Clutch/Brake Control Serpar® Double Valves
35 Series L-G Monitored

Product Catalog

ROSS™
a global family

Clutch/Brake Control Function

The SERPAR® L-G 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.

Size 4	Basic Size 8, 12, & 30
	

Illustration examples.

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 FEATURES

Monitoring	Internal, Pneumatic (L-G) monitoring; requires no additional monitoring circuitry
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	Pneumatic reset, with a momentary external pneumatic signal
Mounting	In-line, with piping flanges
Overrides	Manual, flush button or 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
Cat. 4 PL e	SIL 3 Functional Safety	CE	EAC	CSA C US

Specifications

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; L-G monitor			
	Overrides		Valve Basic Size	4	Manual, flush button	
				8, 12, 30	Manual, rubber grommet	
	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		Valve Basic Size	4	30 to 100 psig (2.1 to 7 bar)	
				8, 12, 30	30 to 125 psig (2.1 to 8.5 bar)	
	Reset Pressure	Remote	Valve Basic Size	4	Require a pressure of minimum 30 psig (2 bar)	
				8, 12, 30	Require a pressure of minimum 60 psig (4 bar)	
		Manual	Valve Basic Size 4 only		Use internal valve pressure	

		Valve Basic Size	Current Flow	Operating Voltage	Power Consumption (each solenoid)
ELECTRICAL DATA	Solenoids	4	DC	24 volts	11 watts on DC
			AC	110-120 volts, 50/60 Hz	30 VA inrush, 16 VA holding on 50 or 60 Hz
				230 volts, 50/60 Hz	
		8, 12, 30	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	
		Rated for continuous duty			
		Design according to VDE 0580			
	Enclosure Rating	IP65, IEC 60529			
	Electrical Connection	Valve Basic Size	4	EN 175301-803 Form A, uses two cord-grip connectors at solenoids	
			8, 12, 30	Uses terminal strip connectors	
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

Valve Basic Size 4

	35	7	3	D	319	1	W

Port Thread

NPT Leave Blank	
G	D

Series — 35

Actuation — Solenoid Controlled — 7

Valve Function — 3/2 — 3

Revision Level — D

Port Size – Flanged Ports

Basic Size	Port Size In-Out	
4	3/8	319
	1/2	421
	3/4	521

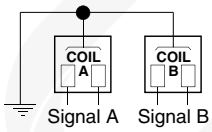
Current	Voltage*	
DC	24 V	W
AC	110-120 V, 50/60 Hz	Z
	230 volts AC, 50/60 Hz**	Y

*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).

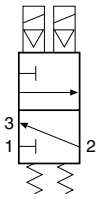
Inlet Orientation	Monitor Reset	
Right	Manual	1
	Remote	2
Left	Manual	5
	Remote	6

Model Number examples: 3573D3192W, 3573D4212Z.

Solenoid Wiring



Simplified Schematic



Size		Flow C_v (Nl/min)		Avg. Response Constants			Weight lb (Kg)
Basic	Port 1, 2	1-2	2-3	M	F 1-2	F 2-3	
4	3/8	3 (3000)	6 (5900)	15	0.70	0.40	8.4 (3.8)
	1/2	3 (3000)	8 (7900)	15	0.65	0.35	
	3/4	3 (3000)	9 (8900)	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.

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

RESET VALVES for L-G MONITOR

On valve models with manual reset a button on the side of the monitor is pushed to perform the reset function.
Valves with 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.

MODEL NUMBER CONFIGURATOR

3-Way 2-Position Valves

Valve Basic Size 8, 12, 30

	35	7	3	A	5152	W

Port Thread	
NPT Leave Blank	
G	D

Series
35

Actuation
Solenoid Controlled
7

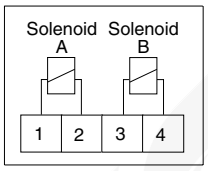
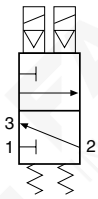
Valve Function
3/2
3

Revision Level
A

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			
Overrides	Basic Size	Port Size # In-Out	
With Manual Overrides	8	1/2	4142
		3/4	5142
	12	3/4	5152
	8	1	6152
	12	1	6162
		1-1/4	7162
	30	1-1/4	7152
		1-1/2	8162
Without Overrides	8	1/2	4162
		3/4	5162
	12	3/4	5172
	8	1	6172
	12	1	6182
		1-1/4	7182
	30	1-1/4	7172
		1-1/2	8182

Solenoid Wiring	Simplified Schematic
	

 # 2 inch Port Size available on Basic Size 30 valves. Order model number 1999H77 flange kit separately.

Model Number examples: 3573D4142W, 3573D6162Z.

Size		Flow C_v (Nl/min)		Avg. Response Constants			Weight lb (Kg)
Basic	Port 1, 2	1-2	2-3	M	F 1-2	F 2-3	
8	1/2	3.5 (3400)	8.5 (8400)	15	0.70	0.30	15.3 (6.9)
	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	19.0 (8.6)
8	1	4.0 (3900)	12 (12000)	20	0.33	0.21	15.3 (6.9)
12	1	8.5 (8400)	19 (19000)	20	0.28	0.21	19.0 (8.6)
	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	37.5 (16.9)
	1-1/2	21 (21000)	43 (42000)	25	0.18	0.07	

Valve Response Time

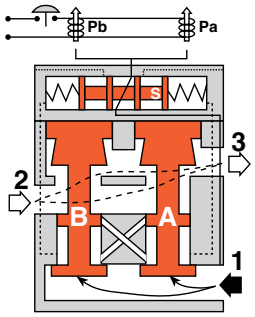
The constants above, designated M and F, can be used to determine the amount of time required to fill or exhaust a volume of any size using the formula on the right.

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

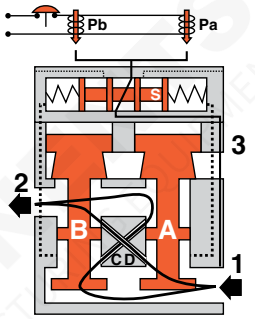
Conditions at Start

Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pilot air is ported from inlet 1 and through the center section of spool S to the normally closed pilots Pa and Pb. Monitoring pressure signals at both ends of spool S are exhausted.



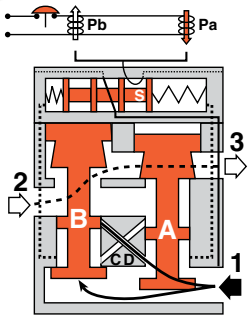
Normal Operation

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.



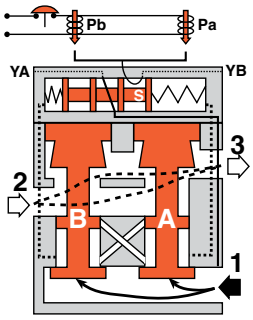
Detecting a Malfunction

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 shuts off and exhausts pilot air to both solenoid pilots, and allows valve element A to return to the closed position.



L-G Monitor Locked-out

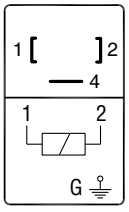
When the L-G spool shifts it is held by a lockout pin (not shown). Pilot air is then exhausted to atmosphere via port YB, and pilot supply air is diverted to atmosphere via port YA. The lockout mechanism must be reset before the valve can return to normal operation. During and following reset, the pilot solenoids must be kept de-energized to prevent inadvertent and possibly dangerous cycling of the press. The reset function is either manual or remote-pneumatic depending on valve model.



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

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.

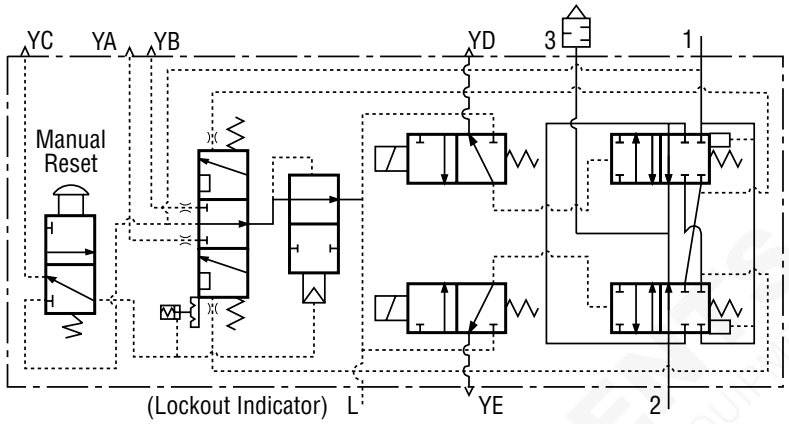
SOLENOID PINOUT



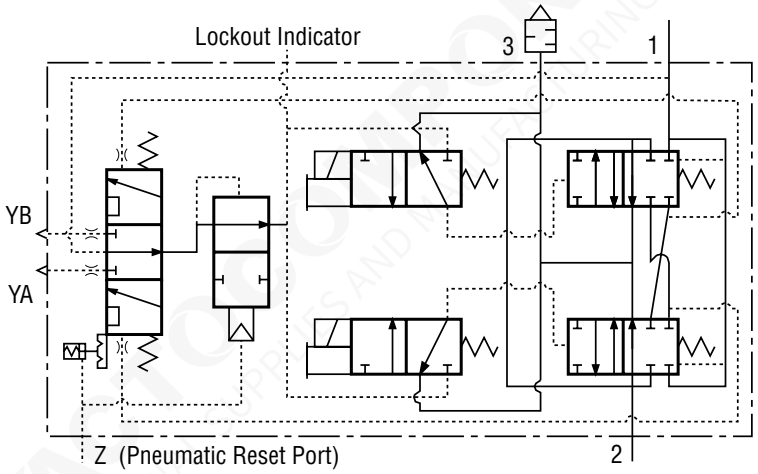
1 - Positive
2 - Negative
4 - Ground

VALVE SCHEMATICS

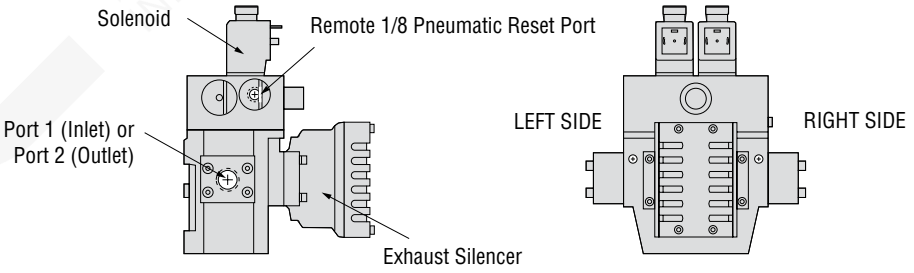
Valve Body Size 4



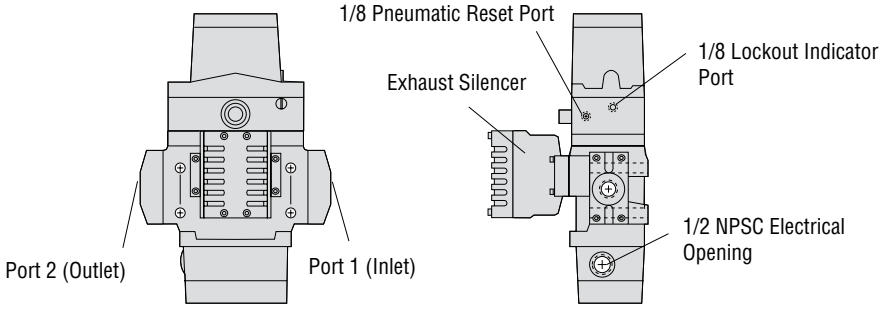
Valve Body Size 8, 12, 30

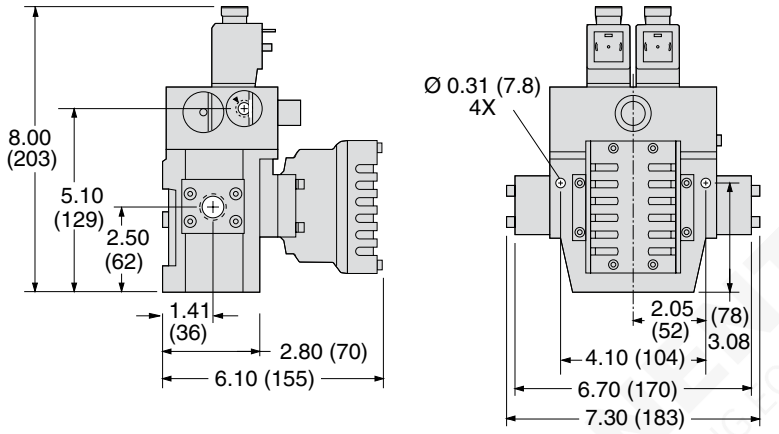
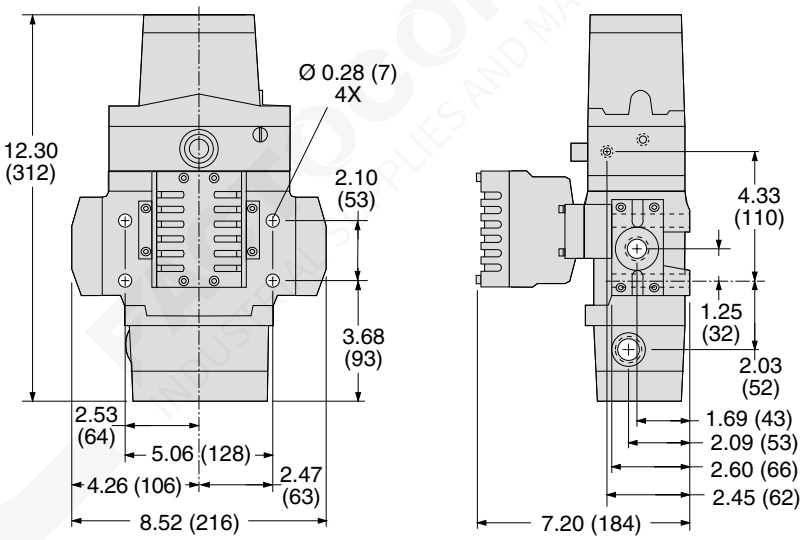


Valve Body Size 4



Valve Body Size 8, 12, 30

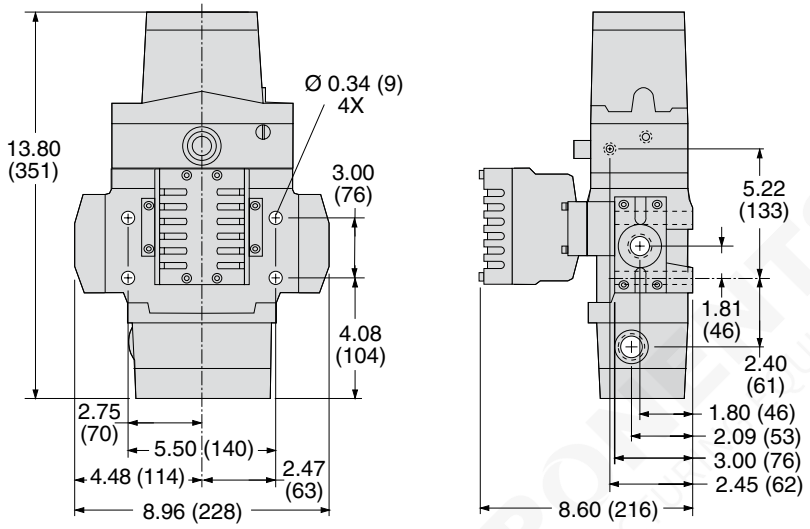


DIMENSIONS	Inches (mm)
Basic Size 4	
Basic Size 8	
Downloadable CAD models available.	

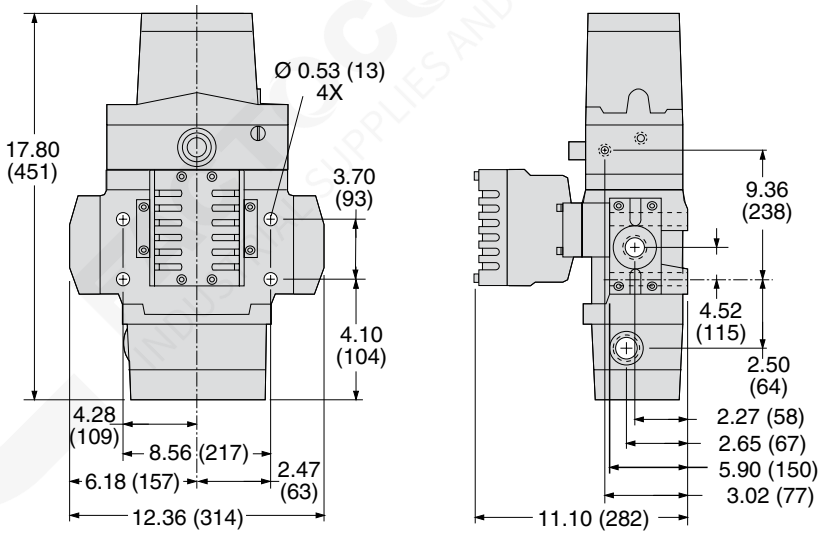
DIMENSIONS

Inches (mm)

Basic Size 12



Basic Size 30



Downloadable CAD models available.

ELECTRICAL STATUS INDICATION

Illustration example.

	Installation Location	Indicator Type	Connector Type	Model Number	Port Thread	Factory Preset psi (bar)
Pressure Switch (Electrical Lockout Indicator)	Pressure Sensing Port	Mechanical Pressure Switch	EN 175301-803 Form A	586A86	1/8 NPT	5 (0.3) falling

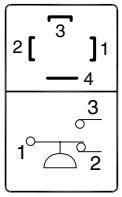
ENERGY RELEASE VERIFICATION

Illustration example.

	Installation Location	Indicator Type	Connector Type	Model Number	Port Thread	Factory Preset psi (bar)
Redundant Pressure Switch Assembly	In-line Downstream	Mechanical Pressure Switch	EN 175301-803 Form A	RC026-13	3/8 NPT	5 (0.3) falling

Pinout

DIN EN 175301-803 Form A



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

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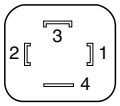
PREWIRED ELECTRICAL CONNECTORS

Illustration example.

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

Connector Pinout

DIN EN 175301-803 Form A



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

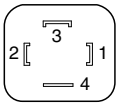
ELECTRICAL CONNECTORS

Cable Grip	
Without Light	**With Light**
	

Illustration examples.

Connectors	Connector					Model Number			
	Type	Connection	Fitting Connection	Quantity Included	Cord Diameter mm	Without Light	Lighted Connector		
							24 V DC	120 V AC	230 V AC
	DIN EN 175301-803 Form A	Solenoid	Cable grip	1	8 to 10	937K87	936K87-W	936K87-Z	936K87-Y
			1/2" NPT conduit	1	–	723K77	724K77-W	724K77-Z	724K77-Y

Connector Pinout
DIN EN 175301-803



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

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REPLACEMENT VALVES

Valve without Piping Flanges

For Basic Size 4

Valve Basic Size	Port Size In-Out	Monitor Reset	Voltage	Valve Model Number* Right Inlet NPT Thread	Right Inlet G Thread	Left Inlet NPT Thread	Left Inlet G Thread
4	3/8, 1/2, 3/4	Manual	24 V DC	3573D4241W	D3573D4241W	3573D4245W	D3573D4245W
			120 V DC	3573D4241Z	D3573D4241Z	3573D4245Z	D3573D4245Z
			230 V DC	3573D4241Y	D3573D4241Y	3573D4245Y	D3573D4245Y
		Remote	24 V DC	3573D4242W	D3573D4242W	3573D4246W	D3573D4246W
			120 V DC	3573D4242Z	D3573D4242Z	3573D4246Z	D3573D4246Z
			230 V DC	3573D4242Y	D3573D4242Y	3573D4246Y	D3573D4246Y

* For other voltages consult ROSS.

Valve without Piping Flanges

For Basic Size 8, 12, 30

Valve Basic Size	Port Size In-Out	Voltage	Valve Model Number* With Manual Overrides NPT Thread	With Manual Overrides G Thread	Without Overrides NPT Thread	Without Overrides G Thread
8	1/2, 3/4, 1	24 V DC	3573A4202W	D3573A4202W	3573A4222W	D3573A4222W
		120 V DC	3573A4202Z	D3573A4202Z	3573A4222Z	D3573A4222Z
		230 V DC	3573A4202Y	D3573A4202Y	3573A4222Y	D3573A4222Y
12	3/4, 1, 1-1/4	24 V DC	3573A5202W	D3573A5202W	3573A5222W	D3573A5222W
		120 V DC	3573A5202Z	D3573A5202Z	3573A5222Z	D3573A5222Z
		230 V DC	3573A5202Y	D3573A5202Y	3573A5222Y	D3573A5222Y
30	1-1/4, 1-1/2	24 V DC	3573A7202W	D3573A7202W	3573A7222W	D3573A7222W
		120 V DC	3573A7202Z	D3573A7202Z	3573A7222Z	D3573A7222Z
		230 V DC	3573A7202Y	D3573A7202Y	3573A7222Y	D3573A7222Y

* For other voltages consult ROSS.

CONNECTION PIPING KITS

Valve Piping Flange Kits

Port Size In-Out	Valve Basic Size	Kit Number* NPT	Kit Number* G Thread	Flange Quantity
3/8	4	658K77	D658K77	2
1/2	4	659K77	D659K77	2
	8	661K77	D661K77	2
3/4	4	660K77	D660K77	2
	8	662K77	D662K77	2
	12	664K77	D664K77	2
1	8	663K77	D663K77	2
	12	665K77	D665K77	2
1-1/4	12	666K77	D666K77	2
	30	667K77	D667K77	2
1-1/2	30	668K77	D668K77	2

*Kits include all required seals and mounting bolts.

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 (NC) valves with either manual or electric control that are suitable for this purpose.

Compact Valves for Line Mounting	Miniature Valve for Base Mounting	Manual Palm Button Valves	Mushroom Valves
			

Illustration examples.

Direct Solenoid Pilot Control – Compact Valves for Line Mounting

Valve Type	Port Size	Valve Model Number*						Flow C_V (Nl/min)	Average Response Constants**	
		NPT Thread			G Thread					
	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		M	F
Normally-Closed	1/8	1613B1020W	1613B1020Z	1613B1020Y	D1613B1020W	D1613B1020Z	D1613B1020Y	0.3 (290)	5	2.90

* For other voltages, consult ROSS.

**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

Direct Solenoid Pilot Control – Miniature Valve for Base Mounting

Valve Type	Override Type	Valve Model Number*			Flow C_V (Nl/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.

Sub-Base for Direct Solenoid Control Valves	Sub-Base Model Number	
	NPT Thread	G Thread
	516B91	D516B91

Manual Palm Button Valves

Valve Operator Type	Port Size	Button Color	Valve Model Number		Flow C_V (Nl/min)
			NPT Thread	G Thread	
Heavy Duty Palm Button	1/4	Green	1223B2001	D1223B2001	0.8 (780)
		Red	1223B2003	D1223B2003	
Flush Pushbutton	1/4	Green	1223B2FPG	D1223B2FPG	0.9 (890)
		Red	1223B2FPR	D1223B2FPR	
Mushroom Button	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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