ROSS®

# Vacuum Applications
# 21 Series Classic Valves

## Product Catalog

# Inline Poppet Valves 21 Series – Vacuum Applications
# Product Overview

### Valves for Vacuum Applications

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

### Valves for Full Vacuum Applications

Full vacuum valves are ideal for applications where compressed air is unavailable. Full vacuum valves use the difference in force between atmospheric pressure and the vacuum within the valve to actuate the valve. The full vacuum valve performs with atmospheric pressure in port 1 and 10 to 30 inches of Mercury vacuum in the valve body.

| Solenoid Pilot Controlled | Pressure Controlled |
|---|---|
|  |  |

*Illustration examples.*

## VALVE FEATURES

| | |
|---|---|
| **Poppet Design** | Poppet construction for high dirt tolerance<br>ROSS vacuum valves have larger orifices, allowing greater flow and easing the transport of air even though there is a small differential between the vacuum within the valve and atmospheric pressure outside the valve |
| **Mounting Options** | Can be mounted close to actuator, reducing length of pipe to be pressurized/exhausted on each cycle |
| **Pilot Supply** | Internal or external; easily field-convertible for use with an external pilot supply |
| **High Velocity** | Near zero leakage |
| **Positive Sealing** | No sliding action to prevent damage and wear |
| **Reliability** | Consistent response times over the life of the valve |

***Valve models for external pilot supply available, consult ROSS.***

***Explosion-Proof solenoid pilot valves available, see valves for Hazardous Locations.***

| Actuation | Application | Available Inlet Port Sizes | | | | | | | | | Functions | | Maximum Flow $C_v$ (Nl/min) | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1/4 | 3/8 | 1/2 | 3/4 | 1 | 1-1/4 | 1-1/2 | 2 | 2-1/2 | 2/2 | 3/2 | | |
| Solenoid Controlled | Vacuum | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 71 (70000) | 3 – 7 |
| | Full Vacuum | | ● | | | | ● | | | | | ● | 33 (32000) | 8 – 9 |
| Pressure Controlled | Vacuum | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 71 (70000) | 10 – 13 |
| Accessories and Options | | | | | | | | | | | | | | 14 – 16 |

## STANDARD SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| **GENERAL** | Function | 2/2 Valve | Normally Closed | |
| | | | Normally Open | |
| | | 3/2 Valve | Normally Closed | |
| | | | Normally Open | |
| | Construction Design | | Poppet | |
| | Actuation | Electrical | Solenoid Pilot Controlled | |
| | | Pneumatic | Pressure Controlled | |
| | Mounting | Type | Inline | |
| | | Orientation | Any, preferably vertical | |
| | Connection | Threaded Port | NPT | |
| | | | G | |
| | Manual Override (Solenoid Pilot valves) | | Non-locking metal button, standard | |
| **OPERATING CONDITIONS** | Temperature | Solenoid Pilot Controlled | Ambient | -40° to 120°F (-40° to 50°C) |
| | | | Media | -40° to 175°F (-40° to 80°C) |
| | | Pressure Controlled | Ambient | -40° to 175°F (-40° to 80°C) |
| | | | Media | |
| | | *For temperatures below 40°F (4°C) air must be free of water vapor to prevent formation of ice.* | | |
| | Flow Media | Vacuum and/or filtered-compressed air | | |
| | Operating Pressure | Vacuum to 150 psig (Vacuum to 10 bar) | | |
| | Pilot Supply | Internal | Must meet minimum operating pressure | |
| | | External | Must be equal to or greater than inlet pressure, but no less than 30 psig (2 bar) | |

| | | | | |
|---|---|---|---|---|
| **ELECTRICAL DATA FOR SOLENOID PILOT VALVES** | Solenoids | 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 |
| | | | 230-240 volts, 60 Hz | |
| | | Rated for continuous duty | | |

| | | | |
|---|---|---|---|
| **CONSTRUCTION MATERIAL** | Valve Body | Cast Aluminum | |
| | Poppet | Aluminum and Stainless Steel | |
| | Seals | Fluorocarbon | Viton |

| | | |
|---|---|---|
| **SAFETY DATA** | Safety Integrity Level (SIL) | Certified by TÜV Rheinland in accordance to IEC 61508 and IEC 61511 safety integrity level 2 (SIL 2) and EN ISO 13849-1, PL c (with application specific diagnosis) in singular application with HFT = 0 and SIL 3 and PL d in redundant application with HFT≥1, for details see certificate. |

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

High temperature valves also available. Please contact ROSS.

## PRODUCT CREDENTIALS

| Safety Integrity Level | Declaration of Conformity | Certificate of Compliance |
|---|---|---|
| Per IEC 2061:2001 | | |
| SIL 2 Functional Safety | CE EAC | CSA C US |

# Ordering Information

## 2/2 Solenoid Pilot Controlled Valves for Vacuum Applications

### Piping 2/2 Normally Closed (NC) or Normally Open (NO) Valves

Pipe the unit into the system by connecting the vacuum source or pump to the normal air pressure inlet port (port 1). The normal outlet port is the work port (port 2).

Note: 2/2 vacuum valves provide only on/off control and do not have an exhaust function.

### SOLENOID PILOT CONTROLLED VALVES — 2-Way 2-Position Valves

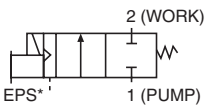
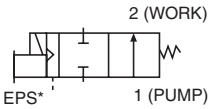
| Body Size | Port Size In-Out | Function | Valve Model Number | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | NPT Thread | | | G Thread | | |
| | | | 24 V DC | 110-120 V AC | 230 V AC | 24 V DC | 110-120 V AC | 230 V AC |
| 3/8 | 1/4 | NC | 2171B2901W | 2171B2901Z | 2171B2901Y | D2171B2901W | D2171B2901Z | D2171B2901Y |
| | 3/8 | NC | 2171B3906W | 2171B3906Z | 2171B3906Y | D2171B3906W | D2171B3906Z | D2171B3906Y |
| | 1/2 | NC | 2171A4917W | 2171A4917Z | 2171A4917Y | D2171A4917W | D2171A4917Z | D2171A4917Y |
| 3/4 | 3/4 | NC | 2171B5905W | 2171B5905Z | 2171B5905Y | D2171B5905W | D2171B5905Z | D2171B5905Y |
| | 1 | NC | 2171B6904W | 2171B6904Z | 2171B6904Y | D2171B6904W | D2171B6904Z | D2171B6904Y |
| 1-1/4 | 1 | NC | 2171B6916W | 2171B6916Z | 2171B6916Y | D2171B6916W | D2171B6916Z | D2171B6916Y |
| | 1-1/4 | NC | 2171B7901W | 2171B7901Z | 2171B7901Y | D2171B7901W | D2171B7901Z | D2171B7901Y |
| | 1-1/2 | NC | 2171B8906W | 2171B8906Z | 2171B8906Y | D2171B8906W | D2171B8906Z | D2171B8906Y |
| | | NO | 2172B8900W | 2172B8900Z | 2172B8900Y | D2172B8900W | D2172B8900Z | D2172B8900Y |
| 2 | 1-1/2 | NC | 2171B8900W | 2171B8900Z | 2171B8900Y | D2171B8900W | D2171B8900Z | D2171B8900Y |
| | 2-1/2 | NC | 2171B9901W | 2171B9901Z | 2171B9901Y | D2171B9901W | D2171B9901Z | D2171B9901Y |

For other voltages, consult ROSS.

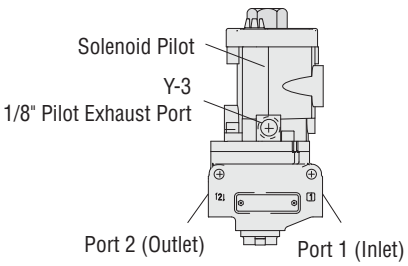
| Size | | Function | Flow $C_v$ (Nl/min) | Average Response Constants* | | ≈ Weight lb (kg) |
|---|---|---|---|---|---|---|
| Body | Port 1, 2 | | 1 – 2 | M | F | |
| 3/8 | 1/4 | NC | 1.7 (1700) | 10 | 0.96 | 3.0 (1.4) |
| | 3/8 | NC | 2.2 (2200) | 10 | 0.90 | |
| | 1/2 | NC | 2.6 (2600) | 10 | 0.82 | |
| 3/4 | 3/4 | NC | 6.6 (6500) | 14 | 0.39 | 3.3 (1.5) |
| | 1 | NC | 7.7 (7600) | 14 | 0.32 | |
| 1-1/4 | 1 | NC | 8.3 (8200) | 14 | 0.31 | 7.5 (3.4) |
| | 1-1/4 | NC | 20 (20000) | 26 | 0.19 | |
| | 1-1/2 | NC | 29 (29000) | 26 | 0.14 | |
| | | NO | 31 (31000) | 26 | 0.17 | |
| 2 | 1-1/2 | NC | 57 (56000) | ## | ## | 15.5 (6.9) |
| | 2-1/2 | NC | 64 (63000) | ## | ## | |

* **Valve Response Time** – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above.
## Consult ROSS.

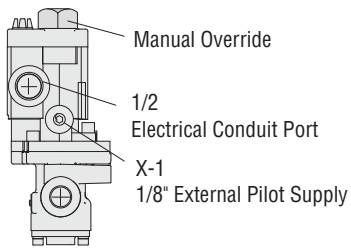
### Valve Schematic

| Normally Closed | Normally Open |
|---|---|
|  |  |





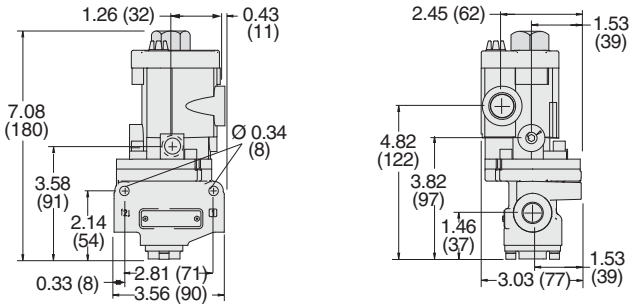




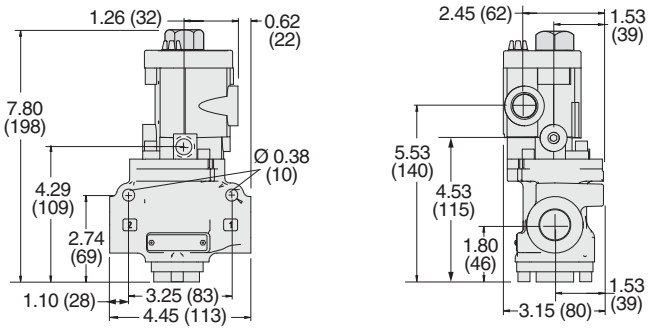
## 2/2 Solenoid Pilot Controlled Valves for Vacuum Applications

| DIMENSIONS | Inches (mm) |
|---|---|

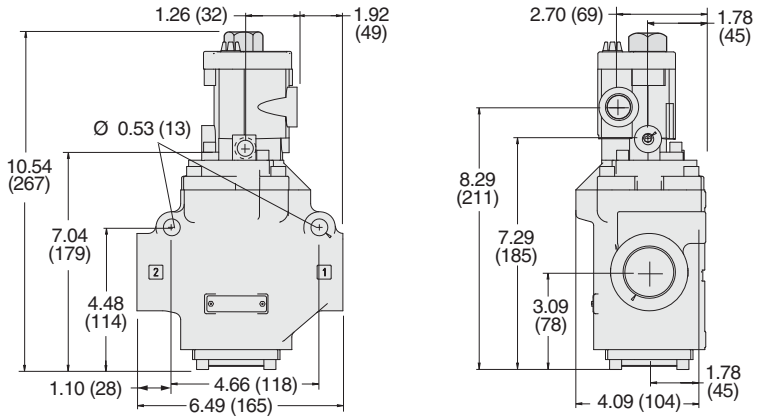
**Body Size 3/8**



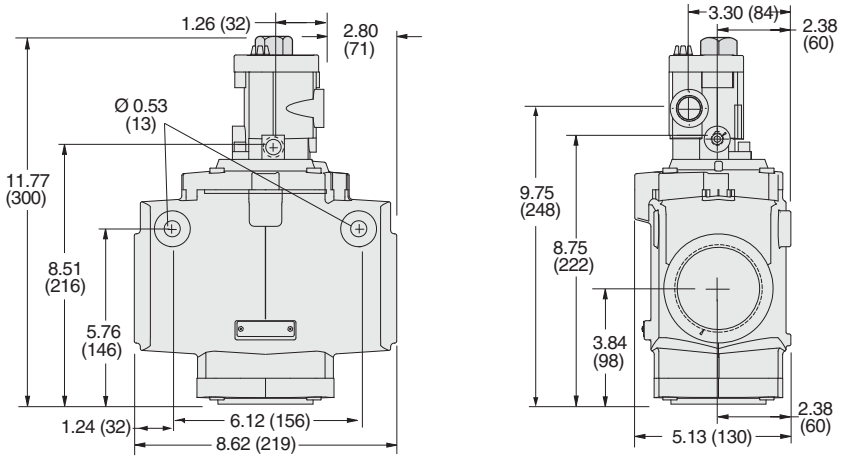

**Body Size 3/4**




**Body Size 1-1/4**




**Body Size 2**




**Downloadable CAD models available.**

# Ordering Information

## 3/2 Solenoid Pilot Controlled Valves for Vacuum Applications

### Piping 3/2 Normally Closed (NC) Valves

In this valve configuration, pipe the unit into the system by connecting the vacuum source or pump to the normal air pressure inlet port (port 1). The normal outlet port is the work port (port 2), and the normal air pressure exhaust port becomes the atmosphere port (port 3).

### Piping 3/2 Normally Open (NO) Valves

To obtain a 3/2 normally open ROSS vacuum valve, simply pipe the 3/2 normally closed body slightly differently. Connect the vacuum source or pump to port 3, the normal exhaust. Leave port 1 open to atmosphere, and the normal outlet remains as the work port (port 2).

## SOLENOID PILOT CONTROLLED VALVES — 3-Way 2-Position Valves

| Body Size | Port Size | | Function | Valve Model Number | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | In-Out | Exhaust | | NPT Thread | | | G Thread | | |
| | | | | 24 V DC | 110-120 V AC | 230 V AC | 24 V DC | 110-120 V AC | 230 V AC |
| 3/8 | 1/4 | 1/2 | NC | 2173B2900W | 2173B2900Z | 2173B2900Y | D2173B2900W | D2173B2900Z | D2173B2900Y |
| | 3/8 | 1/2 | NC | 2173A3908W | 2173A3908Z | 2173A3908Y | D2173A3908W | D2173A3908Z | D2173A3908Y |
| | 1/2 | 1/2 | NC | 2173B4901W | 2173B4901Z | 2173B4901Y | D2173B4901W | D2173B4901Z | D2173B4901Y |
| 3/4 | 1/2 | 1 | NC | 2173B4902W | 2173B4902Z | 2173B4902Y | D2173B4902W | D2173B4902Z | D2173B4902Y |
| | 1/2 | 1 | NO | 2174A4912W | 2174A4912Z | 2174A4912Y | D2174A4912W | D2174A4912Z | D2174A4912Y |
| | 3/4 | 1 | NC | 2173B5900W | 2173B5900Z | 2173B5900Y | D2173B5900W | D2173B5900Z | D2173B5900Y |
| | 1 | 1 | NC | 2173B6901W | 2173B6901Z | 2173B6901Y | D2173B6901W | D2173B6901Z | D2173B6901Y |
| 1-1/4 | 1 | 1-1/2 | NC | 2173B6902W | 2173B6902Z | 2173B6902Y | D2173B6902W | D2173B6902Z | D2173B6902Y |
| | 1 | 1-1/2 | NO | 2174A6914W | 2174A6914Z | 2174A6914Y | D2174A6914W | D2174A6914Z | D2174A6914Y |
| | 1-1/4 | 1-1/2 | NC | 2173B7901W | 2173B7901Z | 2173B7901Y | D2173B7901W | D2173B7901Z | D2173B7901Y |
| | 1-1/4 | 1-1/2 | NC | 2173A7917W | 2173A7917Z | 2173A7917Y | D2173A7917W | D2173A7917Z | D2173A7917Y |
| | 1-1/2 | 1-1/2 | NC | 2173B8900W | 2173B8900Z | 2173B8900Y | D2173B8900W | D2173B8900Z | D2173B8900Y |
| 2 | 2 | 2-1/2 | NC | 2173A9905W | 2173A9905Z | 2173A9905Y | D2173A9905W | D2173A9905Z | D2173A9905Y |
| | 2-1/2 | 2-1/2 | NC | 2173A9906W | 2173A9906Z | 2173A9906Y | D2173A9906W | D2173A9906Z | D2173A9906Y |

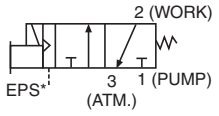
For other voltages, consult ROSS.

| Size | | | Function | Flow $C_v$ (Nl/min) | | Average Response Constants* | | | ≈ Weight lb (kg) |
|---|---|---|---|---|---|---|---|---|---|
| Body | Port 1, 2 | Port 3 | | 1-2 | 2-3 | M | F 1-2 | F 2-3 | |
| 3/8 | 1/4 | 1/2 | NC | 1.7 (1700) | 3.2 (3100) | 10 | 1.76 | 2.08 | 3.0 (1.4) |
| | 3/8 | 1/2 | NC | 2.5 (2500) | 4.4 (4300) | 10 | 0.95 | 1.07 | |
| | 1/2 | 1/2 | NC | 2.6 (2600) | 4.6 (4600) | 10 | 0.94 | 0.98 | |
| 3/4 | 1/2 | 1 | NC | 6.0 (5900) | 8.8 (8700) | 11 | 0.58 | 0.64 | 3.3 (1.5) |
| | 1/2 | 1 | NO | 7.5 (7400) | 8.0 (7900) | 11 | 0.58 | 0.64 | |
| | 3/4 | 1 | NC | 7.5 (7400) | 11 (11000) | 11 | 0.38 | 0.41 | |
| | 1 | 1 | NC | 7.9 (7800) | 12 (12000) | 11 | 0.24 | 0.36 | |
| 1-1/4 | 1 | 1-1/2 | NC | 20 (20000) | 27 (27000) | 28 | 0.16 | 0.18 | 7.5 (3.4) |
| | 1 | 1-1/2 | NO | 19 (19000) | 23 (23000) | 28 | 0.16 | 0.18 | |
| | 1-1/4 | 1-1/2 | NC | 28 (28000) | 33 (32000) | 28 | 0.12 | 0.17 | |
| | 1-1/4 | 1-1/2 | NO | 22 (22000) | 25 (25000) | 28 | 0.15 | 0.19 | |
| | 1-1/2 | 1-1/2 | NC | 29 (29000) | 33 (32000) | 28 | 0.12 | 0.16 | |
| 2 | 2 | 2-1/2 | NC | 70 (69000) | 70 (69000) | ## | ## | ## | 16.5 (7.4) |
| | 2-1/2 | 2-1/2 | NC | 70 (69000) | 71 (70000) | ## | ## | ## | |

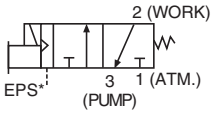
* **Valve Response Time** – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above. ## Consult ROSS.

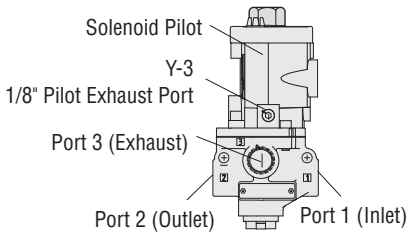
### Valve Schematic

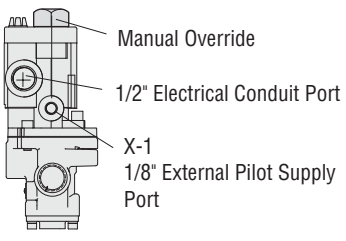
**Normally Closed**




**Normally Open**



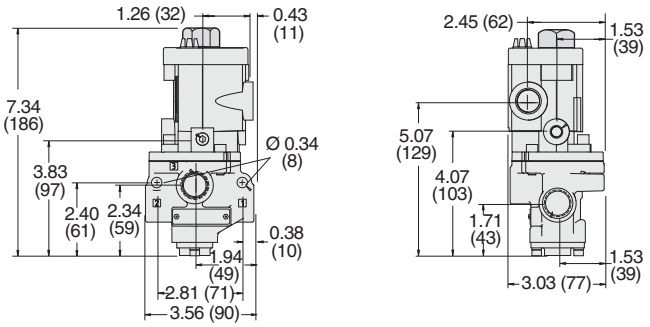



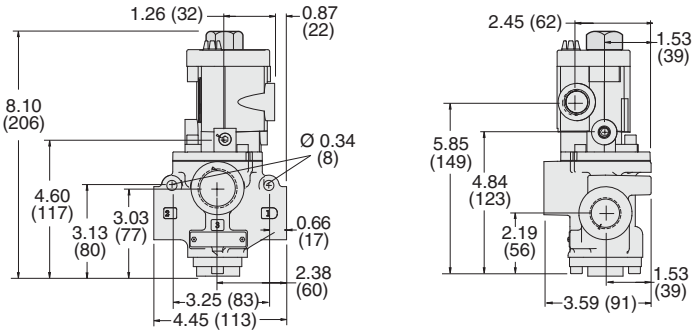
## 3/2 Solenoid Pilot Controlled Valves for Vacuum Applications

| DIMENSIONS | Inches (mm) |
|---|---|

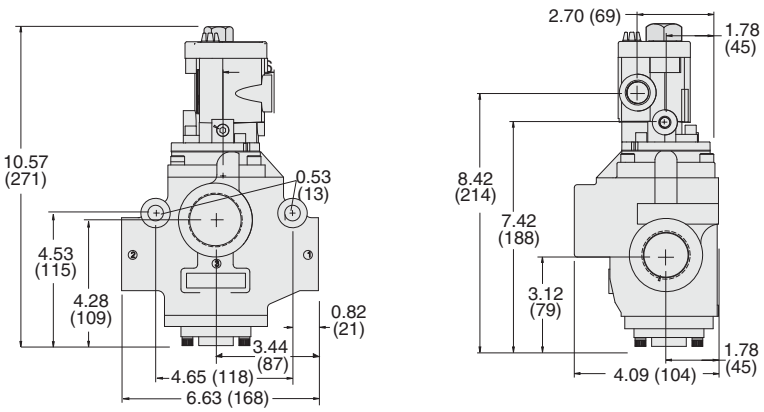
**Body Size 3/8**



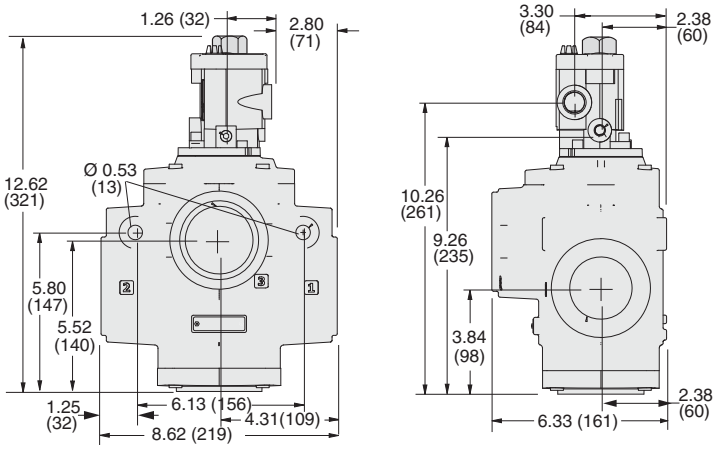

**Body Size 3/4**




**Body Size 1-1/4**




**Body Size 2**




Downloadable CAD models available.

# Ordering Information

## 3/2 Solenoid Pilot Controlled Valves for Full Vacuum Applications

### Full Vacuum – 3/2 Normally Closed (NC) Valves

This valve functions as a normally open valve. Pipe the unit into the system by connecting the vacuum source or pump to port 3, the normal exhaust. Leave port 1 open to atmosphere, and the normal outlet remains as the work port (port 2).

### Full Vacuum – 3/2 Normally Open (NO) Valves

This valve functions as a normally closed valve. Pipe the unit into the system by connecting the vacuum source or pump to port 3, the normal exhaust. Leave port 1 open to atmosphere, and the normal outlet remains as the work port (port 2).

## SOLENOID PILOT CONTROLLED VALVES — 3-Way 2-Position Valves

| Body Size | Port Size | | Function | Valve Model Number | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | In-Out | Exhaust | | NPT Thread | | | G Thread | | |
| | | | | 24 V DC | 110-120 V AC | 230 V AC | 24 V DC | 110-120 V AC | 230 V AC |
| 3/8 | 1/2 | 1/2 | NC | 2173B4914W | 2173B4914Z | 2173B4914Y | D2173B4914W | D2173B4914Z | D2173B4914Y |
| | | | NO | 2174B4900W | 2174B4900Z | 2174B4900Y | D2174B4900W | D2174B4900Z | D2174B4900Y |
| 1-1/4 | 1-1/4 | 1-1/2 | NC | 2173B7904W | 2173B7904Z | 2173B7904Y | D2173B7904W | D2173B7904Z | D2173B7904Y |
| | | | NO | 2174B7903W | 2174B7903Z | 2174B7903Y | D2174B7903W | D2174B7903Z | D2174B7903Y |

For other voltages, consult ROSS.

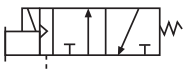
| Size | | | Function | Flow $C_V$ (Nl/min) | | Average Response Constants* | | | ≈ Weight lb (kg) |
|---|---|---|---|---|---|---|---|---|---|
| Body | Port 1, 2 | Port 3 | | 1-2 | 2-3 | M | F | | |
| | | | | | | | 1-2 | 2-3 | |
| 3/8 | 1/2 | 1/2 | NC | 2.6 (2600) | 4.6 (4600) | 11 | 0.50 | 0.70 | 3.0 (1.4) |
| | | | NO | 3.0 (3000) | 2.8 (2800) | 11 | 0.58 | 0.64 | |
| 1-1/4 | 1-1/4 | 1-1/2 | NC | 28 (28000) | 33 (32000) | 28 | 0.15 | 0.19 | 7.5 (3.4) |
| | | | NO | 22 (22000) | 25 (25000) | 28 | 0.12 | 0.17 | |

* **Valve Response Time** – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above.

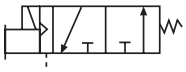
## Consult ROSS.

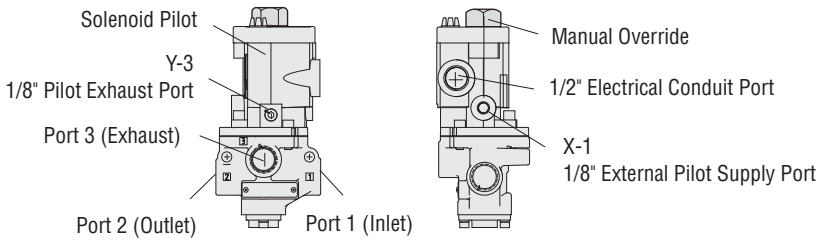
### Valve Schematic

**Normally Closed**

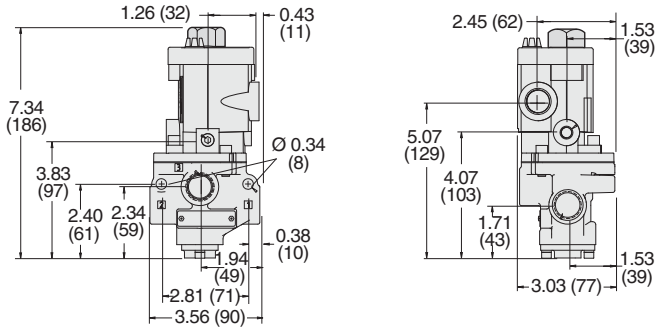
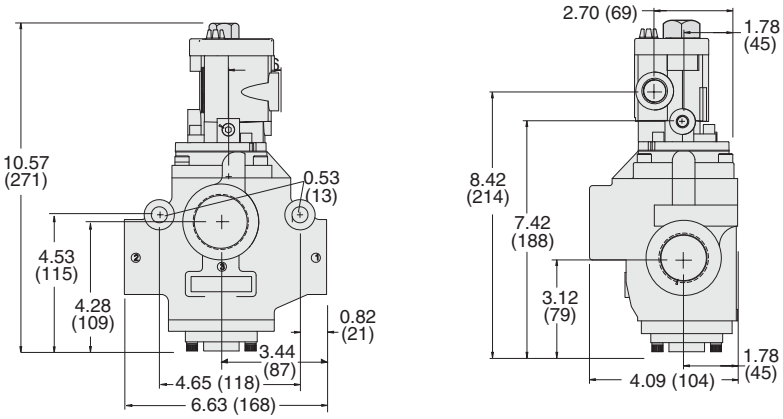


**Normally Open**





## 3/2 Solenoid Pilot Controlled Valves for Full Vacuum Applications

| DIMENSIONS | Inches (mm) |
|---|---|
| **Body Size 3/8** |  |
| **Body Size 1-1/4** |  |

**Downloadable CAD models available.**

# Ordering Information

## 2/2 Pressure Controlled Valves for Vacuum Applications

### Piping 2/2 Normally Closed (NC) or Normally Open (NO) Valves

Pipe the unit into the system by connecting the vacuum source or pump to the normal air pressure inlet port (port 1). The normal outlet port is the work port (port 2).

Note: 2/2 vacuum valves provide only on/off control and do not have an exhaust function.

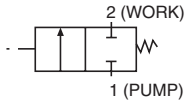
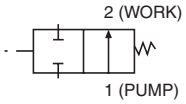
**PRESSURE CONTROLLED VALVES** — **2-Way 2-Position Valves**

| Body Size | Port Size | Function | Valve Model Number | |
|---|---|---|---|---|
| | In-Out | | NPT Thread | G Thread |
| 3/8 | 1/4 | NC | 2151A2901 | D2151A2901 |
| | 1/2 | NC | 2151A4910 | D2151A4910 |
| 3/4 | 1/2 | NC | 2151B4904 | D2151B4904 |
| | 3/4 | NC | 2151A5913 | D2151A5913 |
| | 3/4 | NO | 2152A5901 | D2152A5901 |
| | 1 | NC | 2151B6900 | D2151B6900 |
| 1-1/4 | 1 | NC | 2151A7909 | D2151A7909 |
| | 1-1/4 | NC | 2151B8900 | D2151B8900 |
| | 1-1/2 | NO | 2152B7900 | D2152B7900 |

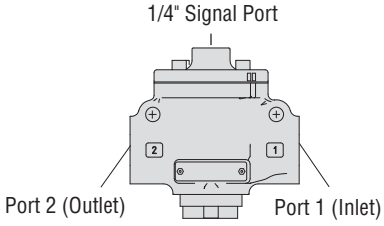
| Size | | Function | Flow $C_V$ (Nl/min) | Average Response Constants* | | ≈ Weight lb (kg) |
|---|---|---|---|---|---|---|
| Body | Port 1, 2 | | 1-2 | M | F | |
| 3/8 | 1/4 | NC | 1.7 (1700) | 10 | 0.96 | 1.8 (0.8) |
| | 1/2 | NC | 2.6 (2600) | 10 | 0.90 | |
| 3/4 | 1/2 | NC | 6.6 (6500) | 10 | 0.82 | 4.5 (2.0) |
| | 3/4 | NC | 7.7 (7600) | 14 | 0.39 | |
| | 3/4 | NO | 7.4 (7300) | 14 | 0.37 | |
| | 1 | NC | 8.3 (8200) | 14 | 0.19 | |
| 1-1/4 | 1 | NC | 20 (20000) | 26 | 0.14 | 11.0 (5.0) |
| | 1-1/4 | NC | 29 (29000) | 26 | 0.13 | |
| | 1-1/2 | NO | 23 (23000) | 26 | 0.17 | |

* **Valve Response Time** – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above.
## Consult ROSS.

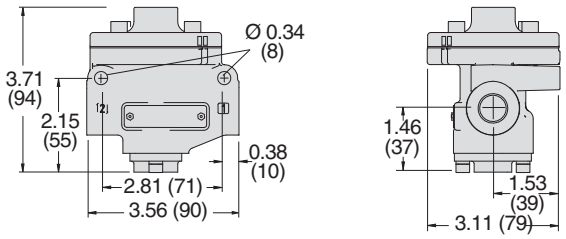
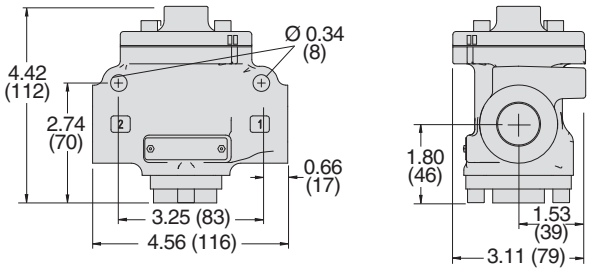
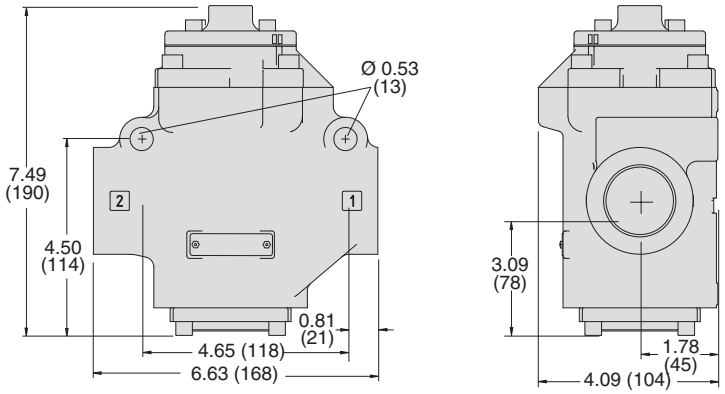
**Valve Schematic**

| Normally Closed | Normally Open |
|---|---|
|  |  |





## 2/2 Pressure Controlled Valves for Vacuum Applications

| DIMENSIONS | Inches (mm) |
|---|---|
| **Body Size 3/8** |  |
| **Body Size 3/4** |  |
| **Body Size 1-1/4** |  |
| **Downloadable CAD models available.** | |

# Ordering Information

## 3/2 Pressure Controlled Valves for Vacuum Applications

### Piping 3/2 Normally Closed Valves

In this valve configuration, pipe the unit into the system by connecting the vacuum source or pump to the normal air pressure inlet port (port 1). The normal outlet port is the work port (port 2), and the normal air pressure exhaust port becomes the atmosphere port (port 3).

**PRESSURE CONTROLLED VALVES** — **3-Way 2-Position Valves**

| Body Size | Port Size | | Valve Model Number | |
|---|---|---|---|---|
| | In-Out | Exhaust | NPT Thread | G Thread |
| 3/8 | 1/4 | 1/2 | 2153B2900 | D2153B2900 |
| | 3/8 | 1/2 | 2153A3913 | D2153A3913 |
| | 1/2 | 1/2 | 2153B4903 | D2153B4903 |
| 3/4 | 3/4 | 1 | 2153B5903 | D2153B5903 |
| | 1 | 1 | 2153A6906 | D2153A6906 |
| | 1 | 1-1/2 | 2153C6905 | D2153C6905 |
| 1-1/4 | 1-1/4 | 1-1/2 | 2153A7906 | D2153A7906 |
| | 1-1/2 | 1-1/2 | 2153B8900 | D2153B8900 |
| | 2 | 2-1/2 | 2153A9903 | D2153A9903 |
| 2 | 2-1/2 | 2-1/2 | 2153A9902 | D2153A9902 |

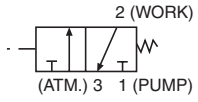
| Size | | | Flow $C_V$ (Nl/min) | | Average Response Constants* | | | ≈ Weight lb (kg) |
|---|---|---|---|---|---|---|---|---|
| Body | Port 1, 2 | Port 3 | 1-2 | 2-3 | M | F 1-2 | F 2-3 | |
| 3/8 | 1/4 | 1/2 | 1.7 (1700) | 3.2 (3100) | 10 | 1.60 | 2.30 | 1.8 (0.8) |
| | 3/8 | 1/2 | 2.5 (2500) | 4.4 (4300) | 10 | 0.95 | 1.07 | |
| | 1/2 | 1/2 | 2.6 (2600) | 4.6 (4600) | 10 | 0.94 | 0.98 | |
| 3/4 | 1/2 | 1 | 6.0 (5900) | 8.8 (8700) | 11 | 0.38 | 0.41 | 4.5 (2.0) |
| | 3/4 | 1 | 7.5 (7400) | 11 (11000) | 11 | 0.24 | 0.36 | |
| | 1 | 1 | 7.9 (7800) | 12 (12000) | 28 | 0.17 | 0.20 | |
| 1-1/4 | 1 | 1-1/2 | 20 (20000) | 27 (27000) | 28 | 0.15 | 0.19 | 11.0 (5.0) |
| | 1-1/4 | 1-1/2 | 28 (28000) | 33 (32000) | 28 | 0.12 | 0.16 | |
| | 1-1/2 | 1-1/2 | 29 (29000) | 33 (32000) | 28 | 0.12 | 0.16 | |
| 2 | 2 | 2-1/2 | 70 (69000) | 70 (69000) | ## | ## | ## | 15.3 (6.9) |
| | 2-1/2 | 2-1/2 | 70 (69000) | 71 (70000) | ## | ## | ## | |

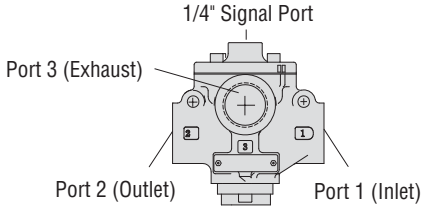
* **Valve Response Time** – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above.

## Consult ROSS.

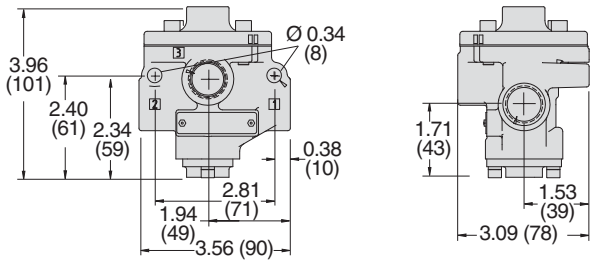
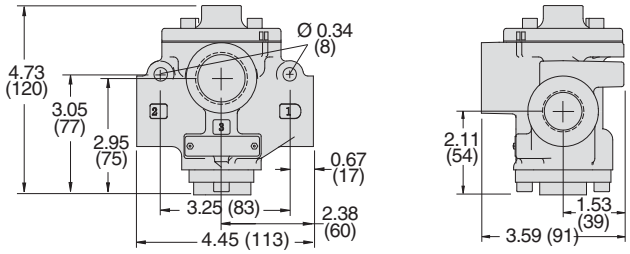
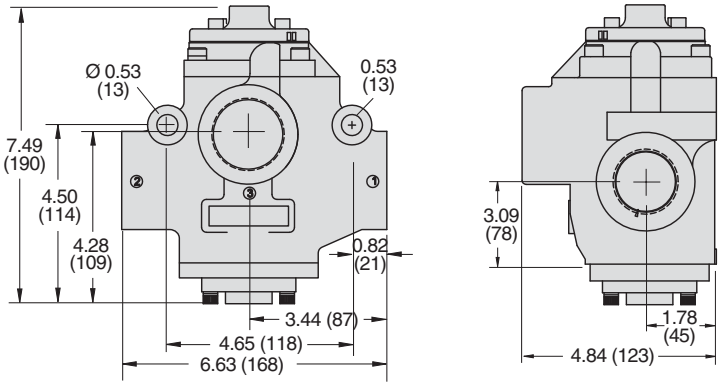
**Valve Schematic**

**Normally Closed**



## 3/2 Pressure Controlled Valves for Vacuum Applications

| DIMENSIONS | Inches (mm) |
|---|---|
| **Body Size 3/8** |   |
| **Body Size 3/4** |   |
| **Body Size 1-1/4** |   |

**Downloadable CAD models available.**

## EXHAUST SILENCERS

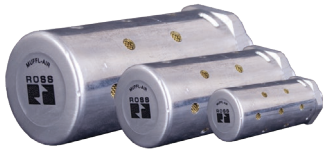


*Illustration example.*

**Silencers**

| SPECIFICATIONS | Silencer Material | Pressure Range psig (bar) | Schematic |
|---|---|---|---|
| | Aluminum | 0-290 (0-20) maximum |  |

| Port Size | Thread Type | Flow $C_V$ (Nl/min) | Model Number | | Dimensions inches (mm) | | ≈ Weight lb (kg) |
|---|---|---|---|---|---|---|---|
| | | | NPT Thread | R/Rp Thread | Length | Hex Size (D) | |
| 1/2 | Male | 6.8 (6700) | 5500A4003 | D5500A4003 | 3.6 (9) | 1.25 (32) | 0.2 (0.1) |
| 1 | Male | 18 (18000) | 5500A6003 | D5500A6003 | 5.4 (14) | 2.0 (51) | 0.9 (0.4) |
| 1-1/2 | Female | 39 (38000) | 5500A8001 | D5500A8001 | 5.7 (14) | 2.5 (64) | 1.3 (0.6) |
| 2-1/2 | Female | 104 (100000) | 5500A9002 | D5500A9002 | 4.0 (102) | 5.7 (145) | 2.9 (1.4) |

## FEMALE SILENCER CONNECTORS

**Hex Nipples**

| Material | Fitting Pipe Size | Thread Type | Model Number | | |
|---|---|---|---|---|---|
| | | | NPT Thread | BSPT Thread | |
| Steel | 1-1/2 | Male - Male | 488J27 | 122J39 |  |
| | 2-1/2 | Male - Male | 490J27 | 123J39 | |

## SOLENOID PILOT INDICATOR LIGHT KITS

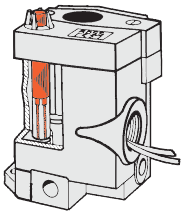


*Illustration example.*

| | Kit Number | | |
|---|---|---|---|
| | **24 V DC** | **110-120 V AC, 50-60 Hz** | **230 V AC, 50-60 Hz** |
| **Indicator Light Kits** | 862K87-W | 862K87-Z | 862K87-Y |
| | To visually verify valve operation, indicator light kits are available for single solenoid models. Indicator lights are standard on double solenoid valves. The indicator light is illuminated when the solenoid is energized. | | |

## SOLENOID PILOT MANUAL OVERRIDE KITS

| Flush Button | Extended Button | Extended Button with Palm |
|---|---|---|
|  |  |  |

*Illustration examples.*

| | Manual Override Type | Kit Number | |
|---|---|---|---|
| | | Locking Type | Non-Locking Type |
| **Manual Override Kits** | Flush Button | 792K87 | – |
| | Extended Button | – | 791K87 |
| | Extended Button with Palm | – | 984H87 |
| | Non-locking metal button manual override is standard on solenoid models.<br>Each of the buttons in the override kits is made of metal and is spring-returned. The locking type button, however, can be kept in the actuated position by turning the slot in the top of the button with a screwdriver. | | |

# Notes

# CAUTIONS, WARNINGS And STANDARD WARRANTY

**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 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®, N06 and N16 Series 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.

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