Basic User and Installation Manual

Mi-4B   Mi-8B   Mi-16B Battery Controller

1.   About This Controller

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

Your controller will operate **9-24V DC latching 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.

The controller opens a DC latching valve by passing a positive pulse through the coil and closes the valve by passing a reverse polarity pulse through the coil.

Mounting the Controller

The controller should be mounted on a wall using four screws, one screw through each of the corner lid bolt holes.

Wiring Up Your Controller

The controller should be wired up as shown in Fig 1 below.

Connecting Lead Acid Battery and 12V Solar Panel

The controller will run from a 12VDC lead acid battery and solar panel.

Mount the 12V battery in the holder as shown in Fig 1. **You must fit the battery strap to hold the battery in place**. Connect the battery to the B+ and B- terminals with the lead provided.

Connect the solar panel to the S+, S- terminals as shown in Fig 1. The solar panel should have a maximum output current of 250mA.

Note:

The controller will switch off its display after 2 minutes if no buttons are pressed to save power. When ever a key is pressed the controller will switch the display back on again.

Always remove the battery before shipping.

Connecting Solenoid Valves

Connect each solenoid valve to the appropriate output as shown in Fig 1. The **RED (positive) wire** from each solenoid valve should be connected to the **"C1" terminal**.

Connecting The Pump Output

One master valve or pump output is available. This is a latching type, that is, positive pulse for ON and a reverse pulse for OFF. The "Pump-1" output is across the "O1", "C1" terminals. To connect a pump you will need a Heron latching relay RELL-DIN see Fig 3.

Adjusting Output Voltage

The output voltage is boosted to 14V normally. The output voltage can be further boosted to 28V by removing the jumper on the power supply board. You will need a higher output voltage if you are using 24VDC coils or your valves are remote from the controller.
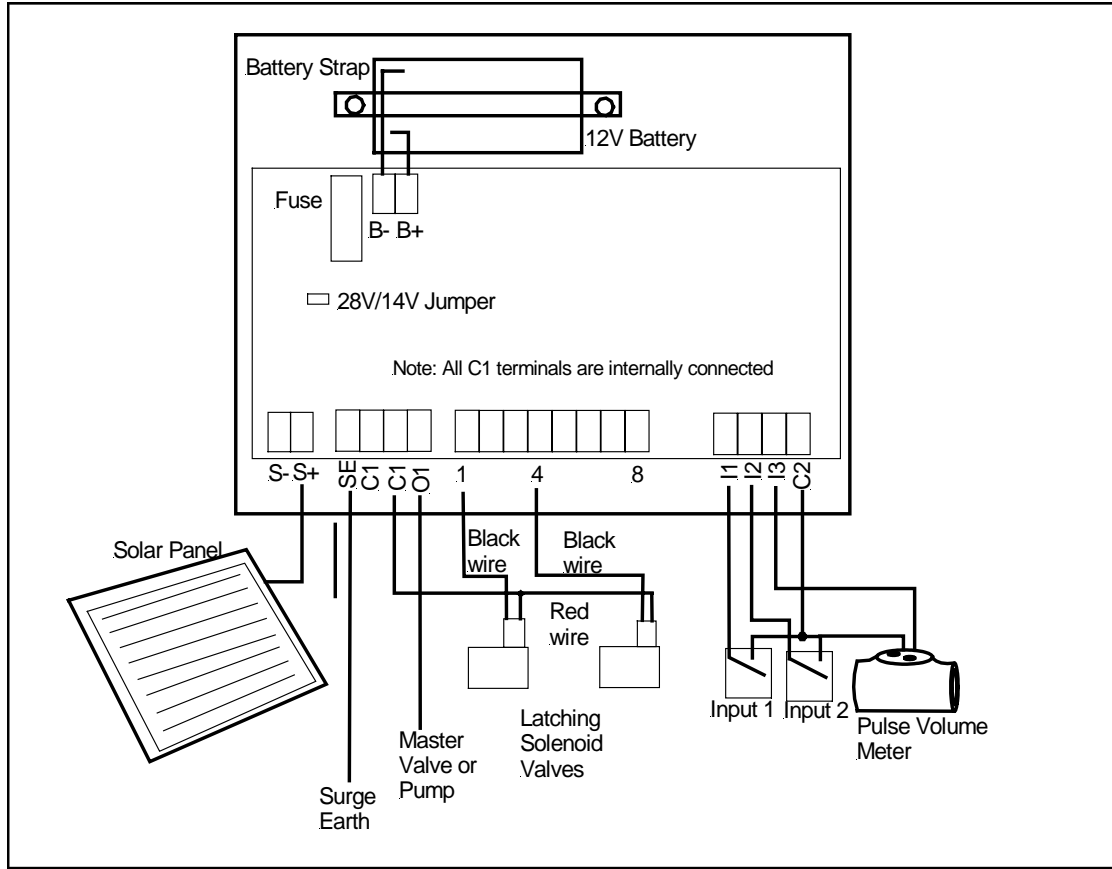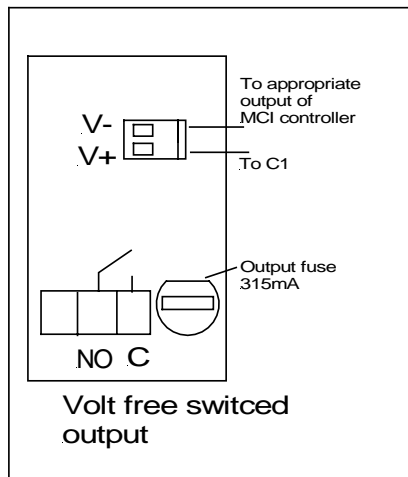
Fig 1. Wiring Diagram

Battery Strap

12V Battery

Fuse

B- B+

28V/14V Jumper

Note: All C1 terminals are internally connected

S- S+   SE C1 C1 O1   1   4   8   I1 I2 I3 C2

Solar Panel

Black wire

Black wire

Red wire

Latching Solenoid Valves

Input 1 Input 2 Pulse Volume Meter

Master Valve or Pump

Surge Earth

Fig 3 Wiring Heron Latching Relay   (RELL-DIN)

To appropriate output of MCI controller

V-
V+

To C1

Output fuse 315mA

NO C

Volt free switced output

2.   Inputs

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.

3.   Getting to know Your Controller

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

```
        MAIN MENU
     >Program Starts
      Programs
      Battery
```
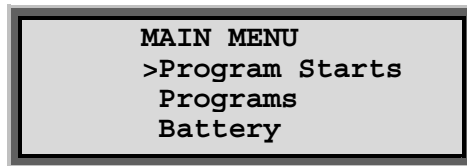
To select any **Main Menu** item press the **OK/SELECT** button.

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

I

f you press **MENU** button on the Menu Page you will display the Time Page as shown below. The Time

```
11:00              TUE

     VALVES OFF
```

Page shows what valves are currently running.

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

4.   Displaying The Battery Voltage

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

The following screen will be displayed. This shows the current battery voltage and the charging status. The controller can either charge the battery fast or slow depending upon the current charge of the battery.

```
        Battery
Battery Voltage 13.0V
Fast Charge
```
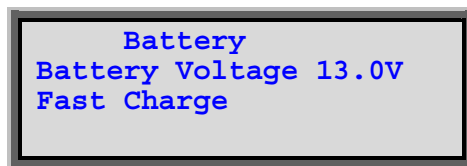
5.   Resetting the Clock, Day and Date

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

The following screen will be displayed. The time is displayed in hours, minutes and seconds.

```
        SET CLOCK
Time   10:50:11
Date   01/03/08
Day    Fri
```
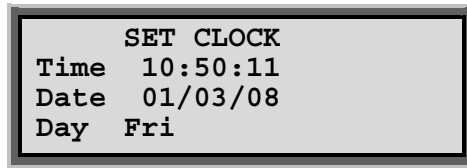
Use the left and right arrow keys to move the flashing cursor over the **Time**, **Date** and **Day** fields.

Position the flashing cursor over the hours, minutes, day, month, or year fields. Use the number keys to set these fields to the correct values.

Position the flashing cursor over the "day" field press the **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 one 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 and **Valve 02** will run for 5 minutes, 10 seconds.

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

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".

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 and set the time.

An automatic start must be activated in order for it to work. Move the flashing cursor over the "**OFF"** field and press the **Select** button, and the **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 12:00.

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.
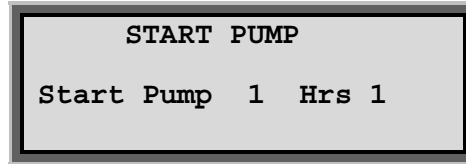
```
        START VALVE

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.

```
        START PUMP

Start Pump  1  Hrs 1
```

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

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.
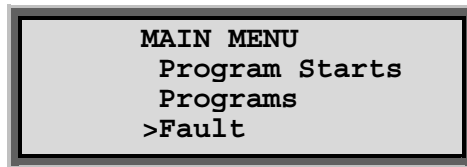
Manual Advance

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

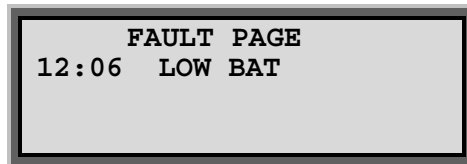This can be useful when testing your system.

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   LOW BAT
```

In the example above, the battery voltage is low.

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, select "**Options**" from the **Main Menu**. The following screen will be displayed.

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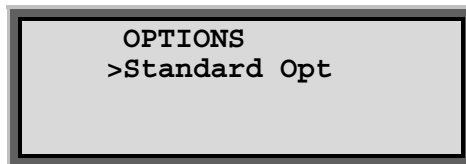
Select **"Standard Opt".** The following screen lists the controller's basic configuration options.

```
      OPTIONS      #01
 Number of Valves    12
 Num 24Hr Starts     03
 Num Weekly Starts   00
```
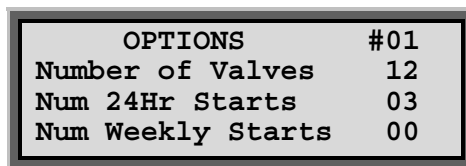
Use either the number keys of press the **OK/Select** button to set the configuration option to its required value.

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.

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	Manual Percentage	Display the global percentage adjustment of irrigation programs	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	Autos On/Off	Use 'Disable Automatic Starts' facility	Y/N
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 **Options** 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 **OK** button until the correct day of the week is displayed.

Move the cursor to the "time" field and set the program start time using the 24hr clock value.

The automatic start must then be activated. Move the cursor to the "**off**" field". Press the **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 9:00pm.

```
   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.

The amount of rainfall to initiate a 25%, 50%, 75% and 100% reduction in irrigation are also specified on this screen. Use the forward arrow to move down this screen to see and enter the 50%, 75% and 100% irrigation reduction trip measurements.

```
        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 rainfall measured reaches 3 mm, then irrigation programs will automatically be reduced by 25%. If 6 mm of rainfall is measured within the specified period, then irrigation programs will be reduced by 50%. At 9 mm of rainfall, irrigation programs will be reduced by 75%. At 12 mm of rainfall all 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. Manual Percentage

The Manual Percentage option allows all irrigation run times to be temporarily adjusted by a specified percentage (0%-250%). Set this option to **'Y'** if you require manual percentage adjust.

Select "**Man Percent** " from the Main Menu.

```
       MAIN MENU
    Program Starts
    Program
   >Man Percent
```

The following screen will be displayed:-

```
      MANUAL PERCENT

 All PROG PERCNT 100%
```

If no increase or decrease in irrigation is required, then the manual percentage value must be set to 100%.

A manual percentage value from 1% to 250% can be entered. To reduce irrigation program run times by half, then the Global Percentage Adjust value should be set to 50%. To double the irrigation programs run time then this value should be set to 200%.

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. Automatic Starts Disable

The Automatic Starts Disable option allows all automatic starts to be disabled by pressing and holding down the **Select** key when on the Time page. When automatic starts are active the controller will display the following:-

```
11:00                TUE

       VALVES OFF
        AUTOS ON
```
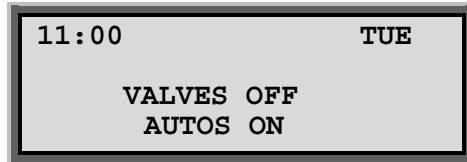
If the **Select** key is pressed and held down for **4 seconds** the controller will then display the following and all automatic starts will be disabled until the **Select** key is pressed again.

```
11:00                TUE

       VALVES OFF
       AUTOS OFF
```
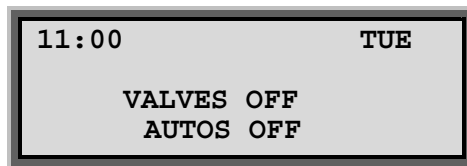
12. Use Gallons

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.

```
 EDIT PROGRAM

Select Prog? 1
Mins:Secs
```

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 Information.

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 calve information set this option to **Y**.

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

```
     MAIN MENU
   Program Starts
   Programs
  >Valve Info
```

15. Display "Options" on the Main Menu

If you do not wish to display "**Options"** on the Main Menu so the controller is more secure and less vulnerable to accidental changes set Option 15 to "N".

With Option 15 set to "N", the only way to access 'Options' is to press and hold the **Manual Advance** button for 10 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 option to **"2"**.