

Installation Guide

Ctek Irrigation Controller



Ctek – Things That Move Data

25 August 2011
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Purpose

Ctek's W4X40 Series of Irrigation controllers provide on-site cellular control of commercial and residential sprinkling systems commonly used to irrigate turf and shrubbery. The controller is designed to be installed alongside and co-exist with most time clock controlled systems. This document provides guidance in the installation of this system.

Scope

Figure 1 shows a Ctek Irrigation Controller in the context of an existing irrigation installation.

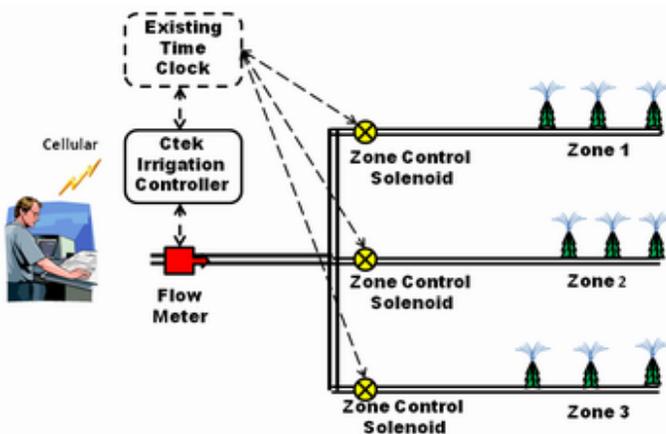


Figure 1 - Controller in an existing system

For a complete installation there are three areas of focus, the flow meter, electrical connections to the existing clock and zones, and application settings necessary to manage the irrigation process. The flow meter and electrical installation are covered in this document. Application settings are discussed in detail in Ctek Application Note APN008.

Flow Meter Installation

Ctek's Irrigation Controller uses the Badger 228PV wireless flow meter system. The 228PV is a 900 MHz wireless flow metering system available in pipe diameters between 1.5 and 4.0 inches. The 228PV uses a model 350T wireless transmitter at the metering point and a 350R wireless receiver that mounts inside of the Ctek Irrigation controller. The 350R wireless receiver requires programming to set the following parameters. Programming is accomplished with PC software available from Badger. Ctek will also perform the required programming for a nominal fee.

Parameter	Value
Volume Units	Gallons
Scaled Pulse Output (units/pulse)	????
Scaled Pulse Output (pulse width)	???

The flow meter integrated with Ctek's Irrigation controller is a Badger Meter product. Technical information on the installation and operation of the flow meter is available on Badger's web site at www.badgermeter.com.



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Tips on Flow Meter Installation

Plumbing - The wireless receiver and transmitter are a matched pair. In the event of a failure of either component both will have to be replaced. Therefore we recommend that the Tee housing the metering unit be installed between two union fittings to facilitate easy removal and replacement. See Badger's requirements for straight, unobstructed pipe to determine the length between the union fittings.

Wireless Range (Transmit/Receive distance) - The current Badger documentation specifies a maximum distance of five-hundred (500) feet between transmitter and receiver. This is a maximum distance and the characteristics of an individual installation may decrease this distance.

Ctek has selected what we believe to be the optimal 900 MHz antenna for the Irrigation Controller. We do not warrant or support any other antenna installations for the wireless flow meter receiver.

Electrical Installation

Theory of Operation

Ctek's Irrigation controller opens the electrical return path from the irrigation zones to create a zone off (not sprinkling) condition. When the Irrigation Controller's schedule specifies that irrigation should begin on a specific zone the return path is closed and power is applied to the correct zone by the mechanical time clock. Obviously this means that the schedule in the mechanical clock needs to be

synchronized as closely as possible with the Irrigation controllers schedule.

Note - The common (return) lines from each zone are connected to the normally closed connection on the Irrigation Controller. This insures that in the event of an Irrigation Controller failure the mechanical time clock can take over, thereby providing a failsafe backup.

Installation - Wiring

Figure 2 below is an electrical wiring diagram of the controller installation. The Controller is provided with color coded flying leads which are identified on the diagram by the red text enclosed in brackets. An example would be **<White>** which is one of the input power leads. The other input power lead is **<Black>**.

The Irrigation Controller uses 24 VAC and draws less than 250ma of current. It can be connected to the mechanical clock power source.

Typically the common runs from all zones are joined at a junction box or connector before being connected to the power source. This junction is the appropriate place to insert the Ctek Irrigation Controller's normally closed **<Red>** relay connection on the irrigation zone side and the Controller's common relay connection **<Yellow>** on the side of the common (return) wire that connects to the clock or the clock's power source.

The normally open relay connection **<Green>** is not used at this time and can be terminated within the controller or in a junction box.



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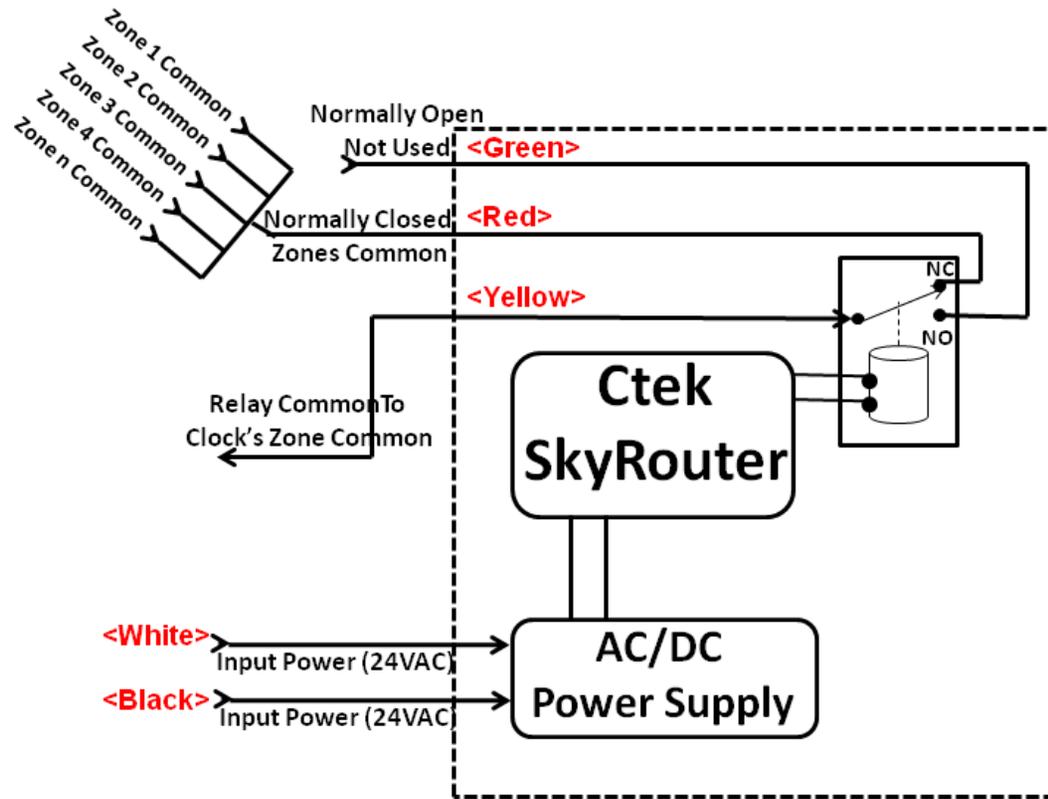


Figure 2 - Electrical Wiring



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Figure 3 shows a view of the Ctek Irrigation controller and its relationship to the existing mechanical time clock. The red line indicates the portion of the zone control circuit that is switched by the Irrigation Controller.

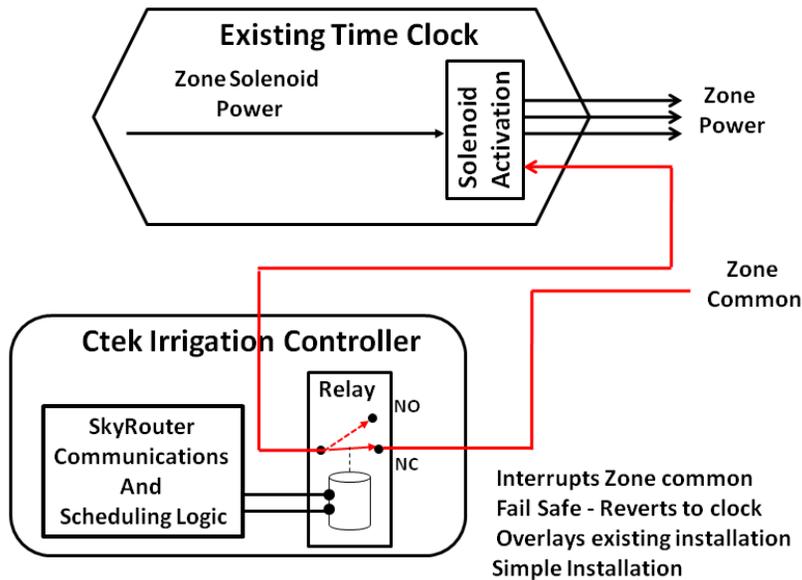


Figure 3 - Installation Focus on Zone Connection

Application Settings

Application settings are described in detail in Ctek document APN008 which is available on www.ctekdirect.com or www.ctekproducts.com.

Application Tips

Clock Synchronization - The Irrigation Controller depends on the preexisting mechanical clock to power each zone on a schedule. It is important to synchronize the mechanical clock's time as closely as possible with the actual time displayed on Ctek's irrigation controller. The Irrigation Controller obtains its time from the cellular network and is highly accurate.

Establishing a Baseline - It will take a number of days of operation to accurately dial-in the settings for the Irrigation Controller. As data is gathered the user can dial in the minutes and over/under percentage settings to achieve a highly tuned system. On day one the GPM flow setting for a zone is critical and over time as information is gathered that setting can also be tuned. Achieving a stable baseline is key to creating an irrigation system that operates within tolerances over a prolonged period of time. Once a stable baseline is achieved alarms and exception reports can lead the user to problems such as broken or plugged nozzles or dramatic changes in water pressure at the main line. Because the Irrigation Controller is connected over the cellular network irrigation technicians can adjust settings from their desk without having to roll a truck.