INSTALLATION AND OPERATING INSTRUCTIONS

WATERMARK

**Multiple Hydrozone System
Wired (MHS) and Wireless (W-MHS)**
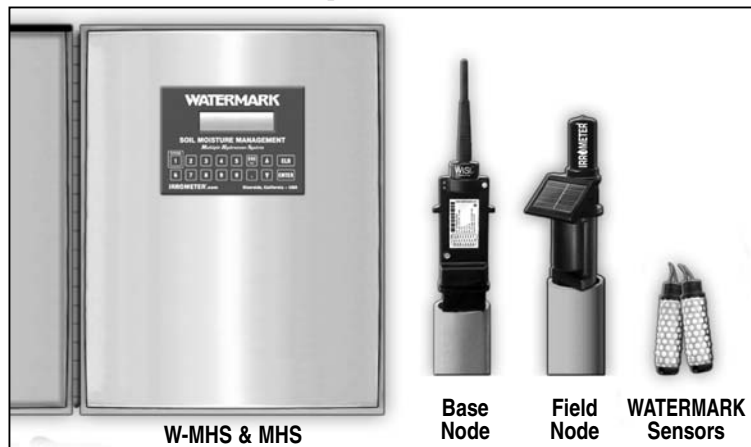

Optimizing Irrigation … Maximizing Conservation … Worldwide Since 1951

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Component View

W-MHS & MHS   Base Node   Field Node   WATERMARK Sensors

1. Introduction

The Multiple Hydrozone System, both wired (MHS) and wireless (W-MHS), works with your existing AC irrigation controller to eliminate programmed irrigations when plants have adequate soil moisture. It makes decisions to open or close the valve common wire or signals the controller, based on several criteria:

— valve program from irrigation controller
— soil moisture status of representative location
— operation of manual override
— allowed watering window

These parameters are set upon installation. Programming and operation of the system is done using the keypad and display on the MHS unit. Besides managing the soil moisture, the system will log data regarding system performance for a truly unique level of irrigation analysis and management. *(Skip to page 4 if you have a wired MHS.)*

## 2. Wireless Option W-MHS ONLY – General Overview – Field Nodes

Field Node is solar powered and shipped uncharged. Expose to sunlight for 1 to 2 hours.

When using the wireless system, Field Nodes are placed at representative locations around the property where soil moisture sensors will be located. They send data back to the W-MHS unit which is connected to your irrigation controller. The Field Nodes must be within "radio line of sight" (up to 1500 ft., 457 m) of the Base Node at or near the W-MHS unit location. Field Nodes must be installed so that the solar panel (built into every Field Node) receives adequate sunlight, ideally facing south (in the Northern Hemisphere). Each Field Node can read four WATERMARK sensors, thus allowing for measurements of two different Hydrozones, or groups of valves with similar watering demands. A total of eight Hydrozones can be managed with this system.

Field Nodes communicate with a Base Node located at or near the W-MHS unit via radio. Each node must be able to "see" the Base Node to provide adequate communication. This is what is meant by "radio line of sight" and is more than just a straight line between antennas; the longer the range the broader the signal and thus more interference that can be anticipated.
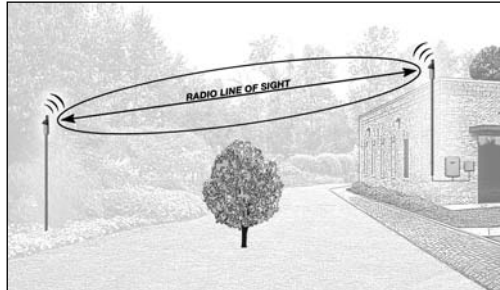
Range is improved by well planned installation height and node placement; 10 to 12 ft. (3 m) above ground is good for most applications. The Field Nodes are powered solely by the solar panel and no battery replacement is required. The Base Node is powered from the W-MHS unit panel and is wired as shown in the diagram on page 10 .
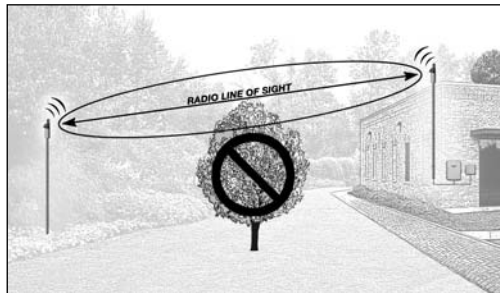
The Base Node can be installed up to 50 ft. (15 m) away from the W-MHS unit to provide better line of sight to the Field Nodes. In many cases an installation of the Base Node on a rooftop is best, especially if Field Nodes are on multiple sides of structures. The purchase of an auxiliary cable will be required if the Base Node is to be mounted away from the W-MHS unit. The W-MHS unit should be installed adjacent to the irrigation controller. Wires need to be run between the two units.

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3. Tools / Supplies Recommended

A. MHS and W-MHS

— 18 gauge color coded multi-conductor wire

— Appropriate Sensor Installation Tool(s) (#1013, #1016, #1017)

B. Field Nodes `W-MHS ONLY`

We suggest the following materials:

— Wheelbarrow

— 50# (22 kg) bag of concrete per node location

— 3 ft. (1 m) bubble level for leveling mounting pole

— Pipe or pole for each Field Node of a length suited to your needs

— Electrical Sweep for each pole (so wires move smoothly from node to sensors in field)

— 18/5 direct burial wire and waterproof wire nuts

4. Defining Your Hydrozones

For proper soil moisture management, determine irrigation requirements for each zone or valve and designate it as a "Hydrozone." *(EXAMPLE: Shady Turf, Slopes, Natives, etc. – see below.)*

SHADY TURF　　**SLOPES**　　**NATIVES**　　**TREES**

FLOWERS　　**SUNNY SHRUBS**　　**SUNNY TURF**　　**CONTAINERS**

Any number of valves can be grouped together in a Hydrozone as long as the water requirement of each is similar enough to be managed by a single sensor location, taking into consideration plant variety, soil type, sun exposure, topography, irrigation method, etc.

Once these decisions have been made, determine sensor locations for the most representative plant material in the grouping. Complete the table on outside back cover of this booklet for future reference before programming units.

5. MHS / W-MHS Unit Placement

Placement of the MHS or W-MHS unit should be adjacent to your existing 24VAC irrigation controller for easy wire connections. The unit can be installed inside your controller pedestal or can be mounted independently. Stainless steel enclosure measures: 9 x 12 x 5" (23 x 30 x 12.7 cm).

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6. Base Node Placement and Installation W-MHS ONLY

When using the wireless system, the Base Node must be mounted no more than 50 ft. (15 m) away from the W-MHS unit. A 15 ft. (4.5 m) cable is provided, a 50 ft. (15 m) cable can be ordered separately (part number: MHS-C). The higher the Base Node is mounted the better range you will achieve when it "talks" to the Field Nodes. Place the cable from the Base Node receiver to the W-MHS unit inside a conduit for protection.

7. Field Node Placement and Installation W-MHS ONLY

Consider placement of a Field Node for "radio line of sight." *(#18 AWG UF direct burial wires can be extended up to 1000 ft. [305 m] from the Field Node location to the sensors, as necessary for proper placement.)* Record your valve locations and plant material information on chart provided on back cover of this booklet.

A. Installing Field Nodes

— Select Field Node location — Range can be tested to ensure good communication by navigating to the applicable screen on the W-MHS unit display and observing the RSSI indicator. A reading of 80 RSSI or better is recommended. *See page 17, Step 9.*

— Determine the height of mounting pole needed for a clear line of sight to the Base Node receiver. *See page 3.*

— Plug connector end securely into Field Node, securing with screw connectors.

— The Field Node is an IP-67 rated outdoor/weather-proof device designed to be inserted inside a 2 in. (50 mm) ID pipe.

— The Field Node **can be secured to the mounting pipe sleeve** with a screw aligned to the retaining notch. *(see Figure 1 – below.)*

— Dig a hole where the Field Node is to be placed and mix concrete.

— Install electrical sweep fitting on base of mounting pole and place in the hole. Using bubble level, align mounting pole vertically. Backfill with concrete to secure in place.

Figure 1
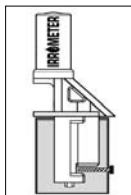
Drill hole for #10 x 7/8" screw 2" from end of PVC pipe to secure node.

Template for positioning of this hole has been packed with Field Node.
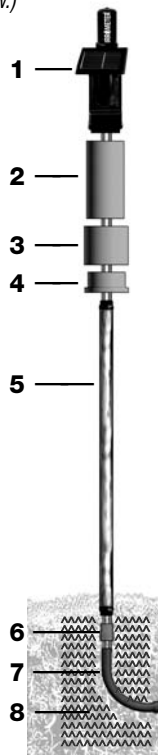
– SUGGESTION –

Example Installation:

1. Field Node *(provided)*

2. 2" x 6" PVC

3. 2" slip x slip coupling

4. 2" x 1" slip x thread bushing

5. 1" galvanized pipe

6. 1" slip x thread coupling

7. 1" electrical sweep

8. Mixed Concrete

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8. WATERMARK Sensor Placement and Installation

WATERMARK sensors are installed underground with two sensors at each location in the active root system of the turf or plant being monitored. Depth of placement varies with the rooting depth of the plant material.

> **Be sure the area where the sensor is located is irrigated by the last valve to operate in sequence within that Hydrozone (valve/station group). You may have to change the sequence of the valves/stations in order to water this area last. (All valves/stations must have the opportunity to be watered before the area where the sensor is located is watered or they may not get watered.)**

Typical Installation Depths —

Shallow Rooted Turf	2" to 5" (5-13 cm) deep (in root system)
Deep Rooted Turf	6" to 8" (15-20 cm) deep (in root system)
Shrubs/Ground Cover	8" to 14" (20-35 cm) deep (in root system)
Trees	16" to 24" (40-60 cm) deep (in root system)

— **Soak** WATERMARK sensors in water overnight before installation. **Always install a "wet" sensor.**

— For root systems that are less than 12 in. (30 cm) deep, sensors are installed 4 in. to 6 in. (10-15 cm) apart at each location and at the same depth (see Typical Installation Depths). For root systems deeper than 12 in. (30 cm) (deep rooted shrubs or trees), sensors are installed at various depths (25% and 75% of the plant rooting depth). This gives an "average" reading, over the entire root profile, of the two sensors combined to allow or eliminate irrigation as needed.

— Trench from where the WATERMARK sensors will be installed to the MHS unit or if installing a wireless system (W-MHS), trench to the Field Node location.

— For sensor installation in turf, at the WATERMARK sensor end of the trench, use an IRROMETER Turf Coring Tool (#1016) or a piece of 1/2 in. (12.7 mm) pipe to tap pilot holes into the soil. Excavate the holes to the depth required for sensor installation. Fill the bottom of the hole with a thick slurry made

of soil removed from the hole and water, then firmly push the sensor down into the mud in the bottom of the hole. This will "grout in" the sensor to ensure maximum surface contact between the sensor surface and the surrounding soil. Alternately the sensor can be firmly pushed to the bottom of the access hole so long as it is a tight enough fit to ensure adequate contact, a snug fit is absolutely necessary. A WATERMARK Insertion Tool (#1017) or a piece of 1/2 in. PVC pipe (class 315) can be used to push the sensor in further, being careful not to pinch the wires.

For installation in a zone with deeper rooted shubs or trees, make a sensor access hole to the desired depth with an IRROMETER Coring Tool (#1013) or a 7/8 in. (22 mm) O.D. rod. Fill the bottom of the hole with a

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thick slurry made of soil removed from the hole and water, then firmly push the sensor down into the mud in the bottom of the hole. This will "grout in" the sensor to ensure maximum surface contact between the sensor surface and the surrounding soil. Alternately the sensor can be firmly pushed to the bottom of the access hole so long as it is a tight enough fit to ensure adequate contact, a snug fit is absolutely necessary. A WATERMARK Insertion Tool (#1017) or a piece of 1/2" PVC pipe (class 315) can be used to push the sensor in, being careful not to pinch the wires. Sensors **MUST be firmly packed in the soil**, a good snug fit is important. (If desired, the PVC can be solvent welded to the sensor collar with a transition solvent PVC to ABS cement).

Be sure all sensors are installed in the active root system of the turf, shrubs or trees. Sensors should be installed vertically or to a 45° downward angle into the soil.

— Backfill the sensors and run the sensor wires to the MHS unit or to field node location if installing the W-MHS wireless system. Backfill the sensor wire trench.

9. Wiring Existing Controller to MHS Unit and W-MHS Unit


Controller Example

Any wire of size 20 AWG to 14 AWG (stranded) or 16 AWG (solid) can be used to make the connections between the MHS or W-MHS units and the controller. A single wire for each valve on the controller must be connected to the corresponding valve terminal on the MHS or W-MHS unit. **All common wires coming from valves in the field must be run to the field common terminals on the MHS or W-MHS units.**
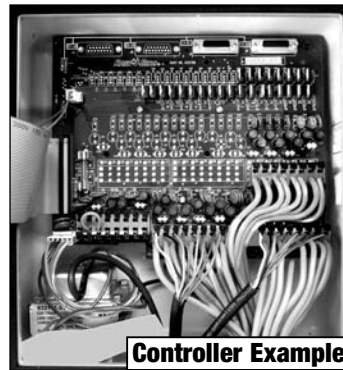
The MHS or W-MHS unit opens and closes the common circuit or interfaces with the controller sensor port(s) between the valves and the controller as necessary, depending on the moisture status reported by the sensors. The yellow jumper pins adjacent to the station terminal strip connections are used to assign each valve/station to a specific Hydrozone. Valves/stations are assigned to each Hydrozone by moving the yellow jumper pins to applicable pair of pins as labeled 1 - 8. *(See photos 2a and 2b on page 9)*. For any valve not being managed by the MHS or W-MHS System, the yellow jumper pins should be left in the "No Hydrozone" position ●. *(See photo 2c on page 9)*.

> **Pump Start Relay Systems –** *See page 11 regarding a recommendation for Pump Start Relay Systems.*

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9. Wiring Existing Controller to MHS Unit *(continued)*
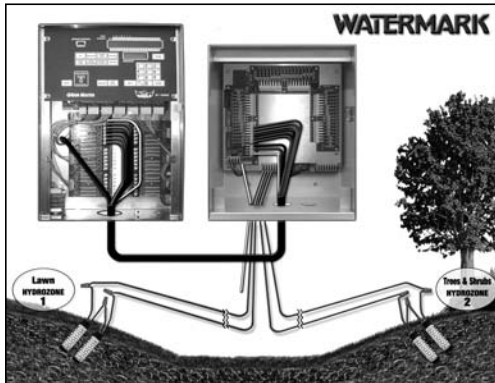
NOTE: Only **ONE** irrigation station output can be operated at a time when using the MHS or W-MHS regardless of the controller's features.

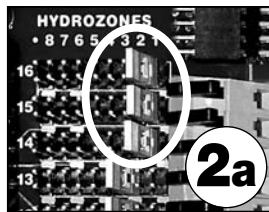**Controller Example**
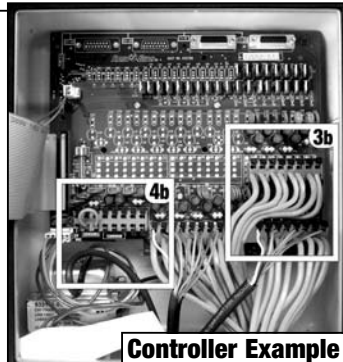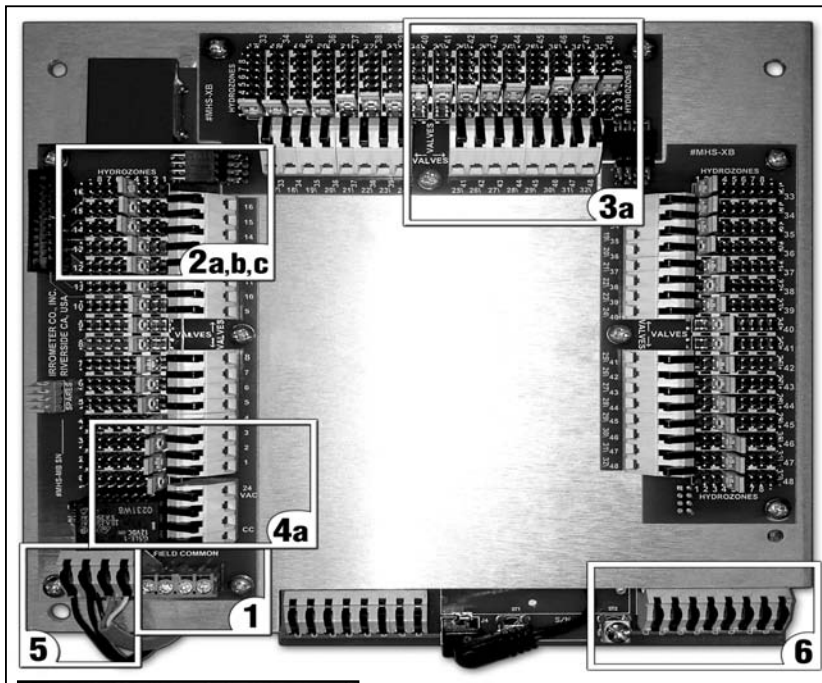
1 – Connect Field **COMMON WIRE(s)** to the bottom left of the MHS or W-MHS. *(Include Pump Start common if applicable.)*

There are four slots available to accept up to 12 AWG wire.

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2a – Assign a **YELLOW JUMPER PIN** for each station to the desired Hydrozone.
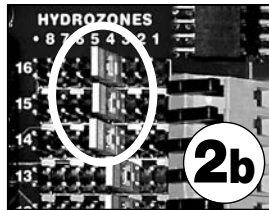
2b – EXAMPLE: Station 14, 15 & 16 have been reassigned from Hydrozone 1 to Hydrozone 4.

2c – EXAMPLE: Station 14, 15 & 16 have been reassigned from Hydrozone 1 to No Hydrozone.
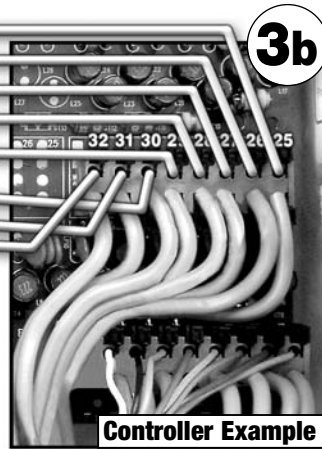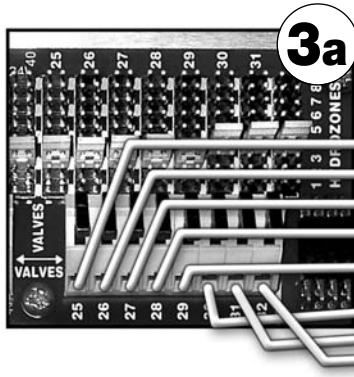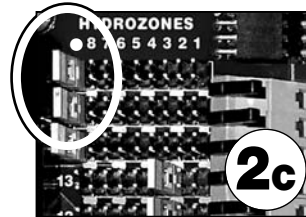
3a & **3b** – *IMPORTANT!* You will use a separate wire to connect the MHS or W-MHS to your existing controller for each valve that irrigates. (*Controller's existing field valve wires remain untouched.*)

Controller Example
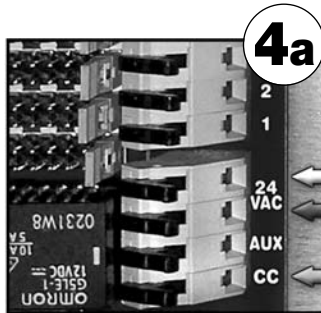
4a & **4b** – Connect separate 24VAC wires from existing controller to MHS or W-MHS.
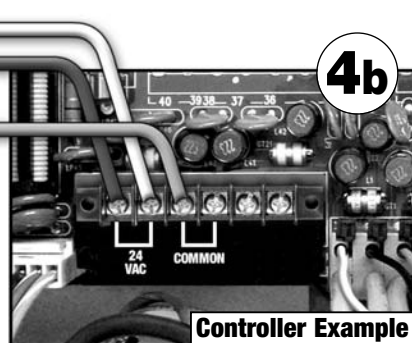
CC = **CONTROLLER COMMON** from MHS or W-MHS to **COMMON** input on your controller.

Controller Example

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9. Wiring Existing Controller to MHS Unit *(continued)*
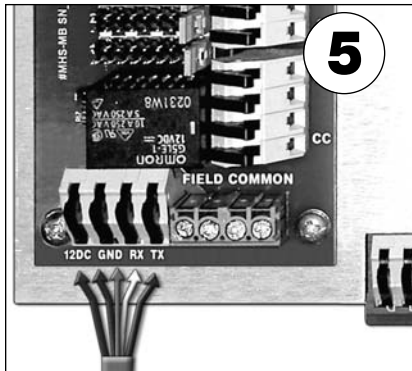
5 – Wiring the **BASE NODE**. `W-MHS ONLY`

   12DC = Red
   GND = Black & Orange
     RX = Green
     TX = White

6 – Wired MHS only. Attach sensor wires to the appropriate terminals as determined by your Hydrozones.
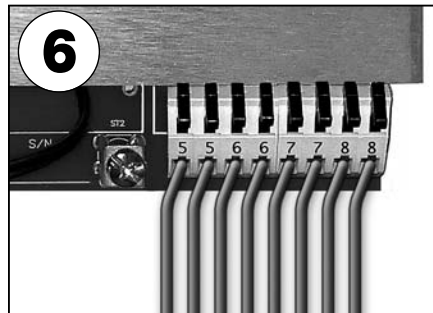
Advanced MHS or W-MHS Units Connectivity

USB & SHUTTLE PORT – *See IRROMETER.com for details.*
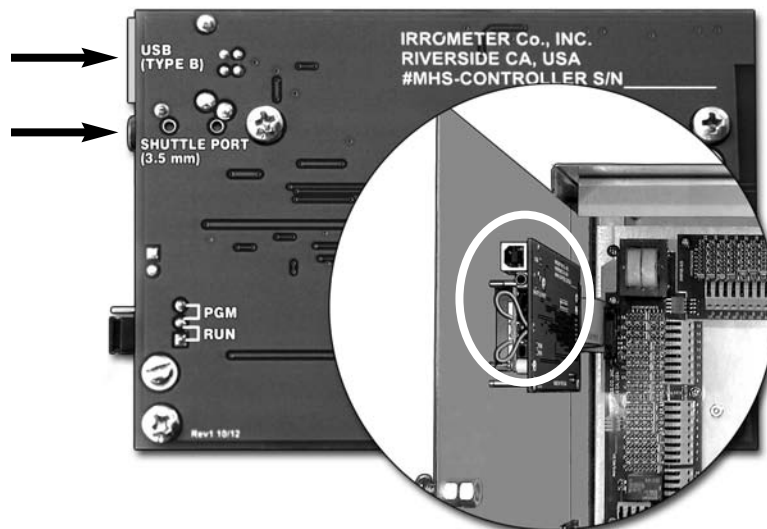
10. Programming Your Existing Controller

Each Hydrozone can be set for different soil moisture levels. Keep in mind that the Soil Moisture Sensors only serve to override your irrigation controller/time clock to prevent excessive or unnecessary irrigation. The irrigation controller is still "in control" and determines "when" irrigation can occur and "how long" a given cycle can run. Thus, the key to successful use of this entire system depends on properly programming your irrigation controller. The correct programming procedure is as follows:

– Allow the controller to come on as often as possible (except maybe the night before, or morning of, the mowing day). This means the controller is frequently "asking" the moisture sensors if irrigation is needed. It will operate ONLY when the sensors say it is necessary.

– Set the valve cycle timer (duration/run time) for short cycles. This prevents the runoff you often see with longer cycles. The soil can absorb water only so fast, and long cycles usually don't permit all the water to penetrate the soil where it is needed without runoff.

– With the short cycles, you'll need to have several repeat cycles, or start times, each day. You may want to seek the advice of a professional irrigation consultant to help you set up a program of this type to meet peak consumptive use based on your specific system and plant material. Since this program can be used year round with moisture sensor control, you will eliminate the need for seasonal program adjustments. The system will automatically adjust the irrigation to whatever is needed regardless of the weather. In climates where ground freezes, sensors **DO NOT** have to be removed.

– Monitor your system and plant material to fine tune your moisture settings for proper balance and correct plant response. You can fine tune by:

    A. Adjusting the moisture setting for a wetter or drier control

    B. Changing the programmed station run time to prevent excessive runoff

    C. Changing the repeat cycles, or start times, to increase or decrease total irrigation "potential" to meet the peak consumptive use of the turf or plants

Once you have established a balanced program, further adjustments become unnecessary. All you need to do is monitor the results, thus eliminating the constant programming of the controller for seasonal needs.

*A free software program is available to assist you in creating the optimum schedule for your landscape. You can download our **WaterPerfect** program by visiting our website at **www.IRROMETER.com**. Go to "Downloads" and select "Downloads Main, WaterPerfect Login appears as the last item under "Downloads Library." When prompted, type the word "conserve", without the quotation marks, for both the user name and password. The program requires Microsoft® Excel®. If you perform an irrigation audit on your landscape, you will have all the data necessary to input into the program, which will then generate a recommended schedule to be programmed into the controller.*

Pump Start Relay Systems – With pump start systems; care must be used in sequencing the valves to minimize the potential for start/stop decisions by the system. All valves within the same Hydrozone should be run in sequence. ***Pump Start common must be switched by MHS.*** Run times should be of sufficient duration so as to not exceed the maximum number of starts per hour recommended by the pump motor manufacturer. The MHS will periodically momentarily close the common to check system status to see what valve is energized. To avoid this momentary closure from affecting pump operation on a pump start application, a time delay relay should be added to the pump start circuit. While the momentary common closure is so short that a pump would likely not start, the contactor points in the pump start relay could chatter. The addition of a time delay relay to the circuit between the controller/MHS and the pump start relay is recommended. The time delay relay should be set for 3 seconds, meaning, if the common is closed by the MHS for more than 3 seconds the power would be passed along to the pump start relay. Any closure of the common for any time shorter than 3 seconds and the pump start relay would not be energized.

A time delay relay kit (#MHS-TD) is availble from IRROMETER, however any single pole 24V AC delay on make timer will work. Wiring for an example delay on make timer is shown on page 22.

11. Programming the MHS and W-MHS Units

Press ESC at any time to return to the Main Menu.

Press CLR to change values.

A. Set Date and Time — 5CLK (Clock)
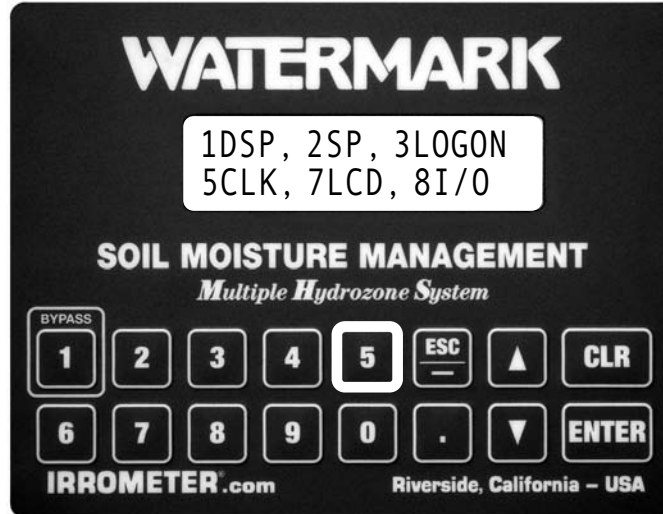
Step 1 — Setting the correct date and time. Start by pressing the **5** key.

```
WED 02/06/2013
Weekday(1-7)=
```

Step 2 — Press the number key that represents the correct **day of the week**. (EX: **1** = Sunday, **2** = Monday, etc.) Press the **ENTER** key.

```
WED 02/06/2013
Month(1-12)=
```

Step 3 — Press the number key(s) that represents the correct **month**. (EX: **1** = January, **2** = February, etc.) Press the **ENTER** key.

```
WED 02/06/2013
Day(1-31)=
```

Step 4 — Press the number key(s) that represents the correct **day of the month**. Press the **ENTER** key.

```
WED 02/06/2013
Year(0-99)=
```

Step 5 — Press the number keys that represent the correct **year**, only the last two digits are necessary. (EX: for 2013, press only **13**). Press the **ENTER** key.

A. Set Date and Time — 5CLK *(continued)*

```
13:48:21
Hour(0-23)=
```

Step 6 – Press the number key(s) that represents the correct **hour of the day using military time format**. *(EX: for 1:00 a.m. = 1; 1:00 p.m. = 13).* Press the **ENTER** key.

```
13:48:21
Minute(0-59)=
```

Step 7 – Press the number key(s) that represents the correct **minute**. Press the **ENTER** key.

```
13:48:21
Second(0-59)=
```

Step 8 – Press the number key(s) that represents the correct **second**. Press the **ENTER** key.

```
7LCD — LCD Display
8I/O — Input / Output
```
These features are factory preset and cannot be adjusted.

B. Set Parameters — 2SP
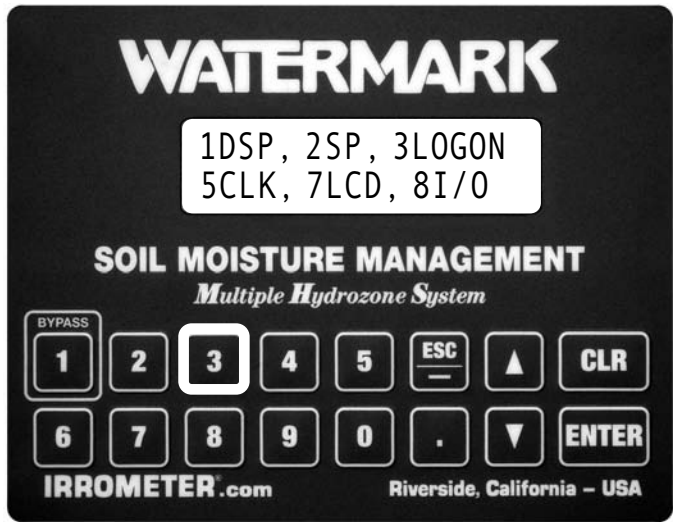
Step 1 – You must first logon **(3LOGON)** to change parameters. Start by pressing the **3** key.

```
Logon code?
=✳ ✳ ✳
```

Step 2 – To access different set points press number keys **987**. Numbers will display as ✳✳✳. Press the **ENTER** key. *(Active for 5 minutes after code is entered, re-enter code to continue.)*

B. Set Parameters — 2SP *(continued)*

```
1DSP, 2SP, 3LOGON
5CLK, 7LCD, 8I/O
```

Step 3 – Press the **2** key to continue.
Press the **ENTER** key.

```
Num Hydrozones
3.00000
```

Step 4 – Press the **CLR** key, then enter
the number of Hydrozones you are using.
Choose 1- 8.
Press the **ENTER** key.
Enter ▼ to continue to the next window.

When performing routine system maintenance on a moisture sensor controlled sprinkler system, the moisture shutoff system must be bypassed in order to allow the valves to operate manually.

Fixed Bypass Time is an option which allows the system to be operated manually during a predefined interval **every day**. This would only be applicable if a remote control device is used for manual operation, to save the operator from having to go to the controller to bypass the system manually. This period should start after all programmed watering has occurred for the day and end before any new programmed watering begins. Typically, watering is done in the late night through early morning hours. So, to program a Fixed Bypass Time into the system, it would begin after work crews begin their day and run until the end of the workday, **which must not overlap with any programmed irrigations**. To program a Fixed Bypass Time for every day, follow Steps 5 and 6, below.

The system allows additional types of bypass operations, and will be discussed later on page 18. Section D.

```
Fixed Bypass Start
06.00
```

Step 5 *(optional)* – Set time to start open watering using **military time format.**
Press the **ENTER** key.

*Fixed Bypass allows you to disable the system **every day** for a period of time for manual or remote watering. On the keypad enter two digits for hours, two digits for minutes, separated by a decimal. For example, for watering to be allowed, starting daily at 6:00 am the setting should be entered as follows:* **06.00**. *(Factory pre-set at* **08.00**.) *NOTE: The decimal is **required** between a 2 digit hour setting and 2 digit minute setting.*

```
Fixed Bypass Time
0.00000
```

Step 6 *(optional)* – Program in hours
1 - 9, how many hours you want the MHS or W-MHS system to be disabled.
Press the **ENTER** key.

NOTE: **0.00000** means that feature is not in use. If this feature is used a **D** will be displayed during the lockout time frame.

There are two ways to control soil moisture with the system. When managing a Hydrozone with multiple valves, the sensing station **MUST** be located within an area that gets watered by the last valve to run in sequence within that group of valves. This ensures that the sensors do not get watered until all the valves in that group have been watered. Only the moisture START setting needs to be programmed for this application. When managing a Hydrozone with only a **single valve**, such as a drip zone with a long run time, it is possible to set both a moisture START as well as a moisture STOP value. In this way, the run time will only be allowed for as long as it takes to wet down to the STOP value.

```
Hz Samp Rate Min
1.00000
```

Step 7 – `W-MHS ONLY`
Determines how often the wireless nodes sample the WATERMARKS and report the values. Default is 1 minute; range is 1-60 minutes.

```
Hz1 Moist Start
30.00000
```

Step 8 – Press the **CLEAR** key.
Enter watering START (dry) point value in centibars, press **ENTER**.
(See page 20, Defining Moisture Values.)
Press the ▼ key to continue.

```
Hz1 Moist Stop
0.00000
```

Step 9 – *(Optional)* Enter watering STOP (wet) point value in centibars, press **ENTER**.
Press the ▼ key to continue. Screen will update to next Hydrozone.

Repeat Steps 8 and 9 for each Hydrozone you are using *(see page 14, Step 4.)*
Continue pressing ▼ to scroll through all remaining remaining Hydrozones.

Several bypass options are available to facilitate routine maintenance and operation of the irrigation system. Below are two such features. **LOCKOUT** allows you to inhibit the irrigation controller from watering for a fixed period of hours. This would only be used for uncommon practices such as after a herbicide application when you would not want any water applied for several days. Once programmed time runs out, the system will allow the irrigation controller to operate normally. **TIMEOUT** is the most common bypass feature. It allows the irrigation controller to be operated in manual mode for a fixed period of time. Once the programmed time runs out, the system will begin to override the controller based on moisture status.

```
Man Lockout Hr
12.00000
```

Step 10 – *(Optional)* Manual Lockout.
The duration in hours for which **No Watering** will be allowed when placed in **L** mode. Range is 1-168 hours. Factory default is 12 hours. This feature is used for long term **No Watering** such as for herbicide applications.
Press the CLEAR key, enter new time (between 1-168 hours), press **ENTER**.
Press the ▼ key to continue.

```
Man Timeout Hr
2.00000
```

Step 11 – *(Optional)* Manual Timeout.
Duration in hours for which **Watering** will be allowed when placed in **T** mode, this feature is used for system maintenance. Temporary additional time, up to 168 hours, can be selected and will reset to factory default when that time has expired. Factory default is 2 hours. Press the CLEAR key, enter new time (between 1-168 hours), press **ENTER**. Press the ▼ key to continue.

C. Current Display — 1DSP For Viewing System Parameters

WATERMARK

```
1DSP, 2SP, 3LOGON
5CLK, 7LCD, 8I/O
```

SOIL MOISTURE MANAGEMENT
Multiple Hydrozone System

BYPASS

[1] [2] [3] [4] [5] [ESC] [▲] [CLR]

[6] [7] [8] [9] [0] [.] [▼] [ENTER]

IRROMETER.com   Riverside, California – USA

Step 1 – View current display. Start by pressing the **1** key.

```
0 System
```

Step 2 – Press **0** key to continue. Press the ▲ or▼ key to scroll through currently displayed Hydrozone. Press **ENTER** key to advance to next Hydrozone.

```
 Hz1 - 20   12
12:41PM   System OK
```

Step 3 – Displays **Hz1**. *EX: Shows centibar reading set to water at* **20** *and current reading is* **12**. Current time is displayed. System status is displayed. Press the ▼ key.

```
 Hz1 - 20   12
900M COM Fail
```

Indicates communication error within MHS system. *See IRROMETER.com for troubleshooting options.*

```
 Hz1 - 20   12
COM Fail HZ 1 & 2
```

W-MHS ONLY Indicates communication error at Field Node. *See IRROMETER.com for troubleshooting options.*

```
 Hz1 - 20   12
Base COM Fail
```

W-MHS ONLY Indicates communication error at Base Node. *See IRROMETER.com for troubleshooting options.*

```
Moist Start=20
Moist Stop =0
```

Step 4 – Current start; **20** and stop **0** for that Hydrozone.
Press the ▼ key.

```
WM1=     25
WM2=     16
```

Step 5 – W-MHS ONLY
Displays current WATERMARK sensor reading
WM1 = 25 (placed shallow in root zone)
WM2 = 16 (placed deep in root zone).
Press the ▼ key.

```
Last Water:
01/30/2013 13:38
```

Step 6 – Indicates last allowed irrigation event.
Press the ▼ key.

```
Water Saved:
43.2  %
```

Step 7 – Percentage of total programmed
irrigation time saved because of sufficient
moisture levels.
Press the ▼ key.

```
Last Com:
02/06/2013 13:40
```

Step 8 – Indicates last communication within
system.
Press the ▼ key.

```
RSSI=    246
CapV=    2.40
```

Step 9 – W-MHS ONLY
RSSI = Field Node signal strength.
         Must be above 80 RSSI.
CapV = Capacitor voltage in Field Node.
         Should be between 1.00 & 2.40.

Press the ▼ key.

Defining Additional Displays — advances as you press the ▼ key repeatedly.

```
1=Manual Timed

2=Manual Lockout

3=Send Samp Time

4=Clear Log

5=Clear H2O Tots

6=Not Used

7=Download Log

8=Install Deflts

9=Not Used
```

1 = Manual TIMEOUT.

2 = Manual LOCKOUT.

3 = W-MHS ONLY
Sends communication to Field Nodes.

4 = Clear logged data from memory.

5 = Clears "Water Saved Percent."

6 = Not used.

7 = Download data to laptop.

8 = Resets factory defaults. *(Set points only, must be logged in for this feature.)*

9 = Not used.

D. System Bypass — The following steps will be effective system-wide.

View current display. Start by pressing the **1** key.

```
O System
```
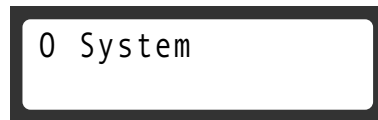
You will see this screen.
Press **O** key to continue.

```
Hz1 — 30   18
System OK
```

This screen indicates System is in **AUTOMATIC** mode. The ━ shows in the window, indicating the System is in automatic mode.

```
Hz1 T 30   18
System OK
```

Press the **1** key, a **T** will appear, indicating System has been placed in **TIMEOUT** mode. This will allow any irrigation to take place *(page 15, Step 11)*. System will return to ━ when the programmed time has expired.

```
Hz1 L 30   18
System OK
```

Press the **2** key, a **L** will appear, indicating System has been placed in **LOCKOUT** mode. System will not operate for set time *(see page 15, Step 10)*. System will return to ━ when the programmed time has expired.

```
Hz1 M 30   18
System OK
```

MANUAL override – Start by pressing the **ESC** key. Press the **3** key. Enter **987** & press **ENTER**. Press the **1** key. Press the **O** key. Override begins by pressing the **O** key again, an **M** will appear. System remains in the manual state until process is repeated.

12. Graphing Software

WaterGraph Software for the Multiple Hydrozone System, used to graph collected Hydrozone data, is available as a free download at:

http://IRROMETER.com/WaterGraph/Setup_3.3.exe

A link to that sofware and instructions for its use, is available on the IRROMETER website at:

http://IRROMETER.com/Landscape/html#mhs

13. Screen Prompt / Display Legend

ESC **=** Will return you to the main window at any time.

Character Legend

— **=** System is in AUTOMATIC mode.

M **=** MANUAL mode, sensors **will not** be part of irrigation decision.
   (see page 18)

T **=** TIMEOUT mode, allows **all** watering for that time frame.
   (see page 15, Step 11)

D **=** DAILY LOCKOUT mode, **permits** daily irrigation during a set time frame.
   (see page 14, Steps 5 & 6)

L **=** LOCKOUT mode, **stops** any irrigation from taking place for a set time.
   (see page 15, Step 10)

A **=** ALLOW mode, **allows** irrigation when station is activated from the controller.*****
   (Hydrozone is drier than the centibar value)

P **=** PREVENT mode, **prevents** irrigation when station is activated from the controller.*****
   (Hydrozone is wetter than the centibar value)

   *Displayed only when complete system is irrigating

From the "System OK" window only *(Press key to operate)*

1 **=** **T** – Timeout,**1** key to activate this feature.*****

2 **=** **L** – Lockout, **2** key to activate this feature.*****

3 **=** **W-MHS ONLY** Sends communication to Field Nodes.

4 **=** Clear logged data from memory.

5 **=** Clears "Water Saved Percent."
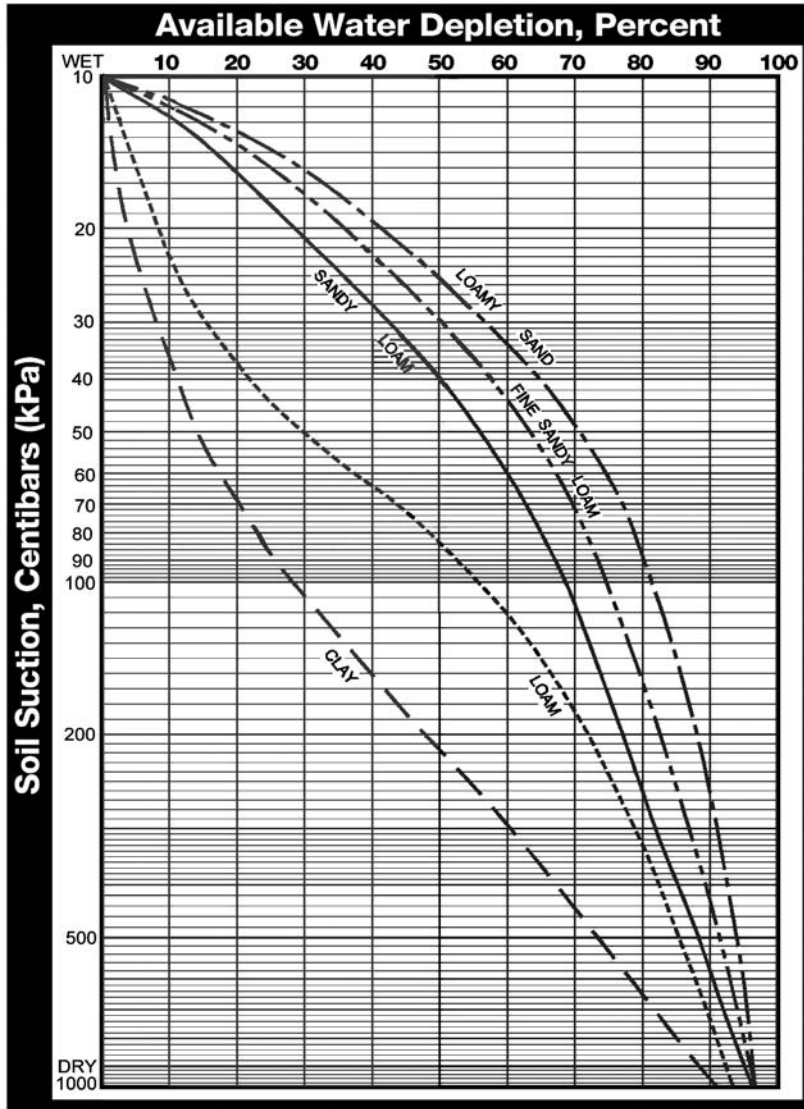
6 **=** Not used.

7 **=** Download data to laptop.

8 **=** Resets factory defaults. *(Set points only)*

9 **=** Not used.

*Press again to cancel.

Defining Moisture Values (Centibars)

Examples of Centibar (cb) Values:

Sunny Turf . . . . 15 - 30 cb

Shady Turf . . . . 20 - 45 cb

Shrubs . . . . 35 - 70 cb

Drought Tolerant / Deep Rooted Plants . . . . 80 - 120 cb

20

Sensor Field Wiring

WATERMARK Connected to wired MHS

Two WATERMARKs wired in series and connected to applicable terminals for each Hydrozone.

Soak WATERMARK sensors in water before installation.

Always install a "wet" sensor.

6" plastic valve box installed at grade for wire connections

0°– 45°

Depth as required, approximately 40 - 50% of effective root depth for turf zones.

Approximately 25% of effective root depth for shallow sensor and 75% of effective root depth for deep sensor with deeper rooted plant zones.

Pea Gravel for Drainage.

Use Direct Burial type wire and connectors for all splices.

6"– 8" Sensors Wired in series.

Lower drawing shows wiring pattern for W-MHS only

WATERMARK Connected to Field Node

Soak WATERMARK sensors in water before installation.

Always install a "wet" sensor.

HYDROZONE #1

HYDROZONE #2

BLACK RED ORANGE WHITE GREEN

GREEN

GREEN

Shallow

GREEN

GREEN

Shallow

All GREEN/WHITE STRIPE connect here

Deep

GREEN

Deep

See above drawing for detailed information on burial depth, placement, spacing and connectivity, etc.

21

MHS Pump Start Relay Wiring

Irrigation Controller
(24 VAC)

MHS

PUMP
START   P   C   COMMON

CONTROLLER
COMMON   CC   FC   FIELD
COMMON

JUMPER
2 to 1

2   7
1
3

MHS-TD
Time Delay Kit

24V
Coil

PUMP START RELAY COIL
(24 VAC)

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Irrigation ASSOCIATION™
Bronze Member

Hydrozone Valve Groupings for Moisture Control

(Record Hydrozone types for your installation here)

Hydrozone	Plant Material	Valves/Stations
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____

Hydrozone Examples

SHADY TURF

SLOPE

NATIVES

TREES

FLOWERS

SUNNY SHRUBS

SUNNY TURF

CONTAINERS

IRROMETER®