



REV: A4

# Moisture controlled Auto Irrigation System

GG-001B

## User manual



ANC Technology

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NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Operate the system with the moisture sensor stakes fully inserted in the ground.
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by ANC Technology could void the user's authority to operate the equipment.

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## 1. Introduction:

The GG-001B irrigation system is a highly effective intelligent irrigation system; it includes: moisture sensor, with controller, solar cell and battery, and latching magnetic valve.

This system is solar powered, plug and use, dramatically reduce labor and water usage with this system.

This system is housed in an ASA plastic shell, which features weather and solar resistance, and is rugged for outdoor usage. The system is great for garden, backyard vegetables, nursery and agriculture.

## 2. How it Works

Moisture data is collected data from soil and sent to the microcontroller. The controller compares the moisture level to the user's preset wet/dry levels to decide if irrigation is needed. The controller opens the valve to irrigate when the sensor reaches the dry level, and closes the valve when the wet level is reached.

## 3. Specifications:

Included with the GG-001B:

Solar Powered Controller, GG-001B-E

Soil Moisture Sensor, GGS-01A

Valve, 1" NPT low power latching

Long Extension Tube

Short Extension Tube with Stake

Battery Pack

Operating Manual and DVD

NiMH Battery pack: 7.2V, 800mAh

Solar cell V: 9.2V/120mA

Quiescent current: <150uA

Sampling period: irrigation off: moisture sensor samples every 30 minutes, irrigation on: moisture sensor takes samples every 5 minutes. Controller shows updated moisture reading after every sample. Moisture readings are relative percent.

Latching magnetic valve (supplied), specifications: Pulse V 5-9 VDC, Power 5.5VA, Width of pulse 20 – 100mS: water pressure 0.5-10bar

Recharge time: Low batteries may cause a new system to not turn on. Place the solar powered controller under sun for 10 hours to recharge the batteries, and then turn power on.

Fully charged batteries can maintain system operation for up to 15 days in darkness.

## 4. Special terms:

**Dry set level.** Soil dry point, when soil moisture sample level is at or below this level, the system will start irrigation. This level is user determined, expressed as a percent range is 1 to 99%.

**Wet set level:** Soil wet point, when soil moisture sample level is at or above this level, the system will stop irrigation. This level is user determined, expressed as a percent range is 1 to 99%.

**Disable Irrigate:** This is the period in time where no irrigation will occur, even if the soil moisture is lower than the dry set level. Use this to set the calendar for forbidden periods of operation, for either when irrigation is not desired, other zones are being irrigated, or water saving ordinances prevents watering.

## 5. Installation:

Please connect the system according to following instructions.

1. Open the package. Remove all the parts, Fig. 1.



Fig. 1



Fig. 2

2. Assemble the tube and the stake as in illustration Fig. 2.

3. Magnetic valve cable and moisture sensor cable are protected by a grommet, Fig. 3.

Pass the valve cable through the grommet; the valve connection must pass through the grommet leading away from the controller.



Fig. 3

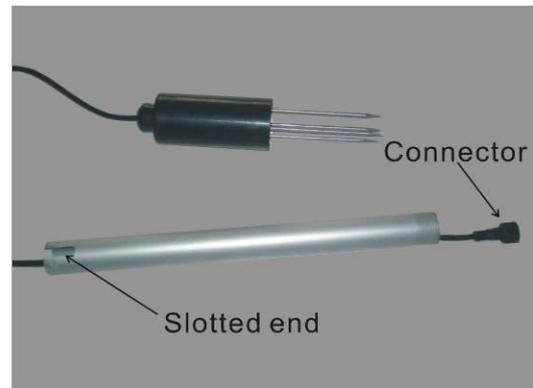


Fig. 4

4. Slide the two cables through the tube from the slotted end, Fig 4.

5. Install the batteries by connecting the mating connectors on the battery to the controller; tighten the retaining nut on the connector, Fig. 5.

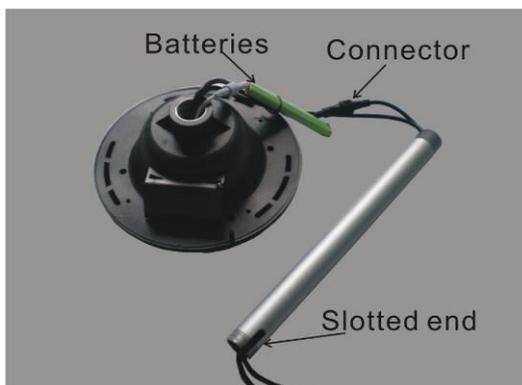


Fig. 5



Fig. 6

6. Connect the mating connectors of the moisture sensor to the controller. Tighten the stain relief nut, Fig.6.

7. Thread the tube into the female insert on controller, and tighten, making sure the cables do not bind in the shaft, Fig. 7.

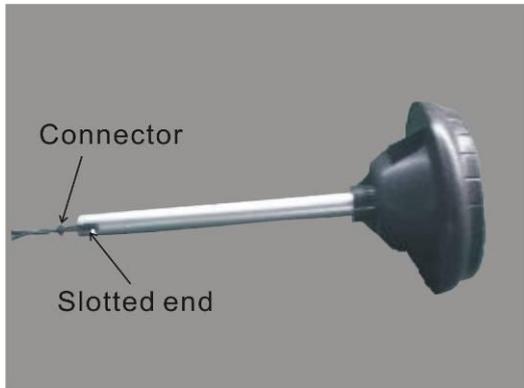


Fig. 7

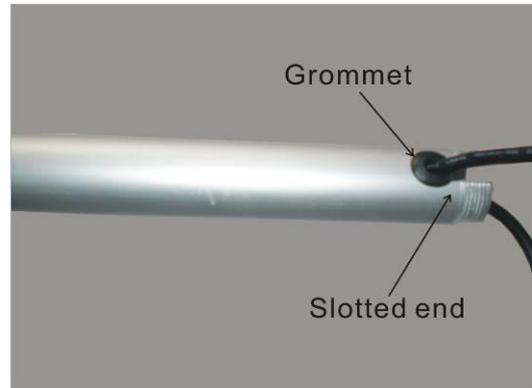


Fig. 8

8. Push the grommet containing the cable bundle into the U shaped notch, Fig 8,9.



Fig. 9

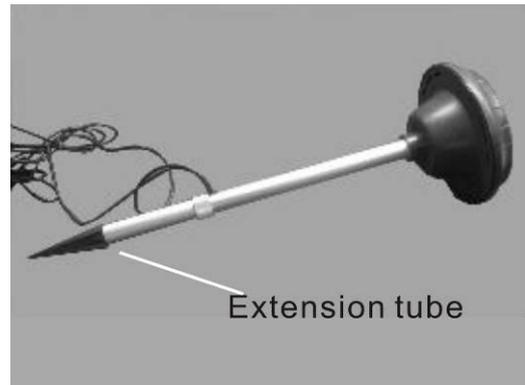


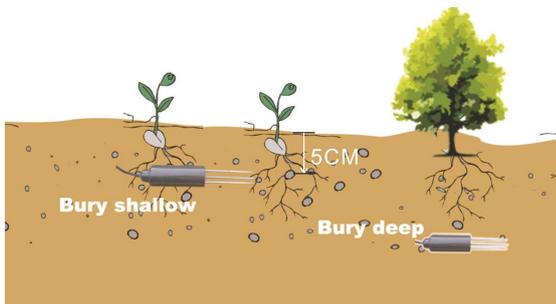
Fig.10

10. Thread the extension tube onto the main tube. This completes the hardware assembly.



Fig 11

11. Choose the installation location; lay out water pipes, if necessary. Arrange and install sprinklers, if necessary, and connect the magnetic valve between the water source and irrigation pipes. Observe the direction arrow on the valve and make sure to install the valve so the water flows in the direction indicated. The valve requires a minimum pressure to operate properly, keep pressure above about 5psi, 1/3 atmosphere. Place the controller in a location where it will be under full sun.



Insert the moisture sensor in the representative soil. The moisture sensor may be installed horizontally, vertically, or at any angle between. It should be buried to a depth, or make sure the

moisture sensor is been covered by soil at least 5 cm deep, where the wet level of the soil is to be measured.

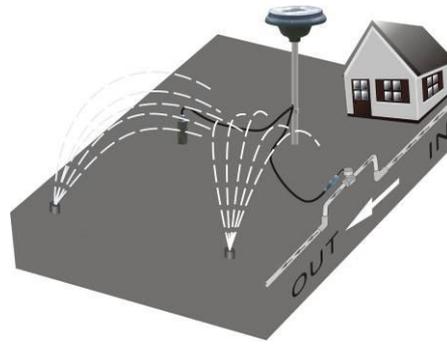
Connect the magnetic valve to the controller as shown on the illustration Fig11.

If there is debris in the water, it is suggested to filter the water before the valve.

If the region where the system is installed may freeze, preventive measures must be taken, such as mounting the valve inside a box underground, or covering the valve with a box. If there is a possibility of Rodents or other creatures to cause damage to exposed wires, place the wires in a jacket, such as a PVC pipe. For maximum lifetime of the wires, cover them to protect them from moisture and solar damage.

If the pressure surges when an automatic valve is used, a pressure relief valve and/or a surge damper may be required.

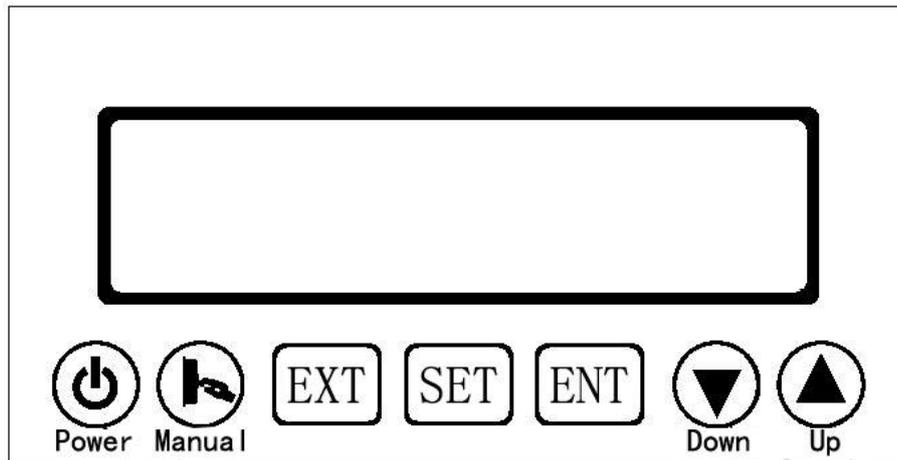
12. Assembly completed as shown on the following illustration.



## 6. Operation:

For a newly installed system, perform the following test prior to irrigation setup:

1. Verify the controller is installed solidly at a location of full sun.
2. See the illustration below for key locations. Push “Power” key on the controller, holding for three seconds, to power the system on. The controller will beep three times. Push “Manual” key to open the valve, there will be a click from the controller relay and a snap from the valve, the LCD will show “Irrigating”, the water valve should have opened normally.
3. Then push the “Manual” key again, there is a snap again, the word “Irrigating” will disappear on the LCD. Verify the valve is closed.
4. Verify the moisture sensor is at the proper location to sense the desired soil moisture. For proper continued operation, make sure the moisture sensor and irrigation maintain the distribution of water and soil structure as existed when the system is setup.
5. Display and keypad illustration:



### 6.1 How to turn on power:

Push power key for 3 seconds, the controller will beep three times, LCD will show operating information, and power is on.

After power on, the system will check if the moisture range as set, is effective (Wet control level  $\geq$  Dry control level). If not, the display will show “Failure,” beep two times every 3 seconds, and simultaneously show these Dry/Wet levels on the LCD. After setting the correct Dry/Wet control levels, the failure word will be automatically deleted.

System also will check if there is an effective connection with the moisture sensor. If there is no signal from the moisture sensor, “Failure” and “--%” will show on the LCD, and a beep two times every 3 seconds will be heard, until the moisture sensor is connected, then the system and LCD both will return to normal.

The system checks if the setup moisture control levels are correct first, then checks the moisture sensor connection, if correct, the system operates normally.

### 6.2 How to turn off power:

Push the power key for over 3 seconds, the controller will beep long once, the LCD will blank, and power is now off.

When collecting moisture samples, system will check the setup Dry/Wet control levels

and the moisture sensor connection. If there is a problem, the valve will be closed first then “Failure” will show on the LCD.

During the time to turn off power, the system will close the valve first, if it is irrigating.

### 6.3 Manually open/close valve

At any time, pushing the manual key inverts the valve status. If push “Manual” key to open the valve, the system will hold the open status until a second push of the manual key. “Auto” will disappear; “Irrigating” will flash every 3 seconds (to show a difference from the “auto” status). Moisture sensor will sample soil moisture every 5 minutes. Push “Manual” key again will close the valve, flashing word “Irrigating” will disappear, “Auto” word comes back on the display, the system returns to automatic operation. If push “Manual” key to close the valve, the system will back to automatically without second time push “Manual” key.

**Note: The system remains manual after first hit of the “Manual” key, not returning to automatic until user second time pushes “Manual” to open/close the valve again.**

### 6.4 Auto Irrigation

After installing, the system is ready to be set up for automatic irrigation as described below. During the period of no irrigation, the LCD shows “Running”, and rolls to current moisture % (This moisture sensor reading is for reference only, not for calibrated readings), then shows the set Dry control level and set wet control level. System will collect soil moisture samples every 30 minutes; will open the valve if analysis of the data requires irrigation. During an irrigation period, the LCD will show “Irrigating”, and sample soil moisture every 5 minutes. If the result of data analysis requires an end to irrigation, the system will close the valve, the word “Irrigating” will disappear from the LCD.

## 6.5 Sleep

Sleep is a safety mode to make sure that irrigation does not become stuck on. The system can operate from a fully charged condition for 15 days in a darkened condition, which is not likely to happen. The System will check the battery voltage, when battery voltage falls to 6.7 to 6.9V, the system will go into sleep mode, the LCD will be blanked, if the system is irrigating, it will cease irrigation, and wait until the sun recharges the battery. At that time, the system will automatically wake up and return to normal operation. During the sleep period, the user only can turn off power to close the system.

If the battery continues to drain to 6.3 V, the system will turn from sleep to off, to prevent further battery discharge. After turning the power off, the charging circuit will continue to work when the sun comes out, but user must turn on the system by pushing the power key.

## 7. Set up

Note: Setup must be performed before attempting to allow automatic operation.

### 7.0 Set up main menu

Push the “SET” key to enter setup, the display shows the entire main menu:

	Calendar	Clock	Learning
	Disable Irrigate		Dry.Level Wet.Level

Use the up/down key to cause an icon, which represents an item to set up, to flash, and then select the item by pushing the, “ENT”, Enter key to show the next level menu. Push the exit key, “EXT” to exit. If 20 seconds elapses before a key is pushed the

controller will exit from the set up mode, pushing any key while an icon is flashing time will begin a 20 second period to allow data entry again.

## 7.1 How to set up Dry/Wet moisture control levels

Notes:

1. Before learning dry/wet settings, finish system installation and make sure to verify it first.
2. After learning wet/dry levels, do not move the moisture sensor, so the original conditions are kept. If the moisture sensor must be moved the wet/dry levels may need to be adjusted, if so, learn the dry/wet levels again.

When “Learning” is flashing, push “ENT” to show the submenu:

		Learning
		Dry.Level Wet.Level

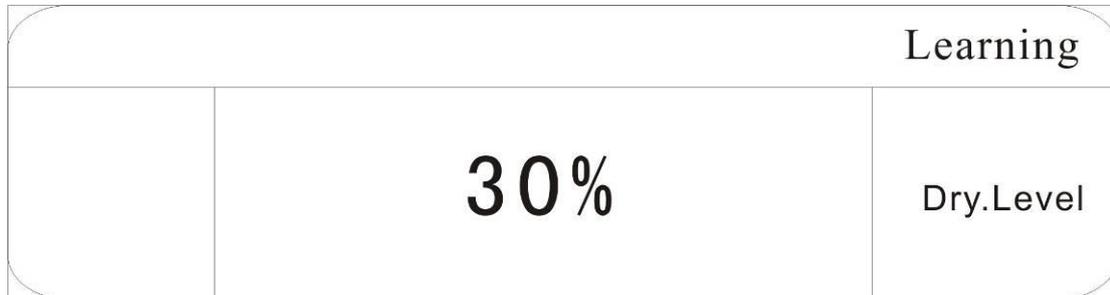
Use the up/down key to cause an icon, which represents an item to set up, to flash, and then select the item by pushing the, “ENT”, Enter key to setup (Details see following). Push the exit key, “EXT” to exit. If 20 seconds elapses before a key is pushed the controller will exit from the set up mode, pushing any key while an icon is flashing time will begin a 20 second period to allow data entry again.

### 7.1.1 Learn Dry Level

If it is first time to learn the dry level, follow the steps below:

1. Push power key to turn off GG-001B. Then no matter if it was irrigating or not, the system will turn off the valve, then shut down.
2. Wait until the soil reaches the dry level. Use your own judgment or a calibrated soil moisture meter. Turn on the power.

3. Under “Learning” menu, push up/down key until “Dry Level” is flashing on the LCD. Push “ENT” to confirm, then the “dry” words will no longer flash. The current moisture % will show on the LCD as on following illustration, the moisture % shown will probably be different.



Push “ENT” for the system to learn the level, two beeps will be sounded by the controller, meaning the dry level has been learned. The system returns to the previous menu. The up/down key can be used now to proceed to setting the wet level, or the system will return to normal operation after 20 seconds.

### 7.1.2 Learn Wet Level

For first time setup or to reset the wet dry level follow these steps:

Judge the current soil moisture to determine how to proceed:

1. If need to increase the wet level %, go to case A.
2. If current moisture % is what is required, go to case B.
3. If need to reduce the wet level %, go to case C.

#### Case A, To increase the wet soil level from the present value:

This step assumes the moisture sensor is in soil that has been determined to be not “Wet” enough. Under “learning” submenu, use up/down key until “Wet Level” are flashing. Push “ENT”, the words will stop flashing. The LCD shows current relative soil moisture %, this is the reading, which will be increased by opening the irrigation valve. Push “manual” to open the irrigation valve, Let the system operate to irrigate until the desired soil moisture is reached, a sample LCD illustration is shown below. The system is not controlling the soil moisture; the user must stop irrigation at the

desired level. Irrigation could continue until the batteries run down, or could be up to 24 hours.

When the correct wet level has been reached, as determined by experience or calibrated soil moisture readings, the new wet level is ready to be set. Push “Manual” key to close the valve, push “ENT ” to learn the new wet level, two beeps will be heard, meaning the controller learned the new wet level successfully, the system returns to previous menu, and will exit in 20 seconds, if no other key is pushed.

User also can reference 7.2 to adjust wet control level on the LCD.

**Case B To learn the present wet soil level:**

This step assumes the moisture sensor is in soil that has been determined to be “Wet,” which is sufficiently irrigated. Push “Set,” use up/down keys to browse to “Learning” submenu, then browse to flashing “Wet Level”, push “ENT” to set wet level. Then words “Wet Level” will no longer flash, current relative moisture % will be shown:

		Learning
	<b>70%</b>	Wet.Level

The wet soil moisture level will now be learned. Push “ENT” for the system to learn the level, two beeps will be sounded by the controller, meaning the wet level has been learned. The system returns to the previous menu and will exit after 20 seconds. Or reference 7.2 adjusting wet control level on the LCD.

**Case C:** Push power key to turn off GG-001B. Wait until the wet moisture level is reached. Then set the wet level as Case B.

**Note: The purpose of learning Dry/Wet control levels directly from field is to make the control levels as close as possible to the real field situation and better**

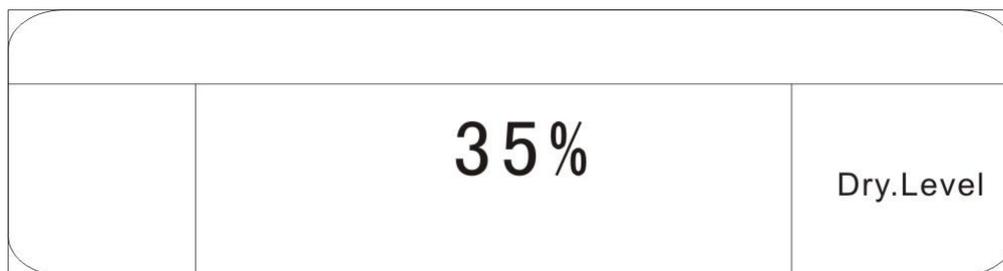
use farmer's experience, or scientific data. User also can reference 7.2 to set and adjust control levels through LCD operation.

## 7.2 Adjusting Dry/Wet control levels

Adjusting Dry/Wet control levels on the LCD is an easy way to set up control levels. User can set up then observe and make sure irrigation is optimized.

### 7.2.1 Adjusting Dry control level

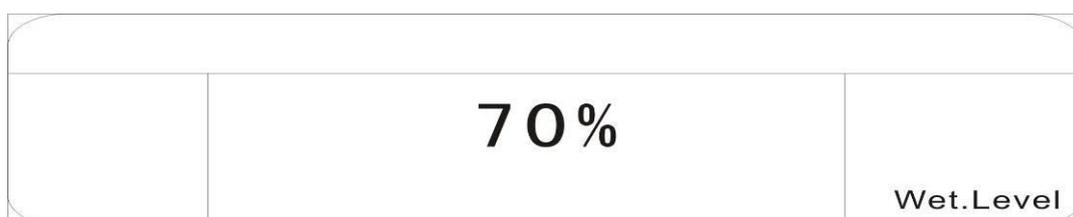
Under the "Adjusting" sub menu, use up/down key to browse, when "Dry level" is flashing, push "ENT" to enter, the words will no longer flash, current dry control % in is shown:



Use up/down keys to adjust the dry control level, until the desired level is reached, push "ENT" to confirm, the controller beeps two times, it has successfully learned the new control level, the controller returns to the previous menu. Push "Exit" key to exit setup.

### 7.2.2 Adjusting wet control level

Under the "Adjusting" sub menu, using up/down key to browse, when "Wet level" is flashing, push "ENT" to enter, the words will no longer flash, current wet control % in is shown:



Use up/down keys to adjust the wet control level, until the desired level is reached, push “ENT” to confirm, the controller beeps two times, it has successfully learned the new control level, then returns to the previous menu. Push “Exit” key exit setup.

### 7.2.3 Wrong Dry/Wet control levels

If Dry control level  $\geq$  Wet control level, the system will take this as an error. After exiting from setup, “Failure” will be shown. Also from power on, “Failure” will be shown to remind the user to adjust or relearn the control levels.

## 7.3 Calendar Set Up

Reference 7.0, browse main menu using up/down key to choose calendar, push ENT key when calendar is flashing, to set up the calendar. “Calendar” will no longer flash:

Calendar		
	Y M D	

### 7.3.1 Year set up

In the calendar set up menu, push up/down key until “Calendar” and “Year” are flashing, push “ENT” key to set up the year. “Year” will no longer flash:

Calendar		
	Y	
		08

Push up/down keys to choose the year, push “ENT” key, two beeps will be heard, the year is saved. Push “EXT” key do nothing and back to previous menu.

### 7.3.2 Month set up

Calendar		
	M	
		08

Set up the calendar month the same way as above

### 7.3.3 Day set up

Calendar		
	D	
		08

Set up the calendar day in the same way as above

### 7.4 Clock set up

Reference 7.1, begin “clock” setup, as shown:

Clock		
	H M S	

### 7.4.1 Hour set

Clock		
	05	H

As shown above, set up hours, same as 7.3.1

### 7.4.2 Minute set

Clock		
	05	M

As shown above, set up minutes same as 7.3.1

### 7.4.3 Second set

Clock		
	05	S

As shown above, set up seconds same as 7.3.1

## 7.5 Disable Irrigation set up

Reference 7.3, begin “Disable Irrigation time period” set up. Shown as:

	Disable Irrigate	Start Finish

### 7.5.1 Disable Irrigation time period “start time” set up

Reference 7.3.1 to set up, (Disable irrigation time period is from hour to hour), as shown:

	08 Disable Irrigate	Start

### 7.5.2 Disable Irrigation period “stop time” set up

Reference 7.3.1 to set up, (Disable irrigation time period is from hour to hour), as shown:

	08 Disable Irrigate	Finish

**Notes:**

**(1) Disabled irrigation period is determined by the start time and finish time.**

After setting up the “Disable Irrigation” period”, the system will not irrigate until the dry level is reached and the time is not during the disabled period.

(2) Forbidden irrigation time period only set by the hour.

(3) If the present time is during the disabled irrigation period, the LCD will show words “Disable irrigate”.

(4) If you don’t wish to use this function, set start and finish time the same.

	15	Start	
	Disable Irrigate		
	17	Finish	
	Disable Irrigate		

(5) During forbidden irrigation time, manual open the magnetic valve, the magnetic valve will keep open, the words “Disable Irrigate” will disappear from the LCD. Manual close valve, will back to auto status.

## 8. Frequently ask questions and answers

Q: why does the LCD show “Irrigating,” but there is no irrigation occurring, when the LCD does not show “Irrigating,” the irrigation is on?

A: Check magnetic valve connection polarity, most probably the wires are reversed.

Q: Why after learning a new current wet level, does the system not stop irrigating right away?

A: Possibly one of the following situations:

If the moisture sensor is moved, after learning the wet level, it may be incorrect.

If water is manually added to the soil, then a wet level is learned; the learned level could be very high, since water could be temporarily accumulated on the surface. Use the displayed % reading as a guide to determine what reading is correct. If the learned value is too high, learn the moisture level again later when the soil dries to the desired level, or set the moisture level directly.

Q: The word “Irrigating” is not shown on the LCD, but irrigation is still on.

A: Possibly the magnetic valve has problem and is stuck on. Manually turn off irrigation, listen for a click from the relay in the controller and from the valve.

Watch the valve to see if the problem recurs. Replace the valve if necessary.

Q: How to determine if the moisture sensor is working normally?

A: Push “SET” key to begin set up, push up/down key to browse, push “ENT” into “Learning” menu, then push “ENT” again when “Dry” is flashing, then the LCD will show the current moisture level. When the moisture sensor needle is in the air, the number should be 0, then put the sensor needles into water slowly, the moisture value will increase, until the display reaches about 99%, this means the sensor is working normally.

Q: The LCD shows the word “Failure” and the controller beeps once every 3 seconds.

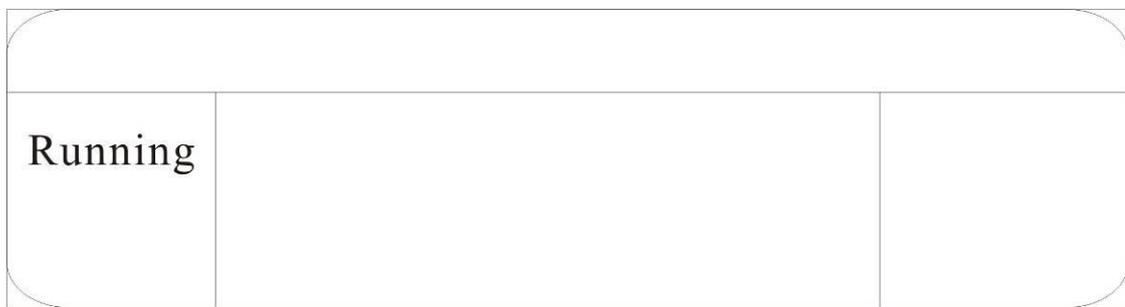
A: The controller allows one hour to judge failure after beginning irrigation. The one-hour period begins after the open valve command issued. After one hour, if the moisture % is greater than the as set dry control level, controller will believe the irrigation is normal, otherwise it will believe there is a failure. Failure could be a broken pipe, or failure to open the magnetic valve... The controller also has one hour to judge failure after stopping irrigation. The one-hour period begins after the close valve command issued. After one hour, if the moisture % is greater than the as set wet

level, the controller will believe there is a failure. Failure could be a broken pipe, or failure to close the magnetic valve... System will show “Failure” on the LCD, and beep every 3 seconds to alert the user.

If after closing the valve, right in one hour it starts to rain, there will be a failure notice too. Rain at any other time, will not cause a failure notice.

Any of the above failure indications will end when soil moisture returns to normal.

During normal operation, the “Running” icon will be displayed.



When the system is not irrigating, the moisture sensor checks the soil moisture every 30 minutes. When the system is irrigating, the moisture sensor will check the soil moisture every 5 minutes.

Q: The LCD shows the word “Failure” and the controller beeps twice every 3 seconds

A: The controller does not have the correct wet/dry levels set.

Please set up the wet dry levels again. If the problem recurs, please contact customer service.

### Notes:

1. Under long-term cloudy weather, the battery voltage will reach the first stage low battery level. The system will turn off valve first if it is open, then go to sleep to conserve power, in this condition, the system cannot irrigate. Return of sunlight will recharge the batteries and return the system to normal operation. If a longer duration

of cloudy days makes the battery voltage reach the lowest level, the system will shut down. Sunlight will recharge the batteries, but the system will need to be restarted manually.

2. Cover the magnetic valve to give protection from summer sun and winter weather. Frozen water inside the magnetic valve could damage the valve. Add a filter before the valve to prevent clogging. Add a pressure relief valve if the pressure causes water hammer or stresses the valve.

3. BEEP CODES:

One beep every 3 seconds, indicates fault, Irrigation has continued past turn off.

Two beeps every 3 seconds, indicates a fault, the wet or dry level is not saved. Or sensor connection is not correct.

Two beeps, new wet or dry level is saved.

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## Shanghai ANC Technology Limited Warranty card

**Dear Customer:**

Thank you very much for choosing ANC products.

1. This product has FCC verification and BV certification.
2. Warranty period is one year. Beginning on day of receipt.
3. Please keep your receipt and this warrantee card.
4. Please verify contents are correct, see included items listed in the manual.
5. For warranty repair, customer is responsible for shipping to ANC; ANC pays shipping to customer.
6. Beyond the warranty period, or for damage caused by customer or for other than defects in material or workmanship, ANC offers repair service at customer's expense.
7. Service phone: 021 5974-3993, in China; 1 805 530-3958, or toll free 1 877 822 3958 in North America.

<b>Product</b>			<b>Type</b>	
<b>User name</b>			<b>Ship date</b>	
<b>Address</b>			<b>Serial #</b>	
<b>Tele</b>			<b>Purchasing date</b>	
<b>Fax</b>			<b>Zip code</b>	
<b>Repairing Record</b>	<b>Check date</b>	<b>Problem</b>	<b>What been done</b>	<b>Repairer</b>

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