SF Solenoid Valves

Product Data Sheet

introduction

< STANDARDS >

ASTM D1784
ASTM D2464
ASTM F437
ASTM F1498

ANSI B1.20.1

IPEX SF 2-way Solenoid Valves are flow control valves designed for precise control and high-cycle service. A 100% duty cycle means no worries about overheating or “burnout”. With their lever-shutter design, standard manual override, and position indicator, these valves will outlast and outperform more conventional diaphragm-style solenoid valves. SF Solenoid Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

Valve Availability

Body Material:	PVC
Size Range:	1/4" through 1/2"
Pressure:	60 psi (ND 0.24 & 0.39), 30 psi (ND 0.31)
Seals:	EPDM or Viton® (FPM)
End Connections:	Threaded (FNPT)

SF Solenoid Valves

Sample Specification

1.0 Solenoid Valves - SF

1.1 Material

- The valve body, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- The coil housing shall be made of glass filled Polypropylene with a non-filled Polypropylene thermal shield between the body and coil.

1.2 Seals

- The o-ring seals and shutter shall be made of EPDM which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

or The o-ring seals and shutter shall be made of Viton® (FPM) which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

1.3 All other wetted and non-wetted parts of the valves shall comply with standards that are equivalent to NSF Standard 61 for potable water.

2.0 Connections

2.1 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall have true union ends.
- The valve opening and closing mechanism shall be a lever type shutter.
- A polypropylene thermal shield shall separate the valve body from the coil.
- The valve shall have a standard manual override.
- The valve shall have a standard light position indicator.
- The valve shall be rated 100% duty cycle.

3.1 Pressure Rating

- Valve sizes ND 0.31" (1/4) shall be rated at 30 psi at 73°F.
- Valve sizes ND 0.24" (1/4) and ND 0.39" (1/2) shall be rated at 60 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Color Coding

- All PVC valves shall be color-coded dark gray.

4.0 All valves shall be Xirtec® 140 by IPEX or approved equal.

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Valve Selection

Size (inches)	N.D. (inches)	Body Material	O-ring Material	IPEX Part Number FNPT Threaded	Pressure Rating @ 73ºF
1/4	0.24	PVC	EPDM	053615	60 psi
			Viton®	053616	
1/4	0.31	PVC	EPDM	053617	30 psi
			Viton®	053618	
1/2	0.39	PVC	EPDM	053619	60 psi
			Viton®	053620	

Size (inches):

- ❑ 1/4" – ND 0.24"
- ❑ 1/4" – ND 0.31"
- ❑ 1/2" – ND 0.39"

Seals:

- ❑ EPDM
- ❑ Viton® (FPM)

IPEX Part Number:

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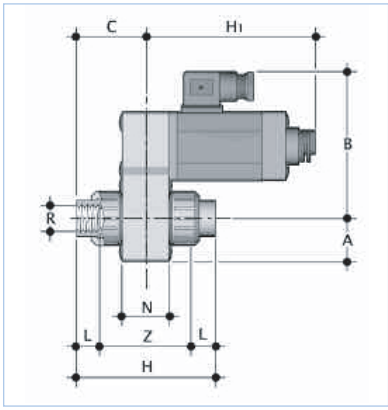
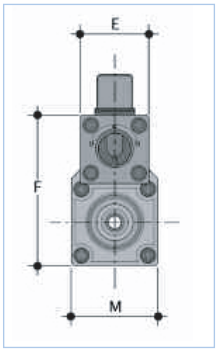
Technical Data

dimensions and weights



Dimension (inches)							
Size	ND	F (NPT)	A	B	C	E	F
1/4	0.24	3/8	0.89	4.13	3.50	1.54	3.43
1/4	0.31	3/8	0.89	4.13	3.50	1.54	3.43
1/2	0.39	3/8	1.28	4.78	4.29	2.05	4.45

Dimension (inches)							
Size	M	N	L	Z	H	H_1	W (lbs)
1/4	1.97	1.18	0.63	2.36	3.62	1.81	0.95
1/4	1.97	1.18	0.63	2.36	3.62	1.81	0.95
1/2	2.56	1.38	0.63	2.80	4.06	2.03	2.34



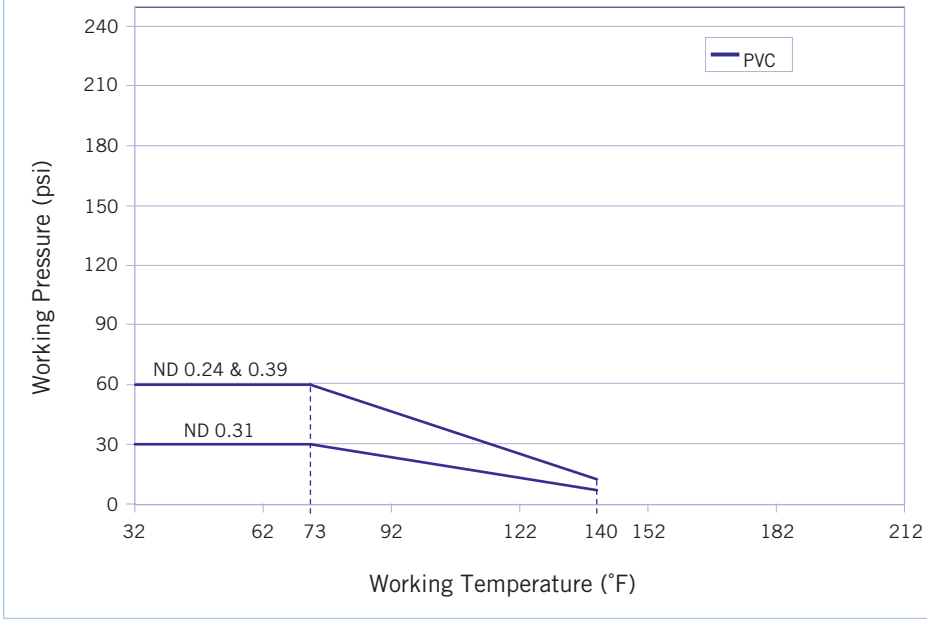
electrical data

Duty Cycle	100% ED (DB)
Closing Time	~20ms
Opening Time	~20ms
AC Voltage	110V
Frequency	50/60Hz

Power Consumption	AC
1/4"	12VA
1/2"	20VA

Electrical Rating	NEMA 4

pressure – temperature ratings



Note: The maximum ambient temperature allowed for the solenoid is 122ºF (50ºC).

flow coefficients

The flow coefficient (C_V) represents the flow rate in gallons per minute (GPM) at 68°F for which there is a 1 psi pressure drop across the valve in the fully open position. These values are determined from an industry standard testing procedure which uses water as the flowing media (specific gravity of 1.0). To determine specific flow rate and pressure loss scenarios, one can use the following formula:

$$f = sg \times \left(\frac{Q}{C_V}\right)^2$$

Where,

f is the pressure drop (friction loss) in psi,

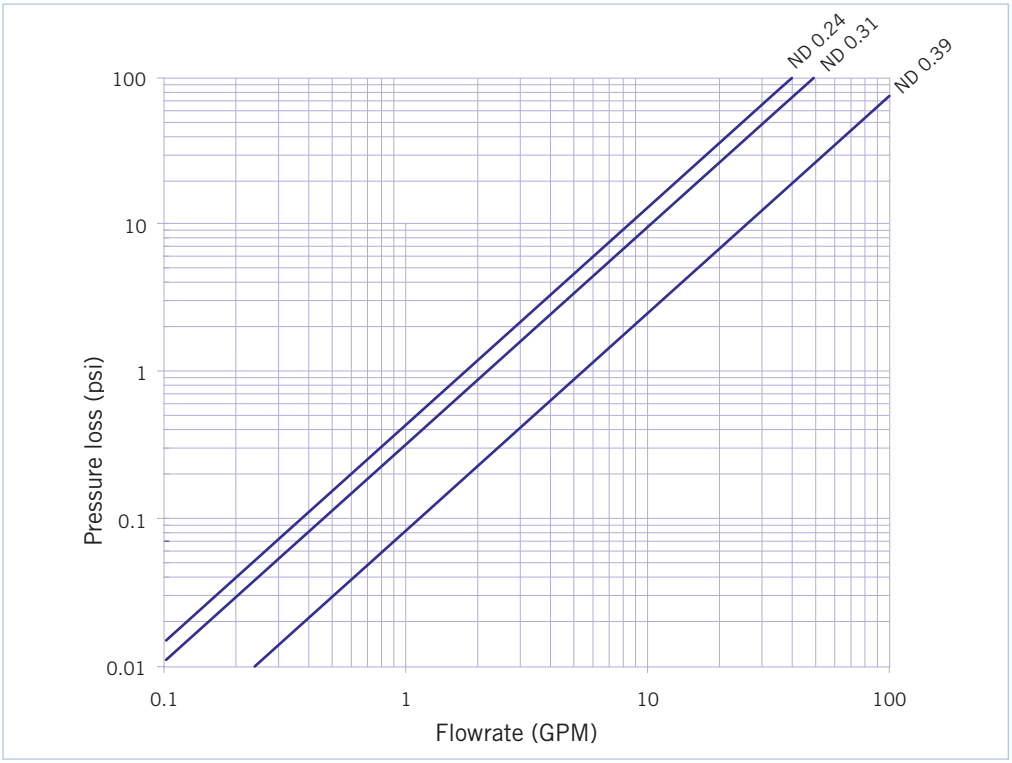
sg is the specific gravity of the fluid,

Q is the flow rate in GPM,

C_V is the flow coefficient.

Size	ND	C_V
1/4	0.24	0.77
1/4	0.31	0.95
1/2	0.39	2.33

pressure loss chart



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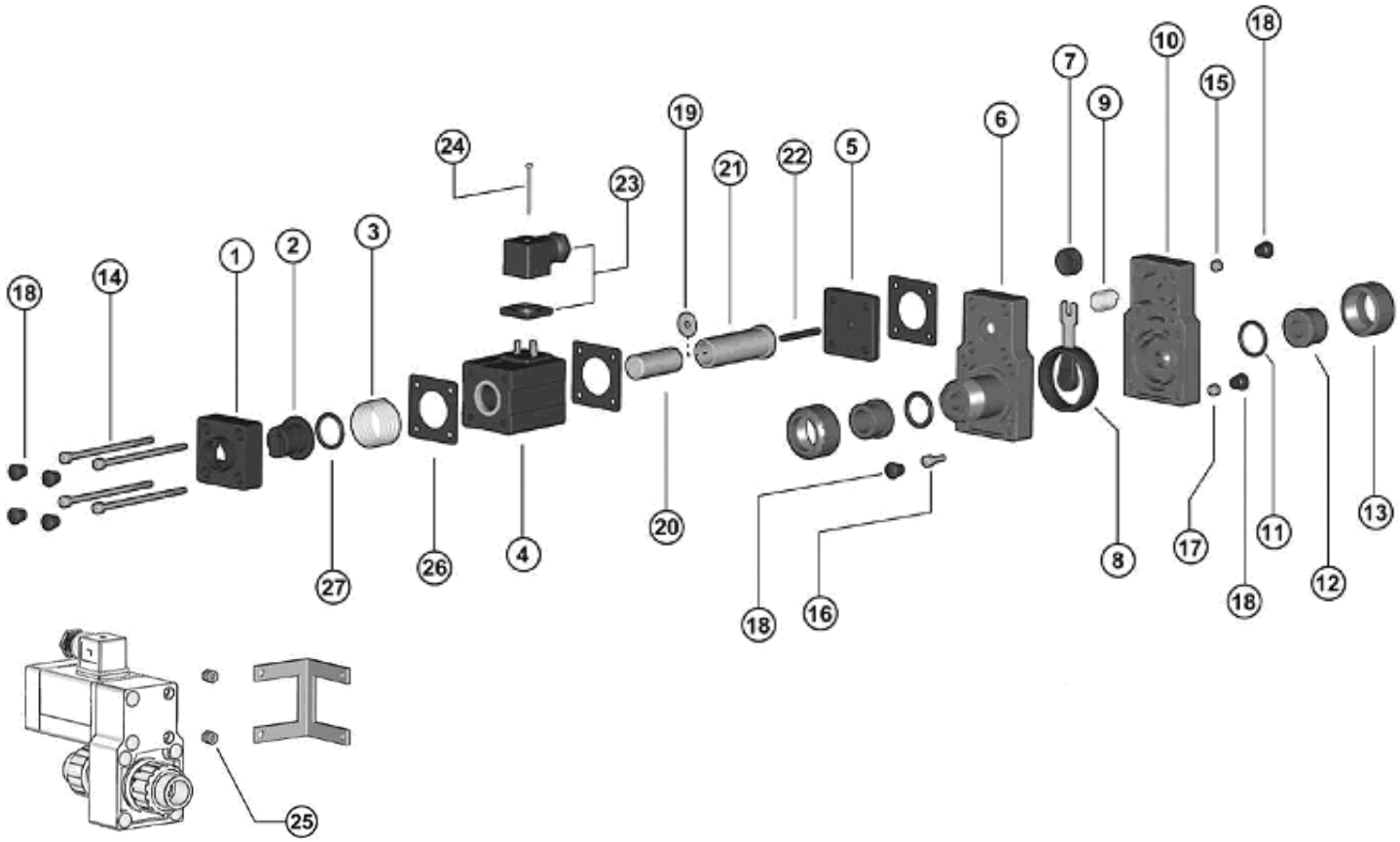
Components



Example of bracket (not supplied by IPEX)

#	Component	Material	Qty
1	housing	GFPP	1
2	manual override	GFPP	1
3	spring	stainless steel	1
4	solenoid	-	1
5	cooling element	GFPP	1
6	upper body	PVC	1
7	spring slide	GFPP	1
8	shutter w/ seal	EPDM or Viton®	1
8	shutter arm	stainless steel	1
9	return spring	stainless steel	1
10	lower body	PVC	1
11	socket o-ring	EPDM or Viton®	2
12	end connector	PVC	2
13	union nut	PVC	2

#	Component	Material	Qty
14	bolts	zinc plated steel	4
15	nuts	zinc plated steel	4
16	bolts	zinc plated steel	4
17	nuts	zinc plated steel	4
18	protection caps	PE	16
19	washer	brass	1
20	movable core	stainless steel	1
21	sliding tube	stainless steel	1
22	control spindle	brass	1
23	connector	-	1
24	connector bolt	chrome plated steel	1
25	bracketing nuts	brass	-
26	flat seals	EPDM	2
27	o-ring seal	EPDM	1

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Installation Procedures

1. Remove the union nuts (part #13 on previous page) and slide them onto the pipe ends.

2. Thread the end connector (12) onto the pipe ends. For correct joining procedure, please refer to the section entitled, *"Joining Methods – Threading"* in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems".*

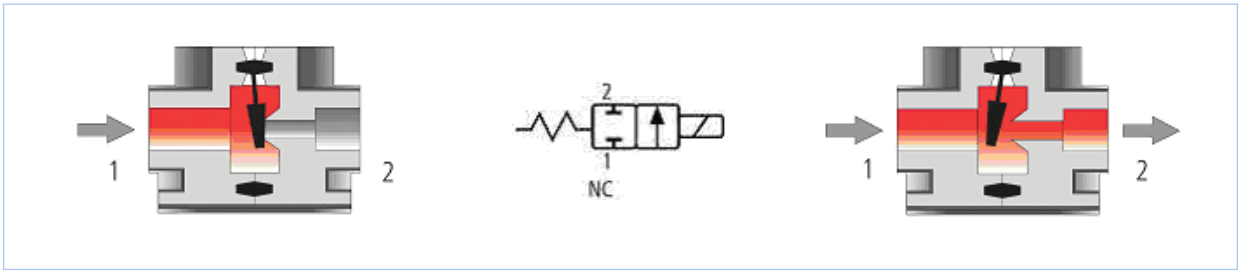
3. Ensure that the desired direction of pipe flow matches the indicated direction on the valve and that the socket o-rings (11) are properly fitted in their grooves. Carefully place the valve in the system between the two end connections.

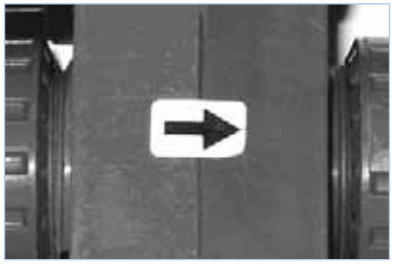
4. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**

5. Remove the connector (23) from the solenoid (4), disassemble, and then connect the electrical leads. A wiring diagram can be found on the bottom of the connector.

6. Reassemble the connector and reattach to the solenoid.

Note: It is advisable to support the valve with a mounting bracket as the weight of the solenoid may cause the pipeline to sag.





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Valve Maintenance

disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing.**
2. Remove the connector (23) from the solenoid (4) and detach the electrical leads. **Be sure to shut off the electrical source before detaching the leads.**
3. Loosen both union nuts (13) and drop the valve out of the line. If retaining the socket o-rings (11), take care that they are not lost when removing the valve from the line.
4. Remove the protection caps (18) from all the bolt and nut holes.
5. Loosen the connector bolt (24) then remove the electrical connector (23) from the plug on the solenoid (4).
6. Loosen the four long bolts (14) and nuts (15) then carefully pull apart the entire solenoid assembly.
7. Disassemble the housing (1), manual override (2), the o-ring (27), and the control spring (3).
8. Pull apart the magnet assembly (4, 19, 20, 21, 22, and 26) and remove all components.
9. Remove the cooling element (5) and all the flat seals (26).
10. Loosen the four short bolts (16) and nuts (17), then pull apart the lower (10) and upper (6) bodies.
11. Remove the shutter assembly from the valve body then detach the spring slide (7) from the shutter arm (8).
12. Remove the return spring (9) from the spring slide.
13. All the valve components can now be checked for problems and/or replaced.

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Valve Maintenance (cont'd)

assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Fit the spring slide (7) into the slot on the shutter arm (8).
2. Attach the return spring (9) to the spring slide.
3. Carefully fit the shutter assembly into the lower body (10). Both the spring and the shutter arm should fit in the molded guides in the body. Correct installation will allow the shutter arm to act as a lever against the body.
4. Without moving the shutter assembly, fit the lower and upper (6) bodies together then fasten using the four short bolts (16) and nuts (17).
5. To assemble the magnet, place the following parts into the solenoid (4) according to the component diagram: The sliding tube (21) containing the fixed core, the control spindle (22), and the brass-washer (19) by inserting it in recess on the control spindle. Then insert the movable core (20) into the sliding tube on the opposite side of the solenoid.
6. Place a flat seal (26) in between the cooling element (5) and the upper body then position the remaining two seals on either side of the magnet assembly.
7. Position the completed magnet assembly (4, 19, 20, 21, 22, and 26) onto the cooling element with the plug orientated as per the component diagram. Ensure that the control spindle is guided into the cooling element hole.
8. Place the hand control spring (3) so that the protruding solenoid core moves inside the spring.
9. Carefully fit the o-ring (27) on the manual override (2), then insert into the housing (1). Ensure that proper fit occurs between the manual override, spring, and solenoid.
10. Fasten the entire assembly using the four long bolts (14) and nuts (15).
11. Fix the electrical connector (23) to the plug on the solenoid then tighten the connector bolt (24).
12. Use the protection caps (18) to cover all bolt and nut holes.
13. Ensure that the socket o-rings (11) are properly fitted in their grooves then attach the end connectors (12) and union nuts (13).

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Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems"* under the section entitled, *"Testing"*. The use of this procedure should be sufficient to assess the quality of a valve installation **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

SF Solenoid Valves

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