

# Detailed Installation & Operator's Manual

## For models WSR8 & WSR12

### Residential and Indoor Installation

#### 1. Selecting a location for Sprinkler Timer See Figure 1.

This controller must be mounted indoors to comply with electrical codes. Mount the controller near an electrical outlet which is *not* controlled by a light switch. Wood screws accompany the WSR controller and may be used to mount the controller on a 2x4 inside your garage. *NOTE: If installing on dry wall or stucco, use an dry-wall anchor which you may obtain from any hardware store.*

Mount the controller at eye level convenient to both the electrical outlet and the wire to the valves. Plug the transformer into the electrical output and into the WSR controller. Make certain the rotary switch is pointing up to the AUTO/Run position. The controller should light up and display the current time and day of the week. The WSR controller will also show the current watering days for the *Lawn™* program. Two arrows on the right of the display will flash (Figure 5) alerting you to the missing Solar and Rain sensors which will be connected in the next 2 steps.

#### 2. Selecting a location for the SFR sensor See Figure 2.

Since the WSR controller makes watering decisions based on readings from the SFR sensor, it is important to mount the SFR solar sensor so that it gets a *good look at the sun most of the day*. The best location will usually be along the roof. There is no restriction on the distance between the SFR sensor and the controller. Read Step 3 before actually mounting the sensor. Extra attention given to positioning this sensor which will result in healthier lawns and greater water savings.

From your chosen location for the SFR sensor, face south and look from the east where the sun rises and imagine the sun traveling through the sky to the west. Look for trees or other obstructions in this path. Our patent pending technology will compensate for shadows from trees or high buildings. But it is still best to give the SFR sensor the best look at the sun all day long. The most important time is from 8 am to 5 PM.

#### 3. Cable connections to the SFR sensor Figures 2.

If the sensor is mounted more than 25 feet from controller, you will need to purchase the materials listed on the back page and extend the cable that comes with the SFR sensor.

If the sensor will be mounted less than 25 feet from the controller, then use the 5 cable staples that come with each WSR controller to route the SFR cable *under the eaves* and into the garage to protect the wiring from ultra-violet sunlight.

At the controller end, connect the black wire to the Solar - terminal and the red wire to the Solar + terminal. The **Solar Missing** arrow should now disappear. If not, then see Trouble-Shooting section at the end of this manual.

At the controller end, connect the other two wires to the Rain terminals. Neither the color nor the orientation of the the rain sensor wires are important. The **Rain Delay** arrow should go disappear. If not, then see Trouble-Shooting section at the end of this manual.

#### 4. Connecting Valves to Sprinkler Timer .

Multi-wire sprinkler connection cable (18AWG ) is commonly used to connect the valves to the WSR sprinkler timer. This sprinkler cable is insulated for direct burial and is color-coded for each valve. Connect the white wire of the cable to the COM terminal of the WSR sprinkler timer. Connect the colored wires to the terminals labeled V1, V2, etc. Skip the MV terminal unless there is a master valve or booster pump in the sprinkler system. It is good to use the wires in the order that they appear in the rainbow which can easily be remembered by the name "ROY G BIV" (red, orange, yellow, green, blue, indigo & violet) Not all of these colors are in the cable. But this rainbow pattern gives an easily remembered order to the wiring.

The white common wire *must* be connected to each valve and to the COM terminal of the WSR controller. The other wire of each valve must be connected to one of the colored wires of the sprinkler cable and to one of the V1 to V12 terminals of the WSR controller.

#### 5. Installation is complete. Next, test the wiring to valves

(Figure 5) Rotate the switch to "1,2,3 Minute Test" position. Push the **MORE** switch to select the number of minutes to activate each valve. The WSR sprinkler timer will now activate each valve in sequence for the length of time that you have selected. Walk through your yard and verify that each valve is working properly. If not, check the display of the controller to see which valve the WSR timer is trying to activate. Make a note of this valve number and return to your lawn and observe the activation of the other valves. *We recommend that you perform this simple test once per month.*

*To advance quickly* to another valve, push the **NEXT** switch on the left of display.

*To stop, prevent or cancel watering*, rotate the switch to "STOP watering" position.

\*\*\* Installation Complete \*\*\*

Figure 1: WSR timer mounted on garage wall

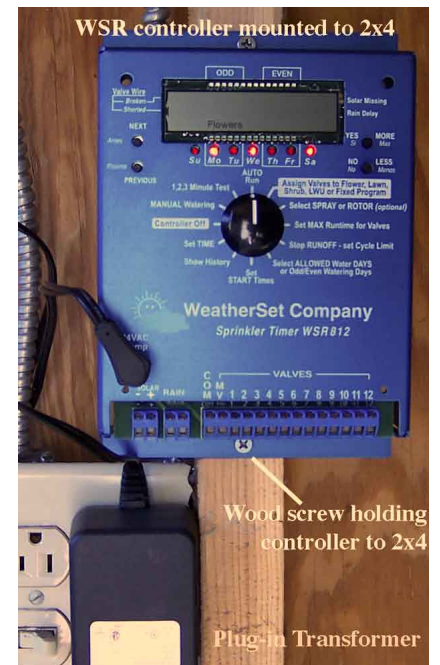


Figure 2: SFR sensor mounted along roof. This mounting of the sensor gives accurate solar readings from sunrise to end of day.



Figure 5: 1,2,3 Minute Test selected by rotary switch. YES/MORE switch was pushed to select 004Minute test. Valve #2 has run 03 min + 01 sec. Solar sensor is missing or connected backwards. Rain sensor is missing or has detected rain.



## Basic programming - Steps 6 to 11

To get you running quickly, WeatherSet sprinkler timers are shipped to you with the following information already set into the timer: time of day; day of week; correct year, month and date; all days allowed for watering; every valve set to run 8 minutes; every valve placed in the **Lawn™** program; every valve set with cycle limit of 4 minutes per hour; and every program set for 3 AM start-time. The hour setting may need adjustment from Pacific Time zone setting. If hour is not correct see Step 16.

### 6. AUTO/Run is the normal running position for the rotary switch See Figure 6.

The rotary switch is normally left in the **AUTO/Run** position. In this mode, the display will show progress for each valve as it waters. If no valve is watering, then the display scrolls information to show the current time and day; to show sensor alerts; to show scheduled programs; and to show which days each program will run.

### 7. OFF / Stop at 9 o'clock position in Figure 6.

- To stop watering now, turn the rotary switch to **OFF / Stop** position and return it to **AUTO/Run**.
- To prevent all watering, turn the rotary switch to **OFF / Stop** position and leave it there.
- To resume automatic irrigation, rotate switch to **AUTO/Run** position and leave it there.

### 8. Assign Valves to Flower™, Lawn™, Shrub™, LWU or Fixed programs

Figure 7 shows the position of the rotary switch for assigning valves to different watering programs. Figure 7 shows that Valve#3 is assigned to the **Shrub™** program and has a Max Runtime of 40 Minutes. The display flashes the current watering program for the selected valve.

8a) To go to the next or previous valve, push and hold the **Next** or **Previous** switches to the left of the display. Then, assign the valve to the best watering program.

8b) Push and hold the **NO** switch to see the available watering programs. When the flashing display reaches the choice that matches your plants for that valve, then release the **NO** switch. The valve is now assigned to that watering program. The choices for self-adjusting (ET) watering programs are labeled **Flower™**, **Lawn™**, **Shrub™** and **LWU1 or 2** (for Dry landscape). A **Fixed** watering program is available for establishing a new lawn or for hanging baskets. See the *Explanation of Watering Programs* in Section 20 on the last page of this manual for a guide to assigning valves.

8c) If you cannot remember what plants are watered by a valve, you can rotate the switch to the **Manual Watering** position. (The display may flash a *different* runtime for the valve. This difference is explained in Step 14.) To see what plants are watered by the valve, push and hold the **YES** switch until the display is steady. Then walk into your yard and see if that valve is best assigned to the **Flower™**, **Lawn™**, **Shrub™** or **LWU** program.

8d) After you have determined what plants are watered by the valve, then return the switch to the **Assign Valves to...** position shown in Figure 7. Push and hold the **NO** switch to force the controller to scroll to the best program for those plants. When the display reaches the best program, simply release the **NO** switch and verify that the display is flashing your choice of programs.

To clear all program settings and return to information set into the sprinkler at the time of shipment, simply push and hold all 4 push button switch (**NEXT**, **PREVIOUS**, **YES** and **NO**) at the same time while the rotary switch is positioned as shown in Figure 7.

### 9. Select Spray or Rotor (optional) for each valve. See Figure 8.

If you know how long you want each valve to run, then go to Step 10.

If you want some help setting the Runtime for each valve, then push the **NO** switch to choose Spray head (5 Min), Rotor (20 Min) or none (for drip or other settings). Spray heads throw lots of water continuously in all directions. Rotors, such as impacts and rainbirds, shoot less water in slowly rotating lines and needs longer Runtimes to deliver enough water

9a) To go to the next or previous valve, push and hold the **Next** or **Previous** switches to the left of the display. Then assign Spray or Rotor to that valve.

9b) To assign Spray or Rotor head to the valve, push and hold the **NO** switch until the correct sprinkler head type is displayed. Then, push the **YES** until the display stops flashing. If you do not remember what kind of head is delivering the water, then use step 8b) to turn on the valve and walk into the yard to see the type of head used by the valve. This setting is erased if you use step 10.

### 10. Set MAX Runtime for each valve at each Start Time on each water day. See Figure 9.

10a) To go to the next or previous valve, push and hold the **Next** or **Previous** switches.

10b) To change the maximum Runtime for a valve, push the **MORE** or **LESS** switch to set desired Runtime. (0-255 minutes). Use **LESS** to quickly reach 255 minutes by passing 0.

The combination of Runtime and program assignment determine the total amount of water delivered each week. See the *Explanation of Watering Programs* in Section 20 for more discussion.

### 11. Stop Runoff-set Cycle Limit for each valve. See Figure 10.

11a) Rotate the switch to the **1,2,3... Minute Test** (see Figure 15). Push the **LESS** switch to set a test-time a long test of 127 Minutes. Watering will begin immediately on Valve #1.

11b) Use the **Next** or **Previous** switch to move to the valve that you want to test for runoff. Then, go to that area of your yard and watch until the water begins to runoff. Return to the controller to read the elapsed time. Divide that elapsed time in 1/2 for the Cycle Limit.

11c) Rotate the switch to the **Stop Runoff** position and use the **MORE** or **LESS** switch to set the cycle limit for the valve. The choices for cycle limit are 2, 4, 6, 8, 10, 15 or 20 minutes per hour or No Limit (=blanked display for Cycle Limit).

11d) Repeat these steps for each valve.

Runoff erodes hillsides. Runoff wastes water. Runoff contaminates our drinking water as pesticides, herbicides and other chemicals are carried from your yard into storm drains. Runoff is also harmful to the plants because runoff indicates that water is not penetrating the soil as deeply as needed for healthy plants. This step is one of the most important and useful programming steps for healthier lawns and cleaner ground water, streams and oceans.

**End of Basic Programming. Rotate switch to AUTO/Run position.**

Figure 6: AUTO/Run selected by rotary switch.



Figure 7: Assign Valves to Flower™, Lawn™, Shrub™, LWU or Fixed programs selected by rotary switch. Display shows that Valve 3 is assigned to **Shrub™** program. Also shown are the Water Days for the program under current weather.



Figure 8: Optional Select SPRAY or ROTOR selected by rotary switch. Display shows that Rotor is assigned to Valve 3. Also shown 20 minute Runtime that goes with assignment of Rotor.



Figure 9: Set MAX Runtime is selected by rotary switch. Display shows that MAX Runtime is set to 40 Minutes for Valve#3. Any Runtime from 0 to 255 may be set.

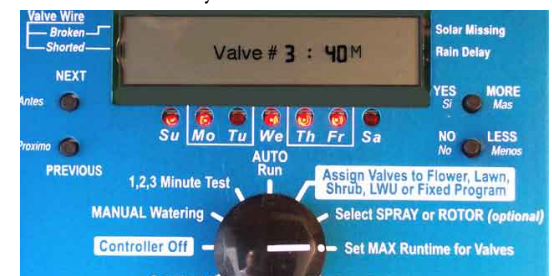


Figure 10: Stop RUNOFF is selected by rotary switch. Display shows that MAX Runtime of 40 minutes is limited to 8 minutes cycles each hour. So, five hours will be required to deliver 40 minutes of water each watering day.



## Additional programming

### 12. Select ALLOWED Water Days for programs. Figure 11.

The controller has 6 watering programs. For the purposes of restricting watering to certain days of the week, the **Flower™**, **Lawn™**, **Shrub™** and **LWU** programs are grouped together and the **Fixed** program has a separate calendar

**12a) For Flower™, Lawn™ and Shrub™**, to change the weekly watering schedule of Allowed Days, then push and hold the **NO** switch to erase the displayed weekly watering schedule. The **SUN** light will begin to flash. *If you want leave SUN as watering day*, then push and hold the **YES** switch. Then, **SUN** light will remain on and **MON** light will begin to flash. *If you want to block SUN as a watering day*, then push and hold the **NO** switch until the **MON** light begins to flash. Continue answering yes or no until the weekly schedule that you want is displayed.

**12b) For the Fixed program**, push the **NEXT** switch until **FIXED** appears in the display. Push and hold the **YES** and **NO** switches to change the displayed water calendar.

**12c) For the LWU programs**, push the **NEXT** switch until **LWU1** appears in the display. See Figure 12. The flashing number (**22** in Figure 12) is the one that you may change by pushing the **MORE** and **LESS** switches. This flashing number is the fewest-days-between-waterings for the **hottest** time of year. For example, if you want to water once every 12 days in the summer, then adjust this flashing number to 12. The number to right of the flashing number (**42** in Figure 12) is calculated, "stretched" actual watering schedule based on accumulated weather measurements from the SFR SunFall™ sensor. Underneath that number is a count of the number of days since the last LWU irrigation cycle (**12** in Figure 12).

**There are 2 LWU programs.** Push the **NEXT** switch until **LWU2** appears in the display. The **LWU2** program may be set for plants that require even drier landscape. You may adjust the flashing number of the fewest-days-between-waterings to whatever you want from 1 to 49 days. This interval will be automatically stretched by the WSR controller as summer changes to fall and winter.

**NOTE: Both LWU programs will honor the restrictions set in 12a.**

### 13. Set START Times for each program. See Figure 13.

The WS Sprinkler Timer has 2 Start Times for the **Flower™**, **Lawn™**, **Shrub™** and **LWU** programs. The **Fixed** program has 4 Start Times.

**13a)** Push and hold the **NEXT** switch to scroll through all the choices of programs and **Start Times**. Note that some entries are blank which means that there is not a **Start Time** entered.

**To change or to add a START Time**, push and hold the **MORE** or **LESS** switch.

**To eliminate a START Time**, push and hold the **MORE** or **LESS** switch until the display is blank.

### 14. MANUAL Watering for each valve. Rotate the switch as shown in Figure 14

**14a)** The flashing display is asking if you want to water the valve that is shown. *If you want to water that valve*, then push and hold the **YES** switch until the display is steady. That valve will run immediately. *If you want to stop that valve* from watering, push and hold the **NO** switch until the display flashes.

**14b)** *If you want to run additional valves manually*, then push and hold the **NEXT** or **PREVIOUS** switch to display another valve and repeat step 14a.

By this method, you can instruct WS controllers to manually water as many valves as you want. The WS controller will run each valve in sequence for the length of time shown in the display. The Runtime shown in the display for each valve may **not** equal that set as the MAX Runtime set in Step 10 because the current Runtime has been modified to match the weather. See the *Explanation of Watering Programs* in Section 20 on the last page of this manual.

The WS controller may also break the displayed Runtime into shorted cycles to respect the Cycle Limit set in Step 11. So, some valves may surprise you by watering during the next several hours. The display will show this watering as it progresses.

After you give the WS controller instructions to manually water, rotate the switch to the **AUTO/Run** position. The display will show the progress of watering of each valve.

**14c)** **To stop all watering and to cancel all pending Manual watering instructions**, rotate the switch to the **OFF / Stop** position. Then, rotate it to the **AUTO/Run** position. Your normally scheduled watering will resume.

**14d)** *If you manually water any valve in either LWU program*, then you should probably manually water the other valves in that LWU program. Manually watering any LWU valve will cause the controller to zero the counter for all the valves in the LWU program. For example, suppose that valves 1 and 2 are assigned to LWU1 and LWU1 is set repeat every 15 days and 10 of those day have elapsed. So, you might expect both valves to water in 5 days. If you now manually water valve #1, then controller will zero the elapsed day counter and it will be 15 days before both valves will water. Manually watering a valve in one LWU program does **NOT** affect the other LWU program.

### 15. "1,2,3 Minute Test". Rotate the switch as shown in Figure 15.

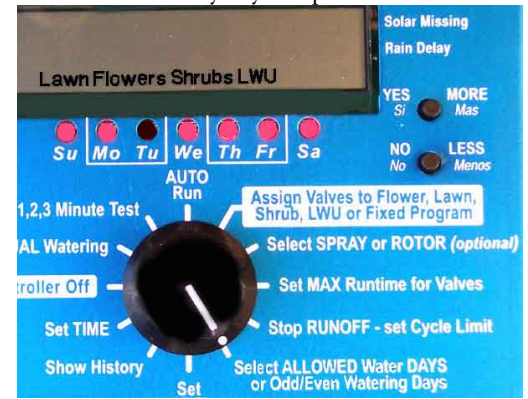
This test is useful when walking through the yard to inspect for leaking valves or broken spray heads which cause both swampy and dry areas in your landscape. Such inspections are suggested at least every spring and fall. Monthly tests are best. Much water is wasted in our country because sprinkler systems often run at night when people cannot see the geysers from broken heads or the leaking from valves.

This test is also useful when setting the Cycle Limit in Step 11.

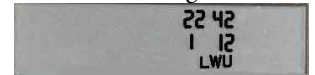
**15a)** **To start a test for leaking valves or broken spray heads**, push and hold the **MORE** switch until 1 or more minutes is selected.

**15b)** **To start a valve for setting the Cycle Limit**, see Step 11.

**Figure 11: Select ALLOWED Water Days** is selected by rotary switch. **Lawn™, Flower™, Shrub™** and **LWU** programs allowed to run every day except TU.



**Figure 12: LWU1 program** is shown. The digits where "22" will flash indicating that you may change it. As you change it, the 2 digits to the right of it will follow. The "12" counts the days since last watering. The "1" will change to "2" for LWU2.



**Figure 13: Set START Times** is selected by rotary switch. **NEXT** switch has been pushed until display shows the second START Time of **Shrub™** is 2:00 AM.



**Figure 14: Manual Watering** is selected by rotary switch. **NEXT** switch was pushed to select Valve#3. **YES** switch was pushed to select it. Valve #3 has MAX Runtime of 40 minutes (see Figure 9). But SFR has signalled need for only 35 minutes of water. Cycle limit is 8minute/hour.



**Figure 15: 1,2,3 Minute Test** selected by rotary switch. **MORE** switch was pushed to select 004Minute test. Valve #2 has run 03 min + 01 sec. **Solar sensor** is missing or connected backwards. **Rain sensor** is missing or has detected rain.



## 16. Set Time

Rotate the switch to the Set Time position. The display will flash the minutes and show the number 1.

16a) Use the Next or Previous switches to the left of the display to move to other units of time as shown in the following chart.

Displayed number	Flashing	Unit of Time
1		Minutes
2	-----	Hours
3	-----	Day of the Week
4	-----	Year
5	-----	Month
6	-----	Day of the Month

16b) To change the flashing time, use the MORE or LESS switches. Note: Changing the Month will effect the Runtimes for valves in the Flowers™ and Lawn™ programs because under the same weather conditions, plants growing the spring have different water needs than the same plants growing during other seasons.

## 17. Show History

Rotate the switch to the Show History position.

17a) Use the Next or Previous switches to the left of the display to move to other units of time as shown in the following chart.

Displayed number	Displayed Information
1	Solar Intensity
2	Averaged SunFall™
3	SunFall™ accumulated today
4	SunFall™ accumulated yesterday
5	SunFall™ accumulated 2 days ago
6	SunFall™ accumulated 3 days ago
7	SunFall™ accumulated 4 days ago

17b) To change SF numbers, use the MORE or LESS switches when number 4, 5, 6 or 7 is displayed. This step will change the SunFall™ in all registers in one simple step.

## 20. Explanation of Watering Programs

Our SunFall™ sensor continuously measures the sunshine on your property. Sunshine robs water from your landscape. Our controllers use SunFall™ measurements to automatically adjust irrigation to changes in weather...rain or shine. This self-adjusting, weather-based sprinkler timing is shown in the graph below.

The following chart summarizes the behavior of each program

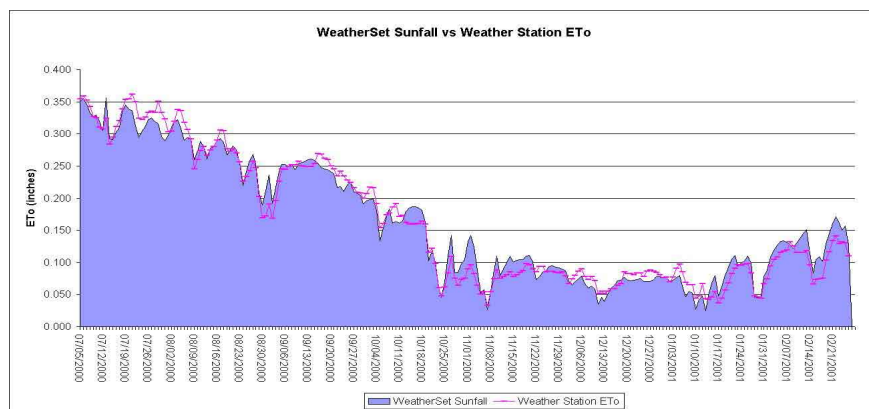
Program Names	Watering Days	MAX Runtimes
Lawn™, Flower™ and Shrub™	Self-Adjusting (weekly)	Self-Adjusting
LWU1 and LWU2	Self-Adjusting (interval)	Fixed
FIXED	Fixed	Fixed

Our adaptive proprietary Flower™, Lawn™ and Shrub™ programs automatically adjust irrigation for plants & valves which need watering on a weekly schedule. Flower™, Lawn™ and Shrub™ programs may be thought of as programs for shallow, medium and deep rooted plants. Since shallow-rooted plants dry more quickly, under any SunFall™ condition, WeatherSet sprinkler timers will water shallow-rooted the Flower™ program/plants more days per week than the deeper rooted the Lawn™ program/plants. The Shrub™ program/plants will have the fewest watering days per week. The specific watering days under the present SunFall™ conditions are shown for each program when the rotary switch is in the AUTO/Run position. If some of these programs are not displayed, then no valves are assigned to those programs.

LWU1 and LWU2 watering programs are for plants which need infrequent water in the summer and usually control drip systems. LWU means Low-Water-Usage. For example, LWU1 may be set to repeat every 8 days while LWU2 is set to repeat every 15 days. As SunFall™ measurements drop, the days-between-waterings are increased and Runtimes for the valves are held constant to conserve water in the LWU1 & 2 programs .

As SunFall™ measurements change, WeatherSet controllers adjust irrigation to prevent over watering on cloudy days and to prevent under watering on sunny days. This adaptive adjustment of irrigation creates healthier soil conditions and healthier plants while conserving water.

The FIXED watering program is for establishing newly planted lawns. The FIXED program will water on a rigid schedule and will NOT adjust with changes in the weather. \*\*\* END \*\*\*



**Shaded graph is watering by WeatherSet Controller. It follows closely the jagged line of ET (weather data) from a state maintained weather station.**

### To extend SFR sensor cable

Purchase Cat3 cable called Telephone wire that is rated CMR/CMX (=Indoor/**Outdoor** rating) from Home Depot or other store. Each WSR controller comes with four special water-resistant connectors for extending the SFR cable. Use these connectors to splice together the SFR cable and Category 3 cable that you have bought.

**Required items if sensor is more than 25 feet from controller**

- \_\_\_ Cat3 cable CMR/CMX=INDOOR/OUTDOOR
- \_\_\_ Cable staples to secure SFR wire from wind.

### Additional items for new installation

- \_\_\_ 18AWG sprinkler cable long enough to reach valves
- \_\_\_ Grease caps for wire connections (2 for each valve)