

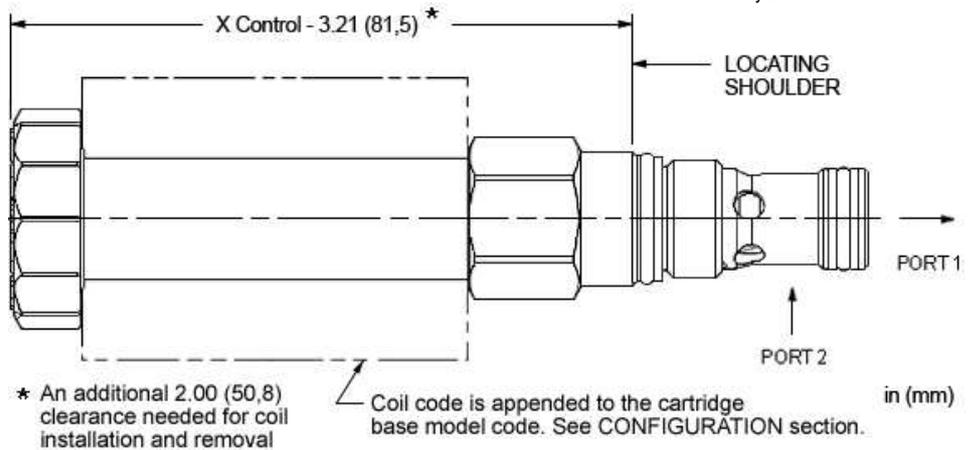
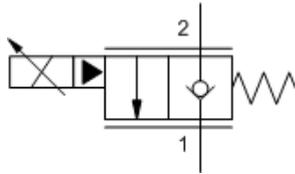
Flow Control, FLeX Series Cartridges

*Powered by Sun **QuickPrint**,
your on-demand, customized catalogue solution.*

This information is subject to change without notice. Visit www.sunhydraulics.com for complete and up to date information.

FPBD	FLeX Series pilot-operated, normally closed, electro-proportional throttle - flow 2-1 - 3000 psi (210 bar)1
FPBE	FLeX Series pilot-operated, normally closed, electro-proportional throttle with reverse flow check - flow 2-1 - 3000 psi (210 bar)2
FPBF	FLeX Series pilot-operated, normally closed, electro-proportional throttle - flow 2-13
FPBG	FLeX Series pilot-operated, normally closed, electro-proportional throttle with reverse flow check - flow 2-14
FPBI	FLeX Series pilot-operated, normally open, electro-proportional throttle - flow 2-15
FPBJ	FLeX Series pilot-operated, normally open, electro-proportional throttle with reverse flow check - flow 2-16
FPBM	FLeX Series pilot-operated, normally open, electro-proportional throttle - flow 2-1 - 3000 psi (210 bar)7
FPBN	FLeX Series pilot-operated, normally open, electro-proportional throttle with reverse flow check - flow 2-1 - 3000 psi (210 bar)8
FPBU	FLeX Series electro-proportional, blocking poppet throttle - normally closed9

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 valve is a pilot-operated, normally closed, electro-proportional throttle with reverse free-flow check. Energizing the coil generates an opening force on the pilot stage which vents the main stage poppet to open proportionally, allowing flow from port 2 to 1. In the open condition, flow from 1 to 2 will cause the valve to auto-close and only pilot flow will pass from 1 to 2.

TECHNICAL DATA

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

Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	210 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min.@210 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

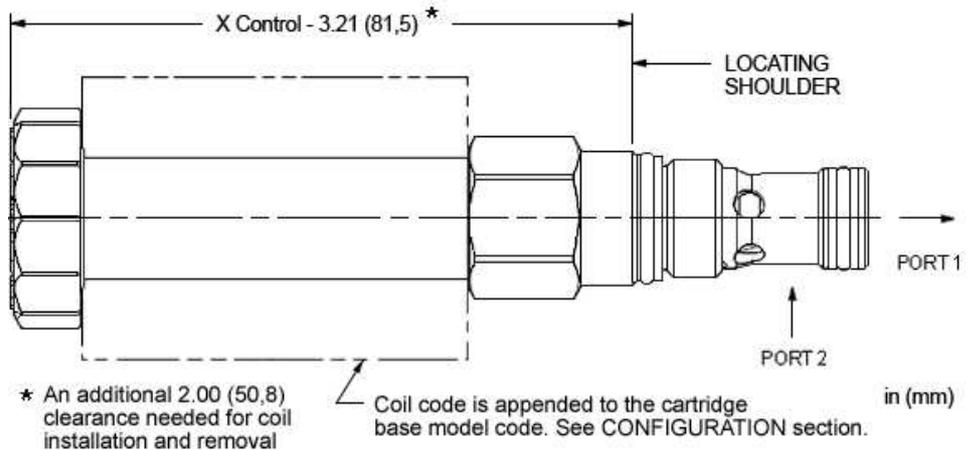
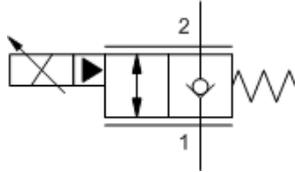
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: FPBDXDN

CONTROL	(X) FLOW RATE	(D) SEAL MATERIAL	(N) COIL *
X No Manual Override	D Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)	N Buna-N V Viton	No coil

* Additional coil options are available



This valve is a pilot-operated, normally closed, electro-proportional throttle with reverse free-flow check. Energizing the coil generates an opening force on the pilot stage which vents the main stage poppet to open proportionally, allowing flow from port 2 to 1. The 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.

Hysteresis (with dither)	15%
Linearity (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	210 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @210 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

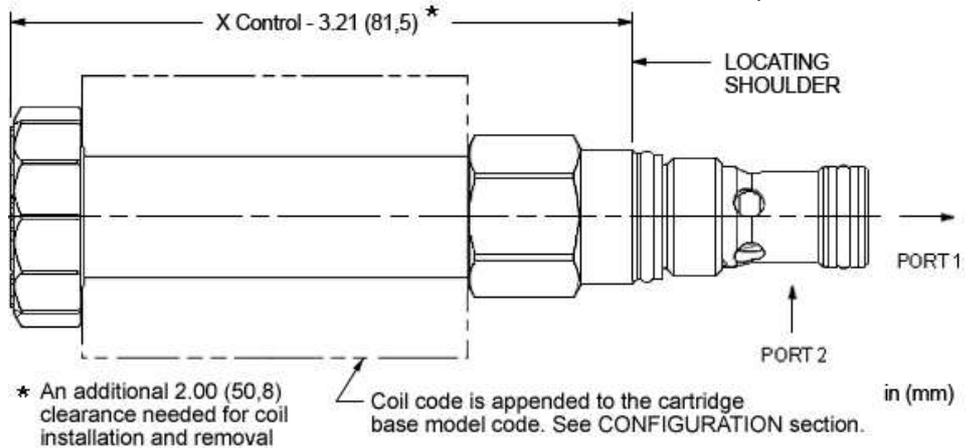
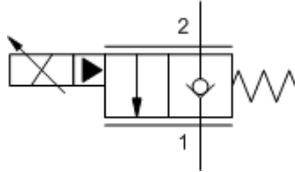
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: FPBEXDN

CONTROL	(X)	FLOW RATE	(D)	SEAL MATERIAL	(N)	COIL *
X No Manual Override		D Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)		N Buna-N V Viton		No coil

* Additional coil options are available



This valve is a pilot-operated, normally closed, electro-proportional throttle with reverse free-flow check. Energizing the coil generates an opening force on the pilot stage which vents the main stage poppet to open proportionally, allowing flow from port 2 to 1. In the open condition, flow from 1 to 2 will cause the valve to auto-close and only pilot flow will pass from 1 to 2.

TECHNICAL DATA

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

Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	350 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

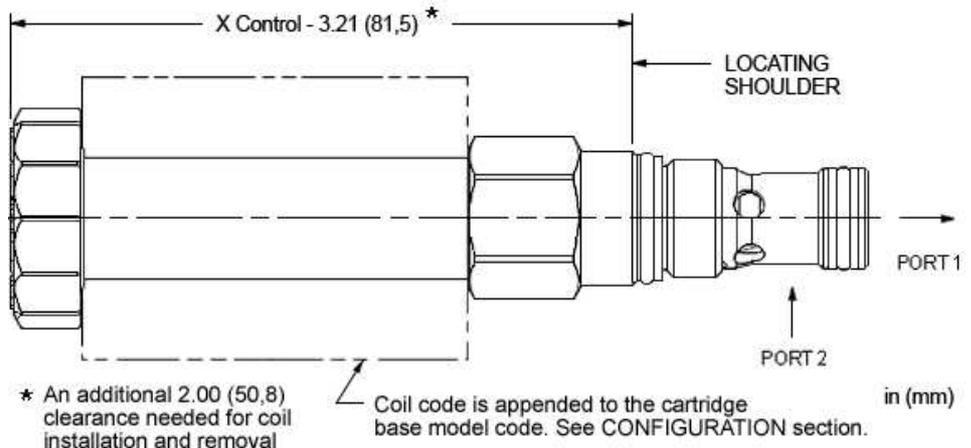
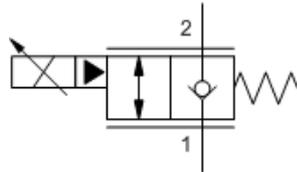
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: FPBFXDN

CONTROL	(X) FLOW RATE	(D) SEAL MATERIAL	(N) COIL *
X No Manual Override	D Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)	N Buna-N V Viton	No coil

* Additional coil options are available



This valve is a pilot-operated, normally closed, electro-proportional throttle with reverse free-flow check. Energizing the coil generates an opening force on the pilot stage which vents the main stage poppet to open proportionally, allowing flow from port 2 to 1. The 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.

Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

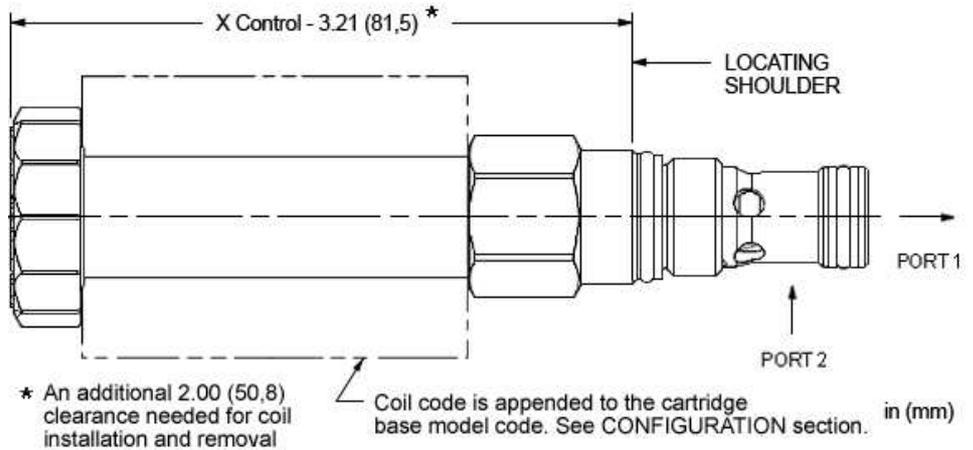
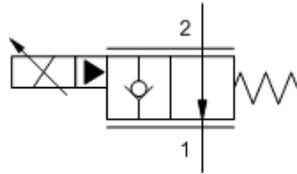
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: FPBGXDN

CONTROL	(X) FLOW RATE	(D) SEAL MATERIAL	(N) COIL *
X No Manual Override	D Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)	N Buna-N V Viton	No coil

* Additional coil options are available



This valve is a pilot-operated, normally open, electro-proportional throttle with reverse free-flow check. Energizing the coil generates a closing force on the pilot stage which pushes the main stage poppet against the seat, proportionally blocking flow from port 2 to 1. In the open condition, flow from 1 to 2 will cause the valve to auto-close and only pilot flow will pass from 1 to 2.

TECHNICAL DATA

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

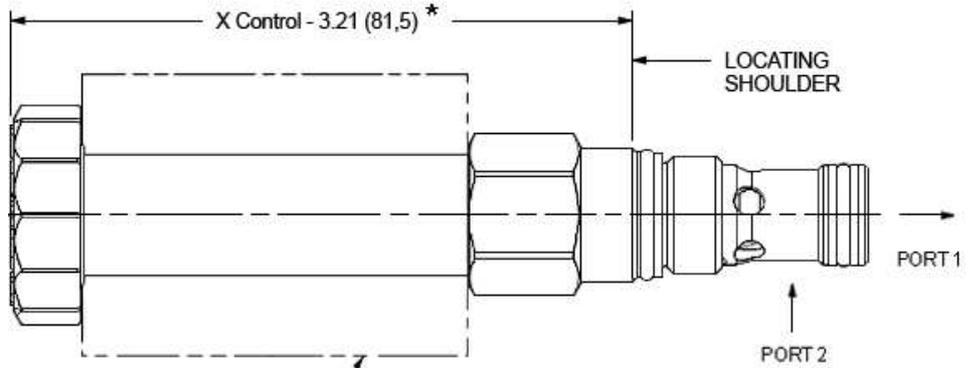
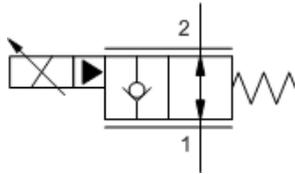
Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
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: FPBIXDN

CONTROL	(X)	FLOW RATE	(D)	SEAL MATERIAL	(N)	COIL *
X No Manual Override		D Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)		N Buna-N V Viton		No coil * Additional coil options are available



This valve is a pilot-operated, normally open, electro-proportional throttle with reverse free-flow check. Energizing the coil generates a closing force on the pilot stage which pushes the main stage poppet against the seat, proportionally blocking flow from port 2 to 1. The 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.

Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

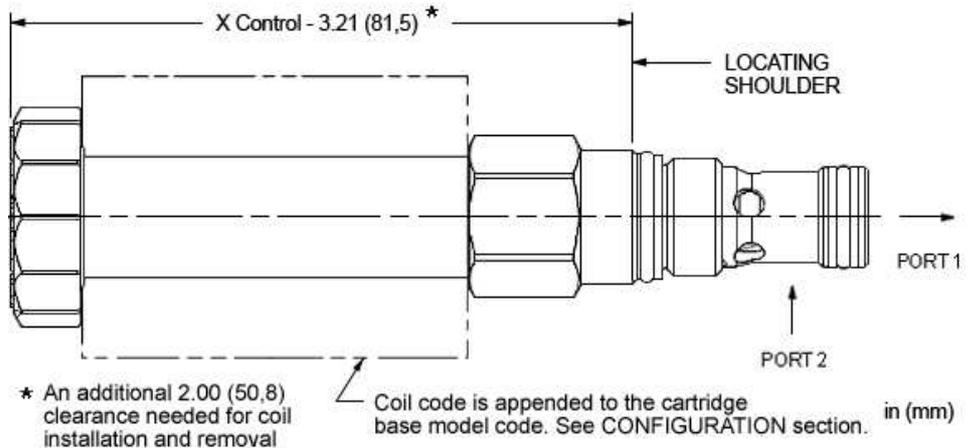
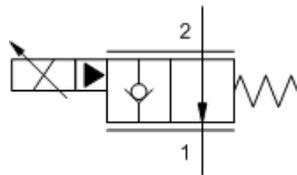
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: FPBJXDN

CONTROL	(X) FLOW RATE	(D) SEAL MATERIAL	(N) COIL *
X No Manual Override	D Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)	N Buna-N V Viton	No coil

* Additional coil options are available



This valve is a pilot-operated, normally open, electro-proportional throttle with reverse free-flow check. Energizing the coil generates a closing force on the pilot stage which pushes the main stage poppet against the seat, proportionally blocking flow from port 2 to 1. In the open condition, flow from 1 to 2 will cause the valve to auto-close and only pilot flow will pass from 1 to 2.

TECHNICAL DATA

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

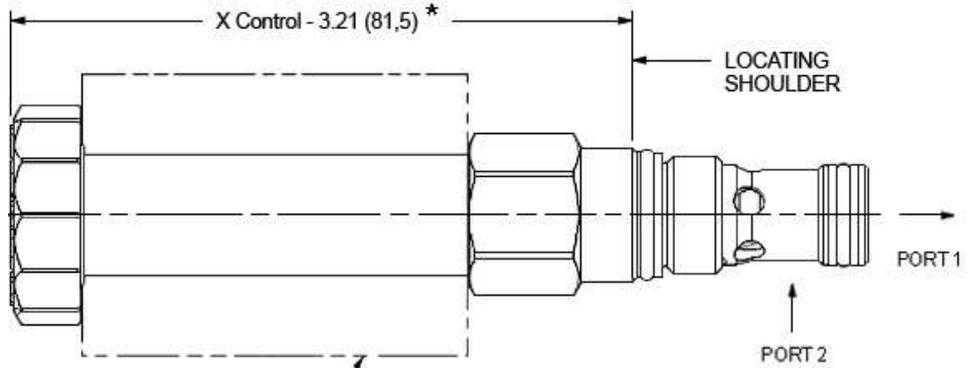
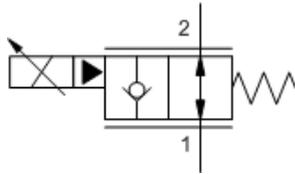
Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	210 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @210 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
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: FPBMXDN

CONTROL	(X)	FLOW RATE	(D)	SEAL MATERIAL	(N)	COIL *
X No Manual Override		D Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)		N Buna-N V Viton		No coil

* Additional coil options are available



This valve is a pilot-operated, normally open, electro-proportional throttle with reverse free-flow check. Energizing the coil generates a closing force on the pilot stage which pushes the main stage poppet against the seat, proportionally blocking flow from port 2 to 1. The 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.

Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	210 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @210 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

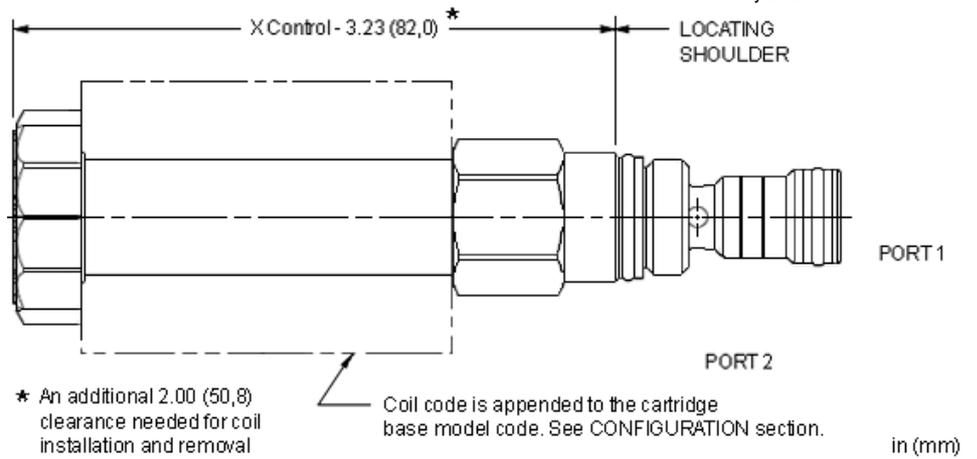
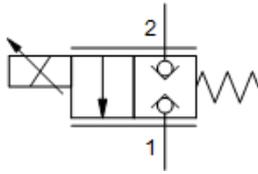
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
 - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

CONFIGURATION OPTIONS

Model Code Example: FPBNXDN

CONTROL	(X) FLOW RATE	(D) SEAL MATERIAL	(N) COIL *
X No Manual Override	D Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)	N Buna-N V Viton	No coil

* Additional coil options are available



This valve is a normally closed, electro-proportional, blocking poppet throttle that is spring-biased closed. Energizing the coil generates an opening force on the poppet proportional to the command current, and this force is countered by the spring and flow forces. This force balance creates a metering orifice whose effective size is proportional to the current. The valve exhibits a large degree of self-compensation in the 2-to-1 direction and will provide proportional flow control in the 1-to-2 direction with the addition of an external compensator. Full reverse flow (1-to-2) with 100% command in the 1-to-2 direction is possible without a compensator under all conditions.

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: **FPBUXCN**

CONTROL	(X) FLOW RATE	(C) SEAL MATERIAL	(N) COIL *
X No Manual Override	C Nominal 2.6 gpm @ 200 psi (14 bar) differential (9.8 L/min) (9.8 L/min.)	N Buna-N	No coil
M Manual Override		V Viton	* Additional coil options are available

smart SOLUTIONS for DEMANDING applications



www.sunhydraulics.com

Sun Hydraulics Headquarters
Sarasota, Florida USA
+1 941 362 1200

Sun Hydraulics Limited
Coventry England
+44 2476 217 400
sales@sunuk.com

Sun Hydraulik GmbH
Erkelenz Germany
+49 2431 80910
sales@sunhydraulik.de

Sun Hydraulics Corp. (India)
Bangalore India
+91 8028 456325
sunindiainfo@sunhydraulics.com

Sun Hydraulics Korea Corp.
Incheon Korea
+82 3281 31350
sales@sunhydraulics.co.kr

Sun Hydraulics China Co. Ltd.
Shanghai P.R. China
+86 2162 375885
sunchinainfo@sunhydraulics.com

Sun Hydraulics Corp. (S.America)
Rosario, Argentina
+54 9 341 584 3075
ventas@sunhydraulics.com