



CLUTCH/BRAKE CONTROL E-P MONITORED DOUBLE VALVES

SERPAR® 35 SERIES

PRODUCT CATALOG



SERPAR® Double Valves with E-P Monitor 35 Series

Product Overview

Clutch/Brake Control Function

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



Illustration example.

The SERPAR® Series valves are internally monitored double valves with a built-in monitoring device that checks for the proper operation of each valve element. If the internal monitor detects a valve fault on a particular cycle, the double valve will fail to a safe condition (all downstream air is exhausted) and the monitor will lock-out to inhibit further operation of the device. Normal operation can only be resumed by a momentary reset signal to the valve.

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



Single Input valves require only one main solenoid signal wired into the terminal strip of the E-P monitored double valve. The main solenoid signal is wired into terminal 1 and internally jumpered to the second main solenoid. Commons are wired into terminal 3. This allows both solenoids to be energized and de-energized simultaneously for proper valve operation.

Dual Input valves require two solenoid signals wired independently into the terminal strip of the E-P monitored double valve. One main solenoid signal is wired into terminal 1 and the second main solenoid signal is wired into terminal 5. Commons are wired into terminal 3. Both solenoid signals must arrive simultaneously for proper valve operation.

VALVE FEATURES

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

PRODUCT CREDENTIALS

Performance Level Per ISO 13849-1:2015 	Safety Integrity Level Per IEC 2061:2001 	Declaration of Conformity  	Certificate of Compliance 
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STANDARD SPECIFICATIONS

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

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

Ordering Information

MODEL NUMBER CONFIGURATOR

3-Way 2-Position Valves

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

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

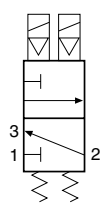
*For other voltages consult ROSS.
**230 V AC not available in the U.S. (OSHA regulations limit press control voltage to no more than 120 volts AC).

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

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

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

Model Number examples: 3573A5141W, D3573A5361Z.

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

Valve Response Time

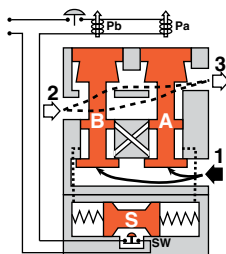
The constants above, designated M and F, can be used to determine the amount of time required to fill or exhaust a volume of any size using the formula on the right:

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

Valve Operation

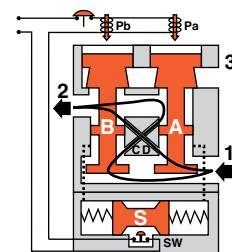
Conditions at Start

Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Contacts of switch SW are closed. Monitoring pressure signals at both ends of spool S are exhausted.



Normal Operation

Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Monitoring pressure signals go to each end of spool S and become equal to inlet pressure.

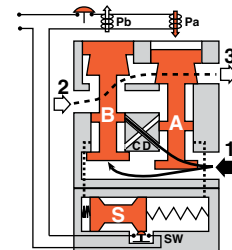


Completion of Normal Cycle

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

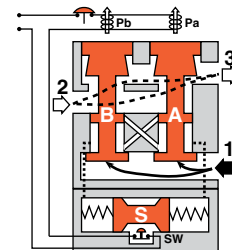
Detecting a Malfunction

A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below two percent of inlet pressure. Full monitoring air pressure from side A goes to the right end of spool S, and a reduced pressure goes to the left end. This pressure imbalance causes the spool to shift to the left. This trips switch SW, breaks the electrical circuit to the pilot solenoids, and allows valve element A to return to the closed position.



E-P Monitor Locked-out

With both valve elements closed, monitoring air pressure is exhausted from both ends of spool S so that it returns to its normal position. The electrical circuit to the pilot solenoids remains broken by switch SW. To restore the electrical circuit and return the valve to normal operation, the reset solenoid (not shown) must be briefly energized to reset switch SW. During and following reset, the pilot solenoids must be kept de-energized to prevent inadvertent and possibly dangerous cycling of the press. Prolonged energizing of the reset solenoid can cause burnout and nullify the reset function.

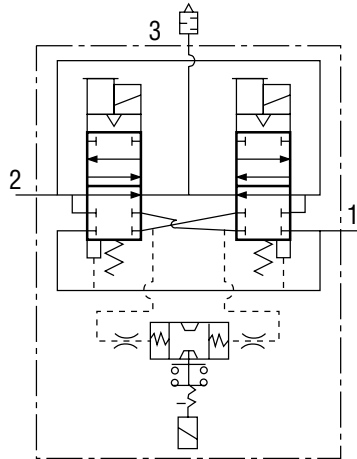


Both solenoids must be energized simultaneously to shift the valve; maintained signal required to keep valve shifted.

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

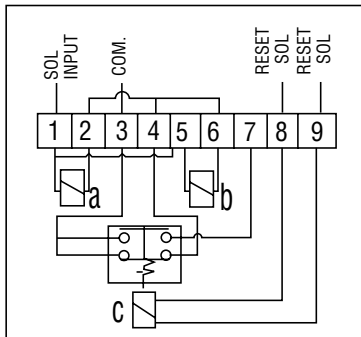
Valve Technical Data

Valve Schematic

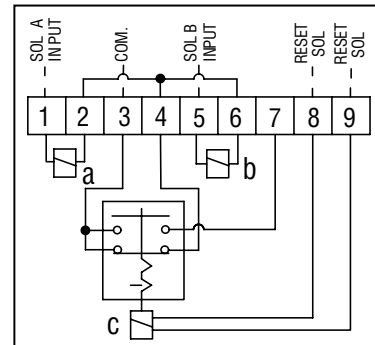


Monitor Wiring

Single Input Wiring Diagram



Dual Input Wiring Diagram

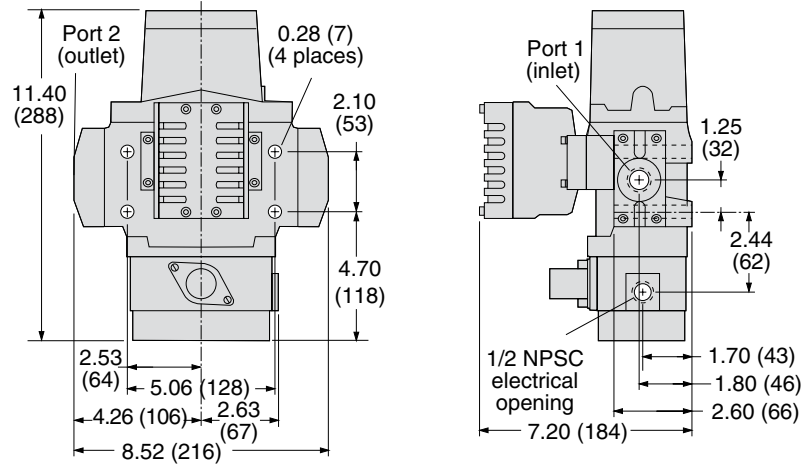


During Lock-out: Terminals 3 and 7 are connected which allows a panel light, bell, or other electrical device to be wired through terminals 7 and 3 to serve as a lockout indicator.

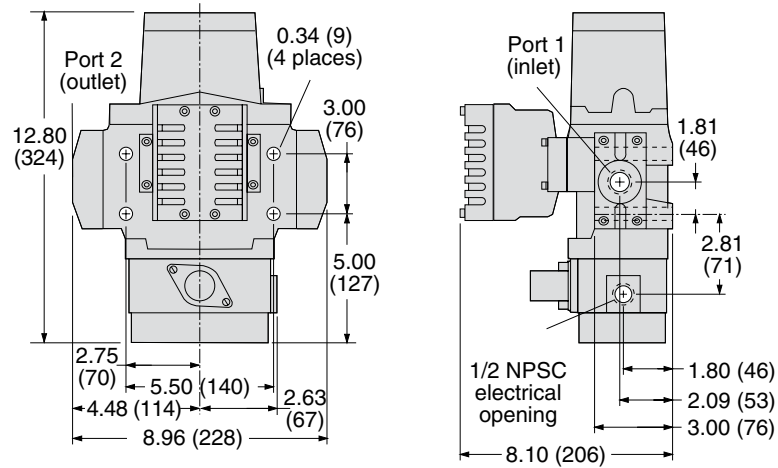
DIMENSIONS

Inches (mm)

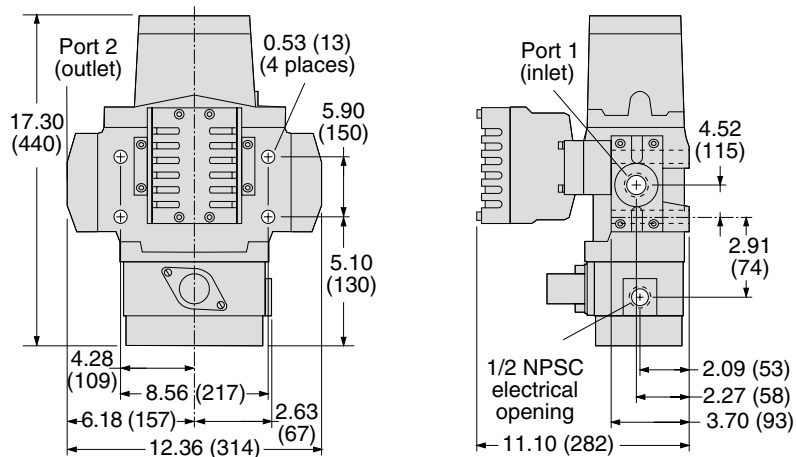
Basic Size 8



Basic Size 12



Basic Size 30



Downloadable CAD models available.

Accessories & Options

ENERGY RELEASE VERIFICATION

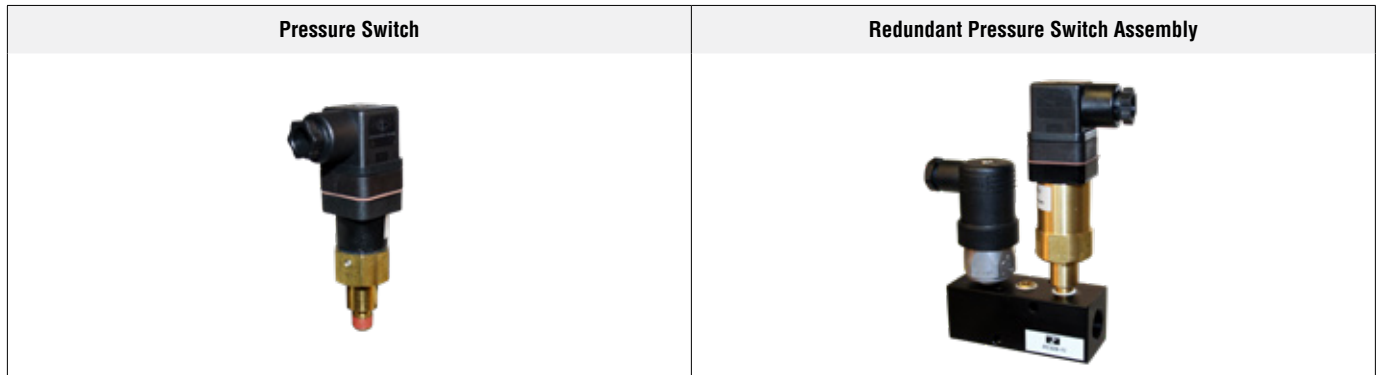
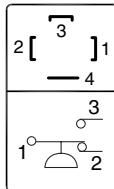


Illustration examples.

Pressure Switch	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 Thread	Factory Preset psi (bar)
	Electrical (Dual)	Downstream	DIN EN 175301-803 Form A	RC026-13	3/8 NPT	5 (0.3) falling

Pinout

DIN EN 175301-803



- 1 - Common
- 2 - Normally Closed
- 3 - Normally Open
- 4 - Ground (Not Used)

Accessories & Options

REPLACEMENT VALVES

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

* For other voltages consult ROSS.

CONNECTION PIPING KITS

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

*Kits include all required seals and mounting bolts.

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.