



**INSTALLATION SERVICE AND PARTS LIST**

SDI/SDP S211-

**DESCRIPTION**

S211 Solenoid Valves are normally closed, 2-way, pilot operated diaphragm type, which are designed for on-off control of air, steam and liquids.

Available options include: Manual Opening Device, and UL Class F and H coils.

**OPERATION**

S211 Valves are normally closed, opening when energized and closing when de-energized.

**SPECIFICATIONS**

Use the valve within the specified operating ranges as indicated on the valve nameplate (min./max. psi, voltage, cycle, maximum media temperature at °F ambient, Cv factor, etc.).

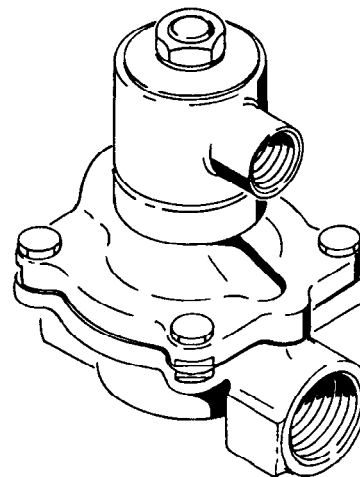


Fig. 1. Typical S211

**OPERATING TEMPERATURES**

FLUID MEDIA	COIL CLASS	MAXIMUM TEMPERATURE °F		SEAT MATERIAL
		FLUID	AMBIENT	
GAS	M (105°C)	185	77	BUNA
LIQUIDS	F (155°C)	200	150	
OIL	M (105°C)	185	77	VITON
	F (155°C)	230	150	
	H (220°C)	185	176	
	H (220°C)	185	176	TEFLON
	H (220°C)	257	125	RULON
STEAM	H (220°C)	338	77	TEFLON
	H (220°C)	257	125	RULON
HOT WATER	F (155°C)	198	77	EPR
STEAM	H (220°C)	298	77	

For other applications, consult the factory.

**INSTALLATION**



This valve is normally closed (N.C.) to flow when not powered. Do not use in place of a normally open (N.O.) valve.

Check valve specifications to be sure that the valve selected is the proper one for the application.

Installation must be performed only by a trained and experienced service person.

1. Clear lines of all foreign matter.
2. S211 Valves must be mounted on a horizontal pipeline with the solenoid in an upright position.
3. Thread seal should be applied sparingly and to the male threads only. To tighten, use a wrench on the body flats at the end being connected. Do not use the solenoid housing as a lever to turn the valve.
4. Provide a clearance for solenoid removal in case removal is subsequently necessary.

5. Wire in accordance with applicable local and national electrical codes. Loosen the hex nut (Fig. 3, No. 1) to rotate the coil jacket (Fig. 3, No. 4). Using a torque wrench, tighten the hex nut to 20-25 inch pound when installation is completed.

**MAINTENANCE**

It is recommended that S211 Series Valves be cleaned on a routine basis by qualified personnel. The customer or user should set up a sound maintenance schedule based on flow media, environment, and frequency of use, which should begin with checking for leakage. Correct voltage must be applied when the valve is tested. If excessive leakage (based on the application) occurs or if operation is sluggish, the unit must be cleaned. The cleaning fluid must be compatible with the valve's materials of construction.

**SERVICE**

Disassembly and Reassembly. (See Fig. 3.)



During reassembly, be certain that the plunger is free of scratches or burrs. These imperfections could cause the valve to stick in an open or closed position, resulting in a potential hazard. If the valve has any tendency to stick during a test, return the whole Universal Kit for a new one. Disassembly and reassembly should be performed only by properly trained and experienced personnel.

Turn off flow media and electrical power supply to the valve.

REPLACE ALL PARTS with the new parts contained in the Universal Kit only (see Universal Kit section). Use only the correct Universal Kit (use the chart to match Catalog Number with Kit Number), and never attempt to interchange parts from different numbered kits.

**TERMS AND CONDITIONS**

All products of the company are sold and all services of the company are offered subject to the company's terms and conditions of sale, copies of which will be furnished upon request.

### To disassemble:

1. Unscrew the hex nut (1). Remove the lockwasher (2).
2. Lift off the coil jacket (4) with nameplate (3) and coil (6) from the plunger tube assembly (10). Also remove the bottom washers (7).
3. Remove the coil and upper washer (5) from the coil jacket.
4. Use an ITTGC Spanner Nut (106198E) to remove the base nut (8).
5. Remove the tube base "O" ring (9) and remove the plunger tube assembly (10) from the bonnet (15). All parts numbered 9 through 13 on Fig. 3 will be replaced by the new parts in the Universal Kit.  
  
It may be necessary to tap the bonnet on your hand or flat surface to free the square seal (13).
6. Remove the bonnet cap screws (14), and lift the bonnet off of the body (19).
7. Remove the parts numbered 16, 17, and 18 on Fig. 3. These parts will all be replaced by the new parts from the Universal Kit. If necessary, tap the body against your hand or a flat surface to free the "O" ring gasket (18).

Check to see that all bonnet and body holes, vents and seating surfaces are clean before reassembling the valve. Use a SOFT object for probing to prevent scratches or burrs.

Reassembly (Use the new parts contained in the Universal kit).

### **CAUTION**

**The body must be installed so that the vent passageway and the diaphragm passageway are lined up with the passageway in the bonnet.**

**Lubricate "O" rings prior to reassembly.**

8. Place the new "O" ring gasket (18) into its hole in the body (19).
9. Replace the diaphragm assembly (17). The plate on the diaphragm assembly must face away from the body. Be sure that the diaphragm is lined up properly (see CAUTION above Step 8).
10. Replace the diaphragm spring (16) as shown in Fig. 3. Reassemble the bonnet (15) onto the body (see CAUTION above Step 8), and replace and tighten down the bonnet cap screws (14).
11. Place the new square seal into the recess in the bonnet operator cavity (REF.).
12. Install the plunger spring (11) small diameter down onto the plunger assembly (12). Insert the final assembly of (11) and (12) into the plunger tube assembly (10).
13. Place the plunger tube assembly, with the plunger spring and plunger in it, into the bonnet operator cavity (REF.). Place the new tube base "O" ring (9) onto the plunger tube assembly as shown in Fig. 3.
14. Replace the base nut (8) onto the plunger tube (10). **USING A TORQUE WRENCH, TIGHTEN THE BASE NUT INTO THE THREADS ON THE BONNET TO 18 TO 24 LB. IN.**
15. Replace the bottom washers (7) onto the plunger tube. The raised outer edge of the bottom washer which is closest to the bonnet (forms a complete

circle) should face down (toward the bonnet). The "X" marked on the bottom washer closest to the coil must face the coil.

16. Replace the upper washer (5) into the coil jacket (4). The side of the upper washer with an "X" marked on it must face the coil upon reassembly.
17. Insert the lead wires from the coil through the hole in the jacket. Pull the wires all the way through, and place the coil into the jacket with the end with voltages printed on it facing away from the upper washer (5). Place the entire assembly back onto the plunger tube.
18. Replace the nameplate (3), lockwasher (2), and hex nut (1), in that order. Tighten the hex nut to 20-25 lb. in.



### **WARNING**



**The use of the manual opening device (MOD) prevents the valve from opening or closing and nullifies the effect of all electrical controls used with the valve. Equipment damage or safety hazard may result if shutoff is expected but does not occur.**

To use the manual opening device (MOD), Turn the MOD stem counterclockwise to open.

After electrical power is restored, turn the MOD stem clockwise.

### **COIL REPLACEMENT**

Turn off the electrical power supply to the solenoid before disconnecting the coil lead wires.

Incorrect coil reassembly can cause coil burnout. At all times, take care not to nick, dent, or damage the plunger tube.

Standard Model Fig. 3.

It is not necessary to remove the valve from the pipeline. Follow Steps 1, 2, 3, 15, 16 and 17 in the DISASSEMBLY AND REASSEMBLY section. Take care to note the exact order of placement and quantity of parts.

Explosion-proof Model Fig. 4.

To replace the coil on an Explosion-proof Model

1. Remove the top cap assembly (1), lockwasher (2), and top cap "O" ring (3).

**GC Valves**

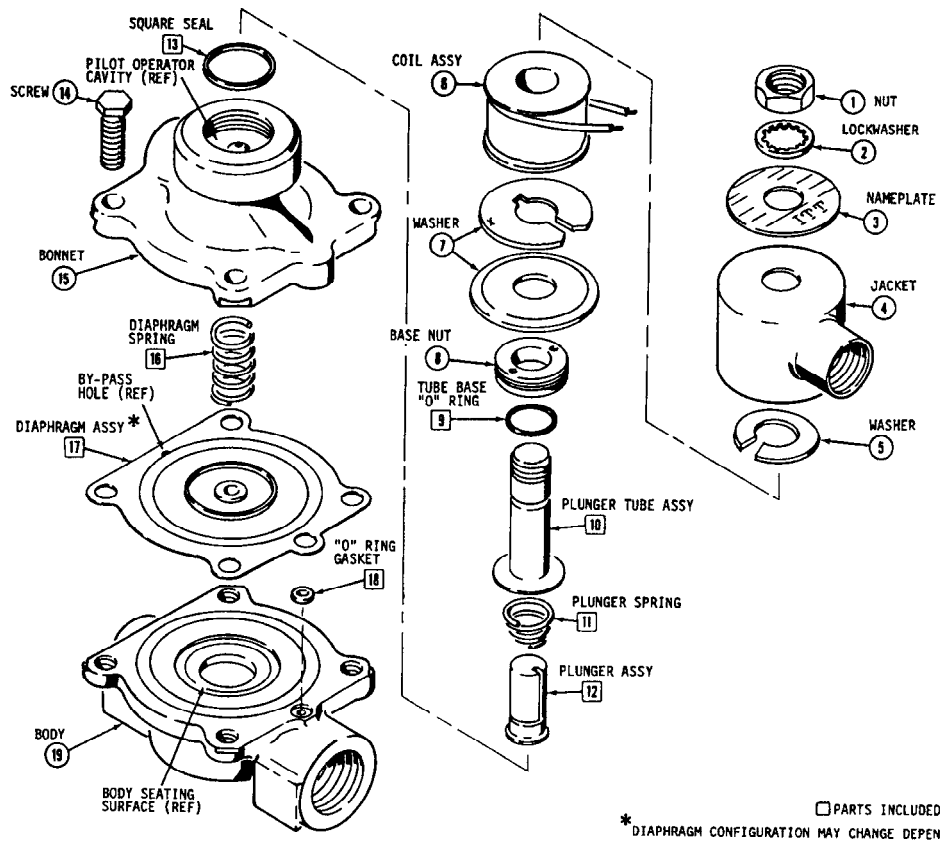


Fig. 3. Typical S211 Valve

2. Use a GC Valves Spanner Nut (Part Number 106198E) to remove the top plate (4).
3. Remove the washer (5). The coil (6) is now accessible for removal and replacement.

To reassemble the explosion-proof coil assembly:

1. Pull the wire through the hole in the jacket (7) and place the new coil in the jacket with the end with voltages printed on it facing into the jacket.
2. Position the washers (5) on top of the coil.
3. Screw the top plate (4) down until bottomed, or torque the top plate to 150 INCH POUNDS MINIMUM to retain registration of the new coil.
4. Place the lockwasher (2) on top of the top plate.
5. Replace the top cap "O" ring (3) in the top cap assembly (1), and screw the top cap back on.

**PARTS**

The charts which follow cover replaceable Coil Part Numbers and Universal Kits for most S211 Series Solenoid Valves.

Before ordering parts/kits, check the Serial Number on the valve which is to be repaired. This Serial Number includes the model designation which determines the appropriate Parts/Kit Number(s). The Serial Number can be found stamped on the nameplate or operator housing.

On older model valves, the third digit of the number, e.g. E5A or E5B, will designate Model "A" or "B". When the name serializing method is used, e.g. 8223A or 8223BA, the fifth and sixth digits will designate Model "A" or "BA", etc. In the instances where there is a

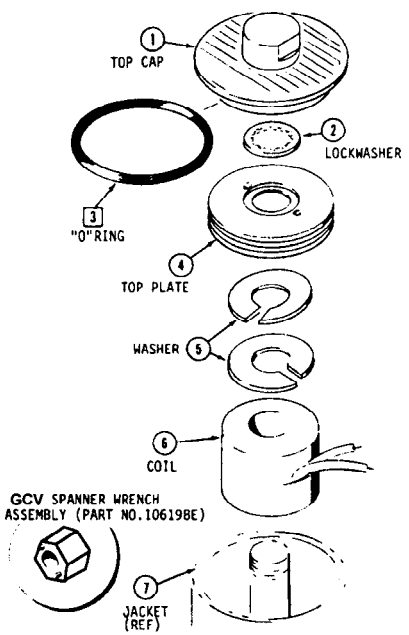


Fig. 4. Typical S211 Explosion-proof Operator

double alpha digit designation, the first alpha digit refers to the valve model and the second alpha digit refers to the model of the operator.



When ordering parts/kits, specify Catalog Number, Serial Number, and Part Name. If your valve's Catalog Number is not listed, obtain the complete Serial Number and consult the factory.

See Fig. 3 for an exploded view of a typical S211 Model "A", and Fig. 4 for an exploded view of a typical S211 Model "B" Explosion-proof operator assembly.

**NOTE**

A GROUNDING PROVISION IS SUPPLIED FOR CSA CERTIFIED VALVES.

**COIL CHART**

IDENTIFYING CATALOG DIGITS	COIL CLASS	WATTS	ELECTRICAL CONNECTION	COIL PART NUMBER <sup>①②</sup>
S21 -GF	F	8	24" LEADS	HS3GF — A24
S21 — F	F			CS3AF — A24
S21 — H	H			CS3AN — A24
S21 - YF	F			DIN Connector

- ① Sixth digit of Catalog Number represents coil class as shown.
- ② Seventh and eighth digits of Catalog Number represent voltages shown in coil class chart. These digits must be transferred into the coil part number.
- ③ Recommended spare part.

**TROUBLE-SHOOTING**

If valve fails to open —

1. Check voltage against rating on nameplate.
2. Check voltage at solenoid lead connections.
3. Check control circuit and solenoid coil for burnout.
4. Check operating pressures.
5. Clean all passageways and check condition of diaphragm.
6. Replace coil.

If valve fails to close —

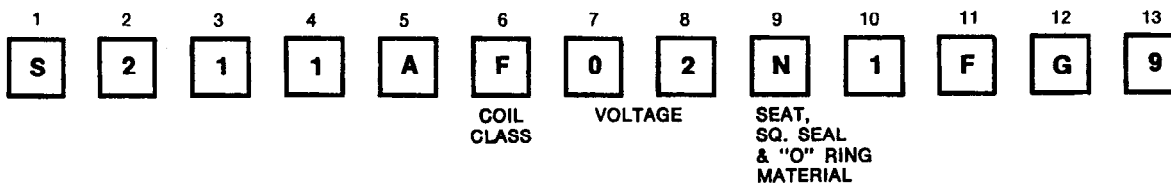
1. Check for bent or nicked plunger tube.
2. Check for damaged springs.
3. Clean pilot valve and main valve seats.
4. Check condition of plunger seat disc and main valve diaphragm.
5. Clean passageways in pilot valve and main valve. Use a small probing object or blow through.

The valve must be free from dirt to ensure tight shutoff. Buzzing or chattering can be caused by low voltage or dirt or chips between top of plunger and tube head. Check voltage. Clean the plunger and the interior of the tube and base assembly.

**UNIVERSAL KIT CHART**

5TH DIGIT OF CAT. NO.	9TH & 10TH DIGIT OF CAT. NO.	13TH & 14TH DIGIT OF CAT. NO.	COIL & VOLTAGE TYPE	UNIVERSAL KIT	
STANDARD A, B, S, T, U, V, or W	N1	G9	AC	KS211AF02N1FG9	
			DC	KS211AF16N1FG9	
	J5	AC	AC	KS211AF02N1GJ5	
			DC	KS211AF16N1GJ5	
	N5	G9	AC	KS211AF02N5FG9	
			DC	KS211AF16N5FG9	
		J2	AC	KS211AF02N5GJ2	
			DC	KS211AF16N5GJ2	
	K4	G1	AC	KS211AF02K4CG1	
			DC	KS211AF16K4CG1	
		G5	AC	KS211AF02K4EG5	
			DC	KS211AF16K4EG5	
	T4	G1	AC	KS211AF02T4CG1	
			DC	KS211AF16T4CG1	
		G5	AC	KS211AF02T4EG5	
			DC	KS211AF16T4EG5	
	T2	G1	AC	KS211AF02T2CG1	
			DC	KS211AF16T2CG1	
		G5	AC	KS211AF02T2EG5	
			DC	KS211AF16T2EG5	
		G9	AC	KS211AF02T2FG9	
			DC	KS211AF16T2FG9	
		J5	AC	KS211AF02T2GJ5	
			DC	KS211AF16T2GJ5	
	EXPL. PROOF X	N1	G9	AC	KS211XF02N1FG9
				DC	KS211XF16N1FG9
			J5	AC	KS211XF02N1GJ5
		DC		KS211XF16N1GJ5	
		N5	G9	AC	KS211XF02N5FG9
				DC	KS211XF16N5FG9
J2			AC	KS211XF02N5GJ2	
		DC	KS211XF16N5GJ2		
K4		G1	AC	KS211XF02K4CG1	
			DC	KS211XF16K4CG1	
		G5	AC	KS211XF02K4EG5	
DC			KS211XF16K4EG5		
T4	G1	AC	KS211XF02T4CG1		
		DC	KS211XF16T4CG1		
	G5	AC	KS211XF02T4EG5		
DC		KS211XF16T4EG5			
T2	G1	AC	KS211XF02T2CG1		
		DC	KS211XF16T2CG1		
	G5	AC	KS211XF02T2EG5		
		DC	KS211XF16T2EG5		
	G9	AC	KS211XF02T2FG9		
		DC	KS211XF16T2FG9		
J5	AC	KS211XF02T2GJ5			
	DC	KS211XF16T2GJ5			

**EXAMPLE CATALOG NUMBER**



GC Valves