

SYSTEM

Many booster pump systems use pressure to start and stop individual pumps. Well pumps, elevated storage tanks, or elevation gradient create the distribution system's static pressure. However, at peak times, booster pumps are needed to maintain required system pressure. Typically, the booster pump will be set to come on when water demand causes the pressure to drop below a preset limit. If the capacity of the pump exceeds the demand, the system pressure will rise until it reaches a shut-off setting typically about 20psi higher than the start point. Time delay relays are required to prevent short cycling.

In larger systems, if the capacity of the first pump is not sufficient to handle the demand, the pressure in the system will continue to fall. A second pump will be turned on by another pressure switch set 10% to 15% lower than the first. A wide difference in pressure switch settings must be maintained in order to prevent more than one pump starting simultaneously when a large change in demand occurs. Even more elaborate systems of Hydro-pneumatic tanks and interlocking time delays are used to prevent cycling or multiple starts.

PROBLEM

The majority of municipal systems must operate over a wide range of flow, but within a narrow band of pressure. Trying to match pump output to system demand using pressure alone can be difficult. The result is inefficient energy usage due to increased running times and motor starts. Since an electric motor draws on the order of five times as much current to start as it does to run, any system improvements can offer great potential for cost savings.

SOLUTION

A better way of staging pumps is based on flow rate. As the flow increases beyond the capacity of each pump the next larger pumps are started. Flow input is from a Badger Meter flow sensor installed in the main line.

The Badger Series 2100 contains up to four relay contacts. Each relay can be independently set in the field to energize whenever the flow has exceeded a predetermined flow set point. Programming allows adjustable on-delays to suppress flow transients and adjustable dead bands to prevent relay chatter or short pump cycling.

Serial communications card and data transmission is possible via modem, SCADA system, computer system, or simply a line printer using the optional RS232/485 options cards.

The Series 2100 may be equipped with an analog input or output cards to interface with other devices such as a pressure sensor, level sensor, chart recorder, etc.

By ordering the Dual Channel Flow Monitor Model 2101, custom units can be created to monitor system pressure, tank level, motor amperage, or other system parameters.

For more information, consult a Badger Meter Applications Engineer.

