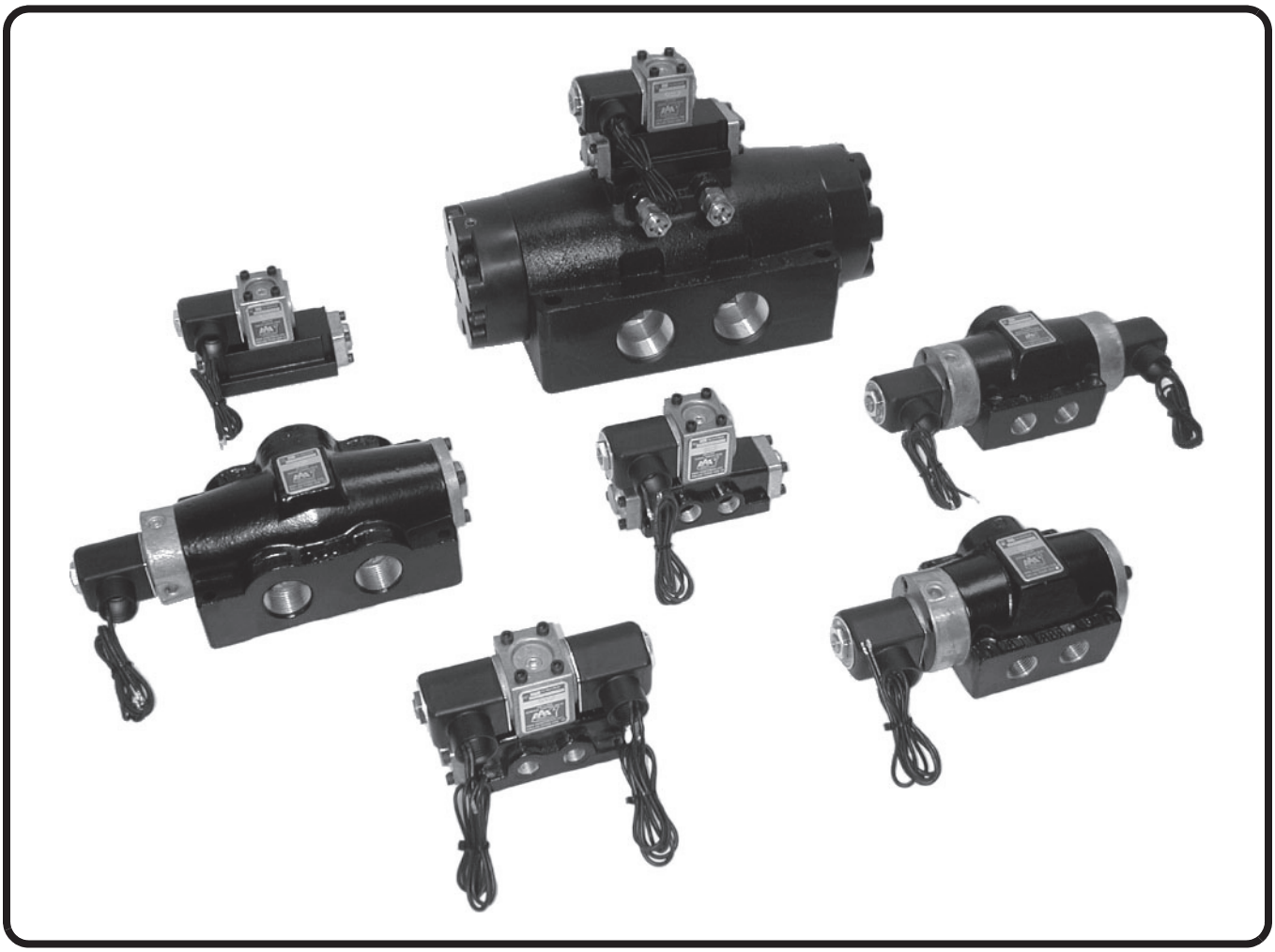
"CLASSIC" SOLENOID CONTROLLED, PILOT OPERATED AIR VALVES

4-WAY: VACUUM TO 250 PSI



PART NUMBER STRUCTURE:

Part 1: The basic part number of an AAA valve is fairly simple to understand. The first part is both an operator style and valve operation. This position describes not only how the valve shifts positions but also what shifts the spool.

Part 2: The second portion is the valve port size and body style. This portion describes whether the valve is a threaded side ported body or a bottom bored subplate body.

Part 3: The third part of the part number structure is the spool configuration. Normally only needed on three position valves, the spool configuration defines the flow at center position. You can have a spool other than the standard "Closed Center" on two position valves; however, the transitional flow is normally not needed for most applications.

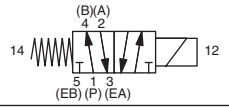
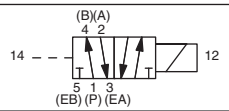
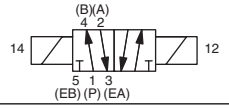
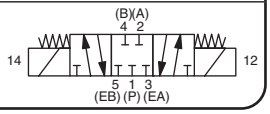
Part 4: The fourth part is the solenoid operator style. AAA valves can have several different coils and operator types. Leaving this position blank will use the common standard coil.

Part 5: The fifth position of the part number structure is used to specify valve options. You can specify different solenoid vents, locking overrides or assembled for "External Pilot" operation by choosing options available for the valve configuration you need.

Part 6: The final position allows you to specify different O-rings used in the main valve body. You choose the O-ring most suited for your application. This specification applies to the body O-rings and not the solenoid or any additional seal materials. On most applications that require special seals, the valve must be configured for "External Pilot".

SS3PGMZ-5-120/60 (Voltage: e.g. 120/60, 24 vdc)

1 Operator Style

Code	Description	Symbol
SO	Single solenoid, 2-position, spring return. Spool returns to position "C" when solenoid is de-energized.	
SR	Single solenoid, 2-position, pilot returned spool. Spool returns to position "C" from auxiliary control valve furnished by the user.	
SS	Double solenoid, 2-position, friction position. Spool shifts and remains shifted when one solenoid or the other is momentarily or continuously energized.	
SY	Double solenoid, 3-position, spring centered. Spool returns to center, position "B", when both coils are de-energized.	

2 Body Style

Side Ported

2 = 1/4" NPTF
3 = 3/8" NPTF
4 = 1/2" NPTF
6 = 3/4" NPTF
8 = 1" NPTF
12 = 1-1/2" NPTF

Subplate Mounted

3P = 3/8" flow
4P = 1/2" flow
8P = 1" flow
16P = 1-1/2" flow

3 Spool Configuration (Normally on 3-position valves, 2-position valves use a closed center spool)

blank = Closed cross over, all ports are blocked in the center position.
D = Regenerative center, ports 2 & 4 are connectect to port 1, ports 3 & 5 are blocked.
G = Float center, port 2 is connected to port 3, port 4 is connected to port 5, port 1 is blocked.

4 Solenoid Operator Form

blank = "Classic" coil with 1/2"-14 NPT conduit connection, with 18" leads.
ED = DIN coil with ISO 4400 connection.
M = Mold-Over coil, with1/2"-14 NPT conduit connection, with 18" leads.
X = Explosion proof solenoid coil.

5 Valve Options

blank = No options selected.
I = Non-threaded spool indicator pin (available only on models with body styles 2, 3 & 3P).
K = Threaded spool indicator pin (available only on models with body styles 2, 3 & 3P).
L = Dust excluder cap.
O = Locking, twist style, manual solenoid override.
ON = Non-locking, twist style, manual solenoid override.
OP = Non-locking, push pin style, manual solenoid override.
OS = Alternate manual spool override (available only on models with body styles 2, 3 & 3P).
T = Tapped solenoid exhaust, 1/8" NPTF.
U = Factory installed muffler/flow controls in ports 3 and 5 (body styles 2, 3 & 4 only).
V = High pressure solenoid, for "Internal Pilot" valves up to 300 psi.
Z = Factory assembled for "External Pilot" operation.

6 Valve O-Ring Option (Only applies to valve body O-Rings)

blank = Viton for body styles 2, 3 & 3P, Buna-N for body styles 4, 6, 8, 12, 4P, 8P &16P.
-1 = Neoprene for freon (-40°F to 225°F).
-2 = Silicon (-80°F to 400°F).
-3 = Viton for most aromatic gases (-20°F to 400°F, 600°F for short time).
-4 = Butyl Rubber (-60°F to 200°F).
-5 = Teflon (-250°F to 450°F).
-7 = Urethane, 70 Durometer (-65°F to 200°F).
-9 = Buna-N (-40°F to 250°F).

GENERAL INFORMATION

"Classic" style solenoid models are assembled for "Internal Pilot" operation; that is, the valves derive shifting pressure for the spool from the valve inlet port. The required pressure to shift the spool is dependent upon the operator style. If the valve must operate at other pressures or vacuum, then the solenoid operator must use an "External Pilot" source at a pressure between 25 PSI to 160 PSI. Valves that require "External Pilot" pressure can be ordered from the factory with the "Z" Option or be converted in the field for "External Pilot" operation.

When using an "External Pilot" source, the maximum pressure of any port is 250 PSI and the maximum vacuum of any port is 28" Hg. A combination of pressure and vacuum on multiple ports is permissible as long as the differential pressure does not exceed 250 PSI.

PREFIX L: LOW PRESSURE SOLENOID VALVES

This option is only available on valves with body styles 2, 3 and 3P. Standard 1/4" and 3/8" valves must use a minimum of 25 PSI on non-spring return models and a minimum of 50 PSI on spring return models. They can be ordered to operate at lower pressures, 15 PSI minimum on non-spring return models and 25 PSI minimum on spring return models. However, shifting response is slightly slower because of the larger volume required to shift the valve (E.g. LSO2 120/60).

OPERATOR STYLE CODE:

SO: Single solenoid, 2-position, spring return. Spool returns to original position when solenoid is de-energized. This operator style will operate reliably on line pressures from 160 PSI down to 50 PSI. If the line pressure is 160 PSI to 250 PSI or less than 50 PSI to 28" Hg, then the solenoid operator must be configured to use an "External Pilot" source.

SR: Single solenoid, 2-position, pilot returned spool. Spool returns to position "C" from auxiliary control valve furnished by the user. This operator style will operate reliably on line pressures from 160 PSI down to 25 PSI. Return shift pressure should be 25 PSI or greater. If the line pressure is 160 PSI to 250 PSI or less than 25 PSI to 28" Hg, then the solenoid operator must be configured to use an "External Pilot" source.

SS: Double solenoid, 2-position, no springs. Spool shifts and remains shifted when one solenoid or the other is momentarily or continuously energized. Standard models are assembled for "Internal Pilot" operation. This operator style will operate reliably on line pressures from 160 PSI down to 25 PSI. If the line pressure is 160 PSI to 250 PSI or less than 25 PSI to 28" Hg, then the solenoid operator must be configured to use an "External Pilot" source.

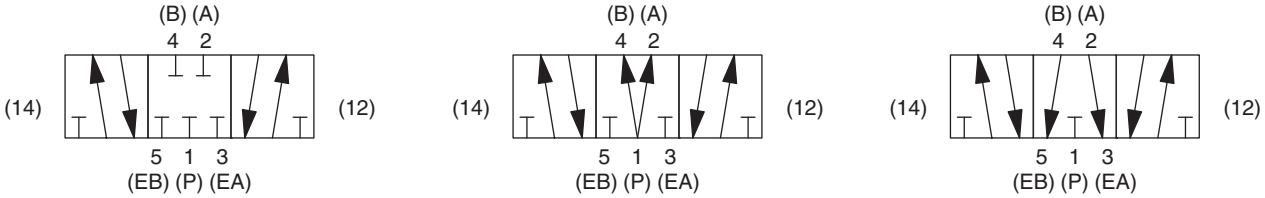
SY: Double solenoid, 3-position, spring centered. Spool is centered when both solenoids are de-energized. Standard models are assembled for "Internal Pilot" operation. This operator style will operate reliably on line pressures from 160 PSI down to 50 PSI. If the line pressure is 160 PSI to 250 PSI or less than 50 PSI to 28" Hg, then the solenoid operator must be configured to use an "External Pilot" source.

BODY STYLE:

SIDE PORTED: Side ported valves can be installed inline. These valves have standard female "National Pipe Threads" to connect directly to installed air lines. The standard pipe sizes are 1/4", 3/8", 1/2", 3/4", 1" and 1-1/2" NPTF.

SUBPLATE MOUNTED: Subplated valves require a mounting base. This mounting base is pre-plumbed to existing control lines. Due to the nature of the plumbing lines fixed to a mounting base, replacing subplate mounted valves is rapid and quick. All port connections, excluding "External Pilot" or "Pilot Return" ports, if used, are made through O-ring sealed holes in the base of the valve through a subplate. O-ring seals and mounting screws are furnished with each subplate valve. Because the connections to a base mount can be of any size and configuration, subplate mounted valves are assigned a designation derived from a basic valve body size. A 3P size subplate valve will have the same flow characteristics as a 3/8" NPTF side ported valve body. Consult factory on the possibility of routing external pilot or pilot return sources through the subplate on body styles 4P and 8P.

SPOOL CONFIGURATION (FOR 3-POSITION VALVES):



STANDARD: Most valves are supplied with a "Closed Center" spool. In the center position, all ports are blocked. If a valve is only a 2-position valve, the actual function of the center position is not critical. So most 2-position valves are "Closed Center". Some designs do require softer transitions, so we offer alternate spool configurations on 2-position valves.

REGENERATIVE: Spool Option "D". In the center position or during transition, ports 2 and 4 are connected to port 1. We call this a "Regenerative" spool since both cylinder ports 2 and 4 are supplied with pressure and flow from port 1.

FLOAT CENTER: Spool Option "G". In the center position or during transition, port 2 is connected to port 3 and port 4 is connected to port 5. We call this a "Float Center" spool since both standard cylinder ports 2 and 4 are vented to an exhaust port and no pressure or flow from port 1 is supplied.

"CLASSIC" SOLENOID OPERATOR FORMS:

"CLASSIC" SOLENOID INFORMATION

The "Classic" coils are a 1/2" Conduit, metal housing style with 1/2" NPT connection, with 18" leads. If no optional solenoid is specified, then the "Classic" coil is used. *Voltage must be specified when ordering.*

Voltages: This chart shows most common voltages. Consult the AAA factory for other voltages which may be available.

Coil Voltage and Frequency	Inrush Current	Holding Current	Resistance
24 volts, 60 Hz	1.72 amps	1.10 amps	5.39 ohms
120 volts, 60 Hz	0.36 amps	0.23 amps	135 ohms
240 volts, 60 Hz	0.18 amps	0.12 amps	546 ohms
6 volts D-C	2.30 amps	2.30 amps	2.4 ohms
12 volts D-C	1.20 amps	1.20 amps	12.8 ohms
24 volts D-C	0.58 amps	0.58 amps	61 ohms

Environmental Ratings: NEMA 1.

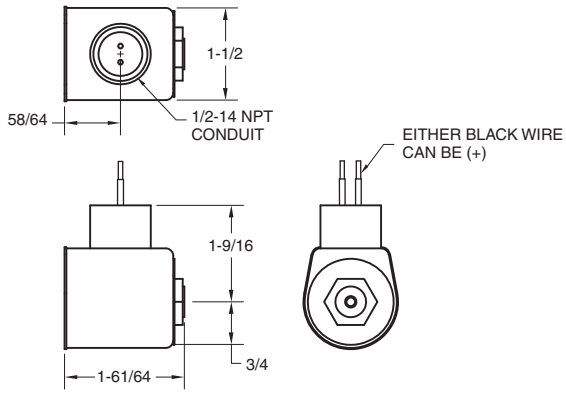
Voltage Tolerance: ±10%.

Resistance Tolerance: ±8% @ 20°C.

Operating Temperatures: -4°F to 120°F.

Casing: Molded steel canister.

Operating Pressures: 29" Hg vacuum - 250 PSIG. Standard models are assembled for "Internal Pilot" operation. They will operate reliably on line pressures from 160 PSIG down to 25 PSIG minimum for no spring models and down to 50 PSIG on spring return and spring centered models. Above 160 PSIG, below minimum pressure and for vacuum service, the valve must be configured for "External Pilot" (Between 50 PSIG and 160 PSIG).



"Classic" Solenoid Operator

Solenoid Seal Material: The internal gasket material is Buna-N, for both the plunger seat and override seal. Consult the factory for seals of other materials.

Mounting Gasket: The gasket that mounts the solenoid stem to the adapter is Buna-N. Additional seals may connect the adapter to the valve body.

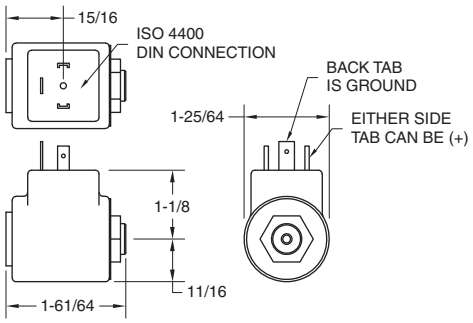
Manual Override: Manual overrides must be specified by using the valve options on page 36 and page 37.

OPTION ED: "DIN" SOLENOID COIL

"Classic DIN" coils have same characteristics and performance as the "Classic" coils, but have an ISO 4400 connection interface. To order solenoid valves with this coil type, use the suffix "ED" (E.g. SO2ED 24 vdc). *Voltage must be specified when ordering.*

Voltages: This chart shows most common voltages. Consult the AAA factory for other voltages which may be available.

Coil Voltage and Frequency	Inrush Current	Holding Current	Resistance
120 volts, 60 Hz	0.36 amps	0.23 amps	135 ohms
240 volts, 60 Hz	0.18 amps	0.12 amps	539 ohms
12 volts D-C	1.20 amps	1.20 amps	9.6 ohms
24 volts D-C	0.58 amps	0.58 amps	38.4 ohms



Classic Style "DIN" Solenoid Operator

Environmental Ratings: (With proper ISO 4400 DIN connection) NEMA 4 and 4X.

Voltage Tolerance: ±10%.

Resistance Tolerance: ±8% @ 20°C.

Operating Temperatures: -4°F to 120°F.

Moulding Material: Duroplast/thermoset resin (Duro).

Operating Pressures: 29" Hg vacuum - 250 PSIG. Standard models are assembled for "Internal Pilot" operation. They will operate reliably on line pressures from 160 PSIG down to 25 PSIG minimum for no spring models and down to 50 PSIG on spring return and spring centered models. Above 160 PSIG, below minimum pressure and for vacuum service, the valve must be configured for "External Pilot" (Between 50 PSIG and 160 PSIG).

Solenoid Seal Material: The internal gasket material is Buna-N, for both the plunger seat and override seal. Consult the factory for seals of other materials.

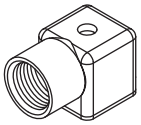
Mounting Gasket: The gasket that mounts the solenoid stem to the adapter is Buna-N. Additional seals may connect the adapter to the valve body.

Manual Override: Manual overrides must be specified by using the valve options on page 36 and page 37.

OPTIONAL DIN CAPS FOR "CLASSIC DIN" COILS

DIN caps are not supplied with "Classic" solenoid valves. These caps must be ordered separately. Below are the DIN caps commonly used.

There are several styles of DIN caps. When ordering LED Indicator type, you must specify voltage of solenoid coil (E.g. EDCL-120/60). All caps listed in table are for ISO 4400, consult factory for additional forms available. LED Indicator type caps are equipped with varistor surge protection (Diode surge protection available upon request).



EDC Cap

Environmental Rating: IP 65.

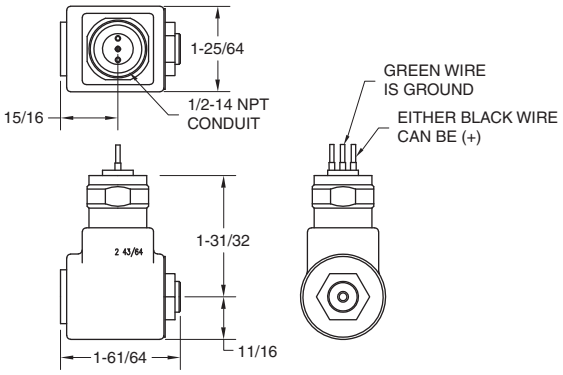
Model No.	Style	LED	Model No.	Style	LED
EDC	**1/2" Conduit**	**no**	**EDCL**	**1/2" Conduit**	**yes**

OPTION M: "CLASSIC MOLD-OVER" SOLENOID COIL

"Classic Mold-Over" coils have same characteristics and performance as the "Classic" coils, but have a molded 1/2"-14 NPT connection with 18" leads that are wired through the connection. To order solenoid valves with this coil type use, the suffix "M" (E.g. SO2M 24 vdc). *Voltage must be specified when ordering.*

Voltages: This chart shows most common voltages. Consult the AAA factory for other voltages which may be available.

Coil Voltage and Frequency	Inrush Current	Holding Current	Resistance
120 volts, 60 Hz	0.36 amps	0.23 amps	135 ohms
240 volts, 60 Hz	0.18 amps	0.12 amps	539 ohms
12 volts D-C	1.20 amps	1.20 amps	9.6 ohms
24 volts D-C	0.58 amps	0.58 amps	38.4 ohms



Classic Style "Mold-Over" Solenoid Operator

Environmental Ratings: (With proper 1/2" NPT connection) NEMA 4 and 4X.

Voltage Tolerance: ±10%.

Resistance Tolerance: ±8% @ 20°C.

Operating Temperatures: -4°F to 120°F.

Moulding Material: Duroplast/thermoset resin (Duro).

Operating Pressures: 29" Hg vacuum - 250 PSIG. Standard models are assembled for "Internal Pilot" operation. They will operate reliably on line pressures from 160 PSIG down to 25 PSIG minimum for no spring models and down to 50 PSIG on spring return and spring centered models. Above 160 PSIG, below minimum pressure and for vacuum service, the valve must be configured for "External Pilot" (Between 50 PSIG and 160 PSIG).

Solenoid Seal Material: The internal gasket material is Buna-N, for both the plunger seat and override seal. Consult the factory for seals of other materials.

Mounting Gasket: The gasket that mounts the solenoid stem to the adapter is Buna-N. Additional seals may connect the adapter to the valve body.

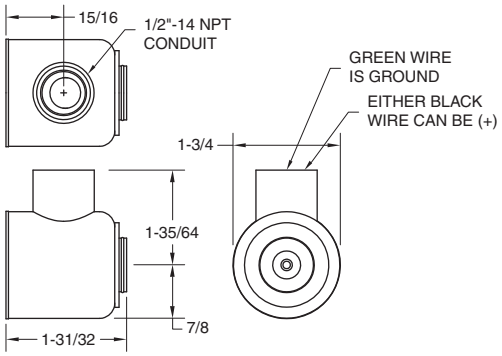
Manual Override: Manual overrides must be specified by using the valve options on page 36 and page 37.

OPTION X: "EXPLOSION PROOF" SOLENOID COIL

All "Classic Explosion Proof" solenoid operators carry the UL label for Class I, Group C and D (Gasoline vapors, etc.), Class II, Groups E, F and G (Coal, coke and grain dusts). The metal housing uses a 1/2"-14 NPT conduit type connection with 18" leads. **Note:** The UL and CSA label on an explosion proof solenoid operator covers only the electrical operator and does not cover the complete valve. To order solenoid valves with "Classic Explosion Proof" operators, add suffix "X" to the basic part number (E.g. SO2X 120/60). *Specify voltage when ordering.*

Voltages: This chart shows most common voltages. Consult the AAA factory for other voltages which may be available.

Coil Voltage and Frequency	Inrush Current	Holding Current	Resistance
24 volts, 60 Hz	1.72 amps	1.10 amps	5.5 ohms
120 volts, 60 Hz	0.36 amps	0.23 amps	135 ohms
240 volts, 60 Hz	0.18 amps	0.12 amps	539 ohms
6 volts D-C	2.30 amps	2.30 amps	2.4 ohms
12 volts D-C	1.20 amps	1.20 amps	9.6 ohms
24 volts D-C	0.58 amps	0.58 amps	38.4 ohms



Classic Style "Explosion Proof" Solenoid Operator

Environmental Ratings: UL label for Class I, Group C and D (Gasoline vapors, etc.), Class II, Groups E, F and G (Coal, coke and grain dusts).

Voltage Tolerance: ±10%.

Resistance Tolerance: ±8% @ 20°C.

Operating Temperatures: -4°F to 120°F.

Casing: Steel.

Operating Pressures: 29" Hg vacuum - 250 PSIG. Standard models are assembled for "Internal Pilot" operation. They will operate reliably on line pressures from 160 PSIG down to 25 PSIG minimum for no spring models and down to 50 PSIG on spring return and spring centered models. Above 160 PSIG, below minimum pressure and for vacuum service, the valve must be configured for "External Pilot" (Between 50 PSIG and 160 PSIG).

Solenoid Seal Material: The internal gasket material is Buna-N, for both the plunger seat and override seal. Consult the factory for seals of other materials.

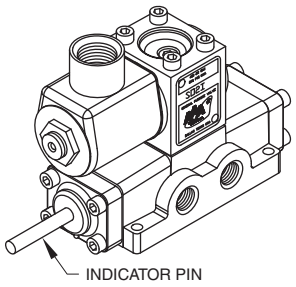
Mounting Gasket: The gasket that mounts the solenoid stem to the adapter is Buna-N. Additional seals may connect the adapter to the valve body.

Manual Override: Manual overrides must be specified by using the valve options on page 36 and page 37.

VALVE OPTIONS:

OPTION I: NON-THREADED SPOOL INDICATOR PIN

Available only on single solenoid, spring return models ("SO") with body styles 2, 3 and 3P. This option allows a pin to protrude through the endcap to indicate the location of the internal spool. This is helpful for actuating a sensor to indicate the shift position of the valve. The pin will retract when the solenoid is energized. The travel of the pin is 18/32". Minimum operating pressure of 70 PSI is required for reliable valve operation.

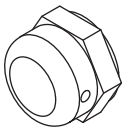


OPTION K: THREADED SPOOL INDICATOR PIN

Same as Option "I", the non-threaded spool indicator pin, but the end of the indicator pin is 1/4"-20x3/4 threaded end. Minimum operating pressure of 70 PSI is required for reliable valve operation.

OPTION L: DUST EXCLUDER NUT

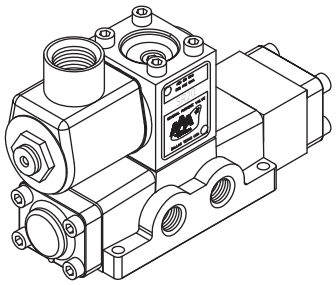
Replaces nut on end of "Classic 1/2" Conduit", "Classic DIN" and "Classic Mold-Over" solenoid coil to reduce entry of dust, water, etc. and reduce sound of exhaust air. Not available on "Classic Explosion Proof" solenoids.



FM-1 Nut

OPTION Q: 2-POSITION SPOOL DETENT

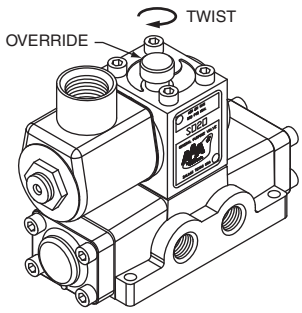
Available only on models SR and SS with body styles of 2, 3 and 3P. This option allows the spool to remain in position when shifting pressure is removed and is most often used in mobile applications where the vibrations may shift the spool when there is no holding pressure available. Overall length of the valve will increase by 1".



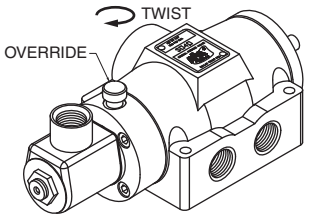
OPTION O: LOCKING MANUAL SOLENOID OVERRIDE TWIST STYLE

Manual override is available on any solenoid operator but is not included unless specified. In case of electrical failure in the control circuit, the valve can be shifted without electricity.

Option "O" designates the standard override as normally used. A knurled knob, operated by hand, physically lifts the poppet off its seat. The knob can be rotated over center and will remain either in the ON or OFF position.



Option "O" on 1/4" Valve



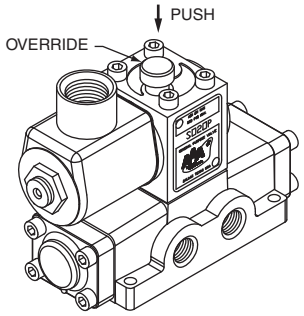
Option "O" on 1/2" Valve

OPTION ON: NON-LOCKING MANUAL SOLENOID OVERRIDE TWIST STYLE

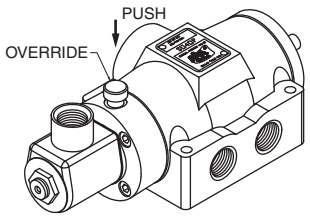
Option "ON" is the same override as "O" except the knob will spring back to the "OFF" position when released.

OPTION OP: NON-LOCKING MANUAL SOLENOID OVERRIDE PUSH STYLE

Option "OP" designates a push style non-locking override. When the knob is pushed in, the poppet is lifted off its seat. This shifts the internal spool and causes a change in air flow through the ports.



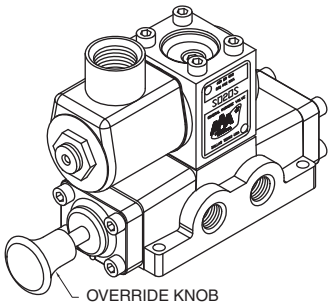
Option "OP" on 1/4" Valve



Option "OP" on 1/2" Valve

OPTION OS: MANUAL MAIN SPOOL OVERRIDE

This option is only available on valves with body styles 2, 3 and 3P. This option designates an alternate method for shifting 1/4" and 3/8" valves. The override knob is attached to the end of the main spool. This type override is most useful on 2-position, no spring models. On valves having springs on the spool, the knob would have to be continuously held. Minimum operating pressure of 70 PSI is required for reliable valve operation.

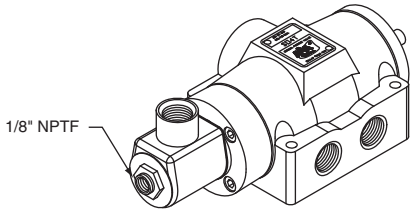


OPTION V: HIGH PRESSURE SOLENOID VALVES

Standard valves must be limited to 160 PSI maximum pressure. However, they can be reconnected for "External Pilot" operation and can operate up to 250 PSI on the main ports provided the external pilot pressure is below 160 PSI (See individual models for details). High pressure solenoids can be furnished for operation on 300 PSI without using external pilot pressure. To order, add Option "V" following standard valve model number. However, shifting response is slightly slower because of the smaller orifice in the operator (E.g. SO2V 120/60).

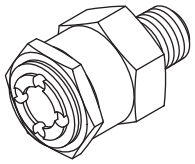
OPTION T: TAPPED SOLENOID EXHAUST

Standard solenoid operators vent pilot exhaust to atmosphere through a small un-threaded hole. A 1/8" NPTF threaded connection can be provided for those applications where the exhaust air or gas must be piped to another area. Sometimes it can be piped into the main exhaust port. To order, add Option "T" to regular valve model number (E.g. SO4T 120/60).



OPTION U: EXHAUST FLOW CONTROLS

Available only on body styles 2, 3 and 4. A Model MFC flow control, listed on page 146, is screwed into each exhaust port, giving meter-out speed control of an associated air cylinder or air motor in both directions of travel. MFC flow controls not only give adjustable speed control but have a built-in muffler to reduce exhaust noise.



MFC Flow Control

OPTION Z: "EXTERNAL" PILOT OPERATION

A valve may be ordered factory assembled for "External Pilot" operation by adding the Option "Z" after the regular model number. 3/8" and 1-1/2" subplate valves are manufactured so the pilot source can **NOT** be provided through the mounting subplate base. On 1/2" and 1" subplate valves the pilot source can be routed through a pilot ported subplate. On all side ported valves, a pilot source must be provided to each solenoid operator.

OPTIONAL O-RING MATERIALS:

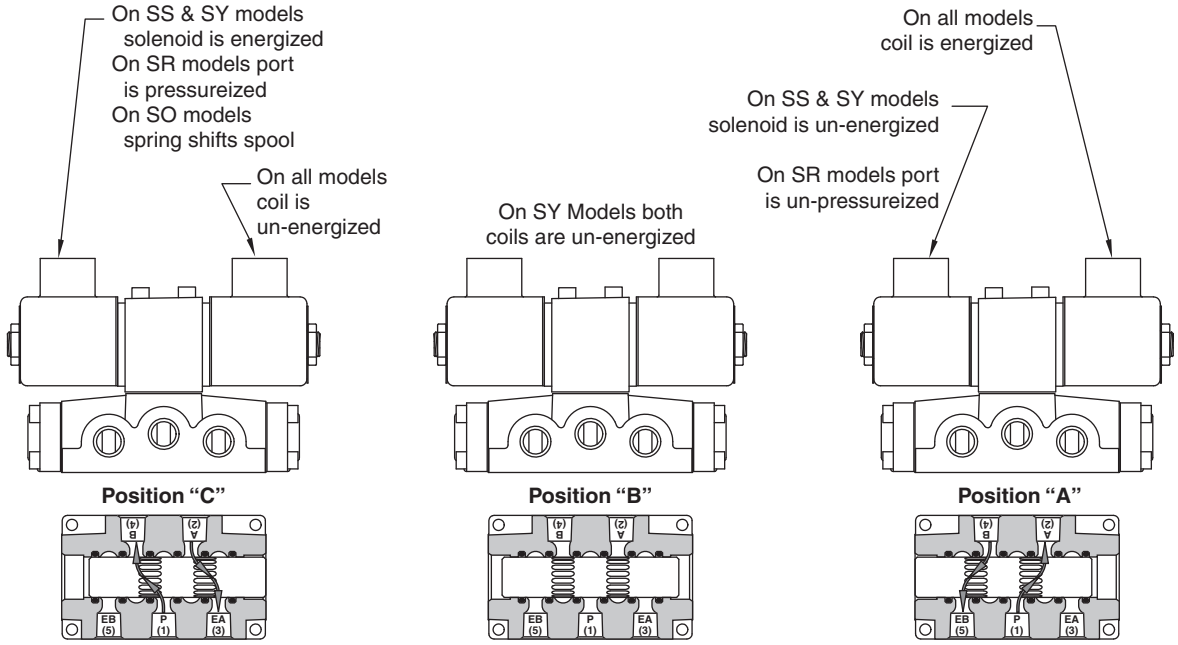
Unless otherwise specified, all 1/4" and 3/8" soft seal valves come standard with Viton O-rings and all 1/2", 3/4", 1", 1-1/2" and 2" soft seal valves come standard with Buna-N O-rings. If a different material is required, use the dash numbers following the basic valve numbering code. In the example, model RY3G-2 will have Silicon O-rings installed for a low temperature application. On valves larger than 1", consult factory on availability of O-ring materials.

Dash No.	O-ring Description	Temperature Rating
-1	Neoprene for freon	-40°F to 225°F
-2	Silicon	-80°F to 400°F
-3	Viton for most aromatic gases	-20°F to 400°F, 600°F for short time
-4	Butyl Rubber	-60°F to 200°F
-5	Teflon	-250°F to 450°F
-7	Urethane, 70 Durometer	-65°F to 200°F
-9	Buna-N	-40°F to 250°F

We are constantly researching O-ring materials to evaluate performance and durability in the AAA valve product line. Above is a compilation of the most commonly requested O-ring materials and the associated dash number. If you have a particular application that requires an O-ring material that is not listed, please contact us. Since we utilize standard O-ring dimensions in our valves, we can respond to the most obscure O-ring material request.

Note: On "Classic" solenoid model valves, the solenoid operator plunger seat is Buna-N. Solenoid operators must be externally piloted when using gases not compatible with seal material. Consult factory for special plunger seat material.

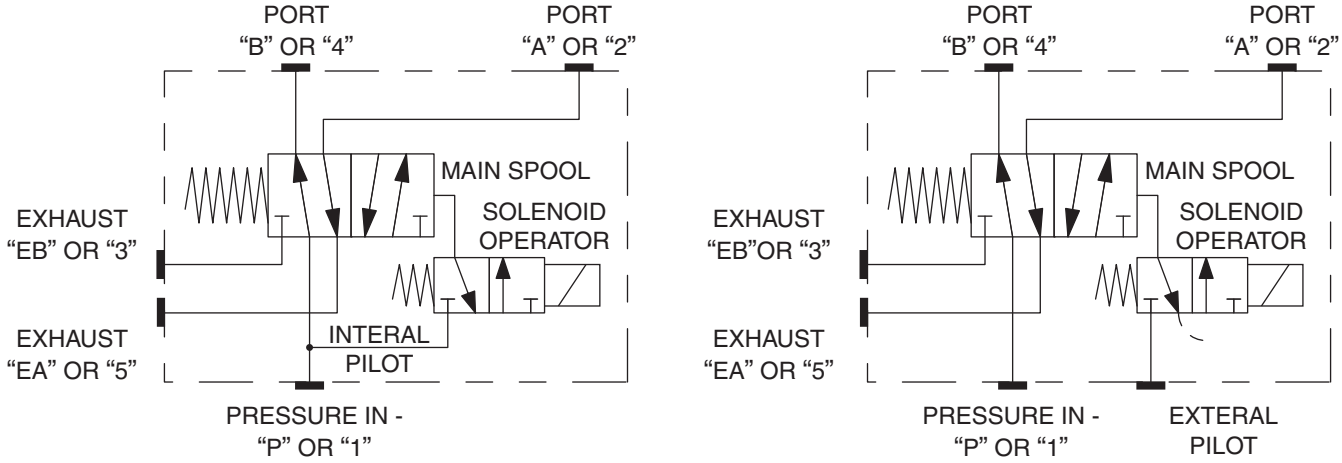
FLOW PATTERN:



1/4" through 1": When a solenoid is energized causing the internal spool to shift, port 1 will connect to the port closest to the energized coil. The furthest port will connect to the appropriate exhaust port.

1-1/2" and 2": These larger valves use a "Piggy-Back" valve mounted to the top of the larger valve. When a solenoid is energized causing the internal spool to shift, port 1 will connect to the port closest to the energized coil. The furthest port will connect to the appropriate exhaust port.

INTERNALLY AND EXTERNALLY PILOTED SOLENOID VALVES:



The diagram shows how AAA solenoid valves obtain their shifting power by tapping into the valve inlet inside the valve itself. If inlet pressure is above or below the limits stated by the operator style code, the valve must make use of an outside source of shifting power. It should be factory ordered with suffix "Z" following the regular model number and will be furnished with the electric operator connected to an external pilot pressure port as shown in the diagram above (E.g. ESO4Z 24 vdc).

CONVERTING TO EXTERNAL PILOT OPERATION:

A valve may be ordered factory assembled for "External Pilot" operation by adding the suffix "Z" after the regular model number; or can be changed to "External Pilot" operation in the field as follows (This operation must be performed on each solenoid operator.)

Remove 4 screws holding the solenoid structure to the main body and remove the entire solenoid assembly. Leave gasket as is and rotate the entire solenoid assembly 180° and re-mount on the body. Remove 1/8" plug and connect a source of external pilot pressure, 50 PSI to 160 PSI, to the external pilot port of each solenoid structure. Stamp the name tag with a "Z" to indicate "External Pilot" operation. External pilots can **NOT** be brought through the subplate on field conversions.

LIMITATIONS ON VACUUM OPERATION

The five main ports on AAA valves can be operated on industrial vacuum to 28" Hg, based on a 30" barometer. O-rings between all ports give tight sealing. While AAA valves are basically 4-way, they can be used for 3-way service by plugging the unused port 2 or 4.

To use solenoid controlled models for vacuum service, they must be ordered with Option "Z" or field converted for "External Pilot" operation. An external source of air pressure, 50 PSI to 160 PSI, must be available for pilot pressure. Field conversion is explained with each model listing.

INTERNALLY PILOTED SOLENOID VALVE TESTING

Standard solenoid models are assembled for "Internal Pilot" operation; that is, they derive shifting pressure for the spool from the valve inlet port. When testing an internally piloted solenoid valve, do not let air free flow through the cylinder port. This flow is normally so great, that back pressure to shift the spool can not be adequately generated. To test an internally piloted valve, either plug the cylinder port, place a muffler in the cylinder port or attach the cylinder port to a short piece of hose to generate a slight back pressure to shift the valve.

MOUNTING OF VALVES

AAA valves may generally be mounted in any position. But for safety, any valve which does not have springs or detents to hold the spool in position should be mounted with the spool horizontal unless pressure is continually applied to hold the spool in position.

AIR FLOW RATINGS AND VALVE SHIFT TIME:

Test for the determination of flow-rate characteristics conforms to ISO 6358, *Pneumatic fluid power - Components using compressible fluids - Determinations of flow-rate characteristics*. These tests were conducted on AAA valves at the Fluid Power Institute Testing Laboratories of the Milwaukee School of Engineering.

RATED FLOW. Flow factor tests were made with the valve outlet vented to atmosphere and flow in the sonic region. The average flow factor was calculated from tests over a range of inlet pressures. The factor was then used to calculate expected flow at 100 PSIG. Cv values were calculated by graphing the flow (scfm) versus the square root of change in pressure across the valve. A line was fitted to this graph and the resulting slope is the Cv value. Cv uses the theoretical flow (scfm) through the valve when the differential pressure between the inlet and outlet is equal to 1 psi. **We have never lost an application based on either flow or durability**.

Rated Flow

Body Style	2	3	4	6*	8*	12*
Port Size	1/4"	3/8"	1/2"	3/4"	1"	1-1/2"
SCFM Flow	73.9	97.1	215.0	446.9	477.7	1627
Cv Factor	1.6	2.4	5.0	10.4	11.1	37.8

*Tested before the published ISO standards. Cv's were calculated using previous data.

SCFM flow in the above table was calculated for 70 PSIG then converted to 100 PSIG (114.7 PSIA) inlet pressure. At other inlet pressures, SCFM flow will be in proportion to PSIA inlet pressure.

Example: Size 3P at 80 PSIG (94.7 PSIA) inlet pressure.

Ratio of 94.7 to 114.7 is 94.7 ÷ 114.7 = 0.826

Flow at 80 PSIG = 0.826 x 97.1 = 80.2 SCFM.

RESPONSE TIME. With the valve initially shifted to communicate 150 psi inlet pressure to a blocked cylinder port the total elapsed shifting time was measured between the instant of energization of the opposite solenoid and build up of 90% of full steady state flow in the other cylinder port, which was vented to atmosphere. The result is a measure of the "Blocked to Open Shift Time".

In another test, with the valve initially shifted to a port which was vented to atmosphere, the total elapsed time was measured between the instant of energization of the opposite solenoid and build-up of 90% of full steady state pressure in the other cylinder port which was blocked. The result is a measure of "Open to Blocked Shift Time":

Response Times in Milliseconds

Body Style	2	3	4	6	8	12
Blocked*	91.0	95.0	74.2	147	147	147
Open†	80.0	67.5	67.5	152	170	105

*Blocked to Open response time.

†Open to Blocked response time.

These test were made over a range of 50 to 150 psi.

The shifting time is quite satisfactory for almost all applications, but for faster response a larger orifice can be supplied on special order.

SEAL KITS:

ERKV-3: One kit required for each 1/4" or 3/8" valve. Includes six V-39 Viton body O-rings, two EMG3 Buna-N solenoid gaskets, two ECG3 composition end cap gaskets, two V-565 Buna-N Namur mounting O-rings, one PBG3 gasket, one PBG3-1 gasket, five V-92 Buna-N subplate O-rings and two V-93 Buna-N subplate pilot O-rings (Seals used determined by valve model and style).

ERKV-4: One kit required for each 1/2" valve. Includes six V-6 Buna-N body O-rings, two EMG3 Buna-N solenoid gaskets, two ECG48 composition end cap gaskets, five V-110 Buna-N subplate O-rings, two V-29 Buna-N subplate pilot hole O-rings (Seals used determined by valve model and style).

ERKV-8: One kit required for each 3/4" or 1" valve. Includes six V-30 Buna-N body O-rings, two EMG3 Buna-N solenoid gaskets, two ECG48 composition end cap gaskets, five V-90 Buna-N subplate O-rings, two V-89 Buna-N subplate pilot hole O-rings (Seals used determined by valve model and style).

ERKV-16: One kit required for each 1-1/2" or 2" valve. Includes six V-123 Buna-N body O-rings, two V-124 Buna-N end cap O-rings, two V-89 Buna-N end cap pilot O-rings, five V-125 Buna-N subplate O-rings, two V-89 Buna-N subplate pilot O-rings (Seals used determined by valve model and style). To repair piggy back valve, use ERKV-3.

RKPSV-1: Pilot solenoid repair kit for "Classic" solenoids. Includes one V-49 plunger, one V-50 spring, one V-61 O-ring. Use one kit for each solenoid on all sizes soft seal and stack sections with "Classic", explosion proof, "DIN" or "Moldover". To repair both main body and solenoid operator(s) order one kit for each solenoid on the valve, plus appropriate body kit from listings above

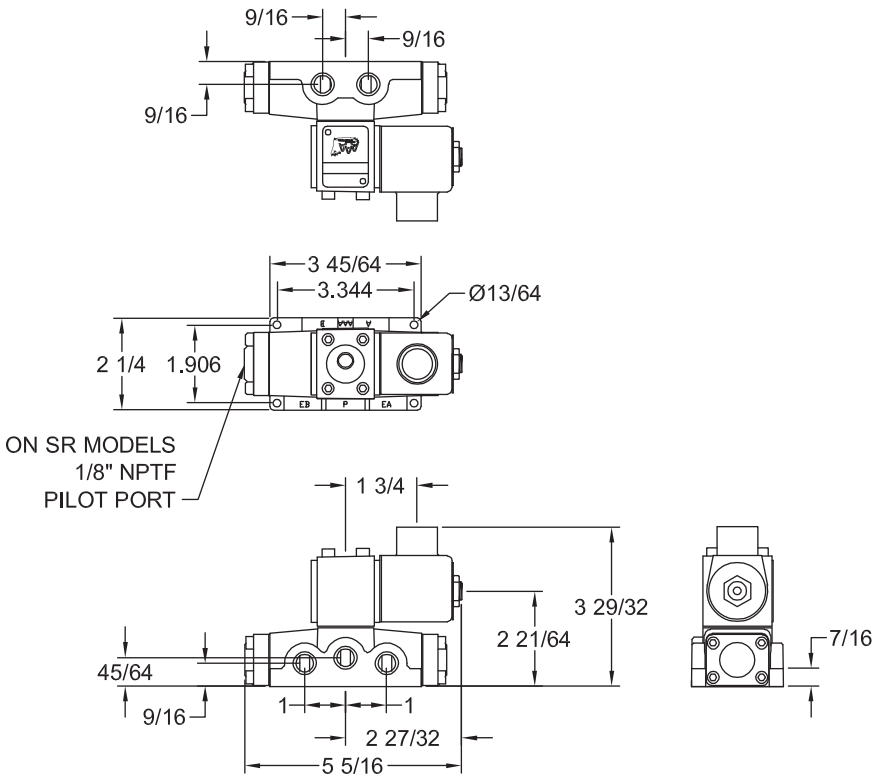
VGK-3: AAA valve grease to lubricate body O-rings during valve overhaul (Each seal repair kit does supply enough grease for complete seal replacement).

REPLACEMENT COMPONENTS:

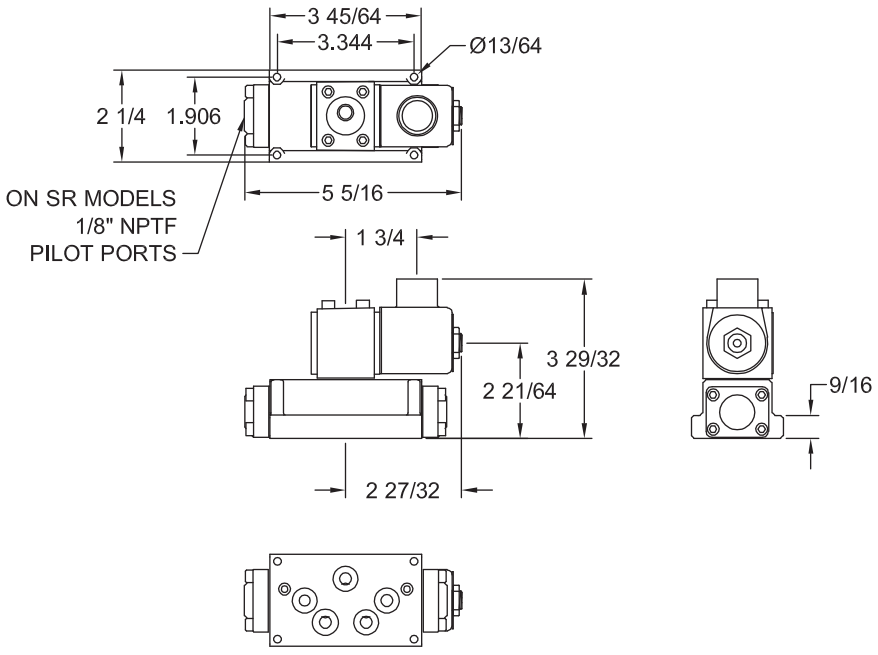
Consult Factory. All AAA valves are designed for rugged applications. But sometimes unforeseen damage does occur. Please contact us for broken items, tired springs or any other component that appears to be working less than optimum.

SEMI-DIMENSIONAL DRAWINGS:

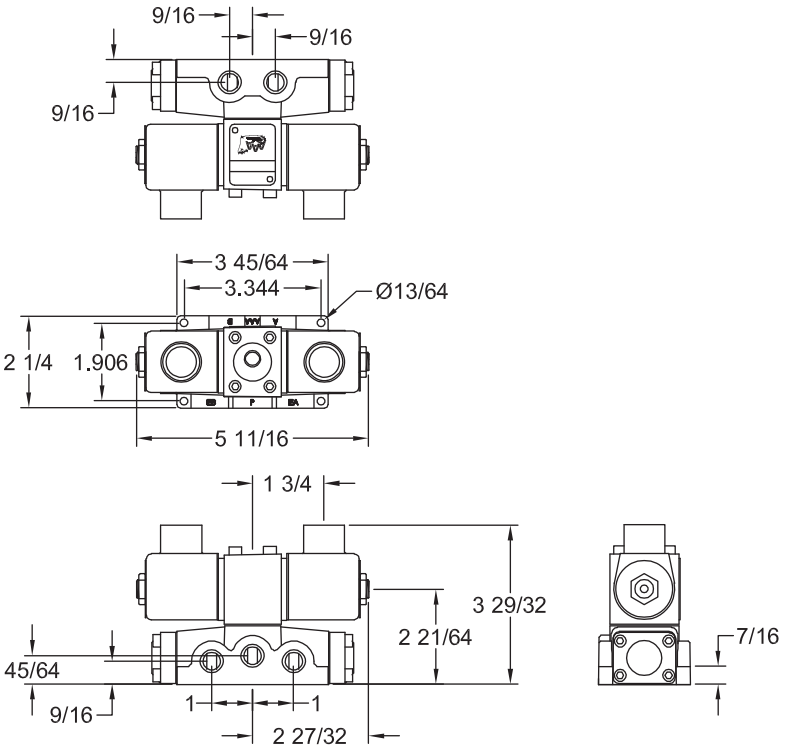
MODELS: SO2, SR2, SO3 & SR3



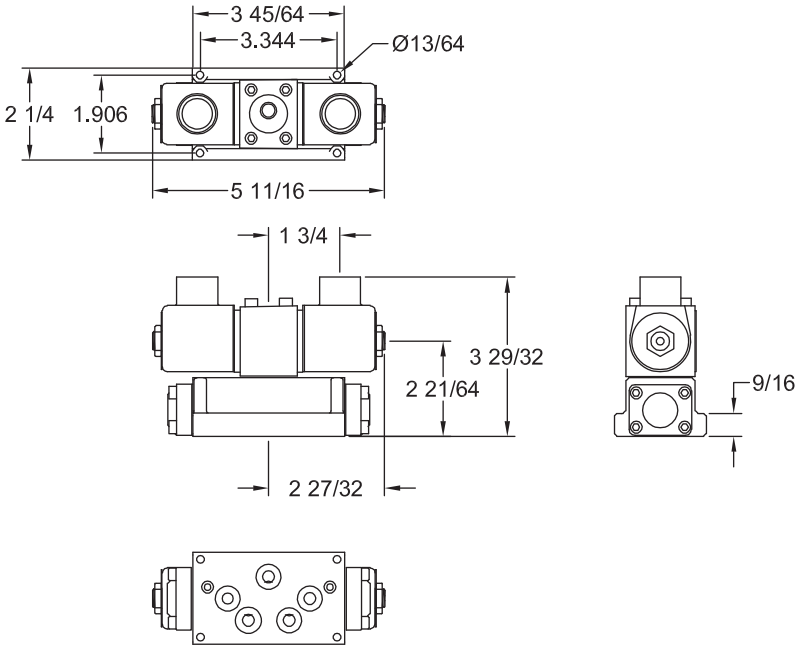
MODELS: SO3P & SR3P



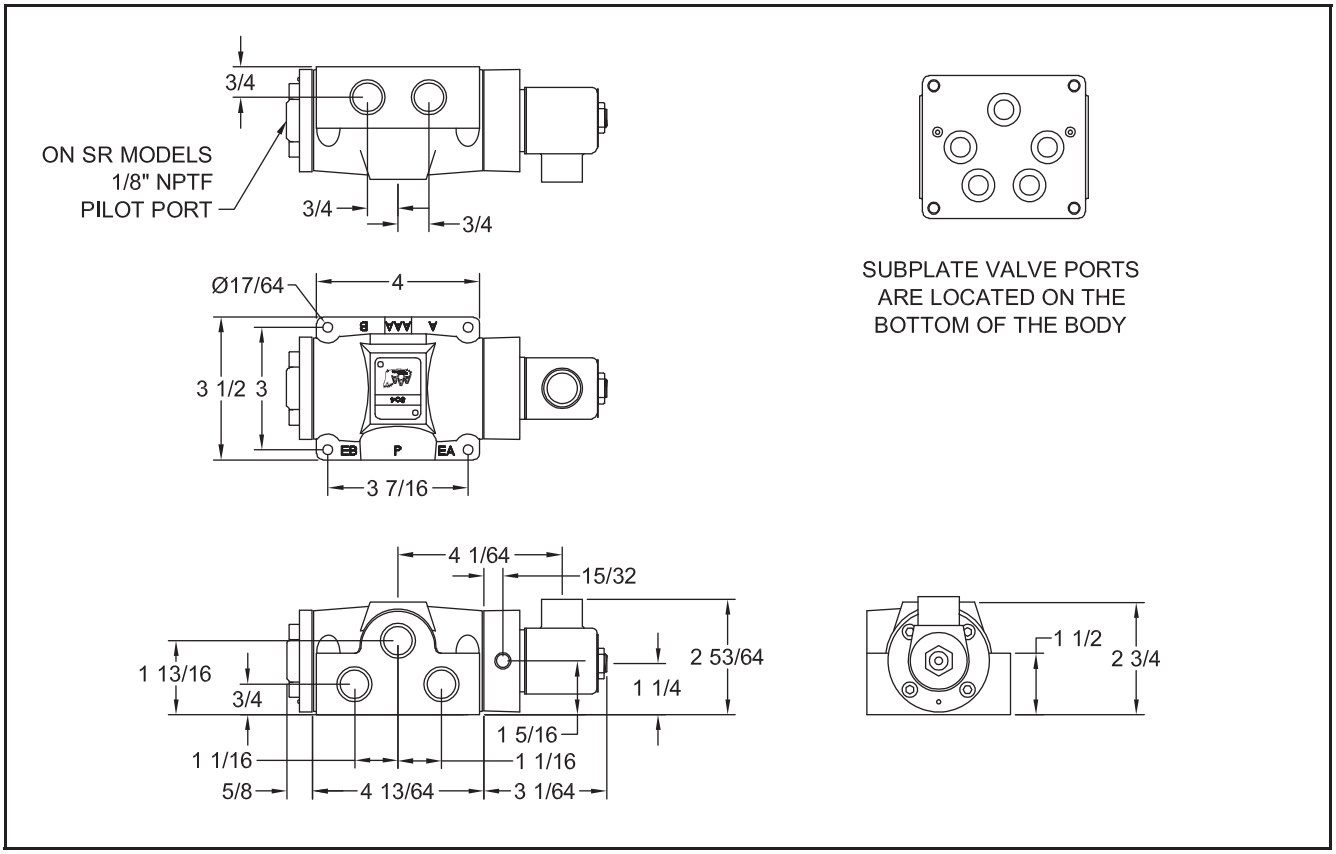
MODELS: SS2, SY2, SS3 & SY3



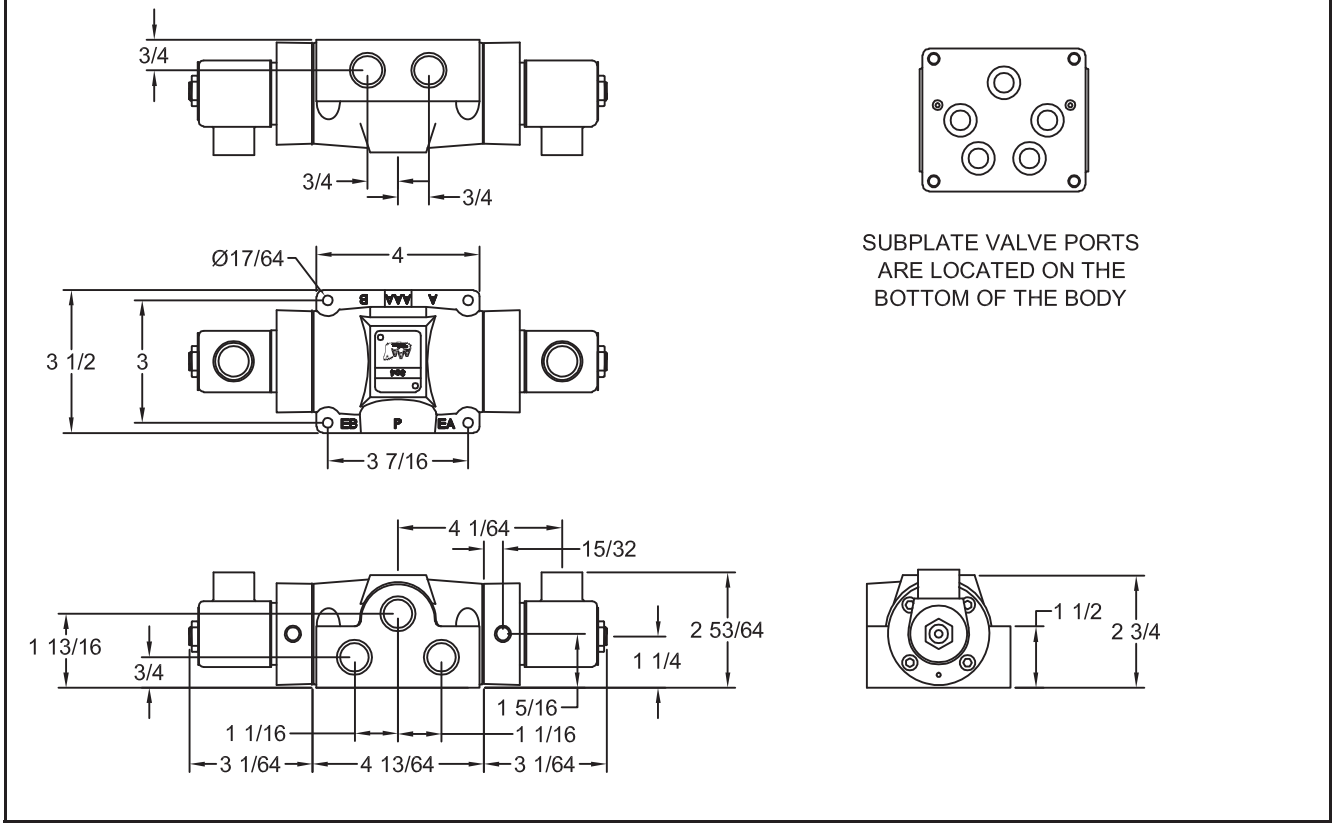
MODELS: SS3P & SY3P



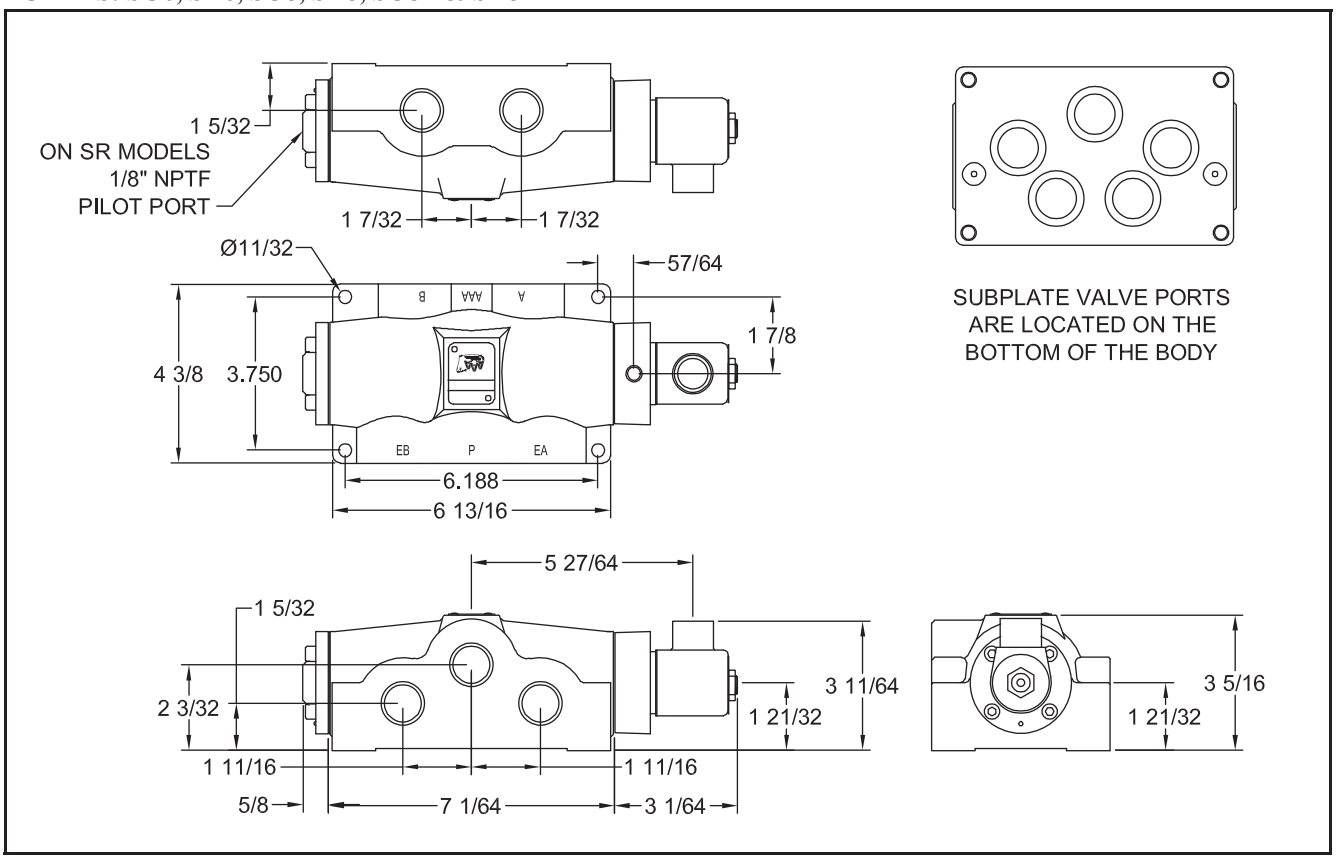
MODELS: SO4, SR4, SO4P & SR4P



MODELS: SS4, SY4, SS4P & SY4P



MODELS: SO6, SR6, SO8, SR8, SO8P & SR8P



MODELS: SS6, SY6, SS8, SY8, SS8P & SY8P