



BULLETIN 510 C



**Pneumatic Machine
Safeguarding
Solutions**

**Complete Your System with
ROSS CONTROLS® Safety-Related Products**

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SAFETY INFORMATION

Fluid Power Safety for Machine Guarding Book

- **Overview of topics related to the safe application of fluid power in industrial applications** – Topics include Control Integrity, Control Categories, Lockout-Tagout, Alternative Lockout-Tagout, Risk Assessment, Risk Assessment as Related to Fluid Power, Clutch/Brake Controls for Mechanical Stamping Presses, Understanding the Function of Counterbalance on Mechanical Stamping Presses, and FAQ's.

Fluid Power Safety Risk Locator Program - provides guidance to areas of possible safety concerns for closer examination (electronic format, downloadable from the Safety Industry page at www.rosscontrols.com)

ROSS Safety-related Applications

- **Energy Isolation (LOTO & Alternative Measures):**
 - Whole machine
 - Zone control
 - Single point lockout
 - Monitored Power Systems
 - Partial de-energization
- **Energy Re-application:**
 - Gradual pressure build-up
- **Load holding and/or mid-stroke positioning:**
 - Hazard in one direction (Vertical cylinders)
 - Hazard in both directions (Horizontal cylinders)
- **Cylinder reverse to safe position:**
 - Hazard in one direction
 - Vertical or horizontal cylinders
- **Two hand anti-tie-down control**
- **Safety control for pinch points, tooling or product damage**
- **Stamping-press control:**
 - Clutch/Brake
 - Counterbalance
- **Noise reduction**
- **Hose whip control due to hose or fitting failure**

Various Safety-related Standards that Apply to Pneumatic Air Systems

ANSI/ASSE Z244.1, OSHA 1910.147

Lockout/Tagout Control of Hazardous Energy, Prevention of Unexpected Startup

OSHA 29 CFR 1910.147, ANSI B11.0, RIA 15.06, ISO13849
Machine Safeguarding

ANSI/PMMI B155.1

Safety Requirements for Packaging Machinery

ANSI B11.1, EN 692

Safety Requirements for Mechanical Power Presses

ANSI B11.2, EN 13736

Safety Requirements for Hydraulic and Pneumatic Power Presses

ANSI B11.3

Safety Requirements for Power Press Brakes

ANSI B11.19

Performance Requirements for Safeguarding

ANSI B11.TR6

Safety Control Systems for Machine Tools

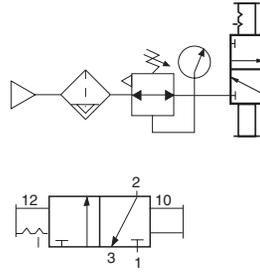


The **Lockout L-O-X®** valve is used to block the supply and remove the downstream pressure from the circuit or machine and allow the employee to lockout the pneumatic energy for safe machine access.
The **Soft Start EEZ-ON®** valve provides gradual re-application of pneumatic energy to prevent rapid equipment movement at startup.

- Lockable only in the OFF position
- Has a full size exhaust port (equal to or larger than supply)
- Simple push/pull of the large handle provides positive direct manual operation
- Fluorocarbon slipper seals for easy shifting, even after long periods of inactivity
- Integrated sensing port for pressure verification or visual indicator option

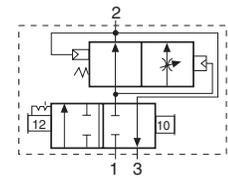
3/2 Manual Lockout L-O-X® Valves

Valve Style	Port Size		Body Size	Valve Model Number		C _v	
	1, 2	3		BSPP Threads	NPT Threads	1-2	2-3
Slim Line	1/4	3/8	3/8	YD1523D2002	Y1523D2002	1.84	1.79
	3/8	3/8	3/8	YD1523D3012	Y1523D3012	2.67	2.64
Modular	1/4	3/4	3/4	YD1523A2003	Y1523A2003	3.7	7.8
	3/8	3/4	3/4	YD1523A3003	Y1523A3003	5.1	8.3
	1/2	3/4	3/4	YD1523A4003	Y1523A4003	5.5	8.6
	3/4	3/4	3/4	YD1523A5013	Y1523A5013	5.6	8.1
Classic	3/8	3/4	1/2	YD1523C3002	Y1523C3002	4.74	3.57
	1/2	3/4	1/2	YD1523C4002	Y1523C4002	7.10	4.00
	3/4	3/4	1/2	YD1523C5012	Y1523C5012	8.26	4.10
	3/4	1 1/4	1	YD1523C5002	Y1523C5002	13.12	8.98
	1	1 1/4	1	YD1523C6002	Y1523C6002	16.56	9.52
High Capacity	1 1/2	2	2	YD1523C8002	Y1523C8002	35.53	50.98
	2	2	2	YD1523C9012	Y1523C9012	40.38	52.23
	1/4	1/4	1/2	D1523B2004	1523B2004	2.14	2.08
Stainless Steel Classic	3/8	1/2	1/2	D1523B3004	1523B3004	5.79	6.24
	1/2	1/2	1/2	D1523B4004	1523B4004	5.79	6.24
	3/4	1	1	D1523B5004	1523B5004	14.30	17.00
	1	1	1	D1523B6004	1523B6004	14.30	17.00
	1 1/2	2	1	D1523B8004	1523B8004	39.00	45.00
	2	2	2	D1523B9004	1523B9004	39.00	45.00



3/2 Manual Lockout L-O-X® Valves with Soft Start EEZ-ON®

Valve Style	Port Size		Body Size	Valve Model Number		C _v	
	1, 2	3		BSPP Threads	NPT Threads	1-2	2-3
Modular	1/4	3/4	3/8	YD1523B2103	Y1523B2103	3.7	7.8
	3/8	3/4	3/8	YD1523B3103	Y1523B3103	5.1	8.3
	1/2	3/4	3/8	YD1523B4103	Y1523B4103	5.5	8.6
	3/4	3/4	3/4	YD1523B5113	Y1523B5113	5.6	8.1
Classic	3/8	3/4	1/2	YD1523B3102	Y1523B3102	3.64	2.81
	1/2	3/4	1/2	YD1523B4102	Y1523B4102	4.86	3.51
	3/4	3/4	1/2	YD1523B5112	Y1523B5112	5.09	2.91
	3/4	1 1/4	1	YD1523B5102	Y1523B5102	10.08	8.56
	1	1 1/4	1	YD1523B6102	Y1523B6102	11.07	8.45
	1 1/4	1 1/4	1	YD1523B7112	Y1523B7112	11.86	8.46



Accessories & Options

- Silencers
- Multiple Lockout Device
- Energy Release Verification Options



Accessories and options, see page 16 & 18.



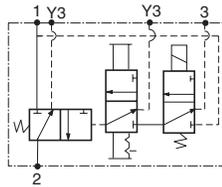
Pneumatic Energy Isolation Piloted Valves with Lockout or Lockout with Soft Start



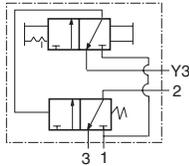
The **Lockout L-O-X®** valve is used to block the supply and remove the downstream pressure from the circuit or machine and allow the employee to lockout the pneumatic energy for safe machine access.

The **Soft Start EEZ-ON®** valve provides gradual re-application of pneumatic energy to prevent rapid equipment movement at startup.

- Lockable only in the OFF position
- Gradual re-application of pneumatic pressure prevents rapid equipment movement at startup
- Has a full size exhaust port (equal to or larger than supply)
- Simple push/pull of the large blue handle provides positive direct manual operation
- Integrated sensing port for pressure verification or visual indicator option



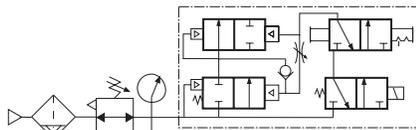
3/2 Valves, Solenoid Pilot Controlled



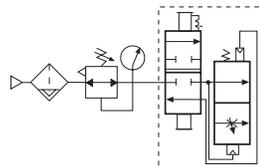
3/2 Valves, Pressure Controlled

3/2 Piloted Valves with Manual Lockout L-O-X® Control								
Valve Style	Port Size			Body Size	Valve Model Number		C _v	
	1	2	3		BSPP Threads	NPT Threads	1-2	2-3
Solenoid Pilot Controlled	1/4	1/2	3/8	YD2773A2072**	Y2773A2072**	2.5	3.1	
	3/8	1/2	3/8	YD2773A3072**	Y2773A3072**	3.6	5.3	
	1/2	1/2	3/8	YD2773A4082**	Y2773A4082**	3.3	5.3	
	1/2	1	3/4	YD2773A4072**	Y2773A4072**	6.3	9.2	
	3/4	1	3/4	YD2773A5072**	Y2773A5072**	7.7	11	
	1	1	3/4	YD2773A6082**	Y2773A6082**	8.0	12	
	1	1 1/2	1 1/4	YD2773A6072**	Y2773A6072**	23	34	
	1 1/4	1 1/2	1 1/4	YD2773A7072**	Y2773A7072**	30	32	
	1 1/2	1 1/2	1 1/4	YD2773A8082**	Y2773A8082**	30	31	
	1 1/2	2 1/2	2	YD2773A8072**	Y2773A8072**	68	70	
	2	2 1/2	2	YD2773A9072**	Y2773A9072**	70	70	
	2 1/2	2 1/2	2	YD2773A9082**	Y2773A9082**	70	71	
	3	2 1/2	3	-	Y3900A0896**	140	71	
Pressure Controlled	1	1 1/2	1 1/4	YD2783A6006	Y2783A6006	23	34	
	1 1/4	1 1/2	1 1/4	YD2783A7006	Y2783A7006	30	32	
	1 1/2	1 1/2	1 1/4	YD2783A8016	Y2783A8016	30	31	
	1 1/2	2 1/2	2	YD2783A8006	Y2783A8006	68	70	
	2	2 1/2	2	YD2783A9006	Y2783A9006	70	70	
	2 1/2	2 1/2	2	YD2783A9016	Y2783A9016	70	71	
	3	2 1/2	3	-	Y3900A0829	140	71	

After energy isolation has been completed the rapid introduction of high pressure can cause motion and unnecessary machine wear or damage. The L-O-X® valve with soft start EEZ-ON® function features all the advantages of the L-O-X® with the added benefit of causing the pressure to increase gradually allowing for a controlled motion to occur.



3/2 Valves, Solenoid Pilot Controlled



3/2 Valves, Pressure Controlled

3/2 Piloted Valves with Manual Lockout L-O-X® with Soft Start Control Function								
Valve Style	Port Size			Body Size	Valve Model Number		C _v	
	1	2	3		BSPP Threads	NPT Threads	1-2	2-3
Solenoid Pilot Controlled	1/4	1/2	3/8	YD2773B2075**	Y2773B2075**	2.5	3.1	
	3/8	1/2	3/8	YD2773B3075**	Y2773B3075**	3.6	5.3	
	1/2	1/2	3/8	YD2773B4085**	Y2773B4085**	3.3	5.3	
	1/2	1	3/4	YD2773B4075**	Y2773B4075**	6.3	9.2	
	3/4	1	3/4	YD2773B5075**	Y2773B5075**	7.7	11	
	1	1	3/4	YD2773B6085**	Y2773B6085**	8.0	12	
	1	1 1/2	1 1/4	YD2773B6075**	Y2773B6075**	23	34	
	1 1/4	1 1/2	1 1/4	YD2773B7075**	Y2773B7075**	30	32	
	1 1/2	1 1/2	1 1/4	YD2773B8085**	Y2773B8085**	30	31	
	Pressure Controlled	1/4	1/2	3/8	YD2783B2055	Y2783B2055	2.5	3.1
3/8		1/2	3/8	YD2783B3055	Y2783B3055	3.6	5.3	
1/2		1/2	3/8	YD2783B4065	Y2783B4065	3.3	5.3	
1/2		1	3/4	YD2783B4055	Y2783B4055	10.0	13.0	
3/4		1	3/4	YD2783B5055	Y2783B5055	12.0	15.0	
1		1	3/4	YD2783B6065	Y2783B6065	12.0	16.0	
1		1 1/2	1 1/4	YD2783A6055	Y2783A6055	23.0	34.0	
1 1/2		1 1/2	1 1/4	YD2783A7055	Y2783A7055	30.0	32.0	
1 1/2		1 1/2	1 1/4	YD2783A8065	Y2783A8065	30.0	31.0	

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., YD2773A2072W, Y2773B2075W. For other voltages, consult ROSS.

Accessories & Options

- Silencers
- Multiple Lockout Device
- Energy Release Verification Options

Accessories and options, see page 16 & 18.



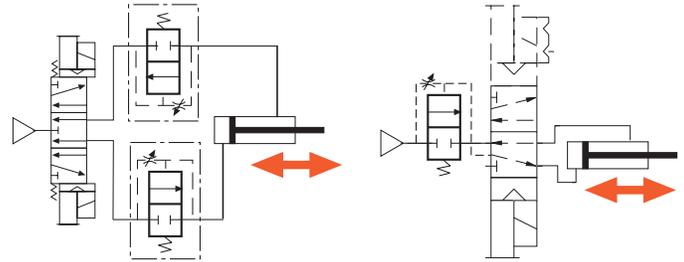
Soft Start EEZ-ON® valve provides gradual re-application of pneumatic energy to prevent rapid equipment movement at startup.

Right-Angle Soft Start EEZ-ON® Valves – 19 Series

- » Right angle style mounts directly in cylinder ports
- » Available with threaded ports or push-in-tubing ports
- » Point of use Soft Start

Soft Start EEZ-ON® Valves – 27 Series

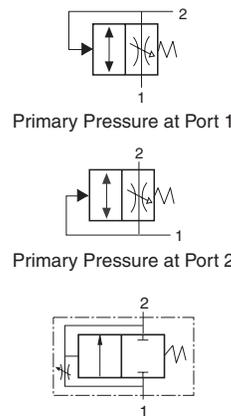
- » Large exhaust port exceeds inlet size for rapid release of pressure
- » Solenoid pilot or pressure controlled



2/2 Soft Start EEZ-ON® Valves						
Valve Style	Port Size		Body Size	Valve Model Number		Avg. C _v
	1	2		BSPB Threads	NPT Threads	
Right-Angle with Threaded Banjo*	1/4	1/4	3/8	D1969B2010	1969B2010	1.2
	3/8	3/8	3/8	D1969B3010	1969B3010	1.7
Pressure Controlled	1/4	1/4	3/8	D2781A2007	2781A2007	2.3
	3/8	3/8	3/8	D2781A3007	2781A3007	3.8
	1/2	1/2	3/8	D2781A4017	2781A4017	4.0
	1/2	1/2	3/4	D2781A4007	2781A4007	13.0
	3/4	3/4	3/4	D2781A5007	2781A5007	15.0
	1	1	3/4	D2781A6017	2781A6017	16.0
	1	1	1 1/4	D2781A6007	2781A6007	24.0
	1 1/4	1 1/4	1 1/4	D2781A7007	2781A7007	29.0
	1 1/2	1 1/2	1 1/4	D2781A8017	2781A8017	29.0

* Port 1 with female threads, port 2 with male threads.

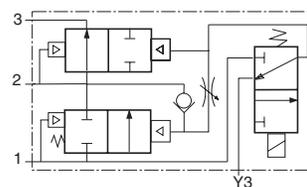
Right-Angle with Threaded Banjo



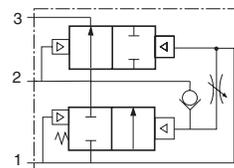
2/2 Valves, Pressure Controlled

3/2 Soft Start EEZ-ON® Valves								
Valve Style	Port Size			Body Size	Valve Model Number		C _v	
	1, 2	3	BSPB Threads		NPT Threads	1-2	2-3	
Solenoid Pilot Controlled	1/4	1/2	3/8	D2773B2037**	2773B2037**	2.5	3.1	
	3/8	1/2	3/8	D2773B3037**	2773B3037**	3.6	5.3	
	1/2	1/2	3/8	D2773B4047**	2773B4047**	3.3	5.3	
	1/2	1	3/4	D2773B4037**	2773B4037**	10.0	13.0	
	3/4	1	3/4	D2773B5037**	2773B5037**	12.0	15.0	
	1	1	3/4	D2773B6047**	2773B6047**	12.0	16.0	
	1	1 1/2	1 1/4	D2773A6037**	2773A6037**	23.0	34.0	
	1 1/4	1 1/2	1 1/4	D2773A7037**	2773A7037**	30.0	32.0	
	1 1/2	1 1/2	1 1/4	D2773A8047**	2773A8047**	30.0	31.0	
Pressure Controlled	1/4	1/2	3/8	D2783C2037	2783C2037	2.5	3.1	
	3/8	1/2	3/8	D2783C3037	2783C3037	3.6	5.3	
	1/2	1/2	3/8	D2783C4047	2783C4047	3.3	5.3	
	1/2	1	3/4	D2783C4037	2783C4037	10.0	13.0	
	3/4	1	3/4	D2783C5037	2783C5037	12.0	15.0	
	1	1	3/4	D2783C6047	2783C6047	12.0	16.0	
	1	1 1/2	1 1/4	D2783B6037	2783B6037	23.0	34.0	
	1 1/4	1 1/2	1 1/4	D2783B7037	2783B7037	30.0	32.0	
	1 1/2	1 1/2	1 1/4	D2783B8047	2783B8047	30.0	31.0	

** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., D2773B2037W. For other voltages, consult ROSS.



3/2 Valves, Solenoid Pilot Controlled



3/2 Valves, Pressure Controlled



Accessories

- Silencers



Silencers, see page 18.



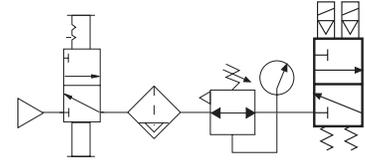
Safety Exhaust Control Reliable Energy Isolation Double Valves



ISO 13849-1:2006
Category 4 PL e
applications

The Safety Shut-Off and exhaust valve is a dual valve 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 and safely and rapidly.

- Status Indicator switch for valve condition (ready to run) feedback
- Highly contaminant-tolerant poppet construction
- Status indicator switch optional
- Sistema library data available
- Explosion proof solenoid pilot available



These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses.

DM¹ Series C – 3/2 Double Valve with Dynamic Monitoring and Automatic Reset



Choose your options (in red) to configure your valve model number.

DM1C **N** **A** **4** **2** **A** **3** **1**

Thread	BSPP D
NPT N	

Revision Level	Size 4, 8 A
Size 2 B	

Basic Size	2 2
4 4	
8 5	

Automatic Reset Type	A
No X	

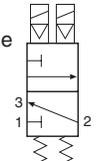
Status Indicator	Yes 1
No X	

Other OPTIONS	
EN 175301-803 Form A* Leave	(connector not included) Blank
M12 (connector included)	005
Silicone Free with EN 175301-803 Form A	030
(connector not included)	
Silicone Free with M12 (connector included)	035
*See options for connectors or wiring kits.	

Basic Size	Port Size		
	Inlet	Outlet	
2	1/4	1/4	0
	3/8	3/8	1
4	1/2	1/2	2
	3/4	3/4	4
8	1	1	5

Voltage*	
24 volts DC	A
110 volts AC, 50 Hz	B
120 volts AC, 50/60 Hz	
* For other voltages consult ROSS.	

Basic Size	Inlet Port Size	Cv	
		1-2	2-3
2	1/4	1.67	2.61
	3/8	2.17	2.61
4	1/2	3	10
	3/4	4.2	13
8	1	4.4	13



- » Self-contained dynamic monitoring system
- » Rapid response time to minimize stopping time
- » Automatic reset by de-energizing solenoids



Accessories and options available, see page 16 thru 18.

DM² Series C – 3/2 Double Valve with Dynamic Monitoring and Memory



- » Dynamic memory of abnormal function retains lockout condition and this prevents unintentional reset with removal of air or electricity
- » Self-contained dynamic monitoring system requires no additional valve monitoring controls
- » Dedicated Reset Signal Required
- » Rapid response time to minimize stopping time

Choose your options (in red) to configure your valve model number.

DM2C **N** **A** **4** **2** **A** **2** **1**

Thread	BSPP D
NPT N	

Revision Level	Size 4, 8, 12, 30 A
Size 2 B	

Basic Size	2 2
4 4	
8 5	
12 6	
30 8	

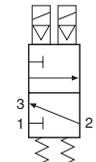
Basic Size	Port Size		
	Inlet	Outlet	
2	1/4	1/4	0
	3/8	3/8	1
4	1/2	1/2	2
	3/4	3/4	4
8	1	1	5
12	1	1	6
30	1½	2	8

Solenoid Reset Type	A
No X	

Status Indicator	Yes 1
No X	

Other OPTIONS	
EN 175301-803 Form A* Leave	(connector not included) Blank
M12 (connector included)	005
Silicone Free with EN 175301-803 Form A	030
(connector not included)	
Silicone Free with M12 (connector included)	035
*See options for connectors or wiring kits.	

Basic Size	Inlet Port Size	Cv	
		1-2	2-3
2	1/4	1.67	2.61
	3/8	2.17	2.61
4	1/2	3	10
	3/4	4.2	13
8	1	4.4	13
12	1	8.5	20
30	1½	22	64



Accessories and options available, see page 16 thru 18.

Air Entry Panels – DM² Series C Double Valves, Manual Lockout L-O-X® Valves with Filter and Regulator

- » Category 4 with Manual L-O-X® and DM¹ or DM² Series C valves



Air Entry Combination	Port Size		Model Number*	Air Entry Type	Cv	
	1, 2	3			1-2	2-3
Cat-4 with DM ² Series C	1/2	1/2	RC408-06**	FR	3	10
	3/4	3/4	RC412-06**	FR	4.4	13
	3/4	3/4	RC412L-06**	FR	3	10

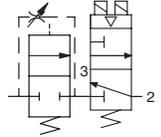
* NPT pressure port threads. Standard unit supplied with metal bowl and manual drain.
** Specify voltage when ordering. Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., RC408-06W. M12 connectors available, consult ROSS.



The Safety Shut-Off and exhaust valve is a dual valve 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 employ to complete their tasks and safely and rapidly.



- Soft start application of air to the system when energized; can be adjusted for slower or faster buildup of system pressure
- Dynamic memory of abnormal function retains lockout condition, thus, preventing unintentional reset with removal of air or electricity
- Self-contained dynamic monitoring system requires no additional valve monitoring controls
- Dedicated reset signal required
- Rapid response time to minimize stopping time



These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses.

M DM²® Series C with Integrated Soft Start – 3/2 Double Valves with Dynamic Monitoring and Memory

» Dedicated Reset Signal Required

Choose your options (in red) to configure your valve model number.

MDM2C **N** **A** **5** **5** **A** **2** **3**

Thread	BSPP D	Revision Level	Basic Size		Solenoid Reset Type	Transducer
	NPT N		Basic Size	Port Size	24 volts DC A	Yes 3
			8	Inlet 3/4		No 1
				Outlet 3/4		
				5		

Inlet Port Size	Basic Size	Cv	
3/4	8	1-2	2-3
		3.7	8.5



Air Entry Units – M DM²® Series C Double Valves with Integrated Soft Start, Manual Lockout L-O-X® Valves with Integrated Filter/Regulators

» Category 4 with Manual L-O-X® and DM¹ or DM² Series C valves

Choose your options (in red) to configure your valve model number.

M **5** **1** **1** **X** **A** **2** **1** **2** **1** **1**

Port Size	1/2 NPTF 4	Lockout Valve Type	Lubricator Fill Type	Downstream Pressure Switch	Cable Options
3/4 NPTF 5	Modular L-O-X® 1	Fill Port 2	586A86 1	Yes 1	
1/2 BSPP D	L-O-X® 2	No lubricator X	None X	No X	
3/4 BSPP E	No L-O-X® X				

Filter-Regulator	Extra-Ports	M DM2® Valve	Extra Ports
(0-125 psi with 0-200 gauge)	(Prior to M DM2® Exhaust Valve)	Without Transducer 1	(Downstream of M DM2®)
5 Micron, Manual Drain, Metal Bowl 1	1/4 2	With Transducer 3	1/4 2
5 Micron, Auto Drain, Metal Bowl 2	3/8 3		3/8 3
None X	1/2 4		1/2 4
	None X		None X



Digital Pressure Transducer

- » Precision digital pressure transducer with 5 pin female connection
- » For external monitoring of downstream pressure

- Two PNP digital outputs which may be set individually, 4-20 mA analog output
- Three operation modes: Easy, Window and Hysteresis
- Selectable response times to eliminate output chattering
- Powered by 12-24 volts DC
- 6 pressure unit conversions
- Lockable keypad
- Fast zero reset

Model Number	2447H77
---------------------	---------

Wiring Kits

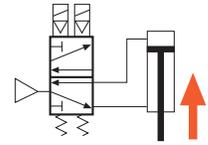
Kit Number	Length
2431H77	Wiring Kit - 5 meters (16.4 feet). Includes two cords, and the cord grips.
2432H77	Wiring Kit with Transducer - 5 meters (16.4 feet). Includes three cords, and the cord grips.



Safe Cylinder Return Double Valves



The CROSSMIRROR® Series is a dual 5/2 spring return valve that when de-energized or a fault occurs will allow an actuator such as a cylinder to reverse and return to the safe position. Typical applications include vertical cylinder presses, but also control of any double-acting cylinder where there is a potential crushing or amputation hazard. The CROSSMIRROR® Series returns an actuator to a safe position so that an employee may have safe access to equipment that contains pneumatically controlled double-acting cylinder hazards.



ISO 13849-1:2006
Category 4 PL e
applications

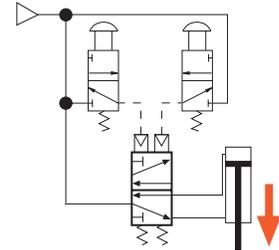
- Self-contained dynamic monitoring system requires no additional valve monitoring controls
- Status indication switch (ready-to-run) to inform machine controller of valve condition
- Sistema library data available
- *Explosion proof solenoid pilot available*

Solenoid Pilot Controlled

- » Status indication switch (ready-to-run) to inform machine controller of valve condition

Pressure Controlled for 2-Hand Control Applications

- » Requires two inputs within 500 ms
- » Senses asynchronous inputs via status indicator switch
- » Asynchronous inputs result in a fault condition where pressure is applied to port 2
- » Status indication switch available to be integrated with electrical safety control system where equipped



These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses.

Meets Standards EN13736 and ANSI B11.2, Safety requirements for Pneumatic Cylinder Presses and other hazardous pneumatic cylinder applications.

77 Series CROSSMIRROR® – 5 Ports, 4-Way 2-Position Valves



- Applications include small size pneumatic cylinder-operated presses, valve operators, and safety latches
- Automatic reset upon de-actuation



Valve Function	Port Sizes		Basic Size	Model Number				C _v			
	1	2, 4		with Pressure Switch*		without Pressure Switch		1-2	1-4	2-3	4-5
				BSPF Threads	NPT Threads	BSPF Threads	NPT Threads				
5/2 Solenoid Pilot Controlled	1/2	3/8	2	YD7776A3411**	Y7776A3411**	YD7776A3410**	Y7776A3410**	2.0	1.6	1.6	2.8
	3/4	1/2	4	YD7776A4421**	Y7776A4421**	YD7776A4420**	Y7776A4420**	3.2	3.4	2.7	7.2
	3/4	3/4	4	YD7776A5411**	Y7776A5411**	YD7776A5410**	Y7776A5410**	3.2	3.4	2.7	7.2
	SAE 12	SAE 12	4#	SYD7776A4H10**	SY7776A4H10**	SYD7776A4H11**	SY7776A4H11**	3.2	3.4	2.7	7.2
5/2 Pressure Controlled	1/2	3/8	2	YD7786A3411**	Y7786A3411**	YD7786A3410	Y7786A3410	2.0	1.6	1.6	2.8
	3/4	1/2	4	YD7786A4421**	Y7786A4421**	YD7786A4420	Y7786A4420	3.2	3.4	2.7	7.2
	3/4	3/4	4	YD7786A5411**	Y7786A5411**	YD7786A5410	Y7786A5410	3.2	3.4	2.7	7.2
	SAE 12	SAE 12	4#	SYD7786A4H11**	SY7786A4H11**	SYD7786A4H10	SY7786A4H10	3.2	3.4	2.7	7.2

* Valve include pressure switches with DIN type connection, for pressure switches with M12 type connection consult ROSS.

** Insert voltage code: "W" = 24 volts DC; "Z" = 110 volts AC, 120 volts AC ; e.g., Y7776A3411W. For other voltages consult ROSS.

Model number includes base.

Preassembled Wiring Kits	Kit Number	Solenoid Connector Type	Length meters (feet)
	2243H77	EN 175301-803 Form A	5 (16.4)
2244H77	EN 175301-803 Form A	10 (32.8)	
2245H77	M12	5 (16.4)	
2246H77	M12	10 (32.8)	

These kits include 2 cables with either EN or M12 connectors for the solenoids. All cables include cord grips.

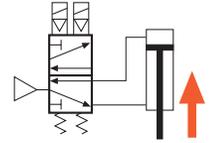
Accessories & Options

- Electrical Connectors
- Energy Release Verification Options
- Wiring Kits



Accessories & Options, see page 16 & 17.

The CROSSMIRROR® Series is a dual 5/2 spring return valve that when de-energized or a fault occurs will allow an actuator such as a cylinder to reverse and return to the safe position. Typical applications include vertical cylinder presses, but also any double-acting cylinder control where there is a potential crushing or amputation hazard. The CROSSMIRROR® Series returns an actuator to a safe position so that an employee may have safe access to equipment that contains pneumatically controlled double-acting cylinder hazards.



ISO 13849-1:2006
Category 4 PL e applications

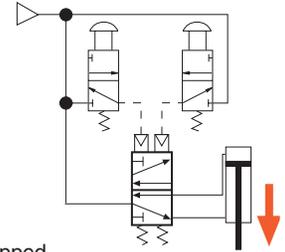
- Self-contained dynamic monitoring system requires no additional valve monitoring controls
- Status indication switch (ready-to-run) to inform machine controller of valve condition
- Sistema library data available
- Explosion proof solenoid pilot available

Solenoid Pilot Controlled

- » Status indication switch (ready-to-run) to inform machine controller of valve condition

Pressure Controlled for 2-Hand Control Applications

- » Requires two inputs within 500 ms
- » Senses asynchronous inputs and valve actuation via dynamic internal monitoring
- » Asynchronous inputs result in a fault condition where pressure is applied to port 2
- » Status indication switch available to be integrated with electrical safety control system where equipped



These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses.

Meets Standards EN13736 and ANSI B11.2, Safety requirements for Pneumatic Cylinder Presses and other hazardous pneumatic cylinder applications.

CM Series CROSSMIRROR® – 5 Ports, 4-Way 2-Position Valves



- Valve fault results in a lockout condition and prevents unintentional reset with removal of air or electricity
- Requires an overt act to reset unit after lockout
- Manifolddable for multi valve applications

Valve Function	Connection Type	Port Sizes		Basic Size	Reset	Model Number				C _v			
		1	2, 4			with Pressure Switch*		without Pressure Switch		1-2	1-4	2-3	4-5
						BSPP Threads	NPT Threads	BSPP Threads	NPT Threads				
5/2 Solenoid Pilot Controlled	EN 175301-803 Form C	1/4	1/4	0	Remote	CM26PDA00A11	CM26PNA00A11	CM26PDA00**1X	CM26PNA00**1X	0.8	0.6	0.5	1.1
		1/4	1/4	0	Solenoid	CM26PDA00A21	CM26PNA00A21	CM26PDA00**2X	CM26PNA00**2X	0.8	0.6	0.5	1.1
		3/8	3/8	0	Remote	CM26PDA01A11	CM26PNA01A11	CM26PDA01**1X	CM26PNA01**1X	0.8	0.6	0.5	1.1
		3/8	3/8	0	Solenoid	CM26PDA01A21	CM26PNA01A21	CM26PDA01**2X	CM26PNA01**2X	0.8	0.6	0.5	1.1
	EN 175301-803 Form A	1/2	1/2	2	Remote	CM26PDA22A11	CM26PNA22A11	CM26PDA22**1X	CM26PNA22**1X	3.0	2.5	2.0	3.9
		1/2	1/2	2	Solenoid	CM26PDA22A21	CM26PNA22A21	CM26PDA22**2X	CM26PNA22**2X	3.0	2.5	2.0	3.9
5/2 Pressure Controlled	–	1/4	1/4	0	Remote	CM26PDA00P11	CM26PNA00P11	CM26PDA00**1X	CM26PNA00**1X	0.8	0.6	0.5	1.1
	–	3/8	3/8	0	Remote	CM26PDA01P11	CM26PNA01P11	CM26PDA01**1X	CM26PNA01**1X	0.8	0.6	0.5	1.1
	–	1/2	1/2	2	Remote	CM26PDA22P11	CM26PNA22P11	CM26PDA22**1X	CM26PNA22**1X	3.0	2.5	2.0	3.9

* Valve include pressure switches with DIN type connection, for pressure switches with M12 type connection consult ROSS.
** Insert voltage code: "A" = 24 volts DC; "B" = 110 volts AC, 120 volts AC; e.g., CM26PNA00A1X.



Basic Valve Size	Kit Number			Solenoid Connector Type	Length meters (feet)
	Connector without Light	Lighted Connector			
		24 Volts DC	120 Volts AC		
0*	2526H77	2529H77-W	2529H77-Z	EN 175301-803 Form A and Form C	5 (16.4)
	2527H77	2530H77-W	2530H77-Z		10 (32.8)
2#	2283H77	2532H77-W	2532H77-Z	EN 175301-803 Form A	5 (16.4)
	2284H77	2533H77-W	2533H77-Z		10 (32.8)
	2288H77**	–	–	M12	5 (16.4)
	2289H77**	–	–	M12	10 (32.8)

* Each cable has one connector. Kits include 1 cable for the status indicator (EN 175301-803 Form A), and 3 cables (EN 175301-803 Form C) with connector plus a cord grip for each.
Each cable has one connector. ** Coil includes light.
Kits include 1 cable for the status indicator, and 3 cables with connector plus a cord grip for each.

Accessories & Options

- Electrical Connectors
- Energy Release Verification Options
- Wiring Kits



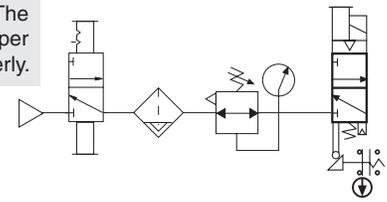
Accessories & Options, see page 16 & 17.

Sensing Valves



The SV27 Series Sensing Valve uses a safety-rated DPST switch to monitor the valve's operating position. The SV27 3/2 valve can be used for safe shut-off and exhaust functions for Category 2 applications with proper integration and monitoring. The feedback switch informs the controls that the valve internals have shifted properly.

- Electrical feedback via DPST switch (Double-Pole Single-Throw)
- Direct-operated safety-rated switch (DPST)
- Poppet construction for near zero leakage & dirt tolerance
- A diagnostic coverage of 99% for 3/2 valves can be obtained by monitoring the safety switch status
- Integrated sensing port for pressure verification or visual indicator
- Sistema library data available



SV27 Sensing Valves – 3/2 Normally Closed Valves

Choose your options (in red) to configure your valve model number.

SV27 **D** **C** **30** **5** **40** **7PS** **AA** **1A** » Has a full size exhaust port (equal to or larger than supply)

Thread	
BSPP	D
NPT	N

Revision Level	
	C

Body Size	
3/4	5
1 1/4	7
2	9

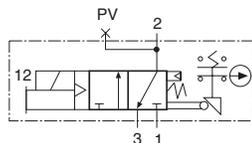
Inline Mounted	
	AA

Voltage* (Solenoid Pilot only)	
24 volts DC	1D
110-120 volts AC, 50/60 Hz	1A
Pressure Controlled	Leave Blank
* For other voltages consult ROSS.	

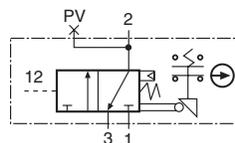
Actuation	
Solenoid Pilot	7PS
Pressure Controlled	5AS

Function	
3/2 Normally Closed	30

Basic Size	Port Size		Cv
	Inlet	Outlet	
3/4	1/2	1/2	40
	3/4	3/4	50
	1	1	60
1 1/4	1	1 1/2	60
	1 1/4	1 1/2	70
	1 1/2	1 1/2	80
2	1 1/2	2 1/2	80
	2	2 1/2	90
	2 1/2	2 1/2	95



Solenoid Pilot Controlled



Pressure Controlled

Port Size	Body Size	Cv	
		1-2	2-3
1/2	1	6.3	9.2
3/4	1	7.7	11
1	1	8.0	12
1	1 1/2	23	34
1 1/4	1 1/2	30	32
1 1/2	1 1/2	30	31
1 1/2	2 1/2	68	70
2	2 1/2	70	70
2 1/2	2 1/2	70	71



SV27 Sensing Valves – 3/2 Normally Closed Valves, with Lockout L-O-X® Function

Choose your options (in red) to configure your valve model number.

SV27 **D** **C** **3L** **5** **40** **7PS** **AA** **1A** » Has a full size exhaust port (equal to or larger than supply)

Thread	
BSPP	D
NPT	N

Revision Level	
	C

Body Size	
3/4	5
1 1/4	7
2	9

Inline Mounted	
	AA

Voltage* (Solenoid Pilot only)	
24 volts DC	1D
110-120 volts AC, 50/60 Hz	1A
Pressure Controlled	Leave Blank
* For other voltages consult ROSS.	

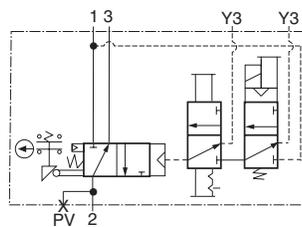
Actuation	
Solenoid Pilot	7PS
Pressure Controlled	5AS

Function	
3/2 Normally Closed with L-O-X®	3L

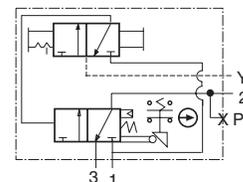
Basic Size	Port Size		Cv
	Inlet	Outlet	
3/4	1/2	1/2	40
	3/4	3/4	50
	1	1	60
1 1/4	1	1 1/2	60
	1 1/4	1 1/2	70
	1 1/2	1 1/2	80

- » Has a full size exhaust port (equal to or larger than supply)
- » Easily identified by red handle
- » Lockable only in the OFF position
- » Simple push/pull of the large red handle accommodates reduced manual actuation forces and easy operation

Port Size	Body Size	Cv	
		1-2	2-3
1/2	1	6.3	9.2
3/4	1	7.7	11
1	1	8.0	12
1	1 1/2	23	34
1 1/4	1 1/2	30	32
1 1/2	1 1/2	30	31



Solenoid Pilot Controlled



Pressure Controlled

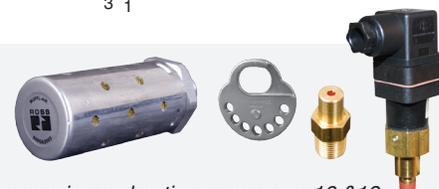
Preassembled Wiring Kits

Valve Type	Kit Number*	No of Cables	Length meters (feet)
Solenoid Pilot	2239H77	2	4 (13.1)
Solenoid Pilot	2240H77	2	10 (32.8)
Pressure Controlled	2241H77	1	4 (13.1)
Pressure Controlled	2242H77	1	10 (32.8)

* Cable has one connector.

Accessories & Options

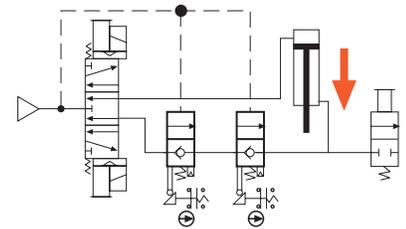
- Silencers
- Multiple Lockout Device
- Energy Release Verification Options



Accessories and options, see page 16 & 18.



Pilot operated checks are designed to trap pressure in order to hold a cylinder in place when a safety event occurs. The SV27 Series Sensing Valve uses a safety-rated DPST switch to monitor the valve's operating position. The SV27 PO Check valves can be used for load holding functions in Category 2 (single) or Category 3 (redundant) applications with proper integration and monitoring. The feedback switch informs the controls that the valve internals have shifted properly.



- Poppet construction for near zero leakage & dirt tolerance
- Direct-operated safety-rated status switch (DPST)
- A diagnostic coverage (DC) of 90% can be obtained by monitoring the safety switch status
- Sistema library data available

SV27 PO Check with Sensing Valves – 2/2 Normally Closed Valves

Choose your options (in red) to configure your valve model number.

SV27 **D** **C** **10** **5** **40** **8CS** **AA** **1A**

Thread	
BSPP	D
NPT	N

Revision Level	

Body Size		
3/4	5	
1 1/4	7	

Inline Mounted

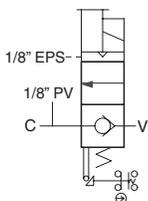
Actuation	
Solenoid Pilot	8CS
Pressure Controlled	5AS

Voltage* (Solenoid Pilot only)	
24 volts DC	1D
110-120 volts AC, 50/60 Hz	1A
* For other voltages consult ROSS.	

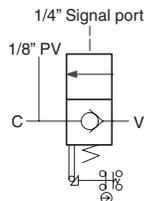
Function	
2/2 Normally Closed	10
2/2 Redundant NC	55

Basic Size	Port Size		
	Inlet	Outlet	
3/4	1/2	1/2	40
	3/4	3/4	50
	1	1	60
1 1/4	1	1 1/2	60
	1 1/4	1 1/2	70
	1 1/2	1 1/2	80

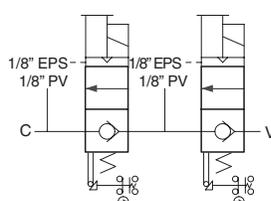
Valve Type	Port Size		Body Size	C _v
	1, 2	1-2		
Single	1/2	3/4	4.5	
	3/4	3/4	8.3	
	1	3/4	10.3	
	1	1 1/4	20	
	1 1/4	1 1/4	29	
Redundant	1 1/2	1 1/4	33	
	1/2	3/4	3.8	
	3/4	3/4	5.6	
	1	3/4	8	
	1	1 1/4	12	
	1 1/4	1 1/4	19	
	1 1/2	1 1/4	22	



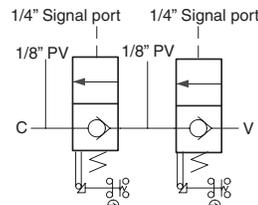
Solenoid Pilot Controlled



Pressure Controlled



Redundant Solenoid Pilot Controlled



Redundant Pressure Controlled

Preassembled Wiring Kits

Valve Type	Kit Number*	No of Cables	Length meters (feet)
Solenoid Pilot	2239H77	2	4 (13.1)
Solenoid Pilot	2240H77	2	10 (32.8)
Pressure Controlled	2241H77	1	4 (13.1)
Pressure Controlled	2242H77	1	10 (32.8)

* Cable has one connector.

Wiring kits for Solenoid Pilot valves

The wiring kits come with a cord grip on each cable. One cable has a 3-pin MINI connector for the solenoid and one has a 5-pin M12 (Micro) connector for the sensing switch.

Wiring kits for Pressure Controlled valves

The wiring kits include one cable with a 5-pin M12 connector for the sensing switch, and a cord grip.

Options

- Energy Release Verification Options



Options, see page 16.

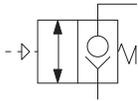
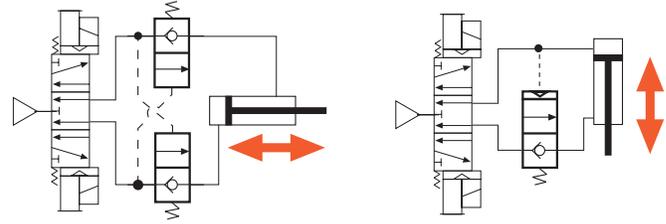


Cylinder Position and Load Holding PO Check Valves



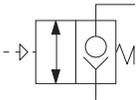
Pilot operated checks are designed to trap pressure in order to hold a cylinder in place. Poppet internals use internal pressure to help complete the seal in order to trap pressure and hold the position of the cylinder in place.

- Poppet construction for near zero leakage
- Cylinder position/load holding applications



Right-Angle PO Check Valves, Cylinder Position Holding										
Valve Function	Port Size*		Valves with BSPP Threads			Valves with NPT Threads			C _v	
			Valve Model Number	Port 12	Tightening Torque Max. Ft-lb (Nm)	Valve Model Number	Port 12	Tightening Torque Max. Ft-lb (Nm)		
	Port 1	Port 2						1-2	2-1	
Right-Angle Threaded Banjo*	1/8	1/8	D1958A1010	M5	7.38 (10)	1958A1010	10-32 UNF	22.13 (30)	0.4	0.4
	1/4	1/4	D1958A2010	M5	8.85 (12)	1958A2010	10-32 UNF	14.75 (20)	0.4	0.4
	3/8	3/8	D1958A3010	M5	14.75 (20)	1958A3010	10-32 UNF	22.13 (30)	0.4	0.4
	1/2	1/2	D1958A4010	M5	22.13 (30)	1958A4010	10-32 UNF	29.50 (40)	0.8	0.7

* Port 1 with female threads, port 2 with male threads.



Right-Angle PO Check Valves, Cylinder Position Holding												
Valve Function	Valves with BSPP Threads					Valves with NPT Threads					C _v	
	Port Size**		Valve Model Number	Port 12	Tightening Torque Max. Ft-lb (Nm)	Port Size**		Valve Model Number	Port 12	Tightening Torque Max. Ft-lb (Nm)		
	Port 1	Port 2				Port 1	Port 2				1-2	2-1
Right-Angle Push-to-Connect Fitting**	4 mm	1/8	D1958A1140	M5	7.38 (10)	5/32"	1/8	1958A1115	10-32 UNF	7.38 (10)	0.4	0.4
	6 mm	1/8	D1958A1160	M5	7.38 (10)	1/4"	1/8	1958A1120	10-32 UNF	7.38 (10)	0.4	0.4
	8 mm	1/8	D1958A1180	M5	7.38 (10)	-	-	-	-	7.38 (10)	0.4	0.4
	6 mm	1/4	D1958A2160	M5	8.85 (12)	1/4"	1/4	1958A2120	10-32 UNF	8.85 (12)	0.8	0.7
	8 mm	1/4	D1958A2180	M5	8.85 (12)	3/8"	1/4	1958A2130	10-32 UNF	8.85 (12)	0.8	0.7
	10 mm	1/4	D1958A2110	M5	8.85 (12)	-	-	-	-	8.85 (12)	0.8	0.7
	8 mm	3/8	D1958A3180	M5	14.75 (20)	3/8"	3/8	1958A3130	10-32 UNF	14.75 (20)	1.2	1.3
	10 mm	3/8	D1958A3110	M5	14.75 (20)	-	-	-	-	14.75 (20)	1.2	1.3

** Port 1 tubing size in inches (") or millimeters (mm).



Manual Override	Manual Trapped Pressure Relief Adapter	Port 1	Port 2	Port Threads	Model Number*
		5/32	10-32 Manual Operated Check	NPT	1998A1015
		M5	M5 Manual Operated Check	BSPP	D1998A1010

* Adapter threads into the signal port.

Pilot operated checks are designed to trap pressure in order to hold a cylinder in place. Poppet internals use internal pressure to help complete the seal in order to trap pressure and hold the position of the cylinder in place. There are a variety of options for pressure relief such as manual, remote signal, and electrical to meet the requirements of the specific application.

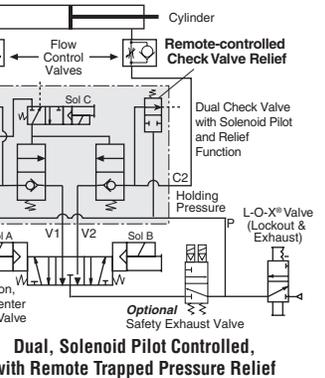
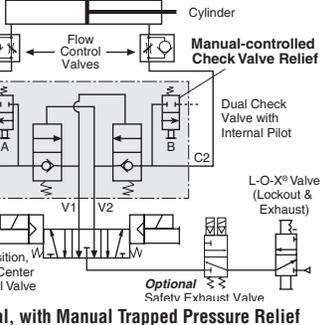
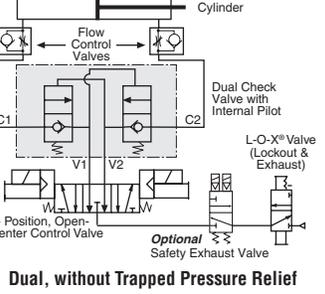
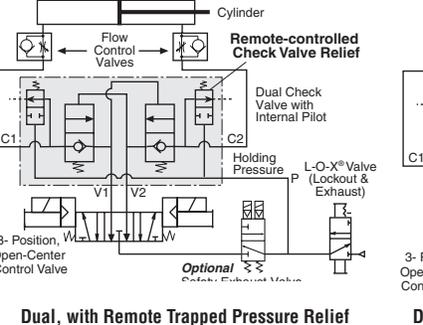
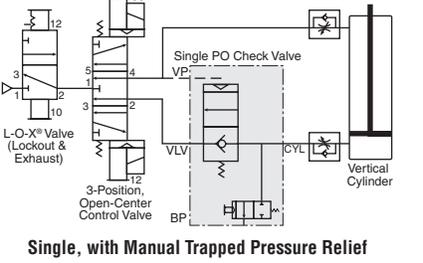
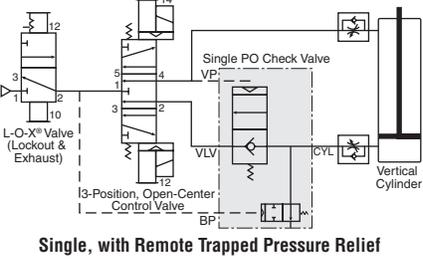
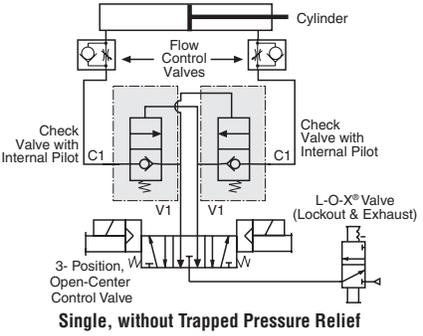
PO Check Valves, Pressure Controlled, Load Holding						
Valve Type	Ports Size	Body Size	Valve Model Number		Signal Port	C _v
			BSPG Threads	NPT Threads		
Single, without Trapped Pressure Relief	1/4	3/8	D2751A2903	2751A2903	1/4	2.3
	3/8	3/8	D2751A3901	2751A3901	1/4	3.8
	1/2	3/8	D2751A4902	2751A4902	1/4	4.0
	1/2	3/4	D2751A4905	2751A4905	1/4	7.7
	3/4	3/4	D2751A5903	2751A5903	1/4	9.0
	1	3/4	D2751A6901	2751A6901	1/4	9.0
	1	1 1/4	D2751B6904	2751B6904	1/4	24
	1 1/4	1 1/4	D2751B7901	2751B7901	1/4	29
1 1/2	1 1/4	D2751B8902	2751B8902	1/4	29	

PO Check Valves, Pressure Controlled, Load Holding						
Valve Type	Ports Size	Valve Model Number		Signal Port	C _v	
		BSPG Threads	NPT Threads			
Single, without Trapped Pressure Relief	1/4	D2751A2908	2751A2908	1/8-27 NPT	2.2	
	3/8	D2751A3908	2751A3908	1/8-27 NPT	2.9	
	1/2	D2751A4915	2751A4915	1/8-27 NPT	3.2	
Single, with Remote Trapped Pressure Relief	3/8	D2751A3922	2751A3922	1/8-27 NPT	2.6	
	1/2	D2751A4922	2751A4922	1/8-27 NPT	2.8	
Single, with Manual Trapped Pressure Relief	3/8	D2751A3920	2751A3920	N/A	2.6	
	1/2	D2751A4920	2751A4920	N/A	2.8	
Dual, without Trapped Pressure Relief	3/8	D2768C3900	2768C3900	1/8-27 NPT	2.9	
	1/2	D2768C4900	2768C4900	1/8-27 NPT	3.2	
	3/4	D2768C5900	2768C5900	1/8-27 NPT	8.5 #	
Dual, with Remote Trapped Pressure Relief	3/8	D2768D3901	2768D3901	1/8-27 NPT	2.9	
	1/2	D2768D4901	2768D4901	1/8-27 NPT	3.2	
	3/4	D2768D5901	2768D5901	1/8-27 NPT	8.5 #	
Dual, with Manual Trapped Pressure Relief	3/8	D2768D6901	2768D6901	1/8-27 NPT	8.5 #	
	1/2	D2768D3904	2768D3904	N/A	2.9	
	3/4	D2768D4904	2768D4904	N/A	3.2	
Dual, with Manual Trapped Pressure Relief	1/2	D2768D5904	2768D5904	N/A	8.5 #	
	3/4	D2768D6904	2768D6904	N/A	8.5 #	

Effective C_v varies with load and pressure drop. Consult ROSS for specifics on your system.

PO Check Valves, Solenoid Pilot Controlled, Load Holding							
Valve Type	Ports Size	Valve Model Number*				Signal Port	C _v
		DIN Connector	3-Pin Mini Connector	24 Volts DC 3-Pin Mini	24 Volts DC 4-Pin Micro		
Dual, Solenoid Controlled, with Remote Trapped Pressure Relief	3/8	2778D3900**	2778D3901**	2778D3902	2778D3904	1/8-27 NPT	2.9
	1/2	2778D4900**	2778D4901**	2778D4902	2778D4904	1/8-27 NPT	3.2
	3/4	2778D5900**	2778D5901**	2778D5902	2778D5904	1/8-27 NPT	8.5 #
	1	2778D6900**	2778D6901**	2778D6902	2778D6904	1/8-27 NPT	8.5 #

* NPT port threads. For BSPG threads, add a "D" prefix to the model number, e.g., D2751A2903.
 ** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., D2778D3900W. For other voltages, consult ROSS.
 # Effective C_v varies with load and pressure drop. Consult ROSS for specifics on your system.





Explosion-Proof Safety Exhaust Double Valves & Inline Poppet Valves



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

DM2® Series C – 3/2 Explosion-Proof Double Valves with Dynamic Monitoring and Memory



ISO 13849-1:2006
Category 4 PL e
applications



- Dynamic memory of abnormal function retains lockout condition and this prevents unintentional reset with removal of air or electricity
- Self-contained dynamic monitoring system requires no additional valve monitoring controls
- Electrical reset valve
- Rapid response time to minimize stopping time
- Status Indicator switch for valve condition (ready to run) feedback
- Highly contaminant-tolerant poppet construction
- Sistema library data available



These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses.

Choose your options (in red) to configure your valve model number.

DM2C N A 4 2 A 2 1 019

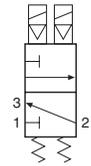
Thread	BSP D	Revision Level	4	Basic Size	4	Reset Type	Solenoid 2	Status Indicator	Yes 1 No X	Pilot Type	Explosion Proof 019
NPT	N			12	6						
				30	8						

Base Port Size	4	1/2 inlet – 1/2 outlet	2
	12	1 inlet – 1 outlet	6
	30	1 1/2 inlet – 2 outlet	8

Voltage*	24 volts DC	A
	120 volts AC, 60 Hz	B

* For other voltages consult ROSS.

Valve Basic Size	Cv	
	1-2	2-3
4	4.4	13
12	8.5	20
30	22	64



Accessories and options available, see page 16 thru 18.

27 & 21 Series – 2/2 Explosion-Proof Inline Valves



- Poppet construction for near zero leakage & high dirt tolerance
- Pilot can be rotated, giving the ability to change orientation
- Repeatability throughout the life of the valve
- 27 Series - Acetal internals
- 21 Series - Metal, aluminum internals - for low temperature applications



ATEX Certified valves available.

Choose your options (in red) to configure your valve model number.

27 71 B 200 2 W

Thread	BSP D	Revision Level	71	Body Size	200	Port Size	2	Voltage* (Solenoid Pilot only)	24 volts DC W 120 volts AC, 60 Hz Z
NPT	Leave Blank								* For other voltages consult ROSS.

Series	21 Low Temperature	21*
	27 Standard	27

* Available in 3/8, 3/4, 1 1/4 Body Size only.

Function	2/2 Normally Closed	71
	2/2 Normally Open	72

Explosion Proof Series	21 Series Valve	5
	27 Series Valve	2

Body Size	3/8	3/4	1 1/4	2	2 1/2
Port Size	1/4	1/2	3/4	1	1 1/2
	3/8	3/4	1 1/4	2	2 1/2
	1/2	3/4	1 1/4	2	2 1/2
	1	1 1/4	1 1/2	2	2 1/2
	1 1/4	1 1/4	1 1/2	2	2 1/2
	1 1/2	1 1/2	1 1/2	2	2 1/2
	2	2	2	2	2 1/2

2 (27 Series valves only)

Normally Closed

Normally Open

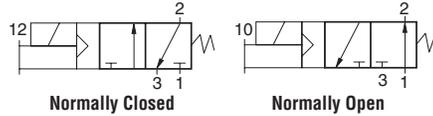
Valve Style	Series	Port Size 1, 2	Body Size	Cv	
				NC	NO
Standard	27	1/4	3/8	2.3	2.3
		3/8	3/8	3.8	3.3
		1/2	3/8	4.0	3.5
		1/2	3/4	7.7	6.5
		3/4	3/4	9.0	7.3
		1	3/4	9.0	7.9
		1	1 1/4	24	21
		1 1/4	1 1/4	29	20
		1 1/2	1 1/4	29	21
		1 1/2	2	49	49
		2	2	57	57
		2 1/2	2	64	72
Low Temperature	21	1/4	3/8	2.3	2.3
		3/8	3/8	3.8	3.3
		1/2	3/8	4.0	3.5
		1/2	3/4	7.7	6.5
		3/4	3/4	9.0	7.3
		1	3/4	9.0	7.9
		1	1 1/4	24	21
		1 1/4	1 1/4	29	20
		1 1/2	1 1/4	29	21
		1 1/2	2	49	49
		2	2	57	57
		2 1/2	2	64	72

27 & 21 Series – 3/2 Explosion-Proof Inline Valves

Valve Style	Series	Port Size		Body Size	C _v			
		1, 2	3		NC		NO	
		1-2	2-3		1-2	2-3		
Standard	27	1/4	1/2	3/8	2.5	3.1	2.3	2.7
		3/8	1/2	3/8	3.6	5.3	2.8	3.2
		1/2	1/2	3/8	3.3	5.3	2.8	3.2
		1/2	1	3/4	6.3	9.2	6.3	8.0
		3/4	1	3/4	7.7	11	6.9	7.4
		1	1	3/4	8	12	6.8	7.5
		1	1½	1¼	23	34	17	24
		1¼	1½	1¼	30	32	19	24
		1½	1½	1¼	30	31	19	23
		1½	2½	2	68	70	57	59
		2	2½	2	70	70	58	61
		2½	2½	2	70	71	54	55
Low Temperature	21	1/4	1/2	3/8	2.4	3.4	2.0	2.1
		3/8	1/2	3/8	3.0	5.8	2.3	2.4
		1/2	1/2	3/8	3.0	5.2	2.9	2.8
		1/2	1	3/4	6.6	12	6.5	7.0
		3/4	1	3/4	7.8	13	7.5	7.5
		1	1	3/4	7.5	12	7.7	7.6
		1	1½	1¼	24	40	15	17
		1¼	1½	1¼	29	39	21	23
		1½	1½	1¼	30	38	22	23



ATEX Certified valves available.



Choose your options (in red) to configure your valve model number.

D **27** **73** **B** **200** **2** **W**

Thread
BSPP **D**
NPT **Leave Blank**

Series
21 Low Temperature **21***
27 Standard **27**
*Available in 3/8, 3/4, 1¼ Body Size only.

Function
3/2 Normally Closed **73**
3/2 Normally Open **74**

Revision Level	Body Size		Port Size
	1,2		
3/8	1/4		200
	3/8		300
	1/2		401
3/4	1/2		400
	3/4		500
	1		601
1¼	1		600
	1¼		700
	1½		801
2 (27 Series valves only)	1½		800
	2		900
	2½		901

Voltage* (Solenoid Pilot only)
24 volts DC **W**
120 volts AC, 60 Hz **Z**
* For other voltages consult ROSS.

Explosion Proof Series
21 Series Valve **5**
27 Series Valve **2**

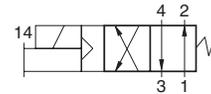


27 & 21 Series – 4/2 Explosion-Proof Inline Valves

Valve Style	Series	Port Size		Body Size	C _v			
		1, 2, 4	3		1-2, 1-4	4-3, 2-3		
		Standard	27		1/4	1/2	3/8	2.1
3/8	1/2			3/8	2.9	4.2		
1/2	1/2			3/8	3.1	4.3		
1/2	1			3/4	5.6	8.1		
3/4	1			3/4	7.0	9.3		
1	1			3/4	7.8	10		
1	1½			1¼	19	26		
1¼	1½			1¼	21	27		
1½	1½			1¼	22	27		
Low Temperature	21			1/4	1/2	3/8	2.1	2.2
				3/8	1/2	3/8	2.5	3.1
				1/2	1/2	3/8	2.9	3.8
		1/2	1	3/4	5.7	6.5		
		3/4	1	3/4	7.1	8.7		
		1	1	3/4	7.7	10		
		1	1½	1¼	18	23		
		1¼	1½	1¼	20	28		
1½	1½	1¼	21	29				



ATEX Certified valves available.



Choose your options (in red) to configure your valve model number.

D **27** **76** **B** **200** **2** **W**

Thread
BSPP **D**
NPT **Leave Blank**

Series
21 Low Temperature **21***
27 Standard **27**

Function
3/2 Normally Closed **76**

Revision Level	Body Size		Port Size	
	Inlet	Outlet		
3/8	1/4	1/2		200
	3/8	1/2		300
	1/2	1/2		401
3/4	1/2	1		400
	3/4	1		500
	1	1		601
1¼	1	1½		600
	1¼	1½		700
	1½	1½		801

Voltage* (Solenoid Pilot only)
24 volts DC **W**
120 volts AC, 60 Hz **Z**
* For other voltages consult ROSS.

Series
21 Low Temperature **5**
27 Series **2**



Accessories

- Silencers

Silencers, see page 18.



Other Safety Devices

AIR-FUSE Flow Diffusers – 19 Series



- **Protection from Broken Hose or Plastic Tubing**
 - » For use with only non-corrosive, non-flammable, non-hazardous gases
 - » Automatically reduces flow to minimize hose whip upon sensing a broken hose/tube
 - » Simple installation; Reset by shutting off air supply

Port Size	Porting Type	Model Number		Shut-off Flow Rate at 100 psi (7 bar) scfm (dm ³ /s)	Flow at 100 psi (7 bar) ΔP 1 psi (0.07 bar) scfm (dm ³ /s)
		BSPG Threads	NPT Threads		
1/4	Female-Female	D1969D2002	1969D2002	29.7 (14)	13.8 (8)
3/8	Female-Female	D1969D3002	1969D3002	68.2 (32)	28.6 (14)
1/2	Female-Female	D1969D4002	1969D4002	102.3 (48)	49.2 (23)
3/4	Female-Female	D1969D5002	1969D5002	169.5 (80)	91.1 (43)
1	Female-Female	D1969D6002	1969D6002	271.0 (128)	144 (68)
1½	Female-Female	D1969D8002	1969D8002	568.0 (268)	307 (145)

Energy Release Verification Options

May be installed on all valves with pressure sensing port, L-O-X® and L-O-X® with EEZ-ON® function, DM¹, DM²⁰ & M DM²⁰ Series, CROSSMIRROR® 77 & CM Series, and SV27 & SV27 PO Check.



- **Pressure Switches (Electrical)**
 - » Provides a means to verify the release of downstream pressure to next obstruction
 - » Factory preset, 5 psi (0.3 bar) - falling
- **Pop-Up (Visual) Indicator**
 - » Provides a means to verify the release of downstream pressure to next obstruction
- **Redundant Downstream Feedback Switch**
 - » Provides a redundant means to verify the release of downstream pressure to next obstruction
 - » May be installed downstream on all double valves, and valves with sensing
 - » Factory preset, 5 psi (0.3 bar) - falling

Pressure Switches

Connection Type	Model Number	Threads
EN 175301-803 Form A	586A86	1/8 NPT
M12	1153A30	1/8 NPT

POP-UP Indicator

Model Number	Port Threads
988A30	1/8 NPT

Redundant Downstream Feedback Switch

Model Number	Port Threads
RC026-13	3/8 NPT

Energy Release Verification Options for Stainless Steel Applications



- **Pressure Switches (Electrical)**
 - » Provides a means to verify the release of downstream pressure to next obstruction
 - » 316 Stainless Steel Body, Internals and Springs, Nitrile Seal
 - » DPDT (Double-Pole Double-Throw) Pressure Switch
 - » Factory preset, 5 psi (0.3 bar) - falling
- **Pop-Up (Visual) Indicator**
 - » Provides a means to verify the release of downstream pressure to next obstruction
 - » 316 Stainless Steel Body, Internals and Springs, Nitrile Seal
 - » Visual Indicator Piston – acetal
 - » Visual Indicator Assembly – acetal with acrylic lens

Pressure Switch

Model Number	Threads
1162A30	1/8 NPT

POP-UP Indicator

Model Number	Port Threads
1155H30	1/8 NPT

Multiple Lock-out Device



- **Allows use of multiple lockout devices on a single energy isolation device**
 - » For use with any ROSS model valve with L-O-X® capability

Model Number	
	356A30

Safety Clamping Devices



- ROSS CONTROLS® specializes in pneumatic and hydraulic safety solutions.
 - When needing rod locks, rod brakes or safety catchers ROSS CONTROLS® can assist you in finding the optimal solution for every application.
- For more information consult ROSS®.

Preassembled Wiring Kits for DM¹, DM²[®], & CrossMIRROR[®] Series Valves

Kits for DM ¹ & CrossMIRROR [®] 77 Series Valves	Kit Number	Solenoid Connector Type	Length meters (feet)
	2243H77	EN 175301-803 Form A	5 (16.4)
	2244H77	EN 175301-803 Form A	10 (32.8)
	2245H77	M12	5 (16.4)
	2246H77	M12	10 (32.8)

These kits include 2 cables with connectors for the solenoids. All cables include cord grips. **Status Indicator kit ordered separately.**



Status Indicator Kits for DM ¹ & CrossMIRROR [®] 77 Series Valves	Kit Number	Length meters (feet)
	2247H77	5 (16.4)
	2248H77	10 (32.8)

Kits for DM ² [®] Series Valves & CrossMIRROR [®] CM Series Size 2 Valves	Kit Number*			Solenoid Connector Type	Length meters (feet)
	Connector without Light	Lighted Connector			
		24 Volts DC	120 Volts AC		
	2283H77	2532H77-W	2532H77-Z	EN 175301-803	5 (16.4)
	2284H77	2533H77-W	2533H77-Z	Form A	10 (32.8)
2288H77**	-	-	M12	5 (16.4)	
2289H77**	-	-	M12	10 (32.8)	

* Each cable has one connector. **Coil includes light.

These kits include 1 cable for the status indicator, and 3 cables with connector plus a cord grip for each.

Wiring Kits with J-Box

Kit Number*	Connector Types	Length meters (feet)
2249H77	M12 - EN	1 (3.3)
2250H77	M12 - M12	1 (3.3)

*24 volts DC only.

A J-Box is a junction box with a 10-pin MINI connector for connecting to the user's control system and (4) 5-pin M12 ports for connecting to the 3 solenoids and the status indicator on the DM²[®] Series valve. The J-Box kits include the J-Box and (4) 1-meter cables for connecting to the valve. These cables have a connector on each end. The status indicator cable and the (3) solenoid cables have an M12 connector on one end and an EN connector on the other end (M12-EN). Valves are available with EN or M12 type solenoid connections. Kits for valves with M12 type solenoid connection have cables with an M12 connector on each end (M12-M12).

10 PIN MINI Cable

Kit Number	Length meters (feet)
2253H77	3.66 (12)
2254H77	6.1 (20)
2255H77	9.1 (30)
2256H77	15.2 (50)

These cables have a 10-pin MINI connector for connecting the J-Box kits above to the user's control system. Kits include one cable with connector and cord grip. Cable conductors are 18-gauge wire.

Outlet Port Pressure Monitoring Wiring Kit

Kit Number	Length meters (feet)
2251H77	1 (3.3)

For use with DM¹ & DM²[®] Series valves, additional monitoring of downstream pressure can be accomplished by installing a pressure switch in the outlet port that is provided on the DM valve. The Outlet Port Pressure Monitoring kit can be used with one of the J-Box kits above to split one of the M12 ports on the J-Box so that a pressure switch can be wired in as well. These kits consist of one port splitter (a Tee with three M12 connectors) and one M12-EN cable (1 meter).

Electrical Connectors

Electrical Connector Form	Electrical Connector Type	Cord Length meters (feet)	Cord Diameter	Electrical Connector Model Number		
				Without Light	Lighted Connector	
					24 Volts DC	120 Volts AC
EN 175301-803 Form C	Prewired Connector	3 (10)	8-mm	2449K77	2450K77-W	2450K77-Z
	Connector Only	-	-	2452K77	2453K77-W	2453K77-Z
EN 175301-803 Form A	Prewired Connector (18 gauge)	2 (6½)	6-mm	721K77	720K77-W	720K77-Z
	Prewired Connector (18 gauge)	2 (6½)	10-mm	371K77	383K77-W	383K77-Z
	Connector for threaded conduit (1/2 inch electrical conduit fittings)	-	-	723K77	724K77-W	724K77-Z
	Connector Only	-	-	937K87	936K87-W	936K87-Z



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

Indicator Light Kit for Pacer Style Pilot	Kit Number	
	24 volts DC	110-120 volts AC 50-60 Hz
	862K87-W	862K87-Z



Port size 2½

- Reduces exhaust noise
- Diffuses exhausting air
- Back pressure, minimal
- Typical impact noise reduction is in the 20-25 dB range



- Constructed for corrosive situations
- For continuous heavy-duty use
- Recommended for air exhaust applications for pressures up to 125 psig (8.6 bar)



- 316 Stainless Steel sintered element silencers used to protect ports open to the atmosphere.
- Recommended for air exhaust applications for pressures up to 174 psig (12 bar)



- Reduces the Exponentially Perceived Noise (EPNdB)
- Improves equipment performance
- Impact noise reduction in the 35–40 dB range
- Recommended for air exhaust applications for pressures up to 125 psig (8.6 bar)



- Reduces exhaust noise at exhaust ports of valves
- Captures 90% of exhausted lubricants
- Use on air tools, valve with piped exhaust cylinder and air motor applications, or any system that requires air line lubrication
- Both a drain cock and a 1/8 tube fitting are supplied for the manual or constant draining of accumulated liquids
- Sound attenuation & back pressure data available, see FRL Catalog for more information

Silencers

Port Size	Thread Type	Model Number		Avg. C _v
		BSPT Threads	NPT Threads	
1/8	Male	D5500A1003	5500A1003	1.2
1/4	Male	D5500A2003	5500A2003	2.1
3/8	Male	D5500A3013	5500A3013	2.7
		D5500A3003	5500A3003	4.3
1/2	Male	D5500A4003	5500A4003	4.7
3/4	Male	D5500A5013	5500A5013	5.1
		D5500A5003	5500A5003	11.5
1	Male	D5500A6003	5500A6003	14.6
		D5500A7013	5500A7013	16.4
1¼	Female	D5500A7001	5500A7001	24
	Female	D5500A8001	5500A8001	29.9
2	Female	D5500A9001	5500A9001	34.2
2½	Female	D5500A9002	5500A9002	103.7

Pressure Range: 0 to 300 psig (0 to 20 bar) maximum.

Flow Media: Filtered air.

Stainless Steel Silencers

Port Size	Thread Type	Model Number		Avg. C _v
		BSPT Threads	NPT Threads	
1/4	Male	D5500B2004	5500B2004	1.44
1/2	Male	D5500B4004	5500B4004	3.01
1	Male	D5500B6004	5500B6004	10.41
2	Male	D5500A9004	5500A9004	28.11

Pressure Range: 0 to 150 psig (0 to 10.3 bar) maximum.

Flow Media: Filtered air; 5 micron recommended.

Stainless Steel Silencers, Sintered Element

Port Size	Thread Type	Model Number		Avg. C _v
		BSP Threads	NPT Threads	
1/4	Male	D5500A2005	5500A2005	1.5
1/2	Male	D5500A4005	5500A4005	3.5
1	Male	D5500A6005	5500A6005	5.7

Pressure Range: 0 to 174 psig (0 to 12 bar) maximum.

Flow Media: Filtered air; 5 micron recommended. Seals: Nitrile.

High-Flow, High-Reduction Silencers

Valve Model	Basic Size	Kit Number*		Flow scfm
		BSPT Threads	NPT Threads	
DM Series C	4	2329H77	2324H77	800 (378)
	8	2330H77	2325H77	800 (378)
	12	2331H77	2326H77	2080 (982)
	30	2332H77	2327H77	7200 (3398)

* Kits include all plumbing required for installation.

Pressure Range: 125 psig (8.6 bar) maximum.

Silencer/Reclassifiers

Port Size	Model Number		Avg. C _v
	BSPT Threads	NPT Threads	
1/2	C5055B4009	5055B4009	5.4
3/4	C5055B5009	5055B5009	7.4
1	C5055B6009	5055B6009	7.4



CAUTIONS and WARNINGS

PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure that all sources of energy are turned off, the entire pneumatic system is shut off and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).
2. All ROSS products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any installation can be tampered with or need servicing after installation, persons responsible for the safety of others or the care of equipment must check every installation on a regular basis and perform all necessary maintenance.
3. All applicable instructions should be read and complied with before using any fluid power system in order 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 location listed on the cover of this document.
4. Each ROSS product should be used within its specification limits. In addition, use only ROSS parts to repair ROSS products.

WARNING: Failure to follow these directions can adversely affect the performance of the product or result in the potential for human injury or damage to property.

FILTRATION and LUBRICATION

5. 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. ROSS recommends a filter with a 5-micron rating for normal applications.
6. All standard ROSS filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. Do not fail to 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, hazardous leakage, and the potential for human injury or damage to property. Immediately replace a crazed, cracked, or deteriorated bowl. When bowl gets dirty, replace it or wipe it with a clean dry cloth.

7. Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible lubricants are petroleum based 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 human injury, and/or damage to property.

AVOID INTAKE/EXHAUST RESTRICTION

8. Do not restrict the air flow in the supply line. To do so could reduce the pressure of the supply air below the minimum requirements for the valve and thereby cause erratic action.
9. 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.

WARNING: ROSS expressly disclaims all warranties and responsibility for any unsatisfactory performance or injuries caused by the use of the wrong type, wrong size, or an inadequately maintained silencer installed with a ROSS product.

POWER PRESSES

10. 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.

ENERGY ISOLATION/EMERGENCY STOP

11. Per specifications and regulations, ROSS L-O-X® and L-O-X® with EEZ-ON® operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

STANDARD WARRANTY

All products sold by ROSS CONTROLS are warranted for a one-year period [with the exception of all Filters, Regulators and Lubricators ("FRLs") which are warranted for a period of seven years] from the date of purchase to be free of defects in material and workmanship. ROSS' obligation under this warranty is limited to repair or replacement of the product or refund of the purchase price paid solely at the discretion of ROSS and provided such product is returned to ROSS freight prepaid and upon examination by ROSS is found to be defective. This warranty becomes void in the event that product has been subject to misuse, misapplication, improper maintenance, modification or tampering.

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