Large Terracotta Irrigation Controller User Manual

Dr Bernie Omodei
Measured Irrigation
5/50 Harvey Street East, Woodville Park SA 5011
Mobile 0403 935277
Email bomodei@measuredirrigation.com.au
Website www.measuredirrigation.com.au

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1. Introduction

Terracotta is porous and so the water level in the bowl falls as water evaporates from the outside surface of the bowl. A float inside the bowl floats on the water. When the water level reaches the low level, a magnet inside the float activates an unpowered valve so that the valve opens and the irrigation starts automatically. During the irrigation event, an adjustable control dripper drips water into the bowl and the water level rises. When the water level reaches the high level, the magnet inside the float disengages from the valve so that the valve closes and the irrigation stops automatically. The adjustable control dripper is used to adjust the water usage to suit the water requirements of the plants. The adjustable float is used to adjust the frequency of irrigation.

Terracotta bowl showing float and water level

Float showing the ring magnet at the bottom of the float

Having set the adjustable control dripper, the water usage (litres per week for example) responds to the prevailing on site evaporation and rainfall. The water usage is proportional to the net evaporation rate (evaporation minus rainfall).

2. Key features of the Large Terracotta Irrigation Controller

1. Use for any size irrigation application with any size solenoid valve (latching or non-latching)
2. The water in the terracotta bowl is protected from algae, mosquitoes and thirsty animals
3. Completely automatic
4. Smart irrigation – the irrigation is controlled by the prevailing weather conditions
5. Use for gravity feed or pressurised irrigation
6. Use for sprinkler or drip irrigation
7. Use for PC (pressure compensating) drippers or NPC (non pressure compensating) drippers
8. Use for porous hose irrigation (for example, weeper hose or soaker hose)
9. You can adjust the water usage (litres per week for example) by adjusting the flow rate of the control dripper
10. You can adjust the irrigation frequency by adjusting the float to change the volume of water discharged by the control dripper during the irrigation event (between 400 ml and 2300 ml)
11. Adjusting the water usage does not affect the irrigation frequency, and adjusting the irrigation frequency does not affect the water usage
12. The water usage and irrigation frequency are directly proportional to the net evaporation rate (evaporation minus rainfall)
13. When there is an unexpected heat wave, the water usage and irrigation frequency increase
14. When it rains, water enters the terracotta bowl and delays the start of the next irrigation
15. A timer is not required
16. If you are using the same drippers throughout the irrigation application including the control dripper, the water usage is independent of the pressure
17. You can irrigate directly from a rainwater tank without using a pump
18. A light sensor provides the option of irrigating at night time only
19. Uses much less water without affecting the yield
20. Simple and low tech, therefore fewer things can go wrong
21. Provided you have a continuous water supply, you can leave your irrigation application unattended for months on end

3. Installing the Large Terracotta Irrigation Controller

Step 1. Position the Large Terracotta Irrigation Controller in a suitable location in your garden so that the evaporation at the controller matches the evaporation at your plants. Use 2 house bricks (for example) to support the terracotta bowl.

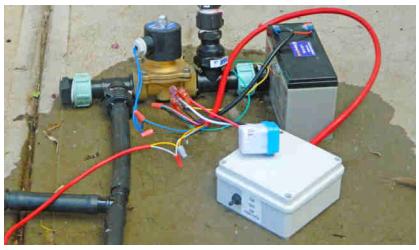
Step 2. Connect a water supply to the irrigation controller. The water pressure should be at least 10 kPa during the irrigation event.

Step 3. Connect the adjustable control dripper to the irrigation zone so that it drips water into the terracotta saucer during the irrigation event. Use the cable tie provided to secure the adjustable dripper to the terracotta saucer.

Adjustable control dripper

Step 4. The control box has 11 colour-coded wires which need to be connected to the various components as follows:

Control box



Eleven colour-coded wires connected to the relevant components

Connect the **red** wire to the positive terminal from the 12V DC power supply.
Connect the **black** wire to the negative terminal from the 12V DC power supply.
Connect the **yellow** wire to one of the wires from the float switch.
Connect the **white** wire to the other wire from the float switch.
Connect the **blue** wire to one of the wires from the solenoid valve.
Connect the **green** wire to the other wire from the solenoid valve.
Connect the **brown** wire to the white wire from the light sensor (connected prior to shipment).
Connect the **purple** wire to the black wire from the light sensor (connected prior to shipment).
Connect the **orange** wire to the red wire from the light sensor (connected prior to shipment).

12V DC power supply for the solenoid valve

Connect the **pink** wire to the positive terminal from the 12V DC power supply.
Connect the **grey** wire to the negative terminal from the 12V DC power supply.

Alternative power supply for the solenoid valve

Connect the **pink** wire to one of the wires from the alternative power supply.
Connect the **grey** wire to the other wire from the alternative power supply.

4. Large Terracotta Irrigation Controller for latching solenoids valves

This section is only relevant if you have purchased the version of the Large Terracotta Irrigation Controller for latching solenoid valves.

Latching solenoids require power only when they are being turned on or off, and so a small 9 volt battery is often be used (sometimes two 9 volt batteries are used). In order for the battery to also power the irrigation controller, the light sensor is not provided.

External connections for the control box

The control box has 6 colour-coded wires which need to be connected to the various components as follows:

Connect the **red** wire to the positive terminal from the 12V (9V) DC power supply.
Connect the **black** wire to the negative terminal from the 12V (9V) DC power supply.
Connect the **yellow** wire to one of the wires from the float switch.
Connect the **white** wire to the other wire from the float switch.
Connect the **blue** wire to the red wire from the latching solenoid valve.
Connect the **green** wire to the black wire from the latching solenoid valve.

Multiple latching solenoid valves

If there are 2 solenoid valves, connect the second solenoid valve (valve 2) in parallel with the first solenoid valve (valve 1).

If there are more than 2 solenoid valves, you will need additional control boxes. All the control boxes should be connected to the power supply and connected in parallel to the float switch on the Large Terracotta Irrigation Controller.

- Connect solenoid valve 3 to control box 2
- Connect solenoid valve 4 in parallel with solenoid valve 3
- Connect solenoid valve 5 to control box 3
- Connect solenoid valve 6 in parallel with solenoid valve 5
- Connect solenoid valve 7 to control box 4
- Connect solenoid valve 8 in parallel with solenoid valve 7
- Connect solenoid valve 9 to control box 5
- Connect solenoid valve 10 in parallel with solenoid valve 9

Continue in this way until all the solenoid valves are connected.

5. Using the Large Terracotta Irrigation Controller

The switch on the control box had 3 positions: **ON** (switch up), **OFF** (middle position), and **ON night only** (switch down).

Switch in the **ON night only** position

When the switch on the control box is in the **ON** position, the irrigation starts automatically after sufficient water has evaporated from the outside of the porous terracotta bowl. The irrigation stops automatically when the control dripper has replaced the evaporated water.

When the switch on the control box is in the **ON night only** position, the irrigation happens at night time only.

Provided the switch is in the ON position, you can start the irrigation manually by pressing the float down. For example, on a very hot day you may wish to irrigate in the middle of the day.

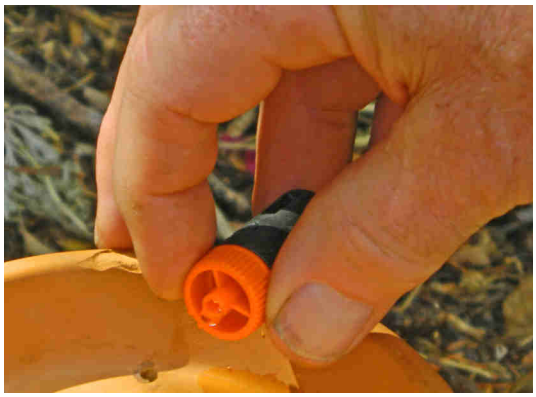
After the unpowered valve under the terracotta bowl closes, water needs to drain from the outlet assembly before the float switch can open. There is a two and a half minute delay between the closing of the unpowered valve and the irrigation stopping.

Turn on the water supply and the irrigation will start immediately. The control dripper drips water into the terracotta bowl during the irrigation. The irrigation stops automatically after the control volume of water have dripped into the bowl. The **control volume** is the volume of water required to raise the water level in the bowl from the low level to the high level.

The irrigation starts again automatically after the control volume of water has evaporated from the outside surface of the porous terracotta bowl. The cycle continues indefinitely and so you can leave your garden unattended for months on end. A terracotta saucer sits on top of the bowl so that the water in the bowl is protected from algae, mosquitoes and thirsty animals. There are 6 small drain holes in the saucer.

When using a conventional irrigation controller, you need to set the start time and the end time for each irrigation event. However, with the self-controlled terracotta valve you don't need a timer. The duration of the irrigation event is simply the time it takes for the control volume of water to drip into the bowl.

It is important to note here that the control dripper is adjustable. If you reduce the flow rate of the control dripper, then it will take a lot longer for the control volume to drip into the bowl and so the duration of the irrigation event increases and your plants will get more water. On the other hand, if you increase the flow rate of the control dripper, the control volume will drip into the bowl more quickly and so the duration of the irrigation event decreases and your plants will get less water. Adjust the control dripper so that the irrigation delivers the appropriate amount of water to your plants at their current stage of growth.


The control dripper is adjustable.

The interval between irrigation events if the time it takes for the control volume to evaporate from the outside surface of the porous terracotta bowl. The important thing to realise here is that the time it takes for the control volume to evaporate is determined by the prevailing weather conditions. When it is hot and dry, the water will evaporate more quickly and so the interval between irrigation events will be shorter. When it is cool and overcast, the water will evaporate more slowly and so the interval between irrigation events will be longer.

If it rains, rainwater will collect in the saucer and drain into the bowl. This means that the start of the next irrigation event will be delayed. In addition to the control volume that needs to evaporate, the rainwater that has entered the bowl will also need to evaporate.

The Large Terracotta Irrigation Controller uses on-site weather data (namely, evaporation and rainfall). Most smart irrigation controllers do not use on-site weather data. Instead they use weather data from the Bureau of Meteorology.

The Large Terracotta Irrigation Controller can be used for both gravity feed and pressurised irrigation. It can be used with pressure compensating drippers and non pressure compensating drippers. It can also be used with weeper hose or soaker hose.

You can irrigate directly from a rainwater tank by gravity feed without using a pump provided that the water level in the tank is at least 1 metre higher than the valve at the bottom of the bowl.

How to adjust the water usage:

If you are using drippers, position an empty measuring container under one of the drippers so that water drips into the container during the irrigation event. At the end of the irrigation event check the amount of water in the measuring container. You should also check the moisture in the soil.

Position an empty measuring container under one of the drippers

If your plants are not getting enough water, reduce the flow rate of the control dripper. Reducing the flow rate of the control dripper increases the duration of the irrigation event and so your plants get more water.

If your plants are getting too much water, increase the flow rate of the control dripper.

Adjusting the water usage does not affect the irrigation frequency.

How to adjust the irrigation frequency:

You can adjust the irrigation frequency by adjusting the gap between the upper and lower discs on the float. Note that the irrigation frequency is controlled by the net evaporation from the outside surface of the terracotta bowl between irrigation events. To adjust the gap by 4 mm simply rotate the upper disc by two and a quarter turns.

To adjust the irrigation frequency, adjust the gap between the upper and lower discs

Adjusting the irrigation frequency does not change the water usage. For example, if you decrease the irrigation frequency by increasing the gap between the upper and lower discs, the amount of water used during the irrigation event will automatically increase to ensure that the water usage (litres per week for example) remains the same.

The following table shows the control volume (net evaporation from the outside surface of the terracotta pot between irrigation events) for various values of the gap between the upper and lower discs.

Gap between the upper and lower discs	Net evaporation between irrigation events (control volume)
zero gap	400 ml
4 mm	637 ml
8 mm	874 ml
12 mm	1111 ml
16 mm	1348 ml
20 mm	1585 ml
24 mm	1822 ml
28 mm	2060 ml
32 mm	2300 ml

For a more detailed discussion of irrigation scheduling, see the Appendix 1. Root zone scheduling.

If you prefer the control volume to be smaller, it is recommended that you use the Small Terracotta Irrigation Controller:
https://www.measuredirrigation.com/product-page/small-terracotta-irrigation-controller

6. When is water usage independent of pressure?

Ideally, the amount of water used to irrigate your garden should be independent of the water supply pressure. Provided that all of the drippers are identical and at approximately the same level, the Large Terracotta Irrigation Controller can be used to ensure that the dripper discharge is independent of the water supply pressure. Conventional drip irrigation systems control the volume of water discharged by a dripper by using PC (pressure compensating) drippers to control the flow rate of the dripper and an irrigation controller to control the time. In a domestic garden with mains water supply, many zones are usually required to ensure that the pressure in each zone does not fall below the lower limit for pressure compensation. The irrigation controller is programmed so that each zone is irrigated at a different time.

Provided that identical drippers are at approximately the same level and the variations in pressure within a zone due to head loss are negligible, the volume of water discharged by each dripper during the irrigation event will be approximately the same. All the drippers may be NPC or PC. For domestic gardens, the irrigation system can usually be designed so that variations in pressure within the zone are negligible.

To ensure that approximately the same volume of water delivered by each dripper during the irrigation event **regardless of the water supply pressure**, the adjustable control dripper must be replaced by an irrigation dripper. Then the volume of water discharged by each dripper will be the same as the volume of water discharged by the control dripper during the irrigation event, namely 250 ml, regardless of the water supply pressure. For example, if the irrigation drippers are Antelco 2 L/H NPC drippers, then the control dripper must also be an Antelco 2 L/H NPC dripper.

By using the Large Terracotta Irrigation Controller in this way, many zones with PC drippers can be combined into a single zone with a single Large Terracotta Irrigation Controller, and so the cost of the irrigation system can be reduced dramatically.

This means that you can irrigate on level ground directly from a rainwater tank or elevated water supply without using a pump or a timer. The irrigation frequency and water usage (litres per week for example) are controlled by the prevailing weather conditions and are independent of the water level in the tank. The water level can rise and fall dramatically without affecting the volume of water used during the irrigation event. The Large Terracotta Irrigation Controller is a game-changer for automated irrigation on from a rainwater tank or elevated water supply without using a pump or timer.

7. NPC drippers and water usage independent of pressure

NPC (non pressure compensating) drippers are usually available with flow rates of 2 L/H, 4 L/H and 8 L/H (at a pressure of 100 kPa). Suppose that a combination of these drippers is used for the irrigation drippers. Provided that the control dripper is also an NPC dripper, the following table tells you the approximate volume of water discharged by the various irrigation drippers during the irrigation event when the control dripper is 2 L/H or 4 L/H. Provided that all the drippers have the same emitter discharge exponent, the volume of water discharged by an irrigation dripper during the irrigation event remains approximately constant across a range of operational pressures.

Gap between the upper and lower discs	Control dripper	Irrigation dripper	Approximate volume of water discharged by the irrigation dripper during the irrigation event
zero gap	4 L/H	2 L/H	0200 ml
4 mm	4 L/H	2 L/H	0318 ml
zero gap	2 L/H	2 L/H	0400 ml
zero gap	4 L/H	4 L/H	0400 ml
8 mm	4 L/H	2 L/H	0437 ml
12 mm	4 L/H	2 L/H	0555 ml
4 mm	4 L/H	4 L/H	0637 ml
4 mm	2 L/H	2 L/H	0637 ml
16 mm	4 L/H	2 L/H	0674 ml
20 mm	4 L/H	2 L/H	0792 ml
zero gap	2 L/H	4 L/H	0800 ml
zero gap	4 L/H	8 L/H	0800 ml
8 mm	2 L/H	2 L/H	0874 ml
8 mm	4 L/H	4 L/H	0874 ml
24 mm	4 L/H	2 L/H	0911 ml
28 mm	4 L/H	2 L/H	1030 ml
12 mm	2 L/H	2 L/H	1111 ml
12 mm	4 L/H	4 L/H	1111 ml
32 mm	4 L/H	2 L/H	1150 ml
4 mm	2 L/H	4 L/H	1274 ml
4 mm	4 L/H	8 L/H	1274 ml
16 mm	2 L/H	2 L/H	1348 ml
16 mm	4 L/H	4 L/H	1348 ml
20 mm	2 L/H	2 L/H	1585 ml
20 mm	4 L/H	4 L/H	1585 ml
zero gap	2 L/H	8 L/H	1600 ml
8 mm	2 L/H	4 L/H	1748 ml
8 mm	4 L/H	8 L/H	1748 ml
24 mm	2 L/H	2 L/H	1822 ml
24 mm	4 L/H	4 L/H	1855 ml

Gap between the upper and lower discs	Control dripper	Irrigation dripper	Approximate volume of water discharged by the irrigation dripper during the irrigation event
28 mm	2 L/H	2 L/H	2060 ml
28 mm	4 L/H	4 L/H	2060 ml
12 mm	2 L/H	4 L/H	2222 ml
12 mm	4 L/H	8 L/H	2222 ml
32 mm	2 L/H	2 L/H	2300 ml
32 mm	4 L/H	4 L/H	2300 ml
4 mm	2 L/H	8 L/H	2548 ml
16 mm	2 L/H	4 L/H	2696 ml
16mm	4 L/H	8 L/H	2696 ml
20 mm	2 L/H	4 L/H	3170 ml
20 mm	4 L/H	8 L/H	3170 ml
8 mm	2 L/H	8 L/H	3496 ml
24 mm	2 L/H	4 L/H	3644 ml
24 mm	4 L/H	8 L/H	3644 ml
28 mm	2 L/H	4 L/H	4120 ml
28 mm	4 L/H	8 L/H	4120 ml
12 mm	2 L/H	8 L/H	4444 ml
32 mm	2 L/H	4 L/H	4600 ml
32 mm	4 L/H	8 L/H	4600 ml
16 mm	2 L/H	8 L/H	5392 ml
20 mm	2 L/H	8 L/H	6340 ml
24 mm	2 L/H	8 L/H	7288 ml
28 mm	2 L/H	8 L/H	8240 ml
32 mm	2 L/H	8 L/H	9200 ml

10. Conclusion

The Large Terracotta Irrigation Controller uses a radically different approach to irrigation scheduling called Measured Irrigation. See the Measured Irrigation website for more information: www.measuredirrigation.com.au

Conventional irrigation systems **indirectly** control the volume of water discharged by a dripper by using PC drippers to control the flow rate and an irrigation controller to control the time. However, Measured Irrigation **directly** controls the volume of water discharged by a dripper, rather than controlling the flow rate and the time. Because it is no longer necessary to control the flow rate, one can use NPC drippers as well as PC drippers. Because the pressure range is not restricted by pressure compensation, the Large Terracotta Irrigation Controller can be used on level ground with any pressure greater than 10 kPa.

The Large Terracotta Irrigation Controller uses on-site weather information rather than information from the Bureau of Meteorology, and so it is ideal for greenhouse applications and any application where the on-site weather conditions are different from those at the nearest Bureau of Meteorology weather station..

The Large Terracotta Irrigation Controller is a game-changer for automated irrigation on level ground using a rainwater tank, reservoir, dam or river. If you are currently using pressure compensating drippers or dripline, the following items are required.

- High-pressure pump
- Additional solenoid valves (one needed for each additional zone)
- Conventional irrigation controller
- Hose clamps

These items are not required if you use a Large Terracotta Irrigation Controller and so the cost of installing and running the irrigation system can be reduced dramatically. Provided that all the zones can be irrigated with the same irrigation schedule, you may be able to combine all the zones into a single zone, and connect all the solenoid valves to a single Large Terracotta Irrigation Controller (see Section 4, How to connect multiple solenoid valves). If you were installing the irrigation system from scratch, you could reduce your cost significantly by using a single large solenoid valve and NPC drippers or dripline instead of PC drippers or dripline.

Many farmers are finding that the cost of electricity to operate pumps is making it very difficult to afford drip irrigation. If the irrigated area is level, you may be able to use the Large Terracotta Irrigation Controller and low pressure drip irrigation, and hence you can slash your power bills.

Appendix 1. Root zone scheduling

For plants with deep roots or for plants in clay soils, it is preferable to irrigate with more water less frequently to enable the water to reach the bottom of the root zone. Between irrigation events the soil near the surface is allowed to dry out, but there should still be moisture in the root zone. If you decide that your plants need irrigating less frequently than daily (for example, once a week), then **root zone scheduling** is recommended. Root zone scheduling takes account of evapotranspiration, the soil type and the depth of the root zone

The following steps can be applied to any irrigation zone, regardless of the size of the zone.

Step 1. How much water is needed

Allow the soil to dry out over several days until the soil is dry between the surface and the bottom of the root zone.

Adjust the float so that the gap between the upper and lower floats is set to the maximum value. Slowly remove water from the terracotta bowl until the float drops down and the irrigation starts. Stop irrigating by raising the float when the position of the wetting front is near the bottom of the root zone (or when the wetting front has reached an appropriate depth). Slowly transfer water from the terracotta bowl to a measuring container until the float drops down and the irrigation starts. The volume of water in the measuring container is the **irrigation control volume** which is the control volume required for the irrigation event to moisten the soil from the surface to the bottom of the root zone.

Step 2. How much evaporation is required between irrigation events

You need to estimate the evaporation from the outside surface of the terracotta bowl before the soil is dry between the surface and the bottom of the root zone.

Slowly add water to the terracotta bowl until the float jumps up. At sunset each day, check the moisture in the soil until the soil is dry between the surface and the bottom of the root zone. If you wish to water your plants more frequently, you could wait until the soil is dry between the surface and the middle of the root zone. Fill a measuring container with water, weigh it and record the weight. Slowly transfer water from the measuring container to the terracotta bowl until the float jumps up. Reweigh the container to determine the volume of water that has evaporated. This is called the **evaporation control volume** and it is the evaporation required to dry out the soil from the surface to the bottom of the root zone.

Adjust the float so that the net evaporation between irrigation events corresponds to the irrigation control volume (see page 8).

Step 3. Run the irrigation

The irrigation starts automatically when the water level reaches the low level. The irrigation stops automatically when the water level reaches the high level. To calculate the control volume, slowly transfer water from the terracotta bowl to a measuring container until the float drops down and the irrigation starts. The volume of water in the measuring container is the control volume.

Step 4 Adjust the control dripper

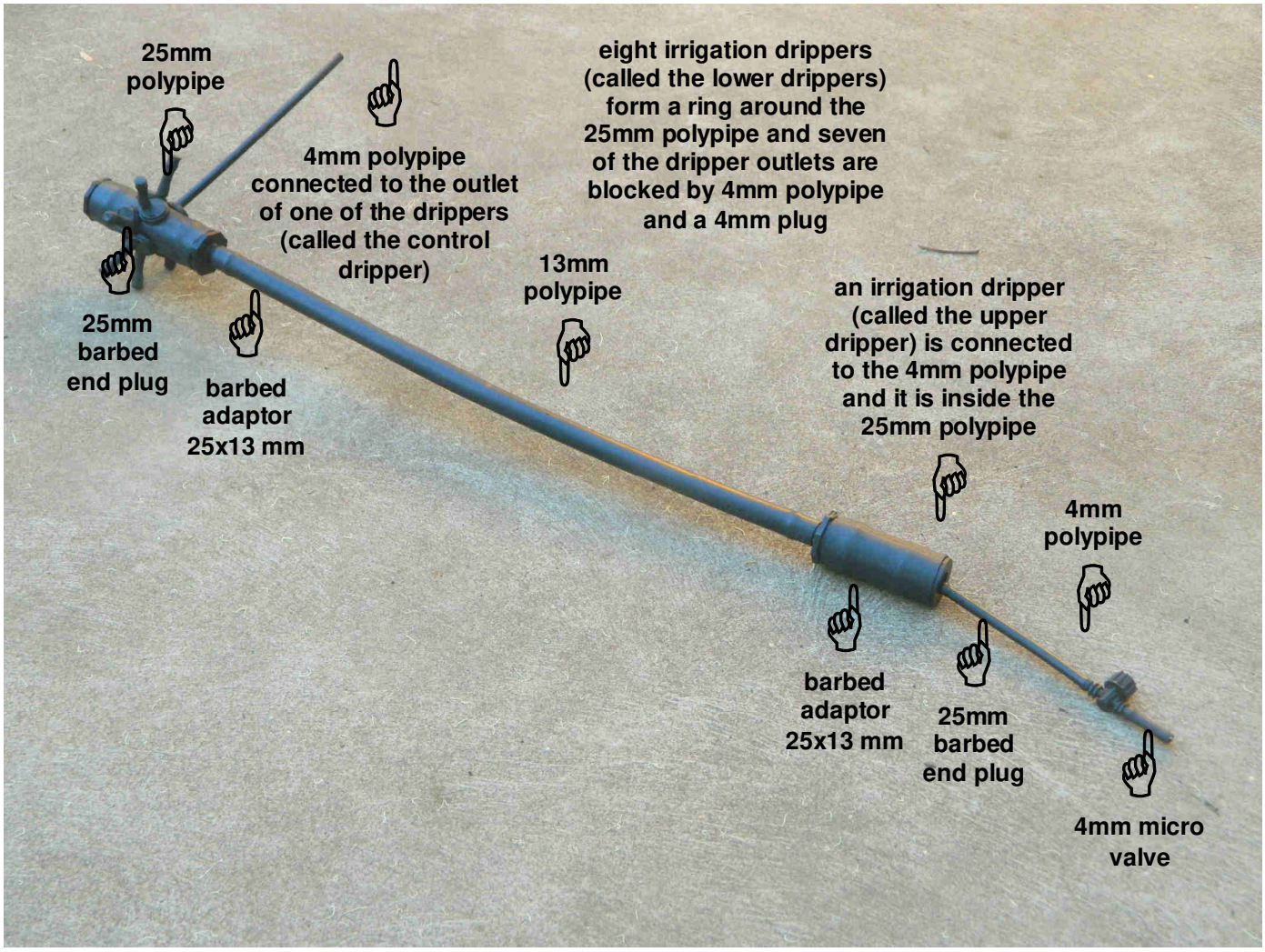
If the control volume is less than the irrigation control volume, then the wetting front is unlikely to have reached the bottom of the root zone. So reduce the flow rate of the control dripper (to increase the duration of the irrigation event) in preparation for the next irrigation. If the control volume is more than the irrigation control volume, then the wetting front is probably below the bottom of the root zone. So increase the flow rate of the control dripper (to decrease the duration of the irrigation event) in preparation for the next irrigation.

Repeat Steps 3 and 4 until the control volume matches the irrigation control volume. It is preferable that the above steps are done in a period when there is no rain.

Appendix 2. How to make a fractional dripper

To ensure that each irrigation dripper discharges the appropriate volume of water during the irrigation event (regardless of the water supply pressure) you will need to make a control dripper that delivers a fraction of the volume of water discharged by an irrigation dripper. This can be done for either PC (pressure compensating) drippers or NPC (non pressure compensating) drippers. If you are using PC drippers, then the pressure at PC drippers does not need to be within the pressure range specified by the manufacturer for pressure compensation.

The component parts of the fractional dripper are labelled in the picture below.



The component parts of the fractional dripper are labelled in the above picture

The following pictures provide step by step instructions for making the fractional dripper.

Step 1. Connect 4mm polypipe to the 4mm micro valve. Drill a 13mm hole in the 25mm end plug.

Step 2. Insert the 4mm polypipe through the hole in the end plug.

Step 3. Connect the irrigation dripper to the 4mm polypipe.

Step 4. Insert the 25mm end plug into one end of a 70mm length of 25mm polypipe. Insert a barbed adaptor into the other end of the 25mm polypipe. Insert the other end of the barbed adapter into a 500mm length of 13mm polypipe.

Step 5. Insert eight irrigation drippers in a circle around a 100mm length of 25mm polypipe so that the outlets of the drippers are at the same level.

Step 6. Insert a 25mm end plug into one end of the 100mm length of 25mm polypipe. Insert a barbed adaptor into the other end of the 25mm polypipe. Insert the other end of the barbed adaptor into the 13mm polypipe.

Fractional drippers for dripline

To make a fractional dripper for dripline you will need to cut dripline into short lengths with one dripper per length and with one end blocked.

Make the upper dripper by connecting a short length of dripline to the 4mm polypipe.

Attach eight 4mm micro valves in a circle around a 100mm length of 25mm polypipe so that they are at the same level. Make the lower drippers by attaching a short length of dripline to each micro valve.

Appendix 3. How to use the fractional dripper

To install the fractional dripper, replace the adjustable control dripper by a length of 4mm polypipe connected to the fractional dripper so that the fractional dripper is suspended above the Large Terracotta Irrigation Controller.

A length of 4mm polypipe is connected to one of the lower drippers (called the control dripper) so that it drips water into the terracotta saucer during the irrigation event. The remaining seven lower drippers should be blocked using a short length of 4mm polypipe and a 4mm plug. The height of the upper dripper should be approximately the same as the height of the irrigation drippers, and the irrigation drippers should all be at approximately the same level.

The control dripper drips water into the terracotta saucer and the remaining seven lower drippers should be blocked.

When the irrigation starts, the upper dripper fills the 13mm polypipe until water start to overflow from the 13mm hole in the 25mm barbed end plug, and the control dripper drips water into the saucer.

Progressively unblock the lower drippers until water stops overflowing at the upper dripper. The unblocked drippers (excluding the control dripper) drip water outside the terracotta saucer. As the number of unblocked drippers increases, the flow rate of the control dripper decreases.

Water overflowing from the 13mm hole at the upper dripper

Adjust the fractional dripper by unblocking lower drippers until the irrigation delivers the appropriate amount of water during the irrigation event to your plants at their current stage of growth.

Adjust the fractional dripper by unblocking lower drippers until the irrigation delivers the appropriate amount of water to your plants.

When the water supply pressure is low (gravity feed for example), the difference in level between the upper dripper and the irrigation drippers may mean that the difference in flow rate becomes significant. You may be able to adjust the length of the 13mm polypipe so that the upper dripper is as close as possible to the same level as the irrigation drippers.

When you use the fractional dripper you must always ensure that water is not overflowing at the upper dripper. However, you may be able to stop the water overflowing by increasing the length of the 13mm polypipe.

The following table shows the volume of water discharged by each irrigation dripper during the irrigation event as the number of unblocked drippers increases. The volume of water discharged by each irrigation dripper during the irrigation event is independent of the water supply pressure.

Number of unblocked drippers	Fractional dripper fraction	Volume of water discharged by each irrigation dripper during the irrigation event
1	1	control volume
2	1/2	control volume x 2
3	1/3	control volume x 3
4	1/4	control volume x 4l
5	1/5	control volume x 5
6	1/6	control volume x 6
7	1/7	control volume x 7
8	1/8	control volume x 8

Additional options can be obtained by using more than one lower dripper as the control dripper. For example, the following table shows that volume of water discharged by each irrigation dripper during the irrigation event when 2 lower drippers are used as the control dripper

Number of unblocked drippers	Fractional dripper fraction	Volume of water discharged by each irrigation dripper during the irrigation event
2	1	control volume
3	2/3	control volume x 1.5
4	1/2	control volume x 2
5	2/5	control volume x 2.5
6	1/3	control volume x 3
7	2/7	control volume x 3.5
8	1/4	control volume x 4