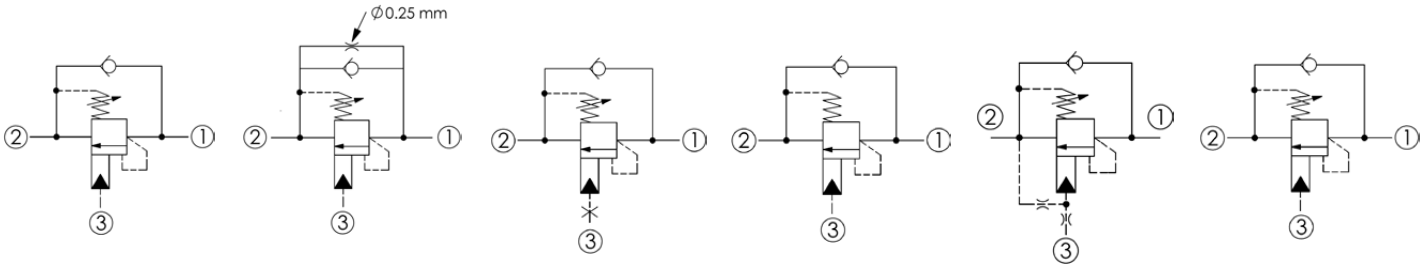
CB SERIES OVERVIEW

The CB Series is a 3-port counterbalance valve designed for general load-holding and motion control applications. It provides reliable load retention and smooth load lowering in hydraulic systems where moderate backpressure conditions are present.



From left to right:
Standard/ Restrictive/ Semi-restrictive/ Ultra-restrictive Counterbalance Valve → Standard Counterbalance Valve with a Ø0.25 mm Orifice → Counterbalance Valve without Pilot Assist → Fixed Setting Counterbalance Valve → Counterbalance Valve with Bleed through Pilot → Pilot Assisted Relief with Check Counterbalance Valve

FUNCTIONS

- Allows free flow from Port 1 to Port 2 during lifting through an integral high-capacity check valve
- Blocks reverse flow until pilot pressure is applied to maintain load position
- Modulates return flow to prevent load overrun and ensure controlled lowering

DESIGN CHARACTERISTICS

- 3-port configuration
- Poppet-type load holding design
- Stable load control performance
- Compact cartridge construction
- Pressure at Port 2 adds directly to the spring setting (1:1 ratio)

TECHNICAL DATA

PARAMETER	VALUE
Maximum Operating Pressure	420 bar (6,000 psi)
Nominal Flow	Up to 480 LPM
Pilot Ratios	1:1 to 16:1
Internal Leakage	≤ 5 drops/min (0.3 cc/min)
Installation	Cartridge, industry-standard cavity

3-PORT, PILOT-ASSISTED, LOAD-HOLDING TYPE

RESTRICTION LEVELS

Counterbalance valves are available in various "restriction" levels to tune system stability and energy efficiency. These models prevent hunting (vibration) during descent, especially in cylinders with rod-down orientations or large area ratios.

TYPE	STABILITY	FLOW CAPACITY	BEST FOR
Semi-Restrictive	Balanced	Moderate-High	General hydraulic circuits
Restrictive	High	Low-Moderate	Precision control
Ultra-Restrictive	Highest	Lowest	Small actuators / Critical stability

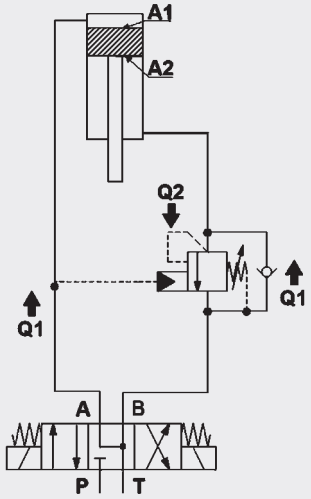
QUICK SELECTION GUIDE (PORT 1 → PORT 2)

01 CB11A3CHL
Standard : 30 – 60 LPM

02 CB11A3CHL40
Semi-Restrictive: 15 – 40 LPM

03 CB11A3CHL20
Restrictive: 5 – 20 LPM

04 CB11A3CHL10
Ultra-Restrictive: < 10 LPM



APPLICATION EXAMPLES — AREA RATIO IMPACT

As cylinder area ratio (A_1/A_2) increases, return flow drops — requiring a more restrictive valve.

SCENARIO A: Q_1 = 60 LPM

A_1/A_2	Q_2 (RETURN)	Model
1.3	46 LPM	CB11A3CHL
2	30 LPM	CB11A3CHL40
3	20 LPM	CB11A3CHL20 CB11A3CHL40

SCENARIO B: Q_1 = 30 LPM

A_1/A_2	Q_2 (RETURN)	Model
1.3	23 LPM	CB11A3CHL40
2	15 LPM	CB11A3CHL20
3	10 LPM	CB11A3CHL10 CB11A3CHL20

SCENARIO C: Q_1 = 15 LPM

A_1/A_2	Q_2 (RETURN)	Model
1.3	1.5 LPM	CB11A3CHL20
2	7.5 LPM	CB11A3CHL20 CB11A3CHL10
3	5 LPM	CB11A3CHL10 CB11A3CHL20

CB SERIES ENCODING PRINCIPLE

MODEL NUMBER STRUCTURE

CB	–	17A	–	33	–	H	–	L	–	10 / 20 / 32 / 40 / 60 / 80 / 160
TYPE		CAVITY		PILOT RATIO		ADJ. RANGE		OPTIONS		Rated flow from Port 1 to Port 2 (semi-restrictive, restrictive, ultra-restrictive type)

VALVE TYPES

CB	Standard Type, Max. Setting 280 / 350 / 420 bar
CB	Semi-Restrictive Type, Max. Setting 280 / 350 / 420 bar
CB	Restrictive Type, Max. Setting 280 / 350 bar
CB	Ultra-Restrictive Type, Max. Setting 280 / 350 bar
CB	Fixed Setting Type, Max. Setting 280 bar / 350 bar
CB	Fixed Setting, Semi-Restrictive Type, Max. Setting 350 bar
CB	Pilot Assisted Relief with Check Type
CB	Counterbalance Valve without Pilot Assist
CBA	Fixed Setting Type, Max. Setting 280 / 350 bar

CAVITY SIZE

2A	1"-14UNS	10WB	7/8"-14UNF	20MS	M20 x 1.5
11A	M20 x 1.5	10WC	7/8"-14UNF	27M	M27 x 1.5
17A	M36 x 2	16WC	1-5/16"-12UN	12B	1-1/16"-12UN
19A	M48 x 2	16WS	1-5/16"-12UN		
163A	M16 x 1.5	20WS	1-5/8"-12UN		

PILOT RATIOS

30	10:1	32	2:1	33	3:1
34	4.5:1	35	5:1	38	8:1
3A	1.5:1 (sealed pilot)	3B	2.3:1 (sealed pilot)	3C	3:1 (sealed pilot)
3D	4:1 / 4.5:1 (sealed pilot)	3E	5:1 (sealed pilot)	3G	7:1 (sealed pilot)
3H	8:1 (sealed pilot)	3J	10:1 (sealed pilot)	3P	16:1 (sealed pilot)
3Q	2:1 (bleed through pilot)				

3-PORT, PILOT-ASSISTED, LOAD-HOLDING TYPE

CB SERIES ENCODING PRINCIPLE

MODEL NUMBER STRUCTURE

CB	–	17A	–	33	–	H	–	L	–	10 / 20 / 32 / 40 / 60 / 80 / 160
TYPE		CAVITY		PILOT RATIO		ADJ. RANGE		OPTIONS		Rated flow from Port 1 to Port 2 (semi-restrictive, restrictive, ultra-restrictive type)

ADJUSTMENT RANGES

CRACKING PRESSURE 1.7 bar			
H	70 - 280 bar (std. setting 210 bar)	J	140 - 350 / 200 - 350 bar (std. setting 210 bar)
I	25 - 105 bar (std. setting 70 bar)	K	70 - 175 bar (std. setting 140 bar)
M	16 - 55 bar (std. setting 25 bar)	P	20 - 105 bar (std. setting 70 bar)
G	140 - 420 bar (std. setting 210 bar)		
CRACKING PRESSURE 0.3 bar			
A	42 - 280 bar (std. setting 210 bar)	D	21 - 210 bar (std. setting 140 bar)
W	70 - 350 bar (std. setting 210 bar)		
SPECIAL PURPOSE - CRACKING PRESSURE 0.3 bar			
A	70 - 280 bar (std. setting 210 bar)	C	140 - 350 bar (std. setting 210 bar)
B	25 - 105 bar (std. setting 70 bar)	D	70 - 175 bar (std. setting 140 bar)
E	16 - 55 bar (std. setting 25 bar)	R	20 - 105 bar (std. setting 70 bar)

FIXED SETTING							
100	100 - 140 bar	225	210 - 240 bar	250	235 - 265 bar	300	285 - 310 bar
170	155 - 185 bar	230	215 - 245 bar	260	245 - 280 bar	310	285 - 340 bar
200	180 - 220 bar	240	220 - 260 bar	270	245 - 290 bar	350	325 - 390 bar
220	200 - 245 bar						

OPTIONS

L	Leakproof hex socket screw	C	Stainless steel tamper resistant
LP	Leakproof hex socket screw with stainless steel external metal components	CP	Stainless steel tamper resistant cover with stainless steel external metal components
CA	Plastic tamper resistant cover of general type hex nut		
CH	Plastic tamper resistant cover of general type hex nut	T	Three-winged handknob kit
N	Non-adjustable, cracking pressure 2.0 bar	Q	Non-adjustable, cracking pressure 0.3 bar