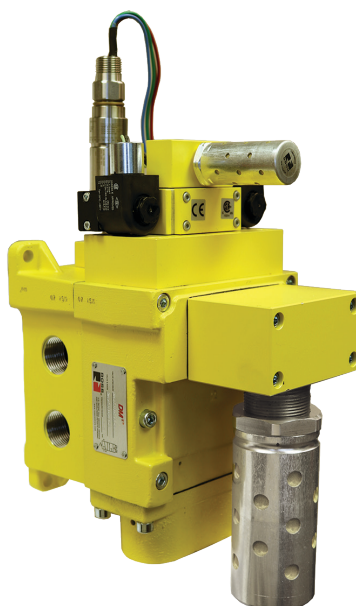




EXPLOSION-PROOF DM²® SERIES C VALVES



PRODUCT CATALOG

Safe Exhaust Explosion-Proof Double Valves DM²® Series C

Product Overview

Safe Exhaust Safety Function

The DM²® Series C valve safety function is to shut off supply or pneumatic energy and to exhaust any pneumatic energy from downstream of the valve. Valves are equipped with explosion proof coils and feedback sensors for use in hazardous locations to prevent potentially explosive situations.

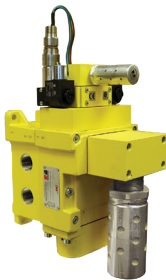


Illustration example.







The DM²® Series C Safe Exhaust valves are dual valves used to block the supply and remove the downstream pressure from the circuit or machine. It is integrated into the electrical safety system to remove potentially hazardous energy in order to provide employees safe access to a machine or zone. By quickly removing the pneumatic energy with a safety valve, determined by the risk assessment, the safety system integrity is maintained allowing the employee to complete their tasks safely and rapidly.

VALVE FEATURES

Dynamic Monitoring	Monitoring, and air flow control functions are simply integrated into two identical valve elements
Dynamic Memory	Asynchronous movement of valve elements is detected by the dynamic monitoring and the valve latches in the safe condition, resulting in a residual outlet pressure of less than 1% of supply
Valve Reset	Reset can only be accomplished by the integrated electrical (solenoid) reset; the valve cannot be reset by removing and re-applying supply pressure
Poppet Design	Dirt tolerant, wear compensating for quick response and high flow capacity
PTFE Backup Piston Rings	Enhances valve endurance enabling operation with or without inline lubrication
Explosion-proof Coils	Contain any spark originating from within the coil or housing preventing the ignition of any flammable material in the surrounding environment, resulting in a larger explosion
Status Indicator	Includes a pressure switch with both normally open (NO) and normally closed (NC) contacts to provide status feedback to the control system indicating whether the valve is in the lockout or ready-to-run condition
Silencer	Includes high flow, clog resistant silencer
Mounting	Base mounted for ease of valve replacement. Captive valve-to-base mounting screws Inlet and outlet ports on both sides provide for flexible piping (plugs for unused ports included)
Intermediate Pilots (Basic Size 12 & 30 valves only)	Increases pilot air flow for fast valve response, making it possible to use the same size solenoids as valve sizes 2, 4 & 8, thereby reducing electrical power requirements for these larger valves
SISTEMA Library	Available for download

These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses, see DM²® Series D double valves for mechanical power press applications.

PRODUCT CREDENTIALS

Performance Level Per ISO 13849-1:2015	Safety Integrity Level Per IEC 2061:2001	Explosion-Proof Certification	DGV	Declaration of Conformity	Certificate of Compliance
		 		 	

Specifications

STANDARD SPECIFICATIONS					
GENERAL	Function		3/2 Valve	Normally Closed	
	Construction Design		Dual Poppet		
	Actuation		Electrical	Solenoid Pilot Controlled	
	Mounting	Type	Base		
		Orientation	Vertically with pilot solenoids on top		
	Connection		Threaded Port	NPT	
				G	
Monitoring		Dynamically, cyclically, internally during each actuating and de-actuating movement Monitoring function has memory and requires an overt act to reset unit after lockout			
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, lubricated or unlubricated (mineral oils according to DIN 51519, viscosity classes 32-46)		
	Operating Pressure		30 to 120 psig (2.1 to 8.3 bar)		
ELECTRICAL DATA	Solenoids Primary & Reset Solenoids		Current Flow	Operating Voltage	Power Consumption (each solenoid)
			DC	24 volts	4.6 watts
			AC	120 volts, 60 Hz	6.8 VA
			Rated for continuous duty		
	Enclosure Rating		IP65, IEC 60529		
	Electrical Connection		Three lead wires with 1/2" NPT conduit connection		
	Mechanical Pressure Switch (Status Indicator) Rating		Contacts - 1 amps at 250 volts AC, SPDT Pressure Switch Enclosure: IP66		
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 _{10D}	20,000,000	
			PFH _D	7.71x10 ⁻⁹	
			MTTF _D	301.9 (n _{op} : 662400)	
	Vibration/Impact Resistance		Tested to DIN EN 60068-2-6		
IMPORTANT NOTE: Please read carefully and thoroughly all of the CAUTIONS, WARNINGS on the inside back cover.					

Applicable Requirements	C22.2 No. 0-10 - General Requirements - Canadian Electrical Code, Part II; CSA C22.2 No. 25-1966 - Enclosures for use in Class II Groups E, F and G Hazardous Locations; CSA C22.2 No. 142-M1987 - Process Control Equipment; C22.2 No. 213-M1987 - Nonincendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations; CAN/CSA E79-0-95 - Electrical apparatus for explosive atmospheres, Part 0: General requirements; CAN/CSA E79-18-95 - Electrical apparatus for explosive atmospheres, Part 18: Encapsulation "m".
APPROVED for use in the following Hazardous Locations	Ex m II T4 and Division 1 – Specifications in accordance to CSA certificate: Class I, Division 1, Groups A, B, C and D; Class II, Groups E, F and G; Class III; Class I, Division 2, Groups A, B, C, D
Specifications in accordance to FM certificate	Explosion-proof Class I, Division 1, Groups A, B, C, D, T4, Ta = 60 °C (encapsulation/explosion-proof Class I, Zone 1, AEx m II T4, Ta = 60 °C; dust-ignition-proof for Class II/III, Division 1, Groups E, F and G, T4, Ta = 60 °C); Nonincendive Class I, Division 2, Groups A, B, C, D, T4, Ta = 60 °C; Suitable for Class II, III, Division 2, Groups E, F, G, T4, Ta = 60 °C CSA CLASS 2258 02 – process control equipment – for hazardous locations FM CLASS 3600, 3611, 3615, 3810 – hazardous (classified) location electrical equipment

Ordering Information

MODEL NUMBER CONFIGURATOR

3-Way 2-Position Valves

Series

DM2C

Port Thread

NPT	N
G	D

Basic Size

	Port Size			
	In	Out	Exhaust	
2	1/4	1/4	3/4	B20
	3/8	3/8	3/4	B21
4	1/2	1/2	1	B42
8	3/4	3/4	1	A54
	1	1	1	A55
12	1	1	1-1/2	A66
30	1-1/2	2	2-1/2	A88

Coil Certification

Explosion-Proof CSA / FM

Status Indicator*

Pressure Switch	1
None	X

* Installed in the base.

Reset Type

Solenoid

Current

DC

Voltage*

24 V

AC

120 V, 60 Hz

B

* For other voltages consult ROSS.

DM2C

N

B21

A

2

1

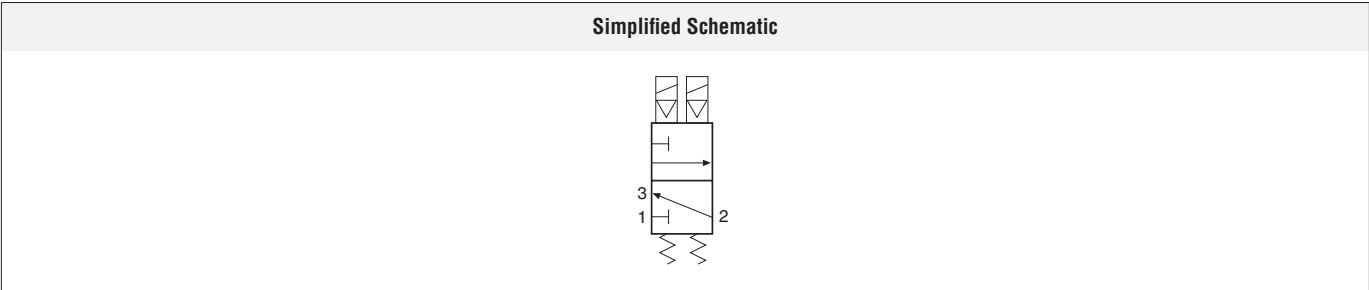
019

For ATEX certified valves order placement, consult ROSS.

Model Number examples: DM2CDB20A21019, DM2CDB21A21019,

Size				Flow Cv (NI/min)		≈ Weight # lb (kg)
Basic	Port 1	Port 2	Port 3	1-2	2-3	
2	1/4	1/4	3/4	1.7 (1700)	2.6 (2600)	5.3 (2.4)
	3/8	3/8	3/4	2.2 (2200)	3.6 (3500)	
4	1/2	1/2	1	3.0 (3000)	6.5 (6400)	5.9 (2.6)
8	3/4	3/4	1	4.2 (4100)	9.4 (9300)	8.4 (3.7)
	1	1	1	4.3 (4200)	9.4 (9300)	
12	1	1	1-1/2	9.0 (8900)	17 (17000)	15.3 (3.7)
30	1-1/2	2	2-1/2	20 (20000)	55 (54000)	34.7 (15.1)

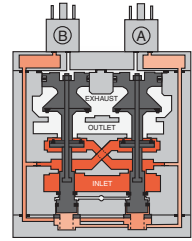
Valve and base assembly with status indicator.



Valve Operation

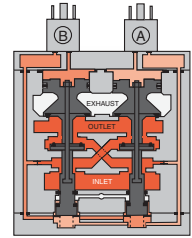
Valve De-actuated (ready-to-run)

The flow of inlet air pressure into the crossover passages from the inlet chamber is restricted by orifices that allow air pressure to bypass the lower inlet poppets. Flow is sufficient to quickly pressurize the pilot supply/timing chambers on both sides A and B. The upper inlet poppets prevent air flow from the crossover passages into the outlet chamber. Air pressure acting on the inlet poppets and return pistons securely hold the valve elements in the de-actuated position. (Internal air passages shown out of the valve body for clarity.)



Valve Actuated

Energizing the pilot solenoids simultaneously applies pressure to both pistons, forcing the internal parts to move to their actuated position, where inlet air flow to outlet is open and both exhaust poppets are closed. The outlet is then quickly pressurized, and pressure in the inlet, crossovers, outlet, and timing chambers are quickly equalized. De-energizing the main solenoids causes the valve elements to return to the ready-to-run (de-actuated) position.



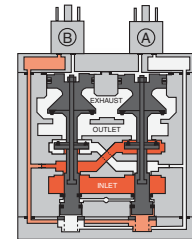
Asynchronous Operation

If the valve elements operate in a sufficiently asynchronous manner on ACTUATION, the valve will shift into a position where one crossover and its related timing chambers will be exhausted, and the other crossover and its related timing chambers will be pressurized.

In the illustration, side B is in the de-actuated position, but has no pilot air available to actuate with and has full pressure on its upper and lower inlet poppets and return piston to hold it in place.

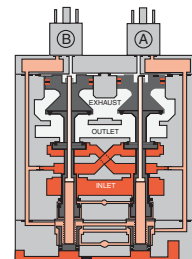
Inlet air flow on side B into its crossover is restricted and flows through the open upper inlet poppet on side A, through the outlet into the exhaust port, and from the exhaust port to atmosphere. Residual pressure in the outlet is less than 1% of inlet pressure.

Once the main solenoids are de-energized, actuating pressure is removed from the top of the main pistons and then the lower inlet poppet return spring along with inlet air pressure acting on the side A return piston will push side A back into the de-actuated position. Inlet air pressurizes the crossovers and volume chambers. Pressure in the crossovers helps hold the upper inlet poppets on seat. The valve will then be in the ready-to-run position. On the next attempt to actuate normally, if side B is still unable to actuate synchronously with side A, the same sequence of events described above will occur again.



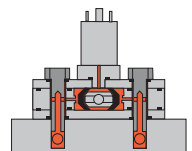
WARNING

If asynchronous operation occurs while DE-ACTUATING, the pilot supply/timing chambers on one side will still be exhausted as described above. However, this could be a temporary situation because the cause of the asynchronous operation may be able to correct itself allowing the stuck or slow acting side of the valve to eventually move back into the de-actuated position. Once the slow or stuck side has de-actuated, the pilot supply/timing chambers that were exhausted will then repressurize. If an external monitoring system is only checking the status indicator periodically this fault signal could be missed. The machine's safety system must be designed to ensure that this does not cause a hazardous situation.



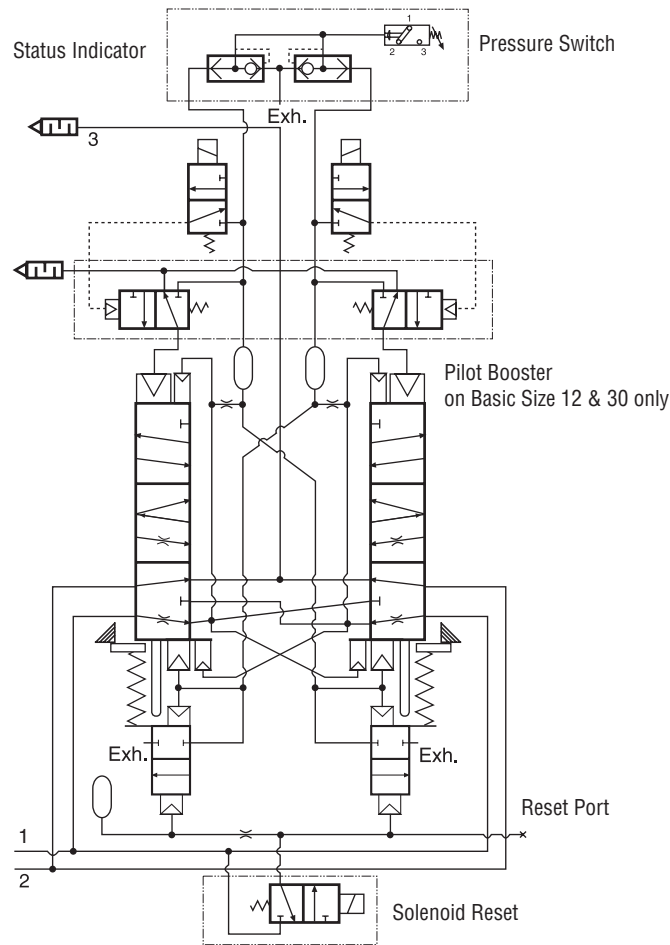
Status Indicator

The status indicator pressure switch will actuate when the main valve is operating normally, and will de-actuate when the main valve is in the locked-out position or inlet pressure is removed. This device is not part of the valve lockout function, but, rather, only reports the status of the main valve.



Status Indicator in normal ready-to-run position

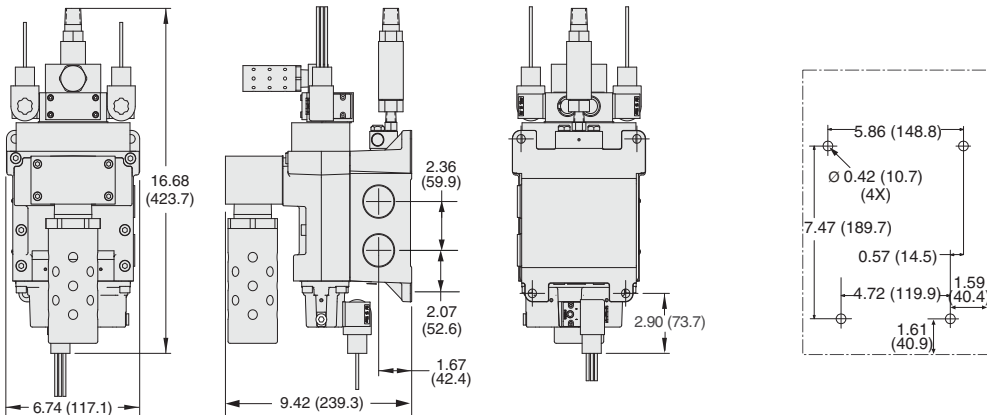
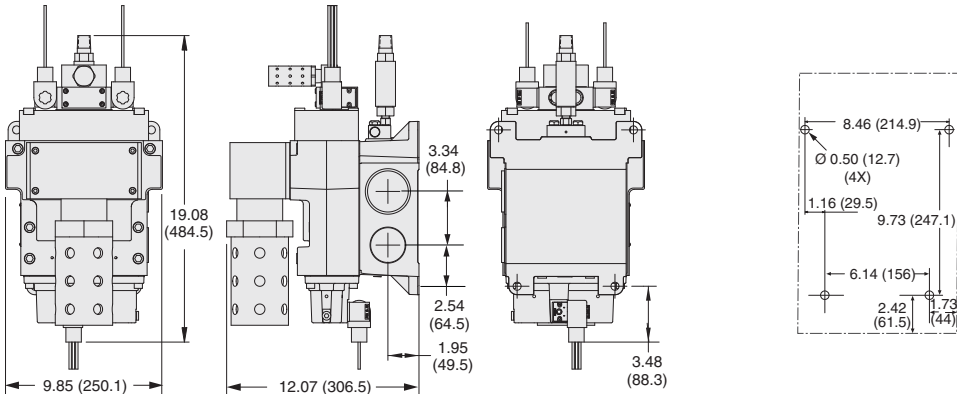
Valve Schematic

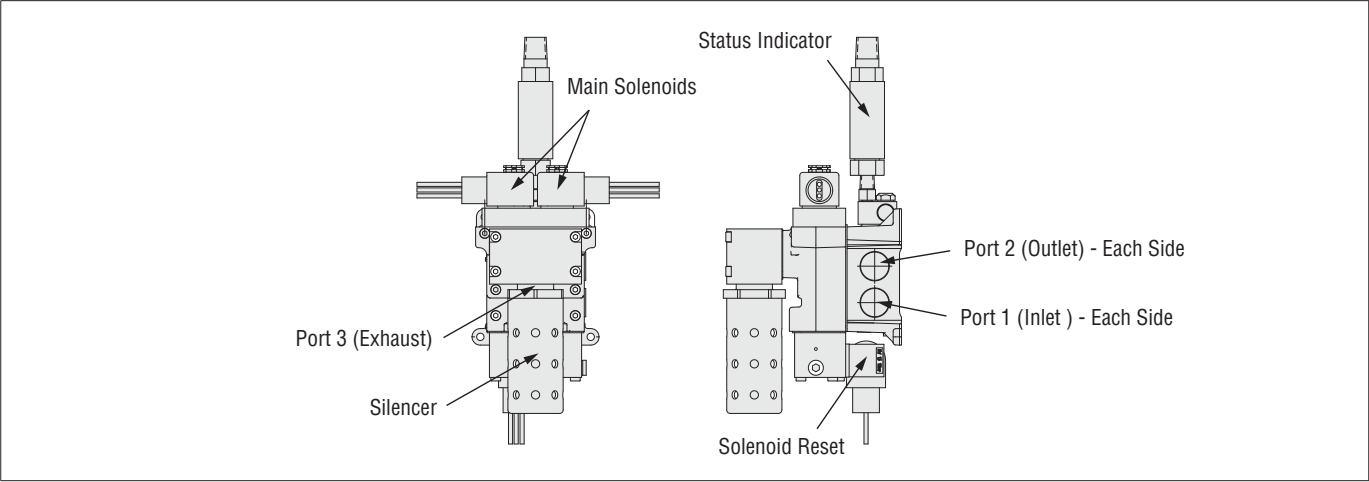


DIMENSIONS		Inches (mm)
Basic Size	Port Size	View X (base mounting hole pattern)
2	1/4 3/8	
4	1/2	
8	3/4 1	

Downloadable CAD models available.


Valve Technical Data

DIMENSIONS		Inches (mm)	
Basic Size	Port Size	View X (base mounting hole pattern)	
12	1		
30	2		
Downloadable CAD models available.			



Accessories

HIGH FLOW NOISE REDUCTION SILENCER KITS

Silencers	Pressure Range psig (bar)	
	0-125 (0-8.6) maximum	
Reduces the Exponentially Perceived Noise (EPNdB), Impact noise reduction in the 35–40 dB range Kits include all plumbing required for installation. # Exhaust Flange Kit required, see below ordering information.		

DM Valve Basic Size	Model Number		Flow scfm (L/s)	Dimensions inches (mm)			
	NPT Thread	R/Rp Thread		Width	Height (NPT)	Height (R/Rp)	Depth
2	2323H77	2328H77	800 (380)	4.96 (126.1)	14.24 (361.7)	16.05 (407.7)	5.73 (145.5)
4	2324H77	2329H77	800 (380)	4.34 (110.2)	19.06 (484.1)	21.40 (543.6)	7.27 (184.7)
8	2325H77	2329H77	800 (380)	5.41 (137.4)	21.18 (538.0)	23.52 (597.4)	8.41 (213.6)
12	2326H77	2330H77	2100 (980)	6.74 (117.2)	25.85 (656.6)	28.20 (716.3)	10.66 (270.8)
30	2327H77	2331H77	7200 (3400)	9.85 (250.2)	41.55 (1055.4)	41.55 (1055.4)	13.47 (342.1)

STATUS INDICATOR

Status Indicator Assembly	Status Indicator Type	Model Number
	The Status Indicator pressure switch actuates when the valve is in a ready-to-run condition and de-actuates when the valve is in a lockout condition or when the inlet air pressure has been removed. Although, the valves can be purchased with this option already installed, the Status Indicator can be purchased separately.	Y739B94

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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