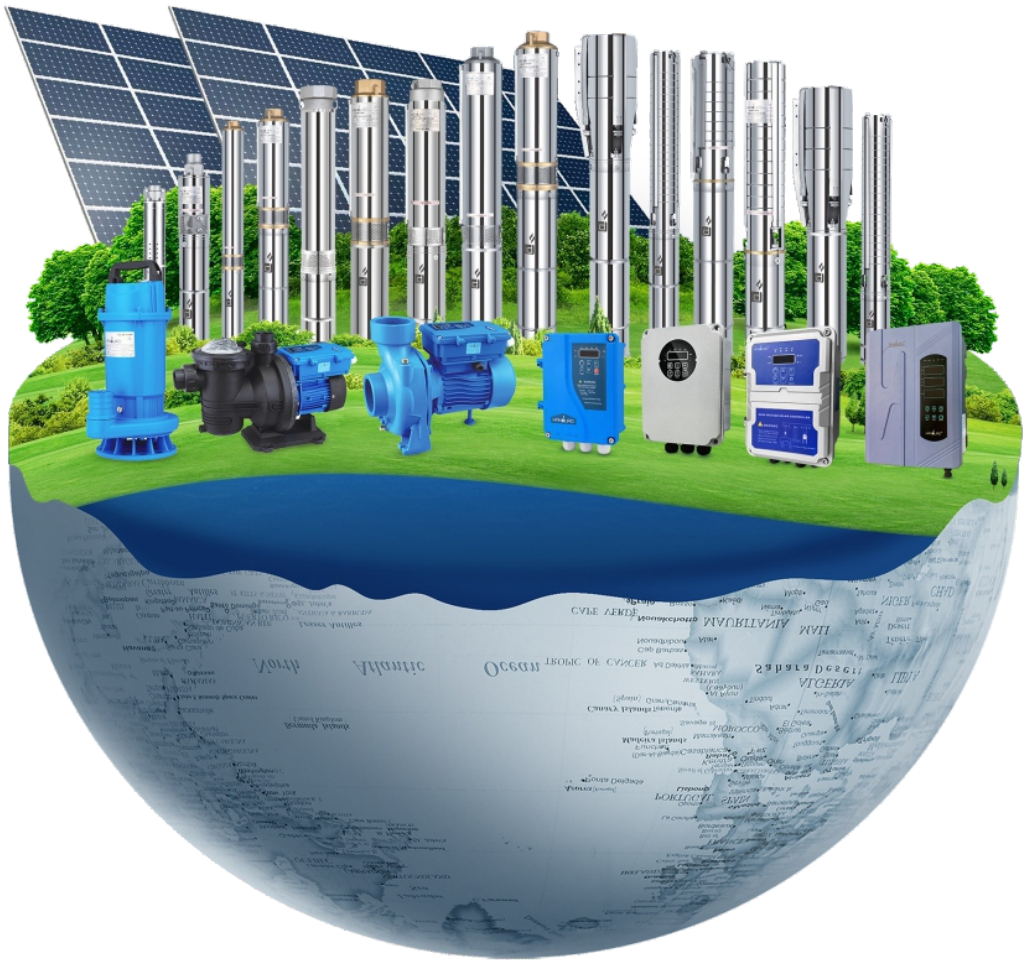
HANDURO®

DC SOLAR WATER PUMPS

Instruction Book

HV& AC/DC(96-300V) AUTO SOLAR CONTROLLER



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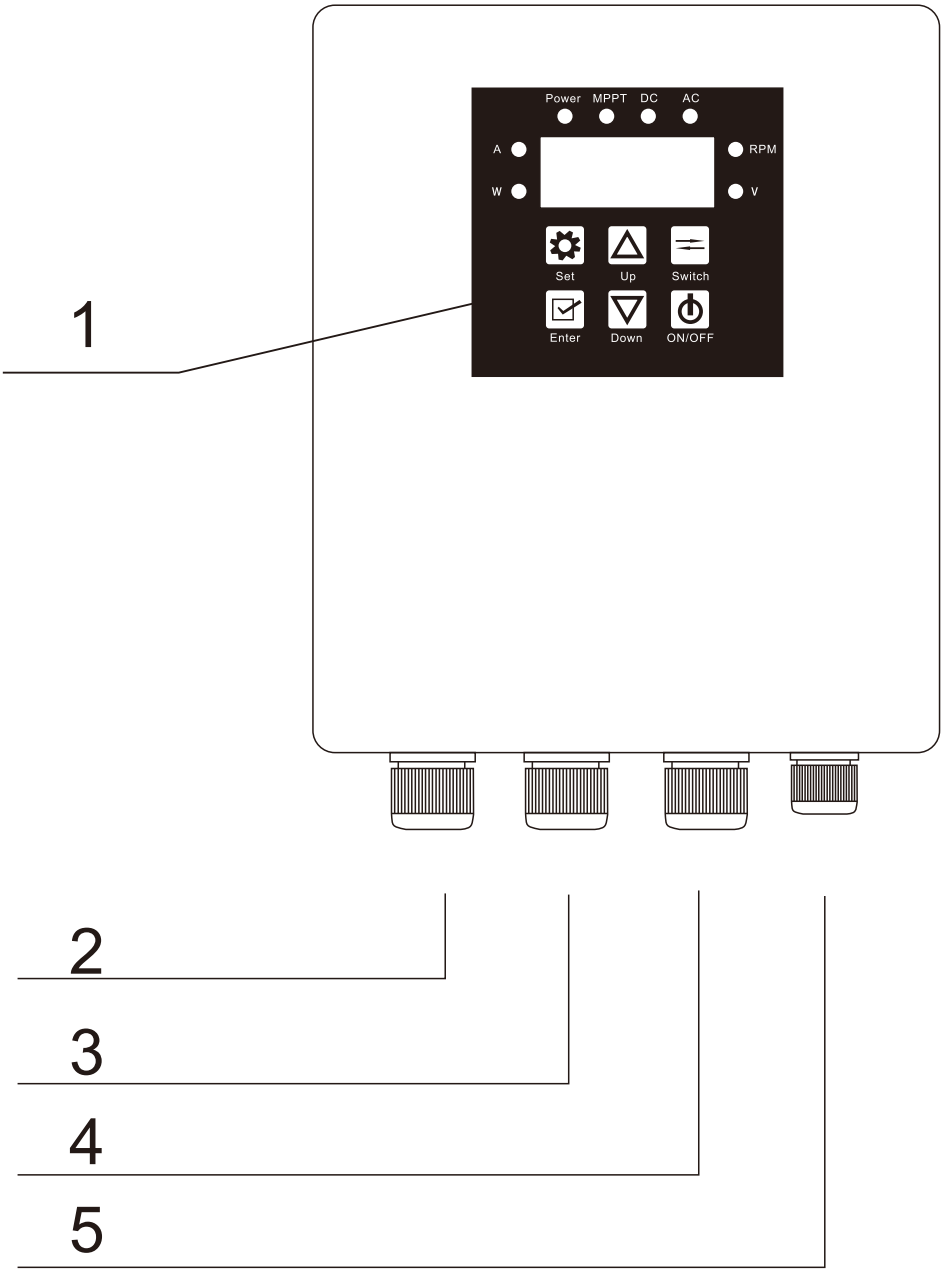
Solar Panel selection

1. Solar Panel Connection Knowledge

Solar panel can be divided into mono-crystalline silicon solar cell, polycrystalline silicon solar cell and thin-film photocell. Mono type is the most efficient one but the price is highest; the thin-film photocell is the cheapest one. Normally, the power of solar cell is 150W per square meter. The open-circuit voltage (Voc) marked on solar cell means the max electromotive force before working. The voltage will decrease when working, its voltage called working voltage (Vmp). Common open-circuit voltage is 21V, 36V, 44V etc, it changes along with the change of area and temperature, the lower the temperature, the higher the voltage. Another important index is power. It is proportional to the panel area. There need some solar cell to connect in series if the voltage is not enough, total voltage equals to adding each panel's voltage.

The working voltage of solar cell need to select according to the controller's working voltage, and then to confirm the open-circuit voltage of solar panel. Then select the solar power according to the pump power after the voltage confirmed. The power of solar water pump is input power and the generating efficiency of solar panel is under 70% usually. In order to ensure the rated working time of 4hours at day, the solar panel power equals to input power multiply 1.5 which is also the minimum power. If the solar panel power is smaller than this value, the pump can not reach its rated flow and head even through it can still work normally. Using more panels for the pump is better if condition permits, because that is able to ensure more time for the pump to running and reach the rated flow and head.

Wiring Diagram



1.Operation panel

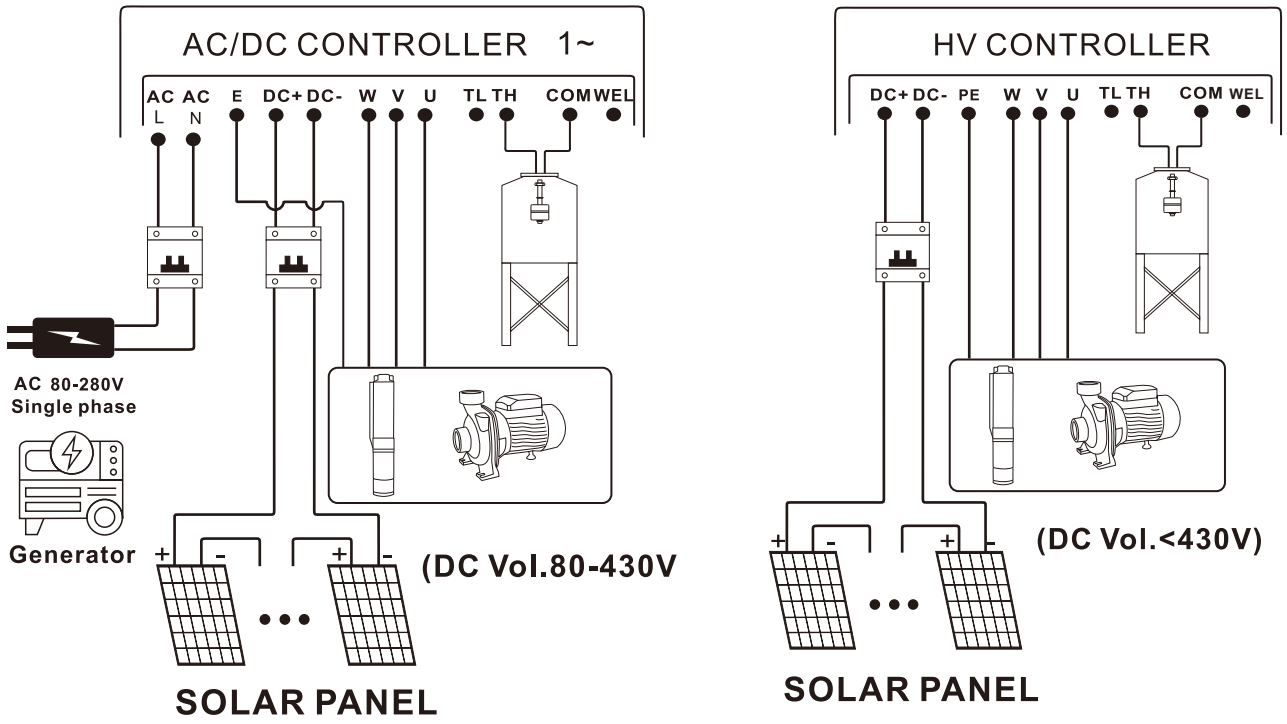
2.AC electric cable entrance **(AC/DC CONTROLLER).**
DC electric cable entrance **(HV CONTROLLER).**

3.DC electric cable entrance.

4.Pump electric cable entrance.

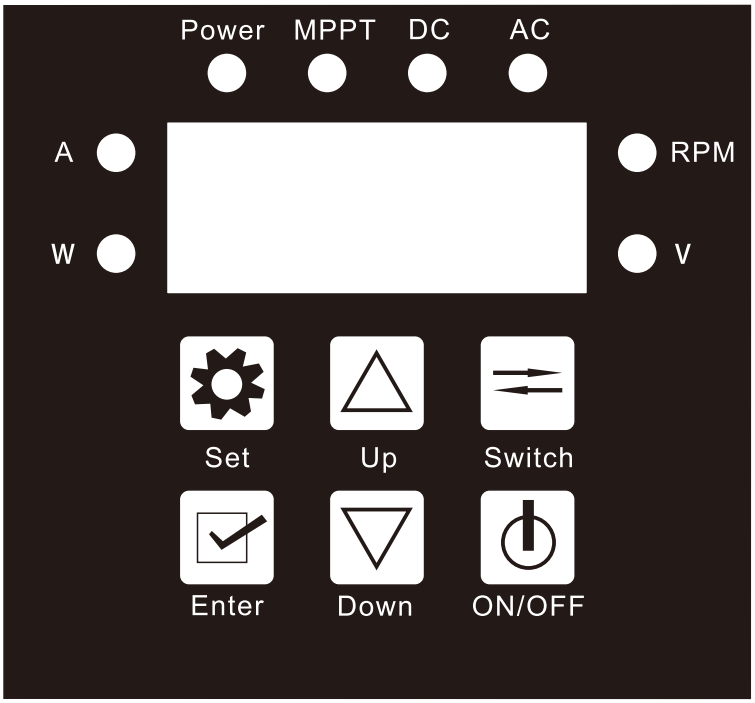
5.Water level sensor cable entrance.

Solar panel recommendati on for AC/DC & HV solar pump



1.Open Voltage must below Controller Max. Voltage.
2.Power Off before wiring.
3.Ensure Correct wiring.
4.DC Open Voltage: 750W-3000W(<430V)
5.Solar panles and electricity can be connected simultaneously
6.Caution: If wiring a battery be very careful not to reverse or short the terminals.
We advise you remove all metal wrist bands or watches before you start.
Solar PV panels when connected together can also produce a lot of energy so must be careful as well when wiring here. A dark cloth to shade the panels is a good precaution to reduce the power output.

Operation Panel



1. LED Indicator Light

- Voltage(V): Voltage indicator lights.
- Speed(RPM): Speed indicator light.
- Current(A):Current indicator light.
- Power(W): Power indicatorlight.
- DC: The DC lights up when solar energy is used
- AC: The AC lights up when AC is used(AC/DC CONTROLLER)
- MPPT: Solar energy running lights (twinkling).
- Power： light twinkles at downtime, light is constent in running.

2. Key Operation

Key Type	Function
 Set Key	Manufacturer parameter setting, not opened.
 Enter	Manufacturer parameter setting, not opened.
 Up	RPM setting key， Each time you press, the RPM will increase for one grade. In fault state, turn off / on the fault display.
 Dowm	RPM setting key， Each time you press, the RPM will decrease for one grade.
 Switch	In the operation status, you can circularly switch the display mode in voltage (V) - > speed (RPM) - > current (A) - > power (W).
 On/Off	In the running state, you can turn it off. In the stop state, you can turn it on.

Test Running

Before you testing the pump, the controller box switch must be in the off position. The pump must be under water at all times and should have been pre-conditioned forat least 15 minutes. Water is the lubrication for the pump and if it is not"preconditioned" properly the bearings will not be adequately lubricated. Do not attempt to test the pump if even for a moment without it being submerged, or permanent damage will occur. You will need a large container so the pump does not pump it dry in seconds. is used to raise and lower the pump. Never use the power cable to do this.

1.Attach a durable rope or stainless steel cable to the top of the pump using the mounting hole. Make sure the rope or cable is longer than the depth at which you want to install the pump. This is used to raise and lower the pump. Never use the power cable to do this.

2.Attention

Do keep the pump under water at all times when operating.Do be careful with wiring.Do remove the pump if not used for a long time and wipe the screw and body. Wipe with vegetable oil. Do make sure the pump has adequate water around it during pumping. don't run without water. Do put your solar PV panels in a sunny position facing true north(southern hemisphere)or true south (northern hemisphere). If the panel angle is fixed then an angle equal to your latitude will be a good compromise. Dont run the pump out of the water, even momentarily. It will void the warranty. Dont use the pump in dirty water.Premature wear will not be covered by warranty. Don't disassemble the pump and control box.

Operation Mode

1. Pump Start

1) Power on to start

Every time it connect with electricity, the system default boot, and pump start immediately without testing water tank (without any Shutdown conditions).

2) Button to start

In shutdown state, press the button 

to turn on the pump, without testing water tank (without any Shutdown conditions).

3) Water Shortage to Start

If the system boot but the pump stop and water shortage switch is closed, the pump immediately starts. (TL signal terminal of the main control board is shorted to the COM terminal).

2. Pump Stop

1) Float Switch Mode

In running state, when the water full switch is closed, the pump immediately stops. (TH signal terminal of the main control board is shorted to the COM terminal, and the Tank light is on)

In running state, when the water shortage switch is closed, the pump immediately stops. (WEL signal terminal of the main control board is shorted to the COM terminal, and the Tank light is on)

2) Dry Pumping Shut Down

If the water pump continuous work for a period of time, and the power is less than the set power at the current speed and continues for 20s, the pump will stop immediately and report P50 fault. After 1 minutes, the fault is cleared.

3) Button to Stop，

In running state, press the button 

to turn off the pump.

3. Pump Operation

Every time the pump starts, it will recognize the AC power and PV (solar) power supply mode for 10 second, and then switch to the corresponding mode to run. The setting speed is invalid during the identification process.

PV Mode

In PV mode, the pump setting speed is similar to DC mode, and the maximum speed (4000 RPM), limit is effective. Pump running speed is also determined by the current solar power. Maximum power point tracking. When the solar light enhances, the output power of solar panel increases, the pump speed increases, and vice versa.

In PV mode, the MPPT indicator flashes. If it flashes faster, it indicates that the current working point is closer to the maximum working point. If the flashing frequency is slower or not, it indicates that the maximum power point is being tracked.

Servicing and Maintenance

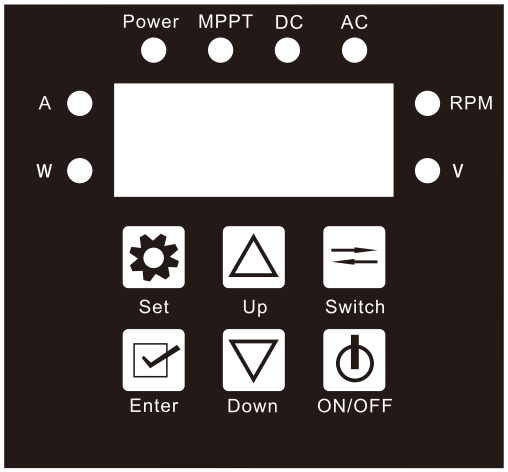
1. After working 3000 hours, the easily damaged parts should be replaced (such as bearing, sealing ring, mechanical seal), or it may cause much more serious damage.
2. If the pump didn’t use for long time, please scrub it, place at dry and ventilated place and keeping properly.

Fault Information and Troubleshooting Method

Fault Code	Fault Description	Reasons and Solutions	Recovery Procedure
P30	Hardware Overcurrent	Motor model is mismatch, please choose the matching pumps	Automatically remove after 30s
		UVW short-circuit connection. Please rewire and ensure the correct installation of UVW	
P16	Stall Protection	Motor model is mismatch, please choose matching pumps	Automatically remove after 30s
		Pump extension cord is too long, please reduce the extension cord	
		Power is too low, increase the power supply	
		Pump bearing is stuck, please clean pump bearings	
P12	Low-voltage protection	The input voltage is too high. Please distribute power according to the electrical characteristics.	Automatically remove after 30s when the voltage is recovered
P10	High-voltage protection	The input voltage is too high, please distribute power according to the electrical characteristics.	
P50	Dry-running protection/Lack-of-phase protection	Not all of air in the pump is exhausted, cut off the power, re-power and start the pump drainage after 30 seconds	Automatically remove after 5minutes or repower to clear it
		There is no water in the water tank waiting for water, it will restart	
	Lack-of-phase protection	UVW open circuit. Please rewire and ensure wires are well connected	
P20	High-temperature protection	The temperature of controller MCU is more than 90℃	Automatically remove after 30s
P40	DC Power Shortage	No sunlight, waiting for the sunlight to restart	remove after 1 minutes
		Solar panel matching error, according to the recommendation to match correctly	
P51	Water-full protection	Release the water from the water tower	remove after 1 minutes
P34	Phase Protection	UVW three-phase open circuit,please rewiring to ensure it reliable contact.	Automatically remove after 30s
P72	AC power failure	When DC power is insufficient, the system switches to AC mode automatically.But AC power is not detected or AC power is too low	Automatically remove after recovered
P70	DC power failure	System switches to AC protection when DC running to the set time.	Automatically remove after recovered
P14	block-up protection	Pump bearing is stuck, please clean pump bearings	Automatically remove after 30s
		Motor model is mismatch, please choose matching pumps	
E17	Communication failure of digital display panel	if the communication line between the main board and the display board was damaged or had poor contacted, after cutting off the power, then plug and pull the wiring again to ensure reliable connection.	Failure is cleared automatically after the communication connection established. If not, please change a new wiring
P1	Backwater fault	The bus voltage is abnormal	1.Pump is returning water, please wait 10 minutes to restart 2.Motor wire to ground short circuit, please check the motor wire

Remark:P72/P70/P1 appears in the AC/DC SOLAR CONTROLLER

AC/DC(110~300V)controller system setting



Press “Set” and “Enter” at the same time

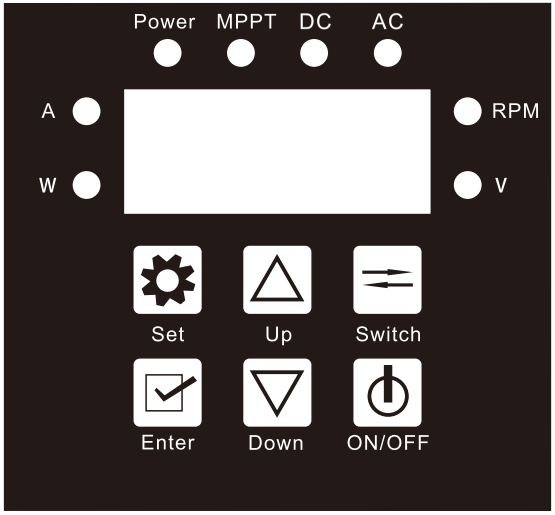
Switch between “up” or “down”

Enter must press ENTER to maintain after setting

Set Press the SET to exit to save

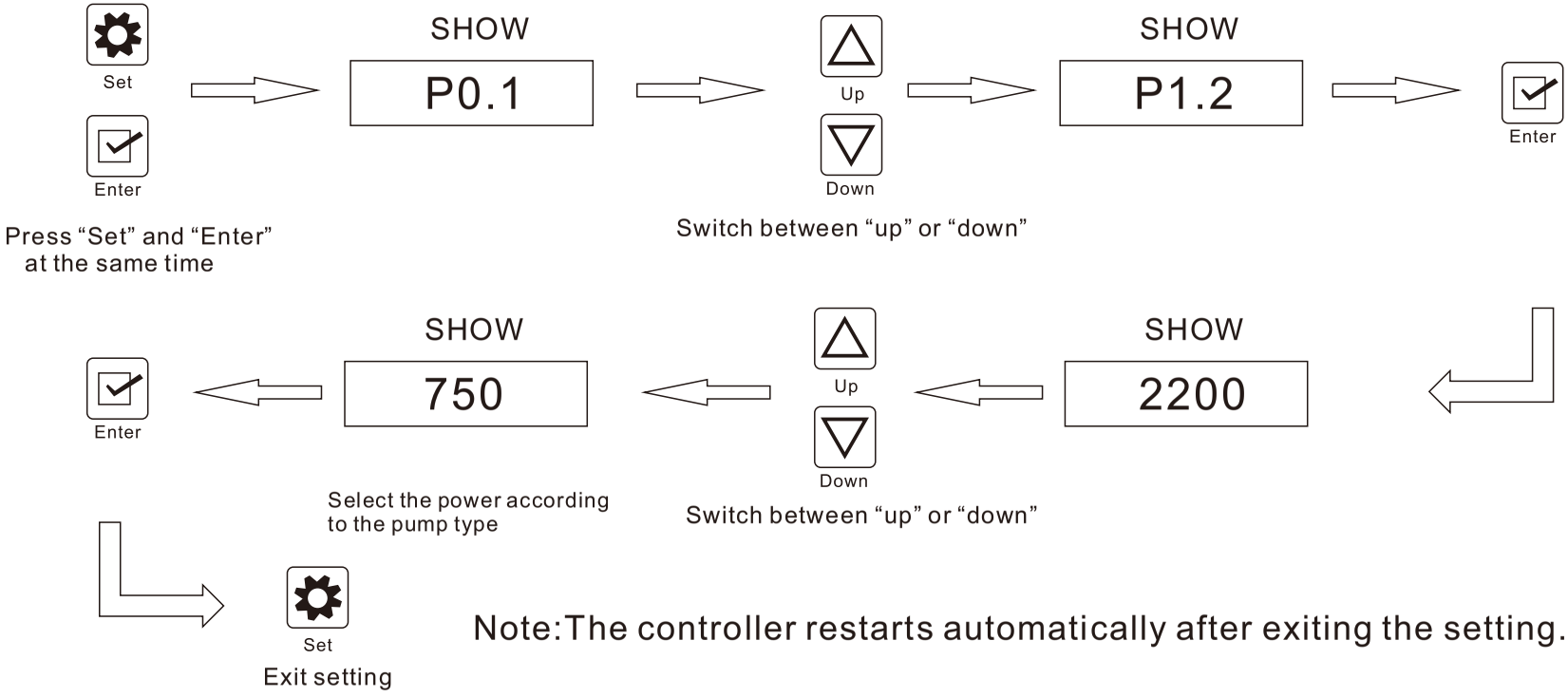
	INITIAL VALUE	RANGE VALUE		
P0.1:Speed setting	4000	1000-5000		
P0.2:Power grade setting	12.0	5.0-15.0		
P0.3:Power shift setting	250	50-1000		
P0.4:DC running time setting	10	60		
P0.5:AC running time setting	10	60		
P0.6:Dry-running protection grade setting	3	1-4		
P0.7:Dry-running protection turn ON/OFF	1	0-1		
P0.8:Shut OFF AC power running	1	0-1		
P0.9:Power grade difference	10	5.0-15.0		
P1.0:Voltage value of DC switch	10	80-300		
P1.2:Motor model setting	decided by the controller model	Submersible pump: 750W=750;1100W=1100;1500W=1500 2200W=2200 3000W=3000		
		SCPM/SSP/SQD/SQB pump: 750W=C0.75;1100W=C1.1; 1500W=C1.5;2200W=C2.2		
P1.3:Pump head		Only APP type		
P1.4:AC Power limit		Submersible pump: 750W=1500;1100W=1500;1500W=1800 2200W=2500 3000W=2800		
		SCPM/SSP/SQD/SQB pump: 750W=1000;1100W=1300; 1500W=1700;2200W=2300		
P1.5:Again Power on the memory switch status	1	0: Default off	1:Start by default	2:Use the last command

AC/DC CONTROLLER POWER WATTAGE VALUE



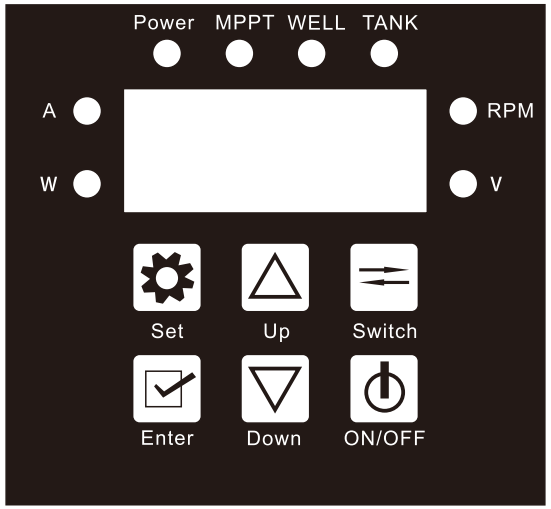
P1.2 Setting Parameters

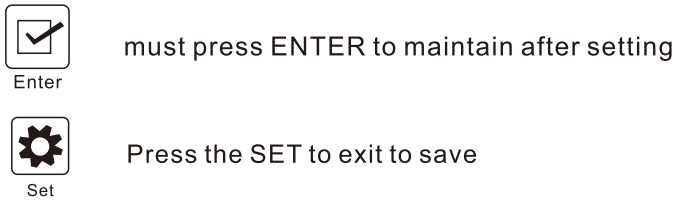
SUBMERSIBLE PUMP	SCPM/SQD/SQB/SSP/SA/SWQD
750(96V-750W)	C0.75 (96V-750W)
1100(150V-1100W)	C1. 10 (150V-1100W)
1500(180V-1500W)	C1. 50 (180V-1500W)
2200(280V-2200W)	C2. 20 (280V-2200W)
3000(300V-3000W)	



Note:The controller restarts automatically after exiting the setting.

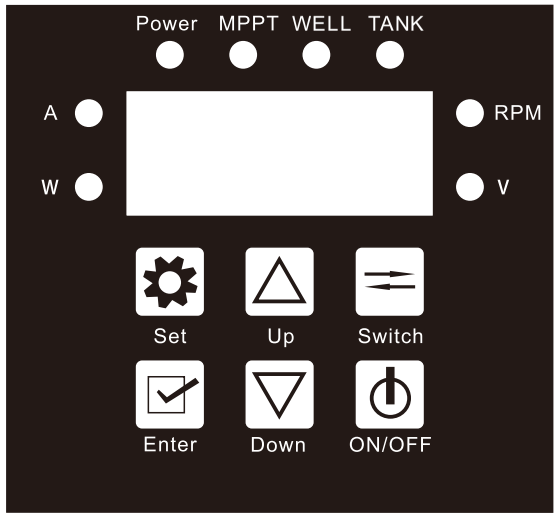
HV controller system setting





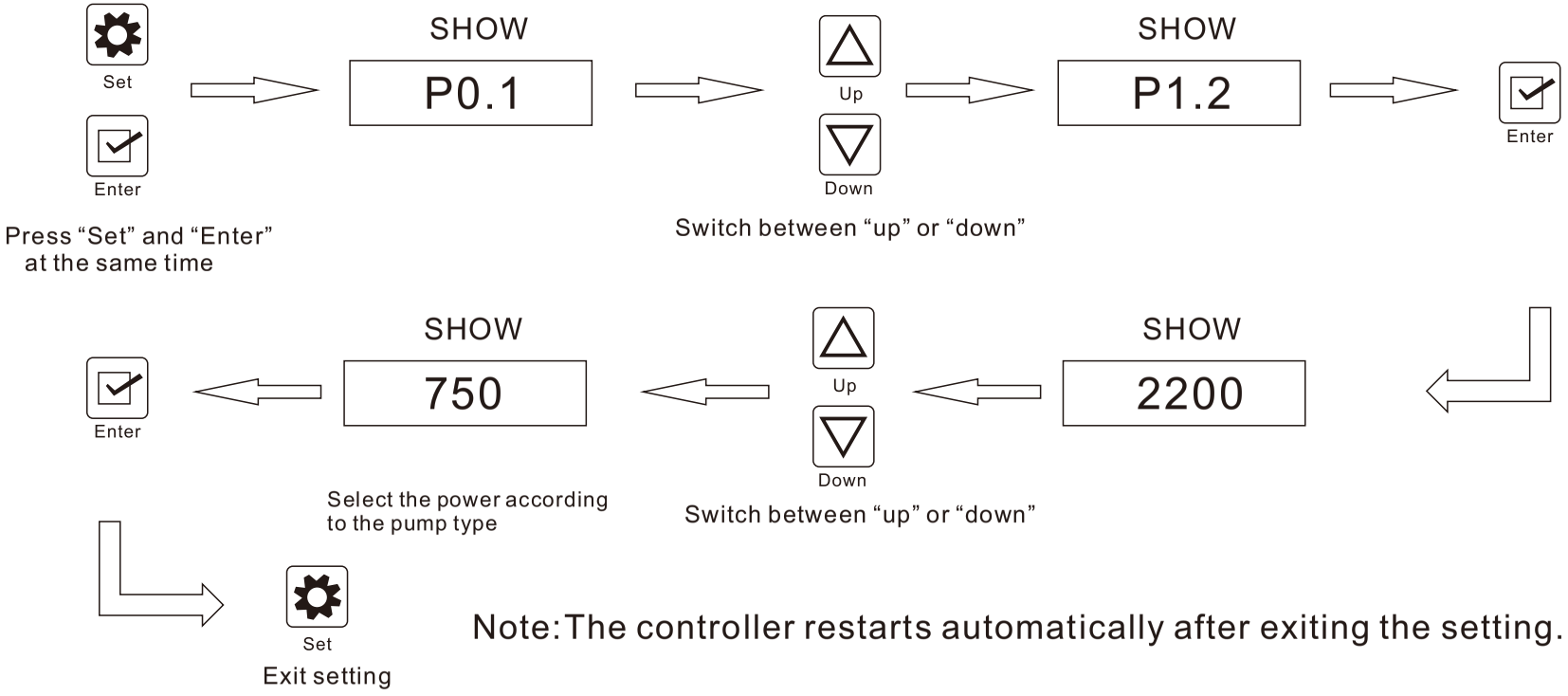
	INITIAL VALUE	RANGE VALUE		
P0.1:Speed setting	4000	1000-5000		
P0.2:Power grade setting	12.0	5.0-15.0		
P0.6:Dry-running protection grade setting	3	1-4		
P0.7:Dry-running protection turn ON/OFF	1	0-1		
P0.9:Power grade difference	10	5.0-15.0		
P1.2:Motor model setting	decided by the controller model	Submersible pump: 750W=750;1100W=1100;1500W=1500 2200W=2200 3000W=3000		
		SCPM/SSP/SQD/SQB pump: 750W=C0.75;1100W=C1.1; 1500W=C1.5;2200W=C2.2		
P1.3:Pump head		Only APP type		
P1.5:Again Power on the memory switch status	1	0: Default off	1:Start by default	2:Use the last command

HV CONTROLLER POWER WATTAGE VALUE



P1.2 Setting Parameters

SUBMERSIBLE PUMP	SCPM/SQD/SQB/SSP/SA/SWQD
750(96V-750W)	C0.75 (96V-750W)
1100(150V-1100W)	C1. 10 (150V-1100W)
1500(180V-1500W)	C1. 50 (180V-1500W)
2200(280V-2200W)	C2. 20 (280V-2200W)
3000(300V-3000W)	



Note:The controller restarts automatically after exiting the setting.