

CavitySaver™ (multi-function) Cartridges

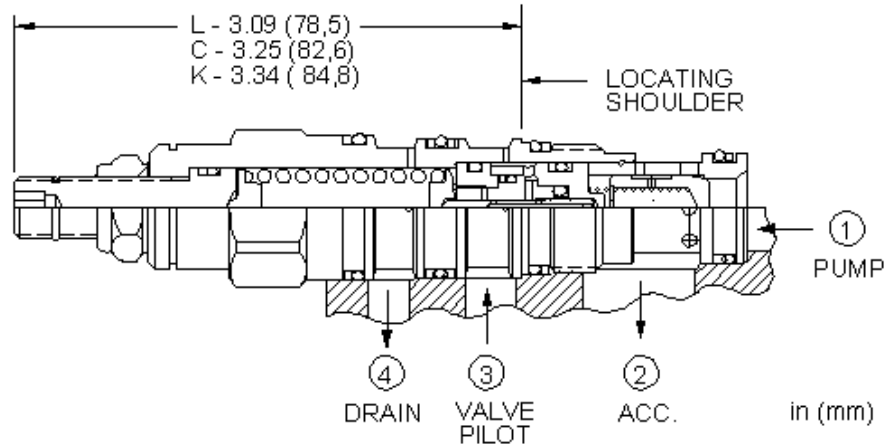
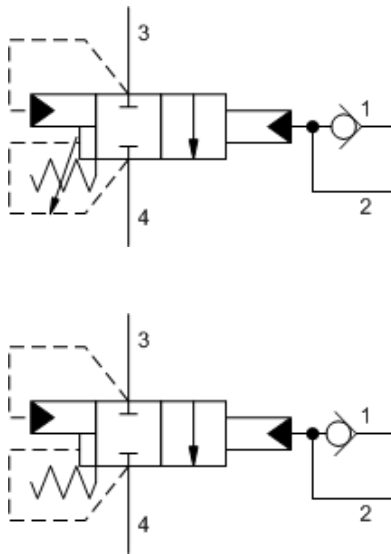
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QCDA	15%, accumulator sense, pump unload valve with check - pilot capacity1
RBAD	Dual, direct-acting relief valve - pilot capacity2
HRDA	Direct-acting relief valve - before check	.....3
HRDB	Direct-acting relief valve - after check	.....4
HVCA	Ventable, pilot operated, balanced piston relief valve - before check	.....5
HVCA8	Ventable, pilot operated, balanced piston relief main stage with integral T-8A control cavity - before check	.....6
LODD	Vent-to-open, spring biased closed, unbalanced poppet logic element with pilot source from port 1 or 2	.....7
LOFD	Vent-to-open, spring biased closed, unbalanced poppet logic element with pilot source from port 1 or 2	.....8
LODD8	Vent-to-open, spring biased closed, unbalanced poppet logic element with pilot source from port 1 or 2 and integral T-8A control cavity	.....9
DKDP	Normally closed, balanced poppet, logic element - pressure adjustable	.....10
DKFP	Normally closed, balanced poppet, logic element - pressure adjustable	.....11
DKHP	Normally closed, balanced poppet, logic element - pressure adjustable	.....12
DKJP	Normally closed, balanced poppet, logic element - pressure adjustable	.....13
DODP	Normally open, balanced poppet, logic element - pressure adjustable	.....14
DOFP	Normally open, balanced poppet, logic element - pressure adjustable15
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DOJP	Normally open, balanced poppet, logic element - pressure adjustable17
SCGA	Direct-acting sequence valve with reverse flow check	.....18
FDBA	Fully adjustable pressure compensated flow control valve with reverse flow check	.....19
FDCB	Fully adjustable pressure compensated flow control valve with reverse flow check	.....20

FDEA	Fully adjustable pressure compensated flow control valve with reverse flow check	.....21
FDFA	Fully adjustable pressure compensated flow control valve with reverse flow check	.....22
LPDS	Normally open modulating element with shuttle	.....23
RVBB	Normally closed modulating element valve with relief function	.....24
RVCB	Normally closed modulating element valve with relief function	.....25
RVEB	Normally closed modulating element valve with relief function	.....26
RVGB	Normally closed modulating element valve with relief function	.....27
RVIB	Normally closed modulating element valve with relief function	.....28

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



The accumulator sense, pump unload pilot valve is used to sense pressure in an accumulator at port 2 of the valve and when the pressure at port 2 reaches the valve setting, port 3 connects to port 4 to vent a relief valve and unload the pump. This valve has a 15% ratio between unload setting and reset; when pressure at port 2 falls below 85% of the valve setting, port 3 is blocked from port 4 and the pump will come back online to recharge the accumulator.

The integral free-flow check valve is suitable for pump flows up to 15 gpm (60 L/min). For higher capacity pumps, another version of accumulator sense, pump unload cartridge, QPAA, which requires a separate check cartridge is available.

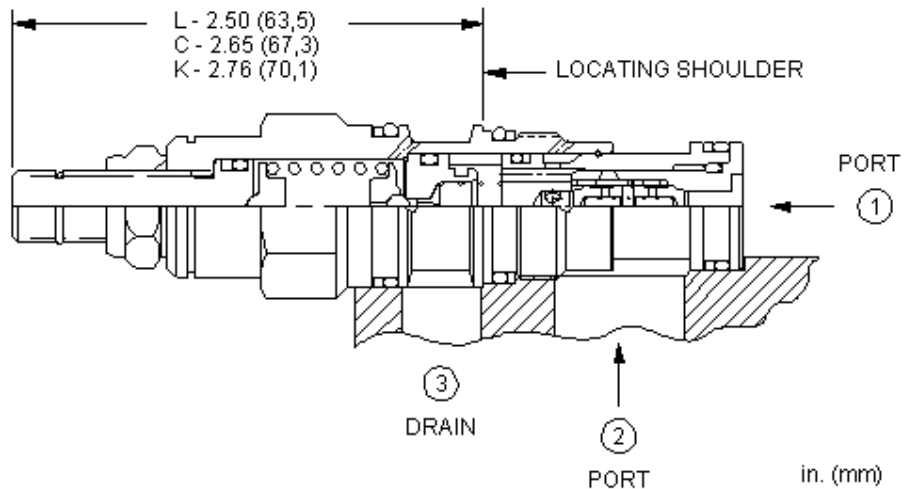
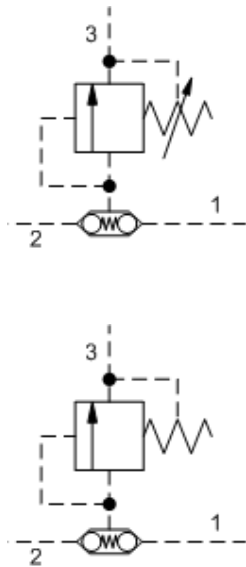
TECHNICAL DATA

Maximum Operating Pressure	350 bar
Check Cracking Pressure	0,3 bar
Pressure Drop, Port 1 to Port 2	7 bar@60 L/min.
Pilot Flow Capacity	0,75 L/min.
Adjustment - Number of Clockwise Turns to Increase Setting	5
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: QCDALAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 1000 - 3000 psi (70 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	B 500 - 1500 psi (35 - 105 bar), 500 psi (35 bar) Standard Setting C 2000 - 5000 psi (140 - 350 bar), 2000 psi (140 bar) Standard Setting D 250 - 800 psi (18 - 55 bar), 250 psi (18 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated



This direct-acting, pilot relief cartridge incorporates back-to-back check valves. This allows it to remotely control 2 other pilot-operated valves or act as a thermal relief for both ends of an actuator. Because capacity is limited to pilot flow, this valve should be used with other valves with comparable pilot flows.

TECHNICAL DATA

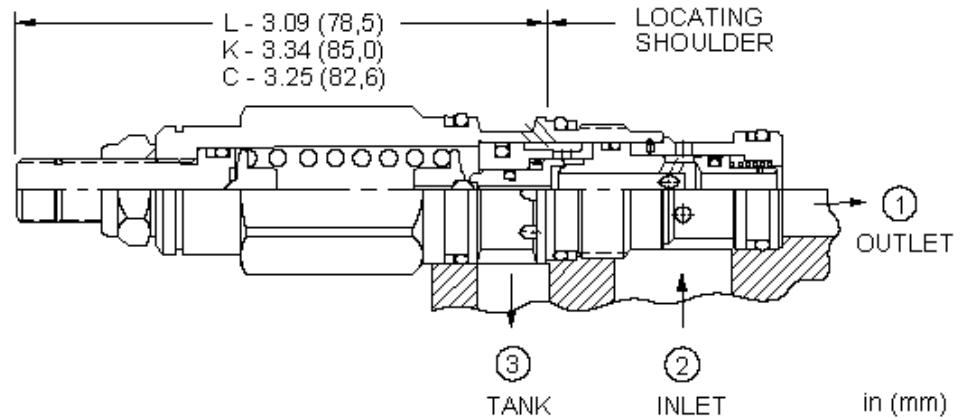
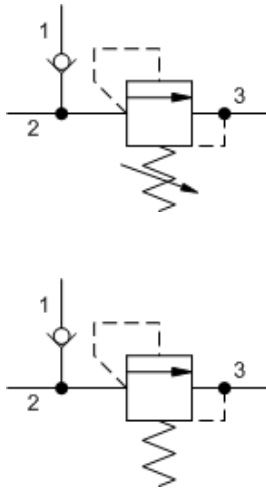
Response Time - Typical	2 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	0,3 cc/min.
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990011007
Seal kit - Cartridge	Polyurethane: 990011002
Seal kit - Cartridge	Viton: 990011006

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: RBADLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 25 - 3000 psi (1,7 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	B 25 - 1500 psi (1,7 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
K Handknob	C 25 - 6000 psi (1,7 - 420 bar), 1000 psi (70 bar) Standard Setting		/LH Mild Steel, Zinc-Nickel
O Handknob with Panel Mount	D 25 - 800 psi (1,7 - 55 bar), 400 psi (28 bar) Standard Setting		
	E 25 - 400 psi (1,7 - 28 bar), 200 psi (14 bar) Standard Setting		
	W 25 - 4500 psi (1,7 - 315 bar), 1000 psi (70 bar) Standard Setting		



The relief-before-check cartridge is a CavitySaver™ (multi-function) valve incorporating a direct-acting relief tee'd in before a check function. When the pressure at the inlet (port 2) reaches the relief valve setting, the valve starts to open to tank (port 3), throttling flow to limit the pressure rise. The check valve flow is from the inlet (port 2) to the system port (port1). These valves are smooth and quiet, essentially zero leak, dirt tolerant, immune to silting and are very fast.

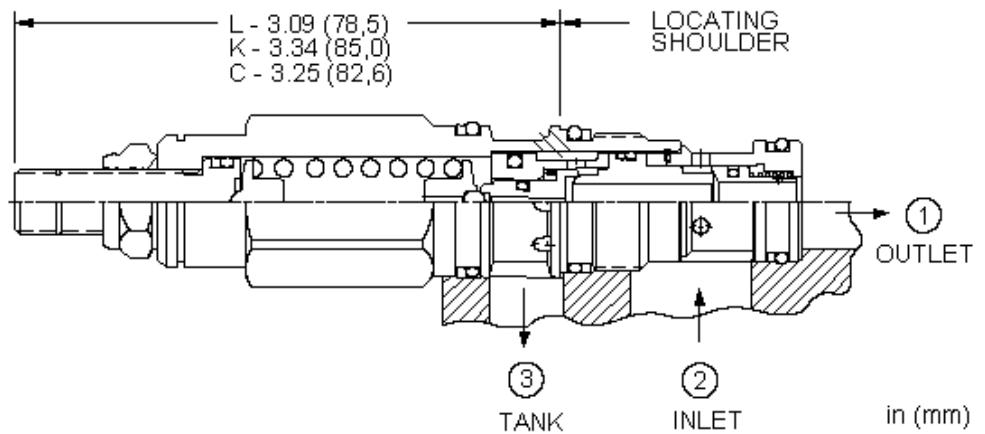
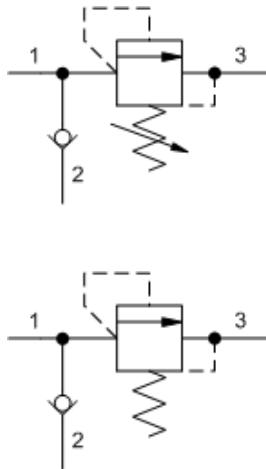
TECHNICAL DATA

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at Reseat	0,3 cc/min.
Check Cracking Pressure	1,7 bar
Adjustment - Number of Clockwise Turns to Increase Setting	6
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: HRDALAN

CONTROL	(L)	ADJUSTMENT RANGE	(A)	SEAL MATERIAL	(N)
L Standard Screw Adjustment	A	500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting	N	Buna-N	
C Tamper Resistant - Factory Set	D	200 - 700 psi (14 - 50 bar), 400 psi (28 bar) Standard Setting	V	Viton	
K Handknob	W	800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting			



The relief-after-check cartridge is a CavitySaver™ (multi-function) valve incorporating a direct-acting relief tee'd in after a check function. The check valve flow is from the inlet (port 2) to the system port (port1). When the pressure in the system (port 1) reaches the relief valve setting, the valve starts to open to tank (port 3), throttling flow to limit the pressure rise. These valves are smooth and quiet, essentially zero-leak, dirt-tolerant, immune to silting and are very fast.

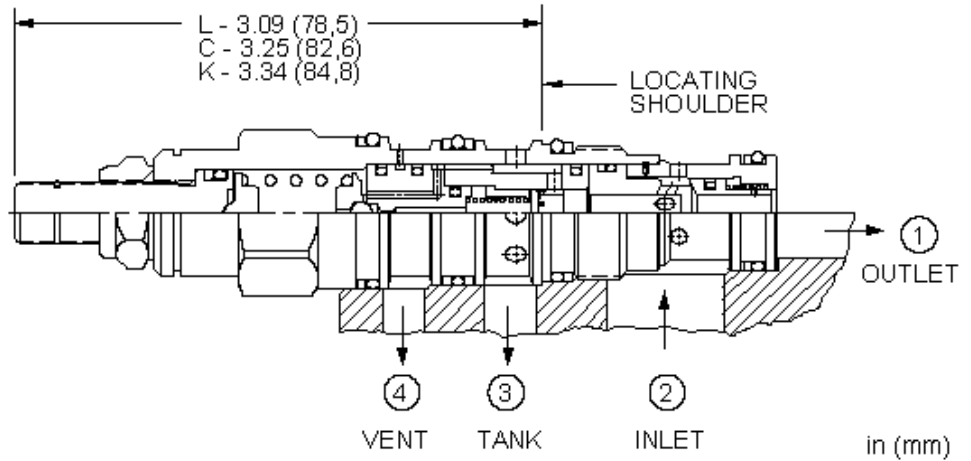
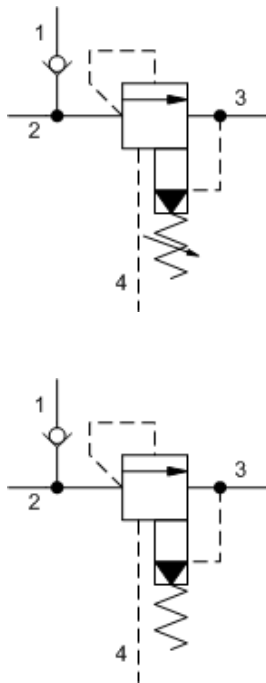
TECHNICAL DATA

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at Reseat	0,3 cc/min.
Check Cracking Pressure	1,7 bar
Adjustment - Number of Clockwise Turns to Increase Setting	6
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: HRDBLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	W 800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
K Handknob			/LH Mild Steel, Zinc-Nickel



The ventable relief-before-check cartridge is a CavitySaver™ (multi-function) valve incorporating a ventable, pilot-operated, balanced piston relief tee'd in before a check function. When the pressure at the inlet (port 2) reaches the relief valve setting, the valve starts to open to tank (port 3), throttling flow to regulate the pressure. The check valve flow is from the inlet (port 2) to the system port (port1). The valve includes a vent port (port 4) that connects between the main piston and pilot stage to provide for remote control by other pilot or 2-way valves.

These valves are accurate, have low pressure rise vs. flow, are smooth, quiet, and are moderately fast.

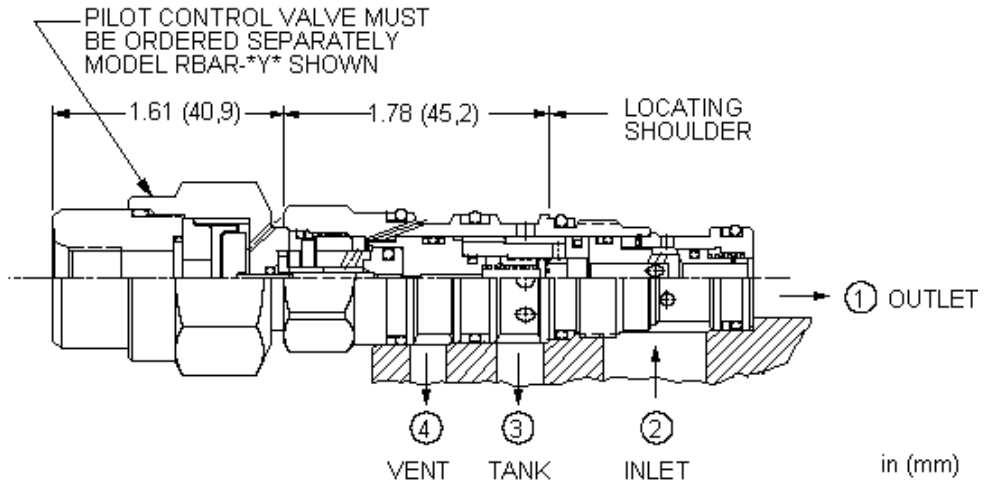
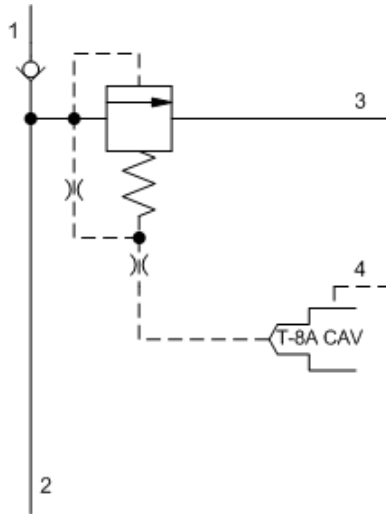
TECHNICAL DATA

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	30 cc/min.@70 bar
Check Cracking Pressure	1,7 bar
Adjustment - Number of Clockwise Turns to Increase Setting	5
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: HVCALAN

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



The relief-before-check cartridge is a CavitySaver™ (multi-function) valve incorporating a normally closed, balanced piston modulating element tee'd in before a check function. The valve incorporates an integral pilot control cavity. The pilot control cavity will accept any T-8A pressure control cartridge. When the pressure at the inlet (port 2) reaches the pilot control valve setting, the modulating element starts to open to tank (port 3), throttling flow to regulate the pressure. The T-8A pilot section is drained to port 4. The check valve flow is from the inlet (port 2) to the system port (port 1).

TECHNICAL DATA

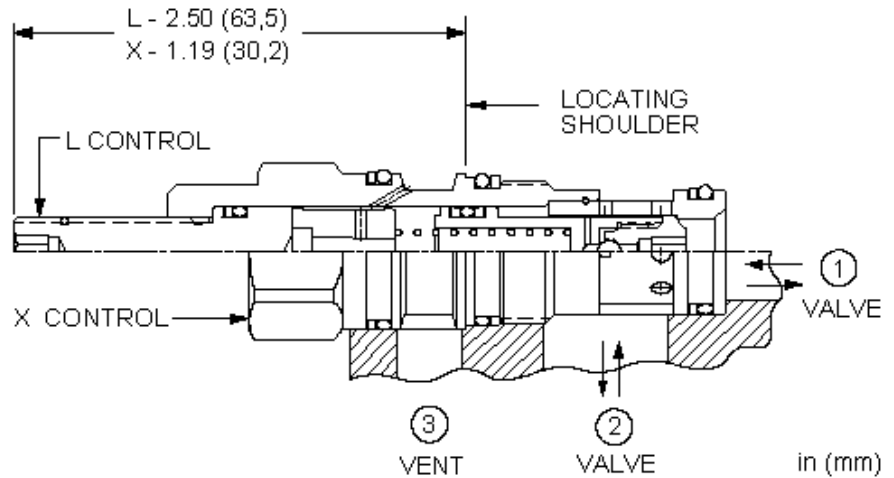
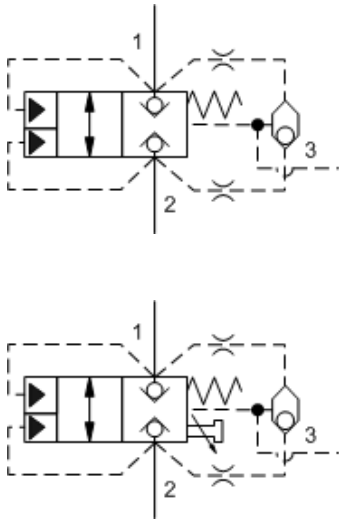
Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	30 cc/min.@70 bar
Check Cracking Pressure	1,7 bar
Pilot Control Cavity	T-8A
Pilot Control Valve Installation Torque	27 - 33 Nm
Seal kit - Cartridge	Buna: 990021007
Seal kit - Cartridge	EPDM: 990021014
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: HVCA8DN

BIAS PRESSURE	(D)	SEAL MATERIAL	(N)
D 75 psi (5 bar)		N Buna-N	
		E EPDM	
		V Viton	



These unbalanced, vent-to-open logic valves are 2-way switching elements that are spring-biased closed and incorporate an integral shuttle so that the higher of pressures at either port 1 or port 2 can be used as a pilot source. With port 3 blocked, the valve is held in the closed position by the spring force. With port 3 vented, the valve will open provided there is sufficient pressure to overcome the spring force. The force generated at port 3, plus the spring force, must be greater than the sum of the forces acting at port 1 and port 2 for the valve to remain closed. NOTE: The pilot area (port 3) is 1.8 times the area at port 1 and 2.25 times the area at port 2.

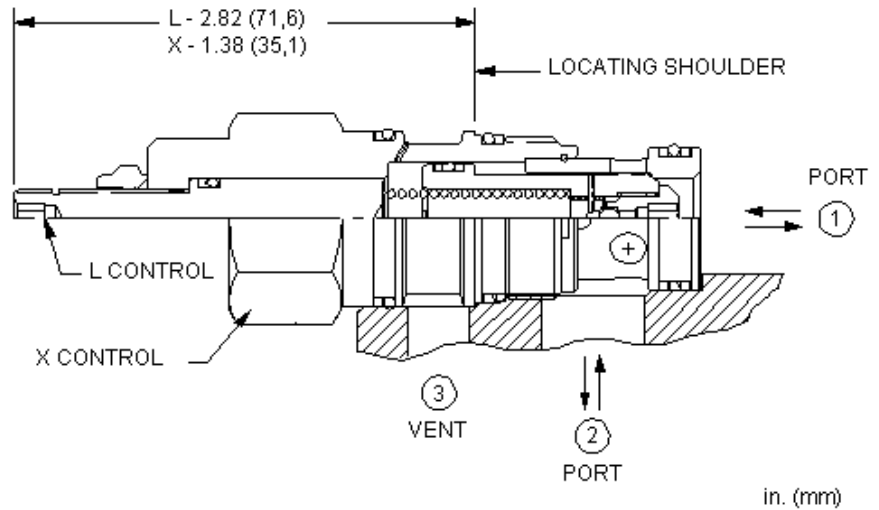
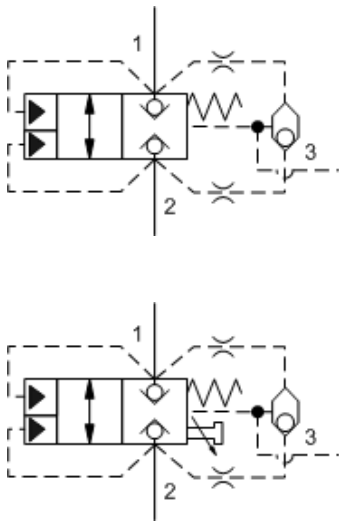
TECHNICAL DATA

Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.
Pilot Volume Displacement	0,66 cc
Area Ratio, A3 to A1	1.8:1
Area Ratio, A3 to A2	2.25:1
Control Orifice Diameter	0,53 mm
Seal kit - Cartridge	Buna: 990011007
Seal kit - Cartridge	EPDM: 990011014
Seal kit - Cartridge	Polyurethane: 990011002
Seal kit - Cartridge	Viton: 990011006

CONFIGURATION OPTIONS

Model Code Example: **LODDXDN**

CONTROL	(X) CRACKING PRESSURE	(D) SEAL MATERIAL	(N) MATERIAL/COATING
X Not Adjustable	D 50 psi (3,5 bar)	N Buna-N E EPDM V Viton	Standard Material/Coating /AP Stainless Steel, Passivated



These unbalanced, vent-to-open logic valves are 2-way switching elements that are spring-biased closed and incorporate an integral shuttle so that the higher of pressures at either port 1 or port 2 can be used as a pilot source. With port 3 blocked, the valve is held in the closed position by the spring force. With port 3 vented, the valve will open provided there is sufficient pressure to overcome the spring force. The force generated at port 3, plus the spring force, must be greater than the sum of the forces acting at port 1 and port 2 for the valve to remain closed. NOTE: The pilot area (port 3) is 1.8 times the area at port 1 and 2.25 times the area at port 2.

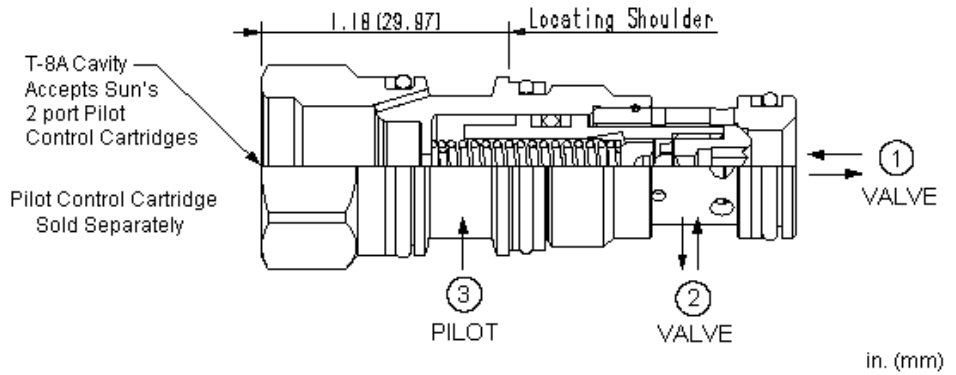
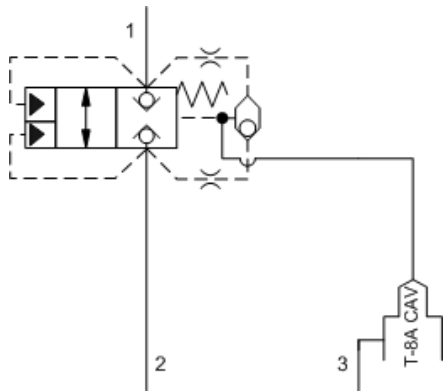
TECHNICAL DATA

Maximum Operating Pressure	350 bar
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.
Pilot Volume Displacement	1,1 cc
Area Ratio, A3 to A1	1.8:1
Area Ratio, A3 to A2	2.25:1
Control Orifice Diameter	0,53 mm
Seal kit - Cartridge	Buna: 990202007
Seal kit - Cartridge	EPDM: 990202014
Seal kit - Cartridge	Polyurethane: 990002002
Seal kit - Cartridge	Viton: 990202006

CONFIGURATION OPTIONS

Model Code Example: LOFDXDN

CONTROL	(X) CRACKING PRESSURE	(D) SEAL MATERIAL	(N) MATERIAL/COATING
X Not Adjustable	D 50 psi (3,5 bar)	N Buna-N E EPDM V Viton	Standard Material/Coating /AP Stainless Steel, Passivated



This valve is an unbalanced, vent-to-open 2-way logic switching element with an integral pilot control cavity. It is spring biased closed and incorporates an integral shuttle so that the higher of pressures at either port 1 or port 2 can be used as a pilot source. With a pilot 2-way valve in the closed position installed in the T-8A cavity, the logic element will remain in the closed position. With the pilot valve open, the logic element will open providing there is a sufficient combination of pressures to overcome the spring force. The force generated at port 3, plus the spring force, must be greater than the sum of the forces acting at port 1 and port 2 for the valve to remain closed. NOTE: The pilot area (port 3) is 1.8 times the area at port 1 and 2.25 times the area at port 2.

TECHNICAL DATA

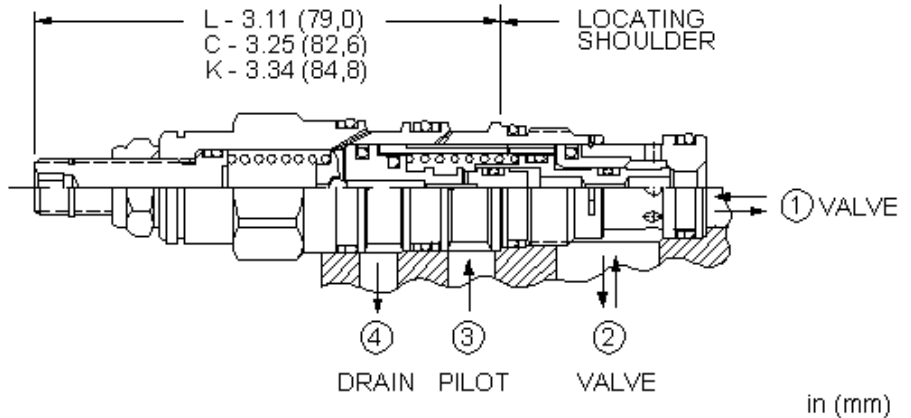
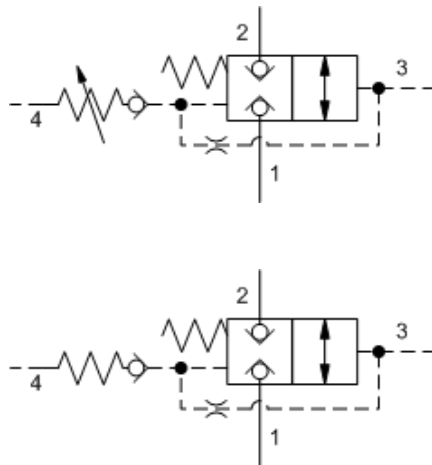
Maximum Operating Pressure	350 bar
Pilot Volume Displacement	0,66 cc
Area Ratio, A3 to A1	1.8:1
Area Ratio, A3 to A2	2.25:1
Pilot Control Cavity	T-8A
Control Orifice Diameter	0,53 mm
Seal kit - Cartridge	Buna: 990011007
Seal kit - Cartridge	EPDM: 990011014
Seal kit - Cartridge	Polyurethane: 990011002
Seal kit - Cartridge	Viton: 990011006

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: LODD8DN

CRACKING PRESSURE	(D)	SEAL MATERIAL	(N)
D 50 psi (3,5 bar)		N Buna-N	
		E EPDM	
		V Viton	



This is a normally closed, balanced poppet, switching element. When pilot pressure is applied to port 3, the poppet remains closed until the pilot pressure reaches the setting established by the integral pilot relief stage, at which point the poppet shifts to the open position.

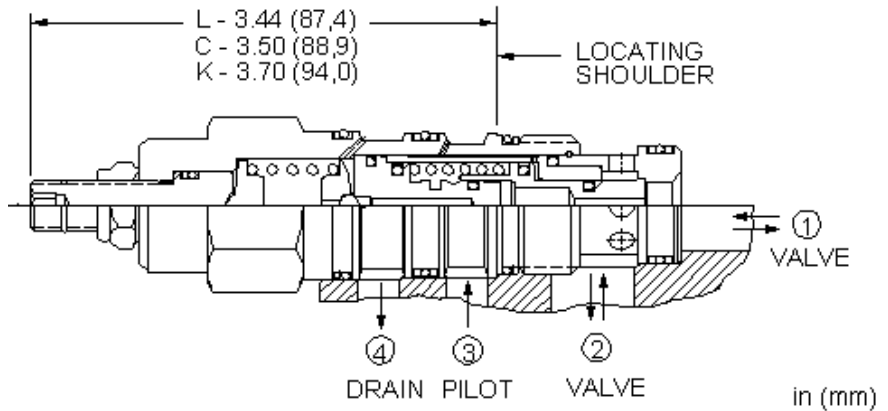
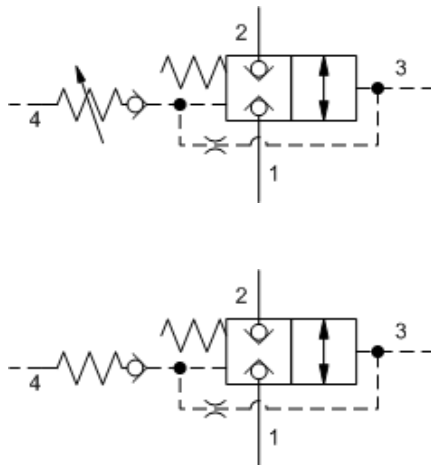
TECHNICAL DATA

Minimum Pilot Pressure Required to Shift Valve	28 bar
Maximum Operating Pressure	350 bar
Control Pilot Flow	See Performance Data
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.@350 bar
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: DKDPLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 400 - 3000 psi (28 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	B 400 - 1500 psi (28 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
K Handknob	W 400 - 4500 psi (28 - 315 bar), 1000 psi (70 bar) Standard Setting		



This is a normally closed, balanced poppet, switching element. When pilot pressure is applied to port 3, the poppet remains closed until the pilot pressure reaches the setting established by the integral pilot relief stage, at which point the poppet shifts to the open position.

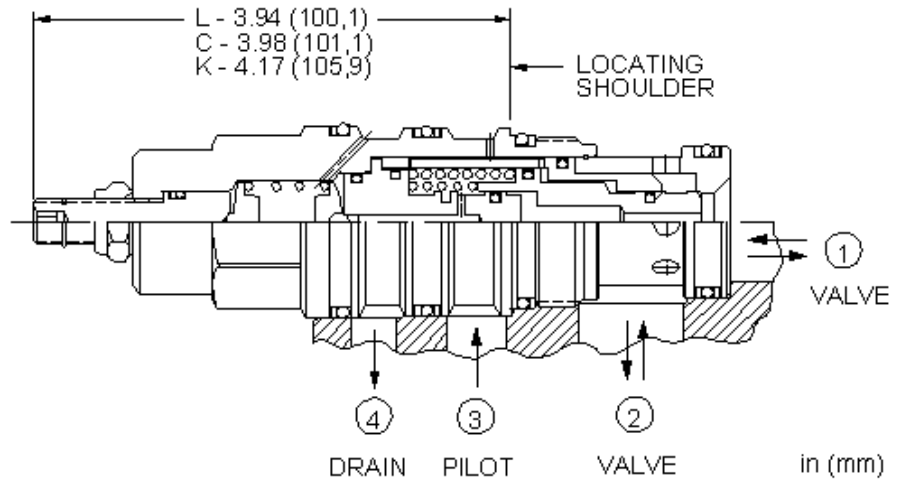
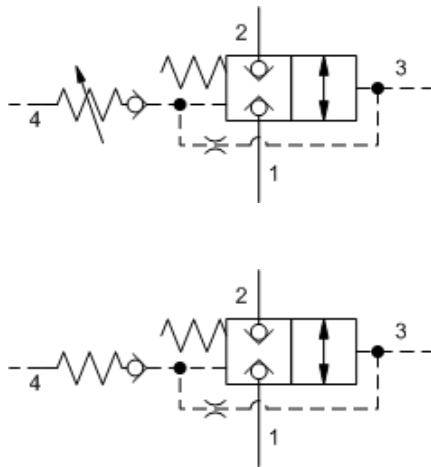
TECHNICAL DATA

Minimum Pilot Pressure Required to Shift Valve	20 bar
Maximum Operating Pressure	350 bar
Control Pilot Flow	See Performance Data
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.@350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990022007
Seal kit - Cartridge	Polyurethane: 990022002
Seal kit - Cartridge	Viton: 990022006

CONFIGURATION OPTIONS

Model Code Example: DKFPLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N)
L Standard Screw Adjustment	A 250 - 3000 psi (18 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	
C Tamper Resistant - Factory Set	B 250 - 1500 psi (18 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	
	W 250 - 4500 psi (18 - 315 bar), 1000 psi (70 bar) Standard Setting		



This is a normally closed, balanced poppet, switching element. When pilot pressure is applied to port 3, the poppet remains closed until the pilot pressure reaches the setting established by the integral pilot relief stage, at which point the poppet shifts to the open position.

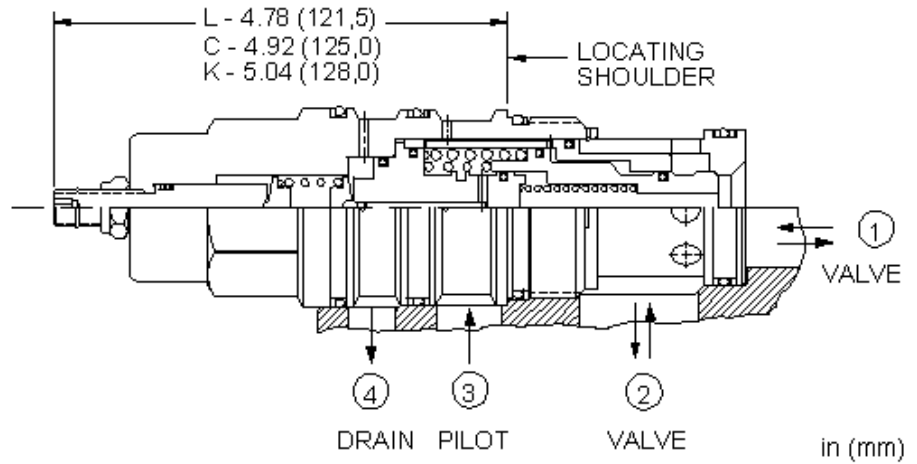
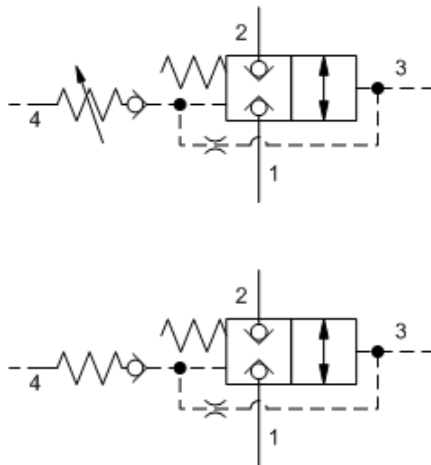
TECHNICAL DATA

Minimum Pilot Pressure Required to Shift Valve	20 bar
Maximum Operating Pressure	350 bar
Control Pilot Flow	See Performance Data
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.@350 bar
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: DKHPLAN

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



This is a normally closed, balanced poppet, switching element. When pilot pressure is applied to port 3, the poppet remains closed until the pilot pressure reaches the setting established by the integral pilot relief stage, at which point the poppet shifts to the open position.

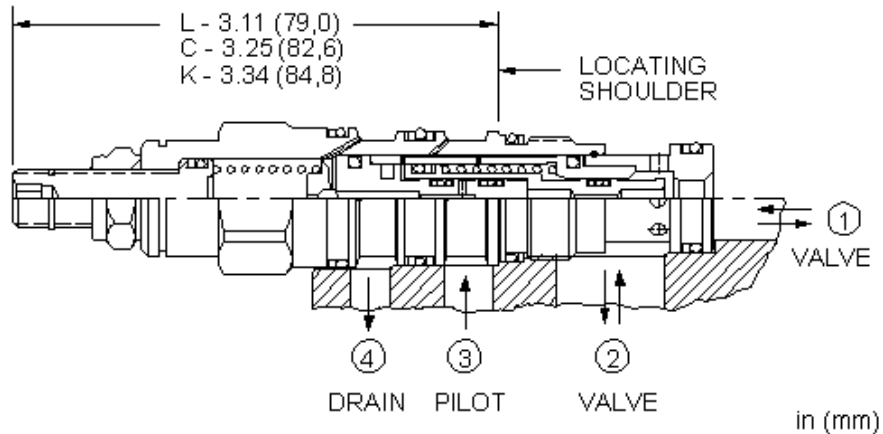
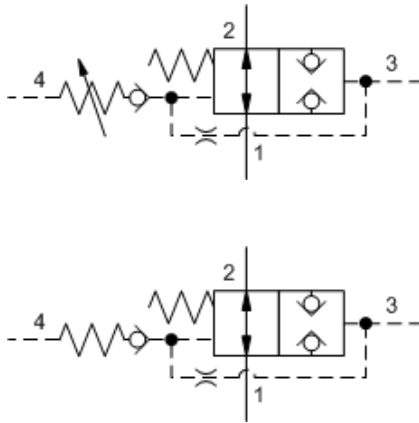
TECHNICAL DATA

Minimum Pilot Pressure Required to Shift Valve	20 bar
Maximum Operating Pressure	350 bar
Control Pilot Flow	See Performance Data
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.@350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990024007
Seal kit - Cartridge	Polyurethane: 990024002
Seal kit - Cartridge	Viton: 990024006

CONFIGURATION OPTIONS

Model Code Example: DKJPLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 200 - 3000 psi (14 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	B 200 - 1500 psi (14 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
K Handknob	W 200 - 4500 psi (14 - 315 bar), 1000 psi (70 bar) Standard Setting		



This is a normally open, balanced poppet, switching element. When pilot pressure is applied to port 3, the poppet remains open until the pilot pressure reaches the setting established by the integral pilot relief stage, at which point the poppet shifts to the closed position.

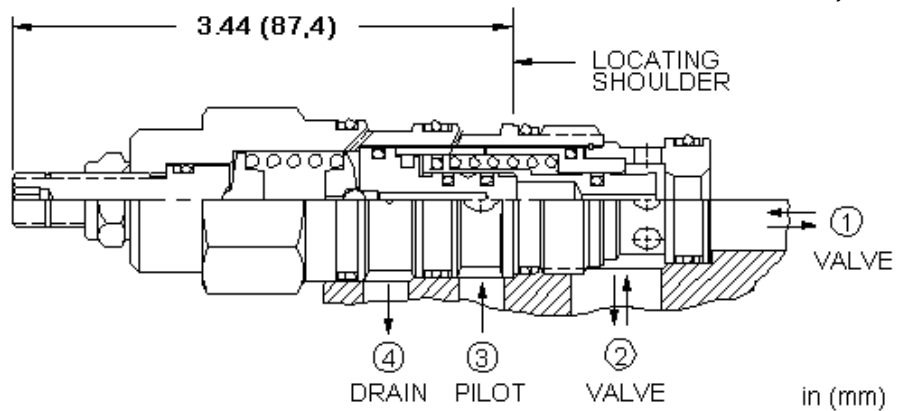
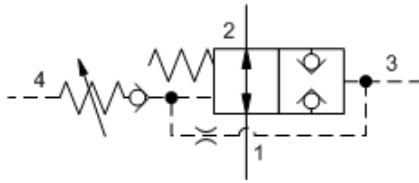
TECHNICAL DATA

Minimum Pilot Pressure Required to Shift Valve	28 bar
Maximum Operating Pressure	350 bar
Control Pilot Flow	See Performance Data
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.@350 bar
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: DODPLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 400 - 3000 psi (28 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	B 400 - 1500 psi (28 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
K Handknob	W 400 - 4500 psi (28 - 315 bar), 1000 psi (70 bar) Standard Setting		



This is a normally open, balanced poppet, switching element. When pilot pressure is applied to port 3, the poppet remains open until the pilot pressure reaches the setting established by the integral pilot relief stage, at which point the poppet shifts to the closed position.

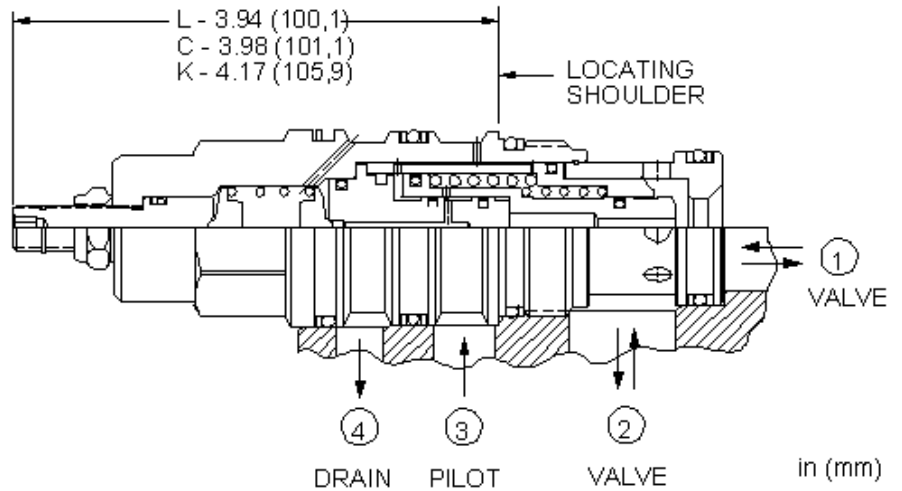
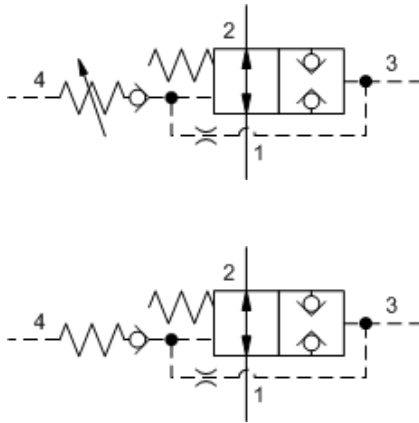
TECHNICAL DATA

Minimum Pilot Pressure Required to Shift Valve	20 bar
Maximum Operating Pressure	350 bar
Control Pilot Flow	See Performance Data
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.@350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990022007
Seal kit - Cartridge	Polyurethane: 990022002
Seal kit - Cartridge	Viton: 990022006

CONFIGURATION OPTIONS

Model Code Example: DOFPLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 200 - 3000 psi (14 - 210 bar), 1000 psi (70 bar) Standard Setting B 200 - 1500 psi (14 - 105 bar), 1000 psi (70 bar) Standard Setting W 200 - 4500 psi (14 - 315 bar), 1000 psi (70 bar) Standard Setting	N Buna-N V Viton	Standard Material/Coating /AP Stainless Steel, Passivated



This is a normally open, balanced poppet, switching element. When pilot pressure is applied to port 3, the poppet remains open until the pilot pressure reaches the setting established by the integral pilot relief stage, at which point the poppet shifts to the closed position.

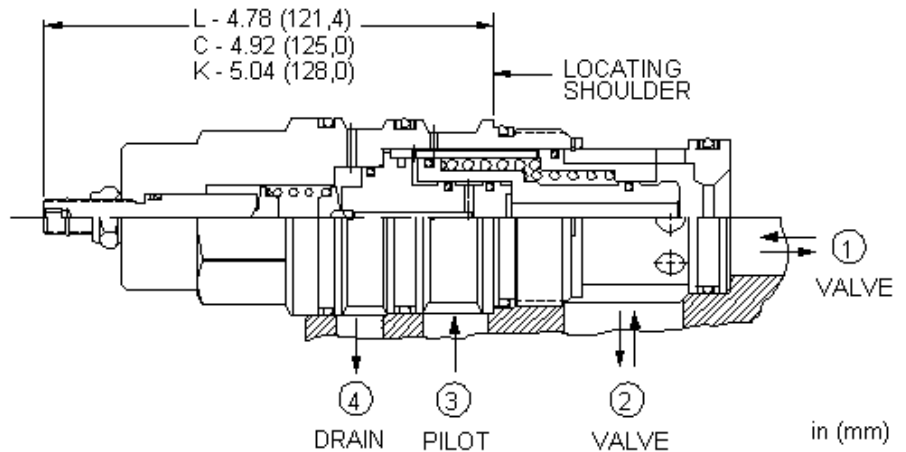
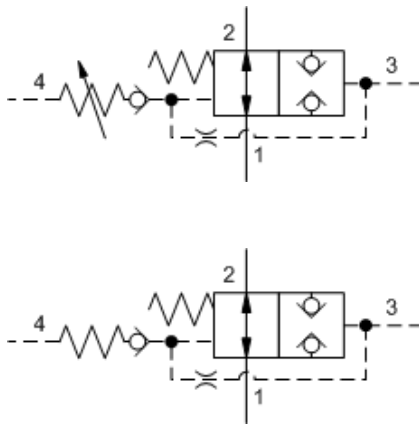
TECHNICAL DATA

Minimum Pilot Pressure Required to Shift Valve	20 bar
Maximum Operating Pressure	350 bar
Control Pilot Flow	See Performance Data
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.@350 bar
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: DOHPLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 200 - 3000 psi (14 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	B 200 - 1500 psi (14 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
K Handknob	W 200 - 4500 psi (14 - 315 bar), 1000 psi (70 bar) Standard Setting		



This is a normally open, balanced poppet, switching element. When pilot pressure is applied to port 3, the poppet remains open until the pilot pressure reaches the setting established by the integral pilot relief stage, at which point the poppet shifts to the closed position.

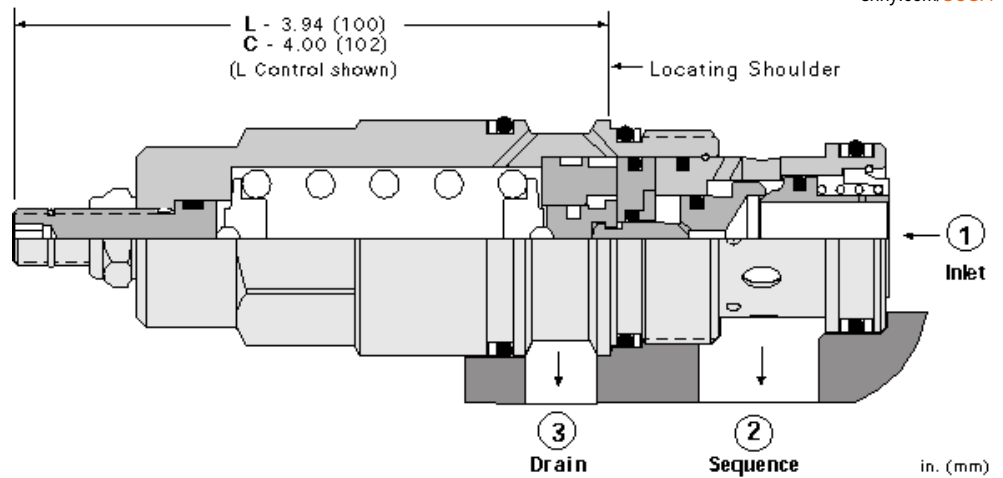
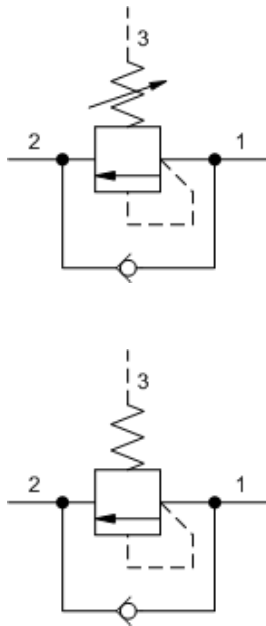
TECHNICAL DATA

Minimum Pilot Pressure Required to Shift Valve	20 bar
Maximum Operating Pressure	350 bar
Control Pilot Flow	See Performance Data
Maximum Valve Leakage at 110 SUS (24 cSt)	0,7 cc/min.@350 bar
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990024007
Seal kit - Cartridge	Polyurethane: 990024002
Seal kit - Cartridge	Viton: 990024006

CONFIGURATION OPTIONS

Model Code Example: DOJPLAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 200 - 3000 psi (14 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	B 200 - 1500 psi (14 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
K Handknob	D 200 - 800 psi (14 - 55 bar)		
	W 200 - 4500 psi (14 - 315 bar), 1000 psi (70 bar) Standard Setting		



Direct-acting sequence valves with reverse-flow check will supply a secondary circuit with flow once the pressure at the inlet (port 1) has exceeded the valve setting. Additionally, these valves incorporate an integral check valve to provide reverse flow from port 2 (sequence) to port 1 (inlet). The pressure setting of a sequence valve controls the pressure at port 1 relative to the pressure at the drain (port 3).

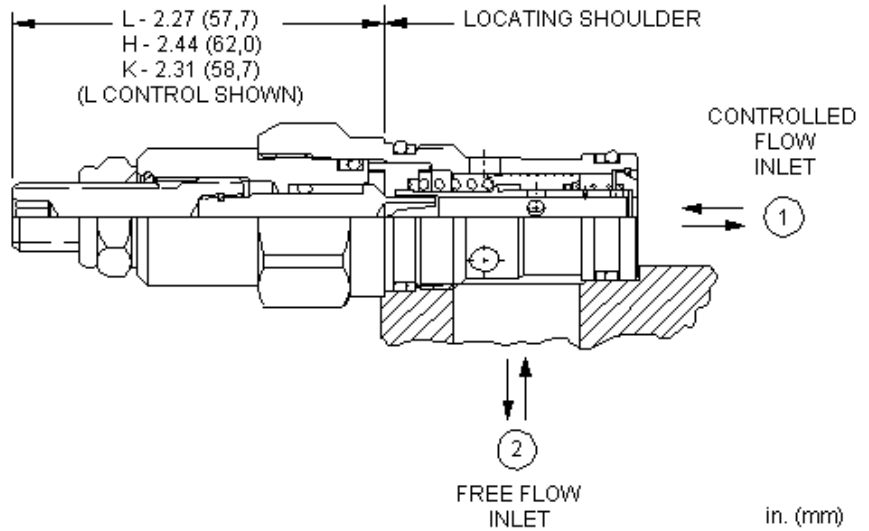
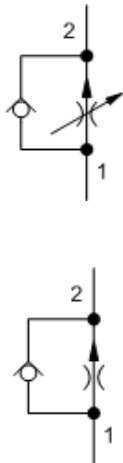
TECHNICAL DATA

Factory Pressure Settings Established at	30 cc/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	0,7 cc/min.
Check Cracking Pressure	1,7 bar
Adjustment - Number of Clockwise Turns to Increase 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: SCGALAN

CONTROL	(L) ADJUSTMENT RANGE	(A) SEAL MATERIAL	(N) MATERIAL/COATING
L Standard Screw Adjustment	A 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	Standard Material/Coating
C Tamper Resistant - Factory Set	W 800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
	B 300 - 1500 psi (20 - 105 bar), 1000 psi (70 bar) Standard Setting		
	C 2000 - 6000 psi (140 - 420 bar), 2000 psi (140 bar) Standard Setting		
	D 200 - 800 psi (14 - 55 bar), 400 psi (28 bar) Standard Setting		
	E 100 - 400 psi (7 - 28 bar), 200 psi (14 bar) Standard Setting		



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

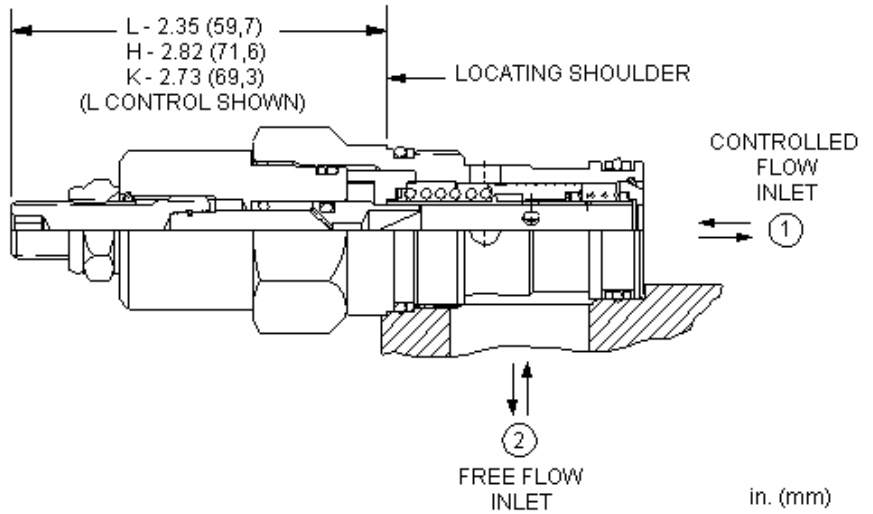
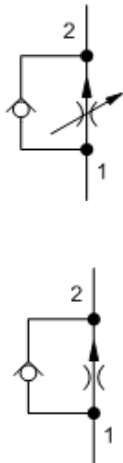
Maximum Operating Pressure	350 bar
Adjustment - Number of Counterclockwise Turns - Fully Closed to Fully Open	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990010007
Seal kit - Cartridge	EPDM: 990010014
Seal kit - Cartridge	Polyurethane: 990010002
Seal kit - Cartridge	Viton: 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

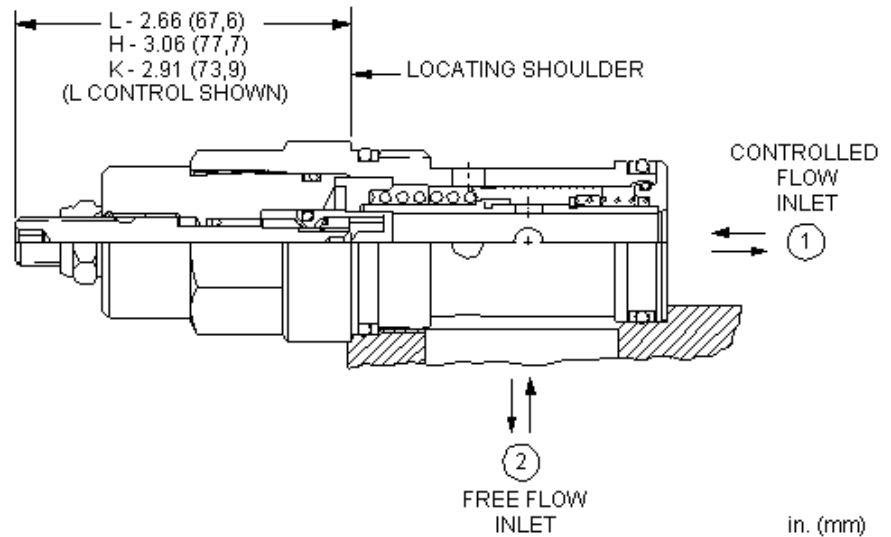
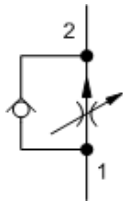
Maximum Operating Pressure	350 bar
Adjustment - Number of Counterclockwise Turns - Fully Closed to Fully Open	5
Locknut Hex Size	15 mm
Locknut Torque	9 - 10 Nm
Seal kit - Cartridge	Buna: 990203007
Seal kit - Cartridge	EPDM: 990203014
Seal kit - Cartridge	Viton: 990203006

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 .1 - 12 gpm (0,4 - 45 L/min.)	N Buna-N	Standard Material/Coating
H Calibrated Handknob with Detent Lock	B .1 - 3 gpm (0,4 - 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.

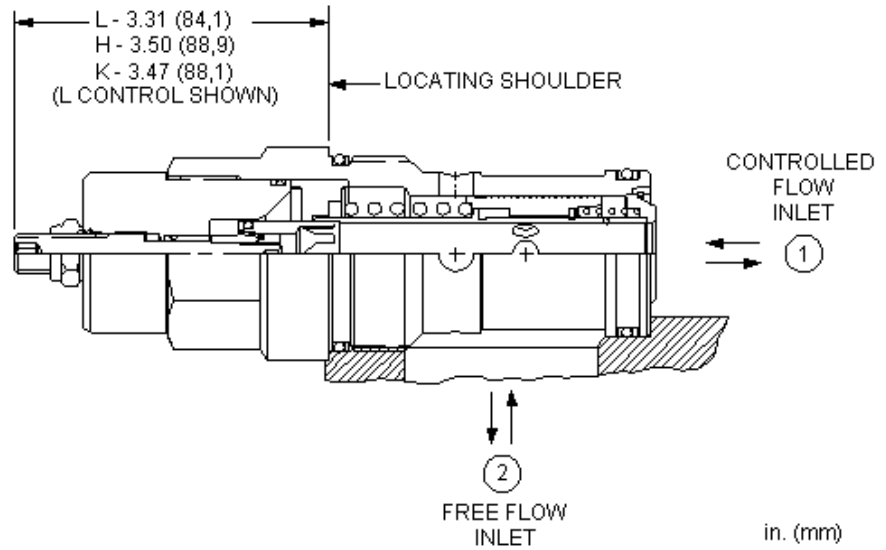
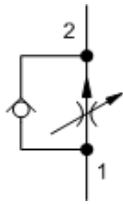
TECHNICAL DATA

Maximum Operating Pressure	350 bar
Adjustment - Number of Counterclockwise Turns - 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
L Standard Screw Adjustment	A .2 - 25 gpm (0,8 - 95 L/min.)	N Buna-N	Standard Material/Coating
H Calibrated Handknob with Detent Lock	B .2 - 16 gpm (0,8 - 60 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.

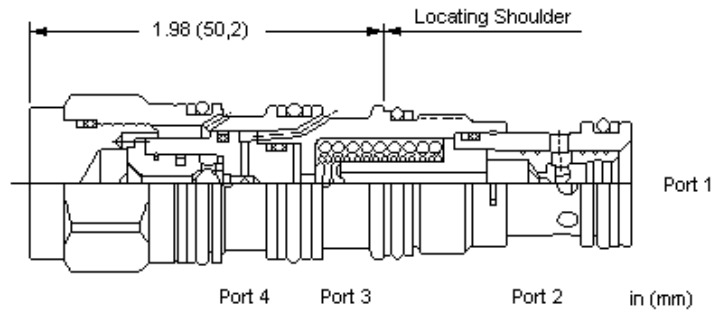
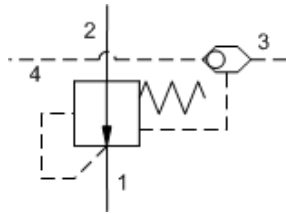
TECHNICAL DATA

Maximum Operating Pressure	350 bar
Adjustment - Number of Counterclockwise Turns - 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
L Standard Screw Adjustment	A .2 - 50 gpm (1 - 200 L/min.)	N 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			



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.

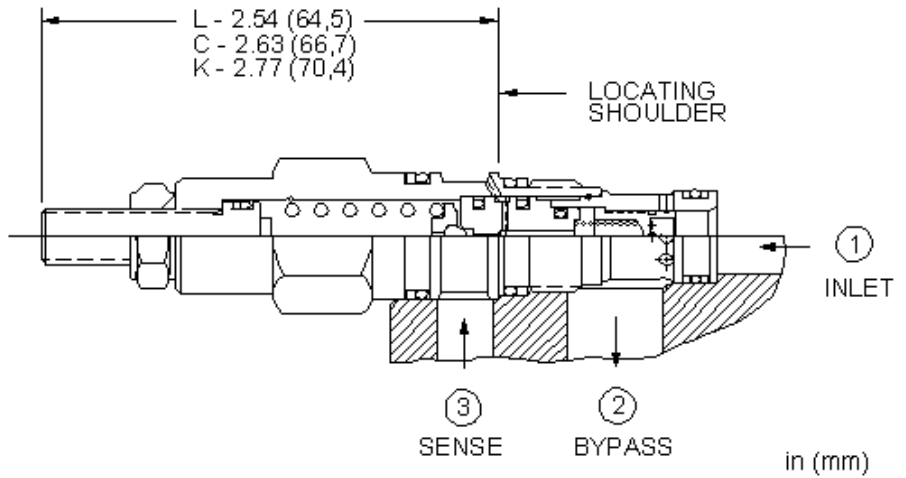
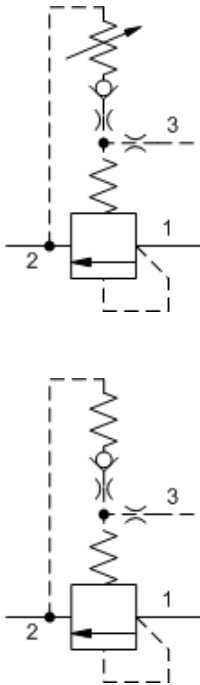
TECHNICAL DATA

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

CONTROL	(X) DIFFERENTIAL PRESSURE	(H) SEAL MATERIAL	(N)
X Not Adjustable	H 200 psi (14 bar)	N Buna-N	V 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.

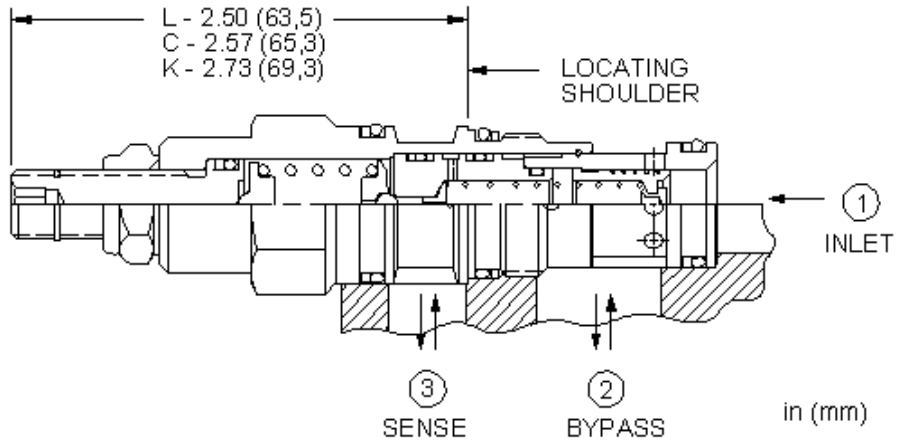
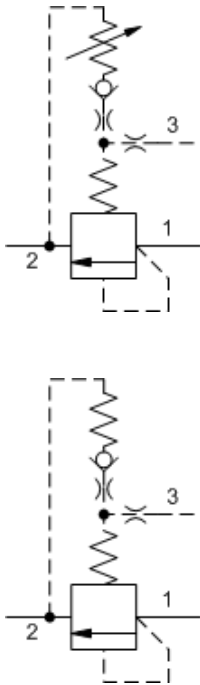
TECHNICAL DATA

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	30 cc/min.@70 bar
Adjustment - Number of Clockwise Turns to Increase 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)
L Standard Screw Adjustment	A	75 - 3000 psi (5 - 210 bar), 1000 psi (70 bar) Standard Setting	N	Buna-N	
C Tamper Resistant - Factory Set	B	75 - 1500 psi (5 - 105 bar), 1000 psi (70 bar) Standard Setting	V	Viton	
K Handknob	C	75 - 6000 psi (5 - 420 bar), 1000 psi (70 bar) Standard Setting			
	N	75 - 800 psi (5 - 55 bar), 400 psi (28 bar) Standard Setting			
	Q	75 - 400 psi (5 - 28 bar), 200 psi (14 bar) Standard Setting			
	W	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.

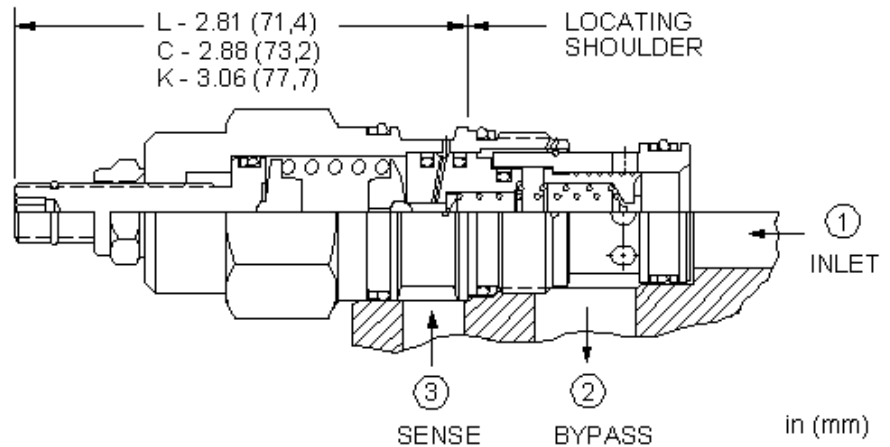
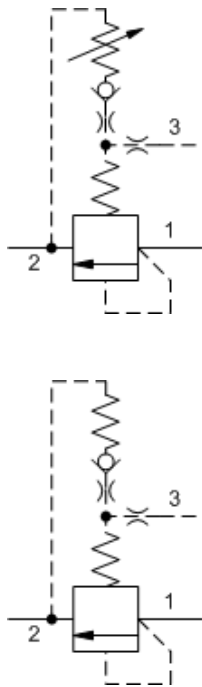
TECHNICAL DATA

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	30 cc/min.@70 bar
Adjustment - Number of Clockwise Turns to Increase 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
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 50 - 1500 psi (3,5 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/AP Stainless Steel, Passivated
K Handknob	C 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.

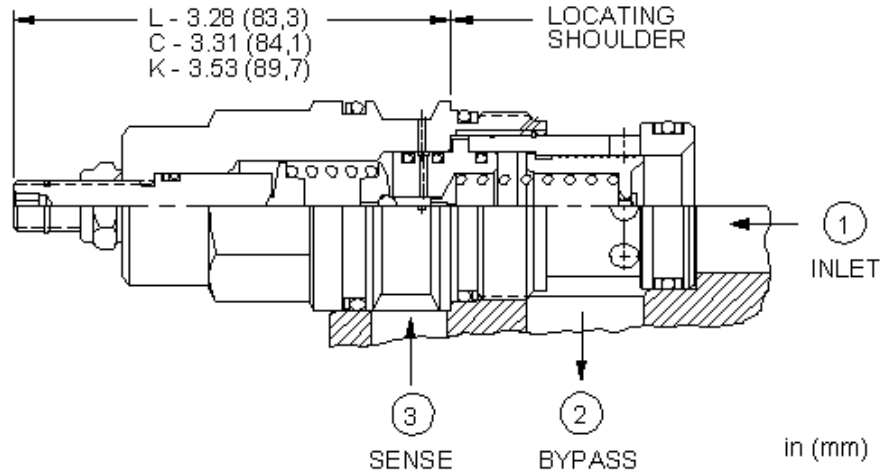
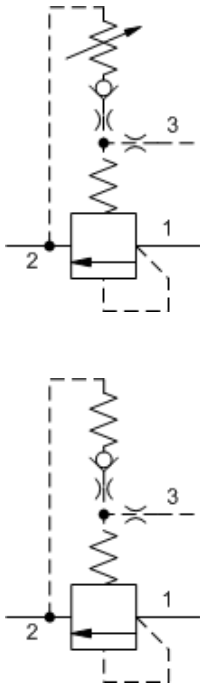
TECHNICAL DATA

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	50 cc/min.@70 bar
Adjustment - Number of Clockwise Turns to Increase 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
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 50 - 1500 psi (3,5 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	IAP Stainless Steel, Passivated
K Handknob	C 100 - 6000 psi (7 - 420 bar), 1000 psi (70 bar) Standard Setting		
W Hex Wrench Adjustment	W 100 - 4500 psi (7 - 315 bar), 1000 psi (70 bar) Standard Setting		
Y 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.

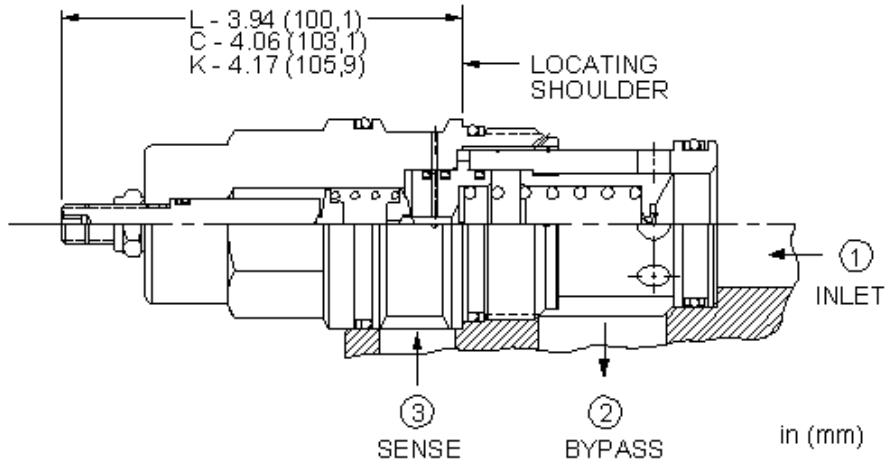
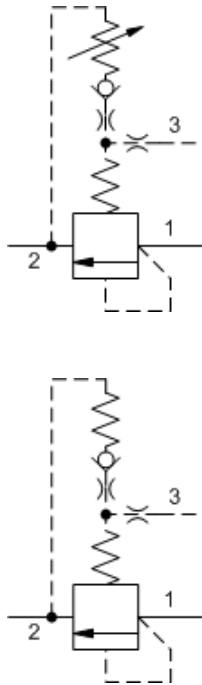
TECHNICAL DATA

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	65 cc/min.@70 bar
Adjustment - Number of Clockwise Turns to Increase 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) OPERATING 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 150 - 1500 psi (10,5 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	
K Handknob	C 150 - 6000 psi (10,5 - 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

Factory Pressure Settings Established at	15 L/min.
Maximum Operating Pressure	350 bar
Response Time - Typical	10 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	80 cc/min.@70 bar
Adjustment - Number of Clockwise Turns to Increase 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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