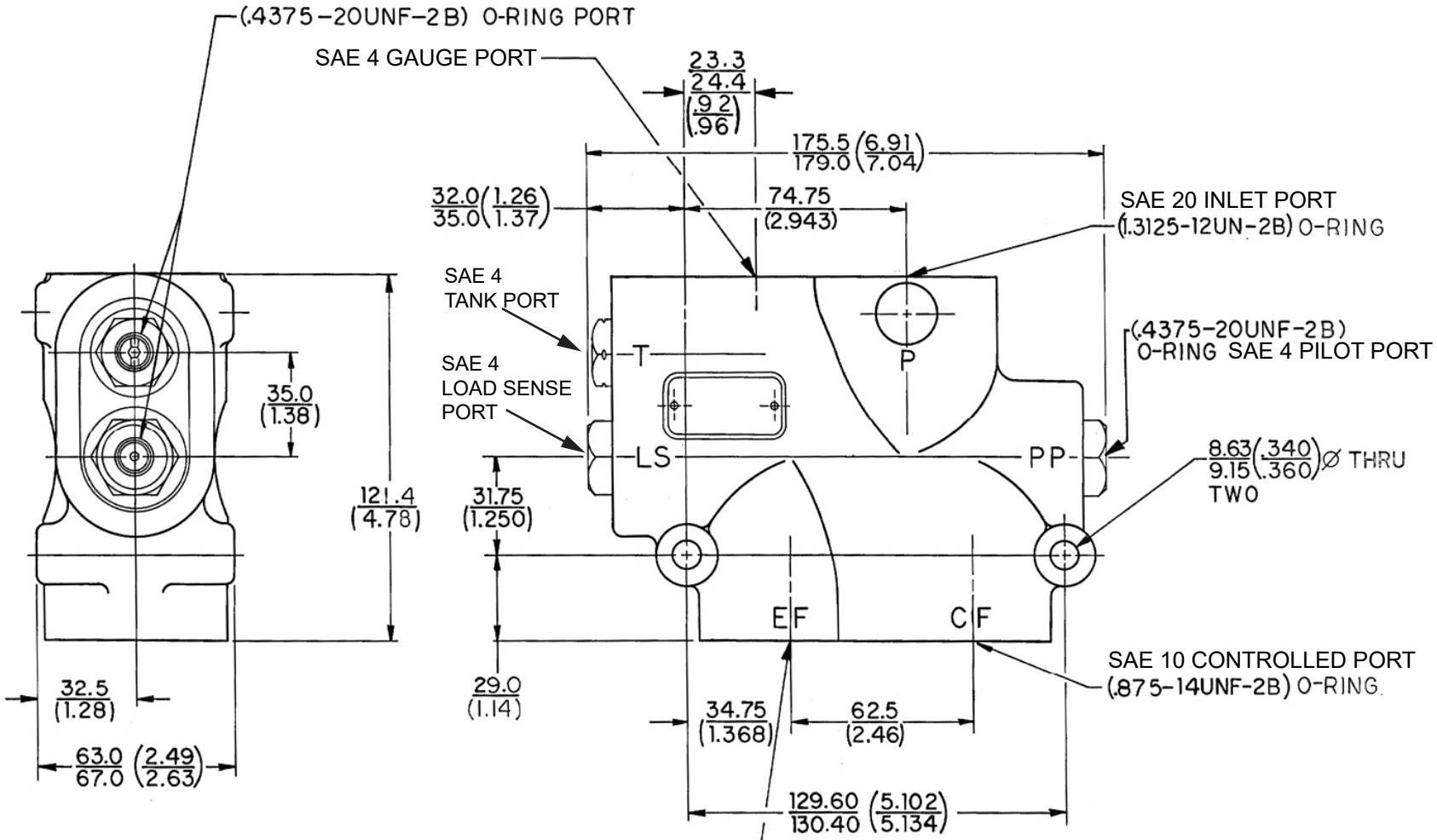


NOTES:

1. ALL DIMENSIONS ±.8(.03) UNLESS OTHERWISE SPECIFIED.
2. PUMP FLOW 151 LPM(40GPM) MAX.
3. CONTROLLED FLOW 98 LPM(26GPM) MAX.
4. SIGNAL LINES SHOULD BE OF (.25 INCH SAE 100R2) HOSE OR STEEL TUBING NO MORE THAN 1.84 METRES(6 FEET) LONG.

VL Load Sensing Priority Valves

Eaton® load sensing priority valves can be used with open center, closed center, or load sensing systems. Use in an open center system with a fixed displacement pump, or a closed center system with a pressure compensated pump, offers many of the features of a load sensing system. Excess flow is available for auxiliary circuits.

Priority valves are sized for design pressure drop at maximum pump output flow rate and priority flow requirements. The minimum control pressure must ensure adequate steering flow rate and must be matched with the steering control unit. The dynamic signal priority valve must be used with a dynamic signal steering control unit.

A pilot line is required to sense pressure downstream from the variable control orifice in the steering control unit. This is balanced by an internal passage to the opposite side of the priority control spool. If there is an appreciable pressure drop (at the maximum steering rate) in the line between the CF port of the priority valve and the P port of the steering unit due to remote location of the priority valve, a higher control pressure or a dynamic signal steering unit and priority valve must be used. Another alternative is the use of the external PP pilot option, with the pilot line connected as close as possible to the steering unit. The total system performance depends on careful consideration of the control pressure chosen and pressure drop in the CF line.

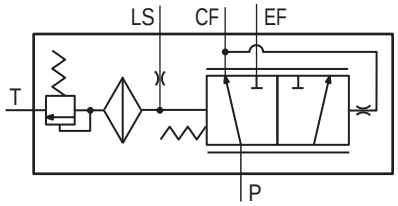
Eaton offers two types of load sensing signal systems: static and dynamic.

Static: Used for conventional applications in which response or circuit stability is not a problem. The load sensing pilot line should not exceed 2 meters [6 feet].

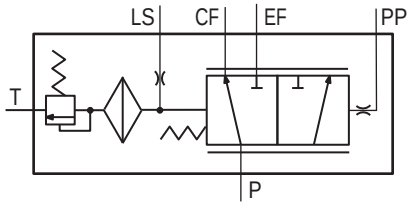
Dynamic: The dynamic signal system offers several advantages, including faster steering response, improved cold weather startup performance, and increased flexibility to optimize system performance and stability. Furthermore, it reduces the reverse flow through the steering unit (wheel kick), which can eliminate the need for an inlet check valve. This design increases the CF spring differential by a “boost ratio” that is determined by the sizing of the orifices.

The priority (CF) circuit pilot relief valve must be factory set at least 20 bar [290 PSI] above the maximum steering pressure requirement. All of the flow other than the small pilot flow of the relief valve will be directed to the excess flow (EF) circuit when the CF relief setting is reached. A pump pressure compensator or master relief valve is required upstream of the priority valve. The compensator or relief must be set at least 10 bar [145 PSI] above the CF relief setting.

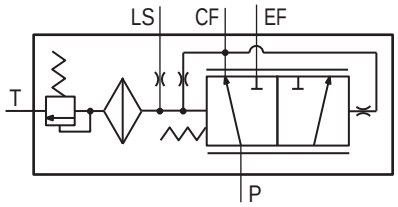
Schematics



Static Signal



Static Signal w/External Pilot

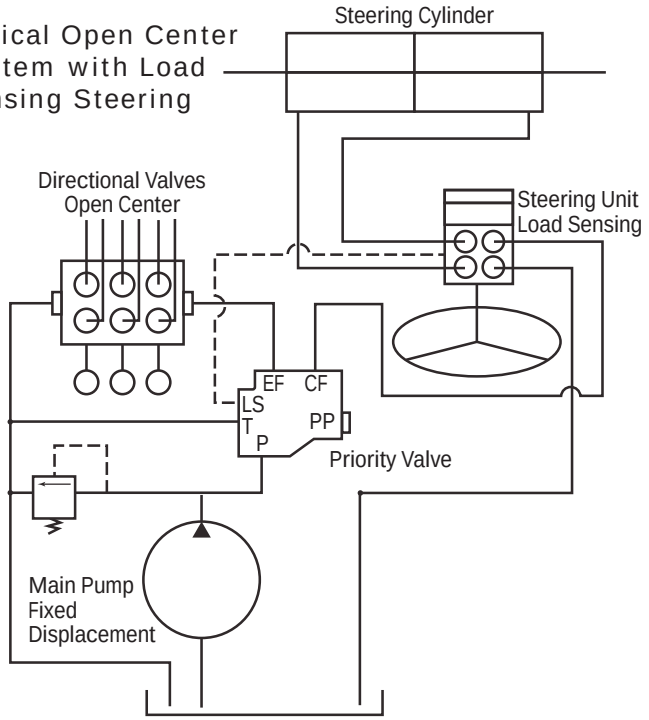


Dynamic Signal

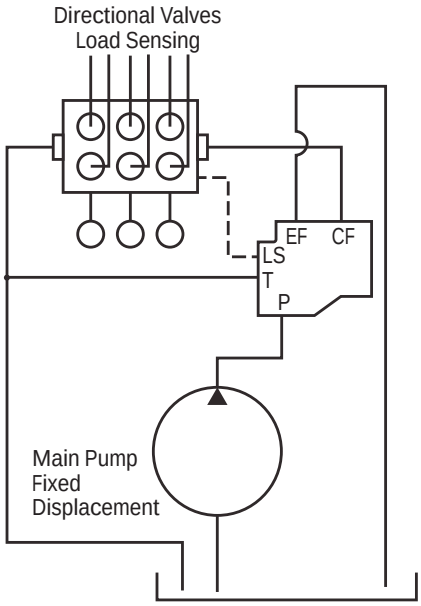
Sample Circuits

These sample circuit configurations show only a few applications possible with the VLC, VLE, and VLH priority valves. Your Eaton distributor can assist with your choice in valves for optimum performance.

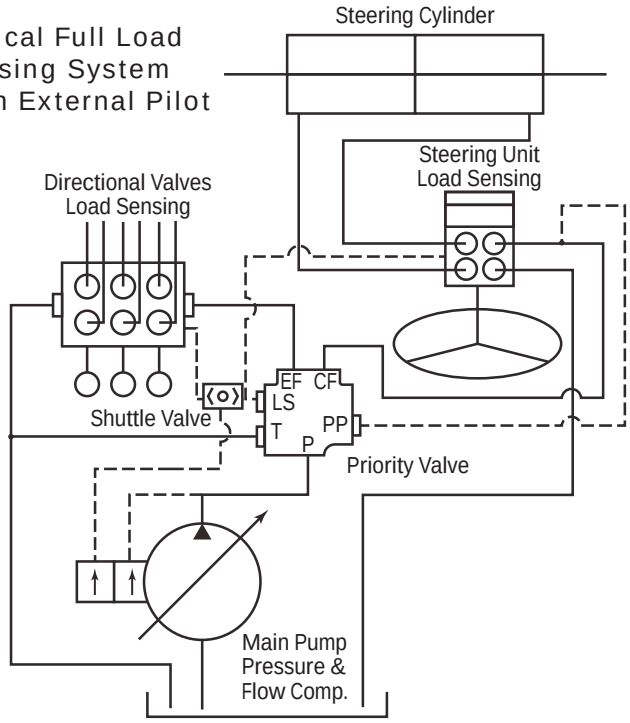
Typical Open Center System with Load Sensing Steering



Typical Use of Priority Valve as Unloading Device



Typical Full Load Sensing System with External Pilot



Typical Full Load Sensing System