MC-E

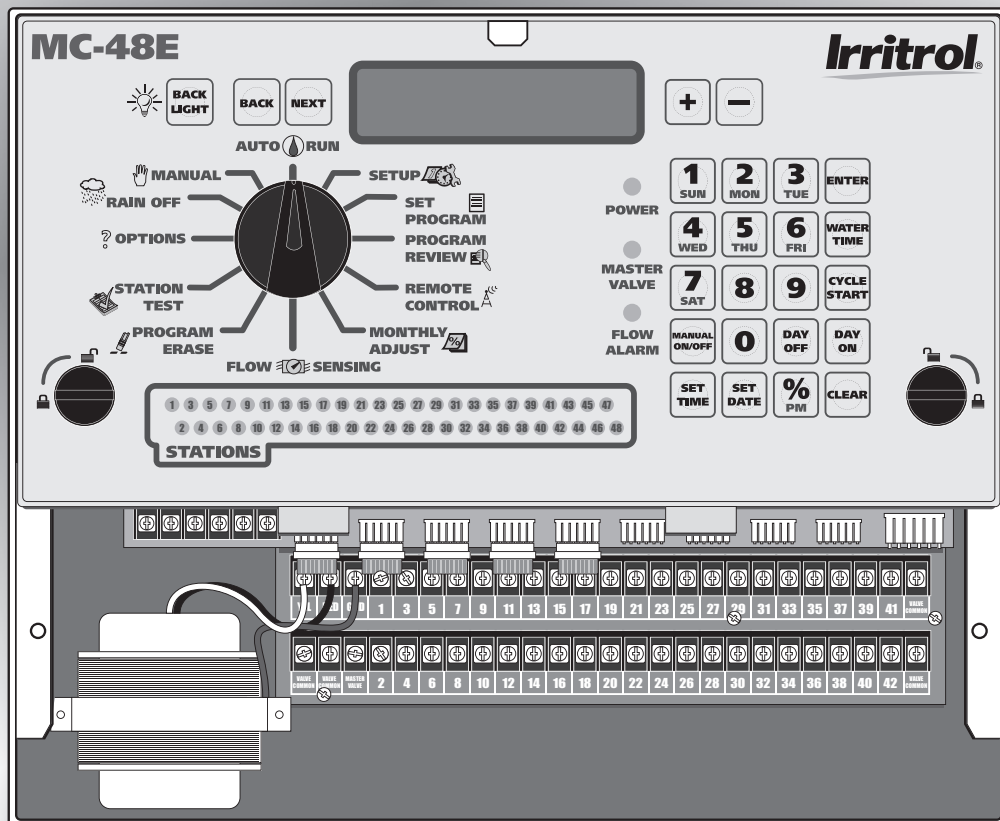*Installation and Programming Guide*

For Controller Models: MC-4E, MC-6E, MC-8E, MC-12E, MC-18E, MC-24E, MC-30E, MC-36E, MC-42E & MC-48E

Irritrol®

Table of Contents

Introduction

The MC-E controller is a solid-state controller, capable of storing eight independent programs designed to meet the needs of commercial and contractor applications. The MC-E is an enhancement to the existing MC controller with many more functions and display features. The new MC-E is designed to be compatible with the current MC Plus B cabinets and wiring connections.

Parts Diagram
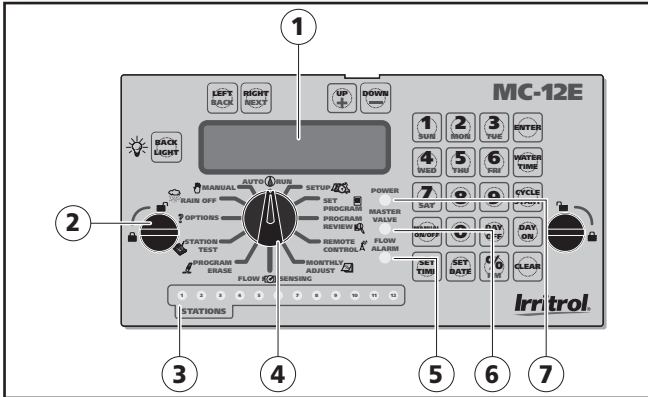
1 - 32-Character Dot Matrix LCD

2 - Timing Mechanism Quick Release

3 - Active Station Indicator Display

4 - Function Dial

5 - Flow Alarm Indicator LED

6 - Master Valve Active Indicator LED

7 - Power Supply Indicator LED

BACK LIGHT - Activates the LCD Display Backlight

BACK - Use to navigate through the menu options

NEXT - Use to navigate through the menu options

+ - Use to navigate through the menu selections or options

− - Use to navigate through the menu selections or options

ENTER - Finalize and save entered parameters

WATER TIME - SETUP - Assigns Station and Station Runtime to a program

CYCLE START - SETUP - Assign Start Times to a program

DAY OFF - SETUP - Assign Event Days

DAY ON - SETUP - Remove Event Days

MANUAL ON/OFF - MANUAL - Activate stations or programs manually

SET TIME - SETUP / SET PROGRAM - Modify the current time

SET DATE - SETUP / SET PROGRAM - Modify current date

% PM - MONTHLY ADJUST - Adjust water budget percentage.

CLEAR - Clear / Delete selection / Revert back to the main menu of the current dial position

Cabinet Installation

Step 1 – Selecting the proper installation site for the MC-E controller is essential to safe and reliable operation. The controller features a weather resistant cabinet designed for indoor and outdoor installation. The controller should be installed on a vertical wall or other sturdy structure near a grounded power source. Select a location that provides as much protection from direct sunlight, rain, snow and irrigation spray as possible.

Step 2 – Drive a wood screw (provided) into the wall at eye level.

(For Large Cabinet Unit - 18 Stations or more) Drive another wood screw 8" (20.3 cm) directly below the first screw.

(For Small Cabinet Unit - 12 Stations or less) Drive another wood screw 5 3/4" (14.5 cm) directly below the first screw.

Leave approximately 1/4" (6.5 mm) of the screw extended from the wall to accommodate the cabinet.

NOTE: For drywall and masonry installation, use proper screw anchors to prevent the screws from loosening.

Figure 1

Step 3 – Place the controller cabinet on the screws using the keyhole slots on the back panel. Ensure that the cabinet is installed securely on the screws. See **Figure 2**.

Step 4 – Open the controller door and the bottom panel door. Locate the bottom screw and tighten it securely.

The MC-E series has two available lockable, weather and vandal resistant steel pedestals for free standing applications. For MC-E controllers with 12 stations or less, use the Irritrol P-2B pedestal. For MC-E controllers with 18 stations or more, use the Irritrol P-6B pedestal. Follow the installation and mounting instructions that are provided with the pedestal.
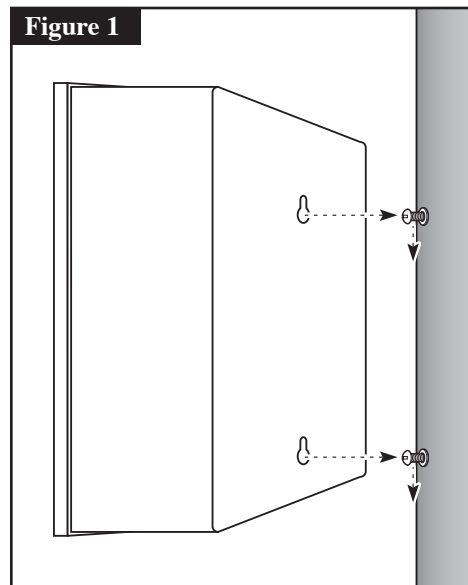
Electrical Conduits Installation

Electrical conduits and adapters are not supplied with the controller but may be required for installations in your area. Check with your local electrical codes and install conduits according to requirements.

For power wires, install a 1/2" (13 mm) NPT threaded conduit access body to the transformer assembly threaded nipple. From the access body, install conduit to the power source.

For station valve wiring, install a 2" (5 cm) conduit adapter and conduit.

Control Wires Installation

Step 1 – Route the valve control wires between the valves and the MC-E controller.

> **NOTE:** For wire runs up to 1000' between the controller and the valves, it is recommended to use an 18 AWG (1.0 mm²) multi-wire sprinkler valve connection cable. This cable is insulated for direct burial and is color coded to simplify installation.

Step 2 – Attach one wire from each valve solenoid to the white color-coded wire from the cable. (Since the valve solenoid has no polarity, either wire can be used for this connection.) Designate this connection as the Valve Common.

Step 3 – Attach a separate cable wire to each of the remaining valve solenoid wire. Take note of the wire color being used for each valve as well as the watering zone/area it is designated. This information will be important when connecting the valve wires to the controller's station terminals.

Step 4 – Use wire nut fasteners to secure the valve solenoid wire connection. Waterproof all connections with grease caps or similar insulation method.

Figure 2

Step 5 – Route the other end of the control wires into the provided conduit hole at the bottom of the cabinet. Leave about 8" of cable remaining in the cabinet. Expose about 3/8" of bare wire from the station and the valve common wires.

Step 6 – Secure the valve common wire to one of the three terminals labeled "VALVE COMMON" and each valve wire to its appropriate station terminal designation.
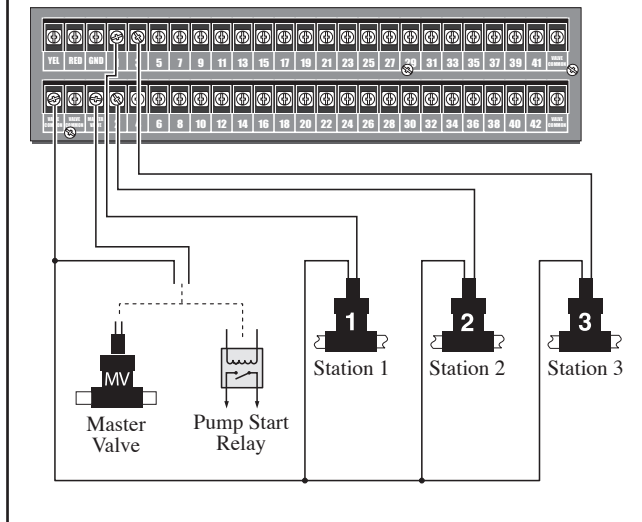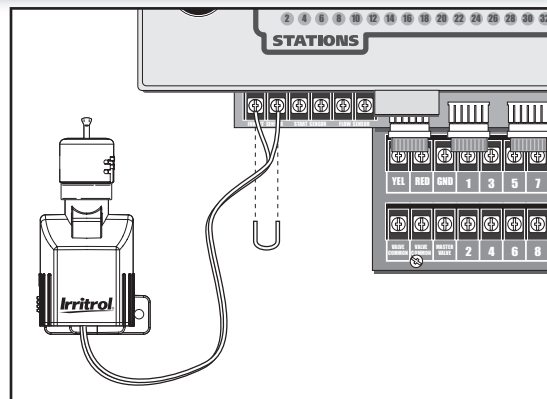
Rain Sensor Installation (Purchased Separately)

⚠ **IMPORTANT!** The INHIBIT SENSOR is designed for a normally closed rain sensor. The wire jumper must be present at the terminals if a sensor is not connected.

Step 1 – Route the rain sensor cable into the controller terminals.

Step 2 – Remove the wire jumper from the INHIBIT SENSOR terminals (INHI+ and INHI- for the 18 stations or more models and INHIBIT+ and SENSOR- for the 12 stations or less models). Refer to the provided rain sensor installation guide for wiring instructions and connect accordingly.

> **NOTE:** The INHIBIT SENSOR will operate on any Function Dial position settings.

Flow Sensor Installation (Purchased Separately)

Flow monitoring is one of the best water resource management tools available in the irrigation industry today. With definable under, over and critical flow values, broken lateral or mainline piping, stuck valves and damaged sprinklers can be quickly detected and bypassed automatically.

The MC-E is equipped with flow sensor terminals that enable it to read, store and compare flow rate data. The flow sensor input is designed for a normally opened flow sensor. The recommended flow sensor to use with the MC-E is the Data Industrial PVC tee flow sensor model 228PV, 250BR or equivalent. When MC-E detects a flow value that violates the under, over or critical flow value set in the flow parameters, the flow alert LED indicator will activate. MC-E will also activate an audible beep every 30 seconds to notify you of the flow alert. The flow alert indicators will continue until the detected flow is returned within the set parameters.

When the flow function is enabled, MC-E will collect flow values within the set flow delay time. MC-E will average the collected flow values to calculate the flow average or learned flow. It will use this value to calculate the over, under and critical flow values when activating the flow alert indicators.

Step 1 – Install the flow meter into the main pipe that services the area being monitored.

Step 2 – Route the cable from the flow sensor to the MC-E controller. The cable can be as far away as 2000 ft. when using a shielded two-conductor 20 AWG or larger stranded copper wire. Leave extra wire length to allow for future servicing.

Step 3 – At the controller terminals, connect the "Red" wire to FLOW+ terminal. Connect the "Black" wire to the FLOW- or SENSOR- terminal.

> ⚠ **IMPORTANT!** Sensor wires must be installed in the correct polarity for proper operation.

> **NOTE:** The controller will beep every 30 seconds when an overflow or underflow is detected.
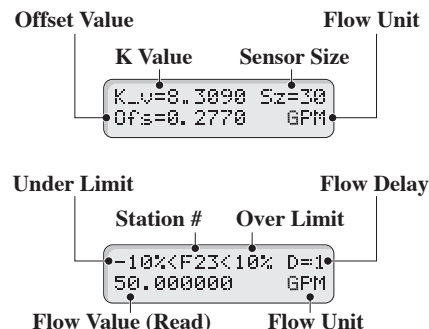

6
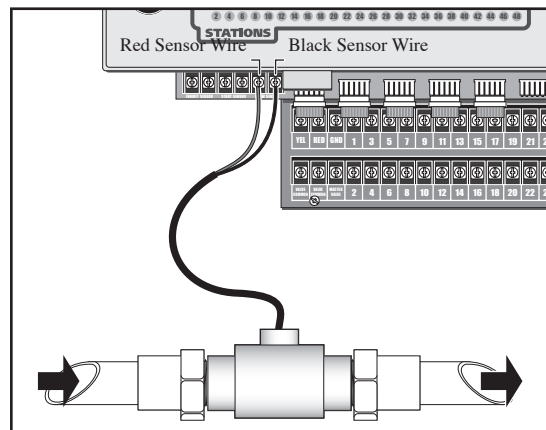
Flow Sensor SETUP

Step 1 – Turn the Function dial to the FLOW SENSING ⧼⌀⧽ position.

Step 2 – If Flow Sensing is not Enabled, the controller will prompt "Enable Flow? Press DAYOFF". Press the `DAY OFF`
button to activate flow sensing. Once flow is enabled, Press the `MANUAL ON/OFF` button to learn/read the flow. It will read/
learn the flow value for approximately one minute and display the average Pulse per Second (PPS). When flow
sensing is active, pressing the `DAY OFF` or `DAY ON` button will deactivate it.

Step 3 – Select the sensor model size by pressing the `—` button.

Model Size Number	Data Industrial Sensor Model
07	250 BR 0700 X-XXXX
10	250 BR 1000 X-XXXX
15	228 PV 15 XX-XXXX
20	228 PV 20 XX-XXXX
30	228 PV 30 XX-XXXX
40	228 PV 40 XX-XXXX
00	Any Unspecified Sensor Model

Offset Value   **Flow Unit**
K Value   **Sensor Size**

```
K_v=8.3090  Sz=30
Ofs=0.2770   GPM
```

NOTE: When using flow sensor other than the suggested
models above, select the **00** option.

Under Limit   **Flow Delay**
Station #   **Over Limit**

```
-10%<F23<10%  D=1
50.000000    GPM
```

Flow Value (Read)   **Flow Unit**

Step 4 – Enter the station number and press the `MANUAL ON/OFF` button to read a specific station's flow. When MC-E completes
reading the flow, you can enter another station number or press the `MANUAL ON/OFF` or `MANUAL ON/OFF` button to read the next or
previous station. Press `CLEAR` to stop the procedure.

Step 5 – Enter the reference flow value by pressing the `WATER TIME` button. MC-E will sequence to all the stations for review.
Press `CLEAR` to stop the procedure. Enter the reference flow value. This value should be the typical valve flow
value when performing routine scheduled programs. You can use the learned flow value if it is within the
valve's expected performance. Press the `ENTER` button to accept. This value is universal to all the stations.

Step 6 – Select the preferred flow unit. Press the `+` button to scroll through the unit selection.
PPS - Pulse per Second, **GPM** - Gallons per Minute, **CFM** - Cubic Feet per Minute,
MPH - Metre Cude par Heure (Cubic Meter per Hour), **LPM** - Liters per Minute
NOTE: The controller will only display the PPS value if the sensor model is unspecified.

Step 7 – Flow delay is the time duration that MC-E will learn/read the flow value in the sensor. The default value is set
at one minute. Press the `WATER TIME` button to set a different flow delay value. MC-E will sequence to all the stations
for review. Press `CLEAR` to stop the procedure. Press the `—` button until the desired delay value (1–9) in minutes.
This value is universal to all stations.

Step 8 – Modify the "Over" and "Under" percentage limits by entering the station number and pressing the `% PM` button.
Press the `+` to adjust the "Over" percentage limit and press the `—` button to adjust the "Under" percentage
limit. Both "Over" and "Under" percentage limits can be adjusted from 10–40% in 10% increments.

NOTE: When a program is activated, the display will toggle displaying the Station on and Flow display to
indicate that a flow sensor active.

7

Start Sensor Installation (Purchased Separately)

⚠ **IMPORTANT!** The START SENSOR input is designed for a normally open sensor. When the START SENSOR is activated, the MC-E controller will immediately stop all controller operation and activate program 8. Scheduled programs, except program 8, will not start until the sensor is deactivated.

Step 1 – Route the sensor connection cable through the bottom of the controller cabinet and into the controller terminals.

Step 2 – Refer to the provided sensor installation guide for wiring instructions.

> **NOTE:** The START SENSOR will operate on any Function Dial position settings.
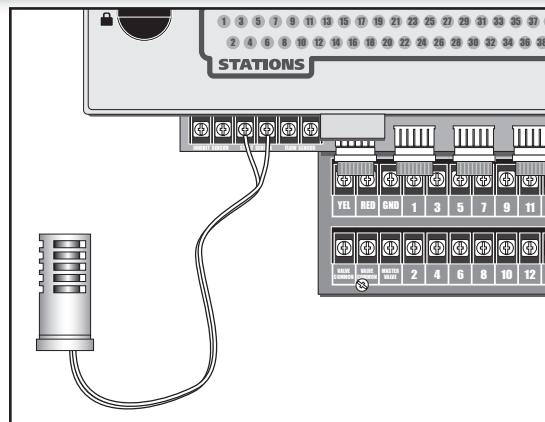
Power Source Installation

⚠ **WARNING:** All electrical components and installation practices must meet applicable national and local electrical codes including installation by a qualified personnel. These codes may require an external junction box mounted on the cabinet and a circuit breaker in the main wiring having a contact separation of at least 0.120" in the line and neutral poles.

The 120 VAC power source must be turned OFF prior to servicing. The power cable used for connection to the controller must have an insulation rating of 221°F minimum.

Step 1 – For power source connection, install a 1/2" electrical conduit from the 120 VAC power source to the MC-E controller cabinet.

Step 2 – Install an electrical junction box at the transformer to allow access for future servicing.

Step 3 – Confirm that power has been disconnected at the power source using a volt meter or voltage detector.

Step 4 – Route 14-AWG insulated solid copper wires for Power (Black), Neutral (White) and Equipment Ground (Green) through the conduit and into the junction box.

Step 5 – Strip back 3/8" of insulation from each wire. Using wire connectors, connect the wires with similar colors together (Black with Black, White with White, etc.).

Step 6 – Tuck the wires inside the junction box and replace the cover.

Step 7 – Apply power to the controller.

Power Wire = Black

Neutral Wire = White

Equipment Ground = Green
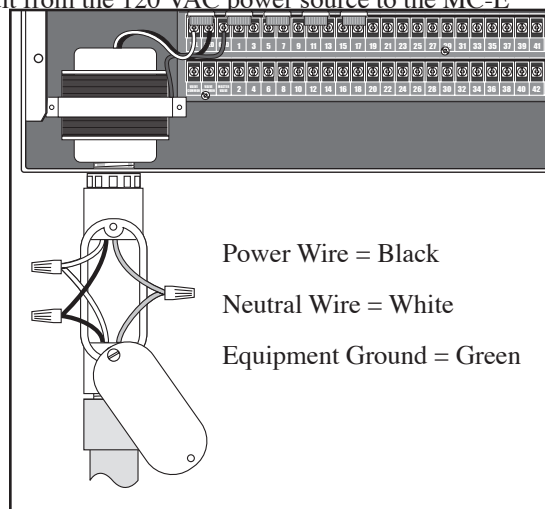
Power On / Reset Mode

MC-E will initiate the operating system and reload all saved data in the memory for stable operation every time the controller is powered up. Turn the Function Dial in the Auto/Run position for normal operation.

Initial Display

```
IRRITROL  MC_48E
Loading........
```

Auto Run Mode Display

```
FRI    02-24-2006
       10:21:03 AM
```

System SETUP

The SETUP 🕰 function allows you to modify the following MC-E parameters:

```
Press SETTIME,
SETDATE or NEXT
```

- Current Date
- Security Password
- Enable/Disable Master Valve
- Configure Station 2 as Flow Alarm
- Current Time
- Event Days

SETUP – Current Date

Set Current Date

Step 1 – Turn the Function dial to the SETUP 🕰 position.

Step 2 – Press the `SET DATE` or the `NEXT` button to access the date setup screen.

Step 3 – Enter the Month, Date and Year in **MM DD YY** format. If the MC-E is operating in International format, enter the Date first, the Month second and the year last (**DD MM YY**).
Example: For February 20, 2006, press the **022006** buttons.

```
SET      MM DD YY
DATE     ■ -  -
```

Step 4 – Press the `ENTER` button to accept the changes. The display will now reflect the new date.

```
MON    02-20-2006
       10:21:03 AM
```

NOTE: While in SET DATE mode, you can advance to the SET TIME mode by pressing the NEXT `NEXT` button.

Step 5 – Return the Function dial to the Auto Run 🔵 position to exit SETUP.

SETUP – Current Time

Set Current Time

Step 1 – Turn the Function dial to the SETUP ⚙ position.

Step 2 – Set the time mode if necessary. To set the time to International format (24-Hour), press $\boxed{0}$ $\boxed{\text{SET TIME}}$. To return to the default U.S. format, press $\boxed{\text{1 SUN}}$ $\boxed{\text{SET TIME}}$.

Step 3 – Press $\boxed{\text{SET TIME}}$ or press the $\boxed{\text{NEXT}}$ button until the time setup screen is displayed.
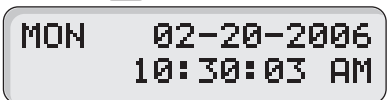
```
SET   HH MM AM/PM
TIME  ▮ :   AM
```

Step 4 – Enter the Hour, Minutes and Seconds in **HH MM f**ormat. Enter the **HH MM** $\boxed{\text{% PM}}$ for PM time. International setting follows the 24-hour format.
Example: For 10:30am, enter **1030**.

Step 5 – Press the $\boxed{\text{ENTER}}$ button to accept the changes. The display will now reflect the new time.

```
MON    02-20-2006
       10:30:03 AM
```

NOTE: While in SET TIME mode, you can advance to the SET LANGUAGE screen by pressing the NEXT $\boxed{\text{NEXT}}$ button or go back to SET DATE by pressing the BACK $\boxed{\text{BACK}}$ button.

Step 6 – Return the Function dial to the Auto Run ⬤ position to exit SETUP.

10

SETUP – Security Password

The MC-E can be secured with a security password to ensure that unauthorized users are not able to modify the programs or execute manual operations.

Enable Security Password

Step 1 – Turn the Function dial to the SETUP ⚙ position.

Step 2 – Press the MANUAL ON/OFF button. The screen will display the following:

```
Your Password
              █
```
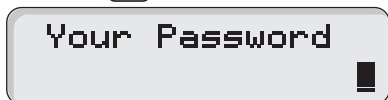
Step 3 – Enter a four-digit (**0000–9999**) security password and press the ENTER button.

> NOTE: Once a security password is established, all menu functions will require you to enter the four-digit security password before gaining access.

Once the security password is verified, the MC-E will allow access to the menu functions for 1-hour. Within that hour, you will be able to navigate through all the function dial positions without re-entering the security password. After the 1-hour time limit expires, you will need to re-enter the password to gain access to the menu functions.

In the event that you have forgotten the four-digit security password, press DAY ON, CYCLE START, WATER TIME and ENTER to disable the password verification process. To reestablish password security to the controller, you must repeat Steps 1–3.

Step 4 – Return the Function dial to the Auto Run ⬤ position to exit SETUP.

SETUP – Event Days

The MC-E allows you to pre-program ten event days throughout the year. During an event day, the controller will suspend automatic watering. Event days will reoccur every year unless deleted.

Example: If December 25 is set as an event day, the controller will ignore watering every December 25 of each year until it is deleted from the Event Days.

Set Event Day:

Step 1 – Turn the Function dial to the SETUP 🖎 position.

Step 2 – Press the **DAY OFF** button. The screen will display the following:

```
0 EVENT DAY SET
PRESS DAYOFF   ■
```

Press the **DAY OFF** button to review the day off events or enter new events. The screen will display the following:

```
SET EVENT MM DD
EVENT#01  ■0/ 0
```

NOTE: Use the ➕ or ➖ button to review the programmed events.

Step 3 – Enter the Event number (**1–10**), then press the **DAY OFF** button.

NOTE: MC-E will re-number the event day if the newly created event is out of sequence or if an event is deleted.

Step 4 – Enter the Month and Date (**MM DD**) of the event day being programmed and press the **ENTER** button. When the controller is in International mode, enter the Date first before the Month (**DD MM**). The controller will increment the total event day and display the following:

```
1 EVENT DAY SET
PRESS DAYOFF   ■
```

Step 5 – Repeat Steps 2–3 for additional event days.

Step 6 – To delete an event, scroll through the event number to select it. Once the event is displayed, enter **0** **0** **0** **0** and press the **ENTER** button to delete.

Step 7 – Return the Function dial to the Auto Run 🚰 position to exit SETUP.

Set Master Valve

NOTE: As factory default, the Master valve is Enabled for all stations. The master valve will activate whenever a station is activated.

In situations that a station does not require the master valve to activate, use the following procedure to select the station and Disable or Enable the master valve.

Step 1 – Turn the Function dial to the SETUP 🖾 position.

Step 2 – Press the WATER TIME button. The following display will be shown on the screen.

```
MV SET UP
STN 1       MV=ON
```

Step 3 – Press the BACK or NEXT buttons to select the station number you want to edit. Use the ➕ or ➖ button to toggle MV (Master Valve) from ON or OFF.

Step 4 – Repeat Step 3 for additional stations.

Step 5 – Return the Function dial to the Auto Run 🔵 position to exit SETUP.

SETUP – Set Station 2 as Flow Alarm / Station

As an added feature, Station 2 of the MC-E can be configured to function as a Flow Alarm line. When an over, under or critical flow is detected from the installed flow sensor, Station 2 will activate until the flow error is corrected. An external light or buzzer that operates at 24 VAC can be connected to this terminal to provide an external flow alarm indicator.

Set Station 2 as Flow Alarm / Station

Step 1 – Turn the Function dial to the SETUP 🖉🐾 position.

Step 2 – Press the **2 MON** button to access this option. The screen should display one of the two screens below.

```
STN#2=       STN
+/- Then ENTER ▮
```

NOTE: The FLOW function must be enabled first before you can access this setup. To enable FLOW, see Flow Sensor SETUP on page 7.

The following message will be displayed if Flow is not Enabled.

```
FLOW Disabled
EnableFLOW First
```

Step 3 – Use the **+** or **–** button to select Station 2's function from Station or Flow. Press **ENTER** to accept. Press **ENTER** again or **CLEAR** to revert back to the main SETUP display.

Step 4 – Return the Function dial to the Auto Run 💧 position to exit SETUP.

14

For a watering program operate properly, it must have a station(s) with a runtime and a specific date and time to activate.

The following program parameters can be defined and/or modified in the SET PROGRAM ☰ function:
• Assign Station and Runtime to a Program
• Assign Station Delay Time
• Assign Program Start Time
• Assign Looping Start Time
• Assign Watering Day Schedule
  - Exclusion Day
  - Odd Day
  - Even Day
  - Interval Day
• Assign Water Budget

Set Program – Assign Station and Runtime to a Program

Assign Station and Runtime to a Program

Step 1 – Turn the Function dial to the SET PROGRAM ☰ position.

Enter PROGRAM#
& Press ENTER

Step 2 – Enter the program number (1–8) you want to create or modify. Press ENTER to activate your selection.

Step 3 – Enter the station number being added or modified in the program and press the WATER TIME button.

NOTE: Entering a station number that exceeds the controller's station count will return an error message.

PROGRAM 1
STN 1 No RunTime

Step 4 – Enter the station runtime in MM (Minutes) or HH MM (Hours:Minutes) and press ENTER .

PROGRAM 1
STN 1   0h30m 0s

Repeat Steps 3–4 for additional stations and runtimes.

To assign similar runtimes to all the available stations in the program, press **9** **9**, WATER TIME, Length of runtime, then ENTER. This procedure will replace all station runtimes to the new runtime.

NOTE: Delete a station from the program by assigning 00 runtime.

Step 5 – Return the Function dial to the Auto Run 🔵 position to exit SET PROGRAM.

15

Enter/Modify/Delete - Single or Multiple Stations

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

```
Enter PROGRAM#
& Press ENTER
```

Step 2 – Enter the program number (1–8) being modified. Press `ENTER` to activate the selection.

Step 3 – Enter the station number you want to create, modify or delete from the program and press the `WATER TIME` button.

Select multiple stations by entering the first station number (two digits), then enter the last station in the sequence (two digits) and press the `WATER TIME` button.

NOTE: Entering a station number that is not assigned to the program will return a "No Runtime" message.

Step 4 – Assign the station runtime and press the `ENTER` button. If the station has a previous runtime, the newly entered runtime will overwrite the previous value. Enter a runtime value of 0 minutes to delete.

Step 5 – Repeat Steps 3–4 to enter/modify/delete additional station(s) from the program.

Step 6 – Return the Function dial to the Auto Run ⧂ position to exit SET PROGRAM.

Review Program Runtimes

Review the program's cumulative runtime – Press the `WATER TIME` button once.

Review individual station's runtime in the program – Press the `WATER TIME` button twice. The controller will sequentially scroll through the program's active stations along with their corresponding runtime.

Set Program Start Times
Each MC-E program can have up to eight start times.

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press ENTER to activate the selection.

Step 3 – Press the CYCLE START button to review all start times. Each programmed start times will be displayed momentarily until the last start time is shown.

Step 4 – Enter the start time number (1–8) being created/modified and press the CYCLE START button. Enter the start time in **HH MM** (Hours and Minutes) and press ENTER.

NOTE: Enter HH MM $\boxed{\frac{\%}{PM}}$ for PM time. (U.S. Time Mode)

The start time number will adjust according to the start time sequence. If assigning start time 4 with 6:00am and currently, the earliest start time is at 7:30am, 6:00am will automatically become start time number 1 and adjust the start time numbers accordingly.

Example: Assign 5:30am to start time number 1 for program 1 by entering **0530** ENTER.

```
 PGM 1   Start 1
05:30AM   05:55AM
```

NOTE: The 05:55am time indicated on the display is the end time. This is calculated by adding the sum of all the station runtimes and station delays to the start time.
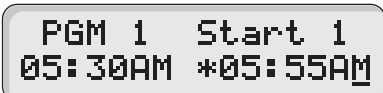
If the assigned start time will result with an end time past midnight, the controller will Beep twice to indicate that end time will run to the next watering day schedule.

The following screen will display momentarily:

```
 PGM 1   Start 1
Over 24h EndTime
```

Then followed by:

```
 PGM 1   Start 1
05:30AM *05:55AM
```

Step 5 – Return the Function dial to the Auto Run ⬤ position to exit SET PROGRAM.

17

Delete Program Start Time

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press the ENTER to activate the selection.

Step 3 – Press the CYCLE START button to review all start times. Each programmed start times will be displayed momentarily until the last start time is shown.

Step 4 – Enter the start time number (1–8) being deleted and press the CYCLE START button. Assign a start time of **0** and press ENTER to finalize.

```
    PROGRAM 1
Start 1 Erased.
```

Step 5 – Return the Function dial to the Auto Run ◖ position to exit SET PROGRAM.

Station delay time is the adjustable delay period between station operations. The controller's default station delay is **0** seconds. The maximum delay time you can set between station operation is 4 hours.

Assign Station Delay Time

Step 1 – Turn the Function dial to the SET PROGRAM ≣ position.

Step 2 – Enter the program number (1–8) being modified. Press the [ENTER] to activate the selection.

Step 3 – Press the [0] and [WATER TIME] buttons to access the station delay function.

```
     PROGRAM 1
DlySTN   0h 0m 0s
```

Step 4 – Enter the station delay duration in H MM SS (Hours, Minutes and Seconds) and press [ENTER].

NOTE: To disable the station delay, assign **0** for the time duration.

Example: To assign a 30-second station delay to program 1, enter **0 00 30**.

```
     PROGRAM 1
DlySTN   0h 0m30s
```

Step 5 – Return the Function dial to the Auto Run (◊) position to exit SET PROGRAM.

19

Set Program – Looping Start Time

The MC-E has the capability to loop a program. When a program is set to loop, the program will repeat after the loop delay time is satisfied. The program will continue to repeat beginning from the start time until the designated end time. To initiate the program to loop, you must assign a start time, end time and a loop delay to the program.

Set a Looping Start Time

Step 1 – Establish a start time to the program. (See **Set Program – Program Start Time** section.)

Step 2 – Assign a program End time. Turn the function dial to the SET PROGRAM 📋 position. Enter the program number being modified. Enter **8** **8** CYCLE START to access the loop function.

```
PGM1 Lp_Dly 0h00
              ▊
```

Enter the program end time in **HH MM** format and press ENTER. Use the %PM button for PM.

Example: Enter 6:00am start time and 10:00pm end time.

```
PGM1 Lp_Dly 0h00
06:00AM  10:00PM
```

Step 3 – Assign loop delay by entering **8** **8** WATER TIME. Enter the delay time in **H MM** or **MM** and press ENTER.

Example: Assign a 30-minute loop delay. Enter **3** TUE **0** ENTER.

```
PGM1 Lp_Dly 0h30
06:00AM  10:00PM
```

NOTE: After establishing a loop, any additional program start time(s) will be deleted.

Step 4 – Return the Function dial to the Auto Run 💧 position to exit SET PROGRAM.

Modify a Looping Start Time

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press the ENTER to activate the selection.

Step 3 – Press [1 SUN] [CYCLE START] to enter a new loop start time in HH MM format (Hours, Minutes and [% PM] for PM) and press ENTER to accept.

Step 4 – Press [8] [8] [CYCLE START] to enter a new loop end time in HH MM format (Hours, Minutes and [% PM] for PM) and press ENTER to accept.

Step 5 – Press [8] [8] [WATER TIME] to enter a new loop delay time in HH MM format (Hours, Minutes and [% PM] for PM) and press ENTER to accept.

Step 6 – Return the Function dial to the Auto Run ◐ position to exit SET PROGRAM.

Delete a Looping Start Time

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press the ENTER to activate the selection.

Step 3 – Enter [8] [8] [CYCLE START] [0] and press ENTER to clear the looping start time. (The start time and end time are automatically deleted.)

```
     PROGRAM 1
LooP Erased.....
```

Step 4 – You must re-enter a start time to reactivate the program. (See **Set Program – Program Start Time** section.)

Step 5 – Return the Function dial to the Auto Run ◐ position to exit SET PROGRAM.

Set Program – Watering Day Schedule

The MC-E offers you several options to schedule your watering programs. Having multiple options will allow you to optimize your watering need while practicing water conservation.

Each of the eight controller programs can be set to one of the following schedule options:

• Days of the Week / Exclusion Days

• Odd Days Watering w/ Exclusion Days

• Even Days Watering w/ Exclusion Days

• Skip Days

Set Program Schedule to Days of the Week / Exclusion Days

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press the ENTER to activate the selection.

Step 3 – Press the DAY/ON button to review the program schedule. The Weekdays scheduling is the factory default. If Odd or Even scheduling is activated, press 7/SAT 7/SAT DAY/ON to reestablish Weekdays scheduling.

```
PGM 1 WeekDaysOn
 SuMoTuWeThFrSa■
```

Step 4 – To exclude a day, enter the day designation number and press the DAY/OFF button.
Su = 1, Mo = 2, Tu = 3, We = 4, Th = 5, Fr = 6 and Sa = 7

Example: Deactivate Sunday (Su) and Wednesday (We) to the Weekdays schedule. Press 1/SUN DAY/OFF to deactivate Sunday and 4/WED DAY/OFF buttons to deactivate Wednesday.

```
PGM 1 WeekDaysOn
  MoTu  ThFrSa■
```

The remaining days, Monday, Tuesday, Thursday, Friday and Saturday are all active days. The program will run only on these days.

NOTE: To deactivate all the days of the week, press 7/SAT 7/SAT DAY/OFF.

Step 5 – To re-activate a day, enter the day designation number and press the DAY/ON button.

Step 6 – Return the Function dial to the Auto Run ⬤ position to exit SET PROGRAM.

Odd Days watering schedule will activate the program on the odd-numbered days in the calendar month (1, 3, 5, ..., 29). However, the controller will treat all the 31st of the month and the 29th of February in leap years as a non-watering day.

Set Program Schedule to Odd Days

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press the [ENTER] to activate the selection.

Step 3 – Press the [1 SUN] [1 SUN] [DAY ON] button to activate Odd days watering schedule.

```
PGM 1   OddDaysOn
No ExclusionDays
```

Step 4 – Return the Function dial to the Auto Run (◊) position to exit SET PROGRAM.

In conjunction to setting your irrigation schedule to Odd Days of the calendar schedule, you can also deactivate any day of the week.

Set Program Schedule to Odd Days with Excluded Days

Step 1 – Set watering schedule to Odd days. (See section on how to set schedule to Odd Days.)

```
PGM 1   OddDaysOn
No ExclusionDays
```

Step 2 – To exclude a day, enter the day designation number and press the [DAY OFF] button.
Su = 1, Mo = 2, Tu = 3, We = 4, Th = 5, Fr = 6 and Sa = 7

Example: Deactivate Wednesday (We) and Saturday (Sa) to the Weekdays schedule. Press [4 WED] [DAY OFF] to deactivate Wednesday and [7 SAT] [DAY OFF] buttons to deactivate Saturday.

```
PGM 1   OddDaysOn
 SuMoTu   ThFr   █
```

NOTE: To return the program's scheduling to Weekdays, press the [7 SAT] [7 SAT] [DAY ON] buttons.

Step 4 – Return the Function dial to the Auto Run (◊) position to exit SET PROGRAM.

Even Days watering schedule will activate the program on the Even-numbered days in the calendar month (2, 4, 6, ..., 30).

Set Program Schedule to Even Days

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press the ENTER to activate the selection.

Step 3 – Press the [2 MON] [2 MON] [DAY ON] button to activate Even days watering schedule.

```
PGM 1 EvenDaysOn
No ExclusionDays
```

Step 4 – Return the Function dial to the Auto Run ◐ position to exit SET PROGRAM.

In conjunction to setting your irrigation schedule to Even Days of the calendar schedule, you can also deactivate any day of the week.

Set Program Schedule to Even Days with Excluded Days

Step 1 – Set watering schedule to Odd days. (See section on how to set schedule to Even Days.)

```
PGM 1 EvenDaysOn
No ExclusionDays
```

Step 2 – To exclude a day, enter the day designation number and press the [DAY OFF] button.
Su = 1, Mo = 2, Tu = 3, We = 4, Th = 5, Fr = 6 and Sa = 7

Example: Deactivate Sundays (Su) and Fridays (Fr) to the Weekdays schedule. Press [1 SUN] [DAY OFF] to deactivate Sundays and [6 FRI] [DAY OFF] buttons to deactivate Fridays.

```
PGM 1 EvenDaysOn
   MoTuWeTh  Sa█
```

NOTE: To return the program's scheduling to Weekdays, press the [7 SAT] [7 SAT] [DAY ON] buttons.

Step 4 – Return the Function dial to the Auto Run ◐ position to exit SET PROGRAM.

Skip Days watering schedule will activate the program within the specified interval. You can designate skip days from 1 through 59 days. The entered value will be the number of days the controller will skip until an active watering day. If you enter a value of 3, MC-E skip watering for 3 consecutive days and water on the fourth day. MC-E will repeat the schedule after the active day.

Set Skip Days Program Schedule

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press the ENTER to activate the selection.

Step 3 – Press the 8 8 DAY/OFF button to activate Skip days watering schedule.

```
PGM 1 SkipDaysOn
 0 Days Today= 0
```

Step 4 – Enter the designated Skip day number and press the ENTER button. (1 = skip 1 day then water the next day, 2 = skip 2 days then water the next day, etc.)

Example: Set the program to skip 4 days before activating. Press 4/WED ENTER.

```
PGM 1 SkipDaysOn
 4 Days Today= 0
```

Step 5 – Enter today's designation number and press the DAY/ON button. This number represents the current day's position within the schedule interval. This number will increment on a daily basis starting from 0 (zero) until the skip day number designation is met, then the controller will regard that day as a watering day.

Example: With skip day set to 4, the program is set to water on the 5th day. Set today so that the controller will water the next day. Enter 3/TUE and press the DAY/ON button.

```
PGM 1 SkipDaysOn
 4 Days Today= 2
```

NOTE: To return the program's scheduling to Weekdays, press the 7/SAT 7/SAT DAY/ON buttons.

Step 6 – Return the Function dial to the Auto Run ⬤ position to exit SET PROGRAM.

Monthly Adjust / Water Budget

The MC-E water budget $\boxed{\%}$ feature maximizes water conservation by allowing you to micro-adjust watering on a monthly basis. By adjusting your irrigation during dry seasons, wet seasons, etc., you can be sure that your landscape areas are receiving the optimum irrigation while conserving water resource.

Adjust the Monthly Water Budget

Step 1 – Turn the Function dial to the MONTHLY ADJUST $\boxed{\%}$ position.

> **NOTE:** To review all monthly adjustments, simply press the $\boxed{\frac{\%}{PM}}$ button twice while in the MONTHLY ADJUST $\boxed{\%}$ position. Each monthly percent budget will display momentarily.

Step 2 – Use the BACK or NEXT buttons to scroll and select the month being adjusted. You can also enter the Month's designation number and press the $\boxed{\frac{\%}{PM}}$ button to select a specific month.

Example: Select December to adjust. Press $\boxed{1 \atop SUN} \boxed{2 \atop MON} \boxed{\% \atop PM}$.

```
MONTHLY ADJUST
DEC            100%
```

Step 3 – Use the $\boxed{+}$ or $\boxed{-}$ buttons to adjust the watering percentage. The $\boxed{+}$ or $\boxed{-}$ buttons will increment/decrement the percentage by 10%. Press ENTER to save any changes.

In addition, you can adjust the percentage by entering the percentage number using the key pad and pressing the ENTER button to accept.

Example: Adjust December's watering to 85%. Press $\boxed{8} \boxed{5 \atop THU}$ ENTER.

```
MONTHLY ADJUST
DEC             85%
```

> **NOTE:** You can adjust the monthly watering budget down to 10% and up to 200%.

Step 4 – Repeat Steps 2 and 3 to adjust additional monthly water budget.

Step 5 – Return the Function dial to the Auto Run $\boxed{\bigcirc}$ position to exit MONTHLY ADJUST.

Set Water Budget per Program

Step 1 – Turn the Function dial to the SET PROGRAM ▤ position.

Step 2 – Enter the program number (1–8) being modified. Press the ENTER to activate the selection.

Step 3 – Press the %/PM button.

```
   PROGRAM 1
Water Budget=100
```

Step 4 – Enter the desired water budget percentage for the selected program. You can decrease the program's watering to 0% (no watering) or increase it up to 200%. Press the ENTER button to accept the water budget modification.

Example: Increase Program 1's watering budget to 150%. Press the %/PM button and enter 1/SUN 5/THU 0 to set budget at 150%. Press ENTER to accept.

```
   PROGRAM 1
Water Budget=150
```

Step 5 – Repeat steps 2–4 to modify additional program water budgets.

NOTE: The Monthly percent adjustment and the water budget percentage will multiply together to get the net increase or decrease of the watering cycle.

Step 6 – Return the Function dial to the Auto Run ◐ position to exit SET PROGRAM.

27

Program Review

Use this function to review program parameters. Parameter modification is not allowed while in review mode.

Review the Program's Parameters

Step 1 – Turn the Function dial to the Program Review 🔍 position.

Step 2 – Enter the program number being reviewed.

Step 3 – Press the following buttons to review the parameters:

   WATER TIME - Review the stations and the corresponding runtimes that are assigned to the selected program. When pressed twice, MC-E will sequentially display all activated stations and their runtimes. To review individual stations, enter the station number and press the **WATER TIME** button.

   CYCLE START - Review all assigned start times in the program. When pressed, the MC-E will sequentially display all start times beginning from the earliest. Review a specific start time by entering the start time number and pressing the **CYCLE START** button.

   DAY ON - Review the program schedule. The **DAY OFF** button can also be used to review the program's schedule.

   % PM - Review the program's water budget for the current month.

Step 4 – Return the Function dial to the Auto Run 💧 position to exit Program Review.

Program Erase – Single Program

Erase Single Program

Step 1 – Turn the Function dial to the Program Erase 🖌 position.

```
PROGRAM Erase
Enter Prog #
```

Step 2 – Enter the program number being erased and press ENTER to process.

Example: Erase program 8 by pressing the 8 ENTER buttons.

```
PROGRAM Erase
Erase PGM#8.....
```

Step 3 – After the deletion, the display will show the following.

```
  PROGRAM ERASE
P1P2P3P4P5P6P7
```

Repeat Step 2 to delete additional programs.

NOTE: Erasing a program will revert it back to default. Program default will have no station and runtime assigned but it will have all **Days of the Week** (Sunday through Saturday) active.

Step 4 – Return the Function dial to the Auto Run 💧 position to exit Program Erase.

29

Program Erase – Complete Program Reset

Activating this function will erase all saved irrigation programs in the MC-E controller. However, it will not erase the current time, date or any **Option** settings.

Reset All Programs

Step 1 – Turn the Function dial to the Program Erase 🖉 position.

```
PROGRAM Erase
Enter Prog #
```

Step 2 – Enter $\boxed{\underset{\text{SUN}}{1}}$ $\boxed{\underset{\text{TUE}}{3}}$ $\boxed{\underset{\text{SAT}}{7}}$ $\boxed{9}$ and press ENTER.

```
Erase PGM 1 to 8
ARE YOU SERIOUS?
```

Press the CLEAR button to exit or press ENTER to accept.

Step 3 – Return the Function dial to the Auto Run (◐) position to exit Program Erase.

Program Erase – Complete Controller Reset

Activating this function will erase all data settings in the MC-E controller. The firmware will revert back to factory default settings.

Reset the Controller

Step 1 – Turn the Function dial to the Program Erase 🖉 position.

```
PROGRAM Erase
Enter Prog #
```

Step 2 – Enter $\boxed{9}$ $\boxed{\underset{\text{SAT}}{7}}$ $\boxed{\underset{\text{TUE}}{3}}$ $\boxed{\underset{\text{SUN}}{1}}$ and press ENTER.

```
  COMPLETE RESET
ARE YOU SERIOUS?
```

Press the CLEAR button to exit or press ENTER to accept.

Step 3 – Return the Function dial to the Auto Run (◐) position to exit Program Erase.

The MC-E provides the Station Test to allow you to activate all stations whether they are assigned to a program or not. When a Station Test is performed, the controller will sequence through all the stations and activate them for the specified duration.

Perform Station Test

Step 1 – Turn the Function dial to the Station Test ✎ position.

```
Set TEST TIME &
press MAN ON/OFF
```

Step 2 – Enter the station runtime from 01 second to 30 minutes (seconds must be entered with 0 first, i.e. 45 seconds, enter 045) and press the MANUAL ON/OFF to initiate the test.

> **NOTE:** If no runtime is entered before pressing the MANUAL ON/OFF button, the controller will test each station for two minutes.

Example: Test each station by activating them for one minute. Press the 1/SUN MANUAL ON/OFF buttons.

```
    STATION TEST
STN  1        0m59s
```

Press the NEXT button to advance to the next station.

Press the MANUAL ON/OFF button to Pause the Station Testing procedure.

Turn the Function Dial to ☁ (RAIN OFF) position to Cancel the procedure.

Step 3 – Return the Function dial to the Auto Run ⬤ position to exit Station Test.

31

The Option function allows you to make modifications to the controller's operation.

- Allows program 1–8 to utilize Station 1 as a secondary Master Valve.

- Allows sensor feedback to activate Program 8 and deactivate all other programs.

- Allows sensor feedback to activate Program 1 and deactivate all other programs.

- Allows you to activate or deactivate the Master Valve during station delays.

Options 1–8

Select Program to use Station 1 as a secondary Master Valve.

Activate Option 1–8 to Activate Secondary Master Valve (Station 1)

Step 1 – Turn the Function dial to the Options ? position.

```
    OPTION# 1
PGM 1   Mv=Master
```

Step 2 – Use the `BACK` and `NEXT` buttons to select the program to modify. Use the ➕ and ➖ buttons to set the Master Valve to Master or Station 1.

Example: Set Program 2 to use Station 1 as a secondary master valve. Press the `BACK` or `NEXT` button until Option# 2 is displayed. Press the ➕ or ➖ button to toggle the Master Valve option to STN 1.

```
    OPTION# 2
PGM 2   Mv=STN 1
```

Step 3 – Repeat Step 2 to modify additional programs.

Step 4 – Return the Function dial to the Auto Run ⬤ position to exit Options.

Option 9

Option 9 is used in conjunction with the Start Sensor and Program 8. Whenever the Start Sensor is triggered, the MC-E will immediately stop any controller activities, manual or scheduled. The controller will halt all automatic programs, with the exception of program 8, until the start sensor is deactivated. Program 8 will start immediately when the start sensor is triggered.

Activate Option 9

Step 1 – Turn the Function dial to the Options ? position. Press the BACK or NEXT button until Option 9 is displayed.

```
    OPTION# 9
PGM 8   Start=OFF
```

Step 2 – Use the ➕ or ➖ button to activate (ON) or deactivate (OFF) program 8. When activated, program 8 will start when the start sensor is triggered.

> NOTE: If program 8 has no value, the controller will still stop all automatic functions until the start sensor switch is deactivated.

Step 3 – Return the Function dial to the Auto Run 🌢 position to exit Options.

Option 10

Option 10 is used in conjunction with the Start Sensor and Program 1. Whenever the Start Sensor is triggered, the MC-E will immediately stop any controller activities, manual or scheduled. The controller will halt all automatic programs, with the exception of program 1, until the start sensor is deactivated. Program 1 will start immediately when the start sensor is triggered.

Activate Option 10

Step 1 – Turn the Function dial to the Options ? position. Press the BACK or NEXT button until Option 10 is displayed.

```
    OPTION#10
PGM 1   Start=OFF
```

Step 2 – Use the ➕ or ➖ button to activate (ON) or deactivate (OFF) program 1. When activated, program 1 will start when the start sensor is triggered.

> NOTE: If program 1 has no value, the controller will still stop all automatic functions until the start sensor switch is deactivated.

Step 3 – Return the Function dial to the Auto Run 🌢 position to exit Options.

Option 11

Option 11 is used to activate or deactivate the master valve during station delays.

Activate Option 11

Step 1 – Turn the Function dial to the Options ? position. Press the `BACK` or `NEXT` button until Option 11 is displayed.

```
   OPTION#11
StnDelay MV =OFF
```

Step 2 – Use the $\boxed{+}$ or $\boxed{-}$ button to toggle Master Valve function from ON or OFF during station delays.

Step 3 – Return the Function dial to the Auto Run (◌) position to exit Options.

Rain Off

The MC-E provides Rain Off to temporarily suspend the controller's automatic watering. When Rain Off is activated, automatic watering cycles are halted until the Rain Off duration has elapsed. Rain Off can be programmed from 0 (Rain Off deactivated) to 14 days.

Activate Rain Off

Step 1 – Turn the Function dial to the Rain Off position.

Step 2 – The MC-E will countdown execute a 3-second countdown to cancel any active watering. In this function dial position, all automatic watering will halt until it is returned to Auto Run position.

```
   RAIN OFF
All Off:  0 Days
```

Step 3 – You can also set a specific rain delay duration in days.

Example: Place the controller in Rain Off for three days. Enter the desired days off, in this case $\boxed{\mathbf{3}_{TUE}}$, and press the `ENTER` button to accept.

```
   RAIN OFF
All Off:  3 Days
```

NOTE: **3 Days** indicate that the current day is day number 3. The controller will countdown at day change until day 0 is met. At day 0, all automatic watering is restored. Disable the Rain Off feature by entering a Rain Off value of 0 day.

Step 3 – Return the Function dial to the Auto Run (◌) position to exit Rain Off.

The MC-E provides the Manual operation feature for unscheduled station activation. The selected station will then water until you turn it off or until the controller's current time reaches midnight. As a safety precaution, the controller is programmed to halt Manual watering at midnight. When Manual is in operation, MC-E will beep every 30 seconds to indicate active operation.

Activate Station Manually

Step 1 – Turn the Function dial to the Manual 🖐 position.

```
Set Station# &
press MAN ON/OFF
```

Step 2 – Enter the station number (1–48) you want to activate or enter 0 if you only want the master valve to activate. Press the MANUAL ON/OFF button to activate.

Example: Activate Station 5. Enter **5 THU** and press the MANUAL ON/OFF button.

```
   MANUAL MODE
STN# 5   12h30m05
```

IMPORTANT! The MC-E "True Manual" feature requires you to turn it off once activated. Otherwise, the manual operation is designed to activate until midnight. Notice that the displayed manual operation runtime will always end at midnight.

You can move the station number back or forward by pressing the **BACK** or **NEXT** button.

Step 3 – Return the Function dial to the Auto Run 🜔 position to deactivate manual operation and place the controller back to Auto Run mode.

NOTE: Manual watering has the least priority. If a scheduled program activated the maximum available active stations, then Manual operation will not run. When the maximum allowed active stations is reached while manual operation and scheduled program are running, the Manually activated stations will deactivate to accommodate the stations in the automatic program.

The MC-E is equipped a remote control port to be used with the Toro Sentinel™ Controller System. The remote control function is designed to communicate with the Toro Sentinel™ system using the Toro MC Link remote device.

When the Function dial is placed in the Remote Control position, MC-E will immediately receive Sentinel commands. The secondary remote for CSR communication using KSR port (Phone Jack) will be disabled.

While in Remote Control mode, MC-E will stop all activities and ignore scheduled programs. The MC-E will only operate based on commands received from the Sentinel central.

Activate Sentinel Remote Control

Step 1 – Secure the 6-Pin ribbon data cable from the MC Link remote device to the MC-E.

Step 2 – Turn the Function dial to the Remote Control $\overset{\text{(·}}{\underset{A}{A}}$ position.

```
Sentinel Control
Start Receiving
```

Step 3 – Return the Function dial to the Auto Run ⬤ position to exit Remote Control.

Notes:

Notes:

Cabinet Dimensions:

Small Metal Cabinet Unit: (9.71" H) x (10.68" W) x (4.25" D) [(24.66 cm H) x (27.13 cm W) x (10.79 cm D)]

Large Metal Cabinet Unit: (12.37" H) x (14.32" W) x (4.75" D) [(31.42 cm H) x (36.37 cm W) x (12.06 cm D)]

Input Voltage:

Domestic:

Primary - 115 VAC, 50/60 Hz; Secondary - 24 VAC, 50/60 Hz, 50VA Class 2 Transformer, UL and CSA Listed.

Export:

Primary - 250 VAC, 50/60 Hz; Secondary - 24 VAC, 50/60 Hz, 50VA Class 2 Transformer, CE and TUV Listed.

Output Voltage:

Station Output Voltage: 24 VAC

Station Output Current including Master Valve/Pump Start: 1.24 Amps Max. @ 24VAC

Total Output Current to Valves: 1.80 Amps including Master Valve/Pump Start

Storage Temperature:

4º F to 140º F (-20º C to 60º C)

Operating Temperature:

32º F to 160º F (0º C to 60º C)

Humidity:

95% RH, Non Condensing, @ 100º F (37.8º C)

Electromagnetic Compatibility

Radio complies with FCC Part 22 and Part 90 of the FCC Rules

Domestic: This equipment has been tested and found to comply with the limits for a FCC Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to the radio communications. Operation in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.