

Parker Weld-in Valve Stations

Product Bulletin 10-02

Type: S8VS, S8ST

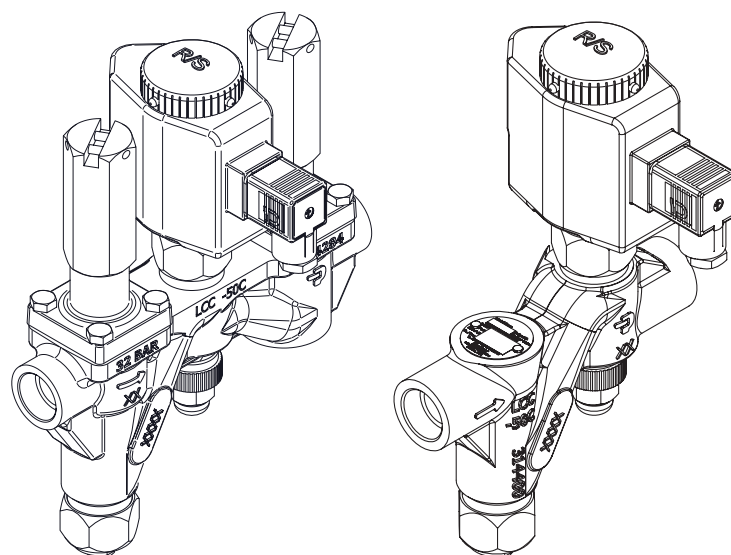


Purpose:

The S8VS and S8ST provide safe and economical solutions for small capacity lines. These products feature a weld-in construction which offers increased safety over traditional two-bolt flange connections. They come standard with an integrated strainer which eliminates the need to order and install additional components.

The S8VS valve station is based on the proven S8F solenoid valves, RSF strainers, and R/S hand valves. The S8ST solenoid-strainer combination valve is also based on S8F and RSF. Both share common components which reduces complexity and spare part requirements.

S **8** **V** **S** VALVE STATION
OLEN ^{1/2"} **S** **T** STRAINER
N
O
I
D



Contact Information: Product Features:

Parker Hannifin Corporation
Refrigerating Specialties Division
2445 South 25th Avenue
Broadview, IL 60155-3891

phone (708) 681-6300
fax (708) 681-6306

www.parker.com/refspec

- Suitable for ammonia and other common refrigerants
- Integrated 60 mesh strainer
- Replaceable seat ensures easy service and long life
- Interchangeable components with S8F solenoids, R/S hand valves (on S8VS), and RSF strainer
- Coil options to meet various applications
- Complies with PED 2014/68/EU
- AC and DC coil options



ENGINEERING YOUR SUCCESS.

Table of Contents

Technical Data	2	Material List: Expansion Valve	5
Electrical	2	Installation	6
Function and Design	3	Nameplate Information	6
Manual Opening Stem Operation	3	Maintenance and Service	7
Material List: Isolation Valve (Hand Shutoff)	4	Dimensional Information	8
Material List: Strainer	4	Clearance Zone 152.40 [6.00]	8
Material List: Solenoid	5	Parts Kit Reference	10

Technical Data

Liquid Temperature Range	-50°C to 105°C (-58°F to 221°F)	Maximum Operating Pressure Diff. (MOPD)	21 bar (305 psid)
Ambient Temperature Range	-50°C to 60°C (-58°F to 140°F)	Burst Pressure	> 5 x MRP
Maximum Rated Pressure (MRP)	32 bar (465 psig)	Coil Classification	Class H; NEMA 4

Valve	Port Size		Connection		Flow Coefficient (control module)		Flow Coefficient (complete valve)	
	mm	inch	SW	BW (ANSI / DIN)	k _v	c _v	k _v	c _v
S8VS	15	1/2"	1/2", 3/4"	1/2", 3/4" / DN15, DN20	2.3	2.7	2.28	2.63
S8ST	15	1/2"	1/2", 3/4"	1/2", 3/4" / DN15, DN20	2.3	2.7	2.28	2.63

Electrical

The Parker Refrigerating Specialties Division molded water resistant Class “F” solenoid coil is designed for long life and powerful opening force. The standard coil housing meets NEMA 4 requirements. This sealed construction can withstand direct contact with moisture and ice. By definition, Class “F” coil construction will permit coil temperatures, as measured by resistance method, as high as 155°C (311°F). Final coil temperatures are a function of both fluid and ambient temperatures. The higher fluid temperatures require lower ambient temperatures for the maximum coil temperature not to be exceeded. Conversely, low fluid temperatures permit higher ambient temperatures.

A solenoid coil should never be energized except when mounted on its corresponding solenoid tube.

The molded Class “F” coil is available from stock with most standard voltages. However, coils are available for other voltages and frequencies, as well as for direct current.

The solenoid coil must be connected to electrical lines with Volts and Hertz same as stamped on the coil. 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 with line voltage from 85% to 110% of rated coil voltage. Operating with a line voltage above or below these limits may result in coil burn-out. Also, operating with line voltage below the limit will definitely result in lowering the valve’s maximum opening pressure differential. Power consumption during normal operation will be 35 watts or less.

Coil (Volts/Hz)	Power Lead	Neutral Lead	Inrush Current (Amps)	Running Current (Amps)	Fuse Size (Amps)	Temp °C (°F)
24/50	Brown	White	6.82	2.99	4	250 (482)
24/60	Brown	White	6.70	2.73	4	250 (482)
115/50	Purple	White	1.22	0.21	1	90 (194)
120/60	Blue	White	1.18	0.46	1	90 (194)
208/60	Red	White	0.63	0.24	1	90 (194)
230/50	Yellow	White	0.65	0.26	1	90 (194)
240/50	Black	White	0.59	0.24	1	90 (194)
240/60	Orange	White	0.60	0.23	1	98 (208)
12 DC	Brown	White	—	—	—	—
24 DC	Brown	White	6.70	6.70	—	204 (400)

Table 1: General Coil Information

Coil Features

- Leaded coils are provided with 18 gage wires at 457 mm (18") in length.
- Both leaded and DIN quick disconnect (QD) coil are Nema 4x.
- Optional LED knobs that indicate when the coil is energized are available in red or green for AC coils only.

Function and Design

The S8VS is a multi-module platform and is available as a four position unit with the capability of interchangeable modules in the fourth position, as shown in Figure 1. The S8ST is two position as shown in Figure 2.

Position 1: Isolation valve (hand shut-off)

Position 2: Strainer (60 mesh)

Position 3: Solenoid

Position 4: Option 1: Isolation valve (hand shut-off)

Option 2: Stop expansion valve

Option 3: Stop check valve

Option 4: Stop check hand expansion

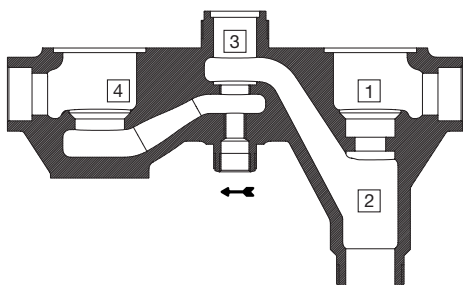


Figure 1: S8VS Modules

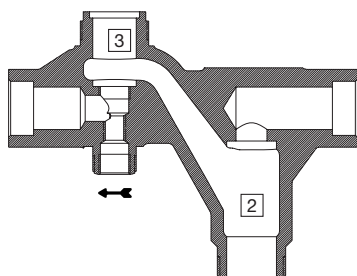


Figure 2: S8ST Modules

The S8VS can be configured for many different applications including liquid feed and as a purge point solenoid.

Isolation Valve (Hand Shut Off) Module

The isolation valves are located in position 1 and optionally in position 4. These are designed based on the proven technology of the R/S hand valve series and serve to isolate the strainer. These isolation valves feature a proven seat and seal as well as a back-seating design.

Strainer Module

The RSF refrigerant strainer in position 2 collects foreign materials and dirt in a refrigerant system at minimal pressure drop to minimize damage to or prevent malfunction of control valves. This is extremely important upon start-up of a new refrigeration system where dirt, scale, and weld particles may be present in the system and are disturbed and circulated when pressure testing or upon system start-up. It is also important when an existing system is revised and any settled dirt or foreign matter may be disturbed and circulated throughout the system.

S8 - Solenoid Module

The S8 solenoid valve in position 3 is a semi-direct acting valve. A small pilot port is opened by a magnetically-lifted solenoid plunger assembly, causing relief of pressure from the top of a main valve and piston assembly. The resulting pressure difference between valve inlet and valve outlet allows the main valve to be lifted. A minimum pressure difference of approximately 1 psi is required for operation.

Stop / Check / Expansion Module

Position 4 features a isolation valve with an optional expansion and check feature. The expansion valve feature allows the user to manually adjust the flow rate. The check valve feature prevents backflow and is generally used in applications that employ a hot gas defrost.

Operation is as follows, starting with a closed valve.

1. When energized, the solenoid coil (1) forms a magnetic field which pulls the solenoid plunger (2) upward, striking the valve needle and pulling it up from its pilot seat. This permits fluid travel from chamber A (in and above piston plug assembly [3]), through orifice B in the piston plug assembly, and to the downstream side of the valve.
2. When the pressure in chamber A has dropped almost to the downstream pressure, the higher upstream pressure, acting on the annular portion of the piston plug assembly (3) outside of the seat bead, lifts the main valve to its open position.
3. When the electrical circuit to the valve is broken, the solenoid coil (1) is de-energized, allowing the solenoid plunger (2) to drop and the valve needle to close the pilot port (4) in the piston plug.
4. Liquid and/or gas leakage through the clearance area around the piston plug (3) causes a rapid pressure buildup in chamber A. This pressure, along with the downward force of the spring in the solenoid plunger (2) and the weight of the piston plug assembly, forces the main valve disc tight against the seat bead to stop all flow.

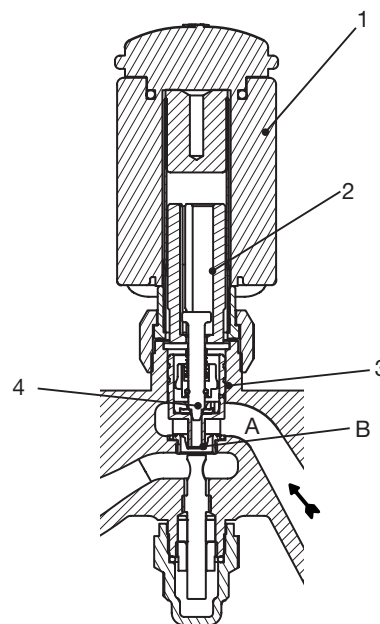
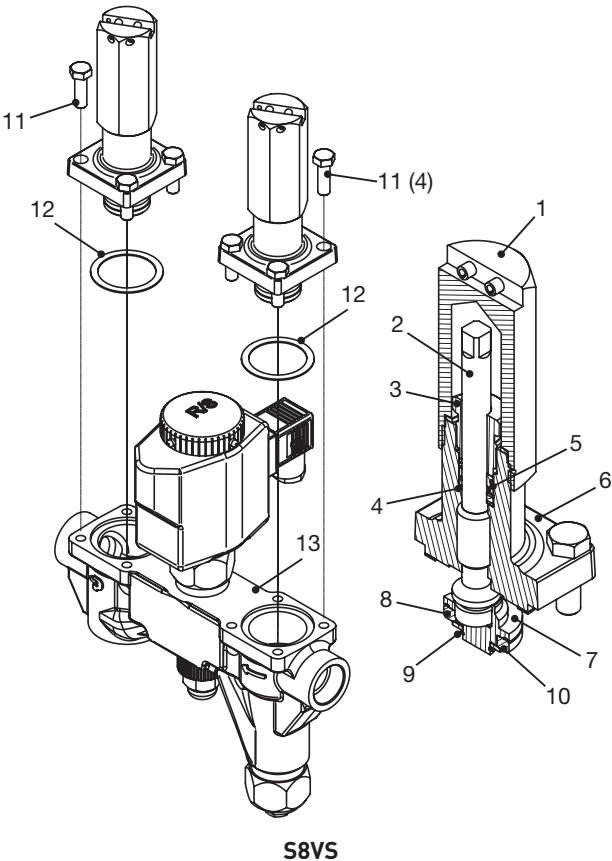


Figure 3: S8VS/S8ST Function Schematic

Manual Opening Stem Operation

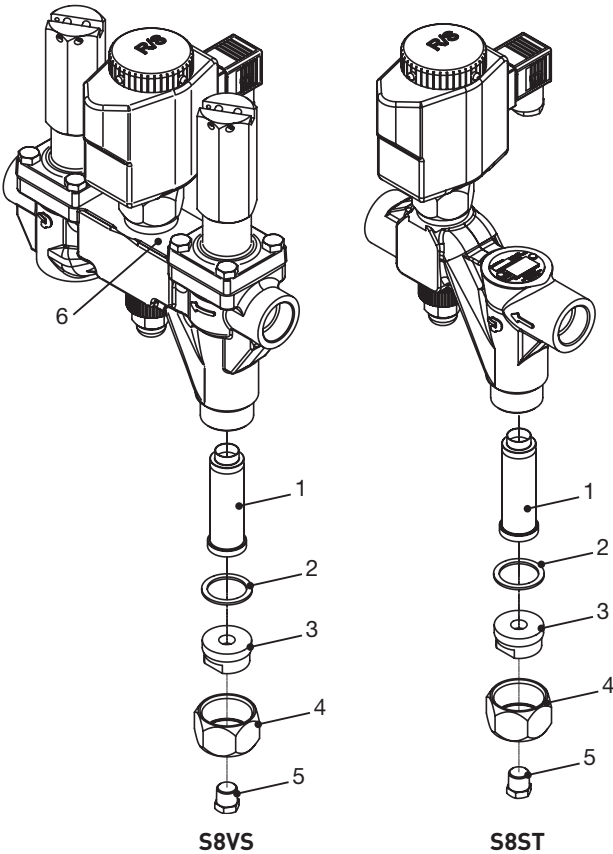
To manually open the S8VS/S8ST solenoid port, first remove the bottom seal cap. Turn the manual opening stem in (clockwise viewed from beneath). The rising stem will lift the piston assembly from its seat and permit flow through the valve. To resume automatic operation, turn the manual opening stem out (counterclockwise viewed from beneath) until it stops and then replace the seal cap.

Material List: Isolation Valve (Hand Shutoff)



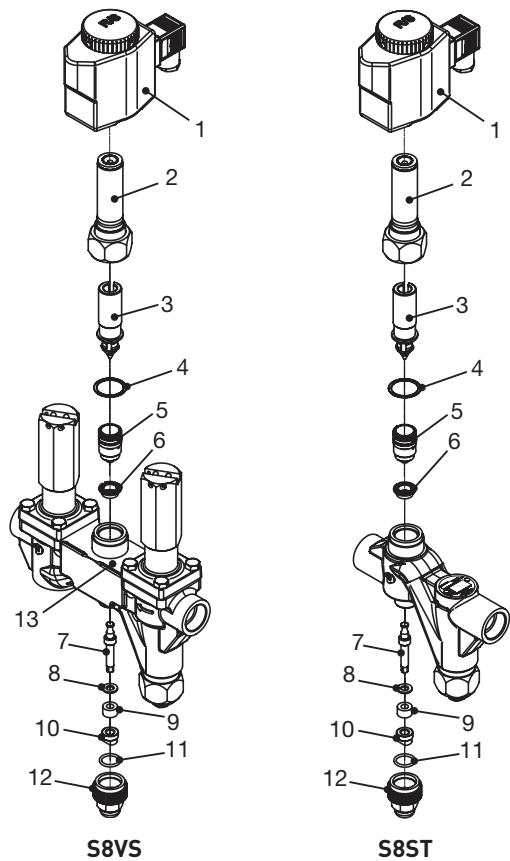
Item	Description	Material
1	Seal Cap	Aluminum, 2011-T3 per ASTM B211
2	Stem, Hand Valve	303 Stainless Steel
3	Nut, Packing	303 Stainless Steel
4	Packing Gland	PTFE, Carbon Filled
5	Packing	Style 235A Crane Foil
6	Bonnet, Hand Valve	Steel, Zinc Plated - A350-LF2 Class 1
7	Disc Carrier, Hand Valve	1117 Stainless Steel
8	Seat Disc, Hand Valve	PTFE, Carbon Filled
9	Washer, Retaining Ring	Low Carbon Steel, Zinc with Clear Chromate Plated
10	Retaining Ring	Carbon Spring, Temper Steel
11	Bolts, Hand Valve Bonnet	Stainless Steel, DIN ISO 3506-1 Grade A2
12	Gasket, Hand Valve Bonnet	Gylon 3500
13	Valve Body	ASTM A352 LCC
-	O-Rings	Neoprene

Material List: Strainer



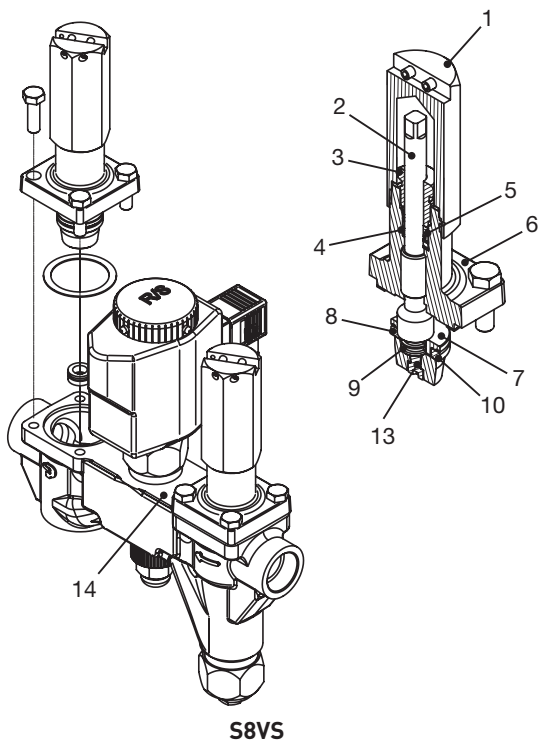
Item	Description	Material
1	Strainer Basket, 60 Mesh	304 Stainless Steel
2	Gasket, Strainer	Garlock 2930
3	Nut, Strainer	416 Stainless Steel
4	Cap, Strainer Bottom	Zinc-Plated Steel
5	Plug Pipe	Zinc-Plated Steel
6	Valve Body	ASTM A352 LCC

Material List: Solenoid



Item	Description	Material
1	Coil, Industrial	Various
2	Tube ASM Solenoid	Stainless Steel
3	Plunger/Needle ASM S8W	Stainless Steel
4	Gasket, Solenoid	Wolverine
5	Piston Plug ASM S8W	Steel with PTFE
6	Valve Seat S8W	303 Stainless Steel
7	Manual Opening Stem	416 Stainless Steel
8	Washer, Flat	Steel
9	Packing, Stem	Graphite
10	Packing Nut	Steel
11	O-Ring	Neoprene
12	Seal Cap Gage, Valve	Aluminum
13	Valve Body	ASTM A352 LCC

Material List: Expansion Valve



Item	Description	Material
1	Seal Cap	Aluminum, 2011-T3 per ASTM B211
2	Stem, Hand Valve	303 Stainless Steel
3	Nut, Packing	303 Stainless Steel
4	Packing Gland	PTFE, Carbon Filled
5	Packing	Style 235A Crane Foil
6	Bonnet, Hand Valve	Steel, Zinc Plated - A350-LF2 Class 1
7	Disc Carrier, Hand Valve	1117 Stainless Steel
8	Seat Disc, Hand Valve	PTFE, Carbon Filled
9	Washer, Retaining Ring	Low Carbon Steel, Zinc with Clear Chromate Plated
10	Retaining Ring	Carbon Spring, Temper Steel
11	Bolts, Hand Valve Bonnet	Stainless Steel, DIN ISO 3506-1 Grade A2
12	Gasket, Hand Valve Bonnet	Gylon 3500
13	Shoulder Screw	Steel
14	Valve Body	ASTM A352 LCC

Installation

All valves are packed for a maximum protection. Unpack carefully. Check the carton to make sure all items are unpacked. Save the enclosed instruction for the installer and eventual user.

Do not remove the protective coverings from the inlet and outlet of the valve until the valve is ready to be installed. Protect the inside of the valve from dirt and chips before and during installation.

⚠ Caution

All personnel working on valves must be qualified to work on refrigeration systems. If there are any questions contact Parker Refrigerating Specialties before proceeding with the work.

The valve should be installed in a location where it is easily accessible for adjustment and maintenance. The location should be such that the valve can not be easily damaged by material handling equipment. When it is necessary to insulate the valve, the insulation should be installed to provide access for adjustment and maintenance. Do not insulate solenoid coils. Proper indicating gauges should be installed to be easily visible to the operating engineer for system checks and adjustment purposes.

The preferred mounting method for the S8VS series is in the upright horizontal position. The valve must be installed with the arrow pointing in the direction of flow for the valve to function properly. Prior to welding, protect the inside of the valve body from welding debris and dirt.

In the event the valve is left disassembled for any length of time, protecting the components is essential. Place the components in a polyethylene bag or apply a rust protection agent, such as refrigerant oil.

Contractors need to follow a WPS (Welding Procedure Specification) for all welding. The procedure must be qualified and the welder doing the weld qualified to perform that procedure.

The codes applicable to the welding of socket weld valves require that the pipe be inserted into the socket until bottomed against the stop. The pipe is then to be backed out approximately $\frac{1}{16}$ of an inch before welding. Use of welding rings is optional, but recommended for butt weld valves. They help alignment, control gap for full penetration welding, and reduce welding debris entry.

Note: When welding carbon steel and stainless steel, the welded joint should be painted to prevent galvanic corrosion.

Socket welding, where allowed, is the preferred connection. This connection helps to reduce the amount of welding debris in the piping system.

Remove welding debris and any dirt from the pipes and valve body before reassembling the valve.

Before putting valves into service, all pipe connections, valve seats, bonnet seals, and stem seals should be tested for leaks at pressure levels called for in the appropriate codes.

Nameplate Information

Item	Description
1	Model - Connection Size
2	Safe Working Pressure
3	Port Size
4	Maximum Operating Pressure Differential
5	Year / Serial Number

Table 2: S8VS/S8ST Nameplate Identification

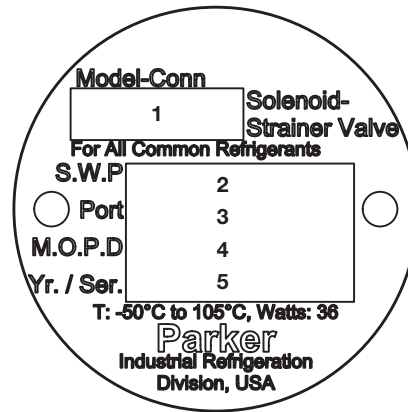


Figure 4: S8VS/S8ST Nameplate

Maintenance and Service

Depending on operating conditions, periodic cleaning and/or replacement of components may be necessary.

Warning

Prior to any service work, the system should be put into a safe condition by qualified personnel. Failure to do so may result in injury or loss of life.

1. The system should be pumped down according to standard operating procedures and in accordance with all local rules and regulations.
2. The coil and electrical connections should be disconnected and put into a known safe condition.

Only after the system is put into a safe condition should maintenance work be performed.

Valve Disassembly

1. Disconnect the coil. Depending on the type of coil used, the method to disconnect the coil from the electrical system may vary.
2. Remove the coil nut and washer. Care should be taken not to apply any forces or torques to the operator.
3. Remove the coil.
4. Disassemble the operator from the body. A wrench nut or spanner wrench should be used to apply the torque necessary. No tools should be used to apply force or torque to the operator sleeve itself as this can cause an unsafe condition.
5. Remove the gasket from the valve body.
6. Remove the valve seat from the housing. The valve seat features a $\frac{3}{8}$ " hex design to allow for disassembly using standard tools.

Prior to reassembly all gaskets and sealing surfaces should be inspected for any damage. If damage is found the parts should be replaced.

Valve Service

If the S8VS fails to open or close, there are four probable causes.

- *Coil is improperly applied.* Check supply voltage and frequency compared to coils rated voltage and frequency. Ensure that the control circuitry is applying power when needed. Ensure that the coil is not burned out.
- *Pressure exceeds MOPD.* Check the system pressure compared to the valve's rating. The valve will not be able to open when the system pressure exceeds its MOPD.
- *Control seat is dirty or eroded.* This can be remedied by replacing the valve seat or by cleaning the seat.
- *Valve is installed backwards.* This can be remedied by removing the valve from the system and reinstalling in the correct orientation.

Strainer Cleaning

It is important that the strainer is periodically inspected for dirt and cleaned during system start-up until no further dirt is found. To remove the strainer basket, first ensure that the S8VS/S8ST has been pumped out and that no refrigerant is trapped in the valve. Then remove the bottom cap. After the strainer has been inspected and cleaned, place the screen assembly into the body so that the spring clip on the closed end is towards the open end of the body. The spring clip must fit tightly into the thread, as it helps hold the basket in place for service. Lightly oil and place a new gasket on the valve body and fit the bottom cap over the gasket. Place the strainer nut on top of the bottom cap and torque to 60 lb-ft (81 Nm). Use the flat surfaces of the bottom cap to secure it with a wrench when installing the pipe plug. Do not permit the bottom cap to turn when installing the pipe plug.

Strainer Service

There are three possible failure modes of the RSF strainer portion of the S8VS/S8ST valve.

- *Screen assembly is ruptured.*
 - (a) Clogged screen causing excessive pressure drop to rupture the screen — check and clean more frequently.
 - (b) Fluid Velocity too great — use a larger strainer or expansion valve to reduce velocity.
- *Screen assembly has collapsed.*
 - (a) Reverse flow through strainer — avoid reverse flow by using a check valve where appropriate and never open a hand valve downstream of a strainer before the upstream hand valve has been opened.
 - (b) Screen assembly crushed during installation — ensure that care is taken when aligning and inserting the screen into the valve body.
- *Dirt is passing through strainer.*
 - (a) Ruptured or collapsed screen assembly — replace.
 - (b) Spring is broken or missing — replace.
 - (c) Fine dirt, less than several thousandths of an inch in size requires more frequent cleaning of the strainer or possible temporary insertion of an R/S filter bag where applicable.

Dimensional Information
mm [inch]

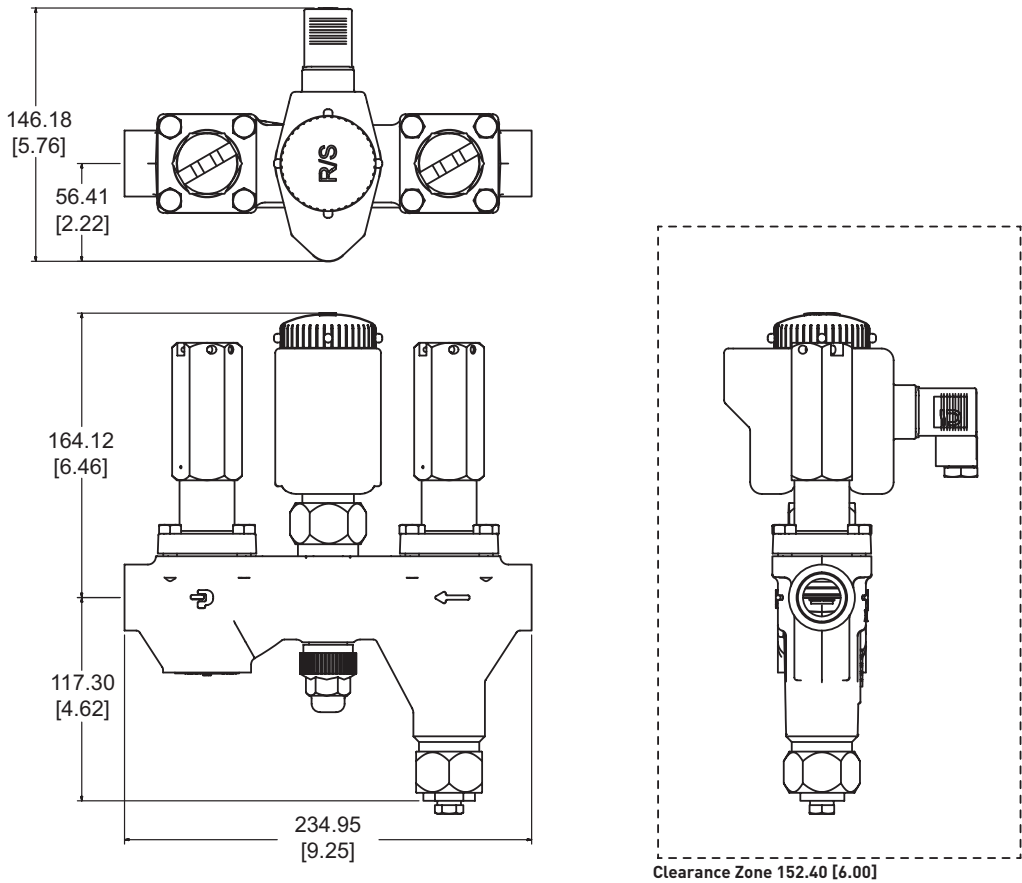


Figure 5: S8VS Dimensional Diagram

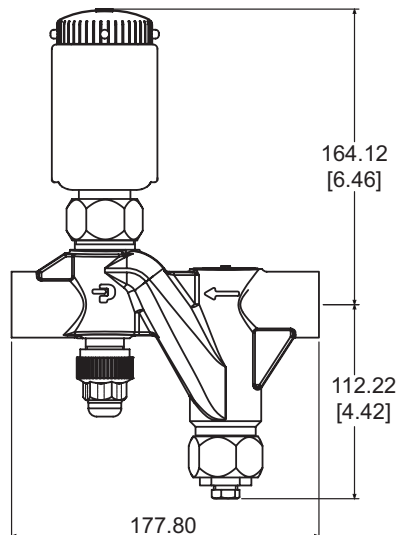
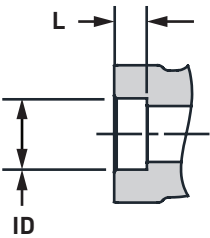


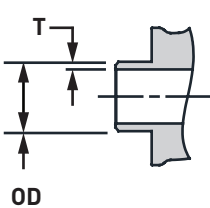
Figure 6: S8ST Dimensional Diagram

SW: Socket Weld ANSI



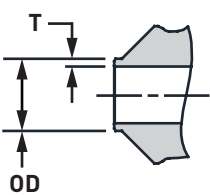
Socket Weld (SW) ANSI						
Port Size		Connection	L		ID	
mm	inch		mm	inch	mm	inch
15	1/2	1/2"	9.5	0.375	22.2	0.874
		3/4"	12.7	0.500	27.6	1.087

BW: Butt-Weld ANSI



Butt-Weld (BW) ANSI						
Port Size		Connection	T		OD	
mm	inch		mm	inch	mm	inch
15	1/2	1/2"	3.9	0.152	21.6	0.850
		3/4"	4.0	0.159	26.9	1.060

BW DN: Butt-Weld Metric



Butt Weld (BW) Metric						
Port Size		Connection	T		OD	
mm	inch		mm	inch	mm	inch
15	1/2	1/2"	2.5	0.099	22.0	0.866
		3/4"	3.0	0.118	28.0	1.102

Figure 7: S8VS/S8ST Connection Diagram

Parts Kit Reference

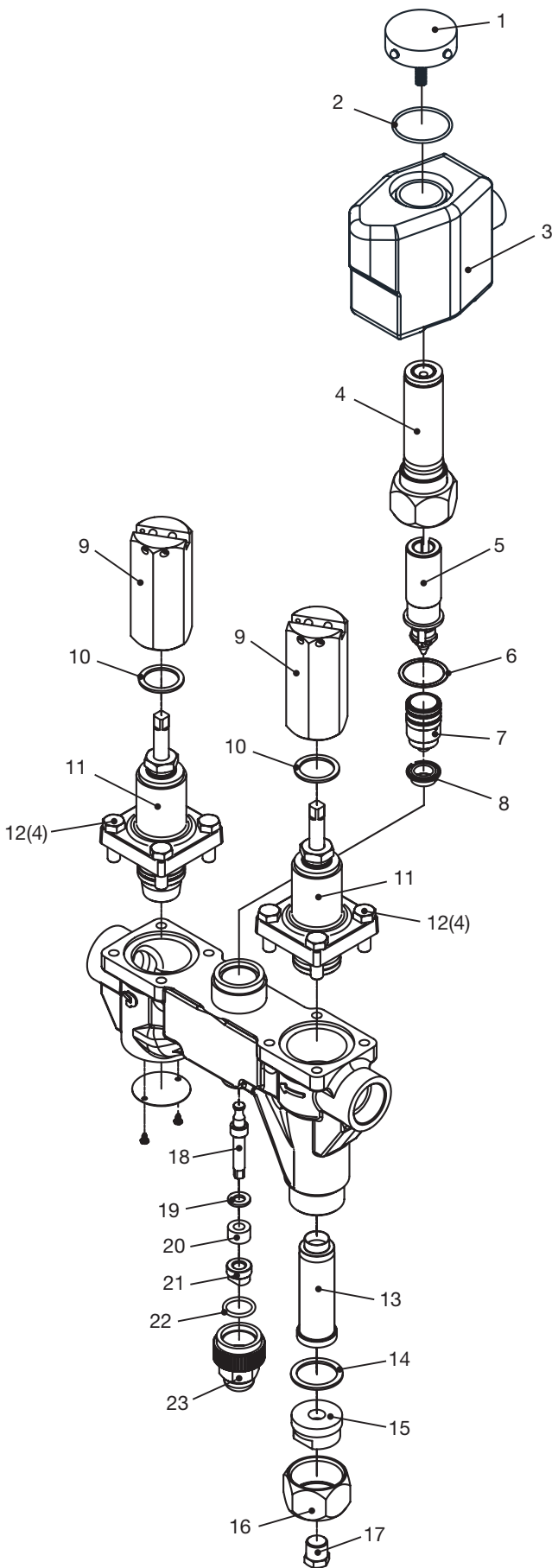
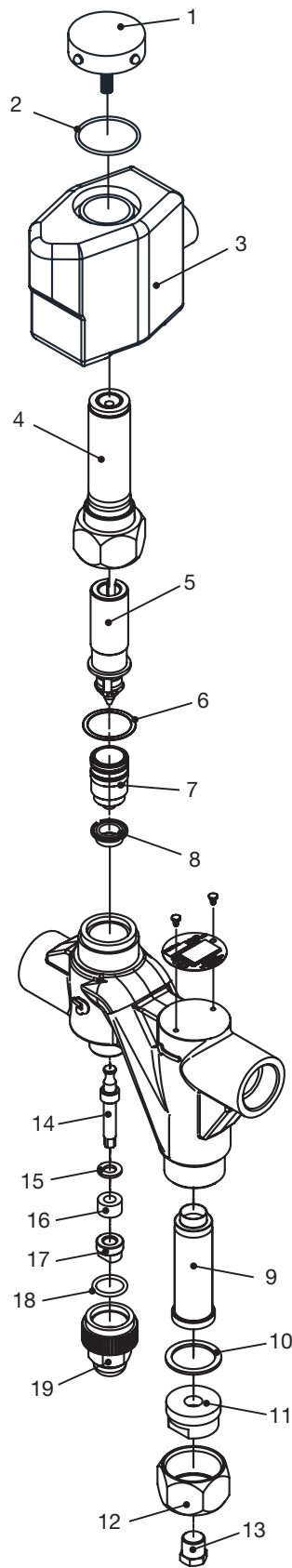


Figure 8: S8VS Exploded View

S8VS Service Parts List			
Item	Description	Kit Description	Kit/ Part No.
1	Knob	Knob Kit Standard (No LED) Green LED Red LED	205237
2	O-Ring		208543
			208544
1 - 2	Knob Kit	Industrial Coil	Consult Price List
3	Coil		
4	Tube Assembly, Solenoid	Tube Kit Standard DN	209320 209321
6	Gasket, Solenoid		
5	Plunger/Needle Assembly	Plunger Kit AC Coil DC Coil	201019 201021
6	Gasket, Solenoid		
6	Gasket, Solenoid	Piston/Seat Kit	210562
7	Piston		
8	Seat		
6 (10)	Gasket, Solenoid Tube Assembly	Gasket Kit	209322
9	Seal Cap	Seal Cap Kit Hand Shut Off Hand Expansion Stop Check	210458 210514 210515
10	Gasket, Seal Cap		
11	Bonnet Assembly, S8VS	Bonnet Assembly Kit Hand Shut Off Hand Expansion Stop Check	210564 210565 210567
12(4)	Bolts, 5/16"-18 x 1" Long SS		
-	Gasket, Bonnet		
13	Strainer Basket	1/2" Screen Kit	205945
14	Gasket, Strainer		
15	Cap, Bottom Strainer		
16	Cover		
17	Pipe Plug		
18	Stem, Manual Opening	Opening Stem Kit	210563
19	Flat Washer		
20	Packing		
21	Packing Nut		
- (2)	Gaskets, Bonnet Assembly	Gasket Kit, S8VS	210561
6	Gasket, Solenoid Tube Assembly		
14	Gasket, Strainer		
22	O-Ring, Cap	Cap, Manual Opening Stem	209916
23	Cap, Manual Opening Stem		

Table 3: S8VS Repair Kits ^[1]

¹ Encapsulated coils are available in a variety of styles and voltages. Contact factory for coil options and part number.



S8VS Service Parts List			
Item	Description	Kit Description	Kit/ Part No.
1	Knob	Knob Kit	205237
2	O-Ring	Standard (No LED)	208543
		Green LED	208544
		Red LED	
1 - 2	Knob Kit	Industrial Coil	Consult Price List
3	Coil		
4	Tube Assembly, Solenoid	Tube Kit	209320
6	Gasket, Solenoid	Standard	209321
		DN	
5	Plunger/Needle Assembly	Plunger Kit	201019
6	Gasket, Solenoid	AC Coil	201021
		DC Coil	
6	Gasket, Solenoid	Piston/Seat Kit	210562
7	Piston		
8	Seat		
6 (10)	Gasket, Solenoid Tube Assembly	Gasket Kit	209322
9	Strainer Basket		
10	Gasket, Strainer		
11	Cap, Bottom Strainer	1/2" Screen Kit	205945
12	Cover		
13	Pipe Plug		
14	Stem, Manual Opening		
15	Flat Washer	Opening Stem Kit	210563
16	Packing		
17	Packing Nut		
- (2)	Gaskets, Bonnet Assembly		
6	Gasket, Solenoid Tube Assembly	Gasket Kit, S8VS	210561
10	Gasket, Strainer		
18	O-Ring, Cap	Cap, Manual Opening	
19	Cap, Manual Opening Stem	Stem	209916

Table 4: S8ST Repair Kits ^[1]

¹ Encapsulated coils are available in a variety of styles and voltages. Contact factory for coil options and part number.

Figure 9: S8ST Exploded View

Safe Operation (See Bulletin RSBCV)

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 which could result from liquid expansion. Temperature increase in a piping section full of solid liquid will cause high pressure due to the expanding liquid which 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 valves upstream of solenoid valves or downstream of check valves be closed 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 which 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 under warranty against defects in workmanship and materials for a period of one year from date of shipment from 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 the Refrigerating Specialties Division. Defective products, or parts thereof 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 which have been altered, or repaired in the field, damaged in transit, or have suffered accidents, misuse, or abuse. Products disabled by dirt or other foreign substances will not be considered defective.

The express warranty set forth above constitutes the only warranty applicable to Refrigerating Specialties products, and is in lieu of all other warranties, expressed or implied, written including any warranty of merchantability, or fitness for a particular purpose. In no event is Refrigerating Specialties responsible for any consequential damages of any nature whatsoever. No employee, agent, dealer or other person is authorized to give any warranties on behalf of Refrigerating Specialties, nor to assume, for Refrigerating Specialties, any other liability in connection with any of its products.

