



## Nu-Check® Valves in Vacuum Applications

Although Nu-Check® valves are not specifically designed for vacuum applications, there have been several vacuum system applications where they have performed successfully.

While standard Nu-Check® valves perform well in soft vacuum, the VAC versions need to be used to obtain long term performance in low vacuum (<10 PSI, <20" Hg, <69 KPasal) applications. On the VAC versions the pilot piston shaft seal (a u-cup seal) is changed. In a standard valve the seal orientation is optimized for sealing positive pressure in the IN chamber. Reversing the orientation of the pilot piston shaft seal optimizes the sealing of vacuum in the IN chamber.

### Flow

The flow rate for a Nu-Check® valve in vacuum applications does not always correspond to the flow characteristics for pressure applications. When the check valve is piloted by air or manually, the flow characteristics are the same as that for pressure applications. For low pressure drops across the valve, the flow through the unpiloted check valve can be lower than that estimated by using the valve flow coefficient.

The check ball in the valve is biased to the valve seat with a spring. The spring restricts the ball from unseating until the pressure drop across the valve is around 2 PSI (the cracking pressure). The restricted ball movement will reduce the valve's flow rating until the pressure drop increases to 6 to 8 PSI. In many applications the restricted flow due to the spring biased ball is still sufficient.

Where higher flow is needed through the valve, the use of a valve with the No Cracking Pressure (NCP) modification has sometimes 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 reengage.
- When the check valve is manually overridden, releasing the manual button will reengage the check function.

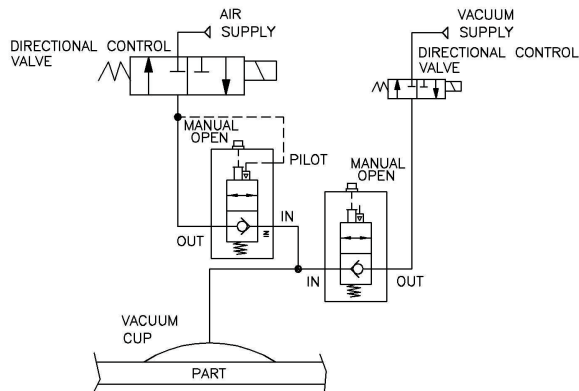
### Vacuum Line Control Valve

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 IN port of the Nu-Check® valve. The component or chamber is attached to the OUT port. The pilot port is connected to the air pressure source. The vacuum line would open 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 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.

## Nu-Check® Valves in Vacuum Applications

CIRCUIT TO PREVENT LOSS OF VACUUM AND BLOW PART OFF

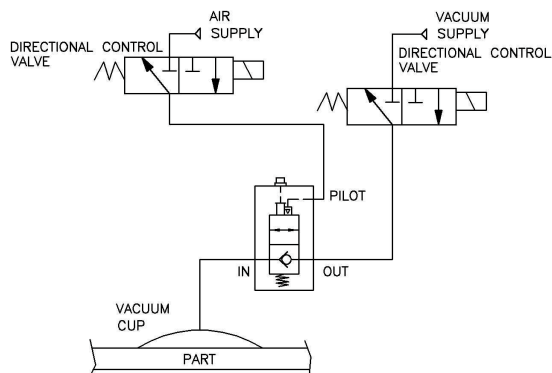


### Vacuum Cup Applications

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.