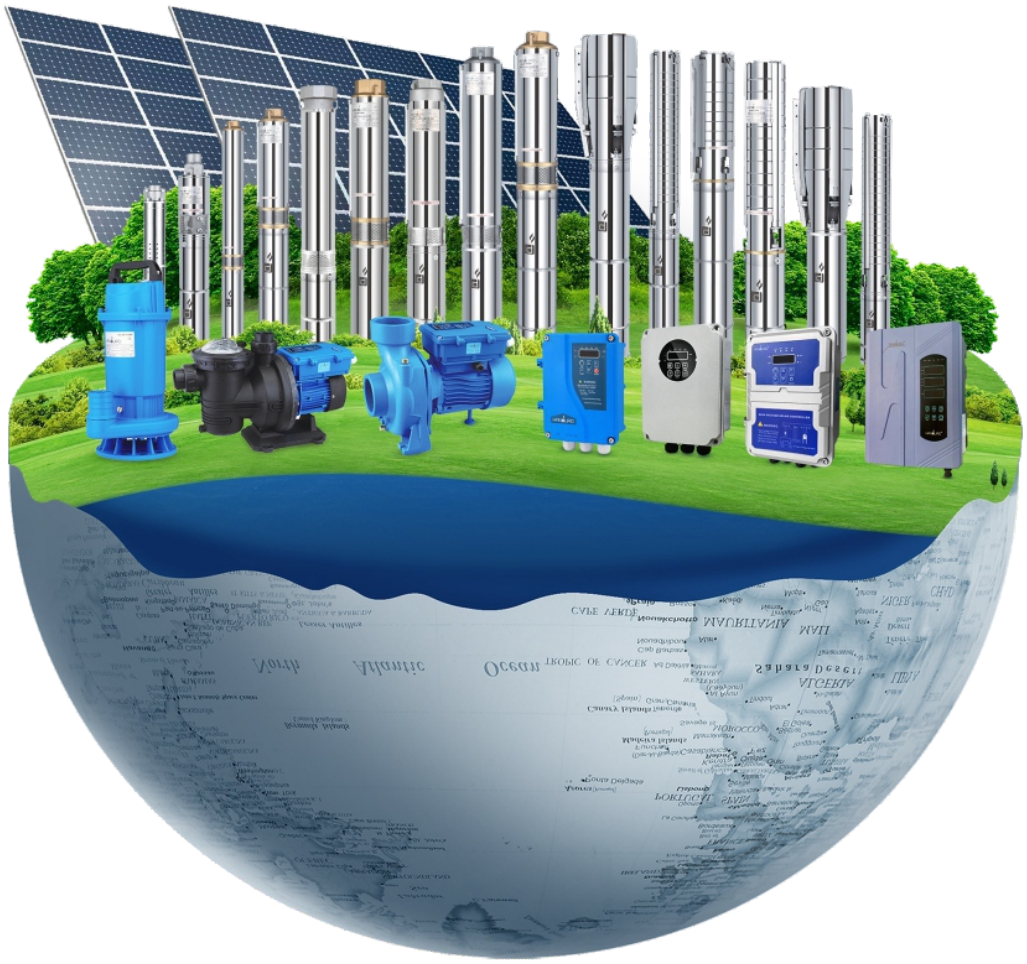
HANDURO®

DC SOLAR WATER PUMPS

Instruction Book

530V AC/DC Solar Pump

(3000W-22000W)



CONTENTS

1. Solar Panel Selection

A. Solar panel selection:

Recommended total solar panel power: (1.5~2) times the pump's rated power

Recommended optimum operating voltage for solar panels: (1.0-1.4) times the rated voltage of the water pump

B. For the AC/DC solar controller described in this product, when selecting and installing solar panels, priority should be given to the series connection method of solar panels, and the open circuit voltage (Voc) of the solar panels afer board connection is required to be less than the maximum limit of the controller's operating voltage.

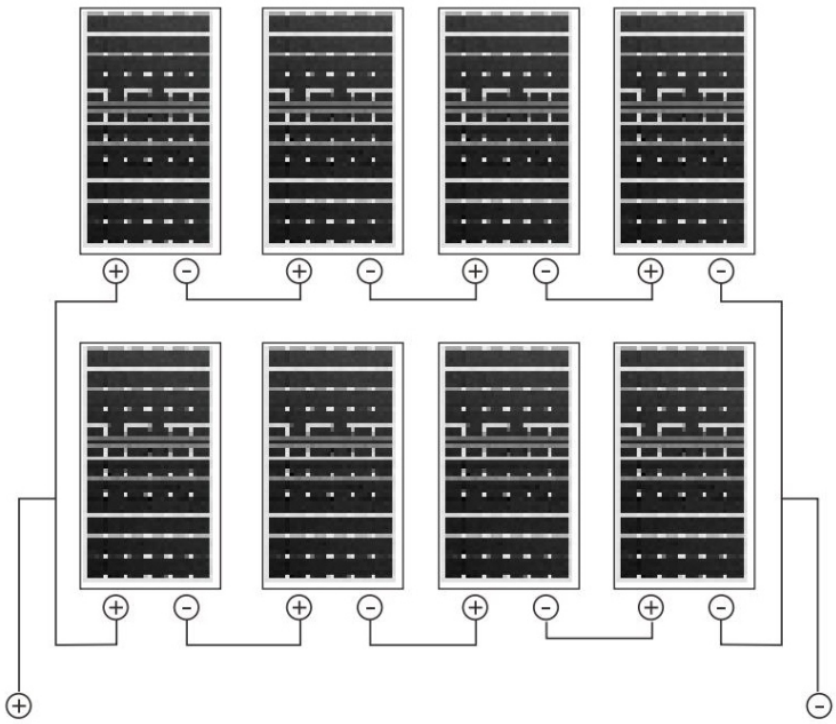
C. If the power required for the pump cannot be met under series connection conditions, series plus parallel collocation may be considered as a method that requires atenntion:

(1) The optimum operating voltage (Vmp) of the completed assembled solar panel needs to be higher or equal to the rated voltage of the pump.

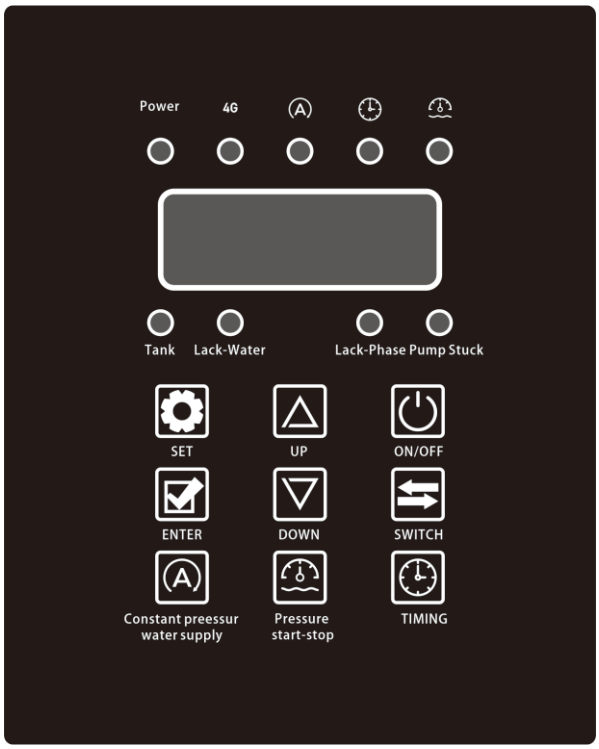
(2) The number of solar panels on the parallel branch circuit needs to be equal to the number of solar panels on the main circuit.

D. When solar panels are connected in parallel, increase the current and power of the solar panels. Solar panels connected in series increase the voltage and power of the solar panel.

Schematic diagram of series-parallel connection:



2. Operation and display interface introduction



Key Operation		
	ON/OFF	A short press of this button can control the start and stop of the device, and a short press in the fault state can reset the fault
	SET	Press and hold the button 2S to enter the menu (F0-XX) settings After setting, press and hold the key 2S to exit the menu
	ENTER	● In the menu settings, press the button briefly to confirm and save the contents of the menu settings and return to the previous screen. ● Press and hold for 3s to switch motor steering.
	SWITCH	Press the button to switch the display, which will switch in the following order: Motor speed -> input voltage -> Output Power -> Current pressure
	UP	Press this button briefly to increase the setting value of the corresponding parameter
	DOWN	Press this button briefly to reduce the set value of the corresponding parameter
	Constant pressure water supply	Long press the button 2S, Constant pressure water supply mode, enter constant pressure water supply mode,Long press the button 2S, constant pressure water supply mode,return to speed mode
	Pressure start-stop	Long press the button 2S, non-pressure start-stop mode, enter the pressure start-stop mode Long press the button 2S, pressure start-stop mode, return to speed mode
	TIMING	Long press the button 2S, non-timer mode, enter timing mode Press and hold the button 2S, timing mode, return to speed mode

LED indicator	
Power	Power display indicator: motor running status, running indicator light is always on. When the motor transitions from running to stopping, the running indicator flashes. When the motor is stopped, the running indicator goes off.
4G	4G display indicator: the indicator light is always on when the IoT signal is full, fast flashing when the signal is 3 bars, slow flashing when the signal is less than 3 bars, and off when the signal is not received
Ⓐ	Constant voltage display indicator: if the system switches to constant voltage mode, the indicator light is always on.
	Timing display indicator: if the system switches to timing mode, the indicator light is always on.
	Pressure start-stop display indicator: If the system switches to the pressure start-stop mode, the indicator light is always on.
Tank	Water full display indicator: if the system is in the water full fault protection state, the display light is always on.
Water shortage	Water shortage display indicator: if the system is in the water shortage fault protection state, the display light is always on.
Phase-Lack	Phase loss display indicator: If the system is in a phase loss fault protection state, the indicator light is always on.
Pump Stuck	Card machine display indicator: If the system is in the card machine fault protection state, the indicator light is always on.

3.Pre-use Inspection

1. Before use, you need to check whether the pump is intact, whether the cable is broken as well as scratches, and use a multimeter ohm stop to measure the insulation impedance between the pump cable and the shell, the insulation impedance should be greater than 2M in the cold state.
2. When the water pump and the controller are connected to the extension cable situation, the access to the extension cable wire diameter must be larger than the original motor cable wire diameter.
3. Before the official use of the water pump needs to be connected to the power supply to check whether the startup and operation is normal, and whether the pump rotation direction is correct. Check in the absence of water, running time can not be too long, after checking the need to stop the pump as soon as possible. If the pump is running in the wrong direction, you need to change the motor cable in any two of the three-phase line to change the direction.
4. When installing the pump, it is strictly prohibited to pull the cable line, need to increase the rope fixed in other parts of the pump. Water pump and the bottom of the well water height needs to be controller in more than 1 metre, to prevent sediment inhalation, damage to mechanical sealing components and impeller and other components.

4. Pump Operation Mode

1. Water pump start-up

1) power-on startup

The pump starts automatically by default after each power supply input if the float signal is not triggered.

2) Push-button power-on startup

A short press on the on/off button switches the pump to start and stop, and a short press on the on/off button resets the pump to stop when the controller fails.

2. Pump shutdown

1) Float signal stop

When the pump is in operation, the pump stops immediately when the tank full signal is triggered (TH).

When the pump is in operation, the pump stops immediately when the water shortage signal is triggered (WELL).

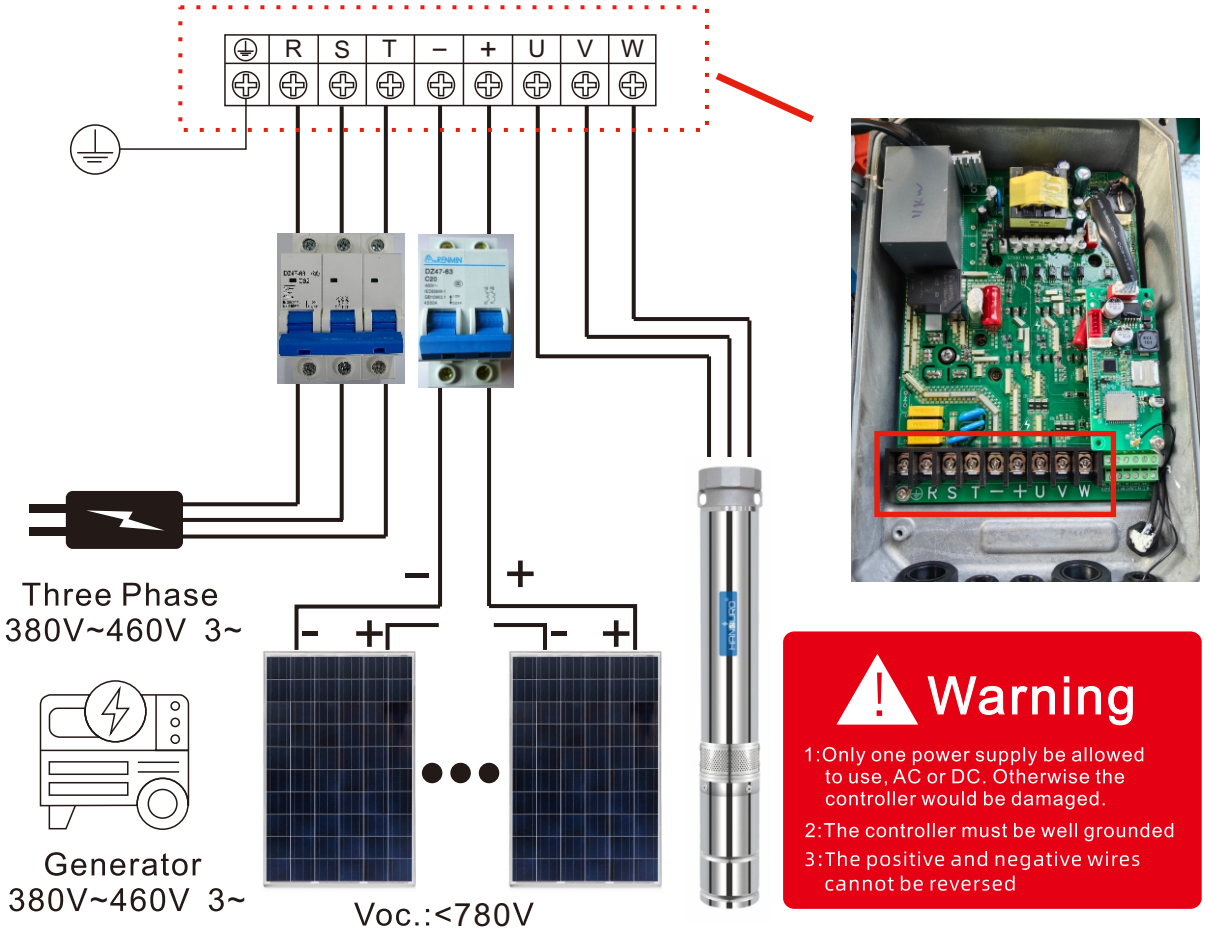
2) outage

If the water pump is in normal operation and the load power is consistently less than the set value, the controller will stop immediately and display the P50 fault code. This fault will automatically clear and start the pump after a 5 minute delay.

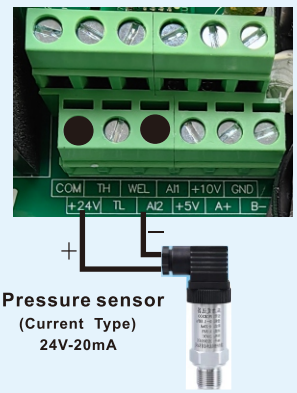
3) power down by pressing a button

When the pump is running, a short press on the on/off button  stops the pump.

5. WIRING DIAGRAM

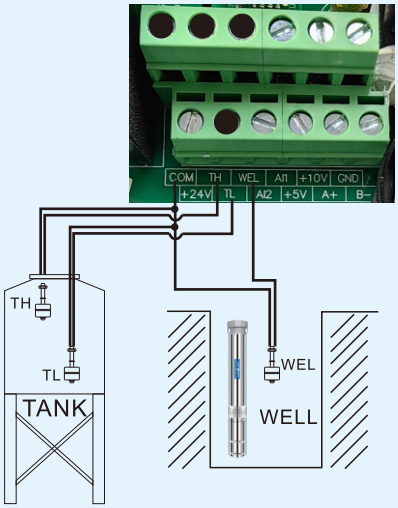


Constantpressurewatersupply &Pressurestrat-stop



Note: When using this function, select thetransmission signal according to the actual pressure transmitter; in constant pressure mode, you need to configure your ownpressure tank.

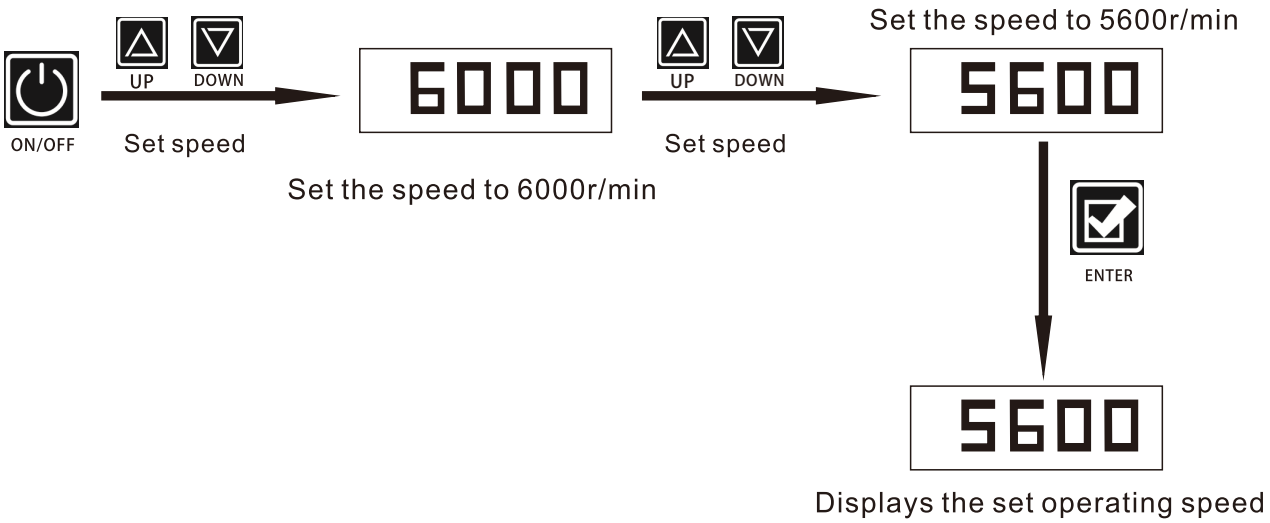
Float



6.PRODUCTS FUNCTIONS

6.1Speed mode (Power-on default speed mode)

Steps chart for setting speed mode



6.1.1Equipment start

(1) Button start: the pump is in the shutdown state, short press the power button ⏻ to switch to start.

(2) Fault self-recovery start: The current controller is in the fault state, the fault recovery time is up, the controller will try to start the equipment aromatically.

6.1.2The equipment stops

(1) Button stop: When the controller is driving the equipment normally, press the power button ⏻ to stop. Slow down the equipment after a stop command is generated.

(2) Fault shutdown: The current controller is in the running state, the controller system fails, the controller will shut down the equipment immediately

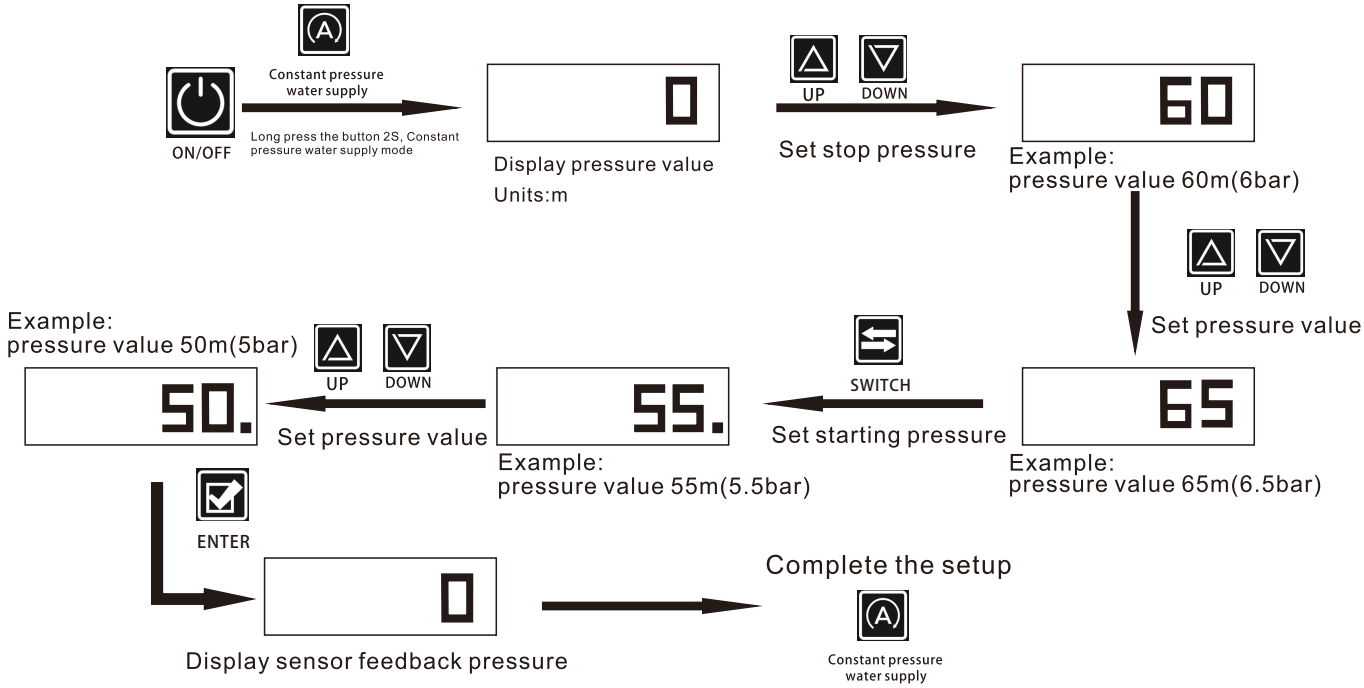
6.1.3Settings.

(1) Target speed setting: pump operation and shutdown mode, short press the up and down △ ▽ button, enter the speed adjustment menu automatically . Press the up and down △ ▽ button again to set the target speed.

6.1.4Display status switch

(1) Short press the switch button. Switch voltage -> Current -> Power -> Speed.

6.2 Constant pressure water supply mode



Steps chart for setting the Constant pressure water supply mode

6.2.1 Equipment start

(1) Constant pressure start: Short press the power button to make the pump in standby state, monitor the pressure is lower than the starting pressure, the pump start automatically.

(2) Fault self-recovery start: The current controller is in the fault state, the fault recovery time is up, the pressure is lower than the starting pressure, the controller will try to start the equipment automatically .

6.2.2 Equipment shutdown

(1) Button stop: short press the power button to make the water pump enter the OFF state and stop.

(2) Constant pressure shutdown: Short press the power button to make the water pump in standby state, the water pump automatically monitors whether the water come out, and the water pump stops automatically when the water come out.

(3) Fault shutdown: The current controller is in the running state, the controller system fails, the controller will shut down the equipment immediately.

6.2.3 Settings

(1) Target pressure setting: pump operation and shutdown mode, short press the up and down button UP DOWN, enter the target pressure setting interface automatically. Press the up and down button UP DOWN again to set the operating target pressure.

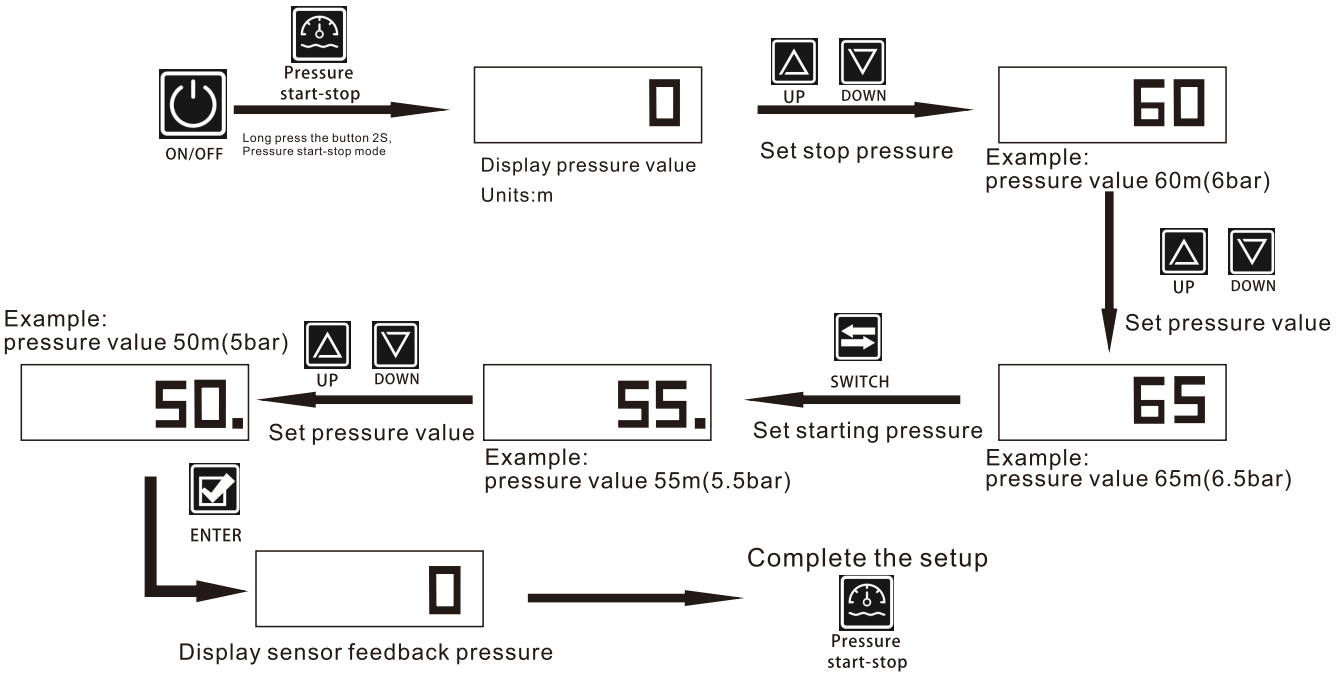
(2) Starting pressure setting: When the target pressure is set, the starting pressure will be adjusted according to a certain proportion automatically (such as 80%). If you want to set the starting pressure separately, short press the switch button SWITCH in the target pressure setting interface to switch to the starting pressure setting interface. Short press the up and down button UP DOWN to set the starting pressure.

(2) Menu difference: the last decimal point of the target pressure setting menu is not bright. The last decimal point of the startup Settings menu is lit.

6.2.4 Display status switch

(1) Short press the switch button. Switch pressure -> Voltage -> Current -> Power -> speed.

6.3 Pressure start-stop mode



Steps chart for setting the pressure start-stop mode

6.3.1 Equipment start

(1) Pressure start-stop start:Short press the ON/OFF button to make the pump in standby state, monitor the pressure is lower than the starting pressure, the pump start automatically .

(2) Fault self-recovery start: The current controller is in the fault state, the fault recovery time is up, the pressure is lower than the starting pressure, the controller will try to start the equipment automatically.

6.3.2 Equipment shutdown

(1) Button stop: short press the ON/OFF button to make the water pump enter the OFF state and stop.

(2) Pressure start-stop stop: short press the ON/OFF button to make the pump in standby state, monitor the pressure is greater than the shutdown pressure, the pump shut down automatically .

(3) Fault shutdown: The current controller is in the running state, the controller system fails, the controller will shut down the equipment immediately .

6.3.3 Settings.

(1) Stop pressure setting: pump operation and stop mode, short press the up and down button, enter the stop pressure setting interface automatically. Press the up and down button again to set the stop pressure.

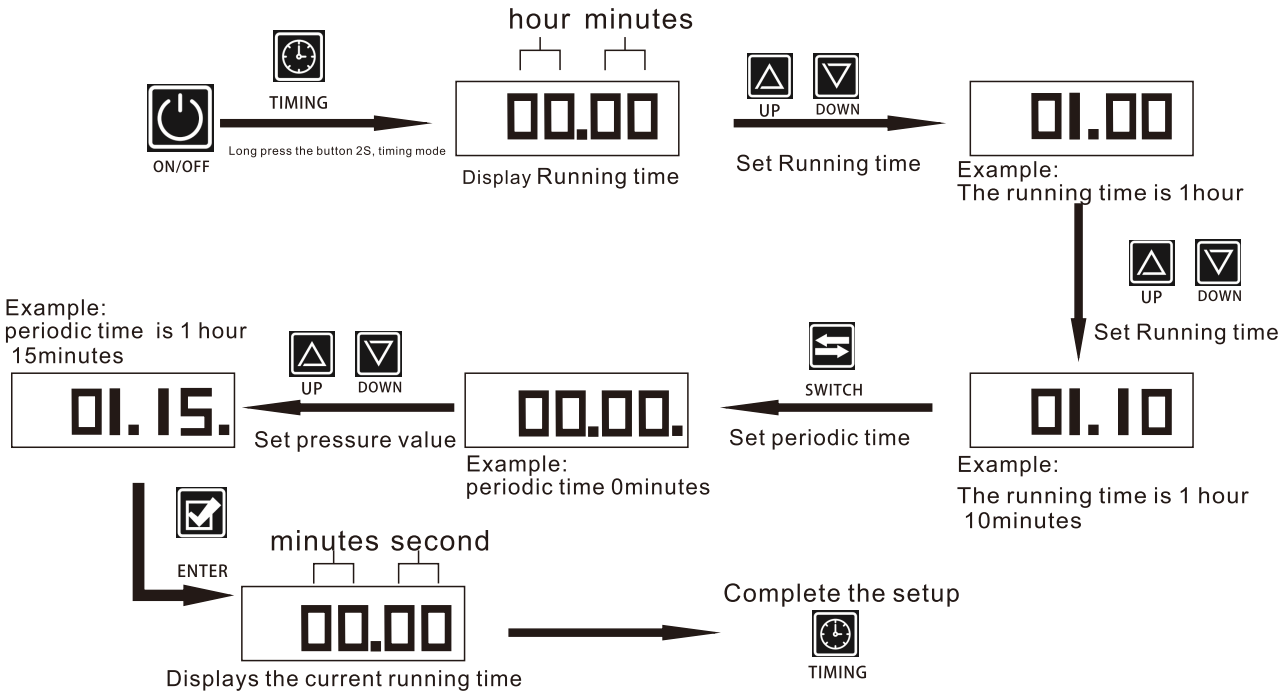
(2) Starting pressure setting: When the shutdown pressure is set, the starting pressure will be automatically adjusted according to a certain proportion (such as 60%). If you want to set the starting pressure separately, short press the switch button in the stop pressure setting interface to switch to the starting pressure setting interface. Press the up and down button to set the starting pressure.

(3) Menu difference: the last decimal point of the shutdown pressure setting menu is not bright. The last decimal point of the startup Settings menu is lit.

6.3.4 Display status switch

(1) Short press the switch button. Switch pressure -> Voltage -> Current -> Power -> speed.

6.4 Timing mode



Remark: For example," 01.10" is the system runs for 1 hour and 10 minutes, "01.15" is the system stops for 5 minutes, and 01.15 is the period time.

Steps chart for setting the timing mode

6.4.1 Equipment start

(1) Timed start: Short press the ON/OFF button , the running time is less than the set running time, and the pump enters the timed running state.

(2) Timed cycle repeat start : The pump is in the standby state, and the cycle time is longer than the scheduled running time. When the cycle time reaches, the pump cycle starts again.

(3) Fault self-recovery start: The current controller is in the fault state, the fault recovery time is up, the running time is less than the set running time, the controller will try to start the equipment automatically.

6.4.2 Equipment shutdown

(1) Button stop: short press the ON/OFF button to make the water pump enter the OFF state and stop.

(2) Timed stop: short press the ON/OFF button to make the pump in standby state, the running time is greater than the set running time, the pump stops.

(3) Fault shutdown: The current controller is in the running state, the controller system fails, the controller will shut down the equipment immediately .

6.4.3 Settings.

(1) Running time setting: pump running and stopping mode, short press the up and down button UP DOWN ,enter the running time setting interface automatically.Short press the up and down button UP DOWN again to set the running time.

(2) Cycle time setting: Run time setting menu, short press the switch button SWITCH , you can switch to the cycle time setting interface. Press the up and down button UP DOWN to set the startup cycle time.

(3) Menu difference: the last decimal point of the running time setting menu is not bright. The last decimal point of the cycle time Settings menu is lit. For less than 24 hours, displayed is “Hour.Minutes”. If the value is over than 24 hours, displayed “Days.Hours”.

(4) Speed setting: Switch back to the speed mode to adjust the speed or adjust the speed through the menu (F0-09).

6.4.4 Display status switch

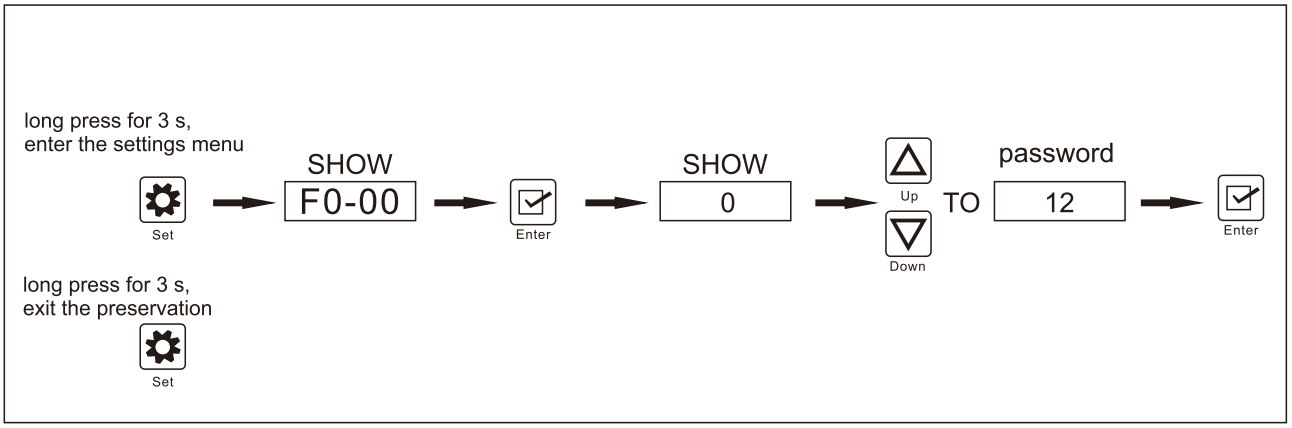
(1) Short press the switch button: Switch time -> Voltage -> Current -> Power -> speed.

(2) Time display interface: When the time is less than 60 minutes, displayed “Minutes. Seconds ", less than 24 hours,displayed "Hours. Minute ",and the number of minutes is blinking. If the value over than 24 hours, displayed “Days.Hours”, and the number of days is blinking.

7. User Advanced Menu Settings

1. Press and hold the Settings key for 2 seconds to enter the advanced Settings menu. After the modification, press and hold the Settings key for 2 seconds to exit and save.

2. After entering the menu, the interface will display the menu number, for example, F0-00. Short press the up UP down DOWN button to set the menu number. Short press ENTER Enter button, the interface will jump to the parameter setting of the menu number, please refer to the table below for the meaning of the parameter corresponding to the specific number. After modifying the parameter, press ENTER Enter button briefly to return to the menu number



Note: Please do not modify the settings arbitrarily. Consult technical personnel before operating settings for items F0-13 to F0-53; the constant pressure function must be used in AC mode.

Function Code	Item	Factory Setting	Explanation
F0-00	User modification permissions	0	12: Get the modification permission 21: Reset the user settings
F0-01	Software dry-running protection	1	0: not enable 1: Enable
F0-02	Power-supply mode	0	0: Automatic identification 1: DC power supply 2: Solar panel power supply 3： AC 380
F0-03	Return Difference Value of Voltage protection	20	unit:V
F0-04	Voltage of Under-pressure protection	Battery power supply under-voltage value stochastic pattern	unit:V
F0-05	Dry-running power point 1 Corresponding to the speed of the stochastic pattern	Determine by model	unit:W 4DC(3000:90;4000:200;5500:200;7500:230;) 6DC(3000:90:4000:200;5500:200;7500:230;11000:280)

F0-06	Dry-running power point 2 Corresponding to the speed of the stochastic pattern	Determine by model	unit:W 4DC(3000:180;4000:400;5500:400;7500:450;) 6DC(3000:180:4000:400;5500:400;7500:450;11000:500)
F0-07	Dry-running power point 3 Corresponding to the speed of the stochastic pattern	Determine by model	unit:W 4DC(3000:270;4000:630;5500:630;7500:900;) 6DC(3000:270:4000:630;5500:630;7500:900;11000:1100)
F0-08	Dry-running power point 4 Corresponding to the speed of the stochastic pattern	Determine by model	unit:W 4DC(3000:360;4000:890;5500:890;7500:1200;) 6DC(3000:360:4000:890;5500:890;7500:1200;11000:1600)
F0-09	Startup speed setting	stochastic pattern	unit:Rpm 4DC(4000R) 6DC(3800R)
F0-10	Operating state of the motor after power on	2	0: Default motor shutdown 1: Default motor starts 2: According to the state of the last power-off
F0-11	Set the maximum output power	Determine by model	unit:KW 4DC(3000:4200;4000:4900;5500:7000;7500:9200;) 6DC(3000:4200;4000:4900;5500:7000;7500:9200;11000:13500) 15000W=17000,22000W=23000
F0-12	Set the temperature protection value	80	unit:℃
F0-13	Work mode selection	0	0: Speed mode 1: constant pressure mode 2: Pressure on-off mode 3: Local timing mode

F0-14	Sensor model	3	Selection of the pressure sensor type 0: 24V,4-20ma, 10Bar 1: 10V, 10Bar 2: 5V, 10Bar 3: 24V,4-20ma, 16bar 4: 10V, 16Bar 5: 5V, 16Bar 6: 24V,4-20ma, 25Bar 7: 10V, 25Bar 8. 5V, 25Bar
F0-15	Constant pressure downtime speed	0	When the pressure condition of the pump is not good or difficult to stop, the shutdown speed can be set manually. When the pressure is greater than or equal to the setting pressure value, meanwhile the speed is less, then stop.
F0-16	Constant pressure of water to judge the time	100	1. Do not stop, first check whether the pressure tank is installed, and whether the pressure tank is effective. 2. Stop sensitivity, the greater the easier to stop. If do not stop, increase this value. 3. Down speed to detect the cycle time
F0-17	Constant pressure of water to judge the pressure	10	1. If Stop by mistake, increase this value. 2. If this value is zero, turn off the automatic shutdown function. 3. When deceleration detection, when the current drop pressure exceeds this value, resume normal operation immediately
F0-18	Ratio of Constant pressure start pressure and set pressure	80	unit:%
F0-19	Pressure value correction	100	Increase this value or decrease, The correction method was as follows: (Actual maximum pressure minus Actual minimum pressure) multiply 100 divide by (Show maximum pressure minus Show minimum pressure) If the actual pressure is 90, but shows 105, and pressure is 5 m but shows 10 m This value is corrected (90-5) * 100 / (105-10)

F0-20	“0” Pressure correction	100	This procedure does not show negative pressure, negative pressure is 0. If the pressure value shows a small value, the actual pressure is higher, then increase this value (If it shows “0” but the actual pressure is 3 m, change this value to “103”) Conversely, (If it shows “3” but the actual pressure is 0 m, change this value to “97”)
F0-21	Down speed (shutdown / recovery)	Determine according to the motor speed model	The smaller this value, the slower the speed (increase/decrease) The bigger this value, the faster the speed (increase/decrease)
F0-22	Constant pressure setting pressure	30	Unit: meter Constant pressure mode: for setting the pressure. When adjusting F0-22, F0-23 will be adjusted according to the ratio of F0-18
F0-23	Constant pressure startup pressure	24	Unit: meter
F0-24	Set the motor running direction	0	0: same direction 1: Opposite direction
F0-25	Set the motor output current limit	Determine by model	Unit: 0.1A
F0-26	Set the weak magnetic percentage of the motor output	50	unit:%
F0-27	Set the motor bus current limit	1.125 times of the rated model	Unit: 0.1A
F0-28	Current correction	1000	Unit: 0.1A
F0-29	Local timing running time	60	Unit: minutes
F0-30	Local timing cycle time	0	Unit: minutes, 0 is run only once by default

F0-31	Floating sensor effective value	1	0: Turn off the float sensor function 1: TH, TL, WELL float sensor low effective 2: TH, TL, high effectiveness, WELL, low effectiveness 3: TH, TL, and WELL are highly effective
F0-32	Motor cable length self-learning function	1	0: not enable 1: Enable
F0-33	Pressure on-off mode Downtime pressure	30	Unit: meter
F0-34	The ratio of Start the pressure and pressure shutdown mode	60	Unit: 1%
F0-35	Pressure on-off mode Startup pressure	18	Unit: meter
F0-36	Enter the missing phase software detection	1	0: not enable 1: Enable
F0-37	AC power limit	15000	unit:W 3000W=4200,4000W=4900,5500W=7000,7500W=9200 9200W/11000W=13500,15000W=17000,22000W=23000
F0-38	difference value of voltage drop protection	120	0: Turn off the voltage drop protection
F0-39	Fault recovery times	1	
F0-40	KP value adjustment of the constant pressure ring	1000	Raise this value when using a high pressure tank

F0-41	The KI value adjustment of the constant pressure ring	1000	Raise this value when using a high pressure tank
F0-44	Over-pressure protection threshold	30	Unit: meter When the actual pressure is higher than the set pressure, the controller will stop for protection
F0-45	Sensor disconnection protection	1	Sensor disconnection protection enables
F0-46	Startup speed adjustment	1000	When this value is increased, the startup speed becomes faster accordingly When this value is decreased, the startup speed slows down accordingly
F0-47	Downtime speed adjustment	1000	When this value is increased, the shutdown speed will be faster accordingly When this value is decreased, the shutdown speed will slow down accordingly
F0-48	Motor cable resistance value	Determine by model	After F0-32 adjusts to “0”, measure the resistance value between the two phases of the motor cable end with the multimeter, and fill in here.
F0-49	TZ 1 decrease the over-current sensitive value	1	0: not enable 1: Enable
F0-50	Water shortage, water full protection recovery time	15	Unit: minutes
F0-51	Dry-running protection timing time	10	Unit: seconds
F0-52	Low-speed protection speed setting	5000	unit:RPM When the water pump is blocked, the speed is lower than the setting speed. When the value is set to “0”, the low speed protection is turned off.
F0-53	Constant voltage minimum speed limit value	1200	unit:RPM When in constant voltage mode, motro would stop if the pump speed is below the current speed

Fault Information and Troubleshooting Method

Fault Description	Fault Code	Fault Reasons	Troubleshooting countermeasure
Hardware overcurrent protection	P0	1. There is a short circuit in the controller output loop 2. The controller driver module is abnormal 3. The controller power inverter module is abnormal 4. The controller acceleration time or deceleration time setting is too short 5. The motor parameters are not matched with the controller 6. The input voltage is low 7. Starting the rotating motor	1. Check whether the motor model matches the controller model 2. Check the connection between the controller and the motor circuit 3. Eliminate the hardware cause of the controller, you can remove the motor cable and try to start, if the E07 fault is still reported, the hardware is damaged 4. Increase acceleration or deceleration time 5. Avoid starting the controller while the motor is spinning
Over voltage protection	P51	1. The controller input voltage is too high 2. The acceleration or deceleration time is set too short	1. Adjust the input voltage to the normal range 2. Increase acceleration or deceleration time
Under voltage protection	PL	1. The controller input voltage is too low	1. Adjust the input voltage to the normal range
The output is out of phase	P43	1. The controller is not connected to the motor abnormally 2. The controller motherboard hardware is damaged	1. Check the motor and controller connection terminals 2. Seek technical support
Power inverter The module is overheating	P60	1. The controller temperature sensor leads are connected abnormally 2. The controller temperature sensor is abnormal 3. The ambient temperature is too high 4. Fan or duct failure	1. Check whether the controller temperature sensor connection is abnormal 2. Lower the ambient temperature 3. Choose an open and ventilated environment as much as possible 4. Check the fan and air duct for foreign objects or abnormalities
Input phase loss fault	E13	1. The controller is not connected to the power cord abnormally	1. Check the power cord and controller connection terminals

The motor is stalled	P44	1. The motor failed to start 2. Stop the motor during operation 3. The motor speed is abnormal	1. Check whether the motor model matches the controller model 2. Check whether the motor bearing is abnormal 3. Check whether there are foreign objects in the impeller of the pump body and whether the motor load is abnormal. 4. Check whether the wiring between the controller and the motor is loose or the connection is abnormal, and the impedance between the motor lines can be measured.。
The motor is out of step	P46	1. The motor failed to start 2. Stop the motor during operation 3. The motor speed is abnormal	1. Check whether the motor model matches the controller model 2. Reduce the length of the extension cord between the motor and the controller 3. Check whether the impedance between the phases of the motor is consistent
Motor overspeed	P47	1. The motor failed to start 2. Stop the motor during operation 3. The motor speed is abnormal	1. Check whether the motor model matches the controller model 2. Reduce the length of the extension cord between the motor and the controller
Dry running / load drop protection	P48	1. The motor running power is lower than the set dry running protection power value	2. Check whether the motor load is abnormal 3. Check whether the parameters of F0-05-F0-08 dry running power point are set correctly
Water tank level protection	FULL	1. The TH terminal input signal is recognized as a valid signal	1. Check whether the tank level is full 2. Check whether the TH terminal wiring is connected correctly
Pressure sensor failure	P62	1. The output value of the pressure sensor does not match the setting 2. The set value differs greatly from the sensor parameters	1. Check whether the pressure sensor setting model is correct 2. Check that the AI1/AI2 terminal connection is correct appropriate
Pressure function	P63	1. When the motor is running, the pressure feedback value cannot reach the target pressure	1. Check whether the pressure sensor wiring connection is correct
Backwater fault	P1	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