

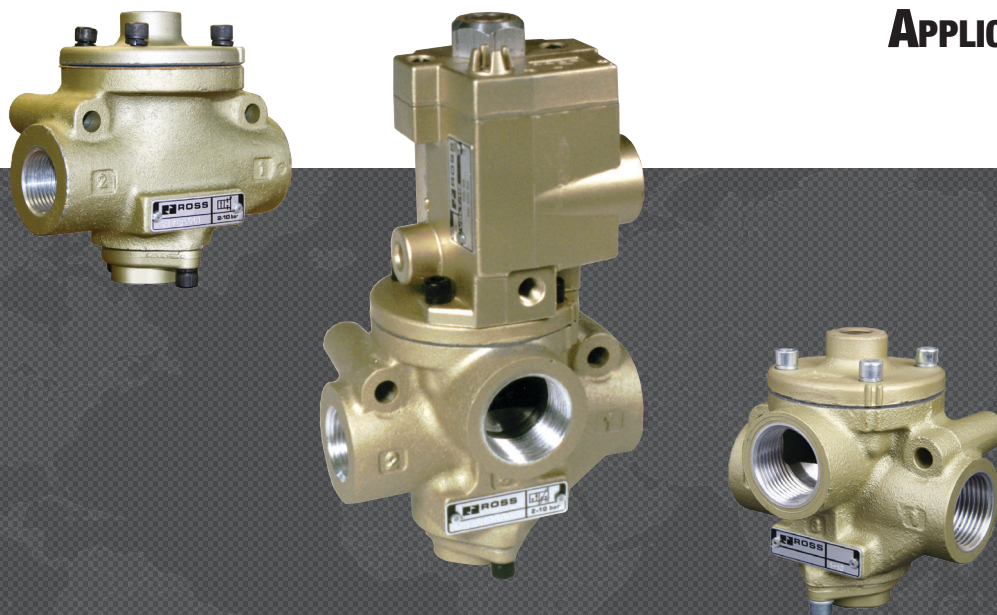


# **DIRECTIONAL CONTROL HEADLINE VACUUM VALVES 21 SERIES**

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## **PRODUCT CATALOG**

**VACUUM AND FULL VACUUM  
APPLICATIONS**



# Headline Valves 21 Series for Vacuum and Full 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  
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.**

**For ATEX certified valves order placement, consult ROSS.**



Actuation	Application	Available Inlet Port Sizes									Functions		Maximum Flow C <sub>v</sub>	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	3 – 7
	Full Vacuum		●				●					●	39	8 – 9
Pressure Controlled	Vacuum	●	●	●	●	●	●	●	●	●	●	●	71	10 – 13
Accessories and Options														14





## STANDARD SPECIFICATIONS

GENERAL	Function		2/2 and 3/2 Valve		
	Construction Design		Poppet		
	Actuation		Electrical – Solenoid Pilot Controlled Pneumatic – Pressure Controlled		
	Mounting	Type	Inline		
		Orientation	Any, preferably vertical		
	Connection		Threaded; G, NPT		
	Manual Override		Non-locking metal button, standard		
Minimum Operation Frequency		Once per month, to ensure proper function			
OPERATING CONDITIONS	Temperature	Low 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	-40° to 175°F (-40° to 80°C)
			For temperatures below 40°F (4°C) air must be free of water vapor to prevent formation of ice.		
	Flow Media		Vacuum and/or filtered-compressed air		
	Operating Pressure		30 to 150 psig (2 to 10 bar)		
	External Pilot Supply		Must be equal to or greater than inlet pressure		
ELECTRICAL DATA FOR SOLENOID PILOT	Solenoids		Rated for continuous duty		
	Operating Voltage (each solenoid)		24 volts DC 110-120 volts AC, 50/60 Hz 230-240 volts AC, 60 Hz		
	Power Consumption		24 V DC – 14 watts 110-120 V AC – 87 VA inrush, 30 VA holding 230-240 V AC – 87 VA inrush, 30 VA holding		
CONSTRUCTION MATERIAL	Valve Body		Cast Aluminum		
	Poppet		Aluminum and Stainless Steel		
	Seals		Fluorocarbon		
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 e 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

<b>SIL</b> Safety Integrity Level  	<b>CE</b> Conformity Declaration  	<b>EAC</b> Conformity Declaration  	<b>CSA</b> Certificate of Compliance  	<b>CRN Certification</b>  Available for appropriately tested valves
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# 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

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

For other voltages, consult ROSS.

Size			Function	Flow C <sub>v</sub>	Average Response Constants*		Weight lb (kg)
Body	Port 1	Port 2			M	F	
3/8	1/4	1/4	NC	2.1	10	0.96	3.0 (1.4)
	3/8	3/8	NC	2.6	10	0.90	
	1/2	1/2	NC	2.6	10	0.82	
3/4	3/4	3/4	NC	7.8	14	0.39	3.3 (1.5)
	1	1	NC	8.3	14	0.32	
1-1/4	1	1	NC	20	14	0.31	7.5 (3.4)
	1-1/4	1-1/4	NC	30	26	0.19	
	1-1/2	1-1/2	NC	31	26	0.14	
			NO	21	26	0.17	
2	1-1/2	1-1/2	NC	57	##	##	15.5 (6.9)
	2-1/2	2-1/2	NC	64	##	##	

\*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.

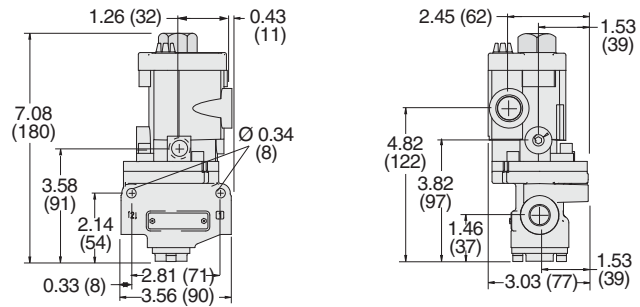
Valve Schematic			
Normally Closed	Normally Open		

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

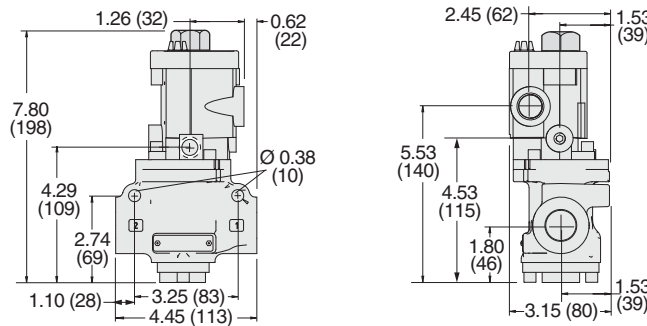
### DIMENSIONS

Inches (mm)

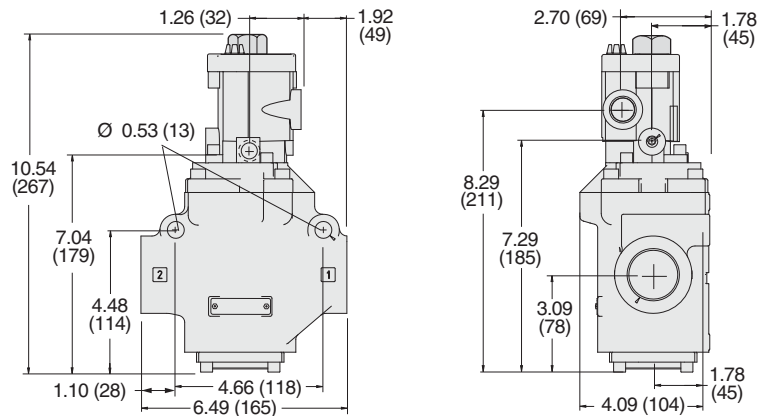
Body Size 3/8



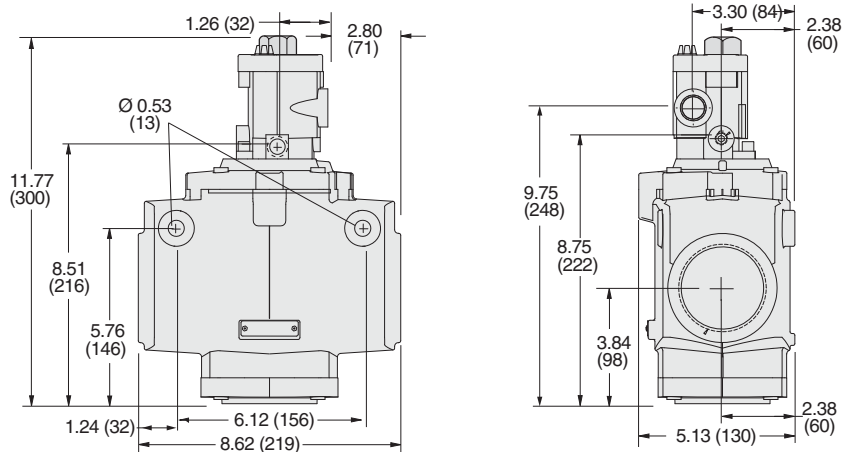
Body Size 3/4



Body Size 1-1/4



Body Size 2



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# 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

Size				Function	Valve Model Number					
Body	Port 1	Port 2	Port 3		G Thread			NPT 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	1/4	1/2	NC	D2173B2900W	D2173B2900Z	D2173B2900Y	2173B2900W	2173B2900Z	2173B2900Y
	3/8	3/8	½	NC	D2173A3908W	D2173A3908Z	D2173A3908Y	2173A3908W	2173A3908Z	2173A3908Y
	1/2	1/2	1/2	NC	D2173B4901W	D2173B4901Z	D2173B4901Y	2173B4901W	2173B4901Z	2173B4901Y
3/4	1/2	1/2	1	NC	D2173B4902W	D2173B4902Z	D2173B4902Y	2173B4902W	2173B4902Z	2173B4902Y
	1/2	1/2	1	NO	D2174A4912W	D2174A4912Z	D2174A4912Y	2174A4912W	2174A4912Z	2174A4912Y
	3/4	3/4	1	NC	D2173B5900W	D2173B5900Z	D2173B5900Y	2173B5900W	2173B5900Z	2173B5900Y
	1	1	1	NC	D2173B6901W	D2173B6901Z	D2173B6901Y	2173B6901W	2173B6901Z	2173B6901Y
1-1/4	1	1	1-1/2	NC	D2173B6902W	D2173B6902Z	D2173B6902Y	2173B6902W	2173B6902Z	2173B6902Y
	1	1	1-1/2	NO	D2174A6914W	D2174A6914Z	D2174A6914Y	2174A6914W	2174A6914Z	2174A6914Y
	1-1/4	1-1/4	1-1/2	NC	D2173B7901W	D2173B7901Z	D2173B7901Y	2173B7901W	2173B7901Z	2173B7901Y
	1-1/4	1-1/4	1-1/2	NO	D2173B7917W	D2173B7917Z	D2173B7917Y	2173B7917W	2173B7917Z	2173B7917Y
	1-1/2	1-1/2	1-1/2	NC	D2173B8900W	D2173B8900Z	D2173B8900Y	2173B8900W	2173B8900Z	2173B8900Y
2	2	2	2-1/2	NC	D2173A9905W	D2173A9905Z	D2173A9905Y	2173A9905W	2173A9905Z	2173A9905Y
	2-1/2	2-1/2	2-1/2	NC	D2173A9906W	D2173A9906Z	D2173A9906Y	2173A9906W	2173A9906Z	2173A9906Y

For other voltages, consult ROSS.

Size				Function	Flow C <sub>v</sub>		Average Response Constants*			Weight lb (kg)
Body	Port 1	Port 2	Port 3		1-2	2-3	M	F		
								1-2	2-3	
3/8	1/4	1/4	1/2	NC	2.4	3.4	10	1.76	2.08	3.0 (1.4)
	3/8	3/8	1/2	NC	3.0	5.8	10	0.95	1.07	
	1/2	1/2	1/2	NC	3.0	5.2	10	0.94	0.98	
3/4	1/2	1/2	1	NC	6.6	12	11	0.58	0.64	3.3 (1.5)
	1/2	1/2	1	NO	6.5	7.0	11	0.58	0.64	
	3/4	3/4	1	NC	7.8	13	11	0.38	0.41	
	1	1	1	NC	7.5	12	11	0.24	0.36	
1-1/4	1	1	1-1/2	NC	24	40	28	0.16	0.18	7.5 (3.4)
	1	1	1-1/2	NO	15	17	28	0.16	0.18	
	1-1/4	1-1/4	1-1/2	NC	29	39	28	0.12	0.17	
	1-1/4	1-1/4	1-1/2	NO	29	39	28	0.12	0.17	
	1-1/2	1-1/2	1-1/2	NC	30	38	28	0.12	0.16	
2	2	2	2-1/2	NC	70	70	##	##	##	16.5 (7.4)
	2-1/2	2-1/2	2-1/2	NC	70	71	##	##	##	

\*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.

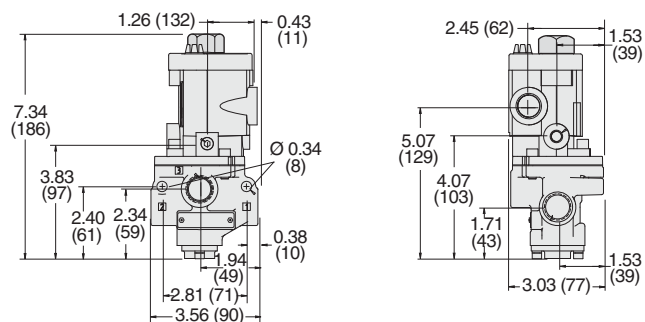
Valve Schematic			
Normally Closed	Normally Open		

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

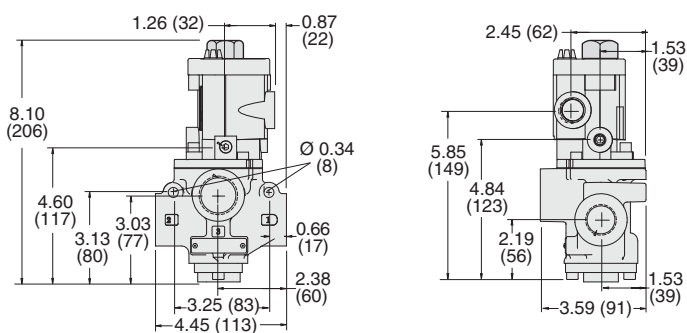
### DIMENSIONS

Inches (mm)

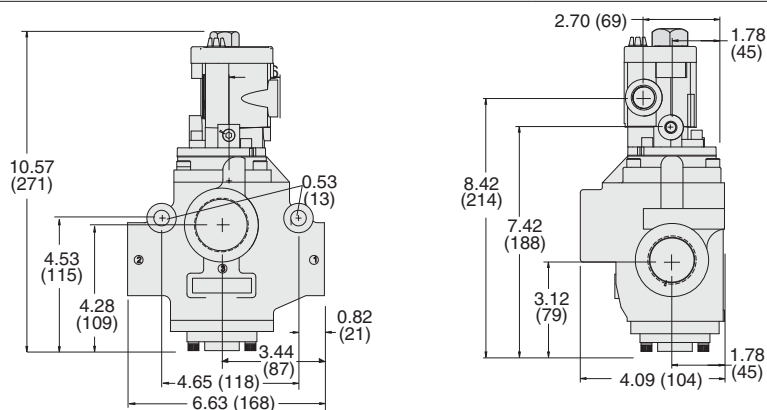
Body Size 3/8



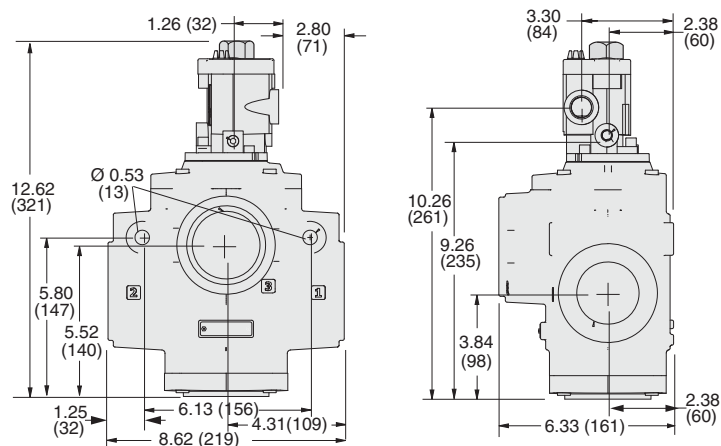
Body Size 3/4



Body Size 1-1/4



Body Size 2



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# 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

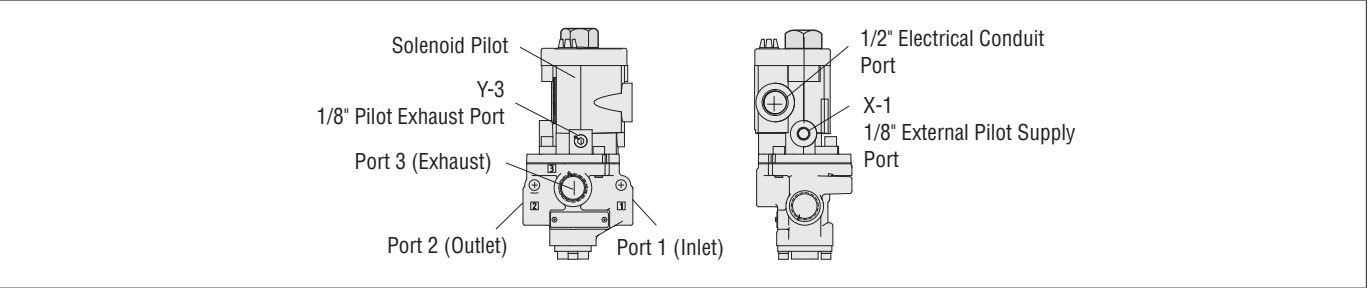
Size				Function	Valve Model Number					
Body	Port 1	Port 2	Port 3		G Thread			NPT Thread		
					24 V DC	110-120 V AC	230 V AC	24 V DC	110-120 V AC	230 V AC
3/8	1/2	1/2	1/2	NC	D2173B4914W	D2173B4914Z	D2173B4914Y	2173B4914W	2173B4914Z	2173B4914Y
				NO	D2174B4900W	D2174B4900Z	D2174B4900Y	2174B4900W	2174B4900Z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

Size				Function	Flow C <sub>V</sub>		Average Response Constants*			Weight lb (kg)
Body	Port 1	Port 2	Port 3		1-2	2-3	M	F		
								1-2	2-3	
3/8	1/2	1/2	1/2	NC	3.0	5.2	11	0.50	0.70	3.0 (1.4)
				NO	2.8	2.8	11	0.58	0.64	
1-1/4	1-1/4	1-1/4	1-1/2	NC	39	39	28	0.15	0.19	7.5 (3.4)
				NO	23	23	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



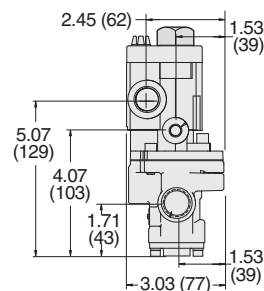
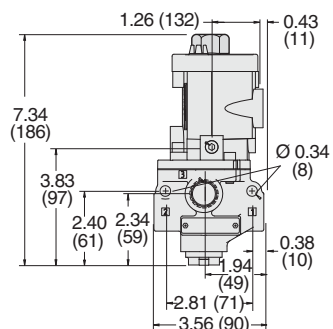


## 3/2 Solenoid Pilot Controlled Valves for Full Vacuum Applications

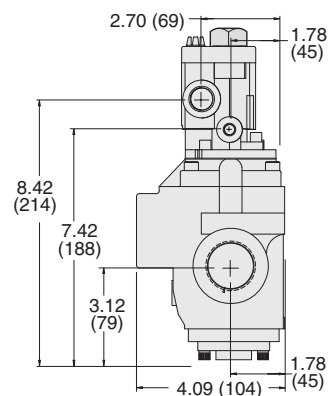
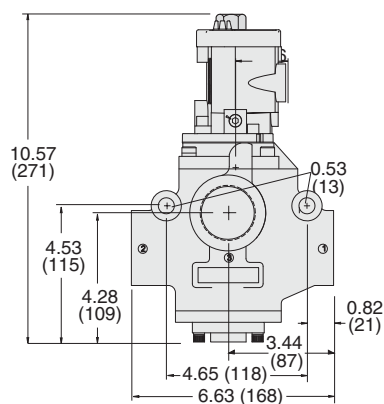
### DIMENSIONS

Inches (mm)

#### Body Size 3/8



#### Body Size 1-1/4



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# 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

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

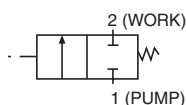
Size			Function	Flow C <sub>v</sub>	Average Response Constants*		Weight lb (kg)
Body	Port 1	Port 2			M	F	
3/8	1/4	1/4	NC	2.1	10	0.96	1.8 (0.8)
	1/2	1/2	NC	3.0	10	0.90	
3/4	1/2	1/2	NC	6.9	10	0.82	4.5 (2.0)
	3/4	3/4	NC	7.8	14	0.39	
	3/4	3/4	NO	7.0	14	0.37	
	1	1	NC	8.3	14	0.19	
1-1/4	1	1	NC	30	26	0.14	11.0 (5.0)
	1-1/4	1-1/4	NC	31	26	0.13	
	1-1/2	1-1/2	NO	23	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.

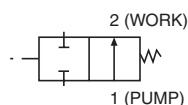
## Consult ROSS.

### Valve Schematic

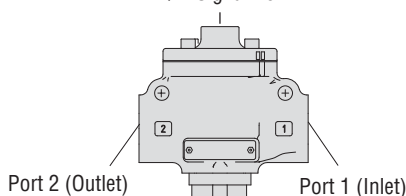
#### Normally Closed (NC)



#### Normally Open (NO)



### 1/4" Signal Port

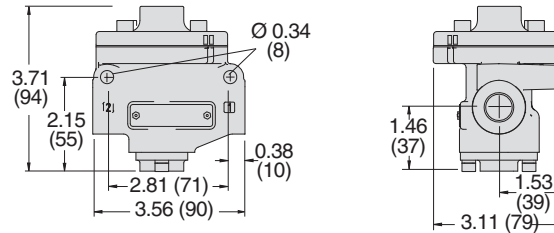


## 2/2 Pressure Controlled Valves for Vacuum Applications

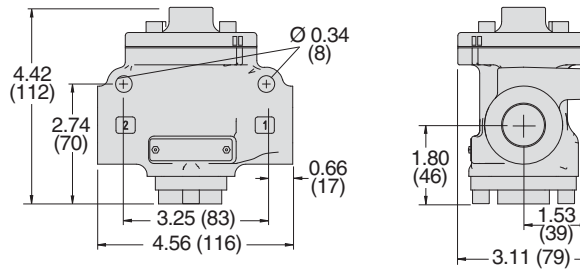
### DIMENSIONS

Inches (mm)

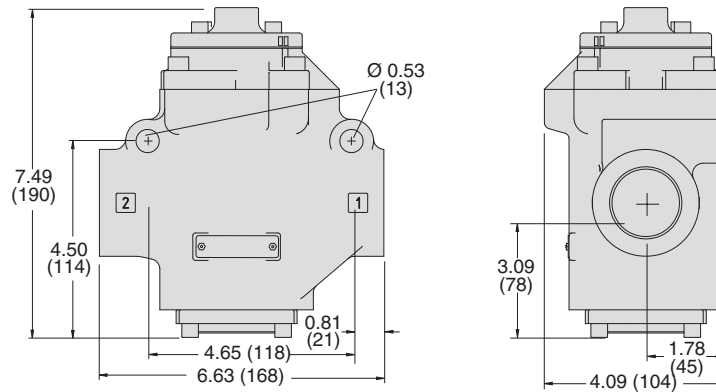
Body Size 3/8



Body Size 3/4



Body Size 1-1/4



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## 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).

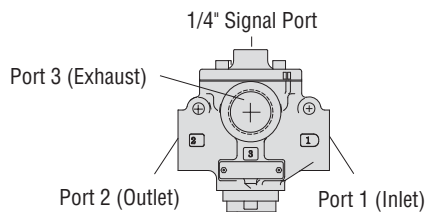
### PRESSURE CONTROLLED VALVES

### 3-Way 2-Position Valves

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

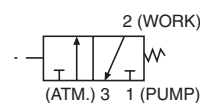
Size				Flow C <sub>v</sub>		Average Response Constants*			Weight lb (kg)
Body	Port 1	Port 2	Port 3	1-2	2-3	M	F		
							1-2	2-3	
3/8	1/4	1/4	1/2	2.4	3.4	10	1.60	2.30	1.8 (0.8)
	3/8	3/8	½	2.4	3.4	10	0.95	1.07	
	1/2	1/2	1/2	3.0	5.2	10	0.94	0.98	
3/4	1/2	1/2	1	7.8	13	11	0.38	0.41	4.5 (2.0)
	3/4	3/4	1	7.4	12	11	0.24	0.36	
	1	1	1	24	40	28	0.17	0.20	
1-1/4	1	1	1-1/2	29	39	28	0.15	0.19	11.0 (5.0)
	1-1/4	1-1/4	1-1/2	30	38	28	0.12	0.16	
	1-1/2	1-1/2	1-1/2	30	38	28	0.12	0.16	
2	2	2	2-1/2	70	70	##	##	##	15.3 (6.9)
	2-1/2	2-1/2	2-1/2	70	71	##	##	##	

\*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

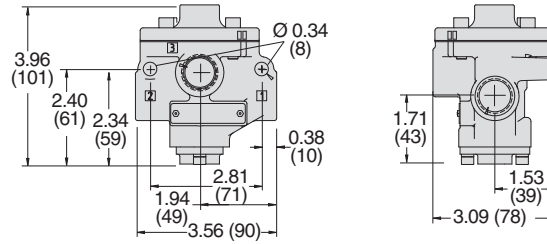


## 3/2 Pressure Controlled Valves for Vacuum Applications

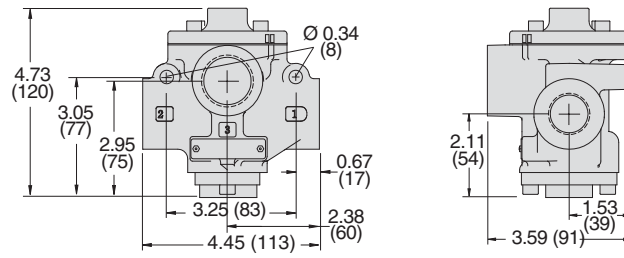
### DIMENSIONS

Inches (mm)

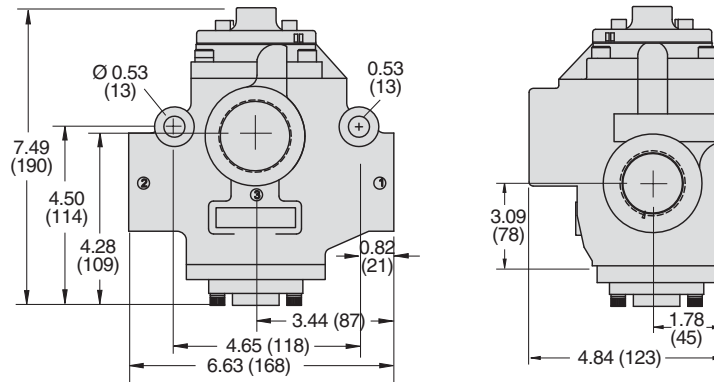
Body Size 3/8



Body Size 3/4



Body Size 1-1/4



For additional information, and to assist you with piping and connectivity designs, our products are available in downloadable 2D drawings and 3D CAD models in a wide range of options including native formats. Please visit [www.rosscontrols.com](http://www.rosscontrols.com).

## Accessories & Options

### SILENCERS

Silencers	Port Size	Thread Type	Model Number		Flow Avg. C <sub>v</sub>	Pressure Range psig (bar)
			R/Rp Thread	NPT Thread		
	1/2	Male	D5500A4003	5500A4003	4.7	0-290 (0-20) maximum
	1	Male	D5500A6003	5500A6003	15	
	1-1/2	Female	D5500A8001	5500A8001	30	
	2-1/2	Female	D5500A9002	5500A9002	104	

### SOLENOID PILOT OPTIONS

Indicator Light Kits	Kit Number					
	24 V DC		110-120 V AC, 50-60 Hz		230 V AC, 50-60 Hz	
	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.					

Manual Override Kits	Flush Button		Extended Button		Extended Button with Palm	
	Locking Type	Kit Number	Locking Type	Kit Number	Locking Type	Kit Number
	Non-Locking	790K87	Non-Locking	791K87	Non-Locking	984H87
	Locking	792K87				
	Flush metal button, non-locking manual override is standard on solenoid models.					
	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.					

# CAUTIONS, WARNINGS And STANDARD WARRANTY



ROSS OPERATING VALVE, ROSS CONTROLS®, ROSS DECCO®, and AUTOMATIC VALVE INDUSTRIAL, collectively the "ROSS Group".

## 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 Group 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 Group 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 Group location.
4. Each ROSS Group Product should be used within its specification limits. In addition, use only ROSS Group components to repair ROSS Group 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 Group recommends a filter with a 5-micron rating for normal applications.
2. All standard ROSS Group 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 Group are warranted for a one-year period [with the exception of Filters, Regulators and Lubricators ("FRLs") 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 Group's obligation under this warranty is limited to repair, replacement or refund of the purchase price paid for products which the ROSS Group 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 Group freight prepaid.

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*Other literature is available for engineering, maintenance, and service requirements.*

*If you need products or specifications not shown in this catalog, please visit ROSS' website, contact ROSS or your ROSS distributor. The ROSS Support Team will be happy to assist you in selecting the best product for your application.*

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