

# Flow Control, Flow Control Cartridges

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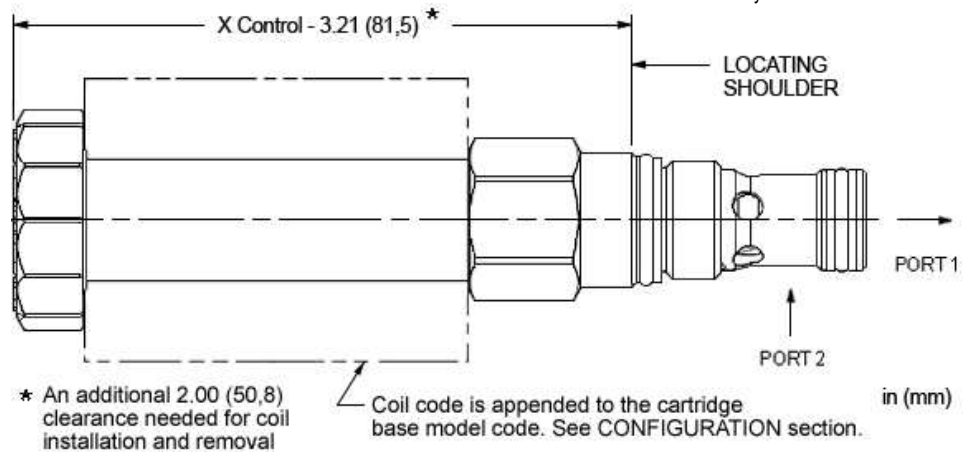
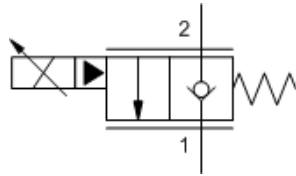
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FPBD	FLeX Series pilot-operated, normally closed, electro-proportional throttle - flow 2-1 - 3000 psi (210 bar)	.....1
FPBE	FLeX Series pilot-operated, normally closed, electro-proportional throttle with reverse flow check - flow 2-1 - 3000 psi (210 bar)	.....2
FPBF	FLeX Series pilot-operated, normally closed, electro-proportional throttle - flow 2-1	.....3
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Series	Ports	Cavities
<b>Series Z Cartridges</b> 3/8-24 UNF Cartridge Thread 5 mm Valve Hex Size 11 - 14 Nm Valve Installation Torque	3-Port	T-382A
<b>Series P Cartridges</b> 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
<b>Series 0 Cartridges</b> 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
<b>Series 1 Cartridges</b> 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
<b>Series 2 Cartridges</b> 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
<b>Series 3 Cartridges</b> 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
<b>Series 4 Cartridges</b> 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.

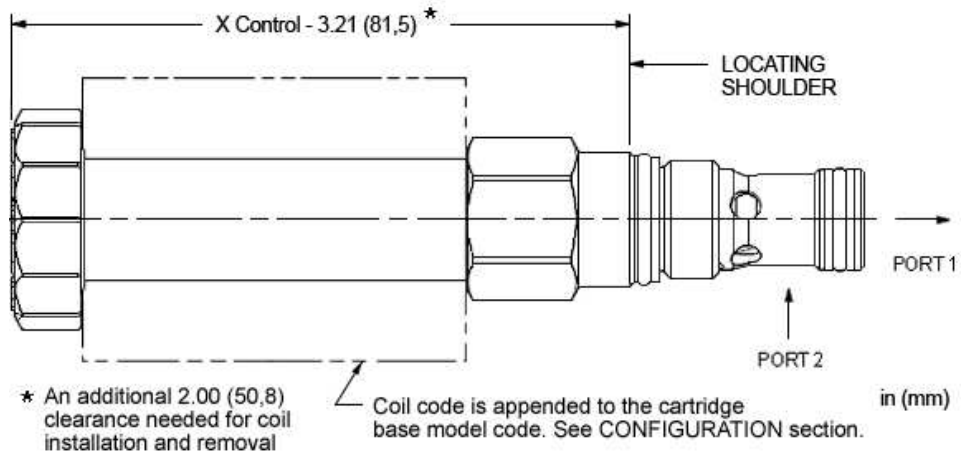
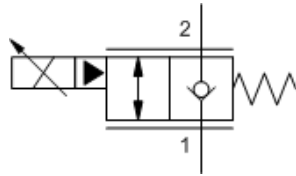
Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	210 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min.@210 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as 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 *
<b>X</b> No Manual Override	<b>D</b> Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)	<b>N</b> Buna-N <b>V</b> Viton	<b>No coil</b>

\* 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.

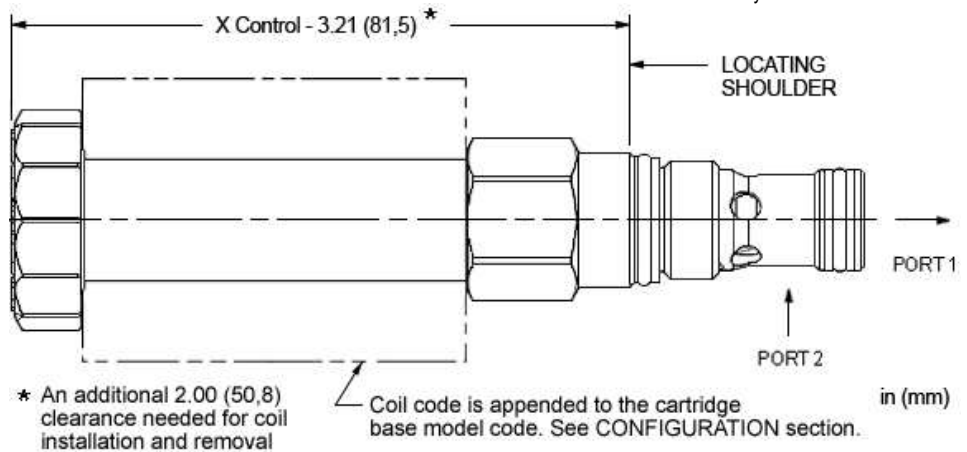
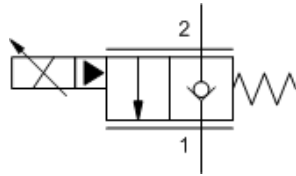
Hysteresis (with dither)	15%
Linearity (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	210 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @210 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as a percentage of input)	48%
Response 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 *
<b>X</b> No Manual Override		<b>D</b> Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)		<b>N</b> 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.

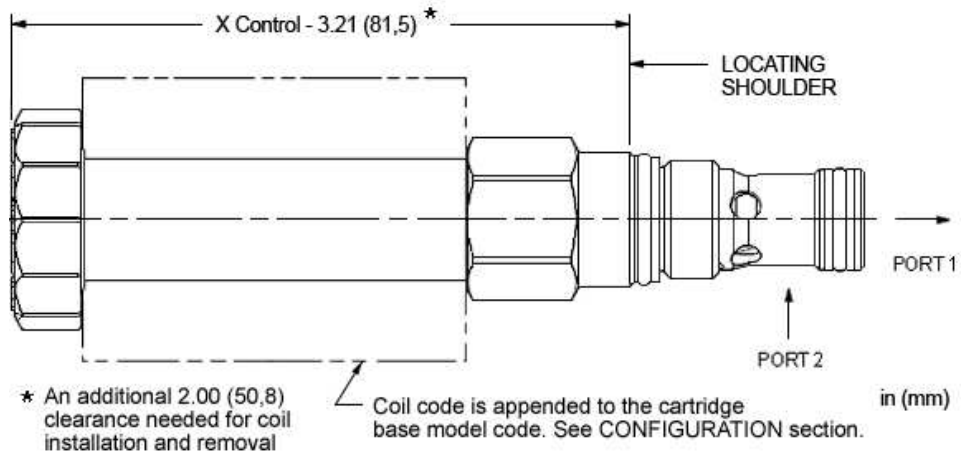
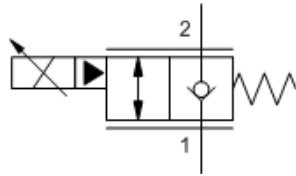
**CONFIGURATION OPTIONS**

**Model Code Example: FPBFXDN**

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

\* 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.

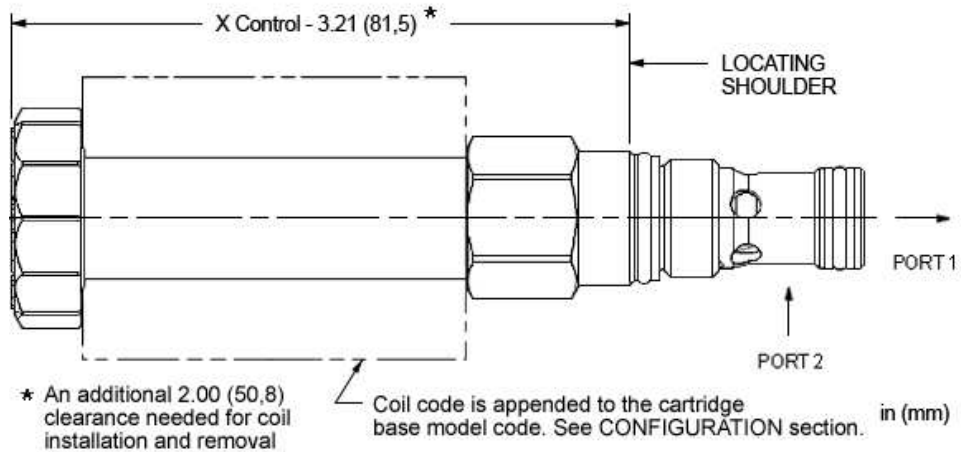
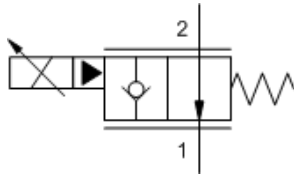
Hysteresis (with dither)	15%
Linearity (with dither)	3%
Repeatability (with dither)	3%
Recommended dither frequency	140 Hz
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Check Cracking Pressure	7 bar
Viscosity Range	2,8 - 380 cSt
Deadband, nominal (as 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 *
<b>X</b> No Manual Override	<b>D</b> Nominal 5 gpm @ 200 psi (14 bar) differential (20 L/min.)	<b>N</b> Buna-N <b>V</b> 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

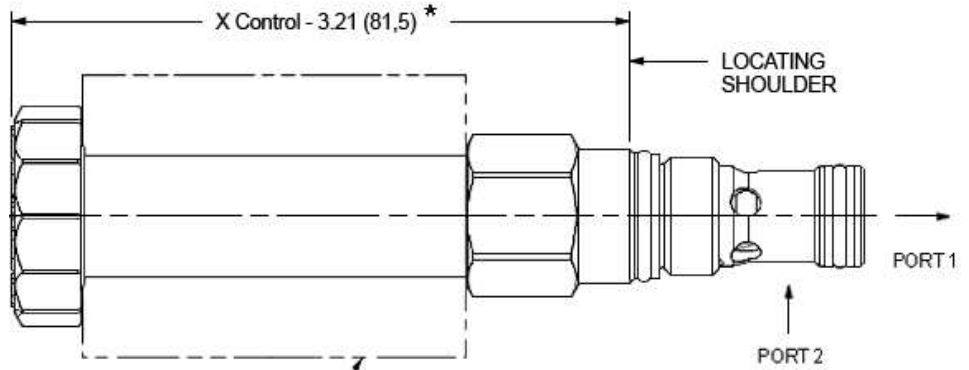
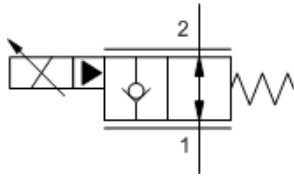
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
  - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

**CONFIGURATION OPTIONS**

**Model Code Example: FPBIXDN**

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

\* Additional coil options are available



\* An additional 2.00 (50,8) clearance needed for coil installation and removal

Coil code is appended to the cartridge base model code. See CONFIGURATION section. in (mm)

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

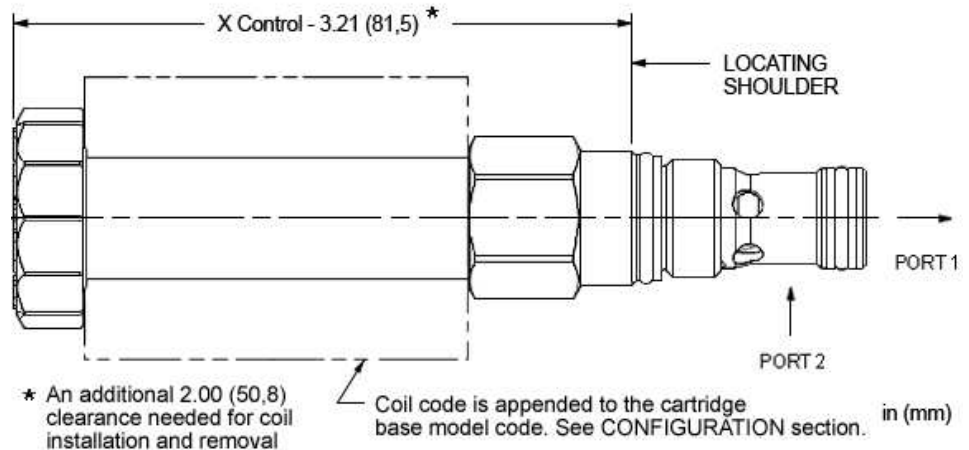
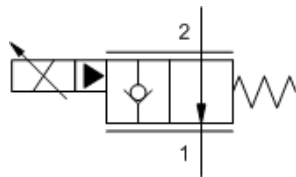
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
  - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

**CONFIGURATION OPTIONS**

**Model Code Example: FPBJXDN**

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

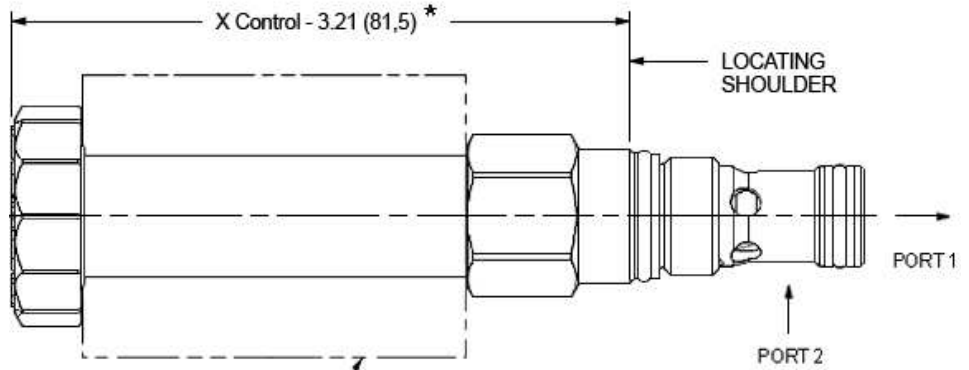
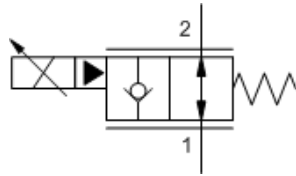
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
  - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

**CONFIGURATION OPTIONS**

**Model Code Example: FPBMXDN**

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

\* Additional coil options are available



\* An additional 2.00 (50,8) clearance needed for coil installation and removal  
Coil code is appended to the cartridge base model code. See CONFIGURATION section. in (mm)

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

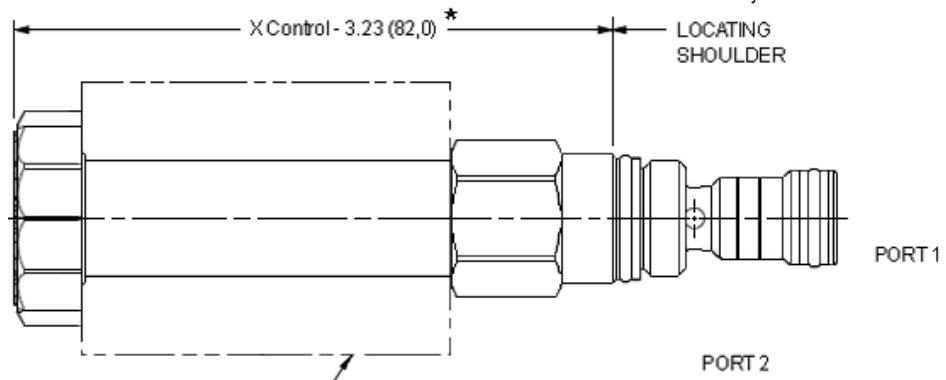
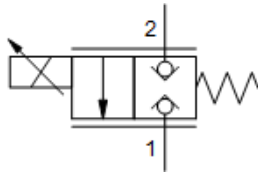
- NOTES**
- Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.
  - An additional 2.00 inches (50,8 mm) beyond the valve extension is needed for coil installation and removal.

**CONFIGURATION OPTIONS**

**Model Code Example: FPBNXDN**

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

\* Additional coil options are available



\* An additional 2.00 (50,8) clearance needed for coil installation and removal  
Coil code is appended to the cartridge base model code. See CONFIGURATION section.  
in (mm)

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.

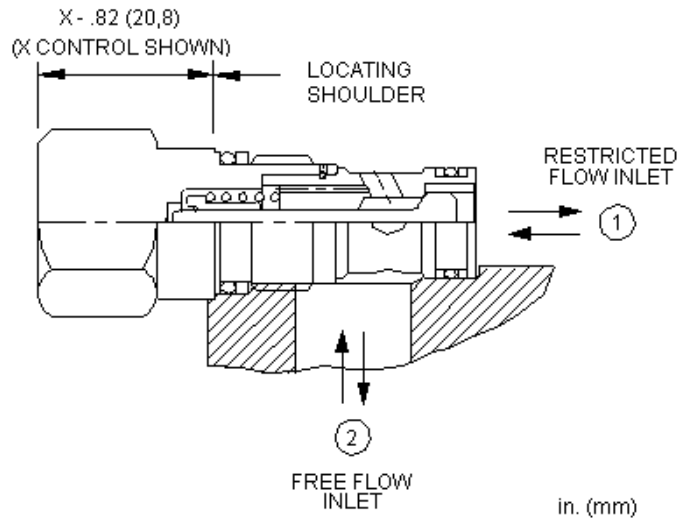
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,07 cc/min. @350 bar
Viscosity Range	2,8 - 380 cSt
Response Time - Typical	50 ms
Switching Frequency	15,000 max. cycles/hr
U.S. Patent #	10,302,201
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Viton: 990162006

- 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 *
<b>X</b> No Manual Override M Manual Override	<b>C</b> Nominal 2.6 gpm @ 200 psi (14 bar) differential (9.8 L/min) (9,8 L/min.)	<b>N</b> Buna-N V Viton	No coil * Additional coil options are available



This valve is a fixed-orifice, non-pressure-compensated flow control with a reverse flow check. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

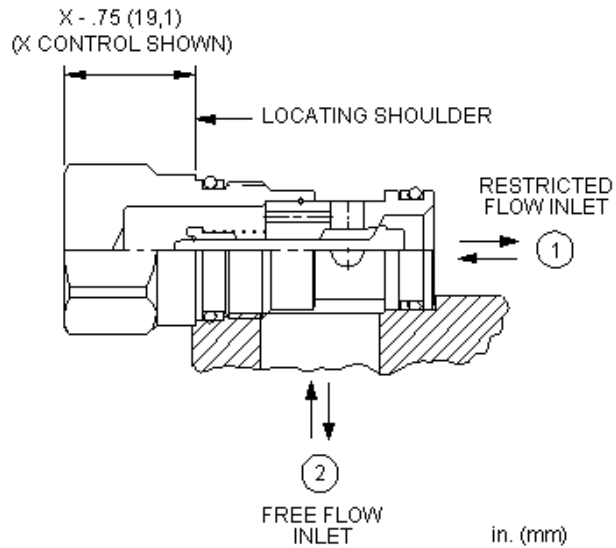
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Orifice Range	0,4 - 1,6 mm
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Polyurethane: 990162002
Seal kit - Cartridge	Viton: 990162006

**CONFIGURATION OPTIONS**

**Model Code Example: CNACXCN**

CONTROL	(X) SETTING RANGE	(C) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>C</b> 30 psi (2 bar) Cracking Pressure, .016 - .062 in. (0,4 - 1,6 mm) <b>A</b> 4 psi (0,3 bar) Cracking Pressure, .016 - .062 in. (0,4 - 1,6 mm) <b>E</b> 75 psi (5 bar) Cracking Pressure, .016 - .062 in. (0,4 - 1,6 mm)	<b>N</b> Buna-N <b>V</b> Viton	Standard Material/Coating <b>/AP</b> Stainless Steel, Passivated <b>/LH</b> Mild Steel, Zinc-Nickel



This valve is a fixed-orifice, non-pressure-compensated flow control with a reverse flow check. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

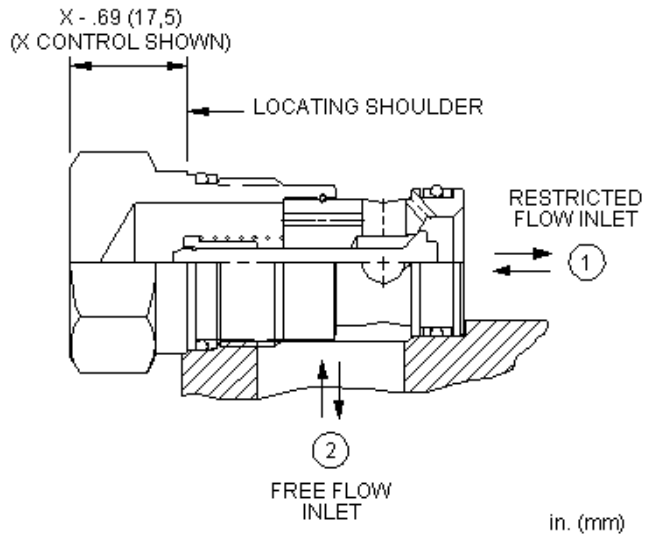
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Orifice Range	0,4 - 3,9 mm
Seal kit - Cartridge	Buna: 990010007
Seal kit - Cartridge	Polyurethane: 990010002
Seal kit - Cartridge	Viton: 990010006

**CONFIGURATION OPTIONS**
**Model Code Example: CNCCXCN**

<b>CONTROL</b>	<b>(X) SETTING RANGE</b>	<b>(C) SEAL MATERIAL</b>	<b>(N) MATERIAL/COATING</b>
<b>X</b> Not Adjustable	<b>C</b> 30 psi (2 bar) Cracking Pressure, .016 - .153 in. (0,4 - 3,9 mm) <b>A</b> 4 psi (0,3 bar) Cracking Pressure, .016 - .153 in. (0,4 - 3,9 mm) <b>B</b> 15 psi (1 bar) Cracking Pressure, .016 - .153 in. (0,4 - 3,9 mm) <b>D</b> 50 psi (3,5 bar) Cracking Pressure, .016 - .153 in. (0,4 - 3,9 mm) <b>E</b> 75 psi (5 bar) Cracking Pressure, .016 - .153 in. (0,4 - 3,9 mm) <b>F</b> 100 psi (7 bar) Cracking Pressure, .016 - .153 in. (0,4 - 3,9 mm)	<b>N</b> Buna-N <b>V</b> Viton	Standard Material/Coating /AP Stainless Steel, Passivated /LH Mild Steel, Zinc-Nickel





This valve is a fixed-orifice, non-pressure-compensated flow control with a reverse flow check. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

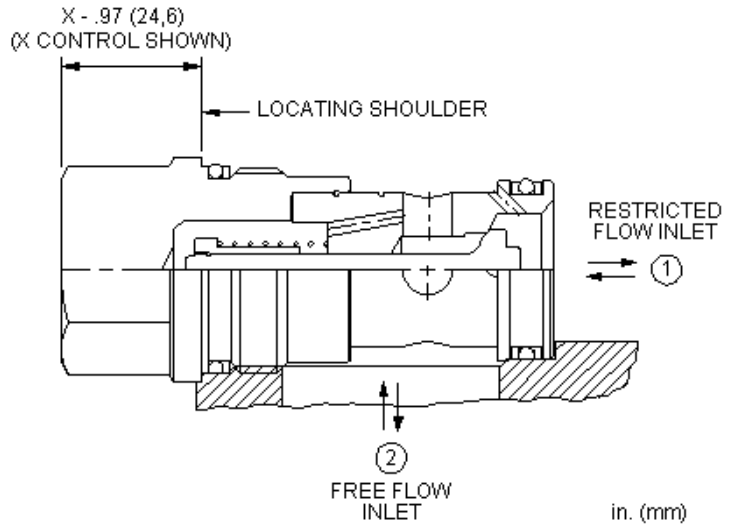
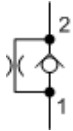
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Orifice Range	0,4 - 3,4 mm
Seal kit - Cartridge	Buna: 990203007
Seal kit - Cartridge	Viton: 990203006

**CONFIGURATION OPTIONS**

**Model Code Example: CNECXCN**

CONTROL	(X) SETTING RANGE	(C) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>C</b> 30 psi (2 bar) Cracking Pressure, .016 - .135 in. (0,4 - 3,4 mm) <b>A</b> 4 psi (0,3 bar) Cracking Pressure, .016 - .135 in. (0,4 - 3,4 mm) <b>B</b> 15 psi (1 bar) Cracking Pressure, .016 - .135 in. (0,4 - 3,4 mm) <b>D</b> 50 psi (3,5 bar) Cracking Pressure, .016 - .135 in. (0,4 - 3,4 mm) <b>E</b> 75 psi (5 bar) Cracking Pressure, .016 - .135 in. (0,4 - 3,4 mm) <b>F</b> 100 psi (7 bar) Cracking Pressure, .016 - .135 in. (0,4 - 3,4 mm)	<b>N</b> Buna-N <b>V</b> Viton	Standard Material/Coating JAP Stainless Steel, Passivated



This valve is a fixed-orifice, non-pressure-compensated flow control with a reverse flow check. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

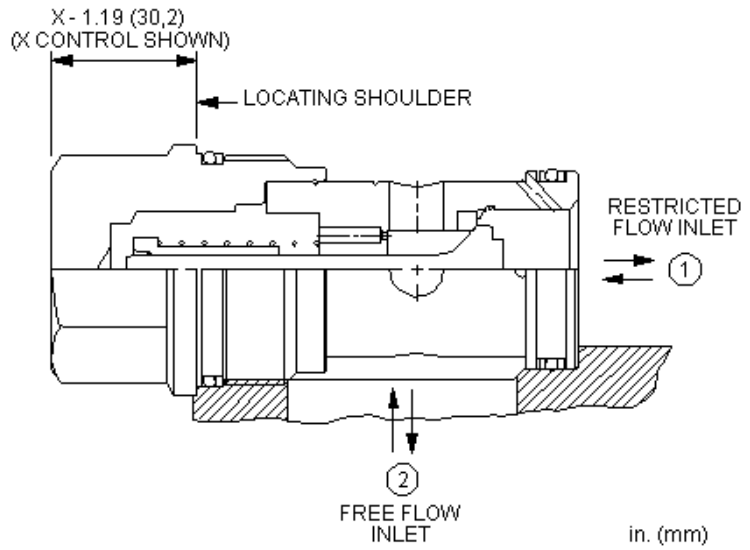
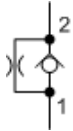
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Orifice Range	0,4 - 5,5 mm
Seal kit - Cartridge	Buna: 990016007
Seal kit - Cartridge	Polyurethane: 990016002
Seal kit - Cartridge	Viton: 990016006

**CONFIGURATION OPTIONS**

**Model Code Example: CNGCXCN**

CONTROL	(X) SETTING RANGE	(C) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>C</b> 30 psi (2 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)	<b>N</b> Buna-N <b>V</b> Viton	Standard Material/Coating /AP Stainless Steel, Passivated
	<b>A</b> 4 psi (0,3 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)		
	<b>B</b> 15 psi (1 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)		
	<b>D</b> 50 psi (3,5 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)		
	<b>E</b> 75 psi (5 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)		
	<b>F</b> 100 psi (7 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)		



This valve is a fixed-orifice, non-pressure-compensated flow control with a reverse flow check. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

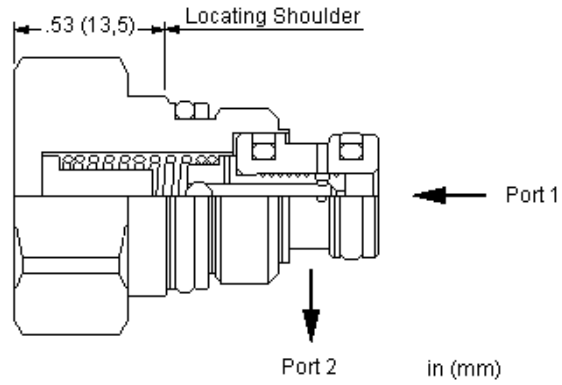
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Orifice Range	0,4 - 5,5 mm
Seal kit - Cartridge	Buna: 990018007
Seal kit - Cartridge	Polyurethane: 990018002
Seal kit - Cartridge	Viton: 990018006

**CONFIGURATION OPTIONS**

Model Code Example: CNICXCN

CONTROL	(X)	SETTING RANGE	(C)	SEAL MATERIAL	(N)
X Not Adjustable		C 30 psi (2 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)		N Buna-N	
		A 4 psi (0,3 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)		V Viton	
		B 15 psi (1 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)			
		D 50 psi (3,5 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)			
		E 75 psi (5 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)			
		F 100 psi (7 bar) Cracking Pressure, .016 - .218 in. (0,4 - 5,5 mm)			



Fixed-orifice, pressure-compensated flow controls provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. A variety of flow rates are available.

**TECHNICAL DATA**

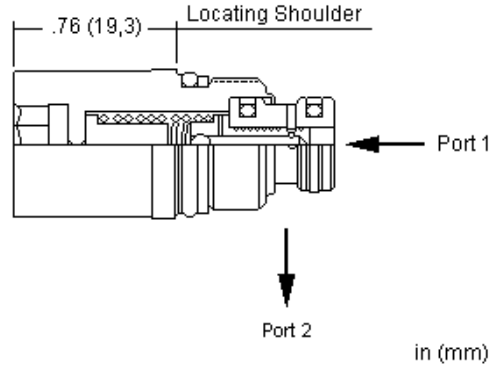
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Seal kit - Cartridge	Buna: 990008007
Seal kit - Cartridge	EPDM: 990008014
Seal kit - Cartridge	Polyurethane: 990008002
Seal kit - Cartridge	Viton: 990008006

**CONFIGURATION OPTIONS**

**Model Code Example: FXAAXAN**

CONTROL	(X) FLOW RATE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> 15 in <sup>3</sup> /min. (250 cc/min.) <b>B</b> 20 in <sup>3</sup> /min. (330 cc/min.) <b>D</b> 40 in <sup>3</sup> /min. (660 cc/min.) <b>F</b> 60 in <sup>3</sup> /min. (1 L/min.) <b>H</b> 80 in <sup>3</sup> /min. (1.3 L/min.) <b>J</b> 100 in <sup>3</sup> /min. (1.6 L/min.) <b>L</b> 120 in <sup>3</sup> /min. (2.0 L/min.)	<b>N</b> Buna-N <b>E</b> EPDM <b>V</b> Viton	Standard Material/Coating /AP Stainless Steel, Passivated /LH Mild Steel, Zinc-Nickel



Fixed-orifice, pressure-compensated flow controls provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. A variety of flow rates are available.

**TECHNICAL DATA**

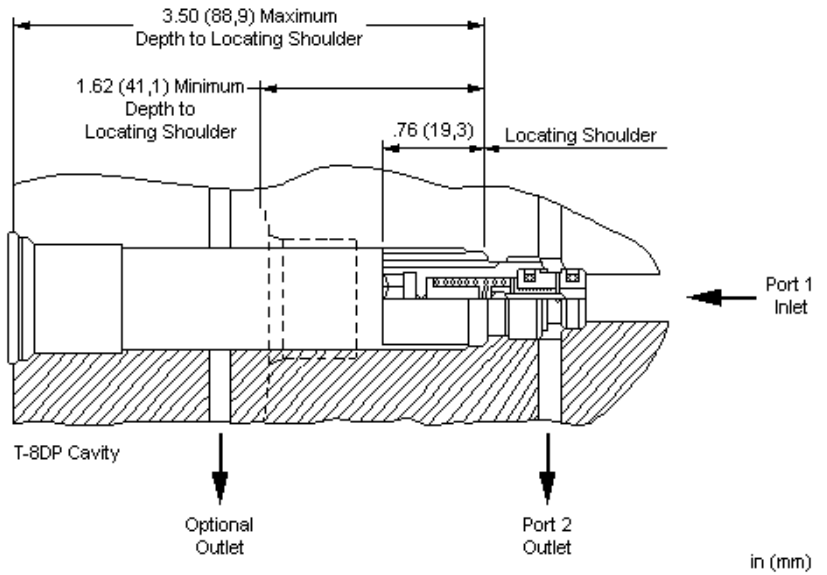
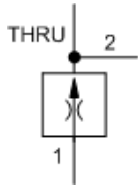
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Valve Internal Hex Size	8 mm
Seal kit - Cartridge	Buna: 990008007
Seal kit - Cartridge	Polyurethane: 990008002
Seal kit - Cartridge	Viton: 990008006

**CONFIGURATION OPTIONS**

**Model Code Example: FXAGXAN**

CONTROL	(X) FLOW RATE	(A) SEAL MATERIAL	(N)
<b>X</b> Not Adjustable	<b>A</b> 15 in <sup>3</sup> /min. (250 cc/min.)	<b>N</b> Buna-N	
	<b>B</b> 20 in <sup>3</sup> /min. (330 cc/min.)	<b>V</b> Viton	
	<b>D</b> 40 in <sup>3</sup> /min. (660 cc/min.)		
	<b>F</b> 60 in <sup>3</sup> /min. (1 L/min.)		
	<b>H</b> 80 in <sup>3</sup> /min. (1.3 L/min.)		
	<b>J</b> 100 in <sup>3</sup> /min. (1.6 L/min.)		
	<b>L</b> 120 in <sup>3</sup> /min. (2.0 L/min.)		



Fixed-orifice, pressure-compensated flow controls provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. A variety of flow rates are available. The THRU port at the top of the valve can be used as the outlet with port 2 blocked. See cavity drawing for details.

**TECHNICAL DATA**

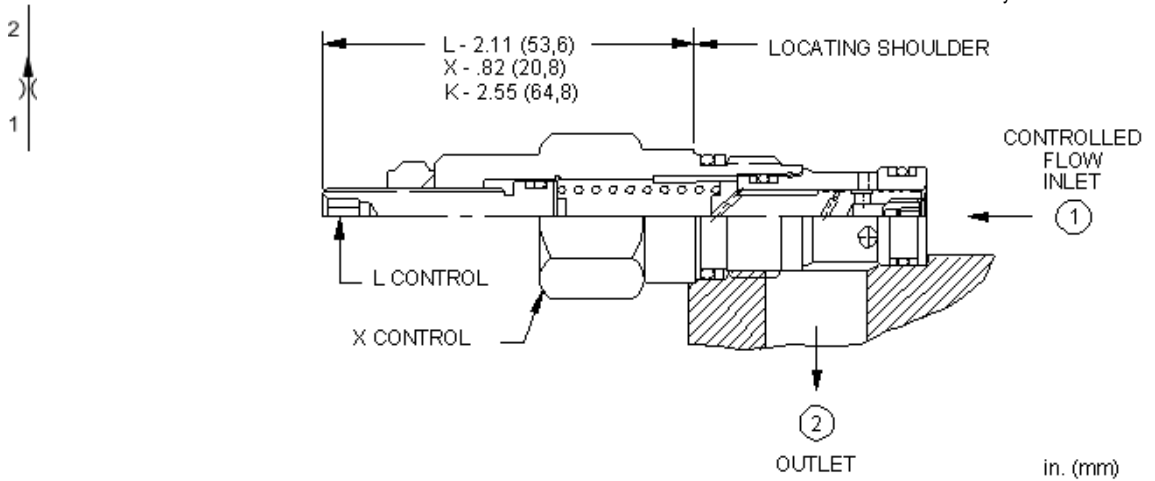
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Valve Internal Hex Size	8 mm

**CONFIGURATION OPTIONS**

**Model Code Example: FXAMXAN**

CONTROL	(X) FLOW RATE	(A) SEAL MATERIAL	(N)
<b>X</b> Not Adjustable	<b>A</b> 15 in <sup>3</sup> /min. (250 cc/min.) <b>B</b> 20 in <sup>3</sup> /min. (330 cc/min.) <b>D</b> 40 in <sup>3</sup> /min. (660 cc/min.) <b>F</b> 60 in <sup>3</sup> /min. (1 L/min.) <b>H</b> 80 in <sup>3</sup> /min. (1.3 L/min.) <b>J</b> 100 in <sup>3</sup> /min. (1.6 L/min.) <b>L</b> 120 in <sup>3</sup> /min. (2.0 L/min.)	<b>N</b> Buna-N <b>V</b> Viton	



Fixed-orifice, pressure-compensated flow controls provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

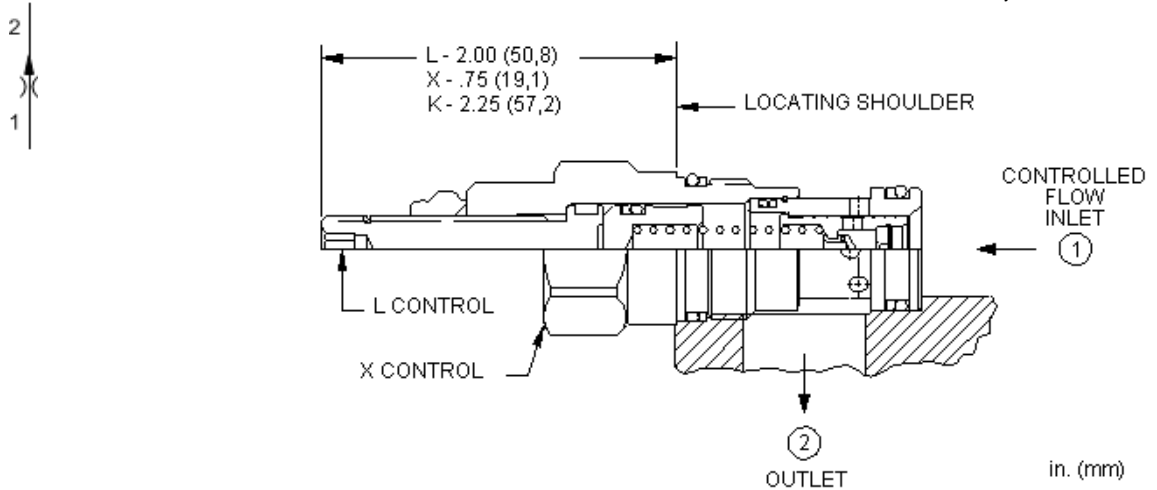
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	EPDM: 990162014
Seal kit - Cartridge	Polyurethane: 990162002
Seal kit - Cartridge	Viton: 990162006

**CONFIGURATION OPTIONS**

**Model Code Example: FXBAXAN**

<b>CONTROL</b>	<b>(X) SETTING RANGE</b>	<b>(A) SEAL MATERIAL</b>	<b>(N) MATERIAL/COATING</b>
<b>X</b> Not Adjustable	<b>A</b> Fixed Orifice .1 - 3 gpm (0,4 - 11 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>L</b> Tuning Adjustment		<b>E</b> EPDM	/AP Stainless Steel, Passivated
<b>K</b> Handknob		<b>V</b> Viton	/LH Mild Steel, Zinc-Nickel



Fixed-orifice, pressure-compensated flow controls provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

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

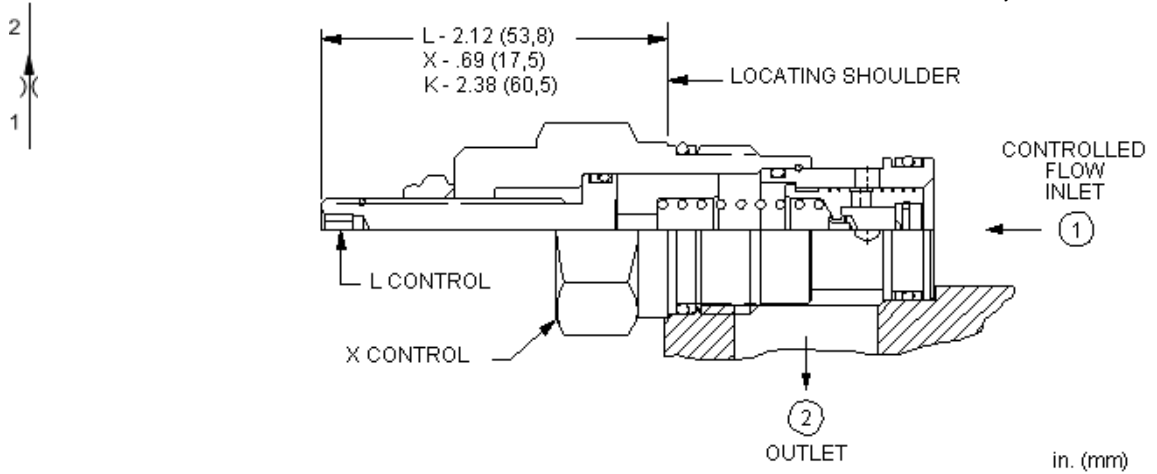
Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990010007
Seal kit - Cartridge	EPDM: 990010014
Seal kit - Cartridge	Polyurethane: 990010002
Seal kit - Cartridge	Viton: 990010006

**CONFIGURATION OPTIONS**

**Model Code Example: FXCAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .1 - 6 gpm (0,4 - 23 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>L</b> Tuning Adjustment		<b>E</b> EPDM	/AP Stainless Steel, Passivated
<b>K</b> Handknob		<b>V</b> Viton	/LH Mild Steel, Zinc-Nickel





Fixed-orifice, pressure-compensated flow controls provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

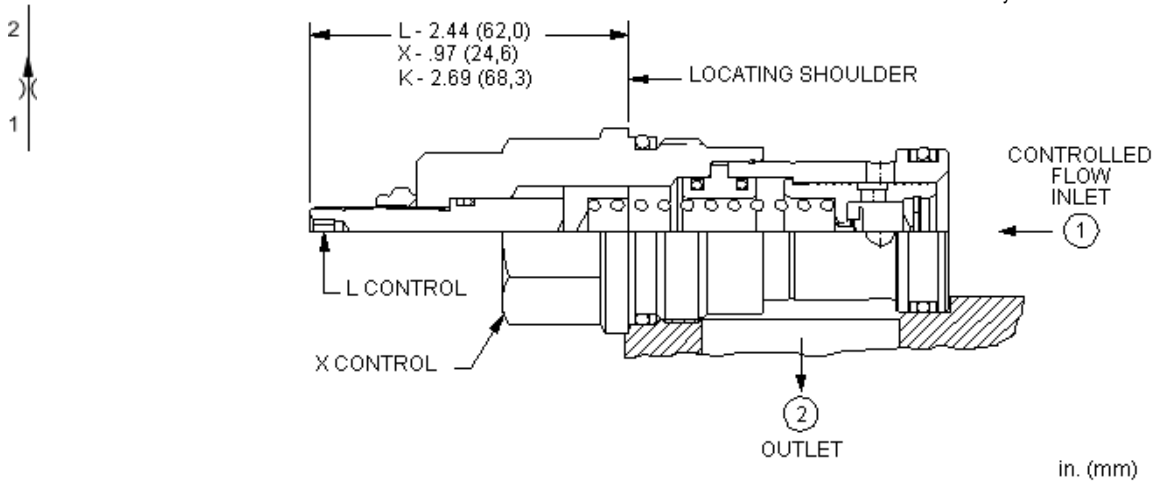
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990203007
Seal kit - Cartridge	EPDM: 990203014
Seal kit - Cartridge	Viton: 990203006

**CONFIGURATION OPTIONS**

**Model Code Example: FXDAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .1 - 12 gpm (0.4 - 45 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
L Tuning Adjustment		E EPDM	/AP Stainless Steel, Passivated
K Handknob		V Viton	/LH Mild Steel, Zinc-Nickel



Fixed-orifice, pressure-compensated flow controls provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

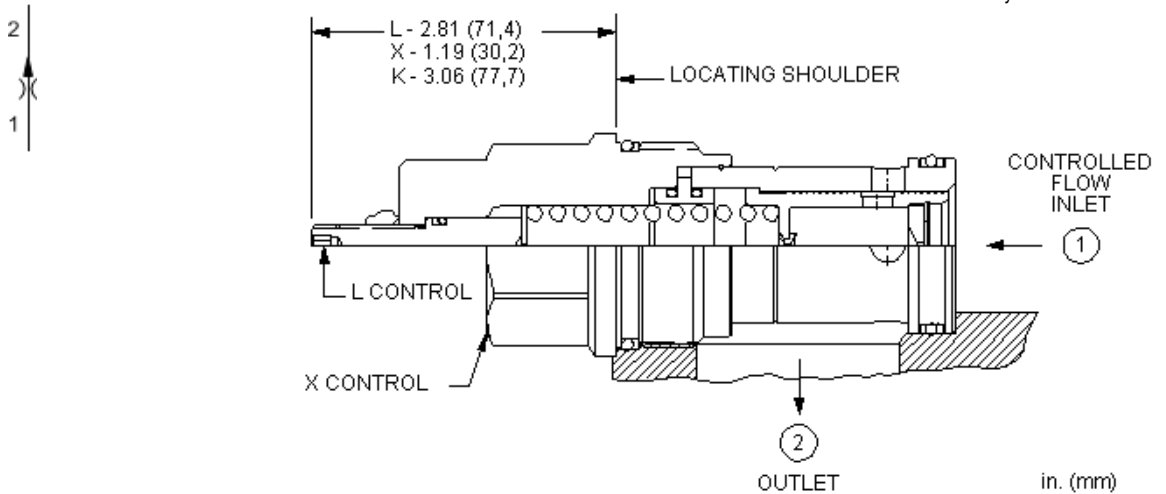
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990016007
Seal kit - Cartridge	EPDM: 990016014
Seal kit - Cartridge	Polyurethane: 990016002
Seal kit - Cartridge	Viton: 990016006

**CONFIGURATION OPTIONS**

**Model Code Example: FXEALAN**

CONTROL	(L) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>L</b> Tuning Adjustment	<b>A</b> Replaceable Orifice .2 - 25 gpm (0,8 - 95 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>C</b> Tamper Resistant - Factory Set		<b>E</b> EPDM	/AP Stainless Steel, Passivated
<b>K</b> Handknob		<b>V</b> Viton	/LH Mild Steel, Zinc-Nickel
<b>X</b> Not Adjustable			



Fixed-orifice, pressure-compensated flow controls provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

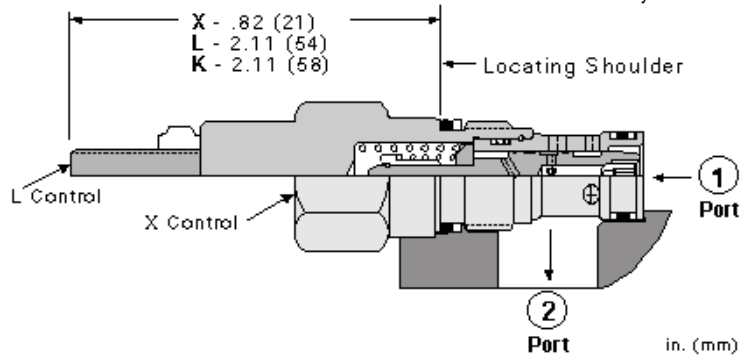
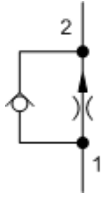
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990018007
Seal kit - Cartridge	EPDM: 990018014
Seal kit - Cartridge	Polyurethane: 990018002
Seal kit - Cartridge	Viton: 990018006

**CONFIGURATION OPTIONS**

**Model Code Example: FXFAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable L Tuning Adjustment K Handknob	<b>A</b> Replaceable Orifice .2 - 50 gpm (1 - 200 L/min.)	<b>N</b> Buna-N E EPDM V Viton	<b>N</b> Standard Material/Coating JAP Stainless Steel, Passivated



Fixed-orifice, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

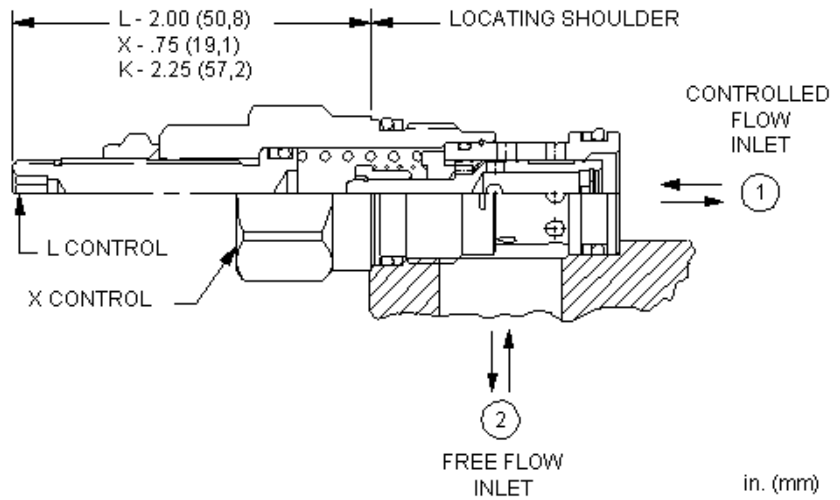
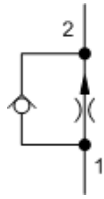
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990162007
Seal kit - Cartridge	Polyurethane: 990162002
Seal kit - Cartridge	Viton: 990162006

**CONFIGURATION OPTIONS**

**Model Code Example: FCBBXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .1 - 3 gpm (0,4 - 11 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>L</b> Tuning Adjustment		<b>V</b> Viton	/AP Stainless Steel, Passivated
<b>K</b> Handknob			/LH Mild Steel, Zinc-Nickel



Fixed-orifice, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

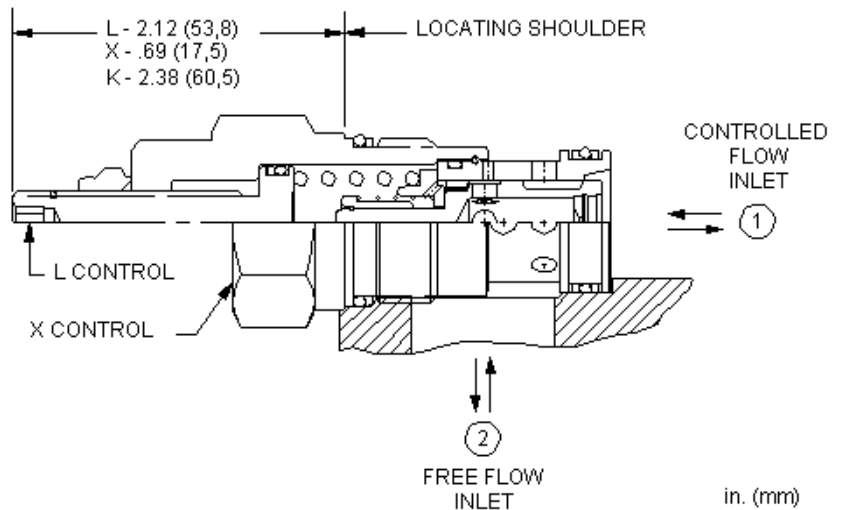
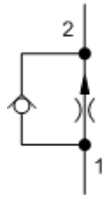
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990010007
Seal kit - Cartridge	Polyurethane: 990010002
Seal kit - Cartridge	Viton: 990010006

**CONFIGURATION OPTIONS**

**Model Code Example: FCCBXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable L Tuning Adjustment K Handknob	<b>A</b> Replaceable Orifice .1 - 6 gpm (0,4 - 23 L/min.)	<b>N</b> Buna-N <b>V</b> Viton	<b>N</b> Standard Material/Coating /AP Stainless Steel, Passivated /LH Mild Steel, Zinc-Nickel



Fixed-orifice, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

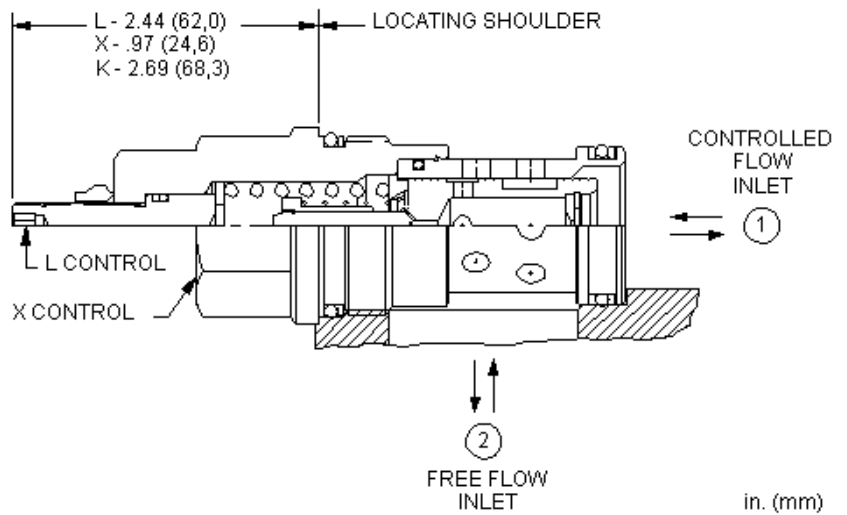
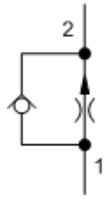
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990203007
Seal kit - Cartridge	Viton: 990203006

**CONFIGURATION OPTIONS**

**Model Code Example: FCDBXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable L Tuning Adjustment K Handknob	<b>A</b> Replaceable Orifice .1 - 12 gpm (0,4 - 45 L/min.)	<b>N</b> Buna-N <b>V</b> Viton	<b>N</b> Standard Material/Coating /AP Stainless Steel, Passivated /LH Mild Steel, Zinc-Nickel



Fixed-orifice, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

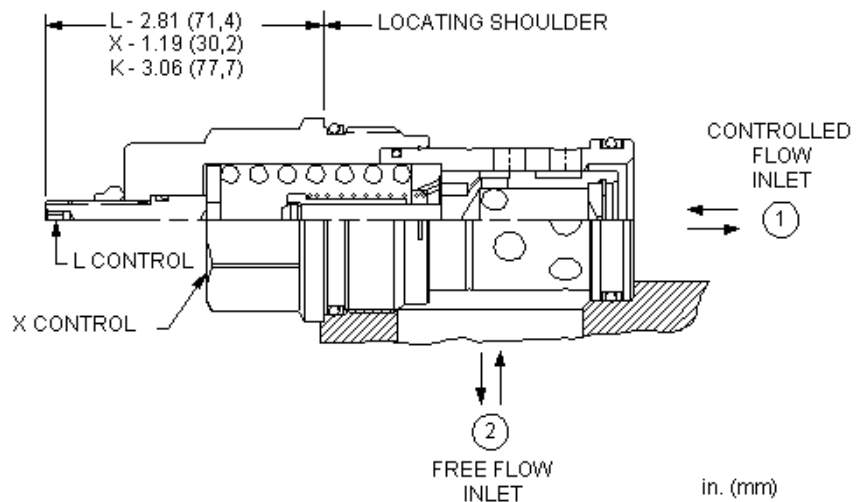
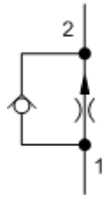
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990016007
Seal kit - Cartridge	Polyurethane: 990016002
Seal kit - Cartridge	Viton: 990016006

**CONFIGURATION OPTIONS**

**Model Code Example: FCEBXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .2 - 25 gpm (0,8 - 95 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>L</b> Tuning Adjustment		<b>V</b> Viton	/AP Stainless Steel, Passivated
<b>C</b> Tamper Resistant - Factory Set			/LH Mild Steel, Zinc-Nickel
<b>K</b> Handknob			



Fixed-orifice, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

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

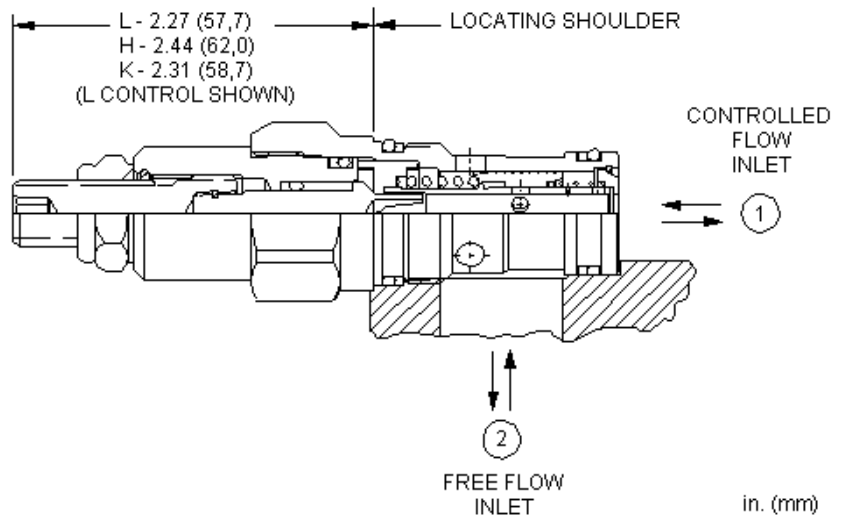
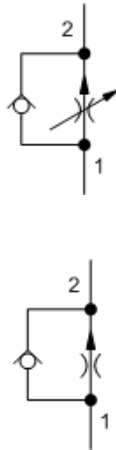
Maximum Operating Pressure	350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990018007
Seal kit - Cartridge	Polyurethane: 990018002
Seal kit - Cartridge	Viton: 990018006

**CONFIGURATION OPTIONS**

Model Code Example: **FCFBXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .2 - 50 gpm (1 - 200 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
L Tuning Adjustment		V Viton	/AP Stainless Steel, Passivated
K Handknob			





Fully adjustable, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. They are infinitely adjustable from nearly closed up to the maximum flow. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1.

**TECHNICAL DATA**

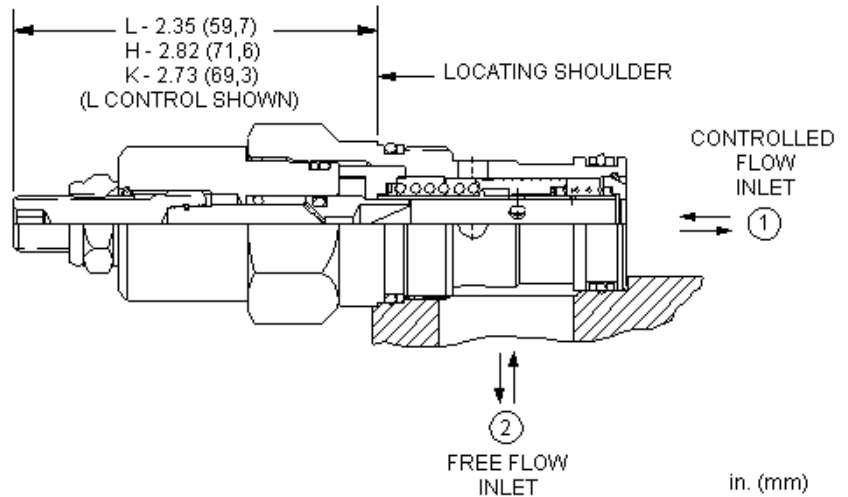
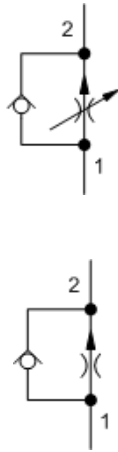
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Adjustment - No. of CCW Turns from Fully Closed to Fully Open	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990010007
Seal kit - Cartridge	EPDM: 990010014
Seal kit - Cartridge	Polyurethane: 990010002
Seal kit - Cartridge	Viton: 990010006

**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.

**CONFIGURATION OPTIONS**
**Model Code Example: FDBALAN**

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A .1 - 6 gpm (0,4 - 23 L/min.)	N Buna-N	Standard Material/Coating
H Calibrated Handknob with Detent Lock	B .1 - 2 gpm (0,4 - 8 L/min.)	E EPDM	/AP Stainless Steel, Passivated
K Handknob		V Viton	/LH Mild Steel, Zinc-Nickel
Y Tri-Grip Handknob			



Fully adjustable, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. They are infinitely adjustable from nearly closed up to the maximum flow. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1.

**TECHNICAL DATA**

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

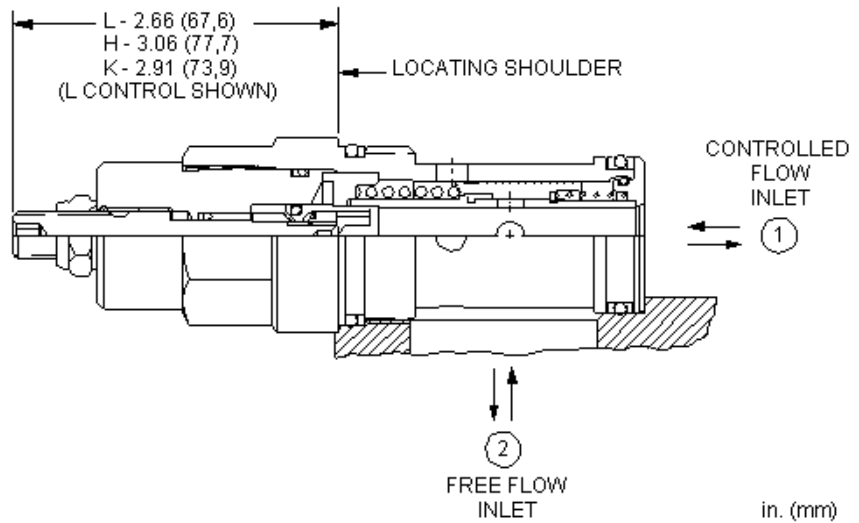
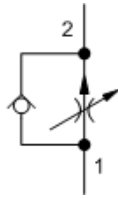
Maximum Operating Pressure	350 bar
Adjustment - No. of CCW Turns from Fully Closed to Fully Open	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990203007
Seal kit - Cartridge	EPDM: 990203014
Seal kit - Cartridge	Viton: 990203006

**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.

**CONFIGURATION OPTIONS**

**Model Code Example: FDCBLAN**

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A .2 - 12 gpm (0,8 - 45 L/min.)	N Buna-N	Standard Material/Coating
H Calibrated Handknob with Detent Lock	B .2 - 3 gpm (0,8 - 11 L/min.)	E EPDM	/LH Mild Steel, Zinc-Nickel
K Handknob		V Viton	
Y Tri-Grip Handknob			



Fully adjustable, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. They are infinitely adjustable from nearly closed up to the maximum flow. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1.

**TECHNICAL DATA**

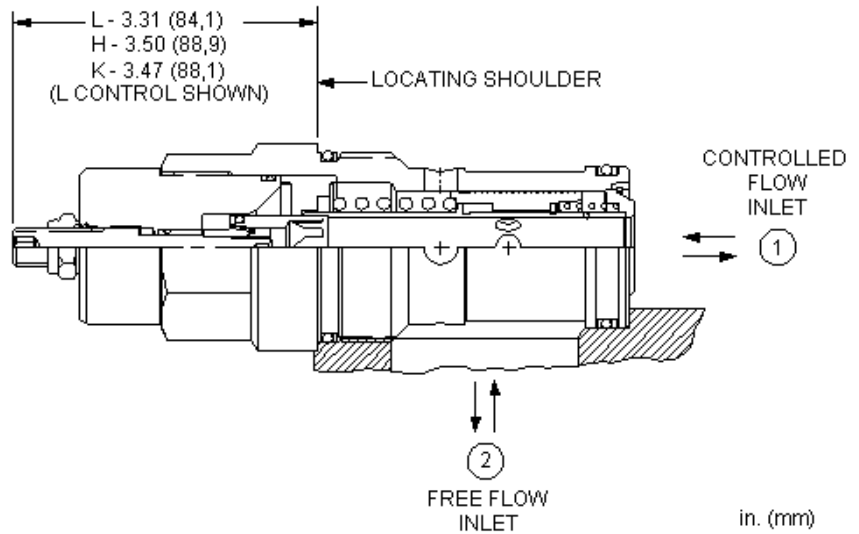
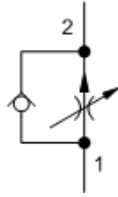
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Adjustment - No. of CCW Turns from Fully Closed to Fully Open	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990016007
Seal kit - Cartridge	EPDM: 990016014
Seal kit - Cartridge	Polyurethane: 990016002
Seal kit - Cartridge	Viton: 990016006

**CONFIGURATION OPTIONS**

**Model Code Example: FDEALAN**

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>L</b> Standard Screw Adjustment	<b>A</b> .2 - 25 gpm (0,8 - 95 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>H</b> Calibrated Handknob with Detent Lock	<b>B</b> .2 - 16 gpm (0,8 - 60 L/min.)	<b>E</b> EPDM	/LH Mild Steel, Zinc-Nickel
<b>K</b> Handknob		<b>V</b> Viton	
<b>Y</b> Tri-Grip Handknob			



Fully adjustable, pressure-compensated flow controls with reverse-flow check provide precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. They are infinitely adjustable from nearly closed up to the maximum flow. An integral high-capacity check valve provides unrestricted flow from port 2 to port 1.

**TECHNICAL DATA**

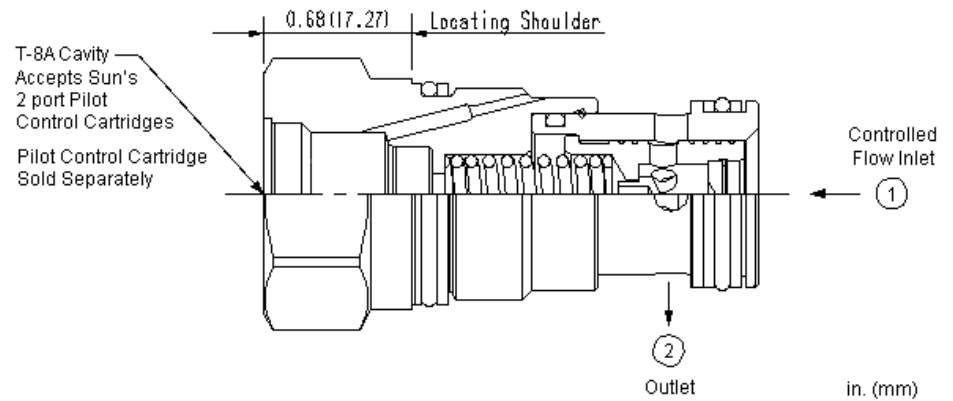
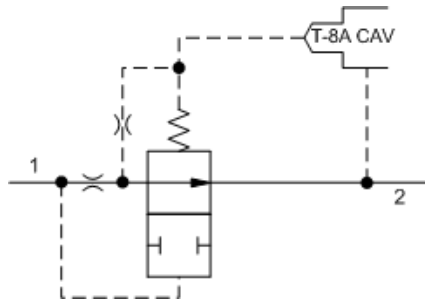
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Adjustment - No. of CCW Turns from Fully Closed to Fully Open	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990018007
Seal kit - Cartridge	EPDM: 990018014
Seal kit - Cartridge	Polyurethane: 990018002
Seal kit - Cartridge	Viton: 990018006

**CONFIGURATION OPTIONS**

**Model Code Example: FDFALAN**

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>L</b> Standard Screw Adjustment	<b>A</b> .2 - 50 gpm (1 - 200 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
H Calibrated Handknob with Detent Lock		E EPDM	/LH Mild Steel, Zinc-Nickel
K Handknob		V Viton	
Y Tri-Grip Handknob			



This valve is a fixed-orifice, pressure-compensated flow control valve with an integral pilot control cavity. The pilot control cavity will accept any T-8A pilot control cartridge. This type of valve provides precise flow regulation for meter-in or meter-out applications where there may be wide pressure fluctuations. The flow setting is specified by the user and is set at the factory.

**TECHNICAL DATA**

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

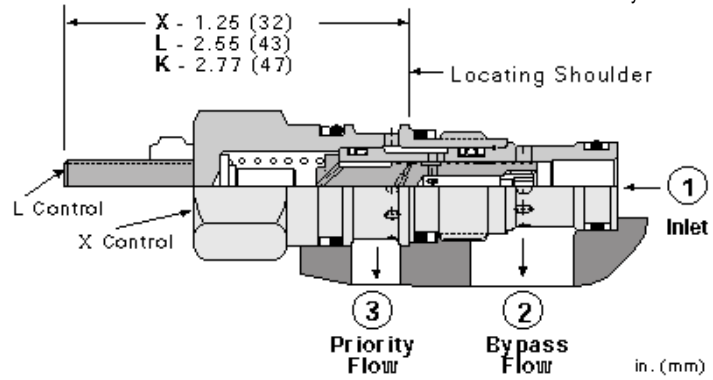
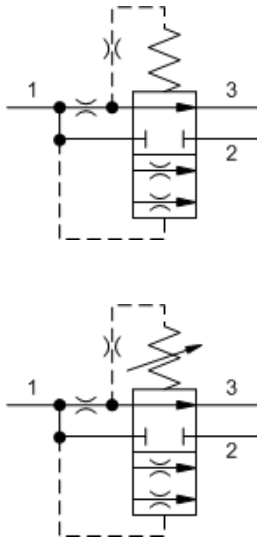
Maximum Operating Pressure	350 bar
Pilot Control Cavity	T-8A
Seal kit - Cartridge	Buna: 990203007
Seal kit - Cartridge	Viton: 990203006

**NOTES** Compound cartridge (pilot and main stage) assembly information is provided for reference only. Cartridges must be ordered separately and assembled at point of use.

**CONFIGURATION OPTIONS**

**Model Code Example: FXDA8AN**

SETTING RANGE	(A)	SEAL MATERIAL	(N)
<b>A</b> Replaceable Orifice .1 - 12 gpm (0,4 - 45 L/min.)		<b>N</b> Buna-N	
		<b>E</b> EPDM	
<b>B</b> Permanent Orifice .1 - 12 gpm (0,4 - 45 L/min.)		<b>V</b> Viton	



Bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit.

**TECHNICAL DATA**

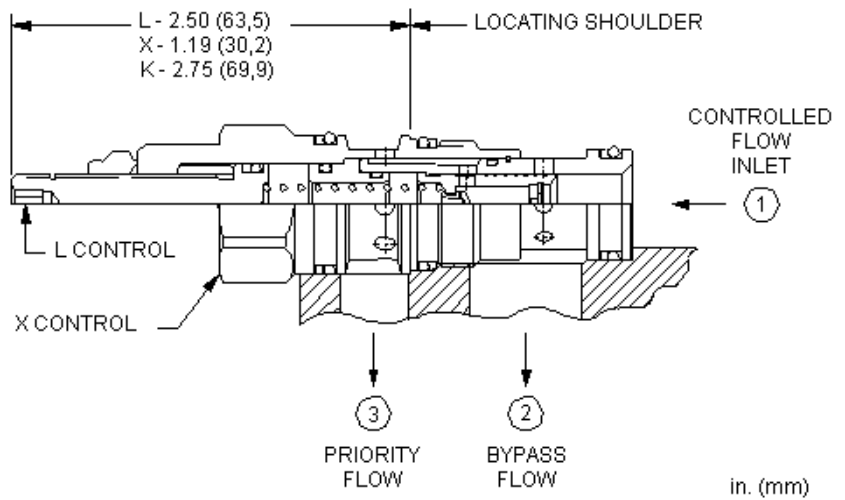
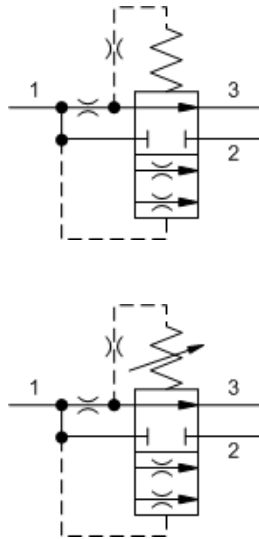
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Maximum Input Flow	30 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990163007
Seal kit - Cartridge	Polyurethane: 990163002
Seal kit - Cartridge	Viton: 990163006

**CONFIGURATION OPTIONS**

**Model Code Example: FRBAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N)
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .1 - 3 gpm (0,4 - 11 L/min.)	<b>N</b> Buna-N	
L Tuning Adjustment		V Viton	



Bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit.

**TECHNICAL DATA**

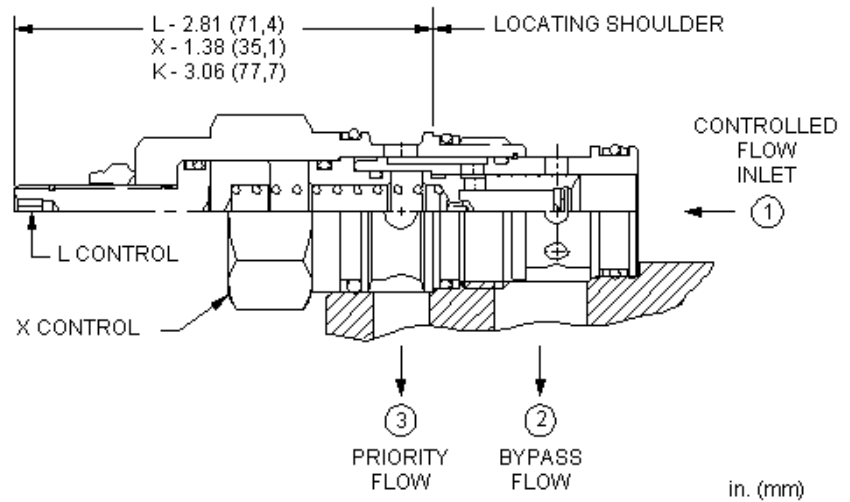
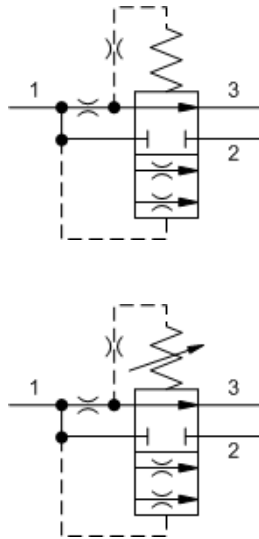
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Maximum Input Flow	60 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990011007
Seal kit - Cartridge	Polyurethane: 990011002
Seal kit - Cartridge	Viton: 990011006

**CONFIGURATION OPTIONS**

**Model Code Example: FRCAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .1 - 6 gpm (0,4 - 23 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
L Tuning Adjustment		V Viton	JAP Stainless Steel, Passivated
K Handknob			



Bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit.

**TECHNICAL DATA**

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

Maximum Operating Pressure	350 bar
Maximum Input Flow	120 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990202007
Seal kit - Cartridge	EPDM: 990202014
Seal kit - Cartridge	Polyurethane: 990002002
Seal kit - Cartridge	Viton: 990202006

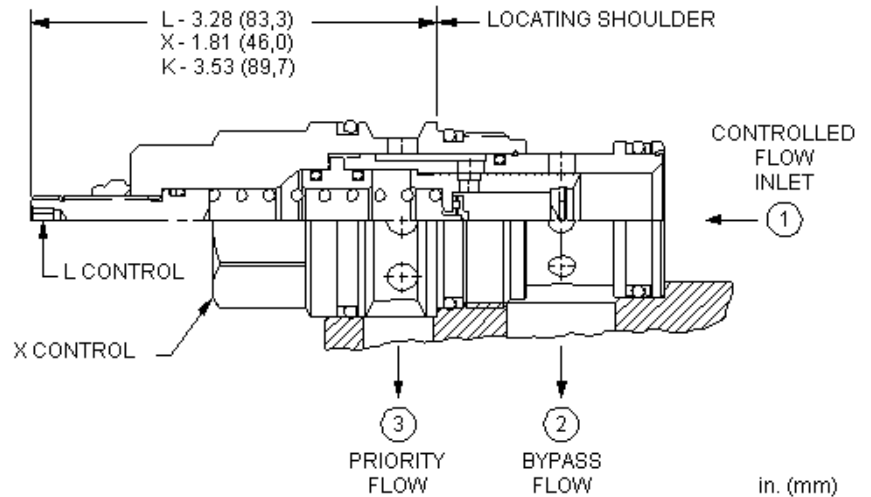
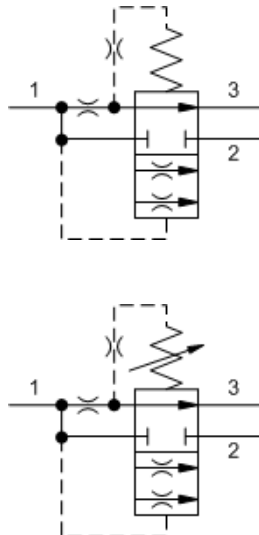
**NOTES** For Series 1 cartridges configured with an O control (panel mount handknob), a .75 in. (19 mm) diameter hole is required in the panel.

**CONFIGURATION OPTIONS**

**Model Code Example: FRDAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .1 - 12 gpm (0,4 - 45 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>L</b> Tuning Adjustment		<b>E</b> EPDM	/AP Stainless Steel, Passivated
<b>K</b> Handknob		<b>V</b> Viton	





Bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit.

**TECHNICAL DATA**

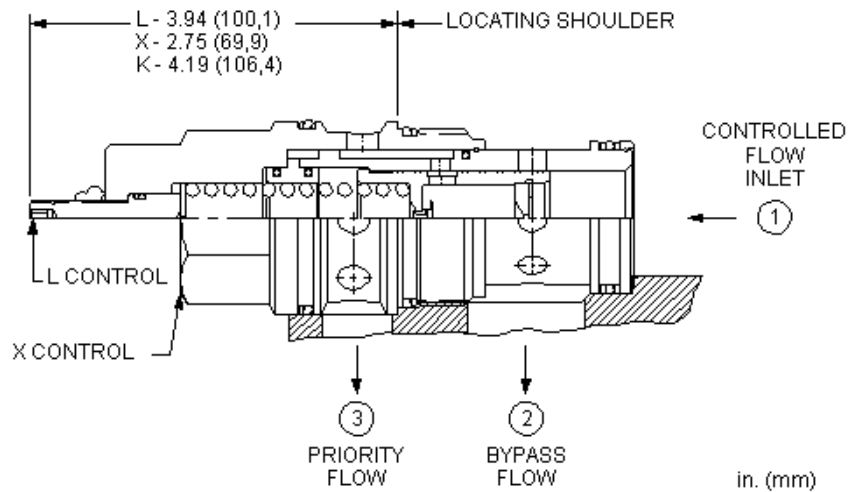
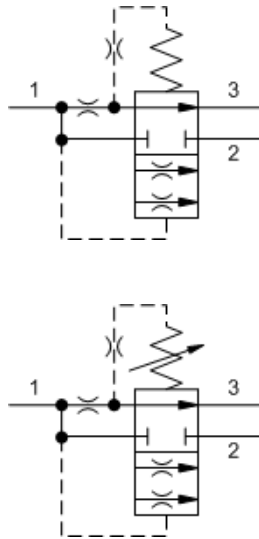
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Maximum Input Flow	240 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990017007
Seal kit - Cartridge	Polyurethane: 990017002
Seal kit - Cartridge	Viton: 990017006

**CONFIGURATION OPTIONS**

**Model Code Example: FREAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .2 - 25 gpm (0,8 - 95 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>L</b> Tuning Adjustment		<b>V</b> Viton	/AP Stainless Steel, Passivated
<b>K</b> Handknob			/LH Mild Steel, Zinc-Nickel



Bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit.

**TECHNICAL DATA**

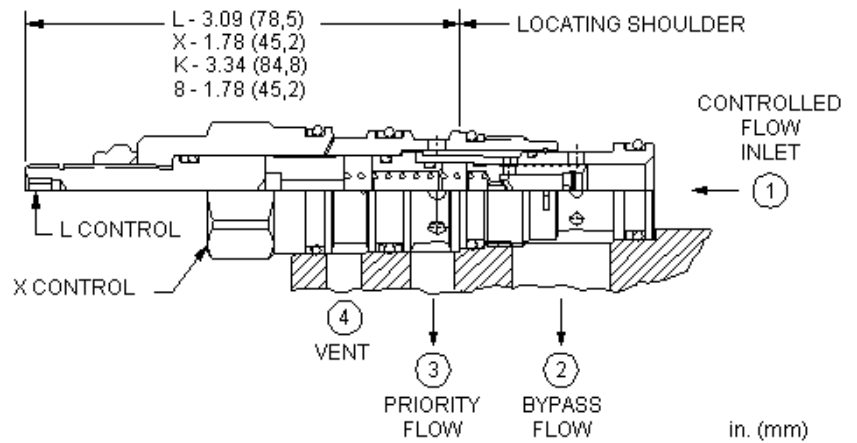
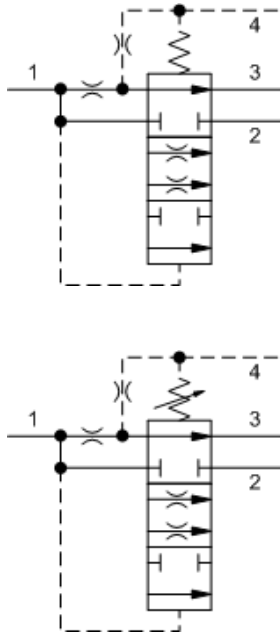
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Maximum Input Flow	480 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990019007
Seal kit - Cartridge	Polyurethane: 990019002
Seal kit - Cartridge	Viton: 990019006

**CONFIGURATION OPTIONS**

**Model Code Example: FRFAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .2 - 50 gpm (1 - 200 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
L Tuning Adjustment		V Viton	JAP Stainless Steel, Passivated
K Handknob			



Ventable, bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit. A vent port (port 4) allows these valves to be controlled remotely.

**TECHNICAL DATA**

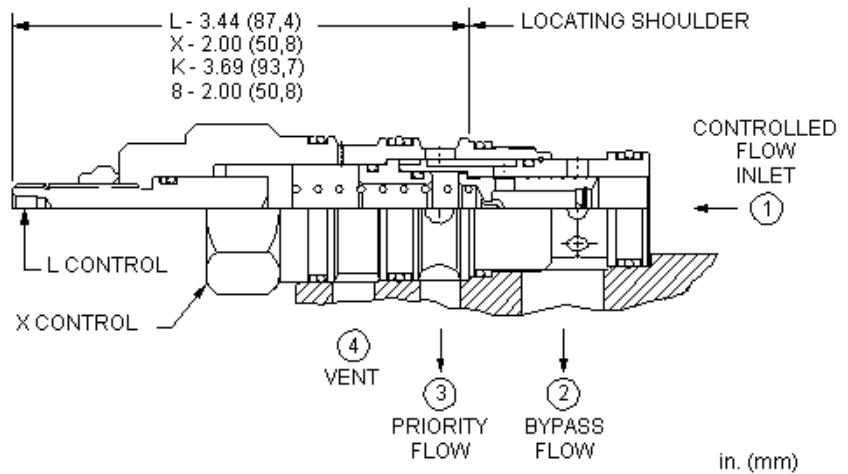
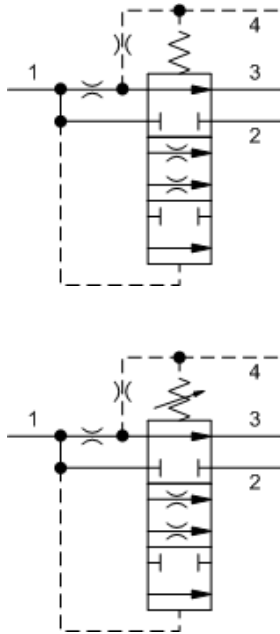
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Nominal Vent Flow	0,75 L/min.
Maximum Input Flow	60 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990021007
Seal kit - Cartridge	Polyurethane: 990021002
Seal kit - Cartridge	Viton: 990021006

**CONFIGURATION OPTIONS**

**Model Code Example: FVCA<sub>XAN</sub>**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N)
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .1 - 6 gpm (0,4 - 23 L/min.)	<b>N</b> Buna-N	
L Tuning Adjustment		V Viton	



Ventable, bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit. A vent port (port 4) allows these valves to be controlled remotely.

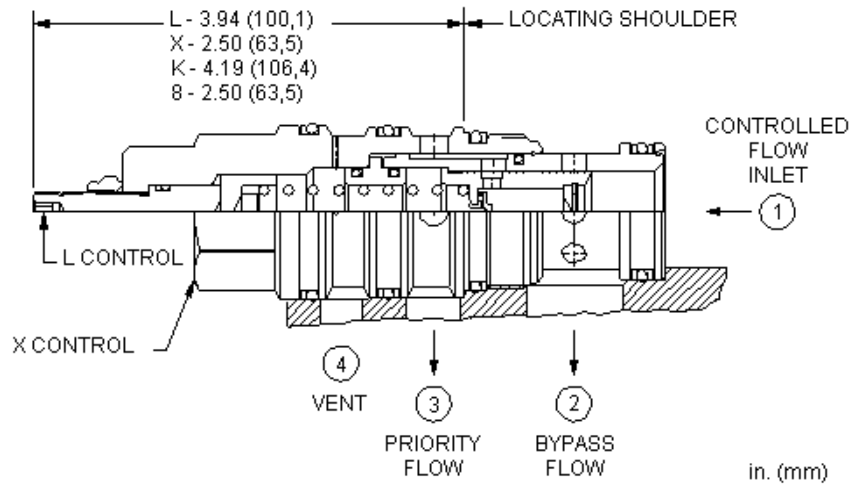
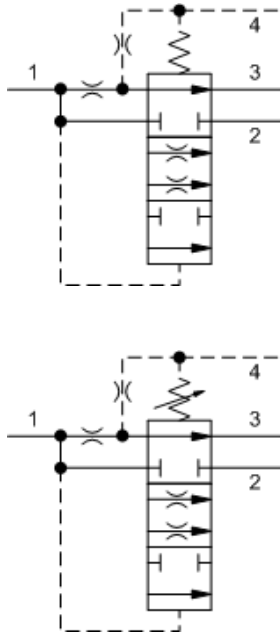
**TECHNICAL DATA**

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

Maximum Operating Pressure	350 bar
Nominal Vent Flow	0,75 L/min.
Maximum Input Flow	120 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990022007
Seal kit - Cartridge	EPDM: 990022014
Seal kit - Cartridge	Polyurethane: 990022002
Seal kit - Cartridge	Viton: 990022006

**CONFIGURATION OPTIONS**
**Model Code Example: FVDAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N)
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .1 - 12 gpm (0,4 - 45 L/min.)	<b>N</b> Buna-N	
L Tuning Adjustment		E EPDM	
		V Viton	



Ventable, bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit. A vent port (port 4) allows these valves to be controlled remotely.

**TECHNICAL DATA**

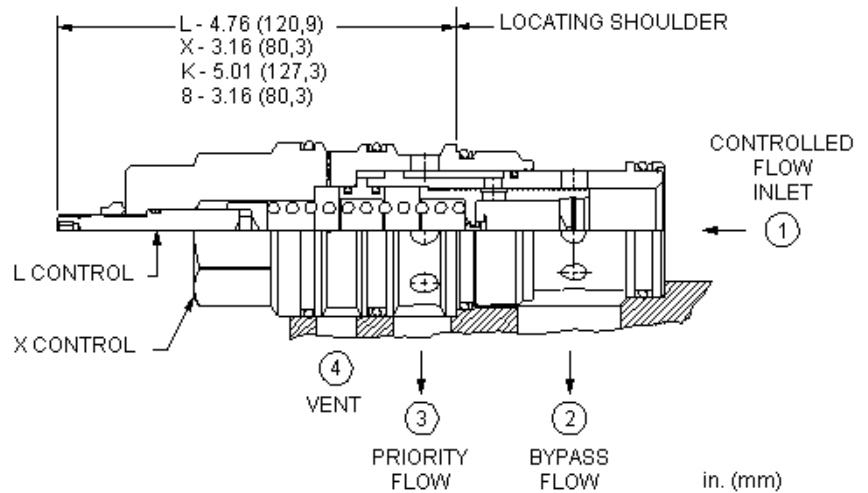
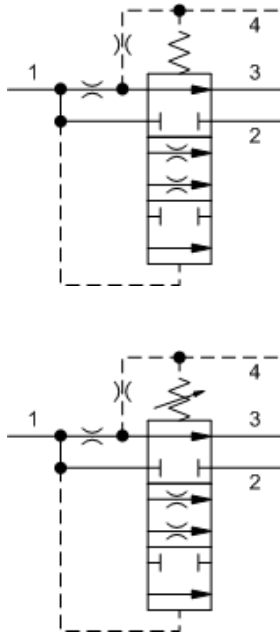
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Nominal Vent Flow	0,75 L/min.
Maximum Input Flow	240 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990023007
Seal kit - Cartridge	Polyurethane: 990023002
Seal kit - Cartridge	Viton: 990023006

**CONFIGURATION OPTIONS**

**Model Code Example: FVEAXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .2 - 25 gpm (0,8 - 95 L/min.)	<b>N</b> Buna-N	Standard Material/Coating
<b>K</b> Handknob		<b>V</b> Viton	/LH Mild Steel, Zinc-Nickel
<b>L</b> Tuning Adjustment			



Ventable, bypass/restrictive, fixed-orifice, priority flow controls take an input flow at port 1 and use it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess is bypassed out port 2. The bypass flow may be used in a secondary circuit. A vent port (port 4) allows these valves to be controlled remotely.

**TECHNICAL DATA**

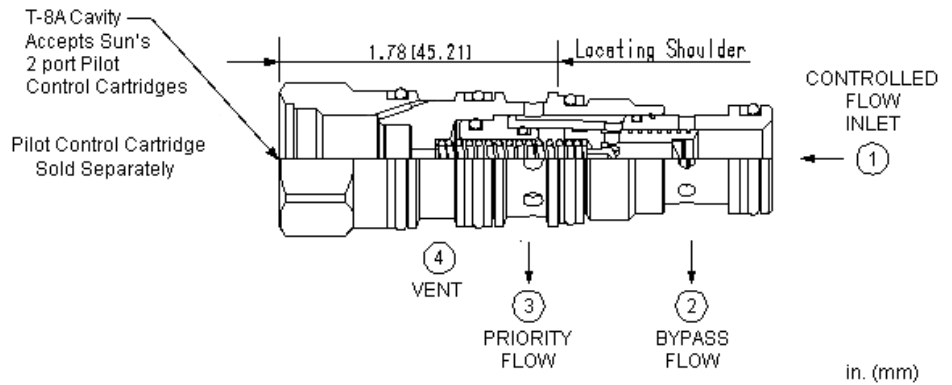
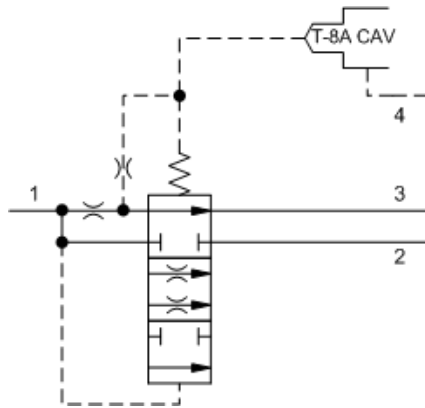
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Maximum Operating Pressure	350 bar
Nominal Vent Flow	0,75 L/min.
Maximum Input Flow	480 L/min.
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990024007
Seal kit - Cartridge	EPDM: 990024014
Seal kit - Cartridge	Polyurethane: 990024002
Seal kit - Cartridge	Viton: 990024006

**CONFIGURATION OPTIONS**

**Model Code Example: FVFXAN**

CONTROL	(X) SETTING RANGE	(A) SEAL MATERIAL	(N)
<b>X</b> Not Adjustable	<b>A</b> Replaceable Orifice .2 - 50 gpm (1 - 200 L/min.)	<b>N</b> Buna-N	
L Tuning Adjustment		E EPDM	
		V Viton	



This valve is a ventable, bypass/restrictive, fixed-orifice, priority flow control with an integral pilot control cavity. The pilot control cavity will accept any T-8A pilot pressure or directional control cartridge. It takes an input flow at port 1 and uses it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess flow is bypassed out of port 2. Bypass flow may be used for a secondary circuit. Depending on which pilot control valve is installed in the T-8A cavity, priority flow can be selected electrically, manually, hydraulically or pneumatically.

**TECHNICAL DATA**

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

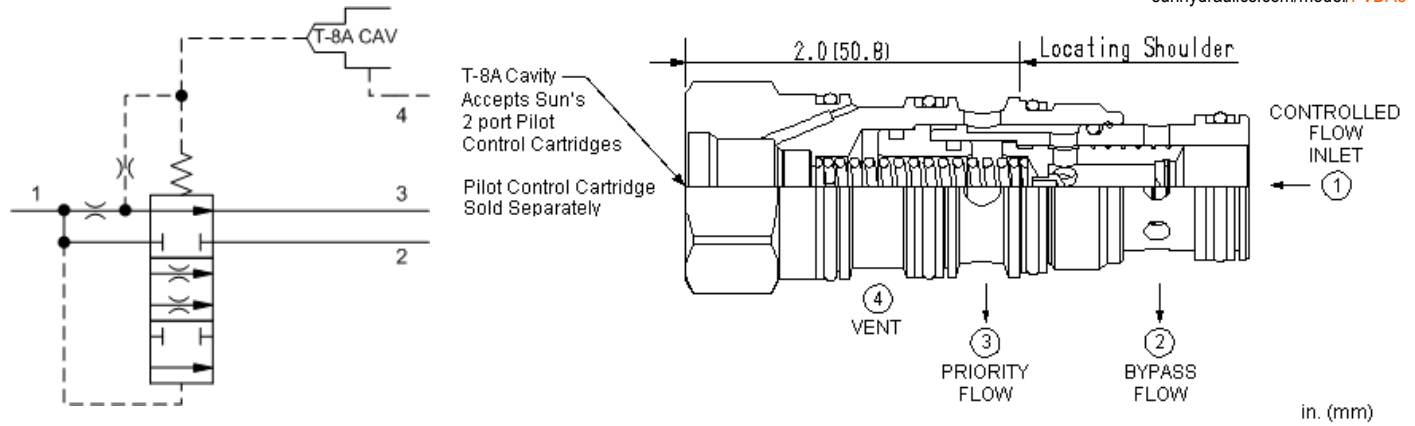
Maximum Operating Pressure	350 bar
Nominal Vent Flow	0,75 L/min.
Maximum Input Flow	60 L/min.
Pilot Control Cavity	T-8A
Pilot Control Valve Installation Torque	27 - 33 Nm
Pilot Control Valve Hex Size	22,2 mm
Seal kit - Cartridge	Buna: 990021007
Seal kit - Cartridge	Polyurethane: 990021002
Seal kit - Cartridge	Viton: 990021006

**NOTES** Compound cartridge (pilot and main stage) assembly information is provided for reference only. Cartridges must be ordered separately and assembled at point of use.

**CONFIGURATION OPTIONS**

Model Code Example: **FVCA8AN**

SETTING RANGE	(A)	SEAL MATERIAL	(N)
A Replaceable Orifice .1 - 6 gpm (0,4 - 23 L/min.)		N Buna-N	
B Permanent Orifice .1 - 6 gpm (0,4 - 23 L/min.)		V Viton	



This valve is a ventable, bypass/restrictive, fixed-orifice, priority flow control with an integral pilot control cavity. The pilot control cavity will accept any T-8A pilot pressure or directional control cartridge. It takes an input flow at port 1 and uses it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess flow is bypassed out of port 2. Bypass flow may be used for a secondary circuit. Depending on which pilot control valve is installed in the T-8A cavity, priority flow can be selected electrically, manually, hydraulically or pneumatically.

**TECHNICAL DATA**

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

Maximum Operating Pressure	350 bar
Nominal Vent Flow	0,75 L/min.
Maximum Input Flow	120 L/min.
Pilot Control Cavity	T-8A
Pilot Control Valve Installation Torque	27 - 33 Nm
Pilot Control Valve Hex Size	22,2 mm
Seal kit - Cartridge	Buna: 990022007
Seal kit - Cartridge	EPDM: 990022014
Seal kit - Cartridge	Polyurethane: 990022002
Seal kit - Cartridge	Viton: 990022006

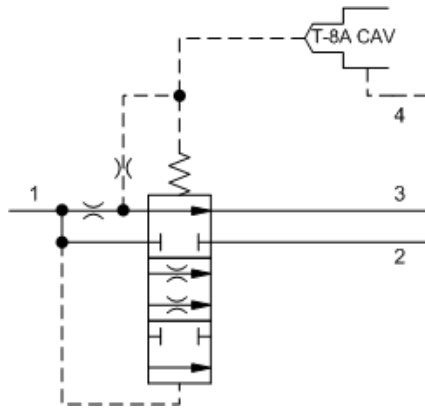
**NOTES** Compound cartridge (pilot and main stage) assembly information is provided for reference only. Cartridges must be ordered separately and assembled at point of use.

**CONFIGURATION OPTIONS**

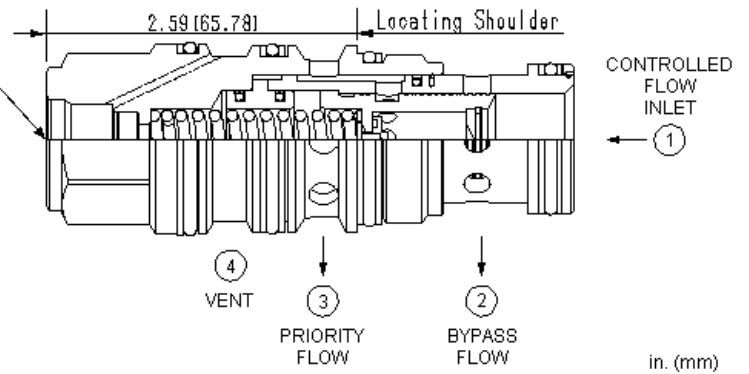
**Model Code Example: FVDA8AN**

SETTING RANGE	(A)	SEAL MATERIAL	(N)
<b>A</b> Replaceable Orifice .1 - 12 gpm (0,4 - 45 L/min.)		<b>N</b> Buna-N	
		<b>E</b> EPDM	
<b>B</b> Permanent Orifice .1 - 12 gpm (0,4 - 45 L/min.)		<b>V</b> Viton	





T-8A Cavity  
Accepts Sun's  
2 port Pilot  
Control Cartridges  
Pilot Control Cartridge  
Sold Separately



This valve is a ventable, bypass/restrictive, fixed-orifice, priority flow control with an integral pilot control cavity. The pilot control cavity will accept any T-8A pilot pressure or directional control cartridge. It takes an input flow at port 1 and uses it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess flow is bypassed out of port 2. Bypass flow may be used for a secondary circuit. Depending on which pilot control valve is installed in the T-8A cavity, priority flow can be selected electrically, manually, hydraulically or pneumatically.

**TECHNICAL DATA**

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

Maximum Operating Pressure	350 bar
Nominal Vent Flow	0,75 L/min.
Maximum Input Flow	240 L/min.
Pilot Control Cavity	T-8A
Pilot Control Valve Installation Torque	27 - 33 Nm
Pilot Control Valve Hex Size	22,2 mm
Seal kit - Cartridge	Buna: 990023007
Seal kit - Cartridge	Polyurethane: 990023002
Seal kit - Cartridge	Viton: 990023006

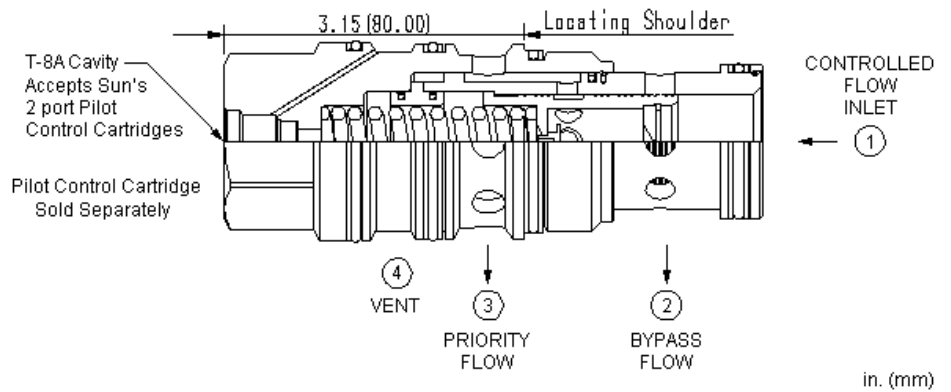
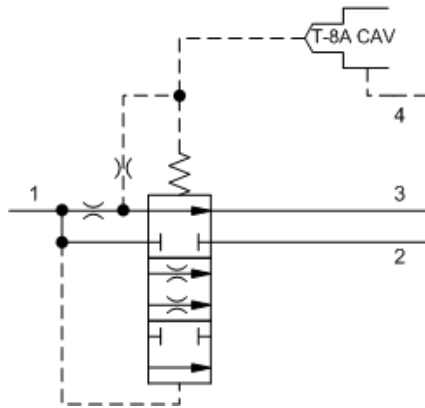
**NOTES** Compound cartridge (pilot and main stage) assembly information is provided for reference only. Cartridges must be ordered separately and assembled at point of use.

**CONFIGURATION OPTIONS**

**Model Code Example: FVEA8AN**

**SETTING RANGE (A) SEAL MATERIAL (N)**

- A** Replaceable Orifice .2 - 25 gpm (0,8 - 95 L/min.)
- B** Permanent Orifice .2 - 25 gpm (0,8 - 95 L/min.)
- N** Buna-N
- V** Viton



This valve is a ventable, bypass/restrictive, fixed-orifice, priority flow control with an integral pilot control cavity. The pilot control cavity will accept any T-8A pilot pressure or directional control cartridge. It takes an input flow at port 1 and uses it to satisfy the priority flow at port 3. If the input flow exceeds the priority flow requirement, the excess flow is bypassed out of port 2. Bypass flow may be used for a secondary circuit. Depending on which pilot control valve is installed in the T-8A cavity, priority flow can be selected electrically, manually, hydraulically or pneumatically.

**TECHNICAL DATA**

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

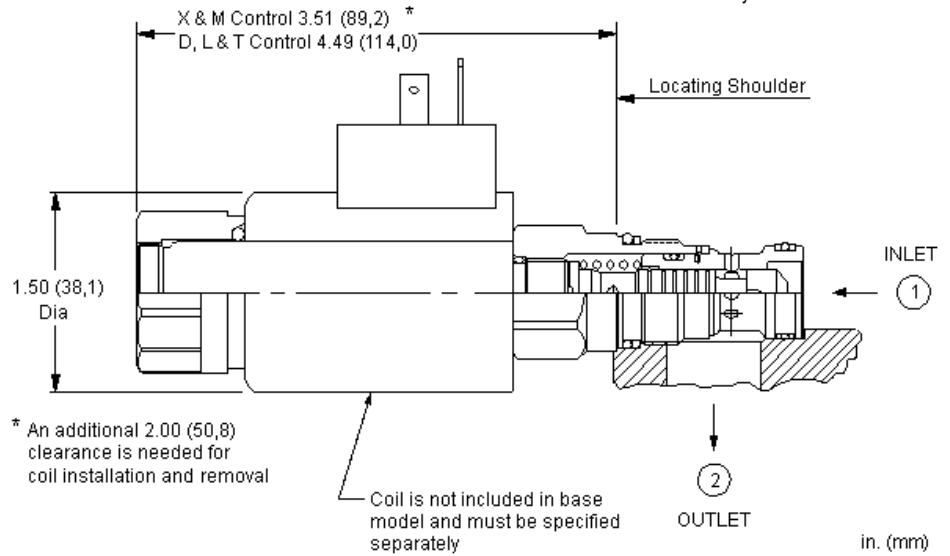
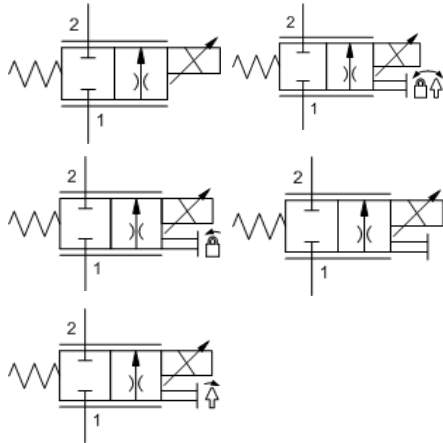
Maximum Operating Pressure	350 bar
Nominal Vent Flow	0,75 L/min.
Maximum Input Flow	480 L/min.
Pilot Control Cavity	T-8A
Pilot Control Valve Installation Torque	27 - 33 Nm
Pilot Control Valve Hex Size	22,2 mm
Seal kit - Cartridge	Buna: 990024007
Seal kit - Cartridge	EPDM: 990024014
Seal kit - Cartridge	Polyurethane: 990024002
Seal kit - Cartridge	Viton: 990024006

**NOTES** Compound cartridge (pilot and main stage) assembly information is provided for reference only. Cartridges must be ordered separately and assembled at point of use.

**CONFIGURATION OPTIONS**

**Model Code Example: FVFA8AN**

SETTING RANGE	(A)	SEAL MATERIAL	(N)
<b>A</b> Replaceable Orifice .2 - 50 gpm (1 - 200 L/min.)		<b>N</b> Buna-N	
		<b>E</b> EPDM	
<b>B</b> Permanent Orifice .2 - 50 gpm (1 - 200 L/min.)		<b>V</b> Viton	



This valve is a normally closed, electro-proportional throttle that is spring-biased closed. Energizing the coil generates an opening force on the spool 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 1-to-2 direction and will provide proportional flow control in the 2-to-1 direction with the addition of an external compensator. Full reverse flow (2-to-1) with 100% command in the 2-to-1 direction is possible without a compensator under all conditions.

**TECHNICAL DATA**

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

Maximum Valve Leakage at 110 SUS (24 cSt)	100 cc/min.@210 bar
Manual Override Force Requirement	33 N/100 bar @ Port 1
Manual Override Stroke	2,5 mm
Seal kit - Cartridge	Buna: 990413007
Seal kit - Cartridge	EPDM: 990010014
Seal kit - Cartridge	Polyurethane: 990413002
Seal kit - Cartridge	Viton: 990413006

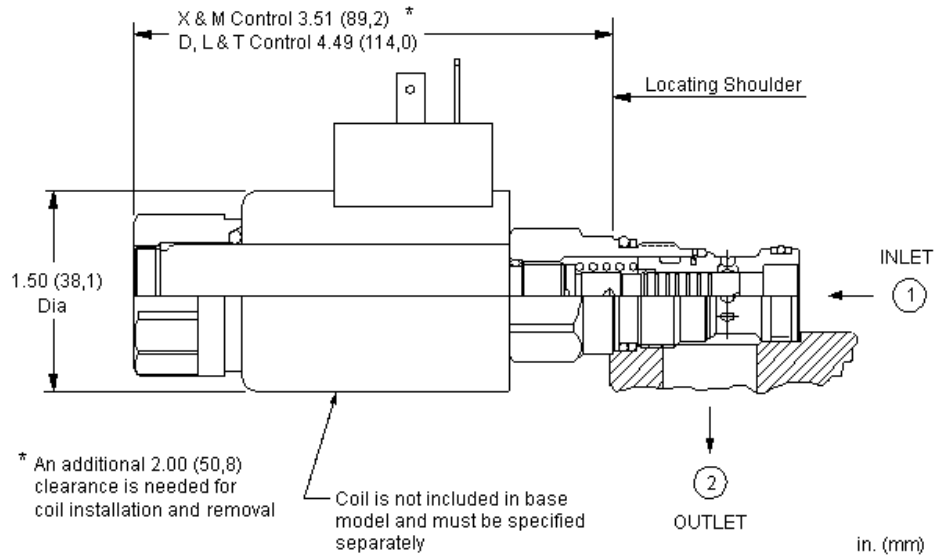
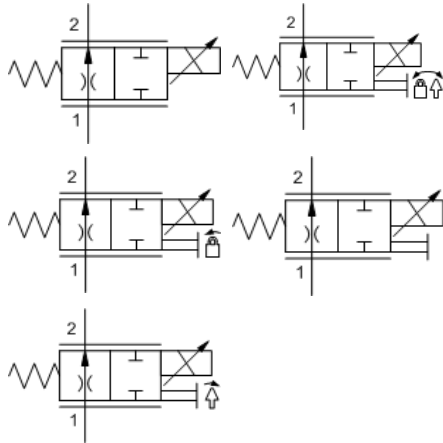
**NOTES** Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.

**CONFIGURATION OPTIONS**
**Model Code Example: FPCCXCN**

CONTROL	(X) FLOW RATE	(C) SEAL MATERIAL	(N) COIL *
<b>X</b> No Manual Override	<b>C</b> .25 - 7 gpm (1 - 28 L/min.)	<b>N</b> Buna-N	No coil
<b>D</b> Twist/Lock (Dual) Manual Override	<b>A</b> .1 - 1.5 gpm (0,4 - 6 L/min.)	<b>E</b> EPDM	<b>212</b> DIN 43650-Form A, 12 VDC
<b>E</b> Twist (Extended) Manual Override	<b>B</b> .15 - 3.5 gpm (0,6 - 14 L/min.)	<b>V</b> Viton	<b>224</b> DIN 43650-Form A, 24 VDC
<b>L</b> Twist/Lock (Detent) Manual Override	<b>D</b> .25 - 10 gpm (1 - 40 L/min.)		<b>224NX01</b> DIN 43650-Form A, 24 VDC, no transient voltage suppression (TVS) diodes, with XMD-01 driver
<b>M</b> Manual Override			<b>224NX02</b> DIN 43650-Form A, 24 VDC, no transient voltage suppression (TVS) diodes, with XMD-02 driver
<b>T</b> Twist (Momentary) Manual Override			<b>912</b> Deutsch DT04-2P, 12 VDC
			<b>912NX01</b> Deutsch DT04-2P, 12 VDC, no transient voltage suppression (TVS) diodes, with XMD-01 driver
			<b>912NX02</b> Deutsch DT04-2P, 12 VDC, no transient voltage suppression (TVS) diodes, with XMD-02 driver
			<b>924</b> Deutsch DT04-2P, 24 VDC
			<b>924NX01</b> Deutsch DT04-2P, 24 VDC, no transient voltage suppression (TVS) diodes, with XMD-01 driver

**924NX02** Deutsch DT04-2P, 24 VDC, no  
transient voltage suppression  
(TVS) diodes, with XMD-02  
driver

\* Additional coil options are available



This valve is a normally open electro-proportional throttle that is spring-biased open. Energizing the coil generates an closing force on the spool 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 1-to-2 direction and will provide proportional flow control in the 2-to-1 direction with the addition of an external compensator. Full reverse flow (2-to-1) with no command in the 2-to-1 direction is possible without a compensator under all conditions.

**TECHNICAL DATA**

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

Maximum Valve Leakage at 110 SUS (24 cSt)	100 cc/min.@210 bar
Manual Override Force Requirement	33 N/100 bar @ Port 1
Manual Override Stroke	2,5 mm
Seal kit - Cartridge	Buna: 990413007
Seal kit - Cartridge	Polyurethane: 990413002
Seal kit - Cartridge	Viton: 990413006

**NOTES** Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.

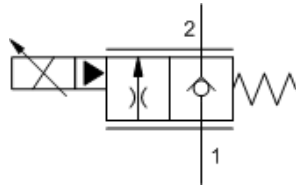
**CONFIGURATION OPTIONS**

**Model Code Example: FPCHXCN**

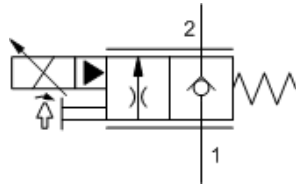
CONTROL	(X) FLOW RATE	(C) SEAL MATERIAL	(N) COIL *
<b>X</b> No Manual Override	<b>C</b> .25 - 7 gpm (1 - 28 L/min.)	<b>N</b> Buna-N	No coil
<b>D</b> Twist/Lock (Dual) Manual Override	<b>A</b> .1 - 1.5 gpm (0,4 - 6 L/min.)	<b>E</b> EPDM	<b>212</b> DIN 43650-Form A, 12 VDC
<b>E</b> Twist (Extended) Manual Override	<b>B</b> .15 - 3.5 gpm (0,6 - 14 L/min.)	<b>V</b> Viton	<b>224</b> DIN 43650-Form A, 24 VDC
<b>L</b> Twist/Lock (Detent) Manual Override			<b>224NX01</b> DIN 43650-Form A, 24 VDC, no transient voltage suppression (TVS) diodes, with XMD-01 driver
<b>M</b> Manual Override			<b>224NX02</b> DIN 43650-Form A, 24 VDC, no transient voltage suppression (TVS) diodes, with XMD-02 driver
<b>T</b> Twist (Momentary) Manual Override			<b>912</b> Deutsch DT04-2P, 12 VDC
			<b>912NX01</b> Deutsch DT04-2P, 12 VDC, no transient voltage suppression (TVS) diodes, with XMD-01 driver
			<b>912NX02</b> Deutsch DT04-2P, 12 VDC, no transient voltage suppression (TVS) diodes, with XMD-02 driver
			<b>924</b> Deutsch DT04-2P, 24 VDC
			<b>924NX01</b> Deutsch DT04-2P, 24 VDC, no transient voltage suppression (TVS) diodes, with XMD-01 driver
			<b>924NX02</b> Deutsch DT04-2P, 24 VDC, no transient voltage suppression (TVS) diodes, with XMD-02 driver

transient voltage suppression  
(TVS) diodes, with XMD-02  
driver

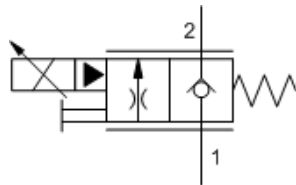
\* Additional coil options are available



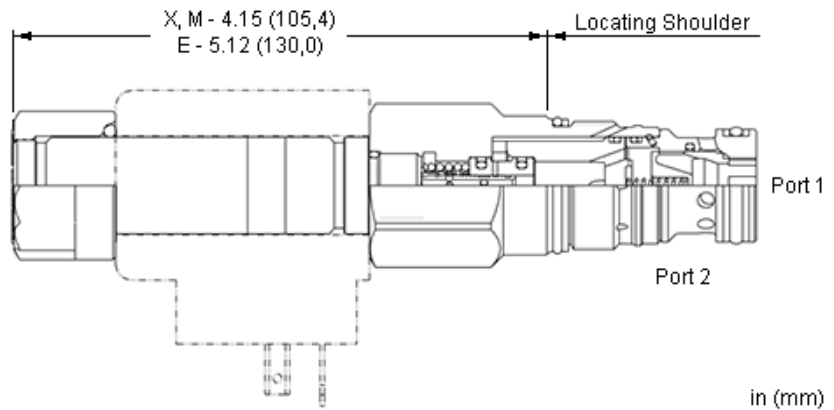
X-Control



E-Control



M-Control



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. Metered flow is from port 1 to port 2 with reverse free flow from port 2 to port 1.

**TECHNICAL DATA**

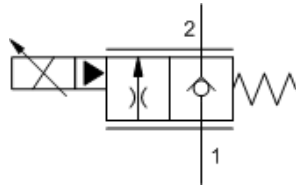
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Recommended dither frequency	100 Hz
Maximum Valve Leakage at 110 SUS (24 cSt)	20 drops/min.@5000 psi
Manual Override Force Requirement	33 N/100 bar @ Port 1
Deadband, nominal (as a percentage of input)	25%
Manual Override Stroke	1,50 mm
Seal kit - Cartridge	Buna: 990203007
Seal kit - Cartridge	EPDM: 990203014
Seal kit - Cartridge	Viton: 990203006

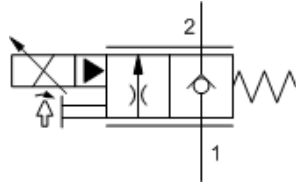
**CONFIGURATION OPTIONS**
**Model Code Example: FPFKXDN**

CONTROL	(X) FLOW RATE	(D) SEAL MATERIAL	(N) COIL *
<b>X</b> No Manual Override	<b>D</b> Nominal 20 gpm @ 200 psi (14 bar) differential (80 L/min.)	<b>N</b> Buna-N	No coil
<b>E</b> Twist (Extended) Manual Override	<b>B</b> Nominal 10 gpm @ 200 psi (14 bar) differential (40 L/min.)	<b>E</b> EPDM	<b>212</b> DIN 43650-Form A, 12 VDC
<b>M</b> Manual Override		<b>V</b> Viton	<b>224</b> DIN 43650-Form A, 24 VDC
			<b>912</b> Deutsch DT04-2P, 12 VDC
			<b>924</b> Deutsch DT04-2P, 24 VDC

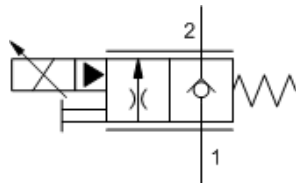
\* Additional coil options are available



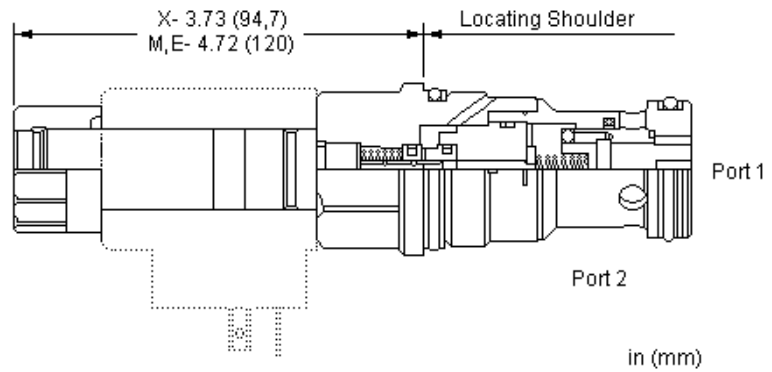
X-Control



E-Control



M-Control



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. Metered flow is from port 1 to port 2 with reverse free flow from port 2 to port 1.

**TECHNICAL DATA**

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

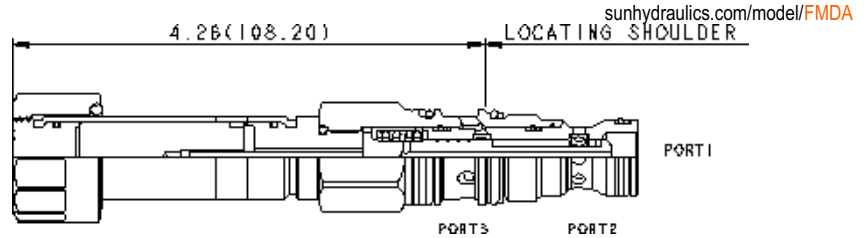
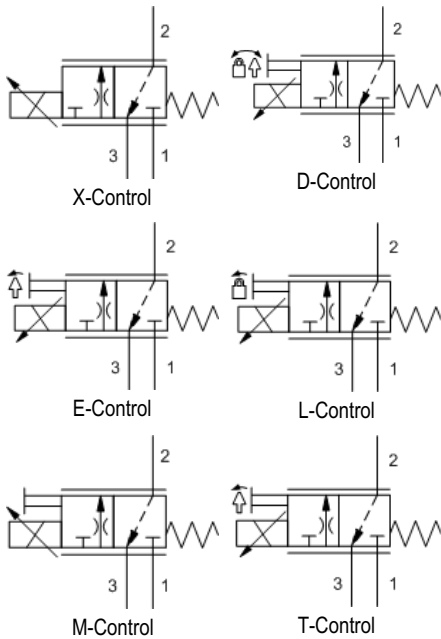
Recommended dither frequency	100 Hz
Maximum Valve Leakage at 110 SUS (24 cSt)	20 drops/min. @5000 psi
Manual Override Force Requirement	33 N/100 bar @ Port 1
Deadband, nominal (as a percentage of input)	25%
Manual Override Stroke	1,50 mm
Seal kit - Cartridge	Buna: 990016007
Seal kit - Cartridge	EPDM: 990016014
Seal kit - Cartridge	Polyurethane: 990016002
Seal kit - Cartridge	Viton: 990016006

**CONFIGURATION OPTIONS**
**Model Code Example: FPHKXCN**

CONTROL	(X) FLOW RATE	(C) SEAL MATERIAL	(N) COIL *
<b>X</b> No Manual Override	<b>C</b> Nominal 40 gpm @ 200 psi (14 bar) differential (160 L/min.)	<b>N</b> Buna-N	No coil
<b>E</b> Twist (Extended) Manual Override	<b>A</b> Nominal 20 gpm @ 200 psi (14 bar) differential (80 L/min.)	<b>E</b> EPDM	<b>212</b> DIN 43650-Form A, 12 VDC
<b>M</b> Manual Override	<b>E</b> Nominal 60 gpm @ 200 psi (14 bar) differential (240 L/min.)	<b>V</b> Viton	<b>224</b> DIN 43650-Form A, 24 VDC
			<b>912</b> Deutsch DT04-2P, 12 VDC
			<b>924</b> Deutsch DT04-2P, 24 VDC

\* Additional coil options are available





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 FMDAs in conjunction with a cushion lock circuit create a meter-in/meter-out 3-position 4-way.

**TECHNICAL DATA**

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

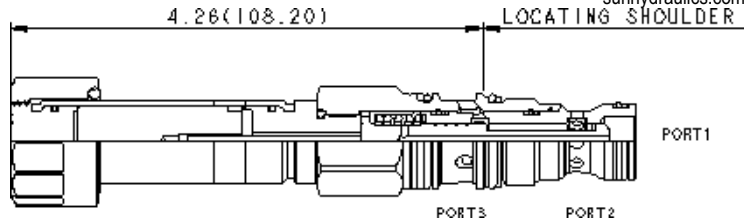
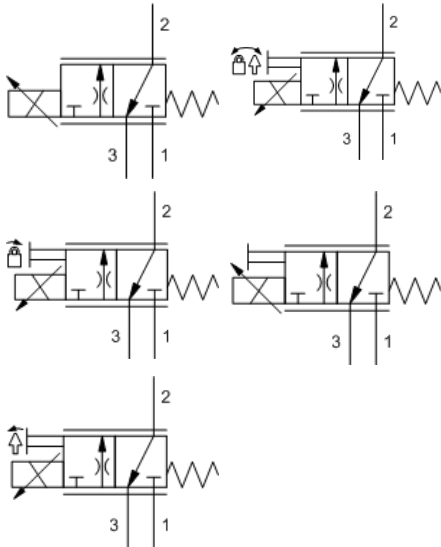
Maximum Valve Leakage at 110 SUS (24 cSt)	30 cc/min.@70 bar
Manual Override Force Requirement	33 N/100 bar @ Port 1
Manual Override Stroke	2,5 mm
Seal kit - Cartridge	Buna: 990411007
Seal kit - Cartridge	Viton: 990411006

**NOTES** Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.

**CONFIGURATION OPTIONS**

**Model Code Example: FMDAXDN**

CONTROL	(X) FLOW RATE	(D) SEAL MATERIAL	(N) COIL *
<b>X</b> No Manual Override	<b>D</b> .1 - 9 gpm (0,4 - 34 L/min.)	<b>N</b> Buna-N	No coil
<b>D</b> Twist/Lock (Dual) Manual Override	<b>A</b> .1 - 1.6 gpm (0,4 - 6.1 L/min.)	<b>E</b> EPDM	<b>212</b> DIN 43650-Form A, 12 VDC
<b>E</b> Twist (Extended) Manual Override	<b>B</b> .1 - 4 gpm (0,4 - 15 L/min.)	<b>V</b> Viton	<b>224</b> DIN 43650-Form A, 24 VDC
<b>L</b> Twist/Lock (Detent) Manual Override	<b>C</b> .1 - 6 gpm (0,4 - 23 L/min.)		<b>912</b> Deutsch DT04-2P, 12 VDC
<b>M</b> Manual Override			<b>924</b> Deutsch DT04-2P, 24 VDC
<b>T</b> Twist (Momentary) Manual Override			* Additional coil options are available



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 connected 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.

**TECHNICAL DATA**

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

Maximum Valve Leakage at 110 SUS (24 cSt)	30 cc/min.@70 bar
Manual Override Force Requirement	33 N/100 bar @ Port 1
Manual Override Stroke	2,5 mm
Seal kit - Cartridge	Buna: 990411007
Seal kit - Cartridge	Viton: 990411006

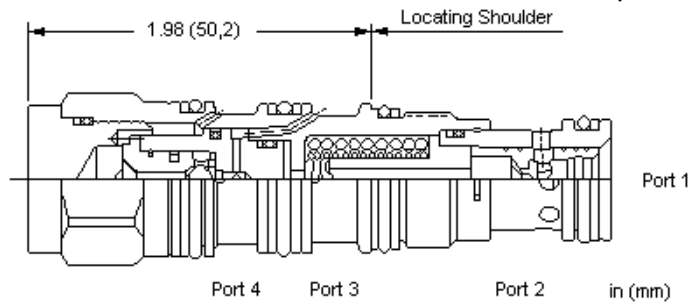
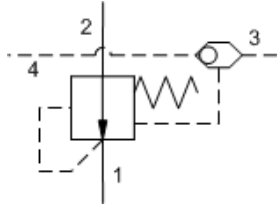
**NOTES** Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances.

**CONFIGURATION OPTIONS**

**Model Code Example: FMDBXCN**

CONTROL	(X) FLOW RATE	(C) SEAL MATERIAL	(N) COIL *
<b>X</b> No Manual Override	<b>C</b> .1 - 6 gpm (0,4 - 23 L/min.)	<b>N</b> Buna-N	No coil
<b>D</b> Twist/Lock (Dual) Manual Override	<b>A</b> .1 - 1.6 gpm (0,4 - 6.1 L/min.)	<b>V</b> Viton	<b>212</b> DIN 43650-Form A, 12 VDC
<b>E</b> Twist (Extended) Manual Override	<b>B</b> .1 - 4 gpm (0,4 - 15 L/min.)		<b>224</b> DIN 43650-Form A, 24 VDC
<b>L</b> Twist/Lock (Detent) Manual Override			<b>912</b> Deutsch DT04-2P, 12 VDC
<b>M</b> Manual Override			<b>924</b> Deutsch DT04-2P, 24 VDC
<b>T</b> Twist (Momentary) Manual Override			

\* Additional coil options are available



A normally open modulating element, used as a restrictive compensator, ensures a constant pressure drop across an external orifice to create a pressure compensated flow control. The resulting flow remains constant regardless of variations in upstream or downstream pressure.

A ball shuttle connects the after orifice signal from the higher of port 3 or 4 to the pilot area.

**TECHNICAL DATA**

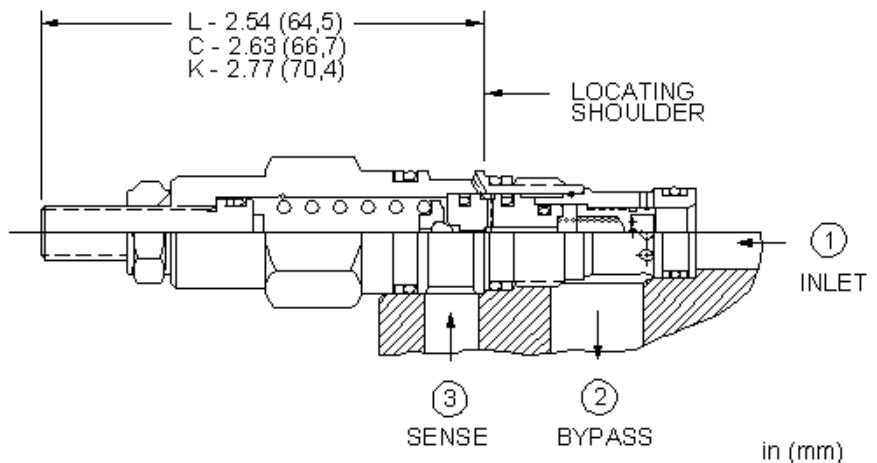
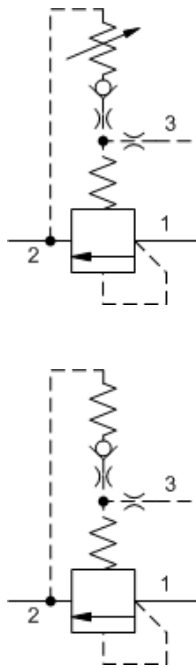
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Nominal Compensating Pressure	14 bar
Maximum Operating Pressure	350 bar
Seal kit - Cartridge	Buna: 990021007
Seal kit - Cartridge	Polyurethane: 990021002
Seal kit - Cartridge	Viton: 990021006

**CONFIGURATION OPTIONS**

**Model Code Example: LPDSXHN**

<b>CONTROL</b>	<b>(X) DIFFERENTIAL PRESSURE</b>	<b>(H) SEAL MATERIAL</b>	<b>(N)</b>
<b>X</b> Not Adjustable	<b>H</b> 200 psi (14 bar)	<b>N</b> Buna-N	<b>V</b> Viton



Three-port normally closed modulating elements with relief provide two functions when combined with an external orifice. The mainstage is a bypass compensator that controls a priority flow into the circuit, determined by the external orifice. Input flow in excess of the priority flow is bypassed to tank (port 2). If the inlet (port 1) pressure rises to the valve setting, the valve operates as a normal relief valve.

**TECHNICAL DATA**

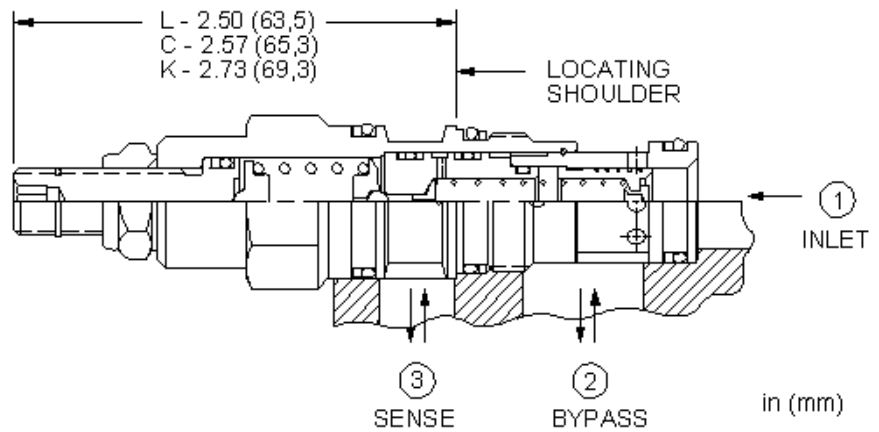
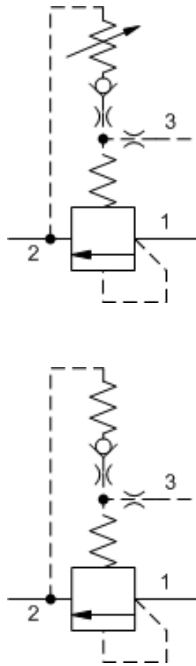
NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	30 cc/min.@70 bar
Response Time - Typical	10 ms
Adjustment - No. of CW Turns from Min. to Max. setting	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990163007
Seal kit - Cartridge	Polyurethane: 990163002
Seal kit - Cartridge	Viton: 990163006

**CONFIGURATION OPTIONS**

**Model Code Example: RVBBLAN**

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N)
<b>L</b> Standard Screw Adjustment	<b>A</b> 75 - 3000 psi (5 - 210 bar), 1000 psi (70 bar) Standard Setting	<b>N</b> Buna-N	
<b>C</b> Tamper Resistant - Factory Set	<b>B</b> 75 - 1500 psi (5 - 105 bar), 1000 psi (70 bar) Standard Setting	<b>V</b> Viton	
<b>K</b> Handknob	<b>C</b> 75 - 6000 psi (5 - 420 bar), 1000 psi (70 bar) Standard Setting		
	<b>N</b> 75 - 800 psi (5 - 55 bar), 400 psi (28 bar) Standard Setting		
	<b>Q</b> 75 - 400 psi (5 - 28 bar), 200 psi (14 bar) Standard Setting		
	<b>W</b> 75 - 4500 psi (5 - 315 bar), 1000 psi (70 bar) Standard Setting		



Three-port normally closed modulating elements with relief provide two functions when combined with an external orifice. The mainstage is a bypass compensator that controls a priority flow into the circuit, determined by the external orifice. Input flow in excess of the priority flow is bypassed to tank (port 2). If the inlet (port 1) pressure rises to the valve setting, the valve operates as a normal relief valve.

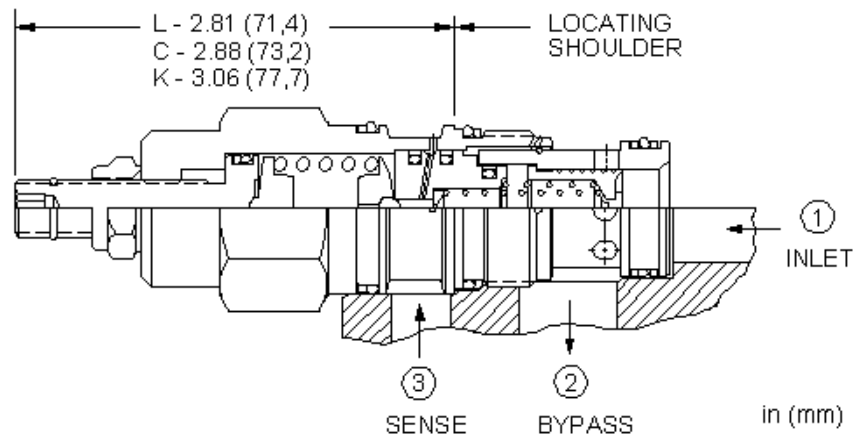
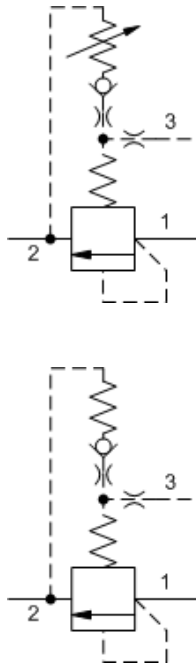
**TECHNICAL DATA**

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

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	30 cc/min.@70 bar
Response Time - Typical	10 ms
Adjustment - No. of CW Turns from Min. to Max. setting	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990011007
Seal kit - Cartridge	Polyurethane: 990011002
Seal kit - Cartridge	Viton: 990011006

**CONFIGURATION OPTIONS**
**Model Code Example: RVCBLAN**

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>L</b> Standard Screw Adjustment	<b>A</b> 100 - 3000 psi (7 - 210 bar), 1000 psi (70 bar) Standard Setting	<b>N</b> Buna-N	Standard Material/Coating
<b>C</b> Tamper Resistant - Factory Set	<b>B</b> 50 - 1500 psi (3,5 - 105 bar), 1000 psi (70 bar) Standard Setting	<b>V</b> Viton	/AP Stainless Steel, Passivated
<b>K</b> Handknob	<b>C</b> 150 - 6000 psi (10,5 - 420 bar), 1000 psi (70 bar) Standard Setting		/LH Mild Steel, Zinc-Nickel



Three-port normally closed modulating elements with relief provide two functions when combined with an external orifice. The mainstage is a bypass compensator that controls a priority flow into the circuit, determined by the external orifice. Input flow in excess of the priority flow is bypassed to tank (port 2). If the inlet (port 1) pressure rises to the valve setting, the valve operates as a normal relief valve.

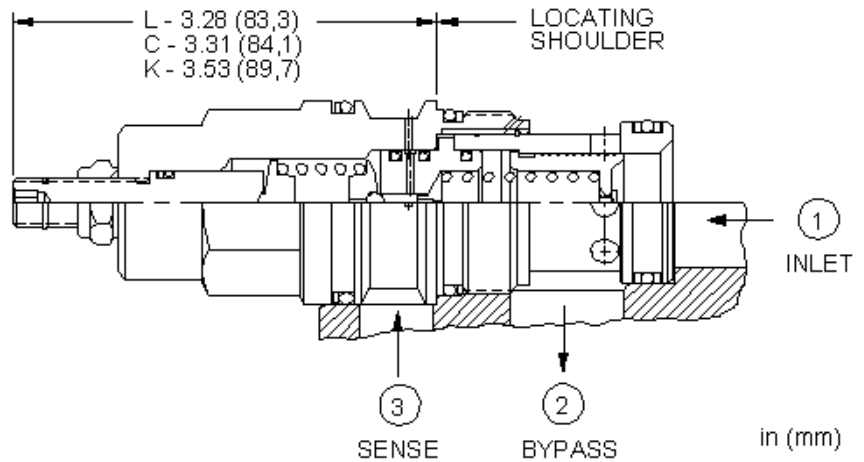
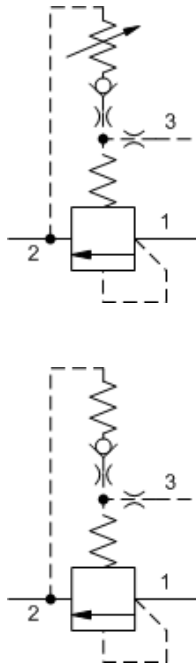
**TECHNICAL DATA**

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

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	50 cc/min.@70 bar
Response Time - Typical	10 ms
Adjustment - No. of CW Turns from Min. to Max. setting	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990202007
Seal kit - Cartridge	Polyurethane: 990002002
Seal kit - Cartridge	Viton: 990202006

**CONFIGURATION OPTIONS**
**Model Code Example: RVEBLAN**

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
<b>L</b> Standard Screw Adjustment	<b>A</b> 100 - 3000 psi (7 - 210 bar), 1000 psi (70 bar) Standard Setting	<b>N</b> Buna-N	Standard Material/Coating
<b>C</b> Tamper Resistant - Factory Set	<b>B</b> 50 - 1500 psi (3,5 - 105 bar), 1000 psi (70 bar) Standard Setting	<b>V</b> Viton	JAP Stainless Steel, Passivated
<b>K</b> Handknob	<b>C</b> 100 - 6000 psi (7 - 420 bar), 1000 psi (70 bar) Standard Setting		
<b>W</b> Hex Wrench Adjustment	<b>W</b> 100 - 4500 psi (7 - 315 bar), 1000 psi (70 bar) Standard Setting		
<b>Y</b> Tri-Grip Handknob			



Three-port normally closed modulating elements with relief provide two functions when combined with an external orifice. The mainstage is a bypass compensator that controls a priority flow into the circuit, determined by the external orifice. Input flow in excess of the priority flow is bypassed to tank (port 2). If the inlet (port 1) pressure rises to the valve setting, the valve operates as a normal relief valve.

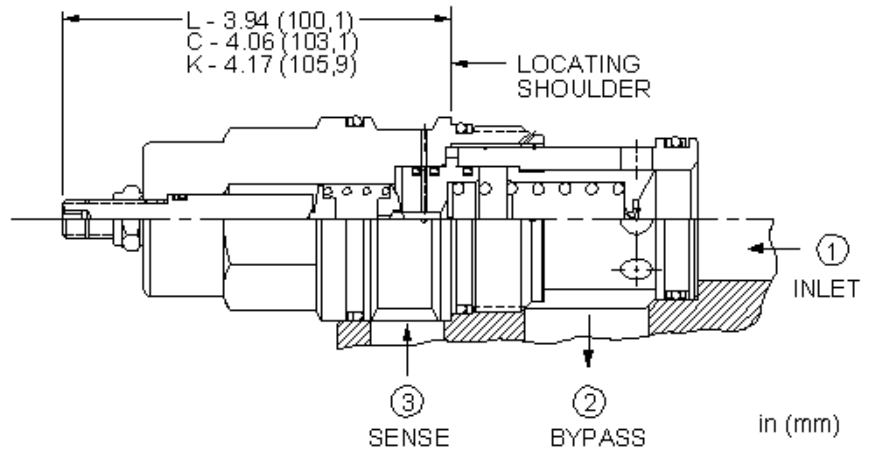
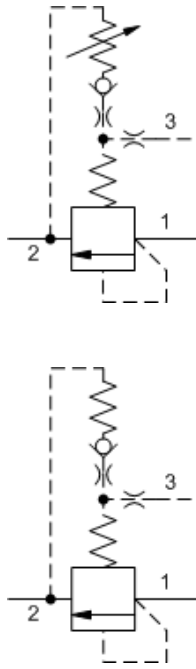
**TECHNICAL DATA**

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

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	65 cc/min.@70 bar
Response Time - Typical	10 ms
Adjustment - No. of CW Turns from Min. to Max. setting	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990017007
Seal kit - Cartridge	Polyurethane: 990017002
Seal kit - Cartridge	Viton: 990017006

**CONFIGURATION OPTIONS**
**Model Code Example: RVGBLAN**

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 100 - 3000 psi (7 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	B 150 - 1500 psi (10,5 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	JAP Stainless Steel, Passivated
K Handknob	C 100 - 6000 psi (7 - 420 bar), 1000 psi (70 bar) Standard Setting		



Three-port normally closed modulating elements with relief provide two functions when combined with an external orifice. The mainstage is a bypass compensator that controls a priority flow into the circuit, determined by the external orifice. Input flow in excess of the priority flow is bypassed to tank (port 2). If the inlet (port 1) pressure rises to the valve setting, the valve operates as a normal relief valve.

**TECHNICAL DATA**

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

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	80 cc/min.@70 bar
Response Time - Typical	10 ms
Adjustment - No. of CW Turns from Min. to Max. setting	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990019007
Seal kit - Cartridge	EPDM: 990019014
Seal kit - Cartridge	Polyurethane: 990019002
Seal kit - Cartridge	Viton: 990019006

**CONFIGURATION OPTIONS**
**Model Code Example: RVIBLAN**

CONTROL	(L)	ADJUSTMENT RANGE	(A)	SEAL MATERIAL	(N)
L Standard Screw Adjustment		A 100 - 3000 psi (7 - 210 bar), 1000 psi (70 bar) Standard Setting		N Buna-N	
C Tamper Resistant - Factory Set		B 50 - 1500 psi (3,5 - 105 bar), 1000 psi (70 bar) Standard Setting		E EPDM	
K Handknob		C 150 - 6000 psi (10,5 - 420 bar), 1000 psi (70 bar) Standard Setting		V Viton	



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[www.sunhydraulics.com](http://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](mailto:sales@sunuk.com)

Sun Hydraulik GmbH  
Erkelenz Germany  
+49 2431 80910  
[sales@sunhydraulik.de](mailto:sales@sunhydraulik.de)

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

Sun Hydraulics Korea Corp.  
Incheon Korea  
+82 3281 31350  
[sales@sunhydraulics.co.kr](mailto:sales@sunhydraulics.co.kr)

Sun Hydraulics China Co. Ltd.  
Shanghai P.R. China  
+86 2162 375885  
[sunchinainfo@sunhydraulics.com](mailto:sunchinainfo@sunhydraulics.com)

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