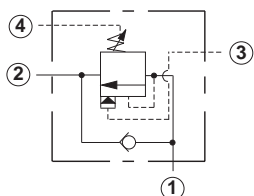


Counterbalance Valves

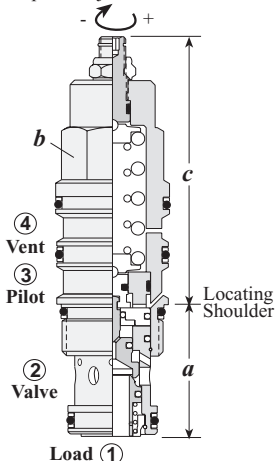
VENTED, 280 BAR MAXIMUM SETTING



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (Nm)
			a	b	L	C	
60 L/min.	CWCA-LHN	T - 21A	34,9	22,2	74	81	40/50
120 L/min.	CWEA-LHN	T - 22A	34,9	28,6	84	90	60/70
240 L/min.	CWGA-LHN	T - 23A	46	31,8	96	101	200/215
480 L/min.	CWIA-LHN	T - 24A	63,5	41,3	117	126	465/500

OPTION ORDERING INFORMATION

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



CW * * - * * *

Nominal Capacity	Control**	Cracking Pressure	Seal
C 60 L/min.	L Standard Screw	A and K Pilot Ratios	N Buna-N
E 120 L/min.	C Tamper Resistant	H 70 - 280 bar	V Viton
G 240 L/min.		I 25 - 105 bar	
I 480 L/min.			

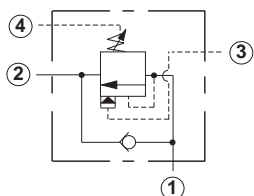
Version

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

Adjustment Range Options:
H is standard set at 210 bar.
I is standard set at 70 bar.
Customer may specify setting.

** See page 244 for information on Control Options

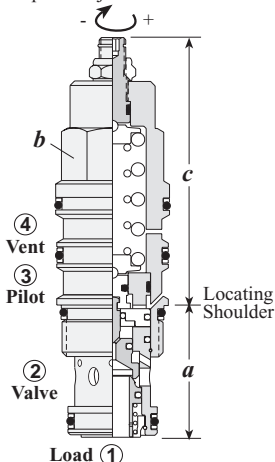
VENTED, 420 BAR MAXIMUM SETTING



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (Nm)
			a	b	L	C	
60 L/min.	CWCG-LFN	T - 21A	34,9	22,2	74	81	40/50
120 L/min.	CWEG-LFN	T - 22A	34,9	28,6	84	90	60/70
240 L/min.	CWGG-LFN	T - 23A	46	31,8	96	101	200/215
480 L/min.	CWIG-LFN	T - 24A	63,5	41,3	117	126	465/500

OPTION ORDERING INFORMATION

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



CW * * - * * *

Nominal Capacity	Control**	Cracking Pressure	Seal
C 60 L/min.	L Standard Screw	G and L Pilot Ratios	N Buna-N
E 120 L/min.	C Tamper Resistant	F 70 - 175 bar	V Viton
G 240 L/min.		G 140 - 420 bar	
I 480 L/min.			

Version

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

Adjustment Range Options:
F is standard set at 140 bar.
G is standard set at 280 bar.
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.

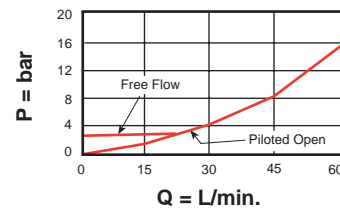
Design Concepts and Features

- 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 1,4 bar and 3,0 bar 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.

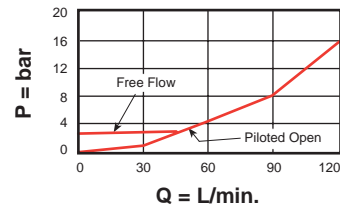
Performance Curves

Free Flow and Pilot Open Pressure Drop

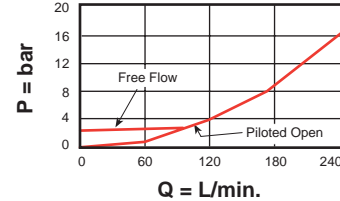
CWC*-L*N



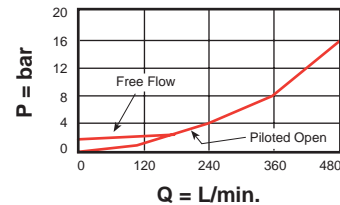
CWE*-L



CWG*-L*N



CWI*-L*N



General Application Requirements

- Operating Temperature Range: Buna-N seals -45° C to 90° C, Viton seals -15° C to 120° C.
- Viscosity Range: 10-600 centistokes.
- 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.