

A Guide to Sun's Counterbalance Families



Tech Resources

Standard Counterbalance (CB**models)

Our CB** family of counterbalance valves is the industry standard in load-holding applications. Its proven poppet and piston design is suitable for most general applications. Each frame size is available in several pilot ratios and flow gains to meet the operating requirements of a broad range of mobile and industrial hydraulic applications. Note that our standard counterbalance valves are non-vented.

Standard counterbalance valves feature the following:

Two check valve cracking pressures available: 25 psi or 4 psi (1,7 or 0,3 bar)

- Use the 25-psi check unless actuator cavitation is a concern

Series 1 and 2 available with fixed-settings (fifth letter "X": CB**X)

- Shorter cartridge extension (-0.78") than adjustable version

LoadAdaptive™ Counterbalance (CE**models)

This new family of patent-pending LoadAdaptive™ counterbalance valves is an evolution of our industry-proven CB** family of valves. LoadAdaptive valves are multi pilot-ratio valves that provide stability and efficiency by adapting to operating conditions. This means that you no longer have to compromise between stability (low pilot ratio) and efficiency (high pilot ratio). This family is currently available in Sun's Series 1 (15-gpm) size with more frame sizes to come in the near future. And like the standard counterbalance valves, these are non-vented valves.

These valves can be used as a direct replacement to CB** family valves when:

- Energy and fuel efficiency are important
- Up to 30% lower pilot pressure required
- Machine lift-lower-lift duty cycle is high

Vented Counterbalance (CW** & CA** models)

Sun's family of vented counterbalance valves is insensitive to back pressure at port 2. Back pressure may adversely affect the operation of a standard non-vented counterbalance as it directly increases the valve setting, opposing pilot pressure. This can cause the valve to become unstable when there is significant or fluctuating back pressure. Sun four-port counterbalance valves (CW**) add a drain port (port 4) to allow for a connection downstream of restriction. A three-port, atmospherically vented version (CA**) is available for retrofit into three-port cavities where unexpected back pressure has created a problem.

Vented counterbalance valves are useful in:

- Regenerative circuits
- With meter-out directional valves, proportional valves or servo valves
- Master-slave circuits
- Where a maximum setting of 6000 psi (420 bar) is required (two models: CWCL, CWCG)

Load-Reactive Load Control (MB** & MW** models)

Our family of M-valve Load-Reactive Load Control valves offers improved modulation performance. Functionally, it is a counterbalance valve that seats as a poppet valve and modulates as a spool valve, offering the best of both worlds. A built-in dampening device smooths the opening of the valve while allowing the valve to close quickly. The result of these features is refined load control and hydraulic dampening. They are available in four-port (MW**) vented versions.

The MB and MW families are useful in challenging applications when:

- Stability is critical and refined motion control is necessary
- Properly sized low-ratio CB** or CW** valves are unstable
- Lower pressure drop is required at higher flows
- Minimum load pressures exceed 1000 psi (70 bar)

LoadMatch™ (MB*P, MW*P, MA*P models)

The LoadMatch™ family offers M-valve performance with an energy-saving self-setting control. The valve setting dynamically self-adjusts in response to load pressure, while still providing a fixed thermal relief setting. The control creates a dynamic setting that is lower than the thermal relief setting but is never more than necessary to provide safe, reliable load control. This allows for lower pilot pressures because the pilot pressure required to open the valve is independent of load-induced pressure.

The LoadMatch family offers the best solution for many load-holding applications which experience the following operating requirements:

- Energy and fuel efficiency are important
- Stability is critical
- Machine lift-lower-lift duty cycle against gravity is repetitive and regular
- Lower consistent pilot pressures required to open the valve regardless of widely varying load pressures
- Predictable modulation
- Fixed setting – tamper proof