

HERON ELECTRIC COMPANY LTD

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# Basic User and Installation Manual

**Mi-4 Mi-8 Mi-12 Mi-16 Mi-144 Multi-Wire Controller**

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# 1. About This Controller

Congratulations, you are now the owner of a Heron Mi irrigation controller.

Your controller will operate 24volt AC solenoid valves. The controller will run the valves for the length of time, and in the order you specify. This sequence of running solenoid valves is known as an **irrigation program**.

Irrigation programs can be started automatically at pre-set start times. Alternatively, an irrigation program, a single solenoid valve or the pump, can be started manually at any time.

\* DC valves can be operated from a DC controller.

## 2. Installation

**WARNING** Installation should be carried out by a Competent Electrician.

### Mounting the Controller

The controller should be mounted on a wall using four screws, one screw through each corner lid bolthole.

Warning: Additional holes should not be drilled through the controller casing.

Do not mount the controller in direct sunlight. Do not mount the controller where it can be exposed to temperatures above 40 deg C.

### Wiring Up Your Controller

The Mi-4 and Mi-8 controllers should be wired up as shown in Fig 1 below.

The Mi-12, Mi-16 and Mi-144 controllers should be wired up as shown in Fig 2.

For an Mi-144 with more than 16 valves, connect the output expansion box to the expansion box connectors. You can use either connector.

### Connecting Mains Supply

**IMPORTANT.** Switch off the mains supply before connecting the controller.

Check that the MAINS SUPPLY VOLTAGE IS THE SAME AS THE VOLTAGE OF THE CONTROLLER. The controller voltage is displayed on the inside the controller casing.

The mains supply should be fused with a 3-amp fuse and be connected via a Residual Current Circuit Breaker as per any equipment used in damp conditions.

Connect the mains supply to the three terminals inside the IEC plug Live to L, Neutral to N and Earth to E as shown in Figs 1 and 2.

Wire the controller directly back to the main distribution panel. This is particularly important when large pumps or inductive electrical loads are also used.

#### Connecting Solenoid Valves

Connect each solenoid valve to the appropriate output as shown in Figs 1 and 2. The common wire from each solenoid valve should be connected to the "C1" terminal. Valves can be connected in parallel provided the maximum valve output current does NOT exceed the output current rating of the controller.

The solenoid output voltage is an Extra Low Safety Voltage. Keep solenoid cables and connections well away mains voltages as per regulations for Extra Low Safety Voltages.

### Connecting Pumps

Two pump control outputs are available, namely "Pump-1" and "Pump-2".

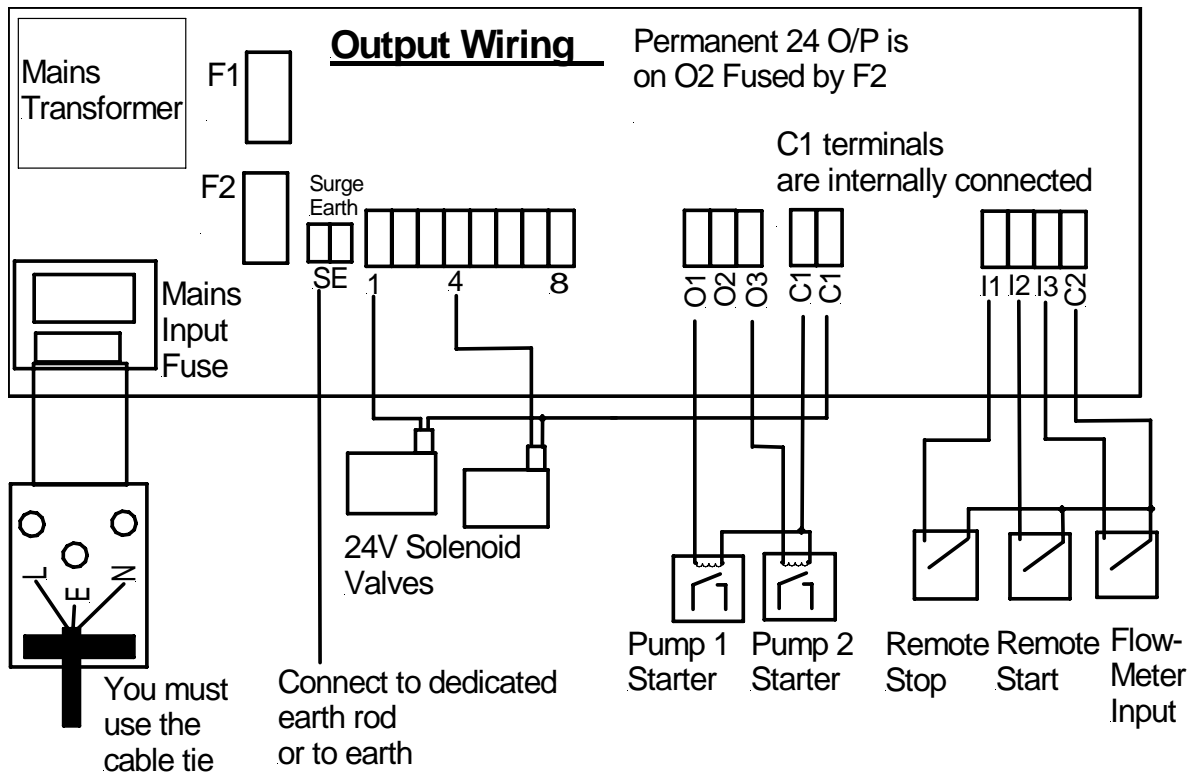
The "Pump-1" output is across the "O1", "C1" terminals. Connect a suitable 24V relay across these terminals to control the pump.

The second pump output is across "O3" and "C1". Connect a suitable 24V relay across these terminals to control the second pump. The second pump output can be attached to programs by configuring pump control Option

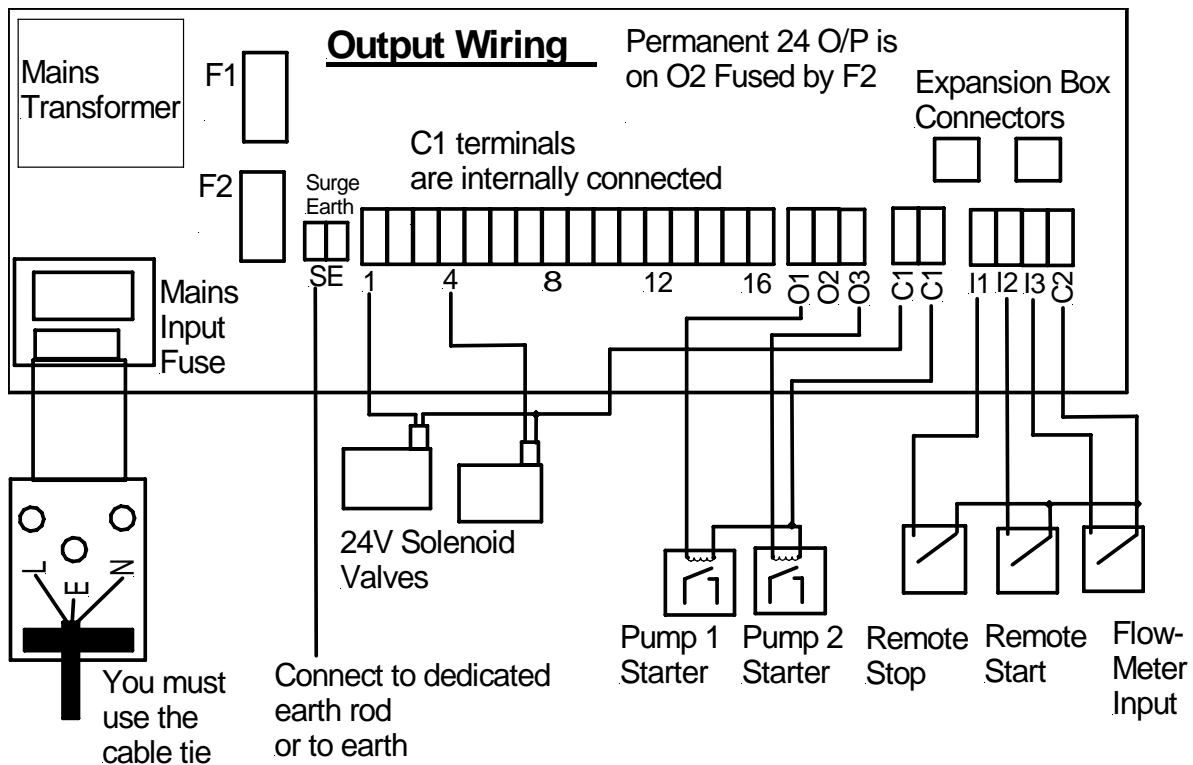
### Surge Earth

If your controller has a surge terminal (marked E1) connect this terminal to a local dedicated earth rod. If this is not possible connect to a good earth.

**Fig 1 Output Wiring for Mi-4 and Mi-8**



**Fig 2 Output Wiring for Mi-12, Mi-16 and Mi-144**



**IMPORTANT: YOU MUST CONNECT SURGE EARTH!**

### 3. More Inputs and Outputs

#### Remote Start

The remote start input is across "I2" and "C2". Joining these terminals will start program 1. The terminals have to be connected for only a short period, 1 second, to activate the program. The contact must be broken before the program will start again.

#### Remote Stop/Low Water Cut Out

The remote stop input is across "I1" and "C2". Joining these inputs halts the irrigation programs. The programs will continue once the short is removed.

This input may be connected to a float switch in the water reservoir so that the irrigation sequence is halted if the water level is low.

When the remote Stop Input is active the following messages can be displayed depending upon Options 9 and 10.

#### Low Tank

"Low Tank" indicates that the water level in the storage tank is low. The irrigation program will temporarily stop. Once the water tank has been filled, the irrigation program will start again.

#### Freeze

"Freeze" indicates that a sensor connected to the remote stop input has been activated. Once the freeze condition has been removed from the input, the irrigation program will start again from the point at which it was temporarily halted.

#### Stop

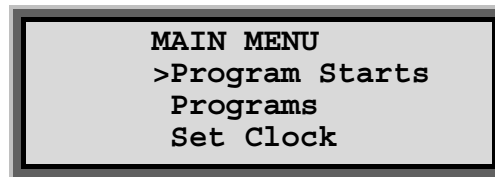
"Stop" indicates that a sensor connected to the remote stop input has been activated. In this case, the irrigation program will not restart when the remote stop condition is removed.

#### 24VAC Permanent Output

A 24VAC permanent output is available across the terminals marked O2 and C1. This output is to supply low power 24VAC devices such as Heron interface cards and the Heron GSM module. This output is fused with a F2 a **0.3A** fuse.

## 4. Getting to know Your Controller

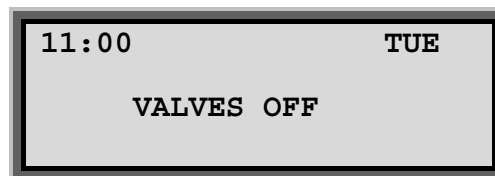
When you switch on the power the **Main Menu** will be displayed, as shown below.



To select any **Main Menu** item press the **OK/SELECT** button.

To return to the **Main Menu** at any time press the **MENU** button.

If you press **MENU** button on the Menu Page you will display the Time Page as shown below. The Time Page shows what valves are currently running.

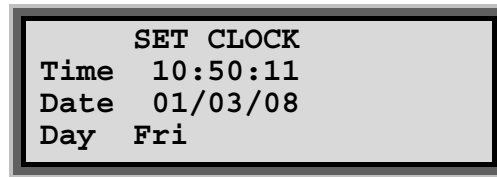


Pressing the **MENU** button from the Time Page will return you to the **Main Menu**.

## 5. Resetting the Clock, Day and Date

Select "**Set Clock**" from the **Main Menu**.

The following screen will be displayed.



Use the **Left** and **Right** arrow keys to move the cursor over the current time to change the time.

Press **Arrow Down** to move cursor over the Date to change the date

Position the flashing cursor over the "day" field press the **Select/OK** button to toggle through the days of the week until the current day is displayed.

Press the **MENU** button to return to the **Main Menu**.



## 6. Set Up or Edit an Irrigation Program.

Select "**Programs**" from the **Main Menu**.

The following screen will be displayed.

```
EDIT PROGRAM
Select Prog? 1
Mins:Secs
```

Initially your controller will be set up to have only 1 program so Press **OK** on this page.

**NOTE:** Your controller can run up to 30 irrigation programs. The number of programs your controller can operate can be changed by setting your controller Options. See section 13 "Changing Basic Configuration Options".

```
PROGRAM 1 #01
1 Valve 1 0:00
1 Valve 2 0:00
1 Valve 3 0:00
```

**NOTE:** Valve times are displayed in minutes and seconds.

Initially the number of valves in a program will be equal to the controller size, an Mi-4 controller will have 4 valves displayed and a Mi-8 controller 8 valves You can increase or decrease the number of valves in any program by setting Program Options.

The number in the top right hand corner of the display is the "line number" for the valve so you know where you are in the programs..

Use the arrow keys to move the flashing cursor over the valve "minutes" and "seconds" fields. Use the number keys to set the time required for each valve in the program to run.

In the example below, **Valve 01** will run for 2 minutes, 30 seconds. The next valve in the program to run will be **Valve 03**. Valve 03 will run for 5 minutes, 10 seconds. Note: **Valve 02** will not operate when the irrigation program runs as the time is zero.

```
PROGRAM 1 #01
1 Valve 1 2:30
1 Valve 2 0:00
1 Valve 3 5:10
```

Press the **Menu** button to return to the **Main Menu**.

## 7. Set Up or Edit an Automatic Program Start Time

Select **"Prog Starts"** from the **Main Menu**.

The following screen will be displayed.

24HR STARTS			#01
Prog 1	at	0:00	off
Prog 1	at	0:00	off
Prog 1	at	0:00	off

**NOTE:** Initially your controller will be set to have a maximum of 3 automatic program starts a day (24 hours). Your controller can have up to 60 automatic starts. The number of automatic starts can be changed by setting the controller's Options. See section 13 "Changing Basic Configuration Options".

The time is displayed in hours and minutes. A start time should be entered using 24hour clock times.

Use the arrow keys to move the flashing cursor over the program number. Use the number keys to enter the number of the program to be started.

Use the arrow keys to move the flashing cursor over the hours and minutes fields. Use the number keys to enter the start time of the program.

**An automatic start must be activated in order for it to work.** Move the flashing cursor over the **"OFF"** field and press the **OK/Select** button. (**OFF** will change to **ON**). . The automatic start has now been activated as shown below.

24HR STARTS			#01
Prog 3	at	6:00	on
Prog 3	at	12:00	on
Prog 7	at	21:30	off

In the example above , **Program 3** will start at 6:00am and then again at 21:30.

Although a start time of 21:30 has been entered for **Program 7**, it **will NOT run**. The automatic start has not been switched on.

Press the **MENU** button to return to the **Main Menu**.

## 8. Starting and Stopping

To manually start a program, a valve or the pump, press the START button. The following screen will be displayed.

```
MANUAL START
>Start Program
  Start Valve
  Start Pump
```

### Program Start

To start a program press **OK**

```
START PROG
Start Prog   1
```

Enter the number of the program to be started. Press **OK** to start the selected program.

### Valve Start

To start a valve, position the flashing cursor next to the **"Start Valve"** option and press **OK**. The following screen will be displayed.

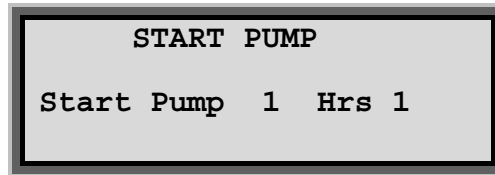
```
START VALVE
Valve  001  Mins   1
```

Enter the number of the valve to be started and the number of minutes it is to run for. Press **OK** to start the selected valve.

## Pump Start

To start a pump, position the flashing cursor next to the “**Start Pump**” option and press **OK** button.

The following screen will be displayed.



Enter the number of hours for the pump to run and press **OK** to start the selected pump.

## Manual Stop

Pressing the **STOP** button at any time when a pump, valve or program is running will stop the pump, valve or program immediately.

## 9. A Couple of Short Cuts

### Set All

When setting up an irrigation program, the **Set All** button allows a quick method of setting a number of valves to run for the same length of time. Select "**Programs**" from the **Main Menu**.

The following screen will be displayed.

```
EDIT PROGRAM
Select Prog? 1
Mins:Secs
```

Press **OK** to select Program 1.

```
PROGRAM 1          #01
1 Valve 01        0:00
1 Valve 02        0:00
1 Valve 03        0:00
```

Press **Set All** button. The following screen will be displayed. Enter the range of valves to be set to the same run time.

```
SET ALL
LINE NUM  1 to 0
Time      0:00
```

The valve range is specified in terms of the line number of a valve in the irrigation program. The line number of a given valve is displayed in the top right hand corner of the program screen.

Enter the number of minutes and seconds these valves are to run for.

In the example below, valves between line number 10 and 15 have all been set to run for 3 minutes 30 seconds each.

```
SET ALL
LINE NUM  10 to 15
Time      3:30
```

Press the **MENU** or **SETALL** button to return the **Edit Program** screen.

## Manual Advance

When an irrigation program is running, press **Manual Advance** to move the program onto the next valve in the sequence.

This can be useful when testing your system.

## 10. Fault Log

If a fault occurs "**Fault**" will appear in the Main Menu.

```
MAIN MENU
Program Starts
Programs
>Fault
```

To view the fault log select "**Fault**" from the **Main Menu**.

The following screen will be displayed. .

```
FAULT PAGE
12:06 VALVE 02 O/L
```

In the example above, there was a current overload when valve 2 was running.

## 11. Taking Care of Your Controller

**Never** - use sharp objects to press the buttons on your controller. Avoid pressing the buttons with your fingernails.

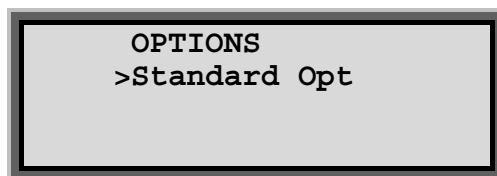
**Always** - ensure the lid screws are screwed down tightly to keep the inside of the controller dry and to reduce exposure to high humidity.



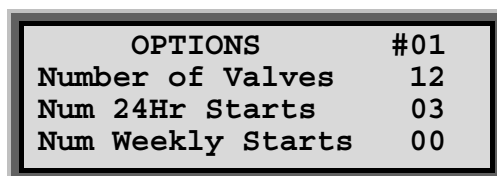
## 12. Changing Basic Controller Options

This section describes the basic configuration options you can set on your controller. There are 16 basic options. If you need to use the more advanced features please refer to the '**Advanced Options**' manual.

To access the controller's basic configuration options, Press and Hold the **Advance** button. The following screen will be displayed.



Select "**Standard Opt**". The following screen lists the controller's basic configuration options.



Use either the number keys or press the **OK/Select** button to set the configuration option to its required value.

The chart below lists the default valve and allowed values for each of the configuration options.

**IMPORTANT: Always fully test any new configuration values after you have changed them to ensure the controller functions as you require.**

**Note:** Your irrigation installer or dealer may have already set the configuration options to the required values for you. If you want Options on the Main Menu set Option 15 to 1.

No.	Option	Brief Description	Allowed values
1	Number of Valves	Set number of valves.	4 –144
2	Num 24hr Starts	Set number of Daily automatic starts.	0-60
3	Num Weekly Starts	Set number of Weekly automatic starts.	0-60
4	Number of Prog	The number of irrigation programs	1-99
5	Pump Prime Mins	Set pump pressurisation time in minutes.	0-59
6	Pump Prime Secs	Set pump pressurisation time in seconds.	0-59
7	Rain Days	Rain sensor connected and number of historical days to be taken into account when measuring rainfall.	0-4
7	Rain Switch Connected	Rain on/off switch connected.	99
8	Water Budget	Display the global percentage adjustment of irrigation programs page AND the display of the enable/disable all automatic starts page.	Y/N
9	Input1 Stop	Controller does a permanent Stop instead of Freeze	Y/N
10	Input1 Low Tank	Display Low Tank instead of Freeze or Stop	Y/N
11	Note Used		
12	Use Gallons	Use gallons rather than litres for flow measurements.	Y/N
13	Config Programs	Enable the changing of valve order within an irrigation program.	Y/N
14	Valve Info	Turn Valve Information display on /off	Y/N
15	Options on Main Menu	Display <b>Options</b> on the Main Menu	Y/N
16	Advanced Options	Display advanced configuration options	0-2

## 1. Number of Valves

Set this to the number of valves attached to your controller.

## 2. Number 24hr Starts

If you need to increase or decrease the number of automatic starts allowed within a 24hour period, use this option. Enter the required number of automatic starts. There will be no change to the operation of the controller just more daily automatic start will be listed. If you do not want any 24hr starts set this Option to 0.

## 3. Number Weekly Starts

If you require weekly starts, enter the number required under this option.

When **Program Starts** is selected from the **Main Menu**, an additional screen, as shown below, will be displayed.

This will enable you to select and set up either the 24hr or weekly starts.

```
PROG STARTS
24hr Starts
>Weekly Starts
```

If **Weekly Starts** is selected then the following screen is displayed.

```
WEEKLY STARTS      #01
Prog 1  Mon    0:00  Off
Prog 1  Mon    0:00  Off
```

First enter the number of the program to be started.

To set the day of the week move the cursor under **MON** and press the **Select/OK** button until the correct day of the week is displayed.

Move the cursor to the "time" field and set the program Start Time.

The automatic start must then be activated. Move the cursor to the "off" field". Press the **Select/OK** button to change this field to "on".

In the example below, Program 1 will start at 10:15 am on Tuesday. Program 2 will start on Wednesday at 21:00pm.

```
WEEKLY STARTS      1
Prog 1  Tue    10:15  On
Prog 2  Wed    21:00  On
```

## 4. Number of Irrigation Programs

Set this option to the number of irrigation programs you need. The controller can support 1 to 60 irrigation programs.

## 5. Pump Pressurisation Time in Minutes

The pump pressurisation time, minutes, can be set with this option. Values between 0 and 59 minutes are allowed.

## 6. Pump Pressurisation Time in Seconds

The pump pressurisation time, seconds, can be set with this option. Values between 0 and 59 seconds are allowed.

## 7. Rain Sensor or Rain Switch Connected

### Rain Sensor

The Heron rain sensor allows the irrigation program to be reduced depending on the amount of rain that has fallen over the last few days. Irrigation programs can be reduced by 25%, 50%, 75% or 100%.

If you have a Heron rain sensor, set this option to the number of days you wish the rain sensor to work over. This is rolling measurement. For example if you set this option to 3 then rain that has fallen within the last 3 days will still be included in the rain fall measurement. The maximum value you can set option to is 4.

Setting this option to zero will disable the rain sensor.

#### Connecting the Rain Sensor

Connect the two terminals inside the rain sensor to Input 2 (across "I2" and "C2"). The terminals in the rain sensor are accessed by removing the bottom of the rain sensor.

#### Using the Rain Sensor

When this option is set, "Rain Fall" will appear in the **Main Menu**.

```
MAIN MENU
Program Starts
Programs
>Rain Fall
```

Select "**Rain Fall**" from the Main Menu.

The following screen will be displayed.

```
RAIN FALL
Rain Fall is 0mm
Reduction Now 0%
Reduce by 25% 3mm
```

The current rainfall measurement in millimetres, and the current level of water reduction, are displayed.

RAIN FALL		
Reduce by	50%	6mm
Reduce by	75%	9mm
Reduce by	100%	12mm

In the example above, 0 mm of rainfall has been measured over the specified period. There has currently been no reduction in irrigation.

If the measured rainfall reaches 3 mm, then irrigation programs will automatically be reduced by 25%. If 6 mm of rainfall is measured, programs will be reduced by 50% and if there is 9 mm of rainfall, irrigation programs will be reduced by 75%. At 12 mm of rainfall irrigation programs will not run.

### Testing the Rain Sensor

The rain sensor can be tested by pressing the spoon down inside the rain sensor.

**Note:** The rain sensor has no effect on a manual valve start.

## Rain On/Off Switch

The Heron controller can also operate with a simple On/Off rain switch. If you have a simple ON/Off rain switch set this option to "99". The On Off rain switch is also connected across I2, C2.

## 8. Water Budget

The water budget option allows:

- All irrigation run times to be temporarily adjusted by a specified percentage (0%-250%).
- All automatic starts to be enabled or disabled.

. If the water budget option is set to "Y", then "**Water Budget**" appears in the **Main Menu**."

MAIN MENU
Program Starts
Program
>Water Budget

Select "**Water Budget**" from the Main Menu.

The following screen will be displayed.

WATER BUDGET
Global Adjust 100%
Starts Enabled Y

If automatic starts are to be disabled set the “Starts Enabled “ field to “**N**”. “**Starts Disabled**” will appear on the Time Page. No irrigation programs will run.

A Global Percentage Adjust value from 1% to 250% can be entered.

**IMPORTANT: Do not leave the percentage value at 0%. No irrigation will run.**

## 9. Remote Stop Option

This controls whether irrigation programs should freeze or permanently stop when the remote stop input is activated.

Set this option to ‘**N**’ to freeze irrigation programs. Irrigation programs will start again from the point at which they stopped when the remote stop condition is removed.

Set this option to ‘**Y**’ to stop irrigation programs. Irrigation programs will not automatically start again when the remote stop condition is removed.’

## 10. Low Tank Display

The “Low Tank” display option changes the remote stop input message to ‘Low Tank’. To display ‘Low tank’ instead of ‘Freeze’ or ‘Stop’, set this option to **Y**. Default is **N**.

## 11. Not Used

## 12. Use Gallons

If you wish to use Gallons rather than Litres set this option to “**Y**”.

## 13. Configure Programs

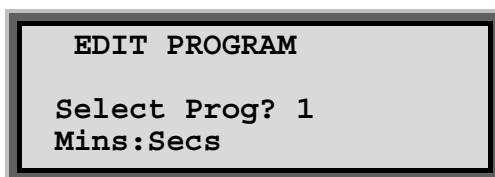
If you wish to change the order in which valves are displayed and run in an irrigation program, then this option should be set to “**Y**”. Any valve can be run in any order within an irrigation program.

For example, if you want to create the following sequence for irrigation program 2.

- Valve 7 – run for 3 minutes
- Valve 5 – run for 1 minute, 30 seconds
- Valve 9 – run for 2 minutes.

Select “**Programs**” from the **Main Menu**.

The following screen will be displayed.



Enter the number of the irrigation program you wish to configure, in this case "2". Press **OK**.

**Step 1** - Use the arrow keys to place the flashing cursor over the valve number on line 01. The valve name will change from "Valve" to "Name". Enter the number of the valve to run first in the irrigation sequence. In this example enter the value "7".

**Step 2** - Use the arrow keys to place the flashing cursor over the valve time on line 01. The valve name will change back to "Valve". Enter the required run time for the first valve in the irrigation sequence. In this example enter the value "3:00".

Use the arrow keys to place the flashing cursor over the valve number on line 02.

Repeat steps 1 and 2 above to enter the details of the second valve to be run in the irrigation sequence. In this case, set the valve number to "5", and the run time to "1:30".

Use the arrow keys to place the flashing cursor over the valve number on line 03.

Repeat steps 1 and 2 above to enter the details of the third valve to be run in the irrigation sequence. In this case, set the valve number to "9", and the run time to "2:00".

PROGRAM 2		#01
1 Valve	7	3:00
1 Valve	5	1:30
1 Valve	9	2:00

## Changing the Zone Number

In the example below, there are three valves displayed called VALVE 1, VALVE 2 and VALVE 3.

The number on the left is the irrigation zone number for the valve. They are all set to 1 so all valves are in the same zone (zone1). As they are in the same zone NO valves will run together.

If, for example, you wanted VALVE 01 and VALVE 02 to run together you would need to assign them to different irrigation zones, as follows:

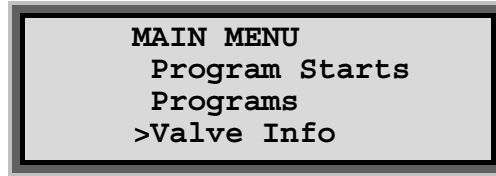
To do this move the cursor over the zone number for VALVE 02 and change it to 2.

PROGRAM 2		#01
1 Valve	1	2:00
2 Valve	2	1:30
1 Valve	3	1:30

## 14. Valve Info.

Valve Information allows you to change the properties of valves. For example you can change the name of the valve. If you wish to edit valve information set this option to **Y**.

When this option is set, "**Valve Info**" will appear in the **Main Menu**.



## 15. Display "Options" on the Main Menu

If you require to enter Options from the Main Menu set Option 15 to "**Y**".

With Option 15 set to "**N**", the only way to access 'Options' is to press and hold the **Advance** button for 5 seconds.

## 16. Display Advanced Options

If you wish to use the '**Advanced Options**' set Option 16 to "**1**".

If you wish to use the **Program Options** or the **Pump Configuration Options** as well, set Option 16 to "**2**".