

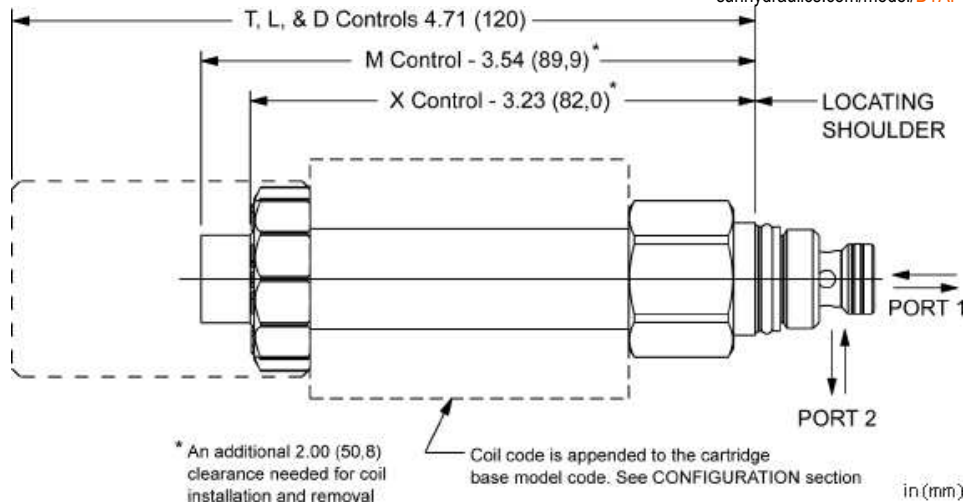
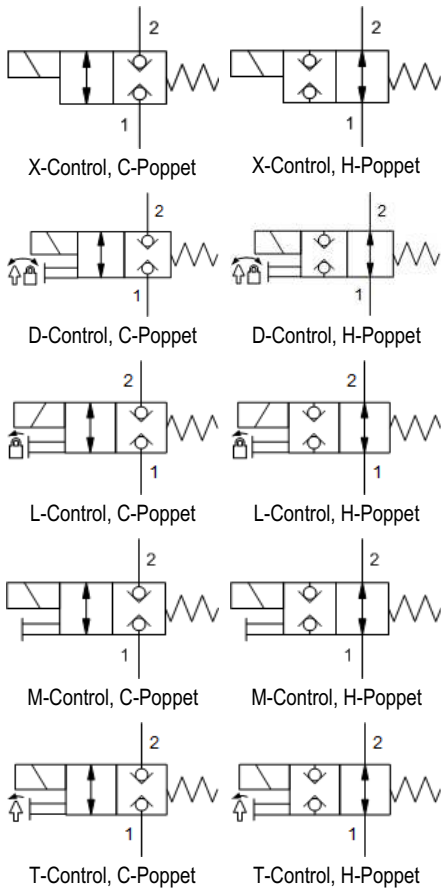
Directional, FLeX Series Cartridges

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DTAF	FLeX Series 2-way, direct-acting, solenoid-operated directional blocking poppet valve1
DTBF	FLeX Series 2-way, direct-acting, solenoid-operated directional blocking poppet valve2
DMBD	FLeX Series 3-way, solenoid-operated directional spool valve - 3000 psi (210 bar)3
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DFBD	FLeX Series 2-way, 2-stage, solenoid-operated directional poppet valve with reverse flow check - flow 2-1, 3000 psi (210 bar)8
DFBE	FLeX Series 2-way, 2-stage, solenoid-operated directional poppet valve with reverse flow check - flow 2-1, 3000 psi (210 bar)9
DFBF	FLeX Series 2-way, 2-stage, solenoid-operated directional poppet valve with reverse flow check - flow 2-110
DFBG	FLeX Series 2-way, 2-stage, solenoid-operated directional poppet valve with reverse flow check - flow 2-111
DTAFS	FLeX Series 2-way, soft shift, solenoid-operated directional poppet valve - pilot capacity12

Series	Ports	Cavities
Series Z Cartridges 3/8-24 UNF Cartridge Thread 5 mm Valve Hex Size 11 - 14 Nm Valve Installation Torque	3-Port	T-382A
Series P Cartridges M16 Cartridge Thread 22,2 mm Valve Hex Size 27 - 33 Nm Valve Installation Torque	2-Port 2-Port (Deep) 3-Port	T-8A T-8DP T-9A
Series 0 Cartridges M16 Cartridge Thread 19,1 mm Valve Hex Size 25,4 mm Valve Hex Size 27 - 33 Nm Valve Installation Torque	2-Port 2-Port (Deep) 3-Port 3-Port 4-Port	T-162A T-162DP T-150A T-163A T-30A
Series 1 Cartridges M20 Cartridge Thread 22,2 mm Valve Hex Size 41 - 47 Nm Valve Installation Torque	2-Port 2-Port 3-Port 4-Port 4-Port 6-Port	T-10A T-13A T-11A T-21A T-31A T-61A
Series 2 Cartridges 1"-14 UNS Cartridge Thread 28,6 mm Valve Hex Size 61 - 68 Nm Valve Installation Torque	2-Port 2-Port 3-Port 4-Port 4-Port 4-Port (Dual path) 6-Port 6-Port	T-3A T-5A T-2A T-22A T-32A T-52AD T-52A T-62A
Series 3 Cartridges M36 Cartridge Thread 31,8 mm Valve Hex Size 203 - 217 Nm Valve Installation Torque	2-Port 3-Port 4-Port 4-Port 4-Port (Dual path) 6-Port 6-Port	T-16A T-17A T-23A T-33A T-53AD T-53A T-63A
Series 4 Cartridges M48 Cartridge Thread 41,3 mm Valve Hex Size 474 - 508 Nm Valve Installation Torque	2-Port 2-Port (Undercut) 3-Port 3-Port (Undercut) 4-Port 4-Port (Undercut) 4-Port 4-Port (Dual path) 6-Port 6-Port	T-18A T-18AU T-19A T-19AU T-24A T-24AU T-34A T-54AD T-54A T-64A



This FLeX Series solenoid-operated 2-way, 2-position cartridge is a direct-acting directional poppet valve. Available in either normally open or normally closed configurations, these valves feature a pressure-balanced design, low leakage, and allow flow or blocking in both directions.

This cartridge can be installed directly into a cavity in the end of many of Sun's pilot operated and ventable valves to provide integrated pilot control.

TECHNICAL DATA

NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

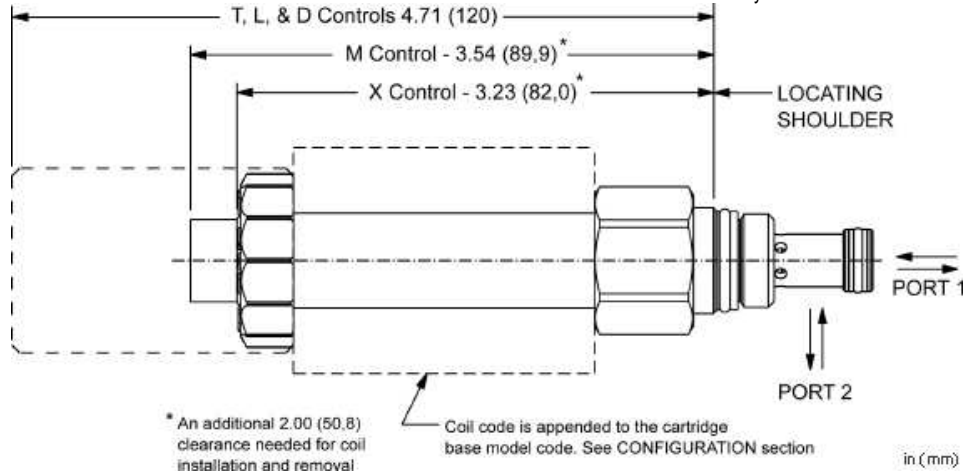
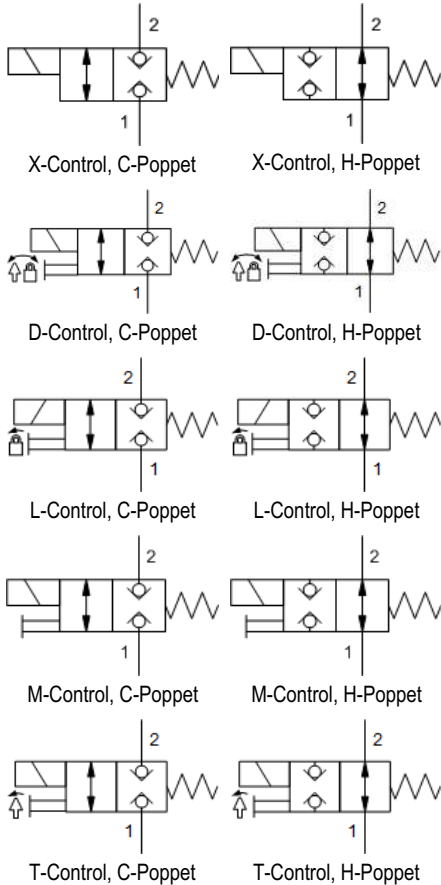
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Viscosity Range	2,8 - 380 cSt
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
U.S. Patent #	10,302,201
Seal kit - Cartridge	Buna: 990608007
Seal kit - Cartridge	Viton: 990608006

- NOTES**
- For Series 1 cartridges configured with an O control (panel mount handknob), a .75 in. (19 mm) diameter hole is required in the panel.
 - Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: DTAFXCN

CONTROL	(X) POPPET CONFIGURATION	(C) SEAL MATERIAL	(N) COIL *
X No Manual Override	C Normally Closed	N Buna-N	No coil
D Twist/Lock (Dual) Manual Override	H Normally Open	E EPDM	* Additional coil options are available
L Twist/Lock (Detent) Manual Override		V Viton	
M Manual Override			
T Twist (Momentary) Manual Override			



This FLeX Series, solenoid-operated 2-way, 2-position cartridge is a direct-acting directional poppet valve. Available in either normally open or normally closed configurations, these valves feature a pressure-balanced design, low leakage, and allow flow or blocking in both directions.

TECHNICAL DATA

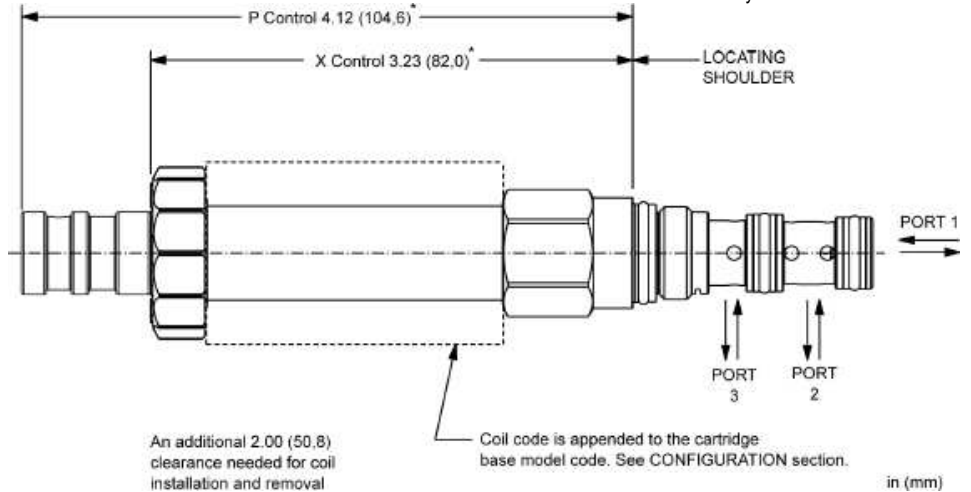
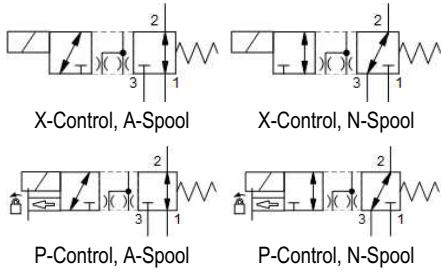
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Viscosity Range	2,8 - 380 cSt
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
U.S. Patent #	10,302,201
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS
Model Code Example: DTBFXCN

CONTROL	(X) POPPET CONFIGURATION	(C) SEAL MATERIAL	(N) COIL *
X No Manual Override	C Normally Closed	N Buna-N	No coil
D Twist/Lock (Dual) Manual Override	H Normally Open	E EPDM	* Additional coil options are available
L Twist/Lock (Detent) Manual Override		V Viton	
M Manual Override			
T Twist (Momentary) Manual Override			



This FLeX Series solenoid-operated 3-way, 2-position cartridge is a direct-acting, balanced spool directional valve.

TECHNICAL DATA

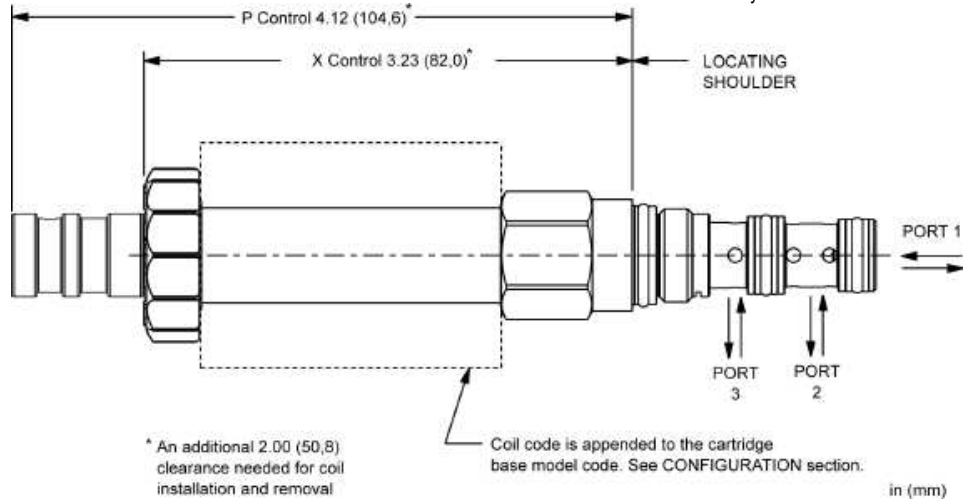
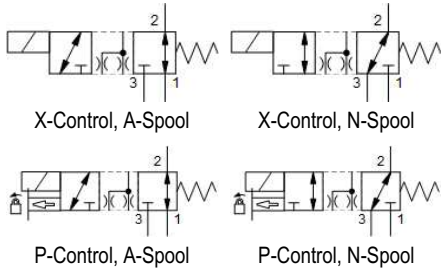
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	210 bar
Typical Valve Leakage at 110 SUS (24 cSt) from port 1 to port 3	50 cc/min.@210 bar
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990150007
Seal kit - Cartridge	Viton: 990150006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS
Model Code Example: DMBDXAN

CONTROL	(X) SPOOL CONFIGURATION	(A) SEAL MATERIAL	(N) COIL *
X No Manual Override	A Normally Open 1 to 2, Closed 2 to 3	N Buna-N	No coil
P Manual Pull Override	N Normally Open 2 to 3, Closed 1 to 2	E EPDM	* Additional coil options are available
		V Viton	



This FLeX Series solenoid-operated 3-way, 2-position cartridge is a direct-acting, balanced spool directional valve.

TECHNICAL DATA

NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

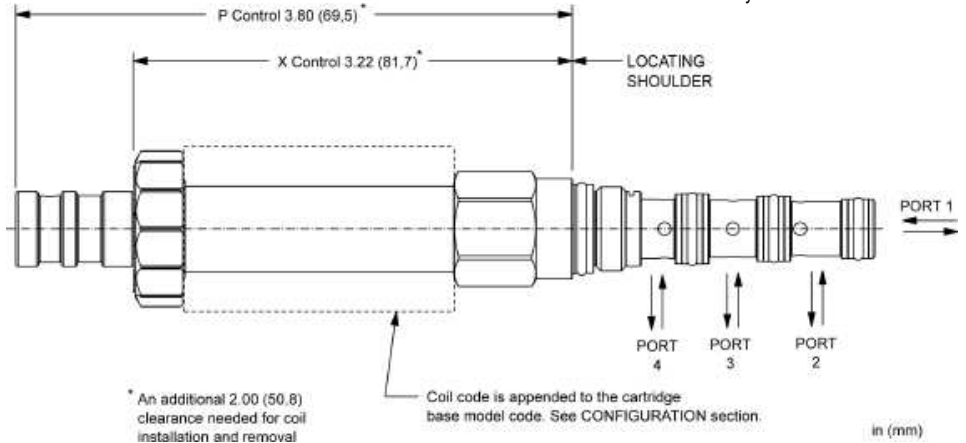
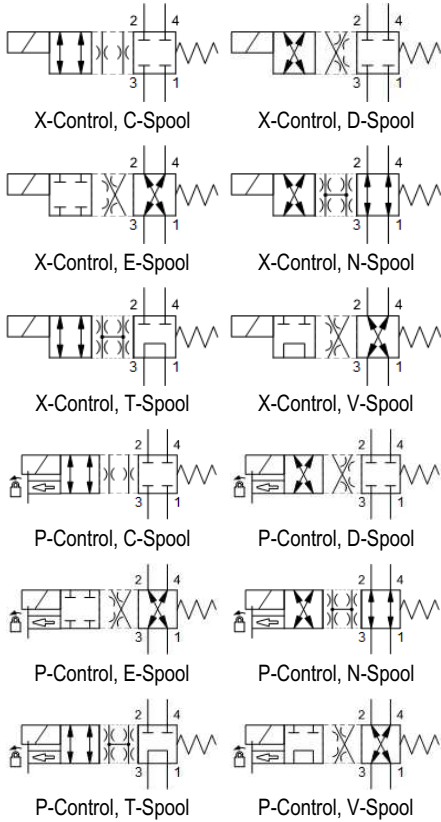
Maximum Operating Pressure	350 bar
Typical Valve Leakage at 110 SUS (24 cSt) Inlet on 1	164 cc/min.@350 bar
Typical Valve Leakage at 110 SUS (24 cSt) Inlet on 2 or 3	82 cc/min.@350 bar
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990150007
Seal kit - Cartridge	Viton: 990150006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: DMBFXAN

CONTROL	(X) SPOOL CONFIGURATION	(A) SEAL MATERIAL	(N) COIL *
X No Manual Override	A Normally Open 1 to 2, Closed 1 to 3	N Buna-N	No coil
P Manual Pull Override	N Normally Open 2 to 3, Closed 1 to 2	E EPDM V Viton	* Additional coil options are available



This FLeX Series solenoid-operated 4-way, 2-position cartridge is a direct-acting, balanced spool directional valve.

TECHNICAL DATA

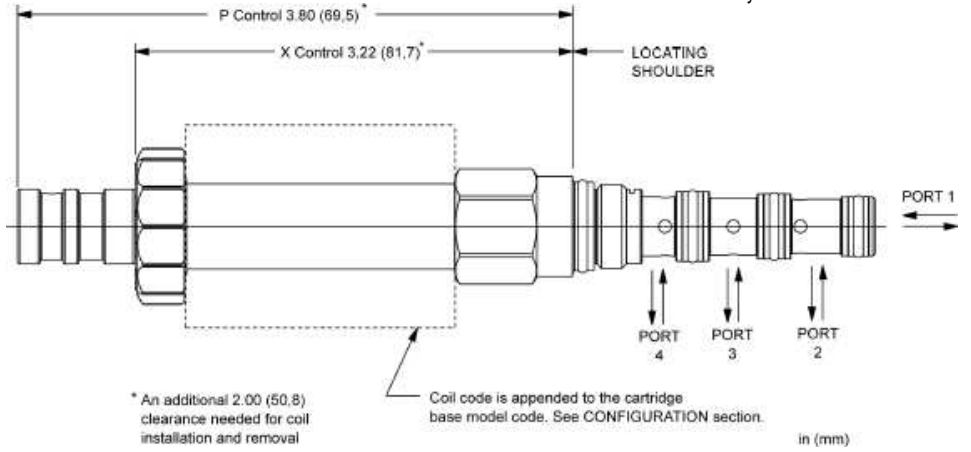
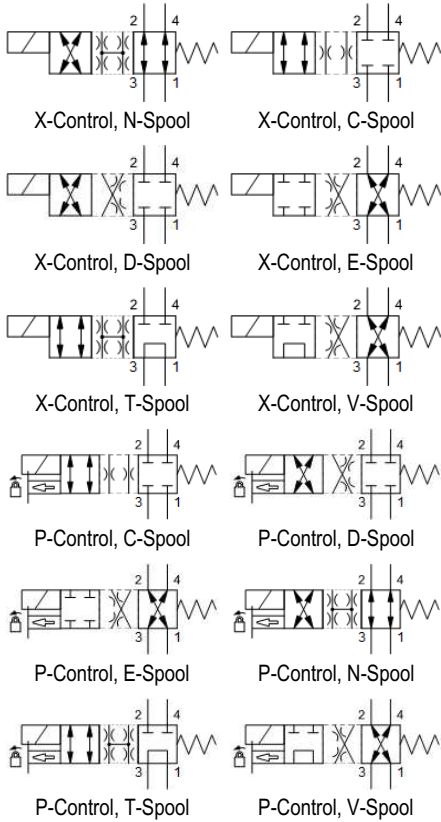
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	210 bar
Typical Valve Leakage at 110 SUS (24 cSt) - Except N Spool	30 cc/min.@210 bar
Typical Valve Leakage at 110 SUS (24 cSt) - N Spool, Inlet on 3	80 cc/min.@210 bar
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990030007
Seal kit - Cartridge	Viton: 990030006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS
Model Code Example: DNBDXCN

CONTROL	(X) SPOOL CONFIGURATION	(C) SEAL MATERIAL	(N) COIL *
X No Manual Override	C Closed, Shift to Through	N Buna-N	No coil
P Manual Pull Override	D Closed, Shift to Cross	V Viton	* Additional coil options are available
	E Cross, Shift to Closed		
	N Through, Shift to Cross		
	T Tandem, Shift to Through		
	V Cross, Shift to Tandem		



This FLeX Series solenoid-operated 4-way, 2-position cartridge is a direct-acting, balanced spool directional valve.

TECHNICAL DATA

NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

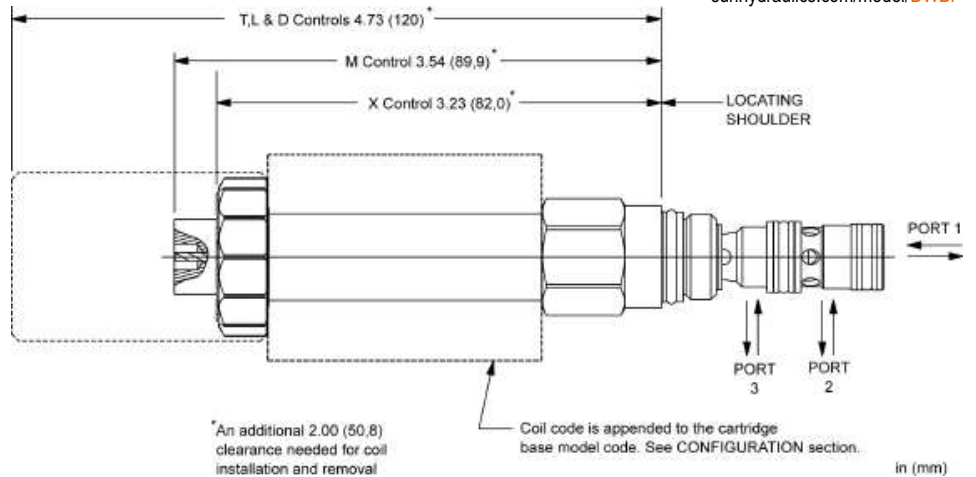
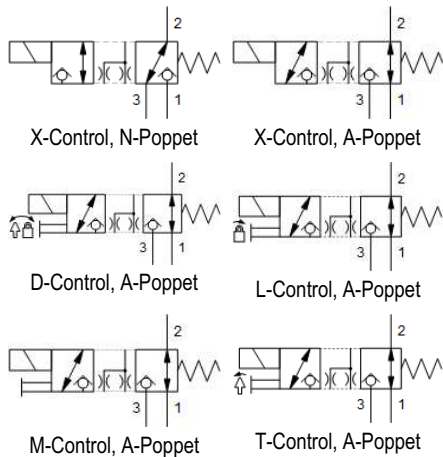
Maximum Operating Pressure	350 bar
Typical Valve Leakage at 110 SUS (24 cSt) - Except N Spool	66 cc/min.@350 bar
Typical Valve Leakage at 110 SUS (24 cSt) - N Spool, Inlet on 3	115 cc/min.@350 bar
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990030007
Seal kit - Cartridge	Viton: 990030006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: DNBFXNN

CONTROL	(X) SPOOL CONFIGURATION	(N) SEAL MATERIAL	(N) COIL *
X No Manual Override	N Through, Shift to Cross	N Buna-N	No coil
P Manual Pull Override	C Closed, Shift to Through	V Viton	* Additional coil options are available
	D Closed, Shift to Cross		
	E Cross, Shift to Closed		
	T Tandem, Shift to Through		
	V Cross, Shift to Tandem		



This FLeX Series solenoid-operated 3-way, 2-position cartridge is a direct-acting, poppet-style directional valve.

Due to the poppet style construction, this valve has extremely low leakage.

TECHNICAL DATA

NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

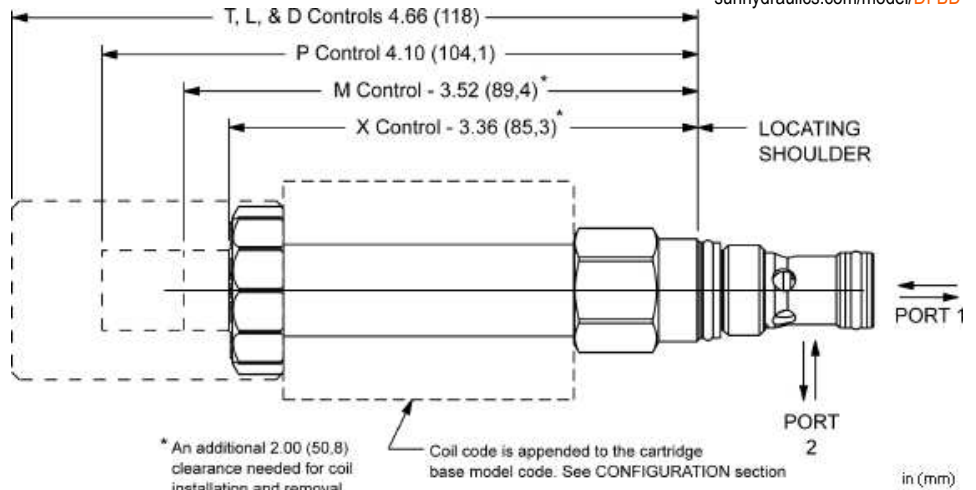
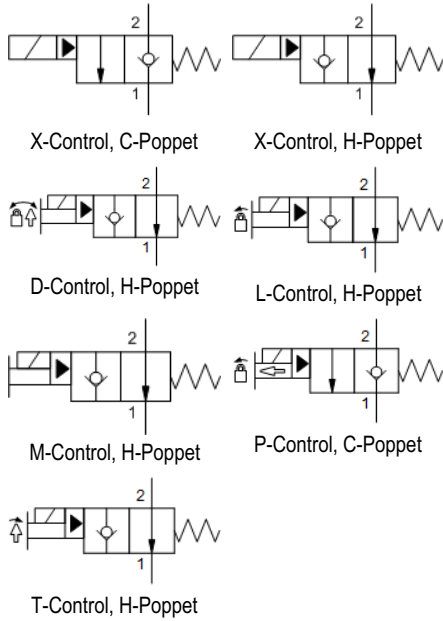
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Response Time - Typical	50 ms
Switching Frequency	10,000 max. cycles/hr
U.S. Patent #	10,302,201
Seal kit - Cartridge	Buna: 990150007
Seal kit - Cartridge	Viton: 990150006

NOTES

- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
- An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.
- Sun Hydraulics bases solenoid valve performance data on testing at maximum ambient temperature (50° C) and 15% undervoltage at stabilized current (580 mA). This ensures that our data represents valve performance under worst-case conditions.

CONFIGURATION OPTIONS
Model Code Example: DWBFXNN

CONTROL	(X)	POPPET CONFIGURATION	(N)	SEAL MATERIAL	(N)	COIL *
X No Manual Override		N Normally Open 2 to 3, Closed 1 to 2		N Buna-N		No coil
D Twist/Lock (Dual) Manual Override		A Normally Open 1 to 2, Closed 2 to 3		E EPDM		* Additional coil options are available
L Twist/Lock (Detent) Manual Override				V Viton		
M Manual Override						
T Twist (Momentary) Manual Override						



This FLeX Series solenoid-operated 2-way, 2-stage cartridge is a pilot-operated directional poppet valve. The valve is low leakage and available in either a normally open or normally closed configuration to control flow from port 2 to port 1. A reverse flow check will allow flow from 1 to 2 in the closed condition. In the open condition, flow from 1 to 2 will cause the valve to auto-close and pilot flow will pass from 1 to 2.

TECHNICAL DATA

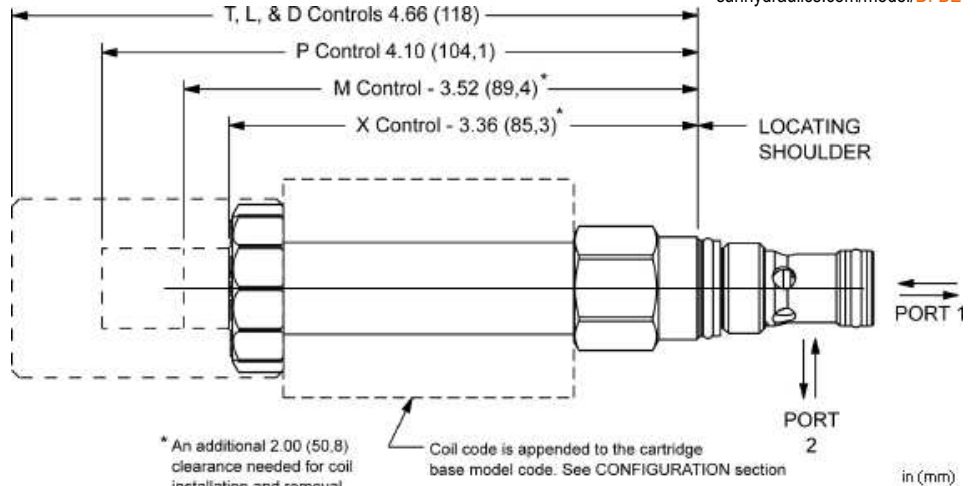
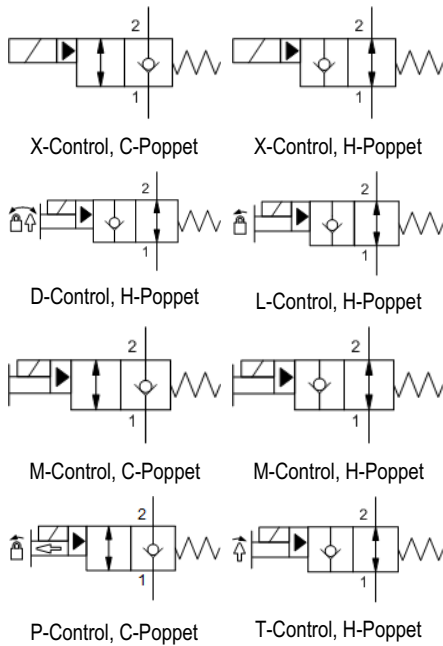
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	210 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min.@210 bar
Check Cracking Pressure	3,5 bar
Viscosity Range	2,8 - 380 cSt
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS
Model Code Example: DFBDXCN

CONTROL	(X) POPPET CONFIGURATION	(C) SEAL MATERIAL	(N) COIL *
X No Manual Override	C Normally Closed	N Buna-N	No coil
D Twist/Lock (Dual) Manual Override	H Normally Open	E EPDM	* Additional coil options are available
L Twist/Lock (Detent) Manual Override		V Viton	
M Manual Override			
P Manual Pull Override			
T Twist (Momentary) Manual Override			



This FLeX Series solenoid-operated 2-way, 2-stage cartridge is a pilot-operated directional poppet valve. The valve is low leakage and available in either a normally open or normally closed configuration to control flow from port 2 to port 1. A reverse flow check will allow flow from 1 to 2 in either the open or closed condition.

TECHNICAL DATA

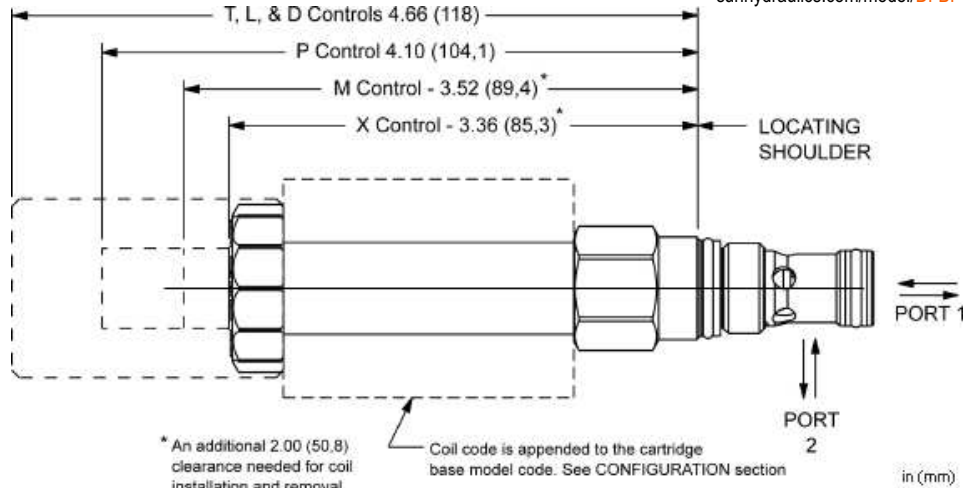
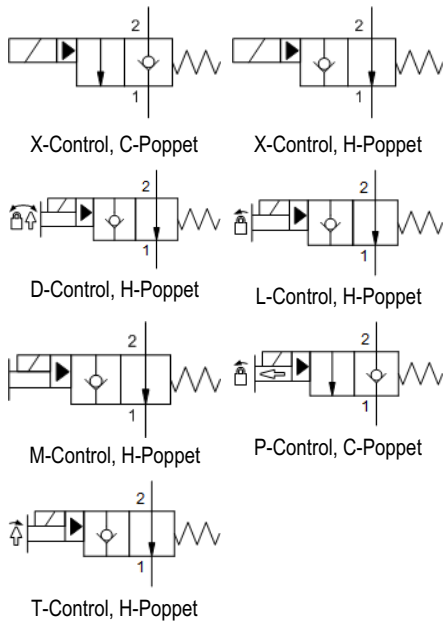
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	210 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @210 bar
Check Cracking Pressure	3,5 bar
Viscosity Range	2,8 - 380 cSt
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS
Model Code Example: DFBEXCN

CONTROL	(X) POPPET CONFIGURATION	(C) SEAL MATERIAL	(N) COIL *
X No Manual Override	C Normally Closed	N Buna-N	No coil
D Twist/Lock (Dual) Manual Override	H Normally Open	E EPDM	* Additional coil options are available
L Twist/Lock (Detent) Manual Override		V Viton	
M Manual Override			
P Manual Pull Override			
T Twist (Momentary) Manual Override			



This FLeX Series solenoid-operated 2-way, 2-stage cartridge is a pilot-operated directional poppet valve. The valve is low leakage and available in either a normally open or normally closed configuration to control flow from port 2 to port 1. A reverse flow check will allow flow from 1 to 2 in the closed condition. In the open condition, flow from 1 to 2 will cause the valve to auto-close and pilot flow will pass from 1 to 2.

TECHNICAL DATA

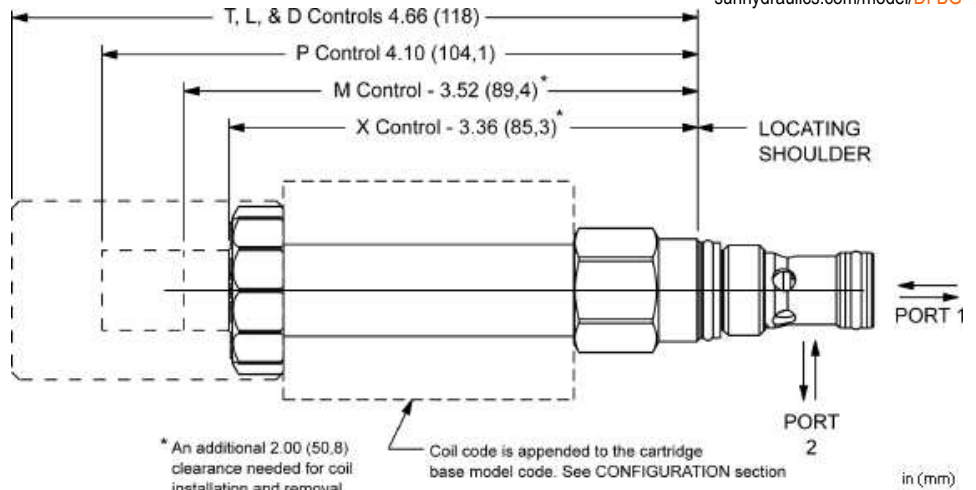
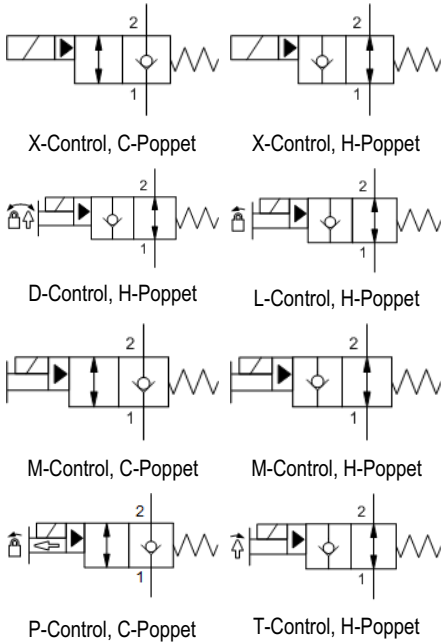
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Check Cracking Pressure	3,5 bar
Viscosity Range	2,8 - 380 cSt
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS
Model Code Example: DFBFXCN

CONTROL	(X)	POPPET CONFIGURATION	(C)	SEAL MATERIAL	(N)	COIL *
X No Manual Override		C Normally Closed		N Buna-N		No coil
D Twist/Lock (Dual) Manual Override		H Normally Open		E EPDM		* Additional coil options are available
L Twist/Lock (Detent) Manual Override				V Viton		
M Manual Override						
P Manual Pull Override						
T Twist (Momentary) Manual Override						



This FLeX Series solenoid-operated 2-way, 2-stage cartridge is a pilot-operated directional poppet valve. The valve is low leakage and available in either a normally open or normally closed configuration to control flow from port 2 to port 1. A reverse flow check will allow flow from 1 to 2 in either the open or closed condition.

TECHNICAL DATA

NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

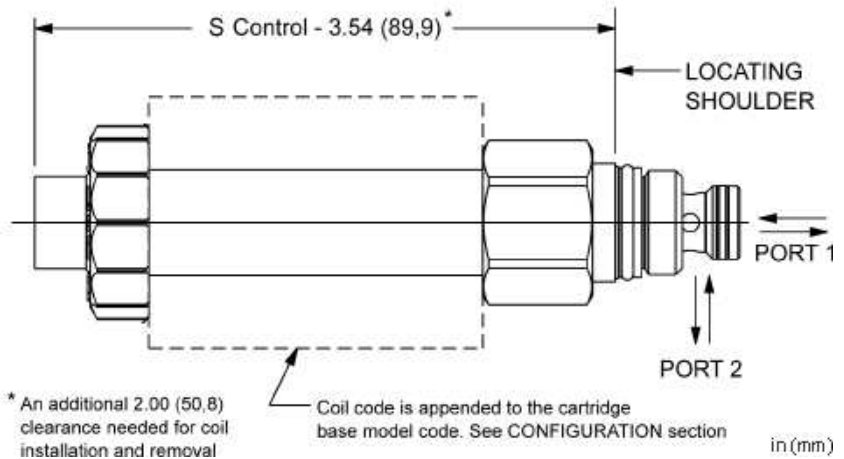
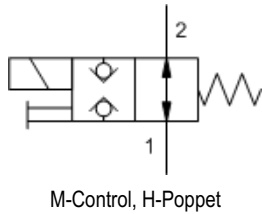
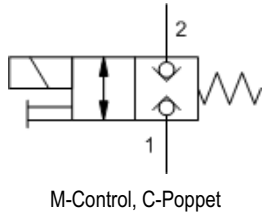
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Check Cracking Pressure	3,5 bar
Viscosity Range	2,8 - 380 cSt
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: DFBGXCN

CONTROL	(X) POPPET CONFIGURATION	(C) SEAL MATERIAL	(N) COIL *
X No Manual Override	C Normally Closed	N Buna-N	No coil
D Twist/Lock (Dual) Manual Override	H Normally Open	E EPDM	* Additional coil options are available
L Twist/Lock (Detent) Manual Override		V Viton	
M Manual Override			
P Manual Pull Override			
T Twist (Momentary) Manual Override			



This FLeX Series, solenoid-operated 2-way, 2-position cartridge is a direct-acting directional poppet valve with a soft shift feature. Available in either normally open or normally closed configurations, these valves feature a pressure-balanced design, low leakage, and allow flow or blocking in both directions.

This cartridge can be installed directly into a cavity in the end of many of Sun's pilot operated and ventable valves to provide integrated pilot control.

TECHNICAL DATA

NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min.@350 bar
Manual Override Force Requirement	66 N/100 bar @ Port 1
Viscosity Range	2,8 - 380 cSt
Seal kit - Cartridge	Buna: 990608007
Seal kit - Cartridge	Viton: 990608006

CONFIGURATION OPTIONS

Model Code Example: DTAFSCN

POPPET CONFIGURATION	(C)	SEAL MATERIAL	(N)	COIL *
C Normally Closed		N Buna-N		No coil
H Normally Open		V Viton		* Additional coil options are available

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