ROSS®

FluTech Fluid Control Specialists
บริษัท ฟลูเทค จำกัด
Flu-tech co.,ltd
Authorized Distributor in Thailand

Safe Return CrossMirror® Double Valves
77 Series

Product Catalog

FLU-TECH CO. LTD.

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Control Reliable CrossMirror® Double Valves 77 Series
Product Overview

Safe Return Safety Function

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 such as small size pneumatic cylinder-operated presses, valve operators, and safety latches.

Solenoid Pilot Controlled	Pressure Controlled
	

Illustration examples.

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

The pressure controlled valve is a two hand pressure controlled 4-way double valve 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.

Dynamic Monitoring	Self-contained dynamic monitoring system requires no additional valve monitoring controls
Valve Reset	Automatic reset upon de-actuation
Spool Type Design	Dual stainless steel spools construction
Status Indicator Option	Status indication switch (ready-to-run) to inform machine controller of valve condition The Pressure switch provides a signal when valve is in a faulted position
Mounting	Base mounted
SISTEMA Library	Available for download

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

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

PRODUCT CREDENTIALS

Performance Level Per ISO 13849-1:2015	Safety Integrity Level Per IEC 2061:2001	DGUV	Declaration of Conformity			Certificate of Compliance
Cat. 4 PL e	SIL 3 Functional Safety	HSM 02064 Sicherheit geprüft tested safety HSM 13022 Sicherheit geprüft tested safety	CE	UK CA	EAC	C SP US

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Specifications

STANDARD SPECIFICATIONS					
GENERAL	Function		4-way 5/2 Valve		
	Construction Design		Double Spool and Sleeve		
	Actuation		Electrical	Solenoid Pilot Controlled	
			Pneumatic	Pressure Controlled	
	Mounting	Type	Base		
		Orientation	Any, preferably vertical		
	Connection		Threaded	NPT, G	
	Minimum Operation Frequency		Once per month, to ensure proper function		
OPERATING CONDITIONS	Temperature	Ambient	40° to 120°F (4° to 50°C)		
		Media	40° to 175°F (4° to 80°C)		
	Flow Media		Filtered air		
	Operating Pressure	Solenoid Pilot Controlled	40 to 150 psig (2.5 to 10.3 bar)		
			NOTE: Main solenoids must be off when performing reset procedure		
		Pressure Controlled	40 to 150 psig (2.5 to 10.3 bar)		
	Pilot Pressure		Must be equal to or greater than inlet pressure but should not exceed maximum inlet pressure		
ELECTRICAL DATA FOR PRESSURE SWITCH	Maximum Current/Voltage		4A, 250 volts AC		
			50 mA, 24 volts DC		
	Pressure Switch Rating		Rated in excess of 15 million cycles; electrical life of switch varies with conditions and voltage		
ELECTRICAL DATA FOR SOLENOID PILOT CONTROLLED VALVES	Solenoids		Current Flow	Operating Voltage	Power Consumption (each solenoid)
			DC	24 volts	14 watts
			AC	110-120 volts, 50/60 Hz	5.8 watts nominal, 6.5 watts maximum
				230-240 volts, 50/60 Hz	
			Rated for continuous duty		
	Enclosure Rating		IP65, IEC 60529		
	Electrical Connection		DIN EN 175301-803 Form A Uses cord-grip connectors at solenoids		
CONSTRUCTION MATERIAL	Valve Body		Cast Aluminum		
	Poppet		Stainless Steel		
	Seals		Buna-N; Fluorocarbon		
SAFETY DATA	Safety Integrity Level (SIL)		Certified by TÜV Rheinland in accordance to IEC 61508 and IEC 61511 safety integrity level 2 (SIL 2) and EN ISO 13849-1, PL c (with application specific diagnosis) in singular application with HFT = 0 and SIL 3 and PL e in redundant application with HFT≥1, for details see certificate.		
	Functional Safety Data		Category	CAT 4, PL e	
			B_{10D}	20,000,000	
			PFH_D	$7.71x10^{-9}$	
			$MTTF_D$	301.9 (n_{op}: 662400)	
	Vibration/Impact Resistance		Calculated to DIN EN 60068-2-6		

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

Ordering Information

5/2 SOLENOID PILOT CONTROLLED VALVES – VALVE AND BASE

MODEL NUMBER CONFIGURATOR — 4-Way 2-Position Valves

Y		77	7	6	A	3	4	1	0	W

Port Thread	
NPT Leave Blank	
G	D
SAE (Straight Thread)	S

Series

Actuation
Solenoid Pilot

Valve Function
5/2

Revision Level

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

* For other voltages consult ROSS.
** 230 V AC (OSHA regulations limit press control voltage to no more than 120 V AC in the US).

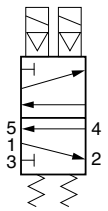
Status Indicator	
None	0
Mechanical Pressure Switch DIN EN 175301-803 Form A (connector included)	1

Basic Size	Port Size			Base Mount	
	In	Out			
2	1/2	3/8	3	4	1
4	3/4	1/2	4	4	2
	1/2	3/4	5	4	1
	SAE12	SAE12	Leave Blank	4H	1

Model Number examples: Y7776A3410W, YD7776A4H21Z.

Valve and Base	Size			Flow C_v (Nl/min)				Weight lb (kg)
	Basic	Port 1	Port 2, 4	1-2	1-4	2-3	4-5	
With Status Indicator Switch	2	1/2	3/8	2.0 (2000)	1.6 (1600)	1.6 (1600)	2.8 (2800)	8.4 (3.8)
	4	3/4	1/2	3.2 (3100)	3.4 (3300)	2.7 (2700)	7.2 (7100)	11.2 (5.1)
			3/4					
		SAE 12	SAE 12					
Without Status Indicator Switch	2	1/2	3/8	2.0 (2000)	1.6 (1600)	1.6 (1600)	2.8 (2800)	7.6 (3.4)
	4	3/4	1/2	3.2 (3100)	3.4 (3300)	2.7 (2700)	7.2 (7100)	10.2 (4.6)
			3/4					
		SAE 12	SAE 12					

Simplified Schematic



Ordering Information

5/2 Solenoid Pilot Controlled Valves – Valve only, Base only

Valve Only

With Status Indicator Switch

Size			Model Number #		
Basic	Port 1	Port 2, 4	24 V DC	110-120 V AC	230 V AC
2	1/2	3/8	Y7776A3401W	Y7776A3401Z	Y7776A3401Y
4	3/4	1/2	Y7776A4401W	Y7776A4401Z	Y7776A4401Y
		3/4			
	SAE 12	SAE 12			

Valve include status indicator switch with DIN EN type connection, for status indicator switch with M12 type connection consult ROSS.

Without Status Indicator Switch

Size			Model Number		
Basic	Port 1	Port 2, 4	24 V DC	110-120 V AC	230 V AC
2	1/2	3/8	Y7776A3400W	Y7776A3400Z	Y7776A3400Y
4	3/4	1/2	Y7776A4400W	Y7776A4400Z	Y7776A4400Y
		3/4			
	SAE 12	SAE 12			

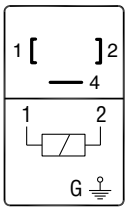
Base Only

Basic Size	Port Sizes		Model Number	
	1	2, 4	NPT Thread	G Thread
2	1/2	3/8	Y996C91	YD996C91
4	3/4	1/2	Y1049C91	YD1049C91
		3/4	Y1153C91	YD1153C91
	SAE 12	SAE 12	Straight Thread	
			Y1159G1	

Solenoid & Pressure Switch Pinouts

Solenoid

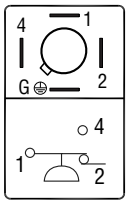
DIN EN 175301-803 Form A



1 - Positive
2 - Negative
4 - Ground

Pressure Switch for Status Indicator

ROSS Connector



1 - Common
2 - Normally Closed
4 - Normally Open
G - Ground

Valve Operation

SOLENOID PILOT CONTROLLED VALVES

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.

Safety Function

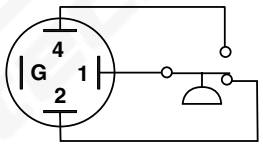
If the two main valve elements are not actuated or de-actuated synchronously, within 500 ms, the valve defaults so that outlet port 2 receives full inlet pressure, and outlet port 4 is exhausted through port 5. If this abnormal operation is the result of a temporary circumstance, the valve will be ready 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.

Pressure Switch

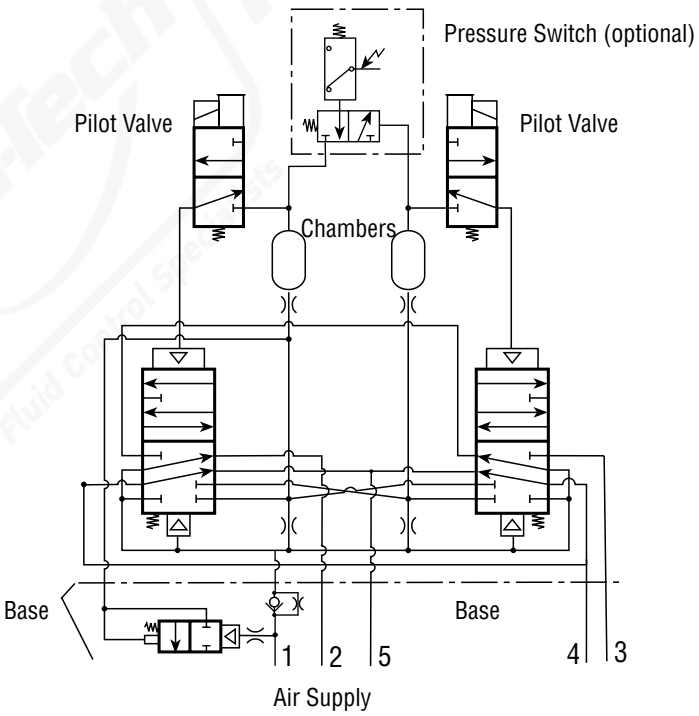
Valves with model numbers ending in the number 1 have a pressure switch to provide user feedback when movement of the main valve elements was asynchronous.

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

Valve Schematic



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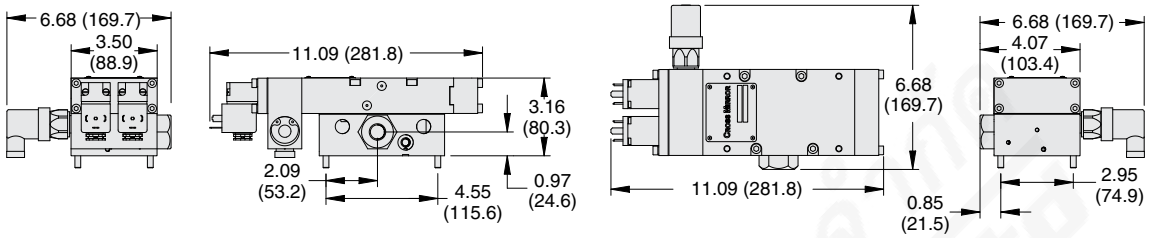
Solenoid Pilot Controlled Valves – Valve and Base Assembly with Remote Reset

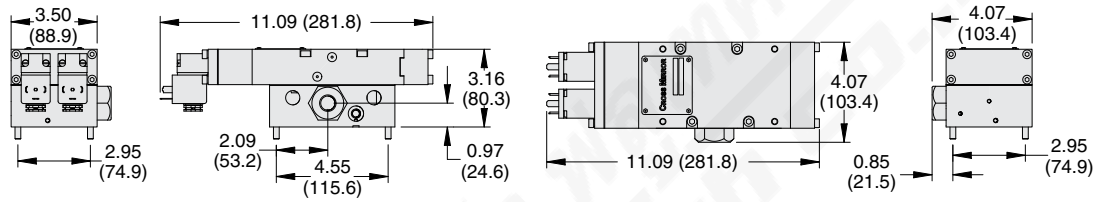
DIMENSIONS — Inches (mm)

Basic Size 2

with Status Indicator Switch

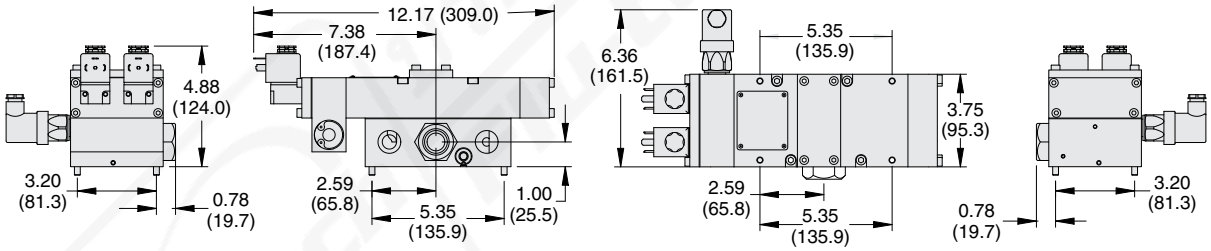


without Status Indicator Switch

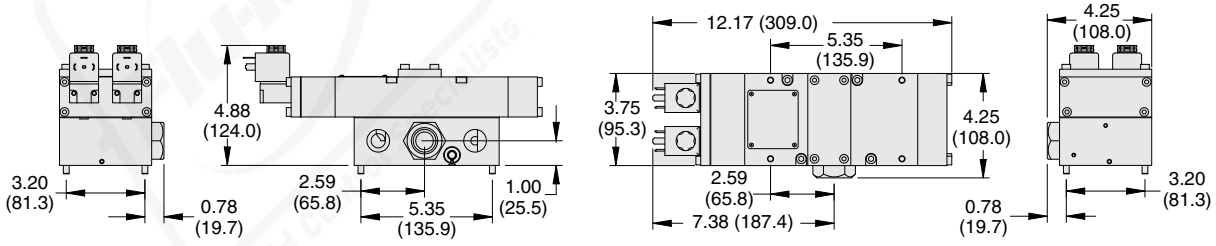


Basic Size 4

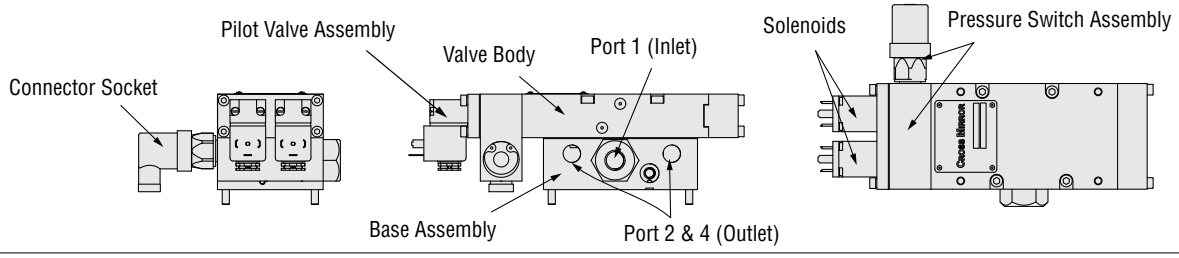
with Status Indicator Switch



without Status Indicator Switch



Downloadable CAD models available.



Ordering Information

5/2 PRESSURE CONTROLLED VALVES – VALVE AND BASE

MODEL NUMBER CONFIGURATOR — 4-Way 2-Position Valves

Y		77	8	6	A	3	4	1	0	W

Port Thread

NPT Leave Blank	
G	D
SAE (Straight Thread)	S

Series

Actuation

Pressure Controlled

Valve Function

5/2

Revision Level

Current / Voltage*

Current	Voltage*	
When None selected for Status Indicator Leave Blank		
DC	24 V	W
AC	110 V, 50 Hz 120 V, 50/60 Hz	Z
	230 V, 50/60 Hz **	Y

* For other voltages consult ROSS.
** 230 V AC (OSHA regulations limit press control voltage to no more than 120 V AC in the US).

Basic Size	Port Size In	Port Size Out		Base Mount	
2	1/2	3/8	3	4	1
4	3/4	1/2	4	4	2
	1/2	3/4	5	4	1
	SAE12	SAE12	Leave Blank	4H	1

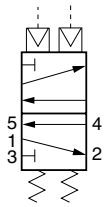
Status Indicator

None	0
Mechanical Pressure Switch DIN EN 175301-803 Form A (connector included)	1

Model Number examples: Y7778A3410W, YD7778A4H21Z.

Valve and Base	Size Basic	Size Port 1	Size Port 2, 4	Flow C_V (Nl/min) 1-2	1-4	2-3	4-5	Weight lb (kg)
With Status Indicator Switch	2	1/2	3/8	2.0 (2000)	1.6 (1600)	1.6 (1600)	2.8 (2800)	8.4 (3.8)
	4	3/4	1/2	3.2 (3100)	3.4 (3300)	2.7 (2700)	7.2 (7100)	11.2 (5.1)
			3/4					
		SAE 12	SAE 12					
Without Status Indicator Switch	2	1/2	3/8	2.0 (2000)	1.6 (1600)	1.6 (1600)	2.8 (2800)	7.6 (3.4)
	4	3/4	1/2	3.2 (3100)	3.4 (3300)	2.7 (2700)	7.2 (7100)	10.2 (4.6)
			3/4					
		SAE 12	SAE 12					

Simplified Schematics



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

5/2 Pressure Controlled Valves – Valve only, Base only

		Size			Model Number #		
		Basic	In	Out	24 V DC	110-120 V AC	230 V AC
Valve Only	With Status Indicator Switch	2	1/2	3/8	Y7786A3401W	Y7786A3401Z	Y7786A3401Y
		4	3/4	1/2	Y7786A4401W	Y7786A4401Z	Y7786A4401Y
				3/4	Y7786A54401W	Y7786A54401Z	Y7786A54401Y
			SAE 12	SAE 12	Y7786A4401W	Y7786A4401Z	Y7786A4401Y
		# Valve include status indicator switch with DIN EN type connection, for status indicator switch with M12 type connection consult ROSS.					

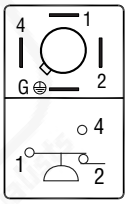
		Size			Model Number
		Basic	In	Out	
Valve Only	Without Status Indicator Switch	2	1/2	3/8	Y7786A3400
		4	3/4	1/2	Y7786A4400
				3/4	
			SAE 12	SAE 12	

	Size			Model Number	
	Basic	In	Out	NPT Thread	G Thread
Base Only	2	1/2	3/8	Y996C91	YD996C91
	4	3/4	1/2	Y1049C91	YD1049C91
			3/4	Y1153C91	YD1153C91
		SAE 12	SAE 12	Straight Thread	
				Y1159G1	

Pressure Switch Pinout

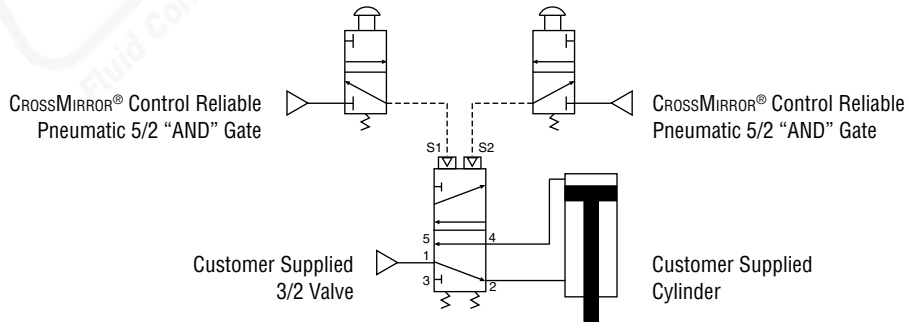
ROSS Connector

Pressure Switch for Status Indicator



1 - Common
2 - Normally Closed
4 - Normally Open
G - Ground

Typical 2-Hand-Anti-Tie-Down Application



Valve Operation

PRESSURE CONTROLLED VALVES

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.

Safety Function

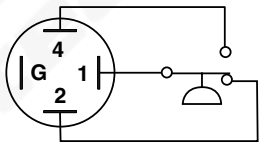
If the two main valve elements are not actuated or de-actuated synchronously, within 500 ms, the valve defaults so that outlet port 2 receives full inlet pressure, and outlet port 4 is exhausted through port 5. If this abnormal operation is the result of a temporary circumstance, the valve will be ready 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.

Pressure Switch

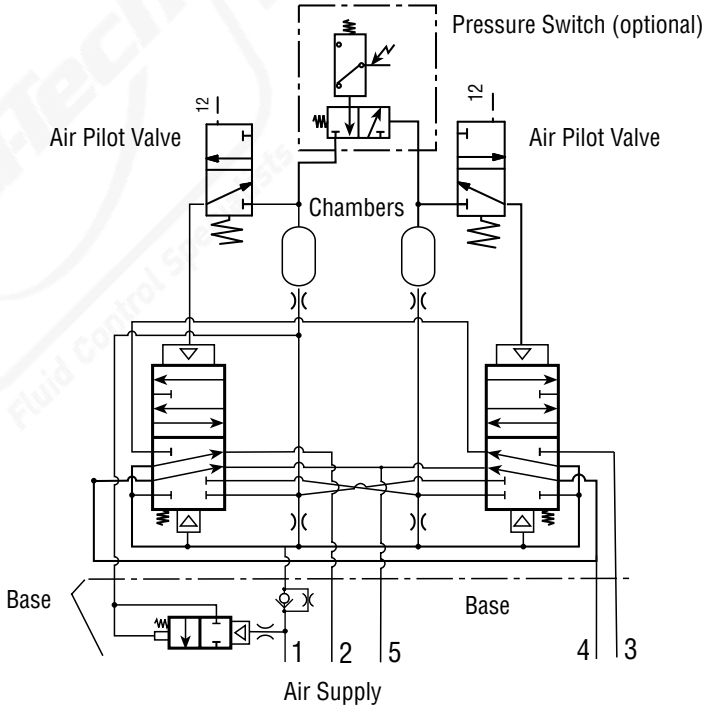
Valves with model numbers ending in the number 1 have a pressure switch to provide user feedback when movement of the main valve elements was asynchronous.

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

Valve Schematic

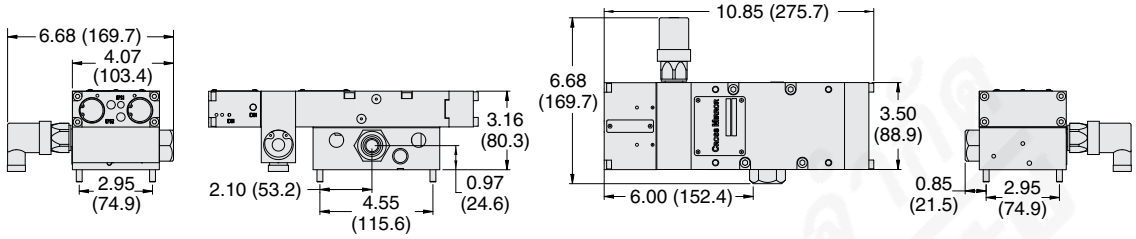


Pressure Controlled Valves – Valve and Base Assembly with Remote Reset

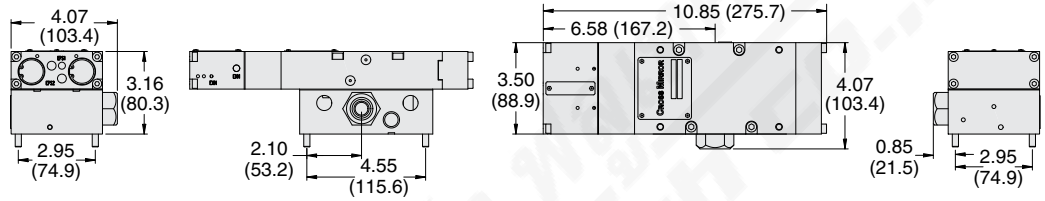
DIMENSIONS Inches (mm)

Basic Size 2

with Status Indicator Switch

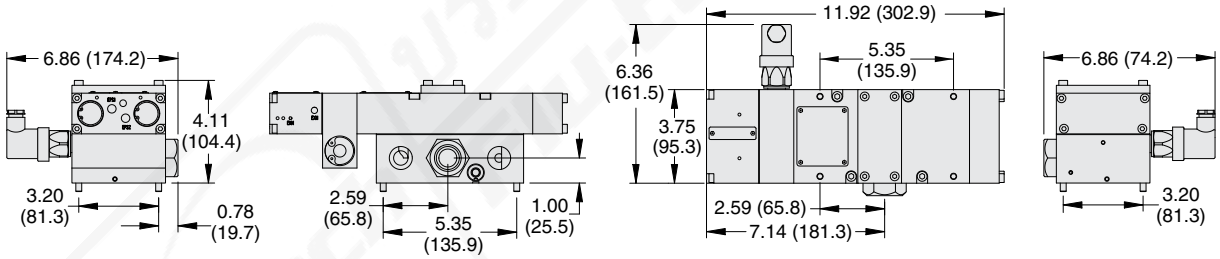


without Status Indicator Switch

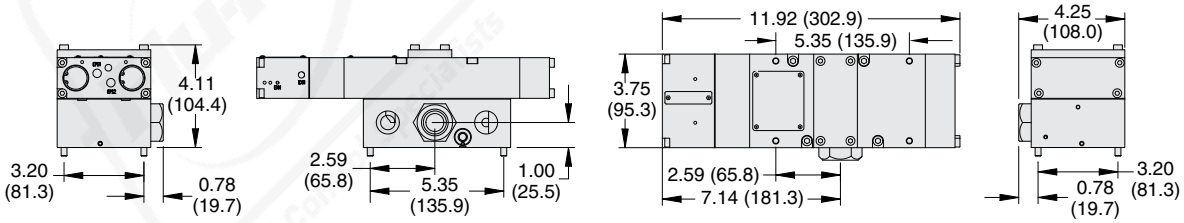


Basic Size 4

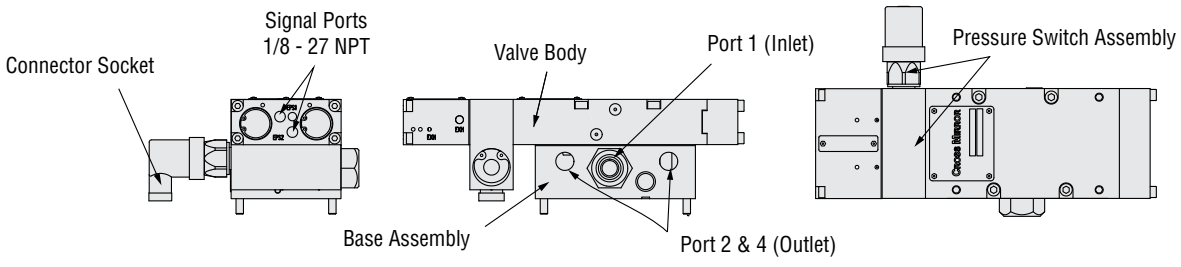
with Status Indicator Switch



without Status Indicator Switch



Downloadable CAD models available.

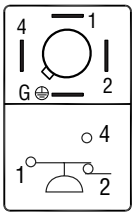


ELECTRICAL STATUS INDICATION

	Installation Location	Indicator Type	Voltage Type	Connector Type	Model Number	Port Thread	Factory Preset psi (bar)
Pressure Switches for Status Indicator	Pressure Sensing Port	Mechanical Pressure Switch	DC	ROSS Connector	798E30	1/8 NPT	22 (1.5) falling
			AC	ROSS Connector	518E30		

Connector Pinout

ROSS Connector



1 - Common
2 - Normally Closed
4 - Normally Open
G - Ground

PREWIRED ELECTRICAL CONNECTORS

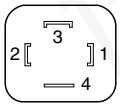
Illustration example.

Prewired Connector Kits	Cable					Kit Number			
	End 1	End 2	Connection	Quantity Included	Length meters (feet)	Without Light	Lighted Connector		
	Connector	Cord					24 V DC	120 V AC	230 V AC
	DIN EN 175301-803 Form A	Flying leads	Solenoid	2	5 (16.4)	2243H77	2268H77-W	2268H77-Z	2268H77-Y
					10 (32.8)	2244H77	2269H77-W	2269H77-Z	2269H77-Y

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

ELECTRICAL CONNECTORS

Connectors	Connector					Model Number			
	Type	Connection	Fitting Connection	Quantity Included	Cord Diameter mm	Without Light	Lighted Connector		
							24 V DC	120 V AC	230 V AC
	DIN EN 175301-803 Form A	Solenoid	Cable grip	1	8 to 10	937K87	936K87-W	936K87-Z	936K87-Y
			1/2" NPT conduit	1	–	723K77	724K77-W	724K77-Z	724K77-Y
	ROSS Connector	Status Indicator	Cable grip	1	8 to 10	522E30	–	–	–

Connector Pinouts	
Solenoid	**Status Indicator**
DIN EN 175301-803	**ROSS Connector**
	
1 - Black 2 - Black 4 - Green/Yellow (Ground)	1 - Common 2 - Normally Closed 4 - Normally Open G - Ground

EXHAUST SILENCERS

Illustration example.

Silencers

SPECIFICATIONS	Silencer Material	Pressure Range psig (bar)	Schematic
	Aluminum	0-290 (0-20) maximum	

Port Size	Thread Type	Flow C_v (Nl/min)	Model Number		Dimensions inches (mm)		Weight lb (kg)
			NPT Thread	R/Rp Thread	Length	Hex Size (D)	
3/8	Male	4.9 (4800)	5500A4003	D5500A4003	3.5 (9)	1.25 (32)	0.07 (0.03)
1/2	Male	6.8 (6700)	5500A6003	D5500A6003	3.6 (9)	1.25 (32)	0.2 (0.1)
3/4	Male	7.2 (7100)	5500A8001	D5500A8001	3.6 (9)	1.25 (32)	
		15 (15000)	5500A9002	D5500A9002	5.3 (14)	2.0 (51)	0.9 (0.4)

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