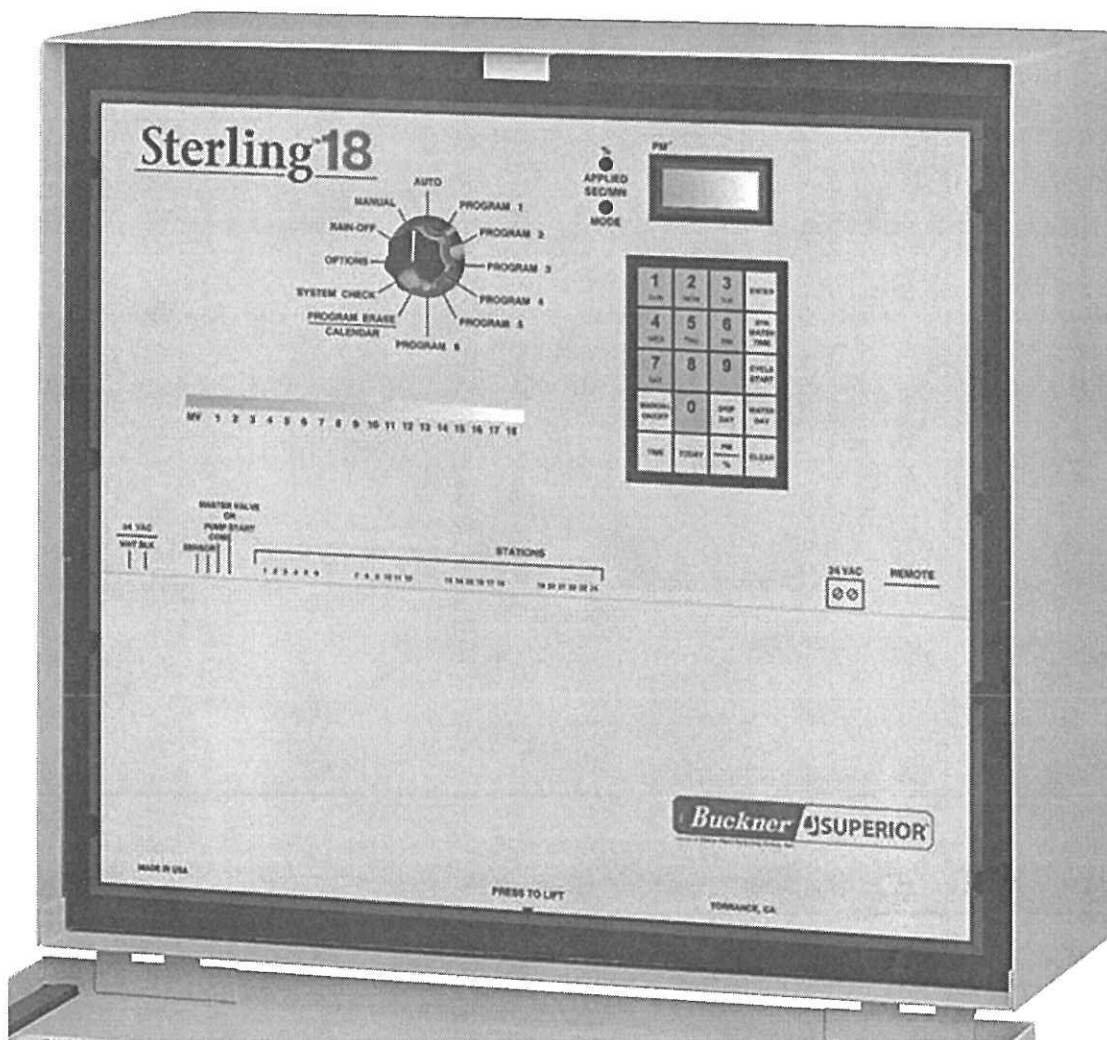


# SUPERIOR CONTROLS

## OWNERS MANUAL FOR STERLING CONTROLLERS INCLUDING MISTING APPLICATIONS



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# **SELECTING THE PROPER LOCATION FOR YOUR CONTROLLER**

## **Indoor Wall Mount**

If possible, always select an indoor location for your controller where you are assured of maximum protection from environmental hazards, accidents, and vandalism. Mount the controller on a solid, smooth surface shoulder high so the operator can easily see the display and read the faceplate graphics.

## **Outdoor Wall Mount**

The most desirable location is shoulder high on the shady side of a suitable wall. Avoid concealing the controller behind a shrub or near ground level where it will be in the direct path of a sprinkler head.

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# **MOUNTING THE CONTROLLER**

## **Wall Mount**

Select suitable fasteners such as molly bolts in plaster board, wood screws in wood, etc. Check to see that the head of the screw will pass through the keyhole slot in the rear of the case. Use the enclosed template to locate mounting screw holes.

If additional support is desired, remove lower plate on the enclosure by removing the screws that hold each side and mount one additional fastener through the lower hole in rear of housing.

## **Pedestal Mount**

If the unit is to be mounted on a pedestal, follow instructions supplied with the pedestal.

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## WIRING

1. Screw a 1/2" conduit to the threaded transformer mounting at bottom of case feeding transformer leads into conduit. Install and secure rigid conduit or armored cable as may be required by local electrical codes.
2. Route two wires from 110 VAC source through conduit and connect one to black transformer lead and the other to the white transformer lead using approved wire nuts.

To ground the controller, connect the green lead from the transformer (which is slightly shorter than the black and white leads) to a grounding wire. Grounding can also be achieved by securing metal conduit to the 1/2" conduit.

3. Route the 24 VAC wiring from the valves through the large hole in the bottom of the case. (NOTE: Check local code for approved method).

### **Sterling 4, 8, and 12:**

One wire is routed from each valve to the correspondingly numbered station terminal. Valve #1 corresponds with station terminal #1, valve #2 with station terminal #2, and so on. One common wire is connected in parallel with each valve and then to the "Common" terminal.

If a master valve or pump start circuit is required, connect one wire to the "Common" terminal and the other to the terminal marked "Master Valve or Pump Start".

### **Sterling 18, 24, 30, and 36**

Route the 24 VAC wiring from the field valves through the large hole in the bottom of the case. (NOTE: Check the local code for approved method.) One wire is routed from each valve to the correspondingly numbered pigtail. Valve #1 corresponds with pigtail #1, valve #2 with pigtail #2, and so on. One common wire is connected in parallel with each valve and to the pigtail labeled "Com".

If a master valve or pump start circuit is required, connect one wire to pigtail labeled "Com" and the other to pigtail labeled "Master Valve or Pump Start".

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## HOW THE BACKUP SYSTEM WORKS

The Sterling is equipped with a non-volatile memory that retains programmed information during power outages of any length. There is no need to reprogram when power is restored.

The controller is also equipped with a time-keeping circuit. A capacitor supplies power to the time-keeping circuit during power outages lasting up to 30 days. If power is restored after an outage of more than 30 days, it may be necessary to re-enter the correct time and day. No battery is required for the backup system.

If the power is restored during the time a watering cycle is normally under-way, the controller will resume operation at the station normally running at the time of power restoration.

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## BACKLIT DISPLAY

To conserve energy, the backlight of the display illuminates only when the program dial is rotated or a key on the keypad is pressed. The backlight will remain on while programming is underway, then shut off after 5 minutes of inactivity.

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## ELECTRONIC CIRCUIT BREAKER

The Sterling is equipped with an electronic circuit breaker. If the controller detects a short circuit at a station (valve), it will shut the station off and the display will alternately flash "FUSE" and the station number or "0" for the master valve. The controller will continue automatic operation at the other stations. During future watering cycles, the controller will skip over the shorted station until the short is repaired.

To clear the electronic circuit breaker, press the **CLEAR** key after you have investigated and corrected the cause of the short.

### Common conditions of the electronic circuit breaker include:

**CONDITION:** Fuse and one or more stations alternately flash.

**Cause:** Shorted solenoid coil and/or a short in the valve wires.

**Cause:** Too many valves are operating at the same time. No more than three valves (including master valve) should operate simultaneously.

**CONDITION:** Fuse displays without any station numbers.

**Cause:** A transient surge has spiked the line. Press **CLEAR**.

**Cause:** An overload has occurred for too short a duration for controller to determine the station number. Press **CLEAR**. If condition repeats during future cycles, activate a **System Check** short duration cycle and monitor display to determine which station is energized when **Fuse** appears on the display. Carefully check valve wiring for broken insulation and other conditions that may cause intermittent short.

**CONDITION:** **Fuse** is alternately displayed with **0** and none of the stations are operating automatically.

**Cause:** Short in master valve or pump start circuit. Check solenoid coil of master valve, pump start relay, and/or wiring. Press **CLEAR** after repair is made.

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## ELECTRICAL SPECIFICATIONS

**Input:** 120 VAC @ 50 or 60 Hz

**Output:** 24 VAC @ 40 VA

Maximum of two 4-watt solenoids per station.

Maximum of four 4-watt solenoids to operate simultaneously.

Optional Sterling H with 50 VA transformer enables up to five 4 watt solenoids to operate simultaneously, OR, for solenoids with current draw at or below .25 amps, up to 6 solenoids can operate simultaneously.

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## FEATURES LIST

In order to take full advantage of the Sterling's versatility and programming flexibility, we recommend that you become familiar with the features listed below:

- Six independent programs that can run concurrently.
- Up to nine cycle starts per day in all six programs; or loop watering optional in all six programs for unlimited cycles.
- Any station can be assigned to more than one program (all six if desired).
- Station timing adjustable from 1 minute to 24 hours in one minute increments. Seconds/minutes time base optional in all six programs.
- Watering calendar factory set at 7 days. For "skip day" scheduling (every other day, every third day, etc.) the watering calendar can be changed to any length between 1 and 32 days.
- Single program option that gives you the flexibility of having two or more programs scheduled, but limiting automatic operation to only that program at which the dial is set.
- Programmable delay of 1 sec. to 59 sec. between the time one station turns off and the next one turns on during a watering cycle
- System Check function programmable from 1 to 15 min. per station (or, optionally, 1 to 15 sec. per station). The controller will advance through all stations beginning with the one chosen to initiate the cycle.



- Percentage function to simultaneously increase or decrease the station water time of all stations within a program.
- Programmable Rain Off up to 14 days. The controller will resume automatic operation on the day following the last programmed "Off" day.
- Sensor feature that allows Program 6 to be activated by a "normally open" sensor switch such as a thermostat. Optional Frost Override feature disables programs 1 thru 5 during operation of Program 6.
- Loop watering in which a program's watering cycle is continuously repeated for a desired period. Cycles can repeat immediately or after a programmable delay of 1 min. to 4 hours, 15 min.
- Program-erase feature that allows existing programs to be erased individually or all at once.
- For simplified program review, the following information can be scrolled on the display: 1) watering duration of each station, 2) watering days, 3) skip days, 4) cycle start/stop times, and 5) status of options ("On" or "Of").
- Single entry procedure for entering the same watering time in a block of consecutive stations.
- Master valve/pump start circuit can be disabled during operation of any program.
- Manual valve/pump start station can be turned on manually without another station turning on.

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## ERASING CURRENT PROGRAMS

All settings within each program (except for current day and current time) can be erased with a single entry. Programs can be erased individually or all at once:

### 1. To Erase An Individual Program:

- a. Turn dial to desired program.
- b. Press the following keys in sequence:



Display will show a flashing “PE” to indicate that the program has been erased.

### 2. To Erase All Programs At Once:

- a. Turn dial to Program Erase/Calendar position.
- b. Press the following keys in sequence:



Display will show a flashing “PE” to indicate that all programs have been erased.

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## BASIC PROGRAMMING INSTRUCTIONS

For misting applications, see instructions beginning in on page 29.

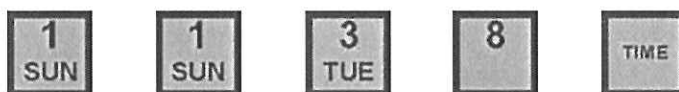
If you make a mistake while programming, the controller displays an error message. Press the **Clear** key, then repeat correctly the last programming step.

Follow the instructions below to set your program(s); or to make changes, deletions, or additions to the current program(s). Any program setting can be changed without affecting the rest of the program. To erase existing program(s), follow instructions on page 10.

To begin programming, turn the dial to a program (e.g., Program 1).

1. **Set Current Time:** Using the numbered keys, key in the current time. If it is p.m., the next step is to press the PM/% key (the p.m. indicator will show up on the upper left side of the display window). Next, press the Time key.

**EXAMPLE A:** Time is 11:38 a.m., press:



**EXAMPLE B:** Time is 4:35 p.m., press:



**Note:** Midnight is 12 00 am, Noon is 12:00 p.m.

2. **Set Today:** Key in the number corresponding to the current day of the week, then press **Today** key.

**EXAMPLE:** Today is Tuesday, press:



Time and Today functions need only be entered once and will automatically apply to all six programs. The remaining functions, covered in steps 3, 4, and 5 below, apply only to the program indicated by the program dial and must be entered in each program that is intended to operate automatically.

3. **Set Water Days:** Key in a day of the week that watering is to occur and then press the **Water Day** key. Repeat for all selected watering days.

**EXAMPLE:** Selected watering days are Sunday, Monday, and Wednesday. To program, press:



To delete a programmed Water Day, key in that day and press **Skip Day** key. When programming a Water Day, display will show “On” and the number corresponding to the appropriate day of the week (Sun. = 1, Mon. = 2, Tues. = 3, etc.). To indicate a Skip Day, display will show “Of” and the day number.

**Note:** To Schedule watering to occur on other than specific days of the week, such as every other day, every 3<sup>rd</sup> day, every 4<sup>th</sup> day, etc., refer to instructions on page 21.

4. **Set Station Water Time:** To set the watering duration of each station to be included in program:

- a. Key in station number.
- b. Press **Stn. Water Time** key.
- c. Key in watering duration.
- d. Press **Enter** key.
- e. Repeat for all stations to be included in this program.

**EXAMPLE A:** Station 4 to water for 24 minutes, press:



**EXAMPLE B:** Station 12 to water for 1 hour 40 minutes, press:



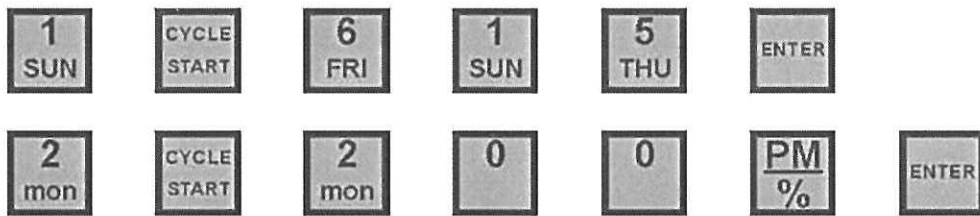
To change the watering duration of a station, follow steps a thru d above entering the new duration at step c. To delete a programmed station, enter “0” at step c.

Controller will skip unprogrammed stations.

5. **Set Cycle Start Time(s):** The cycle start time is the time of day a program will begin watering. For each cycle start time that is set (up to 9), all stations assigned to the program will water in sequence beginning with the lowest numbered station. To set the time a program will begin watering:

- a. Key in the cycle number (1= cycle start 1, 2 = cycle start 2, etc.)
- b. Press **Cycle Start** key.
- c. Key in time of day that cycle is to start.
- d. If cycle start is during p.m. period, press the **PM/%** key
- e. Press **Enter** key.
- f. Follow the same procedure for each additional cycle start. Up to 9 cycle start times may be scheduled in each program.

**EXAMPLE:** Controller is to initiate two watering cycles on the scheduled watering days. The first cycle is to start at 6:15 a.m.; second cycle to start at 2:00 p.m., press:



To change a cycle start time, follow steps a through e above entering the new time at step c. To delete a cycle start, enter “0” at step c.

Do not schedule a watering cycle to start prior to completion of the previous cycle within the same program. The controller will ignore the subsequent overlapping cycle. To determine the end time of a cycle, key in the cycle number (1= cycle start 1, 2= cycle start 2, etc.), then press the **Cycle Start** key twice.

To scroll through the start and stop times of all scheduled cycle starts, press the **Clear** key, then the **Cycle Start** key.

**INCOMPLETE PROGRAM ALERT:** To check if programming is complete, move the program dial out of its current position. A long beep signals that the programming is incomplete and the program will not run automatically. Move the program dial back to the position it was in to complete programming.

To continue programming, turn the dial to the next desired program and follow steps 3 through 5 above. Repeat for all other programs to be scheduled.

After programming has been completed, move the dial to the Auto position. This will lock the keyboard so that no unintentional program entries can be made. This display will show the current time of day.

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## **OPERATING THE CONTROLLER MANUALLY**

Manual operation allows you to perform a watering function without affecting the programmed watering schedule. This section includes instructions for the following manual operations:

- Advancing to another station during a watering cycle.
- Terminating a watering cycle.
- Manually turning a station on and off.
- Manually turning master valve/pump start station on and off.
- Activating one station to water for its programmed duration.
- Activating a watering cycle.
- Activating a System Check cycle.
- Rain Off.
- Programmable Rain Off.

## Advancing To Another Station During A Watering Cycle

To advance to another station, first turn dial to program in operation:

- a. Key in station to which advancement is desired.
- b. Press **Manual On/Off** key.
- c. Return dial to Auto position.

## Terminating a Watering Cycle

Turn dial to program in operation and press **Manual On/Off** key Return dial to Auto position.

## Manually Turning A Station On And Off

To turn station on:

- a. Turn dial to Manual position.
- b. Key in station number
- c. Press **Manual On/Off** key.

To turn station off, do one of the following:

- a. Press **Manual On/Off** key; OR
- b. Move dial out of Manual position; OR
- c. Select another station for manual operation.

**Note:** A station turned on manually will automatically shut off at midnight.

**Beep Alert:** While a station is on manually, the controller will sound two short beeps every 30 seconds.

## Manually Turning Master Valve Pump Start Station On and Off

To turn on the master valve/pump start station without other stations turning on:

- a. Turn dial to Manual position.
- b. Key in 0.
- c. Press **Manual On/Off** key.

To turn off master valve/pump start station, press **Manual On/Off** key, or move dial out of Manual position.

## Activating One Station To Water For Its Programmed Duration

To activate station:

- a. Turn dial to program in which station is included.
- b. Key in station number.
- c. Press **Stn. Water Time** key.
- d. Press **Manual On/Off** key.
- e. Return dial to Auto position.

After watering, controller will not advance to the next programmed watering station.

## Activating A Watering Cycle

To activate the watering cycle of a program at a time other than its scheduled start time(s), do the following:

- a. Turn the dial to desired program.
- b. Key in the first station intended to turn on.
- c. Press **Manual On/Off** key (Display will alternately flash station number and remaining water time.)
- d. Return dial to Auto position.

## Activating A System Check Cycle

This feature activates a watering cycle for a walk-thru check of the irrigation system. The controller will advance through all stations in sequence beginning with the station chosen to initiate the cycle. Station run time (same for all stations) is programmable from 1 to 15 minutes.

To initiate watering at Station 1:

- a. Turn the dial to System Check position.
- b. Key in station run time (1 to 15).
- c. Press **Manual On/Off** key.
- d. Return the dial to Auto position.

To initiate watering at a station other than # 1:

- a. Turn the dial to System Check position.
- b. Key in station run time (1 to 15).



- c. Press **Stn. Water Time** key.
- d. Key in number of station selected to initiate watering cycle.
- e. Press **Manual On/Off** key.
- f. Return the dial to Auto position.

To terminate cycle prior to completion, press **Manual On/Off** key while the dial is in System Check position.

**Note:**

1. Cycle will include stations with no programmed watering time.
2. Station run times can be changed from minutes to seconds (1-15 sec.) by activating Option 7 (see page 27).

## **Rain Off**

To discontinue automatic operation without affecting the program(s), turn the dial to Rain Off position.

To resume automatic operation, turn the dial to Auto position.

## **Programmable Rain Off**

Use this feature to suspend watering for a specific number of days (1 to 14). The controller will resume automatic operation on the day following the last **Off** day.

- a. Turn the dial to Rain Off position.
- b. Key in the number of **Off** days.
- c. Press **Enter**.
- d. Return the dial to Auto position.

In the Auto position, the display will indicate **Off** and the number of remaining days to be off.

To cancel programmable Rain Off:

- a. Turn the dial to Rain Off position.
- b. Press **0**.
- c. Press **Enter**.
- d. Return the dial to Auto position.

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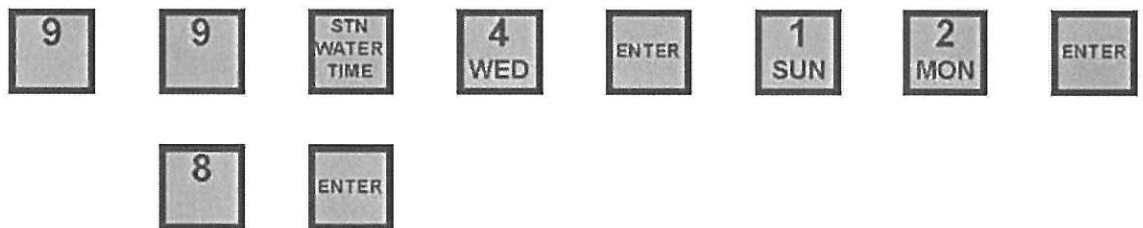
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## PROGRAMMING WATER TIMES OF CONSECUTIVE STATIONS USING ONE ENTRY

This feature is a short-cut method for programming station water time of consecutive stations with the same watering duration. This procedure replaces step 4 of Basic Programming Instructions. With dial at desired program:

- a. Key in number 99.
- b. Press **Stn. Water Time** key. ("START" will appear on display.)
- c. Key in number of the first station in the series.
- d. Press **Enter**. ("END" will appear on display.)
- e. Key in the number of the last station in the series.
- f. Press **Enter**. ("TIME" will appear on display.)
- g. Key in watering duration.
- h. Press **Enter**. The number entered for watering duration will flash to indicate that the entry has been accepted.

**EXAMPLE:** Stations 4 through 12 are each to water for 8 minutes in Program 2. With the dial in Program 2 position, press:



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## DISPLAYING CURRENT PROGRAM SETTINGS

Any program setting can be recalled without affecting the program. To display any of the following settings, turn the dial to the desired program.

**TIME** Press **Time** key and the display will show current time. (The current time is also displayed when the dial is in Auto position.)

**TODAY** Press **Today** key and the display will show the current calendar day. Unless the calendar has been set at other than a 7 day calendar, the number shown will correspond to current day of week (Sun. = 1, Mon. = 2, Tues. = 3, etc.).

**WATER DAYS** Press **Water Day** key and the display will scroll the water days as **On** days.

**SKIP DAYS** Press **Skip Day** key and the display will scroll the days watering will not occur.

**STATION WATER TIME** **Displaying Total Water Time For Program:** Press **Clear** key then press **Stn. Water Time** key. **Note:** Total water time shown takes into account water budget percentage.

### **Displaying Individual Station Water Time:**

1. Press **Clear** key.
2. Key in station number.
3. Press **Stn. Water Time** key.

**Note:** Water time shown takes into account water budget percentage.

**Scrolling All Stations Included In Program And Their Water Times:** Press **Clear** key, then press **Stn. Water Time** key twice. The controller will display each programmed station in sequence with its watering time.

**Note:** Water times shown take into account water budget percentage.

## CYCLE START/END

**Scrolling Cycle Start And End Times Of All Programmed Cycle Starts:** Press **Cycle Start** key and the controller will display in sequence all programmed cycle starts, first showing the cycle start number, then the cycle start time, and then the cycle end time.

**Note:** Cycle end time will take into account the water budget percentage.

If a loop cycle is programmed, "LOOP" is displayed as the cycle end time.

## OPTIONS

To display the status of all 9 options, first turn the dial to Options position, then press **Enter**. The controller will scroll through the options in sequence showing each as "On" or "Of" (Of = OFF).

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# ADDITIONAL FEATURES

## Using Water Budgeting

This feature allows you to simultaneously change the watering time of all stations within a program. The current settings can be increased or decreased within a range of 1% to 255%, with 100% representing the programmed time.

For example, in the winter you may wish to water only 50% of the programmed time.

To use Water Budgeting:

1. Turn dial to desired program.
2. Press the **PM/%** key. The controller displays the current water budgeting % (e.g. 100 for 100%).
3. Key in the new percent value.
4. Press **Enter** key. The controller flashes the new percent value and an LED located to the left of the display window illuminates to indicate that the water budget percentage is other than 100.

**EXAMPLE A:** The new watering duration of each station in Program 1 to be 75% of programmed settings. Turn dial to Program 1, then press:



**EXAMPLE B:** The new watering duration of each station in Program 2 to be 150% (50% increase) of programmed settings. Turn dial to Program 2, then press:



Note: Station water times may be returned to their original value by following steps 1 to 4 above, entering 100 at step 3.

Note: Watering times displayed take into account water budget percentage adjustments.

## Changing The Length Of The Watering Calendar

For greater flexibility, the watering calendar may be changed from its factory setting of 7 days to any other length from 1 to 32 days. **This change affects all programs.**

The calendar setting is the number the controller counts to, advancing one number each day, before resetting to 1. Watering occurs on all days set as water days.

To simplify programming, you may wish to shorten the calendar. A 2 day calendar, for example, will permit watering to occur every day (with days 1 and 2 both set as water days) or every other day (with either day 1 or day 2 set as a water day).

A longer calendar may also be programmed. For skip day programming, a 12 day calendar allows watering to be scheduled at any of the following intervals: every day, every 2<sup>nd</sup> day, every 3<sup>rd</sup> day, every 4<sup>th</sup> day, every 6<sup>th</sup> day, or every 12<sup>th</sup> day.

To change the watering calendar:

1. Turn dial to Program Erase/Calendar position.
2. Key in desired calendar length (1-32).
3. Press Enter key. The calendar flashes the number of days in the new calendar.

Note: The number entered for Today and Water Days (steps 2 and 3 of Basic Programming Instructions) cannot be greater than the selected calendar length.

**EXAMPLE:** Using a twelve day calendar, schedule watering to occur once every four days.

**Set Today:** With dial at the desired program, key in a number representing a calendar day (1-12), then press the **Today** key.



**Set Water Days:** With dial at the desired program, press:



Note: Every fourth day watering could also be scheduled by programming days 3, 7, and 11 as water days; or 2, 6, and 10 as water days.

## Loop Watering

This feature allows a program's watering cycle to be continuously repeated for a desired period. The cycle may repeat immediately or after a scheduled delay. The delay is programmable from 1 minute to 4 hours, 15 minutes (regardless of whether the program is in minutes mode or seconds mode).

The instructions below replace the instructions in step 5, page 13 of the Basic Programming instructions.

To set the time that watering will start (beginning of loop), turn dial to desired program.

- Press **9** key.
- Press **Cycle Start** key.
- Key in the time of day that watering is to start. If during p.m., the next step is to press the **PM/%** Key.
- Press **Enter** key.

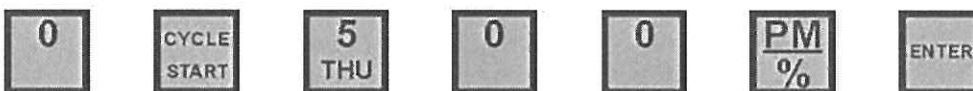
To program the time that watering will stop (end of loop):

- Press **0** key.
- Press **Cycle Start** key.
- Key in time of day watering is to end. If during p.m., the next step is to press the **PM/%** key.
- Press **Enter** key.

**EXAMPLE:** To program a loop beginning at 9:00 a.m. and continuing until 5:00 p.m., press the following keys to program beginning of loop:



Press the following keys to program end of loop:



To change the beginning of the loop and/or the end of the loop, repeat either or both of steps a thru d above, entering the new time at step c. To delete the loop, enter 0 at step c for both the beginning and end times.

## Delay:

To schedule a delay between cycles:

- Key in number **90**.
- Press **Stn. Water Time** key
- Key in delay time (1 minute to 4 hours, 15 minutes).

**Note:** The delay time is the period between the end of one cycle and the start of the next.

- Press **Enter** key.

**EXAMPLE A:** To schedule a 20 minute delay between cycles, press the following keys:



**EXAMPLE B:** To schedule a delay of 2 hours and 30 minutes between cycles, press the following keys:



To change the delay follow steps a thru d above entering the new time at step c. To delete the delay, enter 0 at step c.

After programming has been completed (including steps 1-4 of Basic Programming Instructions), watering will begin automatically at the next scheduled start time (beginning of loop). To activate the loop cycle prior to then, follow the instructions below:

### Manually Starting Loop Cycle

To activate a loop cycle at other than its scheduled start time (beginning of loop), do the following:

- a. Turn the dial to desired program.
- b. Key in the first station intended to turn on.
- c. Press **Manual On/Off** key. (Display will alternately flash station number and remaining water time.)
- d. Return dial to Auto position.

**Note:** If loop cycle is manually started, it will continue until its programmed end time (end of loop) unless it is manually stopped before then.

**Manually Stopping Loop Cycle:** With dial at program in operation, press **Manual On/Off** key.



## Programming A Delay Between Stations

This feature allows for a delay of 1 to 59 seconds between the time one station turns off and the next one turns on during a watering cycle. The delay time is deducted from the previous station's programmed watering time. For example, a station with 5 minutes of programmed watering time will turn off after 4 minutes, 50 seconds if a 10 second delay is set.

To program a delay, first turn dial to desired program:

- a. Press 0 key.
- b. Press **Stn. Water Time** key.
- c. Key in delay time (1 to 59).
- d. Press **Enter**.

Repeat procedure for any other programs in which a delay is desired.

Note: Master Valve/Pump Start station will stay on during delay

To change delay time, follow steps a thru d, entering new time at step c. To delete delay, enter 0 at step c.

**EXAMPLE:** To program a delay of 6 seconds in Program 2, turn dial to Program 2, then press:



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## USING THE OPTIONS

Adding to the versatility of the Sterling are nine options, described below, that are used to make certain changes in operation of the controller.

### Option 0: Single Program

This option gives you the flexibility of having two or more programs set, but limiting automatic operation to only that program at which the dial is set. If the dial is moved to a position other than a program position (e.g. Auto), then all programs are allowed to operate automatically.

To activate Option 0:

1. Turn dial to Options position.
2. Press 0 key.
3. Press **Manual On/Off** key. Display will indicate "On: 0".

To cancel Option 0, repeat steps 1, 2, and 3. Display will indicate "OF:0" (Of = OFF).

### Options 1 thru 6: Seconds Mode

Options 1 thru 6 are used to change the time base in programs 1 thru 6 from minutes/hours to seconds/minutes. (Option numbers correspond to program numbers.) Each program is set separately. Once set, the station run times within that program are adjustable from 1 second to 24 minutes in 1 second increments.

To activate the seconds mode option in a program:

1. Turn dial to Options position.
2. Key in the program number (1-6).
3. Press **Manual On/Off** key. The display will indicate "On" followed by the program number.

To cancel the seconds mode option in the program, follow steps 1, 2, and 3. Display will indicate "Of" followed by the program number (Of = OFF).

**Note:** To determine the status of all 17 options (On or Off), turn dial to Options and press **Enter** key. The controller will scroll thru all options showing each as “On” or “Of” (Of = OFF).

**Note:** If the dial is turned to a program in which the seconds mode option is activated, an LED labeled “sec/min mode” located to the left of the display will illuminate.

## **Option 7: Seconds Mode In System Check Feature**

Option 7 is used to change the programmable station run time in the System Check feature from 1-15 minutes to 1-15 seconds.

To activate Option 7:

1. Turn dial to Options position.
2. Press 7 key.
3. Press **Manual On/Off** key The display will indicate “On:7”.

To cancel Option 7, repeat steps 1, 2, and 3. The display will indicate “Of:7” (Of = OFF).

## **Option 8: Frost Override Cycle**

Option 8 is used to alter the operation of the controller when Program 6 is activated by a sensor switch (see **Using A Sensor To Activate Program 6**, page 28). With Option 8 enabled, Program 6 starts immediately upon closure of the sensor switch and all other programs are disabled. If the sensor switch remains closed at the end of the cycle, the cycle is repeated immediately. When the sensor switch opens, Program 6 immediately stops operating and all other programs are allowed to resume automatic operation.

To Activate Option 8:

1. Turn dial to Options position.
2. Press 8 key.
3. Press **Manual On/Off** key The display will indicate “On:8”.

To cancel Option 8, repeat steps 1, 2, and 3. The display will indicate “Of:8” (Of = OFF).

## Options 11 thru 16: Disable Master Valve/Pump Start Circuit

Options 11 thru 16 are used to disable the master valve/pump start circuit during operation of a program. Option numbers correspond to program numbers with option #11 corresponding to program 1, option #12 corresponding to program 2, and so on.

To disable the master valve/pump start circuit during operation of a program:

1. Turn dial to Options position.
2. Key in option number that corresponds to desired program.
3. Press **Manual On/Off** key. The display will indicate "On" followed by the option number

To cancel the option, repeat steps 1, 2, and 3. Display will indicate "Of" followed by the option number (Of = OFF).

## Using A Sensor To Activate Program 6

A "normally open" sensor device such as thermostat, can be used to activate watering in Program 6.

To use this feature, connect the sensor device to the sensor terminals of the controller. The only programming required is to set the station watering times of the stations to be included in Program 6 (step 4 of Basic Programming Instructions). When the sensor switch closes, a watering cycle is initiated in Program 6 after the switch has remained closed for 30 seconds. If the sensor contacts open before completion of the cycle, the controller will finish the cycle in progress. If, at the end of the cycle, the sensor switch remains closed for an additional 30 seconds, the cycle is repeated.

**Optional Frost Override Cycle:** Option 8 is used to alter the operation of the controller when Program 6 is activated by a sensor switch. (See instructions for activating Option 8, page 27.) With Option 8 activated, Program 6 starts immediately upon closure of the sensor switch and all other programs are disabled.

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## **MISTING APPLICATIONS**

Designed with the greenhouse grower in mind, the Sterling is a highly flexible misting controller in addition to being an ideal controller for virtually all other irrigation applications. The following instructions are for misting applications only. For other watering applications, follow the instructions beginning on page 11.

### **Programming Features Include:**

- Individual station timing adjustable from 1 second to 24 minutes in 1 second increments.
- “OFF” time between misting cycles adjustable from 1 minute to 255 minutes in 1 minute increments.
- Cycling can be scheduled to begin and end automatically (built-in 24-hour clock)
- Cycling can be started and stopped manually as well as automatically.
- Period of time each day that cycling will occur is adjustable from 1 minute to 23 hours 59 minutes
- Six independent programs that can run concurrently.
- Programmable pause of 1 second to 59 seconds between stations to allow full valve closure before advancement to the next station.
- No limit on the number of programs to which a station can be assigned.

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## **PROGRAMMING INSTRUCTIONS FOR MISTING APPLICATIONS**

If you make a mistake while programming, the controller displays an error mes-

sage. Press the **Clear** key, then repeat correctly the last programming step.

Follow the instructions below to set your program(s); or to make changes, deletions, or additions to the current program(s). Any program setting can be changed without affecting the rest of the program. To erase existing program(s), follow instructions on page 10.

To begin programming, turn the dial to a program (e.g., Program 1).

1. **Set Current Time:** Using the numbered keys, key in the current time. If it is p.m., the next step is to press the **PM%** key (the p.m. indicator will show up on the upper left side of the display window). Next, press the **Time** key.

**EXAMPLE A:** Time is 11:38 a.m., press:



**EXAMPLE B:** Time is 4:35 p.m., press:



**Note:** Midnight is 12:00 a.m., Noon is 12:00 p.m.

2. **Set Today:** Key in the number corresponding to the current day of the week, then press **Today** key.

**EXAMPLE:** Today is Tuesday, press:



Time and Today functions need only be entered once and will automatically apply to all six programs. The remaining functions, covered in steps 3, thru 9 below, apply only to the program indicated by the program dial and must be entered in

each program that is intended to operate automatically.

3. **Set Water Days:** Key in a day of the week that watering is to occur and then press the **Water Day** key. Repeat for all selected watering days.

**EXAMPLE:** Selected watering days are *Sunday, Monday, and Wednesday*. To program, press:



To delete a programmed Water Day, key in that day and press **Skip Day** key. When programming a Water Day, display will show “On” and the number corresponding to the appropriate day of the week (Sun. = 1, Mon. = 2, Tues. = 3, etc.). To indicate a Skip Day, display will show “Of” and the day number.

4. **Activate “Seconds” Mode:** Options 1 thru 6 are used to change the time base in programs 1 thru 6 from minutes/hours to seconds/minutes. (Option numbers correspond to program numbers.) Each program is set separately. Once set, the station run times within that program are adjustable from 1 second to 24 minutes in 1 second increments.

To activate the seconds mode option in a program:

- a. Turn dial to Options position.
  - b. Key in the program number (1-6).
  - c. Press **Manual On/Off** key. The display will indicate “On” followed by the program number.
  - d. Return dial to previous position to continue programming.
5. **Set Station Water Time:** To set the watering duration of each station to be included in program:
    - a. Key in station number.
    - b. Press **Stn. Water Time** key.
    - c. Key in watering duration.
    - d. Press **Enter** key.
    - e. Repeat for all stations to be included in this program.

**EXAMPLE A:** Station 4 to water for 24 seconds, press:



**EXAMPLE B:** Station 12 to water for 1 minute 40 seconds, press:



To change the watering duration of a station, follow steps a thru d above entering the new duration at step c To delete a programmed station, enter “0” at step c.

Controller will skip unprogrammed stations.

6. **Set Start-of- Cycling Time:** To set the time that watering will start (beginning of loop):
  - a. Press **9** key.
  - b. Press **Cycle Start** key.
  - c. Key in the time of day that watering is to start. If during p.m., the next step is to press the **PM/%** key.
  - d. Press **Enter** key.

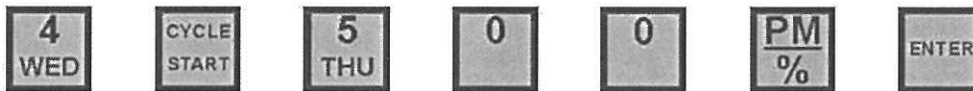
**EXAMPLE:** If cycling is to begin at 9:00 a.m., press:



7. **Set End-of-Cycling Time:** To program the time of day that cycling will stop (end of loop):
  - a. Press **0** key.
  - b. Press **Cycle Start** key.
  - c. Key in time of day watering is to end. If during p.m., the next step is to press the **PM/%** key.
  - d. Press **Enter** key.



**EXAMPLE:** If cycling is to end at 5:00 p.m., press the following keys:



8. **Set Delay Between Cycles:** During the cycling period, watering cycles will repeat immediately unless a delay is scheduled. The “OFF” time between cycles can range from 1 minute to 4 hours and 15 minutes (regardless of whether the program is running in minutes mode or seconds mode). To schedule a delay:

- a. Key in number **90**.
- b. Press **Sta. Water Time** key.
- c. Key in delay time (1 minute to 4 hours and 15 minutes).
- d. Press **Enter** key.

**EXAMPLE A:** To schedule a 20 minute delay between cycles, press the following keys



**EXAMPLE B:** To schedule a delay of 2 hours and 30 minutes between cycles, press the following keys



**Programmable Pause:** This feature allows for a delay of 1 second to 59 seconds between the time each station shuts off and next one turns on as stations are sequencing through the cycle. The pause will be deducted from the previous station’s water time. If a pause is desired, follow step #9.

9. **Set Pause Between Stations:**

- a. Press **0** key.
- b. Press **Stn Water Time** key.
- c. Key in delay time (1 to 59).
- d. Press **Enter**.

**EXAMPLE** To program a pause of 6 seconds, press:



To delete pause, follow steps a through d above, entering “0” at step c.

After programming has been completed, watering will begin automatically at the next scheduled start time (beginning of loop). To activate the loop cycle prior to then, follow the instructions below.

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## MANUALLY STARTING LOOP CYCLE

To activate a loop cycle at other than its scheduled start time (beginning of loop), do the following:

- a. Turn the dial to desired program.
- b. Key in the first station intended to turn on.
- c. Press **Manual On/Off** key. (Display will alternately flash station number and remaining water time.)
- d. Return dial to Auto position.

**Note:** If loop cycle is manually started, it will continue until its programmed end time (end of loop) unless it is manually stopped before then.

**Manually Stopping Loop Cycle:** With dial at program in operation, press **Manual On/Off** key.

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## PROGRAM REVIEW

To recall any of the following functions without affecting the Program, turn Program Knob to the program to be reviewed.

- TIME** Press **Time** key and display will show current time.
- TODAY** Press **Today** key. The number shown will correspond to current day of week (Sun. = 1, Mon. = 2, Tues. = 3, etc.)
- WATER DAYS** Press **Water Day** key and display will scroll the Water Days
- STATION WATER TIME**
- Individual Station Water Time:** Key in station number, then press **Stn. Water Time** key.
  - Combined Water Time Of All Stations Included In Program:** Press **Clear** key, then press **Stn. Water Time** key.
  - Scrolling Of Water Times Of Stations Included In Program:** Press **Clear** key, then press **Stn. Water Time** key **two times**. The display will alternately flash station number and watering time for each programmed station.
- LOOP START/END** Press **Cycle Start** key. Display will show "Loop" followed by start of loop time, then end of loop time.

