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California Energy Commission
Building and Appliance Office
1516 Ninth Street
Sacramento, CA 95814-5512

**Comments Related to Rulemaking on Irrigation Equipment Performance Standards and Labeling Requirements**

**Docket No. 09-AAER-1A**

The following comments are presented to the California Energy Commission in follow up to the June 30th Irrigation Equipment Efficiency Standards Workshop.

**Proposed Landscape Irrigation Language and Requirements (Peter Strait)**

We agree that irrigation controllers should not be classified as "smart" or "dumb" controllers. The irrigation industry has used "smart" and "conventional" controllers to differentiate between those controllers that self-adjust based upon weather or soil moisture, versus those that require manual programming adjustments to be made to compensate for plant water demands. The controller categories proposed by the CEC are sensible, cover a wide range of potential controller products, and provide a foundation for further product development by manufacturers.

Direct Sensing Controllers

The assumption is that direct sensing controllers category will focus primarily on those controllers with integrated on-site ET or soil moisture sensors, used in the automatic and daily calculation of watering schedules. Hunter Industries has two products, the ET System and Solar Sync, both having on-site ET-based sensors, which I believe would be considered direct sensing controller products. However, further definition may be required in regard to the types of sensors that are used with the irrigation controllers. A wide variety of on-site sensors exist in the market that can be attached or wired to irrigation controllers, including the following: 1) on-site sensors that gather weather data used in the calculation of ET, 2) simple micro-switch type weather sensors (rain, freeze, and wind) that are designed to shut down the irrigation system when a weather event occurs, and, 3) soil moisture sensors that monitor soil moisture and activate/deactivate irrigation controllers depending upon the moisture level within the soil reservoir.

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Indirect Sensing Controllers

We cannot comment on this type of controller as our controller product offering is focused mainly on the direct sensing category.

Pre-Calibrated Controllers

The assumption with this category of controller is that it will encompass those controller products that have pre-programmed data, such as historical ET data, which can be utilized in the calculation daily watering schedules.

Manually Calibrated Controllers

A common comment from participants in the CEC workshops has been that "conventional" controllers, or more specifically, manually-calibrated controllers, have the capability to act like "smart" controllers if programmed properly. While manually-calibrated controllers may not be as effective in reducing water waste as direct or indirect sensing controllers, they can offer users water savings benefits if developed with features focused on water conservation. Today's irrigation controllers, even at the low-priced residential segment of the market, can provide users with a high level of programming capability, robustness, and reliability. However, they do require some competence in programming to achieve maximum water savings.

**Basic Controller Features**

During the recent meeting, Peter Strait offered a list of potential features that are being considered by the CEC as a minimum feature set for controllers. While many of the features may seem beneficial in terms of water conservation and feasible from a product development standpoint, some consideration needs to be given to the increased programming complexity associated with some of these features. All controllers, even "smart" controllers, require some level of interface and programming by end users, both in the initial controller setup and also with making necessary adjustments to fine tune a system. Below is a list of controller features, some of which were presented by Peter at the workshop. These feature descriptions and definitions are provided as information to the Commission and are not meant to be a minimum feature set required for controllers.

Days Programming

Today's controllers can be programmed to water any days(s), from specific days of the week to odd/even days, to interval watering. Most irrigation controllers are designed with a 365-day calendar clock that will accommodate odd/even watering restrictions without requiring monthly programming. Interval watering is also a convenient feature for those that want to have a more consistent watering schedule without having to worry about the day of the week or the date. The interval you select is the amount of days between watering. A typical range in interval for most controllers is 1 to 31 days.

Non-Volatile Memory

Irrigation controllers have either volatile or non-volatile memory. Volatile memory controllers will typically lose the programmed data and default to a preprogrammed watering schedule in the event of a power outage. In contrast, non-volatile memory controllers will retain all program data during a power outage. In addition, it is common for non-volatile memory controllers to utilize a battery, sometimes internal to the controller, to backup the timekeeping function of the controller during an extended power outage. This assures that when the power is restored the programmed data is available and the time/day is current.

Sensor Input Terminals

Most irrigation controllers are designed with screw terminals dedicated for the installation of weather sensors. Typically, these terminals allow the installation and use of simple micro-switch type sensor products. These sensor products include the common rain sensor, but also include wind, freeze, flow, and soil moisture sensor products. Most of these sensors are designed to activate or deactivate a controller based on a weather event. The terminals allow for easy installation, along with providing sensor bypass functions.

Sensor Bypass Switch

With a sensor attached to an irrigation system there may be periods of time, especially when servicing of the irrigation system is required, whereby a user may want to override a sensor that has shutdown the controller operation. The sensor bypass switch allows for an easy way to accomplish manual or automatic watering at times when the sensor is active.

Sensor Programmability

Additionally, the sensor input on some controllers can now be programmed by zone or station. This means that the controller can be programmed to respond to the sensor only for specific stations. For example, if a station is watering potted plants that hang below the eaves of a house and do not receive normal rainfall, the controller can be programmed to ignore the sensor input for that station and continue to irrigate when it is raining.

Seasonal Adjustment

This feature offers a significant potential for water savings in conventional controllers. Seasonal adjustment is used to make global station run time changes, as a percentage of the programmed run time, without having to reprogram the entire controller. This feature is perfect for making small adjustments that are necessary as the weather changes. For instance, hotter times of the year may require more water. Seasonal adjust can be increased so that station run times will operate a little longer than the programmed run times. The seasonal adjust feature is easy for most users to understand and program. Manufacturers are beginning to expand the capability of seasonal adjustment to

include the ability for users to program a controller's monthly seasonal adjustment values for a full year when they initially install and program the controller. This feature allows the controller to automatically switch to a new seasonal adjustment value at the start of each month.

No Water Window

The No Water Window feature is designed to provide users a means to easily comply with time of day irrigation restrictions. The user can program a period of time during the day when no watering can occur. For example, a restriction requiring no watering to occur from 6:00 am to 6:00 pm can be programmed via the no water widow feature. This feature is also useful for those customers using seasonal adjustment as they do not have to worry that a global increase in run times will result in watering outside of their allowed watering period.

Programmable Days (Rain) Off

This feature permits the user to stop all programmed irrigation for a designated period of time. It is typically used for those systems that do not have a rain sensor attached, allowing the user to shutdown irrigation for a period of time in days. At the end of the programmable rain off period, the controller will resume normal automatic operation.

Cycle and Soak

Cycle and Soak, or "stuttered" watering is a feature that allows the user to split station run time into more useable, shorter duration watering. This feature is particularly applicable for slopes and tight soils, as it is designed primarily to prevent runoff. The cycle time is programmed as a fraction of the station's watering run time and the soak time as the minimum amount of time before the station can water again. The total number of cycles the controller will operate is determined by taking the total programmed station run time and dividing it by the cycle time. This feature requires that the user know more about the precipitation rates of their irrigation system, along with their soil infiltration rate. Cycle and Soak is considered to be a more advanced feature and is typically found in commercial controllers due to the added complexity associated with programming.

**Add-on Devices**

Currently, no standards exist in the industry in regard to add-on devices. The SWAT Committee has drafted an addendum to redefine smart controllers to include add-on devices, which is currently under review by the Irrigation Association. The typical add-on configuration involves installing the device to the irrigation controller's common wire for the valves. The device is programmed and will interrupt the irrigation controller's program based on how the device's logic compensates for varying plant watering requirements. Most add-on devices are designed to operate with a variety of controllers from different manufacturers.

There exists a group of products that allow customers to easily upgrade their existing conventional controllers to “smart” controllers without having to incur the added expense to replace their whole irrigation control system. Two products offered by Hunter Industries, the ET System and Solar Sync, afford users the opportunity to upgrade their existing Hunter controller to “smart” control. Although from a configuration standpoint, these products “look” as though they are an add-on to a controller, they are designed to be fully integrated into the controller operating system (firmware), sending scheduling commands directly to the controller. They are not designed to interrupt programmed watering through the field wiring as most add-on devices do, but are designed to alter watering schedules automatically by working in conjunction with the controller’s programming logic.

**Estimating Water Needs**

We feel that the standards developed by the Commission should not constrain controller products to a particular formula, such as the CIMIS formula, for calculating plant watering requirements. “Smart” controller products provide real watering savings and each product typically utilizes a slightly different method or technology for calculating or communicating watering schedules to the controller. Standardized testing provides a means for the irrigation industry to evaluate individual product performance and technology. That being said, it is important to allow the manufacturers freedom to innovate and develop products, utilizing the latest methods and technology.

**Performance Standards and Testing**

Over the past several years, the SWAT Group, which includes water purveyors, manufacturers, and industry representatives, have developed testing protocols for products. The SWAT test protocol and independent testing by the Center for Irrigation provide an adequate means to determine product performance. The SWAT process also provides a means for the industry to comment and revise the test protocols on a regular basis, as necessary.

**Controller Power Consumption**

As requested, the following chart offers a comparison of power requirements for conventional and “smart” controllers. The data shows power requirements for three Hunter controller products (SRC, Pro-C and ICC Controllers) and our two “smart” controller products (ET System and Solar Sync). The SRC and Pro-C are primarily residential-type controllers, while the ICC is a more powerful, commercial grade controller. As mentioned previously, the ET System and Solar Sync can be attached to these controllers to upgrade them to “smart” control. Idle power consumption data is based upon the controllers with and without an ET System and Solar Sync attached and with no valves operating. The active power consumption data is for controllers with the maximum number of valves being operated at one time.

| | Primary Power (watts) | | |
|---|---|---|---|
| | SRC | Pro-C | ICC |
| **Idle power standalone** | 6.39 | 5.34 | 7.59 |
| **Idle power w/ ET System** | 7.59 | 5.98 | 7.94 |
| **Idle power w/Solar Sync** | N/A | 5.98 | 7.94 |
| **Active power standalone** | 20.01 | 27.14 | 41.98 |
| **Active power w/ ET System** | 21.16 | 28.41 | 43.01 |
| **Active power w/Solar Sync** | N/A | 28.06 | 42.90 |

Notes:

All inputs 115VAC, 60Hz
Active current for SRC is with 0.6A to valves
Active current for Pro-C is with 0.9A to valves
Active current for ICC is with 1.4A to valves

**Controller Expected Life**

Hunter Industries controller product development requirements focus on meeting an expected product life requirement of at least 10 years. Actual lifespan of 15-20 years would be expected. We have a wide range of controller products designed for both indoor and outdoor use. Controllers are designed to meet demanding performance tests, which include high/low temperature cycling, water resistance, dust intrusion resistance, impact strength, surge/lightning resistance, and UV resistance. Hunter utilizes both industry and internal test standards when evaluating controller products. It is interesting to note that customer demand for new technology in irrigation controllers is likely become a factor in the removal of controllers prior to the end of their expected life. Many customers are willing to replace their existing "good" controllers with new controllers to obtain the latest new features and technology.

I hope this information is helpful as the Commission proceeds with the development of standards and labeling requirements for irrigation equipment. Please do not hesitate to contact me if you have any questions or need additional support.

Respectfully,

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