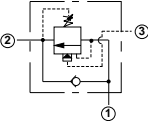
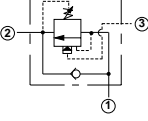
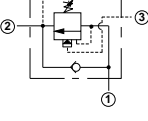
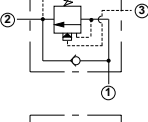
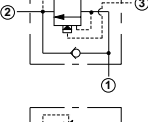
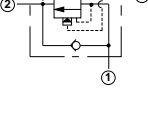
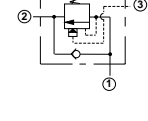
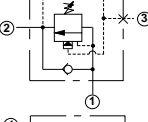
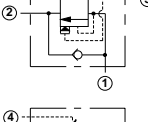
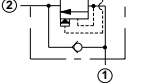
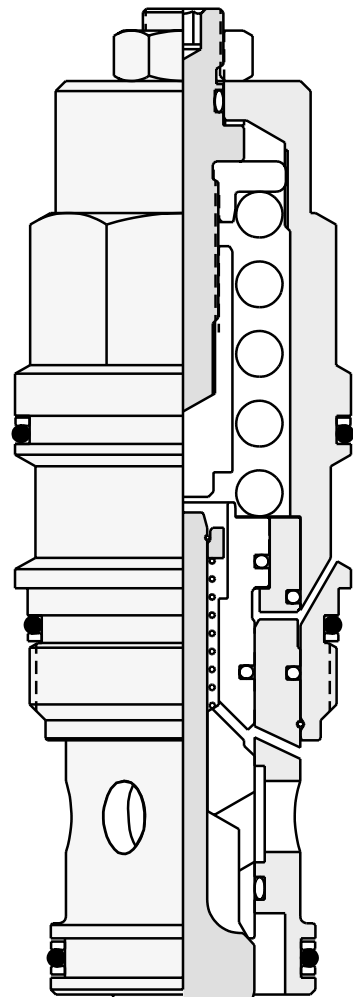


Counterbalance Cartridge Valves

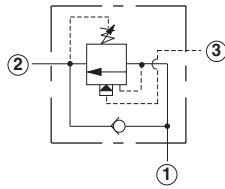
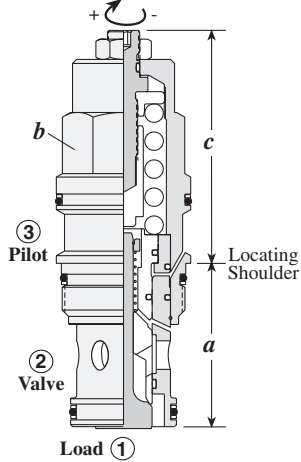
	<i>Cartridge Type</i>	<i>Page</i>
	Standard, 4000 psi Maximum Setting	24
	Standard, 5000 psi Maximum Setting	25
	Semi-Restrictive, 4000 psi Maximum Setting	26
	Semi-Restrictive, 5000 psi Maximum Setting	27
	Restrictive, 4000 psi Maximum Setting	28
	Restrictive, 5000 psi Maximum Setting	29
	Atmospherically Referenced, 3 Port Cavity	30
	Without Pilot Assist, 3 Port Cavity	31
	Vented, 4000 psi Maximum Setting	32
	Vented, 6000 psi Maximum Setting	33



Counterbalance Valves

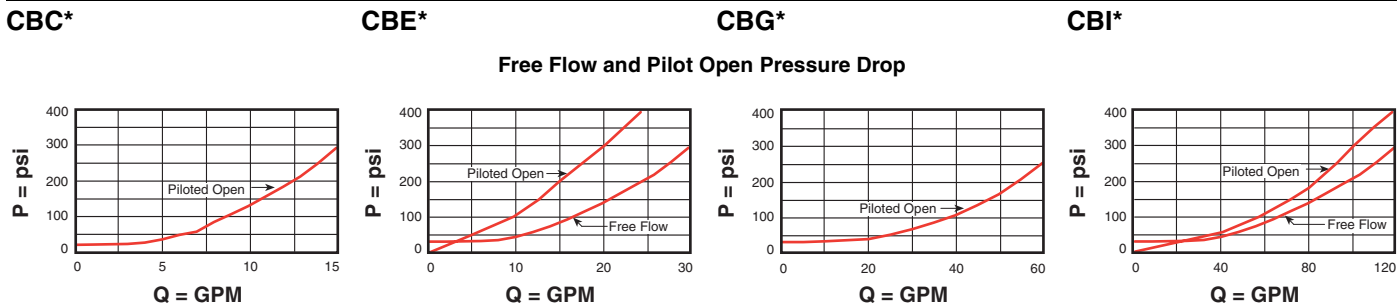
STANDARD, 4000 PSI MAXIMUM SETTING

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



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
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

Performance Curves



- Maximum setting should be 1.3 times the maximum load induced pressure.
- Maximum leakage 5 drops/min. at reset. Reset exceeds 85% of set pressure.
- Back Pressure at Port 2 may adversely affect operation of valve (for circuits with back pressure use CW**).

OPTION ORDERING INFORMATION

Nominal Capacity	Base Price	Version	Control**	Cracking Pressure	Seal
C 15 GPM	\$ 42.90	A 3:1 Pilot Ratio +\$ 0.00	L Standard Screw +\$ 0.00	25 psi Check Spring	N Buna-N +\$ 0.00
E 30 GPM	\$ 58.80	B 1.5:1 Pilot Ratio (with sealed pilot) +\$ 2.00	C Tamper Resistant +\$ 4.10	H 1000 - 4000 psi +\$ 0.00	V Viton +\$ 2.00
G 60 GPM	\$ 108.70	Y 2:1 Pilot Ratio (with Bleed through Pilot) +\$ 2.00		I 400 - 1500 psi +\$ 0.00	
I 120 GPM	\$ 205.00			4 psi Check Spring	
				A 1000 - 4000 psi +\$ 2.00	
				B 400 - 1500 psi +\$ 2.00	

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

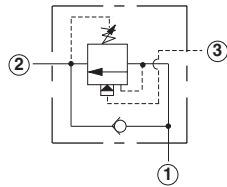
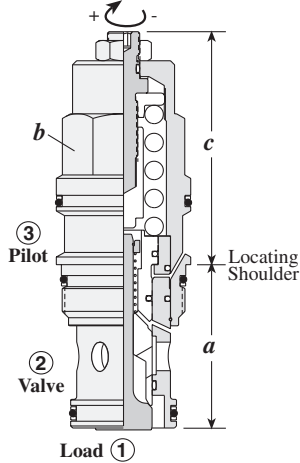
** See page 92 for information on Control Options

Customer may specify setting. +\$ 1.10

Counterbalance Valves

STANDARD, 5000 PSI MAXIMUM SETTING

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



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
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

Performance Curves

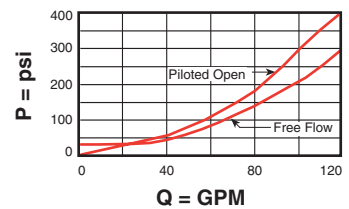
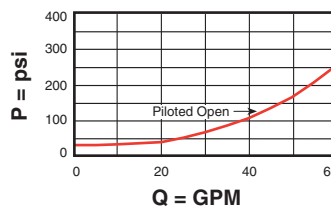
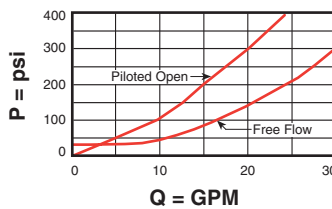
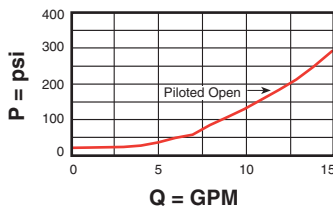
CBC*

CBE*

CBG*

CBI*

Free Flow and Piloted Open Pressure Drop



- Maximum setting should be 1.3 times the maximum load induced pressure.
- Maximum leakage 5 drops/min. at reset. Reset exceeds 85% of set pressure.
- Back Pressure at Port 2 may adversely affect operation of valve (for circuits with back pressure use **CW****).

OPTION ORDERING INFORMATION

Nominal Capacity	Base Price	Version	Control**	Cracking Pressure	Seal
C 15 GPM	\$ 44.60	G 4.5:1 Pilot Ratio	L Standard Screw	25 psi Check Spring	N Buna-N
E 30 GPM	\$ 60.60	H 10:1 Pilot Ratio	C Tamper Resistant	J 2000 - 5000 psi	V Viton
G 60 GPM	\$ 110.60	L 2.3:1 Pilot Ratio (with sealed pilot)		K 1000 - 2500 psi	
I 120 GPM	\$ 206.80			4 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.

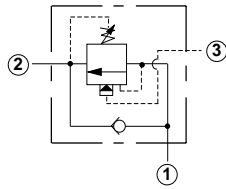
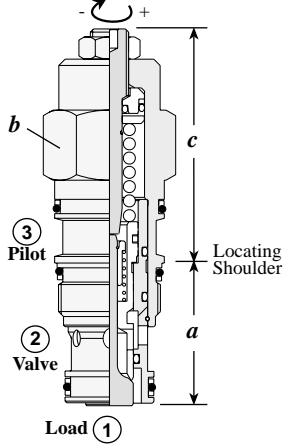
** See page 92 for information on Control Options

+\$ 1.10

Counterbalance Valves

SEMI-RESTRICTIVE, 4000 PSI MAXIMUM SETTING

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



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	c		
					L	C	
10 GPM	CBBC – LHN	T - 11A	1.38	7/8"	1.97	2.19	30/35
20 GPM	CBDC – LHN	T - 2A	1.38	1 1/8"	2.38	2.50	45/50
40 GPM	CBFC – LHN	T - 17A	1.81	1 1/4"	2.75	3.31	150/160

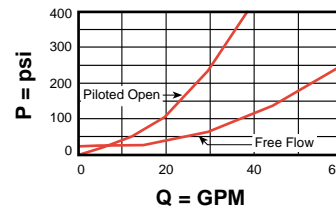
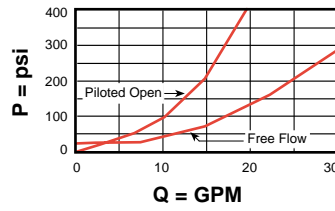
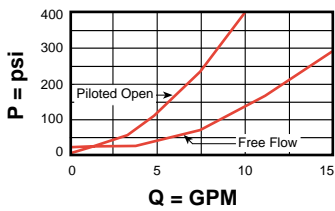
Performance Curves

CBB*

CBD*

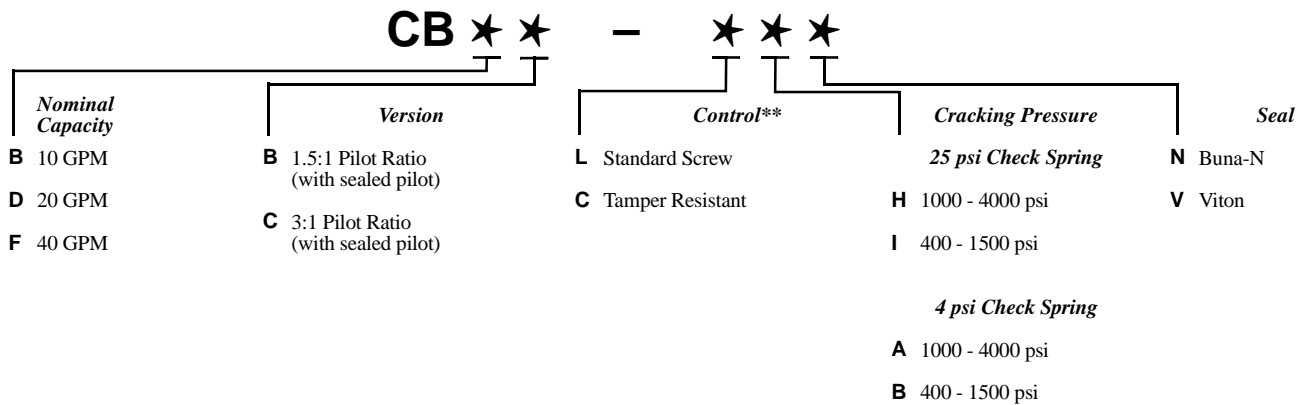
CBF*

Free Flow and Pilot Open Pressure Drop



- Maximum setting should be 1.3 times the maximum load induced pressure.
- Maximum leakage 5 drops/min. at reset. Reset exceeds 85% of set pressure.
- Back Pressure at Port 2 may adversely affect operation of valve (for circuits with back pressure use CW**).

OPTION ORDERING INFORMATION



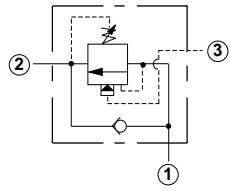
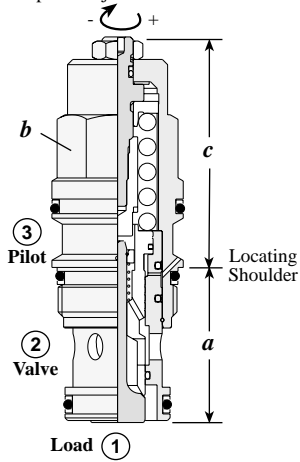
Adjustment Range Options:
 A and H are standard set at 3000 psi.
 I and B are standard set at 1000 psi.
 Customer may specify setting.

** See page 92 for information on Control Options

Counterbalance Valves

SEMI-RESTRICTIVE, 5000 PSI MAXIMUM SETTING

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



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
10 GPM	CBBD - LJN	T - 11A	1.38	7/8"	1.97	2.19	30/35
20 GPM	CBDD - LJN	T - 2A	1.38	1 1/8"	2.38	2.50	45/50
40 GPM	CBFD - LJN	T - 17A	1.81	1 1/4"	2.75	3.31	150/160

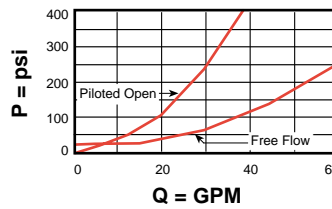
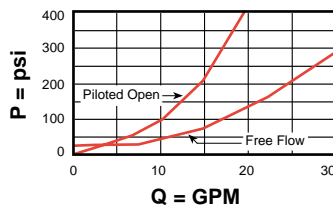
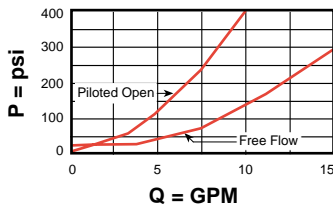
Performance Curves

CBB*

CBD*

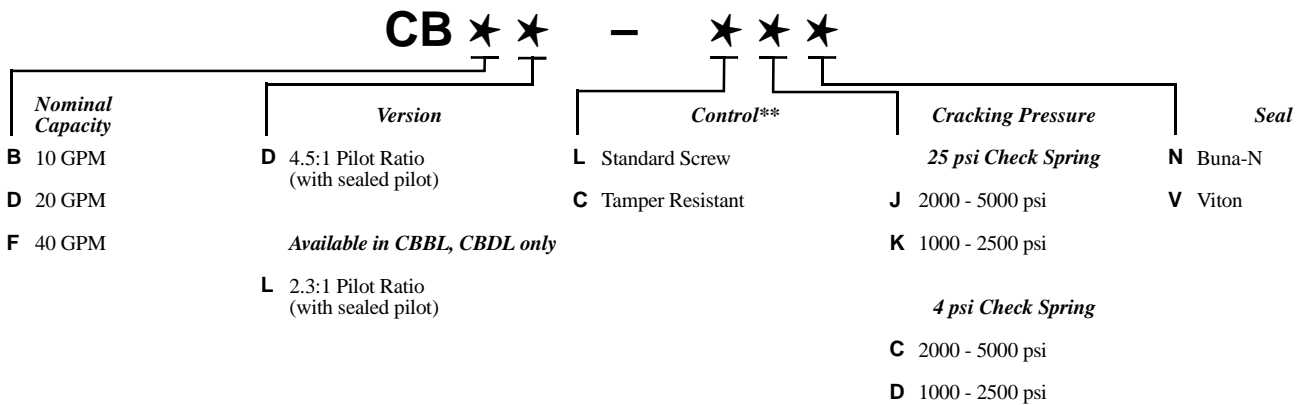
CBF*

Free Flow and Pilot Open Pressure Drop



- Maximum setting should be 1.3 times the maximum load induced pressure.
- Maximum leakage 5 drops/min. at reset. Reset exceeds 85% of set pressure.
- Back Pressure at Port 2 may adversely affect operation of valve (for circuits with back pressure use CW**).

OPTION ORDERING INFORMATION



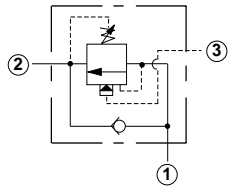
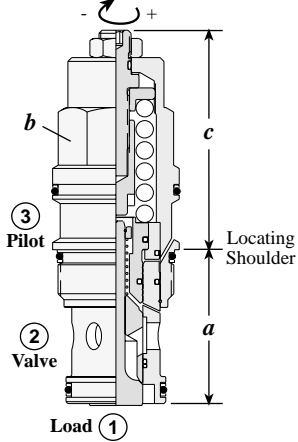
Adjustment Range Options:
 J and C are standard set at 3000 psi.
 K and D are standard set at 2000 psi.
 Customer may specify setting.

** See page 92 for information on Control Options

Counterbalance Valves

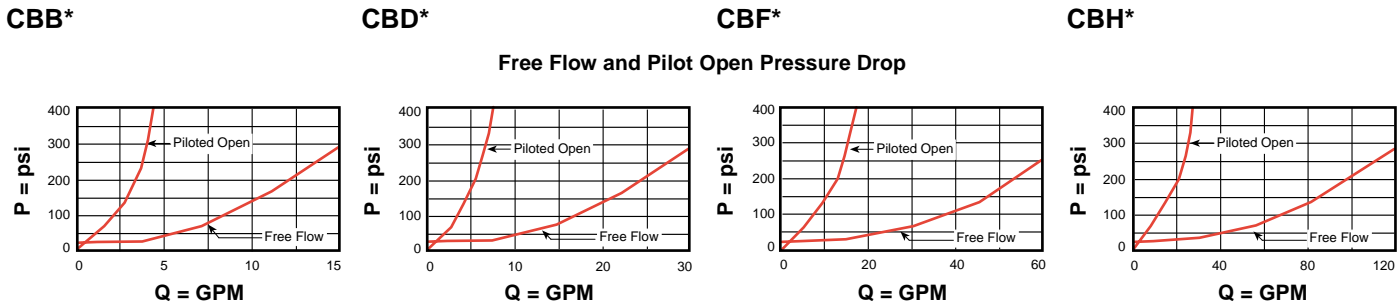
RESTRICTIVE, 4000 PSI MAXIMUM SETTING

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



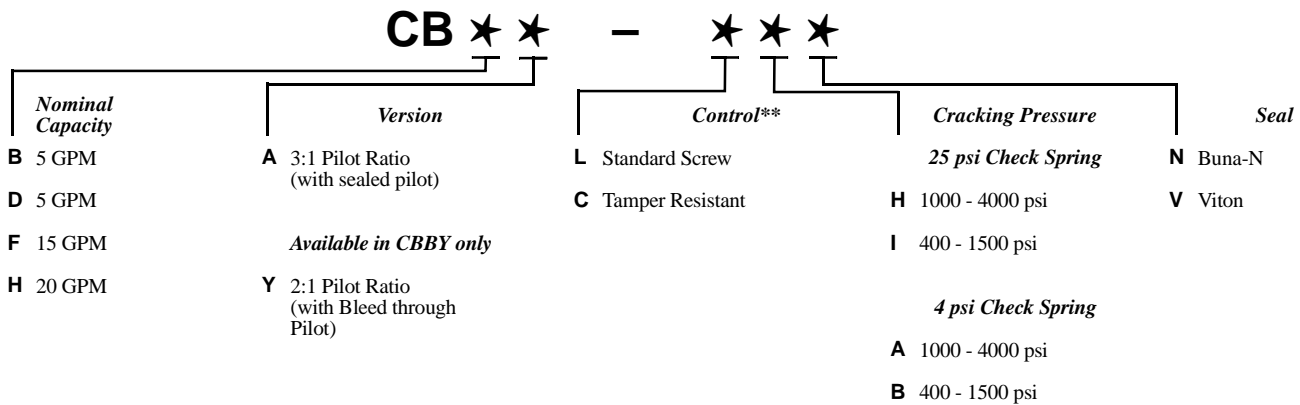
Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
5 GPM	CBBA – LHN	T - 11A	1.38	7/8"	1.97	2.19	30/35
5 GPM	CBDA – LHN	T - 2A	1.38	1 1/8"	2.38	2.50	45/50
15 GPM	CBFA – LHN	T - 17A	1.81	1 1/4"	2.74	3.31	150/160
20 GPM	CBHA – LHN	T - 19A	2.50	1 5/8"	3.50	4.09	350/375

Performance Curves



- Maximum setting should be 1.3 times the maximum load induced pressure.
- Maximum leakage 5 drops/min. at reset. Reset exceeds 85% of set pressure.
- Back Pressure at Port 2 may adversely affect operation of valve (for circuits with back pressure use CW**).
- Restrictive models have thermal relief capacity only.

OPTION ORDERING INFORMATION



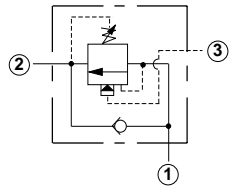
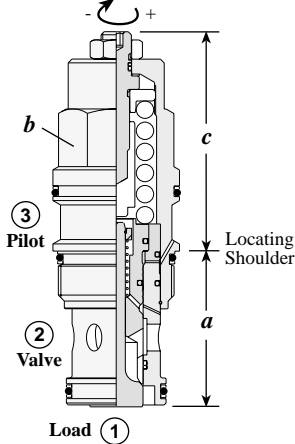
Adjustment Range Options:
 A and H are standard set at 3000 psi.
 I and B are standard set at 1000 psi.
 Customer may specify setting.

** See page 92 for information on Control Options

Counterbalance Valves

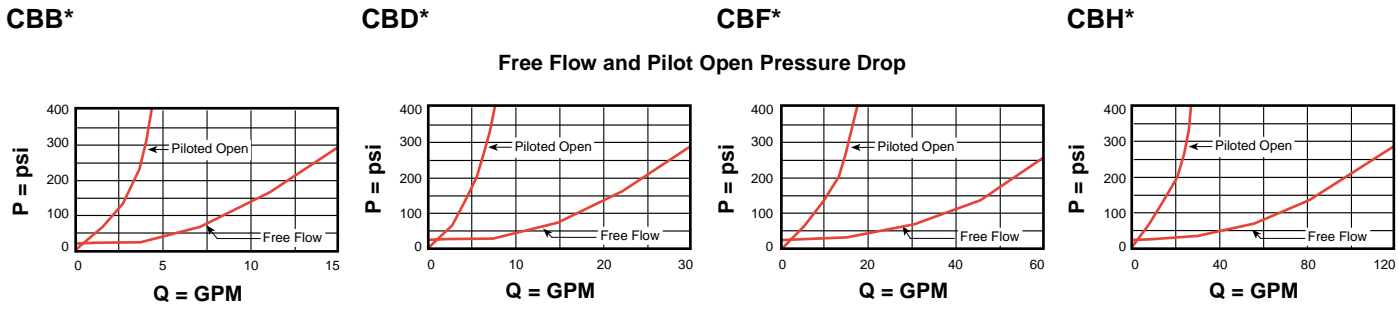
RESTRICTIVE, 5000 PSI MAXIMUM SETTING

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



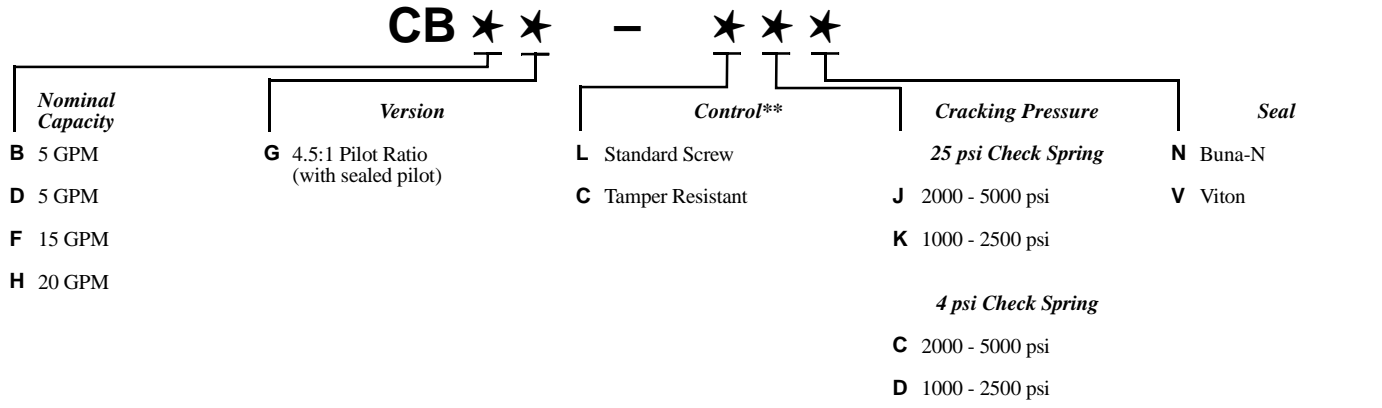
Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
5 GPM	CBBG – LJN	T - 11A	1.38	7/8"	1.97	2.19	30/35
5 GPM	CBDG – LJN	T - 2A	1.38	1 1/8"	2.38	2.50	45/50
15 GPM	CBFG – LJN	T - 17A	1.81	1 1/4"	2.75	3.31	150/160
20 GPM	CBHG – LJN	T - 19A	2.50	1 5/8"	3.50	4.09	350/375

Performance Curves



- Maximum setting should be 1.3 times the maximum load induced pressure.
- Maximum leakage 5 drops/min. at reset. Reset exceeds 85% of set pressure.
- Back Pressure at Port 2 may adversely affect operation of valve (for circuits with back pressure use **CW****).
- Restrictive models have thermal relief capacity only.

OPTION ORDERING INFORMATION



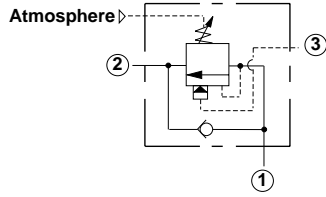
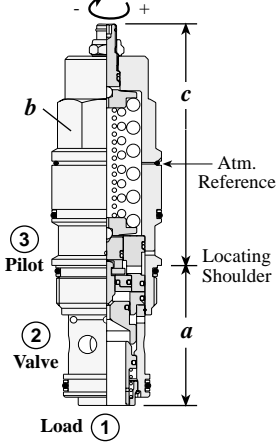
Adjustment Range Options:
 J and C are standard set at 3000 psi.
 K and D are standard set at 2000 psi.
 Customer may specify setting.

** See page 92 for information on Control Options

Counterbalance Valves

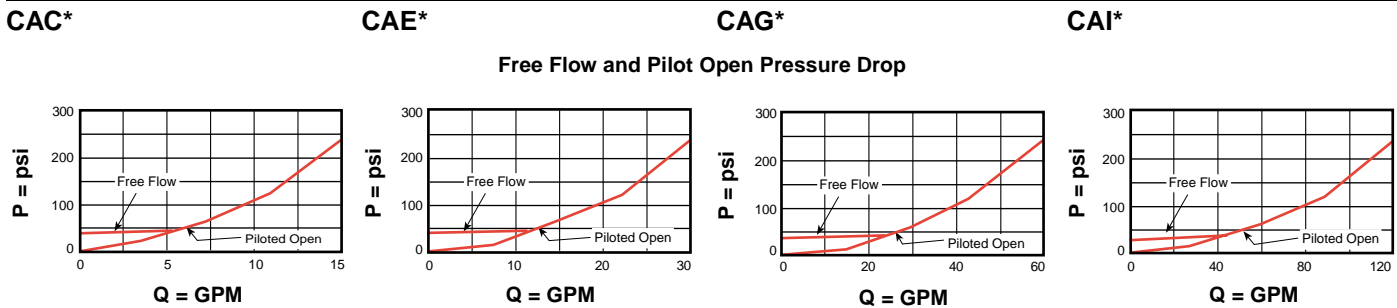
ATMOSPHERICALLY REFERENCED, 3 PORT CAVITY

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



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	c		
15 GPM	CACA – LHN	T - 11A	1.38	7/8"	2.91	3.16	30/35
30 GPM	CAEA – LHN	T - 2A	1.38	1 1/8"	3.29	3.54	45/50
60 GPM	CAGA – LHN	T - 17A	1.81	1 1/4"	3.75	3.97	150/160
120 GPM	CAIA – LHN	T - 19A	2.50	1 5/8"	4.58	4.96	350/375

Performance Curves



- Valves are unaffected by back pressure at Port 2.
- Maximum leakage 5 drops/min. at reseal. Reseat exceeds 85% of set pressure.

OPTION ORDERING INFORMATION

Nominal Capacity	Version	Control**	Cracking Pressure	Seal
C 15 GPM	A 3:1 Pilot Ratio	L Standard Screw	A and K Pilot Ratios	N Buna-N
E 30 GPM	G 5:1 Pilot Ratio	C Tamper Resistant	H 1000 - 4000 psi	V Viton
G 60 GPM	K 1:1 Pilot Ratio		I 400 - 1500 psi	
I 120 GPM	L 2:1 Pilot Ratio		G and L Pilot Ratios	
			F 1000 - 2500 psi	
			G 2000 - 6000 psi	

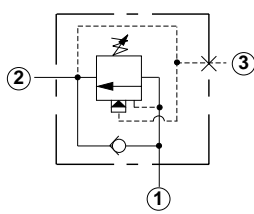
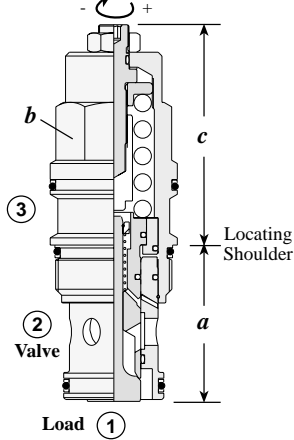
Adjustment Range Options:
H is standard set at 3000 psi.
I is standard set at 1000 psi.
F is standard set at 2000 psi.
G is standard set at 4000 psi.
Customer may specify setting.

** See page 92 for information on Control Options

Counterbalance Valves

WITHOUT PILOT ASSIST, 3 PORT CAVITY

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



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
15 GPM	CCCA – LAN	T - 11A	1.38	7/8"	1.97	2.19	30/35
30 GPM	CCEA – LAN	T - 2A	1.38	1 1/8"	2.38	2.88	45/50
60 GPM	CCGA – LAN	T - 17A	1.81	1 1/4"	2.74	3.31	150/160
120 GPM	CCIA – LAN	T - 19A	2.50	1 5/8"	3.52	4.09	350/375

Performance Curves

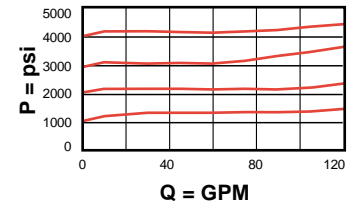
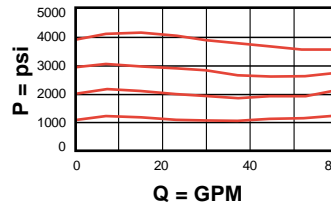
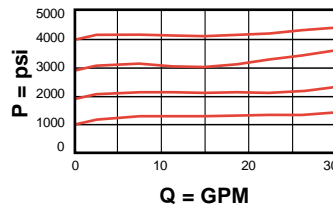
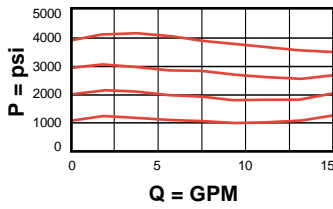
CCCA

CCEA

CCGA

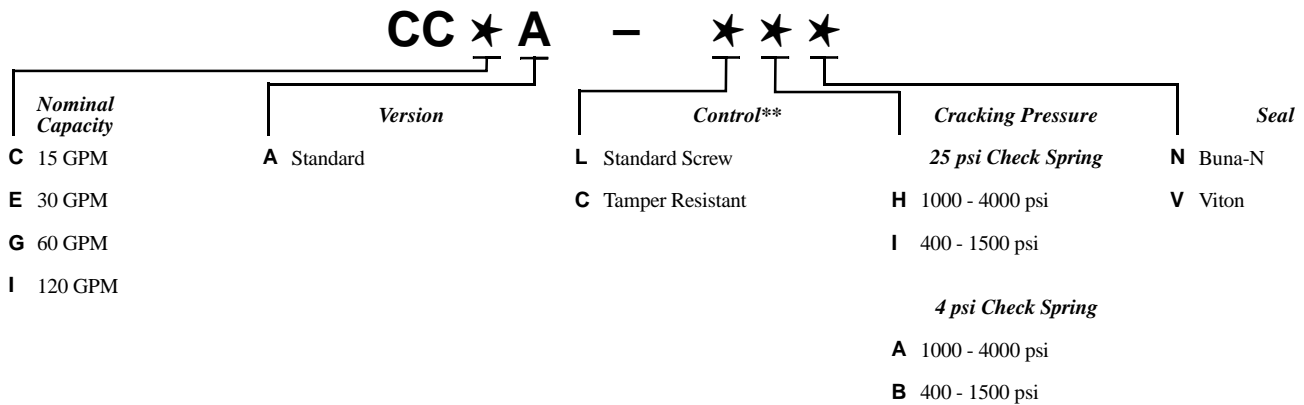
CCIA

Typical Relief Characteristics



- Free flow pressure drop curve are identical to data shown on page 24.
- Maximum leakage 5 drops/min. at reset. Reset exceeds 85% of set pressure.

OPTION ORDERING INFORMATION



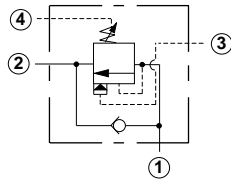
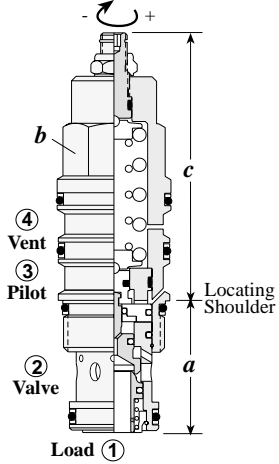
Adjustment Range Options:
A and H are standard set at 3000 psi.
I and B are standard set at 1000 psi.
Customer may specify setting.

** See page 92 for information on Control Options

Counterbalance Valves

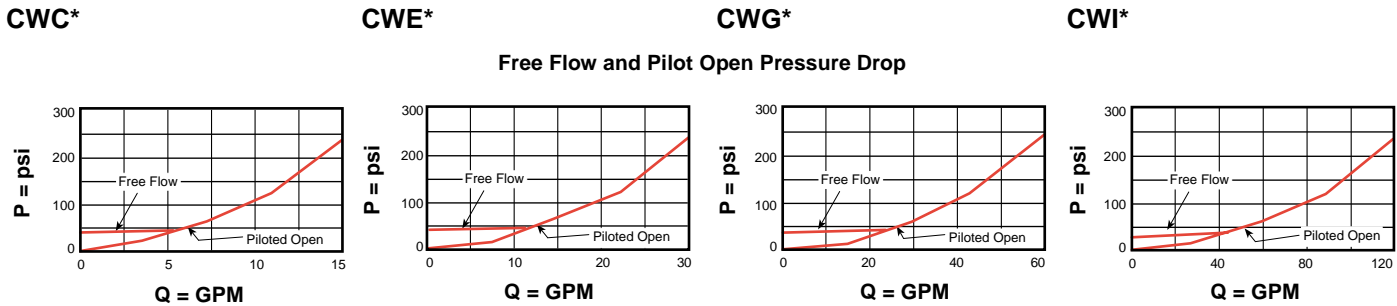
VENTED, 4000 PSI MAXIMUM SETTING

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



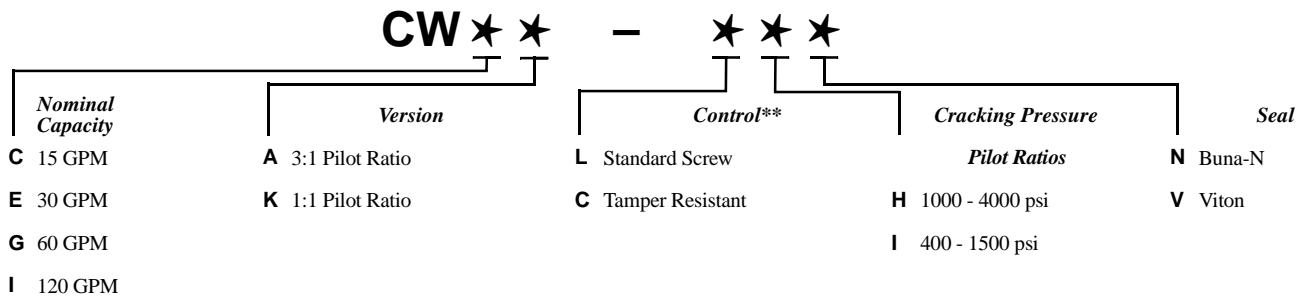
Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
15 GPM	CWCA- LHN	T - 21A	1.38	7/8"	2.91	3.16	30/35
30 GPM	CWEA- LHN	T - 22A	1.38	1 1/8"	3.29	3.54	45/50
60 GPM	CWGA- LHN	T - 23A	1.81	1 1/4"	3.75	3.97	150/160
120 GPM	CWIA - LHN	T - 24A	2.50	1 5/8"	4.58	4.78	350/375

Performance Curves



- Valves are unaffected by back pressure at Port 2.
- Maximum leakage 5 drops/min. at reseal. Reseat exceeds 85% of set pressure.

OPTION ORDERING INFORMATION



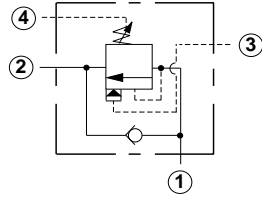
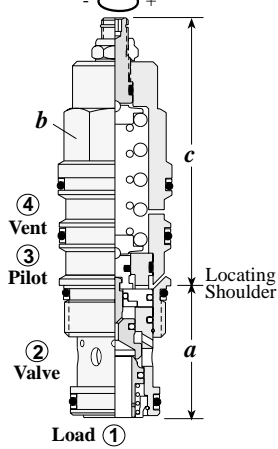
Adjustment Range Options:
 H is standard set at 3000 psi.
 I is standard set at 1000 psi.
Customer may specify setting.

** See page 92 for information on Control Options

Counterbalance Valves

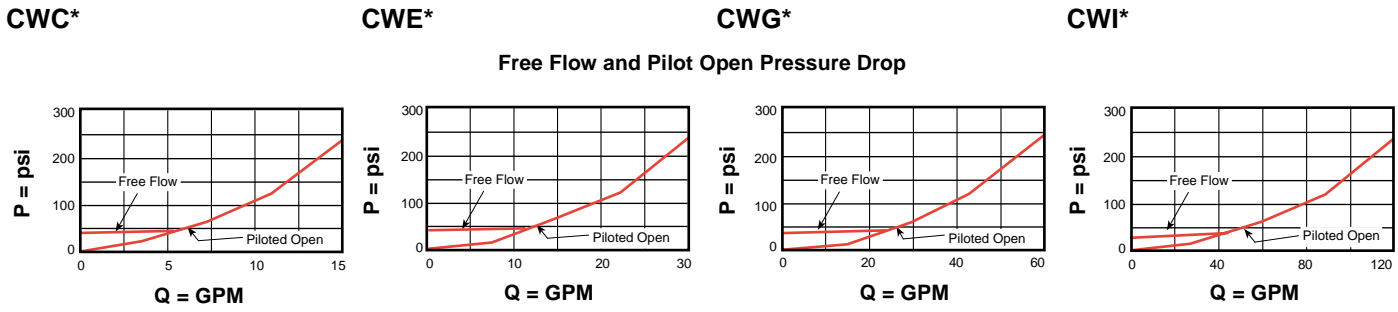
VENTED, 6000 PSI MAXIMUM SETTING

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



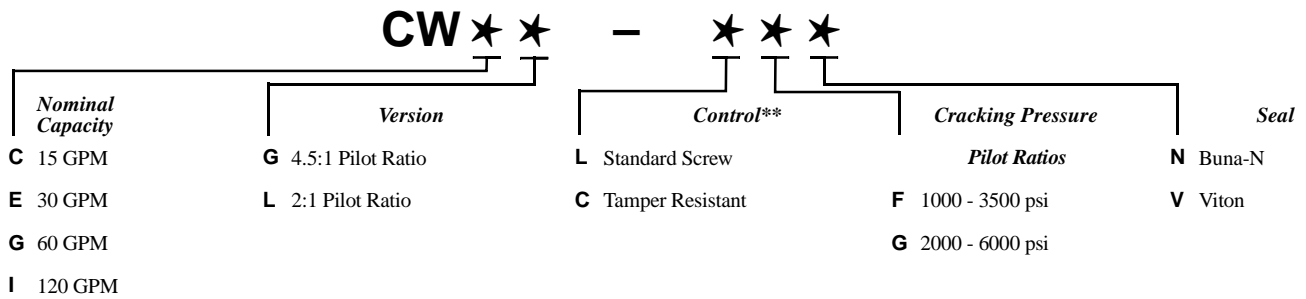
Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions				Installation Torque (lb. ft.)
			a	b	L	C	
15 GPM	CWCG- LFN	T - 21A	1.38	7/8"	2.91	3.16	30/35
30 GPM	CWEG- LFN	T - 22A	1.38	1 1/8"	3.29	3.54	45/50
60 GPM	CWGG- LFN	T - 23A	1.81	1 1/4"	3.75	3.97	150/160
120 GPM	CWIG - LFN	T - 24A	2.50	1 5/8"	4.58	4.78	350/375

Performance Curves



- Valves are unaffected by back pressure at Port 2.
- Maximum leakage 5 drops/min. at reseal. Reseal exceeds 85% of set pressure.

OPTION ORDERING INFORMATION



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

** See page 92 for information on Control Options



NOTES