



SAFE RETURN DOUBLE VALVES CROSSMIRROR[®] 77 SERIES

PRODUCT CATALOG



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.

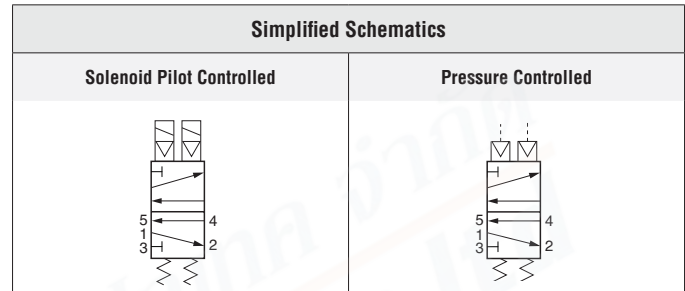


Solenoid Pilot Controlled

- » 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.

VALVE FEATURES

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 at rosscontrols.com

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

Safety Category	DGUV (German Social Accident Insurance)	CE Conformity Declaration	EAC Conformity Declaration	ISO Standard	CSA Certificate of Compliance
				ISO 13849-1:2015	

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; G, NPT	
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) <i>NOTE: Main solenoids must be off when performing reset procedure.</i>	
		Pressure Controlled	40 to 100 psig (2.7 to 7 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		AC or DC power; rated for continuous duty	
	Operating Voltage		24 volts DC	
			110-120 volts AC, 50/60 Hz 230-240 volts AC, 50/60 Hz	
	Power Consumption (each solenoid)		24 V DC – 14 watts 110-120V AC, 230-240 V AC – 87 VA inrush, 30 VA holding	
	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

SOLENOID PILOT CONTROLLED VALVES

4-Way 2-Position Valves

VALVE AND BASE

With Status Indicator Switch

Port Sizes		Basic Size	Model Number #					
1	2, 4		G Thread			NPT Thread		
			24 V DC	110-120 V AC	230 V AC	24 V DC	110-120 V AC	230 V AC
1/2	3/8	2	YD7776A3411W	YD7776A3411Z	YD7776A3411Y	Y7776A3411W	Y7776A3411Z	Y7776A3411Y
3/4	1/2	4	YD7776A4421W	YD7776A4421Z	YD7776A4421Y	Y7776A4421W	Y7776A4421Z	Y7776A4421Y
	3/4	4	YD7776A5411W	YD7776A5411Z	YD7776A5411Y	Y7776A5411W	Y7776A5411Z	Y7776A5411Y
SAE 12	SAE 12	4	Straight Thread					
			24 V DC		110-120 V AC		230 V AC	
			YS7776A4H11W		YS7776A4H11Z		YS7776A4H11Y	

Valve include status indicator switch with DIN EN 175301-803 type connection, for status indicator switch with M12 type connection consult ROSS.

Without Status Indicator Switch

Port Sizes		Basic Size	Model Number					
1	2, 4		G Thread			NPT Thread		
			24 V DC	110-120 V AC	230 V AC	24 V DC	110-120 V AC	230 V AC
1/2	3/8	2	YD7776A3410W	YD7776A3410Z	YD7776A3410Y	Y7776A3411W	Y7776A3410Z	Y7776A3410Y
3/4	1/2	4	YD7776A4420W	YD7776A4420Z	YD7776A4420Y	Y7776A4420W	Y7776A4420Z	Y7776A4420Y
	3/4	4	YD7776A5410W	YD7776A5410Z	YD7776A5410Y	Y7776A5410W	Y7776A5410Z	Y7776A5410Y
SAE 12	SAE 12	4	Straight Thread					
			24 V DC		110-120 V AC		230 V AC	
			YS7776A4H10W		YS7776A4H10Z		YS7776A4H10Y	

Status Indicator Switch	Port Sizes		Basic Size	C _v				Weight lb (kg)
	1	2, 4		1-2	1-4	2-3	4-5	
With	1/2	3/8	2	2.0	1.6	1.6	2.8	8.4 (3.8)
	3/4	1/2	4	3.2	3.4	2.7	7.2	11.2 (5.1)
		3/4						
SAE 12	SAE 12							
Without	1/2	3/8	2	2.0	1.6	1.6	2.8	7.6 (3.4)
	3/4	1/2	4	3.2	3.4	2.7	7.2	10.2 (4.6)
		3/4						
SAE 12	SAE 12							



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845/3-4 Thepharak RD., T.Thepharak, A.Muang, Samutprakarn 10270 THAILAND
Tel. 0 2384 6060, Fax 0 2384 5701, Email : sales@flutech.co.th, www.flutech.co.th

SOLENOID PILOT CONTROLLED VALVES

4-Way 2-Position Valves

VALVE ONLY

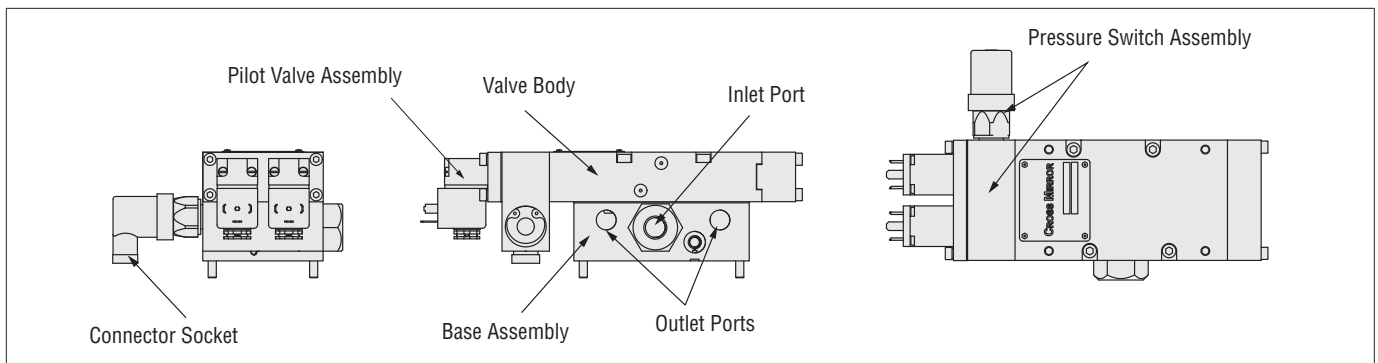
With Status Indicator Switch	Port Sizes		Basic Size	Model Number #		
	1	2, 4		24 V DC	110-120 V AC	230 V AC
	1/2	3/8	2	Y7776A3401W	Y7776A3401Z	Y7776A3401Y
3/4	1/2	4	Y7776A4401W	Y7776A4401Z	Y7776A4401Y	
	3/4					
SAE 12	SAE 12					

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

Without Status Indicator Switch	Port Sizes		Basic Size	Model Number		
	1	2, 4		24 V DC	110-120 V AC	230 V AC
	1/2	3/8	2	Y7776A3400W	Y7776A3400Z	Y7776A3400Y
3/4	1/2	4	Y7776A4400W	Y7776A4400Z	Y7776A4400Y	
	3/4					
SAE 12	SAE 12					

BASE ONLY

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



Ordering Information

PRESSURE CONTROLLED VALVES

4-Way 2-Position Valves

VALVES AND BASE

With Status Indicator Switch

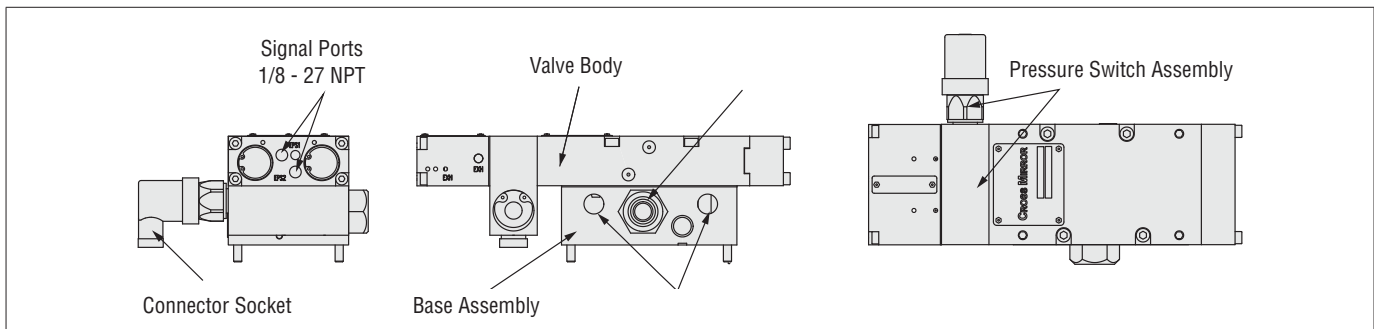
Port Sizes		Basic Size	Model Number #					
1	2, 4		G Thread			NPT Thread		
			24 V DC	110-120 V AC	230 V AC	24 V DC	110-120 V AC	230 V AC
1/2	3/8	2	YD7786A3411W	YD7786A3411Z	YD7786A3411Y	Y7786A3411W	Y7786A3411Z	Y7786A3411Y
3/4	1/2	4	YD7786A4421W	YD7786A4421Z	YD7786A4421Y	Y7786A4421W	Y7786A4421Z	Y7786A4421Y
	3/4	4	YD7786A5411W	YD7786A5411Z	YD7786A5411Y	Y7786A5411W	Y7786A5411Z	Y7786A5411Y
SAE 12	SAE 12	4	Straight Thread					
			24 V DC	110-120 V AC	230 V AC			
			YS7786A4H11W	YS7786A4H11Z	YS7786A4H11Y			

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

Without Status Indicator Switch

Port Sizes		Basic Size	Model Number	
1	2, 4		G Thread	NPT Thread
1/2	3/8	2	YD7786A3410	Y7786A3410
3/4	1/2	4	YD7786A4420	Y7786A4420
	3/4	4	YD7786A5410	Y7786A5410
SAE 12	SAE 12	4	Straight Thread	
			YS7786A4H10	

Status Indicator Switch	Port Sizes		Basic Size	C _v				Weight lb (kg)
	1	2, 4		1-2	1-4	2-3	4-5	
With	1/2	3/8	2	2.0	1.6	1.6	2.8	8.4 (3.8)
	3/4	1/2	4	3.2	3.4	2.7	7.2	11.6 (5.3)
	3/4	3/4						
	SAE 12	SAE 12						
Without	1/2	3/8	2	2.0	1.6	1.6	2.8	7.6 (3.4)
	3/4	1/2	4	3.2	3.4	2.7	7.2	10.6 (4.8)
	3/4	3/4						
	SAE 12	SAE 12						



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PRESSURE CONTROLLED VALVES

4-Way 2-Position Valves

VALVE ONLY

With Status Indicator Switch	Port Sizes		Basic Size	Model Number #		
	1	2, 4		24 V DC	110-120 V AC	230 V AC
	1/2	3/8	2	Y7786A3401W	Y7786A3401Z	Y7786A3401Y
3/4	1/2	4	Y7786A4401W	Y7786A4401Z	Y7786A4401Y	
	3/4	4	Y7786A54401W	Y7786A54401Z	Y7786A54401Y	
SAE 12	SAE 12	4	Y7786A4401W	Y7786A4401Z	Y7786A4401Y	

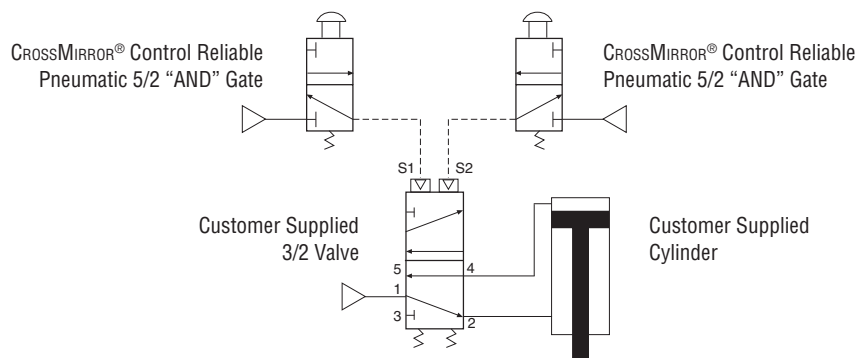
Valve include status indicator switch with DIN EN type connection, for status indicator switch with M12 type connection consult ROSS.

Without Status Indicator Switch	Port Sizes		Basic Size	Model Number
	1	2, 4		
	1/2	3/8	2	Y7786A3400
3/4	1/2	4	Y7786A4400	
	3/4	4		
SAE 12	SAE 12	4		

BASE ONLY

Port Sizes		Basic Size	Model Number	
1	2, 4		G Thread	NPT Thread
1/2	3/8	2	YD996C91	Y996C91
3/4	1/2	4	YD1049C91	Y1049C91
	3/4	4	YD1153C91	Y1153C91
SAE 12	SAE 12	4	Straight Thread	
			Y1159G91	

Typical 2-Hand-Anti-Tie-Down Application



Valve Operation

SOLENOID PILOT CONTROLLED VALVES

4-Way 2-Position 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.

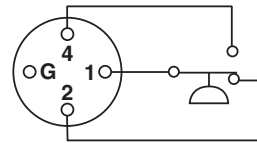
If the cause of the abnormal operation is still present, the valve will either remain in the default position (pressure on port 2 and not port 4) or will again go into this position on the next actuation attempt. The source of the abnormality must be investigated and corrected before further operation.

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.

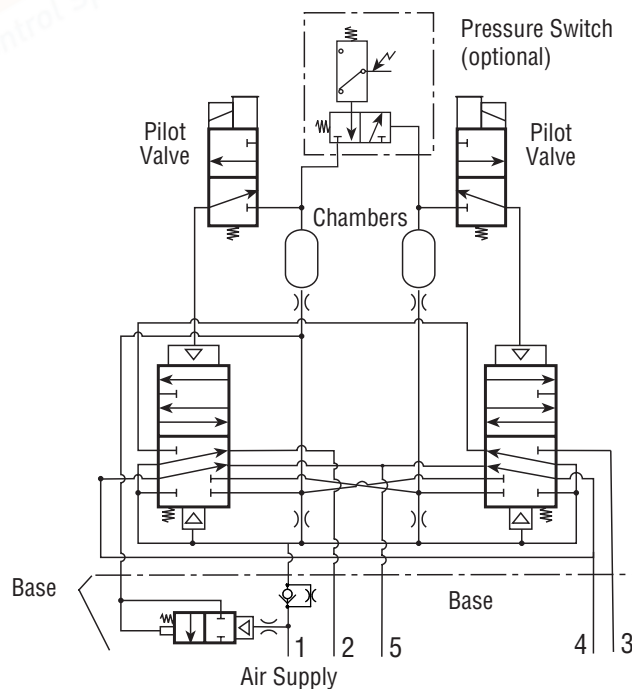
Terminals 1 and 4 are connected when air pressure is present and the valve is "Ready-to-Run". If an abnormal operation has occurred or pressure is removed from the valve inlet, terminals 1 and 2 are connected.

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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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.

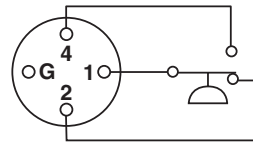
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Pressure Switch

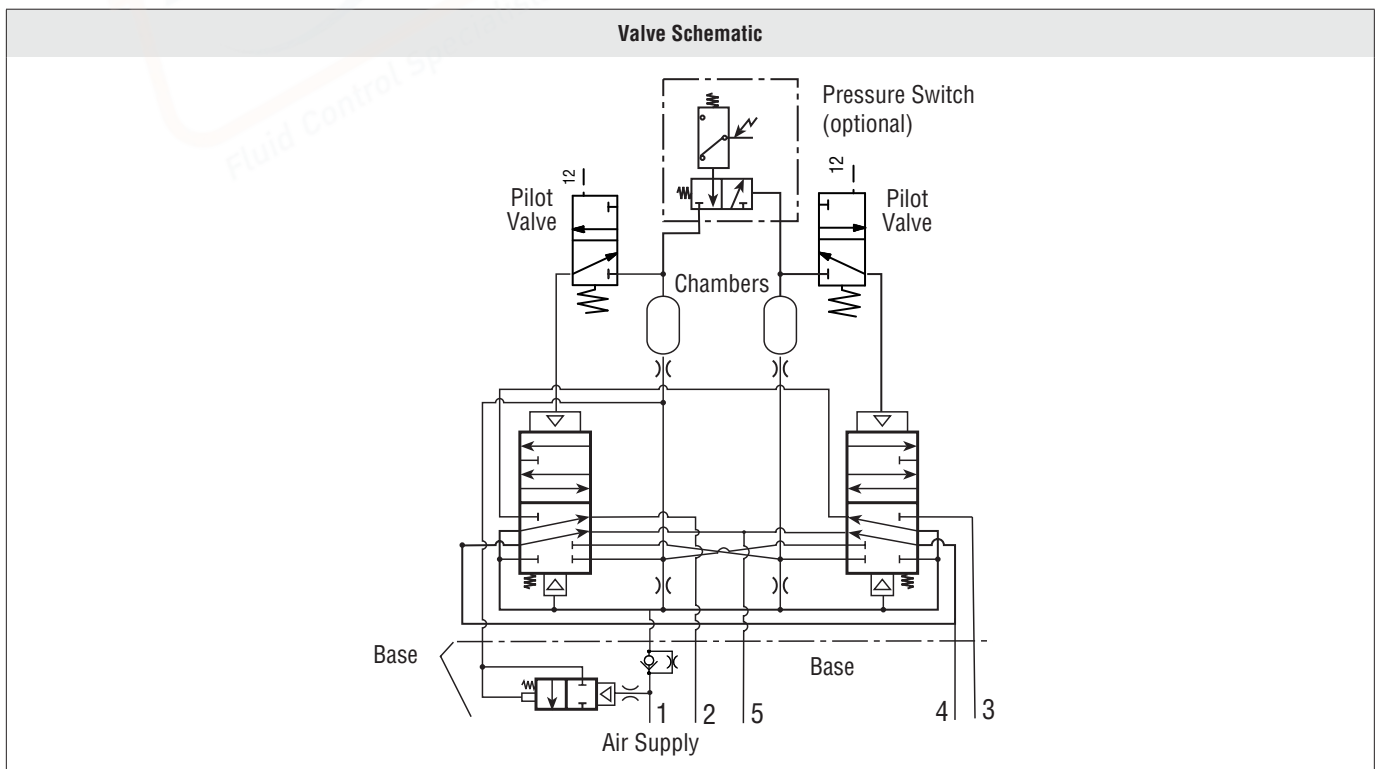
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Terminals 1 and 4 are connected when air pressure is present and the valve is "Ready-to-Run". If an abnormal operation has occurred or pressure is removed from the valve inlet, terminals 1 and 2 are connected.

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 Technical Data

Solenoid Pilot Controlled Valves

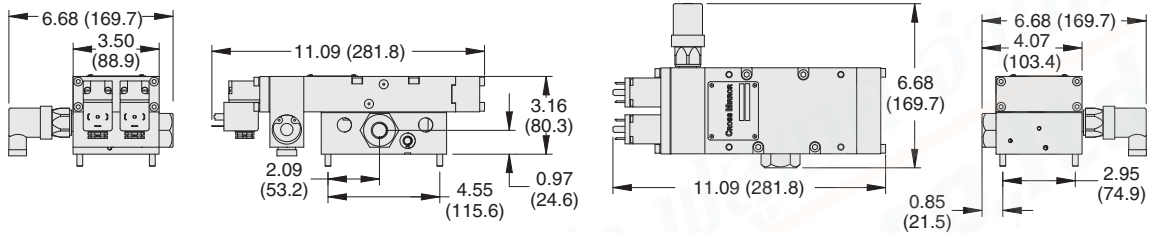
Valve and Base Assembly with Remote Reset

DIMENSIONS

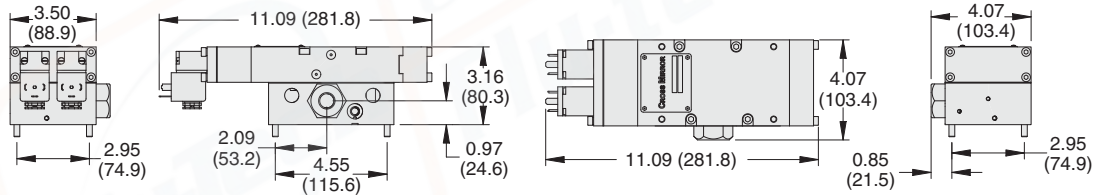
Inches (mm)

Basic Size 2

with Status Indicator Switch

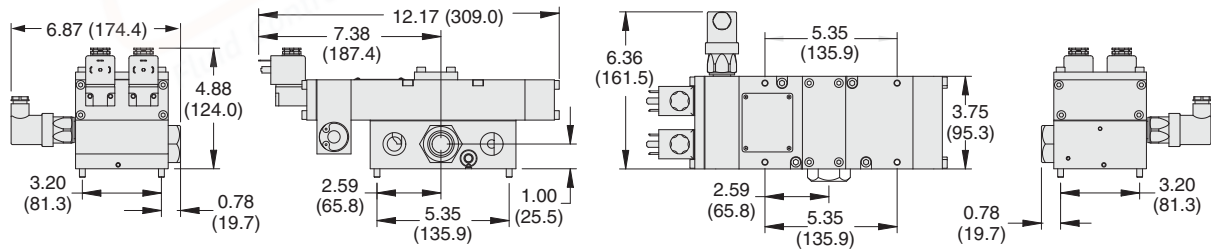


without Status Indicator Switch

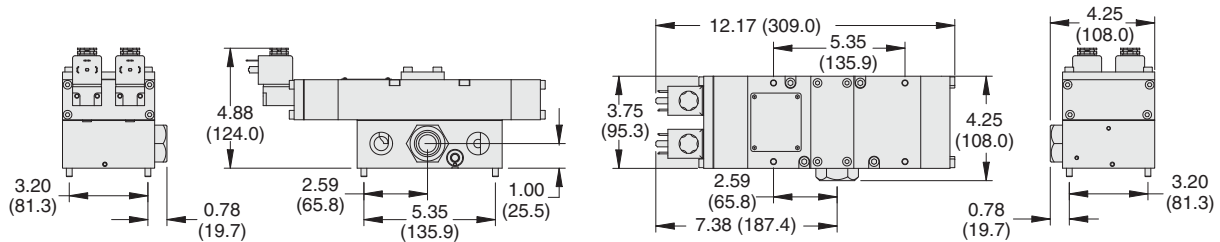


Basic Size 4

with Status Indicator Switch



without Status Indicator Switch



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

Pressure Controlled Valves

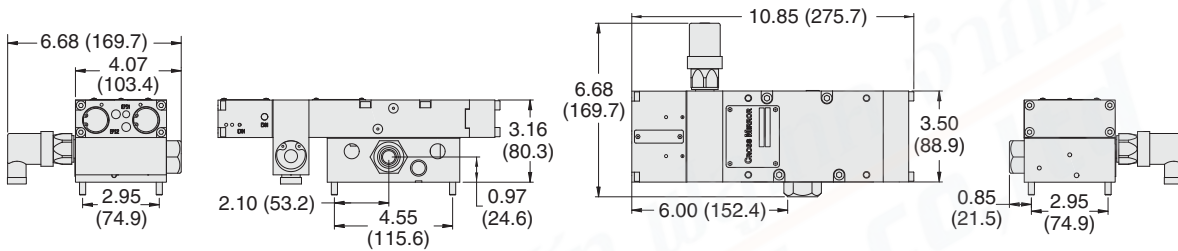
Valve and Base Assembly with Remote Reset

DIMENSIONS

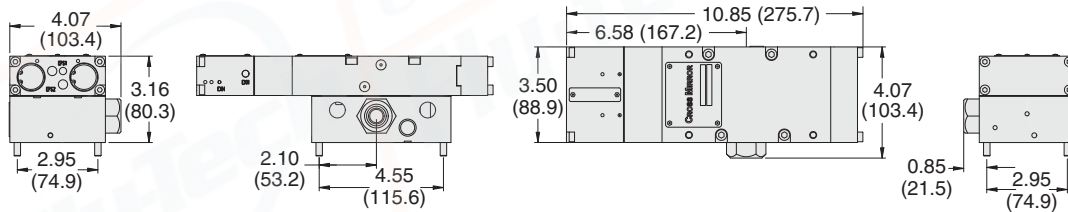
Inches (mm)

Basic Size 2

with Status Indicator Switch

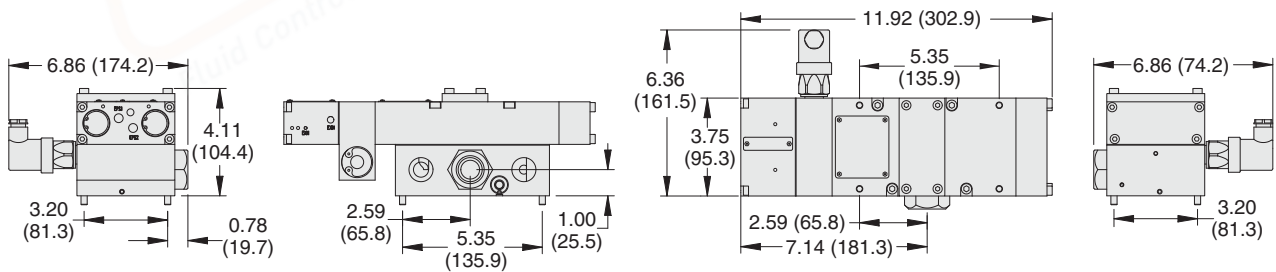


without Status Indicator Switch

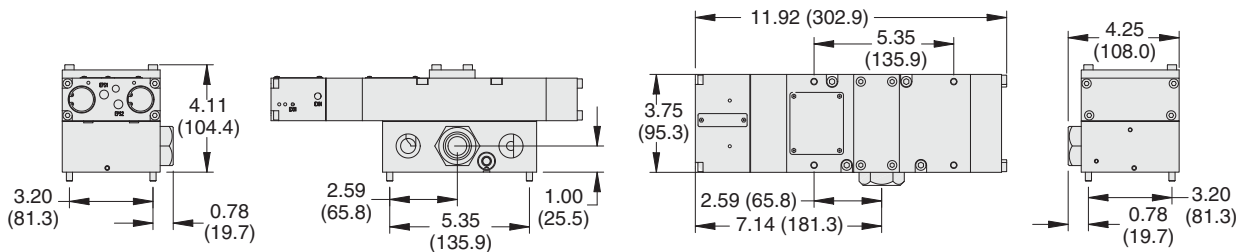


Basic Size 4

with Status Indicator Switch



without Status Indicator Switch



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Accessories

ELECTRICAL STATUS INDICATION

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

Connector Pinout

ROSS Connector



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



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ELECTRICAL CONNECTORS

Complete Pre-wired Connector Kits	Connection Type	Connector Type	Cable		Length meters (feet)	Kit Number				Quantity
			End 1	End 2		Without Light	Lighted Connector			
							24 V DC	120 V AC	230 V AC	
Solenoid	DIN EN 175301-803 Form A	Connector	Flying leads	5 (16.4)	2243H77	2268H77-W	2268H77-Z	2268H77-Y	2	
					2244H77	2269H77-W	2269H77-Z	2269H77-Y	2	
	M12, 5-pin	Female Connector	Flying leads	5 (16.4)	2245H77	-	-	-	2	
					2246H77	-	-	-	2	

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

Connectors (no cable)	Connection Type	Connector Type	Fitting Connection	Kit Number				Quantity
				Without Light	Lighted Connector			
					24 V DC	120 V AC	230 V AC	
Solenoid	DIN EN 175301-803 Form A		Cable grip	937K87	936K87-W	936K87-Z	936K87-Y	1
			1/2" NPT conduit	723K77	724K77-W	724K77-Z	724K77-Y	1
Status Indicator	ROSS Connector		Cable grip	522E30	-	-	-	1

Connectors Pinout

Solenoid		Status Indicator
DIN EN Connector Form A	M12 Connector	ROSS Connector
<p>1 - Black 2 - Black 4 - Green/Yellow (Ground)</p>	<p>3 - Blue 4 - Black</p>	<p>1 - Common 2 - Normally Closed 4 - Normally Open G - Ground</p>

Accessories & Options

SILENCERS

Silencers	Port Size	Thread Type	Model Number		Flow Avg. C _v	Pressure Range psig (bar)
			BSPT (R/Rp) Thread	NPT Thread		
			3/8	Male		
1/2	Male	D5500A4003	5500A4003	4.7		
3/4	Male	D5500A5013	5500A5013	5.1		
		D5500A5003	5500A5003	12		



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845/3-4 Thepharak RD., T.Thepharak, A.Muang, Samutprakarn 10270 THAILAND
Tel. 0 2384 6060, Fax 0 2384 5701, Email : sales@flutech.co.th, www.flutech.co.th