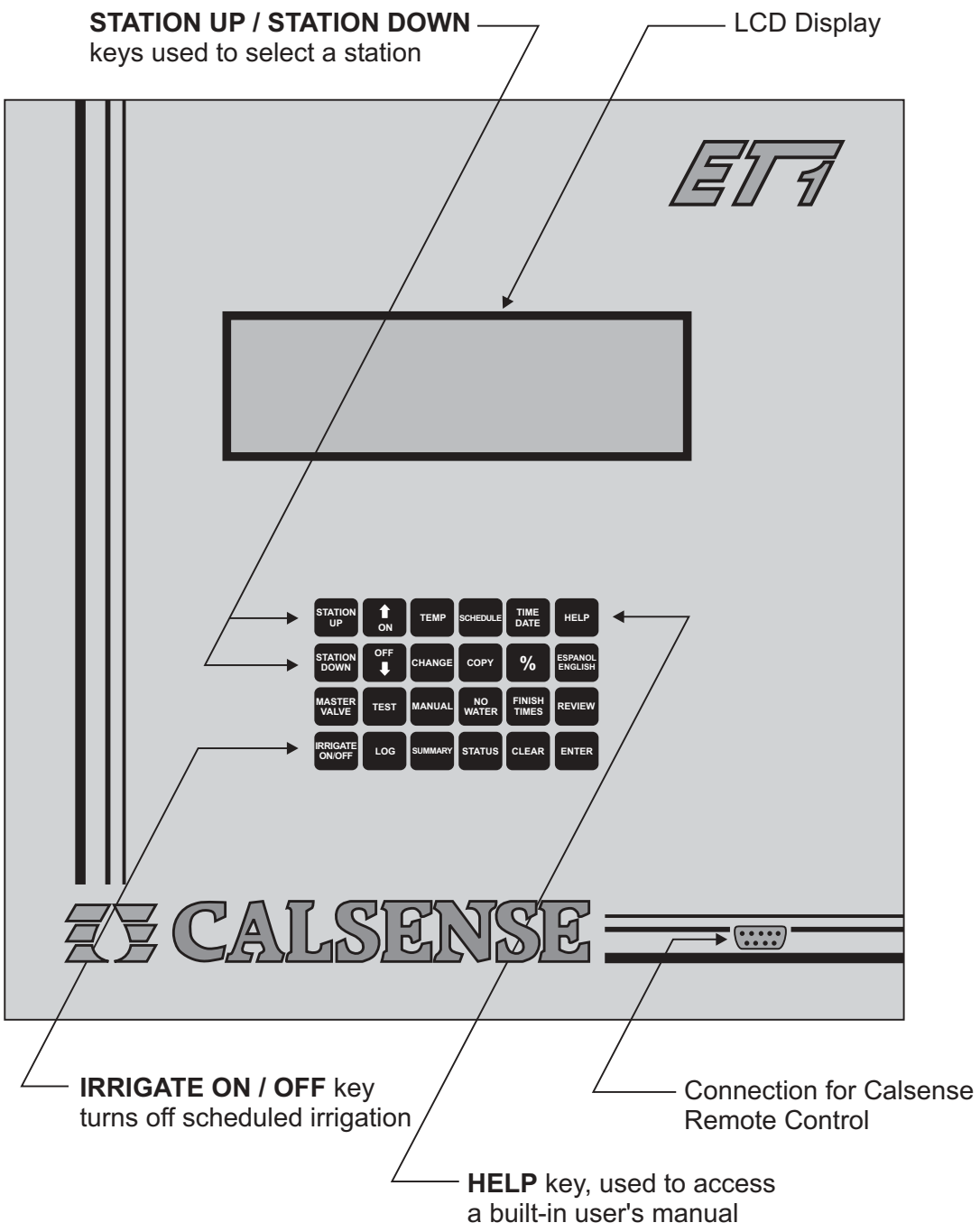
ET1 PROGRAMMING GUIDE



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A. HELP KEY

The HELP key is used to access a built-in operators manual. There are two kinds of HELP, Display Description Help and Key Usage Help. Use the UP and DOWN arrow keys to scroll through the provided HELP screens.

1. Display Description Help

For help explaining how to use a specific screen, for example the SCHEDULE screen.

Press SCHEDULE

Press HELP, a HELP screen explaining the SCHEDULE screen will appear. Press any key to exit HELP.

NOTE **:** For HELP explaining the MAIN screen. Press the **HELP** key twice. If an alert is displayed on the MAIN screen, press the **HELP** key for an explanation of the alert.

2. Key Usage Help

For help explaining the function of a specific key, for example the MANUAL key, you must first be at the MAIN screen.

Press HELP

Press MANUAL, a HELP screen explaining the MANUAL key will appear. Press any key to exit HELP.

B. PROGRAMMING KEYS

When programming the ET1 Controller, there are four keys which are used repeatedly. They are the CHANGE, ON/UP ARROW, OFF/DOWN ARROW, and ENTER.

Press CHANGE to highlight an item to be changed. It is also used to move the highlighted cursor around the display to other items.

Press ON or OFF to make a change to the highlighted item.

Press ENTER after making changes to a highlighted item, and to return to the MAIN screen.

C. IRRIGATE ON/OFF KEY

The Irrigate ON/OFF key is used to turn the controller on or off.

Press IRRIGATE ON/OFF to turn controller off, the MAIN screen will appear as shown below. Press IRRIGATE ON/OFF again to turn controller back on.

```
THE CONTROLLER HAS BEEN TURNED OFF

THERE WILL BE NO IRRIGATION!
```

D. TIME DATE KEY

The TIME DATE key is used to view and or set the controller's time and date.

Press TIME DATE, the TIME DATE screen will appear (shown below).

```
CONTROLLER TIME & DATE IS :

December        25    1996,    Wednesday  10:49:55 AM
```

Press CHANGE to highlight the date, Press CHANGE once more to highlight the time.

Press ⬆ ON or OFF ⬇ to make changes to the highlighted item, hold down either key to quickly scroll to the desired setting.

Press ENTER when changes are complete, Press ENTER once more to return to the MAIN screen.

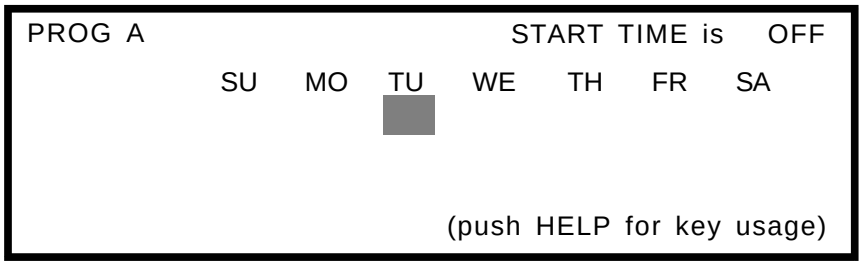
E. ENGLISH / SPANISH KEY

The ET1 Controller display can be viewed in English or Spanish.

Press ESPANOL ENGLISH to switch between an English or Spanish display.

F. HOW TO SET A SCHEDULE

Press SCHEDULE , the SCHEDULE screen will appear (shown below).



During the initial programming of an ET1 Controller, the SCHEDULE screen will appear as shown above. Program A will be the current program (shown in the upper left corner of the screen), there will be no start time set (shown in the upper right corner of the screen), all water days will be off (shown as two dashed lines under each day), a 7-day schedule will be set, and the current day will be highlighted.

1. Selecting a Program

Press SCHEDULE until the desired program is shown in the upper left corner of the screen.

NOTE **:** The ET1 Controller has 7 programs, A, B, C, D, E, Drip 1, and Drip 2. Programs A, B, C, D,& E have overlap protection, that is no station is able to irrigate at the same time as another station. Programs Drip 1 and Drip 2 are designed to be able to irrigate simultaneously with other stations, in this way the user can irrigate up 3 stations at the same time by entering identical start times on Programs Drip 1, Drip 2 and any one of the remaining 5 Programs.

2. Setting Water Days

Press CHANGE , to highlight the current day. To move the highlight to another water day continue to Press CHANGE until the desired day is highlighted.

Press ↑ ON to turn a water day on.

Press OFF ↓ to turn a water day off.

3. Set a Start Time

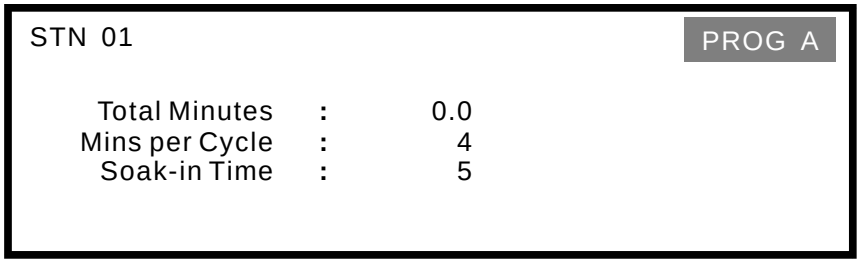
Press CHANGE until the start time in the upper right corner of the screen is highlighted.

Press ↑ ON or OFF ↓ until the desired start time appears. Hold down the key to scroll quickly through start times.

Press ENTER after all changes have been made. Press ENTER once more to return to MAIN screen.

4. Assigning Stations to a Program

After a start time and water days have been set at the SCHEDULE screen, the MAIN screen will appear as shown below. During initial setup all stations are assigned to program A, shown in the upper right corner of the screen.



Press STATION UP or STATION DOWN until the desired station is shown in the upper left corner of the screen.

Press CHANGE until the program is highlighted in the upper right corner of the screen (shown above).

Press ON or OFF until the desired program is displayed.

Press ENTER after all changes have been made.

5. Setting Station Run Times (Single and Multiple Cycle Starts)

On the MAIN screen (shown above) there are three settings which concern station run times, these allow the user to setup multiple irrigation cycle starts. The settings are :

Total Minutes : The total number of minutes a station will irrigate during one water day.

Mins per Cycle : The number of minutes a station will irrigate during each cycle.

Soak-in Time : The number of minutes between each cycle start (if there is only one cycle start, this setting is ignored by the controller).

SEE PAGES 5 AND 6 FOR EXAMPLES OF HOW TO SET THE ET1 FOR MULTIPLE RUN TIMES.

NOTE **:** All settings are made by using the following procedure.

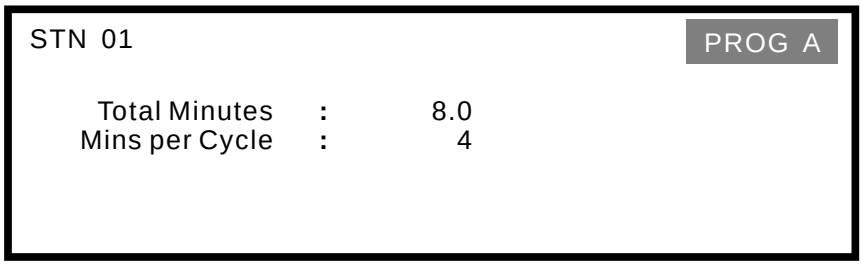
Press STATION UP or STATION DOWN until the desired station is shown in the upper left corner of the screen.

Press CHANGE to highlight the setting to be changed. Press CHANGE again to move the highlight to another setting.

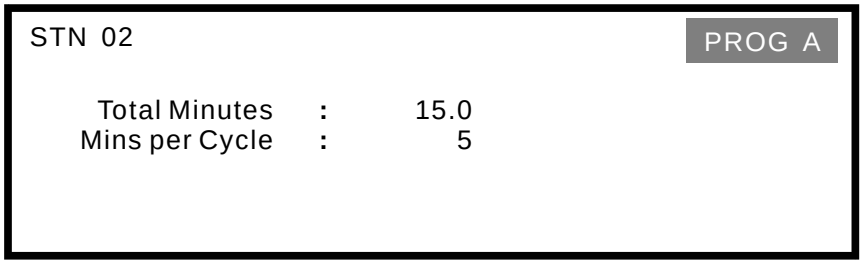
Press ON or OFF until the desired minutes are set. To scroll quickly through minute settings, hold down either key.

Press ENTER after all changes have been made

Examples of Multiple Run Times

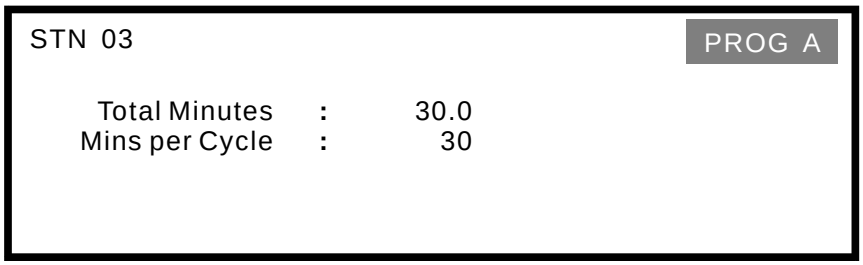


In this example, station 1 will irrigate 4 minutes, after 120 minutes (2 hours) it will irrigate another 4 minutes, for a total irrigation time of 8 minutes. The initial start time is set at the SCHEDULE screen (as described on page3).



In this example, station 2 will have three 5 minute run times, with 240 minutes (4 hours.) between each run time. The initial start time is set at the SCHEDULE screen (as described on page 3).

Example of a Single Run Time



In this example station 3 will irrigate one time for 30 minutes. It's start time is set at the SCHEDULE screen (as describe on page 3).

NOTE **:** Whenever the "Mins per Cycle" setting is equal to or more than the "Total Minutes" setting, the "Soak-in Time" is ignored by the controller and the station will have one run time.

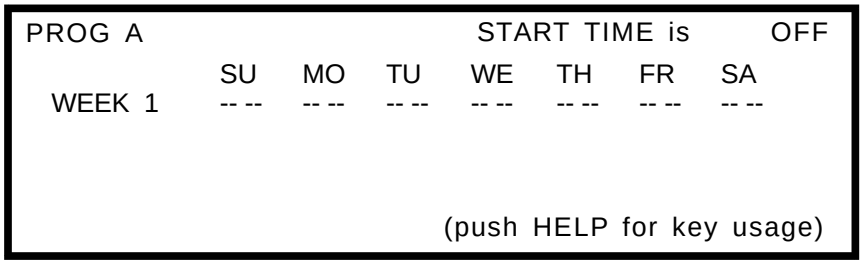
6. Set a 14-Day / 21-Day, / 28-Day Schedule

The ET1 Irrigation Controller comes with a 7-day schedule pre-set (shown on page 2). The following procedure describes how to change to a 14-day, 21-day, or 28-day schedule .

Press SCHEDULE , the SCHEDULE screen will appear.

Press CHANGE

Press COPY , a 14-day schedule will appear as shown below (the current week is in uppercase letters)



To set a 21-day schedule Press COPY a second time.

To set a 28-day schedule Press COPY a third time.

Press COPY a fourth time to go back to a 7-day schedule.

To set a start time and water days, use the procedure described on page 2, "Setting Water Days" and "Set a Start Time".

Press ENTER after all changes have been made.

G. CONTROLLER SET-UP

The ET1 Set-Up program is where each of the controller's features are enabled or disabled. To access Set-Up, a four key code must be entered as follows :

1. How to Access Set-Up

Press IRRIGATE ON/OFF (if the controller is already off, proceed to the next step).

Press STATION UP

Press STATION DOWN

Press ⬆ ON, the set-up program screen will appear.

Press ENTER to proceed through each screen until the desired screen appears.

NOTE **:** Accessing Set-Up with this four key code will be referred to throughout this guide.

2. Station Usage

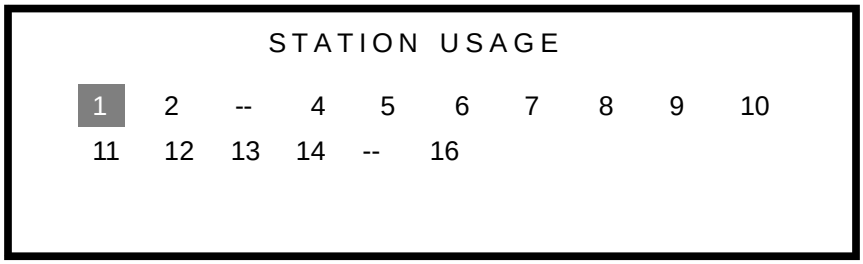
If a station is not in use it can be "turned off" (not displayed on the MAIN screen). To turn a station off, first enter Set-Up as described above.

Press ENTER until the STATION USAGE screen appears (shown below).

Press CHANGE, station 1 will be highlighted. Continue to Press CHANGE to move the highlight to the desired station.

Press OFF ⬇ turn a station off, shown as two dashed lines.

Press ⬆ ON to turn a station on.



In the example above, a 16 station controller has station 1 highlighted, stations 3 and 15 are turned off, and all remaining stations are turned on.

Press ENTER when changes are complete. Continue to Press **ENTER** to proceed through Set-Up. To quickly exit Set-Up, hold down the **ENTER** key until the MAIN screen appears.

3. Flow Meter, Master Valve and Pump Set-Up

If a Calsense flow meter and/or master valve and/or pump are installed, they must be enabled and options set in Set-Up. All settings will be made using the following procedure.

Press ENTER until the desired screen appears.

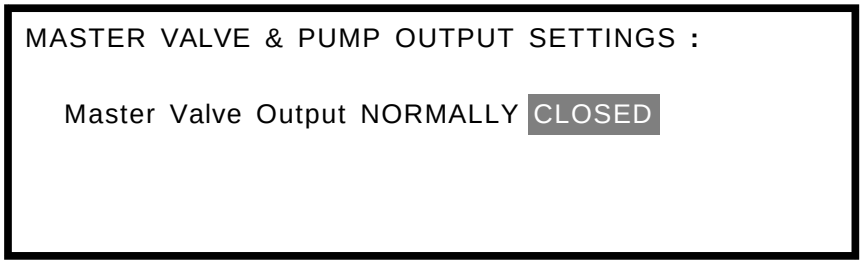
Press ↑ ON to change a highlighted item.

Press CHANGE to move the highlight to another item (if necessary).

Press ENTER when all changes have been made, and to move on to the next screen.

Enter Set-Up using the procedure described on page 7 of this guide. Press the ENTER key until the MASTER VALVE & PUMP OUTPUT SETTINGS screen appears (shown below). This is the first in a series of screens that will need to be programmed if a flow meter, master valve or pump are installed. Each screen is shown along with a description of the different options that can be set.

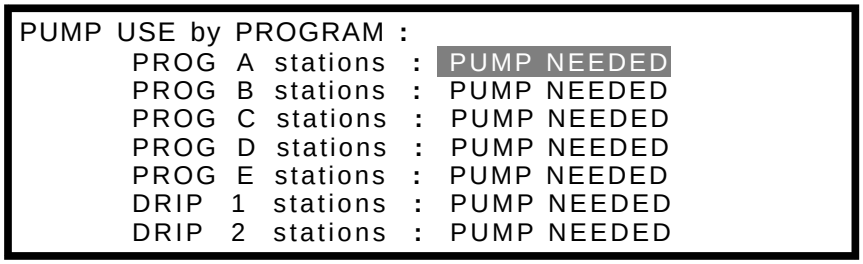
Master Valve & Pump Output Settings



The MASTER VALVE & PUMP OUTPUT SETTINGS screen will appear with the type of master valve highlighted and set for a normally closed master valve. There are 2 settings, CLOSED, if a normally closed master valve is installed and OPEN, if a normally open master valve is installed.

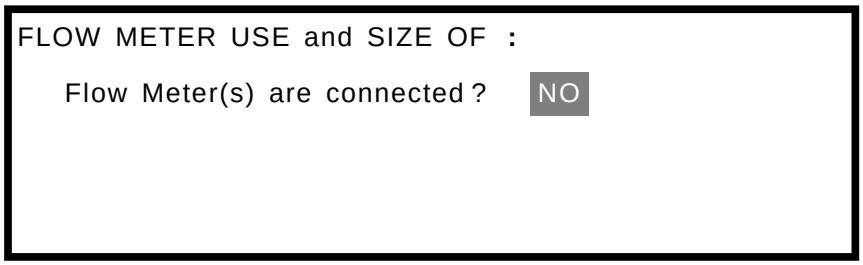
The pump output has three settings. NORMAL, if a pump is installed or if a pump is not installed and the output is not used for a special purpose. STEADY ALERT or BLINKING ALERT, if the pump output is to be connected to some type of signaling device such as a light to alert the user to a possible problem (e.g. 'MAINLINE BREAK')

Pump by Program

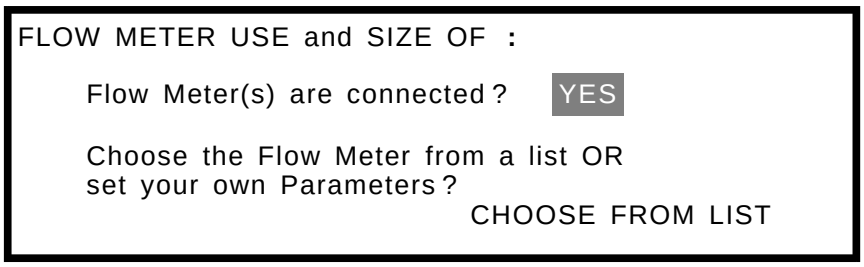


The PUMP USE BY PROGRAM screen will appear with all programs set to use a pump. There are 2 settings possible, PUMP NEEDED, if the pump is to be turned on when a program irrigates, and NO PUMP, if the pump is not to be turned on when a program irrigates, or if there is no pump installed.

Flow Meter Use and Size



When the FLOW METER USE AND SIZE screen appears (shown above), no flow meter will be selected. If a flow meter is installed change the setting to YES, the screen will appear as shown below.



If a standard Calsense flow meter is installed Press ENTER to move to the next screen. If a Calsense FMBX flow meter is installed, move highlight to CHOOSE FROM LIST, and change the setting to ENTER OWN PARAMETERS, then Press ENTER to move to the next screen. The following page describes both options.

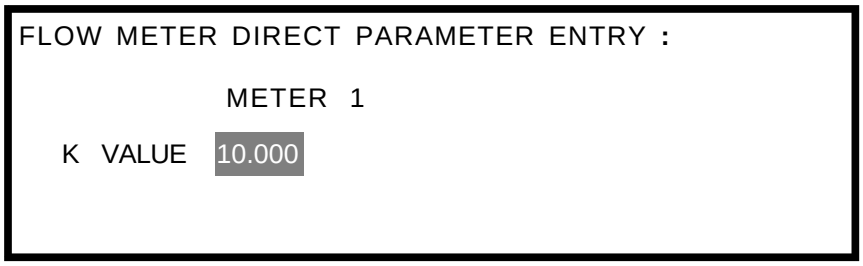
After Pressing ENTER the FLOW METER CHOICES screen will appear as shown below (for a standard Calsense flow meter).

Change the highlighted setting to the appropriate size of flow meter installed.

The possible settings are :				
	FM-1	1"	FM-1.5	1 1/2"
	FM-1B	1" Brass	FM-2	2"
	FM-1.25B	1 1/4" Brass	FM-3	3"

NOTE : In a Calsense -F controller there will be three flow meters listed on the FLOW METER CHOICES screen and a size will need to be set for each flow meter installed.

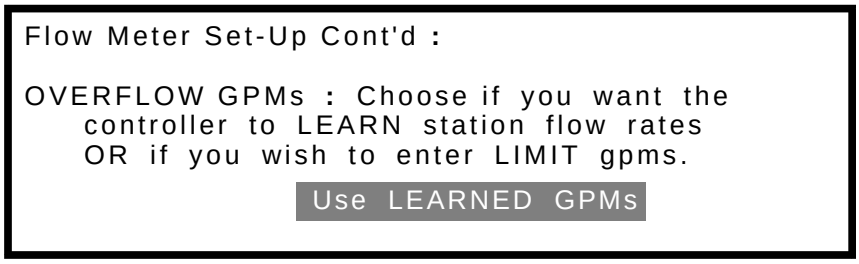
If a Calsense FMBX flow meter is installed, you should have selected ENTER OWN PARAMETERS on the previous screen. After Pressing ENTER the screen will appear as shown below. Enter the K value and offset for the size and type of pipe the FMBX is installed in.



Master Controller

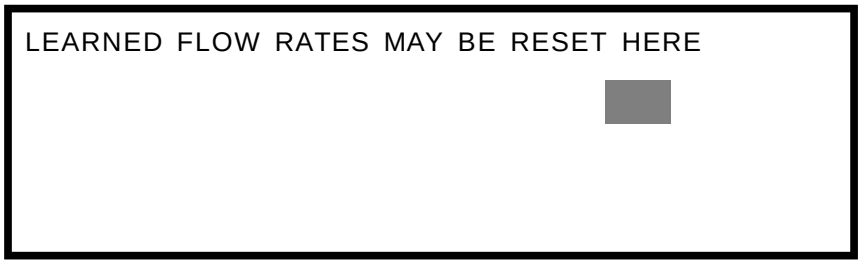
The MASTER CONTROLLER screen will appear with NO selected (as shown above). In most cases this setting will not change. If a system has multiple controllers on a single mainline, and more than one controller has to irrigate at the same time, one controller is designated as the master controller (and is connected to a Calsense flow meter). All other controllers have flow monitoring disabled. The job of the master controller is to continuously monitor for mainline breaks, no other flow monitoring features will be enabled for the master controller.

Overflow GPM's



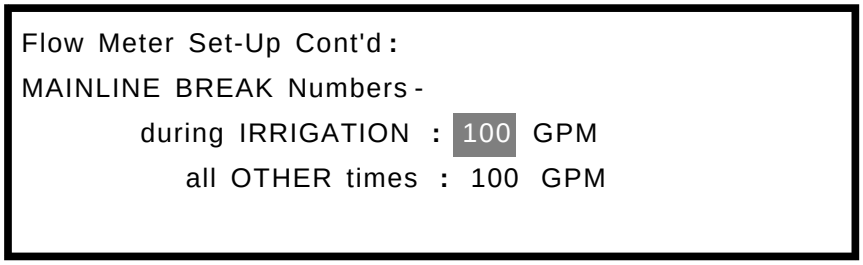
The OVERFLOW GPMs screen appears with USE LEARNED GPMs selected (shown above). With this option selected, the controller will learn the flow rate of each valve over a period of 8 watering cycles. This learned flow rate is then used to determine when an 'OVERFLOW' occurs. The other option which can be selected is USE LIMIT GPMs. If this option is selected, the user will be required to enter a limit GPM for each station, this limit GPM will be used to determine when an 'OVERFLOW' occurs.

NOTE **:** The term OVERFLOW refers to a measured flow rate which exceeds the LEARNED GPMs (by a user programmable trip percentage, see page 12), or exceeds the LIMIT GPMs entered by the user. (See the CONTROLLER ALERTS section of this guide for more information concerning overflows)



The screen following LEARNED GPMs is shown above. If at some time the user wishes to have the controller re-learn each stations flow rate, change the current setting to YES.

Mainline Break



The MAINLINE BREAK screen (shown above) will appear with the DURING IRRIGATION setting highlighted. The default mainline break number will depend on which size flow meter is installed. The DURING IRRIGATION number is the mainline break number used while the controller is irrigating, the OTHER TIMES number is the mainline break number used when the controller is not irrigating. A typical mainline break setting might be slightly more than twice the flow rate of the highest flowing valve on the system.

Flow Delay / Trip Percent

	FLOW DELAY TIME	TRIP PERCENT
PROG A :	120 seconds	15 %
PROG B :	120 seconds	15 %
PROG C :	120 seconds	15 %
PROG D :	120 seconds	15 %
PROG E :	120 seconds	15 %
DRIP 1 :	120 seconds	15 %
DRIP 2 :	120 seconds	15 %

The FLOW DELAY / TRIP PERCENT screen (shown above) appears with a 120 second delay time and a 15% trip percentage set. Using the UP ARROW key or DOWN ARROW key each program can be independently set with a delay time of 15 to 1,800 seconds and a trip percentage of 1 to 99 percent.

FLOW DELAY is the amount of time the controller waits after activating a valve before taking a flow reading. This allows for an accurate flow reading, by giving time for air to be flushed from piping and the previous valve to shut down. The only restriction is that the flow delay time not be longer than a stations run time.

TRIP PERCENT is the amount of increase above the learned flow rate at which the controller will alert the user to an 'OVERFLOW'.

Overflow / No Flow Alerts

	OVERFLOWs	NO FLOWs
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

The OVERFLOW / NO FLOW ALERT screen (shown above) appears with Alert / No Action set for all programs. There are three settings possible :

1. Alert / No Action : An alert is displayed on the screen but the valve continues to irrigate.
2. Alert / Shut-Off : An alert is displayed on the screen and the valve is shut down.
3. No Alerts : No alert is displayed and the valve continues to irrigate.

Auto - Learn

Press the < TEST > Key To Start
an AUTO-LEARN sequence.

The AUTO-LEARN screen (shown above) will allow the user to quickly have the controller learn each stations flow rate. By pressing the TEST key at this screen the controller will immediately start cycling through each valve learning each valves flow rate.

H. OTHER KEYS

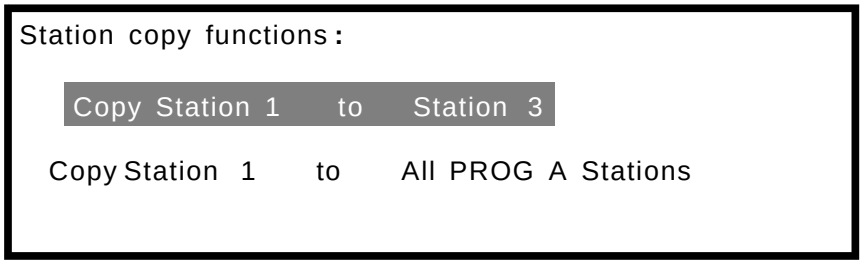
1. Copy Key

When programming a schedule it is possible to copy the settings of one station (Total Minutes, Mins per Cycle, and Soak-in Time) to another station, or from one station to all stations assigned to the same program.

Copy a Station to Another Station

From the MAIN screen, Press STATION UP or STATION DOWN until the station to be copied is displayed.

Press COPY , the STATION COPY screen will appear with the station to station option highlighted (shown below).



Press OFF or ON to select the station to copy to (station 3 has been selected in the example above).

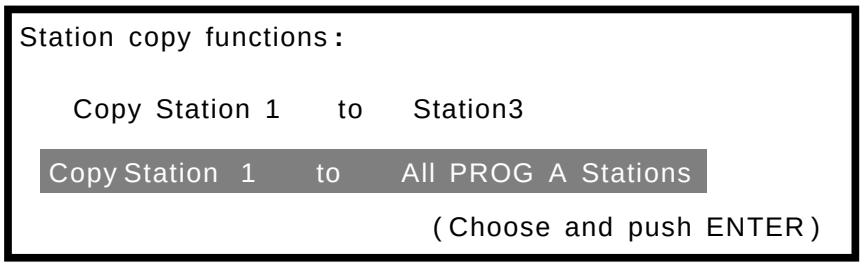
Press ENTER to copy and return to the MAIN screen.

Copy a Station to a Program

From the MAIN screen, Press STATION UP or STATION DOWN until the station you wish to copy is displayed.

Press COPY , the STATION COPY screen will appear with the station to station option highlighted (shown above).

Press CHANGE to move the highlight to the second line (shown below).



Press ENTER to copy and return to the MAIN screen.

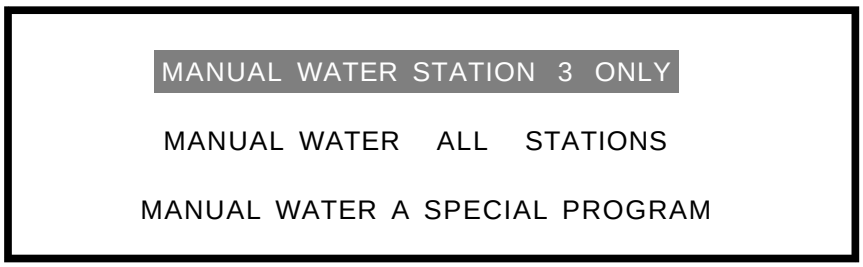
NOTE : A station can only be copied to the program it is assigned to.

2. Manual Key

The MANUAL key is used to manually activate a single station, an entire program, or every station on the controller. A Special Manual Program can also be set by the user.

Manually Water a Single Station

Press MANUAL , the MANUAL WATER screen will appear (shown below).



Press ON or OFF until the desired station appears in the highlighted bar (station three has been selected in the example above).

Press ENTER , the selected station will irrigate. The manual run time will be the same as the scheduled irrigation run time.

To end the manual water sequence prematurely, Press CLEAR

Manually Water a Program / All Stations

Press MANUAL , the MANUAL WATER screen will appear (shown above).

Press CHANGE to move the highlighted bar to the next line.

Press ON or OFF until the desired program is selected, or "All Stations" is selected.

Press ENTER , each station will irrigate in sequence. The run times will be the same as the scheduled irrigation run times.

To end the manual water sequence prematurely, Press CLEAR

Manual Water Special Program

Press MANUAL, the MANUAL WATER screen will appear (shown on page 9).

Press CHANGE until "MANUAL WATER A SPECIAL PROGRAM" is highlighted.

Press ENTER, the MANUAL WATER SPECIAL PROGRAM screen will appear (shown below).

```
STATION   :  --   --   --   --   --   --   --   --   --   --
MINUTES   :  --   --   --   --   --   --   --   --   --   --
            Start Times  :    NOW          OFF
      Number of Cycles   :    1
   Between Cycle Starts  :    0      minutes
Schedule  :     ---   ---   ---   ---   ---   ---   ---
Run Thru  :     January    01    1995,    Sunday
```

The Manual Water Special Program allows the user to setup an entire program independent of the main scheduled irrigation program. The user can set which stations to irrigate, run times for each station, up to two start times or start the program immediately, multiple cycle starts, the amount of time between cycle starts, water days, and a date to end the special program.

Press STATION UP or STATION DOWN until the desired station appears in the highlight bar.

Press ↑ ON or OFF ↓ until the desired run time is set (maximum run time is 99 minutes).

Press CHANGE to move the highlight bar to the next station, repeat the steps described above. Continue until all desired stations have been set.

The Manual Water Special Program has a maximum of two start times. Each start time has three options which the user can set. NOW, which would start the program immediately. OFF, which indicates no start time. Or the user can set a specific time of day to start the program. To set a start time use the following procedure.

Press CHANGE until the first start time is highlighted.

Press ↑ ON or OFF ↓ until the desired start time is set.

Press CHANGE until the second start time is highlighted. Repeat the previous step.

The Manual Water Special Program also allows the user to set multiple cycle starts and the amount of time between each cycle start. Use the **CHANGE** key and the **UP ARROW** or **DOWN ARROW** to set these options if desired.

The last two options which can be set in the Manual Water Special Program are the scheduled water days and a date when the special program will cease to irrigate.

NOTE **:** If the start time is set to "NOW" it is not necessary to set scheduled water days and a date to end the special program.

Press CHANGE to move the highlight bar to the schedule. Dashed lines indicate a water day is turned off.

Press ↑ ON to turn a water day on, the day of the week will appear.

Press OFF ↓ to turn a water day off, dashed lines will appear.

Press CHANGE to move the highlight bar to the date.

Press ↑ ON or OFF ↓ to set a date and time to end the Manual Special Program.

Press ENTER to return to main screen after all settings have been made. The special program settings will remain until the user changes them.

The following is an example of a Manual Special Program. Stations 1, 3, 8, and 12 have been set with varying run times. The program will start at 6:30 PM, all stations will have two run times with a 60 minute soak in time between cycle starts. The scheduled water days are Monday and Friday. The program will run from the day it was started until September 20, 2001.

```
STATION   :  1   3   8   12  --  --  --  --  --  --
MINUTES   :  10  15  5   15  --  --  --  --  --  --
          Start Times  :    6:30 PM      OFF
     Number of Cycles  :    2
  Between Cycle Starts :    60   minutes
Schedule   :    ---   Mon  ---   ---   ---   Fri   ---
Run Thru   :    September  20   2001,   Thursday
```

NOTE**:** If a normally scheduled irrigation program is running when the Manual Special Program starts, the scheduled irrigation will pause while the Manual Special Program runs, after which the normally scheduled irrigation program will resume where it left off.

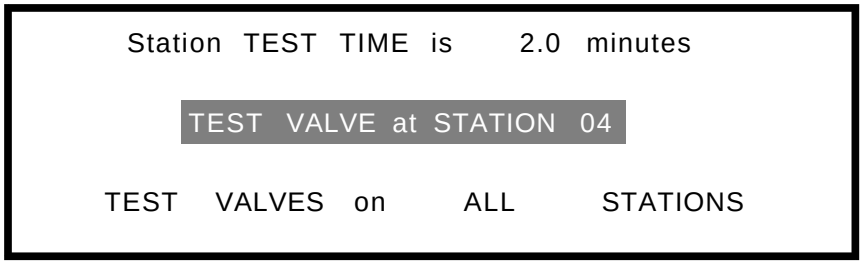
If a the Manual Special Program is running when the normally scheduled irrigation program starts, the Manual Special Program will terminate.

3. Test Key

The TEST key is used to test a single station, all the stations on a program, or all the stations on the controller. Unlike the MANUAL key, when the TEST key is used to activate a station the controller implements test functions used during scheduled irrigation. These test functions measure station flow rates and current flows, then alert the user to any malfunctions.

Test a Single Station

Press TEST , the TEST screen will appear (shown below).



Press ON or OFF until the desired station is shown in the highlighted bar (station 4 has been selected in the example above).

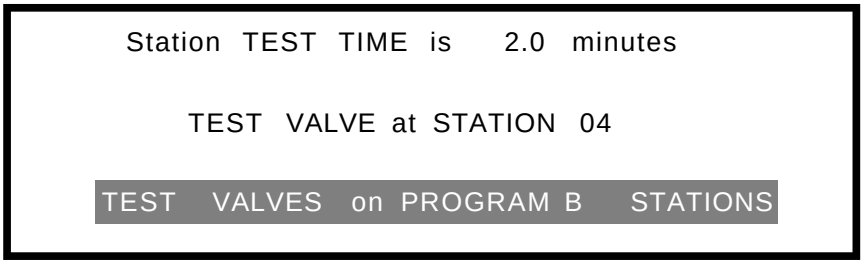
Press ENTER , the selected station will activate (the test time will be 2 minutes in the example above).

To end the test sequence prematurely, Press CLEAR

Test All Stations on a Program / All Stations on a Controller

Press TEST the TEST screen will appear.

Press CHANGE to move highlight bar (shown below).



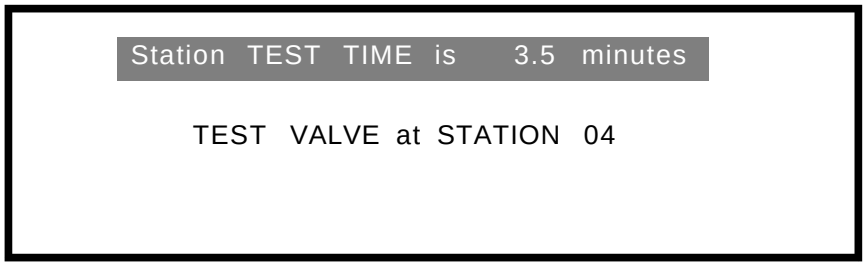
Press ON or OFF until the desired Program is shown in the highlighted bar (Program B has been selected in the example above).

Press ENTER , the selected Program will activate (the test time will be 2 minutes for each station on Program B in the example above).

To end the test sequence prematurely, Press CLEAR

Change Station Test Time

The test run time can be set from 0.2 minutes to 10.0 minutes



Press CHANGE to move the highlight bar to the test time (shown above).

Press ON or OFF until the desired test time is shown in the highlighted bar (3.5 minutes has been set in the example above).

Press CHANGE to move the highlight bar to the desired test.

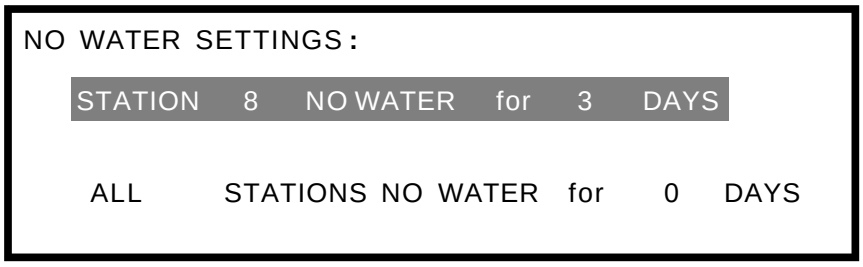
Press ENTER to start test sequence (the test will run 3.5 minutes in the above example).

4. No Water Key

The NO WATER key allows the user to turn off scheduled irrigation for a pre-determined number of days (from 1 to 31 days). This can be applied to a single station, an entire program, or all stations on a controller. At the end of the

Turn Off a Single Station

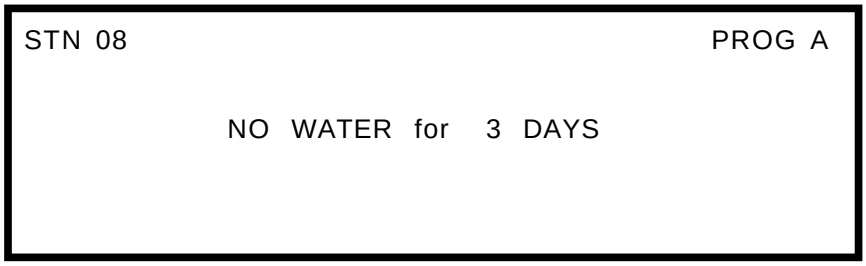
Press NO WATER, the NO WATER screen will appear (shown below).



Press STATION UP or STATION DOWN to select which station to turn off (station 8 has been selected in the example above).

Press ON or OFF to set the number of days the selected station will remain off (the selected station will remain off for 3 days in the example above).

Press ENTER, the selected station will remain off for the desired number of days. The MAIN screen will appear as shown on the following page.



To end the NO WATER setting prematurely, Press **CLEAR**

Turn Off All Stations on a Program / All Stations on a Controller

Press **NO WATER**, the NO WATER screen will appear.

Press **CHANGE** to move the highlight bar (shown below).

Press **STATION UP** or **STATION DOWN** to select which Program to turn off (Program A has been selected in the example above).

Press **ON** or **OFF** to set the number of days the selected Program will remain off (the selected Program will remain off for 2 days in the example above).

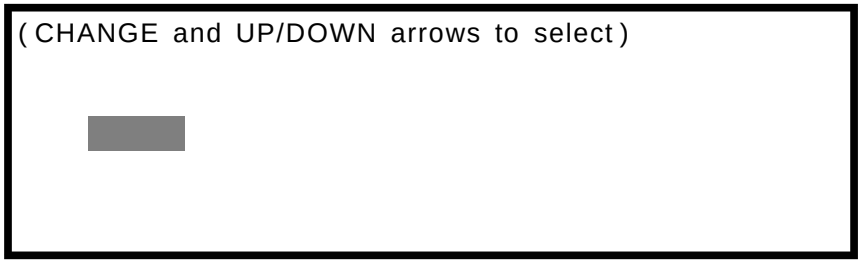
Press **ENTER**, the selected program will remain off for the selected number of days.

To prematurely end the NO WATER setting for an entire program, you must return to the no water screen (as described in the first two steps) and set the number of days to zero, then Press **ENTER**

5. Master Valve Key

The MASTER VALVE key is used to manually activate the master valve. In a system with a normally closed master valve installed, the MASTER VALVE key will open the master valve. In a system with a normally open master valve the MASTER VALVE key will close the master valve.

Press MASTER VALVE , the MASTER VALVE screen will appear (shown below).

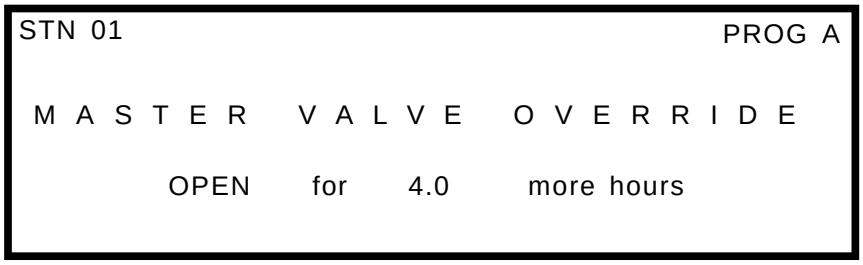


Press ON or OFF to select either to open or close the master valve. (the setting you choose depends on which type of master valve is installed).

Press CHANGE to move the highlight bar to the number of hours.

Press ON or OFF to set the number of hours for the master valve override to be in effect. The setting can be from 1 to 24 hours, 4 hours has been set in the example above.

Press ENTER to activate the master valve. The MAIN screen will appear as shown below.



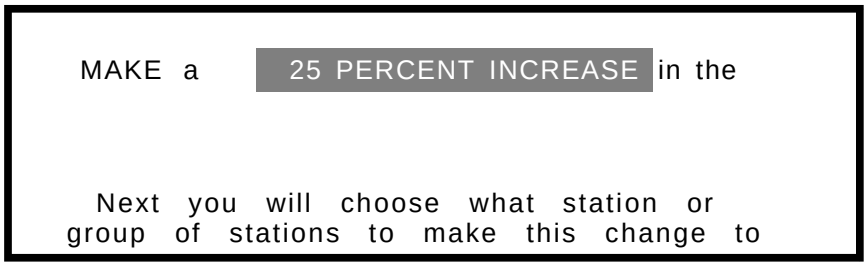
To end the MASTER VALVE OVERRIDE prematurely, Press CLEAR

NOTE **:** While the master valve override is in effect, the normally scheduled irrigation program cannot start.

6. % Key

The % key is used to increase or decrease the total minutes setting of a single station, all stations on a Program, or all stations on a controller. The change is a percentage of the current setting.

Press **%** , the % screen will appear (shown below).



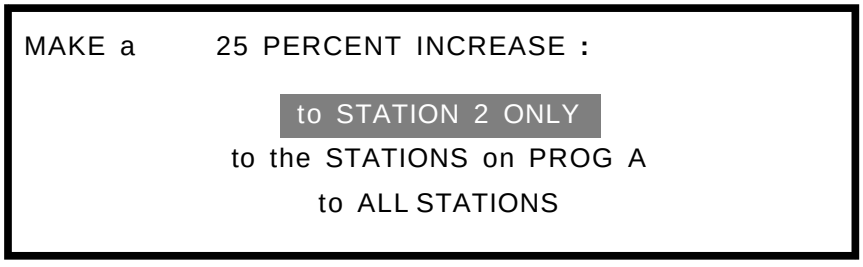
Press **ON** to set the amount of percent increase (from 1% to 301%). A 25 % increase has been made in the above example.

Press **OFF** to set the amount of percent decrease (from 1% to 99%).

Press **ENTER** to proceed to the next screen (shown below).

NOTE **:** After the ENTER key is pressed the user has 3 options from which to choose. The following describes the

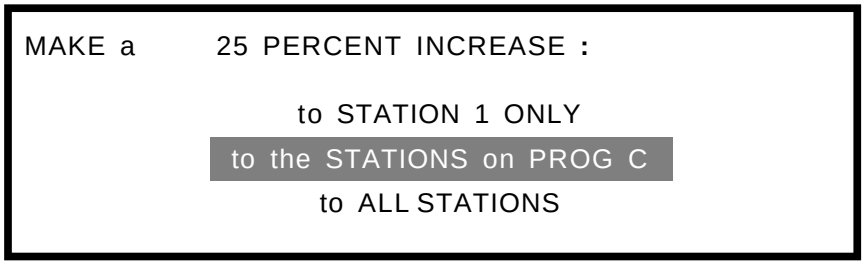
Change a Single Station



Press **ON** or **OFF** to select which station to change (station 2 has been selected in the example above).

Press **ENTER** , the MAIN screen will appear with a change to the total minutes setting (the current total minutes setting of station 2 will have increased by 25 % in the example above).

Change All Stations on a Program



Press CHANGE to move the highlight bar as shown above.

Press ON or OFF to select which Program to change (Program C has been selected in the example above).

Change All Stations on a Controller

Press CHANGE to move the highlight bar as shown above.

Press ENTER , the MAIN screen will appear with a change to the total minutes setting (the current total minutes setting of all stations on the controller will have increased by 25 % in the example above).

I. INFORMATION KEYS

The LOG, and SUMMARY keys are used to view a variety of information databases kept in the controller memory. Information includes all programming changes, a history of the last 30 watering cycles, and a summary of water usage. The following describes how to access this information.

1. Log Key

Watering Cycle History

Log Data is a history of the last 30 watering cycles. A cycle is any 24 hr. period in which programmed irrigation occurred. Each line in the Log represents one cycle, and the controller keeps a Log of each station. The information in the Log includes the date, start time, end time, number of watering cycles, programmed minutes, the number of minutes a station actually irrigated (under normal conditions these should be the same), the amount of water used (measured in gallons), the Program the station is assigned to, the measured flow rate, the average flow rate, any manual minutes, hold over minutes, and any detected alerts.

Press **LOG** , the the LOG screen will appear (shown below).

START DATE & TIME		REPEAT CYCLES	PRGM MINS	ACTUAL MINS	ACTUAL GALLONS
10/07	09:30PM	2	16.0	16.0	368
10/06	09:30PM	2	16.0	16.0	368
10/05	09:30PM	1	08.0	08.0	184
10/04	10:00PM	3	24.0	24.0	552
10/03	10:00PM	3	24.0	24.0	552

Press **ON** or **OFF** to scroll up and down the screen.

Press **STATION UP** or **STATION DOWN** to view other stations. The current station is shown in the bottom right corner of the display.

Press **CHANGE** to view more log data, as shown in example below. Press **CHANGE** again to go back to original screen.

END TIME	PROG	FLOW GPM	FLOW AVG	MAN MINS	HOLD MINS	FLAG
09:46PM	A	23	23	0.0	0.0	
09:46PM	A	24	23	0.0	0.0	
09:38PM	A	23	23	0.0	0.0	
09:54PM	A	23	23	0.0	0.0	
09:54PM	A	22	23	0.0	0.0	
09:54PM	A	23	23	0.0	STATION 01	

Press **ENTER** to return to MAIN screen.

Diagnostics

The Diagnostics section of Log Data keeps a record of all Program changes, and all Alerts detected by the controller. Diagnostics contains 100 lines of the latest data which can be viewed using the following pocedure.

Press STATION UP or STATION DOWN until station 1 is displayed on the MAIN screen.

Press LOG

Press STATION DOWN, the DIAGNOSTICS screen will appear as shown in the example below.

```
  WHEN                          DIAGNOSTICS
02/17   12:37PM     Irrigation TURNED OFF
02/15   04:25AM     Power Fail Recovery
02/15   01:31AM     Power Fail
12/10   11:23AM     CHANGE : Temp Prog Assign
11/09   03:01PM     CLEAR KEY PUSHED
11/09   02:33PM     MV CLOSED for    3 HOURS
10/22   11:38AM     IRRIG RESUME - SETUP ENDED
```

Press ↑ ON or OFF ↓ to scroll display up or down to veiw more data.

Press ENTER to return to MAIN screen.

2. Summary Key

Summary data is a record of water usage.

Press STATION UP or STATION DOWN until station 1 is displayed on the MAIN screen.

Press SUMMARY, the SUMMARY screen will appear (shown below).

```
STN 01

   THIS Month IRRIGATED          2367.0    gallons

   LAST Month IRRIGATED          65345.0   gallons
```

The first line of the SUMMARY screen, "This Month Irrigated" is the amount of water used from the 1st day of the current month up until the current day. The second line "Last Month Irrigated" is the total amount of water used in the previous calendar month. To view the amount of water measured in HCF Press the CHANGE key, to view the number of minutes Press the CHANGE key again.

Press STATION DOWN, the total amount of water used by all stations will be displayed (shown below). Press CHANGE to view in HCF's.

```
PROGRAMMED IRRIGATION Totals

    THIS Month IRRIGATED          82367.0     gallons

    LAST Month IRRIGATED        5465345.0     gallons
```

Press STATION DOWN, totals for the MANUAL key and TEST key usage will be displayed (shown below).

```
MANUAL and TEST Totals

      THIS Month Use                8.5     minutes
                                  175.0     gallons

      LAST Month Use               48.6     minutes
                                  2383.0     gallons
```

Press STATION DOWN, non-controller totals will be displayed (shown below). Non-controller totals are all unscheduled irrigation such as quick coupler usage.

```
NON-CONTROLLER FLOW Totals

      THIS Month Use                0.5     minutes
                                    0.0     gallons

      LAST Month Use               98.6     minutes
                                  6393.0     gallons
```

Press STATION DOWN, year to year by each month comparisons of water usage will be displayed (shown below).

Press STATION DOWN again to view more comparisons.

```
Year-to-Year Monthly Totals :   (GALLONS)
97  February     24834.6        23444.8   February     96
97  January      22911.4        21339.0   January      96
96  December     18389.0        19341.1   December     95
96  November     26838.4        28383.0   November     95
96  October      33979.1        38972.1   October      95
```

Press ENTER to return to the MAIN screen.

3. Finish Time Key

The FINISH TIME key is used to calculate the finish time of each programs scheduled irrigation. It also calculates a projection of monthly water usage, based on the current schedule. Water usage is shown in gallons (or HCF), and as a % of Historical ETo.

	FINISH TIME	GAL/MONTH	% of ET
PROG A	04:08 AM	68828	91%
PROG B	06:33 AM	22831	82%
PROG C	NO RUN	0	------
PROG D	NO RUN	0	------
PROG E	NO RUN	0	------
DRIP 1	NO RUN	0	------
DRIP 2	NO RUN	0	------

Press **FINISH TIMES** , the controller will calculate finish times and projected water usage (shown in the above example).

"NO RUN" will be displayed on a program that is not set up for scheduled irrigation.

Press **CHANGE** to view water usage in HCF.

Press **ENTER** to return to the MAIN screen.

4. Status Key

The STATUS key is used to view the status of any on going irrigation (the controller must be in an irrigation cycle for the STATUS key to function). It can also be used to stop a currently running station or a station which is waiting to run.

STN	HOLD-OVER	IRRIG LEFT	STATUS
1	0.0	5.3	Irrigating
2	0.0	10.0	Waiting
3	0.0	10.0	Waiting
4	0.0	10.0	Waiting
5	0.0	0.0	
6	0.0	0.0	
7	0.0	0.0	

Press **STATUS** , the STATUS screen will appear (as shown above).

The status of any station which is in the current cycle will be shown as either "Irrigating" or "Waiting" and the remaining run time will be shown. To stop the currently running station or to keep a waiting station from irrigating, move the highlight bar to the desired station, using the **UP ARROW** or **DOWN ARROW**, and Press **CLEAR**, repeat this process for any other stations to be turned off. Press **ENTER** to return to the MAIN SCREEN.

J. CONTROLLER ALERTS

1. Overflow

Once an ET1 Controller is setup for flow monitoring (see the CONTROLLER SETUP section of this guide), it will learn the flow rate of each station. During the beginning of each watering cycle, the controller will compare the measured flow rate with the learned flow rate, if the measured flow rate exceeds the learned by more than the trip percentage, it will skip the station and generate an OVERFLOW alert. This alert will appear as shown below.

```
STN 08                                          PROG A


                    O V E R F L O W
NORMAL     35.0 GPM          MEASURED     39.8 GPM


 0.0 GPM                                  Learned  35.0
```

In the example above, station 8 has generated an OVERFLOW alert, the display shows the normal flow rate (learned) and the measured flow rate. The first thing the user should do is to determine the cause of the overflow alert, using the **TEST** key, turn on the station and look for any broken heads or pipe. Once the irrigation system has been repaired, press the **CLEAR** key, the display will appear as shown below.

```
CHOOSE ONE (with CHANGE key) :

   1.  Clear OVERFLOW alert

   2.  Clear  OVERFLOW  alert  and  SET  THIS
       stations  LEARNED  GPM  to   45.8   GPM

                              (Push ENTER to proceed)
```

The display will appear with the #1 choice highlighted. Press **ENTER** to clear the OVERFLOW alert.

If the OVERFLOW alert was generated because of some other reason, for example, heads were added to the irrigation system or plugged heads were recently cleaned which would increase the flow rate, the user can have the learned flow rate reset to this new increased flow rate. This can be done by pressing the **CHANGE** key to highlight the #2 choice, then press the **ENTER** key.

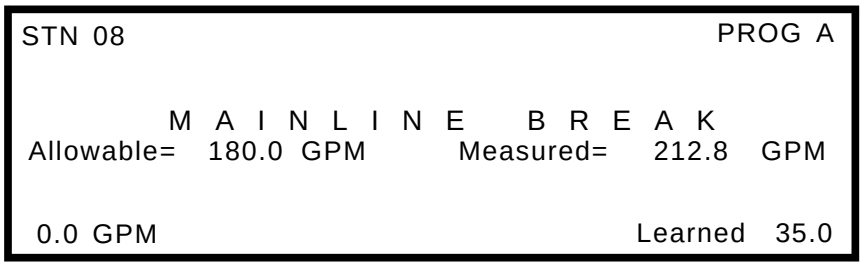
2. No Flow

```
STN 08                                          PROG A


                      N O   F L O W
NORMAL     35.0 GPM          MEASURED     0.0  GPM


 0.0 GPM                                  Learned  35.0
```

A NO FLOW alert (shown in the example above) is generated when the controller activates a station and measures no flow rate. This could be caused by a malfunctioning valve or a valve that has been turned off. After the problem has been found and repaired the user can clear the NO FLOW alert by pressing the **CLEAR** key. If during the next watering cycle the controller measures a flow rate it will clear the NO FLOW automatically.

NOTE : There is a minimum flow rate for each size flow meter, it can range from 2 GPM to 25 GPM depending on the size of the flow meter installed. If a valve's flow rate is below this minimum flow rate, it will generate a NO FLOW alert.

3. Mainline Break



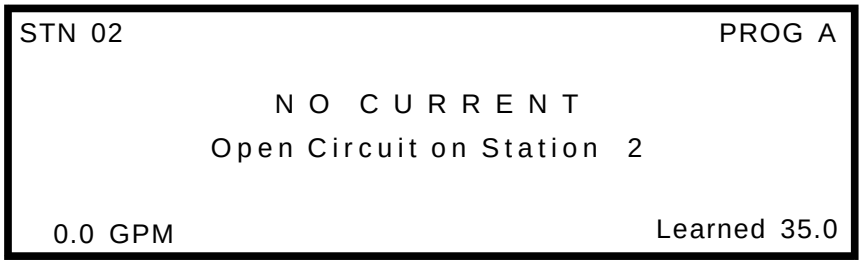
A MAINLINE BREAK alert (shown in the above example) is generated whenever the controller measures a flow rate equal to, or higher than, the mainline break number programmed in the controllers setup program (see the CONTROLLER SETUP section of this guide). In the example above, the mainline break number is 180 GPM and the controller measured a flow rate of 212.8 GPM. Once a MAINLINE BREAK alert is generated the controller will close the master valve and not irrigate until the user clears the MAINLINE BREAK alert by pressing the **CLEAR** key.

4. Output Short

When the ET1 Controller activates a valve it also measures the current flow to the valve. If the current flow is to high, possibly caused by a short circuit in the valve's solenoid or field wiring, the controller will generate an OUTPUT SHORT alert. In the example above a short was measured when station 2 was activated. To clear the alert, press the **CLEAR** key.

NOTE : If the alert reads "Short Detected Station Unknown", this indicates that the short is most likely in the master valve.

5. No Current



If the controller tries to activate a valve, and there is no current flow, a NO CURRENT alert is generated. This could be caused by a broken wire or a burned out valve solenoid. In the example above, no current was measured when station 2 was activated. If every station shows a NO CURRENT alert, the problem is possibly in the field common, or the controllers panel fuse is blown. The alert can be cleared by pressing the **CLEAR** key.

This Programming Guide covers only the basics of programming a CALSENSE ET1 Controller. CALSENSE offers free training as part of the purchase of an ET1 Controller. Call to arrange for an appointment for training.

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