

HERON ELECTRIC COMPANY LTD

Basic User and Installation Manual

MCI-4, MCI-8, MCI-12, MCI-16, and MCI-96

Doc ref.MCI4-96 BASIC-6 March 2003
Basic manual for version 49XXX, controllers

Copy of this manual is at www.heron-electric.com
Price for a copy to be posted is £10

1. About This Controller

Congratulations, you are now the owner of a Heron MCI 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. Wiring Up

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 MCI-96, MCI-16, MCI-12 and all DC controllers should be wired up as shown in Fig 2.

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

For an MCI-96 with more than 16 valves, wire up the output expansion box to the connector marked "EX".

Connecting Mains Supply: IMPORTANT

Switch off the mains supply before connecting the controller.

Ensure the mains supply voltage is the same as the voltage of the controller. The controller voltage is displayed inside the controller.

As with any equipment used in damp conditions, the mains supply should be fused with a Residual Current Circuit Breaker (3 amp fuse).

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

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 from 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 "Pump-2" output is across "O3" and "C1". Connect a suitable 24V relay across these terminals to control the second pump.

The second pump start output, "Pump-2", operates with irrigation programs 7 to 15.

Surge Earth

If your controller has an 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 Wiring for MCI-4 and MCI-8

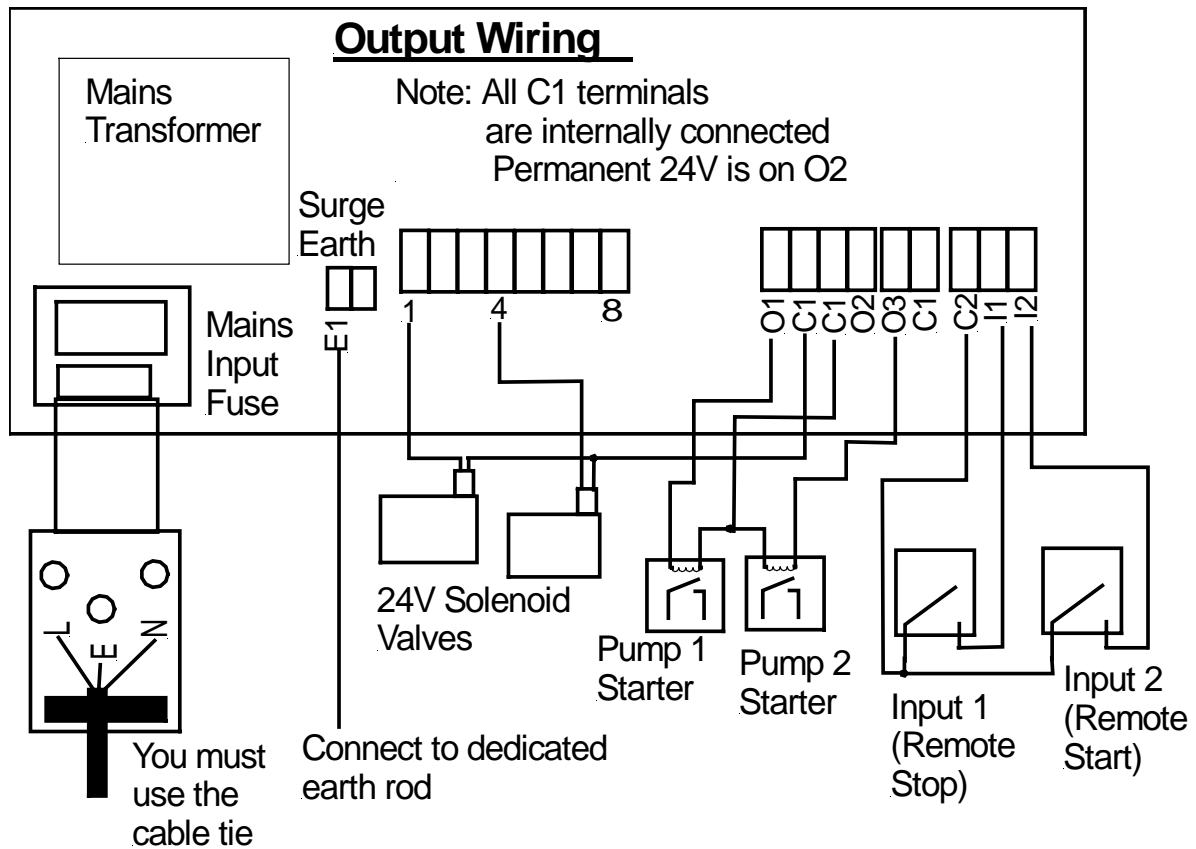
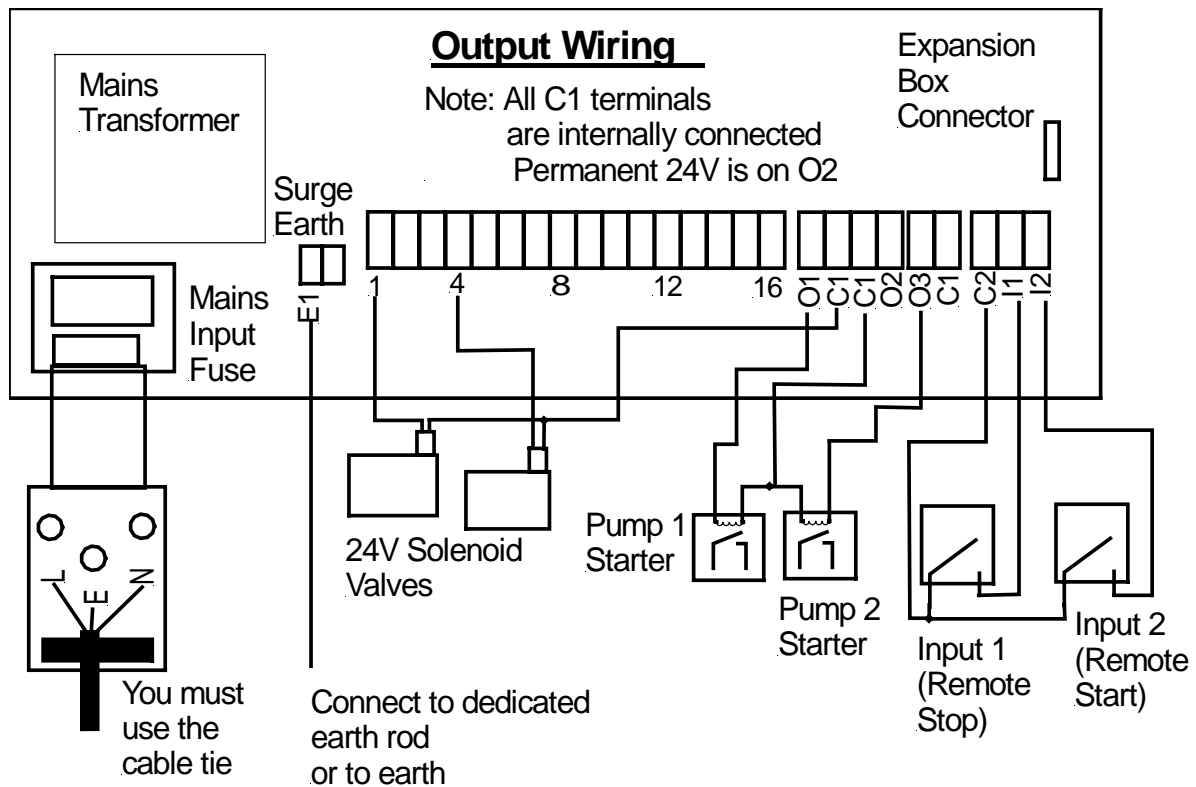


Fig 2 Wiring for MCI-12, MCI-16 and MCI-96



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. If the contacts are left shorted program 1 will continually cycle.

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.

24V Output

A 24V supply is permanently available across "O2" and C1".

PC Connection

The PC connection is white 4 Pin connector on the top side of the processor board. (The processor board is mounted in the lid.) Plug a Heron RS232 interface onto this connector (RS232INT-B) to allow your controller to be connected to a PC running Ground Control software.

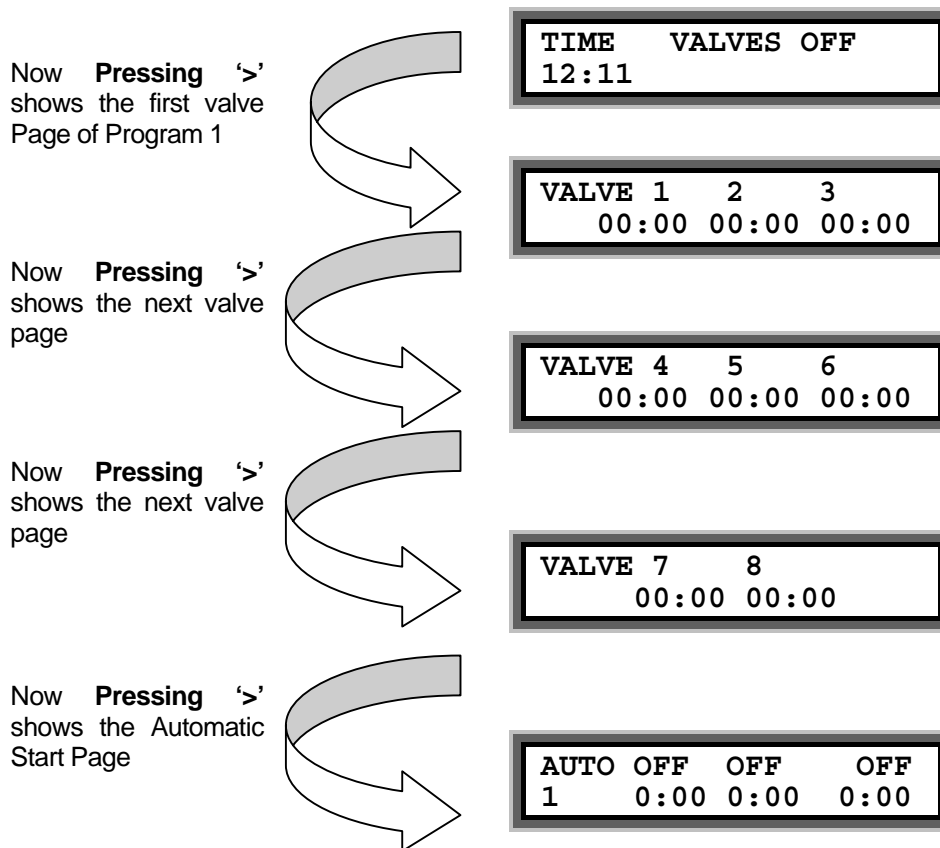
Interface Board Connection

The Interface Board Connection is Black 10 pin connector in the middle of the processor board. (The Processor board is mounted in the lid.) You can plug the following boards into this connector to allow a variety of sensors to be connected to your MCI controller:-

- Remote Start Expansion Board
- Single Analogue Interface Board
- Multi-Interface Board

4. Getting to know your controller

When the you switch on the power the **Time Page** is displayed as shown below.



Now pressing '>' will return you to the Time Page again.

5. Your First Irrigation Program

By means of an example this section describes how to set an irrigation program and set an automatic start. The example will set **Valve 1 for 10 minutes, Valve 2 for 5minutes** in irrigation **program 1** and then set an **automatic start** to start the irrigation program at **6.00 am**.

Setting the Irrigation Program

Press '>' until the valve page is displayed as shown below.

With the cursor flashing under **"VALVE 1"**, press "1" and "0" to enter 10 minutes as shown below.

VALVE	1	2	3
	10:00	0:00	0:00

Press the ">" twice to move the cursor under **VALVE 2** and press "5" as shown below.

VALVE	1	2	3
	10:00	5:00	0:00

Setting the Automatic Start Times - The Steps

Press the arrow forward key ">" until the **"Automatic Start Time"** page is displayed.

AUTO	OFF	OFF	OFF
1	0:00	0:00	0:00

With the cursor flashing on the first zero, press the "6" on the keypad to enter a 6:00 am start time.

AUTO	OFF	OFF	OFF
1	6:00	0:00	0:00

You must now activate the start time by pressing the **"Select"** button whilst the flashing cursor is still positioned on the start time You will see the display above the start time change **from "OFF" to "PRG1"**.

AUTO	PRG1	OFF	OFF
1	6:00	0:00	0:00

"PRG1" indicates that a start time has been activated as shown above.

To enter a second automatic start time, press the arrow forward key ">" until it is positioned on the first zero of the second start.

Press the arrow forward key ">" to return to the **"Time Page"**.

Congratulations....You have now set up your first irrigation program.

6. Starting and Stopping

To manually start the **pump, a valve or an irrigation program** press 'Start/Stop' and the following page will be displayed.

```
START >PUMP VALVE  
PROG
```

Pump Start

With the flashing arrow pointing at "**PUMP**" press "**Select**" to start Pump 1. The display below will be shown.

```
TIME PUMP ON  
12:30
```

Valve Start

Press the arrow forward key ">" to position the flashing arrow to point at "**VALVE**".

Press "**Select**" and the page below is shown.

```
START VALVE 5 TIME 2
```

Enter the number of the valve to be started.

Press the ">" and then enter the number of minutes the valve is to run.

In the example above valve 5 has been set to run for 2 minutes.

Now press "**Select**" to start this valve. The "**Time Page**" will be displayed as shown below.

```
TIME VALVE 5 1:58  
12:00
```

Program Start

To start an irrigation program press the arrow forward key ">" to move the flashing arrow to point at "**PROG**".

Press "**Select**" to start the irrigation program. The time page will be displayed showing the program running.

```
TIME VAL 1 PRG 1  
12:22
```

Manual Stop

Pressing "**Start/Stop**" at any time when a program, valve or pump is running will stop the program, valve or pump immediately.

7. A Couple of Short Cuts

Set All

When setting up an irrigation program, the **'Set All'** key is a quick method of setting a number of valves to the same time.

When the **"Enter Valve Time"** page is displayed, press the **"Set All"** key. The following page will be displayed.



Using the arrow forward key ">" and the keypad, the range of valves to be set to the same run time, and the run time itself, can be entered. In the example shown above, valves 2 through to 5 have all been set to run for 20 minutes each.

Pressing **"Set All"** again will return you to the program.

Manual Advance

When the 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.

8. Resetting the Clock

- Press ">" until the "**Time Page**" is shown.
- Now Press and hold down the "**0**" key for five seconds. A black flashing cursor will appear.
- Using number keys and ">" the correct time of day can be entered.
- When you have reset the time, press the ">" twice or wait **15** seconds. The black flashing cursor will disappear.
- The time has been reset.

9. Fault Messages

Overload

During the running of an irrigation program a current overload condition may occur. The most common reasons for a current overload condition are:-

- A short circuit on the solenoid valve wiring
- Too many valves running at the same time
- A faulty solenoid valve.

Should a current overload condition occur then the irrigation program will skip to the next valve to be run in the sequence.

Once the irrigation program has finished, the "Valve Fault" message will be displayed along with the number of the valve where the fault was detected. In the example below, the second valve in the irrigation program was faulty.

TIME	VALVE 02
12:11	O/L 1 FAULT

The controller will continue to run irrigation programs until four overload conditions are registered. The "Valve Fault" message will continue to be displayed after an irrigation program has run until the "Start/Stop" button is pressed.

If four overload conditions are registered then the running of all irrigation programs will cease. Pressing "Start/Stop" will reinitiate the running of irrigation programs again.

O/L1 means a semi short circuit. O/L1 means a direct short circuit.

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.

10. Taking Care of Your Controller

Battery Back-Up.

Your controller has a battery to keep the clock running when there is no mains power. The battery will keep the clock running for 3-5 years.

To ensure the battery lasts for the life of the product avoid disconnecting mains power for months at a time. However, should the battery run flat, it can be replaced.

The battery is located inside the lid on the top right hand side. To replace the battery, disconnect mains supply and open the lid. The battery is simply slipped out of its holder and a new one inserted. The battery type is CR 2016.

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

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

Leave Mains Power On Over the Winter - to keep the controller warm and prevent the inside of the casing becoming damp.

11. Fuses

The following fuses are fitted. **Never fit higher values. All Fuses are Slow Blow.**

AC Output Controllers

F1	Mains Input Fuse 630mA	(In Plastic Mains Input Connector)
F2	24 Volt Bulk Fuse 2.0A	(Left of Bottom Board)
F3	2 nd Pump Output and Permanent 24V output 630mA	(Right of Bottom Board)
F4	Electronics Fuse 250mA	(On board in lid)

DC Output Controllers

F1	Mains Input Fuse 630mA	(In Plastic Mains Input Connector)
F2	12Volt Bull fuse 250mA	(Left of Bottom Board)
F2A	24 Volt Valve Output Fuse 1.6A	(Left of Bottom Board)
F3	Permanent 24V output 630mA	(Right of Bottom Board)
F4	Electronics Fuse 250mA	(On board in lid)

USA This product has been certified as an FCC **Class B** device.

Declaration of Conformity

We herewith declare that all products manufactured by the company below meet the requirements of EC directives.

Applied Standards Are:

EN 50081-1 EMC Generic Emission

EN 50082-2 EMC Generic Immunity

To comply the product must be permanently installed in accordance with the installation instructions provided and the electrical supply must be sinusoidal.

USA This product has been certified as an FCC **Class B** device

Heron Electric Co Ltd,

Unit G15 Rudford Industrial Estate, Arundel, England

12. Changing Configuration Options

This section describes the basic options you can set on your controller. There are just 15 basic options. If you need to use the more advanced features please refer to the 'Advanced Options' manual.

To access the configuration options press and hold down "**Manual Advance**" button for **10 seconds**. The following page will be displayed.

OPTION	1	2	3
	8	3	0

The arrow forward key ">" is used to position the cursor under the option you want to change. Use the keypad to enter the required number, as described below, to activate the option.

In the example above, Option's 1,2 and 3 have been set to 8, 3 and 0. When the required options have been set, press the arrow forward ">" or arrow backward key "<" repeatedly until the 'Time' page is shown.

IMPORTANT: Always fully test any new configuration after you have changed any options to check the controller functions as you require.

Note: You irrigation installer or dealer may have already set the configuration options to the required values for you.

The 15 basic options are listed below.

Option	Brief Description	Default Value
Option 1	Set number of valves.	4-96
Option 2	Set number of Daily automatic starts.	3
Option 3	Set number of Weekly automatic starts.	0
Option 4	The number of irrigation programs	1
Option 5	Set pump pressurisation time in minutes.	0
Option 6	Set pump pressurisation time in seconds.	2
Option 7	Rain sensor connected and number of historical rain days	0
Option 8	The Day of the week (1 = Monday, 2 = Tuesday)	1-7
Option 9	Controller does a permanent Stop instead of Freeze	0
Option 10	Display Low Tank instead of Freeze or Stop	0
Option 11	Use Percentage Up and Down	0
Option 12	Not used	0
Option 13	Use 'Disable Automatic Starts' facility	0
Option 14	Enable Serial Number Page (MCI-100S Only)	0
Option 15	DISPLAY ADVANCED OPTIONS (OPTIONS 16 TO 72)	0

Number of Valves (Option 1)

If you increase the number of valves on your controller you will need to change Option 1. For example if you have upgraded a 16 valve controller to a 32 valve controller, enter '32' under Option 1. There will be no change to the operation of the controller, just more valve pages will be displayed. (Values between 4 and 96 are allowed).

Number of Daily Automatic Starts (Option 2)

If you need to increase or decrease the number of Daily automatic starts change Option 2. Enter the required number under Option 2. There will be no change to the operation of the controller just more Daily automatic start pages will be displayed. (Values between 0 and 51 are allowed).

Number of Weekly Automatic Starts (Option 3)

If you need to increase or decrease the number of Weekly automatic starts change Option 3. Enter the required number under Option 3. Values between 0 and 32 are allowed.

When weekly programming is selected an additional page will be displayed for each automatic start. An example is shown below.

AUT 4
OFF MON AT 0:00

- To enable the automatic start move the cursor under 'OFF'. Now press the **Select** button to select the program.
- To set the day of the week move the cursor under **MON**. and press the **Select button** repeatedly to change the day of the week.
- Set the time move the cursor under the time and change it.

AUT 4
PRG1 TUE AT 12:00

In the example above Program 1 will start at 12:00 on Tuesday.

Number of Irrigation Programs (Option 4)

Set option 4 to the number of irrigation programs you need. A maximum of 16 irrigation programs are allowed. If this is option is not set the controller will use just one irrigation program.

Once you have set this option you can then modify and use more than one irrigation program. Modification of additional irrigation programs is exactly the same as modifying Irrigation Program 1. All you have to do is set the number of the program you want to edit.

Pump Pressurisation Time in Minutes (Option 5)

The pump pressurisation time (in minutes) can be set with Option 5. (Values between 0 and 99 minutes are allowed).

Pump Pressurisation Time in Seconds (Option 6)

The pump pressurisation time (in seconds) can be set with Option 6. (Values between 0 and 99 seconds are allowed).

Rain Sensor to Reduce Watering (7)

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. Two trip points can be set.

If you have a rain sensor, set Option 7 to the number of days you wish the rain sensor to work over. For example if you set Option '7' 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 7 to is 4.

Setting Option 7 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 option 7 is set, the rain page is displayed after the Automatic Start pages. Press ">" or "<" to view the page. The rain page is shown below.

RAIN	ADJ	50%	100%
2mm	TRIP	4mm	9mm

On the rain page you can set two trip points in mm of rain fall. When these trip points are met irrigation programs will run for either :

- 50% (half) of their normal time
- 0% of their normal time (i.e. not run).

To set a trip point move the cursor under the appropriate percentage (50%, or 0%) and enter a number . In the example above trip points have been set at 4 mm and 9 mm.

Testing the Rain Sensor

The rain sensor can be tested by pressing the spoon down inside the rain sensor . Pressing the spoon down every 10 seconds will increment the rain fall by 1 mm. If you press the spoon enough times so that a trip level is reached you will see a reduction in the irrigation watering programs.

Note:

- The rain sensor has no effect on a manual valve or manual program start
- One minute must elapse before the percentage reduction will be registered after the threshold is reached.

Setting the Day of the Week (Option 8)

The current day of the week for weekly automatic starts should not normally need changing. If you do need to change the day of the week set Option 8 to 1 for Monday, 2 for Tuesday, 3 for Wednesday etc.

Remote Stop Option (Option 9)

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

Set option 9 to '0' to freeze irrigation programs. Irrigation programs will start again from the point at which they stopped when the remote stop condition is removed.

Set option 9 to '1' to stop irrigation programs. Irrigation programs will not automatically start again when the remote stop condition is removed.'

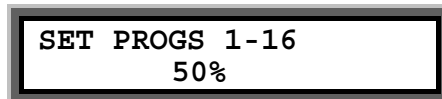
'Low Tank' Display (Option 10)

Option '10' changes the remote stop input message to 'Low Tank'. To display 'Low tank' instead of 'Freeze' or 'Stop', set option '10' to '1'. Default is '0'.

Percentage Up and Down (Option 11)

Percentage Up and Down allows all irrigation run times to be temporarily adjusted by a specified percentage (0%-250%). With Option 25 set to '1' the following page will be displayed after the Automatic Start pages.

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



SET PROGS 1-16
50%

In the example above irrigation programs will run for half their normal time.

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

Automatic Start disable (Option 13)

Option 13 allows all automatic starts to be disabled by pressing the **Select** key when on the Time page. When automatic starts are active the controller will display the following:-



TIME AUTOS ON
12:00

If the **Select** key is pressed the controller will then display the following and all automatic starts will be disabled until the **Select** key is pressed again.



TIME AUTOS OFF
12:00

Enable and Display Advanced Options (Option 15)

If you wish to use the 'Advanced Options' set Option 15 to 1. Advanced Options are Options 16 onwards.

With option 15 set at 0 you will not be able to access the Advanced Options. Furthermore, the controller will ignore the value of all Advanced Options if Option 15 is 0.