NU-CHECK® VALVES in VACUUM APPLICATIONS

Although standard Nu-Check® valves are not specifically designed for vacuum applications, VAC versions of Nu-Check® valves have performed successfully in a variety of vacuum system applications. While standard Nu-Check® valves have good short term performance for soft vacuum applications (>-10 PSI, >-20" Hg, >-69 KPascal pressure), the VAC versions of Nu-Check® are needed for harder vacuum applications and for long term performance. In a standard valve the U-cup seal for the pilot piston shaft is orientated for sealing positive pressure in the IN chamber. The orientation of the shaft seal is reversed in VAC versions, so the U-cup seal is optimized for sealing of vacuum in the IN chamber. (See valve cross section figures on page 2)

Flow

When the Nu-Check® check valve is piloted by air or manually overridden, the flow characteristics can be estimated by using the flow coefficient.

The flow though the unpiloted check valve will be lower than that estimated by using the flow coefficient. A spring is used to hold the check ball into the valve seat, which restricts the ball from unseating until the pressure drop across the valve is around 2 PSI (cracking pressure). The restricted ball movement will significantly reduce the valve's rated flow below pressure drops of 6 PSI. For many applications the restricted flow past the check ball is sufficient. For applications where less restricted flow is needed, the No Cracking Pressure (NCP) modification has proven to be beneficial. The NCP modification involves removing the spring bias on the ball. Eliminating the spring bias results in low pressure flow characteristics similar to that obtained as when the check valve is piloted.

Applications

In all Nu-Check® applications the following valve characteristics need to be considered in the system design and operation:

- When the check valve is overridden by using air, the pilot port needs to be vented for the check function to re-engage.
- When the check valve is manually overridden, releasing the manual button will re-engage the check function.
- The Nu-Check® valve will not perform properly if installed inside a vacuum chamber.

Vacuum Line Control Valve

The Nu-Check® valve can be used as an air piloted valve to control the vacuum supply line to a component or test chamber. The vacuum source is attached to the OUT port of the Nu-Check® valve. The component or chamber is attached to the IN port. The PILOT port is connected to the air pressure source. The vacuum line would be opened when the PILOT port is pressurized and close when the pilot port is vented. A typical application would involve a venturi vacuum pump attached to a large chamber, where the PILOT port is connected to the air supply line of the vacuum pump.

The low leak characteristics of the Nu-Check® valve will maintain vacuum in the component for an extended period of time.

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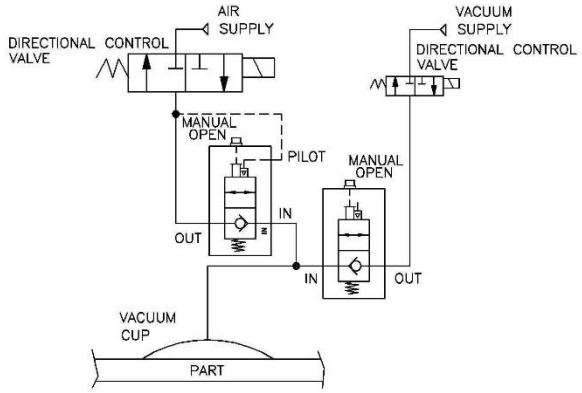
NU-CHECK® VALVES in VACUUM APPLICATIONS

CIRCUIT TO PREVENT LOSS OF VACUUM AND BLOW PART OFF

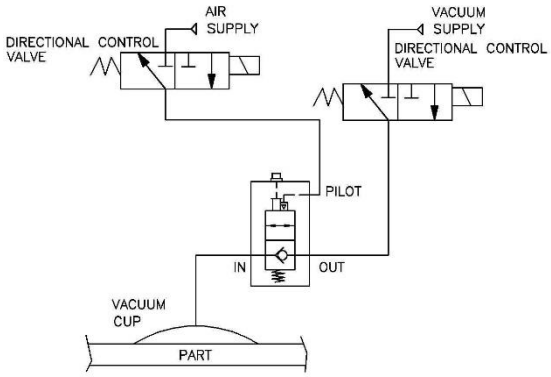


Vacuum Cup Applications

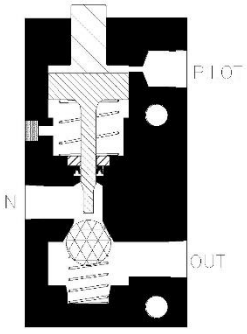
The schematic to the left illustrates an application where one Nu-Check® valve is used as a vacuum check valve and the second Nu-Check® valve is used to allow blow off of the part.

The first Nu-Check® valve maintains the vacuum in case of the loss or drop in vacuum supply. The air blow off function rapidly disengages the part or assists pushing a part to a location.

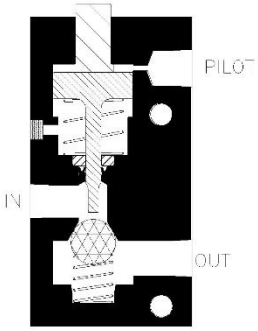
CIRCUIT TO PREVENT LOSS OF VACUUM AND BREAK VACUUM



The schematic to the left illustrates an application where one Nu-Check® valve is used as a vacuum check valve. The vacuum is broken by piloting the check valve open, so the vacuum cup is vented through the normally open valve.



STANDARD VERSION



VACUUM VERSION

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