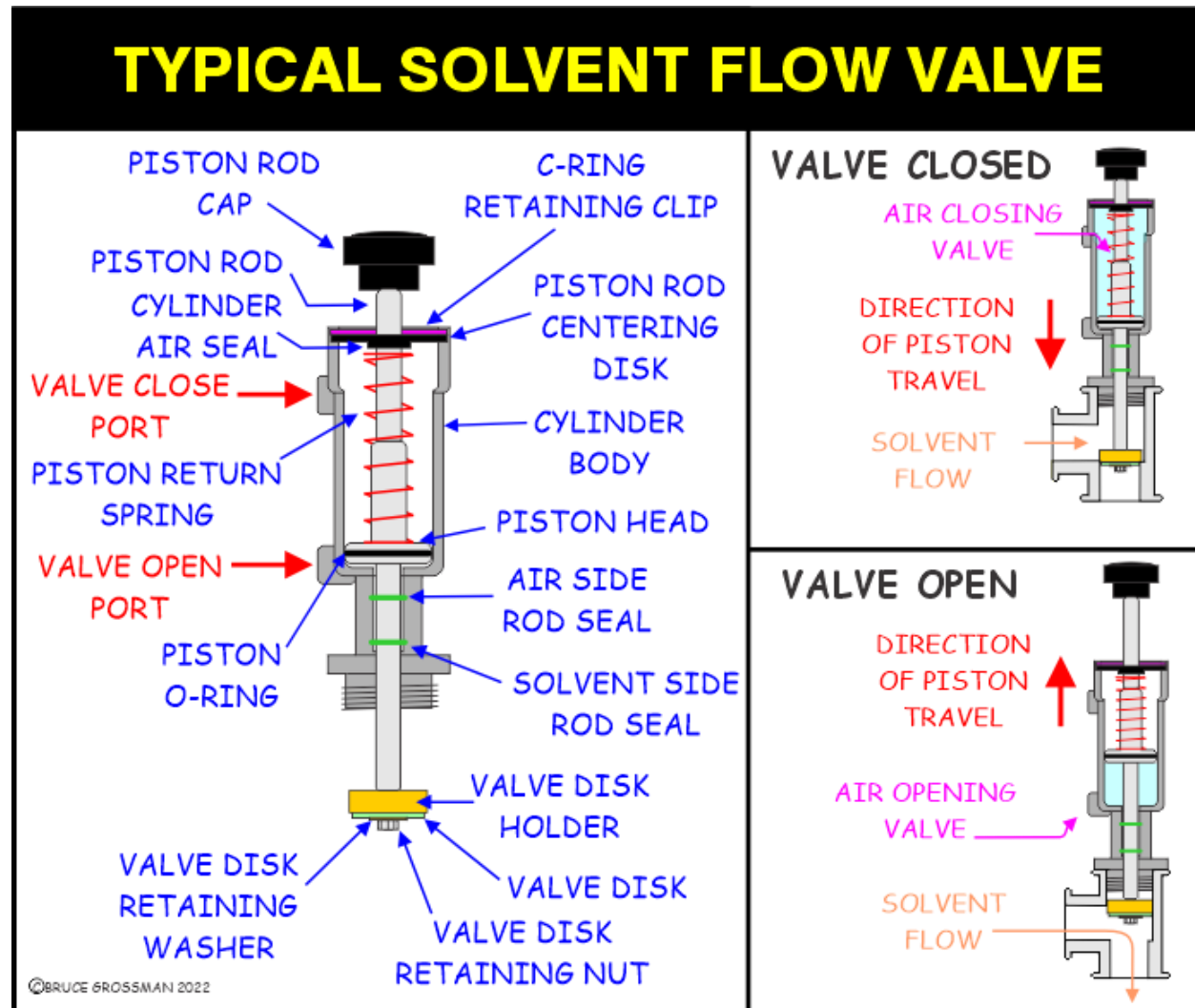


SOLVENT FLOW-3

In this month's issue, which concludes the solvent-flow series, I'll discuss valves—the devices that direct solvent flow through the dry cleaning machine.



HOW SOLVENT-FLOW VALVES OPERATE

Compressed air, controlled by a solenoid, operates the solvent-flow control valves on nearly every dry cleaning machine. The solenoid directs compressed air into a cylinder, where it moves a piston. The piston, in turn, positions a disk that either stops or allows solvent to flow through the valve.

Valves come in two types: **single-acting** and **double-acting**.

Single-acting valves are commonly, but not always, configured as normally closed. In this configuration, spring action keeps the valve closed and stops solvent flow when the valve is not

activated. When the valve is activated, compressed air moves the piston and compresses the spring, opening the valve. When the solenoid exhausts the air from the cylinder, the spring expands and returns the valve to its closed position.

The other type is the **double-acting valve**, which uses compressed air to position the valve in either the open or closed position.

REASONS FOR VALVE FAILURE

FAULT IN THE VALVE CONTROL SYSTEM

Before beginning any troubleshooting, make sure the incoming air pressure is at least **80 PSI**.

Problems in the systems that control the valves are often misdiagnosed as valve failures. These systems include the computer and the solenoid associated with the suspect valve.

The easiest way to check for a computer or solenoid problem is to disconnect the air line going to the suspect valve and activate the valve, either manually or through a cleaning program. If air flows from the disconnected line, the problem is likely in the valve itself.

FOULED CYLINDER

Most plants fail to pay proper attention to the quality of the compressed air delivered to their equipment. Over time, poor air quality can cause grit and other contaminants to accumulate in air-operated components.

When these contaminants accumulate in the cylinder, they can deteriorate the rubber components and cause excessive friction and wear on the piston O-ring, cylinder walls, and other seals within the valve.

Most air-operated equipment features a filter/regulator and lubricator to clean and lubricate the incoming air. Check these components regularly to ensure the filter/regulator drains accumulated water properly and the lubricator contains oil and is correctly adjusted.

KEEP UP WITH MAINTENANCE ON THESE ITEMS, AND YOU WILL RARELY HAVE VALVE OR SOLENOID PROBLEMS!!!

FAULTY O-RINGS

The valve typically has two types of O-rings.

The first is located in a groove on the piston head. It seals the air on one side of the piston as the valve operates. This O-ring is usually made of Buna and is black.

The second type seals the piston shaft. These O-rings are typically made of Viton or silicone and are usually green or brown. They are located at the bottom of the valve, where they seal the cylinder section from the solvent flowing through the valve.

Double-acting valves have another O-ring at the top of the cylinder that serves as a shaft seal.

Contamination inside the cylinder can prevent the piston from moving properly. This contamination can result in either faulty closing, where the valve remains partially open after the compressed air is exhausted, or faulty opening, where the valve remains partially closed when the cylinder is pressurized.

Partial closing allows solvent to leak through the valve, while partial opening restricts solvent flow.

Carefully examine the piston-rod length, especially where it extends above the top of the cylinder, to indicate proper piston travel. One way to familiarize yourself with proper piston travel is to watch a similar valve operate and compare the two. When the valve is closed, note how far the piston rod extends above the top of the cylinder. If the piston rod on the suspect valve extends farther, the valve is probably not closing completely.

I've found that removing the air line from the faulty valve and spraying WD-40 into the valve through the air fittings and if possible, into the air line as well, then operating the valve several times often remedies this problem.

DEBRIS ON VALVE SEAT

Occasionally, a pin or other debris can become lodged where the valve disk seats. These obstructions prevent the disk from sealing properly and allow solvent to leak through the valve when it is closed.

This problem is usually apparent when the cylinder assembly is unscrewed from the valve seat. A subsequent article covers the procedure for this type of repair.

PROBLEMS CAUSED BY FAULTY VALVE OPERATION

Valve failures can cause many problems, and discussing them in depth would require a dedicated article. However, based on my service calls, I've found that the three most notable symptoms of valve failure are:

1. **Overfilling the still**, caused by the still valve sticking partially open.
2. **The inability to draw solvent from the solvent tanks**, caused by the button-trap valve sticking partially open.
3. **A continuous flow of solvent from the wheel (basket) during the drain cycle**, caused by the wheel-inlet valve sticking partially open.

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