

**ROSS CONTROLS
FLUID POWER PRODUCTS
FOR PNEUMATIC
SOLUTIONS**

FLUID POWER PRODUCTS FOR PNEUMATIC SOLUTIONS



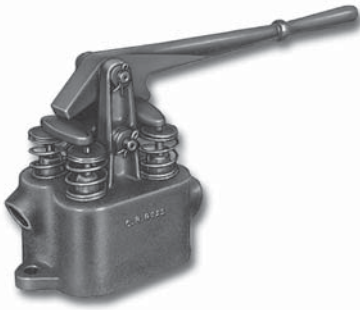
Consider it **DONE!**

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This catalog represents an overview of ROSS' extensive product line. If you need products or specifications not shown within this catalog, please contact ROSS for more information or visit ROSS website at www.rosscontrols.com.

Revolutionizing Fluid Power



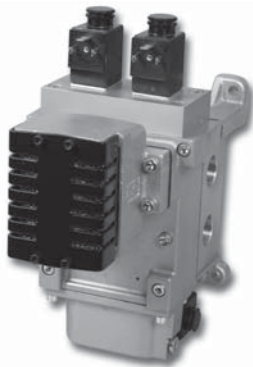
Chevrolet engine tappets, springs, and retainers were the ingredients that Charlie Ross used to make the first poppet valve after a fire destroyed Detroit Seamless Steel Tube Company in 1917. Charlie, a master mechanic, needed to resume production in a hurry and could not wait for shipments of replacement valves from Europe. Soon after, he filed his first patent and in 1921, Charlie Ross, StClair Cameron and four others incorporated the Ross Operating Valve Company.

Today, ROSS CONTROLS® proudly continues as a private company owned by the Cameron family and the ROSS spirit of ingenuity and appreciation for state-of-the-art designs still flows through its corporate culture. Our focus is to be a formidable competitor in key industries where technology offers ROSS® customers a distinct advantage.

ROSS customers are the experts in determining and communicating their fluid power product requirements. Instead of inventing “push” products that ROSS thinks its customers want, ROSS listens to our customers as they “pull” ROSS into new fluid power applications. With our unique customer-driven ROSS/FLEX® development process, ROSS is revolutionizing the fluid power industry.

ROSS CONTROLS® is an international company. Our design process of making unique and tailored products is in demand around the globe. ROSS is ISO 9000 certified and has facilities and/or sales offices in the United States, Germany, Japan, the United Kingdom, India, Brazil, France and China, augmented by 145 stocking distributors worldwide to serve customers locally.

Visit the ROSS website at www.rosscontrols.com to fully explore premium pneumatic controls systems, services, and distributor channels. ROSS is dedicated to developing matchless pneumatic system solutions to improve the efficiency and effectiveness of customers’ equipment and operations. With outstanding design, sales, service, and highly trained worldwide distributor network, ROSS has a GLOBAL Reach with a LOCAL Touch ready to provide customers with its very best anywhere. ROSS is ready to serve YOU!



50 Years of Success for the Pneumatic Lockout and Exhaust Valve!



2013 marks the 50th anniversary for ROSS’ pneumatic energy isolation L-O-X® valve series.

All of ROSS’ safety products meet or exceed the global safety requirements for machine safeguarding and energy isolation.

ROSS’ global safety team can assist with system and product selection and provide solutions that help customers standardize globally.



• **Manufacturers of Premium Pneumatic Controls since 1921** •

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



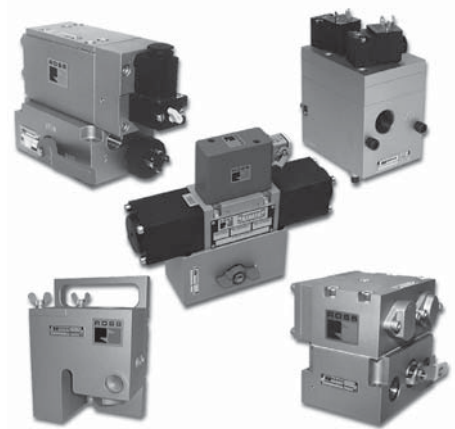
Industry Solutions

Visit the ROSS web site at www.rosscontrols.com to fully explore the premium pneumatic and electronic controls systems, services, and distributor channels.

ROSS is dedicated to developing matchless pneumatic, electronic, and/or hydraulic system industry solutions to improve the safety and effectiveness of customers' equipment and operations.

Glass Container Machines

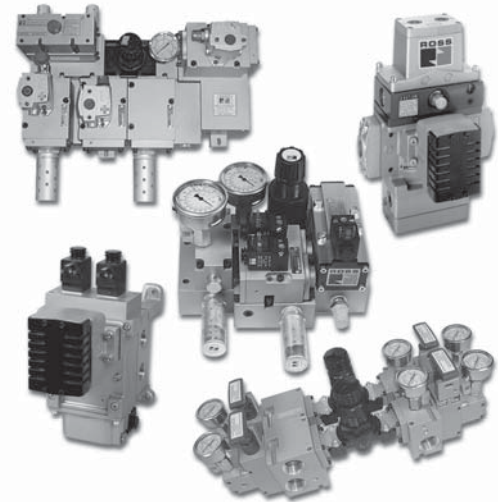
- Valves designed for repeatability
- Counterblow vacuum valves
- Hi/low pressure valves
- Plunger up/down & cooling valves
- Blowhead on/off valve including kickoff
- Mold open/close valves
- Pusher valves
- Blow mold vacuum valves
- Final blow Slimline™ valves with quick exhaust or pressure booster options
- All designed for high temperature service
- Blow pistol valve
- Proportional valves for plunger and blowing applications
- Unbeatable poppet technology for high shift consistency
- Systems, circuits & products which substantially reduce piping, fittings, maintenance, downtime, labor cost, & compressed air usage



For details, visit the [Glass Container Industry page at www.rosscontrols.com](http://www.rosscontrols.com).

Press Metalforming Products

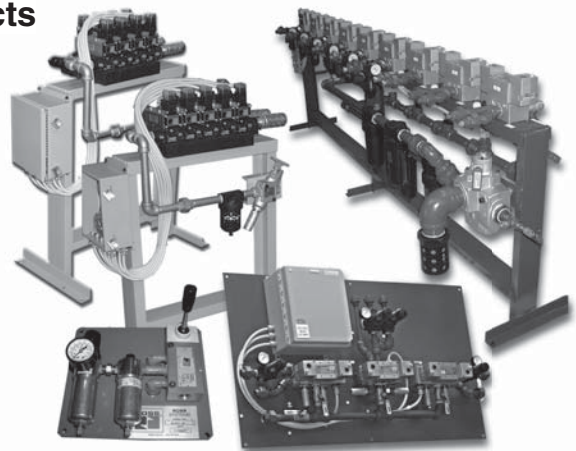
- Pneumatic double valves for clutch/brake control
- 4-way double valves for clamp cylinder control
- Soft Clutch and Soft Brake modules
- Modular Press Solutions
- Custom pneumatic manifolds
- Air distribution manifolds
- Automation valve manifolds
- Die Cushion manifolds
- Lockout valve manifolds
- Main air filter and lockout devices
- Efficiently designed systems to eliminate piping connections, ease installation, reduce procurement costs, simplify troubleshooting, save energy, reduce downtime, improve appearance and consolidate space



For details, visit the [Metalforming Industry page at www.rosscontrols.com](http://www.rosscontrols.com).

Steel Industry & Primary Metals Processing Products

- Valve stands, panels & enclosures
- High flow, dirt tolerant valve accessories
- High flow FRL's
- Proportional pressure controls for tension rolls
- 1/8"-3" NPT, metric & SAE threads
- Rugged construction
- Complete integrated systems
- Entry & exit systems on mills & process lines
- Water valve control for cooling & descaling
- High speed valves for brake control
- Control of inert gases to approximately 10 Bar
- High flow, dirt tolerant base mounted & in-line poppet valves



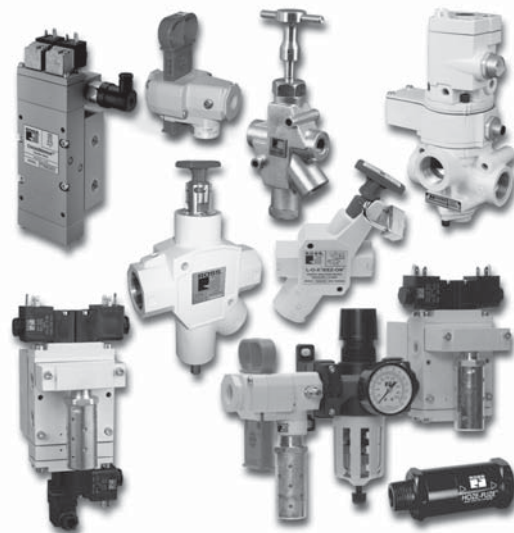
For details, visit the [Steel Industry page at www.rosscontrols.com](http://www.rosscontrols.com).

Industry Solutions

Safety Products

- Control Reliable 3/2 and 5/2 pneumatic valves with BG certification
- Pneumatic internally monitored double valves for safety applications
- Control Reliable double valves
- Manual and solenoid L-O-X® valves for energy isolation
- EEZ-ON® valves for gradual start-up
- Manual L-O-X® valves with EEZ-ON® operation
- Modular L-O-X® air entry combination
- Stainless Steel L-O-X® valves for energy isolation
- Sensing valves Category 2 In-line valves
- Pilot operated check valves (single/double channel sensing available)
- Check valves
- Safety Clamping Devices
- HOZE-FUZE® to prevent hose whip
- Silencers & reclassifiers
- Lockout verification accessories

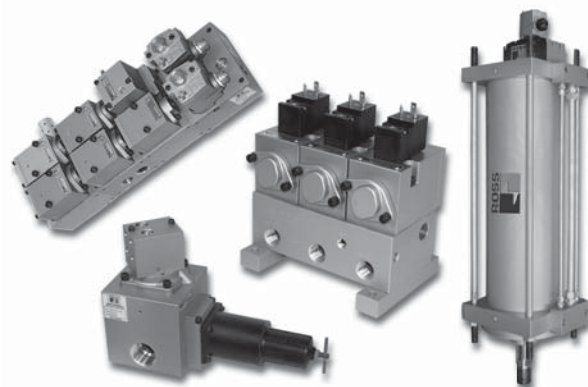
For details, visit the Safety Industry page at www.rosscontrols.com.



Aluminum Reduction

- Smelter-Duty valves and cylinders
- ENERGYSAVER® Crustbreaker valves, cylinders and systems
- Point Feed, Ore Feed and Bar Break System Solutions
- Door opening
- Overhead crane
- Pot Tapping
- Anode Forming
- Casthouse
- Pneumatic Conveying
- PTM (Pot Tending Machine) Controls
- Safety Systems

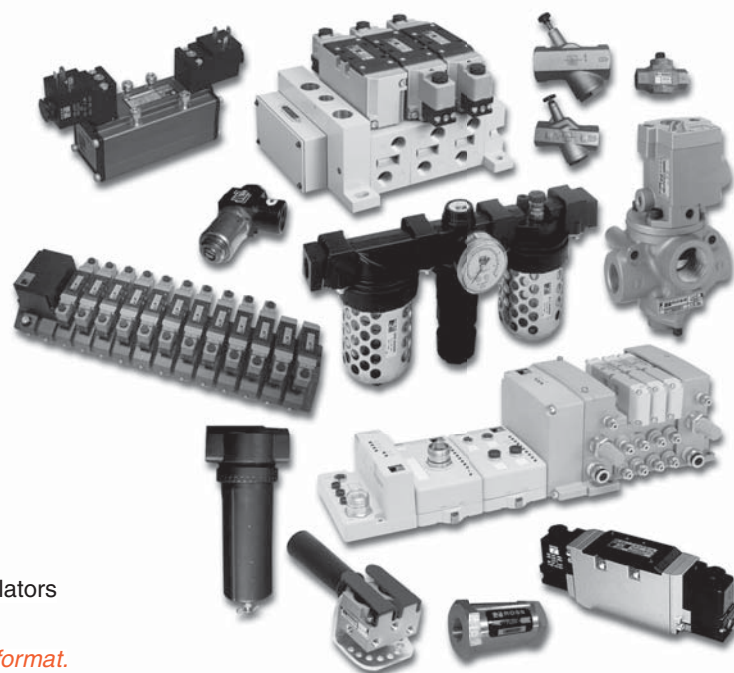
For details, visit the Aluminum Industry page at www.rosscontrols.com.



General Automation Products

- Line-mounted valves
- ISO, ANSI, SAE base mounted valves
- ENERGYSAVER® valves
- Flow control valves
- Check valves
- Pendant control valves
- Manual L-O-X® valves
- EEZ-ON® valves
- Filters, regulators and lubricators
- High-flow reverse flow regulators
- High capacity water & particulate filters
- Silencers
- Mechanical valves
- Pilot operated valves
- Pilot operated check valves
- Dale Series poppet, manifold and leak tight valves
- Serial BUS systems
- Pneumatic relief valves
- Vacuum valves
- Right angle pilot operated checks, EEZ-ON® valves, & regulators
- Foot & hand valves

Visit www.rosscontrols.com to download our literature in PDF format.



ROSS/FLEX® Process For Innovative Solutions

ROSS/FLEX® Is Not a Product Line

The ROSS/FLEX® process is a manufacturing culture. Its goal is to help you reduce costs while increasing the practical value of your air controls and pneumatic systems. It puts the power back where it belongs: In the hands of the customer!

As a customer, we believe you have every right to receive a product that is precisely suited to your needs - both functional and financial.

If you're building a machine that requires six different air controls, and the design could be improved by having a single, six-function control – then that's what you should have.

That is why we created the ROSS/FLEX® service.



It's an innovative and economical process of involving the customer in the design of pneumatic controls for their application.

A Creative Resource for Total System Solutions

ROSS brings you into the process, to produce better solutions for your pneumatic applications. ROSS/FLEX® supports your goals and specifications with a specially-trained and equipped design engineering team and a fully-automated manufacturing system that is truly "state-of-me-art." The net result is a unique system solution, manufactured to your requirements and developed to your schedule. It's a special approach, involving some very unique capabilities which are available today, only at ROSS.

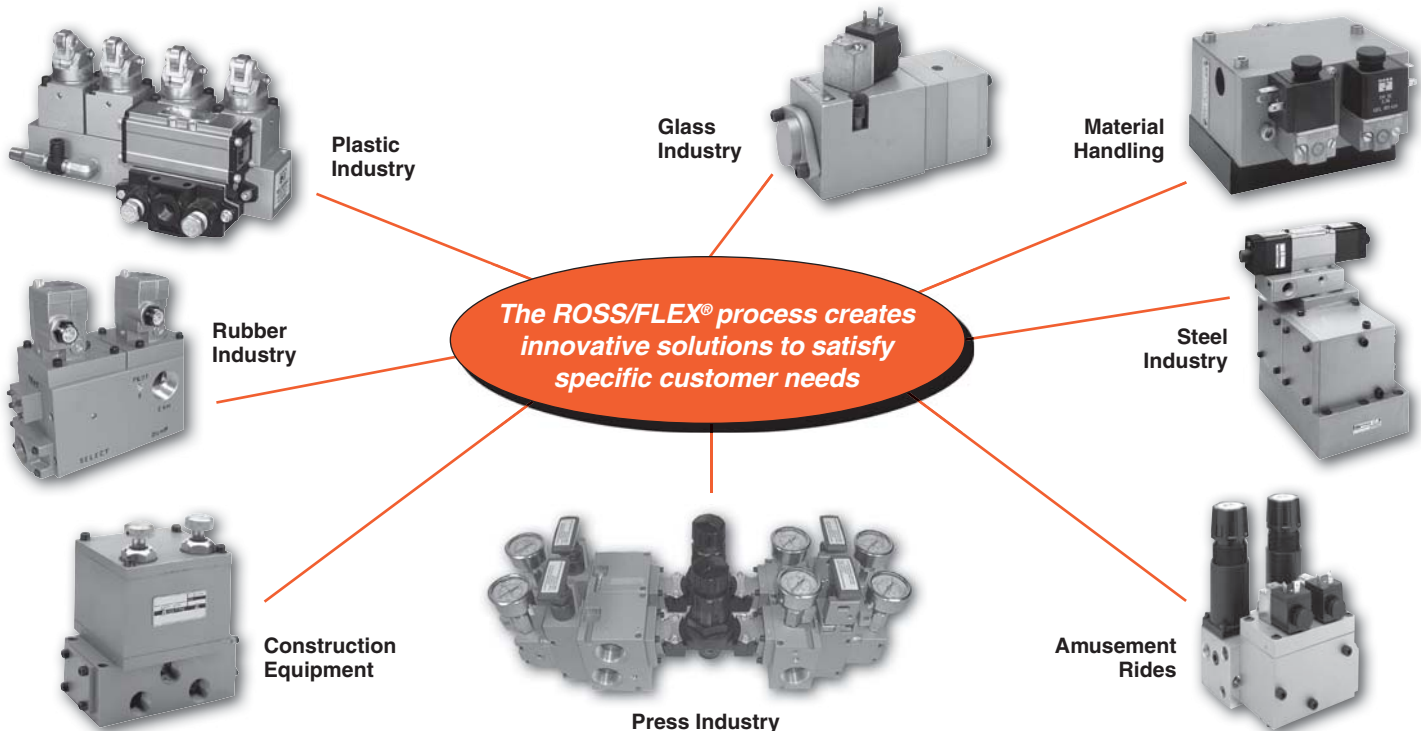
The underlying concept is simple. Using a custom-designed product is better than force-fitting run-of-the-mill products to your application.

The cost. It used to involve an army of engineers, designers, production planners, machinists, and others. It often meant new equipment, special tooling, new materials, or other manufacturing costs.

ROSS/FLEX® technology eliminates those costs and dramatically reduces the time required to develop a solution. Designing, prototyping, testing, revising, prototyping, testing – It all took time, and the sequence could continue through endless repetitions.

The ROSS/FLEX® service can deliver concept drawings and a working prototype in a timely manner. Revisions are also done in a timely fashion.

And there are no worries about being tied to one supplier for integration with all your other units as the ROSS/FLEX® service can design and manufacture for compatibility with any brand. In addition, all the working components are proven ROSS parts – available worldwide from ROSS and its distributors.



ROSS Integrated Systems

ROSS Offers Custom Design, Manufacturing and Support of Complete Valve Systems

ROSS offers engineering and construction of Valve Stands, Wall Mounted Plates or Enclosed System Panels to allow quick and easy installation at the job site.

Services Provided:

- Systems Engineering
- Controls Engineering
- Custom Fabrication
- Installation Assistance
- Integrated ROSS Components into a Engineered System Solution

Valve Stands

Free standing valve stands provides a flexible way to isolate and position a group of valves near the tooling.

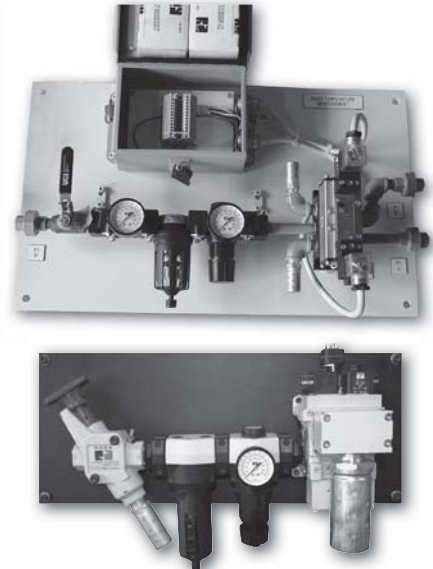


ROSS – Providing more than just components



Wall or Plate Mounted Systems

Connect the unit to the tooling then pipe in the air supply and discharge lines.

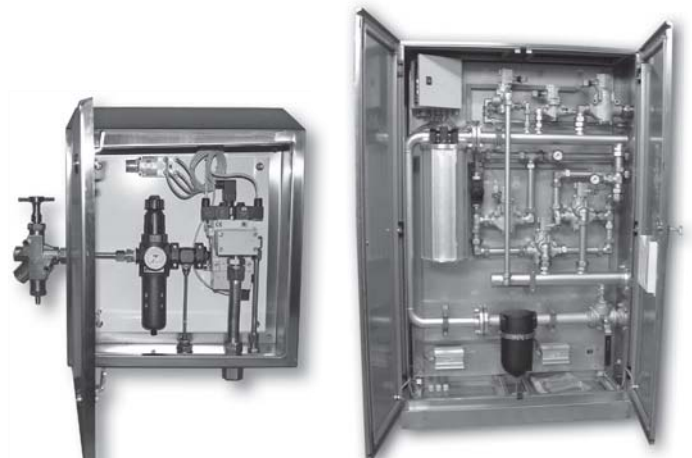


Enclosed System Panels (Cabinets)

ROSS provides custom systems with enclosed panels for harsh or hazardous conditions. Enclosed-panel designs help protect system components by eliminating the risk of contamination from the surrounding environment.

Features and Benefits:

- Available with locking cabinets for restricted access
- Customized with a wide range equipment to meet the needs of an “Any” application
- Customized in a variety of shapes and sizes, based on surroundings and space availability



ROSS can offer the right configuration for your specific needs.

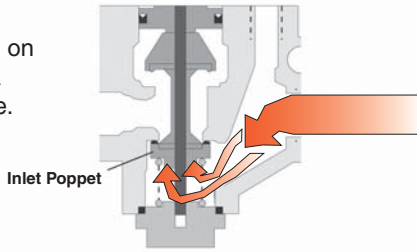


The ROSS Poppet Valve . . . A ROSS Speciality from the Beginning

Positive Sealing

Inlet air pressure forces the inlet poppet upward, pushing the poppet seal firmly against the seat. The higher the inlet pressure, the greater the sealing force. Note that the seal is engaged perpendicular to the seat; there is no sliding action to damage and wear the seal, or to cause erratic friction.

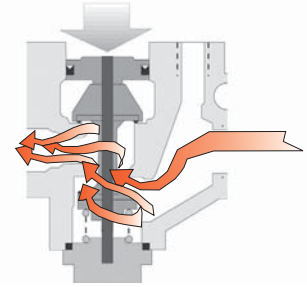
Pilot air pressure, working on a large piston, produces a very strong actuating force.



Self-Cleaning and Dirt Tolerant

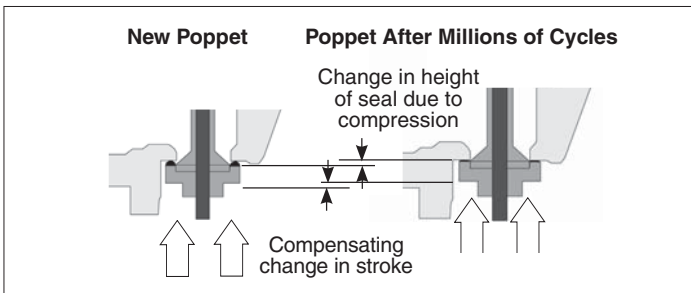
The flow velocity for a given volume of air is dependent upon the area through which it is flowing. The smaller the area, the greater the velocity.

In poppet valves, the smallest flow-through area is across the poppet's seal and seat. This produces a very high velocity which blows all dirt and foreign matter out of the seat area for a virtually leak-proof seal.



Self-Compensating for Wear

Because of its superior design, any change in the height of the valve seal (due to compression) is automatically compensated for by an equal change in the length of stroke.



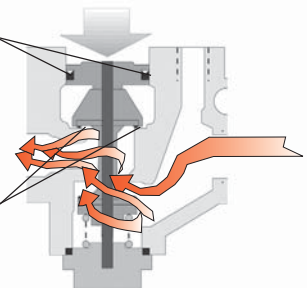
Repeatability Over the Life of the Valve

High velocity air flow begins at the instant when the inlet poppet moves off the seat; flow enhances actuation right from the start.

Pilot air pressure, working on a large piston, produces a very strong actuating force.

There is minimal sliding of seals in a poppet valve (sliding seals are highly prone to varnish). The friction and therefore, the repeatability, remain consistent for millions of cycles.

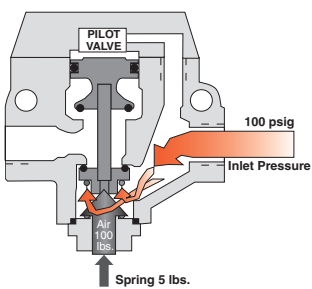
When pilot air is exhausted, the inlet pressure produces an extremely strong upward force, reliably shifting the valve to a closed position.



Why Do ROSS Poppet Valves Pop?

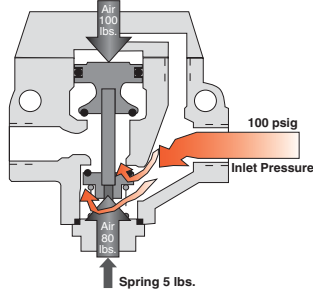
ROSS poppet valves pop open and closed almost instantly. Surface areas of the piston poppet, the exhaust poppet and the inlet poppet are carefully calculated to produce strong shifting and sealing forces in each direction. This results in a design which ensures high speed, repeatability and high shifting forces.

1 - Valve Not Actuated



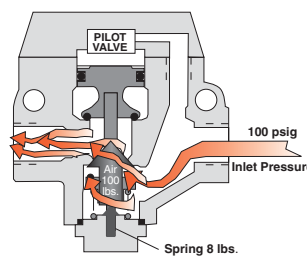
Net Upward Force: 85 lbs.
This force keeps the inlet poppet well sealed.

2 - Actuating Signal Applied



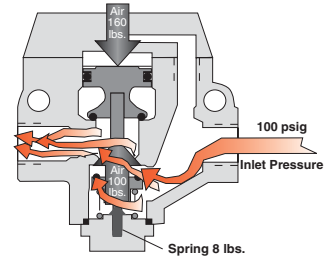
Net Downward Force: 75 lbs.
This force moves the valve element downward once pilot pressure is on the piston poppet. When the inlet poppet opens, the full force of 160 lb on the piston poppet moves the valve element downward.

3 - Valve Actuated



Net Downward Force: 52 lbs.
This force seals the exhaust poppet and holds the valve element open.

4 - De-actuating Signal Removed



Net Upward Force: 108 lbs.
This force initiates the return of the valve element to the closed position. When the valve closes, the cycle is complete and the valve is again in position 1 (see illustration, 1- Valve Not Actuated).

Choose the Type of Base Mounted Valve Construction that Best Meets Your Needs

Poppet- ISO W64, ANSI W74, SAE 84 Series

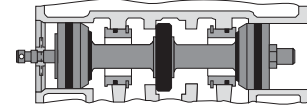
Poppet surfaces face-seal against flat poppet seats.

FEATURES

- Large pilot pistons
- Mechanical detents
- Self-cleaning
- Short stroke
- Fluorocarbon seal option available
- Wear-compensating design

BENEFITS

- Very dependable
- Tolerant of dirty air
- Positive seating
- Fast response
- Long service life
- Low maintenance
- Repeatability



APPLICATIONS

- Where there is no lubricated air
- Where the air is dirty (steel mills, glass plants, foundries, and aluminum smelters)
- High-speed machines
- High-temperature environments

Stainless Steel Spool & Sleeve- ISO W60, W65, ANSI W70, SAE 80 Series

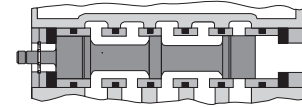
Stainless steel spools move on an extremely thin film of air in the micro-inch clearance between spool and sleeve.

FEATURES

- Low shifting forces
- No wearing contact
- Balanced spool
- Mechanical detents
- Full 5-port design
- 2 or 3-position types
- No dynamic seals

BENEFITS

- Extremely long service life
- High cycle rates
- Fast response
- Use as 2-, 3-, 4-, or 5-way selector valve
- No seals to wear out
- Very low maintenance



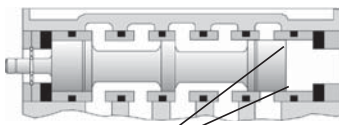
APPLICATIONS

- On high-speed machines
- In food processing
- In dual-pressure circuits
- As little as 15 psi (1 bar) shifts spool

The ROSS Stainless Steel Spool & Sleeve Valve . . . Better, by Design!

Balanced Design

A balanced design means that the force required to shift the valve does not change when the inlet pressure changes. Inlet pressure or back pressure may be applied to one or more ports without affecting this shifting force.



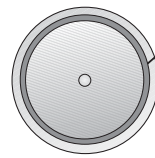
Air Bearing



Illustration of micro Air Bearing concept

Low-friction Spool

The spool is separated from, and actually floating within, the sleeve. A thin film of air creates an air bearing which virtually eliminates sliding friction between the spool and sleeve during shifting.



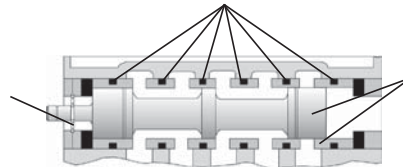
Air Bearing

Artist's rendering depicts an end view of the spool, to show how the air bearing minimizes wear.

Other Significant Features

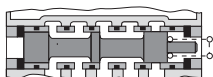
A mechanical detent is built into all ROSS 2-position spools to ensure that they maintain position.

O-rings isolate the precision steel sleeve from valve body and mounting torque distortions. O-rings are static and are not subject to dynamic wear.

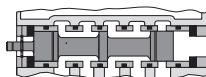


The stainless steel spool and sleeve are matched and selectively assembled to maintain a clearance of 1 to 2 ten-thousandths of an inch over the diameter. The stainless steel components are also immune to most chemicals.

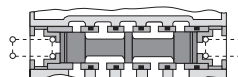
Spool valve construction can be made in 2 and 3 position functions.



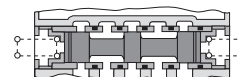
Single Control (2 position)



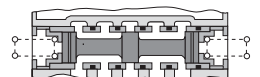
Double Momentary [Impulse] Control (2 position)



Power Center, Double Control (3 position)



Closed Center, Double Control (3 position)



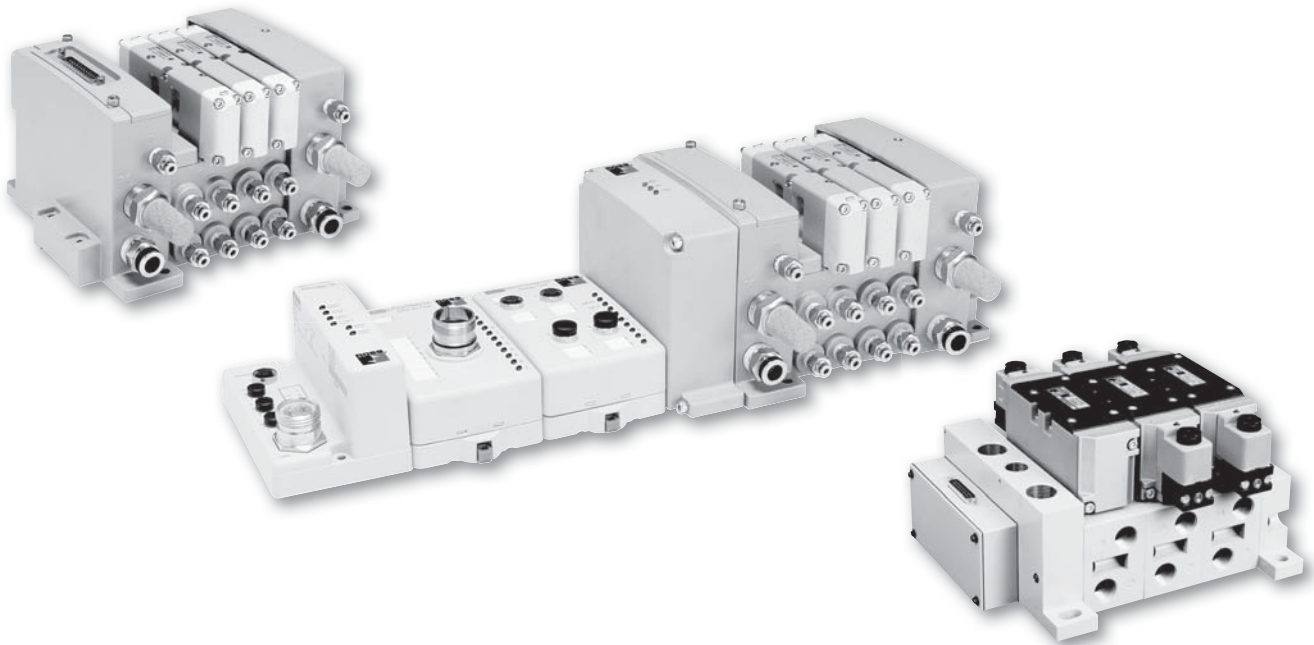
Open Center, Double Control (3 position)



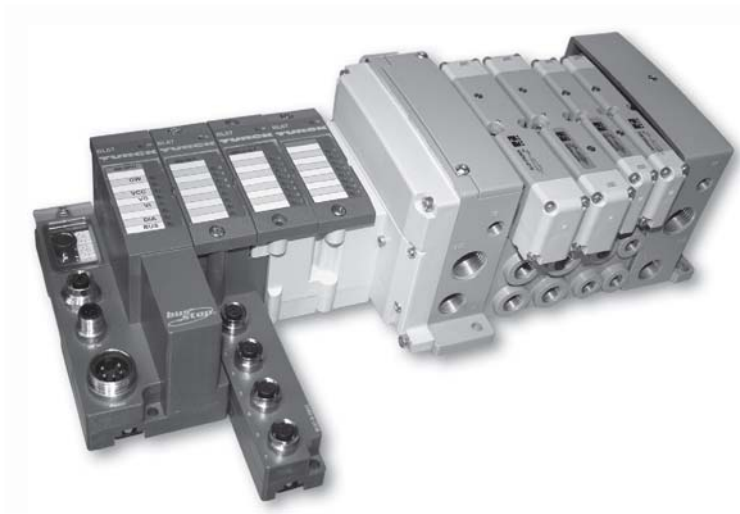
ISO Valves and Serial Bus Communication from ROSS CONTROLS

For more information please refer to

BULLETIN 600



and BULLETIN 600T



Please visit the ROSS web site to view the complete Bulletin 600 (Form #A10309) and Bulletin 600T (Form A10309T) at www.rosscontrols.com.

ISO (15407-1 & 2) Size 00 & 0 Valves Series W66

Specifications

Flow Capacity:

Size 00, Series W66: 0.55 Cv (18 mm)

Size 0, Series W66: 1.1 Cv (26 mm)

Materials of Construction:

- End Caps: PBT (Polybutylene Terephthalate)
- Fasteners: Zinc Plated Steel
- Valve Body: Aluminum
- Coils: Thermoset Plastic

Operating Pressure:

- Vacuum to 145 psi (10 bar)
- Minimum Operating Pressure
 - 2-Position: 25 psi (1.7 bar)
 - 3-Position: 35 psi (2.4 bar)

Certification / Approval:

- Approved to be CE Marked
- CSA / C-US Approved
- NEMA 4
- IP65
- Manifold and Sublease Ports Meet ISO 1179 Specifications

Ports:

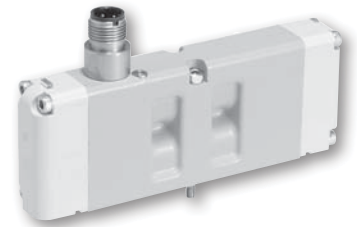
- NPT, BSPP (G).

Manifolds:

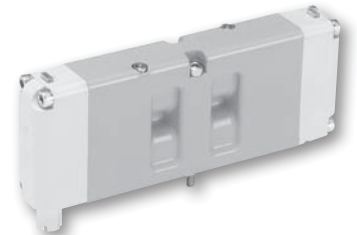
- Terminal Block Wiring (Series W66, Size 0 Only)
- Collective Wiring
 - 25-Pin, D-Sub
 - 19-Pin Round
 - 16 Point Terminal Strip
 - M23, 12-Pin
 - Serial Bus Field Bus

Solenoids:

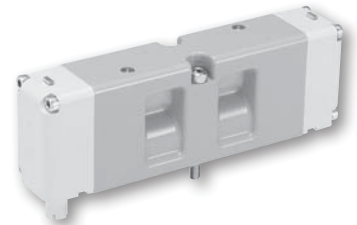
- Surge Suppression (Standard)
- Low Watt – 1.0, 24 volts DC, 2.0 VA, 120 volts AC
- Indicator Lights



Size 00 (18 mm)
Single Solenoid (5/2)
Series W66 (15407-1)



Size 00 (18 mm)
Double Solenoid (5/2)
Series W66 (15407-2)



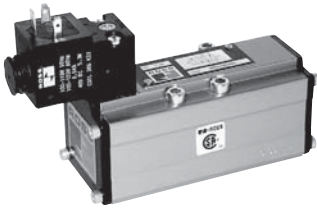
Size 0 (26 mm)
Double Solenoid (5/3) Open Center
Series W66 (15407-2)

Please visit the ROSS web site to view the complete Bulletin 600 (Form #A10309) and Bulletin 600T (Form A10309T) at www.rosscontrols.com.

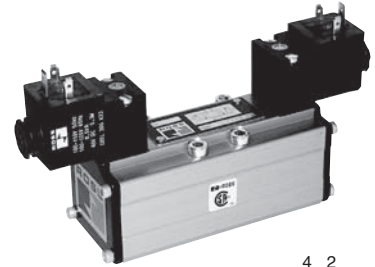


ISO (5599/I) Spool and Sleeve Valves Series W60

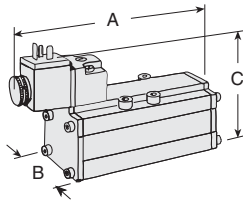
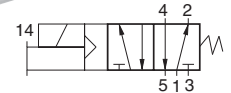
Solenoid Pilot Controlled



- Micro-thin air bearing between spool and sleeve assures quick valve response
- Designed for high cycle rates, long life
- No seals to wear out
- Suitable for vacuum service (with external pilot supply)



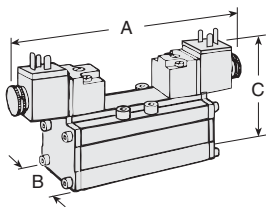
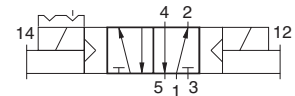
5/2 Valves – Single Solenoid Pilot Controlled, Spring Return



ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/8 - 3/8	W6076B2401**	0.8	5.41 (137.5)	1.64 (41.7)	3.25 (82.6)	1.5 (0.7)
2	3/8 - 1/2	W6076B3401**	1.9	6.24 (158.5)	2.10 (53.4)	3.55 (90.2)	2.3 (1.1)
3	1/2 - 3/4	W6076B4401**	3.8	6.21 (157.8)	2.55 (64.8)	3.73 (94.8)	3.5 (1.6)

* Sub-base and electrical connector not included. See pages 17-19 for sub-bases, manifolds and accessories.

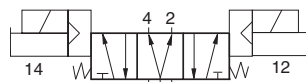
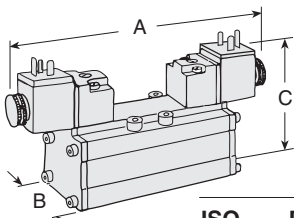
5/2 Valves – Double Solenoid Pilot Controlled, Detented



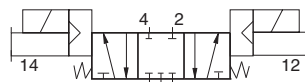
ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/8 - 3/8	W6076B2407**	0.8	6.59 (167.4)	1.64 (41.7)	3.25 (82.6)	1.8 (0.9)
2	3/8 - 1/2	W6076B3407**	1.9	7.39 (187.7)	2.10 (53.4)	3.55 (90.2)	2.7 (1.2)
3	1/2 - 3/4	W6076E4407**	3.8	6.62 (168.2)	2.55 (64.8)	3.73 (94.8)	3.9 (1.8)

* Sub-base and electrical connector not included. See pages 17-19 for sub-bases, manifolds and accessories.

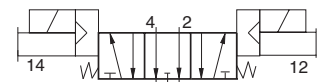
5/3 Valves – Double Solenoid Pilot Controlled



Power Center



Closed Center



Open Center

ISO Size	Port Size	Valve Model Number*			Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Power Center	Closed Center	Open Center		A	B	C	
1	1/8 - 3/8	W6077A2951**	W6077B2401**	W6077B2407**	0.8	6.67 (169.5)	1.64 (41.7)	3.25 (82.6)	1.8 (0.9)
2	3/8 - 1/2	W6077A3945**	W6077B3401**	W6077B3407**	1.9	7.59 (192.8)	2.10 (53.4)	3.55 (90.2)	2.8 (1.3)
3	1/2 - 3/4	W6077B4934**	W6077B4401**	W6077B4407**	3.8	6.65 (169.0)	2.55 (64.8)	3.73 (94.8)	4.0 (1.8)

* Sub-base and electrical connector not included. See pages 17-19 for sub-bases, manifolds and accessories.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., W6076B2401W, W6076B2401Z.



Electrical connection conforming to ANSI standard B93.55M is available. For more information, refer to ROSS Bulletin 379B (form number A10090).

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid; 11 VA inrush, 8.5 VA holding on 50 or 60 Hz; 6 watts on DC.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: Vacuum to 150 psig (10 bar).

Pilot Pressure: Size 1 models: At least 30 psig (2 bar).

Size 2 & 3 models: At least 15 psig (1 bar).

Internal/External Supply: Selected automatically.

Manual Override: Flush; metal, non-locking.

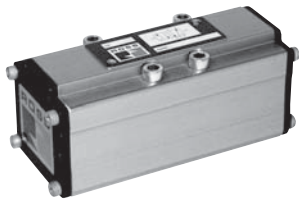
Certification: By CSA according to UL 429 and CSA 22.2-139.

For other temperature ranges, consult ROSS.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

ISO (5599/I) Spool and Sleeve Valves Series W60

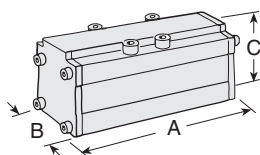
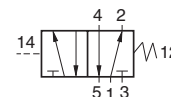
Pressure Controlled



- Micro-thin air bearing between spool and sleeve assures quick valve response
- Designed for high cycle rates, long life
- No seals to wear out
- Suitable for vacuum service



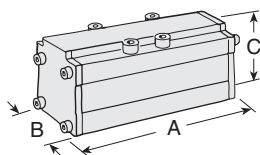
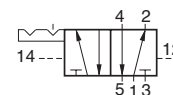
5/2 Valves – Single Pressure Controlled, Spring Return



ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/8 - 3/8	W6056B2411	0.8	4.1(105)	1.7 (42)	1.8 (47)	0.8 (0.4)
2	3/8 - 1/2	W6056B3411	1.9	5.0 (126)	2.1 (54)	2.1 (54)	1.5 (0.7)
3	1/2 - 3/4	W6056B4411	3.8	6.0 (152)	2.6 (65)	2.6 (65)	3.0 (1.4)

* Sub-base not included. See pages 17-19 for sub-bases, manifolds and accessories.

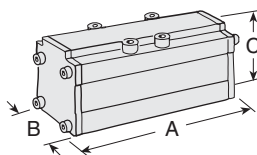
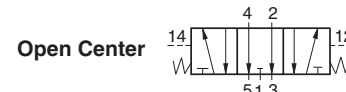
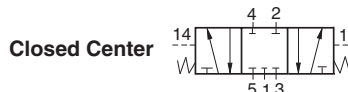
5/2 Valves – Double Pressure Controlled, Detented



ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/8 - 3/8	W6056B2417	0.8	4.1(105)	1.7 (42)	1.8 (47)	0.8 (0.4)
2	3/8 - 1/2	W6056B3417	1.9	5.0 (126)	2.1 (54)	2.1 (54)	1.5 (0.7)
3	1/2 - 3/4	W6056E4417	3.8	6.0 (152)	2.6 (65)	2.6 (65)	3.0 (1.4)

* Sub-base not included. See pages 17-19 for sub-bases, manifolds and accessories.

5/3 Valves – Double Pressure Controlled



ISO Size	Port Size	Valve Model Number*			Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Power Center	Closed Center	Open Center		A	B	C	
1	1/8 - 3/8	W6057A2934	W6057B2411	W6057B2417	0.8	4.2 (107)	1.7 (42)	1.8 (47)	1.0 (0.5)
2	3/8 - 1/2	W6057A3933	W6057B3411	W6057B3417	1.9	5.4 (135)	2.1 (54)	2.1 (54)	1.5 (0.7)
3	1/2 - 3/4	W6057A4937	W6057B4411	W6057B4417	3.8	6.2 (158)	2.6 (65)	2.6 (65)	3.0 (1.4)

* Sub-base not included. See pages 17-19 for sub-bases, manifolds and accessories.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 40° to 175°F (4° to 80°C).
Flow Media: Filtered air; 5 micron recommended.
Inlet Pressure: Vacuum to 150 psig (10 bar).

Pilot Pressure: *Size 1 models:* At least 30 psig (2 bar).
Size 2 & 3 models: At least 15 psig (1 bar).

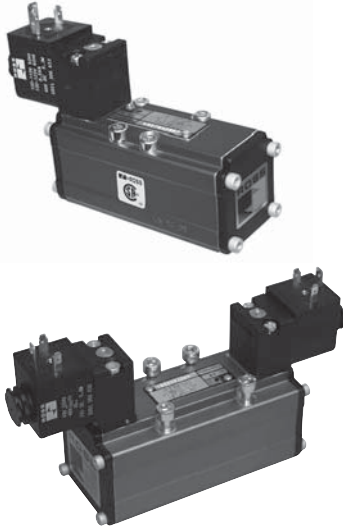
For other temperature ranges, consult ROSS.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



ISO (5599/I) EnergySaver® Valves Series W60

Solenoid Pilot Controlled



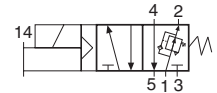
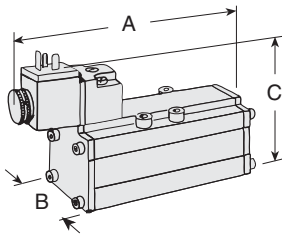
Reduces compressed air consumption up to 30%



- Replaces conventional ISO 5599/I valves without any adaptation
- Leakage in cylinder and fittings reduced due to low applied pressure
- Spool & sleeve construction designed for high cycle rates, long life
- Noise reduction
- Extends life of cylinders and other equipment

Traditionally, standard valves apply the same pressure for extending and retracting double acting cylinders. However, this ENERGYSAVER® valve revolutionizes the way cylinders are controlled, by reducing the cylinder retract pressure.

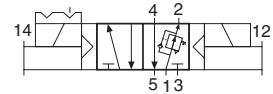
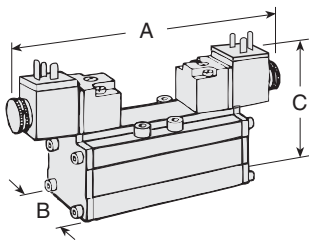
5/2 Valves – Single Solenoid Pilot Controlled, Spring Return



ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/8 - 3/8	W6076A2957**	0.8	5.41 (137.5)	1.64 (41.7)	3.25 (82.6)	1.5 (0.7)
2	3/8 - 1/2	W6076A3957**	1.9	6.24 (158.5)	2.10 (53.4)	3.55 (90.2)	2.3 (1.1)
3	1/2 - 3/4	W6076A4957**	3.8	6.21 (157.8)	2.55 (64.8)	3.73 (94.8)	3.5 (1.6)

* Sub-base and electrical connector not included. See pages 17-19 for sub-bases, manifolds and accessories.

5/2 Valves – Double Solenoid Pilot Controlled, Detented



ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/8 - 3/8	W6076A2961**	0.8	6.59 (167.4)	1.64 (41.7)	3.25 (82.6)	1.79 (0.9)
2	3/8 - 1/2	W6076A3961**	1.9	7.39 (187.7)	2.10 (53.4)	3.55 (90.2)	2.7 (1.2)
3	1/2 - 3/4	W6076A4961**	3.8	6.62 (168.2)	2.55 (64.8)	3.73 (94.8)	3.9 (1.8)

* Sub-base and electrical connector not included. See pages 17-19 for sub-bases, manifolds and accessories.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., W6076A2957W, W6076A2957Z.

Electrical connection conforming to ANSI standard B93.55M is available. For more information, refer to ROSS Bulletin 379B (form number A10090).

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid: 8.5 VA inrush, 6 VA holding on 50 or 60 HZ; 6 watts on DC.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: 60 to 120 psig (4 to 8 bar).

Manual Override: Flush; metal, non-locking.

Options:

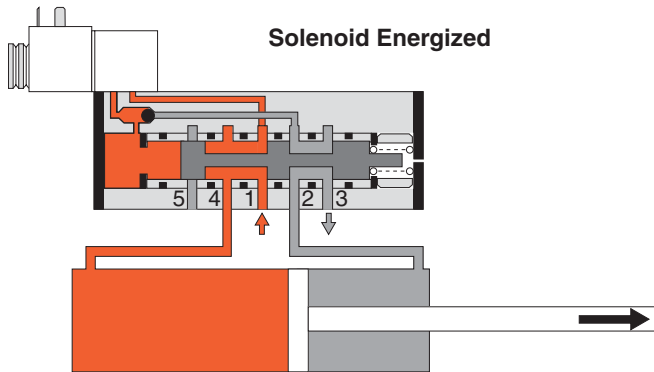
Indicator Light: Optional in electrical connector.

For other temperature ranges, consult ROSS.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

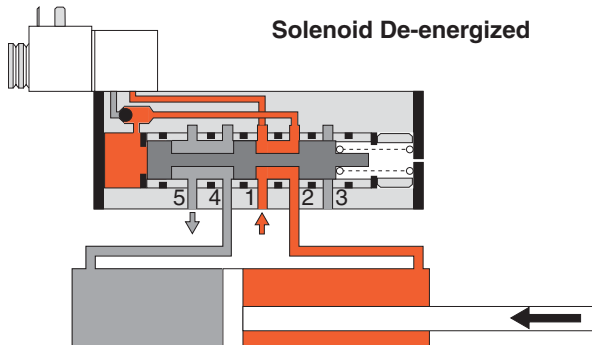
The Series W60 ENERGYSAVER® valve is a 5-port, 2-position, sub-base mounted valve that supplies full line pressure to port 4 and reduced pressure (30 psig (2 bar)) to port 2. This provides full cylinder force to move the load, but returns the cylinder with less pressure thus reducing your compressed air consumption by up to 30%. Although reduced, the pressure in port 2 is enough for quick return of the cylinder. The energy saving function is accomplished by action of the spool and works as quickly as a pressure regulator.

VALVE OPERATION



NOTE: The example of “How it Works” is specific to the single solenoid ENERGYSAVER® valve. The double solenoid models operate similarly, but as a double solenoid type valve. If you have specific questions about the operation of the double or single solenoid ENERGYSAVER® valves, please contact ROSS for more information.

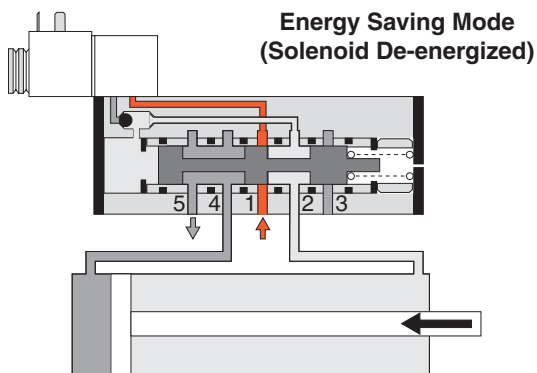
When the solenoid is energized, the ENERGYSAVER® valve operates as a standard valve. Supply pressure is directed from the inlet port to port 4 extending the cylinder at full pressure and force. Air in the rod end of the cylinder is exhausted via port 3.



Upon de-energizing the solenoid, the pilot valve starts to exhaust the pilot signal from the end of the spool. Momentarily, the spool shifts back to a “normal” de-energized position directing inlet air to flow to the rod end of the cylinder (port 2 of the valve) and exhausting the cap end.

The shuttle now has higher pressure on the opposite side causing it to shift. Shifting the shuttle closes the connection from the spool to the pilot exhaust and opens the cavity at the end of the spool to feedback pressure from port 2.

Meanwhile the cylinder has begun to retract.



Because the actuating end of the spool now has high pressure applied, the spool starts to shift to the right again closing off the inlet port. Closing the inlet prohibits the air supply from maintaining pressure on the rod end of the cylinder and as the cylinder continues to retract, the pressure drops.

This pressure drop reduces the amount of force available to keep the spool actuated against the valve return spring. So, the spool starts to shift back thus allowing an influx of pressure to help retract the cylinder.

The ENERGYSAVER® valve operates as a fixed spring regulator when in the energy saving mode, maintaining the cylinder return pressure at approximately 30 psig (2 bar). Retracting and holding the cylinder with only 30 psig (2 bar) pressure consumes much less air than the standard method of using full pressure to shift and retract.

APPLICATION WARNING:

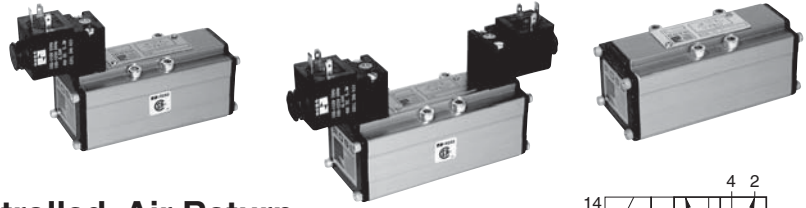
When inlet pressure is 60 psig (4 bar) or less, the double and single solenoid ENERGYSAVER® valves will pressurize port 2 and exhaust port 4, regardless of applied solenoid signals. This feature, which occurs when inlet pressure is below 60 psig (4 bar), must be taken into consideration in your application design in order to avoid the potential for personal injury or property damage.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

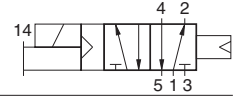
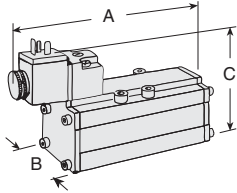
ISO (5599/I) Poppet Valves Series W64

Solenoid Pilot Controlled Pressure Controlled

- Poppet design very tolerant of dirty air
- Poppets are self-compensating for wear; promote long life
- Available with special seals for use in high temperature environments

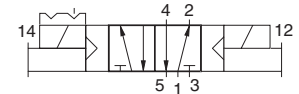
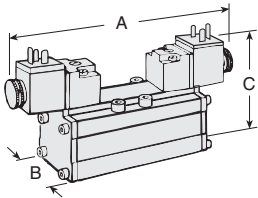


5/2 Valves – Single Solenoid Pilot Controlled, Air Return



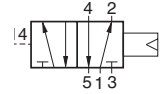
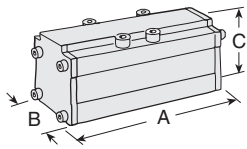
ISO Size	Port Size	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Std. Temp.	High Temp.		A	B	C	
1	1/8 - 3/8	W6476B2401**	W6476B2402**	1.0	5.4 (137)	1.7 (42)	3.2 (82)	1.3 (0.6)
2	3/8 - 1/2	W6476B3401**	W6476B3402**	2.0	6.3 (153)	2.1 (54)	3.5 (90)	1.8 (0.8)
3	1/2 - 3/4	W6476B4401**	W6476B4402**	4.0	6.6 (168)	2.6 (65)	3.7 (94)	2.8 (1.3)

5/2 Valves – Double Solenoid Pilot Controlled, Detented



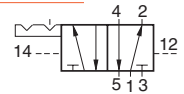
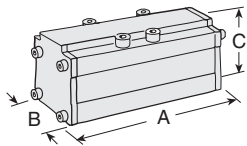
ISO Size	Port Size	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Std. Temp.	High Temp.		A	B	C	
1	1/8 - 3/8	W6476B2407**	W6476B2408**	1.0	6.9 (175)	1.7 (42)	3.2 (82)	1.8 (0.8)
2	3/8 - 1/2	W6476B3407**	W6476B3408**	2.0	7.6 (192)	2.1 (54)	3.5 (90)	2.3 (1.0)
3	1/2 - 3/4	W6476B4407**	W6476B4408**	4.0	6.8 (172)	2.6 (65)	3.7 (94)	3.3 (1.5)

5/2 Valves – Single Pressure Controlled, Air Return



ISO Size	Port Size	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Std. Temp.	High Temp.		A	B	C	
1	1/8 - 3/8	W6456B2411	W6456B2412	1.0	4.3 (109)	1.6 (41)	1.8 (46)	0.8 (0.4)
2	3/8 - 1/2	W6456B3411	W6456B3412	2.0	5.1 (130)	2.1 (53)	2.1 (54)	1.3 (0.6)
3	1/2 - 3/4	W6456B4411	W6456B4412	4.0	6.4 (165)	2.6 (66)	2.2 (56)	2.3 (1.1)

5/2 Valves – Double Pressure Controlled, Detented



ISO Size	Port Size	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Std. Temp.	High Temp.		A	B	C	
1	1/8 - 3/8	W6456B2417	W6456B2418	1.0	4.3 (119)	1.6 (41)	1.8 (47)	0.8 (0.4)
2	3/8 - 1/2	W6456B3417	W6456B3418	2.0	5.1 (130)	2.1 (53)	2.1 (54)	1.3 (0.6)
3	1/2 - 3/4	W6456B4417	W6456B4418	4.0	6.4 (165)	2.6 (66)	2.2 (59)	2.3 (1.1)

* Sub-base and electrical connector not included. See pages 17-19 for sub-bases, manifolds and accessories.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., W6476B2401W, W6476B2401Z.

Electrical connection conforming to ANSI standard B93.55M is available. For more information, refer to ROSS Bulletin 379B (form number A10090).

STANDARD SPECIFICATIONS (for valves on this page):

Solenoid Pilot Controlled:

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid; 11 VA inrush, 8.5 VA holding on 50 or 60 Hz; 6 watts on DC.

Ambient Temperature: 40° to 120°F (4° to 50°C); extended to 175°F (80°C) for High Temperature models.

Media Temperature: 40° to 175°F (4° to 80°C); extended to 220°F (105°C) for High Temperature models.

Internal/External Supply: Selected automatically.

Manual Override: Flush; metal non-locking.

Options:

Indicator Light: Optional in electrical connector.

Pressure Controlled:

Ambient Temperature: 40° to 175°F (4° to 80°C).

Media Temperature: 40° to 175°F (4° to 80°C); extended to 220°F (105°C) for High Temperature models.

Common Specifications:

Flow Media: Filtered air.

Inlet Pressure: 30 to 150 psig (2 to 10 bar).

Pilot Pressure: Must be equal to or greater than inlet pressure.

For other temperature ranges, consult ROSS.

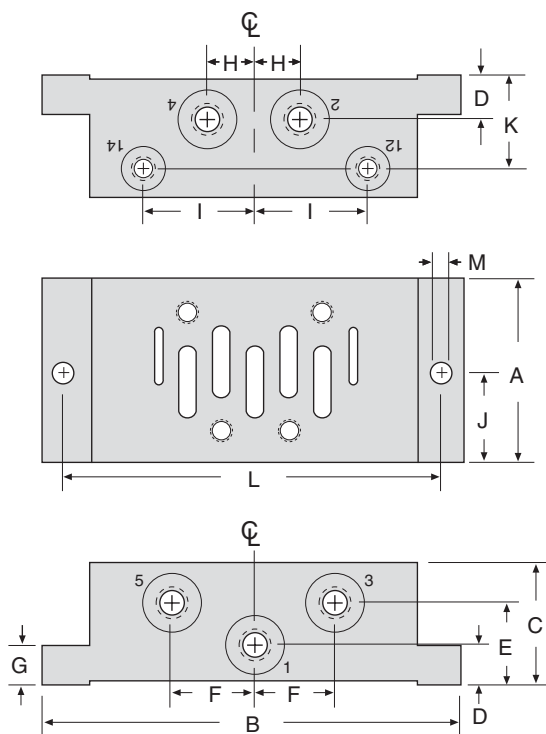
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

ISO (5599/I) Sub-Bases & Manifolds

for Valves Series W60 & W64

Sub-Base Model Number

ISO Size	Side Ported	Port Size		
		2, 4	1, 3, 5	12, 14
1	654K91	1/8	1/4	1/8
	600C01	1/4	1/4	1/8
	D600C01	G1/4	G1/4	G1/8
	642K91	3/8	3/8	1/8
2	601C01	3/8	1/4	1/8
	D601C01	G3/8	G3/8	G1/8
	643K91	1/2	1/2	1/8
3	602C01	1/2	1/2	1/8
	D602C01	G1/2	G1/2	G1/8
	644K91	3/4	3/4	1/8



Sub-Base Dimensions inches (mm)

	ISO 1	ISO 2	ISO 3
A	1.89 (48)	2.24 (57)	2.80 (71)
B	4.33 (110)	4.88 (124)	5.87(149)
C	1.26 (32)	1.57 (40)	1.26 (32)*
D	0.41 (38)	0.55 (14)	0.67 (17)
E	0.85 (39)	1.02 (26)	0.67 (17)
F	0.85 (23)	1.10 (28)	1.34 (34)
G	0.39 (23)	0.51 (13)	0.71 (18)
H	0.47 (92)	0.59 (15)	0.63 (16)
I	1.14 (29)	1.46 (37)	1.77 (45)
J	0.94 (58)	1.12 (29)	1.40 (36)
K	0.93 (24)	1.518(30)	0.87 (22)
L	3.86 (22)	4.41 (112)	5.35(136)
M	0.22 (6)	0.26 (7)	0.26 (7)

* 1.77 (45) on sub-base **644K91**

ACCESSORIES and OPTIONS for MANIFOLDS

Blank Station Kits, Blocking Discs, Pressure Plates, Transition Plates and other available options are shown on page 18 and 19.

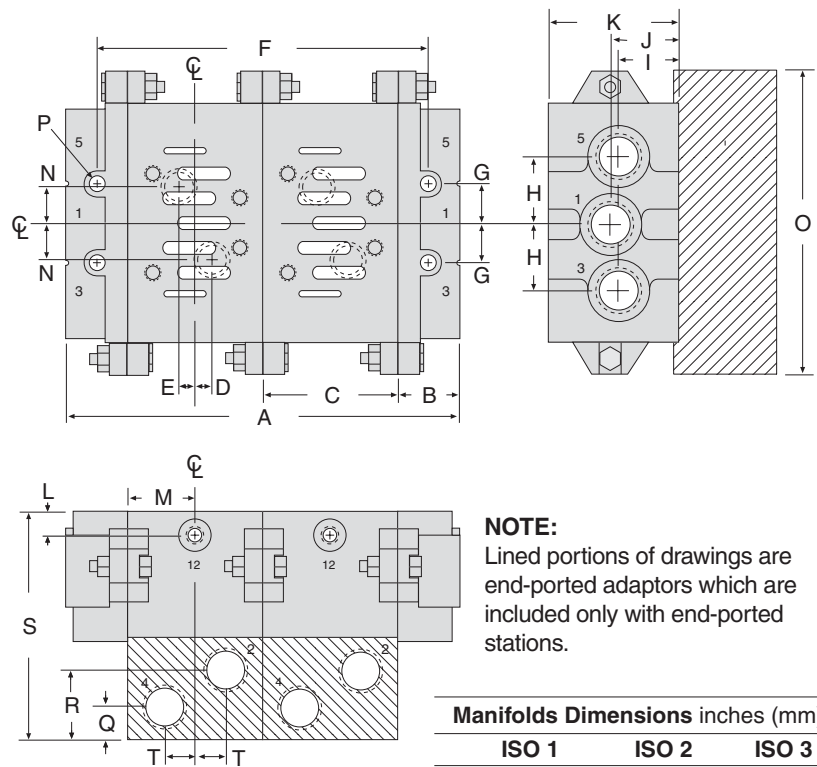
A and F dimensions are for a 2-station manifold. For each additional station add the C dimension to obtain new A and F dimensions.

In addition to the manifold stations, an end station kit must be ordered for each manifold installation. End-ported stations are assemblies consisting of a bottom-ported station and an end-ported adaptor plate. Adaptor plates are cross-hatched in the drawings below.

Manifold Model Number

ISO Size	Bottom Ported Station*	End Ported Station*	End Station Kit*	Port Size		
				2, 4	1, 3, 5	12, 14
1	460K91	664K91	326K86	1/4	3/8	1/8
2	461K91	665K91	327K86	3/8	1/2	1/8
3	462K91	666K91	328K86	1/2	1	1/8

* NPT port threads. For BSPP threads, add a "D" prefix to the model number, e.g., D460K91.



NOTE: Lined portions of drawings are end-ported adaptors which are included only with end-ported stations.

Manifolds Dimensions inches (mm)

	ISO 1	ISO 2	ISO 3
A	5.12 (130)	6.46 (164)	7.95 (202)
B	0.87 (22)	1.02 (26)	1.18 (30)
C	1.69 (43)	2.20 (56)	2.80 (71)
D	0.30 (8)	0.24 (6)	0.31 (8)
E	0.06 (2)	0.20 (5)	0.24 (6)
F	4.25 (108)	5.43 (138)	6.77 (172)
G	0.55 (14)	0.69 (18)	1.02 (26)
H	0.94 (24)	1.24 (32)	1.85 (47)
I	0.83 (21)	0.87 (22)	1.22 (31)
J	0.94 (24)	0.94 (24)	1.34 (34)
K	1.81 (46)	1.85 (47)	2.20 (56)
L	0.33 (9)	0.35 (9)	0.39 (10)
M	0.85 (22)	1.10 (28)	1.40 (36)
N	0.51 (13)	0.59 (15)	0.75 (19)
O	4.33 (110)	5.31 (135)	7.48 (190)
P	0.27 (7)	0.35 (9)	0.47 (12)
Q	0.47 (12)	0.55 (14)	0.67 (17)
R	0.98 (25)	1.02 (26)	1.14 (29)
S	3.19 (81)	3.54 (90)	3.90 (99)
T	0.43 (11)	0.57 (15)	0.71 (18)



IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

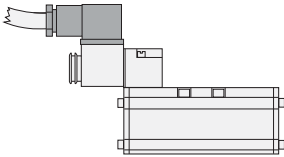
CONNECTORS for use with DROPCORDS (DIN 43650, Form A)

Electrical connectors are required to connect the valve solenoids to the dropcords supplying electrical power. Each connector can be oriented so that the cord can exit in any one of four directions: outboard, inboard, and to the right or to the left of the valve centerline. Cords of 6 mm to 10 mm diameter can be used.



WIRED CONNECTORS

Connectors have a 6½ ft (2 meter) cord with three 18 gauge conductors. Insulation is water, oil, and abrasion resistant. Connectors are available with 10 mm cords for maximum abrasion resistance, or with 6 mm cords where added flexibility or small diameter is required.



Electrical Connectors

Connector Type	Part Number Without Light	Part Number With Light*
For use with dropcord (Cord not included)	937K87	936K87*
Wired with 6-mm cord	721K77	720K77*
Wired with 10-mm cord	371K77	383K77*
For use with threaded conduit	723K77	724K77*

* Specify solenoid voltage.

* **Lights in connectors with a translucent housing can be used as indicator lights to show when solenoids are energized.**

FLYING SOLENOID LEADS

Flying leads are available with 18 gauge insulated wires with spade connectors at one end. A kit of flying leads consists of three wires, each 39 inches (991 mm) long.

Order by kit number **725K77**.

BLANK STATION KITS

A blank station plate is used to cover the top of a manifold station that is not in use. A kit consists of a metal plate 0.32 inch (8 mm) thick, a gasket, and mounting bolts.

ISO Size	Kit Number
1	546H77
2	537H77
3	694K77

TRANSITION PLATES

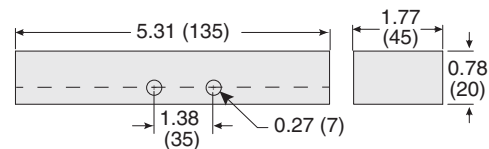
Different size ISO valves can be used in the same manifold installation by means of transition plates. The inlet and exhaust ports of two different size manifold stations are connected by means of a transition plate installed between the two stations.

ISO Size Part Number

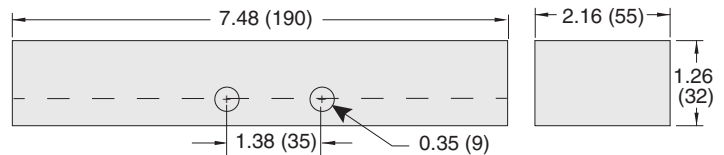
1 to 2	D355K86
2 to 3	D356K86
1 to 3	D357K86

ISO Size 1 to 2

Dimensions - inches (mm)



ISO Size 2 to 3 and 1 to 3



INTERPOSED FLOW CONTROLS for SPOOL VALVES

An interposed flow control unit regulates the exhaust flow of air from a pneumatic cylinder, thereby controlling the extension and retraction speeds. Separate controls regulate the air flow from each end of the cylinder. Being located between the valve and base, the unit requires no additional piping.

Available only for Series W60 valves.

ISO Size Part Number

1	701B77
2	702B77
3	722K77

INDEPENDENT PRESSURE PLATES

When a valve in a manifold installation must work at a different pressure than that supplied to the manifold, an independent supply can be provided via an independent pressure plate. The pressure plate mounts between valve and base and isolates the valve from the manifold inlet pressure. The independent supply is connected to an inlet port in the end of the pressure plate.

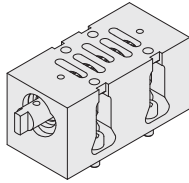
ISO Size Inlet Port Kit Number

1	1/4	703K77
2	3/8	692K77
3	1/2	715K77

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

INTERPOSED SHUT-OFF

Manually actuated with a 1/4 turn, the interposed shut-off isolates all ports, including the pilot.



ISO Size	Part Number
1	1871B91

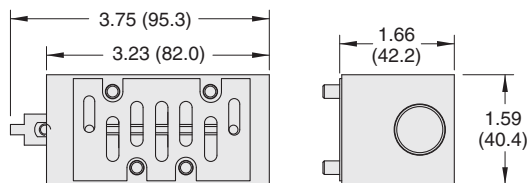
BLOCKING DISKS

Ports between manifold stations can be closed by means of blocking disks.

ISO Size	Single Disk Part Number	Kit of 3 Disk Part Number
1	235A40	1007K77
2	236A40	1008K77
3	237A40	1009K77

ISO Size 1

Dimensions - inches (mm)



ISO Size 2 & 3: For ordering, please contact ROSS.

INTERPOSED PRESSURE REGULATORS

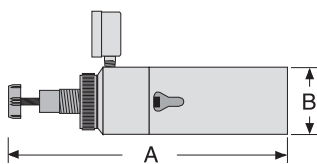
Both single and double pressure regulators are available.

Single left hand (14) and single right hand (12) regulators are available.

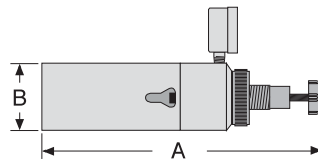
Single pressure regulators provide the same regulated pressure at both outlet ports.

Double pressure regulators allow the pressure at each outlet port to be set independently.

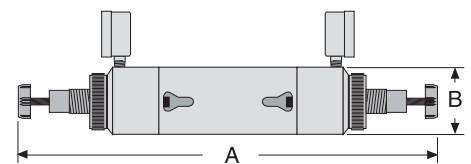
Pressure can be regulated from 0 to 150 psig (0 to 10 bar). Requires no new piping.



Single Left Hand (14) Regulator



Single Right Hand (12) Regulator



Double Regulator

ISO Size	Single		Double
	Left Hand (14) Part Number	Right Hand (12) Part Number	
1	1300K91	1301K91	1302K91
2	1303K91	1304K91	1305K91
3	1306K91	1307K91	1308K91

Regulator Dimensions - inches (mm)

ISO Size	A (Single)	B (Double)	B (Single/Double)
A	7.3 (186)	13.2 (336)	1.5 (39)
B	8.3 (211)	14.8 (376)	2.0 (51)
C	10.5 (267)	18.3 (465)	2.5 (64)

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

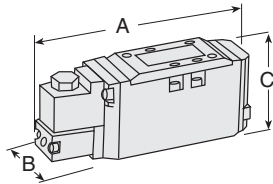
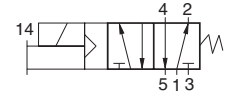
ISO (5599/II) Spool and Sleeve Valves Series W65

Solenoid Pilot Controlled

- Designed for high cycle rates and long life
- Micro-thin air bearing between spool and sleeve assures quick valve response
- No seals to wear out
- Suitable for vacuum service



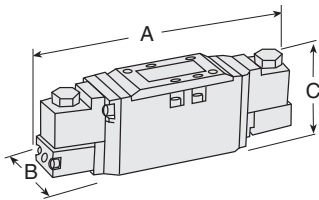
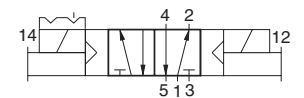
5/2 Valves – Single Solenoid Pilot Controlled, Spring Return



ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W6576A2401**	1.0	6.3 (161)	1.6 (41)	2.7 (69)	1.5 (0.7)
2	3/8 - 1/2	W6576A3401**	2.3	7.3 (186)	2.1 (52)	2.8 (71)	2.0 (1.0)
3	1/2 - 3/4	W6576A4401**	3.4	8.5 (216)	2.6 (67)	3.1 (78)	3.5 (1.6)

* Sub-base not included. See pages 22-24 for sub-bases, manifolds and accessories.

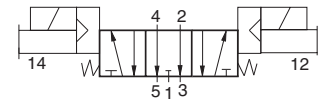
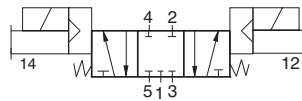
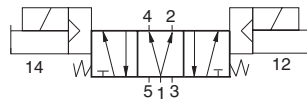
5/2 Valves – Double Solenoid Pilot Controlled, Detented



ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W6576A2407**	1.0	8.8 (224)	1.6 (41)	2.7 (69)	2.0 (1.0)
2	3/8 - 1/2	W6576A3407**	2.3	9.0 (228)	2.1 (52)	2.8 (71)	2.5 (1.2)
3	1/2 - 3/4	W6576A4407**	3.4	10.0 (254)	2.6 (67)	3.1 (78)	4.0 (1.9)

* Sub-base not included. See pages 22-24 for sub-bases, manifolds and accessories.

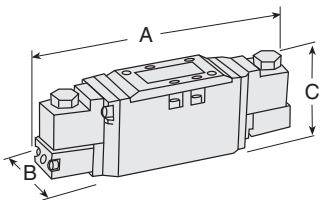
5/3 Valves – Double Solenoid Pilot Controlled



Power Center

Closed Center

Open Center



ISO Size	Port Size	Valve Model Number*			Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Power Center	Closed Center	Open Center		A	B	C	
1	1/4 - 3/8	W6577A2902**	W6577A2401**	W6577A2407**	1.0	8.8 (224)	1.6 (41)	2.7 (69)	2.0 (1.0)
2	3/8 - 1/2	W6577A3901**	W6577A3401**	W6577A3407**	2.3	9.0 (228)	2.1 (52)	2.8 (71)	2.5 (1.2)
3	1/2 - 3/4	W6577A4900**	W6577A4401**	W6577A4407**	3.4	10.0 (254)	2.6 (67)	3.1 (78)	4.0 (1.9)

* Sub-base not included. See pages 22-24 for sub-bases, manifolds and accessories.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., W6576A2401W, W6576A2401Z.

The W65 Series has a base electrical connector which eliminates the need to disconnect wires to remove the valve. This eliminates drop cords, simplifies maintenance and connection to Serial Data Communication systems. For more information, refer to Bulletin 379B (form number A10090).

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: Rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz. For other voltages, see page 113.

Power Consumption: Each solenoid. 6.5 VA holding on 50 or 60 Hz; 3.5 watts on DC (at 10 bar).

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: Size 1 models: 30 to 150 psig (2 to 10 bar);

Size 2 & 3 models: 15 to 150 psig (1 to 10 bar).

All sizes also available up to 232 psig (16 bar).

Pilot Supply: Internal/external supply selected automatically.

Required pressure at least 30 psig (2 bar).

Indicator Light: Included, one per solenoid.

Manual Override: Flush; metal, non-locking.

Certification: By CSA according to UL 429 and CSA 22.2-139.

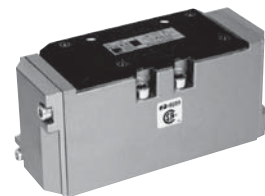
For other temperature ranges, consult ROSS.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

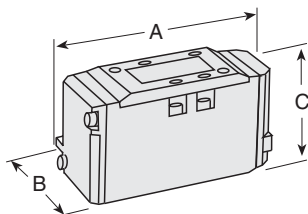
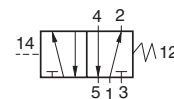
ISO (5599/II) Spool and Sleeve Valves Series W65

Pressure Controlled

- Designed for high cycle rates and long life
- Micro-thin air bearing between spool and sleeve assures quick valve response
- No seals to wear out
- Suitable for vacuum service



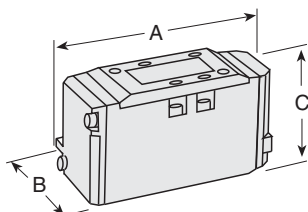
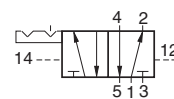
5/2 Valves – Single Pressure Controlled, Spring Return



ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W6556A2411	1.0	4.8 (121)	1.6 (41)	2.7 (69)	0.8 (0.4)
2	3/8 - 1/2	W6556A3411	2.3	5.8 (148)	2.1 (52)	2.8 (71)	1.5 (0.7)
3	1/2 - 3/4	W6556A4411	3.4	7.0 (178)	2.6 (67)	3.1 (78)	3.0 (1.4)

* Sub-base not included. See pages 22-24 for sub-bases, manifolds and accessories.

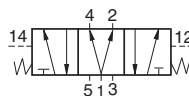
5/2 Valves – Double Pressure Controlled, Detented



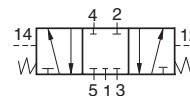
ISO Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W6556A2417	1.0	4.8 (121)	1.6 (41)	2.7 (69)	0.8 (0.4)
2	3/8 - 1/2	W6556A3417	2.3	5.8 (148)	2.1 (52)	2.8 (71)	1.5 (0.7)
3	1/2 - 3/4	W6556A4417	3.4	7.0 (178)	2.6 (67)	3.1 (78)	3.0 (1.4)

* Sub-base not included. See pages 22-24 for sub-bases, manifolds and accessories.

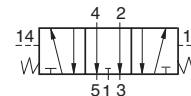
5/3 Valves – Double Pressure Controlled



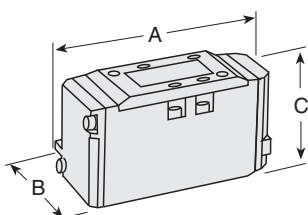
Power Center



Closed Center



Open Center



ISO Size	Port Size	Valve Model Number*			Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Power Center	Closed Center	Open Center		A	B	C	
1	1/4 - 3/8	—	W6557A2411	W6557A2417	1.0	4.8 (121)	1.6 (41)	2.7 (69)	0.8 (0.4)
2	3/8 - 1/2	W6557A3901	W6557A3411	W6557A3417	2.3	5.8 (148)	2.1 (52)	2.8 (71)	1.5 (0.7)
3	1/2 - 3/4	W6557A4900	W6557A4411	W6557A4417	3.4	7.0 (178)	2.6 (67)	3.1 (78)	3.0 (1.4)

* Sub-base not included. See pages 22-24 for sub-bases, manifolds and accessories.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 40° to 175°F (4° to 80°C).
Flow Media: Filtered air; 5 micron recommended.
Inlet Pressure: Size 1 models: 30 to 150 psig (2 to 10 bar);
 Size 2 & 3 models: 15 to 150 psig (1 to 10 bar).
 All sizes also available up to 232 psig (16 bar).

Pilot Supply: Internal/external supply selected automatically.
 Required pressure at least 30 psig (2 bar).

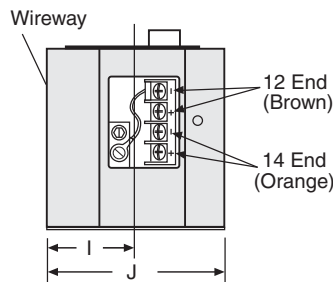
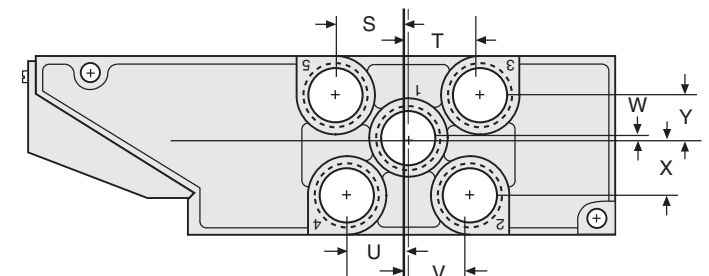
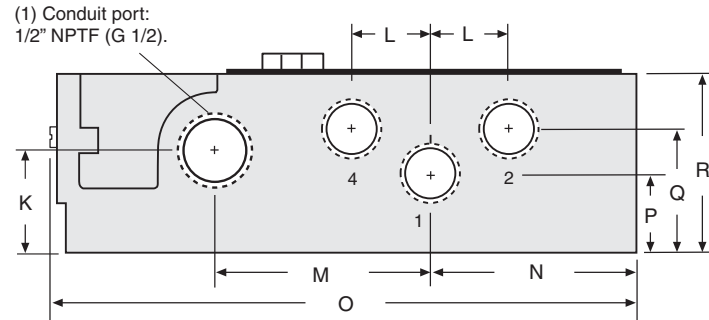
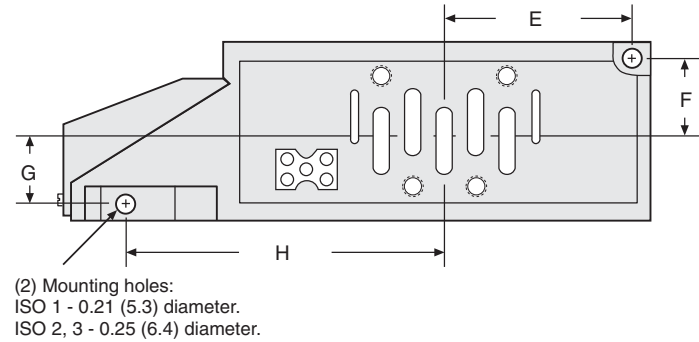
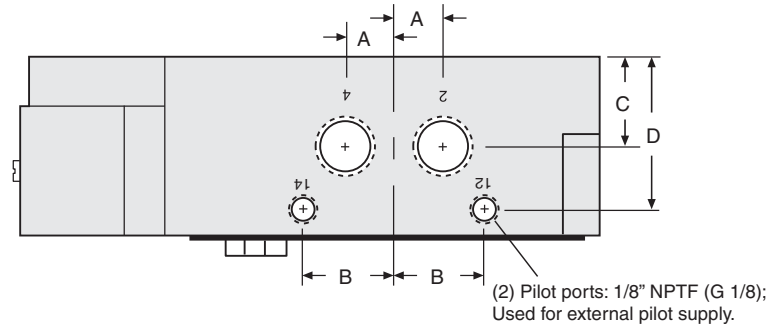
For other temperature ranges, consult ROSS.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Side and Bottom-Ported Sub-Bases

ISO Size	Port Size	Sub-Base Station Model Number
ISO 1	1/4 NPTF Side	949N91
	1/4 NPTF Side/Bottom	971N91
	3/8 NPTF Side	950N91
	3/8 NPTF Side/Bottom	972N91
	G 1/4 Side	D949N91
	G 3/8 Side	D950N91
ISO 2	3/8 NPTF Side	951N91
	3/8 NPTF Side/Bottom	952N91
	1/2 NPTF Side	953N91
	1/2 NPTF Side/Bottom	954N91
	G 1/2 Side	D953N91
ISO 3	1/2" NPTF Side	955N91
	1/2" NPTF Side/Bottom	956N91
	3/4" NPTF Side	957N91
	3/4" NPTF Side/Bottom	958N91
	G 1/2 Side	D955N91
	G 1/2 Side/Bottom	D956N91
	G 3/4 Side	D957N91
	G 3/4 Side/Bottom	D958N91



**Note: Port 1 is 0.117" (3 mm) off center line.
ISO 2, 3 fall on center line.**

Assembled manifolds also available, consult ROSS.

Sub-Base Dimensions inches (mm)			
	ISO 1	ISO 2	ISO 3
A	0.5 (13)	0.6 (16)	0.8 (21)
B	1.0 (26)	1.3 (33)	1.8 (45)
C	0.8 (21)	1.2 (31)	1.3 (34)
D	1.5 (38)	1.9 (49)	2.7 (70)
E	1.6 (39)	2.3 (57)	2.5 (63)
F	0.9 (23)	1.1 (29)	1.5 (39)
G	0.9 (23)	1.1 (29)	1.4 (36)
H	3.6 (92)	4.3 (108)	5.4 (137)
I	1.1 (29)	1.4 (35)	1.8 (45)
J	2.3 (58)	2.8 (70)	3.5 (90)
K	0.9 (24)	1.5 (37)	1.8 (47)
L	0.9 (22)	1.1 (27)	1.5 (38)
M	2.4 (60)	3.0 (75)	4.1 (104)
N	1.8 (46)	2.5 (64)	2.7 (69)
O	6.5 (164)	7.8 (197)	9.3 (235)
P	0.8 (21)	1.1 (28)	1.3 (34)
Q	1.3 (34)	1.7 (44)	2.0 (51)
R	1.9 (47)	2.4 (60)	3.3 (85)
S	0.8 (21)	1.1 (27)	1.6 (42)
T	1.1 (27)	1.1 (27)	1.6 (42)
U	0.5 (13)	0.9 (22)	1.1 (27)
V	0.6 (15)	0.9 (22)	1.1 (27)
W	0.3 (8)	0.1 (3)	0.8 (20)
X	0.7 (17)	0.8 (20)	0.8 (20)
Y	0.6 (16)	0.9 (20)	0.8 (20)

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Bottom or End-Ported Manifolds

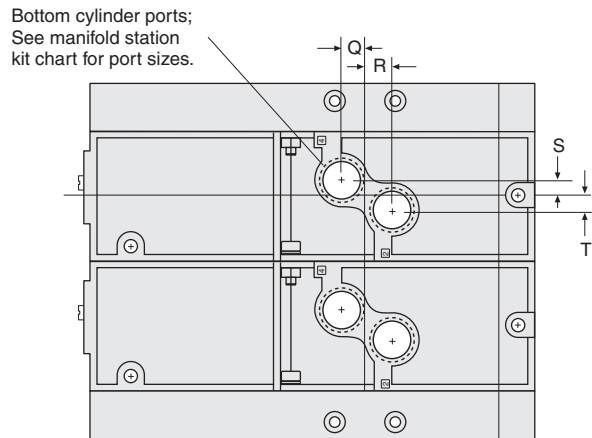
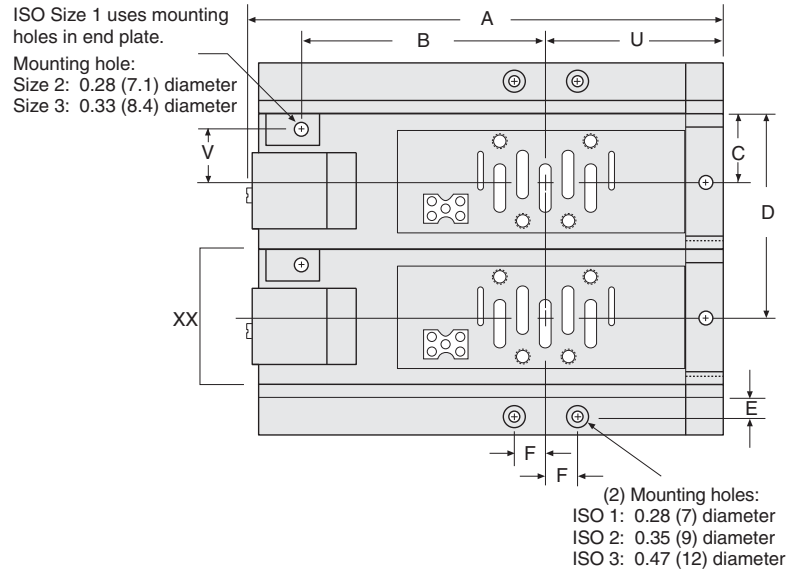
Manifold Dimensions inches (mm)			
	ISO 1	ISO 2	ISO 3
A	7.2 (183)	9.0 (229)	10.6 (270)
B	4.9 (125)	6.0 (152)	7.1 (180)
C	1.0 (26)	1.3 (33)	1.7 (43)
D	3.1 (79)	3.9 (100)	5.1 (128)
E	0.6 (14)	0.6 (16)	0.6 (15)
F	0.6 (14)	0.7 (17)	1.0 (26)
G	1.3 (34)	1.7 (42)	1.8 (46)
H	1.0 (25)	1.2 (30)	1.2 (31)
I	1.1 (28)	1.4 (35)	2.1 (52)
J	2.5 (64)	3.1 (79)	4.1 (104)
K	1.2 (31)	1.6 (40)	1.7 (42)
L	0.9 (22)	1.0 (25)	1.2 (30)
M	0.5 (13)	0.6 (16)	0.8 (21)
N	2.1 (53)	2.6 (67)	3.4 (86)
O	2.2 (55)	2.6 (66)	3.1 (78)
P	0.6 (16)	0.9 (22)	0.8 (20)
Q	0.5 (13)	0.6 (15)	0.7 (18)
R	0.5 (13)	0.6 (15)	0.8 (21)
S	0.3 (7)	0.3 (8)	0.5 (13)
T	0.3 (7)	0.3 (8)	0.5 (12)
U	2.0 (51)	2.8 (67)	3.1 (79)
V	-----	1.0 (26)	1.3 (31)

End Station Kit Numbers*		
Series	Port Size	Part Number**
ISO 1	3/8" NPTF	493N86
ISO 2	1/2" NPTF	494N86
ISO 3	1" NPTF	495N86

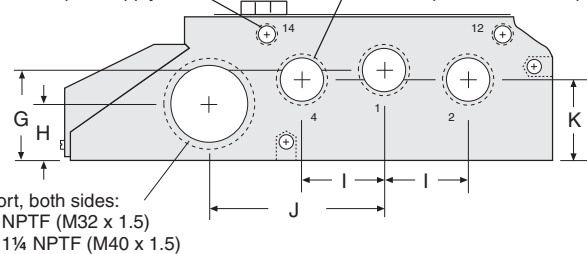
* Each end station kit includes left and right end plates, socket head screws, nuts and seals.
 ** NPT port threads. For BSPP threads, add a "D" prefix to the model number, e.g., D493N86.

Manifold Station Assembly Numbers*		
Series	Port Size	Part Number**
ISO 1	1/4" NPTF End/Bottom	959N91
	3/8" NPTF End/Bottom	960N91
ISO 2	3/8" NPTF End/Bottom	961N91
	1/2" NPTF End/Bottom	962N91
ISO 3	1/2" NPTF End/Bottom	963N91
	3/4" NPTF End/Bottom	964N91

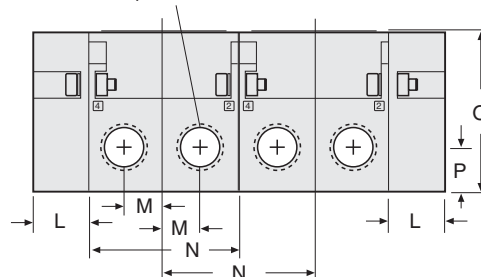
* Each manifold station assembly includes a manifold assembly, socket head screws, nuts and seals.
 ** NPT port threads. For BSPP threads, add a "D" prefix to the model number, e.g., D959N91.



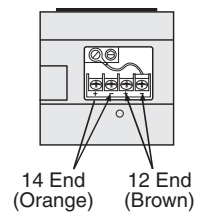
(2) Pilot ports: 1/8" NPTF (G 1/8); Used for external pilot supply.
 (3) Side ports, both sides; See end plate kit chart for port sizes.



(2) Side cylinder ports: See manifold block kit chart for port sizes



View XX with conduit cover removed

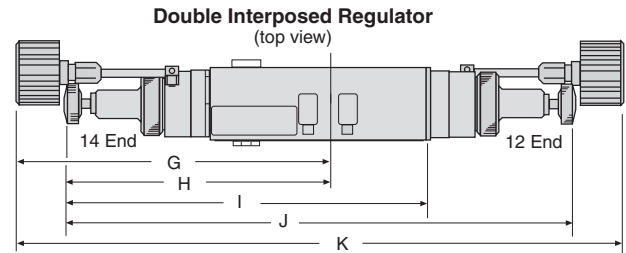
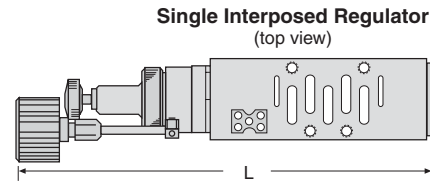
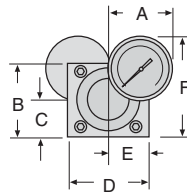


Interposed Regulators

The interposed regulator controls the pressure through the base-mounted valve. These interposed devices are “sandwich” style, mounting between a valve and base or manifold. When using a dual interposed regulator for a Series 65 solenoid valve, the valve **must be externally piloted (port 14)**.

WARNING:

Double interposed regulators will reverse output ports - the 12 solenoid will pressurize the 4 port, the 14 solenoid will pressurize the 2 port - which may cause unexpected, potentially dangerous cylinder movement at valve pressurization.

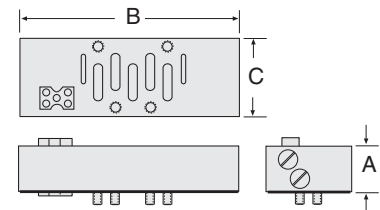


ISO Size	Part Number	Dimensions inches (mm)												
		A	B	C	D	E	F	G	H	I	J	K	L	
1 (Sgl.)	965N91	1.6 (39)	1.8 (45)	0.9 (23)	1.7 (43)	0.9 (22)	2.5 (63)	6.2 (157)	7.2 (182)	8.0 (204)	11.6 (295)	13.6 (345)	9.0 (229)	
1 (Dbl.)	966N91	1.6 (39)	1.8 (45)	0.9 (23)	1.7 (43)	0.9 (22)	2.5 (63)	6.2 (157)	7.2 (182)	8.0 (204)	11.6 (295)	13.6 (345)	9.0 (229)	
2 (Sgl.)	967N91	1.6 (39)	1.8 (45)	0.9 (23)	2.0 (51)	1.0 (26)	2.5 (63)	6.5 (166)	7.5 (191)	9.0 (229)	12.6 (320)	14.6 (370)	10.0 (254)	
2 (Dbl.)	968N91	1.6 (39)	1.8 (45)	0.9 (23)	2.0 (51)	1.0 (26)	2.5 (63)	6.5 (166)	7.5 (191)	9.0 (229)	12.6 (320)	14.6 (370)	10.0 (254)	
3 (Sgl.)	969N91	2.1 (52)	2.7 (67)	1.3 (34)	2.6 (66)	1.3 (33)	3.4 (85)	9.5 (242)	8.0 (203)	10.6 (270)	18.2 (463)	15.2 (386)	13.0 (330)	
3 (Dbl.)	970N91	2.1 (52)	2.7 (67)	1.3 (34)	2.6 (66)	1.3 (33)	3.4 (85)	9.5 (242)	8.0 (203)	10.6 (270)	18.2 (463)	15.2 (386)	13.0 (330)	

Flow Control Kits

The interposed flow control independently adjusts the speed of a cylinder's extend and retract motions. This action is achieved by throttling the flow of exhaust air through ports 3 and 5 by means of a separate needle valve across each of these ports. These interposed devices are “sandwich” style, mounting between a valve and a base or manifold.

ISO Size	Part Number	Dimensions inches (mm)		
		A	B	C
1	1371N77	0.9 (24)	3.8 (97)	1.7 (43)
2	1372N77	1.3 (33)	5.1 (130)	2.0 (51)
3	1373N77	1.6 (41)	5.6 (142)	2.6 (66)



Transition Plates

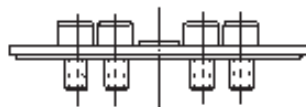
To bank different manifold sizes together.

ISO 1 to ISO 2	Part Number
Left to right	1387N77
Right to left	1388N77

ISO 2 to ISO 3	Part Number
Left to right	1389N77
Right to left	1390N77

Blank Station Kits

A blank station plate is used to cover the top of a manifold station not in use.



ISO Size	Part Number
1	1381N77
2	1382N77
3	1383N77

Pilot Port Blocking Plug

The pilot blocking plug blocks the pilot ports between manifold stations.



ISO Size	Part Number
1	1375N77
2	1377N77
3	1379N77

Blocking Disk Kits

A blocking disk closes the ports between manifold stations.



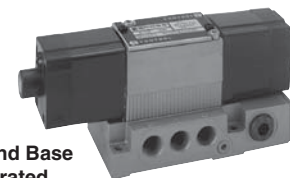
ISO Size	Part Number
1	1376N77
2	1378N77
3	1380N77

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

ANSI Spool & Sleeve Valves Series W70

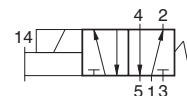
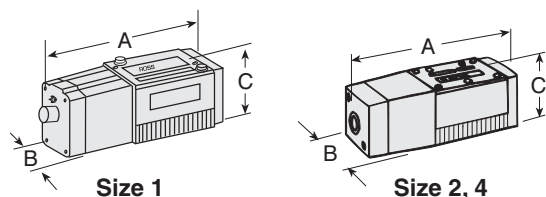
Direct Solenoid

- Designed for high cycle rates and long life
- Micro-thin air bearing between spool and sleeve assures quick valve response
- No seals to wear out
- Suitable for vacuum service



Valve and Base Illustrated

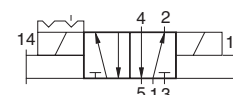
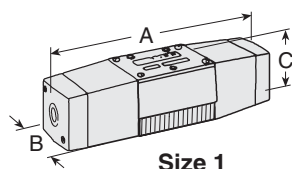
5/2 Valves – Single Direct Solenoid, Spring Return



ANSI Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W7016B2331**	1.0	7.0 (177)	2.0 (50)	2.3 (58)	3.5 (1.6)
2.5	3/8 - 1/2	W7016A3331**	2.5	8.3 (209)	2.6 (66)	2.6 (66)	3.3 (1.5)
4	3/8 - 3/4	W7016C4331**	4.2	10.0 (254)	3.5 (88)	2.8 (70)	4.3 (1.9)

* Sub-base not included. See pages 29-30 for sub-bases, manifolds and accessories.

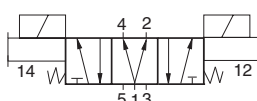
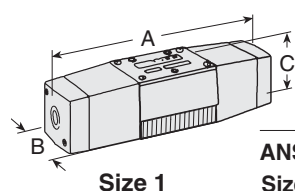
5/2 Valves – Double Direct Solenoid, Detented



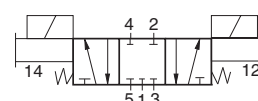
ANSI Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W7016B2332**	1.0	8.9 (226)	2.0 (50)	2.3 (58)	4.5 (2.0)
2.5	3/8 - 1/2	W7016A3332**	2.5	10.8 (273)	2.6 (66)	2.6 (66)	5.0 (2.3)
4	3/8 - 3/4	W7016C4332**	4.2	13.2 (335)	3.5 (88)	2.8 (70)	5.8 (2.6)

* Sub-base not included. See pages 29-30 for sub-bases, manifolds and accessories.

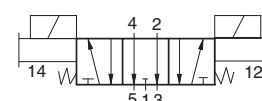
5/3 Valves – Double Direct Solenoid



Power Center



Closed Center



Open Center

ANSI Size	Port Size	Valve Model Number*			Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Power Center	Closed Center	Open Center		A	B	C	
1	1/8 - 3/8	W7017B2905**	W7017B2331**	W7017B2332**	1.0	8.9 (226)	2.0 (50)	2.3 (58)	4.5 (2.0)
2.5	3/8 - 1/2	—	W7017A3331**	W7017A3332**	2.5	10.8 (273)	2.6 (66)	2.6 (66)	5.0 (2.3)
4	1/2 - 3/4	—	W7017C4331**	W7017C4332**	4.2	13.2 (335)	3.5 (88)	2.8 (70)	5.8 (2.6)

* Sub-base not included. See pages 29-30 for sub-bases, manifolds and accessories.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., W7016B2331W, W7016B2331Z.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC power; DC for size 1 models only.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid.

Size 1 models: 140 VA inrush, 30 VA holding on 50 or 60 Hz;

20 watts on DC.

Size 2.5 and 4: 380 VA inrush, 79 VA holding.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: Vacuum to 150 psig (10 bar).

Manual Override: Flush; rubber non-locking.

Certification: By CSA according to UL 429 and CSA 22.2-139.

Options:

Indicator Light: Optional in Base/Manifold, see page 29.

For other temperature ranges, consult ROSS.

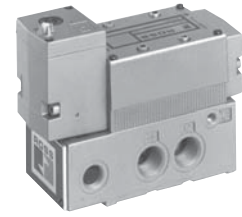
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



ANSI Spool & Sleeve Valves Series W70

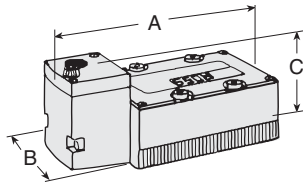
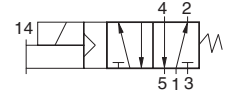
Solenoid Pilot Controlled

- Designed for high cycle rates and long life
- Micro-thin air bearing between spool and sleeve assures quick valve response
- No seals to wear out
- Suitable for vacuum service (with external pilot supply)



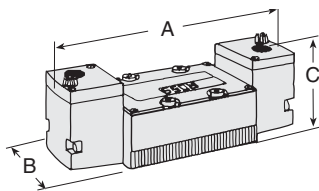
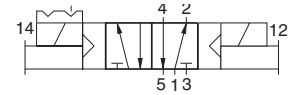
Valve and Base Illustrated

5/2 Valves – Single Solenoid Pilot Controlled, Spring Return



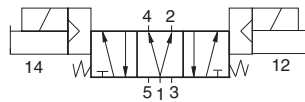
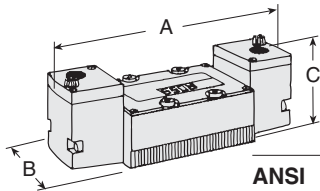
ANSI Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W7076B2331**	1.0	6.4 (163)	2.0 (50)	2.4 (59)	3.0 (1.4)
2.5	3/8 - 1/2	W7076A3331**	2.5	7.3 (185)	2.7 (67)	3.6 (91)	3.0 (1.4)
4	3/8 - 3/4	W7076D4331**	4.2	8.4 (212)	3.5 (88)	4.0 (101)	5.3 (2.4)
10	3/4 - 1 1/4	W7076C6331**	10	9.8 (249)	3.9 (99)	4.0 (101)	7.3 (3.3)
20	1 1/4 - 1 1/2	W7076C8331**	22	15 (381)	5.6 (142)	4.1 (104)	14.5 (6.5)

5/2 Valves – Double Solenoid Pilot Controlled, Detented

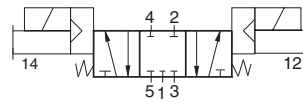


ANSI Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W7076B2332**	1.0	7.7 (194)	2.0 (50)	2.4 (59)	4.0 (1.8)
2.5	3/8 - 1/2	W7076A3332**	2.5	8.8 (224)	2.7 (67)	3.6 (91)	4.0 (1.8)
4	3/8 - 3/4	W7076D4332**	4.2	9.8 (249)	3.5 (88)	4.0 (101)	6.5 (2.9)
10	3/4 - 1 1/4	W7076C6332**	10	11.3 (286)	3.9 (99)	4.0 (101)	9.0 (4.1)
20	1 1/4 - 1 1/2	W7076C8332**	22	16.5 (417)	5.6 (142)	4.1 (104)	15.8 (6.8)

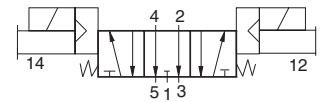
5/3 Valves – Double Solenoid Pilot Controlled



Power Center



Closed Center



Open Center

ANSI Size	Port Size	Valve Model Number*			Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Power Center	Closed Center	Open Center		A	B	C	
1	1/4 - 3/8	W7077B2906**	W7077B2331**	W7077B2332**	1.0	7.7 (194)	2.0 (50)	2.4 (59)	4.0 (1.8)
2.5	3/8 - 1/2	W7077A3904**	W7077A3331**	W7077A3332**	2.5	8.8 (224)	2.7 (67)	3.6 (91)	4.0 (1.8)
4	3/8 - 3/4	W7077C4939**	W7077D4331**	W7077D4332**	4.2	9.8 (249)	3.5 (88)	4.0 (101)	6.5 (2.9)
10	3/4 - 1 1/4	W7077A6920**	W7077C6331**	W7077C6332**	10	12.1 (307)	3.9 (99)	4.0 (101)	8.5 (3.8)
20	1 1/4 - 1 1/2	W7077A8901**	W7077C8331**	W7077C8332**	22	16.5 (417)	5.6 (142)	4.1 (104)	15.3 (6.9)

* Sub-base not included. See pages 29-30 for sub-bases, manifolds and accessories.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 100-110/50, 100-130/60 volts AC/Hz; e.g., W7076B2331W, W7076B2331Z.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 100-110/50, 100-130/60 volts AC/Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid.

Size 1 models: 10 VA inrush, 24 VA holding on 50 or 60 Hz;

5 watts on DC.

All other sizes: 87 VA inrush, 55 VA holding on 50 or 60 Hz;

14 watts on DC.

Ambient Temperature: 40° to 120°F (4°C to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: Vacuum to 150 psig (10 bar).

Pilot Pressure: Size 1 & 20 models: At least 30 psig (2 bar).

Size 2.5, 4 & 10 models: At least 15 psig (1 bar).

Indicator Light: Size 4, 10 & 20 models only.

Manual Override: Flush; rubber, non-locking.

Certification: By CSA according to UL 429 and CSA 22.2-139.

Options:

Indicator Light: Optional in Base/Manifold, see page 29.

For other temperature ranges, consult ROSS.

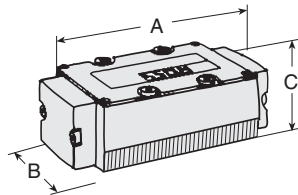
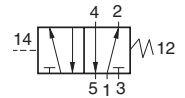
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

ANSI Spool & Sleeve Valves Series W70

Pressure Controlled

- Designed for high cycle rates and long life
- Micro-thin air bearing between spool and sleeve assures quick valve response
- No seals to wear out
- Suitable for vacuum service (with external pilot supply)

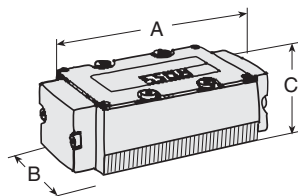
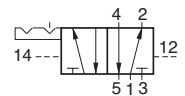
5/2 Valves – Single Pressure Controlled, Spring Return



ANSI Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W7056B2331	1.0	5.1(128)	2.0 (50)	2.3 (58)	2.5 (1.1)
2.5	3/8 - 1/2	W7056A3331	2.5	5.7 (145)	2.6 (66)	2.6 (66)	2.0 (0.9)
4	3/8 - 3/4	W7056B4331	4.2	6.9 (174)	3.5 (88)	2.8 (70)	4.3 (1.9)
10	3/4 - 1¼	W7056A6331	10	8.3 (211)	3.9 (99)	2.7 (68)	6.3 (2.8)
20	1¼ - 1½	W7056A8331	22	13.5 (342)	5.6 (142)	3.0 (76)	13.0 (5.9)

* Sub-base not included. See pages 29-30 for sub-bases, manifolds and accessories.

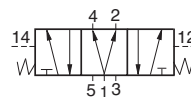
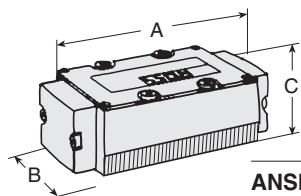
5/2 Valves – Double Pressure Controlled, Detented



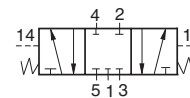
ANSI Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1	1/4 - 3/8	W7056B2332	1.0	5.1(128)	2.0 (50)	2.3 (58)	2.5 (1.1)
2.5	3/8 - 1/2	W7056A3332	2.5	5.7 (145)	2.6 (66)	2.6 (66)	2.0 (0.9)
4	3/8 - 3/4	W7056B4332	4.2	6.9 (174)	3.5 (88)	2.8 (70)	4.3 (1.9)
10	3/4 - 1¼	W7056A6332	10	8.3 (211)	3.9 (99)	2.7 (68)	6.3 (2.8)
20	1¼ - 1½	W7056A8332	22	13.5 (342)	5.6 (142)	3.0 (76)	13.8 (6.2)

* Sub-base not included. See pages 29-30 for sub-bases, manifolds and accessories.

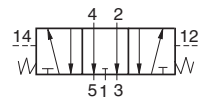
5/3 Valves – Double Pressure Controlled



Power Center



Closed Center



Open Center

ANSI Size	Port Size	Valve Model Number*			Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Power Center	Closed Center	Open Center		A	B	C	
1	1/8 - 3/8	–	W7057B2331	W7057B2332	1.0	5.1(128)	2.0 (50)	2.3 (58)	2.5 (1.1)
2.5	3/8 - 1/2	–	W7057A3331	W7057A3332	2.5	5.7 (145)	2.6 (66)	2.6 (66)	2.0 (0.9)
4	1/2 - 3/4	–	W7057B4331	W7057B4332	4.2	6.9 (174)	3.5 (88)	2.8 (70)	4.5 (2.0)
10	3/4 - 1¼	W7057A6902	W7057A6331	W7057A6332	10	8.3 (211)	3.9 (99)	2.7 (68)	6.3 (2.8)
20	1¼ - 1½	–	W7057A8331	W7057A8332	22	13.5 (342)	5.6 (142)	3.0 (76)	13.8 (6.2)

* Sub-base not included. See pages 29-30 for sub-bases, manifolds and accessories.

STANDARD SPECIFICATIONS (for valves on this page):

Ambient Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: Vacuum to 150 psig (10 bar).

Pilot Pressure:

Size 1 & 20 models: At least 30 psig (2 bar).

Size 2.5, 4 & 10 models: At least 15 psig (1 bar).

For other temperature ranges, consult ROSS.

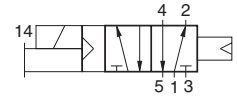
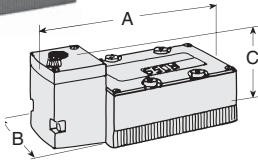
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



ANSI Poppet Valves Series W74

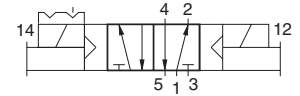
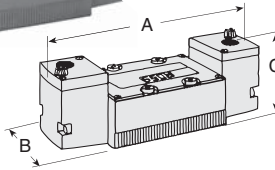
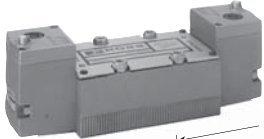
Solenoid Pilot Controlled Pressure Controlled

5/2 Valves – Single Solenoid Pilot Controlled, Air Return



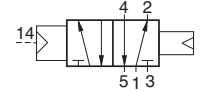
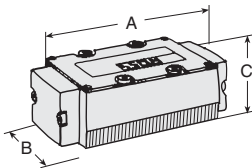
ANSI Size	Port Size	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Std. Temp.	High Temp.		A	B	C	
1	1/4 - 3/8	W7476B2331**	W7476B2336**	0.9	6.5 (164)	2.0 (50)	2.4 (59)	3.0 (1.4)
2.5	3/8 - 1/2	W7476A3331**	W7476A3336**	2.0	7.3 (185)	2.7 (67)	3.6 (91)	3.0 (1.4)
4	3/8 - 3/4	W7476C4331**	W7476B4336**	4.2	8.4 (212)	3.5 (88)	4.0 (101)	5.0 (2.3)
10	3/4 - 1 1/4	W7476A6331**	W7476A6336**	11	9.8 (249)	3.9 (99)	4.0 (101)	6.1 (2.8)
20	1 1/4 - 1 1/2	W7476A8331**	W7476A8336**	22	15.0 (381)	5.6 (142)	4.1 (104)	18.5 (8.3)

5/2 Valves – Double Solenoid Pilot Controlled, Detented



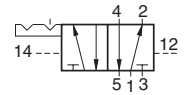
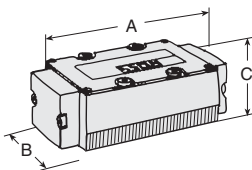
ANSI Size	Port Size	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Std. Temp.	High Temp.		A	B	C	
1	1/4 - 3/8	W7476B2332**	W7476B2337**	0.9	7.7 (194)	2.0 (50)	2.4 (59)	3.5 (1.6)
2.5	3/8 - 1/2	W7476A3332**	W7476A3337**	2.0	8.8 (224)	2.7 (67)	3.6 (91)	4.0 (1.8)
4	3/8 - 3/4	W7476C4332**	W7476C4337**	4.2	9.8 (249)	3.5 (88)	4.0 (101)	5.5 (2.5)
10	3/4 - 1 1/4	W7476A6332**	W7476A6337**	11	11.3 (286)	3.9 (99)	4.0 (101)	10.8 (4.9)
20	1 1/4 - 1 1/2	W7476A8332**	W7476A8337**	22	16.5 (417)	5.6 (142)	4.1 (104)	19.8 (8.9)

5/2 Valves – Single Pressure Controlled, Air Return



ANSI Size	Port Size	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Std. Temp.	High Temp.		A	B	C	
1	1/4 - 3/8	W7456B2331	W7456B2336	0.9	5.1 (128)	2.0 (50)	2.3 (58)	2.5 (1.1)
2.5	3/8 - 1/2	W7456A3331	W7456A3336	2.0	5.7 (145)	2.6 (66)	2.6 (66)	2.0 (0.9)
4	3/8 - 3/4	W7456C4331	W7456C4336	4.2	6.9 (174)	3.5 (88)	2.8 (70)	3.3 (1.5)
10	3/4 - 1 1/4	W7456A6331	W7456A6336	11	8.3 (211)	3.9 (99)	2.7 (68)	7.3 (3.3)
20	1 1/4 - 1 1/2	W7456A8331	W7456A8336	22	13.5 (342)	5.6 (142)	3.0 (76)	17.5 (7.9)

5/2 Valves – Double Pressure Controlled, Detented



ANSI Size	Port Size	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Std. Temp.	High Temp.		A	B	C	
1	1/4 - 3/8	W7456B2332	W7456B2337	0.9	5.1 (128)	2.0 (50)	2.3 (58)	2.5 (1.1)
2.5	3/8 - 1/2	W7456A3332	W7456A3337	2.0	5.7 (145)	2.6 (66)	2.6 (66)	2.0 (0.9)
4	3/8 - 3/4	W7456C4332	W7456C4337	4.2	6.9 (174)	3.5 (88)	2.8 (70)	3.3 (1.5)
10	3/4 - 1 1/4	W7456A6332	W7456A6337	11	8.3 (211)	3.9 (99)	2.7 (68)	7.3 (3.3)
20	1 1/4 - 1 1/2	W7456A8332	W7456A8337	22	13.5 (342)	5.6 (142)	3.0 (76)	17.5 (7.9)

* Sub-base not included. See pages 29-30 for sub-bases, manifolds and accessories.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110/50, 110-120/60 volts AC/Hz; e.g., W7476B2331W, W7476B2331Z.



STANDARD SPECIFICATIONS (for valves on this page):

Solenoid Pilot Controlled:

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110/50, 110-120/60 volts AC/Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid.

Size 1 models: 10 VA inrush, 24 VA holding on 50 or 60 Hz;

5 watts on DC.

All other sizes: 87 VA inrush, 55 VA holding on 50 or 60 Hz;

15 watts on DC. **Indicator Light:** Size 4, 10 & 20 models only.

Ambient Temperature: 40° to 120°F (4° to 50°C); extended to 175°F (80°C) for High Temperature models.

Indicator Light: Included, one per solenoid.

Manual Override: Flush; rubber, non-locking.

Certification: By CSA according to UL 429 and CSA 22.2-139.

Pressure Controlled:

Ambient Temperature: 40° to 175°F (4° to 80°C).

Common Specifications:

Media Temperature: 40° to 175°F (4° to 80°C); extended to 220°F (105°C) for High Temperature models.

Flow Media: Filtered air.

Inlet Pressure: 30 to 150 psig (2 to 10 bar).

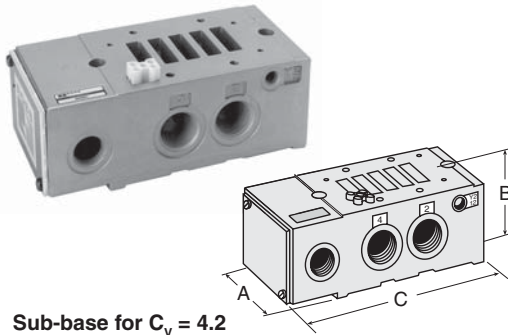
Pilot Pressure: Must be equal to or greater than inlet pressure.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

ANSI Sub-Bases & Manifolds

for Series W70 & W74

Sub-Bases for ANSI Valves



Sub-base for $C_v = 4.2$ valve illustrated

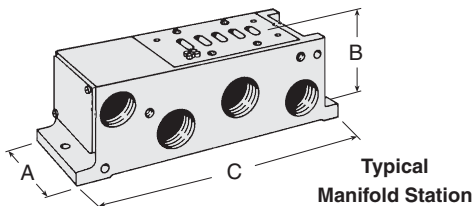
The sub-base numbers shown in the chart on the right specify pressure ports with NPT threads, and electrical openings with 1/2 NPT threads.

Electrical connection conforming to ANSI standard B93.55M is available. For more information, refer to ROSS Bulletin 379B (form number A10090).

ANSI Sub-base Model Numbers

Type of Sub-Base	Outlet Port	Indicator Lights in Base*			Avg. C_v	Dimensions inches (mm)		
		None	One	Two		A	B	C
Side Ported	1/4	500B91	525K91**	526K91**	0.9 to 1.0	2.8 (72)	1.6 (41)	6.2 (157)
	3/8	501B91	527K91**	528K91**	0.9 to 1.0	2.8 (72)	1.6 (41)	6.2 (157)
	3/8	474K91	482K91**	484K91**	2.0 to 2.5	3.6 (91)	1.5 (37)	7.1 (180)
	1/2	475K91	483K91**	485K91**	2.0 to 2.5	3.6 (91)	1.5 (37)	7.1 (180)
	3/8	361B91	—	—	4.2	3.3 (84)	2.7 (67)	7.2 (183)
	1/2	362B91	—	—	4.2	3.3 (84)	2.7 (67)	7.2 (183)
	3/4	363B91	—	—	4.2	3.3 (84)	2.7 (67)	7.2 (183)
	3/4	364B91	—	—	10 to 11	5.1 (130)	3.8 (96)	10.5 (266)
	1	365B91	—	—	10 to 11	5.1 (130)	3.8 (96)	10.5 (266)
	1 1/4	366B91	—	—	10 to 11	5.1 (130)	3.8 (96)	10.5 (266)
Side and Bottom Ported	1 1/4	367B91	—	—	22	6.4 (163)	3.7 (94)	12.4 (314)
	1 1/2	368B91	—	—	22	6.4 (163)	3.7 (94)	12.4 (314)
	1/4	499B91	529K91**	530K91**	0.9 to 1.0	2.8 (72)	1.5 (37)	6.2 (157)
	3/8	476K91	477K91**	486K91**	2.0 to 2.5	3.6 (91)	1.5 (37)	7.1 (180)
	3/8	369B91	—	—	4.2	3.4 (86)	2.7 (67)	7.2 (183)
	1/2	370B91	—	—	4.2	3.4 (86)	2.7 (67)	7.2 (183)
	3/4	371B91	—	—	4.2	3.4 (86)	2.7 (67)	7.2 (183)
	3/4	372B91	—	—	10 to 11	5.1 (130)	3.9 (99)	10.5 (266)
	1	373B91	—	—	10 to 11	5.1 (130)	3.9 (99)	10.5 (266)
	1 1/4	374B91	—	—	10 to 11	5.1 (130)	3.9 (99)	10.5 (266)
Bottom Ported	1 1/4	375B91	—	—	22	6.4 (163)	3.8 (98)	12.4 (314)
	1 1/2	376B91	—	—	22	6.4 (163)	3.8 (98)	12.4 (314)

Manifolds for ANSI Valves



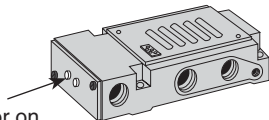
Typical Manifold Station

The numbers of the manifold stations shown in the chart on the right specify pressure ports with NPT threads and electrical openings with 1 1/4 NPT threads. All necessary hardware and seals for manifold assembly are included with each manifold station.

Indicator Lights:

As shown in the chart the smaller sizes of manifolds are available with indicator lights. These lights are located in the end plate covering the electrical cavity.

Lights are mounted in bases, on the valves, or on solenoids, depending on the particular type of valve.



Manifold Note: The port positions of the solenoid controlled and the pressure controlled manifolds are not the same. For this reason these stations cannot be mixed in the same installation.

If both types of valves *must* be used in the same installation, *use only manifold stations for solenoid controlled valves.*

ANSI Manifolds Model Numbers

Type of Manifold	Outlet Port	Indicator Lights in Manifold*			Avg. C_v	Dimensions inches (mm)		
		None	One	Two		A	B	C
For Solenoid Controlled Valves	1/4	502B91	531K91**	532K91**	0.9 to 1.0	2.3 (57)	2.3 (58)	8.0 (205)
	3/8	503B91	533K91**	534K91**	0.9 to 1.0	2.3 (57)	2.3 (58)	8.0 (205)
	3/8	472K91	478K91**	480K91**	2.0 to 2.5	2.3 (57)	2.3 (57)	8.0 (205)
	1/2	473K91	479K91**	481K91**	2.0 to 2.5	2.3 (57)	2.3 (57)	8.0 (205)
	3/4	380B91	—	—	10 to 11	4.25 (108)	4.1 (104)	13.3 (338)
	1	381B91	—	—	10 to 11	4.25 (108)	4.1 (104)	13.3 (338)
	1 1/4	382B91	—	—	10 to 11	4.25 (108)	4.1 (104)	13.3 (338)
	1/4	359B91	—	—	0.9 to 1.0	2.26 (57)	2.3 (58)	6.3 (160)
	3/8	360B91	—	—	0.9 to 1.0	2.26 (57)	2.3 (58)	6.3 (160)
	3/8	468B91	—	—	2.0 to 2.5	2.80 (71)	2.7 (69)	6.9 (174)
For Pressure Controlled Valves	1/2	469B91	—	—	2.0 to 2.5	2.80 (71)	2.7 (69)	6.9 (174)
	3/8	383B91	—	—	4.2	3.54 (90)	3.7 (94)	9.2 (232)
	1/2	384B91	—	—	4.2	3.54 (90)	3.7 (94)	9.2 (232)
	3/4	385B91	—	—	4.2	3.54 (90)	3.7 (94)	9.2 (232)
	3/4	386B91	—	—	10 to 11	4.25 (108)	4.1 (104)	13.3 (338)
	1	387B91	—	—	10 to 11	4.25 (108)	4.1 (104)	13.3 (338)
	1 1/4	388B91	—	—	10 to 11	4.25 (108)	4.1 (104)	13.3 (338)

*NPT port threads. For BSPP threads, add a "D" prefix to the model number, e.g., D502B91; for JIS threads, add a "J" prefix to the model number, e.g., J502B91.

Standard Voltages: 24 volts DC; 100-120 volts AC, 50/60 Hz. For other voltages, see page 113.

Note: Specify voltage when ordering.

** Insert voltage code: "-W" = 24 volts DC; "-Z" = 110-120 volts AC, 50/60 Hz; e.g., 525K91-W, 525K91-Z.

ASSEMBLED MANIFOLDS

Valves and manifold stations can be assembled by ROSS to precise specifications. The assembly is then ready for integration into your system.

For detailed information about such assemblies, consult your ROSS Distributor or call ROSS in the U.S.A. at 1-888-TEK-ROSS (835-7677) or 1-706-356-3708.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Interposed Pressure Regulators

Both single and double interposed regulators are available for valves with C_v ratings up to 4.2. A regulator is bolted to the valve's sub-base or manifold station, and the valve is then bolted to the regulator. This mounting method allows the valve to be removed and replaced without disturbing the regulator.

Single pressure regulators provide the same regulated pressure at both outlet ports. Double pressure regulators allow the pressure at each outlet port to be set independently.

A locking type knob is used to set the regulated pressure at any point in the range of:

- 5 to 100 psig (0.3 to 7 bar) for size 1 and 2 models;
- 5 to 125 psig (0.3 to 8.5 bar) for size = 4.2 models.

Maximum inlet pressure is 150 psig (10 bar).

Pressure gauge(s) included.

Order regulators by the part numbers shown at the right.

	Model Number		
	Single Solenoid	Double * Solenoid	Single Remote Air
$C_v = 0.9$, Size 1 Valves:	840C91	841C91	713C91
$C_v = 2.0$, Size 2.5 Valves:	626C91	627C91	714C91
$C_v = 4.2$, Size 4 Valves:	632C91	633C91	715C91

* Double regulator only for W70 spool valves.

WARNING: Double interposed regulators will reverse output ports - the 12 solenoid will pressurize the 4 port, the 14 solenoid will pressurize the 2 port - which may cause unexpected, potentially dangerous cylinder movement at valve pressurization.

Manual Override Kits for ANSI Valves, Solenoid Pilot Controlled - Sizes 2.5, 4, 10, 20

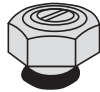
Flush flexible manual overrides are standard on solenoid pilot controlled valves with C_v ratings of 2.0 or larger. Both locking and non-locking metal override buttons are also available for these models.

Each of the override buttons in the kits at the right is made of metal and is spring-returned. The locking type button, however, can be kept in the actuated position by turning the slot in the top of the button with a screwdriver.

Order by the kit numbers shown below.

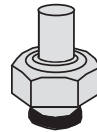
FLUSH BUTTON

Type	Kit Number
Locking	792K87
Non-locking	790K87



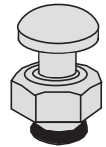
EXTENDED BUTTON

Type	Kit Number
Non-locking	791K87



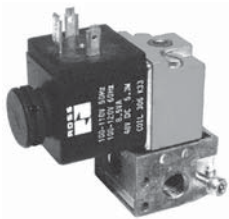
EXTENDED BUTTON with PALM

Type	Kit Number
Non-locking	984H87



3-Way Miniature Valves Series W14

for Base Mounting



VALVE MODEL NUMBERS

With locking manual override..... **W1413A1408****

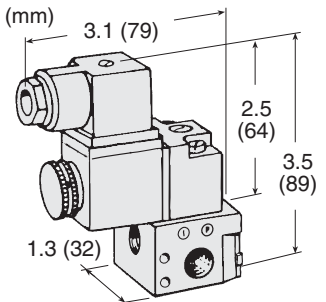
With non-locking manual override ... **W1413A1409****

BASES: 1/8 NPT ports threads.
For BSPP threads, add a "D" prefix to the model number.

Sub-Base..... **516B91**

Manifold **535K91**

DIMENSIONS – inches (mm)



Valve is shown with electrical connector and on a base.
Electrical connector, optional.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., W1413A1408W, W1413A1408Z.

STANDARD SPECIFICATIONS (for 3/2 Miniature valves):

C_v Rating: 0.1.

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 8 VA inrush, 6 VA holding on 50 or 60 Hz; 6 watts on DC.

Ambient Temperature: 5° to 120°F (-15° to 50°C).

Media Temperature: 5° to 175°F (-15° to 80°C).

For temperatures below 40°F (4°C) air must be free of water vapor to prevent formation of ice.

Flow Media: Filtered air.

Inlet Pressure: Vacuum to 150 psig (10 bar).

Manual Override: Flush; metal, locking and non-locking.

Options:

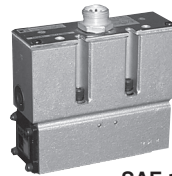
Indicator Light: Optional in electrical connector, see page 18.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

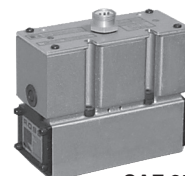
SAE Spool & Sleeve Valves Series 80

Solenoid Pilot Controlled

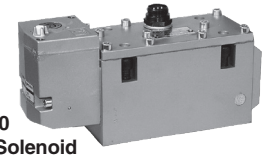
- Micro-thin air bearing between spool and sleeve assures quick valve response
- Designed for high cycle rates and long life
- No seals to wear out
- Suitable for vacuum service (with external pilot supply)



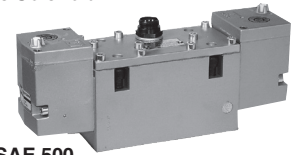
SAE 125



SAE 250



SAE 500
Single Solenoid



SAE 500
Double Solenoid

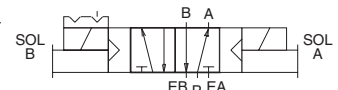
5/2 Spool Valves – Solenoid Pilot Controlled

Valve Model Numbers*

SAE Size	Chrysler Wired 5-pin micro-connector	Chrysler Wired 5-pin micro-connector	Ford Wired 5-pin mini-connector	Chrysler Wired 5-pin mini-connector	Hardwire	Ford Wired 4-pin micro-connector	Avg. C _v
	(120 volts / 60 Hz)	(24 volts DC)	(all voltages)	(all voltages)		(24 volts DC)	
Single Solenoid Pilot Valves							
125	8076C3311	8076C3321	8076C3331**	8076C3341**	8076C3351**	8076C3361	1.4
250	8076C4311	8076C4321	8076C4331**	8076C4341**	8076C4351**	8076C4361	4.0
500	8076B6311	8076B6321	8076B6331**	8076B6341**	8076B6351**	8076B4361	8.2
Double Solenoid Pilot Valves							
125	8076C3312	8076C3322	8076C3332**	8076C3342**	8076C3352**	8076C336	1.4
250	8076C4312	8076C4322	8076C4332**	8076C4342**	8076C4352**	8076C4362	4.0
500	8076B6312	8076B6322	8076B6332**	8076B6342**	8076B6352**	8076B6362	8.0



Single Solenoid



Double Solenoid

Note: For wiring diagrams, see page 32.

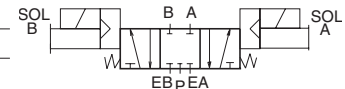
5/3 Spool Valves – Solenoid Pilot Controlled

Valve Model Numbers*

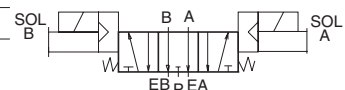
SAE Size	Chrysler Wired 5-pin micro-connector	Chrysler Wired 5-pin micro-connector	Ford Wired 5-pin mini-connector	Chrysler Wired 5-pin mini-connector	Hardwire	Ford Wired 4-pin micro-connector	Avg. C _v
	(120 volts / 60 Hz)	(24 volts DC)	(all voltages)	(all voltages)		(24 volts DC)	
Power Center Solenoid Pilot Valves							
125	–	–	8077B3910**	8077B3904**	–	–	1.4
250	–	–	8077A4907**	8077A4904**	–	–	4.0
Closed Center Solenoid Pilot Valves							
125	8077C3311	8077C3321	8077C3331**	8077C3341**	8077C3351**	8077C3361	1.4
250	8077C4311	8077C4321	8077C4331**	8077C4341**	8077C4351**	8077C4361	4.0
500	8077B6311	8077B6321	8077B6331**	8077B6341**	8077B6351**	8077B6361	8.0
Open Center Solenoid Pilot Valves							
125	8077C3312	8077C3322	8077C3332**	8077C3342**	8077C3352**	8077C3362	1.4
250	8077C4312	8077C4322	8077C4332**	8077C4342**	8077C4352**	8077C4362	4.0
500	8077B6312	8077B6322	8077B6332**	8077B6342**	8077B6352**	8077B6362	8.0



Power Center



Closed Center



Open Center

* Sub-Bases not included. See pages 33-34 for sub-bases and manifolds.

Measurements – Dimensions & Weights: See page 33.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 8076C3331W, 8076C3331Z.

IMPORTANT NOTE:

The C_v values given for valves on this page should not be used in comparing ROSS valves with those of other makers. These C_v values are intended only for use with performance charts published by ROSS. The C_v ratings listed in this bulletin are averages for the various flow paths through the valve and are for steady flow conditions.

EXTERNAL PILOT SUPPLY Conversion, see instructions on page 32.

Pressure Controlled Spool & Sleeve Valves for ASE available, consult ROSS.

STANDARD SPECIFICATIONS (for valves on this page):
Solenoids: AC or DC power. Rated for continuous duty.
Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.
 For other voltages, see page 113.

Power Consumption: Each solenoid:
 SAE 125, 250 models: 8 VA inrush; 6 VA holding on 50/60 Hz;
 8 watts on DC.

SAE 500 models: 87 VA inrush; 30 VA holding on 50/60 Hz;
 14 watts on DC.

Indicator Light: One for each solenoid.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: Vacuum to 150 psig (10 bar).

Pilot Pressure: At least 15 psig (1 bar).

Manual Override: Flush; rubber, non-locking.

Options:

Interposed Pressure Regulators: Consult ROSS.

Manual Override: For SAE 500 sizes only, see page 34 for Manual Override Kits.

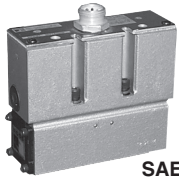
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



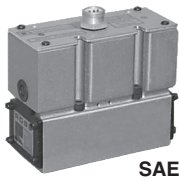
SAE Poppet Valves Series 84

Solenoid Pilot Controlled

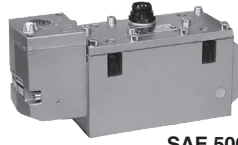
5/2 Valves – Solenoid Pilot Controlled



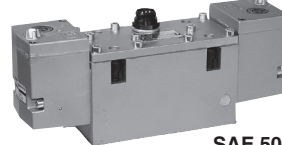
SAE 125
Single or Double Solenoid



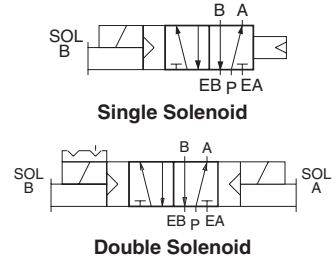
SAE 250
Single or Double Solenoid



SAE 500
Single Solenoid



SAE 500
Double Solenoid



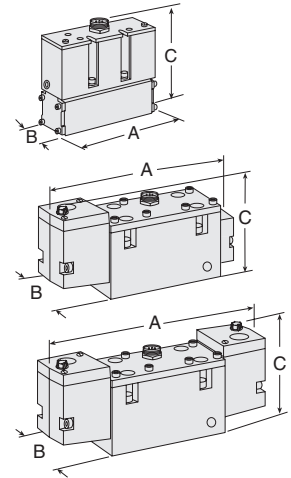
Valve Model Numbers*

SAE Size	Chrysler Wired 5-pin micro-connector (120 volts / 60 Hz)	Chrysler Wired 5-pin micro-connector (24 Volts DC)	Ford Wired 5-pin mini-connector (all voltages)	Chrysler Wired 5-pin mini-connector (all voltages)	Hardwire	Ford Wired 4-pin micro-connector (24 Volts DC)	Avg. C _v
Single Solenoid Pilot Valves							
125	8476C3311	8476C3321	8476C3331**	8476C3341**	8476C3351**	8076C3361	1.8
250	8476C4311	8476C4321	8476C4331**	8476C4341**	8476C4351**	8076C4361	5.5
500	8476B6311	8476B6321	8476B6331**	8476B6341**	8476B6351**	8076B4361	7.9
Double Solenoid Pilot Valves							
125	8476C3312	8476C3322	8476C3332**	8476C3342**	8476C3352**	8476C3362	1.8
250	8476C4312	8476C4322	8476C4332**	8476C4342**	8476C4352**	8476C4362	5.7
500	8476B6312	8476B6322	8476B6332**	8476B6342**	8476B6352**	8476B6362	7.6

* Sub-Bases not included. See pages 33-34 for sub-bases and manifolds.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 8476C3331W, 8476C3331Z.



IMPORTANT NOTE: The C_v values given for valves on this page should not be used in comparing ROSS valves with those of other makers. These C_v values are intended only for use with performance charts published by ROSS. The C_v ratings listed in this bulletin are averages for the various flow paths through the valve and are for steady flow conditions.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC or DC power. Rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid:

SAE 125, 250 models: 8 VA inrush; 6 VA holding on 50/60 Hz; 8 watts on DC.

SAE 500 models: 87 VA inrush; 30 VA holding on 50/60 Hz; 14 watts on DC.

Indicator Light: One for each solenoid.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 30 to 150 psig (2 to 10 bar).

Pilot Pressure: Must be equal to or greater than inlet pressure.

Manual Override: Flush; rubber non-locking.

Options:

Interposed Pressure Regulators: Consult ROSS.

Manual Override: For SAE 500 sizes only, see page 34 for Manual Override Kits.

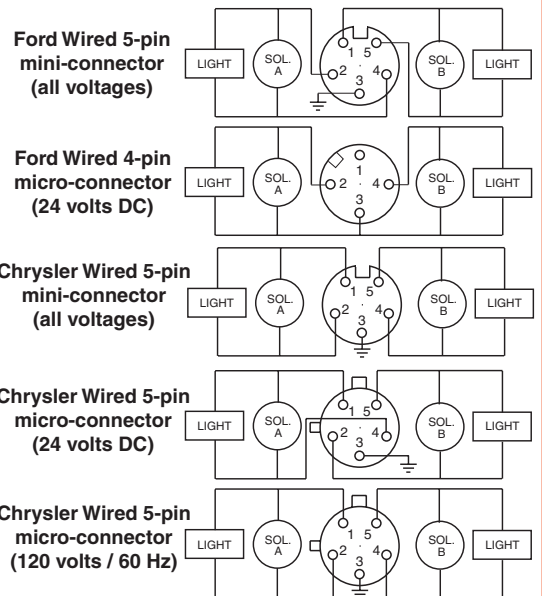
Pressure Controlled Spool & Sleeve Valves for ASE available, consult ROSS.

EXTERNAL PILOT SUPPLY Conversion

Solenoid pilot valves are designed to use an internal pilot supply. However, they are easily converted for use with an external pilot supply. To make this conversion, remove the pipe plug on the bottom of the valve. The plug is located between the center port and an adjacent port. Install this plug in the threaded port at the end of the center port. This blocks the internal pilot supply. Connect the external pilot supply line to port X in the base. Pressure in the external supply line must not be less than that specified in the valve's Standard Specifications.

Pilot Valve	SAE Size	Dimensions inches (mm)			Weight lb (kg)
		A	B	C	
Single Solenoid	125	5.5 (140)	1.8 (45)	5.1 (129)	2.8 (1.3)
	250	7.3 (185)	2.6 (65)	5.6 (142)	5.2 (2.4)
	500	10.1 (257)	3.0 (76)	4.8 (121)	7.7 (3.5)
Double Solenoid	125	5.5 (140)	1.8 (45)	5.1 (129)	3.3 (1.5)
	250	7.3 (185)	2.6 (65)	5.6 (142)	5.7 (2.6)
	500	11.2 (285)	3.0 (76)	7.1 (180)	8.9 (4.1)

Wiring Diagrams For Available Options



Interposed devices are also available, for more information, refer to Bulletin 376D (form number A10084).

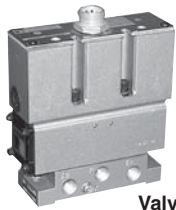
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

SAE Sub-Bases

for Valves Series 80 & 84

Side-Ported

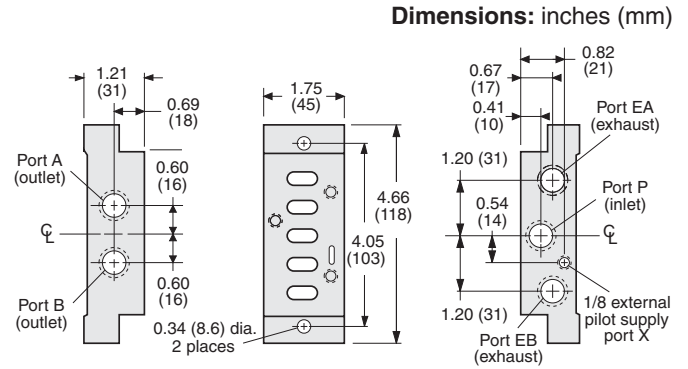
SAE 125



Valve and Base Illustrated

Sub-Base Model Number	Port Size*	
	A, B	P, EA, EB
577K91	1/8	1/4
578K91	1/4	3/8
579K91	3/8	3/8

* NPT threads.
For SAE threads, consult ROSS.



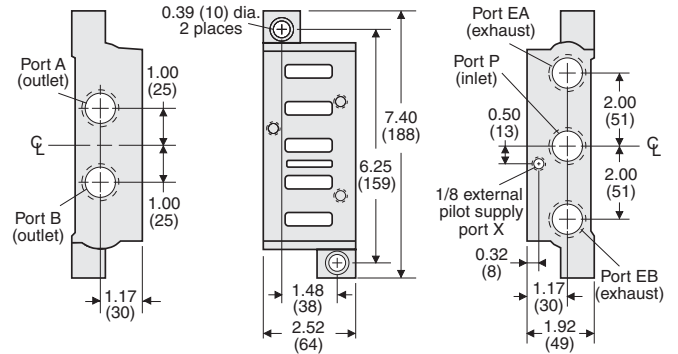
SAE 250



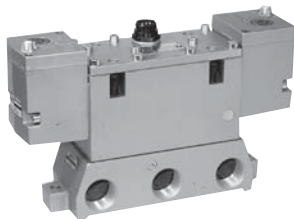
Valve and Base Illustrated

Sub-Base Model Number	Port Size*	
	A, B	P, EA, EB
539K91	1/4	3/8
540K91	3/8	1/2
541K91	1/2	1/2
542K91	3/4	3/4

* NPT threads.
For SAE threads, consult ROSS.



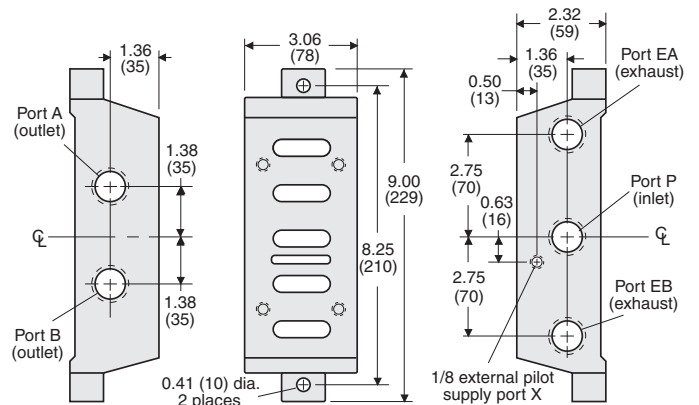
SAE 500



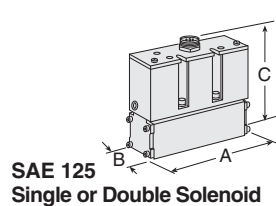
Valve and Base Illustrated

Sub-Base Model Number	Port Size*	
	A, B	P, EA, EB
582K91	1/2	3/4
728K91	3/4	3/4
583K91	3/4	1
584K91	1	1

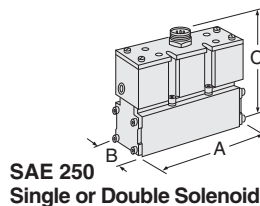
* NPT threads.
For SAE threads, consult ROSS.



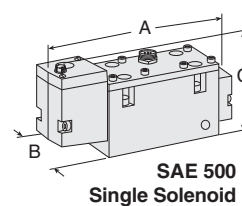
Measurements: Dimensions & Weights (for valves on page 31)



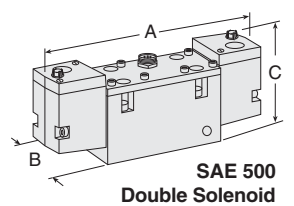
SAE 125 Single or Double Solenoid



SAE 250 Single or Double Solenoid



SAE 500 Single Solenoid



SAE 500 Double Solenoid

5/2 Spool Valves

Pilot Valve	SAE Size	Dimensions inches (mm)			Weight lb (kg)
		A	B	C	
Single Solenoid	125	5.5 (140)	1.8 (45)	5.1 (129)	3.5 (1.6)
	250	7.3 (185)	2.6 (65)	5.6 (142)	6.5 (2.9)
	500	10.1 (257)	3.0 (76)	4.8 (121)	8.3 (3.7)
Double Solenoid	125	5.5 (140)	1.8 (45)	5.1 (129)	3.5 (1.6)
	250	7.3 (185)	2.6 (65)	5.6 (142)	7.0 (3.2)
	500	11.2 (285)	3.0 (76)	4.8 (121)	9.5 (4.3)

5/3 Spool Valves

Pilot Valve	SAE Size	Dimensions inches (mm)			Weight lb (kg)
		A	B	C	
Power Center Solenoid	125	5.5 (140)	1.8 (45)	5.1 (129)	3.5 (1.6)
	250	7.3 (185)	2.6 (65)	5.6 (142)	7.0 (3.2)
Open or Closed Center Solenoid	125	5.5 (140)	1.8 (45)	5.1 (129)	3.5 (1.6)
	250	7.3 (185)	2.6 (65)	5.6 (142)	7.0 (3.2)
	500	11.2 (285)	3.0 (76)	4.8 (121)	9.5 (4.3)



IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

SAE Manifolds

for Valves Series 80 & 84

SAE 125

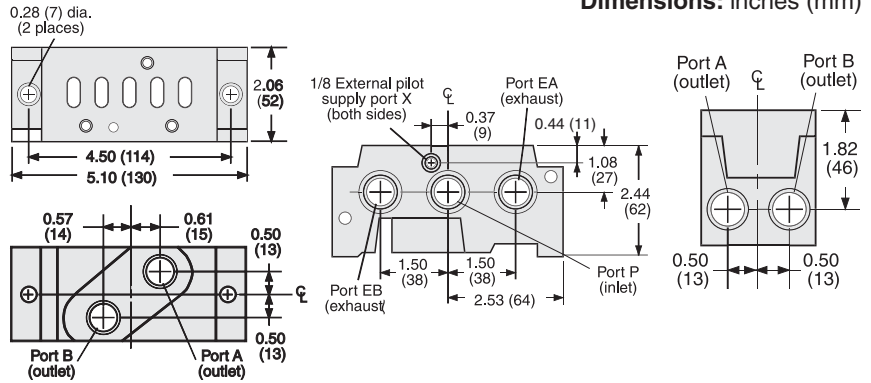
Station Model Number	Port Size*	
	A, B	P, EA, EB
580K91	1/4	3/8
581K91	3/8	3/8

* NPT threads. For SAE threads, consult ROSS.

Blanking Plate

For manifold stations not occupied by a valve, blanking plates are available. These plates block the unused air passages.

Order by part number **820K77**.



SAE 250

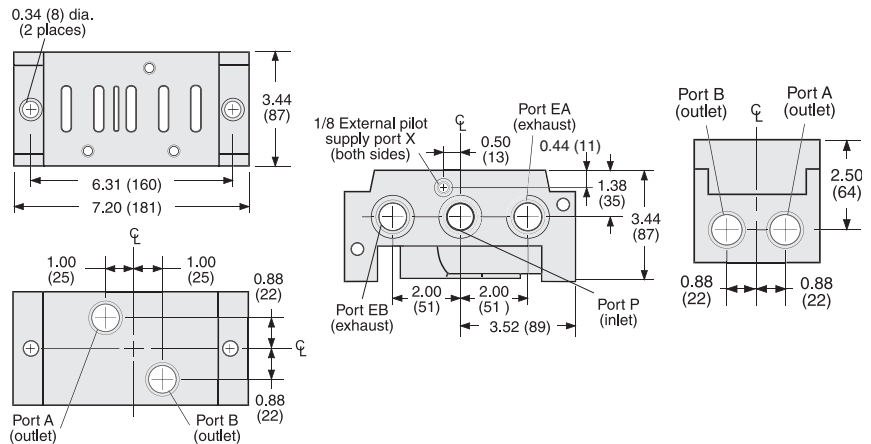
Station Model Number	Port Size*	
	A, B	P, EA, EB
553K91	3/8	1/2
554K91	1/2	3/4
555K91	3/4	3/4

* NPT threads. For SAE threads, consult ROSS.

Blanking Plate

For manifold stations not occupied by a valve, blanking plates are available. These plates block the unused air passages.

Order by part number **821K77**.



SAE 500

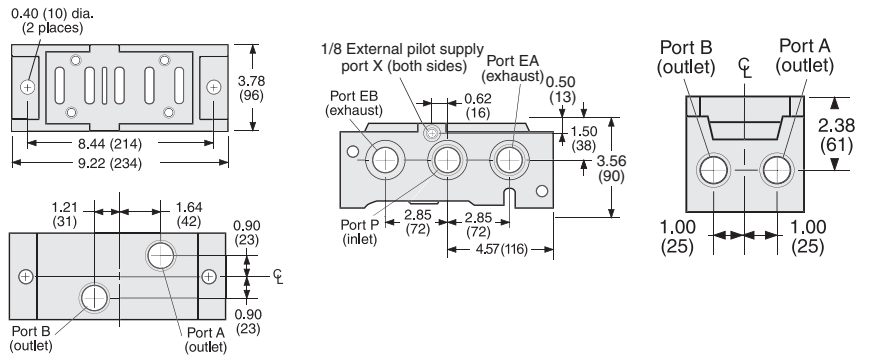
Station Model Number	Port Size*	
	A, B	P, EA, EB
585K91	1/2	3/4
586K91	3/4	1
587K91	1	1

* NPT threads. For SAE threads, consult ROSS.

Blanking Plate

For manifold stations not occupied by a valve, blanking plates are available. These plates block the unused air passages.

Order by part number **822K77**.



Each manifold station is supplied with all necessary seals and hardware for assembly. End stations are not required with these manifolds. Each station has all ports threaded to accept piping.

For more information, refer to Bulletin 376D (form number A10084).

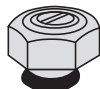
Optional Manual Override Kits for SAE 500

Flush flexible manual override buttons are standard on all SAE 500 solenoid pilot valves. Metal buttons as shown below can be installed in place of the standard flexible buttons. Both locking and non-locking metal buttons are available. Each button has spring-return action. The locking type button, however, can be kept in the actuated position by turning the slot in the top of the button with a screwdriver.

Order by the kit numbers shown below.

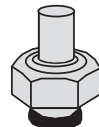
FLUSH BUTTON

Type	Kit Number
Locking	792K87



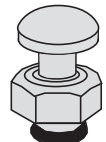
EXTENDED BUTTON

Type	Kit Number
Non-locking	791K87



EXTENDED BUTTON with PALM

Type	Kit Number
Non-locking	984H87



IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Poppet Valves Series 27

for Line Mounting

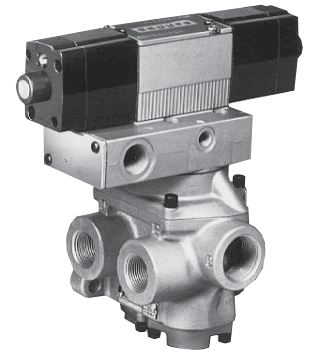
Series 27 Poppet valves for line mounting are available with single or double solenoid pilot control, or an air head for pressure control. Valve elements have end-guided stainless steel stems. Flush flexible manual override buttons are standard on solenoid models. Solenoid models listed in this catalog use an internal pilot supply. They are, however, easily field-convertible for use with an external pilot supply. Models for external pilot supply may also be ordered from ROSS.

Explosion-Proof Solenoid Pilot available, see page 42-43.

To provide special control functions, most models are also available with the following **LOGICAIR®** adaptors.



3/2 Valve with
Single Solenoid Pilot Control



4/2 Valve with
Double Solenoid Pilot Control

Timed Sequence Adaptor:



Timed-Out Adaptor

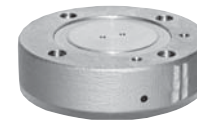


Dual Timed Adaptor

Allows the actuation and/or de-actuation of a valve to be delayed up to 30 seconds for 2/2 valves, and up to 3 seconds for 3/2 and 4/2 valves. The time delay function is controlled by a continuously adjustable tapered needle. Longer time delays can be obtained by using this adaptor in conjunction with the “Q” adaptor below.

“PB” Adaptor:

Increases the actuating force on the valve piston by means of a supplementary piston. The “PB” adaptor should be used when the main valve supply pressure exceeds the available pilot or signal pressure. It should also be used when the pilot or signal pressure is less than the minimum specified for the valve. Air line lubrication required with this adaptor. For valves having this adaptor, please consult ROSS.



3-way PB Adaptor



4-way PB Adaptor

Air Index Adaptor:



Allows a pressure controlled or single solenoid pilot controlled valve to function as an impulse controlled, mechanically detented valve. A momentary signal shifts and holds the valve. A second momentary signal returns the valve to its original position. Air line lubrication required with this adaptor. For valves having this adaptor, please consult ROSS.

“Q” Adaptor:

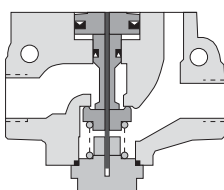
For use in conjunction with the timed sequence adaptor to extend the delay interval up to 60 seconds. It also helps to obtain “snap” action of the valve by keeping pilot or signal air off the main valve piston until the pressure has built high enough to cause prompt valve response. Air line lubrication is required with this adaptor.



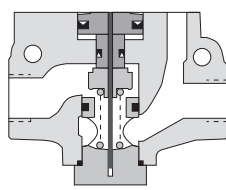
For additional information consult your ROSS distributor or call ROSS Technical Services in the U.S.A. at 1-888-TEK-ROSS (835-7677).

Series 27 Valve Bodies

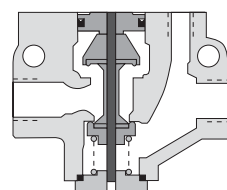
- FEATURES:**
- Poppet construction for near zero leakage & high dirt tolerance
 - Self-cleaning
 - Wear compensating
 - Repeatability throughout the life of the valve



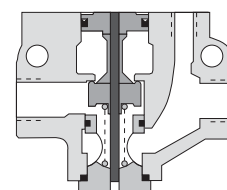
2/2 Normally Closed



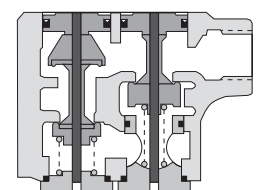
2/2 Normally Open



3/2 Normally Closed



3/2 Normally Open



4/2



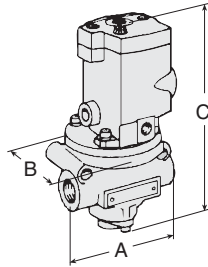
Poppet Valves for Line Mounting

Series 27

Solenoid Pilot Controlled

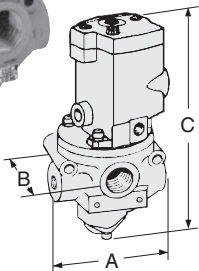
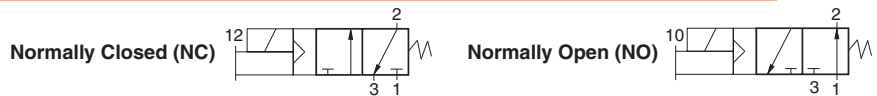
Single Solenoid Pilot Controlled

2/2 Valves



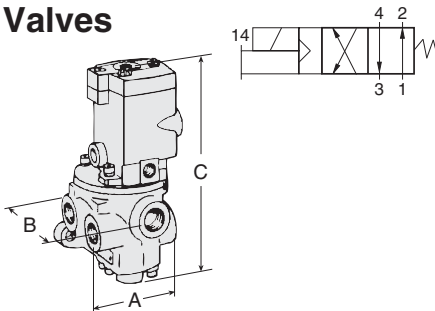
Port Size	Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
	1-2	NC	NO	NC	NO	A	B	
1/4	2771B2001**	2772B2001**	2.3	2.3	3.6 (91)	3.2 (79)	6.9 (175)	2.5 (1.2)
3/8	2771B3001**	2772B3001**	3.8	3.3	3.6 (91)	3.2 (79)	6.9 (175)	2.5 (1.2)
1/2	2771B4011**	2772B4011**	4.0	3.5	3.6 (91)	3.2 (79)	6.9 (175)	2.5 (1.2)
1/2	2771B4001**	2772B4001**	7.7	6.5	4.6 (116)	3.2 (79)	7.6 (193)	3.3 (1.5)
3/4	2771B5001**	2772B5001**	9.0	7.3	4.6 (116)	3.2 (79)	7.6 (193)	3.3 (1.5)
1	2771B6011**	2772B6011**	9.0	7.9	4.6 (116)	3.2 (79)	7.6 (193)	3.3 (1.5)
1	2771B6001**	2772B6001**	24	21	6.7 (169)	4.1 (104)	10.4 (265)	7.0 (3.2)
1¼	2771B7001**	2772B7001**	29	20	6.7 (169)	4.1 (104)	10.4 (265)	7.0 (3.2)
1½	2771B8011**	2772B8011**	29	21	6.7 (169)	4.1 (104)	10.4 (265)	7.0 (3.2)
1½	2771B8001**	2772B8001**	49	49	8.7 (219)	5.2 (131)	11.8 (300)	15.5 (6.9)
2	2771B9001**	2772B9001**	57	57	8.7 (219)	5.2 (131)	11.8 (300)	15.5 (6.9)
2½	2771B9011**	2772B9011**	64	72	8.7 (219)	5.2 (131)	11.8 (300)	15.5 (6.9)

3/2 Valves



Port Size	Port Size	Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
		1-2	3	NC	NO	NC	NO	A	
1/4	1/2	2773B2001**	2774B2001**	2.8	2.5	3.6 (91)	3.2 (79)	7.2 (182)	2.5 (1.2)
3/8	1/2	2773B3001**	2774B3001**	4.0	3.0	3.6 (91)	3.2 (79)	7.2 (182)	2.5 (1.2)
1/2	1/2	2773B4011**	2774B4011**	3.8	3.0	3.6 (91)	3.2 (79)	7.2 (182)	2.5 (1.2)
1/2	1	2773B4001**	2774B4001**	7.8	7.2	4.6 (116)	3.6 (92)	7.9 (201)	3.3 (1.5)
3/4	1	2773B5001**	2774B5001**	9.4	7.2	4.6 (116)	3.6 (92)	7.9 (201)	3.3 (1.5)
1	1	2773B6011**	2774B6011**	10	7.2	4.6 (116)	3.6 (92)	7.9 (201)	3.3 (1.5)
1	1½	2773B6001**	2774B6001**	29	21	6.7 (169)	4.9 (123)	10.4 (265)	7.0 (3.2)
1¼	1½	2773B7001**	2774B7001**	31	22	6.7 (169)	4.9 (123)	10.4 (265)	7.0 (3.2)
1½	1½	2773B8011**	2774B8011**	31	21	6.7 (169)	4.9 (123)	10.4 (265)	7.0 (3.2)
1½	2½	2773B8001**	2774B8001**	69	58	8.7 (219)	6.4 (161)	12.4 (313)	16.5 (7.4)
2	2½	2773B9001**	2774B9001**	70	60	8.7 (219)	6.4 (161)	12.4 (313)	16.5 (7.4)
2½	2½	2773B9011**	2774B9011**	71	55	8.7 (219)	6.4 (161)	12.4 (313)	16.5 (7.4)

4/2 Valves



Port Size	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				1, 2, 4	3	A	
1/4	1/2	2776B2001**	2.5	4.0 (100)	3.9 (97)	7.2 (182)	3.0 (1.4)
3/8	1/2	2776B3001**	3.6	4.0 (100)	3.9 (97)	7.2 (182)	3.0 (1.4)
1/2	1/2	2776B4011**	3.7	4.0 (100)	3.9 (97)	7.2 (182)	3.0 (1.4)
1/2	1	2776B4001**	6.9	4.7 (118)	5.3 (135)	9.0 (228)	5.3 (2.4)
3/4	1	2776B5001**	8.2	4.7 (118)	5.3 (135)	9.0 (228)	5.3 (2.4)
1	1	2776B6011**	8.9	4.7 (118)	5.3 (135)	9.0 (228)	5.3 (2.4)
1	1½	2776B6001**	23	6.5 (166)	8.3 (211)	10.7 (271)	11.3 (5.1)
1¼	1½	2776B7001**	24	6.5 (166)	8.3 (211)	10.7 (271)	11.3 (5.1)
1½	1½	2776B8011**	25	6.5 (166)	8.3 (211)	10.7 (271)	11.3 (5.1)

* NPT port threads, for BSPP threads add a "D" prefix to the model number e.g., D2771B2001, D2773B2001, D2776B2001.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 2771B2001W, 2771B2001Z.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 1/4 to 1½ Port Sizes: 15 to 150 psig (1 to 10 bar);

1½ to 2½ Port Sizes: 30 to 150 psig (2 to 10 bar).

Pilot Pressure: When external supply is used, pressure must be equal to or greater than inlet pressure.

Port Threads: NPT, BSPP. For other threads consult ROSS.

Manual Override: Flush; rubber, non-locking.

Options: Indicator Light: See page 38 for Indicator Light Kit.

Manual Override: See page 38 for Manual Override Kits.

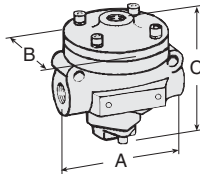
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Poppet Valves for Line Mounting Series 27

Pressure Controlled

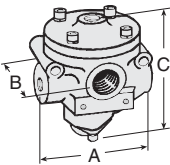
Single Pressure Controlled

2/2 Valves



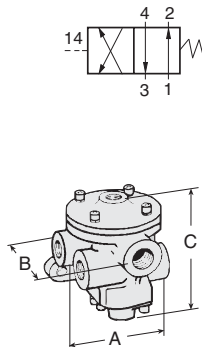
Port Size 1-2	Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
	NC	NO	NC	NO	A	B	C	
1/4	2751A2001	2752A2001	2.3	2.3	3.6 (91)	3.2 (79)	3.8 (95)	1.3 (0.6)
3/8	2751A3001	2752A3001	3.8	3.3	3.6 (91)	3.2 (79)	3.8 (95)	1.3 (0.6)
1/2	2751A4011	2752A4011	4.0	3.5	3.6 (91)	3.2 (79)	3.8 (95)	1.3 (0.6)
1/2	2751A4001	2752A4001	7.7	6.5	4.6 (116)	3.2 (79)	4.5 (113)	2.0 (0.9)
3/4	2751A5001	2752A5001	9.0	7.3	4.6 (116)	3.2 (79)	4.5 (113)	2.0 (0.9)
1	2751A6011	2752A6011	9.0	7.9	4.6 (116)	3.2 (79)	4.5 (113)	2.0 (0.9)
1	2751A6001	2752A6001	24	21	6.7 (169)	4.1 (104)	7.5 (190)	8.0 (3.6)
1¼	2751A7001	2752A7001	29	20	6.7 (169)	4.1 (104)	7.5 (190)	8.0 (3.6)
1½	2751A8011	2752A8011	29	21	6.7 (169)	4.1 (104)	7.5 (190)	8.0 (3.6)
1½	2751A8001	2752A8001	49	49	8.7 (219)	5.2 (131)	9.0 (228)	14.3 (6.4)
2	2751A9001	2752A9001	57	57	8.7 (219)	5.2 (131)	9.0 (228)	14.3 (6.4)
2½	2751A9011	2752A9011	64	72	8.7 (219)	5.2 (131)	9.0 (228)	14.3 (6.4)

3/2 Valves



Port Size 1-2	3	Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
		NC	NO	NC	NO	A	B	C	
1/4	1/2	2753A2001	2754A2001	2.8	2.5	3.6 (91)	3.2 (79)	4.0 (101)	1.3 (0.6)
3/8	1/2	2753A3001	2754A3001	4.0	3.0	3.6 (91)	3.2 (79)	4.0 (101)	1.3 (0.6)
1/2	1/2	2753A4011	2754A4011	3.8	3.0	3.6 (91)	3.2 (79)	4.0 (101)	1.3 (0.6)
1/2	1	2753A4001	2754A4001	7.8	7.2	4.6 (116)	3.6 (92)	4.8 (121)	2.0 (0.9)
3/4	1	2753A5001	2754A5001	9.4	7.2	4.6 (116)	3.6 (92)	4.8 (121)	2.0 (0.9)
1	1	2753A6011	2754A6011	10	7.2	4.6 (116)	3.6 (92)	4.8 (121)	2.0 (0.9)
1	1½	2753A6001	2754A6001	29	21	6.7 (169)	4.9 (123)	7.5 (190)	6.0 (2.7)
1¼	1½	2753A7001	2754A7001	31	22	6.7 (169)	4.9 (123)	7.5 (190)	6.0 (2.7)
1½	1½	2753A8011	2754A8011	31	21	6.7 (169)	4.9 (123)	7.5 (190)	6.0 (2.7)
1½	2½	2753A8001	2754A8001	69	58	8.7 (219)	6.4 (161)	9.5 (241)	15.3 (6.9)
2	2½	2753A9001	2754A9001	70	60	8.7 (219)	6.4 (161)	9.5 (241)	15.3 (6.9)
2½	2½	2753A9011	2754A9011	71	55	8.7 (219)	6.4 (161)	9.5 (241)	15.3 (6.9)

4/2 Valves



Port Size 1, 2, 4	3	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1/4	1/2	2756A2001	2.5	4.0 (100)	3.9 (97)	4.0 (101)	1.8 (0.8)
3/8	1/2	2756A3001	3.6	4.0 (100)	3.9 (97)	4.0 (101)	1.8 (0.8)
1/2	1/2	2756A4011	3.7	4.0 (100)	3.9 (97)	4.0 (101)	1.8 (0.8)
1/2	1	2756A4001	6.9	4.7 (118)	5.3 (135)	5.8 (147)	4.3 (1.9)
3/4	1	2756A5001	8.2	4.7 (118)	5.3 (135)	5.8 (147)	4.3 (1.9)
1	1	2756A6011	8.9	4.7 (118)	5.3 (135)	5.8 (147)	4.3 (1.9)
1	1½	2756A6001	23	6.5 (166)	8.3 (211)	7.5 (190)	10.3 (4.6)
1¼	1½	2756A7001	24	6.5 (166)	8.3 (211)	7.5 (190)	10.3 (4.6)
1½	1½	2756A8011	25	6.5 (166)	8.3 (211)	7.5 (190)	10.3 (4.6)

* NPT port threads, for BSPP threads add a "D" prefix to the model number e.g., D2751A2001, D2753A2001, D2756A2001.

STANDARD SPECIFICATIONS (for valves on this page):

Ambient/Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 1/4 to 1½ Port Sizes: 15 to 150 psig (1 to 10 bar).

1½ to 2½ Port Sizes: 30 to 150 psig (2 to 10 bar).

Pilot Pressure: Must be equal to or greater than inlet pressure.

Port Threads: NPT, BSPP. For other threads consult ROSS.

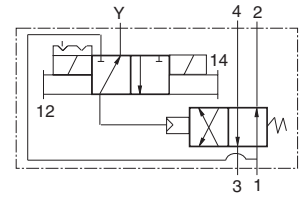
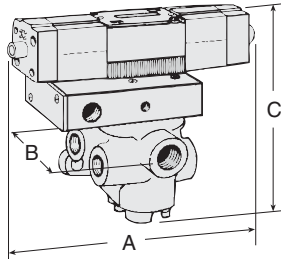
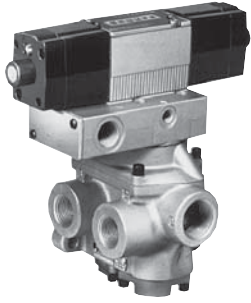
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Poppet Valves for Line Mounting Series 27

Solenoid Pilot Controlled

4/2 Valves – Double Direct Solenoid Controlled, Detented



Port Sizes		Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
1, 2, 4	3			A	B	C	
1/4	1/2	2776B2003**	2.5	9.3 (236)	3.9 (97)	7.9 (201)	4.0 (1.8)
3/8	1/2	2776B3003**	3.6	9.3 (236)	3.9 (97)	7.9 (201)	4.0 (1.8)
1/2	1/2	2776B4013**	3.7	9.3 (236)	3.9 (97)	7.9 (201)	4.0 (1.8)
1/2	1	2776B4003**	6.9	9.3 (236)	5.3 (135)	9.7 (246)	6.3 (2.8)
3/4	1	2776B5003**	8.2	9.3 (236)	5.3 (135)	9.7 (246)	6.3 (2.8)
1	1	2776B6013**	8.9	9.3 (236)	5.3 (135)	9.7 (246)	6.3 (2.8)
1	1½	2776B6003**	23	9.3 (236)	8.3 (211)	11.6 (295)	12.3 (5.5)
1¼	1½	2776B7003**	24	9.3 (236)	8.3 (211)	11.6 (295)	12.3 (5.5)
1½	1½	2776B8013**	25	9.3 (236)	8.3 (211)	11.6 (295)	12.3 (5.5)

* NPT port threads, for BSPP threads add a "D" prefix to the model number e.g., D2776B2003.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 2771B2001W, 2771B2001Z.

STANDARD SPECIFICATIONS (for valves listed above):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid; 190 VA inrush, 40 VA holding on 50 or 60 Hz; 20 watts on DC.

Indicator Lights: In each solenoid housing.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 15 to 150 psig (1 to 10 bar).

Pilot Pressure: If external supply is used, pressure must be equal to or greater than inlet pressure.

Port Threads: NPT, BSPP. For other threads consult ROSS.

Manual Override: Flush; rubber, non-locking.

Options: Indicator Light: See below for Indicator Light Kit.

Manual Override: See below for Manual Override Kits.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

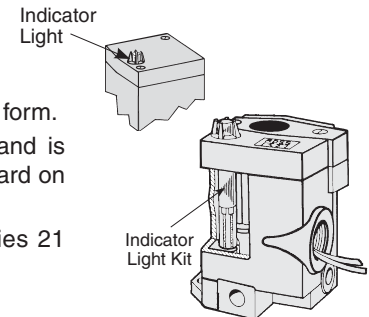
Options for Poppet Valves

Indicator Light Kit

To visually verify valve operation indicator lights are available in kit form. The indicator light extends through the solenoid or pilot cover and is illuminated when the solenoid is energized. Such lights are standard on double solenoid valves in Series 21 and 27.

Indicator light kit is available for single solenoid models in Series 21 (type O only), and Series 27.

Order kit number **862K87** and specify the voltage of the solenoid.



Manual Override Kits

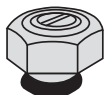
Flush flexible manual overrides are standard on single solenoid models in Series 27. Double solenoid models in Series 21 and 27 have flush metal-button overrides. Both types are non-locking.

Each of the buttons in the override kits below is made of metal and is spring-returned. The locking type button, however, can be kept in the actuated position by turning the slot in the top of the button with a screwdriver.

Order by the kit numbers shown below.

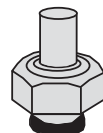
FLUSH BUTTON

Type	Kit Number
Locking	792K87



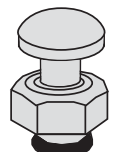
EXTENDED BUTTON

Type	Kit Number
Non-locking	791K87



EXTENDED BUTTON with PALM

Type	Kit Number
Non-locking	984H87



Poppet Valves for Line Mounting Series 21

High Temperature and Low Temperature Service

Series 21 valves are configured like the Series 27 valves, but are designed with metal internals and special seals appropriate for use in more extreme temperatures. The valves are designated as either Type H (High Temperature) or Type O (Low Temperature) valves. Temperature specifications for the two types are given below.

Solenoid models listed in this catalog use an internal pilot supply. They are, however, easily field-convertible for use with an external pilot supply. Models for external pilot supply may also be ordered from ROSS.

Explosion-Proof Solenoid Pilot available, for more information consult ROSS.

Type H (High Temperature) Service:

Fluorocarbon seals are used to ensure high temperature stability.

Ambient Temperature: Up to 250°F (122°C) for solenoid models; up to 300°F (150°C) for pressure controlled models.

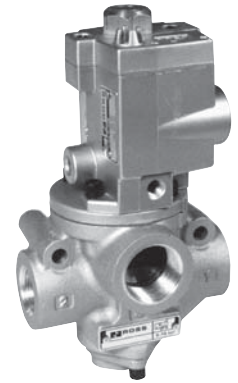
Media Temperature: 0° to 300°F (-17° to 150°C).

Type O (Low Temperature) Service:

Buna-N seals are used to ensure good performance at low temperatures.

Ambient Temperature: Down to -40°F (-40°C).

Media Temperature: -40° to 175°F (-40° to 80°C).



**3/2 Valve with
Single Solenoid Pilot**

(Metal override button on top of pilot is standard on all single solenoid models.)

Vacuum Service Valves

Vacuum service valves are ideal for lifting, holding, vacuum packaging and moving anything from large objects to tiny particles. They also provide an effective means for leak testing. The vacuum source typically comes from either a vacuum pump or a venturi. In vacuum service applications, the pressure within the valve is reduced below atmospheric pressure. Consequently, atmospheric pressure actually pushes air into the valve, instead of the common belief that air is “sucked” in by the vacuum.

In normal valves, filters exist to clean compressed air, which is then pushed through the valve. In vacuum valves, there is no filter, and the air comes from the atmosphere and enters through the outlet, bringing with it atmospheric and nearby surface dust and dirt. Vacuum valves, in order to function consistently, must therefore be highly tolerant of the particles that freely flow into the valves.

To construct a vacuum service valve system, typically a 3/2 normally closed valve is used. The vacuum is on the inlet, while the exhaust remains open to atmosphere. Port 2 is the working port. However, if there is a need for the vacuum service valve to function as normally open, simply connect the vacuum source to the exhaust and port 1 to atmosphere. Several variations of this construction are effective, including using 2/2 valves.

The construction of Series 21 valves makes them readily adaptable to vacuum service.

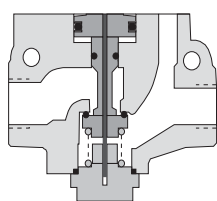
**For additional information consult your ROSS distributor or
call ROSS Technical Services in the U.S.A. at 1-888-TEK-ROSS (835-7677).**

FEATURES:

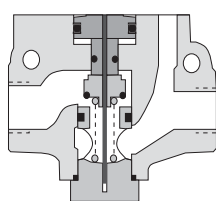
- Poppet construction for near zero leakage & high dirt tolerance
- Self-cleaning
- Wear compensating
- Repeatability throughout the life of the valve

Series 21 Valve Bodies

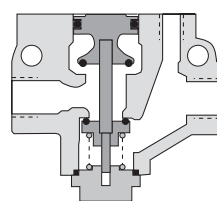
O-ring piston seals have PTFE wear rings top and bottom. Inlet and exhaust poppets have spun-in O-ring seals.



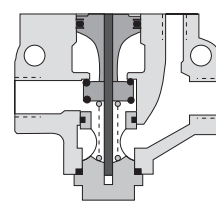
2/2 Normally Closed



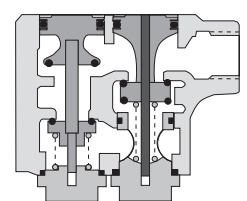
2/2 Normally Open



3/2 Normally Closed



3/2 Normally Open



4/2



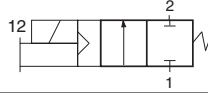
Poppet Valves for Line Mounting Series 21

High Temperature and Low Temperature Service

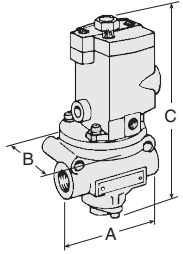
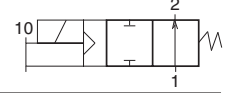
Single Solenoid Pilot Controlled

2/2 Valves

2/2 Normally Closed (NC)



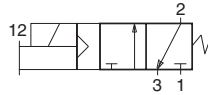
2/2 Normally Open (NO)



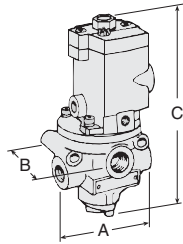
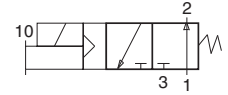
Port Size	Valve Model Number*				Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
	Type H		Type O		NC	NO	A	B	C	
	NC	NO	NC	NO						
1/4	2171B2001**	2172B2001**	2171B2002**	2172B2002**	2.3	2.3	3.6 (90)	3.0 (76)	7.0 (178)	3.0 (1.4)
3/8	2171B3001**	2172B3001**	2171B3002**	2172B3002**	3.8	3.3	3.6 (90)	3.0 (76)	7.0 (178)	3.0 (1.4)
1/2	2171B4011**	2172B4011**	2171B4012**	2172B4012**	4.0	3.5	3.6 (90)	3.0 (76)	7.0 (178)	3.0 (1.4)
1/2	2171B4001**	2172B4001**	2171B4002**	2172B4002**	7.7	6.5	4.6 (116)	3.0 (76)	7.7 (196)	3.3 (1.5)
3/4	2171B5001**	2172B5001**	2171B5002**	2172B5002**	9.0	7.3	4.6 (116)	3.0 (76)	7.7 (196)	3.3 (1.5)
1	2171B6011**	2172B6011**	2171B6012**	2172B6012**	9.0	7.9	4.6 (116)	3.0 (76)	7.7 (196)	3.3 (1.5)
1	2171B6001**	2172B6001**	2171B6002**	2172B6002**	24	21	6.6 (168)	4.1 (104)	10.5 (266)	7.5 (3.4)
1 1/4	2171B7001**	2172B7001**	2171B7002**	2172B7002**	29	20	6.6 (168)	4.1 (104)	10.5 (266)	7.5 (3.4)
1 1/2	2171B8011**	2172B8011**	2171B8012**	2172B8012**	29	21	6.6 (168)	4.1 (104)	10.5 (266)	7.5 (3.4)

3/2 Valves

3/2 Normally Closed (NC)

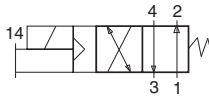
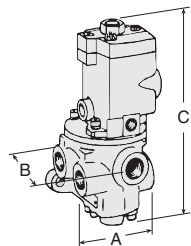


3/2 Normally Open (NO)



Port Sizes 1, 2	Port Size 3	Valve Model Number*				Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
		Type H		Type O		NC	NO	A	B	C	
		NC	NO	NC	NO						
1/4	1/2	2173B2001**	2174B2001**	2173B2002**	2174B2002**	2.8	2.5	3.6 (90)	3.6 (90)	7.3 (186)	3.0 (1.4)
3/8	1/2	2173B3001**	2174B3001**	2173B3002**	2174B3002**	4.0	3.0	3.6 (90)	3.6 (90)	7.3 (186)	3.0 (1.4)
1/2	1/2	2173B4011**	2174B4011**	2173B4012**	2174B4012**	3.8	3.0	3.6 (90)	3.6 (90)	7.3 (186)	3.0 (1.4)
1/2	1	2173B4001**	2174B4001**	2173B4002**	2174B4002**	7.8	7.2	4.6 (116)	4.6 (117)	8.0 (203)	3.3 (1.5)
3/4	1	2173B5001**	2174B5001**	2173B5002**	2174B5002**	9.4	7.2	4.6 (116)	4.6 (117)	8.0 (203)	3.3 (1.5)
1	1	2173B6011**	2174B6011**	2173B6012**	2174B6012**	10	7.2	4.6 (116)	4.6 (117)	8.0 (203)	3.3 (1.5)
1	1 1/2	2173B6001**	2174B6001**	2173B6002**	2174B6002**	29	21	6.6 (168)	6.6 (168)	10.5 (266)	7.5 (3.4)
1 1/4	1 1/2	2173B7001**	2174B7001**	2173B7002**	2174B7002**	31	22	6.6 (168)	6.6 (168)	10.5 (266)	7.5 (3.4)
1 1/2	1 1/2	2173B8011**	2174B8011**	2173B8012**	2174B8012**	31	21	6.6 (168)	6.6 (168)	10.5 (266)	7.5 (3.4)

4/2 Valves



Port Sizes 1, 2, 4	Port Size 3	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		A	B		C			
1/4	1/2	2176B2001**	2176B2002**	2.5	3.8 (97)	7.7 (196)	3.9 (99)	3.0 (1.4)
3/8	1/2	2176B3001**	2176B3002**	3.6	3.8 (97)	7.7 (196)	3.9 (99)	3.0 (1.4)
1/2	1/2	2176B4011**	2176B4012**	3.7	3.8 (97)	7.7 (196)	3.9 (99)	3.0 (1.4)
1/2	1	2176B4001**	2176B4002**	6.9	5.2 (132)	9.7 (246)	4.6 (104)	5.8 (2.6)
3/4	1	2176B5001**	2176B5002**	8.2	5.2 (132)	9.7 (246)	4.6 (104)	5.8 (2.6)
1	1	2176B6011**	2176B6012**	8.9	5.2 (132)	9.7 (246)	4.6 (104)	5.8 (2.6)
1	1 1/2	2176B6001**	2176B6002**	23	8.2 (208)	11.1 (282)	6.5 (165)	12.0 (5.4)
1 1/4	1 1/2	2176B7001**	2176B7002**	24	8.2 (208)	11.1 (282)	6.5 (165)	12.0 (5.4)
1 1/2	1 1/2	2176B8011**	2176B8012**	25	8.2 (208)	11.1 (282)	6.5 (165)	12.0 (5.4)

* NPT port threads, for BSPP threads add a "D" prefix to the model number e.g., D2171B2001, D2173B2001, D2176B2001.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 2171B2001W, 2171B2001Z.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz. For other voltages, see page 113.

Power Consumption: 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

Ambient Temperature: Type H: 0° to 250°F (-17° to 122°C). Type O: -40° to 120°F (-40° to 50°C).

Media Temperature: Type H: 0° to 300°F (-17° to 150°C). Type O: -40° to 175°F (-40° to 80°C).

For temperatures below 40°F (4°C) air must be free of water vapor to prevent formation of ice.

Flow Media: Filtered air.

Inlet Pressure: 30 to 150 psig (2 to 10 bar).

Pilot Pressure: When external supply is used, pressure must be equal to or greater than inlet pressure.

Threads: NPT, BSPP. For other threads consult ROSS.

Manual Override: Non-locking metal button, standard.

Options:

Indicator Light: See page 38 for Indicator Light Kit.

Manual Override: See page 38 for Manual Override Kits.

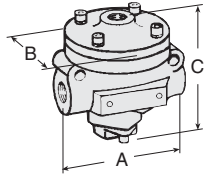
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Poppet Valves for Line Mounting Series 21

High Temperature and Low Temperature Service

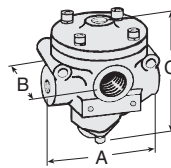
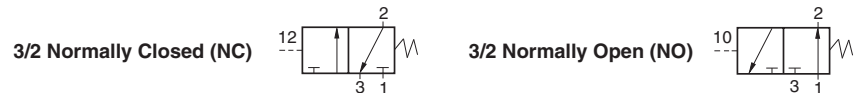
Single Pressure Controlled

2/2 Valves



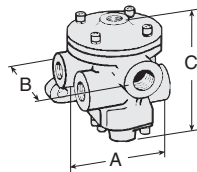
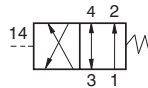
Port Size	Valve Model Number*				Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
	Type H		Type O		NC	NO	A	B	C	
	NC	NO	NC	NO						
1/4	2151B2001	2152B2001	2151B2002	2152B2002	2.3	2.3	3.6 (90)	3.7 (94)	3.0 (94)	1.8 (0.8)
3/8	2151B3001	2152B3001	2151B3002	2152B3002	3.8	3.3	3.6 (90)	3.7 (94)	3.0 (94)	1.8 (0.8)
1/2	2151B4011	2152B4011	2151B4012	2152B4012	4.0	3.5	3.6 (90)	3.7 (94)	3.0 (94)	1.8 (0.8)
1/2	2151B4001	2152B4001	2151B4002	2152B4002	7.7	6.5	4.6 (116)	4.4 (112)	3.0 (94)	4.5 (2.0)
3/4	2151B5001	2152B5001	2151B5002	2152B5002	9.0	7.3	4.6 (116)	4.4 (112)	3.0 (94)	4.5 (2.0)
1	2151B6011	2152B6011	2151B6012	2152B6012	9.0	7.9	4.6 (116)	4.4 (112)	3.0 (94)	4.5 (2.0)
1	2151B6001	2152B6001	2151B6002	2152B6002	24	21	6.6 (168)	7.5 (190)	4.1 (104)	11.0 (5.0)
1¼	2151B7001	2152B7001	2151B7002	2152B7002	29	20	6.6 (168)	7.5 (190)	4.1 (104)	11.0 (5.0)
1½	2151B8011	2152B8011	2151B8012	2152B8012	29	21	6.6 (168)	7.5 (190)	4.1 (104)	11.0 (5.0)

3/2 Valves



Port Sizes		Valve Model Number*				Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
1, 2	3	Type H		Type O		NC	NO	A	B	C	
		NC	NO	NC	NO						
1/4	1/2	2153B2001	2154B2001	2153B2002	2154B2002	2.8	2.5	3.6 (90)	4.0 (101)	3.1 (79)	1.8 (0.8)
3/8	1/2	2153B3001	2154B3001	2153B3002	2154B3002	4.0	3.0	3.6 (90)	4.0 (101)	3.1 (79)	1.8 (0.8)
1/2	1/2	2153B4011	2154B4011	2153B4012	2154B4012	3.8	3.0	3.6 (90)	4.0 (101)	3.1 (79)	1.8 (0.8)
1/2	1	2153B4001	2154B4001	2153B4002	2154B4002	7.8	7.2	4.6 (116)	4.7 (120)	3.6 (91)	4.5 (2.0)
3/4	1	2153B5001	2154B5001	2153B5002	2154B5002	9.4	7.2	4.6 (116)	4.7 (120)	3.6 (91)	4.5 (2.0)
1	1	2153B6011	2154B6011	2153B6012	2154B6012	10	7.2	4.6 (116)	4.7 (120)	3.6 (91)	4.5 (2.0)
1	1½	2153B6001	2154B6001	2153B6002	2154B6002	29	21	6.6 (168)	7.5 (190)	4.8 (123)	11.0 (5.0)
1¼	1½	2153B7001	2154B7001	2153B7002	2154B7002	31	22	6.6 (168)	7.5 (190)	4.8 (123)	11.0 (5.0)
1½	1½	2153B8011	2154B8011	2153B8012	2154B8012	31	21	6.6 (168)	7.5 (190)	4.8 (123)	11.0 (5.0)

4/2 Valves



Port Sizes		Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
1, 2, 4	3				A	B	C	
1/4	1/2	2156B2001	2156B2002	2.5	3.8 (97)	7.7 (196)	3.9 (99)	3.0 (1.4)
3/8	1/2	2156B3001	2156B3002	3.6	3.8 (97)	7.7 (196)	3.9 (99)	3.0 (1.4)
1/2	1/2	2156B4011	2156B4012	3.7	3.8 (97)	7.7 (196)	3.9 (99)	3.0 (1.4)
1/2	1	2156B4001	2156B4002	6.9	5.2 (132)	9.7 (246)	4.6 (104)	5.8 (2.6)
3/4	1	2156B5001	2156B5002	8.2	5.2 (132)	9.7 (246)	4.6 (104)	5.8 (2.6)
1	1	2156B6011	2156B6012	8.9	5.2 (132)	9.7 (246)	4.6 (104)	5.8 (2.6)
1	1½	2156B6001	2156B6002	23	8.2 (208)	11.1 (282)	6.5 (165)	12.0 (5.4)
1¼	1½	2156B7001	2156B7002	24	8.2 (208)	11.1 (282)	6.5 (165)	12.0 (5.4)
1½	1½	2156B8011	2156B8012	25	8.2 (208)	11.1 (282)	6.5 (165)	12.0 (5.4)

* NPT pressure port threads, for BSPP threads add a "D" prefix to the model number e.g., D2151B2001, D2153B2001, D2156B2001.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperatures: Type H: 0° to 300°F (-17° to 150°C).
 Type O: -40° to 175°F (-40° to 80°C).
 For temperatures below 40°F (4°C) air must be free of water vapor to prevent formation of ice.

Flow Media: Filtered air.
Inlet Pressure: 30 to 150 psig (2 to 10 bar).
Pilot Pressure: Must be equal to or greater than inlet pressure.
Threads: NPT, BSPP. For other threads consult ROSS.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Poppet Valves for Line Mounting Series 27

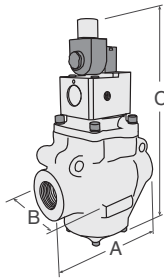
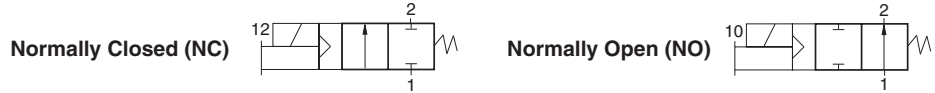
Explosion-Proof

Single Solenoid Pilot Controlled

Explosion-proof solenoid pilot controlled valves are ideal for applications in a wide range of industries and environments where safety from electrical ignition of flammable gases, vapors, flammable liquids, combustible dust, or easily ignitable fibers is a concern.

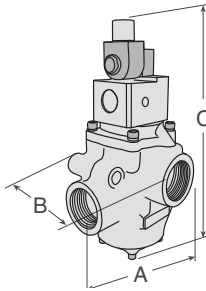
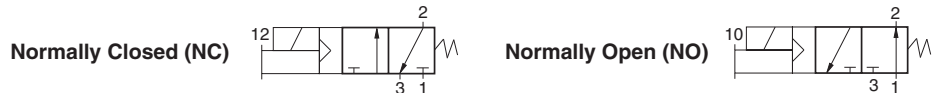
- Solenoid pilot controlled
- Poppet construction for near zero leakage & high dirt tolerance
- Pilot can be rotated, giving the ability to change orientation
- Self-cleaning
- Wear compensating
- Repeatability throughout the life of the valve

2/2 Valves



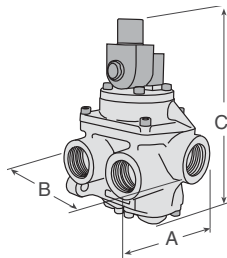
Port Size	Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
	1-2	NC NO	NC	NO	A	B	C	
1/4	2771B2002	2772B2002	2.3	2.3	3.6 (91)	3.2 (79)	9.0 (229)	3.0 (1.4)
3/8	2771B3002	2772B3002	3.8	3.3	3.6 (91)	3.2 (79)	9.0 (229)	3.0 (1.4)
1/2	2771B4012	2772B4012	4.0	3.5	3.6 (91)	3.2 (79)	9.0 (229)	3.0 (1.4)
1/2	2771B4002	2772B4002	7.7	6.5	4.6 (116)	3.2 (79)	9.0 (229)	3.6 (1.6)
3/4	2771B5002	2772B5002	9.0	7.3	4.6 (116)	3.2 (79)	9.0 (229)	3.6 (1.6)
1	2771B6012	2772B6012	9.0	7.9	4.6 (116)	3.2 (79)	9.0 (229)	3.6 (1.6)
1	2771B6002	2772B6002	24	21	6.7 (169)	4.1 (104)	12.0 (305)	7.5 (3.4)
1¼	2771B7002	2772B7002	29	20	6.7 (169)	4.1 (104)	12.0 (305)	7.5 (3.4)
1½	2771B8012	2772B8012	29	21	6.7 (169)	4.1 (104)	12.0 (305)	7.5 (3.4)
1½	2771B8002	2772B8002	49	49	8.7 (219)	5.2 (131)	13.0 (330)	16.0 (7.3)
2	2771B9002	2772B9002	57	57	8.7 (219)	5.2 (131)	13.0 (330)	16.0 (7.3)
2½	2771B9012	2772B9012	64	72	8.7 (219)	5.2 (131)	13.0 (330)	16.0 (7.3)

3/2 Valves



Port Sizes		Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
1, 2	3	NC	NO	NC	NO	A	B	C	
1/4	1/2	2773B2002	2774B2002	2.8	2.5	3.6 (91)	3.2 (79)	9.0 (229)	2.5 (1.2)
3/8	1/2	2773B3002	2774B3002	4.0	3.0	3.6 (91)	3.2 (79)	9.0 (229)	2.5 (1.2)
1/2	1/2	2773B4012	2774B4012	3.8	3.0	3.6 (91)	3.2 (79)	9.0 (229)	2.5 (1.2)
1/2	1	2773B4002	2774B4002	7.8	7.2	4.6 (116)	3.6 (92)	9.0 (229)	3.3 (1.5)
3/4	1	2773B5002	2774B5002	9.4	7.2	4.6 (116)	3.6 (92)	9.0 (229)	3.3 (1.5)
1	1	2773B6012	2774B6012	10	7.2	4.6 (116)	3.6 (92)	9.0 (229)	3.3 (1.5)
1	1½	2773B6002	2774B6002	29	21	6.7 (169)	4.9 (123)	12.0 (305)	7.0 (3.2)
1¼	1½	2773B7002	2774B7002	31	22	6.7 (169)	4.9 (123)	12.0 (305)	7.0 (3.2)
1½	1½	2773B8012	2774B8012	31	21	6.7 (169)	4.9 (123)	12.0 (305)	7.0 (3.2)
1½	2½	2773B8002	2774B8002	69	58	8.7 (219)	6.4 (161)	13.0 (330)	16.5 (7.4)
2	2½	2773B9002	2774B9002	70	60	8.7 (219)	6.4 (161)	13.0 (330)	16.5 (7.4)
2½	2½	2773B9012	2774B9012	71	55	8.7 (219)	6.4 (161)	13.0 (330)	16.5 (7.4)

4/2 Valves



Port Sizes		Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
1, 2, 4	3			A	B	C	
1/4	1/2	2776B2002	2.5	4.0 (100)	3.9 (97)	8.0 (203)	1.9 (0.9)
3/8	1/2	2776B3002	3.6	4.0 (100)	3.9 (97)	8.0 (203)	1.9 (0.9)
1/2	1/2	2776B4012	3.7	4.0 (100)	3.9 (97)	8.0 (203)	1.9 (0.9)
1/2	1	2776B4002	6.9	4.7 (118)	5.3 (135)	10.0 (254)	4.2 (1.9)
3/4	1	2776B5002	8.2	4.7 (118)	5.3 (135)	10.0 (254)	4.2 (1.9)
1	1	2776B6012	8.9	4.7 (118)	5.3 (135)	10.0 (254)	4.2 (1.9)
1	1½	2776B6002	23	6.5 (166)	8.3 (211)	12.0 (305)	11.0 (5.0)
1¼	1½	2776B7002	24	6.5 (166)	8.3 (211)	12.0 (305)	11.0 (5.0)
1½	1½	2776B8012	25	6.5 (166)	8.3 (211)	12.0 (305)	11.0 (5.0)

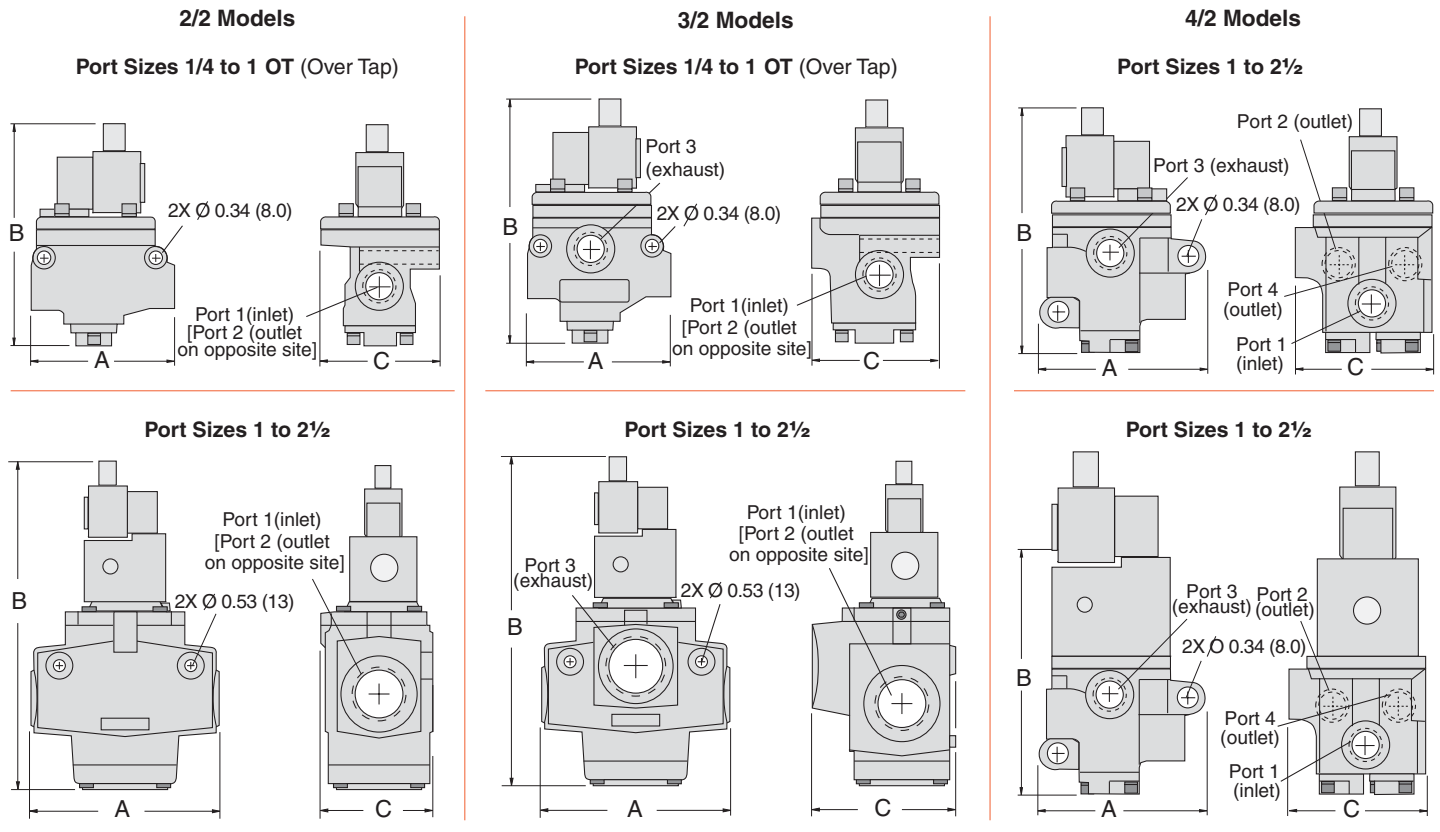
* NPT port threads, for BSPP threads add a "D" prefix to the model number e.g., D2771B2002, D2773B2002, D2771B2002.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Poppet Valves for Line Mounting Series 27

Explosion-Proof

Technical Drawings Specifications



Conversion Kits

ROSS Controls standard poppet solenoid pilot controlled valves for line mounting can be easily field-converted into an explosion-proof solenoid pilot poppet valve.

Listed on the right are the conversion kit numbers to replace the obsolete ROSS explosion proof pilot, or to convert a standard in-line valve to an explosion-proof valve.

	Kit Number
1/4" - 1" OT (Over Tap)	2370K77W
1" - 2 1/2"	2371K77W

Applicable Requirements

- C22.2 No. 0-10 - General Requirements - Canadian Electrical Code, Part II
- CSA C22.2 No. 25-1966 - Enclosures for use in Class II Groups E, F and G Hazardous Locations
- CSA C22.2 No. 142-M1987 - Process Control Equipment
- C22.2 No. 213-M1987 - Nonincendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
- CAN/CSA E79-0-95 - Electrical apparatus for explosive atmospheres, Part 0: General requirements
- CAN/CSA E79-18-95 - Electrical apparatus for explosive atmospheres, Part 18: Encapsulation "m"

CSA APPROVED, for use in the following hazardous locations:

- CLASS I, Zone 1 • CLASS I, Div. 1, Group A, B, C and D • CLASS I, Div. 2, Group A, B, C and D
- CLASS II, Group E, F and G • CLASS III • Ex m II, T4

STANDARD SPECIFICATIONS (for valves on page 42):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC.

Power Consumption: 4.6 watts.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Solenoid Temperature: -4° to 140°F (-20° to 60°C).

Flow Media: Filtered air.

Inlet Pressure: 1/4 to 1 1/2 Port Sizes: 15 to 150 psig (1 to 10 bar).
1 1/2 to 2 1/2 Port Sizes: 30 to 150 psig (2 to 10 bar).

Threads: NPT, BSPP port threads.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Dale Series

CP, CX, LF, LX & LT Manifold Compact Poppet Valves Inline Poppet Valves Leak Test Valves & Manifolds

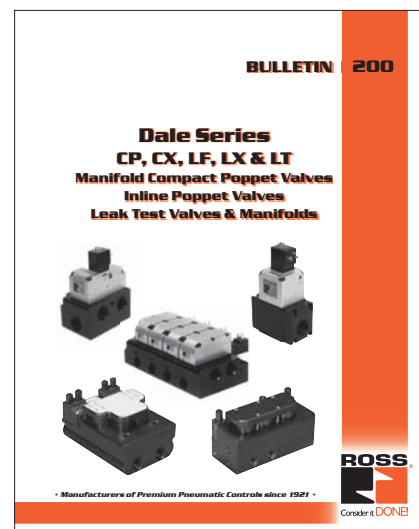
For more information please refer to

BULLETIN 200



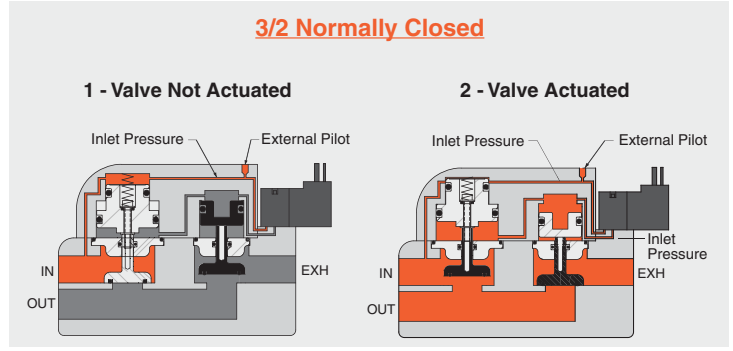
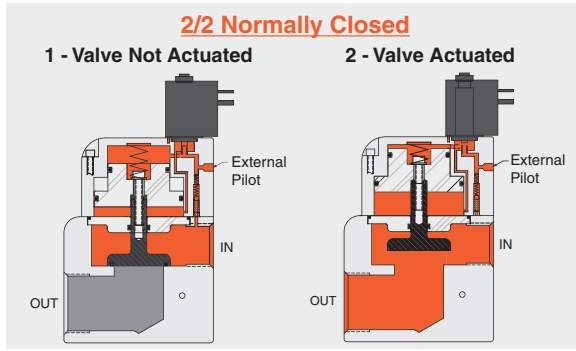
Dale Series Poppet and Manifold valves

A high flow, compact design poppet and manifold valves, the Dale Series will complement ROSS' proven Series 21 and 27 poppet valves in applications requiring port pressure independence with compact manifold mounting. In addition, the Dale Series brings its experience in the vacuum and leak test proven applications.



Please visit the ROSS web site to view the complete Bulletin 200 (Form #A10343)
at www.rosscontrols.com.

Poppet Valves and Manifolds Dale Series

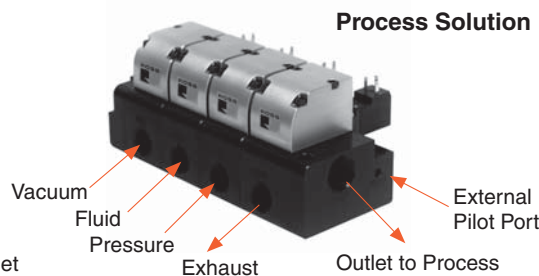
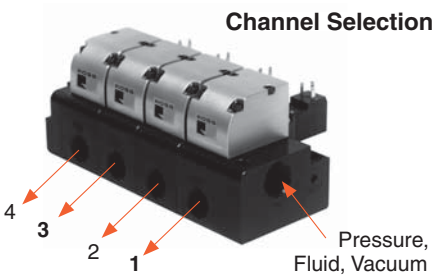


CP Manifold Series

2/2 Valves

Port Size: 3/8" to 2 1/2"

Impressive high flow with up to a Cv of 100 to reduce cycle time.



Process Industry

- Liquid Mixing applications
- Vacuum Fill applications
- Process Routing

Vacuum Industry

- Multi-million Life Cycles
- Leak Test
- Medium to Ultrahigh Vacuum

General Automation

- Improved Shift Speed
- Compact Cost Effective
- Ease of Repair

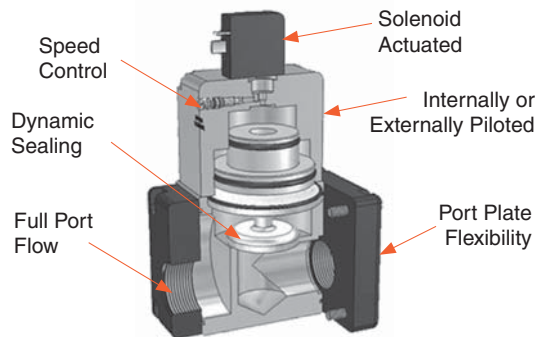
LF Inline Series

2/2 Valves

Port Size: 3/8" to 2 1/2"

Target Market:

Diaphragm & Ball Valve



Process Industry

- Bi-directional Flow
- Adjustable Shift Speed Control
- Solenoid Actuated

Vacuum Industry

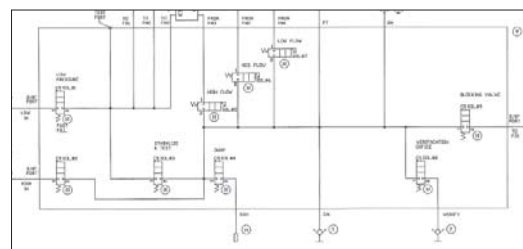
- Multi-million Life Cycles
- Leak Test
- Medium to Ultrahigh Vacuum

General Automation

- Improved Shift Speed
- Compact Cost Effective
- Ease of Repair

ROSS/FLEX® Expands with New Dale Series

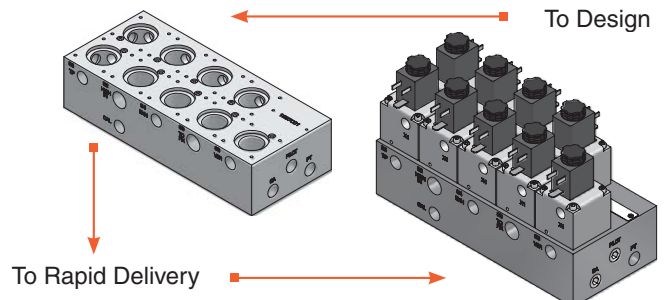
Utilizing the revolutionary new Dale cartridge style poppet valve the ROSS/FLEX® engineering team has greatly expanded their capabilities and deliveries for the most demanding applications. A cost effective manifold solution can greatly reduce assemble time, space required and trouble shooting in the field.



(Circuit for illustration purposes only.)

From Concept

To Design

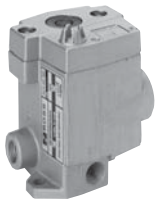


IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

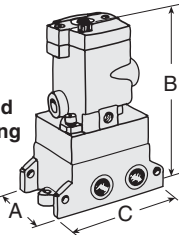
Compact Poppet Valves Series 16

Line or Manifold Mounting

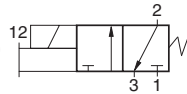
3/2 Valves – Single Direct Solenoid Pilot Controlled



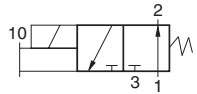
Manifold Mounting



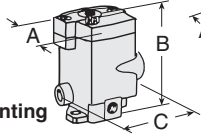
3/2 Normally Closed (NC)



3/2 Normally Open (NO)



Line Mounting

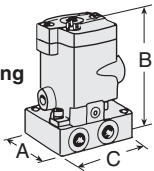


Port Size	Valve Type	Valve Model Numbers*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		NC	NO		A	B	C	
1/8	Line Mounting	1613B1020**	1614B1020**	0.3	2.7 (69)	3.8 (95)	3.0 (77)	1.4 (0.6)
1/4	Line Mounting	1613B2020**	1614B2020**	0.3	2.7 (69)	3.8 (95)	3.0 (77)	1.4 (0.6)
1/4	Manifold Mounting#	1613C2322**	1614B2322**	0.3	2.7 (69)	6.6 (168)	4.2 (107)	1.4 (0.6)

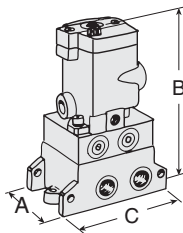
Manifold not included with the valve. Order manifold **256B91**.

4/2 Valves – Single Solenoid Pilot Controlled

Line Mounting



Manifold Mounting



Port Size	Valve Type	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1/4	Line Mounting	1616C2020**	0.4	2.7 (69)	4.8 (121)	6.6 (168)	2.4 (1.1)
1/4	Manifold Mounting#	1616C2322**	0.4	2.7 (69)	6.6 (168)	4.2 (107)	2.4 (1.1)

Manifold not included with the valve. Order manifold **257B91**.

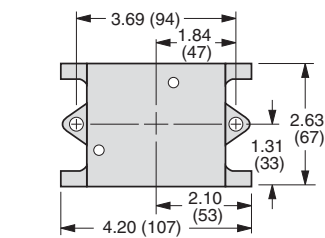
* NPT threads. For BSPP threads add a "D" prefix to the model number, for J threads add a "J" prefix to the model number, e.g., D1613B1020.

Note: Specify voltage when ordering.

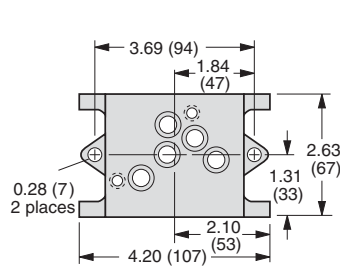
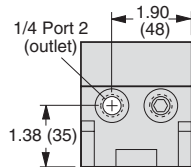
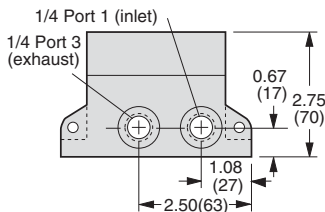
** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 1613B1020W, 1613B1020Z.

Manifolds

Technical Drawings Specifications

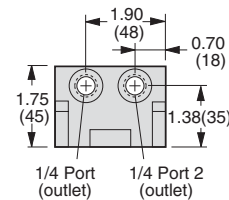
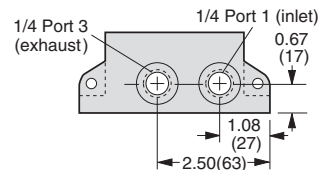


**3/2 Manifold Station
Model Number
256B91**



DIMENSIONS – inches (mm)

**4/2 Manifold Station
Model Number
257B91**



STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

Ambient Temperature: 40° to 120°F (4° to 50°F).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 3/2 Valves: 5 to 150 psig (0.3 to 10 bar).

4/2 Valves: 30 to 150 psig (2 to 10 bar).

Port Threads: NPT, BSPP, J.

Manual Override: Flush flexible manual override (non-locking).

Options:

Indicator Light: See Indicator Light Kit option, page 47.

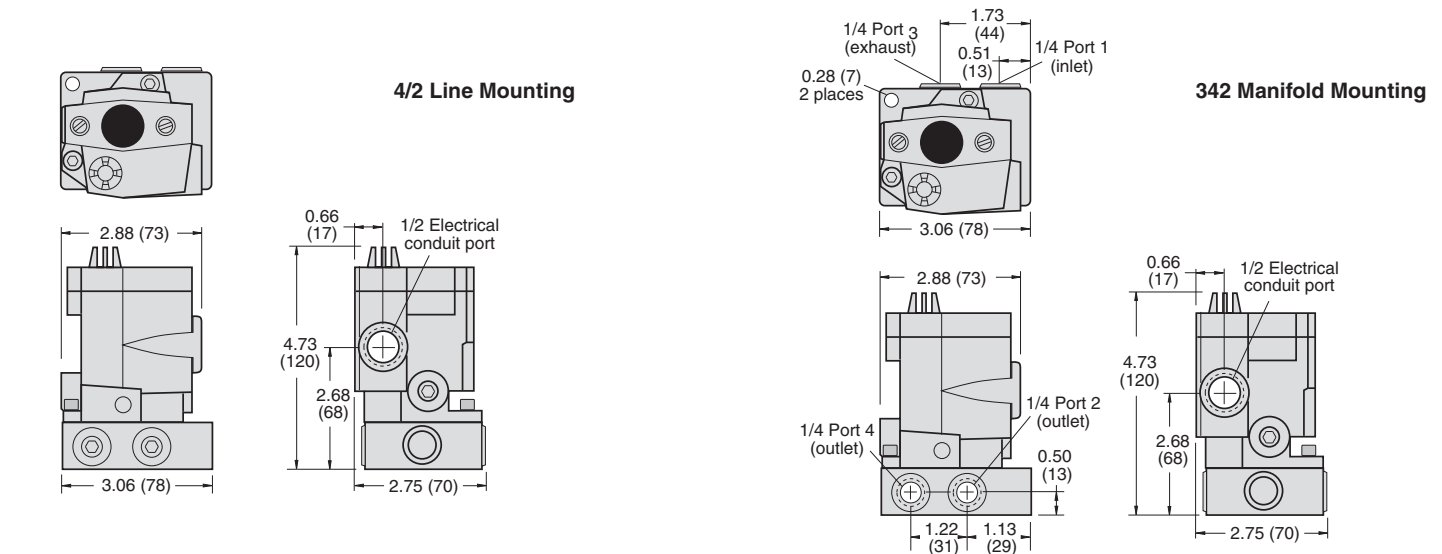
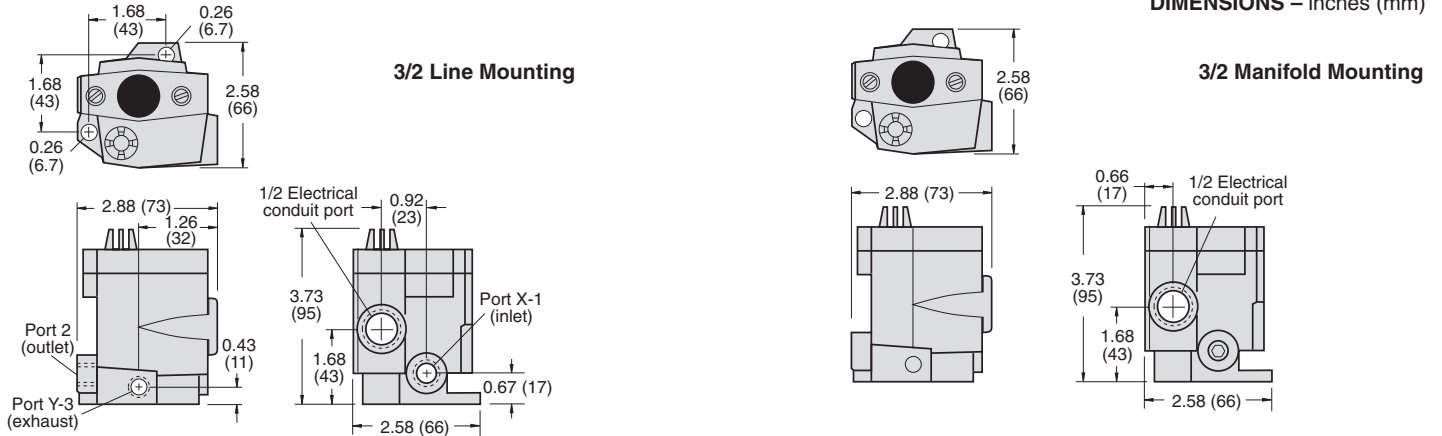
Manual Override: Metal button; see options for Manual Override Kits, page 47.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Manifolds

Technical Drawings Specifications

DIMENSIONS – inches (mm)

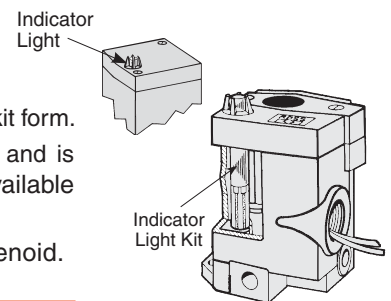


Options for Compact Valves Series 16

Indicator Light Kit

To visually verify valve operation indicator lights are available in kit form. The indicator light extends through the solenoid or pilot cover and is illuminated when the solenoid is energized. Indicator light kit is available for single solenoid models in Series 16.

Order kit number **862K87** and specify the voltage of the solenoid.



Manual Override Kits

Flush flexible manual overrides are standard on single solenoid models in Series 16.

Each of the buttons in the override kits below is made of metal and is spring-returned. The locking type button, however, can be kept in the actuated position by turning the slot in the top of the button with a screwdriver.

Order by the kit numbers shown below.

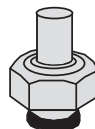
FLUSH BUTTON

Type	Kit Number
Locking	792K87
Non-locking	790K87



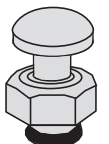
EXTENDED BUTTON

Type	Kit Number
Non-locking	791K87



EXTENDED BUTTON with PALM

Type	Kit Number
Non-locking	984H87



4-Way Solenoid Pilot Valves Pak

Solenoid Pilot Controlled

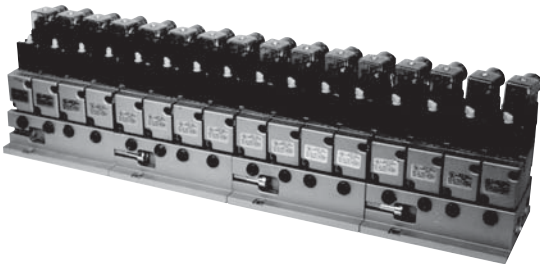
ROSS® solenoid pilot valves provide reliable pilot control for various process valves: butterfly, knife gate, ball, mixing, diverters and other pneumatically actuated devices. With over 90 years of experience, ROSS' proven poppet valves deliver unsurpassed reliability.

- Individual Valve Shut-off (automatic): increases uptime for continuous processing (see page 48 for details)
- Sure-Shifting and Self-Cleaning: reliable performance in extreme conditions (dirt tolerant, high humidity, cold, heat, dust, debris returned from the field actuator, etc...)
- Easily Accessible Manual Override (Yellow): turn to actuate, no tools needed
- Positive Sealing and Self-Compensating for Wear: perpendicular poppet face seals
- Quick Electrical Disconnect w/Indicator Light: allows immediate troubleshooting of component/system issues in the field.
- Consistent Actuation over the Life of the Valve: strong shifting forces
- Explosion Proof & Intrinsically Safe - options available, consult ROSS
- 8 & 16 Station Valve/Manifold: flying wire leads or central wiring option

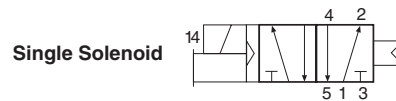
Applications:

- Power Generation
- Food & Beverage
- Petro-Chem
- Waste Water Treatment
- Aggregates
- Oil & Gas
- Pulp & Paper
- Pharmaceutical
- Household & Consumer Goods

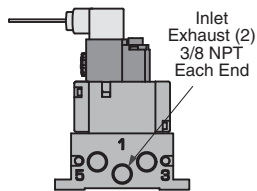
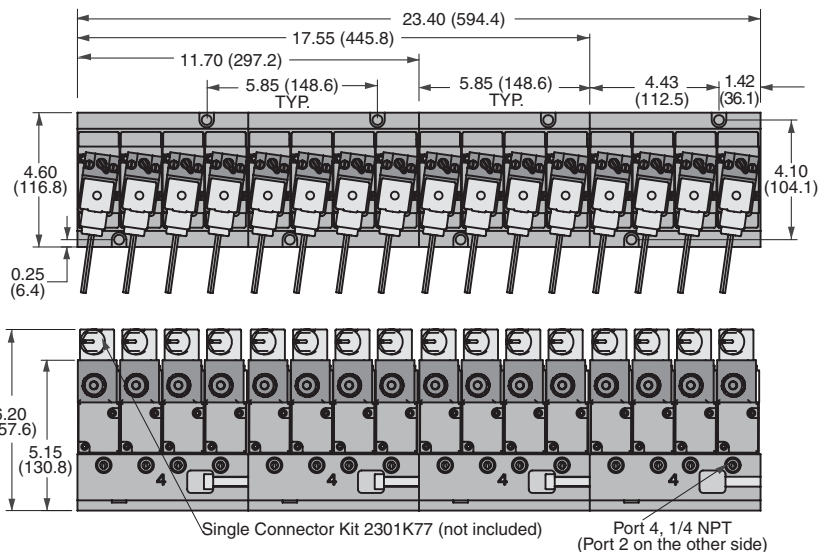
5/2 Valves – Extended-Duty Solenoid Pilot Controlled



For dual or spring return actuators. Field convertible to a 3/2 Valve.



Valve/Manifold Assembly	Model Number
4 Station	3900A1052-1**
8 Station	3900A1052-2**
12 Station	3900A1052-3**
16 Station	3900A1052-4**
20 Station and over	consult ROSS
Brass Swivel Fitting 1/4 NPT, 1/4 Tube	270A27
Electrical Connector w/10' leads	2301K77
Replacement Valve	7476B1901**



Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3900A1052-1W, 3900A1052-1Z.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: Rated for continuous duty.
Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.
 For other voltages, see page 113.
Power Consumption: 3.9 VA holding on 50/60 Hz; 2.1 watts on DC.
Ambient Temperature: 39° to 122°F (4° to 50°F).

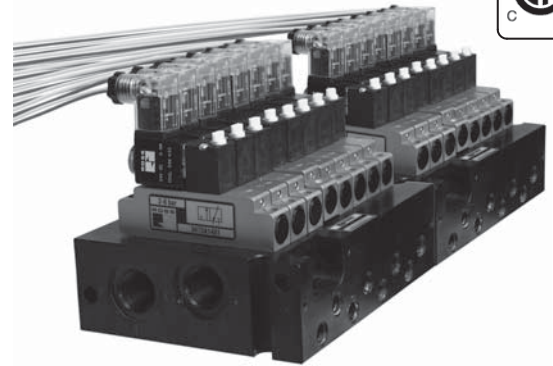
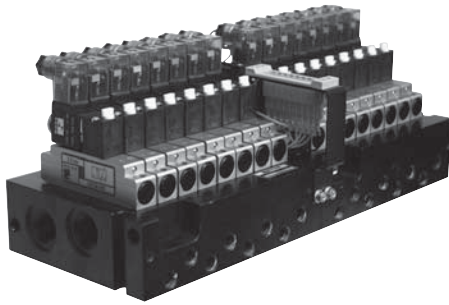
Media Temperature: 39° to 175°F (4° to 80°C).
Indicator Light: In connector.
Flow Media: Filtered air.
Inlet Pressure: 30 to 150 psig (2 to 10 bar).
Flow: C_v = 0.5
Certification: By CSA according to UL 429 and CSA 22.2-139.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

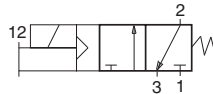
3-Way Solenoid Pilot Valves Pak

Solenoid Pilot Controlled

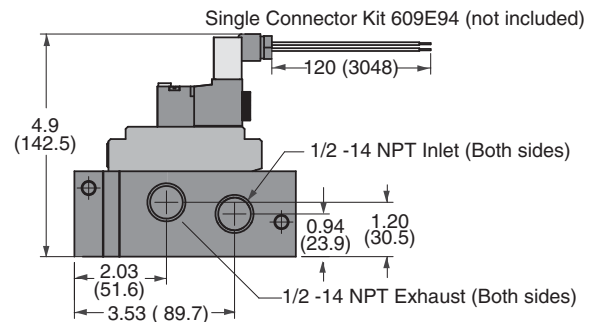
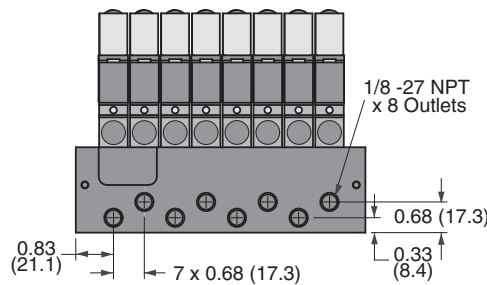
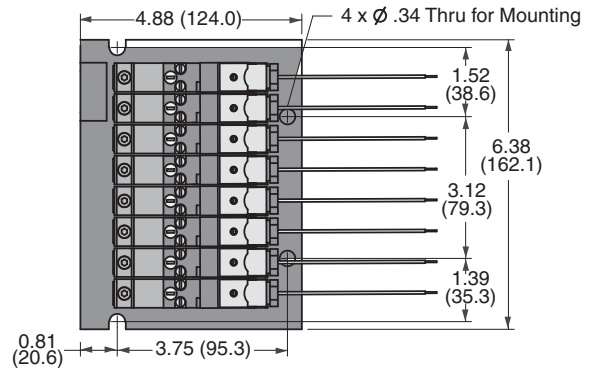
3/2 Vales – Low-Power Solenoid Pilot Controlled



3/2 Normally Closed



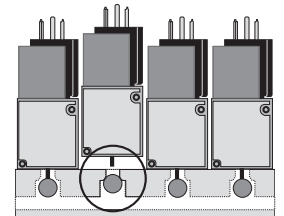
Valve/Manifold Assembly	Model Number Flying Leads	Model Number Central Wiring
8 Station	3900A0713-1**	3900A1055-1**
16 Station	3900A0713-2**	3900A1055-2**
24 Station and over	consult ROSS	consult ROSS
Metal Swivel Fitting 1/8 NPT, 1/4 Tube	322E27	322E27
Electrical Connector w/10' leads	609E94	consult ROSS
Replacement Valve	3473A1401**	3473A1401**



4/2 Low-Power Solenoid Pilot Controlled Valves available, consult ROSS.

Individual Valve Shut-off (automatic): Individual valves can be removed without shutting off main air supply to the whole manifold or entire solenoid cabinet.

- Simply remove the valve and an internal check-ball automatically blocks inlet air to that station
- Inlet air is automatically restored to the station when the valve is returned



Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3900A0713-1W, 3900A0713-1Z.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: Rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 0.03 VA holding on 50/60 Hz; 0.8 watts on DC.

Ambient Temperature: 39° to 122°F (4° to 50°F).

Media Temperature: 39° to 175°F (4° to 80°C).

Indicator Light: In connector.

Flow Media: Filtered air.

Inlet Pressure: 30 to 150 psig (2 to 10 bar).

Flow: $C_v=0.5$

Certification: By CSA according to UL 429 and CSA 22.2-139.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



NAMUR Interface Wash Down Service Valves

Solenoid Pilot Controlled

3/2, 5/2 Valves – Single Solenoid Pilot Controlled

US Patent # 5,918,631



Model with M12 Micro electrical connector shown

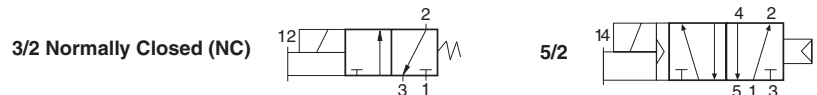


Model with DIN electrical connector shown

- “Duck-bill” protected exhaust port(s):
 - Limits wash down fluids from entering the valve
 - Minimizes the collection point for contamination
- Corrosion resistant epoxy powder coat
- Solenoid Pilot – Low wattage, fast shifting, repeatable, long life
- Patented Ball-poppet internals - Near zero internal leakage for the life of the valve, self cleaning valve seats, sure shifting
- Faster and more precise operation than a spool valve
- 3/2 Normally Closed

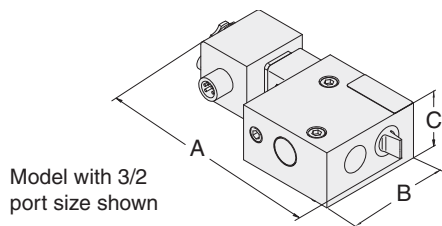
APPLICATIONS:

- Designed for washdown application – Minimum collection point for contamination
- Ideal for food and beverage industries
- Process industries - Hot, cold, wet environments



Valve Function	Valve Model Number*	Mounting Bolts	Connection	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
					A	B	C	
3/2	3473D190**	10-32	M12 Micro	0.25	4.62 (117.4)	2.19 (55.50)	1.2 (30.5)	0.8 (0.3)
3/2	3473D1900**	10-32	DIN 43650 form A	0.25	4.62 (117.4)	2.19 (55.50)	1.2 (30.5)	0.8 (0.3)
5/2	3476C1904**	10-32	M12 Micro	0.25	5.32 (135.2)	2.19 (55.50)	1.2 (30.5)	0.9 (0.4)
5/2	3476C1900**	10-32	DIN 43650 form A	0.25	5.32 (135.2)	2.19 (55.50)	1.2 (30.5)	0.9 (0.4)

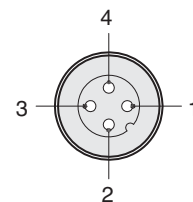
*Note: 10-24 and M5 mounting bolts available upon request.



Model with 3/2 port size shown

M 12 Connector Pin Out

- 1 = N/C
- 2 = N/C
- 3 = BROWN (Positive)
- 4 = BLUE (Negative)



Note: Specify voltage when ordering.

** Insert voltage code: “W” = 24 volts DC; “Z” = 110-120 volts AC, 50/60 Hz; e.g., 3473D190W, 3473D190Z.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 24 volts DC, 0.7 watt; 110-120 volts DC, 50/60 Hz.

Ambient/Media Temperatures: 4° to 122°F (-10° to 50°C).

For temperatures below 40°F (4°C) air must be free of water vapor to prevent formation of ice.

Flow Media: Filtered air.

Inlet Pressure: 29 to 116 psig (2 to 8 bar).

Pilot Pressure: Must be equal to or greater than inlet pressure.

Port Threads: NPT.

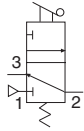
Standard: NEMA 4X (enclosure constructed for indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; and also provides protection in highly corrosive environments).

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

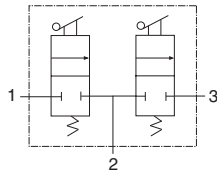
Pendant Control Valves

for Manual Control

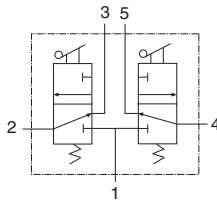
ROSS pendant control valves are a durable pneumatic solution that can be used anywhere manual control of devices is needed, such as an air hoist, air motor, or counterbalance cylinder. Ideal for use on or with material handling devices such as overhead cranes or air hoists, ROSS pendant control valves can withstand even the toughest environments.



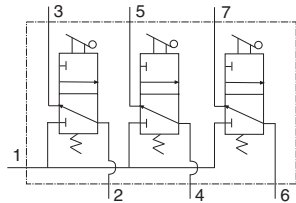
Single 3-way



Dual 2-way



Dual 3-way



Triple 3-way

Single 3/2

The Single 3/2 pendant control valve may be used anywhere that requires manual 3/2 control, such as operating small single acting cylinders or pressurizing vacuum cups for quick release. Ideal for use on or with material handling devices. Spring-return rubber poppet internals provide dependable shifting, long life, and low cost.

Dual 2/2

Ideal for use on or with material handling devices. Spring-return rubber poppet internals provide dependable shifting, long life, and low cost.

Dual 3/2

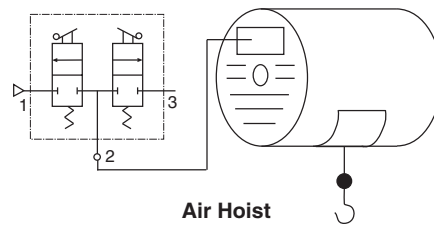
Ideal for use on or with material handling devices. Twin Pacer® inserts ensure reliability, dirt tolerance, and easy maintenance. May be used as a pilot valve convertible to a dual 2/2 function.

Triple 3/2

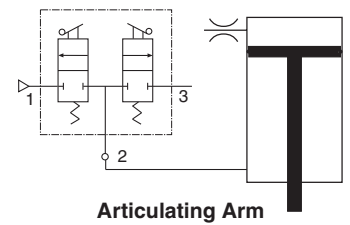
The Triple 3/2 pendant control valve may be used anywhere that three independent manual outputs are needed. Provides remote pilot signals to pressure controlled valves. Three Pacer® inserts ensure reliability and dirt tolerance.

Application Data

Dual 2/2 - High Flow

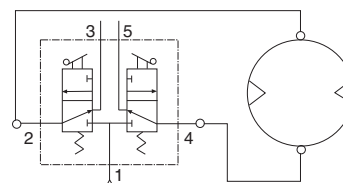


Air Hoist

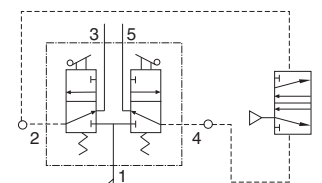


Articulating Arm

Dual 3/2



Bi-directional Air Motor

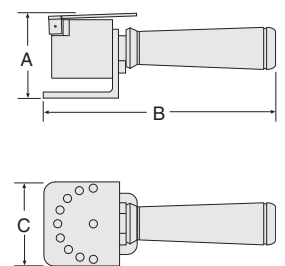


Pilot for Larger Double Pressure Controlled Valve

To convert a Dual 3/2 into a Dual 2/2:

Plug ports 3 and 5. Connect supply line to port 2. Port 1 becomes the outlet and port 4 becomes the exhaust port.

Model Description	Pipe Size	Model Number	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
			1-2	2-3	A	B	C	
Single 3-way; one lever, no handle	1/4"	2025A2904	0.24	0.42	4.7 (120)	6.0 (170)	1.8 (46)	1.0 (0.5)
Single 3-way; one lever/handle	1/4"	3900A1111	0.24	0.42	4.7 (120)	7.2 (182)	1.8 (46)	1.7 (0.8)
Dual 2-way high flow; two levers only	1/4"	2025A2901	0.73	0.55	3.1 (78)	2.8 (71)	2.8 (70)	1.0 (0.5)
Dual 2-way high flow; two levers/handle	1/4"	3900A0378	0.73	0.55	3.1 (78)	7.2 (182)	2.8 (70)	1.7 (0.8)
Dual 3-way; two levers only	1/8"	2025A1900	0.24	0.42	2.1 (54)	2.8 (71)	2.5 (64)	0.9 (0.4)
Dual 3-way; two levers/handle	1/8"	3900A0379	0.24	0.42	2.9 (73)	7.2 (182)	2.8 (70)	1.6 (0.7)
Triple 3-way; three levers only	1/4"	2025A2902	0.24	0.42	2.8 (71)	2.8 (71)	3.8 (97)	1.6 (0.7)
Triple 3-way; three levers/handle	1/4"	3900A0407	0.24	0.42	2.8 (71)	7.2 (182)	3.8 (97)	2.3 (1.0)



STANDARD SPECIFICATIONS (for valves on this page):

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 50°C).

Flow Media: Filtered air.

Inlet Pressure: 0 to 150 psig (0 to 10 bar).

Port Threads: NPT.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

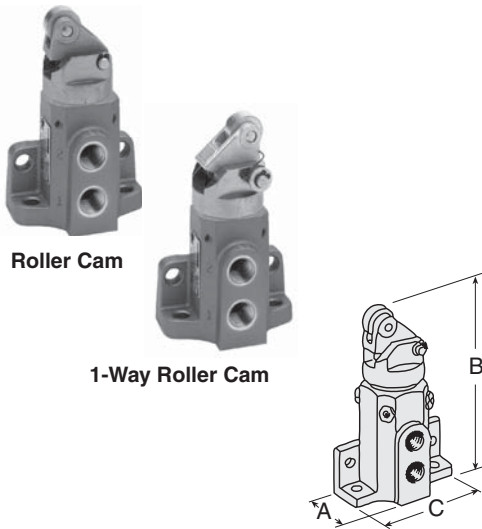


Cam, Pushbutton & Toggle Valves Series 11

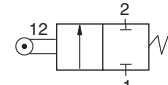
for Mechanical / Manual Control

2/2 and 3/2 Cam Valves

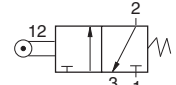
- Self-cleaning poppet design tolerates dirty air



Roller Cam

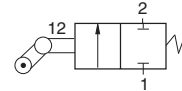


2/2 Normally Closed (NC)

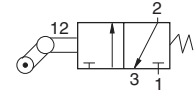


3/2 Normally Closed (NC)

1-Way Roller Cam



2/2 Normally Closed (NC)

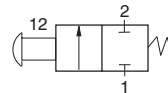
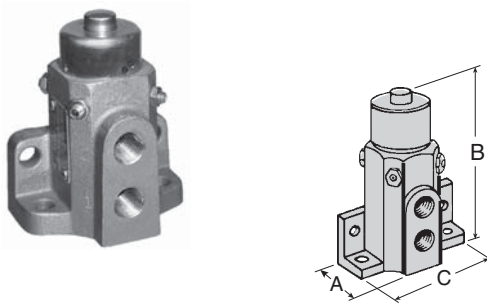


3/2 Normally Closed (NC)

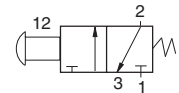
Port Size	Valve Type	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1/4	2/2 - Roller	1131A2001	0.5	1.8 (46)	4.4 (111)	2.8 (70)	1.0 (0.5)
1/4	3/2 - Roller	1133A2001	0.5	1.8 (46)	4.4 (111)	2.8 (70)	1.0 (0.5)
1/4	2/2 - 1-Way Roller	1131A2002	0.5	1.8 (46)	4.5 (114)	2.8 (70)	1.0 (0.5)
1/4	3/2 - 1-Way Roller	1133A2002	0.5	1.8 (46)	4.5 (114)	2.8 (70)	1.0 (0.5)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1131A2001.

2/2 and 3/2 Plunger Cam Valves



2/2 Normally Closed (NC)

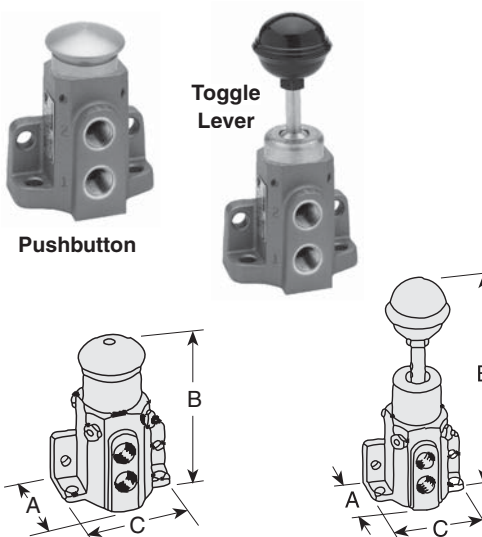


3/2 Normally Closed (NC)

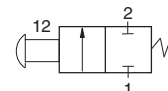
Port Size	Valve Type	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1/4	2/2 - Plunger	1131A2003	0.5	1.8 (86)	3.4 (111)	2.8 (70)	1.0 (0.5)
1/4	3/2 - Plunger	1133A2003	0.5	1.8 (86)	3.4 (111)	2.8 (70)	1.0 (0.5)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1131A2003.

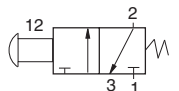
2/2 and 3/2 Pushbutton and Toggle Lever Valves



Pushbutton

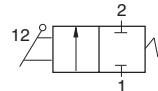


2/2 Normally Closed (NC)

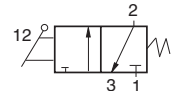


3/2 Normally Closed (NC)

Toggle Lever



2/2 Normally Closed (NC)



3/2 Normally Closed (NC)

Port Size	Valve Type	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1/4	2/2 - Pushbutton	1121A2001	0.5	1.8 (46)	3.3 (83)	2.8 (70)	1.0 (0.5)
1/4	3/2 - Pushbutton	1123A2001	0.5	1.8 (46)	3.3 (83)	2.8 (70)	1.0 (0.5)
1/4	2/2 - Toggle Lever	1121A2002	0.5	1.8 (46)	5.9 (150)	2.8 (70)	1.0 (0.5)
1/4	3/2 - Toggle Lever	1123A2002	0.5	1.8 (46)	5.9 (150)	2.8 (70)	1.0 (0.5)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1121A2001.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 40° to 175°F (4° to 80°C).
Flow Media: Filtered air.

Inlet Pressure: 5 to 150 psig (0.3 to 10 bar).
Port Threads: NPT, BSPP.

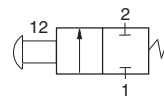
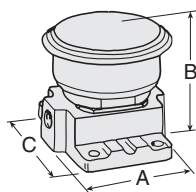
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Pushbutton & Selector Switch Series 12

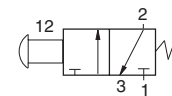
for Manual Control

2/2 and 3/2 Pushbutton Valves, Heavy Duty

- Self-cleaning poppet design tolerates dirty air



2/2 Normally Closed (NC)



3/2 Normally Closed (NC)

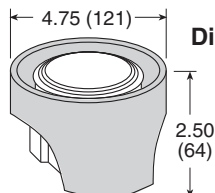
Port Size	Valve Type	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Green Button	Red Button		A	B	C	
1/4	2/2	1221B2001	1221B2003	0.8	2.7 (69)	2.3 (58)	3.0 (77)	1.8 (0.8)
1/4	3/2	1223B2001	1223B2003	0.8	2.7 (69)	2.3 (58)	3.0 (77)	1.8 (0.8)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1221B2001.

Ring-type Guard

Helps to protect against accidental valve actuation.

Order by following part number: **278B30**



Dimensions: inches (mm)

3/2 Flush Pushbutton & Mushroom Button Valves

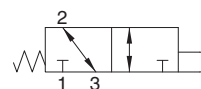


Flush Pushbutton



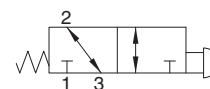
Mushroom Button

Flush Pushbutton

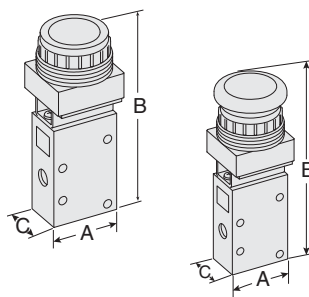


3/2 Normally Closed (NC)

Mushroom Button



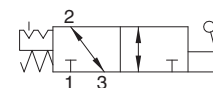
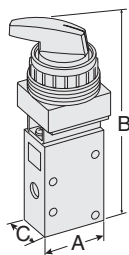
3/2 Normally Closed (NC)



Port Size	Valve Type	Valve Model Number*		Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
		Green Button	Red Button		A	B	C	
1/8	3/2 - Flush Pushbutton	1223B1FPG	1223B1FPR	0.6	1.4 (35)	3.9 (99)	0.8 (21)	0.28 (0.13)
1/4	3/2 - Flush Pushbutton	1223B2FPG	1223B2FPR	0.9	1.6 (40)	3.9 (99)	1.0 (25)	0.34 (0.15)
1/8	3/2 - Mushroom Button	1223B1MBG	1223B1MBR	0.6	1.4 (35)	4.4 (111)	0.8 (21)	0.29 (0.13)
1/4	3/2 - Mushroom Button	1223B2MBG	1223B2MBR	0.9	1.6 (40)	4.4 (111)	1.0 (25)	0.35 (0.16)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1223B1FPG.

3/2 Selector Switch Valves



3/2 Normally Closed (NC)

Port Size	Valve Type	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1/8	3/2 - Selector Switch	1223B1SLB	0.6	1.4 (35)	4.6 (118)	0.8 (21)	0.31 (0.14)
1/4	3/2 - Selector Switch	1223B2SLB	0.9	1.6 (40)	4.6 (118)	1.0 (25)	0.37 (0.17)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1223B1SLB.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 40° to 175°F (4° to 80 °C).
Flow Media: Filtered air.

Inlet Pressure: 5 to 150 psig (0.3 to 10 bar).
Port Threads: NPT, BSPP.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



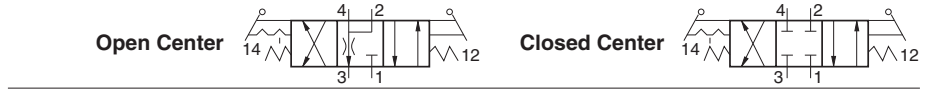
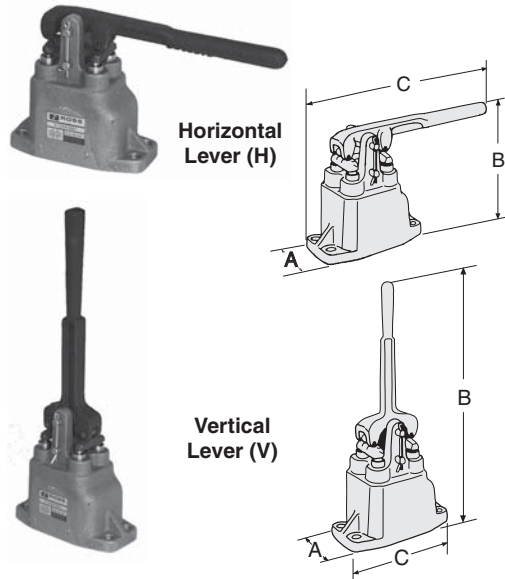
Lever, Pedal & Treadle Valves

Series 31 & 36

for Manual Control

4/3 Lever Valves

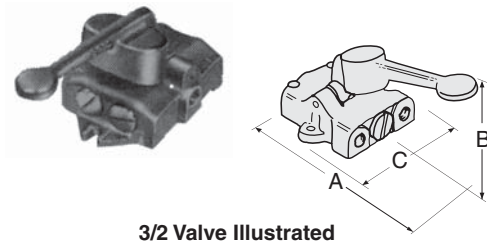
All Ports on Bottom Face



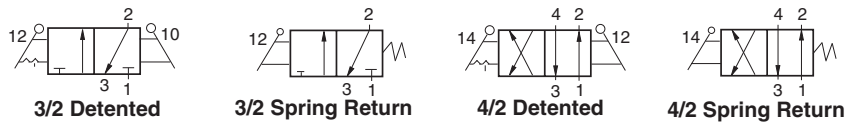
Lever Type	Port Size	Valve Model Number*	Avg. C _v	Closed/Open Center	Dimensions inches (mm)			Weight lb (kg)
					A	B	C	
H	3/8	3126A3007	1.6	Open	2.1 (54)	4.4 (112)	8.1 (205)	2.0 (0.9)
	3/8	3126A3010	1.6	Closed	2.1 (54)	4.4 (112)	8.1 (205)	2.0 (0.9)
	1/2	3126A4007	2.6	Open	2.8 (70)	5.5 (140)	11.2 (284)	3.8 (1.7)
	1/2	3126A4010	2.6	Closed	2.8 (70)	5.5 (140)	11.2 (284)	3.8 (1.7)
	3/4	3126A5007	4.6	Open	3.3 (83)	6.2 (156)	12.5 (317)	5.0 (2.3)
	3/4	3126A5010	4.6	Closed	3.3 (83)	6.2 (156)	12.5 (317)	5.0 (2.3)
V	1	3126A6007	8.8	Open	4.1 (105)	8.0 (202)	18.6 (473)	10.0 (4.5)
	1	3126A6010	8.8	Closed	4.1 (105)	8.0 (202)	18.6 (473)	10.0 (4.5)
	1 1/4	3126A7007	12	Open	4.8 (121)	8.2 (207)	18.8 (476)	11.0 (5.0)
	1 1/4	3126A7010	12	Closed	4.8 (121)	8.2 (207)	18.8 (476)	11.0 (5.0)
	3/8	3126A3009	1.6	Open	2.1 (54)	10.8 (273)	4.3 (109)	2.4 (1.1)
	3/8	3126A3012#	1.6	Open	2.1 (54)	10.8 (273)	4.3 (109)	2.4 (1.1)
	3/8	3126A3013	1.6	Closed	2.1 (54)	10.8 (273)	4.3 (109)	2.4 (1.1)
	3/8	3126A3014#	1.6	Closed	2.1 (54)	10.8 (273)	4.3 (109)	2.4 (1.1)
	1/2	3126A4009	2.6	Open	2.8 (70)	13.5 (344)	5.6 (143)	4.8 (2.2)
	1/2	3126A4012#	2.6	Open	2.8 (70)	13.5 (344)	5.6 (143)	4.8 (2.2)
1/2	3126A4013	2.6	Closed	2.8 (70)	13.5 (344)	5.6 (143)	4.8 (2.2)	
1/2	3126A4014#	2.6	Closed	2.8 (70)	13.5 (344)	5.6 (143)	4.8 (2.2)	

Non-detented models.

3/2 and 4/2 Lever Valves



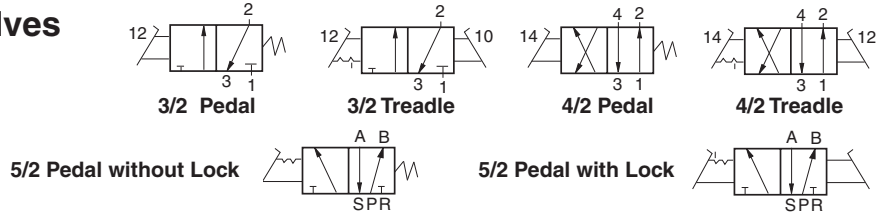
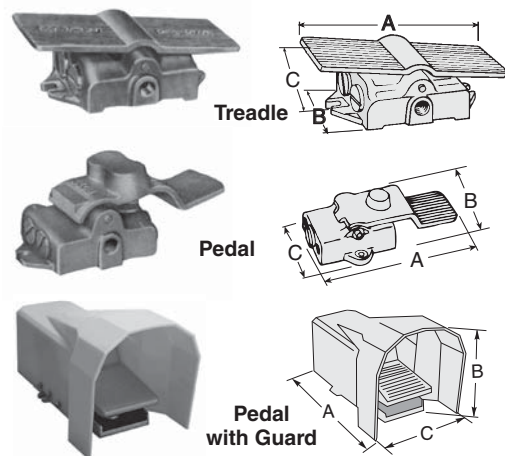
3/2 Valve Illustrated



Port Size	Valve Type	Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1/4	3/2 - Detented	3623A2003	1.2	7.2 (182)	3.2 (81)	3.4 (87)	1.3 (0.6)
1/4	3/2 - Spring return	3623A2004	1.2	7.2 (182)	3.2 (81)	3.4 (87)	1.3 (0.6)
1/4	4/2 - Detented	3626A2003	1.2	7.9 (200)	3.8 (97)	3.7 (93)	2.5 (1.1)
1/4	4/2 - Spring return	3626A2004	1.2	7.9 (200)	3.8 (97)	3.7 (93)	2.5 (1.1)

For models with vertical handle, consult ROSS.

3/2, 4/2, 5/2 Pedal and Treadle Valves



Port Size	Valve Type	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
1/4	3/2 - Pedal	3643A2002	1.2	6.4 (161)	2.6 (65)	3.5 (87)	1.3 (0.6)
1/4	3/2 - Treadle	3643A2001	1.2	6.0 (152)	3.5 (87)	1.9 (48)	1.3 (0.6)
1/4	4/2 - Pedal	3646A2002	1.2	7.2 (183)	2.9 (73)	3.7 (93)	2.8 (1.3)
1/4	4/2 - Treadle	3646A2001	1.2	6.5 (165)	3.7 (93)	2.5 (64)	2.8 (1.3)
1/4	5/2 - Pedal w/Guard	RM4F210-08G#	0.5	9.6 (245)	5.2 (133)	5.3 (135)	2.1 (0.9)
1/4	5/2 - Pedal w/Guard	RM4F210-08LG##	0.5	9.6 (245)	5.2 (133)	5.3 (135)	2.1 (0.9)

Non-locking foot pedal. ## Locking foot pedal.

Note: The 3/2 and 4/2 pedal and treadle valves are not designed to be used to actuate clutch/brake mechanisms on mechanical power presses.

* NPT port threads, for BSPP threads add a "D" prefix to the model number e.g., D3126A3007, D3623A2003, D3643A2002.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 40° to 175°F (4° to 80°C).
Flow Media: Filtered air.

Inlet Pressure: Series 31: 5 to 150 psig (0.3 to 10 bar).
 Series 36: 5 to 125 psig (0.3 to 8.5 bar).
Port Threads: NPT, BSPP.

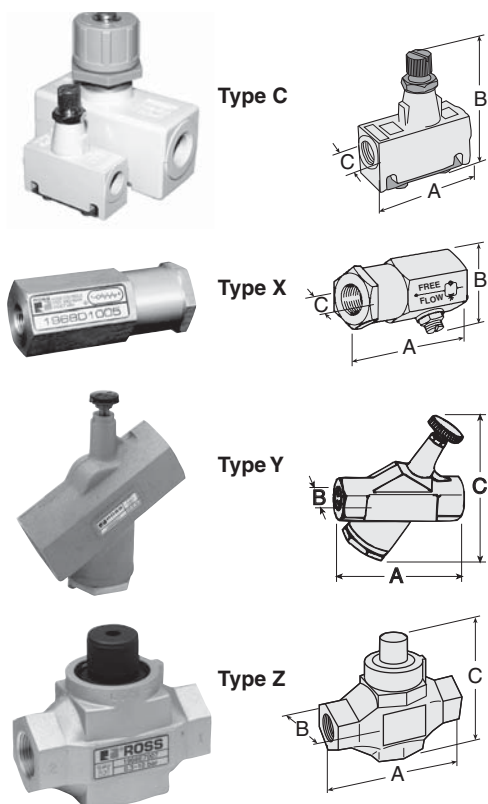
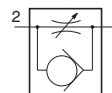
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Flow Control Valves Series 19

to Control Air Flow

Flow Control Valves

Flow control valves are used to control air flow from air cylinders, thereby controlling the speeds at which the pistons in the cylinders move. They allow free flow in one direction and adjustable, precision controlled flow in the other direction. Adjustment in the X-type models is by means of a screwdriver slot, and in the Y and Z-type models by a knurled knob.



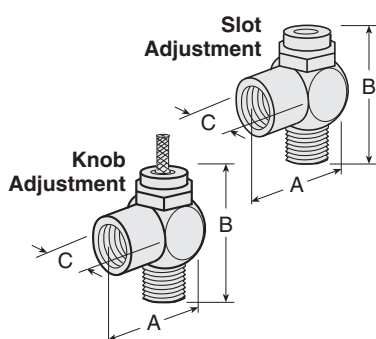
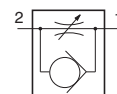
Valve Type	Port Size	Valve Model Number*	Avg. C _v (Fully open)	Dimensions inches (mm)			Weight lb (kg)	
				A	B	C		
C	1/8	1968F1004	0.5	1.6 (41)	0.6 (16)	1.6 (41)	0.1 (0.1)	
	1/4 OT	1968F2004	0.5	1.6 (41)	0.8 (20)	2.1 (54)	0.1 (0.1)	
	1/4	1968F2007	2.3	2.6 (67)	1.2 (30)	2.8 (70)	0.4 (0.2)	
	3/8	1968F3007	2.3	2.6 (67)	1.2 (30)	2.8 (70)	0.4 (0.2)	
X	1/2	1968F4007	2.3	2.6 (67)	1.2 (30)	2.8 (70)	0.4 (0.2)	
	1/8	1968D1004	0.5	2.4 (62)	1.3 (33)	1.0 (25)	0.5 (0.2)	
	1/4	1968D2004	0.5	2.4 (62)	1.3 (33)	1.0 (25)	0.5 (0.2)	
	3/8	1968D3014	0.5	2.4 (62)	1.3 (33)	1.0 (25)	0.5 (0.2)	
	1/4	1968B2007	2.3	3.5 (89)	1.3 (33)	4.3 (108)	0.5 (0.2)	
	3/8	1968B3007	2.6	3.5 (89)	1.3 (33)	4.3 (108)	0.5 (0.2)	
	1/2	1968B4017	2.6	3.5 (89)	1.3 (33)	4.3 (108)	0.5 (0.2)	
	1/2	1968B4007	7.5	4.8 (121)	1.8 (45)	5.6 (142)	0.8 (0.4)	
Y	3/4	1968B5007	8.3	4.8 (121)	1.8 (45)	5.6 (142)	0.8 (0.4)	
	1	1968B6017	8.3	4.8 (121)	1.8 (45)	5.6 (142)	0.8 (0.4)	
	1	1968B6007	17	5.4 (130)	2.3 (57)	7.1 (181)	2.2 (1.0)	
	1 1/4	1968B7007	22	5.4 (130)	2.3 (57)	7.1 (181)	2.2 (1.0)	
	1 1/2	1968B8017	22	5.4 (130)	2.3 (57)	7.1 (181)	2.2 (1.0)	
	1 1/2	1968B8007	50	7.5 (191)	3.5 (90)	9.5 (241)	4.3 (1.9)	
	2	1968B9007	50	7.5 (191)	3.5 (90)	9.5 (241)	4.3 (1.9)	
	2 1/2	1968B9017	50	7.5 (191)	3.5 (90)	9.5 (241)	4.3 (1.9)	
	Z	1/2	1968E4007	7.5	3.8 (96)	1.6 (40)	3.2 (82)	0.8 (0.4)
		3/4	1968E5007	8.3	3.8 (96)	1.6 (40)	3.2 (82)	0.8 (0.4)
1		1968E6007	17	5.0 (127)	2.5 (64)	4.5 (113)	2.1 (1.0)	
1 1/4		1968E7007	22	5.0 (127)	2.5 (64)	4.5 (113)	2.1 (1.0)	

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1968F1004.

Right Angle Flow Control Valves



Right angle flow control valves function like those described above. However, their compact right angle design permits use where conventional straight-through flow controls might be undesirable. Flow adjustment is achieved by means of either a screwdriver slot or a knurled knob. Models listed in the table below have threaded female inlet ports. Models in the 1/8, 1/4, and 3/8 sizes are also available with push-to-connect tubing fittings.



Port Size	Type of Adjustment	Valve Model Number*		Avg. C _v (Fully open)	Dimensions inches (mm)			Weight lb (kg)
		Threaded Inlet	Tube Fitting		A	B	C	
1/8	Slot	1968A1008	1968A1108#	0.3	1.1 (28)	1.3 (32)	0.6 (15)	0.06 (0.03)
1/8	Knob	1968A1018	1968A1118#	0.3	1.1 (28)	1.9 (48)	0.6 (15)	0.08 (0.04)
1/4	Slot	1968A2008	1968A2108	0.6	1.3 (33)	1.6 (41)	0.8 (19)	0.12 (0.05)
1/4	Knob	1968A2018	1968A2118	0.6	1.3 (33)	2.3 (59)	0.8 (19)	0.14 (0.06)
3/8	Slot	1968A3008	1968A3108	1.9	1.6 (44)	2.6 (66)	0.9 (23)	0.20 (0.09)
3/8	Knob	1968A3018	1968A3118	1.9	1.5 (38)	3.0 (77)	0.9 (23)	0.20 (0.09)
1/2	Slot	1968A4008	---	2.8	1.8 (46)	2.3 (58)	1.1 (28)	0.34 (0.15)
1/2	Knob	1968A4018	---	2.8	1.8 (46)	3.2 (81)	1.1 (28)	0.34 (0.15)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1968A1008.

These models have 1/8 threaded inlet, but with 1/4 tube fittings.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 40° to 175°F (4° to 80°C).
Type C only: 41° to 140°F (5° to 60°C).
Flow Media: Filtered air.

Pressure Range: 5 to 150 psig (0.3 to 10 bar).
Type C only - Supply Pressure: 217 psi (14.9 bar).
Type C only - Maximum Operating Pressure: 150 psi (10.3 bar).
Port Threads: NPT, BSPP.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



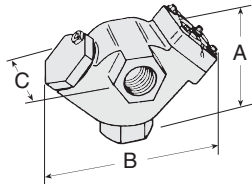
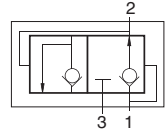
Quick Exhaust, Shuttle and Check Valves

Series 18 & 19

to Control Air Flow

Quick Exhaust Valves

Quick cylinder reversal can be a problem if the control valve is at a distance from the cylinder or otherwise restricts the exhaust flow. A ROSS quick exhaust valve near the cylinder opens as soon as the controls valve begins exhausting, and thus allows quick reversal of the cylinder.

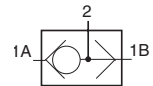


Port Size		Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
1-2	3		1-2	2-3	A	B	C	
3/8	1/2	1868A3005	2.9	3.4	3.2 (81)	4.7 (119)	2.0 (51)	1.0 (0.5)
1/2	1/2	1868A4005	2.9	3.4	3.2 (81)	4.7 (119)	2.0 (51)	1.0 (0.5)
3/4	1	1868A5005	7.2	10	4.3 (110)	6.5 (165)	2.6 (65)	2.5 (1.1)
1	1	1868A6005	7.2	10	4.3 (110)	6.5 (165)	2.6 (65)	2.5 (1.1)

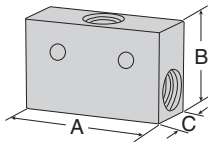
* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1868A3005.

Shuttle Valves

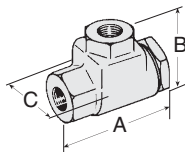
ROSS shuttle valves have two inlets and one outlet. The first inlet to be pressurized is connected to the outlet, and the second inlet is then closed. Thus, a pneumatic device connected to the shuttle outlet can be operated by either of two control valves connected to the shuttle inlets.



Y



Z



Valve Type	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
			1-2	A	B	C	
Y	1/8	1968E1006	0.8	1.98 (50)	1.25 (32)	0.75 (19)	0.15 (0.07)
	1/4	1968E2006	0.8	1.98 (50)	1.25 (32)	0.75 (19)	0.15 (0.07)
Z	1/4	1968D2003	2.0	2.64 (67)	2.13 (54)	1.25 (32)	0.8 (0.4)
	3/8	1968D3003	3.0	2.64 (67)	2.13 (54)	1.25 (32)	0.8 (0.4)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1968E1006.

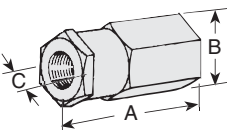
Check Valves

ROSS check valves are self-actuating and designed to provide free air flow in one direction, and to be closed to flow in the opposite direction.

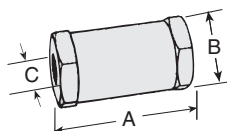
- Self-cleaning poppet design tolerates dirty air
- Low cracking pressure
- Serviceable in-line
- Quiet operation due to soft-seal design



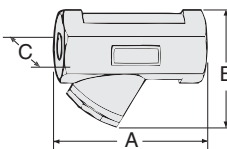
Type X



Type Y



Type Z



Valve Type	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
			1-2	A	B	C	
X	1/8	1968D1005	0.5	2.7 (67)	1.2 (29)	1.0 (25)	0.5 (0.2)
	1/4	1968D2005	0.5	2.7 (67)	1.2 (29)	1.0 (25)	0.5 (0.2)
Y	1/4	1968D2001	2.9	2.8 (71)	1.6 (40)	1.4 (35)	0.5 (0.2)
	3/8	1968D3001	3.7	2.8 (71)	1.6 (40)	1.4 (35)	0.5 (0.2)
	1/2	1968D4001	3.9	3.7 (94)	1.5 (40)	1.4 (35)	0.5 (0.2)
Z**	1/2	1968A4107	5.2	4.8 (122)	3.2 (81)	1.8 (46)	0.9 (0.4)
	3/4	1968A5107	8.6	4.8 (122)	3.2 (81)	1.8 (46)	0.9 (0.4)
	1	1968A6117	8.3	4.8 (122)	3.2 (81)	1.8 (46)	0.9 (0.4)
	1	1968A6107	17	5.4 (137)	4.3 (109)	2.3 (58)	2.0 (0.9)
	1 1/4	1968A7107	22	5.4 (137)	4.3 (109)	2.3 (58)	2.0 (0.9)
	1 1/2	1968A8117	22	5.4 (137)	4.3 (109)	2.3 (58)	2.0 (0.9)
	1 1/2	1968A8107	50	7.5 (191)	5.7 (145)	3.5 (89)	4.7 (2.1)
2	1968A9107	50	7.5 (191)	5.7 (145)	3.5 (89)	4.7 (2.1)	
2 1/2	1968A9117	50	7.5 (191)	5.7 (145)	3.5 (89)	4.7 (2.1)	

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D1968D1005.

** SAE port threads available, add an "S" prefix to the model number, e.g., S1968A4107.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 40° to 175°F (4° to 80°C).
Flow Media: Filtered air.

Inlet Pressure: 5 to 150 psig (0.3 to 10 bar).
Signal Pressure: Must be equal to or greater than inlet.
Port Threads: NPT, BSPP.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Pilot Operated Check Valves Series 27

Load Holding Cylinder Position Holding



**Dual Pilot Operated
Check Valve with
Manual Trapped Pressure Relief**



**Dual Pilot Operated
Check Valve with
Remote Trapped Pressure Relief**



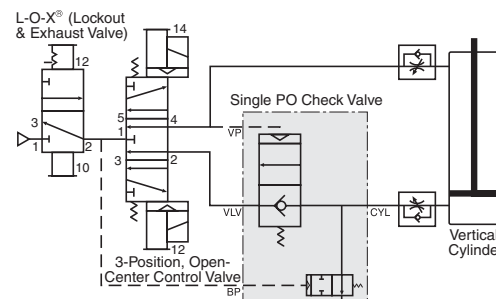
**Single Pilot Operated
Check Valve with
Trapped Pressure Relief**

- Can be used wherever a high-flow or remotely-controlled checking function is needed, in a circuit to provide automatic stopping of a cylinder in the event of the loss of electrical or pneumatic power.
- Available with an automatic exhausting function, remote and manual trapped pressure relief function, or solenoid pilot dual pilot operated check.

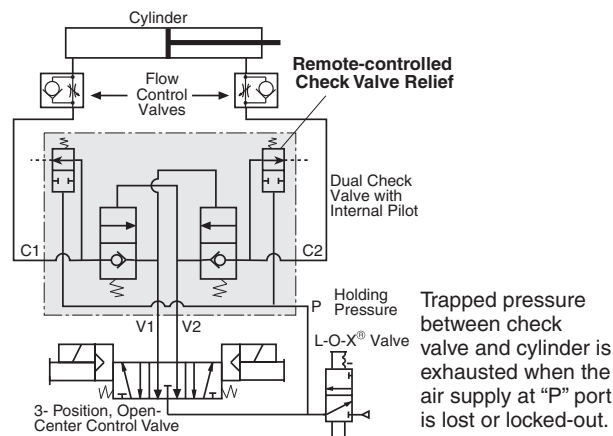
CIRCUIT FEATURES:

- Trapped pressure between check valve and cylinder is exhausted when the air supply at the Blowdown Signal Port (BP) is lost or locked-out.
- Cylinder moves as long as the control valve solenoid is energized. Use for continuous motion or jogging.
- Cylinder remains stationary if neither control valve solenoid is energized, or if electrical signal is lost.

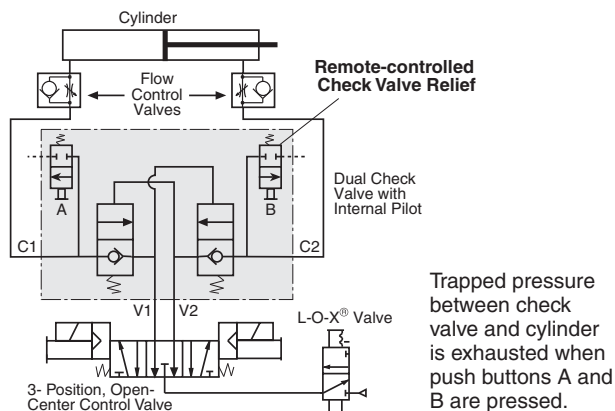
Single Pilot Operated Check Valve with Trapped Pressure Relief Application



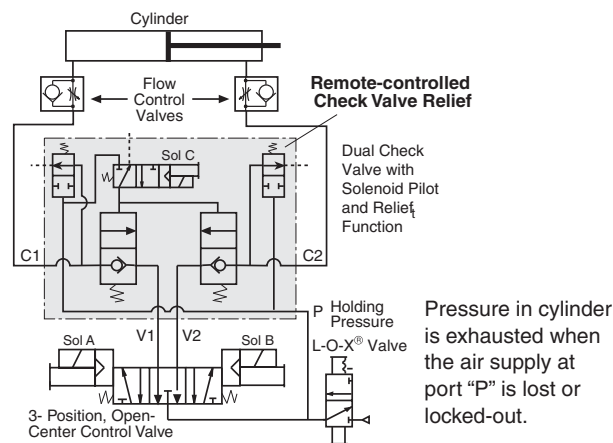
Dual Pilot Operated Check Valve Remote Trapped Pressure Relief Application



Dual Pilot Operated Check Valve Manual Trapped Pressure Relief Application



Dual Pilot Operated Check Valve Solenoid Pilot Controlled Application



TYPICAL APPLICATIONS: Overhead lifter circuits; applications where there is a long distance between the check valve and the operating valve.

CIRCUIT FEATURES:

- To operate cylinder, simultaneously energize solenoids A and C or B and C
- Pilot supply and exhaust are independent of control valve
- Response time is not affected by exhaust restrictions of the control valve
- Cylinder remains stationary if neither control valve solenoid is energized, or if electrical signal is lost
- Pressure in cylinder is exhausted when the air supply at "P" port is lost or locked-out
- L-O-X® valve provides lockable shut-off of air supply, and exhausting of trapped downstream air

IMPORTANT NOTES, CAUTIONS and WARNINGS:

- Cylinder movement may occur when inlet pressure is lost. The cylinder's movement is slowed only by the restrictions of the flow control valves, and by the exhaust capacity of the check valve relief flow capacity.

- For best response, flow control valves should be installed between the check valve and the cylinder.
- Pressurizing the system after supply air has been off may cause rapid movement of the cylinder because cylinder air was exhausted while the supply air was off.

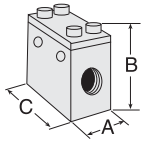
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Pilot Operated Check Valves Series 27

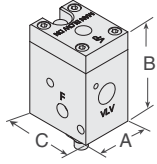
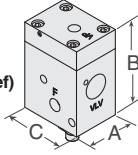
Load Holding Cylinder Position Holding

Pressure Controlled



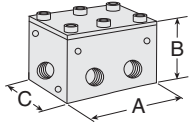
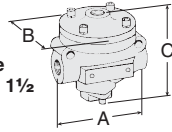
Type A Single PO Check Valve
Ports: 1/4 through 1/2

Type A Single PO Check Valve (Remote Trapped Pressure Relief)
Ports: 3/8 through 3/4



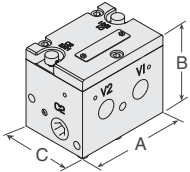
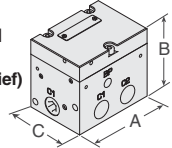
Type A Single PO Check Valve (Manual Trapped Pressure Relief)
Ports: 3/8 through 3/4

Type B Single PO Check Valve
Ports: 1/4 through 1/2



Type C Dual PO Check Valve
Ports: 3/8 through 1

Type D Internal Pilot Dual PO Check Valve (Remote Trapped Pressure Relief)
Ports: 3/8 through 1/2



Type D Internal Pilot Dual PO Check Valve (Manual Trapped Pressure Relief)
Ports: 3/8 through 1/2

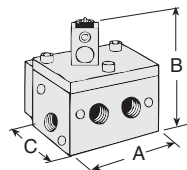
Valve Type	Port Size	Valve Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
				A	B	C	
A	1/4	2751A2908	2.2	1.5 (38)	3.6 (91)	2.0 (51)	2.3 (1.0)
	3/8	2751A3908	2.9	1.5 (38)	3.6 (91)	2.0 (51)	2.3 (1.0)
	1/2	2751A4915	3.2	1.5 (38)	3.6 (91)	2.5 (64)	2.3 (1.0)
Remote A	3/8	2751B3922	2.6	1.7 (41.9)	3.6 (90.6)	2.2 (55.9)	1.8 (0.8)
	1/2	2751B4922	2.8	1.7 (41.9)	3.6 (90.6)	2.2 (55.9)	1.8 (0.8)
	3/4	2751B5917	9.2	4.3 (110)	4.2 (107)	2.2 (56)	2.9 (1.3)
Manual A	3/8	2751B3920	2.6	1.7 (41.9)	3.5 (88)	2.2 (55.9)	1.8 (0.8)
	1/2	2751B4920	2.8	1.7 (41.9)	3.5 (88)	2.2 (55.9)	1.8 (0.8)
	3/4	2751B5919	9.2	4.3 (110)	4.2 (107)	2.2 (56)	2.9 (1.3)
B	1/4	2751A2903	2.3	3.6 (91)	3.8 (95)	3.1 (79)	1.3 (0.6)
	3/8	2751A3901	3.8	3.6 (91)	3.8 (95)	3.1 (79)	1.3 (0.6)
	1/2	2751A4902	4.0	3.6 (91)	3.8 (95)	3.1 (79)	1.3 (0.6)
B	1/2	2751A4905	7.7	4.6 (116)	4.4 (112)	3.1 (79)	2.3 (1.0)
	3/4	2751A5903	9.0	4.6 (116)	4.4 (112)	3.1 (79)	2.3 (1.0)
	1	2751A6901	9.0	4.6 (116)	4.4 (112)	3.1 (79)	2.3 (1.0)
B	1	2751B6904	24	6.7 (169)	6.5 (165)	4.1 (104)	6.0 (2.7)
	1 1/4	2751B7901	29	6.7 (169)	6.5 (165)	4.1 (104)	6.0 (2.7)
	1 1/2	2751B8902	29	6.7 (169)	6.5 (165)	4.1 (104)	6.0 (2.7)
C Dual	3/8	2768C3900	2.9	3.4 (89)	3.7 (94)	2.4 (61)	2.0 (0.9)
	1/2	2768C4900	3.2	3.4 (89)	3.7 (94)	2.4 (61)	2.4 (1.1)
	3/4	2768C5900	8.5#	4.4 (111)	4.1 (104)	3.0 (76)	3.8 (1.7)
D Remote	1	2768A6900	8.5#	5.8 (147)	4.1 (104)	3.9 (99)	6.8 (3.1)
	3/8	2768D3901	2.9	3.6 (91.4)	3.7 (92.4)	2.6 (66.1)	3.5 (1.6)
	1/2	2768D4901	3.2	3.6 (91.4)	3.7 (92.4)	2.6 (66.1)	3.5 (1.6)
D Manual	3/4	2768D5901	8.5#	5.0 (126.5)	4.2 (107.7)	3.4 (86.4)	5.2 (2.3)
	1	2768D6901	8.5#	5.0 (126.9)	4.2 (107.7)	3.4 (86.4)	8.8 (4.0)
	3/8	2768D3904	2.9	3.6 (91.4)	3.6 (91.4)	2.6 (66.1)	3.2 (1.4)
D Manual	1/2	2768D4904	3.2	3.6 (91.4)	3.6 (91.4)	2.6 (66.1)	3.5 (1.6)
	3/4	2768D5904	8.5#	4.8 (122)	4.2 (107.7)	3.4 (86.4)	5.2 (2.3)
	1	2768D6904	8.5#	4.8 (122)	4.2 (107.7)	3.4 (86.4)	8.8 (4.0)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D2751A2908.

Effective C_v varies with load and pressure drop. Consult ROSS for specifics on your system.

Solenoid Pilot Controlled

Valve Model Number*



Type E Solenoid Pilot Dual PO Check Valve
Ports: 3/8 through 1

Valve Type	Port Size	Avg. C _v	DIN Connector	3-Pin Mini Connector	24 volts DC		Dimensions inches (mm)			Weight lb (kg)
					3-Pin Mini Connector	4-Pin Micro Connector	A	B	C	
E	3/8	2.9	2778D3900**	2778D3901**	2778D3902**	2778D3904**	3.6 (91.4)	5.7 (144)	2.6 (66.1)	4.0 (1.8)
	1/2	3.2	2778D4900**	2778D4901**	2778D4902**	2778D4904**	3.6 (91.4)	5.7 (144)	2.6 (66.1)	4.2 (1.9)
	3/4	8.5#	2778D5900**	2778D5901**	2778D5902**	2778D5904**	5.0 (126.5)	6.8 (172)	3.4 (86.4)	6.1 (2.8)
	1	8.5#	2778B6900**	2778B6901**	2778B6902**	2778B6904**	5.0 (126.5)	6.8 (172)	3.4 (86.4)	6.1 (2.8)

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D2751A2908.

Effective C_v varies with load and pressure drop. Consult ROSS for specifics on your system.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3473D190W, 3473D190Z.

STANDARD SPECIFICATIONS (for valves on this page):

Solenoid Pilot Controlled:

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 8 VA inrush, 6 VA holding on AC; on DC 4.5 watts with 4-pin Micro connector, 60 watts with 3-pin connector.

Ambient/Media Temperature: 40° to 175°F (4° to 80°C).

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Inlet Pressure: 30 to 150 psig (2 to 10 bar).

Pressure Controlled:

Ambient/Media Temperature: 40° to 175°F (4° to 80°C).

Inlet Pressure: 15 to 150 psig (1 to 10 bar).

Common Specifications:

Flow Media: Filtered air.

Signal Pressure: Must be equal to or greater than inlet.

Port Threads: NPT, BSPP.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

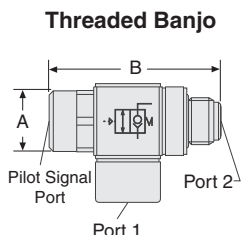


Pilot Operated Check Valves Series 19

Right Angle Cylinder Position Holding

Pilot Operated Check Valves are used to block the return of air from cylinders or other devices. Air flows freely from port 1 to port 2, but a signal at the pilot signal port is required to allow flow in the reverse direction from port 2 to port 1.

- Right angle design with banjo for easy positioning of pipe or tubing
- Galvanized zinc plated brass body construction
- Quick and easy installation
- Lube or non-lube operation



Models with Threaded Banjo

Signal Port Thread	Port Size		Valve Model Number	Avg. C _v		Dimensions inches (mm)		Tightening Torque Max. Ft-lb (Nm)
	Port 1*	Port 2**		1 to 2	2 to 1	A	B	
10-32 UNF	1/8	1/8	1958A1010	0.4	0.4	0.5 (13)	1.7 (41)	11.06 (15)
10-32 UNF	1/4	1/4	1958A2010	0.8	0.7	0.7 (17)	1.9 (48)	14.75 (20)
10-32 UNF	3/8	3/8	1958A3010	1.2	1.3	0.9 (22)	2.2 (55)	22.13 (30)
10-32 UNF	1/2	1/2	1958A4010	2.3	2.2	1.1 (27)	2.6 (66)	29.50 (40)
M5	G1/8	G1/8	D1958A1010	0.4	0.4	0.5 (13)	1.7 (41)	7.38 (10)
M5	G1/4	G1/4	D1958A2010	0.8	0.7	0.7 (17)	1.9 (48)	8.85 (12)
M5	G3/8	G3/8	D1958A3010	1.2	1.3	0.9 (22)	2.2 (55)	14.75 (20)
M5	G1/2	G1/2	D1958A4010	2.3	2.2	1.1 (27)	2.6 (66)	22.13 (30)

* Threads in port 1 are female. ** Port 2 threads are male.

Models with Push-to-Connect Fitting

Signal Port Size	Port Size		Valve Model Number	Avg. C _v		Dimensions inches (mm)		Tightening Torque Max. Ft-lb (Nm)
	Port 1# (tube size)	Port 2** (thread size)		1 to 2	2 to 1	A	B	
10-32 UNF	5/32"	1/8	1958A1115	0.4	0.4	0.5 (13)	1.7 (41)	11.06 (15)
10-32 UNF	1/4"	1/8	1958A1120	0.4	0.4	0.5 (13)	1.7 (41)	11.06 (15)
10-32 UNF	1/4"	1/4	1958A2130	0.8	0.7	0.7 (17)	1.9 (48)	14.75 (20)
10-32 UNF	3/8"	1/4	1958A2110	0.8	0.7	0.7 (17)	1.9 (48)	14.75 (20)
10-32 UNF	3/8"	3/8	1958A3130	1.2	1.3	0.9 (22)	2.2 (55)	22.13 (30)
M5	4 mm	G1/8	D1958A1140	0.4	0.4	0.5 (13)	1.7 (41)	7.38 (10)
M5	6 mm	G1/8	D1958A1160	0.4	0.4	0.5 (13)	1.7 (41)	7.38 (10)
M5	8 mm	G1/8	D1958A1180	0.4	0.4	0.5 (13)	1.7 (41)	7.38 (10)
M5	6 mm	G1/4	D1958A2160	0.8	0.7	0.7 (17)	1.9 (48)	8.85 (12)
M5	8 mm	G1/4	D1958A2180	0.8	0.7	0.7 (17)	1.9 (48)	8.85 (12)
M5	10 mm	G1/4	D1958A2110	0.8	0.7	0.7 (17)	1.9 (48)	8.85 (12)
M5	8 mm	G3/8	D1958A3180	1.2	1.3	0.9 (22)	2.2 (55)	14.75 (20)
M5	10 mm	G3/8	D1958A3110	1.2	1.3	0.9 (22)	2.2 (55)	14.75 (20)

Port 1 tubing size in inches (") or millimeters (mm). ** Port 2 threads are male.

Optional Manual Override

Manual Trapped Pressure Relief Adapter



Adapter threads into the signal port.

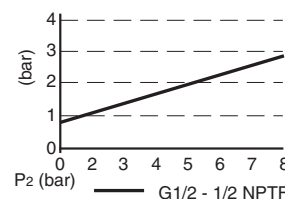
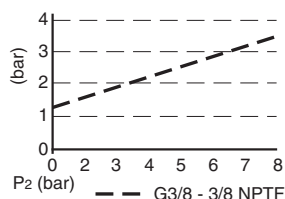
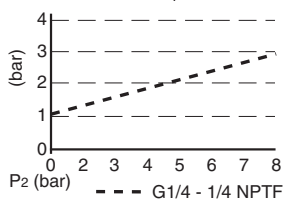
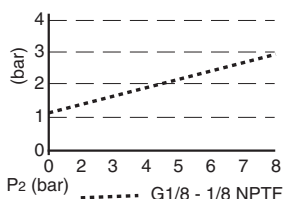
Manual Override

Model Number	Port Size	Description
for Models with Threaded Banjo		
1998A1010	10-32	10-32 Manual Operated Check
D1998A1010	5M	M5 Manual Operated Check
for Models with Push-to-Connect Fitting		
1998A1020	1/4	10-32 Manual Operated Check
1998A1015	5/32	10-32 Manual Operated Check
D1998A1140	4 mm tube	M5 Manual Operated Check
D1998A1160	6 mm tube	M5 Manual Operated Check



Valve Illustrated with Manual Trapped Pressure Relief Adapter (Optional)

Signal Pressure: The charts below show the minimum signal pilot port pressure to open the valve versus port 2 pressure (P₂) when there is no pressure at port 1 (P₁ = 0 bar).



STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 15° to 160°F (-10° to 70°C).
Flow Media: Filtered air; 5 micron recommended.

Operating Pressure: 15 to 150 psig (1 to 10 bar).

Optional:

Manual Override: Manual Trapped Pressure Relief Adapter.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



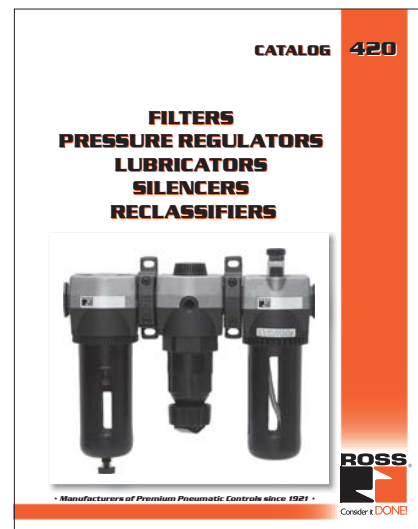
FILTERS PRESSURE REGULATORS LUBRICATORS SILENCERS RECLASSIFIERS

For more information please refer to

CATALOG 420



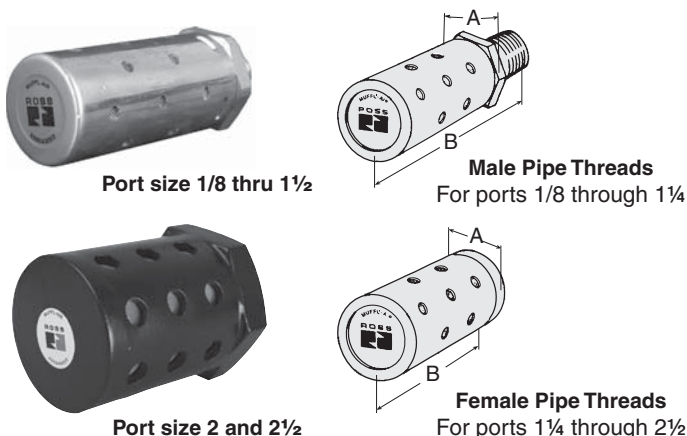
Please visit the ROSS web site
to view the complete ROSS FRL's Catalog
(ROSS Form #A10120)
at www.rosscontrols.com.



MUFFL-AIR® Silencers

for Noise Control

Noise Control Solutions for air exhaust



ROSS MUFFL-AIR® silencers substantially reduce exhaust noise levels yet produce little back pressure. Typical impact noise reduction is in the 20–25 dB range.

Port Size	Thread Type	Model Number*	Avg. Cv	Dimensions inches (mm)		Weight lb (kg)
				A	B	
1/8	Male	5500A1003	1.2	0.9 (21)	2.0 (51)	0.1 (0.1)
1/4	Male	5500A2003	2.1	0.9 (21)	2.2 (55)	0.1 (0.1)
3/8	Male	5500A3013	2.7	0.9 (21)	2.2 (55)	0.1 (0.1)
3/8	Male	5500A3003	4.3	1.3 (32)	3.5 (88)	0.2 (0.1)
1/2	Male	5500A4003	4.7	1.3 (32)	3.6 (91)	0.2 (0.2)
3/4	Male	5500A5013	5.1	1.3 (32)	3.6 (92)	0.2 (0.2)
3/4	Male	5500A5003	11.5	2.0 (51)	5.3 (135)	0.6 (0.3)
1	Male	5500A6003	14.6	2.0 (51)	5.4 (138)	0.6 (0.3)
1 1/4	Male	5500A7013	16.4	2.0 (51)	5.5 (140)	0.6 (0.3)
1 1/4	Female	5500A7001	24.0	2.5 (64)	5.7 (144)	1.0 (0.5)
1 1/2	Female	5500A8001	29.9	2.5 (64)	5.7 (144)	1.0 (0.5)
2	Female	5500B9001	34.2	3.0 (76)	6.6 (168)	1.5 (0.7)
2 1/2	Female	5500A9002	103.7	4.0 (102)	5.7 (145)	2.9 (1.4)

STANDARD SPECIFICATIONS (for silencers):
Pressure Range: 0 to 150 psig (0 to 10.3 bar) maximum.
Flow Media: Filtered air; 5 micron recommended.
Port Threads: NPT, BSPP.

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D5500A1003.

High-flow, high-reduction silencers for DM¹, DM²® Series E & DM²® Series C double valves

ROSS high-flow, high reduction Silencer Kits are designed to reduce the Exponentially Perceived Noise (EPNdB), improving equipment performance. Typical impact noise reduction is in the 35–40 dB range.

Kits are available for DM¹, DM²® Series E & DM²® Series C double valves.



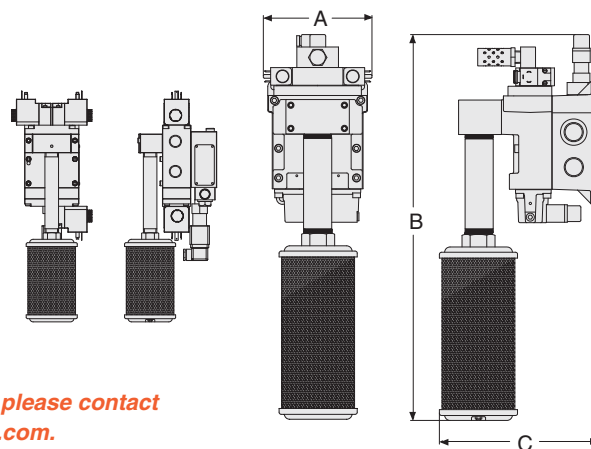
Valve Size	Port Threads	Kit Model Number*	Flow scfm (l/s)	Dimensions inches (mm)		
				A	B	C
2	NPT	2323H77	256 (121)	4.96 (126.1)	14.24 (361.7)	5.68 (144.3)
2	BSPP	2328H77	256 (121)	4.96 (126.1)	16.05 (407.7)	5.73 (145.5)

DM ² ® Series C						
Valve Size	Port Threads	Kit Model Number*	Flow scfm (l/s)	Dimensions inches (mm)		
				A	B	C
4	NPT	2324H77	800 (378)	4.34 (110.2)	19.06 (484.1)	7.27 (184.7)
8	NPT	2325H77	800 (378)	5.41 (137.4)	21.18 (538.0)	8.41 (213.6)
12	NPT	2326H77	2080 (982)	6.74 (117.2)	25.85 (656.6)	10.66 (270.8)
30	NPT	2327H77	7200 (3398)	9.85 (250.2)	41.55 (1055.4)	13.47 (342.1)
4	BSPP	2329H77	800 (378)	4.34 (110.2)	21.40 (543.6)	7.27 (184.7)
8	BSPP	2330H77	800 (378)	5.41 (137.4)	23.52 (597.4)	8.41 (213.6)
12	BSPP	2331H77	2080 (982)	6.74 (117.2)	28.20 (716.3)	10.66 (270.8)
30	BSPP	2332H77	7200 (3398)	9.85 (250.2)	41.55 (1055.4)	13.47 (342.1)

* Kits include all plumbing required for installation.

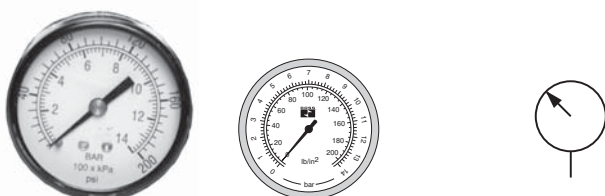
Pressure Range: 125 psig (8.6 bar) maximum.

For additional information on high-flow, high-reduction Silencer Kits please contact ROSS' Global Safety Team, email: sales.info@rosscontrols.com.



Pressure Gauges

to Measure Pressure



Port Size	Model Number	Range psig (bar)	Diameter inches (mm)
1/8	5400A1002	0-160 (0-11)	1.7 (43)
1/4	5400A2010	0-60 (0-4)	2.2 (56)
1/4	5400A2011	0-200 (0-14)	2.2 (56)
1/4	5400A2012	0-300 (0-21)	2.2 (56)

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

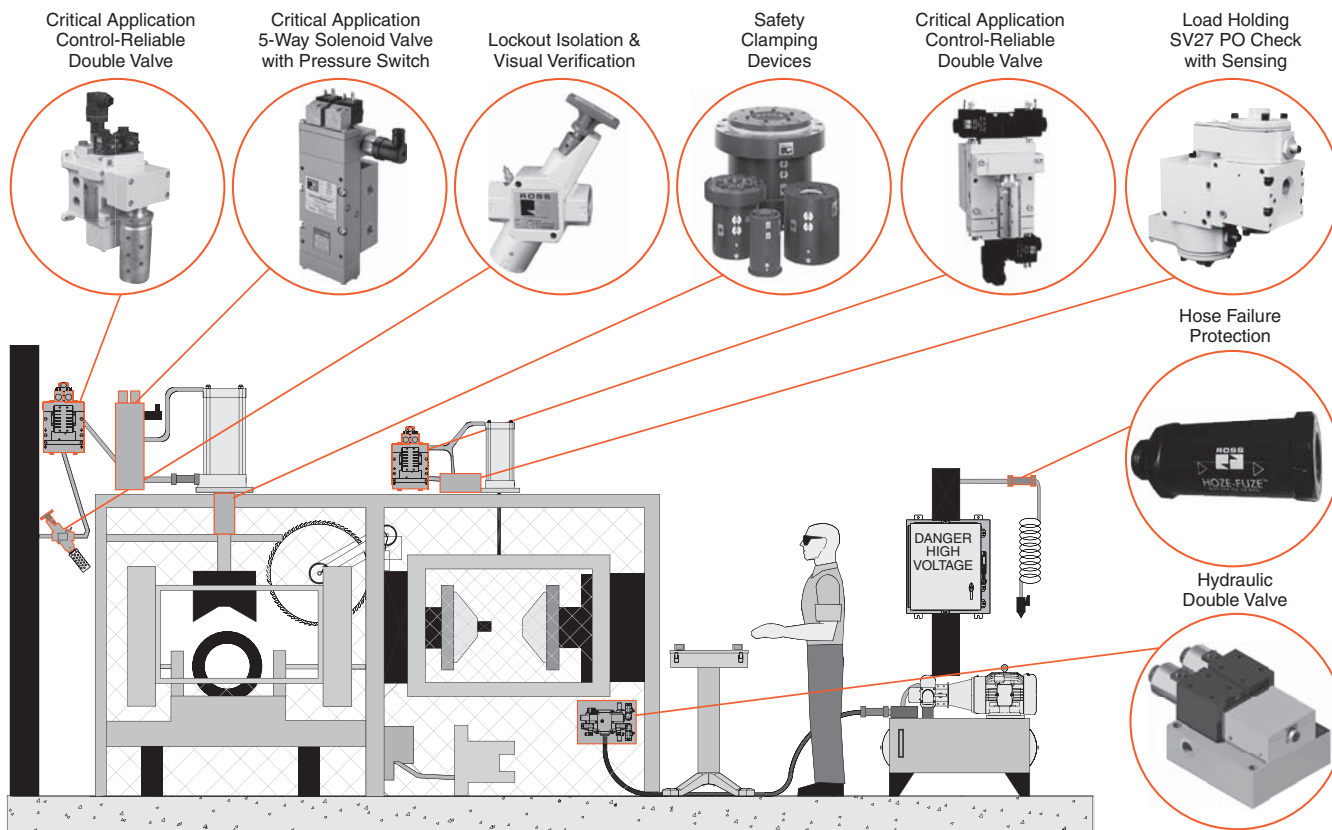


ROSS Safety-Related Solutions

ROSS has been manufacturing fluid power products since 1920. In 1954, ROSS patented the first double valve for the most demanding of safety applications, metal forming press clutch and brake control. Since that time, ROSS has patented several improved versions of the double valve and expanded its safety product offering.

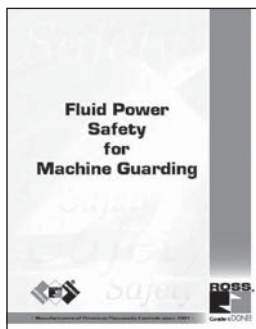
ROSS has become recognized as the premier supplier of high-quality pneumatic and hydraulic safety components for various applications in metal forming.

- Control-reliable solenoid operated pneumatic valves
- L-O-X® lockout and exhaust pneumatic energy isolation valves
- EEZ-ON® soft start pneumatic valves
- Pilot-operated pneumatic check valves with pressure release
- HOZE-FUZE® air hose blow-out protection
- Latching manual valves



Where Does Your Safety System End?

A Complete Safety System should always include all of the components (both electrical and mechanical) – not just the electrical



Fluid Power Safety for Machine Guarding Book (order A10264)

- Over 50 pages of information providing an overview of topics related to the safe application of fluid power in industrial applications
- Topics include Control Integrity, Control Categories, LOTO, Alternative LOTO, Risk Assessment, Risk Assessment as Related to Fluid Power, Clutch/Brake Controls for Mechanical Stamping Presses, Understanding the Function of Counterbalance on Mechanical Stamping Presses, and FAQ's

Fluid Power Safety Risk Locator Program (electronic format, downloadable from the Safety Industry page at www.rosscontrols.com)

- Simply answer questions about your machine and the interactive program provides guidance to areas of possible safety concerns for closer examination



Total Machine Safety



TOTAL MACHINE SAFETY™ ROSS CONTROLS

INTRODUCTION

Total Machine Safety is the first fully-integrated electrical and fluid power machine safeguarding training program. This comprehensive approach to evaluating and designing safety controls systems is critical in the overall success of a safety program.

An understanding of global safety standard requirements for lockout and machine guarding is critical to implementing safety systems that both protect employees and promote greater productivity. When safety is addressed in the machine design process you begin to realize that safety is just another aspect of good business practices.



Electrical



Pneumatic



Lockout/tagout

IACET accredited for 3 CEUs

WHAT'S IN IT FOR YOU?

You will learn to:

- Understand the existing global safety standard landscape and future direction
- Assess and minimize risk when evaluating machines for safety
- Examine work environments and recognize potential problems
- Grasp the basics of electrical and fluid power safety components
- Manage productivity and uptime by taking a holistic approach to machine safety

WHAT DOES THE PROGRAM COVER?

This eight hour course is anchored on a fictional case study that addresses current safety standards, hazard & risk assessment, integration of safety devices, lockout/tagout, and pneumatic & electrical components.

Total Machine Safety will cover topics such as Standards, Risk Assessment requirements, Lockout/Energy Isolation, Electrical and Fluid Power Safety Devices and applications, and overall machine safeguarding requirements and solutions. This class will not cover detailed component specifications, detailed component selection, or specific detailed circuit design. It will however provide a broad basis and understanding of what is required from a design standpoint, how to implement a machine guarding process, and how to select the components that will most effectively provide a solution while avoiding common pitfalls.

Go to www.totalmachinesafety.com for more information on scheduled seminars.

For additional information please contact ROSS.



Safety Clamping Devices

ROSS CONTROLS specializes in pneumatic and hydraulic safety solutions. When needing safety rod locks, safety catchers or safety brakes ROSS will provide you the optimum solution for every application.

For information or technical assistance please call ROSS Technical Services in the U.S.A. at 1-888-TEK-ROSS(835-7677)

Safety Product Data for SISTEMA Library Users

ROSS CONTROLS has available safety product data library designed for use with the innovative new Safety Integrity Software Tool for the Evaluation of Machine Applications (SISTEMA).

Developed by the Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA, formerly know as the BGIA), SISTEMA is available to download for no charge at the IFA web site. This software tool is expected to prove invaluable to system designers because of its potential time savings and safety implications.

Besides having data suitable for use in this world-class system development tool, ROSS CONTROLS is conveniently providing free library data for a selection of its safety products. ROSS expects to expand the data offerings in the future.

Currently, data library for the following products is available: DM² Series C, D, E, Cat-4 double valves, DM1 Series, Cat-3 double valves, 5/2 CROSSMIRROR[®] Series, Cat-4 double valves.

The ROSS DM² Series safety products meet all global requirements for machine safety and are commonly used for exhausting the downstream air to help meet stop-time requirements in machine guarding applications.

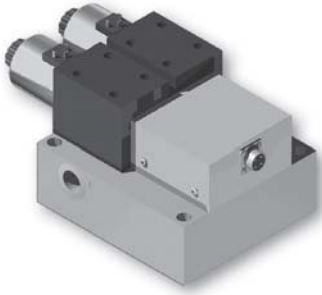
ROSS safety valve customers will find convenience and increased system design accuracy with this free software tool and data library. It can enhance their overall safety program and offers a simple way to help ensure compliance with the new EN ISO 13849-1:2008 standard.

To download a copy of the ROSS' safety products SISTEMA library, visit the Safety Industry page at www.rosscontrols.com.

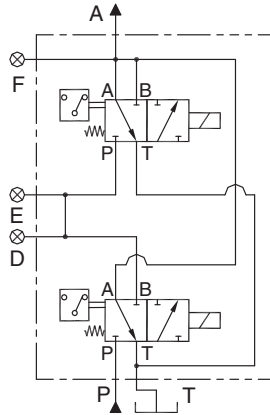


Control Reliable Hydraulic Double Valve

Size 12, 16 and 30



Ports: Inlet: SAE #12, 16 and 30
 Outlet: SAE #12, 16 and 30
 Tank: SAE #12, 16 and 30



This valve package features redundant valve elements that allow series flow from the inlet to the outlet of the valve package and allows parallel flow from the outlet to tank. This configuration assures that if either valving element fails to operate as requested, inlet flow will be blocked and fluid from the outlet is directed to the tank. The shifting of each valving element is monitored by its own safety switch.

APPLICATIONS:

- Bending Machines
- Trimming Machines
- Cutting, Forming, Piercing Machines
- Special Purpose Hydraulic Applications

Solenoid Voltage: 12, 24, 48 volts DC
 115, 230 volts AC/60 Hz

Flow rate requirements, 30 GPM (114 LPM) to 150 GPM (568 LPM).

For additional information or order placement, consult ROSS.

HOZE-FUZE®

Reduces the Dangers of Hose and Plastic Tubing Failure



The ROSS HOZE-FUZE® automatically reduces air flow to minimize hose whip. After a hose failure has occurred, the HOZE-FUZE® is designed to minimize the whip effect of the hose. A minimal amount of media flow will occur after the HOZE-FUZE® is triggered. This pilot flow will escape to atmosphere and continue until the HOZE-FUZE® is reset, therefore, the HOZE-FUZE® is intended to be used only with non-corrosive, non-flammable, non-hazardous gases. To reset the HOZE-FUZE®, simply shut-off the air supply.

NOTE:

HOZE-FUZE® size should equal hose I.D. (e.g., 1/4" FUZE: 1/4" hose or 3/8" OD x 1/4" I.D. plastic tube). There should be no reduced fittings used downstream of the HOZE-FUZE® before the tool.

Minimize Hose Whip



Tube Size	Thread/Porting	Model Number
1/4 Tube	1/4 NPT Male x Tube Push-In	1969A2002
6mm Tube	1/4 BSPP Male x Tube Push-In	D1969A2002

Hose Size	Thread/Porting	Model Number*	Overall Length Dimensions	Hex Flat inches (mm)	Weight lb (kg)
1/4	Male-Female	1969A2001	2.3 (58)	0.87 (22)	0.8 (0.36)
3/8	Male-Female	1969A3001	2.8 (71)	1.1 (27)	1.4 (0.62)
1/2	Male-Female	1969A4001	3.2 (80)	1.2 (30)	1.9 (0.86)
3/4	Female	1969A5002	3.0 (76)	1.6 (41)	2.4 (1.07)
1	Female	1969A6002	3.9 (100)	2.0 (50)	6.6 (3.00)

* NPT port threads. For BSPP threads add a "D" prefix to the model number, e.g., D1969A2001.

Approximate Flow Before Shut-Off cfm (Liters/Min.)

Hose Size	50 psi (3.4 bar)	75 psi (5.1 bar)	100 psi (6.9 bar)	125 psi (8.6 bar)	150 psi (10.3 bar)	180 psi (12.4 bar)
1/4	13 (368)	15 (424)	18 (509)	21 (594)	23 (651)	26 (736)
3/8	39 (1,104)	49 (1,387)	58 (1,642)	67 (1,897)	76 (2,152)	87 (2,463)
1/2	65 (1,840)	80 (2,265)	96 (2,718)	111 (3,143)	126 (3,568)	14 (4,077)
3/4	110 (3,114)	126 (3,567)	142 (4,020)	158 (4,474)	174 (4,927)	193 (5,465)
1	173 (4,898)	210 (75,946)	248 (7,022)	285 (8,070)	322 (9,118)	367 (10,392)

STANDARD SPECIFICATIONS (for Hoze-Fuze®):

Body: Aluminum.
Piston: Hostalen.

Maximum Pressure: 260 PSI (17 Bar).
Temperature Range: -4° to 275°F (-20° to 135°C).
Port Threads: NPT, BSPP.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Manual L-O-X® (Lockout and Exhaust) Valves

Pneumatic Energy Isolation for LOTO

L-O-X® is your simple and effective solution. The manual L-O-X® valve controls air flow simply by a push of its large red handle in or out. The valve is open when the handle is pulled outward and air then moves freely from inlet to outlet port. A short inward push of the handle closes the inlet to the flow of air and connects the outlet port to the exhaust port to exhaust compressed air immediately from downstream.

For your convenience, L-O-X® valves are available in pipe sizes from 1/4 to 3 inches.

If your machines are not already equipped with L-O-X® or manual L-O-X® valve with EEZ-ON® operation, here are six good reasons why they should be:

- **Effectiveness:** A L-O-X® valve not only isolates the equipment by shutting off air supply, it exhausts stored or residual air immediately from downstream.
- **Ease of Use:** Air shut-off is simple; just push in the bright red or stainless steel handle! There's no turning or twisting and guessing whether the valve is completely open – it's automatic!
- **Locking protection:** L-O-X® valves are designed to allow secure lockout upon shutdown, using standard padlocks.
- **Reliability:** Special PTFE seals help ensure "shift-ability" even after long periods of non-use.
- **Efficiency:** Large exhaust ports provide rapid exhaust of downstream air and are threaded for silencers or remote exhaust lines.
- **User Confidence:** Three-way valve design opens the system to atmosphere during shut-down. Any leakage past the spool is exhausted faster than it can build up.

With ROSS' manual L-O-X® valve with EEZ-ON® operation, you get even more value. Combining the lockout function of ROSS' L-O-X® valve with the gradual start-up capability of the EEZ-ON®, the manual L-O-X® valve with EEZ-ON® operation gives you two safety-related functions in one convenient unit.

A ROSS EEZ-ON® valve is designed to allow a gradual buildup of downstream air pressure before opening the line to full air flow. This gradual pressure buildup allows cylinders or other work elements to move slowly and more safely into their normal working positions before full line pressure buildup is applied. The time required for full pressure buildup is adjustable.

EEZ-ON® valves are available as either 2/2 (2-port, 2-position) or 3/2 (3-port, 2-position) valves. Either type can be used in conjunction with a L-O-X® valve to supply a lockout and exhaust feature in addition to the gradual buildup of supply pressure.

The L-O-X® valve and EEZ-ON® valve functions can now also be obtained in a combined configuration – the manual L-O-X® valve with EEZ-ON® operation. In this valve, all the functions are combined in a single valve for the most compact installation possible.

The Stainless Steel Manual L-O-X® valve offers easy and reliable solutions for applications where corrosion and contaminants are a concern. Featuring 316 stainless steel construction and self-draining capability, this rugged valve is an excellent solution for washdown applications.

The Stainless Steel L-O-X® is an asset in many applications including:

**Food and Beverage • Pharmaceutical • Pulp and Paper
Chemical Processing • Oil and Gas • Off-Shore Industries**

Size 1/4-3/4



Size 1/4-3/8



Size 3/8-1 1/4



Size 1 1/2-2



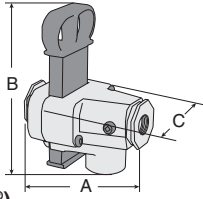
Stainless Steel
Size 1/4 thru 2



IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



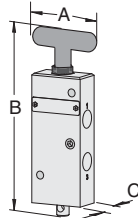
Port Sizes
1/4 thru 3/4
(Modular L-O-X®)



- Fluorocarbon slipper seals for easy shifting, even after long periods of inactivity
- Easily identified by yellow body with red handle
- Integrated sensing port for pressure verification
- Lockable only in the OFF position
- Large exhaust port exceeds inlet size for rapid release of pressure
- Large red operating handle for high visibility
- Simple push/pull of the large red handle provides positive direct manual operation



Port Sizes
1/4 and 3/8

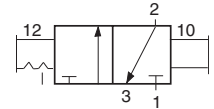


ROSS manual L-O-X® (lockout & exhaust) valves are energy isolation valves and are generally used as the first valve in a line supplying compressed air to equipment.

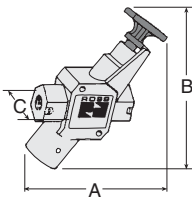
OSHA compliance requires that the valve be padlocked in closed position to prevent handle from being pulled out inadvertently during maintenance and/or servicing.

NOTE:

If a system requires gradual buildup of downstream pressure, see manual L-O-X® valves with EEZ-ON® operation.



Port Sizes
3/8 thru 1 1/4



Port Size	Valve Model Number*	Avg. Cv		Dimensions inches (mm)			Weight lb (kg)
		1 to 2	2 to 3	A	B	C	
Modular L-O-X®							
1/4	1/4 Y1523D2003	3.7	7.8	4.01(102)	5.29(135)	2.90 (74)	1.7 (0.8)
3/8	3/8 Y1523D3003	5.1	8.3	4.01(102)	5.29(135)	2.90 (74)	1.7 (0.8)
1/2	1/2 Y1523D4003	5.5	8.6	4.01(102)	5.29(135)	2.90 (74)	1.8 (0.8)
3/4	3/4 Y1523D5013	5.6	8.1	4.01(102)	5.29(135)	2.90 (74)	1.8 (0.8)

Manual L-O-X®

1/4	3/8 Y1523D2002	1.84	1.79	2.2 (57)	7.1 (180)	1.0 (26)	0.9 (0.4)
3/8	3/8 Y1523D3012	2.67	2.64	2.3 (58)	6.5 (166)	1.0 (26)	0.9 (0.4)
3/8	3/4 Y1523C3002	4.74	3.57	6.3 (159)	8.8 (225)	2.0 (51)	1.5 (0.7)
1/2	3/4 Y1523C4002	7.10	4.00	6.3 (159)	8.8 (225)	2.0 (51)	1.5 (0.7)
3/4	3/4 Y1523C5012	8.26	4.10	6.3 (159)	8.8 (225)	2.0 (51)	1.5 (0.7)
3/4	1 1/4 Y1523C5002	13.12	8.98	7.6 (194)	10.6 (270)	2.3 (57)	2.5 (1.1)
1	1 1/4 Y1523C6002	16.56	9.52	7.6 (194)	10.6 (270)	2.3 (57)	2.5 (1.1)
1 1/4	1 1/4 Y1523C7012	19.25	9.74	7.6 (194)	10.6 (270)	2.3 (57)	2.5 (1.1)
1 1/2	2 Y1523C8002	35.53	50.98	8.2 (209)	14.9 (379)	3.0 (77)	8.3 (3.7)
2	2 Y1523C9012	40.38	52.23	8.2 (209)	14.9 (379)	3.0 (77)	8.3 (3.7)

* NPT threads. For BSPP threads, insert a "D" after "Y" to the model number, e.g., YD1523D2003.

The exhaust port is threaded for the installation of a silencer or a line for remote exhausting. Two mounting holes are provided to simplify the installation of the L-O-X® valve.

For coordinating silencers, see MUFFL-AIR® Silencers (model numbers 5500A2003, 5500A3003, 5500A5003, 5500A5013, 5500A7013 and 5500B9001), page 61.

NOTE: Model number 5500B9001 is female threaded as is the exhaust port in the valve. Therefore, a pipe nipple will be needed in order to attach the muffler to the valve.

CAUTION: These L-O-X® valves are rated to 20 bar (300 psig), but the mufflers listed above are rated only to 10 bar (150 psig). These mufflers must not be used for applications with pressures greater than 10 bar (150 psig) or serious injury or damage could occur.

Manual L-O-X® valve are padlocked in closed position. The valve can only be locked in the closed position. Push/pull operation - Push the handle inward to exhaust downstream air (lockable in this position). Pull the handle outward to supply air downstream.

L-O-X® Valves port sizes 1 1/2 and 2 can be padlocked in two locations, at the handle or at the end of the spool.



NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

STANDARD SPECIFICATIONS (for valves on this page):

Ambient/Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: Port sizes 1/4 to 3/4: 15 to 200 psig (1 to 13.8 bar).

Port sizes 1/4 to 3/8: 15 to 145 psig (1 to 10 bar).

Port sizes 3/8 to 2: 15 to 300 psig (1 to 20 bar).

Body Paint: Yellow.

Port Threads: NPT, BSPP.

Lock Hole Diameter: Port sizes 1/4 to 3/8: 0.27 inch (7.0 mm).

Port sizes 1 1/2 to 2: 0.38 inch (9.6 mm).

Length of Hole: Port sizes 1/4 to 3/8: 0.43 inch (10.9 mm).

Port sizes 1 1/2 to 2: 0.75 inch (19.1 mm).

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

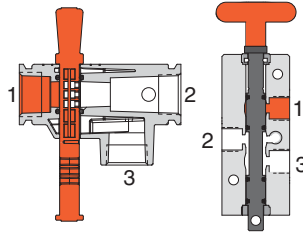


VALVE OPERATION

1/4 and 3/8 Port Sizes

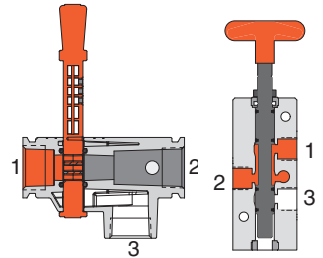
Valved Closed

When the red handle is pushed inward, the flow of supply air is blocked and downstream air is exhausted via the exhaust port. While servicing or maintaining machinery, the L-O-X® valve should be padlocked in this position to prevent the handle from being pulled outward inadvertently where potential for human injury exists.



Valve Open

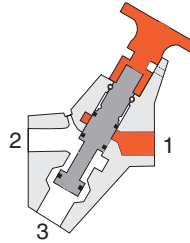
When the red handle is pulled outward supply air flows freely from inlet to outlet and flow to exhaust is blocked. A detent keeps the handle in the open position.



3/8 thru 1 1/4 Port Sizes

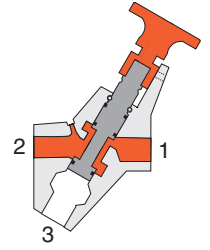
Valved Closed

With a short push of the red handle inward, the flow of supply air is blocked and downstream air is exhausted via the exhaust port at the bottom of the valve. The L-O-X® valve should be padlocked in this position to prevent the handle from being pulled outward inadvertently where potential for human injury exists or while servicing machinery.



Valve Open

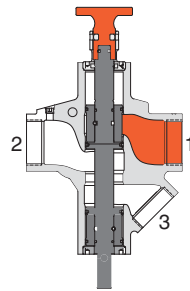
When the red handle is pulled out, supply air flows freely from inlet to outlet and flow to exhaust is blocked. A detent keeps the handle in the open position. The handle is not designed to be locked in this position, thereby providing for ready shut-off when necessary.



1 1/2 and 2 Port Sizes

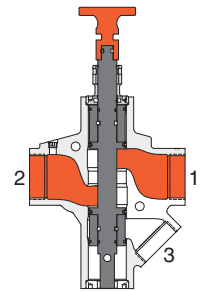
Valved Closed

With a short push of the red handle inward, the flow of supply air is blocked and downstream air is exhausted via the exhaust port while servicing or maintaining machinery. Padlock the L-O-X® valve in this position to prevent the handle from being pulled outward inadvertently to avoid potential for human injury while servicing machinery.



Valve Open

When the red handle is pulled out, supply air flows freely from inlet to outlet and flow to exhaust is blocked. A detent keeps the handle in the open position. The handle is not designed to be locked in this position, thereby providing for ready shut-off when necessary.



L-O-X® Sensing Port

L-O-X® Sensing Port - Series 15 manual L-O-X® and manual L-O-X® valves with EEZ-ON® operation are now provided with 1/8 NPT sensing ports, enabling installation of a pressure sensing device such as the Pop-Up Indicator or Pressure Switch shown below. Standards suggest that machine design should include a method for verifying the release of energy after lockout.

The ROSS 988A30 Pop-Up Indicator is constructed for the industrial environment with a brass body and 1/8" NPT connection. It offers 360° visibility and a redundant verification feature. By pushing on the red plunger, the operator can "feel" the presence of pressure and verify that the indicator is performing its sensing function.

The ROSS 586A86 Pressure Switch offers an electronic pressure sensing option that can be integrated into a safety monitoring system, which confirms energy isolation throughout the circuit.

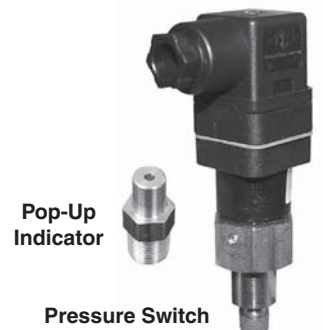
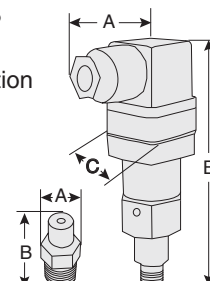
Energy Release Verification Options

Visual Pop-Up Indicator or Pressure Switch (electrical)

- May be installed on all L-O-X® valves and manual L-O-X® valves with EEZ-ON® operation with pressure sensing port
- Provides a means to verify the release of downstream pressure to next obstruction

Model Number	Inlet Port Size*	Verification Option	Dimensions inches (mm)			Weight lb (kg)
			A	B	C	
988A30	1/8	Pop-Up Indicator	0.55 (14)	0.98 (25)	—	0.03 (0.01)
586A86	1/8	Pressure Switch	2.01 (51)	4.3 (110)	1.22 (31)	0.28 (0.12)

* NPT threads.



Stainless Steel Manual L-O-X® Valves

Series 15

Lockout / Tagout

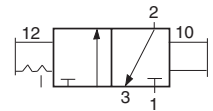
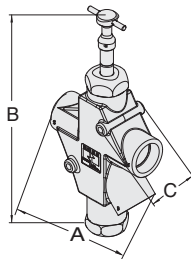
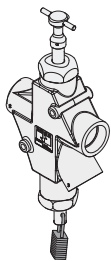
Port Sizes 1/4 thru 2



- Easily identified by unique shape
- Corrosion-resistant 316 stainless steel construction
- Reliable Fluorocarbon seals withstand contaminant ingress
- Self-draining, washdown suitable design
- Trusted L-O-X® performance, Lockable only in the OFF position
- Standard pressure sensing port with optional pressure switch or visual indicator
- Simple push/pull of the large handle provides direct manual operation
- Pressure sensing port allows installation of either the visual indicator or pressure switch to verify pressure downstream to the next obstruction is released
- Large exhaust port for rapid release of pressure

ROSS L-O-X® valves are energy isolation valves and are generally used as the first valve in a line supplying compressed air to equipment.

Air can be shut off by pushing the L-O-X® handle inward; downstream air is simultaneously exhausted through the L-O-X® exhaust port. Many standards & regulations, e.g., OSHA, require that the valve be padlocked in this position to prevent handle from being pulled out inadvertently during maintenance and/or servicing.



Port Size		Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight
1-2	3		1-2	2-3	A	B	C	lb (kg)
1/4	1/4	1523B2004	2.14	2.08	3.5 (89.9)	8.6 (218.3)	2.1 (53.6)	3.75 (1.70)
3/8	1/2	1523B3004	5.79	6.24	4.3 (108.5)	10.5 (265.8)	1.8 (44.5)	6.0 (2.72)
1/2	1/2	1523B4004	5.79	6.24	4.3 (108.5)	10.5 (265.8)	1.8 (44.5)	6.0 (2.72)
3/4	1	1523B5004	14.30	17	6.0 (151.1)	14.1 (356.9)	2.5 (63.5)	13.0 (5.89)
1	1	1523B6004	14.30	17	6.0 (151.1)	14.1 (356.9)	2.5 (63.5)	13.0 (5.89)
1½	2	1523B8004	39	45	8.2 (208)	18.5 (470)	4.0 (101)	35.0 (15.87)
2	2	1523B9004	39	45	8.2 (208)	18.5 (470)	4.0 (101)	35.0 (15.87)

* NPT threads. For BSPP threads, add a "D" prefix to the model number, e.g., D1523B2004.

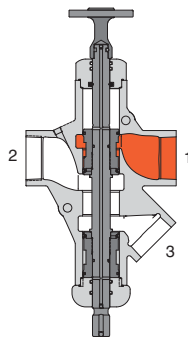
Manual L-O-X® valve shown padlocked in closed position. The valve can only be locked in the closed position.

Push/pull operation - Push the handle inward to exhaust downstream air (lockable in this position). Pull the handle outward to supply air downstream.

VALVE OPERATION

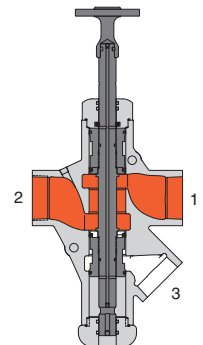
Valve Closed

With a push of the handle inward, the flow of supply air is blocked and downstream air is exhausted via the exhaust port while servicing or maintaining machinery. Padlock the L-O-X® valve in this position to prevent the handle from being pulled outward inadvertently to avoid potential for human injury while servicing machinery.



Valve Open

When the handle is pulled out, supply air flows freely from inlet to outlet and flow to exhaust is blocked. A detent keeps the handle in the open position. The handle is not designed to be locked in this position, thereby providing for ready shut-off when necessary.



Referenced Standards: All standards are subject to revision. Parties are encouraged to investigate and apply the most recent editions of the standards indicated in the following listing: OSHA 29 CFR 1910.147; CSA Z142-10; CSA Z460-05; ISO 13849-1; ISO 14118:2000; EN 1037; ANSI Z244.1- 2003(R2008); ANSI/PMMI B155.1- 2011, ANSI B11-2010.

For information on Stainless Steel Filter/Regulator please visit www.rosscontrols.com.

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, **NOT AS EMERGENCY STOP DEVICES.**

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 30° to 175°F (-1° to 80°C).
Note: For lower temperature ratings, consult ROSS.
Flow Media: Filtered air.
Inlet Pressure: 0 to 300 psig (0 to 20.7 bar).

Port Threads: NPT, BSPP.
Lock Hole Diameter: Port sizes 1/4 thru 2: 0.34 inch (8.64 mm).
Length of Hole: Port size 1/4: 0.44 in (11.17mm).
 Port size 1/2: 0.47 in (11.93mm)
 Port size 1 and 2: 0.55 inch (13.97 mm).

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



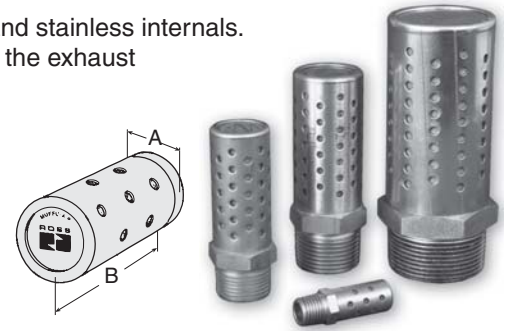
Accessories

Stainless Steel Silencer

Silencers port sizes 1/4 thru 1 have all stainless steel construction. Silencer port size 2 have standard construction consisting of nickel plated bodies and stainless internals. All silencers are supplied with a standard pipe thread fitting for attaching directly to the exhaust ports of air-operated equipment.

Port Size	NPT Threads	Construction Material	Model Number*	Avg. C _v	Dimensions inches (mm)			Weight lb (kg)
					A	B		
1/4	Male	Stainless Steel	5500A2004	1.44	0.56 (14.2)	1.75 (44.5)	0.05 (0.23)	
1/2	Male	Stainless Steel	5500A4004	3.01	0.87 (22.1)	2.75 (69.7)	0.25 (0.11)	
1	Male	Stainless Steel	5500A6004	10.41	1.31 (33.3)	3.87 (98.3)	0.45 (0.20)	
2	Male	Nickel Plated	5500A9004	28.11	2.37 (60.2)	5.50 (139.7)	1.5 (0.68)	

* NPT threads. For BSPP threads add a "D" prefix to the model number, e.g., D5500A2004.

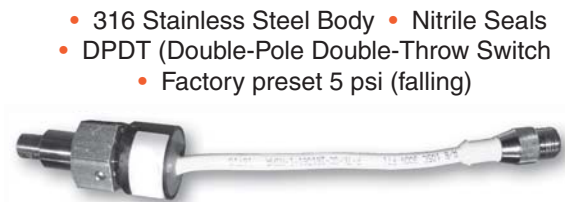
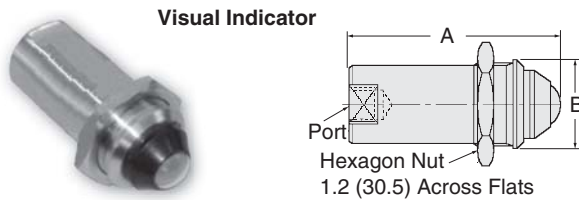


Pneumatic Energy Release Verification Options

- 316 Stainless Steel Body, Internals and Springs
- Nitrile Seals • Visual Indicator piston, Acetal
- Visual Indicator assembly, Acetal with acrylic lens

Model Number	Inlet Port Size*	Verification Option	Dimensions inches (mm)		Weight lb (kg)
			A (Length)	B (Width)	
1155H30	1/8	Visual Indicator	2.33 (59.3)	1.00 (25.4)	0.22 (0.1)
1162A30	1/8	Pressure Switch	8.50 (215.9)	1.15 (29.2)	0.23 (.01)

* NPT port threads.



Pressure Switch



- 316 Stainless Steel Body • Nitrile Seals
- DPDT (Double-Pole Double-Throw Switch)
- Factory preset 5 psi (falling)

Stainless Steel Cabinet for Wash-Down Applications

Control Reliable Energy Isolation

Manual energy isolation device (L-O-X®) located outside the cabinet is stainless steel and designed for wash-down areas. Stainless steel control cabinet includes filter/regulator and Category 4 DM²⁰ valve for air entry control. Control cabinet is built with slanted top to avoid pooling.

Will build to your specifications!



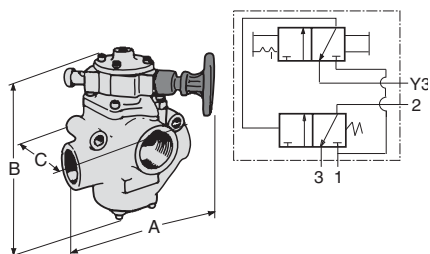
For more information on Stainless Steel Cabinet for Wash-Down Applications please contact ROSS' Global Safety Team, email: sales.info@rosscontrols.com.



Piloted Valves with L-O-X® Control Series 27

Lockout / Tagout

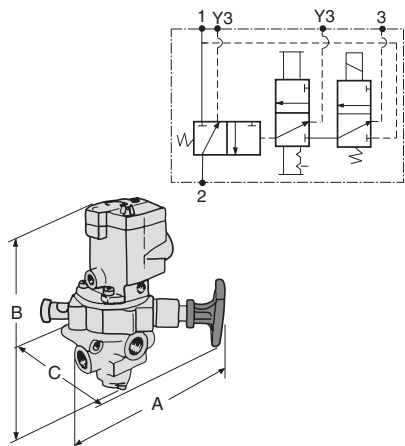
Pressure Controlled



Operated just like the smaller manual L-O-X® valve. The position of the red handle indicates instantaneous full flow pressurizing or exhausting capability.

Port Size 1-2	Port Size 3	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
			1-2	2-3	A	B	C	
1	1½	Y2783A6006	23	34	7.4 (187)	8.6 (218)	6.4 (162)	7.0 (3.2)
1¼	1½	Y2783A7006	30	32	7.4 (187)	8.6 (218)	6.4 (162)	7.0 (3.2)
1½	1½	Y2783A8016	30	31	7.4 (187)	8.6 (218)	6.4 (162)	7.0 (3.2)
1½	2½	Y2783A8006	68	70	8.4 (213)	10.2 (259)	6.6 (168)	15.3 (6.9)
2	2½	Y2783A9006	70	70	8.4 (213)	10.2 (259)	6.6 (168)	15.3 (6.9)
2½	2½	Y2783A9016	70	71	8.4 (213)	10.2 (259)	6.6 (168)	15.3 (6.9)

Single Solenoid Pilot Controlled



Port Size 1-2	Port Size 3	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
			1-2	2-3	A	B	C	
1/4	1/2	Y2773A2072**	2.5	3.1	7.1 (181)	8.4 (212)	6.5 (165)	3.5 (1.6)
3/8	1/2	Y2773A3072**	3.6	5.3	7.1 (181)	8.4 (212)	6.5 (165)	3.5 (1.6)
1/2	1/2	Y2773A4082**	3.3	5.3	7.1 (181)	8.4 (212)	6.5 (165)	3.5 (1.6)
1/2	1	Y2773A4072**	6.3	9.2	7.1 (181)	9.0 (228)	6.9 (175)	4.3 (1.9)
3/4	1	Y2773A5072**	7.7	11	7.1 (181)	9.0 (228)	6.9 (175)	4.3 (1.9)
1	1	Y2773A6082**	8.0	12	7.1 (181)	9.0 (228)	6.9 (175)	4.3 (1.9)
1	1½	Y2773A6072**	23	34	8.1 (206)	11.8 (299)	6.9 (175)	8.0 (3.6)
1¼	1½	Y2773A7072**	30	32	8.1 (206)	11.8 (299)	6.9 (175)	8.0 (3.6)
1½	1½	Y2773A8082**	30	31	8.1 (206)	11.8 (299)	6.9 (175)	8.0 (3.6)
1½	2½	Y2773A8072**	68	70	9.3 (235)	13.8 (352)	7.3 (184)	17.5 (7.9)
2	2½	Y2773A9072**	70	70	9.3 (235)	13.8 (352)	7.3 (184)	17.5 (7.9)
2½	2½	Y2773A9082**	70	71	9.3 (235)	13.8 (352)	7.3 (184)	17.5 (7.9)

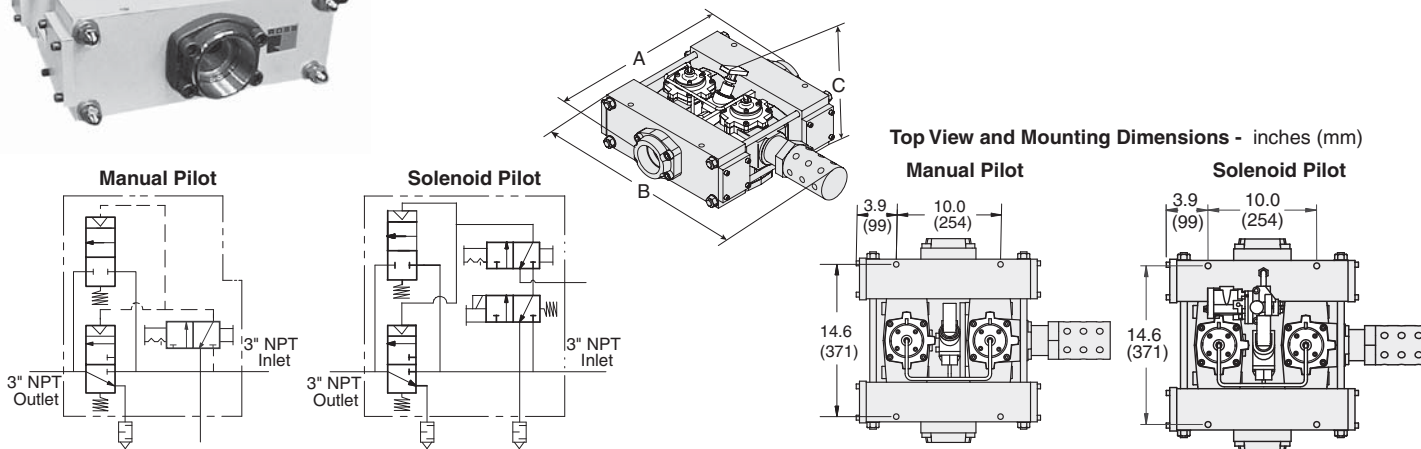
* NPT port threads, for BSPP threads, insert a "D" after "Y" to the model number, e.g., YD2783A6006, YD2773A2072.

3 Inch L-O-X® Valve for Lockout



Port Size 1-2	Port Size 3	Valve Model Number#	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
			1-2	2-3	A	B	C	
3	2½	Y3900A0829*	140	140	19.6 (496)	25.3 (643)	11.5 (292)	110 (49.9)
3	2½	Y3900A0896**	140	140	19.6 (496)	25.3 (643)	14.9 (379)	115 (53.0)

* Manual Pilot. ** Solenoid Pilot. # NPT threads.



NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., Y2773A2072W, Y2773A2072Z.

For coordinating silencers, see MUFFL-AIR® Silencers (model numbers 5500A4003, 5500A6003, 5500A8001 and 5500A9002), page 61.

STANDARD SPECIFICATIONS: See page 71.

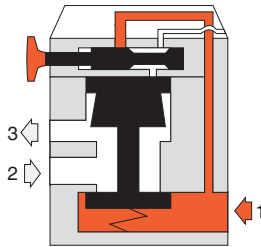


VALVE OPERATION

Pressure Controlled

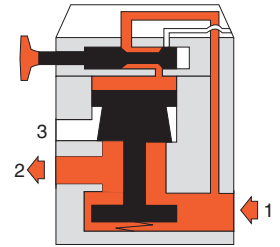
Valve Closed

With a short push of the red handle inward the flow of supply air is blocked and downstream air is exhausted via the exhaust port. Air pressure on the inlet and exhaust poppets produces a large closing force. The L-O-X® valve should be padlocked in this position to prevent the handle from being pulled outward inadvertently when potential for human injury exists or servicing machinery.



Valve Open

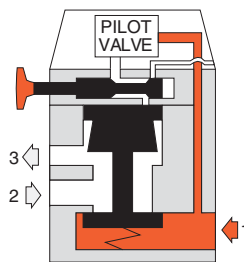
With the red handle pulled out, pilot air flows to the top of the actuating piston, causing it to open the inlet poppet. Supply air then flows freely from inlet to outlet, and the exhaust port is blocked. A detent keeps the L-O-X® handle in the open position. The handle is designed not to be locked in the open position, thereby allowing for quick shut-off when necessary.



Solenoid Pilot Controlled

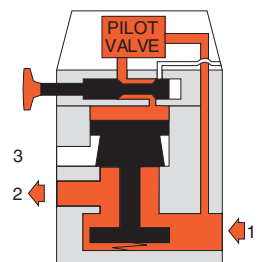
Pilot De-energized

With the solenoid pilot de-energized (regardless of the position of the L-O-X® handle) the inlet poppet remains closed. The outlet port is connected to the exhaust port so that pressure in the downstream lines is vented to atmosphere.



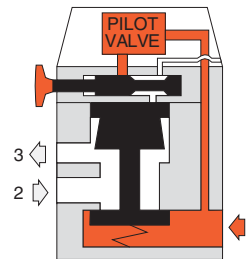
Pilot Energized

With the solenoid pilot energized and the L-O-X® control in the open position, air can flow from inlet to outlet port. The exhaust port is closed.



L-O-X® Valve Closed

With the handle pushed inward, the L-O-X® control is closed, and air to the valve piston is cut off. This allows the inlet poppet to be closed by its spring and the pressure of the inlet air. The outlet is connected to exhaust so downstream pressure is vented.



L-O-X® Sensing Port

L-O-X® Sensing Port - Series 15 manual L-O-X® valves and manual L-O-X® valves with EEZ-ON® operation are now provided with 1/8 NPT sensing ports, enabling installation of a pressure sensing device such as the Pop-Up Indicator or Pressure Switch shown below. Standards suggest that machine design should include a method for verifying the release of energy after lockout.

The ROSS 988A30 Pop-Up Indicator is constructed for the industrial environment with a brass body and 1/8" NPT connection. It offers 360° visibility and a redundant verification feature. By pushing on the red plunger, the operator can "feel" the presence of pressure and verify that the indicator is performing its sensing function.

The ROSS 586A86 Pressure Switch offers an electronic pressure sensing option that can be integrated into a safety monitoring system, which confirms energy isolation throughout the circuit.

STANDARD SPECIFICATIONS (for valves on page 70):

Common Specifications:

Flow Media: Filtered air; 5 micron recommended.
Pilot Pressure: Must be equal to or greater than inlet pressure.
Body Paint: Yellow.
Port Threads: NPT, BSPP.

Pressure Controlled:

Ambient/Media Temperature: 40° to 175°F (4° to 80°C).
Inlet Pressure: Port sizes 1 to 2½: 15 to 150 psig (1 to 10 bar).
 Port sizes 1½ to 2½: 30 to 150 psig (2 to 10 bar).

Solenoid Pilot Controlled:

Solenoids: AC or DC power.
Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.
 For other voltages, see page 113.
Power Consumption: 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.
Ambient Temperature: 40° to 120°F (4° to 50°C).
Media Temperature: 40° to 175°F (4° to 80°C).
Inlet Pressure: Port sizes ¼ to 1½: 15 to 150 psig (1 to 10 bar).
 Port sizes 1½ to 2½: 30 to 150 psig (2 to 10 bar).

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

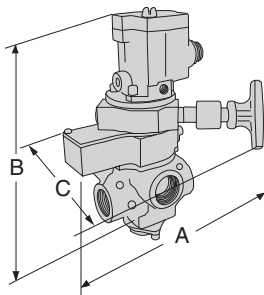
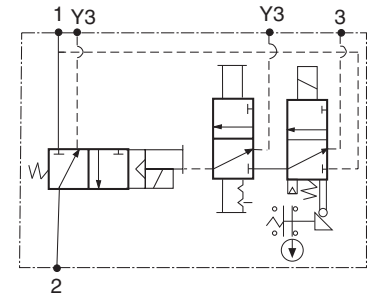
Sensing Valves with L-O-X® Control Series SV27

Lockout / Tagout
Air Dump / Release

3/2 Valves – Solenoid Pilot Controlled



- Senses internal position & state
- Electrical feedback via DPST switch (Double-Pole Single-Throw)
- Directly operated safety-rated force-guided positive-break status switch (DPST)
- Poppet construction for near zero leakage & dirt tolerance
- A diagnostic coverage (DC) of 99% can be obtained by monitoring the safety switch status
- Sistema library data available (see page 63)
- *Explosion proof solenoid pilot available, for more information consult ROSS*



Port Size	1-2	3	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
				1-2	2-3	A	B	C	
1/2	1		SV27NC3L5407PSAA1A**	6.3	9.2	8.2 (208)	6.9 (175)	10 (254)	5.5 (2.5)
3/4	1		SV27NC3L5507PSAA1A**	7.7	11	8.2 (208)	6.9 (175)	10 (254)	5.5 (2.5)
	1	1	SV27NC3L5607PSAA1A**	8.0	12	8.2 (208)	6.9 (175)	10 (254)	5.5 (2.5)
	1	1½	SV27NC3L7607PSAA1A**	23	34	7.5 (191)	6.9 (175)	13.4 (340)	9.0 (4.0)
	1¼	1½	SV27NC3L7707PSAA1A**	30	32	7.5 (191)	6.9 (175)	13.4 (340)	9.0 (4.0)
	1½	1½	SV27NC3L7807PSAA1A**	30	32	7.5 (191)	6.9 (175)	13.4 (340)	9.0 (4.0)

* NPT port threads. For BSPP threads, replace "N" in the model number with a "D".

Wiring kits and accessories available, see page 84.

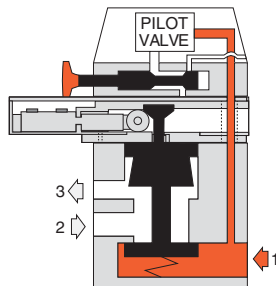
Note: Specify voltage when ordering.

** Insert voltage code: "1A"=120 volts AC, 60 Hz; "1D" for 24 volts DC; e.g., SV27NC3L5407PSAA1A1A, SV27NC3L5407PSAA1A1D.

VALVE OPERATION

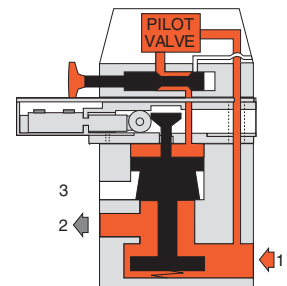
Pilot De-energized

With the solenoid pilot de-energized (regardless of the position of the L-O-X® handle) the inlet poppet remains closed. The outlet port is connected to the exhaust port so that pressure in the downstream lines is vented to atmosphere. The switch is in a de-actuated position.



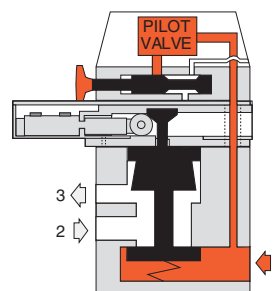
Pilot Energized

With the solenoid pilot energized and the L-O-X® control in the open position, air can flow from inlet to outlet port. The exhaust port is closed. The inlet poppet stem will cause the switch to be actuated indicating that the valve is open.



L-O-X® Valve Closed

With the handle pushed inward, the L-O-X® control is closed, and air to the valve piston is cut off. This allows the inlet poppet to be closed by its spring and the pressure of the inlet air. The outlet is connected to exhaust so downstream pressure is vented. The switch is in a de-actuated position.



STANDARD SPECIFICATIONS (for valves on this page):

Solenoid Pilot: AC or DC power. Rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 40 to 150 psig (2.8 to 10 bar).

Pilot Pressure: Must be equal to or greater than inlet pressure.

Switch Current/Voltage Max.: 2.5 A/120 volts AC.

Switch Current/Voltage Min.: 50 mA/24 volts DC.

Body Paint: Yellow.

Threads: NPT, BSPP. For other threads consult ROSS.

Manual Override: Flush; rubber, non-locking.

NOTE: Electrical life of switch varies with conditions and voltage; rated in excess of 15 million cycles.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



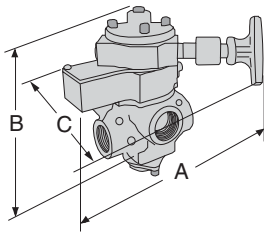
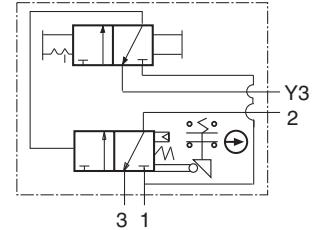
Sensing Valves with L-O-X® Control Series SV27

Lockout / Tagout
Air Dump / Release

3/2 Valves - Pressure Controlled



- Senses internal position & state
- Electrical feedback via DPST switch (Double-Pole Single-Throw)
- Directly operated safety-rated force-guided positive-break status switch (DPST)
- Poppet construction for near zero leakage & dirt tolerance
- A diagnostic coverage (DC) of 99% can be obtained by monitoring the safety switch status
- Sistema library data available (see page 63)
- *Explosion proof solenoid pilot available, for more information consult ROSS*



Port Size		Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
1-2	3		1-2	2-3	A	B	C	
1/2	1	SV27NC3L5405ASAA	6.3	9.2	8.2 (208)	6.9 (1.75)	6.8 (172)	4.3 (2.0)
3/4	1	SV27NC3L5505ASAA	7.7	11	8.2 (208)	6.9 (1.75)	6.8 (172)	4.3 (2.0)
1	1	SV27NC3L5605ASAA	8.0	12	8.2 (208)	6.9 (1.75)	6.8 (172)	4.3 (2.0)
1	1½	SV27NC3L7605ASAA	23	34	7.5 (191)	6.9 (1.75)	10.2 (259)	7.4 (3.4)
1¼	1½	SV27NC3L7705ASAA	30	32	7.5 (191)	6.9 (1.75)	10.2 (259)	7.4 (3.4)
1½	1½	SV27NC3L7805ASAA	30	32	7.5 (191)	6.9 (1.75)	10.2 (259)	7.4 (3.4)

* NPT port threads. For BSPP threads, replace "N" in the model number with a "D".

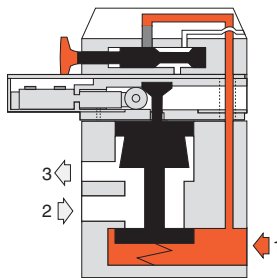
Wiring kits and accessories available, see page 84.

VALVE OPERATION

Valve Closed

With a short push of the red handle inward the flow of supply air is blocked and downstream air is exhausted via the exhaust port. Air pressure on the inlet and exhaust poppets produces a large closing force. The L-O-X® valve should be padlocked in this position to prevent the handle from being pulled outward inadvertently when potential for human injury exists or servicing machinery.

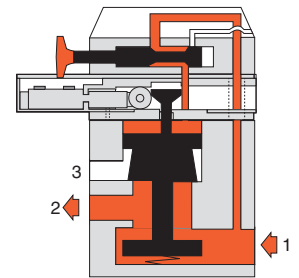
The switch is in a de-actuated position.



Valve Open

With the red handle pulled out, pilot air flows to the top of the actuating piston, causing it to open the inlet poppet. Supply air then flows freely from inlet to outlet, and the exhaust port is blocked. A detent keeps the L-O-X® handle in the open position. The handle is designed not to be locked in the open position, thereby allowing for quick shut-off when necessary.

The inlet poppet stem will cause the switch to be actuated indicating that the valve is open.



STANDARD SPECIFICATIONS (for valves on this page):

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 40 to 150 psig (2.8 to 10 bar).

Pilot Pressure: Must be equal to or greater than inlet pressure.

Switch Current/Voltage Max.: 2.5 A/120 volts AC.

Switch Current/Voltage Min.: 50 mA/24 volts DC.

Body Paint: Yellow.

Port Threads: NPT, BSPP.

NOTE: Electrical life of switch varies with conditions and voltage; rated in excess of 15 million cycles.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



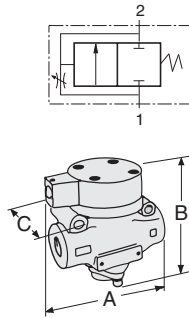
EEZ-ON® Valves

Series 27

Soft Start

An EEZ-ON® valve is used in an air supply line to provide a gradual buildup of downstream air pressure. This permits cylinders or other work elements to move slowly into their normal working positions before full line pressure is applied. The time required to reach full line pressure is adjustable.

2/2 Valves



Port Size	Valve Model Number*	Avg. C _v 1-2	Dimensions inches (mm)			Weight lb (kg)
			A	B	C	
1/4	2781A2007	2.3	3.8 (97)	3.8 (97)	3.0 (77)	1.5 (0.7)
3/8	2781A3007	3.8	3.8 (97)	3.8 (97)	3.0 (77)	1.5 (0.7)
1/2	2781A4017	4.0	3.8 (97)	3.8 (97)	3.0 (77)	1.5 (0.7)
1/2	2781A4007	13.0	4.6 (117)	4.5 (114)	3.0 (77)	2.3 (1.0)
3/4	2781A5007	15.0	4.6 (117)	4.5 (114)	3.0 (77)	2.3 (1.0)
1	2781A6017	16.0	4.6 (117)	4.5 (114)	3.0 (77)	2.3 (1.0)
1	2781A6007	24.0	6.6 (168)	7.6 (192)	4.1 (103)	6.0 (2.7)
1¼	2781A7007	29.0	6.6 (168)	7.6 (192)	4.1 (103)	6.0 (2.7)
1½	2781A8017	29.0	6.6 (168)	7.6 (192)	4.1 (103)	6.0 (2.7)

* NPT threads. For BSPP threads, add a "D" prefix to the model number, e.g., D2781A2007.

3/2 Valves

In addition to providing gradual pressure buildup as described above, the 3/2 valve has an exhaust port so that downstream air is exhausted when the valve is de-energized. At the same time, supply air is positively shut-off so that a separate shut-off valve is not required.

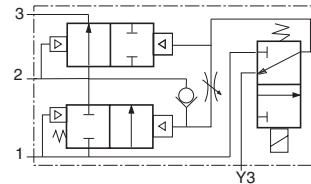
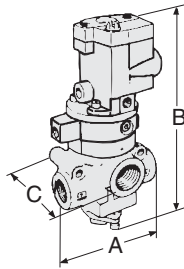
Solenoid Pilot Controlled



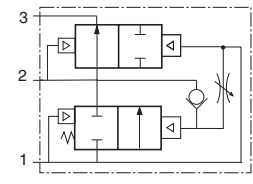
1/4 thru 1
Exhaust Port Size



1 thru 1½
Exhaust Port Size



Solenoid Pilot Controlled



Internal Pressure Controlled

Port Size 1-2	3	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
			1 to 2	2 to 3	A	B	C	
Solenoid Pilot Controlled								
1/4	1/2	2773B2037**	2.5	3.1	4.1 (105)	8.8 (224)	3.1 (79)	4.5 (2.0)
3/8	1/2	2773B3037**	3.6	5.3	4.1 (105)	8.8 (224)	3.1 (79)	4.5 (2.0)
1/2	1/2	2773B4047**	3.3	5.3	4.1 (105)	8.8 (224)	3.1 (79)	4.5 (2.0)
1/2	1	2773B4037**	10.0	13.0	4.9 (124)	9.6 (243)	3.6 (92)	5.0 (2.3)
3/4	1	2773B5037**	12.0	15.0	4.9 (124)	9.6 (243)	3.6 (92)	5.0 (2.3)
1	1	2773B6047**	12.0	16.0	4.9 (124)	9.6 (243)	3.6 (92)	5.0 (2.3)
1	1½	2773A6037**	23.0	34.0	6.6 (168)	10.6 (268)	4.8 (123)	8.8 (4.0)
1¼	1½	2773A7037**	30.0	32.0	6.6 (168)	10.6 (268)	4.8 (123)	8.8 (4.0)
1½	1½	2773A8047**	30.0	31.0	6.6 (168)	10.6 (268)	4.8 (123)	8.8 (4.0)

Internal Pressure Controlled

1/4	1/2	2783C2037	2.5	3.1	4.1 (105)	5.7 (146)	3.1 (79)	4.5 (2.0)
3/8	1/2	2783C3037	3.6	5.3	4.1 (105)	5.7 (146)	3.1 (79)	4.5 (2.0)
1/2	1/2	2783C4047	3.3	5.3	4.1 (105)	5.7 (146)	3.1 (79)	4.5 (2.0)
1/2	1	2783C4037	10.0	13.0	4.9 (124)	7.1 (180)	3.6 (92)	5.0 (2.3)
3/4	1	2783C5037	12.0	15.0	4.9 (124)	7.1 (180)	3.6 (92)	5.0 (2.3)
1	1	2783C6047	12.0	16.0	4.9 (124)	7.1 (180)	3.6 (92)	5.0 (2.3)
1	1½	2783B6037	23.0	34.0	6.6 (168)	7.4 (188)	4.8 (123)	8.8 (4.0)
1¼	1½	2783B7037	30.0	32.0	6.6 (168)	7.4 (188)	4.8 (123)	8.8 (4.0)
1½	1½	2783B8047	30.0	31.0	6.6 (168)	7.4 (188)	4.8 (123)	8.8 (4.0)

* NPT threads. For BSPP threads, add a "D" prefix to the model number, e.g., D2773B2037.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 2773B2037W, 2773B2037Z.

NOTE: The 3/2 EEZ-ON® valve is also available with a L-O-X® adapter so that both L-O-X® and EEZ-ON® functions are consolidated in a single valve.

For coordinating silencers, see MUFFL-AIR® Silencers (model numbers 5500A4003, 5500A6003 and 5500A8001), page 61.

STANDARD SPECIFICATIONS (for valves on this page):

Common Specifications:

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: 15 to 150 psig (1 to 10 bar).

Body Paint: Gold.

Port Threads: NPT, BSPP.

Manual Pilot:

Ambient/Media Temperature: 40° to 175°F (4° to 80°C).

Solenoid Pilot Controlled:

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Optional: Indicator Lights.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



EEZ-ON® Valves Series 27

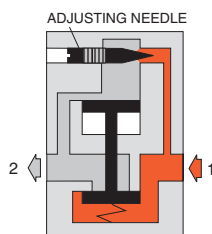
Soft Start

VALVE OPERATION

2/2 VALVE

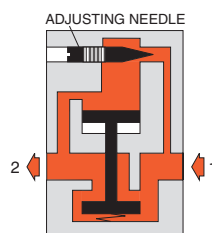
Air Pressure to Inlet

When air pressure is first applied to the inlet, air flow to the piston is restricted by the adjustable needle in the delay orifice. Downstream air pressure gradually builds up at a rate determined by the setting of the adjustable needle.



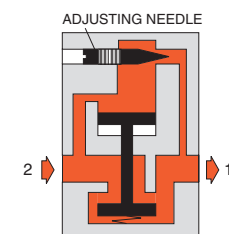
Valve Opens to Full Flow

When downstream air pressure reaches approximately 40 to 60 percent of inlet pressure, the valve element shifts to the full open position and there is full air flow to the downstream components. This condition continues as long as inlet air pressure is present.



Inlet Pressure Removed

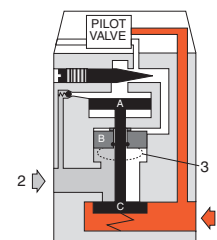
When inlet pressure is removed, the exhausting downstream air pressure keeps the inlet poppet open until the downstream pressure drops by approximately 90 percent. The remaining pressure is exhausted via the delay orifice.



3/2 VALVE

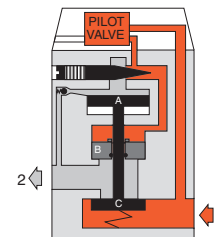
Pilot Not Energized

Pilot air is blocked by the pilot. Any downstream pressure forces piston B (which slides on the valve stem) upward. This opens the exhaust port and vents the downstream line.



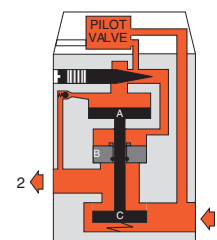
Pilot Energized

Pilot air forces piston B downward to close the exhaust port. Pilot air also flows past the adjusting needle, opens the ball check and begins slowly to pressurize the outlet line. At the same time, pressure is building up on piston A.



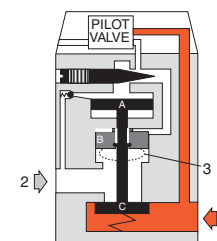
Full Pressure

When the pressure on piston A reaches approximately 50 percent of inlet pressure, it is forced downward and opens inlet poppet C. Full inlet pressure now flows freely to the outlet port.



Pilot De-energized

Air above pistons A and B is exhausted through the exhaust port of the pilot valve. Air above poppet C forces sliding piston B upward so that the main exhaust port is opened and the pressurized air is exhausted.

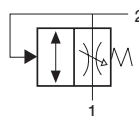


Right-Angle EEZ-ON® Valves Series 19

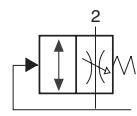
Soft Start

EEZ-ON® Valves – Port Mounted

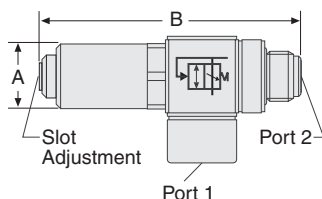
- Gradual re-application of pneumatic pressure prevents rapid equipment movement at startup
- Right angle style mounts directly in cylinder ports
- Available with threaded ports or push-in-tubing ports
- Point of use Soft Start



Primary Pressure at Port 1



Primary Pressure at Port 2



Models with Threaded Banjo

Port Size		Valve Model Numbers	Avg. C _v	Dimensions inches (mm)		Weight lb (kg)
Port 1* (female)	Port 2** (male)			A	B	
1/4	1/4	1969B2010	1.2	0.7 (17)	2.44 (62)	0.38 (0.15)
3/8	3/8	1969B3010	1.7	0.7 (17)	2.44 (62)	0.38 (0.15)
G1/4	G1/4	D1969B2010	1.2	0.7 (17)	2.44 (62)	0.38 (0.15)
G3/8	G3/8	D1969B3010	1.7	0.7 (17)	2.44 (62)	0.38 (0.15)
G1/2	G1/2	D1969B4010	1.8	1.1 (27)	2.78 (71)	0.39 (0.18)

* Threads in port 1 are female. ** Port 2 threads are male.

STANDARD SPECIFICATIONS (for right-angle EEZ-ON® valves:
Ambient/Media Temperature: 15° to 160°F (-10° to 70°C).

Flow Media: Filtered air. 5 micron recommended.
Operating Pressure: 45 to 150 psig (3 to 10 bar).

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Manual L-O-X® Valves with EEZ-ON® Operation Series 15

Soft Start Lockout / Tagout



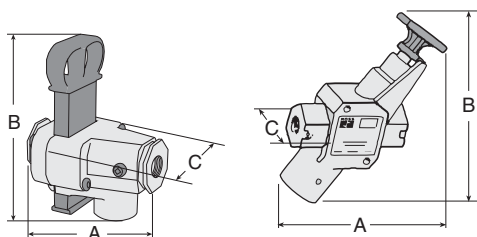
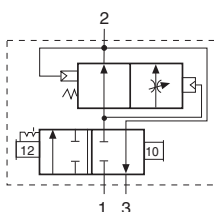
Port Sizes 1/4 thru 3/4
(Modular L-O-X®)



Port Sizes
3/8 - 3/4

- Easily identified by blue handle
- Gradual re-application of pneumatic pressure prevents rapid equipment movement at startup
- Lockable only in the OFF position
- Large exhaust port exceeds inlet size for rapid release of pressure
- Positive action (2 positions only)
- Simple push/pull of the large blue handle provides positive direct manual operation
- Integrated sensing port for pressure verification

The manual L-O-X® valve with EEZ-ON® operation combines shut-off certainty with gradual pressurization upon start-up. Special labels and adjustment screw indicates EEZ-ON® function.



For coordinating silencers, see MUFFL-AIR® Silencers (model numbers 5500A2003, 5500A3003, 5500A4003, 5500A5003, 5500A5013 and 5500A7013), page 61.

L-O-X® Sensing Port

L-O-X® Sensing Port - Series 15 manual L-O-X® valves and manual L-O-X® valves with EEZ-ON® operation are now provided with 1/8" NPT sensing ports, enabling installation of a pressure sensing device such as the Pop-Up Indicator or Pressure Switch shown below. Standards suggest that machine design should include a method for verifying the release of energy after lockout.

The ROSS 988A30 Pop-Up Indicator is constructed for the industrial environment with a brass body and 1/8" NPT connection. It offers 360° visibility and a redundant verification feature. By pushing on the red plunger, the operator can "feel" the presence of pressure and verify that the indicator is performing its sensing function.

The ROSS 586A86 Pressure Switch offers an electronic pressure sensing option that can be integrated into a safety monitoring system, which confirms energy isolation throughout the circuit.

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

STANDARD SPECIFICATIONS (for valves on this page):
Ambient/Media Temperature: 40° to 175°F (4° to 80°C).
Flow Media: Filtered air.
Inlet Pressure: Modular: 1 to 200 psig (1 to 13.8 bar).
 Manual: 30 to 150 psig (2 to 10 bar).

Body Paint: Yellow.
Port Threads: NPT, BSPP.

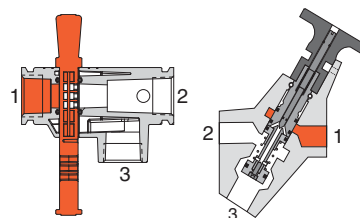
Modular L-O-X®:
Lock Hole Diameter: Port sizes 1/4 to 3/8: 0.27 inch (7.0 mm).
Length of Hole: Port sizes 1/4 to 3/8: 0.43 inch (10.9 mm).

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

VALVE OPERATION

Valve Closed

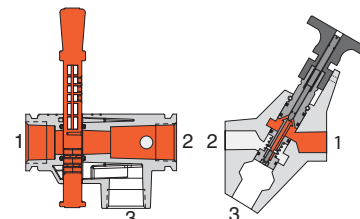
With a short push of the blue handle inward, the flow of supply is blocked and downstream air is exhausted via the exhaust port at the bottom of the valve. It is required by OSHA that the L-O-X® valves with EEZ-ON® operation be padlocked in this position to prevent the handle from being pulled outward inadvertently when potential for human injury exists or servicing machinery.



EEZ-ON® Function

For modular L-O-X® valve: The blue handle will only shift part way due to a mechanical stop button allowing only partial flow from inlet to downstream causing the pressure to increase at a slower rate.

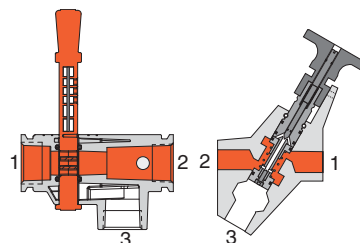
For other L-O-X® valves: With the blue handle pulled out, the adjustable needle valve (accessed through top of handle) setting determines the rate of pressure buildup.



Valve Open

For modular L-O-X® valve: Pressing the mechanical stop button allows the blue handle to be shifted completely open allowing full flow from inlet to downstream.

For other L-O-X® valves: After the blue handle is pulled out and pressure downstream has gradually increased, the valve automatically changes to a fully open state, allowing full flow from inlet to downstream. Full flow is achieved at approximately 50% of inlet pressure.



Port Size		Valve Model	Avg. C _v		Dimensions inches (mm)			Weight
1, 2	3	Numbers*	1 to 2	2 to 3	A	B	C	lb (kg)
Modular L-O-X® with EEZ-ON®								
1/4	1/4	Y1523B2103	3.7	7.8	4.01(102)	5.29(135)	2.9 (74)	1.7 (0.8)
3/8	3/8	Y1523B3103	5.1	8.3	4.01(102)	5.29(135)	2.9 (74)	1.7 (0.8)
1/2	1/2	Y1523B4103	5.5	8.6	4.01(102)	5.29(135)	2.9 (74)	1.8 (0.8)
3/4	3/4	Y1523B5113	5.6	8.1	4.01(102)	5.29(135)	2.9 (74)	1.8 (0.8)

Manual L-O-X® with EEZ-ON®								
3/8	3/4	Y1523B3102	6.0	8.0	6.4 (163)	8.8 (224)	2.0 (51)	1.5 (0.7)
1/2	3/4	Y1523B4102	7.1	8.3	6.4 (163)	8.8 (224)	2.0 (51)	1.5 (0.7)
3/4	3/4	Y1523B5112	8.0	9.5	6.4 (163)	8.8 (224)	2.0 (51)	1.5 (0.7)
3/4	1 1/4	Y1523B5102	12.0	10.9	7.7 (196)	10.8 (274)	2.3 (58)	3.2 (1.5)
1	1 1/4	Y1523B6102	13.7	12.0	7.7 (196)	10.8 (274)	2.3 (58)	3.2 (1.5)
1 1/4	1 1/4	Y1523B7112	16.2	12.8	7.7 (196)	10.8 (274)	2.3 (58)	3.2 (1.5)

* NPT threads. For BSPP threads, insert a "D" prefix to the model number, e.g., YD1523B2103.



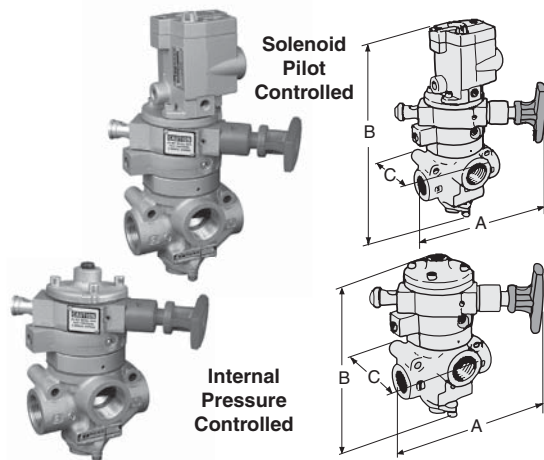
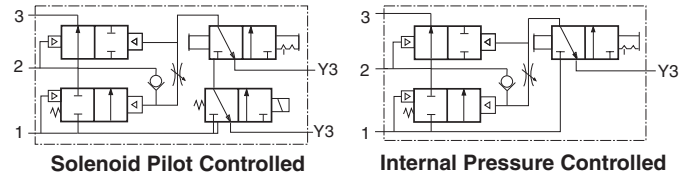
Manual L-O-X® Valves with EEZ-ON® Operation Series 27

Soft Start
Lockout / Tagout



These unique valves give pneumatic circuits the soft start-up of the EEZ-ON® valves plus the lockout and exhaust capabilities of L-O-X® valves. They are available with either solenoid pilot or pressure control. **Blue handle indicates that EEZ-ON® function is included** (L-O-X® valves with red handles do not have the EEZ-ON® function).

- Easily identified by blue handle, Lockable only in the OFF position
- Gradual re-application of pneumatic pressure prevents rapid equipment movement at startup
- Large exhaust port exceeds inlet size for rapid release of pressure
- Positive action (2 positions only)
- Simple push/pull of the large blue handle provides positive direct manual operation
- Integrated sensing port for pressure verification



Port Size 1-2	3	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
			1 to 2	2 to 3	A	B	C	
Solenoid Pilot Controlled								
1/4	1/2	Y2773B2075**	2.5	3.1	7.1 (181)	9.9 (253)	6.5 (165)	5.3 (2.4)
3/8	1/2	Y2773B3075**	3.6	5.3	7.1 (181)	9.9 (253)	6.5 (165)	5.3 (2.4)
1/2	1/2	Y2773B4085**	3.3	5.3	7.1 (181)	9.9 (253)	6.5 (165)	5.3 (2.4)
1/2	1	Y2773B4075**	10.0	13.0	7.1 (181)	10.6 (269)	6.9 (175)	6.0 (2.7)
3/4	1	Y2773B5075**	12.0	15.0	7.1 (181)	10.6 (269)	6.9 (175)	6.0 (2.7)
1	1	Y2773B6085**	12.0	16.0	7.1 (181)	10.6 (269)	6.9 (175)	6.0 (2.7)
1	1½	Y2773A6075**	23.0	34.0	7.4 (188)	11.6 (296)	6.9 (175)	9.5 (4.3)
1¼	1½	Y2773A7075**	30.0	32.0	7.4 (188)	11.6 (296)	6.9 (175)	9.5 (4.3)
1½	1½	Y2773A8085**	30.0	31.0	7.4 (188)	11.6 (296)	6.9 (175)	9.5 (4.3)
Internal Pressure Controlled								
1	1½	Y2783A6055	23.0	34.0	7.4 (188)	11.6 (296)	6.9 (175)	9.5 (4.3)
1¼	1½	Y2783A7055	30.0	32.0	7.4 (188)	11.6 (296)	6.9 (175)	9.5 (4.3)
1½	1½	Y2783A8065	30.0	31.0	7.4 (188)	11.6 (296)	6.9 (175)	9.5 (4.3)

* NPT threads. For BSPP threads, add a "D" prefix to the model number, e.g., DY2773B2075.

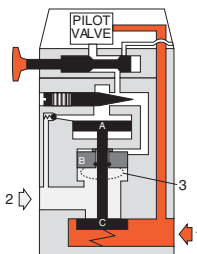
Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., Y2773B2075W, Y2773B2075Z.

VALVE OPERATION

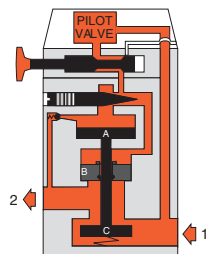
L-O-X® Handle Open and Pilot Not Energized

Pilot air is blocked by the pilot. Any downstream pressure forces piston B (which slides on the valve stem) upward. This opens the exhaust port and vents the downstream line.



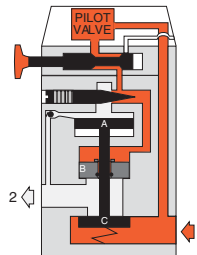
Full Pressure

When the pressure on piston A reaches approximately 50 percent of inlet pressure, it is forced downward and opens inlet poppet C. Full inlet pressure now flows freely to the outlet port.



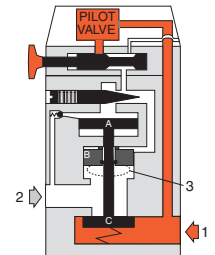
L-O-X® Handle Open and Pilot Energized

Pilot air forces piston B downward to close the exhaust port. Pilot air also flows past the adjusting needle, opens the ball check and begins slowly to pressurize the outlet line. At the same time, pressure is building up on piston A.



L-O-X® Handle Closed

At any time the L-O-X® handle can be pushed inward, thereby closing off the flow of pilot air. Pilot air above pistons A and B is then vented to atmosphere. Piston A moves upward and closes inlet poppet C. Sliding piston B also moves upward to open the exhaust port and vents the downstream line.



For coordinating silencers, see MUFFL-AIR® Silencers (model numbers 5500A4003, 5500A6003, 5500A8001 and 5500A9002), page 61.

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

STANDARD SPECIFICATIONS (for valves on this page):

Common Specifications:

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: 40 to 150 psig (2.8 to 10 bar).

Body Paint: Yellow.

Port Threads: NPT, BSPP.

Manual Pilot:

Ambient/Media Temperature: 40° to 175°F (4° to 80°C).

Solenoid Pilot Controlled:

Solenoids: AC or DC power.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Optional: Indicator Lights.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Modular L-O-X®

Lockout Valve with Integrated Filter/Regulator

Air Entry Combination Pneumatic Energy Isolation (LOTO)

Ports: 1/4, 3/8, 1/2
Flow to 105 scfm

The Modular L-O-X® Air Entry is a combination Lockout Valve with Integrated Filter/Regulator in a high flow, compact space saving design. Full flow exhaust meets all the applicable standards.



- Filter and regulator consolidated into a single space-saving assembly
- Modular mounting for easy servicing
- Internal automatic drain; optional manual drain or float drain (metal bowl only)
- Reverse flow, self-relieving piston-type regulator; non-relieving optional
- Tamper-resistant pressure setting
- Has a visible indicator of pressure release (verification port)
- Only lockable in the off position
- Has a full size exhaust port (equal to or larger than supply)
- Easy to operate (positive push/pull operation-detented)
- Optional EEZ-ON® operation available

APPLICATIONS: • Packaging • Material handling • Conveyor panels • All Air Entry points

HOW TO ORDER

(Choose your options (in red) to configure your valve model number.)

MD3 **53P** **B** **A** **B** **4** **B** **B** **-**

BOWL SIZE
53P - Polycarbonate Bowl 4-oz (120-ml)
53M - Metal Bowl with sight gauge 6-oz (180-ml)

ELEMENT TYPE
A - 40 Micron
B - 5 Micron; standard

BOWL DRAIN
A - Auto Drain/Differential Pressure
M - Manual Drain
F - Float Drain (metal bowl only)

PIPE SIZE
2 - 1/4 NPTF
3 - 3/8 NPTF
4 - 1/2 NPTF
C - 1/4 BSPP
D - 3/8 BSPP
E - 1/2 BSPP

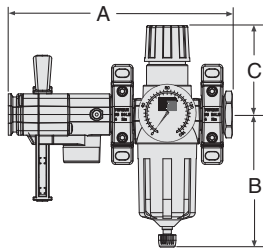
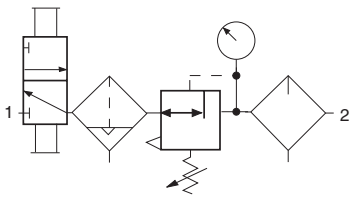
ADD ON L-O-X®
1 - Outlet Side
2 - Inlet Side
3 - L-O-X® with EEZ-ON® on Outlet Side
4 - L-O-X® with EEZ-ON® on Inlet Side
X - no L-O-X®

GAUGE
A - No Gauge
B - 0-200 psig (0-14 bar)
C - 0-60 psig (0-4 bar)
D - No Gauge with Panel Mount Nut
E - 0-200 psig (0-14 bar) Gauge with Panel Mount Nut
F - 0-60 psig (0-4 bar) Gauge with Panel Mount Nut

ADJUSTMENT RANGE
A - 0-150 psig (0-10 bar); reverse flow
B - 0-100 psig (0-6.8 bar); standard, reverse flow
C - 0-50 psig (0-3.4 bar); reverse flow
G - Reverse flow

Lockout/Filter/Regulator ISO Symbol

Lockout - Automatic Drain
Self-relieving



Bowl	DIMENSIONS inches (mm)			Depth †	Weight † lb (kg)
	A	B *	C **		
Polycarbonate	7.7 (195.6)	4.81 (122.2)	3.23 (82.0)	2.9 (73.7)	3.12 (1.4)
Metal	7.7 (195.6)	6.43 (163.4)	3.23 (82.0)	2.9 (73.7)	3.18 (1.4)

* Bowl removal clearance: add 3.1 (79). ** Dome removal clearance: add 0.63 (16).
† Less gauge.

STANDARD SPECIFICATIONS (for valves on this page):

Ambient/Media Temperature:

Plastic or Metal bowl: 40° to 125°F (4° to 52°C).

Body: Zinc.

Bonnet: Acetal.

Bowl: 4-oz (120-ml) polycarbonate plastic with zinc shatterguard; optional zinc bowl with clear nylon sight glass 6-oz (180-ml).

Bowl Drain: Internal automatic drain; optional manual drain or float drain (metal bowl only).

Cap Color: Black.

Filter Element: 5-micron rated polyethylene filter element; optional 40-micron element.

Fluid Media: Filtered air.

Inlet Pressure: 15 psig (1 bar) minimum with automatic drain.

Plastic bowl: 150 psig (10 bar).

Metal bowl: 200 psig (14 bar).

Outlet Pressure: Adjustable up to 150 psig (10 bar); optional adjusting springs.

Pressure Adjustment: Removable, knob.

Pressure Gauge: 0 to 200 psig (0 to 14 bar); 1/4 NPT gauge ports front and rear; 0 to 60 psig (0 to 4 bar) optional.

Panel Mounting: 1.56 inch (37.1 mm) hole required.

Ports: Tapped inlet, outlet and exhaust ports.

Seals/Elastomers: Nitrile.

Valve: Brass.

Valve Color: Yellow body, red lockout slide.

Slide: Acetal.

Threads: NPT, BSPP.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



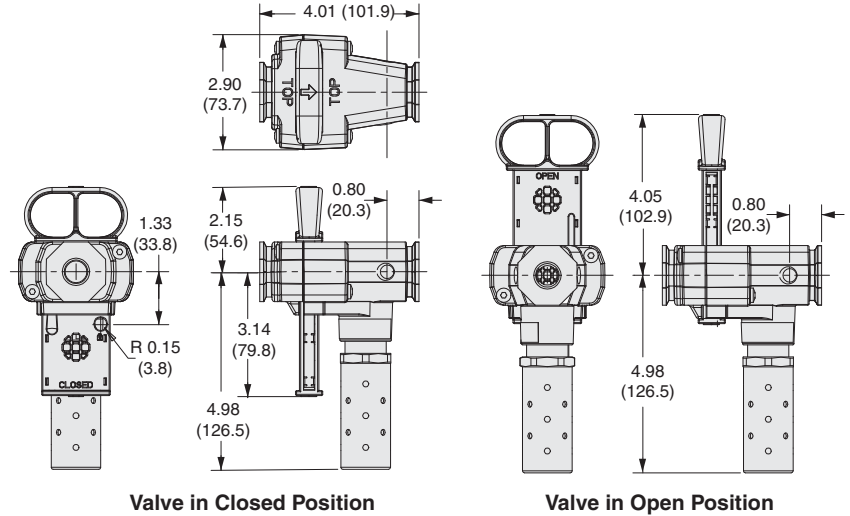
VALVE OPERATION

Valve Closed

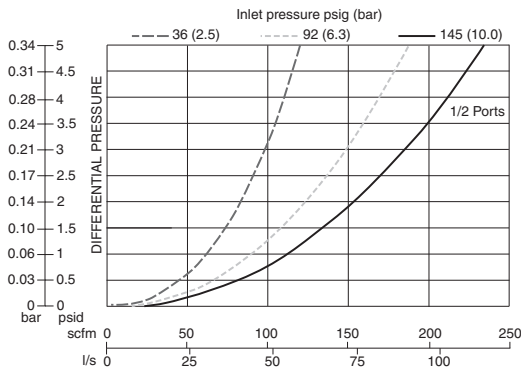
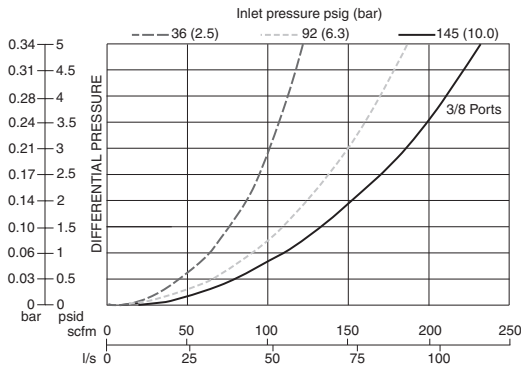
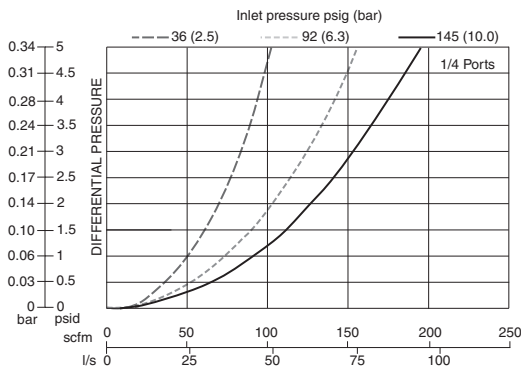
With a short inward push of the red handle, the flow of supply air is blocked from the outlet port. Downstream air flows from outlet to exhaust port. The valve must be padlocked while in this position during maintenance to prevent it from being inadvertently pulled outward and creating the potential for injury to people or machinery.

Valve Open

When the red handle is pulled out, supply air flows freely from inlet to outlet, and flow to the exhaust port is blocked. A detent keeps the handle in the open position. The handle is not designed to be locked in the open position so that the valve is always ready for shutoff.



LOCKOUT VALVE FLOW CHARACTERISTICS

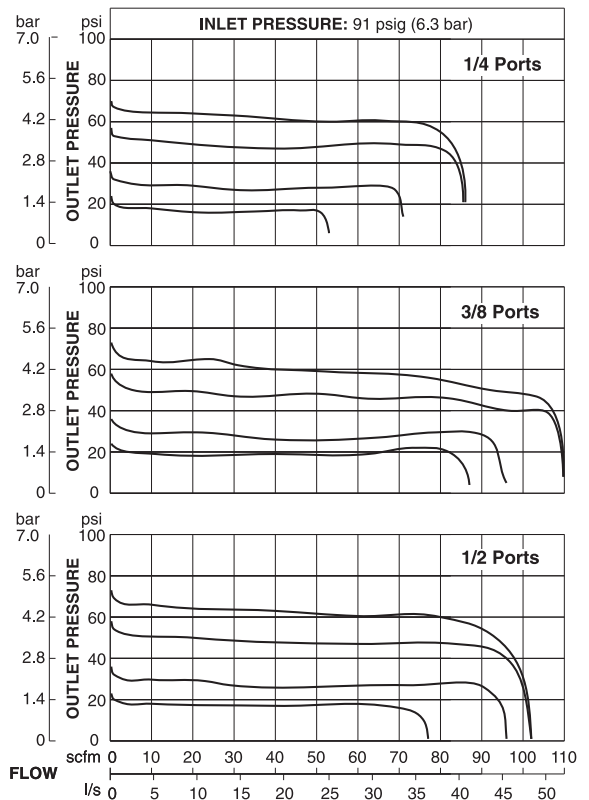


REPLACEMENT FILTER ELEMENT KITS

Element Rating	Kit Number
5- μ m (Std. element)	936K77
40- μ m	938K77

Accessories not included with the product, see page 80 for accessories.

FILTER/REGULATOR FLOW CHARACTERISTICS



CLAMP for MODULE CONNECTIONS

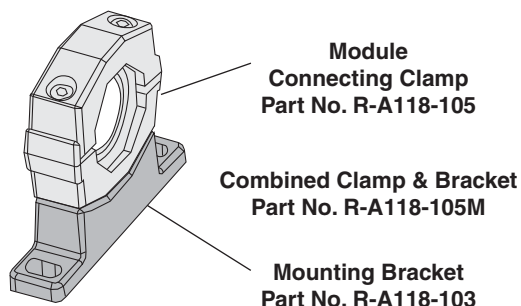
Specially designed clamps provide a quick and easy assembly or disassembly of MD3 modules. Two Allen-head bolts quickly tighten or loosen the clamp using a 5/32 or 4mm hex key. The clamp contains a plate carrying two O-rings to provide positive sealing between modules.

Order clamp by part number **R-A118-105**.
Combined clamp and bracket (below) can be ordered by part number **R-A118-105M**.

MOUNTING BRACKET

Two brackets are normally used to mount an FRL to a vertical surface. The mounting bracket attaches to the module-connecting clamp (see above) with a single screw. Each bracket then employs two bolts (1/4" or 6mm) to connect the assembly to the mounting surface.

Order bracket and screw by part number **R-A118-103**.
Combined bracket and clamp (above) can be ordered by part number **R-A118-105M**.

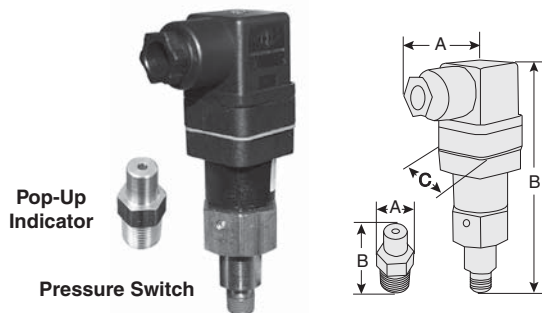


PNEUMATIC ENERGY RELEASE VERIFICATION OPTION

Provides a means to verify the release of downstream pressure to next obstruction.

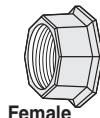
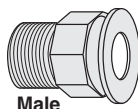
Model Number	Inlet Port Size*	Verification Option	Dimensions inches (mm)			Weight lb (kg)
			A	B	C	
988A30	1/8	Pop-Up Indicator	0.55 (14)	0.98 (25)	—	0.03 (0.01)
586A86	1/8	Pressure Switch	2.01 (51)	4.3 (110)	1.22 (31)	0.28 (0.12)

* NPT port threads.



MALE and FEMALE END PORTS

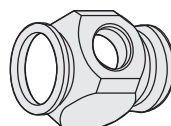
Either male or female end ports can be attached to threaded inlet and outlet lines. This allows all modules of an FRL assembly to be removed easily and quickly without having to unthread the end modules. The end ports are attached to the modules with clamps (see at left). End ports can be included in an assembled FRL or ordered separately by the following part numbers:



Port Size	Male Number	Female Number
1/4 NPTF	R-118-109-2F	R-118-100-2
3/8 NPTF	R-118-109-3F	R-118-100-3
1/2 NPTF	R-118-109-4F	R-118-100-4
3/4 NPTF	R-118-109-6F	R-118-100-6

EXTRA PORT BLOCK

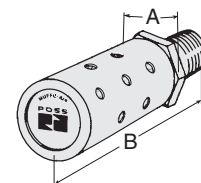
An extra port block can be placed between modules to provide two auxiliary 1/4 NPTF ports. Its mounting position can be rotated to obtain the most convenient operating orientation. If only one auxiliary port is to be used, the unused port must be closed with a pipe plug. (The inlet and outlet are not threaded.)



Port Size	Part Number
1/4 NPTF	R-118-106-2
3/8 NPTF	R-118-106-3
1/2 NPTF	R-118-106-4

MUFFL-AIR® SILENCER

MUFFL-AIR® silencers substantially reduce exhaust noise levels yet produce little back pressure. Typical impact noise reduction is in the 20–25 dB range.



Port Size	Model Numbers*	Avg. Cv	Dimensions inches (mm)		Weight lb (kg)
			A	B	
3/4	5500A5013	7.0	1.3 (32)	3.8 (96)	0.5 (0.2)

* NPT port threads, Male.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Sensing Valves Series SV27

With Position and State Sensing Feedback for Safety Applications

Series SV27 sensing valves, based upon the proven Series 27 valve family, combine the tough, dirt tolerant characteristics of poppet technology with sensing for actual poppet position and state.

Electrical feedback is provided via a positively-driven, safety-rated DPST (Double-Pole Single-Throw) switch with both normally open (NO) and normally closed (NC) contacts. For 3/4 and 1 1/4 bodies, the DPST switch is actuated whenever the valve is not in the normal home position. For size 2 body, the DPST switch is only actuated whenever the valve is in the normal home position.

Enhanced safety can be achieved by installing an optional visual pressure indicator (988A30) or pressure switch kit (608A86) into the 1/8 NPT pressure verification port (PV) for verification of pressure release.

These new sensing valves are available in 2/2 and 3/2 normally closed functions with single solenoid pilot or pressure controlled pilot actuation.



3/2 Normally Closed, Solenoid Pilot Controlled

- Pressure Controlled and Solenoid Pilot Controlled versions
- Senses internal position & state
- Electrical feedback via DPST switch (Double-Pole Single-Throw)
- Directly operated safety-rated force-guided positive-break status switch (DPST)
- Positive-break on 3/4 and 1 1/4 body valves
- Poppet construction for near zero leakage & high dirt tolerance
- Applications include air dump and trapped-pressure release
- A diagnostic coverage (DC) of 99% can be obtained by monitoring the safety switch status
- Sistema library data available (see page 63)
- *Explosion proof solenoid pilot available, for more information consult ROSS*

Pilot Operated Check Sensing Valves Series SV27

Position and State Sensing Feedback for Category 2 & 3 Safety Applications Load Holding

Series SV27 Pilot Operated Check sensing valves, based upon the proven Series 27 valve family, combine the tough, dirt tolerant characteristics of poppet technology with sensing for actual internal position and state.

Electrical feedback is provided via a positively-driven, safety-rated DPST (Double-Pole Single-Throw) switch with normally open (NO) contacts. The DPST switch is actuated whenever the valve is not in the normal home position.

Enhanced safety can be achieved by installing an optional visual pressure indicator (988A30) or pressure switch kit (608A86) into the 1/8 NPT pressure verification port (PV) for verification of pressure release.

These new Sensing Valves are available in 2/2 normally closed functions with single or double solenoid pilot or pressure control actuation.



2/2 SV27 PO Check Pressure Controlled

- Pressure Controlled and Solenoid Pilot Controlled versions
- Poppet construction for near zero leakage & dirt tolerance
- Directly operated safety-rated force-guided positive-break status switch (DPST)
- Holds a vertical load in the event of loss of air pressure (and loss of electrical power with solenoid operated models)
- A diagnostic coverage (DC) of 99% **can** be obtained by monitoring the safety switch status
- Sistema library data available (see page 63)
- *Explosion proof solenoid pilot available, for more information consult ROSS*

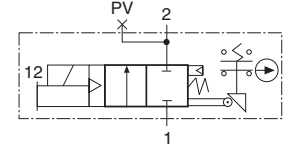
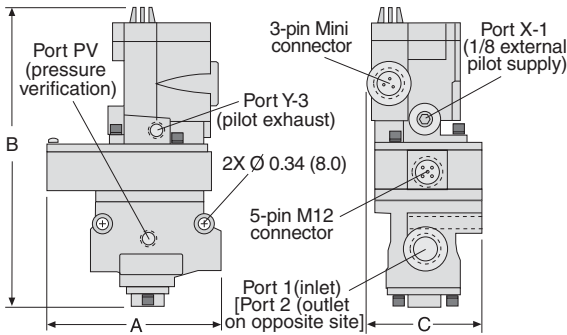


2/2 Redundant SV27 PO Check Pressure Controlled

Sensing Valves Series SV27

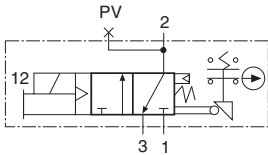
Solenoid Pilot Controlled Air Dump / Release

2/2 Valves



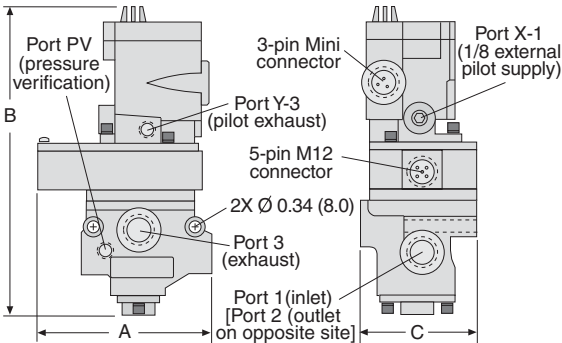
Port Size	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
		1-2	2-3	A	B	C	
1/2	SV27NC105407PSAA1A**	7.7	5.7 (145)	9.3 (235)	3.1 (77)	4.6 (2.1)	
3/4	SV27NC105507PSAA1A**	9.0	5.7 (145)	9.3 (235)	3.1 (77)	4.6 (2.1)	
1	SV27NC105607PSAA1A**	9.0	5.7 (145)	9.3 (235)	3.1 (77)	4.6 (2.1)	
1	SV27NC107607PSAA1A**	24	6.8 (173)	12.0 (303)	4.9 (123)	8.1 (3.7)	
1 1/4	SV27NC107707PSAA1A**	29	6.8 (173)	12.0 (303)	4.9 (123)	8.1 (3.7)	
1 1/2	SV27NC107807PSAA1A**	29	6.8 (173)	12.0 (303)	4.9 (123)	8.1 (3.7)	

3/2 Valves

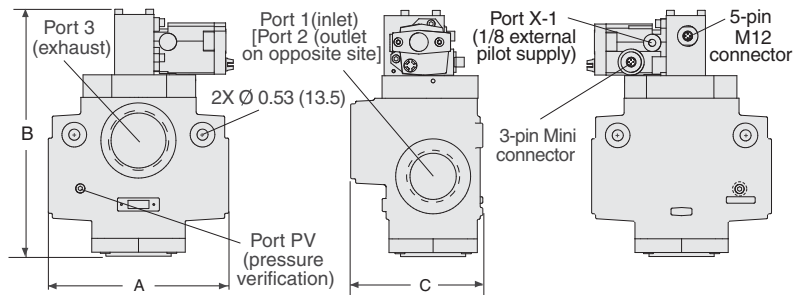


Port Size	1, 2, 3	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
			1-2	2-3	A	B	C	
1/2	1	SV27NC305407PSAA1A**	6.3	9.2	5.7 (145)	9.6 (244)	3.1 (77)	4.5 (2.0)
3/4	1	SV27NC305507PSAA1A**	7.7	11	5.7 (145)	9.6 (244)	3.1 (77)	4.5 (2.0)
1	1	SV27NC305607PSAA1A**	8.0	12	5.7 (145)	9.6 (244)	3.1 (77)	4.5 (2.0)
1	1 1/2	SV27NC307607PSAA1A**	23	34	6.8 (173)	12.0 (303)	4.9 (123)	7.8 (3.5)
1 1/4	1 1/2	SV27NC307707PSAA1A**	30	32	6.8 (173)	12.0 (303)	4.9 (123)	7.8 (3.5)
1 1/2	1 1/2	SV27NC307807PSAA1A**	30	31	6.8 (173)	12.0 (303)	4.9 (123)	7.8 (3.5)
1 1/2	2 1/2	SV27NC309807PSAA1A**	68	70	8.7 (219)	11.8 (300)	6.4 (161)	18.1 (8.2)
2	2 1/2	SV27NC309907PSAA1A**	70	70	8.7 (219)	11.8 (300)	6.4 (161)	18.1 (8.2)
2 1/2	2 1/2	SV27NC309957PSAA1A**	70	71	8.7 (219)	11.8 (300)	6.4 (161)	18.1 (8.2)

Sizes 1/2 thru 1 1/2



Sizes 1 1/2 thru 2 1/2



* NPT port threads. For BSPP threads, replace "N" in the model number with a "D", e.g., SV27DC105407PSAA1A**.

Note: Specify voltage when ordering.

** Insert voltage code: "1A"=120 volts, 60 Hz; "1D"= 24 volts DC; .e.g., SV27NC105407PSAA1A1A, SV27NC105407PSAA1A1D.

STANDARD SPECIFICATIONS (for valves on this page):

- Solenoid Pilot:** AC or DC power. Rated for continuous duty.
- Standard Voltages:** 24 volts DC; 110-120 volts AC, 50/60 Hz. For other voltages, see page 113.
- Power Consumption:** 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.
- Ambient Temperature:** 40° to 120°F (4° to 50°C).
- Media Temperature:** 40° to 175°F (4° to 80°C).
- Flow Media:** Filtered air.
- Inlet Pressure:** 40 to 150 psig (2.8 to 10 bar).
- Pilot Pressure:** Must be equal to or greater than inlet pressure.
- Switch Current/Voltage Max.:** 2.5 A/120 volts AC.

Switch Current/Voltage Min.: 50 mA/24 volts DC.

Port Threads: NPT, BSPP.

NOTE: Electrical life of switch varies with conditions and voltage; rated in excess of 15 million cycles.

Functional Safety Data: Category 2 PL d; B10d:

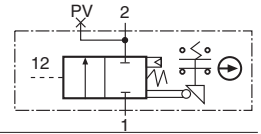
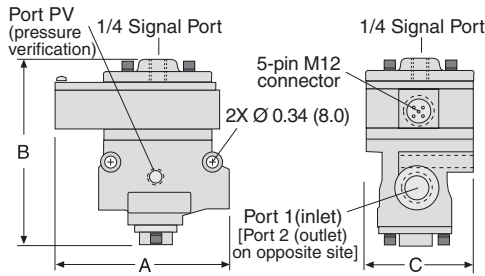
Valve - 20,000,000, Switch - 2,000,000; PFH: 2.35x10⁻⁷; MTTFd: 98.15 (n_{op}: 7360); DC (obtained by monitoring safety switch status): 3/2 valves - 99%, 2/2 and PO Check valves - 90%; Ross recommends testing the switch function and sealing for load holding valves every 8 hours.

Vibration/Impact Resistance: Calculated to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

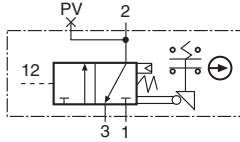
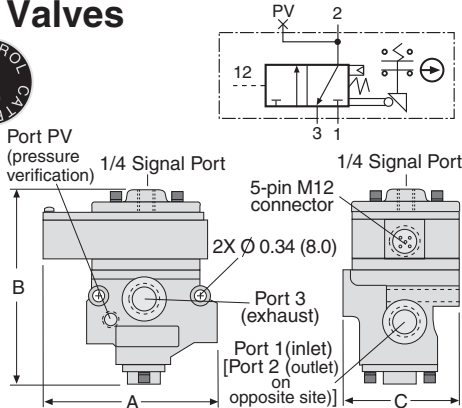


2/2 Valves



Port Size	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
		1 - 2	2 - 3	A	B	C	
1/2	SV27NC105405ASAA	7.7	5.7 (145)	6.1 (155)	3.1 (79)	3.4 (1.6)	
3/4	SV27NC105505ASAA	9.0	5.7 (145)	6.1 (155)	3.1 (79)	3.4 (1.6)	
1	SV27NC105605ASAA	9.0	5.7 (145)	6.1 (155)	3.1 (79)	3.4 (1.6)	
1	SV27NC107605ASAA	24	6.8 (173)	8.7 (220)	4.1 (105)	6.7 (3.0)	
1 1/4	SV27NC107705ASAA	29	6.8 (173)	8.7 (220)	4.1 (105)	6.7 (3.0)	
1 1/2	SV27NC107805ASAA	29	6.8 (173)	8.7 (220)	4.1 (105)	6.7 (3.0)	

3/2 Valves



Port Size	Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
		1 - 2	2 - 3	A	B	C	
1/2	SV27NC305405ASAA	6.3	9.2	5.7 (145)	6.4 (163)	3.6 (91)	3.3 (1.5)
3/4	SV27NC305505ASAA	7.7	11	5.7 (145)	6.4 (163)	3.6 (91)	3.3 (1.5)
1	SV27NC305605ASAA	8.0	12	5.7 (145)	6.4 (163)	3.6 (91)	3.3 (1.5)
1	SV27NC307605ASAA	23	34	6.8 (173)	8.8 (222)	4.9 (123)	6.4 (2.9)
1 1/4	SV27NC307705ASAA	30	32	6.8 (173)	8.8 (222)	4.9 (123)	6.4 (2.9)
1 1/2	SV27NC307805ASAA	30	31	6.8 (173)	8.8 (222)	4.9 (123)	6.4 (2.9)
1 1/2	SV27NC309805ASAA	68	70	8.7 (219)	11.8 (300)	6.4 (161)	17.2 (7.8)
2	SV27NC309905ASAA	70	70	8.7 (219)	11.8 (300)	6.4 (161)	17.2 (7.8)
2 1/2	SV27NC309955ASAA	70	71	8.7 (219)	11.8 (300)	6.4 (161)	17.2 (7.8)

* NPT port threads. For BSPP threads, replace "N" in the model number with a "D", e.g., SV27DC105405ASAA, SV27DC305405ASAA.

STANDARD SPECIFICATIONS (for valves on this page):

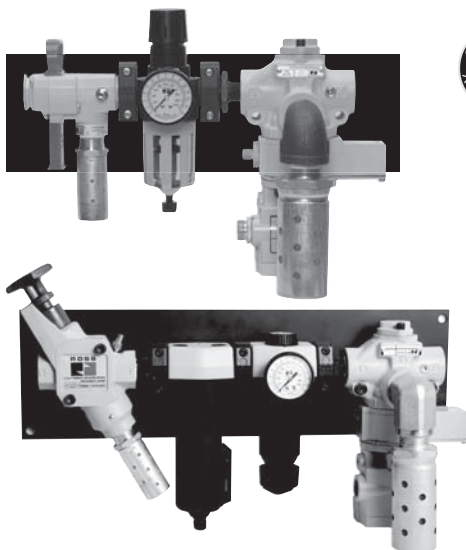
- Ambient Temperature:** 40° to 120°F (4° to 50°C).
- Media Temperature:** 40° to 175°F (4° to 80°C).
- Flow Media:** Filtered air.
- Inlet Pressure:** 40 to 150 psig (2.8 to 10 bar).
- Pilot Pressure:** Must be equal to or greater than inlet pressure.
- Switch Current/Voltage Max.:** 2.5 A/120 volts AC.
- Switch Current/Voltage Min.:** 50 mA/24 volts DC.
- Port Threads:** NPT, BSPP.

NOTE: Electrical life of switch varies with conditions and voltage; rated in excess of 15 million cycles.

Functional Safety Data: Category 2 PL d; B10d:
Valve - 20,000,000, Switch - 2,000,000; PFH: 2.35x10⁻⁷; MTTFd: 98.15 (n_{op}: 7360); DC (obtained by monitoring safety switch status): 3/2 valves - 99%, 2/2 and PO Check valves - 90%; Ross recommends testing the switch function and sealing for load holding valves every 8 hours.

Vibration/Impact Resistance: Calculated to BS EN 60068-2-27.

Air Entry Packages with 3/2 Normally Closed Sensing Valve



- Pre-engineered panel-mounted design with air entry via filter and regulator "FR", or filter, regulator, and lubricator "FRL"
- Includes 3/2 Normally Closed Sensing Valve
- Applications include Air Dump and Trapped-Pressure Release

Model Number*	Air Entry Type	Port Size		Avg. C _v		Dimensions (inches/mm)		
		1-2	3	1-2	2-3	Length	Width	Depth
Category 2 with Modular L-O-X® and SV27 Sensing Valve								
RC208-09**	FR	1/2	1/2	6.3	9.2	14.8 (375)	11.0 (279)	6.6 (168)
RC208L-09**	FRL	1/2	1/2	6.3	9.2	14.8 (375)	11.0 (279)	6.6 (168)
Category 2 with Manual L-O-X® and SV27 Sensing Valve								
RC208-06**	FR	1/2	1/2	6.3	9.2	23.0 (585)	12.8 (326)	6.7 (171)
RC212-06**	FR	3/4	3/4	7.7	11	23.0 (585)	12.8 (326)	6.7 (171)
RC216-06**	FR	1	1	8.0	12	28.0 (712)	17.0 (432)	9.5 (242)
RC208L-06**	FRL	1/2	1/2	6.3	9.2	23.0 (585)	12.8 (326)	6.7 (171)
RC212L-06**	FRL	3/4	3/4	7.7	11	23.0 (585)	12.8 (326)	6.7 (171)
RC216L-06**	FRL	1	1	8.0	12	31.8 (808)	17.0 (432)	9.5 (242)

* NPT pressure port threads. M12 connectors available, consult ROSS.

The standard Air Entry Packages are supplied with metal bowl and auto drain.

Note: Specify voltage when ordering. ** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., RC404-09W, RC208-09Z.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Preassembled Wiring Kits

for Sensing Valves Series SV27

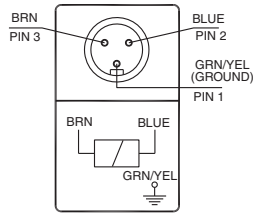
The wiring kits for Series SV27 Sensing Valves are available in lengths of 4 or 10 meters, with a cord grip on each cable.

Kit Number	Valve Type	Length meters (feet)	No. of Cables
2239H77	Solenoid Pilot	4 (13.1)	2
2240H77	Solenoid Pilot	10 (32.8)	2
2241H77	Pressure Controlled	4 (13.1)	1
2242H77	Pressure Controlled	10 (32.8)	1

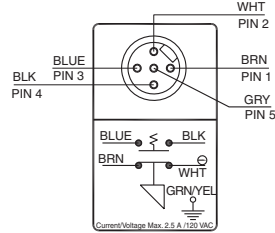
The kits for SV27 solenoid pilot controlled models come with 2 cables; one with a 3-pin MINI connector for the solenoid and one with a 5-pin M12 (Micro) connector for the sensing switch.

The kits for SV27 pressure controlled models include only one cable with a 5-pin M12 connector for the sensing switch. (Note: Each cable has one connector.)

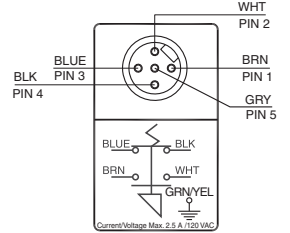
Solenoid Cable with 3-pin MINI Connector



Sensing Switch Cable with 5-pin M12 Connector for 3/4 and 1 1/4 bodies

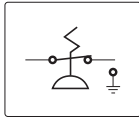


Sensing Switch Cable with 5-pin M12 Connector for 2 inch body



Optional Pressure Switch Kit (608A86)

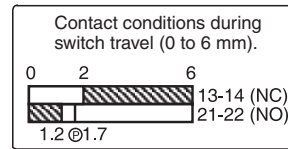
Schematic



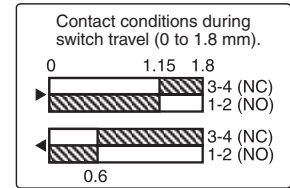
Note: Pressure switch closes on falling pressure of 5 psig (0.34 bar).

Integrated Double-Pole Single-Throw Switch (DPST)

Switch States for 3/4 and 1 1/4 bodies



Switch States for 2 inch body



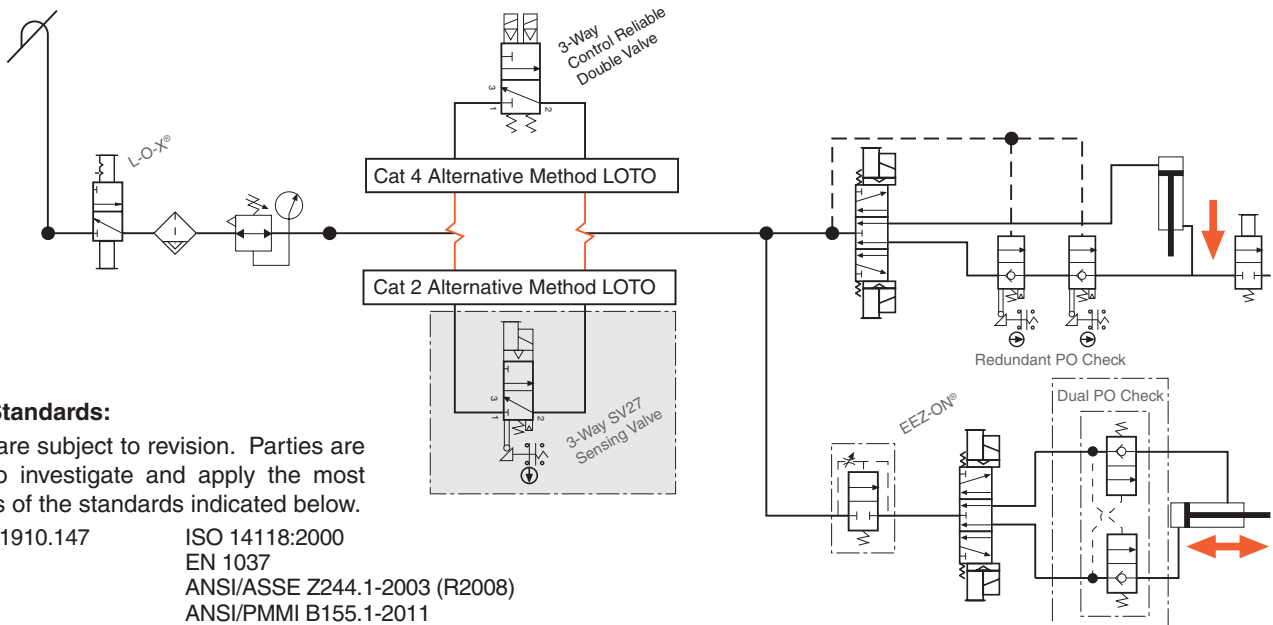
For 3/4 and 1 1/4 inch bodies, the DPST switch is actuated whenever the valve is not in the normal home position. For 2 inch bodies, the DPST switch is only actuated whenever the valve is in the normal home position.

General Illustration Safety-Related Applications

ROSS CONTROLS is the leader in safety-related pneumatic products. Shown here are a few examples of the variety of the ROSS safety-related products and their applications. Please contact us if you are interested in or confused about safety for your pneumatically operated equipment.

ROSS Safety-Related Applications:

- * Cylinder hazard in 2 directions
- * Pinch points
- * Tooling or product damage
- * Single point Lockout
- * Press clutch/brake
- * Counterbalance
- * Monitored power systems
- * Partial de-energization
- * Vertical loads
- * Cylinder hazard.



Referenced Standards:

All standards are subject to revision. Parties are encouraged to investigate and apply the most recent editions of the standards indicated below.

- | | |
|----------------------|-------------------------------|
| OSHA 29 CFR 1910.147 | ISO 14118:2000 |
| CSA Z142-02 | EN 1037 |
| CSA Z460-05 | ANSI/ASSE Z244.1-2003 (R2008) |
| ISO 13849-1 | ANSI/PMMI B155.1-2011 |

DISCLAIMER

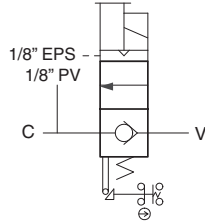
These circuits are illustrative only and not intended to be used literally for your application. Each machine is unique and has individual characteristics that must be considered when designing a safety circuit. In addition, the referenced standards are not an exhaustive list. There may be many additional local, state, national, and international standards as well as machine function specific standards pertinent to your machine. This document is not a substitute for a complete risk assessment of a machine's hazards, professional circuit design or acquiring an in depth understanding of standards/regulations relevant to an application or machine.



Pilot Operated Check Sensing Valves Series SV27

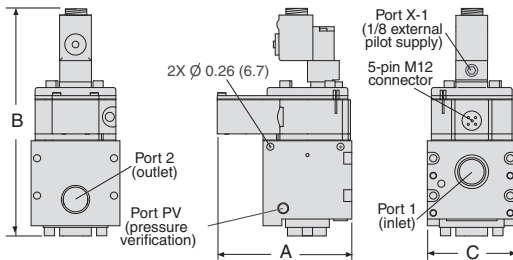
Solenoid Pilot Controlled Load Holding

2/2 Valves

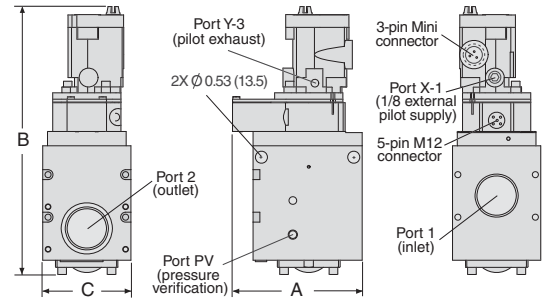


Port Size 1-2	Valve Model Number*	Avg. C _v 1, 2	Dimensions inches (mm)			Weight lb (kg)
			A	B	C	
1/2	SV27NC115408CSAA1A**	4.5	5.0 (127)	8.5 (215)	3.3 (84)	5.0 (2.3)
3/4	SV27NC115508CSAA1A**	8.3	5.0 (127)	8.5 (215)	3.3 (84)	5.0 (2.3)
1	SV27NC115608CSAA1A**	10.3	5.0 (127)	8.5 (215)	3.3 (84)	5.0 (2.3)
1	SV27NC117608CSAA1A**	20	5.7 (145)	11.8 (299)	3.8 (99)	12.5 (5.6)
1¼	SV27NC117708CSAA1A**	29	5.7 (145)	11.8 (299)	3.8 (99)	12.5 (5.6)
1½	SV27NC117808CSAA1A**	33	5.7 (145)	11.8 (299)	3.8 (99)	12.5 (5.6)

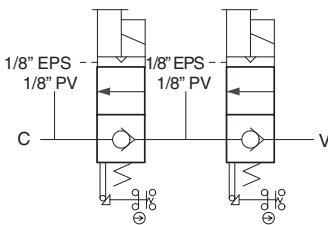
Solenoid Pilot Controlled Model (CNOMO Style)
Sizes ½ thru 1



Solenoid Pilot Controlled Model (Pacer Style)
Sizes 1 thru 1½

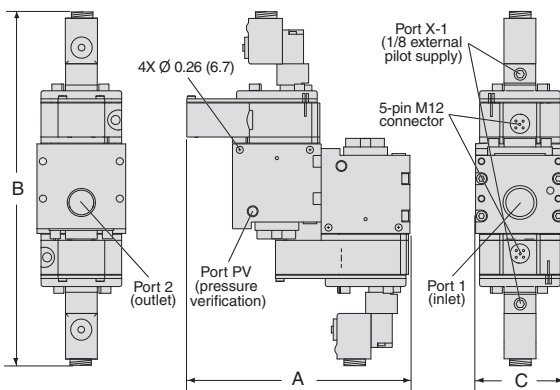


2/2 Valves Redundant

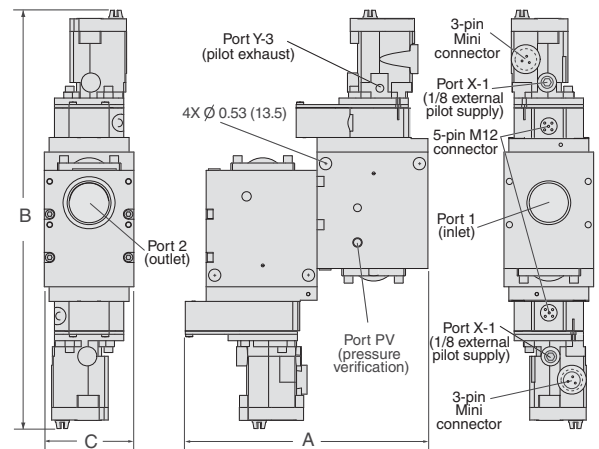


Port Size 1-2	Valve Model Number*	Avg. C _v 1, 2	Dimensions inches (mm)			Weight lb (kg)
			A	B	C	
1/2	SV27NC555408CSAA1A**	3.8	8.3 (211)	13.2 (335)	3.3 (84)	10.0 (4.5)
3/4	SV27NC555508CSAA1A**	5.6	8.3 (211)	13.2 (335)	3.3 (84)	10.0 (4.5)
1	SV27NC555608CSAA1A**	8	8.3 (211)	13.2 (335)	3.3 (84)	10.0 (4.5)
1	SV27NC557608CSAA1A**	12	10.5 (267)	18.1 (459)	3.9 (99)	25.0 (11.3)
1¼	SV27NC557708CSAA1A**	19	10.5 (267)	18.1 (459)	3.9 (99)	25.0 (11.3)
1½	SV27NC557808CSAA1A**	22	10.5 (267)	18.1 (459)	3.9 (99)	25.0 (11.3)

Solenoid Pilot Controlled Model (CNOMO Style)
Sizes ½ thru 1



Solenoid Pilot Controlled Model (Pacer Style)
Sizes 1 thru 1½



* NPT port threads. For BSPP threads, replace "N" in the model number with a "D", e.g., SV27DC115408CSAA1A.

Note: Specify voltage when ordering.

** Insert voltage code: "1A"=120 volts, 60 Hz; "1D"= 24 volts DC; e.g., SV27NC115408CSAA1A1A, SV27NC115408CSAA1A1D.

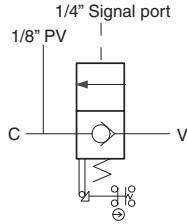
STANDARD SPECIFICATIONS: See page 86.



Pilot Operated Check Sensing Valves Series SV27

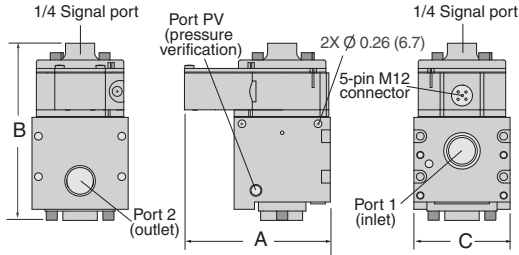
Pressure Controlled Load Holding

2/2 Valves

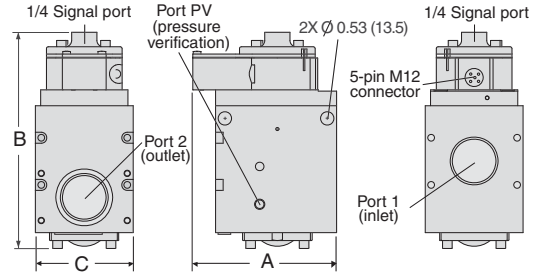


Port Size 1-2	Valve Model Number*	Avg. C _v 1, 2	Dimensions inches (mm)			Weight lb (kg)
			A	B	C	
1/2	SV27NC115405ASAA	4.5	5.0 (127)	6.1 (154)	3.3 (84)	4.0 (1.8)
3/4	SV27NC115505ASAA	8.3	5.0 (127)	6.1 (154)	3.3 (84)	4.0 (1.8)
1	SV27NC115605ASAA	10.3	5.0 (127)	6.1 (154)	3.3 (84)	4.0 (1.8)
1	SV27NC117605ASAA	20	5.7 (145)	8.6 (218)	3.8 (99)	11.0 (5.0)
1 1/4	SV27NC117705ASAA	29	5.7 (145)	8.6 (218)	3.8 (99)	11.0 (5.0)
1 1/2	SV27NC117805ASAA	33	5.7 (145)	8.6 (218)	3.8 (99)	11.0 (5.0)

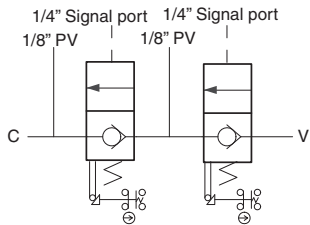
Sizes
1/2 thru 1



Sizes
1 thru 1 1/2

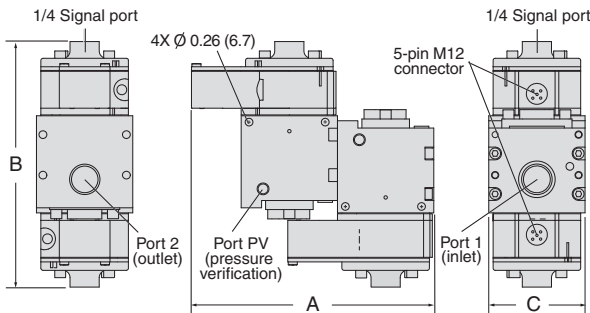


2/2 Valves Redundant

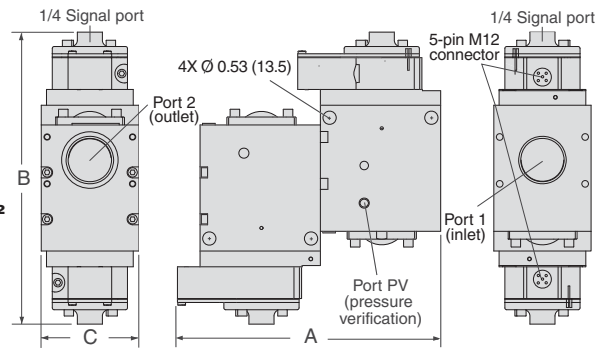


Port Size 1-2	Valve Model Number*	Avg. C _v 1, 2	Dimensions inches (mm)			Weight lb (kg)
			A	B	C	
1/2	SV27NC555405ASAA	3.8	8.3 (211)	8.5 (214)	3.3 (84)	9.0 (4.1)
3/4	SV27NC555505ASAA	5.6	8.3 (211)	8.5 (214)	3.3 (84)	9.0 (4.1)
1	SV27NC555605ASAA	8	8.3 (211)	8.5 (214)	3.3 (84)	9.0 (4.1)
1	SV27NC557605ASAA	12	10.5 (267)	11.7 (296)	3.5 (88)	22.0 (10.0)
1 1/4	SV27NC557705ASAA	19	10.5 (267)	11.7 (296)	3.5 (88)	22.0 (10.0)
1 1/2	SV27NC557805ASAA	22	10.5 (267)	11.7 (296)	3.5 (88)	22.0 (10.0)

Sizes
1/2 thru 1



Sizes
1 thru 1 1/2



* NPT port threads. For BSPP threads, replace "N" in the model number with a "D", e.g., SV27DC115405ASAA, SV27DC555405ASAA.

STANDARD SPECIFICATIONS (for valves on this page and page 85):

Common Specifications:

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 40 to 150 psig (2.8 to 10 bar).

Pilot Pressure: Must be equal to or greater than inlet pressure.

Port Threads: NPT, BSPP.

Functional Safety Data: Category 2 PL d; B10d: Valve - 20,000,000, Switch - 2,000,000; PFH: 2.35x10⁻⁷; MTTFd: 98.15 (n_{op}: 7360); DC (obtained by monitoring safety switch status): 3/2 valves - 99%, 2/2 and PO Check valves - 90%; Ross recommends testing the switch function and sealing for load holding valves every 8 hours.

Vibration/Impact Resistance: Calculated to BS EN 60068-2-27.

Functional Safety Data: Category 3 PL e; B10d: Valve - 20,000,000, Switch - 2,000,000; PFH: 2.47x10⁻⁸; MTTFd: 100 (n_{op}: 7360); DC (obtained by monitoring safety switch status): 3/2 valves - 99%, 2/2 and PO Check valves - 90%; Ross recommends testing the switch function and sealing for load holding valves every 8 hours.

Vibration/Impact Resistance: Calculated to BS EN 60068-2-27.

Solenoid Pilot Controlled:

Solenoid: AC or DC power. Rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: CNOMO Style: 11 VA inrush, 8.5 VA holding on 50 or 60 Hz; 6 watts on DC. **Pacer Style:** 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

Manual Pilot: Switch Current/Voltage Max.: 2.5 A/120 volts AC.
Switch Current/Voltage Min.: 50 mA/24 volts DC.

NOTE: Electrical life of switch varies with conditions and voltage; rated in excess of 15 million cycles.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Preassembled Wiring Kits

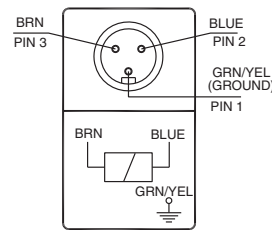
for Sensing PO Check Valves Series SV27

The wiring kits for Series SV27 Sensing PO Check Valves are available in lengths of 4 or 10 meters, with a cord grip on each cable. The kits for SV27 PO Check solenoid pilot controlled models come with 2 cables; one with a 3-pin MINI connector for the solenoid and one with a 5-pin M12 (Micro) connector for the sensing switch. The kits for the air pilot controlled models include only one cable with a 5-pin M12 connector for the sensing switch. (Note: Each cable has one connector.)

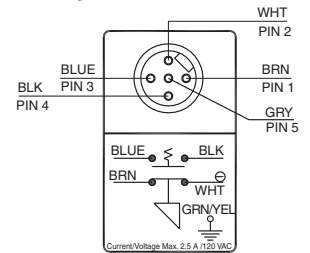
For SV27 Redundant PO Check valves (CAT 3), order 2 kits.

Kit Number	Valve Type	Length meters (feet)	No. of Cables
2239H77	Solenoid Pilot	4 (13.1)	2
2240H77	Solenoid Pilot	10 (32.8)	2
2241H77	Pressure Controlled	4 (13.1)	1
2242H77	Pressure Controlled	10 (32.8)	1

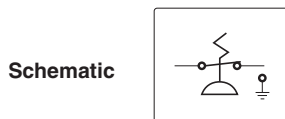
Solenoid Cable with 3-pin MINI Connector



Sensing Switch Cable with 5-pin M12 Connector

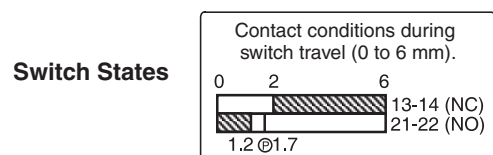


Optional Pressure Switch Kit (608A86)



Note: Pressure switch closes on falling pressure of 5 psig (0.34 bar).

Integrated Double-Pole Single-Throw Switch (DPST)

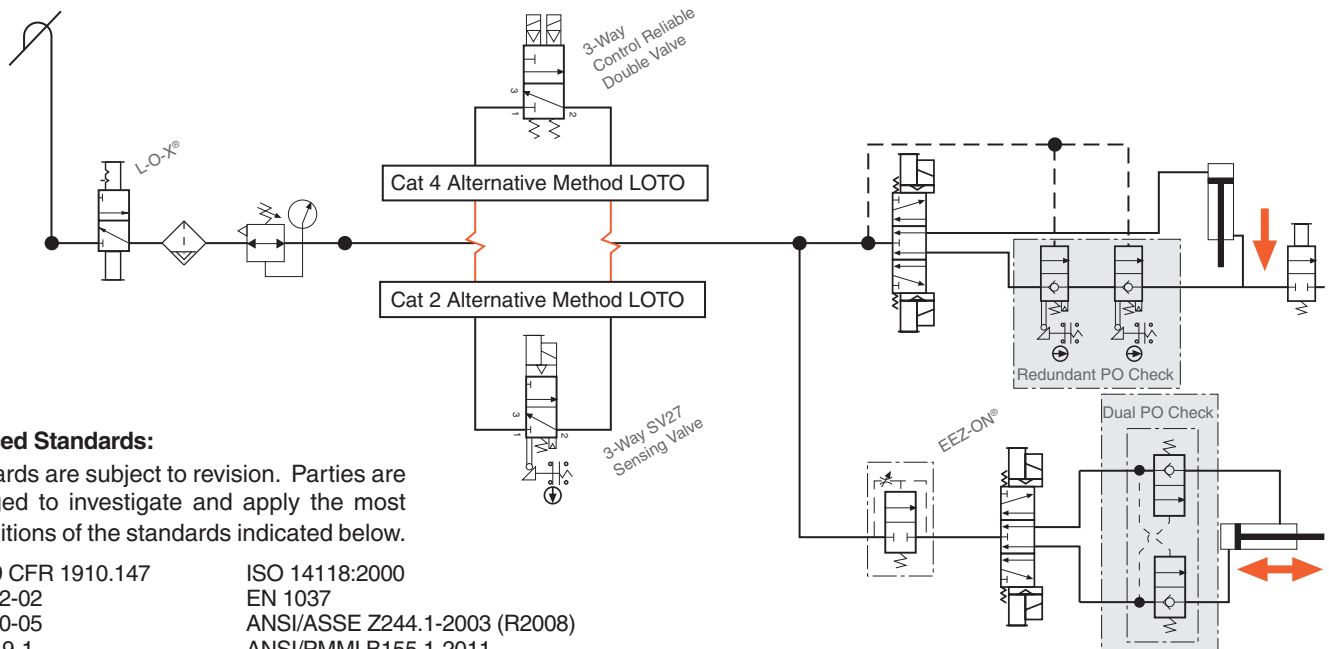


General Illustration Safety-Related Applications

ROSS CONTROLS is the leader in safety-related pneumatic products. Shown here are a few examples of the variety of the ROSS safety-related products and their applications. Please contact us if you are interested in or confused about safety for your pneumatically operated equipment.

ROSS Safety-Related Applications:

- * Cylinder hazard in 2 directions
- * Pinch points
- * Tooling or product damage
- * Single point Lockout
- * Press clutch/brake
- * Counterbalance
- * Monitored power systems
- * Partial de-energization
- * Vertical loads
- * Cylinder hazard



Referenced Standards:

All standards are subject to revision. Parties are encouraged to investigate and apply the most recent editions of the standards indicated below.

- | | |
|----------------------|-------------------------------|
| OSHA 29 CFR 1910.147 | ISO 14118:2000 |
| CSA Z142-02 | EN 1037 |
| CSA Z460-05 | ANSI/ASSE Z244.1-2003 (R2008) |
| ISO 13849-1 | ANSI/PMMI B155.1-2011 |

DISCLAIMER

These circuits are illustrative only and not intended to be used literally for your application. Each machine is unique and has individual characteristics that must be considered when designing a safety circuit. In addition, the referenced standards are not an exhaustive list. There may be many additional local, state, national, and international standards as well as machine function specific standards pertinent to your machine. This document is not a substitute for a complete risk assessment of a machine's hazards, professional circuit design or acquiring an in depth understanding of standards/regulations relevant to an application or machine.



Control Reliable Double Valves DM¹ Series E

with Dynamic Monitoring



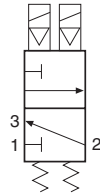
Air Dump / Release

ISO 13849-1:2006 Category 3
PL d applications



- Line mounted
- Rapid response time to minimize stopping time
- Self-contained dynamic monitoring system
- Highly contaminant tolerant poppet construction
- The status indicator switch for valve condition must be integrated in the electrical safety control (dennergizing of the solenoids after an inlet pressure failure)
- Sistema library data available (see page 63)
- *Explosion proof solenoid pilot available, for more information consult ROSS*

- **Dynamic Monitoring:** Monitoring and air flow control functions are integrated into two identical valve elements for CAT 3 applications. The valve exhausts downstream air if asynchronous movement of valve elements occurs during actuation or de-actuation, resulting in a residual outlet pressure of less than 1% of supply. If the abnormality clears itself, the valve will return to the ready-to-run state; there is no memory of the abnormal behavior, as in the ROSS DM² Series E and DM² Series C products that require an intentional reset following lockout.
- **Basic 3/2 Normally Closed Valve Function:** Dirt tolerant, wear compensating poppet design for quick response and high flow capacity. PTFE back-up rings on pistons to enhance valve endurance – operates with or without inline lubrication.
- **Ready-to-run:** If an abnormality clears itself upon the removal of electricity to both solenoids, it will be ready-to-run again. It does not remember the abnormality and stay in a locked-out state until intentionally reset. Therefore, cumulative abnormalities may go undetected.
- **Status Indicator:** The below products include a pressure switch with both normally open (NO) and normally closed (NC) contacts to provide status feedback to the control system indicating whether the valve is in the “ready-to-run” condition or has experienced abnormal function. This indicator only reports status it is not part of a lockout function.
- **Silencers:** All models include high flow, clog resistant silencers.
- **Mounting:** Inline mounted with BSPP or NPT pipe threads. Inlet and outlet ports on both sides provide for flexible piping (plugs for unused ports included).



Simplified Schematic

Port Size		Valve Model	Avg. C _v		Dimensions inches (mm)			Weight
1, 2	3	Number*	1-2	2-3	Width	Length	Depth	lb (kg)
1/4	1/2	DM1ENA20**31	1.34	2.43	4.96 (126.1)	11.14 (283)	4.87 (123.6)	5.0 (2.27)
3/8	1/2	DM1ENA21**31	1.92	2.43	4.96 (126.1)	11.14 (283)	4.87 (123.6)	5.0 (2.27)

* NPT port threads. For BSPP threads, replace “N” in the model number with a “D”, e.g., DM1EDA20**31.

Note: Specify voltage when ordering.

** Insert voltage code: “A” = 24 volts DC; “B” = 110 volts AC, 50/60 Hz; .e.g., DM1ENA20A31, DM1ENA20B31.

This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses, see DM² series D for mechanical power press applications.

STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoid: According to VDE 0580. Enclosure rating according to DIN 400 50 IP 65. Connector socket according to DIN 43650 Form A. Three solenoids, rated for continuous duty.

Power Consumption (each solenoid): 6.0 watts on DC; 15.8 VA inrush and 10.4 VA holding on AC.

Standard Voltages: 24 volts DC; 110 volts AC, 50/60 Hz. For other voltages, see page 113.

Ambient Temperature: 15° to 122°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered, lubricated or unlubricated air (mineral oils according to DIN 51519, viscosity classes 32-46); 5 micron recommended.

Inlet Pressure: 30 to 116 psig (2 to 8 bar).

Pressure Switch (Status Indicator) Rating:

Contacts - 5 amps at 250 volts AC, or 5 amps at 30 volts DC.

Port Threads: NPT, BSPP.

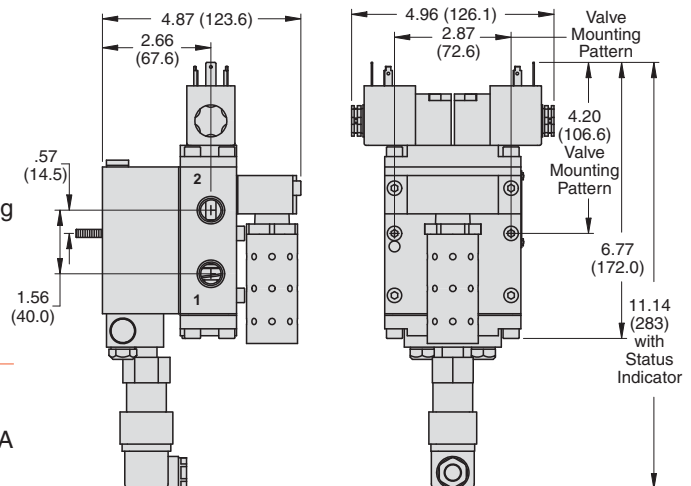
Functional Safety Data: Category 3 PL d; B10d: 20,000,000;

PFH: 4.29x10⁻⁸; MTTFd: 100 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL, TSSA for appropriately tested valves.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

Dimensions: inches (mm)



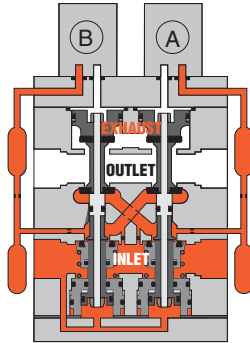
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



VALVE OPERATION

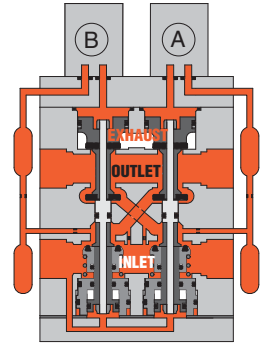
Valve de-actuated (ready-to-run):

The flow of inlet air pressure into the crossover passages from the inlet chamber is restricted by orifices that allow air pressure to bypass the lower inlet poppets. Flow is sufficient to quickly pressurize the pilot supply/timing chambers on both sides A and B. The upper inlet poppets prevent air flow from the crossover passages into the outlet chamber. Air pressure acting on the inlet poppets and return pistons securely hold the valve elements in the de-actuated position. (Internal air passages shown out of the valve body for clarity.)



Valve actuated:

Energizing the pilot solenoids simultaneously applies pressure to both pistons, forcing the internal parts to move to their actuated position, where inlet air flow to outlet is open and both exhaust poppets are closed. The outlet is then quickly pressurized, and pressure in the inlet, crossovers, outlet, and timing chambers are quickly equalized. De-energizing the main solenoids causes the valve elements to return to the ready-to-run (de-actuated) position.



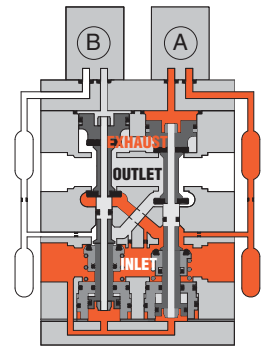
Asynchronous operation:

If the valve elements operate in a sufficiently asynchronous manner on ACTUATION, the valve will shift into a position where one crossover and its related timing chambers will be exhausted, and the other crossover and its related timing chambers will be pressurized.

In the illustration, side B is in the de-actuated position, but has no pilot air available to actuate with and has full pressure on its upper and lower inlet poppets and return piston to hold it in place.

Inlet air flow on side B into its crossover is restricted and flows through the open upper inlet poppet on side A, through the outlet into the exhaust port, and from the exhaust port to atmosphere. Residual pressure in the outlet is less than 1% of inlet pressure.

Once the main solenoids are de-energized, actuating pressure is removed from the top of the main pistons and then the lower inlet poppet return spring along with inlet air pressure acting on the side A return piston will push side A back into the de-actuated position. Inlet air pressurizes the crossovers and volume chambers. Pressure in the crossovers helps hold the upper inlet poppets on seat. The valve will then be in the ready-to-run position. On the next attempt to actuate normally, if side B is still unable to actuate synchronously with side A, the same sequence of events described above will occur again.



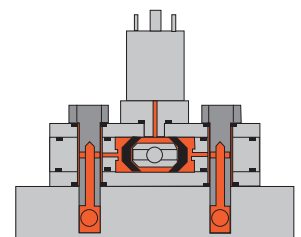
Valve in restricted outlet to exhaust state

WARNING:

If asynchronous operation occurs while DE-ACTUATING, the pilot supply/timing chambers on one side will still be exhausted as described above. However, this could be a temporary situation because the cause of the asynchronous operation may be able to correct itself allowing the stuck or slow acting side of the valve to eventually move back into the de-actuated position. Once the slow or stuck side has de-actuated, the pilot supply/timing chambers that were exhausted will then repressurize. If an external monitoring system is only checking the status indicator periodically this fault signal could be missed. The machine's safety system must be designed to ensure that this does not cause a hazardous situation.

Status indicator:

The status indicator pressure switch will actuate when the main valve is operating normally, and will de-actuate when the main valve operation is sufficiently asynchronous or inlet pressure is removed. This device is not part of the valve lockout function, but, rather, only reports the status of the main valve.



Status indicator in normal ready-to-run position

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Control Reliable Double Valves DM²® Series E

with Dynamic
Monitoring & Memory



Air Dump / Release

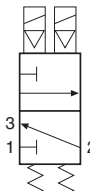
ISO 13849-1:2006 Category 4
PL e applications



- Line mounted
- Electrical reset valve
- Rapid response time to minimize stopping time
- Highly contaminant tolerant poppet construction
- Dynamic memory of abnormal function retains lockout condition and this prevents unintentional reset with removal of air or electricity
- Self-contained dynamic monitoring system requires no additional valve monitoring controls
- The status indicator switch for valve condition must be integrated in the electrical safety control (denergizing of the solenoids after an inlet pressure failure)
- Sistema library data available (see page 63)
- *Explosion proof solenoid pilot available, for more information consult ROSS*

- **Dynamic Monitoring with Memory:** Memory, monitoring, and air flow control functions are integrated into two identical valve elements for CAT 4 applications, except control of the clutch/brake mechanism on mechanical power press. Valves lock-out if asynchronous movement of valve elements occurs during actuation or de-actuation, resulting in a residual outlet pressure of less than 1% of supply.
- **An action is required for reset** – cannot be reset by removing and re-applying supply pressure or electrical power. Reset can only be accomplished by the integrated electrical (solenoid) reset.
- **Basic 3/2 Normally Closed Valve Function:** Dirt tolerant, wear compensating poppet design for quick response and high flow capacity. PTFE back-up rings on pistons to enhance valve endurance – operates with or without inline lubrication.
- **Status Indicator:** Includes a pressure switch with both normally open (NO) and normally closed (NC) contacts to provide status feedback to the control system indicating whether the valve is in the lockout or ready-to-run condition.
- **Silencers:** All models include high flow, clog resistant silencers.
- **Mounting:** Inline mounted with BSPP or NPT pipe threads. Inlet and outlet ports on both sides provide for flexible piping (plugs for unused ports included).

Port Size		Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
1, 2	3		1-2	2-3	Width	Length	Depth	
1/4	1/2	DM2ENA20**21	1.34	2.43	4.96 (126.1)	4.87 (123.6)	11.14 (283)	5.6 (2.43)
3/8	1/2	DM2ENA21**21	1.92	2.43	4.96 (126.1)	4.87 (123.6)	11.14 (283)	5.6 (2.43)



Simplified Schematic

* NPT port threads. For BSPP threads, replace "N" in the model number with a "D", e.g., DM2EDA20**21.

Note: Specify voltage when ordering.

** Insert voltage code: "A" = 24 volts DC; "B" = 110 volts AC, 50/60 Hz; e.g., DM2ENA20A21, DM2ENA20B21.

This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses, see DM²® series D for mechanical power press applications.

STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoid: According to VDE 0580. Enclosure rating according to DIN 400 50 IP 65. Connector socket according to DIN 43650 Form A. Three solenoids, rated for continuous duty.

Power Consumption (each solenoid): 6.0 watts on DC; 15.8 VA inrush and 10.4 VA holding on AC.

Reset Solenoid Power Consumption: 6.0 watts on DC; 15.8 VA inrush and 10.4 VA holding on AC.

Standard Voltages: 24 volts DC; 110 volts AC, 50/60 Hz. For other voltages, see page 113.

Ambient Temperature: 15° to 122°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered, lubricated or unlubricated air (mineral oils according to DIN 51519, viscosity classes 32-46); 5 micron recommended.

Inlet Pressure: 30 to 116 psig (2 to 8 bar).

Pressure Switch (Status Indicator) Rating: Contacts - 5 amps at 250 volts AC, or 5 amps at 30 volts DC.

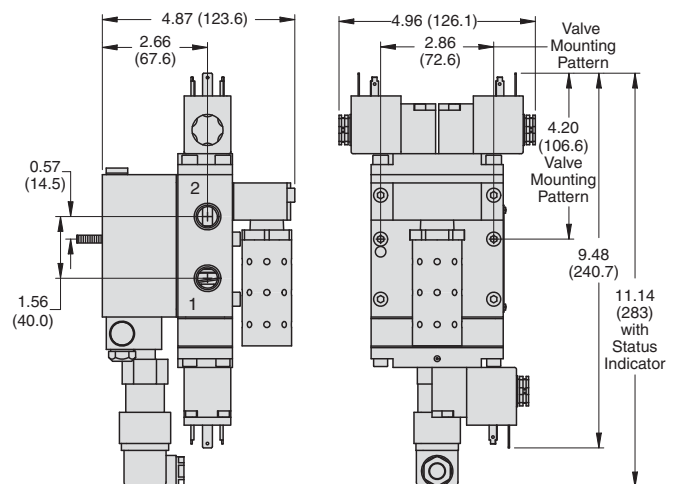
Port Threads: NPT, BSPP.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL, TSSA for appropriately tested valves.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

Dimensions: inches (mm)



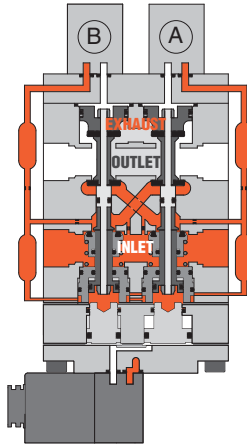
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



VALVE OPERATION

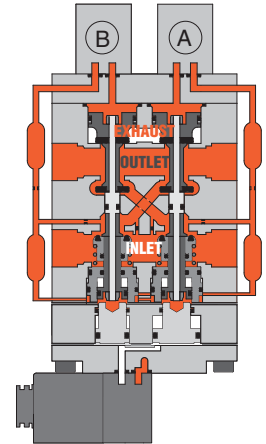
Valve de-actuated (ready-to-run):

The flow of inlet air pressure into the crossover passages from the inlet chamber is restricted by orifices that allow air pressure to bypass the lower inlet poppets. Flow is sufficient to quickly pressurize the pilot supply/timing chambers on both sides A and B. The upper inlet poppets prevent air flow from the crossover passages into the outlet chamber. Air pressure acting on the inlet poppets and return pistons securely hold the valve elements in the de-actuated position. (Air passages shown out of position for clarity.)



Valve actuated:

Energizing the pilot solenoids simultaneously applies pressure to both pistons, forcing the internal parts to move to their actuated position, where inlet air flow to outlet is open and both exhaust poppets are closed. The outlet is then quickly pressurized, and pressure in the inlet, crossovers, outlet, and timing chambers are quickly equalized. De-energizing the main solenoids causes the valve elements to return to the ready-to-run (de-actuated) position.

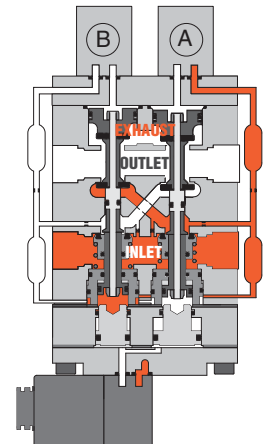


Asynchronous operation:

Whenever the valve elements operate in a sufficiently asynchronous manner, either on actuation or de-actuation, the valve will shift into a locked-out position. In the locked-out position, one crossover and its related timing chambers will be exhausted, and the other crossover and its related timing chambers will be pressurized. The valve element (side A) that is partially actuated has pilot air available to actuate it, but there is no air pressure on the return piston to de-actuate that valve element.

Air pressure in the crossover acts on the differential of side A stem diameters creating a latching force.

Side B is in the de-actuated position, but has no pilot air available to actuate with and has full pressure on its upper and lower inlet poppets and return piston to hold it in place. Inlet air flow on side B into its crossover is restricted and flows through the open upper inlet poppet on side A, through the outlet into the exhaust port, and from the exhaust port to atmosphere. Residual pressure in the outlet is less than 1% of inlet pressure. Also, the return springs can only return the valve elements to the intermediate (locked-out) position. Therefore, the valve will remain in the locked-out position even if the inlet air supply is removed and re-applied. A reset signal must be applied intentionally in order to reset the valve.

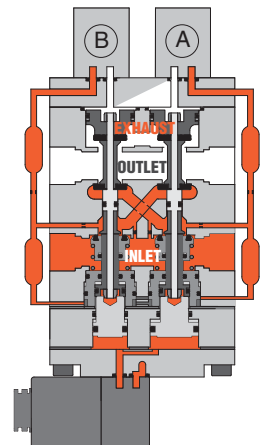


Resetting the valve:

Reset is accomplished by momentarily energizing the reset solenoid. Actuation of the reset solenoid provides inlet air pressure to the reset pistons which physically push the main valve elements to their de-actuated position. Inlet air pressurizes the crossovers and volume chambers, thereby applying air to the return pistons which then hold the upper inlet poppets on seat. De-actuation of the reset solenoid removes pressure from the lower side of the reset pistons, thus allowing them to return to their de-actuated position.

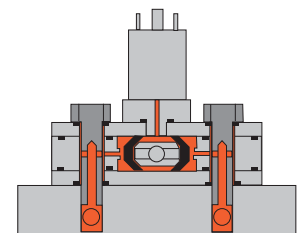
Reset anti-tie-down feature:

Attempting to energize the valve's main solenoids while the reset solenoid is energized will cause side B to shift (overcoming the pressure on the small reset piston), but side A will not move due to the pressure on the larger reset piston on that side. This will cause the valve to go into and remain in the locked-out position until a reset signal is applied while the main solenoids are de-energized.



Status indicator:

The status indicator pressure switch will actuate when the main valve is operating normally, and will de-actuate when the main valve is in the locked-out position or when inlet pressure is removed. This device is not part of the valve lockout function, but, rather, only reports the status of the main valve.



IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Control Reliable Double Valves DM²® Series C

with Dynamic
Monitoring & Memory



Air Dump / Release

ISO 13849-1:2006 Category 4
PL e applications



- Rapid response time to minimize stopping time
- Base mounted
- Electrical reset valve
- Status Indicator switch for valve condition (ready to run) feedback
- Dynamic memory of abnormal function retains lockout condition and this prevents unintentional reset with removal of air or electricity
- Self-contained dynamic monitoring system requires no additional valve monitoring controls
- Highly contaminant tolerant poppet construction
- Sistema library data available (see page 63)
- *Explosion proof solenoid pilot available, for more information consult ROSS*

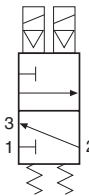
Size 4, 8, 12 and 30

- **Dynamic Monitoring With Memory:** Memory, monitoring, and air flow control functions are integrated into two identical valve elements. Valves lock-out if asynchronous movement of valve elements occurs during actuation or de-actuation, resulting in a residual outlet pressure of less than 1% of supply.
- **An action is required for reset** – cannot be reset by removing and re-applying supply pressure. Reset can only be accomplished by the optional integrated electrical (solenoid) reset.
- **Basic 3/2 Normally Closed Valve Function:** Dirt tolerant, wear compensating poppet design for quick response and high flow capacity. PTFE back-up rings on pistons to enhance valve endurance – operates with or without inline lubrication.
- **Status Indicator (Optional):** Includes a pressure switch with both normally open (NO) and normally closed (NC) contacts to provide status feedback to the control system indicating whether the valve is in the lockout or ready-to-run condition. The Status Indicator can be ordered installed or purchased separately and added to any DM²® Series C base.
- **Silencers:** All models include high flow, clog resistant silencers.
- **Mounting:** Base mounted – with BSPP or NPT pipe threads. Inlet and outlet ports on both sides provide for flexible piping (plugs for unused ports included). Captive valve-to-base mounting screws.

Size 12 and 30

- **Intermediate Pilots:** Increase pilot air flow for fast valve response and make it possible to use the same size solenoids as valve sizes 4 & 8, thereby reducing electrical power requirements for these larger valves.

Valve Size	Port Size		Valve Model Number*	Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
	1, 2	3		1-2	2-3	Width	Length	Depth	
4	1/2	1/2	DM2CNA42**21	3	10	4.34 (110.2)	12.00 (304.8)	6.33 (160.8)	5.9 (2.6)
8	3/4	3/4	DM2CNA54**21	4.4	13	5.41 (137.4)	12.58 (319.5)	7.48 (190.0)	8.4 (3.7)
8	1	1	DM2CNA55**21	4.4	13	5.41 (137.4)	12.58 (319.5)	7.48 (190.0)	8.4 (3.7)
12	1	1	DM2CNA66**21	8.5	20	6.74 (117.2)	14.39 (365.5)	9.42 (239.3)	15.3 (6.7)
30	1½	2	DM2CNA88**21	22	64	9.85 (250.2)	16.94 (430.3)	11.82 (300.3)	34.7 (15.1)



Simplified Schematic

* NPT port threads. For BSPP threads, replace "N" in the model number with a "D", e.g., DM2EDA20**21.

Note: Specify voltage when ordering.

** Insert voltage code: "A" = 24 volts DC; "B" = 110 volts AC, 50/60 Hz; .e.g., DM2ENA20A21, DM2ENA20B21.

This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses, see DM² series D for mechanical power press applications.

STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoids: According to VDE 0580. Enclosure rating according to DIN 400 50 IP 65. Connector socket according to DIN 43650 Form A. Three solenoids, rated for continuous duty.

Standard Voltages: 24 volts DC; 110 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption (each solenoid):

Size 2, 4, 12, 30: For primary and reset solenoids:

6.0 watts on DC; 36 VA inrush and 24.6 VA holding on AC.

Size 8: Primary solenoids:

15 watts on DC; 36 VA inrush and 24.6 VA holding on AC.

Reset solenoid:

6.0 watts on DC; 15.8 VA inrush and 10.4 VA holding on AC.

Enclosure Rating: IP65, IEC 60529.

Electrical connection: DIN 43650. Order connectors separately.

Ambient Temperature: 15° to 122°F (-10° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered, lubricated or unlubricated (mineral oils according to DIN 51519, viscosity classes 32-46); 5-micron recommended.

Inlet Pressure: 30 to 120 psig (2 to 8 bar).

Reset Pressure: For remote reset option – equal to inlet pressure.

Pressure Switch (Status Indicator) Rating: Contacts - 5 amps at 250 volts AC, or 5 amps at 30 volts DC.

Monitoring: Dynamically, cyclically, internally during each actuating and de-actuating movement. Monitoring function has memory and requires an overt act to reset unit after lockout.

Mounting orientation: Preferably horizontally (valve on top of base) or vertically with pilot solenoids on top.

Port Threads: NPT, BSPP.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL, TSSA for appropriately tested valves.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



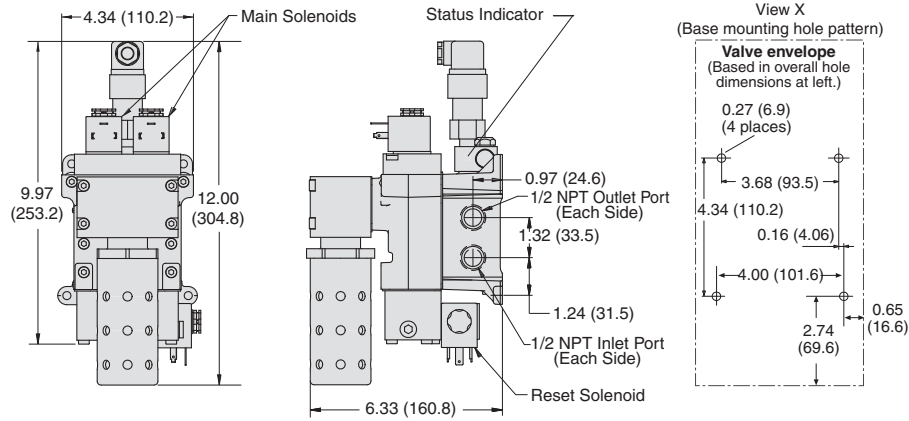
Control Reliable Double Valves

DM²® Series C

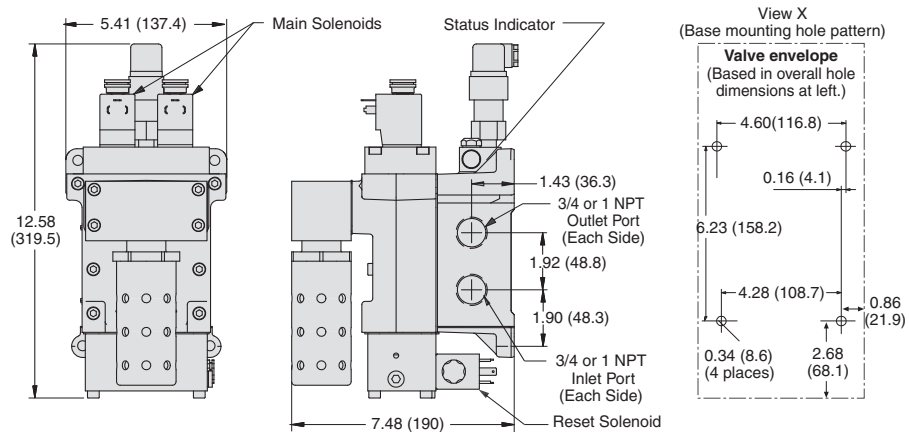
Valve Technical Data

SIZE 4

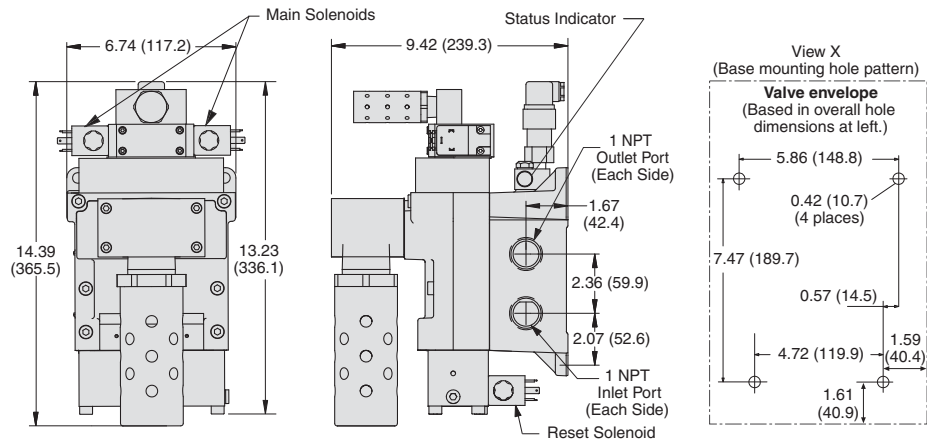
Dimensions: inches (mm)



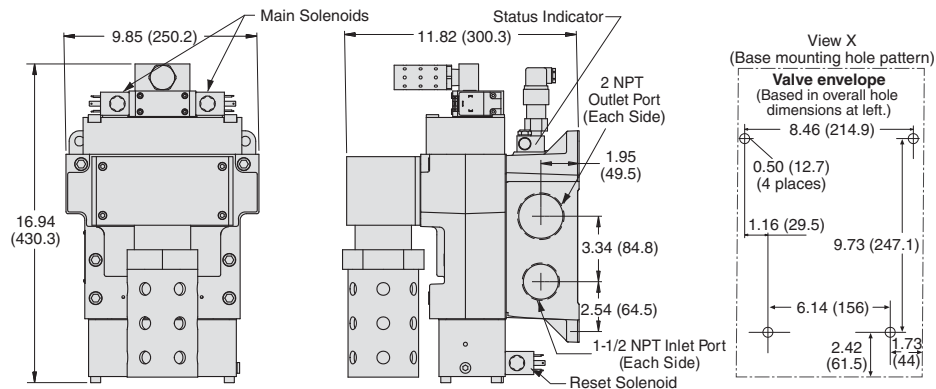
SIZE 8



SIZE 12



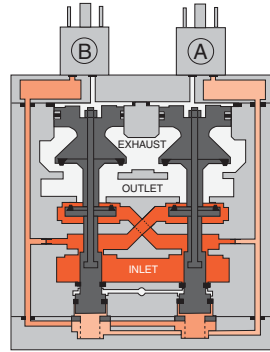
SIZE 30



VALVE OPERATION

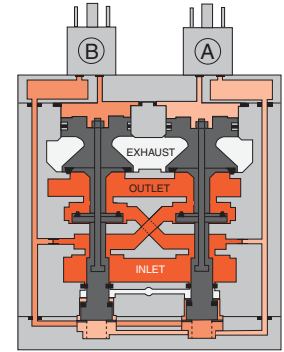
Valve de-actuated (ready-to-run):

The flow of inlet air pressure into the crossover passages is restricted by the size of the passage between the stem and the valve body opening. Flow is sufficient to quickly pressurize pilot supply/timing chambers A and B. The inlet poppets prevent air flow from crossover passages into the outlet chamber. Air pressure acting on the inlet poppets and return pistons securely hold the valve elements in the closed position. (Air passages shown out of position and reset adapter omitted for clarity.)



Valve actuated:

Energizing the pilot valves simultaneously applies pressure to both pistons, forcing the internal parts to move to their actuated (open) position, where inlet air flow to crossover passages is fully open, inlet poppets are fully open and exhaust poppets are fully closed. The outlet is then quickly pressurized, and pressure in the inlet, crossovers, outlet, and timing chambers are quickly equalized. De-energizing the pilots quickly causes the valve elements to return to the ready-to-run position.

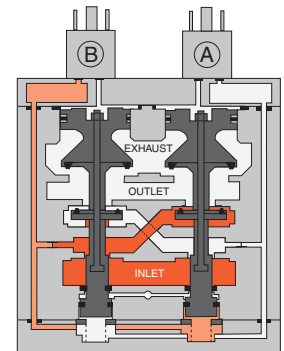


Valve locked-out:

Whenever the valve elements operate in a sufficiently asynchronous manner, either on actuation or de-actuation, the valve will move to a locked-out position. In the locked-out position, one crossover and its related timing chamber will be exhausted, and the other crossover and its related timing chamber will be fully pressurized.

The valve element (side B) that is partially actuated has pilot air available to fully actuate it, but no air pressure on the return piston to fully de-actuate the valve element.

Air pressure in the crossover acts on the differential of side B stem diameters creating a latching force. Side A is in a fully closed position, and has no pilot air available to actuate, but has full pressure on the inlet poppet and return piston to hold the element in the fully closed position. Inlet air flow on side A into its crossover is restricted, and flows through the open inlet poppet on side B, through the outlet into the exhaust port, and from the exhaust port to atmosphere. Residual pressure in the outlet is less than 1% of inlet pressure. The return springs are limited in travel, and can only return the valve elements to the intermediate (locked-out) position. Sufficient air pressure acting on the return pistons is needed to return the valve elements to a fully closed position.

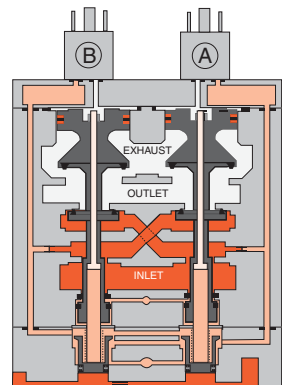


Resetting the valve:

The valve will remain in the locked-out position, even if the inlet air supply is removed and re-applied.

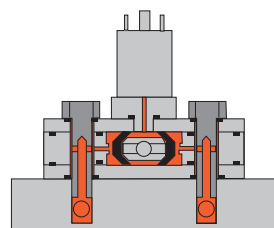
A remote reset signal must be applied to reset the valve. Reset is accomplished by momentarily pressurizing the reset port. Actuation of the reset piston physically pushes the main valve elements to their closed position. Inlet air fully pressurizes the crossovers and holds the inlet poppets on seat. Actuation of the reset piston opens the reset poppet, thereby, immediately exhausting pilot supply air, thus, preventing valve operation during reset (Reset adapter added to illustration.). De-actuation of reset pistons causes the reset poppets to close and pilot supply to fully pressurize. Reset pressure can be applied by a remote 3/2 normally closed valve, or from an optional 3/2 normally closed solenoid mounted on the reset adapter. De-actuation of reset pistons causes the reset poppets to close and pilot supply to fully pressurize.

Reset air pressure can be applied by a remote 3/2 normally closed valve, or from an optional 3/2 normally closed solenoid, or a manual push button mounted on the reset adapter.



Status indicator:

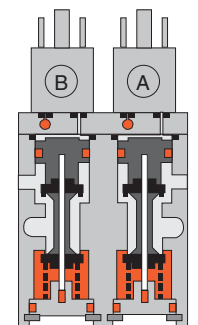
The optional status indicator pressure switch will actuate when the main valve is operating normally, and will de-actuate when the main valve is in the locked-out position or inlet pressure is removed. This device is not part of the valve lockout function, but, rather, only reports the status of the main valve.



Status indicator (optional)
in normal ready-to-run position

Size 12 and 30 valves require relatively large pilots to actuate and de-actuate the main valve elements. In order to achieve extremely quick valve response for such large pilots, a 2-stage solenoid pilot system is incorporated into the design.

This keeps the required electrical current to operate the pilots to a minimum.



Size 12 & 30 pilots

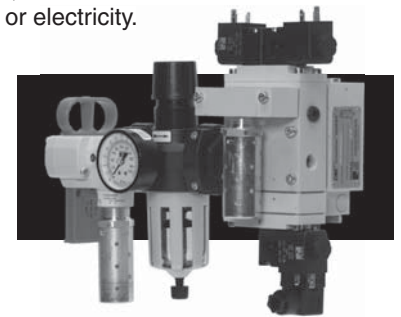
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

These systems are not designed for controlling clutch/brake mechanisms on mechanical power presses.

Category 4 with Modular L-O-X® and DM²® Series E



- Pre-engineered panel-mounted design with air entry via a filter and regulator “FR”, or filter, regulator and lubricator “FRL”
- Includes DM²® Series E Double Valve with Monitoring & Memory:
 - a) Self-contained dynamic monitoring system requires no further valve monitoring controls,
 - b) Dynamic memory of abnormal function prevents unintentional reset with removal of air or electricity.
- All necessary features for safety applications are included:
 - a) Electrical reset valve,
 - b) Status indicator switch for valve condition (ready-to-run) feedback.

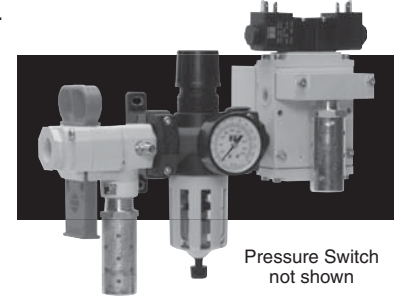


Model Number*	Air Entry Type	Port Size		Avg. C _v		Dimensions (inches/mm)		
		1,2	3	1-2	2-3	Length	Width	Depth
RC404-09**	FR	1/4	1/2	1.3	2.4	13.0 (330)	11.68 (297)	5.4 (135)
RC406-09**	FR	3/8	1/2	1.9	2.4	13.0 (330)	11.68 (297)	5.4 (135)
RC404L-09**	FRL	1/4	1/2	1.3	2.4	13.0 (330)	11.68 (297)	5.4 (135)
RC406L-09**	FRL	3/8	1/2	1.9	2.4	13.0 (330)	11.68 (297)	5.4 (135)

Category 3 with Modular L-O-X® and DM¹ Series E



- Pre-engineered panel-mounted design with air entry via a filter and regulator “FR”, or filter, regulator and lubricator “FRL”
- Includes DM¹ Series E Double Valve with Monitoring:
 - a) Self-contained dynamic monitoring system requires no further valve monitoring controls,
 - b) Ready-to-run: If an abnormality clears itself upon the removal of electricity to both solenoids, it will be ready-to-run again. It does not remember the abnormality & stay in a locked-out state until intentionally reset. Therefore, cumulative abnormalities may go undetected,
 - c) Status indicator switch for valve condition (ready-to-run) feedback.

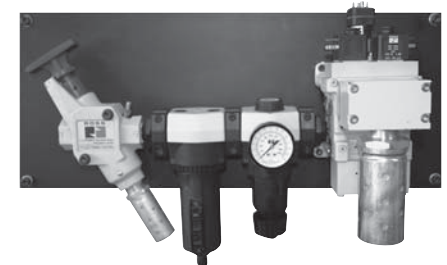


Model Number*	Air Entry Type	Port Size		Avg. C _v		Dimensions (inches/mm)		
		1,2	3	1-2	2-3	Length	Width	Depth
RC304-09**	FR	1/4	1/2	1.3	2.4	13.0 (330)	11.0 (279)	5.4 (135)
RC306-09**	FR	3/8	1/2	1.9	2.4	13.0 (330)	11.0 (279)	5.4 (135)
RC304L-09**	FRL	1/4	1/2	1.3	2.4	13.0 (330)	11.0 (279)	5.4 (135)
RC306L-09**	FRL	3/8	1/2	1.9	2.4	13.0 (330)	11.0 (279)	5.4 (135)

Category 4 with Manual L-O-X® and DM²® Series C



- Pre-engineered panel-mounted design with air entry via a filter and regulator “FR”, or filter, regulator and lubricator “FRL”
- Includes DM²® Series C Double Valve with Monitoring & Memory:
 - a) Self-contained dynamic monitoring system requires no further valve monitoring controls,
 - b) Dynamic memory of abnormal function prevents unintentional reset with removal of air or electricity
- All necessary features for safety applications are included:
 - a) Electrical reset valve,
 - b) Status indicator switch for valve condition (ready to run) feedback



Model Number*	Air Entry Type	Port Size		Avg. C _v		Dimensions (inches/mm)		
		1,2	3	1-2	2-3	Length	Width	Depth
RC408-06**	FR	1/2	1/2	3	10	24.0 (610)	14.5 (369)	7.4 (187)
RC412-06**	FR	3/4	3/4	4.4	13	24.0 (610)	15.7 (399)	8.3 (211)
RC416-06**	FR	1	1	4.4	13	27.0 (686)	19.0 (483)	9.0 (229)
RC408L-06**	FRL	1/2	1/2	3	10	24.0 (610)	14.5 (369)	7.4 (187)
RC412L-06**	FRL	3/4	3/4	4.4	13	24.0 (610)	15.7 (399)	8.3 (211)
RC416L-06**	FRL	1	1	4.4	13	31.0 (788)	19.0 (483)	9.0 (229)

* NPT pressure port threads.

Note: Specify voltage when ordering.

** Insert voltage code: “W” = 24 volts DC; “Z” = 110-120 volts AC, 50/60 Hz; e.g., RC404-09W, RC404-09Z.
M12 connectors available, consult ROSS.

Custom panel options available, consult ROSS.

Explosion proof solenoid pilot available, for more information consult ROSS.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Preassembled Wiring Kits

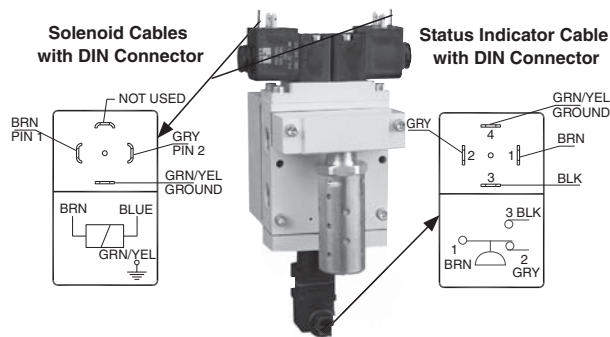
for DM1 & DM2®
Series Double Valve

DM1 Series E Wiring Kits

These kits include 2 cables with either a DIN or M12 connector plus a cord grip for each. They are available in lengths of 5 or 10 meters. Separate kits are available for the Status Indicator. **Note:** Each cable has one connector.

Kit Number	Solenoid Connector Type	Length meters (feet)	Status Indicator Kit Number	Length meters (feet)
2243H77	DIN	5 (16.4)	2247H77	5 (16.4)
2244H77	DIN	10 (32.8)	2248H77	10 (32.8)
2245H77	M12	5 (16.4)		
2246H77	M12	10 (32.8)		

Status Indicator kits include one cable with DIN connector and a cord grip.

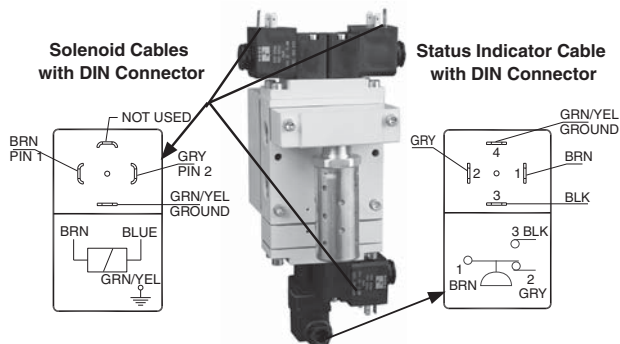


DM2® Series C, D and E Wiring Kits

Kits include three cables for the solenoids and one cable for the status indicator. All cables come with a cord grip. Solenoid cables come with either DIN or M12 connectors. They are available in lengths of 5 or 10 meters.

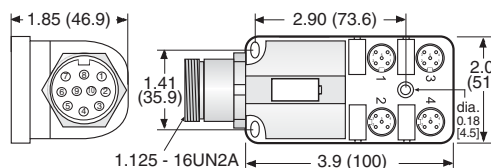
Kit Number	Solenoid Connector Type	Length meters (feet)
2283H77	DIN	5 (16.4)
2284H77	DIN	10 (32.8)
2288H77	M12	5 (16.4)
2289H77	M12	10 (32.8)

Note: Each cable has one connector.



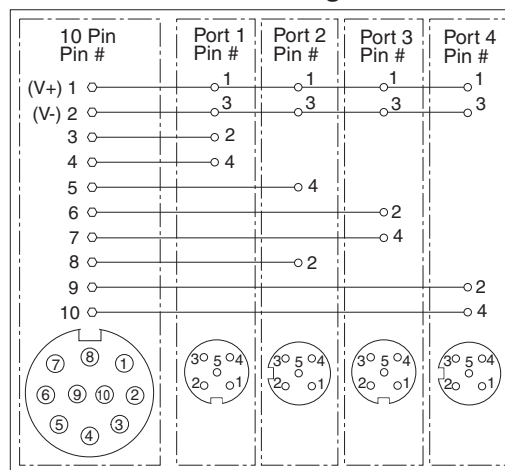
Wiring Kits with J-Box

A J-Box is a junction box with a 10-pin MINI connector for connecting to the user's control system and (4) 5-pin M12 ports for connecting to the 3 solenoids and the status indicator on the DM2® Series valve. The J-Box kits include the J-Box as described above and (4) 1-meter cables for connecting to the valve. These cables have a connector on each end. The status indicator cable and the (3) solenoid cables have an M12 connector on one end and a DIN connector on the other end (M12-DIN). Standard valves come with DIN type solenoid connections, but could be bought with M12 type connections as well. Therefore we also offer a kit that provides solenoid cables with an M12 connector on each end (M12-M12).



Kit Number	Solenoid Connector Type	Length meters (feet)
2249H77	M12 - DIN	1 (3.3)
2250H77	M12 - M12	1 (3.3)

J-Box Wiring



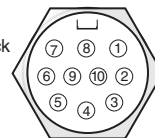
10 PIN MINI Cable

These cables have a 10-pin MINI connector for connecting the J-Box kits above to the user's control system. Kits include one cable with connector and cord grip. Cable conductors are 18 gauge wire.

Kit Number	Length meters (feet)	Kit Number	Length meters (feet)
2253H77	3.66 (12)	2255H77	9.1 (30)
2254H77	6.1 (20)	2256H77	15.2 (50)

PIN #	PIN #
1 +24 volts DC	6 -
2 Common volts DC	7 -
3 Solenoid B	8 -
4 Solenoid A	9 Remote Valve Fault Light
5 Remote Reset	10 Remote System OK Light

Wire Colors:	Wire Colors:
Orange	Orange w/Black
Blue	Red
White w/Black	Green/Yellow
Red w/Black	Black
Green w/Black	White



Outlet Port Pressure Monitoring Kit

Some customers prefer to monitor downstream pressure in addition to using the or DM1 Series valve. A convenient way to do this is to install a pressure switch in the extra outlet port that is provided on the valve. The Outlet Port Pressure Monitoring kit can be used with one of the J-Box kits above to split one of the M12 ports on the J-Box so that a pressure switch can be wired in as well. These kits consist of one port splitter (a Tee with three M12 connectors) and one M12-DIN cable (1 meter). A pressure switch is available separately - order part number **586A86**.

Kit Number 2251H77

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

4-Way CrossMirror® Double Valves Series 77

Solenoid Pilot Controlled Cylinder Return to Home Position



5/2 CrossMirror®
double valve
with pressure switch

Size 2 & 4 Certifications
ISO 13849-1:2006
Category 4 PL e applications



- Designed to enable users to comply with current safety regulations
- Self-contained dynamic monitoring system requires no additional valve monitoring controls
- Base mounted, Interrelated dual stainless steel precision spool & sleeve construction
- Status indication switch (ready-to-run) to inform machine controller of valve condition; **MUST** be integrated into machine controls in order to prevent run signal until fault is cleared in valve
- Optional pressure switch to provide signal for external monitoring
- Sistema library data available (see page 63)
- *Explosion proof solenoid pilot available, for more information consult ROSS*

Model Number	Port Sizes				Avg. C _v				Pressure Switch	Dimensions inches (mm)			Weight lb (kg)	Replacements*	
	1	2, 3, 4, 5	1-2	1-4	2-3	4-5	A	B		C	Valve No.	Base No.			
Valve Size 2*															
7776A3410**	1/2	3/8	2.0	1.6	1.6	2.8	Without	11.1 (282)	4.1 (104)	3.2 (81)	7.6 (3.4)	7776A3400**	996C91		
7776A3411**	1/2	3/8	2.0	1.6	1.6	2.8	With	11.1 (282)	6.7 (170)	3.2 (81)	8.4 (3.8)	7776A3401**	996C91		
Valve Size 4*															
7776A4420**	3/4	1/2	3.2	3.4	2.7	7.2	Without	12.1 (307)	4.3 (109)	4.1 (104)	10.2 (4.6)	7776A4400**	1049C91		
7776A4421**	3/4	1/2	3.2	3.4	2.7	7.2	With	12.1 (307)	6.9 (175)	4.1 (104)	11.2 (5.1)	7776A4401**	1049C91		
7776A5410**	3/4	3/4	3.2	3.4	2.7	7.2	Without	12.1 (307)	4.3 (109)	4.1 (104)	10.2 (4.6)	7776A4400**	1153C91		
7776A5411**	3/4	3/4	3.2	3.4	2.7	7.2	With	12.1 (307)	6.9 (175)	4.1 (104)	11.2 (5.1)	7776A4401**	1153C91		
Valve Size 4 SAE#															
S7776A4H10**	SAE 12	SAE 12	3.2	3.4	2.7	7.2	Without	12.1 (307)	4.3 (109)	4.1 (104)	10.2 (4.6)	7776A4400**	1159G91		
S7776A4H11**	SAE 12	SAE 12	3.2	3.4	2.7	7.2	With	12.1 (307)	6.9 (175)	4.1 (104)	11.2 (5.1)	7776A4401**	1159G91		

Model number includes base.

* Model number includes base supplied with NPT threads.

For BSPP threads, order model or base with a "D" prefix, e.g., D7776A3410, D996C91.

Note: Specify voltage when ordering.

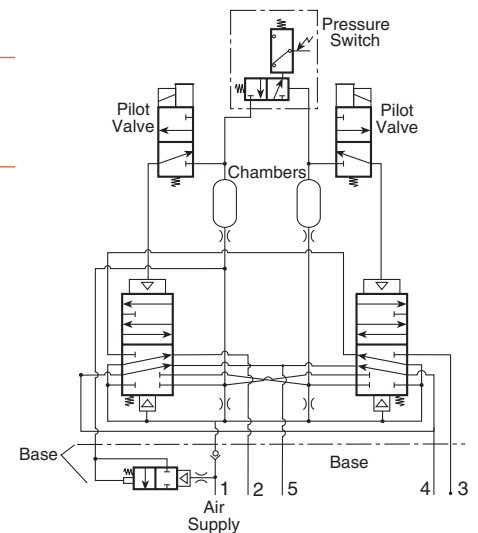
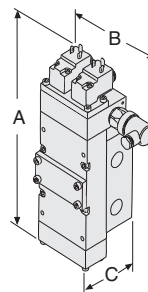
** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 7776A3410W, 7776A3410Z.

Pressure Switches:

Pressure switch provides a signal when valve is in a faulted position.

APPLICATIONS:

- Small size pneumatic cylinder-operated presses
- Valve operators
- Safety latches
- Pinch point applications
- Die clamp applications
- Long cylinder stroke applications
- Shearing equipment



This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses.

STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoids: Rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid, 18 VA inrush, 14 VA holding on 50 or 60 Hz; 6 watts on DC.

Electrical Connections: Uses cord-grip connectors at solenoids. Order connectors separately (see page 112).

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: 40 to 150 psig (2.5 to 10 bar).

Port Threads: NPT, BSPP.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



4-Way CrossMirror® Double Valves Series 77

Pressure Controlled Cylinder Return to Home Position



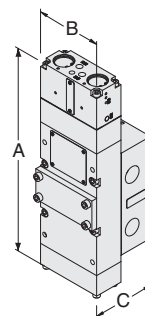
Size 2 & 4 Certifications
ISO 13849-1:2006
Category 4 PL e applications



- Designed to enable users to comply with current safety regulations
- Requires two inputs within 500 ms
- Self-contained dynamic monitoring system requires no additional valve monitoring controls
- Senses asynchronous inputs via status indicator switch
- Status indication switch available to be integrated with electrical safety control system where available
- Optional pressure switch to provide signal for external monitoring
- Base mounted, Interrelated dual stainless steel precision spool & sleeve construction
- Sistema library data available (see page 63)

This Series 77 5/2 CROSSMIRROR® valve is a control reliable, two hand pressure controlled 4-way double valve that is controlled by two separate pneumatic signals essentially providing “AND” gate control for the output ports. Both pilot signals must be provided within approximately 500 milliseconds of each other to actuate the valve. Proper actuation shifts output pressure to port 4. If the valve is not actuated, not provided appropriate pneumatic signals within the discordance window or if the valve actuates abnormally, inlet pressure will only be passed to port 2 - cylinder retracted.

This valve is constructed with precision, stainless steel spools as the main valve elements, and is designed to offer added safety to the operation of many pneumatically controlled machines.



Model Number	Port Sizes				Avg. C _v			Pressure Switch	Dimensions inches (mm)			Weight lb (kg)	Replacements*	
	1	2, 3, 4, 5	1-2	1-4	2-3	4-5	A		B	C	Valve No.		Base No.	
Valve Size 2*														
7786A3410	1/2	3/8	2.0	1.6	1.6	2.8	Without	10.9 (277)	4.1 (104)	3.2 (81)	7.6 (3.4)	7786A3400	996C91	
7786A3411**	1/2	3/8	2.0	1.6	1.6	2.8	With	10.9 (277)	6.7 (170)	3.2 (81)	8.4 (3.8)	7786A3401**	996C91	
Valve Size 4*														
7786A4420	3/4	1/2	3.2	3.4	2.7	7.2	Without	12.1 (307)	4.3 (109)	4.1 (104)	10.6 (4.6)	7786A4400	1049C91	
7786A4421**	3/4	1/2	3.2	3.4	2.7	7.2	With	12.1 (307)	6.9 (175)	4.1 (104)	11.6 (5.1)	7786A4401	1049C91	
7786A5410	3/4	3/4	3.2	3.4	2.7	7.2	Without	12.1 (307)	4.3 (109)	4.1 (104)	10.6 (4.6)	7786A4400	1153C91	
7786A5411**	3/4	3/4	3.2	3.4	2.7	7.2	With	12.1 (307)	6.9 (175)	4.1 (104)	11.6 (5.1)	7786A4401**	1153C91	
Valve Size 4 SAE#														
S7786A4H10	SAE 12	SAE 12	3.2	3.4	2.7	7.2	Without	12.1 (307)	4.3 (109)	4.1 (104)	10.6 (4.6)	7786A4400	1159G91	
S7786A4H11**	SAE 12	SAE 12	3.2	3.4	2.7	7.2	With	12.1 (307)	6.9 (175)	4.1 (104)	11.6 (5.1)	7786A4401**	1159G91	

Model number includes base.

* Model number includes base supplied with NPT threads.
For BSPP threads, order model or base with a “D” prefix, e.g., D7786A3410, D996C91

Note: For models with pressure switch option, specify voltage when ordering.

** Insert voltage code: “W” = 24 volts DC; “Z” = 110-120 volts AC, 50/60 Hz; e.g., 7786A3411W, 7786A3411Z.

This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses.

STANDARD SPECIFICATIONS (for valves on this page):

Ambient Temperature: 40° to 120°F (4° to 50°C).
Media Temperature: 40° to 175°F (4° to 80°C).
Flow Media: Filtered air; 5 micron recommended.
Inlet Pressure: 40 to 100 psig (2.5 to 7 bar).
Pilot Pressure: Must be equal or greater than inlet pressure, but should not exceed maximum inlet pressure.
Pressure Switch Rating: Max Current 4A, Max 250 volts AC.
 Max Current 50 mA, Max 24 volts DC.

Pressure Switch: Pressure Switch signal indicates when the input signals or parts movement is asynchronous.

Port Threads: NPT, BSPP.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



VALVE OPERATION

Normal Operation:

After installation the valve is operated by pressurizing both pilot supply ports (S1 and S2) simultaneously. This causes both main valve elements to be actuated so that air from inlet port 1 flows to outlet port 4. Air downstream of port 2 is exhausted through port 3.

When the pilot supply ports are de-pressurized, both valve elements are de-actuated, and air then flows from inlet port 1 to outlet port 2. Air downstream of port 4 is exhausted through port 5.

Safety Function:

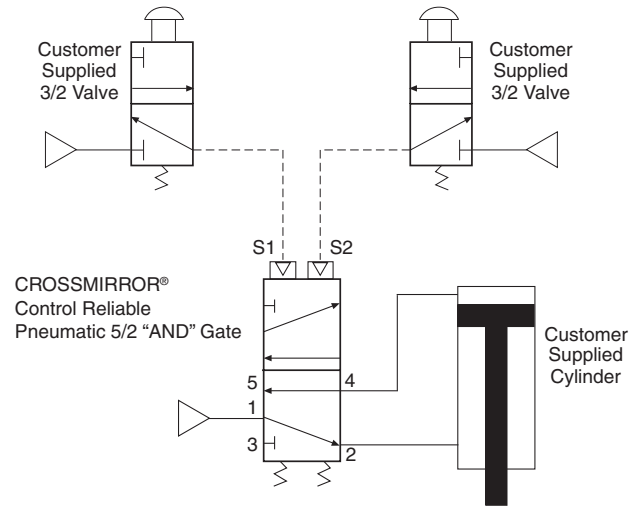
If the two main valve elements are not actuated or de-actuated synchronously, within 500ms, the valve defaults so that outlet port 2 receives full inlet pressure, and outlet port 4 is exhausted through port 5. If this abnormal operation is the result of a temporary circumstance, the valve will be ready to resume normal operation as soon as both pilot signal ports have been de-pressurized and both main valve elements have returned to their normal ready-to-run position. Applying pressure to both signal ports simultaneously will resume normal operation.

If the cause of the abnormal operation is still present, the valve will either remain in the default position (pressure on port 2 and not port 4) or will again go into this position on the next actuation attempt. The source of the abnormality must be investigated and corrected before further operation.

Pressure Switch:

Valves with model numbers ending in the number 1 have a pressure switch to provide user feedback when movement of the main valve elements was asynchronous.

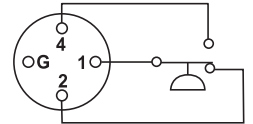
Typical 2-Hand-Anti-Tie-Down Application



Status Indicator (pressure switch)

Terminals 1 and 4 are connected when air pressure is present and the valve is "Ready-to-Run". If an abnormal operation has occurred or pressure is removed from the valve inlet, terminals 1 and 2 are connected.

Note: DC voltage pressure switches do not have a ground terminal.



Pin 1: Common
Pin 2: Normally Closed
Pin G: Not used
Pin 4: Normally Open

Pneumatic cylinder applications:

- Small size pneumatic cylinder-operated presses
- Valve operators
- Safety latches
- Two hand control EN574 Type III C
- Forming applications
- Pinch point applications
- Cutting applications
- Shearing equipment
- Clamping applications

Service Kits

Valve Size	Valve Model Number	Valve Body Seal and Gasket Kit	Valve Body Service Kit	Base Service Kit	Pressure Switch Assembly Service Kit	Pressure Switch	Pressure Switch Connector
2	7786A3400	2216K77	2218K77	1694K77	N/A	N/A	N/A
	7786A3401	2216K77	2218K77	1694K77	1696K77	AC - 518E30 DC - 798E30	522E30
4	7786A4400	2217K77	2219K77	1695K77	N/A	N/A	N/A
	7786A4401	2217K77	2219K77	1695K77	1696K77	AC - 518E30 DC - 798E30	522E30

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

DM²® Series D Double Valves

The ROSS DM²® Series D double valves provide significant features in response to the changing demands of the mechanical press industry and its associated standards and regulations regarding the control of pneumatically controlled clutch and brake applications. The consensus requirements of the regulations and good practices require that, in case of a failure within the valve, the clutch and brake mechanisms be quickly exhausted, a monitor takes action to prevent further operation, and a method to alert personnel is incorporated. These features also make the valve suitable for use in other Category 3 & 4 safety-related applications.

A ROSS DM²® Series D double valve has two valve elements independently controlled by two solenoid pilots. The two valve elements share common inlet, outlet, and exhaust ports. When the pilot valves are simultaneously energized, the valve elements operate so that the valve functions as a 3/2 normally closed valve.

If one of the valve elements does not open or close synchronously with the other, the valve goes into a faulted condition, exhausts downstream air and keeps residual outlet pressure to less than 1% of inlet supply. This is an important safety characteristic of the ROSS DM²® Series D design.

Valve element redundancy provides an additional safety factor, as the likelihood of a malfunction in both valve elements in the same cycle is considered extremely remote.

DM²® valves also have an internal monitor that is integrated into the valve elements. Should the valve operate abnormally, the monitor will lock-out the valve and prevent further operation until corrective action is taken.

IMPORTANT NOTE:

Standards, regulations, and good practice all require that mechanical power presses or other hazardous machines using a pneumatically-controlled clutch and brake mechanism be equipped with a double valve with a self-contained monitoring device and/or an external monitoring system, which inhibits further operation of the valve and machine in the event of a failure within the valve. Of course, a double valve is just one of the components in a press control system, and all other elements of the system should be planned with safety as a primary consideration.

DM²® Monitoring:

The DM²® is a patented 3/2 normally closed valve (with an intermediate, lockout position) distinguished by Crossflow™ passages with poppet and spool valving on the main valve stems. This arrangement provides the valve's outstanding flow characteristics and an integrated monitoring capability with total memory. The valve provides dynamic monitoring and dynamic memory.

Dynamic Monitoring means that all monitoring components change state on every valve cycle. Should the valve elements cycle asynchronously, the valve will exhaust downstream air and lock-out, prohibiting further operation.

Dynamic Memory within a monitoring system indicates that when a valve lock-out occurs, the valve will retain the fault information regardless of air or electrical changes. The DM²® system can only be reset by a defined operation/procedure, and will not self-reset (turning the valve off and on) or reset when inlet air supply is removed and re-applied. Such automatic resetting would conceal potential hazards from the operator.

The Leader in Double Valve Design

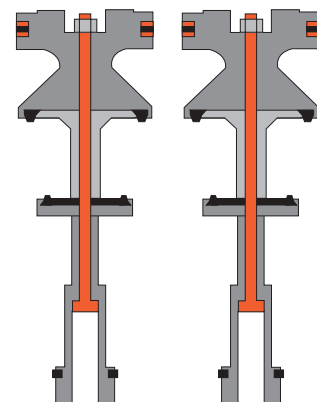
ROSS has long been in the forefront of double valve research and development.

For over 60 years ROSS has been responding to the needs of press manufacturers and users by progressively improving double valve technology. Internal flow patterns of double valves developed by ROSS have included series flow, parallel flow, combined series-parallel tandem flow, and combined series-parallel Crossflow™.

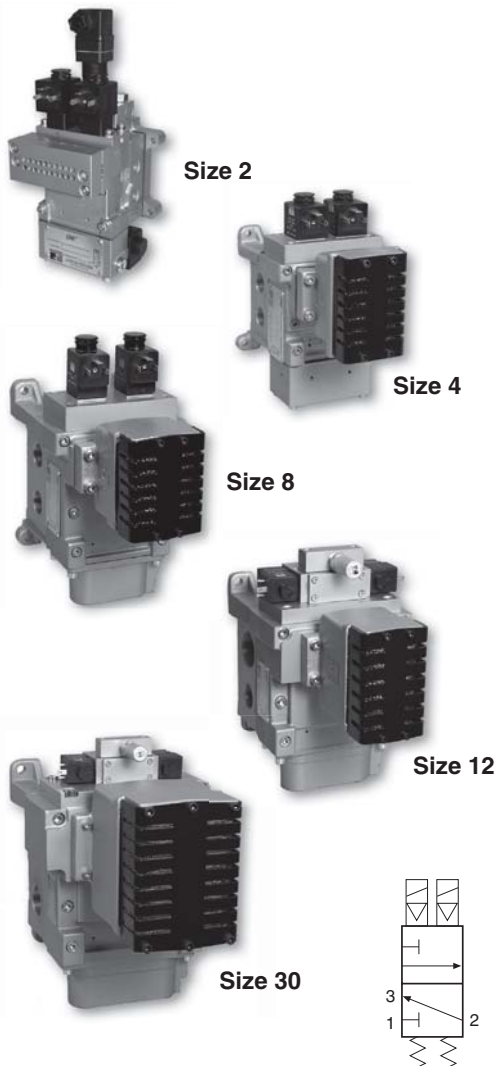
Monitoring devices have also been offered in a variety of designs to satisfy differing requirements. Traditionally, in order to achieve complete monitoring capability, it has been necessary to add devices or components to the valve or to the control system.

The DM²® Series D valve combines the monitor and the main valve components into two identical piston-poppet assemblies. Two piston-poppet assemblies provide a redundant 3/2 normally closed air flow pattern and the patented internal design provides dynamic monitoring as well as complete memory.

During valve operation air pressure acting on changing combinations of assembly surfaces cause the assemblies to move to the required position. Force balances in the valve assure positive shifting forces during normal operation as well as a positive force to hold the assemblies in a locked-out position.



Self Monitored - Clutch/Brake Control



Simplified Schematic

- Base mounted
- Highly contaminant tolerant poppet construction
- High flow, clog resistant silencers
- Provides redundancy, dynamic monitoring and memory for the mechanical press industry regarding the control of pneumatically controlled clutch and brake applications
- Sistema library data available (see page 63)

DM²® Series D double valves are available in 5 sizes, providing a broad range of flow capabilities to meet your needs. For convenience, valves are designated by the nominal sizes 2, 4, 8, 12, and 30 with outlet ports ranging from 1/4" to 2".

Size 2, 4, 8, 12 and 30

- **Dynamic Monitoring With Complete Memory:** Memory, monitoring, and air flow control functions are simply integrated into two identical valve elements. Valves lock-out due to asynchronous movement of valve elements during actuation or de-actuation, resulting in a residual outlet pressure of less than 1% of supply. Overt action is required for reset – cannot be reset by removing and re-applying supply pressure. Reset can only be accomplished by remote air signal, optional electrical solenoid reset signal, or optional manual reset.
 - **Basic 3/2 Normally Closed Valve Function:** Dirt tolerant, wear compensating poppet design for quick response and high flow capacity. PTFE back-up rings on pistons to enhance valve endurance – operates with or without inline lubrication.
 - **Status Indicator (Optional):** Includes a pressure switch with both normally open and normally closed contacts to provide status feedback to the press control system indicating whether the valve is in the lockout or ready-to-run condition. The Status Indicator can be ordered installed or purchased separately and added to any DM²® base.
 - **Silencers:** All models include high flow, clog resistant silencers.
 - **Mounting:** Base mounted – with BSPP or NPT pipe threads. Inlet and outlet ports on both sides provide for flexible piping (plugs for unused ports included). Captive valve-to-base mounting screws.
- #### Size 12 and 30
- **Intermediate Pilots:** Increases pilot air flow for fast valve response, making it possible to use the same size solenoids as valve sizes 2, 4 & 8, thereby reducing electrical power requirements for these larger valves.

STANDARD SPECIFICATIONS: For DM²® Series D double valves.

Pilot Solenoids: According to VDE 0580. Enclosure rating according to DIN 40050, IEC 60529 IP65. Two solenoids, rated for continuous duty (additional solenoid on optional reset).

Standard Voltages: 24 volts DC; 110 volts AC, 50/60 Hz. For other voltages, see page 113.

Power Consumption (each solenoid):

Size 2, 4, 12, 30: For primary and reset solenoids:
6.0 watts on DC; 15.8 VA inrush and 10.4 VA holding on AC.

Size 8: Primary solenoids:
15 watts on DC; 36 VA inrush and 24.6 VA holding on AC.
Reset solenoid:
6.0 watts on DC; 15.8 VA inrush and 10.4 VA holding on AC.

Electrical connection: DIN 43650, Form A. Order connectors separately, see page 112.

Ambient Temperature: 15° to 120°F (-10° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered, lubricated or unlubricated (mineral oils according to DIN 51519, viscosity classes 32-46); 5-micron recommended.

Inlet Pressure: Size 2: 45 to 150 psig (3.1 to 10.3 bar).

Size 4, 8, 12, 30: 30 to 120 psig (2.1 to 8.3 bar).

Reset Pressure: For remote air reset option – must be equal to inlet pressure.

Manual Pressure: Encapsulated, push button actuation.

Pressure Switch (Status Indicator) Rating: Contacts - 5 amps at 250 volts AC, or 5 amps at 30 volts DC.

Monitoring: Dynamically, cyclically, internally during each actuating and de-actuating movement. Monitoring function has memory and requires an overt act to reset unit after lockout.

Mounting orientation: Preferably horizontally (valve on top of base) or vertically (with pilot solenoids on top).

Port Threads: NPT, BSPP.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL, TSSA for appropriately tested valves.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

HOW TO ORDER

(Choose your options (in red) to configure your valve model number.)

PRODUCT _____

THREAD _____

BSPP **D**

NPT **N**

N/A (no base) **X**

REVISION LEVEL _____

Size 4, 8, 12, 30 **A**

Size 2 **B**

BASIC SIZE _____

2 **2**

4 **4**

8 **5**

12 **6**

30 **8**

BASE PORT SIZE _____

Size 2 1/4 inlet – 1/4 outlet **0**

3/8 inlet – 3/8 outlet **1**

Size 4 1/2 inlet – 1/2 outlet **2**

1/2 inlet – 3/4 outlet **3**

Size 8 3/4 inlet – 3/4 outlet **4**

1 inlet – 1 outlet **5**

Size 12 1 inlet – 1 outlet **6**

1 inlet – 1½ outlet **7**

Size 30 1½ inlet – 2 outlet **8**

Valve only (less base) **X**

STATUS INDICATOR

1 YES

X NO

RESET TYPE

1 REMOTE

2 SOLENOID

4 MANUAL

VOLTAGE

A 24 volts DC

B 110 volts AC, 50/60 Hz

C** 220 volts AC, 50/60 Hz

D 12 volts DC

E 24 volts AC

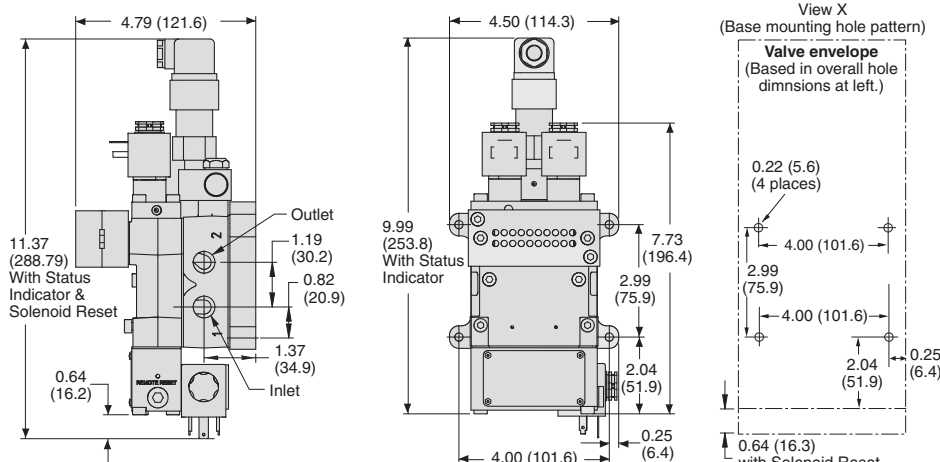
** 220 VAC not available in the U.S. (OSHA regulations limit press control voltage to no more than 120 volts AC).

BASE MODEL NUMBERS and BASE SPECIFIC INFORMATION

Valve Size	Port Size Inlet	Port Size Outlet	Base Model Number*	Status Indicator	Weight lb (kg)
2	1/4	1/4	1872C91	No	1.7 (0.8)
2	1/4	1/4	1873C91	Yes	2.1 (1.0)
2	3/8	3/8	1874C91	No	1.7 (0.8)
2	3/8	3/8	1875C91	Yes	2.1 (1.0)
4	1/2	1/2	1697C91	No	1.7 (0.8)
4	1/2	1/2	1698C91	Yes	2.3 (1.1)
4	1/2	3/4	1699C91	No	1.7 (0.8)
4	1/2	3/4	1700C91	Yes	2.3 (1.1)
8	3/4	3/4	1701C91	No	3.6 (1.6)
8	3/4	3/4	1702C91	Yes	4.2 (1.9)
8	1	1	1703C91	No	3.6 (1.6)
8	1	1	1704C91	Yes	4.2 (1.9)
12	1	1	1705C91	No	6.2 (2.8)
12	1	1	1706C91	Yes	6.8 (3.1)
12	1	1½	1707C91	No	6.2 (2.8)
12	1	1½	1708C91	Yes	6.8 (3.1)
30	1½	2	1709C91	No	12.0 (5.4)
30	1½	2	1710C91	Yes	12.6 (5.7)

* NPT port threads. For BSPP threads add a "D" prefix to the model number, e.g., D1872C91.

SIZE 2



C_v:

1 to 2: 2.17

2 to 3: 3.66



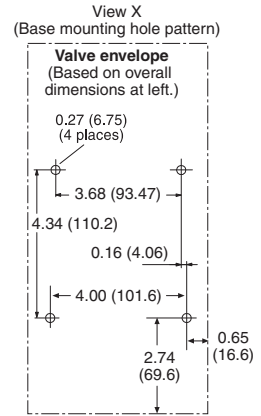
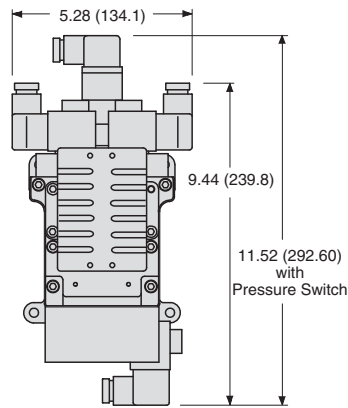
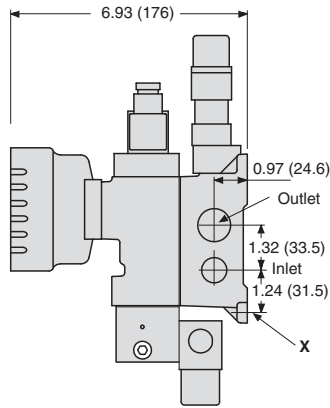
Control Reliable Double Valves

DM²® Series D

Valve Technical Data

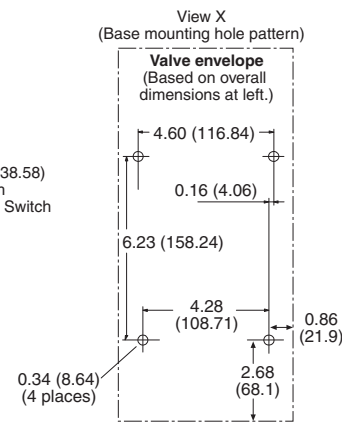
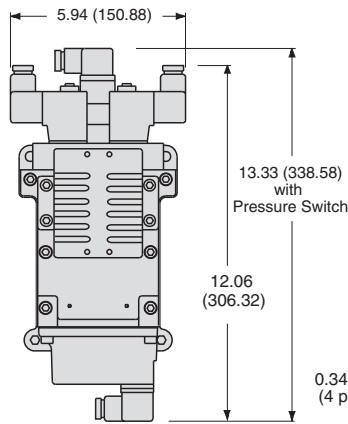
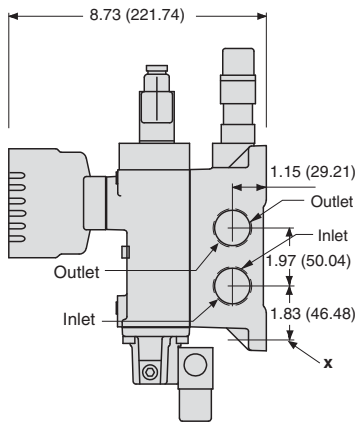
SIZE 4

C_v:
1 to 2: 2.80
2 to 3: 6.70



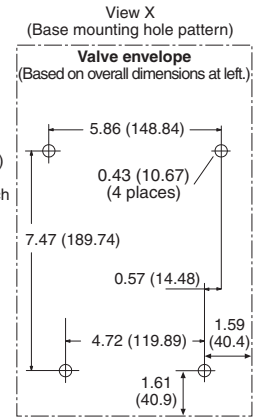
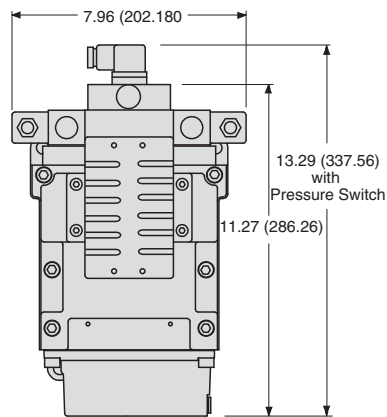
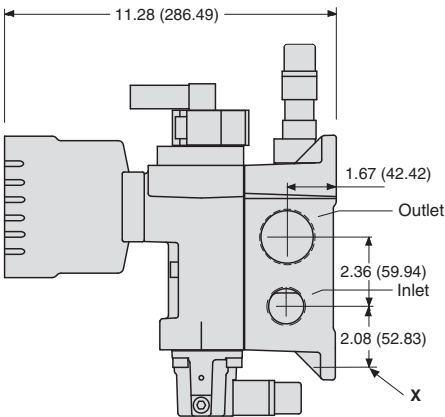
SIZE 8

C_v:
1 to 2: 4.63
2 to 3: 12.55



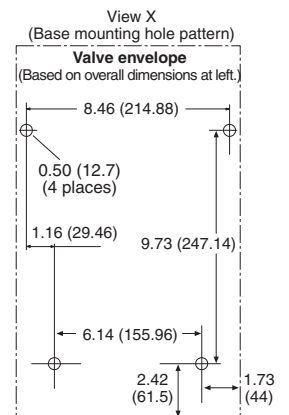
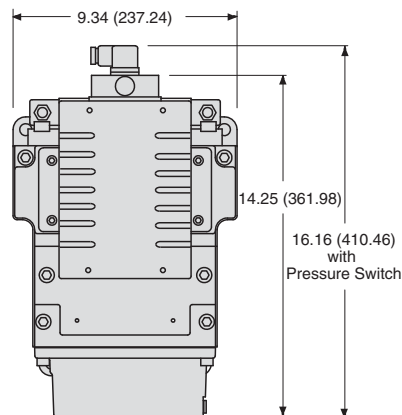
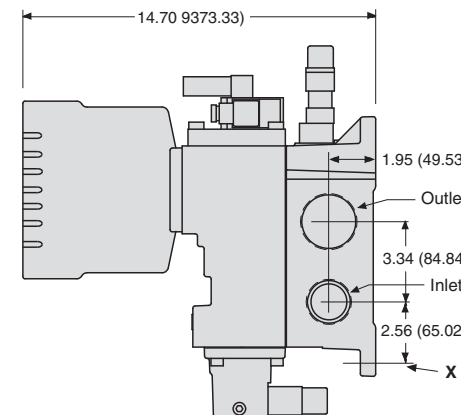
SIZE 12

C_v:
1 to 2: 8.86
2 to 3: 20.78



SIZE 30

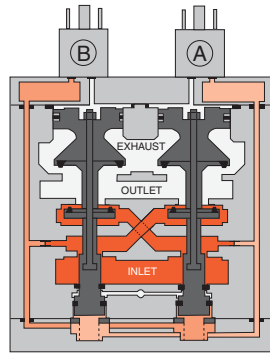
C_v:
1 to 2: 20.22
2 to 3: 53.68



VALVE OPERATION

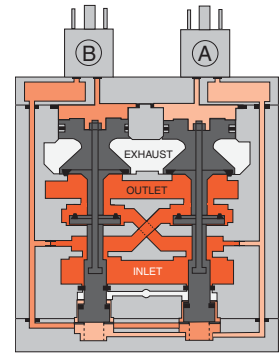
Valve de-actuated (ready-to-run):

The flow of inlet air pressure into the crossover passages is restricted by the size of the passage between the stem and the valve body opening. Flow is sufficient to quickly pressurize pilot supply/timing chambers A and B. The inlet poppets prevent air flow from crossover passages into the outlet chamber. Air pressure acting on the inlet poppets and return pistons securely hold the valve elements in the closed position. (Air passages shown out of position and reset adapter omitted for clarity.)



Valve actuated:

Energizing the pilot valves simultaneously applies pressure to both pistons, forcing the internal parts to move to their actuated (open) position, where inlet air flow to crossover passages is fully open, inlet poppets are fully open and exhaust poppets are fully closed. The outlet is then quickly pressurized, and pressure in the inlet, crossovers, outlet, and timing chambers are quickly equalized.



De-energizing the pilots quickly causes the valve elements to return to the ready-to-run position.

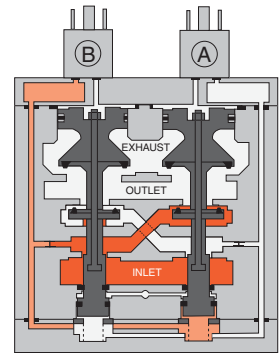
Valve locked-out:

Whenever the valve elements operate in a sufficiently asynchronous manner, either on actuation or de-actuation, the valve will move to a locked-out position. In the locked-out position, one crossover and its related timing chamber will be exhausted, and the other crossover and its related timing chamber will be fully pressurized. The valve element (side B) that is partially actuated has pilot air available to fully actuate it, but no air pressure on the return piston to fully de-actuate the valve element. Air pressure in the crossover acts on the differential of side B stem diameters creating a latching force.

Side A is in a fully closed position, and has no pilot air available to actuate, but has full pressure on the inlet poppet and return piston to hold the element in the fully closed position.

Inlet air flow on side A into its crossover is restricted, and flows through the open inlet poppet on side B, through the outlet into the exhaust port, and from the exhaust port to atmosphere. Residual pressure in the outlet is less than 1% of inlet pressure.

The return springs are limited in travel, and can only return the valve elements to the intermediate (locked-out) position. Sufficient air pressure acting on the return pistons is needed to return the valve elements to a fully closed position.

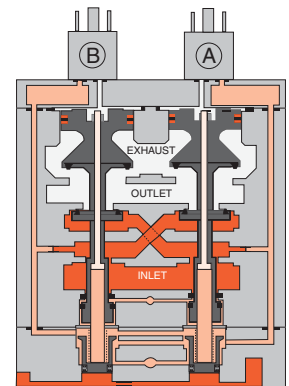


Resetting the valve:

The valve will remain in the locked-out position, even if the inlet air supply is removed and re-applied. A remote reset signal (air or electric), or a manual push button actuation must be applied to reset the valve. Reset is accomplished by momentarily pressurizing the reset port. Actuation of the reset piston physically pushes the main valve elements to their closed position. Inlet air fully pressurizes the crossovers and holds the inlet poppets on seat. Actuation of the reset piston opens the reset poppet, thereby, immediately exhausting pilot supply air, thus, preventing valve operation during reset. (Reset adapter added to illustration.)

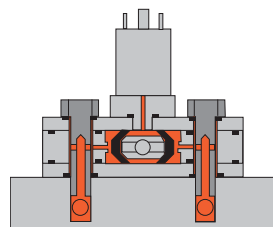
De-actuation of reset pistons causes the reset poppets to close and pilot supply to fully pressurize.

Reset air pressure can be applied by a remote 3/2 normally closed valve, or from an optional 3/2 normally closed solenoid, or a manual push button mounted on the reset adapter.



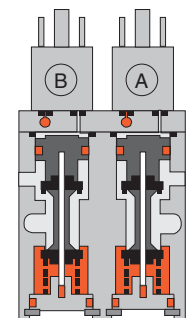
Status indicator:

The status indicator pressure switch will actuate when the main valve is operating normally, and will de-actuate when the main valve is in the locked-out position or inlet pressure is removed. This device is not part of the valve lockout function, but, rather, only reports the status of the main valve.



Status indicator (optional)
in normal ready-to-run position

Size 12 and 30 valves require relatively large pilots to actuate and de-actuate the main valve elements. In order to achieve extremely quick valve response for such large pilots, a 2-stage solenoid pilot system is incorporated into the design. This keeps the electrical current required to operate the pilots, to a minimum.



Size 12 & 30 pilots

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Double Valves Series 35

ROSS double valves, also known as “Control-Reliable” or “Press Safety” valves, are pneumatic control valves with two internal elements (redundant), both of which must operate correctly in order to supply pressure to the outlet port. The general function of these valves is that of a 3/2 normally closed valve. The main difference between ROSS double valves and standard pneumatic valves is that any circumstance which might cause one of the double valve elements to operate improperly will result in no output to the work device. This means that solenoid failures, loose electrical connections, broken wires, contamination inside the valve body, broken internals or even faulty valve signals will result in an exhausting or “fail-to-safe” condition.

ROSS double valves come in many shapes and sizes to fit any safety application.

Size 1 and 2 Crossflow™ valves with pressure switches (for external monitoring) are available from 1/4” to 3/4” port sizes. Externally monitored double valves provide feedback signals (via the pressure switches), which allows the main press controls, or separate monitoring device, to check for proper operation of each valve element on every cycle.

Series 35 Serpar® valves are internally monitored double valves and are available in Size 4, 8, 12 and 30 ranging from 3/8” – 1 1/2” port sizes. Internally monitored double valves contain a built-in monitoring device that checks for the proper operation of each valve element. If the internal monitor detects a valve fault on a particular cycle, the double valve will fail to a safe condition (all downstream air is exhausted) and the monitor will lock-out to inhibit further operation of the device. Normal operation can only be resumed by a momentary reset signal to the valve, either pneumatic or electric.

The original application for these double valves was in the control of clutch/brake mechanisms on stamping presses, but they have found their way into many other critical applications such as alternative lockout systems for energy isolation, air cylinder press load-holding systems, as well as other Category -3 and -4 safety circuits. ROSS double valves are a vital part of any control-reliable fluid power control system.

Double Valves with Pressure Switches for External Monitoring features:

- Designed to enable users to comply with current safety regulations
- Can be integrated with external monitoring systems to provide for lockout and inhibiting further machine operation until the controls system is reset
- Default to de-energized position upon fault condition
- Built-in non-clogging silencers on Sizes 4, 8, 12 and 30

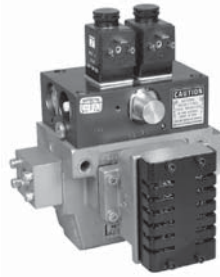
Double Valves with Internal Monitoring & Lockout features:

- Internal monitoring – requires no additional monitoring circuitry
- Automatic lock-out/inhibit upon detection of a malfunction
- Default to de-energized position upon fault detection
- Dedicated reset function
- No undesired automatic reset upon removal of electrical or pneumatic energy sources
- Built-in non-clogging silencers on Sizes 4, 8, 12 and 30

Control reliability does not end at the wire.

The final element of control in pneumatic safety systems must be a control-reliable valve; otherwise the integrity of the entire system is limited.

All Category-4 electrical devices implemented into safety systems are reduced to Category -1 if they control a standard pneumatic valve in a critical machine operation. Failure of the standard pneumatic valve, for example, to become de-energized when a light curtain is broken could easily result in a hazardous condition. Consider the ROSS line of double valves and see what we can do to improve the integrity of your safety equipment.



Series 35 Serpar®
3/2 internally monitored double valve
with L-G monitoring -
Size 4 - port sizes 3/8” - 3/4”



Series 35 - SERPAR®
3/2 internally monitored double valve
with L-G monitor
Sizes 8, 12 and 30 - port sizes 1/2” - 1 1/2”



Series 35 - SERPAR®
3/2 internally monitored double valve
with E-P monitor
Sizes 8, 12 and 30 - port sizes 1/2” - 1 1/2”



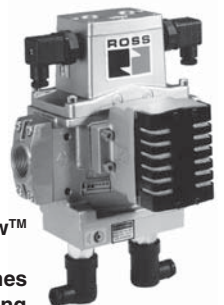
Series 35 - SERPAR®
3/2 internally monitored double valve
with D-S monitor
Sizes 8, 12 and 30 - port sizes 1/2” - 1 1/2”



Series 35 - Crossflow™
3/2 double valve
with or without pressure switches
for external monitoring
Sizes 1 and 2 - port sizes 1/4” - 3/4”



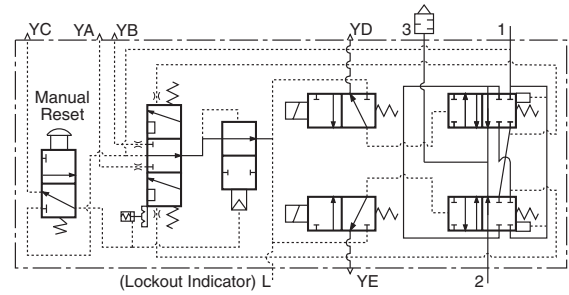
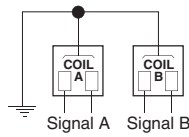
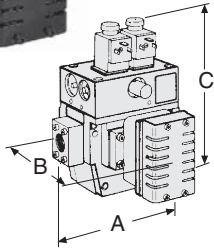
Series 35 - Crossflow™
3/2 double valve
with pressure switches
for external monitoring
Sizes 4, 8, 12, 30 - port sizes 3/8” - 1 1/2”



SERPAR® Double Valves Series 35

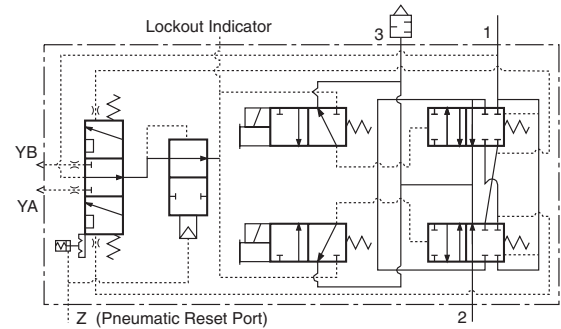
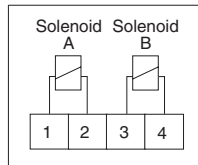
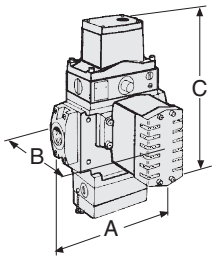
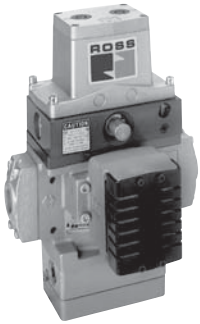
with L-G Monitor

Size 4



Valve Port Monitor			Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight
Size	Size	Reset	Right Inlet	Left Inlet	1-2	2-3	A	B	C	lb (kg)
4	3/8	Manual	3573D3191**	3573D3195**	3.0	6.0	7.4 (188)	6.3 (160)	7.4 (188)	8.3 (3.7)
4	3/8	Remote	3573D3192**	3573D3196**	3.0	6.0	7.4 (188)	6.3 (160)	7.4 (188)	8.3 (3.7)
4	1/2	Manual	3573D4211**	3573D4215**	3.0	8.0	7.4 (188)	6.3 (160)	7.4 (188)	8.3 (3.7)
4	1/2	Remote	3573D4212**	3573D4216**	3.0	8.0	7.4 (188)	6.3 (160)	7.4 (188)	8.3 (3.7)
4	3/4	Manual	3573D5211**	3573D5215**	3.0	9.0	7.4 (188)	6.3 (160)	7.4 (188)	8.3 (3.7)
4	3/4	Remote	3573D5212**	3573D5216**	3.0	9.0	7.4 (188)	6.3 (160)	7.4 (188)	8.3 (3.7)

Sizes 8, 12, 30



Valve Port		Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight
Size	Size w/ Overrides	w/o Overrides		1-2	2-3	A	B	C	lb (kg)
8	1/2	3573A4142**	3573A4162**	3.5	8.5	8.5 (216)	7.1 (180)	12.3 (312)	15.3 (6.9)
8	3/4	3573A5142**	3573A5162**	4.0	12	8.5 (216)	7.1 (180)	12.3 (312)	19.0 (8.6)
12	3/4	3573A5152**	3573A5172**	8.0	15	9.0 (228)	8.5 (216)	13.4 (340)	19.0 (8.6)
8	1	3573A6152**	3573A6172**	4.0	12	8.5 (216)	7.1 (180)	12.3 (312)	15.3 (6.9)
12	1	3573A6162**	3573A6182**	8.5	19	9.0 (228)	8.5 (216)	13.4 (340)	19.0 (8.6)
12	1¼	3573A7162**	3573A7182**	9.0	21	9.0 (228)	8.5 (216)	13.8 (351)	19.0 (8.6)
30##	1¼	3573A7152**	3573A7172**	20	42	12.4 (314)	11.1 (282)	17.7 (450)	37.5 (16.9)
30##	1½	3573A8162**	3573A8182**	21	43	12.4 (314)	11.1 (282)	17.7 (450)	37.5 (16.9)

2 inch port size available on size 30 valves. Order part number 1999H77 flange kit separately.

* NPT pressure port threads, for BSPP threads add a "D" prefix to the model number e.g., D3573D3191.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3573D3191W, 3573D3191Z.

STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoids: Two, rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption:

Size 4: Each solenoid, 30 VA inrush, 16 VA holding on 50 or 60 Hz; 11 watts on DC.

Sizes 8, 12, 30: Each solenoid, 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

Electrical Connections: Sizes 8, 12 and 30 uses terminal strip connectors. Size 4 uses cord-grip connectors at solenoids. Order connectors separately for size 4, see page 112.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: *Size 4:* 30 to 100 psig (2 to 7 bar).

Sizes 8, 12, 30: 30 to 125 psig (2 to 8.5 bar).

L-G Reset Pressure: *Size 4:* Remote pneumatic reset models require a pressure of at least 30 psig (2 bar). Manual reset models use internal valve pressure.

Sizes 8, 12, 30: 60 psig (4 bar) minimum.

Inlet Port: *Size 4 only:* Models are available with the inlet port on either the right or the left side of the valve body.

Port Threads: NPT, BSPP.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

SERPAR® Double Valves Series 35

with L-G Monitor

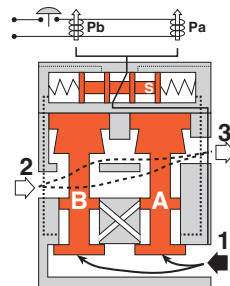
Double Valves with Internal Monitoring & Lockout Features:

- Internal monitoring—requires no additional monitoring circuitry
- Automatic lock-out/inhibit upon detection of a malfunction
- Default to de-energized position upon fault detection
- Dedicated reset function
- No undesired automatic reset upon removal of electrical or pneumatic energy sources
- Built-in non-clogging silencers on Sizes 4, 8, 12 and 30.

VALVE OPERATION

Conditions at Start:

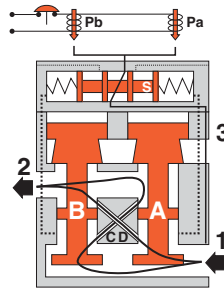
Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pilot air is ported from inlet 1 and through the center section of spool S to the normally closed pilots Pa and Pb. Monitoring pressure signals at both ends of spool S are exhausted.



Conditions at start:

Normal Operation:

Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Monitoring pressure signals go to each end of spool S and become equal to inlet pressure.



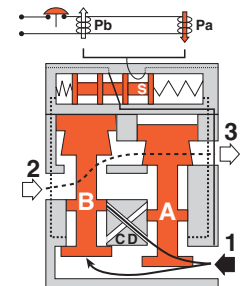
Normal operation:

Completion of normal cycle:

Simultaneously de-energizing both solenoids returns the valve to the "Conditions at Start" described at left.

Detecting a Malfunction:

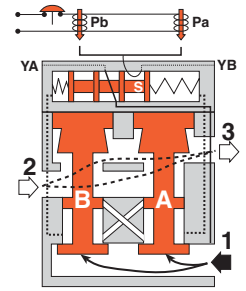
A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below two percent of inlet pressure. Full monitoring air pressure from side A goes to the right end of spool S, and a reduced pressure goes to the left end. This pressure imbalance causes the spool to shift to the left. This shuts off and exhausts pilot air to both solenoid pilots, and allows valve element A to return to the closed position.



Detecting a malfunction:

L-G Monitor Locked-out:

When the L-G spool shifts it is held by a lockout pin (not shown). Pilot air is then exhausted to atmosphere via port YB, and pilot supply air is diverted to atmosphere via port YA. The lockout mechanism must be reset before the valve can return to normal operation. *During and following reset, the pilot solenoids must be kept de-energized to prevent inadvertent and possibly dangerous cycling of the press.* The reset function is either manual or remote-pneumatic depending on valve model.



L-G monitor locked-out:

Both solenoids must be energized simultaneously to shift the valve; maintained signal required to keep valve shifted.

WARNING: If monitor must be reset, electrical signals to both solenoids must be removed to prevent the machine controlled by the valve from immediately recycling and producing a potentially hazardous condition.

OPTIONAL

Valve Without Piping Flanges

Order by the following model numbers:

Valve Size	Port Size	Monitor Reset	Model Numbers	
			Right Inlet	Left Inlet
4	All	Manual	3573D4241**	3573D4245**
4	All	Remote	3573D4242**	3573D4246**

Valve Size	Port Size	Model Numbers	
		w/ Overrides	w/o Overrides
8	All	3573A4202**	3573A4222**
12	All	3573A5202**	3573A5222**
30	All	3573A7202**	3573A7222**

* NPT pressure port threads, for BSPP threads add a "D" prefix to the model number e.g., D3573D4241.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3573D4241W, 3573D4241Z.

Valve Without Silencer

Exhaust port has threaded flange only. Consult ROSS.

Piping Flange Kits

Each kit includes two threaded (NPT) flanges and the required seals and mounting bolts.

Order by the following kit numbers:

Valve Size	Port Size	Kit Number
4	3/8	658K77
	1/2	659K77
	3/4	660K77
8	1/2	661K77
	3/4	662K77
	1	663K77
12	3/4	664K77
	1	665K77
	1 1/4	666K77
30	1 1/4	667K77
	1 1/2	668K77
	2	1999H77

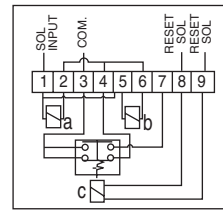
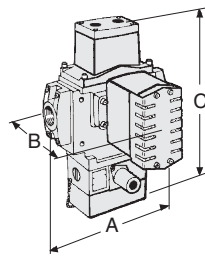
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



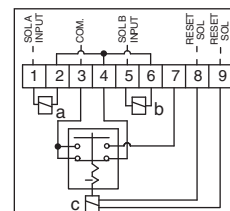
SERPAP® Double Valves Series 35

with E-P Monitor

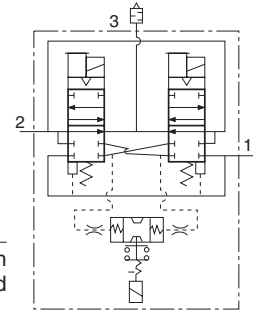
Sizes 8, 12, 30



Single Input Wiring Diagram



Dual Input Wiring Diagram



During lock-out: Terminals 3 and 7 are connected which allows a panel light, bell, or other electrical device to be wired through terminals 7 and 3 to serve as a lockout indicator.

Valve Model Number*

Valve Port		Single Signal Input		Dual Signal Input		Avg. C _v		Dimensions inches (mm)			Weight
Size	Size	w/ Overrides	w/o Overrides	w/ Overrides	w/o Overrides	1-2	2-3	A	B	C	lb (kg)
8	1/2	3573A4141**	3573A4161**	3573A4341**	3573A4361**	3.5	8.5	8.5 (216)	7.2 (184)	11.4 (288)	11.8 (5.3)
8	3/4	3573A5141**	3573A5161**	3573A5341**	3573A5361**	4.0	12	8.5 (216)	7.2 (184)	11.4 (288)	11.8 (5.3)
12	3/4	3573A5151**	3573A5171**	3573A5351**	3573A5371**	8.0	15	8.6 (219)	8.6 (219)	12.0 (303)	15.5 (7.0)
8	1	3573A6151**	3573A6171**	3573A6351**	3573A6371**	4.0	12	8.5 (216)	7.2 (184)	11.4 (288)	11.8 (5.3)
12	1	3573A6161**	3573A6181**	3573A6361**	3573A6381**	8.5	19	8.6 (219)	8.6 (219)	12.0 (303)	15.5 (7.0)
12	1 1/4	3573A7161**	3573A7181**	3573A7361**	3573A7381**	9.0	21	9.0 (228)	8.5 (216)	12.8 (324)	15.5 (7.0)
30	1 1/4	3573A7151**	3573A7171**	3573A7351**	3573A7371**	20	42	12.4 (314)	11.1 (282)	17.3 (440)	35.0 (15.8)
30	1 1/2	3573A8161**	3573A8181**	3573A8361**	3573A8381**	21	43	12.4 (314)	11.1 (282)	17.3 (440)	35.0 (15.8)

* NPT pressure port threads, for BSPP threads add a "D" prefix to the model number e.g., D3573A4141.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3573A4141W, 3573A4141Z.

VALVE OPERATION

Conditions at Start:

Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Contacts of switch SW are closed. Monitoring pressure signals at both ends of spool S are exhausted.

Normal Operation:

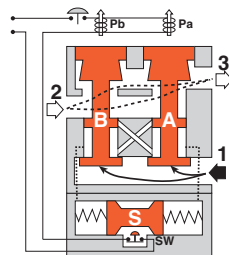
Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Monitoring pressure signals go to each end of spool S and become equal to inlet pressure.

Completion of Normal Cycle:

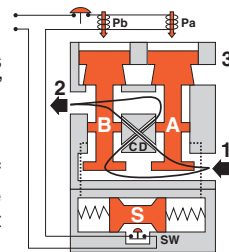
Simultaneously de-energizing both solenoids returns the valve to the "Conditions at Start" described at left.

Detecting a Malfunction:

A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion



Conditions at start:

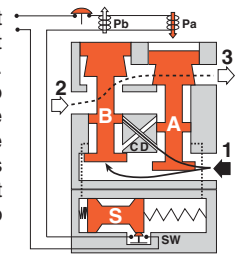


Normal operation:

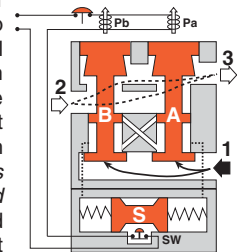
of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below two percent of inlet pressure. Full monitoring air pressure from side A goes to the right end of spool S, and a reduced pressure goes to the left end. This pressure imbalance causes the spool to shift to the left. This trips switch SW, breaks the electrical circuit to the pilot solenoids, and allows valve element A to return to the closed position.

E-P Monitor Locked-out:

With both valve elements closed, monitoring air pressure is exhausted from both ends of spool S so that it returns to its normal position. The electrical circuit to the pilot solenoids remains broken by switch SW. To restore the electrical circuit and return the valve to normal operation, the reset solenoid (not shown) must be briefly energized to reset switch SW. *During and following reset, the pilot solenoids must be kept de-energized to prevent inadvertent and possibly dangerous cycling of the press.* Prolonged energizing of the reset solenoid can cause burnout and nullify the reset function.



Detecting a malfunction:



E-P monitor locked-out:

STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoids: Two, rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid, 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

E-P Reset Solenoid: Rated for *intermittent* duty. Voltages: 24-48 or 100-120 volts AC or DC.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Pressure Range: 30 to 125 psig (2 to 8.5 bar).

Port Threads: NPT, BSPP.

Optional: Valve Without Piping Flanges.

Valve Size	Port Size	Model Number	
		w/ Overrides	w/o Overrides
8	All	3573A4201	3573A4221
12	All	3573A5201	3573A5221
30	All	3573A7201	3573A7221

Piping Flange Kits, see page 107.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000;

PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL.

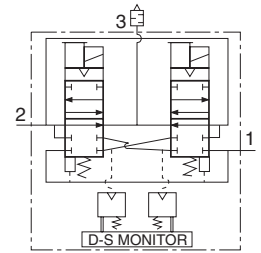
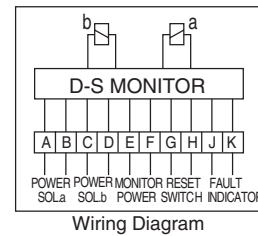
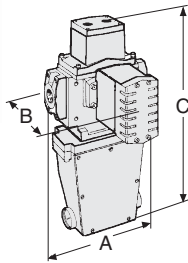
Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

SERPAR® Double Valves Series 35

with D-S Monitor

Sizes 8, 12, 30



Valve Size	Port Size	Valve Model Number*		Avg. C _v		Dimensions inches (mm)			Weight lb (kg)
		w/ Overrides	w/o Overrides	1-2	2-3	A	B	C	
8	1/2	3573B4143**	3573B4163**	3.5	8.5	8.5 (216)	7.2 (184)	16.5 (418)	16.8 (7.6)
8	3/4	3573B5143**	3573B5163**	4.0	12	8.5 (216)	7.2 (184)	16.5 (418)	16.8 (7.6)
12	3/4	3573B5153**	3573B5173**	8.0	15	9.0 (229)	8.6 (219)	17.8 (451)	20.5 (9.2)
8	1	3573B6153**	3573B6173**	4.0	12	8.5 (216)	7.2 (184)	16.5 (418)	16.8 (7.6)
12	1	3573B6163**	3573B6183**	8.5	19	9.0 (229)	8.6 (219)	17.8 (451)	20.5 (9.2)
12	1 1/4	3573B7163**	3573B7183**	9.0	21	9.0 (229)	8.6 (219)	17.8 (451)	20.5 (9.2)
30##	1 1/4	3573B7153**	3573B7173**	20	42	12.4 (314)	11.1 (282)	21.8 (553)	39.3 (17.7)
30##	1 1/2	3573B8163**	3573B8183**	21	43	12.4 (314)	11.1 (282)	21.8 (553)	39.3 (17.7)

2 inch port size available on size 30 valves. Order part number 1999H77 flange kit separately.

* NPT pressure port threads, for BSPP threads add a "D" prefix to the model number e.g., D3573B4143.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3573B4143W, 3573B4143Z.

VALVE OPERATION

Conditions at Start:

Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Contacts of switch SW are closed. Monitoring pressure signals at both ends of spool S are exhausted.

Normal Operation:

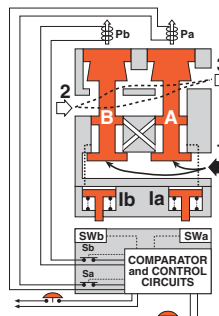
Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Monitoring pressure signals go to pressure indicators Ia and Ib, causing the indicator pins to be extended and to actuate proximity switches SWa and SWb. In normal operation, each pair - solenoids, valve elements, indicators, and proximity switches - responds in unison so that the comparator circuits "read" the operation as normal.

Completion of Normal Cycle:

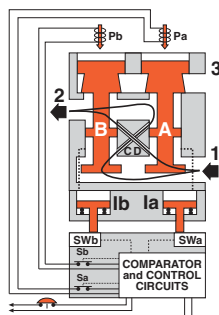
Simultaneously de-energizing both solenoids returns the valve to the "Conditions at Start" described at left.

Detecting a Malfunction:

A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D,



Conditions at start:

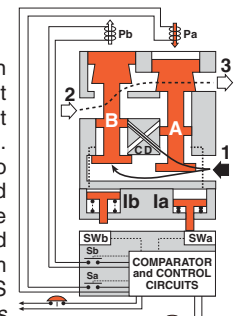


Normal operation:

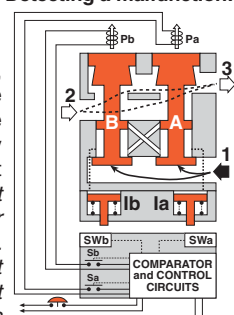
but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below two percent of inlet pressure. Full monitoring air pressure from side A goes to pressure indicator Ia so that its pin is extended and actuates proximity switch SWa. When the time interval between the signal to a solenoid and the signal from its corresponding proximity switch exceeds approximately 175 milliseconds, the D-S monitor breaks contacts Sa and Sb as soon as solenoid power is removed. This allows valve element A to return to the closed position.

D-S Monitor Locked-out:

With the valve locked out by contacts Sa and Sb, solenoids Pa and Pb cannot be energized. The monitor must be reset before another valve cycle can begin. Reset can be achieved by a separately connected ancillary switch, but not if the pilot solenoids are energized. The monitor can be reset by removing and reapplying power to the monitor even when the pilot solenoids are energized. For this reason it is necessary to have the pilot solenoids de-energized during and following reset to prevent inadvertent and possibly dangerous cycling of the press.



Detecting a malfunction:



D-S monitor locked-out:

STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoids: Two, rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption: Each solenoid, 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on DC.

D-S Monitor: Rated for same voltage as pilot solenoids. Power supply to monitor must be independent and continuous.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Pressure Range: 30 to 125 psig (2 to 8.5 bar).

Port Threads: NPT, BSPP.

Optional: Valve Without Piping Flanges.

Valve Size	Port Size	Model Numbers	
		w/ Overrides	w/o Overrides
8	All	3573A4203	3573A4223
12	All	3573A5203	3573A5223
30	All	3573A7203	3573A7223

Piping Flange Kits, see page 107.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Crossflow™ Double Valves Series 35

with or without
Pressure Switches

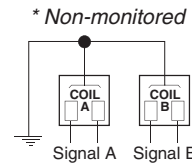
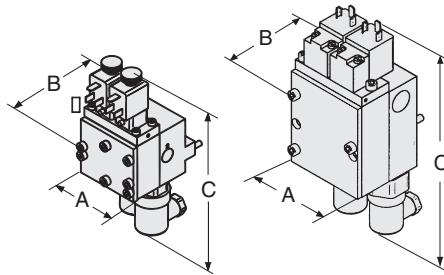
Size 1 & 2



Crossflow™
Size 1



Crossflow™
Size 2



Valve Port Size	Valve Assembly		Model Number*	Pressure Switches	Pressure Switch Provision	Avg. C _v		Dimensions inches (mm)			Avg. Response Constants				Weight lb (kg)
	1, 2	3				1-2	2-3	A	B	C	M	1-2	2-3	F	
1	1/4	1/4	3573B2632**	None	Yes	0.9	1.4	2.7 (69)	3.3 (84)	5.0 (127)	28	4.6	3.4	2.1 (95)	
1	1/4	3/8	3573B2640**	None	No	0.9	1.4	2.7 (69)	3.3 (84)	5.0 (127)	24	4.4	3.1	2.1 (95)	
1	1/4	1/4	3573B2642**	Two##	Yes	0.9	1.4	2.7 (69)	3.3 (84)	7.5 (191)	28	4.6	3.4	2.5 (1.14)	
1	3/8	3/8	3573B2644**	Two##	Yes	1.2	1.7	2.7 (69)	3.3 (84)	7.6 (195)	25	3.1	2.8	2.9 (1.32)	
1	3/8	3/8	3573B2645**	None	Yes	1.2	1.7	2.7 (69)	3.3 (84)	5.1 (130)	25	3.1	2.8	2.5 (1.14)	
2	1/2	1/2	3573B4620**	None	No	3.7	6.6	3.4 (86)	3.2 (81)	6.3 (160)	30	1.2	1.0	4.3 (1.95)	
2	1/2	1/2	3573B4632**	None	Yes	3.7	6.6	3.4 (86)	3.2 (81)	6.5 (165)	30	1.2	1.0	4.3 (1.95)	
2	1/2	3/4	3573B4640**	None	No	3.7	9.0	3.4 (86)	3.2 (81)	6.5 (165)	25	1.1	0.9	4.3 (1.95)	
2	1/2	1/2	3573B4642**	Two##	Yes	3.7	6.6	3.4 (86)	3.2 (81)	9.0 (229)	30	1.2	1.0	4.8 (2.18)	
2	3/4	3/4	3573B4643**	None	No	4.2	9.0	3.4 (86)	3.2 (81)	6.5 (165)	25	1.1	0.9	4.7 (2.13)	
2	3/4	3/4	3573B4644**	Two##	Yes	4.2	9.0	3.4 (86)	3.2 (81)	9.0 (165)	25	1.1	0.9	5.2 (2.36)	
2	3/4	3/4	3573B4645**	None	Yes	4.2	9.0	3.4 (86)	3.2 (81)	6.5 (165)	25	1.1	0.9	4.7 (2.13)	
2	1/2	3/4	3573B4652**	None	Yes	3.7	9.0	3.4 (86)	3.2 (81)	9.0 (165)	25	1.1	0.9	4.3 (1.95)	

Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

* Model number includes base. NPT port threads. For BSPP threads, add a "D" prefix to the model number; for JIS threads, add a "J" prefix to the model number, e.g., D3573B2632, J3573B2632. Valve and base can be ordered separately; consult ROSS.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3573B2642W, 3573B2642Z.

Valve Response Time

The constants below, designated M and F, can be used to determine the amount of time required to fill or exhaust a volume of any size using the formula on the right:

$$\text{Vlv. Resp. Time (msec)} = M + F \cdot V$$

M = avg. time for parts movement
F = msec. per cubic inch of volume
V = volume in cubic inches

Pressure Switches & Monitoring:

Valves without pressure switches must not be used to control clutch/brake mechanisms on press machinery. Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217). The valves on this page do not have a built-in monitor, and must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve in the event of a failure within the valve.

Valve Operation: Both solenoids must be energized simultaneously to shift the valve; maintained signal required to keep valve shifted.

CAUTION: If the monitor must be reset, electrical signals to both solenoids must be removed to prevent the machine controlled by the valve from immediately recycling and producing a potentially hazardous condition.

STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoids: Two, rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Power Consumption:

Size 1: Each solenoid, 12 VA maximum inrush, 9.8 VA maximum holding on 50 or 60 Hz; 7.5 watts nominal on DC.

Size 2: Each solenoid, 8.5 VA maximum inrush, 8.5 VA maximum holding on 50 or 60 Hz; 6 watts nominal on DC.

Electrical Connections: Uses two cord-grip connectors at solenoids. Order connectors separately, see page 112.

Size 1: DIN 43650 Form B connector P/N 266K77.

Size 2: Din 43650 Form A connector P/N 937K87.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

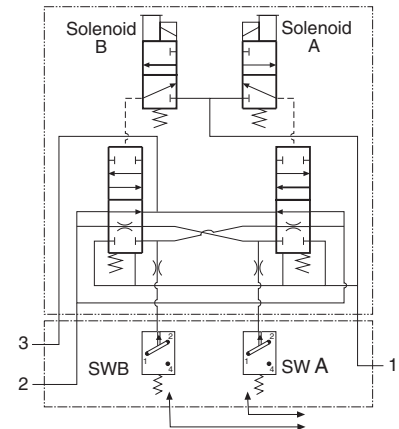
Inlet Pressure: 40 to 100 psig (2.8 to 7 bar).

Port Threads: NPT, BSPP.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.



To customer's external monitor

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

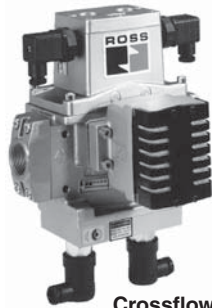
Crossflow™ Double Valves Series 35

with Pressure Switches

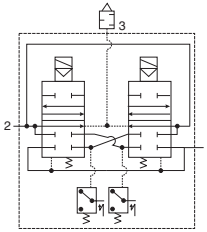
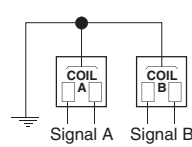
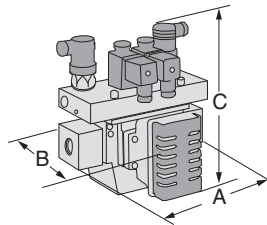
Size 4 thru 30



Crossflow™
Size 4



Crossflow™
Size 8, 12, 30



Valve Port		Flanged Ports		Avg. C _v		Dimensions inches (mm)			Weight
Size	Size	Inlet Right	Inlet Left	1-2	2-3	A	B	C	lb (kg)
4	3/8	3573C3270**	3573C3276**	3	7	8.2 (209)	6.1 (155)	7.6 (195)	8.4 (3.8)
4	1/2	3573C4270**	3573C4276**	3	9	8.2 (209)	6.1 (155)	7.6 (195)	8.4 (3.8)
4	3/4	3573C5230**	3573C5236**	3	11	8.2 (209)	6.1 (155)	7.6 (195)	8.4 (3.8)

Valve Port		Model Number*		Avg. C _v		Dimensions inches (mm)			Weight
Size	Size	Flanged Ports	1-2	2-3	A	B	C	lb (kg)	
8	1/2	3573B4638**	3.5	10	8.8 (224)	7.2 (184)	11.1 (284)	11.4 (5.2)	
8	3/4	3573B5638**	4	14	8.8 (224)	7.2 (184)	11.1 (284)	11.4 (5.2)	
8	1	3573B6638**	4	14	8.8 (224)	7.2 (184)	11.1 (284)	11.4 (5.2)	
12	3/4	3573B5632**	8	15	9.0 (230)	8.6 (219)	12.4 (316)	15.4 (7.0)	
12	1	3573B6632**	8.5	19	9.0 (230)	8.6 (219)	12.4 (316)	15.4 (7.0)	
12	1 1/4	3573B7632**	9.0	21	9.0 (230)	8.6 (219)	12.4 (316)	15.4 (7.0)	
30	1 1/4	3573B7630**	20	42	12.4 (315)	11.1 (282)	16.5 (420)	33.9 (15.4)	
30	1 1/2	3573B8630**	21	43	12.4 (315)	11.1 (282)	16.5 (420)	33.9 (15.4)	

* NPT port threads. For BSPP threads, add a "D" prefix to the model number; for JIS threads, add a "J" prefix to the model number, e.g., D3573C3270, J3573C3270, D3573B4638, J3573B4638.

Note: Specify voltage when ordering.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., 3573B2642W, 3573B2642Z.

Pressure Switches & Monitoring

Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217).

The valves on this page do not have a built-in monitor, and so must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve and associated machinery in the event of a failure within the valve.

CAUTION: If the system must be reset, electrical signals to both solenoids must be removed to prevent the machine from immediately recycling and producing a potentially hazardous condition.

VALVE OPERATION

Conditions at Start:

Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pressure signals at both switches SWA and SWB are exhausted. Contacts 1 and 2 of switches SWA and SWB are connected.

Normal Operation:

Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Sensing pressure signals go to each pressure switch and become equal to inlet pressure. Both switches trip and now contacts 1 and 4 of switches SWA and SWB are connected instead of contacts 1 and 2.

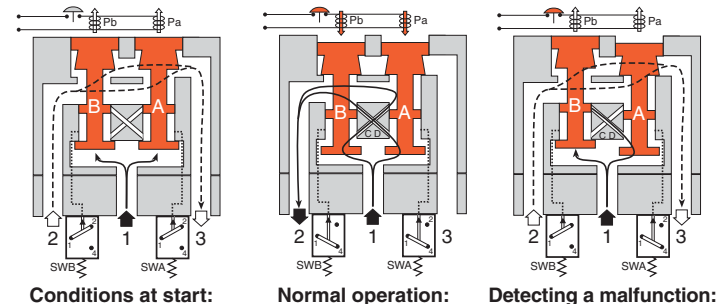
Completion of Normal Cycle:

Simultaneously de-energizing both solenoids returns the valve and switches to the "Conditions at Start" described above.

Detecting a Malfunction:

A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past

element B keeps the pressure at the outlet port below 2% of inlet pressure. Full sensing air pressure from side A goes to switch SWA, and a reduced pressure goes to switch SWB. This full pressure signal causes switch SWA to trip. Switch SWB, with a reduced pressure signal, does not trip. An external monitoring system can detect the malfunction by monitoring the condition of the switches SWA and SWB. The external monitoring system may then react accordingly by shutting down the power to the valve solenoids and any other components deemed necessary to stop the machine.



STANDARD SPECIFICATIONS (for valves on this page):

Pilot Solenoids: Two, rated for continuous duty.

Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.

For other voltages, see page 113.

Voltages at pressure switches must not exceed 250 volts.

Power Consumption:

Size 4: Each solenoid: 35 VA maximum in-rush, 22 VA holding on 50 or 60 Hz; 14 watts nominal on DC.

Size 8, 12, 30: Each solenoid: 87 VA maximum in-rush, 30 VA holding on 50 or 60 Hz; 14 watts nominal on DC.

Electrical Connections: Uses cord-grip connectors at solenoids. Connectors according to DIN 43650 A (ISO 4400).

Order connectors separately, see page 112.

Enclosure Rating: IP 65 according to IEC-Publication 144 and DIN 40050, Sheet 1.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air; 5 micron recommended.

Inlet Pressure: Size 4: 40 to 150 psig (2.5 to 10 bar).

Size 8, 12, 30: 30 to 125 psig (2 to 8.5 bar).

Port Threads: NPT, BSPP, JIS.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFH: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, BG, CSA/UL.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



Accessories



STATUS INDICATOR

The Status Indicator pressure switch actuates when the valve is in a ready-to-run condition and de-actuates when the valve is in a lockout condition or when the inlet air pressure has been removed. Although, the valves can be purchased with this option already installed, the Status Indicator can be purchased separately by ordering part number: **670B94**.

RESET VALVES for DOUBLE VALVES with REMOTE RESET

Valves with the remote reset option require a small 3/2 reset valve and the installation of a 1/8 inch air line from the reset valve to the reset port of the double valve. ROSS offers 3/2 normally closed valves with either manual or electric control that are suitable for this purpose. The valves, pictured below, are suggested.

Model Numbers of Reset Valves

Description	Model Number
Pushbutton: Green	1223B2001*
Ring-type Guard for Pushbutton (optional)	278B30
Flush Push Button: Green	1223B1FPG*
Mushroom Button: Green	1223B1MBG*
Direct Solenoid Control for line mounting	1613B1020*
Direct Solenoid Control for base mounting	W1413A1409* (Base: 516B91)

* Port threads: NPT. For BSPP threads, add a "D" prefix to the model number, e.g., D1223B2001. In the case of the W1413A1409, the prefix should be added to the base model number instead of the valve.

Pushbutton:
1223B2001



Flush Pushbutton:
1223B1FPG



Mushroom Button:
1223B1NBG

ELECTRICAL CONNECTORS

Electrical connectors are required to connect the valve solenoids to the drop cords supplying electrical power. Each connector can be positioned so that the cord exits upward or to the side. Cords of 6 mm to 10 mm diameter can be used. Connectors with a light in a translucent housing are also available to serve as indicator lights. Order connectors by the part numbers given in the chart below.



WIRED CONNECTORS have a 2 meter (6½ ft) cord with three 18 gauge conductors. Cord is available in either 6 mm or 10 mm diameter.

CONNECTORS for THREADED CONDUIT accept 1/2 inch electrical conduit fittings.

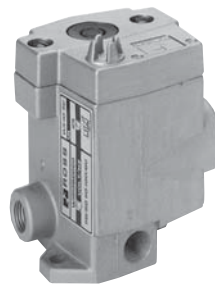
CAUTION: Do not use electrical connectors with surge suppressors, as this may increase valve response time when de-actuating the solenoids.

Part Numbers of Electrical Connectors

Connector Type	Without Light	With Light
For use with dropcord (Cord not included)	937K87	936K87**
Wired with 6-mm cord	721K77	720K77**
Wired with 10-mm cord	371K77	383K77**
For use with threaded conduit	723K77	724K77**

** Specify solenoid voltage and Hz when ordering.

Direct Solenoid Model
for Line Mounting:
1613B1020**



Direct Solenoid Model
for Base Mounting
Valve: W1413A1409**
Sub-Base: 516B91



** Specify solenoid voltage and Hz when ordering.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

General Information

Standard Specifications

The standard specifications for the products on each page of this catalog are given on the same page or referenced. For solenoid pilot valves, models with internal pilot supply are listed. Most models are also available for use with external pilot supply or have a built-in pilot supply selector valve.

The products in this catalog are intended for use in industrial pneumatic systems. Most products are adaptable to other uses and conditions not covered by the standard specifications given in this catalog. Weights shown are approximate and are subject to change. Dimensions given, unless otherwise noted, are envelope dimensions (not for mounting). Consult ROSS for further information.

Port Threads

Ports of valves and bases described in this catalog have NPT (ANSI B2.1) threads. Other thread types can be specified by putting an appropriate prefix letter on the model or part number when ordering.

Thread Types by Model Prefix Letter

Pneumatic Port Threads	Prefix Letter	Threaded Electrical Opening
NPT (ANSI B2.1)	None	NPT
ISO 228/1, DIN 259 Parallel, BSPP	C*	—
ISO 228/1, DIN 259 Parallel, BSPP	D	G
JIS B0203 Tapered	J	ISO
SAE 1926- ISO 11926	S	NPT

* Used only for filters, regulators, lubricators.

Flow Ratings

Flow ratings are expressed as C_v where $C_v = 1$ corresponds to a steady state air flow of approximately 32 scfm under the following conditions:

Inlet pressure = 100 psig (6.7 bar)
Pressure drop = 10 psi (0.69 bar)
Air temperature = 68°F (20°C)
Relative humidity = 36 percent

Note: Because widely differing test standards are used to measure C_v values, the figures given in this catalog should not be used to compare ROSS valves with those of other makers. The C_v ratings given here are intended only for use with performance charts published by ROSS. The C_v ratings are averages for the various flow paths through the valve and are for steady flow conditions.

Approvals and Certifications

ROSS products are designed to meet a number of industrial standards, including the Canadian Standards Association (C.S.A.) guidelines.

For more information on specific product approvals, contact your local distributor or ROSS.

Solenoids

All ROSS standard solenoids are rated for continuous duty (unless noted otherwise) and will operate the valve within the air pressure range specified in this catalog.

Explosion-Proof Solenoid Pilot available, for more information consult ROSS.

Voltage & Hertz

When ordering a solenoid valve, also specify the desired solenoid voltage and hertz.

Voltage Types by Model Suffix Letter

Voltage	Suffix Letter
120 volts AC	Z
220 volts AC	Y
12 volts DC	H
24 volts DC	W
48 volts DC	M
90 volts DC	K
110 volts DC	P
125 volts DC	C

Recommended Solenoid Voltages: 100-110 volts, 50 Hz; 100-120 volts, 60 Hz; 24 volts DC; 110 volts DC.

In addition, the following voltages are available:

200, 220 volts, 50 Hz
200, 240, 480 volts, 60 Hz
24, 48, 220 volts, 50 Hz
240 volts, 60 Hz
200, 220 volts, 50 Hz
200, 240 volts, 60 Hz.

For example: Model 2773B5001, 120 volts, 60 Hz.
Model W6076B2401, 220 volts, 50 Hz.

Please note that not all configurations are available for all models.

For additional information or help with voltage configuration, please contact your local distributor or ROSS.

Port Identification

Valve symbols in this catalog conform to the ISO 1219-1:1991 standard of the International Organization for Standardization (ISO) and the SAE J2051 standard of the Society of Automotive Engineers (SAE) respectively.

Information or Technical Assistance

For additional information or application assistance concerning ROSS products, consult ROSS or your local ROSS distributor (see contact information on the back cover).

Order Placement

For order placement, consult ROSS or your local ROSS distributor on the back cover of this catalog.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.



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600	ROSS ISO Valves and Serial Bus Communication <i>(PDF only)</i>	A10309
600T	ISO Valves and Serial Bus Communications <i>(PDF only)</i>	A10309T

To order any of the catalogs/bulletins listed above, contact ROSS or your local ROSS distributor.

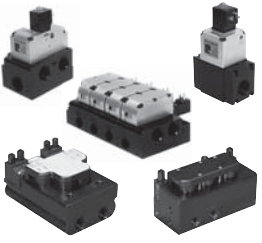
The above literature can also be downloaded in PDF format at www.rosscontrols.com.



Additional ROSS Literature

BULLETIN 200

**Dale Series
CP, CX, LF, LX & LT
Manifold Compact Poppet Valves
Inline Poppet Valves
Leak Test Valves & Manifolds**



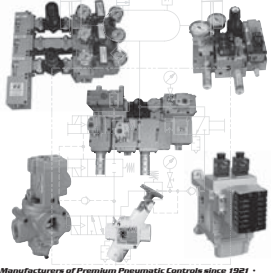
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BULLETIN 450

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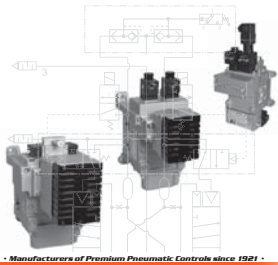
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Embreagem/Freio
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CATALOG 420

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BULLETIN 600T

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CAUTIONS, WARNINGS and STANDARD WARRANTY

PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure that all sources of energy are turned off, the entire pneumatic system is shut off and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).
2. All ROSS products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any installation can be tampered with or need servicing after installation, persons responsible for the safety of others or the care of equipment must check every installation on a regular basis and perform all necessary maintenance.
3. All applicable instructions should be read and complied with before using any fluid power system in order to prevent harm to persons or equipment. In addition, overhauled or serviced valves must be functionally tested prior to installation and use.
4. Each ROSS product should be used within its specification limits. In addition, use only ROSS parts to repair ROSS products.

WARNING: Failure to follow these directions can adversely affect the performance of the product or result in the potential for human injury or damage to property.

FILTRATION and LUBRICATION

5. Dirt, scale, moisture, etc. are present in virtually every air system. Although some valves are more tolerant of these contaminants than others, best performance will be realized if a filter is installed to clean the air supply, thus preventing contaminants from interfering with the proper performance of the equipment. ROSS recommends a filter with a 5-micron rating for normal applications.
6. All standard ROSS filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. Do *not* fail to use the metal bowl guard, where provided, to minimize danger from high pressure fragmentation in the event of bowl failure. Do not expose these products to certain fluids, such as alcohol or liquefied petroleum gas, as they can cause bowls to rupture, creating a combustible condition, hazardous leakage, and the potential for human injury or damage to property. Immediately replace a crazed, cracked, or deteriorated bowl. When bowl gets dirty, replace it or wipe it with a clean dry cloth.

7. Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible lubricants are petroleum based oils with oxidation inhibitors, an aniline point between 180°F (82°C) and 220°F (104°C), and an ISO 32, or lighter, viscosity. Avoid oils with phosphate type additives which can harm polyurethane components, potentially leading to valve failure which risks human injury, and/or damage to property.

AVOID INTAKE/EXHAUST RESTRICTION

8. Do not restrict the air flow in the supply line. To do so could reduce the pressure of the supply air below the minimum requirements for the valve and thereby cause erratic action.
9. Do not restrict a valve's exhaust port as this can adversely affect its operation. Exhaust silencers must be resistant to clogging and must have flow capacities at least as great as the exhaust capacities of the valves. Contamination of the silencer can result in reduced flow and increased back pressure.

WARNING: ROSS expressly disclaims all warranties and responsibility for any unsatisfactory performance or injuries caused by the use of the wrong type, wrong size, or an inadequately maintained silencer installed with a ROSS product.

POWER PRESSES

10. Mechanical power presses and other potentially hazardous machinery using a pneumatically controlled clutch and brake mechanism must use a press control double valve with a monitoring device. A double valve without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All double valve installations involving hazardous applications should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.

ENERGY ISOLATION/EMERGENCY STOP

11. Per specifications and regulations, ROSS L-O-X® and L-O-X® with EEZ-ON® operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

STANDARD WARRANTY

ROSS' obligation under this warranty is limited to repair or replacement of the product or refund of the purchase price paid solely at the discretion of ROSS and provided such product is returned to ROSS freight prepaid and upon examination by ROSS is found to be defective. This warranty becomes void in the event that product has been subject to misuse, misapplication, improper maintenance, modification or tampering.

THE WARRANTY EXPRESSED ABOVE IS IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND ROSS EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ROSS MAKES NO WARRANTY WITH RESPECT TO ITS PRODUCTS MEETING THE PROVISIONS OF ANY GOVERNMENTAL OCCUPATIONAL SAFETY AND/OR HEALTH LAWS OR REGULATIONS. IN NO EVENT IS ROSS LIABLE TO PURCHASER, USER, THEIR EMPLOYEES OR OTHERS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A BREACH OF THE WARRANTY DESCRIBED ABOVE OR THE USE OR MISUSE OF THE PRODUCTS. NO STATEMENT OF ANY REPRESENTATIVE OR EMPLOYEE OF ROSS MAY EXTEND THE LIABILITY OF ROSS AS SET FORTH HEREIN.

All products sold by ROSS CONTROLS are warranted for a one-year period [with the exception of all Filters, Regulators and Lubricators ("FRLs") which are warranted for a period of seven years] from the date of purchase to be free of defects in material and workmanship.





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There are ROSS Distributors Throughout the World

To meet your requirements across the globe, ROSS distributors are located throughout the world. Through ROSS or its distributors, guidance is available for the selection of ROSS products, both for those using pneumatic components for the first time and those designing complex pneumatic systems.

This catalog presents an overview of the extensive ROSS product line. Other literature is available for engineering, maintenance, and service requirements. If you need products or specifications not shown here, please contact ROSS or your ROSS distributor. They will be happy to assist you in selecting the best product for your application.