

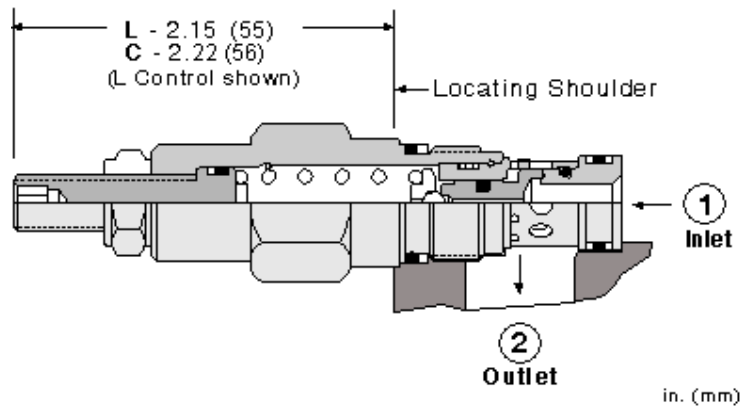
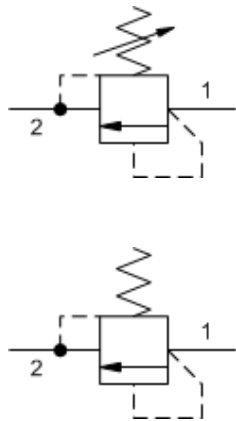
Pressure Control, Relief Cartridges

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RDBA	Direct-acting relief valve	1
RDDA	Direct-acting relief valve	2
RDFA	Direct-acting relief valve	3
RDHA	Direct-acting relief valve	4
RDJA	Direct-acting relief valve	5
RDDA3	Non-adjustable direct-acting relief valve	6
RDFA3	Non-adjustable direct-acting relief valve	7
RDDT	Direct-acting relief valve, CE marked	8
RDFT	Direct-acting relief valve, CE marked	9
RBAA	Direct-acting relief valve - pilot capacity	10
RBAC	Direct-acting relief valve - pilot capacity	11
RBAE	Direct-acting relief valve - pilot capacity	12
RBAB	Air-controlled, direct-acting relief valve - pilot capacity	13
RBAR	Air-controlled, direct-acting relief valve - pilot capacity	14
RBAD	Dual, direct-acting relief valve - pilot capacity	15
HRDA	Direct-acting relief valve - before check	16
HRDB	Direct-acting relief valve - after check	17

Series	Ports	Cavities
Series Z Cartridges 3/8-24 UNF Cartridge Thread 3/16 in. Valve Hex Size 100 - 120 lbf in. Valve Installation Torque	2-Port	T-382A
Series P Cartridges M16 Cartridge Thread 7/8 in. Valve Hex Size 20 - 25 lbf ft Valve Installation Torque	2-Port 2-Port (Deep) 3-Port	T-8A T-8DP T-9A
Series 0 Cartridges M16 Cartridge Thread 3/4 in. Valve Hex Size 1.00 in. Valve Hex Size 20 - 25 lbf ft Valve Installation Torque	2-Port 2-Port (Deep) 3-Port	T-162A T-162DP T-163A
Series 1 Cartridges M20 Cartridge Thread 7/8 in. Valve Hex Size 30 - 35 lbf ft 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 1 1/8 in. Valve Hex Size 45 - 50 lbf ft 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 1 1/4 in. Valve Hex Size 150 - 160 lbf ft 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 1 5/8 in. Valve Hex Size 350 - 375 lbf ft 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



Direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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

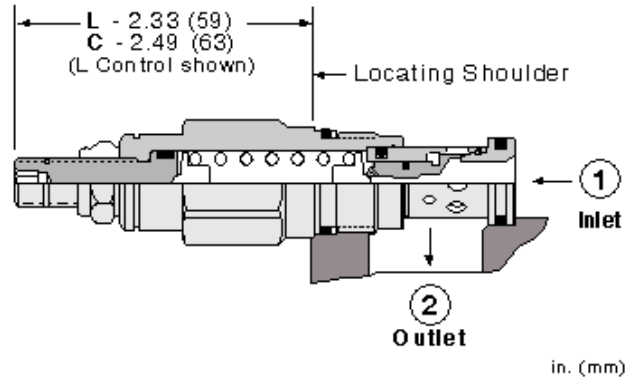
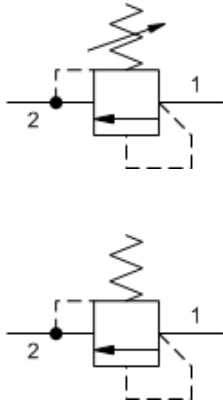
Factory Pressure Settings Established at	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>85% of setting
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-162-007
Seal kit - Cartridge	Polyurethane: 990-162-002
Seal kit - Cartridge	Viton: 990-162-006

NOTES U.S. Patent #4,742,846; European Patent Pending

CONFIGURATION OPTIONS

Model Code Example: RDBALAN

CONTROL	ADJUSTMENT RANGE	SEAL MATERIAL	MATERIAL/COATING
L Standard Screw Adjustment	A 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	(none) Standard Material/Coating
C Tamper Resistant - Factory Set	W 800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting	E EPDM	/AP Stainless Steel, Passivated
K Handknob	B 300 - 1500 psi (20 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/LH Mild Steel, Zinc-Nickel
	C 1000 - 6000 psi (70 - 420 bar), 1000 psi (70 bar) Standard Setting		
	D 200 - 800 psi (14 - 55 bar), 400 psi (28 bar) Standard Setting		
	E 150 - 400 psi (10 - 28 bar), 200 psi (14 bar) Standard Setting		
	S 50 - 200 psi (3.5 - 14 bar), 100 psi (7 bar) Standard Setting		



Direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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.

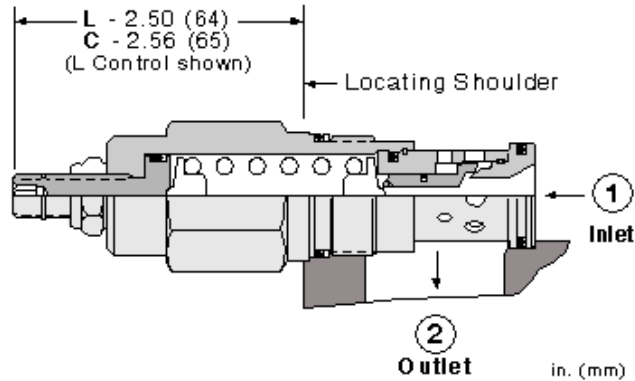
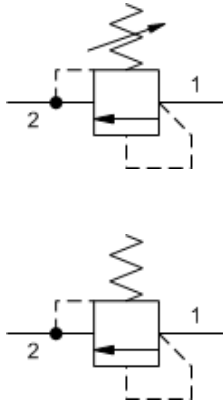
TECHNICAL DATA

Factory Pressure Settings Established at	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>90% of setting
Adjustment - Number of Clockwise Turns to Increase Setting	6
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-310-007
Seal kit - Cartridge	Viton: 990-310-006

CONFIGURATION OPTIONS

Model Code Example: RDDALAN

CONTROL	ADJUSTMENT RANGE	SEAL MATERIAL	MATERIAL/COATING
L Standard Screw Adjustment	A 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	(none) Standard Material/Coating
C Tamper Resistant - Factory Set	W 800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting	E EPDM	/AP Stainless Steel, Passivated
Y Tri-Grip Handknob	B 300 - 1500 psi (20 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/LH Mild Steel, Zinc-Nickel
	C 1000 - 6000 psi (70 - 420 bar), 1000 psi (70 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		
	S 50 - 200 psi (3,5 - 14 bar), 100 psi (7 bar) Standard Setting		



Direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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

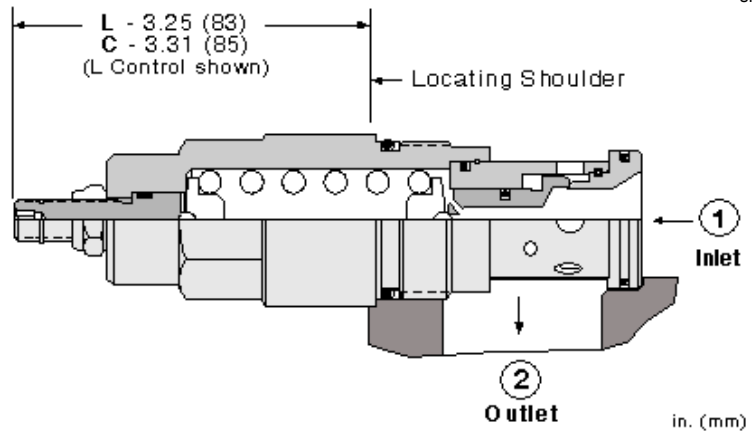
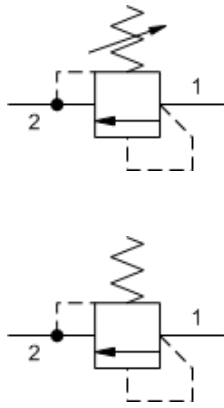
Factory Pressure Settings Established at	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>90% of setting
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-303-007
Seal kit - Cartridge	Polyurethane: 990-303-002
Seal kit - Cartridge	Viton: 990-303-006

NOTES U.S. Patent #4,742,846; European Patent Pending

CONFIGURATION OPTIONS

Model Code Example: RDFALAN

CONTROL	ADJUSTMENT RANGE	SEAL MATERIAL	MATERIAL/COATING
L Standard Screw Adjustment	A 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	(none) Standard Material/Coating
C Tamper Resistant - Factory Set	W 800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting	E EPDM	/AP Stainless Steel, Passivated
Q Capped and Lockwired	B 300 - 1500 psi (20 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/LH Mild Steel, Zinc-Nickel
	C 1000 - 6000 psi (70 - 420 bar), 1000 psi (70 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		
	S 50 - 200 psi (3.5 - 14 bar), 100 psi (7 bar) Standard Setting		



Direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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

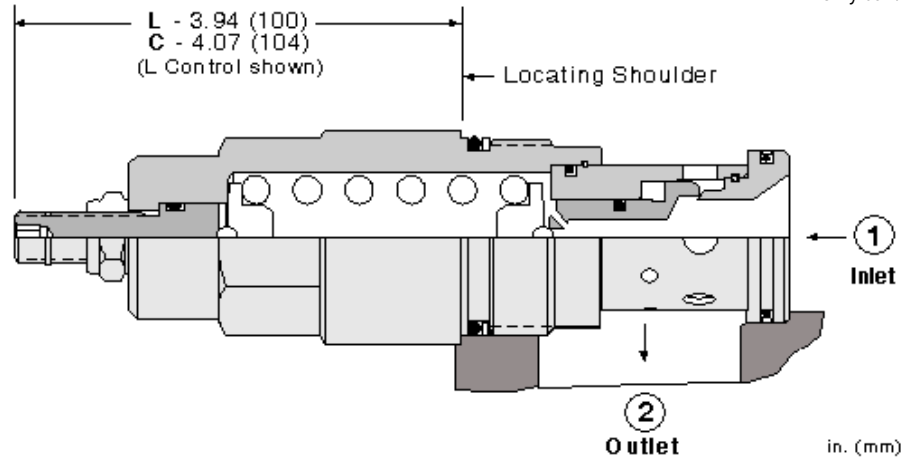
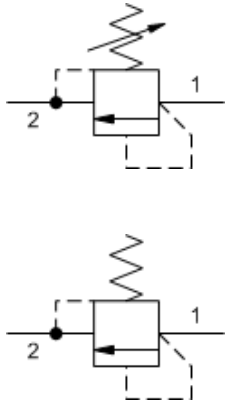
Factory Pressure Settings Established at	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>90% of setting
Adjustment - Number of Clockwise Turns to Increase Setting	6
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-316-007
Seal kit - Cartridge	Viton: 990-316-006

NOTES U.S. Patent #4,742,846; European Patent Pending

CONFIGURATION OPTIONS

Model Code Example: RDHALAN

CONTROL	ADJUSTMENT RANGE	SEAL MATERIAL	MATERIAL/COATING
L Standard Screw Adjustment	A 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	(none) Standard Material/Coating
C Tamper Resistant - Factory Set	W 800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting	E EPDM	/AP Stainless Steel, Passivated
	B 300 - 1500 psi (20 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/LH Mild Steel, Zinc-Nickel
	C 1000 - 6000 psi (70 - 420 bar), 1000 psi (70 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		
	S 50 - 200 psi (3,5 - 14 bar), 100 psi (7 bar) Standard Setting		



Direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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

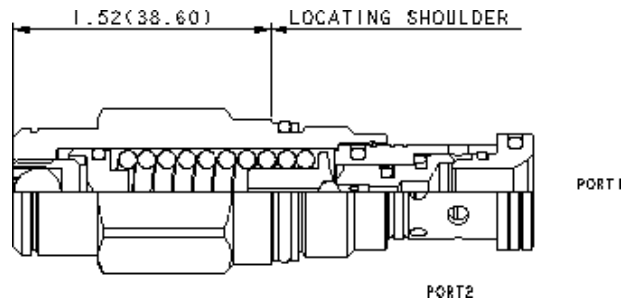
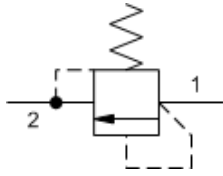
Factory Pressure Settings Established at	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>90% of setting
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-318-007
Seal kit - Cartridge	Viton: 990-318-006

NOTES U.S. Patent #4,742,846; European Patent Pending

CONFIGURATION OPTIONS

Model Code Example: RDJALAN

CONTROL	ADJUSTMENT RANGE	SEAL MATERIAL	MATERIAL/COATING
L Standard Screw Adjustment	A 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	(none) Standard Material/Coating
C Tamper Resistant - Factory Set	B 300 - 1500 psi (20 - 105 bar), 1000 psi (70 bar) Standard Setting	E EPDM	/AP Stainless Steel, Passivated
Q Capped and Lockwired	C 1000 - 6000 psi (70 - 420 bar), 1000 psi (70 bar) Standard Setting	V Viton	/LH Mild Steel, Zinc-Nickel
	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		
	S 50 - 200 psi (3,5 - 14 bar), 100 psi (7 bar) Standard Setting		



Non-adjustable direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>90% of setting
Seal kit - Cartridge	Buna: 990-310-007
Seal kit - Cartridge	Viton: 990-310-006

CONFIGURATION OPTIONS

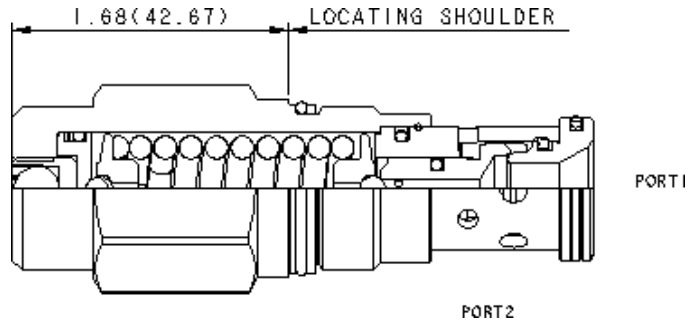
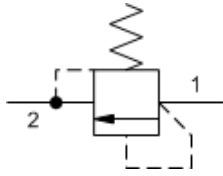
Model Code Example: RDDA3AN

ADJUSTMENT RANGE

- A** 500 - 3000 psi (35 - 210 bar)
- C** 1000 - 6000 psi (70 - 420 bar)
- D** 200 - 800 psi (14 - 55 bar)

SEAL MATERIAL

- N** Buna-N
- V** Viton



Non-adjustable direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>90% of setting
Seal kit - Cartridge	Buna: 990-303-007
Seal kit - Cartridge	Polyurethane: 990-303-002
Seal kit - Cartridge	Viton: 990-303-006

CONFIGURATION OPTIONS

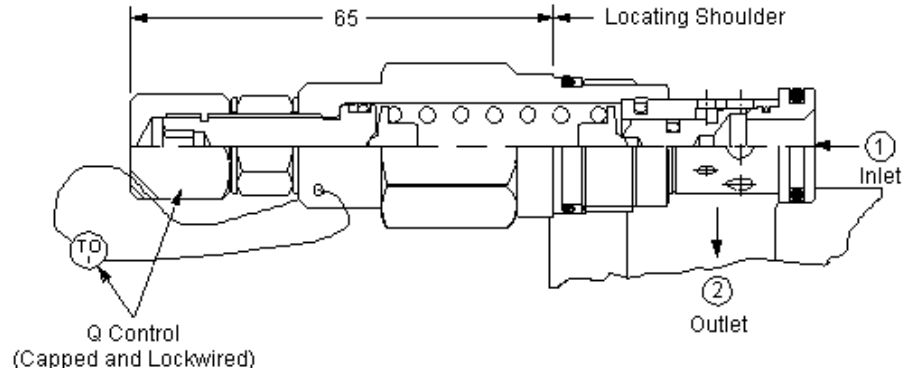
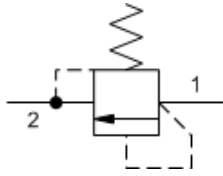
Model Code Example: **RDFA3AN**

ADJUSTMENT RANGE

- A** 500 - 3000 psi (35 - 210 bar)
- C** 1000 - 6000 psi (70 - 420 bar)
- D** 200 - 800 psi (14 - 55 bar)

SEAL MATERIAL

- N** Buna-N
- V** Viton



Dimensions in mm

Direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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.

The CE marked valve is a safety valve that meets the requirements of the European Directive for Pressurized Devices (PED) 97/23/EC. The valve setting represents the excess operating pressure at which the valve opens. Valve capacity can be determined from the performance curve. It shows an approved flow which depends on the excess operating pressure. As a requirement of the PED, the system pressure at the maximum approved flow is a maximum of 10% above the excess operating pressure.

TECHNICAL DATA

Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>90% of setting
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-310-007
Seal kit - Cartridge	Viton: 990-310-006

CONFIGURATION OPTIONS

Model Code Example: RDDTQAN

CONTROL

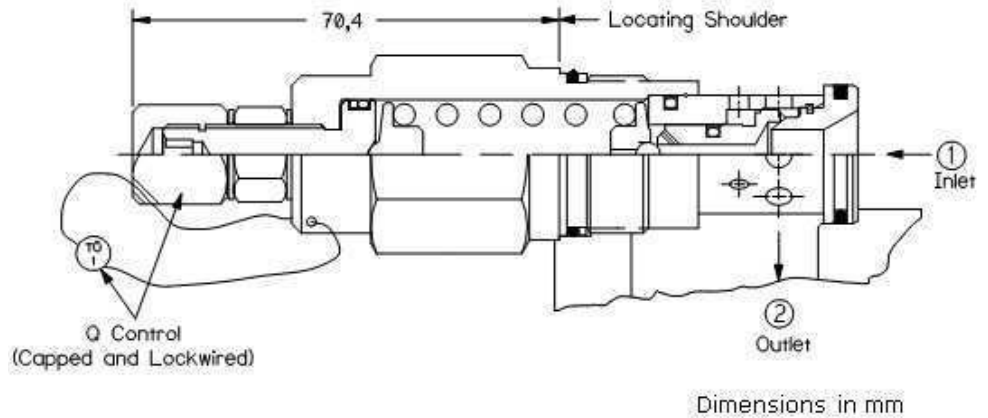
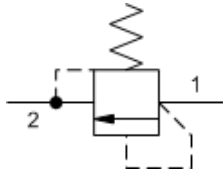
Q Capped and Lockwired

ADJUSTMENT RANGE

- A** 100 - 210 bar (100 - 210 bar)
- B** 90 - 99 bar (90 - 99 bar)
- C** 315 - 422 bar (315 - 422 bar)
- W** 211 - 314 bar (211 - 314 bar)

SEAL MATERIAL

- N** Buna-N
- V** Viton



Direct-acting relief cartridges are normally closed, pressure-limiting valves used to protect hydraulic components from pressure transients. When the pressure at the inlet (port 1) reaches the valve setting, the valve starts to open to tank (port 2), 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.

The CE marked valve is a safety valve that meets the requirements of the European Directive for Pressurized Devices (PED) 97/23/EC. The valve setting represents the excess operating pressure at which the valve opens. Valve capacity can be determined from the performance curve. It shows an approved flow which depends on the excess operating pressure. As a requirement of the PED, the system pressure at the maximum approved flow is a maximum of 10% above the excess operating pressure.

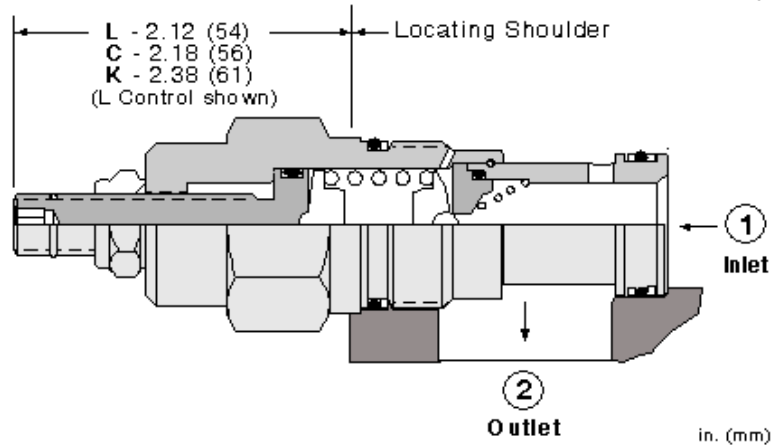
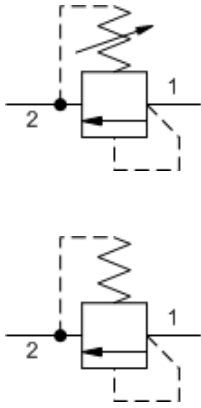
TECHNICAL DATA

Response Time - Typical	2 ms
Maximum Valve Leakage at Reseat	10 drops/min.
Reseat	>90% of setting
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-303-007
Seal kit - Cartridge	Polyurethane: 990-303-002
Seal kit - Cartridge	Viton: 990-303-006

CONFIGURATION OPTIONS

Model Code Example: RDFTQBN

CONTROL	ADJUSTMENT RANGE	SEAL MATERIAL
Q Capped and Lockwired	B 60 - 105 bar (60 - 105 bar) A 106 - 209 bar (106 - 209 bar) C 210 - 420 bar (210 - 420 bar)	N Buna-N V Viton



Direct-acting, pilot relief cartridges are used to remotely control the pressure setting of other pilot-operated valves. Because capacity is limited to pilot flow, these valves should be used with other higher flow valves.

TECHNICAL DATA

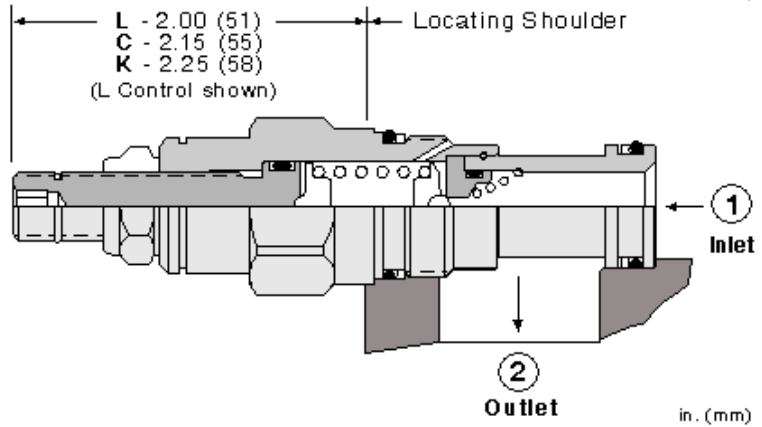
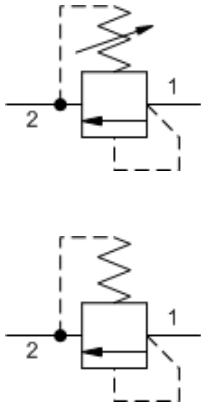
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	5 drops/min.
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-203-007
Seal kit - Cartridge	Polyurethane: 990-003-002
Seal kit - Cartridge	Viton: 990-203-006

NOTES For Series 2 cartridges configured with an O control (panel mount handknob), a 1.00 in. (25,4 mm) diameter hole is required in the panel.

CONFIGURATION OPTIONS

Model Code Example: RBAALAN

CONTROL	ADJUSTMENT RANGE	SEAL MATERIAL	MATERIAL/COATING
L Standard Screw Adjustment	A 25 - 3000 psi (1,7 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	(none) Standard Material/Coating
C Tamper Resistant - Factory Set	B 25 - 1500 psi (1,7 - 105 bar), 1000 psi (70 bar) Standard Setting	E EPDM	/AP Stainless Steel, Passivated
J Capped Screw Adjustment	C 25 - 6000 psi (1,7 - 420 bar), 1000 psi (70 bar) Standard Setting	V Viton	
K Handknob	D 25 - 800 psi (1,7 - 55 bar), 400 psi (28 bar) Standard Setting		
O Handknob with Panel Mount	E 25 - 400 psi (1,7 - 28 bar), 200 psi (14 bar) Standard Setting		
Y Tri-Grip Handknob	W 25 - 4500 psi (1,7 - 315 bar), 1000 psi (70 bar) Standard Setting		



Direct-acting, pilot relief cartridges are used to remotely control the pressure setting of other pilot-operated valves. Because capacity is limited to pilot flow, these valves should be used with other higher flow valves.

TECHNICAL DATA

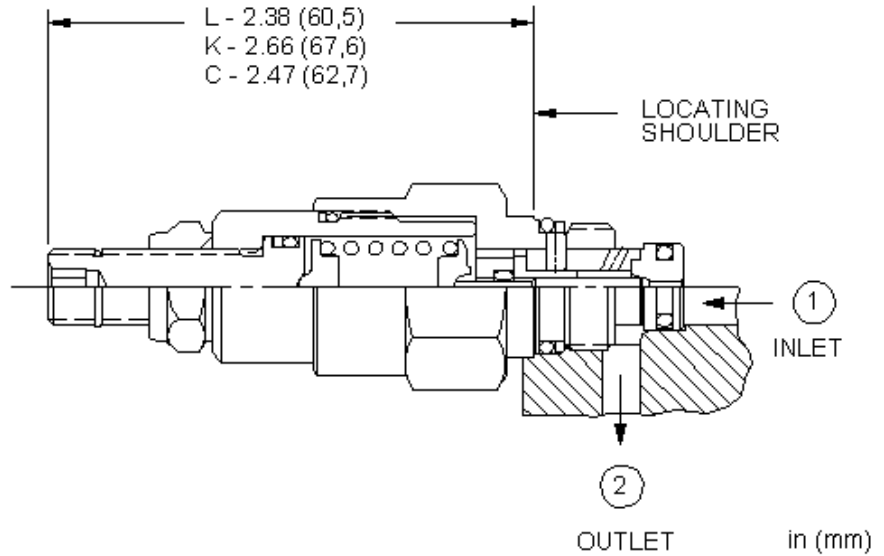
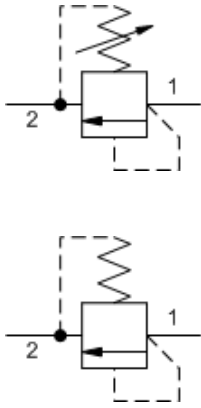
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	5 drops/min.
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-010-007
Seal kit - Cartridge	Polyurethane: 990-010-002
Seal kit - Cartridge	Viton: 990-010-006

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: RBACLAN

CONTROL	ADJUSTMENT RANGE	SEAL MATERIAL	MATERIAL/COATING
L Standard Screw Adjustment	A 25 - 3000 psi (1,7 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	(none) Standard Material/Coating
C Tamper Resistant - Factory Set	W 25 - 4500 psi (1,7 - 315 bar), 1000 psi (70 bar) Standard Setting	E EPDM	/AP Stainless Steel, Passivated
J Capped Screw Adjustment	B 25 - 1500 psi (1,7 - 105 bar), 1000 psi (70 bar) Standard Setting	V Viton	/LH Mild Steel, Zinc-Nickel
K Handknob	C 25 - 6000 psi (1,7 - 420 bar), 1000 psi (70 bar) Standard Setting		
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		



Two-port, pilot-stage, direct-acting relief cartridges are fully adjustable, normally closed pressure regulating valves. When the pressure at port 1 (inlet) is sufficient to overcome the spring force (valve setting), a flow path is opened from port 1 to port 2 (tank).

TECHNICAL DATA

Factory Pressure Settings Established at	2 in ³ /min.
Maximum Operating Pressure	5000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	15 drops/min.
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-608-007
Seal kit - Cartridge	Polyurethane: 990-008-002
Seal kit - Cartridge	Viton: 990-608-006

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: **RBAELAN**

CONTROL

- L** Standard Screw Adjustment
- C** Tamper Resistant - Factory Set
- K** Handknob
- O** Handknob with Panel Mount
- Y** Tri-Grip Handknob

ADJUSTMENT RANGE

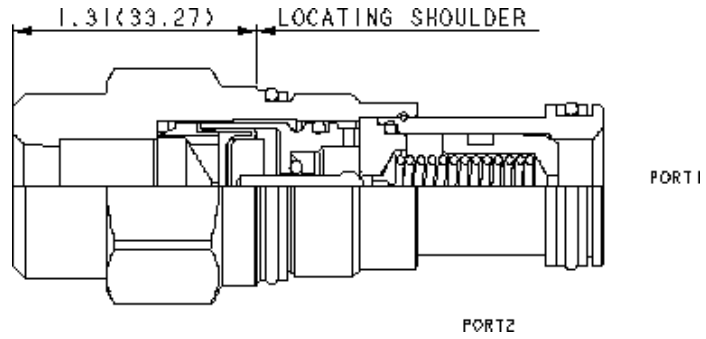
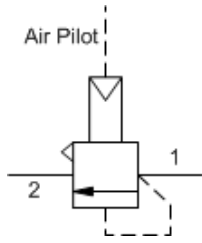
- A** 25 - 3000 psi (1,7 - 210 bar), 1000 psi (70 bar) Standard Setting
- B** 25 - 1500 psi (1,7 - 105 bar), 1000 psi (70 bar) Standard Setting
- C** 25 - 6000 psi (1,7 - 420 bar), 1000 psi (70 bar) Standard Setting
- D** 25 - 800 psi (1,7 - 55 bar), 400 psi (28 bar) Standard Setting
- E** 25 - 400 psi (1,7 - 28 bar), 200 psi (14 bar) Standard Setting
- W** 25 - 4500 psi (1,7 - 315 bar), 1000 psi (70 bar) Standard Setting

SEAL MATERIAL

- N** Buna-N
- E** EPDM
- V** Viton

MATERIAL/COATING

- (none)** Standard Material/Coating
- /AP** Stainless Steel, Passivated
- /LH** Mild Steel, Zinc-Nickel



Air-controlled, pilot relief cartridges are used to remotely control the pressure setting of other pilot operated valves. Because capacity is limited to pilot flow, these valves should be used with valves with compatible pilot flows. They use compressed air over a diaphragm instead of an adjustable spring to control pressure setting, the air signal is supplied through a port in the hex-end of the cartridge.

TECHNICAL DATA

Pilot Ratio	20:1
Maximum Operating Pressure	2000 psi
Response Time - Typical	2 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	5 drops/min.
Seal kit - Cartridge	Buna: 990-203-007
Seal kit - Cartridge	Viton: 990-203-006

CONFIGURATION OPTIONS

Model Code Example: RBABABN

CONTROL

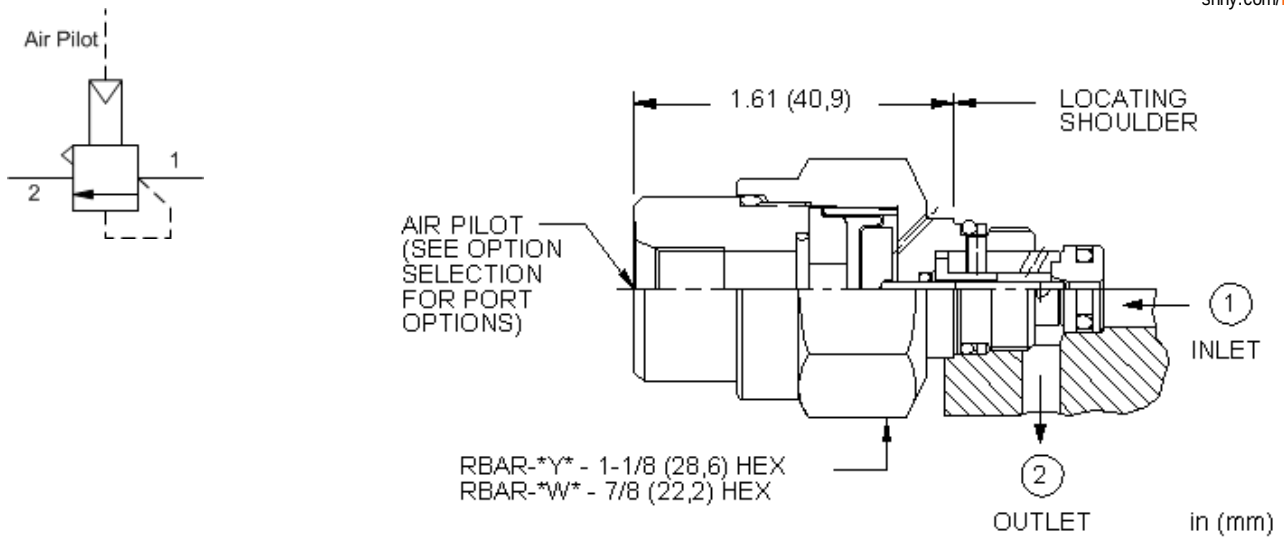
A External 1/4 NPTF Port

OPERATING RANGE

B 50 - 1500 psi (3,5 - 105 bar)

SEAL MATERIAL

N Buna-N
V Viton



Two-port, pilot-stage, air-controlled, direct-acting relief cartridges are normally closed pressure regulating valves. When the pressure at port 1 (inlet) is sufficient to overcome the force due to the air signal, a flow path is opened from port 1 to port 2 (tank). These cartridges are designed for pilot flow applications and utilize Sun's T-8A cavity so they can be used in conjunction with Sun's pilot-operated, main-stage valves.

TECHNICAL DATA

Maximum Operating Pressure	5000 psi
Maximum Valve Leakage at 110 SUS (24 cSt)	15 drops/min.
Maximum Pilot Pressure	150 psi
Pilot Control Port	See Control Options
Seal kit - Cartridge	Buna: 990-008-007
Seal kit - Cartridge	Polyurethane: 990-008-002
Seal kit - Cartridge	Viton: 990-008-006

CONFIGURATION OPTIONS

Model Code Example: RBARBWN

CONTROL

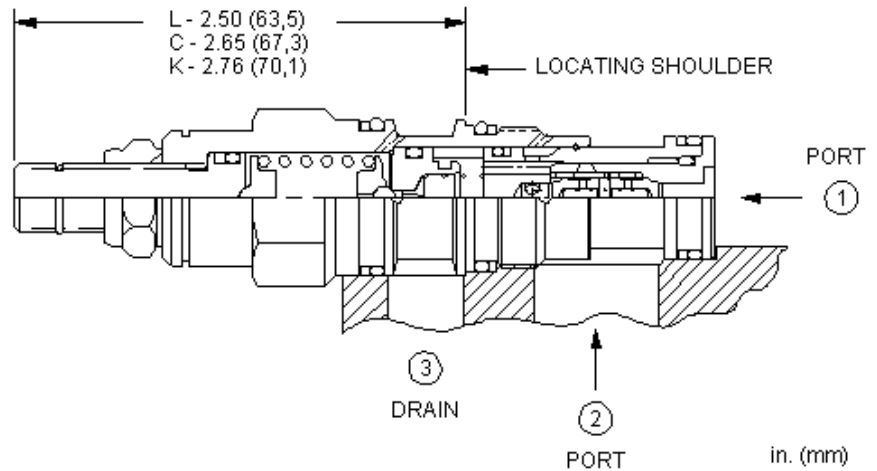
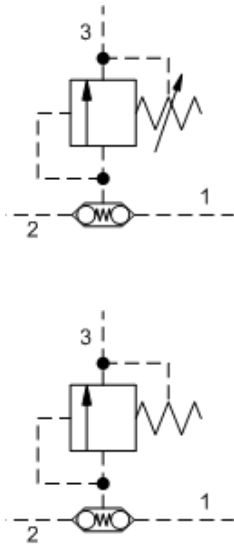
- B** External 4-SAE Port
- A** External 1/8 NPTF Port
- D** External 1/8 BSPP Port

AIR PILOT RATIO

- W** 50:1
- Y** 75:1

SEAL MATERIAL

- N** Buna-N
- E** EPDM
- V** Viton



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

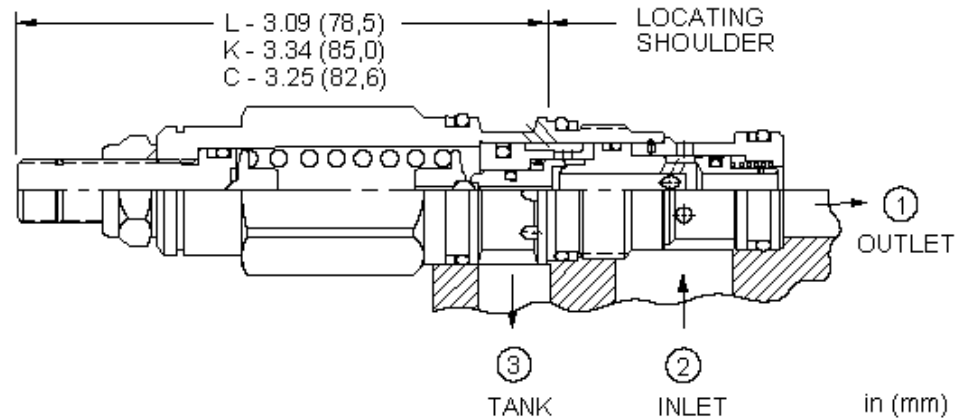
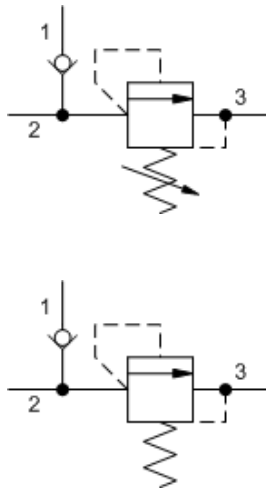
Response Time - Typical	2 ms
Maximum Valve Leakage at 110 SUS (24 cSt)	5 drops/min.
Adjustment - Number of Clockwise Turns to Increase Setting	5
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-011-007
Seal kit - Cartridge	Polyurethane: 990-011-002
Seal kit - Cartridge	Viton: 990-011-006

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	ADJUSTMENT RANGE	SEAL MATERIAL	MATERIAL/COATING
L Standard Screw Adjustment	A 25 - 3000 psi (1,7 - 210 bar), 1000 psi (70 bar) Standard Setting	N Buna-N	(none) 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 hybrid 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 (port 1). 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	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	10 ms
Maximum Valve Leakage at Reseat	5 drops/min.
Check Cracking Pressure	25 psi
Adjustment - Number of Clockwise Turns to Increase Setting	6
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-011-007
Seal kit - Cartridge	Polyurethane: 990-011-002
Seal kit - Cartridge	Viton: 990-011-006

CONFIGURATION OPTIONS

Model Code Example: HRDALAN

CONTROL

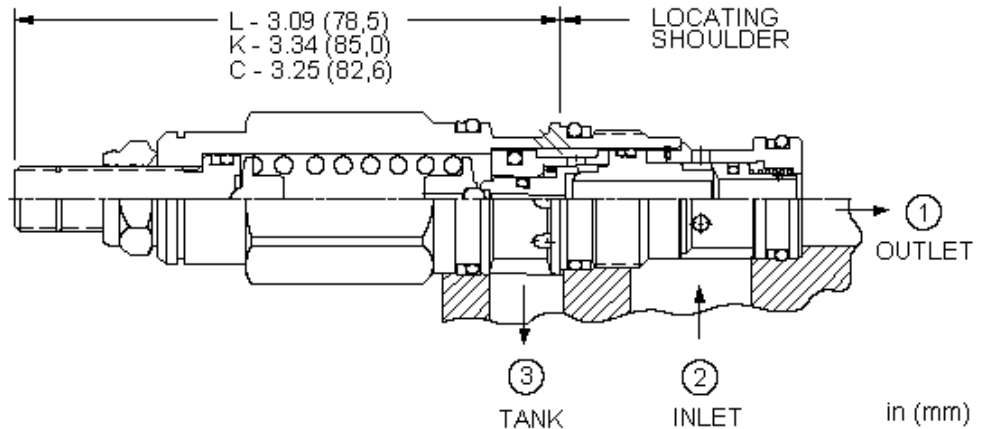
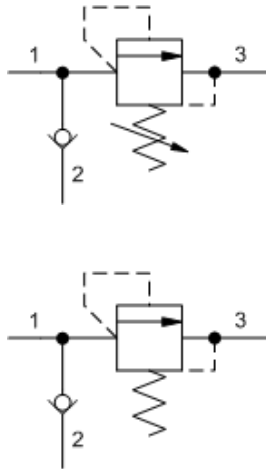
- L** Standard Screw Adjustment
- C** Tamper Resistant - Factory Set
- K** Handknob

ADJUSTMENT RANGE

- A** 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting
- D** 200 - 700 psi (14 - 50 bar), 400 psi (28 bar) Standard Setting
- W** 800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting

SEAL MATERIAL

- N** Buna-N
- V** Viton



The relief-after-check cartridge is a hybrid 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	4 gpm
Maximum Operating Pressure	5000 psi
Response Time - Typical	10 ms
Maximum Valve Leakage at Reseat	5 drops/min.
Check Cracking Pressure	25 psi
Adjustment - Number of Clockwise Turns to Increase Setting	6
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-011-007
Seal kit - Cartridge	Polyurethane: 990-011-002
Seal kit - Cartridge	Viton: 990-011-006

CONFIGURATION OPTIONS

Model Code Example: HRDBLAN

CONTROL

- L Standard Screw Adjustment
- C Tamper Resistant - Factory Set
- K Handknob

ADJUSTMENT RANGE

- A 500 - 3000 psi (35 - 210 bar), 1000 psi (70 bar) Standard Setting
- W 800 - 4500 psi (55 - 315 bar), 1000 psi (70 bar) Standard Setting

SEAL MATERIAL

- N Buna-N
- V Viton

MATERIAL/COATING

- (none) Standard Material/Coating
- IAP Stainless Steel, Passivated



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