

SPECIAL REPORT

A Guide to Specifying Central Control

How to make irrigation
control technology work for
you and your customers

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In today's increasingly busy world, we've all wished that we could be in multiple places at the same time. Of course, that's not possible—or is it? Today's irrigation technology has transformed that wish into a reality for anyone tasked with the day-to-day operations of one or more properties. Central control systems make it possible to program, monitor and operate one or several irrigation systems from one centralized location—a personal computer. But the convenience doesn't stop there—some central controls can also manage the functionality of other on-site systems, including lights and security. For all these reasons, more specifiers are implementing central control systems for a broader range of applications than ever before.

Users of central control systems

Originally designed to manage irrigation on golf courses, the use of central control systems has expanded greatly over time. Central control systems can be customized to match the specific needs of just about any customer, budget, site and application. For example, contractors hired to maintain properties within a homeowners association (or within several homeowners associations) can manage irrigation systems, security gates and lighting without sending employees out in trucks to each residence or commons area. Residential property management companies, apartment complexes, grounds maintenance personnel and commercial property managers can also save time and money by operating multiple systems from the comfort of their own offices. Cities have also used central control systems to manage irrigation at multiple parks and sports fields from a single computer.

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The basics of central control

Central control software allows water managers and superintendents to create customized computer programs to automatically operate their irrigation systems. A central control system can monitor and adapt system operation and irrigation run times in response to conditions in the system or surrounding area. These systems can also provide historical data for detailed analysis and reporting of what ran when and the amount of water used. More advanced systems can integrate weather stations, flow meters, rain sensors and wind sensors to automatically make any pre-determined adjustments to system run-times and watering schedules.

Components in a typical central control system include a computer, communications equipment, field satellites and sensors. Communications equipment, such as a telephone, radio modem, Ethernet, Wi-Fi, cellular modem or fiber optic modem, is located at the central computer and at each of the sites being monitored. In some systems, cluster control devices are located on-site to monitor and control the system equipment. Connected to the irrigation valves, sensors and other field equipment on-site, these devices receive parameters and scheduling data that a water manager sets up using a central computer.

Advantages of central control systems

Central control systems offer a broad range of advantages to anyone faced with operating irrigation systems for large sites or multiple locations:

- **Convenience.** Being able to make individual adjustments to multiple irrigation systems spread over a geographic distance, can save

significant time and money for the water manager by eliminating the need to travel to each site. Changes to irrigation schedules can be made quickly and easily from the comfort of an air-conditioned office. Some central control systems can even be set up to manage other automated features of a property, such as lights, fountains, security systems and gates. Central controls decrease the risk of human error because after being programmed only once, they can turn the irrigation system on and off according to pre-determined conditions and schedules.

- **Constant monitoring.** Sensors at each location can detect high-flow, low-flow and no-flow situations, alerting water managers to potential problems before they become catastrophic. Not only does this inform the water manager of a problem quickly, resulting in a more effective use of time and money, it can also save turf and landscapes that could be severely damaged due to an undetected malfunction.
- **Water efficiency.** With central control systems, water managers are able to automatically change watering schedules with a few simple keystrokes on their computers. Weather stations can report back evapotranspiration (ET) conditions to make automatic adjustments. Rainfall intensity can even be monitored and compared to the soil infiltration rate to determine how much water makes it to the plant's root zone. In this way, water is saved by avoiding the irrigation of landscapes that simply don't need the extra moisture.
- **Healthier plants and turf.** Central control systems also do a better job of ensuring each landscape receives the right amount of water, not too much and not too little, resulting in healthier plants that are better able to resist infestation and disease.
- **Safety.** Being able to quickly and easily change watering schedules is especially important when irrigating commercial, recreational and other public areas with high levels of pedestrian traffic. Central control systems can prevent irrigation mishaps that could occur if there is an outdoor event taking place at a particular location.
- **Cost savings.** Besides the obvious money saved by spending less time and fuel traveling to and from the site, central controls allow users to coordinate activity between the satellites on the site and manage irrigation demand so that pumps operate at peak efficiency. This lowers electric and water bills as well as reduces the amount of wear-and-tear on pumps by making sure they are only running when necessary. The same holds true for other irrigation system components including main lines, main line fittings and control valves.
- **Security.** Some central controls include higher levels of security that are especially important in situations where multiple people may need to have access to the irrigation system. These systems sometimes allow for the creation of a master list of users who can only access the system using a special identification number. Central controls can also provide logs detailing which users have accessed the system during a certain time period.
- **Modularity and affordability.** Today's central control users are under more budgetary, time and watering constraints than ever before. As a result, central control system providers are making their systems increasingly modular, allowing users to purchase a basic package that fits their initial needs with the flexibility of adding additional features, stations, satellites and sites over time.

Critical decision factors

Before specifying a central control system, it's important to closely examine a number of factors about the project. The type of central control specified will need to take into account the overall size of the project, the number of sites to be managed, the use of satellites or two-wire decoders, the client's desired level of automation and many other details unique to the project. Because every situation is different, the weight assigned to each decision factor will vary. The key to specifying the best central control system is to determine the customer's "must-have" features and let those findings lead you to the central control system that best fits the project.

1. Project size and complexity. The overall size and complexity of the irrigation project are primary considerations when specifying a central control system. The use of satellites or two-wire decoders at the project site may also dictate the type of central control system that's most appropriate. Some central control systems may only be compatible with one or the other. Other systems, like IQ™ v2.0 Central Control and SiteControl™ Central Control from Rain Bird, are compatible with both.

The number of valves and the number of different sites that the central control will be expected to manage also affects the overall scope of the project, as well as the geographic proximity of those sites to one another. Certain types of central control systems are designed for one large site while others are specifically used to control multiple sites. For example, Rain Bird's Maxicom²® Central Control System can manage literally hundreds of commercial and industrial locations, making it a great choice for municipalities, school districts and parks and recreation departments. Meanwhile, SiteControl is specifically for single site applications including cemeteries, sports

fields or vacation resorts. Rain Bird's IQ v2.0 Central Control System has the versatility to handle either single- or multi-site control.

A project's budget and development plan can also impact the choice of central control product. For sites that are being developed in stages, such as housing developments, a more modular central control system can save money up front while still making it possible to add advanced features as they are needed. Rain Bird's IQ v2.0 is a great example of such a system, incorporating distinct "feature packs" that allow users to add reporting, flow management, weather data and security features as need arises and budgets permit.

Determining the client's need for additional system automation is also a significant consideration when choosing the right central control. While some central controls, such as Maxicom² can be programmed to operate security systems, lights, fountains and gates in addition to irrigation systems, others are not equipped with that functionality.

2. Water conservation objectives. It's always important for an irrigation system to perform efficiently, but in some situations, it's absolutely imperative. For example, when specifying central control for an irrigation system in a particularly drought-prone or arid region, water efficiency is likely to be a priority. The best central control



system in this type of situation will need to include a high level of programming flexibility to accommodate changing water

restrictions. The ability to interpret ET data and link to weather stations and rain sensors is also important, as the watering schedule can be suspended when significant precipitation begins to fall.

However, the need for water efficiency isn't always triggered by concern for conservation. In some parts of the country, irrigation users can get water for little or no cost, but the expense of the electricity used to run the irrigation pumps can quickly add up. In this case, the central control system will need to coordinate irrigation demand so that pumps are operating at peak efficiency, saving the customer money on electric bills rather than on water bills. Regardless of the final objective, Rain Bird's SiteControl and Maxicom² central controls are able to take advantage of advanced weather station technology and react to current conditions based on user-defined options. IQ v2.0 also provides smart, weather-based control with the addition of an Advanced ET Feature Pack.

3. Water source. The use of municipal water or reclaimed water also affects the choice of a central control system. Because reclaimed water may contain potentially harmful chemicals or bacteria, its use must be reported to environmental agencies. In most situations, systems using both municipal and reclaimed water will require flow sensors to measure the amount of water being used from both sources so that the system manager can create a report. The greater the number of water sources, the more flow sensors required for reporting purposes. This can get expensive if



there are multiple points of connection into the irrigation system.

4. Water type. If a particular site is using non-potable water for

irrigation, you can be fairly certain that they are interested in water conservation and water efficiency. While using non-potable water is an environmentally-responsible choice, non-potable water use must adhere to a number of specific guidelines depending on its level of treatment. Its use also typically requires careful reporting to environmental agencies due to public health and safety concerns. In this situation, it's important to choose a central control system that has the capability to create detailed reports that include the type and amount of water used during specific time periods. Each of Rain Bird's three central control products—Maxicom², SiteControl and IQ v2.0—has the capability of creating water usage reports that can be used for this purpose.

5. Water windows. The amount of time, or watering window, that an irrigation site has available for water application can be dictated by the levels of pedestrian traffic and the number of outdoor events experienced throughout the day. For example, a high school football field cannot be watered during a match, and a park cannot be watered during an outdoor concert. In these situations, a central control system will need to be flexible enough to quickly and easily accommodate scheduling changes.

Watering windows can also be affected by a completely different type of consideration. Over time, as metropolitan areas have grown, the size of the pipes that deliver water throughout those areas have not. This can make it difficult to deliver enough water to the site to meet the peak needs of the irrigation system. To counter this demand issue, cities often enforce odd/even day watering



restrictions to balance the load. In this situation, specifiers need to design systems that can apply the peak amount of water needed in the limited amount of time available for irrigation. Rain Bird's Maxicom², IQ v2.0 and SiteControl systems offer an integrated Flo-Manager™ feature that provides real-time monitoring and sequencing of the order in which valves operate to lower water demand, reduce system wear-and-tear and save energy. Flow management tools like these are particularly helpful at facilitating multi-station operation, as they can shorten total system runtimes and watering windows.

6. System management. There are two possible scenarios for central control management: one person is in complete control of the system, or multiple individuals share control. Usually, one person manages the majority of applications. In some cases, however, such as city parks and recreation departments, the various individuals tasked with maintaining certain parks or sports fields may all use the same central control system for a variety of reasons. Certain multi-site systems are far better suited to meet the challenges of multiple users, so it's important to find out how the system will be managed before specifying a central control system. This type of system management may require the need for a central control system with integrated security features to prevent unauthorized users from accessing the system. For example, Rain Bird's IQ v2.0's optional Advanced Programming Feature Pack can prevent unauthorized individuals from making programming changes by requiring users to first enter a Personal Identification Code (PIN).

7. Communications options. There are two types of communication involved with central control. Primary communication is the type of communication used between the computer and the irrigation site; secondary communication is the method used for the satellites on the site to communicate with each other. A single-site project may only use one of the following communication methods—a PC-based network, telephone landline, cellular telephone, radio or Internet modem. The characteristics of the site or sites themselves determine which communication method(s) are the most reliable and least expensive.

However, when a central control system is tasked with controlling multiple sites, it must often be capable of incorporating any combination of the aforementioned communication methods. This type of situation is common for contractors who are managing multiple small to medium-sized irrigation sites for various clients, residential and commercial. Rain Bird's Maxicom² works well in this type of scenario, as it is compatible with multiple communication options, allowing wired or wireless connections between cluster control units (CCUs) and satellite controllers. With the addition of its NCC Network Communication Cartridge, IQ v2.0 can also handle a variety of communication options. These systems can also be easily expanded if contractors take on the management of additional sites.

8. Flow monitoring. At one time, flow monitoring was an expensive add-on option to most central control systems; now, it's far more common. Flow monitoring is necessary to generate the water usage reports that businesses, cities and school districts often require.

Flow sensors record the actual flow of every valve in the system for reporting purposes. Because a valve's actual flow is the best indicator

of any potential problems at the site, the system can automatically compare the typical flow rate to the actual flow rate to see if problems exist. For example, if vandals kick off the sprinkler heads at a site, the flow sensors will show a much higher flow than normal. Or, if a sprinkler head has gotten clogged with grass or mud, the flow will appear abnormally low. While many central controls now offer flow monitoring, Rain Bird's Maxicom² and IQ v2.0 can automatically react to these situations by shutting off one valve or the entire system based on pre-determined parameters. In a low-flow situation, the central control can even be programmed to purge filters automatically.

9. Water use reporting. It's crucial to determine a customer's reporting needs and make certain that the chosen central control system can meet them. Some projects require reporting that extends beyond flow monitoring. Sites irrigating with non-potable water are often required to report usage amounts to federal and state environmental agencies. Clients located in regions supplied with water from an aquifer may be asked to document their usage so that local water agencies are aware of the demand being placed on the water supply. These reports are especially significant when the aquifer level is dropping, or the area is experiencing a drought. Systems like Maxicom² incorporate software that can easily provide water usage, station run time and water cost logs for multiple sites. This type of functionality is optional for IQ v2.0, and SiteControl is able to create these reports for one large contiguous site. Other systems may not offer this type of reporting.

Selecting the right central control

Central controls offer a tremendous degree of flexibility, convenience, efficiency and cost-savings, making them extremely valuable for many irrigation projects. However, they can be a challenging

component to specify due to the many factors involved and the wide variety of products available on the market. In addition to the aforementioned critical decision factors, upfront hardware expenses, installation and any recurring monthly costs will also be factors when deciding which central control system is best for a project. It may be tempting to specify a system with all the "bells and whistles," but finding the best product with the most applicable technology at a reasonable price should be the ultimate goal. Because many sites are under initial budgetary constraints or require the flexibility for future expansion, modular central control systems like Rain Bird's IQ v2.0 are becoming increasingly popular. However, one-size does not always fit all. That's why it's best to closely consider all factors—site characteristics, user types and reporting needs, for example—before choosing a central control system.

It's also important to remember that while the initial cost of a central control system may seem high, most sites can more than recoup that expense over the life of their systems. The many benefits of central control—scheduling convenience, flow monitoring and sensing, water-efficiency, safety and healthier landscapes—can pay for themselves over time.

Irrigation system providers sometimes offer helpful product guides and design tools to help make choosing the right central control a little easier. Some central controls are included in pre-assembled, pre-tested and pre-packaged systems, taking even more of the guesswork out of the equation. However, the keys to specifying the right central control remain the same. Choose a central control product from a company with a long and proven track record of success. Ask the right questions and gather as much information as possible. Being armed with this knowledge is the best way to make an informed decision that will provide clients with top performance and the highest level of satisfaction.

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