Clutch/Brake Control

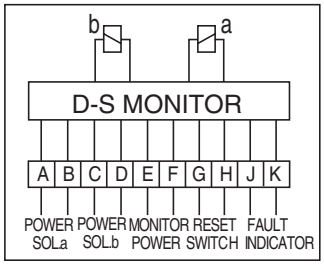
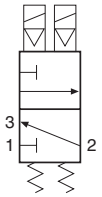
Serpar® D-S Monitored Double Valves

Product Catalog

SERPAR® Double Valves with D-S Monitor 35 Series
Product Overview

Clutch/Brake Control Function

The SERPAR® 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, as well as other Category -3 and -4 safety circuits.

Monitor Wiring	Simplified Schematic
 Wiring Diagram	

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 properly resetting the monitor.

VALVE FEATURES

Monitoring	Electronic, uses electronic circuit and proximity switches with a comparator
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	Disables electrical circuit upon fault detection
Valve Reset	Dry contact; must be reset by a non-powered contact closure between terminals G and H
Mounting	In-line, with piping flanges
Overrides	Manual, rubber grommet
SISTEMA Library	Available for download at rosscontrols.com

Specifications

STANDARD SPECIFICATIONS			
GENERAL	Function		Clutch/Brake Control
	Construction Design		3/2 Normally-Closed valve, Dual Poppet
	Actuation		Solenoid Pilot Controlled
	Mounting	Type	In-line
		Orientation	Preferably vertically (with pilot solenoids on top)
	Connection		Threaded; BSPP (G), NPT
	Monitoring		Internal dinamic; D-S 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)
	D-S Monitor Reset		Non-powered contact closure
ELECTRICAL DATA	Solenoids		According to VDE 0580. Two solenoids, rated for continuous duty
	Operating Voltage		24 volts DC; 110-120 volts AC, 50/60 Hz
	Power Consumption		14 watts on DC, 87 VA inrush, 30 VA holding on 50 or 60 Hz
		D-S Monitor	Rated for same voltage as pilot solenoids Power supply to monitor must be independent and continuous
	Enclosure Rating		IP65, IEC 60529
	Electrical Connection		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.

PRODUCT CREDENTIALS				
Safety Category	**CE Conformity Declaration**	**EAC Conformity Declaration**	**ISO Standard**	**CSA Certificate of Compliance**
Cat. 4 PL e / SIL 3 Functional Safety	CE	EAC	ISO 13849-1:2015	CSA C US

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Ordering Information

MODEL NUMBER CONFIGURATOR — 3-Way 2-Position Valves

Valve Basic Size 8, 12, 30

[ ]	35	73	B	5143	W
Thread	Series	Type/Function	Revision Level		Voltage*

Thread	
BSPP (G)	D
NPT	Leave Blank

Type/Function
3/2-Way Solenoid

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

*For other voltages consult ROSS.

Port Size – Flanged Ports			
Overrides	Basic Size	Port Size #	
With Manual Overrides	8	1/2	4143
		3/4	**5143**
	12	3/4	5153
	8	1	6153
	12	1	6163
		1-1/4	7163
	30	1-1/4	7153
		1-1/2	8163

Port Size – Flanged Ports			
Overrides	Basic Size	Port Size #	
Without Overrides	8	1/2	4163
		3/4	5163
	12	3/4	5173
	8	1	6173
	12	1	6183
		1-1/4	7183
	30	1-1/4	7173
		1-1/2	8183

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

Valve Basic Size	Inlet Port Size	Flow C_V		Avg. Response Constants			Weight lb (Kg)
				M	F		
		1-2	2-3		1-2	2-3	
8	1/2	3.5	8.5	15	0.70	0.30	16.8 (7.6)
	3/4	4.0	12	15	0.65	0.23	
12	3/4	8.0	15	15	0.65	0.23	20.5 (9.2)
8	1	4.0	12	20	0.33	0.21	16.8 (7.6)
12	1	8.5	19	20	0.28	0.21	20.5 (9.2)
	1-1/4	9.0	21	20	0.28	0.21	
30	1-1/4	20	42	25	0.19	0.07	39.3 (17.7)
	1-1/2	21	43	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

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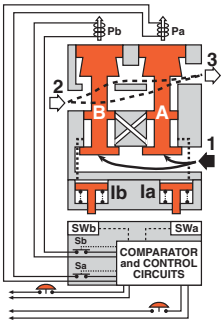
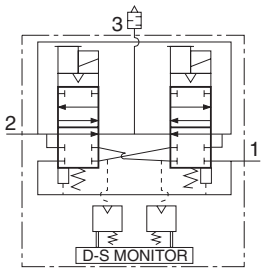
Valve Operation

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.

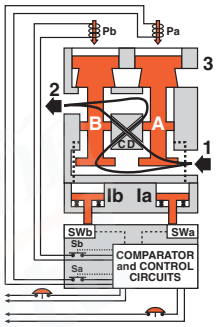


Valve Schematic



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 pressure indicators Ia and Ib, causing the indicator pins to be extended and to actuate proximity switches SWa and SWb. In normal operation, each pair - solenoids, valve elements, indicators, and proximity switches - responds in unison so that the comparator circuits "read" the operation as normal.

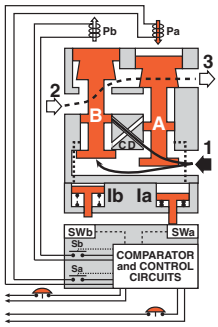


Completion of Normal Cycle

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

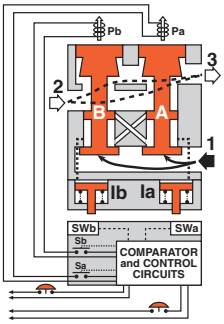
Detecting a Malfunction

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 pressure indicator Ia so that its pin is extended and actuates proximity switch SWa. When the time interval between the signal to a solenoid and the signal from its corresponding proximity switch exceeds approximately 175 milliseconds, the D-S monitor breaks contacts Sa and Sb as soon as solenoid power is removed. This allows valve element A to return to the closed position.



D-S Monitor Locked-out

With the valve locked out by contacts Sa and Sb, solenoids Pa and Pb cannot be energized. The monitor must be reset before another valve cycle can begin. Reset can be achieved by a separately connected ancillary switch, but not if the pilot solenoids are energized. The monitor can be reset by removing and reapplying power to the monitor even when the pilot solenoids are energized. For this reason it is necessary to have the pilot solenoids de-energized during and following reset to prevent inadvertent and possibly dangerous cycling of the press.



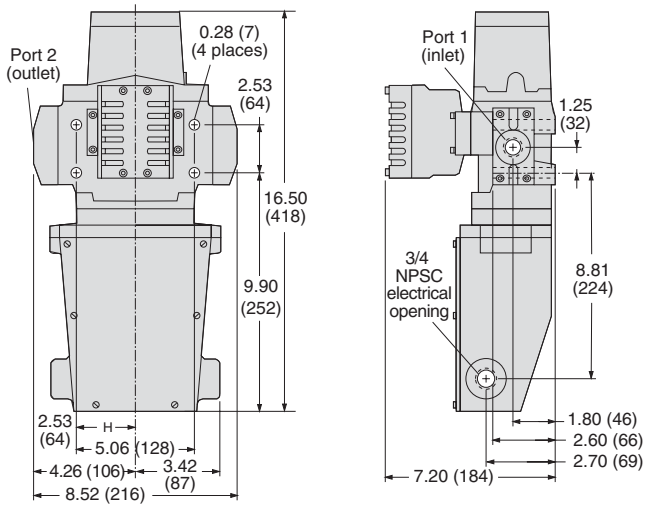
Both solenoids must be energized simultaneously to shift the valve; maintained signal required to keep valve shifted.

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.*

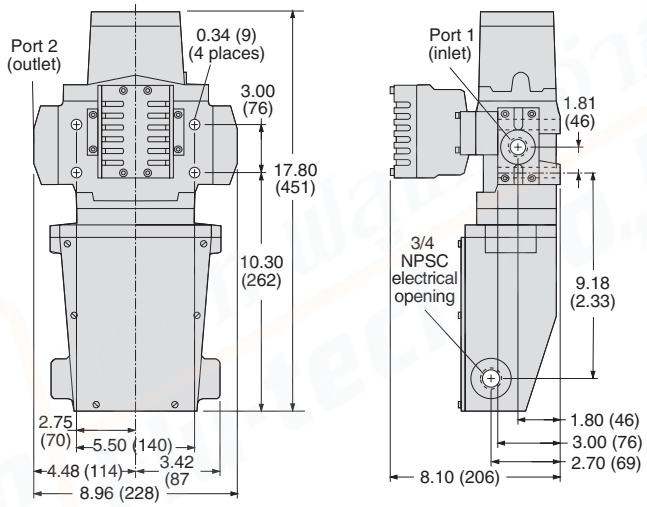
DIMENSIONS

Inches (mm)

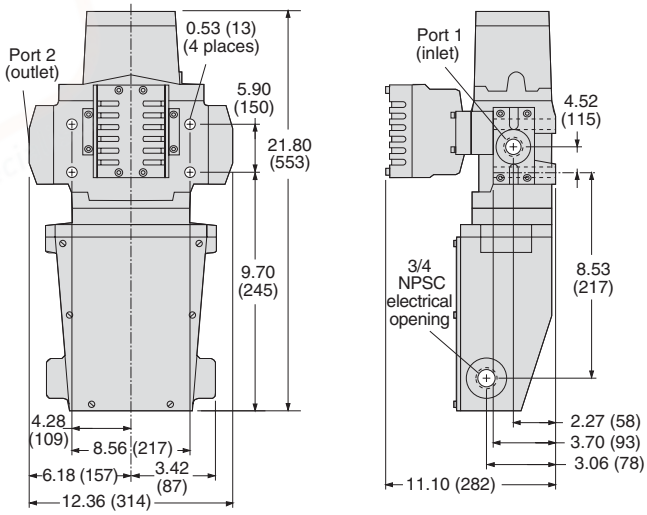
Basic Size 8



Basic Size 12



Basic Size 30



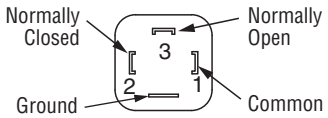
For additional information, and to assist you with piping and connectivity designs, our products are available in downloadable 2D and 3D CAD models in a wide range of formats at www.rosscontrols.com.

ENERGY RELEASE VERIFICATION

	Installation Location	Indicator Type	Connector Type	Model Number	Port Size	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

Connectors Pinout

EN 175301-803 Mechanical Pressure Switch



Accessories & Options

REPLACEMENT VALVES

Valve without Piping Flanges

Port Size	Valve Basic Size	Voltage	Valve Model Number*			
			With Manual Overrides		Without Overrides	
			BSPP (G) Thread	NPT Thread	BSPP (G) Thread	NPT Thread
1/2, 3/4, 1	8	24 V DC	D3573A4203W	3573A4203W	D3573A4223W	3573A4223W
		120 V DC	D3573A4203Z	3573A4203Z	D3573A4223Z	3573A4223Z
3/4, 1, 1-1/4	12	24 V DC	D3573A5203W	3573A5203W	D3573A5223W	3573A5223W
		120 V DC	D3573A5203Z	3573A5203Z	D3573A5223Z	3573A5223Z
1-1/4, 1-1/2	30	24 V DC	D3573A7203W	3573A7203W	D3573A7223W	3573A7223W
		120 V DC	D3573A7203Z	3573A7203Z	D3573A7223Z	3573A7223Z

* For other voltages, consult ROSS.

CONNECTION PIPING KITS

Valve Piping Flange Kits

Port Size	Valve Basic Size	Kit Number*		Flange Quantity
		BSPP (G) Thread	NPT	
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.

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