



# CLUTCH/BRAKE CONTROL 35 SERIES CROSSFLOW™ Valves



## PRODUCT CATALOG

# CROSSFLOW™ Double Valves for External Monitoring – with or without Pressure Switches

## Product Overview

### Clutch/Brake Control Function

The CROSSFLOW™ double valve is designed to provide control of clutch/brake mechanisms on stamping presses, and many other critical applications such as alternative lockout systems for energy isolation, air cylinder press load-holding systems, as well as other Category -3 and -4 safety circuits.



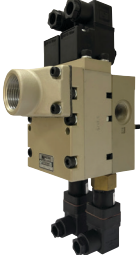
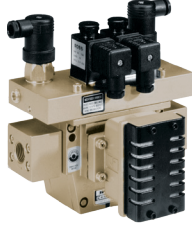


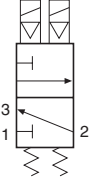
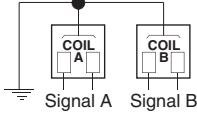
Valve Basic Size					
1	3/4" Exhaust	2	1" Exhaust	4	8, 12, 30
					

Illustration examples.

<b>Simplified Schematic</b>		<b>Solenoid Wiring</b>	
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### Pressure Switches & Monitoring

Valves without pressure switches must not be used to control clutch/brake mechanisms on press machinery.

Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217).

## VALVE FEATURES

<b>External Monitoring</b>	Dynamic, cyclical, external with customer supplied equipment. Monitoring should check state of both valve pressure sensors with any and all changes in state of valve control signals.
<b>Poppet Design</b>	Dirt tolerant, wear compensating for quick response and high flow capacity
<b>PTFE Backup Piston Rings</b>	Enhances valve endurance enabling operation with or without in-line lubrication
<b>Pressure Switches</b>	Valves equipped with pressure switches (when externally monitored), provide feedback signals, which allows the main press controls, or separate monitoring device, to check for proper operation of each valve element on every cycle.
<b>Silencer</b>	High flow, clog resistant silencer included on Basic Size 4, 8, 12, and 30
<b>Mounting</b>	Basic Size 1 – Base mounted for ease of valve replacement; Captive valve-to-base mounting screws Basic Size 2 – Base mounted with right or left inlet orientation option Basic Size 4, 8, 12, and 30 – Inline mounted with flanged ports
<b>SISTEMA Library</b>	Available for download

## PRODUCT CREDENTIALS

<b>Performance Level</b> Per ISO 13849-1:2015  	<b>Safety Integrity Level</b> Per IEC 2061:2001  	<b>DGUV</b>  	<b>Declaration of Conformity</b>  	<b>Certificate of Compliance</b>  
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STANDARD SPECIFICATIONS						
GENERAL	Function		3/2 Valve	Normally Closed		
	Construction Design		Dual Poppet			
	Actuation		Electrical	Solenoid Pilot Controlled		
	Mounting	Type	Valve Basic Size	1, 2	Base mounted	
		Orientation		4, 8, 12, 30	Inline mounted	
	Connection		Threaded Port	NPT		
				G		
	Monitoring		Dynamic, cyclical, external with customer supplied equipment			
Minimum Operation Frequency		Once per month, to ensure proper function				
OPERATING CONDITIONS	Temperature	Ambient	15° to 122°F (-10° to 50°C)			
		Media	40° to 175°F (4° to 80°C)			
	Flow Media		Filtered air			
	Operating Pressure	Valve Basic Size	1, 2	40 to 100 psig (2.8 to 7 Bar)		
4			40 to 150 psig (2.8 to 10 Bar)			
8, 12, 30			30 to 125 psig (2 to 8.5 Bar)			
ELECTRICAL DATA	Power Consumption	Solenoids	Current Flow	Operating Voltage	Valve Basic Size	Power Consumption (each solenoid)
			2	6 watts nominal		
			4	14 watts nominal		
			8, 12, 30	16 watts nominal		
			AC	110-120 volts, 50/60 Hz	1	12 VA maximum inrush, 9.8 VA maximum holding
					2	8.5 VA maximum inrush, 8.5 VA maximum holding
					4	35 VA maximum inrush, 22 VA maximum holding
					8, 12, 30	8.5 VA maximum inrush, 8.5 maximum holding
			Rated for continuous duty			
<i>Voltages at pressure switches must not exceed 250 volts.</i>						
Enclosure Rating		Valve Basic Size	1, 2	IP65, IEC 60529		
			4, 8, 12, 30	IP 65 according to IEC-Publication 144 and DIN 40050, Sheet 1		
Electrical Connection		Valve Basic Size	1	DIN EN 175301-803	Form B	
			2, 4, 8, 12, 30	DIN EN 175301-803	Form A	
Mechanical Pressure Switch (Status Indicator) Rating		NO/NC Contacts - 0.1 A, 125/250 volts AC; 0.1 A, 30 volts DC; 0.3 A, 60 volts DC				
Solid State Pressure Sensor (Status Indicator) Rating		Supply Voltage - 8-30 volts DC Current Consumption <4mA				
CONSTRUCTION MATERIAL	Valve Body		Cast Aluminum			
	Poppet		Acetal and Stainless Steel			
	Seals		Buna-N			
SAFETY DATA	Functional Safety Data		Category	CAT 4, PL e		
			B <sub>10D</sub>	20,000,000		
			PFH <sub>D</sub>	7.71x10 <sup>-9</sup>		
			MTTF <sub>D</sub>	301.9 (n <sub>op</sub> : 662400)		
Vibration/Impact Resistance		Tested to DIN EN 60068-2-6				
<b>IMPORTANT NOTE:</b> 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

### VALVE BASIC SIZE 1

	35	7	3	B	2632	W	
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<b>Port Thread</b>	
NPT	
Leave Blank	
G	D

<b>Series</b>	
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<b>Actuation</b>	
Solenoid Controlled	

<b>Valve Function</b>	
3/2	

<b>Revision Level</b>	
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Port Size	Pressure Switches#	
1/4	None	2632
	Two	2642
3/8	None	2645
	Two	2644

<b>Pressure Switch</b>	
None	
Leave Blank	
Mechanical Pressure Switch *	
Leave Blank	
M12 Solid State Pressure Sensor *	2
* When Two Pressure Switches are selected	

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

\* For other voltages consult ROSS.  
\*\* 230 V AC (OSHA regulations limit press control voltage to no more than 120 V AC in the US).

Valve and base can be ordered separately, see valve technical data page.

# Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

**Model Number examples:** D3573B2632W, 3573B2644Z1.

### Pressure Switches & Monitoring

Valves without pressure switches must not be used to control clutch/brake mechanisms on press machinery.

Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217).

The valves on this page do not have a built-in monitor, and so must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve and associated machinery in the event of a failure within the valve.

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

Port Sizes	Pressure Switches	Flow C <sub>v</sub> (NI/min)		Avg. Response Constants			Weight lb (kg)
		1-2	2-3	M	F		
					1-2	2-3	
1/4	None	0.9 (890)	1.4 (1400)	28	4.6	3.4	2.1 (0.95)
	Two	0.9 (890)	1.4 (1400)	28	4.6	3.4	2.5 (1.14)
3/8	None	1.2 (1200)	1.7 (1700)	25	3.1	2.8	2.5 (1.14)
	Two	1.2 (1200)	1.7 (1700)	25	3.1	2.8	2.9 (1.32)

### 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

# Ordering Information

## Valve Basic Size 1 – Valve and Base Only

### VALVE ONLY

### 3-Way 2-Position Valves

Port Size	Pressure Switches**	Replacement Valve Only		
		24 V DC	110-120 V AC	230 V AC
1/4	None	3573B2602W	3573B2602Z	3573B2602Y
	Two			
3/8	None			
	Two			

\*\* Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

# For other voltages consult ROSS.

**Connectors ordered separately.**

### BASE ONLY

Port Size	Pressure Switches Provision**	Base Model Number	
		NPT Thread	G Thread
1/4	Two	888C91	D888C91
3/8	Two	1172C91	D1172C91

\*\* Pressure switch ports are provided to all valve bases.

Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

# Ordering Information

## MODEL NUMBER CONFIGURATOR

## 3-Way 2-Position Valves

### VALVE BASIC SIZE 2

<b>Port Thread</b>		<b>35</b>	<b>7</b>	<b>3</b>	<b>C</b>	<b>4652</b>	<b>W</b>	
NPT Leave Blank		<b>Series</b>						
G	<b>D</b>							
<b>Actuation</b>								
Solenoid								
<b>Valve Function</b>								
3/2								
<b>Pressure Switch</b>								
None Leave Blank								
Mechanical Pressure Switch * Leave Blank								
M12 Solid State Pressure Sensor *								<b>2</b>
* When Two Pressure Switches are selected								

Inlet Orientation	Port Size		Pressure Switches#	Revision Level		Inlet Orientation	Port Size		Pressure Switches#	Revision Level	
	1,2	3					1,2	3			
Left Hand	1/2	3/4	None	<b>C</b>	<b>4652</b>	Right Hand	1/2	3/4	None	<b>C</b>	<b>4658</b>
			Two	<b>C</b>	<b>4741</b>				Two	<b>B</b>	<b>4702</b>
		1	None	<b>A</b>	<b>4735</b>			1	None	<b>B</b>	<b>4717</b>
	3/4	3/4	Two	<b>A</b>	<b>4736</b>		Two	<b>B</b>	<b>4706</b>		
			1	None	<b>C</b>		<b>4645</b>	3/4	1	None	<b>B</b>
		Two	<b>C</b>	<b>4644</b>	Two		<b>B</b>	<b>4715</b>			

Current	Voltage*	
DC	24 V	<b>W</b>
AC	110 V, 50 Hz	<b>Z</b>
	120 V, 50/60 Hz	
	230 V, 50/60 Hz **	
* For other voltages consult ROSS. ** 230 V AC (OSHA regulations limit press control voltage to no more than 120 V AC in the US).		

Valve and base can be ordered separately, see valve technical data page.

# Pressure switch ports are provided to all valves.

Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

**Model Number examples: D3573C4652W, 3573A4736Z1.**

### Pressure Switches & Monitoring

Valves without pressure switches must not be used to control clutch/brake mechanisms on press machinery.

Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217).

The valves on this page do not have a built-in monitor, and so must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve and associated machinery in the event of a failure within the valve.

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

Port Sizes		Pressure Switches	Flow C <sub>v</sub> (NI/min)		Avg. Response Constants			Weight lb (kg)
1, 2	3		1-2	2-3	M	F		
						1-2	2-3	
1/2	3/4	None	3.7 (3600)	9.0 (8900)	25	1.2	0.9	4.7 (2.13)
		Two	3.7 (3600)	9.0 (88900)	25	1.2	0.9	5.2 (2.36)
	1	None	3.7 (3600)	9.1 (9000)	25	1.2	0.9	5.2 (2.36)
		Two	3.7 (3600)	9.1 (9000)	25	1.2	0.9	5.7 (2.58)
3/4	3/4	None	4.2 (4100)	9.0 (8900)	25	1.1	0.9	4.7 (2.13)
		Two	4.2 (4100)	9.0 (8900)	25	1.1	0.9	5.2 (2.36)
	1	None	4.2 (4100)	9.3 (9200)	25	1.1	0.8	5.2 (2.36)
		Two	4.2 (4100)	9.3 (9200)	25	1.1	0.8	5.7 (2.58)

### 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

## Valve Basic Size 2 – Valve and Base Only

### VALVE ONLY

### 3-Way 2-Position Valves

Inlet Orientation	Port Size		Replacement Valve Only		
	In-Out	Exhaust	24 V DC	110-120 V AC	230 V AC
Left Hand	1/2	3/4	3573C4602LW	3573C4602LZ	3573C4602LY
		1	3573B4605LW	3573B4605LZ	3573B4605LY
	3/4	3/4	3573C4602LW	3573C4602LZ	3573C4602LY
		1	3573B4605LW	3573B4605LZ	3573B4605LY
Right Hand	1/2	3/4	3573C4602RW	3573C4602RZ	3573C4602RY
		1	3573B4605RW	3573B4605RZ	3573B4605RY
	3/4	3/4	3573C4602RW	3573C4602RZ	3573C4602RY
		1	3573B4605RW	3573B4605RZ	3573B4605RY

\*\* Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

# For other voltages consult ROSS.

Connectors ordered separately.

### BASE ONLY

Inlet Orientation	Port Sizes		Pressure Switches Provision **	Base Model Number #	
	In-Out	Exhaust		NPT Thread	G Thread
Left Hand	1/2	3/4	Two	1129C91	D1129C91
		1	Two	1633C01	D1633C01
	3/4	3/4	Two	1163C91	D1163C91
		1	Two	1123C91	D1123C91
Right Hand	1/2	3/4	Two	1132C91	D1132C91
		1	Two		
	3/4	1	Two	1784C91	D1784C91

\*\* Pressure switch ports are provided to all valve bases.

Only valves with pressure switches should be used to control clutch/brake mechanisms on press machinery. The pressure switches must be used in conjunction with a monitoring device to assist with OSHA compliance (Ref. 1910.217).

# Ordering Information

## MODEL NUMBER CONFIGURATOR

## 3-Way 2-Position Valves

### VALVE BASIC SIZE 4

<b>Port Thread</b>	
NPT	
Leave Blank	
G	D

<b>Series</b>	35
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<b>Actuation</b>	7
Solenoid Controlled	

<b>Valve Function</b>	3
3/2	

<b>Revision Level</b>	C
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<b>Port Size – Flanged Ports</b>		
Basic Size	Port Size	
	In-Out	
4	3/8	327
	1/2	427
	3/4	523

<b>Pressure Switch</b>	
Mechanical Pressure Switch	
Leave Blank	
M12 Solid State Pressure Sensor	2

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

\* For other voltages consult ROSS.  
 \*\* 230 V AC (OSHA regulations limit press control voltage to no more than 120 V AC in the US).

<b>Inlet Orientation</b>	
Right	0
Left	6

Model Number examples: D3573C3276W, 3573C2530Z2.

### Pressure Switches & Monitoring

Valves without pressure switches must not be used to control clutch/brake mechanisms on press machinery.

Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217).

The valves on this page do not have a built-in monitor, and so must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve and associated machinery in the event of a failure within the valve.

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

Size		Flow C <sub>v</sub> (NI/min)		Avg. Response Constants			Weight lb (kg)
Basic	Port 1, 2			M	F		
		1-2	2-3		1-2	2-3	
4	3/8	3.0 (3000)	7.0 (6900)	15	0.70	0.40	8.4 (3.8)
	1/2	3.0 (3000)	9.0 (8900)	15	0.65	0.35	
	3/4	3.0 (3000)	11 (11000)	15	0.65	0.35	

### 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:

$$\text{Vlv. Resp. Time (msec)} = M + F * V$$

**M** = avg. time for parts movement

**F** = msec. per cubic inch of volume

**V** = volume in cubic inches

## MODEL NUMBER CONFIGURATOR 3-Way 2-Position Valves

**VALVE BASIC SIZE 8, 12, 30**

Port Thread	
NPT	
Leave Blank	
G	D

	35	7	3	D	4638	W	
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Series	
35 7 3 D	

Actuation	
Solenoid Controlled	

Valve Function	
3/2	

Revision Level	
4638	

Pressure Switch	
Mechanical Pressure Switch	
Leave Blank	
M12 Solid State Pressure Sensor	2

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

\* For other voltages consult ROSS.  
\*\* 230 V AC (OSHA regulations limit press control voltage to no more than 120 V AC in the US).

Port Size – Flanged Ports		Internal Pilot Supply	External Pilot Supply*
Basic Size	Port Size In-Out		
8	1/2	4638	4639
	3/4	5638	5639
12	3/4	5632	5633
8	1	6638	6639
	12	6632	6633
12	1	6632	6633
	1-1/4	7632	7633
30	1-1/4	7630	7631
	1-1/2	8630	8631

\*External pilot supply pressure must be equal to or greater than inlet pressure.

**Model Number examples: D3573D4638W, 3573D6632Z2.**

### Pressure Switches & Monitoring

Valves without pressure switches must not be used to control clutch/brake mechanisms on press machinery.  
 Valves with pressure switches must be used in conjunction with an external monitoring device to assist with OSHA compliance (Ref. 1910.217).  
 The valves on this page do not have a built-in monitor, and so must only be used in conjunction with an external monitoring system. Such monitoring system must be capable of inhibiting the operation of the valve and associated machinery in the event of a failure within the valve.

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

Size		Flow C <sub>v</sub> (NI/min)		Avg. Response Constants			Weight lb (kg)
Basic	Port 1, 2			M	F		
		1-2	2-3		1-2	2-3	
8	1/2	3.5 (3400)	10 (9800)	15	0.70	0.30	11.4 (5.2)
	3/4	4.0 (3900)	14 (14000)	15	0.65	0.23	
12	3/4	8.0 (7900)	15 (15000)	15	0.65	0.23	15.4 (7.0)
8	1	4.0 (4000)	14 (14000)	20	0.33	0.21	
	12	1	8.5 (8400)	19 (19000)	20	0.28	
		1-1/4	9.0 (8900)	21 (21000)	20	0.28	
30	1-1/4	20 (20000)	42 (41000)	25	0.19	0.07	33.9 (15.4)
	1-1/2	21 (21000)	43 (42000)	25	0.18	0.07	

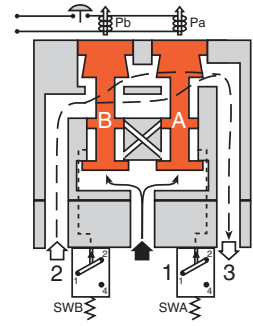
**Valve Response Time**      The constants above, designated M and F, can be used to determine the amount of time required to fill or exhaust a volume of any size using the formula on the right:

**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

# Valve Operation

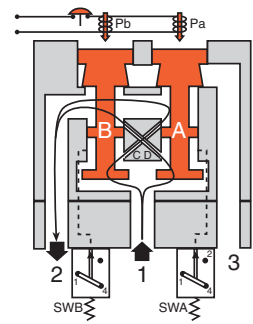
## Conditions at Start

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



## Normal Operation

Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Sensing pressure signals go to each pressure switch and become equal to inlet pressure. Both switches trip and now contacts 1 and 4 of switches SWA and SWB are connected instead of contacts 1 and 2.

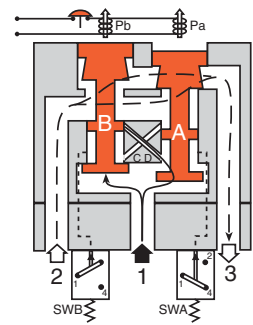


## Completion of Normal Cycle

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

## Detecting a Malfunction

A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below 2% of inlet pressure. Full sensing air pressure from side A goes to switch SWA, and a reduced pressure goes to switch SWB. This full pressure signal causes switch SWA to trip. Switch SWB, with a reduced pressure signal, does not trip. An external monitoring system can detect the malfunction by monitoring the condition of the switches SWA and SWB. The external monitoring system may then react accordingly by shutting down the power to the valve solenoids and any other components deemed necessary to stop the machine.



## CAUTION

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



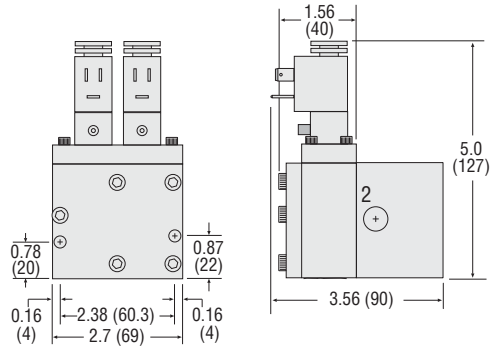
# Valve Technical Data

## Valve Basic Size 1

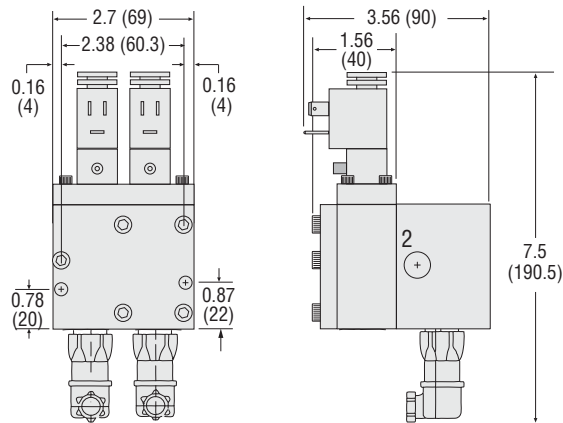
### DIMENSIONS

Inches (mm)

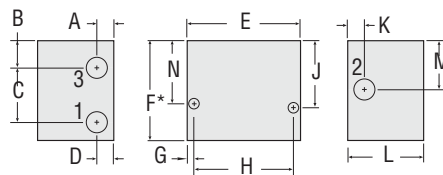
Valve without Pressure Switches



Valve with Pressure Switches



Base



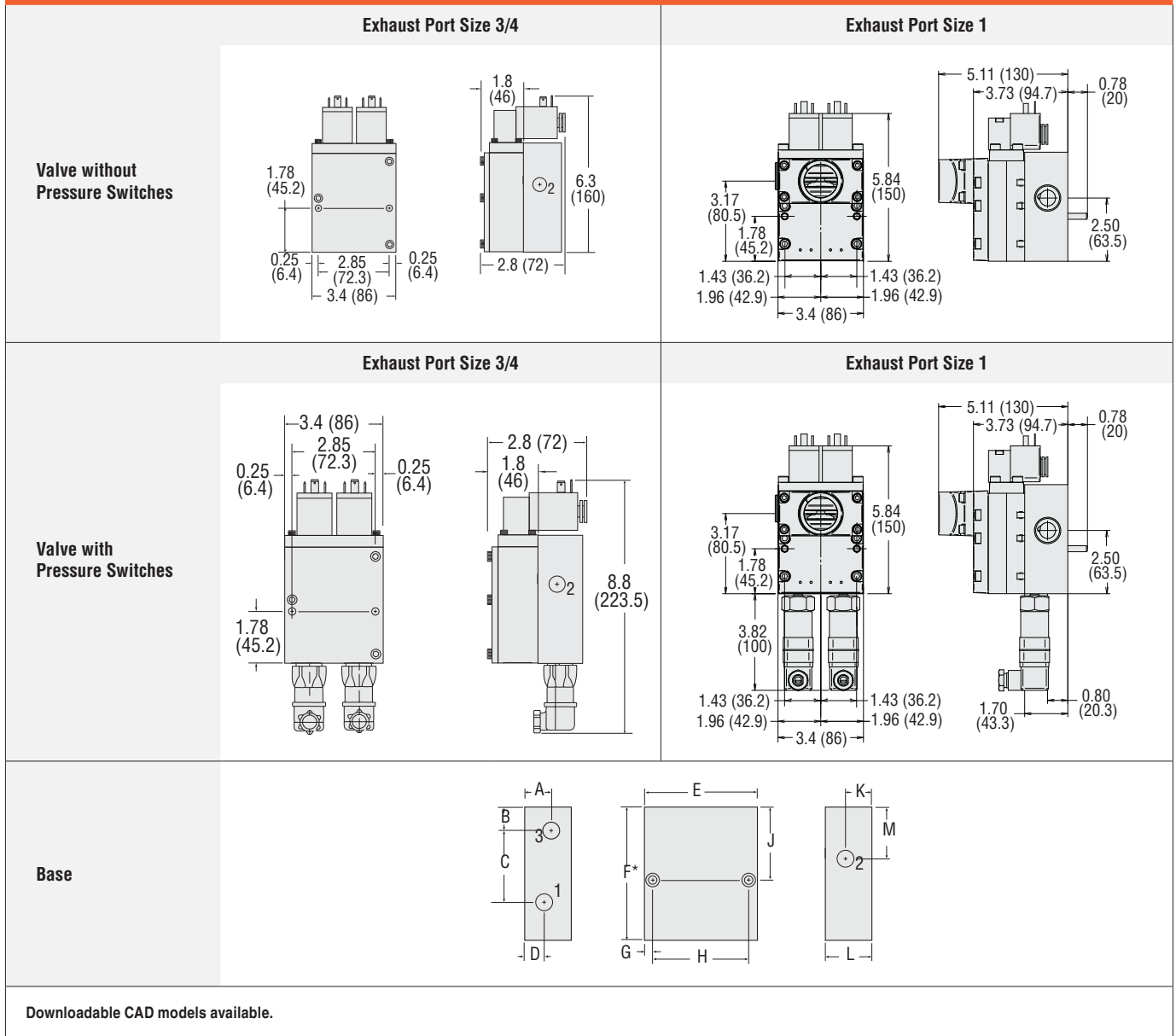
Downloadable CAD models available.

Port Size	BASE Dimensions – inches (mm)												
	A	B	C	D	E	F	G	H	J	K	L	M	N
1/4	0.4 (11)	0.7 (17)	1.29 (32.8)	0.4 (11)	2.7 (69)	2.4 (61)	0.2 (5)	2.38 (60.5)	1.6 (41)	0.4 (11)	1.8 (46)	1.2 (30)	1.5 (38)
3/8	0.5 (13)	0.6 (15)	1.47 (37.2)	0.5 (13)	2.7 (69)	2.5 (63)	0.2 (5)	2.38 (60.5)	1.6 (41)	0.8 (19)	1.8 (46)	1.1 (27)	1.5 (38)

## Valve Basic Size 2

### DIMENSIONS

Inches (mm)



Inlet Orientation	Port Size		BASE Dimensions – inches (mm)											
	1, 2	3	A	B	C	D	E	F	G	H	J	K	L	M
Left	1/2	3/4	1.1 (27)	0.8 (19)	2.86 (72.7)	0.7 (17)	3.7 (94)	4.3 (110)	0.3 (7)	2.85 (72.4)	2.6 (64)	0.7 (17)	2.0 (50)	1.8 (46)
		1	Consult ROSS.											
	3/4	3/4	1.1 (27)	0.8 (19)	2.86 (72.7)	0.7 (17)	3.7 (94)	4.3 (110)	0.3 (7)	2.85 (72.4)	2.6 (64)	0.7 (17)	2.0 (50)	1.8 (46)
		1	Consult ROSS.											
Right	1/2	3/4	Consult ROSS.											
		1	Consult ROSS.											
	3/4	3/4	Consult ROSS.											
		1	Consult ROSS.											

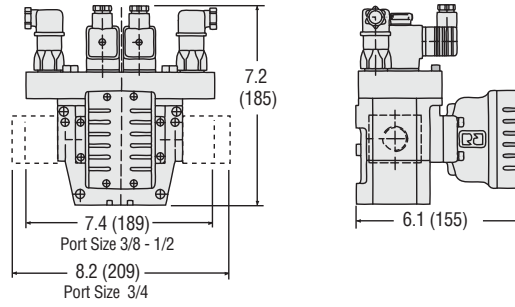
# Valve Technical Data

## Valve Basic Size 4, 8, 12, 30

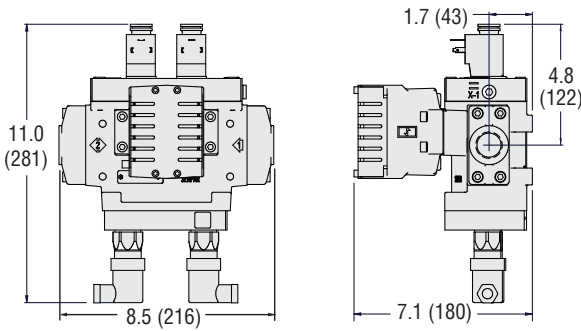
### DIMENSIONS

Inches (mm)

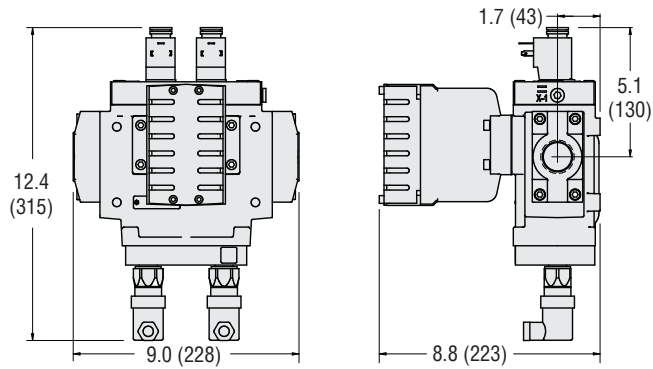
Basic Size 4



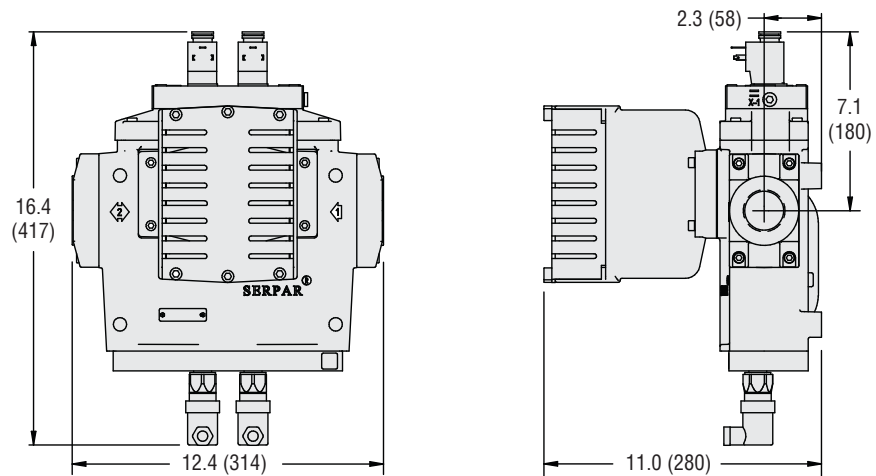
Basic Size 8



Basic Size 12



Basic Size 30



Downloadable CAD models available.

**ELECTRICAL STATUS INDICATION**



Illustration example.

Pressure Switches (Electrical Lockout Indicator)	Indicator Type	Connector Type	Model Number	Port Thread	Factory Preset psi (bar)
	Mechanical Pressure Switch	DIN EN 175301-803 Form A	1104A30	M10x1	22 (1.5) falling
		M12	1153A30		
Solid State Pressure Sensor	M12	1335B30W	M10x1	17 (1.2) falling	

**ENERGY RELEASE VERIFICATION**



Illustration example.

Pressure Switches	Verification Type	Installation Location	Connector Type	Model Number	Port Thread	Factory Preset psi (bar)
	Electrical	Downstream	DIN EN 175301-803 Form A	586A86	1/8 NPT	5 (0.3) falling

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

Pinouts		
Mechanical Pressure Switch		Solid State Pressure Sensor
DIN EN 175301-803 Form A	M12	M12
<p>1 - Common 2 - Normally Closed 3 - Normally Open 4 - Ground (Not Used)</p>	<p>1 - Common 2 - Normally Closed 3 - Not Used 4 - Normally Open</p>	<p>1, 2, 3, 4 - Pin PNP - Switched Positive NO - Normally Open NC - Normally Closed</p>

# Accessories

## PREWIRED ELECTRICAL CONNECTORS



Illustration example.

Prewired Connectors	For Valve Basic Size	Cable					Kit Number				
		End 1	End 2	Length feet (meters)	Connection	Quantity Included	Cord Diameter mm	Without Light	Lighted Connector		
		Connector	Cord						24 V DC	120 V AC	230 V AC
2, 4, 8, 12, 30	DIN EN 175301-803 Form A	Flying leads	2 (6.5)	Solenoid	1	6	721K77	720K77-W	720K77-Z	720K77-Y	
						10	371K77	383K77-W	383K77-Z	383K77-Y	
	1	DIN EN 175301-803 Form B	Flying leads	2 (6.5)	Solenoid	1	10	372K77	382K77-W	382K77-Z	382K77-Y

\* Used on Valve Basic Size 2, 4, 8, 12, 30 only.  
\*\* Used on Valve Basic Size 1 only.

## ELECTRICAL CONNECTORS

With Cable Grip		1/2" NPT Conduit
without Light	with Light	
		

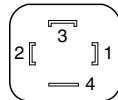
Illustration examples.

Connectors	Connection Type	For Valve Basic Size	Connector			Model Number			
			Type	Fitting Connection	Quantity Included	Without Light	Lighted Connector		
							24 V DC	120 V AC	230 V AC
Solenoid	2, 4, 8, 12, 30	DIN EN 175301-803 Form A	Cable grip	1	937K87	936K87-W	936K87-Z	936K87-Y	
			1/2" NPT conduit	1	723K77	724K77-W	724K77-Z	724K77-Y	
	1	DIN EN 175301-803 Form B	Cable grip	1	266K77	267K77-W	267K77-Z	267K77-Y	

**CAUTIONS:** Do not use electrical connectors with surge suppressors, as this may increase valve response time when de-actuating the solenoids.

### Solenoid Connectors Pinout

#### EN DIN Connector



- 1 - Black
- 2 - Black
- G - Green/Yellow (Ground)

**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 <sub>v</sub> (NI/min)	Model Number		Dimensions inches (mm)		Weight lb (kg)
NPT Thread				R/Rp Thread	Length	Hex Size (D)		
1/4	Male	2.3 (2300)	5500A2003	D5500A2003	2.2 (6)	0.81 (21)	0.07 (0.03)	
3/8	Male	2.9 (2900)	5500A3013	D5500A3013				
1/2	Male	6.8 (6700)	5500A4003	D5500A4003	3.6 (9)	1.25 (32)	0.2 (0.1)	
3/4	Male	7.2 (7100)	5500A5013	D5500A5013	3.6 (9)	1.25 (32)	0.2 (0.1)	
		15 (15000)	5500A5003	D5500A5003	5.3 (14)	2.0 (51)	0.9 (0.4)	
1	Male	18 (18000)	5500A6003	D5500A6003	5.4 (14)	2.0 (51)	0.9 (0.4)	

# Accessories

## RESET VALVES FOR DOUBLE VALVES WITH REMOTE RESET

Valves with the remote reset option require a small 3/2 reset valve and the installation of a 1/8 inch air line from the reset valve to the reset port of the double valve. ROSS offers 3/2 normally closed valves with either manual or electric control that are suitable for this purpose.

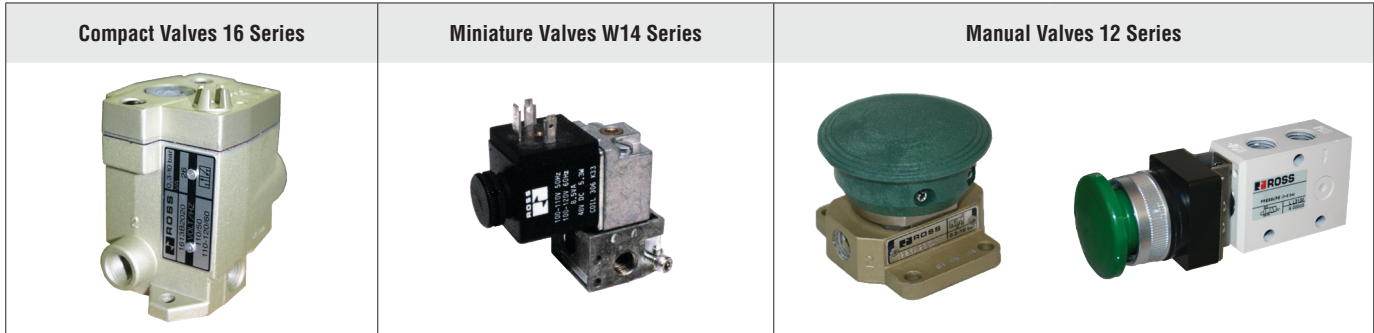


Illustration example.

### Direct Solenoid Pilot Control – Compact Valves 16 Series for Line Mounting

Valve Type	Port Size	Valve Model Number*						Flow C <sub>v</sub> (NI/min)	Average Response Constants**	
		NPT Thread			G Thread				M	F
Normally-Closed	1, 2, 3	24 V DC	110-120 V AC 50/60 Hz	230 V AC 50/60 Hz	24 V DC	110-120 V AC 50/60 Hz	230 V AC 50/60 Hz	0.3 (300)	5	2.90
	1/8	1613B1020W	1613B1020Z	1613B1020Y	D1613B1020W	D1613B1020Z	D1613B1020Y			

\* For other voltages, consult ROSS.

<b>**Valve Response Time</b>	<p>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:</p> <p><b>Vlv. Resp. Time (msec) = M + F * V</b>  <b>M</b> = avg. time for parts movement  <b>F</b> = msec. per cubic inch of volume  <b>V</b> = volume in cubic inches</p>
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### Direct Solenoid Pilot Control – Miniature Valve W14 Series for Base Mounting

Valve Type	Override Type	Valve Model Number*			Flow C <sub>v</sub> (NI/min)
		24 V DC	110-120 V AC 50/60 Hz	230 V AC 50/60 Hz	
Normally-Closed	Non-Locking	W1413A1409W	W1413A1409Z	W1413A1409Y	0.1 (98)

\* For other voltages, consult ROSS.

<b>Sub-Base for Direct Solenoid Control Valves</b> (Required for use with Miniature Valve W14 Series Valves)	<b>Sub-Base Model Number</b>	
	<b>NPT Thread</b>	<b>G Thread</b>
	516B91	D516B91

### Manual Palm Button Valves 12 Series

Valve Style	Valve Operator Type	Port Size	Button Color	Valve Model Number		Flow C <sub>v</sub> (NI/min)
				NPT Thread	G Thread	
<b>Heavy Duty Palm Button</b>	3/2 NC Spring Return	1/4	Green	1223B2001	D1223B2001	0.8 (790)
			Red	1223B2003	D1223B2003	
<b>Flush Pushbutton</b>	3/2 NC Spring Return	1/4	Green	1223B2FPG	D1223B2FPG	0.9 (890)
			Red	1223B2FPR	D1223B2FPR	
<b>Mushroom Button</b>	3/2 NC Spring Return	1/4	Green	1223B2MBG	D1223B2MBG	
			Red	1223B2MBR	D1223B2MBR	

# 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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