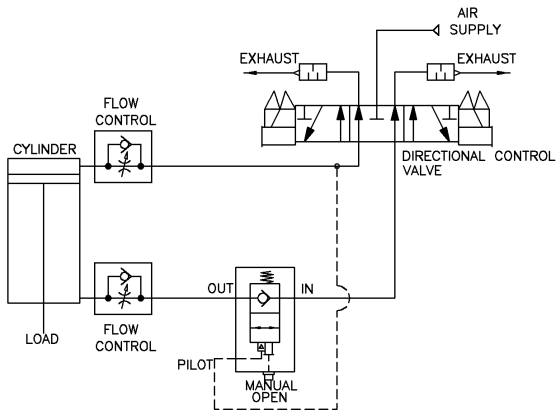
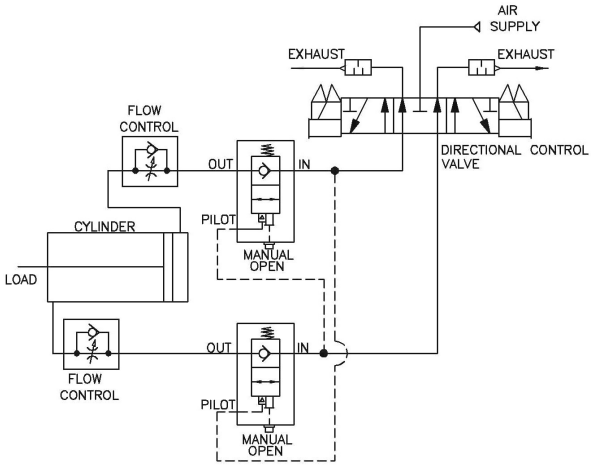
Nu-Check® Holding a Double Acting Cylinder

There are two general types of double acting cylinder control systems using Nu-Check valves. One type combines a direction control valve and one Nu-Check valve to check the exhaust of one of the cylinders ports. A second type combines a directional control valve and two Nu-Check valves to check the exhaust of both cylinder ports. Examples of the systems are shown below:



The circuit to the left illustrates an example of a cylinder control system using one Nu-Check® valve. The load is moved to one of two positions when the directional control valve is activated. The check valve is engaged when it's pilot port is not pressurized, which occurs when the directional control valve is moving the load up or when the valve is in it's centered / standby position. The Nu-Check valve allows the load to move down only when it's pilot port is pressurized. If the load is stopped in midstroke, it is possible for the load to move up since one port is not controlled by a check valve. The amount of upward movement would depend on the load, piston position and the pressure on the unchecked side of the piston. The flow control valves are optional, but their placement must not interfere with venting of the pilot air.

In this control system; if air pressure is lost or power is interrupted, the downward movement of the load would be stopped. 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 circuit to the left illustrates an example of a cylinder control system using two Nu-Check® valves. The load can positioned and stopped anywhere along the cylinder stroke. The load is moved only when one of the directional control valve solenoids are energized. The load is stopped by the Nu-Check® valves when the directional control valve is denergized and goes to it's open centered position. The venting of a cylinder port only occurs when the pilot port of the Nu-Check valve attached to the port is pressurized. The flow control valves are optional, but their placement must not interfere with venting of the pilot air.

In this control system, the load would be stopped if 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.

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The two example systems have the following characteristics:

- If air pressure and power to the direction control valve have been removed, the checked ports 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.
- 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 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 directional 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

This type of circuit is used in a wide variety of applications involving work holding, clamping, or positioning and material or equipment lifting.

Specific circuit design and valving component selection and placement is application-dependant. Your ALADCO distributor or ALADCO can be contacted to provide assistance with answering application questions.