ET2000 (500 SERIES) IRRIGATION CONTROLLER

PROGRAMMING GUIDE

making **water work**
since 1986

💧 *TABLE OF CONTENTS*

CALSENSE ®

making **water work**

since 1986
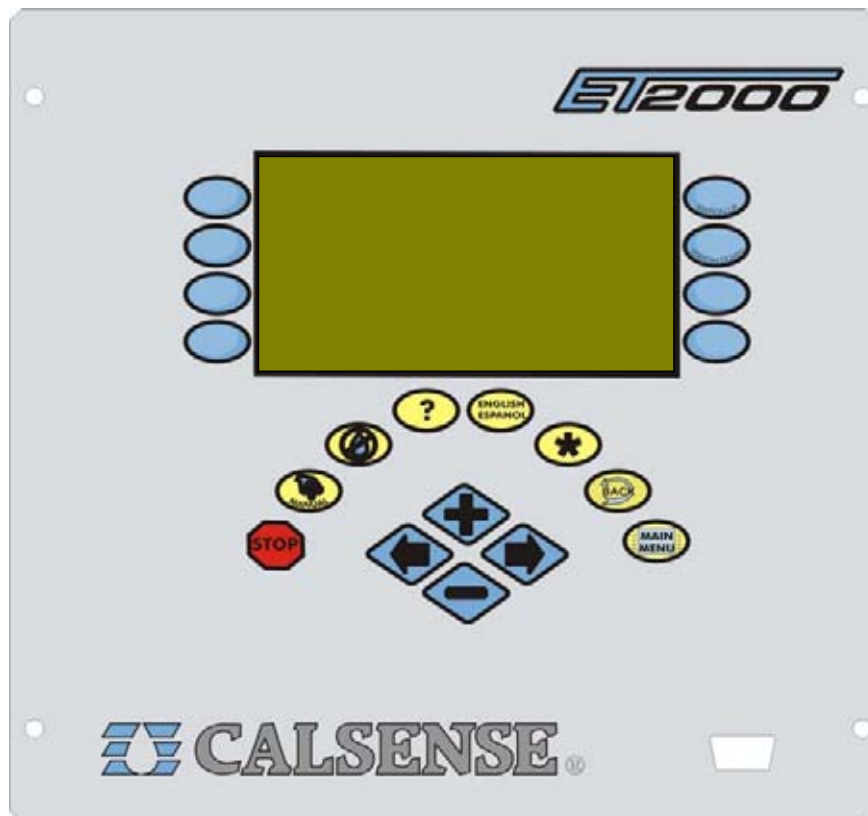
SECTION 1 CONTROLLER DESCRIPTION

I. ET2000 KEY PAD DESCRIPTION

1. **STOP** – The STOP key will stop any currently running Scheduled watering Cycle, Manual Cycle, Test Cycle, Manual Programs.
2. **MANUAL** – The MANUAL key will perform Manual Water, Test, Master Valve Override, Manual Program 1 & 2, Walk-thru, and Use Hold-over.
3. **NO WATER** – The NO WATER key is used for turning the controller Off and to set No Water Days.
4. **?** – The ? key is used to access the controller Help screens.
5. **ENGLISH / ESPANOL** – The ENGLISH / ESPANOL key allows you to toggle the displayed text between English and Spanish.
6. **BACK** – The BACK key will go back to the previous screen.

7. **MAIN MENU** – The MAIN MENU key is used to access the different program features of the controller.
8. **MENU KEYS** – MENU keys are used to select the different features of commands in the various screens. The text in the screen will point towards the MENU key that needs to be pressed.
9. **LEFT / RIGHT ARROW KEYS** – The LEFT / RIGHT ARROW keys move the highlighted cursor around the different screens when setting up or editing the controller's features and options.
10. **PLUS / MINUS KEYS** – The PLUS / MINUS keys are used to increase or decrease values or answer Yes or No questions in the different screens.

Programs & Stations

Programs & Stations

Start Times & Water Days
- Select Program
- Set Program Start Time
- Select Program Description (optional)
- Set Number Of Water Days in Schedule
- Set Water Days
- Set Program Stop Time (optional)

If 12 Month Schedule Is Enabled:
- Set All The Above For Each Month Of The Year
- Select Stop Time

Station Programming

If Not In Daily ET Mode:
- Set Station Program Assignment
- Set Total Minutes
- Set Minutes Per Cycle
- Set Soak-In-Time
- Set No Water Days
- Test Station

If In Daily ET Mode:
- Set Station Program Assignment
- Set % ET
- Set Minutes Per Cycle
- Set Area (Sq. Ft.)
- Set No Water Days
- Test Station

Station-To-Station Copy
- Copy Station-To-Station
- Copy Station-To-Program

Station-By-Program
- View Station By Program
- Move Station From Program To Program

Flow

Flow

Line Fill & Valve Close Times
- Line Fill By Program
- Valve Close By Program

Alert Actions
- Set High Flow Alert Actions By Program
- Set Low Flow Alert Actions By Program

Master Valve
- Select Type Of Master Valve

Pump
- Select Use Of Pump (By Program)

Flow Meter
- Select To Use A Flow Meter
- Select To Use List Or Enter Own Parameters
- Set Flow Meter Size / Set Own parameters
- Learn Expecteds By Program

Mainline Capacity
- Set Mainline Break Numbers
- Set System Maximum Flow Rates

On-At-A-Time
- Set Valves On At A Time Within Program
- Set Valves On At A Time Within Controller / System (IF More Than One Controller)

Weather

Weather

ET Gage
- Select Irrigation Day Window
- Select To Use ET Gage
- Select To Log Et Pulses
- Reset Full ET Gage
- Manually Set Gage Amount In Inches
- Set Skip Tonight

Rain Bucket
- Set Minimum Rain
- Set Maximum Hourly Rain
- Set Maximum 24 Hour Rain
- Set Maximum Total Rain
- Set Use Of Rain By Program

Wind Gage
- Select The Use Of Wind Gage
- Set Wind Speed For Pausing Irrigation
- Set Wind Speed to Resume Irrigation
- Respond To Wind By Program

Rain Switch
- Select To Use A Rain Switch Device

ET
- Select To Use Daily ET (By Program)
- Select To Use ET Averaging (By Program)
- Crop Coefficients In Use Setting

Budget
- Select To Use A Budget
- Select Budget By Square Footage
- Select Budget By City ET
- Select Budget By Monthly Direct Enter
- Calculate Budget

Moisture
- Select To Use Moisture Sensors
- Assign Sensor Slaving To Valves

ET County / City
- Select County And City For ET
- Enter Your Own ET Numbers
- View Historical ET Totals

Manual Programs

Manual Programs

Manual Water
- Manual Water A Station
- Manual Water A Program
- Cycle And Soak During Manual

Test
- Learn The Expected At A Station
- Test Station
- Test Station Moisture Sensor

Master Valve Override
- Open Master Valve For Hours
- Weekly Schedule For Opening Master Valve

Learn Expected
- Learn The Expected By Program

Manual Program 1
- Schedule Water Days For Manual Program 1
- Set Up To 6 Start Times For Manual Program 1
- Set Run Duration From / To
- Set Station Times

Manual Program 2
- Schedule Water Days For Manual Program 2
- Set Up To 6 Start Times For Manual Program 2
- Set Run Duration From / To
- Set Station Times

Walk-Thru
- Set Walk Thru Count Down
- Set Station Run Times
- Set Walk-Thru Station Order
- Begin Countdown

Use Hold-Over
- Select Use Hold-Over
- Set Start Times For Hold-Over Use
- Set Stop Time For Hold-Over Use
- Select Water Days For Hold-Over

CALSENSE ®

Setup

Communications
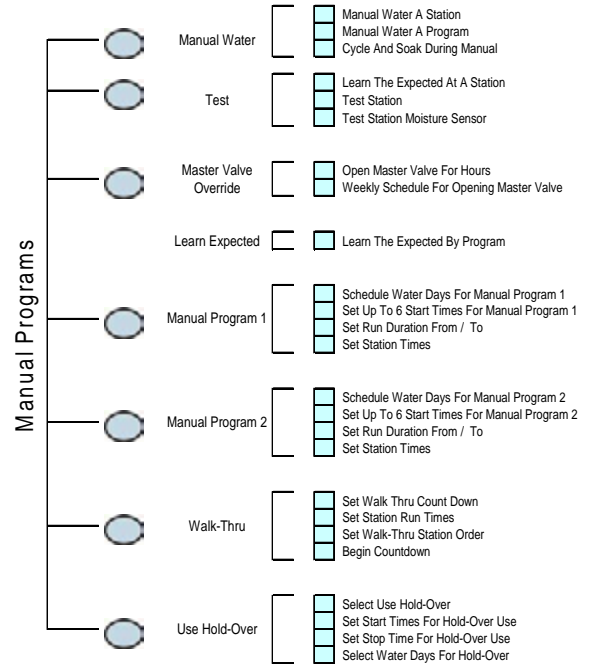- Select If Part Of FLOWSENSE® Chain
- Select Number Of Controllers In Chain
- Set Communications Address
- View Controller Information

Part & Serial Number
- View R.O.M. Version
- View Controller Baud Rate
- View Part Number
- View Serial Number
- View CC4 Version Required
- View Expected Communication Signal Levels

Date & Time
- View Current Date & Time
- Change Date & Time
- Use Day Light Savings Time

Stations In Use
- Select To Activate A Station
- Select To Deactivate A Station

12 Month Mode
- Turn On Twelve Month Mode

Access Control
- View Current Access Level
- Enter Your Access Code

Miscellaneous

Lights
- Set Up Four Separate Lights Schedules
- Manually Start Lights For 4 hours

Radio Remote
- Enable Radio Remote

Station Alerts
- View And Clear Station Alerts

Controller Alerts
- View And Clear Controller Alerts

Status
- View Current Status Of Controller
- View Next Scheduled Irrigation
- Turn Controller ON (If It Has Been Turned OFF)

Reports

This Month / Last Month
- View Water Usage And Irrigation Time

24 Month
- View Yearly Water Usage & Budget Totals

Hold-Over
- View Station Hold-Over
- Clear All Hold-Over
- Clear Station Hold-Over

ET & Rain Tables
- View Or Edit ET Tables
- View Rain Table

Alerts
- View Controller Alerts

Station History
- View Station History

Use Vs. Budget
- View Actual & Expected Water Usage Compared To Budget

Live Screens
- View Irrigation Activity
- View Irrigation Details
- View Real-Time Flow

No Water

No Water
- Turn Controller OFF
- Apply No Water Days To Program
- No Water Days By Station

making **water work**

since 1986

### III. USING THIS GUIDE WITH THE ET2000 CONTROLLER

This guide will explain the operation and programming of the ET2000 Controller. The following describes the conventions used throughout this guide. When instructed to press a key, the name of the key will be **CAPITALIZED AND BOLD**. The illustration below shows the name and location of keys used for operating and programming the ET2000 Controller.

MENU KEYS: The eight (8) blue keys located on either side of the controller screen. The text next to the key indicates the choice available and will change with each screen. The arrow will point to the Menu key that is to be pressed, and the name of the key will be **CAPITALIZED AND BOLD**.

HOT KEYS: The eight (8) keys in a horseshoe shape directly below the display screen. They are the **STOP, MANUAL**, **NO WATER, HELP**, **ENGLISH / SPANISH**, **BACK**, and **MAIN MENU** key.

PLUS / MINUS & ARROW KEYS: The last four (4) keys are the **PLUS** key, **MINUS** key and the two (2) **ARROW** keys. When a screen is accessed, certain information on the screen can be changed. There will be a highlighted cursor on the screen, which you can move with either **ARROW** key. A change can only be made to a setting while it is highlighted by the cursor. Once a setting is highlighted, use the **PLUS** or **MINUS** key to make the change. If the setting is a number, you can quickly scroll to the desired setting by holding down the **PLUS** or **MINUS** key.

The Controller's screen in the illustration below shows the Main Menu, which can be accessed at any time by pressing the **MAIN MENU** key. The description on the screen with the arrows, point to the Menu keys which can be pressed to access the various parts of the controller's programming (See Enclosure 1 ET2000 IRRIGATION CONTROLLER SCREEN MAP). You can always return to a previous screen by pressing the **BACK** key.
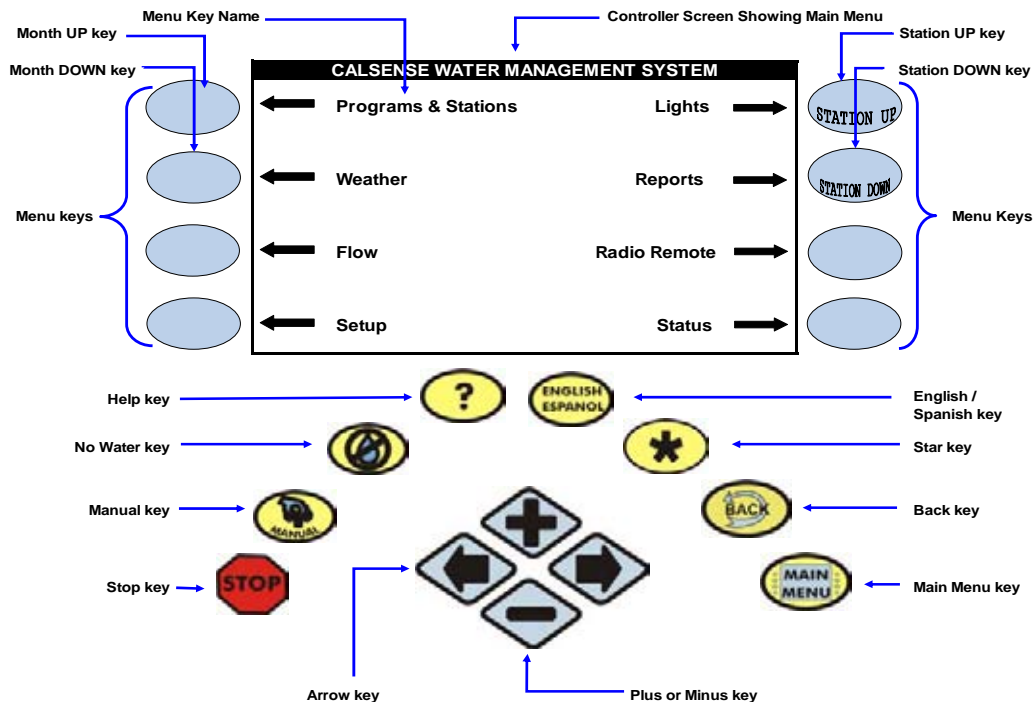
ET2000 Irrigation Controller Key Placement and Description

SECTION 2: SETUP

The Setup section of the controller is used for programming the following:
- Communication addresses
- Accessing the controller's Part & Serial number information
- Setting Time & Date
- Activating stations in use
- Utilizing a 12 month schedule
- Inputting access codes

A. COMMUNICATIONS

Skip communication setup section if controller(s) has no communications option installed.

The Communications screen can be used to set the communications address in the controller. This address is used for communicating back to a central computer, and is also used to differentiate one controller from another in a communications chain.

From the MAIN MENU screen.

1. ⬭ Press the **SETUP** Menu key.
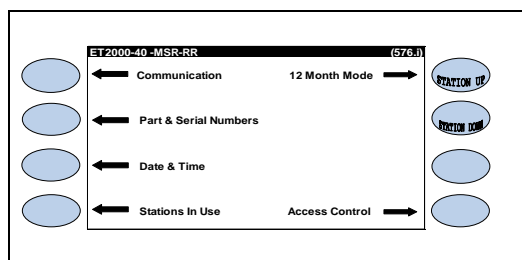
The GENERAL SETUP screen is displayed (Figure 2.1).

Figure 2.1

2. ⬭ Press the **COMMUNICATION** Menu key, the COMMUNICATION screen will appear.

1. *Controller(s) with central communication:*

Note: If *FLOWSENSE*® option is installed (This can be verified by looking for a (-FL) in the part number of the controller section 1B) See Section 11 for detailed instructions.

The communication screen should look like the one in Figure 2.2 if your controller **does not** have the *FLOWSENSE*® option.
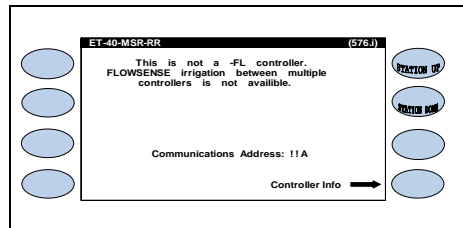
Figure 2.2

1. Press the blue **ARROW** keys to highlight the Communications address.

2. Press the **PLUS** or **MINUS** keys to set the first character.

3. Press the blue **ARROW** keys to move the cursor to the next character.

Repeat the process described above until all three characters are set (The character furthest to the right must be a letter).

Note: With multiple controllers one of the controllers must be the Master with an address ending in a Capitol "A". All other controllers will have addresses ending in B, C, D, etc. No two controllers can have the same exact address when communicating to the same central computer. The Master controller **must** be the controller communicating back to the central.

To view the controller's communications information:

4. ⬭ Press the **CONTROLLER INFO** Menu key.

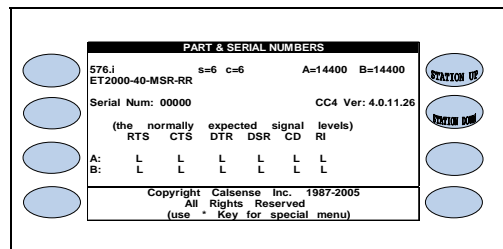The PART & SERIAL NUMBERS screen is displayed (Figure 2.3).

Figure 2.3

THIS CONCLUDES THE COMMUNICATIONS SECTION

B. PART & SERIAL NUMBER

This screen contains part & serial number information along with communication information for the controller.

From the MAIN MENU screen.

1. Press the **SETUP** Menu key.

2. Press the **PART & SERIAL NUMBERS** Menu key.

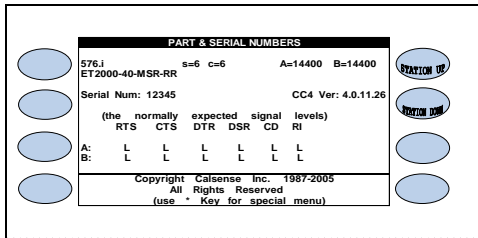The PART & SERIAL NUMBERS screen is displayed (Figure 2.4).

```
                    PART & SERIAL NUMBERS
576.i              s=6  c=6        A=14400   B=14400
ET2000-40-MSR-RR

Serial Num: 12345                 CC4 Ver: 4.0.11.26

(the   normally   expected   signal   levels)
       RTS    CTS    DTR   DSR   CD   RI

A:      L      L      L     L     L    L
B:      L      L      L     L     L    L


        Copyright   Calsense   Inc.   1987-2005
              All   Rights   Reserved
        (use  *  Key  for  special  menu)
```

Figure 2.4

THIS CONCLUDES THE PART A& SERIAL NUMBER SECTION

C. DATE & TIME

The Date & Time setting on a new controller will be set to Pacific Standard Time and will need to be changed to the local time by the customer upon receipt.

From the MAIN MENU screen.

1. Press the **SETUP** Menu key.

2. Press the **DATE & TIME** Menu key.

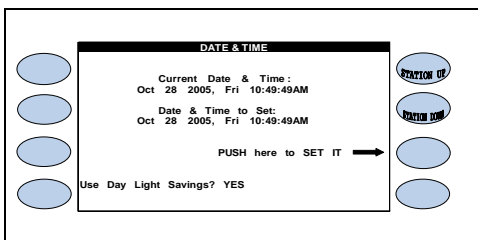The DATE AND TIME screen is displayed (Figure 2.5).

```
                    DATE & TIME

        Current  Date  &  Time :
Oct  28  2005,  Fri  10:49:49AM

        Date  &  Time  to Set:
Oct  28  2005,  Fri  10:49:49AM

                PUSH  here  to  SET  IT  ➡

Use  Day  Light  Savings?  YES
```

Figure 2.5

3. Press the **PLUS** or **MINUS** keys to change the Month setting.

4. Press the blue **ARROW** keys to move the cursor to the next entry.

5. Press the **PLUS** or **MINUS** keys to change the next entry. Continue on until the correct date and time are displayed.

Use this same method to highlight the "Use Day Light Savings?" entry and change it to the desired setting. If you select YES the controller will automatically change time for Day Light Savings.

6. Once you have completed this press the **PUSH HERE TO SET IT** Menu key.

IMPORTANT:

The changes do not take effect until this button is pressed.

THIS CONCLUDES THE DATE AND TIME SECTION

D. STATIONS IN USE

At this screen you can turn-off non-required station outputs. These stations will no longer be visible for programming in any other screen.

From the MAIN MENU screen.

1. Press the **SETUP** Menu key.

2. Press the **STATIONS IN USE** Menu key.

The STATIONS IN USE screen is displayed (Figure 2.6)

```
                    STATIONS IN USE

  1   2   3   4   5   6   7   8   9   10
 11  12  13  --  --  16  17  18  --  20
 21  22  23  24  25  26  27  28  29  30
 31  32  33  34  35  36  37  38  39  40
```

Figure 2.6

making **water work**
since **1986**

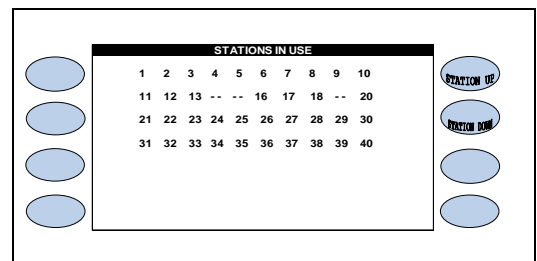3. To turn a station off press the blue **ARROW** keys to move the cursor to the desired station.

4. Press the **PLUS** or **MINUS** keys to turn off the station, two dashed lines will appear instead of the station number. In figure 2.6 station 14, 15, and 19 are turned off. To turn them back on,

5. Press the blue **ARROW** key to highlight the station.

6. Then press the **PLUS** or **MINUS** key, the station number will reappear.

THIS CONCLUDES THE STATIONS IN USE SECTION

E. 12 MONTH MODE

The 12 Month Mode feature allows you to pre-program an irrigation schedule for each month of the year. Each month can be programmed with different Start Times, Water Days, Number of Days in Schedule, Total Minutes, Minutes Per Cycle and Soak in Time.

**Note:** A 12 month schedule is not required to water all year around.

**Note:** As soon as 12-Month Schedule is enabled, the controller will copy the current irrigation schedule to all twelve months of the year. All of the months will keep this schedule until you re-program each month's schedule. If you enable 12-Month schedule before the controller has been programmed with an irrigation schedule, there will be no Start Times, water Days or Run Times on all twelve months of the year. Be sure an irrigation schedule has been programmed for all twelve months of the year.

From the MAIN MENU screen.

1. Press the **SETUP** Menu key.

2. Press the **12-MONTH MODE** Menu key.

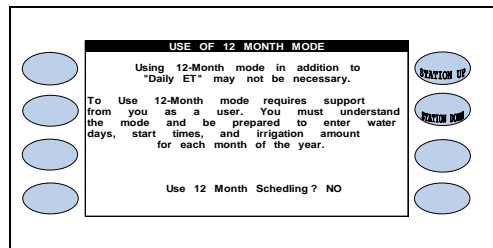The USE OF 12 MONTH MODE screen is displayed (Figure 2.7)

```
              USE OF 12 MONTH MODE

          Using  12-Month  mode  in  addition  to
              "Daily  ET"  may  not  be  necessary.

     To   Use   12-Month   mode   requires   support
     from    you    as    a    user.    You    must   understand
     the    mode    and    be    prepared    to    enter   water
     days,    start    times,    and    irrigation    amount
           for   each   month   of   the   year.


           Use  12  Month  Schedling ?  NO
```

STATION UP   STATION DOWN

Figure 2.7

3. Press the **PLUS** or **MINUS** key to change the setting.

If you select YES you will have to return to the START TIMES & WATER DAYS and STATIONS screens and enter the information for each month accordingly. This can be accomplished by using the two upper most blue Menu keys to the left of the display screen.

THIS CONCLUDES THE 12 MONTH MODE SECTION

F. ACCESS CONTROL

Using the Calsense Command Center software, a three character password can be sent to the controller, once a password has been sent, the user will only be able to make changes to screens the operator has given him access to via the password entered by the user at the ACCESS CONTROL screen.

From the MAIN MENU screen.

1. Press the **SETUP** Menu key, the GENERAL SETUP screen will appear.

2. Press the **ACCESS** Menu key.

The ACCESS CONTROL screen is displayed (Figure 2.8).

```
                ACCESS  CONTROL
     You  may  be  blocked  from  making  changes
      in  areas  of  the  controller.  If  you
     have  an  access  code  you  may  be  able
     to  make  those  changes.


           Current  Access  is  Level 0


       Enter  Your  Access  Code:  0 0 0
                and  Push  To  Log  In
```

STATION UP   STATION DOWN

Figure 2.8

3. Enter the first character of the password by pressing the **PLUS** or **MINUS** key until the character appears.

4. Press the blue **ARROW** Keys to move the cursor to the next character, repeat the process described above until all three password characters appear.

5. Press the   **PUSH TO LOG IN** Menu key, a message will appear confirming that the log in was successful and the LOG OUT prompt will appear.

THIS CONCLUDES THE ACCESS CONTROL SECTION

SECTION 3:   PROGRAMS & STATIONS

The Programs & Stations section of the controller is used for programming or viewing the following:

- Start Times & Water days
- Individual station programming
- Station to station copying
- Viewing stations by program

A. START TIMES & WATER DAYS

The Start Times & Water Days section of the controller is used to setup individual program start times, program name (optional),number of days in a schedule, schedule days, and stop times.

From the Main MENU screen.

1. Press the **PROGRAMS & STATIONS** Menu key.

2. Press the **START TIMES & WATER DAYS** Menu key.

The START TIMES & WATER DAYS screen is displayed (Figure 3.1).

START TIMES & WATER DAYS
Program : PROG A   Sart Time : 11:30PM
Name : . . . .
Number of Days in Schedule : 07
Sun Mon Tue Wed Thu Fri SAT
WEEK 1   on   --   on   --   on   on   on
STOP TIME :   OFF

Figure 3.1

3. Press the blue **ARROW** keys to move the cursor to the setting you wish to change.

4. Press the **PLUS** or **MINUS** keys to change the highlighted setting.
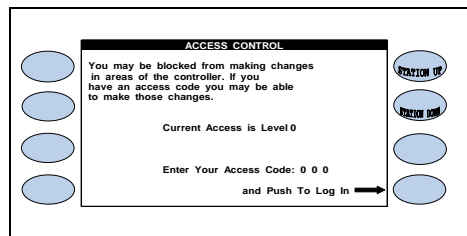
CALSENSE ®

5. When at the START TIMES & WATER DAYS screen the two (2) top right Menu keys can be used to scroll to the different programs. The following explains each setting on the START TIMES & WATER DAYS screen.

- **PROG:** Indicates the current program. Program A is being programmed in the example figure 3.1. The ET2000 Controller has seven (7) programs A, B, C, D, E, Drip1, and Drip 2.

- **START TIME:** The Start Time for scheduled irrigation on the current program. Program A has a 11:30 PM Start Time.

- **NAME:** A program description can be selected which describes the type of plant material and irrigation heads assigned to that program (this setting is optional).

- **DAYS IN SCHEDULE:** The ET2000 can be set with a 7-Day schedule (shown in figure 3.1), 14-Day Schedule, 21-Day Schedule or 28-Day Schedule.

- **WATER DAYS:** The days of the week in the schedule to irrigate. "on" represents a water day, "- -" represents an off day.

- **STOP TIME:** A time at which irrigation is forced to end, even if the scheduled irrigation cycle is not finished.

THIS CONCLUDES THE START TIMES & WATER DAYS SECTION

💧 *B. STATIONS (STATION PROGRAMMING)*

The stations section of the controller is used to setup the following:

- Individual station program assignments
- Total minutes
- Minutes per cycle
- Soak-In Times
- No water days
- % of ET *(If in Daily ET mode)*
- Expected Flow Rates *(If in Daily ET mode, or in Budgets mode)*
- Area square footages (*If in Daily ET mode*)
- Precipitation rates (*If in Daily ET mode*)

Note: Station description's can be entered via the Command Center software.

From the MAIN MENU screen.

1. Press the **PROGRAMS & STATIONS** Menu key.

2. Press the **STATIONS** Menu key.

The STATION PROGRAMMING screen is displayed (Figure 3.2).

STATION PROGRAMMING

Station 1 . . . . PROG A

Total Mins : 15.0
Mins per Cycle :   5
Soak-in Time :   60   No Water Day 0

STATION UP
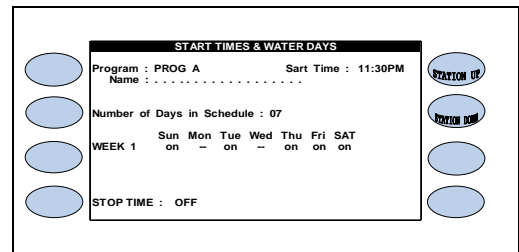
STATION DOWN

Test ➡️
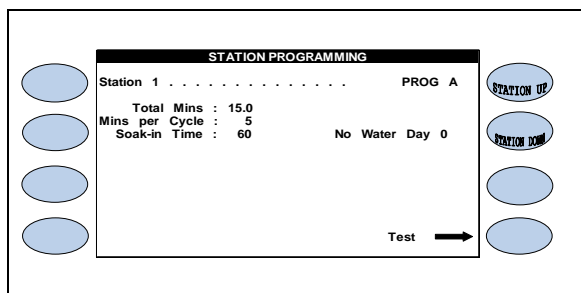
Figure 3.2

3. Press the blue **ARROW** keys to move the cursor to the setting you want to change.

4. Press the **PLUS** or **MINUS** keys to change the highlighted setting.

5. When at the Station Programming screen, the two (2) top right Menu keys are used for **STATION UP** and **STATION DOWN** . The following explains each setting on the STATION PROGRAMMING screen.

- **STATION:** Indicates the current station number (Station 1 is the example in figure 3.2).

- **PROG:** Indicates the program that the current station is assigned to (Program A is the example in figure 3.2).

- **TOTAL MINS:** The total amount of irrigation time that will be applied in each 24 our watering period.

- **MINS PER CYCLE:** The amount of irrigation time applied in each cycle of a 24 hour watering period.
- **SOAK-IN TIME:** The amount of time (In Minutes) between multiple cycle starts.

1. *Cycle and soak examples:*

In the example shown in figure 3.2, station 1 will irrigate for 5.0 minutes (the Mins per Cycle setting) then wait 60 minutes (the Soak-in Time setting), it will repeat the process two (2) more times until the total irrigation applied is 15 minutes (the Total Mins setting), this feature is called Cycle and Soak. Each station's Cycle and Soak setting can be set independent of any other station's settings. The following shows some examples of Cycle and Soak settings:

Example 1

Total Mins: 10.0
Mins per Cycle: 2.0
Soak-in Time: 15

In this example the controller will irrigate 5 cycles of 2 minutes, for a total of 10 minutes with a soak in time of 15 minutes between cycles.

Example 2

Total Mins: 10.0
Mins per Cycle: 10.0
Soak-in Time: 5.0

In this example the total minutes and the minutes per cycle are the same, therefore the controller will irrigate one cycle of ten minutes. **The soak in time will be ignored**.

Example 3

Total Mins: 10.0
Mins per Cycle: 20.0
Soak-in Time: 10

In this example the controller will irrigate 1 cycle of 10 minutes. **The Mins per Cycle Time and Soak-In Time will be ignored**.

2. *Test a Station at the Station Programming Screen*

1. Press the **TEST** Menu key to turn the current station on. The run time will be the time set at the Valve Testing screen.

2. Pressing the **STOP** key at anytime will end the test.

3. *Set NO Water Days at the Station Programming Screen*

No Water Days gives you the ability to turn a specific station off for a certain amount of days consecutively starting from today's date. This setting will only affect the station involved.

1. To turn the current station off for 1 to 31 days, press the blue **ARROW** keys to highlight the NO Water day setting.

2. Press the **PLUS** or **MINUS** keys to set the number of NO Water Days desired.

THIS CONCLUDES THE STATION PROGRAMMING SECTION

💧 *C. STATION-TO-STATION COPY*

The Station to Station Copy feature allows you to copy programming from one station to another, copy the programming from one station to all stations, or any program.

The settings that are copied are:

- Total Minutes *(except in Daily ET mode)*
- Minutes Per Cycle
- Soak-In Time

From the MAIN MENU screen.

1. Press the **PROGRAMS & STATIONS** Menu key.

2. Press the **STATION – TO – STATION COPY** Menu key.

The STATION TO STATION COPY screen is displayed (Figure 3.3).

Figure 3.3

CALSENSE ®
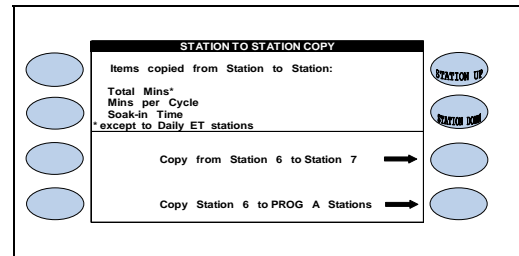
1. _Copy a Station to another Station_

1. At the Station To Station Copy screen press the **PLUS** or **MINUS** key until the station you want to copy is highlighted. (station 6 was selected in figure 3.3).

2. Press the blue **ARROW** keys to highlight the station you want to copy to.

3. Press the **PLUS** or **MINUS** keys to change the station to copy to.(station 7 was selected in the example above).

4. Press the **COPY FROM STATION TO STATION** Menu key, the station will be copied and you will be asked to press any key to continue.

2. _Copy a Station to All Stations on a Program, or All Stations on the Controller:_

1. At the STATION TO STATION COPY screen press the Blue **ARROW** keys to move the cursor.

2. Press the **PLUS** or **MINUS** key to select all stations or a specific program.

3. Press the **COPY STATION TO PROG** Menu key, the station will copy and you will be asked to press any key to continue.

THIS CONCLUDES THE STATION TO STATION COPY SECTION

💧 **_D. STATIONS-BY-PROGRAM_**

This section of the controller allows you to view each station, by program, that it is currently assigned to. You can also move individual stations from one program to another.

1. At the PROGRAMS & STATION screen press the **STATIONS-BY-PROGRAM** Menu key.

The PROGRAM ASSIGNMENT SUMMARY screen is displayed (Figure 3.4).

PROGRAM ASSIGNMENT SUMMARY

PROG A: ……………………………
    1

PROG B: ……………………………
    2, 3, 4, 5, 6, 7, 8

PROG C: ……………………………

PROG D: ……………………………

(move cursor to see more)   Move Station ➡

STATION UP
STATION DOWN

Figure 3.4

2. Press the **PLUS** or **MINUS** keys to scroll through the programs.

3. Press the blue **ARROW** keys to highlight the station that you want to move.

4. Press the **MOVE STATION** Menu key.

The CHANGE STATION PROGRAM ASSIGNMENT screen is displayed (Figure 3.5)

CHANGE STATION PROGRAM ASSIGNMENT

Change Station 1:

FROM: PROG A: ………………………

TO: PROG B: ………………………

                    Make the Change ➡

Press ANY key except the one above to leave screen WITHOUT making the change.

STATION UP
STATION DOWN
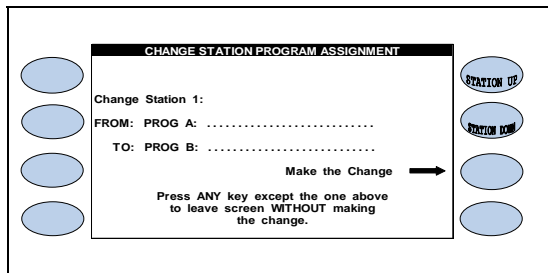
Figure 3.5

5. Press the **PLUS** or **MINUS** keys to change the program.

6. Press the **MAKE THE CHANGE** Menu key to change the station to It's new program.

THIS CONCLUDES THE STATION BY PROGRAM SECTION

making **water work**
since 1986

SECTION 4:   FLOW

The Flow section of the controller is used for setting up the following:

- Line Fill & Valve close times
- Alert Action settings
- Master Valve type
- Use of Pump by program
- Flow Meter size and K & Offset values
- Flow Checking parameters
- Mainline Capacity parameters
- Valve On-at-a Time settings

From the MAIN MENU screen.

1. ⬭   Press the **FLOW** Menu key.

The FLOW METER, MASTER VALVE & PUMP screen is displayed (Figure 4.1).

FLOW METER, MASTER VALVE & PUMP
Flow Meter ➡
STATION UP
STATION DOWN
⬅ Master Valve   Mainline Capacity ➡
⬅ Pump   On-at-a-Time ➡
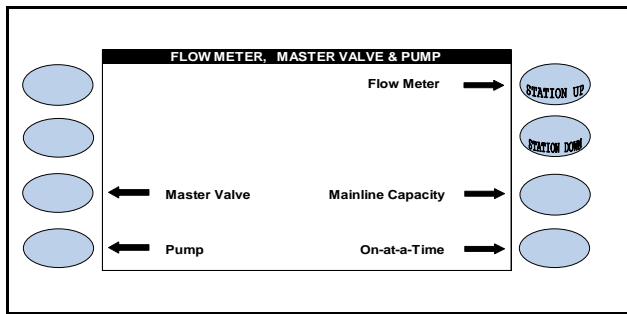
Figure 4.1

💧 A. FLOW METER SETUP

The flow meter setup is used to enter the type and size of a single, or multiple flow meters assigned to this controller. You can also enter the K & Offset values for FMBX style flow meters.

Note: The multiple flow meter option will only be available if the (**-F**) option is installed in the controller. See section 12 for more information.

From the FLOW METER, MASTER VALVE & PUMP screen (Figure 4.1).

1. ⬭   Press the **FLOW METER** Menu key.

1. _Estimated Water Usage_

The Estimated Water Use setting is set to YES <u>only if there is **NO** flow meter installed</u>, and the following items are turned off:

- System Capacity
- Daily ET
- Budgets

If none of these items are in use, and you want to track estimated water usage, change the DO YOU WANT TO TRACK ESTIMATED WATER USE FOR REPORTS? setting to YES, retur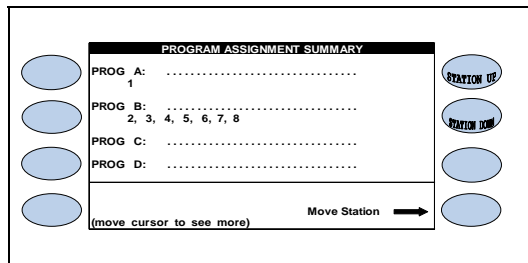n to the Station Programming screen and set the flow rate for each station (the flow rate setting appears on the station programming screen only when the estimated water use setting is set to YES).

The FLOW METER screen is displayed (Figure 4.2).

FLOW METER
Is a Flow Meter in use ?   <mark>NO</mark>
STATION UP
Do you want to track estimated water use for Reports? NO
STATION DOWN
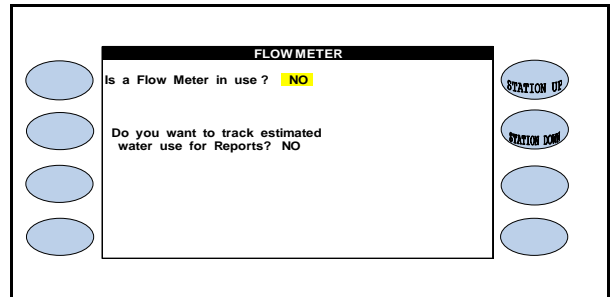
Figure 4.2

If Using a Flow Meter use the following directions:

1. ⬥   Press the **PLUS** or **MINUS** keys to change the IS A FLOW METER IN USE ? to YES.

The Flow Meter screen will appear (It will appear as shown in Figure 4.3 only after the Flow Meter In Use setting is set to YES).

FLOW METER
Is a Flow Meter in use ?   Y<mark>ES</mark>
Use your own K & Offset ? NO
METER 1
SIZE: FM-1
(Expected Flow Rates can be automatically learned.)
Learn Expecteds ➡
STATION UP
STATION DOWN
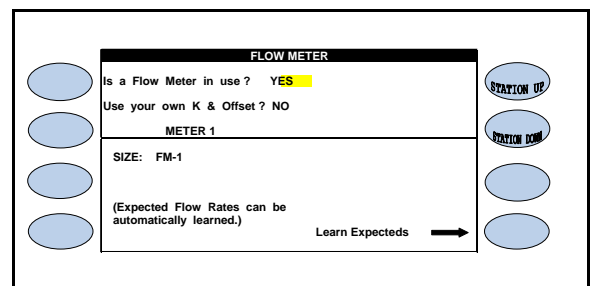
Figure 4.3

2. Press the blue **ARROW** keys to move the cursor to the USE YOUR OWN K & OFFSET setting, which is set to NO as the default.

If using a FMBX flow meter see:

2. *FMBX flow meter setup*

If using a regular flow meter see:

3. *Regular flow meter setup*

2. *FMBX flow meter setup*

If the flow meter installed on the system is a Calsense FMBX, change the "Use your own K & Offset" to YES, (The screen will appear as shown in Figure 4.4).
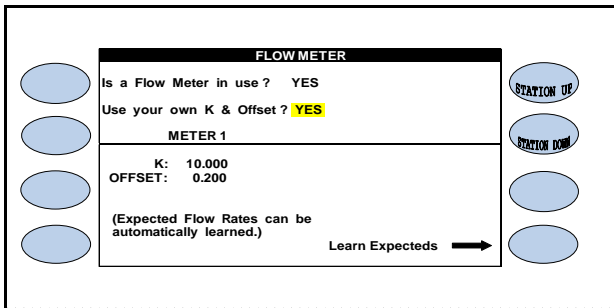
FLOW METER
Is a Flow Meter in use ? YES
Use your own K & Offset ? YES
METER 1
K: 10.000
OFFSET: 0.200
(Expected Flow Rates can be automatically learned.)
Learn Expecteds ➡

STATION UP

STATION DOWN

Figure 4.4

1. Press the blue **ARROW** keys to move the cursor to the K: setting.

2. Press the **PLUS** or **MINUS** keys to change the number.

3. Press the blue **ARROW** keys to move the cursor to the OFFSET: setting.

4. Press the **PLUS** or **MINUS** keys to change the number.

Note: The two settings that must be set are the K value and the Offset. If you know these values enter them now. If not, Call Calsense at 1-(800)-572-8608 for assistance.

3. *Regular flow meter setup*

If the answer to Use your own K & Offset is NO.

1. Press the blue **ARROW** keys to move the cursor to the SIZE setting.

2. Press the **PLUS** or **MINUS** keys to change the flow meter type.

Refer to the chart (Figure 4.5), to choose the correct flow meter type.

MODEL NUMBER	SIZE	
FM-1	1"	PLASTIC FLOW METER
FM-1B	1"	BRASS FLOW METER
FM-1.25B	1 ¼"	BRASS FLOW METER
FM-1.5	1 ½"	PLASTIC FLOW METER
FM-2	2"	PLASTIC FLOW METER
FM-3	3"	PLASTIC FLOW METER

Figure 4.5

4. *Learn Expecteds (Flow rate)*

The Learn Expecteds option on the controller will learn the expected flow rate for each station on each program selected.

1. After you have entered the appropriate Flow Meter(s) select the **LEARN EXPECTEDS** Menu key (Figure 4.6).

FLOW METER
Is a Flow Meter in use ? YES
Use your own K & Offset ? NO
METER 1
SIZE: FM-1
(Expected Flow Rates can be automatically learned.)
Learn Expecteds ➡

STATION UP

STATION DOWN
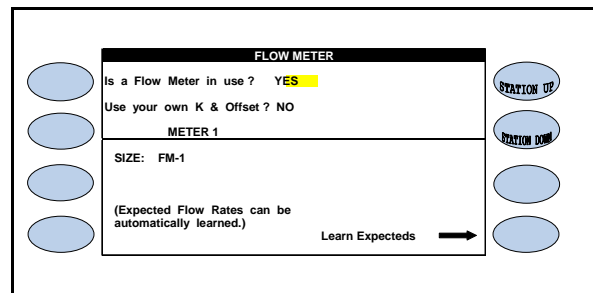
Figure 4.6

The LEARN THE EXPECTED FLOW RATES screen is displayed (Figure 4.7).

LEARN THE EXPECTED FLOW RATES

At the next program start , turn on
each station and use the measured flow
to set the expected flow rate.

Learn The Expected Flow Rates for:

PROG A	NO
PROG B	NO
PROG C	NO
PROG D	NO
PROG E	NO
DRIP 1	NO
DRIP 2	NO

STATION UP

STATION DOWN
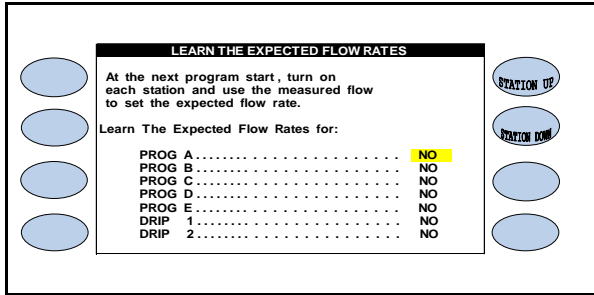
Figure 4.7

• **LEARN EXPECTEDS:** This allows you to learn the expected flow rate for each station at the next program start. Once the flow rate has been recorded the entry on the screen will default back to NO.

2. Press the **PLUS** or **MINUS** keys to select the program.

3. Press the blue **ARROW** keys to change the setting.

THIS CONCLUDES THE FLOW METER SECTION

💧 **B. LINE FILL & VALVE CLOSE TIMES**

The Line Fill & Valve Close times are used to allow each valve time to stabilize before checking flow.

After you have enabled the flow meter on the FLOW METER screen as described on the previous page:

1. Press the **BACK** key twice to return to the FLOW METER, MASTER VALVE, & PUMP screen (Figure 4.1).

2. Press the **LINE FILL & VALVE CLOSE TIMES** Menu key.

The LINE FILL & VALVE CLOSE TIMES screen is displayed (Figure 4.8).

LINE FILL & VALVE CLOSE TIMES

	Line Fill	Valve Close
PROG A	60	60
PROG B	60	60
PROG C	60	60
PROG D	60	60
PROG E	60	60
DRIP 1	60	60
DRIP 2	60	60

(times are in seconds)

STATION UP

STATION DOWN
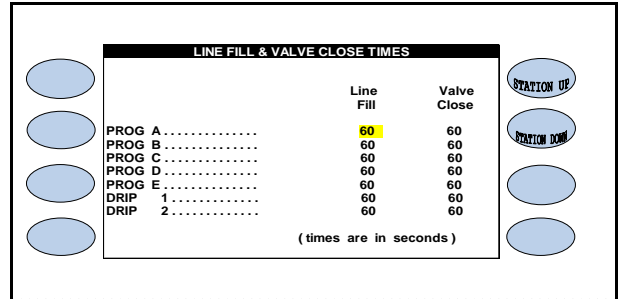
Figure 4.8

• **LINE FILL TIMES:** The delay time in seconds that the controller will wait to check flow rates on a station allowing the flow to stabilize.

• **VALVE CLOSE TIMES**: The delay time in seconds that the controller will wait to check flow on the very next valve allowing time for the previous valve to close.

3. Press the blue **ARROW** keys to move the cursor to the PROG A LINE FILL TIME.

4. Press the **PLUS** or **MINUS** keys to set the desired seconds.

Note: Use this same method to change the VALVE CLOSE TIME for program A and then repeat these steps for each program on the list.

5. Press the **BACK** key to return to the FLOW METER, MASTER VALVE, & PUMP SETUP screen (Figure 4.9).

THIS CONCLUDES THE LINE FILL & VALVE CLOSE TIMES SECTION

ZZ CALSENSE ®

💧 *C. MASTER VALVE*

This section of the controller allows you to select from two types of master valves available:

- Normally Open
- Normally Closed

From the FLOW METER, MASTER VALVE & PUMP SETUP screen (Figure 4.1).

1. ⬭   Press the **MASTER VALVE** Menu key.

The TYPE OF MASTER VALVE screen is displayed (Figure 4.9).

```
                TYPE OF MASTER VALVE

   The  MASTER  VALVE  is      NORMALLY CLOSED      STATION UP

                                                    STATION DOWN
```
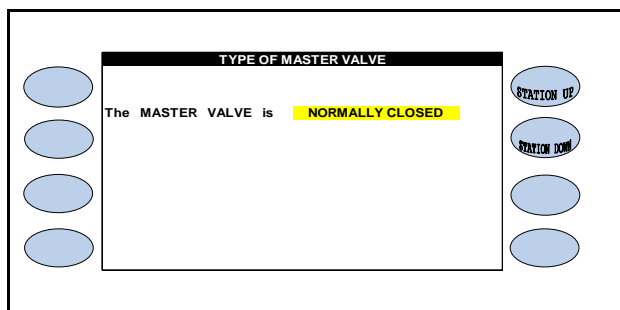
Figure 4.9

The Master Valve default setting is for a normally closed Master Valve. There are two (2) settings,

- **NORMALLY CLOSED:** A normally closed master Valve is in the closed position until voltage is applied to open it.

- **NORMALLY OPEN:** A normally open Master Valve is in the open position until voltage is applied to close it.

Note: Be sure to select the correct type of Master Valve installed, if it is incorrect the Master Valve will close whenever a station is irrigated and no water will flow when a valve is turned on
.

2. 🔄 BACK   Press the **BACK** key to return to the FLOW METER, MASTER VALVE, & PUMP SETUP screen (shown Figure 4.1).

THIS CONCLUDES THE MASTER VALVE SECTION

💧 *D. PUMP*

If you are using a pump for any one of your valves you will have to set the controller to recognize that there is a pump in use and on which program it will be used on.

From the FLOW METER, MASTER VALVE & PUMP screen (Figure 4.1).

1. ⬭   Press the **PUMP** Menu key.

The WHICH PROGRAMS USE THE PUMP screen is displayed (Figure 4.10).

```
              WHICH PROGRAMS USE THE PUMP
            For  each  program,  select  YES
         if you would like to use the pump        STATION UP

                                                  STATION DOWN
        PROG  A . . . . . . . . . . . . . . . . .    YES
        PROG  B . . . . . . . . . . . . . . . . .    YES
        PROG  C . . . . . . . . . . . . . . . . .    YES
        PROG  D . . . . . . . . . . . . . . . . .    YES
        PROG  E . . . . . . . . . . . . . . . . .    YES
        DRIP   1 . . . . . . . . . . . . . . . . .   YES
        DRIP   2 . . . . . . . . . . . . . . . . .   YES
```
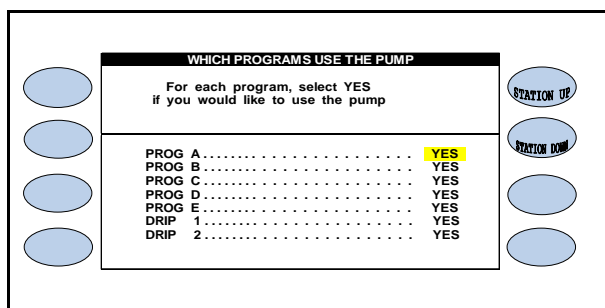
Figure 4.10

2. ✛   Press the blue **ARROW** keys to move the cursor to the Program desired.

The default setting is set to YES on all programs. This means that the controller's pump output will be activated whenever a station on any program is activated.

3. ✛   Press the **PLUS** or **MINUS** keys to change any Program.

Note: If the Pump Output Enabled setting is set to NO on a program, the pump output will not activate when a station on that program is activated.

4. 🔄 BACK   Press the **BACK** key to return to the Flow Meter, Master Valve & Pump screen (See figure 4.1).

THIS CONCLUDES THE PUMP SECTION

making **water work**

since **1986**

💧 **E. MAINLINE CAPACITY**

System capacity is defined by the max flow rate of water that your system can operate at during irrigation.

From the FLOW METER, MASTER VALVE & PUMP screen (Figure 4.1).

4. ⬭   Press the **MAINLINE CAPACITY** Menu key.

The MAINLINE BREAK SETTINGS screen is displayed (Figure 4.11).
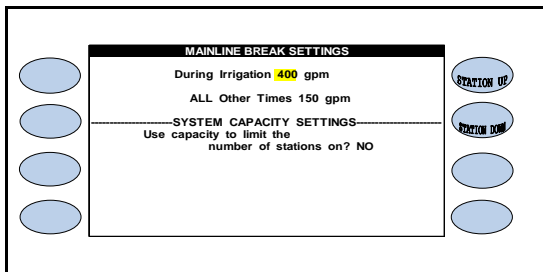
Figure 4.11

5. ✛   Press the blue **ARROW** keys to move the cursor to the DURING IRRIGATION gpm.

6. ✛   Press the **PLUS** or **MINUS** keys to change the number.

Use the same method to change the ALL OTHER TIMES number.

- **DURING IRRIGATION:** The during irrigation number is the mainline break number used while the controller is irrigating.

- **ALL OTHER TIMES:** The all other times number is the mainline break number used when the controller is not irrigating.

- **USE CAPACITY TO LIMIT THE NUMBER OF STATIONS ON ?:** If you want to use capacity to limit the number of stations on change to YES.

This will open up the portion of the screen dealing with Capacity with or without Pump (Figure 4.12).

7. ✛   Press the **PLUS** or **MINUS** key to change the capacity numbers.
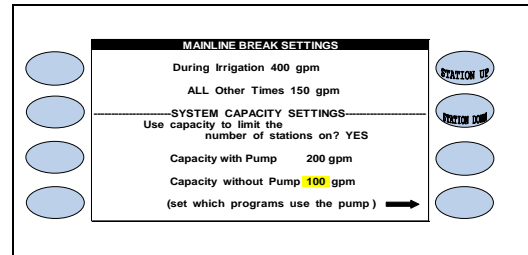
Figure 4.12

Capacity with pump: When a program irrigates by use of pump the GPM limit set will not be exceeded.

Capacity without pump: When a program irrigates without the use of a pump the GPM limit will not be exceeded.

Note: Pump and non-pump programs will not run simultaneously on the same controller / system.

8. ⬭   If you did not select SET WHICH PROGRAMS TO USE PUMP in the pump section of this manual then press the **SET WHICH PROGRAMS TO USE THE PUMP** Menu key (Figure 4.12).

See Part D of this section for instructions.

THIS CONCLUDES THE MAINLINE CAPACITY SECTION

💧 **F. ON – AT – A – TIME**

The On-at-a-Time section of the controller is used to set up the number of valves that you want to come on simultaneously within a program, and also within a controller.

From the FLOW METER, MASTER VALVE & PUMP screen (Figure 4.1).

1. ⬭   Press the **ON-AT-A-TIME** Menu key.

The STATIONS ON-AT-A-TIME screen is displayed (Figure 4.13).

Figure 4.13

2. Press the blue **ARROW** keys to move the cursor to the Program and Within Program setting desired.

Note: The default setting is set to 1 on all programs.

3. To change the settings press the **PLUS** or **MINUS** keys for any number to change the setting.

- **WITHIN PROGRAM:** This section allows you to choose the amount of valves that you want to set as a limit to come on at a time within a program.

- **WITHIN CONTROLLER:** This section allows you to choose the amount of valves that you want to set as a limit to come on at a time within the controller.

Example:		
Within Program		Within Controller
Program A	1	2
Program B	1	2

This example allows the user to set up one (1) valve on at a time for Programs A and B. The controller will allow both Programs to have one (1) valve each run simultaneously for a total of two (2) on within controller.

Example:		
Within Program		Within Controller
Program A	1	1
Program B	3	3

This example allows the user to set up one (1) valve on at a time for Programs A. The controller will only allow one valve to operate while program A is running. Program B is set up to operate 3 valves on at a time, and will only operate up to three valves when Program B is running.

4. Press the **BACK** key to return to the FLOW METER, MASTER VALVE, & PUMP screen (See figure 4.9).

THIS CONCLUDES THE ON AT A TIME SECTION

G. FLOW CHECKING

Flow checking allows you to have the controller compare the flow of each station during irrigation to the learned expected flow and alert you of any problems.

From the FLOW METER, MASTER VALVE & PUMP SETUP screen (Figure 4.1).

1. Press the **FLOW CHECKING** Menu key

The FLOW CHECKING screen is displayed (Figure 4.14).
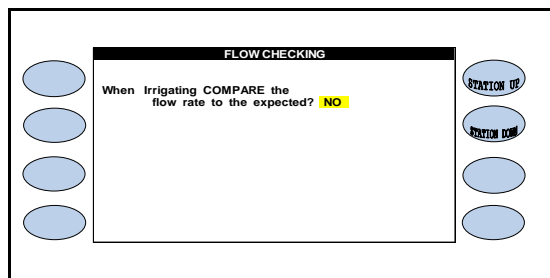
Figure 4.14

This will open up the ALLOWABLE portion of the screen when you select YES to the WHEN IRRIGATING COMPARE THE FLOW TO THE EXPECTED ? question (Figure 4.15).

FLOW CHECKING

When Irrigating COMPARE the
flow rate to the expected? YES

STATION UP

STATION DOWN

ALLOWABLE

Below 30 gpm   -5 / +5

From 30 gpm to 100 gpm   -10 / +10

Above 100 gpm   -15 / +15

(-gpm / +gpm)

Figure 4.15

2. Press the blue **ARROW** keys to
change the Allowable settings.
The default settings are:

BELOW: -5 / +5
FROM / TO: -10 / +10
ABOVE: -15 / +15

Note: The above settings are defaulted in the
controller and can be changed by the user.

3. To change the settings press the
PLUS or **MINUS** keys for any number
to change the setting.

Below: This section allows you to enter the fluctuation
range for the low end of your normal operating flow.
Use the (-) and (+) entries to set the range.

Example:

If you set the below limit at 30 gallons per minute.

Then set your (-) limit at 5, and your (+) limit at 5.

You will be alerted if the flow at the low end of the
scale fluctuates by more than five gallons per minute
in either direction.

That is less than 25 gpm or more than 35 gpm

From / to: This section allows you to set the
fluctuation limits for the full range of flow. In this box
you want to enter the normal operating range of water
flow. Then in the (-) and (+) blocks enter the range of
fluctuation that you deem normal.

Example:

If you set the limit at 30 gpm to 100 gpm.

Then set your (-) limit at 10, and your (+) limit at 10.

You will be alerted if the flow at the middle of the scale
fluctuates by more than ten gallons per minute in
either direction.
That is less than 20 gpm or more than 110 gpm

Above: This section allows you to enter the fluctuation
range for the high end of your normal operating flow.
Use the (-) and (+) entries to set the range.

Note: You will want to set this allowable range up a
little wider due to the amount of water flow.

Example:

If you set the above limit at 100 gallons per minute.

Then set your (-) limit at 15, and your (+) limit at 15.

You will be alerted if the flow at the high end of the
scale fluctuates by more than fifteen gallons per
minute in either direction.

That is less than 85 gpm or more than 115 gpm

4. Press the **BACK** key to return to the
FLOW METER, MASTER VALVE, &
PUMP screen (Figure 4.1).

Note: Notice that the Alert Actions option has now
been added to this screen (See figure 4.16).

FLOW METER, MASTER VALVE & PUMP

Line Fill
& Valve Close Times   Flow Meter

STATION UP

Alert Actions   Flow Checking

STATION DOWN

Master Valve   Mainline Capacity

Pump   On-at-a-Time
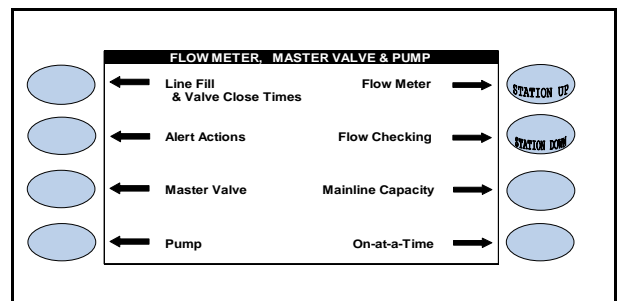
Figure 4.16

**THIS CONCLUDES THE FLOW CHECKING
SECTION**

H. ALERT ACTIONS

The Alert Actions section of the controller allows you to setup the way in which you want the controller to inform you of any problems. The Alert Actions setting defaults with Alert / No Action set for all programs. There are three possible settings:

- **Alert / No Action:** An alert is displayed on the screen but the valve continues to irrigate.

- **Alert / Shut-Off:** An alert is displayed on the screen and the value is shut off.

- **No Alerts:** No alert is displayed and the valve continues to irrigate.

From the FLOW METER, MASTER VALVE & PUMP screen (Figure 4.1).

1. Press the **ALERT ACTIONS** Menu key.

The ALERT ACTIONS screen is displayed (Figure 4.17).

ALERT ACTIONS

	HIGH FLOW	LOW FLOW
PROG A	Alert / No Action	Alert / No Action
PROG B	Alert / No Action	Alert / No Action
PROG C	Alert / No Action	Alert / No Action
PROG D	Alert / No Action	Alert / No Action
PROG E	Alert / No Action	Alert / No Action
DRIP 1	Alert / No Action	Alert / No Action
DRIP 2	Alert / No Action	Alert / No Action
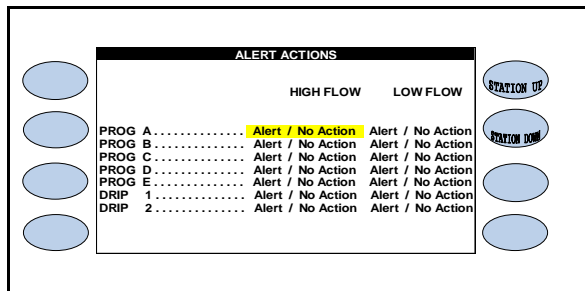
Figure 4.17

2. Press the blue **ARROW** keys to move the cursor to the Program HIGH FLOW and LOW FLOW settings.

3. Press the **PLUS** or **MINUS** keys to change the settings.

4. Press the MAIN MENU key to return to the MAIN MENU screen.

THIS CONCLUDES THE ALERTS / ACTIONS SECTION

SECTION 5: WEATHER

The weather section of the controller is used to set up the ET Gage, Rain bucket, Wind Gage, Rain switch, budgets, and Moisture sensors.

A. ET GAGE

The ET Gage setting in the controller is used for:

- Setting ET irrigation day
- *Selecting ET gage Usage
- *Logging ET Gage Pulses
- *Setting Gage fill percentage
- **Manually entering pulses
- **Skipping tonight's entries

* Only if (-G) option installed in controller and an ET Gage is connected.
** Used for troubleshooting, or servicing ET Gage.

1. ET Gage setup

From the MAIN MENU screen (Figure 5.1).

1. Press the **WEATHER** Menu key.

CALSENSE WATER MANAGEMENT SYSTEM

Programs & Stations	Lights
Weather	Reports
Flow	Radio Remote
Setup	Status
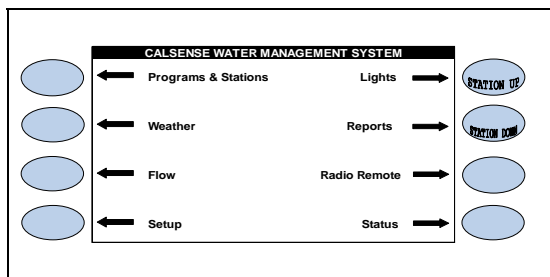
Figure 5.1

The WEATHER SETUP screen is displayed (Figure 5.2).

WEATHER SETUP

ET Gage	ET
Rain Bucket	Budget
Wind Gage	Moisture
Rain Switch	
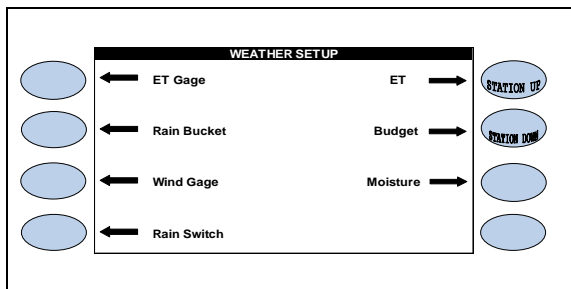
Figure 5.2

2. Press the **ET GAGE** Menu key.

The ET GAGE screen is displayed (Figure 5.3).

ET GAGE
Irrigation Day is from 8:00PM to 8:00PM

Is there an ET Gage? NO

STATION UP
STATION DOWN
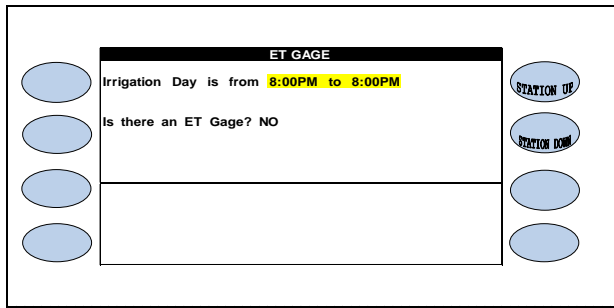
Figure 5.3

- **Irrigation Day is from 8:00PM to 8:00PM:**
  This setting is for the time period that you
  want your ET information to be collected for
  each day. Keep in mind that you want this
  time to be before your first irrigation Start
  Time for that day so that you are using the
  most current ET information.

3. Press the **PLUS** or **MINUS** keys to
   change the setting.

Note: Following steps are for (-G) option only.

4. Press the blue **ARROW** keys to
   move the cursor to the IS THERE AN
   ET GAGE? (Figure 5.4).

ET GAGE
Irrigation Day is from 8:00PM to 8:00PM

Is there an ET Gage? NO

STATION UP
STATION DOWN
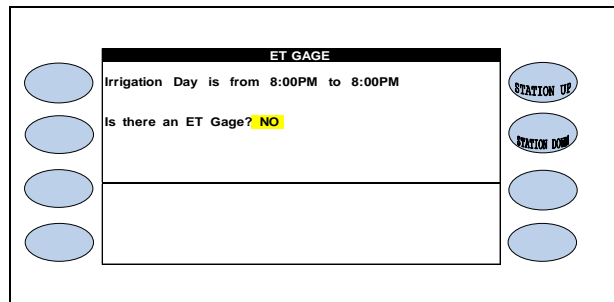
Figure 5.4

5. Press the **PLUS** or **MINUS** keys to
   change the setting.

If YES is selected the screen will change to read:
(Figure 5.5).

ET GAGE
Irrigation Day is from 8:00PM to 8:00PM

Is there an ET Gage? YES

Log Pulses? NO   Gage is 99% full

GAGE=.00 inches   Skip tonight? YES

STATION UP
STATION DOWN
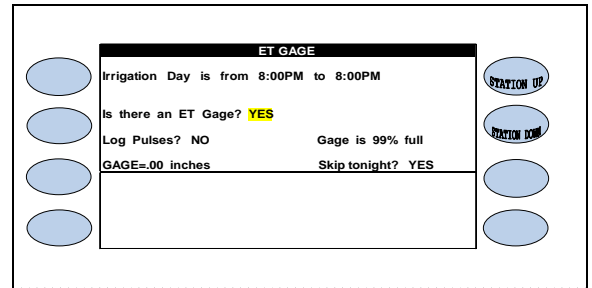
Figure 5.5

6. Press the blue **ARROW** keys to
   move the cursor to the LOG
   PULSES? entry (Figure 5.6).

ET GAGE
Irrigation Day is from 8:00PM to 8:00PM

Is there an ET Gage? YES

Log Pulses? NO   Gage is 99% full

GAGE=.00 inches   Skip tonight? YES

STATION UP
STATION DOWN
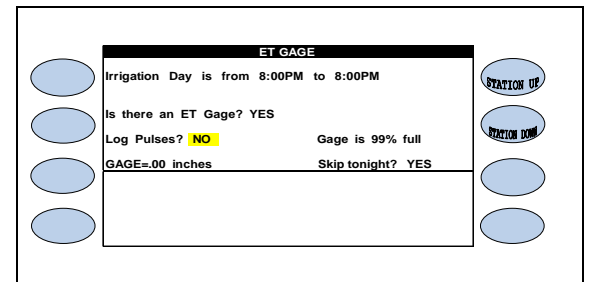
Figure 5.6

- **Log Each Pulse?:** The default is set to NO.
  Changing to the YES setting gives you the
  option of keeping a record of each ET Gage
  pulse sent to the controller. This information
  is located in the diagnostic log. This is
  helpful when first setting up the ET Gage to
  make sure that it is working properly, but
  can be set to NO after you are sure the ET
  Gage is working properly.

7. Press the **PLUS** or **MINUS** keys to
   change the setting.

8. Press the blue **ARROW** keys to
   move the cursor to the GAGE IS 99%
   FULL setting (Figure 5.7).
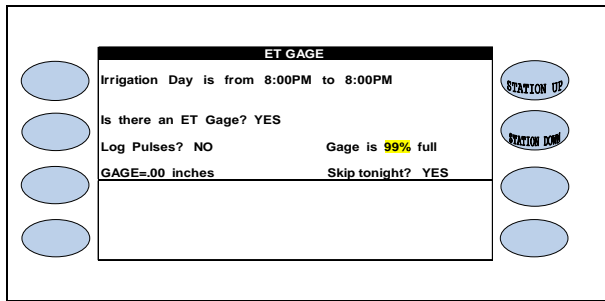
Figure 5.7

- **Gage is 99% full:** The percent full counter is used to reset the counter after the ET Gage has been refilled during periodic maintenance.

9. Press the **PLUS** or **MINUS** keys to change the setting.

10. Press the blue **ARROW** keys to move the cursor to the GAGE=.00 INCHES setting (Figure 5.8).
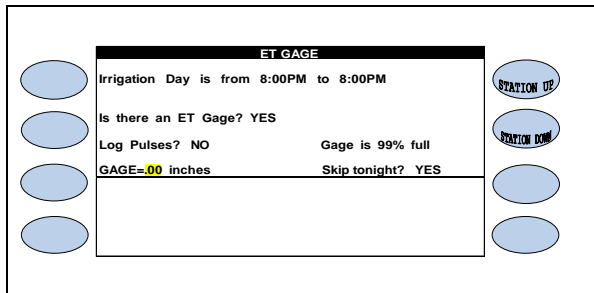
Figure 5.8

- **The "GAGE=.00 inches ":** This option allows you to edit the amount of inches. Some of the reasons for editing this number:

  o Servicing the ET gage and removing erroneous logged pulses.
  o Gage temporarily not working and a need to log pulses for that day.
  o Editing number up or down due to specific circumstances.

Note: Daily pulses show at this location.

11. Press the **PLUS** or **MINUS** keys to change the setting.

12. Press the blue **ARROW** keys to move the cursor to the **SKIP TONIGHT?** (Figure 5.9).
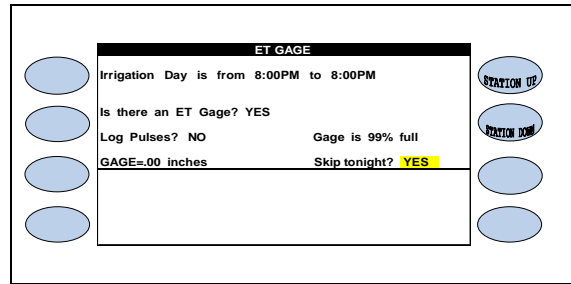
Figure 5.9

- **SKIP TONIGHT?:** Selecting YES causes the GAGE=inches number to be left out of the ET table for this twenty four hour period, a historical value will be entered instead.

Note: The Skip Tonight option is used for troubleshooting the ET gage. Pulses created during troubleshooting will not be entered into the ET Table if YES is selected.

13. Press the **BACK** key to return to the WEATHER SETUP screen (Figure 5.2).

THIS CONCLUDES THE ET GAGE SECTION

B. RAIN BUCKET

The Rain Bucket setting in the controller is used for recording the amount and rate of rainfall, and calculating station run times accordingly by use of the following:

- Setting irrigation rain stop value
- Set Maximum rain in one hour value
- Set Maximum rain in 24 hour value
- Set rain build up value
- Set use of rain by program

Skip Rain Bucket setup section if controller has no (-RB) option and you **are not** sharing rain to controller.

If the controller in use has a (-RB) option installed and a Rain Bucket connected see:

1. Rain setup with Rain Bucket installed.

If the controller in use ***does not*** have the (-RB) option installed see:

2. Rain setup (Without Rain Bucket installed) and you are sharing rain to controller.

1. Rain setup with Rain Bucket installed

From the WEATHER SETUP screen (Figure 5.2).

1. ◯   Press the **RAIN BUCKET** Menu key.

The RAIN BUCKET SETUP screen is displayed (Figure 5.10).

RAIN BUCKET SETUP

STOP   Irrigation   After   `0.10`   inches

MAXIMUM   Rain   in   ONE   Hour   is   0.20   inches

MAXIMUM   Rain   in   24   Hours   is   0.60   inches

Let   Rain   Only   Build   up   to   1.50   inches

Set   Use   of   Rain   by   Program   ➡

STATION UP   STATION DOWN

Figure 5.10

The four (4) settings on the screen determine how much actual rainfall will be placed into the rain table, which is used to offset irrigation run times. The following is a description of each:

Note: Each value in the following definitions denoted in **red** is a default setting and can be adjusted by the user.

- **Stop irrigation after:** This setting determines how much rain must fall, before the controller will start accumulating rainfall values in the rain table. It also determines when to halt any on going irrigation. In figure 5.10, (**0.10**) inches of rain will have to fall before any rain data starts to accumulate in the rain table, or irrigation is stopped.

- **Maximum Hourly Rain:** This setting determines the maximum amount of rain that will be put in the rain table after a period of one (1) hour of rain. In figure 5.10, a maximum of (**0.20**) inches of rain will be put into the rain table, no matter

how much rain falls in a one (1) hour period. The amount of rain from this setting put into the rain table, will increase only until it reaches the 24 HOUR TOTAL setting.

- **Maximum 24 Hour Total:** This setting determines the maximum amount of rain that will be put into the rain table in a 24 hour period. In figure 5.10, a maximum of (**0.60**) inches of rain will be put into the table, no matter how much rain falls in a 24 hour period. The amount of rain from this setting put into the rain table, will increase only until it reaches the LET RAIN ONLY BUILD UP TO :setting.

- **Let Rain Only Build Up to:** This setting determines the maximum amount of rain that will be stored in the rain table. In figure 5.10, the controller will stop storing rain data in the rain table if the Maximum 24 Hour Total reaches **1.50** inches of rain.

2. ✥   Press the **PLUS** or **MINUS** keys to change the settings.

3. ✥   Press the blue **ARROW** key to move the cursor to the next entry.

- **Set Use of Rain by Program:** This section describes how to enable the use of rain in the ET2000 controller. Each Program can be set individually to either use or not use rain to offset irrigation run times.

From the RAIN BUCKET SETUP screen (Figure 5.10).

4. ◯   Press the **SET USE OF RAIN BY PROGRAM** Menu key.

The USE OF RAIN BY PROGRAM screen is displayed (Figure 5.11).

USE OF RAIN BY PROGRAM

Rain causes negative hold-over to build which acts to cancel irrigation.

Allow RAIN on the following:

PROG A . . . . `YES`
PROG B . . . . YES
PROG C . . . . YES
PROG D . . . . YES
PROG E . . . . YES
DRIP 1 . . . . YES
DRIP 2 . . . . YES

STATION UP   STATION DOWN

Figure 5.11

You have the option of enabling or disabling the use of rain (negative hold over) for any of the controller's seven programs. If you select YES, rain (negative hold over) will be used for that program to reduce irrigation run times. If you select NO, rain will have no effect on irrigation run times for that program.

If there is no rain bucket installed and you are not sharing rain data through the Calsense Command Center program, these settings will have no effect on irrigation.

5. Press the **PLUS** or **MINUS** keys to change the setting.

6. Press the blue **ARROW** keys to move the cursor to the next entry.

7. Press the **MAIN MENU** key to return to the MAIN MENU screen (Figure 5.1).

THIS CONCLUDES RAIN SETUP WITH RAIN BUCKET INSTALLED

2. ***Rain setup (Without Rain Bucket installed) and you are sharing rain to controller.***

From the WEATHER SETUP screen (Figure 5.2).

1. Press the **RAIN BUCKET** Menu key.

The RAIN BUCKET SETUP screen is displayed (Figure 5.12).


```
                    RAIN BUCKET SETUP
  Rain  Bucket  controllers  have  3  more        STATION UP
    setings.  This  controller  does  not
        have  a  -RB  interface.               STATION DOWN

  Let  Rain  Only  Build  up  to  1.50  inches


                Set  Use  of  Rain  by  Program  ➡
```
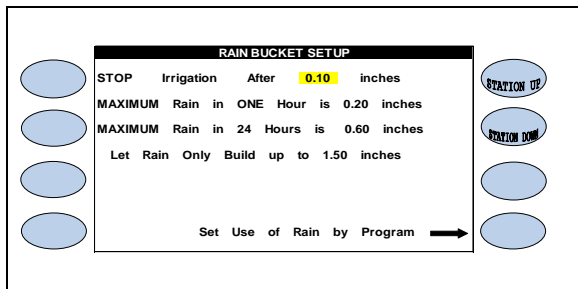
Figure 5.12

If a controller is not wired to a rain bucket, the RAIN BUCKET SETUP screen will only have one setting (Figure 5.12). This setting is described below:

- **Let Rain Only Build Up to:** This setting determines the maximum amount of rain that can be stored in the rain table. In figure 5.12 the controller will stop storing rain data in the rain table if the Maximum 24 Hour Total reaches **1.50** inches of rain.

If you are not sharing rain data using the Calsense Command Center software, this setting will have no effect on irrigation.

2. Use the **PLUS** or **MINUS** key to change the setting.

- **Set Use of Rain by Program:** This section describes how to enable the use of rain in the ET2000 controller. Each program can be set individually to either use or not use rain to offset irrigation run times.

From the RAIN BUCKET SETUP screen (Figure 5.12).

3. Press the **SET USE OF RAIN BY PROGRAM** Menu key.

The USE OF RAIN BY PROGRAM screen is displayed (Figure 5.13).


```
                USE OF RAIN BY PROGRAM
  Rain  causes  negative  hold-over  to  build     STATION UP
      which  acts  to  cancel  irrigation.
                                                  STATION DOWN
          Allow  RAIN  on  the  following:

  PROG A . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . YES
  PROG B . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . YES
  PROG C . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . YES
  PROG D . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . YES
  PROG E . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . YES
  DRIP 1 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . YES
  DRIP 2 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . YES
```
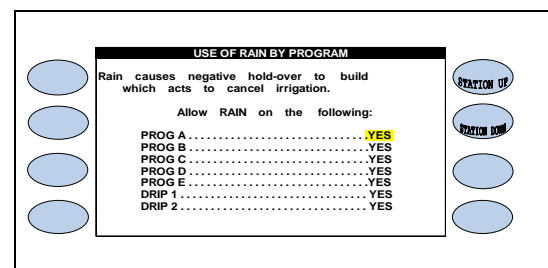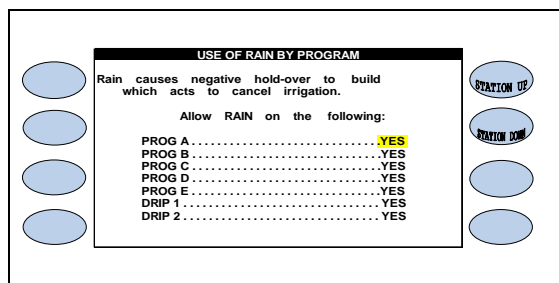
Figure 5.13

Here you will have the option of enabling or disabling the use of negative hold-over (rain) for any of the controller's seven programs. If you select YES, rain (negative hold over) will be used for that program to reduce irrigation run times. If you select NO, rain will have no effect on irrigation run times for that program.

If there is no rain bucket installed and you are not sharing rain data through the Calsense Command Center program, these settings will have no effect on irrigation.

4. Press the **PLUS** or **MINUS** keys to change the setting.

5. Press the blue **ARROW** keys to move the cursor to the next entry.

6. Press the **MAIN MENU** key to return to the MAIN MENU screen (Figure 5.1).

THIS CONCLUDES RAIN SETUP UNDERLINE WITHOUT RAIN BUCKET INSTALLED SECTION

C. WIND GAGE

The Wind Gage setting in the controller is used to measure the current wind speed used to pause and resume irrigation by use of the following:
:
- Selecting Wind Gage activation.
- Setting wind pause speed.
- Setting wind resume speed.
- Selecting use of wind by program.

1. Wind Gage setup

From the WEATHER SETUP screen (Figure 5.2).

1. Press the **WIND GAGE** Menu key.

The WIND GAGE SETUP screen is displayed (Figure 5.14).
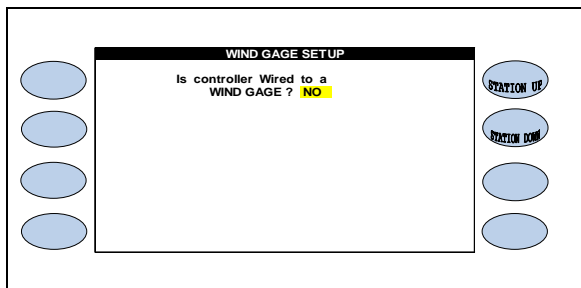
Figure 5.14

The default setting is NO. If you are currently using a wind gage on this controller then change the setting to YES.

2. Press the **PLUS** or **MINUS** keys to change the settings.

The WIND GAGE SETUP screen will change to reveal the irrigation wind settings (Figure 5.15).
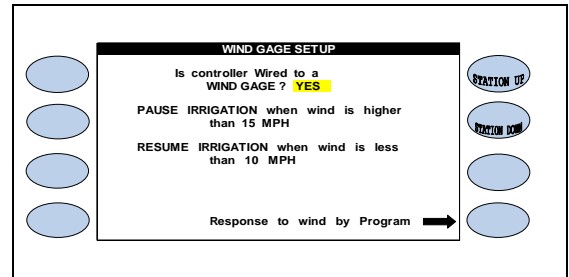
Figure 5.15

Note: The pause and resume irrigation default settings are 15 MPH pause and 10 MPH resume.

3. Press the blue **ARROW** keys to move the cursor to the next entry (Figure 5.16).
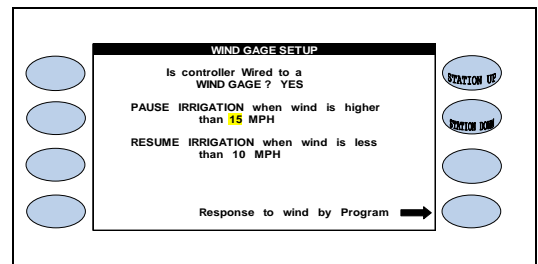
Figure 5.16

To change the Miles Per Hour that you want the irrigation to pause at,

4. Press the **PLUS** or **MINUS** keys (Figure 5.17).

5. Press the blue **ARROW** keys to move the cursor to the next entry.

To set the Miles Per Hour that you want the controller to resume irrigation at, (Figure 5.17).

CALSENSE ®
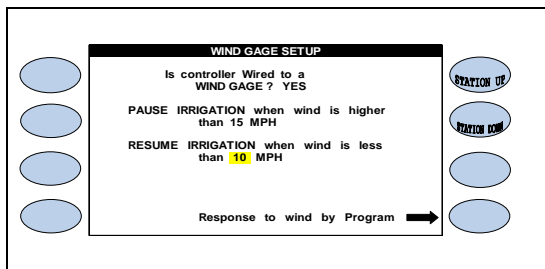
Figure 5.17

6. Use the **PLUS** or **MINUS** keys to change the speed (Figure 5.17).

2. *Respond to wind by Program*

1. Press the **RESPONSE TO WIND BY PROGRAM** Menu key.

The USE OF WIND BY PROGRAM screen (Figure 5.18).
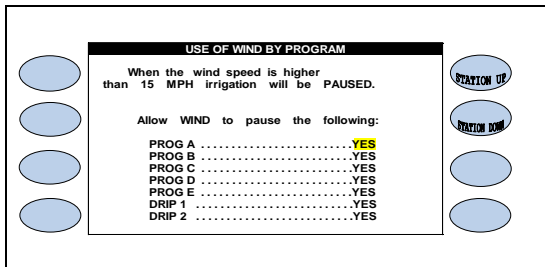
Figure 5.18

You can select the programs that you want to be affected by wind. The default setting is YES. If you **do not** want programs to be effected by wind change the setting to NO for the appropriate program.

2. Press the **PLUS** or **MINUS** keys to change the settings.

3. Press the blue **ARROW** key to move the cursor to the next entry.

4. Press the **MAIN MENU** key to return to the MAIN MENU screen (Figure 5.1).

THIS CONCLUDES THE WIND GAGE SETUP SECTION

🔵 *D. RAIN SWITCH*

This section of the controller is used to activate the use of a rain switch and have the controller turn irrigation off due to rain detection.

1. *Rain Switch setup*

From the WEATHER SETUP screen (Figure 5.2).

1. Press the **RAIN SWITCH** Menu key if you want to activate a Rain Switch.

The RAIN SWITCH SETUP screen is displayed (Figure 5.19).
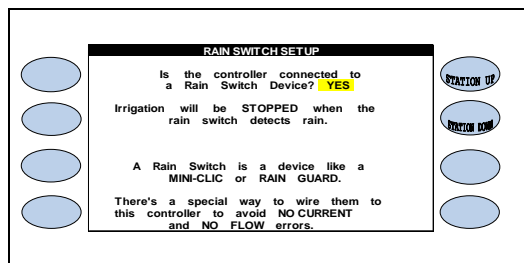
Figure 5.19

2. Press the **PLUS** or **MINUS** keys to change the setting.

If you select YES this will change the screen to read, "Irrigation will be stopped when the rain switch detects rain". If you do not want irrigation to be affected by the rain switch leave the setting at the default setting of NO (Figure 5.20).

CAUTION:

If YES is selected, and the controller is **not** hooked up to a rain switch **irrigation will be halted**. This is due to rain switch wiring requirements.
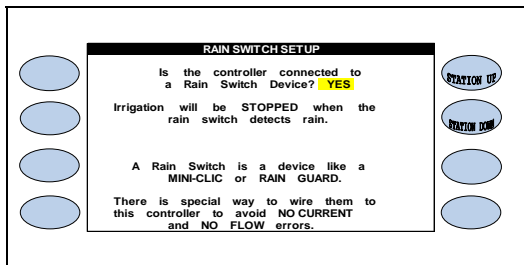
Figure 5.20

THIS CONCLUDES THE RAIN SWITCH SECTION

making **water work**

since 1986

E. ET

The ET section of the controller can be programmed to use evapotransperation data accessed from an ET Gage, or controller pre-set values, to compute irrigation run times using the following:

- Irrigate using ET table
- Irrigate using ET averaging
- Adjust allowable percentage of historical ET
- Use of crop coefficients

From the WEATHER SETUP screen (Figure 5.2).

1. ⬭ Press the **ET** Menu key.
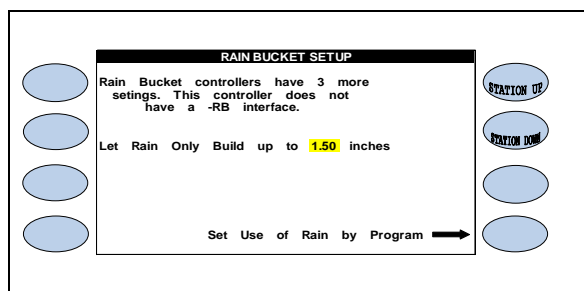
The DAILY ET SETUP screen is displayed (Figure 5.21).
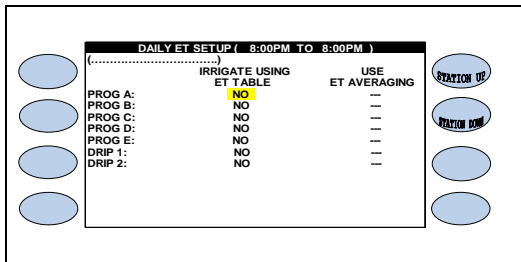
Figure 5.21

Note: The text line directly under the heading bar will have each program tag if you are currently using them. (See Section 3 Start Times & Water Days / Name:). If you do not have any selected the default (………………………..) will appear.

1. *Irrigate using ET table*

A NO next to a program indicates the program is using minutes. Once YES is selected for a program, any station assigned to that program will now use daily ET to automatically adjust the amount of time the station will run during it's next irrigation.

1. ⬦ Press the **PLUS** or **MINUS** keys to change the setting.

Note: If the setting is changed to YES for a program, the USE ET AVERAGING setting will automatically change to YES for that particular program.

2. ⬦ Press the **PLUS** or **MINUS** keys to change the setting.

2. *Use ET averaging*

A YES next to a program indicates ET averaging is enabled for that program, which is only available if the program is in daily-ET mode. With ET averaging ON the controller will not use a single ET valve to calculate the next run times. Instead it will use the average of the last 7 days of ET (Figure 5.22).
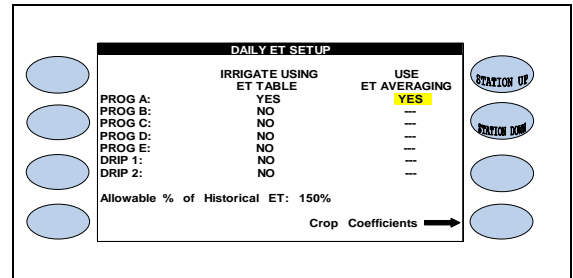
Figure 5.22

3. Allowable % of historical ET

This setting controls the maximum allowable amount of ET that can be used to calculate station run times. The default is 150%, which means that if real-time ET measured by the gage, exceeds 150% of historical ET, the controller will place an ET value in the ET table equal to 150% of historical ET instead of the actual real-time ET. This setting allows the user to control the maximum amount of total irrigation time for sites that have a limited water window (Figure 5.23).

Note: The water window is the time from when you can start irrigating to when you have to end irrigation.
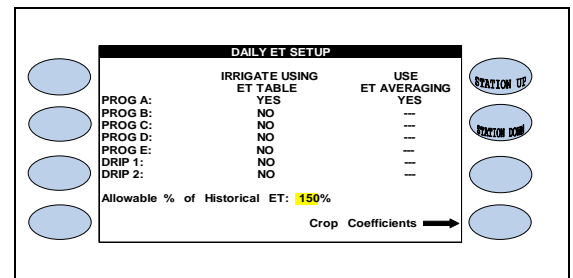
Figure 5.23

4. Crop Coefficients

This setting is used to adjust ET for a specific type of crop at different periods throughout the year. If you do not want ET to be modified, leave the selection set at NO (Figure 5.24)

From the WEATHER SETUP screen (Figure 5.2).

1. Press the **CROP COEFFICIENTS** Menu key.

2. Press the **PLUS** or **MINUS** keys to change the setting.

```
                 CROP COEFFICIENTS

  Crop  Coefficients  In  Use: NO                    STATION UP

                                                     STATION DOWN
```
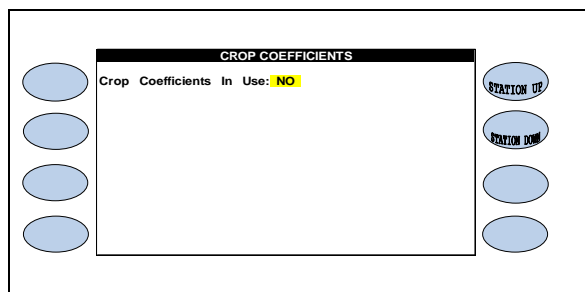
Figure 5.24

*   **Crop Coefficients In Use:** The default setting is set to NO. By changing it to YES the Screen will open up the Month and Program Columns (Figure 5.25).

```
                      CROP COEFFICIENTS

                Crop  Coefficients  In  Use: YES
           A      B      C      D      E      D1      D2
  JAN  1.00   1.00   1.00   1.00   1.00   1.00   1.00     STATION UP
  FEB  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  MAR  1.00   1.00   1.00   1.00   1.00   1.00   1.00     STATION DOWN
  APR  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  MAY  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  JUN  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  JUL  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  AUG  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  SEP  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  OCT  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  NOV  1.00   1.00   1.00   1.00   1.00   1.00   1.00
  DEC  1.00   1.00   1.00   1.00   1.00   1.00   1.00
```

Figure 5.25

This will allow you the option of entering Crop Coefficient values for each month of the year, on each program in the controller. You must be familiar with crop coefficients to use this feature.

3. Press the **PLUS** or **MINUS** keys to change the setting.

4. Press the blue **ARROW** keys to move the cursor.

5. Press the **MAIN MENU** key to return to the MAIN MENU screen (Figure 5.1).

THIS CONCLUDES THE CROP COEFFICIENTS SECTION

CAUTION:

When using Daily ET mode you will have to set each Stations flow rate, Precipitation rate, and square footage area for every program using Daily ET. The following instructions cover how to set up station flow rates whether or not you have a flow meter installed.

NO FLOW METER INSTALLED

5. Station flow rates without a flow meter present:

There are two methods to determine station flow rates if a Calsense flow meter is not installed on the system. The following describes each method

*   ***How to calculate Station Flow rates Using Manufacturer's Published data:***

With the first method, you use a manufacturer's catalog which has the flow rates (gpm) listed for the type heads, and nozzle sizes on the system you are calculating. Simply total the flow rates for all of the nozzles on the station.

Example:

A station has 8 half-circle pop-ups with a flow rate of 2 GPM each, 3 full circle pop-ups at 4 GPM each and 4 quarter circle pop-up heads at 1 GPM each. The station's flow rate would be calculated as follows.

8 heads x 2 GPM =	16 GPM
3 heads x 4 GPM =	12 GPM
2 heads x 1 GPM =	2 GPM
Total flow =	**30 GPM**

- ***How to calculate Station Flow rates by Measuring Station Flow Rates:***

The second method may provide more accurate results, by using the irrigation system's water meter to calculate flow rates. Use the following procedure:

- o Determine the units used by the water meter (Gallons, cubic feet, etc.) Make sure no other water will be flowing while you are measuring flow rates. Also, if there is more than one water meter connected to the mainline, all of them must be turned-off except the one you are using to measure flow with.
- o Before beginning, turn on each station to make sure there are no broken heads or pipes which will cause incorrect flow readings.
- o Begin by turning on a station long enough to purge all of the air out of the system. Then simultaneously, make note of the meter reading and start timing using a stopwatch. After 3 minutes has elapsed make note of the water reading again. Subtract the starting meter reading from the ending meter reading, this will give you the amount of water used by the valve in 3 minutes. Continue this procedure until all stations have been measured.

- o To calculate the flow rate, divide the amount of water the station used (measured in gallons) by 3 minutes, this will give you the station's flow rate measured in GPM's.

Example #1
(if water meter units are in gallons):

The starting meter reading is 312,121 After 3 minutes the ending meter reading is 312,378 gallons, the flow rate would be calculated as follows:

312,378 gallons – 312,121 gallons = 257 gallons
257 gallons ÷ 3 minutes = 85.6 GPM

Example #2
(If water meter units are in cubic feet or CF):

The starting meter reading is 9,975 CF after 3 minutes the ending meter reading is 10,003 CF the flow rate would be calculated as follows:

10,003 CF-9,975 CF = 28 CF
28 CF x 7.48 gallons = 209.4 gallons
(1 CF = 7.48 gallons)
209.4 gallons ÷ 3 minutes = 69.8 GPM

Example #3
(if water meter units are in hundreds of cubic feet or CCF):

The starting meter reading is 12,321 CCF after 3 minutes the ending meter reading is 12,321.25 CCF, the flow rate would be calculated as follows:

12,321.25 CCF – 12,321.00 CCF = .25 CCF
.25 CCF x 748 gallons = 187 gallons
(1 CCF =748 gallons)
187 gallons ÷ 3 minutes= 62.3 GPM

FLOW METER INSTALLED

6. *Station flow rates & Area with flow meter installed.*

From the MAIN MENU screen.

1. ⬭ Press the **PROGRAMS & STATIONS** Menu key.

2. ⬭ Press the **STATIONS** Menu key.

3. ⬭ Press the **STATION UP** or **STATION DOWN** keys to select the station desired.

The STATION PROGRAMMING screen is displayed (Figure 5.26).


```
                 STATION PROGRAMMING
Station 1 . . . . . . . . . . . . . . .        PROG  A

        Last Min :    2.3
    Estimated Mins :  3.2          % of ET :  100 %
Mins  per  Cycle :     4
    Soak-in  Time :    5           No  Water  Day  0


Expected Flow  =  25 GPM
        Area  =  3826 sq / Ft
      Precip  =  0.63 In / Hr
                                         Test ➡
```
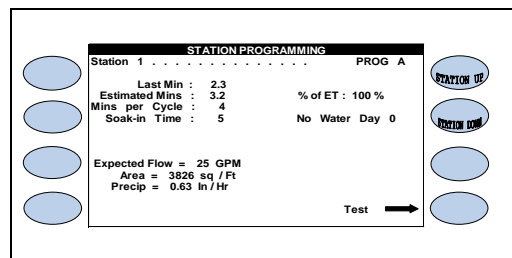
Figure 5.26

Last Min: This is the amount of time programmed on this station prior to selecting the use of Daily ET.

Estimated Mins: This is the total estimated minutes for this station using Daily ET, and is calculated automatically.

% of ET: This value can be adjusted to increase or decrease the amount of estimated time on a station based on percentage of ET.

Expected Flow: This is the station expected flow rate. You can either learn the expected flow rate (See section 4 Learn Expecteds), or set the flow rate number yourself.

Area: This is the amount of area in square feet that all of the heads assigned to the valve / station encompass.

Precip: This entry is the precipitation rate for all of the heads assigned to this valve / station and is calculated automatically by using the flow rate and area square footage.

4. Press the blue **ARROW** keys to move the cursor to the setting.

5. Press the **PLUS** or **MINUS** keys to change the highlighted selection.

6. Press the **MAIN MENU** key to return to the MAIN MENU screen (Figure 5.1).

THIS CONCLUDES THE ET SECTION

F. BUDGET

The Budget feature of the controller allows you to compare actual water usage with a water budget that has been programmed into the controller by the user. The user will be alerted whenever the actual water usage exceeds the budget. Once the budget feature has been enabled, there will be three budget options to choose from:

- Directly enter the monthly budgets.
- Controller will automatically calculate the budget amount using the total square footage and your City ET.(*see Section 5 H. ET County / City*)

- Enter a yearly budget and have the controller divide it among the months using your City ET. (*see Section 5 H. ET County / City*)

From the WEATHER SETUP screen (Figure 5.2).

1. Press the **BUDGET** Menu key.

The WATER USE BUDGET screen is displayed (Figure 5.27)
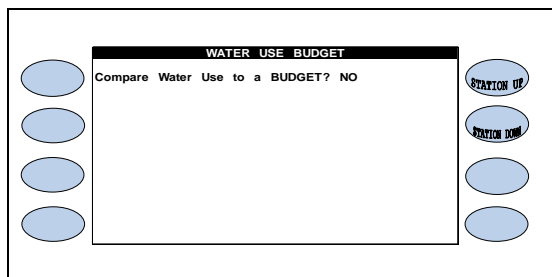
Figure 5.27

2. Press the **PLUS** or **MINUS** keys to select YES for budget use.

You will be able to choose between three different types of budget settings.

1. Directly enter the monthly budgets

The first setting will be DIRECTLY ENTER THE MONTHLY BUDGETS (Figure 5.28).
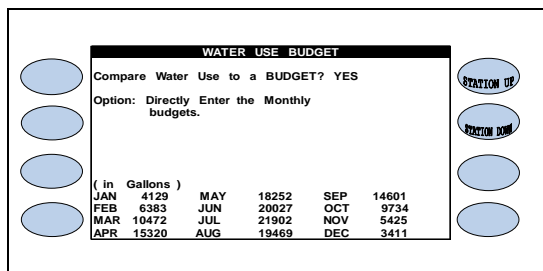
Figure 5.28

1. Press the blue **ARROW** keys to select each individual months amount.

2. Press the **PLUS** or **MINUS** keys to change each entry.

Note: When you exit this screen your entry's will be saved.

2. _Controller will automatically calculate the budget amount using the total square footage and your city ET._

1. In the WATER USE BUDGET screen (Figure 5.28). In the OPTIONS: setting press the **PLUS** or **MINUS** keys to change the setting to CONTROLLER WILL AUTOMATICALLY CALCULATE THE BUDGET AMOUNT USING THE TOTAL SQUARE FOOTAGE AND YOUR CITY ET (Figure 5.29).

WATER USE BUDGET

Compare Water Use to a BUDGET? YES

Option: Controller will automatically calculate the budget amount using the total square footage and your city ET.

Calculate budgets at 80% of ET

(in Gallons)
JAN	4129	MAY	18252	SEP	14601
FEB	6383	JUN	20027	OCT	9734
MAR	10472	JUL	21902	NOV	5425
APR	15320	AUG	19469	DEC	3411
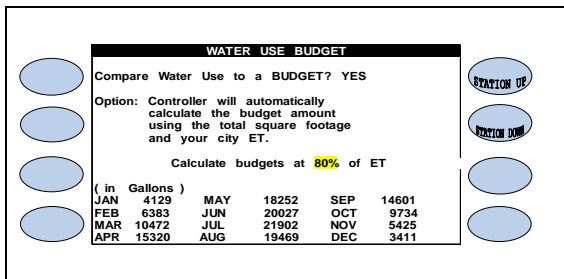
Figure 5.29

2. Press the blue **ARROW** keys to select the CALCULATE BUDGETS AT ## % OF ET setting.

3. Press the **PLUS** or **MINUS** keys to change the percentage entry, the numbers for each months entries will automatically adjust.

Note: When you exit this screen your data will be saved.

3. _Enter a Yearly Budget and have the controller divide it among the months using your city ET._

1. In the WATER USE BUDGET screen (Figure 5.28). In the OPTIONS: setting press the **PLUS** or **MINUS** keys to change the setting to ENTER A YEARLY BUDGET AND HAVE THE CONTROLLER DIVIDE IT AMONG THE MONTHS USING YOUR CITY ET setting (Figure 5.30).

WATER USE BUDGET

Compare Water Use to a BUDGET? YES

Option: Enter a Yearly Budget and have the controller divide it among the months using your city ET.

Yearly budget is 149125 gal

(in Gallons)
JAN	4129	MAY	18252	SEP	14601
FEB	6383	JUN	20027	OCT	9734
MAR	10472	JUL	21902	NOV	5425
APR	15320	AUG	19469	DEC	3411
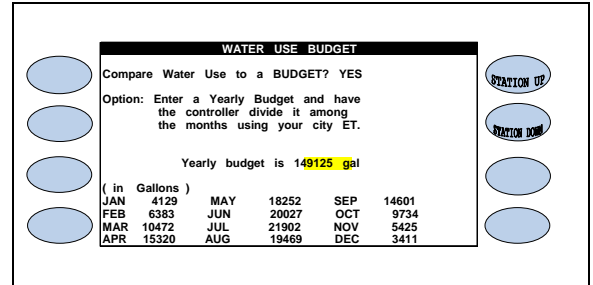
Figure 5.30

2. Press the blue **ARROW** keys to select the YEARLY BUDGET IS ######## GAL setting.

3. Press the **PLUS** or **MINUS** keys to change the amount entry, the numbers for each months entries will automatically adjust.

Note: When you exit this screen your data will be saved.

THIS CONCLUDES THE BUDGET SECTION

G. *MOISTURE*

The Moisture section of the controller, along with the use of 1000-S moisture sensors, allows you to:

- Set up moisture sensing use by program.
- Assign individual sensors to stations.
- Designate and share sensor data from master stations to slave stations.

From the WEATHER SETUP screen (Figure 5.2).

1. Press the **MOISTURE** Menu key.

The MOISTURE SENSING SETUP screen is displayed (Figure 5.31).

MOISTURE SENSING SETUP

Moisture Sensing in Use ? NO

Figure 5.31

making **water work** since 1986
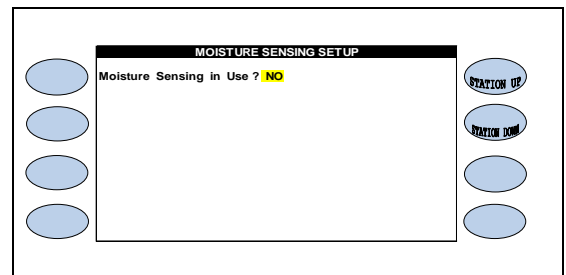
If you are currently using Moisture sensors on this controller then change the setting to YES.

2. Press the **PLUS** or **MINUS** keys to change the settings.

1. Moisture Sensor Setup

The MOISTURE SENSOR SETUP screen will change to reveal the Use by Program settings (Figure 5.32).
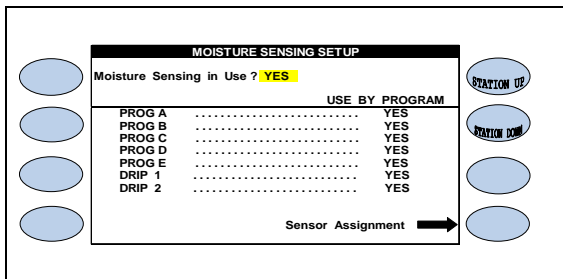
```
              MOISTURE SENSING SETUP
Moisture Sensing in Use ? YES                    STATION UP

                          USE BY PROGRAM
         PROG A   ..........................   YES
         PROG B   ..........................   YES   STATION DOWN
         PROG C   ..........................   YES
         PROG D   ..........................   YES
         PROG E   ..........................   YES
         DRIP 1   ..........................   YES
         DRIP 2   ..........................   YES

                         Sensor  Assignment  ➡
```

Figure 5.32

1. Press the blue **ARROW** keys to move the cursor to the next entry (Figure 5.33)

```
              MOISTURE SENSING SETUP
Moisture Sensing in Use ? YES                    STATION UP

                          USE BY PROGRAM
         PROG A   ..........................   YES
         PROG B   ..........................   YES   STATION DOWN
         PROG C   ..........................   YES
         PROG D   ..........................   YES
         PROG E   ..........................   YES
         DRIP 1   ..........................   YES
         DRIP 2   ..........................   YES

                         Sensor  Assignment  ➡
```

Figure 5.33

2. Press the **PLUS** or **MINUS** keys to change the Use by Program.

3. Press the blue **ARROW** keys to move the cursor to the next entry.

Note: This will allow you to set up the programs that you want to use Moisture Sensors on.

Note: The controller may be set up for some programs to use ET, other programs to use moisture, or programs can be set up to use a combination of the two.

2. Moisture Sensor Assignment

1. Press the **SENSOR ASSIGNMENT** Menu key.

The MOISTURE SENSOR ASSIGNMENT SCREEN (Figure 5.34).

```
            MOISTURE SENSOR ASSIGNMENT

    Station  01  02  03  04  05  06  07  08  09  10    STATION UP
    Sensor   01  02  03  04  05  06  07  08  09  10

    Station  11  12  13  14  15  16  17  18  19  20    STATION DOWN
    Sensor   11  12  13  14  15  16  17  18  19  20

    Station  21  22  23  24  25  26  27  28  29  30
    Sensor   21  22  23  24  25  26  27  28  29  30

    Station  31  32  33  34  35  36  37  38  39  40
    Sensor   31  32  33  34  35  36  37  38  39  40
```
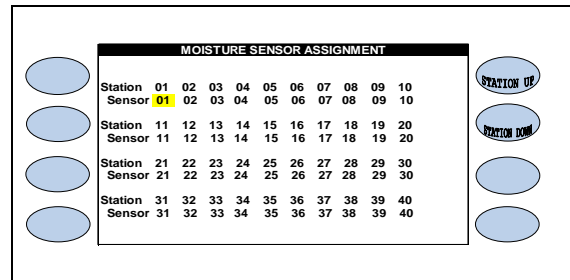
Figure 5.34

Next, you will have to enter the settings for each Moisture sensor assigned to a station.

A representative station for each different climatic and plant material zone on the controller is given a sensor and is known as a Master station. Slave stations are stations without sensors and are assigned to a master station which share similar water requirements. The choice of groups of stations controlled by the same sensor is done at the controller within the MOISTURE SENSOR ASSIGNMENT screen.

Example:

Station: 01 02 03 04 05 06 07 08 09 10
Sensor: 01 02 03 04 05 06 07 08 09 10

becomes

Station: 01 02 03 04 05 06 07 08 09 10
Sensor: 01 02 03 04 05 03 03 07 03 09 10

Note: In the example above station 03 is the Master station (the station with the moisture sensor) and stations 05, 06, and 08 are now slaves stations to station 03 (Highlighted in the example).

2. Press the **PLUS** or **MINUS** keys to change the entry.

3. Press the blue **ARROW** keys to move the cursor to the next entry.

4. Once all of the Moisture Sensors have been set up properly, press the **MAIN MENU** key to return to the MAIN MENU screen (Figure 5.1).

Note: New settings will be available in the STATION PROGRAMMING screen for **each** station that is using Moisture sensing and will have to be programmed individually.

5. Press the **PROGRAMS & STATIONS** Menu key (Figure 5.1).

The PROGRAMS & STATIONS screen is displayed (Figure 5.35).

PROGRAMS & STATIONS
← Start Times & Water Days
← Stations
← Station-to-Station Copy
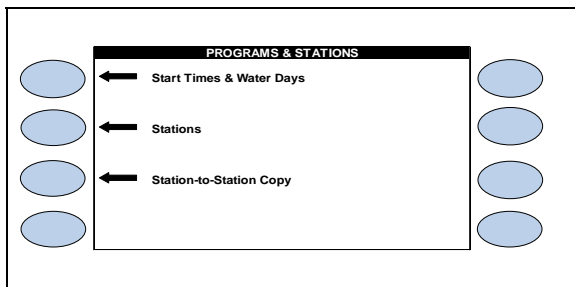
Figure 5.35

6. Press the **STATIONS** Menu key.

The STATION PROGRAMMING screen is displayed (Figure 5.36).

STATION PROGRAMMING
Station 1 .... PROG A
Total Mins : 5.0
Mins per Cycle : 2.5
Soak-In Time : 5   No Water Days 0
                          Max Days : 00
                          Moist Set : 99
                          Moist Read : - -
                              MASTER
                          Test ➡
STATION UP
STATION DOWN
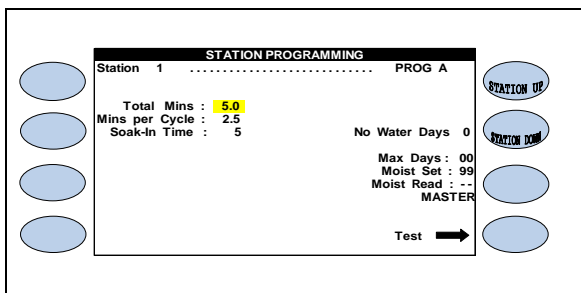
Figure 5.36

7. Press the blue **ARROW** keys to move the cursor to the MAX DAYS entry.

- **MAX DAYS:** This entry is used to automatically bypass the moisture sensors of individual stations so they will receive their maximum programmed water time. The controller will display the number of days remaining and can be cleared at any time. After the programmed Maximum Water has elapsed, the system will automatically return to moisture sensing operation (Figure 5.37).

STATION PROGRAMMING
Station 1 .... PROG A
Total Mins : 5.0
Mins per Cycle : 2.5
Soak-In Time : 5   No Water Days 0
                          Max Days : 00
                          Moist Set : 99
                          Moist Read : - -
                              MASTER
                          Test ➡
STATION UP
STATION DOWN

Figure 5.37

8. Press the **PLUS** or **MINUS** keys to change the entry.

9. Press the blue **ARROW** keys to move the cursor to the MOIST SET entry.

- **MOIST SET:** The Calsense Moisture Sensor has it's own numerical system of moisture readings. Typically it reads between the range of 45 (dry) to 85 (wet). By keeping moisture set points at 99, the sensors are never allowed to read above the set point value, and the controller waters the full programmed time. This occurs for th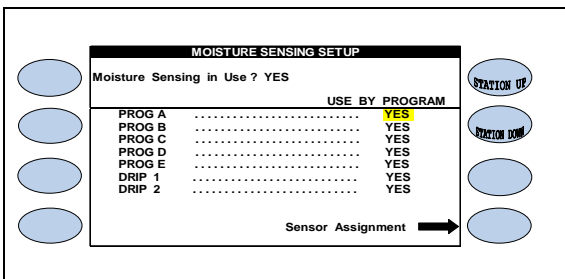e Master station as well as all slave stations assigned to the Master Station. After a few weeks, the slave areas should be checked and readjusted if necessary. If the slave area is to dry, adjust it's maximum time to 10% more. If the area is to wet, decrease it by the same percentage. In both cases, the area should be rechecked after another few weeks, with readjustments made until the proper siol moisture level is achieved (Figure 5.38).

STATION PROGRAMMING

Station 1 .... PROG A

Total Mins : 5.0
Mins per Cycle : 2.5
Soak-In Time : 5   No Water Days 0

Max Days : 00
Moist Set : 99
Moist Read : - -
MASTER

Test ➡

STATION UP

STATION DOWN
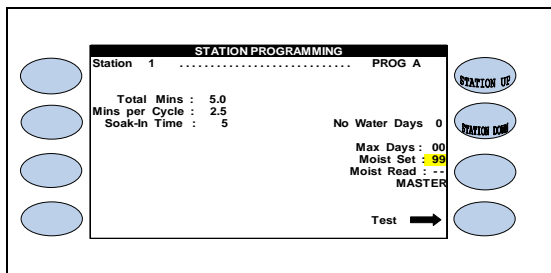
Figure 5.38

- **MOIST READ:** This entry is non-changeable. As a moisture sensor reading goes above the determined moisture set point, the controller stops irrigation. When the moisture level reading drops below the moisture set point. The controller automatically begins to irrigate more of the programmed time to where it may water the full programmed amount (Figure 5.39).

STATION PROGRAMMING

Station 1 .... PROG A

Total Mins : 5.0
Mins per Cycle : 2.5
Soak-In Time : 5   No Water Days 0

Max Days : 00
Moist Set : 99
Moist Read : 45
MASTER

Test ➡

STATION UP
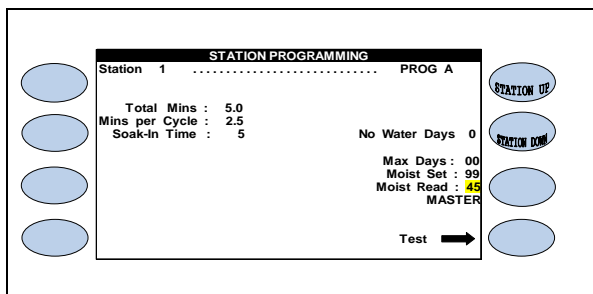
STATION DOWN

Figure 5.39

3. *Test Moisture Sensor*

1.   Press the **TEST** Menu key to test the station that you are currently on.

2.   If you want to test a different station press the **STATION UP** or **STATION DOWN** keys to the right of the display screen.

Note: This will only test the station selected, **but will not** get a reading from the moisture sensor.

If you want to retrieve a current reading from the moisture sensor,

3.   Press the **MANUAL** Menu key.

The MANUAL IRRIGATION screen (Figure 5.40).
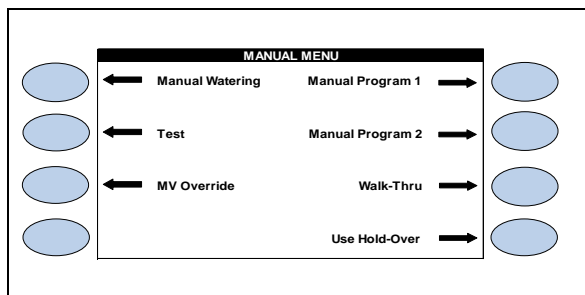
MANUAL MENU

← Manual Watering   Manual Program 1 ➡

← Test   Manual Program 2 ➡

← MV Override   Walk-Thru ➡

Use Hold-Over ➡

Figure 5.40

4.   Press the **TEST** Menu key.

The VALVE TESTING screen is displayed (Figure 5.41).

VALVE TESTING

← Learn the Expected at Station 1

← Test Station 1 for 2.0 minutes

← Test Station 1 for Moisture Sensor
(MASTER)
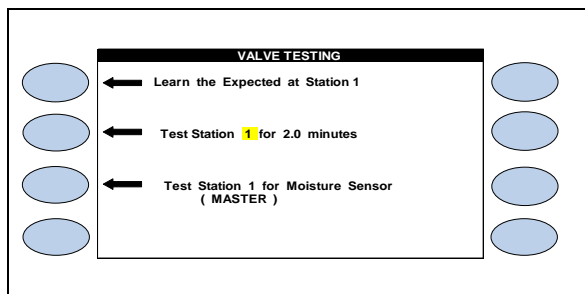
Figure 5.41

5.   Press the blue **ARROW** keys to move the cursor to the **TEST STATION # FOR MOISTURE SENSOR** Entry (Figure 5.42).

VALVE TESTING

← Learn the Expected at Station 1

← Test Station 1 for 2.0 minutes

← Test Station 1 for Moisture Sensor
(MASTER)
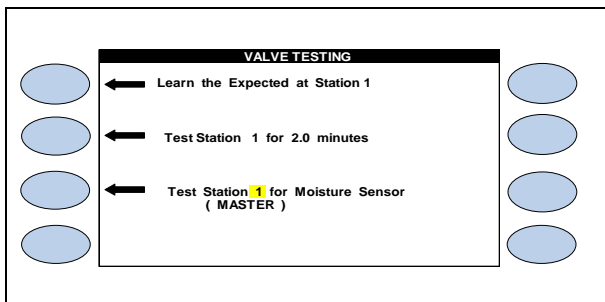
Figure 5.42

6.   Press the **PLUS** or **MINUS** key to change the station entry.

Note: Only Master stations can test Moisture sensor for readings.

7. ⬭   Press the **TEST STATION # FOR MOISTURE SENSOR**   Menu key to activate test. The screen will show "READING SENSOR ON # please wait (Less than 15 seconds)" for which ever station you selected. After a brief test the STATION PROGRAMMING screen will appear with the Moisture Sensor reading displayed (Figure 5.43).

```
                 STATION PROGRAMMING
Station   1     . . . . . . . . . . . . . . . . . . . . .        PROG  A

    Total  Mins :   5.0
Mins per Cycle :   2.5
   Soak-In Time :     5              No  Water  Days   0

                                        Max  Days :  00
                                        Moist  Set :  99
                                        Moist Read :  45
                                               MASTER

                                        Test  ➡
```
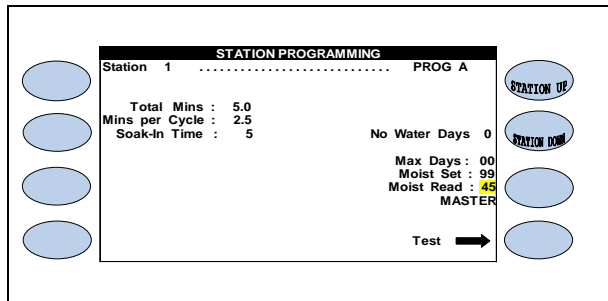
Figure 5.43

THIS CONCLUDES THE MOISTURE SECTION

💧 *H. ET COUNTY / CITY*

This section of the controller is only available if using budgets, or ET by program, and is used for:

- Selecting pre-programmed County & City monthly ET values.
- Setting your own County & City monthly ET values.

1. ET County / City setup

From the WEATHER SETUP screen (Figure 5.2).

1. ⬭   Press the **ET COUNTY / CITY** Menu key.

The ET COUNTY / CITY screen is displayed (Figure 5.44).

```
              REFERENCE ET NUMBERS
Source:  Enter  Your  Own  Numbers  Below
County: KERN
City: CHINA LAKE

   JAN    FEB    MAR    APR    MAY    JUN
   2.1    3.2    5.3    7.7    9.1    10.0

   JUL    AUG    SEP    OCT    NOV    DEC
   11.0   9.8    7.3    4.9    2.7    1.7
```
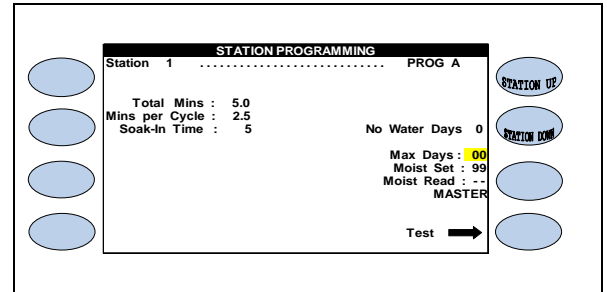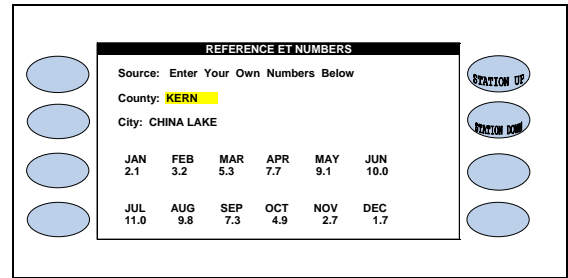
Figure 5.44

2. ⬭   Press the **PLUS** or **MINUS** key to change the County.

3. ⬭   Press the blue **ARROW** keys to move the cursor to the City entry (Figure 5.45).

4. ⬭   Press the **PLUS** or **MINUS** key to change the City.

 As explained in the (ET and Rain Tables) portion of this guide, historical ET is used as a back-up to real-time daily-ET, or it can be used as the source data to drive the program if real time ET is not used. In either case, you would want to use historical ET for the area you are located in. The ET2000 controller stores historical ET information for counties in California, and numerous cities within each of those counties. Select the area that most closely represents your location (Figure 5.45)

```
              REFERENCE ET NUMBERS
Source:  Enter  Your  Own  Numbers  Below
County: KERN
City: CHINA LAKE

   JAN    FEB    MAR    APR    MAY    JUN
   2.1    3.2    5.3    7.7    9.1    10.0

   JUL    AUG    SEP    OCT    NOV    DEC
   11.0   9.8    7.3    4.9    2.7    1.7
```

Figure 5.45

making **water work**
since 1986
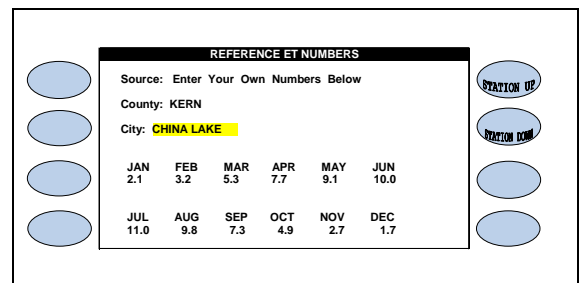
You can also choose to enter your own ET numbers. If you have selected to enter your own numbers, you will be allowed to edit the numbers under each month (Figure 5.46).

REFERENCE ET NUMBERS

Source: Enter Your Own Numbers Below

STATION UP

STATION DOWN

JAN	FEB	MAR	APR	MAY	JUN
2.1	3.2	5.3	7.7	9.1	10.0

JUL	AUG	SEP	OCT	NOV	DEC
11.0	9.8	7.3	4.9	2.7	1.7
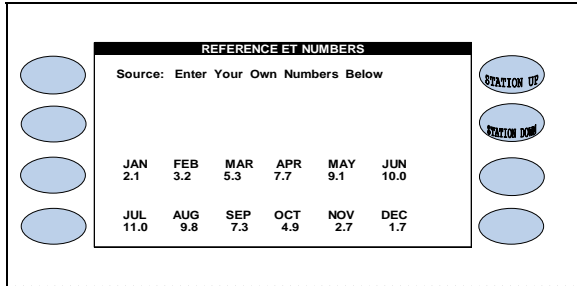
Figure 5.46

2. Press the blue **ARROW** keys to select a setting.

3. Press the **PLUS** or **MINUS** keys to change the setting.

4. Press the **MAIN MENU** key to return to the MAIN MENU screen (Figure 5.1).

THIS CONCLUDES THE ET COUNTY / CITY SECTION

SECTION 6:   REPORTS

The reports section of the controller is used to view the following report information:

- This Month / last Month.
- 24 Month.
- Hold-Over.
- ET & Rain Tables.
- Alerts.
- Station History.
- Use verses Budget.
- Live screens.

A. THIS MONTH / LAST MONTH

The This Month / Last Month report allows you to view water usage in Gallons, Hundreds of Cubic Feet, or by time used on each station for the current month, to the previous month, in the following categories:

- Irrigation.
- Test and Manual.
- Non-Controller usage.

1. Press the **MAIN MENU** key.

The MAIN MENU screen (Figure 6.1).

CALSENSE WATER MANAGEMENT SYSTEM

← Programs & Stations	Lights →	STATION UP
← Weather	Reports →	STATION DOWN
← Flow	Radio Remote →	
← Setup	Status →	
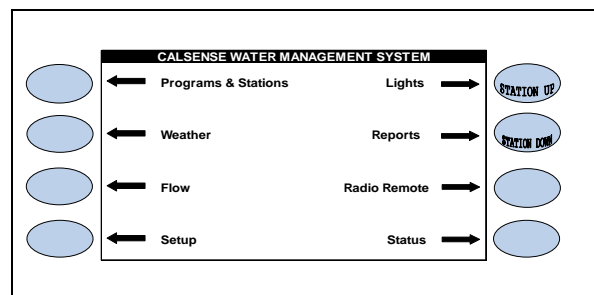
Figure 6.1

2. Press the **REPORTS** Menu key.

The REPORTS menu screen is displayed
(Figure 6.2).
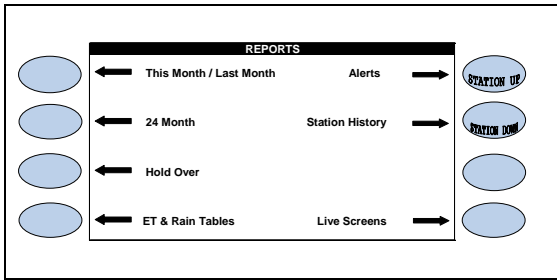
Figure 6.2

3. Press the **THIS MONTH / LAST MONTH** Menu key.

The THIS MONTH / LAST MONTH TOTALS screen is displayed (Figure 6.3)
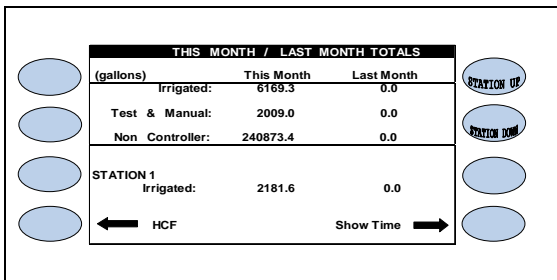
Figure 6.3

4. Press the **PLUS** or **MINUS** keys to select the desired station.

5. Press the **HFC** Menu key to change the information to Hundreds of Cubic Feet.

6. Press the **GALLONS** Menu key to change information back to Gallons.

7. You can also view Time in Minutes for each station by pressing the **SHOW TIME** Menu key.

8. To change the information back to Water Usage press the **SHOW WATER USE** Menu key.

THIS CONCLUDES THE THIS MONTH / LAST MONTH SECTION

B. 24 MONTH

The 24 month report shows the amount of water used, budgeted (if budget enabled), and ET (if ET enabled) for the last 24 months.

From the REPORTS menu screen (Figure 6.2).

1. Press the **24 MONTH** Menu key.

The 24 MONTH screen is displayed (Figure 6.4)
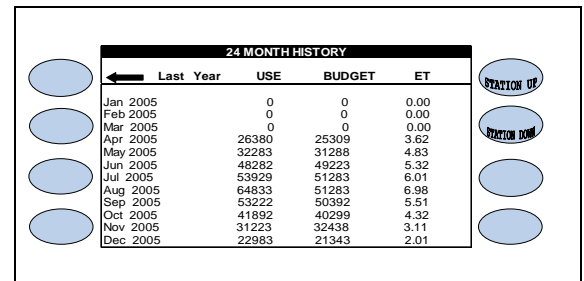
Figure 6.4

The report is listed in three columns:

- **USE:** The amount of water used (gallons)
- **BUDGET:** The amount set in the budget (gallons)
- **ET:** The amount of ET for the month (inches)

2. Press the **LAST YEAR** Menu key to access last year's information.

3. Press the **THIS YEAR** Menu key to go back to this year's information

THIS CONCLUDES THE 24 MONTH SECTION

C. HOLD-OVER

Hold over occurs if the controllers irrigation cycle is forced to end before it has finished, any unfinished irrigation will be saved as hold-over time, the controller will then try to use up this hold over time during subsequent irrigation cycles when programmed to do so.

Figure 6.6

1. *Reports / ET & Rain table (ET)*

The ET Table (Figure 6.6) is where the controller stores daily ET numbers (measured in inches). The numbers in the table are used to determine the amount of irrigation to be applied by each station and can be generated from the following sources:

- o Automatically generated from an ET Gage wired to the controller.
- o Automatically generated from Campbell Scientific weather station.
- o Automatically shared from another controller connected to an ET Gage using Calsense Command Center software. (Controllers must have communication capabilities to share ET).
- o Historical ET which is automatically entered into the ET Table when Daily ET is enabled, and remains in the table until it is replaced by real time ET from an ET gage or manually edited by the user.
- o Manually edit the ET Table.

The ET table stores the last 28 days of ET numbers. In the example in Figure 6.6 the ET table has a combination of Historical ET, actual real-time ET and user edited ET. The letter next to each number indicates how the number got into the ET Table:

h – historical This means the (ET) number was retrieved from the historical (ET) table.
g – ET Gage This means the (ET) number was retrieved from an actual real-time (ET) gage.
e – edited This means the (ET) number was edited at the controller by a user.
c – Central This means the central created the (ET) value due to the real-time (ET) value being below the minimum (ET) set by the user.

Prior to irrigation, the controller will read the number in the ET table and use it to recalculate the irrigation run times for each station.

The Hold-Over section of the controller allows you to:

- Set positive or negative individual hold over time per station.
- Clear an individual stations hold-over time.
- Clear all station hold over times on controller.

From the REPORTS menu screen (Figure 6.2).

1. Press the **HOLD-OVER** Menu key.

The HOLD-OVER screen is displayed (Figure 6.5).

Figure 6.5

2. Press the **STATION UP / STATION DOWN** Menu key to view each station assigned.

3. Press the **PLUS** or **MINUS** keys to change station values.

4. Press the **CLEAR STATION** Menu key to clear all hold over for that particular station.

5. Press the **CLEAR ALL** menu key to clear all stations at one time.

THIS CONCLUDES THE HOLD-OVER SECTION

 D. ET & RAIN TABLES

The ET & Rain Table section of the controller allows you to look at the last consecutive 28 days of ET and Rain data.

From the REPORTS menu screen (Figure 6.2).

1. Press the **ET & RAIN TABLES** Menu key.

The ET & RAIN TABLE screen is displayed (Figure 6.6).

2. *Reports / ET & Rain table (Rain)*
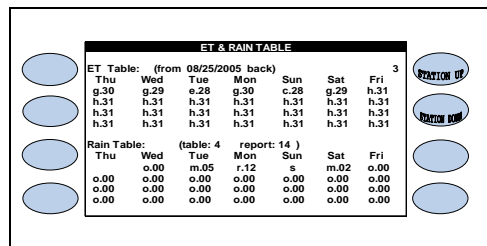
The Rain Table (Figure 6.6) is where the controller stores rainfall numbers (measured in inches). The numbers in this table can be generated from the following sources:

  o   Automatically generated from a Rain Bucket wired to the controller.
  o   Automatically generated from Campbell Scientific weather station.
  o   Automatically shared from another controller connected to a Rain Bucket using Calsense Command Center software. (Controllers must have communication capabilities to share rain).

o – Original This value is zero (no usable rain), it has no effect on irrigation run times.
m – Below minimum The below minimum value is measured rain but it is not enough to offset irrigation run times.
r – usable rain This value is rain that is used to offset irrigation run times.
s – Shutdown This means that irrigation was stopped due to rain polling being shared with this controller.

The usable rain in the Rain Table is used to reduce each stations irrigation run times determined by the precipitation rate. Usable rain in the Rain Table is determined by settings programmed at the Rain Bucket setup screen at the controller. When scheduled irrigation is set to occur, the controller will use up the usable rain first by the amount of time scheduled to irrigate for each station. Until the usable rain is used up, there will be no irrigation. This will continue until all of the rain is used up at which time the irrigation will start again.

(Table: 0 Reports: 0): These two values appear in (Figure 6.6) and are defined as follows:

  • **Table:** Shows the amount of usable rain pulses recorded during a one hour period, in the controller, that will be applied to irrigation.
  • **Reports:** Shows the amount of total rain, recorded by the controller, during a one hour period.

Note: The number in the upper right hand corner of the screen (Represented by a 3 in Figure 6.6) is the total recorded ET gage pulses in the last 24 hours.

THIS CONCLUDES THE ET & RAIN TABLES SECTION

 E. ALERTS

Alerts are a chronological listing of each individual event that has taken place, or changes that have been made to the controller. They can be viewed at the controller physically or obtained from the controller via communication. The Alerts section of the controller allows you to view the controller alerts in the following arrangements:

  • All Alerts.
  • Change *(alterations made by use of Command Center software, or by controller keypad).*
  • Irrigation.
  • Status View.
  • Go To Top *(Returns the highlight cursor to the top of the current list of alerts being viewed).*

From the REPORTS menu screen (Figure 6.2).

1. ⬭   Press the **ALERTS** Menu key.

Note: If the "ALERTS TO SEE" menu key is available on the STATUS screen when the ALERTS MENU key is pressed it will cause the MOST RECENT ALERTS screen to come up, if not the ALERTS screen will appear as in figure 6.7.

The ALERTS screen is displayed (Figure 6.7).

4 Total Alerts - on 1 of 4 (ALL)

11/18	9:52AM	Radio Remote Finished (***
11/18	9:51AM	Radio Remote Enabled (norm)
11/18	1:10AM	END: Programmed Irrigation
11/18	12:10AM	START: Programmed Irrigation

STATION UP   **STATION DOWN**

(Use "*" key for other views)
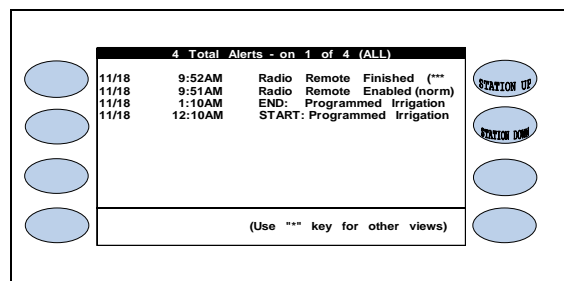
Figure 6.7

2. ✛   Press the **PLUS** or **MINUS** keys to scroll up and down the list.

✦✦ CALSENSE ®

Note: Press the **STAR** key to access the WHICH ALERTS TO SEE screen which will give you a presorted view of the alerts based on alert type. (Figure 6.8).

WHICH ALERTS TO SEE

Communications

← Status View   Change →

Irrigation →

← Go To Top   All →

STATION UP
STATION DOWN
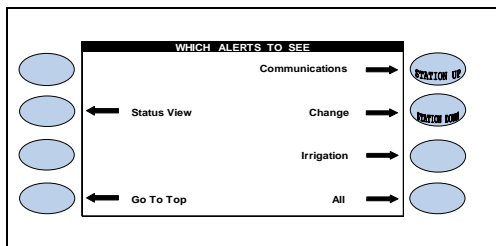
Figure 6.8

3. Press the appropriate Menu key to access the alerts that you want to see.

Note: Alerts can also be accessed when the "ALERTS TO SEE" menu key appears on the STATUS screen (Figure 6.9).

Note: From the STATUS screen pressing the ALERTS TO SEE menu key will allow you to view the alerts listed under the STATUS VIEW arrangement (Figure 6.9).

STATUS

← (live screens)   (adjust stations) →

No Stations are Watering

PROGRAMED IRRIGATION WILL RUN
12:00AM on Sunday Apr 2, 2006

Mar 28 2006
Tue 10:50:25AM

ALERTS TO SEE →

0 GPM   0.03 AMPS

STATION UP
STATION DOWN
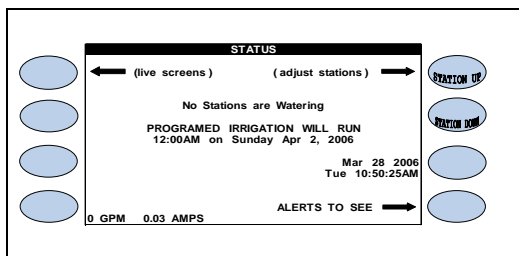
Figure 6.9

THIS CONCLUDES THE ALERTS SECTION

F. STATION HISTORY

The Station History report section of the controller allows you to view individual station irrigation information which include the following:

- Date and time irrigated.
- Program station assigned to.
- Number of cycles.
- Programmed minutes.
- Minutes applied.

- Inches applied.
- High flow limit.
- Low flow limit.
- Actual flow.
- Minutes of Hold-Over.
- Applicable Flag letter alerts. (See Enclosure 2).

From the REPORTS menu screen (Figure 6.2).

1. Press the **STATION HISTORY** Menu key.

The STATION HISTORY screen is displayed (Figure 6.10).

STATION 1 HISTORY

Date	& Time	PRG	CYC	PROG MIN	APPLIED MIN	GAL
11/21	2:20PM	A	1	4.0	4.0	96
11/20	2:20PM	A	1	4.0	4.0	96
11/18	2:20PM	A	1	4.0	4.0	96
11/14	2:20PM	A	1	4.0	4.0	96
11/13	2:20PM	A	1	4.0	4.0	96
11/11	2:20PM	A	1	4.0	4.0	96
11/07	2:20PM	A	1	4.0	4.0	96
11/07	2:20PM	A	1	4.0	4.0	96

Page Right →

STATION UP
STATION DOWN
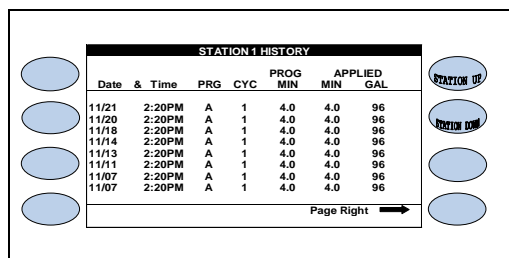
Figure 6.10

2. Press the **PLUS** or **MINUS** keys to scroll up and down the screen to view additional information.

3. Press the **PAGE LEFT** Menu key to view the next screen (Figure 6.11).

STATION 1 HISTORY

Date	& Time	:--FLOW---: HI	GPM	LO	MOISTURE SET	READ	FLAG
11/21	2:20PM	19	24	29	99	41	
11/20	2:20PM	19	24	29	99	41	
11/19	2:20PM	19	24	29	99	41	
11/17	2:20PM	19	24	29	99	41	
11/16	2:20PM	19	24	29	99	41	
11/10	2:20PM	19	24	29	99	41	
11/09	2:20PM	19	24	29	99	41	
11/08	2:20PM	19	24	29	99	41	

Page Left →

STATION UP
STATION DOWN
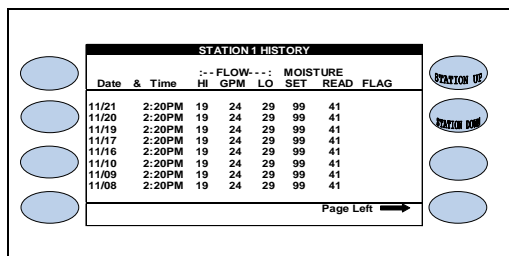
Figure 6.11

4. Press the **PAGE RIGHT** Menu key to view the previous screen (Figure 6.10).

THIS CONCLUDES THE STATION HISTORY SECTION

making **water work**

since 1986

G. USE VS. BUDGET

The Use Vs. Budgets option is only available if budgets are turned on in the controller under the weather menu.

This section of the controller allows you to view the predicted outcome for the month based on your current controller settings.

From the REPORTS menu screen (Figure 6.2)

1. Press the **USE VS. BUDGET** Menu key.

The PERFORMANCE TO BUDGET screen is displayed (Figure 6.12)

PERFORMANCE TO BUDGET

November Budget : 74684 gal

Use From Start of Month : 9866 gal

Expected for November : 12851 gal

NOTES:
1) Use & Expected are Scheduled plus Test plus Manual.
2) The Expected use takes into account the irrigation schedule along with your Test and Manual usage pattern.

STATION UP / STATION DOWN
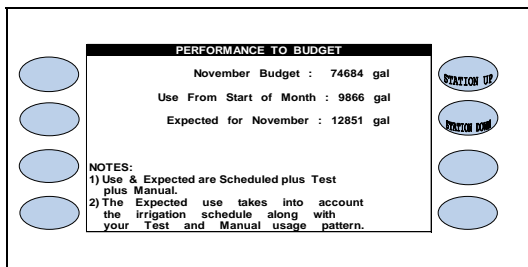
Figure 6.12

Note: You can press the **STAR** key to change the view on the screen from Gallons to Hundreds of Cubic Feet and back again.

THIS CONCLUDES THE USE VS. BUDGET SECTION

H. LIVE SCREENS

This section of the controller allows you to view:

- Current Irrigation activity.
- Current Irrigation Details.
- Current Real-Time flow.

From the REPORTS menu screen (Figure 6.2).

1. Press the **LIVE SCREENS** Menu key.

The REAL-TIME DISPLAYS screen is displayed (Figure 6.13)

REAL-TIME DISPLAYS

Irrigation Activity ➡ STATION UP

Irrigation Details ➡ STATION DOWN

Real-Time Flow ➡
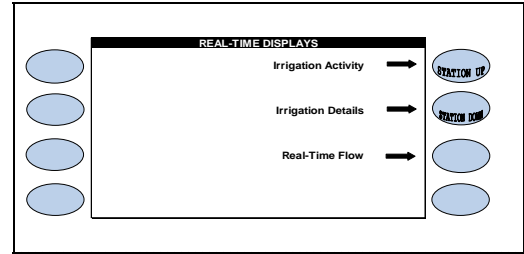
Figure 6.13

1. Irrigation Activity

1. Press the **IRRIGATION ACTIVITY** Menu key.

The IRRIGATION ACTIVITY screen is displayed (Figure 6.14).

IRRIGATION ACTIVITY

Manually Watering (mv open-pump off)

3.4 Min of 4.0 Min Cycle

24 is the Expected Flow

24 GPM 0.03 AMPS 0 MPH   Details ➡

STATION UP / STATION DOWN

Figure 6.14

2. Press the **DETAILS** Menu key to access the IRRIGATION DETAILS screen (Figure 6.15).

2. Irrigation Details

From the REPORTS menu screen (Figure 6.2).

1. Press the **LIVE SCREENS** Menu key to access the REAL-TIME DISPLAYS screen (Figure 6.13)

2. Press the **DETAILS** Menu key to access the IRRIGATION DETAILS screen (Figure 6.15).

Note: From here you can view the irrigation details for each station currently irrigating, testing, manually watering, waiting, or soaking.

ZE CALSENSE ®
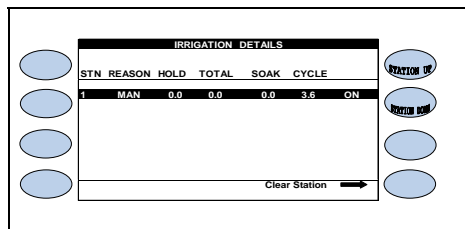
Figure 6.15

3. Press the **PLUS** or **MINUS** keys to highlight the station that you want to clear.

4. Press the **CLEAR** Menu key to clear the highlighted station (Figure 6.16).

Note: Clearing a station will cease the operation for that station delegated on that particular line entry.

3. *Real-Time Flow*

Real time flow allows the user to view the following:

- System flow rate
- Average flow rates
- Expected flow rate
- Flow meter attached to which controller and the rate at which it is currently flowing
- Whether the system is stable or unstable
- Master valve open or closed
- The number of valves that are currently on.
- Number of controllers in the chain.

From the REPORTS menu screen (Figure 6.2).

1. Press the **LIVE SCREENS** Menu key to access the REAL-TIME DISPLAYS screen (Figure 6.13)

2. Press the **REAL TIME FLOW** Menu key.

The REAL-TIME FLOW screen is displayed (Figure 6.16)
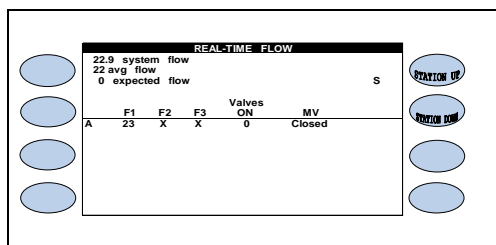
Figure 6.16

SECTION 7: LIGHTS

A. PROGRAMMING A LIGHTS SCHEDULE

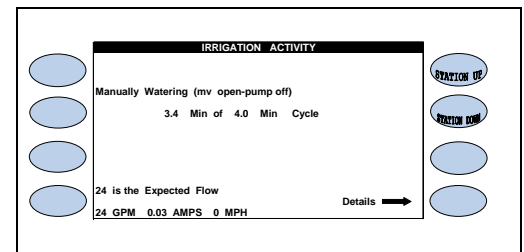You can program up to four (4) individual light programs, with two (2) different start and stop times, each and a rolling two (2) week schedule.

From the MAIN MENU screen.

1. Press the **LIGHTS** Menu key.

The LIGHTS SCHEDULING & MANUAL OPERATION screen is displayed (Figure 7.1)
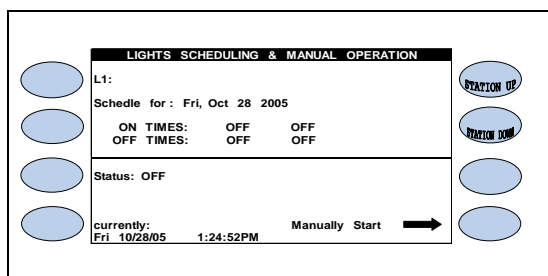
Figure 7.1

2. Press the **PLUS** or **MINUS** keys to scroll through the four (4) light program screens. They are designated as L1:, L2:, L3: and L4:

Note: The lights program names can be changed by the user via Command Center software.

Once you have selected the lights program that you want to use.

3. Press the blue **ARROW** keys to highlight the date entry. You can select any date between now and two weeks from today's date.

4. Press the blue **ARROW** keys to highlight the ON TIMES (Two per program), and OFF TIMES (two per program).

5. Adjust the times by using the **PLUS** or **MINUS** keys.

making **water work**

since **1986**

B. TESTING A LIGHTS CIRCUIT

1. ⬭ You can also test a light circuit by pressing the **MANUALLY START** Menu key.

This will activate the program selected for four hours from the time you pressed the button (Figure 7.2).

```
          LIGHTS   SCHEDULING   &   MANUAL   OPERATION
  L1:
  Schedle  for :  Fri,  Oct  28  2005

     ON  TIMES:        OFF         OFF               STATION UP
     OFF  TIMES:       OFF         OFF
                                                     STATION DOWN
  Status:  MANUALLY TURNED ON

  Will  turn  OFF  at  5:24PM  on  Fri  (10/28)

  currently:                            STOP  ➡
  Fri  10/28/05        1:24:52PM
```
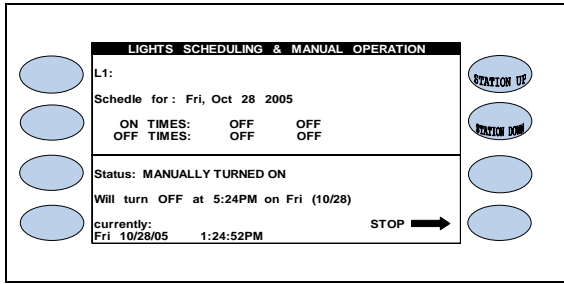
Figure 7.2

2. 🛑 **STOP** To end the light program test, press the **STOP** key.

Note: The **STOP** Menu key can also be pressed to end the lights program in progress.

THIS CONCLUDES THE LIGHTS SECTION

SECTION 8:   RADIO REMOTE

A. ENABLE RADIO REMOTE

If the Radio Remote Control option is installed on a controller (-RR), the **RADIO REMOTE** Menu key will be available at the MAIN MENU screen.

From the MAIN MENU screen.

1. ⬭ Press the **RADIO REMOTE** Menu key.

The RADIO REMOTE ACTIVATION screen will appear (Figure 8.1).

2. ⬭ Press the **ENABLE RADIO REMOTE NOW** Menu key to activate the controller Radio Remote. You can also set Normal Command Codes, addressed Command Codes and the receiver frequency at this screen. (see the instruction sheet that is shipped with the Calsense Radio Remote for more information).

```
                RADIO REMOTE ACTIVATION
              Enable  Radio  Remote  NOW  ➡      STATION UP
  Code  for  NORMAL  COMMANDS  is:  * 1 1 1
                                                   STATION DOWN
  Code  for  ADDRESSED  COMMANDS  is:  * -


    Receive  Chanel :  5  (160.150Mhz)
```
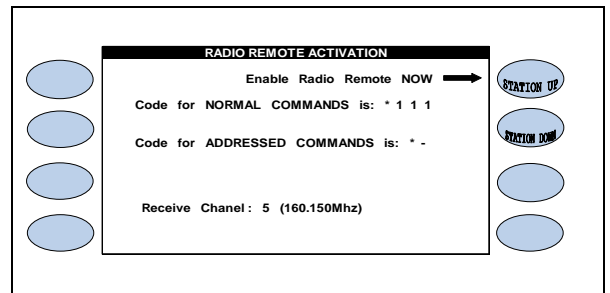
Figure 8.1

3. Press the blue **ARROW** keys to highlight the different areas on the screen.

4. Press the **PLUS** or **MINUS** keys to change the individual entries.

THIS CONCLUDES THE RADIO REMOTE SECTION

SECTION 9: NO WATER KEY

A. NO WATER KEY DESCRIPTION

From this screen you can turn the controller off, set No water Days by all stations, program, or individual stations. At the end of the No Water Days setting, the station(s) will start to irrigate according to their irrigation schedule. The No water setting can be from 1 to 31 days.

1.　　　　Press the **NO WATER** key.

The TURN Controller OFF & NO WATER screen is displayed (Figure 9.1).
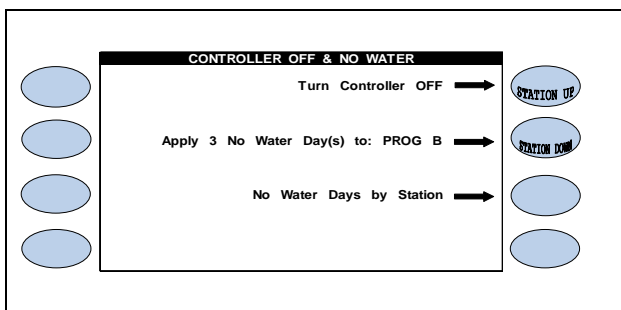
Figure 9.1

1. Turn controller OFF

1.　Press the **TURN CONTROLLER OFF** Menu key. The controller will be turned off and will immediately return to the STATUS screen.

2.　To turn the controller back on, press the **PUSH TO TURN ON** Menu key located at the STATUS screen.

2. Apply no water days to program

From the CONTROLLER OFF & NO WATER DAYS screen (Figure 9.1).

1.　Press the blue **ARROW** keys to move the highlight to the number of No Water days setting.

2.　Press the **PLUS** or **MINUS** keys to set the desired number of No Water Days.

3.　Press the blue **ARROW** keys to highlight which program to set the No Water Days for.

4.　Press the **PLUS** or **MINUS** keys to select the desired program (or all stations).

5.　Press the **APPLY NO WATER DAYS** Menu key. In figure 9.1, all stations on Program B will be turned off for three consecutive days.

6.　To turn Program B back on at anytime, return to the TURN CONTROLLER OFF & NO WATER screen and set the No Water Days to zero (0).

7.　Press the **APPLY NO WATER DAYS** Menu key.

3. No water days by station

1.　Press the **NO WATER DAYS BY STATION** Menu key.

The NO WATER DAYS BY STATION screen (Figure 9.2).
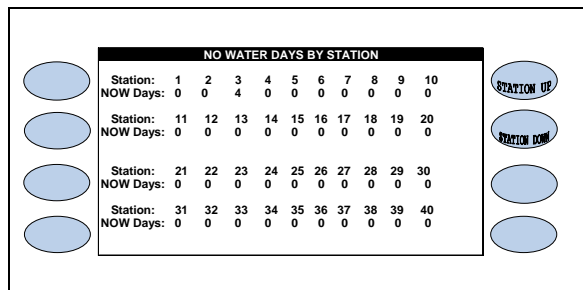
Figure 9.2

2.　Press the blue **ARROW** keys to highlight which station to set the No Water Days on.

3. Press the **PLUS** or **MINUS** keys to select the desired amount of no water days per station.

Note: In figure 9.2 station three has been selected for 4 consecutive no water days.

Note: When No Water Days are set in the controller, they take effect based on the Start Time for which program the station is assigned to.

THIS CONCLUDES THE NO WATER SECTION

SECTION 10: MANUAL KEY

The Manual section of the controller is used for:

- Manual Watering stations.
- Testing individual stations.
- Master Valve Override.
- Learning station expected flow rates.
- Manual Programs.
- Walk-Thru.
- Use Hold Over.

1. Press the **MANUAL** key.

The MANUAL MENU screen is displayed (Figure 10.1).

MANUAL MENU

← Manual Watering	Manual Program 1 →	STATION UP
← Test	Manual Program 2 →	STATION DOWN
← MV Override	Walk-Thru →	
← Learn Expected	Use Hold-Over →	
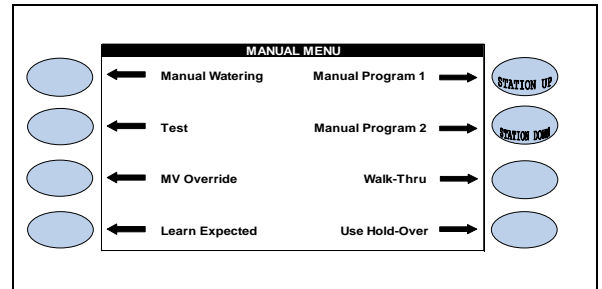
Figure 10.1

A. MANUAL WATERING

The Manual Watering section of the controller is used to manually water individual stations, or all stations within a program using total timed irrigation or cycle and soak.

1. Press the **MANUAL WATERING** Menu key.

The MANUAL IRRIGATION screen is displayed (Figure 10.2).

MANUAL IRRIGATION

← Manual Water Station 1 for 4.0 mins

← Manual Water PROG A Stations

Cycle & Soak During manual ? NO
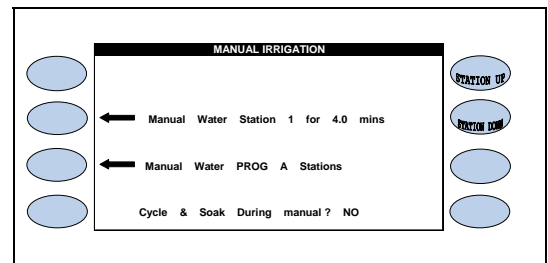
Figure 10.2

1. Manual Water a Station

From the MANUAL IRRIGATION screen (Figure 10.2).

1. Press the **PLUS** or **MINUS** keys to change the station number.

2. Press the **MANUAL WATER STATION # FOR #.## MINS** Menu key.

The IRRIGATION FOR STATION # screen is displayed (Figure 10.3).

```
                IRRIGATION for STATION 1

 Manually    Watering   ( mv   open-pump   off )        STATION UP

              1.9  Min  of  4.0  Min  Cycle             STATION DOWN



                                    Details
```
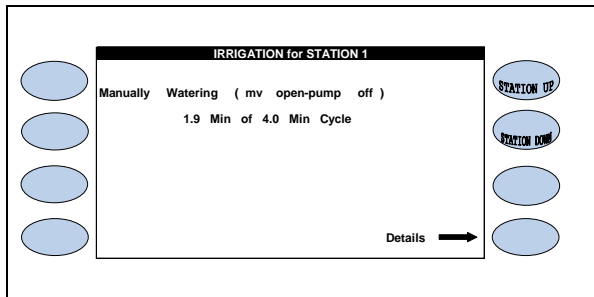
Figure 10.3

Note: Pressing the **DETAILS** Menu key will take you to the IRRIGATION DETAILS screen where you can view, or clear the station. (See Section 6 REPORTS / IRRIGATION DETAILS).

2. Manual Water a Program

From the MANUAL IRRIGATION screen (Figure 10.2).

1. Press the **PLUS** or **MINUS** keys to change the program selection.

2. Press the **MANUAL WATER PROG # STATIONS** Menu key to activate watering of all stations for selected program.

The IRRIGATION FOR STATION # screen will appear for each station as it irrigates (Figure 10.3).

3. Cycle and Soak during Manual

From the MANUAL IRRIGATION screen (Figure 10.2).

1. Press the **PLUS** or **MINUS** keys to change the CYCLE & SOAK DURING MANUAL setting (Figure 10.2).

Note: This will use the Soak-in-Time and minutes per cycle setting for each station individually. IF "NO" then it will water the Total Minutes without soaking.

THIS CONCLUDES THE MANUAL WATERING SECTION

B. TEST

The Test section of the controller is used to:

- Learn expected flow rates at a station.
- Test an individual station.
- Test station moisture sensors *(If enabled)*.

From the MANUAL MENU screen (Figure 10.1).

1. Press the **TEST** Menu key.

The VALVE TESTING screen is displayed (Figure 10.4)

```
                        VALVE TESTING

           ◄   Learn  the  Expected  at  Station 1


           ◄   Test  Station  1  for  2.0  minutes


           ◄   Test  Station  1  for  Moisture  Sensor
                           ( MASTER )
```
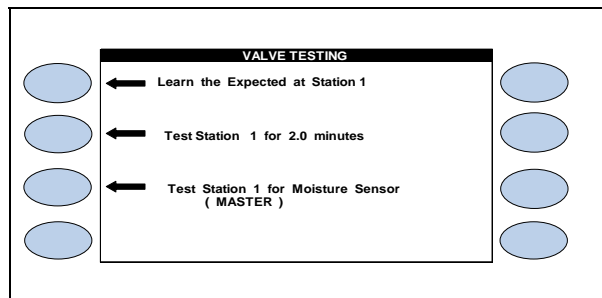
Figure 10.4

1. Learn the Expected at a Station

The Learn expected option on the controller will learn the expected flow rate for each station on each program selected.

From the VALVE TESTING screen (Figure 10.4)

1. Press the **PLUS** or **MINUS** keys to change the station number.

2. Press the **LEARN THE EXPECTED AT STATION #** Menu key to Learn The Expected flow rate for the Station selected.

Note: The IRRIGATION FOR STATION # screen will come on for the station selected while it learns the expected flow (Figure 10.3)

Note: The valve will physically come on at this time

3. Press the **DETAILS** Menu key to view, or clear the selected station.

2. Test a Station

From the VALVE TESTING screen (Figure 10.4).

1. Press the **PLUS** or **MINUS** keys to change the Station number.

2. Press the **TEST STATION # FOR X.X MINUTES** Menu key to test the selected station. The time is adjustable from 0.1 to 20.0 minutes.

3. Test a Station Moisture Sensor (See Section 5 Moisture)

THIS CONCLUDES THE TEST SECTION

💧 *C. MV OVERRIDE*

The Master Valve Override section of the controller is used for:

- Opening the Master Valve for a specific amount of time.
- Setting up a weekly schedule for the Master Valve to be opened.

From the Manual Menu screen (Figure 10.1).

1. Press the **MASTER VALVE OVERRIDE** Menu key.

The MASTER VALVE OVERRIDE screen is displayed (Figure 10.5).

```
                  MASTER VALVE OVERRIDE

                                                      STATION UP
    OPEN  the  MASTER  VALVE f  or  4.0  HOURS   ➜
                                                      STATION DOWN
      ( Master   Valve   Override   may   only
      be  used   to   OPEN  the   Master   Valve. )


       WEEKLY  SCHEDULE  FOR  OPENING  MV   ➜
```
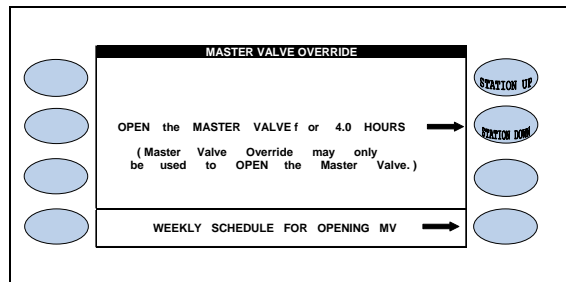
Figure 10.5

1. *Open Master Valve for Specified Time*

From the MASTER VALVE OVERRIDE screen (Figure 10.5).

1. Press the **PLUS** or **MINUS** keys to change the Open Master Valve time.

2. Press the **OPEN MASTER VALVE FOR #.## HOURS** Menu key to activate the time period.

2. Weekly Schedule for Opening Master Valve

From the MASTER VALVE OVERRIDE screen (Figure 10.5).

1. Press the **WEEKLY SCHEDULE FOR OPENING MV** Menu key.

The SCHEDULE OPENING THE MASTER VALVE screen is displayed (Figure 10.6).

```
              SCHEDULE OPENING THE MASTER VALVE

                   MON   TUE   WED   THU   FRI        STATION UP
         Open      OFF   OFF   OFF   OFF   OFF
         Close     OFF   OFF   OFF   OFF   OFF
                                                      STATION DOWN

                   SAT   SUN
         Open      OFF   OFF
         Close     OFF   OFF
```

Figure 10.6

CALSENSE ®
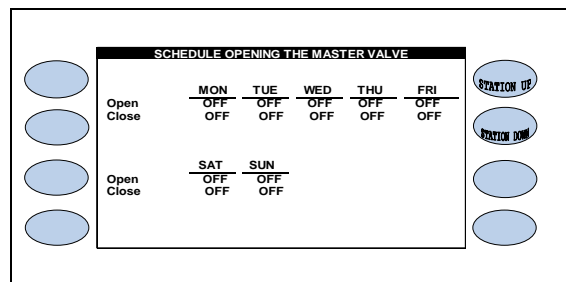
2. Press the **PLUS** or **MINUS** keys to change the "Open master valve time".

3. Press the blue **ARROW** keys to change from the open and close entry and to change from one day to the next.

Note: This is a rolling schedule that will repeat every week.

Note: All daily settings will have to be set to OFF to terminate the weekly schedule.

THIS CONCLUDES THE MASTER VALVE OVERRIDE SECTION

D. LEARN EXPECTEDS

Learn expecteds allows you to learn the expected flow rate for each station. This will occur at the next scheduled irrigation for that station.

From the MANUAL MENU screen (Figure 10.1).

1. Press the **LEARN EXPECTED** Menu key to access the LEARN THE EXPECTED FLOW RATES screen (Figure 10.7).

```
LEARN THE EXPECTED FLOW RATES
At the next program start, turn on
each station and use the measured flow       STATION UP
to set the expected flow rate.

Learn The Expected Flow Rates for:           STATION DOWN

        PROG  A ........................NO
        PROG  B ........................NO
        PROG  C ........................NO
        PROG  D ........................NO
        PROG  E ........................NO
        DRIP  1 ........................NO
        DRIP  2 ........................NO
```

Figure 10.7

2. Press the **PLUS** or **MINUS** keys to change the program setting.

3. Press the blue **ARROW** keys to change from one program to the next.

THIS CONCLUDES THE LEARN EXPECTEDS SECTION

E. MANUAL PROGRAM 1

The Manual Program section of the controller provides an alternative to regularly scheduled irrigation that performs the day to day requirements for watering landscapes. Typical use of manual programs might include over seeding, and fertilizing.

From the MANUAL MENU screen (Figure 10.1).

1. Press the **MANUAL PROGRAM 1** Menu key to access the MANUAL PROGRAM 1 screen (Figure 10.8).

```
Manual  Program 1
            NOTHING TO RUN
          (check the start times)          STATION UP

Schedule:  ---  ---  ---  ---  ---  ---  ---
                                            STATION DOWN
Start Times:    OFF        OFF      OFF
                OFF        OFF      OFF

Run: (1 days)
       Mon  Nov  07  2005 - Mon  Nov  07  2005

currently:                    STATIONS TIMES ➡
Fri  11/11/05    4:29:18PM
```
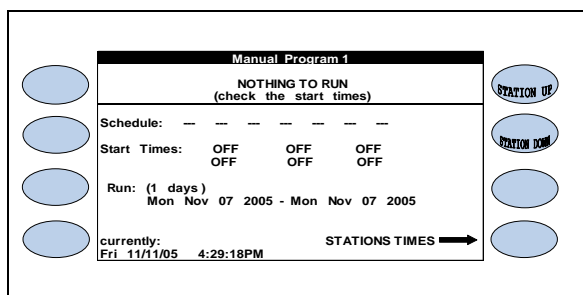
Figure 10.8

2. Press the **PLUS** or **MINUS** keys to turn a specific day of the week ON, or OFF.

3. Press the blue **ARROW** keys to change from one day to the next.

4. Press the **PLUS** or **MINUS** keys to set a specific Start Time.

Note: You can set up to six different Start Times per Manual Program.

5. Press the blue **ARROW** keys to change from one Start time to the next.

Now select the amount of days that you want the program to run.

making **water work**

since **1986**

6.   Press the blue **ARROW** keys to highlight the Run setting.

7.   Press the **PLUS** or **MINUS** keys to set the amount of days that you want the program to run. (The End date will change automatically).

Note: If you want the schedule to begin on a later date you will have to adjust the number of run days to accommodate the change, and then change the Start date.

F. MANUAL PROGRAM 2 (See MANUAL PROGRAM 1)

THIS CONCLUDES THE MANUAL PROGRAMS SECTION

G. WALK-THRU

The Manual Walk-Thru program is used to perform a user orchestrated wellness check on selected stations in the controller by selecting:

- The countdown time to activation *(5 seconds to 15.0 minutes)*.
- The order in which the stations activate.
- The run time limit for each station *(0.1 seconds to 15.0 minutes)*.

From the MANUAL MENU screen (Figure 10.1).

1.   Press the **WALK-THRU** Menu key.

The WALK-THRU screen is displayed (Figure 10.9).

WALK-THRU SET-UP
Start your Walk-Thru in 0 seconds
Run Each Station For 3.0 minute(s)

Set the Walk-Thru Order:
-- -- -- -- -- -- -- -- -- --
-- -- -- -- -- -- -- -- -- --
-- -- -- -- -- -- -- -- -- --

STATION UP
STATION DOWN
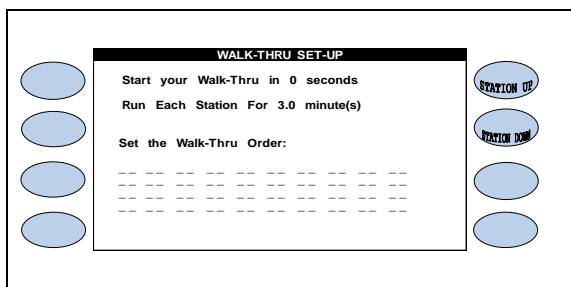
Figure 10.9

2.   Press the **PLUS** or **MINUS** keys to set the time in seconds that you want the Walk-Thru to begin in.

Note: Time must be set from 0.1 seconds to 15.0 minutes.

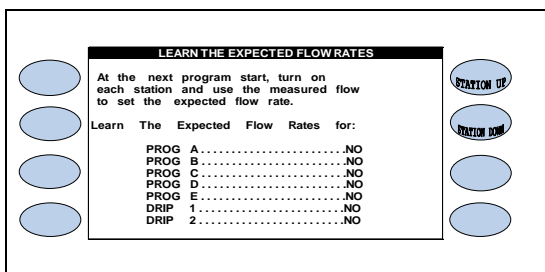3.   Press the blue **ARROW** keys to highlight the RUN EACH STATION FOR ##.# Minute(s).

4.   Press the **PLUS** or **MINUS** keys to set the amount of time that you want each station to run for. The same time will be set for each station selected.

5.   Press the blue **ARROW** keys to highlight the individual station slots.

6.   Press the **PLUS** or **MINUS** keys to enter the number for the station that you want to come on in that slot.

Note: A single station **cannot** be entered into multiple slots.

7.   Press the **BEGIN COUNTDOWN** Menu Key (Figure 10.10).

WALK-THRU SET-UP
Start your Walk-Thru in 15 seconds
Run Each Station For 3.0 minute(s)

Set the Walk-Thru Order:
20 13 12 11 10 5 4 6 7 8
-- -- -- -- -- -- -- -- -- --
-- -- -- -- -- -- -- -- -- --

Begin Countdown ➡

STATION UP
STATION DOWN
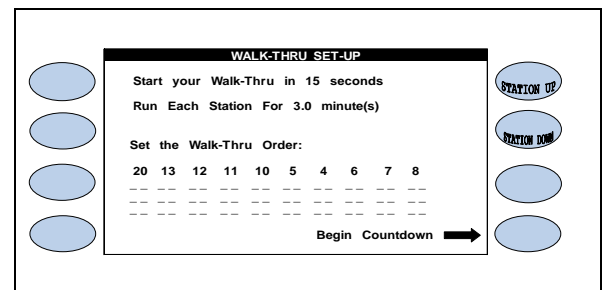
Figure 10.10

8.   Press the **STOP TIMER** Menu key to halt the countdown.

THIS CONCLUDES THE WALK-THRU SECTION

💧 **H. USE HOLD-OVER**

Hold-Over time is generated whenever scheduled irrigation has hit the Stop time. The controller will first try and use up any hold-over in the table after scheduled irrigation has finished, but before the Stop Time has been reached. The Use Hold-Over feature allows the user to schedule a specific time and day(s) to try and use up any hold-over in the table.

From the MANUAL MENU screen (Figure 10.1).

1.　　Press the **USE HOLD-OVER** Menu key.

The MANUAL USE OF HOLD-OVER screen is displayed (Figure 10.11).

MANUAL USE of HOLD-OVER

In ADDITION to the normally scheduled irrigation, do you want a special time to run Hold-Over?

NO

STATION UP

STATION DOWN
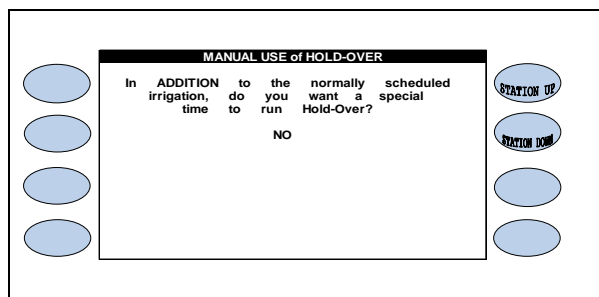
Figure 10.11

2.　　Press the **PLUS** or **MINUS** keys to select whether or not you want to use Hold-Over. If YES is selected, the screen will change to reveal the set up parameters (Figure 10.12).

MANUAL USE of HOLD-OVER

In ADDITION to the normally scheduled irrigation, do you want a special time to run Hold-Over?

YES

Start Time: 10:00PM

Stop Time:　　OFF

Schedule: --- --- --- --- --- --- ---

(No Water prevents this from running.)

STATION UP

STATION DOWN
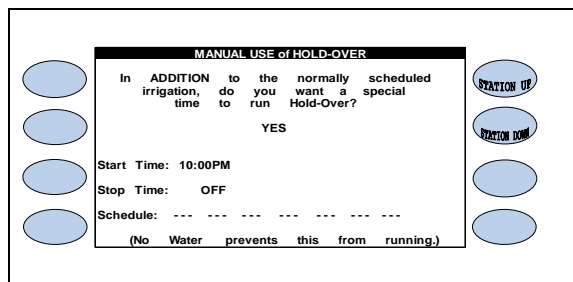
Figure 10.12

3.　　Press the blue **ARROW** keys to highlight the Start Time.

4.　　Press the **PLUS** or **MINUS** keys to set the time that you want the Hold-Over irrigation to begin.

5.　　Press the blue **ARROW** keys to highlight the Stop Time.

6.　　Press the **PLUS** or **MINUS** keys to set the Stop Time.

7.　　Press the blue **ARROW** keys to highlight the Schedule days.

8.　　Press the **PLUS** or **MINUS** keys to turn on the days that you want the Hold-Over to be used on.

9.　　Press the **MAIN MENU** key to return to the MAIN MENU screen.

CAUTION:

No Water Days prevents the Manual HOLD-Over program from Running.

THIS CONCLUDES THE USE HOLD-OVER SECTION

SECTION 11:   (-FL) FLOWSENSE®

The Calsense *FLOWSENSE®* option allows the user to manage an irrigation system that has one or more points of connection and one or more controllers sharing these points of connection. *FLOWSENSE®* affords the user the following:

- No more scheduling conflicts between multiple controllers
- Eliminates relays when sharing pumps or master valves with several controllers
- Manage the number of valves ON based upon flow capacities
- Water management capabilities with or without a flow meter
- Pump performance managed for electrical savings
- Setup in the field without a central computer

Note: The above listed items are only feasible with two or more controllers in a communications chain.

ﾠ A. MULTIPLE CONTROLLER COMMUNICATION SETUP

Note: A chain is defined as a set of controllers connected together via the same communications type and / or frequency.

Note: All of the controllers in the chain must be able to communicate with each other via (-SR) Spread Spectrum Radio, or (-M) Hardwired.

From the MAIN MENU screen.

1. ◯ Press the **SETUP** Menu key.

2. ◯ Press the **COMMUNICATIONS** Menu key.

The COMMUNICATION ADDRESS screen (Figure 11.1).
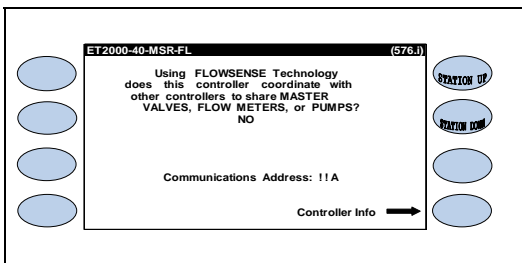
Figure 11.1

3. Press the **PLUS** or **MINUS** keys to change the NO to a YES setting.

Note: Each controller in the communications chain must have the (-FL) option and will have to be set to YES.

4. Press the blue **ARROW** keys to move the cursor to the next question. NUMBER OF CONTROLLERS IN SYSTEM ?.

5. Press the **PLUS** or **MINUS** keys to change the amount of controllers in the system (Figure 11.2).
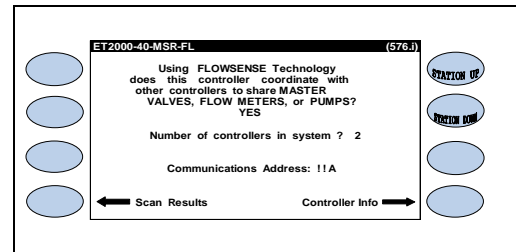
Figure 11.2

Repeat the process described above until all three characters are set (The character furthest to the right must be a letter).

Note: With multiple controllers one of the controllers must be the Master with an address ending in a Capitol "A". All other controllers will have addresses ending in B, C, D, etc. No two controllers can have the same exact address when communicating to the same central computer. The Master controller **must** be the controller communicating back to the central.

If you desire to look at the controller's communications information:

6. ◯ Press the **CONTROLLER INFO** Menu key to go to the PART & SERIAL NUMBERS screen (Figure 11.3).

Note: This will allow you to look at the controller's ROM version, Baud Rates, Part number, and Command center software version required to communicate with this controller.

making **water work**
since 1986
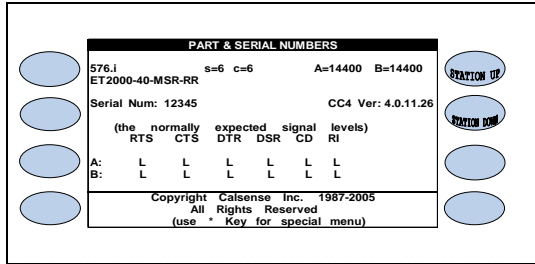
Figure 11.3

You will have to perform a Controller Scan:

7. Press the **BACK** key.

8. Press the **SCAN RESULTS** Menu key.

The COMMUNICATIONS SCAN RESULTS screen is displayed (Figure 11.4).
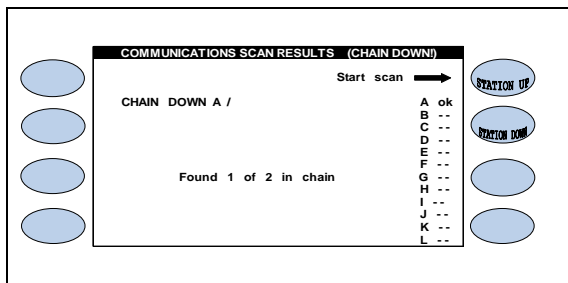
Figure 11.4

9. Press the **START SCAN** Menu key to begin the scan.

Note: The controller will scan each controller in the chain.

- B " **- -** " symbol indicates that the controller in the chain was unsuccessful at communicating (The Master did not find the "B" controller).
- B " **ok** " symbol indicates that the controller was found and is currently communicating with the master controller (the "A" controller).

Note: The scan can only be performed at the Master controller in the *FLOWSENSE®* chain. Also the "Number of controllers in chain." can only be adjusted at the master controller.

THIS CONCLUDES MULTIPLE CONTROLLER COMMUNICATIONS SETUP

B. MULTIPLE CONTROLLER FLOW SETUP

Setting up a *FLOWSENSE®* chain involves making adjustment entries to the Master controller and every controller that a flow meter or master valve is physically installed on. Make sure you are familiar with the following subsections of Section 4 FLOW:

- A. Flow Meter setup.
- B. Line Fill & Valve close times.
- C. Master Valve.
- D. Pump.
- H. Alert Actions.

in addition to the following instructions:

1. Mainline Capacity

System capacity is defined by the max flow rate of water that your system can operate at during irrigation.

Note: This setting will have to be adjusted at the Master Controller (The controller with the letter "A" as the right most character in its communications address).

From the FLOW METER, MASTER VALVE & PUMP screen is displayed.

1. Press the **MAINLINE CAPACITY** Menu key (Figure 11.5).
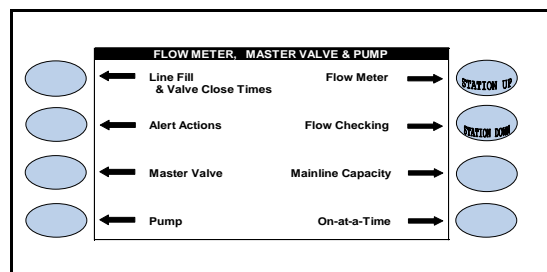
Figure 11.5

The MAINLINE BREAK SETTINGS screen is displayed (Figure 11.6).

MAINLINE BREAK SETTINGS

During Irrigation **400** gpm

ALL Other Times 150 gpm

————SYSTEM CAPACITY SETTINGS————
Use capacity to limit the
number of stations on? NO

STATION UP

STATION DOWN

Figure 11.6

2. Press the blue **ARROW** keys to move the cursor to the DURING IRRIGATION gpm.

3. Press the **PLUS** or **MINUS** keys to change the number.

Use the same method to change the ALL OTHER TIMES number.

- **DURING IRRIGATION:** The during-irrigation number is the mainline break number used while the controller is irrigating.

- **ALL OTHER TIMES:** The all other times number is the mainline break number used when the controller is not irrigating.

- **USE CAPACITY TO LIMIT THE NUMBER OF STATIONS ON ?:** If you want to use capacity to limit the number of stations on in the system change to YES.

This will open up the portion of the screen dealing with Capacity with or without Pump (Figure 11.7).

4. Press the **PLUS** or **MINUS** key to change the capacity numbers.

MAINLINE BREAK SETTINGS

During Irrigation 400 gpm

ALL Other Times 150 gpm

————SYSTEM CAPACITY SETTINGS————
Use capacity to limit the
number of stations on? YES

Capacity with Pump 200 gpm

Capacity without Pump **100** gpm

(set which programs use the pump) ➡

STATION UP

STATION DOWN
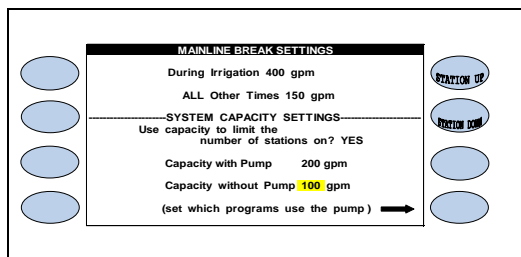
Figure 11.7

Capacity with pump: When a program irrigates by use of pump the GPM limit set will not be exceeded.

Capacity without pump: When a program irrigates without the use of a pump the GPM limit will not be exceeded.

Note: Pump and non-pump programs will not run simultaneously on the same controller / system.

5. If you are using a pump and did not select SET WHICH PROGRAMS TO USE PUMP in the pump section of this manual then press the **SET WHICH PROGRAMS TO USE THE PUMP** Menu key (Figure 11.7).

The WHICH PROGRAMS USE THE PUMP screen is displayed (Figure 11.8).

WHICH PROGRAMS USE THE PUMP

For each program, select YES
if you would like to use the pump

PROG A . . . . **YES**
PROG B . . . . YES
PROG C . . . . YES
PROG D . . . . YES
PROG E . . . . YES
DRIP 1 . . . . YES
DRIP 2 . . . . YES

STATION UP

STATION DOWN
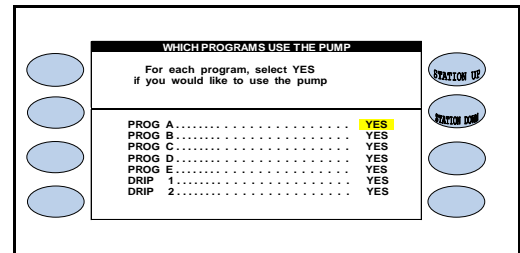
Figure 11.8

6. Press the blue **ARROW** keys to move the cursor to the program desired.

Note: The default setting is set to YES on all programs, which means that the controller's pump output will be activated whenever a station on any program is activated.
Set the Pump Output Enabled setting to NO. If the Pump Output Enabled setting is set to NO on a program, the pump output will not activate when a station on that program is activated.

7. Press the **PLUS** or **MINUS** keys to change any program setting.

CALSENSE ®

2. *Flow Checking*

Flow checking allows you to have the controller compare the flow of each station during irrigation to the learned expected flow and alert you of any problems.

Note: You must have a flow meter turned on in the controller, or in the chain / system.

Note: This setting will have to be adjusted at the Master Controller (The controller with the letter "A" as the right most character in its communications address). Once set, all of the controllers in the chain will conform to this setting.

From the FLOW METER, MASTER VALVE & PUMP screen.

1. Press the **FLOW CHECKING** Menu key.

The FLOW CHECKING screen is displayed (Figure 11.9).

FLOW CHECKING

When Irrigating COMPARE the flow rate to the expected? NO

STATION UP
STATION DOWN
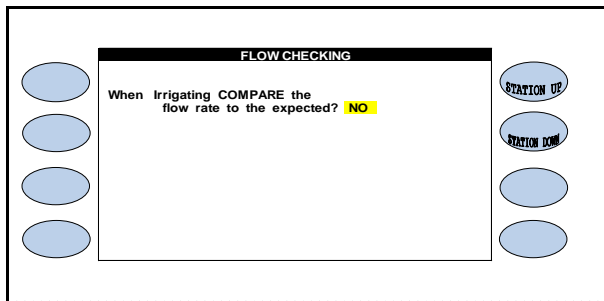
Figure 11.9

This will open up the ALLOWABLE portion of the screen if you select YES to the WHEN IRRIGATING COMPARE THE FLOW TO THE EXPECTED ? question (Figure 11.10).

FLOW CHECKING

When Irrigating COMPARE the flow rate to the expected? YES

ALLOWABLE

Below 30 gpm   -5 / +5
From 30 gpm to 100 gpm   -10 / +10
Above 100 gpm   -15 / +15

(-gpm / +gpm)

STATION UP
STATION DOWN
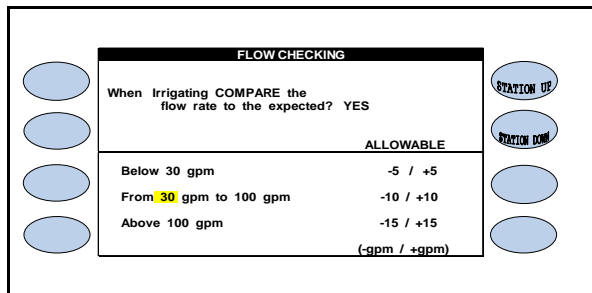
Figure 11.10

2. Press the blue **ARROW** keys to change the Allowable settings.

The default settings are:

BELOW:	-5 / +5
FROM / TO:	-10 / +10
ABOVE:	-15 / +15

Note: The above settings are defaulted in the controller and can be changed by the user.

3. To change the settings press the **PLUS** or **MINUS** keys for any number to change the setting.

Below: This section allows you to enter the fluctuation range for the low end of your normal operating flow. Use the (-) and (+) entries to set the range.

Example:

If you set the below limit at 30 gallons per minute.

Then set your (-) limit at 5, and your (+) limit at 5.

You will be alerted if the flow at the low end of the scale fluctuates by more than five gallons per minute in either direction.

That is less than 25 gpm or more than 35 gpm

From / to: This section allows you to set the fluctuation limits for the full range of flow. In this box you want to enter the normal operating range of water flow. Then in the (-) and (+) blocks enter the range of fluctuation that you deem normal.

Example:

If you set the limit at 30 gpm to 100 gpm.

Then set your (-) limit at 10, and your (+) limit at 10.

You will be alerted if the flow at the middle of the scale fluctuates by more than ten gallons per minute in either direction.
That is less than 20 gpm or more than 110 gpm

Above: This section allows you to enter the fluctuation range for the high end of your normal operating flow. Use the (-) and (+) entries to set the range.

Note: You will want to set this allowable range up a little wider due to the amount of water flow.

Example:

If you set the above limit at 100 gallons per minute.

Then set your (-) limit at 15, and your (+) limit at 15.

You will be alerted if the flow at the high end of the scale fluctuates by more than fifteen gallons per minute in either direction.

That is less than 85 gpm or more than 115 gpm

---

4.   Press the **BACK** key to return to the FLOW METER, MASTER VALVE, & PUMP screen (Figure 11.5).

3. *On – At - a - Time*

The On-At-a-Time section of the controller is used to set up the number of valves that you want to come on simultaneously within a program, and also within the system.

Note: These settings need to be entered at each controller in the chain.

From the FLOW METER, MASTER VALVE & PUMP screen (Figure 11.5).

1.   Press the **ON-AT-A-TIME** Menu key.

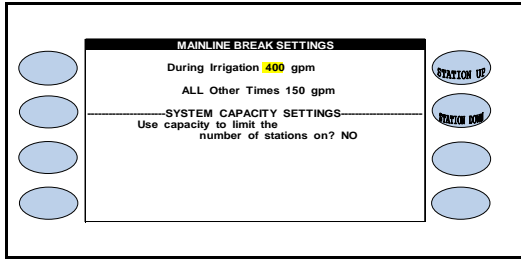The STATIONS ON-AT-A-TIME screen is displayed (Figure 11.11).

Figure 11.11

---

2.   Press the blue **ARROW** keys to move the cursor to the Program and Within Program setting desired.

Note: The default setting is set to 1 on all programs and within system.

3.   Press the **PLUS** or **MINUS** keys for any number to change the setting.

- **WITHIN PROGRAM:** This section allows you to choose the amount of valves that you want to set as a limit to come on at a time within a program.

- **WITHIN CONTROLLER:** This section allows you to choose the amount of valves that you want to set as a limit to come on at a time within the controller.

Example:

	Within Program	Within Controller
Program A	1	2
Program B	1	2

This example allows the user to set up one (1) valve on at a time for Programs A and B. The controller will allow both Programs to have one (1) valve each run simultaneously for a total of two (2) on within controller.

Example:

	Within Program	Within Controller
Program A	1	1
Program B	3	3

This example allows the user to set up one (1) valve on at a time for Programs A. The controller will only allow one valve to operate while program A is running. Program B is set up to operate 3 valves on at a time, and will only operate up to three valves when Program B is running.

4.   Press the **BACK** key to return to the FLOW METER, MASTER VALVE, & PUMP screen (Figure 11.5).

THIS CONCLUDES THE *FLOWSENSE®* SECTION

SECTION 12: (-F) OPTION:

All models of Calsense controllers that have a (-F) option can receive up to three (3) separate flow meter inputs. The first flow meter is wired to the irrigation controller using the standard Calsense red and black flow meter wires. The second and third flow meters are wired to the irrigation controller using an additional wire harness supplied when a (-F) option is specified.

A. MULTIPLE FLOW METER SETUP

1. **MAIN MENU** Press the **MAIN MENU** key.

The MAIN MENU screen is displayed (Figure 12.1).

CALSENSE WATER MANAGEMENT SYSTEM

Programs & Stations	Lights
Weather	Reports
Flow	Radio Remote
Setup	Status

STATION UP
STATION DOWN
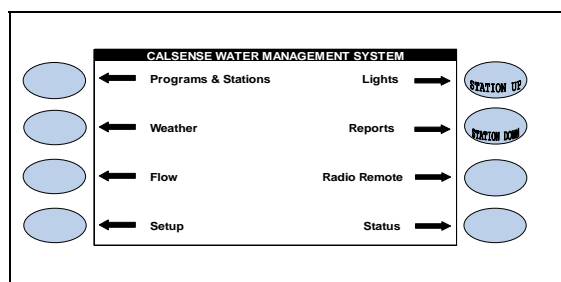
Figure 12.1

2. Press the **FLOW** Menu key.

The FLOW METER, MASTER VALVE & PUMP screen is displayed (Figure 12.2).

FLOW METER, MASTER VALVE & PUMP

Line Fill & Valve Close Times	Flow Meter
Alert Actions	Flow Checking
Master Valve	Mainline Capacity
Pump	On-at-a-Time

STATION UP
STATION DOWN
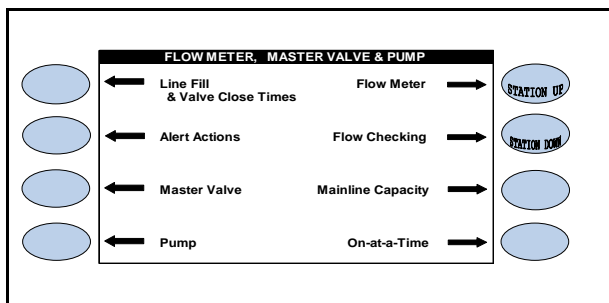
Figure 12.2

3. Press the **FLOW METER** Menu key.

The Flow Meter screen will appear (It will appear as shown in Figure 12.3 only after the Flow Meter In Use setting is set to YES).

FLOW METER

Is a Flow Meter in use ?   YES

Use your own K & Offset ? NO

	METER 1	METER 2	METER 3
SIZE:	NOT USED	NOT USED	NOT USED

(Expected Flow Rates can be automatically learned.)

Learn Expecteds ➡

STATION UP
STATION DOWN
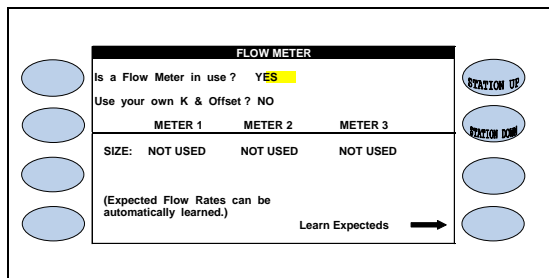
Figure 12.3

4. Press the blue **ARROW** keys to move the cursor to the USE YOUR OWN K & OFFSET setting, this is set to NO as the default.

If using a FMBX flow meter see:

> 1. *FMBX flow meter setup*

If using a regular flow meter see:

> 2. *Regular flow meter setup*

If using a combination of FMBX along with regular style flow meters you will have to select "USE YOUR OWN K & OFFSET NUMBERS" for all three flow meter entries.

1. FMBX flow meter setup

If the flow meter installed on the system is a Calsense FMBX, change the "Use your own K & Offset" to YES, (The screen will appear as shown in Figure 12.4).

FLOW METER

Is a Flow Meter in use ?   YES

Use your own K & Offset ? YES

METER 1

K:	10.000	10.000	10.000
OFFSET:	0.200	0.200	0.200

(Expected Flow Rates can be automatically learned.)

Learn Expecteds ➡

STATION UP
STATION DOWN
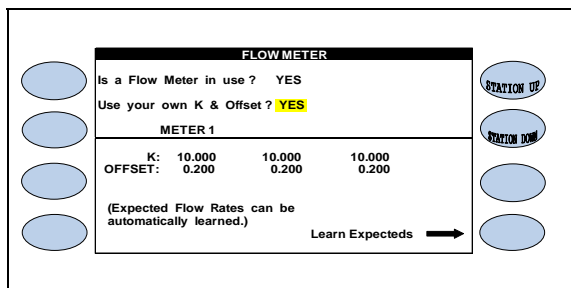
Figure 12.4

1. Press the blue **ARROW** keys to move the cursor to the K: setting.

2. Press the **PLUS** or **MINUS** keys to change the number.

3. Press the blue **ARROW** keys to move the cursor to the OFFSET: setting.

4. Press the **PLUS** or **MINUS** keys to change the number.

Note: The two settings that must be set are the K value and the Offset. If you know these values enter them now. If not Call Calsense at 1-(800)-572-8608 for assistance.

2. *Regular flow meter setup*

If the answer to Use your own K & Offset is NO.

1. Press the blue **ARROW** keys to move the cursor to the SIZE setting.

2. Press the **PLUS** or **MINUS** keys to change the flow meter type.

Refer to the chart (Figure 12.5), to choose the correct flow meter type.

MODEL NUMBER	SIZE
FM-1	1" PLASTIC FLOW METER
FM-1B	1" BRASS FLOW METER
FM-1.25B	1 ¼" BRASS FLOW METER
FM-1.5	1 ½" PLASTIC FLOW METER
FM-2	2" PLASTIC FLOW METER
FM-3	3" PLASTIC FLOW METER

Figure 12.5

3. *Learn Expecteds (Flow rate)*

This allows you to learn the expected flow rate for each station at the next program start. Once the flow rate has been recorded, the entry on the screen will default back to NO.

1. After you have entered the appropriate Flow Meter(s) select the **LEARN EXPECTEDS** Menu key (Figure 12.6).


```
                    FLOW METER
  Is a Flow Meter in use ?    YES
  Use your own K & Offset ? NO
                METER 1      METER 2      METER 3
  SIZE:    FM-1.5       FM-2         FM-1.5

  (Expected Flow Rates can be
  automatically  learned.)
                            Learn Expecteds
```
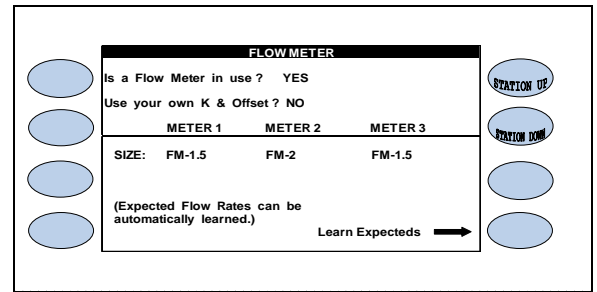
Figure 12.6

This will bring you to the LEARN THE EXPECTED FLOW RATES screen (Figure 12.7).


```
            LEARN THE EXPECTED FLOW RATES
  At the next program start , turn on
  each station and use the measured flow
  to set the expected flow rate.

  Learn The Expected Flow Rates for:

    PROG A . . . . . . . . . . . . . . . . . . . .   NO
    PROG B . . . . . . . . . . . . . . . . . . . .   NO
    PROG C . . . . . . . . . . . . . . . . . . . .   NO
    PROG D . . . . . . . . . . . . . . . . . . . .   NO
    PROG E . . . . . . . . . . . . . . . . . . . .   NO
    DRIP   1 . . . . . . . . . . . . . . . . . . . .  NO
    DRIP   2 . . . . . . . . . . . . . . . . . . . .  NO
```
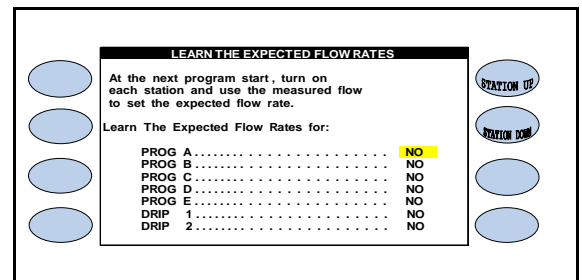
Figure 12.7

*   **LEARN EXPECTEDS:** This allows you to learn the expected flow rate for each station at the next program start. Once the flow rate has been recorded the entry on the screen will default back to NO.

2. Press the **PLUS** or **MINUS** keys to select the program.

3. Press the blue **ARROW** keys to change the setting.

THIS CONCLUDES THE (-F) OPTION SECTION

NOTES

Flag Letter Definitions
For Controller

LETTER	DESCRIPTION	DEFINITION
S	**Short Circuit**	During normally scheduled irrigation or during scheduled manual hold over a short circuit was detected. The valve is turned off and the remaining irrigation time is thrown away. At the next scheduled irrigation the valve will try again.
O	**No Current**	During normally scheduled irrigation or during scheduled manual hold-over, an open circuit was detected. This is a passive alert. The valve stayed on and completed its irrigation.
C	**Low Current**	A low current situation was detected. Not yet implemented or used.
I	**High Current**	A high current situation was detected. Not yet implemented or used.
A	**Tail Ends Adjustment**	During normally scheduled irrigation or during scheduled manual hold-over, the Tail-Ends adjustment caused a portion of the scheduled time not to run. The time to irrigate was less than 5% of the cycle time. (FYI: When the residual time is between 5% & 20% of the cycle time it is evenly divided up among the cycles that do run.)
L	**Low Flow**	During normally scheduled irrigation or during scheduled manual hold-over, flow was tested and this valve failed the **LOW FLOW** test. The action taken is controlled by the Alert Actions settings.
H	**High Flow**	During normally scheduled irrigation or during scheduled manual hold-over, flow was tested and this valve failed the **HIGH FLOW** test. The action taken is controlled by the Alert Actions settings.
U	**Flow Not Checked**	For one reason or another flow could not be checked during one of the cycles that this station ran during normally scheduled irrigation or during scheduled manual hold-over. In field service mode you will get an elaborate alert detailing the conditions that could prevent flow from being checked.
W	**No water**	The scheduled programmed irrigation did not apply any time for this station because **NO WATER** days were set.
R	**Rain switch**	The **RAIN SWITCH** caused the programmed irrigation to cut short or to not be applied at all. In addition whenever a **RAIN BUCKET** causes programmed irrigation to be affected (either through polling or sharing) this flag is set. So it's a dual use flag: used to indicate Rain Switch and Rain Bucket activities. This flag will be set if the above rain events occur during scheduled manual hold-over.
B	**Main Line Break**	A **MAINLINE BREAK** affected the programmed irrigation. Either it did not start or it was cut short when the mainline break occurred. This flag will be set if the mainline break occurs during scheduled manual hold-over.

T	**Normal Stop Time**	During normally scheduled programmed irrigation, we crossed the **HOLD OVER** time. The irrigation was terminated and the remaining time was added to the hold-over for that station. This flag is set during manually scheduled hold-over if during that activity we hit the manual hold-over **STOP TIME**.
F	**Controller Off**	The normally scheduled programmed irrigation did not apply any time for this station because the controller was set to **OFF**. This flag will be set if the controller is turned **OFF** in the middle of applying normally scheduled irrigation or scheduled manual hold-over.
M	**Moisture Sensor Caused Cycle Skip**	The **MOISTURE SENSOR** caused he programmed irrigation or scheduled hold-over time to be cut short. A number of cycles did not irrigate because the moisture sensor reading was equal to or above the set point. Anywhere from one cycle to all of the scheduled cycles may be curtailed. This flag is set in the master station as well as all of his slaves.
X	**Moisture Sensor Max water Days Set**	While using moisture sensing, **MAX WATER** was set causing this station to irrigate all of its normally scheduled irrigation- regardless of what the moisture sensor said to do.
V	**Master Valve Override**	The master valve was closed using **MASTER VALVE OVERRIDE.** This master valve closure either prohibited the normally scheduled irrigation from occurring or it interrupted it. This flag will be set if the master valve is closed using master valve override during scheduled manual hold-over.

Flag Letter Definitions
For Moisture sensors

LETTER	DESCRIPTION	DEFINITION
---	**Reading Never Taken**	This means the "Moisture sensor in use block" in Program Data is checked but the program in the "Use Moisture Sensor in the following program" block using this station is not checked for moisture sensor usage.
R**	**Reading Out Of Range**	This means the reading the controller received from the Moisture Sensor was out of the realm of 0-100 therefore out of range.
F**	**No Filtered Reading**	Hardware problem with the controller / moisture sensor / or field wiring
S**	**Signal Never went Away**	Hardware problem with the controller.
O--	**Reading Not Put In Line Yet**	This means that there is a Moisture Sensor assigned to this station via a program, but has not yet taken a reading.

ET Table Codes

LETTER	DESCRIPTION	DEFINITION
e	**Edited**	This means the (ET) number was edited at the controller by a user.
g	**ET Gage**	This means the (ET) number was retrieved from actual real-time (ET).
h	**Historical**	This means the (ET) number was retrieved from the historical (ET).
c	**Central**	This means the central created the (ET) number due to the real-time (ET) being below the minimum (ET) allowed by the user.

Rain Table Codes

LETTER	DESCRIPTION	DEFINITION
o	**Original**	This value is zero (no usable rain), it has no effect on irrigation run times.
m	**Below Minimum**	The below minimum value is measured rain but not enough to offset irrigation run times.
r	**Usable Rain**	This means that the number was usable rain. This value is rain that is used to offset irrigation run times.
s	**Shutdown**	This means that irrigation was stopped due to rain polling being shared with this controller.
p	**Polling**	This means weather sharing has either failed or has not occurred yet since polling shutdown occurred.

making **water work**

since 1986

CALSENSE ®

2075 Corte del Nogal, Suite P, Carlsbad CA 92011
1-(800)-572-8608   FAX: 1-(760)-438-2619
www.calsense.com

making **water work**

since 1986

MAIN MENU

Programs & Stations
- Start Times & Water Days → (H) Set Valve Run Times
- Stations → Station Programming → Test
- Stations-By-Program → Move Station
- Station-To-Station Copy → Copy Station-To-Station
  - Copy Station-To-Program Stations

Weather
- (A) ET Gage
- (A) Rain Bucket → (A) Use Of Rain By Program
- (A) Wind Gage
- Rain Switch
- ET → (B) Crop Coefficients
- Budget
- Moisture → Moisture Sensing Setup → (G) Sensor Assignment
- (B) Et County / City

Flow
- (C) Line Fill & Valve Close Times
- (C) Alert Action
- Master Valve
- Pump
- (C) Flow Meter → Learn Expecteds
- Flow Checking
- Mainline Capacity → Set Which Programs Use The Pump
- On-At-A-Time → Controller Info
- Communications → (H) Scan Results → (H) Start Scan

Setup
- Part & Serial Number
- Date & Time → Push Here to Set It
- Stations In Use
- 12 Month Mode
- Access Control → Push To Log In

(D) Lights
- (D) Lights Scheduling & Manual Operation → (D) Manually Start

Reports
- This Month / Last Month → (K) HCF / Gallons
  - Show Time / Show Water Use
- 24 Month → This Year / Last Year
- Hold-Over → Clear All
  - Clear Station
- Et & Rain Tables
- Alerts → ✱
- Station History → Page Right / Page Left
- (H) Use Vs. Budget → ✱ → (K) Changes GALLONS / HCF
- Live Screens →
  - Irrigation Activity → Details
  - Irrigation Details → Details
  - Real Time Flow → Clear Station

- Status → Status View → Status
- Go To Top
- Communications
- Change
- Irrigation
- All

- (J) Live Screens → (E) Alerts To See
  - (J) Adjust Station

(F) Radio Remote → (F) Enable Radio Remote Now ✱

Status ✱

MANUAL

Manual Water
- Manual Water A Station → Details → Clear Station
- Manual Water Program Stations → Details → Clear Station
- Cycle And Soak During Manual

Test
- Learn The Expected At A Station → Details → Clear Station
- Test A Station → Details → Clear Station
- Test Station For Moisture Sensor → Test → Details → Clear Station
- Open Master Valve For Hours → Clear
- Weekly Schedule For Master Valve

MV Override

Learn Expecteds

Manual Program 1 → Station Times → Schedule

Manual Program 1 → Station Times → Schedule

Walk-Thru → Begin Coundown

Use Hold-Over

Turn Controller Off → (L) Push To Turn On

Apply No Water Days to Program → (L) Push To Turn On
- No Water Days Are Set Summary

No Water Days By Station

Menu Key Availability

(A) Available only if option is installed.
(B) Only In Daily ET Mode.
(C) Available if Flow Meter is enabled.
(D) If Lights option enabled.
(E) If any to view.
(F) If Radio Remote is enabled.
(G) If in moisture sensing mode.
(H) If Budgets turned on.
(I) Only If SR Radio Installed.
(J) If currently irrigation.
(K) Will change both screens. *(Shaded in green)*
(L) If controller is turned OFF.
(M) Available when controller first turned on.

Note: *Yellow shading denotes only when option installed / turned on.*