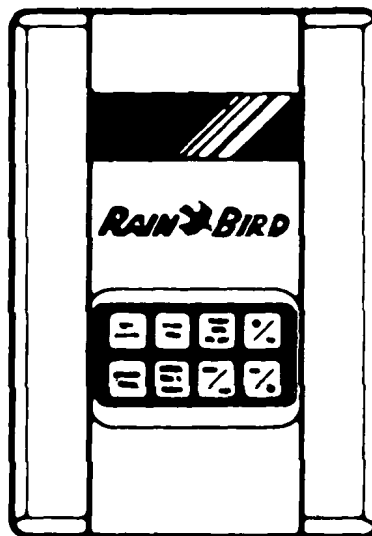




# RAIN CLOCK OWNERS MANUAL

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## SPRINKLER SYSTEM CONTROLLER



## RAIN CLOCK MODELS

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<b>PC-104</b>	<b>4 Station</b>
<b>PC-106</b>	<b>6 Station</b>
<b>PC-104-PS</b>	<b>4 Station with Pump Relay Circuit</b>
<b>PC-106-PS</b>	<b>6 Station with Pump Relay Circuit</b>

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**RAIN  BIRD®**

# PC-104/106 SPRINKLER SYSTEM CONTROLLER

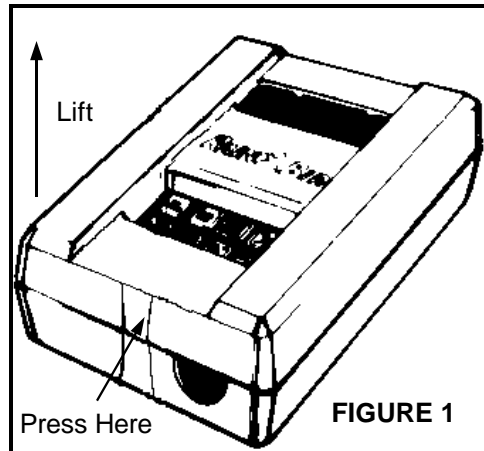
## INSTALLATION INSTRUCTIONS

Rain Bird Rain Clocks are designed for use with all standard residential 24 volt AC electric valves regardless of brand. However, some older brass electric valves and commercial duty plastic valves may have power requirements higher than this series is designed for

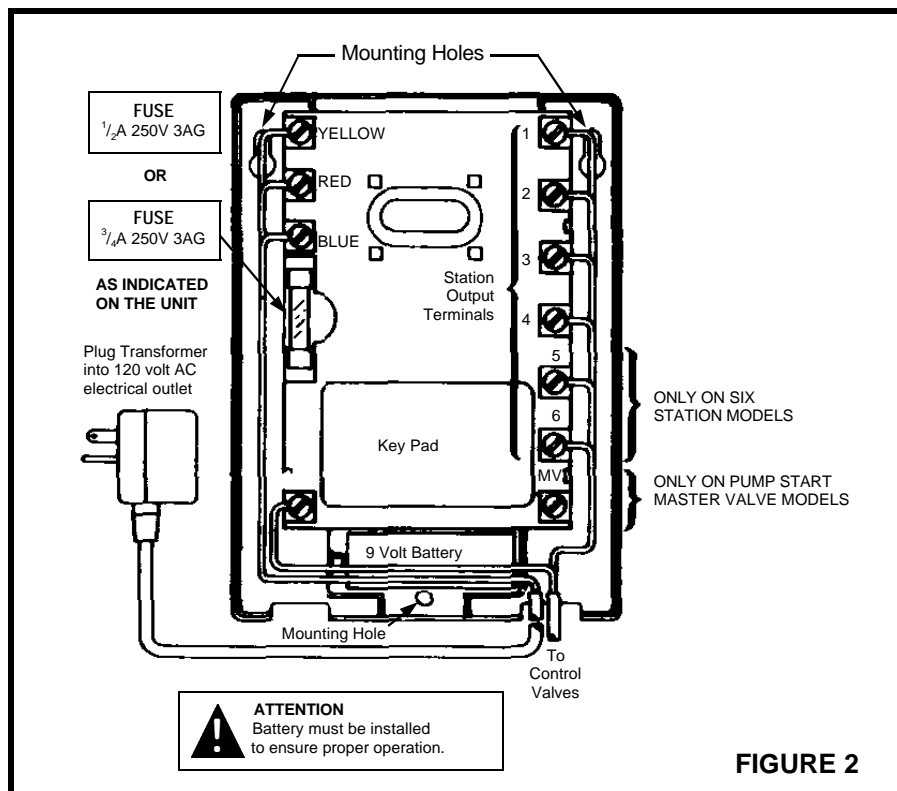
### STEP 1: MOUNT THE TIMER

Location: Select a location inside a building, and within six feet of a grounded electrical outlet. This is not an outdoor timer. Do not mount it where it is exposed to any of nature's elements. If it must be outside, be sure to use an outdoor enclosure and a weatherproof electrical connection.

Cover Removal: Remove the front cover of the timer by depressing the bottom tab and lifting as shown in Figure 1.



Mounting: Mount the timer to a wall using two #10 screws installed at centers  $3 \frac{13}{16}$ " apart at eye level. Use plastic anchors to secure screws if the wall is plastic or masonry. Leave the screw heads extended  $\frac{1}{4}$ " and hang the Rain Clock using the keyhole slots on the back. Install a third screw through the mounting hole (located below the battery area) to secure the timer to the wall.



## STEP 2: CONNECTING THE WIRING

How to choose the right type of sprinkler wire: Use 18-gauge “bell,” “thermostat” or “underground burial” wire for the sprinkling system. “*Bell wire*” is available in single strands or twisted in 2 or 3 wire sets and can only be used indoors. “*Thermostat wire*,” the most common sprinkling system wire, is typically available with up to 7 wires twisted inside a brown PVC jacket (about ¼” in diameter), and is suitable for most indoor and conduit installations. “*Direct Burial*” cable is similar to thermostat wire, except the jacket is made of a black Poly UV resistant material, and is suitable for any indoor or outdoor installation, including sunlight exposure. Each individual wire is color-coded.

**Note:** *Some areas require by code the use of UL approved cable only. Most Direct Burial Cables have this approval. Most thermostat and bell wires do not.*

**Important:** *18 gauge wire or larger is recommended for sprinkler system wire, allowing cable to be run up to 600’ without problems. Some thermostat wire that is referred to as “sprinkler wire” may actually be a smaller gauge (#19 or #20) and will not have the UL listing or the capacity to run long distances.*

The number of wires needed is determined by the number of valves being wired, plus a common wire. For example, three valves in a grouping require a 4-wire cable since the 4th wire serves as the common wire. If a system had two valves in the front yard, and four in the back, the wiring could be run in one of two ways:

- 1) Use a single run or 18/7 (18 gauge, 7 wires) cable connected ‘in-series’ from the front valves to the back valves to the timer;
- 2) Use one run of 18/3 cable from the timer to the front valves, and one run of 18/5 cable from the timer to the back valves.

All wiring connections should be sealed with a water-tight connector. Cables that are run indoors should be properly secured with a staple or clip.

How to connect the valves: Each valve connects to the timer through two wires. One wire from each valve solenoid must connect to the output terminal of the timer. This is the “HOT” connection. The second wire of each solenoid must connect to the (COM.) common terminal of the timer. This is the “COMMON” connection. If the valves are grouped together, it is easier to join the common from all valves and just run one wire to the timer’s (COM.) common terminal.

**Note:** *Only one valve may be connected to each station output terminal.*

### **STEP 3: CONNECTING THE TRANSFORMER**

Refer to Figure 2 and connect the yellow wire to the terminal marked "YELLOW," and red wire to the terminal marked "RED" and the blue wire to the terminal marked "BLUE." **Caution:** *Always connect the wires before plugging in the transformer. If not, you run a risk of short circuiting the transformer and/or clock.*

### **STEP 4: USING THE PUMP START CIRCUIT**

Pump start or master valve capability is available only on the PC-106-PS and PC-104-PS models. This circuit allows the timer to be used in conjunction with a "pump relay switch" (Rain Bird model PCR-1) which when activated by the timer, will in turn activate the pump. The pump start circuit can also be used to operate a standard 24-volt "master valve."

The hot wire of the relay switch connects to the terminal marked "MV" The common wire connects to the regular system common wire or terminal. See the pump relay's instruction booklet for details.

**Caution:** *Be sure the total current draw of the relay switch plus the station valve doesn't exceed 650 milliamps.*

**Important:** *To avoid pump damage caused during a "default schedule," wire each unused station terminal to a terminal that is being used. This prevents the pump from operating against closed valves if the default program kicks-in during a power failure.*

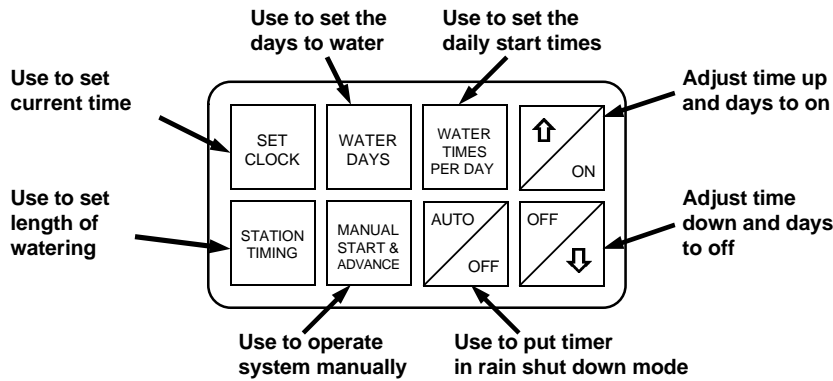
### **STEP 5: INSTALL A BATTERY**

To ensure proper timer operation, install a 9-volt alkaline battery (not included) to the snap connector near the bottom edge of the control panel. In the event of a power failure the battery will maintain the programmed watering schedule in memory for up to 24 hours.

The battery will not allow the timer to open any valves, but the timer will remember the approximate time of the power failure. When the power resumes, an uncompleted watering cycle will be completed. If a watering start was missed during the outage, it will be initiated once the power resumes. After a power outage, reset the exact time of day.

If the battery is dead or doesn't have enough power left, none of the programming will be retained. In this event, the timer will revert to its "default program," which waters once per day, 10 minutes per station, 8 hours after the power is restored. All programming steps must be repeated.

# PROGRAMMING INSTRUCTIONS



## STEP 1: SET THE CURRENT TIME AND DAY

SET  
CLOCK




The PC-104/106 Series holds a 7 day program which repeats after the seventh day. The days of the week relate to a number as follows.

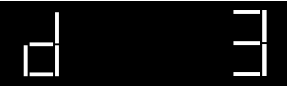
Actual Days >>>	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Day Number>>>	1	2	3	4	5	6	7

This timer displays in military time. To convert from AM/PM time to military time, see the reference chart on the next page.

1-A:                      Enter Today's Day Number

**Press**      **Adjust day setting with:**      **Display Shows:**



**OR**







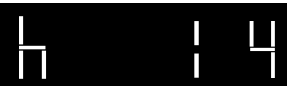
**Day**      **Tues.**  
Setting "d 3"

Example:      To set Tuesday = Day 3

1-B:                      Enter the Current Hour in Military Time

**First Press**      **Adjust the hour with:**      **Display Shows:**



**OR**








**Hour**      **2:00 pm**  
Setting "h 14"

Example:      2:00 PM = 1400 Hrs

1-C:                      Enter the Current Minute

**First Press**      **Adjust the minutes with:**      **Display Shows:**



**OR**




**Hour**  
Setting "n 20"

Example:      20 minutes past the hour

1-D: To display the Current Time

Press



Display Shows:



The above setting of 2:20 PM = 1420 military time

You can also press the “SET CLOCK” button during any other programming operation to return it to the time of day display.

## STEP 2: SET THE DAYS OF THE WEEK TO WATER

When shipped from the factory, the PC-104/106 Series is pre-set to water every day of the week. Since this is a single program timer, all stations will water on the same program of watering days.

The clock can water either on (A) specific days of the week, or (B) an interval or cycle of days (i.e. every third day, every fourth day, etc.).

2-A: Watering on specific days of the week

Press



Then turn on/off with:



OR



Display Should be:



Day

Example: If Monday should be off, display



Repeat this process for each day of the week

### REFERENCE CHART #1: Military Time Conversion Table

Normal	Military	Normal	Military
12:00 Midnight	0000	12:00 Noon	1200
1:00 AM	0100	1:00 PM	1300
2:00	0200	2:00	1400
3:00	0300	3:00	1500
4:00	0400	4:00	1600
5:00	0500	5:00	1700
6:00	0600	6:00	1800
7:00	0700	7:00	1900
8:00	0800	8:00	2000
9:00	0900	9:00	2100
10:00	1000	10:00	2200
11:00	1100	11:00	2300

2-B: Watering on an "Interval" of Days (i.e. every 3rd day)

**Now Press** Adjust Day 1 to "ON" with:



**Display changes to:**



**Now Press** Adjust Day 2 to "OFF" by pressing:



**Display changes to:**



**Now Press** Adjust Day 3 to "OFF" by pressing:



**Display changes to:**



**Now Press** Then adjust Day 4 to "- -" by pressing and holding



**Display changes to:**



for 3 seconds.

This means day 4 through 7 have no program, and the cycle will return to Day 1 after Day 3 has watered. The same procedure is used to adjust watering in cycles of every day, other day, 4th day, 5th day, and 6th day (see reference chart #2 below).

To return to a 7-day cycle

**First Press** Adjust the day showing "- -" to "ON" by holding



**Display changes to:**



for 2 seconds.

All days are now operable again, selectable by days. If you are in a cycle other than every fourth day, use the same process and change "- -" into "ON" on the first day shown to be "- -".

**REFERENCE CHART #2: Day Settings for interval watering**

Day Number	Desired Watering Cycle						
	Every Day	Every Other Day	Every Third Day	Every Fourth Day	Every Fifth Day	Every Sixth Day	Every Seventh Day
Day 1	ON	ON	ON	ON	ON	ON	ON
Day 2	--	OFF	OFF	OFF	OFF	OFF	OFF
Day 3	--	--	OFF	OFF	OFF	OFF	OFF
Day 4	--	--	--	OFF	OFF	OFF	OFF
Day 5	--	--	--	--	OFF	OFF	OFF
Day 6	--	--	--	--	--	OFF	OFF
Day 7	--	--	--	--	--	--	OFF







## STEP 3: SET THE TIME OF DAY TO WATER

This button determines the time of day when the cycle will start watering. The timer can be set to water once, twice, or three times per day. *All* stations will start in sequence at each start time (for example, if this is a four station timer, and the start times are set at 8:00 AM, 1:00 PM, and 6:00 PM, all four stations will go on sequentially at 8:00 AM, 1:00 PM, and 6:00 PM).

Start #1 is preset at 8:00. Starts #2 and #3 are blank unless programmed. Start times can be programmed to start on the hour.


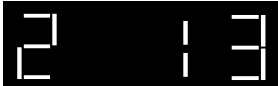


The clock can water either on (A) specific days of the week, or (B) an interval or cycle of days (i.e. every third day, every fourth day, etc.).

**3-A:** \_\_\_\_\_

**Press**  **Display shows:**  **Adjust Start Time 1 with:**  **ON** OR  **OFF**


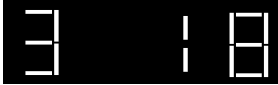


**First Start Time** **Watering will start at 8:00 AM**

**3-B:** \_\_\_\_\_ **Watering Twice Per Day**

**Press**  **Display shows:**  **Adjust Start Time 2 with:**  **ON** OR  **OFF**





**i.e. 6:00 PM**

**3-C:** \_\_\_\_\_ **Watering Three Times Per Day**

**Press**  **Display shows:**  **Adjust Start Time 3 with:**  **ON** OR  **OFF**

**i.e. 6:00 PM**

**3-D:** \_\_\_\_\_ **To remove a Start Time**

**Press**  **Adjust the digits with:**  **ON** OR  **OFF** **Until the display shows:** 

When the two right digits change to “- -” between “23” and “00” hours, the start time is eliminated.

**Note #1:** If “00” shows the timer will start a cycle at midnight.

**Note #2:** Start time indicates the the starting time for the entire cycle, all stations operate sequentially after the programmed start time. The stations do not have separate start times; e.g., “2 12” does not mean station two starts at noon- it means station one will run a second time at noon, and when it is done, station two will run, etc.

**Note #3:** Don’t confuse this button with station timing-the displays look alike.

## STEP 4: SET THE WATERING TIME FOR EACH STATION

This button sets how long each station (zone) will run. Each station can be separately adjusted between 0-99 minutes in one minute increments. This “watering time” is always the same for that station, every time the system waters. The PC-106/106 series is preset to water each station for ten minutes.

Press

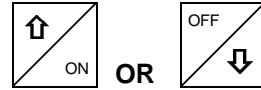


Display will show:



Station 1 10 min-

Adjust the time using:



To repeat for station #2 to station #6, push “Station Timing” again and repeat adjustments.

4-B: \_\_\_\_\_ To skip a station

Press

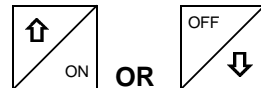


Display will show:



Station 2 0 minutes

Adjust the time to 00:



After programming the last station,

Press



Display will show:



Press “Set Clock” to return to the normal time of day display.

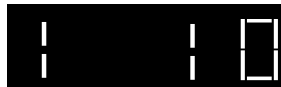
## STEP 5: START A WATERING CYCLE MANUALLY

5-A: \_\_\_\_\_ To start an entire watering cycle

Press



The display will show:



Station 1 Blink

Each station will run sequentially for its programmed time.

5-B: \_\_\_\_\_ To advance to the next station

Press



The display will show:



Station 2 Runtime

The clock will stop the manual operation after last station has run or you touch the “AUTO/OFF” button.

## STEP 6: TO INTERRUPT WATERING FOR RAIN

The "AUTO/OFF" button allows the watering and programming to be interrupted until pressed again. it does not affect the program, but it does prevent power from going to the valves.

Press



Display will show: The Current Time



Last Digit Blinks i.e. the current time is 8:00 a.m.

Press "AUTO/OFF" again to return to normal.

## TROUBLE-SHOOTING

Sometimes when problems occur they can be easily solved by rechecking some often overlooked possibilities. So check here before you call your dealer or contractor. It could save you time and money

IF YOU'RE HAVING THIS PROBLEM:	CHECK FOR THESE THINGS:
Automatic Cycle doesn't turn on and the Manual Start won't operate:	-If the display is blank, check the fuse. -Check the wire connections for improper wiring or shorts. -Check the valve and valve solenoid for proper operation.
Automatic Cycle doesn't operate but the Manual Start does:	-If the last digit blinks, the timer is in the Rain Shutoff Mode. Press 'Auto/Off" for normal operation.
Automatic Cycle doesn't turn off:	-Check the wiring for a short or a cross-connection. -This is probably not a timer problem, but a valve problem. Check the solenoid and the inside of the valve for obstructions.
Entire Display is blank:	-Check the fuse and transformer
Some of the display won't appear:	-Circuit problem/replace timer
Entire Display blinks:	-9 volt battery needs replacing and the timer needs reprogramming.
Last Digit blinks:	-Timer is in Rain Shutdown Mode. Press "Auto/Off" for normal operation.
Last Two Digits blink:	-Timer is counting down time remaining on the station currently watering.
Timer gains/loses a few minutes/week:	-Caused by intermittent power fluctuations. Nothing can be done except to correct time.
Fuse Blows too often/display goes blank:	-There is a short in the wire between the timer and valve. Make sure connections are watertight and no bare wires are exposed. -Maximum current is being exceeded. Check amperage draw of solenoid (especially older models and brass valves). On pump start models, check combined amperage draw of pump relay and valve.

### Programming limitations of this timer

The PC-104/106 series are very flexible timers available at a very economical price. However, there are some things it will not do:

- It will not run more than one valve per station (i.e. two valves can't be connected to one terminal/station);
- It will not run some stations on one set of days and some stations on another set of days. This feature is called dual programmability.
- It will not run stations on separate start times. All stations will start on the same schedule.
- It is not designed for outdoor installation.
- It is not in a waterproof case, and will therefore be adversely affected by the climate, nor is it electrically prudent to plug the transformer in an exterior outlet.

If you need any or all of these features, Rain Bird manufactures a variety of additional models incorporating these and other features. Please contact your dealer for details.

## **GENERAL INFORMATION**

### What happens during a power failure?

In the event of a power failure, the emergency battery back-up will maintain the watering program in memory for up to 24 hours. However, the battery will not operate the valves. If the power is off for longer than the battery will last, the entire program is lost and the entire display will blink after power is restored. The timer is now operating in the default mode: eight hours after the power came back on, each station will water for 10 minutes, every 24 hours. To change this, just reprogram.

### When is the best time to water?

The early morning hours -between 2 and 6 a.m. - are the best hours to water. There is low evaporation very little wind, and water pressure is usually highest then. Watering in the middle of the day tends to "scorch" the grass, and watering in the late evening tends to "mildew" the grass before sunrise.

### How long should the system water?

During hot weather, most lawns require ½" water every other day, or about an inch and a half of water per week. Hotter climates require more and cooler climates require less. Sandy soils need frequent and greater amounts because of excess drainage but clay soil needs lesser, more infrequent amounts to prevent runoff. New lawns require frequent but short burst of water. See our special "Watering Tips" brochure at your dealer, or check with your garden center for local conditions.

Different sprinklers water at different rates. Sprayheads and bubblers water fast (usually 5-15 minutes will put down ½"), but impulse sprinklers and rotors water slow (usually 45-90 minutes will put down ½"). To check your watering rates, place a flat bottom pan and measure the time takes to fill it.

What should be done in the winter?

If you live in an area where you don't use the timer for an extended period of time, we recommend unplugging and possibly storing the timer. The "Auto/Off " rain shutdown mode is a short-term shutdown only, not a winterization mode. In addition, if you're in a freezing area, be sure your sprinkler lines don't have any water left in them.

**NOTE:** This Rain Clock Timer generates radio frequency energy and may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause 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 one or more of the following measures:

- reorient the receiving antenna
- move the timer away from the receiver
- plug the timer into a different outlet so out timer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio and television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: *"How To Identify and Resolve Radio-TV Interference Problems."* This booklet is available from the US Government Printing Office, Washington D.C. 20402, Stock No. 004-000-0034504. (Price is \$2.00 postpaid.)

**Rain Bird Sales, Inc.**  
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