

Smart Brief

Troubleshoot problematic single or double-diaphragm pulse valves to maintain effective cleaning

There are typically two basic problems with pulse valves: they won't open, or they won't close. The problem may be the valve housing is visibly cracked or broken, but frequently the cause is less obvious, and may not be within the valve itself.

It is important to evaluate the entire pulsing system, from the air supply to the solenoid valve, and the timer.

Problem:

Valve will not open

Potential Causes:

- No power to timer or solenoids, or faulty steps in the timer
- Solenoid coil continuity
- Buildup of debris (oil, dirt, etc.) in solenoid plunger sleeve
- Tubing between solenoid and pulse valve blocked
- Tubing interior diameter less than 0.160 in. (4mm) or tubing length greater than 8 ft. (2.4 m)
- Solenoid plunger worn
- Holes in diaphragm
- Blocked exhaust ports

Problem:

Valve will not close (leaks air)

Potential Causes:

- Solenoid leaks air
- Leaks in tubing between solenoid and pulse valve
- Solenoid continuously energized
- Insufficient air supply
- Blocked bleedports in pulse valve housing
- Bad seal at primary diaphragm seat
- Broken diaphragm springs

Recommendations:

When troubleshooting any process equipment, it is important to follow all applicable safety procedures.

Air Supply:

At startup, and especially when new, quick pressurization is needed to fully seal and equalize pressure in the valve for proper operation. This type of valve uses equalized air pressures on unequal surface areas to create the sealing force. If the back side pressure doesn't equalize, the valve will not seal.

This can be accomplished one of two ways. If only one or two valves don't fully seal, try plugging the 3/8" side exhaust port to reduce leakage and let the valve reach pressure. If several or all valves are leaking, isolate the header from the air supply until the supply line is at full pressure, then quickly allow the header and valves to repressurize.

If this problem occurs regularly, a ball valve may be installed at the header to ease isolation. Keep the valve closed until the supply line is up to full pressure, then open the valve to quickly pressurize the header and valves. The importance of this procedure increases with the number of valves in a system. If the problem persists, verify that the compressor, supply lines, and header are properly sized.

Blocked Bleedports:

Each valve has bleedports to allow air passage between both sides of the diaphragm to equalize pressure within the valve. Air pressure on the diaphragm's larger top-side surface area and the supplemental spring force pushes the diaphragm into the closed position. If the bleedport is blocked, pressures won't equalize. The spring's force alone cannot shut the valve, so it remains open.



Smart Brief

Troubleshoot problematic single or double-diaphragm pulse valves to maintain effective cleaning

Blockage-causing contaminant can come from a variety of places: the air itself, flaking rust or galvanization from inside pipes, or shavings from threaded fittings. The easiest solution to this problem is to lightly tap the valve housing near the bleedport (with air header pressure maintained) to try to dislodge the contamination. This may cause the valve to shut. If the valve is still open, the next step depends on whether you have a single or double diaphragm.

Single-Diaphragm Valves

The only other option for a single-diaphragm valve is to take apart the valve and manually remove the blockage. (NOTE: The diagrams at right are generic. Always follow instructions in the operation manual for the particular valve.)

Double-Diaphragm Valves

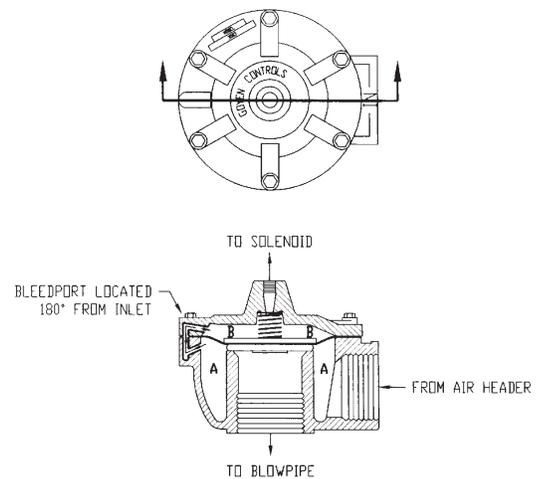
Because double-diaphragm valves have two bleedports, there are two possible blockage points. Blockage at the large diaphragm will result in leakage out the blowpipe and probably will require valve disassembly. Blockage at the smaller diaphragm results in leakage out the side exhaust port. Try plugging this port (usually requires a 3/8" NPT plug), allowing header to reach full operating pressure, and then removing the plug. The valve should be shut. If this fails, disassembly of the valve is required. (NOTE: Always follow instructions provided in the operation manual for the particular valve.)

Disassembly

Turn off the air supply to the header and bleed pressure from it. Remove the back from the valve. If the leak is out the 3/8" exhaust port on a double-diaphragm valve, start with the small diaphragm. A pipe cleaner or other flexible item may be used to clear each bleedport.

Check the disk in the center of the large diaphragm for nicks or embedded material which would prevent sealing. An even groove in the disk is evidence that it is seating properly. Replace the diaphragm if the disk is the source of leakage. Also check the valve seat to assure a smooth flat surface without nicks or protrusions which would prevent an airtight seal. Following instructions in the operation manual, reassemble the valve and try again.

Single-Diaphragm Valve



Double-Diaphragm Valve

