



TO Series

Proportional solenoid valves

FEATURES

- 2-way normally closed
- Offers operating pressure up to 150 psig and a range of orifice sizes
- Additional low flow versions for flow below 500 sccm
- Maintains ideal flow through thermal compensation
- Excellent leakage specification for over 100 million life cycles (10 million for low flow version)
- Uses either DC current or pulse width modulation
- Brass body
- RoHS compliant
- PRO services



MEDIA COMPATIBILITY

Air, argon, helium, hydrogen, methane, nitrogen, oxygen & others

ELECTRICAL

Power	max. 2 W
Voltage	
TO...003... (low flow)	max. 6.5, 8, 12 or 18 V _{DC}
all others	max. 5.5, 8, 11.5, 13.5, 20 or 29 V _{DC}
PWM	5-12 KHz recommended

PHYSICAL PROPERTIES

Operating environment	0 to 55 °C
Storage temperature	-40 to 70 °C
Porting	Manifold mount or barbs
Weight	63 g (2.2 oz)
Internal volume	0.508 cm ³ (0.031 in ³)
Filtration (recommended)	
0.003" to 0.020" orifice	17 µm
all others	40 µm
Lubrication	None required
Oxygen clean	

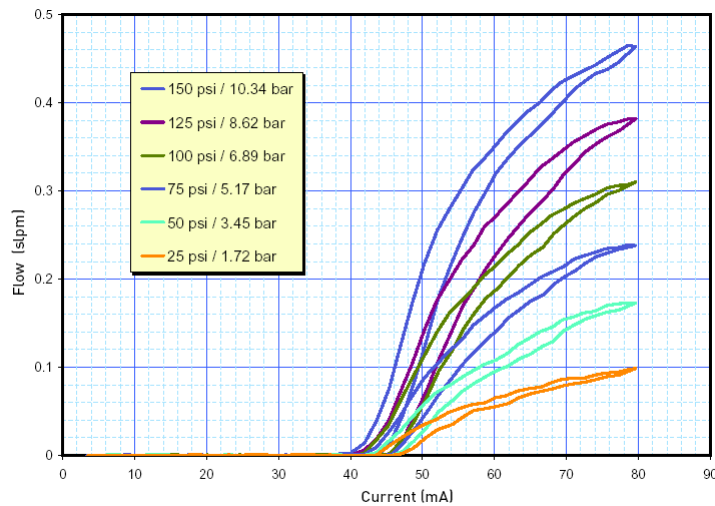


PERFORMANCE CHARACTERISTICS

Part no.	Pressure	Vacuum	Orifice sizes	Leak rate ¹	Response
TOP150C003...	0..150 psid	-	0.003" (0.076 mm)	≤0.2 sccm of helium (bubble tight)	<15 msec cycling
TOP150C010...	0..150 psid	0...27 "Hg (0...13 psi)	0.010" (0.245 mm)		<30 msec cycling (2 W)
TOP150C020...	0...150 psid		0.020" (0.510 mm)		
TOP150C030...	0...150 psid		0.030" (0.762 mm)		
TOP075C040...	0...75 psid		0.040" (1.016 mm)		
TOP100C050...	0...100 psid		0.050" (1.270 mm)		
TOP050C065...	0...50 psid		0.065" (1.651 mm)		

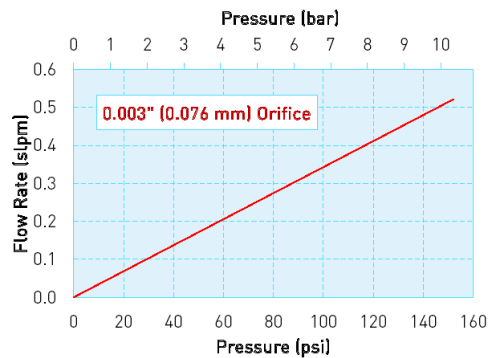
FLOW CURVES

Low flow devices (0.003" orifice)
(typical air flow with 12 V_{DC} coil)²



PRESSURE VS FLOW CURVE

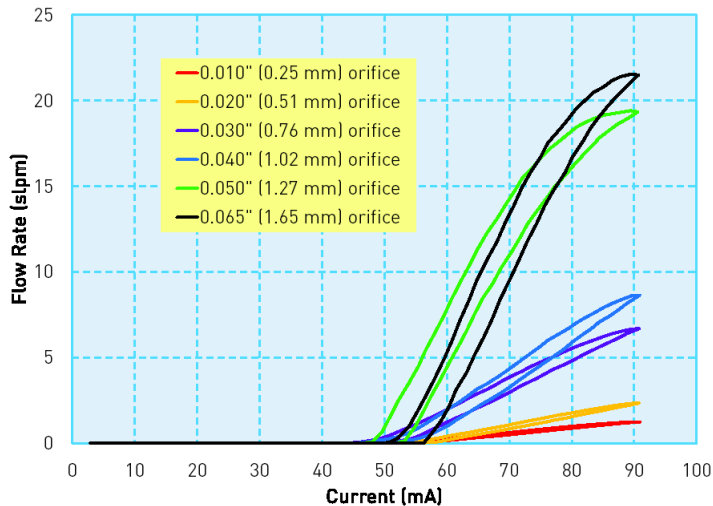
Low flow devices (0.003" orifice)



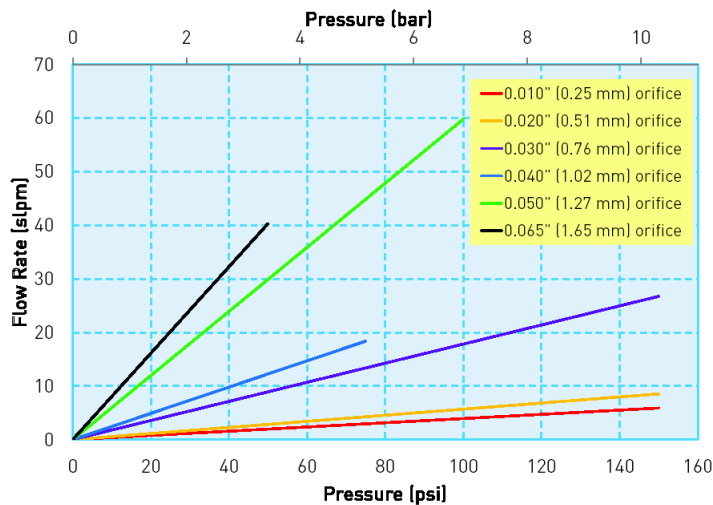


TO Series Proportional solenoid valves

FLOW CURVES (typical air flow with 20 V_{DC} coil @ 25 psi)² All other devices



PRESSURE VS FLOW CURVE All other devices



PRESSURE AND FLOW CAPABILITIES

Orifice Diameter	Maximum Operating Inlet Pressure	Maximum Operating Pressure Differential
0.010in (0.245mm)	150 psig (10.34 bar)	150 psid (10.34 bar)
0.020in (0.510mm)	150 psig (10.34 bar)	150 psid (10.34 bar)
0.030in (0.762mm)	150 psig (10.34 bar)	150 psid (10.34 bar)
0.040in (1.016mm)	150 psig (10.34 bar)	75 psid (5.17 bar)
0.050in (1.270mm)	150 psig (10.34 bar)	100 psid (6.89 bar)
0.065in (1.651mm)	150 psig (10.34 bar)	50 psid (3.45 bar)

ELECTRICAL REQUIREMENTS

Minimum Available Voltage (VDC)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Flow (mA)
5.5	11	304
8.0	23	212
11.5	47	152
13.5	68	125
20.0	136	91
29.0	274	66

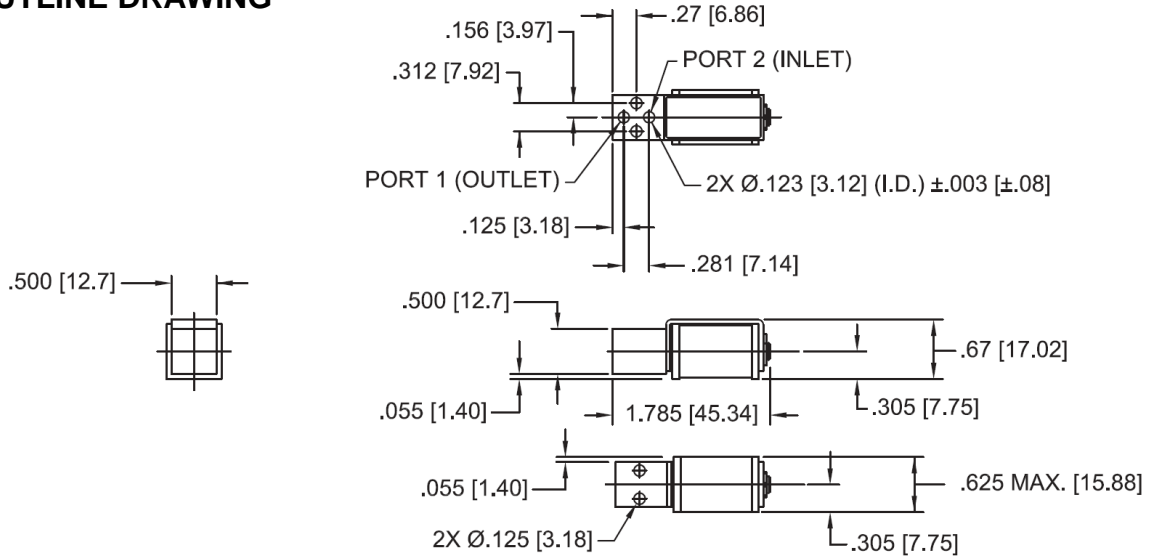
Notes:

- ¹ sccm denotes Standard Cubic Centimeters per Minute (at standard conditions of temperature and pressure). 1000 sccm = 1 slpm.
- ² slpm denotes Standard Liters per Minute (at standard conditions of temperature and pressure). 1 slpm = 1000 sccm.



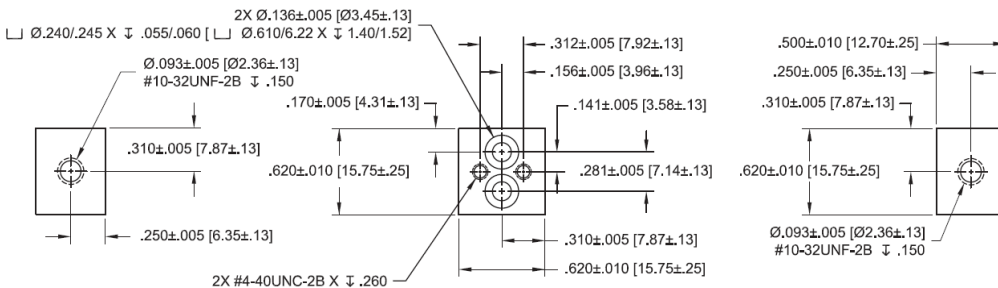
TO Series Proportional solenoid valves

OUTLINE DRAWING



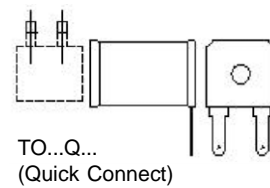
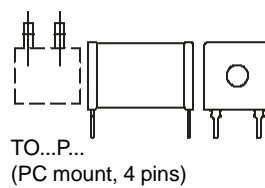
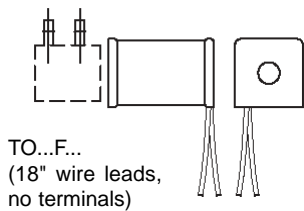
dimensions in inches (mm)

Manifold & O-ring dimensions & design

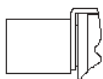


dimensions in inches (mm)

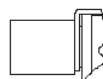
ELECTRICAL INTERFACE



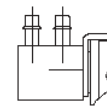
PNEUMATIC INTERFACE



TO...0
(No barbs, face seal to manifold)



TO...1
(No barbs, face seal to manifold with screen)



TO...8
(0.125" barbs, 1/8" I.D. tubing, 1/4" O.D. max)



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ORDERING INFORMATION

Low flow devices (0.003" orifice)

Options	Series	Pressure / Function / Orifice		Elastomer		Coil selection			Electrical interface	Pneumatic interface			
						Max. voltage*	Resistance**	Current***					
	TO	P150C003	150 psi, NC, 0.003 inch	V	Viton (FKM)	065	6.5 V _{DC}	47 Ω	0.130 A	F	Wire leads, 18"	1	Manifold mount with screens
						080	8 V _{DC}	68 Ω	0.115 A				
						120	12 V _{DC}	136 Ω	0.080 A				
						180	18 V _{DC}	274 Ω	0.060 A				
						240	24 V _{DC}	547 Ω	0.043 A				
						* max. voltage for continuous full flow, ambient temp. 55°C ** coil resistance for room temp. *** input current for full flow							
Example: TO P150C003						V	080			F	1		

All other devices

Options	Series	Pressure / Function / Orifice		Elastomer		Coil selection			Electrical interface	Pneumatic interface									
						Max. voltage*	Resistance**	Current***											
	TO	P050C065	50 psi, NC, 0.065 inch	V	Viton (FKM)	055	5.5 V _{DC}	11 Ω	0.304 A	F	Wire leads, 18"	0	Manifold mount						
						C	Cemraz (FFKM)	080	8 V _{DC}					23 Ω	0.212 A	P	PC board mount	1	Manifold mount with screens
								115	11.5 V _{DC}					47 Ω	0.152 A				
								135	13.5 V _{DC}					68 Ω	0.125 A				
								200	20 V _{DC}					136 Ω	0.091 A				
								290	29 V _{DC}					274 Ω	0.066 A				
						* max. voltage for continuous full flow, ambient temp. 55°C ** coil resistance for room temp. *** input current for full flow													
Example: TO P100C040						V	055			P	1								

Note: Not all combinations might be available. Please contact First Sensor.

Accessories (please order separately using the following order numbers)

Order No.	Description
190-007024-002 (FKM)	Manifold mount O-ring

PRO services:

- Extended warranty period of 2 years
- Advanced logistics models for supply inventory and short delivery times
- Technical support through application engineers on the phone or at your site
- Fastest possible technical response for design and QA engineers
- ... plus other services on request

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