

COMPACT WIDE-RANGE PRESSURE REGULATORS

Type A8A, A81, A82

Ports 9mm (3/8") to 66mm (2 5/8") Nom.

FEATURES

- Dual spring for wide range pressure set-points
- Pilot operated for close control at desired set-point
- Excellent regulation at light loads
- Interchangeable capacity cartridges
- Inlet, outlet or differential regulator functions
- Low pressure drop
- Few moving parts
- Long-life stainless steel diaphragms (no bellows to fail)
- Variations available for pilot electric shut-off and pilot electric wide-opening pressure control
- Manual opening feature
- All service from the top
- Sweat-in-place without disassembly
- Furnished with access fitting
- UL listed (except 50 Hertz versions)

SPECIFICATIONS

- Design pressure (PS): 31.0 bar (450 psig)
- Range: 250mm hg to 27.6 bar (10" hg to 400 psig)

DESCRIPTION

These ductile iron-bodied regulators, with brazed copper couplings, will modulate the flow of refrigerant vapor or liquid to maintain a constant pressure at a control point regardless of fluctuations in load or ambient conditions, or alternate diversions for flow. Models are available in combinations of connection sizes, port sizes, functions and features as designated by the model code, for application in a wide variety of control functions on industrial, commercial and air conditioning systems. (3) control functions are available: Inlet, Outlet and Differential pressure control. (2) control features can be added by incorporating pilot solenoids; either Electric Shut-off (S) or Electric Bypass (also called Wide-Opening) (B).

The valves are an integrated assembly of (4) modules: 1) A body, which contains no moving parts, but is ordered to suit a particular connection size; 2) A capacity cartridge, which contains both piston and modulating

BULLETIN 25-94E Type A8A, A81, A82



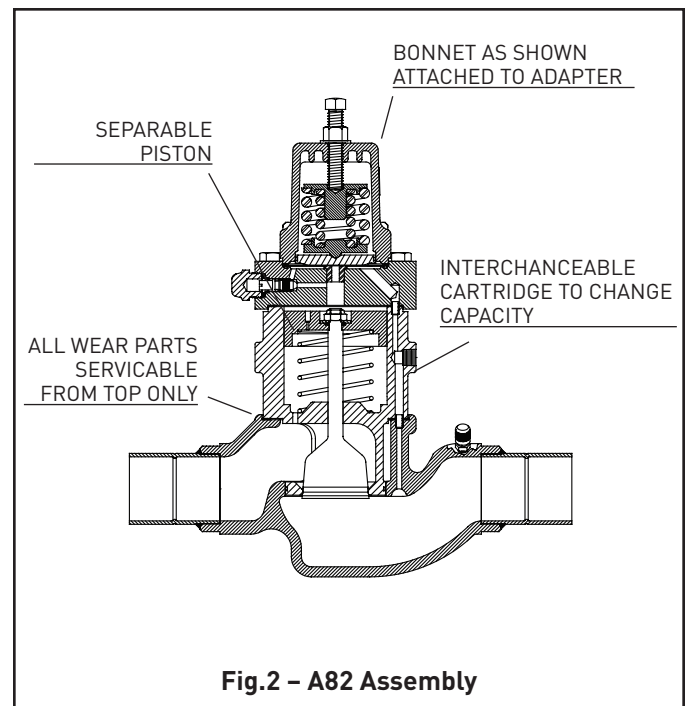
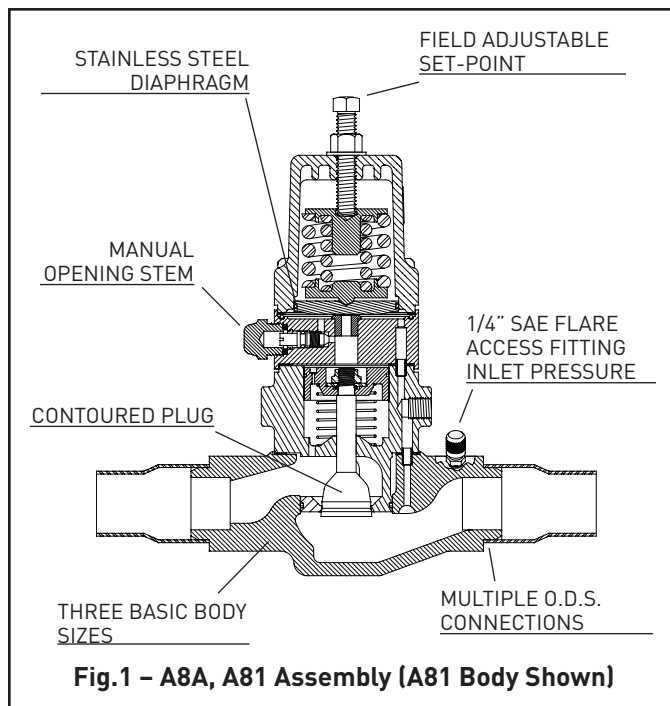
October 2006

Installation, Service and Parts Information

plug, and defines the Port Size; 3) A pilot adapter, which defines the valve function and onto which the Pilot Solenoids providing either the "S" or "B" feature are added as required; 4) The bonnet, containing the Range Spring and adjustment screw, which mechanisms are set for the value of pressure which the valve is to maintain.

This unique modular design allows the regulator to be soldered into the line without disassembly, yet provides full access for disassembly, cleaning and servicing from the top only. Interchangeable capacity cartridges facilitate flow revisions should an undersized or oversized condition be created, while pilot adaptors can be changed out to add features or even change functions. Thus, retrofitting for additional evaporator capacity, heat reclaim, or holdback for hot gas defrost is simple and requires no pipe line revisions under most circumstances.

All A8 series regulators for inlet and outlet functions feature the wide range pressure setting, 250mm Hg to 27.6 bar (10" VA. to 400 psig). Regulators for differential function have a range of 0 to 8.3 bar (0 to 120 psi).



PURPOSE

These valves will modulate to maintain a pressure as set for in the field, in spite of fluctuations in load, changes in ambient, changes in available refrigerant flow paths, and other operating variances. Appropriately sized, these valves will modulate the flow of liquid or vapor, high side or low side in a wide variety of system arrangements used in industrial, commercial and air conditioning installations. A particular inlet regulator can be applied to control evaporator, condensate, discharge or defrost relief pressure; a particular outlet regulator can be applied to control crankcase, receiver or hot gas bypass; or a differential regulator can be applied to maintain oil receiver pressure, or discharge differential, or liquid line differential pressure. Each port size will have a specific maximum capacity at full opening corresponding to the available or sensible pressure difference under which it will operate, for each of these applications.

The prefix A8 defines a body or assembly style, in this case a direct-connected, O.D.S. stubbed, modular assembly, pressure regulator. The basic designations are A8A, A81, and A82, which, with no other suffix, define by default Inlet Pressure Regulators in the (3) available body sizes. To complete the purchasing specification for an inlet regulator with no additional features, the Port Size and Connection Size must yet be determined. For an Inlet Pressure Regulator, as the valve's inlet pressure increases even marginally above the set-point the valve tends to open, increasing flow and reducing inlet pressure. As operating conditions change and the inlet pressure tends to drop, the valve's port closes and the inlet pressure will tend to rise. In this fashion the valve continually adjusts its available flow area in response to flow conditions to maintain a practically constant inlet pressure.

The solenoid features can be designated for these inlet pressure regulators by adding the appropriate suffix, thus A8-S for Inlet Regulator with Electric Shut-off and A8-B for Inlet Regulator with Electric Wide Opening.

The suffix "O" defines a regulator whose function is to modulate flow to maintain a constant Outlet or Downstream pressure. This valve function requires that an external field installed connection be made between the pilot equalizing connection and the downstream pipe, thus the "O" designation is always accompanied by an "E" for externally equalized (A8-OE). The function now is to open and permit higher flows when outlet pressure tends to drop, and to close and reduce flow when outlet pressure tends to rise. In this fashion the valve is continuously adjusting its opening to maintain downstream pressure practically constant.

The outlet pressure regulators are available with the "S" feature, thus the designation A8-OES defines an Outlet Pressure Regulator with Electric Shut-Off, which will maintain constant downstream pressure when the coil is energized, and close tightly when the coil is de-energized.

The suffix "L" is added to designate a Differential Pressure Regulator. This valve function senses both Upstream and Downstream pressure and modulates to maintain the difference, practically constant. Thus the regulator responds to a rise in that pressure difference by opening the port, and responds to a drop in that difference by closing the port. An A8-L is a Differential Pressure Regulator.

The Differential Pressure Regulators can all be ordered with the Wide Opening Feature, by adding the suffix "B" to the valve designation. Thus, an A8-BL is a Differential Pressure Regulator when the solenoid coil is not energized, and will open wide, providing the system flow can maintain a minimum pressure difference of 1.5 psig, once the solenoid coil is energized.

The valve designation then describes the Body Size, Function, and Control Features of the Regulator. A complete specification for a regulator also includes:

The Port Size: Selected according to the state and density of the refrigerant along with the sensible or available pressure difference under which the valve will operate;

The Connection Size: Normally designated by the system designer, but often selected by the installer to match the line size as found in the field.

Note that the particular combination of the above (2) sizes will normally indicate the appropriate body size, though there are some overlaps.

The Pressure Control Function: Inlet, by default; Outlet (OE) or Differential (L), according to just what pressure, or pressure difference, the designer or installer expects the valve to regulate.

The Control Features: Shut-off, "S" or Bypass "B", as selected by the designer or the installer.

AND, ONLY FOR THOSE VALVES REQUIRING THE "S" OR "B" FEATURE:

The Control Circuit Voltage: As required by the installation, consists of Voltage and, for A.C. circuits, Frequency.

All A8 regulators will permit reverse flow if the outlet pressure exceeds the inlet pressure by more than 0.14 bar (2 psi).

INSTALLATION

On the Types A8A, A81 and A82 Series Regulators, the proper direction of flow is designated by an arrow cast into the side of the valve body, pointing from inlet to outlet.

The regulator can be mounted in a horizontal or vertical pipe line with direction of flow as described above. As with all pressure regulators, these compact regulators can control flow in this normal direction only. If a change in system operating conditions causes the outlet pressure to rise sufficiently above the inlet pressure, the Main Valve Assembly may be blown down from its seat and reverse flow can occur. This is often accompanied by a clicking noise.

Protect the inside of the regulator from moisture, dirt, chips and solder beads during installation. These compact regulators may be soldered into the line without disassembly if reasonable precautions are taken. The flame from the soldering torch should be directed away from the valve body to avoid excessive heat build-up which could possibly damage some of the internal parts. As an additional precaution, a wet cloth should be wrapped around the regulator body to dissipate some of the heat during the soldering operation.

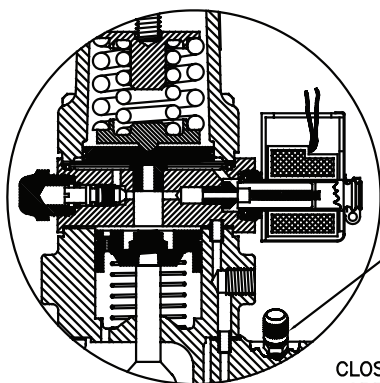
PRINCIPLES OF OPERATION

(Referring to Valves as shown in Fig. 3-9) In all cases, a throttling point serves to increase or reduce the rate of delivery of the pilot stream from the upstream side of the valve to the space on top of the piston, from which it is bled to the downstream via both a tiny hole through the piston and the clearance between piston and bore. An increased pilot stream flow increases the pressure on top of the piston which pushes the modulating plug down. Conversely, a decreased pilot stream flow reduces the pressure on top of the piston and permits the closing spring to push the modulating plug up, reducing the flow area available at the port. The pilot portion of the valve is devoted to administering this pilot stream flow, thus effectively controlling the main valve opening. The valve function (inlet, outlet, differential) is determined by the pressure condition to which the pilot aspect of the valve responds.

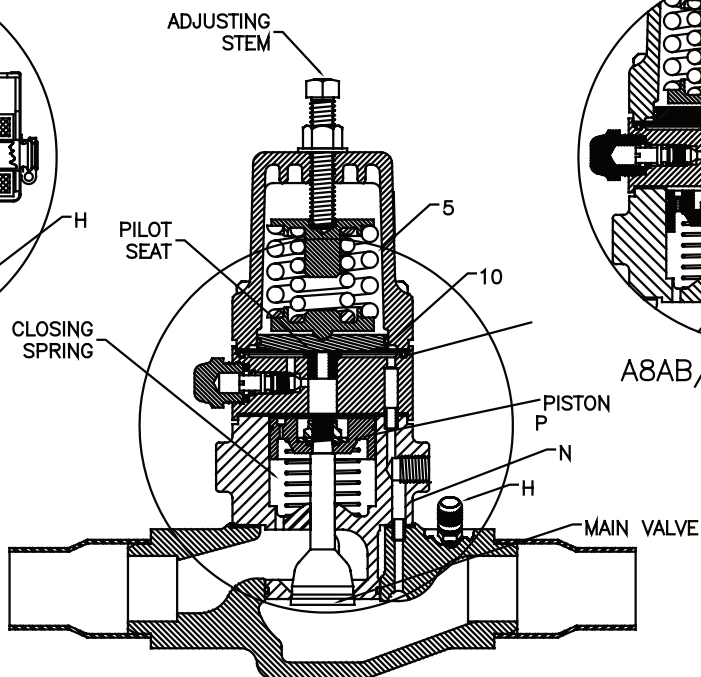
FOR AN INLET PRESSURE REGULATOR: The inlet pressure is applied via Passage N to the underside of the #10 Diaphragm at Chamber P. Considering a valve that is initially closed, as the inlet pressure rises, the Diaphragm exerts a force upward against the #5 Range Spring. When that force developed by the inlet pressure is high enough, it will equal the spring force at that point of adjustment and the diaphragm will rise off its seat and permit flow from the upstream to Chamber G, thus raising the pressure on top of the piston, causing the Modulating Plug H to move down, and opening the port. Should the system conditions cause the upstream pressure to decrease, the Diaphragm will return to a position closer to the Pilot Seat, reducing the pilot stream flow, and allowing the pressure in Chamber G to bleed away somewhat, which permits the closing spring to move the modulating plug up, thus closing the port.

FOR AN OUTLET PRESSURE REGULATOR: The external, field installed connection is run from the Fitting J to the appropriate space where the pressure is to be controlled. If this is the pressure at the outlet of the valve, then downstream pressure is communicated to the space beneath the Diaphragm #10. As outlet pressure drops, the Range Spring overcomes the force developed by the Diaphragm #10, pushing it down and opening the passage in the Pilot Seat. Thus, the pilot stream flow from the inlet side of the valve via Passage N increases, raising the pressure in Chamber G and pushing the piston and modulating plug down, causing the port to open. As downstream pressure increases, the force developed by the Diaphragm #10 increases, overcoming the range spring force, and the Pilot Passage closes, reducing pilot stream flow and the pressure at Chamber G, permitting the closing spring to move the Modulating Plug up, and reducing the available flow area.

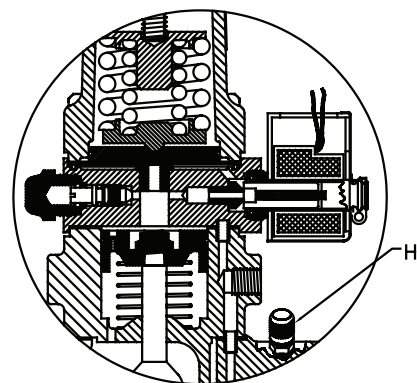
FOR A DIFFERENTIAL PRESSURE REGULATOR: The inlet pressure is applied to the underside of the Diaphragm #10 and the outlet pressure is field connected to the Fitting K on the Special bonnet, such that pressure is applied to the top of the Diaphragm #10. The force applied against the range spring by the diaphragm is now due to the difference between the inlet pressure and the outlet pressure. As the inlet pressure rises to exceed the outlet pressure by more than the compressive force of the spring, the diaphragm will tend to lift and the pilot stream increase, applying more pressure to the top of the piston and increasing the port area available to flow. As conditions change and the Outlet Pressure rises to reduce the difference between inlet and outlet, the Diaphragm #10 will be pushed down toward its seat by the Range Spring, which will decrease the pilot stream flow, reduce the pressure in Chamber G and permit the closing spring to raise the modulating plug, thus reducing the available flow area.



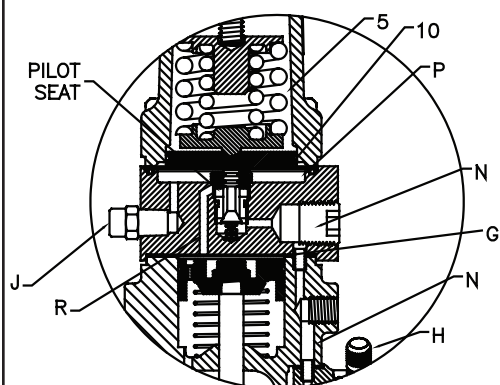
A8AS/A81S/A82S
Fig.3



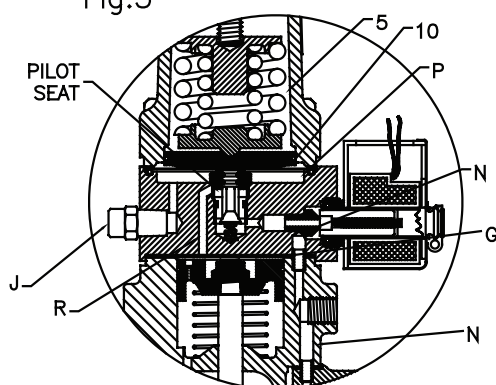
A8A/A81/A82
Fig.5



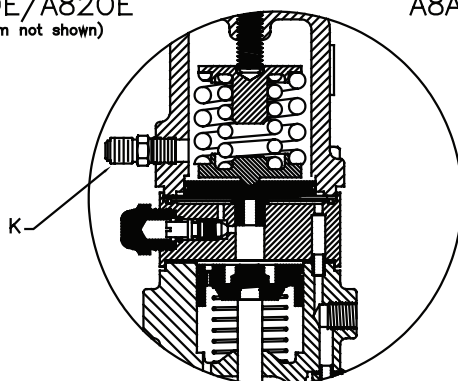
A8AB/A81B/A82B
Fig.4



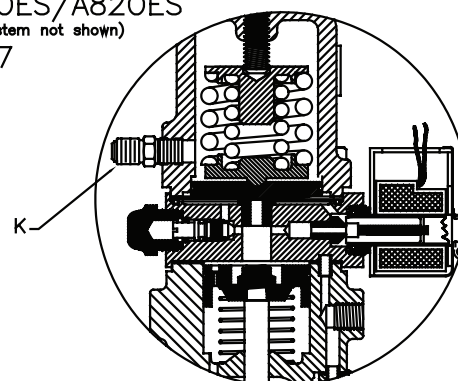
A8AOE/A81OE/A82OE
(Manual opening stem not shown)
Fig.6



A8AOES/A81OES/A82OES
(Manual opening stem not shown)
Fig.7



A8AL/A81L/A82L
Fig.8



A8ABL/A81BL/A82BL
Fig.9

ITEM	DESCRIPTION	QTY	FOR A8A KIT NO.	FOR A81 KIT NO.	FOR A82 KIT NO.
17	Cartridge Assembly	1	Only with kit	Only with kit	Only with kit
14, 17, 17A, 18	Cartridge Assembly (Red 5/8")	1 ea	202712	202712	—
14, 17, 17A, 18	Cartridge Assembly (Full 5/8")	1 ea	202711	202711	—
14, 17, 17A, 18	Cartridge Assembly (7/8")	1 ea	202710	202710	—
14, 17, 17A, 18	Cartridge Assembly (1-1/8")	1 ea	—	202709	—
14, 17, 17A, 18	Cartridge Assembly (1-3/8")	1 ea	—	202708	—
17B	Capacity Cartridge Housing, A82	1	—	—	Only with kit
14, 17A, 17B, 18, 26, 30	Complete Capacity Cartridge, 1-5/8 P.	1 ea	—	—	203811
14, 17A, 17B, 18, 26, 30	Complete Capacity Cartridge, 2-1/8 P.	1 ea	—	—	203812
14, 17A, 17B, 18, 26, 30	Complete Capacity Cartridge, 2-5/8 P.	1 ea	—	—	203813

ITEM	DESCRIPTION	QTY	FOR A8A, A81 KIT NUMBER	FOR A82 KIT NUMBER
1	Adjusting Stem (All except "L")	1	301888	301888
1A	Adjusting Stem ("L" Types only)	1	Only with kit	Only with kit
1A, 25, 26	Adjusting Stem Seal Kit ("L" Types only)	1 ea	201698	201698
2	Adjusting Stem Seal Nut	1	301836	301836
3	Bonnet (All except "L")	1	Only with kit	Only with kit
3, 11, 8	Bonnet Kit (All except "L")	1 ea	200910	200910
3A	Bonnet ("L" Types only)	1	Only with kit	Only with kit
3A, 11, 12, 32, 33, 33A	Bonnet Kit ("L" Types only)	1 ea	202714	202714
4	Upper Spring Rest	1	Only with kit	Only with kit
5	Range Spring (Outer)	1	Only with kit	Only with kit
5A	Range Spring (Inner)	1	Only with kit	Only with kit
7	Lower Spring Rest	1	Only with kit	Only with kit
8	"O" Ring Diaphragm Follower (All except "L")	1	Only with kit	Only with kit
4, 5, 5A, 7, 8, 11	Spring Kit (All except "L")	1 ea	202205	202205
4, 5, 7, 11	Spring Kit ("L" Types only)	1 ea	202702	202702
6, 6A	Bolt Package (All except "OE and L") A82	4 ea	—	203820
6, 6A	Bolt Package ("OE" Types only) A82	4 ea	—	203821
6, 6A	Bolt Package ("L" Types only) A82	4 ea	—	203822
6	Bolt Package (All except "OE" and "L") A8A, A81	4	202717	—
6	Bolt Package ("OE" Types only) A8A, A81	4	202716	—
6	Bolt Package ("L" Types only) A8A, A81	4	202718	—
8, 11, 12, 14, 17A, 18, 19, 37	Gasket/O-Ring Kit, All Types except "L"	8	202701	203818
11, 12, 14, 17A, 18, 19, 32, 33, 33A, 37	GaskeVO-Ring Kit "L" Type	10	203714	203819
9	Diaphragm Follower	1	Only with kit	Only with kit
8, 9, 11	Diaphragm Follower Kit (Do not use O-Ring on "L" versions)	1 ea	200911	200911
10	Diaphragm	1	Only with kit	Only with kit
10, 11, 12	Diaphragm Kit	1 ea	200873	200873
13	Adapter Assembly	1	Only with kit	Only with kit
20	Seal Cap	1	Only with kit	Only with kit
11, 12, 13, 14, 19, 20	Adapter Assembly A8A, A81 Only	1 ea	202721	—
11, 12, 13, 14, 19, 20, 36, 37	Adapter Assembly A8AS, A81S Only	1 ea	202722	—
11, 12, 13, 14, 19, 20, 36, 37	Adapter Assembly ASAS, A81B Only	1 ea	202723	—
11, 12, 13, 14, 19, 20, 35	Adapter Assembly A8AOE, A81OE Only	1 ea	202720	—
11, 12, 13, 14, 19, 20, 35, 36, 37	Adapter Assembly A8AOES, A81OES Only	1 ea	202719	—
11, 12, 13, 14, 19, 20	Adapter Assembly A82 Only	1 ea	—	203803
11, 12, 13, 14, 19, 20, 36, 37	Adapter Assembly A82S Only	1 ea	—	203805
11, 12, 13, 14, 19, 20, 36, 37	Adapter Assembly A82B Only	1 ea	—	203804
11, 12, 13, 14, 19, 20, 35	Adapter Assembly A82OE Only	1 ea	—	203806
11, 12, 13, 14, 19, 20, 35, 36, 37	Adapter Assembly A82OES Only	1 ea	—	203807
15	Pin, Locating	2	N/A Separately	N/A Separately
16	Body Assembly	1	N/A Separately	N/A Separately
21, 22	Access Fitting and Cap	1 ea	N/A Separately	N/A Separately
23	Self-Lock Nut	1	—	Only with kit
24	Washer	1	—	Only with kit
25	O-Ring	1	—	Only with kit
26	Above 3 Items	—	—	—
14, 17A, 18, 26	Service Kit, Piston/Plug	1 ea	—	203823
27	Piston	1	—	Only with kit
28	Closing Spring	1	—	Only with kit
14, 17A, 18, 26, 27, 28	Piston Kit	1 ea	—	203824
29	Modulating Plug	1	—	Only with kit
30	Items: 27, 28, 29	—	—	Only with kit
31	Seal Cap (Only "L")	1	Only with kit	Only with kit
31, 32	Seal Cap Kit (Only "L") (Discard gasket from kit)	1 ea	202713	202713
33	Retaining Ring, "L" Bonnet	1	Part of 201698	Part of 201698
33A	O/Ring, Adjusting Stem	1	Part of 210698	Part of 210698
34	1/4" SAE Flare Half-Union	1	Part of 202714	Part of 202714
35A	Seat, Pilot ("OE" Only)	1	Only with kit	Only with kit
35B	O-Ring, Pilot Seat ("OE" Only)	1	Only with kit	Only with kit
35C	Spring, Pilot Seat ("OE" Only)	1	Only with kit	Only with kit
10, 11, 12, 35A-C	Seat Kit, Pilot ("OE" Only)	1 ea	202715	202715
36	Solenoid Operator Assembly	1	Only with kit	Only with kit
36, 37, 38	Solenoid Operator Repair Kit	1 ea	202700	202700
39	Coil	1	Only with kit	Only with kit
40	Sleeve, Coil Insert	2	Only with kit	Only with kit
41	Clip, Coil Cover	1	Only with kit	Only with kit
39, 40, 41	Coil and Housing Kit 120V/60; 110V/50	1	202940	202940
39, 40, 41	Coil and Housing Kit 240V/60; 220V/50	1	202941	202941
39, 40, 41	Coil and Housing Kit 208V/60	1	202942	202942
39, 40, 41	Coil and Housing Kit 480V/60; 440V/50	1	202943	202943
39, 40, 41	Coil and Housing Kit 24V/60	1	202944	202944
39, 40, 41	Coil and Housing Kit 240V/50	1	202945	202945

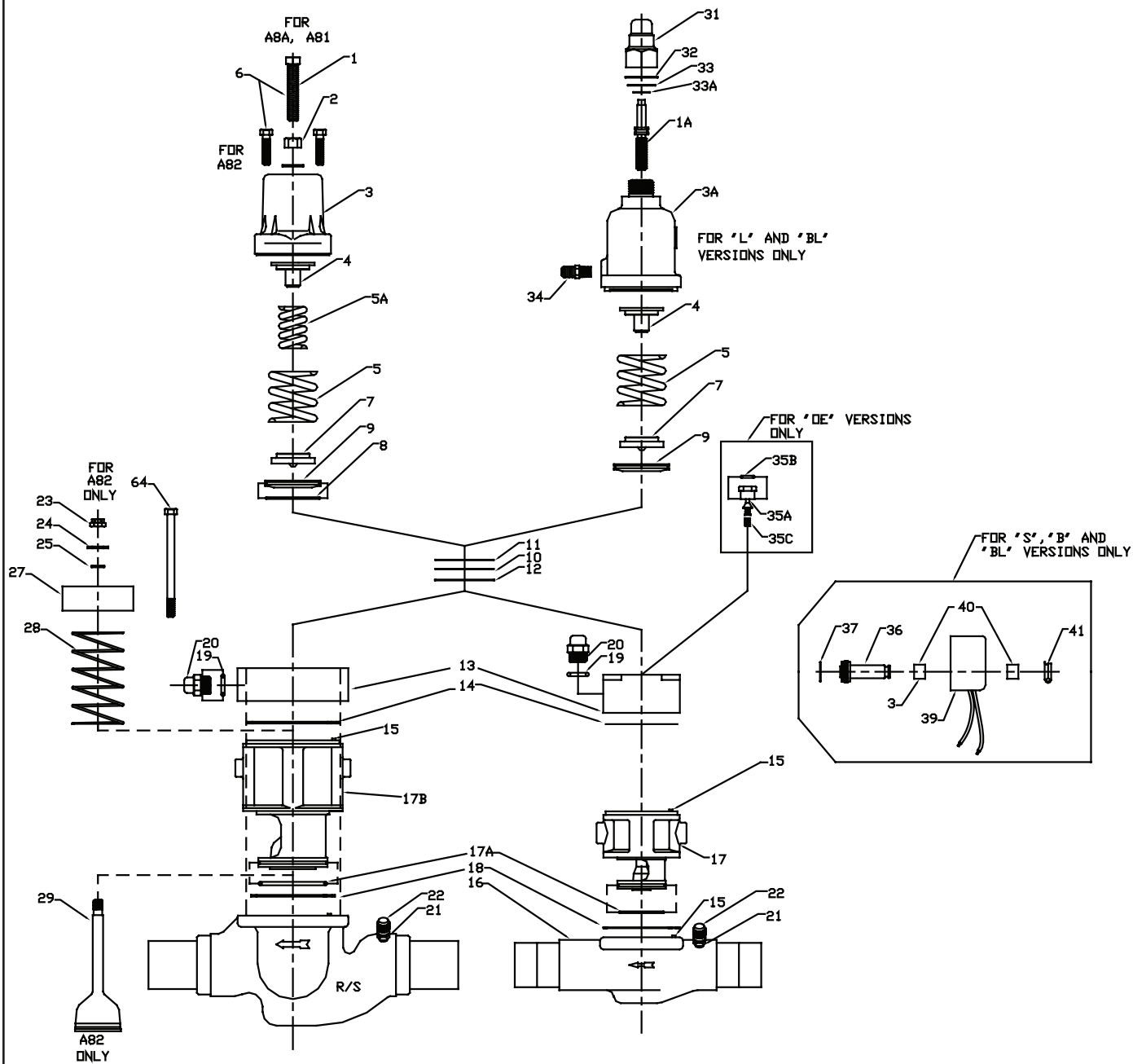


Fig. 10

THE SOLENOID FEATURES: “S” for Shut-off, “B” for Bypass. To effect either of the features, a Solenoid is employed to modify the Pilot Stream at the Pilot Adapter. The Actuator is Normally Closed for both features, and can accept a variety of different coil voltages.

A valve with the “S” feature will act to regulate in its normal fashion, according to its function and as set-for, when its solenoid coil is energized, and shut tightly when the solenoid coil is de-energized. The pilot solenoid is arranged such that, when closed, it will intercept the pilot stream before it reaches the throttling device, thus ensuring that the pressure on top of the Piston is the same as Downstream pressure and permitting the closing spring to close the main valve. When the Solenoid is energized, it permits the full upstream pressure to be delivered to the throttling device.

A valve with the “B” feature will act to regulate in its normal fashion, according to its function and as set for, when its solenoid coil is de-energized, and will open wide when its coil is energized, providing the available flow can maintain a 1.5 psi minimum pressure difference.

Now the pilot solenoid is arranged such that, when energized it bypasses the throttling device in the pilot circuit and delivers full upstream pressure to Chamber G on top of the piston, causing piston and modulating plug to move all the way down and the main valve to open wide. When de-energized the pilot stream is managed by the normal throttling device, and the regulator will maintain its set-for pressure in its normal fashion. This feature is available for the Inlet and Differential regulator functions.

ADJUSTMENT

Adjustment of a regulator’s set point requires that the pressure being controlled be monitored by an accurate pressure gauge. Before making any adjustments, the SEAL NUT #2 must be loosened. In all cases where the regulator is administering a pressure condition and a solenoid feature is not overriding that function, and the flow is in the normal direction, turning the ADJUSTING SCREW #1 in (i.e. clockwise) will raise the set point, and turning it out (i.e. counterclockwise) will lower the set point. Depending on system responses, the gauge may reflect some delay before a change in set point actually results in a change in the pressure being maintained. This can also sometimes be observed following the energization or de-energization of the Solenoid Features.

For any Inlet Pressure Regulator, the Pressure Gauge can be connected to the Access Fitting H on the Inlet side of the regulator Cartridge Assembly #17. For an Outlet Pressure Regulator, if no system gauge is available to monitor the controlled pressure, an access fitting for the gauge will have to be incorporated into the External Equalizer. For a Differential Pressure Regulator, both upstream and remote pressure must be known before a sensible adjustment can be made. The inbuilt Access Fitting H reads only upstream pressure; the Bonnet Pressure must be measured by a second gauge.

For Inlet and Outlet Pressure Regulators: Between 0 and 6.2 Bar (90 psig), one complete turn of the Adjusting Screw will change the set point 1.4 Bar (20 psi). Between 6.2 Bar (90 psig) and 400 psig, one complete turn of the Adjusting Screw will change the set point 4.8 Bar (70 psi). For Differential Pressure Regulators, one complete turn of the Adjusting Screw will change the set point 1.4 Bar (20 psi) up to the maximum 8.4 Bar (120 psi) differential.

CAUTION: Regulators with B features can only be adjusted with the pilot solenoid de-energized. Regulators with the S feature can only be adjusted with the solenoid energized.

Always re-tighten the Seal Nut once adjustment is completed.

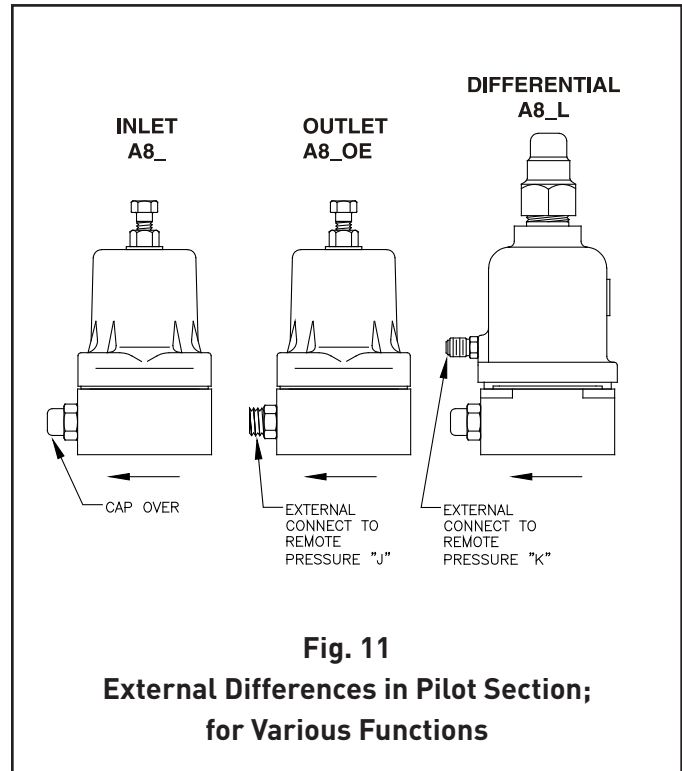


Fig. 11
External Differences in Pilot Section;
for Various Functions

CONTROL CONFIGURATIONS TYPICAL APPLICATIONS	BODY SIZE & FUNCTION	PORT SIZES	CONNECTION SIZES	FEATURES (PILOT CIRCUIT) NOTE (1)
INLET PRESSURE (INTEGRATED) Evaporator Pressure Regulator Defrost Relief Regulator Head Pressure Control Heat Reclaim	A8A	3/8", 5/8", 7/8"	5/8", 7/8", 1-1/8"	Shut-Off "S" A8AS, A81S, A82S
	A81	{3/8", 5/8"} 7/8", 1-1/8", 1-3/8"	1-1/8", 1-3/8", 1-5/8", 2-1/8"	Wide Opening "B" A8AB, A81B, A82B
	A82	1-5/8", 2-1/8", 2-5/8"	1-5/8", 2-1/8", 2-5/8"	
OUTLET PRESSURE (EXTERNAL EQUALIZED) Crankcase Pressure Regulator Receiver Pressure Control Heat Reclaim	A8AOE	3/8", 5/8", 7/8"	5/8", 7/8", 1-1/8"	Shut-Off "S"
	A810E	{3/8"-5/8"} 7/8", 1-1/8", 1-3/8"	1-1/8", 1-3/8", 1-5/8", 2-1/8"	A8AOES A810ES A820ES
	A820E	1-5/8", 2-1/8"	1-5/8", 2-1/8", 2-5/8"	
DIFFERENTIAL PRESSURE (EXTERNAL EQUALIZED) Liquid Main Pressure Control Heat Reclaim Oil Return Liquid Overfeed Control	A8AL	3/8", 5/8", 7/8"	5/8", 7/8", 1-1/8"	Wide-Open "B"
	A81L	{3/8", 5/8"} 7/8", 1-1/8", 1-3/8"	1-1/8", 1-3/8", 1-5/8", 2-1/8"	A8ABL A81BL A82BL
	A82L	1-5/8", 2-1/8", 2-5/8"	1-5/8", 2-1/8", 2-5/8"	

DISASSEMBLY (See also Bulletin RSBCV)

All A8 series regulators can be disassembled and all serviceable and moving parts replaced without disturbing the piping, but of course, disassembly will cause exposure of some section of piping to atmosphere, which should be addressed before disassembly by evacuation and reclaim of the refrigerant.

For the **A8A and A81** series Inlet and Outlet Pressure Regulators, the Seal Nut should be loosened and the Adjustment Screw backed out until no further spring compression is felt. For the OE and L function valves, all external equalizers should now be carefully disconnected, taking care that any trapped refrigerant is allowed to escape slowly. For any Differential (L) Function regulator, remove the seal cap carefully to ensure all trapped refrigerant is safely vented; then back out the Adjusting Screw. For the A82 series, if it is known that access to the Range Spring(s) #5 and Diaphragm #10 is not required, the sub-assembly from the Adapter up can remain intact and the regulator set point can thus be preserved, avoiding the need for gross adjustments when the valve is put back in service. If access to the pilot parts on an A82 is required, then the compression must be taken off the Range Spring as described above, and the Bonnet Bolts #6 removed. If a Solenoid Feature is incorporated, the Solenoid Coil #39 should now be removed by removing the Coil Cover Retaining Clamp. Never energize a Solenoid Coil that is not mounted and secured on its Solenoid Actuator #36.

If the subject valve is of the **A8A or A81** series, then the 4-bolts retaining the Valve Assembly can now be removed. The bonnet can be easily lifted off, and will usually leave the Diaphragm #10 resting on top of the O-Ring #12. If the valve is of the A82 series, the bolts retaining the (3) lower sub-assemblies can now be removed. The wear aspects of the Adapter Assembly #13 are the Diaphragm #10 and the Pilot Seat, which is pressed into the top of the Adapter #13, and which may cause replacement of that Adapter. Remove the diaphragms and inspect carefully for cracks, or scarring around the pilot seat area. This is most easily done by looking down a piece of large tubing, through the diaphragm, at a safety lamp or similar light source. Inspect the Pilot Seat area of Inlet or Differential regulators for erosion or other damage; it should be dead smooth to maintain a good metal-to-metal seat. Removal of the Adapter Assembly #13 and the Cartridge Assembly #17 may require a sharp tap on their sides to unseat the parts from their sealed position, for which a rubber or rawhide hammer is recommended so as to avoid damage to the sealing surfaces.

Removal of the Adapter #13 will expose the top of the piston. The top of piston space should be inspected now, and the piston pressed down by hand and permitted to return to ensure it is free. The return stroke is damped and is fairly slow, though there should be no dragging or hesitation. In the case of the A8A and A81, the Cartridge Assembly #17 is a sealed sub-assembly which must be replaced intact, but it is of very rugged construction so, with the exception of change to valve port size with changes in flow requirements, it should not require servicing beyond basic cleaning. With the Capacity Cartridge removed from the body, depress the piston and inspect the Seating Surfaces at the Modulating Plug for deleterious material, extraordinary wear, misalignment, etc.

Before re-assembly, all parts must be cleaned with a suitable solvent, permitted to dry, and lubricated with a light film of refrigerant oil, simply wiped on with the fingers. All gaskets and O-Rings should be renewed, and insertion and sealing will be facilitated if a similar film of oil is applied to them as well.

Re-assembly is exactly the reverse of disassembly, with the precaution that the reliefs cut into each module of the valve assembly and the corresponding gaskets be aligned with the appropriate Locating Pin #15. Ensure that all access fittings and external equalizing lines are sealed when re-installing the corresponding parts. Adjust all torques to the values indicated by Table 1.

Tighten all bolts equally to draw the assembly together evenly, to ensure properly sealing of all joints. Replace all Seal Caps as applicable. When re-adjusting following servicing, prevent excessive pressures by starting with the adjustment stems at low spring compression until the system approaches the desired operating pressures, then re-set as per "ADJUSTMENT", above.

ELECTRICAL

The Refrigerating Specialties Division molded water resistant Class "H" solenoid coil is designed for long life and powerful opening force. The standard coil housing meets NEMA 3R and 4 requirements. This sealed construction can withstand direct contact with moisture and ice. By definition, Class "H" coil construction will permit coil temperatures, as measured by resistance method, as high as 185°C. (366°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.

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

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 Model PLT-2. See Bulletin No. 60-20.

The solenoid coil must be connected to electrical lines with volts and Hertz same as stamped on 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 10.2 watts or less. On transformer coils the 6 volt leads are always black.

SAFE OPERATION (See Bulletin RSBCV)

People doing any work on a refrigeration system must be qualified and completely familiar with the system and the valves involved, or all other precautions will be meaningless. This includes reading and understanding pertinent product bulletins and the current Bulletin RSB-FC prior to installation or servicing work.

WARRANTY

All products are warranted against defects in workmanship and materials for a period of one 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 catalogs or bulletins for normal refrigeration applications, unless otherwise approved in writing. 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 the company's 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, accidents, misuse or abuse. Products disabled by dirt or other foreign substances will not be considered defective.

The express warranty above constitutes the only warranty of the company's products and is in lieu of all other warranties expressed or implied, written or oral, including any warranty of merchantability or warranty of fitness for a particular purpose, and in no event is the company 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 the company, nor to assume, for the company, any other liability in connection with any of its products.

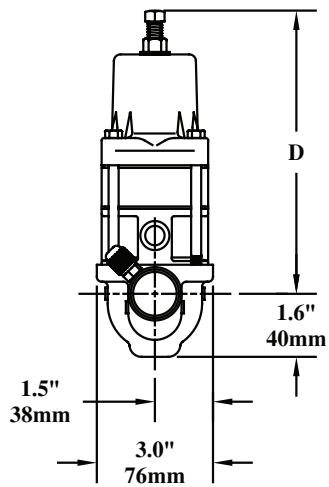
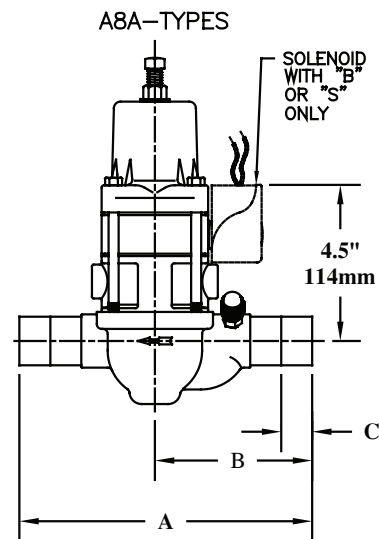
TABLE 1 - TORQUES FOR RE-ASSEMBLY
(Presumes use of New Gaskets, O-Rings)

Location, Use	Description (SAE)	Required Torque mkg. Ft-Lbs.	
Cartridges: A8A, A81 Bonnet: A82	1/4"-20	1.1	8
Cartridges: A82 Piston/Plug: A82 Jam Nut	5/16"-18	1.7	12
		1.1	8
Solenoid Operator (all)		0.9	6

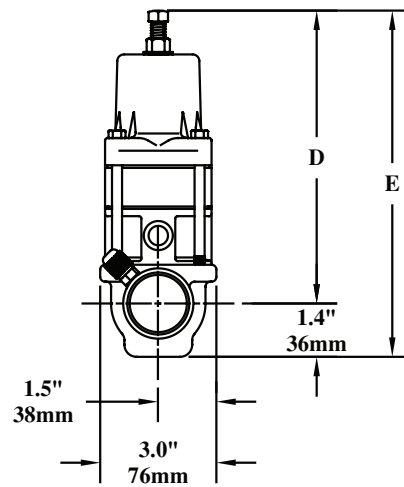
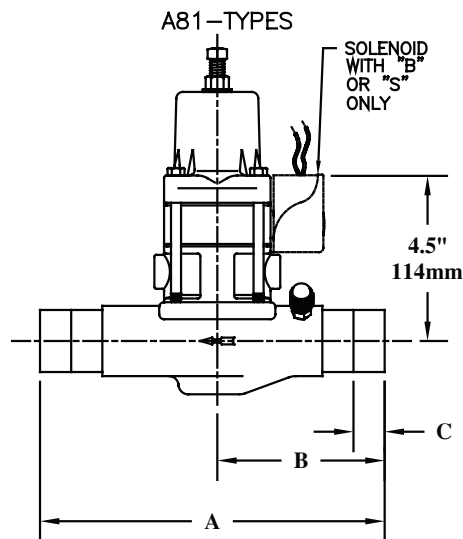
TABLE 2 - SERVICE POINTERS

Symptom	Probable Cause	Correction
Failure to open, close or regulate	Piston jammed due to excessive dirt.	Flush clearance space between piston and cartridge bore with refrigeration oil solvent.
	Valve manually open.	Close manual bypass stem by turning clockwise.
	Adjusting stem improperly positioned: a. Turned in too far. Does not open (inlet regulator). b. Not turned in far enough. Does not close (inlet regulator). Does not open (Outlet regulator).	Position adjusting stem properly.
	Passage "N" clogged.	Clean passage "N"
	Pilot seat dirty or eroded.	Clean and smooth pilot seat. If diaphragm is removed, replace with new gasket and O-Ring.
System control cannot be maintained - unstable valve operation.	Regulator installed backwards.	Re-install regulator in proper position.
	Improper Regulator selection: a. Actual load is much lower than regulator capacity. b. Actual pressure drop across valve higher than originally intended. c. Combinations of a and b.	Replace cartridge with one of suitable size.

A8A - Types



A81 Types



A82 - Types

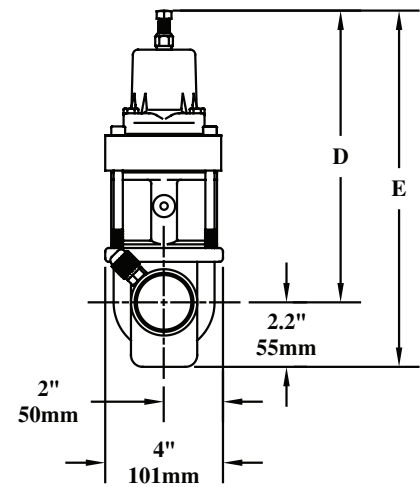
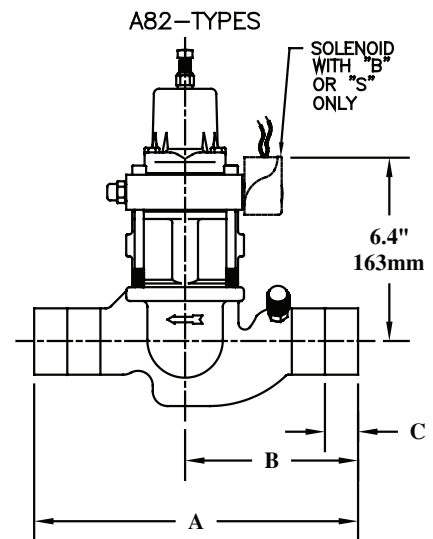


TABLE OF DIMENSIONS

Type		A8A (AllTypes)					A81 (All Types)					A82				
Connection Size		5/8"	7/8"	1-1/8"			1-1/8"	1-3/8"	1-5/8"	2-1/8"			1-5/8"	2-1/8"	2-5/8"	
		15 mm	22 mm	28 mm			28 mm	35 mm	42 mm	54mm			42 mm	54 mm	67 mm	
A	Inch	7.2	7.5	8.0			8.9	9.4	9.9	11.1			11	12	13.5	
	mm	183	190	203			226	239	251	282			279	305	343	
B	Inch	3.9	4.0	4.3			4.5	4.7	5.0	5.6			5.9	6.4	7.1	
	mm	99	102	109			114	119	127	142			149	162	181	
C	Inch	0.6	0.8	1.0			1.0	1.0	1.1	1.2			1.1	1.4	1.7	
	mm	15	20	25			25	25	28	30			28	36	44	
Functions		A8A	-S, -B	-L	-BL	-OE,-OES	A81	-S, -B	-L	-BL	-OE, -OES	A82	-S, -B	-L	-BL	-OE
D	Inch	8.0	8.0	8.6	8.6	8.4	8.0	8.0	8.6	8.6	8.4	10.2	10.1	10.4	10.4	10.5
	mm	203	203	218	218	213	201	201	218	218	213	260	260	264	264	267
E	inch	9	9.4	10.0	10.0	9.8	9.4	9.4	10.0	10.0	9.8	12.2	12.2	12.4	12.4	12.5
	mm	239	239	254	254	249	239	239	254	254	249	310	310	315	315	318