

This month's edition of Netafim TechTALK focuses on Solenoids.

One method of controlling valves is with an electromechanical device called a solenoid. A solenoid is a cylindrical coil of wire wrapped around a movable plunger. When the coil is energized, a magnetic field is created that moves the plunger causing a hydraulic pathway to open or close. When choosing a solenoid, there are several parameters to consider. We need to look at the type and bias, control voltage and inrush current, maximum operating pressure, and orifice size.

Netafim uses either 2-Way and 3-Way solenoids for different types of valves (Figure 1). 2-Way solenoids typically connect directly into the valve allowing the water to flow one direction, out of the control chamber. 3-Way solenoids allow water to flow into or out of the control chamber. Solenoids can also have a bias, normally open or normally closed. If a solenoid is normally open, then energizing it will cause it to close. Likewise if a solenoid is normally closed then energizing it will cause it to open. When combined with a hydraulic valve, a normally closed solenoid will create a normally open valve and a normally open solenoid will create a normally closed valve.

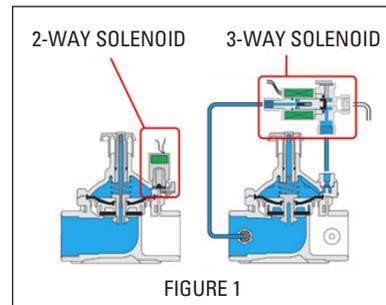


FIGURE 1

The control voltage is probably one of the easiest parameters to specify because it is typically determined by your valve controller. Voltage options typically include 12 VDC, 12 VDC latching, and 24 VAC. Both 12 VDC and 24 VAC require continuous current to energize the solenoid. Larger solenoids (or solenoids built for higher operating pressures) will usually require more current to hold the magnet open. 12 VDC latching solenoids require a very short pulse to activate and a similar, but reverse polarity pulse to deactivate it.

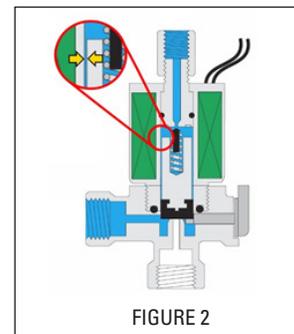


FIGURE 2

The orifice size of the solenoid will determine how quickly the valve reacts. A larger orifice will allow the water to enter or exit the valve's control chamber quicker than a smaller orifice. For very large valves a hydraulic accelerator may be combined with a solenoid to achieve faster reaction times.

There are also some problems associated with solenoids that you should be aware of. Most solenoid plungers are in direct contact with the water. Particles of sand, rust or debris can become wedged between the plunger and the wall of the coil causing the plunger to stick (Figure 2). Better filtration is required to prevent this problem. Another problem with traditional solenoids is overheating due to extended use. Solenoids can become extremely hot if energized for long periods of time, greatly decreasing the life span of the device.

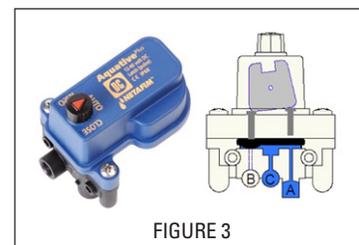


FIGURE 3

As an alternative to solenoids, Netafim provides the Aquative Plus. This device functions like a 3-Way solenoid but uses an isolated actuator instead of a magnetic coil and plunger (Figure 3). Because the water never comes in contact with the actuator, you don't have to worry about debris smaller than the orifice jamming up the device. It is available in 24 VAC and 12 VDC latching.

Ask your Netafim representative for more information or visit our website at www.netafimusa.com.

If you have a suggestion for a future topic, we'd love to hear from you. Please e-mail your idea to netafim.usa@netafim.com. Thank you.