

4 Reasons to Use Pilot Operated Solenoid Valves in Pneumatic Manifolds

Solenoid valves used in air manifolds can be direct acting or pilot operated. In the case of a direct acting solenoid valve, the coil acts directly on the valve spool to actuate it. In the case of a pilot operated solenoid valve, it uses system air pressure as a pilot to actuate the spool. Both have been in use for many years and each has their benefits. However, for many OEM's that are still using direct acting solenoid valves in their pneumatic manifolds, it might be worthwhile to consider moving to pilot actuated valves to ease installation, reduce footprint, save money, and allow fieldbus communication.

Recently, we had a customer that had been using a very simple 6-station pneumatic manifold with direct acting solenoids and they asked us to take a look at replacing it with a more compact manifold that utilized pilot operated solenoid valves. We put together a comparison using the Numatics 503 series as it had very similar flow characteristics to the manifold they had been using for years. In the end, the machine builder realized an easier installation, opened up valuable space on the machine control panel, and saved money on the manifold itself – all while improving performance. In fact, the newer pilot operated 503 Series valves have a higher Cv and are designed for longer life. Take a look at the four main benefits of this option.

1. Ease of Installation

The installation was much easier since the OEM had to bring only one cable to the manifold. The Numatics 503 Series takes advantage of internal circuit board technology so that a single 25-pin connector on the end plate is all that is needed to send a signal to any of the valves in the manifold. The older manifold design with direct acting solenoids required a separate cable to each of the valves.



2. Reduced Footprint

The footprint required was significantly reduced, by roughly 30%, due to the newer design of the 503 series valves because of comprehensive refinements to the valve's internal designs. A smaller valve can produce the same amount of flow thanks to the new and improved designs. In this case, the Cv for the 503 valves was 1.2 compared to a Cv of 1.0 for the older direct acting solenoid valve.

3. Cost Reduction

An approximately 20% lower cost was realized since the newer style valves take advantage of the latest technology in lean manufacturing and were designed to capitalize on improvements in materials and assembly techniques. There is also a cost reduction due to the ease of installation as there are no wires to terminate on the valve manifold.

4. Fieldbus Communication

A pilot operated solenoid valve manifold also allows for the future use of Fieldbus communication protocols such as DeviceNet, Ethernet/IP™, PROFINET, EtherCAT®, etc. Fieldbus communications offer significant advantages in cost savings and diagnostic capabilities.

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More on that topic can be found in our technical guide: [Three Reasons to Upgrade Pneumatic Valve Manifolds to a Fieldbus System.](#)

In the end, for this specific application it was an easy decision to make. The OEM was able to deliver to his customer a cleaner looking machine with increased performance all while reducing his overall cost. For more information about utilizing pilot operated solenoid valves in your pneumatic manifolds, contact a pneumatic automation expert at Cross!