REV：1.02

1 moisture 4 valve wireless field irrigation controller

MS4V Series

User Manual

www.anctech.com

Content

1. How to use

1.1 Description

This wireless device only can be used as field wireless controller with ANC Intelligent wireless system Controllers in the GG-002 series

This wireless controller is solar powered with rechargeable battery, controls one moisture sensor, four 1” to 3” latching valves and four pressure switches/meters. Also functions as relay in the wireless mesh network.

Note: This wireless device only applied to GG-002-PC/WIFI/3G

1.2 Specifications

Solar panels: 17.4V DC /220mA/3.8W

Back-up battery: 10 x 1.2V/ 2.3AH AA Size

Quiescent current: 1mA

Frequency: 902-928 MHZ

Wireless distance at open space: 1600 ft

Operating environment: Temperature [-30~60℃]; Humidity [<90%]

Lasting time of fully charged battery: 7 days without sun

Battery charging time: 10 hours under standard illumination

Moisture sensor:

1. Output: wired digital to remote controller
2. Moisture Range: 0-99%
3. Resolution: +/- 5%

4. Measurement Method: Dielectric

5. Extension cable is up to 50 meters.

A. Push scan key immediately takes a sample, normally take soil samples every 5 minutes when irrigating, otherwise 30 minutes.

B. When exit from setup, controller will take sample once.

C. When at adjusting Dry/Wet control levels, samples every 0.5 second.

Solenoid valve:

1. Output: pulse signal

2. DC 6-12V

3. Extension cable is up to 20 meters.

Pressure switch：

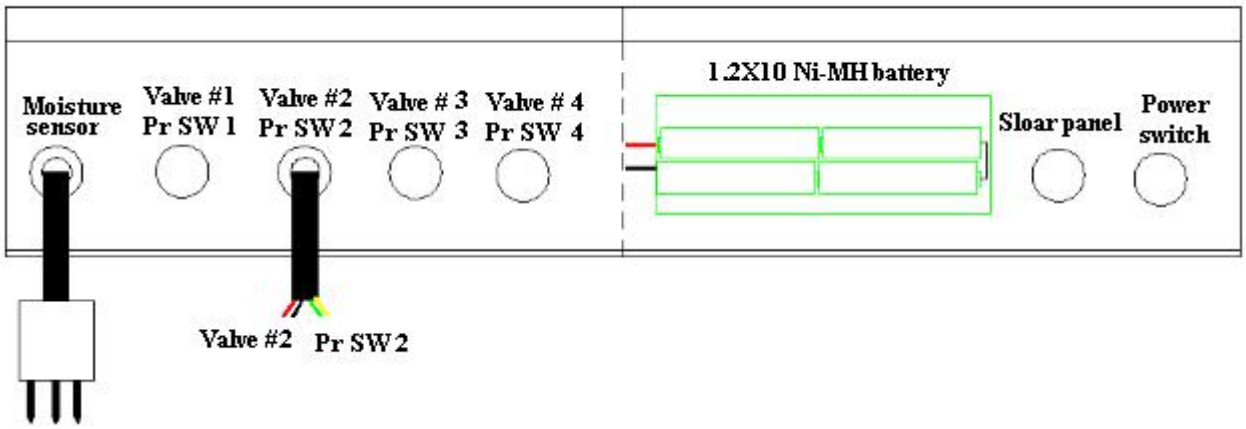
1. Pressure range：Optional 0.06-0.6MPa or 0.1Mpa-1.3Mpa

2. Thread：1/8 or 1/4 NPT; or 1/4G

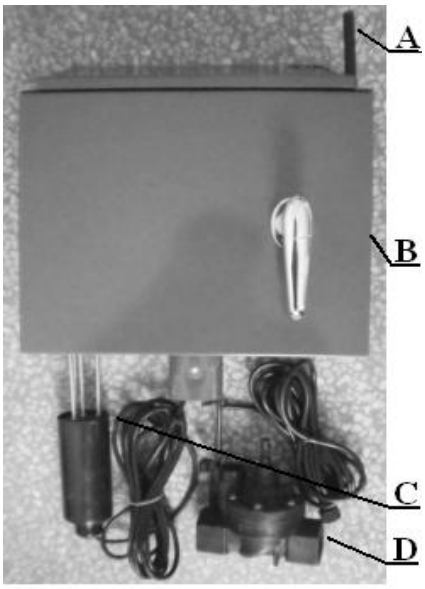
3. Extension cable is up to 50 meters.

Pressure meter:

1. Range: 0.1-1.0Mpa
2. Accurate: +/- 1%
3. Output: 4-20mA
4. Supply Voltage: 9-15VDC
5. Thread: Optional 1/4 NPT, 1/4G
6. Work temperature: -20~120℃



Control box illustration



A. Antenna
B. Controller box
C. Moisture sensor
D. Solenoid valve

Metal Box type

Valve box type

1.3 How to install battery

Remark:

1). Battery standard: Rechargeable Ni-MH AA battery 1.2v*10

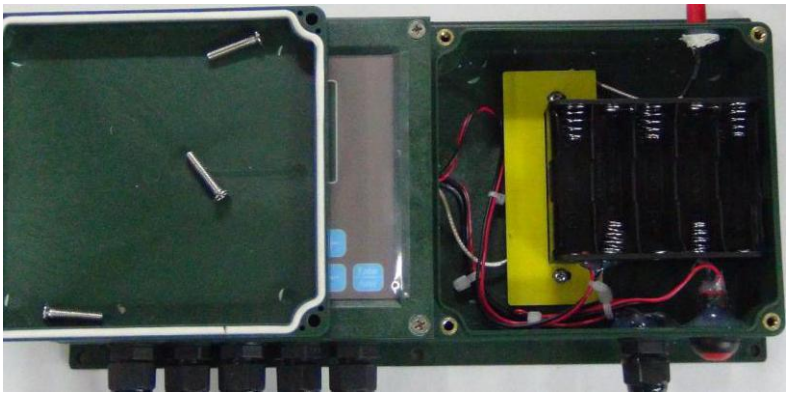
2). Pay attention to the (+/-) sign

3). Suggest to use ≥2300mAh rechargeable battery.

Installation steps:

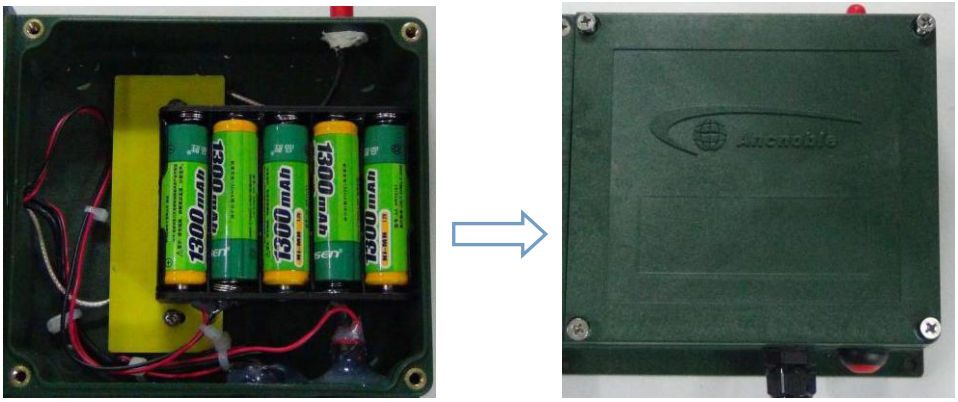
1). Using screw driver to open the battery box cover.

2). Take out the battery box



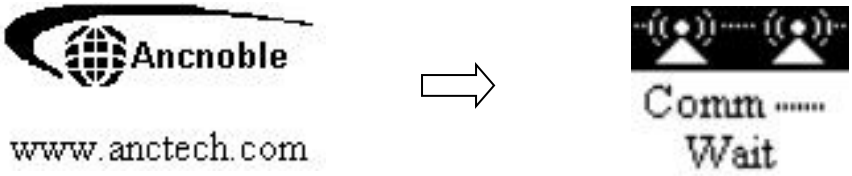
3). Put Ni-MH AA rechargeable battery 1.2v*10 into the battery box, please pay attention to +/- sign.

4). Please put the battery box back to the place, put cover back, screw tight.



1.4 Power on

Push power switch, unit will beep twice then show logo, do self-test and start work.



After power on, the controller will:

1. Check battery voltage. If the voltage is lower than normal operating voltage, the controller will go sleep and charge the battery using the solar panel until reach normal operating voltage, then wake up automatically and start to work.
2. Check connection of moisture sensor. If there is no connection with moisture sensor, the controller will default the moisture sensor reading as 99%. If no moisture sensor is registered, the controller will control valves only.
3. If Dry/Wet control level is not set, there will be a failure alarm on the LCD. The system will not operate until the error is corrected. Push “menu” key to adjust dry/wet control.

Note: Wet control % must greater than dry control %.

1.5 How to establish wireless communication mesh network

After power been turn on, if moisture sensors and valves are already been registered, the controller will automatically try to establish wireless communication route to reach main controller. During searching time, keys been locked, LCD shows “Searching Comm path”. After route is been established, there will be two beeps, the controller is ready for work.

If failed to establish the route, the controller will unlock the keys and back after 1 minute. Push 【+】and 【-】 keys to check route, you will see XX, which means no route been established. Push and hold 【Enter/Save】 and 【Exit/Delete】keys at same time to speed up research, otherwise the controller will try automatically again

and again until done.

After successfully established route, the field controller will send the route information to the main controller and show on the main controller screen as following. That is for sensor.

If the search is not successful, the field controller will keep try every 1 minute.

Note A: For speed up establishment of wireless mesh network, please follow steps as below:

1. Register all the field controllers first. Then turn off all the field controllers.

2. During search time, the main controller must be in normal work status, not in any programmable menu, ready to pick all field wireless signals.

3. Take the main controller as center, turn on field controllers which are most nearby, like in the range of 500meter or 1640feet, more or less, then all field controllers which is on will automatically to looking for route to communicate with main controller. After all this layer of controllers found route to main controller, then open second layer of field controllers in the mesh work, so on until all 4 layers of controllers established wireless communication with main controller.

Note B: All field controllers need to found wireless route through relay to communicate with main controller, the relay route could be 1, 2, or 3 layers. Field controllers will report route to the main controller, the main controller will save this information and follow this route to communicate with field controllers. If the field

controllers found the route, but not success to forward this information to main controller, then the field controller will keep do so everyone minute until success. The main controller will show XX until received route information.

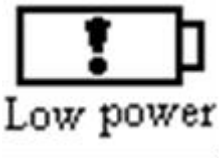
1.6 Power On/Off

Push the red power switch it will turn power on/off.

1.7 System sleep

During working period, controller will check the voltage of the battery time to time. When the backup battery voltage is less than 11 V, the controller will turn off all the valves and pumps, then put self into sleep, waiting for the solar panel to recharge the battery. When the battery voltage is back to 11.5 V, the controller will automatically back to normal working status. During sleep period, if the solar panel still can't charge up the battery, if the backup battery voltage drops to 10 V, for protecting the battery from over discharge, the controller will automatically turn from sleep status to total turn off.

After been total turn off, the solar panel will still charge the battery as long as there is sun. System will do auto-restart after the battery is recharged back.



1.8 Manually open/close valves

Can manually on/off valves from main controller.

Or do manual operation directly on the field controller when it is on. Push #1 key with valve logo to realize manually open/close valves. On LCD screen, there has 【Manual】→【Auto】→【Manual】→【Auto】, loop operation.

Also, can manually open/close valve by using Remoter (Romoter-1) for the convenience of maintenance.

If user did manual open/close, the valve will keep open/close until main controller or wireless field controller change the status back to 【Auto】. Or setup timer to stop.

Note: Manual operation has priority over Lock out period.

1.8.1 Manually open/close valve #1

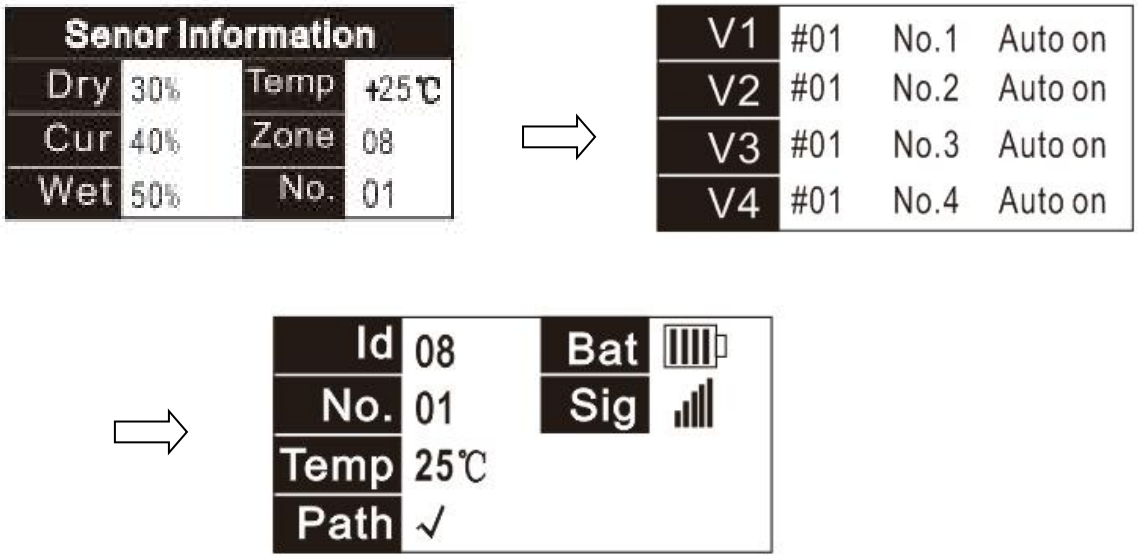
On the remote controller panel, choose and push "#1 " multi-function key, which functions as "Manual on"→ "Auto"→ "Manual off" → "Auto" for valve #1. Operation is the same for #2, #3, and #4 valves.

1.8.2 System information

There are three pages information. Push [+ -] keys to change the page.

First page shows moisture sensor, second page shows valves, the last page is for other information.

The LCD will turn off after 2 minutes if there is no operation. Push any key will light up the LCD.



1.9 System setup

Setup notes:

1. When menu item is highlighted, there is sub menu, press [Browse/Menu] key enter this sub menu.

2. When cursor is flashing, enter value or edit. Push **[**+/ **-]** keys to adjust value.

3. Push [Browse/Menu] to enter system setup, push [+/ -] or [Browse/Menu] to browse, there are 6 menu items:

[Set up sensor]–

[Set up valve #1]–

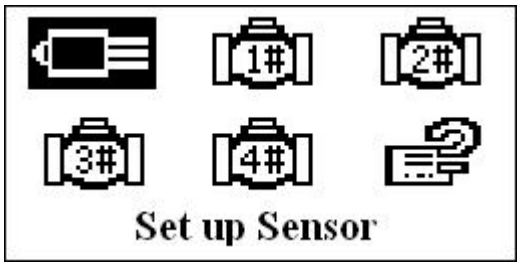
[Set up valve #2]–

[Set up valve #3]–

[Set up valve #4]–

[User help] –

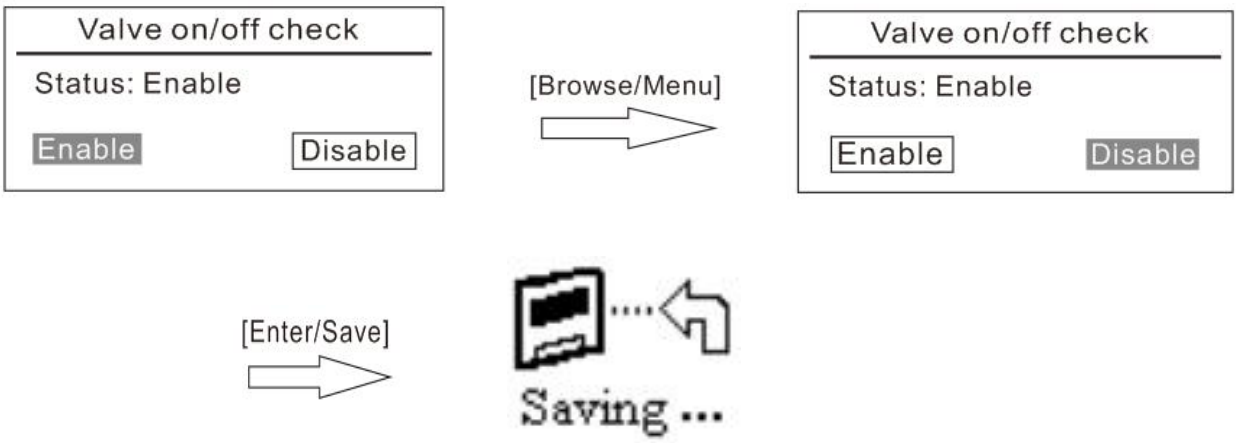
Push [Enter] into highlighted menu, push [Exit] to exit, or auto exit will occur after two minutes without any operation.



1.9.1 Enable pressure switch/meter

Enable pressure switch #1

Push [Browse/Menu] into main menu, choose [Set up valve #1], push [Enter/Save] into this setup. Push [Browse/Menu] to choose [Valve on/off check] and push [Enter]. Push [Browse/Menu] to switch between [Enable] or [Disable], and push [Enter/Save] to save data. The LCD will display “Saving” and then show what is saved. Push “Exit” to return to previous menu.



1.9.2 Set pressure check delay

Water pressure takes time to establish, so there must have a time delay to check the water pressure to avoid misalarm. Out of factory default is 1 minute, user can adjust up to 99 minutes to make sure there is no misalarm. After setup delay time, push 【Enter】to save.

1.9.3 Valve drive level setup

This set is for making drive 6-12V latching valves more realible.

We divide solenoid pulse width into three ranges: 1-20 ms; 2-50 ms; 3-100 ms.

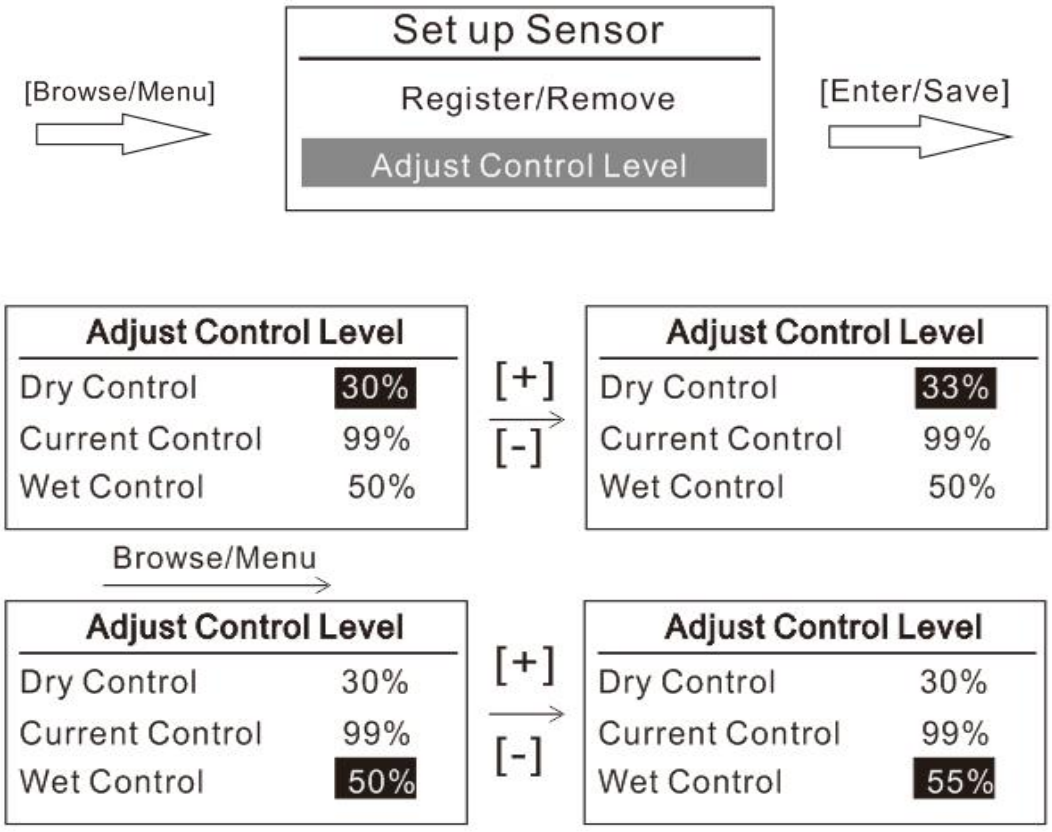
For 6V latching valve, recommend 20 ms.

For 12V latching valve, recommend 50 ms or 100 ms.

User can adjust the range until fit according to the real valve at real time.

1.9.4 Adjusting Dry/Wet control level

Under [Set up Sensor] menu, push [Browse/Menu] to choose [Adjust Control Level] and push [Enter/Save]. Push [Browse/Menu] to choose set dry control level or wet control level, then push [+ /-] keys to adjust dry/wet control level. Then push [Enter/Save] to save.



Note: Wet Control Level must bigger than Dry Control Level.

1.9.5 How to register this device with main controller

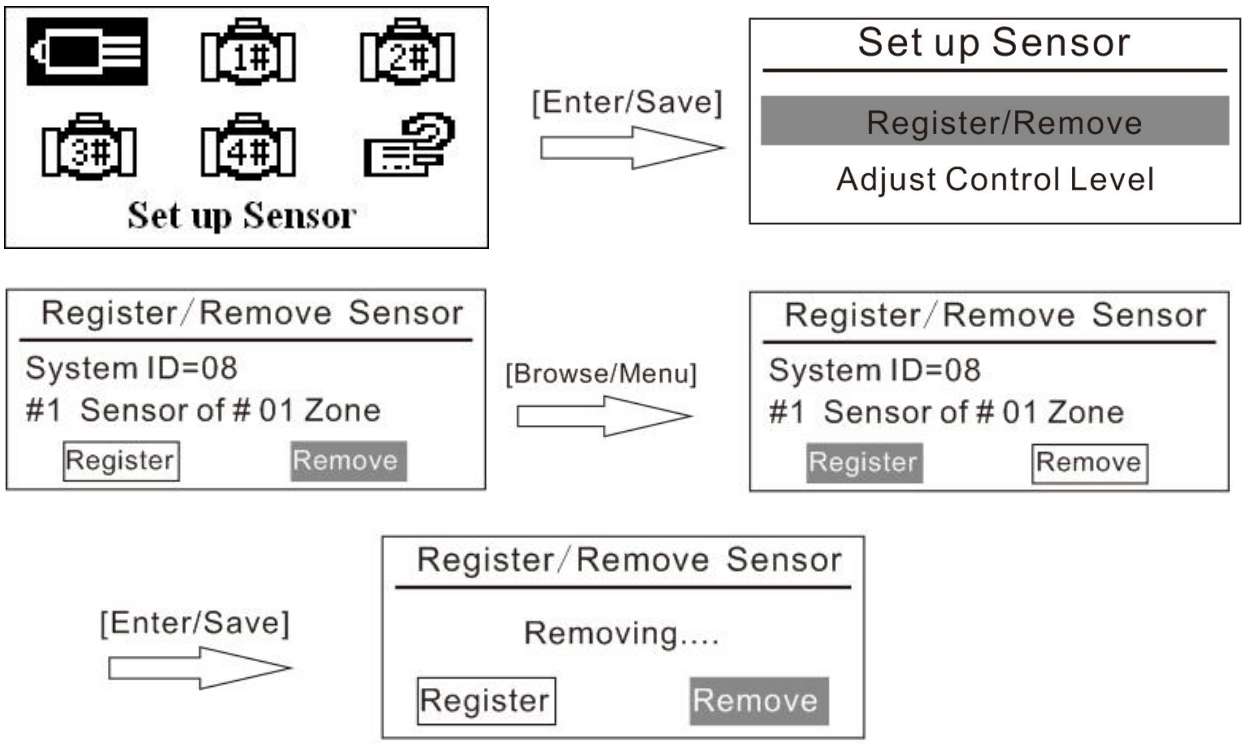
Register with main controller will establish bidirectional wireless communication channel with main controller. Register and delete this wireless communication must be done with both main controller and field controller simultaneously.

Note: 1. We suggest do the registration between main controller and field controller before to the field. Mark the field controller field position, for example, like “#1 valve for apple trees” first, before install the field controller to the field.

2. The suggested registration distance between main controller and field controller is 2m≤X≤500m.

1.9.5.1 Register Moisture Sensor with Main Controller

At system main menu, select [Set up Sensor], push [Enter/Save] to enter setup. Choose [Register/Remove], and push [Enter/Save] key to into Register/Remove menu. Using [Browse/Menu] browse to [Register/Remove] and push [Enter/Save] key to start registration or remove moisture sensor. Put this wireless field controller at registration state aside. Set the main controller also to registration state, then registration will establish wireless communication channel to each other.



Notes：

1. During registration, wireless field controller will exit registration automatically if there is no registration information from the main controller within 2 minutes.

2. During Register/Removing period, need the main controller simultaneously into Register/Removing status.

3. After registration, this field controller will only receive command from this main

controller. If you need to move this field controller to another system, needs to remove all the registration information from this original main controller first.

1.9.5.2 Register/Remove Valve

Same as 1.9.5.1. Register all the valves one by one, could either register to one zone, or to 4 different zones.

1.10 One key to set dry/wet control level

Wait until soil just needs irrigation, push and hold “set dry control” key about five seconds to set current moisture % as the dry control level. Start to irrigate, wait until soil just wet enough to stop irrigation, push and hold “Set wet control” key to set current moisture % as wet control level. After setup, this field controller will send the new setting to the main controller.

Note: Wet Control Level must higher than Dry Control Level.

1.11 How to install Pressure Switch/Meter

1. If install water pressure switch/meter for the #1 valve, pull out the related pressure switch/meter connector from cable of #1 valve. unscrew the screws.

2. Connect the wire from the pressure switch/meter to the connector, tight up the screw.

Note:

The wire can prolong to about 50 meters. Using water proof tape to protect the connection from water.

1. One pressure switch/meter may be used for each valve. Each pressure switch/meter is installed after the valve to check if open/close is correct for this valve.

Here is a sample installation of field controller MS4V series, with #1 valve and one pressure switch/meter as example.

Use one “T” to install water pressure switch/meter on the pipe as shown. Install the pressure switch/meter behind valve to detect water pressure for the valve.

2. Enable this pressure switch/meter for the controller. Reference 1.9.1.

3. Manually open/close valves to check if there are misalarm, any leaking.

Notes:

a. Make sure the “T” thread match with pipe and water pressure switch/meter.

b. Installed pressure switch/meter needs to be straight up to prevent water damage through the cap.

c. If the water does not drain itself, a backflow preventer will not relieve the

pressure, it will hold the pressure. An anti siphon valve, which lets the water out, will relieve the pressure and prevent water flowing back into the valve. Should the water supply fail a backflow preventer will prevent flow into the water supply and avoid a hazard.

d. If water pipe after valve is up, so water may flow back towards the valve, install one anti-siphon valve to eliminate water pressure when the valve is closed this will avoid a false alarm of the pressure switch.

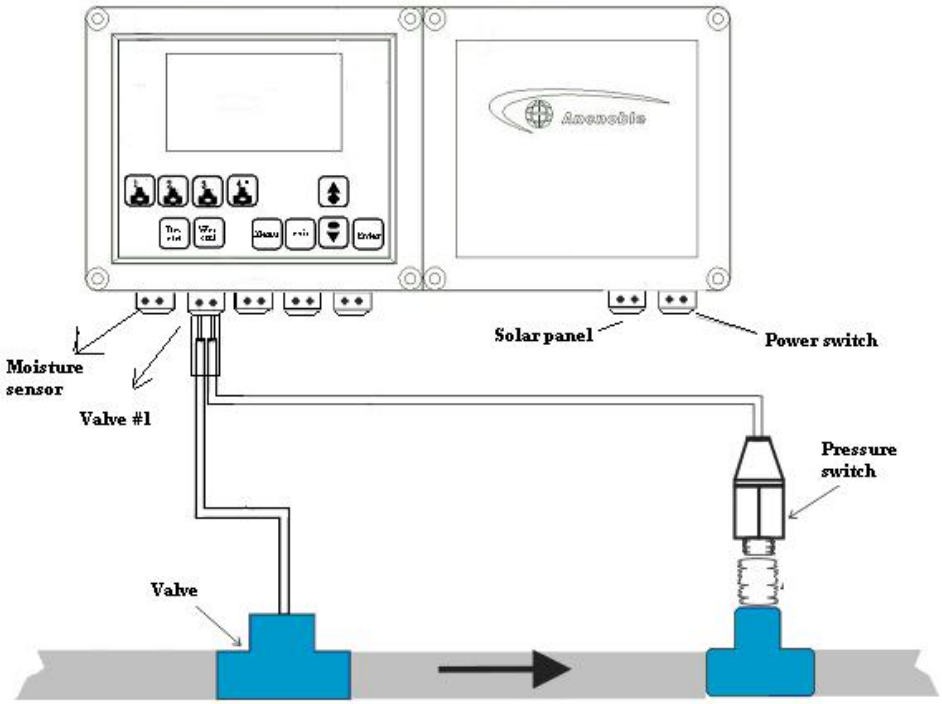
e. May increase cable length to 50 meters if needed.

f. If open valve normally, but with failure alarm. First check if the pressure switch is installed correctly; second open the black cover on switch, using screwdriver to adjust screw counter clockwise until there is no false alarm. If it still showing failure when the screw reaches the end, check if the water pressure in range.

g. If valve closed normally, but valve off failure is indicated, adjust the screw anticlockwise until there is no false alarm.

Manually open/close valve to check if there is any leak, and with no open/close alarm.

Note: For pressure meter, no need of adjusting, installation as same as pressure switch.



2. How to upgrade wireless field controllers

1. Preparation: First, turn power off for the field controller which needs to be updated. Preparing one field controller with the new software you want. You can do this by buying a new one from ANC Technology, or send one old version field controller to ANC Technology for update at a fee. This new version field controller would be used to update all other existing wireless field controllers.

2. For the field controller waiting for upgrade, push and hold the menu key and power button simultaneously until interface show as Figure 2.1, then press menu key to select【Download Program】, push【Enter】key to start download program, interface as Figure 2.2

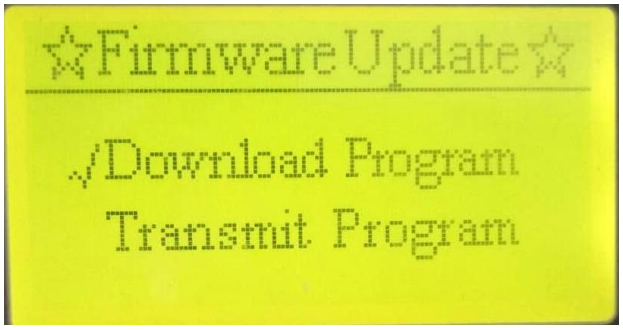


Figure 2.1

Figure 2.2

3. For the new version carrier of the field controller, push and hold the menu key

and power button simultaneously until interface show as Figure 2.3, push menu key to select [Transmit Program], and push the 【Enter】key to start transmit the program, interface shows as Figure 2.4

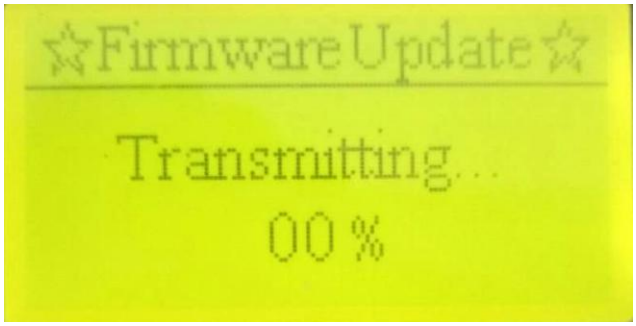


Figure 2.3

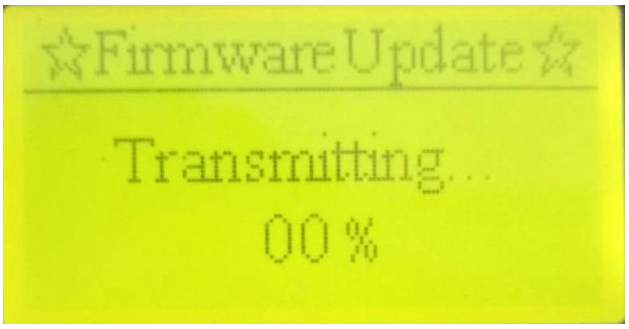


Figure 2.4

4 The upgrading interface will show the upgrading progress. The upgrade procedure takes a few minutes. Make sure the distance of two units are at effective communication distance of 2m≤X≤500m, to grantee good wireless communication.

5. After successful upgrade, LCD will show as Figure 2.5

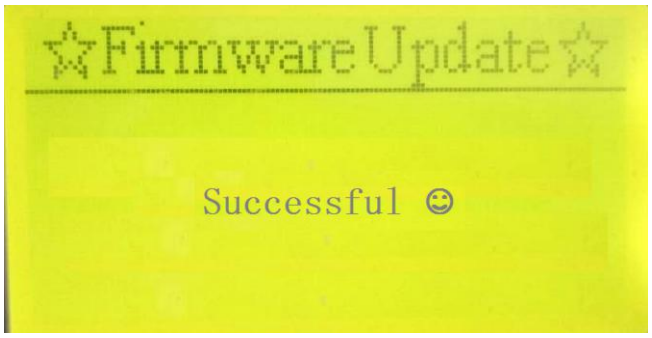


Figure 2.5

3. Frequently ask questions

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

A: Possibly one of the following:

A: For user wired valves at the time of installation, check the magnetic valve connection polarity, the wires may be reversed.

B: Check the magnetic valve controller, if used, is on and showing the correct state

of irrigation. If the state is incorrect, there may be a communications problem, the controllers should show communications error, check for an obstruction of the line of sight between the main controller and the valve controller.

C: Manually turn irrigation on and off at the valve controller, listen for a click from the valve.

If no sound is heard from the valve, check if the cable from the valve controller has been cut or broken. Check the connector to the controller, make sure it is clean, dry and the retaining nut is tightened.

1. Verify continuity of the valve solenoid with an ohmmeter, 2 to 6 ohms resistance is typical.

2. If a sound is heard from the valve, and water does not flow, make sure the water inlet has pressure.

3. If a sound is heard form the valve, the valve may be stuck, remove the valve and check for an obstruction, if nothing is found, replace the valve.

4. If no click is heard from the controller, make sure the battery is charged. The main controller shows the battery charge. If the battery charge is OK, replace the controller. If the battery charge is low, and the solar exposure has been normal, replace the battery.

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

A: Possibly one of the following:

A: If the moisture sensor is moved after learning the wet level, it may be incorrect. User should redo the learning process.

B: 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.

C: The LED “Irrigating” is off, but still the system is still irrigating. See FAQ 1, about valve problems.

D: The main controller show this zone is irrigating, but has no problems as described at A and B. then maybe it is sensor problem, please reference questions 3 and 4.

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

A: Push [Browse/Menu] key to begin to set up sensor, push [Enter/Save] to set up sensor, then [Adjust Control Level]. Then push “Enter/Save” to begin setup, when Dry or Wet is flashing, push “Enter” again, then the LCD will show the current moisture level. When the moisture sensor probe is in the air, the number should be 00%, then put the sensor probe into water slowly, the moisture value will increase, this means the sensor is working normally. If the moisture number does not change, either the connection to moisture sensor is bad, or the moisture sensor may be bad. Check if the cable from the valve controller has been cut or broken. Check the connector to the controller, make sure it is clean, dry and the \retaining nut is tightened.

4. Q： When using several wireless field controllers, why is there so little water flow?

A: Possibly one of the following:

A: Check and see if the Maximum number of simultaneously irrigated zones is too many (Check from main controller). User should adjust until there is enough water pressure.

B: Check if the valve is jammed.

C: Check water pressure and pipe. If there is not enough water pressure, reduce the maximum number of simultaneously irrigated zones to increase water pressure.

5. Q：Main controller always shows communication failure

A：First make sure wireless field controller is registered to the main controller. Learned “ID”, and Dry/Wet levels, all at normal operating states, and batteries are charged.

B: Check if the wireless distance is over the normal range, and if any obstructions are in the way. Communications is line of sight. Try adjusting the position until the failure disappears.

6. Q：Wireless field controller LCD is blank, has no response from any key, main controller shows failure.

A：After long time without sun, the battery starts to discharge. The controller first goes to sleep, saving power, in this condition it will beep if a key is pushed, but not operate. If discharge continues, the controller will turn off to save power for automatic recharge. When sun comes out, the solar panel will automatically recharge the battery, and the controller will power on so long as the power switch is on.

7. A: After wireless field controller working some time later, LCD without any display, and keys also no reaction, main controller display this zone is failure.

Q: If the wireless field controller can not receive solar power for long time, and the backup battery voltage is less than 11 V, the controller will turn off all the valves and pumps, then put self to sleep, waiting for the solar panel to recharge the battery. If the wireless field controller still cannot receive solar power, the controller will

turn off. After turning off, the solar panel will still charge the battery as long as there is sun. The controller will restart when the batteries recharge.

8. A: Main controller display “Open/Close valve failure” and accompanies long beep.

Q: When the main controller or wireless field controller turns on/off valves, it will check if the valves open/close normal or not, if the pressure switch detected that the valve open/close is not normal, the main controller will alarm with a long beep. The failure cause may be: Water pipe burst, valve broken, or valve is stuck. When the failures are removed, the alarm will stop too.

4. Packing list

1. Wireless solar controller
2. One magnetic valve
3. One moisture sensor
4. One 1/4" Pressure Switch
5. User Manual + Warranty card

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 warranty 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.

Product			**Type**	
User name			**Ship date**	
Address			**Serial #**	
Tel			**Purchasing date**	
Fax			**Zip code**	
Repairing Record	**Check date**	**Problem**	**What been done**	**Repairer**

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