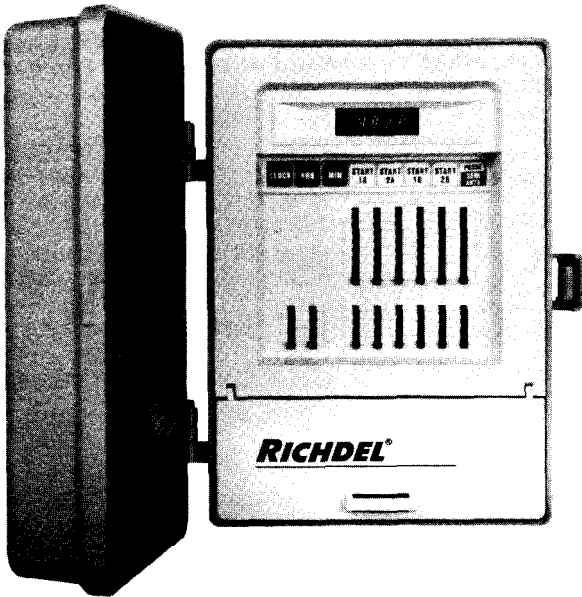


Richdel

446PRI HYBRID IRRIGATION CONTROLLER



INSTALLATION AND OPERATING GUIDE

FEATURES

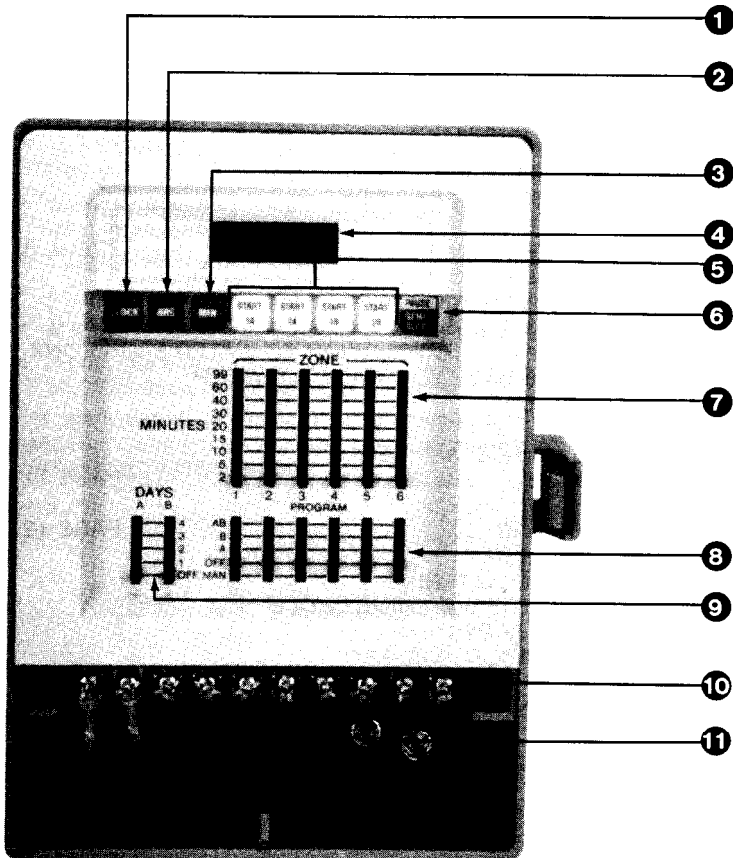
- * Zone Control: Turns **sprinkler** valves on and off automatically in sequence.
- * Easy At-A-Glance Settings: Makes it simple to set watering lengths and programs.
- * Dual Programming: Allows you to water your lawn and garden on separate time schedules.
- * Two Separate Day Schedules: Let you water the lawn and garden on independant days.
- * Multiple Watering Times: Let you water up to four times per day – ideal for new lawns.
- * Variable Watering Periods: Let you water up to 99 minutes per zone.
- * Pause: Makes it easy to interrupt watering cycles for yard activities.
- * Manual Operating Mode: Lets you manually water one zone at a time.
- * Pump Start: Automatically turns water pump or master valve on and off. (Requires a pump start relay, Model SR-1)

TO USE YOUR NEW TIMER MOST EFFECTIVELY, PLEASE READ THIS MANUAL CAREFULLY BEFORE USE AND REFER TO THE MANUAL IF ANY DIFFICULTIES ARISE.

CONTENTS

ILLUSTRATION OF TIMER PARTS	PAGE 4
INSTALLING YOUR NEW TIMER	PAGE 6
STEP 1: SELECT THE LOCATION	
STEP 2: MOUNT THE TIMER	
STEP 3: WIRE THE VALVES	
STEP 4: CONNECT THE VALVE WIRES TO THE TIMER	
STEP 5: CONNECT THE TRANSFORMER	
STEP 6: CONNECT THE BATTERY	
PROGRAMMING THE TIMER	PAGE 8
STEP 1: SET THE CLOCK TO THE CURRENT TIME	
STEP 2: SELECT THE RIGHT PROGRAM	
STEP 3: SET THE TIMES OF DAY YOU WANT TO WATER	
STEP 4: SET HOW LONG YOU WANT TO WATER EACH ZONE	
STEP 5: SET THE DAYS YOU WANT TO WATER	
SAMPLE PROGRAM	
CONNECT THE PUMP START RELAY OR MASTER VALVE	PAGE 11
SPECIAL FUNCTIONS	PAGE 12
MANUAL WATERING	
SEMI-AUTOMATIC WATERING	
INTERRUPTING THE WATERING CYCLE	
TURNING OFF THE SYSTEM	
ELECTRONIC CIRCUIT BREAKER	
TROUBLE-SHOOTING GUIDE	PAGE 14
ZONE LEGEND	PAGE 15

FEATURES



- 1** CLOCK KEY
Allows you to set the time of day.
- 2** HOURS KEY
Allows you to set the correct hour of the day and the hours for your start times.
- 3** MINUTES KEY
Lets you set the correct minute for the time of day and the minutes for your start times.
- 4** TIMER DISPLAY
Shows time of day, zone being watered, watering run time. Also indicates programming errors and short circuits.
- 5** START KEYS
Enable you to set up to four start times per day. (2 on Program A and 2 on Program B).
- 6** PAUSE/SEMI-AUTO KEY
Temporarily interrupts a watering cycle in progress or allows you to start a semi-automatic watering cycle.
- 7** ZONE-MINUTES SWITCHES
Allow you to choose a separate watering time for each zone – from 2 minutes to 99 minutes.
- 8** ZONE-PROGRAM SWITCHES
Let you set a different program for each zone. (A, B, or AB).
- 9** PROGRAM-DAY SWITCHES
Let you set up different day intervals for each program.
- 10** TERMINAL SCREWS
Connect valve wires to terminal.
- 11** BATTERY CONNECTOR
Connects to a 9 volt battery for safetyclockback-up.
- 12** PLUG IN TRANSFORMER (NOT SHOWN)
Enables timer to run from a conventional 120 volt wall outlet.

INSTALLING YOUR NEW TIMER

Install your new timer by following these six steps:

STEP 1: SELECT THE LOCATION

- A. Select an indoor location near a conventional 120 volt dual electrical outlet.

CAUTION: The timer should not be placed where it is exposed to a temperature exceeding 55° Centigrade (130° Fahrenheit) or on a circuit controlled by a switch. Malfunctions may result.

- B. If the timer is adistancefrom the outlet, replace the supplied cord with a similar electrical cord (available at hardware and electrical supply stores).

STEP 2: MOUNT THE TIMER

- A. Screw in a No. 8 screw at eye level, leaving the screw head extended 1/8"
- B. Slip the keyhole opening on the back of the timer over the screw head.
- C. Open the timer and install two screws through the holes in the wiring compartment at the bottom of the timer.

NOTE: To install the timer on a plaster or masonry wall, use plastic or lead shields to secure screws

STEP 3: WIRE THE VALVES

- A. Place valve wiring underground where possible. (Under 800 feet, use 18 gauge, plastic jacketed, thermostat control wire; over 800 feet, use 14 gauge wire. This wire is available from your dealer in 2,3,4, 5,6,7, and 8 color coded wires).
- B. Run one common wire to all valves.
- C. Solder all splices, or join them with wire nuts and seal with vinyl cement or other waterproof cement.

IMPORTANT: The power transformer is protected by an electronic circuit breaker. Do not connect a combination of valves requiring an inrush current of more than 1 AMP at 24 VAC. (Two valves maximum).

STEP 4: CONNECT THE VALVE WIRES TO TIMER

- A. Bring valve wires up through the hole on the bottom of the timer.
- B. Connect the wire from valve number 1 to the terminal screw on the timer marked "1", valve number 2 to terminal "2", and so forth.

NOTE: The terminal designation is marked on the inside of the wiring cover.

- C. Connect the common wire to the terminal marked "COMM". (Fig. 1)
- D. If using a water pump or master valve, refer to page 11 for instructions and diagrams. (Fig. 2).

STEP 5: CONNECT THE TRANSFORMER

- A. Connect the power leads from the timer to the plug-in transformer.
- B. Attach one lead to each terminal screw on transformer. Be sure terminals on cord do not touch.
- C. Plug in transformer.

CAUTION: Use with supplied transformer ONLY!

STEP 6: CONNECT THE BATTERY

Battery will keep program in memory during temporary power failure.

- A. Connect a 9 volt alkaline battery (not supplied) to the battery connector in the wiring compartment of the timer box.
- B. Place the battery in the wiring compartment.
- C. Replace wiring compartment cover.
- D. Replace battery at least once a year. More often if frequent power failures occur.

CAUTION: DO NOT ALLOW THE BATTERY CONNECTOR TO TOUCH THE TIMER'S TERMINAL STRIP (DIRECTLY ABOVE THE WIRING COMPARTMENT). ALSO, DO NOT CONNECT OR DISCONNECT VALVE WIRES WHILE ANY ZONES ARE IN OPERATION.

NOTE: Check local codes to be sure wiring and installation will meet all requirements.

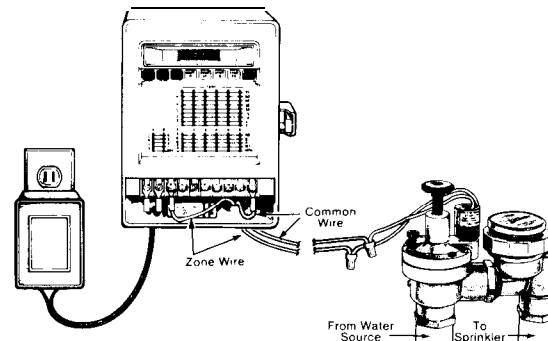


FIGURE 1

PROGRAMMING YOUR NEW TIMER




Before programming, read all instructions carefully.










STEP 1: SET THE CLOCK TO THE CURRENT TIME

The timer's clock features a 12 hour format – 12 PM represents noon; 12 AM represents midnight. The AM or PM setting changes at 12:00 so that 1159 AM progresses to 12:00 PM.

When the power is first turned on, the timer automatically displays a time of "4OOP" (4:00 PM).

To set **the** correct time:

- Press .
- Press  key and hold it down until the current hour and A (AM) or P (PM) rolls up on the display or repeatedly press key to advance the the numbers digit-by-digit.
- Press  key repeatedly, or hold it down until the current minute rolls up on the display.

 Press the  and  keys one at a time for single digit changes. Hold the  and  keys down for fast changes. Once you have pressed the  key, you must press the  or  key within 10 seconds. Otherwise, you must press the  key again to make the changes.

STEP 2: SELECT THE RIGHT PROGRAM





The 446PRI timer has several options that allow SIMPLE, FLEXIBLE, programming never before offered. The newest of these is the multiple programs option which provides the ability to water individual areas of any yard separately. These programs are displayed on the face of the timer by the letters "A", "B" & "AB".

A simple example of how these programs might be used would be to use the "A" program to water all the grass areas of the yard every other day. Use the "B" program to water all the shrub or groundcover areas of the yard daily. The "AB" program would normally only be used when new grass is being established and more than 2 start times per day are needed.

NOTE: Any of the zones can be set to water in any combination within the "A" "B" or "AB" programs. Page #10 shows a sample program.





Move the "PROGRAM" switch under each zone to the desired watering day program, "A," "B" "OFF", or "MAN" (for manual watering).

STEP 3: SET THE TIMES OF DAY YOU WANT TO WATER






Now that the program selections have been made, the times that each program should start need to be set. This is done by using the "START" keys located under the display. Note that there are 4 keys to choose from , , and , . There are 2 start times for all "A" zones and 2 start times for all "B" zones.

The two keys marked with the letter "A" will start all the zones where the program switch is located on the letter "A" and the same is true for the zones where the switch is located on "B".

To program the start times for "A" follow these steps:

- Press the  key. (The display will show "200A").
- Press the  key and hold it until the desired hour and "A" (AM) or "P" (PM) is displayed.
- Press the  key and hold it until the desired minute is displayed.
- Repeat this procedure for all the remaining start times.
- If any start time is not needed be sure to set it to the "OFF" position. This is done by holding the  key until the word "OFF" is shown in the display. This occurs just after "11 OOP".

NOTE: If a program switch is placed in the "AB" position that zone would start at every start time programmed. (Up to 4).

 Once you have pressed a  key, you must press the  or  key within 10 seconds. Otherwise, you must press the  key again to make the changes.

Leave enough time between start times to allow all zones to be watered. If a start time produces a watering cycle that runs into the next start time, the timer will automatically move the next start time ahead to allow completion of the current watering cycle. If a start time produces a watering cycle that runs past midnight, any other start times programmed to start before midnight will be cancelled.

Start times can be entered in any order. Watering cycles progress by the time of day, not by start numbers. For example, START 1A may actually be the last watering time of the day.

STEP 4: SET HOW LONG YOU WANT TO WATER EACH ZONE

Each zone can be set with a run time from 2 minutes to 99 minutes.

To set the run times:

Move the switch under each zone to the desired watering time. (Place the switches only **on** the minute marks, not **between** the marks).

CONNECT PUMP START RELAY OR MASTER VALVE

STEP 5: SET THE DAYS YOU WANT TO WATER

To set the watering days for each program:

- A. Move the "DAYS" switch for "A" and "B" to the desired watering day(s). "4" (every 4th day), "3" (every 3rd day), "2" (every 2nd day), "1" (every day), or "OFF".



Zones programmed to water on a certain day will be watered sequentially, skipping those zones programmed to "OFF".

During watering, the zone number will appear on the left of the display, and the zone's run time will appear on the right. The display starts at one minute and counts up to the total run time before changing to the next zone to be watered.

SAMPLE PROGRAM

PROGRAM A (Lawn)		PROGRAM B (Shrubs)	
START TIME "1A": 6 0 0 A		START TIME "1B": 1 0 3 0 P	
START TIME "2A": 7 0 0 P		START TIME "2B": -OFF-	
ZONE RUN TIMES			
Zone #	Run Time (2-99 Min)	Zone #	Run Time (2-99 Min)
1	10		
2	15		
3	30	3	
4	20	4	
5		5	5
6		6	60
7		7	10
8		8	10
9		9	60
3. WATERING DAYS (Choose 1 only)		WATERING DAYS (Choose 1 only)	
Every 4th day	(4) _____	Every 4th day	(4) _____
Every 3rd day	(3) _____	Every 3rd day	(3) _____
Every 2nd day	(2) _____	Every 2nd day	(2) <u>X</u>
Every day	(1) <u>X</u>	Every day	(1) _____
OFF	_____	OFF	_____

If you plan on connecting timer to a well pump or master valve, use the following instructions.

- Bring two wires up through the same hole used for the valve wiring.
- Connect one wire to the terminal marked "PUMP".
- Connect the second wire to the terminal marked "COMM".
- If a master valve is required, the two wires should then be connected to a master valve, rated at 24 VAC and a current no greater than 9 VA.
- If a pump start relay is required, connect the two wires to an auxiliary relay with a coil rated at 24 VAC and a current no greater than 9 VA. The relay's contact would then be wired so it would supply voltage to the pump's contactor. A qualified electrician can make these connections for you. Model SR-1 can be connected to the two wires and will directly control a pump up to 2 HP at 240 VOLTS.

NOTE: The timer's pump output will be turned on whenever a zone is watering manually or automatically.

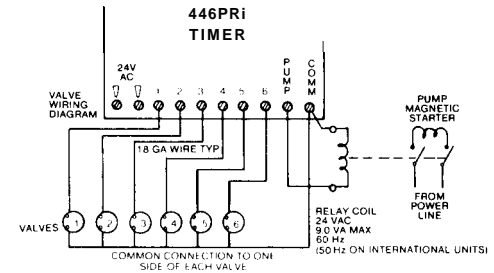


FIGURE 2

SPECIAL FUNCTIONS




MANUAL WATERING

To water your yard manually, move the "PROGRAM" switch to "MAN" for the zone you wish to water. The timer will allow only one zone at a time to be watered manually. If more than one program switch is placed in the "MAN" position, only the lowest numbered zone will water. When the switch is moved off the "MAN" position, the next lowest zone set on "MAN" will start to water.



The "MAN" setting will override any automatic or semi-automatic watering cycle, including any cycle in progress.

NOTE: When manual setting is used, water will stay on until the switch is moved. **DO NOT LEAVE IT IN THIS POSITION!**

SEMI-AUTOMATIC WATERING

If no watering is in progress, press the  key to start a semi-automatic watering cycle of all zones not set to "OFF". To stop a semi-automatic cycle, press the  key and then within 10 seconds press the  key. The watering in progress will stop, and the display will show "OFF" for 10 seconds before returning to the clock mode.

INTERRUPTING THE WATERING CYCLE

When an automatic or semi-automatic watering cycle is in progress press  to freeze the cycle at that point of the zone's run time. The display will alternately flash "PAUSE" and the zone's number and run time. To resume the watering cycle, press  again, and the zone's count will continue.

NOTE: If a "PAUSE" is turned on and forgotten, the program will automatically reset itself at midnight. The timer will then begin with the first start time for the new day.

TURNING OFF THE SYSTEM

When watering is not in progress, you can prevent automatic watering by moving the "DAY A" and "B" switches to "OFF".



Manual watering is still possible, when the timer is in the "OFF" mode.

ELECTRONIC CIRCUIT BREAKER

If the timer detects a short circuit the shorted valve/zone will automatically be turned off. The display will then alternately flash "FUS" and the shorted zone number and run time. The timer will continue to automatically water the other zones and the following watering cycles, with the display continuing to flash on the zone number with the short circuit.

After repairing the short, press  or any  key to return the timer and display back to its current operating mode.

TROUBLE-SHOOTING GUIDE

ZONE LEGEND

PROBLEM	POSSIBLE CAUSE
One or more valves do not water.	<ol style="list-style-type: none"> 1. Faulty solenoid. 2. Poor wire connection. 3. Possible break in wire. 4. Valve flow stem is screwed down too far.
Display is stuck on a zone and "FUS" is flashing in the display.	<ol style="list-style-type: none"> 1. Faulty solenoid. 2. Poor or shorted wire connection.
Continous loss of time.	<ol style="list-style-type: none"> 1. No battery. 2. Weak or bad battery. 3. Timer on a circuit controlled by a switch. 4. Timer is on the same circuit as a high power user, (refrigerator, air conditioner, etc.).
Zones turn on when they are NOT programmed to start.	<ol style="list-style-type: none"> 1. Start times and the total combined zone run times have overlapped.
The clock has the correct time and the zones appear to be functioning properly, but none of the valves are on.	<ol style="list-style-type: none"> 1. One or more zone switches are in the "OFF" position. 2. The common wire is not hooked up. 3. Valve flow stem is screwed down too far.
One zone is stuck on and won't shut off electrically.	<ol style="list-style-type: none"> 1. Zone switch is in "MAN" position. 2. Faulty valve. 3. Particles of dirt or debris are stuck in the valve.

ZONE	TIME	LOCATION
1		
2		
3		
4		
5		
6		
7		
8		
9		

NOTES:

WARNING: DO NOT LINK TWO OR MORE CONTROLLERS VIA A COMMON TRANSFORMER OR COMMON WIRE.