

# Compact Wide-Range Pressure Regulators

Product Bulletin 25-94 G

Type: A8A, A81, & A82

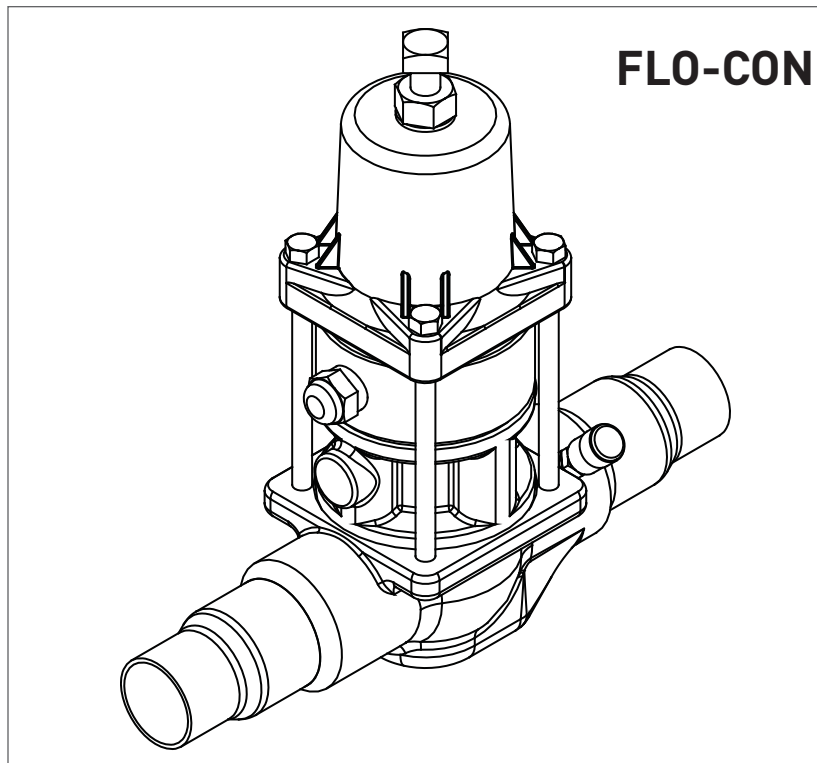
Port Size: 9 - 66 mm ( $\frac{3}{8}$ " -  $2\frac{5}{8}$ "

Design Working Pressure: 31.0 bar (450 psig)



## Purpose:

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, 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.



**FLO-CON**

## Contact Information: Product Features:

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[www.parker.com/refspec](http://www.parker.com/refspec)

- 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 (Except for the A82's)
- Inlet, outlet or differential regulator functions
- Low pressure drop
- Few moving parts
- Long life stainless steel diaphragms
- Variations available for pilot electric shut-off and pilot electric wide open pressure control
- Manual openings feature
- All service from the top
- Sweat-in-place without disassembly



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### Description

Three control functions are available: Inlet, Outlet, and Differential pressure control. Two control features can be added by incorporating pilot solenoids; either Electric Shut-Off (S) or Electric Bypass (B); also called Wide-Opening.

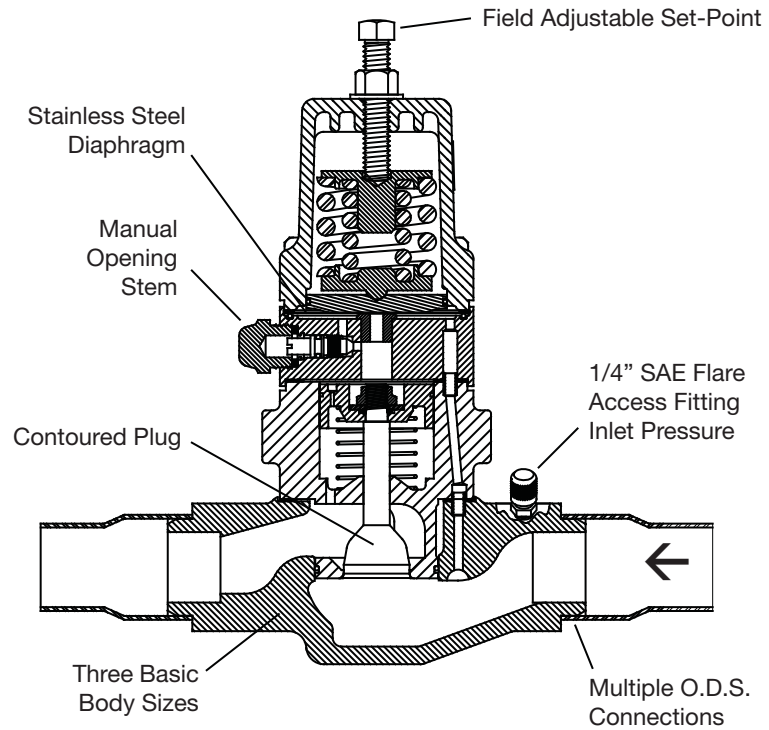
The valves are an integrated assembly of four modules:

- 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 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.

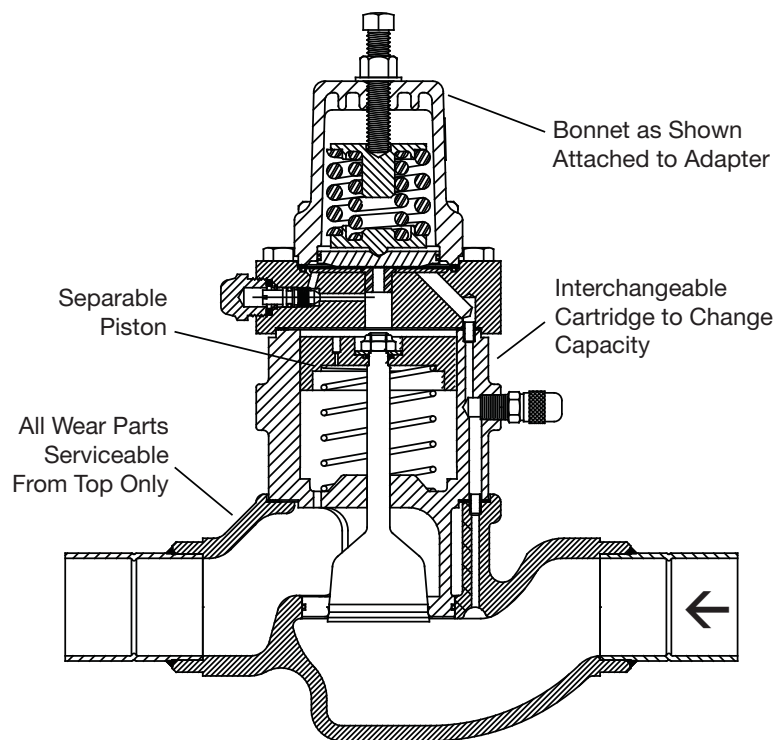
This unique modular design allows the regulator to be soldered into the line without disassembly, yet provides full access for disassembly, cleaning and servicing from the top only. Interchangeable capacity cartridges facilitate flow revisions should an undersized or oversized condition be created, while pilot adaptors can be changed out to add features or even change functions. Thus, retrofitting for additional evaporator capacity, heat reclaim, or hold back 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" Hg to 400 psig). Regulators for differential function have a range of 0 to 8.3 bar (0 to 120 psi).

These valves will modulate to maintain a pressure as set for in the field, in spite of fluctuations in load, changes in ambient, changes



**A8A & A81 Assembly Cross-Section (A81 Body Shown)**



**A82 Assembly Cross-Section**

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,

Port Size	Valve Body
9 mm (3/8")	A8A
15 mm (5/8")	A8A, A81
22 mm (7/8")	A8A, A81
28 mm (1-1/8")	A81
35 mm (1-3/8")	A81
42 mm (1-5/8")	A82
54 mm (2-1/8")	A82
67 mm (2-5/8")	A82

**Port Size vs. Valve Body Table**

Suffix	Description
B	Electric Wide Open
S	Electric Shut - off
O	Outlet or Downstream Pressure Regulator
E	Externally Equalized
L	Differential Pressure Regulator

**Suffix Table**

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 three 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.

A Differential Pressure Regulator, A8-L, 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.

When the solenoid coil in a Differential Pressure Regulator, A8-BL, 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 Outlet Pressure Regulator, A8-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, which will maintain constant downstream pressure when the coil is energized, and close tightly when the coil is de-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.

Only for those valves requiring the "S" OR "B" features:

**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).

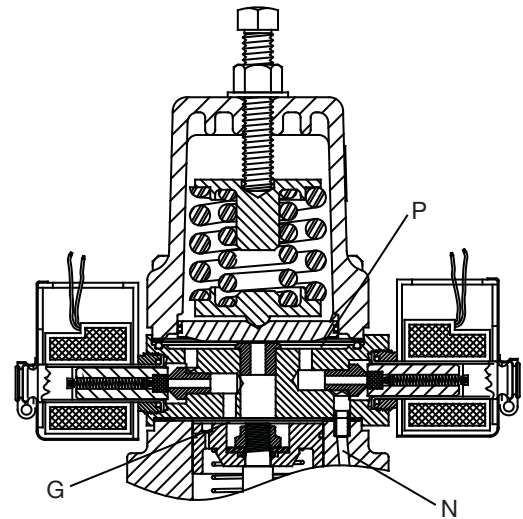
The bonnet and adaptor assemblies

Suffix	Port Size	Connection Size
A8A	3/8", 5/8", 7/8"	5/8", 7/8", 1-1/8"
A81	5/8", 7/8", 1-1/8", 1-3/8"	1-1/8", 1-3/8", 1-5/8", 2-1/8"
A82	1-5/8", 2-1/8", 2-5/8"	1-5/8", 2-1/8", 2-5/8"
A8AOE	3/8", 5/8", 7/8"	5/8", 7/8", 1-1/8"
A81OE	5/8", 7/8", 1-1/8", 1-3/8"	1-1/8", 1-3/8", 1-5/8", 2-1/8"
A82OE	1-5/8", 2-1/8"	1-5/8", 2-1/8", 2-5/8"
A8AL	3/8", 5/8", 7/8"	5/8", 7/8", 1-1/8"
A81L	5/8", 7/8", 1-1/8", 1-3/8"	1-1/8", 1-3/8", 1-5/8", 2-1/8"
A82L	1-5/8", 2-1/8", 2-5/8"	1-5/8", 2-1/8", 2-5/8"

**A8 Series Port and Connection Table**

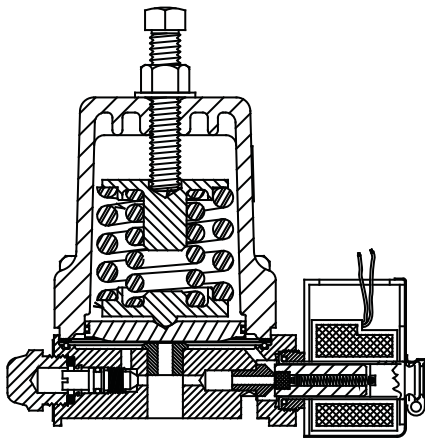
The solenoid features can be designated for these inlet pressure regulators by adding the appropriate suffix:

Valve	Description	Typical Applications
A8-S	Inlet Pressure Regulator with Electric Shut-off	Evaporator Pressure Regulator Defrost Relief Regulator
A8-B	Inlet Pressure Regulator with Electric Wide Opening	Head Pressure Control Heat Reclaim
A8-L	Differential Pressure Regulator	Liquid Main Pressure Control Heat Reclaim
A8-BL	Differential Pressure Regulator with Electric Wide Opening	Oil Return Liquid Overfeed Control
A8-OE	Outlet Pressure Regulator Externally Equalized	Crankcase Pressure Regulator Receiver Pressure Control
A8-OES	Outlet Pressure Regulator Externally Equalized with Electrical Shut-off	Heat Reclaim

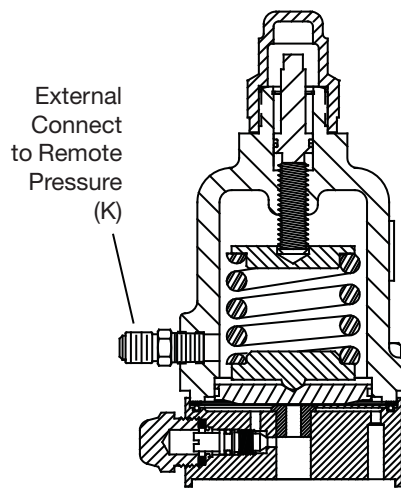


**A8ABS / A81BS / A82BS**  
Inlet Pressure Regulator with Electric Wide Opening & Shut-off

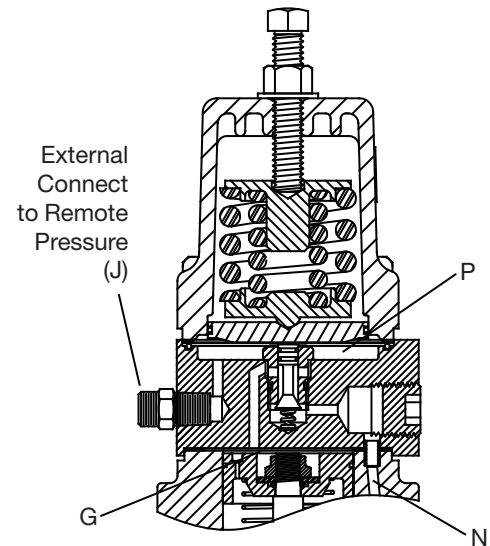
**A8 Valve with Suffix Description Table**



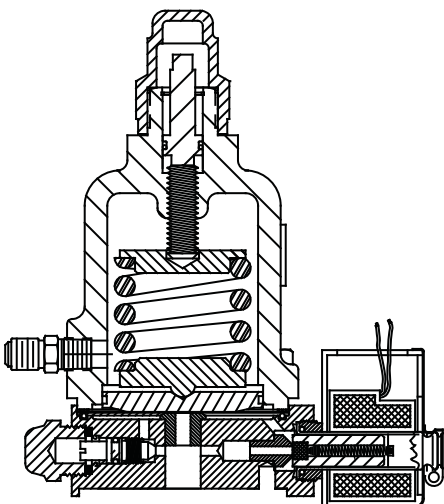
**A8AB / A81B / A82B**  
Inlet Pressure Regulator with Electric Wide Opening



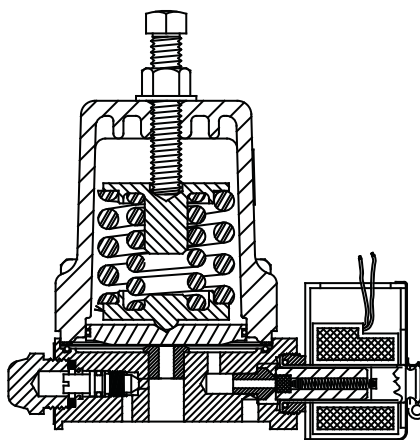
**A8AL / A81L / A82L**  
Differential Pressure Regulator



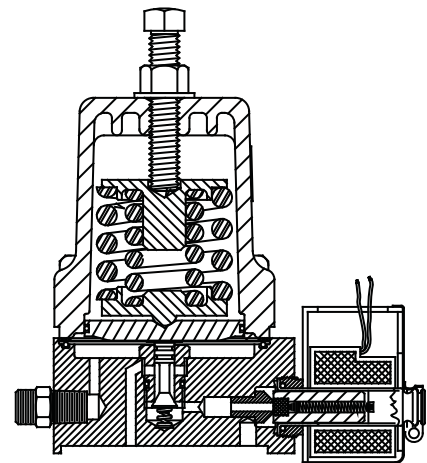
**A8AOE / A81OE / A82OE**  
Outlet Pressure Regulator Externally Equalized



**A8ABL / A81BL / A82BL**  
Differential Pressure Regulator with Electric Wide Opening



**A8AS / A81S / A82S**  
Inlet Pressure Regulator with Electric Shut-off



**A8AOES / A81OES**  
Outlet Pressure Regulator with Electric Shut-off

are inter-changeable with the appropriate body and cartridge assemblies sizes.

**Principles of Operation**

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.

**Inlet Pressure Regulator**

The inlet pressure is applied via Passage N to the underside of the Diaphragm (#10) at Chamber P. Considering a valve that is initially closed, as the inlet pressure rises, the Diaphragm exerts a force upward against the Range Spring (#5). 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 (#29) 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.

**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. As outlet pressure drops, the Range Spring overcomes the force developed by the diaphragm, 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 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.

**Differential Pressure Regulator**

The inlet pressure is applied to the underside of the Diaphragm 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. 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 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.

**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 (#27) 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

Valve	Port Size							
	9 mm (3/8")	15 mm (5/8")	22 mm (7/8")	28 mm (1-1/8")	35 mm (1-3/8")	42 mm (1-5/8")	54 mm (2-1/8")	66 mm (2-5/8")
A8A, A81	1.5	3.3	5.1	8.1	11.3	—	—	—
A82	—	—	—	—	—	18	27	36

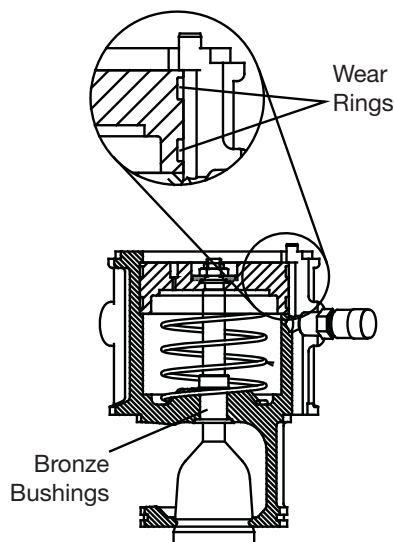
**A8A, A81, & A82 Cv Table**

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.

The A82L and A82BL cartridge has been re-engineered to reduce friction and increase life expectancy. These valves are commonly used for discharge applications in supermarket refrigeration. This cartridge is compatible with other A82 cartridges, but is only recommend to be used with the "L" and "BL" valves.

#### Installation

On the Types A8A, A81 and A82 Series Regulators, the proper direction of flow is designated by an arrow



#### A82L & A82BL New Cartridge Design

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.

#### 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 on the Inlet side of the regulator. 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 in built Access Fitting 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.

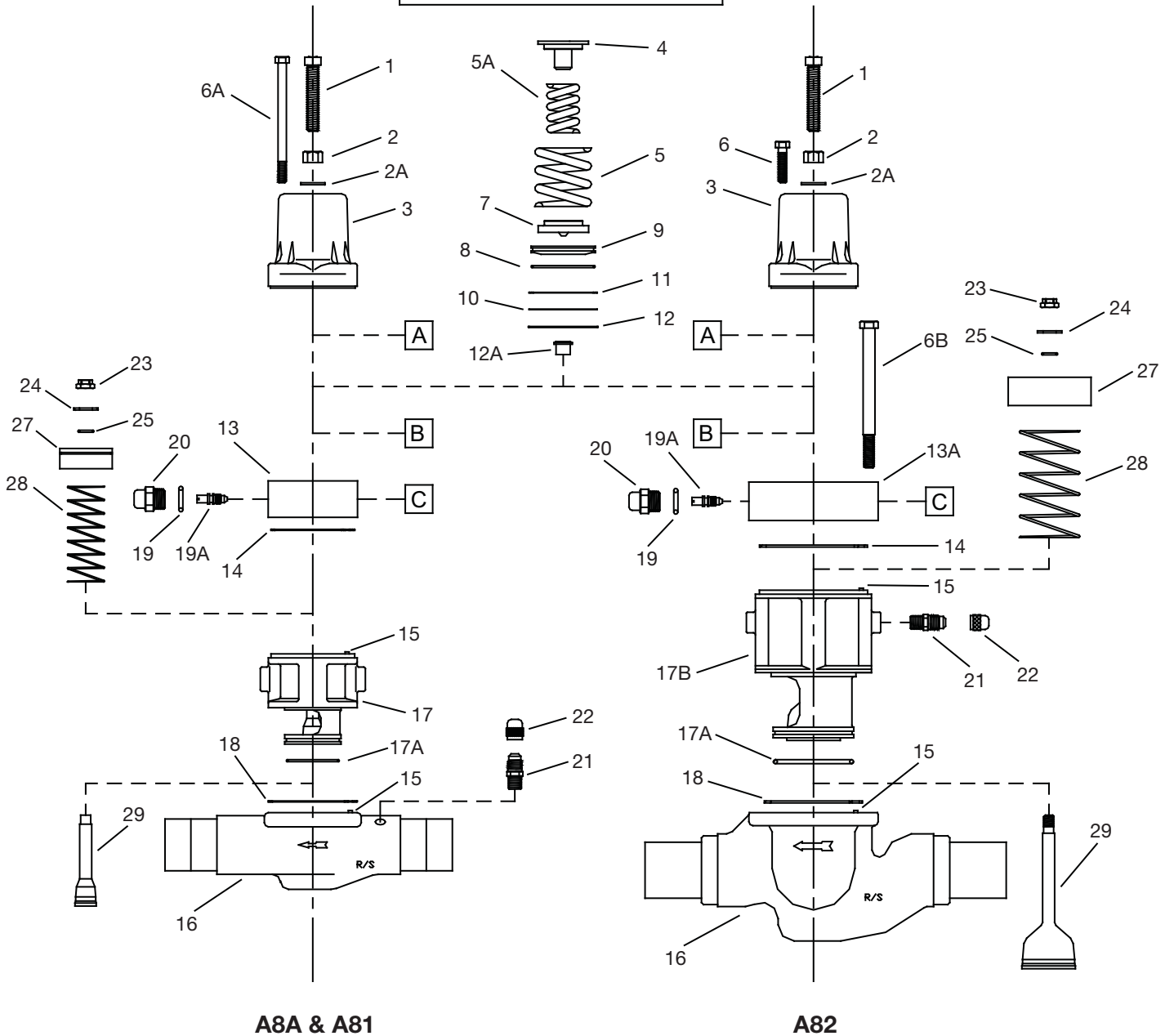
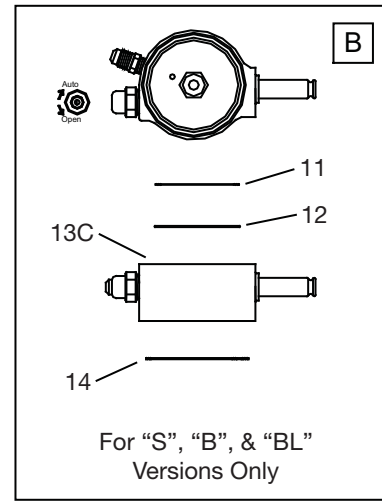
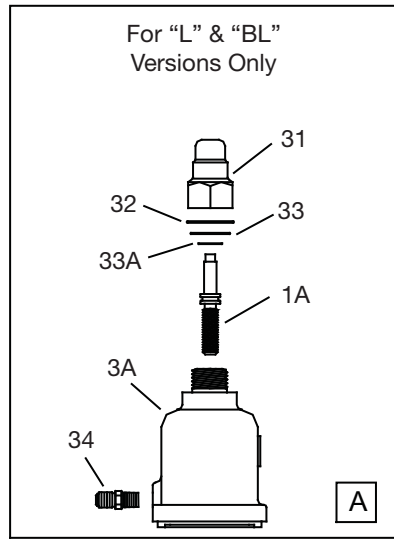
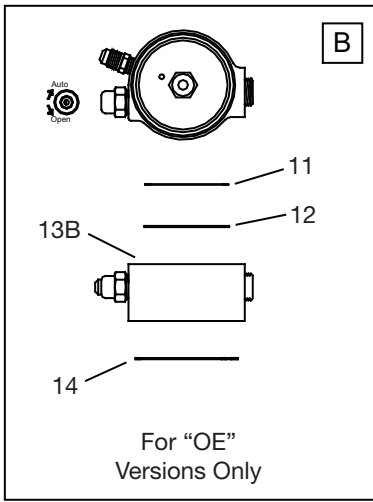
Always re-tighten the Seal Nut once adjustment is complete.

#### 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 re-claim of the refrigerant.

For the **A8A and A81** series Inlet and Outlet Pressure Regulators, the Seal Nut should be loosened and the Adjusting 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 (#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

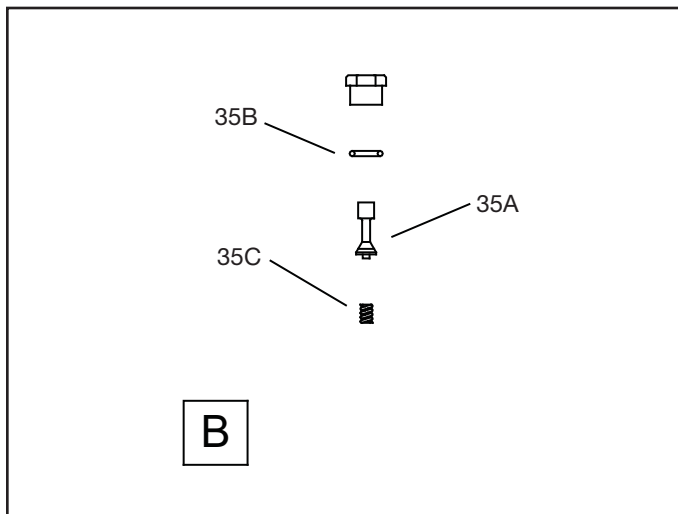


A8A, A81, & A82 Valve Exploded View

Item	Description	Qty
1	Adjusting Stem	1
1A	Adjusting Stem ("L" Only)	1
2	Adjusting Stem Seal Nut	1
2A	Washer, Seal	1
3	Bonnet	1
3A	Bonnet ("L" Only)	1
4	Upper Spring Plate	1
5	Outer Range Spring	1
5A	Inner Range Spring	1
6	Hex Screw 1/4-20 X 1-1/4"	4
	Hex Screw 1/4-20 x 4"	4
6A	Hex Screw 1/4-20 x 3-3/4" ("L" Only)	4
	Hex Screw 1/4-20 x 4-1/4" ("OE" Only)	4
6B	Hex Screw 5/16-18 x 4-1/4"	4
7	Lower Spring Plate	1
8	O-Ring, Diaphragm Follower	1
9	Diaphragm Follower	1
10	Diaphragm	1
11	Gasket, Bonnet	1
12	O-Ring, Adaptor	1
12A	Pilot Seat	1
13	A8A & A81 Adaptor Assembly	1
13A	A82 Adaptor Assembly	1
13B	A8-OE Adaptor Assembly	1
13C	A8-"S", "B," & "BL" Adaptor Assembly	1
14	Gasket, Adaptor	1
15	Pin Location	2
16	Body Assembly	1
17	A8A & A81 Cartridge	1
17A	O-Ring, Cartridge	1

Item	Description	Qty
18	Gasket, Body	1
19	O-Ring, Stem Valve	1
19A	Valve Stem, Adaptor	1
20	Seal Cap, Stem Valve	1
21	Access Fitting	1
22	Cap, SAE	1
23	Self-Lock Nut	1
24	Washer, Flat	1
25	O-Ring, Piston	1
26	A82 Cartridge	1
27	Piston	1
28	Spring, Cartridge	1
29	Modulating Plug	1
31	Seal Cap ("L" Only)	1
32	Gasket, Seal Cap ("L" Only)	1
33	Retaining Ring ("L" Only)	1
33A	O-Ring, Adjusting Stem	1
34	1/4" SAE Flare Half-Union ("OE" Only)	1
35A	Pilot Plug ("OE" Only)	1
35B	O-Ring, Pilot Seat ("OE" Only)	1
35C	Spring, Pilot Seat ("OE" Only)	1
36	Solenoid Pseudo ("S", "B", & "BL" Only)	1
37	O-Ring, Solenoid Pseudo ("S", "B", & "BL" Only)	1
38	Solenoid Seat ("S", "B", & "BL" Only)	1
39	Coil ("S", "B", & "BL" Only)	1
40	Sleeve, Coil Insert ("S", "B", & "BL" Only)	2
41	Clip, Coil Cover ("S", "B", & "BL" Only)	1

### A8 Series Parts List



A8-OE Pilot Seat Exploded View

Item	Kit Description	Kit Number
1	Adjusting Stem	301888
1A, 33, 33A	Adjusting Stem ("L" Only)	201698
2	Adjusting Stem Seal Nut	301836
3, 8, 11	Bonnet	200910
3A, 11, 12, 32, 33-34	Bonnet ("L" Only)	202714
4, 5, 5A, 7, 8, 11	Spring	202205
4, 5, 7, 11	Spring ("L" Only)	202702
8, 9, 11	Diaphragm Follower	200911
10, 11, 12	Diaphragm	200873
10-12, 35A-35C	Pilot Seat ("OE" Only)	202715

A8A, A81, & A82 Parts Kit



Item	Kit Description	Kit Number
11, 12, 13, 14	A8A & A81 Adaptor Assembly	202721
11, 12, 13C, 14	A8AS & A81S Adaptor Assembly	202722
11, 12, 13C, 14	A8AB & A81B Adaptor Assembly	202723
11, 12, 13B, 14	A8AOE & A81OE Adaptor Assembly	202720
11, 12, 13C, 14	A8AOES & A81OES Adaptor Assembly	202719
14, 17, 17A, 18	Reduced 5/8" Cartridge Assembly	202712
14, 17, 17A, 18	5/8" Cartridge Assembly	202711
14, 17, 17A, 18	7/8" Cartridge Assembly	202710

Item	Kit Description	Kit Number
14, 17, 17A, 18	1-1/8" Cartridge Assembly (A81 Only)	202709
14, 17, 17A, 18	1-3/8" Cartridge Assembly (A81 Only)	202708
31, 32, 33A	Seal Cap ("L" Only)	202713
6A	Bolt Package	202717
6A	Bolt Package ("OE" Only)	202716
6A	Bolt Package ("L" Only)	202718
8, 11-12, 14, 17A, 18, 19, 37	Gasket/O-Ring	202701
11-12, 14, 17A, 18, 19, 32, 33, 33A, 37	Gasket/O-Ring ("L" Only)	203714

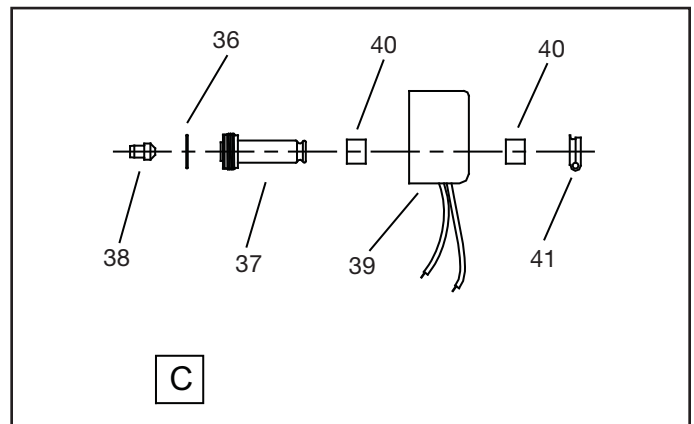
**A8A & A81 Parts Kit**

Item	Kit Description	Kit Number
11, 12, 13A, 14	A82 Adaptor Assembly	203803
11, 12, 13C, 14	A82S Adaptor Assembly	203804
11, 12, 13C, 14	A82B Adaptor Assembly	203805
11, 12, 13B, 14	A82OE Adaptor Assembly	203806
14, 17A, 17B, 18	1-5/8" Cartridge Assembly	203811
14, 17A, 17B, 18	2-1/8" Cartridge Assembly	203812
14, 17A, 17B, 18	2-5/8" Cartridge Assembly	203813
14, 17A, 17B, 18	A82L & A82BL 1-5/8" Cartridge Assembly	208284

Item	Kit Description	Kit Number
14, 17A, 17B, 18	A82L & A82BL 2-1/8" Cartridge Assembly	208285
14, 17A, 17B, 18	A82L & A82BL 2-5/8" Cartridge Assembly	208286
31, 32, 33A	Seal Cap ("L" Only)	202713
6A	Bolt Package	203820
6A	Bolt Package ("OE" Only)	203821
6A	Bolt Package ("L" Only)	203822
8, 11-12, 14, 17A, 18, 19, 37	Gasket/O-Ring	203818
11-12, 14, 17A, 18, 19, 32, 33, 33A, 37	Gasket/O-Ring ("L" Only)	203819

**A82 Parts Kit**

Item	Kit Description	Kit Number
36, 37	Solenoid Operator Repair	202700
39, 40, 41	Coil & Housing 120V/60Hz; 110V/50Hz	202940
39, 40, 41	Coil & Housing 240V/60Hz; 220V/50Hz	202941
39, 40, 41	Coil & Housing 208V/60Hz	202942
39, 40, 41	Coil & Housing 480V/60Hz; 440V/50Hz	202943
39, 40, 41	Coil & Housing 24V/60Hz	202944
39, 40, 41	Coil & Housing 240V/50Hz	202945



**A8-S, B, & BL Coil Parts Kit**

**A8-S, A8-B, & A8-BL Coil Exploded View**

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 three 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.

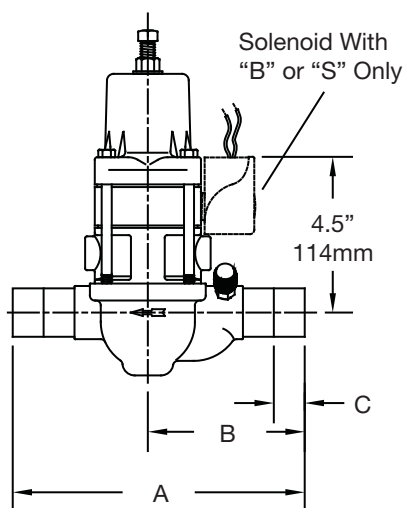
### Gasket Oiling Instructions

When installing gaskets into valves, it is important to add Refrigeration Oil to them prior to installation.

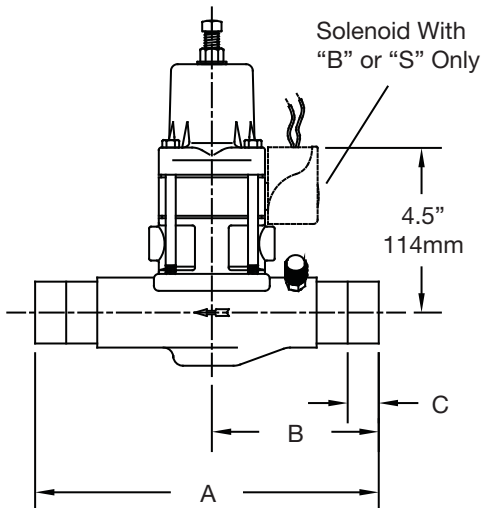
Adding oil will soften the gasket and help to reduce the possibility of leaks by filling the small voids between the gasket and the valve. This will give the gasket time to compress and form a better bond with the valve.

Coat the surface of the gasket. Do not soak it in oil.

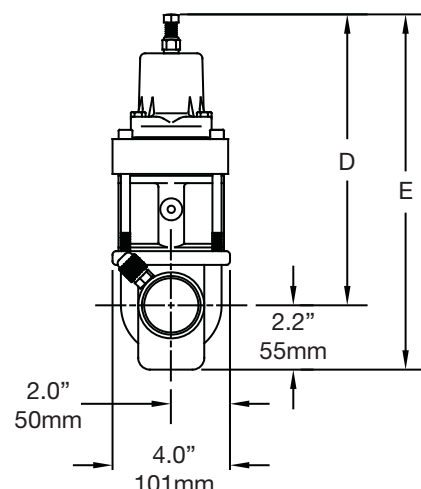
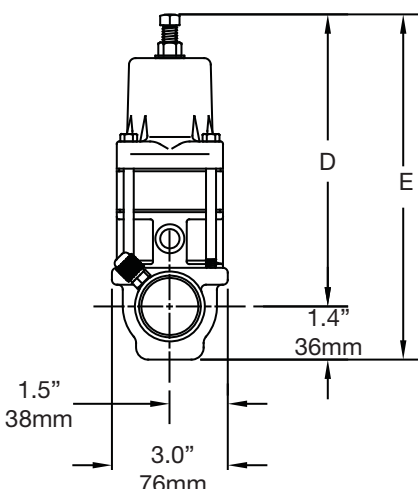
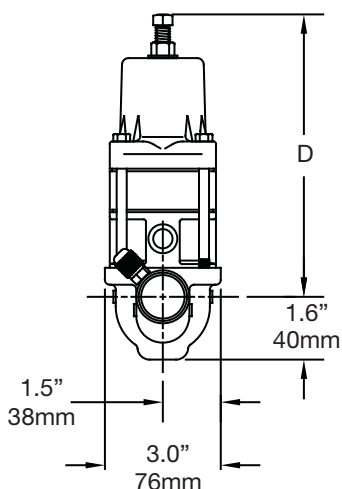
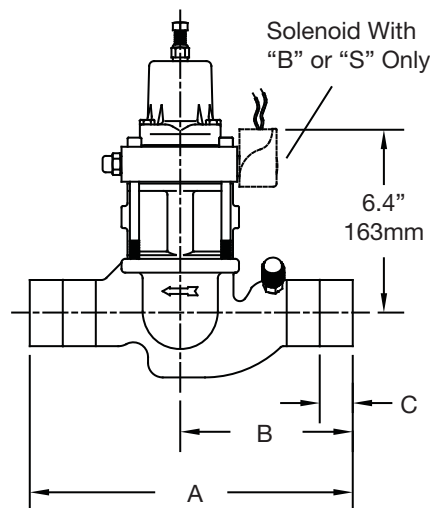
**Type: A8A**



**Type: A81**



**Type: A82**



Connection Size	A8A			A81				A82		
	15 mm (5/8")	22 mm (7/8")	28 mm (1-1/8")	28 mm (1-1/8")	35 mm (1-3/8")	42 mm (1-5/8")	54 mm (2-1/8")	42 mm (1-5/8")	54 mm (2-1/8")	67 mm (2-5/8")
A	183 mm (7.2")	190 mm (7.5")	203 mm (8.0")	226 mm (8.9")	239 mm (9.4")	251 mm (9.9")	282 mm (11.1")	279 mm (11.0")	305 mm (12.0")	343 mm (13.5")
B	99 mm (3.9")	102 mm (4.0")	109 mm (4.3")	114 mm (4.5")	119 mm (4.7")	127 mm (5.0")	142 mm (5.6")	149 mm (5.9")	162 mm (6.4")	181 mm (7.1")
C	15 mm (0.6")	20 mm (0.8")	25 mm (1.0")	25 mm (1.0")	25 mm (1.0")	28 mm (1.1")	30 mm (1.2")	28 mm (1.1")	36 mm (1.4")	44 mm (1.7")

**A8A, A81, & A82 External Dimensions**

A8A Valve Function	Connection Size			
	D		E	
	inch	mm	inch	mm
A8A	8.0	203	9.0	239
S, B	8.0	203	9.4	239
L	8.6	218	10.0	254
BL	8.6	218	10.0	254
OE, OES	8.4	213	9.8	249

A81 Valve Function	Connection Size			
	D		E	
	inch	mm	inch	mm
A81	8.0	201	9.4	239
S, B	8.0	201	9.4	239
L	8.6	218	10.0	254
BL	8.6	218	10.0	254
OE, OES	8.4	213	9.8	249

A82 Valve Function	Connection Size			
	D		E	
	inch	mm	inch	mm
A82	10.2	260	12.2	310
S, B	10.1	260	12.2	310
L	10.4	264	12.4	315
BL	10.4	264	12.4	315
OE	10.5	267	12.5	318

**A8A, A81, & A82 Dimension Tables**

Location	Valve	Description (SAE)	Torque mkg (Ft-Lbs)
Bonnet Screws	A8A, A81	1/4" - 20	1.4 (10)
Bonnet Screws	A82	1/4" - 20	1.3 (9)
Adapter Screws	A82	5/16" - 18	3.4 (26)
Bonnet Fitting	"L" Types	—	1.4 (10)
Bonnet Seal Cap	"L" Types	—	Snug
Gages	All Types	—	1.4 (10)
Seal Cap	All Types	—	Snug
Pilot Seat	"OE" Types	—	1.4 (10)
Mod Plug/ Piston	All Types	5/16" - 24	1.1 - 1.4 (8 - 10) per 1/4 Turn

**A8A, A81, & A82 Torque Requirement Table**

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 tuning clockwise
	Adjusting stem improperly positioned:	Position adjusting stem properly
	a. Turned in too far. Does not open (inlet regulator)	
	b. Not turned far enough. Does not close (inlet regulator). Does not open (outlet regulator)	
	Passage "N" clogged	Clean passage "N"
System Control cannot be maintained - unstable valve operation	Pilot seat dirty or eroded	Clean and smooth pilot seat. If diaphragm is removed, replace with new gasket and O-Ring
	Regulator installed backwards	Re-install regulator in proper position
	Improper regulator selection:	Replace cartridge with one of suitable size
	a. Actual load is much lower than regulator capacity	
	b. Actual pressure drop across valve higher than originally intended	
	c. Combination of a and b	

**A8A, A81, & A82 Service Pointers**

**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.

