

# SOLENOID VALVE

Type SV2, SV2A

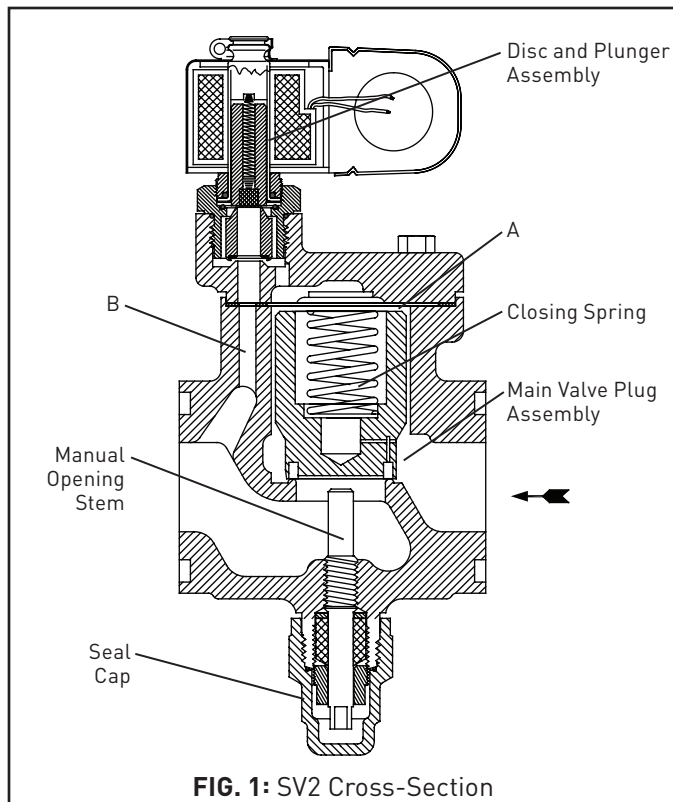
Port Size 1/2" to 1-1/4" (13-32 mm)  
Suitable For: Ammonia, R-12, R-22,  
R-502 and Other Common Refrigerants

## FEATURES

- Ductile Iron Body Strong, Compact
- Pilot Operated
- Manual Opening Stem
- All Service From The Top
- Maximum Opening Pressure Difference 20.7 bar (300 psig)
- Design Pressure (MRP):31.0 bar (450 psig)
- Pilot Light Available
- Molded Class "H" Coil Construction
- Teflon Seat

## DESCRIPTION

This compact, heavy duty, pilot operated, ductile iron bodied solenoid valve is suitable for Ammonia, R 12, R 22, R 502, and other refrigerants, certain oils and other fluids approved for use in refrigeration. This valve may be opened by means of a manual opening stem for servicing or in case of an electrical power failure. The valve can be ordered with a close couple stainless steel screen strainer.



## Bulletin 30-06 D



## December 2007 Installation, Service, and Parts Information

The Type SV2 valve is available with an optional extension tube to raise the solenoid operator and coil housing assembly 50mm (2.0") above the valve body to accommodate pipe insulation. When this option is desired, the Type SV2A solenoid valve should be specified.

The Type SV2 and SV2A solenoid valves can be furnished with FPT: Internal NPT (U.S. Standard Taper Pipe Thread), Socket Weld, Weld Neck, or ODS (solders over copper tubing of given diameter) connections. The valves may be easily removed from between the flanges for servicing.

## PURPOSE

The SV2 is a spring closing, normally closed solenoid valve. The SV2 is suitable for use in refrigerant liquid, hot gas or suction lines in a fluid temperature range of -45° to 121°C (50° to 250°F). Minimum pressure drop to hold valve open is .24 bar (3.5 psi).

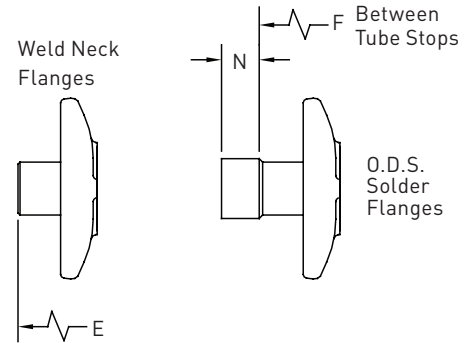
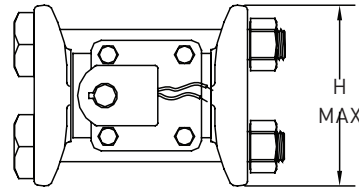
## PRINCIPLES OF OPERATION

The Type SV2 is a pilot operated solenoid valve. The valve, in its closed position, with the solenoid coil de-energized and the disc and plunger assembly in its seated position, is shown in Figure 1. Electrical energization of the solenoid coil forms a magnetic field, pulling up the plunger and allowing the piston plug to lift off its seat. This permits flow of the trapped refrigerant from the top of the main valve plug. (Chamber A) which reduces pressure above the plug assembly. The main valve plug is then forced upward by the upstream pressure acting on it. This opens the valve port to allow flow through the valve.

De-energization of the solenoid coil permits the spring assisted disc and plunger assembly to drop back to its seat, stopping the flow through the pilot port (port 13). The

## REPAIR KITS FOR SV2 & SV2A SOLENOID VALVES

Item #	Description	Qty	1/2"(13mm)	3/4"(20mm)	1"(25mm)	1-1/4"(32mm)
1 - 5	Coil & Housing Kit	1	Specify Coil Voltage and Valve Type			
6 - 8	Solenoid Operator Assembly	1	202700	202700	202700	202700
9 & 10	Seal Cap Kit(Discard Gasket)	1	202713	202713	202713	202713
11,12,&13	Stem Packing Kit	1	202100	202100	202100	202100
11 to 14	Manual Opening Stem Kit	1	202745	202746	202746	202747
17	Bolt Package	4	202761	202762	202762	202763
15,16	Main Valve Plug Kit	1	202748	202749	202750	202751
16,18	Closing Spring Kit	1	202752	202753	202753	202754
16,19,20	Top Cover Kit	1	202755	202756	202756	202757
20,21,22,23	Piston Plug Kit for SV2	1	-----	202764	202764	202764
20,21,22,23	Piston Plug Kit for SV2A	1	202765	202766	202766	202766
24	Flange Gasket	12	202078	202079	202079	202080
7,10,16,20,23,24	SV2,SV2A Solenoid Gasket Kit	1	202758	202759	202759	202760
	Sv2 Repair kit	1	202767	202769	202769	202770
	SV2A Repair Kit	1	202771	202773	202773	202774



### DIMENSIONAL DATA- PORT SIZE

Dimension	Solenoid Valve Port Size								
	1/2" (13mm)			3/4" - 1" (20 - 25mm)			1-1/4" (32mm)		
	Flange	inch	mm	Flange	inch	mm	Flange	inch	mm
A	---	6.56	166	---	8.00	203	---	8.62	219
B	---	2.31	59	---	3.12	79	---	3.50	89
C	---	2.25	57	---	3.43	87	---	5.87	149
D(FPT,SW)	---	3.75	95	---	5.76	146	---	7.97	203
E(WN)	---	4.44	113	---	7.53	192	1-1/4"	9.67	246
	---	---	---	---	---	---	1-1/2"	9.87	251
F(ODS)	1/2"	4.75	121	---	6.63	168	1-3/8"	8.47	215
	5/8"	5.25	134				1-5/8"	8.87	225
	7/8"	6.12	156				2-1/8"	9.87	251
G	---	2.00	50	---	3.9	99	---	7.00	178
H	---	3.00	76	---	4.60	117	---	3.75	95
	---	3.87	98	---	4.87	124	---	5.12	130
J N(ODS)	1/2"	0.37	10	7/8"	0.75	20	1-3/8"	1.00	25
	5/8"	0.50	13	1-1/8"	0.93	24	1-5/8"	1.09	28
	7/8"	0.75	20	1-3/8"	1.00	25	2-1/8"	1.34	34
P(SW)	---	0.50	13	---	0.50	13	---	0.50	13

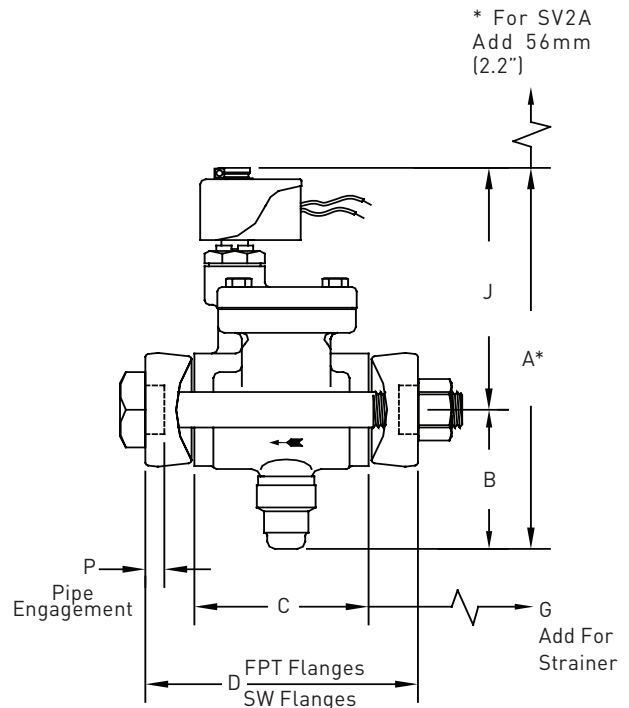
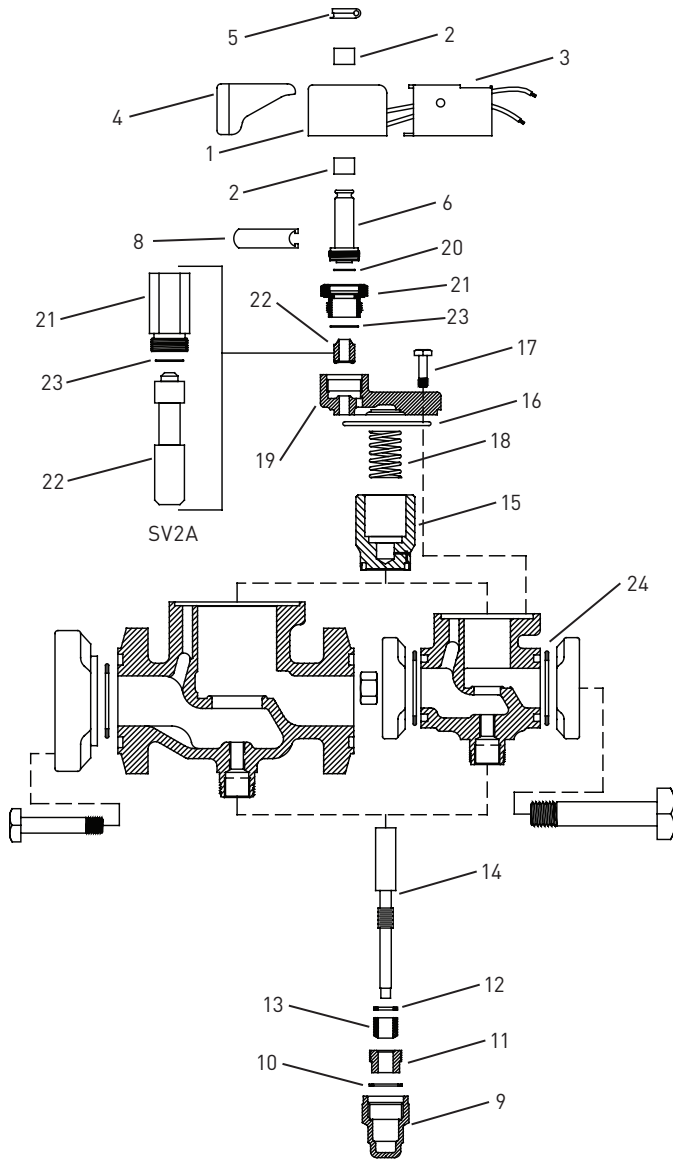


FIG. 2: SV2 Dimensions



**FIG 3. : SV2 Solenoid Valve**

pressure above and below the main valve plug assembly is equalized, utilizing the closing spring, which forces the main valve plug assembly onto its seat, thus stopping flow through the valve.

**MANUAL OPENING STEM**

The manual opening stem on the Type SV2 is for the purpose of opening the valve without energizing the solenoid coil. Refer to the exploded view and the parts list for location of the stem and other related parts. For access to the stem, the seal cap on the bottom of the valve must be removed. This must be done with caution as refrigerant may be trapped inside the seal cap. Manual opening is accomplished by turning the stem clockwise until only the flats on the end of the stem protrude from the packing nut. To reset for automatic operation, turn the stem counter clockwise as far as it will go. Loosen packing nut before turning stem and re-tighten after turning stem.

**INSTALLATION**

Protect inside of valve from dirt, chips and moisture during Installation. Mount only in horizontal pipe line with solenoid coil at the top; this valve will work properly only in this position. In a liquid line, the Solenoid Valve should be near the expansion valve inlet. It is advisable to Install the RSF close coupled companion strainer ahead of the valve for protection against dirt and chips.

The SV2 solenoid valve must be installed with the arrow on the valve body in the direction of flow through the valve. If the valve is backwards, the flow will not be stopped when the valve is electrically de-energized. Like all Solenoid Valves, the SV2 can stop flow only in the direction of normal inlet to normal outlet (as shown by the arrow on the body). If reversal of pressure occurs in the system so the outlet pressure exceeds the Inlet pressure, the piston will be blown away from its seat and reverse flow will occur. If a system has this type of pressure reversal (as encountered during hot gas defrost with liquid recirculation systems), a check valve such as Refrigerating Specialties Division Type CK4A in series with the solenoid valve will prevent flow reversal. (CK4A must be installed downstream to avoid trapping liquid.)

**ELECTRICAL**

The Refrigerating Specialties Division molded water resistant Class "H" solenoid coil is designed for long life and powerful opening force. The Class "H" coil construction will permit coil temperatures, as measured by resistance method, as high as 180°C (365°F). Final coil temperatures are a function of both fluid and ambient temperatures. The higher fluid temperatures require lower ambient temperatures so the maximum coil temperature is not exceeded. Conversely, low fluid temperatures permit higher ambient temperatures. The molded Class "H" coil is available from stock with most standard voltages. However, coils are available for other voltages and frequencies, as well as for direct current. Coils are also available as transformer type with a 6 volt secondary winding for use with the Refrigerating Specialties Division Pilot Light Assembly (see current copy of Bulletin 60 10, "Pilot Light Assembly and Solenoid Transformer Coil"). It is not recommended to mount the pilot light directly onto the coil housing.

The solenoid coil must be connected to electrical lines with Volts and Hertz the same as specified on the coil assembly. The supply circuits must be properly sized to give adequate voltage at the coil leads even when other electrical equipment is operating. The coil is designed to operate at 15% under voltage. Operating with line voltage

Coil Type	Watt Rating and Volt Amperage		
	Watts	VA Holding	VA InRush
Standard AC Coil Coil Class 'H'	10.5	23	37
Standard AC Coil with 6v secondary pilot light	11	26	38

below the limit will result in lowering the valve opening pressure differential.

### SERVICE POINTERS

The SV2 Solenoid Valve and Strainer are easily removable for cleaning or repairing. To remove valve and strainer, first manually open then pump out valve, unscrew the flange bolts and spread the flanges slightly apart.

- 1. Failure To Open:** (a) Coil Is of incorrect voltage. See "Electrical." Check voltage specified on the coil assembly. (b) Line voltage Is abnormally low. See "Electrical." Check line voltage at coil leads with a voltmeter. (c) Failure to electrically energize. Check control circuit. (d) Pressure difference across valve Is too high. The SV2 will open against a maximum pressure difference across the valve of 20.7 bar (300 psig). (e) Solenoid coil is burned out. See "Electrical," and replace with proper coil. (f) Disc and Plunger Assembly Is sticking. To disassemble the valve for inspection of internal parts (after pumping out the system as required), disconnect the power source to the solenoid coil, remove the Tube Assembly, lift out the Disc and Plunger Assembly, then remove the Piston Plug Retainer and Piston Plug Assembly. Remove the Top Cover and the Main Valve Plug Assembly. In any traces of dirt from these parts and using fine emery cloth remove any burrs if necessary. Thoroughly clean all parts and re-assemble applying a light film of refrigeration oil on the parts.
- 2. Failure To Close:** (a) Electrical control circuit is not opening properly. Check wiring and controls. (b) There are chips or dirt on the seat(s) preventing proper seating. Disassemble and clean valve as outlined in 1(f) above. If any of these parts need replacing, it is advisable to replace them using a proper new replacement kit. (d) Piston is sticking. See 1(f) above. (e) Manual Opening Stem is turned all of the way or partly in holding Main Valve Plug Assembly open and permitting flow through valve.
- 3. Leakage Through Valve:** See (2) above.
- 4. Overheating:** The Solenoid Coil Is designed to operate hot and is constructed of high temperature materials accordingly. Unless troubled with actual coil burn outs, high coil temperature should be ignored. Persistent burn outs indicate improper line or coil voltage. See 1(e) above .

### SAFE OPERATION (SEE BULLETIN RSBVC)

People doing any work on a refrigeration system must be qualified and completely familiar with the system and the Refrigerating Specialties Division valves involved, or all other precautions will be meaningless. This includes reading and understanding pertinent Refrigerating Specialties Division product Bulletins and Safety Bulletin

RSB prior to installation or servicing work.

Where cold refrigerant liquid lines are used, it is necessary that certain precautions be taken to avoid damage that could result from liquid expansion. Temperature increase in a piping section full of solid liquid will cause high pressure due to the expanding liquid that can possibly rupture a gasket, pipe or valve. All hand valves isolating such sections should be marked, warning against accidental closing, and must not be closed until the liquid is removed. Check valves must never be installed upstream of solenoid valves, or regulators with electric shut-off, nor should hand valve upstream of solenoid valves or downstream of check valves be close until the liquid has been removed. It is advisable to properly install relief devices in any section where liquid expansion could take place.

Avoid all piping or control arrangements that might produce thermal or pressure shock. For the protection of people and products, all refrigerant must be removed from the section to be worked on before a valve, strainer, or other device is opened or removed. Flanges with ODS connections are not suitable for ammonia service.

### WARRANTY

All Refrigerating Specialties products are warranted against defects in workmanship and materials for a period of one (1) year from date of shipment from originating factory. This warranty is in force only when products are properly installed, field assembled, maintained, and operated in use and service as specifically stated in Refrigerating Specialties catalogs or bulletins for normal refrigeration applications, unless otherwise approved in writing by Refrigerating Specialties Division. Defective products or parts returned to the factory with transportation charges prepaid and found to be defective by factory inspection will be replaced or repaired at Refrigerating Specialties option, free of charge F.O.B. factory. Warranty does not cover products that have been altered or repaired in the field, damaged in transit as a result of accidents, misuse, or abuse. Products disabled by dirt or other foreign substances will not be considered defective.

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