



Save

Money, Energy and Time

by Communicating with Your Pump Station

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Central control systems have been able to communicate with pump stations for several years. It's a wonder that more people are not taking advantage of the benefits this revolutionary technology brings to golf irrigation. Maximizing pump efficiency, shortening watering windows, operating at full pump station capacity and minimizing the effects of a system failure are all excellent reasons to have your central control software communicate with your pump station.

To take advantage of this technology you need:

- Central control software capable of communicating with the pump station and reacting to the information received from the station.
- A reliable communication path from the central control to the pump station (radio or wire).
- A modern pump station with the necessary hardware and software.

Maximize the pump efficiency

With the introduction of variable frequency drives (VFD) into the golf market, pump station efficiency took a major leap. Before the introduction of VFD, constant speed pumps were the norm. These constant speed pump stations were inefficient,

because the motors were constantly running full speed regardless of the amount of water that flowed out of the system. This lack of pump control wasted a large amount of electricity when pumping a small amount of water. VFD technology allows the pump station to slow the motor speeds to match the demand from the irrigation system when flow requirements are low, thus saving electricity.

Central controlled irrigation systems communicating with VFD pump stations offer even more opportunities to maximize pump station efficiency. When flow requirements are smaller, slowing down pumps saves electricity; however, to gain maximum efficiency, pumps must operate at a certain speed (point on their curve). Central control software from leading irrigation manufacturers ensures the station is operating at maximum efficiency by reacting to real-time data sent from the pump station. This communication link helps the central control software determine how to respond and which sprinklers to activate, deactivate or pause when the pump station is operating below the most efficient flow rates.

Historically, irrigation computerized control systems calculated a *theoretical* flow based on data entered by a user such as sprinkler type, pressure setting, nozzle type and flow rate. Based on this information, the central control software would calculate theoretically how much water would be required. The software then added the flows of the sprinklers that were on at different times during the cycle and created a theoretical flow graph that represented this flow. The graph

shows a theoretical number of what the pump station output should look like if the central control software's data was 100% accurate. Due to the flow variances of sprinklers, incorrect data entry, pipe leaks and potential pump station failure, the actual flow from the pump station is usually different from the theoretical graph. This difference can be quite significant depending upon how widely the information in the computer varies from the actual system. Until recently, there has been no verification between the theoretical flow rate and the actual flow rate observed at the pump station.

Due to these potential inconsistencies, it is imperative that the central control software is capable of adjusting to real-time flow data fed back from the pump station. When the central control software identifies that the pump station is operating below its capacity, more sprinklers are activated to take advantage of the pump station's available capacity. If the pump station's actual flow is above its capacity, the central control software will turn off stations, which can prevent a low pressure shutdown. When configured properly, the software will do this automatically during each and every irrigation cycle, resulting in shorter watering windows and greater system efficiency.

Shorten the watering window

With constant communication between the pump station and the central control computer, the system is able to maximize the amount of flow supplied from the pump station and applied to the turfgrass. Because the communication between the central control software and the pump station allows the pump station to operate at full capacity, the watering window for each irrigation cycle is shortened. Shortening the amount of time the irrigation system runs saves money on electric bills, causes less wear and tear on the pump station and allows the maintenance staff to begin cultural practices earlier in the morning.

Many electric companies offer time-of-use billing. By watering during off-peak hours, a golf course can save thousands of dollars on power bills. By shortening the watering window, communication between the central control system and the pump station often ensures that watering is complete within the time-of-use window.

Use the full pump station capacity

Central control systems at many golf courses are programmed to operate at flow rates that are 10 - 20% lower than the actual flow capacity of the pump station. This is done to avoid the unwelcome low pressure shutdown due to excess flow rates. Some sprinklers are slow to turn off, still operating while the next set of sprinklers has already started to run. This overlap can cause excess flow due to extra stations operating at the same time. Historically, superintendents avoid an excess flow situation at the pump station by programming their central control software to always demand less than the maximum flow of the pump station. For example, if the course has a 1,200 gallon per minute (GPM) pump station, the superintendent

may program the central control software to operate at a maximum of 1,000 GPM or perhaps 1,100 GPM. This allows excess (unused) pump station capacity to buffer the extra flow described above. However, programming the central control to operate 10 - 20% below the pump station's maximum flow capability causes the irrigation cycle to run 10 - 20% longer than necessary.

Now that central control systems have the capability to react to *real-time* data feeds from the pump station, the central control software manages the extra flow. This eliminates the need to lower the central control's *theoretical* flow 10 - 20% below the pump station's capacity. With this advanced technology, superintendents can know with certainty that the central control system will operate in harmony with the pump station throughout the night, providing the tightest watering window possible.

There are many reasons to enable smart communication between the pump station and the central control system. Operating pumps at their most efficient output level saves money on electricity. Shortening the watering window provides a golf course professional more time to conduct maintenance on the golf course and allows golfers earlier access to the golf course. The days of having your central control software operating independently from your pump station are rapidly drawing to a close. Technological improvements allow professional water managers the capability of running their central controlled irrigation system off the actual flow from the pump station. Exciting times are ahead for improved water management and more control over the irrigation system. 🌱

