

Series 35 SERPAR[®] and Crossflow[™] Press Control Double Valves



• *Manufacturers of Premium Pneumatic Controls since 1921* •



Consider it **DONE!**

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Accessories

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If you need products or specifications not shown within this bulletin, please contact ROSS for more information or visit ROSS website at www.rosscontrols.com.

The Leader in Double Valve Design

ROSS has long been in the forefront of double valve research and development. For over 54 years ROSS has been responding to the needs of press manufacturers by supplying double valves of different types. Internal flow patterns have included series flow, parallel flow, and combined series flow.

Monitoring devices have also been offered in a variety of designs to satisfy differing requirements. The culmination of all this experience is seen in the present line of SERPAR® and Crossflow™ double valves described in this brochure.

Selecting the double valve best suited to each application requires considerable technical knowledge. If you need information or application assistance, please consult ROSS. (See back cover.)

ROSS Double Valves

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 ¼” to ¾” 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” – 1½” 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.

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 valve and see what we can do to improve the integrity of your safety equipment.

Why Use A Double Valve?

A double valve is designed to help promote safety in the operation of many pneumatically controlled machines, and fully satisfies the OSHA requirements for valves used on mechanical power presses employing pneumatically controlled clutch and brake mechanisms.

A ROSS double valve has two valve elements independently controlled by two solenoid pilot valves. The two valve elements share common inlet, outlet, and exhaust ports. When the pilot valves are simultaneously energized, the two main elements are operated simultaneously so that during normal operation the valve functions like a three-way valve with a single element.

However, if one of the valve elements does not behave normally (either failing to open or failing to close), the valve is designed to keep the pressure on the outlet port at less than two percent

of the inlet pressure. This is an inherent safety characteristic of ROSS’ double valve design. Valve element redundancy provides a safety factor as the likelihood of both valve elements malfunctioning on the same cycle is considered extremely remote.

IMPORTANT NOTE: *A mechanical power press or other hazardous machines using a pneumatically controlled clutch and brake mechanism should use a double valve with a self-contained monitoring device and/or 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.*



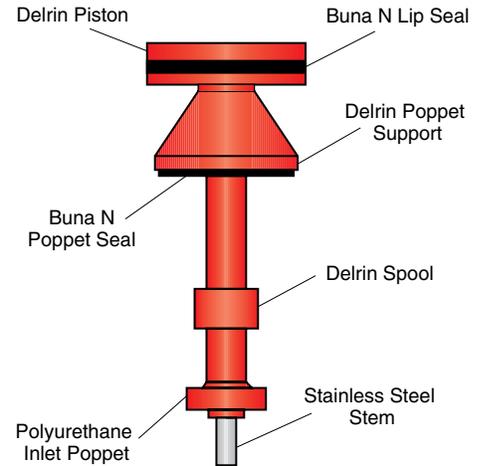
SERPAR® and Crossflow™ Double Valves

The design of the SERPAR® and Crossflow™ double valve is distinguished by crossflow passages and spool valving on the main valve stems. This arrangement provides the valve's unique flow characteristics.

Monitors: Self-contained monitors, designed to inhibit valve operation in case of a fault within the valve, are built into the valve assembly. There are three types of ROSS monitors available: pneumatic, electro-pneumatic, and electronic.

Valve Sizes: ROSS double valves are available in four sizes. For convenience, valves are designated by the nominal sizes 4, 8, 12, and 30. These sizes approximate an average of the flow coefficients (C_v) of the various flow paths through the valve. Further information about C_v ratings is given on page 14.

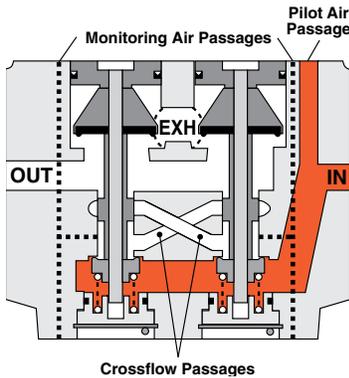
Valve Element Construction: The dual valve elements are of lightweight construction. Their low inertia allows them to respond quickly to actuating and deactuating forces. Impact loads are also kept small to help assure long valve life. Each valve element is guided at the top by the piston and at the bottom by the stainless steel stem, and there is no sliding bearing surface between.



Overview of SERPAR® and Crossflow™ Functions

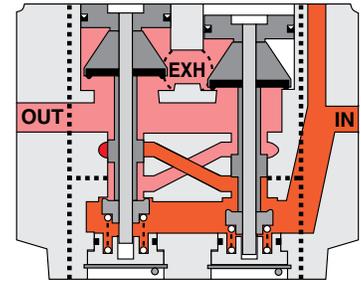
Air flow paths:

Parallel flow paths develop equal forces on the valve elements in both the actuated and deactuated modes. This enables both valve elements to respond equally to pilot pressures and promotes synchronous movement of the valve elements. The air flow paths for the valve in different operating modes are shown below.



Valve elements actuated:

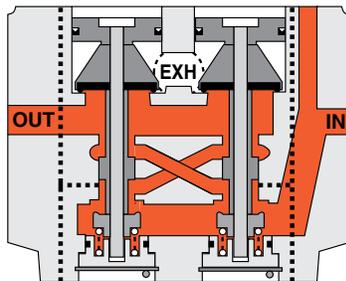
With the valve elements in the actuated position, inlet air is free to flow past the two inlet poppets and through the two crossflow passages to the outlet port. The exhaust poppets close off the exhaust port, and monitoring pressure signals become equal to inlet pressure.



When the valve is returned to the deactuated position (see figure at top of this page), the design of the spool elements (on the valve stem) allows any pressure remaining in the monitoring or crossflow passages to be exhausted through the open exhaust port.

Valve elements de-actuated:

With both inlet poppets closed, inlet air pressure holds each poppet firmly against its seat. Exhaust poppets are open to an oversized exhaust port, and monitoring air pressure signals are zero. Monitoring air passages (shown as dashed lines) go upward or downward depending on the location of the monitoring device being used.



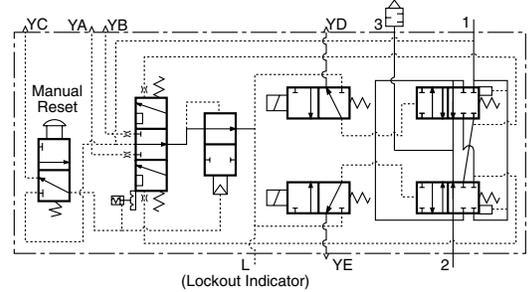
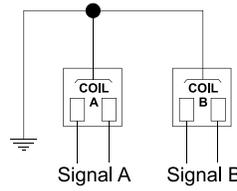
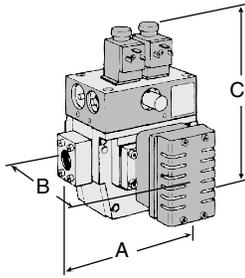
Detecting a malfunction:

A malfunction in the system or in the valve itself could cause one valve element to be open and the other closed. In this event inlet air from the open inlet poppet is substantially blocked from the outlet port by the spool on the closed valve element. The large size of the open exhaust passage serves to keep the pressure at the outlet port below two percent of the inlet pressure.

The monitoring pressure signal from the open valve element is equal to inlet pressure, while the monitoring signal from the closed valve element is very small. The monitor senses the difference between these two pressures and uses this information to shut down the valve and inhibit further valve action. After the cause of the malfunction has been corrected and the electrical signal has been removed from the pilot solenoid, the monitor can be reset and normal operation can be resumed.

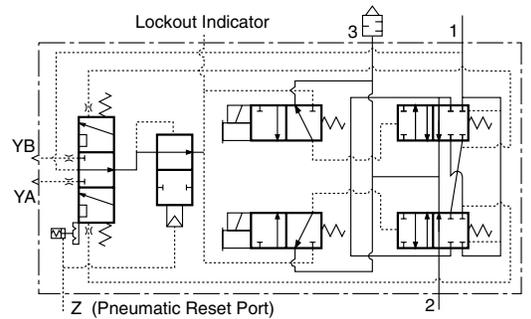
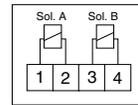
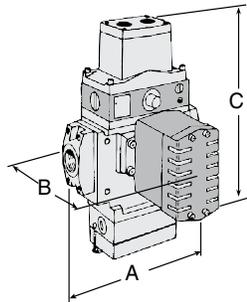
Series 35 SERPAR® Double Valves with L-G Monitor

Size 4



| Size | Port Size | Monitor Reset | Valve Model Numbers | | Average C_v^* | | Dimensions inches (mm) | | | Weight lb (kg) |
|--|-----------|---------------|---------------------|------------|-------------------|----------|------------------------|-----------|-----------|----------------|
| | | | Right Inlet | Left Inlet | In-Out | Out-Exh. | A | B | C | |
| 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) |
| Valves Models without Piping Flanges (For replacement purposes) | | | | | | | | | | |
| 4 | All | Manual | 3573D4241 | 3573D4245 | See corresponding | | | | | 7.5 (3.4) |
| 4 | All | Remote | 3573D4242 | 3573D4246 | above. | | | | | 7.5 (3.4) |

Sizes 8, 12, 30

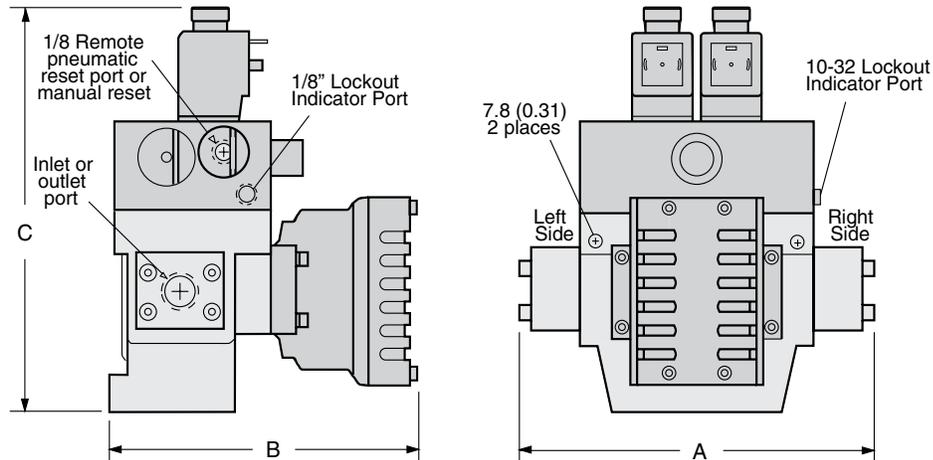


| Size | Port Size | Valve Model Numbers | Average C_v | | Dimensions inches (mm) | | | Weight lb (kg) | |
|--|-----------|---------------------|---------------|-------------------|------------------------|------------|------------|----------------|-------------|
| | | | w/ Overrides | w/o Overrides | In-Out | Out-Exh. | A | | B |
| 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 | 1 1/4 | 3573A7162 | 3573A7182 | 9.0 | 21 | 9.0 (228) | 8.5 (216) | 13.8 (351) | 19.0 (8.6) |
| 30* | 1 1/4 | 3573A7152 | 3573A7172 | 20 | 42 | 12.4 (314) | 11.1 (282) | 17.7 (450) | 37.5 (16.9) |
| 30* | 1 1/2 | 3573A8162 | 3573A8182 | 21 | 43 | 12.4 (314) | 11.1 (282) | 17.7 (450) | 37.5 (16.9) |
| Valves Models without Piping Flanges (For replacement purposes) | | | | | | | | | |
| 8 | All | 3573A4202 | 3573A4222 | See corresponding | | | | | 13.8 (6.3) |
| 12 | All | 3573A5202 | 3573A5222 | above. | | | | | 17.5 (8.0) |
| 30 | All | 3573A7202 | 3573A7222 | above. | | | | | 36.0 (16.4) |

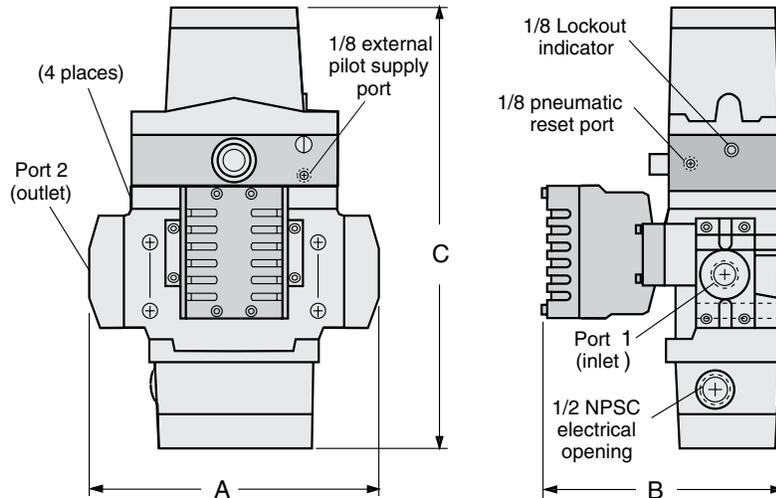
*2 inch port size available on size 30 valves. Order part number 1999H77 flange kit separately.

Series 35 SERPAR® Double Valves with L-G Monitor

Size 4



Size 8, 12, 30



NOTE: For external pilot models consult ROSS.

VALVE OPERATION

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.

OPTIONS

Valve Without Piping Flanges: See above.

Valve Without Silencer: Exhaust port has threaded flange only. Consult ROSS.

$$\text{Valve Response Time (msec)} = M + F \cdot V$$

See page 18 for response time values.

STANDARD SPECIFICATIONS: For valves with L-G monitor.

Pilot Solenoids: Two, rated for continuous duty.

Standard voltages: 100-110 volts, 50 Hz; 100-120 volts, 60 Hz; 24 volts DC; 110 volts DC. For other voltages, consult ROSS.

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: Size 4 uses cord-grip connectors at solenoids. Order connectors separately on Serpar® size 4; terminal strip on sizes 8, 12 and 30.

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: Models are available with the inlet port on either the right or the left side of the valve body (size 4 only).

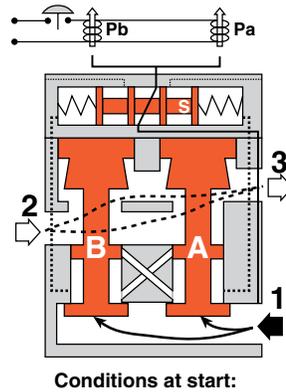
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS** on the inside back cover.

Series 35 SERPAR® Double Valves with L-G Monitor

Overview of Valve Function

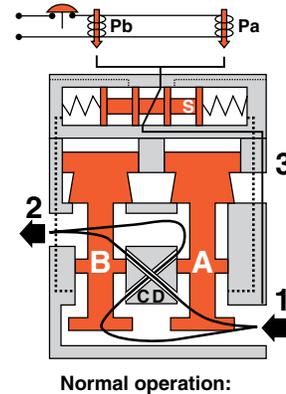
Conditions at start:

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.



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.

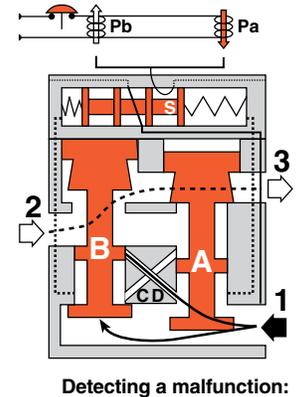


Completion of normal cycle:

Simultaneously deenergizing both solenoids returns the valve to the "Conditions at Start" described at left.

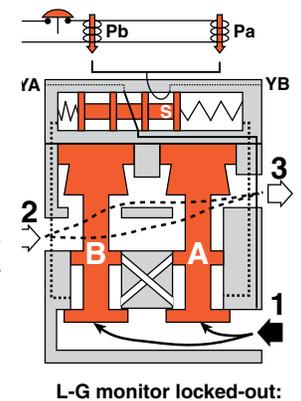
Detecting a malfunction:

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.



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 YA, and pilot supply air is diverted to atmosphere via port YB. The lockout mechanism must be reset before the valve can return to normal operation. *During and following reset, the pilot solenoids must be kept deenergized to prevent inadvertent and possibly dangerous cycling of the press.* The reset function is either manual or remote-pneumatic depending on valve model.



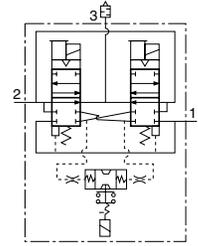
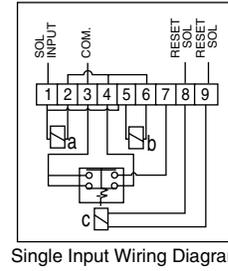
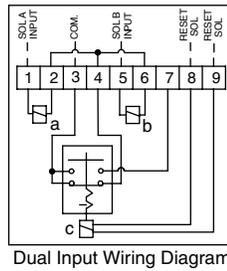
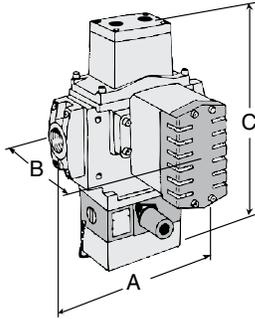
Double Valves with Internal Monitoring & Lockout feature:

- 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.

For accessories please see page 17.

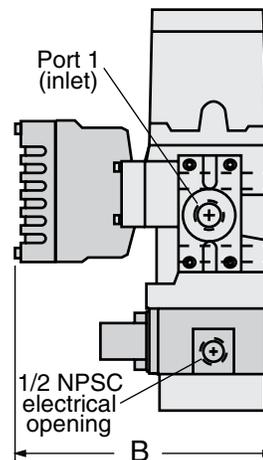
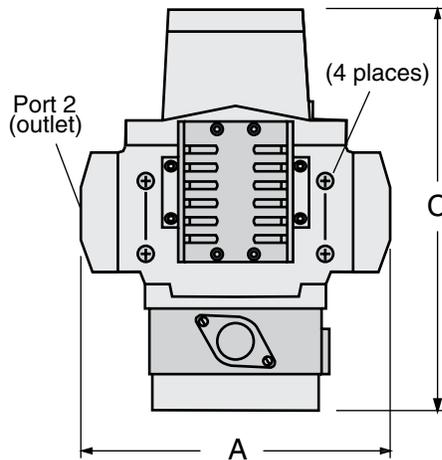
Series 35 SERPAR® Double Valves with E-P Monitor

Sizes 8, 12, 30



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.

| Port | | Valve Model Number | | | | Avg. C _v | | Dimensions inches (mm) | | | Weight |
|---|------|----------------------------------|-----------------------------------|--------------------------------|---------------------------------|--------------------------|---------|------------------------|------------|------------|-------------|
| Size | Size | Single Signal Input w/ Overrides | Single Signal Input w/o Overrides | Dual Signal Input w/ Overrides | Dual Signal Input w/o Overrides | In | Out-Exh | A | B | C | lb (kg) |
| 8 | 1/2 | 3573A4141 | 3573A4161 | 3573A4341 | 3753A4361 | 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 | 1¼ | 3573A7161 | 3573A7181 | 3573A7361 | 3573A7381 | 9.0 | 21 | 9.0 (228) | 8.5 (216) | 12.8 (324) | 15.5 (7.0) |
| 30 | 1¼ | 3573A7151 | 3573A7171 | 3573A7351 | 3573A7371 | 20 | 42 | 12.4 (314) | 11.1 (282) | 17.3 (440) | 35.0 (15.8) |
| 30 | 1½ | 3573A8161 | 3573A8181 | 3573A8361 | 3573A8381 | 21 | 43 | 12.4 (314) | 11.1 (282) | 17.3 (440) | 35.0 (15.8) |
| Valves Models without Piping Flanges (For replacement purposes) | | | | | | | | | | | |
| 8 | All | 3573A4201 | 3573A4221 | 3573A4301 | 3573A4321 | See corresponding above. | | | | | 10.3 (4.7) |
| 12 | All | 3573A5201 | 3573A5221 | 3573A5301 | 3573A5321 | | | | | | 14.0 (6.4) |
| 30 | All | 3573A7201 | 3573A7221 | 3573A7301 | 3573A7321 | | | | | | 33.5 (15.2) |



VALVE OPERATION

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.

OPTIONS

Valve Without Piping Flanges: See above.

Valve Without Silencer: Exhaust port has threaded flange only. Consult ROSS.

$$\text{Valve Response Time (msec)} = M + F \cdot V$$

See page 18 for response time values.

Series 35 SERPAR® Double Valves with E-P Monitor

Overview of Valve Function

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:

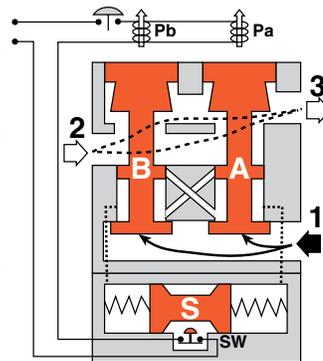
Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Monitoring pressure signals go to each end of spool S and become equal to inlet pressure.

Completion of normal cycle:

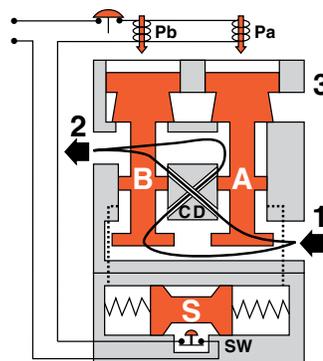
Simultaneously deenergizing both solenoids returns the valve to the "Conditions at Start" described at left.

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



Conditions at start:

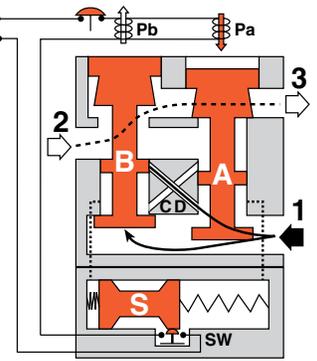


Normal operation:

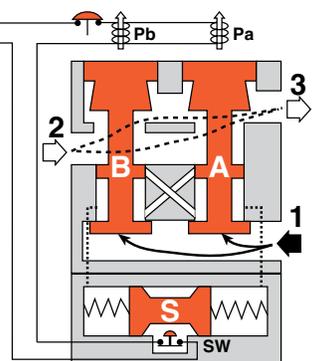
past element B keeps the pressure at the outlet port below two percent of inlet pressure. Full monitoring air pressure from side A goes to the right end of spool S, and a reduced pressure goes to the left end. This pressure imbalance causes the spool to shift to the left. This trips switch SW, breaks 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 deenergized 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:

Single Input Signal and Dual Input Signal models are available in the E-P series of double valves. Both models can be equipped with, or without, manual overrides.

Single input valves require only one main solenoid signal wired into the terminal strip of the E-P monitored double valve. The main solenoid signal is wired into terminal 1 and internally jumpered to the second main solenoid. Commons are wired into terminal 3. This allows both solenoids to be energized and de-energized simultaneously for proper valve operation.

Dual Input valves require two solenoid signals wired independently into the terminal strip of the E-P monitored double valve. One main solenoid signal is wired into terminal 1 and the second main solenoid signal is wired into terminal 5. Commons are wired into terminal 3. Both solenoid signals must arrive simultaneously for proper valve operation.

CAUTION ON THE USE OF RESET SOLENOID

The reset solenoid is rated only for intermittent duty. Energizing it continuously will lead to solenoid burnout and nullify the reset function.

For accessories please see page 17.

STANDARD SPECIFICATIONS: For valves on this page.

Pilot Solenoids: Two, rated for continuous duty.

Standard voltages: 100-110 volts, 50 Hz; 100-120 volts, 60 Hz; 24 volts DC; 110 volts DC. Other voltages available.

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 (for E-P only).

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

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

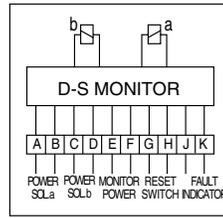
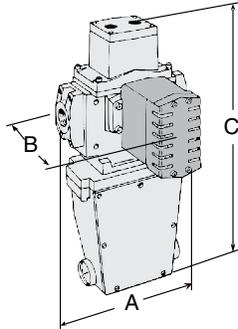
Flow Media: Filtered air; 5 micron recommended.

Pressure Range: 30 to 125 psig (2 to 8.5 bar).

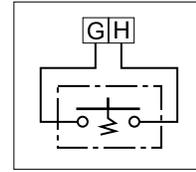
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS** on the inside back cover.

Series 35 SERPAR® Double Valves with D-S Monitor

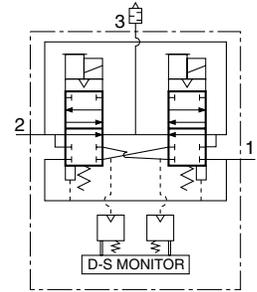
Sizes 8, 12, 30



Wiring Diagram

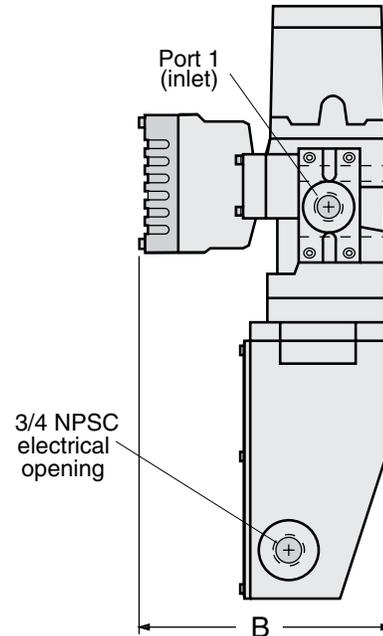
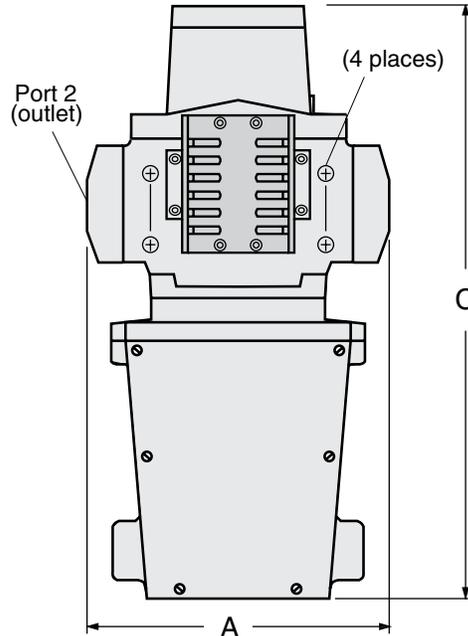


Momentary Reset Switch with no power applied. (supplied by customer)



| Size | Port Size | Valve Model Number | | Avg. C _v | | Dimensions inches (mm) | | | Weight lb (kg) |
|---|-----------|--------------------|---------------|-------------------------------|----------|------------------------|------------|------------|----------------|
| | | w/ Overrides | w/o Overrides | In-Out | Out-Exh. | 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 | 1¼ | 3573B7163 | 3573B7183 | 9.0 | 21 | 9.0 (229) | 8.6 (219) | 17.8 (451) | 20.5 (9.2) |
| 30* | 1¼ | 3573B7153 | 3573B7173 | 20 | 42 | 12.4 (314) | 11.1 (282) | 21.8 (553) | 39.3 (17.7) |
| 30* | 1½ | 3573B8163 | 3573B8183 | 21 | 43 | 12.4 (314) | 11.1 (282) | 21.8 (553) | 39.3 (17.7) |
| Valves Models without Piping Flanges (For replacement purposes) | | | | | | | | | |
| 8 | All | 3573B4203 | 3573B4223 | See corresponding size above. | | | | | 15.3 (6.9) |
| 12 | All | 3573B5203 | 3573B5223 | See corresponding size above. | | | | | 19.0 (8.6) |
| 30 | All | 3573B7203 | 3573B7223 | See corresponding size above. | | | | | 37.8 (17.2) |

*2 inch port size available on size 30 valves. Order part number 1999H77 flange kit separately.



VALVE OPERATION

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.

OPTIONS

Valve Without Piping Flanges: See above.

Valve Without Silencer: Exhaust port has threaded flange only. Consult ROSS.

$$\text{Valve Response Time (msec)} = M + F \cdot V$$

See page 18 for response time values.

Series 35 SERPAR® Double Valves with D-S Monitor

Overview of Valve Function

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:

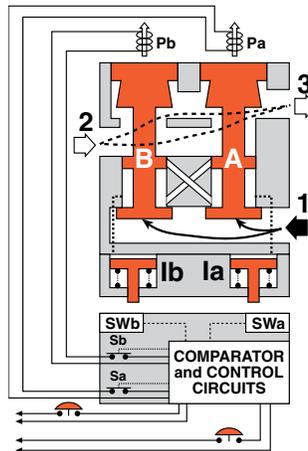
Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Monitoring pressure signals go to pressure indicators Ia and Ib, causing the indicator pins to be extended 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:

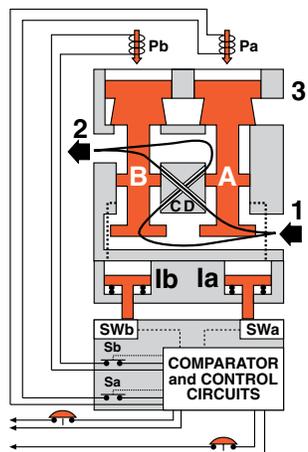
Simultaneously deenergizing both solenoids returns the valve to the "Conditions at Start" described at left.

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



Conditions at start:

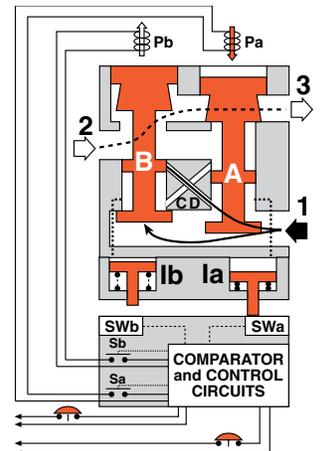


Normal operation:

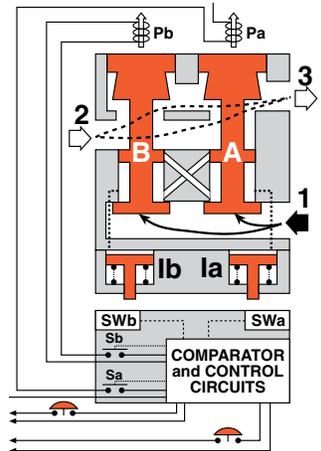
substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below two percent of inlet pressure. Full monitoring air pressure from side A goes to pressure indicator Ia so that its pin is extended and actuates 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 deenergized during and following reset to prevent inadvertent and possibly dangerous cycling of the press.*



Detecting a malfunction:



D-S monitor locked-out:

D-S Monitor Double Valves include a self-contained, dynamic, electronic monitor that checks for proper valve operation during each cycle. Allowable discordance between each internal element is fixed at 175ms and is non-adjustable. A separate monitor power supply is wired into the terminal strip and must be constant, i.e. non-interruptible. Valve monitor faults, when detected, are not revealed until the valve cycle is complete, e.g. the valve is de-energized, allowing for completion of the current press stroke. Monitor reset must include a *dry contact* wired into terminals G and H to properly reset the valve. Applying power to the reset terminals will result in monitor damage.

For accessories please see page 17.

STANDARD SPECIFICATIONS: For valves on this page.

Pilot Solenoids: Two, rated for continuous duty.

Standard voltages: 100-110 volts, 50 Hz; 100-120 volts, 60 Hz; 24 volts DC; 110 volts DC. Uses same voltage and frequency as pilot solenoids, but power supply must be independent and continuous.

Power Consumption: Each solenoid, 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; 5 micron recommended.

Pressure Range: 30 to 125 psig (2 to 8.5 bar).

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

Series 35 Crossflow™ Double Valves with Pressure Switches*

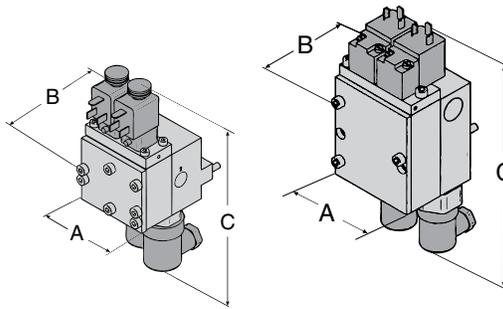
Size 1 & 2



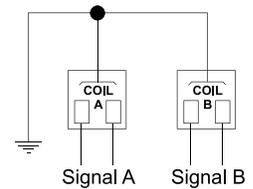
Crossflow™ Size 1



Crossflow™ Size 2



* Non-monitored



| Valve Size | Valve Model Number* | Avg. C _v | | Pressure Switches** | Press. Switch Provision | Port Sizes | | Dimensions inches (mm) | | | Avg. Response Constants | | | Weight lb (kg) |
|------------|---------------------|---------------------|-----|---------------------|-------------------------|------------|-----|------------------------|----------|-----------|-------------------------|----------|----------|----------------|
| | | 1-2 | 2-3 | | | 1 & 2 | 3 | A | B | C | M | F In-Out | Out-Exh. | |
| 1 | 3573B2632 | 0.9 | 1.4 | None | Yes | 1/4 | 1/4 | 2.7 (69) | 3.3 (84) | 5.0 (127) | 28 | 4.6 | 3.4 | 2.1 (95) |
| 1 | 3573B2640 | 0.9 | 1.4 | None | No | 1/4 | 3/8 | 2.7 (69) | 3.3 (84) | 5.0 (127) | 24 | 4.4 | 3.1 | 2.1 (95) |
| 1 | 3573B2642 | 0.9 | 1.4 | Two | Yes | 1/4 | 1/4 | 2.7 (69) | 3.3 (84) | 7.5 (191) | 28 | 4.6 | 3.4 | 2.5 (1.14) |
| 1 | 3573B2644 | 1.2 | 1.7 | Two | Yes | 3/8 | 3/8 | 2.7 (69) | 3.3 (84) | 7.6 (195) | 25 | 3.1 | 2.8 | 2.9 (1.32) |
| 1 | 3573B2645 | 1.2 | 1.7 | None | Yes | 3/8 | 3/8 | 2.7 (69) | 3.3 (84) | 5.1 (130) | 25 | 3.1 | 2.8 | 2.5 (1.14) |
| 2 | 3573B4620 | 3.7 | 6.6 | None | No | 1/2 | 1/2 | 3.4 (86) | 3.2 (81) | 6.3 (160) | 30 | 1.2 | 1.0 | 4.3 (1.95) |
| 2 | 3573B4632 | 3.7 | 6.6 | None | Yes | 1/2 | 1/2 | 3.4 (86) | 3.2 (81) | 6.5 (165) | 30 | 1.2 | 1.0 | 4.3 (1.95) |
| 2 | 3573B4640 | 3.7 | 9.0 | None | No | 1/2 | 3/4 | 3.4 (86) | 3.2 (81) | 6.5 (165) | 25 | 1.1 | 0.9 | 4.3 (1.95) |
| 2 | 3573B4642 | 3.7 | 6.6 | Two | Yes | 1/2 | 1/2 | 3.4 (86) | 3.2 (81) | 9.0 (229) | 30 | 1.2 | 1.0 | 4.8 (2.18) |
| 2 | 3573B4643 | 4.2 | 9.0 | None | No | 3/4 | 3/4 | 3.4 (86) | 3.2 (81) | 6.5 (165) | 25 | 1.1 | 0.9 | 4.7 (2.13) |
| 2 | 3573B4644 | 4.2 | 9.0 | Two | Yes | 3/4 | 3/4 | 3.4 (86) | 3.2 (81) | 9.0 (165) | 25 | 1.1 | 0.9 | 5.2 (2.36) |
| 2 | 3573B4645 | 4.2 | 9.0 | None | Yes | 3/4 | 3/4 | 3.4 (86) | 3.2 (81) | 6.5 (165) | 25 | 1.1 | 0.9 | 4.7 (2.13) |
| 2 | 3573B4652 | 3.7 | 9.0 | None | Yes | 1/2 | 3/4 | 3.4 (86) | 3.2 (81) | 9.0 (165) | 25 | 1.1 | 0.9 | 4.3 (1.95) |

* Model number includes base. For BSPP threads, order with a "D" prefix. For JIS threads, order with a "J" prefix.

Valve and base can be ordered separately; consult ROSS.

** 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).

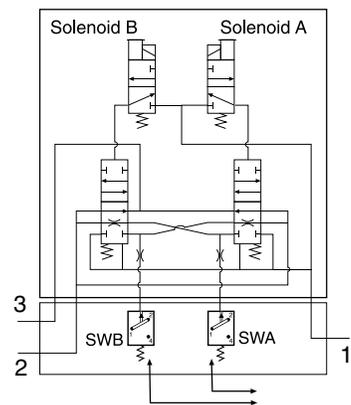
*Pressure Switches & Monitoring:

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.

$$\text{Valve Response Time (msec)} = M + F \cdot V$$

See page 18 for response time values.



To customer's external monitor

STANDARD SPECIFICATIONS: For valves on this page.

Pilot Solenoids: Two, rated for continuous duty.

Standard Voltages: 100-110 volts, 50 Hz; 100-120 volts, 60 Hz; 24 volts DC; 110 volts DC. For other voltages, consult ROSS.

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 maximum on DC.

Electrical Connections: Uses two cord-grip connectors at solenoids (order separately).

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.

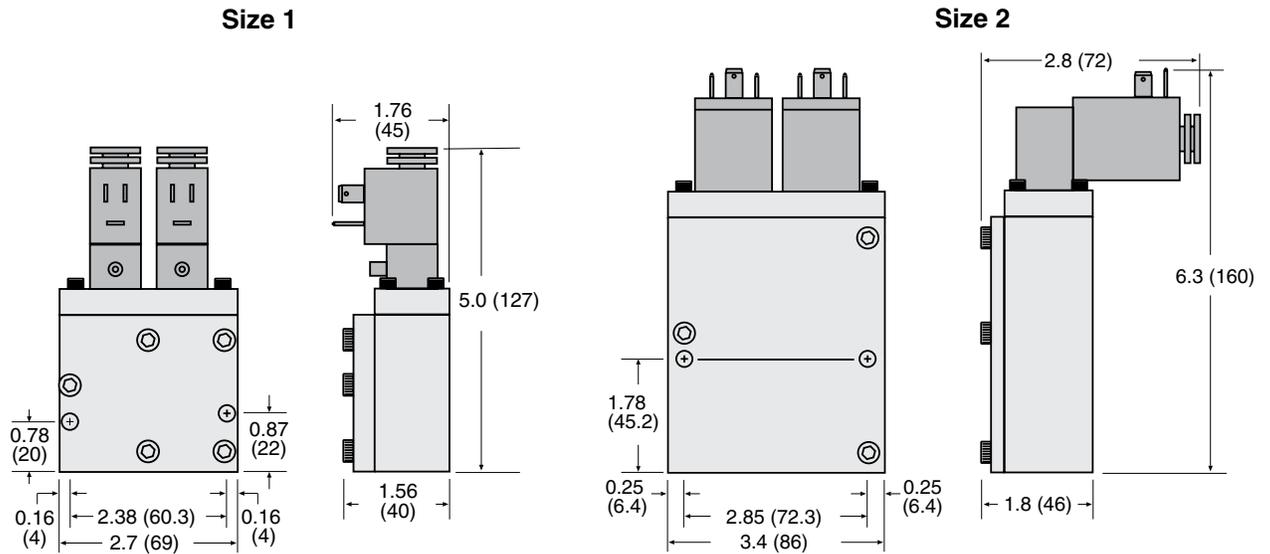
Inlet Pressure: 40 to 100 psig (2.8 to 7 bar).

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.

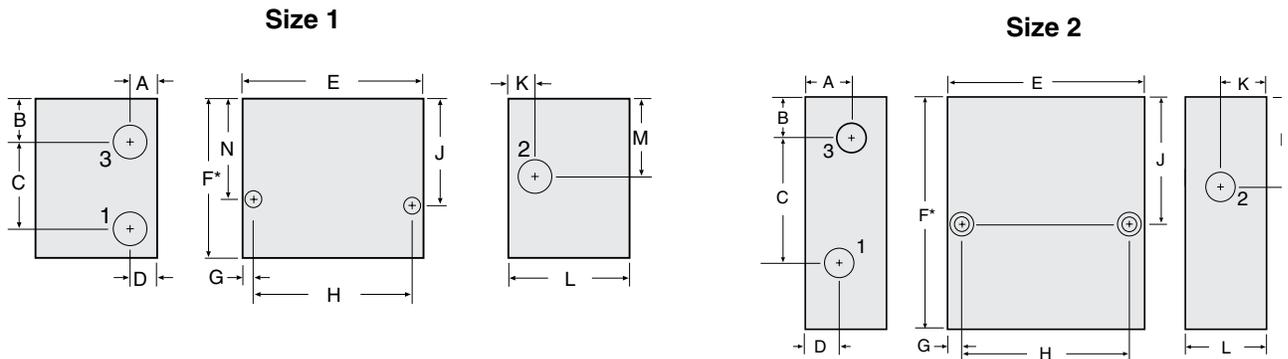
IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS** on the inside back cover.

Series 35 Crossflow™ Double Valves with Pressure Switches*

VALVE Dimensions inches (mm)



BASE Dimensions inches (mm)



NOTE: Add 2.6" (67 mm) to dimension F for models with pressure switches.

| Model # | Base | A | B | C | D | E | F | G | H | J | K | L | M | N |
|-----------|---------|----------|----------|-------------|----------|----------|-----------|---------|-------------|----------|----------|----------|----------|----------|
| 3573B2632 | 1120C91 | 0.4 (11) | 0.7 (17) | 1.29 (32.8) | 0.4 (11) | 2.7 (69) | 2.4 (61) | 0.2 (5) | 2.38 (60.5) | 1.6 (41) | 0.4 (11) | 1.8 (46) | 1.2 (30) | 1.5 (38) |
| 3573B2640 | 1042C91 | 0.5 (13) | 0.6 (15) | 1.36 (34.5) | 0.4 (11) | 2.7 (69) | 2.4 (61) | 0.2 (5) | 2.38 (60.5) | 1.6 (41) | 0.4 (11) | 1.8 (46) | 1.2 (30) | 1.5 (38) |
| 3573B2642 | 888C91 | 0.4 (11) | 0.7 (17) | 1.29 (32.8) | 0.4 (11) | 2.7 (69) | 2.4 (61) | 0.2 (5) | 2.38 (60.5) | 1.6 (41) | 0.4 (11) | 1.8 (46) | 1.2 (30) | 1.5 (38) |
| 3573B2644 | 1171C91 | 0.5 (13) | 0.6 (15) | 1.47 (37.2) | 0.5 (13) | 2.7 (69) | 2.5 (63) | 0.2 (5) | 2.38 (60.5) | 1.6 (41) | 0.8 (19) | 1.8 (46) | 1.1 (27) | 1.5 (38) |
| 3573B2645 | 1172C91 | 0.5 (13) | 0.6 (15) | 1.47 (37.2) | 0.5 (13) | 2.7 (69) | 2.5 (63) | 0.2 (5) | 2.38 (60.5) | 1.6 (41) | 0.8 (19) | 1.8 (46) | 1.1 (27) | 1.5 (38) |
| 3573B4620 | 1136C91 | 0.8 (19) | 0.7 (17) | 2.15 (54.6) | 0.6 (15) | 3.4 (86) | 4.0 (101) | 0.3 (7) | 2.85 (72.4) | 2.2 (56) | 0.8 (19) | 1.4 (36) | 1.6 (39) | — |
| 3573B4632 | 1122C91 | 0.8 (19) | 0.7 (17) | 2.15 (54.6) | 0.6 (15) | 3.4 (86) | 4.0 (101) | 0.3 (7) | 2.85 (72.4) | 2.2 (56) | 0.8 (19) | 1.4 (36) | 1.6 (39) | — |
| 3573B4640 | 1028C91 | 1.1 (27) | 1.0 (24) | 2.32 (58.9) | 0.6 (15) | 3.4 (86) | 4.3 (110) | 0.3 (7) | 2.85 (72.4) | 2.6 (64) | 0.8 (19) | 1.7 (44) | 1.9 (48) | — |
| 3573B4642 | 893C91 | 0.8 (19) | 0.7 (17) | 2.15 (54.6) | 0.6 (15) | 3.4 (86) | 4.0 (101) | 0.3 (7) | 2.85 (72.4) | 2.2 (56) | 0.8 (19) | 1.4 (36) | 1.6 (39) | — |
| 3573B4643 | 1123C91 | 1.1 (27) | 0.8 (19) | 2.64 (67.1) | 1.3 (33) | 3.7 (94) | 4.3 (110) | 0.3 (7) | 2.85 (72.4) | 2.6 (64) | 0.7 (17) | 2.0 (50) | 1.8 (46) | — |
| 3573B4644 | 1163C91 | 1.1 (27) | 0.8 (19) | 2.86 (72.7) | 0.7 (17) | 3.7 (94) | 4.3 (110) | 0.3 (7) | 2.85 (72.4) | 2.6 (64) | 0.7 (17) | 2.0 (50) | 1.8 (46) | — |
| 3573B4645 | 1164C91 | 1.1 (27) | 0.8 (19) | 2.86 (72.7) | 0.7 (17) | 3.7 (94) | 4.3 (110) | 0.3 (7) | 2.85 (72.4) | 2.6 (64) | 0.7 (17) | 2.0 (50) | 1.8 (46) | — |
| 3573B4652 | 1129C91 | 1.1 (27) | 1.0 (24) | 2.32 (58.9) | 0.6 (15) | 3.4 (86) | 4.3 (110) | 0.3 (7) | 2.85 (72.4) | 2.6 (64) | 0.8 (19) | 1.7 (44) | 1.9 (48) | — |

For replacement valve (less base): **Size 1** – order model 3573B2602; **Size 2** – order model 3573B4602.

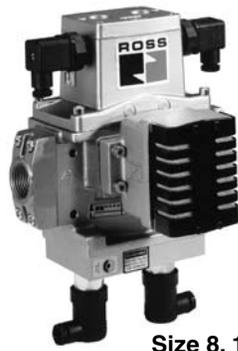
For accessories please see page 17.

Series 35 Crossflow™ Double Valves with Pressure Switches*

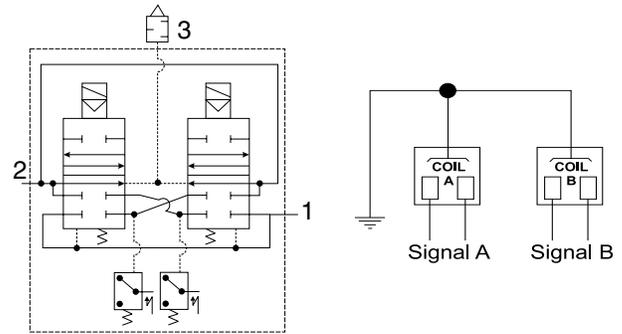
Size 4, 8, 12, 30



Size 4



Size 8, 12, 30



| Model Number*Standard Flow | | | | | | | Valve Weight | | |
|----------------------------|-----------------------------|--------------------------|---------------------|------------------------|------------------------|------------|--------------|-------------|-----------|
| Port Size | Flanged Ports Inlet Right | Flanged Ports Inlet Left | Avg. C _v | | Dimensions inches (mm) | | | lb (kg) | |
| Size | Size | Size | 1-2 | 3-4 | A | B | C | | |
| 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) |
| Port Size | Model Number* Flanged Ports | Avg. C _v | | Dimensions inches (mm) | | | Weight | | |
| Size | Size | 1-2 | 3-4 | 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 | 1¼ | 3573B7632 | 9.0 | 21 | 9.0 (230) | 8.6 (219) | 12.4 (316) | 15.4 (7.0) | |
| 30 | 1¼ | 3573B7630 | 20 | 42 | 12.4 (315) | 11.1 (282) | 16.5 (420) | 33.9 (15.4) | |
| 30 | 1½ | 3573B8630 | 21 | 43 | 12.4 (315) | 11.1 (282) | 16.5 (420) | 33.9 (15.4) | |

*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 and associated machinery in the event of a failure within the valve.

$$\text{Valve Response Time (msec)} = M + F \cdot V$$

See page 18 for response time values.

STANDARD SPECIFICATIONS: For valves on this page.

Pilot Solenoids: Two, rated for continuous duty.

Standard Voltages: 24, 48, 110, 220 volts AC, 50/60 Hz; 24 volts DC; 110 volts DC. For other voltages, consult ROSS.

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. Order connectors separately (see accessories page 17).

Electrical Connection:

Connectors according to DIN 43650 A (ISO 4400), must be ordered separately.

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).

Pressure Range:

Size 8, 12, 30: 30 to 125 psig (2 to 8.5 bar).

Enclosure Rating: IP 65 according to IEC-Publication 144 and DIN 40050, Sheet 1.

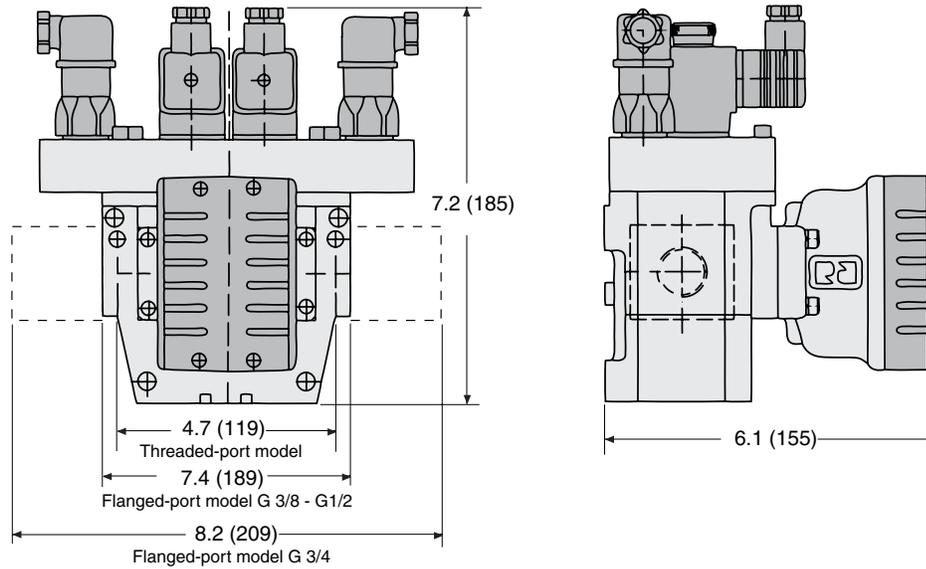
CAUTION: If the system must be reset, electrical signals to both solenoids must be removed to prevent the machine from immediately recycling and producing a potentially hazardous condition.

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

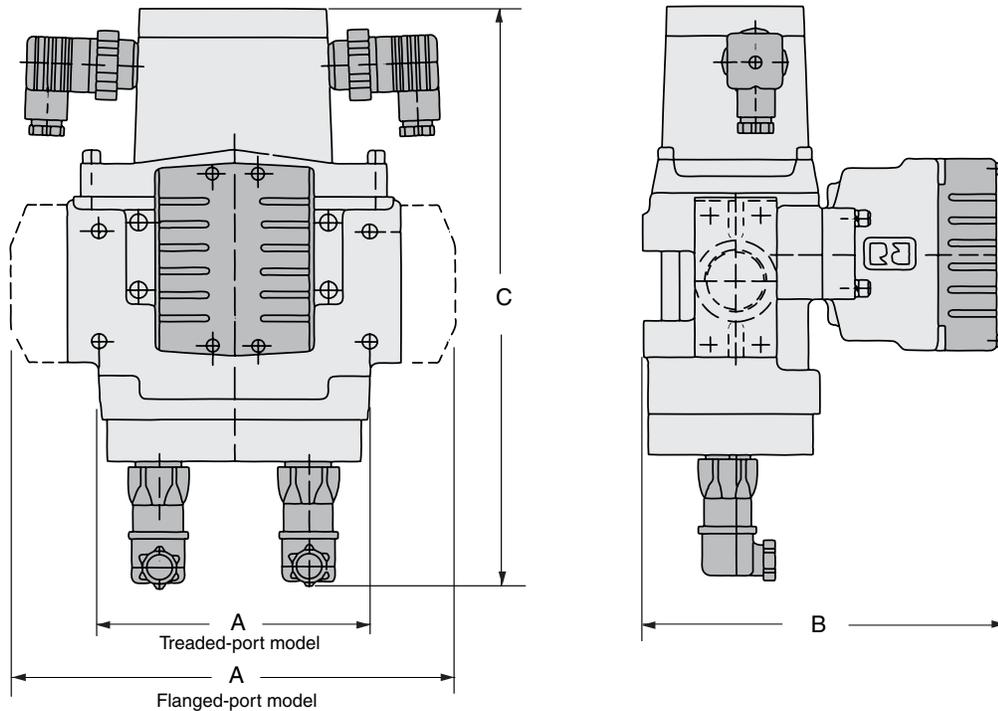
Series 35 Crossflow™ Double Valves with Pressure Switches*

Size 4

Dimensions inches (mm)



Size 8, 12, 30



| Size | Dimensions inches (mm) | | | |
|------|------------------------|-------------------------|------------|------------|
| | A (Flanged-port model) | A (Threaded-port model) | B | C |
| 8 | 8.8 (224) | 6.7 (172) | 7.2 (184) | 11.2 (284) |
| 12 | 9.1 (230) | 7.0 (178) | 8.6 (219) | 12.4 (316) |
| 30 | 12.4 (315) | 10.3 (267) | 11.1 (282) | 16.5 (420) |

For accessories please see page 17.

Series 35 Crossflow™ Double Valves with Pressure Switches*

Overview of Valve Function

Conditions at start:

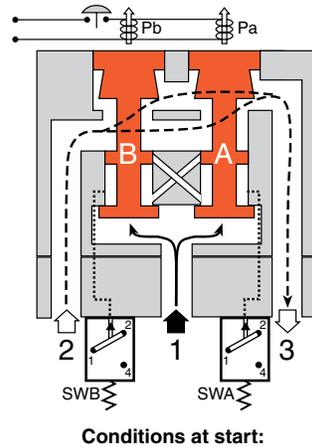
Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pressure signals at both switches SWA and SWB are exhausted. Contacts 1 and 2 of switches SWA and SWB are connected.

Normal operation:

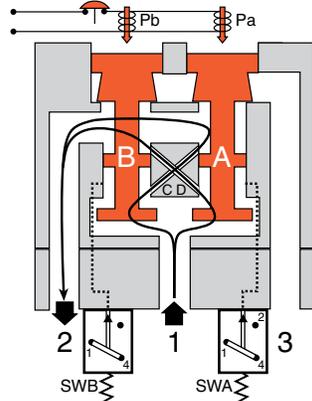
Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Sensing pressure signals go to each pressure switch and become equal to inlet pressure. Both switches trip 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.



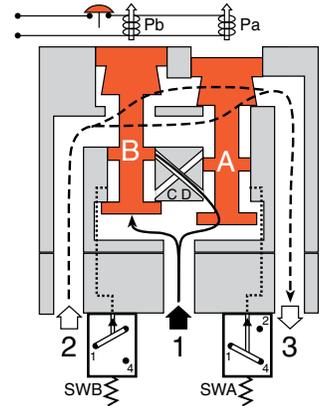
Conditions at start:



Normal operation:

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. See note below.



Detecting a malfunction:

***NOTE:** These models have two pressure switches that sense pressure in the sensing ports resulting from the movement of corresponding valve elements. The pressure switches only indicate if the valve elements do not move in unison.

The switches will not lock out the valve without the addition of an external monitoring system and should not be confused with a monitor. If lock-out capability is advisable for your application, be sure to connect the pressure switches to an external monitor. If an internal monitor is preferred, use a model with LG, EP, or DS monitor.

These models are also available with:

- 1) no pressure switches installed, but with provision for installing pressure switches later, or
- 2) with no switches installed and no provision for installing them later.

The models with no provision for pressure switches are not capable of being monitored and should not be used in applications where lock-out capability is a requirement, i.e. press clutch/brakes.

SWITCH OPERATION: Each pressure switch has four electrical contacts. Contacts 1 and 2 are connected when no air pressure signal is applied to the switch. Contacts 1 and 4 are connected when an air pressure signal is applied to the switch. Contact 3 is for a ground connection.

For further information in the use or connection of the pressure switches call your local ROSS distributor or, in the U.S.A., call ROSS Technical Services at 1-888-TEK-ROSS.

Double Valves with Pressure Switches for External Monitoring feature:

- 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.

Accessories

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 exits upward, and 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.

For Series 35 Crossflow™ Double Valves with Pressure Switches* , Size 1 only.

Part Numbers of Electrical Connectors

| Connector Type | Without Light | With Light* |
|--|---------------|-------------|
| For use with dropcord (Cord not included) | 266K77 | 267K77 |
| Wired with 10-mm cord (Cord exits upward) | 372K77 | 382K77 |

*Specify solenoid voltage.

RESET VALVES for L-G Monitor

On valve models with manual reset, a button on the side of the monitor is pushed to perform the reset function. Models for remote reset, however, require a small reset valve and the installation of a 1/8 line from the reset valve to the reset port on the monitor. ROSS offers 3/2 normally closed valves with either manual or electric control that are suitable for this purpose.

The following valves are suggested:

Pushbutton Models

Green button: 1223A1005
Red button: 1223A1006



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.

Port threads: NPT standard. For BSPP threads, add a "D" prefix to the model number, e.g., D1223A1005. In the case of the W1413A1409, the prefix should be added to the base model instead of the valve.

PIPING FLANGE KITS

Each kit includes two threaded (NPT) flanges and the required seals and mounting bolts.

Order by the following kit numbers:

| Nominal 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 |
| | 1¼ | 666K77 |
| 30 | 1¼ | 667K77 |
| | 1½ | 668K77 |
| | 2 | 1999H77 |

General Information

VALVE RESPONSE TIMES

Most pneumatic applications call for a valve to be used to control the repeated filling and exhausting device (cylinder, clutch, etc.) having a certain volume. The time required to fill or exhaust this volume is called the “*valve response time*.”

The time to fill a volume is usually different from the time to exhaust the volume. However, both times can be found using the following formula:

$$\text{Valve Response Time (msec)} = M + F \cdot V$$

This formula will give the number of milliseconds (msec) required to fill the volume *V* to 90 percent of supply pressure or to exhaust the volume to 10 percent of supply pressure. *M* and *F* are *average response constants*, and their values for each valve are given on the valve specification pages (6-12). *V* is the number of cubic inches in the volume to be filled or exhausted. Response times will be valid for any supply pressure from 3.5 to 8.5 bar (50 to 125 psig).

What is the constant *M*? When a valve is energized, it takes a number of milliseconds for the valve to shift and allow a steady flow of air to be established at the outlet port. In a like manner, when the valve is deenergized, it takes a number of milliseconds for the valve to cut off the flow of air and establish the flow of exhaust air. These valve “movement” times are designated by *M* in the above formula.

What is the constant *F*? After the valve has shifted and air flow (either to fill or exhaust) is established, the air flows rapidly at first, then flows at a reducing rate. The *average flow rate* is represented in the above formula by the letter *F*. It is the average number of milliseconds required to fill or exhaust one cubic inch of the volume *V*. The product *F* • *V*, then, is the average number of milliseconds required to fill or exhaust the entire volume *V* after the valve has shifted.

SAMPLE PROBLEM.

How long will it take to fill a 100-cubic-inch clutch to 90 percent of supply pressure using a nominal size 8 double valve with 3/4 ports?

Solution. Specifications for size 8 valves are given on pages 8, 10, and 12. From the chart on page 8 (pages 10 and 12 will give the same values) we find that the average response constants for a size 8 valve with 3/4 ports are *M* = 15 and *F* = 0.65. The *F* value of 0.23 is for the exhausting paths and is not needed for this problem. Putting the *M* and *F* values into the response time formula gives:

$$\begin{aligned} \text{Average response time} &= 15 + (0.65)(100) \\ &= 15 + 65 \\ &= 80 \text{ msec} \end{aligned}$$

Therefore, the 100-cubic-inch volume would be filled to 90 percent of supply pressure in just 80 milliseconds.

AVERAGE C_v RATINGS

Because widely differing test standards are used in the measurement of *C_v* values, the following figures should not be used in comparing ROSS valves with other makes. These *C_v* ratings are intended only for use with performance charts published by ROSS.

| Nominal Size | Port Size | Average C _v Ratings | |
|--------------|-----------|--------------------------------|--------|
| | | 1 to 2 | 2 to 3 |
| 4 | 3/8 | 3.0 | 7 |
| | 1/2 | 3.0 | 9 |
| | 3/4 | 3.0 | 11 |
| 8 | 1/2 | 3.5 | 10 |
| | 3/4 | 4.0 | 14 |
| | 1 | 4.0 | 14 |
| 12 | 3/4 | 8.0 | 15 |
| | 1 | 8.5 | 19 |
| | 1¼ | 9.0 | 21 |
| 30 | 1¼ | 20 | 42 |
| | 1½ | 21 | 43 |

THREAD OPTIONS

To serve customers around the world, ROSS supplies double valves with threaded pressure ports and electrical openings that conform to various local standards. These variations are identified by a letter preceding the valve model number or flange kit number. The specifications for these prefix letters are shown in the chart at the right.

| Prefix Letter | Pneumatic Port Threads | Electrical Opening | |
|---------------|------------------------|--------------------|-------------|
| | | L-G or E-P Monitor | D-S Monitor |
| None | NPT | 1/2 NPSC | 3/4 NPSC |
| D | DIN 259 (parallel) | R 1/2 | R 3/4 |
| J | DIN 259 (parallel) | R 1/2 | R 3/4 |

Cautions

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. Failure to follow these directions can adversely affect the performance of the product or result in the potential for human injury.

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. 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 base 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 and/or human injury. If you have questions regarding whether a lubricant used on your system is compatible with ROSS products, please contact ROSS.

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 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.

ROSS expressly disclaims all warranties and responsibility for any unsatisfactory performance or injuries caused by the use of the wrong type, wrong size, or 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 manual **L-O-X**® with **EEZ-ON**® operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

Warranty

Products manufactured by ROSS are warranted to be free of defects in material and workmanship for a period of one year from the date of purchase. 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 such product is found to be defective. This warranty shall be 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 SHALL ROSS BE 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 SHALL EXTEND THE LIABILITY OF ROSS AS SET FORTH HEREIN.





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Your local ROSS distributor is:

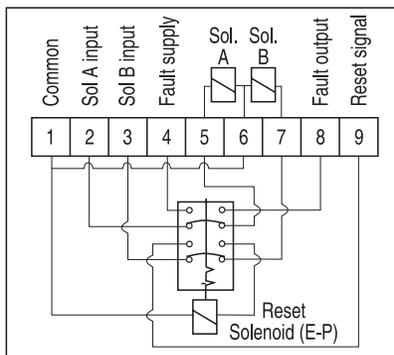
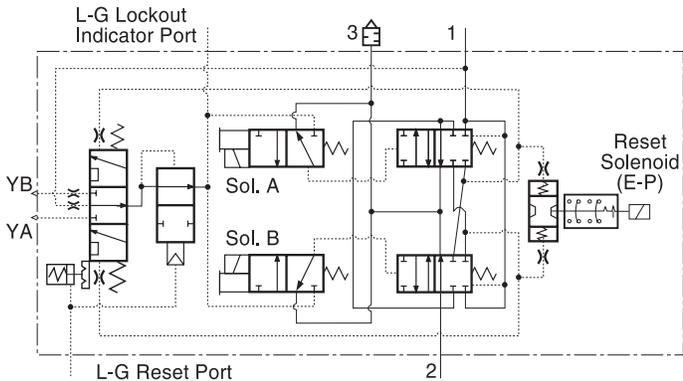
There are ROSS Distributors Throughout the World

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.

New Product Information

SERPAR® Crossflow Double Valves with Dual Monitoring Includes Both L-G and E-P Monitors – Sizes 8, 12, & 30



STANDARD SPECIFICATIONS

- Pilot Solenoid:** Two, rated for continuous duty.
- Standard Voltages:** 100 – 110 volts 50 Hz; 100 – 120 volts 60 Hz; 24 volts d.c.
- Power Consumption:** Each solenoid, 87 VA inrush, 30 VA holding on 50 or 60 Hz; 14 watts on d.c.
- Reset Solenoid (E-P):** Rated for intermittent duty.
- Standard Voltages:** Same as above for pilot solenoids.
- Electrical Connections:** Terminal Strip
- 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 125 psig (2 to 8.5 bar).
- Reset Pressure (L-G):** 60 psig (4 bar) minimum.

CSA Z142
Compliant



Size 8

ROSS' new SERPAR® Crossflow Double Valves with Dual Monitoring provide the reliability and durability you have come to expect from ROSS since the introduction of the first monitored double valves for mechanical power press safety in 1954.

These dual-monitored valves are based on the proven technology of the SERPAR® Crossflow family of double valves, adding independent signal sources and redundant monitoring to meet CSA Z142 (Canadian Standards Association) requirements for safety circuit performance.

Incorporating both ROSS' L-G and E-P monitoring systems provides redundancy in monitoring through two separate, dissimilar monitors. The actuating solenoids are wired independently through a double-pole, double-throw switch in the E-P monitor.

These new SERPAR® Crossflow Double Valves with Dual Monitoring are available in sizes 8, 12, and 30, with port sizes ranging from 1/2 to 2. The valves mount inline via removable flanges, and are available with or without manual overrides.

FEATURES:

- SERPAR® Crossflow technology
- Dual monitoring – E-P & L-G
- DPDT (double-pole, double-throw) switch
- 3/2 normally closed function
- Rugged poppet technology
- PACER® solenoid pilots
- Designed to enable compliance with current safety regulations
- Non-clogging Silencer



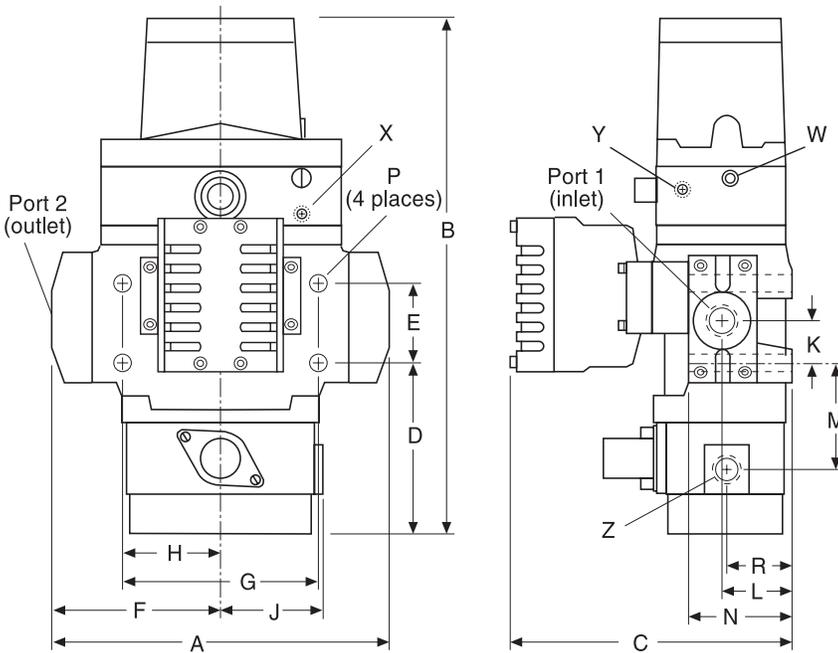
VALVE MODEL NUMBERS and MODEL SPECIFIC INFORMATION

| Nominal Size | Port Size | Model Numbers | | Average C _v | | Avg. Response Constants | | | Weight lbs (kg) |
|--------------|-----------|----------------|-------------------|------------------------|--------|-------------------------|--------|--------|-----------------|
| | | With Overrides | Without Overrides | 1 to 2 | 2 to 3 | M | F | | |
| | | | | | | | 1 to 2 | 2 to 3 | |
| 8 | 1/2 | 3573A4148 | 3573A4168 | 3.5 | 10 | 15 | 0.70 | 0.30 | 17.0 (7.7) |
| | 3/4 | 3573A5148 | 3573A5168 | 4.0 | 14 | | 0.65 | 0.23 | |
| | 1 | 3573A6158 | 3573A6178 | 4.0 | 14 | | 0.65 | 0.23 | |
| 12 | 3/4 | 3573A5158 | 3573A5178 | 8.0 | 15 | 20 | 0.33 | 0.21 | 21.0 (9.5) |
| | 1 | 3573A6168 | 3573A6188 | 8.5 | 19 | | 0.28 | 0.21 | |
| | 1-1/4 | 3573A7168 | 3573A7188 | 9.0 | 21 | | 0.28 | 0.21 | |
| 30 | 1-1/4 | 3573A7158 | 3573A7178 | 20 | 42 | 25 | 0.19 | 0.07 | 39.5 (17.9) |
| | 1-1/2 | 3573A8168 | 3573A8188 | 21 | 43 | | 0.18 | 0.07 | |
| | 2 | 3573A9168 | 3573A9188 | 24 | 42 | | 0.14 | 0.10 | |

VALVE MODELS WITHOUT PIPING FLANGES
(For replacement purposes)

| | | | | | |
|----|-----|-----------|-----------|-------------------------------|-------------|
| 8 | ALL | 3573A4208 | 3573A4228 | See corresponding size above. | 15.8 (7.2) |
| 12 | ALL | 3573A5208 | 3573A5228 | | 19.5 (8.8) |
| 30 | ALL | 3573A7208 | 3573A7228 | | 38.0 (17.2) |

Dimensions inches (mm)



| Size | 8 | 12 | 30 |
|-------|--------------------------------|---------------|--------------|
| Ports | 1/2, 3/4, 1 | 3/4, 1, 1-1/4 | 1-1/4, 1-1/2 |
| W | 1/8 lockout indicator port | | |
| X | 1/8 external pilot supply port | | |
| Y | 1/8 pneumatic reset port | | |
| Z | 1/2 NPSC electrical opening | | |
| A | 8.52 (216) | 8.96 (228) | 12.36 (314) |
| B | 13.3 (338) | 14.8 (376) | 18.8 (478) |
| C | 7.2 (184) | 8.6 (216) | 11.1 (282) |
| D | 4.7 (118) | 5.0 (127) | 5.1 (130) |
| E | 2.10 (53.3) | 3.0 (76.2) | 5.90 (150) |
| F | 4.26 (108) | 4.48 (114) | 6.18 (157) |
| G | 5.06 (128) | 5.50 (140) | 8.56 (217) |
| H | 2.53 (64) | 2.75 (70) | 4.28 (109) |
| J | 2.63 (67) | 2.63 (67) | 2.63 (67) |
| K | 1.25 (32) | 1.81 (46) | 4.52 (115) |
| L | 1.80 (46) | 1.69 (43) | 2.27 (58) |
| M | 2.44 (62) | 2.81 (71) | 2.91 (74) |
| N | 2.6 (66) | 3.0 (76) | 3.7 (93) |
| P | 0.28 (7.1) | 0.34 (8.7) | 0.53 (13.5) |
| R | 2.70 (43) | 1.70 (43) | 2.09 (53) |
| S | 3.9 (99) | 4.8 (121) | 8.9 (227) |
| T | 4.33 (110) | 5.22 (133) | 9.36 (238) |
| U | 2.45 (62) | 2.45 (62) | 3.02 (77) |
| V | 2.13 (54) | 2.13 (54) | 2.13 (54) |

WARRANTY and CAUTIONS

Standard ROSS warranty and cautions apply, available upon request or at www.rosscontrols.com/pdfs/cautionswarranty.pdf.

CAUTION ON THE USE OF E-P RESET SOLENOID

The E-P reset solenoid is rated only for intermittent duty. Energizing the reset solenoid continuously will nullify the E-P reset function.



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