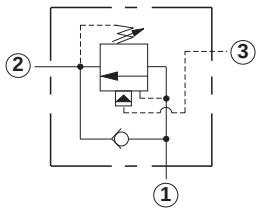
Counterbalance Valves

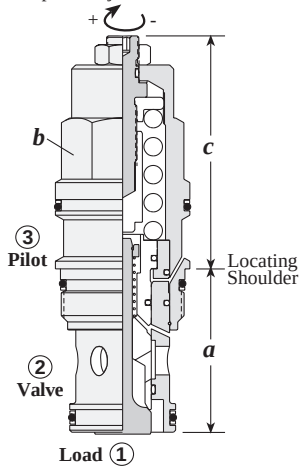
STANDARD, 4000 PSI MAXIMUM SETTING



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions a	b	c L	c C	Installation Torque (lb. ft.)
15 GPM	CBCA – LHN	T - 11A	1.38	7/8”	1.97	2.19	30/35
30 GPM	CBEA – LHN	T - 2A	1.38	1 1/8”	2.38	2.50	45/50
60 GPM	CBGA – LHN	T - 17A	1.81	1 1/4”	2.75	3.31	150/160
120 GPM	CBIA – LHN	T - 19A	2.50	1 5/8”	3.50	4.09	350/375

OPTION ORDERING INFORMATION

Turn screw clockwise to reduce setting and release load. Complete Adjustment 3 Turns



CB ★ ★ – ★ ★ ★

Nominal Capacity

- **C** 15 GPM
- **E** 30 GPM
- **G** 60 GPM
- **I** 120 GPM

Control**

- **L** Standard Screw
- **C** Tamper Resistant

Version

- **A** 3:1 Pilot Ratio
- **B** 1.5:1 Pilot Ratio (with sealed pilot)
- **Y** 2:1 Pilot Ratio (with bleed through pilot)

** *See page 244 for information on Control Options*

Cracking Pressure

30 psi Check Spring

- **H** 1000 - 4000 psi
- **I** 400 - 1500 psi

5 psi Check Spring

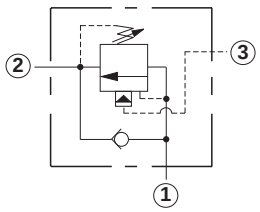
- **A** 1000 - 4000 psi
- **B** 400 - 1500 psi

Adjustment Range Options:
A and H are standard set at 3000 psi.
I and B are standard set at 1000 psi.
Customer may specify setting.

Seal

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

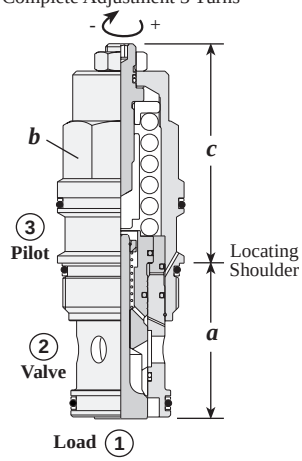
STANDARD, 5000 PSI MAXIMUM SETTING



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions a	b	c L	c C	Installation Torque (lb. ft.)
15 GPM	CBCG – LJN	T - 11A	1.38	7/8”	1.97	2.19	30/35
30 GPM	CBEG – LJN	T - 2A	1.38	1 1/8”	2.38	2.50	45/50
60 GPM	CBGG – LJN	T - 17A	1.81	1 1/4”	2.75	3.31	150/160
120 GPM	CBIG – LJN	T - 19A	2.50	1 5/8”	3.50	4.09	350/375

OPTION ORDERING INFORMATION

Turn screw clockwise to reduce setting and release load. Complete Adjustment 3 Turns



CB ★ ★ – ★ ★ ★

Nominal Capacity

- **C** 15 GPM
- **E** 30 GPM
- **G** 60 GPM
- **I** 120 GPM

Control**

- **L** Standard Screw
- **C** Tamper Resistant

Version

- **G** 4.5:1 Pilot Ratio
- **H** 10:1 Pilot Ratio
- **L** 2.3:1 Pilot Ratio (with sealed pilot)

** *See page 244 for information on Control Options*

Cracking Pressure

30 psi Check Spring

- **J** 2000 - 5000 psi
- **K** 1000 - 2500 psi

5 psi Check Spring

- **C** 2000 - 5000 psi
- **D** 1000 - 2500 psi

Adjustment Range Options:
J and C are standard set at 3000 psi.
K and D are standard set at 2000 psi.
Customer may specify setting.

Seal

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

TECHNICAL TIPS / PERFORMANCE CURVES

Counterbalance Valves, 3:1, 1.5:1 and 2:1 Pilot Ratio, External Pilot, Non-vented

Applications

The Sun three port counterbalance cartridges (with pilot to open assist) are modulating devices that allow free flow from port 2 (inlet) to port 1 (load) and then block reverse flow until a pilot pressure inversely proportional to the load pressure is sensed at port 3 (pilot) or load pressure exceeds relief setting. These valves improve the motion control of most control valve systems by ensuring that the actuator always sees a positive load pressure, even under overrunning load situations.

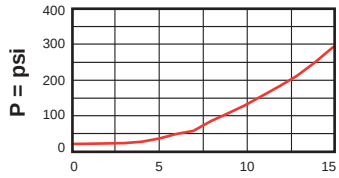
Design Concepts and Features

- Recommended minimum setting should be 1.3 times maximum load induced pressure.
- 3:1, 1.5:1, 2:1 pilot ratio, load holding to 3000 psi (with 4000 psi setting).
- Load reactive pilot assist for overcenter load control applications.
- 5 drops/min. maximum leakage at reseat.
- Reseat exceeds 85% of set pressure at standard setting.
- Back pressure at Port 2 may adversely affect operation of valve. For circuits with back pressure Sun recommends vented counterbalance valves CW** (vented valves).

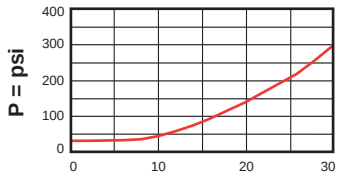
Performance Curves

Free Flow and Pilot Open Pressure Drop

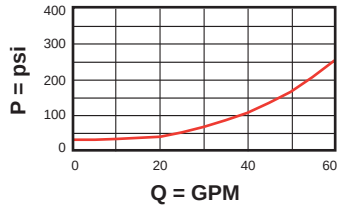
CBC*-L*N



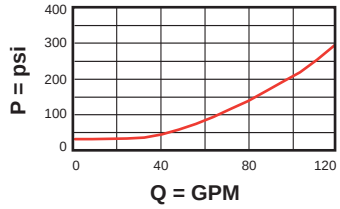
CBE*-L*N



CBG*-L*N



CBI*-L*N



Counterbalance Valves, 4.5:1, 10:1 and 2.3:1 Pilot Ratio, External Pilot, Non-vented

Applications

The Sun three port counterbalance cartridges (with pilot to open assist) are modulating devices that allow free flow from port 2 (inlet) to port 1 (load) and then block reverse flow until a pilot pressure inversely proportional to the load pressure is sensed at port 3 (pilot) or load pressure exceeds relief setting. These valves improve the motion control of most control valve systems by ensuring that the actuator always sees a positive load pressure, even under overrunning load situations.

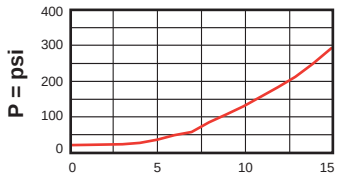
Design Concepts and Features

- Recommended minimum setting should be 1.3 times maximum load induced pressure.
- 4.5:1 10:1, 2.3:1 pilot ratio, load holding to 3760 psi (with 5000 psi setting).
- Load reactive pilot assist for overcenter load control applications.
- 5 drops/min. maximum leakage at reseat.
- Reseat exceeds 85% of set pressure at standard setting.
- Back pressure at Port 2 may adversely affect operation of valve. For circuits with back pressure Sun recommends vented counterbalance valves CW** (vented valves).

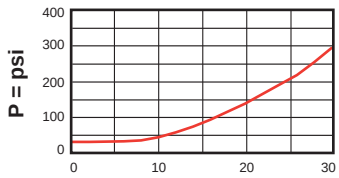
Performance Curves

Free Flow and Pilot Open Pressure Drop

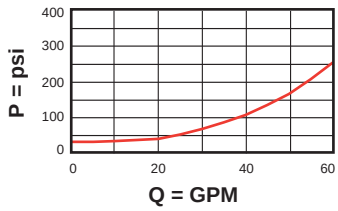
CBC*-L*N



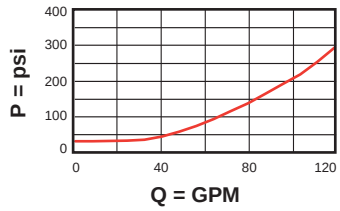
CBE*-L*N



CBG*-L*N



CBI*-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 35 cc/min.