RAIN BIRD®

ESP-SMT Smart Modular Control System

Installation & Operation Guide

AUTO MODE

Monday 01 Apr 2009
07:25 AM
Next Irrigation
Estimate: 03 Apr

BEGIN
SUSPEND

OFF   AUTO   SET DATE & TIME

MANUAL WATERING   CONFIGURE CONTROLLER

RESTORE SETTINGS   INPUT ZONE INFORMATION

SYSTEM REVIEW   FINE-TUNE WATERING   SPECIAL FEATURES

ENGLISH / ESPAÑOL

ESP-SMT
SMART MODULAR CONTROLLER

RAIN BIRD®

Safety Information

WARNING:

A CIRCUIT BREAKER OR CUTOFF SWITCH IS TO BE PROVIDED IN THE FIXED WIRING TO ISOLATE THE CONTROLLER. THE CURRENT DATE AND TIME ON THE CONTROLLER IS RETAINED BY A LONG-LIFE LITHIUM BATTERY, WHICH MUST BE DISPOSED OF IN ACCORDANCE WITH LOCAL REGULATIONS.

LIGHTNING FLASH SYMBOL is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electronic shock to persons.

EXCLAMATION POINT SYMBOL is intended to alert the user to important operating or maintenance (servicing) instructions in the literature accompanying the product.

For technical assistance contact Rain Bird at 1-800-247-3782

IMPORTANT

This Installation and Operation Guide supports ESP-SMT control panels with a date code later than March 31, 2011.

Contents

Check Box Contents

ESP-SMT System

It is recommended that you familiarize yourself with the various items below, prior to beginning the installation process.

Box Contents

1 ESP-SMT Modular Controller (1 of 3 models below)

    a. ESP-SMT4 (outdoor controller with key-lock)

    b. ESP-SMT4i (indoor controller)

    c. ESP-SMT-UPG (upgrade panel for previously installed ESP-M controller)

2 Controller Mounting Hardware (Four #8 screws) Other hardware may be required depending on the mounting surface and materials)

3 Mounting Template (controller models only)

4 ESP-SMT Installation & Operation Guide

5 ESP-SMT Site Profile Chart

6 ESP-SMT Installation & Quick Setup Poster

7 SMT Weather Sensor

8 Weather Sensor Debris Screen

9 Weather Sensor Mounting Bracket

10 Mounting Bracket Hardware (Four Phillips head screws + finger screw for mounting sensor to mounting bracket)

11 Sensor Wire - 25 feet of 20-2 UV rated wire (not rated for direct burial)
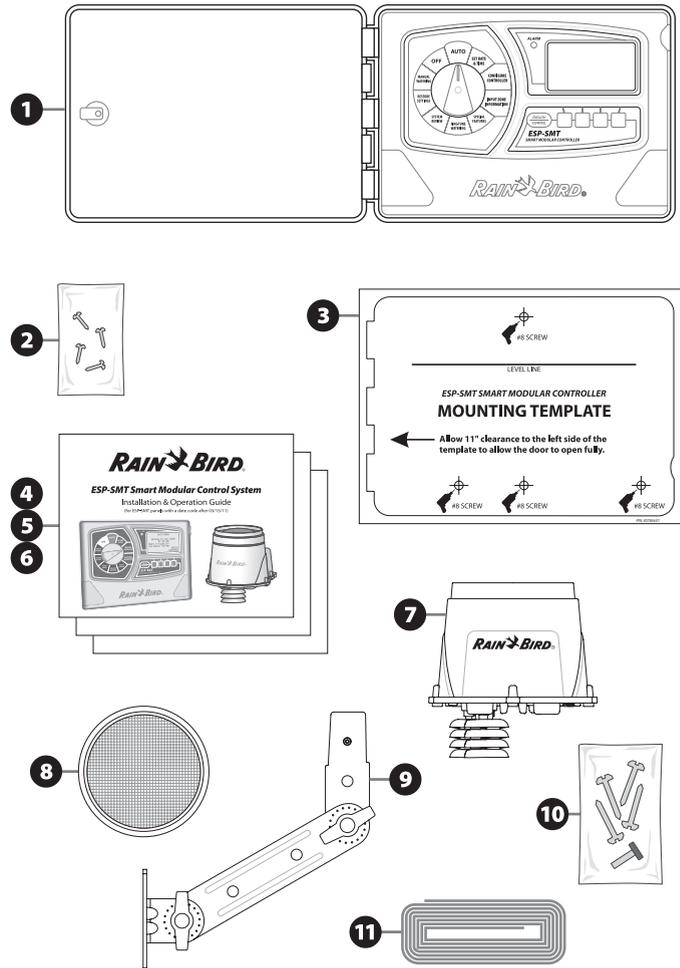
Introduction

Welcome to Rain Bird

The Intelligent Use of Water

At Rain Bird, we believe it is our responsibility to develop products and technologies that use water efficiently. Our commitment also extends to education, training and services for our industry and our communities.

The need to conserve water has never been greater. We want to do even more and with your help we can.

Visit www.rainbird.com for more information about The Intelligent Use of Water.

ESP-SMT Smart Modular Control System

Thank you for selecting the new state-of–the-art Rain Bird ESP-SMT "Smart" Modular Control System. For more than seven decades, Rain Bird has led the irrigation industry in meeting professional water management needs by providing the highest quality water efficient products and services available. The new Rain Bird smart control system is designed to keep your landscape healthy and vibrant by providing you unparalleled automatic on-site watering control.

The Rain Bird ESP-SMT "Smart" Modular Control System can operate up to 13 different zones. The system consists of a controller and an on-site weather sensor that communicates weather data on a regular basis back to the controller. As weather conditions change, the irrigation schedule adjusts accordingly. Studies have indicated that most traditional "time-based" controllers are only adjusted on average 2 to 3 times per year. The lack of appropriate irrigation schedule adjustments generally result in significant over-watering.
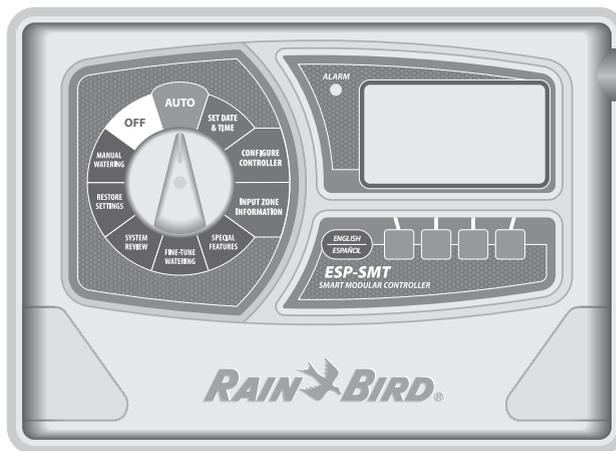
The Rain Bird ESP-SMT controller automatically adjusts each zone's irrigation schedule on a daily basis based on the actual site weather conditions. When the ESP-SMT is programmed properly, you will maintain a vibrant, healthy landscape while consuming 30% to 50% less water than a traditional time-based control system. Once the site and zone parameters are set-up in the controller, the optimal irrigation schedule is developed automatically for your convenience.

There are three ESP-SMT models:

- 4 Station Indoor Controller (ESP-SMT4i)
- 4 Station Outdoor Controller (ESP-SMT4)
- Upgrade Kit for ESP-Modular (ESP-SMT-UPG)

Each control system can be expanded to operate up to 13 zones by using 3 zone expansion modules (ESPSM3).

Features and Benefits

The ESP-SMT Controller automatically optimizes the daily irrigation schedule based on weather data collected by the on-site weather sensor. In addition to this time and water saving feature, the control system has other unique features that provide easy installation, set-up, operation and flexibility to customize the unit to your particular site conditions.

Large Backlit Dot Matrix Display

Up to 8 lines of text are displayed at once with menu options to help prompt you in making your selections. The adjustable backlit display dramatically improves the readability of the display in dimly lit areas.

Programmable with 9 Volt Battery

The backlit display will illuminate under battery power allowing for remote programming. All pre-programmed information is saved in non-volatile memory for retrieval at a future date.

English/Spanish Button

A simple push of the language button will toggle the display text to read in either English or Spanish.

Color Coded Dial Positions

Ten color coded dial positions enable the user to easily perform the initial controller set-up and subsequent operation of the control system.

Alarm Light

Red LED on the front panel illuminates to warn you of any issues that require immediate attention.

Meet Water Restrictions

Set user-defined watering days and watering times to meet local water restrictions.

Block Day a Week

Permanently blocks a specific day of the week independent of the assigned days to irrigate. This is especially useful if you want to prevent irrigation on a specific day.

Zone Set-Up Wizard

An automatic data entry system walks the user through the process of entering all of the required zone set-up information for each zone.

Grow-In Period

The controller allows the user to set a "grow-in" irrigation schedule per zone with a user set time period before the controller automatically converts the irrigation schedule to the weather based method.

Default Values

Each selection has a common industry standard default value assigned to assist novice users in setting up the controller.

Custom Values

For more advanced users, the controller will allow the user to overwrite the default values with a user selected value further optimizing the irrigation schedule to match specific site conditions.

Event Days Off

Allows you to select up to four specific dates in which you want to block irrigation from occurring. This can be useful if you have planned an event that will take place in the yard on specific dates.

Short Circuit Test

Enable you to perform a electronic diagnostic test to determine on a zone by zone basis if there is a "Short" circuit or if the circuit is "Good".

Cold Weather Shutdown

All irrigation will be suspended to prevent potential freeze damage to the irrigation components if the measured temperature is below a user set level.

Rainfall Shutdown

Irrigation will be suspended if the measured rainfall exceeds a user set threshold.

Individual Zone Shutdown

Each individual zone can be either set in an "active" or "inactive" mode. This is ideal if repairs are necessary on a zone and you want to continue irrigating the other zones on the system.

System Review

Allows the user to look at a log of irrigation and alarm events by date or by zone. Additionally, the user can view the next estimated scheduled irrigation cycle by zone and review the current and past weather data.

Suspend Irrigation

Allows the user to suspend irrigation for a period of time (1 minute to 14 days), at which time the system will return to the AUTO mode.

Save & Restore Settings

Save your current program in memory, so that if the program gets changed inadvertently, you can easily retrieve the previously saved program.

Manually Water Combination of Zones

User can set a zone or any combination of zones to run manually, each with it's own run time prior to returning to the AUTO mode.

Manually Water all Zones (TEST)

All zones that are present in the available modules can be set to run for the same period of time sequentially. This is a time-saver in performing a system walkthrough and/or when winterizing a system.

Fine Tune by Zone

Each zone's calculated run-time can easily be adjusted from an increase of up to 30% to a decrease of 30% without changing any of the other pre-set programming information that was entered in the initial controller and zone set-up.

Hot Swap-able Station Expansion Modules

Easily expand the zone capability by inserting up to three, 3 station expansion modules for a maximum of 13 stations. This can be done while the unit is connected to AC power.

Tool-less Communication Wire Terminal

No tools are required to connect the pair of communication wires to the controller or the sensor. There is no polarity required on either the controller or the sensor connection to provide communication.

LED Light to Validate Sensor Communication

A green LED located in the Sensor communication wire compartment will blink when power is applied and continuously illuminate when there is communication between the controller and the sensor. This prevents the need of going back to the controller to verify communication during installation.

Adjustable Sensor Mounting Bracket

Mounting Bracket Arms can be adjusted in fine increments to assist that the sensor pod is mounted level in virtually any installation scenario. The arms have a wire routing mechanism that provides a "strain relief".

Rain Gauge

The rain gauge not only acts as a rain shut-off device, it also provides rainfall intensity and accumulation information to the controller in order to prevent over-irrigation by accounting for "effective" rainfall.

Removable Debris Screen

Prevents leaves and other large debris from getting into the tipping bucket mechanism and preventing accurate rainfall measurement. It can be easily removed to clean debris off the screen surface.

Removable "Tipping" Rain Bucket"

The Tipping Rain Bucket can be easily removed from the sensor housing to clean out debris that may have made it past the debris screen into the mechanism.

Controls, Switches and Indicators

Controller Panel Features

INITIAL CONTROLLER & ZONE SET-UP DIAL POSITIONS (LIGHT BLUE)

ALARM LIGHT ILLUMINATES WHEN CONDITIONS PREVENT IRRIGATION

LARGE BACK-LIT DOT-MATRIX DISPLAY

COLOR-CODED DIAL POSITIONS FOR "EASE OF USE"

"CONTRACTOR DEFAULT" PROGRAM RESTORE

(2) GRIP AREAS TO ASSIST DURING REMOTE PROGRAMMING

REMOTELY PROGRAMMABLE USING 9V BATTERY

SCREEN TITLE

SCREEN TEXT

FUNCTION LABELS FOR SET-UP & NAVIGATION

NAVIGATION BUTTONS WITH ACCELERATOR

ENGLISH/SPANISH BUTTON FOR EASY SWITCHING OF DISPLAY LANGUAGE

ALARM

AUTO

OFF

SET DATE & TIME

CONFIGURE CONTROLLER

MANUAL WATERING

RESTORE SETTINGS

INPUT ZONE INFORMATION

SYSTEM REVIEW

FINE-TUNE WATERING

SPECIAL FEATURES

SET CURRENT DATE AND TIME

24 Mar 2009

10:16 AM

BACK   −   +   NEXT

ENGLISH ESPAÑOL

ESP-SMT
SMART MODULAR CONTROLLER

RAIN BIRD®

The ESP-SMT Smart Modular controller panel is designed to upgrade previously installed ESP-Modular controllers (ESP-SMT-UPG Kit).

Weather Sensor Features

The durable Weather Sensor provides high and low temperature and rainfall data to the ESP-SMT Controller for daily irrigation schedule adjustments.

REMOVABLE DEBRIS SCREEN

SENSOR HOUSING

ADJUSTABLE MOUNTING BRACKET

HOLES IN BRACKET ARMS (3) TO ROUTE WIRING AND PROVIDE "STRAIN RELIEF"

REMOVABLE TIPPING RAIN BUCKET

MOUNTING BASE

TOP
LEVEL HERE

SOLAR SHIELD WITH TEMPERATURE SENSOR

WING NUTS (2) FOR SENSOR POSITIONING ADJUSTMENTS

SLOT FOR EASY LEVELING OF UNIT
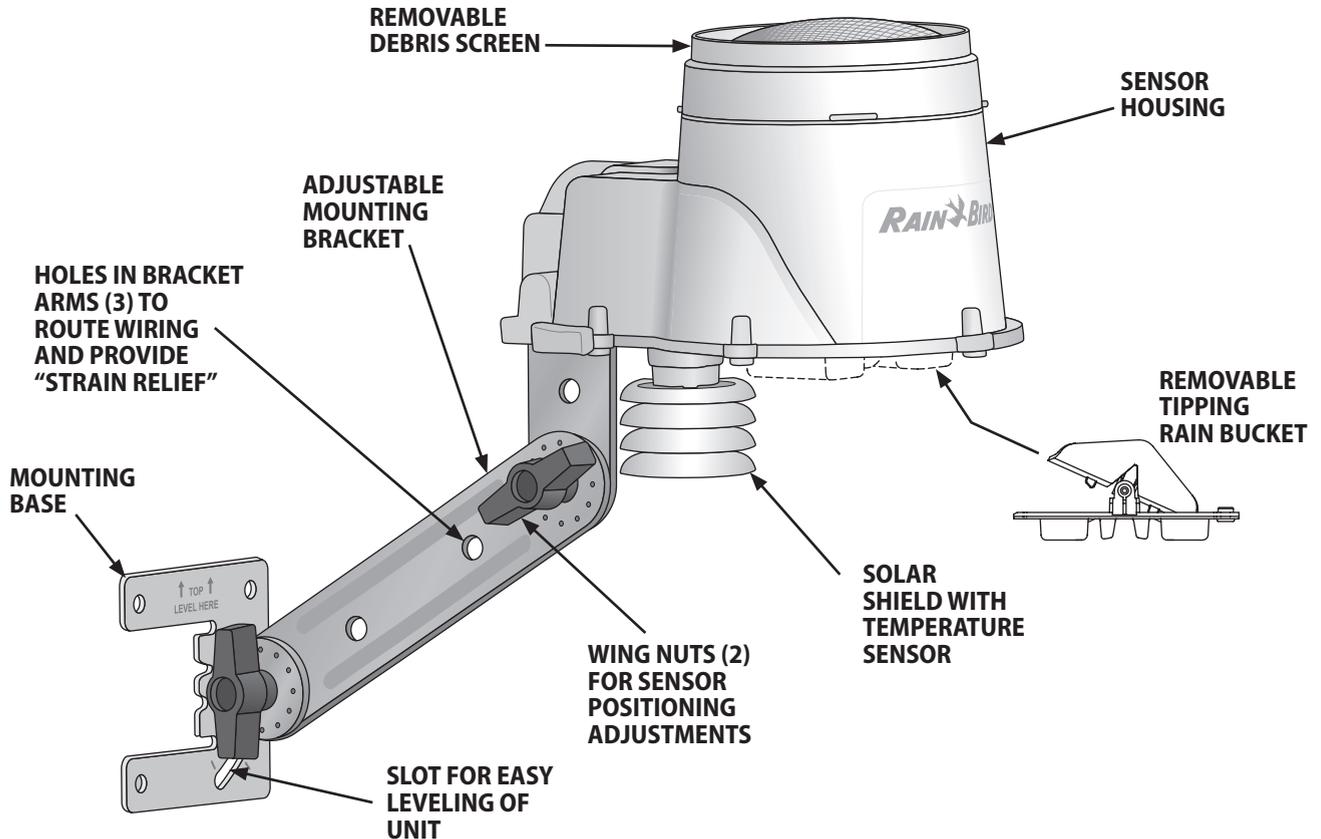
Set Current Date & Time

This section shows you how to set the current date & time on the ESP-SMT Controller.

Rotate the dial to the **SET DATE & TIME** position...
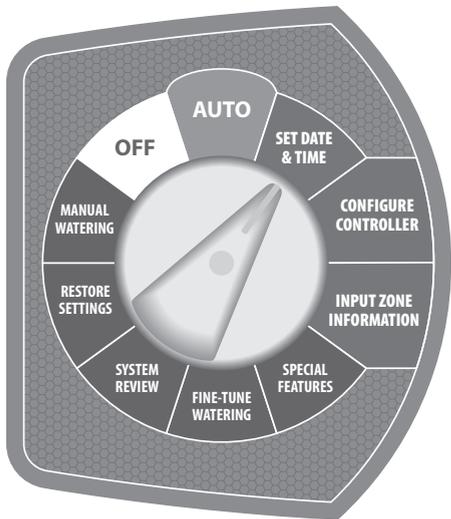
1 The SET CURRENT DATE & TIME screen will appear and the three letter **month** designation will be blinking on the display.

Set Month

a. Press the **- or +** button(s) until the current month is shown; then press the **NEXT** button.

Set Day of Month

b. The **day** of the month will begin to blink. Press the **- or +** button(s) until the current day is shown; then press the **NEXT** button.

Set Year

c. The **year** will begin to blink. Press the **- or +** button(s) until the current year is displayed; then press the **NEXT** button.

Set Hour

d. The **hour** will begin to blink. Press the **- or +** button(s) until the current hour appears on the display; then press the **NEXT** button.
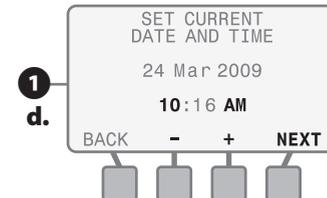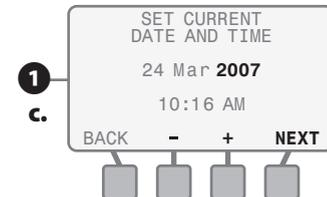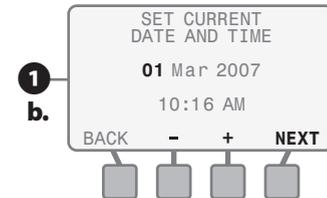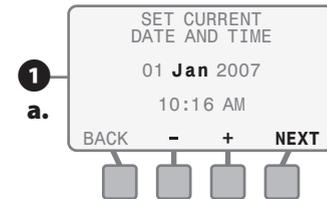
NOTE: Make sure the hour is set correctly to either **AM** or **PM**.

AUTO

OFF

SET DATE & TIME

MANUAL WATERING

CONFIGURE CONTROLLER

RESTORE SETTINGS

INPUT ZONE INFORMATION

SYSTEM REVIEW

FINE-TUNE WATERING

SPECIAL FEATURES

1
a.

SET CURRENT
DATE AND TIME

01 **Jan** 2007

10:16 AM

BACK   **−**   **+**   **NEXT**

1
b.

SET CURRENT
DATE AND TIME

01 Mar 2007

10:16 AM

BACK   **−**   **+**   **NEXT**

1
c.

SET CURRENT
DATE AND TIME

24 Mar **2007**

10:16 AM

BACK   **−**   **+**   **NEXT**

1
d.

SET CURRENT
DATE AND TIME

24 Mar 2009

10:16 **AM**

BACK   **−**   **+**   **NEXT**

Set Minutes

e. The **minutes** will begin to blink. Press the **- or +** button(s) until the current minutes are shown; then press the **NEXT** button to review the current Date & Time settings.

Review Current Date & Time

2 Review the information on the screen to confirm that all settings are correct:

- **If the information is not correct:**

  Press either the **BACK** button or the **NEXT** button to navigate backward or forward to the section that requires a change; then follow the instructions above to make a modification to that section.

- **If the information is correct:**

  Rotate the dial into any other position and the entered information in the SET DATE & TIME dial position will be saved in the controller memory. The internal lithium battery will save the current date and time during power outages.

1 / **e.**

```
    SET CURRENT
  DATE AND TIME

   24 Mar 2009

    02:16 PM
BACK    -    +    NEXT
```

2

```
    SET CURRENT
  DATE AND TIME

   24 Mar 2009

    02:54 PM
BACK    -    +    NEXT
```
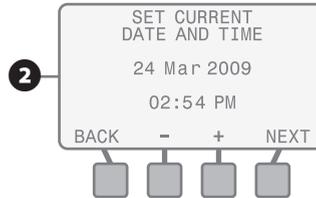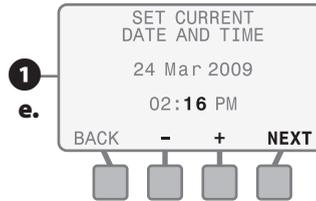
⚠ **NOTE:** To rapid advance through the values shown on various screens, depress and hold the corresponding navigation button to activate the "Accelerator" feature.

You have now completed all of the required steps to set the current date and time on the controller.

Review Checklist

Set Current Date
☐ Set Current Month
☐ Set Current Day of Month
☐ Set Current Year
Set Current Time
☐ Set Current Hour (**NOTE:** confirm **AM** or **PM** is correct)
☐ Set Current Minute

Configure Controller

This section shows you how to configure the ESP-SMT controller for your site conditions using one of the following Two methods:

1) Select Location by Zip Code; 2) Enter Custom Site Data relative to site location

Method 1: Select Location by Zip Code

Rotate the dial to the **CONFIGURE CONTROLLER** position...
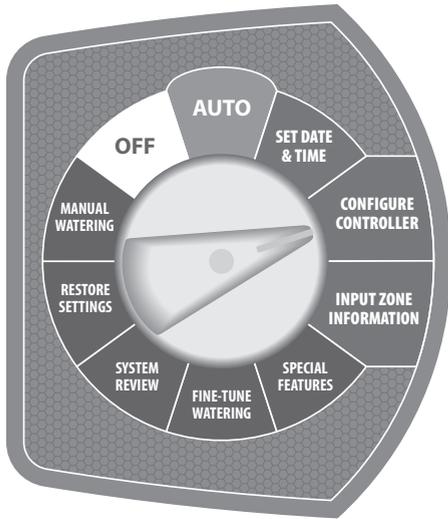
1 The CONFIGURE CONTROLLER screen will appear and **Enter Site Zip Code** will be blinking; press the **SELECT** button.

2 The SITE ZIP CODE screen will appear and the **1st digit** of the zip code will be blinking.

a. Press the **- or +** button(s) to set the number from 0 to 9 to match the 1st digit of the site zip code; then press the **NEXT** button.

b. The **2nd digit** of the zip code will begin to blink. Press the **- or +** button(s) to set the number from 0 to 9 to match the 2nd digit of the site zip code; then press the **NEXT** button.

c. Perform this function until all 5 digits of the site zip code are entered; then press the **NEXT** button.
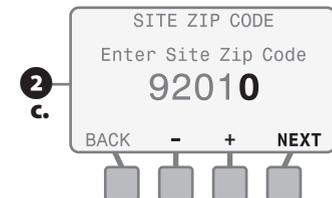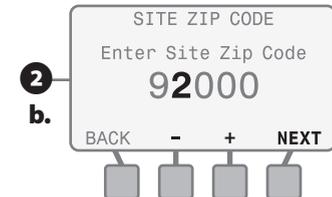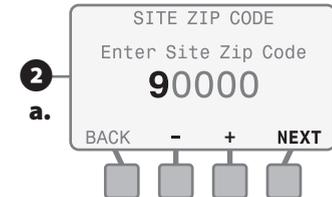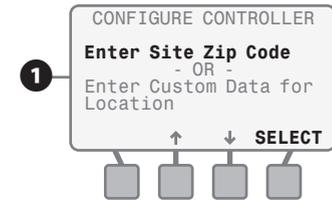
NOTE: If the zip code you entered is not found in the controller database, the closest zip code available will be substituted and you will be asked "Is this Correct?"

3 The zip code you entered will be displayed and you will be asked:

Is This Correct?

• **If you press the NO button:**

   The screen will revert back to allow you to modify the previously entered zip code values (steps 2 and 3)

• **If you press the YES button:**

4 The ALLOWED WATER DAYS screen will appear.

   Use the **UP or DOWN arrow button(s)** to navigate to enter the desired Allowed Water Days and Time (see page 13 for details).

```
        SITE ZIP CODE


          92010

        Is This Correct?
 NO                      YES
```

```
   ALLOWED WATER DAYS

 No Restrictions
 By Days of the Week
 Even Days: 2,4,6,… 30
 Odd Days: 1,3,5,…no31
 Cyclical:Every   Days
 BACK    ↑    ↓  SELECT
```
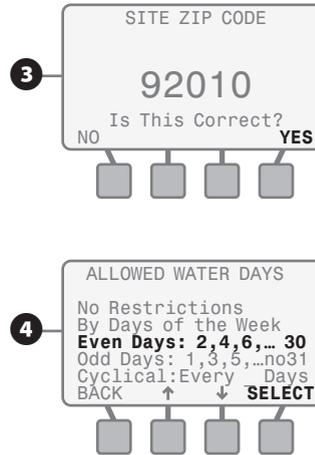
Configure Controller

Method 2: Enter Custom Data for Location

Rotate the dial to the **CONFIGURE CONTROLLER** position...
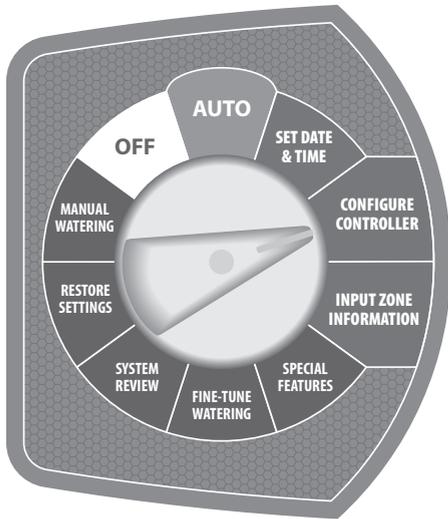
1 The CONFIGURE CONTROLLER screen will appear. Press the **UP or DOWN** arrow button(s) until **Enter Custom Data for Location** begins to blink; then press the **SELECT** button.

2 The LATITUDE & ELEVATION screen will appear and the **value** corresponding to Latitude will be blinking.

a. Press the **- or +** button(s) until the correct value is entered; then press the **NEXT** button.

b. The **value** for Elevation will begin to blink. Press the **- or +** button(s) until the correct value (100 foot increments) is entered; then press the **NEXT** button.

```
  CONFIGURE CONTROLLER

  Enter Site Zip Code
       - OR -
  Enter Custom Data for
  Location

             ↑     ↓   SELECT
```

```
  LATITUDE & ELEVATION


  Latitude       35 °N
  Elevation       0 ft

  BACK    –    +    NEXT
```

```
  LATITUDE & ELEVATION


  Latitude       41 °N
  Elevation    1100 ft

  BACK    –    +    NEXT
```

Dial positions: AUTO, OFF, SET DATE & TIME, MANUAL WATERING, CONFIGURE CONTROLLER, RESTORE SETTINGS, INPUT ZONE INFORMATION, SYSTEM REVIEW, FINE-TUNE WATERING, SPECIAL FEATURES
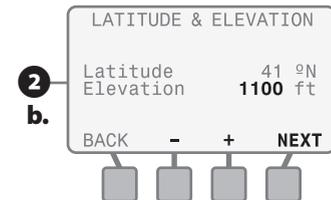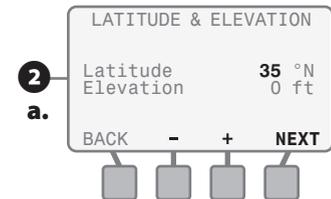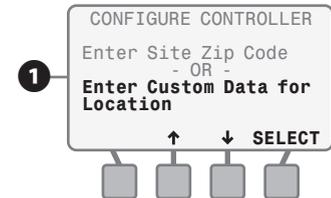
3 The AVG WIND SPEED screen will appear and the **value** for January will be blinking.

a. Press the **- or +** button(s) until the correct value is entered and then press the **NEXT** button.

b. The **value** for February will begin to blink. Press the **- or +** button(s) until the correct value is entered; then press the **NEXT** button.

c. Perform this function until you have entered the value for December; then press the **ACCEPT** button.

⚠ **NOTE:** Historical weather information can usually be found at the local airport or local university web site.

4 The AVERAGE HUMIDITY screen will appear and the **value** for January will be blinking.

a. Press the **- or +** button(s) until the correct value is entered; then press the **NEXT** button.

b. The **value** for February will begin to blink. Press the **- or +** button(s) until the correct value is entered; then press the **NEXT** button.

c. Perform this function until you have entered the value for December; then press the **ACCEPT** button.


```
3      AVG WIND SPEED    MPH
       Jan  7.5  Feb   3.0
       Mar  3.0  Apr   3.0
       May  3.0  Jun   3.0
a.     Jul  3.0  Aug   3.0
       Sep  3.0  Oct   3.0
       Nov  3.0  Dec   3.0
       BACK   -    +   NEXT
```

```
4      AVERAGE HUMIDITY
       Jan  22%  Feb  20%
       Mar  20%  Apr  20%
       May  20%  Jun  20%
a.     Jul  20%  Aug  20%
       Sep  20%  Oct  20%
       Nov  20%  Dec  20%
       BACK   -    +   NEXT
```

```
3      AVG WIND SPEED    MPH
       Jan  7.5  Feb   5.2
       Mar  3.0  Apr   3.0
       May  3.0  Jun   3.0
b.     Jul  3.0  Aug   3.0
       Sep  3.0  Oct   3.0
       Nov  3.0  Dec   3.0
       BACK   -    +   NEXT
```

```
4      AVERAGE HUMIDITY
       Jan  22%  Feb  27%
       Mar  20%  Apr  20%
       May  20%  Jun  20%
b.     Jul  20%  Aug  20%
       Sep  20%  Oct  20%
       Nov  20%  Dec  20%
       BACK   -    +   NEXT
```

```
3      AVG WIND SPEED    MPH
       Jan  7.5  Feb   5.2
       Mar  4.8  Apr   4.3
       May  3.7  Jun   5.1
c.     Jul  4.4  Aug   2.3
       Sep  6.1  Oct   1.8
       Nov  2.5  Dec   1.2
       BACK   -    +  ACCEPT
```

```
4      AVERAGE HUMIDITY
       Jan  22%  Feb  27%
       Mar  21%  Apr  31%
       May  38%  Jun  45%
c.     Jul  52%  Aug  46%
       Sep  39%  Oct  32%
       Nov  28%  Dec  23%
       BACK   -    +  ACCEPT
```
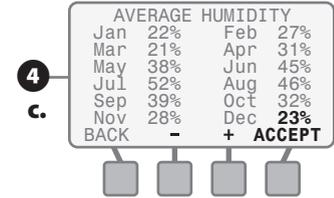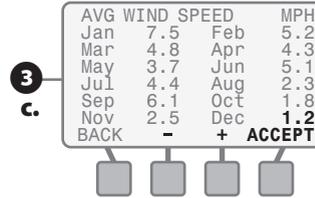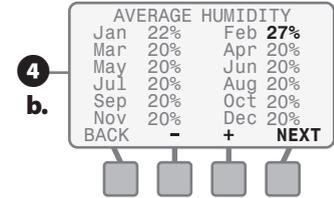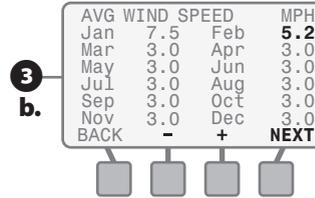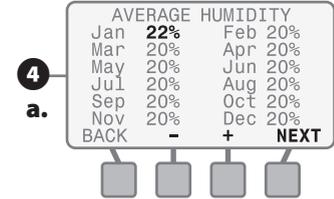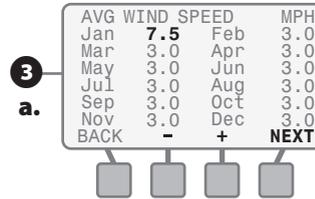
Enter Allowed Water Days

⚠️ **NOTE:** Check with your local water authorities to see if there are any current water restrictions in effect that would dictate what days and/or time of day that you are **permitted** to irrigate your site.

The ALLOWED WATER DAYS screen will appear with the following options to chose from:

No Restrictions
Can irrigate on any day(s)

❶ If there are no restrictions on what days you can irrigate, press the **SELECT** button when **No Restrictions** is blinking on the display; the BLOCK ON SPECIFIC DAY OF WEEK screen will appear (see step 8 on page 15 for details).

By Days of the Week
Set custom 7 day schedule

❷ Press the **UP and DOWN** arrow button(s) until **By Days of the Week** is blinking; then press the **SELECT** button.

❸ The first day of the week, **Mo** (Monday) will be blinking in the Allow Watering display.

a. You can either allow watering to occur or block watering from occurring on that day by pressing either the **BLOCK or ALLOW** button(s). After the Block or Allow selection is made, press the **NEXT** button.

b. The next day of the week, **TU** (Tuesday) will begin to blink. Press either the **BLOCK or ALLOW** button(s) to block or allow watering to occur for that day as well.

c. Select **Block or Allow** for each day of the week and continue the process until the information is entered for each day.

```
    ALLOWED WATER DAYS

    No Restrictions
  2 By Days of the Week
    Even Days: 2,4,6,… 30
    Odd Days: 1,3,5,…no31
    Cyclical:Every   Days
    BACK    ↑    ↓  SELECT
```

```
    WATER BY DAY OF WEEK
    Allow Watering:
  3 Mo Tu We Th Fr Sa Su
a.
    Block Watering:

    BACK BLOCK ALLOW NEXT
```

```
    WATER BY DAY OF WEEK
    Allow Watering:
  3 Mo    We Th Fr Sa Su
b.
    Block Watering:
        Tu
    BACK BLOCK ALLOW NEXT
```

```
    ALLOWED WATER DAYS

  1 No Restrictions
    By Days of the Week
    Even Days: 2,4,6,… 30
    Odd Days: 1,3,5,…no31
    Cyclical:Every   Days
    BACK    ↑    ↓  SELECT
```

```
    WATER BY DAY OF WEEK
    Allow Watering:
  3 Mo    We    Fr
c.
    Block Watering:
        Tu    Th    Sa Su
    BACK BLOCK ALLOW NEXT
```

Once you've entered the Block or Allow information for each day of the week, press the **NEXT** button and the SET ALLOWED WATERING TIME screen will appear (see page 16 for details).

By Even Days of the Month
Water on all even days of each month (2nd, 4th… 28th, 30th)

4 Press the **UP and DOWN** arrow button(s) until **Even Days: 2, 4, 6, …30** is blinking; then press the **SELECT** button; the BLOCK ON SPECIFIC DAY OF WEEK screen will appear (see step 8 on page 15 for details).

By Odd Days of the Month
Water on all odd days of each month (1st, 3rd… 29th, not on 31st)

5 Press the **UP and DOWN** arrow button(s) until **Odd Days: 1,3,5, …no31** is blinking; then press the **SELECT** button; the BLOCK ON SPECIFIC DAY OF WEEK screen will appear (see step 8 on page 15 for details).

NOTE: Some water restrictions will allow irrigation on all odd days with the exception of the 31st day of any month. The Odd Days selection will not allow irrigation on the 31st of any month or on Feb. 29th in leap years.

```
ALLOWED WATER DAYS

No Restrictions
By Days of the Week
Even Days: 2,4,6,… 30
Odd Days: 1,3,5,…no31
Cyclical:Every  Days
BACK    ↑    ↓   SELECT
```

4

```
ALLOWED WATER DAYS

No Restrictions
By Days of the Week
Even Days: 2,4,6,… 30
Odd Days: 1,3,5,…no31
Cyclical:Every  Days
BACK    ↑    ↓   SELECT
```

5

Cyclical
Water every 2 to 14 days

6 Press the **UP and DOWN** arrow button(s) until **Cyclical: Every _ Day** is blinking; then press the **SELECT** button.

7 The CYCLICAL WATERING screen will appear and the **value** for Water Every **X** Days will be blinking.

a. Press the **- or +** button(s) to enter a value of between 2 and 14 days between irrigation cycles; then press the **NEXT** button.

b. The date to Begin Watering **dd mmm** will begin to blink. Press the **- or +** button(s) to set the date in which you want the first irrigation cycle to begin; then press the **NEXT** button; the BLOCK ON SPECIFIC DAY OF WEEK screen will appear.

⚠ **NOTE:** You can delay the actual start date up to the number of days you set between irrigation cycles.

Block One Day A Week
Allows a specific day of the week to be blocked on a regular basis.

8 The BLOCK WATERING ON SPECIFIC DAY OF WEEK screen will appear. Press the **UP and Down** arrow button(s) until the desired selection is blinking; then press the **SELECT** button and the SET ALLOWED WATERING TIME SCREEN will appear (see next page for details).

⚠ **NOTE:** An ideal application of this feature is to block irrigation on the day the gardener normally comes. The ESP-SMT controller will always block irrigation on the specific day of the week selected independent of the Allowed Watering Day's selection that was entered in the Configure Controller Section during step 3 on page 13.

6
```
  ALLOWED WATER DAYS

No Restrictions
By Days of the Week
Even Days: 2,4,6,… 30
Odd Days: 1,3,5,…no31
Cyclical:Every _ Days
BACK    ↑    ↓  SELECT
```

7
a.
```
  CYCLICAL WATERING

Water Every  3 Days

Begin Watering 01 Jan
BACK    -    +    NEXT
```

7
b.
```
  CYCLICAL WATERING

Water Every 5 Days

Begin Watering 04 Jan
BACK    -    +    NEXT
```

8
```
BLOCK WATERING ON
SPECIFIC DAY OF WEEK
None          Monday
Tuesday    Wednesday
Thursday      Friday
Saturday      Sunday
Sat & Sun
BACK    ↑    ↓  SELECT
```

Set Allowed Watering Windows

You must set specific time periods in which irrigation can occur on the previously set Allowed Watering Days.

1 When the SET ALLOWED WATER

a. TIME (screen is displayed the **06:00AM** is blinking under the 1st Watering Window text that is displayed on the screen

b. Press the **- or +** button(s) to set the time in which the irrigation schedule will begin if irrigation is needed on that particular Allowed Watering Day. Once the desired time is reached, press the **NEXT** button.

c. The text under the 1st Watering Window representing an ending time of **6:00PM** will begin to blink. Press the **- or +** button(s) to set the time in which the irrigation schedule must end. Once the desired end time is reached, press the **NEXT** button.
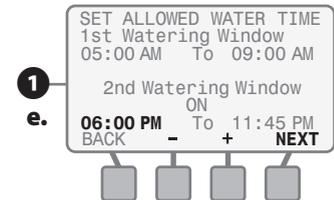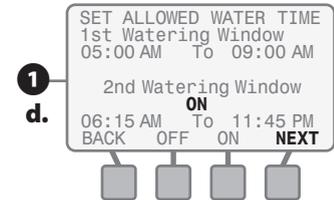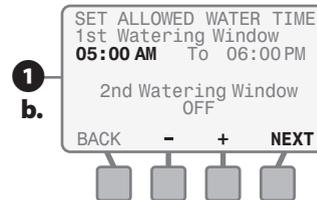
d. If a 2nd Watering Window is desired, Press the **ON** button and a second watering time will be displayed. Press the **NEXT** button and the start time of the 2nd watering window will begin to blink.

e. Press the **- or +** button(s) to set the 2nd Watering Window in which the irrigation schedule will begin if irrigation is needed on that particular Allowed Watering Day. Once the desired time is reached, press the **NEXT** button.

1
c.
```
SET ALLOWED WATER TIME
1st Watering Window
05:00 AM  To 09:00 AM

   2nd Watering Window
          OFF
BACK    −     +     NEXT
```

1
a.
```
SET ALLOWED WATER TIME
1st Watering Window
06:00 AM  To 06:00 PM

   2nd Watering Window
          OFF
BACK    −     +     NEXT
```

1
d.
```
SET ALLOWED WATER TIME
1st Watering Window
05:00 AM  To 09:00 AM

   2nd Watering Window
          ON
06:15 AM  To 11:45 PM
BACK   OFF   ON   NEXT
```

1
b.
```
SET ALLOWED WATER TIME
1st Watering Window
05:00 AM  To 06:00 PM

   2nd Watering Window
          OFF
BACK    −     +     NEXT
```

1
e.
```
SET ALLOWED WATER TIME
1st Watering Window
05:00 AM  To 09:00 AM

   2nd Watering Window
          ON
06:00 PM  To 11:45 PM
BACK    −     +     NEXT
```

f. The text under the 2nd Watering Time representing the ending time will begin to blink. Press the **- or +** button(s) to set the time in which the 2nd Watering Time must end. Once the desired end time is reached, press the **NEXT** button.

2 The Grow-In Water Window screen will appear and the text under the Grow-In Watering Time representing the start time will begin to blink.

a. Press the **- or +** button(s) to set the time in which the irrigation schedule will begin every calendar day. Once the desired time is reached, press the **NEXT** button.
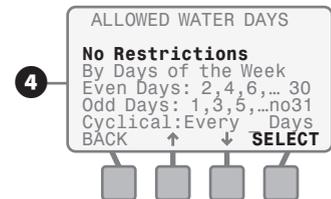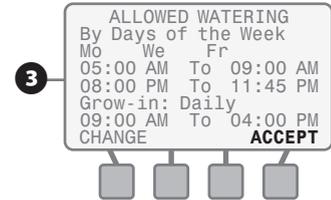
b. The text under the Grow-In Watering Time representing the ending time will begin to blink. Press the **- or +** button(s) to set the time in which the Grow-In Watering Time must end. Once the desired end time is reached, press the **NEXT** button.

3 The ALLOWED WATERING review screen will appear. This screen displays the Allowed Irrigation Days and the Allowed Watering Times that you set previously and asks you to either **ACCEPT** or to **CHANGE** the information.

4 If you press the **CHANGE** button, the screen will revert back to ALLOWED WATERING DAYS. Modify the information by following the previous steps in the Set Watering Days and Set Watering Times section of this user manual.

If you press **ACCEPT** then the CONFIGURE CONTROLLER screen will appear.

You have now completed all of the required steps to configure the controller.

```
GROW-IN WATER WINDOW
Water every day
between
09:00 AM   To  05:00 PM
BACK    -    +    NEXT
```
2 **a.**

```
GROW-IN WATER WINDOW
Water every day
between
09:00 AM   To  04:00 PM
BACK    -    +    NEXT
```
2 **b.**

```
  ALLOWED WATERING
By Days of the Week
Mo    We    Fr
05:00 AM  To  09:00 AM
08:00 PM  To  11:45 PM
Grow-in: Daily
09:00 AM  To  04:00 PM
CHANGE            ACCEPT
```
3

```
SET ALLOWED WATER TIME
1st Watering Window
05:00 AM   To  09:00 AM

 2nd Watering Window
      ON
08:00 PM  To  11:45 PM
BACK    -    +    NEXT
```
1 **f.**

```
ALLOWED WATER DAYS

No Restrictions
By Days of the Week
Even Days: 2,4,6,… 30
Odd Days: 1,3,5,…no31
Cyclical:Every   Days
BACK    ↑    ↓  SELECT
```
4

EXAMPLE:

Watering Restrictions are imposed;

You can only irrigate on even days of the month from 10:00 PM until 6:00AM; lawn maintenance occurs every Wednesday. Lawns on Zones 1 & Zone 2 are newly seeded and require a grow-in watering period of 14 days at 3 minutes per cycle for 8 cycles per calendar day to keep the seed moist during the warmest part of the day.

To meet site conditions, CONFIGURE CONTROLLER as follows:

- Set Allowed Watering Days to Even Days Of The Month
- Set Block Irrigation on Wednesdays
- Set 1st Watering Window from 10:00 PM to 11:45PM
- Set 2nd Watering Window from 12:00AM (midnight) to 06:00AM
- Set Grow-In Watering Time from 9:00AM until 5:00PM – Zone 1 &2 watering will occur for the next 14 calendar days for 3 minutes per cycle 8 times evenly divided by the Grow-In Watering Time (In this example 8 cycles in 8 hours = 1 cycle every hour)

Review Checklist

Enter Site Data
☐ Location by Zip Code
○ 5 Digit Site Zip Code (OR)
☐ Site Custom Data
○ Site Latitude
○ Site Elevation
○ Monthly Avg. Wind Speed
○ Monthly Avg. Humidity
Set Allowed Watering Days (select one)
☐ No Restrictions (OR)
☐ Custom Day(s) of the week (OR)
☐ Even Days of the Month (OR)
☐ 0dd Days of the Month - not 31st (OR)
☐ Cyclical
○ Days between Cycle
○ Beginning Date
☐ Block Day Of Week
Set Allowed Watering Times
☐ Set 1st Watering Window
☐ Set 2nd Watering Window
☐ Set Grow-in Watering Window

Input Zone Information

This section shows you how to input information that is specific to each zone you plan to irrigate. There are three methods to accomplish this task:

1) Zone Setup Wizard; 2) Advanced User Entry; 3) Copy Zone to Zone(s)

Method 1: Zone Setup Wizard

This method is recommended for new users of the ESP-SMT Controller.

Rotate the dial to **INPUT ZONE INFORMATION** position...
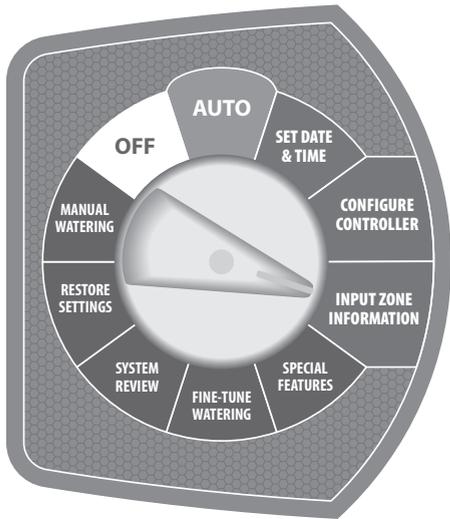
1 The INPUT ZONE INFORMATION screen will appear with the **Zone Setup Wizard** blinking; press the **SELECT** button.

Select Specific Zone Number

2 The SELECT ZONE screen will appear. Press the **- or +** button(s) until the desired Zone Number is displayed; then press the **NEXT** button.

Turn Zone to ENABLE status

3 Zone **OFF** is displayed. Press the **ENABLE** button to change zone status.

4 Zone XX **ENABLED** is displayed; press the **NEXT** button.

⚠️ **NOTE:** You can still input zone information with the zone in the OFF mode. This may be beneficial
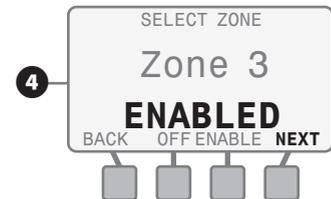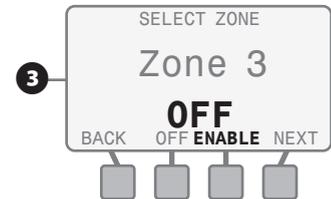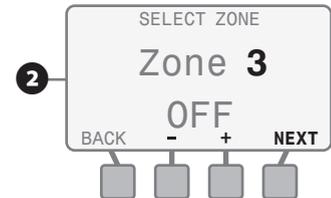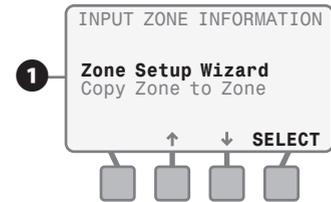
to pre-program all zones of the controller using a 9V battery prior to AC power being applied.

Enter Soil Type

5 The SOIL TYPE screen will appear. Press the **DOWN** arrow button until the desired Soil Type begins to blink; then press the **SELECT** button.

6 If you would like a description of the soil type that is blinking, press the **Help** button.

7 A description screen will appear for the soil type that was blinking when the Help button was depressed.

a. To view the next page of the soil description; press the **MORE** button.

b. The second Soil Description screen will appear; After reviewing the information; press the **NEXT** button and the SOIL TYPE screen will appear. You can then select that soil type or continue the Help process to identify the description that best matches the sites soil type.


```
SOIL TYPE        Zone 2

Sand         Loamy Sand
Sandy Loam          Loam
Clay Loam   Silty Clay
Clay

BACK   Help   ↓  SELECT
```



```
SOIL TYPE        Zone 2

Sand         Loamy Sand
Sandy Loam          Loam
Clay Loam   Silty Clay
Clay

BACK   Help   ↓  SELECT
```

```
SANDY LOAM SOIL 1 of 2
Some individual sand
grains can be seen &
felt. Enough silt
and/or clay soil
particles to provide
soil cohesion.
BACK              MORE
```

```
SANDY LOAM SOIL 2 of 2
When dry, casts can
be formed that will
not break with
careful handling.

See Manual For Details
BACK              NEXT
```

Soil Types

The adjacent table lists the Soil Type default values that are used to determine the irrigation schedule.

To help you determine the specific type of soil to select, see page 73 of the user manual.

Type	Available Water inch water /inch of soil	Basic Intake Rate inches per hour	Management Allowable Depletion (MAD)
Sand	0.06"	0.60"	50%
Loamy Sand	0.08"	0.50"	50%
Sandy Loam	0.12"	0.40"	55%
Loam	0.17"	0.35"	50%
Clay Loam	0.18"	0.20"	50%
Silty Clay	0.17"	0.15"	40%
Clay	0.17"	0.30"	35%

8 Once you've identified the correct soil type for the site; press the down arrow button until the desired soil type is blinking; press the **SELECT** button.

Select Sprinkler Type Method

9 The SPRINKLER TYPE screen will appear;

Press the **up or down** arrow button(s) to navigate to the dominant sprinkler type for that zone; then press the **SELECT** button.

⚠️ **NOTE:** It is recommended that the Default Net Application rate be adjusted to match the actual zone conditions. See pages 81-83 for different methods to determine the correct value.

Sprinkler Type - Default Net Application Rates

Sprinkler Type	Net Application Rate (in/hr)
Sprays	1.60
Rotors	0.45
Rotary Nozzle	0.50
Bubblers	2.50
Point Source Drip	0.80

10 The screen will display the default Net Application Rate for the sprinkler type selected.

11 If you need to change this value to better match the actual application rate, press the **- or +** button(s) until the desired value is shown.

12 If choosing **Drip** as the sprinkler type, you will be given two types of drip to select from.

a. When **Drip** is blinking on the display, press the **SELECT** button.

b. Select Point Source or Inline Grid.

10
```
ROTOR           Zone 2
Net Application Rate:
0.45 in/hr
BACK    −    +    NEXT
```


11
```
ROTOR           Zone 2
Net Application Rate:
0.25 in/hr
BACK    −    +    NEXT
```


8
```
SOIL TYPE       Zone 2
Sand        Loamy Sand
Sandy Loam        Loam
Clay Loam  Silty Clay
Clay
BACK  Help   ↓  SELECT
```


9
```
SPRINKLER TYPE Zone 2
Sprays           Rotors
       Bubblers
    Rotary Nozzle
        Drip
       - OR -
     Time-Based
BACK    ↑    ↓  SELECT
```

12 a.
```
SPRINKLER TYPE Zone 2
Sprays           Rotors
       Bubblers
    Rotary Nozzle
        Drip
       - OR -
     Time-Based
BACK    ↑    ↓  SELECT
```

12 b.
```
DRIP            Zone 2
      Point Source
       Inline Grid
BACK    ↑    ↓  SELECT
```

13 If Point Source Drip is selected, a series of notes will be displayed to describe how to determine the net application rate for point source emitters.

a. Continue to press **NEXT** to advance to the next screen.

b. Press the **NEXT** button.

c. Press the **NEXT** button.

d. Similar to other sprinkler types, the default net application rate for point source drip will appear.

e. Use the **- or +** button(s) to change the value until it matches the conditions of the zone. Press the **NEXT** button and the CYCLE/SOAK screen will appear.

Drip Irrigation Emitter Application Rates

Clay Soil

Flow in Gallons per hour	Wetted Area (Dia. Ft.)	Wetted Area (Sq. Ft.)	Application Rate (inches per hour)
0.5	2.0'	3.14	0.26"
1	2.5'	4.91	0.33"
2	3.0'	7.07	0.45"
5	3.0'	7.07	1.13"

Loam Soil

Flow in Gallons per hour	Wetted Area (Dia. Ft.)	Wetted Area (Sq. Ft.)	Application Rate (inches per hour)
0.5	1.5'	1.77	0.45"
1	2.0'	3.14	0.51"
2	2.5'	4.91	0.65"
5	2.5'	4.91	1.63"

Sandy Soil

Flow in Gallons per hour	Wetted Area (Dia. Ft.)	Wetted Area (Sq. Ft.)	Application Rate (inches per hour)
0.5	1.0'	0.79	1.02"
1	1.0'	0.79	2.03"
2	1.25'	1.23	2.61"
5	1.25'	1.23	6.52"

13 a.
```
POINT SOURCE EMITTERS
Application Rate is
calculated by first
calcuting the Total
Zone GPM and
Estimated Wetted Area
in Sq Ft.
BACK    1 of 3    NEXT
```

13 b.
```
POINT SOURCE EMITTERS
Zone GPM is (# of
Emitters * Flow Rate
of Emitters in GPH)
and dividing by 60
BACK    1 of 3    NEXT
```

13 c.
```
POINT SOURCE EMITTERS
Net Application Rate
is calculated as
(96.25 * Zone GPM) +
Estimated Soil Wetted
Area of all point
source emitters.
BACK    1 of 3    NEXT
```

13 d.
```
DRIP          Zone 10

Net Application Rate:
0.80 in/hr

BACK    -    +    NEXT
```

13 e.
```
DRIP          Zone 10

Net Application Rate:
0.60 in/hr

BACK    -    +    NEXT
```

14 If Inline Grid is selected:

a. The Flow Rate value will blink. Use the **- or +** button(s) to change the Flow Rate to the desired value. Press the **NEXT** button.

b. The Emitter Spacing value will blink. Use the **- or +** button(s) to change the value as desired. Press the **NEXT** button.

c. The Row Spacing value will blink. Use the **- or +** button(s) to change to the desired value. Press the **NEXT** button.

d. The Estimated Application Rate screen will appear with the Adjust Factor blinking. Use the **- or +** button(s) to change to the desired Adjust Factor value. Press the **NEXT** button.

e. The CYCLE/SOAK screen will appear.

14 a.
```
INLINE GRID    Zone 11
Flow Rate        0.90 GPH
Emitter Spacing  12 in
Row Spacing      12 in
BACK    −    +    NEXT
```

14 b.
```
INLINE GRID    Zone 11
Flow Rate        0.90 GPH
Emitter Spacing  12 in
Row Spacing      12 in
BACK    −    +    NEXT
```

14 c.
```
INLINE GRID    Zone 11
Flow Rate        0.90 GPH
Emitter Spacing  18 in
Row Spacing      12 in
BACK    −    +    NEXT
```

14 d.
```
INLINE GRID    Zone 11
Est.Application Rate:
      0.64 in/hr
Adjust Factor   100%
Net Application Rate:
0.64 in/hr
BACK    −    +    NEXT
```

14 e.
```
INLINE GRID    Zone 11
Est.Application Rate:
      0.64 in/hr
Adjust Factor   95%
Net Application Rate:
0.61 in/hr
BACK    −    +    NEXT
```

Select Time-Based Method

15 Press the **up or down** arrow button(s) to navigate to the **Time-Based** text and press the **SELECT** button.

16 The TIME–BASED screen for the selected zone will appear and the Every XX Days **value** will be blinking. Press the **- or +** button(s) to set the desired number of calendar days between irrigation schedules. Press the **NEXT** button.

17 The Water XXX Minutes **value** will begin to blink. Press the **- or +** button(s) to set the minutes for each irrigation cycle. Press the **NEXT** button.

18 The For X Times Per Day **value** will begin to blink. Press the **- or +** button(s) to set the desired number of irrigation cycles per day. Press the **NEXT** button.

⚠️ **NOTE:** A typical application for using the time-based method is for 1) zones that irrigate potted plants and 2) a zone that may be used to fill a pool.

15
```
SPRINKLER TYPE  Zone 1
Sprays          Rotors
     Bubblers
   Rotary Nozzle
        Drip
       - OR -
     Time-Based
BACK    ↑     ↓   SELECT
```

17
```
TIME-BASED      Zone 12
Odd Days:1,3,5,...no 31
     Except Wednesday
Desired Every 2 Days
  Water For  8 Minutes
  xx Times Per Day
BACK    -     +    NEXT
```

16
```
TIME-BASED      Zone 12
Odd Days:1,3,5,...no 31
     Except Wednesday
Desired Every 2 Days
  Water For xx Minutes
  xx Times Per Day
BACK    -     +    NEXT
```

18
```
TIME-BASED      Zone 12
Odd Days:1,3,5,...no 31
     Except Wednesday
Desired Every 2 Days
  Water For  8 Minutes
  3 Times Per Day
BACK    -     +    NEXT
```

19 The CYCLE/SOAK screen will appear with 0° - 2° blinking.

a. Use the **up or down** arrow button(s) to select the slope degree category representative of the zone topography. Press the **NEXT** button.

b. The Automatic Cycle and Soak Mode will blink. If you agree with the automatically calculated maximum cycle value and the minimum soak value, press the **NEXT** button.

c. If you want to change the automatically calculated cycle and soak values, press either the **- or +** button(s) and Custom will blink. Press the **NEXT** button.

d. The Maximum Cycle value will blink. Use **- or +** button(s) the to increase or decrease the maximum cycle time. Press the **NEXT** button.

e. The Minimum Soak value will blink. Use the **- or +** button(s) to change to the desired minimum soak time value.

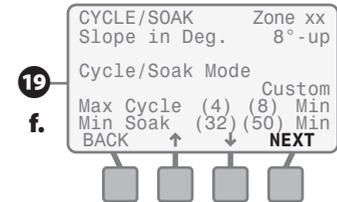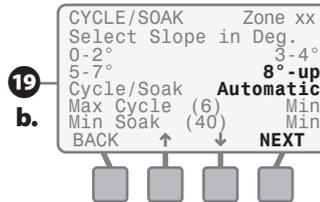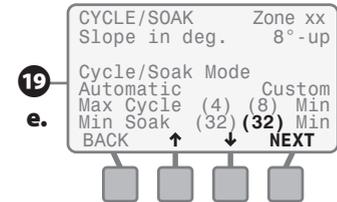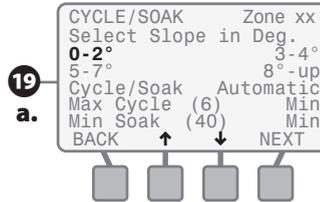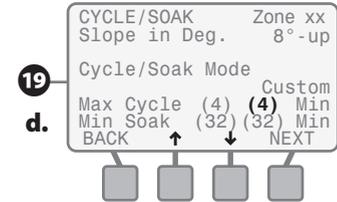**f.** Press the **NEXT** button. The Plant Type screen will appear.

19 c.
```
CYCLE/SOAK       Zone xx
Slope in deg.      8°-up

Cycle/Soak Mode
Automatic         Custom
Max Cycle  (4) (4)  Min
Min Soak  (32)(32)  Min
 BACK      ↑    ↓   NEXT
```

19 d.
```
CYCLE/SOAK       Zone xx
Slope in Deg.      8°-up

Cycle/Soak Mode
                  Custom
Max Cycle  (4) (4)  Min
Min Soak  (32)(32)  Min
 BACK      ↑    ↓   NEXT
```

19 a.
```
CYCLE/SOAK       Zone xx
Select Slope in Deg.
0-2°             3-4°
5-7°             8°-up
Cycle/Soak    Automatic
Max Cycle  (6)      Min
Min Soak  (40)      Min
 BACK      ↑    ↓   NEXT
```

19 e.
```
CYCLE/SOAK       Zone xx
Slope in deg.      8°-up

Cycle/Soak Mode
Automatic         Custom
Max Cycle  (4) (8)  Min
Min Soak  (32)(32)  Min
 BACK      ↑    ↓   NEXT
```

19 b.
```
CYCLE/SOAK       Zone xx
Select Slope in Deg.
0-2°             3-4°
5-7°             8°-up
Cycle/Soak    Automatic
Max Cycle  (6)      Min
Min Soak  (40)      Min
 BACK      ↑    ↓   NEXT
```

19 f.
```
CYCLE/SOAK       Zone xx
Slope in Deg.      8°-up

Cycle/Soak Mode
                  Custom
Max Cycle  (4) (8)  Min
Min Soak  (32)(50)  Min
 BACK      ↑    ↓   NEXT
```

Select Plant Type Method - Grass Lawns

20 While the PLANT TYPE screen is displayed, **Grass Lawn** will be blinking; press the **SELECT** button.
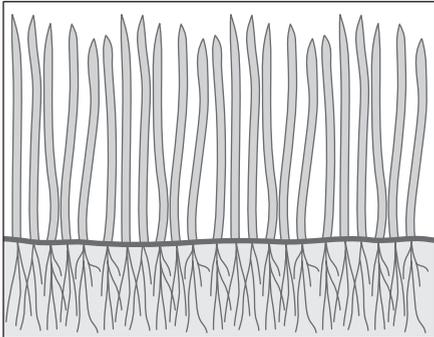
21 The GRASS VARIETY screen will appear. Press the **UP and Down** arrow button(s) until the desired variety (Cool Season or Warm Season) is blinking; then press the **SELECT** button and the SHADE FACTOR screen will appear (see page 29 for details).

20
```
PLANT TYPE        Zone 1
Grass Lawn       Annuals
Ground Cover      Shrubs
Desert Plants      Trees
Mixed Planting
        - OR -
Custom Plant Factors
BACK      ↑      ↓   SELECT
```

21
```
PLANT TYPE        Zone 1
Grass Lawn       Annuals
Ground Cover      Shrubs
Desert Plants      Trees
Mixed Planting
        - OR -
Custom Plant Factors
BACK      ↑      ↓   SELECT
```

Most "Cool Season" grasses do not spread through runners, but rather from actual seed that germinates. Cool Season varieties usually have individual blades that grow in a vertical orientation.

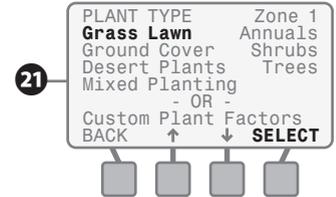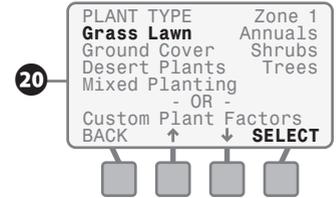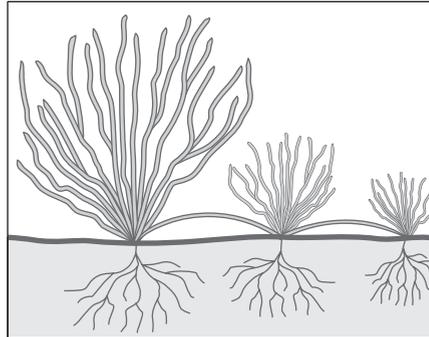*Most "Warm Season" grass varieties grow (spread) through runners that branch out horizontally from the established lawn or from planted stolons. In general, Warm Season grasses go dormant in the winter.*

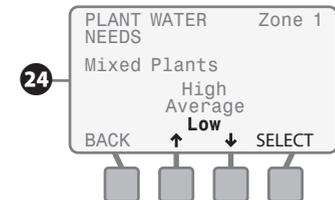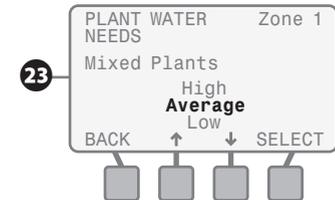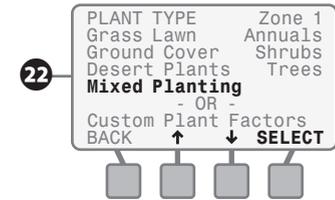## Cool Season Variety

Warm Season Variety

Select Plant Type Method - Non-Grass Lawns

22 While the PLANT TYPE screen is displayed, press the **UP and DOWN** arrow button(s) until the desired plant type (non-grass) is blinking; then press the **NEXT** button and the PLANT WATER NEEDS screen will appear (see next page for details).

Select Plant Water Needs - (Non-Grass Plant Types)

23 The PLANT WATER NEED screen will appear with the plant type selected and Average selection blinking.

24 Use the **UP and DOWN** arrow button(s) to navigate to the desired plant water need for that specific zone. Press the SELECT button and the PLANT DENSITY screen will appear.

22
```
PLANT TYPE        Zone 1
Grass Lawn       Annuals
Ground Cover      Shrubs
Desert Plants      Trees
Mixed Planting
     - OR -
Custom Plant Factors
BACK     ↑     ↓   SELECT
```

23
```
PLANT WATER      Zone 1
NEEDS
Mixed Plants
         High
       Average
        Low
BACK     ↑     ↓   SELECT
```

24
```
PLANT WATER      Zone 1
NEEDS
Mixed Plants
         High
       Average
         Low
BACK     ↑     ↓   SELECT
```

The adjacent table lists the default species factor (Ks) and root depth values used to calculate the irrigation schedule. If you do not want to use the default values then use the Custom Plant Factor method.

The plant choices and their respective Ks values listed in the table are representative of different plant varieties that fall into these broad categories.

Plant Factor & Root Depth by Plant Type - Default Values

Plant Type	High Need	Average Need	Low Need	Root Depth
Grass – Cool Season	ESP-SMT uses monthly Kc values, published in the Irrigation Assoc. SWAT Testing Protocol - 8th Draft.			3"
Grass – Warm Season				3"
Annual Color	150%	120%	100%	2"
Ground Cover	90%	50%	20%	6"
Shrubs	70%	50%	20%	8"
Desert Plants (Natives)	50%	30%	15%	12"
Trees	90%	50%	20%	12"
Mixed Planting	90%	50%	20%	6"

For example: a low water need shrub would use 20% of ETo and have a default root depth of 8 inches.

Custom Plant Factor Method

25 While the PLANT TYPE screen is displayed, press the **UP and DOWN** arrow button(s) until **Custom Plant Factors** is blinking; then press the **SELECT** button.

26 The CUSTOM PLANT FACTORS screen will appear with the Species Factor **value** blinking.

a. Press the **- or +** button(s) to adjust Species Factor (Ks) to the desired value; then press the **NEXT** button.

b. The Root Depth **value** will begin to blink. Press the **- or +** button(s) to adjust Root Depth to the desired value; then press the **NEXT** button and the PLANT DENSITY screen will appear.

For more plant variety specific information, it is recommended that you access Water Use Classifications of Landscape Species (WU-COLS) Guide developed by the University of California. This guide is available through the California Department of Water Resources at:
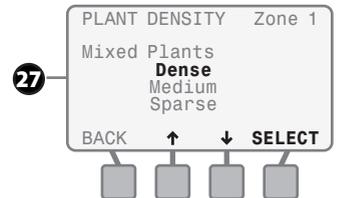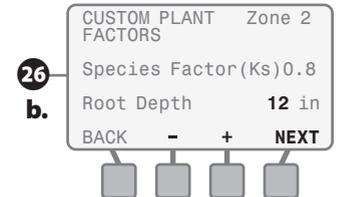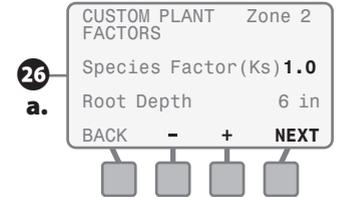
http://ucce.ucdavis.edu/files/ filelibrary/1726/15359.pdf
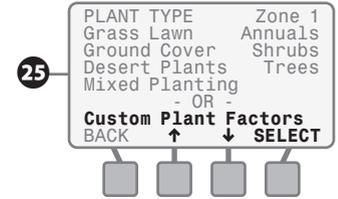
Enter Plant Density

27 While the PLANT DENSITY screen is displayed, press the **UP and DOWN** arrow button(s) until the desired plant density description starts to blink, press the **SELECT** button and the SHADE FACTOR screen will appear.

The following table lists the Density Factor default values that are applied to the Species Factor (Ks) above to determine the irrigation schedule.

Density Factor by Plant Type

Plant Type	Dense	Medium	Sparse
Cool Turf	Density is not a factor for Cool Turf or Warm Turf		
Warm Turf			
Annual Color	1.0	1.0	0.8
Ground Cover	1.1	1.0	0.5
Shrubs	1.1	1.0	0.6
Desert/Native	1.3	1.0	0.6
Trees	1.3	1.0	0.6
Mixed Planting	1.2	1.0	0.6
Custom Plant Factor	1.2	1.0	0.6

25
```
PLANT TYPE      Zone 1
Grass Lawn     Annuals
Ground Cover    Shrubs
Desert Plants    Trees
Mixed Planting
      - OR -
Custom Plant Factors
BACK    ↑    ↓   SELECT
```

26 a.
```
CUSTOM PLANT    Zone 2
FACTORS

Species Factor(Ks)1.0

Root Depth      6 in

BACK    −    +    NEXT
```

26 b.
```
CUSTOM PLANT    Zone 2
FACTORS

Species Factor(Ks)0.8

Root Depth     12 in

BACK    −    +    NEXT
```

27
```
PLANT DENSITY   Zone 1

Mixed Plants
      Dense
      Medium
      Sparse

BACK    ↑    ↓   SELECT
```

Enter Shade Factor

28 The SHADE FACTOR screen will appear. Press the **UP and DOWN** arrow button(s) until the desired Shade Factor **description** starts to blink; then press the **SELECT** button and the PLANT MATURITY screen appears.

The following table lists the Sun / Shade Factor default values that are applied to the Species Factor (Ks) to determine the irrigation schedule.

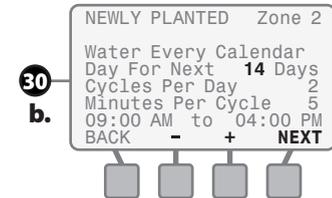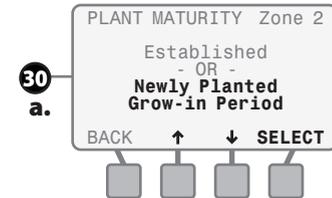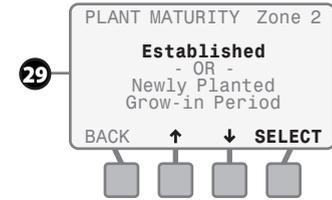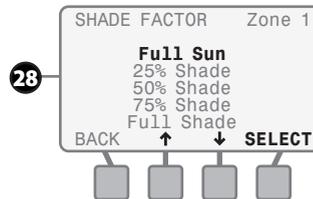| Exposure	Non-Turf	Turf
Full Sun	1.30	1.00
25% Shade	1.15	0.89
50% Shade	1.00	0.77
75% Shade	0.75	0.67
Full Shade	0.50	0.56

Enter Plant Maturity - (Established Method)

29 While the PLANT MATURITY screen is displayed;

Press the **UP and DOWN** arrow button(s) until **Established** is blinking on the display; then press the **SELECT** button and the ZONE REVIEW screen will appear.

Enter Plant Maturity - (Newly Planted Method)

30 While the PLANT MATURITY screen is displayed:

a. Press the **UP and DOWN** arrow button(s) until **Newly Planted, Grow-in Period** is blinking on the display; then press the **SELECT** button.

b. The NEWLY PLANTED screen will appear and the **value** For the Next XX Days will be blinking. Press the **- or +** button(s) to adjust to the desired number of days (this value can be from 0 to 99 days); then press the **NEXT** button.

c. The **value** for **Cycles Per Day** will begin to blink. Press the **- or +** button(s) to adjust to the desired Cycles Per Day (this value can be from 1 to 8 cycles per day); then press the **NEXT** button.

29
```
SHADE FACTOR     Zone 1

        Full Sun
        25% Shade
        50% Shade
        75% Shade
        Full Shade
BACK     ↑     ↓    SELECT
```

29
```
PLANT MATURITY  Zone 2

        Established
         - OR -
       Newly Planted
       Grow-in Period
BACK     ↑     ↓    SELECT
```

30 a.
```
PLANT MATURITY  Zone 2

        Established
         - OR -
       Newly Planted
       Grow-in Period
BACK     ↑     ↓    SELECT
```

30 b.
```
NEWLY PLANTED   Zone 2

Water Every Calendar
Day For Next    14 Days
Cycles Per Day        2
Minutes Per Cycle     5
09:00 AM  to  04:00 PM
BACK     –     +     NEXT
```

30 c.
```
NEWLY PLANTED   Zone 2

Water Every Calendar
Day For Next   14 Days
Cycles Per Day        6
Minutes Per Cycle     5
09:00 AM  to  04:00 PM
BACK     –     +     NEXT
```

d. The **value** for the **Minutes Per Cycle** will begin to blink. Press the **- or +** button(s) to adjust to the desired Minutes Per Cycle (this value can be from 1 to 30 minutes per cycle); then press the **NEXT** button and the ZONE REVIEW screen will appear.
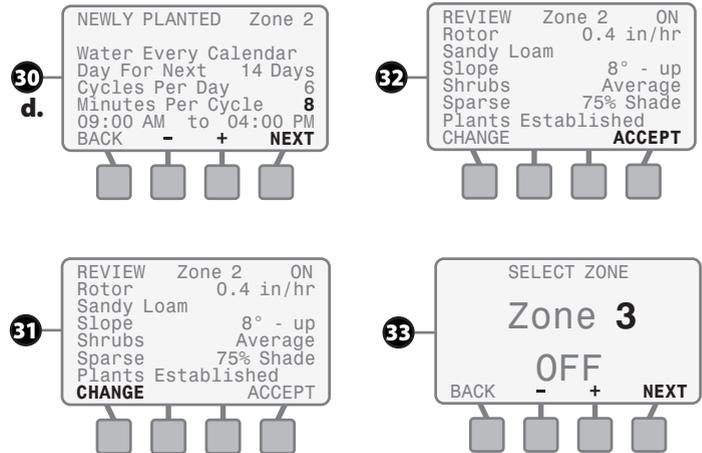
Review Zone Information

The REVIEW screen displays the previously entered information for the specific zone that you entered in the previous steps following the Zone Input Wizard

31 If you want to change any of the information on the REVIEW screen, press the **CHANGE** button and the SOIL TYPE screen will appear. Go to step 5 on page 20 to change the information as required.

32 If you accept all of the information in the REVIEW screen then press the **ACCEPT** button.

33 The SELECT ZONE screen will appear. Select the next zone and repeat steps starting on page 19 for all zones that will be enabled either now or in the future.

As you enter information for each active zone, it will be saved for recall in the event of a power outage.

You have now completed all of the required steps for the INPUT ZONE INFORMATION dial position (see page 31 for Review Checklist).

30 d.
```
NEWLY PLANTED   Zone 2

Water Every Calendar
Day For Next   14 Days
Cycles Per Day        6
Minutes Per Cycle     8
09:00 AM  to  04:00 PM
BACK    -    +    NEXT
```

32
```
REVIEW   Zone 2    ON
Rotor       0.4 in/hr
Sandy Loam
Slope          8° - up
Shrubs         Average
Sparse       75% Shade
Plants Established
CHANGE          ACCEPT
```

31
```
REVIEW   Zone 2    ON
Rotor       0.4 in/hr
Sandy Loam
Slope          8° - up
Shrubs         Average
Sparse       75% Shade
Plants Established
CHANGE          ACCEPT
```

33
```
SELECT ZONE

Zone 3

OFF
BACK    -    +    NEXT
```

Review Checklist Zone Method #1 - Zone Setup Wizard

1 ☐ Select Specific Zone Number

2 ☐ Turn Zone to ENABLED or OFF

3 ☐ Enter Soil Type
- ○ Sand   ○ Loamy Sand
- ○ Sandy Loam   ○ Loam
- ○ Clay Loam   ○ Silty Clay
- ○ Clay

or ☐ Select Time-based Mode
- ○ Every XX Days
- ○ Water XXX Minutes
- ○ For X Times Per Day

4 ☐ Select Sprinkler Type
- ○ Sprays   ○ Rotors
- ○ Rotary Noz   ○ Bubblers
- ○ Drip

5 ☐ Enter Slope in XX Degrees
- ○ 0-2°   ○ 3-4°
- ○ 5-7°   ○ 8° - up

6 ☐ Select Plant Type
- ○ Grass Lawn
  - ○ Cool Season Variety
  - ○ Warm Season Variety
- ○ Annuals
- ○ Ground Cover
- ○ Shrubs
- ○ Desert Plants (Natives)
- ○ Trees
- ○ Mixed Planting

or ☐ Custom Plant Factors
- ○ Species Factor (Ks)
- ○ Root Depth

7 ☐ Plant Water Needs By Zone
- ○ High
- ○ Medium
- ○ Low

8 ☐ Enter Plant Density
- ○ Dense
- ○ Medium
- ○ Sparse

9 ☐ Enter Shade Factor
- ○ Full Sun
- ○ 25% Shade
- ○ 50% Shade
- ○ 75% Shade
- ○ Full Shade

10 ☐ Established

or ☐ Newly Planted
- ○ Water Next XX Days
- ○ XX Cycles per Day
- ○ XX Minutes per Cycle

11 ☐ Review Screen
- ○ Accept Data - Select the next zone and repeat steps starting on page 19
- ○ Change Data - Go to step 5 on page 20 to change the information as required
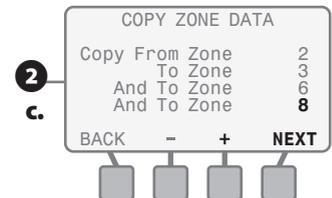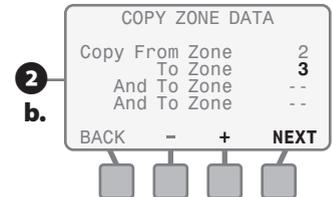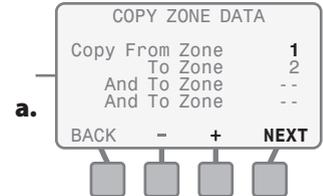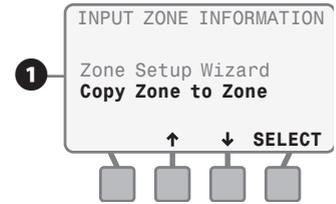
Input Zone Information

Method 2: Copy Zone to Zone(s)

This method is useful if the conditions for one zone match other zones.

Rotate the dial to **INPUT ZONE INFORMATION** position...

```
┌─────────────────────────────┐
│ INPUT ZONE INFORMATION      │
│                             │
│ Zone Setup Wizard           │
│ Copy Zone to Zone           │
│                             │
│           ↑    ↓   SELECT    │
└─────────────────────────────┘
```
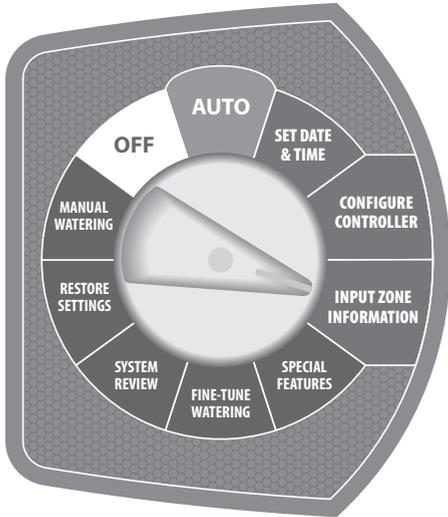
❶ The INPUT ZONE INFORMATION screen will appear. Press the **UP and DOWN** arrow button(s) until **Copy Zone to Zone** is blinking; then press the **SELECT** button.

❷ The Copy From Zone **value** will begin to blink;

a. Press the **- or +** button(s) until the source Zone number is displayed; then press the **NEXT** button.

```
┌─────────────────────────────┐
│       COPY ZONE DATA        │
│                             │
│ Copy From Zone          1   │
│         To Zone         2   │
│     And To Zone        --   │
│     And To Zone        --   │
│ BACK    −    +     NEXT      │
└─────────────────────────────┘
```
a.

b. The To Zone **value** will blink. Press the **- or +** button(s) until the destination Zone number is displayed; then press the **NEXT** button.

```
┌─────────────────────────────┐
│       COPY ZONE DATA        │
│                             │
│ Copy From Zone          2   │
│         To Zone         3   │
│     And To Zone        --   │
│     And To Zone        --   │
│ BACK    −    +     NEXT      │
└─────────────────────────────┘
```
❷ b.

c. The next destination zone will begin to blink. Press the **- or +** button(s) until the destination Zone number is displayed; then press the **NEXT** button. Repeat this process to add a third destination zone if needed.

```
┌─────────────────────────────┐
│       COPY ZONE DATA        │
│                             │
│ Copy From Zone          2   │
│         To Zone         3   │
│     And To Zone         6   │
│     And To Zone         8   │
│ BACK    −    +     NEXT      │
└─────────────────────────────┘
```
❷ c.

3 The COPY ZONE DATA screen will display the information you just entered.

a. If the information is incorrect then press the **QUIT** button.

b. Zone Data NOT copied screen will appear.

4 If the information is correct then
a. press the **COPY** button.

b. A confirmation screen will appear. Press the **NEXT** button.

5 The original INPUT ZONE INFORMATION screen will appear.

```
        COPY ZONE DATA

Copy From Zone       2
         To Zone      3
   And To Zone        6
   And To Zone        8
   Start Copy or Quit
QUIT       COPY
```
3 a.

```
        COPY ZONE DATA

Copy From Zone       2
         To Zone      3
   And To Zone        6
   And To Zone        8
   Start Copy or Quit
QUIT       COPY
```
4 a.

```
        COPY ZONE DATA

        Zone Data
    NOT Copied

Press NEXT To Continue
                   NEXT
```
3 b.

```
        COPY ZONE DATA

        Copy Complete
      From Zone       2
         To Zone      3
   And To Zone        6
   And To Zone        8
                   NEXT
```
4 b.

```
   INPUT ZONE INFORMATION

   Zone Setup Wizard
   Copy Zone to Zone

             ↑    ↓  SELECT
```
5

Special Features

This section shows you how to customize the irrigation schedule for your site to meet your specific needs by utilizing the ESP-SMT controller's Special Features.

Rotate the dial to **SPECIAL FEATURES** position...
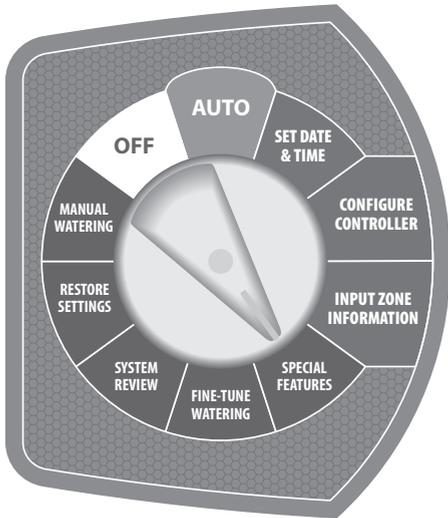
1 The SPECIAL FEATURES screen will appear allowing you to utilize any combination of the following five Special Features:

Event Days Off

Allows you to block irrigation on up to 4 specific dates up to 365 days in advance.

2 If you'd like to block irrigation from occurring on a specific date(s): when **Event Days Off** is blinking on the display press the **SELECT** button;

3 The EVENT DAYS OFF screen will appear;

a. Press the **+** button and the **current date** will appear in the first available line of dashes.

b. Press either **- or +** button(s) to change to the date that you would like to block irrigation from occurring; then press the **NEXT** button.
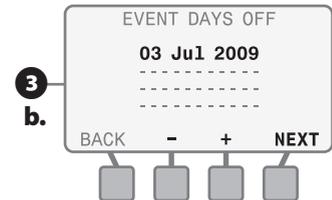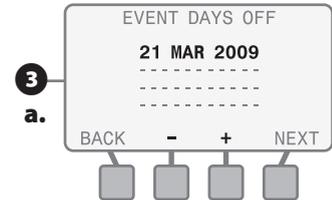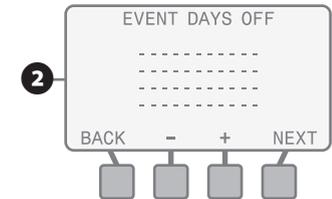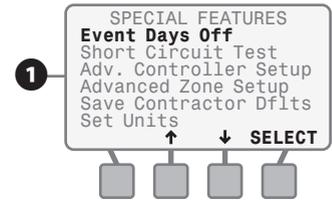
c. The second entry line will begin to blink. Press the **+** button and the **current date** appears and begins to blink. Press either **- or +** button(s) to change to the date that you would like to prevent irrigation from occurring; then press the **NEXT** button.

d. Continue this process until all desired Event Days Off are displayed (maximum of 4 dates). In the screen example, irrigation will be blocked from occurring on July 3rd & 4th, as well as Dec 24th and 25th as there are parties planned in the yard on those specific dates.

⚠ **NOTE:** Event Day Off dates can be entered in any order. The ESP-SMT controller will block irrigation based on the chronological order of the dates listed on the screen independent of the Allowed Watering Days entered in the Configure Controller Section.
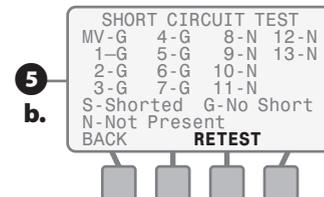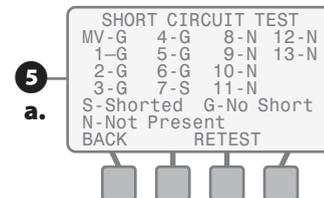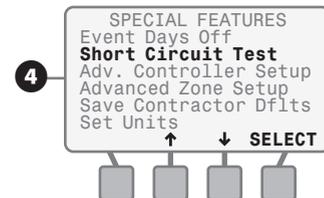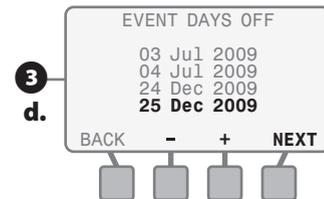
⚠ **NOTE:** Do not press the - button when the current date appears on the screen as this date will be canceled and dashes will re-appear on the screen.

Short Circuit Test
Allows you to run a test to validate that the wiring is working properly.

4 If you would like to conduct a Short Circuit Test to validate the wiring integrity on a zone by zone basis: Press the **UP and Down** arrow button(s) until **Short Circuit Test** is blinking on the display; then press the **SELECT** button.

5 The SHORT CIRCUIT TEST screen will appear and a Short Circuit Test will be initiated;

a. The short circuit test identifies on a zone by zone basis, the electrical integrity of each zone as "Good", "Short" or "Not Present".

b. If you want to run the short circuit test again after you've identified and fixed a problem, press the **RETEST** button.

3
d.
```
        EVENT DAYS OFF

       03 Jul 2009
       04 Jul 2009
       24 Dec 2009
       25 Dec 2009

   BACK    −    +    NEXT
```

4
```
      SPECIAL FEATURES
   Event Days Off
   Short Circuit Test
   Adv. Controller Setup
   Advanced Zone Setup
   Save Contractor Dflts
   Set Units
           ↑    ↓  SELECT
```

5
a.
```
     SHORT CIRCUIT TEST
   MV-G   4-G   8-N 12-N
    1—G   5-G   9-N 13-N
    2-G   6-G  10-N
    3-G   7-S  11-N
   S-Shorted  G-No Short
   N-Not Present
   BACK       RETEST
```

3
c.
```
        EVENT DAYS OFF

       03 Jul 2009
       04 Jul 2009
       - - - - - - - - - -
       - - - - - - - - - -
   BACK    −    +    NEXT
```

5
b.
```
     SHORT CIRCUIT TEST
   MV-G   4-G   8-N 12-N
    1—G   5-G   9-N 13-N
    2-G   6-G  10-N
    3-G   7-G  11-N
   S-Shorted  G-No Short
   N-Not Present
   BACK       RETEST
```

Advanced Controller Setup

Allows you to set an ETo adjustment factor, set a Zone to Zone Delay and/or Suspend Watering when rainfall exceeds a user set value, and/or when the temperature falls below a user-set value.

6 If you would like to globally program the controller to:

- Set an ETo adjustment factor to adjust for sensor placement.

- Set a time delay between one valve turning off and the next valve turning on.

- Suspend irrigation when rainfall exceeds a specific amount.

- Suspend irrigation when the temperature falls below a preset level.

Press the **UP and Down** arrow button(s) until **Adv. Controller Setup** is blinking on the display; then press the **SELECT** button.

7 The ADV CONTROLLER SETUP screen will appear with the **value** for the ET Adjustment factor blinking;

a. Press the **- or +** button(s) to set the desired ET adjustment factor; then press the **NEXT** button.

⚠ **NOTE:** This feature can be used to globally increase or decrease the calculated ETo value thereby adjusting the overall water needs.

b. Press the **- or +** button(s) to set the desired zone delay time value; then press the **NEXT** button.
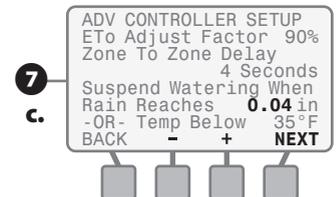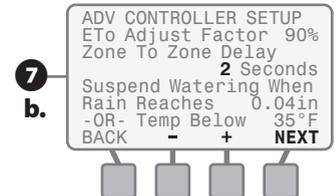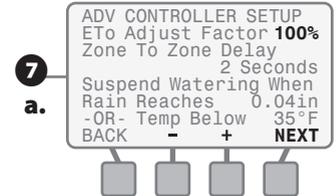
⚠ **NOTE:** An ideal application of the Zone to Zone Delay feature is for a slow filling well in which a delay is required to allow the well to fill back to a minimum level prior to the next zone irrigating.

c. The Suspend Watering When Rain Over **value** will begin to blink. Press the **- or +** button(s) to set the desired rainfall value; then press the **NEXT** button.

⚠ **NOTE:** The Suspend Watering When Rain Over XX inches feature allows you to customize how much rainfall is required before suspension of the irrigation system will occur.

6
```
  SPECIAL FEATURES
Event Days Off
Short Circuit Test
Adv. Controller Setup
Advanced Zone Setup
Save Contractor Dflts
Set Units
     ↑      ↓   SELECT
```

7
a.
```
ADV CONTROLLER SETUP
ETo Adjust Factor 100%
Zone To Zone Delay
           2 Seconds
Suspend Watering When
Rain Reaches   0.04in
-OR- Temp Below   35°F
BACK    -    +    NEXT
```

7
b.
```
ADV CONTROLLER SETUP
ETo Adjust Factor 90%
Zone To Zone Delay
           2 Seconds
Suspend Watering When
Rain Reaches   0.04in
-OR- Temp Below   35°F
BACK    -    +    NEXT
```

7
c.
```
ADV CONTROLLER SETUP
ETo Adjust Factor 90%
Zone To Zone Delay
           4 Seconds
Suspend Watering When
Rain Reaches   0.04in
-OR- Temp Below   35°F
BACK    -    +    NEXT
```

d. The Temp. Below: **value** will begin to blink. Press the **- or +** button(s) to set the desired temperature value; then press the **NEXT** button.

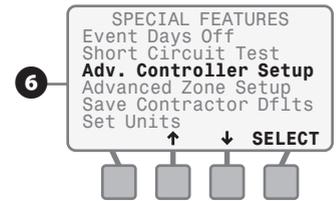⚠️ **NOTE:** The Suspend Watering When Temp. Below XX feature allows you to set a temperature threshold when irrigation will be suspended to prevent potential freeze damage to the system components.

Advanced Zone Setup
Allows you to assign each zone to:

- **Use/Not Use a Master Valve / Pump Start Relay.**
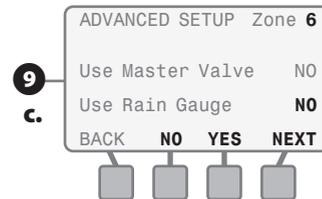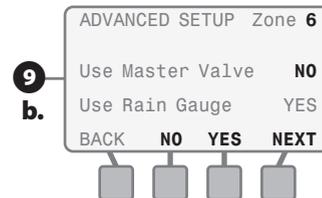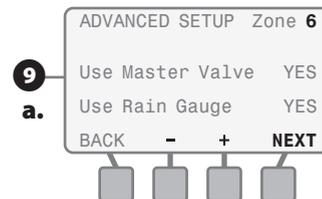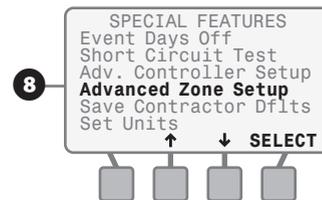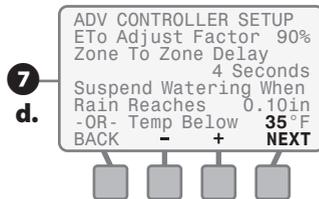- **Use/Not Use the ESP-SMT Rain Gauge information.**

8 If you would like to set a specific zone to use or not use a Master Valve or Pump Start Relay and/or the rainfall measurement information gathered from the ESP-SMT Rain Gauge: Press the **UP and Down** arrow button(s) until **Advanced Zone Setup** is blinking on the display; then press the **SELECT** button.

9 The ADVANCED SETUP screen will appear and the Zone Number begins to blink;

a. Press the **- or +** button(s) until the desired Zone number is displayed; then press the **NEXT** button.

b. Use Master Valve: **YES** will begin to blink. Press either the **YES or NO** button(s) and either **YES or NO** will be displayed; then press the **NEXT** button.

c. Use Rain Sensor: **YES** will begin to blink; press either the **YES or NO** button(s) and either **YES or NO** will be displayed; then press the **NEXT** button.

8
```
    SPECIAL FEATURES
Event Days Off
Short Circuit Test
Adv. Controller Setup
Advanced Zone Setup
Save Contractor Dflts
Set Units
     ↑        ↓   SELECT
```

9
a.
```
ADVANCED SETUP  Zone 6

Use Master Valve     YES

Use Rain Gauge       YES

BACK    –    +     NEXT
```

9
b.
```
ADVANCED SETUP  Zone 6

Use Master Valve      NO

Use Rain Gauge       YES

BACK   NO  YES    NEXT
```

7
d.
```
ADV CONTROLLER SETUP
ETo Adjust Factor 90%
Zone To Zone Delay
           4 Seconds
Suspend Watering When
Rain Reaches   0.10in
-OR- Temp Below  35°F
BACK    –    +     NEXT
```

9
c.
```
ADVANCED SETUP  Zone 6

Use Master Valve      NO

Use Rain Gauge        NO

BACK   NO  YES    NEXT
```

Save Settings to "Contractor Default" Program

10 The SPECIAL FEATURES screen will appear and **Save Contractor Deflts** will be blinking. If you want to save your current settings into memory for retrieval at a later date in case you or your customer accidentally makes undesired setting adjustments, press the **SELECT** button.

11 The SAVE CURRENT SETTINGS TO: Contractor Defaults screen will appear. If you want to continue the process of saving your settings to Contractor Default, press the **SAVE** button.

12 A WARNING screen will appear. If you want to continue to save your current settings press the **CONTINUE** button.

13 The CURRENT SETTINGS SAVED screen will appear. Press the **CONTINUE** button.

10
```
     SPECIAL FEATURES
Event Days Off
Short Circuit Test
Adv. Controller Setup
Advanced Zone Setup
Save Contractor Dflts
Set Units
        ↑    ↓  SELECT
```

12
```
     WARNING
  Saving Settings To
 Contractor Defaults
  Will Overwrite All
   Previously Saved
 Contractor Defaults
QUIT       SAVE
```

11
```
   SAVE CURRENT
   SETTINGS TO:

 Contractor Defaults

QUIT      SAVE
```

13
```
  CURRENT SETTINGS

    SAVED
    To Contractor
  Settings Backup

            CONTINUE
```

Set Units

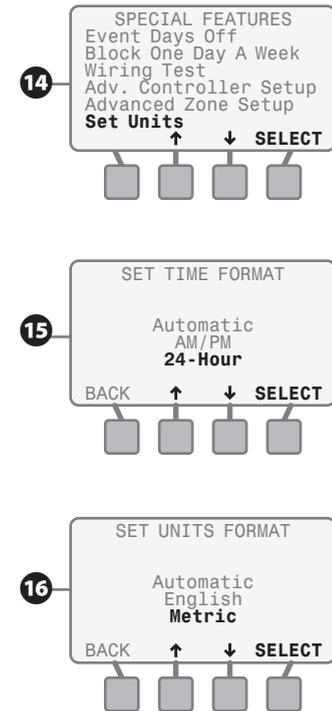**Allows you to assign the Time Format and the Unit Format displayed on the ESP-SMT screen.**

14 If you would like to change the time format or the unit format from that currently shown on the display: Press the **UP and Down** arrow button(s) until **Set Units** is blinking on the display; then press the **SELECT** button.

15 The SET TIME FORMAT screen will appear and the **current time** format will blink. If you wish to change the time format to an alternate choice (For Example: from AM/PM format to 24 Hour format): Press the **UP or DOWN** button(s) to the desired time format; then press the **SELECT** button.

16 The SET UNITS FORMAT screen will appear and the current **unit** format will blink. If you wish to change the unit format to an alternate choice (For Example: English format to Metric format): Press the **UP or DOWN** button(s) to the desired time format; then press the **SELECT** button.

⚠ **NOTE:** The factory default or Automatic setting will automatically set the time format to "AM/PM" and the Unit format to "English" when the ESP-SMT controller is connected to a 60Hz power source.

14
```
        SPECIAL FEATURES
Event Days Off
Block One Day A Week
Wiring Test
Adv. Controller Setup
Advanced Zone Setup
Set Units
         ↑       ↓   SELECT
```

15
```
       SET TIME FORMAT


         Automatic
           AM/PM
          24-Hour
BACK     ↑       ↓   SELECT
```

16
```
      SET UNITS FORMAT


         Automatic
          English
           Metric
BACK     ↑       ↓   SELECT
```

Fine Tune Watering By Zone

This section shows you how to make quick, minor adjustments (+/- 60%) to each zone's run-time calculation based on changing weather patterns and the site/zone parameters previously entered.

Rotate the dial to **FINE TUNE WATERING** position...
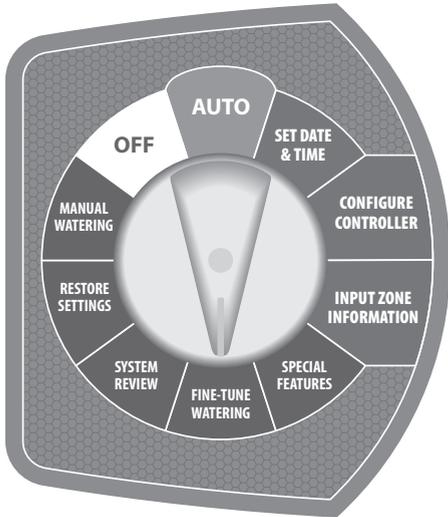
❶ The FINE TUNE BY ZONE screen will appear and the **value** for Zone 1 will begin to blink.

❷ IIf you want to fine-tune the irrigation amount applied to Zone 1, press either the **- or +** button(s) until the desired value is displayed. Press the **NEXT** button and the value for zone 2 will begin to blink.

❸ Continue to press the **NEXT** button to advance to the next Zone you would like to Fine Tune. Press either the **-** or **+** button(s) to adjust the value. Once the desired value is displayed, press the **NEXT** button and the value for the next sequential Zone will begin to blink.

⚠ **NOTE:** After making all of the Fine Tune By Zone adjustments, move the dial into the AUTO position. These adjustments will occur indefinitely until you rotate the dial into the FINE TUNE WATERING position and make additional adjustments.

❶
```
  FINE TUNE BY ZONE
1 +0 % 6 +0%  10  n/a
2 +0 % 7 +0%  11  n/a
3 +0 % 8 n/a  12  n/a
4 +0 % 9 n/a  13  n/a
5 +0 %
BACK    –    +    NEXT
```

❷
```
  FINE TUNE BY ZONE
1 +12% 6 +0%  10  n/a
2 +0 % 7 +0%  11  n/a
3 +0 % 8 n/a  12  n/a
4 +0 % 9 n/a  13  n/a
5 +0 %
BACK    –    +    NEXT
```

❸
```
  FINE TUNE BY ZONE
1 +12% 6 +0%   10  n/a
2 +0 % 7 -11%  11  n/a
3 +0 % 8 n/a   12  n/a
4 +14% 9 n/a   13  n/a
5 -8 %
BACK    –    +    NEXT
```

System Review

This section shows you how to review (not change) the controller and zone information that you have entered into the controller. It also allows you to review various logs of past Irrigation Events, Alarm & Note Conditions, and measured Weather data. There are six different Information Review modes.
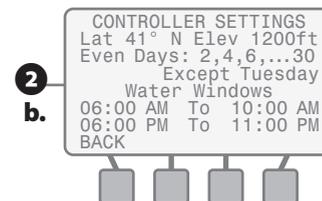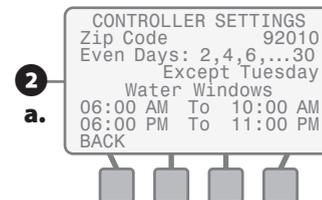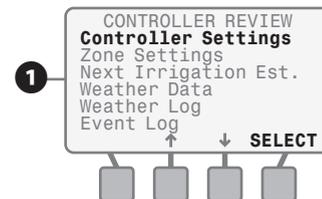
Rotate the dial to **SYSTEM REVIEW** position...
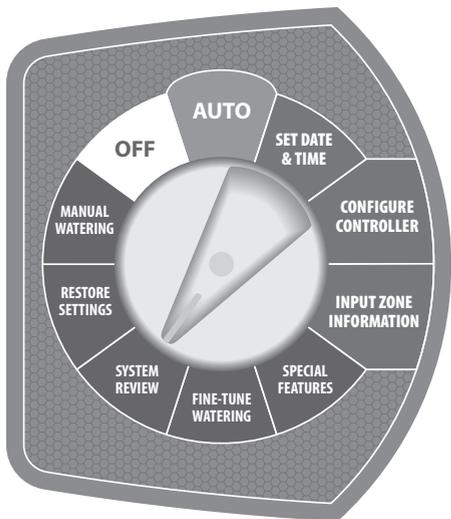
The CONTROLLER REVIEW screen will appear allowing you to use any one of the six Information Review modes.

Controller Settings Review

Allows you to review all of the current settings that were selected while in the CONFIGURE CONTROLLER dial position and the controller specific settings while in the SPECIAL FEATURE dial position.

❶ To review the Controller Settings: when Controller Settings is blinking; press the **SELECT** button.

❷ If you configured the controller using the "Enter Site Zip Code" mode;

a. The CONTROLLER SETTINGS screen will appear displaying the Zip Code, Allowed Irrigation Days and Allowed Irrigation Time (Watering Window).

```
  CONTROLLER REVIEW
 Controller Settings
  Zone Settings
  Next Irrigation Est.
  Weather Data
  Weather Log
  Event Log    ↑      ↓  SELECT
```

```
  CONTROLLER SETTINGS
  Zip Code       92010
  Even Days: 2,4,6,...30
       Except Tuesday
      Water Windows
  06:00 AM  To  10:00 AM
  06:00 PM  To  11:00 PM
  BACK
```

```
  CONTROLLER SETTINGS
  Lat 41° N Elev 1200ft
  Even Days: 2,4,6,...30
       Except Tuesday
      Water Windows
  06:00 AM  To  10:00 AM
  06:00 PM  To  11:00 PM
  BACK
```

OR: If you configured the controller using the "Enter Custom Data For Location" mode;

b. The CONTROLLER SETTINGS screen will appear displaying the Locations Latitude and Elevation, Allowed Irrigation Days and Allowed Irrigation Time (Watering Window).

Zone Settings Review

Allows you to review the all of the current settings that were selected while in the INPUT ZONE INFORMATION dial position and the zone specific settings while in the SPECIAL FEATURE dial position.

3 If you want to review all Zone Settings on a Zone by Zone basis; press the **UP or DOWN** button(s) until **Zone Settings** is blinking on the display; press the **SELECT** button.

4 The first Zone Review screen (1of 2)
a. will appear for Zone 1 with the Zone number blinking. If you would like to review Zone Information for a different Zone (Example – Zone 3); press the **- or +** button(s) until the desired zone is displayed.
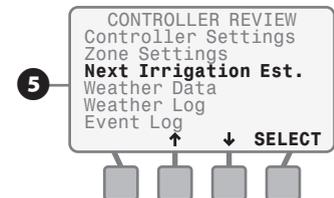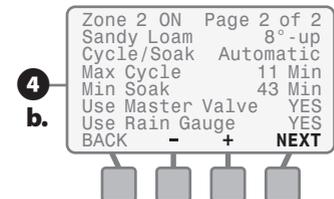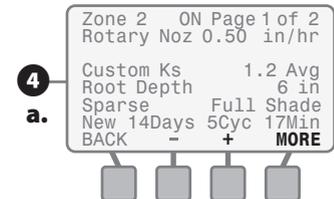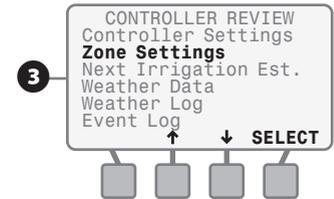
b. To review additional zone information for the selected Zone; press the **MORE** button and the second Zone Review screen (Page 2 of 2) will appear.

To return to the CONTROLLER REVIEW screen; press the **NEXT** button.

Next Irrigation Estimate Review

On a zone-by-zone basis, allows you to review the next estimated irrigation event based on the past climatic conditions.

5 If you would like to review the next estimated irrigation cycle on a zone by zone basis; press the **UP and DOWN** button(s) until **Next Irrigation Est.** is blinking on the display; press the **SELECT** button.

3
```
  CONTROLLER REVIEW
Controller Settings
Zone Settings
Next Irrigation Est.
Weather Data
Weather Log
Event Log
        ↑    ↓  SELECT
```

4
a.
```
Zone 2   ON Page 1 of 2
Rotary Noz 0.50 in/hr

Custom Ks      1.2 Avg
Root Depth      6 in
Sparse    Full Shade
New 14Days 5Cyc 17Min
BACK    -    +   MORE
```

4
b.
```
Zone 2 ON  Page 2 of 2
Sandy Loam     8°-up
Cycle/Soak  Automatic
Max Cycle     11 Min
Min Soak      43 Min
Use Master Valve  YES
Use Rain Gauge    YES
BACK    -    +   NEXT
```

5
```
  CONTROLLER REVIEW
Controller Settings
Zone Settings
Next Irrigation Est.
Weather Data
Weather Log
Event Log
        ↑    ↓  SELECT
```

6 The NEXT IRRIGATION EST. screen will appear displaying the next estimated cycle and run times for Zones 1 thru Zone 5; press the **MORE** button and the same information for Zones 6 thru Zone 10 will appear.

7 The NEXT IRRIGATION EST. screen will appear displaying the next estimated cycle and run times for Zones 6 thru Zone 10; press the **MORE** button and the same information for Zone 11 thru Zone 13 will appear.

8 The NEXT IRRIGATION EST. screen will appear displaying the next estimated cycle and run times for Zones 11 thru Zone 13; press the **DONE** button to return to the CONTROLLER REVIEW screen.
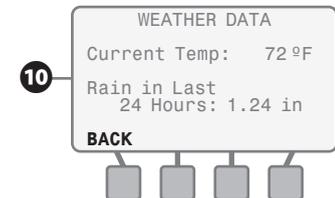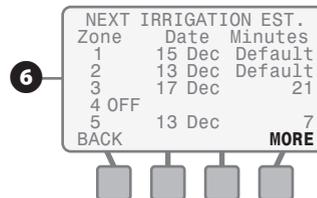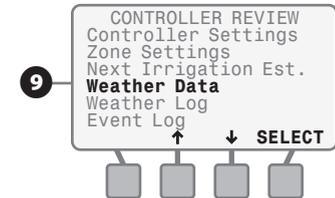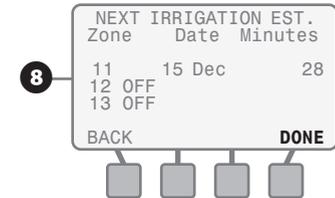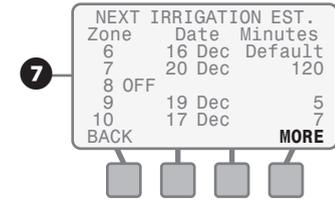
⚠️ **NOTE:** If the measured rainfall appears to be significantly less than the actual rainfall, see the trouble-shooting section in the Appendix.

Weather Data Review
Allows you to review the current temperature and the measured rainfall over the past 24 hours based on the information communicated to the ESP-SMT controller from the SMT Weather Sensor.

9 If you would like to review the current temperature and the rainfall that has occurred in the last 24 hours as measured by the SMT Weather Sensor; press the **UP or DOWN** button(s) until **Weather Data** is blinking on the display; press the **SELECT** button.

10 The WEATHER DATA screen will appear displaying the current temperature, as well as the amount of rainfall measured in the last 24 hours (- or + 1 hour) by the ESP-SMT sensor.

7
```
   NEXT IRRIGATION EST.
Zone     Date  Minutes
 6     16 Dec  Default
 7     20 Dec      120
 8 OFF
 9     19 Dec        5
10     17 Dec        7
BACK             MORE
```

8
```
   NEXT IRRIGATION EST.
Zone     Date  Minutes

11     15 Dec       28
12 OFF
13 OFF

BACK             DONE
```

9
```
   CONTROLLER REVIEW
Controller Settings
Zone Settings
Next Irrigation Est.
Weather Data
Weather Log
Event Log
        ↑      ↓  SELECT
```

6
```
   NEXT IRRIGATION EST.
Zone     Date  Minutes
 1     15 Dec  Default
 2     13 Dec  Default
 3     17 Dec       21
 4 OFF
 5     13 Dec        7
BACK             MORE
```

10
```
     WEATHER DATA

Current Temp:    72 ºF

Rain in Last
   24 Hours: 1.24 in
BACK
```

Weather Log Review

Allows you to review a daily log of high and low temperature, calculated Evapotranspiration (ETo), and the measured rainfall for the past 30 days based on the information communicated to the ESP-SMT controller from the SMT Weather Sensor.

11 To review the Weather Log, press the **UP or DOWN** button(s) until **Weather Log** is blinking on the display; press the **SELECT** button.

12 To review the same information for additional dates; press either the **Pg Up or Pg Dn** button(s) until the desired dates are displayed.

Event Log Review

Allows you to review watering events and Alarm & Note conditions in one of three different views:

1. Alarms and Notes by date in chronological order

2. Event Log by date in chronological order

3. Event Log by Zone

13 To review Alarms and Notes, Events by Date or Events by Zone; press the **UP and DOWN** button(s) until **Event Log** is blinking on the display; press the **SELECT** button.

14 The EVENT LOG screen will appear and Alarms and Notes will begin to blink; press the **SELECT** button.

15 The ALARMS AND NOTES screen will appear displaying various "Alarm" and/or "Note" conditions by the Date and Time that they occurred. To view additional dates; press either the **Pg Up or Pg Dn** button(s) until the desired dates appear.

12
```
WEATHER LOG   (ºF,in)
Date    Hi Low ETo Rain
03May  85  55 .12    0
02May  87  56 .15    0
01May  84  53 .11    0
30Apr  80  55 .14  .23
29Apr  86  54 .15  .15
BACK     PgDn PgUp
```

13
```
  CONTROLLER REVIEW
Controller Settings
Zone Settings
Next Irrigation Est.
Weather Data
Weather Log
Event Log
BACK    ↑    ↓  SELECT
```

14
```
     EVENT LOG

Alarms and Notes
Events by Date
Events by Zone

BACK    ↑    ↓  SELECT
```
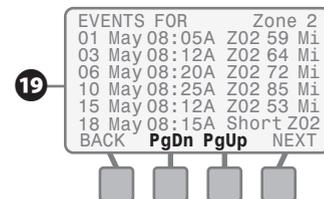
11
```
  CONTROLLER REVIEW
Controller Settings
Zone Settings
Next Irrigation Est.
Weather Data
Weather Log
Event Log
        ↑    ↓  SELECT
```

15
```
   ALARMS AND NOTES
03 May 10:16A High Temp
04 May 11:24A Rain Susp
05 May 10:02A Short Z10


BACK  PgDn PgUp
```

16 To review events by date - While in the EVENT LOG screen, press the **UP and DOWN** button(s) until **Events By Date** is blinking on the display; press the **SELECT** button.

17 The EVENTS BY DATE screen will appear. Press the **Pg Up or Pg Dn** button(s) until the desired date is displayed. Events that occurred on the selected date will be displayed in chronological order. If all of the events will not fit on the one screen, you can press the **Pg Up or Pg Dn** button(s) to view additional records. To return to the EVENT LOG menu screen; press the **BACK** button.

18 When the EVENT LOG screen is present; press the **UP or DOWN** button(s) until **Events By Zone** is blinking on the display; press the **SELECT** button.

19 The EVENTS BY ZONE screen will appear and the zone number will be blinking. To change the zone number; press the **NEXT** button until the desired zone number is displayed. Events that occurred on that zone will be displayed in chronological order. If all of the events will not fit on the one screen, you can press the **Pg Up or Pg Dn** button(s) to view additional events.

20 To review Event Log information for other zones, press the **NEXT** button until the desired zone is displayed.

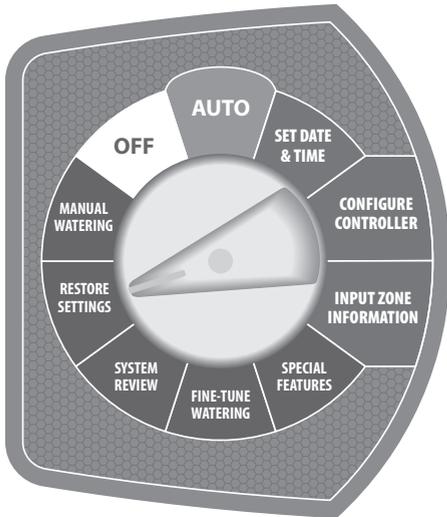- To return to the EVENT LOG menu screen; press the **BACK** button.

17
```
       EVENTS BY DATE
03 May 08:00A Z01 12 Mi
03 May 08:12A Z02 64 Mi
03 May 09:16A Z03 10 Mi
03 May 09:26A Z06 16 Mi
03 May 09:42A Z08  8 Mi
03 May 10:16A High Temp
BACK   PgDn PgUp
```

18
```
       EVENT LOG

Alarms and Notes
Events by Date
Events by Zone

BACK     ↑     ↓   SELECT
```

19
```
EVENTS FOR       Zone 2
01 May 08:05A Z02 59 Mi
03 May 08:12A Z02 64 Mi
06 May 08:20A Z02 72 Mi
10 May 08:25A Z02 85 Mi
15 May 08:12A Z02 53 Mi
18 May 08:15A Short Z02
BACK   PgDn PgUp   NEXT
```

16
```
       EVENT LOG

Alarms and Notes
Events by Date
Events by Zone

BACK     ↑     ↓   SELECT
```

20
```
EVENTS FOR       Zone 2
01 May 08:05A Z02 59 Mi
03 May 08:12A Z02 64 Mi
06 May 08:20A Z02 72 Mi
10 May 08:25A Z02 85 Mi
15 May 08:12A Z02 53 Mi
18 May 08:15A Short Z02
BACK   PgDn PgUp   NEXT
```

Events that will appear in the Event Logs

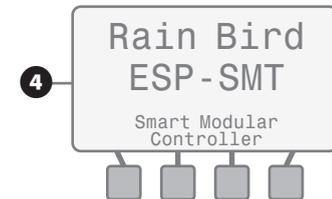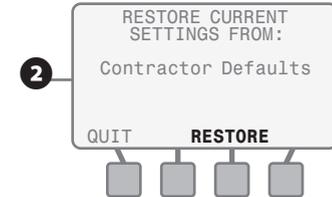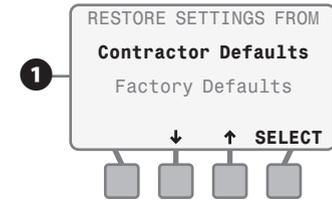| Screen Text	Event Description
Alarm-Sen	Pod communication alarm was activated
Alrm-Temp	No temperature reading received since date shown
C Default	Contractor Defaults were restored
Cold Susp	Irrigation suspended due to Cold Temperature threshold
C Save	Program saved to Contractor Default
F Default	Factory Defaults were loaded into the controller
High Rain	An unusually high rainfall value was detected
High Temp	A temperature reading > 170 °F occurred
Incomplet	Watering was not completed during the watering window
Init	Controller initialized due to an unknown issue
Rain Susp	Irrigation suspended due to exceeding Rain Fall threshold
Reset	Controller processor was reset
Short Zxx	A short circuit was detected in zone "XX"
User Susp	Irrigation was intentionally suspended by the user
User Term	Watering terminated by user

Restore Settings

This section shows you how save the program information you have entered into the ESP-SMT controller in memory and then how to retrieve the saved information when necessary. This dial position also allows you to clear all information stored in the controller and reset the controller to its original Factory Settings.

Rotate the dial to **RESTORE SETTINGS** position...

```
                    RESTORE SETTINGS FROM
              ┌──────────────────────────┐
         ❶    │    Contractor Defaults   │
              │      Factory Defaults     │
              │                           │
              │          ↓    ↑   SELECT  │
              └──────────────────────────┘
```

Restore "Contractor Default" Program Settings

❶ Press the **UP or DOWN** button(s) until the RESTORE SETTINGS FROM **Contractor Defaults** screen begins to blink; then press the **SELECT** button.

❷ The RESTORE CURRENT SETTINGS FROM Contractor Defaults screen will appear. Press the **RESTORE** button.

```
                    RESTORE CURRENT
                    SETTINGS FROM:
              ┌──────────────────────────┐
         ❷    │    Contractor Defaults   │
              │                           │
              │  QUIT          RESTORE    │
              └──────────────────────────┘
```

❸ The RESTORING TO Contractor Defaults screen will appear with a message that reads: Please Wait While Unit Reconfigures.

```
                    RESTORING TO
              ┌──────────────────────────┐
         ❸    │      Contractor          │
              │      Defaults            │
              │   Please Wait While       │
              │   Unit Reconfigures       │
              └──────────────────────────┘
```

❹ While the controller is restoring the Contractor Default settings, the Rain Bird ESP-SMT screen will appear until all information has been programmed into the ESP-SMT controller.
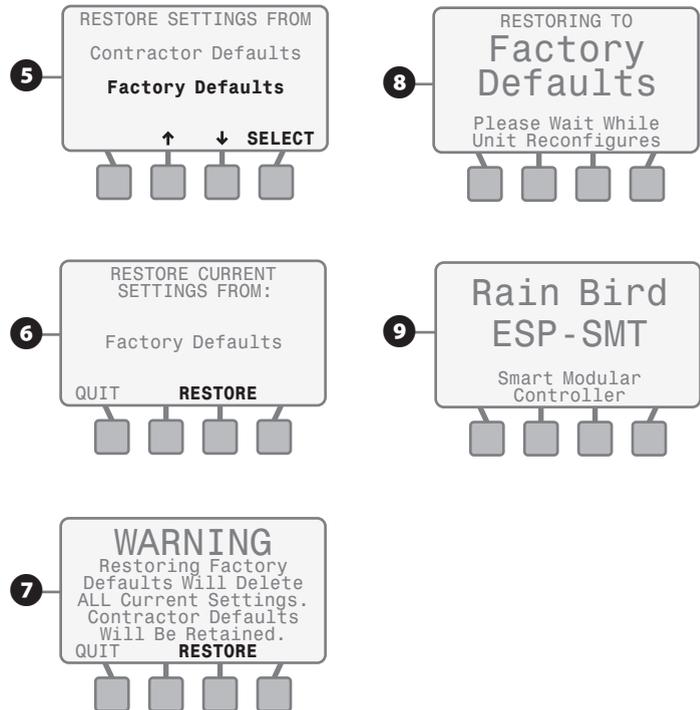
```
              ┌──────────────────────────┐
         ❹    │      Rain Bird            │
              │      ESP-SMT             │
              │   Smart Modular           │
              │   Controller              │
              └──────────────────────────┘
```

Restore "Factory Default" Program Settings

5 The RESTORE SETTINGS FROM screen will appear and Contractor Defaults will be blinking. Press the **UP or DOWN** button(s) until the **Factory Defaults** begins to blink; then press the **SELECT** button.

6 RESTORE CURRENT SETTINGS FROM Factory Defaults will appear. Press the **RESTORE** button.

7 A WARNING screen will appear. If you want to continue to restore the original factory settings. Press the **CONTINUE** button.

8 The RESTORING TO Factory Defaults screen will appear with a message that reads: Please Wait While Unit Reconfigures.

9 While the ESP-SMT is restoring the Factory Default settings, the screen as shown will appear until all information has been programmed into the ESP-SMT controller.

⚠️ **NOTE:** If you elect to restore Factory Defaults, all previously programmed information will be erased and replaced with Factory default values. Information saved in Contractor Defaults is not erased.

5
```
RESTORE SETTINGS FROM
  Contractor Defaults
  Factory Defaults

    ↑      ↓   SELECT
```

6
```
  RESTORE CURRENT
  SETTINGS FROM:

  Factory Defaults

QUIT      RESTORE
```

7
```
     WARNING
  Restoring Factory
 Defaults Will Delete
 ALL Current Settings.
 Contractor Defaults
  Will Be Retained.
QUIT      RESTORE
```

8
```
   RESTORING TO
   Factory
   Defaults
  Please Wait While
  Unit Reconfigures
```

9
```
  Rain Bird
   ESP-SMT
  Smart Modular
    Controller
```

Manual Watering

This section shows you how to manually water an individual zone, a combination of individual zones, or all zones.

Rotate the dial to **MANUAL WATERING** position...
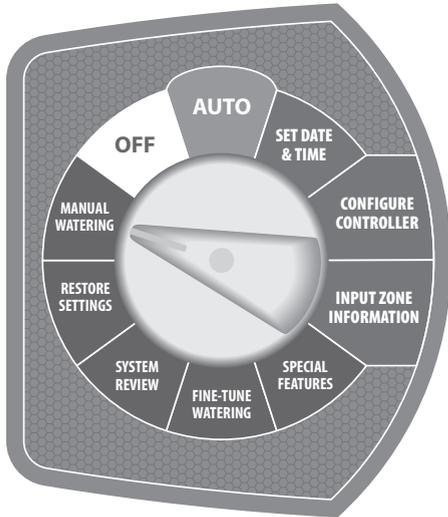
① The MANUAL WATERING screen will appear and **Water Selected Zones** will be blinking. If you want to manually water a single zone or a combination of zones, Press the **SELECT** button.

Manually Water Selected Zones

Water a single Zone or any combination of Zones with a specific manual run time for each Zone.

② The MANUAL WATERING MINUTES PER ZONE will appear and the **value** for Zone 1 will begin to blink. If you want to apply water on zone 1 manually, press the **- or +** button(s) to set the desired amount of manual irrigation for zone 1; then press the **NEXT** button.
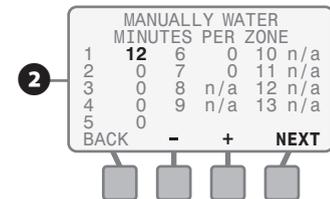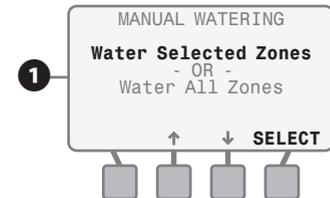
3 Continue to press the **NEXT** button until you get to the next Zone you would like to apply water manually. Press either the **- or +** button(s) to adjust the value.

Once the desired value is displayed. Press the **NEXT** button and the **value** for the next sequential Zone will begin to blink. Continue the process until the time for the last active zone is set.

4 Press the **START** button and the WATERING-MANUAL screen will appear and the first zone that you set to manually water in numerical sequence and Minutes Remaining will show the amount of manual irrigation time left on the zone.

5 The Minutes Remaining will count down to 0 and then the next Zone that you set to manually operate will be displayed with the Minutes Remaining displayed.

6 If you desire to stop the manual watering for the current zone and want to advance to the next zone that has a manual run time, press the **ADV. ZONE** button and the next valve will begin to manually operate.

If you want to cancel all manual watering, press the **CANCEL** button on the screen OR turn the dial to the OFF position.

⚠ **NOTE:** If manual watering starts when automatic watering is occurring, the automatic watering will be cancelled for that day and will resume on the next allowed watering day when a new auto watering schedule is generated.
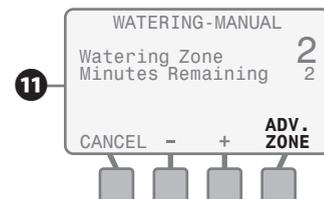
3
```
        MANUALLY WATER
        MINUTES PER ZONE
  1    12   6    0   10 n/a
  2     0   7   11   11 n/a
  3     0   8  n/a   12 n/a
  4   120   9  n/a   13 n/a
  5    14
  BACK    -    +    NEXT
```

4
```
     WATERING-MANUAL

  Watering Zone        1
  Minutes Remaining   12

                     ADV.
  CANCEL   -    +    ZONE
```

5
```
     WATERING-MANUAL

  Watering Zone        4
  Minutes Remaining  120

                     ADV.
  CANCEL   -    +    ZONE
```

6
```
     WATERING-MANUAL

  Watering Zone        5
  Minutes Remaining   14

                     ADV.
  CANCEL   -    +    ZONE
```
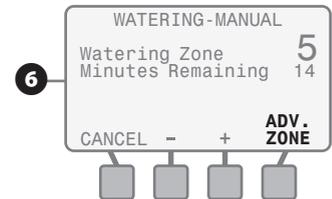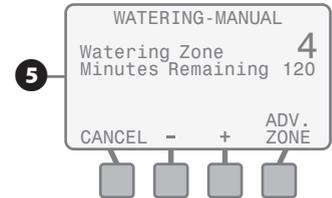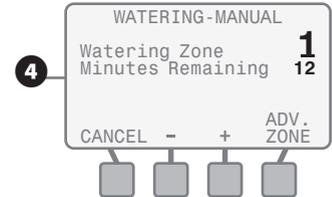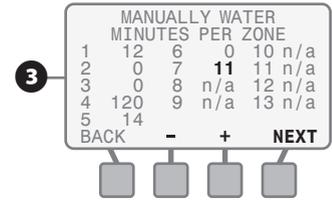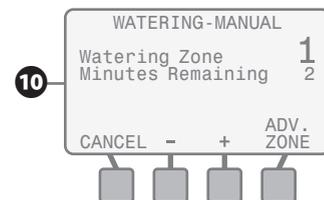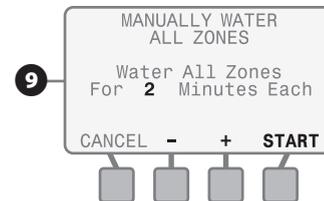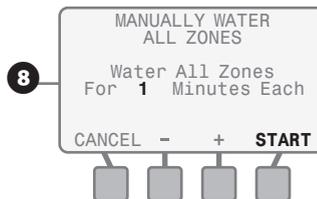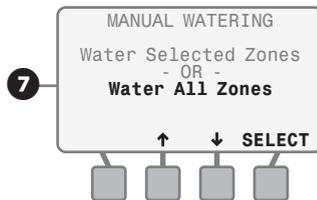
Manually Water All Active Zones (Test Program)

Water all Zones with the same manual run time per zone.

7 The MANUAL WATERING screen will appear and Water Selected Zones will be blinking. Press the **UP or DOWN** arrow button(s) until Water All Zones is blinking; then press the **SELECT** button.

8 The MANUALLY WATER ALL ZONES screen will appear and the **value** for Water All Zone for **XX** Minutes Each will begin to blink.

9 Press the **- or +** button(s) to set the desired amount of manual irrigation run time for all Zones; then press the **START** button.

10 The Minutes Remaining for Zone 1 will count down to 0 and then Zone **2** will be displayed with the Minutes Remaining displayed.

11 If you desire to stop the manual watering for the current zone and want to advance to the next zone. Press the **ADV. ZONE** button and the next valve will begin to manually operate.

If you want to cancel all manual watering, press the **CANCEL** button on the screen OR turn the dial to the OFF position.

⚠️ **NOTE:** The MANUALLY WATER ALL ZONES feature is a time saving tool to perform a quick system "walk-thru" or to perform "system winterization" without having to walk back to the controller to set each zone's manual run time one zone at a time.

9
```
    MANUALLY WATER
     ALL ZONES

    Water All Zones
  For  2  Minutes Each

CANCEL  −    +   START
```

7
```
   MANUAL WATERING

  Water Selected Zones
       - OR -
    Water All Zones


    ↑      ↓   SELECT
```

10
```
   WATERING-MANUAL

  Watering Zone      1
  Minutes Remaining  2

                   ADV.
CANCEL  −    +      ZONE
```

8
```
   MANUALLY WATER
     ALL ZONES

    Water All Zones
  For  1  Minutes Each

CANCEL  −    +   START
```

11
```
   WATERING-MANUAL

  Watering Zone      2
  Minutes Remaining  2

                   ADV.
CANCEL  −    +      ZONE
```

Off Position or Adjust Display Contrast Function

This section shows you how to easily prevent all irrigation from occurring. In this dial position, you can also adjust the contrast of the LCD display to make it more readable in varying light conditions

Rotate the dial to **OFF** position...
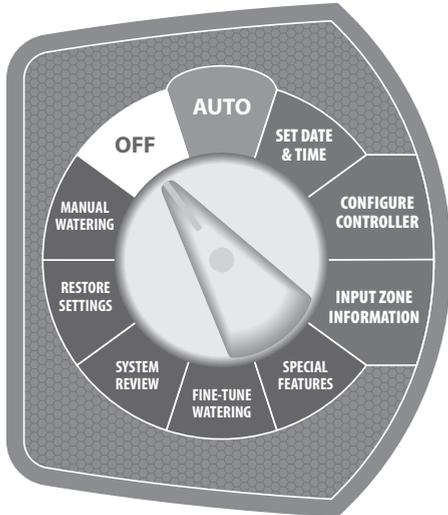
1 The ALL WATERING OFF screen will appear. If you want to adjust the contrast of the LCD display to make it more readable for your given light condition. Press the **- or +** button(s) until the desired contrast is achieved.

```
ALL WATERING  OFF
Tuesday 24 Mar 2009

     7:25 PM

 ADJUST CONTRAST
     -    +
```
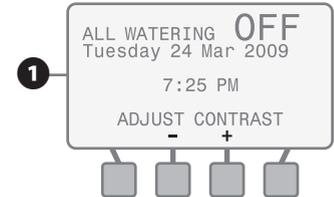
Auto Position or Suspend Watering Function

This section describes the various displays that may occur when the dial is in this position. It also will show you how to suspend irrigation for a user determined period of time and then resume automatically after the time has elapsed

Rotate the dial to **AUTO** position...
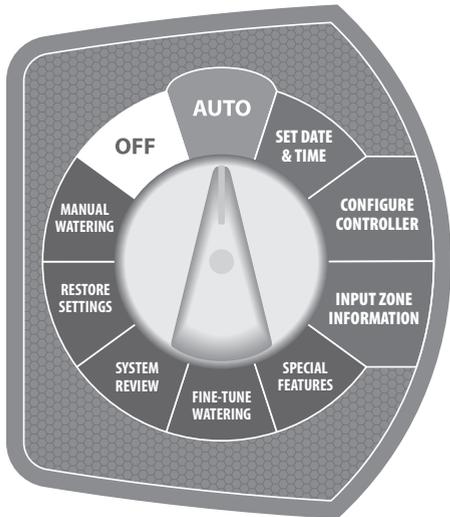
No Irrigation Currently Occurring

❶ The AUTO MODE screen will appear displaying the current date and time. Additionally, based on the weather data retrieved, information is displayed showing the estimated date when the next irrigation cycle will occur.

```
          AUTO MODE

     Monday 01 Apr 2009
          07:25 AM
     Next Irrigation
     Estimate:      02 Apr
                     BEGIN
                   SUSPEND
```
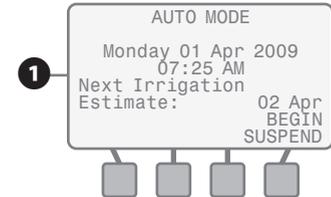
Automatic Irrigation Is Occurring

❷ The WATERING-AUTOMATIC screen will appear displaying the current day of the week. It will also display the **current zone** being irrigated and the **Minutes Remaining** on this zone.

```
   WATERING — AUTOMATIC
   Wednesday 06:45 PM

   Watering Zone        2
   Minutes Remaining   14
                     BEGIN
                   SUSPEND
```
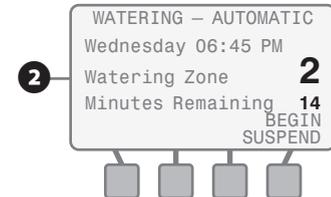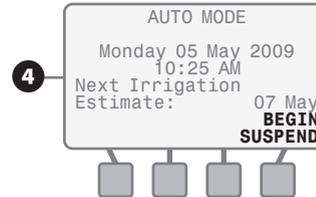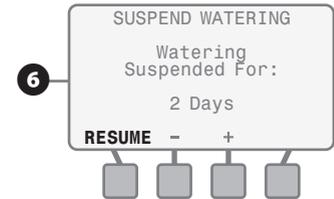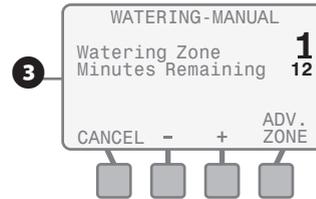
⚠ **NOTE:** When the dial is left in the AUTO position, any required irrigation will automatically begin at the start of the Allowed Watering Time on Allowed Watering Days.

Manual Irrigation Is Occurring

3 The WATERING-MANUAL screen will appear. It will display the **current zone** being irrigated and the **Minutes Remaining**.

Suspend Automatic Irrigation

4 If you want to suspend irrigation for a preset amount of time, press the **BEGIN SUSPEND** button when the AUTO MODE or the WATERING-AUTOMATIC screens are displayed.

5 The SUSPEND WATERING screen will appear with the suspend time **value** blinking. Press the **UP or DOWN** button(s) until the desired amount of suspension time is displayed.

6 If you want to stop the suspension of irrigation and resume automatic irrigation, press the **RESUME** button and the AUTO WATERING screen will appear.

3
```
        WATERING-MANUAL

Watering Zone        1
Minutes Remaining    12

                     ADV.
CANCEL   –    +      ZONE
```

6
```
       SUSPEND WATERING

           Watering
         Suspended For:

           2 Days
RESUME   –    +
```

4
```
          AUTO MODE

      Monday 05 May 2009
          10:25 AM
      Next Irrigation
      Estimate:       07 May
                       BEGIN
                      SUSPEND
```

7
```
          AUTO MODE

      Monday 06 May 2009
          05:00 PM
      Next Irrigation
      Estimate:       07 May
                       BEGIN
                      SUSPEND
```

5
```
       SUSPEND WATERING

           Watering
         Suspended For:

           3 Days
RESUME   –    +
```
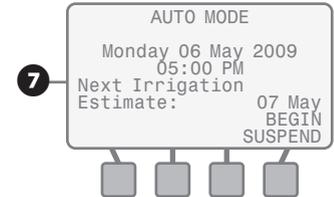
Installation

This section provides information on how to install the ESP-SMT Controller.

Installing The Controller

Select Location

Select a location that has a flat, stable surface in an area protected from vandalism.

❶ Using the mounting template, mount the controller at eye level and allow at least 11" of horizontal clearance so the hinged cabinet door can swing fully open to the left.

❷ Allow enough clearance for electrical conduit and connections at the bottom of the plastic cabinet.

❸ Select a location that has access to 120 VAC electrical power. It is best to run a dedicated circuit for the controller; one that cannot be turned off by a light switch.

⚠ **NOTE:** Select a location that allows the communication wire (a pair of #16 AWG or #18AWG UV rated wire maximum distance 200 feet) to be easily run from the ESP-SMT controller to the SMT Weather Sensor.

⚠ **NOTE:** The ESP-SMT controller must be installed in compliance with local electrical codes. Indoor models must be installed indoors only. Outdoor models (with locking cabinets) may be installed either indoors or outdoors.
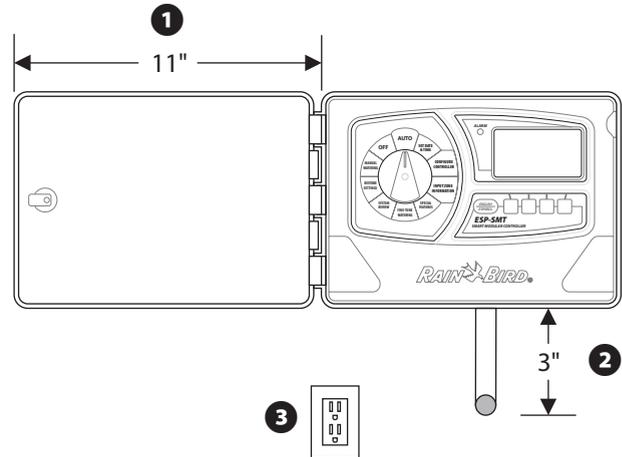
⚠ **CAUTION:** To minimize electromagnetic interference, select a location at least 15 feet (4,6 m) away from high-draw motors, such as air conditioners or refrigerators.

Never share a 120 VAC circuit with pumps, motors, shop tools, etc. as they may interfere with the correct operation of the controller.

Installation Tools Required

a. Phillips slot-head screwdriver (#1, #2 & #3 tip)

b. Marking pencil for template

c. Wire stripper

d. Torpedo level

e. Drill bit & hammer drill (if installing in masonry or concrete, select drill bit accordingly)

Optional Items:

- If the communication wire run is greater than 25 feet, additional wire will be required (#18 AWG or #16 AWG, 2 strand UV rated wire recommended - 200 feet maximum distance from controller to sensor)
- Ladder to reach sensor mounting location

Valve (Zone) and Communication Wire Entrances

The ESP-SMT controller has three "knockouts" available for routing valve & sensor communication wires, two on the underside of the cabinet, and one on the back.

① The underside of the cabinet has two knockouts sized for either a 1" or 1-1/4" PVC male adapter.

② To use the larger hole, turn the cabinet upside down. Place the blade of a slot-head screwdriver in the groove around the knockout. Tap the handle of the screwdriver to punch in the knockout in two places.

③ To route field and communication wires through the back of the cabinet, use the 1-1/4" knockout provided. Punch out the knockout, as described in step 2.
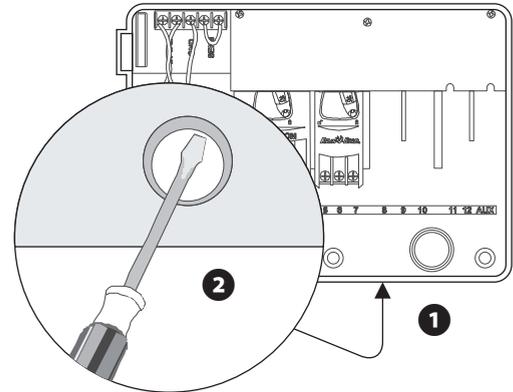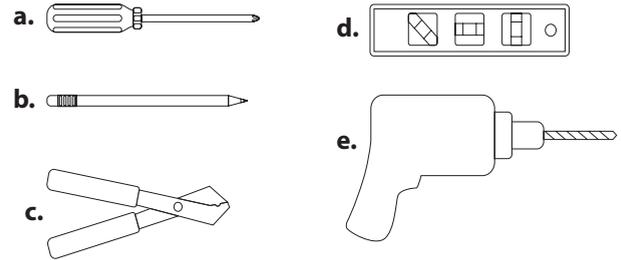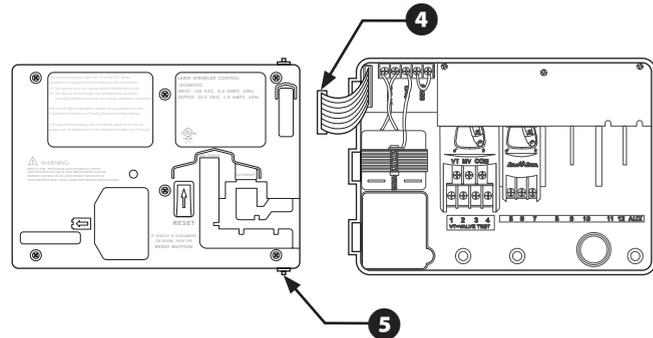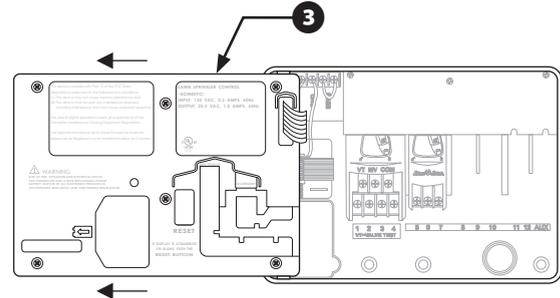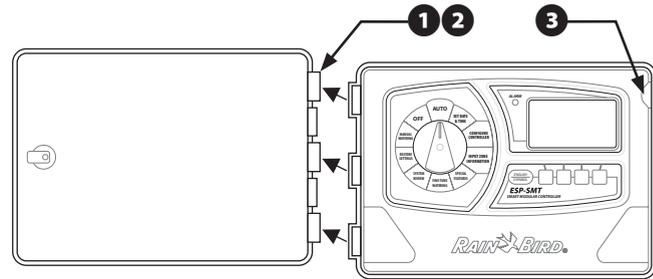
Mounting the Controller

Before you mount the controller, we recommend you remove the door and face panel. Although these steps are not absolutely necessary, they will make installation easier.

1 If necessary, unlock the door with the supplied key. Open the door of the cabinet and swing it to the left.

2 Remove the door from the hinges.

3 Open the face panel by grasping the crescent shaped finger hold on the top right side of the cabinet. Swing the face panel to the left.

4 Disconnect the ribbon cable from the panel by gently pulling the **connector** up and away from the socket. Avoid pulling directly on the ribbon cable.

5 Slip the front panel hinge pins out of the cabinet sockets. Remove the bottom of the panel first.

⚡ **CAUTION:** When re-assembling the connector, observe the keyed orientation of the connector. If correctly connected, the red line on the cable will be on the top side.

6 The ESP-SMT Smart Modular controller has a single keyhole slot at the rear top of the cabinet. At the bottom of the cabinet are three circular mounting holes. Mount the controller so that at least one of the bottom holes lines up with a wall stud or other solid surface.

7 Hold the mounting template at eye level against the mounting surface. Use a pencil to mark the position of the top keyhole slot and one or more of the bottom holes.

8 Drive an appropriate fastener for the type of wall into the mark for the keyhole slot.

9 Drill or tap a pilot hole on the mark for the lower mounting hole(s). DO NOT drive a fastener into these locations yet.

10 Hang the controller by the keyhole slot. Make sure the fastener is well up in the narrow part of the keyhole.

11 Drive the appropriate fastener(s) into the lower mounting hole(s). Verify that the cabinet is secure.
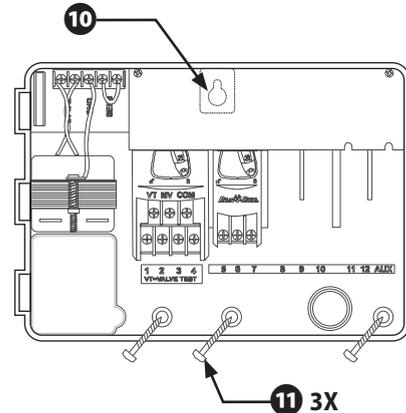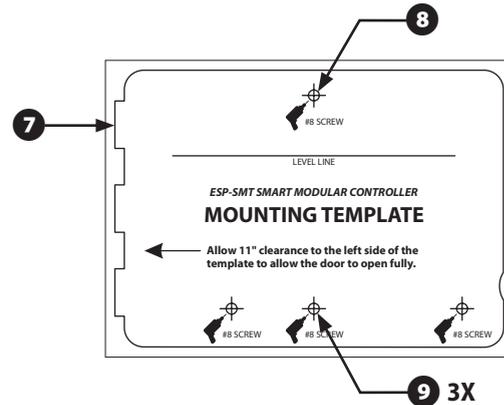
Connect Field Wiring

Station Valve Wiring

1 Connect each valve by its own separate power wire to one of the numbered screw terminals, as shown in the illustration.

2 Connect a common wire to one of the leads on each valve. Connect the other end of the common wire to the COM terminal. Wires used to connect the valves must be code-approved for underground installation.

Master Valve / Pump Start Relay

⚠ **NOTE:** Complete this section only if your system requires a master valve (an automatic valve installed on the mainline pipe upstream from the station valves) or a pump start relay. The controller does not provide main power for a pump.

3 Connect the master valve or pump start relay wiring to the controller as shown in the illustration.
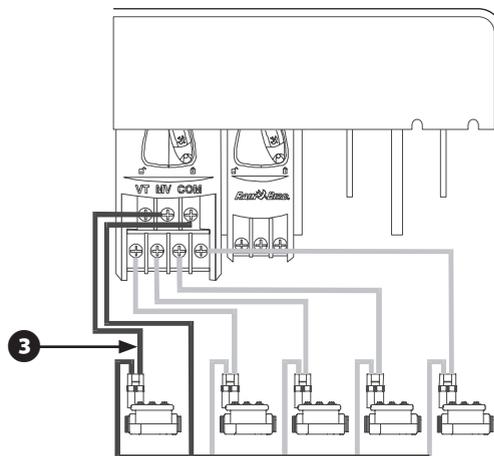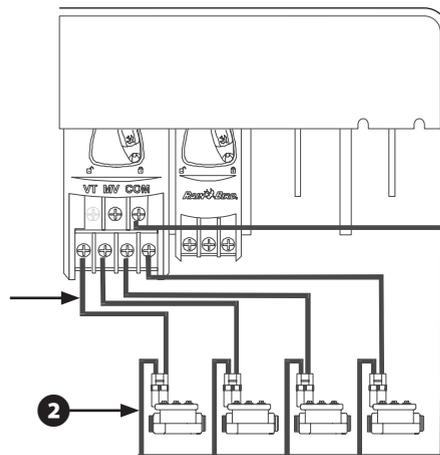
Jumper Setting for Unused Stations

⚡ **CAUTION:** To prevent pump damage when using a pump start relay, use a jumper to connect unused stations to a station that is being used.

If unused stations are not jumpered and they are accidentally turned on, the pump may operate with no flow (dead-head). Dead-heading could cause the pump to overheat or burnout.

Connect Sensor Communication Wire To Controller Panel

1. Make sure you have enough (2 x #16AWG or 2 x #18AWG) UV rated wire to run from the controller to the sensor location (maximum of 200 feet).

2. Strip the two communication wire leads 1/4" and insert the leads into the green connector located on the back of the ESP-SMT controller panel (polarity is not important).

3. Route the sensor communication wire(s) through the channel tabs on the back panel to provide "strain relief".

4. Once the panel is inserted back into the controller chassis, route the two communication wires through the field-wire knockout that you made based on an earlier installation step.

⚠ **NOTE:** Apply 120VAC power to the controller prior to connecting the communication wires to the SMT Weather Sensor to allow for verification of communication between the sensor and controller.

JUMPER WIRE

WIRES TO SMT SENSOR
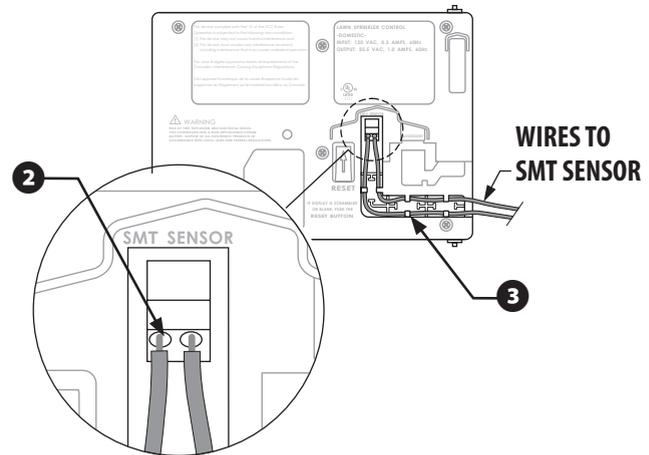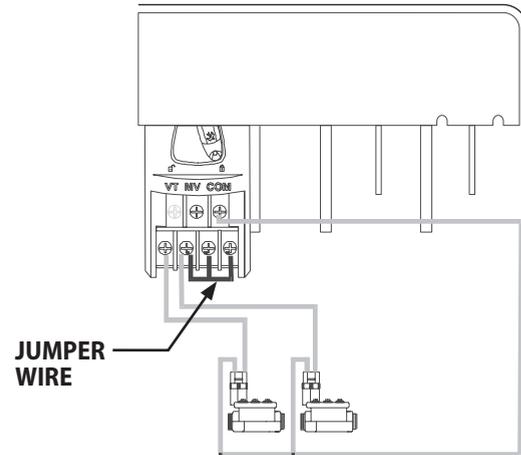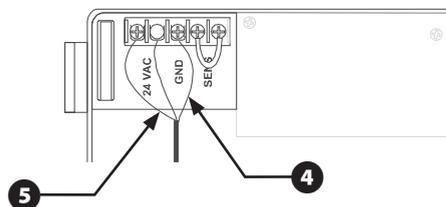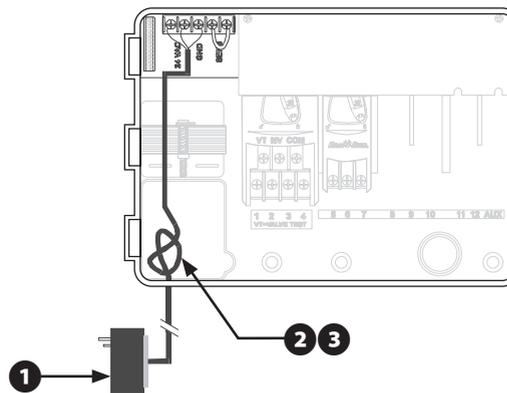
Connect Transformer

ESP-SMT Indoor Controller

The ESP-SMT indoor controller has an external transformer that reduces standard supply voltage to 24 VAC to operate the sprinkler valves. You will need to connect this transformer to terminals within the controller cabinet.

⚡ **CAUTION:** To prevent electrical shock and potential damage to the transformer, DO NOT plug in the transformer until you have connected its cable to the controller.

1 Make sure the transformer is NOT plugged in.

2 Feed the three transformer wires through the bottom left hole in the cabinet. Then pull about 12" of the cable up into the cabinet.

3 Tie a loose overhand knot in the cable just inside the controller to prevent strain on the connector terminals.

4 On the horizontal terminal strip at the top of the controller cabinet, connect the green wire to the "GND" terminal.

5 Connect one of the remaining two wires to a 24 VAC terminal. Connect the other wire to the second 24 VAC terminal. Connect either wire to either 24 VAC terminal; polarity of these wires is not important.

6 Verify that all connections are secure. Then plug the transformer into any standard three-pronged grounded electrical outlet.

⚠ **NOTE:** All electrical connections and wiring runs must be made according to local building codes.

ESP-SMT Outdoor Controller

The ESP-SMT outdoor controller has an internal transformer that reduces standard supply voltage (120 VAC) to 24 VAC to operate the valves connected to the controller. You will need to connect power supply wires to the transformer's three wires.

⚠️ **CAUTION:** To prevent electrical shock, make sure all supply power is OFF before connecting these wires. Electrical shock can cause severe injury or death.

1 With the door and face panel removed, locate the high-voltage compartment in the lower left corner of the controller cabinet.

2 Using a #1 Phillips screw tip, remove the screw on the right edge of the compartment cover. Then pull the cover open to expose the transformer's primary input wires.

3 Attach a 1/2" (1,3cm) conduit fitting to the bottom entrance of the high-voltage compartment. Then attach conduit to the fitting.

4 Bring three supply wires from the power source through the conduit into the high-voltage compartment.

CONNECT

120 VAC
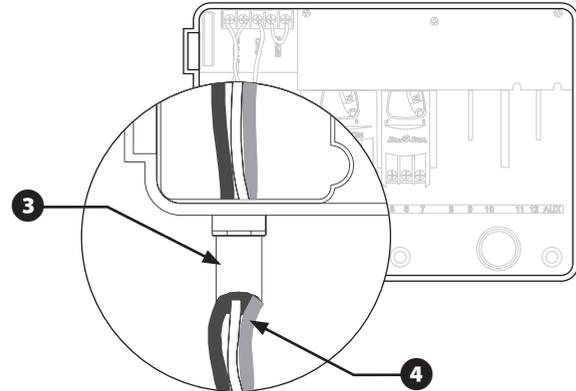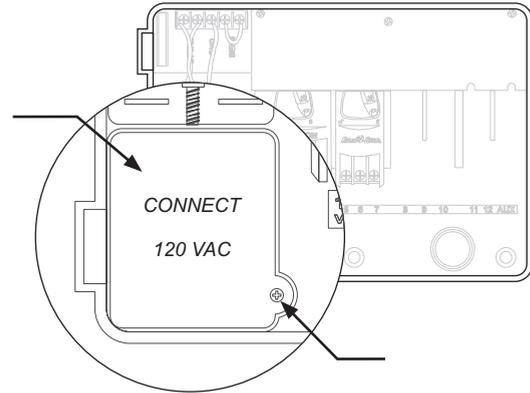
Using a code-approved wire connector, connect the wires as follows:

5 Strip the insulation from the incoming wires to expose about 1/2" (1,3cm) of bare wire. Connect the black supply wire ("hot") to the black transformer wire.

6 Connect the white supply wire ("neutral") to the white transformer wire.

**7** Connect the green supply wire ("ground") to the green transformer wire.

⚠️ **NOTE:** The ground wires MUST be connected to provide electrical surge protection.

8 Verify that all connections are secure. Then close the cover of the high-voltage compartment and secure it with the screw.

⚠️ **NOTE:** All electrical connections and wiring runs must be made according to local building codes.

CONNECT

120 VAC
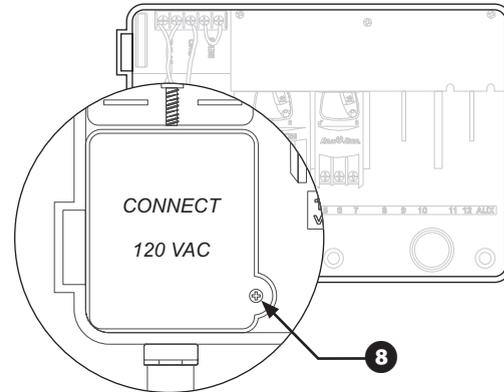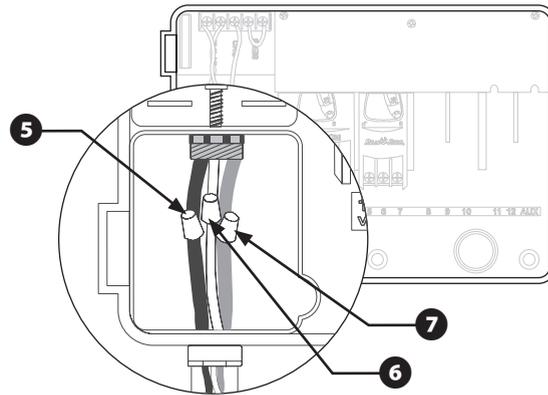
Remote Panel Programming

Installing a 9-Volt alkaline battery in the ESP-SMT Smart Modular controller will allow you to program the controller panel while disconnected from the cabinet.

The battery is **NOT** required to maintain program information. After you pre-program the ESP-SMT controller, remove the 9-Volt battery. The programmed information will then be saved in non-volatile memory.

1 Open the cabinet door and then open the front panel by grasping the crescent shaped finger hold on the top right side of the cabinet. Swing the face panel to the left.

2 Locate the battery compartment on the rear of the front panel.

3 Install the new battery and slide it into the compartment. Then close the front panel.

The controller panel may now be disconnected from the housing in order to operate remotely. Refer to previous chapter "Mounting the Controller" for instructions on how to disconnect the controller panel.

⚠ **NOTE:** With a battery installed and the front panel disconnected from the cabinet, you can program all zone information and it will be immediately saved in nonvolatile memory. However, once AC is applied, information entered for a non-existent module will be erased.
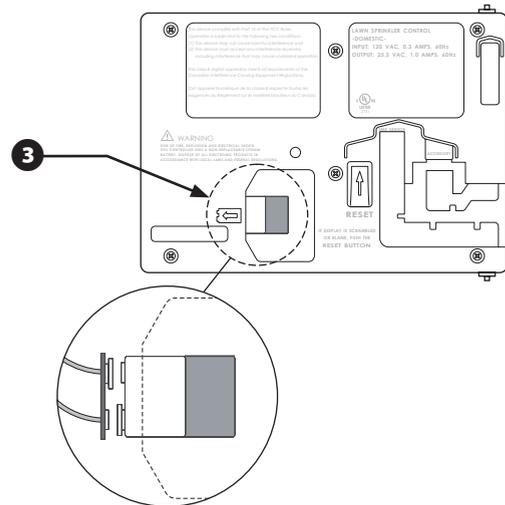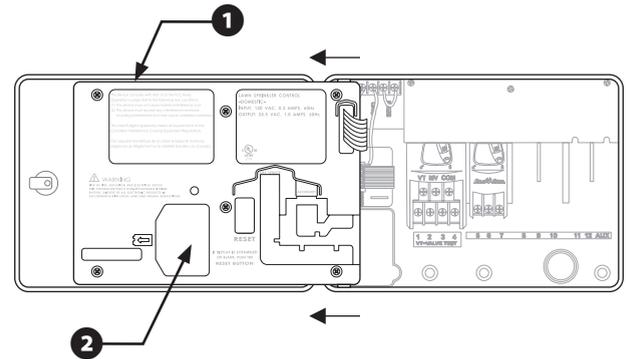
Installing Station Expansion Modules

Optional modules for the ESP-SMT Smart Modular controller provide terminals for up to nine additional valves (zones) for a total of 13 separate zones.

You can install optional 3 station expansion modules in any open position in the cabinet. The valve numbers associated with each terminal (e.g., 5, 6, and 7) are molded into the cabinet.

1 Open the cabinet door and then open the front panel by grasping the crescent shaped finger hold on the top right side of the cabinet. Swing the face panel to the left.

2 Locate an open module expansion slot in the cabinet.

3 Make sure the lever on the module is in the unlocked position (pointing to the left). Place the module in the slot between the plastic rails.

4 Push the module toward the top of the cabinet until it snaps into place.

5 Slide the lever to the locked position (to the right).

6 To remove a module, slide the lever to the unlocked position, then pull the module down and out of the slot.

⚠️ **NOTE:** You can install or remove any modules with or without AC voltage connected. The modules are "hot-swappable."
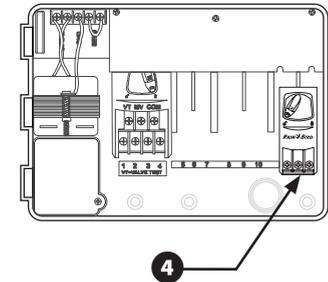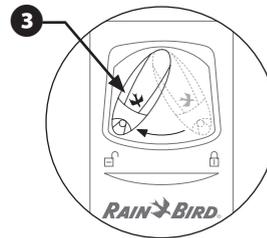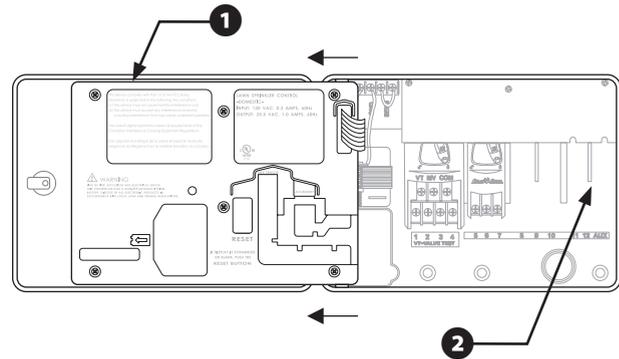
Installing ESP-SMT Upgrade Panel

1 Open the door of the existing ESP-Modular cabinet.

2 Open the ESP-Modular panel by grasping the crescent shaped finger hold on the top right side of the cabinet.

3 Disconnect the ribbon cable from the panel by gently pulling the connector up and away from the socket.

4 Slip the front panel hinge pins out of the cabinet sockets.

5 Re-connect the ribbon cable to the ESP-SMT Controller panel, then slip the hinge pins back into the cabinet sockets.

⚡ **CAUTION:** When re-assembling the connector, observe the keyed orientation of the connector. If correctly connected, the red line on the cable will be on the top side.

⚠ **NOTE:** Be sure to remove the ESP-Modular quick reference label that is adhered to the inside of the controller door as this information is no longer valid after the ESP-SMT panel upgrade is installed.
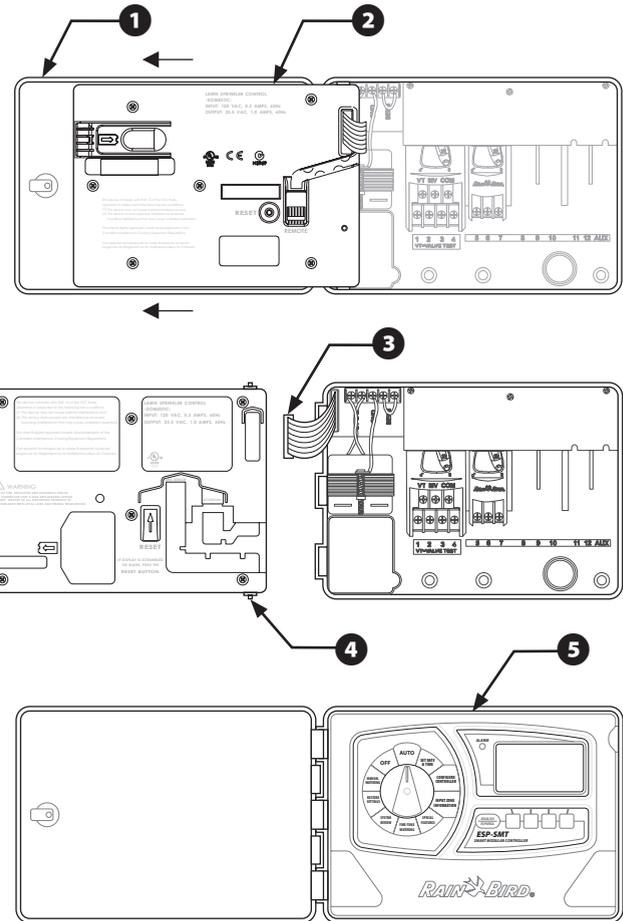
Installing The Weather Sensor

Locating the SMT Weather Sensor

Select a convenient outdoor location in close proximity (wire-run distance is 200 feet maximum) to the ESP-SMT controller. Place in an unobstructed area away from reflective heat so that the unit can provide accurate on-site temperature and rainfall measurements.

Mount the unit at least 6 feet above the ground surface to accurately measure ambient temperature. Suggested installation locations include, but are not limited to the eave of a residence roof, a wood fence post, siding of a residence, etc.).

The sensor mounting bracket is designed to mount on any vertical surface. Easy adjustment of the mounting arms assist to make sure the installed sensor is level. UV rated #16AWG or #18AWG wire is recommended for the communication wires if more than 25 feet is required.

Sensor Installation Procedure

1 Run the communication wire to the location in which the sensor will be mounted.

2 Place the mounting bracket assembly base against a vertical mounting surface and drive one of the screws into the upper left hole of the base (do not tighten completely).

3 Drive a second screw into the middle area of the adjustment slot located on the lower right corner of the mounting base.

4 Level the mounting base. Hold in place.

5 Tighten the screws in the slot first and then assure that all 4 screws are tightened to the mounting surface to secure the mounting base.
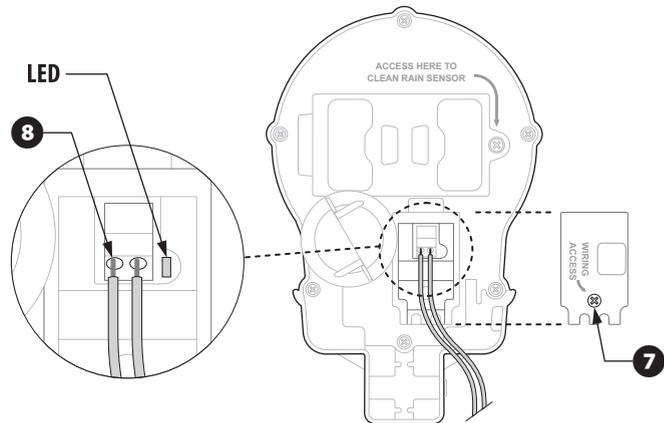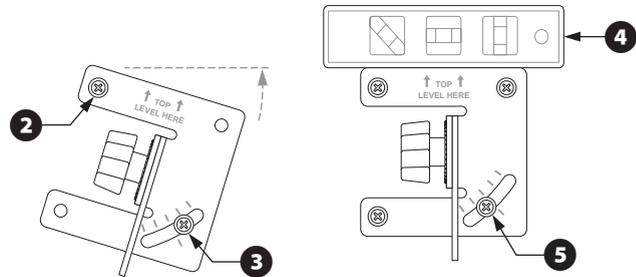
6. Feed the wire(s) through the three holes located in the mounting arms to provide a "strain relief".

7. Unscrew the captured screw of the wiring compartment cover to expose the sensor housing and green wire connector within the wiring compartment.

8. Strip the two communication wire leads 1/4" and insert into the connectors (polarity is not important). If the wires are attached to the ESP-SMT controller and AC power is available, a green LED will blink. Once communication has been established between the sensor and the controller, the LED will illuminate.

9. Re-attach the wiring compartment cover and route the wire through the two openings. Then tighten the captured screw to secure the cover to the housing.

10. Attach the sensor housing assembly to the top of the mounting arm. Align the mounting hole on the bracket and the arm and using the provided thumb screw, attach the sensor to the mounting bracket assembly.

11. Adjust each of the mounting arms to assure that the top of the sensor is secured in a level configuration.

12. Slip the sensor debris cover onto the top of the sensor.

TIPPING BUCKET
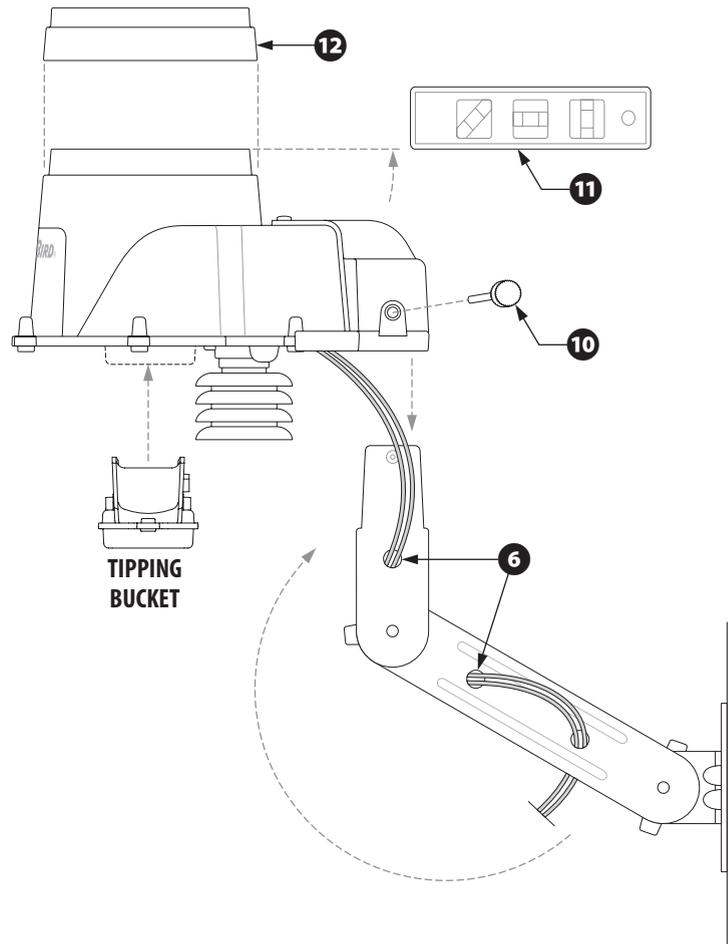
Trouble-shooting

This section shows you how to trouble-shoot problems with the ESP-SMT Controller or Sensor Pod.

Symptom	Possible Cause	Correction
Automatic irrigation is not occurring	Dial is set to OFF Position.	Set the dial to the AUTO position.
	The unit is in a SUSPEND Mode due to user entry.	Set the Dial to AUTO and press the RESUME button.
	Irrigation is not required based on accumulated weather data.	If the plant material needs irrigation, manually water the affected zone(s).
	Today is not an "Allowed Watering Day"	If regulations permit, change the "Allowed Watering Days" by rotating the dial to the CONFIGURE CONTROLLER dial position and enter new information for the Allowed Water Days, or the Block Watering on Specific Day of Week.
	Block Day of Week feature is activated.	Rotate the dial to the CONFIGURE CONTROLLER dial position and change the Allowed Watering Day status from BLOCK to ALLOW.
	Event Day Off feature is activated.	Rotate the dial to the SPECIAL FEATURES dial position and remove the day from Event Days Off status.
	Irrigation suspended due to measured rainfall.	Move the dial to the SPECIAL FEATURES dial position. Change the user set value to higher rainfall threshold from Advanced Controller Setup.
	Irrigation suspended due to measured low temperature.	Move the dial to the SPECIAL FEATURES dial position. Change the user set value to lower threshold from Advanced Controller Setup.
	Zone to Zone Delay is activated for an extended duration.	Move the dial to the SPECIAL FEATURES dial position. Change the Zone to Zone Delay feature to a shorter time value from Advanced Controller Setup.
	An individual zone has been set in the OFF (inactive) mode.	Move the dial to the INPUT ZONE INFORMATION dial position. Change the zone setting to ENABLED (active).
	AC Power has been lost and is not currently available. NO AC POWER will be blinking in the AUTO screen if a 9V battery is installed.	Reset the circuit breaker or make the necessary repairs to assure a consistent 120 VAC +/- 10% power supply.

Symptom	Possible Cause	Correction
Alarm LED is illuminated	"No Pod Communication" appears on the screen when the communication has been lost for more than one hour.	Identify if there is connection or wiring problem. If not, press the reset button located on the back of the controller.
	SHORT Z xx appears on the screen when a short has been detected on a specific valve(s).	Fix the wiring problem between the controller and the identified zone.
Display is partially or completely blank.	An electrical surge or lightning strike has disrupted or damaged the controllers electronics.	Push the RESET button located on the back of the controller front panel.
		Turn off the controller and disconnect the 9V battery. Let the controller rest for 2-3 minutes then restore power to the controller. If the electrical surge did no permanent damage, the controller will accept programming commands and function normally.
Temperature Reading does not match the actual ambient temperature for an extended period of time.	Unit is absorbing reflective heat and/or from adjacent pavement.	Relocate the sensor to a more appropriate location.
Inaccurate rain fall measurement occurs on a regular basis.	Debris Screen is clogged and is not allowing the rainfall to activate the tipping bucket mechanism.	Clean the debris off the Debris Screen.
	Sensor rain funnel is clogged.	Clear the funnel.
Individual valve does not come on.	The zone is set in the OFF (inactive) position.	Rotate the dial to the INPUT ZONE INFORMATION and change the statue of the zone to ENABLED (active).
	Valve wiring problem.	Run short circuit test to identify short conditions and repair accordingly.
Zone is too Wet.	Incorrect Zone Parameters are set such as the Sprinkler Application Rate.	Rotate the dial to the FINE TUNE WATERING dial position and decrease watering by up to 60% in 1% increments.
Zone is too Dry.	Incorrect Zone Parameters are set such as the Sprinkler Precipitation Rate.	Rotate the dial to the FINE TUNE WATERING dial position and increase watering by up to 30% in 1% increments.
Run off is occurring on a regular basis.	Zone input information may not match active site conditions.	Rotate the dial to the INPUT ZONE INFORMATION position and change the soil type and/or degree slope.

Symptom	Possible Cause	Correction
NOTE 1 on Display Screen.	All Zones are OFF.	Rotate the dial to the INPUT ZONE INFORMATION position and change the status of each desired zone to an ENABLED (Active) mode.
NOTE 2 on Display Screen.	All Watering Days are OFF.	Rotate the dial to the CONFIGURE CONTROLLER position and change the Allowed Watering Days.
NOTE 3 on Display Screen.	Unusually High Temperature Reading.	Verify that the temperature sensor is not malfunctioning. Relocate the sensor in a different location to measure more accurately the ambient temperature of the site.
NOTE 4 on Display Screen.	Unusually High Rainfall Reading.	Remove the Tipping Rain Bucket from the sensor housing. Clean with mild soap and water. Verify that the tipping mechanism is functioning properly and reinsert the mechanism into the sensor housing.
NOTE 5 on Display Screen.	Watering Not Completed During Watering Window.	If this is an occasional occurrence, the controller will finish the required irrigation during the next allowed watering day. If it is a regular occurrence, expand the Watering window while in the CONFIGURE CONTROLLER dial position. Another solution is to use to FINE TUNE affected zones.
NOTE 6 on Display Screen.	Irrigation Suspended Due to Extreme Cold.	If irrigation is desired at this temperature, rotate the dial to the SPECIAL FEATURES dial position. Change the user set value to lower threshold temperature value.
NOTE 7 on Display Screen.	Irrigation Suspended Due to Rain.	If irrigation is desired at the current rainfall amount, rotate the dial to the SPECIAL FEATURES dial position. Change the user set value to a higher rainfall threshold.
NOTE 8 on Display Screen.	Unit is Re initializing, Please WAIT.	Unit has encountered a small problem. The controller will correct itself – no action is necessary.

For technical assistance contact Rain Bird at 1-800-247-3782

Appendix

Irrigation System Overview

Basic Valve (Zone) Operation

The ESP-SMT Smart Modular controls when your sprinkler system turns on, and how long the sprinklers run. The controller has several valves connected to it, as shown in the illustration on the following page.

Each valve opens when it receives power from the controller, and the sprinklers connected to that valve turn on. When these sprinklers have run per the automatic irrigation schedule, the controller shuts off the valve and opens the next valve scheduled to irrigate.
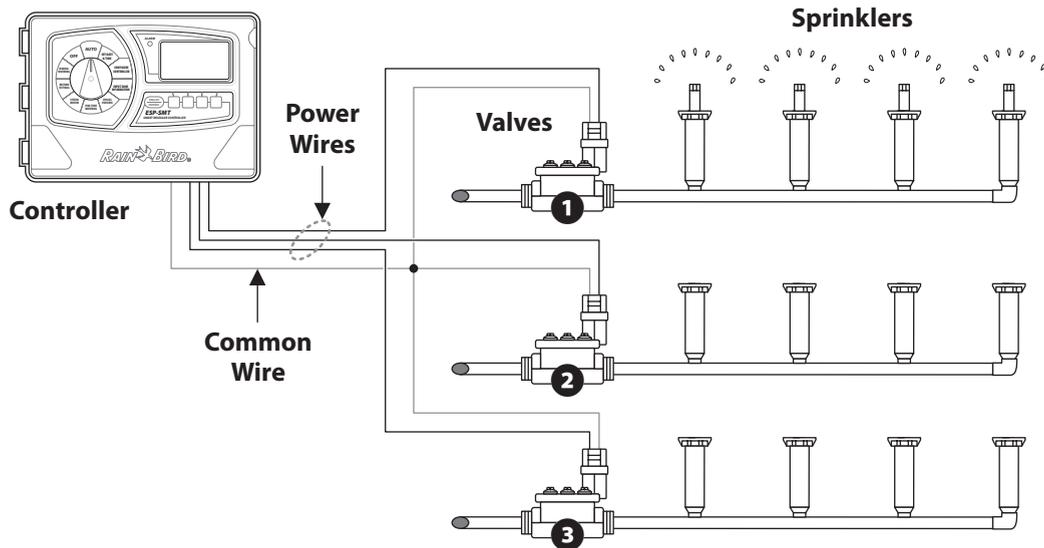
Description Of Each Soil Type

Sand

- Loose and single grained. Each grain of sand can be easily seen and has a gritty feel.
- Squeezed when dry, sands cannot form a cast and will readily fall apart when released.
- Squeezed when moist, soil will form a very weak cast that will crumble if touched.

Loamy Sand

- Resembles sand as it is loose and single grained. Most individual grains can be seen. Feel is not as gritty as sand.
- Squeezed when dry, soil forms a slight cast that readily falls apart when hand releases soil.
- Squeezed when moist, soil is slightly cohesive. Fragile cast can be formed more than with sand.

Sandy Loam

- Some individual sand grains can be seen and felt.
- Enough silt and/or clay soil particles to provide soil cohesion when moist.
- When dry, casts can be formed that will not break with careful handling.

Loam Soil

- Medium textured soil. Mixture of sand, silt and clay with none dominant.
- When dry, soil can form a cast that can be handled freely.
- Squeezed moist, soil is fairly smooth and plastic with a gritty feel.

Clay Loam

- Fine textured soil. Even distribution of sand, silt and clay. Soil feels like it has more clay than sand or silt.
- Forms clods that are firm when moist and hard when dry.
- When the moist soil is squeezed between the thumb and forefinger it forms a thin ribbon that will barely sustain it's own weight.

Silty Clay

- Soil has a moderate amount of fine grains of sand and clay particles. Medium sized particles represent less than 50% of all soil particles.
- When dry, soil forms very hard clods that can be broken.
- When moist, a moderate size ribbon can be formed that will support it's own weight.

Clay Soil

- Very fine textured soil.
- When dry, forms very hard lumps that are hard to break up.
- When moist, soil is extremely sticky and plastic.
- Squeezed soil will form a thin, long flexible ribbon that will not break easily.

Simple Test To Determine The Soil Type

1. Remove 1 to 2 cups of soil at the approximate root depth of the plant material you plan to irrigate

2. Place the soil into a glass jar in which you can see the contents (a Mason jar or an empty mayonnaise jar works well)

3. Fill the balance of the glass jar with water.

4. Screw the cover onto the jar and shake vigorously until all of the soil particles are suspended in the water.

5. Set the closed jar onto a flat surface and let sit until most of the soil particles have settled to the bottom of the jar (this can take a few hours).

   The settled soil will be deposited in layers with the heavier soil particles (sand) forming the bottom layer, followed by the next heaviest soil particles (silt), and finally the lightest soil particles (clay).

6. Measure the total height of all the soil layers combined.

7. Measure the height of each of the three individual soil layers (sand, silt and clay) and compare these values to the total soil height to get an approximate percentage of each soil type.

8. Apply these percentages to the Soil Classification Triangle on the adjacent page to identify the Soil Type description.
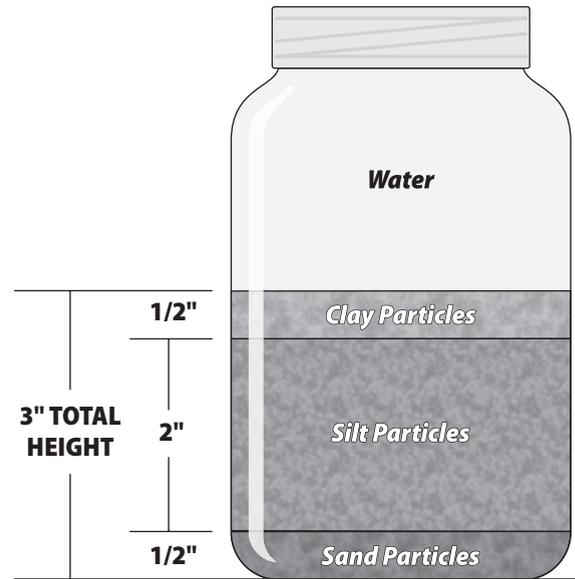
Example: Total Soil Height = 3 inches.

The soil is comprised of the following:

- **Clay; ½ inch (0.5/3.0) = 17%**
- **Silt; 2 inches (2.0/3.0) = 66%**
- **Sand; ½ inch (0.5/3.0) = 17%**

Apply these values to the Soil Classification Triangle on the next page to determine the soil type description.
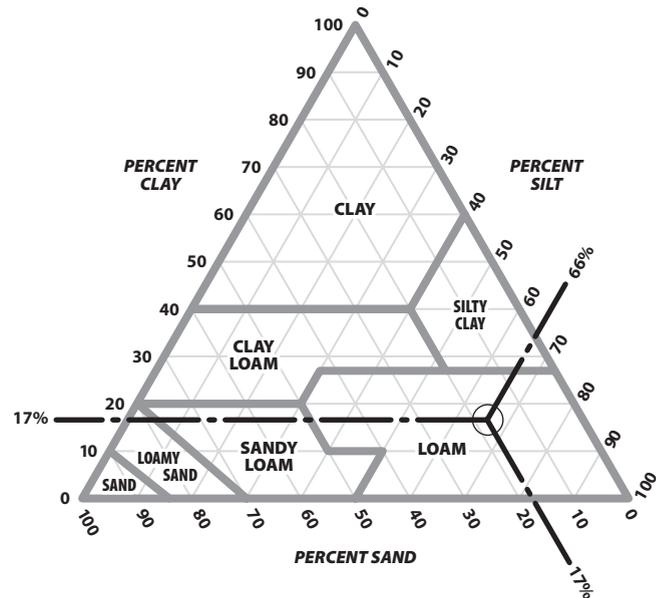
Soil Classification Triangle

This tool is used to classify the soil based on soil texture. Soil texture describes the size and shape of individual soil particles such as sand, silt, or clay. The soil texture class describes the relative amounts of sand, silt, and clay in that particular soil.

Soil texture has a major influence on the amount of water stored (moisture holding capacity) in a soil. This is used to determine how much to irrigate and the timing of required irrigation.

The ability of water to enter the soil profile (infiltration rate) and the rate at which water can move through the soil (permeability) is determined by the soil texture. The infiltration rate and permeability of the soil, combined with the slope of the irrigated area will determine how long each irrigation event (cycle) should run and how much time should elapse (soak) between cycles to prevent water from running off the soil.

To determine the Soil Type (Classification) using the Soil Classification Triangle, draw a parallel line for the value of each soil particle type. The Soil Type is identified by where the three lines intersect in the Soil Classification Triangle.

The three soil particle type lines for the soil sample example intersect in the LOAM soil classification area.

How the ESP-SMT Smart Control System Works

Unlike a traditional time-based irrigation controller that employs fixed station run times, start times, and irrigation days manually set by the user, the Rain Bird ESP-SMT Smart Control System irrigation schedule automatically changes daily based on specific weather conditions at the site.

Weather information is collected in real-time by an on-site SMT Weather Sensor and communicated to the ESP-SMT Controller. This collected weather information is combined with 1) historic weather information for the site location and 2) specific site and individual zone parameters that are entered into the controller by the user to automatically create an optimized irrigation schedule that will promote healthy deep rooted plants while conserving water. Based on the soil type and slope conditions, the overall irrigation requirement is split into multiple "cycle and soak" irrigation events, thereby eliminating the problems from water run-off.

Automated Management Allowed Depletion (MAD)
Irrigation Scheduling Method

The objective of an automated irrigation system is to augment rainfall in order to re-supply the (soil) with enough available water for the plant to make up for the water lost through Evapotranspiration (ET). The proven MAD method looks at the soil as a water reservoir that supplies the plant with water as needed. The soil texture (class) of the soil reservoir influences the amount of water that can be stored in the soil, as well as the potentially available water (PAW) for the plant material growing in the soil. The soil texture and the MAD will determine the amount and frequency of irrigation

Evapotranspiration

The Evapotranspiration (ET) rate is usually expressed in inches of water lost over a time period (usually on a daily basis) due to evaporation from the soil surface and transpiration from the plant surfaces. The ET rate is influenced greatly by the weather conditions at the site. For example; a hot dry environment would have a much higher ET rate and require longer, more frequent irrigation than a cool, humid environment.

EVAPOTRANSPIRATION (ET)

ET	
Inches/Day	Day
0.18"	1
0.16"	2
0.16"	3
0.18"	4
0.14"	5
0.81"	(50% MAD)

MAD 0.5"
PAW 1"
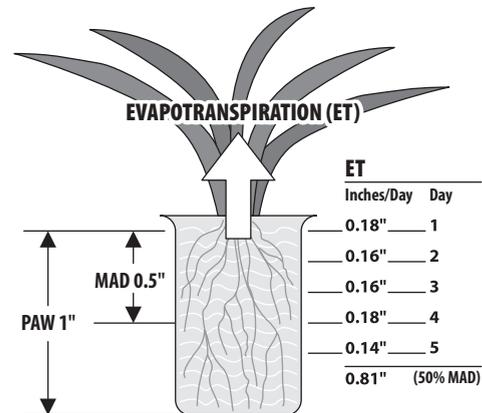
IRRIGATE: When? >>>>>   After 4 days
How Much? >>>   0.51" + losses

In this example the daily water losses due to ET are as follows:

Day	ET/Day
1	0.18"
2	0.16"
3	0.16"
4	0.18"
5	0.14"
Total	0.81

Effective Rainfall

Not all rainfall is usable by the plant. If the rainfall intensity is high, the rain may not percolate completely to the plant root zone before running off the clay soils or in sandy soils, the water may go below the plant root zone. The integral tipping rain bucket measures both the total amount and intensity of the rainfall and determines how much of it should be considered "effective" rainfall.

In this example the daily water losses due to ET are as follows:

Day	Total Rain	Effective Rain
1	0.00"	0.00"
2	0.00"	0.00"
3	0.46"	0.16"
4	0.00"	0.00"
5	0.00"	0.00"
Total	0.46	0.16

Plant Available Water

In the attached example, the plants roots are 12 inches deep. The soil class is Loam. Looking at the adjacent Soil Water Holding Capacity Table, the AW is 0.17 inches of water per inch of soil. The Plant Available Water (PAW) in this example would be 0.17 inch/inch X 6 inch root depth = 1.02 inches of potentially available water in the soil reservoir for the plant material.

Soil Available Water (AW) Table MAD Table

Soil Type or Class	Available Water (AW) (in of water per in of soil)
Clay	0.17
Silty Clay	0.17
Clay Loam	0.18
Loam	0.17
Sandy Loam	0.12
Loamy Sand	0.08
Sand	0.06

Management Allowed Depletion (MAD)

This is the maximum amount of amount of Plant Available Water (PAW) expressed as a percent that the irrigation manager has determined can be removed from the soil from ET before irrigation will need to occur. To promote Plant Health and deep root growth, it is best to irrigate only when the root zone has reached MAD. In this example, the MAD value is 50% (see Table below); so irrigation will need to occur when the PAW level reaches 0.51 inches (1.02" @ 50%)

Managed Allowed Depletion (MAD) Table

Soil Type or Class	Available Water (AW) (in of water per in of soil)
Sand	30%
Loamy Sand	50%
Sandy Loam	50%
Loam	50%
Clay Loam	40%
Silty Clay	40%
Clay	30%

"Checkbook" Method of Irrigation

The on-site SMT Weather Sensor constantly monitors the weather and communicates the information to the controller on a daily basis. Once the Accumulated Water Requirement reaches the MAD threshold value, irrigation will begin if it is on an Allowed Watering Day. An analogy to this scenario is your checkbook…. rainfall is the amount of free money going in, and ET being the money being withdrawn; and irrigation representing a deposit that you put into your account to bring it up to a certain threshold value.

The Table below shows the Accumulated Water Requirement (AWR) for the example:

Day	ET/Day	Effective Rain	Net Water Req't	Accumulated Water Req't
1	0.18"	0.00"	0.18"	0.18"
2	0.16"	0.00"	0.16"	0.34"
3	0.16"	0.16"	0.00"	0.34"
4	0.18"	0.00"	0.18"	0.52"
5	0.14"	0.00"	0.14"	0.66"

In the example, irrigation will occur on Day 4 as the Accumulated Water Requirement (0.52) has reached the calculated Management Allowed Depletion (0.51).

Replenish Accumulated Water Requirement (AWR)

The total amount of time that each zone needs to operate is dependent on the Net Application Rate (Precipitation Rate X System Efficiency) that the sprinkler system is applying.

For example, if the precipitation rate for a rotor zone is 0.6 inches per hour and the efficiency is 85%, then the Net application Rate is 0.52 inches per hour. To replenish the AWR, the zone would need to have a total run time of 1 hour on Day 4.

Applying the "Cycle and Soak" Principle

In most soil types, you would not want to run the zone's irrigation system for one hour in duration as this would most likely cause significant water loss through runoff. Based on the soil type and degree of slope information entered into the controller for the zone, the ESP-SMT controller will determine the maximum "cycle" time and minimum "soak" time required to irrigate without runoff. These prescribed cycle and soak times are based on the Water Intake rate of the soil type as identified in the following tables:

Soil Type or Class Basic Intake Rate

Soil Type or Class	Basic Intake Rate (inches per hour)
Sand	0.60"
Loamy Sand	0.50"
Sandy Loam	0.40"
Loam	0.35"
Clay Loam	0.20"
Silty Clay	0.15"
Clay	0.10"

This process would continue on a daily basis as shown is the table below:

Illustrative Scheduling Example

Day	ET/Day	Effective Rain	Net Water Req't	Accumulated Water Req't	Irrigation Event
1	0.18"	0.00"	0.18"	0.18"	---
2	0.16"	0.00"	0.16"	0.34"	---
3	0.16"	0.16"	0.00"	0.34"	---
4	0.18"	0.00"	0.18"	0.52"	0.53"
5	0.14"	0.00"	0.14"	0.13"	---
6	0.13"	0.10"	0.03"	0.16"	---
7	0.15"	0.11"	0.04"	0.20"	---
8	0.14"	0.00"	0.14"	0.34"	---
9	0.11"	0.00"	0.11"	0.45"	---
10	0.16"	0.00"	0.16"	0.61"	0.60"
11	0.12"	0.00"	0.12"	0.13"	---
12	0.12"	0.00"	0.12"	0.25"	---

In this example the irrigation schedule for the zone would be:

Day 4 - 60 minutes (Cycle 1 = 30 minutes & Cycle 2 = 30 minutes)

Day 10 – 68 minutes (Cycle 1 = 30 minutes, Cycle 2 = 30 minutes, Cycle 3 = 8 minutes).

As you can see, to optimize an irrigation schedule for each zone can be a tedious task. The ESP-SMT Control System automatically optimizes the Irrigation Schedule per the method described above for each zone on a daily basis.

This is how we can make the claim that the ESP-SMT "smart" Control System can promote healthier plants with significant water savings when compared to the traditional time-based irrigation controllers on the market today.

Determine Zone Application Rate

The Net Application Rate that is entered into the controller (Default or user-Set) is extremely important to optimize the irrigation schedule and to prevent water run-off. The greater the application rate, the shorter the required run times and/or cycles needed to apply the needed replacement water to the plants root zone and conversely the lower the net application rate, the longer the required run times and/or cycles needed.

Sprinkler Type Default Method (least accurate)

The ESP-SMT controller provides Net Application rates for the different sprinkler type. To use this method, see page 21, in the Input Zone Information section.)

The Table below provides the Default Net Application Rate Values by Sprinkler Type that are used by the controller if this method is used.

Sprinkler Type	Net Application Rate (in/hr)
Sprays	1.60
Rotors	0.45
Rotary Nozzle	0.50
Bubblers	2.50
Point Source Drip	0.80

Total Area Covered Method to Determine Precipitation Rate and Efficiency (moderate accuracy)

1. Determine the Manufacturer and Model of the sprinkler being used in the zone, making particular note of the specific nozzle being used at each sprinkler location. For Example a Rain Bird 5004 with the following MPR nozzles are being used on Zone 1 (Full Circle = MPR 30Q, Half Pattern = MPR30H and Quarter Patterns = MPR30Q). See illustration in the next column.

2. Determine the operating water pressure at the Sprinkler Nozzle. Example = Water Pressure = 45 psi.

3. Obtain Catalog Information for Sprinkler (This information is usually found on the Manufacturer web site).

5004 MPR Nozzle Series @ 45 psi

Model	Radius	Pattern	Flow (GPM)
30Q	30 Foot	Quarter	1.40
30H	30 Foot	Half	2.59
30F	30 Foot	Full	5.78

4. Determine the Total Amount of flow (GPM) for the area being covered by the zone.

   Example: (4) 30Q's @ 1.40 GPM+ (6) 30H's @ 2.59 GPM + (2) 30F's @ 5.78. Total Zone 1 Flow = 32.7GPM

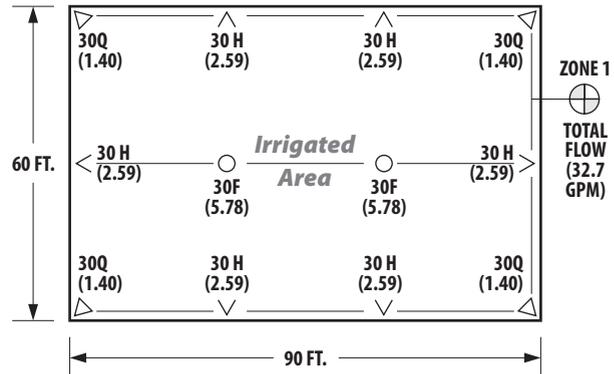5. Determine the Total Area (square feet) covered by Zone 1.

   Example: the area is 60 feet by 90 feet = 5,400 square feet (SF)

6. Calculate the Precipitation Rate (PR) using the following formula:

$$\frac{\text{Total Flow (GPM) X 96.3}}{\text{Total Area (sq. ft.)}}$$

   Example: Zone 1 PR = $\dfrac{32.7 \text{ X } 96.3}{5,400}$

7. Enter 0.58 inches per hour into the ESP-SMT controller based on information contained on page 20-21 of this User Manual.

8. Determine the Efficiency Rating - Chose an efficiency rating based on your visual observation of system condition and operating pressure at the nozzle from the Table below:

Sprinkler Type	Poor Performance	Average Performance	Good Performance
Sprays	50%	60%	70%
Rotors	55%	70%	80%
Rotary Nozzle	55%	70%	80%
Bubblers	50%	60%	70%
Drip	70%	80%	90%

Example: Zone 1 Sprinkler Type is a Rotor and the zone operating condition is average, so the sprinkler efficiency value is 70% based on information in the table above.

9. Determine the Net Application Rate - The ESP-SMT controller will automatically calculate the Net Application Rate for the zone in which you entered the Precipitation Rate and Efficiency.

Example: Precipitation Rate = 0.44 inches per hour

Efficiency = 70%

Net Application Rate for Zone 1 is 0.31 inch/hour

(0.44 X 70%) = 0.31 inches per hour

Zone System Audit Method (most accurate)

1. Place a series of catchment devices (that are the same size & shape) throughout the area that the zone is irrigating.

2. Turn on the zone and run for at least 10 minutes to collect water in the catchment device.

3. The amount of water collected in each catchment device is measured and analyzed to determine the Distribution Uniformity (DU).

Information on how to perform an Irrigation System Audit correctly is available on the Irrigation Association web site at www.irrigation.org

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If the equipment does cause harmful 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 the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by Rain Bird Sales, Inc., could void the user's authority to operate the equipment.

This product was FCC certified under test conditions that included the use of shielded I/O cables and connectors between system components. To be in compliance with FCC regulations, the user must use shielded cables and connectors and install them properly.

RAIN BIRD

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