
Irritrol
SYSTEMS
Smart Dial
WeatherTRAK
IRRITROL SMART DIAL
IRRIGATION SYSTEM CONTROLLER
USER'S GUIDE
MANUAL
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SETUP
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Irritrol® SYSTEMS

# Smart Dial™ Controller
# User's Guide

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## Introduction

Improper irrigation is often the culprit of pale, sparse turf and disease-prone plants. Frequent light watering promotes shallow root growth and increases the plants' susceptibility to disease while decreasing its tolerance to stress conditions. Over-watering saturates the soil, causing runoff which pollutes and endangers our natural watersheds.

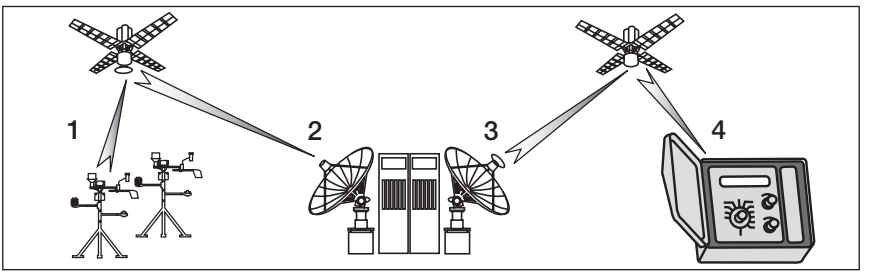
The precise irrigation that you can attain using the Irritrol Smart Dial control system will not only help keep your landscape in top condition and looking it's best, it will save you money by reducing water use to a minimum.

### How the Smart Dial Control System Works

First, you will be guided through a series of steps to enter very specific landscape and irrigation system parameters into the controller memory. The Smart Dial automatically calculates a baseline irrigation program specifically tailored for each station using these parameters.

When the HydroPoint ET Everywhere™ service is enabled, the baseline programs are automatically adjusted each day to compensate for actual conditions using the following process:

1. Across the US each day, a network of weather stations transmits weather data to a NOAA National Weather Service satellite.
2. WeatherTRAK™ collects specific data from the satellite and numerous other weather data collection sources.
3. The weather data is analyzed, converted to ET (evapotranspiration) data and transmitted to the WeatherTRAK wireless network.
4. Location-specific ET data, accurate to less than 1/2-square mile, is broadcast daily to the Smart Dial. The controller uses this data to adjust and optimize the irrigation program of each active station to perfectly match the current soil moisture depletion rate.



## Getting Started

The first step in preparing the Smart Dial for operation is to put aside what you may know about conventional controller programming. Why? Because the Smart Dial takes a much more scientific approach to irrigation scheduling. Do you have to be an agronomist to use the Smart Dial? Absolutely not. The Smart Dial takes care of the "Science" for you.

Conventional controllers schedule irrigation by "Programs" that operate stations on specific days, at specific times for a specific duration. The Smart Dial automatically calculates the exact amount of water needed for each station zone, independent of one another, based on site-specific landscape and irrigation system parameters. So there are no programs to guesstimate. Each station zone receives only the necessary amount of water to replace what's lost each day through natural evaporation and plant transpiration—all automatically.

The true benefits of the Smart Dial precision irrigation control system are realized when the irrigation system design, installation and sprinkler adjustments are correct and operating within the sprinkler manufacturers' specifications. We recommend that you do a thorough operational check of the irrigation system, especially if the Smart Dial is being installed in a retrofit installation where the design, piping, sprinkler type and spacing may be unknown or less than optimal.

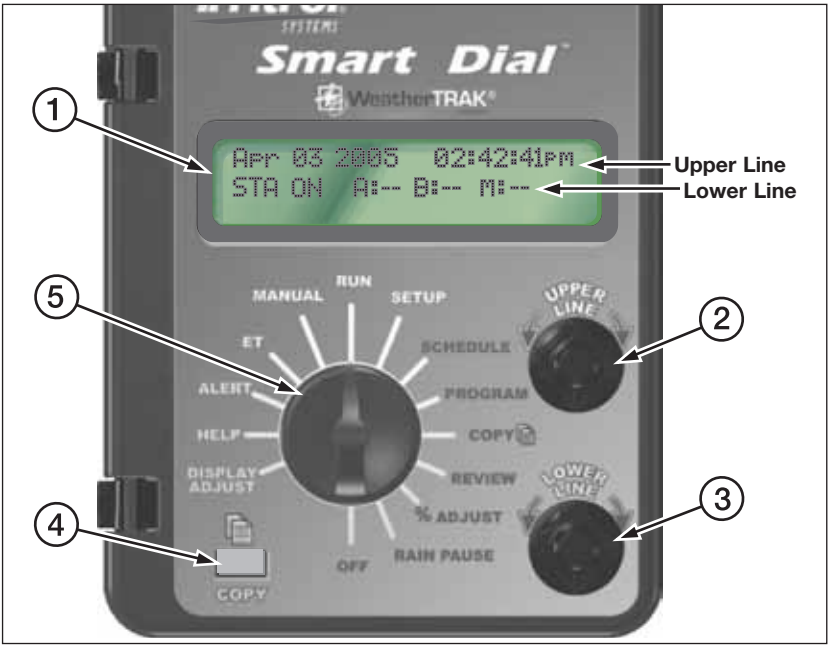
Just as important as system hardware, is the accuracy of the information entered for each station watering zone. The watering routine formulated by the Smart Dial can only be as accurate as the parameters entered for each station.

A Landscape and Irrigation System Profile Worksheet is provided to help you record and organize the information you will need to have on hand to prepare the Smart Dial for operation. Taking the time to complete the form before moving ahead to the actual setup procedures will have the Smart Dial controller up and running in the shortest possible time.

One of the key elements on the worksheet is sprinkler Precipitation Rate (PR). If this information is not known, refer to the Sprinkler Precipitation Rate appendix in this guide to assist in acquiring this important data.

**Note:** Your landscape may go through a reconditioning period with the Smart Dial in control. It will take some time and a phased-in approach to attain an optimal irrigation routine. However, you should begin to see an increase in water savings and landscape vitality within a short time.

## Smart Dial Control Module Components




① **Information Display**
Large, easy-to-read digital display provides text information for controller setup, programming, operation and messaging functions.

② **Upper Line Dial**
Turn this dial left or right to select the menu items that appear on the upper line of the display.

③ **Lower Line Dial**
Turn this dial left or right to change the input data that appears on the lower line of the display

④ **Copy Button**
The Copy button is pressed to execute the copy feature commands.

⑤ **Function Dial**
Turn this dial left or right to select the various controller functions. A brief description of each function follows on page 5. For detailed information, refer to the accompanying page number.

**RUN** (p. 39)
The normal dial position for automatic operation. Current time/date and controller activity is displayed.

**SETUP** (p. 6)
To select and define specific controller setup parameters.

**SCHEDULE** (p. 16)
To select and define the watering day schedule for stations using the Fully Automated program mode.

**PROGRAM** (p. 15)
To enter specific watering program information required for each station.

**COPY** (p. 32)
To transfer programming data from one station to another. Also enables restoration of the Setup, Schedule and Program default settings.

**REVIEW** (p. 34)
To review watering program settings for each station.

**% ADJUST** (p. 36)
To adjust the total applied irrigation to a Fully Automated station zone. Adjustment range: 25% increase to 50% decrease in 5% increments.

**RAIN PAUSE** (p. 41)
To suspend automatic watering for a period of 1 to 14 days.

**OFF** (p. 42)
To terminate and suspend all watering activity.

**DISPLAY ADJ** (p. 50)
To adjust the display screen contrast.

**HELP** (p. 44)
To display various Help Menu items for troubleshooting assistance.

**ALERTS** (p. 42)
To indicate system problems and operational conflicts

**ET** (p. 40)
To display various ET values and adjust plant coefficient (Kc) factors.

**MANUAL** (p. 39)
To manually control station watering operation.

## Setup Procedures

The information entered in the Setup procedures will adapt the Smart Dial for operation in the local environment. The Setup menu items are accessed in the following order:

- ⇩ Set Irrigation Start
- ⇩ Set Water Window
- ⇩ Set High ET Start
- ⇩ Set Clock
- ⇩ Set Time Zone
- ⇩ Auto Daylight Savings?
- ⇩ Set Maximum Active Stations
- ⇩ Serial Number
- ⇩ Phase Integrity
- ⇩ Lock Phase
- ⇩ Microzone
- ⇩ WT Version
- ⇩ Stacking
- ⇩ Set Water District Number
- ⇩ Set Maximum Backup ET
- ⇩ Rain Service Active
- ⇩ Set Zip Code
- ⇩ Set ET Zone Number
- ⇩ Group Number
- ⇩ Radio Antenna

### Set Irrigation Cycle Start Time

The irrigation cycle start time initiates watering for the scheduled day and marks the beginning of the “Water Window” duration.

- Turn the Function dial to **SETUP**.
- Turn the Upper Line dial to select **Set Irrig Start (Hour)**.
- Turn the Lower Line dial to adjust the start time hour (a.m. or p.m.).
- Turn the Upper Line dial to select **Set Irrig Start (Minute)**.
- Turn the Lower Line dial to adjust the start time minute.

  **Note:** The beginning of the watering day is 12:01 a.m. and is therefore the earliest possible irrigation start time.

  **Example:** Irrigation start time set to 1:15 a.m.

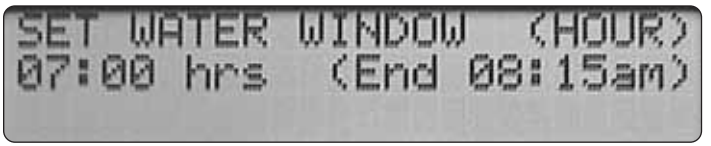
**Set Water Window**

The Water Window is the duration of time allotted for irrigation on a scheduled watering day. The minimum Water Window duration is 6 hours and is adjustable up to 23 hours and 59 minutes. The Water Window end time will be automatically calculated and displayed when the duration is entered.

⚠ **Important: The Water Window duration must enable all scheduled irrigation for the day to be completed. Any scheduled irrigation remaining when the Water Window end time occurs will be carried over to the next scheduled watering day and an "Alert" condition will occur.**

**If the Water Window extends past 12:00 a.m. (midnight) into an unscheduled or restricted watering day, irrigation can occur.**

- Turn the Upper Line dial to select **Set Water Window (Hour)**.
- Turn the Lower Line dial to select hours (6 to 23).
- Turn the Upper Line dial to select **Set Water Window (Minute)**.
- Turn the Lower Line dial to select minutes (0 to 59).
- **Example:** The Water Window duration is set for 7 hours. With a start time set for 1:15 a.m., the resulting end time is 8:15 a.m.




**Set High ET Start**

If the daily calculated ET rate is higher than can be replenished in one run cycle of the scheduled stations, the High ET start time will enable the stations which require additional irrigation to run again in the same day.

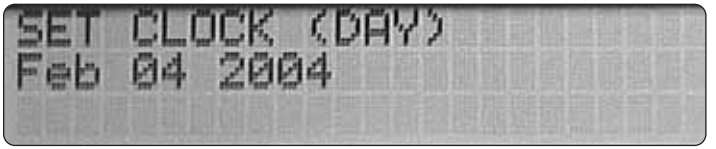
- Turn the Upper Line dial to select **Set High ET Start (Hour**).
- Turn the Lower Line dial to select the start time hour (1 p.m. to 9 p.m.).
- Turn the Upper Line dial to select **Set High ET Start (Minute)**.
- Turn the Lower Line dial to select start time minutes (0 to 59).

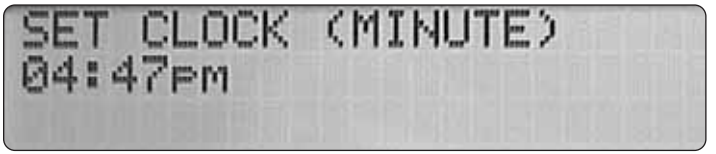
**Example:** High ET start time set for 1:15 p.m.

**Set Clock**

- Turn the Upper Line dial to select **Set Clock (Year)** (or the portion of the current time or date to be set).
- Turn the Lower Line dial to select the the current value.
- Repeat the procedure to set the current Month, Day, Hour and Minute.

**Example:** Date set to February 4th, 2004 and current time is 4:47 p.m.




**Select Time Zone**

The daily ET Everywhere service broadcast updates the controller clock to current Greenwich Mean Time (GMT). The GMT data must be corrected for the local time zone to enable synchronization.

- Turn the Upper Line dial to select **Set Time Zone**.
- Turn the Lower Line dial to select the applicable time zone option menu.

**Example:** Hawaii time zone selected.

**Select Automatic Daylight Savings**

This option enables the controller clock to be automatically adjusted to the Daylight Savings time change.

- Turn the Upper Line dial to select **Auto Daylight Savings?**
- Turn the Lower Line dial to select **Yes** or **No**.

**Example:** Automatic Daylight Savings adjustment option is selected.


**Select Maximum Active Stations**

**⚠ Important: Selecting a higher station count than actual can cause the Water Window duration to be exceeded, resulting in a condition alert. Setting a lower station count than actual will prevent some of the stations from operating.**

- Turn the Upper Line dial to select **Set Max Active Stations**.
- Turn the Lower Line dial to select the current value.

**Example:** The controller is currently using 11 stations.


**View Serial Number**

- Turn the Upper Line dial to select **Serial Number.** Record the number for future reference.

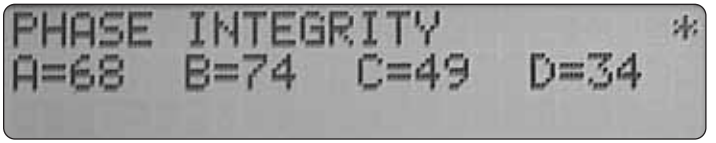
**Example:** The controller serial number is 00000056.

### Phase Integrity

The Phase Integrity display shows the current signal reception strength values of four receiver phases labeled A, B, C and D. This information will be used during the ET Everywhere service activation procedure.

- Turn the Upper Line dial to select **Phase Integrity**.

  **Example:** A typical Phase Integrity screen.




**Note:** If a value of 32 or above is not indicated, install external antenna kit, P/N 102-5581 to increase reception strength.

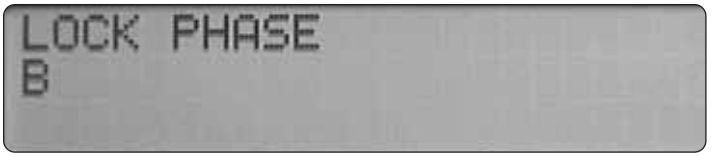
The pulsing star symbol in the upper display corner indicates normal signal-acquisition activity.

### Lock Phase

During the ET Everywhere service activation procedure, the signal phase with the highest integrity value will be used. Once service is established, the controller will scan all phases and automatically lock to the strongest signal.

- Turn the Upper Line dial to select **Lock Phase**.
- Turn the Lower Line dial to select a phase designator.

  **Example:** Receiver locked to Phase B.




### View Microzone Number

The Microzone number is automatically downloaded during the ET Everywhere service activation procedure and displayed for reference only.

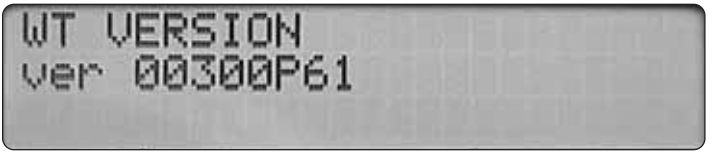
- Turn the Upper Line dial to select **Microzone (8-digit number)**.

  **Example:** Typical Microzone number screen.

**View WeatherTRAK Firmware Version Number**

- Turn the Upper Line dial to select **WT Version**.

  **Example:** Current WeatherTRAK firmware version is 00300P61.




**Select Stacking Option**

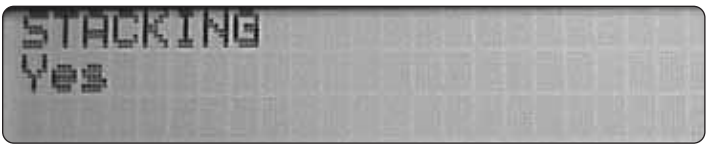
When the Stacking option is enabled, the controller is constrained to run one automatic watering schedule (A or B) at a time. Overlapping station cycle starts are prioritized as follows: Schedule “A” stations followed by schedule “B” stations; number sequence from low to high.

When the Stacking option is not enabled, one station in schedule A and one station in schedule B can operate **concurrently**.

⚠ **Important: Before selecting the “Stacking No” option, ensure the hydraulic capacity of the irrigation system and the controller’s maximum output current will not be exceeded if two stations operate concurrently.**

- Turn the Upper Line dial to select **Stacking**.
- Turn the Lower Line dial to Yes or No.

  **Example:** Stacking option is selected.

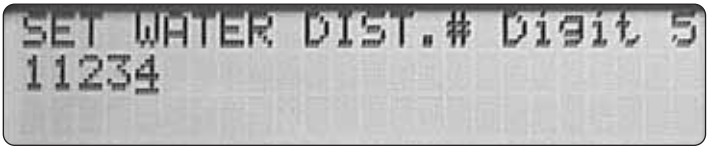


**Set Water District Number**

If the Smart Dial user is a participant in a water agency program, a water district code number will be provided during the ET Everywhere service activation procedure.

- Turn the Upper Line dial to select **Set Water Dist. # Digit 1**.
- A cursor indicates the adjustable digit of the five-digit number. Turn the Upper Line dial as necessary to move the cursor.
- Turn the Lower Line dial to adjust the underlined digit.
- Repeat these steps to enter the assigned number.

**Example:** Water district code number set to 11234.




**Set Maximum Backup ET Value**

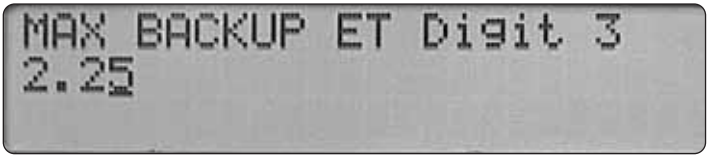
If the Smart Dial fails to receive the ET Everywhere service data, the last broadcast ET data received will be used to calculate the watering cycles. The controller will continue operating in this mode up to four consecutive days, after which the Maximum Backup ET value will be used in the daily watering calculation. A lost communications alert condition will be displayed.

The Backup ET value entered can range from 0.00 to 9.99 and should represent the highest Weekly ET value expected for the year. This data will be automatically adjusted to coincide with the current seasonal ET reference data.

**Note:** For location-specific ET information, contact a local Farm Advisory Service for assistance.

- Turn the Upper Line dial to select **Set Max Backup ET Digit 1**. A cursor indicates the adjustable digit of the three-digit value. Turn the dial as necessary to move the cursor.
- Turn the Lower Line dial to adjust the underlined digit.
- Repeat these steps to enter the maximum Backup ET value.

**Example:** Maximum Backup ET is set to 2.25.



**Select Rain Service Option**

Rain Service is an optional ET Everywhere service feature that enables localized rainfall data to be included in the daily broadcast.

- Turn the Upper Line dial to select **Rain Service Active**.
- Turn the Lower Line dial to select YES (applicable only if activated) or NO.

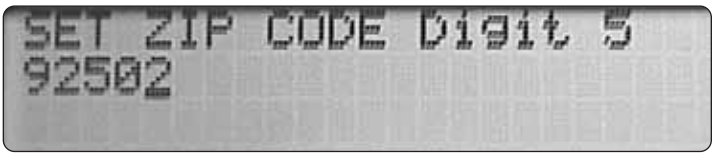
**Example:** Rain Service is not active (default).


**Set ZIP Code**

Entering the ZIP Code of the controller installation site provides a location reference for the ET Everywhere service.

- Turn the Upper Line dial to select **Set Zip Code Digit 1**.
  A cursor indicates the adjustable digit of a five-digit number.
  Turn the dial as necessary to move the cursor.
- Turn the Lower Line dial to adjust the underlined digit.
- Repeat these steps to enter the number.

**Example:** ZIP Code set to 92502.




**Set ET Zone Number**

If required, an ET Zone number will be provided during the ET Everywhere service activation process.

- Turn the Upper Line dial to select **Set ET Zone # Digit 1**.
  A cursor indicates the adjustable digit of a five-digit value.
  Turn the dial as necessary to move the cursor.
- Turn the Lower Line dial to adjust the underlined digit.
- Repeat these steps to enter the number.

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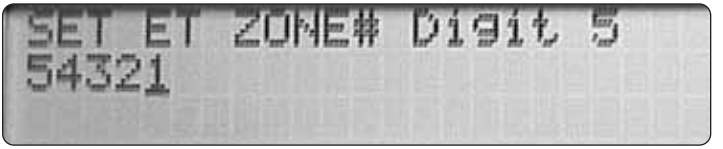
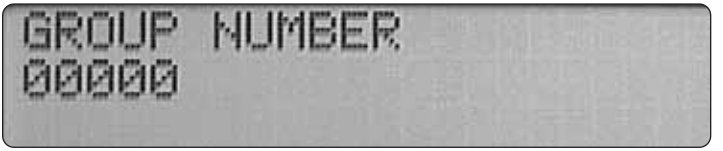
**Example:** ET zone number set to 54321.




### View Group Number

If the Smart Dial user is a participant in a water agency program, a Group number will be downloaded during the ET Everywhere service activation process. The Group number will enable the Smart Dial to be automatically notified of specific water agency requirements.

**Example:** The default Group number is 00000.




### Select Radio Antenna Option

The Smart Dial utilizes a built-in radio antenna for reception of the ET Everywhere service broadcast signal. During the service activation process, signal reception strength is tested. If the reception is marginal, an external antenna may be required.

Order the antenna kit, P/N 102-5581, from your local Irritrol distributor.

- Turn the Upper Line dial to select **Radio Antenna.**
- Turn the Lower Line dial to select Internal or External antenna.

**Example:** The default radio antenna selection is Internal.


**Note:** This completes the controller setup procedure.
Continue at “Station Programming Procedures” on page 15.

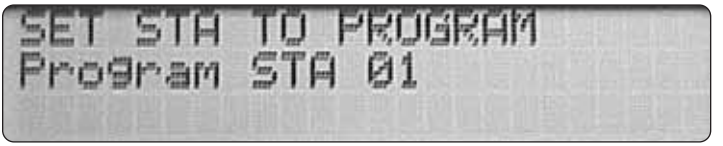
## Station Programming Procedures

### Select the Station to be Programmed

- Turn the Function dial to **PROGRAM**. By default, **Set Sta To Program Program Sta (01)** will be displayed.
- To change the station number, turn the Lower Line dial.

  **Note:** Station number access is limited to the number of active stations entered in the “Select Maximum Active Stations” procedure on page 9.

  **Example:** Station 01 is selected for programming.




### Select the Station Operating Mode

For each active station, one of four operating modes can be selected. The “Fully Automated” mode is assigned by default. In this mode, the station watering routine is defined by the Smart Dial based on very specific station parameters. The routine is updated daily by the ET Everywhere service. To use an alternate mode, continue at a procedure heading and corresponding page number as follows:

**User Programmed – ET Everywhere Service Active** – The station watering routine is defined by the user and updated daily by the ET Everywhere service (page 26).

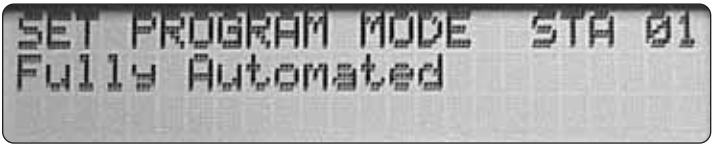
**User Programmed – ET Everywhere Service Inactive** – The station watering routine is defined by the user and the ET Everywhere service is not utilized (page 31).

**Station Operation Off** – To prevent station operation (page 32).

#### ❑ Fully Automated Mode

- Turn the Upper Line dial to select **Set Program Mode Sta (01)**.

  **Example:** Fully Automated Mode (default) selected for Station 1.

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**Define the Automatic Watering Day Schedule**

The Fully Automated program mode requires a watering day schedule to determine which days are eligible for irrigation.

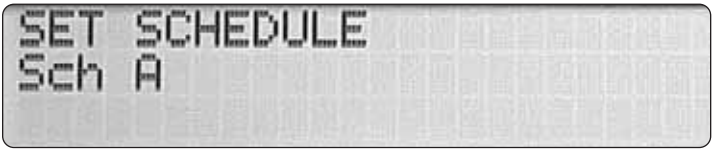
**Note:** If the daily ET calculation determines that watering is not required for a scheduled day, watering will not occur. Automatic watering will never occur on an unscheduled or restricted day.

Two separate watering day schedules (A and B) can be defined. The station is then assigned to either schedule A or B.

**Select the Schedule to Define**

- Turn the Function dial to **SCHEDULE**. By default, schedule A is selected.
- To select schedule B, turn the Lower Line dial to display **Sch B**.

  **Example:** Schedule A selected.




**Select the Schedule Format**

For each watering day schedule, one of four formats can be used. "Automated by WeatherTrak" is assigned by default. Using this format makes all days eligible (unless otherwise specified) then selects days based on daily ET requirements.

Continue at **Automated by WeatherTRAK Schedule** below, or select one of the following schedule formats and continue at the corresponding page.

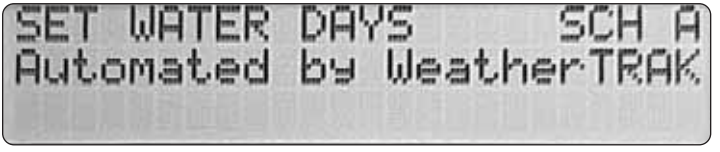
**Odd/Even Day Schedule** (page 17).

**Day Interval Schedule** (page 18).

**Days-of-Week Schedule** (page 19).

❑ **Automated by WeatherTRAK Schedule**

- Turn the Upper Line dial to select **Set Water Days SCH A (or B) Automated by WeatherTRAK** as shown in the example below.

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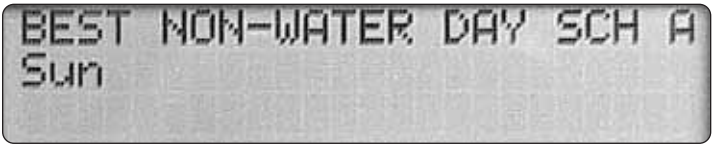
A feature of this schedule format enables one day of the week to be restricted from watering. To utilize this feature:

- Turn the Upper Line dial to select **Best Non-Water Day Sch A (or B)**.
- Turn the Lower Line dial to select a specific day of the week to restrict watering, or None if no restricted days are required.

**Example:** Sunday selected as a restricted day.

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❑ **Odd/Even Day Schedule**

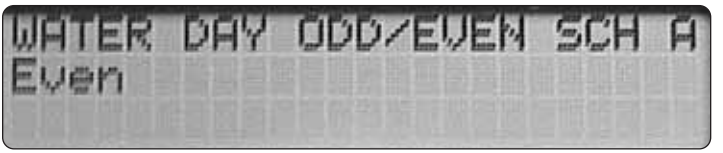
This format schedules all odd-or all even-number calendar days.

- Turn the Upper Line dial to select **Set Water Days SCH A (or B) Automated by WeatherTRAK**.
- Turn the Lower Line dial to select **Odd/Even**.

**Example:** Odd/Even watering day schedule selected.


- Turn the Upper Line dial to select **Water Day Odd/Even Sch (Odd)**.
- To select Even, turn the Lower Line knob to display **Even**.

**Example:** An Even watering day format is selected for Schedule A.




**Note:** When using the Odd number day schedule, two consecutive watering days will occur at the end of months with 31 days.

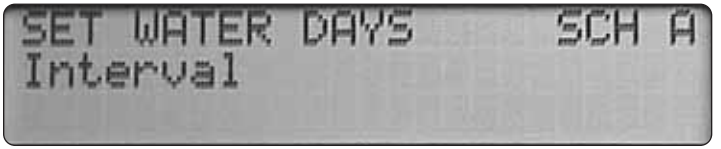
(CONTINUE ON PAGE 20)

### ❑ Interval Day Schedule

The Interval format provides a periodic watering day schedule ranging from 01 (every day) to 31 (every-31st day) in one-day increments. For example, a 02 interval schedules a watering day followed by one day off, or watering every other day. A 06 interval schedules a watering day followed by five days off, and so on up to 31.

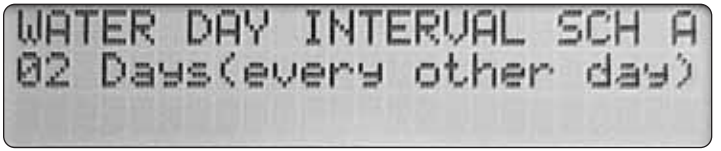
- Turn the Upper Line dial to select **Set Water Days SCH A (or B) Automated by WeatherTRAK**.
- Turn the Lower Line dial to select **Interval**.

  **Example:** Interval watering day schedule selected for Schedule A.



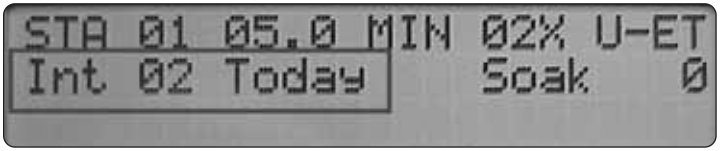

- Turn the Upper Line dial to select the desired Interval number (01–31).

  **Example:** A two-day (02) interval is selected for Schedule A.




  **Note:** When the function dial is turned to the REVIEW position, the number of days remaining until the next scheduled watering day in the interval schedule will be displayed.

  **Example:** A two-day interval is selected and the next scheduled watering day is today.



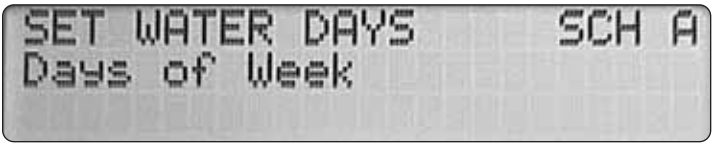

(CONTINUE ON PAGE 20)

❑ **Days-of-Week Schedule**

This watering day format enables each day of the week (per month) to be included or excluded from the schedule.

- Turn the Upper Line dial to select **Set Water Days SCH A (or B) Automated by WeatherTRAK** (default).
- Turn the Lower Line dial to select **Set Water Days Sch A (or B) Days of Week**.

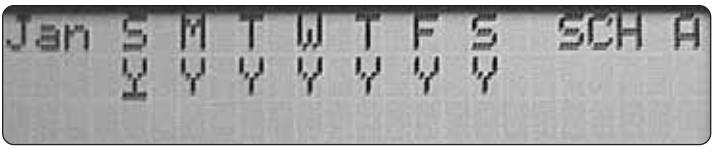
  **Example:** Watering by days of the week format selected for Schedule A.




- Turn the Upper Line dial to display the days of the week by month. The cursor will underline the letter Y (Yes) below the letter S (Sunday).

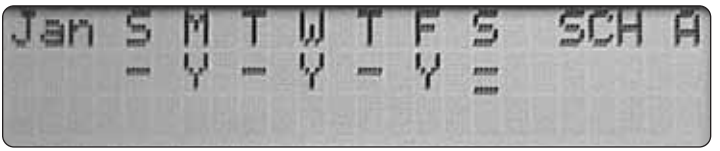
  **Note:** By default, all days of all months are selected as active (Y).

  **Example:** January is selected and watering can occur every day.




- To remove specific days of the week from the watering schedule, turn the Upper Line dial to position the cursor under the day abbreviation. Turn the Lower Line dial once to replace the letter Y with a dash (inactive).

  **Example:** In January, watering is set for Monday, Wednesday and Friday.




  **Note:** Moving the cursor past the last day of the week will advance the display to the next month.

- Repeat this procedure for each month.

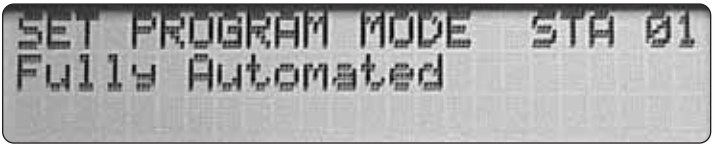
**(**CONTINUE ON PAGE 20**)**

**Note:** If you have not completed the System Profile Worksheet, take time to do so before proceeding. Having the necessary information on hand to complete the following procedures will be very helpful.

To establish an accurate ET profile, the following parameters must be entered for each active station:

- ✔ Sprinkler type
- ✔ Soil type
- ✔ Plant type
- ✔ Root depth
- ✔ Microclimate
- ✔ Precipitation rate
- ✔ Efficiency factor
- ✔ Slope %
- ✔ Location on slope

• Turn the Upper Line dial to select **Set Program Mode Sta (01) Fully Automated** (default). See example below.




**Select Water Day Schedule A or B**

• Turn the Upper Line dial to select **Set Schedule Sta (01) Sch A** (default).

• To select Schedule B, turn the Lower Line dial to display **Sch B**.

**Example:** Schedule A is selected.

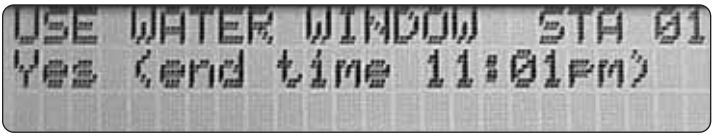

**Select Water Window Usage**

Selecting “Yes” will constrain station operation to occur within the set Water Window time period. Selecting “No” enables the station to operate at any time during a scheduled watering day.

• Turn the Upper Line dial to select **Use Water Window Sta (01) Yes (end time [computed])** (default).

• To select No, turn the Lower Line dial.

**Example:** Water Window use option elected.



**Select Sprinkler Type**

- Turn the Upper Line dial to select **Set Sprinkler Type Sta 01 Spray Head** (default).
- Turn the Lower Line dial to select the sprinkler type from the following menu:

| | |
|---|---|
| ◊ Spray Head (fixed) | ◊ Mixed Impacts |
| ◊ Full-circle Rotor | ◊ Steam Rotors |
| ◊ Part-circle Rotor | ◊ Bubbler |
| ◊ Mixed Rotors | ◊ Drip Emitter |
| ◊ Full-circle Impact | ◊ Stream Spray |
| ◊ Part-circle Impact | |

**Example:** Mixed Rotors selected for station 01.

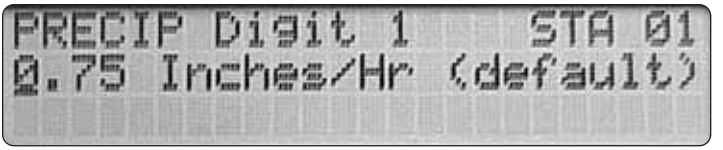

**Set Precipitation Rate**

**Note:** The Precipitation Rate (PR) default value for each sprinkler type can be used to establish a baseline watering program routine. To determine site-specific sprinkler PR values, refer to Appendix A: Acquiring Sprinkler Precipitation Rate on page 51.

The sprinkler PR value can be set from 0.10 to 9.99 inches per hour.

- Turn the Upper Line dial to select **Precip Digit 1 Sta (01)**.
- Turn the Lower Line dial to adjust the first digit.
- Turn the Upper Line dial to select digit 2.
- Repeat this procedure to adjust the second and third digits.

**Example:** The PR entered is 0.75 inches per hour (default).



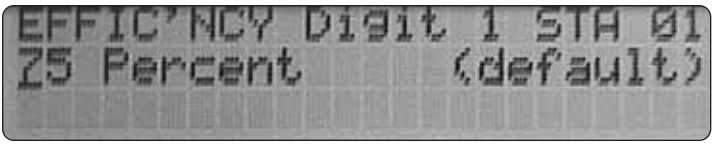
### Set Sprinkler Efficiency Rate

**Note:** The published Efficiency Rate for the selected sprinkler type is displayed as the default value. Using the default value is recommended if the actual Efficiency Rate is not known at this time. The default Efficiency Rate can be adjusted to fine-tune the watering program as follows:
To decrease watering, increase the Efficiency Rate. Conversely, to increase watering, decrease the Efficiency Rate.

The Efficiency Rate value is adjustable from 10–99%.

- Turn the Upper Line dial to select **Effic'ncy Digit 1 Sta (01) 75 Percent**.
- Turn the Lower Line dial to adjust the first digit.
- Turn the Upper Line dial to select the second digit with the cursor.
- Turn the Lower Line dial to adjust the second digit.

**Example:** The default efficiency rate value for the sprinklers controlled by station 01 is 75%.

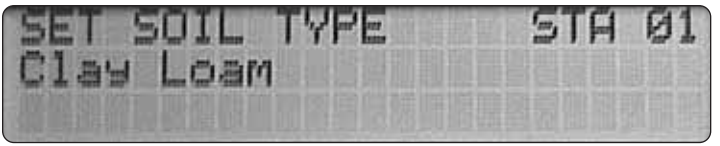



### Select Soil Type

- Turn the Upper Line dial to select **Select Soil Type Sta (01)**.
- Turn the Lower Line dial to make a selection from the following menu:

⇩ Sandy ⇩ Clay Loam
⇩ Sandy Loam ⇩ Clay
⇩ Loam

**Example:** The soil type selected for station 01 is Clay Loam.



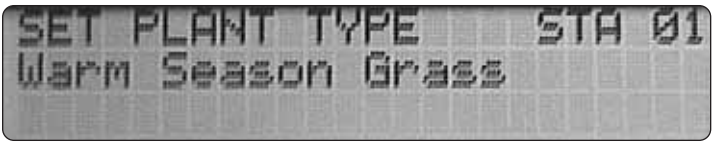
**Select Plant Type**

**Note:** For hybrid turf or plant applications, select the Custom Plant A, B or Turf option.

- Turn the Upper Line dial to select **Select Plant Type Sta (01)**.
- Turn the Lower Line dial to make a selection from the following menu:

⇩ Warm Season Grass
⇩ Combined Grass
⇩ Flowers
⇩ Trees
⇩ Shrubs - High Water Use
⇩ Shrubs - Medium Water Use
⇩ Shrubs - Low Water Use
⇩ Mixed - High Water Use
⇩ Mixed - Medium Water Use
⇩ Mixed - Low Water Use
⇩ Native Trees/Shrubs
⇩ Native Grasses
⇩ Custom Plant A
⇩ Custom Plant B
⇩ Custom Turf

**Example:** The plant type selected for station 01 is “Warm Season Grass.”




**Select Root Depth**

**Note:** The Smart Dial uses a soil moisture depletion model to determine the irrigation requirements for each watering zone. A longer root depth value increases the number of days between watering. Conversely, a shorter root depth value decreases the number of days between watering. Select a root depth value from 2 to 36 inches.

- Turn the Upper Line dial to select **Select Root Depth Sta (01)**.
- Turn the Lower Line dial to select root depth from 2–36 inches.

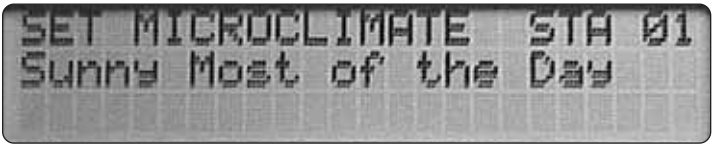
**Example:** The root depth entered for station 01 is 6 inches.

**Select Microclimate**

Select the microclimate that best describes the major portion of the watering zone.

- Turn the Upper Line dial to select **Set Microclimate Sta 01**.
- Turn the Lower Line dial to make a selection from the following menu:
  - ⇩ Sunny All Day
  - ⇩ Sunny Most of the Day
  - ⇩ Shady Most of the Day
  - ⇩ Shady All Day

**Example:** The microclimate selected for station 01 is "Sunny Most of the Day."




**Select Slope % Factor**

Select the slope factor or gradient that best describes the major portion of the watering zone.

- Turn the Upper Line dial to select **Set Slope Factor Sta 01**.
- Turn the Lower Line dial to select a slope factor from the following menu:
  - ⇩ Gentle: 6–8% (16.6:1–12.5:1) Grade (6%)
  - ⇩ Mild: 9–12% (11.1–8.3:1) Grade (9%)
  - ⇩ Moderate: 13–20% (7.7:1–5:1) Grade (13%)
  - ⇩ Steep: > 20%+ (> 5:1) Grade (20%)

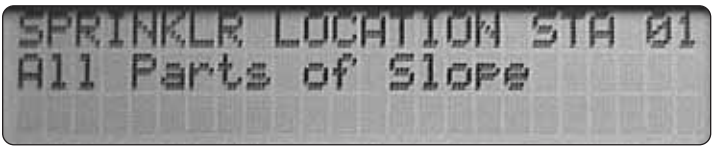
**Example:** The slope factor selected for station 01 is "Gentle 6–8% Grade."

**Select Sprinkler Location on Slope**

Select the location on the slope that best describes sprinkler placement.

- Turn the Upper Line dial to select **Sprinkler Location Sta (01)**.
- Turn the Lower Line dial make a from the following menu:
  - ⇩ All Parts of Slope
  - ⇩ Top of Slope
  - ⇩ Middle of Slope
  - ⇩ Bottom of Slope

**Example:** The slope factor selected for station 01 is “All Parts of Slope.”




**Set Usable Rainfall % Factor (optional)**

Setting a rainfall effectivity % factor is available when the Rain Service option is enabled. The usable rainfall % value is the percentage of rainfall expected to reach the plant root zone. Enter a value from 0 to 100%. If the service is not activated, “Inactive” will be displayed.

- Turn the Upper Line dial to select **Usable Rainfall Sta (01)**.
- Turn the Lower Line dial to select a percentage value from 0–100% (in 25% increments).

**Example:** Usable Rainfall feature is inactive.

**Completing the Program**

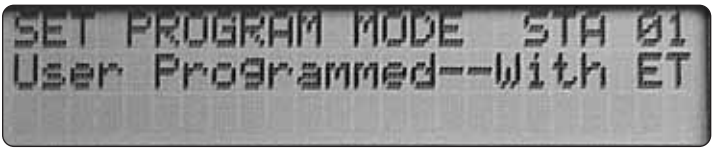
- Turn the Upper Line dial to select **Program Complete Sta (01)**.
- Repeat the programming procedure as required for each station, starting on page 15.

⚠ **Important: If other stations have the same or similar watering routine attributes, the Copy feature enables all program attributes of one station to be easily transferred to any or all other active stations and edited as necessary; greatly simplifying the programming procedure. See "Copy" on page 32 for detailed information.**

❑ **User Programmed–ET Service Active Mode**

In this program mode, you will establish a baseline or target watering routine for the station by defining four specific operating parameters. The routine is then automatically updated and modified as necessary each day using ET data received from the ET Everywhere service broadcast.

- Turn the Upper Line dial to select set **Program Mode Sta (01**) **Fully Automated** (default).
- Turn the Lower Line dial to select **Set Program Mode STA (01**) **User Programmed – – with ET**. See example below.




The operating parameters are listed in the following menu order:

⇩ Set Cycle Time

⇩ Set Number of Cycles

⇩ Set Soak Time

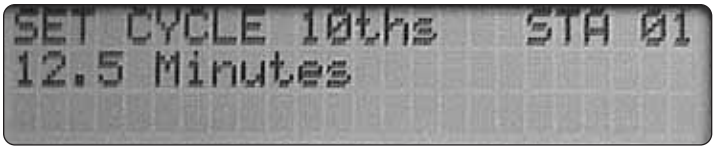
⇩ Set Watering Day Schedule

**Set Cycle Time**

Cycle Time is the duration of time a station operates during a watering cycle. Enter a value from 0.1 to 99.9 minutes.

- Turn the Upper Line dial to select **Set Cycle Time Sta (01) 05.0 Minutes** (default).
- Turn the Lower Line dial to select the minutes value (0–99).
- Turn the Upper Line dial to select **Set Cycle 10ths**.
- Turn the Lower Line dial to select the 10ths of a minute value (1–9).

**Example:** Cycle Time is set for 12.5 minutes.

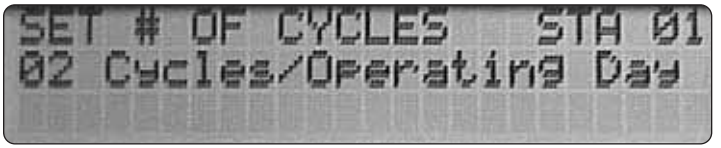



**Select Number of Cycles**

This program element sets the number of times the station will run on a scheduled watering day. Select 1 to 20 cycles.

- Turn the Upper Line dial to select **Set # Of Cycles Sta (01) 01 Cycles/Operating Day** (default).
- Turn the Lower Line dial to select the value (1–20).

**Example:** Two watering cycles per scheduled operating day have been selected for station 01.



**Set Soak Time**

Soak Time is a delay period that occurs between station watering cycles. The delay enables the water from a one run cycle to soak into the root zone before the next cycle begins. The Soak Time value is adjustable from 10 to 480 minutes (8 hours) in 10-minute increments.

- Turn the Upper Line dial to select **Set Soak Time Sta (01) 30 Minutes** (default).
- Turn the Lower Line dial to select the minutes value (10–480).

**Example:** Soak time for station 01 is set for 50 minutes.


**Set Watering Day Schedule**

The watering day schedule determines which days of the year will be eligible for watering. **"**Let Me Set Water Days" is the default format that enables each day of the year to be scheduled as eligible or ineligible for watering operation.

To use an alternate scheduling method, continue at a procedure heading and corresponding page number as follows:

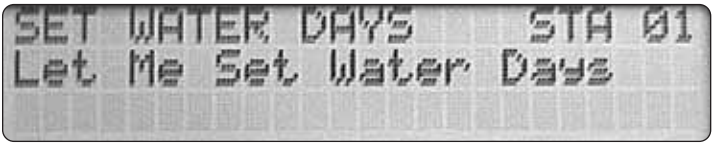
**Water 7 Days Per Week** – Every day eligible for operation (page 29).

**Set Water Day Interval** – Eligible water day routine set according to how often watering can occur (page 30).

❑ **Let Me Set Water Days**

- Turn the Upper Line dial to select **Set Water Days Sta 01 Let Me Set Water Days** (default).

**Example:** Let Me Set Water Days format selected.

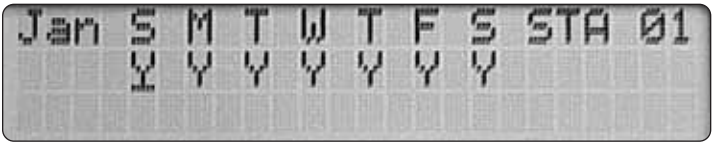



(CONTINUED)

• Turn the Upper Line dial to display the days of the week by month. The cursor will underline the letter Y (Yes) below the letter S (Sunday).

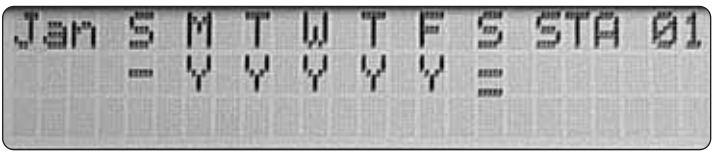
**Note:** By default, all days of all months are selected as active (indicated by the letter Y).

**Example:** Jan (January) is selected and watering can occur every day.




• To remove specific days of the week from the watering schedule, turn the Upper Line dial to position the cursor under the day abbreviation. Turn the Lower Line dial once to replace the letter Y with a dash (inactive).

**Example:** In January, every Sunday and Saturday are excluded from watering.




**Note:** Moving the cursor past the last day of the week will advance the display to the next month.

• Repeat this procedure for each month.

• Proceed to “Completing the Program” on page 31.

❑ **Water 7 Days Per Week**

• Turn the Upper Line dial to select **Set Water Days Sta (01) Let Me Set Water Days** (default).

• Turn the Lower Line dial to select **Set Water Days Sta (01) Water 7 Days Per Week** as shown below.

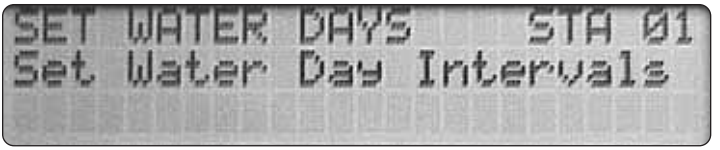

• Proceed to “Completing the Program” on page 31.

❑ **Set Water Day Interval**

The Interval format enables a you to select a periodic water day schedule ranging from 01 (every day) to 31 (every 31st day) in one-day increments. For example, a 02 interval schedules one watering day followed by one day off, or watering every other day. A 06 interval schedules one watering day followed by five days off, and so on up to 31.

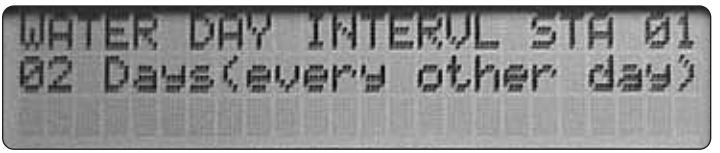
**Note:** The first day of an Interval schedule is today. Watering can occur today if the irrigation start time and water window end time have not yet occurred. When the function dial is in the RUN position, the number of days remaining before the next scheduled watering day will be displayed.

- Turn the Upper Line dial to select **Set Water Days Sta (01) Let Me Set Water Days** (default).
- Turn the Lower Line dial to select **Set Water Days Sta (01) Set Water Day Interval** as shown below.




- Turn the Upper Line dial to select **Set Water Days Sta (01) 01 Day (water every day)** (default).
- Turn the Lower Line dial to change the Interval number (01–31).

**Example:** A 2-day or every-other-day Interval is set for Station 01.



**Completing the Program**

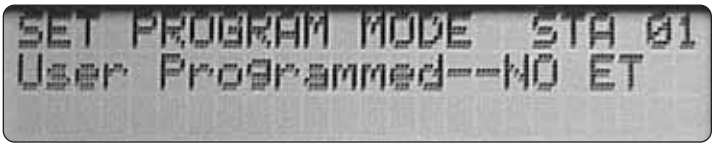
- Turn the Upper Line dial to select **Program Complete Sta (01)**.
- Repeat the programming procedure as required for each station, starting on page 15.

**⚠ Important: If other stations have the same or similar watering routine attributes, the Copy feature enables all program attributes of one station to be easily transferred to any or all other active stations and edited as necessary; greatly simplifying the programming procedure. See "Copy" on page 32 for detailed information.**

**❑ User Programmed–ET Service Inactive Mode**

**⚠ Important: The program values entered for this program mode are the same as the "User Program-ET Service Active" mode. However, all programming values entered will remain constant.**

- Turn the Upper Line dial to select **Set Program Mode Sta (01) Fully Automated** (default).
- Turn the Lower Line dial to select **Set Program Mode Sta (01) User Programmed – – NO ET**. See example below.

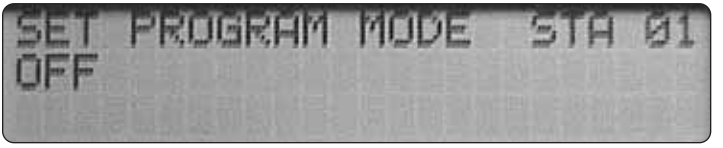



- Refer to **"User Programmed – ET Service Active Mode" on** page 26. Begin the programming procedure on page 27 at **"Set Cycle Time."**

❑ **Station Program Off Mode**

The Station Program Off mode enables any station to be made inactive without altering or changing any of its attributes.

- Turn the Upper Line dial to select **Set Program Mode Sta (01)**. "**Fully Automated**" mode will be selected by default.
- Turn the Lower Line dial to select **Set Program Mode Sta (01)**) **OFF**.




- Repeat this procedure to turn off additional stations as needed.

**Note:** To return a station to active status, simply assign any operational program mode.

## Control Features

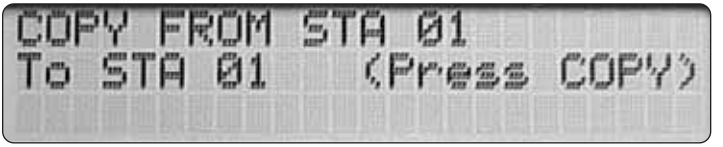
## Copy

The Copy feature enables you to transfer station program values quickly from one station to another or to all active stations simultaneously.

**Copy from Station to Station(s)**

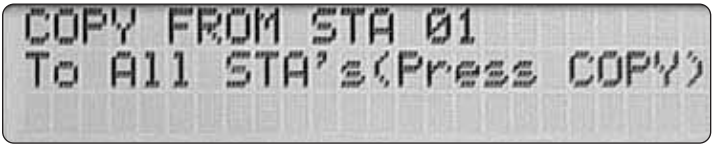
- Turn the Function Dial to **COPY**.

  **Example:** The display will show **Copy from Sta 01 to Sta 01 (Press Copy)**.



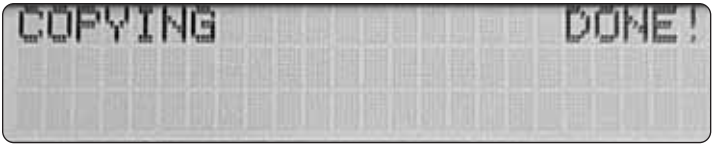

- Turn the Upper Line Dial to select the station number to copy **from**.
- Turn the Lower Line Dial to select the station number or "All Stations" (listed after the highest active station number) to copy **to**.

  **Example:** Station 01 data will be copied to all stations.




(CONTINUED)

• Press and hold the **COPY** button until **Copying Done!** is displayed.



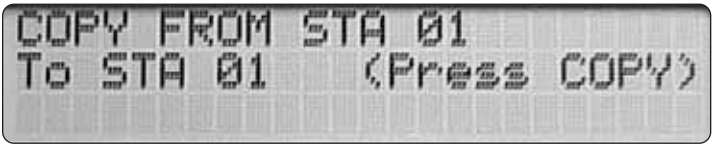

**Restore Controller Default Values**

The Copy feature also enables the controller default values for Program, Setup and Schedule to be easily restored when replacement of the current user-input values is desired.

The Program defaults can be restored to individual stations or to all active stations simultaneously.

Restore Program Defaults

• Turn the Function Dial to **COPY**. The display will show **Copy From STA 01 To STA (01)** as shown in the example below.

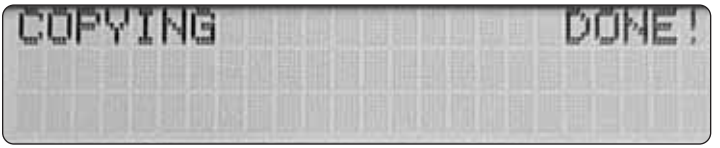



• Turn the Upper Line Dial to select **Copy Program Defaults**.

• Turn the Lower Line Dial to select an individual station number or all active stations to restore the default value.

**Example:** Program default values will be restored to all active stations.

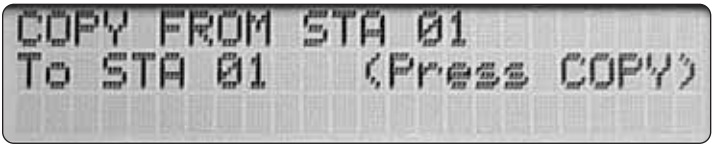

• Press and hold the **COPY** button until the **Copying Done!** is displayed.



### Restore Schedule or Setup Defaults

**Note:** The Schedule and Setup default values are restored to all active stations simultaneously.

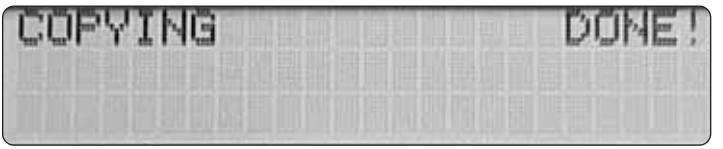
- Turn the Function Dial to **COPY**. The display will show **Copy From Sta (01) To Sta (01)** as shown below.




- Turn the Upper Line Dial to select **Copy Schedule Defaults** or **Copy Setup Defaults**.

  **Example:** The Schedule default values are selected.


- Press and hold the **COPY** button until the **Copying Done!** is displayed.




## Review Feature

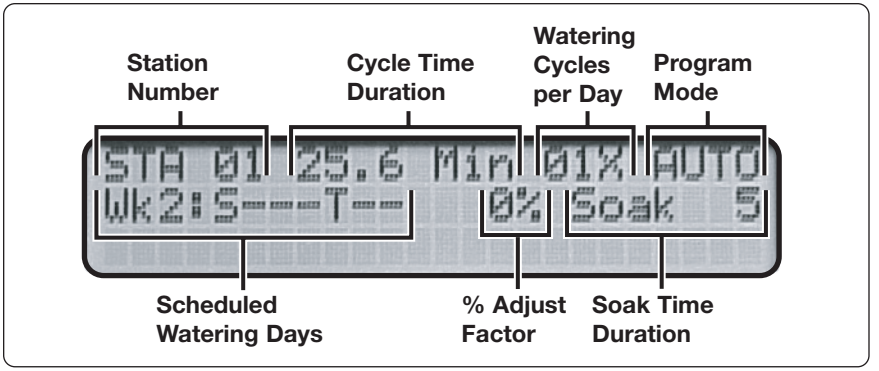
The Review feature provides a convenient, at-a-glance overview of the current watering day schedule and program values for each station.

The review information is displayed in an abbreviated format that enables all pertinent station information to be viewed on a single screen.

- Turn the Function Dial to **REVIEW**. The review screen for station 01 will be displayed.
- Turn the Upper Line Line to select the station number to be reviewed.

(CONTINUED)

**Example:** The illustration below depicts a typical review screen. The format will vary slightly by displaying information that pertains specifically to the station being reviewed.

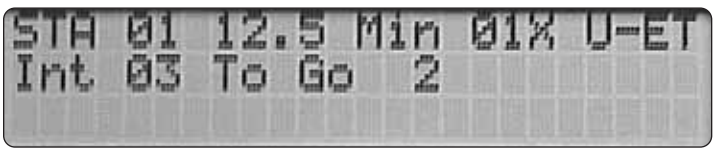



In the example above, Station 01 cycle time is 25.6 minutes, one time per day and is assigned to the “Fully Automated” program mode. If the assigned program mode is “User Programmed-With ET Service Active” “U–ET” will be displayed. “U–NO” will be displayed if the “User Programmed –With ET Service Inactive” program mode is used.

The scheduled watering days for week 2 of an 8-week schedule are Sunday and Thursday. The station run time has a 0% adjustment factor and a 5 minute soak time.

If an Interval watering day schedule is assigned, the Interval number (01–31) and the number of days remaining until the next active watering day will be displayed.

**Example:** The review screen below indicates Station 01 is assigned to the “User Programmed with ET Service Active” (U–ET) program mode. Watering days are scheduled on a 3-day (03) Interval with two days remaining until the next eligible watering day.



## % Adjust Feature

The % Adjust feature provides a convenient method of fine-tuning station watering zones that are slightly dryer or wetter than optimum. The sum watering of any Fully Automated station can be increased 5 to 25% or decreased 5 to 50% in 5% increments. All factors that determine how much irrigation time the station receives are instantly recalculated and adjusted.

**Note:** This feature applies only to stations using the “Fully Automated” program mode. “Non-Adjustable Mode” will be displayed for any station(s) using a ”User Programmed” mode.

**Note:** Using the Review feature in conjunction with % Adjust provides a convenient reference of actual station operating values before and after the calculated adjustments.

- Turn the Function Dial to **REVIEW**. The display will show all current operating control values for station 01.
- Turn the Upper Line dial to change the station number as needed.

  **Note:** The Review screen shows only future days scheduled to water. Therefore, reviewing Week 2 is recommended to ensure all scheduled watering days of the week are displayed.
- Turn the Lower Line dial to select Week 2 watering day schedule.

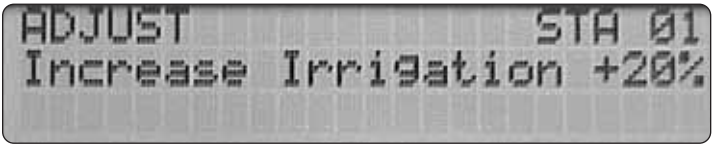
  **Example:** Station 01 is currently set to run for 25.6 minutes, one time per day on Tuesday and Friday of Week 2. It has no % adjustment factor and a soak-in time of 5 minutes.


(CONTINUED)

- Turn the Function dial to **ADJUST**.
- Turn the Upper Line dial to select the station to adjust. In this example station 01 is selected.


- Turn the lower dial to the right to increase the percentage (+25 maximum) or left to decrease the percentage (-50% minimum).

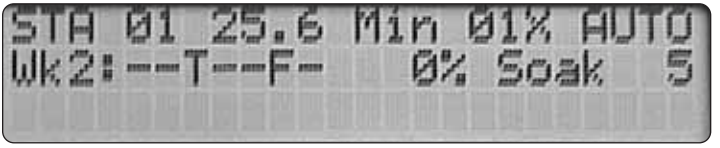
  **Example:** The Cycle Time for station 01 has been increased by 20%.




- Turn the Function dial to **REVIEW** to display the results of the adjustment.

  **Example:** Note the changes from the original settings shown in example Screen 1 below, to the adjusted settings in example Screen 2. Station 01 is now set to run 20.5 minutes, one time per day, Monday, Wednesday and Thursday. The net result of the 20% increase is actually a reduction in cycle time with an increase in watering days. The Smart Dial calculated a watering routine solution that would increase irrigation without exceeding the soil moisture depletion rate, possibly resulting in run off.

  Example Screen 1




  Example Screen 2

## ET Feature

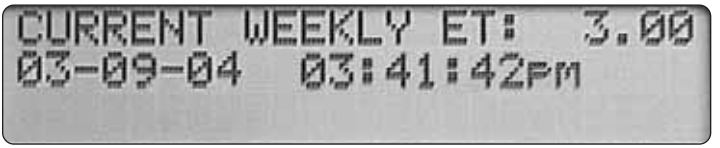
The screens provided within in the ET feature enable the current ET values for daily and weekly watering operations to be reviewed and Kc values for Custom Turf and Plants to be entered and adjusted.

**Review Current ET Values**

- Turn the Function dial to **ET**.
- Turn the Upper Line dial to select from the following screen menu options:

  ⇩ Current Daily ET ⇩ Current Weekly ET

  **Example:** The Current Weekly ET value is 3.00. The last broadcast ET data was received was on March 9th, 2004 at 3:41 p.m.




**Note:** To adjust the Weekly ET value, see “Troubleshooting” on page 55.

**Adjust Custom Turf and Plant Kc Values**

When Custom Turf or Plants are entered as the station “Plant Type,” a Kc (crop [turf] coefficient) default value of 1.00 is used to calculate ET.

**Note:** Custom Plant values use the same factor for all months. Custom Turf values are set specifically for each month.

To adjust the current Kc value, use the following procedure:

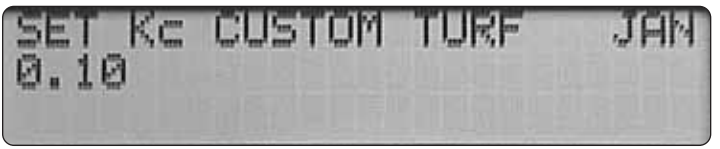
- Turn the Function dial to the **ET** position.
- Turn the Upper Line dial to select a menu option:

  ⇩ Set Kc Custom Plant A

  ⇩ Set Kc Custom Plant B

  ⇩ Set Kc Custom Turf (set each month)
- Turn the Lower Line dial to adjust the value from 0.10 to 1.20.

  **Example:** The Custom Turf Kc value for January is adjusted to 0.10.



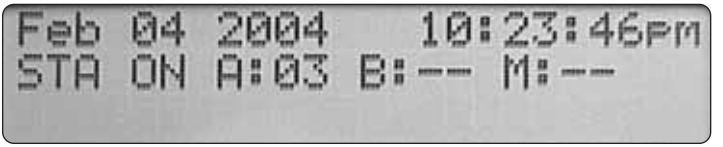

- Repeat the above two steps to set a Kc value for each month.

## Operating Modes and Features

## Run Mode

RUN is the Function dial home position. The display indicates the current date and time and any current Automatic and/or Manual station watering operation.

**Example:** The current date is February 4th, 2004. The current time is 10:23 p.m. Station 03 is currently running a schedule A watering routine.




## Manual Mode

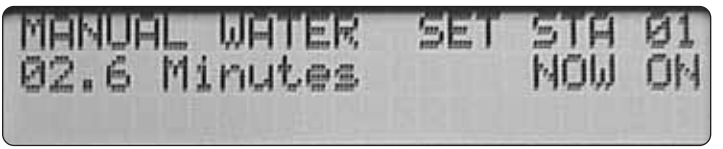
Manual mode enables a single station or sequence of stations to be operated at any time needed. Manual operation can occur simultaneously with Automatic operation and is not affected by the Rain Pause mode or an active Rain Sensor.

⚠ **Important: Ensure the hydraulic capacity of the irrigation system and the controller's maximum output current will not be exceeded with concurrent Automatic and Manual operation.**

**Specific Station Operation**

- Turn the Function dial to **MANUAL**.
- Turn the Upper Line dial to select the applicable station number.
- Turn the Lower Line dial to select a temporary cycle time from **1** to **99** minutes. The selected station will start immediately.
- Repeat the procedure to queue additional stations. Stations will run in numeric sequence; as one station finishes, the next station starts.

**Example:** Station 01 is running and has 2.6 minutes of time remaining.



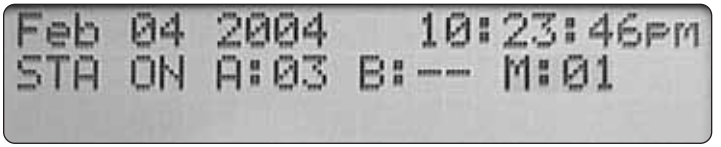

**Note:** Cycle time can be adjusted by turning the Lower Line dial while the station is operating. Selecting **00** minutes turns off operation.

(CONTINUED)

**Note:** To discontinue manual operation, turn the Function dial to OFF, pause to display “Irrigation is Turned OFF,” then return the dial to RUN.

**Note:** To review current operating status, turn the Function dial to RUN.

**Example:** Station 03 is currently running in Automatic watering schedule “A” and station 01 is running in Manual mode.

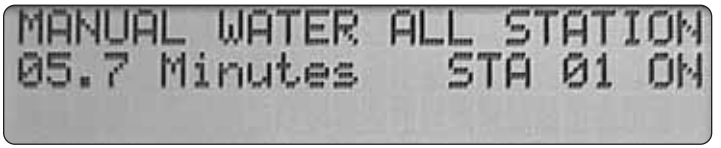



**Sequential Station Operation**

All active stations can be set to operate in numeric sequence, one station at a time. As one station finishes operation, the next station in sequence starts.

- Turn the Function dial to **MANUAL**.
- Turn the Lower Line dial to select **All Stations**.
- Turn the Upper Line dial to select **00.0 Minutes**.
- Turn the Lower Line dial to select a cycle time from **1** to **99** minutes. The temporary cycle time selected will be applied to all active stations.

**Example:** Station 01 is running and has 5.7 minutes of time remaining.

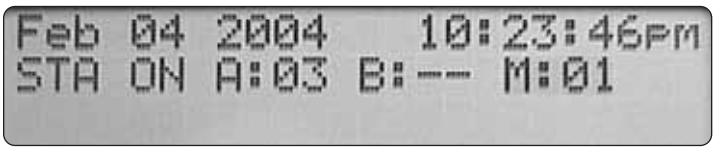



**Note:** Cycle time can be adjusted with the Lower Line dial while the station is operating. Selecting 00 minutes turns off operation.

**Note:** To discontinue manual operation, turn the Function dial to OFF, pause to display “Irrigation is Turned OFF,” then return the dial to RUN.

**Note:** To review current operating status, turn the Function dial to RUN.

**Example:** Station 03 is currently running in Automatic watering schedule “A” and station 01 is running in Manual mode.



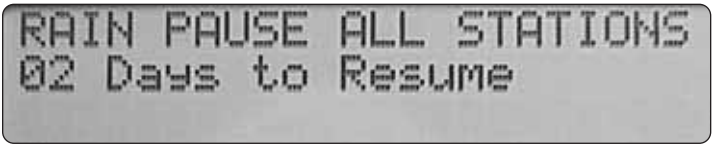
## Rain Pause Mode

The Rain Pause mode enables all automatic watering activity to be placed on hold for a duration of 1–14 days. When initiated, all automatic watering operations will be turned off and remain off until the selected duration has elapsed or “00 Days Remaining” is selected.

**Note:** All remaining controller functions, including Manual operations, are available while the controller is in the Rain Pause mode.

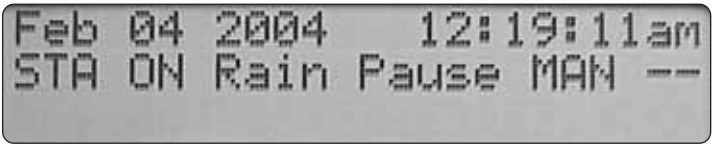
- Turn the Function dial to the **RAIN PAUSE** position.
- Turn the Lower Line dial to select a duration from 1–14 days.

**Example:** A two-day pause has been selected.



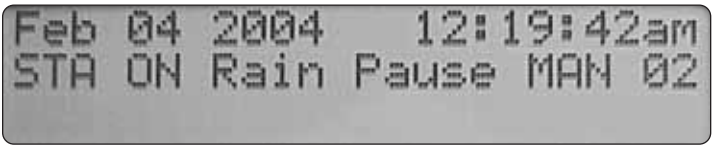

The Rain Pause mode is also displayed while the Function dial is in the RUN position.

**Example:** The function dial is in the RUN position, Rain Pause is active and Manual mode is not currently active.




If a Manual watering operation is active, the display will indicate the station number currently running.

**Example:** The function dial is in the RUN position, Rain Pause is active and station 02 is currently running in Manual mode.



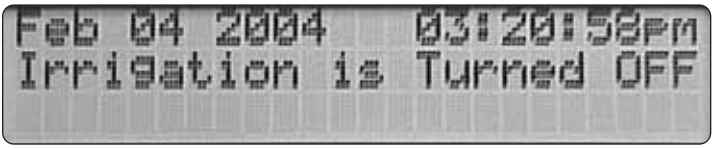
## Off Mode - Controller Shutdown

When the Function dial is turned to the OFF position, all watering activity will be terminated and remain off until the dial is turned to another position. Leave the Function dial in the OFF while the irrigation system is winterized or for any prolonged period of time greater than the 14-day maximum Rain Pause delay.

**Note:** All non-watering controller functions remain unaffected by the Off mode, including daily ET Everywhere service broadcast downloads.

- Turn the Function dial to the **OFF** position.

  **Example:** Irrigation is turned off.




- Turn the Function d ial to any other position to exit the OFF mode.

## System Alerts

The System Alert screens provide the current status of all key controller operations. If the controller detects a problem in the watering program/ scheduling, signal reception or the 24V field output, the alert message “Status: Warning See Alert” will be displayed. The alert message will continue to be displayed until the problem has been corrected.

Use the following procedure to determine the cause of the problem:

- Turn the Function dial to **ALERTS**.
- Turn the Upper Line dial to access status information from the following menu:

⇩ Alert Status
⇩ Water Window Status
⇩ Day Status Schedule A
⇩ Day Status Schedule B
⇩ Communication Status
⇩ Electrical Status

**Example:** Alert Status menu item selected — no alerts at this time.

**Water Window Status**

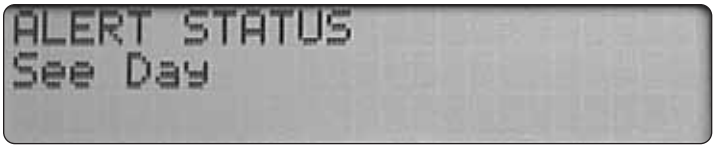
This alert condition occurs when the cumulative station cycle and soak time exceeds the current Water Window duration.

- To resolve the problem, increase the Water Window duration, and/or reduce the station cycle times or add eligible days to the watering schedule.

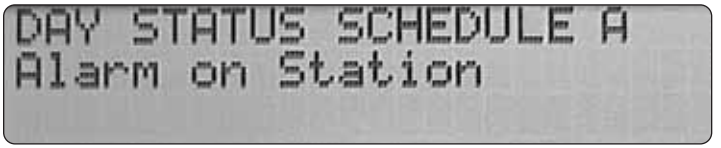
**Day Status**

This alert condition occurs when there are not enough eligible watering days available to complete the required operation.

- **Example:** Alert Status screen selected.and a Day conflict has occurred.




- Turn the Upper Line dial to select **Day Status Schedule A (or B) Alarm on Station** to determine the affected schedule.




- To resolve the problem, turn the Function dial to **SCHEDULE**. Select the indicated Schedule and increase the number if eligible watering days.

**Communication Status**

This alert will appear if the Smart Dial fails to receive the daily ET Everywhere Service broadcast data for four consecutive days. The alert will continue to be shown until communication is restored or the Function dial is turned to the Off position.

**Electrical Status**

This alert indicates that an over-current condition exists on one or more field outputs. The Smart Dial will attempt to operate all active stations as programmed, but will automatically bypass the station and advance to the next programmed station in sequence.

To resolve the problem, check the field wiring for damaged or loose wire splices at the valve solenoid connection and repair as necessary. A faulty valve solenoid can also cause this condition and should be tested with a digital ohmmeter for the manufacturer's specified normal resistance range.

## System Help

If the controller problem can not be resolved using the troubleshooting steps provided in Appendix B, please contact the Irritrol Customer Service Help Line at 1-800-634-8873, Monday thru Friday, 7:30 a.m. to 4:00 p.m. (pacific time).

During the service call, you may be asked to review and adjust various controller settings to help diagnose the issue.

- Turn the Function dial to **HELP**. The customer service phone number will be displayed.
- Turn the Upper Line dial to access specific information from the following menu:

⇩ Current Weekly ET
⇩ Serial Number
⇩ Microzone
⇩ Data Encryption Mask
⇩ Start Times (First Irrigation and High ET Start)
⇩ Beep on Message? (Yes/No)*
⇩ Phase Integrity
⇩ Lock Phase (A, B, C, D and None)*
⇩ Reset/Erase or Restart **

***Note:** The current settings for “Beep on Message” and “Lock Phase” can be changed. The remaining Help menu items are for reference, review or service use only.

**Example:** Beep on Message?– Changed from Yes, (default) to No.


** ⚠ **Important:The “Reset/Erase or Restart” menu item is for service use only. Do not use this procedure unless instructed to do so by a customer service representative.**

## Installation Procedures

### Installing the Controller

For safe, reliable operation, select an installation site for the controller that will provide the following conditions:

**Indoor Models:**

- An enclosed or sheltered area, protected from all weather elements and direct sunlight.
- Access to a grounded, 120 Vac wall receptacle on a branch circuit that is not controlled by a light switch or utilized by a major appliance.
- Access to the control valve wiring.

**Outdoor Models:**

- Protected from direct exposure to irrigation spray, afternoon sun, wind and snow.
- Access to a grounded 120 Vac branch circuit that is not controlled by a light switch or utilized by a major appliance.
- Access to the sprinkler control valve wiring.

1. Open the controller door. On the outdoor model, press the control module latch to the right. Swing the hinged control module outward from right to left.

   **Note:** On the outdoor cabinet, the lower mounting pilot holes are flashed over. If screw anchors are to be installed, remove the flash from one or both pilot holes as needed using a 1/4" drill bit.

   **Note:** Screw anchors must be used when the controller is installed on drywall or masonry. Temporarily position the controller on the wall, mark the mounting hole locations and install the screw anchors.

2. Install the top mounting screw leaving approximately 1/4" of the screw shaft exposed.
3. Align the keyhole on the cabinet back panel with the screw head. Slide the controller downward to capture the screw shaft in the keyhole slot.

   **Note:** Adjusting the screw depth may be required to enable the controller to fully engage the mounting screw.

4. Install the lower mounting screw(s) to secure the controller cabinet.

   **Note:** The field wiring access hole in the base of the Outdoor controller cabinet accepts a 1-1/4" conduit and the Indoor cabinet accepts 3/4" conduit. Install conduit at this time if required by local electrical codes.

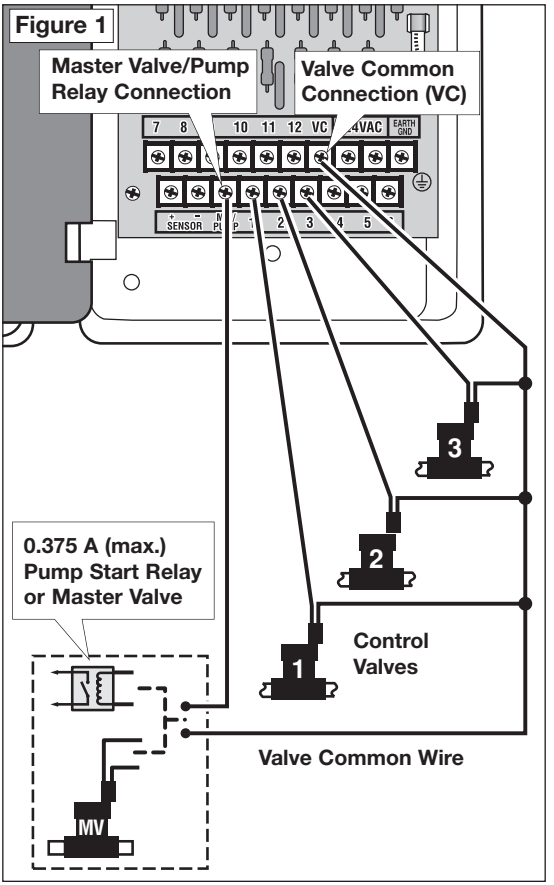
### Connecting the Control Valves

**Note:** Using 18-gauge, multi-strand, direct-burial irrigation valve connection cable is recommended. Select a cable that provides at least one wire for each valve and one extra wire for the valve common connection.

**⚠ CAUTION: To prevent corrosion and possible short circuit, use waterproof wire connectors on all wire splices.**

1. To provide the valve common connection, splice one cable wire (generally the white wire) to one solenoid lead from each valve.
2. Connect a separate wire to the remaining solenoid lead of each valve. For reference, note the wire color code used for each valve connection and it's associated watering zone.
3. If a master valve or pump start relay is used, make this connection in the same manner.

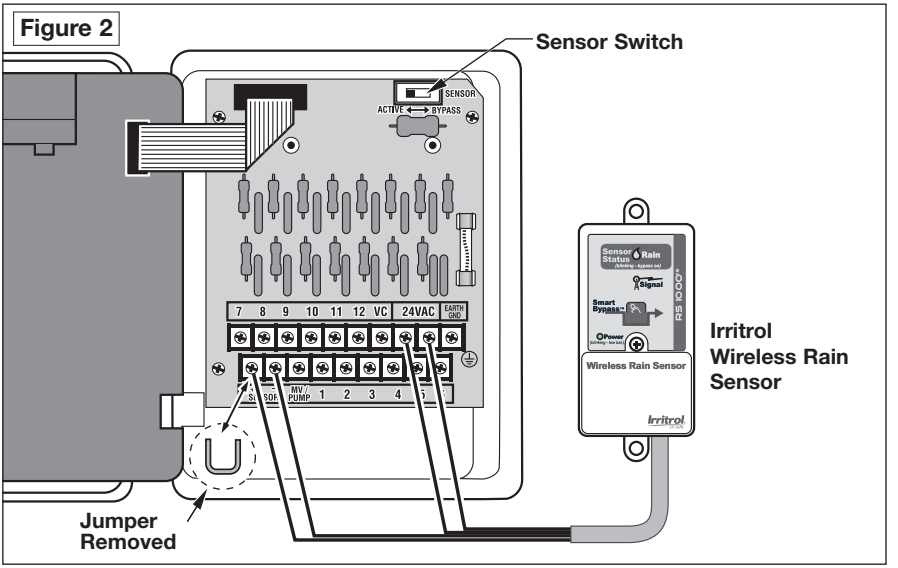
   **⚠ CAUTION: The pump start relay must be rated 24 Vac at 0.375A max. Never connect directly to the pump starter.**
4. Route the wire cable into the controller through the large opening in the base of the housing or through conduit if installed.
5. Leave about 8" of cable remaining in the cabinet. Remove the outer jacket to expose about 6" of wire. Strip insulation back on each wire about 3/8".
6 Secure the valve common wire to terminal "VC" and each valve wire to the applicable station number terminal. See **Figure 1**.



**Connecting a Rain Sensor (optional)**

⚠ **Important:** The sensor circuit is designed for a Normally Closed rain sensor. If a rain sensor is NOT connected, the Sensor switch must be in the "Bypass" position or the jumper wire must be installed across the sensor terminals.

**If the jumper wire is removed and the Sensor switch is in the "Active" position, the controller will not run automatically.**



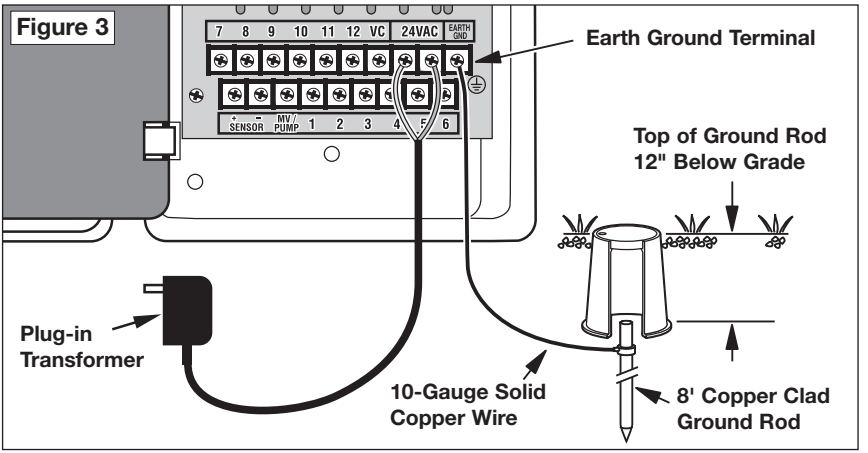

1. Insert in the sensor connection cable through the access hole in the bottom of the cabinet.
2. Remove the jumper wire from the "Sensor" terminals. Refer to the installation instructions included with the Rain Sensor and connect wires accordingly. See **Figure 2**.
3. Place the Sensor switch to the "Active" position.

   **Note:** Operation of the rain sensor does not affect reception of the ET Everywhere service or Manual controller operations.

   When the sensor circuit is activated, the controller will continue to operate for 10 minutes before the Sensor circuit disables Automatic operation. Automatic operation will resume when the sensor input is terminated.

**Connecting the Indoor Model Power Source and Earth Ground for Indoor and Outdoor Models**

1. Route the plug-in transformer cable through the small hole provided in the cabinet bottom and connect to the terminals labeled “24 VAC.”




**⚠ CAUTION: The controller’s surge protection circuitry must have an earth ground path to function properly. Proper grounding is especially important in lightning-prone areas.**

2. Install an 8' copper-clad ground rod into well-moistened soil to about 12" below grade. Connect a 10-gauge solid copper ground wire and route to the controller in the most direct path, avoiding bends smaller than a 12" radius.

   **Note:** Using a small round valve box to cover ground rod is recommended.

3. Route the ground wire through the bottom of the cabinet and connect to the “EARTH GND” terminal.
4. Close the control module and plug the transformer into a wall outlet.

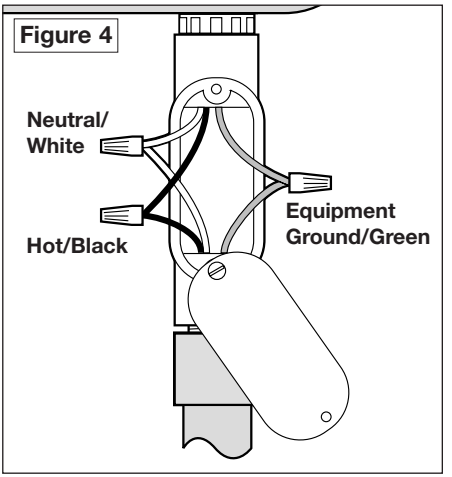
   **Note:** To adjust the controller display contrast, see “Display Contrast Adjust Feature” on page 50.

## Connecting the Outdoor Model Power Source

**WARNING: All electrical components must meet applicable national and local electrical codes including installation by qualified personnel. These codes may require an external junction box mounted on the transformer 1/2" NPT nipple and a means in the fixed wiring of disconnecting AC power having a contact separation of at least 0.120" in the line and neutral poles. Ensure the AC power source is OFF prior to connecting to the controller. The wire used for connection to the controller must have insulation rated at 105° C minimum.**

1. For input power wire connections, install a 1/2" NPT threaded conduit body to the transformer assembly nipple. From the conduit body, install electrical conduit to the 120 Vac power source.
2. Confirm that power has been disconnected at the source by using a volt meter or voltage detector.
3. Route solid copper 14-AWG power, neutral and equipment ground wires through conduit from the power source into the conduit body.
4. Using the supplied wire nuts, connect the power wire to Black, neutral wire to White and equipment Ground to Green controller wire. See **Figure 4**.
5. Close and secure the conduit cover.
6. Referring to the grounding procedures on page 48, install and connect an earth ground wire.
7. Apply power to the controller.

   **Note:** To adjust the controller display contrast, see “Contrast Adjust Feature” on page 50.

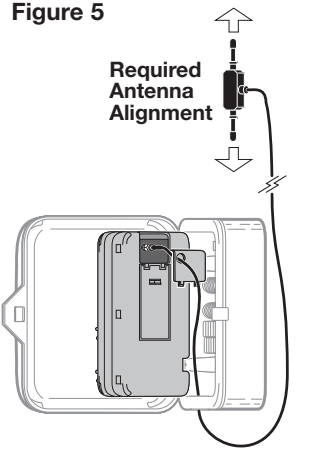


**Installing an External Antenna (optional)**

If the controller's built-in antenna does not provide adequate signal reception, an externally-mounted antenna, P/N 102-5581 can be easily installed.

1. Remove the access cover from the top inside edge of the control module as shown in **Figure 5**.
2. Route the antenna cable into the controller through the access hole provided in the cabinet base. **Do not drill any additional holes in the cabinet!**
3. Install the antenna cable connector to the threaded receptacle.
4. Position the antenna at the highest point above the controller that will not strain the cable connection. Align the antenna as shown in Figure 5.
5. Use the adhesive backing on the antenna when installaing on a smooth surface. Use the provided fasteners for installation on textured surfaces.
6. Change the antenna option setting from Internal to External as described on page 14.
7. Test signal reception strength as described in "View Phase Integrity Data" on page 10. A value of 32 or higher is required.

**Figure 5**

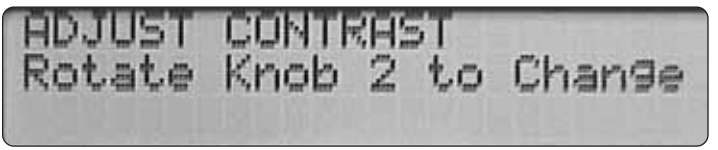



## Display Contrast Adjust Feature

The display screen contrast level can be adjusted for optimum viewing in various ambient light conditions.

- Turn the Function dial to the **DISPLAY ADJ** position.
- Turn the Upper Line dial (Knob 2) left to decrease or right to increase the contrast level.

**Example:** The Adjust Contrast display screen.



## Appendix A: Acquiring Sprinkler Precipitation Rate

The Smart Dial controller's default sprinkler precipitation rate (PR) values are based on a composite of the major sprinkler manufacturers' published performance data. If you do not have the specific sprinkler manufacturer's performance data charts, using the default PR values during initial set up will generally provide an acceptable baseline watering routine. Once the system has been up and running for several days, adjustments should be made to optimize the watering routine of each station.

**Determining Site-specific PR Values**

The following procedures will enable you to gather enough site information to determine a basic PR value for each station. PR value fine-tuning may be necessary if the system was not installed within the manufacturer's guidelines.

**Step A.** Do the sprinklers provide head-to-head spray coverage?
**Yes** - Go to **Step B**.
**No** - Go to **Step C**.

**Step B.** Do you have the sprinkler manufacturer's performance data chart?
**Yes** - Go to **Procedure 1 below**.
**No** - Go to **Step C**.

**Step C.** Do the sprinklers produce a fogging or misting spray?
**Yes** - Go to **Procedure 3 on page 52**.
**No** - Go to **Step D**.

**Step D.** Is the irrigation system less than 10 years old?
**Yes** - Go to **Procedure 2 on page 52**.
**No** - Go to **Procedure 3 on page 52**.

**Procedure 1: Using the Manufacturer's Performance Data Charts**

- Record the sprinkler performance data to include nozzle size, operating pressure and spacing.
- If the pressure at the sprinkler appears too high or too low, measure the nozzle spray pressure at the sprinkler nearest to the control valve and farthest from the control valve. Calculate and record the average pressure.

  **Note:** Use a 0–100 psi water pressure gauge with a pitot tube attachment to measure nozzle discharge pressure.
- Find and record the published PR value at the average measured pressure.

  **Note:** If the measured pressure is not within the recommended operating range, irrigation system rework may be required before a precise PR value can be determined.

**Procedure 2: Using a Basic PR Calculation**

- Measure and record the row spacing and sprinkler spacing (in feet).
- Measure the spray pressure at the sprinkler nearest to the control valve and farthest from the control valve (in psi). Calculate and record the average pressure.
- **Note:** Use a 0–100 psi water pressure gauge with a pitot tube attachment to measure nozzle spray pressure.
- Locate and record the sprinkler manufacturer's published flow rate (in GPM) for a "Full Head" for the sprinkler type, nozzle size and pressure.
  **Note:** If the measured pressure is not within the range limit, a rework of the system may be required before continuing with this procedure.
- Calculate the PR value using the following formula:
  PR = (96.3 x GPM)/(row spacing x sprinkler spacing).
  **Note:** This process assumes the sprinklers are installed in a matched precipitation rate arrangement. If this condition does not exist, a rework of the irrigation system may be necessary.

**Procedure 3: Using a "Catch Container" Audit**

**Note:** This procedure requires a straight-sided container, like a small coffee can for example, to collect a sample of irrigation water.

- Measure the inside diameter of the catch can and multiply by 3.14 to determine the catch Container Area (CA) in square inches.
- Place the container in the watering zone.
- Manually Test Run (TR) the station for 10 minutes. Measure and record the Collected Volume (CV) of water (in milliliters).
- Repeat this procedure several times to obtain an accurate Average Collected Volume (ACV).
- Calculate the PR value using the following formula:
  PR = (ACV x 3.66)/(TR x CA).
  Where:
  ACV = the Average Collected Volume average in milliliters
  TR = the Test Run time in minutes
  CA = the catch Container Area in square inches
  **Example:**
  PR = (35 ml x 3.66)/(10 minutes x 16.5 sq. inches) = 128.1/165 = 0.78 in/hr.

## Appendix B: Troubleshooting

### Resolving Alert Messages

✧ **Communication Alert**

**Possible Cause:** Reception interruption or loss of ET service broadcast.

**Remedy:**

- Call HydroPoint Data Systems Customer Service at: 800-362-8774.

✧ **Day Interval Alert**

**Possible Cause:** During times of high ET, the number of days scheduled for irrigation may not be enough to adequately irrigate all zones.

**Remedy:**

- Increase the number of scheduled irrigation days.

✧ **Electrical Alert**

**Possible Cause:** Shorted solenoid or valve wiring.

**Remedy:**

- Check for faulty wiring connections and valve solenoids. Repair and/or replace as necessary.

✧ **Water Window Alert**

**Possible Cause:** During times of high ET, the water window you selected may not have enough duration to adequately irrigate all zones.

**Remedy:**

- Increase the water window duration.
- Increase the number of scheduled irrigation days.
- Use % Adjust to decrease watering.

### Resolving Controller Operation Problems

**Problem:** Controller programs correctly but stations are not irrigating.

**Remedy:**

- Check the time and date settings and adjust to current time and date as necessary.
- If “Rain Switch” is displayed, the sensor circuit is active and blocking irrigation. If a rain sensor is not installed, confirm the sensor terminals are connected by a jumper wire and/or the Sensor switch is in the “Bypass” position.
- Rain Pause may be active. Turn Function dial to Rain Pause position and turn the Lower Line dial to display “00 Days to Resume.”

**Problem:** Station zone is too wet.

**Remedy:**

- % Adjust station down 10%.
- Watch for stress in landscape for 7 days.
- Repeat until stress is noted.
- % Adjust station up 5%.

**Problem:** Station zone is too dry.

**Remedy:**

- % Adjust station up 5%.
- Watch for stress in landscape for 7 days.
- Repeat until stress is gone.

**Problem:** % Adjust is not working.

**Remedy:**

- Turn the Function Selector to the "Run" position.
- Check the time and date settings and adjust to current time and date as necessary.
- Turn the Function Selector to "Review." The % Adjust changes may be subtle, shown as a small difference in the run time or number of cycles, or it may be more significant depending on how large the adjustment was. If you are towards the end of the week when reviewing the schedule (Wednesday or later) the affect of "Adjust" may not be evident in the current week. Remember, any days that have already irrigated will appear in the "Review" display in spite of any "% Adjust" changes. You should see the effect of "% Adjust" in week 2, 3, etc. with different day intervals.

**Problem:** Controller just installed, activated and continues to “Beep.”

**Remedy:**

- Check the time and date settings and adjust to current time and date as necessary.
- Refer to the procedure on page 44 to turn off the beep tone.

**Problem:** The display is frozen.

**Remedy:**

- Turn the Function dial to "Run." The display should change and show the date and time.
- If the display shows "PHASE" on the lower line:, the Copy button may be stuck in the "pressed" position. Free the copy button.
  - If the Copy button was stuck, the controller may have been initialized.
    - If the controller was initialized, all setup, schedule and program information must be entered again. Activating the controller again may also be required.
      Call Irritrol Customer Support at 800-634-8873 for assistance.

**Problem:** “ETP” is displayed.

**Remedy:**

- Check the time and date settings and adjust to current time and date as necessary.
- Turn the Function dial to the HELP position. If you see a ETP, the controller is currently running and ET data was communicated during station operation. The controller will label the ET data as pending (P) until the irrigation cycles are complete. The new ET data will then be applied to all programs for the next irrigation cycle.

**Problem:** Unable to manually adjust the Weekly ET value.

**Remedy:**

**Note:** The Weekly ET value should not be adjusted unless instructed to do so by an authorized Irritrol customer customer service representative.

- Turn the Function dial counterclockwise one detent past the “Display Adjust” position. (This is an unmarked Function dial position reserved for system diagnostics and troubleshooting.)
- Turn the Upper Line dial until “Set Weekly ET: 1.00” is displayed.
- Turn the Upper Line dial as needed to move the cursor.
- Turn the Lower Line dial to adjust the selected digit.
- Repeat the procedure as needed to enter the ET value.
- Turn the Function dial to the “Run” position.

## Appendix C: Glossary of Terms

**ET Zone Number** – A reference value used exclusively by the ET Everywhere service to group ET Microzones that have matching ET values for a given day.

**Group Number** – This is a code number downloaded by the ET Everywhere service to the Smart Dial at the time of activation enabeling the ET Everywhere service to communicate conditions relative to controllers in locations where irrigation regulation programs are in effect. This code will only be assigned if the user is a participant in the program.

**High ET Start Time** – In the event of a very high ET rate, the controller will try to irrigate enough to satisfy the plants' needs. If it cannot accomplish this within the allotted water window time frame, an additional irrigation start time will be initiated to fulfill the watering requirements. The High ET Start Time is when the additional watering cycle start can occur.

**Maximum Active Stations** – This number represents the actual number of functional stations. For example, if 10 stations have valves connected, but two valves are for future system use and are currently non-functional, the maximum active station number would be eight. Selecting a higher number of stations than actually used can cause the Water Window duration to be exceeded, resulting in false condition alerts. Setting a lower number than actual will prevent some of the stations from operating.

**Maximum Backup ET Value** – This value represents the highest ET rate expected for the year based on geographic and climatic conditions. Backup ET is a fail-safe measure used only in the event that the daily ET Everywhere service data transmission has not been received for four consecutive days. The Backup ET value will be automatically adjusted to compensate for the current calendar month in which the interruption occurs.

**Microzone Number** – This value is transmitted by the ET Everywhere service at the time of activation to establish specific latitude and longitude coordinates. This process enables the ET Everywhere service to provide localized ET/weather data.

**Phase Integrity Data** – This reference value is used exclusively by the ET Everywhere service to determine the broadcast integrity or signal strength signal of three wireless network communication carriers used to broadcast the ET Everywhere service data. The highest displayed signal phase value is used for initial service activation.

**Phase Lock** – The Smart Dial receives daily weather updates from three different paging carriers. At the time of ET Everywhere service activation, the carrier with the highest signal strength is selected to ensure the best data reception and to expedite the activation process. After initial activation, the Smart Dial will automatically unlock from the single phase selected and "listen" to all carriers each night to provide redundancy and optimum data reception.

**Rain Service** – This is an optional service available in a limited number of areas that enables the controller to receive rainfall information to adjust the program accordingly without the need of a rain sensor. The Rain Service data accounts for local reported rainfall and includes it in the soil moisture depletion calculations.

**Stacking** – When the Stacking option is enabled, the controller is constrained to run one automatic watering schedule (A or B) at a time. Overlapping station cycle starts are prioritized as follows: Schedule "A" stations followed by Schedule "B" stations; number sequence from low to high.

When the Stacking option is not enabled, one station in Schedule A and one station in Schedule B can operate concurrently.

**Water District Number** – If you are an active participant in a water agency program, you will be given a water control district identification number to enter during the ET Everywhere service activation. This five-digit code will enable the Smart Dial to be automatically notified of specific agency requirements and/or restrictions in your location.

**Water Window** – The Water Window is a selectable time frame ranging from 6 hours minimum to 23 hours and 59 minutes maximum per scheduled watering day. The water window start time marks the beginning of irrigation for the day. All stations which need to operate on the scheduled watering day must run to completion before the end of the water window occurs.

## Fuse Replacement

**WARNING: The fuse protects the transformer from overload due to a short circuit condition. For continued protection against risk of fire, replace only with the same type and rating of fuse. Ensure power to the controller is off prior to removing or installing fuse.**

1. Disconnect power to the controller.
2. Carefully remove the blown fuse from the retaining clips on the PC Board.
3. Install a new 2A, 220V, Slow-blow fuse, P/N 363-1578.
4. Troubleshoot system to determine the cause of the blown fuse.
5. Restore power to the controller.

## Specifications

### Mechanical

- Outdoor models: 8.50" H x 10.75" W x 4.30" D
- Indoor models: 7.75" H x 7.50" W x 3.75" D
- Operating temperature range: 32˚ F to 140˚ F

### Electrical

Input power: 120 Vac, 60 Hz
Station output: 24 Vac, 60 Hz, 0.5A maximum per station
Master Valve/Pump Start: 24 Vac, 60 Hz, 0.375A
Total output: 24 Vac, 60 Hz, 1.0A maximum
UL/CSA-listed transformer

## FCC Compliance Information

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a FCC Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the irrigation controller with respect to the receiver.
- Move the irrigation controller away from the receiver.
- Plug the irrigation controller into a different outlet so that the irrigation controller and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio/TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.

**Notes:**

**Notes:**

Irritrol® SYSTEMS



Form Number 373-0334 Rev. B

## Proof of Purchase

*(rebate program use)*

Name: _____

Address: _____

State: _____ ZIP: _____

Model number: _____

Serial Number: _____

*(inside cabinet door)*

Date of Purchase: _____

Activation Date: _____

Installer Name: _____

Address: _____

City: _____

State: _____ ZIP: _____