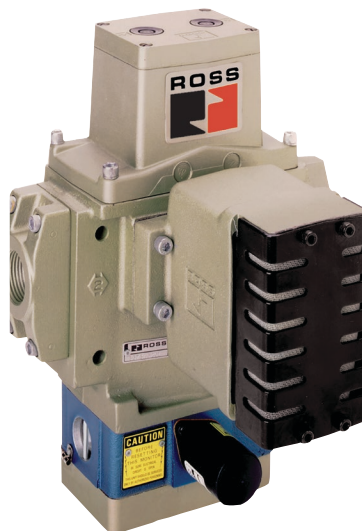




# **CLUTCH/BRAKE CONTROL E-P MONITORED DOUBLE VALVES**

## **SERPAR<sup>®</sup> 35 SERIES**

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# **PRODUCT CATALOG**

# SERPAR® Double Valves with E-P Monitor 35 Series

## Product Overview

**Clutch/Brake Control Function**

The SERPAR® E-P double valve is designed to provide control of clutch/brake mechanisms on mechanical stamping presses as well as other safety applications, such as alternative lockout systems for energy isolation.



Illustration example.

The SERPAR® Series valves are internally monitored double valves with 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.

Valve models with E-P monitor are available with Single Input Signal and Dual Input Signal.

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.

| VALVE FEATURES           |                                                                                 |
|--------------------------|---------------------------------------------------------------------------------|
| Monitoring               | Internal, Electro-Pneumatic (E-P) monitoring                                    |
| Poppet Design            | Dirt tolerant, wear compensating for quick response and high flow capacity      |
| PTFE Backup Piston Rings | Enhances valve endurance enabling operation with or without in-line lubrication |
| Automatic Lock-out       | Automatic lock-out/inhibit upon detection of a malfunction                      |
| Fault Detection          | Default to de-energized position upon fault detection                           |
| Valve Reset              | Solenoid reset, with a momentary external electric signal                       |
| Mounting                 | In-line, with piping flanges                                                    |
| Overrides                | Manual, rubber grommet                                                          |
| SISTEMA Library          | Available for download                                                          |

| PRODUCT CREDENTIALS                                                                 |                                                                                     |                                                                                                                                                                           |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Performance Level<br>Per ISO 13849-1:2015                                           | Safety Integrity Level<br>Per IEC 2061:2001                                         | Declaration of Conformity                                                                                                                                                 | Certificate of Compliance                                                             |
|  |  |   |  |

| STANDARD SPECIFICATIONS                                                                                      |                               |                                                        |                                                     |                           |                                            |
|--------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------|-----------------------------------------------------|---------------------------|--------------------------------------------|
| GENERAL                                                                                                      | Function                      |                                                        | 3/2 Valve                                           |                           |                                            |
|                                                                                                              | Construction Design           |                                                        | Dual Poppet                                         |                           |                                            |
|                                                                                                              | Actuation                     |                                                        | Electrical                                          | Solenoid Pilot Controlled |                                            |
|                                                                                                              | Mounting                      | Type                                                   | In-line                                             |                           |                                            |
|                                                                                                              |                               | Orientation                                            | Preferably vertically (with pilot solenoids on top) |                           |                                            |
|                                                                                                              | Connection                    |                                                        | Threaded Port                                       | NPT                       |                                            |
|                                                                                                              |                               |                                                        |                                                     | G                         |                                            |
| Monitoring                                                                                                   |                               | Internal                                               | E-P Monitor                                         |                           |                                            |
| Minimum Operation Frequency                                                                                  |                               | Once per month, to ensure proper function              |                                                     |                           |                                            |
| OPERATING CONDITIONS                                                                                         | Temperature                   | Ambient                                                | 40° to 120°F (4° to 50°C)                           |                           |                                            |
|                                                                                                              |                               | Media                                                  | 40° to 175°F (4° to 80°C)                           |                           |                                            |
|                                                                                                              | Flow Media                    |                                                        | Filtered air                                        |                           |                                            |
|                                                                                                              | Operating Pressure            |                                                        | 30 to 125 psig (2.1 to 8.5 bar)                     |                           |                                            |
| ELECTRICAL DATA                                                                                              | Power Consumption             |                                                        | Current Flow                                        | Operating Voltage         | Power Consumption (each solenoid)          |
|                                                                                                              |                               |                                                        | DC                                                  | 24 volts                  | 14 watts                                   |
|                                                                                                              |                               |                                                        | AC                                                  | 110-120 volts, 50/60 Hz   | 87 VA inrush, 30 VA holding on 50 or 60 Hz |
|                                                                                                              | 230 volts, 50/60 Hz           |                                                        |                                                     |                           |                                            |
|                                                                                                              | Solenoids                     |                                                        | Two solenoids, rated for continuous duty            |                           |                                            |
|                                                                                                              | Power Consumption E-P Monitor |                                                        | Rated for intermittent duty                         |                           |                                            |
|                                                                                                              |                               |                                                        | 24-48 or 100-120 volts AC or DC                     |                           |                                            |
|                                                                                                              | Enclosure Rating              |                                                        | IP65, IEC 60529                                     |                           |                                            |
| Electrical Connection                                                                                        |                               | Uses terminal strip connection with multiple terminals |                                                     |                           |                                            |
| CONSTRUCTION MATERIAL                                                                                        | Valve Body                    |                                                        | Cast Aluminum                                       |                           |                                            |
|                                                                                                              | Poppet                        |                                                        | Acetal and Stainless Steel                          |                           |                                            |
|                                                                                                              | Seals                         |                                                        | Buna-N                                              |                           |                                            |
| IMPORTANT NOTE: Please read carefully and thoroughly all of the CAUTIONS, WARNINGS on the inside back cover. |                               |                                                        |                                                     |                           |                                            |

# Ordering Information

## MODEL NUMBER CONFIGURATOR

## 3-Way 2-Position Valves

Examples: 3573A5141W, D3573A5361Z

|                     |   |                |   |   |   |      |   |
|---------------------|---|----------------|---|---|---|------|---|
| Port Thread         |   | 35             | 7 | 3 | A | 4141 | W |
| NPT                 |   |                |   |   |   |      |   |
| Leave Blank         |   |                |   |   |   |      |   |
| G                   | D |                |   |   |   |      |   |
| Actuation           |   | Series         |   |   |   |      |   |
| Solenoid Controlled |   |                |   |   |   |      |   |
| Valve Function      |   | Revision Level |   |   |   |      |   |
| 3/2                 |   |                |   |   |   |      |   |

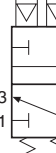
| Current | Voltage*                 |   |
|---------|--------------------------|---|
| DC      | 24 V                     | W |
| AC      | 110-120 V, 50/60 Hz      | Z |
|         | 230 volts AC, 50/60 Hz** | Y |

\*For other voltages consult ROSS.  
 \*\*230 V AC not available in the U.S. (OSHA regulations limit press control voltage to no more than 120 volts AC).

| Port Size – Flanged Ports |                       |            |             |      |
|---------------------------|-----------------------|------------|-------------|------|
| Signal Type               | Overrides             | Basic Size | Port Size # |      |
|                           |                       |            | In-Out      |      |
| Single Input Signal       | With Manual Overrides | 8          | 1/2         | 4141 |
|                           |                       |            | 3/4         | 5141 |
|                           |                       | 12         | 3/4         | 5151 |
|                           |                       |            | 8           | 6151 |
|                           |                       | 12         | 1           | 6161 |
|                           |                       |            | 1-1/4       | 7161 |
|                           |                       | 30         | 1-1/4       | 7151 |
|                           |                       |            | 1-1/2       | 8161 |
|                           | Without Overrides     | 8          | 1/2         | 4161 |
|                           |                       |            | 3/4         | 5161 |
|                           |                       | 12         | 3/4         | 5171 |
|                           |                       |            | 8           | 6171 |
|                           |                       | 12         | 1           | 6181 |
|                           |                       |            | 1-1/4       | 7181 |
|                           |                       | 30         | 1-1/4       | 7171 |
|                           |                       |            | 1-1/2       | 8181 |

| Port Size – Flanged Ports |                       |            |             |      |
|---------------------------|-----------------------|------------|-------------|------|
| Signal Type               | Overrides             | Basic Size | Port Size # |      |
|                           |                       |            | In-Out      |      |
| Dual Input Signal         | With Manual Overrides | 8          | 1/2         | 4341 |
|                           |                       |            | 3/4         | 5341 |
|                           |                       | 12         | 3/4         | 5351 |
|                           |                       |            | 8           | 6351 |
|                           |                       | 12         | 1           | 6361 |
|                           |                       |            | 1-1/4       | 7361 |
|                           |                       | 30         | 1-1/4       | 7351 |
|                           |                       |            | 1-1/2       | 8361 |
|                           | Without Overrides     | 8          | 1/2         | 4361 |
|                           |                       |            | 3/4         | 5361 |
|                           |                       | 12         | 3/4         | 5371 |
|                           |                       |            | 8           | 6371 |
|                           |                       | 12         | 1           | 6381 |
|                           |                       |            | 1-1/4       | 7381 |
|                           |                       | 30         | 1-1/4       | 7371 |
|                           |                       |            | 1-1/2       | 8381 |

# 2 inch Port Size available on Basic Size 30 valves. Order model number 1999H77 Flange Kit separately.

| Size  |           | Flow<br>C <sub>v</sub> (NI/min) |            | Avg. Response Constants |      |      | Weight<br>lb (kg) | Simplified<br>Schematic                                                               |
|-------|-----------|---------------------------------|------------|-------------------------|------|------|-------------------|---------------------------------------------------------------------------------------|
| Basic | Port 1, 2 |                                 |            | M                       | F    |      |                   |                                                                                       |
|       |           | 1-2                             | 2-3        |                         | 1-2  | 2-3  |                   |                                                                                       |
| 8     | 1/2       | 3.5 (3400)                      | 8.5 (8400) | 15                      | 0.70 | 0.30 | 11.8 (5.3)        |  |
|       | 3/4       | 4.0 (3900)                      | 12 (12000) | 15                      | 0.65 | 0.23 |                   |                                                                                       |
| 12    | 3/4       | 8.0 (7900)                      | 15 (15000) | 15                      | 0.65 | 0.23 | 15.5 (7.0)        |                                                                                       |
| 8     | 1         | 4.0 (3900)                      | 12 (12000) | 20                      | 0.33 | 0.21 | 11.8 (5.3)        |                                                                                       |
| 12    | 1         | 8.5 (8400)                      | 19 (19000) | 20                      | 0.28 | 0.21 | 15.5 (7.0)        |                                                                                       |
|       | 1-1/4     | 9.0 (8900)                      | 21 (21000) | 20                      | 0.28 | 0.21 |                   |                                                                                       |
| 30    | 1-1/4     | 20 (20000)                      | 42 (41000) | 25                      | 0.19 | 0.07 | 35.0 (15.8)       |                                                                                       |
|       | 1-1/2     | 21 (21000)                      | 43 (42000) | 25                      | 0.18 | 0.07 |                   |                                                                                       |

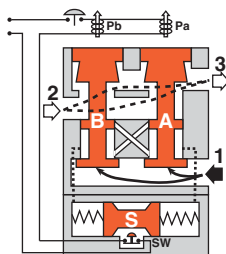
### Valve Response Time

The constants above, 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:

Vlv. Resp. Time (msec) = M + F \* V  
 M = avg. time for parts movement  
 F = msec. per cubic inch of volume  
 V = volume in cubic inches

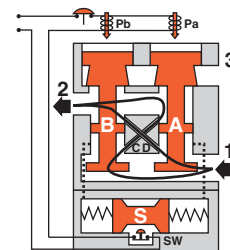
## Conditions at Start

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.

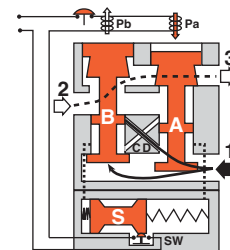


## Completion of Normal Cycle

Simultaneously de-energizing both solenoids returns the valve to the "Conditions at Start" described above.

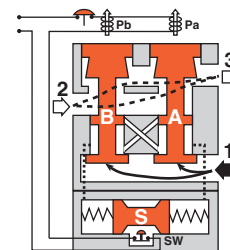
## Detecting a Malfunction

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 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

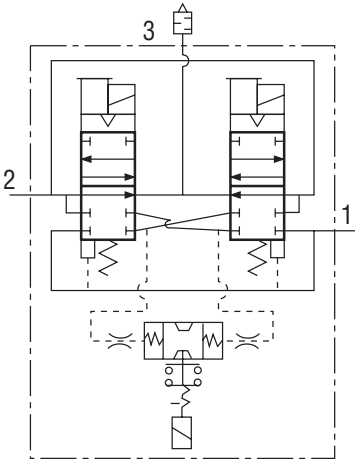
With both valve elements closed, monitoring air pressure is exhausted from both ends of spool S so that it returns to its normal position. The electrical circuit to the pilot solenoids remains broken by switch SW. To restore the electrical circuit and return the valve to normal operation, the reset solenoid (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.



Both solenoids must be energized simultaneously to shift the valve; maintained signal required to keep valve shifted.

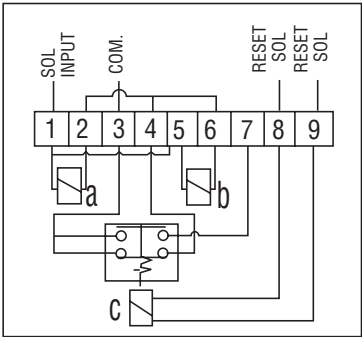
**WARNING:** If monitor must be reset, electrical signals to both solenoids must be removed to prevent the machine controlled by the valve from immediately recycling and producing a potentially hazardous condition.

Valve Schematic

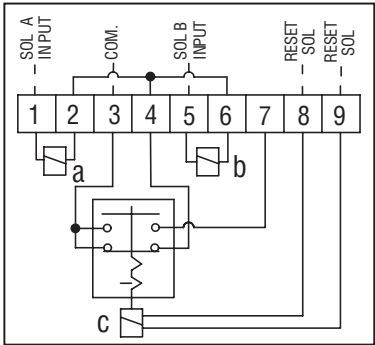


Monitor Wiring

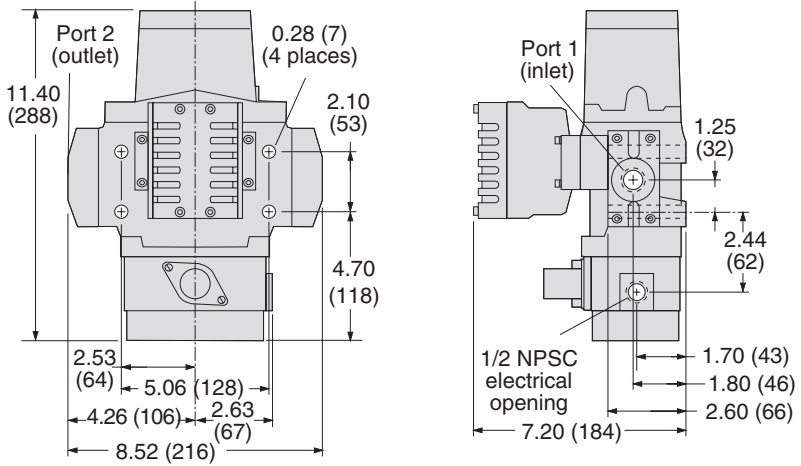
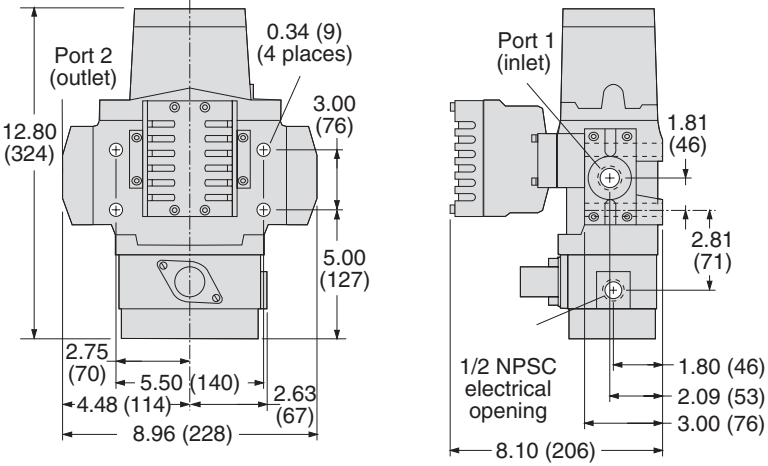
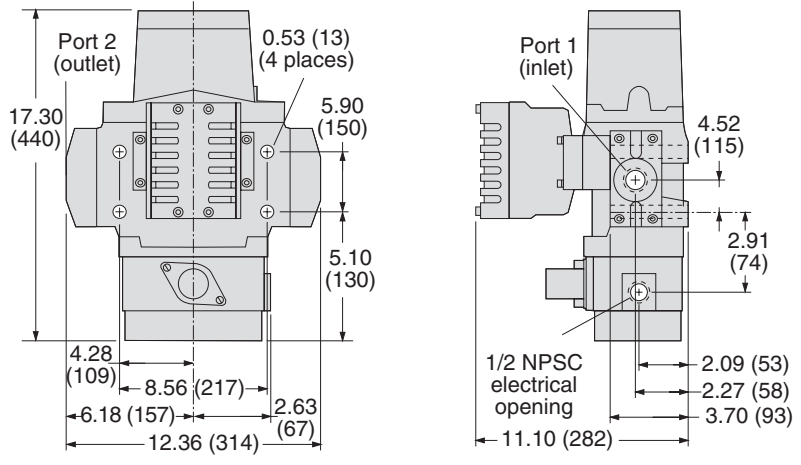
Single Input Wiring Diagram



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.

| DIMENSIONS                                | Inches (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Basic Size 8</b></p>                |  <p>Technical drawings of the Basic Size 8 valve. The front view shows a port 2 (outlet) at the top, a central body with four electrical connection points (0.28 (7) inches), and a base with a mounting hole. Dimensions include a total height of 11.40 (288) inches, a base width of 8.52 (216) inches, and a base height of 4.70 (118) inches. The side view shows port 1 (inlet) on the left, a 1/2 NPSC electrical opening on the right, and a total width of 7.20 (184) inches. Other dimensions include 2.10 (53) inches for the side port offset, 2.53 (64) inches for the base width, 5.06 (128) inches for the base length, 4.26 (106) inches for the base width, 2.63 (67) inches for the base length, 1.25 (32) inches for the side port offset, 2.44 (62) inches for the side port offset, 1.70 (43) inches for the side port offset, 1.80 (46) inches for the side port offset, and 2.60 (66) inches for the side port offset.</p>          |
| <p><b>Basic Size 12</b></p>               |  <p>Technical drawings of the Basic Size 12 valve. The front view shows a port 2 (outlet) at the top, a central body with four electrical connection points (0.34 (9) inches), and a base with a mounting hole. Dimensions include a total height of 12.80 (324) inches, a base width of 8.96 (228) inches, and a base height of 5.00 (127) inches. The side view shows port 1 (inlet) on the left, a 1/2 NPSC electrical opening on the right, and a total width of 8.10 (206) inches. Other dimensions include 3.00 (76) inches for the side port offset, 2.75 (70) inches for the base width, 5.50 (140) inches for the base length, 4.48 (114) inches for the base width, 2.63 (67) inches for the base length, 1.81 (46) inches for the side port offset, 2.81 (71) inches for the side port offset, 1.80 (46) inches for the side port offset, 2.09 (53) inches for the side port offset, and 3.00 (76) inches for the side port offset.</p>        |
| <p><b>Basic Size 30</b></p>               |  <p>Technical drawings of the Basic Size 30 valve. The front view shows a port 2 (outlet) at the top, a central body with four electrical connection points (0.53 (13) inches), and a base with a mounting hole. Dimensions include a total height of 17.30 (440) inches, a base width of 12.36 (314) inches, and a base height of 5.10 (130) inches. The side view shows port 1 (inlet) on the left, a 1/2 NPSC electrical opening on the right, and a total width of 11.10 (282) inches. Other dimensions include 5.90 (150) inches for the side port offset, 4.28 (109) inches for the base width, 8.56 (217) inches for the base length, 6.18 (157) inches for the base width, 2.63 (67) inches for the base length, 4.52 (115) inches for the side port offset, 2.91 (74) inches for the side port offset, 2.09 (53) inches for the side port offset, 2.27 (58) inches for the side port offset, and 3.70 (93) inches for the side port offset.</p> |
| <p>Downloadable CAD models available.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

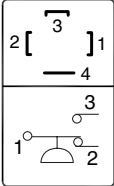
Accessories & Options

ENERGY RELEASE VERIFICATION

| Pressure Switch                                                                   | Redundant Pressure Switch Assembly                                                  |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

Illustration examples.

| Pressure Switch                       | Verification Type | Installation Location | Connector Type              | Model Number | Port Thread | Factory Preset<br>psi (bar) |
|---------------------------------------|-------------------|-----------------------|-----------------------------|--------------|-------------|-----------------------------|
|                                       | Electrical        | Downstream            | DIN EN 175301-803<br>Form A | 586A86       | 1/8 NPT     | 5 (0.3) falling             |
| Redundant Pressure<br>Switch Assembly | Verification Type | Installation Location | Connector Type              | Model Number | Port Thread | Factory Preset<br>psi (bar) |
|                                       | Electrical (Dual) | Downstream            | DIN EN 175301-803<br>Form A | RC026-13     | 3/8 NPT     | 5 (0.3) falling             |

| Pinout                                                                              |                                                                                 |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| DIN EN 175301-803                                                                   |                                                                                 |
|  | 1 - Common<br>2 - Normally Closed<br>3 - Normally Open<br>4 - Ground (Not Used) |

## REPLACEMENT VALVES

| Valve without Piping Flanges       | Signal Input | Port Size     | Valve Basic Size | Voltage  | Valve Model Number* |             |                   |             |
|------------------------------------|--------------|---------------|------------------|----------|---------------------|-------------|-------------------|-------------|
|                                    |              |               |                  |          | With Overrides      |             | Without Overrides |             |
|                                    |              |               |                  |          | NPT Thread          | G Thread    | NPT Thread        | G Thread    |
|                                    |              |               |                  |          |                     |             |                   |             |
|                                    | Single       | 1/2, 3/4, 1   | 8                | 24 V DC  | 3573A4201W          | D3573A4201W | 3573A4221W        | D3573A4221W |
|                                    |              |               |                  | 120 V AC | 3573A4201Z          | D3573A4201Z | 3573A4221Z        | D3573A4221Z |
|                                    |              |               |                  | 230 V AC | 3573A4201Y          | D3573A4201Y | 3573A4221Y        | D3573A4221Y |
|                                    |              | 3/4, 1, 1-1/4 | 12               | 24 V DC  | 3573A5201W          | D3573A5201W | 3573A5221W        | D3573A5221W |
|                                    |              |               |                  | 120 V AC | 3573A5201Z          | D3573A5201Z | 3573A5221Z        | D3573A5221Z |
|                                    |              |               |                  | 230 V AC | 3573A5201Y          | D3573A5201Y | 3573A5221Y        | D3573A5221Y |
|                                    |              | 1-1/4, 1-1/2  | 30               | 24 V DC  | 3573A7201W          | D3573A7201W | 3573A7221W        | D3573A7221W |
|                                    |              |               |                  | 120 V AC | 3573A7201Z          | D3573A7201Z | 3573A7221Z        | D3573A7221Z |
|                                    |              |               |                  | 230 V AC | 3573A7201Y          | D3573A7201Y | 3573A7221Y        | D3573A7221Y |
|                                    | Dual         | 1/2, 3/4, 1   | 8                | 24 V DC  | 3573A4301W          | D3573A4301W | 3573A4321W        | D3573A4321W |
|                                    |              |               |                  | 120 V AC | 3573A4301Z          | D3573A4301Z | 3573A4321Z        | D3573A4321Z |
|                                    |              |               |                  | 230 V AC | 3573A4301Y          | D3573A4301Y | 3573A4321Y        | D3573A4321Y |
|                                    |              | 3/4, 1, 1-1/4 | 12               | 24 V DC  | 3573A5301W          | D3573A5301W | 3573A5321W        | D3573A5321W |
|                                    |              |               |                  | 120 V AC | 3573A5301Z          | D3573A5301Z | 3573A5321Z        | D3573A5321Z |
|                                    |              |               |                  | 230 V AC | 3573A5301Y          | D3573A5301Y | 3573A5321Y        | D3573A5321Y |
|                                    |              | 1-1/4, 1-1/2  | 30               | 24 V DC  | 3573A7301W          | D3573A7301W | 3573A7321W        | D3573A7321W |
|                                    |              |               |                  | 120 V AC | 3573A7301Z          | D3573A7301Z | 3573A7321Z        | D3573A7321Z |
|                                    |              |               |                  | 230 V AC | 3573A7301Y          | D3573A7301Y | 3573A7321Y        | D3573A7321Y |
| * For other voltages consult ROSS. |              |               |                  |          |                     |             |                   |             |

## CONNECTION PIPING KITS

| Valve Piping Flange Kits                             | Port Size | Valve Basic Size | Kit Number* |          | Flange Quantity |
|------------------------------------------------------|-----------|------------------|-------------|----------|-----------------|
|                                                      |           |                  | NPT Thread  | G Thread |                 |
|                                                      | 1/2       | 8                | 661K77      | D661K77  | 2               |
|                                                      | 3/4       | 8                | 662K77      | D662K77  | 2               |
|                                                      |           | 12               | 664K77      | D664K77  | 2               |
|                                                      | 1         | 8                | 663K77      | D663K77  | 2               |
|                                                      |           | 12               | 665K77      | D665K77  | 2               |
|                                                      | 1-1/4     | 12               | 666K77      | D666K77  | 2               |
|                                                      |           | 30               | 667K77      | D667K77  | 2               |
|                                                      | 1-1/2     | 30               | 668K77      | D668K77  | 2               |
| *Kits include all required seals and mounting bolts. |           |                  |             |          |                 |





ROSS OPERATING VALVE, ROSS CONTROLS®, ROSS DECCO®, AUTOMATIC VALVE INDUSTRIAL, and MASTER PNEUMATIC, collectively the “ROSS Global Family”.

## PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure all sources of energy are turned off, the entire pneumatic system is shut down and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).
2. All ROSS Global Family Products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any product can be tampered with and/or need servicing after installation, persons responsible for the safety of others or the care of equipment must check ROSS Global Family Products on a regular basis and perform all necessary maintenance to ensure safe operating conditions.
3. All applicable instructions should be read and complied with before using any fluid power system to prevent harm to persons or equipment. In addition, overhauled or serviced valves must be functionally tested prior to installation and use. If you have any questions, call your nearest ROSS Global Family location.
4. Each ROSS Global Family Product should be used within its specification limits. In addition, use only ROSS Global Family components to repair ROSS Global Family Products.

### WARNINGS:

***Failure to follow these instructions can result in personal injury and/or property damage.***

## FILTRATION and LUBRICATION

1. 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. The ROSS Global Family recommends a filter with a 5-micron rating for normal applications.
2. All standard ROSS Global Family filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. 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 and hazardous leakage. Immediately replace crazed, cracked, or deteriorated bowls.
3. 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 which risks personal injury, and/or damage to property.

### WARNINGS:

***Failure to follow these instructions can result in personal injury and/or property damage.***

## AVOID INTAKE/EXHAUST RESTRICTION

1. Do not restrict air flow in the supply line. To do so could reduce the pressure of the supply air below minimum requirements for the valve and thereby causing erratic action.
2. 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.

### WARNINGS:

***Failure to follow these instructions can result in personal injury and/or property damage.***

## SAFETY APPLICATIONS

1. 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.
2. Safe Exhaust (dump) valves without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All Safe Exhaust valve installations should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.
3. Per specifications and regulations, the ROSS L-O-X® and L-O-X® with EEZ-ON®, operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

***WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.***

## STANDARD WARRANTY

All products sold by the ROSS Global Family are warranted for a one-year period [with the exception of Air Preparation products which are warranted for a period of seven (7) years] from the date of purchase. All products are, during their respective warranty periods, warranted to be free of defects in material and workmanship. The ROSS Global Family's obligation under this warranty is limited to repair, replacement or refund of the purchase price paid for products which the ROSS Global Family has determined, in its sole discretion, are defective. All warranties become void if a product has been subject to misuse, misapplication, improper maintenance, modification or tampering. Products for which warranty protection is sought must be returned to the ROSS Global Family freight prepaid.

THE WARRANTY EXPRESSED ABOVE IS IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND THE ROSS GLOBAL FAMILY EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE ROSS GLOBAL FAMILY 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 THE ROSS GLOBAL FAMILY 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 THE ROSS GLOBAL FAMILY MAY EXTEND THE LIABILITY OF THE ROSS GLOBAL FAMILY AS SET FORTH HEREIN.





950 Woodward Heights, Ferndale, Michigan 48220 US

#### GLOBAL LOCATIONS

|             |                |                |                            |                      |                                                                          |
|-------------|----------------|----------------|----------------------------|----------------------|--------------------------------------------------------------------------|
| <b>ROSS</b> | AMERICAS       | USA            | <b>ROSS CONTROLS</b>       | +1-248-764-1800      | <a href="http://www.rosscontrols.com">www.rosscontrols.com</a>           |
|             |                | Canada         | <b>ROSS CANADA</b>         | +1-416-251-7677      | <a href="http://www.rosscanada.com">www.rosscanada.com</a>               |
|             |                | Brazil         | <b>ROSS BRASIL</b>         | +55-11-4335-2200     | <a href="http://www.rosscontrols.com.br">www.rosscontrols.com.br</a>     |
|             |                | Mexico         | <b>ROSS MEXICO</b>         | +52-81-2130-2570     | <a href="http://www.rossmexico.com">www.rossmexico.com</a>               |
|             | EUROPE         | Germany        | <b>ROSS EUROPA</b>         | +49 (0)6103-7597-100 | <a href="http://www.rosseuropa.com">www.rosseuropa.com</a>               |
|             |                | France         | <b>ROSS FRANCE</b>         | +33(0)1-49-45-65-65  | <a href="http://www.rossfrance.com">www.rossfrance.com</a>               |
|             |                | United Kingdom | <b>ROSS UK</b>             | +44 (0)1254 872277   | <a href="http://www.rossuk.co.uk">www.rossuk.co.uk</a>                   |
|             | ASIA & PACIFIC | India          | <b>ROSS CONTROLS INDIA</b> | +91-44-2624-9040     | <a href="http://www.rosscontrolsindia.com">www.rosscontrolsindia.com</a> |
|             |                | China          | <b>ROSS CONTROLS CHINA</b> | +86-21-6915-7961     | <a href="http://www.rosscontrolschina.com">www.rosscontrolschina.com</a> |
|             |                | Japan          | <b>ROSS ASIA</b>           | +81-42-778-7251      | <a href="http://www.rossasia.co.jp">www.rossasia.co.jp</a>               |



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