Electro-proportional 3-way flow control valve, meter in

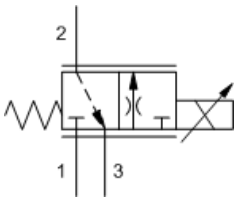
Capacity:
9 gpm (34 L/min.)

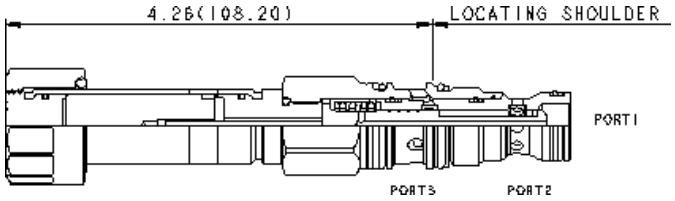
Model:
FMDA

Product Description

This valve is a 3-way, meter-in, electro-proportional throttle. The flow path, unenergized, has the supply blocked at port 1 and port 2 is drained to tank at port 3. Energizing the coil generates a closing force on the spool, creating a metering orifice in the 1 to 2 direction that is proportional to the coil command current. The valve self-compensates in the 1 to 2 direction and with the addition of an external compensator will provide pressure compensated flow control.

Flow in the 2 to 3 direction is not proportional and is limited in the interest of increased resolution and capacity. Flow capacity in the 2 to 3 direction is about 1.5 gpm (6 L/min). This valve is meant to be used in a circuit that has a separate passage to tank such as a cushion lock circuit. Two FMDA's in conjunction with a cushion lock circuit create a meter-in/meter-out 3 position 4-way.



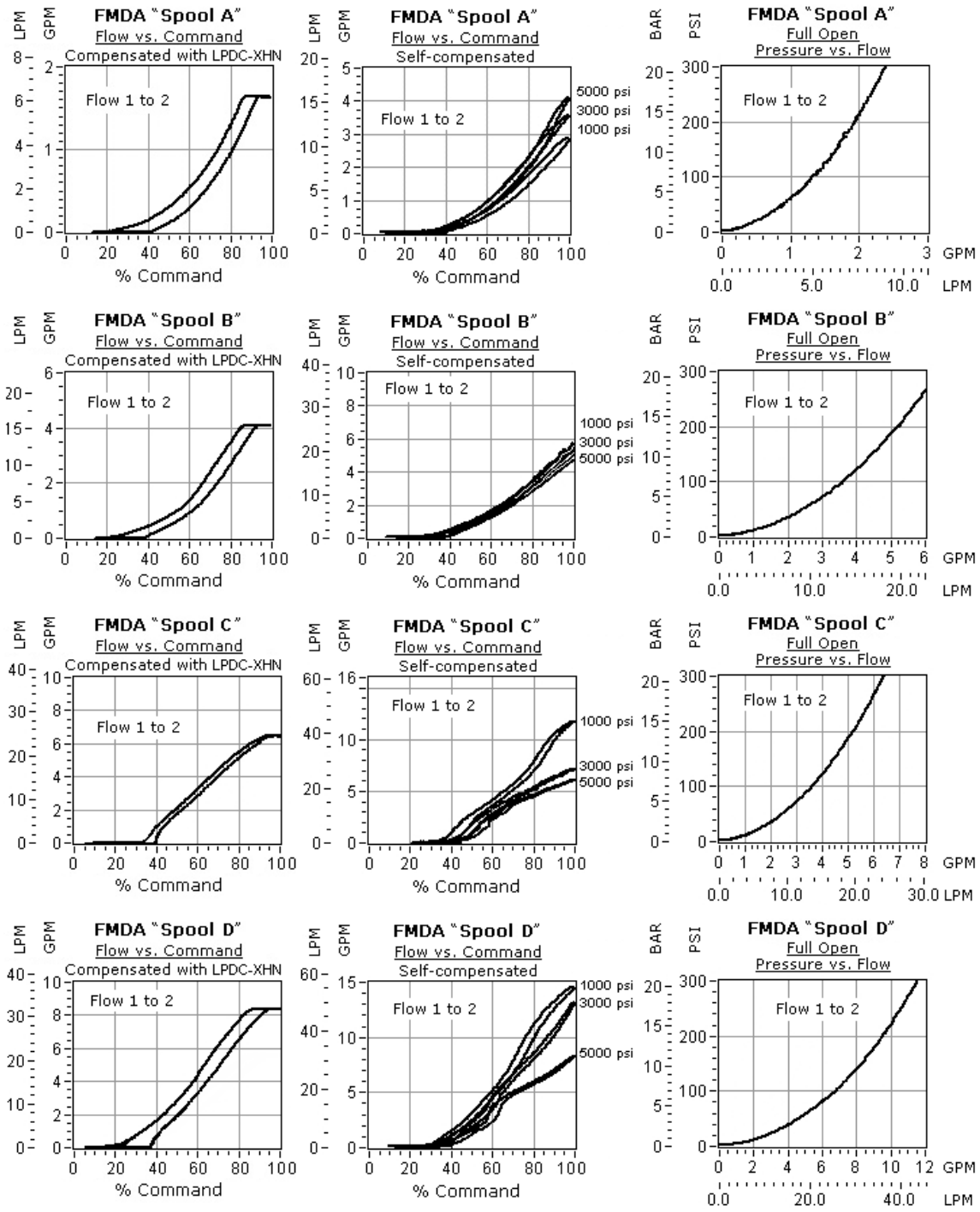


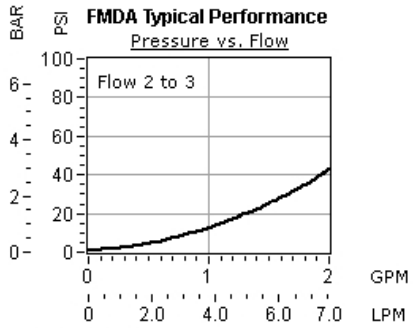
Technical Features

- Note: Flow in the 2 to 3 direction is limited to about 1.5 gpm (5 L/pm).
- The transition between positions is closed.
- Using 2 3-ways to create a 4-way allows one to choose existing flow ranges instead of cutting a special spool.
- These valves may be pressure compensated by an external, modulating, logic element. Use LR_C-XHN for a bypass circuit or LP_C-XHN for a restrictive circuit.
- If the flow control need is absolute, a pressure compensator is needed. If the flow control need is not absolute, as with a joystick, self-compensation may suffice.
- All ports will accept 5000 psi (350 bar).
- Coils are interchangeable with Sun's other full flow, solenoid-operated valves and can be mounted on the tube in either direction.
- For optimum performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.
- Incorporates the Sun floating style construction to minimize the possibility of internal parts binding due to excessive installation torque and/or cavity/cartridge machining variations.

Technical Data

	U.S. Units	Metric Units
Cavity	T-11A	
Capacity	9 gpm	34 L/min.
Hysteresis (with dither)	<4%	
Hysteresis with DC input	<8%	
Linearity (with dither)	<2%	
Repeatibility (with dither)	<2%	
Recommended dither frequency	140 Hz	
Deadband, nominal (as a percentage of input)	30%	
Manual Override Force Requirement	5 lbs/1000 psi @ Port 1	3 kgs/100 bar @ Port 1
Manual Override Stroke	.10 in.	2,5 mm
Maximum Valve Leakage at 110 SUS (24 cSt)	2 in^3/min.@1000 psi	30 cc/min.@70 bar
Series (from Cavity)	Series 1	
Solenoid Tube Diameter	.75 in.	19 mm
Valve Hex Size	7/8 in.	22,2 mm
Valve Installation Torque	30 - 35 lbf ft	40 - 50 Nm
Model Weight (with coil)	1.10 lb	0,50 kg
Seal Kits - Cartridge	Buna: 990-411-007	
Seal Kits - Cartridge	Viton: 990-411-006	
Seal Kits - Coil	Viton: 990-770-006	
Model Weight	0.75 lb.	0.34 kg.

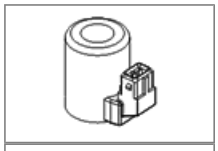
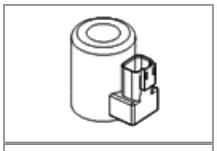
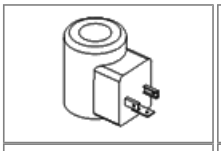
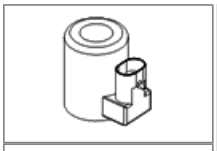
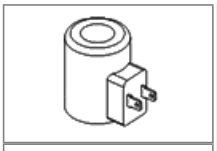
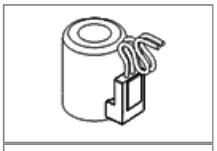

FMDA "Spool A"
Flow vs. Command
Compensated with LPDC-XHN
Flow 1 to 2
LPM
GPM
% Command
FMDA "Spool A"
Flow vs. Command
Self-compensated
Flow 1 to 2
5000 psi
3000 psi
1000 psi
LPM
GPM
% Command
FMDA "Spool A"
Full Open
Pressure vs. Flow
Flow 1 to 2
BAR
PSI
GPM
LPM
FMDA "Spool B"
Flow vs. Command
Compensated with LPDC-XHN
Flow 1 to 2
LPM
GPM
% Command
FMDA "Spool B"
Flow vs. Command
Self-compensated
Flow 1 to 2
1000 psi
3000 psi
5000 psi
LPM
GPM
% Command
FMDA "Spool B"
Full Open
Pressure vs. Flow
Flow 1 to 2
BAR
PSI
GPM
LPM
FMDA "Spool C"
Flow vs. Command
Compensated with LPDC-XHN
Flow 1 to 2
LPM
GPM
% Command
FMDA "Spool C"
Flow vs. Command
Self-compensated
Flow 1 to 2
1000 psi
3000 psi
5000 psi
LPM
GPM
% Command
FMDA "Spool C"
Full Open
Pressure vs. Flow
Flow 1 to 2
BAR
PSI
GPM
LPM
FMDA "Spool D"
Flow vs. Command
Compensated with LPDC-XHN
Flow 1 to 2
LPM
GPM
% Command
FMDA "Spool D"
Flow vs. Command
Self-compensated
Flow 1 to 2
1000 psi
3000 psi
5000 psi
LPM
GPM
% Command
FMDA "Spool D"
Full Open
Pressure vs. Flow
Flow 1 to 2
BAR
PSI
GPM
LPM



FMDA-XDN-***

Control	Flow Rate	Seal Material	Coil
Standard Options	Standard Options	Standard Options	
			*** See Coil Options Below
M Manual Override	A .1 - 1.6 gpm (0,4 - 6.1 L/min.)	N Buna-N	
T Twist Manual Override	B .1 - 4 gpm (0,4 - 15 L/min.)	V Viton	
X No Manual Override	C .1 - 6 gpm (0,4 - 23 L/min.)		
	D .1 - 9 gpm (0,4 - 34 L/min.)		

Standard Coil Options

					
AMP Junior Timer	Deutsch DT04-2P	DIN 43650 4 pin (Hirschman)	Metri-Pack	SAE J858A	Twin Lead

*** no coil	612 AMP Junior Timer 12 VDC	812 Metri-Pack 12 VDC
212 DIN 43650 4 pin (Hirschman) 12 VDC	624 AMP Junior Timer 24 VDC	824 Metri-Pack 24 VDC
224 DIN 43650 4 pin (Hirschman) 24 VDC	712 Twin Lead 12 VDC	912 Deutsch DT04-2P 12 VDC
524 SAE J858A 24 VDC	724 Twin Lead 24 VDC	924 Deutsch DT04-2P 24 VDC

Embedded Coil Options

2B12A DIN 43650 4 pin (Hirschman) command common on fourth pin 12 VDC 0-20 mA	2C24V DIN 43650 4 pin (Hirschman) +5V reference on fourth pin 24 VDC 0-10V	4A12A Deutsch DT04-6P all functions enabled (separate command common, 5 v reference, and an enable) 12 VDC 0-20 mA
2B12V DIN 43650 4 pin (Hirschman) command common on fourth pin 12 VDC 0-10V	2D12A DIN 43650 4 pin (Hirschman) enable input on fourth pin 12 VDC 0-20 mA	4A12V Deutsch DT04-6P all functions enabled (separate command common, 5 v reference, and an enable) 12 VDC 0-10V
2B24A DIN 43650 4 pin (Hirschman) command common on fourth pin 24 VDC 0-20 mA	2D12V DIN 43650 4 pin (Hirschman) enable input on fourth pin 12 VDC 0-10V	4A24A Deutsch DT04-6P all functions enabled (separate command common, 5 v reference, and an enable) 24 VDC 0-20 mA
2B24V DIN 43650 4 pin (Hirschman) command common on fourth pin 24 VDC 0-10V	2D24A DIN 43650 4 pin (Hirschman) enable input on fourth pin 24 VDC 0-20 mA	4A24V Deutsch DT04-6P all functions enabled (separate command common, 5 v reference, and an enable) 24 VDC 0-10V
2C12A DIN 43650 4 pin (Hirschman) +5V reference on fourth pin 12 VDC 0-20 mA	2D24V DIN 43650 4 pin (Hirschman) enable input on fourth pin 24 VDC 0-10V	4F12V Deutsch DT04-6P programmable ramps, separate rise and fall 12 VDC 0-10V
2C12V DIN 43650 4 pin	2F12V DIN 43650 4 pin	4F24V Deutsch DT04-6P

	(Hirschman) +5V reference on fourth pin 12 VDC 0-10V	(Hirschman) programmable ramps, separate rise and fall 12 VDC 0-10V	programmable ramps, separate rise and fall 24 VDC 0-10V
2C24A	DIN 43650 4 pin (Hirschman) +5V reference on fourth pin 24 VDC 0-20 mA	2F24V	DIN 43650 4 pin (Hirschman) programmable ramps, separate rise and fall 24 VDC 0-10V

Additional Options

Additional Coils

512 SAE J858A 12 VDC

Customer specified setting stamped on hex.