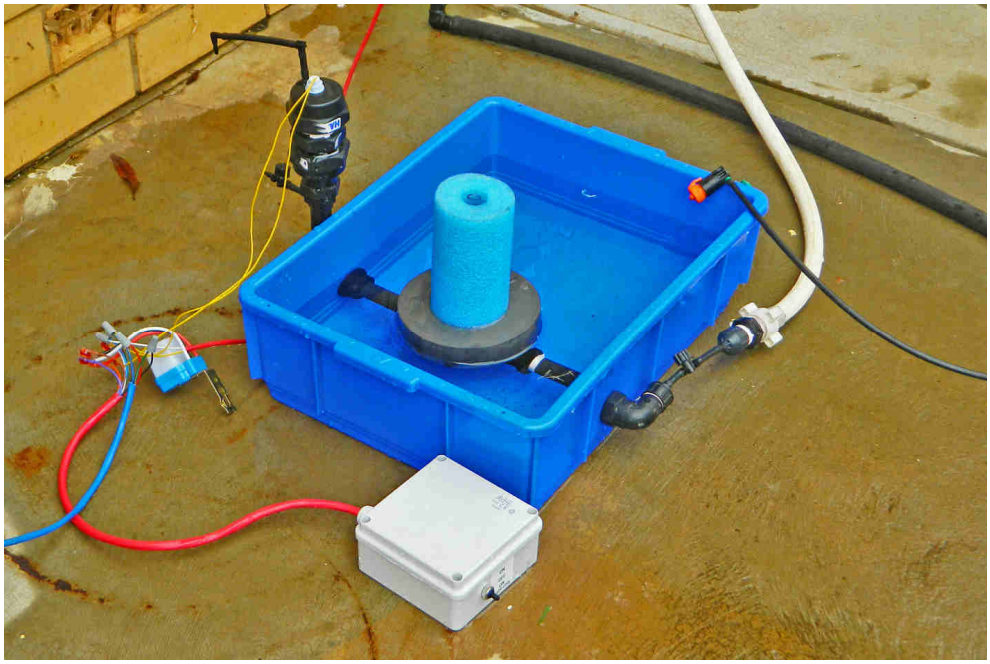
Universal & Sunset Measured Irrigation Controller User Manual



Universal Measured Irrigation Controller

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Chapter 1. Introduction to Measured Irrigation (MI)

Definition of measured irrigation

Measured irrigation is an irrigation scheduling method that satisfies the following two conditions:

1. *Variations in the water usage throughout the year are controlled by the prevailing net evaporation rate (evaporation minus rainfall).*
2. *The volume of water discharged by each emitter during an irrigation event is controlled directly without the need to control the flow rate or the duration of the irrigation event.*

Research on measured irrigation conducted at the Bureau of Meteorology weather station at Adelaide Airport demonstrated a correlation greater than 90% between the dripper discharge volumes and the prevailing ET (evapotranspiration) minus rainfall. When it rains the start of the next irrigation event is delayed, and when there is a heat wave the Universal Measured Irrigation Controller responds appropriately. If fact the water usage (litres per week for example) is directly proportional to the prevailing net evaporation rate. The research report *Evapotranspiration and Measured Irrigation - Report for Smart Approved Watermark* can be downloaded from the Measured Irrigation website: https://www.measuredirrigation.com.

Three fully automatic smart irrigation controllers are available from Measured Irrigation:

- Universal Measured Irrigation Controller: https://www.measuredirrigation.com/product-page/universal-measured-irrigation-controller
- Sunset Measured Irrigation Controller: https://www.measuredirrigation.com/product-page/sunset-measured-irrigation-controller-free
- Unpowered Measured Irrigation Controller: https://www.measuredirrigation.com/product-page/unpowered-measured-irrigation-controller

Measured irrigation uses the net evaporation from an evaporator since the previous irrigation event to control the next irrigation event. Note that net evaporation means evaporation minus rainfall. When using a measured irrigation controller the irrigation frequency is determined by the net evaporation from the evaporator between irrigation events

The Universal Measured Irrigation Controller has an adjustable float so that the irrigation frequency can be set to any valve within the range 4mm to 29mm of net evaporation between irrigation events. See Chapter 2.

The Sunset Measured Irrigation Controller has a float switch and the irrigation frequency is daily. See Chapter 3.

The Unpowered Measured Irrigation Controller has an adjustable float so that the irrigation frequency can be set to any valve within the range 4mm to 29mm of net evaporation between irrigation events. This controller has an unpowered magnetic valve with a half inch inlet and outlet. See the document “Unpowered Measured Irrigation Training Manual for Smallholders” which can be downloaded from the Measured Irrigation website: https://www.measuredirrigation.com.

The following table provides a detailed comparison between various fully automatic smart irrigation controllers.

	Unpowered Measured Irrigation Controller	**Universal Measured Irrigation Controller**	**Sunset Measured Irrigation Controller**	**Weather-based IC using BOM ET data** (for example, Orbit 6-zone B-Hyve)	**Weather-based IC with onsite ET measurement** (for example, Hunter Pro-C outdoor 6-zone and ET weather sensor)	**Soil Moisture Sensor-based IC** (for example, Hunter X-core 4 outdoor and Soil-Clik moisture sensor)
irrigation valve included	✓ 1/2" BSP inlet and outlet	X	X	X	X	X
power supply required	None	12V DC	12V DC	240V AC	240V AC	240V AC
minimum water supply pressure	10 kPa	0 kPa	0 kPa	70 kPa	70 kPa	70 kPa
irrigation from a rainwater tank without a pump	✓	✓	✓	X	X	X
variable water supply pressure with NPC drippers	✓	✓	✓	X	X	X
size of zone not limited by water supply pressure	X	✓	✓	X	X	X
irrigation frequency control	✓	✓	X irrigation at sunset	✓	✓	✓
on site sensors	✓	✓	✓	X	✓	✓

Chapter 2. Universal Measured Irrigation Controller

2.1 Introduction to the Universal Measured Irrigation Controller

Claim: For any drip or sprinkler irrigation zone, the Universal Measured Irrigation Controller can save more water than any other smart irrigation controller of similar cost (without compromising the plants).

This claim has not been tested with scientific field trials. Please contact me if you are interested in such research.

The Universal MI Controller is an automatic smart irrigation controller with universal application. The Universal MI Controller can be used for any size irrigation system regardless of the size of the solenoid valve.

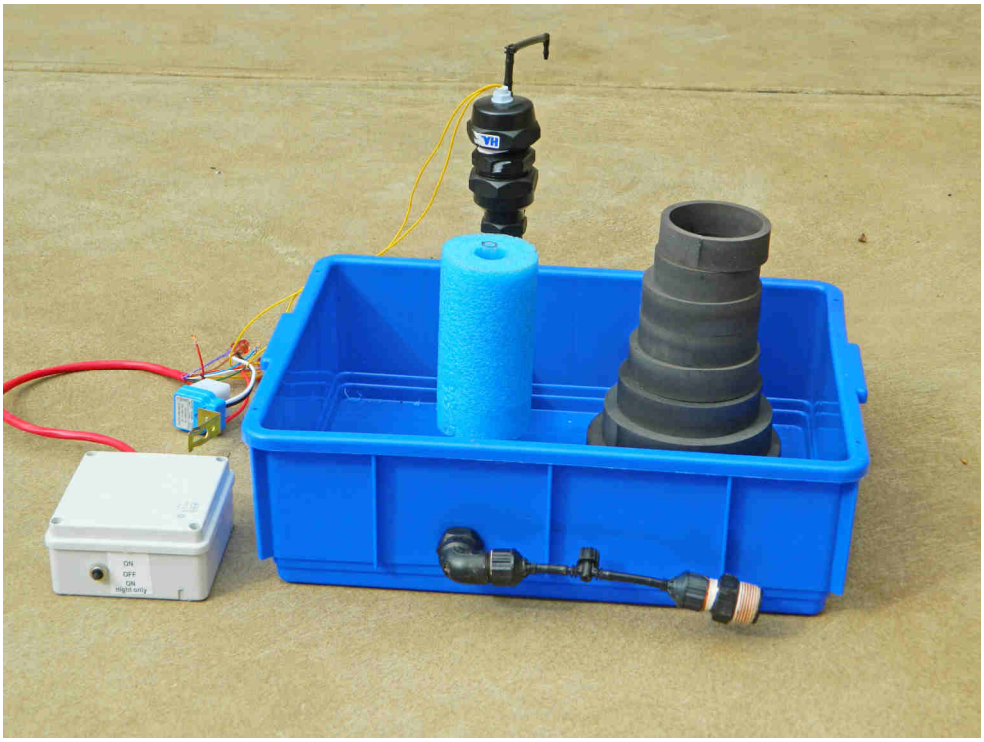
It can be used for gravity feed or pressurized systems, sprinkler or drip irrigation, porous hose irrigation (weeper hose or soaker hose), pressure compensating drippers or non pressure compensating drippers.

For programmable irrigation controllers, one of the disadvantages of non pressure compensating drippers is that the water usage is affected by variations in the water supply pressure. With the Universal MI Controller the water usage is independent of the water supply pressure. If fact the water pressure can change significantly during the irrigation event without affecting the dripper discharge volumes. **This is a unique feature of measured irrigation.**

The water usage for the Universal Measured Irrigation Controller is directly proportional to the prevailing onsite net evaporation experienced by your plants. **This is a unique feature of measured irrigation.**

The Universal MI Controller includes a light sensor so that you have the option of irrigating at night time only.

The Universal Measured Irrigation Controller can be purchased from the Online Shop at the Measured Irrigation website https://www.measuredirrigation.com/shop-1.



Universal Measured Irrigation Controller components

Hi-flow Solenoid Valve

You can also purchase a 12 volt Hi-flow Solenoid Valve, pressure range zero to 800 kPa, 25 mm inlet and outlet, from the Online Shop at the Measured Irrigation website: https://www.measuredirrigation.com/product-page/hi-flow-solenoid-valve-12v-free-postage-for-orders-over-170

By using this solenoid valve and the Universal Measured Irrigation Controller, you can irrigate directly from your rainwater tank without the need to purchase a pump or a timer. The water usage for measured irrigation is controlled by the prevailing weather conditions and is independent of the water level in the rainwater tank. The Universal Measured Irrigation Controller is a game-changer for automated irrigation from a rainwater tank (or header tank) without using a pump or timer. Low pressure means that hose clamps are not needed.

I recommend that you watch the Measured Irrigation video:
Amazing water-saving invention - Universal Measured Irrigation Controller
https://www.youtube.com/watch?v=57bB5z2vNtA&t

2.2 Instructions for installing the Universal Measured Irrigation Controller

Step 1. Position the Universal Measured Irrigation Controller in a suitable location so that the evaporation matches the evaporation in your garden. Position the float shaft so that it points vertically up. Be very careful when adjusting the float shaft to avoid placing any stress on the fragile plastic float shaft.

Step 2. Connect a water supply to the inlet of the Universal Measured Irrigation Controller. The water supply pressure should be between 10 kPa and 800 kPa. An irrigation zone should be connected to the water supply via a solenoid valve.

Step 3. Connect a control dripper to the irrigation zone so that it will drip water into the evaporator during the irrigation event. For gravity feed applications you may need to adjust the height of the evaporator so that the NPC (non pressure compensating) control dripper is at the same level as the irrigation drippers. If your irrigation drippers are PC (pressure compensating), the adjustable control dripper should be replaced by a PC dripper (or drippers). For porous hose irrigation (weeper hose or soaker hose), replace the control dripper by a short length of porous hose.

Control dripper

Step 4. A light sensor and the float switch inside the vertical black tube are already connected to the control box.

Light sensor

Control box

Connect a 12V DC solenoid valve to your water supply

There are 4 colour-coded wires that need to be connected to the various components as follows:

Connect the **blue** wire to one of the wires from the solenoid valve.

Connect the **green** wire to the other wire from the solenoid wire.

Connect the **red** wire to the positive terminal of a 12V DC power supply

Connect the **black** wire to the negative terminal of the power supply.

Connect the blue and green wires to the solenoid valve

Changes required for an alternative solenoid valve with an alternative power supply:

Disconnect the **blue** wire from the 12V DC solenoid valve.

Disconnect the **green** wire from the 12V DC solenoid valve and connect it to one of the wires from alternative solenoid valve.

Connect the other wire from alternative solenoid valve to one of the wires from the alternative power supply.

Cut the **pink** wire (connected to the **black** wire) and reconnect it to the other wire from the alternative power supply.

Step 5. The switch on the control box had 3 positions: **ON** (switch up), **OFF** (middle position), and **ON night only** (switch down). If you are happy for the irrigation to occur at any time of day, then flick the switch up. If you want the irrigation to occur at night time only, then flick the switch down.

Provided that the switch on the control box is in the ON position and the water level in the evaporator is below the high level, you can start the irrigation manually at any time by pressing the float down. For example, on a very hot dry day you may wish to irrigate in the middle of the day. Simply push the float down and the irrigation starts.

Push the float down to start irrigating

You can delay the next irrigation or stop the irrigation at any time by removing the float. The irrigation cannot start again until the float is replaced.

Remove the float to stop irrigating

Step 6. Make sure that the adjustable float is installed and close the small valve that controls the water supply to Universal Measured Irrigation Controller. Close the small valve connected to the vertical tube with the float switch inside. Slowly open the small valve controlling the water supply until water is dripping from connected to the top of the vertical tube at approximately 6 drips per second. Slowly open the small valve connected to side of the vertical tube until water is dripping from both outlets at the same rate.

Close the small valve on the side of the evaporator

Close the small valve on the vertical tube

Open the small valve connected to the water supply until water drips at about 6 drips per second

Water dripping from the top outlet at about 6 drips per second

Slowly open the small valve connected to side of the vertical tube until water is dripping from both outlets at the same rate

Step 7. Fill the evaporator with water until the water stops flowing from the two outlets.

Fill the evaporator with water until the water stops flowing from the two outlets

Step 8 The float falls as water slowly evaporates from the evaporator. When the float has fallen below the low level, the irrigation starts automatically provided that the switch on the control box is in the ON position. If the switch on the control box is in the ON night only position, the irrigation starts at sunset. The float rises as the control dripper drips water into the evaporator. When the float reaches the high level the irrigation stops automatically. The cycle continues indefinitely.

Step 9 **How to adjust the irrigation frequency**.

To increase the options for the irrigation frequency, the Universal Measured Irrigation Controller is provided with an adjustable float consisting of a 7 cm diameter cylindrical float and 7 float rings that can slide over the cylinder to increase the outside diameter of the float (the bottom of the float ring should align with the bottom of the cylindrical float).

Float cylinder and 7 float rings

The following table shows the irrigation frequency for various float rings. The irrigation frequency is determined by the net evaporation from the evaporator between irrigation events.

Outside diameter of float	Number of float rings	Net evaporation between irrigation events
7 cm	0	29.3 mm
8 cm	1	24.6 mm
8 cm	2	20.3 mm
9 cm	1	16 mm
10 cm	1	11.6 mm
11 cm	1	9.3 mm
13 cm	1	6 mm
15 cm	1	4 mm

Step 10 **How to adjust the water usage**

Adjusting water usage by adjusting the control dripper

Position an empty measuring container under one of the irrigation drippers so that water drips into the container during the irrigation event.

Empty measuring container under one of the irrigation drippers

At the end of the irrigation event check the amount of water in the measuring container. You may also wish to check the moisture in the soil (see Chapter 4).

At the end of the irrigation event check the amount of water in the container

If your plants are not getting enough water, turn the control dripper clockwise to reduce the flow rate of the control dripper. If your plants are getting too much water, turn the control dripper anticlockwise to increase the flow rate of the control dripper.

If the irrigation drippers are PC (pressure compensating), you can adjust the water usage by replacing the PC control dripper by a different combination of PC drippers. If you are using short length of porous hose in place of the control dripper, you can adjust the water usage by changing the length of the porous hose.

Turn the control dripper to change the flow rate

Adjusting water usage by adjusting the surface area of evaporation

This technique is particularly useful when you are using pressure compensating drippers.

The water usage is directly proportional to the surface area of evaporation. You can increase the surface area of evaporation by choosing a supplementary evaporator with vertical sides. The total surface area of evaporation is the surface area of the supplementary evaporator plus the surface area of the original evaporator minus the surface area of the float. One way to connect the evaporators is to drill in hole in the side of each evaporator and to insert a rubber grommet into each hole. Insert a barbed connector or elbow into each grommet, and then use a length of flexible tube to connect the evaporators. The water level will be same in both evaporators.

How to connect two evaporators

You can decrease the surface area of evaporation by placing full bottles of water in the evaporator.

A full bottle of water decreases the surface area of evaporation

Step 11. You may wish to protect the evaporator to prevent animals drinking the water, but make sure that you do not impede the evaporation (chicken wire is ideal). Replace the water and clean the evaporator regularly to remove algae and other contaminants.

2.3 Key features of the Universal Measured Irrigation Controller

1. Completely automatic
2. Smart irrigation controller – the irrigation is controlled by the prevailing weather conditions rather than a program
3. Use for both gravity feed and pressurised irrigation
4. Use for any size irrigation application and any size solenoid valve
5. Use for sprinkler or drip irrigation
6. Use for porous hose irrigation (weeper hose or soaker hose)
7. Use with pressure compensating drippers or non pressure compensating drippers.
8. A light sensor provides the option of irrigating at night time only without using a timer
9. You can adjust the water usage by adjusting the control dripper
10. You can adjust the irrigation frequency by adjusting the float
11. Adjusting the water usage does not change the irrigation frequency
12. Adjusting the irrigation frequency does not change the water usage
13. The water usage is directly proportional to the onsite net evaporation rate
    This is a unique feature of measured irrigation
14. Respond appropriately when there is an unexpected heat wave
15. When it rains, water enters the evaporator and delays the start of the next irrigation
16. The water usage is independent of the water supply pressure
    This is a unique feature of measured irrigation
17. Uses much less water without affecting the yield
18. There is no minimum water supply pressure
19. Simple and low tech and so there are fewer things to go wrong
20. Provided you have a continuous water supply, you can leave your irrigation application unattended for weeks on end

Claim: For any drip or sprinkler irrigation zone, the Universal Measured Irrigation Controller can save more water than any other smart irrigation controller of similar cost (without compromising the plants).

Chapter 3. Sunset Measured Irrigation Controller

3.1 Introduction to the Sunset Measured Irrigation Controller

The Sunset Measured Irrigation Controller is the Universal Measured Irrigation Controller where the adjustable float, the associated water supply and the vertical tube with the float switch inside are replaced by a float switch. It is the appropriate choice of irrigation controller for plants with a shallow root zone or plants in sandy soil.

The irrigation starts at sunset each day provided that the water level in the evaporator is below the float switch.

Sunset Measured Irrigation Controller

3.2 Instructions for installing the Sunset Measured Irrigation Controller

Step 1. Position the Sunset Measured Irrigation Controller in a suitable location so that the evaporation matches the evaporation in your garden.

Step 2. An irrigation zone should be connected to the water supply via a solenoid valve.

Step 3. Connect a control dripper to the irrigation zone so that it will drip water into the evaporator during the irrigation event. For gravity feed applications you may need to adjust the height of the evaporator so that the NPC (non pressure compensating) control dripper is at the same level as the irrigation drippers. If your irrigation drippers are PC (pressure compensating), the adjustable control dripper should be replaced by a PC dripper (or drippers). For porous hose irrigation (weeper hose or soaker hose), replace the control dripper by a short length of porous hose.

Control dripper

Step 4. A light sensor is already connected to the control box.

Light sensor

Control box

Connect a 12V DC solenoid valve to your water supply

There are 4 colour-coded wires that need to be connected to the various components as follows:

Connect the **blue** wire to one of the wires from the solenoid valve.

Connect the **green** wire to the other wire from the solenoid wire.

Connect the **red** wire to the positive terminal of a 12V DC power supply

Connect the **black** wire to the negative terminal of the power supply.

Connect the blue and green wires to the solenoid valve

Changes required for an alternative solenoid valve and power supply:

Disconnect the **blue** wire from the 12V DC solenoid valve.

Disconnect the **green** wire from the 12V DC solenoid valve.

Connect one of the wires from the alternative solenoid valve to one of the terminals of the alternative power supply.

Connect the **green** wire to the other wire from alternative solenoid valve.

Cut the **pink** wire (connected to the **black** wire) and reconnect it to the other wire from the alternative power supply.

Step 5. The switch on the control box had 3 positions: **ON** (switch up), **OFF** (middle position), and **ON night only** (switch down). If you are happy for the irrigation to occur at any time of day, then flick the switch up. If you want the irrigation to occur at night time only, then flick the switch down.

Switch with 3 positions: ON, OFF, ON night only

Step 6. Fill the evaporator with water until the water level is covering the float switch.

Step 7 The water level falls as water slowly evaporates from the evaporator. When the water level has fallen below the float switch, the irrigation starts automatically provided that the switch on the control box is in the ON position. If the switch on the control box is in the ON night only position, the irrigation starts at sunset provided that the water level is below the float switch. The water level rises as the control dripper drips water into the evaporator. When the water level covers the float switch the irrigation stops automatically. The cycle continues indefinitely.

Step 8 **How to adjust the water usage**

Adjusting water usage by adjusting the control dripper

Position an empty measuring container under one of the irrigation drippers so that water drips into the container during the irrigation event.

Empty measuring container under one of the irrigation drippers

At the end of the irrigation event check the amount of water in the measuring container. You may also wish to check the moisture in the soil (see Chapter 4).

At the end of the irrigation event check the amount of water in the container

If your plants are not getting enough water, turn the control dripper clockwise to reduce the flow rate of the control dripper. If your plants are getting too much water, turn the control dripper anticlockwise to increase the flow rate of the control dripper.

If the irrigation drippers are PC (pressure compensating), you can adjust the water usage by replacing the PC control dripper by a different combination of PC drippers. If you are using short length of porous hose in place of the control dripper, you can adjust the water usage by changing the length of the porous hose.

Turn the control dripper to change the flow rate

Adjusting water usage by adjusting the surface area of evaporation

This technique is particularly useful when you are using pressure compensating drippers.

The water usage is directly proportional to the surface area of evaporation. You can increase the surface area of evaporation by choosing a supplementary evaporator with vertical sides. The total surface area of evaporation is the surface area of the supplementary evaporator plus the surface area of the original evaporator. One way to connect the evaporators is to drill in hole in the side of each evaporator and to insert a rubber grommet into each hole. Insert a barbed connector or elbow into each grommet, and then use a length of flexible tube to connect the evaporators. The water level will be same in both evaporators.

You can decrease the surface area of evaporation by placing full bottles of water in the evaporator.

How to connect two evaporators

Step 9. You may wish to protect the evaporator to prevent animals drinking the water, but make sure that you do not impede the evaporation (chicken wire is ideal). Replace the water and clean the evaporator regularly to remove algae and other contaminants.

3.3 Key features of the Sunset Measured Irrigation Controller

1. Completely automatic
2. Smart irrigation controller – the irrigation is controlled by the prevailing weather conditions rather than a program
3. Use for both gravity feed and pressurised irrigation
4. Use for any size irrigation application and any size solenoid valve
5. Use for sprinkler or drip irrigation
6. Use for porous hose irrigation (weeper hose or soaker hose)
7. Use with pressure compensating drippers or non pressure compensating drippers.
8. A light sensor provides the option of irrigating at night time only without using a timer
9. When the switch on the control box is in the ON night only position, the irrigation starts at sunset provided that the water level is below the float switch
10. You can adjust the water usage by adjusting the control dripper
11. Adjusting the water usage does not change the irrigation frequency
12. The water usage is directly proportional to the onsite net evaporation rate
    This is a unique feature of measured irrigation
13. The irrigation starts at sunset each day provided that the water level is below the float switch
14. Respond appropriately when there is an unexpected heat wave
15. When it rains, water enters the evaporator and delays the start of the next irrigation
16. The water usage is independent of the water supply pressure
    This is a unique feature of measured irrigation
17. Uses much less water without affecting the yield
18. There is no minimum water supply pressure
19. Simple and low tech and so there are fewer things to go wrong

Chapter 4. Soil moisture and measured irrigation scheduling

4.1 Soil moisture probe

The amount of water that your plants need will depend on many factors in addition to the weather. For example, as the plants grow and become bigger they will need more water. Plants growing in sandy soil will need more water than plants growing in clay soil.

To take account of all these additional factors, you may need a soil moisture probe is to check the moisture level in the soil at various depths. A very simple but effective soil moisture probe is a length of steel pipe with a long slot. I suggest that the diameter of the pipe be between 30 and 40 mm. An angle grinder can be used to cut a long slot in the steel pipe to that you can inspect the soil inside the pipe. I suggest that the width of the slot be about 15 mm. You can also use the angle grinder to sharpen the edge of the end of the soil moisture probe.

A suitable soil moisture probe may be purchased from the Online Shop at the Measured Irrigation website: https://www.measuredirrigation.com/product-page/soil-moisture-probe.

By checking the moisture level in the soil through the slot in the steel pipe, you can decide whether your plants have been irrigated with too much or not enough water.

Hammer the steel pipe into the soil near a dripper so that the slot faces the dripper. Remove the steel pipe from the soil and use the slot to inspect the moisture level in the soil and the position of the wetting front. You may wish to use the slot to remove some soil from the pipe and to squeeze the soil sample between your fingers.

An angle grinder can be used to make a long slot in a length of steel pipe.

Hammer the steel pipe into the soil near a dripper so that the slot faces the dripper.

Remove the steel pipe from the soil and use the slot to inspect the moisture level in the soil and the position of the wetting front.

4.2 Introduction to measured irrigation scheduling

Measured irrigation scheduling can be applied to sprinkler irrigation as well as drip irrigation.

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

As your crop grows and the water requirement of the crop changes, you may wish to repeat the process of root zone scheduling.

Most weather-based irrigation controllers use data from a weather station to control the irrigation scheduling. Root zone scheduling responds to the prevailing onsite weather conditions in your garden rather than the weather at a weather station. For example, it responds to the actual evapotranspiration of your plants, rather than the theoretical evapotranspiration at a weather station. This is particularly important if you are using a greenhouse.

4.3 Root zone scheduling using an adjustable dripper

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 (use the soil moisture probe).

Place a measuring container under one of the drippers to collect the water and start irrigating just before sunset. For sprinkler irrigation, place a measuring container under a non pressure compensating dripper that has been added to the irrigation zone. For porous hose irrigation, connect a small length of porous hose to the irrigation system so that the discharge from the small length of porous hose enters a measuring container.

While irrigating, check the moisture level in the soil by hammering the soil moisture probe into the soil near a dripper. Stop irrigating 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).

The volume of water in the measuring container is the **dripper control volume** and it is the amount of water that each dripper should deliver during the irrigation event to moisten the soil from the surface to the bottom of the root zone.

Place a measuring container under one of the irrigation drippers

Dripper control volume for root zone scheduling

By following this procedure the volume of water that each dripper discharges during the irrigation event can be adjusted to match the dripper control volume. Alternatively, your knowledge of your plants requirements at their current stage of growth can be used to adjust the volume the volume of water that each dripper discharges during the irrigation event.

Step 2. How much evaporation is required between irrigation events?

You need to estimate the evaporation in mm before the soil is dry between the surface and the bottom of the root zone.

Position any container with vertical sides at a suitable location so that the evaporation from the container matches the evaporation near your plants. Fill the container with water and weigh it at sunset.

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. For deficit irrigation, you may wait until the soil is dry between the surface and below the root zone.

Reweigh the container to determine the volume of water that has evaporated.
The number of mm that has evaporated is the volume of water divided by the surface area of the container. This is called the **root zone evaporation** and it is the evaporation required to dry out the soil from the surface to the bottom of the root zone.

Make adjustments to the float so that the net evaporation between irrigation events corresponds to the root zone evaporation.

Step 3. Run the irrigation

Adjust the control dripper so that the flow rate is roughly the same as the flow rate of the dripper used in Step 1. For porous hose irrigation, replace the control dripper by a length of porous hose the same as the small length of porous hose used in Step 1. Empty the measuring container and place it below the same dripper used in Step 1. Slowly remove water from the evaporator until the irrigation starts.

Step 4 Adjusting the control dripper

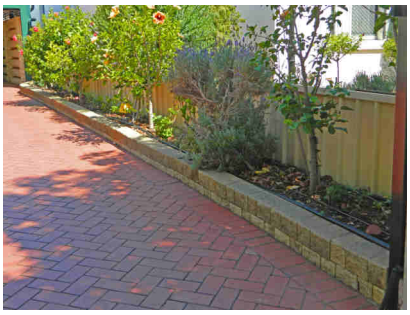
Check the volume of water in the measuring container at the end of the irrigation event. If the volume in the measuring container is less than the dripper control volume, then the wetting front is unlikely to have reached the bottom of the root zone. So reduce the flow rate of the control dripper (to increase the duration of the irrigation event) in preparation for the next irrigation. If the volume in the measuring container is more than the dripper 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. For porous hose, the control dripper is replaced by a length of porous hose, and so the length of the hose can be adjusted.

Repeat Steps 3 and 4 until the volume of water in the measuring container matches the dripper control volume. It is preferable that the above steps are done during a period when there is no rain.

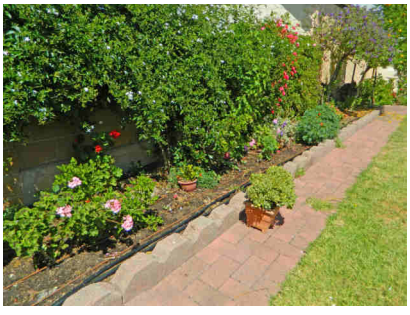
Chapter 5. Demonstration garden in Adelaide

This large garden uses gravity feed irrigation from a header tank. A single zone can be used for all the flower beds because the pressure at the tank outlet remains the same regardless of the number of drippers. For this zone there are about 1000 non pressure compensating drippers and the pressure at every the dripper is about 50 cm. For conventional pressurised irrigation a pump is needed and the single zone would need to be replaced by many zones. The flower bed zone uses a Sunset Measured Irrigation Controller and the fruit tree zone uses a Universal Measured Irrigation Controller. For this garden and similar applications, gravity feed irrigation is much less expensive than pressurised irrigation.

Header tank



Sunset Measured Irrigation Controller used for the flower bed zone



Universal Measured Irrigation Controller used for the fruit tree zone