# PD210 Series AC/DC Inverter
# Operation Guide

Publication status: Standard
Product version: V1.07

## 1. safety instructions


(1) Be careful of fire or electric shock! Do not install the device in areas with flammable or explosive materials, or areas that are exposed to water or corrosion.
(2) Wiring work must be performed by qualified electrical engineers, otherwise there is a risk of electric shock or damage to the inverter.
(3) Before wiring, make sure the power is off, otherwise there may be a risk of electric shock or fire.
(4) The grounding terminal PE must be reliably grounded, otherwise the inverter casing may be electrified.
(5) When wiring, be careful to prevent foreign objects from entering the inverter , and do not allow the main circuit terminal wiring to come into contact with the casing, otherwise there is a risk of electric shock.
(6) When the power is turned on with the operation signal connected, the motor will automatically start to run, so please make sure that the operation signal is off before connecting the power. Otherwise, there is a risk of personal injury.
(7) Make sure the front cover is installed before turning on the power. Do not remove the cover when the power is on, otherwise there is a risk of electric shock .
(8) After cutting off the power supply of the main circuit, wait at least 2 minutes to confirm that the charging indicator light on the front cover is off before carrying out maintenance and inspection. Otherwise, there will be residual voltage on the capacitor and there will be a risk of electric shock.


(1) When transporting or installing, please focus on the bottom of the product to prevent the inverter from being hit or damaged.
(2) Do not install the device in an area where it may be subject to continuous vibration, shock, or electromagnetic interference.
(3) The inverter should be installed on flame retardant materials such as metal, away from flammable objects and heat sources.
(4) Be careful of fire! Make sure there is no debris (such as wood chips, iron filings, dust, paper, etc.) inside the inverter and on its heat sink.
(5) connect the power input cable to the U /T1 , V / T2, W /T3 motor terminals, and do not connect the motor cable to the R/ L1 , S/ L2 , T/ L3 power input terminals.
(6) Before operation, please confirm that the voltage level and current level are consistent with the inverter.

## 2. product information

D 2 10 4T 05 5 4

| Taype | interpretation |
|---|---|
| PD | Pump Inverter |

| Type | interpretation |
|---|---|
| 1 | Universal model |
| 2 | Solar |

| Type | IP |
|---|---|
| 00 | IP20 |
| 10 | IP55 |

| Type | Voltage level |
|---|---|
| 2S | 1PH 220AC |
| 2T | 3PH 220VAC |
| 4T | 3PH 380VAC |

| Type | Network type |
|---|---|
| / | Non |
| 4G | 4G |

| Type | Motor power(kW) |
|---|---|
| 0P75 | 0.75 |
| 01P5 | 1.5 |
| 02P2 | 2.2 |
| 0003 | 3 |
| 0004 | 4 |
| 05P5 | 5.5 |
| 07P5 | 7.5 |
| 0011 | 11 |
| 0015 | 15 |
| 18P5 | 18.5 |
| 0022 | 22 |

2.1 Inverter rated parameter specifications:

Table 1 PD 2 10 series inverter specifications

| Voltage grade | Inverter Model | DC rated input current (A) | AC rated input current (A) | Rated output current (A) | Applicable motor (kW) |
|---|---|---|---|---|---|
| Single phase 200V | PD210 2S0P75 | 3 | 8 | 4.1 | 0.75 |
| | PD210 2S01P1 | 4.4 | 10 | 5.6 | 1.1 |
| | PD210 2S01P5 | 6 | 15 | 7.5 | 1.5 |
| | PD210 2S02P2 | 8.8 | 20 | 10 | 2.2 |
| | PD210 2S0003 | 12 | 27 | 13.7 | 3 |
| | PD210 2S0004 | 16 | 35 | 17.5 | 4 |
| Three-phase 200V class | PD210 2T0P75 | 3 | 4.6 | 4.1 | 0.75 |
| | PD210 2T01P1 | 4.4 | 6.2 | 5.6 | 1.1 |
| | PD210 2T01P5 | 6 | 8.3 | 7.5 | 1.5 |
| | PD210 2T02P2 | 8.8 | 11 | 10 | 2.2 |
| | PD210 2T0003 | 12 | 15 | 13.7 | 3 |
| | PD210 2T0004 | 16 | 19.4 | 17.5 | 4 |
| | | | | | |
| Three-phase 380V | PD210 4T0P75 | 1.7 | 3 | 2.1 | 0.75 |
| | PD210 4T01P5 | 3.3 | 4.4 | 4 | 1.5 |
| | PD210 4T02P2 | 4.9 | 6.1 | 5.5 | 2.2 |
| | PD210 4T0003 | 6.7 | 8.1 | 6.9 | 3 |
| | PD210 4T0004 | 8.9 | 10.8 | 9.5 | 4 |
| | PD210 4T05P5 | 12.2 | 14.3 | 13 | 5.5 |
| | PD210 4T07P5 | 16.7 | 18 | 16.7 | 7.5 |
| | PD210 4T0011 | 24.4 | 24 | 22.5 | 11 |
| | PD210 4T0015 | 33.3 | 35 | 32 | 15 |
| | PD210 4T18P5 | 41.1 | 41 | 38 | 18.5 |
| | PD210 4T0022 | 48.9 | 48 | 45 | 22 |

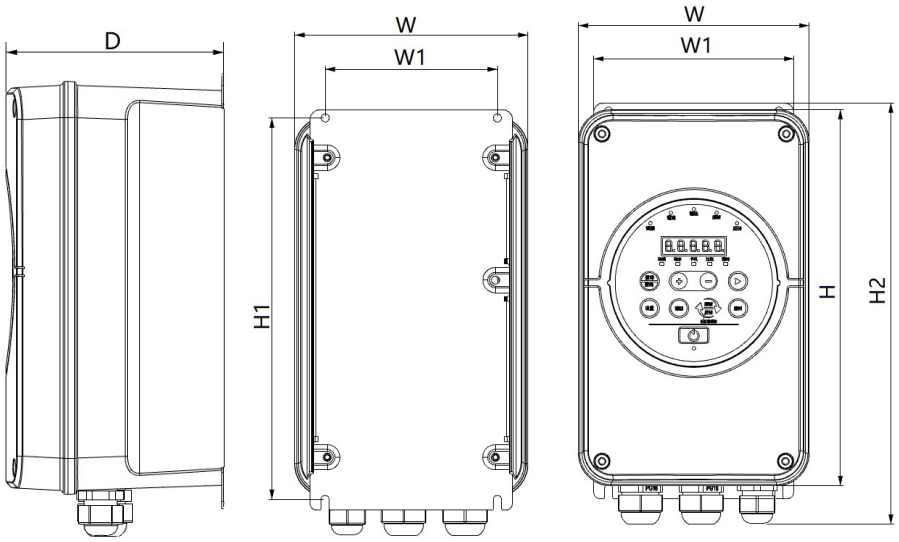



figure 1 Shape and installation dimensions

| Inverter Specifications | Inverter Model | | | Dimensions (mm) | | | | Installation size (mm) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2 00 V Class | 2 00 V Class | 400 V Class | H | H2 | W | D | H1 | W1 | Aperture |
| F1 | / | / | PD210 4T0P75 | 230 | 256 | 141 | 122 | 231 | 104 | Φ5 |
| | / | PD210 2T0P75 | PD210 4T01P5 | | | | | | | |
| | PD210 2S0P75 | PD210 2T01P1 | PD210 4T02P2 | | | | | | | |
| | PD210 2S 01P1 | PD210 2T0 1P5 | PD210 4T 003 | | | | | | | |
| | PD210 2S 0 1P5 | PD210 2T02P2 | PD210 4T 0004 | | | | | | | |
| | PD210 2S 02P2 | PD210 2T0003 | PD210 4T05P5 | | | | | | | |
| F2 | PD210 2S0003 | PD210 2T0004 | PD210 4T07P5 | 285 | 315 | 174 | 128 | 288 | 137 | Φ5 |
| | PD210 2S0004 | | PD210 4T0011 | | | | | | | |
| F3 | / | / | PD210 4T0015 | 325 | 364 | 210 | 149 | 328 | 175 | Φ 5 |
| | / | / | PD210 4 T 18 P 5 | | | | | | | |
| | / | / | PD210 4 T 0022 | | | | | | | |

Table 2 PD 2 10 series inverter installation dimensions

## 2.2 Inverter installation conditions

1) Avoid exposure to direct sunlight and rain.

2) Please install it in a well-ventilated place and install it vertically to facilitate heat dissipation.

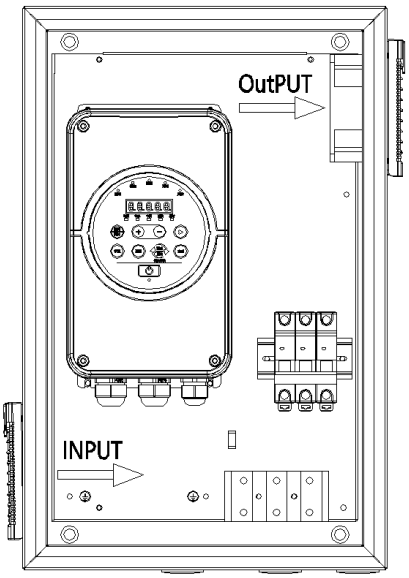
3) When installing in the distribution box, please note that there must be ventilation holes on the side . For self-installation in the distribution box, it is recommended to follow the following principles:

a) Cabinet size:

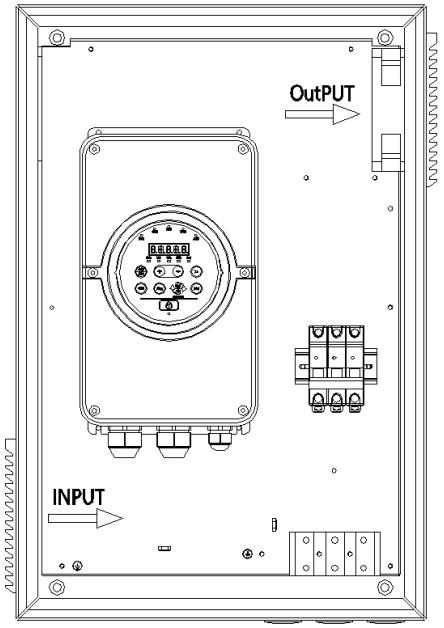
| Serial number | Power kW | Recommended cabinet dimensions (length * width * height mm ) | Remark |
|---|---|---|---|
| 1 | 2.2 ~4 | 480×310×180 | |
| 2 | 5.5~11 | 520×350×200 | |
| 3 | 11kW and above | 520×350×200 | |

b ) Cabinet cooling duct design:

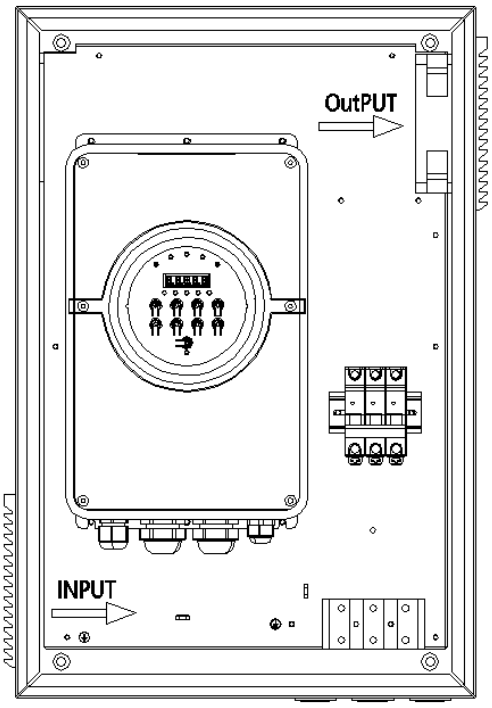
The inverter itself is IP55 high protection, with high requirements for heat dissipation. It is installed in an electrical cabinet for use, which requires the electrical cabinet to have sufficient heat dissipation channels:




2.2 ~4kW: Air inlet and outlet positions and sizes:




7.5 ~11kW Air inlet and outlet positions and sizes:




11kW Air inlet and outlet positions and sizes

c) Recommended cabinet cooling fan selection:

| Serial number | power | Fan type (length x width x thickness ) | Remark |
|---|---|---|---|
| 1 | 2.2 ~4 | 9 2 x 92 x 38 | 380V power supply fan |
| 2 | 5.5~11 | 1 20 x 120 x 38 | 380V power supply fan |
| 3 | 11kW and above | 1 20 x 120 x 38 | 380V power supply fan |

d ) Other notes:

Please install the inverter vertically;

Please keep enough air outlet distance between the inverter top air outlet and the cabinet edge;

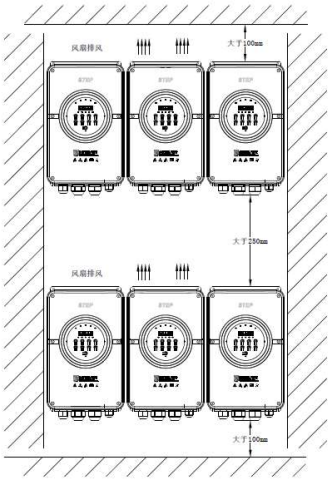
Please ensure reliable grounding;

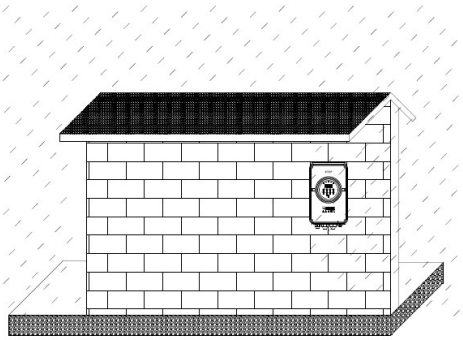
Please turn off the power during installation and inspection to ensure safe operation.

4) Do not operate in places with oil mist, metal dust, vibration, excessive dust or salt .

5) Do not install in places with harmful gases, liquids, corrosive, flammable or explosive gases.

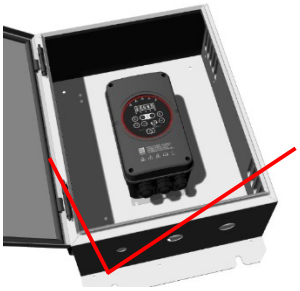
6 ) Inverter installation distance requirements :





When used outdoors, a certain degree of shelter is required

Not allowed without heat dissipation ducts



It is allowed to have a heat dissipation duct

## 3. Photovoltaic water pump wiring diagram

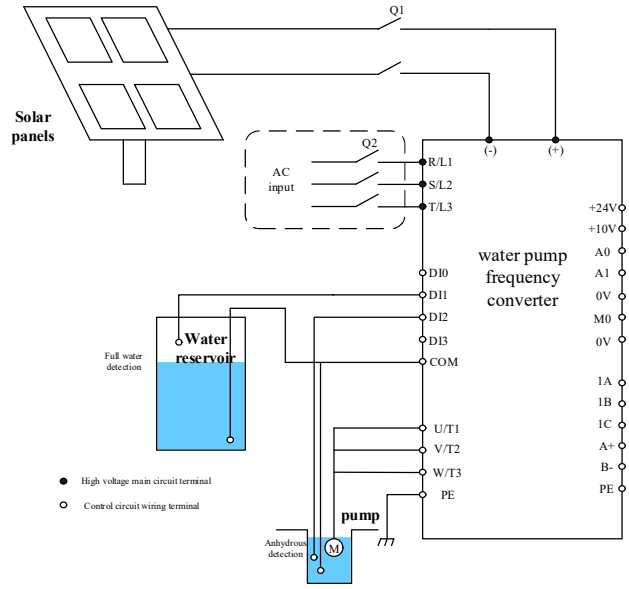



Figure 2 Schematic diagram of photovoltaic water pump connection

**Note: It is strictly forbidden to close Q1 and Q2 at the same time, otherwise the photovoltaic panel will be damaged.**

## 3.1 Description of main circuit terminals

| DC+ | DC- | R/L | S/N | T | U | V | W | PE |
|---|---|---|---|---|---|---|---|---|

F1 specification main circuit terminal arrangement diagram

| R/L | S/N | T | U | V | W | PE | DC- | DC+ |
|---|---|---|---|---|---|---|---|---|

F2 specification main circuit terminal arrangement diagram

| DC+ | DC- | R | S | T | U | V | W | PE |
|---|---|---|---|---|---|---|---|---|

F3 specification main circuit terminal arrangement diagram

(1) DC+, DC-: Solar DC power input terminals, connected to the + - terminals of the solar panel;
(2) R, S, T: three-phase AC power input terminals, connected to the three-phase power grid;
(3) L, N: single-phase power input terminals, connected to the single-phase power grid;
(4) U, V , W : Inverter three-phase AC output terminals , connected to three-phase asynchronous motor ;
(5) PE: Grounding terminal, connected to the protective ground. The grounding resistance cannot be greater than 4Ω at 400V level .

## 3.2 Control circuit terminal description

| 24V | 10V | 0V | A0 | A1 | M0 | X0 | X1 | X2 | X3 | 485+ | 485- | SC | PE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

(1) 24 V: DC power supply maximum output 100 mA , used for input power of sensors and terminals;
(2) X0~X3: digital input, the default common terminal is 0V;
(3) 10 V: DC power supply, maximum output 2 0 mA, used for analog input power supply;
(4) 485+, 485-, SC, PE: RS485 terminals. The shielding layer can be connected to the PE terminal. If you want to share the ground with the PLC, you can also connect the shielding layer to the SC terminal.
(5) A0, A1 analog input terminals; the common ground is the 0V terminal;
(6) M0 analog output terminal, used for output voltage, frequency and other functions, its common ground is also 0V, and the output can be selected by the dip switch: 0~10V or 4~20mA;

Note: Use shielded wires for analog signal lines, and keep them at least 5cm away from the power lines. It is best to cross the power lines and avoid parallel wiring with the power lines. Connect the shielded wires to the PE terminal.

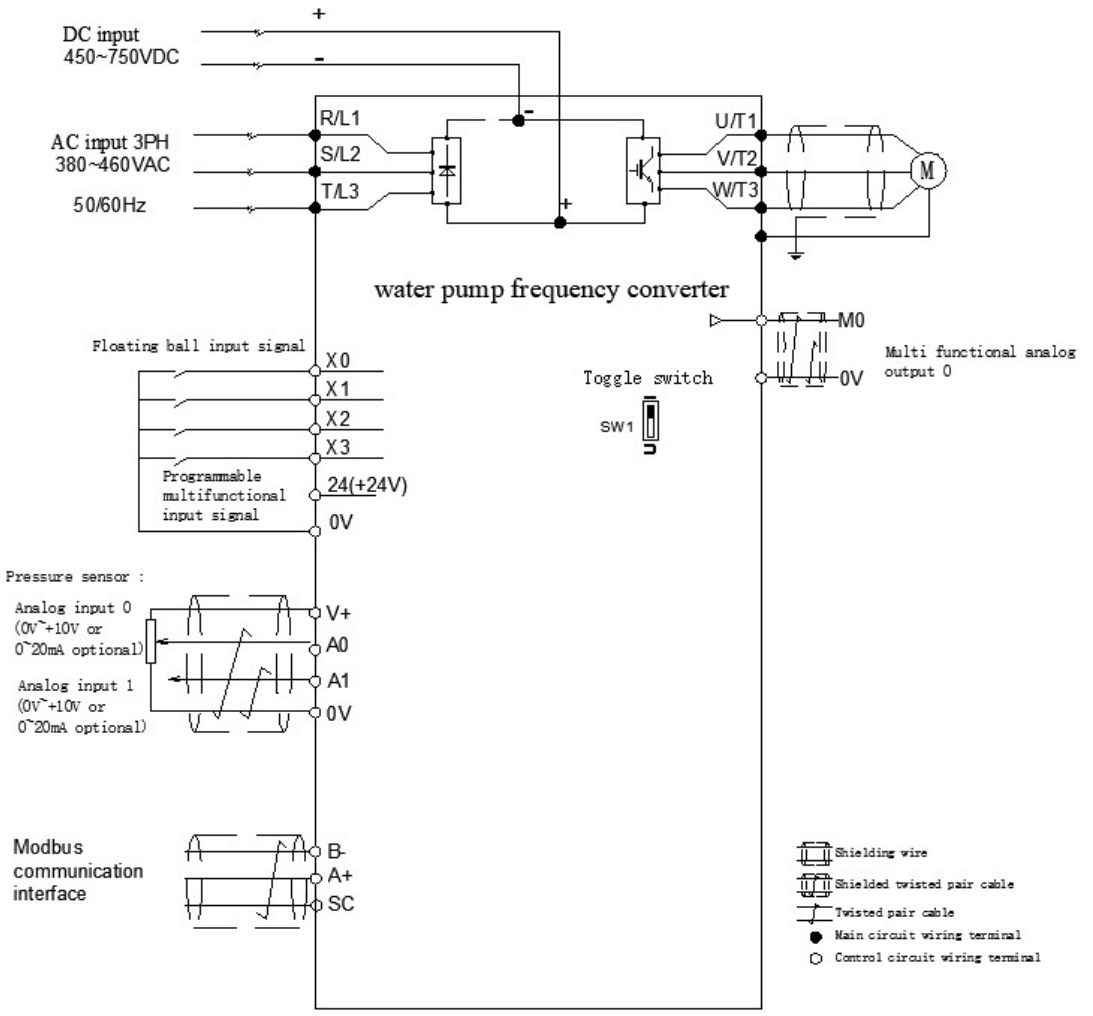
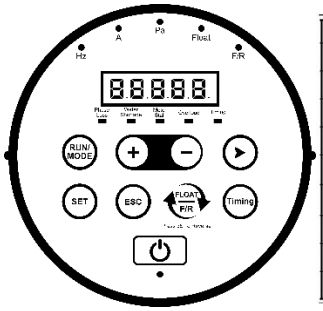



Figure 3. Wiring diagram of photovoltaic water pump terminals

## 4. Quick Debug

### 4.1 Operation panel appearance




| Character | LED Display | Character | LED Display | Character | LED Display | Character | LED Display |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 9 | 9 | I | , | R | r |
| 1 | 1 | A | A | J | J | S | S |
| 2 | 2 | B | b | K | t | T | T |
| 3 | 3 | C | C | L | L | U | U |
| 4 | 4 | D | d | M | m* | V | v |
| 5 | 5 | E | E | N | n | W | vv* |
| 6 | 6 | F | F | O | o | X | No display |
| 7 | 7 | G | G | P | P | Y | y |
| 8 | 8 | H | H | Q | q | Z | No display |

Figure 4 a. Operation and display panel appearance Figure 4 b. LED digital tube display and text comparison

The button functions are shown in Table 1 :

Table 3 : Button Function Description

| button | name | Function |
|---|---|---|
| + | Increase key | When selecting a function, select the previous function code;<br>[Parameter setting], the parameters increase. |
| − | Minus key | When selecting a function, select the next function code;<br>[Parameter setting], the parameter decreases. |
| ➤ | Right shift key/display type conversion key | When setting numbers, move the position key to the right.<br>During operation, click to switch the digital tube display value:<br>In constant frequency working mode, switch between current, voltage, frequency and speed;<br>In constant pressure working mode, switch between current, voltage, frequency, speed and pressure;<br>In constant current working mode, switch between current, voltage, frequency and speed.<br>In standby mode, press and hold for more than 3 seconds to enter network configuration mode. |
| MODE | Working mode switch key | Click to cycle between constant frequency, constant voltage, and constant current operation modes, and light up the corresponding indicator lights. |
| SET | Setting Key | In [Monitoring Status], enter the function selection interface;<br>In the function selection interface, enter the selected function interface;<br>On the working mode interface, confirm the settings. |
| ESC | return key<br>Reset button | In the function selection interface, return to [Monitoring Status];<br>In each function operation interface, return to the function selection interface.<br>In case of a fault, click Reset Fault. |
| ⏻ | Start/Stop Button | In the local panel control state, for the start and stop function , click to switch between the running and stopping states, and the indicator light displays its status. |
| FLOAT F/R | Float/Reverse Button | In shutdown state:<br>Click to enter the float switch mode, the inverter start and stop are controlled by the float input switch, and the float indicator light is on; click again to exit the float switch mode, and the float indicator light is off.<br>Press and hold for 3 seconds or longer to switch the motor direction and light up the reverse indicator light. |
| Timing | Timing key | Activate or deactivate the timer function. |

## 4.2 Basic Operations of the Panel

### 4.2.1 Operation status of the operator : Entering the parameter setting interface requires manufacturer authorization. The following examples are all authorized and the operation steps after entering the password

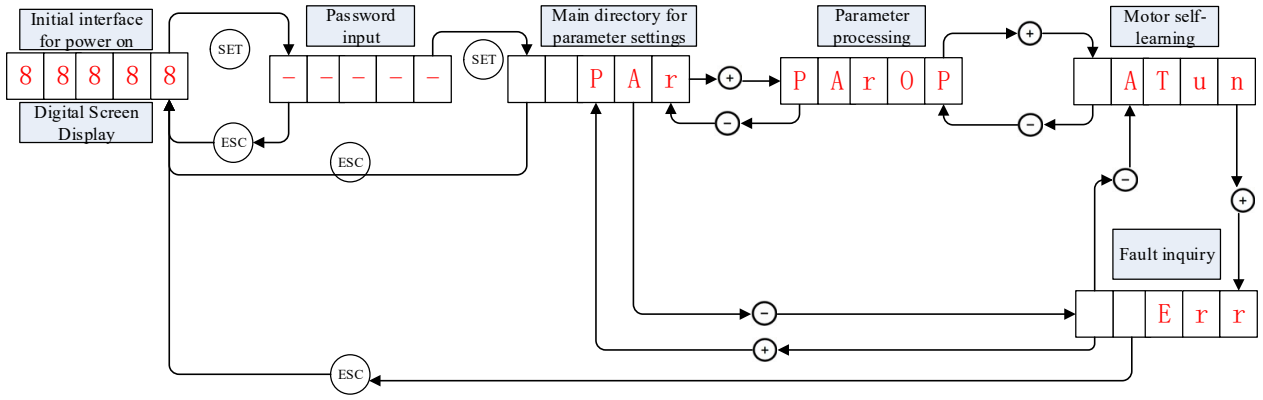



Figure 5. General display of the operator

4.2.2 Parameter setting: Entering the parameter setting interface requires manufacturer authorization. The following examples are all authorized and the operation steps after entering the password

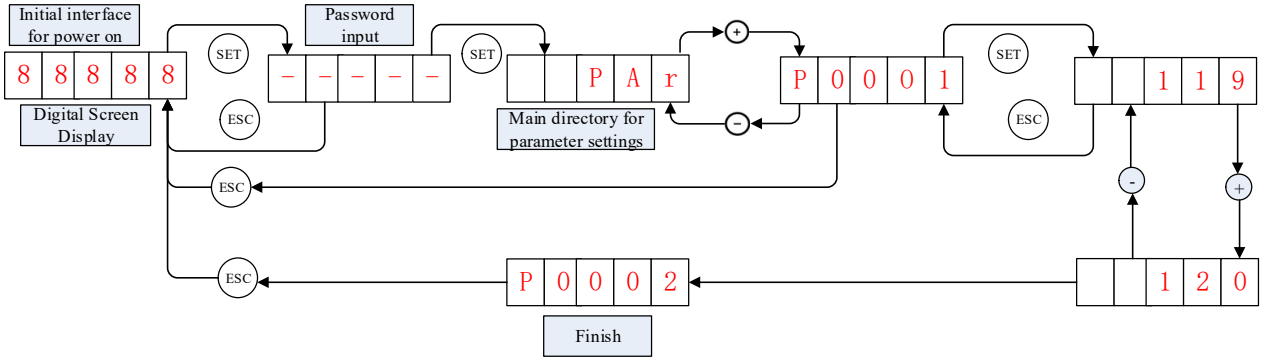



Figure 6. Parameter setting diagram

4.2.3 Parameter reset: Entering the parameter setting interface requires manufacturer authorization. The following examples are all authorized and the operation steps after entering the password

When using this function, all parameters are restored to factory values. There are two ways to achieve parameter reset:

(1) Modify the parameter P00.46 = 1. After the reset is completed, P00.46 automatically returns to 1 and the interface returns to the initial state

(2) Use the menu operation, the operation method is shown in Figure 6.

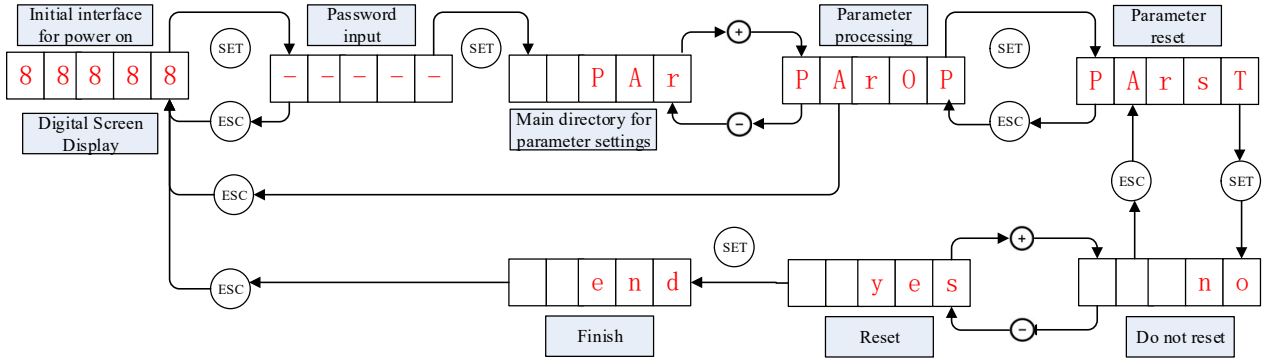



Figure 7. Parameter reset function settings

4.2.4 Fault inspection:

In the Err [Fault Check] state, you can view the contents of the 8 most recent faults and the voltage, current, given speed, feedback speed status and instantaneous values of the U, V, and W three-phase currents recorded when the fault occurred.

Press thekey (SET) to enter the fault list, and E01 (the first fault record) is displayed. Press the (+) and (−) keys to switch to other fault records, which change between E01 and E08, where E01 represents the most recent fault

number and E08 represents the earliest fault number.

When the fault number is displayed (such as E01), press the key SET again to enter and view the corresponding value when the fault occurs. Press the key to display XX (fault code) → Udc voltage value → Irms output current value → Vref given frequency → Vfbk feedback frequency in sequence. In this process, press the key SET or key ESC to return to the fault number state.

Note: When a fault occurs, ErrXX (fault code) will be displayed and the fault light will be on. In the first-level menu, the fault code and menu appear alternately; after entering the second-level menu (such as ParST, P00.01, etc.), the fault code will not be displayed.

### 4.3.1 Photovoltaic water pump control mode

(1) Check whether the rated parameters of the inverter motor match the actual parameters

(2) Set the P0.35 parameter to 1, which means to enable the MPPT control mode of the photovoltaic water pump.

(3) run.

Table 4 : Photovoltaic control parameters of photovoltaic inverter

| Parameter number | parameter name | Predetermined area | default value | illustrate |
|---|---|---|---|---|
| P0.35 | MPPT enable instruction | 0~2 | 0 | 0: No photovoltaic power is used<br>1: Enable MPPT control<br>2: Enable CVT control |
| P0.36 | MPPT disturbance voltage step size | 0~32V | 2 | When using MPPT control, the rate of change of the given voltage each time<br>If the bus voltage is higher, this value can be appropriately increased. |
| P0.37 | MPPT-CVT coefficient | 0~100% | 85 | The given value of the initial constant voltage control is generally a percentage of the open circuit voltage.<br>If the open-circuit voltage of the solar panel is low but the power is sufficient, this value can be appropriately increased to 90% to avoid repeated jitters in the inverter output frequency. |
| P0.38 | Cvt stability threshold | 0~199V | 10 | If the difference between the given voltage and the feedback voltage is within this range, the system can be considered stable. |
| P0.39 | Voltage loop setpoint | 0~800V | 290 | The voltage setting value when using CVT control should be increased as the bus voltage increases. |
| P0.42 | Power-on automatic start delay time | 0.0~3600.0s | 0 | Set this parameter after the inverter is debugged.<br>After power is turned on again, the inverter automatically starts within the specified time. |
| P0.43 | Voltage loop Kp | 0.000~65.535 | 0.500 | If the inverter output frequency jitters repeatedly, this value can be appropriately reduced. However, if the value is too small, the inverter may report an undervoltage fault when the battery panel voltage drops suddenly. |

Notice:

(1) In constant current mode, if the sunlight is insufficient, the inverter will not operate at constant current; the output frequency will be adjusted only when the output exceeds the set value.

(2) In constant pressure control, insufficient light will cause the output pressure to decrease. At this time, the output frequency will not be increased, but the photovoltaic power will be operated at its maximum power. Only when the feedback pressure is greater than the given pressure, the constant pressure control mode can be adjusted according to the pressure control mode.

(3) In constant frequency control mode, when the frequency of the maximum power point of the photovoltaic is greater than the set frequency, it runs at the set frequency; otherwise, it runs at the maximum power point frequency.

## 4.4 Features

### 4.4.1 Common Operations

(1) Give commands by keys to make the motor run and stop;

(2) Use the and keys to adjust the target speed, current and pressure values, and press the key SET to confirm.

(3) Motor rotation direction: Press and hold the key FLOAT F/R for 3 seconds to adjust the motor rotation direction, that is, to reverse the current direction;

(4) Fault reset: When a fault occurs, press the button ESC to reset the fault.

(5) Press the button during operation to switch the display of the current operating status and display it in a 5-digit digital tube, including output voltage ("u" + current output voltage, unit: V), current ("c" + current output current, unit: A), frequency ("f" + current output frequency, unit: Hz), speed ("r" + current speed value, unit: r/min) and outlet pressure (only displayed in constant pressure mode, "P" + current outlet pressure, unit: MPa), etc.

**Note: The photovoltaic water pump works in MPPT maximum power output mode by default. It can be set to constant frequency control mode, constant frequency control mode or constant voltage control mode under AC power supply.**

# 5. Solar Panel Selection and Installation

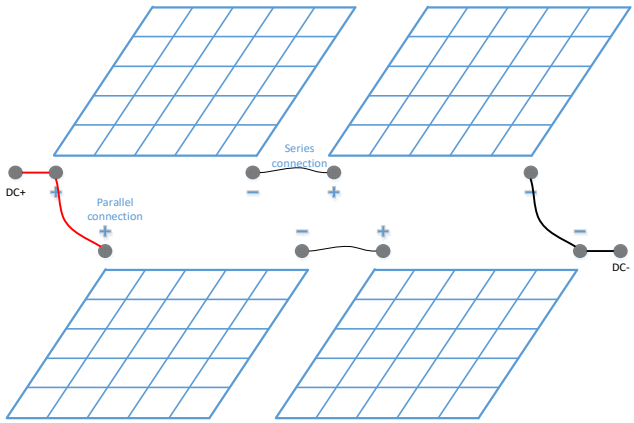



Figure 8 Solar panel connection diagram

When selecting solar panels, the recommended total output power of the solar panels is 1.3~2 times (when the pump voltage is 400V) or 1.6~2 times (when the pump voltage is 200V) the rated power of the water pump.

When the output voltage of the solar panel is within the recommended input voltage range, the water pump can achieve optimal working condition.

Solar panel output voltage = single panel operating voltage × number of series connections. Input voltage should be within the optimal input voltage range. Optimal DC input voltage range

200V class: 250~400VDC

400V class: 450~700VDC

For example: the rated voltage of the water pump is 220V, the rated current is 15.7A, and the rated power is 3kW. The open circuit voltage of each solar panel is 35V, the rated power is 300W, and the working voltage is 29V.

According to the power of the water pump, a 4.8~6kw power battery panel needs to be adapted, that is, 16~20 battery panels need to be adapted. It is recommended to adapt 20 battery panels, 10 in series and 2 in parallel, with an operating voltage of 290V within the optimal operating voltage range, and the open circuit voltage of 350V does not exceed the maximum adaptation voltage.

Note: The short-circuit voltage of the solar panel cannot be higher than the nominal maximum input voltage of the inverter;
200V level: Inverter maximum voltage input voltage 450VDC ;
400V level: Inverter maximum voltage input voltage 800VDC ;

Maximum output voltage of solar panel = open circuit voltage of single panel × series output .

| Solar panel recommended panel matching example | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| load | | Solar panels | | | | | | | | | |
| Motor power (KW) | AC voltage (V) | Single board open circuit voltage DC(V) | Single board operating voltage DC (V) | Single board power (W) | Concatenation (block) | Parallel (block) | Total number of boards (pieces) | Board voltage DC(V) | Total open circuit voltage DC(V) | Total voltage DC(V) | Power of the board |
| twenty two | 380 | 38.5 | 31 | 270 | 17 | 1 | 17 | 527 | 655 | 540 | 4590 |
| 3 | 380 | 38.5 | 31 | 270 | 18 | 1 | 18 | 558 | 693 | 540 | 4860 |
| 4 | 380 | 38.5 | 31 | 270 | 18 | 1 | 18 | 558 | 693 | 540 | 4860 |
| 5.5 | 380 | 38.5 | 31 | 270 | 18 | 2 | 36 | 558 | 693 | 540 | 9720 |
| 7.5 | 380 | 38.5 | 31 | 270 | 18 | 2 | 36 | 558 | 693 | 540 | 9720 |
| 9.2 | 380 | 38.5 | 31 | 270 | 18 | 3 | 54 | 558 | 693 | 540 | 14580 |
| 11 | 380 | 38.5 | 31 | 270 | 18 | 3 | 54 | 558 | 693 | 540 | 14580 |
| 13 | 380 | 38.5 | 31 | 270 | 18 | 4 | 72 | 558 | 693 | 540 | 19440 |
| 15 | 380 | 38.5 | 31 | 270 | 18 | 4 | 72 | 558 | 693 | 540 | 19440 |
| 18.5 | 380 | 38.5 | 31 | 270 | 18 | 5 | 90 | 558 | 693 | 540 | 24300 |
| twenty two | 380 | 38.5 | 31 | 270 | 18 | 7 | 126 | 558 | 693 | 540 | 34020 |
| ★ Inverter operating voltage range: DC450~DC700V | | | | | | | | | | | |

| |
|---|
| ★ It is recommended that the panel voltage reaches the inverter rated voltage DC540V, and is matched with the solar working voltage; the maximum input voltage does not exceed DC750V, and is matched with the open circuit voltage of the solar panel. The optimal panel power is recommended to be 1.5~2 times the rated power of the motor. |
| ★ The number of panels is determined based on the actual on-site conditions. When the number of panels is small, the panels are aged and the working voltage is low, the actual output energy will be appropriately reduced. |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.75 | 220 | 38.5 | 31 | 270 | 10 | 1 | 10 | 310 | 385 | 310 | 2700 |
| 1.1 | 220 | 38.5 | 31 | 270 | 10 | 1 | 10 | 310 | 385 | 310 | 2700 |
| 1.5 | 220 | 38.5 | 31 | 270 | 10 | 1 | 10 | 310 | 385 | 310 | 2700 |
| 2.2 | 220 | 38.5 | 31 | 270 | 10 | 2 | 20 | 310 | 385 | 310 | 5400 |
| 3 | 220 | 38.5 | 31 | 270 | 10 | 2 | 20 | 310 | 385 | 310 | 5400 |
| 4 | 220 | 38.5 | 31 | 270 | 10 | 3 | 30 | 310 | 385 | 310 | 8100 |

| |
|---|
| ★ Inverter operating voltage range: DC250~DC400V |
| ★ It is recommended that the panel voltage reaches the inverter rated voltage DC310V, and is matched with the solar working voltage; the maximum input voltage does not exceed DC450V, and is matched with the open circuit voltage of the solar panel. The optimal panel power is recommended to be 1.6~2 times the rated power of the motor. |
| ★ The number of panels is determined according to the actual on-site conditions. When the number of panels is small, the panels are aged and the working voltage is low, the actual output energy will be appropriately reduced. |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.75 | 220 | 38.5 | 31 | 270 | 10 | 1 | 10 | 310 | 385 | 310 | 2700 |
| 1.1 | 220 | 38.5 | 31 | 270 | 10 | 1 | 10 | 310 | 385 | 310 | 2700 |
| 1.5 | 220 | 38.5 | 31 | 270 | 10 | 1 | 10 | 310 | 385 | 310 | 2700 |
| 2.2 | 220 | 38.5 | 31 | 270 | 10 | 2 | 20 | 310 | 385 | 310 | 5400 |
| 3 | 220 | 38.5 | 31 | 270 | 10 | 2 | 20 | 310 | 385 | 310 | 5400 |
| 4 | 220 | 38.5 | 31 | 270 | 10 | 3 | 30 | 310 | 385 | 310 | 8100 |
| 5.5 | 220 | 38.5 | 31 | 270 | 10 | 4 | 40 | 310 | 385 | 310 | 10800 |

| |
|---|
| ★ Inverter operating voltage range: DC250~DC400V |
| ★ It is recommended that the panel voltage reaches the inverter rated voltage DC310V, and is matched with the solar working voltage; the maximum input voltage does not exceed DC450V, and is matched with the open circuit voltage of the solar panel. The optimal panel power is recommended to be 1.6~2 times the rated power of the motor |
| ★ The number of panels is determined according to the actual on-site conditions. When the number of panels is small, the panels are aged and the working voltage is low, the actual output energy will be appropriately reduced. |

## 6. parameter list

Table 5 : Parameter list of photovoltaic water pump inverter

| Parameter number | parameter name | English name | Predetermined area | default value | unit | illustrate |
|---|---|---|---|---|---|---|
| P0.00 | Password login | Password Login | 0~65535 | 0 | | |
| P0.01 | Input Di0 function | Di0 Func | 0~161 | 119 | | 119: Float function, can run when closed<br>156: Mains /PV switch, switch to mains when closed |
| P0.02 | Input Di1 function | Di1 Func | 0~161 | 0 | | |
| P0.03 | Input Di2 function | Di2 Func | 0~161 | 0 | | |
| P0.04 | Enter Di3 function | Di3 Func | 0~161 | 0 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| P0.05 | Input AI0 type | AI0 Type | 0~4 | 2 | | 0: 0~10V<br>1:0~20mA 2:4~20mA 3:0~10V adjustable<br>4:4~20mA adjustable |
| P0.06 | Pressure feedback channel selection | Fbk Channel | 0~1 | 0 | | 0: AI0<br>1: AI1 |
| P0.07 | Input AI1 type | AI1 Type | 0~4 | 2 | | 0: 0~10V<br>1:0~20mA 2:4~20mA 3:0~10V adjustable<br>4:4~20mA adjustable |
| P0.08 | Input AI1 function | AI1 Func | 0~6 | 0 | | 0: Undefined function<br>1: Target speed signal |
| P0.09 | Output M0 function | M0 Func | 0~40 | 1 | | 0: Undefined<br>1: Output current<br>2: Output voltage<br>4: Bus voltage<br>5: Output active power<br>6: Target speed (unsigned<br>7: Current speed (unsigned<br>8: Speed setting (signed<br>13: Analog A0<br>14: Analog A1<br>18: Output total power |
| P0.10 | Output K1 function | K1 Func | 0~155 | 2 | | 0: Undefined function<br>1: Power-on self-test is normal<br>2: Fault output<br>3: Running<br>4: Frequency reached output<br>5: Frequency consistent output<br>34: Reverse running<br>35: Sleep<br>100~135 is opposite to 0~35 output |
| P0.11 | Scheduled running time | RunTime | 0~99.9 | 0.0 | h | |
| P0.12 | Timer standby time | StopTime | 0~99.9 | 0.0 | h | |
| P0.13 | Target current setting | Curr Ref | 0~200 | 100 | % | Set current value during constant current operation |
| P0.14 | Frequency adjustment step | Auto Start Sel | 0~50.00 | 5.00 | | Press the up and down keys to increase the frequency |
| P0.15 | Frequency adjustment times | Export Pressure1 | 0~20 | 6 | | |
| P0.16 | Target pressure setting | Pressure Ref | 0~300.00 | 0.70 | MPa | Pressure setting value for constant pressure control |
| P0.17 | Sensor range upper limit | RefMax-->FdbMax | 0~20.00 | 1.60 | MPa | Consistent with the pressure sensor nameplate |
| P0.18 | Sensor range lower limit | RefMin-->FdbMin | 0~10.00 | 0.00 | MPa | |
| P0.19 | Special sensor upper limit | InspectWork Time | 0~255 | 100 | % | When AI0 and AI1 type are selected as 3~4, if the pressure sensor is 1~5V, P0.19 can be set to 50% and P0.20 can be set to 20%. |
| P0.20 | Special sensor lower limit | InspectHold Time | 0~100 | 0 | % | |
| P0.21 | Overpressure protection value | Squib Func | 0~2.00 | 0.10 | MPa | |
| P0.22 | Pressure calibration factor | In Sensor UpLmt | 0~200 | 100 | % | Modify when the inverter displays pressure inconsistent with the pressure sensor |
| P0.23 | Sensor disconnection delay | Sensor TimeOut | 0~30000 | 60 | s | When set to 0, disconnection detection is not performed. |

| | | | | | | |
|---|---|---|---|---|---|---|
| P0.24 | Sensor disconnection current | Sensor Cur | 0~100 | 85 | % | |
| P0.25 | Hibernation selection | Sleep Sel | 0~1 | 1 | | |
| P0.26 | Sleep frequency percentage | Sleep Freq | 0~100 | 50 | % | |
| P0.27 | Sleep delay | Sleep Delay | 0~6553.5 | 30.0 | s | |
| P0.28 | Sleep error percentage | Sleep Tr | 0~20.0 | 1.0 | % | |
| P0.29 | Wake-up error percentage | Awake Error | 0~100 | 30 | % | |
| P0.30 | Wake-up delay | Awake Delay | 0~6553.5 | 1.0 | s | |
| P0.31 | Low frequency protection frequency | LowFreq Protect | 0~100 | 0 | % | |
| P0.32 | Low frequency protection time | LowFreq Prot. Tm | 0~43200 | 300 | s | |
| P0.33 | Stall forward and reverse times | Block Cnt | 0~5 | 0 | | it is not 0, if a 1# fault is reported at low speed, it will automatically restart and run in reverse |
| P0.34 | Reset times per hour | Rst Time perHour | 0~100 | 5 | | When a fault other than No. 5 or No. 28 occurs, the system can automatically restart several times per hour. If the number exceeds this number, it will take 1 hour to restart. |
| P0.35 | MPPT enable instruction | MPPT Enable | 0~2 | 0 | | 0: Do not use photovoltaic<br>1: Enable MPPT control<br>2: Enable CVT control |
| P0.36 | MPPT disturbance voltage step size | MPPT voltageStep | 0~32V | 2 | V | using MPPT control, the rate of change of the given voltage each time can be appropriately increased if the bus voltage is high. |
| P0.37 | MPPT-CVT coefficient | MPPT-CVT modulus | 0~100 | 85 | % | The given value of the initial constant voltage control is generally a percentage of the open circuit voltage.<br>If the open-circuit voltage of the solar panel is low but the power is sufficient, this value can be appropriately increased to 90% to avoid repeated jitters in the inverter output frequency. |
| P0.38 | Cvt stability threshold | Cvt Thr | 0~199 | 10 | V | If the difference between the given voltage and the feedback voltage is within this range, the system can be considered stable. |
| P0.39 | Voltage loop setpoint | AVR VoltageSet | 0~800 | 290 | V | The voltage setting value when using CVT control should be increased as the bus voltage increases. |
| P0.40 | Input voltage determination method | InPut Src Identify | 0~1 | 1 | - | 0: Determine by external terminal<br>1: Automatic identification |
| P0.42 | Power-on automatic start delay time | Start DelayTime | 0.0~3600.0 | 0.0 | s | Set this parameter after the inverter is debugged.<br>After power is turned on again, the inverter automatically starts within the specified time. |
| P0.43 | Voltage loop Kp | AVR Kp | 0.000~65.535 | 0.500 | | If the inverter output frequency jitters repeatedly, this value can be appropriately reduced. However, if the value is too small, the inverter may report an undervoltage fault when the battery panel voltage drops suddenly. |

| | | | | | | |
|---|---|---|---|---|---|---|
| P0.44 | Power deviation threshold | Power Err. | 0.000~0.199 | 0.010 | kW | When the inverter power is small, this value can be appropriately reduced, and the minimum value is 0.002. |
| P0.46 | Restore factory settings | Reset Deflt Para | 0~1 | 0 | | When changed to 1, the parameter will be restored to the factory value. |
| P1.00 | Motor 1 Type 0: IM | Motor1 Type 0:IM | 0~2 | 0 | | According to the nameplate setting |
| P1.01 | Motor 1 rated power | M1 Rated Power | 0.10~650.00 | | kW | |
| P1.02 | Motor 1 rated current | M1 Rated Cur | 0.1~5000.0 | | A | |
| P1.03 | Motor 1 rated frequency | M1 Rated Freq | 0.01~650.00 | 50.00 | Hz | |
| P1.04 | Motor 1 rated speed | M1 Rated Spd | 1~18000 | | rpm | |
| P1.05 | Motor 1 rated voltage | M1 Rated Volt | 0~690 | 220 | V | |
| P1.06 | Motor 1 poles | M1 Pole Number | 2~200 | 2 | P | |
| P1.07 | Motor 1 phase sequence 1: positive sequence | M1 Dir 1:Pos | 0~1 | 1 | | |
| P1.08 | Maximum frequency | Max Freq | 0~655.00 | 55.00 | Hz | |
| P1.09 | Frequency Cap | Freq Upper Lmt | 0.00~650.00 | 50.00 | Hz | |
| P1.10 | Frequency lower limit | Freq Lower Lmt | 0.00~300.00 | 0.00 | Hz | |
| P1.11 | PM1 stator resistance | PM1-Rotor R | 0.000~65.535 | 0.000 | ohm | |
| P1.12 | PM1 motor D-axis inductance | PM1-Ld | 0.0~6553.5 | 0.0 | | |
| P1.13 | PM1 motor Q-axis inductance | PM1-Lq | 0.0~6553.5 | 0.0 | | |
| P1.14 | PM1 back EMF coefficient | PM1-EMF | 0.0~6553.5 | 0.0 | V | |
| | | | | | | |
| P1.20 | GVC feature selection | GVC Func Sel | 0~65535 | 288 | | |
| P1.21 | Injected DC size | DC Inj Cur | 0~200 | 0 | % | |
| P1.22 | DC injection time | Magnetic Time | 0~100.0 | 0.3 | s | |
| P1.23 | DC injection slope | DC Inj Slope | 0~100.00 | 1.00 | s | |
| P1.24 | Switching frequency | IF Switch Freq | 0~200 | 10 | % | |
| P1.25 | Vibration suppression gain | VibSuppGain | 0~655.35 | 2.00 | | |
| | | | | | | |
| P2.00 | Control mode selection | Ctrl Mode | 0~1 | 0 | | 0: GVC general vector control<br>1: SVC open-loop vector control, self-learning required |
| P2.01 | Operation mode selection | Operation Mode | 0~6 | 6 | | 0: Two-wire operation mode 1<br>1: Two-wire operation mode 2<br>6: Float start-stop mode |
| P2.02 | Command channel selection | Cmd Channel Sel | 0~2 | 0 | | 0: Panel given running command<br>1: Terminal given running command<br>2: Communication given command |
| P2.03 | Speed channel selection 1 | Ref Sel 1 | 0~15 | 0 | | 0: Panel given speed<br>1: Digital multi-speed given<br>3: Analog 0 given target speed<br>7: Internal communication current speed<br>8: PID given target speed<br>12: Modbus given target speed |
| P2.04 | Panel speed | Panel Ref | 0.00~650.00 | 50.00 | Hz | |
| P2.05 | Fundamental frequency | Bas Freq | 0.00~300.00 | 50.00 | Hz | |

| | | | | | | |
|---|---|---|---|---|---|---|
| P2.06 | Acceleration time Ta0 | Accel Time Ta0 | 0.00~650.00 | 5.00 | s | |
| P2.07 | Deceleration time Td0 | Decel Time Td0 | 0.00~650.00 | 5.00 | s | |
| P2.08 | Parking mode selection | Stop Mode Sel | 0~4 | 0 | | |
| P2.09 | No-load judgment restart times | NoLoad Rst Cnt | 0~10 | 1 | Second-rate | |
| P2.10 | No-load restart interval | NoLoad Rst Time | 1~65535 | 60 | m | |
| P2.11 | No-load protection confirmation times | NoLoad Conf. | 0~65535 | 1 | Second-rate | |
| P2.12 | PWM carrier frequency | PWM Carrier Freq | 1.100~16.000 | 6.000 | kHz | |
| P2.13 | Communication baud rate selection | Baud Rate Sel | 0~7 | 3 | | |
| P2.14 | Local address | Local Addr | 0~247 | 1 | | |
| P2.15 | Input phase loss voltage threshold | InputPh_Los Volt | 0~400 | 170 | V | |
| P2.16 | Output phase loss confirmation | Output Ph_Los | 0~65.000 | 2.000 | s | |
| P2.17 | Three-phase unbalance threshold | OutUnbalanceLvl | 1~100 | 10 | % | |
| P2.18 | Water shortage detection frequency point | PreFreq Time | 0~100 | 80 | % | |
| P2.19 | Water shortage current threshold | Export Pressure | 0~100 | 0 | % | |
| P2.20 | Monitor interface refresh time | PreFreq Time | 0~10.0 | 0.5 | s | |
| P2.21 | Speed mode selection | Speed Mode | 0~2 | 1 | | 0: Constant current speed regulation<br>1: Constant frequency speed regulation<br>2: Constant pressure speed regulation |
| P2.22 | Closed loop main setting mode | CL Main Ref | 0~6 | 0 | | 0: Internal setting<br>1: AI0 2: AI1 6: Modbus communication setting |
| P2.23 | Closed loop main feedback method | CL Main Fbk | 0~6 | 1 | | 0: Internal setting<br>1: AI0 2: AI1 6: Modbus communication setting |
| P2.24 | Points method selection | KI Mode Sel | 0~1 | 0 | | |
| P2.25 | Proportional gain Kp | Kp | 0~6.5535 | 0.1000 | | |
| P2.26 | Integral gain Ki | Ki | 0~65.535 | 0.0100 | | |
| P2.27 | Differential gain Kd | Kd | 0~655.35 | 0.00 | | |
| P2.28 | Current loop Kp | ACR | 0~100.00 | 0.40 | | |
| P2.29 | Current loop Ki | AHr | 0~650.00 | 0.25 | | |
| P2.30 | Current loop Kd | ACR | 0~650.00 | 0.00 | | |
| P2.31 | Current loop bandwidth | ACR Bandwidth | 0~1000.0 | 300.0 | Hz | |
| P2.32 | Output torque limit | Output Torq Lmt | 0~500 | 150 | % | |
| P2.33 | Current limiting and frequency reduction threshold | Lmtd Cur Value | 0~200 | 105 | % | |
| P2.34 | Reverse prohibition | Rev Disable | 0~1 | 0 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 0:N;1:Y | | | | | |
| P2.35 | Instantaneous stop self-reset function | Auto Start Sel | 0~3 | 3 | | 0: None<br>1: Restart after undervoltage recovery<br>2: Restart after power failure recovery<br>3: Restart after both undervoltage and power failure recovery |
| | | | | | | |
| P3.00 | Inverter rated power | Inv Rated Freq | 0~650.00 | - | kW | |
| P3.01 | Inverter rated current | Inv Rated Cur | 0~6500.0 | - | A | |
| P3.02 | Inverter maximum current | INV Max Cur | 0~6500.0 | - | A | |
| P3.03 | Inverter rated voltage | Inv Rated Volt | 100~690 | 220 | V | |
| P3.04 | Driver software version | DrvSoft Ver | 0~655.35 | - | | |
| P3.05 | Main control board software version | Hardware Version | 0~655.35 | - | | |

## 7. Fault code table

Table 6 : Photovoltaic water pump inverter fault list and countermeasures

| error code | Fault display | Possible Causes | Countermeasures |
|---|---|---|---|
| 1 | Module overcurrent protection | DC terminal voltage is too high | Check the grid power supply and whether the large inertia load stops quickly without energy consumption braking |
| | | There is a short circuit in the periphery | Check whether the motor and output wiring are short-circuited or short-circuited to the ground. |
| | | Output phase missing | Check whether the motor and output wiring are loose |
| | | The hardware is in poor contact or damaged | Ask professional technicians to perform maintenance |
| | | The internal connector of the inverter is loose | Ask professional technicians to perform maintenance |
| | | Power circuit components overheated due to a problem with the cooling fan or cooling system. | Check cooling fans. Check for proper cooling fan power and for obstructions. |
| | | Warning: The inverter operation must be started after the cause of the fault is cleared to avoid damage to the IGBT. | |
| 3 | Radiator overheating | Ambient temperature is too high | Lower the ambient temperature and enhance ventilation and heat dissipation<br>Keep the ambient temperature below 40° or check the capacity of the inverter based on this performance. |
| | | The cooling fan is damaged or foreign matter has entered the cooling system | Check whether the fan power cord is properly connected, or replace the fan with the same model and remove foreign objects. |
| | | Cooling fan abnormality | Check cooling fans. Check for proper cooling fan power and for obstructions. |
| | | Temperature detection circuit failure | Ask professional technicians to perform maintenance |
| 8 | ( Standby or accelerated | Abnormal input power voltage | Check the input power |

| error code | Fault display | Possible Causes | Countermeasures |
|---|---|---|---|
| | operation) Busbar overvoltage protection | Restarting quickly while the motor is rotating at high speed | Restart the motor after it stops |
| | (Deceleration operation) Busbar overvoltage protection | The load moment of inertia is too large | Use appropriate dynamic brake components |
| | | Deceleration time is too short | Extend the deceleration time |
| | | The brake resistor is too large or not connected. | Connect a suitable braking resistor |
| | (Constant speed operation) Busbar overvoltage protection | Input power abnormality | Check the input power |
| | | The load moment of inertia is too large | Use appropriate dynamic brake components |
| | | The brake resistor is too large or not connected. | Connect a suitable braking resistor |
| 9 | Bus undervoltage | The power supply voltage is lower than the minimum operating voltage of the device | Check the input power |
| | | A momentary power outage occurs | Check the input power supply, wait until the input voltage is normal, reset and restart |
| | | The input power voltage varies too much. | |
| | | The power supply terminal is loose | Check input wiring |
| | | Internal switch power supply abnormality | Ask professional technicians to perform maintenance |
| | | There are loads with large starting current in the same power system | Change the power supply system to meet the specification value |
| 10 | Output phase loss | The inverter output side wiring is abnormal, missing or broken. | Check the inverter output side wiring according to the operating procedures to eliminate missed connections and broken wires. |
| | | Output terminal loose | |
| | | The motor power is too small, less than 1/20 of the maximum applicable motor capacity of the inverter | Adjust inverter capacity or motor capacity |
| | | Output three-phase unbalance | Check whether the motor wiring is intact |
| | | | Turn off the power to check whether the terminal characteristics of the inverter output side and DC side are consistent |
| twenty one | abc overcurrent (three-phase instantaneous value) | The motor is short-circuited to ground. | Check the motor and output line circuit |
| | | Driver board detection circuit error | Replace the driver board |
| 27 | Output overcurrent (effective value) | Too much time running in overload state, the greater the load, the shorter the time | Stop running for a while. If it appears again after running, check whether the load is within the allowable range. |
| | | Motor stall | Check the motor or brake |
| | | Motor coil short circuit | Check the motor |
| | | Output short circuit | Check the wiring or motor |

| error code | Fault display | Possible Causes | Countermeasures |
|---|---|---|---|
| 29 | Input phase loss | Input side voltage is abnormal | Check the grid voltage |
| | | Input voltage phase loss | |
| | | Input terminal is loose | Check input terminal wiring |
| 31 | Motor overload protection | Low grid voltage | Check the input power |
| | | Load mutation during operation | Reduce the frequency and amplitude of load mutations |
| | | The motor parameter settings are abnormal. | Correctly set the motor parameters |
| 32 | Ground protection | Wiring Error | Refer to the user manual for instructions and correct the incorrect wiring |
| | | Motor abnormality | Before replacing the motor, you need to perform an insulation test to the ground |
| | | The ground leakage current on the inverter output side is too large | Ask professional technicians to perform maintenance |
| 42 | IGBT short circuit protection | There is a short circuit in the phase bridge arm<br>Driver optocoupler protection | Ask professional technicians to perform maintenance |
| 48 | Temperature sampling disconnection | Radiator temperature sampling disconnection | Check the temperature sampling connection |
| 51 | Abnormal output current during operation | Improper parameter settings<br>The inverter to motor is disconnected<br>Inverter hardware failure | Consult the manufacturer<br>Check the connection cable<br>Ask professional technicians to perform maintenance |
| 53 | Pressure sensor disconnection abnormality | Analog input signal disconnection<br>Analog input signal abnormality | Modify related parameters<br>Check the analog input signal |
| 5 4 | Low frequency operation fault | The set operating frequency is too low | Check if the set pressure of constant pressure mode is too low or<br>Constant current mode overload or<br>The frequency set in constant frequency mode is too low |
| 56 | Motor fan abnormality | The motor fan is blocked or abnormal | Check the fan |
| 5 8 | Motor stall | Water pump impeller stuck | Check whether the water pump impeller is stuck |
| 5 9 | Water shortage protection failure | Water shortage in wells | Check whether it is running dry due to lack of water.<br>Or the parameter setting is incorrect, please consult the manufacturer |