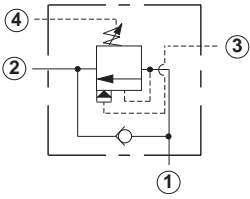


Counterbalance Valves

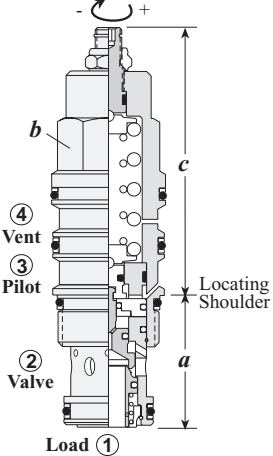
VENTED, 4000 PSI MAXIMUM SETTING



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
15 GPM	CWCA- LHN	T - 21A	1.38	7/8"	2.91	3.16	30/35
30 GPM	CWEA- LHN	T - 22A	1.38	1 1/8"	3.29	3.54	45/50
60 GPM	CWGA- LHN	T - 23A	1.81	1 1/4"	3.75	3.97	150/160
120 GPM	CWIA - LHN	T - 24A	2.50	1 7/8"	4.58	4.78	350/375

OPTION ORDERING INFORMATION

Turn screw clockwise to reduce setting and release load. Complete Adjustment 5 Turns



CW * * - * * *

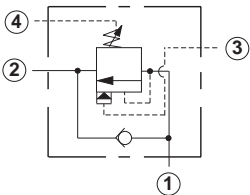
Nominal Capacity	Control**	Cracking Pressure	Seal
C 15 GPM	L Standard Screw	A and K Pilot Ratios	N Buna-N
E 30 GPM	C Tamper Resistant	H 1000 - 4000 psi	V Viton
G 60 GPM		I 400 - 1500 psi	
I 120 GPM			

Version
A 3:1 Pilot Ratio
K 1:1 Pilot Ratio

Adjustment Range Options:
H is standard set at 3000 psi.
I is standard set at 1000 psi.
Customer may specify setting.

** See page 244 for information on Control Options

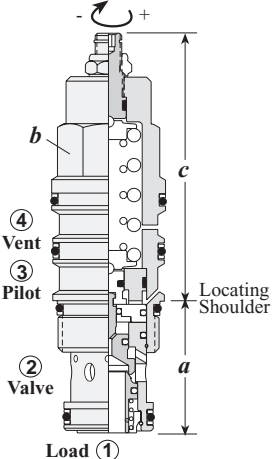
VENTED, 6000 PSI MAXIMUM SETTING



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
15 GPM	CWCG- LFN	T - 21A	1.38	7/8"	2.91	3.16	30/35
30 GPM	CWEG- LFN	T - 22A	1.38	1 1/8"	3.29	3.54	45/50
60 GPM	CWGG- LFN	T - 23A	1.81	1 1/4"	3.75	3.97	150/160
120 GPM	CWIG - LFN	T - 24A	2.50	1 7/8"	4.58	4.78	350/375

OPTION ORDERING INFORMATION

Turn screw clockwise to reduce setting and release load. Complete Adjustment 5 Turns



CW * * - * * *

Nominal Capacity	Control**	Cracking Pressure	Seal
C 15 GPM	L Standard Screw	G and L Pilot Ratios	N Buna-N
E 30 GPM	C Tamper Resistant	F 1000 - 3500 psi	V Viton
G 60 GPM		G 2000 - 6000 psi	
I 120 GPM			

Version
G 5:1 Pilot Ratio
L 2:1 Pilot Ratio

Adjustment Range Options:
F is standard set at 2000 psi.
G is standard set at 4000 psi.
Customer may specify setting.

** See page 244 for information on Control Options

TECHNICAL TIPS / PERFORMANCE CURVES

Counterbalance Valves, 3:1, 5:1, 1:1 and 2:1 Pilot Ratios, Vented

Applications

Sun counterbalance valves with pilot assist are used for load holding and to provide smooth motion control. When used with vertical actuators they help to ensure control of the load during lowering. With horizontal rotary motion, such as slewing, they can help provide good control of acceleration and deceleration.

The vented type are used to provide load control on applications where there is a variable back-pressure downstream of the valve which could cause instability in a standard valve. The spring chamber is vented externally to tank through a fourth port making it insensitive to back pressure. Any pressure generated on the drain port will be additive to the setting.

Counterbalance valves are load control valves and not speed control valves. Separate meter-in flow control valves should be included to provide speed control. It is always better to undersize rather than oversize the valve used and mount it as close to the actuator as possible. It is always advisable to set the pressure setting of a counterbalance valve before fitting it to the application as it is difficult to set up on a machine.

It is always advisable to select a low pilot ratio to provide the best stability, particularly on cylinder applications. High pilot ratios should only be used on stable motor applications.

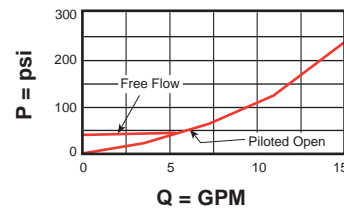
Design Concepts and Features

- All cartridges are fully tested and supplied at a standard setting. The setting of a counterbalance valve is always the cracking pressure.
- The valve reseats after opening at 85% of the cracking pressure.
- Maximum leakage on reseat is 5 drops/min.
- The standard free reverse flow check varies between 20 psi and 45 psi depending on the frame size.
- Recommended setting for counterbalance valves is 1.3 times the maximum load induced pressure.
- Increase setting by turning adjust screw anti-clockwise.
- The valve is opened by a combination of the load induced pressure on the main seat area and the pilot pressure on the pilot area.
- The cartridge has a sealed pilot.
- All cartridges have 3 nominal adjustment turns from minimum to maximum pressure setting.
- A press fit tamper resistant cap is available to fit over the screw adjustment.
- Valves are unaffected by back pressure at Port 2.
- Vent port should not be blocked.

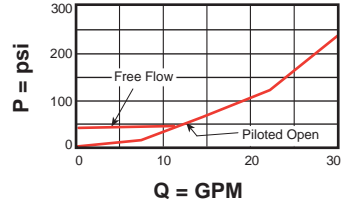
Performance Curves

Free Flow and Pilot Open Pressure Drop

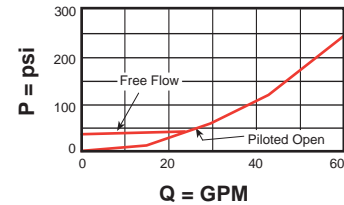
CWC*-L*N



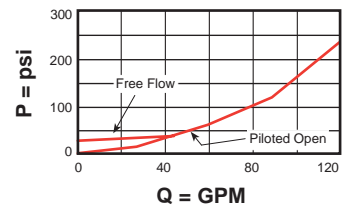
CWE*-L*N



CWG*-L*N



CWI*-L*N



General Application Requirements

- Operating Temperature Range: Buna-N seals -50° F to 200° F, Viton seals 0° F to 250° F.
- Viscosity Range: 60-3000 SUS.
- Fluid Contamination Level: ISO 4406 18/15 or better; Recommend $\beta_{10} \geq 75$ to achieve ISO 18/15 or better in most systems.
- Factory Pressure Setting for cartridge is established at cracking flow.