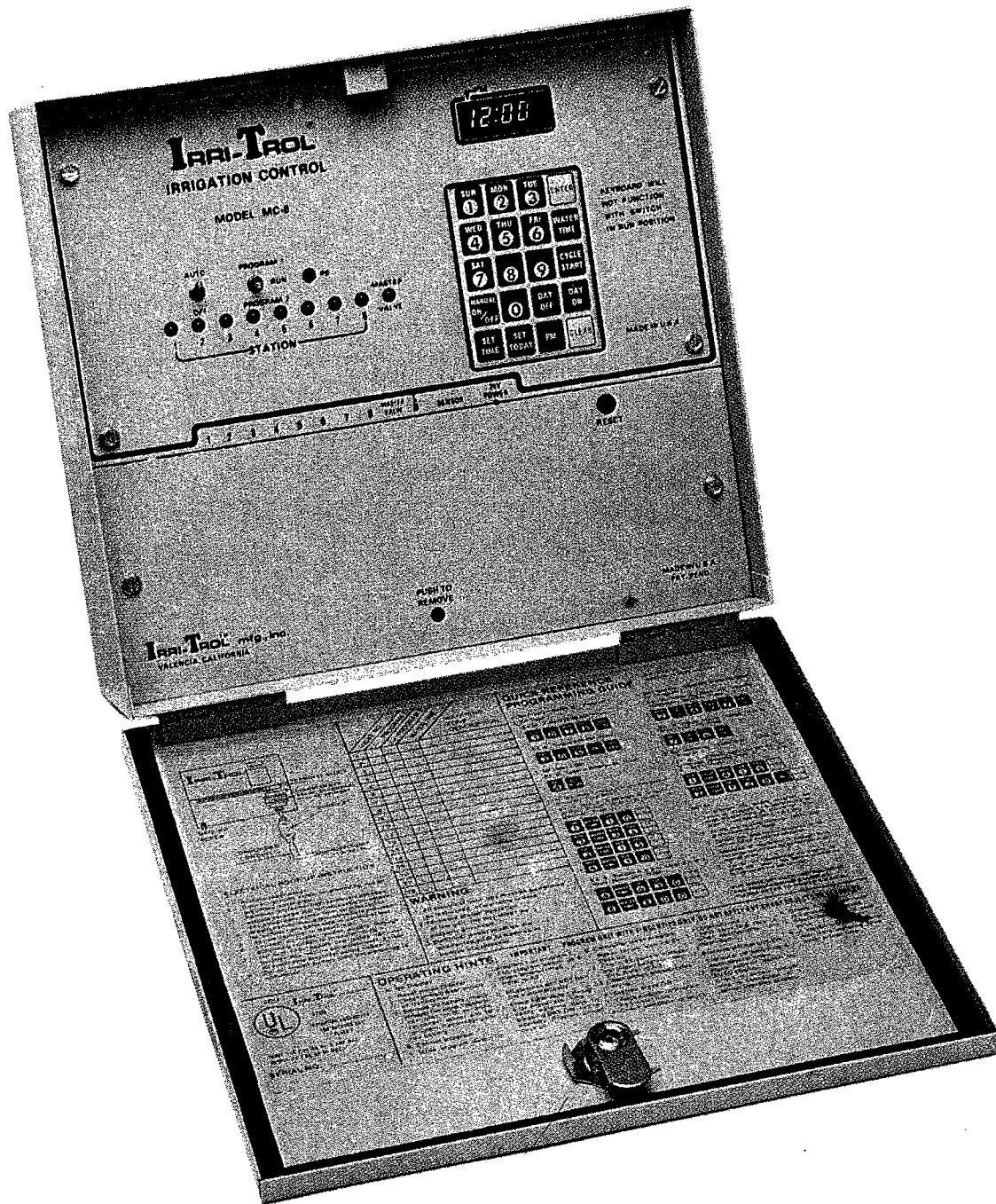


# IRRI-TROL®



**MC-4, MC-8, MC-12 & MC-18  
OWNER'S MANUAL**



# MC - SERIES CONTROLLERS

## FEATURES TABLE

No.	DESCRIPTION	M C 4	M C 8	M C 12	M C 18
1.	Solid State logic, programmable micro-computer, no moving parts, all functions accurate within fraction of a second.	●	●	●	●
2.	20 key programming keyboard, bright digital display for daylight visibility.	●	●	●	●
3.	Weatherproof steel case for outdoor installation, with lock and two keys.	●	●	●	●
4.	Station light, indicating the watering station(s).	●	●	●	●
5.	One 9 volt battery (battery not included) keeps program in memory during temporary power failures.	●	●	●	●
6.	Automatic Safety Back-up Program (ASBP).	●	●	●	●
7.	Program Erase (PE) Switch.		●	●	●
8.	Resettable Circuit Breaker.		●	●	●
9.	Master valve or Pump start station.	●	●	●	●
10.	Provision for sensor hook-up.		●	●	●
11.	True Dual Programming.	●	●	●	●
12.	Each station can be programmed to water from 1 min. to 9 hrs. and 59 minutes.	●	●	●	
13.	Each program (1 and 2) can water four times (cycles) per day, controller can water 8 times utilizing both programs.	●	●	●	
14.	Third Syringe Program (1-9 min.)				●
15.	During each watering cycle, all programmed stations will water in sequence.	●	●	●	●
16.	Optional auxiliary program for the last two stations.			●	
17.	7-Day weekly schedule for watering.	●	●	●	●
18.	Optional 6-Day watering program. Allows: Every other day, three days and six days watering schedules.			●	●
19.	Rain Switch (Auto/Off) turns off watering stations.	●	●	●	●
20.	Available with 220/240 volt, 50 cycles wiring.	●	●	●	●
21.	Pedestal available for free standing installation.	●	●	●	●
22.	UL Listed.	●	●	●	●


# GLOSSARY

 ~  , Numeral Keys

 ~  , Day of the Week Keys


 ~   , Station Number Keys

 ~  , Number of cycle Repeats per Program Keys

 , enters the correct time, and starts digital clock.


 , indicates PM period.


 , enters Today's Day.

 , selects each Station's watering duration.


 , selects Start Time for each Watering Cycle.

 , enters "Water Time" and "Cycle Start" functions.

 , enters the selected watering days.

 , deletes a programmed "Day On".

 , operates Stations manually.

 , clears display only. (Will not clear programmed functions.)

**Program Switch:** Selects the Programming mode.

**Rain Switch:** "Auto" position; automatic, semi-automatic and manual operations. "Off" position; omits all watering schedules, and turns off the presently watering stations.

**PE Switch:** Program Erase Switch. (Not included in MC-4.)

**Master Valve:** Automatically activated during all watering periods.

**Sensor:** Normally closed terminals, provided for sensor override. (Not included in MC-4.)

**9V Battery Back-Up:** Keeps program in memory during power failures. Battery will not continue to keep time; i.e. if power is restored after 5 minutes, clock will be five minutes slow.

**Reset Button:** (Not included in MC-4.) Resettable Circuit Breaker, (Press to reset.) Protects controller's logic and station's outputs.

# 1. INSTALLATION INSTRUCTIONS

## 1.1 Mounting The Control Box

1.1.1 The controller is in an outdoor rain-tight and dust-proof box. Nevertheless, it should be installed away from direct sprinkler spray and if possible in shaded and dry location. **Do not** install in closed and humid environment, or area subjected to continuously heavy condensation.

1.1.2 Mount controller vertically on flat and secure surface. Use enclosed template for locating mounting screws. Follow complete mounting instructions on template (Fig.1).

1.1.3 For free standing pedestal type installation follow the installation instructions in the pedestal box (Fig. 2).

## 1.2 Electrical Hook-Up

1.2.1 Remove lower panel.

1.2.2 Follow wiring diagram (Fig. 3). Strip wires approx. ¼" (do not bend exposed end), insert straight bare wire between plates of "sure grip" terminal, tighten screw firmly.

**NOTE:** Follow all local applicable electrical wiring codes.

1.2.3 To avoid any possible damage to controller, follow carefully terminal block wiring assignments.

**NOTE:** Before power is turned on, recheck all the leads connected to the terminal block, for shorts or incorrect terminal assignment.

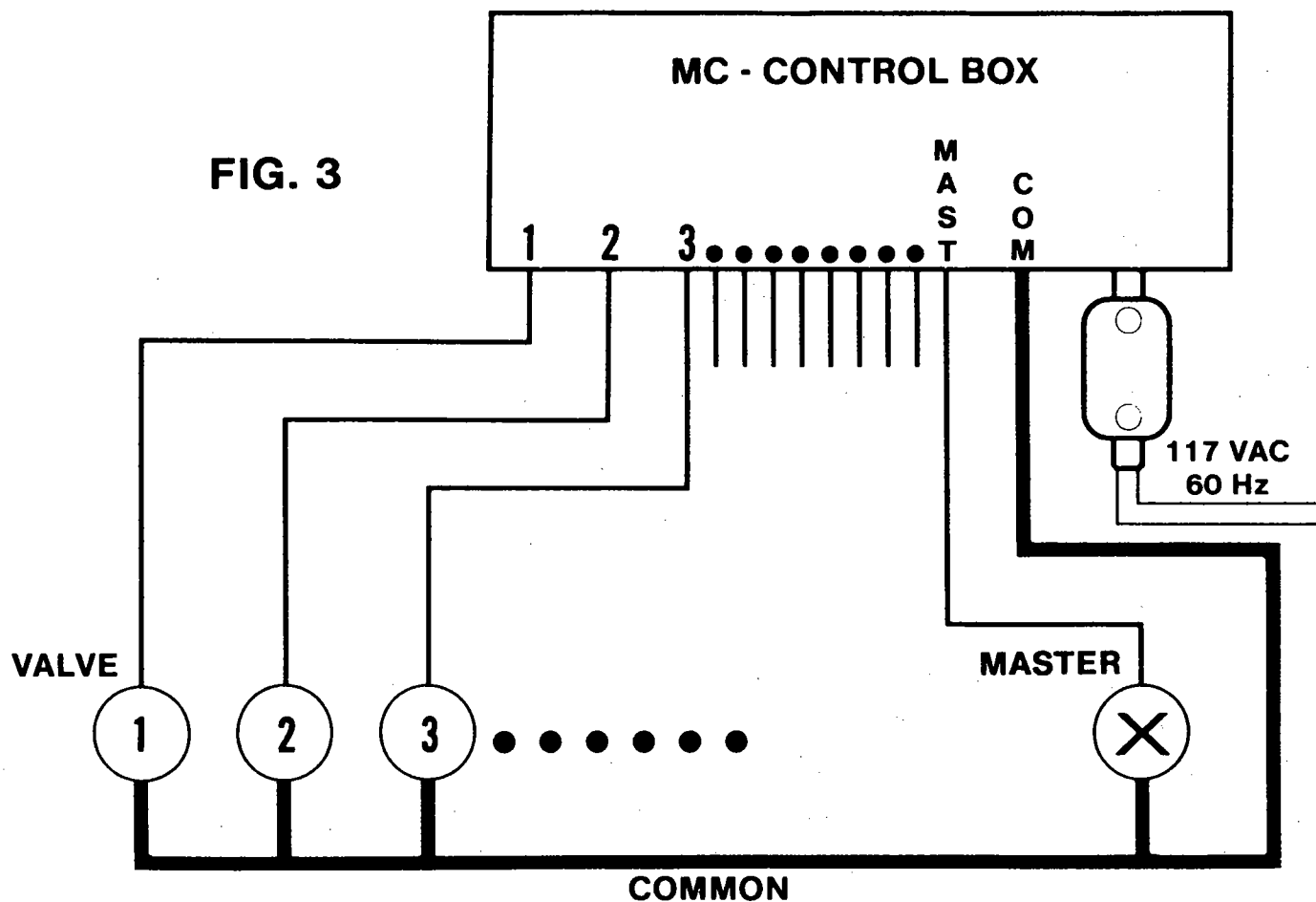
1.2.4 Maximum of two 4-watt solenoid valves can be connected to each station. Maximum of four 4-watt solenoid valves can be programmed to operate simultaneously. (Maximum 2 solenoids for MC-4)

**CAUTION:** Under no circumstances should station terminal be shorted to common, to create sparks for station identification.

1.2.5 Sensor terminals are shorted by factory. Do not remove jumper unless sensor is being used.

1.2.6 Remount lower panel.

1.2.7 Turn on power supply to controller.



### ELECTRICAL WIRING DIAGRAM

**NOTE:** Do not remove Terminal screws! Only loosen enough to insert bare wire.

## 2. OPERATIONS INSTRUCTIONS

### 2.1 Total Installation Check

2.1.1 The controller is now in the "Automatic Safety Back-Up Program" (ASBP). **Do not erase until checking procedure is completed.** The "ASBP" is automatically activated when power supply is turned on for the first time. Furthermore, it will be reactivated after every power failure if 9 volt battery is not installed, or if battery fails during power loss. (Good battery will keep program in memory during power loss of up to three days.) When the "ASBP" is activated each station is programmed to water for 10 minutes, every day, at the time of day that the power was restored. The "ASBP" is assigned to Program 1 only.

**2.1.3** All stations are programmed for 10 minutes of watering on Program 1.

**2.1.4** Operate all stations manually "On" and "Off". Check for correct station to valve wiring and proper valve operation.

**2.1.5** Manual "On" operation can be performed on each individual station by pressing the station number (1, 2, 3...10...18), then pressing the "Manual On/Off" key. Second depression of the "Manual On/Off" key will turn the station "Off". Only one station can be manually "On" at one time on the same program.

**NOTE:** The three requirements for manual operation are:

1. Program switch must be in Program 1 or Program 2 mode.
2. "Auto Off" switch must be in "Auto" mode.
3. A station must have "Water Time" programmed into it.

**2.1.6** If valves are spread over large area and walking the system is required, semi-automatic operation can be performed. Program each station for short "Water Time". Turn station one manually on. Each station will water for the length of "Water Time" programmed, turn itself off and sequence to the next station until cycle is completed through the last station.

**2.1.7** Connect 9 volt battery to the snap type connector. (Battery not included. Alkaline or Duracell battery is recommended for longer service life.) Battery should be replaced once a year or whenever necessary.

**NOTE:** Do not remove insulating tube from battery snap, if battery is not installed. Battery to be installed only after programming is completed.

## **2.2 PROGRAMMING INSTRUCTIONS**

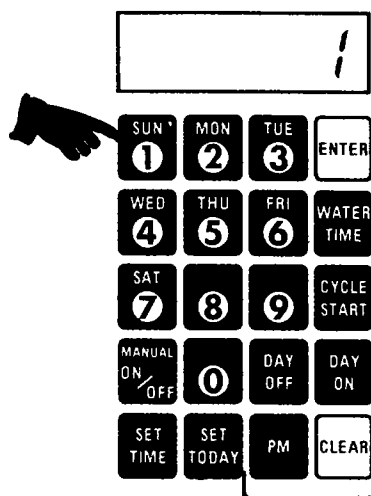
**2.2.1** Program Switch must be set to Program One or Two, before any programming or manual operations can be performed. There are five required programming steps:

1. Set Time: Enters the correct time and starts the digital clock.
2. Set Today: Enters Today's day.
3. Water Time: Enters the watering duration for each individual station.
4. Days On: Enters the watering days of the week.
5. Cycle Start: Enters the starting time for each watering cycle.

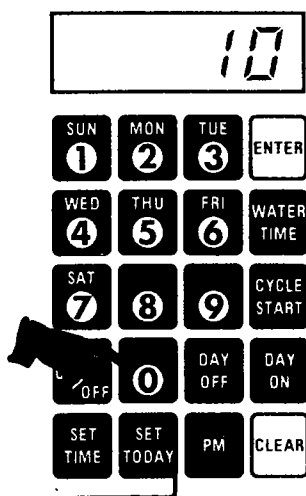
Each Program operates independently, therefore, must be programmed separately. Only Time and Today's Day functions apply to both Programs.

**2.2.2 Set Time:** Enter correct time (to the display) using numeral keys. Then press “Set Time” Key. If during PM period, press “PM” Key prior to “Set Time” Key.

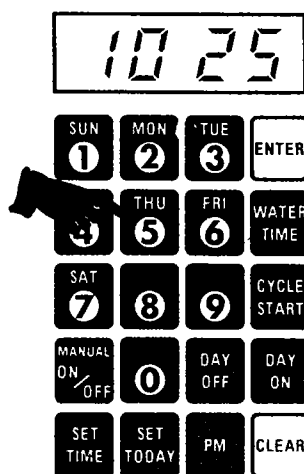
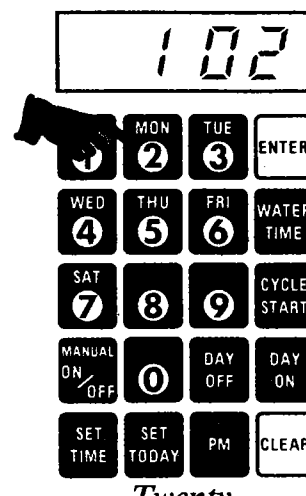
**EXAMPLE A: Time is 10:25 AM, Press:**



*Ten*



*Twenty*



*Five*



*Set Time*

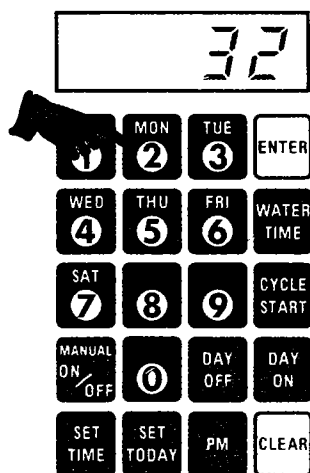
**Programming Hints:**

*Before attempting to program the controller for the first time, get familiar with the programming procedures by simulating the examples in this booklet.*

**EXAMPLE B: Time is 3:28 PM, Press:**



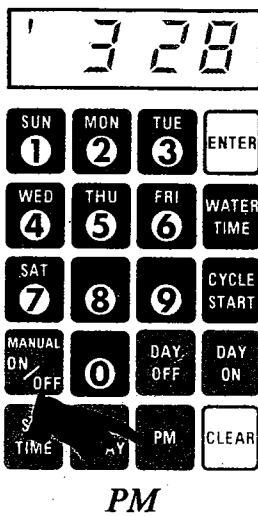
*Three*



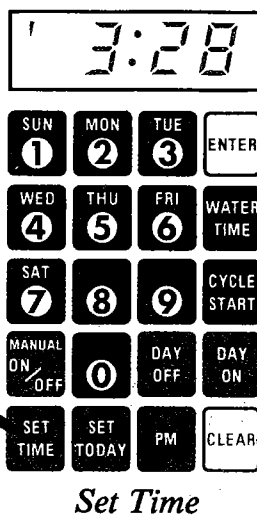
*Twenty*



*Eight*



*PM*



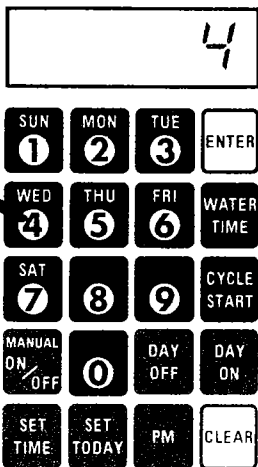
*Set Time*

### **NOTE:**

12:00 AM — Midnight,  
12:00 PM — Noon

**2.2.3 Set Today:** Press Today's Day Key (the corresponding number will appear on the display), then press "Set Today" Key.

*EXAMPLE: Today is Wednesday, Press*



*Wed*



*Set Today*

**2.2.4 Program Erase (PE):** When programming for the first time, or reprogramming at some future date, the PE switch can be used to completely erase the "ASBP", or all previously programmed functions, except the Time of Day and Today's Day. The "Program Erase" switch is located behind the "PE" hole in center of main panel. To activate, press gently with a thin and long non-metallic object through the "PE" hole.

**NOTE:** Program Switch must be in Program 1 or Program 2 mode while "PE" switch is pressed. "PE" switch will erase both programs when activated.

**2.2.5 Water Time:** Each station can be programmed to water from 1 minute to 9 hours & 59 minutes, with one minute increments. To set the watering period for each station:

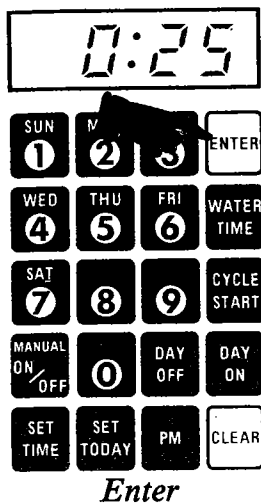
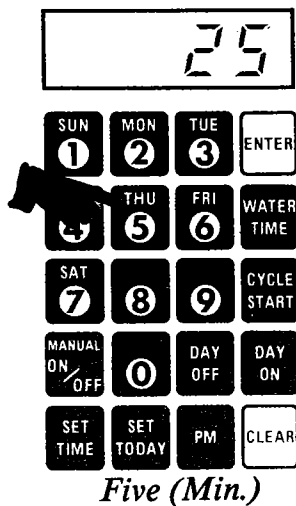
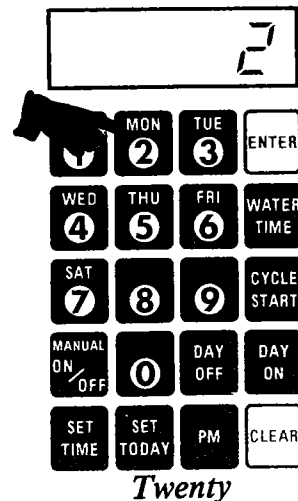
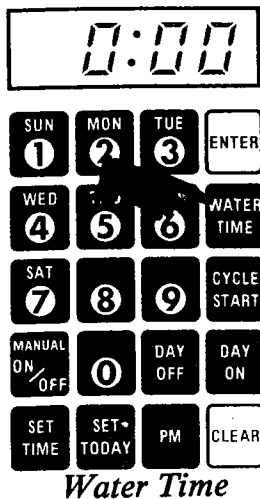
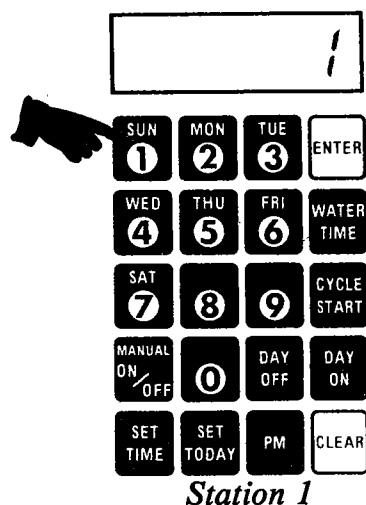
- Press Station Number (1, 2, 3...) Key.
- Press "Water Time" Key.

- Press Watering Period.
- Press "Enter" Key.

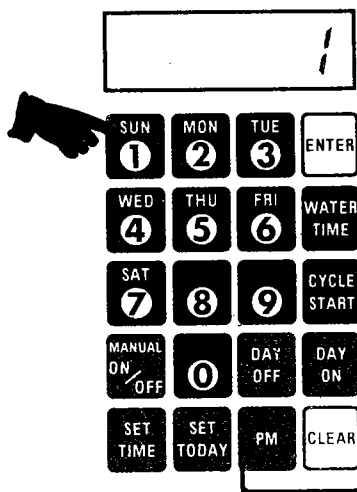


Programmed stations will water in sequence. Controller will skip a non-programmed station, or one with zero "Water Time". To delete a programmed station, enter "Zero" as watering period.

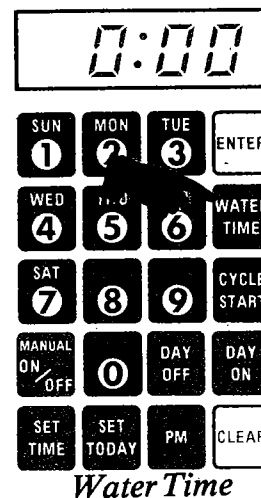
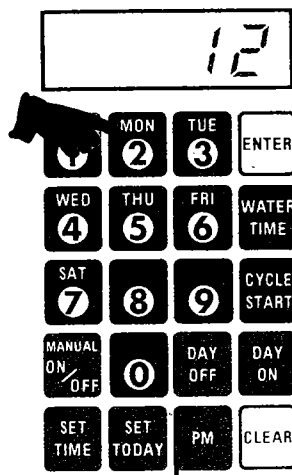
**EXAMPLE A: Station 1 to water for 25 minutes, Press:**

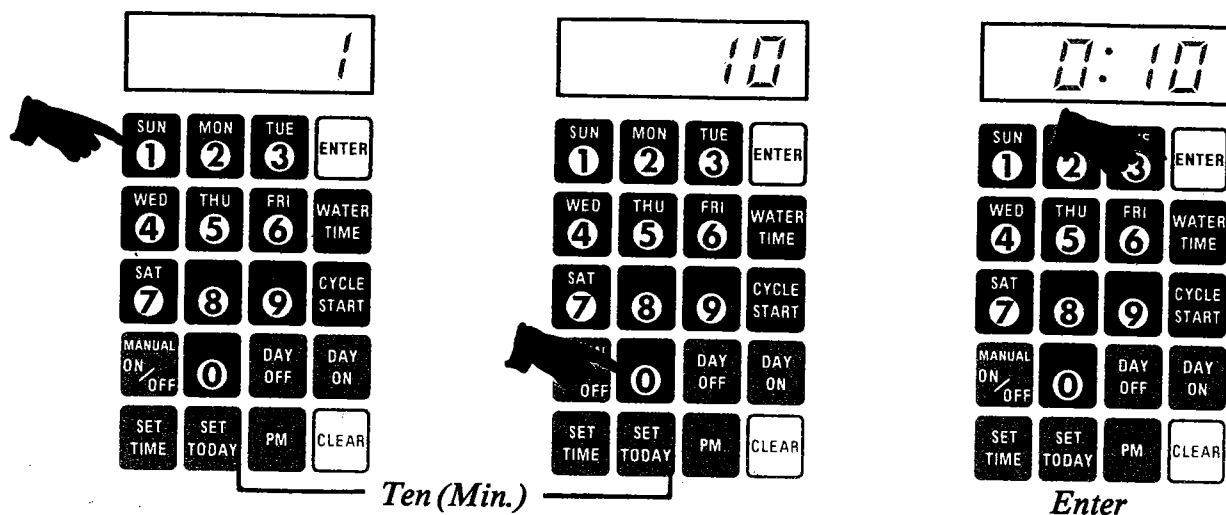


**EXAMPLE B: Station 12 to water for 10 minutes, Press:**

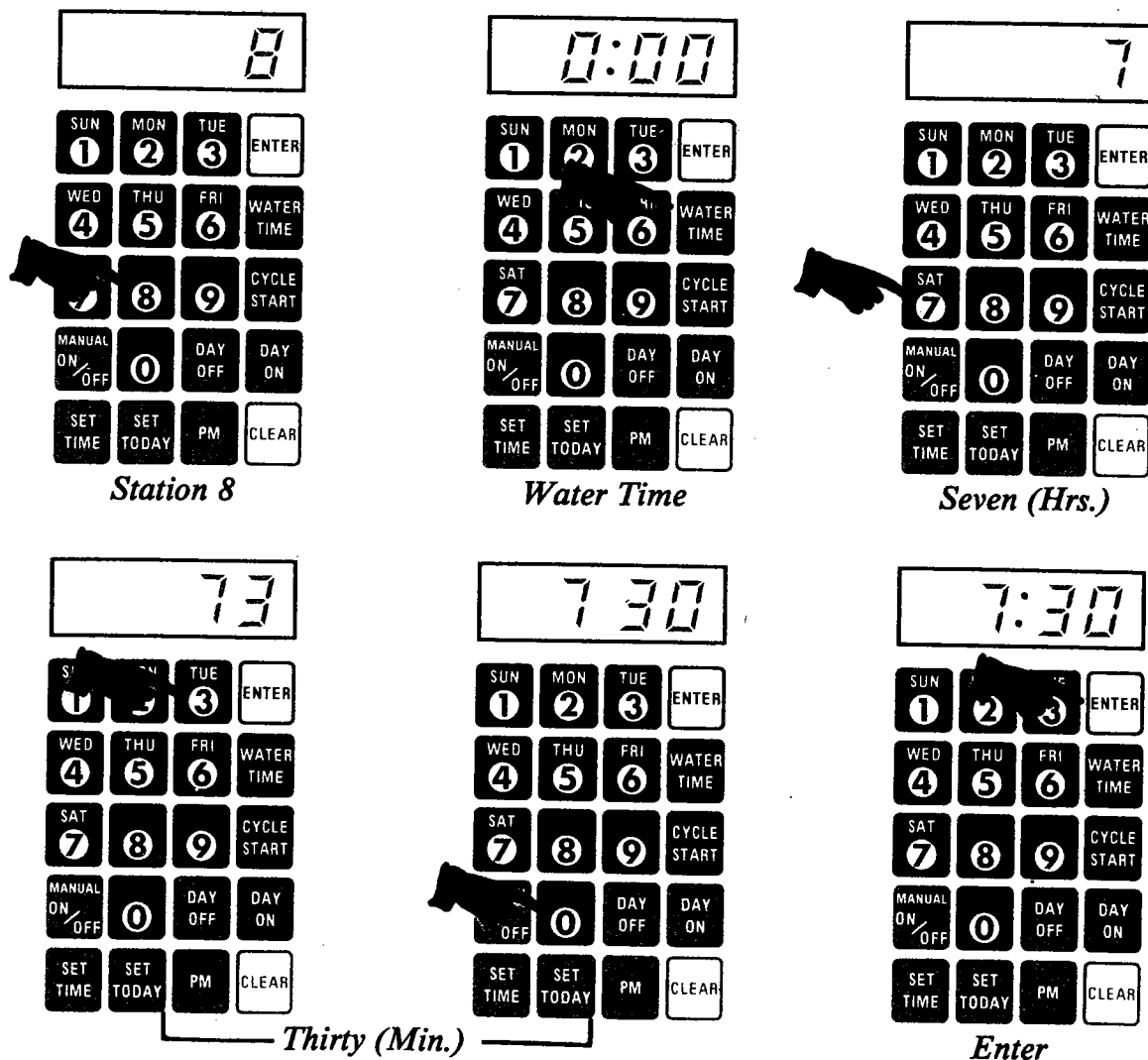


*Station 12*





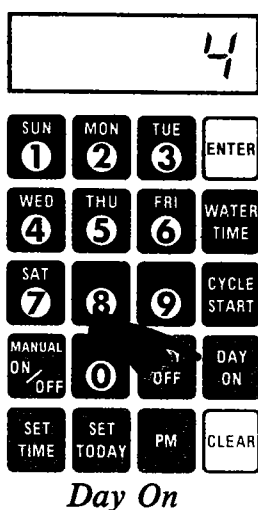
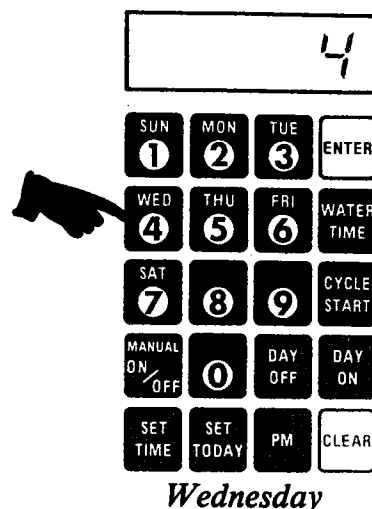
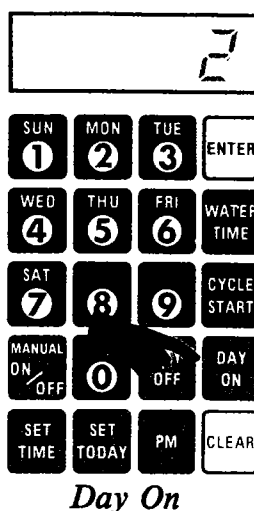
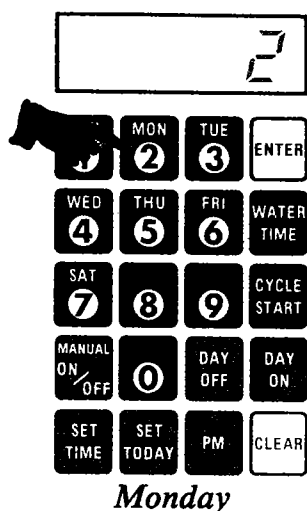
**EXAMPLE C: Station 8 to water for 7½ hours, Press:**



**2.2.6 Set Days On:** To program the watering days of the week, press a watering day then press the “Day On” Key. Repeat the same for all the days selected as watering days. To eliminate a programmed watering day, press the key of that day, then the “Day Off” Key.

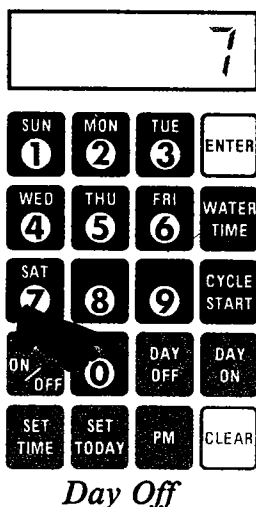
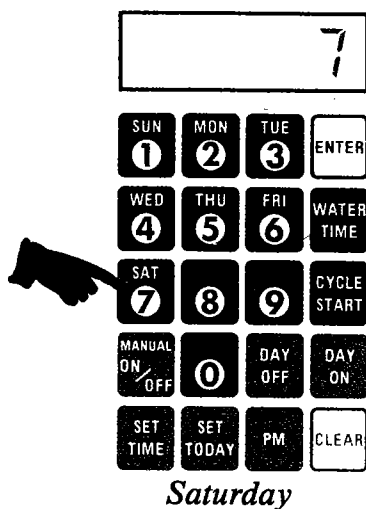
**EXAMPLE A:** The selected watering days are: Monday, Wednesday

and Saturday, Press:



**NOTE:** To check for proper entry of programmed days on, press "Day On" Key repeatedly. The programmed watering days will be displayed in sequence.

**EXAMPLE B:** Change watering days to Monday, Wednesday and Friday, press:



**2.2.7 Cycle Start:** Each program can have as many as four cycle repeats per day. To program "Cycle Start":

- Press Number of Cycle (1, 2, 3 or 4) Key.
- Press "Cycle Start" Key.
- Press the time of day to start watering.
- Press "PM" Key, only if cycle is to start during PM period.
- Press "Enter" Key.

Follow the same for each additional cycle repeat. To delete a "Cycle Start", enter Zero as the time of day to start watering.

**EXAMPLE A:** Controller is to water twice a day, on the scheduled watering days. 1st cycle to start at 4:15 AM, 2nd cycle to start at 9:45 PM. Press:

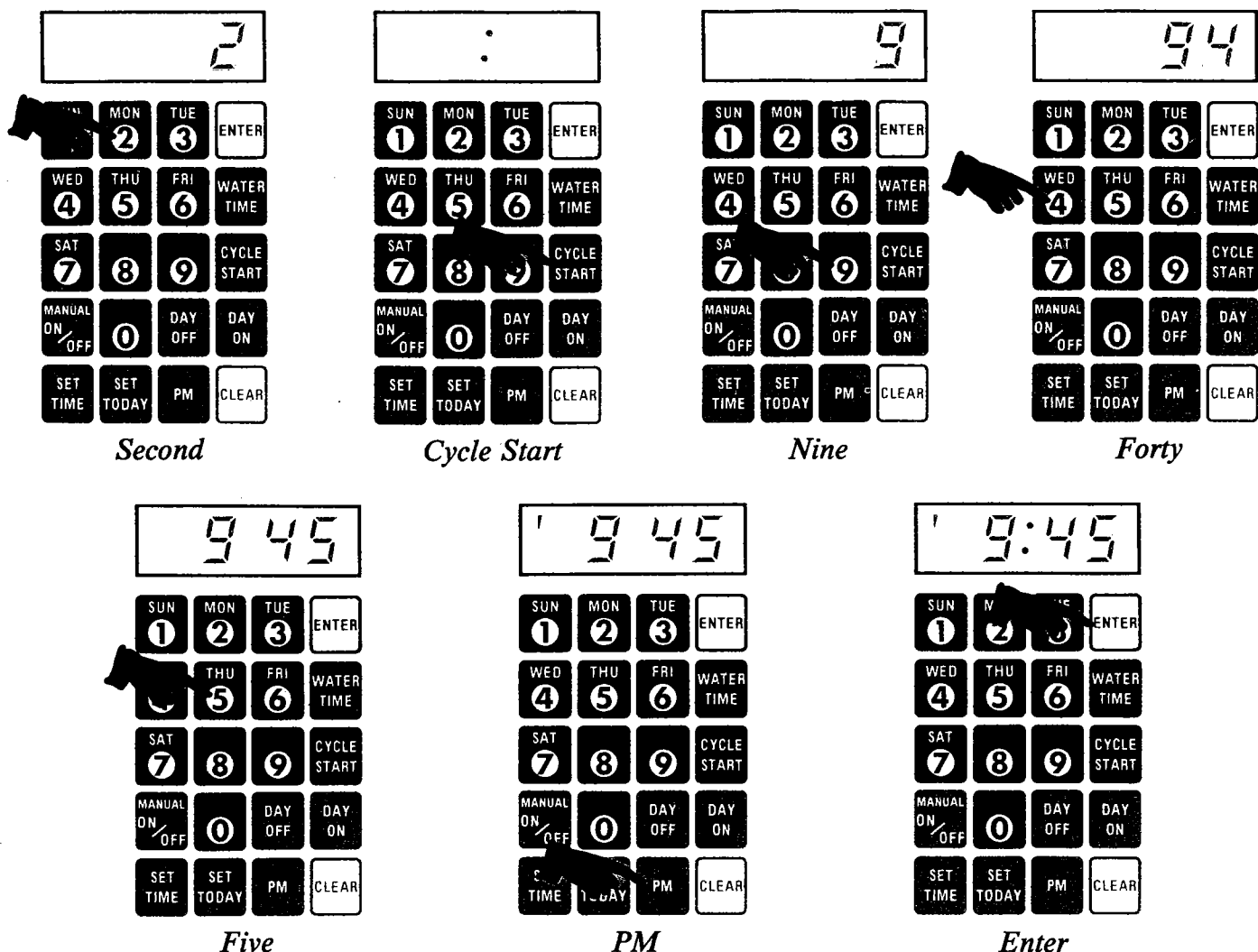
**First**

**Cycle Start**

**Four**

**Fifteen (AM)**

**Enter**



**NOTE:** Only one cycle can be watering at one time on each program. A watering cycle must end before a second cycle can start, otherwise the controller will skip (ignore) the second cycle.

**2.2.8 Dual Programming:** If dual programming is required, repeat instructions 2.2.5 through 2.2.7 for Program 2. All or any of the stations can be programmed on both programs. If the same stations are programmed on both programs, 8 cycle repeats per day can be achieved. The two programs can be scheduled to water at the same time, operating two groups of valves. (Make sure that sufficient water flow is available for proper sprinkler coverage.) Maximum of 2 valves can be on at the same time.

**2.2.9 Run Position:** When programming is completed, return "Program Switch" to the "Run" position. It will lock the keyboard, and return time to the display.

**NOTE:** The Automatic Program will operate at any switch position. Nevertheless, the return to "Run" position will eliminate unintentional program entries.

#### 2.2.10 Error Display:



will appear on the display if unacceptable function is entered. Programming can not be continued until "Err" is cleared. Clear Error by pressing "Clear" Key and repeat last programming function properly.

**NOTE:** Clearing the "Err" from the display **will not** clear from memory any good and acceptable function which was previously entered and accepted by the program.

### 3. DISPLAY OF PROGRAMS AND CHANGE OF PROGRAMMED FUNCTIONS

Display or change of programmed functions can be performed in a Program mode only (Program 1 or Program 2).

#### Set Program Switch to Program 1 position:

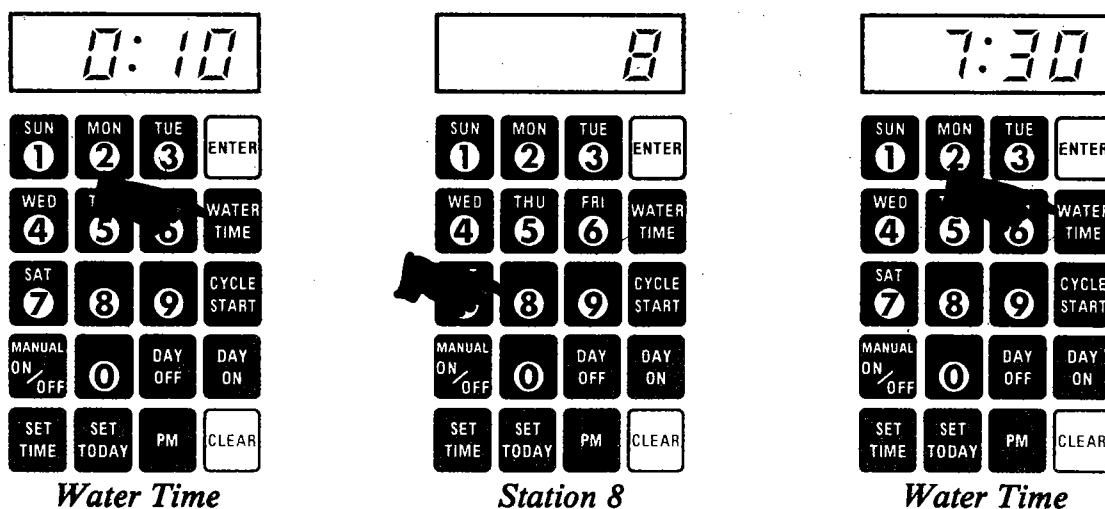
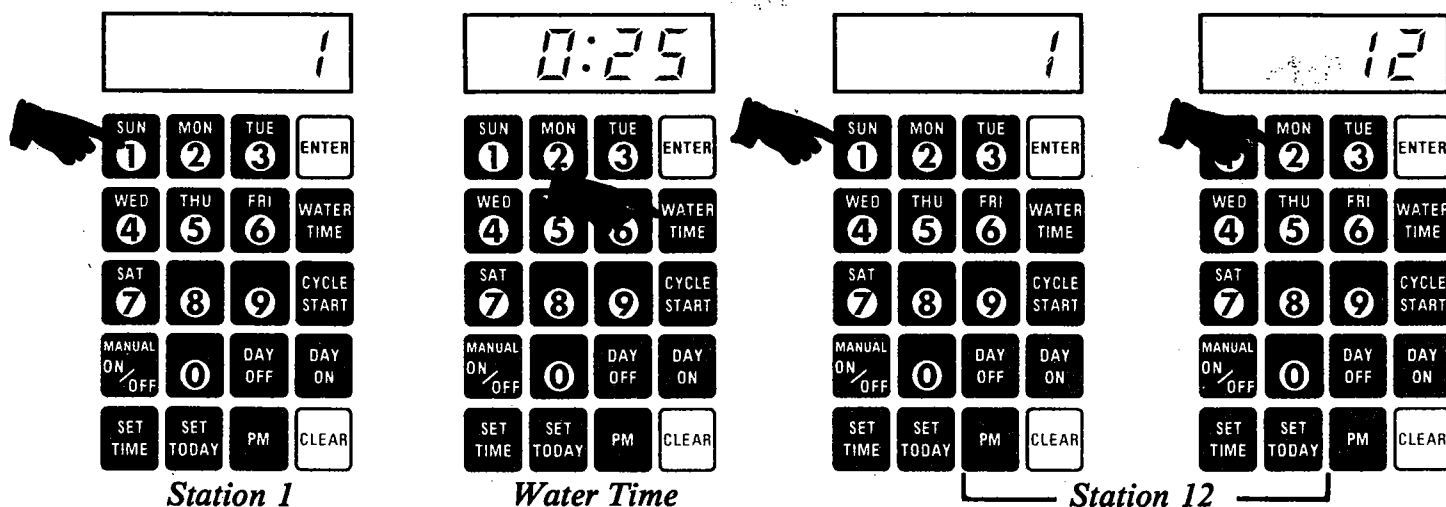
**3.1.1 Time Function:** The time is continuously displayed while controller is in "Run" mode. To display the time while programming in a Program mode, press "Clear" Key, then "Set Time" Key. To change the time, press Numeral Keys for correct time, then "Set Time" Key.

**3.1.2 Today's Day Function:** Press "Set Today" Key, the corresponding numeral to Today's Day will appear on the display. If change is needed, press Numeral Key of correct day, then "Set Today" Key.

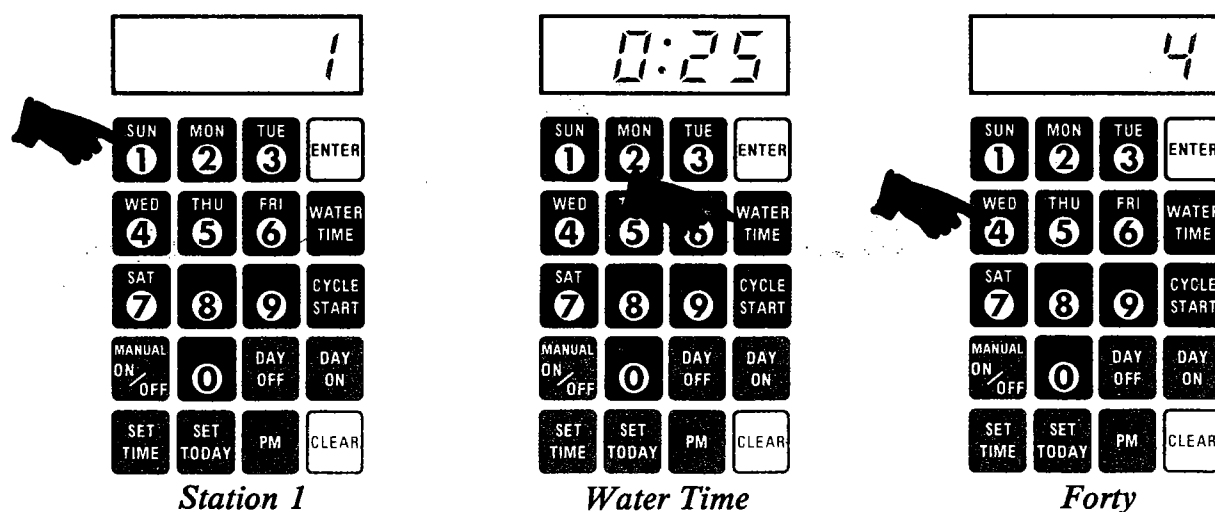
The following instructions should be performed separately for Program 1 and Program 2.

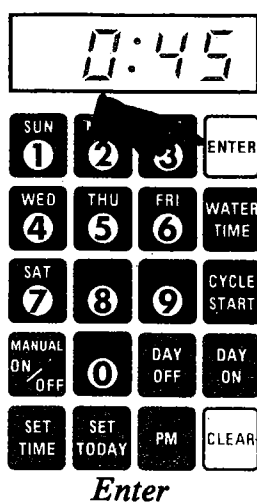
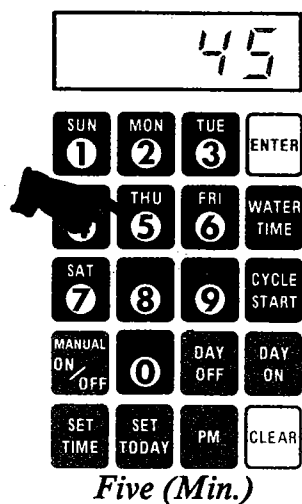
**3.1.3 Water Time Functions:** Press Numeral 1 Key, then "Water Time" Key, the programmed watering duration for Station 1 will appear on the display. Repeat the same for all Stations. Stations which did not display watering time (three zeros), will be skipped by controller during watering sequence. If change of watering duration is needed while displaying the programmed "Water Time", press the Numeral Keys of the new desired watering duration, then press "Enter" Key. To omit or skip a programmed station, change watering duration to zero, then press "Enter" Key.

**EXAMPLE A:** Display the “Water Time” functions from Examples A, B, & C, of Section 2.2.5. Set Program Switch to Program 1, Press:



**EXAMPLE B:** Change water time of Station 1 from 25 minutes to 45 minutes (Ex. A, 2.2.5), Press:

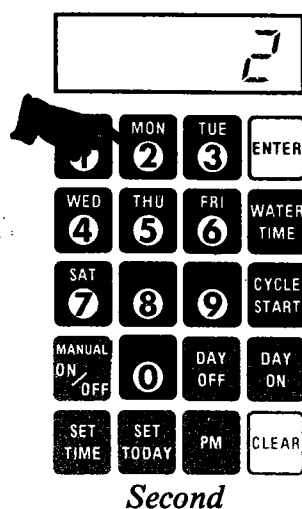
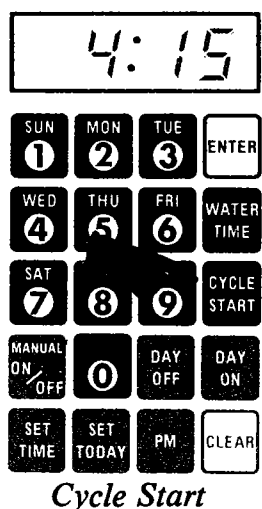
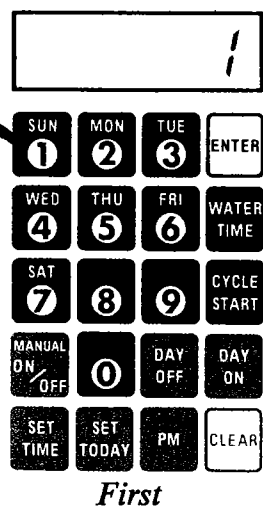




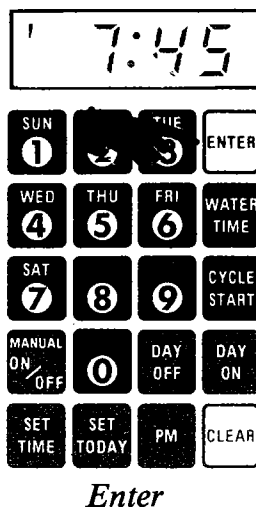
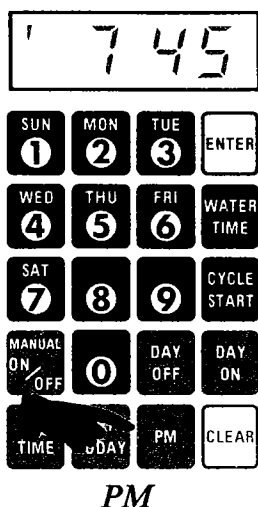
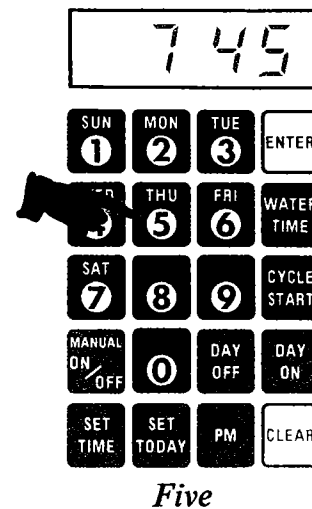
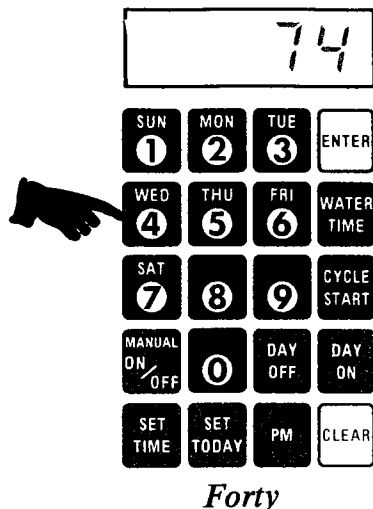
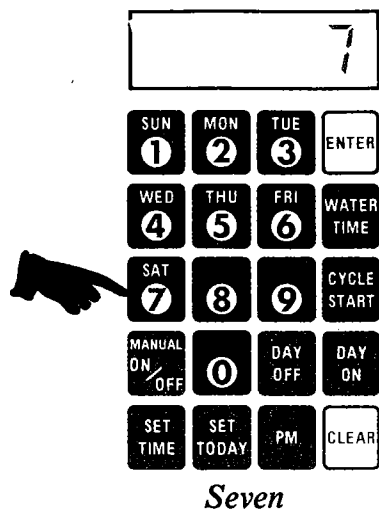
**3.1.4 Scheduled Watering Days Functions:** To display the numerals representing the scheduled watering days, press "Day On" Key repeatedly. The scheduled watering days will appear on the display in sequence (1-7). To omit a scheduled watering day, press the Day Key (Sun-Sat), then press "Day Off" Key. To add watering day to the schedule, press the Day Key, then "Day On" Key.

**3.1.5 Cycle Start Functions:** Press Numeral 1 Key, then "Cycle Start" Key. The programmed time of the day for the first cycle will appear on the display. Repeat the same for 2, 3, & 4 Cycle Starts. (Display will turn blank if no "Cycle Start" was assigned.) To change the programmed "Cycle Start" after the existing programmed one is displayed, press the Numeral Keys corresponding to the new selected "Cycle Start" time, then press the "Enter" Key.

*EXAMPLE A: Display the Cycle Starts (from Ex. A, Section 2.2.7), and change the 2nd start to 7:45 PM, Press:*







## 4. ADDITIONAL FEATURES

### 4.1 MC-12

**The MC-12** provides two optional features which can be activated by turning “On” switches 1 and 2 of the miniature dip switch located between the terminal block and the reset button. Remove lower panel to expose switch.

**4.1.1 Both switches “Off” (down position):** The MC-12 controller will operate normally. None of the options is activated.

**4.1.2 Switch 1 “On” (up position), switch 2 “Off” (down position):** Controller will operate on six days watering schedule. This will provide programming capabilities for every other day, three days and six days watering schedule.

**NOTE:** When operating on 6 days watering schedule, (even schedule), watering will occur on different days every week, unless scheduled to water every day.

**4.1.3 Switch 1 “Off” (down position), switch 2 “On” (up position):** Auxiliary program can be performed on stations 11 and 12 independently of stations 1 through 10.

- A. Stations 1 through 10 (irrigations stations) can be programmed as before, with the exception of each program having only three "cycle starts" (cycles 1 through 3).
- B. Stations 11 and 12 (auxiliary stations) will turn on every day regardless of the scheduled "Days On" and "Days Off" of the irrigation stations. Cycle start No. 4 on program 1 and 2 is designated for the auxiliary stations only.

**Note:** The auxiliary and the irrigation stations can operate at the same time (simultaneously), only when scheduled on different programs (1 and 2).

**4.1.4 Both switches "On" (up position):** The two options are applicable together.

## 4.2 MC-18

**4.2.1 Water Time:** In Programs 1 and 2 stations 1 through 16 can be programmed to water from 1 to 59 minutes. Stations 17 and 18 can each water from 1 minute to 9 hours and 59 minutes. In Program 3 (syringe cycle), all stations can water only from 1 to 9 minutes. The "Water Time" is entered only once, with the same watering duration for all stations.

**NOTE:** In Program 3 the watering stations and duration on can not be individually selected for each station.

**4.2.2 Cycle Start:** Programs 1 and 2 can have up to 3 watering cycles (repeats) per day. Six repeats per day can be achieved by having the same station(s) on both programs. Program 3 (syringe cycle) can be programmed to water once a day only.

**4.2.3 Days On:** Watering days can be individually selected for all programs (1, 2, and 3).

**4.2.4 Programming Guide:** For Programs 1 and 2 use the same programming procedure as in the programming instruction section (pp. 6-17).

*Program 3 EXAMPLE: Syringe cycle to start at 5:30 AM, each station to water for 3 minutes, on Saturday and Sunday only.*

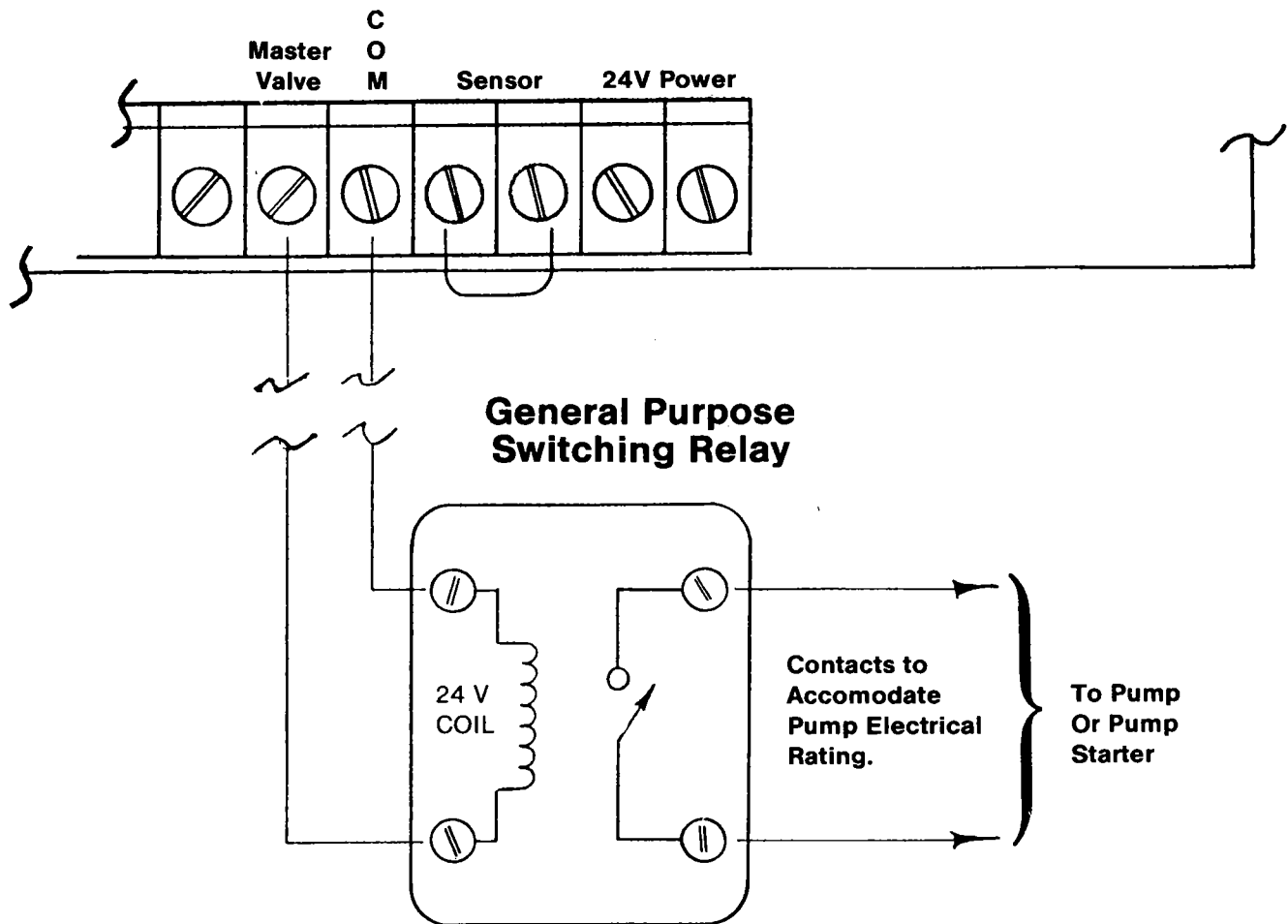
*Set switch to Program 3 position, Press:*



**Note:** "Cycle Start" function does not require a prior key entry indicating the cycle number (1, 2, 3 or 4); "Water Time" function does not require the prior key entry indicating the station number (1, 2, 3 . . . 18).

# MC-CONTROLLER

## Hookup Instructions for Pump Start



1. Install relay at least 5 feet from controller box. (Preferably on pump panel).
2. Hookup 24 volt relay coil to master valve and common terminals.
3. Controller box **must** be grounded.
4. Installation must meet all local Electrical Codes.

Note: Above instructions also apply to hookup of lighting or other appliances.

**IRRI-TROL<sup>®</sup>**

mfg., inc.

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