



**REV: A0**

# **Moisture controlled Auto Irrigation System**

**GG-006A**

# 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-006A irrigation system is a highly effective intelligent irrigation system; it includes: moisture sensor, controller with AC (110V/220V) power supply and magnetic valve.

After user setup Dry/Wet control levels, the system will accurately keep the soil moisture level at setup range to optimize irrigation and lift water usage efficiency, is great for vertical landscape of walls, indoor garden, roof garden/agriculture and greenhouse with AC power.

## 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-006A:

Controller, GG-006A-E

Soil Moisture Sensor, GGS-01A

Valve, 1" NPT low power latching

Operating Manual

Power Supply: 12V

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 4-9 VDC, Power 5.5VA, Width of pulse 20 – 100mS: water pressure 0.5-10bar

## 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

**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.

**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.

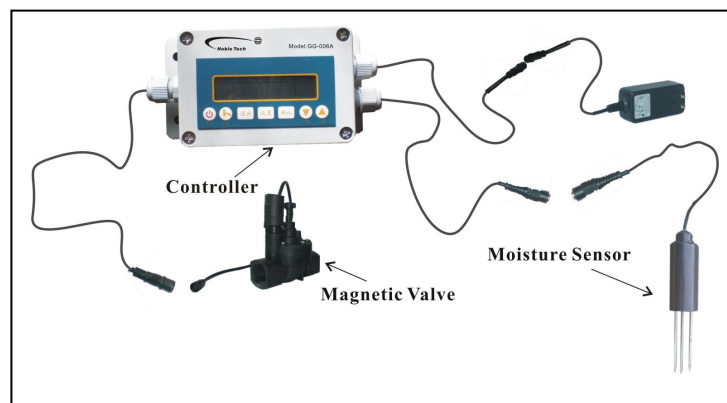
1. Choose right place to install and fix the controller.
2. Choose the installation location; lay out water pipes, if necessary. Arrange and install sprinklers, if necessary, and connect the magnetic valve between the water source and irrigation pipes. Observe the direction arrow on the valve and make 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. Insert the moisture sensor in the representative soil. The moisture sensor may be installed horizontally, vertically, or at any angle between. It may be buried to a depth where the wet level of the soil is to be measured; this is useful for trees, where irrigation periods may be for many hours. Connect the magnetic valve to the controller

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.

3. Assembly completed as shown on the following illustration.



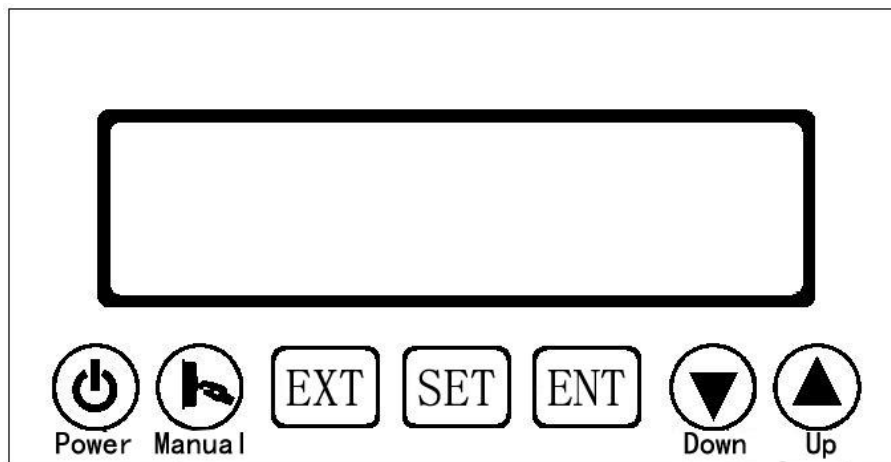
## 6. Operation:

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

1. 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.
2. Then push the “Manual” key again, there is a snap again, the word “Irrigating” will disappear on the LCD. Verify the valve is closed.

3. 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.

4. 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 ineffective Dry/Wet levels on the LCD. After reset the right range Dry/Wet control levels, the failure word will be automatically deleted.

System also will check if there is effective connection with moisture sensor. If can't find signal from the moisture sensor, will show “Failure” and “--%” on the LCD, beep two times every 3 seconds, until find effective moisture sensor connection, then the system and LCD both will automatically back to normal.

The system check if the setup moisture control levels is right first, then check moisture connection. Will not working until both are all right.

Note: Every time when the system collects moisture samples from the soil, will also



check moisture sensor connection and Dry/Wet control levels. If there are problems, the system will turn off valve first, then show “Failure” on the display. During failure time, the manual valve control will not work.

## **6.2 How to turn off power:**

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

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

## **6.3 Manually open/close valve**

Any time, pushing the manual key inverts the valve status. If pushing manual key to open valve, the valve will keep open until turn off by manual again. At left side of the LCD will show “Irrigating” every 3 seconds (“Irrigating” will keep on if it is opened automatically). After manually opened the valve, the soil moisture scanning is once every one minute. Push the “Manual” key again to turn off the valve, then the “Irrigating” word will disappear and the system backs to auto control. When you do setup, only under “Learning” status, you can manually open the valve.

## **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 rolling show every 3 seconds current moisture % (This moisture sensor is for reference only, not for calibrated readings), setup Dry control level and setup 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.

# 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 as shown:

	Y M D	H M S	Learning	Adjust
	Disable Irrigate			

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 into 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” into submenu, as shown below:

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 into 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, following steps below:

1. Push power key to turn off GG-006A. 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.

Learning		
	<b>35%</b>	Dry.Level

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, 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, and 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, followed by two beeps, 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” key, use up/down key browse to “Learning”

submenu, then browse to flashing “Wet Level”, push “ENT” into wet level setup. Then words “Wet Level” will no more flashing, show in the middle the current relative moisture % as below:

Learning		
	70%	
		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 a easy way to set up control levels. User can set up then observe and see if optimize irrigation.

### 7.2.1 Adjusting Dry control level

Reference 7.0, from the main menu, using up/down key to browse, when “Dry level” is flashing, push “ENT” to enter, then the words will no more flashing, show current dry control % in the middle of LCD as following:

		Adjust
	<b>37%</b>	Dry.Level

Using up/down key to adjust the dry control level until reached desired level, (The range is 1% to 99%), push “ENT” to confirm, beep two times, successful learned new control level which will over previous control level. Then automatically back to previous menu. Push “Exit” key exit to previous menu.

### 7.2.2 Adjusting wet control level

Reference 7.0, from the main menu, using up/down key to browse, when “Wet level” is flashing, push “ENT” to enter, then the words will no more flashing, show current wet control % in the middle of LCD as following:

		Adjust
	<b>75%</b>	Wet.Level

Using up/down key to adjust the wet control level until reached desired level, (The range is 1% to 99%), push “ENT” to confirm, beep two times, successful learned new control level which will over previous control level. Then automatically back to previous menu. Push “Exit” key exit to previous menu.

### 7.2.3 Wrong Dry/Wet control levels

If Dry control level  $\geq$  Wet control level, system will take this as a mistake. After exit from setup, will occur “Failure” on the screen. (Reference turns power on). Failure is for remind user to do adjusting or relearn control levels.

## 7.3 Calendar Set Up

Reference 7.0, browse main menu by up/down key to choose calendar, push ENT key when “Y M D” is flashing, into calendar set up. Then “Y M D” word no more flashing.

LCD will show as following:

Y M D		

### 7.3.1 Year set up

In the calendar set up menu, push up/down key until “Year” are flashing, push “ENT” key to enter year set up. Then Year word no more flashing, as following:

Y		
	10	

Push up/down keys to choose the year, push ‘ENT” key beep two times save and exit, push “EXT” key do nothing and back to previous menu.

### 7.3.2 Month set up

M		
	10	

Set up the calendar month the same way as above

### 7.3.3 Day set up

D		
	10	

Set up the calendar day in the same way as above

### 7.4 Clock set up

Reference 7.3, into “H M S” setup, as shown following:

H M S		

#### 7.4.1 Hour set

H		
	08	

As shown above, set up the hour same way as 7.3.1

#### 7.4.2 Minute set

M		
	07	

As shown above, set up the minute same way as 7.3.1



### 7.4.3 Second set

S		
	00	

As shown above, set up the second same way as 7.3.1

### 7.5 Disable Irrigation set up

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

S		
	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 following”

S		
	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 following”



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 time is during the disabled irrigation period, the LCD will show words “Disable irrigate”.
- (4) If you don’t wish to use this function, just set start and finish time the same.
- (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.

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. 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.

2. 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 has not been saved.

Or sensor connection is not right.

Two beeps, new wet or dry level has been saved.

## **9. Standard package list**

1. Moisture based Controller....1

2. One wired 1” magnetic valve....1

3. Wired moisture sensor.....1
4. 12V power supply
5. Manual
6. Warrantee card
7. How to install and operation DVD.

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## Shanghai ANC Technology Limited Warranty card

Dear Customer:

Thank you very much for choosing ANC products.

This product has FCC verification and BV certification.

Warranty period is one year. Beginning on day of receipt.

Please keep your receipt and this warrantee card.

Please verify contents are correct, see included items listed in the manual.

For warranty repair, customer is responsible for shipping to ANC; ANC pays shipping to customer.

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.

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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