoid Stop Feature** (optional)
- **Electric Open Feature** (optional)
- **Adjustment Range in** (psig)
- **Electrical Specifications for Solenoid Stop Feature** (optional)