

Flow Meter, Pressure Meter, Master Valve, Pump Controller

FMP-Solar

Manual

Version: 1.01

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1. General

FMP-Solar controller controls pump and master valve, measures flow rate, and water pressure. Compatible with GG-002 WiFi / 3G wireless control system.

Solar powered with water proof shell design, good for outdoor application.

2. Specification

Solar Panel: 17.4V DC /220mA/3.8W (Support Extra panel)

Back battery: 1 0*1.2V/ 2.3AH AA NiMH

Solar charging time: About 10 hours under standard sunlight

Idle power: 1mA

Lasting time under fully charged battery: 7 days

Wireless frequency: 902MHz-928MHz

Receiving distance: Open space \geq 500 %, can relay forward.

Application environment: Temperature: $-30 \sim 60^{\circ}$ C Relative humidity: <90%

Flow meter specification:

- 1, Voltage: 12VDC
- 2, Type: Turbine (3 wires system)
- 3, Signal: Pulse

Pressure meter specification:

- 1, Voltage: 12VDC
- 2, Range: 0-1Mpa
- 3, Signal output: Current4-20mA

Valve specification:

Voltage: 6-12VDC Pulse
Latching valve
Pump control output: Open- (12VDC) Close- (0VDC)
Controller box size: Long: 28cm Wide: 17.5cm High: 28.2cm
Controller box protective grade: IP56

3. Function

1, ASA weather proof shell design, water proof, for outdoor application

2, Solar powered, wireless, no need of power or communication lines in the field.

3, Solar panel is fixed on the shell. Can add extra solar panel for area without enough sun.

4, With relay function.

5, Control: pump and master valve, Monitoring flow rate, flow total, water pressure, and water level of well or water tank.

6, Field manual open/close pump and master valve for convenience.

7, Setup flow rate and water pressure range to control protective shut down of pump and master valve.

8, Using water level checking function to control protective shut down of pump, to avoid pumping without right water level.

4. How to install

Please read manual before installation. We have how to install video online.

4.1 Notes of installation:

1, Make sure solar panel is face maximum sun. If there is not enough sun, add extra solar panel.

2. For application of controlling pump and master valve, must install protective pressure sensor or pressure switch. If pump water from well, suggest to sue water position sensor to prevent pumping without water.

3, All accessories, suggest to using parts suggested on ANC web. If need to purchase from another source, please communicate with ANC first to make sure it is compatible.

4. The connection box is water proof. Before cover up, make sure the rubber seal at right position for seal and checking around to make sure all connectors are been tighten, including connectors not been used.

4.2 Installation:

4.2.1 Pump connection illustration







How to install pump

4.2.2 How to install pressure sensor/switch

Note: Because that the threaded end of pressure sensor and switch is very small, suggest using three way adaptor for small pipe, and drill hole to install for big pipe.

When water pressure out of setup range, the controller will protectively shut off the pump or master valve.

If pump water from well, suggest to install level sensor to protect pump from pumping without water from well or rain tank. The setup will be one for high, and one for low. The pump will not been open when the water level didn't at high position. If the water reaches low position, the controller will protectively shut down the pump.

Also could install flow meter, when the flow rate is out of range, the controller will protectively shut down the pump and alarm.



"T" connection



drilling connection



4.2.3 Valve connection



For master valve, choose one of them as protective devices, pressure switch, pressure sensor, or flow meter. To mechanical pressure switch, must do tiny adjusting when water go through pipe, adjusting the screw until no alarms at normal situation. (Open water proof cap to do adjusting. Screwing in to increase pressure, screwing out to reduce pressure until there is no open/close valve alarm).

For pressure meter, if the open water pressure is bigger than the setup pressure, as normal or otherwise alarm; when pump/valve is been closed, pressure less than this setup value, as normal or otherwise alarm.

Pressure meter and switch, must installed after water flow.

3, Connection for supervising flow rate and pressure.



There are only total 5 wireless flow meter controllers for one GG-002 WIFI/3G system.

4.3 How to do connection inside the connection box

Turn off controller first. Check printed instruction at both beside of the controller, find the one you want to do connection. And pick out the related connector from the box. Unscrew and get ready.

Step 1: Unscrew outside water proof screw.



Step 2: Take connector out of box.



Step 3: Screw loose water proof cap from the cable, take off plug, and insert wires into the



box.



Step 4: According to printed instruction on the side of the box, connect the wires according to color, and screw tight.



Step 5: Double check connection, put seal right, before put the connector back to box.Cover and tight up.



4.4 Printed instruction on the box:



Extra solar panel+Flow meter



Valve+Pressure Meter+Pressure switch Pump+Low Level switch+High level switch

5. How to operate





1. Solar panel	6.Battery	11. Manual valve key
2. LCD	7. Water proof connector	12. Enter/Save key
3. Key pad	8. Connection instruction	13. Browse/Menu key
4. Cable	9. Stick	14. Exit/Remove
5. Battery	10. Manual switch of pump	15. Digital keys

5.1 Turn on Controller

Push and lock the red power key at right low end of the controller, followed by two beep,

LCD will show as following, then into running. If the battery voltage is low, the controller will turn self off.

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If there is no sun to charge battery for some time, the battery voltage will reach low point, then controller will protectively shut down self, and automatically wake up after the battery is been recharged again.

5.2 How to register to GG-002wifi/3g system main controller

FMPVPP registration including 1. Flow meter, 2. Pressure meter, 3. Master valve, and 4.Pump.Needs registration to get system ID and code, to establish bidirectional wireless communication between these devices and main controller.

Please read related charter of how to register.

5.3 How to establish wireless communication mesh network

After power been turn on, if all devises are already been registered, the controller will automatically try to establish wireless communication route to reach main controller. During searching time, keys been locked, push "Exit" to exit if needs, otherwise 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 to previous menu after 1 minute. Push digital key 4 you will see "X", which means no route been established. Please check and see if the distance is right, or if all the relay on the way is normal. If push digital key 4 show" $\sqrt{}$ ", which means the route is been established. You can check the route by browsing into help menu.

This controller will automatically search route until success. Or push [Setting] key into main menu, then push [Exit] key to exit will produce one search, if there is no wireless communication route yet.

During search, the keys are been locked up. LCD show as following:



After successfully established route, the FMVPP field controller will send the route information to main controller. If done, main controller will show " $\langle \langle \Psi \Psi \rangle \rangle$ " icon on related LCD screen, FMVPP route show as " $\sqrt{2}$ ". If failed to establish route, will show " \mathcal{M} ", and try again every one minute, if tried three times without success, the controller will think the route has been tried is not right, change route and try again.

Note 1. For speed up establishment of wireless mesh network, please follow steps as below:

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

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

C. 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 been on, start automatically 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 all established wireless communication with main controller.

Note 2: 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 then save this information and follow this route to communicate with field controllers. After the field controllers found the route, will keep send the route information to the main controller every one minute, if tried three times without success, will looking for another route.

Note 3: If the established route no more working, the controller will automatically search new route after one hour try.

5.4 How to turn off controller

Push the red power switch will turn power off.

5.5 Controller sleep

During working period, controller will check the voltage of battery time to time. When the backup battery voltage reach less than 11 V, the controller will turn off master valve and pump, stop flow meter, put self into sleep, waiting for the solar panel to recharge the battery. When the battery voltage is been charged back to 11.5 V, the controller will automatically back to 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. Controller will automatically wake up after the battery is been changed up to normal. Ancnoble

During sleeping, LCD show as following:



5.6 Field manual open/close

5.6.1 Field manual open/close

During working status, push "valve" key, LCD show valve status as "Manual on", the controller will open the master valve, and send current status to main controller.

Push "valve" key again, LCD show status as "Manual off", which will manually turn off valve.

"valve" key has cycling function, cycle function as "Auto off – Manual on – Auto off – Manual off", Every push switch function.

After manual open / close operation, the controller will keep this manual status until manually switch to either auto on or off from the field controller, then go back to auto control.

During manual open/close status, the controller will keep beep to reminder user to switch back to auto control after field work finished.

5.6.2 Field manual open/close pump

Same as field valve manual open/close, reference 5.6.1.



After manually open the pump, LCD show as above. 05' (time range is 00' -99') means manual open valve for 5 minutes. This function is for observing delay time needed for stabilizing flow rate and water pressure, then setup right delay time for alarm. And setup right flow and pressure range.

5.7 Explanation of LCD information

5.7.1 Main working LCD display:



1, Pump status: Above LCD show display as "Auto off", which means current status is auto off. Pump has 6 status, Auto off, Auto on, Manual off, Manual on, Remote on, Remote off. 2, Master valve status: Above show as "Auto off", which means current status as auto off. There are 6 status as, Auto off, Auto on, Manual off, Manual on, Remote on, Remote off. 3, Current flow rate and accumulated total flow volume. Total flow volume alarm shown as icon, before the flow rate. The icon will not show until this alarm function is been enabled. If this function is been enabled, there is " $\stackrel{\circ}{\longrightarrow}$ " icon. First alarm show " $\stackrel{\circ}{1}$ ", second alarm show as " $\stackrel{\circ}{\longrightarrow}$ " icon.

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This function is for fertilizing control by total flow volume. Customer setup first and second alarm volume from main controller or PC. For example, like 3 cubic meter and 4 cubic meter. Then, when the volume reached 3 cubic meter, first alarm on, it is time to start get ready to turn off the valve, when reached 4 cubic meter, second alarm on, it is time to turn off the fertilizing valve.

After valve been turned off, flow rate reach to 0, this flow meter controller will automatically finish this cycle of fertilizing alarm.

Suggested connection:



4, Current pressure meter reading

5.7.2 LCD display for protective shut down of pump:



When pump is been protective shut down, LCD will show the reason, 1, High flow rate + value of the high flow rate; 2, Low flow rate + value of the low flow rate; 3, High pressure + value of high pressure; 4 Low pressure + value of low pressure; 5, Low water level. Above example show information as, auto shut down by low flow rate at 0.00 m³/h.

5.7.3 Communication window:



During communication time between FMP-Solar and main controller, show as above. Then all the keys been locked up until communication finished.

5.7.4 Detail information windows

During normal work status, push $\begin{bmatrix} 1 \end{bmatrix} \begin{bmatrix} 2 \end{bmatrix} \begin{bmatrix} 3 \end{bmatrix} \begin{bmatrix} 4 \end{bmatrix}$ digital keys switch for more work information. Also can push $\begin{bmatrix} Enter \end{bmatrix}$ key, switch and cycle information window.

Push key [1] , show flow meter information,

Flowmeter Info					
Reg N	0.	Γ	1]	
Rate	[0.	00]m ³ /h	
Total	Γ	0.	00	$] m^3$	

Flow meter registration #: Here show as 1, which means registered as #1 flow meter in this system. (Otherwise, show as, "Not registered").

Flow rate: Show current flow rate. Can setup different unit at basic setup.

Show total flow volume.

Pus key [2] , show pressure information



1 . Pressure meter registration #: Here means this pressure meter registered as #1 pressure



meter in this system. (If not registered yet, will show "Not registered").

- 2. Current pressure.
- 3. Pressure range: Pressure range setup by customer.

Push key $\begin{bmatrix} 3 \end{bmatrix}$, show valve and pump information



1. Master valve registered #: Here #1 means this master valve is been registered as #1 master valve in this system. (If not registered, will show "Not registered").

2. Master Valve: The status are: Auto off, Auto on, Manual off, Manual on, Remote on, Remote off.

- 3. Pump #: Same as master valve.
- 4. Pump status: Same as master valve.

Push key **[** 4 **]**, show I D / route and wireless signal strength



System ID: FMP-Solar controller through registration to get ID from the main controller. All field controllers in one system have same ID.

2. Current battery status. Will show charging icon when is charging.

3. Show communication status. Route without relay show as " $\sqrt{}$ ", with relay show as " $\sqrt{}$ ", or no route with " \times ".

4. Strength of wireless signal.

Note: The controller will automatically turn off after 1 minute without any operation. Push any key to bring back.

6. How to setup

This controller control one flow meter, one pressure sensor, one pump and one master valve. Each has setup menu. Push [Menu] into main menu, push [Menu] again to browse. Push [Enter] into the setup. Push [Exit] key to exit or exit without operation after 1 minute.



6.1 Flow Meter setup

For flow meter, there are 4 setup as: Reg(istration)/remove flow meter –Setup flow rate range –Clear total flow volume to zero. Push [Menu] key to browse, push [Enter] to confirm. Push [Exit] key back to previous menu, or return after 1 minute without operation.



6.1.1 Register/Remove flow meter

Browse into Reg(istration)/remove flow meter menu, There is current registration information as following. If not registered, will show "not registered". Push [Menu] key to choose register or remove, push [Enter] key to execute.

Reg/remove flowmeter					
System Device	ID = 12 No =1				
Register	Remove				

Registration:

Any registration needs to do with main controller simultaneously. Both need to be at registering stage. Example: Register flow meter as #1 flow meter in the system, procedure as following:

Browse into flow meter setup ->choose register/remove menu ->choose "Register" ->push [Enter] into setup as following:



For main controller, browse into devise setup->Register/Remove ->flow meter register/remove ->key in flow meter #, like #1 ->choose register ->push 【 Enter 】 to start. Reference main controller manual.

If register right, main controller and FMP controller both will beep two times. Show registration information on FMP controller LCD.

Note: 1, During registering, push **[** Exit **]** key will cancel registration and back to registration menu.

2, If there is previous registration information, don't need to remove, new information



will overlap old ones.

How to remove:

There are two kinds of remove operation, one is remove registration information from main controller and field controller simultaneously, and another is remove from field controller only, and remove from main controller later on.

Remove from field controller only:

When [Remove] menu is been chosen, push **[** Enter **]** key to confirm, LCD show "Removing....." as following:



During removing, FMP controller will try to communicate with main controller, but main controller is not at remove status.

After FMP-Solar failed to reach main controller, push 【Exit】 will exit from registration, otherwise LCD will ask if you want to do "Local delete?". Choose Exit to exit, choose Enter to remove.



Note: After remover registration information from FMP controller, needs to remove this registration information from the main controller separately. Otherwise the main controller will report wireless communication failure, and add extra scan time. Detail reference main controller manual about registration and remove.



Remove simultaneously:

Remove registration information from main controller and FMP controller simultaneously. Let FMP controller get ready for remove same as above. When FMP controller start to search main controller, let main controller also into remove menu and get ready. Then the registration information will be removed from both simultaneously.

Suggest to remove both simultaneously!

6.1.2 How to setup flow meter coefficient number

Browse into"**Flow meter coefficient**"menu, LCD will show current coefficient # as following if there is one:



Push digital keys to input, push [Exit] to delete one digital, automatically out after reach 8 digits; Less than 8 digits push [Enter] key to save. LCD will show saving and beep two times to confirm.

Should get the coefficient # from the manual of the flow meter. Make sure input right to avoid calculation error. If you know how to do it, you also can adjusting the efficient number. (If the reading is bigger than real, increase the efficient #, otherwise reduce until read right).

6.1.3How to setup flow rate range

Browse into "Setup flow rate range"menu, LCD will show current flow rate range as

following;

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Push 【Menu】 key to choose between MIN and MAX, highlighted one is the one been chosen. Input digits, push 【Exit】 key to delete one digit, less than 5 digits, push 【Enter】

key to confirm. After done with edit MIN-MAX value, push [Enter] key to save and back to previous menu.

This flow rate range means right range under normal irrigation. Can get the range number by observing flow rate value under normal operation. Can adjusting later on if there is fault alarm.

Note: Flow rate range can setup from the field controller, also can setup from either PC, or anywhere through server.

6.1.4 How to clear total flow volume

Browse into"Total value return to zero" menu, LCD will show accumulated total current volume. Push [Enter] to exit and back to previous menu, push [Enter] key to clear total volume to zero. After this operation, no more can recover to previous total volume number, needs to be cautious about this operation.



6.2 Pressure meter setup

Browse into "Set up pressure meter" menu: Reg/remover pressure meter—set up pressure range 2 choices as following:

Set up pressure meter				
Reg/remove pressure meter				
set up pressure range				

6.2.1 Reg/remove pressure meter

Reference 6.1.1 flow meter register and remove.

6.2.2 Setup pressure range (0 - 1Mpa)

Reference 6.1.3 flow meter flow rate range setup.

			set up pressure range			
Set up pressure meter	key	Min: [0.20] Mpa		
Reg/remove pressure meter	$ \longrightarrow $	Max:[0.50]Mpa		
set up pressure range		Range:	0.00-1	. 00 Mpa		

6.3 Pump setup

Browse into "Set up pump" menu, there are Reg/remove pump, Detection sensor options, and Safety detection delay 3 items as following:



6.3.1 Register and remove pump

Reference 6.1.1 flow meter registration and remove.

6.3.2 Set up pump protection sensor

Browse into "Set up pump" menu, there are Disable flow meter, Pressure meter, Liquid level switch 4 choices as following:



In the Sensor option to choose, if choose 0, which means no protection for the pump. If choose like above, 1 and 2, which means choose flow meter and pressure sensor as protective sensors.

(Flow meter protection:

Through time delay to setup right flow rate range. If the flow rate is out of range during normal operation after delay time, this controller will protectively turn off the pump. Jammed, or broken pipe could be the reason. If there is false alarm, adjusting the setup.

(Pressure meter protection:

Through time delay to setup right pressure range. If the pressure is out of range during normal operation after delay time, this controller will protectively turn off the pump. Jammed, or broken pipe could be the reason. If there is false alarm, adjusting the setup.

(Level sensor protection:

The level sensor will first check if the water level reach high level before open the pump to prevent open pump without much water. During normal operation, if the sensor detected low

water level, will protectively turn off the pump.

Note: Sensor which is not been installed, make sure not been chosen in the protection setup.

Otherwise the pump can't operate normal.

6.3.3 Setup pump protective time delay

Browse into"Safety detection delay"menu, LCD show current setup as following:



Set up range is 1 - 99 minutes.

This duration time is time need from start of the pump until flow rate and water pressure is been stabilized. If time delay too short, will produce faulty protective shut down of the pump, too long, will lost some meaning of protection. Needs to observe and adjusting the setup until right.

6.4 How to setup master valve

Browse into"**Set up master valve**" menu, there are Reg/remove master valve, Detection sensor options, and On/off detection delay 3 choices as following:

Set up master valve				
Reg/remove master valve				
Detection sensor options				
On/off detection delay				

6.4.1 Register/Remove master valve

Reference 6.1.1 flow meter registration and remove.

6.4.2 How to setup detection devices

Browse into "Sensor options" menu, there are Non-Flow meter-Pressure meter-Water level 4 choices, choose 1, or up to 3 items as shown at following:



If key in 0 beside "Sensor options=", which means will not using any protective sensor. Choose either one of other 1,2,3, or any combination of these sensors, for example, choose 1, which means choose only flow meter as protective sensor for the pump. About how to do protection, please see following. If there is a failure, this controller will try three times more before report failure.

(Flow meter protection

After valve been open, after delay time, if current flow rate is still 0, then judge as open failure. After closed valve, after delay time, if current flow rate is 0, then close normal, otherwise report failure.

(Pressure meter protection

After open valve, after delay time, if current pressure reading is less than setup MIN, open failure otherwise normal. After close valve, after delay time, if pressure reading is bigger than setup MIN, close failure otherwise normal.

(Pressure switch protection

Protection function same as pressure meter. Pressure switch is a mechanical switch, needs to adjusting to get right check pressure point.



6.4.3 Setup valve open/close time delay



Reference 6.3.3 pump delay time setup, which is similar.

6.5 Help

6.5.1 Questions and Answer



Not setup yet.

6.5.2 Communication link



Above illustration means direct communication with main controller, no any relay between them. If there are relays, will show relay devices with ID. If there is no communication route, will show as following:



7. How to upgrade wireless field controllers

1. Preparation: First of all, power off the field controller which is waiting for upgrading, and prepare a newest version of wireless field controller standby (users can buy a latest wireless controller from ANC Technology, or send one old version wireless field controller to the manufacturer to upgrade to newest version, can be used to send newest version of program to old version of wireless field controller).

 The field controller waiting for upgrading: Push and hold the menu key and power button at the same time, will see interface as Figure 2.1, and then press menu key to select [Download Program], and push the [Enter] key to start download program, will see interface as Figure 2.2



Figure 2.1



3. Newest version of field controller: Push and hold the menu key and power button at the same time, will see interface as Figure 2.3, and then press menu key to select [Transmit Program], and push the [Enter] key to start transmit the program, will see interface as Figure 2.4



Figure 2.3

Figure 2.4

4. Enter the upgrade interface, user can see the screen shows the current schedule, the



upgrade process takes about a few minutes, please be patient. The upgrade process ensure greater than 2 meters, the distance between the two machines is less than the maximum distance to communication to ensure that the two controllers can communication normally, prevent the upgrade failed.

5. After upgrade successfully, will see interface as Figure 2.5



Figure 2.5

8. Standard package

1, Solar C-FMPMVP controller (Including 1.2*10 AA NIMH rechargeable battery with

water proof connection box)

- 2, One pressure meter
- 3, Manual
- 4, Warrantee card

Shanghai ANC Technology Limited Warranty card

Dear Customer:

Thank you very much for choosing ANC products.

- 1. This product has FCC verification.
- 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.

Product			Туре		
User name			Ship date		
Address			Serial #		
Tele			Purchasing date		
Fax			Zip code		
_ ≂	Check date	Problem	What been d	one	Repairer
epain Reco					
rd					

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