SUPERFREEZE

SPRLX - TWO STEPS SOLENOID VALVE

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TYPE

SPRLX

PORT SIZE

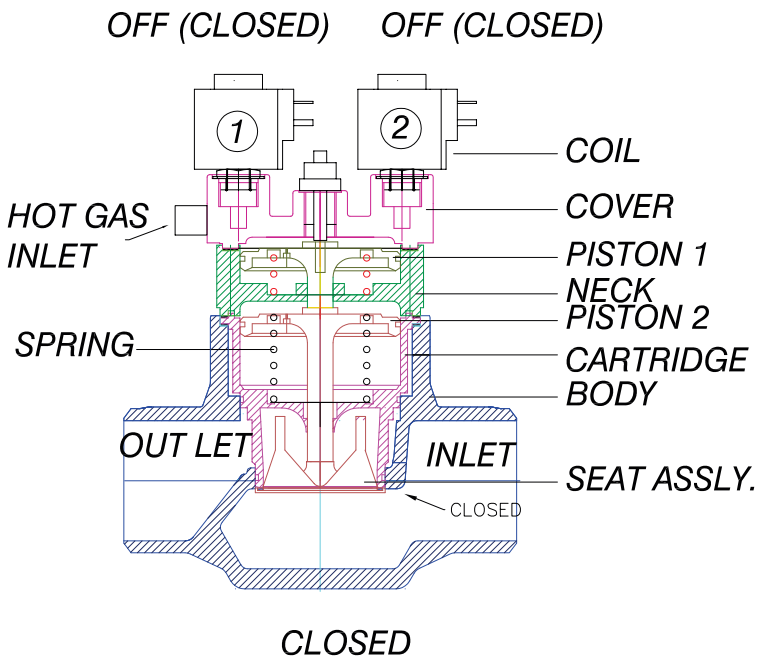
32 mm,40mm, 50 mm, 65 mm, 80 mm & 100 mm

REFRIGERANTS

Suitable for all common refrigerants including R-717 (Ammonia), R-134a, R-404, neutral, gaseous and liquid media.

INTRODUCTION

SUPERFREEZE SPRLX is two step solenoid. Both the solenoid are NC type. When First solenoid is energized, the main valve opens only 10%. The valve is said to be soft open. This is done to let hot gas in the low pressure side slowly. This prevent thermal shocks and hammering. Thermal shocks and hammering damage pipes and fittings. When the pressure across main valve is equalized, second solenoid is ON. This makes main valve to open fully.
This valve is very suitable for hot gas application and all other application where it is necessary to first let small quantity of liquid or gas is required to let in the system , and then when desired level of equalization of pressure is reached, valve is allowed to open fully. The sequencing of solenoid coils is done by PLC or timer.



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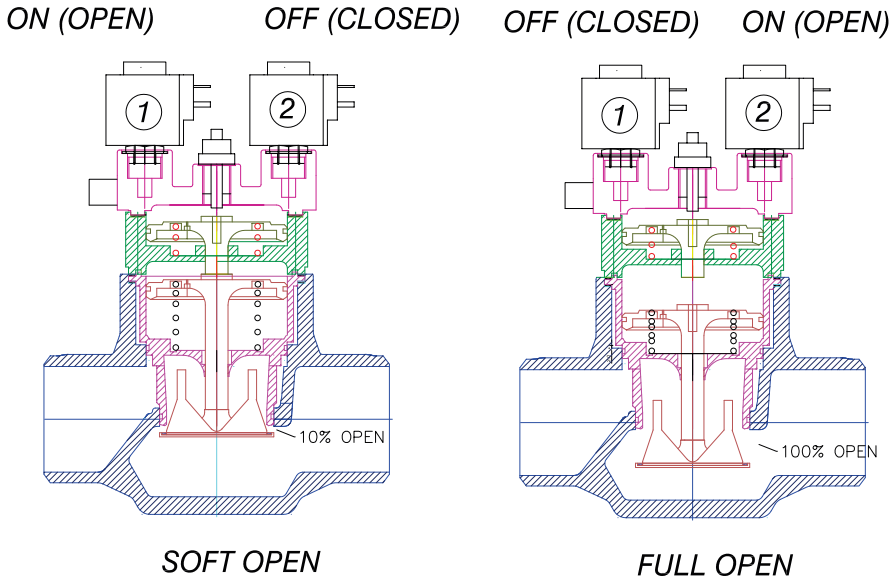

SOFT OPEN

FULL OPEN

FEATURES

Can be used for all normal, non-flammable refrigerants, including R717, and non-corrosive gases/liquids -

Temperature range : -60/+120°C (-76/+248°F).

Pressure range : Max. working pressure: 52 bar (754 psig)

- Direct welding (refer welding instructions)
- Low temperature steel body
- Compact design
- Hot gas operated (No differential press required
- Provision for manual opening
- Easily serviceable

SPECIFICATIONS

PART	MATERIAL
VALVE	BODY ASTM A352 GR. LCC
GASKET	NON ASBESTOS
BOLTS (Stainless Steel)	A2-70, B 1054
VALVE	SPINDLE STEEL
THROTTLE CONE	STEEL
VALVE SEAT	TEFLON
SPRING	STEEL
SERVO PISTON	STEEL

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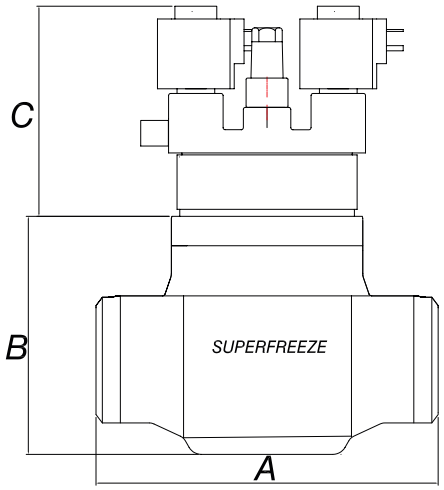

VALVE SIZE	A	B	C
32	146`	107	185
40	160	127	185
50	200	138	185
65	230	168	185
80	245	168	185
100	295	275	185

HOT GAS DEFROST SEQUENCE OF OPERATION

Defrosting of evaporator is necessary for efficient working of the system. Ice formation is the result of humidity and too low temperature in evaporator.
Hot gas is used to melt down ice from the evaporator.

1. When ice formation is noticed, manual switch for defrosting is activated.
2. **Refrigeration phase**-(1-2-3-4-5-6-7-8-9) SPR working as solenoid is kept open. The saturated liquid pass through it and via expansion valve enters into evaporator. Heat is absorbed and some of the refrigerant aporizes. The refrigerant exists through the open suction SPRLX (8) and flows to an LPR or accumulator.
3. On starting defrost cycle, liquid line solenoid SPR is closed and liquid starts to pump out from coil.
4. The fans are kept running for 3-5 minutes. This helps in quicker boiling off of liquid. At this time, suction line or wet return line valve is kept open (SPRLX- 8) and liquid is pumped out of the evaporator.
5. Now wet suction line 2 step solenoid valve SPRLX (8) is closed after 3-5 minutes and fans are turned off.
6. **Hot Gas Defrosting Phase** (11-12-13-14-15) At this point, hot gas is let in the coil thru SPRLX-13. Initially soft opening is done by switching ON first solenoid. Slowly hot gas enters the coil. It equalizes the temperature and pressure in the coil. This is done to avoid thermal shocks. After 2-3 minute, another solenoid is activated and main valve opens fully. During this time, condensate liquid line valve is kept closed and thus hot gas do not have any out let. The pressure in coil increases to 5 bar. The over flow valve opens pressure crosses 5 bar and hot gas is relieved safely to LPR.
7. After hot gas cycle is completed in 10-15 minutes, the suction line is opened by a SPRLX-2 step solenoid. First soft opening is done by switching On first solenoid. Slowly hot gas enters the coil. It equalizes the temperature and pressure in wet return line. This is done to avoid thermal shocks. After 2-3 minute, another solenoid is activated and main valve opens fully and pressure from the evaporator is released to wet return line.
8. Liquid line solenoid and suction stop valve will open and allow liquid refrigerant to evaporate.
9. The fans are not yet started. There is possibility of water droplets on coil to be blown off in cooling space. The temperature of coil is allowed to drop and thus freezing the tiny water drops.
10. Now fans are turned on and refrigeration phase is started.

The entire process must be controlled by PLC/timer and closely monitored.

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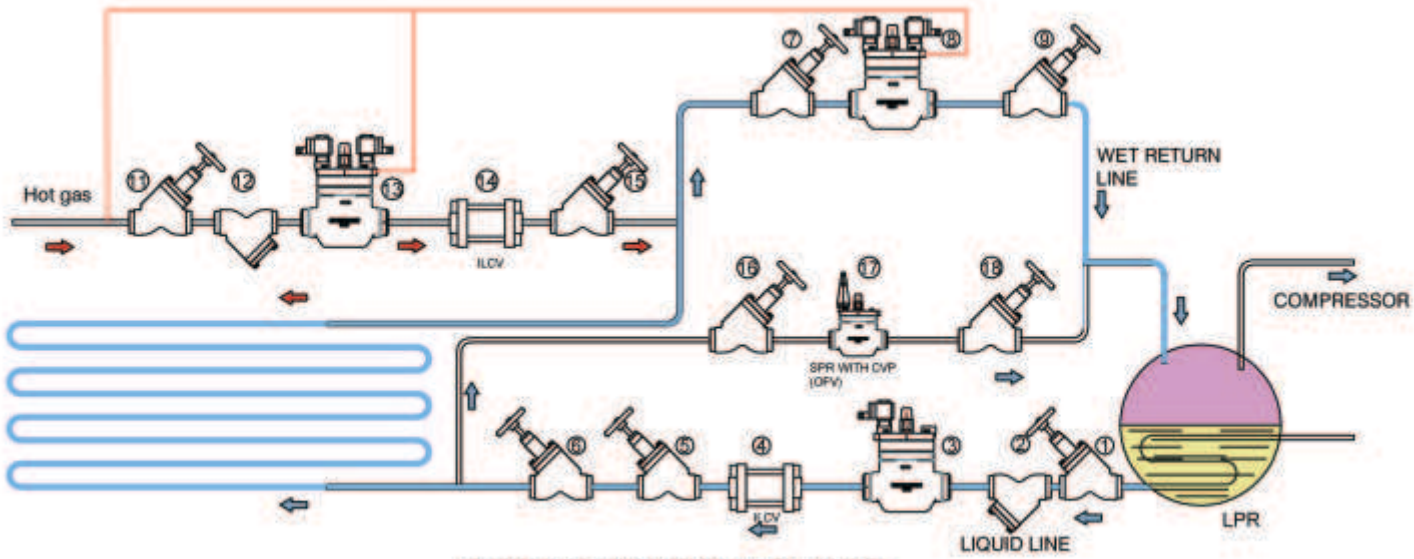
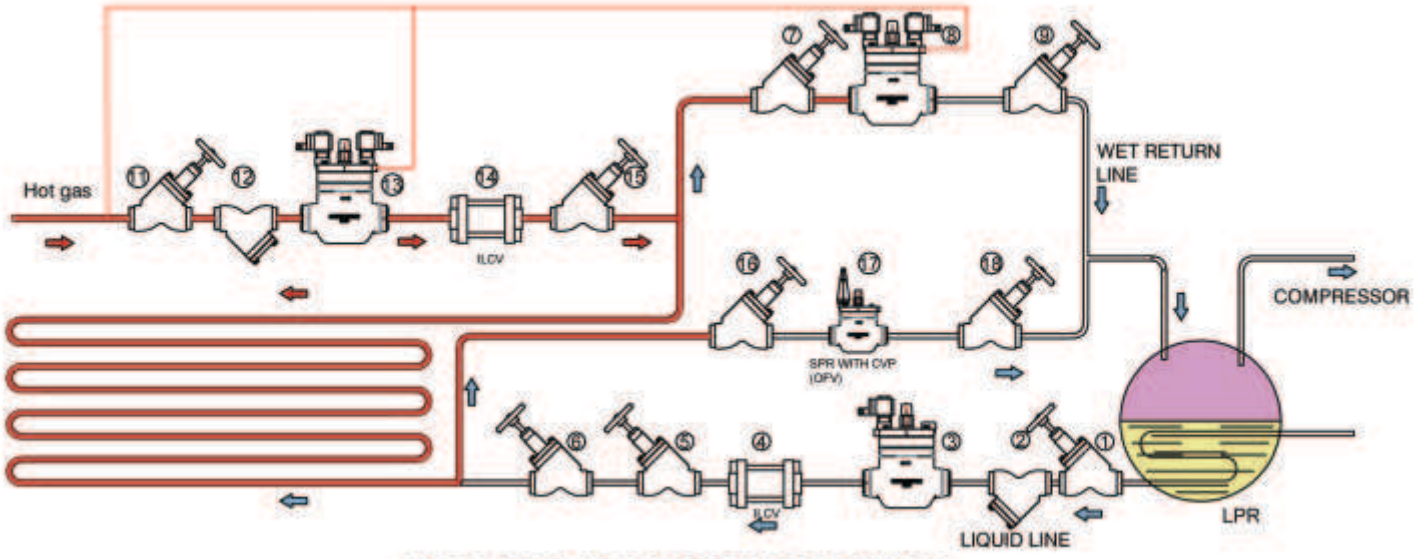


REFRIGERATION PHASE



HOT GAS DEFROSTING PHASE

1,5,7,9,11,15,16 &18	STOP VALVE SBW
2&12	SERAINER STW
3	SOLENOID VALVE SPR
4&14	IN LINE CHECK VALVE WSCK
6	HAND EXPANSION VALVE SBW
17	SPR WORKING AS OVER FLOW VALVE
8&13	2 STEP SOLENOID SPRLX

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CAPACITY CHARTS FOR AMMONIA

DRY SUCTION LINE

Valve Size	Kv (m3/hr.	Evaporative temp. °C							
		-50	-40	-30	-20	-10	0	10	20
32	23	29	39	50	63	77	94	113	133
40	30	38	50	65	82	101	123	147	173
50	48	61	81	105	131	161	196	235	277
65	85.5	109	144	187	233	288	350	419	494
80	85.5	109	144	187	233	288	350	419	494
100	172	219	289	375	469	579	703	843	993

The above table is for Qn(kW), T=30 °C, , ▲P=0.05 bar and Superheat=8K
Qn = Q0 x f▲p x f Tliq x Ts

dP correction factor

dP	0.01	0.03	0.05	0.08	0.1	0.14
factor	2.24	1.29	1	0.79	0.71	0.6

Liquid temp. correction factor

temp	-20	-10	0	10	20	30	40	50
factor	0.82	0.85	0.9	0.92	0.96	1	1.04	1.09

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