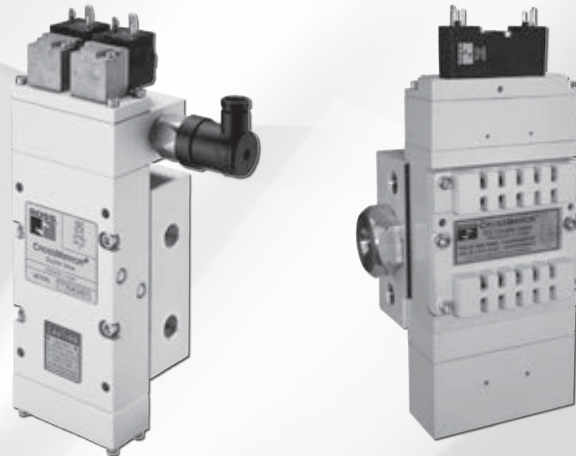


ROSS CONTROLS®



**DOUBLE VALVES FOR CYLINDER RETURN
TO HOME POSITION
CROSSMIRROR® 77 AND CM SERIES**



5/2 PRESSURE RETURN – KEY FEATURES

- Can be used as 3/2 Normally Closed or 3/2 Normally Open valve function by plugging the unused outlet port
- Self-contained dynamic monitoring system; no additional monitoring required
- Valve fault results in a lockout condition and prevents unintentional reset with removal of air or electricity
- Reset can be electrical solenoid or remote pneumatic signal
- Status indication switch (ready-to-run) to inform machine controller of valve condition
- Base mounted, stainless steel spool valve construction
- Manifordable for multi valve applications
- Includes non-clogging safety mufflers; for applications requiring ported exhaust, consult ROSS

VALVE TYPE	VALVE SERIES	AVAILABLE PORT SIZES				MAX. FLOW Cv				RESET		Page
		1/4	3/8	1/2	3/4	Port Size				REMOTE	SOLENOID	
						1/4	3/8	1/2	3/4			
SOLENOID PILOT CONTROLLED												
with Pressure Switch	77					2.8	7.2	7.2				F5.3 - F5.4
without Pressure Switch	77					2.8	7.2	7.2				F5.3 - F5.4
PRESSURE CONTROLLED												
with Pressure Switch	77					2.8	7.2	7.2				F5.5 - F5.6
without Pressure Switch	77					2.8	7.2	7.2				F5.5 - F5.6
SOLENOID PILOT CONTROLLED												
with Pressure Switch	CM					1.1	1.1	3.9				F5.7 - F5.10
without Pressure Switch	CM					1.1	1.1	3.9				F5.7 - F5.10
COMPONENTS FOR MANIFOLD ASSEMBLIES - SOLENOID PILOT CONTROLLED												
Valves, Manifold Bases and End Stations for Manifold Assemblies											F5.7	
PRESSURE CONTROLLED												
with Pressure Switch	CM					1.1	1.1	3.9				F5.11 - F5.13
without Pressure Switch	CM					1.1	1.1	3.9				F5.11 - F5.13
COMPONENTS FOR MANIFOLD ASSEMBLIES - PRESSURE CONTROLLED												
Valves, Manifold Bases and End Stations for Manifold Assemblies											F5.11	

5 Ports, 4-Way 2-Position Valve, Solenoid Pilot Controlled											
Port Sizes		Basic Size	Pressure Switch#	Model Number (valve and base)	C _v				Weight lb (kg)	Model Number (valve only)	Model Number (base only)
1	2, 4				1-2	1-4	2-3	4-5			
1/2	3/8	2*	With	Y7776A3411**	2.0	1.6	1.6	2.8	8.4 (3.8)	Y7776A3400**	996C91
1/2	3/8	2*	Without	Y7776A3410**	2.0	1.6	1.6	2.8	7.6 (3.4)	Y7776A3401**	996C91
3/4	1/2	4*	With	Y7776A4421**	3.2	3.4	2.7	7.2	11.2 (5.1)	Y7776A4400**	1049C91
3/4	1/2	4*	Without	Y7776A4420**	3.2	3.4	2.7	7.2	10.2 (4.6)	Y7776A4401**	1049C91
3/4	3/4	4*	With	Y7776A5411**	3.2	3.4	2.7	7.2	11.2 (5.1)	Y7776A4400**	1153C91
3/4	3/4	4*	Without	Y7776A5410**	3.2	3.4	2.7	7.2	10.2 (4.6)	Y7776A4401**	1153C91
SAE 12	4	With	SY7776A4H10**	3.2	3.4	2.7	7.2	11.2 (5.1)	Y7776A4400**	1159G91	
SAE 12	4	Without	SY7776A4H11**	3.2	3.4	2.7	7.2	10.2 (4.6)	Y7776A4401**	1159G91	

* NPT port threads. For BSPP threads, add a "D" prefix to the model number, e.g., YD7776A3411W.
 ** Insert voltage code: "W" = 24 volts DC; "Z" = 110 volts AC, 120 volts AC; e.g., Y7776A3411W.
 For other voltages consult ROSS.
 #Pressure switches with DIN type connection, for pressure switches with M12 type connection consult ROSS.



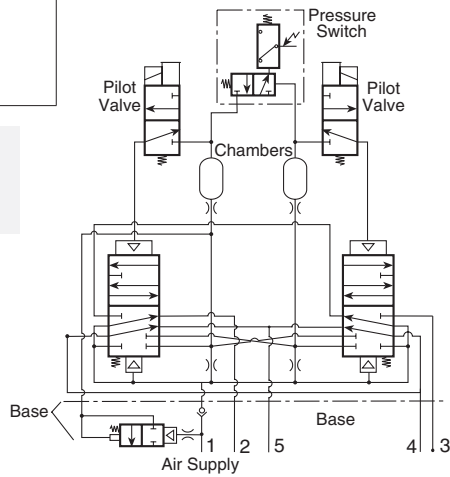
ISO 13849-1:2006
Category 4 PL e applications

5/2 CrossMIRROR® double valve with pressure switch

This valve is constructed with precision, stainless steel spools as the main valve elements, and is designed to offer added safety to the operation of many pneumatically controlled machines. The Pressure switch provides a signal when valve is in a faulted position.

ACCESSORIES & OPTIONS

Pressure Switches & Pressure Switch Connectors	Pressure Switch		Pressure Switch Connector
	24 Volts DC	120 Volts AC	
	798E30	518E30	522E30
798E30	518E30	522E30	



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 A	Prewired Connector (18 gauge)	2 (6½)	6-mm	721K77	720K77-W	720K77-Z
EN 175301-803 Form A	Prewired Connector (18 gauge)	2 (6½)	10-mm	371K77	383K77-W	383K77-Z
EN 175301-803 Form A	Connector for threaded conduit (1/2 inch electrical conduit fittings)	-	-	723K77	724K77-W	724K77-Z
EN 175301-803 Form A	Connector Only	-	-	937K87	936K87-W	936K87-Z



F5
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CAUTIONS: Do not use electrical connectors with surge suppressors, as this may increase valve response time when de-actuating the solenoids.

Explosion proof solenoid pilot available, for more information consult ROSS.

STANDARD SPECIFICATIONS (for valves on this page):

Construction: Double spool and sleeve.
Mounting Type: Base mounted.
Pilot Solenoid: According to VDE 0580. Enclosure rating according to DIN 400 50 IP 65. Three (with pressure switch) or two solenoids (without pressure switch), rated for continuous duty.
Standard Voltages: 24 volts DC; 110-120 volts AC, 50/60 Hz.
Power Consumption (each solenoid): 6 watts on DC; 18 VA inrush, 14 VA holding on 50 or 60 Hz.
Enclosure Rating: IP65, IEC 60529.
Electrical Connection: EN 175301-803 Form A. Uses cord-grip connectors at solenoids.

Ambient Temperature: 40° to 120°F (4° to 50°C).
Media Temperature: 40° to 175°F (4° to 80°C).
Flow Media: Filtered air.
Inlet Pressure: 40 to 150 psig (2.5 to 10.3 bar).
Functional Safety Data:
Category 4 PL e; B10d: 20,000,000; PFHd: 7.71x10⁻⁹ ;
 MTTFd: 301.9 (n_{op}: 662400).
Certifications: CE Marked for applicable directives, DGUV Test.
Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

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

This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses.

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

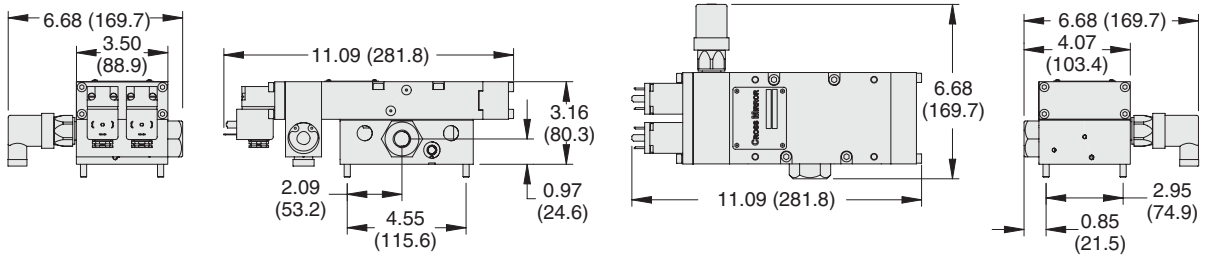


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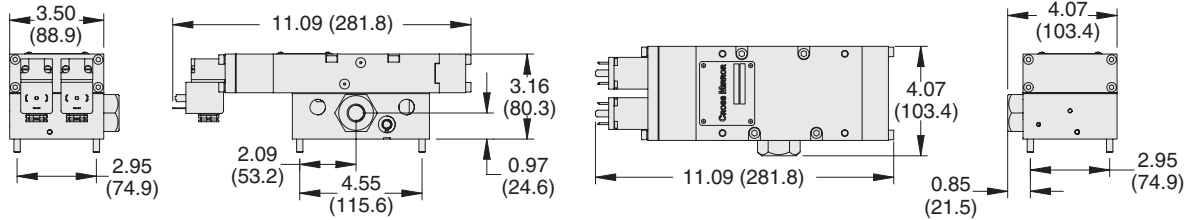
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Valve Dimensions – inches (mm)

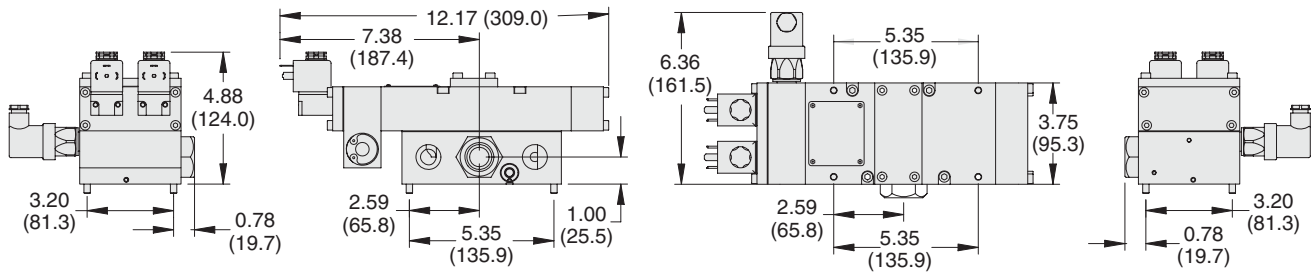
Basic Size 2 – Valve and base assembly, with remote reset and pressure switch.



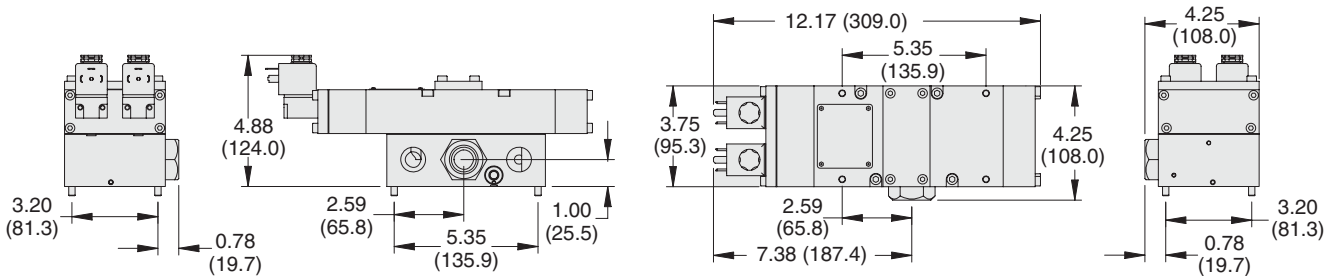
Basic Size 2 – Valve and base assembly, with remote reset and without pressure switch.



Basic Size 4 – Valve and base assembly, with remote reset and pressure switch.



Basic Size 4 – Valve and base assembly, with remote reset and without pressure switch.



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Valve Operation

Normal Operation:

After installation the valve is operated by energizing both solenoid pilots (S1 and S2) simultaneously. This causes both main valve elements to be actuated so that air from inlet port 1 flows to outlet port 4. Air downstream of port 2 is exhausted through port 3.

When the solenoid pilots are de-energizing, both valve elements are de-actuated, and air then flows from inlet port 1 to outlet port 2. Air downstream of port 4 is exhausted through port 5.

Pressure Switch:

Valves with model numbers ending in the number 1 have a pressure switch to provide user feedback when movement of the main valve elements was asynchronous.

Safety Function:

If the two main valve elements are not actuated or de-actuated synchronously, within 500 ms, the valve defaults so that outlet port 2 receives full inlet pressure, and outlet port 4 is exhausted through port 5. If this abnormal operation is the result of a temporary circumstance, the valve will be ready to resume normal operation as soon as both pilot signal ports have been de-energized and both main valve elements have returned to their normal ready-to-run position. Applying the electrical signal to both solenoids simultaneously will resume normal operation.

If the cause of the abnormal operation is still present, the valve will either remain in the default position (pressure on port 2 and not port 4) or will again go into this position on the next actuation attempt. The source of the abnormality must be investigated and corrected before further operation.

5 Ports, 4-Way 2-Position Valve											
Port Sizes		Basic Size	Pressure Switch#	Model Number (valve and base)	C _v				Weight lb (kg)	Model Number (valve only)	Model Number (base only)
1	2, 4				1-2	1-4	2-3	4-5			
1/2	3/8	2*	With	Y7786A3411**	2.0	1.6	1.6	2.8	8.4 (3.8)	Y7786A3400	996C91
1/2	3/8	2*	Without	Y7786A3410	2.0	1.6	1.6	2.8	7.6 (3.4)	Y7786A3401**	996C91
3/4	1/2	4*	With	Y7786A4421**	3.2	3.4	2.7	7.2	11.6 (5.3)	Y7786A4400	1049C91
3/4	1/2	4*	Without	Y7786A4420	3.2	3.4	2.7	7.2	10.6 (4.8)	Y7786A4401**	1049C91
3/4	3/4	4*	With	Y7786A5411**	3.2	3.4	2.7	7.2	11.6 (5.3)	Y7786A3400	1153C91
3/4	3/4	4*	Without	Y7786A5410	3.2	3.4	2.7	7.2	10.6 (4.8)	Y7786A3401**	1153C91
SAE 12	4	4	With	SY7786A4H11**	3.2	3.4	2.7	7.2	11.6 (5.3)	Y7786A4400	1159G91
SAE 12	4	4	Without	SY7786A4H10	3.2	3.4	2.7	7.2	10.6 (4.8)	Y7786A4401**	1159G91



ISO 13849-1:2006
Category 4 PL e
applications



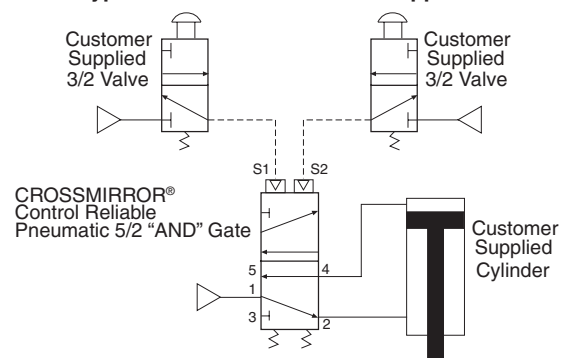
* NPT port threads. For BSPP threads, add a "D" prefix to the model number, e.g., YD7786A3411W.
** Insert voltage code: "W" = 24 volts DC; "Z" = 110-120 volts AC, 50/60 Hz; e.g., Y7786A3411W.
For other voltages consult ROSS.
#Pressure switches with DIN type connection, for pressure switches with M12 type connection consult ROSS.

This 77 Series 5/2 CROSSMIRROR® valve is a control reliable, two hand pressure controlled 4-way double valve that is controlled by two separate pneumatic signals essentially providing "AND" gate control for the output ports. Both pilot signals must be provided within approximately 500 milliseconds of each other to actuate the valve.

Proper actuation shifts output pressure to port 4. If the valve is not actuated, not provided appropriate pneumatic signals within the discordance window or if the valve actuates abnormally, inlet pressure will only be passed to port 2 - cylinder retracted.

This valve is constructed with precision, stainless steel spools as the main valve elements, and is designed to offer added safety to the operation of many pneumatically controlled machines.

Typical 2-Hand-Anti-Tie-Down Application

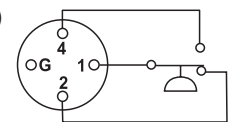


ACCESSORIES & OPTIONS

Pressure Switches & Pressure Switch Connectors	Pressure Switch		Pressure Switch Connector
	24 Volts DC	120 Volts AC	
	798E30	518E30	522E30
798E30	518E30	522E30	

Status Indicator (pressure switch)

Terminals 1 and 4 are connected when air pressure is present and the valve is "Ready-to-Run". If an abnormal operation has occurred or pressure is removed from the valve inlet, terminals 1 and 2 are connected.
Note: DC voltage pressure switches do not have a ground terminal.



Pin 1: Common
Pin 2: Normally Closed
Pin G: Not used
Pin 4: Normally Open

STANDARD SPECIFICATIONS (for valves on this page):

Construction: Double spool and sleeve.

Mounting Type: Base mounted.

Ambient Temperature: 40° to 120°F (4° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 40 to 100 psig (2.7 to 7 bar).

Pilot Pressure: Must be equal or greater than inlet pressure, but should not exceed maximum inlet pressure.

Pressure Switch Rating: Max Current 4A, Max 250 volts AC.

Max Current 50 mA, Max 24 volts DC.

Pressure Switch: Pressure Switch signal indicates when the input signals or parts movement is asynchronous.

Functional Safety Data: Category 4 PL e; B10d: 20,000,000;

PFHd: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, DGUV Test.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

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

This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses.

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

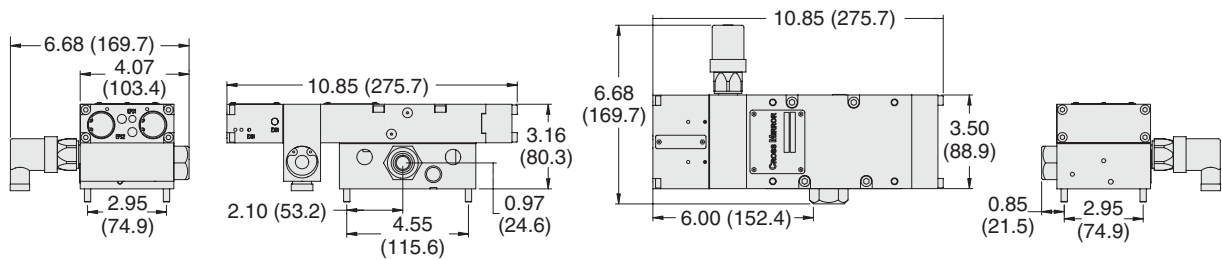


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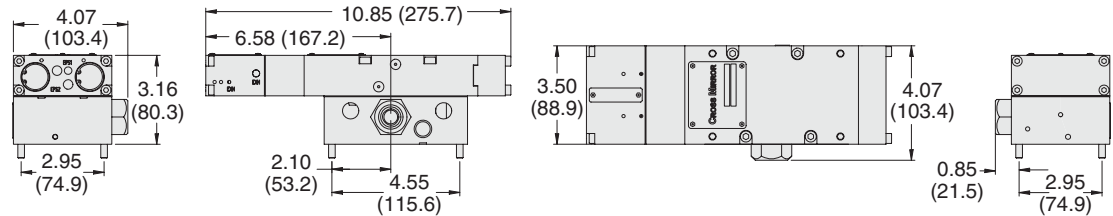
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Basic Size 2 – Valve and base assembly, with remote reset and pressure switch.

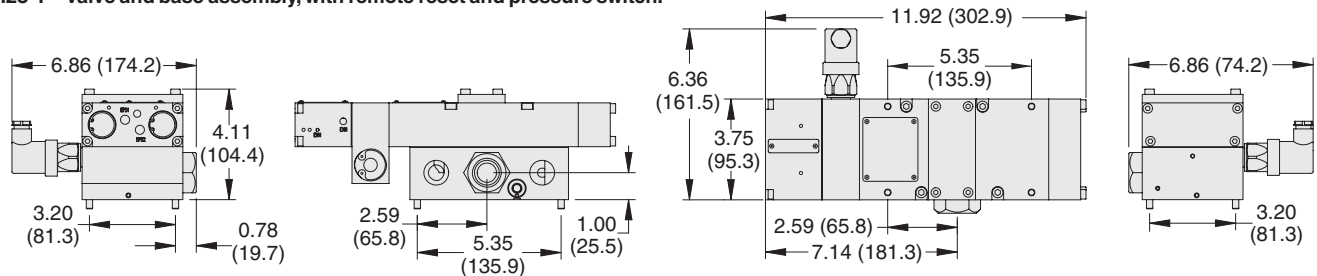
Valve Dimensions – inches (mm)



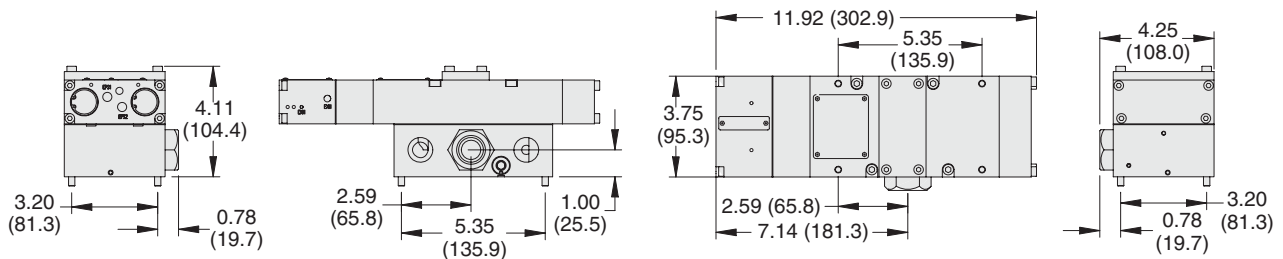
Basic Size 2 – Valve and base assembly, with remote reset and without pressure switch.



Basic Size 4 – Valve and base assembly, with remote reset and pressure switch.



Basic Size 4 – Valve and base assembly, with remote reset and without pressure switch.



Valve Operation

Normal Operation: After installation the valve is operated by pressurizing both pilot supply ports (S1 and S2) simultaneously. This causes both main valve elements to be actuated so that air from inlet port 1 flows to outlet port 4. Air downstream of port 2 is exhausted through port 3.

When the pilot supply ports are de-pressurized, both valve elements are de-actuated, and air then flows from inlet port 1 to outlet port 2. Air downstream of port 4 is exhausted through port 5.

Pressure Switch: Valves with model numbers ending in the number 1 have a pressure switch to provide user feedback when movement of the main valve elements was asynchronous.

Safety Function: If the two main valve elements are not actuated or de-actuated synchronously, within 500 ms, the valve defaults so that outlet port 2 receives full inlet pressure, and outlet port 4 is exhausted through port 5. If this abnormal operation is the result of a temporary circumstance, the valve will be ready to resume normal operation as soon as both pilot signal ports have been de-pressurized and both main valve elements have returned to their normal ready-to-run position. Applying pressure to both signal ports simultaneously will resume normal operation.

If the cause of the abnormal operation is still present, the valve will either remain in the default position (pressure on port 2 and not port 4) or will again go into this position on the next actuation attempt. The source of the abnormality must be investigated and corrected before further operation.

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

Valve and Base Assembly

5 Ports, 4-Way 2-Position Valve, Pressure Return

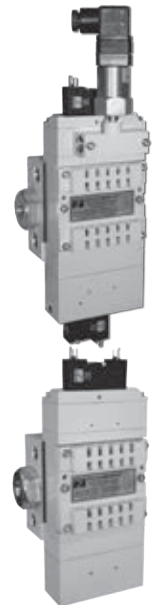
Port Sizes		Basic Size	Pressure Switch	Model Number*		C _v				Weight lb (kg)
1	2, 4			With Remote Reset	With Solenoid Reset	1-2	1-4	2-3	4-5	
1/4	1/4	0	With#	CM26PNA00**11	CM26PNA00**21	0.8	0.6	0.5	1.1	5.85 (2.7)
1/4	1/4	0	Without	CM26PNA00**1X	CM26PNA00**2X	0.8	0.6	0.5	1.1	5.30 (2.4)
3/8	3/8	0	With#	CM26PNA01**11	CM26PNA01**21	0.8	0.6	0.5	1.1	5.75 (2.6)
3/8	3/8	0	Without	CM26PNA01**1X	CM26PNA01**2X	0.8	0.6	0.5	1.1	5.20 (2.4)
1/2	1/2	2	With#	CM26PNA22**11	CM26PNA22**21	3.0	2.5	2.0	3.9	14.45 (6.56)
1/2	1/2	2	Without	CM26PNA22**1X	CM26PNA22**2X	3.0	2.5	2.0	3.9	13.80 (6.26)

* Includes base supplied with NPT port threads. For BSPP threads, replace "N" with a "D" in the model number, e.g., CM26PDA00A1X. ** Insert voltage code: "A" = 24 volts DC; "B" = 110 volts AC, 120 volts AC; e.g., CM26PNA00A1X.

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



ISO
13849-1:2006
Category 4 PL e



Valves, Manifold Bases, and End Stations for Manifold Assemblies

In addition to the manifold, an end station kit with a check valve must be ordered for each assembly. The number of manifolds with a single supply inlet will be limited to the pressure and flow rate of the system. Too many manifolds may result in too large of an internal pressure drop resulting in valve faults. The manifold end station kit with dual inlet check will allow the manifold to be supplied with air from both ends of the assembly.

Port Size		Basic Size	Pressure Switch	Valve without Sub-Base		Manifold Base Model Number#	Manifold End Station w/ Check Valve Kit Number##	Dual Supply Manifold End Station w/ Check Valves Kit Number##
1	2, 4			With Remote Reset	With Solenoid Reset			
1/4	1/4	0	With*	CM26PXA0X**11	CM26PXA0X**21	Y1951D91	699K86	701K86
1/4	1/4	0	Without	CM26PXA0X**1X	CM26PXA0X**2X	Y1951D91	699K86	701K86
3/8	3/8	0	With*	CM26PXA0X**11	CM26PXA0X**21	Y1949D91	698K86	700K86
3/8	3/8	0	Without	CM26PXA0X**1X	CM26PXA0X**2X	Y1949D91	698K86	700K86
1/2	1/2	2	With*	CM26PXA2X**11	CM26PXA2X**21	Y1955D91	702K86	704K86
1/2	1/2	2	Without	CM26PXA2X**1X	CM26PXA2X**2X	Y1955D91	702K86	704K86

* 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., CM26PXA0XA1X.

#NPT port threads. For BSPP threads, insert a "D" after "Y" in the model number, e.g., YD1951D91.

##NPT port threads. For BSPP threads, add a "D" prefix to the model number, e.g., D699K86, D701K86.

End Station



End Station with Check Valve



Manifold Base

For other voltages consult ROSS.

Explosion proof solenoid pilot available, for more information consult ROSS.

STANDARD SPECIFICATIONS (for valves on this page):

Construction: Double spool and sleeve.

Mounting Type: Base mounted.

Pilot Solenoid: According to VDE 0580. Two solenoids, rated for continuous duty.

Standard Voltages/Pilot Solenoids Power Consumption (each solenoid):

Size 0: 24 volts DC: 1.2 watts on DC. 110 volts AC, 50 Hz: 5.4 VA; 120 volts AC, 60 Hz: 5.0 VA.

Size 2: 24 volts DC; 110 volts AC, 50 Hz; 120 volts AC, 50/60 Hz.

5.8 watts nominal on AC and DC, 6.5 watts maximum on AC and DC.

Enclosure Rating: DIN 400 50 IP 65.

Electrical Connection:

Size 0: Connector socket according to EN 175301-803 Form C.

Size 2: Connector socket according to EN 175301-803 Form A.

Ambient Temperature: 15° to 122°F (-10° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 40 to 150 psig (3 to 10 bar).

Pressure Switch (Status Indicator) Rating: 5 amps at 250 volts AC, or 5 amps at 30 volts DC.

Monitoring: Dynamically, cyclically, internally during each actuating and de-actuating movement. Monitoring function has memory and requires an overt act to reset unit after lockout.

Solenoid Reset: Units with solenoid reset include a 3/2 solenoid valve. Energize this solenoid momentarily to reset valve after lock-out condition occurs.

Remote Reset: Remote signal to be supplied by customer's 3/2 valve (connect remote signal line to remote RESET port in valve). Apply signal momentarily to reset valve after fault condition occurs.

NOTE: Main solenoids must be off when performing reset procedure.

Product data for Sistema Library users. For Basic Size 0 only:

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFHd: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, DGVV Test.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

For Basic Size 2, Product data for Sistema Library users, pending.

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

This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses.

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



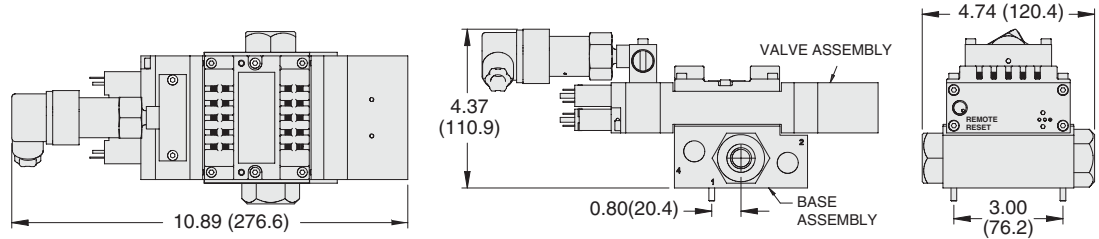
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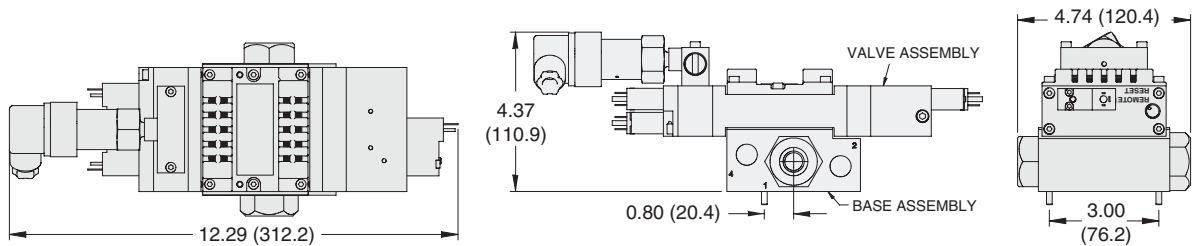
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Valve Dimensions – inches (mm)

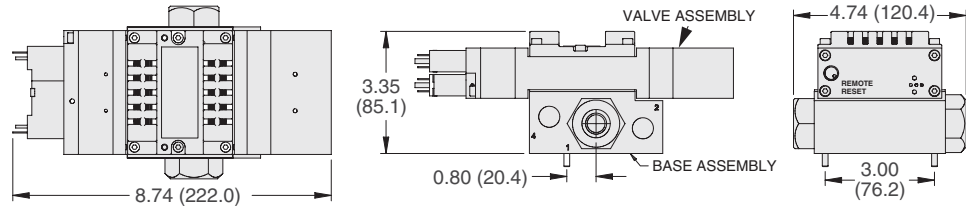
Basic Size 0 - Valve and base assembly, with remote reset and with pressure switch.



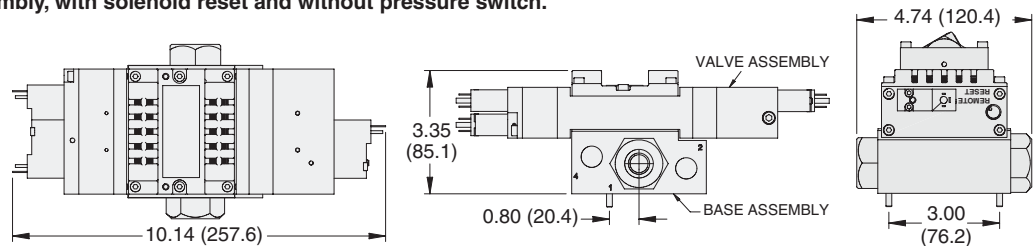
Basic Size 0 - Valve and base assembly, with solenoid reset and with pressure switch.



Basic Size 0 - Valve and base assembly, with remote reset and without pressure switch.

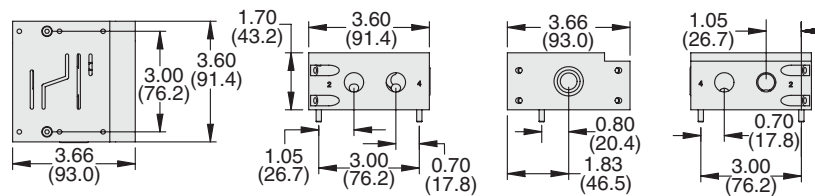


Basic Size 0 - Valve and base assembly, with solenoid reset and without pressure switch.

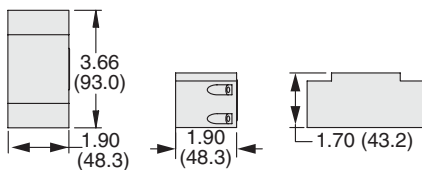


Dimensions – inches (mm)

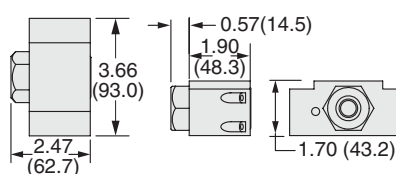
Manifold Base for Basic Size 0



End Station for Basic Size 0



End Station with Check Valve for Basic Size 0

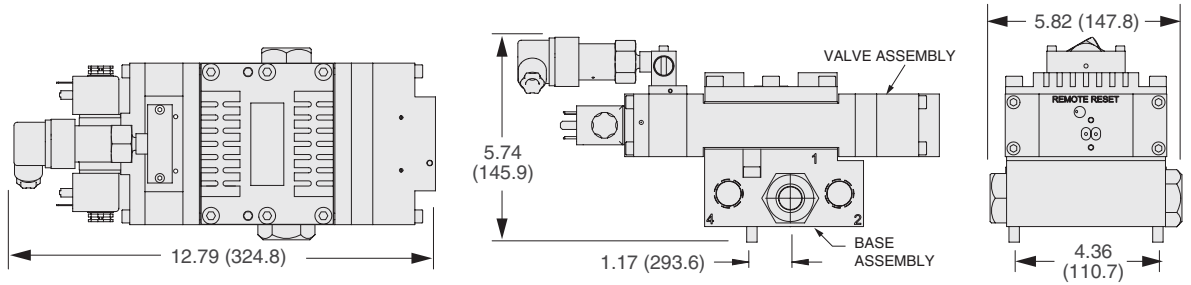


CROSSMIRROR® Double Valves Solenoid Pilot Controlled

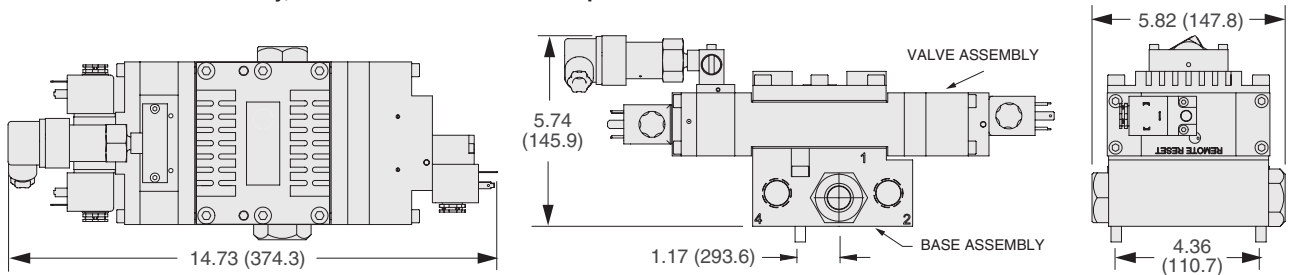
CM Series Valve Technical Data

Basic Size 2 - Valve and base assembly, with remote reset and with pressure switch.

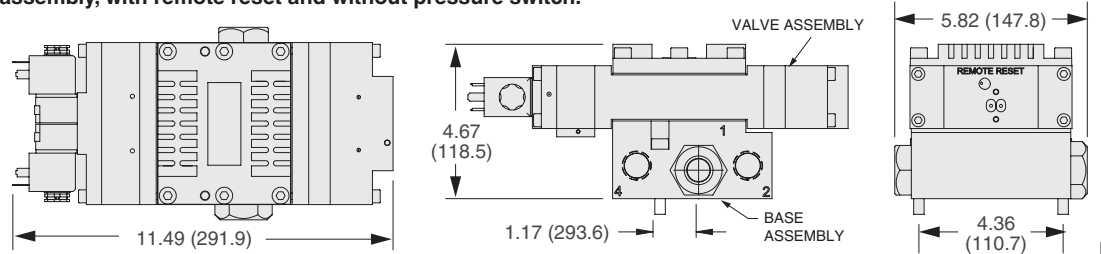
Valve Dimensions – inches (mm)



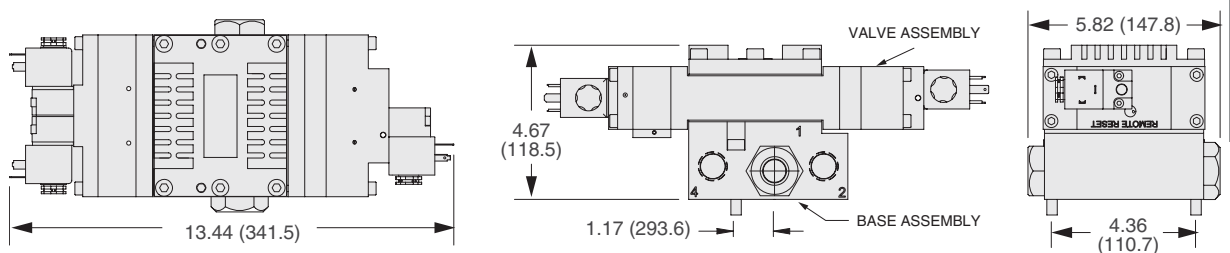
Basic Size 2 - Valve and base assembly, with solenoid reset and with pressure switch.



Basic Size 2 - Valve and base assembly, with remote reset and without pressure switch.

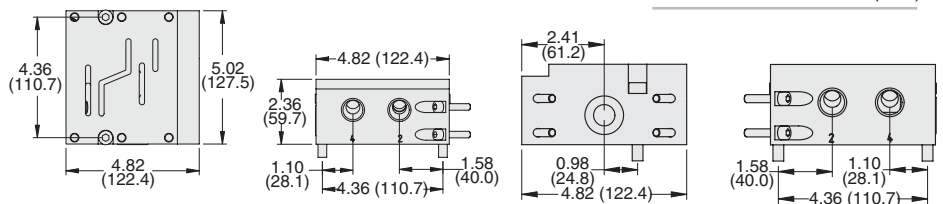


Basic Size 2 - Valve and base assembly, with solenoid reset and without pressure switch.



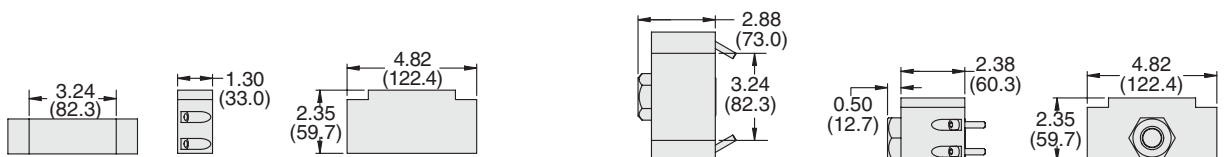
Manifold Base for Basic Size 2

Dimensions – inches (mm)



End Station for Basic Size 2

End Station with Check Valve for Basic Size 2



CROSSMIRROR® Double Valves Solenoid Pilot Controlled

CM Series Valve Operation & Options

Normal Operation: The valve is operated by energizing both pilot solenoids simultaneously. This causes both main valve elements to be actuated so that air from inlet port 1 flows to outlet port 4, but not to port 2. Air downstream of port 2 is exhausted through port 3.

When the solenoids are de-energized, both valve elements are de-actuated, and air then flows from inlet port 1 to outlet port 2, but no longer to outlet port 4. Air downstream of port 4 is exhausted through port 5. On first operation, or after repair, the pilot valve supply circuit and inherent monitoring elements may need to be reset.

Valve Locked-out: Whenever the valve elements operate in a sufficiently asynchronous manner, either on actuation or de-actuation, the valve will move to a locked-out position. In the locked-out position, one crossover and its related timing chamber will be exhausted, and the other crossover and its related timing chamber will be fully pressurized.

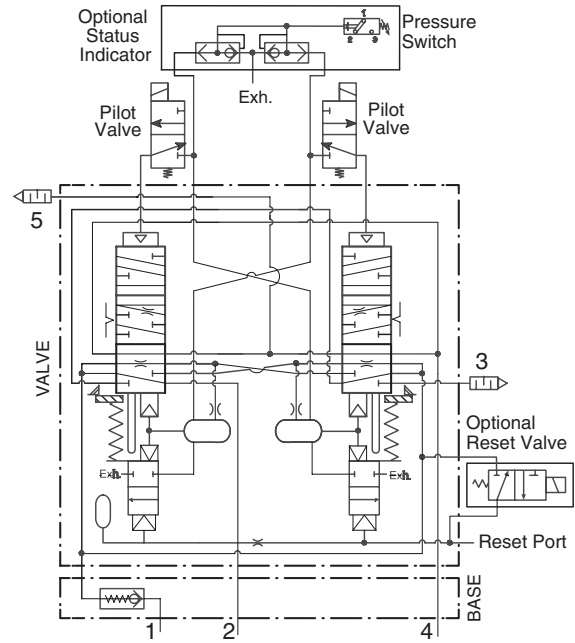
The valve element (side B) that is partially actuated has pilot air available to fully actuate it, but no air pressure on the return piston to fully de-actuate the valve element.

The return springs are limited in travel, and can only return the valve elements to the intermediate (locked-out) position. Sufficient air pressure acting on the return pistons is needed to return the valve elements to a fully home position.

Detecting a Malfunction: If the main valve elements are not both actuated or de-actuated synchronously, the valve defaults to the locked-out position so that outlet port 2 receives full inlet pressure, and outlet port 4 is exhausted through port 5. The valve must now be "reset" to resume normal operation.

Resetting the Valve: The valve will remain in the locked-out position, even if the inlet air supply is removed and re-applied.

A remote reset signal must be applied to reset the valve. Reset is accomplished by momentarily pressurizing the reset port. Actuation of the reset piston physically pushes the main valve elements to their home position. Actuation of the reset piston also opens the reset poppet, thereby, immediately exhausting pilot supply air, thus, preventing valve operation during reset. De-actuation of reset pistons causes the reset poppets to close and pilot supply timing chambers to fully pressurize. Reset pressure can be applied by a remote 3/2 normally closed valve, or from an optional 3/2 normally closed solenoid (which includes an integral manual reset button) mounted on the reset adapter.



Valve Schematic

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

Electrical Connectors

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

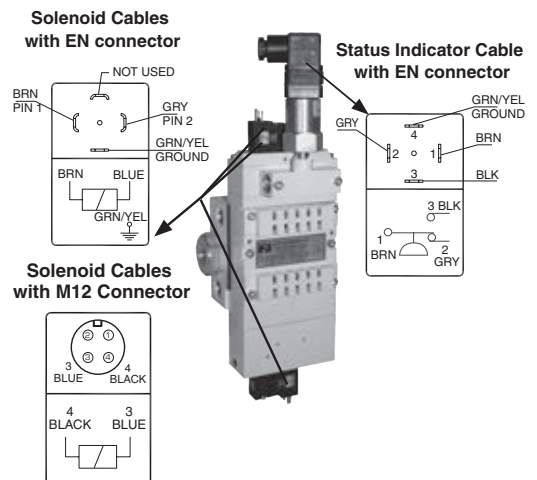
Preassembled Wiring Kits

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	EN 175301-803 Form A	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.



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

Valve and Base Assembly

5 Ports, 4-Way 2-Position Valve, Pressure Return

Port Sizes		Basic Size	Pressure Switch	Valve Model Number*	C _v				Weight lb (kg)
1	2, 4				1-2	1-4	2-3	4-5	
1/4	1/4	0	With#	CM26PNA00P11	0.8	0.6	0.5	1.1	6.15 (2.79)
1/4	1/4	0	Without	CM26PNA00P1X	0.8	0.6	0.5	1.1	5.60 (2.54)
3/8	3/8	0	With#	CM26PNA01P11	0.8	0.6	0.5	1.1	6.05 (2.74)
3/8	3/8	0	Without	CM26PNA01P1X	0.8	0.6	0.5	1.1	5.50 (2.49)
1/2	1/2	2	With#	CM26PNA22P1X	3.0	2.5	2.0	3.9	14.45 (6.56)
1/2	1/2	2	Without	CM26PNA22P11	3.0	2.5	2.0	3.9	13.80 (6.26)

* Model number includes base supplied with NPT port threads. For BSPP threads, replace "N" with a "D" in the model number, e.g., CM26PDA00P11.

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



ISO
13849-1:2006
Category 4 PL e



Valves, Manifold Bases, and End Stations for Manifold Assemblies

In addition to the manifold, an end station kit with a check valve must be ordered for each assembly. The number of manifolds with a single supply inlet will be limited to the pressure and flow rate of the system. Too many manifolds may result in too large of an internal pressure drop resulting in valve faults. The manifold end station kit with dual inlet check will allow the manifold to be supplied with air from both ends of the assembly.

Port Size		Basic Size	Valve without Sub-Base		Manifold Base Model Number#	Manifold End Station w/ Check Valve Kit Number##	Dual Supply Manifold End Station w/ Check Valves Kit Number##
1	2, 4		Pressure Switch	Valve Model Number			
1/4	1/4	0	With*	CM26PNA0XP11	Y1951D91	699K86	701K86
1/4	1/4	0	Without	CM26PNA0XP1X	Y1951D91	699K86	701K86
3/8	3/8	0	With*	CM26PNA0XP11	Y1949D91	698K86	700K86
3/8	3/8	0	Without	CM26PNA0XP1X	Y1949D91	698K86	700K86
1/2	1/2	2	With*	CM26PNA22P11	Y1955D91	702K86	704K86
1/2	1/2	2	Without	CM26PNA22P1X	Y1955D91	702K86	704K86

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

#NPT port threads. For BSPP threads, insert a "D" after "Y" in the model number, e.g., YD1951D91.

##NPT port threads. For BSPP threads, add a "D" prefix to the model number, e.g., D699K86, D701K86.

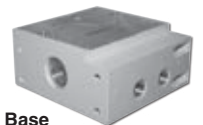
End Station



End Station with Check Valve

F5

Manifold Base



F

STANDARD SPECIFICATIONS (for valves on this page):

Construction: Double spool and sleeve.

Mounting Type: Base mounted.

Ambient Temperature: 15° to 122°F (-10° to 50°C).

Media Temperature: 40° to 175°F (4° to 80°C).

Flow Media: Filtered air.

Inlet Pressure: 40 to 150 psig (3 to 10 bar).

Pilot Pressure: Must be equal or greater than inlet pressure, but should not exceed maximum inlet pressure.

Pressure Switch Rating: Max Current 4A, Max 250 volts AC.

Max Current 50 mA, Max 24 volts DC.

Pressure Switch: Pressure Switch signal indicates when the input signals or parts movement is asynchronous.

Monitoring: Dynamically, cyclically, internally during each actuating and de-actuating movement. Monitoring function has memory and requires an overt act to reset unit after lockout.

Product data for Sistema Library users. For Basic Size 0 only:

Functional Safety Data: Category 4 PL e; B10d: 20,000,000; PFHd: 7.71x10⁻⁹; MTTFd: 301.9 (n_{op}: 662400).

Certifications: CE Marked for applicable directives, DGUV Test.

Vibration/Impact Resistance: Tested to BS EN 60068-2-27.

For Basic Size 2. Product data for Sistema Library users, pending.

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

This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses.

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



Online Version
Rev. 11/14/16

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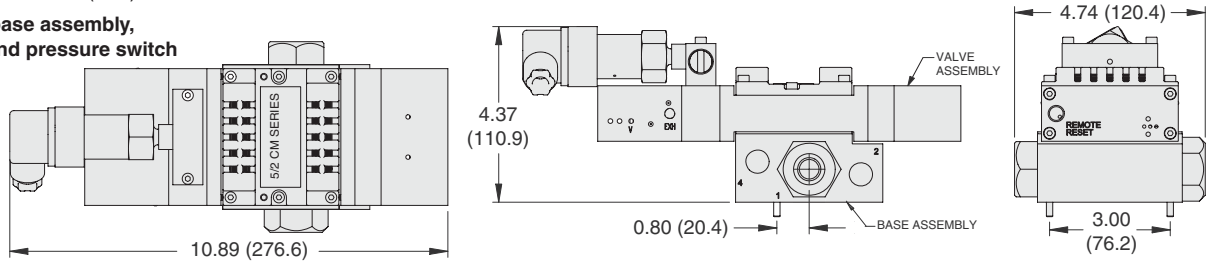
F5.11

CROSSMIRROR® Double Valves Pressure Controlled

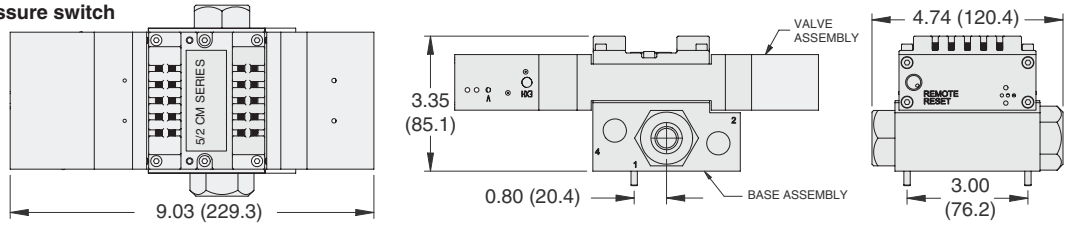
CM Series Valve Technical Data

Valve Dimensions – inches (mm)

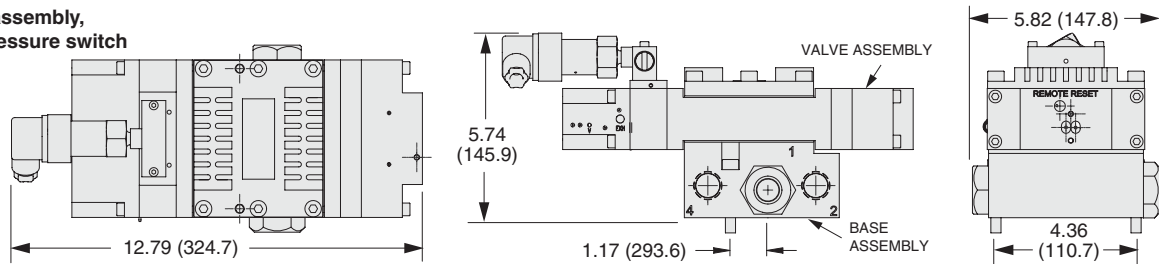
Size 0 – Valve and base assembly,
with remote reset and pressure switch



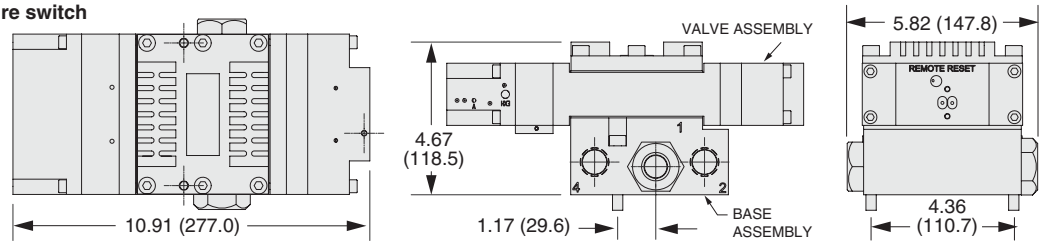
Size 0 – Valve and base assembly,
with remote reset and without pressure switch



Size 2 – Valve and base assembly,
with remote reset and pressure switch



Size 2 – Valve and base assembly,
with remote reset and without pressure switch

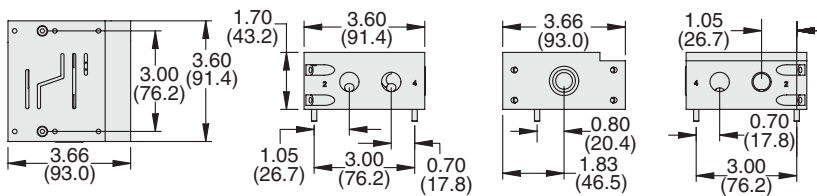


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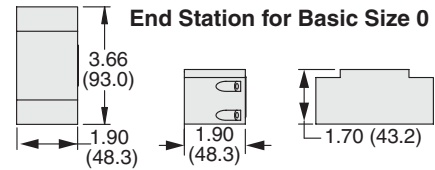
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Dimensions – inches (mm)

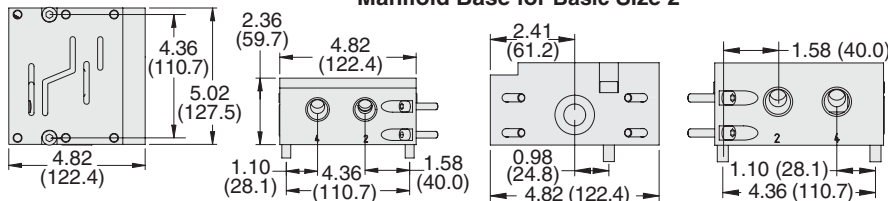
Manifold Base for Basic Size 0



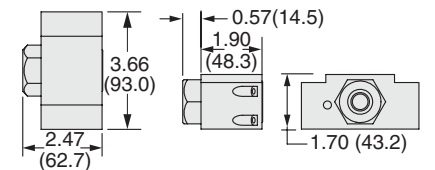
End Station for Basic Size 0



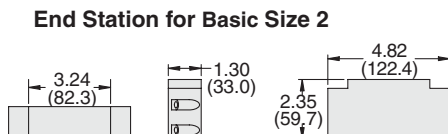
Manifold Base for Basic Size 2



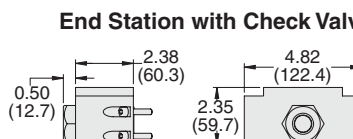
End Station with Check Valve for Basic Size 0



End Station for Basic Size 2



End Station with Check Valve for Basic Size 2

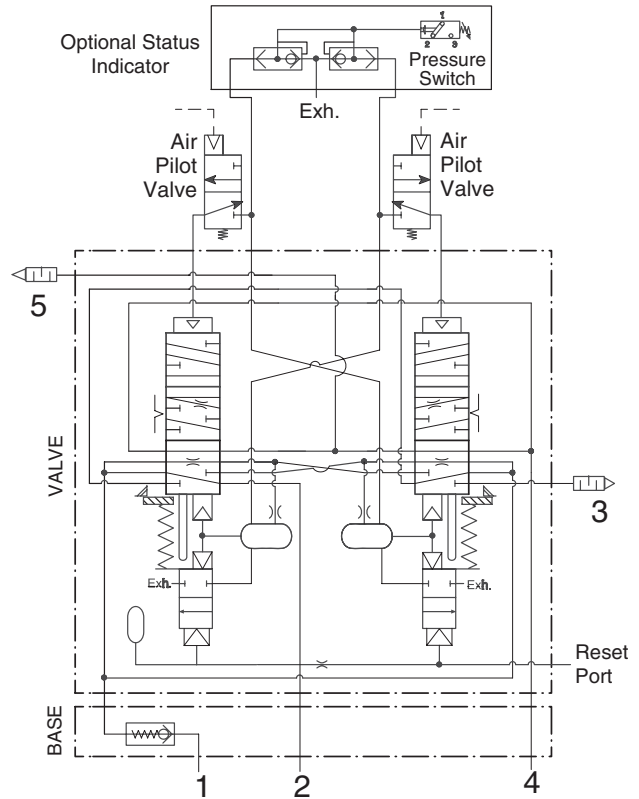


Normal Operation: The valve is operated by pressurizing both pilot supply ports simultaneously. This causes both main valve elements to be actuated so that air from inlet port 1 flows to outlet port 4, but not to port 2. Air downstream of port 2 is exhausted through port 3. When the pilot supply ports are de-pressurized, both valve elements are de-actuated, and air then flows from inlet port 1 to outlet port 2, but no longer to outlet port 4. Air downstream of port 4 is exhausted through port 5. On first operation, or after repair, the pilot valve supply circuit and inherent monitoring elements may need to be reset.

Valve Locked-out: Whenever the valve elements operate in a sufficiently asynchronous manner, either on actuation or de-actuation, the valve will move to a locked-out position. In the locked-out position, one crossover and its related timing chamber will be exhausted, and the other crossover and its related timing chamber will be fully pressurized. The valve element (side B) that is partially actuated has pilot air available to fully actuate it, but no air pressure on the return piston to fully de-actuate the valve element. The return springs are limited in travel, and can only return the valve elements to the intermediate (locked-out) position. Sufficient air pressure acting on the return pistons is needed to return the valve elements to a fully home position.

Detecting a Malfunction: If the main valve elements are not both actuated or de-actuated synchronously, the valve defaults to the locked-out position so that outlet port 2 receives full inlet pressure, and outlet port 4 is exhausted through port 5. The valve must now be "reset" to resume normal operation.

Resetting the Valve: The valve will remain in the locked-out position, even if the inlet air supply is removed and re-applied. A remote reset signal must be applied to reset the valve. Reset is accomplished by momentarily pressurizing the reset port. Actuation of the reset piston physically pushes the main valve elements to their home position. Actuation of the reset piston also opens the reset poppet, thereby, immediately exhausting pilot supply air, thus, preventing valve operation during reset. De-actuation of reset pistons causes the reset poppets to close and pilot supply timing chambers to fully pressurize. Reset pressure can be applied by a remote 3/2 normally closed valve.



Valve Schematic

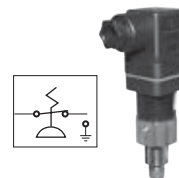
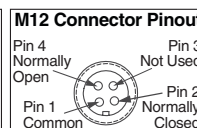
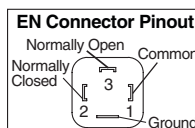
Status Indicator: The optional status indicator pressure switch will actuate when the main valve is operating normally, and will de-actuate when the main valve is in the locked-out position or inlet pressure is removed. This device is not part of the valve lockout function, but, rather, only reports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

F5
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OPTIONS

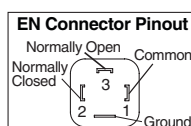
PRESSURE SWITCHES For Verification Of Downstream Pressure Release

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



- May be installed downstream on all double valves
- Provides means to verify the release of downstream pressure to next obstruction
- Factory preset, 5 psi (0.3 bar) - falling

Redundant Pressure Switch		
Connection Types	Model Number	Port Threads
EN 175301-803 Form A	RC26-13	3/8 NPT



- May be installed downstream on all double valves
- Provides a redundant means to verify the release of downstream pressure to next obstruction
- Factory preset, 5 psi (0.3 bar) - falling

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



General Information

Standard Specifications

The standard specifications for the products on each page of this catalog are given on the same page or referenced. For solenoid pilot valves, models with internal pilot supply are listed. Most models are also available for use with external pilot supply or have a built-in pilot supply selector valve.

The products in this catalog are intended for use in industrial pneumatic systems. Most products are adaptable to other uses and conditions not covered by the standard specifications given in this catalog. Weights shown are approximate and are subject to change. Dimensions given, unless otherwise noted, are envelope dimensions (not for mounting). Consult ROSS for further information.

Port Threads

Ports of valves and bases described in this catalog have NPT (ANSI B2.1) threads. Other thread types can be specified by putting an appropriate prefix letter on the model or part number when ordering.

Thread Types by Model Prefix Letter

Pneumatic Port Threads	Prefix Letter	Threaded Electrical Opening
NPT (ANSI B2.1)	None	NPT
ISO 228 - DIN 259 Parallel, BSPP#	C*	—
ISO 228 - DIN 259 Parallel, BSPP#	D	G
ISO 228 - JIS B0203 Tapered#	J	ISO
SAE 1926- ISO 11926	S	NPT

* Used only for filters, regulators, lubricators.

ISO 228 threads supersedes BSPP, G and JIS thread types.

Flow Ratings

Flow ratings are expressed as C_v where $C_v = 1$ corresponds to a steady state air flow of approximately 32 scfm under the following conditions:

Inlet pressure = 100 psig (6.7 bar)
Pressure drop = 10 psi (0.69 bar)
Air temperature = 68°F (20°C)
Relative humidity = 36%

Note: Because widely differing test standards are used to measure C_v values, the figures given in this catalog should not be used to compare ROSS valves with those of other makers. The C_v ratings given here are intended only for use with performance charts published by ROSS. The C_v ratings are averages for the various flow paths through the valve and are for steady flow conditions.

Approvals and Certifications

ROSS products are designed to meet a number of industrial standards, including the Canadian Standards Association (C.S.A.) guidelines. For more information on specific product approvals, contact your local distributor or ROSS.

Solenoids

All ROSS standard solenoids are rated for continuous duty (unless noted otherwise) and will operate the valve within the air pressure range specified in this catalog.

Explosion-Proof Solenoid Pilot available, for more information consult ROSS.

Voltage & Hertz

When ordering a solenoid valve, also specify the desired solenoid voltage and hertz.

Voltage Types by Model Suffix Letter

Voltage	Suffix Letter
120 volts AC	Z
220 volts AC	Y
12 volts DC	H
24 volts DC	W
48 volts DC	M
90 volts DC	K
110 volts DC	P
125 volts DC	C

Recommended Solenoid Voltages: 100-110 volts AC, 50 Hz; 100-120 volts AC, 60 Hz; 24 volts DC; 110 volts DC.

In addition, the following voltages are available:

200, 220 volts AC, 50 Hz
200, 240, 480 volts AC, 60 Hz
24, 48, 220 volts AC, 50 Hz
240 volts AC, 60 Hz
200, 220 volts AC, 50 Hz
200, 240 volts AC, 60 Hz.

For example: Model 2773B5001, 120 volts AC, 60 Hz.
Model W6076B2401, 220 volts AC, 50 Hz.

Please note that not all configurations are available for all models.

For additional information or help with voltage configuration, please contact your local distributor or ROSS.

Port Identification

Valve symbols in this catalog conform to the ISO 1219-1:1991 standard of the International Organization for Standardization (ISO) and the SAE J2051 standard of the Society of Automotive Engineers (SAE) respectively.

Information or Technical Assistance

For additional information or application assistance concerning ROSS products, consult ROSS or your local ROSS distributor (see contact information on the back cover).

Order Placement

For order placement, consult ROSS or your local ROSS distributor.

For a current list of countries and local distributors, visit ROSS' website at www.rosscontrols.com.

CAUTIONS, WARNINGS and STANDARD WARRANTY

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

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.

THE WARRANTY EXPRESSED ABOVE IS IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND ROSS EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ROSS MAKES NO WARRANTY WITH RESPECT TO ITS PRODUCTS MEETING THE PROVISIONS OF ANY GOVERNMENTAL OCCUPATIONAL SAFETY AND/OR HEALTH LAWS OR REGULATIONS. IN NO EVENT IS ROSS LIABLE TO PURCHASER, USER, THEIR EMPLOYEES OR OTHERS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A BREACH OF THE WARRANTY DESCRIBED ABOVE OR THE USE OR MISUSE OF THE PRODUCTS. NO STATEMENT OF ANY REPRESENTATIVE OR EMPLOYEE OF ROSS MAY EXTEND THE LIABILITY OF ROSS AS SET FORTH HEREIN.

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

