Application Setup Guide

Low-High Valve

P/N's: 70-9410-04, 70-9410-05, 70-9410-06, 47-0940-04, 47-0940-05, 47-0940-06

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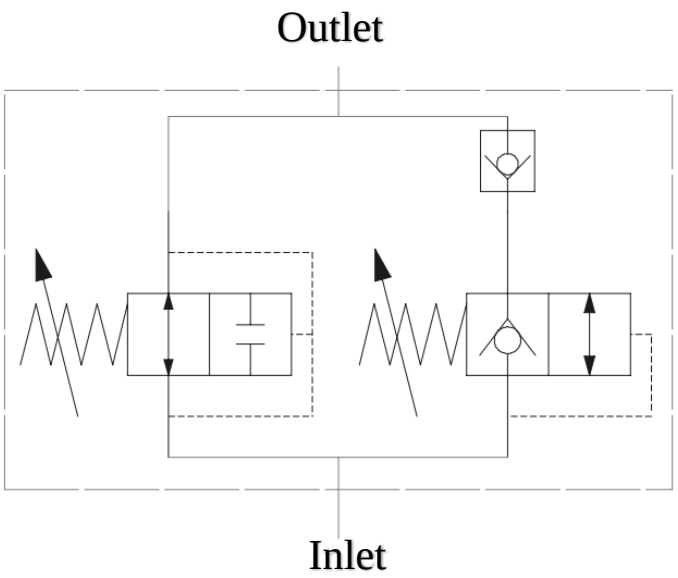
Introduction to the Low-High Valve

The low-high valve serves as an accessory valve designed to use two clamp pressures that are intentionally delayed from each other. This is achieved by using a pressure reducing valve and a sequence valve, both plumbed in parallel. The valve system enables a circuit to start clamping with low pressure initially, allowing the clamps to move into position. Next, the sequence valve within the low-high valve opens, allowing for higher pressure clamping. This higher pressure is applied to secure the part in place.

Operation

The High-Low Valve functions by using a pressure reducing valve and a sequence valve in parallel, along with a check valve that prevents backflow through the sequence valve. Refer to the image below for and understanding of the hydraulic circuit.

When configuring the clamping circuits, a second circuit with a sequence valve is required. The set pressure of this second circuit's sequence valve must be lower than the set pressure of the sequence valve but higher than the pressure reducing valve of the low-high valve. During the clamping operation, the low-high valve circuit will energize first, operating with reduced pressure. The secondary circuit will then sequence once its set pressure has been reached. While the second circuit is clamping, the first circuit will continue clamping with reduced pressure. Once the other circuits are finished clamping and when the pump pressure reaches the set pressure of the low-high sequence valve, the low-high circuit will clamp with higher pressure ***If a secondary sequenced circuit is not used, then the low to high pressure transition will be instantaneous. The added volume of the second circuit causes the delay during the low to high transition.***



Applications

The low-high valve allows for low pressure clamping to hold parts in place with light force while other hydraulic components can move into place. This initial low-pressure clamping allows other hydraulic components to move into place. Subsequently, the initial low clamping force transitions to a higher pressure for securing the part. Below are examples of three beneficial uses for the low-high valve.

1. **Precision Machining**: The low-high valve is employed to lightly secure a part, allowing other clamps to maneuver the part into the desired position. Once in place, the initial low clamping force is increased to a higher pressure, ensuring the part is securely held for precision machining.

2. **Preventing Deformation and Misalignment**: Another common application involves using the low-high valve to hold parts in place with light force, preventing higher forces from causing deformation, overstressing, or displacing other clamping locations. This method safeguards the part while allowing additional clamps to be positioned without compromising the integrity of the workpiece. The higher pressure is then applied to secure the first clamps, providing sufficient force for machining.

3. **Soft Clamping With Work Suports**: The low-high valve is also effective in correcting fixturing issues where there is insufficient force to hold a part in place while work supports come up to provide additional support. The low-force clamping ensures the part remains securely in place without deformation as the work supports are positioned. Once the initial clamps are supported by the work supports, higher pressure can be applied.

Mounting & Plumbing Options

The low-high valve has multiple mounting and plumbing options. Mounting options include external plumbing, manifold mounting to the back of the valve, manifold mounting to the bottom of the valve, and the inlet can be sandwiched using a PRV/Sequence combo block (the combo block will need to be externally plumbed.

Manifold Mounted under a PRV/Sequence Combo Valve:

Prep the valves by removing the plug from the inlet manifold port of the combo valve and the inlet plug from the non-counterbored port of the low-high valve and install the provided manifold mount o-ring (Vektek PN 39-0000-50) in the counterbore of the combo valve inlet port. Remove the inlet and outlet manifold port plugs from the low-high valve and use the same o-ring in the counterbores if manifold mounting otherwise externally plum to inlet and outlet. Use three 1/4-20 X 4” socket head cap screw to mount both the combo valve and the low-high valve together. Externally plumb the combo valve outlet

Bottom Manifold Mounting:

Low High Valves can be manifold mounted from the bottom to allow porting from the fixture plate. Remove the plugs from the bottom inlet and outlet ports and install the provided manifold mount o-ring (Vektek PN 39-0000-50) into each counterbore (2). Use three 1/4-20 X 2.75" socket head cap screws to mount the low-high valve.

Rear Manifold Mount:

Low High valves can be manifold mounted from the rear to allow for porting from the fixture plate. Remove the two rear SAE 2 plugs and install the provided manifold mount o-ring (Vektek PN 39-0000-50) into each counterbore. Use three 1/4-20 X 2.5" socket head cap screws to mount the low-high valve.

Externally Plumbed:

Mounting the valve as a standalone and plumbing externally is the simplest way to mount and plumb the valve. Simply mount the valve using 3X ¼-20 X 2.5" socket head cap screw if mounting from the front or 3X ¼-20 X2.75 socket head cap screws if mounting from the top. Remove any inlet or outlet plug and plumb directly to the SAE2 or SAE4 port.

Bleeding

Bleeding the air out of hydraulic systems is important. Bleed the air at the clamps to allow the low-high valve to function properly. See the Vektek Youtube video titled "How to Bleed Air from Hydraulic Circuit" for detailed information on bleeding a system.

Pressure and Timing Adjustments

If the force of the initial soft clamping needs to be adjusted just use the PRV on the low-high block and turn the adjustment screw until the force is set to what is desired. If the timing of the hard clamping with high pressure is starting too soon or too late just adjust the sequence valve adjustment screw until the correct timing has been achieved.

Q & A

Q: Will the low-high valve work with any Vektek device?
A: Yes, the low-high valve will work with both single acting and double acting clamps.

Q: Can I use the low-high valve without using a secondary circuit that is using a sequence valve?
A: No, if you don't have a separate sequence valve that is set lower than your low-high valve sequence valve then there will be no soft clamping. The first circuit will not have enough of a delay and both your first and second circuit will clamp around the same time without first getting a soft clamping function.

Q: How is the unclamp delay valve different than a pilot operated check valve?
A: The UDV doesn't require a 3rd "B" pilot line to open. The UDV is self-sustained and only requires 2 ports: an inlet and outlet.

Q: If I add a low-high valve to my fixture, how will it affect my clamp/unclamp cycle time?
A: In most fixtures, the time to clamp a work piece will not change much but the amount of delay between soft clamp and hard clamping can be adjusted by adjusting the sequence valves. Unclamp time won't be any different than if you were just using a PRV.

Trouble Shooting

Problem	Cause	Corrective Action
The soft clamping can't get into place quick enough before the hard clamping starts.	The Sequence valve on the low-high is set too low.	Adjust sequence valve adjustment screw clockwise until the correct timing is reached.
The hard clamping is taking too long after my second circuit has clamped	The sequence valve on the low-high is set too high.	Adjust sequence valve adjustment screw counterclockwise until the correct timing is reached.
I am seeing pressure creep on my low-high valve circuit.	There may be contamination in the check valve or the PRV may be damaged.	Make sure your line is free from contamination and replace the thread in check valve. If the pressure creep persists, then the PRV may be damaged and may need to be sent back for evaluation/repair.
I am seeing pressure loss on my low-high valve circuit.	Fittings may be loose, clamps may be leaking, or PRV could be leaking.	Check for any fittings that are leaking oil and see if any clamps have oil leaking out and ports or wipers. Check the oil overflow hole in the PRV and see if oil is coming out of it during operation. If the PRV is leaking it will need to be sent back for evaluation/repair because the seal is damaged.