9 Steps to Start Up an Electronic Control Valve Panel

By Ryan Spooner

Properly setting up an electronic control panel to ensure automated control of valves

As the world's population rapidly grows, the water industry is focusing on ways to save water, reduce maintenance on the growing amount of equipment and lessen the pipe breaks that are synonymous with aging infrastructure. Electronic control panels offer solutions to these issues and are gaining momentum in the industry. However, this means that not only does the mechanical control valve need to be started up, but the control panel also needs to be commissioned. This article will examine some basic steps that need to be taken to start up the electronic control panel for your valve(s).

① Commission the Valve

The initial step before starting the electronic control panel is to commission the valve that the panel will be controlling. This can be done by following the manufacturer's startup procedure, which is supplied with the valve. Basic steps usually begin with filling the main line with water and bleeding air out of the valve and system. Most valves controlled by electronic control panels are equipped with manual bypass valves to allow valve operation under power failure. Use these bypass ball valves to manually stroke the valve open and closed to ensure correct operation and to adjust the speed controls to a desired rate.

② Lock the Valve

Before any commissioning of the electronic control panel commences, lock the valve in place. This usually can be done with a ball valve located above the bonnet of the valve. This is important because a system often has constraints on valve operation—such as the maximum flow or maximum pressure that is acceptable in the system during the operation of the valve. If the electronic control panel has not yet been fully set up and tested, the valve may unexpectedly travel out of these constraints and cause major issues in the system during initial setup and testing of the panel. Locking the valve will ensure that all tests are complete and that the panel will control the valve as expected.

③ Check Electrical Wiring

The next step is to verify that the electronic control panel has been wired correctly by a certified electrician. All control panels should include a wiring diagram for the electrician to follow. A few of the expected wiring requirements are main power supply connection, solenoid connection(s), sensor connection(s), remote set point connection(s), alarm(s) and remote control input connection(s).

④ Turn on the Panel

Flip the breaker on the panel to start the electronic control panel. The screen and controller should turn on. If additional parts are included in the panel, check that the power supply, uninterrupted power supply/ battery system and filters are functioning as needed. This usually is indicated by a "System OK" or "DC OK" indicator.

⑤ Test the Solenoids

With power now available, the valve solenoids can be energized and tested. Before testing can begin, the solenoid orientation needs to be set up within the electronic control panel. Solenoids can be supplied as normally open or normally closed; the orientation is dependent on specified valve operation. If the orientations of the solenoids are unknown, seek the manufacturer's spec sheet for details. Once the solenoid orientation is set within the electronic control panel, set the control panel to manual control mode and energize the prospective solenoids to ensure correct working order. When solenoid verification is complete, unlock the valve and stroke the valve open and closed, using the manual control mode to complete the solenoid check.

⑥ Set Up the Solenoids

Before the system can be switched out of manual control, the sensor(s) of the system need to be set up. Before the sensor(s) can be calibrated with the electronic control panel, the range and units of the sensor(s) need to be determined. The range usually is stamped on the side or found in the manufacturer's spec sheet. Additionally, some sensors are programmed or set up though the local display. Once the range is determined, the sensor(s) can be calibrated, which often is referred to as zeroing and spanning the sensor(s). This means setting the minimum (zero) and maximum (span) sensor signal received by the electronic control panel so the panel can compare this with the range of the sensor.

⑦ Match the Sensor & Signal

Ensure the sensor value(s) match the signal(s) displayed on the electronic control panel. If there is a considerable discrepancy between the values, this is often because of a range mismatch. If there is a minor discrepancy, this is usually because of the zero and span calibration values compared with the incoming sensor signals. To rectify these issues, repeat step 6 until values are accurate.

⑧ Tune for Ideal Control

When the solenoids and the sensors are verified, the next step is to start using the electronic control panel to its full potential. Before releasing the panel to control the valve automatically, follow the manufacturer's user manual on tuning process for setting up initial tuning control values. Once set, introduce a small bump in the system by applying a conservative setpoint and watch the performance of the valves react to the setpoint change. Based on the performance of the valve, adjust the tuning control values. Tuning control values are usually adjusted based on three factors: overshoot, undershoot or oscillation. Follow the manufacturer's tuning process to eliminate these factors until ideal control is achieved.

⑨ Remote Setup

The final step is only necessary if remote capabilities are present. Such functions include remote setpoint input, remote control input, sensor value retransmission, alarm and notification outputs. These functions usually communicate with an additional master control panel. To set up the remote setpoint and sensor value retransmission, follow step 6. The range will have to be determined and the signals zeroed and spanned. The rest of the digital signals will have to be checked individually to ensure correct communication.

The steps above describe the basic procedure to starting up the electronic control panel and allowing the panel to take over full automated control of the valve(s). **w&wd**

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