

HCS Brief

Hydraulic Cartridge Systems

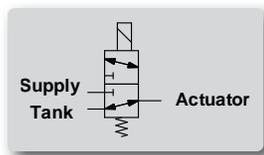
Applications Brief

AB-0001

The Versatility of the N5 Series of Valves

The Directional Control Valve That Does So Much More

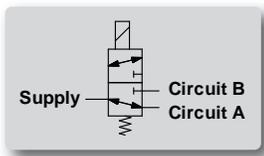
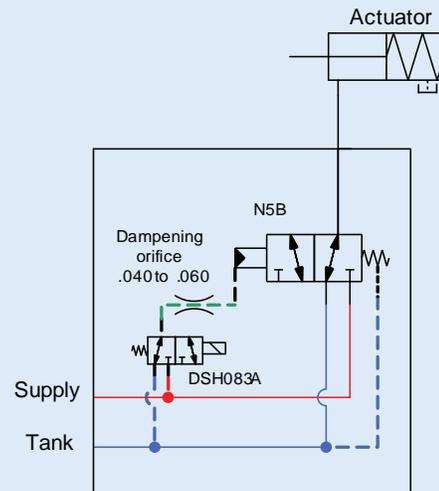
The N5 series of pilot operated spool type directional valves can be applied in a multitude of fluid power circuits. These devices can be used for a variety of control solutions, such as directional valves, pressure compensators, sequence and pressure controls, as well as flow controls. Combined with the Parker Winners Circle valves, the opportunities to solve circuit problems are unlimited. The N5X125 family is rated to 42.3 GPM at 6000 PSI, while the N5X300 family is rated to 105 GPM at 6000 PSI.



High Flow 2-Position/3-Way Normally Closed Solenoid Operated Directional Valve

In this example, the solenoid valve (DSH083A) is used to control a pilot signal that operates the N5B cartridge valve

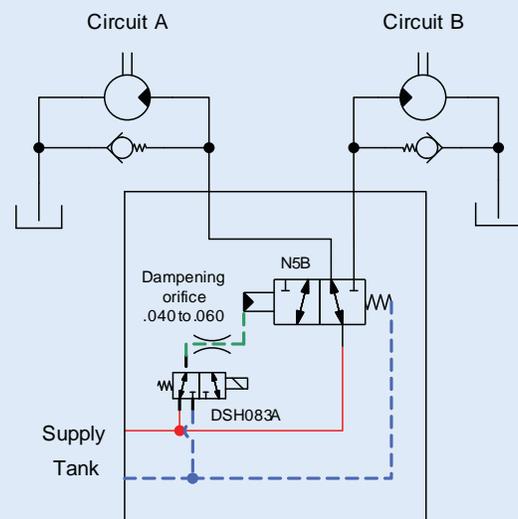
valve. By energizing the solenoid valve, it directs pressure is directed to the pilot port of the N5B causing the spool to shift against the bias spring. This results in flow being directed to the actuator. When the solenoid valve is deenergized, it vents the pilot pressure signal. This venting causes the N5B to return to a spring bias condition thereby venting the actuator pressure to tank. A small dampening orifice stabilizes the circuit.

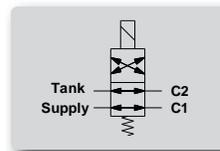
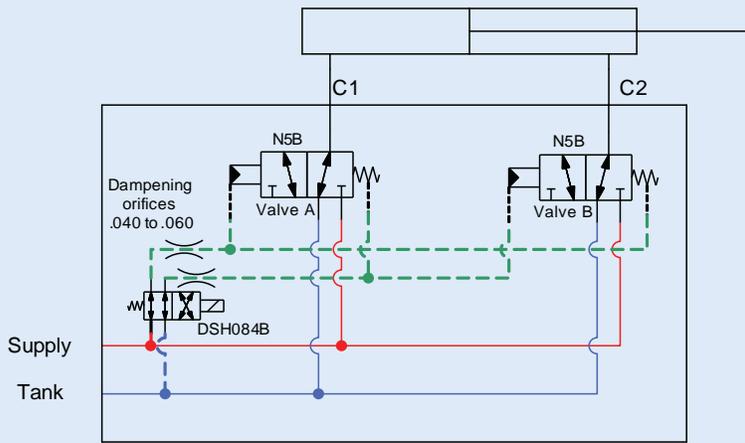


High Flow 2-Position/3-Way Solenoid Operated Selector Valve

As seen in the illustration to the right, a 2-position/3-way solenoid valve (DSH083A) is used to control a pilot signal to shift the N5B cartridge valve.

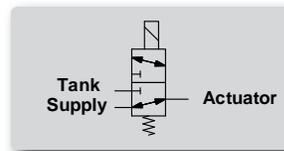
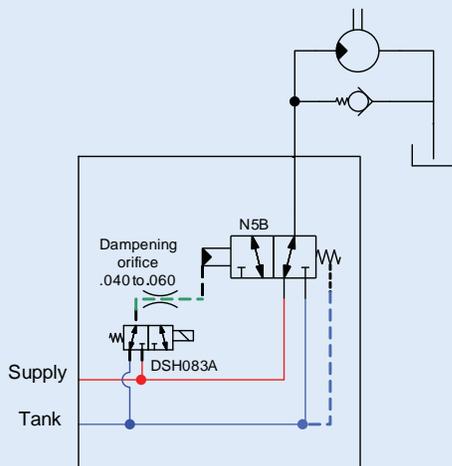
When the DSH083A is energized, system flow is directed to Circuit A. Denergizing the DSH083A directs pressure to the pilot port of the N5B. This causes the spool to shift against the bias spring allowing system flow to be directed to circuit B. A small dampening orifice stabilizes the circuit.





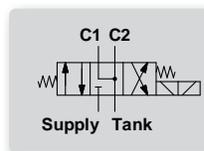
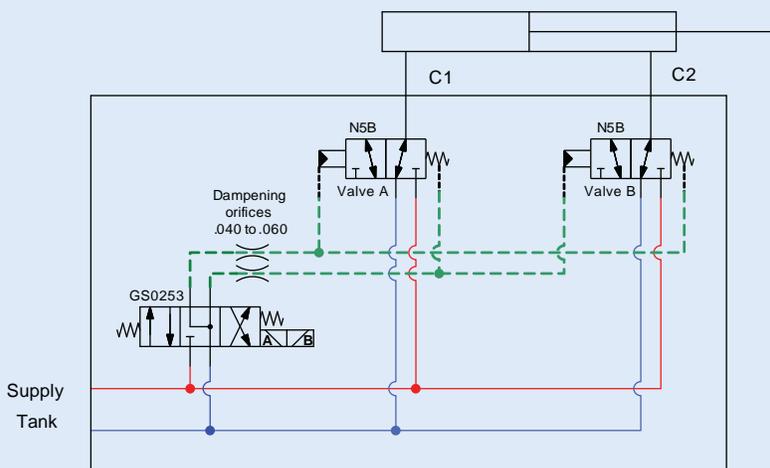
High Flow 2-Position/4-Way Solenoid Operated Directional Valve

In this example, A 2-position/4-way solenoid valve (DSH084B) is used to control a pilot signal to shift the N5B cartridge valves. With the DSH084B dennergized, pilot pressure acts on the pilot port of N5B valve A to shift it against the bias spring and also acts on the spring of N5B valve B to hold it in a spring bias condition. This causes system flow to be directed to port C1 and port C2 to vent to tank extending the cylinder. Energizing the DSH084B reverses the pilot sequence retracting the cylinder. Small dampening orifice stabilizes the circuit.



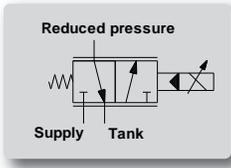
High Flow 2-Position/3-Way Normally Open Solenoid Operated Directional Valve

Solenoid valve (DSH083A) is used to control a pilot signal that operates the N5B cartridge valve. The appropriate size N5B cartridge can be selected to control flow rates up to 100 GPM. In this example, when the DSH083A is in a dennergized condition, pilot pressure that controls the N5B spool is blocked and the pilot port of the N5B is vented to low pressure. As a result, the system defaults to an "on" condition. Energizing the DSH083A directs pressure to the pilot port of the N5B causing the spool to shift against the bias spring stopping flow to the circuit. A small dampening orifice stabilizes the circuit.



High Flow 3-Position/4-Way Solenoid Operated Directional Valve

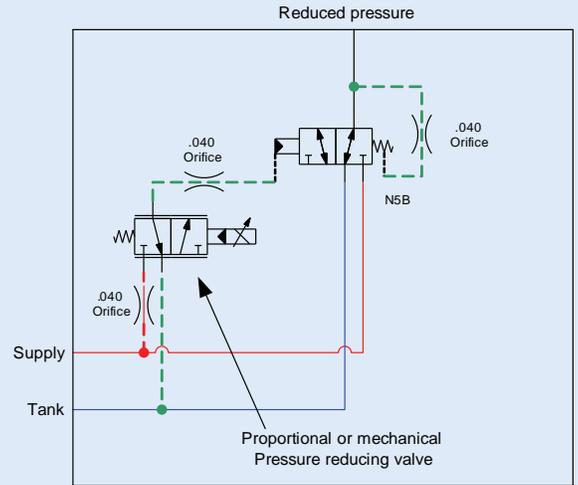
A 3-position / 4-way solenoid valve (GS0253) is used to control a pilot signal to shift the N5B cartridge valves. With the GS0253 dennergized, pilot pressure to the N5B valves is blocked allowing the N5 valves to maintain a spring offset condition blocking Flow to both sides to the actuator. Energizing the GS0253 (coil A) directs pilot pressure to the pilot port of N5B (valve A) and spring chamber of N5B (valve B). This allows flow to the base end of the cylinder causing it to extend. Energizing GS0253 (coil B) reverses the sequence causing the cylinder to retract. Holding valves can be incorporated as required. Small dampening orifice stabilizes the circuit.



High Flow High Pressure, Pressure Reducing Relieving Valve

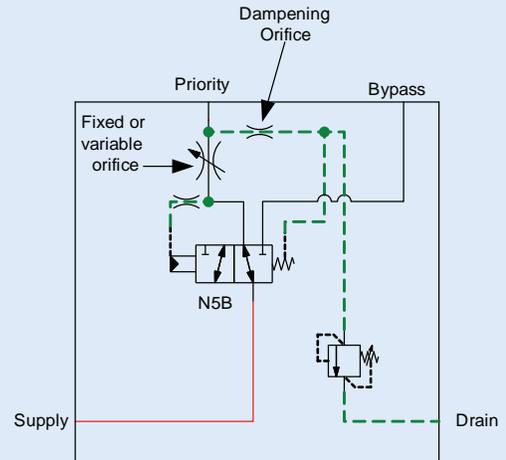
A small pressure reducing valve (proportional or mechanical) is used to control a pressure signal to the pilot port of the N5B valve. With the N5B plumbed as shown, The N5B will match the command pressure of pilot reducing valve providing high flow pressure reducing relieving function to the reduced pressure port.

Small dampening orifices stabilize the circuit.



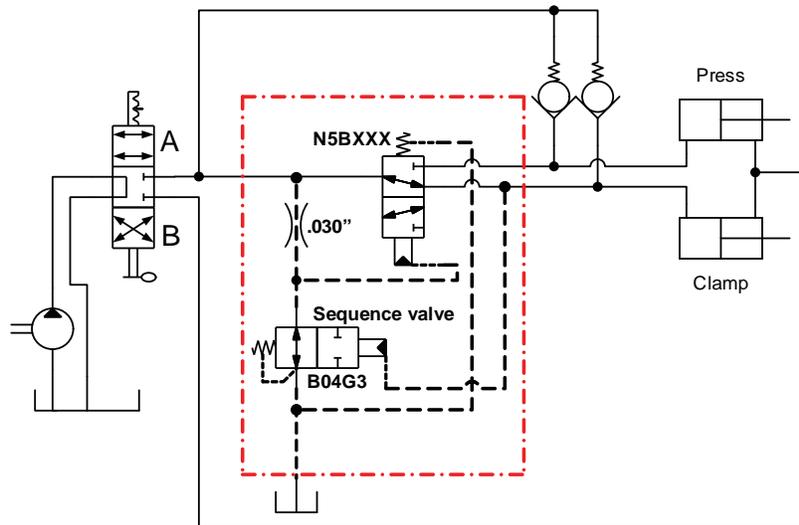
High Flow Bypass Compensator

The N5B will maintain priority flow through the control orifice. The valve maintains a constant pressure drop across the control orifice equal to the bias spring in the valve. Excess flow will be bypassed through the bypass port of the valve and can be routed to tank or used to power another circuit. When the control orifice is closed, all flow will pass to the by-pass port. A dampening orifices help stabilize the circuit. Note: If the priority port is blocked downstream of the control orifice, the N5B will not shift into a by-pass condition, therefore a small pilot relief in the sense line is recommended as illustrated in the above circuit.



High Flow Sequence Valve

Shifting the directional valve to position A directs flow to the cylinder circuit. The normally open sequence valve vents the flow in the pilot line through the .030" orifice to tank keeping the N5B valve in the spring offset condition. In this example, this condition allows the clamp operation to occur first. When the pressure in the clamp cylinder reaches the bias spring setting of the sequence valve, it shifts to a closed position causing the N5B valve to shift, directing pump flow to the press cylinder. Shifting the directional valve retracts the cylinders.



More Information

Parker Directional Control Valves are available from the Hydraulic Cartridge Systems Division. Consult your HCS catalog or www.parker.com/hcs for more information. You can also contact a Product Manager or Technical Support Specialist for help at 847-955-5000 or HCSTechnical@parker.com.

