Nu-Check® Valve Basics.

A standard Nu-Check® valve contains a single check valve that can be air piloted or manually overridden. Figure 1 is a functional schematic for a Nu-Check® valve.

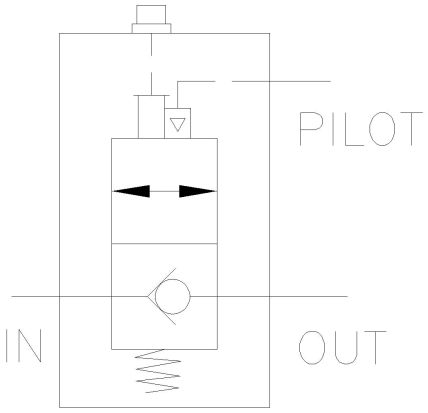

Figure 1. Nu-Check® Schematic.

In a typical application, the IN port is connected to a directional control valve and the OUT port would be connected to the inlet port of the pneumatic component. The connections to the air PILOT port would vary with the application.

The Nu-Check® valve allows flow in only one direction unless it overridden. The check valve function can be overridden by two methods: air piloting and manually.

1. AIR PILOTING – Air pressure at the PILOT port will cause the check valve to be piloted or overridden. The check valve will reengage when the pilot port is vented.

2. MANUALLY - Pressing down the manual override button will cause the check valve to be piloted or overridden. The check valve will reengage when the button is released.

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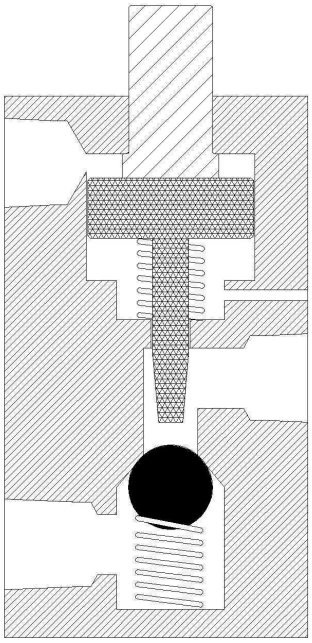

The physical components of a Nu-Check® valve with manual override are illustrated in the cross section model (unpressurized state) to the left.

In a standard Nu-Check® valve, the check valve seal is obtained by a spring loaded Buna-N ball. The pilot piston is biased away from the check ball with a spring and the spring chamber below the piston head is externally vented.

The pressure needed to overcome the spring loaded ground Buna-N is called the “Cracking Pressure”. The typical cracking pressure is around two to three PSI.

For the pilot piston to overcome the load from the piston spring and move enough for the tip to contact the check ball, approximately 4 to 8 PSI of pressure is needed at the PILOT port. When the pilot piston contacts the ball, additional pilot pressure is required to break the check ball away from the valve seat. The ratio of the piston head area to the ball seating area (pilot ratio) is approximately 4 to 1. Consequently, the pressure at the PILOT port required to uncheck the valve will be approximately 25% of the checked pressure plus 4 to 8 PSI.

When the pressure above the pilot piston drops to around 4 to 8 PSI, the pilot piston will rapidly retract. Typical response time for piloting the check ball is 5 to 10 milliseconds or less. Typical response time for unpiloting the check ball is 10 to 35 milliseconds, depending on how rapidly the pressure to the PILOT port is vented.

When air flows though the check valve, the spring loaded check ball vibrates and oscillates. The vibration of the check ball helps keep the valve seating surface clean, which preserves the tight sealing characteristics even with relatively dirty air.