

WeatherLink[®] for Irrigation Control Addendum

Introduction

This Data Logger is designed for use with most common irrigation systems, including those provided by Rain Bird, Rain Master, and Toro. For the industrial controllers used in agriculture and turf management, it provides electronic pulse outputs for wind, rain, and evapotranspiration (ET). Homeowners can add our optional solar radiation sensor to their VantagePro[™] weather station to turn their irrigation system on or off based on evapotranspiration. All users can use the alarm settings in the Vantage Pro[™] console or Weather Envoy[™] to inhibit the irrigation cycle based on weather conditions. The data logger will inhibit the irrigation cycle if ANY of the alarms are active.

This product also contains the functionality of the WeatherLink for Vantage Pro Serial version. Please consult the WeatherLink for Vantage Pro[™] Getting Started Guide and on-line Help files for information on the use of the WeatherLink[®] program (including its hardware requirements and typical installation), package contents, and optional accessories for this product.

If you plan to install this product in a Vantage Pro[™] console, use the notch in the Battery Door located adjacent to where the PC connector protrudes and above the AC power connector to bring out the Connector Block wire.

If you plan to install this product in a Weather Envoy[™], it is recommended that you knock out the left-most tab with the Weather Envoy's PC connector facing you and loop the Connector Block wire around the datalogger connector to the Weather Envoy[™] and bring it out where this tab was removed.

Hardware Installation and Requirements

In addition to the requirements for WeatherLink, the Irrigation capability of this product has the following additional hardware requirements.

- One Free Serial Port or One Free USB port with the Serial to USB adapter (Part # 8434) connected to a Windows PC.
- Computer running any version of Windows[™] with at least 3 MB free of RAM and 512 KB free of hard disk space.

- Industrial Irrigation Controller with inputs for wind, rain, and/or ET; or a Residential Controller with a Common or a Rain Sensor connection. Irrigation wire as appropriate to your Irrigation Controller
- Solar Radiation Sensor, P/N 6450 to use evapotranspiration (ET) to control the irrigation cycle. In addition to the ET pulse output, the Rain – ET algorithm uses this information. More information is provided below.
- Small Slotted Screwdriver
- Relays: You may need to obtain your own relays in order to switch equipment at voltages higher than 28 Volts or power levels above 10 Watts.

Note 1: Your Residential Irrigation Controller may be connected in series to both the ET and Alarm inputs on the Irrigation datalogger if you wish the Irrigation system to also be suspended due to, say, high winds or cold temperatures, for example, in addition to the Rain/ET balance.

Note 2: Due to its normal operation, this product will draw more current from the Vantage Pro™ Console and Weather Envoy™ than in typical use. Davis recommends you use the power adapter provided with your product if you are concerned about battery life.

Software Installation and Setup

Installing the Software

Follow the installation instructions for WeatherLink®. This will also install the configuration software. The install disc contains this program as well as WeatherLink® if you ever need to install the program manually.

Running the Configuration Software

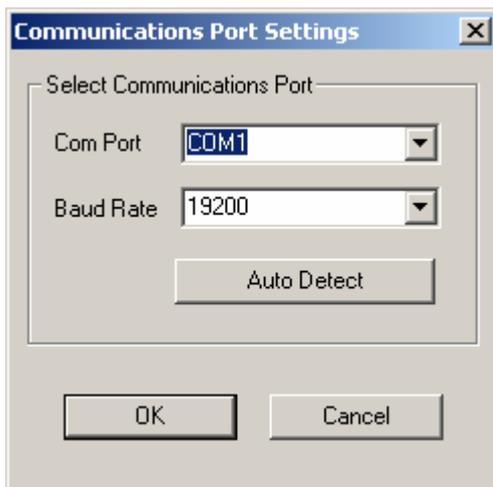
To run the configuration software, double-click on the Streaming Data Utility icon in the Streaming Data Utility directory of the WeatherLink® directory or select the Streaming Data Utility from the Start Menu under the WeatherLink® directory.

Finding the Correct Serial Port

The configuration software includes a procedure for locating the serial port to which your streaming data logger is connected or determining whether that serial port is working.

Note: Using the Auto Detect command in WeatherLink® can help you locate the serial port. The Loopback command will help you determine whether the serial port is functioning. Consult the WeatherLink® for Vantage Pro™ Getting Started Guide and on-line Help files for more information.

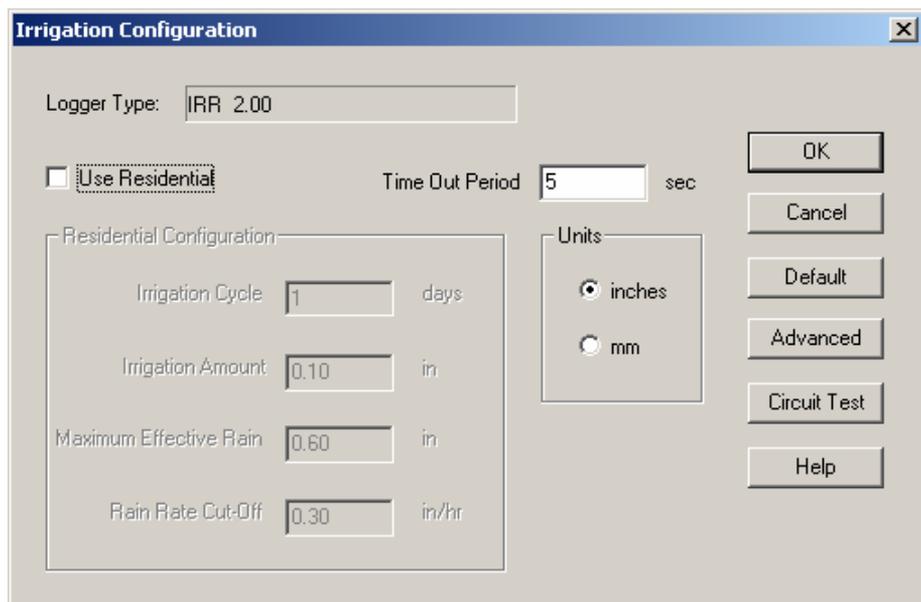
Use the Serial Port Settings dialog box to select the correct COM port and baud rate to communicate to the streaming data logger. The correct baud rate will be the one set in your Vantage Console, and in WeatherLink. The default value is 19200 baud. You may manually set the COM port setting or use the Auto Detect button to automatically find where your streaming data logger is connected.



Note: If you have more than one streaming data logger connected to your system, it is highly recommended that you manually set the com port and baud rate.

Logger Type

The software indicates the logger type and firmware revision level of the streaming data logger in the logger type box.



The screenshot shows a dialog box titled "Irrigation Configuration" with a close button (X) in the top right corner. The dialog contains the following elements:

- Logger Type:** A text box containing "IRR 2.00".
- Use Residential:** A checkbox that is currently unchecked.
- Time Out Period:** A text box containing "5" followed by the unit "sec".
- Residential Configuration:** A group box containing four text boxes:
 - Irrigation Cycle:** "1" days
 - Irrigation Amount:** "0.10" in
 - Maximum Effective Rain:** "0.60" in
 - Rain Rate Cut-Off:** "0.30" in/hr
- Units:** A group box with two radio buttons:
 - inches:** Selected (indicated by a filled circle).
 - mm:** Unselected (indicated by an empty circle).
- Buttons:** A vertical stack of buttons on the right side: "OK", "Cancel", "Default", "Advanced", "Circuit Test", and "Help".

Time Out Period

Normally, the Irrigation data logger will send pulse data to an Automated Irrigation Sprinkler System Controller. However, the Irrigation data logger utilizes a time-out period for ceasing Irrigation functions whenever software attempts to communicate to the logger. The default setting is 5 seconds. You may adjust this value if you wish Irrigation functions to resume sooner or later after communicating to the logger using WeatherLink[®] or the Streaming Data Utility.

Note: Once communications to WeatherLink are initiated and successful, the streaming data logger will be unable to communicate with the Streaming Data Utility until the Time Out Period expires. If you need to communicate to the logger with both the Streaming Data Utility and WeatherLink[®], you should communicate using the Streaming Data Utility first.

Use Residential

Check this dialog box if you choose to use the Irrigation data logger with a Residential Irrigation System Controller to inhibit the watering cycle. This type of sprinkler controller will be what is typically installed by most homeowners and will have inputs for a Common and in many cases a Rain Sensor. See the Installation section below for installation instructions.

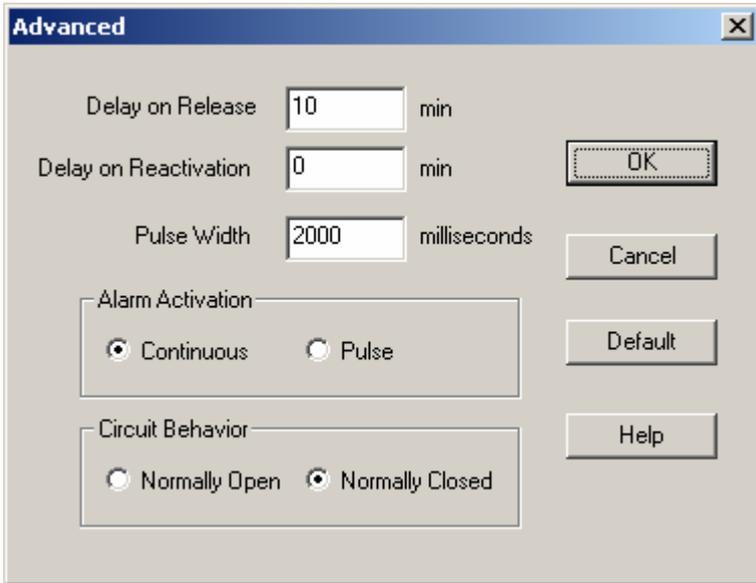
Do NOT check this box if you are using this product in an Industrial application where the controller has inputs for wind, rain and/or ET.

Units

Choose whether you want to enter your Rain and ET values in inches or millimeters. This will not affect how the rain or ET outputs function. The Rain will still output according to the rain collector type and ET will always output every 0.01 inch.

Advanced

The following functions apply to the alarm output:



Delay on Release

Use this function in conjunction with the Alarm output and the Vantage Pro alarms to determine how long to extend the activation time once it is triggered. The default value is 10 minutes.

Delay on Reactivation

Use this function in conjunction with the Alarm output and the Vantage Pro alarms to determine how long to delay the reactivation of an alarm once it is inactive. The default value is zero.

Pulse Width

This function determines the pulse width for any pulse outputs. These outputs include the Rain, ET and Alarm outputs. The default value is 2000 milliseconds (2 seconds). In the case of consecutive pulses, it also

determines the time between pulses. In most cases, there is no need to alter this value unless directed to do so by the Irrigation controller manufacturer.

Alarm Activation

This command determines whether a pulse for alarm activation is continuous throughout the activation time or a one time pulse. The default is continuous activation and is appropriate for most Irrigation controllers. Pulsed relay oriented devices will require the one-time pulse.

Circuit Behavior

This command determines whether the circuit stays open or closed when no alarms are active. The opposite behavior occurs for an active alarm condition. Default is normally closed. Choose normally open if you want the irrigation controller to inhibit the system unless an alarm condition occurs. Choose normally closed if you want the irrigation controller to run its normal cycle unless an alarm condition occurs (This is the most typical operation.).

Circuit Test



Pressing the Circuit Test button puts the Irrigation data logger into Circuit Test mode. In this mode, all other functions of the data logger cease. Do not press this button unless you wish to perform a test because it may disrupt the behavior of your Irrigation system.

This function is used to test the output of the Irrigation logger. Push the button of the output you want to test (Wind, Rain, ET, or Alarm). The button

will be depressed to indicate Closed circuit mode and raised to indicate Open circuit mode. To utilize this function effectively, you will need to connect a device to the appropriate output so that you can tell whether it is turning on or off.

You can connect a voltmeter or continuity tester to the outputs and see if the output changes state (high for closed or low for open). You may also connect your irrigation controller to one or more of the outputs. If you utilize Industrial mode, check to see that the controller receives the data correctly (Rain, ET and/or Wind pulses). If you use Residential mode, put your controller in manual mode and run the sprinklers and check to see that the sprinklers run when the ET circuit is closed and doesn't run when the ET circuit is open. Additionally, if you wire the alarm circuit to the irrigation controller, you can check to see if the sprinklers run with the Alarm circuit closed or fail to run with the Alarm circuit open. When wired in series with the ET function either the ET function or the Alarm function should cause the same behavior when either of the circuits is closed (or open). When wired in parallel, both circuits must be closed (or open) to cause the same behavior.

To leave this mode, simply exit the dialog box by pressing the OK button. You must hit OK in the main dialog box to return the datalogger to its original settings.

Default

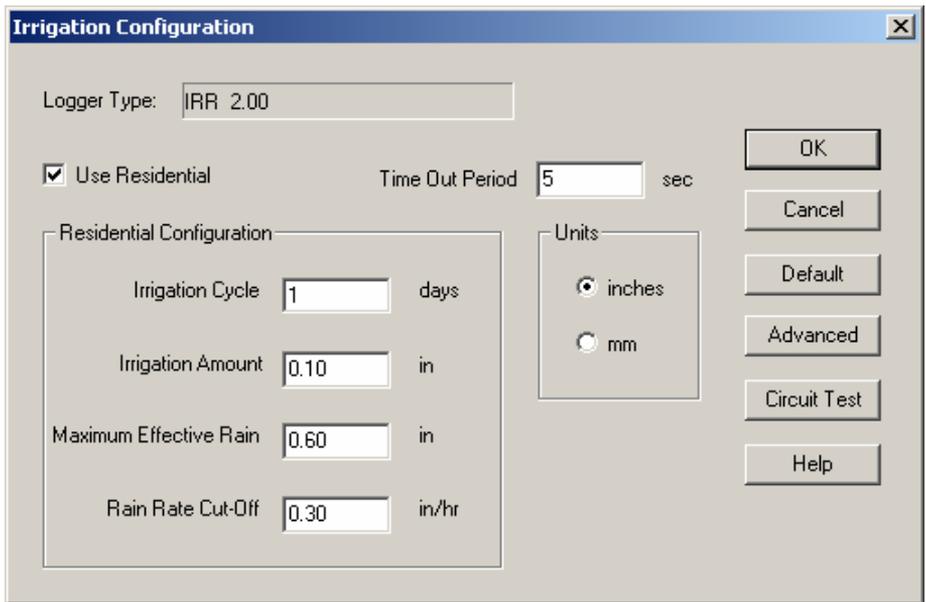
Press this button to restore the data entries to their default values. You must still hit OK to save the settings in the data logger.

Residential Configuration

This function is designed to inhibit the irrigation cycle when sufficient rainfall and/or irrigation has occurred to make up for any ET loss over the past irrigation cycle. In this mode, the Irrigation data logger calculates Rain minus ET every cycle to get the net result, much like balancing a checkbook. In this manner, Rain can be thought of as deposits, and ET as withdrawals. However, unlike a checking account, this number can run negative. In this case, deposits of rain from irrigation need to be entered to make the net balance zero again. The Irrigation Amount you enter into the dialog box (see below) is applied at the end of each cycle when the data logger allows the

irrigation system to run. Positive numbers in the balance indicate more rain and irrigation than ET; negative numbers indicate more ET than rain and irrigation has occurred over the irrigation cycle. If the value is negative, then it indicates that watering needs to occur to make up for the deficit that rainfall has not made up. Please note that this difference only updates once per every cycle, thus there will be a cycle-long delay in the system responding to rain. Also, the irrigation system will be enabled upon power up until the first Irrigation Cycle has completed.

The following functions are only available in the Residential mode with “Use Residential” checked:



Irrigation Cycle

Indicate the length of your entire watering cycle in days. The irrigation data logger determines for the duration of each cycle whether or not to allow the irrigation system to run. The default value is 1 and represents a daily watering cycle. This value is used to determine over what period to calculate the Rain – ET balance. Enter a value of 2, for example, if your watering cycle is every other day. If your schedule is a Monday, Wednesday, Friday schedule, for example, you can either use the most frequent watering interval

of 3 days (Friday – Monday) or a weekly watering period (7 days). Since most ET occurs during the day on a daily basis, using these values will provide the most consistent results with your irrigation system. Your watering cycle should represent the period of time it takes for all your programmed cycles on your irrigation controller to start, finish and then begin again. If you have some circuits on a 2 day cycle, and others on a 3 day cycle, it is recommended that you enter the longest of all the cycles you use. In this case, enter 3 days. Please note that altering this value restarts the cycle.

Irrigation Amount

Enter the amount of water in inches that your Irrigation system puts out during one cycle. The cycle should be defined as recommended in the previous paragraph. Typically, placing several cans around your lawn, and measuring the depth of water in the cans with a ruler will provide you with the Irrigation Amount for that location. Average all the locations to get the number to enter into this dialog box. Since the Vantage Pro™ Console or Weather Envoy™ calculates reference ET over regularly mowed grass, it is best to enter the lawn sprinkler value. Consult your Vantage Pro™ Console or Weather Envoy™ Manual for more information on ET.

Maximum Effective Rain

This function puts a “cap” on the amount of rain that is counted toward the balance between Rain and ET. The amount entered in this dialog box represents the total amount of rain during a 24 hour period that is counted. A value of zero in this dialog box disables this function, so that all rain is counted toward the Rain minus ET balance.

Rain Rate Cutoff

This function can be used to inhibit the irrigation cycle in the case where the ET deficit has not been made up by rainfall, but rainfall is occurring at a high enough rate that the combination of rainfall and irrigation may cause runoff and thus waste water. The default value is 0.30"/hour, which represent a heavy rain rate. Rain rate is an instantaneous calculation. Consult your Vantage Pro™ Console or Weather Envoy™ Manual for more information on Rain Rate. Once this function goes into effect, it inhibits the system until the rain rate reaches zero, which is when it has stopped raining for at least 15

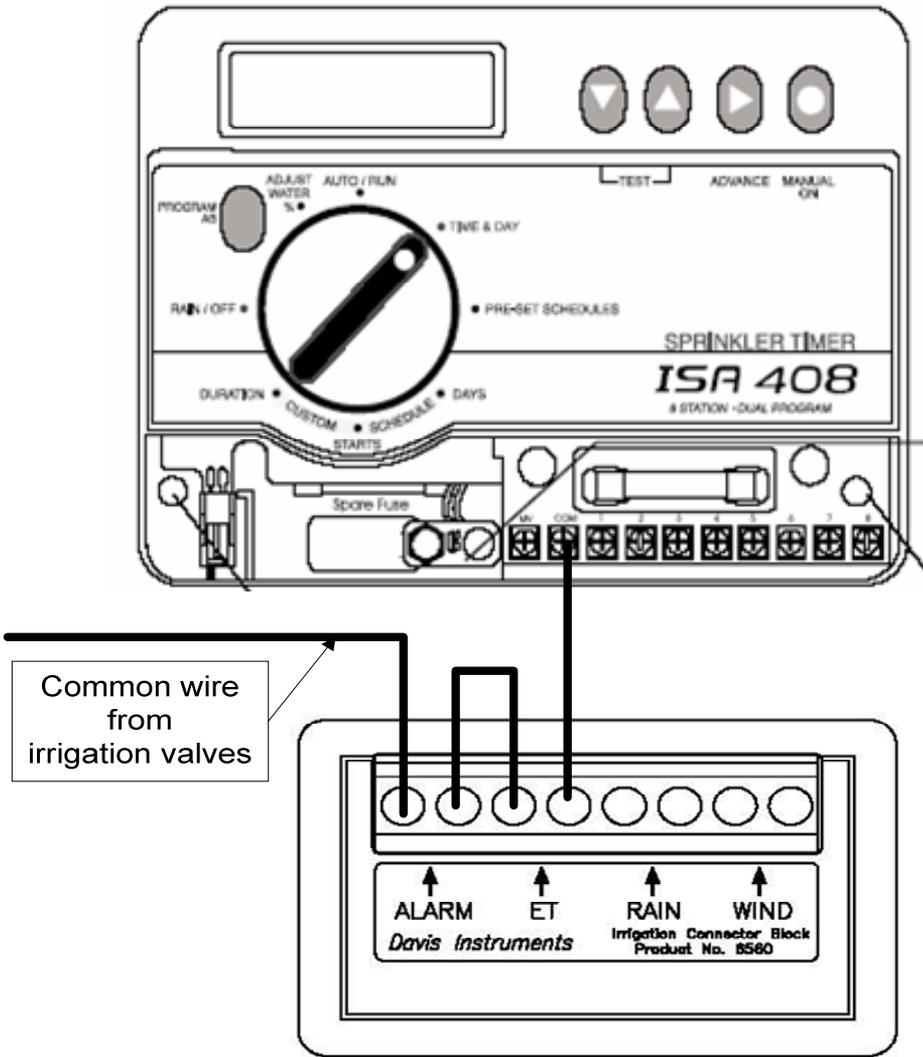
minutes. If you want your irrigation system to immediately stop watering whenever any rain occurs, set the Rain Rate Cut-Off value to 0.01” (0.1 mm) (see below). Note that 0.02” or 0.4 mm of rain must accumulate before a rain rate is calculated.

Irrigation Connector Block Installation

For an Industrial installation, connect the Wind, Rain, and ET connections to the corresponding connections (if available) on the Industrial Irrigation Controller. Consult the Controller’s manual for details. The wind output generates a frequency equal to the wind speed in mph over a 2 second period. Thus, the frequency in Hz is half the wind speed. The rain output generates a pulse for every tip of the rain collector, which will either be 0.01” or 0.2 mm depending upon the rain collector type. Consult your Vantage Pro Console Manual for details. ET output generates a pulse for every 0.01” of ET.

To use the Residential function, connect the ET connection of the irrigation connector block to the Rain Sensor or in series with Common connection on the Irrigation Controller.

To use the Alarm output function, connect the Alarm connection of the irrigation connector block to the Rain Sensor or Common connection on the Sprinkler Controller. This function will work with any properly equipped Irrigation controller even in Residential mode.



Contact Specifications

The “contact” closure is provided by a photo-coupled MOS device. Because it is a solid-state device, it is not subject to arcing and contact-welding as are mechanical relays. However, since it is a solid-state device, it will be damaged by operation beyond its ratings, which are:

Nominal Load Voltage: 28 V AC or 48 V DC, Maximum
Peak Voltage: ± 60 V, Maximum
Load Current: ± 1.8 A, continuous Maximum at 77°F (25°C),
derated to 0.7 A at 185°F (85°C)
ON Resistance: 0.12 Ohm, Maximum

Note: Upon power up (powering the Vantage Pro Console™ or Weather Envoy™), the datalogger will briefly test all four outputs by closing the circuit (turning on the output). It is recommended that you disconnect any equipment attached to the datalogger outputs before rebooting the Vantage Pro Console™ or Weather Envoy™.

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