Contents

Check Box Contents ........................................ IV

Introduction ...................................................... 1
  Welcome to Rain Bird ........................................ 1
  The Intelligent Use of Water ............................... 1
ESP-SMTe Smart Modular Control System ........... 1
  Features and Benefits ..................................... 1
  Basic Irrigation Description ........................... 2
  Controls and Indicators.................................... 2
  Controller Features ........................................ 2
  Weather Sensor Features ................................ 3
  Station Modules ............................................. 3

Normal Operation ............................................. 4
  Auto ......................................................... 4
  OFF .......................................................... 5

Programming ................................................... 6
  Set Date and Time .......................................... 6
  Configure Controller ...................................... 6
  Enter Site Location ........................................ 7
  Select Location by Zip Code ......................... 7
  Enter Custom Data for Location ..................... 7
  Set Allowed Watering Days ......................... 8
  Block One Day a Week .................................. 9
  Set Allowed Watering Windows ................. 9
  Review ...................................................... 10

Input Zone Information ..................................... 11
  Zone Setup Wizard ....................................... 12
  Enter Zone Number ...................................... 12
  Select Soil Type ........................................ 12
  Select Zone Type ......................................... 13
  Select Sprinkler Type .................................... 13
  Sprinklers .................................................. 13
  Point Source Drip ........................................ 14
  Inline Grid Drip ........................................... 15
  Time-Based ............................................... 15
  Cycle+Soak™ ............................................. 16
  Select Plant Type ......................................... 17
  Select Plant Density (non-grass) .................. 19
  Select Shade Factor .................................... 19
  Enter Refill Point ....................................... 20
  Select Plant Maturity ................................... 20
  Select Next Action ....................................... 21
  Copy Zone to Zone ...................................... 22

Advanced Options ......................................... 23
  Special Features .......................................... 23
  Event Days Off .......................................... 23
  Short Circuit Test ....................................... 23
  Advanced Controller Setup ............................ 24
  Advanced Zone Setup ................................... 24
  Save Contractor Defaults ............................. 25
  Set Units .................................................... 25

Fine-Tune Watering ......................................... 26
  System Review ........................................... 27
  Controller Settings ...................................... 27
  Zone Settings ............................................ 28
  Next Irrigation Estimate ............................. 29
    Set Initial Temperature Values .................... 29
  Weather Data ............................................ 30
  Weather Log .............................................. 30
  Event Log .................................................. 31

System Restore ............................................... 33
  Contractor Defaults .................................... 33
  Factory Defaults ....................................... 34
  Set Soil Moisture ....................................... 34

Manual Watering ............................................. 35
  Water Individual Zone ................................ 35
  Water All Zones ........................................ 36
  Water Selected Zones ................................ 36

Installation .................................................. 38
  Installation Checklist .................................. 38
  Gather Installation Tools ............................. 38
  Mount Controller ........................................ 38
    Choose Location ..................................... 38
    Remove Front Panel ................................ 39
    Remove Knock-outs ................................ 39
    Mount Controller ................................... 40
  Connect Power ........................................... 40
    Indoor Model ......................................... 40
    Outdoor Model ....................................... 41

Station Expansion Modules .............................. 42
  Module Options ......................................... 42
  Install Modules .......................................... 42
  Station Numbering ..................................... 43

Wiring Connections ......................................... 44
  Connect Valves .......................................... 44
  Connect Master Valve ................................ 44
  Connect Pump Start Relay ............................ 45

Complete Controller Installation ....................... 46
  Install Front Panel ..................................... 46
  Connect Weather Sensor ................................ 46
  Finish Installation ..................................... 46

Install SMTe Weather Sensor ............................ 47
  Choose Location ....................................... 47
  Sensor Mounting Options ............................. 47
  Do’s ......................................................... 47
  Don’t’s ..................................................... 47

Weather Sensor Installation ................................ 48

Remote Programming ..................................... 49
Troubleshooting ................................. 50
  Error Detection............................................ 50
    Sensor Pod Communication Error ................. 50
    No Temperature Data Error ......................... 50
    Short Circuit Error .................................. 51
  Watering or Electrical Issues ...................... 52
  Reset Button .......................................... 54
  Connect Optional Accessory ......................... 54

Appendix ................................................. 55
  ESP-SMTe Smart Control System ................. 55
    Overview ........................................... 55
    Irrigation Scheduling Method ................. 55
  Soil Type ............................................. 55
    Soil Type Description ......................... 55
    Simple Test To Determine The Soil Type .... 56
    Soil Classification Triangle ................. 57
  Factors That Affect Irrigation .................... 57
    Evapotranspiration ............................... 57
    Plant Available Water ......................... 57
    Effective Rainfall ............................... 58
    Management Allowed Depletion (MAD) ...... 58
    Efficiency ........................................... 58
  Applying the Cycle+Soak™ Principle ............... 59
  Determine Net Application Rate .................... 60
    Sprinkler Type Default Method ................ 60
    Total Area Covered Method .................... 60
    Zone System Audit Method ..................... 61
  Drip Irrigation ....................................... 62
    Inline Grid Drip .................................. 62
    Point Source Drip ................................. 62
Check Box Contents

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

1. ESP-SMTe Modular Controller (Outdoor model shown)
2. Door Keys (Outdoor model only)
3. Controller Mounting Hardware (Four #8 screws and wire nuts)
4. Grounded Power Supply (Indoor model only)
5. Mounting Template
6. ESP-SMTe Homeowner’s Guide
7. Site Profile Chart
8. Installation & Quick Setup Poster
9. SMTe Weather Sensor
10. Weather Sensor Debris Screen
11. Weather Sensor Mounting Bracket
12. Mounting Bracket Hardware (Four Phillips head screws + finger screw for mounting sensor to bracket)
13. Sensor Wire - 25 feet of 20-2 UV rated wire (not rated for direct burial)

Symbols

⚠️ CAUTION: Symbol is intended to alert the user to important instructions or conditions that could seriously affect irrigation effectivity or controller operation.

-arrow DIAL: Symbol indicates that the user is required to turn the dial on the controller to the appropriate position in order to follow subsequent instructions as described in that section.

⚠️ NOTE: Symbol is intended to alert the user to important operating functionality, installation or maintenance instructions.

🔄 REPEAT: Symbol indicates that a repetition of previous steps may be required in order to continue or complete the controller programming process.

⚠️ WARNING: Symbol alerts the user to the presence of electricity or electromagnetic energy which may constitute a risk of electric shock, radiation exposure or other hazard.

Technical Support

For assistance, contact Rain Bird at 1-800-247-3782 or visit our website at www.rainbird.com/esp-smte

Additional copies of the user documentation for the ESP-SMTe Smart Modular Control System can also be downloaded there, including:

- ESP-SMTe Homeowner’s Guide
- ESP-SMTe Contractor’s Manual (this document)
- ESP-SMTe Site Profile Chart
- ESP-SMTe Installation and Quick Setup Poster

To learn more about Rain Bird irrigation systems, visit the Rain Bird Academy at www.rainbirdservicescorporation.com/training

Foreign Language Support

Spanish and French language versions of all user documentation for the ESP-SMTe Smart Modular Control System can be found online at www.rainbird.com/esp-smte
Introduction

Welcome to Rain Bird
Thank you for choosing the ESP-SMTe Smart Modular Control System from Rain Bird.

For more than seven decades, Rain Bird has led the irrigation industry by providing the highest quality products and services available for state of the art water management.

The Intelligent Use of Water
We believe it is our responsibility to develop products that use water efficiently.

Using weather-based irrigation control, the ESP-SMTe Smart Control System will help maintain your landscape while using 30% to 50% less water than traditional time based controller systems.

ESP-SMTe Smart Modular Control System
Your new Rain Bird control system is designed to provide many years of advanced irrigation control.

The ESP-SMTe Controller is an indoor or outdoor weather-based irrigation controller for residential and light commercial use. There are two ESP-SMTe models available that can be expanded up to 22 stations:

- 4 Station Indoor Controller (ESP4SMTEI)
- 4 Station Outdoor Controller (ESP4SMTE)

NOTE: An upgrade kit (ESPSMTEUPG) is available for the ESP-M controller to provide ESP-SMTe functionality but does not increase the number of stations.

Features and Benefits

The ESP-SMTe Smart Control System has a variety of advanced water management features, including:

- The ESP-SMTe controller supports 4 zones standard, plus a master valve or pump start relay and includes an SMTe Weather Sensor.
- Station Modules can increase the total number of available zones to 22, should your irrigation needs expand in the future.
- The SMTe Weather Sensor provides weather-based irrigation control, adjusting each zone's watering needs based on the actual site conditions.
- Watering occurs as needed and can be restricted to selected days of the week, odd or even calendar days, or at set intervals.
- Automatic and manual Cycle+Soak™ feature for each zone allows watering duration to be split up to avoid run-off.
- Next Irrigation Estimate shows an estimate of the current soil moisture, the next scheduled irrigation date and an estimated schedule up to three weeks in advance.
- Manual Watering allows immediate watering of selected zones or all zones.
- Event Days Off allows you to select up to four specific dates to block watering for special occasions.
- SMTe Weather Sensor acts as a rain shut-off device and sends rainfall and temperature data to the controller on an hourly basis.
- Rainfall Shutdown suspends all irrigation if the measured rainfall exceeds a user set threshold.
- Cold Weather Shutdown suspends all irrigation to prevent potential freeze damage if the measured temperature is too low.
- English/Spanish Button easily switches the display text between languages.
Basic Irrigation Description

The ESP-SMTe Controller operates sprinklers when irrigation is required.

When irrigation is scheduled to begin for a particular zone, the controller sends a signal to the associated valve to open. This allows the sprinklers to begin watering. When the calculated run time is over, the controller shuts off the valve.

Sprinkler Nozzles

Sprinkler nozzles, such as rotors and sprays, are the most common method to apply water quickly and effectively to a large area of landscape.

Drip Emitters

Drip emitters apply water directly to the root zone or base of a plant, using a network of small diameter tubes and emitters. This type of irrigation is more efficient and requires less water than sprinkler nozzles.

Controls and Indicators

Key operational features of the ESP-SMTe Controller:

Controller Features

- **AUTO**
  - Watering occurs automatically

- **OFF**
  - Cancels all irrigation after 3 seconds

- **Manual Watering**
  - Start watering selected zones immediately

- **System Restore**
  - Set initial soil moisture, restore contractor defaults, or restore factory defaults

- **System Review**
  - View system settings, weather information, estimated schedules 3 weeks in advance, and event logs

- **Fine-Tune Watering**
  - Adjust run times by zone for weather based zones

- **Special Features**
  - Select advanced irrigation features and controller setup options, such as block irrigation on days of special events

- **Alarm Light**
  - Illuminates when conditions prevent watering

- **Large Back-Lit Dot-Matrix Display**
- **Programming Buttons**
  - Press and Hold to accelerate settings

- **English/Spanish Button**
  - For easy switching of display language

- **Remotely Programmable**
  - Using 9V battery
Station Modules

Optional upgrade of additional Station Modules can increase the number of available zones up to 22.

The ESP-SMTe Controller comes standard with a base module that supports four zones (valves). If more zones are required, up to three additional Station Modules (not included) can be installed.

**NOTE:** The 6-Station module is only compatible with the ESP-SMTe controller, and not the ESP-SMT controller.
Normal Operation

Auto

*AUTO is the normal operating mode for the controller.*

Irrigation starts automatically when required, and the next estimated watering date is displayed.

1. Turn the dial to **AUTO**.

   **In AUTO Mode:**

   The display shows the current day of the week, date, time, and the next estimated watering day.

   ![Auto Mode Display](image)

   **During Watering:**

   The display shows the current day, current active zone, and the Time Remaining for that Zone.

   ![Watering Display](image)

   **To Suspend Automatic Irrigation:**

   Automatic irrigation can be suspended for a period of time from one minute up to 14 days.

   **NOTE:** This can be useful if you want to temporarily suspend watering. For example, you may want to pick up the newspaper, walk the dog, or are having guests. You can suspend irrigation if rain is in the forecast.

2. Press **SUSPEND**.

3. Press – or + to set the desired amount of time. The display will show the countdown of the time remaining.

4. Press **RESUME** at any time to resume automatic irrigation.
Alarms, Notes and Messages:

In **AUTO** Mode, the controller will indicate problems or issues with normal operation on the display. Refer to the Troubleshooting section for details.

**ALARMS** indicate there is a significant problem, such as a short in the wiring.

**NOTES** provide information about why the controller is not watering as expected.

**MESSAGES** provide information about temporary conditions that are affecting normal irrigation.

---

**OFF**

*Cancel all active watering immediately and stop automatic irrigation.*

1. Turn the dial to **OFF**.
2. Press – or + to adjust the LCD contrast if desired.

Controller Configuration and Zone Information settings remain stored in memory while the controller is **OFF** or if there is a loss of power. Date and time are also maintained for up to 10 years by an internal battery. A 9V battery is not required to maintain settings or date and time.

⚠️ **NOTE**: Automatic irrigation will **NOT** occur if the controller remains in **OFF** mode.
**Programming**

Online training and other resources are available at www.rainbird.com/esp-smte to help understand the theory and programming of the ESP-SMTe Controller.

**Set Date and Time**

*Set the current calendar Date and Time of day.*

1. Set the current month, day and year.
2. Set the current time (ensure that the AM/PM setting is correct).

**Configure Controller**

*Enter site location data and setup irrigation schedules.*

Configure the controller by entering site location information for your site, selecting the days to allow watering, and entering the times that watering can occur.

Use the provided checklist and the ESP-SMTe Site Profile Chart as a guide to configure the controller.

### Configuration Checklist

<table>
<thead>
<tr>
<th>Site Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Location By Zip Code</td>
</tr>
<tr>
<td>5 Digit Zip Code __________</td>
</tr>
<tr>
<td>OR</td>
</tr>
<tr>
<td>- Site Custom Data</td>
</tr>
<tr>
<td>Site Latitude __________</td>
</tr>
<tr>
<td>Site Elevation __________</td>
</tr>
<tr>
<td>Monthly Avg. Wind Speed (for all 12 months)</td>
</tr>
<tr>
<td>Monthly Avg. Humidity (for all 12 months)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Set Allowed Watering Days (select one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- No Restrictions</td>
</tr>
<tr>
<td>- By Days of the Week</td>
</tr>
<tr>
<td>- Even Days of the Month</td>
</tr>
<tr>
<td>- Odd Days of the Month</td>
</tr>
<tr>
<td>- Cyclical</td>
</tr>
<tr>
<td>Days between Cycles _____ Beginning Date _____</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Block Day of the Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Select day(s) of the week to block watering _____</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Set Allowed Watering Windows</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Set 1st Watering Window __________</td>
</tr>
<tr>
<td>- Set 2nd Watering Window __________</td>
</tr>
<tr>
<td>- Set Daily Water Window</td>
</tr>
<tr>
<td>- Set Rain Shutoff</td>
</tr>
</tbody>
</table>

- Turn the dial to **Configure Controller**.

> Configure Controller

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

- Turn the dial to **Configure Controller**.

> Configure Controller

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

The ESP-SMTe controller will use historical weather data (for wind speed and humidity) based on zip code or you can enter custom values for your site.

**NOTE:** If outside the United States you must use Custom Data for Location.

Select Location by Zip Code

1. Select Enter Site Zip Code.

2. Enter the complete zip code for your site; then press NEXT.

**NOTE:** If the zip code you entered is not found in the database, the closest zip code will be used.

3. If the zip code is correct, press YES.

Enter Custom Data for Location

**NOTE:** Contact your local weather station for Custom Data information.

1. Select Enter Custom Data for Location.

2. Enter the latitude and elevation for your site; then press NEXT.

3. Enter the average wind speed for each month; then press ACCEPT.

4. Enter the average humidity for each month; then press ACCEPT.
2 Set Allowed Watering Days

Check with your local water authorities to see if there are any current water restrictions in effect that would limit the days or times of day that you can schedule irrigation.

Select one of the following options to determine the days that the controller is allowed to water.

No Restrictions:

1. Select No Restrictions if there are no restrictions on days that you can irrigate.

3. Press OFF or ALLOW to set each day of the week as an Allowed Watering day or a non-watering day.

4. When each day is set, press NEXT.

5. To water on all even calendar days of each month, select Even Days: 2, 4, 6, ... 30.

6. To water on all odd calendar days of each month (except the 31st on Feb. 29), select Odd Days: 1, 3, 5, ... no 31.

>> Go To Step 3, Block One Day a Week

Days of the Week:

2. To set a custom weekly schedule, select By Days of the Week.

>> Go To Step 4, Set Allowed Watering Windows

Even Days:

WATER BY DAY OF WEEK
Allow Watering:
Mo We Fr
Waterring OFF:
Tu Th Sa Su

BACK OFF ALLOW NEXT

Cyclical: Every x Days

>> Go To Step 3, Block One Day a Week

Odd Days:

ALLOWED WATER DAYS
No Restrictions
By Days of the Week
Even Days: 2, 4, 6, ... 30
Odd Days: 1, 3, 5, ... no 31
Cyclical: Every x Days
BACK ↑ ↓ SELECT

>> Go To Step 3, Block One Day a Week

BACK OFF ALLOW NEXT

Cyclical: Every x Days

>> Go To Step 4, Set Allowed Watering Windows
**Cyclical:**

7. To water on a cycle of every 2 to 14 days, select **Cyclical:** Every X Days.

8. Enter a value from 2 to 14 to set the irrigation cycle.

9. Set the date that you want the first irrigation cycle to begin; then press NEXT.

**Set Allowed Watering Windows**

Set a time that irrigation can occur on Allowed Watering Days.

1. Set the start and end times for the 1st Watering Window; then press NEXT.

2. Set the 2nd Watering Window to ON if desired.

3. Set the start and end times for the 2nd Watering Window; then press NEXT.

**Block One Day a Week**

Select a specific day of the week to block irrigation. The controller will always block irrigation on this day.

1. Select a day of the week (or none) to block irrigation.
4. Set the Daily Water Window for new plants and zones that may water every day regardless of allowed watering days; then press NEXT.

```
DAILY WATER WINDOW
Water Every Day Except Blocked Days Between
09:00 AM and 04:00 PM
BACK - + NEXT
```

**NOTE:** The Daily Water Window allows irrigation of new plants every day, and is not affected by Allowed Watering Days, Blocked Days or Event Days Off. The number of days that a Daily Water Window is in effect is set in the Enter Plant Maturity step under Input Zone Information.

5. Set Rain Shutoff (days and inches); then press NEXT.

```
RAIN SHUTOFF
For Time-base and Grow-in Zones Only:
Shutoff Watering for 1 Full Day(s) when Rain Reaches: 0.20 in
BACK - + NEXT
```

**NOTE:** Once the desired amount of rain has been exceeded, the controller will stop watering time based and grow-in zones for the number of Full Days specified. Full Days begin at midnight so 1 Full Day is the rest of today and all of tomorrow.

**5 Review**

1. Review controller configuration settings. Press BACK to make changes if desired, then press MORE.

```
CONTROLLER SETTINGS
Zip Code  92010
By Days of the Week
Mo We Fr
Water Windows
05:00 AM To 09:00 AM
04:00 PM To 06:00 PM
BACK MORE
```

2. Review controller configuration settings. Press BACK to make changes if desired, then press MORE.

```
CONTROLLER SETTINGS
Daily Water Window
09:00 AM To 04:00 PM
BACK MORE
```

3. Review controller configuration settings. Press BACK to make changes if desired, then press DONE.

```
CONTROLLER SETTINGS
For Time-base and Grow-in Zones Only:
Shutoff Watering for 1 Full Day(s) when Rain Reaches: 0.20 in
BACK DONE
```
Input Zone Information

*Enter site information for each zone.*

Detailed site information about soil, sprinklers, and plant types is needed to determine irrigation schedules. Once the information is entered for one zone, the settings can be copied to other zones.

The Appendix contains helpful instructions and information that can be used to determine the proper settings for your site.

Use the provided checklist and the ESP-SMTe Site Profile Chart as a guide to input zone information.

**NOTE:** The ESP-SMTe Site Profile Chart is available at www.rainbird.com/esp-smte and is included in the ESP-SMTe Controller box.

### Zone Information Checklist

<table>
<thead>
<tr>
<th>Zone Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Turn Zone to Enabled or OFF</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soil Type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Sand</td>
<td>☐ Loamy Sand</td>
</tr>
<tr>
<td>☐ Sandy Loam</td>
<td>☐ Loam</td>
</tr>
<tr>
<td>☐ Clay Loam</td>
<td>☐ Silty Clay</td>
</tr>
<tr>
<td>☐ Clay</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zone Type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Sprinkler</td>
<td>☐ Inline Grid Drip</td>
</tr>
<tr>
<td>☐ Point Source Drip</td>
<td>☐ Time-Based</td>
</tr>
<tr>
<td>☐ Select Water Window (1st+2nd: Restricted or Daily Water Window)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sprinkler Type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Sprays</td>
<td></td>
</tr>
<tr>
<td>☐ Rotors</td>
<td></td>
</tr>
<tr>
<td>☐ Bubblers</td>
<td></td>
</tr>
<tr>
<td>☐ Rotary Nozzle</td>
<td></td>
</tr>
<tr>
<td>☐ Set Net Application Rate for selected type ______</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cycle and Soak (Degree of Slope)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ 0 - 2 (Degree of Slope)</td>
<td>☐ 3 - 4 (Degree of Slope)</td>
</tr>
<tr>
<td>☐ 5 - 7 (Degree of Slope)</td>
<td>☐ 8- up (Degree of Slope)</td>
</tr>
<tr>
<td>☐ Automatic Mode</td>
<td>☐ Custom Mode</td>
</tr>
<tr>
<td>☐ Max Cycle (Custom) ______ min</td>
<td>☐ Min Soak (Custom) ______ min</td>
</tr>
</tbody>
</table>

### Plant Type

- Grass Lawn
- ☐ Cool Season Turf (Fescue, Bluegrass, Rye)
- ☐ Warm Season Varieties (Bermuda, St. Augustine)
- ☐ Ground Cover
- ☐ Desert Plants
- ☐ Mixed Planting

**OR**

- ☐ Custom Plant Factors (Species Factor, Root Depth)

### Plant Water Need (non grass)

- ☐ High
- ☐ Average
- ☐ Low

### Root Depth

- ☐ Set Root Depth to ______ in

### Plant Density (non grass)

- ☐ Dense
- ☐ Medium
- ☐ Sparse

### Shade Factor (all plants)

- ☐ Full Sun
- ☐ 25% Shade
- ☐ 50% Shade
- ☐ 75% Shade
- ☐ Full Shade

### Refill Point

- ☐ Refill Point ______ %

### Plant Maturity (all plants)

- ☐ Established
- ☐ Newly Planted
1 Enter Zone Number

The number of available zones depends on the number and type of station modules that are installed.

**NOTE:** If you select a zone number that does not have an associated module installed, “No Module” is displayed.

1. Select the desired Zone Number; then press NEXT.

2. Press ENABLE to enable the selected Zone; then press NEXT.

2 Select Soil Type

If you are not sure what the soil type is for your site, refer to the Soil Type section in the Appendix. Also, you can highlight a soil type and press Help for a brief soil description.

1. Select the soil type for your site.

**NOTE:** The default values for soil data that the controller uses to determine irrigation are listed below. The soil type you choose will affect irrigation frequency (number of days between watering) and watering run times.

### Soil Types

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Available Water (inches of water per inch of soil)</th>
<th>Basic Intake Rate (inches per hour)</th>
<th>Management Allowed Depletion (MAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>0.06”</td>
<td>0.60”</td>
<td>50%</td>
</tr>
<tr>
<td>Loamy Sand</td>
<td>0.08”</td>
<td>0.50”</td>
<td>50%</td>
</tr>
<tr>
<td>Sandy Loam</td>
<td>0.12”</td>
<td>0.40”</td>
<td>55%</td>
</tr>
<tr>
<td>Loam</td>
<td>0.17”</td>
<td>0.35”</td>
<td>50%</td>
</tr>
<tr>
<td>Clay Loam</td>
<td>0.18”</td>
<td>0.20”</td>
<td>50%</td>
</tr>
<tr>
<td>Silty Clay</td>
<td>0.17”</td>
<td>0.15”</td>
<td>40%</td>
</tr>
<tr>
<td>Clay</td>
<td>0.17”</td>
<td>0.10”</td>
<td>35%</td>
</tr>
</tbody>
</table>
3 Select Zone Type

Select the Zone Type based on the type of sprinkler that is installed in the selected zone.

1. Select the Zone Type or select Time-Based.

NOTE: Time-Based is typically used for zones that irrigate potted plants or is used to fill a pool.

2. Select the desired option for the Water Window.

NOTE: If 1st+2nd: Restricted is selected, any restrictions entered during Controller Configuration will be applied. If Daily Water Window is selected, the programmed Daily Water Window will be used and zones will be allowed to water only if required.

4 Select Sprinkler Type

To enter information for the installed sprinklers based on the Zone Type selection, follow the appropriate step:

- If Sprinklers is selected, go to Step 4a.
- If Point Source Drip is selected, go to Step 4b.
- If Inline Grid Drip is selected, go to Step 4c.
- If Time-Based is selected, go to Step 4d.

4a Sprinklers

1. Select the appropriate sprinkler type from the list.

2. Adjust the default Net Application Rate if desired; then press NEXT.

NOTE: Increasing the Net Application Rate will decrease irrigation run times, and decreasing the value will increase the run times.

Default Net Application Rates

<table>
<thead>
<tr>
<th>Sprinkler Type</th>
<th>Net Application Rate (in/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprays</td>
<td>1.60</td>
</tr>
<tr>
<td>Rotors</td>
<td>0.45</td>
</tr>
<tr>
<td>Rotary Nozzle</td>
<td>0.50</td>
</tr>
<tr>
<td>Bubblers</td>
<td>2.50</td>
</tr>
</tbody>
</table>

NOTE: Detailed instructions on alternate methods to determine Net Application Rates are found in the Appendix.

>> Go To Step 5, Cycle+Soak
**Point Source Drip**

1. Use the instructions on the display and the following tables to determine the Net Application Rate for a Point Source sprinkler type.

---

### Drip Irrigation Emitter Application Rates

#### Clay Soil

<table>
<thead>
<tr>
<th>Flow in Gallons per Hour</th>
<th>Wetted Area (Dia. Ft.)</th>
<th>Wetted Area (Sq. Ft.)</th>
<th>Application Rate (in/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>2.0'</td>
<td>3.14</td>
<td>0.26&quot;</td>
</tr>
<tr>
<td>1</td>
<td>2.5'</td>
<td>4.91</td>
<td>0.33&quot;</td>
</tr>
<tr>
<td>2</td>
<td>3.0'</td>
<td>7.07</td>
<td>0.45&quot;</td>
</tr>
<tr>
<td>5</td>
<td>3.0'</td>
<td>7.07</td>
<td>1.13&quot;</td>
</tr>
</tbody>
</table>

#### Loam Soil

<table>
<thead>
<tr>
<th>Flow in Gallons per Hour</th>
<th>Wetted Area (Dia. Ft.)</th>
<th>Wetted Area (Sq. Ft.)</th>
<th>Application Rate (in/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>1.5'</td>
<td>1.77</td>
<td>0.45&quot;</td>
</tr>
<tr>
<td>1</td>
<td>2.0'</td>
<td>3.14</td>
<td>0.51&quot;</td>
</tr>
<tr>
<td>2</td>
<td>2.5'</td>
<td>4.91</td>
<td>0.65&quot;</td>
</tr>
<tr>
<td>5</td>
<td>2.5'</td>
<td>4.91</td>
<td>1.63&quot;</td>
</tr>
</tbody>
</table>

#### Sandy Soil

<table>
<thead>
<tr>
<th>Flow in Gallons per Hour</th>
<th>Wetted Area (Dia. Ft.)</th>
<th>Wetted Area (Sq. Ft.)</th>
<th>Application Rate (in/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>1.0'</td>
<td>0.79</td>
<td>1.02&quot;</td>
</tr>
<tr>
<td>1</td>
<td>1.0'</td>
<td>0.79</td>
<td>2.03&quot;</td>
</tr>
<tr>
<td>2</td>
<td>1.25'</td>
<td>1.23</td>
<td>2.61&quot;</td>
</tr>
<tr>
<td>5</td>
<td>1.25'</td>
<td>1.23</td>
<td>6.52&quot;</td>
</tr>
</tbody>
</table>

2. Enter the Net Application Rate; then press NEXT.

---

**NOTE:** Increasing the Net Application Rate will decrease irrigation run times, and decreasing the value will increase the run times.

> **Go To Step 5, Cycle+Soak**
**4c Inline Grid Drip**

Refer to the drip tubing documentation for your installed system and the tubing layout at your site to determine the Inline Grid values.

1. Set the values for emitter Flow Rate, Emitter Spacing, and Row Spacing; then press NEXT.

<table>
<thead>
<tr>
<th>INLINE GRID Zone 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate</td>
</tr>
<tr>
<td>Emitter Spacing</td>
</tr>
<tr>
<td>Row Spacing</td>
</tr>
</tbody>
</table>

2. Change the Adjust Factor to adjust the Estimated Application Rate if desired; then press NEXT.

<table>
<thead>
<tr>
<th>INLINE GRID Zone 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Est. Application Rate:</td>
</tr>
<tr>
<td>Adjust Factor</td>
</tr>
</tbody>
</table>

**NOTE:** Increasing the Estimated Application Rate will decrease irrigation run times, and decreasing the value will increase the run times.

>> Go To Step 5, Cycle+Soak

**4d Time-Based**

The Time-Based screen will display the Allowed Watering Days that were selected during controller configuration.

The controller will irrigate a Time-Based zone based on the programmed schedule, and will not use any weather information to determine irrigation.

1. Set the desired number of calendar days between irrigation.

2. Set the minutes for each irrigation cycle.

3. Set the desired number of irrigation cycles per day; then press NEXT.

<table>
<thead>
<tr>
<th>TIME-BASED Zone 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Days of the Week</td>
</tr>
<tr>
<td>Desired Every</td>
</tr>
<tr>
<td>Water For</td>
</tr>
<tr>
<td>2 Times Per Day</td>
</tr>
</tbody>
</table>

>> Go To Step 10, Enter Plant Maturity.
Irrigation run times may be divided into several cycles to prevent runoff based on soil type, precipitation rate, and landscape slope. Steeper slopes will require more cycles, but will not affect the total run time.

1. Select the **Slope** degree (by pressing – or +) that best represents the zone topography; then press **NEXT**.

2. The **Automatic** mode is selected. To accept the automatically calculated cycle and soak values, press **NEXT**.

3. To use Custom values, press + to select **Custom**; then press **NEXT**.

4. Adjust the Maximum Cycle and Minimum Soak values; then press **NEXT**.

The following table lists the values for the Allowable Surface Accumulation by slope for each soil type:

**Surface Accumulation Values**

<table>
<thead>
<tr>
<th>Soil Texture</th>
<th>0 - 3% Slope</th>
<th>4 - 6% Slope</th>
<th>7 - 12% Slope</th>
<th>&gt;13% Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>0.40</td>
<td>0.35</td>
<td>0.30</td>
<td>0.25</td>
</tr>
<tr>
<td>Loamy Sand</td>
<td>0.36</td>
<td>0.30</td>
<td>0.26</td>
<td>0.22</td>
</tr>
<tr>
<td>Sandy Loam</td>
<td>0.33</td>
<td>0.29</td>
<td>0.24</td>
<td>0.20</td>
</tr>
<tr>
<td>Loam</td>
<td>0.30</td>
<td>0.25</td>
<td>0.21</td>
<td>0.17</td>
</tr>
<tr>
<td>Clay Loam</td>
<td>0.26</td>
<td>0.22</td>
<td>0.18</td>
<td>0.15</td>
</tr>
<tr>
<td>Silty Clay</td>
<td>0.23</td>
<td>0.19</td>
<td>0.16</td>
<td>0.13</td>
</tr>
<tr>
<td>Clay</td>
<td>0.20</td>
<td>0.15</td>
<td>0.10</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**5 Cycle+Soak™**

**Go To Step 6, Select Plant Type.**
Select Plant Type

Select the dominant plant type for the zone or enter custom plant factors.

- To select a Plant Type from the list, use Step 6a.
- To enter Custom Plant Factors, use Step 6b.

6a To select Plant Type:
1. Select the plant type for the zone.

If Grass Lawns is selected:
2. Select either Cool Season Varieties or Warm Season Varieties.

3. Enter Root Depth; then press NEXT.

NOTE: Increasing the root depth will decrease irrigation frequency (water less often) and increase watering run times. Decreasing the root depth will increase irrigation frequency (water more often) and decrease run times.

Default Root Depth by Plant Type

<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Root Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool Grass</td>
<td>3&quot;</td>
</tr>
<tr>
<td>Warm Grass</td>
<td>3&quot;</td>
</tr>
<tr>
<td>Annual Color</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Ground Cover</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Shrubs</td>
<td>8&quot;</td>
</tr>
<tr>
<td>Desert (Natives)</td>
<td>12&quot;</td>
</tr>
<tr>
<td>Trees</td>
<td>12&quot;</td>
</tr>
<tr>
<td>Mixed Planting</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

>> Go to Step 8, Enter Shade Factor.
If any other plant type is selected:

4. Select an estimated Plant Water Need.

**NOTE**: Increasing the Water Need (Low to High) will increase irrigation frequency (water more often). Decreasing Water Need will decrease irrigation frequency (water less often).

### Plant Water Needs Default Values

<table>
<thead>
<tr>
<th>Plant Type</th>
<th>High Need</th>
<th>Average Need</th>
<th>Low Need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass (Cool Season)</td>
<td>Uses monthly Kc values, published in the Irrigation Association SWAT Testing Protocol - 8th Draft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass (Warm Season)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Color</td>
<td>150%</td>
<td>120%</td>
<td>100%</td>
</tr>
<tr>
<td>Ground Cover</td>
<td>90%</td>
<td>50%</td>
<td>20%</td>
</tr>
<tr>
<td>Shrubs</td>
<td>70%</td>
<td>50%</td>
<td>20%</td>
</tr>
<tr>
<td>Desert Plants (Natives)</td>
<td>50%</td>
<td>30%</td>
<td>15%</td>
</tr>
<tr>
<td>Trees</td>
<td>90%</td>
<td>50%</td>
<td>20%</td>
</tr>
<tr>
<td>Mixed Planting</td>
<td>90%</td>
<td>50%</td>
<td>20%</td>
</tr>
</tbody>
</table>

5. Enter Root Depth; then press NEXT.

**NOTE**: Increasing the root depth will decrease irrigation frequency (water less often) and increase watering run times. Decreasing the root depth will increase irrigation frequency (water more often) and decrease run times.

**>> Go to Step 7, Enter Plant Density.**
7 Select Plant Density (non-grass)

Plant Density is the relative amount of foliage (leaf surface area and plant spacing) in the zone.

1. Select the appropriate plant density for the zone.

![PLANT DENSITY Zone 1]

<table>
<thead>
<tr>
<th>Density</th>
<th>Zone 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Plants</td>
<td></td>
</tr>
<tr>
<td>Dense</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Sparse</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Increasing the Plant Density (Sparse to Dense) will increase irrigation frequency (water more often). Decreasing the Plant Density will decrease irrigation frequency (water less often).

Density Factor by Plant Type

<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Dense</th>
<th>Medium</th>
<th>Sparse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass (Cool Season)</td>
<td>Density is not a factor for Grass Types</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass (Warm Season)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Color</td>
<td>1.0</td>
<td>1.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Ground Cover</td>
<td>1.1</td>
<td>1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Shrubs</td>
<td>1.1</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Desert Plants (Natives)</td>
<td>1.3</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Trees</td>
<td>1.3</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Mixed Planting</td>
<td>1.2</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Custom Plant Factor</td>
<td>1.2</td>
<td>1.0</td>
<td>0.6</td>
</tr>
</tbody>
</table>

8 Select Shade Factor

Shade Factor is the approximate amount of time that plants are exposed to direct sunlight each day.

1. Select the appropriate shade factor for the zone.

![SHADE FACTOR Zone 1]

<table>
<thead>
<tr>
<th>SHADE FACTOR</th>
<th>Zone 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Sun</td>
<td></td>
</tr>
<tr>
<td>25% Shade</td>
<td></td>
</tr>
<tr>
<td>50% Shade</td>
<td></td>
</tr>
<tr>
<td>75% Shade</td>
<td></td>
</tr>
<tr>
<td>Full Shade</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Increasing the Shade Factor (less exposure to the sun) will decrease irrigation frequency (water less often). Decreasing the Shade Factor (more exposure to the sun) will increase irrigation frequency (water more often).

Shade Factor Default Values

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Non-Turf</th>
<th>Turf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Sun</td>
<td>1.30</td>
<td>1.00</td>
</tr>
<tr>
<td>25% Shade</td>
<td>1.15</td>
<td>0.89</td>
</tr>
<tr>
<td>50% Shade</td>
<td>1.00</td>
<td>0.77</td>
</tr>
<tr>
<td>75% Shade</td>
<td>0.75</td>
<td>0.67</td>
</tr>
<tr>
<td>Full Shade</td>
<td>.50</td>
<td>0.56</td>
</tr>
</tbody>
</table>
9 Enter Refill Point

1. Adjust the Refill Point if desired; then press NEXT.

![Graphic showing refill point settings]

**NOTE:** The graphic on the left of the screen shows the amount of water in the soil. When this amount drops to the level indicated by the arrow (Refill Point) then irrigation is scheduled. Increasing the Refill Point will cause shorter, more frequent irrigation, and decreasing the Refill Point will cause longer, less frequent irrigation.

10 Select Plant Maturity

New plants have different watering needs than plants that are already established. New plants are watered every day during the Daily Period, then are considered Established when the Daily Period ends.

**Established:**

1. Select Established.

![Graphic showing plant maturity settings]

>> Go to Step 11, Select Next Action.

**Newly Planted:**

2. Select Newly Planted (Daily Period).

![Graphic showing newly planted settings]

3. Set the number of days (1-199) for the desired Daily Period.

4. Set the desired number of Cycles per Day (1-8).

5. Set the desired Minutes per Cycle (1-30); then press NEXT.
Select Next Action

After programming is complete for a zone, select the desired Next Action.

- **Program Next Zone** returns to the Select Zone screen (Step 1) to program another zone.

- **Review This Zone** displays all the zone information selected during programming. Press MORE to view all the Review screens.

- **Change This Zone Data** returns to the Select Zone screen (Step 1) to edit zone information.

- **Copy Zone To Zone** displays the Copy Zone Data screen, to copy zone information from one zone to another zone if desired.

REPEAT the Zone Setup Wizard for each zone at your site.
Copy Zone to Zone

Copy zone information from one zone to another zone.

Turn the dial to **INPUT ZONE INFORMATION** and select **Copy Zone to Zone**.

1. Select the source Zone number (**Copy From Zone**).
2. Select up to three destination zones (**To Zone**); then press **NEXT**.
3. Select **COPY** if the selections are correct.
4. Select **QUIT** to re-enter selections.

**NOTE**: If **QUIT** is selected, NOT COPIED will be displayed on the screen.

5. When the copy is complete, press **NEXT**.
Advanced Options

Special Features
Select advanced irrigation scheduling and controller setup options.

Turn the dial to Special Features.

Event Days Off
Event Days Off allows you to select up to four specific dates to block irrigation for special occasions.

1. Select Event Days Off.

2. Press + to add a new date.

3. Set the desired date; then press NEXT.

NOTE: Event Days Off dates can be entered in any chronological order, and will be re-arranged after leaving the screen.

4. To delete an Event Day Off, select the date using NEXT or BACK and press and HOLD -. 

5. When an Event Day Off date has passed, it will automatically be deleted.

Short Circuit Test
Verify the integrity of the wires between the controller and the valves.

1. Select Short Circuit Test.

The test result for each zone is displayed; the test takes about 30 seconds to complete.

2. Press RETEST to run the test again if desired.

NOTE: “NoMod” indicates that no module is present for that station number.
Advanced Controller Setup

1. Select **Adv. Controller Setup**.

Adjust calculated ET values, set time delays between zones, and set thresholds that determine when the controller will suspend irrigation due to weather conditions.

- **ETo Adjust Factor** globally increases or decreases the calculated daily ET value.
- **Zone to Zone Delay** sets a time delay between one station valve turning off and the next station valve turning on.
- **Suspend Watering When Rain Reaches** value suspends irrigation when measured rainfall reaches the specified amount.
- **Suspend Watering When Temp Below** value suspends irrigation when the temperature falls below a specific value.

2. Adjust the desired value.

Advanced Zone Setup

1. Select **Advanced Zone Setup**.

Set each zone to use (or not to use) an installed master valve, pump start relay, or the ESP-SMT Rain Gauge.

![NOTE:](image)

- **Use Master Valve** (or Pump Start Relay) to **YES** or **NO**.
- **Use Rain Gauge** to **YES** or **NO**.

2. Select the desired **Zone**.

3. Set **Use Master Valve** (or Pump Start Relay) to **YES** or **NO**.

4. Set **Use Rain Gauge** to **YES** or **NO**.

![NOTE:](image)

*NOTE: If Use Rain Gauge is set to **NO**, the selected zone will not receive rainfall information from the weather sensor but will continue to receive temperature data.*
Save Contractor Defaults

Save the current Configure Controller and Input Zone Information settings for all zones to memory.

1. Select **Save Contractor Defaults**.

2. Press **SAVE** to save zone settings to Contractor Defaults.

3. Read the Warning; then press **SAVE**.

4. Current Settings are saved; press **CONTINUE**.

Set Units

Set the Time format (AM/PM or 24-Hour) and Units format (English or Metric) that is displayed by the controller.

**NOTE:** The Automatic setting will set the Time format to AM/PM and the Unit format to English when the controller is connected to a 60 Hz power source, and use 24-Hour and Metric when connected to 50 Hz.

1. Select **Set Units**.

2. Select the desired Time Format.

3. Select the desired Unit Format.
Fine-Tune Watering

Adjust the calculated run time for each individual zone.

If minor adjustments are required to calculated run times, you can increase or decrease run times for ET zones by a selected percentage. These adjustments will apply until you set the value back to 0.

**NOTE:** The Fine Tune % By Zone value can be adjusted from -60% to +60%. For example, if a +50% adjustment is set, then a calculated run time of 10 minutes will become 15 minutes.

Fine-Tune Watering adjustments only affect Weather-Based zones, and do not affect any zone that is programmed in Newly Planted or Time-Based mode.

**NOTE:** Fine Tune settings can be adjusted for Newly Planted zones, but will not take effect until the Newly Planted mode expires.

1. Turn the dial to Fine-Tune Watering.
2. Select the zone to adjust.
3. Set the adjustment percentage for the selected zone.

4. After completing all adjustments, return the dial to AUTO.

**NOTE:** Any zone that is programmed in Time-Based mode will display n/a.
**System Review**

*View system settings, weather information, and the next scheduled irrigation event.*

The information that is available under System Review is for review purposes only. This allows the review of programming settings without accidentally making unwanted changes.

To make changes to any of the settings, refer to the Configure Controller, Input Zone Information or Special Features sections.

**Controller Settings**

Review the settings used to determine irrigation scheduling, such as watering days and times.

1. **Select Controller Settings.**

2. **Review location data, Allowed Watering Days and Water Windows; then press MORE.**

3. **Review the Grow-In Water Window for new plants; then press MORE.**

4. **Review the Rain ShutOff Setting; then press DONE.**

**NOTE:** When the Weather Sensor detects the set amount of rain, Time-Based and Newly Planted irrigation is shut off for the set number of days. Automatic irrigation (ET zones) are delayed by the added moisture in the soil.
Zone Settings

Review the site information entered for each zone, such as plant, soil, and sprinkler type.

1. Select Zone Settings.

   ![Diagram](image)

   **NOTE:** On any Review screen, press - or + to see information for other zones. Press BACK to view previous screens.

2. Review zone settings; then press MORE.

   ![Review Screen](image)

3. Review zone settings; then press MORE.

   ![Review Screen](image)

4. Review zone settings; then press MORE.

   ![Review Screen](image)

5. Review zone settings; then press DONE.

   ![Review Screen](image)
Next Irrigation Estimate

Review the estimated soil moisture content for each zone, the next scheduled irrigation event and an estimated irrigation schedule for up to three weeks in advance.

1. Select Next Irrigation Est.

2. Select Soil Moisture.

NOTE: Initial Temperature Values must be set when programming the SMTe controller for the first time. See Set Initial Temperature Values for more details.

3. Press – or + to view the desired zone.

4. Review Soil Moisture and the Next Irrigation Estimate; then press SCH.

5. Press – or + to view the desired zone.

6. Review the estimated irrigation schedule for the next three weeks; then press DONE.

Set Initial Temperature Values

The ESP-SMTe cannot provide valid irrigation estimates until temperature values from the previous day are set. To determine irrigation estimates the same day the unit is installed, the screen below will be displayed to enter the highest and lowest temperatures from the previous day. Once this temperature data is entered and accepted, this screen will no longer be displayed.

1. Set the highest temperature from the previous day; then press ACCEPT.

2. Set the lowest temperature from the previous day; then press ACCEPT.

NOTE: Initial temperature values will have to be set again if Factory Defaults are restored.
Weather Data

Review the current temperature and measured rainfall over the past 24 hours based on data from the SMTe Weather Sensor.

1. Select **Weather Data**.

2. Review weather data; then press **BACK**.

Weather Log

Review a daily log of high and low temperatures, calculated ET values, and rainfall over the past month based on data from the SMTe Weather Sensor.

1. Select **Weather Log**.

2. Review weather data. Press **PgUp** or **PgDn** to see more info if necessary; then press **BACK**.
**Event Log**

Review notifications and error messages concerning irrigation events by date or by zone. Check these messages if the controller is not operating as expected.

![NOTE: A table at the end of this section lists all the messages that can appear in the Event Logs.](image)

1. Select **Event Log**.

View Alarms and Notes

1. Select **Alarms and Notes**.

2. Review alarms and notes. Press **PgUp** or **PgDn** to see more info if necessary; then press **BACK**.

**View Events by Date**

1. Select **Events by Date**.

![EVENT LOG](image)

2. Review events. Press **PgUp** or **PgDn** to see more info if necessary; then press **BACK**.

![EVENTS BY DATE](image)
View Events by Zone

1. Select **Events by Zone**.

   ![EVENT LOG](image)

   **EVENTS FOR Zone 1**
   04 May 06:14A Z01 Done
   04 May Sch'l'd Z01 3 Mi
   03 May 06:21A Z01 Done
   03 May Sch'l'd Z01 10 Mi

   BACK   PgDn   PgUp   NEXT

2. Review events for the selected zone. Press **PgUp** or **PgDn** to see more info if necessary.

3. Press **NEXT** to review events for the next zone.

   ![EVENTS FOR Zone 1](image)

   **NOTE**: New log entries will not be displayed while the log is open. Press **BACK** and then **SELECT** to update the display.

---

Event Logs

### Normal Operation Notifications

<table>
<thead>
<tr>
<th>Screen Text</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schl'd Zxx xxx mi</td>
<td>Irrigation is scheduled for Zone xx for xxx minutes</td>
</tr>
<tr>
<td>Zxx Done</td>
<td>Zone xx completed the scheduled irrigation</td>
</tr>
<tr>
<td>Cold Susp</td>
<td>All irrigation delayed due to near freezing temperature</td>
</tr>
<tr>
<td>Rain Susp</td>
<td>All irrigation delayed due to rain reaching Suspend Watering threshold</td>
</tr>
<tr>
<td>Rain SOff</td>
<td>Time-Based and Daily irrigation shut off due to rain reaching Rain Shut Off threshold</td>
</tr>
</tbody>
</table>

### User Initiated Actions

<table>
<thead>
<tr>
<th>Screen Text</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Susp</td>
<td>User suspended irrigation</td>
</tr>
<tr>
<td>User Term</td>
<td>User terminated irrigation</td>
</tr>
<tr>
<td>C Save</td>
<td>User saved Contractor Defaults to backup storage</td>
</tr>
<tr>
<td>C Default</td>
<td>User restored Contractor Defaults from backup storage</td>
</tr>
<tr>
<td>F Default</td>
<td>User reset all settings to Factory Defaults (does not affect Contractor Defaults saved in storage)</td>
</tr>
<tr>
<td>Reset x02</td>
<td>The Reset button was pressed (if a short was logged right before Reset, the short may have caused by the MV or zone wiring short)</td>
</tr>
</tbody>
</table>

### Errors

<table>
<thead>
<tr>
<th>Screen Text</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplet</td>
<td>The scheduled irrigation did not complete in the time permitted by the Watering Windows. (Select HELP on the NOTE 5 screen or refer to symptom “NOTE 5 on Display Screen” in the Troubleshooting section in this manual.)</td>
</tr>
<tr>
<td>Short MV</td>
<td>The wiring or solenoid for the Master Valve has a short. Always fix any Master Valve short before fixing any shorted Zones.</td>
</tr>
<tr>
<td>Short Zxx</td>
<td>The wiring or solenoid for Zone xx has a short</td>
</tr>
<tr>
<td>Alarm-Sen</td>
<td>Weather sensor wiring may be damaged</td>
</tr>
<tr>
<td>High Temp</td>
<td>Weather sensor may be affected by a local heat source (air conditioner, reflective surface or other source of heat)</td>
</tr>
<tr>
<td>Reset x07</td>
<td>AC Power was lost</td>
</tr>
<tr>
<td>Init</td>
<td>Controller detected an error and cleared the error (no action required unless Init occurs frequently)</td>
</tr>
<tr>
<td>Alarm-Temp</td>
<td>Possible temperature sensor malfunction (Reset the front panel - if the error doesn’t reoccur no action is required)</td>
</tr>
</tbody>
</table>
System Restore

*Restore Contractor or Factory Defaults and adjust soil moisture values.*

Restore Contractor Default settings, restore original factory settings, or make adjustments to estimated soil moisture values for all zones.

1. Select **Contractor Defaults**.

2. Press **RESTORE** to restore the Contractor Defaults.

3. The following screen is displayed while the controller reconfigures.

4. When the restore is complete, the display returns to the **RESTORE SETTINGS** menu.
**Factory Defaults**

Restore the original factory default settings. All current zone settings are erased. Any settings saved using Save Contractor Defaults are NOT affected.

1. Select **Factory Defaults**.

   ![RESTORE SETTINGS FROM Contractor Defaults Factory Defaults Set Soil Moisture](image)

2. Press **RESTORE** to restore the Factory Defaults.

   ![RESTORE CURRENT SETTINGS FROM: Factory Defaults](image)

3. The following warning is displayed; press **RESTORE**.

   ![WARNING Restoring Factory Defaults Will Delete ALL Current Settings. Contractor Defaults Will Be Retained.](image)

4. The following screen is displayed while the controller reconfigures.

   ![RESTORING TO Factory Defaults Please Wait While Unit Reconfigures](image)

5. When the restore is complete, the display returns to the **RESTORE SETTINGS** menu.

**Set Soil Moisture**

Set the estimated Soil Moisture value (DRY, MEDIUM, or FULL). This affects the irrigation calculations for all weather based zones for the next few days.

1. Select **Soil Moisture**.

   ![RESTORE SETTINGS FROM Contractor Defaults Factory Defaults Set Soil Moisture](image)

2. Adjust the value if desired; then press **NEXT**.

   ![SET SOIL MOISTURE Set Estimated Soil Moisture For All Zones To: FULL BACK NEXT](image)

   **NOTE**: The bar shows what the soil moisture will be after it is set.

3. The following warning is displayed; press **SET ALL**.

   ![WARNING Setting Soil Moisture Will Update Soil Moisture For ALL ZONES SET ALL](image)

4. The following screen is displayed when Soil Moisture has been reset; press **CONTINUE**.

   ![Soil Moisture Has Been Reset For ALL ZONES CONTINUE](image)
Manual Watering

Start watering immediately for selected zones or for all zones.

Manual Watering is used to conduct a system check or perform a “system winterization”.

**NOTE:** If Manual Watering is started during automatic irrigation, the automatic watering schedule is canceled for the day and resumes on the next Allowed Watering Day.

1. Turn the dial to **Manual Watering**.

   ![Manual Watering Interface](Image)

   During Manual Watering:
   - The Watering - Manual screen shows the current zone and time remaining.
   - Adjust the time remaining up or down if desired.

   ![Manual Watering Time Adjust](Image)

   **Water Individual Zone**

   1. Select **Water Individual Zone**.

      ![Water Individual Zone Interface](Image)

      ![Manual Watering Interface](Image)

   **NOTE:** Selected zone will be activated even if it is not ENABLED. A zone that does not have an associated station module will display **No Module**.

2. Select the desired zone; then press **NEXT**.

3. Set the run time for the selected zone; then press **NEXT**.

   ![Manual Watering Time Selection](Image)

4. Adjust the time remaining up or down if desired.

5. To cancel watering, press **CANCEL**, **ADV. ZONE** or turn the dial to **OFF** for three seconds and then return the dial to the AUTO position.
Water All Zones

1. Select Water All Zones.

![Manual Watering Screen]

**NOTE:** All zones will be activated even if they are not ENABLED. Zones will not activate that do not have an associated station module installed.

2. Set the run time for all zones; then press START.

3. Adjust the time remaining up or down if desired.

During Manual Watering:
The Watering - Manual screen shows the current zone and time remaining.

4. To cancel watering, press CANCEL, ADV. ZONE or turn the dial to OFF for three seconds and then return the dial to the AUTO position.

Water Selected Zones

1. Select Water Selected Zones.

![Manual Watering Screen]

**NOTE:** Selected zones will be activated even if they are not ENABLED. Zones that do not have an associated station module will display n/a.

2. Select the desired zone or zones.

3. Set the run time for every desired zone; then press NEXT until you reach the end of your available zones.

4. NEXT will change to START; then press START.
During Manual Watering:

The Watering - Manual screen shows the current zone and time remaining.

5. Adjust the time remaining up or down if desired.

6. To cancel watering, press CANCEL, ADV. ZONE or turn the dial to OFF for three seconds and then return the dial to the AUTO position.
Installation Checklist

When installing the ESP-SMTe controller for the first time, it is recommended that you complete the following steps in order. For your convenience, a check-off box is provided for each step.

☐ Check box contents (see Page IV)
☐ Gather installation tools
☐ Choose a location
☐ Mount the controller
☐ Connect controller power
☐ Install station modules (optional)
☐ Connect field wires
☐ Complete the controller installation
☐ Install the Weather Sensor

Gather Installation Tools

Before beginning installation, gather the following tools and materials:

- a. Marking pencil
- b. Phillips screwdriver (#1, #2, #3 tip)
- c. Flathead screwdriver
- d. Hammer
- e. Level
- f. Drill and drill bit
- g. Wire Stripper

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

Mount Controller

Choose Location

1. Choose a suitable mounting location with access to an electrical power source. Allow clearance for conduit connections below the unit, and for the hinged door (outdoor model only) to swing fully open to the left.

![Mounting location diagram]

NOTE: DO NOT use an outlet or power source that is controlled by a secondary ON/OFF light switch or GFI outlet.

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-SMTe controller to the SMT Weather Sensor.

NOTE: The ESP-SMTe 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.

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

1. Open the door of the controller and swing it to the left. If desired, remove it from the hinges by applying pressure upward and outward until the door unsnaps from the hinges.

2. Pull open the front panel, swing it to the left and disconnect the ribbon cable by gently pulling the connector out of the socket.

   **CAUTION:** Be careful not to bend the pins in the sockets when detaching the ribbon cable.

3. Remove the front panel by pressing down on the left side of the cabinet near the bottom corner pin with the fingers of your right hand, while pushing up on the front panel with your right thumb.

   **NOTE:** Outdoor model shown with internal transformer.

Remove Knock-outs

The ESP-SMTe controller cabinet has four “knock-outs” available for connecting conduit and routing field wires.

*Three knock-outs are located on the underside of the cabinet and one is located on the back.*

**Tools Required:**
- Flat-head screwdriver
- Hammer

**If a knockout needs to be removed:**

1. Place the blade of the screwdriver into the groove around the knockout and tap it with a hammer.

2. Punch a hole through the material in two or more places and twist to remove.
Mount Controller

1. Mark the four screw locations with a marking pencil.
2. Drill holes in the mounting surface, installing wall anchors if necessary.
3. Drive a mounting screw for the top anchor into the wall. Leave an 1/8 inch gap between the screw head and the wall surface.
4. Locate the keyhole slot on back of the controller unit and hang the unit securely on the mounting screw.
5. Drive three additional mounting screws through the open holes inside the controller and into the wall. Verify that the unit is fastened securely to the wall.

Connect Power

Indoor Model

⚠️ WARNING: DO NOT plug in the transformer until you have completed and checked all wiring connections.

⚠️ WARNING: All electrical connections and wiring runs must comply with local building codes.

1. Route the transformer power cord through the conduit opening at the bottom left of the unit. Knot the cable/cord inside the controller cabinet to prevent it from being pulled out.

⚠️ CAUTION: Do not route the power cord through the field wire opening at the bottom right of the unit.

2. Connect the two red power wires on the cord to the two 24VAC terminal connections on the controller.
3. Connect the green ground wire on the cord to the GND terminal.
4. Plug the transformer into the electrical outlet.
Connect Power
Outdoor Model

The ESP-SMTe outdoor controller has an internal transformer that reduces supply voltage from 120 VAC to 24 VAC. You will need to connect power supply wires to the transformer’s three wires. (Line, Neutral, Ground).

**WARNING:** Electric shock can cause severe injury or death. Make sure power supply is turned OFF before connecting power wires.

**WARNING:** DO NOT turn on power until you have completed and checked all wiring connections.

**WARNING:** All electrical connections and wiring runs must comply with local building codes. Some building codes require that only a licensed or certified electrician can make the power connections. Please check with your local building code for guidance.

1. Locate the transformer wiring compartment in the lower left corner of the controller unit. Use a screwdriver to remove the cover and expose the transformer connection wires.

   **NOTE:** Attach a 1/2 inch conduit to the unit below the transformer if desired.

2. Route the three external power source wires through the conduit opening at the bottom of the unit and into the wiring compartment.

3. Using the provided wire nuts, connect the external power source wires (hot, neutral and ground) to the transformer connection wires inside the wiring compartment.

   **WARNING:** Ground wire must be connected to provide electrical surge protection.

4. Verify that all wiring connections are secure, then replace the wiring compartment cover and secure it with the screw.

   **WARNING:** DO NOT turn on power until you have completed and checked all wiring connections and replaced the cover.

### Power Wiring Connections

**120 VAC (US)**

- Red or Black supply wire (hot) to the black transformer wire
- White supply wire (neutral) to the white transformer wire
- Green supply wire (ground) to the green transformer wire
Station Expansion Modules
Optional Station Modules are installed in the empty slots to the right of the base module. Installation of 6-Station or 3-Station Modules into those slots can increase the zone capacity up to 22 zones.

Module Options

<table>
<thead>
<tr>
<th>Base Module (included)</th>
<th>Expansion Modules (sold separately)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT MV COM</td>
<td>ESPSM3 (3-STATION)</td>
</tr>
<tr>
<td></td>
<td>ESPSM6 (6-STATION)</td>
</tr>
</tbody>
</table>

**NOTE:** For proper station sequencing, it is recommended that a 6 station module always be installed in the 1st bay. For more details see Station Numbering section.

Install Modules

1. Verify the securing lever on the module is in the unlocked position (pointing to the left).

2. Place the module under the desired slot between the plastic rails.

3. Push the module up into the slot until secure.

4. Slide the securing lever to the locked position (to the right).

*REPEAT* for additional modules.

**NOTE:** Modules can be installed and removed with OR without AC power connected. They are “hot-swappable”.

![Module Installation Diagram]
**Station Numbering**

*Static Station Numbering Description*

The controller is configured with Static Station Numbering. Each bay is set up to accept a 6 station module.

**Station numbers are pre-assigned as follows:**

<table>
<thead>
<tr>
<th>Bay One</th>
<th>Bay Two</th>
<th>Bay Three</th>
<th>Bay Four</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Base Module)</td>
<td>5 6 7</td>
<td>11 12 13</td>
<td>17 18 19</td>
</tr>
<tr>
<td>1 2 3 4</td>
<td>8 9 10</td>
<td>14 15 16</td>
<td>20 21 22</td>
</tr>
</tbody>
</table>

It is recommended, but not required that modules be installed sequentially in the first available Bay and that a 6 station module always be installed in Bay Two, as shown in the example illustration.

In this example:

- The Base Module is installed in Bay One and provides Zones 1-4.
- A 6-Station Expansion Module is installed in Bay Two and provides Zones 5-10.
- A 3-Station Expansion Module is installed in Bay Three and provides Zones 11-13.
- In our example Zones 14-16 remain available and reserved for future expansion.
- A 6-Station Expansion Module is installed in Bay Four and provides Zones 17-22.

However, if a 3 station module is installed in Bay Two, Three or Four then only the first three zone numbers assigned to that bay will be used and the unused numbers will be “reserved” for future use.

**Display Indications:**

For the previous example, the first screen of the Zone Setup Wizard is displayed. The “No Module” message indicates there is no module associated with Zone 14.

![Zone Setup Wizard](image)
Wiring Connections

Connect the valve wires for each zone, a (optional) Master Valve or Pump Start Relay, and the ESP-SMTe Weather Sensor.

Connect Valves

1. Route the valve wires through a knock-out opening at the bottom or back of the unit.

⚠️ **CAUTION:** Do not route the valve wires through the same opening as the power wiring.

2. Connect the common wire from each valve together and then to the COMMON (COM) terminal on the base module.

3. Connect the control (or valve) wire from each valve to the terminal on the base module or Station Module that corresponds to the desired zone number (1-22).

огда

**WARNING:** You must use special precautions when valve wires (also known as station or solenoid wires) are located adjacent to or share a conduit with other wires, such as wires used for landscape lighting, other “low voltage” systems or other “high voltage” power. Be sure to separate and insulate all conductors carefully taking care not to damage wire insulation during installation. An electrical “short” (contact) between the valve wires and another source of power can damage the controller and create a fire hazard.

Connect Master Valve

Connect an optional Master Valve to the ESP-SMTe controller.

Complete this section if you are installing a master valve (an automatic valve installed on the mainline pipe upstream from the zone valves)

1. Route the master valve wires through a knock-out opening at the bottom or back of the unit.

⚠️ **CAUTION:** Do not route the master valve wires through the same opening as the power wiring.

2. Connect the power wire from the master valve to the master (MV) terminal on the base module.

3. Connect the common wire from the master valve to the COMMON (COM) terminal on the base module.

4. To perform a Valve Test- connect the common wire to the “COM” terminal and the power wire to the VT terminal. This will immediately turn the valve “ON”.

⚠️ **WARNING:** The VT terminal always has power applied.
**Connect Pump Start Relay**

*Connect an optional Pump Start Relay to the ESP-SMTe controller.*

Pumps are used in some places to draw water from a well or other source. If you are activating a pump from the controller, you must install a Pump Start Relay.

A Pump Start Relay connects to the controller in the same way as a Master Valve, but connects differently at the water source.

⚠️ **NOTE:** The ESP-SMTe controller DOES NOT provide main power for a pump.

1. Route the pump start relay wires through a knock-out opening at the bottom or back of the unit.

⚠️ **CAUTION:** Do not route the pump start relay wires through the same opening as the power wiring.

2. Connect the Relay Input wire from the Pump Start Relay to the master (MV) terminal on the base module.

3. Connect the common wire from the Pump Start Relay to the COMMON (COM) terminal on the base module.

⚠️ **CAUTION:** To avoid possible pump damage when using a Pump Start Relay, connect a short jumper wire from any unused zone terminal to a terminal in use.

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.

⚠️ **NOTE:** as of 1/1/2012 the following pump start relays were compatible with the ESP-SMTe:

- RBSR24WG1 - Universal Pump Start Relay
- RBPL24WG1 - Pump Start Relay with Pressure Switch

For the most up to date compatibility list of pump start relays, visit our website at: www.rainbird.com/controllersupport
**Complete Controller Installation**

**Install Front Panel**

1. Reinstall the front panel by first inserting the top corner pin into the top pin-hole.

2. Then gently pull upward and slide the bottom corner pin into the lower pin-hole.

3. Reconnect the ribbon cable to the front panel by gently pushing the connector into the socket (Red line on ribbon cable towards the top).

   **CAUTION:** Be careful NOT to bend the socket pins.

**Connect Weather Sensor**

Ensure you have enough (2 x #16 AWG or 2 x #18 AWG) UV rated wire to run from the controller to the sensor location (maximum of 200 feet). 25 ft. of 18-2 AWG UV rated wire is provided.

1. Strip the two communication wire leads 3/8” and route the two wires through the field-wire knockout opening.

2. Insert the leads into the green connector located on the back of the ESP-SMTe 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”.

**Finish Installation**

1. Reinstall the outer door if necessary.

2. Apply power to the controller and test the system.

   **NOTE:** The electrical connections can be checked even if water is not available. If water is available and you would like to test some or all of your stations, use the Manual Watering feature of the controller.
Install SMTe Weather Sensor
Choose Location

Select a convenient outdoor location in close proximity (wire-run distance is 200 feet maximum) to the ESP-SMTe 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 the eave of a residence roof, a wooden fence post, etc.

The sensor mounting bracket is designed to mount on any vertical surface. Easy adjustment of the mounting arm ensures 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 Mounting Options

Do’s

• Mount weather sensor at least six feet above grade.
• Ensure that the sensor is free from obstructions to allow for collection and accurate measurement of rainfall.
• Sensor does not require direct sun to work correctly provided any shade or other obstruction does not block rainfall.

Dont’s

• Do NOT install sensor in a location where spray from any sprinkler or runoff from the roof or other object will collect in the sensor funnel.
• Do NOT install the sensor where rainfall will be reduced or blocked from entering the sensor funnel.
• Do not install the sensor above an air conditioning unit or where reflected heat from a concrete slab, swimming pool, wall, or roof will cause heating of the sensor.
• Do NOT install the sensor where it will be impractical to service – the rain sensor may require cleaning depending on the amount of leaves, dust, etc that may collect in the debris screen, funnel, or tipping bucket rain sensor.
Weather Sensor Installation

Begin by running the communication wire to the location where the sensor will be mounted.

1. Place the mounting bracket base assembly against a mounting surface that permits the top of the mounting bracket to be adjusted to vertical. Drive a screw into the upper left hole of the base (do not tighten completely).

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

3. Level the mounting base and hold it in place, then tighten the screw in the adjustment slot.

4. Tighten the upper left screw, then drive the two remaining screws into the mounting base, securing it to the mounting surface.

5. Feed the communication wire(s) through the three holes in the mounting arm, providing “strain-relief” for the wires. Leave enough extra wire at the top end so the sensor pod can easily be installed and removed.

6. Loosen the captured-screw of the wiring compartment cover to expose the sensor housing and green wiring connector within.

7. Strip the two wire leads 1/4” and insert into the connectors (polarity is not important).

8. If AC power is available, the green LED will blink. Once communication is established between the sensor and controller, the LED will light solid.

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

10. Mount the sensor housing assembly to the top of the mounting arm. Align the mounting hole on the bracket with the arm and tighten using the provided thumbscrew.

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

12. Press the sensor debris cover onto the top of the sensor.
Remote Programming

Program the front panel remotely on battery power.

The front panel can be removed from the controller and programmed remotely using a 9 volt battery for power.

Controller configuration and zone information settings can be entered and saved on battery power for all zones.

**NOTE:** This is useful if a contractor wants to program the controller prior to installation on site.

1. Remove the front panel (refer to Remove Front Panel in the Installation section).

2. Install a 9-volt battery in the battery compartment.

3. Program the controller.

**NOTE:** Program information is stored in nonvolatile memory so it is not lost if the front panel loses power.

4. Replace the front panel (refer to the Complete Installation section).

**NOTE:** A battery is not required for operation of the controller. It is only for remote programming of the controller while it is not connected to the controller housing. The battery does not provide backup power for time and date settings. The time and date are provided back up power by an internal 10 year lithium battery. The lithium battery is not field replaceable.
Troubleshooting

Error Detection
The ESP-SMTe controller has built-in error detection that includes sensor pod communication errors and electrical short circuits.

Sensor Pod Communication Error
When this error is detected the Alarm LED blinks and the following message is displayed (alternates with AUTO screen):

To clear the error:
1. If there are no obvious wiring or connection problems, press the Reset button located on the back of the front panel. After the front panel is reset, communication with the Sensor Pod is usually established within 15 seconds.
2. Check the status LED on the Sensor Pod by removing the wiring access cover with a screwdriver (underneath the Sensor Pod):

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>Good communication</td>
</tr>
<tr>
<td>Blinking</td>
<td>No communication (reset front panel).</td>
</tr>
<tr>
<td>Off</td>
<td>No power (check wiring).</td>
</tr>
</tbody>
</table>

No Temperature Data Error
When a No Temperature Error is detected, the Alarm LED blinks and the following message is displayed (alternates with AUTO screen):

To clear the error:
1. Press the Reset button located on the back of the front panel. If the alarm does not clear, see if there is a wiring or connection problem.
2. If the alarm is unable to be cleared, the Sensor Pod may need to be replaced.
### Short Circuit Error

The controller will detect an electrical short circuit or overload condition on a zone, master valve or pump start relay wiring connection. All irrigation for an affected zone is then cancelled and the next unaffected zone will water as scheduled. The controller will attempt to water the affected zone again at every scheduled watering. If watering begins successfully, the error condition associated with that zone will automatically clear.

When a Short Circuit Error is detected, the Alarm LED blinks and the following message is displayed (alternates with AUTO screen):

![ALARM 3]

**To clear the error:**

1. See if there is a wiring or connection problem with the station, master valve, or pump start relay wiring.

2. Fix any wiring problem between the controller and the identified zone or valve.

   **NOTE:** A shorted Master Valve will prevent any zone that is activated with the Master Valve from watering. Always repair a shorted Master Valve before fixing zone wiring.

3. Sprinkler valves can also be shorted internally. Disconnect the valve from the wire to the controller and run the Short Circuit Test (turn the dial to **Special Features**) to see if the short is cleared.
## Watering or Electrical Issues

The following table shows you how to troubleshoot problems with the ESP-SMTe Controller or Weather Sensor.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic irrigation is not occurring.</td>
<td>Dial is set to OFF.</td>
<td>Set the dial to AUTO.</td>
</tr>
<tr>
<td>A NOTE or ALARM condition is active that prevents irrigation.</td>
<td>Turn dial to AUTO and read the screen. If an ALARM is active the message will alternate with the AUTO screen every few seconds. If no ALARMS are active then any NOTES will alternate every few seconds. There are also messages that appear on the AUTO screen on the second line. Individual ALARMS, NOTES and messages are described below.</td>
<td></td>
</tr>
<tr>
<td>NOTE 1 – All Zones Are Off</td>
<td>Unit is new. This condition exists when the controller has been installed but has not been programmed. If you have hired someone to install the unit contact them and find out when they plan to program the controller. If you plan to program the controller yourself go the <a href="http://www.rainbird.com/esp-smte">www.rainbird.com/esp-smte</a> and download the Contractor’s Manual.</td>
<td>Set the dial to INPUT ZONE INFORMATION. Select “Zone Setup Wizard” and change the Zone Delay feature to a shorter time value.</td>
</tr>
<tr>
<td>NOTE 1 – All Zones Are Off</td>
<td>Unit has previously been irrigating</td>
<td>Set the dial to SPECIAL FEATURES. Select “Event Days Off” to view or change this schedule. Manual watering for a party or other event for which wet lawn areas is undesirable. Turn the dial to SPECIAL FEATURES and select “Event Days Off” to view or change this schedule. Manual watering can be used to irrigate selected zones if desired.</td>
</tr>
<tr>
<td>NOTE 2 – All watering days are off</td>
<td>This is handled the same as “All Zones Are Off” described above.</td>
<td></td>
</tr>
<tr>
<td>NOTE 7 – Irrigation Suspended Due To Rain</td>
<td>The controller generally will not irrigate if there has been rain in the last two hours. If you want the controller to continue irrigation press “CLEAR” to erase the rain from the memory. Alternately, you can select MANUAL WATERING and irrigate the desired zones.</td>
<td>Set the Dial to AUTO and press the RESUME button to clear the user activated Suspend feature.</td>
</tr>
<tr>
<td>NOTE 6 – Irrigation Suspended Due To Extreme Cold</td>
<td>For safety reasons, the controller will not irrigate when the temperature is near or below freezing. If irrigation is necessary MANUAL WATERING will override this safety feature.</td>
<td></td>
</tr>
<tr>
<td>“No AC Power” appears on the second line of the AUTO screen.</td>
<td>The controller cannot irrigate without AC power. The front panel will operate and can be programmed using the 9 V batteries, but this will not power sprinkler valves.</td>
<td>Set the Dial to AUTO and press the RESUME button to clear the user activated Suspend feature.</td>
</tr>
<tr>
<td>Irrigation will not occur if irrigation is not permitted or required.</td>
<td>The following methods can be used to determine if irrigation is permitted or required.</td>
<td></td>
</tr>
<tr>
<td>Irrigation is not required based on accumulated weather data.</td>
<td>Turn the dial to SYSTEM REVIEW and select “Next Irrigation Estimate”. Review the zone calendars to see when irrigation is scheduled. On the calendar, today is shown in reverse video. Days marked with an X are blocked by watering restrictions. Days that are blank indicate that watering is not required. Days with a number in them provides the estimated minutes of irrigation needed that day. If the landscape needs irrigation, manually water the affected zone(s).</td>
<td></td>
</tr>
<tr>
<td>Today is not an “Allowed Watering Day”.</td>
<td>The “Next Irrigation Estimate” calendars display an X for each day that watering is not allowed by the controller programming. The features that block watering are described below.</td>
<td>If regulations permit, change the “Allowed Watering Days” by setting the dial to CONFIGURE CONTROLLER and change the Block Watering on Specific Day of Week.</td>
</tr>
<tr>
<td>Event Day Off feature is activated.</td>
<td>The controller can be set to block up to 4 days in the future. This can be used to prevent irrigation for a party or other event for which wet lawn areas is undesirable. Turn the dial to SPECIAL FEATURES and select “Event Days Off” to view or change this schedule. Manual watering can be used to irrigate selected zones if desired.</td>
<td></td>
</tr>
<tr>
<td>Block Day of Week feature is activated.</td>
<td>If the grounds are maintained on Wednesdays, that day may be set as a “Blocked Day of Week”. Set the dial to CONFIGURE CONTROLLER and display the Block Watering on Specific Day of Week screen. Change the selection for Block Watering day if desired.</td>
<td></td>
</tr>
<tr>
<td>Watering restrictions may be active.</td>
<td>The controller can be programmed to block specific days of the week, odd days of the month, even days of the month, or cyclic days (a specific number of days between each irrigations). The irrigation estimate calendars will display an X on each day that is blocked. The settings can be viewed by turning the dial to SYSTEM REVIEW and selecting the “Controller Settings” option. If local laws permit the settings can be adjusted by turning the dial to CONFIGURE CONTROLLER and stepping through the settings until the desired options are reached.</td>
<td></td>
</tr>
<tr>
<td>Zone to Zone Delay is activated for an extended duration.</td>
<td>Set the dial to SPECIAL FEATURES. Select “Adv. Controller Setup” and change the Zone to Zone Delay feature to a shorter time value.</td>
<td></td>
</tr>
<tr>
<td>An individual zone has been set in the OFF (inactive) mode.</td>
<td>Set the dial to INPUT ZONE INFORMATION. Select “Zone Setup Wizard” and change the Zone setting to ENABLED (active).</td>
<td></td>
</tr>
<tr>
<td>AC Power has been lost and is not currently available. The screen is blank.</td>
<td>Reset the circuit breaker or make the necessary repairs to assure a consistent 120 VAC +/- 10% power supply.</td>
<td></td>
</tr>
<tr>
<td>Symptom</td>
<td>Possible Cause</td>
<td>Correction</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>Display is blank.</td>
<td>An electrical surge or lightning strike has disrupted or damaged the controller’s electronics.</td>
<td>Push the RESET button located on the back of the controller front panel. Turn off the controller and disconnect the 9V battery if applicable. After 2-3 minutes restore AC power to the controller. If the electrical surge did no permanent damage, the controller will accept programming commands and function normally.</td>
</tr>
<tr>
<td>Temperature Reading does not match the actual temperature for an extended period of time.</td>
<td>Unit is absorbing reflective heat and/or from adjacent pavement.</td>
<td>Relocate the sensor to a more appropriate location.</td>
</tr>
<tr>
<td>Inaccurate rain fall measurement occurs on a regular basis.</td>
<td>Debris Screen is clogged and is not allowing rainfall to activate the tipping bucket.</td>
<td>Clean the debris off the Debris Screen. 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.</td>
</tr>
<tr>
<td>Inaccurate rain fall measurement occurs on a regular basis.</td>
<td>Sensor rain funnel is clogged.</td>
<td>Clear the funnel.</td>
</tr>
<tr>
<td>Individual valve does not come on.</td>
<td>Valve wiring problem.</td>
<td>Set the dial to SPECIAL FEATURES and run the Short Circuit Test to identify short conditions and repair accordingly.</td>
</tr>
<tr>
<td>Zone is too Wet.</td>
<td>Incorrect Zone Parameters are set such as the Sprinkler Precipitation Rate.</td>
<td>For ET and Drip zones set the dial to FINE TUNE WATERING and decrease watering by up to 60% in 1% increments. For Time-Based zones adjust the run time for the affected zone(s).</td>
</tr>
<tr>
<td>Zone is too Dry.</td>
<td>Incorrect Zone Parameters are set such as the Sprinkler Precipitation Rate.</td>
<td>For ET and Drip zones set the dial to FINE TUNE WATERING and increase watering by up to 60% in 1% increments. For Time-Based zones adjust the run time for the affected zone(s).</td>
</tr>
<tr>
<td>Run off is occurring on a regular basis.</td>
<td>Zone input information may not match actual site conditions.</td>
<td>Set the dial to INPUT ZONE INFORMATION and change the soil type and/or degree slope.</td>
</tr>
<tr>
<td>NOTE 3 on Display Screen.</td>
<td>Unusually High Temperature Reading.</td>
<td>Verify that the temperature sensor is not being heated by an air conditioner or reflective surface. Relocate the sensor in a different location to more accurately measure the ambient temperature of the site.</td>
</tr>
<tr>
<td>NOTE 4 on Display Screen.</td>
<td>Unusually High Rainfall Reading.</td>
<td>Verify that the Rain Gauge is not receiving runoff from the roof, trees, etc. Check the mounting bracket is secure and not swaying back and forth.</td>
</tr>
<tr>
<td>NOTE 5 on Display Screen.</td>
<td>Watering Not Completed During Watering Window.</td>
<td>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 using CONFIGURE CONTROLLER. Another solution is to reduce the soak time for the affected zones.</td>
</tr>
<tr>
<td>NOTE 6 on Display Screen.</td>
<td>Irrigation Suspended Due to Extreme Cold.</td>
<td>If irrigation is desired at this temperature, set the dial to the SPECIAL FEATURES, select “Adv. Controller Setup” and change the user set value (Temp Below) to a lower threshold temperature value.</td>
</tr>
<tr>
<td>NOTE 7 on Display Screen.</td>
<td>Irrigation Suspended Due to Rain.</td>
<td>If irrigation is desired at the current rainfall amount, set the dial to SPECIAL FEATURES, select “Adv. Controller Setup” and change the user set value (When Rain Reaches) to a higher rainfall threshold.</td>
</tr>
<tr>
<td>NOTE 8 on Display Screen.</td>
<td>Unit is re-initializing, Please WAIT.</td>
<td>Unit has encountered a small problem. The controller will normally correct itself. However, if the NOTE doesn’t go away after a couple minutes press the Reset button.</td>
</tr>
</tbody>
</table>
## Reset Button

The Reset button resets the controller. Active watering is canceled, and all previously programmed configuration and zone information remains stored in memory. Irrigation will resume on the next Allowed Watering Day.

Insert a small tool into the access hole and press until the controller is reset.

**NOTE:** We suggest using a non-metallic object such as a pencil or pen to press the Reset button.

![Reset Button Illustration](image)

## Connect Optional Accessory

**NOTE:** Use only Rain Bird approved devices with 5 pin accessory port. Unapproved devices may damage controller and void warranty.

1. The front panel provides a port for the use of external devices, such as the Rain Bird LIMR Remote.

![Connect Optional Accessory Illustration](image)
Appendix

ESP-SMTe Smart Control System
Overview

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

Weather information is measured in real-time by an on-site SMT Weather Sensor and sent to the ESP-SMTe Controller. This information is combined with historic weather information for the site and specific site and zone parameters 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+Soak™ irrigation events, thereby eliminating problems from water run-off.

Irrigation Scheduling Method

The objective of an automated irrigation system is to augment rainfall in order to re-supply the soil with the water that plants need. The ESP-SMTe looks at the soil as a water reservoir that supplies the plant with water. The soil type, amount of available water and the rate that water is lost or used determines the amount and frequency of irrigation.

Soil Type

Soil Type Description

Different soil types vary greatly in the ability to hold water and the rate that water filters down through the soil. The ESP-SMTe accounts for soil types in each zone to help determine when plants need water.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| 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 it sit until most of the soil particles have settled to the bottom of the jar (this can take a few hours).

   **NOTE:** 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 next 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 found in that particular soil. Soil texture has a major influence on the amount of water stored (moisture holding capacity) in soil. This is used to determine how much to irrigate and how often irrigation is required. 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.

Factors That Affect Irrigation

Evapotranspiration

The ESP-SMTe calculates water needs based on water lost from the soil surface (evaporation) and water used by the plants (transpiration). The rate that water is lost is called evapotranspiration, or ET, and is usually expressed in inches of water lost over a time period (usually on a daily basis). This water loss is influenced 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 watering than a cool, humid environment.

Plant Available Water

The total amount of water in the soil that is available to the plant is called Plant Available Water, or PAW. This amount varies based on the soil type and plant root depth. For an example, lets assume that a plant has roots that are 6 inches deep, and the soil class is Loam. Referring to the following table, the amount of available water per inch of Loam soil is 0.17. The Plant Available Water (PAW) would therefore be 0.17 X 6 inch root depth = 1.02 inches of potentially available water in the soil for the plant.

Plant Available Water (PAW) By Soil Type

<table>
<thead>
<tr>
<th>Soil Type or Class</th>
<th>Available Water (AW) (in. of water per in. of soil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>0.17</td>
</tr>
<tr>
<td>Silty Clay</td>
<td>0.17</td>
</tr>
<tr>
<td>Clay Loam</td>
<td>0.18</td>
</tr>
<tr>
<td>Loam</td>
<td>0.17</td>
</tr>
<tr>
<td>Sandy Loam</td>
<td>0.12</td>
</tr>
<tr>
<td>Loamy Sand</td>
<td>0.08</td>
</tr>
<tr>
<td>Sand</td>
<td>0.06</td>
</tr>
</tbody>
</table>

The three soil particle type lines (clay, silt and sand) for the soil sample example intersect in the LOAM soil classification area.
Effective Rainfall

Not all rainfall is usable by the plant. If the rainfall intensity is high, some water may not reach the plant root zone before running off or may infiltrate past the root zone. The amount of rain that is actually used by the plants is called Effective Rainfall.

The weather sensor measures total rainfall, and the ESP-SMTe determines how much to consider Effective Rainfall when calculating irrigation Run Times.

For an example, the table below shows a record of rainfall for a 5 day period. The weather sensor measured .46 inches of rain on Day 3, but the ESP-SMTe determined that only .16 inches will be used by the plants.

<table>
<thead>
<tr>
<th>Day</th>
<th>Total Rain</th>
<th>Effective Rain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00&quot;</td>
<td>0.00&quot;</td>
</tr>
<tr>
<td>2</td>
<td>0.00&quot;</td>
<td>0.00&quot;</td>
</tr>
<tr>
<td>3</td>
<td>0.46&quot;</td>
<td>0.16&quot;</td>
</tr>
<tr>
<td>4</td>
<td>0.00&quot;</td>
<td>0.00&quot;</td>
</tr>
<tr>
<td>5</td>
<td>0.00&quot;</td>
<td>0.00&quot;</td>
</tr>
<tr>
<td>Total</td>
<td>0.46</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Management Allowed Depletion (MAD)

When the amount of water available to the plant gets too low due to water loss through ET, then irrigation is scheduled. This level is referred to as Management Allowed Depletion, or MAD and can be adjusted if needed during programming.

The MAD level is expressed as a percentage of the total Plant Available Water (PAW) that can be lost from the soil before irrigation will be scheduled. If the amount of PAW is 1.02 inches and the MAD level is set at 50%, then the controller would schedule irrigation when the water in the soil drops to 0.51 inches.

When the controller is programmed, the “REFILL POINT” is entered. The Refill Point is 100%-MAD. Most soil is approximately 50%. The clay Refill Point is typically set to 70% (MAD value of 30%).

Efficiency

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 soil moisture in the example above, the zone would need to have a total Run Time of 1 hour on Day 4.
**Applying the Cycle+Soak™ Principle**

In most soil types, if a calculated Run Time is run continuously significant water loss through runoff would occur. Based on the soil type and degree of slope for the zone, the ESP-SMTe controller will divide the required Run Time into several “cycles” with a “soak” time in between. These cycle and soak times are based on the Water Intake rate of the soil type as identified in the following table.

**Basic Intake Rate for Various Soil Types**

<table>
<thead>
<tr>
<th>Soil Type or Class</th>
<th>Basic Intake Rate (inches per hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>0.60”</td>
</tr>
<tr>
<td>Loamy Sand</td>
<td>0.50”</td>
</tr>
<tr>
<td>Sandy Loam</td>
<td>0.40”</td>
</tr>
<tr>
<td>Loam</td>
<td>0.35”</td>
</tr>
<tr>
<td>Clay Loam</td>
<td>0.20”</td>
</tr>
<tr>
<td>Silty Clay</td>
<td>0.15”</td>
</tr>
<tr>
<td>Clay</td>
<td>0.10”</td>
</tr>
</tbody>
</table>

For an example, the following table shows water requirements over a 12 day period. The ESP-SMTe has scheduled irrigation on Day 4 and Day 10, and will divide the calculated Run Times into several cycles.

**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).**

**Plant Water Requirements for Cycle+Soak**

<table>
<thead>
<tr>
<th>Day</th>
<th>Daily ET</th>
<th>Effective Rain</th>
<th>Net Water Req’t</th>
<th>Accum. Water Req’t</th>
<th>Irrigation Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.18”</td>
<td>0.00”</td>
<td>0.18”</td>
<td>0.18”</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>0.16”</td>
<td>0.00”</td>
<td>0.16”</td>
<td>0.34”</td>
<td>---</td>
</tr>
<tr>
<td>3</td>
<td>0.16”</td>
<td>0.16”</td>
<td>0.00”</td>
<td>0.34”</td>
<td>---</td>
</tr>
<tr>
<td>4</td>
<td>0.18”</td>
<td>0.00”</td>
<td>0.18”</td>
<td>0.52”</td>
<td>0.53”</td>
</tr>
<tr>
<td>5</td>
<td>0.14”</td>
<td>0.00”</td>
<td>0.14”</td>
<td>0.13”</td>
<td>---</td>
</tr>
<tr>
<td>6</td>
<td>0.13”</td>
<td>0.10”</td>
<td>0.03”</td>
<td>0.16”</td>
<td>---</td>
</tr>
<tr>
<td>7</td>
<td>0.15”</td>
<td>0.11”</td>
<td>0.04”</td>
<td>0.20”</td>
<td>---</td>
</tr>
<tr>
<td>8</td>
<td>0.14”</td>
<td>0.00”</td>
<td>0.14”</td>
<td>0.34”</td>
<td>---</td>
</tr>
<tr>
<td>9</td>
<td>0.11”</td>
<td>0.00”</td>
<td>0.11”</td>
<td>0.45”</td>
<td>---</td>
</tr>
<tr>
<td>10</td>
<td>0.16”</td>
<td>0.00”</td>
<td>0.16”</td>
<td>0.61”</td>
<td>0.60”</td>
</tr>
<tr>
<td>11</td>
<td>0.12”</td>
<td>0.00”</td>
<td>0.12”</td>
<td>0.13”</td>
<td>---</td>
</tr>
<tr>
<td>12</td>
<td>0.12”</td>
<td>0.00”</td>
<td>0.12”</td>
<td>0.25”</td>
<td>---</td>
</tr>
</tbody>
</table>

**NOTE:** The maximum cycle time is limited to 60 minutes even if the infiltration rate of the soil will allow more time. This assures that additional zones will get irrigated during the allotted watering window.
Determine Net Application Rate

The Net Application Rate is the amount of water that is applied to the landscape in a certain period of time. In order for the controller to determine a Run Time for each zone, the Net Application Rate for your sprinkler type must be programmed appropriately. This value will determine how long the sprinklers need to water to replenish water to the plants.

Sprinkler Type Default Method

The ESP-SMTe controller provides default Net Application rates for the different sprinkler type. To use this method, refer to Input Zone Information in the Programming section.

The table below provides the Default Net Application Rate Values for common sprinkler types used by the controller.

<table>
<thead>
<tr>
<th>Sprinkler Type</th>
<th>Net Application Rate (in/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprays</td>
<td>1.60</td>
</tr>
<tr>
<td>Rotors</td>
<td>0.45</td>
</tr>
<tr>
<td>Rotary Nozzle</td>
<td>0.50</td>
</tr>
<tr>
<td>Bubblers</td>
<td>2.50</td>
</tr>
<tr>
<td>Drip</td>
<td>0.80</td>
</tr>
</tbody>
</table>

Total Area Covered Method

The following steps show you how to calculate the Net Application Rate based on Total Area, Precipitation Rate and an Efficiency Rating.

1. Determine the Manufacturer and Model of the sprinklers being used in the zone, making particular note of the specific nozzle being used at each sprinkler location. In our example, a Rain Bird 5004 with the following MPR nozzles are being used in Zone 1: Full Circle = MPR 30F, Half Pattern = MPR30H and Quarter Patterns = MPR30Q. See illustration in the next column.

Zone 1 - 5004 MPR Nozzle Series @ 45 psi

<table>
<thead>
<tr>
<th>Model</th>
<th>Radius</th>
<th>Pattern</th>
<th>Flow (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30Q</td>
<td>30 Foot</td>
<td>Quarter</td>
<td>1.40</td>
</tr>
<tr>
<td>30H</td>
<td>30 Foot</td>
<td>Half</td>
<td>2.59</td>
</tr>
<tr>
<td>30F</td>
<td>30 Foot</td>
<td>Full</td>
<td>5.78</td>
</tr>
</tbody>
</table>

2. Determine the operating water pressure at the Sprinkler Nozzle. In our example, Water Pressure = 45 psi.

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

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 Gross Precipitation Rate (PR) using the following formula:

\[
\text{Total Flow (GPM)} \times 96.3 \\
\text{Total Area (sq. ft.)}
\]

Example: Zone 1 PR = \[\frac{32.7 \times 96.3}{5,400}\] = 0.58”

7. Enter 0.58 inches per hour into the ESP-SMTe controller for Net Application Rate. Refer to Input Zone Information in the Programming section.
8. Determine the Efficiency Rating - choose an efficiency rating based on your visual observation of system conditions and operating pressure at the nozzle from the table below:

**Approximate Efficiency Rating**

<table>
<thead>
<tr>
<th>Sprinkler Type</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprays</td>
<td>50 %</td>
<td>60 %</td>
<td>70 %</td>
</tr>
<tr>
<td>Rotors</td>
<td>55 %</td>
<td>70 %</td>
<td>80 %</td>
</tr>
<tr>
<td>Rotary Nozzle</td>
<td>55 %</td>
<td>70 %</td>
<td>80 %</td>
</tr>
<tr>
<td>Bubblers</td>
<td>50 %</td>
<td>60 %</td>
<td>70 %</td>
</tr>
<tr>
<td>Drip</td>
<td>70 %</td>
<td>80 %</td>
<td>90 %</td>
</tr>
</tbody>
</table>

Example: Zone 1 Sprinkler Type is a Spray and the zone operating condition is average, so the sprinkler efficiency value is 60% based on information in the table above.

9. Determine the Net Application Rate - The Net Application Rate value must be entered for sprinklers during programming.

Example: Precipitation Rate = 0.44 inches per hour
Efficiency = 60%
Net Application Rate for Zone 1 is 0.26 inch/hour

\[ 0.44 \times 0.60 = 0.26 \text{ inches per hour} \]

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**Zone System Audit Method**

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

1. Place a series of catchment devices (that are the same size and 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).
**Drip Irrigation**

Drip irrigation is a system that applies water directly to the root zone or base of a plant, using a network of small diameter tubes and emitters. This type of irrigation is more efficient and requires less water than traditional sprinkler nozzles.

The ESP-SMTe controller uses information about the installed drip system (emitter flow rate, emitter spacing and row spacing) to calculate water application rates and determine irrigation schedules.

⚠️ The online Rain Bird Academy offers classes and training to learn more about drip products and applications.

**Inline Grid Drip**

Inline Grid Drip is used to irrigate an area of closely spaced plants with similar water needs, such as a flower bed. Evenly placed drip emitters are used with the same flow rate.

**Point Source Drip**

Point Source Drip is used to irrigate an area that has a variety of plant types, such as a mix of trees and bushes. Drip emitters are placed exactly where water is needed, and the flow rates can be individually adjusted for each plant.
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.

- 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.