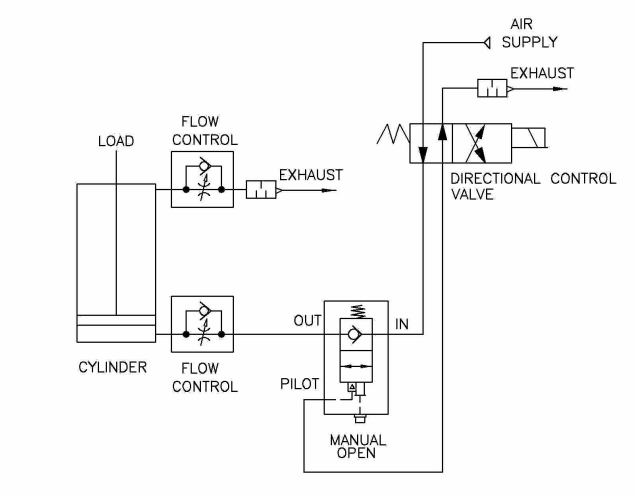
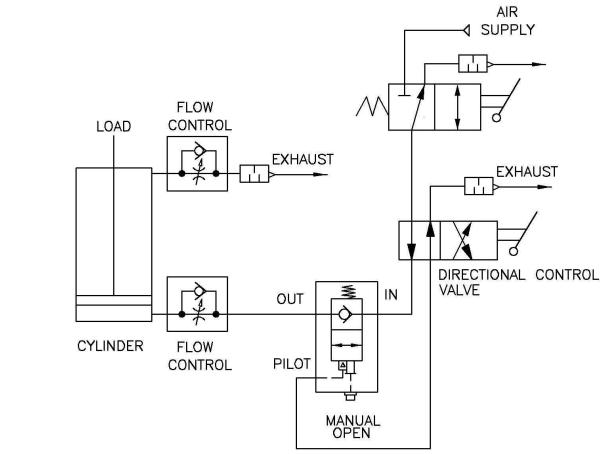
Nu-Check® Holding a Single Acting Cylinder

A typical single acting cylinder application involves using a Nu-Check® valve to check the load movement in one direction. When a Nu-Check® valve is used in the control system for a single acting cylinder, it is combined with directional control valves to control the air flow to one port. Two control system examples are shown below:



The first example, illustrated in the circuit to the left, is a basic control circuit for vertically moving a load between two positions. The load is moved up by the directional control valve providing air to the IN port of the Nu-Check valve. When the directional control valve provides air to the pilot port, the cylinder port is vented and gravity provides the force to move the load down. The flow control valves are optional, but their placement must not interfere with venting of the pilot air.

In this control system, the downward movement of the load would be stopped if either air pressure is lost or power is interrupted. When either air pressure or control power are not available, the manual override on the Nu-Check® valve could be used to control the safe lowering of the load.



The second example, illustrated in the circuit to the left, is a basic control circuit for vertically moving and stopping a load anywhere along the cylinder stroke. The directional control valve controls the cylinder direction while the second valve controls when the movement can occur. The basic operating principles are similar to the two position control system, but the control valving adds an additional standby control state.

As in the two position control circuit, the downward movement of the load would be stopped if either air pressure is lost or manual control is interrupted. When air pressure is not available, the manual override on the Nu-Check® valve could be used to control the safe lowering of the load.

The example systems have the following characteristics:

- If air pressure and power to the direction valve have been removed, the checked port can not be exhausted until both air pressure and power to the direction control valve have been restored or the check valve is manually overridden.
- If there is loss of air pressure or valve control, the load may move up. The amount of upward movement would depend on the load, piston position, and pressure on the unchecked side of the cylinder.

- The stopped cylinder keeps the load in a stable position, but does not rigidly hold the load.
- A rapid stop in mid-stroke is cushioned by air in the cylinder.
- Load hold capacity is limited by the cylinder bore and maximum work pressure limits.
- The same control system components can be used on a wide variety of pneumatic cylinders.
- In some single acting cylinder applications the use of a Nu-Check® valve can eliminate the need for a cylinder brake or generate a higher load capability than a cylinder brake.

Additional Control System Design Considerations

When selecting and placing components in a cylinder control system, requirements of the air piloting function of the Nu-Check® valve needs to be considered. (Refer to the "Nu-Check Information" PDF file for more information on the Nu-Check® operation.) The pilot air venting requirements particularly affects some of the directional control valve and flow control valve options.

- Directional control valving selection and placement needs to provide proper venting of pilot air for both normal operation and safety conditions.
- A flow control valve, if used, can be placed in the line between the Nu-Check valve and the cylinder or between the directional control valve and the Nu-Check valve. However, the flow control valve placement must not restrict the venting of the pilot air.

Combining a Nu-Check® valve with a glandless spool sleeve type of direction control valve can result in a long lasting, low maintenance control system. Glandless spool sleeve direction control valves are long lasting, but do not seal tightly. The long lasting Nu-Check® valve provides tight sealing when needed by the control system.

The best control sensitivity is obtained by minimizing the internal volume of lines and components between the Nu-Check® valve and the cylinder.

Applications

The cylinder control systems using Nu-Check® valves are used in a wide variety of equipment applications involving work holding, clamping, and lifting or tipping of equipment, material, doors, and platforms.

Specific circuit design and switching valve selection is application dependant. Your ALADCO distributor or ALADCO can be contacted to provide assistance with answering application questions.