

DIAL SERIES CONTROLLERS



OWNER'S MANUAL

5, 7, 11, 14, 16, 18, 24, 30 and 36 stations

Irritrol[®]
SYSTEMS

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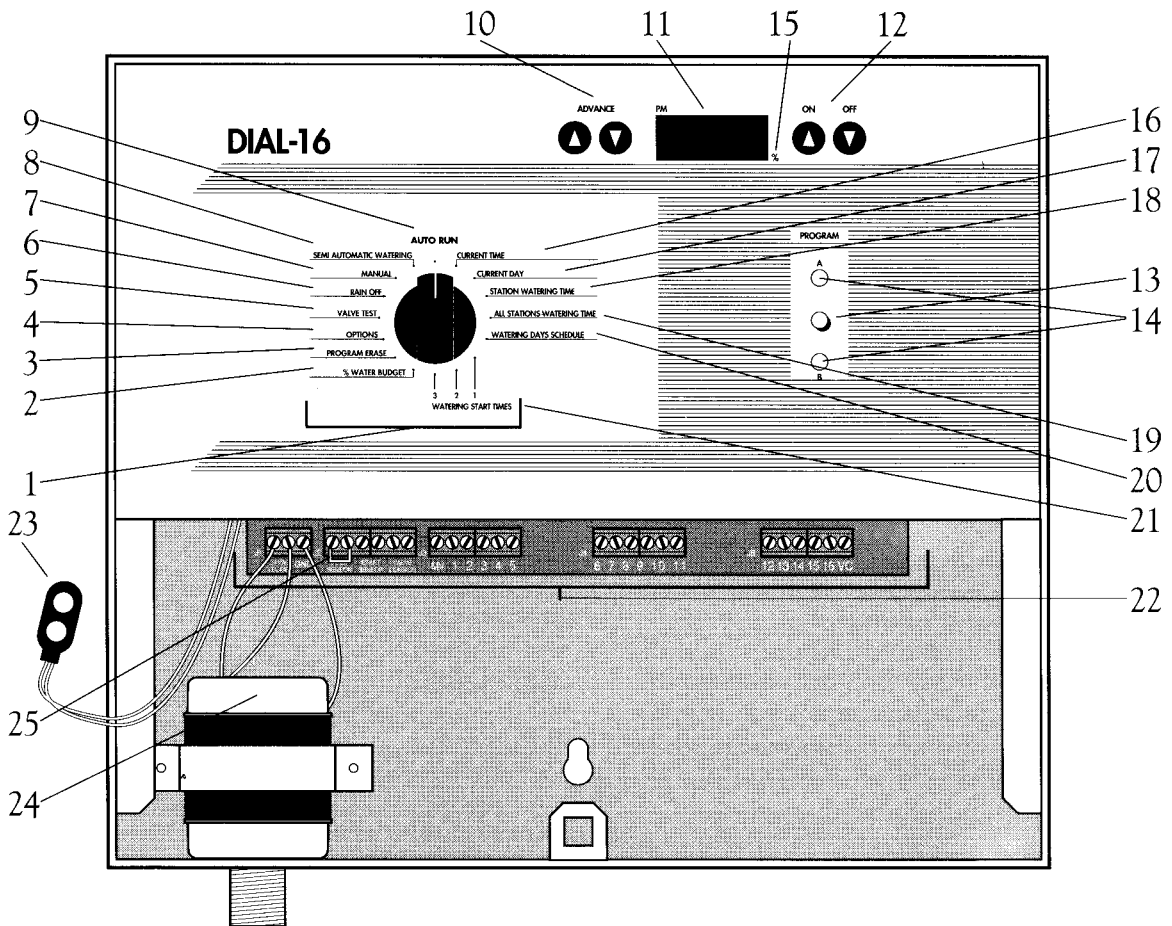
Thank you for purchasing a Dial Series Controller. Listed below are some important features you should be aware of before you begin programming. Details on how to implement these features are described on the following pages.

- Two independent programs that can run concurrently
- 6- or 14-day calendar
- Station watering time in seconds, minutes or hours
- Non-volatile memory that retains programmed information indefinitely
- 9-volt battery to ensure accurate time during power failures
- Water budgeting
- Valve test for easy system testing of each station for 1 to 9 minutes
- Remote ready for upgrading to an IrriTrol remote control system
- Selectable loop option for continuous cycling of program
- Electronic circuit breaker that identifies and overrides bad stations
- Single-entry “All stations watering time”
- Semi-Automatic and true manual operation
- Rain off programmable to 7 days
- Rain off sensor hook-up
- Sensor start hookup in program B for water conservation systems
- Start time stacking overlap protection within each program
- UL listed

These are just a few of the many features of the Dial Series Controllers. Please review your manual before beginning programming.

LOCATION OF PARTS

1. **Function Dial:** For selecting programming and operating functions
2. **Water Budget:** For single-entry increase or decrease of watering times for all stations within a program by a selected percentage (does not alter program)
3. **Program Erase:** For erasing programmed information
4. **Options:** For selecting additional features, 6-day watering schedule, seconds, loop and/or hours
5. **Valve Test:** For running a valve test for all stations from 1 to 9 minutes
6. **Rain Off:** For turning off output to all stations manually or programmable to 7 days off
7. **Manual:** For true manual operation
8. **Semi-Automatic Watering:** For activating a manual watering cycle that uses the programmed station watering times
9. **Auto Run:** Position for automatic operation
10. **Advance Buttons:** For programming and operating functions
11. **Digital Display:** For viewing time and program information
12. **On/Off Buttons:** For programming and operating functions
13. **Program Select Switch:** For program selection
14. **Program LEDs:** To indicate what program is currently operating
15. **Water Budget Indicator:** Shows whether water budgeting for the program selected is other than 100%
16. **Current Time:** For setting current time
17. **Current Day:** For setting calendar day
18. **Station Watering Time:** For setting individual watering time for each station
19. **All Station Watering Time:** For setting watering time for all stations with one entry
20. **Watering Day Schedule:** For setting which days to water
21. **Watering Start Times:** For setting the times each watering cycle will start
22. **Terminal Strip:** For hook-up of transformer, valve wires, common wire, pump start and sensors
23. **Battery Snap:** For hookup of 9V alkaline battery to keep time during power failures
24. **120V/24V transformer**
25. **Short Wire:** Must be installed if sensor is not used



INSTALLING AND WIRING THE CONTROLLER

This section includes instructions for installing the controller and hooking up the electricity. To ensure safe operation, it is important to follow the instructions carefully. The following topics are covered:

- Selecting the site
- Mounting the controller
- Connecting the power
- Hooking up the valves
 - Testing the valve hook-ups
- Hooking up a pump start relay
- How the backup system works
- Installing and using sensor ports
- How the electronic circuit breaker works

CAUTION: To avoid injury to you or damage to the controller, you **MUST** follow the sequence of installation steps outlined in this manual.

SELECTING THE SITE

The controller comes in an outdoor, rain-resistant, rust-resistant and dust-resistant box. Selecting the correct location for your controller is essential to ensure safe operation. Select a site for the controller that is:

1. Away from direct sprinkler spray.
2. In a shaded and dry location, if possible. Avoid direct sun; do not expose to temperatures exceeding 130°F.
3. NOT in a closed and humid environment, or where it is subject to continual heavy condensation.
4. Accessible to a 3-wire, grounded 120-volt AC, 60 Hz power supply.

MOUNTING THE CONTROLLER

WALL MOUNT: For wall mounting, install the controller vertically on a flat, secure surface. Use the enclosed template to locate mounting screw holes. Follow complete mounting instructions on template.

PEDESTAL: For free-standing installation on a pedestal, follow the installation instructions in the pedestal box.

CONNECTING THE POWER

The controller is a solid-state microcomputer that may be affected by transient surges and electromagnetic interference. Wherever possible, the controller should be installed on its own dedicated circuit breaker.

CAUTION: Be sure to follow all applicable local electrical wiring codes.

CAUTION: **DO NOT** install the controller on the same line or within 15 feet of a heavy inductive load, such as a pump, motor, air conditioner, refrigerator, transformer, etc. Valve and power wires must also be routed away from “high power users.”

CAUTION: **DO NOT** turn on the power until all valves are wired (see “Hooking Up the Valves,” page 7).

1. Remove the lower panel by unfastening the screw located in the middle of the panel and lifting the panel out and down.
2. Verify that the yellow and red wires of the transformer are connected to the 24-volt AC input on the terminals of the controller (see figure 1, page 6). Connect the black and white wires of the 120 volt AC, 60 Hz power supply to the black and white wires of the transformer (see figure 1).

CAUTION: **DO NOT** wire 120 volts directly to the PC board terminals; the transformer supplied with the controller **MUST** be used.

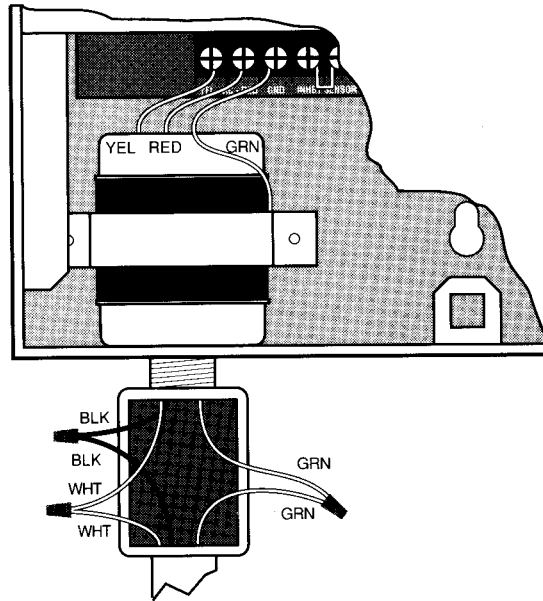


Figure 1. Electrical Hook-ups

3. Connect the green ground wire directly to the terminal labeled "GND."

In areas where lightning is prevalent or the condition of the third wire ground is questionable, a ground rod must be installed. Connect the grounding rod to the controller's case ground using a #10 gauge or heavier stranded copper wire.

The distance from the controller's case to the earth ground should be minimized.

HOOKING UP THE VALVES

A maximum of **20 VA** (0.8 amps) may be output on each station. A maximum of **36 VA** (1.5 amps) may be programmed to operate simultaneously (including master valve).

1. Strip the solenoid wires approximately 1/2 inch (do not bend exposed end).
2. Following the wiring diagram in figure 1, insert straight bare wire between the plates of the “sure grip” terminal. Connect one solenoid wire to the station terminal and the other to common. Tighten screws firmly.

CAUTION: Use a separate (dedicated) valve common wire for each controller. **DO NOT** daisy-chain controllers together using the same common wire.

3. Before turning on the power, recheck all leads connected to the terminal block for shorts.

TESTING THE VALVE HOOK-UPS

CAUTION: **NEVER** short wires in order to identify a station or to verify power from 24-volt side of transformer. This will result in damage to controller and/or transformer.

1. Make sure the valve common wire and all station wires are connected.
2. Turn on power to the controller.
3. Turn dial to Valve Test position.
4. Press **Advance ▲** or **Advance ▼** to change the test time from 1 min. to 9 min. If time is not changed, 2 min. will be assumed.
5. Press the **On ▲** key.

Each station in sequence will turn on for the number of minutes you selected. A short circuit test will occur during the valve test. If a short circuit condition exists on any station, the controller will display “FUSE” alternately with the station number or zero (0) for the master valve. “FUSE” indicates a short on that station.

NOTE: Any operating program cycles will be paused during a valve test cycle.

HOOKING UP A PUMP START RELAY

In cases where a pump is to be controlled by the master valve output, **DO NOT** drive the pump directly from the controller. The master station must be connected to the coil of a 24-volt AC relay, such as an Essex #184-20105-101Z (IrriTrol part number I 1001).

CAUTION: Connecting a pump to the controller without a 24-volt AC relay will damage the controller.

The pump latch relay should be set up by an electrician so that a switch closure will activate the latch relay coil, turning on the pump. The switch contacts of the relay should be connected to control the latch relay coil (see figure 2). The relay should be mounted at least 5 feet from the controller box, and the box **MUST** be grounded. Installation must follow all local electrical wiring codes.

CAUTION: **DO NOT** attempt to power the controller using power from one phase of pump power. This can seriously damage the controller.

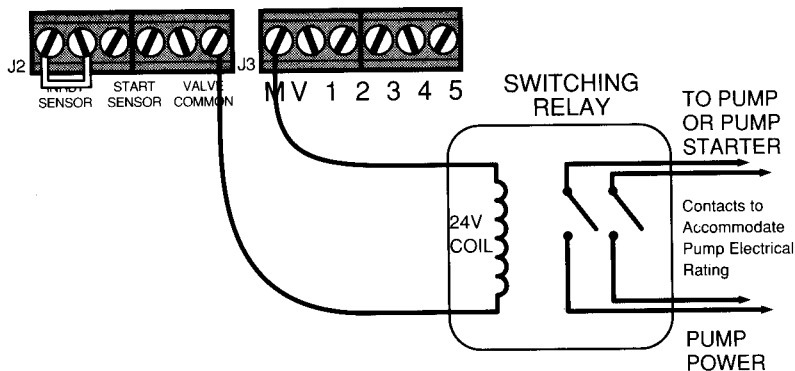


Figure 2. Installing a Relay for a Pump

HOW THE BACKUP SYSTEM WORKS

The controller is equipped with non-volatile memory for retention of programmed information. Once programming is complete, the controller will retain your program in the event of a power failure. There will be no need to reprogram following a power failure.

This controller is also equipped with a timekeeping circuit. This allows the controller to maintain accurate time during a power failure for up to 30 days continuous via a standard 9-volt alkaline battery (not included).

NOTE: The controller will not activate valves during a power failure.

INSTALLING AND USING SENSOR PORTS

The controller is equipped with two types of sensor hookups.

1. **Rain Off Sensor Hook-up:** Terminals labeled “Inhibit Sensor” on the controller’s terminal block. When the sensor contacts open, the controller will inhibit output to all stations (all programs are affected). If no sensor is used, the “short” wire must be installed.
2. **Start Sensor Hook-up:** Terminals labeled “Start Sensor” on the controller’s terminal block. The sensor must be a “normally open” type of sensor. When the sensor contacts close, the controller will start a Program B watering cycle.

This sensor hook-up enables you to activate watering using a sensor, such as a moisture sensor. Sensor contacts must remain closed for 30 seconds before the cycle will start.

If the sensor remains closed after completion of the watering cycle, another cycle will be initiated. If the sensor opens before completion of the watering cycle, no new cycle will be initiated. The cycle in progress, however, will continue watering until completion.

To install a sensor:

1. Attach the sensor to the terminals of the controller’s terminal block. Adjust the sensor according to manufacturer’s instructions.

HOW THE ELECTRONIC CIRCUIT BREAKER WORKS

The controller is equipped with an electronic circuit breaker. If the controller detects a short circuit, the shorted station (valve) will be turned off automatically. The display will then alternately flash “FUSE” and the shorted station number or “0” for the master valve. The controller will continue to automatically water the other stations and the following watering cycles until the short is repaired.

Common conditions of the electronic circuit breaker include:

CONDITION: “FUSE” and one or more station numbers alternately flash.

Diagnosis: One or more stations are shorted.

Solution: Check station(s) for cause of shorted condition. Repair valve(s) and/or wiring on station(s), and press both Advance buttons at the same time to clear.

Diagnosis: Too many valves are operating at the same time.

Solution: Check programs and stations, including master valve for VA output. Maximum total output is 36 VA (1.5 amps). Reduce number of valves on at the same time to below maximum output allowance. Press both Advance buttons at the same time to clear.

Diagnosis: A short circuit has occurred with a time duration too short for the controller to determine the station.

Solution: Check valve wiring for breaks in the insulation which may cause a station output to short to common. Press both Advance buttons at the same time to clear.

CONDITION: “FUSE” displays without any station numbers.

Diagnosis: A transient surge has spiked the line.

Solution: Press both Advance buttons at the same time to clear.

Diagnosis: An overload or short has occurred while the controller is being activated by a remote control device such as the RVC system.

Solution: Press both Advance buttons at the same time to clear.

CONDITION: “FUSE” is alternately displayed with “0” and none of the stations is operating automatically.

Diagnosis: The master valve is shorted. When this occurs, all station outputs will be suspended until the short is repaired.

Solution: Repair master valve, pump start relay and/or wiring, and press both Advance buttons at the same time to clear.

PROGRAMMING THE CONTROLLER FOR WATERING

To set up a regular watering schedule, follow the steps below. This section covers the following topics:

- Developing a watering plan
- Setting the current time and day
- Erasing any prior programs
- Setting the station watering time
- Selecting the days to water
- Programming watering start times
- Program B watering

DEVELOPING A WATERING PLAN

Two watering programs are available. Each program can be used for separate watering requirements. For example, you might use one program to water the lawn on Wednesdays and Saturdays, and another program to water trees and shrubs once a week.

The controller is pre-programmed with a 14-day calendar. The calendar can be changed to a 6-day calendar (see the Advanced Features section, page 21). The examples in this section assume a 14-day calendar.

WHAT IS A WATERING CYCLE?

Each watering cycle waters all the stations in a program in sequence. For example, in the sample watering plan shown below, program A has three watering cycles. Therefore, all four stations in the program are watered three times each day, first starting at 2 A.M., then at 6 A.M., and again at 5 P.M. Before you program a watering schedule, decide how to use each program.

SAMPLE WATERING PLAN				
Program	Days	Cycle Start Times	Stations	Water Time Duration
A	Every	2 A.M.	1	10 min.
		6 A.M.	2	15 min.
		5 P.M.	3	35 min.
			4	5 min.
B	M, once every 2 weeks	7:06 A.M.	5	4.5 hrs.

Number of Watering Cycles Available

Programs A and B can have up to 3 watering cycles each. For example, program A in the sample has three watering cycles. The first starts at 2 A.M., the second at 6 A.M., the third at 5 P.M. Therefore, each station in program A is activated three times each day.

Overlap Protection

The start time stacking feature on this controller provides start time overlap protection in the event that an error in programming or an increased water budgeting percent creates an overlap between cycle start times. If an overlap occurs, the controller will automatically suspend the start time until the current watering cycle finishes.

SETTING THE CURRENT TIME AND DAY

Before you can program the controller for watering, set the current time and day of the week. This information is used to control the watering schedules. Once set, the time and day apply to all programs. To set the day and time, follow the steps below. To change the day or time, use the same steps.

CURRENT TIME

1. Set the dial to the Current Time position.
2. Use the **On ▲** and **Off ▼** buttons to increase or decrease the time shown in the digital display.
3. For P.M., make sure the p.m. indicator (‘) is displayed.

NOTE: Midnight is 12:00 A.M.; noon is 12:00 P.M.

CURRENT DAY

1. Set the dial to the Current Day position.
The controller displays a number corresponding to the current day.
1=Sun, 2=Mon, 3=Tues, 4=Wed, 5=Thur, 6=Fri, 7=Sat, 8=Sun (2nd week), etc., up to 14.
2. Press the **Advance ▲** or **Advance ▼** buttons until the number corresponding to the current day appears in the display.

ERASING ANY PRIOR PROGRAMS

This process erases all watering times, watering start times, the watering day schedule and resets water budget to 100%.

To clear prior watering programs:

1. Turn the dial to the Program Erase position.
2. Press the both **Advance** buttons at the same time.

The controller display flashes “PE,” indicating that the existing program(s) have been erased. Both programs are erased regardless of program switch position.

NOTE: Program Erase does not change option settings and does not erase current time and day information.

SETTING THE STATION WATERING TIME

Follow the steps below to program how long each station will water.

1. Make sure the program switch is set to the desired program, A or B.
2. Set the dial to the Station Watering Time position.
The controller displays the station number on the left and the station watering time on the right. For example, the display “1:10” indicates station one is set to water for 10 minutes.
3. Use the **Advance ▲** or **Advance ▼** buttons to select the desired station number.
4. Press the **On ▲** button to increase watering time, the **Off ▼** button to decrease watering time.

NOTE: To skip a station, set watering time to zero (0).

5. Repeat steps 3 and 4 for each station.

NOTE: The start time stacking feature on this controller provides start time overlap protection in the event that an error in programming or an increased water budgeting percent creates an overlap between cycle start times. If an overlap occurs, the controller will automatically suspend the start time until the current watering cycle finishes.

SETTING THE SAME WATERING TIME FOR ALL STATIONS

Use this feature to set the same watering time for all stations using a single entry. This feature applies to all stations within the same program.

1. Select the desired program, A or B.
2. Set the dial to the All Stations Watering Time position.
3. Press the **On ▲** button to increase watering time, the **Off ▼** button to decrease watering time.
4. Press both **Advance** buttons at the same time to enter. The display will flash to indicate the entry was accepted.

DELETING A PROGRAMMED STATION

To delete a programmed station, set watering time to zero (0)

SELECTING THE DAYS TO WATER

The Dial Series controller has a 14-day watering schedule (6-day schedule instructions are listed in Advanced Features, page 21). Table 1 below shows the numbers corresponding to the days of the week. To program the watering days, refer to table 1 and the steps below.

Table 1. Watering Days Schedule

	SUN	MON	TUE	WED	THU	FRI	SAT
1st Week:	1	2	3	4	5	6	7
2nd Week:	8	9	10	11	12	13	14

1. Select the desired program, A or B.
2. Set the dial to the Watering Day Schedule position.
3. Press the **Advance ▲** or **Advance ▼** buttons until the desired day of the week is displayed.
4. Press the **On ▲** button to schedule a day on, the **Off ▼** button to schedule a day off.

DISPLAYING PROGRAMMED WATERING DAYS

To display the watering days without changing them, do the following:

1. Select the desired program, A or B.
2. Set the dial to the Watering Day Schedule position.
3. Press the **Advance ▲** or **Advance ▼** buttons repeatedly.

The controller displays the days on and days off. For example, the display “1:ON” indicates Sunday of the first week is a scheduled day on; “8:OF” indicates Sunday of 2nd week is not a watering day.

NOTE: OF = OFF.

DELETING A PROGRAMMED WATERING DAY

If you make a mistake or want to delete a programmed day on, do the following:

1. Set the program switch to the program with the day to be deleted, A or B.
2. Press the **Advance ▲** or **Advance ▼** buttons until the desired day of the week is displayed.
3. Press the **Off ▼** button to schedule a day off.
4. Repeat for all watering days to be deleted.

PROGRAMMING WATERING START TIMES

Use this feature to set the time for watering to start on the scheduled watering days. Three watering start times per day are available in each program; use start times 2 and 3 to water more than once per day.

1. Select the desired program, A or B.
2. Set the dial to the Watering Start Times, position 1.
3. Press the **On ▲** button or the **Off ▼** button to select the start time.
4. Make sure the p.m. indicator (') is displayed if watering start time is in the p.m. period.

WATERING MORE THAN ONCE A DAY

1. Select the desired program, A or B.
2. Set the dial to the Watering Start Times, position 2 or 3.
3. Press the **On ▲** button or the **Off ▼** button to select the start time.
4. Make sure the p.m. indicator (') is displayed if watering start time is in the P.M. period.

NOTE: The start time stacking feature on this controller provides start time overlap protection in the event that an error in programming or an increased water budgeting percent creates an overlap between cycle start times. If an overlap occurs, the controller will automatically suspend the start time until the current watering cycle finishes.

DISPLAYING WATERING START TIMES

1. Select the desired program, A or B.
 2. Set the dial to the Watering Start Times, position 1, 2 or 3.
- The controller displays the programmed watering start times.

CANCELLING A WATERING START TIME

1. Select the desired program, A or B.
2. Set the dial to the Watering Start Times, position 1, 2 or 3.
3. Press the **On** ▲ button or the **Off** ▼ button to select a start time of zero (0:00).

NOTE: Zero time is between 11:59 P.M. and 12:00 A.M.

PROGRAM B WATERING

Use program B to establish a different watering schedule, with different stations and watering times than in program A. Programming is the same except that the program switch is set to B.

EXAMPLE: You have programmed stations 1, 2 and 3 in program A to water 10 minutes every day, starting at 6:00 A.M. Suppose you want to add a fourth station that waters once a week on Wednesday at 7:00 P.M. for 30 minutes. You would need to program station 4 on program B.

To program station 4 to water for 30 minutes, starting Wednesday at 7:00 P.M.:

1. Set the switch to program B.
2. Follow the programming instructions for “Setting the Station Watering Time.” For station 4, select 30 minutes.
3. Follow the programming instructions for “Selecting the Days to Water.” To select Wednesdays, select day 4 (for the 1st week) and day 11 (for the second week).
4. Follow the programming instructions for “Programming Watering Start Times.” Select 7:00 p.m. for the start time.

NOTE: In this example, station 4 is the only station with a watering time; therefore, it will be the only station operating in program B.

NOTE: You may water up to six times per day with station watering time in both programs, or use Option 4, Loop Operation (page 24), for unlimited start times.

MANUAL OPERATION

Manual operation allows you to perform a one-time watering function without affecting the programmed watering plan. For example, you might want to turn off sprinklers on a rainy day but have watering resume normally after that. This section includes instructions for the following manual operations:

- Manual on and off
- Rain off
- Semi-automatic watering

MANUAL ON

Use this feature to water one station for any amount of time regardless of programming.

1. Set the dial to the Manual position.
2. Use the **Advance ▲** or **Advance ▼** buttons to select the station number.
3. Press the **On ▲** button.
The station will water until turned off or until midnight, whichever comes first.

TURNING OFF MANUAL WATERING

1. Press the **Off ▼** button, or move the dial out of Manual position.

MANUAL OFF

Use this feature to turn shut off a station that is currently watering.

To turn off a manually “On” station:

1. Set the program switch to the desired program, A or B.
2. Set the dial to the Semi-Automatic position.
3. Press the **Off ▼** button.

To turn off output to all stations:

1. Set the dial to the Rain Off position.

RAIN OFF

Use this feature to temporarily turn off watering, such as when it is raining. As long as this feature is on, watering cycles cannot be activated automatically.

1. Set the dial to the Rain Off position.

Stations currently watering will turn off after a 2-second delay.

To return controller to normal operation, turn dial to Auto Run position.

PROGRAMMABLE RAIN OFF

Use his feature to turn off watering cycles for a specific length of time, from 1 to 7 days.

1. Set the dial to the Rain Off position.
2. Press the **On ▲** or **Off ▼** buttons to select number of days to turn off (from 1 to 7).
3. Return dial to Auto Run position.

In the Auto Run position, the display shows the number of days off and counts down. For example, “OFF7” = 7 days off; tomorrow will display “OFF6.”

TO CANCEL PROGRAMMABLE RAIN OFF

1. Set dial to the Rain Off position.
2. Press the **On ▲** or **Off ▼** buttons until display reads “OFF” (no number).
3. Return dial to Auto Run position.

SEMI-AUTOMATIC WATERING

Use this feature to activate a given station and all subsequent stations in a program. Only stations with watering times in the selected program will be watered.

1. Set the program switch to the desired program, A or B.
2. Set the dial to the Semi-Automatic Watering position.
3. Use the **Advance ▲** or **Advance ▼** buttons to select the station you intend to turn on.
4. Press the **On ▲** button to start the watering sequence.
5. Return the dial to the Auto Run position.

NOTE: All stations programmed after the selected starting station will turn on automatically in sequence.

NOTE: The controller will return to automatic programmed watering at the end of the semi-automatic watering cycle.

USING ADVANCED FEATURES

The Dial Series controller offers several advanced features for sophisticated watering applications. These advanced features include:

- Water budgeting (programs A & B)
- Option 1: Six-day watering schedule (programs A & B)
- Option 2: Programming water time in seconds (program B only)
- Option 3: Programming water time in hours (program B only)
- Option 4: Loop operation (program B only)

WATER BUDGETING

The water budgeting feature allows you to quickly increase or decrease the watering time per **program**. The currently programmed times can be adjusted by a percentage ranging from 0% through 255%. For example, in the winter you might want to water only 50% of the programmed time.

To use water budgeting:

1. Select the desired program, A or B.
2. Turn the dial to the Water Budgeting position.
The controller displays the current water budgeting percent, such as "100" for 100%.
3. Press the **On ▲** or **Off ▼** buttons to select the watering percent, such as "150" to increase watering by 50%, or "50" to decrease by 50%.

NOTE: Watering run times may be returned to their original values by setting to 100%.

NOTE: Watering times will be displayed as originally programmed.

NOTE: For percentages other than 100%, a period will appear in the lower right side of display. This is to alert the user of a water budget status in that program.

NOTE: The start time stacking feature on this controller provides start time overlap protection in the event that an error in programming or an increased water budgeting percent creates an overlap between cycle start times. If an overlap occurs, the controller will automatically suspend the start time until the current watering cycle finishes.

OPTION 1: SIX-DAY WATERING SCHEDULE

To give you greater flexibility, the watering calendar may be changed from its factory setting of 14 days to 6 days. This change affects both programs A and B. This feature provides for watering every day, every other day, every third day, or every sixth day.

1. Set the dial to the Options position.
2. Use the **Advance ▲** or **Advance ▼** buttons to select option 1.
3. Press the **On ▲** button.

To return to a 14-day schedule:

1. Set the dial to the Options position.
2. Use the **Advance ▲** or **Advance ▼** buttons to select option 1.
3. Press the **Off ▼** button.

OPTION 2: PROGRAMMING WATER TIME IN SECONDS

This feature changes all stations' watering times in program B to seconds. The watering time duration is from 0.1 minute to 9.9 minutes in 0.1-minute (6-second) increments.

1. Set the dial to the Options position.
2. Use the **Advance ▲** or **Advance ▼** buttons to select option 2.
3. Press the **On ▲** button.

To return to minutes mode (1 min. to 99 min):

1. Set the dial to the Options position.
2. Use the **Advance ▲** or **Advance ▼** buttons to select option 2.
3. Press the **Off ▼** button.

OPTION 3: PROGRAMMING WATER TIME IN HOURS

This feature changes all stations' watering times in program B to hours. The watering time duration is from 0.1 hour to 9.9 hours in 0.1-hour (6-minute) increments.

1. Set the dial to the Options position.
2. Use the **Advance ▲** or **Advance ▼** buttons to select option 3.
3. Press the **On ▲** button.

To return to minutes mode (1 min. to 99 min.):

1. Set the dial to the Options position.
2. Use the **Advance ▲** or **Advance ▼** buttons to select option 3.
3. Press the **Off ▼** button.

NOTE: The controller will not allow you to activate both seconds (option 2) and hours (option 3) at the same time. If one of these options is "ON" and another is selected as "ON," the first option will be turned off automatically. For example, if option 2 has been selected as "ON" and option 3 is then selected as "ON," option 2 will be turned off.

OPTION 4: LOOP OPERATION

This feature allows you to repeat the watering cycle for a specified length of time. Using this option allows you to have unlimited start times. When on, it changes watering start times 1 and 2 of program B to Loop Start and Loop Stop times. Watering start time 3 will remain as a normal start.

To program the loop cycle:

1. Set the dial to the Options position.
2. Use the **Advance ▲** or **Advance ▼** buttons to select option 4.
3. Press the **On ▲** button.
4. Select program B.
5. Set the dial to Watering Start Time 1 (loop start time).
6. Press the **On ▲** button or the **Off ▼** button to select the loop start time.
7. Set the dial to Watering Start Time 2 (loop stop time).
8. Press the **On ▲** button or the **Off ▼** button to select the loop stop time.

PROGRAMMING A LOOP DELAY

Use station 88 to program a delay during loop watering. This special station creates a delay between loop cycles with the master valve off for the amount of time you program.

1. Select option 4 “ON” (instructions above.)
2. Make sure the program switch is in the Program B position.
3. Set the dial to the Station Watering Time position.
4. Use the **Advance ▲** or **Advance ▼** buttons to select station 88.
5. Press the **On ▲** button or the **Off ▼** button to select the delay time (0 minutes to 99 minutes).

NOTE: Station 88 is always in minutes regardless of option 2 and 3 settings.

TROUBLESHOOTING

❖ Error

Solution...

❖ All Valves Will Not Turn on Automatically

1. Verify program: station watering time, watering start times, watering days schedule, current time, current day, and water budget.
2. Check valve common wire for proper hook-up.
3. Check for a fused station; refer to Controller Displays "Fuse" troubleshooting.

❖ Cannot Program

1. Remove battery (check voltage). Disconnect power to controller for 5 min. Reconnect power and reprogram. Reconnect good 9-volt alkaline battery.

❖ Controller Skips a Cycle

1. Verify watering start times and current time.

❖ No Display

1. Check incoming power and valve wiring.
2. Remove batteries (check voltage). Disconnect power to controller for 5 min. Reconnect power and reprogram. Reconnect good 9-volt alkaline battery.

❖ Valve Stays On

1. Disconnect valve; check for manual bleed closure.
2. Disconnect valve wire to valve. If still on, valve is bad.
3. Check for manual mode; place controller in Auto Run mode.
4. Check solenoids for obstructions or wiring shorts.
5. Check station watering times, option settings and water budget percentage.
6. Check valve for rocks or other obstructions or torn diaphragm.

❖ Error	Solution...
❖ Valve Will Not Turn On	<ol style="list-style-type: none">1. Make sure dial is not in the Rain Off position and is not in the programmed Rain Off mode.2. Make sure common wire and valve wire are correctly connected.3. Verify the program: station watering time, watering start times, watering days schedule, current time, current day, and water budget.4. Check solenoid.5. Check valve bleed tube.6. Check for a fused station; refer to Controller Displays “Fuse” troubleshooting. See also, “How the Electronic Circuit Breaker Works,” page 9.
❖ Controller Displays “FUSE”	<ol style="list-style-type: none">1. Note station numbers flashing. (Zero (0) is the master valve.)2. Examine wiring connections for breaks or bad connections. Repair and reconnect.3. Examine solenoid for shorted connections. Repaired and reconnect.4. Make sure solenoid rating does not exceed capacity of controller.5. Press both Advance buttons at the same time to reset.
❖ Controller Displays “Err 1” or “Err 2”	<ol style="list-style-type: none">1. Indicates hardware failure. Disconnect power for 5 minutes. If “Err” is still displayed, return for repair.

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