A DIY Guide for Weather-Based 'Smart' Irrigation Controllers

This is a programming walkthrough for 5 common weather-based controller brands. The brands include:

- Hunter HC (with Hydrawise software);
- Rachio Generation 2;
- Rain Bird ESP-SMTe;
- Signature EZ Connect™ 8250 series (with Wyzehome software and SCS Share);
- Weathermatic SL 800 Smartline

The following are two methods by which controllers choose to "intelligently" turn irrigation programs on/off.

1. Historical climate data: obtaining an average temperature, humidity and precipitation reading from a database
2. Live climate data: adjusting schedules by the hour, based on continuous data feeds and an on-site rain sensor

The following steps will ensure that your irrigation system only applies water to your lawn/landscape when the climate and equipment deem it necessary.

Getting Started - Below is a check-list of things to do when first setting up your controller:

1. Write down the controller's serial number (found on back) before mounting to wall. This is needed to connect the controller to its wireless software.
2. Complete the Wireless Connection Wizard on your controller (your router's password is needed for this step) before logging into the phone application or website (this can take up to 30 seconds).
3. If a master valve zone is asked for while programming, select "not assigned."
4. **Most** controllers with 'smart' modes require you to set-up a basic weekly schedule first (start/run times and frequency for each zone - as you would for a traditional controller).
   - As a general rule, set up the basic schedule to run each zone based on the following criteria
     - Rotor zone: 25-35 minutes
     - Spray zone for about 10-20 minutes
     - 2-3 days per week between 8pm and 4am.

Lawns generally require about 1.0"-1.5" of water during the **hottest** part of the summer (July-August). This basic schedule will be used as a baseline for adjustments that sensors automatically calibrate. This is an "intelligent" form of seasonal adjustment (which is manually operated).

Hunter (HC)

- Can be programmed directly via its panel, or via its website/mobile application;
- **User Interface difficulty:** beginner friendly;
- 'Smart' mode relies on local weather data, and setting 'system thresholds' (see below).

What to enter:
1) Modify schedule settings and 'watering triggers' via the website or mobile application in the '**Predictive Watering**' window
2) Local weather stations: choose to subscribe to '**Free airport weather stations**'
3) Watering type: choose '**Smart ET schedule**'
4) Schedule adjustments: choose '**Don't water extra when hot**'
5) Enable cycle and soak when prompted
6) Watering triggers:
   a. Suspend watering via '**predictive watering**' (forecasts)
      i. Low temperature limit: 45° F
      ii. Chance of rain upper limit: 80%
      iii. Wind speed limit: 8 mph
   b. Suspend watering via **weather station measurements**
      i. Yesterday's rainfall limit: more than 0.25"
      ii. Last 7 days' rainfall limit: more than 1.0-1.5"
   c. Suspend watering via '**variable watering**'
      i. Low temp limit: 45° F
      ii. High temp limit: 95° F

Hunter continued (Pro-C / X-Core / I-Core / ACC)

These controllers require the *Solar Sync* weather station in order to be **WaterSense**® certified. Information about this weather station can be found below.

Rain Sensor options for all models listed above:

Mini-Clik
> Rainfall threshold adjustable from 1/8" - 3/4"

Rain-Clik
> 'Quick Response' suspends irrigation within minutes of rainfall
> Adjustable vent allows for multiple reset settings (time delay before allowing irrigation again)

Weather Station option:

Solar Sync
> Daily run-time adjustments based on evapotranspiration (ET) calculation (measures temperature and rainfall)
> Suspends irrigation at temperatures below 37° F

Rachio (Generation 2)

- Programming requires access to its website/mobile application;
- **User Interface difficulty:** beginner friendly;
- 'Smart' mode relies on local climate data and/or soil moisture sensor data to adjust watering days and run times.

What to enter:
1) Once wireless setup is complete, a window that offers two options ('start using my controller' or 'set-up my zones') will pop up – choose '**set-up my zones**'
2) Watering schedule:
   a. For '**smart**' mode:
      i. For **no** soil moisture sensor: choose 'flexible monthly'
      ii. For soil moisture sensor: choose 'flexible daily'
   b. For **DIY** mode:
      i. Choose 'fixed days' and enter 2-3 watering days per week (e.g. Tues/Thurs/Sat) and a 'rainfall shutoff' at 0.25" (if a rain sensor is installed)
3) Soil type: choose 'clay loam'
4) Primary nozzle type: whichever dominates each zone; choose 'rotary nozzle' for MSMTs
5) Zone slope: 'flat' and 'slight' are common in Bozeman. 'Moderate' slopes are often found in the Highland Blvd and Sourdough Rd areas

Rain Sensor options:
Hunter Rain-Clik
Rain Bird WR2
Toro
Irritrol
Orbit

Rain Bird (ESP-SMTe)

- Can be programmed directly via its panel, or via its website/mobile application;
- **User Interface difficulty:** irrigation aficionado;
- 'Smart' mode relies on using local weather data and a rain collection system to automatically adjust watering days and run times.

What to enter:
1) For the '**Configure Controller**' feature, set 'rain shutoff' to 1 full day at 0.25"
2) For the '**Input Zone Information**' feature, enter the following within the setup wizard:
   a. Soil Type: choose 'Clay Loam' or 'Sandy Loam' (clay loam is most common in Bozeman residential landscapes)
   b. Application Rate: Spray (1.6" per hr), Rotor (0.5" per hr), MSMT (0.9" per hr)
   c. Slope: Flat (0-2°) Slight (3-4°) Moderate (5-7°) Steep (8+°)
   d. Cycle and Soak: choose 'Automatic'
   e. Root Depth: 3-6" (check with a soil probe or garden spade)
   f. Re-Fill Point (for a soil moisture sensor = plant available water level): user preference, but a good rule of thumb is about 50-65%
3) For '**Special Features**'
   a. Short circuit test: testing solenoid operation (good to do once per year)
   b. Advanced controller setup
      i. ETo (evapotranspiration rate) adjustment factor: 75-85%
      ii. Suspend watering when rainfall accumulation reaches 0.25", or temperature is below 45° F

Rain Bird (ESP-Me or ESP-TM2)

Note: These models require a **Wi-Fi module and rain sensor** in order to be **WaterSense**® labeled.

The module allows for wireless access to controller programming which enables the controller to pull local weather data from the internet to make daily irrigation adjustments. The rain sensor will automatically stop and hold irrigation events once it collects a set amount of precipitation.

- Can be programmed directly via its panel, or via its website/mobile application.
- **User Interface difficulty:** beginner friendly;
- 'Smart' mode relies on using local weather data and a rain sensor to automatically adjust watering days and run times.

NOTE: Daily irrigation times will NOT be adjusted (based on weather data) unless '**Automatic Seasonal Adjustments**' has been enabled on your mobile application. To do this, within the 'edit schedule' window (frequency and start times) click on the button labeled 'Use Automatic Seasonal Adjustment for this Program'

5. Programming for the ESP-Me or ESP-TM2 controllers is much like a traditional model - all you need to do is enter your preferred zone run times and set up your mobile application settings to initiate 'smart' mode. As a general rule, set up the basic schedule to run each zone based on the following criteria
   - Rotor zone: 25-35 minutes
   - Spray zone for about 10-20 minutes
   - 2-3 days per week between 8pm and 4am.
   Lawns generally require about 1.0"-1.5" of water during the **hottest** part of the summer (July-August). This basic schedule will be used as a baseline for adjustments that sensors automatically calibrate. This is an "intelligent" form of seasonal adjustment (which is manually operated).

Rain Sensor option:
> RSD (BEx/CEx)
>> Rainfall threshold adjustable from 1/8" – 3/4"
>> Vent can be open or closed to allow expandable cork to dry

Weather Station option:
> WR2 (RFC/RFC-48)
>> Weather data updates every 45 minutes
>> Rainfall threshold adjustable from 1/8" – 1/2"
>> Temperature threshold adjustable from 33 – 41° F
>> Irrigation modes:
>> (**For RFC**)

Programmed
Automatic 72 hour suspension
72 hour override
(**For RFC-48**)
'Automatic 48 hour hold' suspends irrigation after 1/4" rainfall has been collected (active by default)
'Quick shut off' suspends within 2 minutes of rainfall

Signature (EZ Connect™ 8250)

- Programming requires access to its desktop or mobile application;
- **User Interface difficulty:** irrigation professional;
- 'Smart' mode (or 'intelligent irrigation') relies on entering 'microclimate settings'. This allows the software to establish optimal program start times (based on the 'water window' you chose during set-up), and zone run times (for weekly or monthly timeframes).

What to enter:
1) Under 'Zone/Decoder Settings', create a '**profile**' for each **sprinkler zone** you have
   a. In the 'Microclimate' tab, within the '**Irrigation Equipment**' field, enter the required information for each sprinkler zone
   b. Specific vegetation and sprinkler information can be entered in the '**microclimate Settings**' field

Rain Sensor option:
   Rain Switch (8501)
           Suspends irrigation based on programmed parameters

Weathermatic (*Smartline* SL 800)

- Can be programmed directly via its panel, or via its mobile application;
- **User Interface difficulty:** irrigation professional;
- 'Smart' mode relies on wireless weather data feeds and plant/site information.

What to enter:
1) After setting up Basic Mode, enter the following for each feature on the left-hand side of the controller dial (labeled Enthusiast):
   a. More/Less: Total shade (-50%); Filtered shade (-20%); Morning shade (-10%); Afternoon shade (-30%)
   b. Sprinkler type: Spray (1.5" per hour); Rotor (0.5" per hour); Drip (1.1" per hour)
   c. Plant type: Cool season turf - Kentucky bluegrass/Fescue mixes (80%); Shrubs (60%); Trees (80%); Native plants (25%) **Note:** Percentages represent a plant factor
   d. Soil type (slope): Slight (1-5°); Mild (6-10°); Moderate (11-15°); Steep (16-20°)
   e. **Advanced Menu**: cycle & soak options, rain delay settings, wireless setup
2) On the right-hand side of the controller push the "Watering Mode" button until SMART mode is enabled

Plant factor: an adjustment of total water requirement based on plant type

Rain Sensor options:
   RS1/RFS1
      Rainfall threshold adjustable from 1/8" – 1"
      Temperature below 37° F suspends irrigation

   RS5/RFS5
      Rainfall threshold adjustable from 1/8" – 1"
      Temperature below 37° F suspends irrigation

   420GLS/420LS
      Rainfall threshold adjustable from 1/8" – 1"

Weather Sensor option:
   SLW1/SLW5
      Rainfall threshold adjustable from 1/8" – 3/4"
      Temperature below 37° F suspends irrigation
      Weather data processed and recorded to automatically adjust run times