



Wireless Rain and Wireless Rain/Freeze Sensor



Installation and Operating Instructions for:

WRC: Wireless Rain Sensor Combo

WRT: Wireless Rain Sensor Transmitter

WSR: Wireless Rain Sensor Receiver

WRFC: Wireless Rain and Freeze Sensor Combo

WRFT: Wireless Rain and Freeze Sensor Transmitter

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**Technical Assistance
(USA and Canada only):
1-800 RAIN BIRD**

Wireless Rain Sensor

The Wireless Rain Sensor Family, consisting of the Wireless Rain Sensor and Wireless Rain/Freeze Sensor, automatically monitors rainfall and freezing conditions and shuts off your sprinklers to prevent unnecessary watering.

Note: The Wireless Rain Sensor is a low-voltage device compatible with all 24 volt alternating current (VAC) control circuits and 24 VAC pump start relays.

The Wireless Rain Sensor is a very sophisticated Sensor Transmitter and Receiver system designed to work with all 24 volt alternating current (VAC) control circuits and 24 VAC pump start relay circuits. The Receiver has three Light Emitting Diodes (LEDs). Each LED can indicate two conditions. If the LED is solid then the condition labeled on the left is occurring. If the LED is blinking the condition labeled on the right has taken place. These are explained on page 10.

1. Installation

Note: Follow the installation instructions carefully and install the unit only in full compliance with the National Electrical Code (NEC) or your local electrical code.

There are two components of the Wireless Rain Sensor product, the Sensor Transmitter and the Receiver.

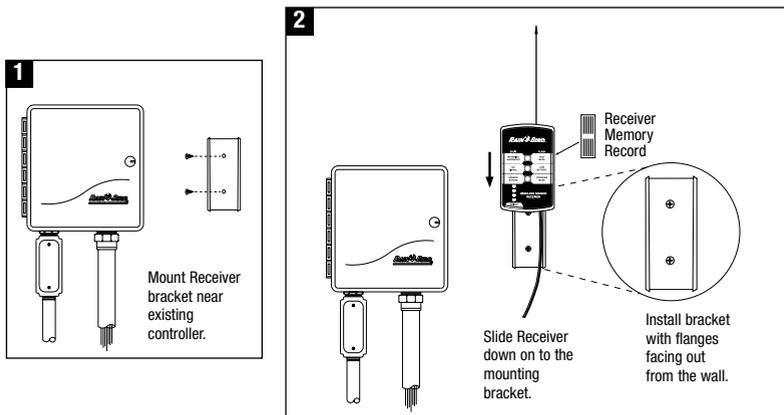
Important!: Begin by installing the Receiver and test the two components (transmitter and receiver) side by side before mounting the Sensor Transmitter.

Wireless Rain Sensor Receiver Mounting

1. Select a place near your controller where you will install the Receiver. Ensure that there will be room for the receiver antenna and that the leads will reach to the sensor connection on your controller (approximately 24 inches).

Note: The Receiver unit is weather resistant and is suitable for mounting near an outdoor controller.

2. Secure the bracket to the wall near your controller with appropriate fasteners. Be sure to install the bracket with the flanges facing out away from the wall. **See Illustration 1.**
3. Slide the water resistant receiver unit down onto the mounting bracket. **See Illustration 2.**
4. Attach the red "Notice" sticker to your automated irrigation system control panel.
5. Attach the gray "Receiver" memory sticker to the side of the Receiver.



Wireless Rain Sensor Wiring

Important! Before connecting wires, you must determine whether your controller uses "Normally Open" or "Normally Closed" wiring for sensors.

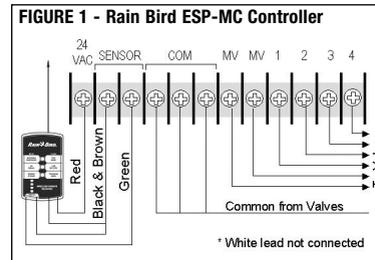
All Rain Bird controllers, and most other manufacturers' controllers, are installed using a "Normally Closed" wiring method.

Wiring Instructions

Note: Before beginning, determine whether the controller uses "Normally Open" or "Normally Closed" wiring.

Normally Closed Installations

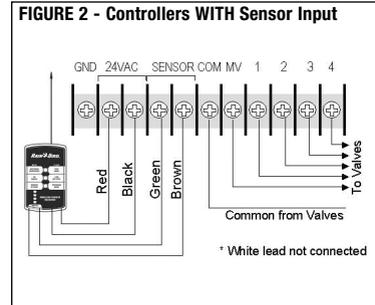
Rain Bird ESP-MC Controller – FIG. 1 (The Rain Bird ESP-MC Controller has only one 24VAC terminal)



1. Connect the Red lead to the 24VAC terminal.
2. Connect the Black lead to the sensor terminal ("Sensor" or "SN") next to the 24VAC terminal.
3. Connect the Brown lead to the same terminal as the Black wire.
4. Connect the Green lead to the sensor terminal next to the common terminal.

Note: White lead labeled "NO" is only used for "Normally Open" configurations, and is not used here.

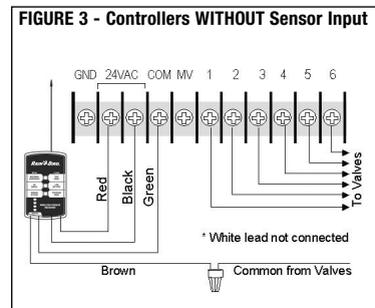
Controllers With Sensor Input – FIG. 2 (Rain Bird ESP-LX+, Rain Bird ESP Modular, Most Other Controllers)



1. Connect the Red and Black leads to the two 24VAC terminals.
2. Remove jumper wire (if present).
3. Connect Green lead and Brown lead to the sensor terminals.

Note: White lead labeled "NO" is only used for "Normally Open" configurations, and is not used here. Also, make sure the sensor activation switch on the controller is set to the desired on/off position.

Controllers Without Sensor Input – FIG. 3



1. Connect Red and Black leads to the two 24VAC terminals.
2. Disconnect the valve common wire from the common terminal ("C" or "COM").
3. Connect the Green lead to the controller common terminal.
4. Connect the Brown lead to the valve common.

Note: White lead labeled "NO" is only used for "Normally Open" configurations, and is not used here.

Normally Open Installations

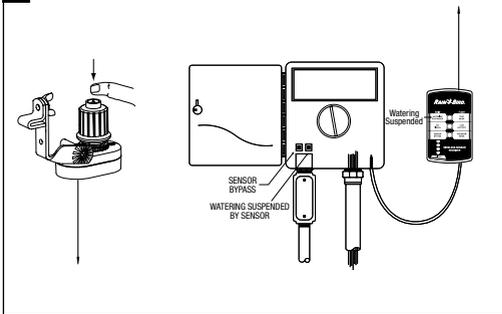
Some controllers require rain sensors to be installed “Normally Open” (“NO”). In this case substitute the White lead for the Brown lead in the instructions for Normally Closed installations described above.

IMPORTANT! Brown lead is only used for “Normally Closed” configurations, and is not used here.

For connecting to all other controllers, please refer to your controller’s user guide.

Testing the Transmitter and Receiver Pair

3 Test Sensor Transmitter with Receiver



If you bought the Transmitter and Receiver together, they were programmed at the factory to work together. If you purchased them separately, or, if the following test procedure doesn't work properly, it may be necessary to program the receiver to work with the transmitter. Use the following procedure to test the two units together. **See Illustration 3.**

1. Push and hold the pin for a few seconds on the top of the Sensor Transmitter.
2. If the Receiver detects the signal, the Red LED will begin to indicate “Watering Suspended”. You can release the Transmit button and continue with the installation.
3. If the LED does not light, follow the procedure below for programming. Otherwise skip to “Select a Location for the Sensor Transmitter.”

Programming the Transmitter and Receiver Pair

Use the following procedure to program the Receiver to recognize the Sensor Transmitter. It is possible to program a Receiver to receive signals from up to five Sensor Transmitters. This allows your Receiver to work with multiple sensors that may be used to interrupt watering. It is also possible to program multiple Receivers to work with a single Transmitter. This is ideal for locations using multiple controllers. A single Transmitter can be used to communicate with multiple controllers (as long as all are within range).

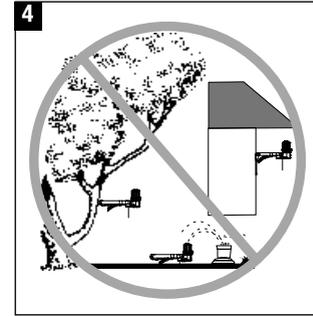
1. Press and hold the bypass switch on the Receiver button until the Green LED begins to blink rapidly, then release (Green LED will then begin to blink approximately once per second).
2. Activate the transmitter (by pushing the pin on the top of the Sensor Transmitter) until a clicking noise is heard from the receiver and the Red LED indicates “Watering Suspended”.
3. If more than one click is heard, this means multiple transmitters are programmed into this Receiver unit. The number of clicks will indicate how many of five locations have been programmed.
4. To exit the Program Mode prior to activating the Transmitter, push and release the Receiver button. If the Transmitter is not activated for thirty (30) seconds after the Receiver is in Program Mode, the Receiver will return to Sensor Bypass Mode.

Selecting a Location for the Sensor Transmitter

Select a mounting location where the rain-sensing head will receive direct rainfall. Make sure the head extends beyond the roof line, tree limbs, and any other obstructions. Install the Sensor Transmitter in an area that receives as much rain and sunlight as the grass.

Be sure to mount the sensor above spray from sprinklers. Avoid mounting locations such as those shown in **Illustration 4.**

Be sure that the sensor is located within range of the receiver portion of the Wireless Rain Sensor system. See “Testing the System” section.

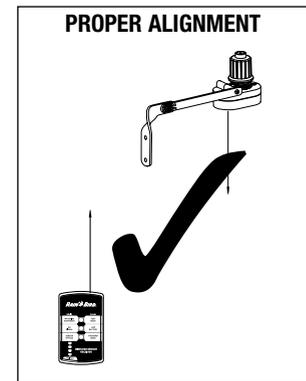
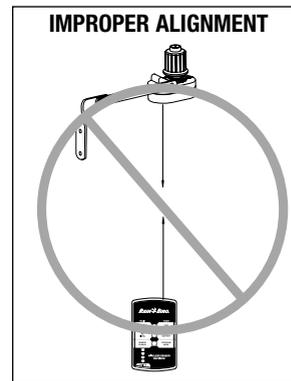


Coverage Area/ Antenna Alignment

To ensure optimal coverage area, the Transmitter and Receiver must be aligned properly as shown here.

Both the transmitter and receiver antennas radiate “outward”. Placing antennas directly above one another will result in poor signal reception.

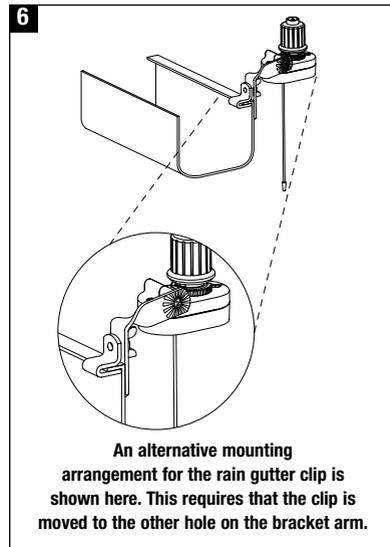
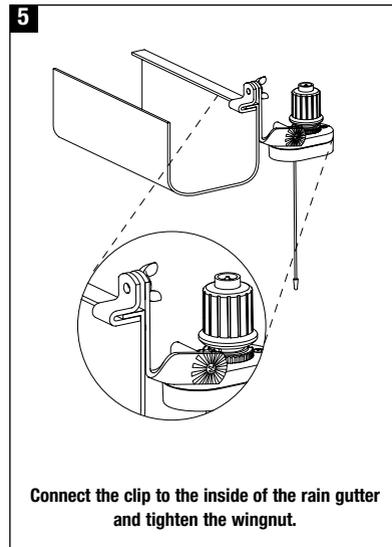
Furthermore, coverage area (500 feet maximum line-of-site) may be reduced due to building materials, atmospheric conditions, terrain and other forms of interference.



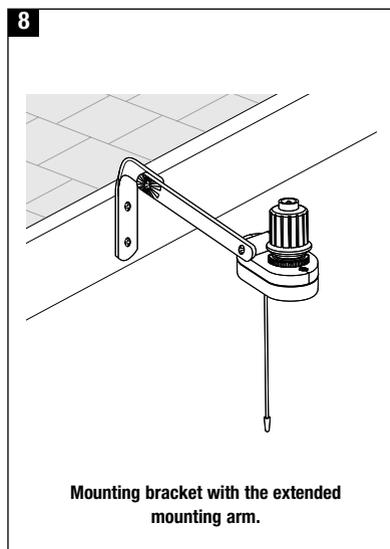
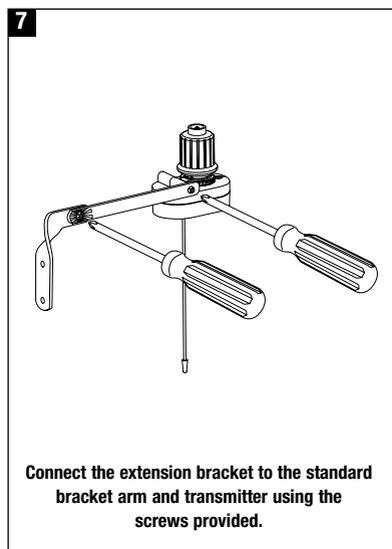
Sensor Transmitter Mounting and Low Power Test

The Wireless Rain Sensor provides a flexible-mounting bracket and gutter clip for the Sensor Transmitter. It can be used to mount onto a rain gutter or directly to a wall or post. An extension arm is also provided to assist in moving the sensor out beyond any obstructions. The rain gutter clip and the extension arm can be easily installed in the field with the provided wing nut connectors. Figures 5-8 detail the rain gutter mounting procedure and the various possible mounting configurations that are available.

Rain Gutter Mounting



Mounting with Extended Bracket



Sensor Transmitter Mounting and Low Power Test

This procedure allows a single installer to mount and test the Sensor Transmitter and Receiver for communication. **See Illustration 9.**

The Low Power Test helps to ensure that the Wireless Sensor will continue to operate even under conditions of radio interference or weakening batteries.

Select an appropriate mounting location as described above. Drive two mounting screws through the mounting holes in the mounting bracket. Use fasteners appropriate for the mounting surface (wood, tile, masonry, etc.).

Be sure to test the reception of the signal from the sensor, in this location, to the receiver using this procedure.

1. Push and hold the Transmitter button for at least four (4) seconds (but not more than 10 seconds).
2. The Sensor Transmitter will send a signal with lower than normal power.
3. If the Receiver detects the signal, the Red LED will begin flashing for a duration of 2.5 minutes. This allows a single installer time to return to the Receiver to verify the signal was received. If the LED is flashing, the selected Transmitter location is within range.

2. Operation

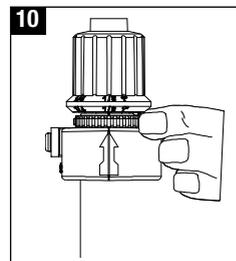
Set Rainfall Setting

The rainfall setting determines the amount of rainfall needed to prevent your irrigation system from watering. You can adjust the rainfall setting from $\frac{1}{8}$ " to $\frac{3}{4}$ " (5mm to 20mm).

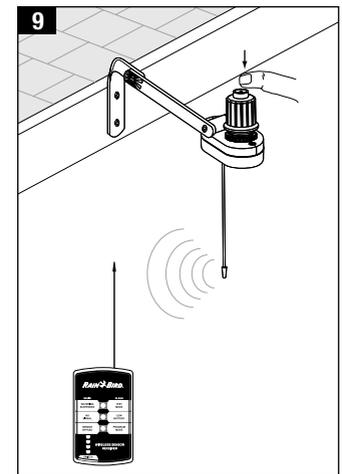
The ideal rainfall setting for your location depends on soil type, humidity, amount of direct sunlight the sensor receives and frequency and amount of rainfall. The table below gives some guidelines to help determine the appropriate rainfall setting. (See table)

Note: At the $\frac{1}{8}$ " or 5mm setting, a very light rainfall will activate the sensor and suspend watering. The $\frac{1}{8}$ " or 5mm rainfall setting is not recommended in areas with high humidity.

To set the rainfall setting, turn the sensor dial cap until the desired rainfall setting lines up with the arrow on the sensor body, as shown in **Illustration 10.**

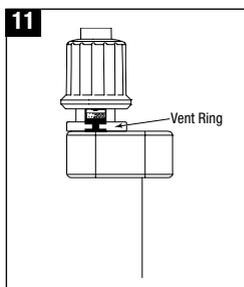


Irrigation site conditions	Rainfall setting
<ul style="list-style-type: none"> • Dry climate/low humidity • Infrequent, light rains • Sensor receives long periods of direct sunlight • Clay-type soils 	$\frac{1}{8}$ " to $\frac{1}{4}$ " (5mm to 10mm).
<ul style="list-style-type: none"> • Moist climate/high humidity • Frequent, heavy rains • Sensor mounted in a mostly shady area • Sandy soils 	$\frac{1}{2}$ " to $\frac{3}{4}$ " (15mm to 20mm).



Set Vent Ring

The vent ring determines “drying time” – the length of time the sensor turns off irrigation after a rainfall. For most installations, set the vent ring to the fully open position.



For some installations, such as sites where water pools after rainfall, set the vent ring to a partially open position. This will shut down the irrigation system a little longer after a rain.

To set the vent ring, turn the vent ring knob below the dial cap to the desired position, as shown in **Illustration 11**.

Set Freeze Setting

The Wireless Rain Freeze Sensor (on Wireless Rain/Freeze product only) is programmed to automatically shut off when the temperature reaches 3°C. It is not temperature adjustable.

3. Testing the System

It is recommended that you check the Transmitter and Receiver side by side prior to mounting the Sensor. It is also recommended that the Low Power Test be completed successfully.

Once installed, the completed system can be tested by turning on any controller irrigation zone, verifying that zone does come on, and then pressing down on the Rain Sensor pin located on the top of the dial cap. The irrigation system should stop watering within a few seconds. If the system does not shut off, review the installation process to ensure the system is correctly installed.

For assistance, call Rain Bird Technical Services at 800-247-3782 (USA and Canada only).

4. Maintenance

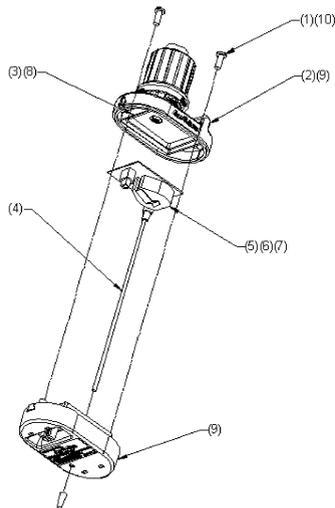
Battery

The Wireless Rain and Freeze Sensor operates automatically and usually requires no regular maintenance other than replacing the batteries in the Rain and Freeze Sensor (Transmitter) every three (3) years. Replace the batteries with two Panasonic CR2032 3V or equivalent replacement. Rain Bird Part Number 651009 - CR2032 lithium battery. To change the battery refer to the instructions and diagram below.

Changing Transmitter Batteries

(Requires two – CR2032 batteries)

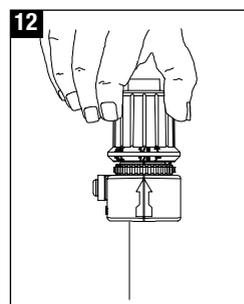
- (1) Remove two screws located on top of the transmitter.
- (2) Remove top half of housing.
- (3) If rectangular seal does not stay assembled to top half of housing, remove from bottom half.
- (4) Carefully push up on antenna to release transmitter board.
- (5) Use a screwdriver to slide batteries out of battery clip. (**NOTE:** Be careful not to bend the metal clip; this clip ensures a secure battery fit).



- (6) Slide in new batteries with “+” side on top. (**NOTE:** Do not push the small ‘SW1’ button on the bottom of the transmitter board. If pushed, the transmitter will go to sleep after 10 hours).
- (7) Re-insert transmitter board into bottom half. (**NOTE:** Pay careful attention to the alignment of the seals on the bottom of the board. The bottom of each seal should be positioned into the appropriate hole prior to pushing the board fully into place).
- (8) Ensure rectangular seal is securely replaced on the underside of the top half of the housing. (**NOTE:** Press down on the metal collar to ensure that the seal has snapped into its proper place).
- (9) Re-assemble the two halves of the housing ensuring that the button actuators are aligned. (**NOTE:** An arrow will be formed on the outside end of the housing if the halves are aligned properly).
- (10) Re-install screws. It is not required to reprogram the Transmitter with the Receiver after changing batteries. If necessary, however, follow the instructions in “Programming the Transmitter and Receiver Pair” section.

Transmitter

In addition, the fibrous disks inside the Transmitter dial cap sometimes become contaminated with debris or insects. If this happens, use the following procedure to clean the Rain Sensor.



1. Turn the dial cap to the ¾" rainfall setting, as shown in **Illustration 12**.
2. Press the tab labeled “Press” on the side of the sensor body. Then turn the dial cap about 1 and ¼ turns further to remove the cap from the sensor body.
3. Remove the plunger and disks from the sensor body, and wash them in clean water.
4. Reinstall the plunger and disks into the cap first, then screw the cap onto the sensor body. Reset the rainfall setting to the desired position.

Removing Transmitter from Receiver’s Memory

To reset the receiver (clear all Transmitters) press Bypass button during power up.

Product Specifications

Transmitter	Receiver
Size: 3 x 2 x 9 inches (8 x 5 x 23 mm)	Size: 2¾ x 1½ x 9 inches (7 x 4 x 23 mm)
Batteries: 2 ea. #CR2032	Voltage: 22.0 - 30.8 VAC (from the controller)
Frequency: 433.92 MHz	Relay: SPDT, 3 Amp, 125 VAC

The term “IC:” before the certification/registration number only signifies that the Industry Canada technical specifications were met.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

5. Functional Mode Summary

Monitor

The Monitor Mode is the normal mode of operation once the Transmitter and Receiver unit(s) have been installed. While the transmitter is in Monitor Mode, it will transmit a signal on a change of state (such as rain received) or to confirm that a communication link still exists. While the Receiver is in Monitor Mode, it will continually listen for signals from the Transmitter(s).

Program

The Program Mode allows for a Transmitter to be programmed into a receiver to allow one-way communication. Each Receiver is capable of holding five (5) Transmitters in its memory.

Press and hold the Bypass Switch on the Receiver until the Green LED begins to blink rapidly, then release (Green LED will then begin to blink approximately once per second). To program the Transmitter into the Receiver, activate the Transmitter by holding down the pin at the top of the Sensor Transmitter until a clicking noise is heard from the Receiver. The number of clicks will indicate which one of five locations the Transmitter has been programmed into. To exit the Program Mode prior to activating the Transmitter, push and release the Receiver bypass button. If the Transmitter is not activated for thirty (30) seconds once the Receiver is in Program Mode, the Receiver will return to Sensor Bypass

Test

The Test Mode allows for the installation site to be tested for signal reception. Once in Test Mode, the Transmitter will send a signal to the Receiver at one half the normal signal strength. After sending the signal, the Transmitter will return to the Monitor Mode. Typically, this mode is only utilized during installation.

Push and hold the Transmitter button for at least four (4) seconds but not longer than 10 seconds. The Transmitter will send a signal at the test mode signal strength. If the Receiver detects the signal, the Red LED will begin flashing for a duration of two and a half (2.5) minutes.

Bypass

The Bypass Mode allows for the irrigation system to operate independently from the Wireless Rain Sensor. Regardless of whether the Wireless Rain Sensor is in the Watering Suspended state due to rain or freeze, the irrigation system will operate normally when in the Bypass Mode. You can toggle back and forth between Bypass and Non-Bypass. A Bypassed state with Watering Suspended will reset back to the Monitor Mode once the disks dry out.

Momentarily push and release the Receiver button to toggle between the Bypass and Monitor Modes. The Receiver is in Bypass Mode when the Green LED is solid. Note: If the Receiver button is depressed longer than four (4) seconds prior to releasing, the Receiver will enter the Program Mode.

Receiver LED Indications

Normal – ALL LEDs OFF

Watering Suspended

(Freeze or Rain) – RED SOLID LED
The Red LED becomes solid if the Transmitter is activated while the Receiver is in the Bypass or Monitor Mode.

No Signal

– YELLOW SOLID LED
The Transmitter retransmits its current state several times a day. If the Receiver does not receive two consecutive transmissions, then the Yellow LED becomes solid to indicate a loss of signal. The LED will turn off if the Transmitter becomes activated. Possible causes include low batteries, radio frequency interference, and physical obstacles.

Sensor Bypass

– GREEN SOLID LED
The Green LED becomes solid if the Receiver is put into the Bypass Mode. Until a change of state is received from the Transmitter or the user toggles the Receiver back to Monitor Mode, the irrigation system will operate independently from the WRS.

Test Mode

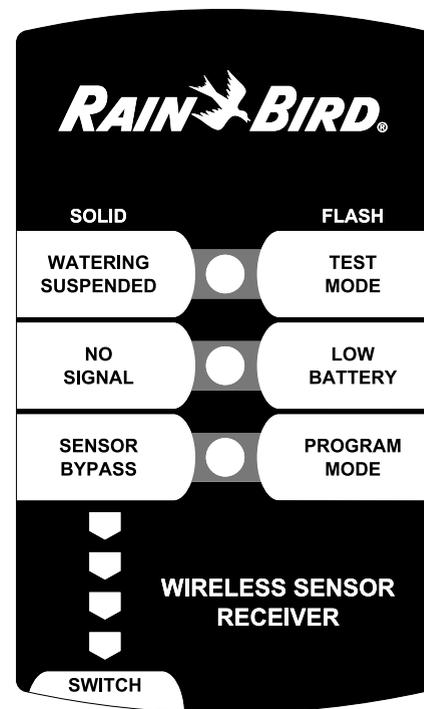
– RED FLASHING LED
The Red LED flashes when the Receiver has successfully received the test signal from the Transmitter. Once the test signal is received, the Receiver will continue to flash the Red LED for two and a half (2.5) minutes. The flashing LED will turn off if the Receiver changes mode.

Low Battery

– YELLOW FLASHING LED
The expected life of the battery is 3 years. The yellow LED begins to flash when approximately two and a half years of battery life have been depleted. Changing the batteries will reset the low battery indicator.

Program Mode

– GREEN FLASHING LED
When the Bypass Switch on the Receiver is held for more than three seconds, the Green LED will begin to blink rapidly. If the button is then released, the Receiver will enter the Program Mode, which is indicated by the Green LED blinking approximately once per second. The Green LED will turn off if the Receiver Bypass Switch is pushed again or the Transmitter becomes activated.



6. Troubleshooting

Please follow these steps BEFORE finalizing installation to ensure that your Wireless Rain Sensor is functioning correctly. If you are having difficulty with installation, please contact Rain Bird Technical Support at 1-800-Rain Bird.

Step 1 – Install Receiver to Controller (Using Wiring Diagrams)

Step 2 – Verify Receiver Power

- Press Receiver Bypass Switch
- Is the Sensor Bypass Light on?
 - If YES, continue to Step 3
 - If NO, there is a wiring error, please recheck wiring diagram

Step 3 – Verify Programming

- Press the Transmitter Pin for 1 Second
- Did the Watering Suspended Light on the Receiver turn on/off?
 - If YES, continue to Step 4
 - If NO, you must reprogram the Receiver and Transmitter (if problem persists, you may have to replace the Transmitter batteries)

Step 4 – Test Mode

- Test with Transmitter in desired location for final installation
- Push and Hold the Transmitter Pin for 5 Seconds
- Is the Test Mode Light on the Receiver Flashing?
 - If YES, proceed with final installation
 - If NO, the Transmitter is out of range; relocate the Transmitter and repeat Step 4

Problem	Possible Cause	Action/Refer to Section of Manual
No Signal Light is On	Poor Signal/Antenna Alignment	Test Mode; Coverage Area
	Unmatched Transmitter/Receiver	Programming Instructions
	Low Battery	Changing Batteries
Low Battery Light is Flashing	Low/Dead Battery	Changing Batteries
Lose Signal After 2 Hours	Poor Signal/ Antenna Alignment	Test Mode; Coverage Area
	Unmatched Transmitter/Receiver	Programming Instructions
	Low Battery	Changing Batteries
Continues to Water When Raining	Improper Wiring	Wiring Instructions
	No Power at Receiver	Check Power – Press Bypass Switch
	No Signal/Low Battery	See No Signal/Low Battery Actions
	Damaged Transmitter/Receiver	Replace Transmitter/Receiver
Stops Watering When Not Raining	Improper Wiring	Wiring Instructions
	Damaged Transmitter/Receiver	Replace Transmitter/Receiver



Controls Mfg. Division

Declaration of Conformity

Application of Council Directives: 89/336/EEC
73/23/EEC

Standards To Which Conformity Is Declared	EN55022 Class B (AZ/NZS 3548 Class B) EN55024: 1998 EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-6 EN61000-4-8
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Importers: Rain Bird Europe, S.A.R.L. - France
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(33) 442 24 44 61

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ACN 004 644 446
P.O Box 11 Harrisville Qld. 4307

Equipment Description: Wireless Rain Sensor Receiver

Equipment Class: ITE – Class B

Model Number: WSR, WRT, and WRFT

I the undersigned, hereby declare that the equipment specified above, conforms to the above Directive(s) and Standard(s).

Tijuana B. C., Mexico
Place
Signature *John Rafael Zwick*
Full Name John Rafael Zwick
Plant Manager
Position