EPV230 Series Solar

Water Pump Inverter Manaul



User Manual

Foreword

First of all, thank you for purchasing EPV230 Series inverter!

EPV230 series special inverter for photovoltaic water pump, is based on the core control algorithm of ES230 series inverter, combined with the application control requirements of photovoltaic water pump, developed a special inverter for outdoor photovoltaic power supply pump. It has maximum power tracking, light weak sleep, light intensity wake up, high water level sleep, water shortage warning, remote communication monitoring and other control and protection functions.

This manual describes how to use EPV230 series inverter correctly. Please read this manual carefully before use (installation, operation, maintenance, inspection, etc.). In addition, please understand the safety precautions of the product before using the product.

NOTES
● When using this product, please be sure to install the shell or cover according to the regulations, and operate according to the contents of the instructions. ● The legend in this manual is for illustration only and may differ from the product you ordered. ● Due to product upgrades or specification changes, and to improve the convenience and accuracy of the manual, the content of this manual is subject to change without notice. ● If you need to order the instruction manual due to damage or loss, please contact our regional agents or contact our customer service center directly.

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1 Safety and Precautions

Identification definition: In this manual, safety precautions are divided into the following two categories:

Danger: a condition that could result in serious injury or even death due to failure to perform as required;

Caution: This may result in moderate injury, minor injury, or damage to the equipment.

When installing, commissioning, and maintaining the system, read this section carefully and follow the safety precautions described in this section. The Company has nothing to do with any injury or loss caused by illegal operations.

1.1 Precautions

1.1.1 Before installation

Danger	● Do not install the control system if water is in the control system, parts are missing, or parts are damaged. ● If the packing list does not match the actual name, please do not install!
Danger	● When handling should be carried gently, otherwise there is the danger of damage to the equipment! ● Damaged drives or missing parts of the inverter please do not use, there is a risk of injury! ● Do not touch the components of the control system with your hands, otherwise there is the risk of electrostatic damage!

1.1.2 At installation

Danger	● Please install on metal and other flame retardant objects, away from combustible materials, otherwise it may cause fire! ● Do not screw the fixing bolts of the equipment components at will, especially the bolts with red marks!
Caution	● Do not let the wire head or screw fall into the drive, otherwise it will cause drive damage! ● Please install the drive in a place with little vibration and avoid direct sunlight! ● When more than two inverters are placed in the same cabinet, please pay attention to the installation position to ensure the heat dissipation effect!

1.1.3 Wiring

Danger	● You must follow the instructions of this manual and be constructed by professional electrical engineers, otherwise unexpected dangers will occur! ● There must be a circuit breaker between the inverter and the power supply, otherwise there may be a fire! ● Before wiring, please confirm that the power supply is in the zero voltage state, otherwise there is the risk of electric shock! ● Please ground the inverter correctly according to the standard, otherwise there is a risk of electric shock!
Danger	● Never connect the input power supply to the output terminal of the inverter (U, V, W), pay attention to the mark of the terminal, do not connect the wrong line, otherwise cause damage to the drive! ● Ensure that the wiring meets the EMC requirements and the safety standards of the area. Please refer to the suggestions in the instruction manual for the diameter of the wire used, otherwise accidents may occur! ● Never connect the brake resistor directly between the DC bus (+) and (-) terminals, otherwise it will cause a fire alarm! ● The encoder must use a shielded wire, and the shielding layer must ensure that the single end is reliably grounded!

1.1.4 Before power on

Caution	●Please confirm whether the voltage level of the input power supply is consistent with the rated voltage level of the inverter; Power input terminals S, T) and the output terminals (U, V, W) on the connection position is correct; And check the peripheral circuit of the connected to the drive for short circuit phenomenon, even the line is fastening, or actuator displacement caused by damaged! ● Any part of the inverter does not need to carry out voltage test, the product has been tested when leaving the factory, otherwise it will cause an accident!
Danger	● The inverter must be covered with the panel before it can be powered on, otherwise it may cause electric shock! ● The wiring of all peripheral accessories must comply with the guidance of this manual, and correctly connect the circuit in accordance with the circuit connection method provided in the manual to prevent accidents!

1.1.5 After power on

Danger	● Do not open the panel after power-on, otherwise there is a risk of electric shock! ● Do not touch the driver and the surrounding circuit with wet hands, otherwise there is a risk of electric shock! ● Do not touch any input and output terminals of the inverter, otherwise there is a risk of electric shock! ● Early access to electricity, inverter automatic external high-voltage electrical circuit test, safety at this point, can't touch drive terminals U, V, W or motor terminal blocks, or get an electric shock risk!

1.1.6 Running

Danger	● Do not touch the cooling fan and discharge resistance to test the temperature, otherwise it may cause burns! ● Non-professional technical personnel do not detect signals during operation, otherwise it may cause personal injury or equipment damage!
Caution	● During the operation of the inverter, something should be avoided falling into the equipment, otherwise it will cause damage to the equipment! ● Do not use the contactor on and off method to control the start and stop of the driver, otherwise it will cause equipment damage!

1.1.7 Maintain

Danger	● Please do not repair and maintain the equipment with power on, otherwise there is a risk of electric shock! ● After confirming that the input power of the inverter is cut off for 10 minutes, use a multimeter to confirm that the voltage on the bus is lower than 36V before the driver can be maintained and repaired, otherwise the residual charge on the capacitor will cause harm to people! ● Do not repair and maintain the inverter without professional training, otherwise it will cause personal injury or equipment damage! ● After replacing the inverter, the parameters must be set, and all pluggable plug-ins must be plugged and unplugged in the case of power failure!
Caution	● The rotating motor feeds power to the inverter, which causes the inverter to be charged even when the motor is stopped and the power is cut off. When performing maintenance on the inverter, ensure that the motor is safely disconnected from the inverter.

1.2 Notes

1.2.1 Leakage protector RCD requirements

A large leakage current may flow through the grounding conductor when the device is running. Install a type B leakage protector (RCD) on one side of the power supply. When selecting a leakage protector (RCD), the transient and steady-state floor drain currents that may occur when the device is started and operated should be considered, and a special RCD with measures to suppress higher harmonics or a general RCD with larger residual currents should be selected.

1.2.2 Motor insulation inspection

When the motor is used for the first time, before it is used again after being placed for a long time and during regular inspection, the motor insulation inspection should be done to prevent damage to the inverter due to the insulation failure of the motor winding. Insulation inspection must be separated from the motor connection from the inverter, it is recommended to use 500V voltage megohm meter, should ensure that the insulation resistance measured is not less than 5MΩ.

1.2.3 Thermal protection of the motor

If the rated capacity of the motor and the inverter do not match, especially if the rated power of the inverter is greater than the rated power of the motor, it is necessary to adjust the motor protection parameters in the inverter or install a thermal relay in front of the motor to ensure the protection of the motor.

1.2.4 Run above power frequency

The inverter can provide an output frequency of 0Hz~600Hz. If the customer need to operate in more than 50 hz, please consider the affordability of mechanical device.

1.2.5 Vibration of a mechanical device

Some output frequency inverter in the place, may encounter the mechanical resonance point of load device, can be set up by the inverter parameters to avoid jumping frequency rate.

1.2.6 About motor heating and noise

For the inverter output voltage is PWM waves, contain certain harmonic, therefore the rise of temperature of the motor, noise and vibration compared with transport line power frequency will increase slightly.

1.2.7 The output side is prohibited from installing pressure-sensitive devices or capacitors that improve the power factor

The output of the inverter is PWM wave. If capacitors or lightning protection varistors are installed on the output side to improve the power factor, they may cause instantaneous overcurrent or even damage to the inverter. Do not use them.

1.2.8 Switching devices such as contactors for input and output of inverter

If a contactor is installed between the power supply and the inverter input, it is not allowed to use this contactor to control the start and stop of the inverter. The contactor must be used to control the start and stop of the inverter at intervals of not less than 10 minutes. Frequent charge and discharge can easily reduce the service life of the capacitor in the inverter. If there is a contactor and other switching device between the output and the motor, it should be ensured that the inverter is operated on and off when there is no output, otherwise it will easily cause damage to the module in the inverter.

1.2.9 Use beyond the rated voltage value

The EPV230 series inverter is not suitable for use outside the allowable working voltage range specified in the manual, which is easy to cause damage to the components in the inverter. If necessary, use the corresponding booster or buck device for transformer treatment.

1.2.10 Lightning impulse protection

This series of inverter is equipped with lightning overcurrent protection device, which has certain self-protection ability for induced lightning. Customers should also install protection at the front end of the inverter where lightning occurs frequently.

1.2.11 Altitude and derating use

In the area with an altitude of more than 1000m, the cooling effect of the inverter is poor due to thin air, and it is necessary to derate the use. In this case, please consult our company for technical advice.

1.2.12 special usages

If customers need to use methods other than the recommended wiring diagram provided in this manual, such as common DC bus, EPS power supply, etc., please consult our company.

1.2.13 Pay attention to the scrap of the inverter

The electrolytic capacitor of the main circuit and the electrolytic capacitor on the printed board may explode during incineration. The incineration of plastic parts will produce toxic gas. Please dispose of it as industrial waste.

1.2.14 About adaptive motor

a. The standard adaptive motor is a squirrel cage induction motor or a permanent magnet synchronous motor

b. The cooling fan of the inverter motor is coaxial with the rotor shaft, and the cooling effect of the fan decreases when the speed decreases. Therefore, when the motor is overheated, a strong exhaust fan should be installed or replaced with a frequency conversion motor.

c. The inverter has been built-in to adapt the standard parameters of the motor. According to the actual situation, it is necessary to identify the motor parameters or modify the default values to conform to the actual values as much as possible, otherwise the operation effect and protection performance will be affected.

d. Due to the short circuit in the cable or motor, the inverter will alarm and even blow up the machine. Therefore, please first test the insulation short circuit of the initially installed motor and cable, and it is also necessary to perform this test frequently in daily maintenance. Note that when doing this test, the inverter must be completely disconnected from the part being tested.

2 Product information

2.1 Naming rule

The model code contains inverter product information. The user can find the model code from the nameplate and the simple nameplate on the inverter.

EPV230 - 4T 4.0 G B

① ② ③ ④ ⑤

Portion	Number	Name	Explain
Product abbreviation	①	Product model	EPV230：Photovoltaic pump
Voltage classes	②	Voltage classes	2SS:Single-phase Input/Output: 220V 2S：Single-phase 220V 2T:Three-phase 220V 4T：Three-phase 380V
Rated power	③	Power range	4.0：4.0kW
	④		G：Heavy load
	⑤		B：With brake function

2.2 Nameplate example

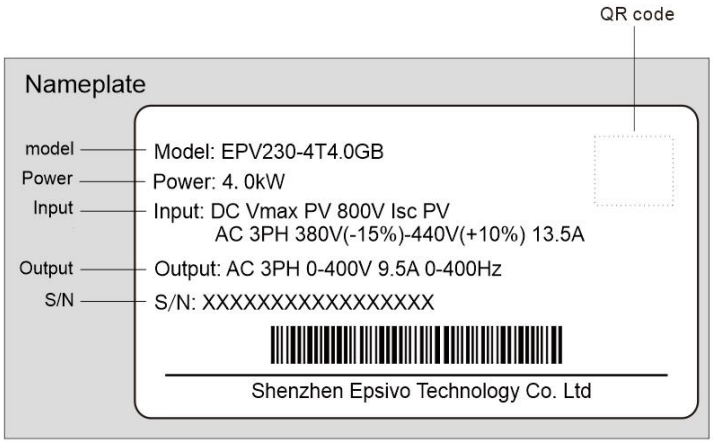


Figure 2.1 Nameplate

The shell structure of each EPV230 model is as follows：

Voltage classes	Model	Shell
Single-phase 220V/ Three-phase 220V/ three-phase 380V	0.4kW~11kW	Plastic structure

2.3 Electric data

EPV230 inverter model and technical data sheet

Model	Voltage (V)	Motor		Rated Input Current	Rated Output Current	Circuit Voltage
		Rated Power（KW）	HP	(A)	(A)	(V)
EPV230-2SS0.4GB	1AC 220V/230V/240V - 15%~15%(Single phase output 220V)	0.4	0.5	11	4.6	380-450
EPV230-2SS0.75GB		0.75	1	18	8	
EPV230-2SS1.5GB		1.5	2	27	11	
EPV230-2SS2.2GB		2.2	3	23	17	
EPV230-2SS4.0GB		4.0	5	35	25	
EPV230-2S0.4GB	3AC 220V/230V/240V - 15%~15%(Three phase output 220V)	0.4	0.5	3.2	2.3	
EPV230-2S0.75GB		0.75	1	5.6	4	
EPV230-2S1.5GB		1.5	2	9	7	
EPV230-2S2.2GB		2.2	3	13	9.6	
EPV230-2S4.0GB		4.0	5	23	17	
EPV230-2S5.5GB		5.5	7.5	35	25	
EPV230-2T0.4GB	3AC 220V - 15%~+20%(Three phase output 200V	0.4	0.5	3.4	2.1	
EPV230-2T0.75GB		0.75	1	5	3.8	
EPV230-2T1.5GB		1.5	2	7.8	6.8	
EPV230-2T2.2GB		2.2	3	10.5	9	
EPV230-2T4.0GB		4.0	5	14.6	13	
EPV230-2T5.5GB		5.5	7.5	26	25	
EPV230-4T0.75GB	3AC380V/480V（Three phase output 380V）	0.75	1	3.4	2.1	660-780
EPV230-4T1.5GB		1.5	2	5.0	3.8	
EPV230-4T2.2GB		2.2	3	5.8	5.1	
EPV230-4T4.0GB		4.0	5.5	13.5	9.5	
EPV230-4T5.5GB		5.5	7.5	14.6	13	
EPV230-4T7.5GB		7.5	10	20.5	17	
EPV230-4T11GB		11	15	26	25	

2.4 Technical specification

	220V voltage class		380V voltage class
Maximum input DC voltage	450VDC		800VDC
MPPT voltage range is recommended	150~400VDC		350~750VDC
Recommended input working voltage	320VDC		540VDC
Efficiency of MPPT	99.99%		
Input path number	1		
Rated output voltage	1AC220	3AC 200V	3AC 380V
Output frequency range	0~50Hz		
Overall maximum efficiency	97%		
Type of cooling	Forced air cooling		
Level of protection	IP20		
Altitude	Below 1000m, when the altitude exceeds 1000m, derate the altitude by 1% of 100m.		
Standard	CE		

2.5 Product shape, mounting hole size

2.5.1 Product outline drawing

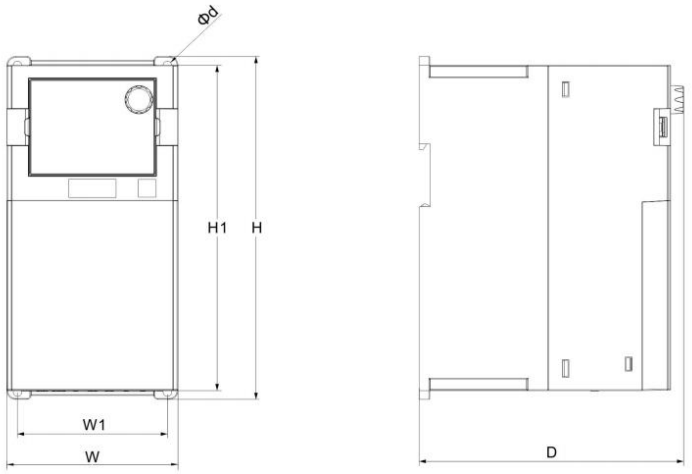


Figure 2.2 Outline and dimension diagram of EPV230 series 0.4~11KW wall-mounted plastic structure

Note: In the case of a lot of dust, the enclosed dust baffle can be connected to the heat dissipation hole to prevent dust from entering the inverter.

2.5.2 inverter mounting hole size (mm)

Power range	Overall dimensions (mm)			Mounting dimensions (mm)		Mounting aperture (mm)	Terminal blocks (mm)		Weight (kg)
	W	H	D	W1	H1		Terminal width	Terminal screw specifications	
E02 (0.4kW-0.75kW-1.5kW-2.2kW)	84.6	170.2	135.65	67.5	157.5	φ5.7	6.4	M3	1
E03 (3.7kW-5.5kW)	97	194	149.9	85	184	Φ4.8	8	M3	1.3
E04 (7.5kW-11kW)	124	245	177.9	106	233	Φ5	10	M4	2.5

2.5.3 Keyboard carriage dimensions

If you need to pull the keyboard to another cabinet door or console, you can select a keyboard tray. The dimensions of the keyboard tray are shown in the following figure：

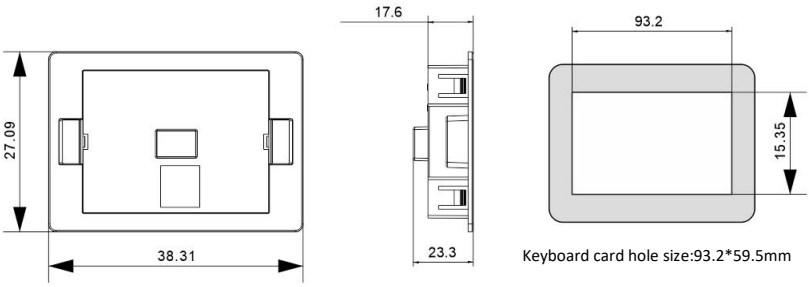


Figure 2.3 Outline dimensions and opening dimensions of the keyboard bracket

2.6 Daily maintenance and maintenance of inverter

2.6.1 Daily maintenance

Due to the influence of ambient temperature, humidity, dust and vibration, the components inside the inverter will age, resulting in potential failure of the inverter or reducing the service life of the inverter. Therefore, it is necessary to implement daily and regular maintenance and maintenance of the inverter.

Routine inspection items：

a）Whether the sound changes abnormally during motor operation

b）Whether vibration occurs during the operation of the motor

c）Whether the installation environment of the inverter has change

d）Whether the inverter cooling fan works normally

e）Whether the inverter is overheating

Daily cleaning：

a）The inverter should always be kept in a clean state

b）Effectively remove dust from the upper surface area of the inverter to prevent dust from entering

the interior of the inverter, especially metal dust

c）Effectively remove the oil from the inverter cooling fan

2.6.2 Periodical inspection

Check the areas that are difficult to check regularly during operation. Regular inspection items:

a）Check the air duct and clean it regularly

b）Check whether the screws are loose

c）Check that the inverter is corroded

d）Check whether the wiring terminals have arc traces

e）Main loop insulation test

Reminder: When measuring insulation resistance with a megohm meter (please use a DC 500V megohm meter), disconnect the main return route from the inverter. Do not test control loop insulation with an insulation resistance meter. High voltage testing is not required (it is done at the factory).

2.6.3 Inverter wear parts replacement

The wearing parts of the inverter are mainly cooling fans and electrolytic capacitors for filtering, and their life is closely related to the use of the environment and maintenance status. The general life time is:

Name	Life time
Fan	2~3 years
Electrolytic capacitor	4~5 years

Users can determine the replacement period according to the running time.

a）Fan

Possible damage causes: bearing wear, blade aging.

Judging criteria: whether there are cracks in fan blades, and whether there is abnormal vibration sound when starting up.

b）Filtered electrolytic capacitor

Possible causes of damage: poor input power quality, high ambient temperature, frequent load hopping, electrolyte aging.

Judging criteria: whether there is liquid leakage, whether the safety valve has protruded, the measurement of electrostatic capacitance, the measurement of insulation resistance.

2.6.4 Storage condition

Users to buy inverter, temporary storage and long-term storage must pay attention to the following: as far as possible when stored in the original packaging into the company within the bag packing.

Long-term storage will lead to the deterioration of electrolytic capacitors, must ensure that within 2 years of a power, power time of at least 5 hours, the input voltage must be slowly increased to the rated value with a regulator.

3 Debugging guide and control terminals

3.1 Commissioning procedure for photovoltaic panel power supply

3.1.1 Refer to Figure 3.1 for wiring, and check whether the wiring is correct, and then Q2 is closed

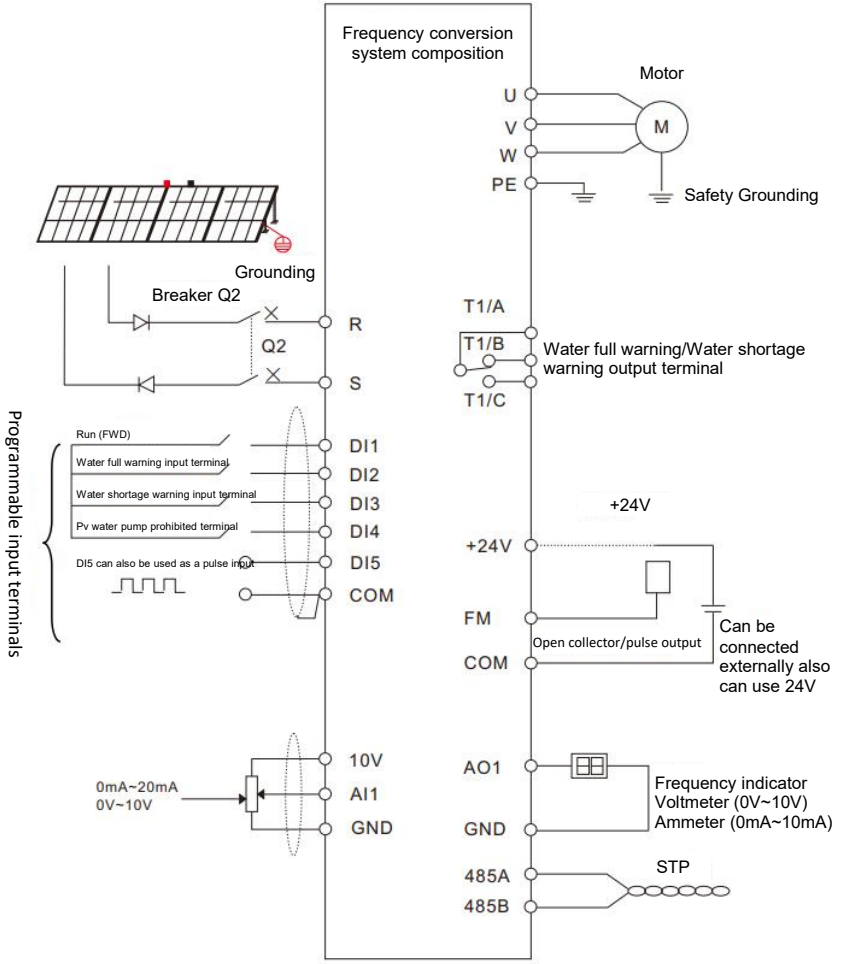


Figure 3.1 Reference wiring diagram for photovoltaic panel power supply

3.1.2 Set the parameters of the motor

Set the motor nameplate parameters as P1-00 motor model, P1-01 motor rated power, P1-02 motor rated voltage, P1-03 motor rated current, and P1-04 motor rated frequency.

3.1.3 Water pump output test

1）Set PP-01=10 to restore PV pump parameters and restore factory parameters of the PV pump.

2）Set the keyboard command channel to P0-02=0.

3）Click the Run button, at this time to observe the frequency and water output, in the case of normal lighting if the frequency is normal but the water output is small, it means that the motor line may be connected to the reverse, need to stop and exchange the wiring of the two motors.

3.1.4 Fault point setting and fault reset and delay time setting

If the customer needs to use dry pump early warning, light weak early warning, full water early warning and water shortage early warning, the fault detection point, reset time and delay time can be set as required.

3.1.5 Set this parameter after the system runs properly

When the water output is normal and the system runs stably, the commissioning is completed. When PP-01=1 is set, it is a regular product and does not work according to the photovoltaic function. When PP-01 is set to 10, restore the factory parameters of the photovoltaic water pump (see Table 4-1), close the DI1 terminal and run automatically.

3.2 This section describes the commissioning procedure for mains and PV panels

a）Set the parameters of the motor.

b）According to 3.1 debugging steps: 3.1.2, 3.1.3, 3.1.4, 3.1.5, debug the system well.

c）Close the DI4 terminal (or set H3-00=0).

Note: It is strictly forbidden to close Q1 and Q2 at the same time, otherwise it will damage the photovoltaic panel!

3.3 Control terminal and wiring

3.3.1 Control loop terminal layout

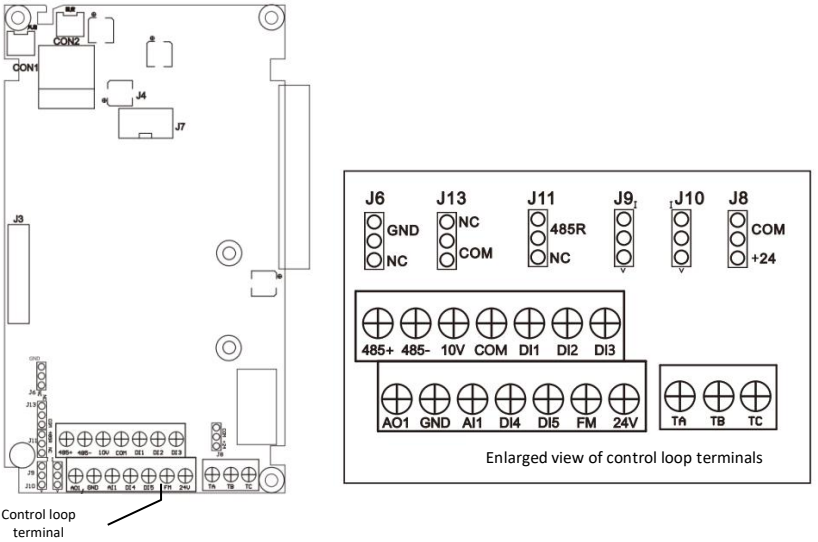


Figure 3.2 Layout of control loop terminals

3.3.2 Description of the jumper on the EPV230 control board

Description of jumper cables for the EPV230 control board			
Terminal	Terminal name	Terminal selection	Function declaration
J3	PG card/Expansion card	-	Extension OC card /CAN communication card, etc
J4	External keyboard interface	-	External keyboard
J7	Keyboard interface		Keyboard
CON1	Fan interface		5.5KW and below fan interface (24V output)
CON2	Temperature interface		Temperature data cable
J6	GND ground terminal	GND NC	The jumper cap is connected to the ground resistance in GND, and the jumper cap is not grounded in GND of the NC circuit
J13	COM ground terminal	NC COM	The jumper cap is connected to the ground resistance in COM, and the jumper cap is not grounded in COM of the NC circuit

Terminal	Terminal name	Terminal selection	Function declaration
J11	485 Communication resistance selection	485R NC	The jumper cap connects to a resistance of 120R at 485R, and the jumper cap has no resistance in the NC circuit
J8	Digital input power selection	COM 24V	Jump cap at the COM end, 24V no longer output 24V voltage, 24V short-circuit COM; If the jumper cap is 24V, the DI and COM can be short-circuited. You can also connect the jumper cap without the jumper cap and connect the external power supply to the 24V terminal.
J9	AO output selection	I V	The jumper is a current output at I, a voltage output at V, and a voltage output at the factory
J10	AI input selection	I V	The jumper cap is a current input at I, a voltage input at V, and a voltage input at the factory

3.3.3 EPV230 series terminals

Functions of EPV230 terminals				
Terminal	Terminal name	Terminal selection	Function declaration	
Power supply	10V/GND	10V power supply	External 10V power supply, maximum output current: 10mA	
	24V/COM	24V power supply	24V power supply, maximum output current: 200mA	
Analog input	AI1/GND	Analog input	Input voltage range DC:0-10V/4-20mA (determined by control board J10)	
Analog output	AO1/GND	Analog output	Output voltage range DC:0-10V/4-20mA (determined by control board J9)	
Digital input	DI1/COM	Digital input 1	22.1K, active low.	In addition to the function of DI1-DI4, DI5/COM can also be used as a pulse output, up to 100KHz.
	DI2/COM	Digital input 2		
	DI3/COM	Digital input 3		
	DI4/COM	Digital input 4		
	DI5/COM	Pulse input		
Digital output	FM/COM	Digital output/Pulse output	F5-00 can choose FM output mode: pulse output 100kHz, voltage output range 0~24V, current 0~ 50mA.	
Relay output	TA-TB	Normally closed terminal	250VAC.3A 30V DC 1A	
	TA-TC	Normally opened terminal		
485 communication	485+	485 Differential signal +	Supports standard MODBUS communication	
	485-	485 Differential signal -		

4 Operation and display

4.1 Operation and display interface introduction

Through the keyboard operation panel, you can modify the function parameters of the inverter, monitor the working status of the inverter, and control the operation of the inverter (start, stop), etc. Its appearance and function area are shown in the following figure：

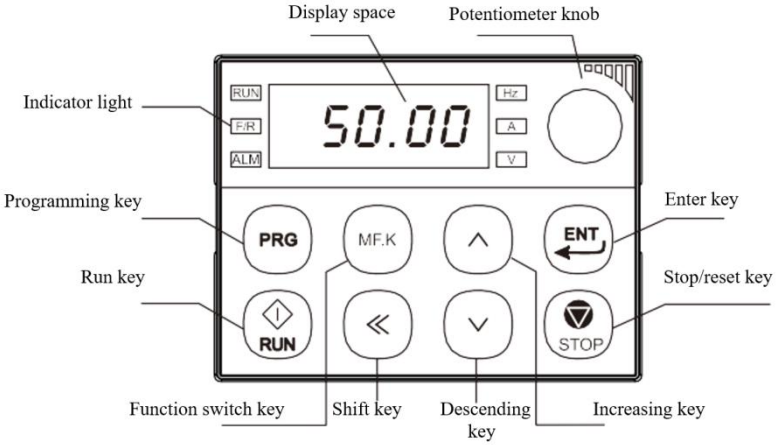


Figure 4-1 Operation panel

Status indicator description				Unit indicator description	
Symbol	Name	Indicator status	State description	Indicator status	Display area numerical unit
RUN	running indicator light	☾	Stopping	Hz RPM A % V ☀ & ☾ & ☾	Frequency unit Hz
		☀	Running		
ALM	fault indicating lamp	☾	Normal	Hz RPM A % V ☾ & ☀ & ☾	Current unit A
		☀	Fault		
F/R	Positive and negative indicator light	☾	Reverse	Hz RPM A % V ☾ & ☾ & ☀	Voltage unit V
		☀	Forward	Hz RPM A % V ☀ & ☀ & ☾	Rotational speed unit RMP
		☾		Hz RPM A % V ☾ & ☀ & ☀	percentage %
		☀			
description： ☀ Indicator light ☀ Indication flicker ☾ Indicator light off					

Name	Function declaration
Programming key	Enter the first level menu or exit
Run key	Menu mode switch (according to the value in PP-03)
Function switch key	In the start/stop control mode, run operations are performed
Potentiometer knob	According to the set value of P7-01, switch the corresponding function
Increasing/ descending key	Decrement or increment of data or parameters
Enter key	Decrement or increment of data or parameters
Shift key	The menu screen is displayed step by step to set parameters and confirm operations
Stop/Reset key	In the run and stop interface, the parameter selection cycle; When modifying a parameter, you can select the modification bit of the parameter

4.2 This section describes how to view and modify basic function codes

The basic function code group is the whole function code of the inverter, which is the I-level menu after entering. The operation panel of EPV230 inverter adopts three-level menu structure for parameter setting and other operations.

The three level menus are: Function parameter group (Level 1 menu) → Function code (Level 2 menu) → Function code setting value (Level 3 menu). In the three-level menu operation, you can press the MODE or ENTER key to return to the second-level menu, the difference between the two is that press the ENTER key to save the parameters to return to the second-level menu, and automatically transfer to the next function code, while press the MODE key to return directly to the second-level menu, do not store parameters, and return to the function code.

In the third-level menu state, if the parameter does not blink, the function code cannot be modified. The possible causes are as follows:

a. The function code is an unmodifiable parameter. Such as actual detection parameters, operation record parameters, etc.

b. The function code cannot be modified in the running state and can be modified only after the system is stopped.

4.3 The user has changed the function code

The user has changed the function code group only lists the function codes whose current Settings are different from the factory values and have been modified by the user. This is a list automatically generated by the inverter, allowing users to quickly access the modified function code. The Level II menu is displayed.

4.4 Multi-function key definition and operation

The function of the MF.K key can be defined by the P7-01 function code, which is used to switch the command source or switch the rotation direction of the inverter. For details, see the P7-01 function code.

4.5 Method of viewing status parameters

In the shutdown or running state, you can display multiple state parameters by pressing the SHIFT key ">>/SHIFT". Function codes P7-03 (running parameter 1), P7-04 (running parameter 2), and P7-05 (stopping parameter) select whether the parameter is displayed according to the binary bits.

In the shutdown state, a total of sixteen shutdown state parameters can be selected or not displayed.

The selected parameters are displayed by pressing keys in sequence

Parameter	Name	Default	Setting range
P7-05	LED shutdown display parameters	33	0000~FFFF
			Bit00：Set frequency（Hz）
			Bit01：Busbar voltage（V）
			Bit02：S terminal input status
			Bit03：DO terminal output status
			Bit04：AI1 voltage（V）
			Bit05：AI2 voltage（V）
			Bit06：AI3 voltage（V）
			Bit07：Count value
			Bit08：Length value
			Bit09：PLC stage
			Bit10：Loading speed
			Bit11：PID setting
			Bit12：HDI Input pulse Frequency (kHz)

In the running state, the five running state parameters: running frequency, set frequency, bus voltage, output voltage, output current are displayed by default, and whether other parameters are displayed is set by the P7-03 and P7-04 function codes：

Parameter	Name	Default	Setting range
P7-03	LED operation display parameter 1	1F	0000~FFFF
			Bit00：Operating frequency 1（Hz）
			Bit01：Set frequency（Hz）
			Bit02：Busbar voltage（V）
			Bit03：Output voltage（V）
			Bit04：Output current（A）
			Bit05：Output power（kW）
			Bit06：Output torque（%）
			Bit07：DI Input terminal status
			Bit08：DO output terminal status
			Bit09：AI1 voltage（V）
			Bit10：AI2 voltage（V）
			Bit11：AI3 voltage（V）

Parameter	Name	Default	Setting range
P7-03	LED operation display parameter 1	1F	Bit12：Count value
			Bit13：Length value
			Bit14：Load speed display
			Bit15：PID setting
H7-04	LED operation display parameter 2	0	0000~FFFF
			Bit00：PID feedback
			Bit01：PLC stage
			Bit02：HDI input (DI6 terminal) Pulse frequency (kHz)
			Bit03：Operating frequency 2（Hz）
			Bit04：Remaining running time
			Bit05：DI1 Voltage before correction（V）
			Bit06：DI2 Voltage before correction（V）
			Bit07：DI3 Voltage before correction（V）
			Bit08：Linear velocity
			Bit09：Current power-on time（Hour）
			Bit10：Current running time（Min）
			Bit11：HDI Input Pulse Frequency (Hz)
			Bit12：Communication Settings
			Bit13：Encoder feedback speed (Hz)
			Bit14：Main frequency A display (Hz)
			Bit15：Auxiliary frequency B display (Hz)

If the inverter is powered on after it is powered off, the parameters displayed are the parameters selected before the inverter is powered off by default.

Button order change according to the selected parameter, the parameter value set as follows: such as the user set the switch according to the parameters displayed: operating frequency, busbar voltage, output voltage, output current, output power, output feedback speed, torque, PID feedback, encoder, according to the actual display data corresponding to a set of binary data.

The value of P7-03 is 0000 0000 0111 1101B；

The value of P7-04 is 0010 0000 0000 0001B。

Convert hexadecimal data to：

P7-03 should be set to 007DH；

P7-04 should be set to 2001H.

Keyboard Settings are displayed as P7-03: H.1043, P7-04: H.2001.

5 Function parameter table

When PP-00 is set to a non-0 value, the parameter protection password is set. In the function parameter mode and User parameter change mode, the parameter menu can be accessed only after the correct password is entered. To cancel the password, set PP-00 to 0. The parameter menu in user-defined parameter mode is not password protected. Group P and H are the basic function parameters, and group U is the monitoring function parameters.

Whether the parameter value can be changed depends on the properties of the parameter itself and the running status of the product at that time. The meanings of symbols under the " Modified Type " column in the parameter table are as follows:

☆- Indicates that the parameter setting value can be changed when the drive is stopped or running；

★- Indicates that the setting value of this parameter cannot be changed when the drive is running；

●- Indicates that the value of the parameter is the actual detection record value and cannot be changed；

5.1 General inverter function parameter table

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P0 basic function				
P0-00	G/P type	1: G type (Constant torque load)	1	●
P0-01	Motor 1 control mode	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: V/f control	2	★
P0-02	Command source	0: Command channel on the operation panel 1: Terminal command channel 2: Communication command channel	0	★
P0-03	Main frequency source X	0: digital setting (preset frequency P0-08, UP/ DOWN can be modified, power failure does not remember) 1: digital setting (preset frequency P0-08, UP/ DOWN can be modified, power down memory) 2: AI1 3: AI2 4: Reserved 5: PULSE Pulse Setting (DIO1) 6: multi-segment instruction 7: Simple PLC 8: PID 9: Communication setting 10: keyboard potentiometer setting	10	★
P0-08	Preset frequency	0.00Hz～600.00Hz	50.00	☆
P0-10	Maximum frequency	50.00Hz～600.00Hz	50.00	★
P0-12	Frequency upper limit	0.00~600.00Hz	50.00	☆
P0-15	Carrier frequency	0.8Hz～16.0Hz	-	☆
P0-17	Acceleration time 1	0.0s~6500.0s	20.0s	☆
P0-18	Deceleration time 1	0.0s~6500.0s	20.0s	☆

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P0-23	Retention of digital setting of frequency at stop	0: Not reserved 1:Reserved	0	☆
P1 First motor parameter				
P1-00	Motor type	0：Common asynchronous motor 1：Variable frequency asynchronous motor 2：PMSM	2	★
P1-01	Rated motor power	0.1kW~1000.0kW	-	★
P1-02	Rated motor voltage	1V~2000V	-	★
P1-03	Rated motor current	0.1~6553.5	-	★
P1-04	Rated motor frequency	0.01Hz~600.00Hz	-	★
P1-05	Rated motor speed	1rpm~65535rpm	-	★
P1-06	Asynchronous motor stator resistance	0.001~65.535	-	★
P1-07	Asynchronous motor rotor resistance	0.001~65.535	-	★
P1-08	Asynchronous motor leakage inductance	0.01~655.35	-	★
P1-09	Asynchronous motor mutual inductance	0.1~6553.5	-	★
P1-10	Asynchronous motor no-load current	0.1~6553.5	-	★
P1-37	Tuning selection	0: no manipulation 1: asynchronous machine static tuning 2: The asynchronous machine is fully tuned 11: Synchronizer no-load part tuning (untuned back electromotive force) 12: synchronous machine dynamic no-load tuning	0	★
P3 V/F control parameter				
P3-00	V/f curve setting	0: Linear V/f curve 1: Multi-point V/f curve 2: Square V/f curve 3: 1.2-power V/f curve 4: 1.4-power V/f curve 5:Reserved 6: 1.6-power V/f curve 7:Reserved 8: 1.8-power V/f curve 9:Reserved 10: V/f complete separation mode 11: V/f half separation mode	0	★
P3-01	Torque boost	0.0~30.0	-	☆
P3-02	Cutoff frequency of torque boost	0.00~600.00	50.00	★
P3-03	Multi-point V/f frequency 1	0.00~600.00	0.00	★
P3-04	Multi-point V/f voltage 1	0.0%~100.0%	0.0%	★
P3-05	Multi-point V/f frequency 2	0.00~600.00	0.00	★
P3-06	Multi-point V/f voltage 2	0.0%~100.0%	0.0%	★
P3-07	Multi-point V/f frequency 3	0.00~600.00	0.00	★

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P3-08	Multi-point V/f voltage 3	0.0%~100.0%	0.0%	★
P3-09	V/F slip compensation gain	0.0%~200.0%	0.0%	☆
P3-10	V/f over-excitation gain	0~200	64	☆
P3-11	V/f oscillation suppression gain	0~100	-	☆
P3-18	V/f overcurrent stall action current	50%~200%	150%	★
P3-19	V/f overcurrent stall selection	0:Disabled 1:Enabled	1	★
P3-20	V/f overcurrent rate suppression gain	0~100	20	☆
P3-21	Compensation coefficient for overcurrent stall action current at multiplied frequency in V/f mode	50%~200%	50%	★
P3-22	V/f overvoltage stall action voltage	200.0V~2000.0V	770.0V	★
P3-23	V/f overvoltage stall selection	0:Disabled 1:Enabled	1	★
P3-24	V/f overvoltage stall suppression frequency gain	0~100	30	☆
P3-25	V/f overvoltage stall suppression voltage gain	0~100	30	☆
P3-26	Frequency rise limit upon overvoltage stall	0Hz~50Hz	5Hz	★
P3-27	Slip compensation time constant	0.1~10.0	0.5	☆
P4 input terminal				
P4-00	DI1 function	0: No function 1: Forward run (FWD) 2: Reverse run (REV) 100: photovoltaic pump ban: photovoltaic pump work, the use of external power supply 101: water full warning: accept water level warning device signal 102: water warning: accept water level warning signal	1	★
P4-01	DI2 function		4	★
P4-02	DI3 function		9	★
P4-03	DI4 function		12	★
P4-04	DI5 function		13	★
P4-10	DI filter time	0.000s~1.000s	0.010s	☆
P4-11	Terminal control mode	0: Two-wire mode 1 1: Two-wire mode 2 2: Three-wire mode 1 3: Three-wire mode 2	0	★

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P4-12	Terminal UP/DOWN change rate	0.001Hz/s~65.535Hz/s	1.000Hz /s	☆
P4-13	AI curve 1 minimum input	0.00V~10.00V	0.05V	☆
P4-14	Corresponding setting of AI curve 1 minimum input	0.0%~100.0%	0.0%	☆
P4-15	AI curve 1 maximum input	-10.00~10.00	10.00	☆
P4-16	Corresponding setting of AI curve 1 maximum input	-100.0%~100.0%	100.0%	☆
P4-17	AI1 filter time	0.00s~10.00s	0.10s	☆
P4-28	PULSE minimum input	0.00~100.00	0.00	☆
P4-29	PULSE Minimum input corresponds to the setting	-100.0%~100.0%	0.0%	☆
P4-30	PULSE maximum input	0.00~100.00	50.00	☆
P4-31	PULSE Maximum input corresponds to the setting	-100.0%~100.0%	100.0%	☆
P4-32	PULSE filter time	0.00s~10.00s	0.10s	☆
P4-33	AI Simulate input curve selection	Ones: 1：Curve 1 (2 points) 2：Curve 2 (2 points) 3：Reserved 4：Curve 4 (4 points) 5：Curve 5 (4 points) Tens: 1：Curve 1 (2 points) 2：Curve 2 (2 points) 3：Reserved 4：Curve 4 (4 points) 5：Curve 5 (4 points) Hundreds: 1：Curve 1 (2 points) 2：Curve 2 (2 points) 3：Reserved 4：Curve 4 (4 points) 5：Curve 5 (4 points)	321	☆
P4-34	Setting for the AI lower than the minimum input	Ones: 0：Corresponding minimum input Settings 1：0.0% Tens:0：Corresponding minimum input Settings 1：0.0% Hundreds: 0：Corresponding minimum input Settings 1：0.0%	0	☆
P4-35	DI1 delay	0.0s~3600.0s	0.0s	☆
P4-36	DI2 delay	0.0s~3600.0s	0.0s	☆
P4-37	DI3 delay	0.0s~3600.0s	0.0s	☆

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P4-38	DI active state setting 1	Ones: 0: Active high 1: Active low Tens: 0: Active high 1: Active low Hundreds: 0: Active high 1: Active low Thousands: 0: Active high 1: Active low Ten thousands: 0: Active high 1: Active low	0	★
P4-39	DI active state setting 2	Ones: 0: Active high 1: Active low Tens: 0: Active high 1: Active low Hundreds: 0: Active high 1: Active low Thousands: 0: Active high 1: Active low Ten thousands: 0: Active high 1: Active low	0	●
P5 output terminal				
P5-00	FM terminal output mode selection	0: Pulse output (FMP) 1: Open Collector output (FMR) 2:Reserved	0	☆
P5-01	FMR output function selection	0: No function 1: AC drive running 2: Fault output (stop upon fault) 100: photovoltaic pump always warning (weak is full of water, water, light, dry pump warning the merger of the output signal) 101: water full warning (A - tF) : receives the water tank will be full, the output signal ON 102: water warning (A - tL) : receives the water source water, the output ON signal	0	☆
P5-02	Control board relay function selection		2	☆
P5-03	Expansion card relay output function selection		0	☆
P5-04	DO1 Output function Select	103: A weak light warning (A - LS) : detect the light intensity is not enough (weak light), the output signal ON 104: dry pump warning (A - LL) : detect idle running (no load), the output ON signal	0	☆
P5-05	Expansion card DO2 Output selection		4	☆
P5-06	FMP output function	0: Operating frequency 1: Frequency reference 2: Output current 3: Motor output torque 4: Output power 5: Output voltage 6: Pulse input(100.% corresponds to 50.0kHz) 7: AI1 8: AI2 9: Reserved 10: Length	0	☆
P5-07	AO1 output function		0	☆

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P5-08	Expansion card AO2 output selection	11: Count value 12: Communication setting 13: Motor speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Motor output torque (with direction)	1	☆
P5-09	FMP output maximum frequency	0.01~100.00	50.00	☆
P5-10	AO1 zero offset coefficient	-100.0%~100.0%	0.0%	☆
P5-11	AO1 gain	-10.00%~10.00%	1.00%	☆
P5-12	AO2 zero bias coefficient	-100.0%~100.0%	0.0%	☆
P5-13	AO2 gain	-10.00%~10.00%	1.00%	☆
P5-22	DO active state selection	Ones: 0: positive logic 1: Reverse logic Tens: 0: positive logic 1: Reverse logic Hundreds: Reserved Thousands: Reserved 0: positive logic 1: Reverse logic Ten thousands: 0: positive logic 1: Reverse logic	0	☆
P6 start stop control				
P6-00	Start mode	0: Direct startup 1:Speed tracking start (asynchronous motor) 2:Vector pre-excitation startup (asynchronous motor)	0	☆
P6-01	Speed tracking mode	0: Starting from the outage frequency 1: Start at 50Hz 2: Start with the maximum frequency	0	★
P6-02	Speed tracking speed	1~100	20	☆
P6-03	Starting frequency	0.00Hz~10.00Hz	0.00Hz	☆
P6-04	Hold time of starting frequency	0.0s~100.0s	0.0s	★
P6-05	DC braking current at start/Pre-excitation current	0%~100%	0%	★
P6-06	DC braking time at start/Pre-excitation time	0.0s~100.0s	0.0s	★
P6-07	Acceleration/decelerati on mode	0: Linear acceleration/deceleration 1: S-curve acceleration/deceleration	0	★
P6-08	Time proportion of S-curve at start	0.0%~70.0%	30.0%	★
P6-09	Time proportion of S curve at end	0.0%~70.0%	30.0%	★

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
P6-11	Starting frequency of DC braking at stop	0.00~50.00	0.00	☆
P6-12	Waiting time of DC braking at stop	0.0s~100.0s	0.0s	☆
P6-13	DC braking current at stop	0~100	0	☆
P6-14	DC braking time at stop	0.0s~100.0s	0.0s	☆
P6-15	Brake usage	0%~100%	100%	★
P7 Keyboard and display				
P7-09	Accumulative operating time	0h~65535h	-	●
P7-11	Function software version	0~0	-	●
P7-12	Number of decimal places for load speed display	Ones:The number of decimal points U0-14 0: 0 decimal place 1: 1 decimal place 2: 2 decimal places Tens:The number of decimal points U0-14 1: 1 decimal place 2: 2 decimal places	11	☆
P7-13	Accumulative power-on time	0h~65535h	-	●
P7-14	Accumulative power consumption	0°~65535°	-	●
P8 Auxiliary Function				
P8-00	Jogging frequency	0.00~600.00	2.00	☆
P8-14	Running mode when frequency reference lower than lower limit	0: Run at frequency lower limit 1：stop 2: Run at zero speed	0	☆
P8-18	Startup protection	0: Disabled 1: Enabled	0	☆
P8-47	IGBT temperature reached	0℃~100℃	75℃	☆
P8-48	Cooling fan control	0: Working during drive running 1: Working continuously	0	☆
P9 Fault and Protection				
P9-00	The AC Drive overload suppression function is enabled	0~1	0	☆
P9-01	Motor overload protection gain	0.20~10.00	1.00	☆
P9-02	Motor overload prewarning coefficient	50%~100%	80%	☆
P9-03	Reserved	0~65535	0	●

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P9-04	Overvoltage threshold	350.0V~820.0V	820.0V	☆
P9-05	Reserved	5~100	100	●
P9-06	Output phase loss inspection before start	0: Disabled 1: Enabled	1	☆
P9-07	Detection of software short-circuited to ground	0: does not detect 1: Check before power-on 2: Check before running 3: Check before power-on and operation	1	★
P9-08	Initial voltage of braking unit action	200.0V~2000.0V	760.0V	●
P9-09	Automatic fault reset count	0~20	0	☆
P9-10	DO action during automatic fault reset	0: Not act 1: Act	0	☆
P9-11	Automatic fault reset interval	0.1s～100.0s	1.0s	☆
P9-12	Input phase loss/Contactor pickup protection	Ones: Input phase loss protection selection 0: Input phase loss detection inhibited 1: Input phase loss detected by software and hardware 2: Input phase loss detected by software 3: Input phase loss detected by hardware Ten: Contactor pickup/Fan fault protection 0: Disabled 1: Enabled	13	☆
P9-13	Fault reset restart interval	0.0s~600.0s	10.0s	☆
P9-14	Type of the 1st Fault	0~99	-	●
P9-15	Type of the 2nd Fault	0~99	-	●
P9-16	Type of the 3rd(latest) Fault	0~99	-	●
P9-17	Frequency upon occurrence of the 3rd (latest) fault	0.00Hz~655.35Hz	-	●
P9-18	Current upon occurrence of the 3rd (latest) fault	0.0A~6553.5A	-	●
P9-19	Bus voltage upon occurrence of the 3rd (latest) fault	0.0~6553.5	-	●
P9-20	DI state upon occurrence of the 3rd (latest) fault	0~9999	-	●
P9-21	DO state upon occurrence of the 3rd (latest) fault	0~9999	-	●
P9-22	AC drive state upon occurrence of the 3rd (latest) fault	0~65535	-	●
P9-23	Power-on time upon occurrence of the 3rd (latest) fault	0~65535	-	●
P9-24	Operating time upon occurrence of the 3rd (latest) fault	0.0~6553.5	-	●
P9-25	IGBT temperature upon occurrence of the 3rd (latest) fault	0~999	-	●

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P9-26	Subcode of the 3rd (latest) fault	0~65535	-	●
P9-27	Frequency upon occurrence of the 2nd fault	0.00Hz~655.35Hz	-	●
P9-28	Current upon occurrence of the 2nd fault	0.0A~6553.5A	-	●
P9-29	Bus voltage upon occurrence of the 2nd fault	0.0V~6553.5V	-	●
P9-30	DI state upon occurrence of the 2nd fault	0~9999	-	●
P9-31	DO state upon occurrence of the 2nd fault	0~9999	-	●
P9-32	AC drive state upon occurrence of the 2nd fault	0~65535	-	●
P9-33	Power-on time upon occurrence of the 2nd fault	0~65535	-	●
P9-34	Operating time upon occurrence of the 2nd fault	0.0~6553.5	-	●
P9-35	IGBT temperature upon occurrence of the 2nd fault	0~999	-	●
P9-36	Subcode of the 2nd fault	0~65535	-	●
P9-37	Frequency upon occurrence of the 1st fault	0.00Hz~655.35Hz	-	●
P9-38	Current upon occurrence of the 1st fault	0.0A~6553.5A	-	●
P9-39	Bus voltage upon occurrence of the 1st fault	0.0V~6553.5V	-	●
P9-40	DI state upon occurrence of the 1st fault	0~9999	-	●
P9-41	DO state upon occurrence of the 1st fault	0~9999	-	●
P9-42	AC drive state upon occurrence of the 1st fault	0~65535	-	●
P9-43	Power-on time upon occurrence of the 1st fault	0~65535	-	●
P9-44	Operating time upon occurrence of the 1st fault	0.0~6553.5	-	●
P9-45	IGBT temperature occurrence of the 1st fault	0~999	-	●
P9-46	Subcode of the 1st fault	0~65535	-	●

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P9-47	Fault protection action selection 0	ones-:E01 0: Coast to stop 2: Restart upon fault tens-:E05、E06、E07 0: Coast to stop 2: Restart upon fault hundreds-:E08 0: Coast to stop thousands-:E09 0: Coast to stop 2: Restart upon fault ten thousands-:E10 0: Coast to stop 2: Restart upon fault	00000	★
P9-48	Fault protection action 1	ones -:E11 0: Free parking 1: Slow down and stop 2: restart after a fault occurs 4: Warning 5: Cancel Tens place -:E12 0: Free parking 1: Slow down and stop 2: restart after a fault occurs 4: Warning 5: Cancel Hundreds -:E13 0: Free parking 1: Slow down and stop Thousands -:E14 0: Free parking ten thousands -:E15 0: Free parking 1: Slow down and stop 3: Electronic core sealing 4: Warning 5: Cancel	00000	★
P9-49	Fault protection action 2	ones -:E16 0: Free parking 1: Slow down and stop 4: Warning 5: Cancel Tens -:E17 0: Free parking 1: Slow down and stop 4: Warning 5: Cancel Hundreds -:E18 0: Free parking Thousands -:E19 0: Free parking 4: Warning 5: Cancel ten thousands -:E20 0: Free parking 4: Warning 5: Cancel	00000	★
P9-50	Fault protection action 3	ones -: reserved 0: Free parking Tens -:E63 0: Free parking 4: Warning Hundreds -:E23 0: Free parking 5: Cancel Thousands -:E24 0: Free parking 5: Cancel ten thousands -:E25 0: Free parking 5: Cancel	05040	★

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P9-51	Fault protection action 4	ones -:E26 0: Free parking 1: Slow down and stop Tens -:E27 0: Free parking 1: Slow down and stop Hundreds-:E28 0: Free parking 1: Slow down and stop Thousands -:E29 0: Free parking 1: Slow down and stop Ten thousands -:E30 0: Free parking 1: Slow down and stop 4: Warning 5: Cancel	51111	★
P9-52	Fault protection action 5	ones -:E31 0: Free parking 1: Slow down and stop 4: Warning 5: Cancel Tens -:E40 0: Free parking 2: restart after a fault occurs Hundreds -:E41 0: Free parking 1: Slow down and stop 4: Warning 5: Cancel Thousands -:E42 0: Free parking 1: Slow down and stop 2: restart after a fault occurs 4: Warning 5: Cancel Ten thousands -:E43 0: Free parking 1: Slow down and stop 4: Warning 5: Cancel	00101	★
P9-53	Fault protection action 6	Ones-:E45 0: Free parking 1: Slow down and stop 4: Warning 5: Cancel Tens -:E60 0: Free parking 5: Cancel Hundreds-:E61 5: Cancel Thousands -:E62 5: Cancel Ten thousands -: Reserved 5: Cancel	55555	★
P9-54	Frequency for continuing operation upon fault	0: runs at the current operating frequency 1: Run at set frequency 2: Operating at the upper limit frequency 3: Run at the lower limit frequency 4: Run at the standby frequency in case of an exception	1	☆

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P9-55	Backup frequency upon error	0.0%~100.0%	100.0%	☆
PD Communication parameter				
PD-00	Baud rate	0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS	5	☆
PD-01	Modbus data format	0: No check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No check (8-N-1)	0	☆
PD-02	Local address	1~247	1	☆
PD-03	Response delay	0ms~20ms	2ms	☆
PD-04	Modbus communication timeout	0.0~60.0	0.0	☆
PD-05	Reserved	0~1	0	●
PP User parameter				
PP-00	User password	0~ 65535	0	●
PP-01	parameter initialization	0: no operation is performed 1: Restore factory parameter mode 1 2: clears the record information 4: Restore user backup parameters 501: backs up the current parameters of the user 502: Restore factory parameter mode 2 503: Restore factory parameter mode 3	000	☆
PP-02	Initialization Parameter	Ones -: displays the U group 0: hidden 1: Display Tens -: Group H displays selection 0: hidden 1: Display Hundreds -:L group display selection 0: hidden 1: Display Thousands -:T group display selection 0: hidden 1: Display	0111	☆
PP-03	Personality parameter mode display selection	Ones -: 0: not displayed 1: Display Tens -: 0: not displayed 1: Display	11	☆
PP-04	Function code Modifies attributes	0: can be modified 1: cannot be modified	0	☆
PP-05	Reserved	0~65535	4	☆

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
U0 Basic monitor parameter				
U0-00	Operating frequency	0.00~0.00	-	●
U0-01	Frequency reference	0.00~0.00	-	●
U0-02	Bus voltage	0.0~0.0	-	●
U0-03	Output voltage	0~0	-	●
U0-04	Output current	0.0~0.0	-	●
U0-05	Output power	0.0~0.0	-	●
U0-06	Output torque	0.0~0.0	-	●
U0-07	DI state	0~0	-	●
U0-08	DO state	0~0	-	●
U0-09	AI1 voltage	0.00~0.00	-	●
U0-10	AI2 voltage	0.00~0.00	-	●
U0-11	AI3 voltage	0.00~0.00	-	●
U0-14	Load speed display	0~0	-	●
U0-15	PID setting	0~0	-	●
U0-16	PID feedback	0~0	-	●
U0-18	Pulse input frequency	0.00~0.00	-	●
U0-21	AI1 voltage before correction	0.000~0.000	-	●
U0-22	AI2 voltage before correction	0.000~0.000	-	●
U0-23	AI3 voltage before correction	0.000~0.000	-	●
U0-24	Linear speed	0~0	-	●
U0-25	Current power-on time	0~0	-	●
U0-26	Current operating time	0.0~0.0	-	●
U0-27	Pulse input frequency	0~0	-	●
U0-28	Communication setting value	0.00~0.00	-	●
U0-34	Motor temperature	0~0	-	●
U0-35	Target torque	0.0~0.0	-	●
U0-36	Resolver position	0~0	-	●
U0-37	Power factor angle	0.0~0.0	-	●
U0-38	ABZ position	0~0	-	●
U0-39	Target voltage upon V/f separation	0~0	-	●

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
U0-40	Output voltage upon V/f separation	0~0	-	●
U0-41	DI state display	0~0	-	●
U0-42	DO state display	0~0	-	●
U0-43	DI function state display	0~0	-	●
U0-44	DO function state display	0~0	-	●

5.2、Photovoltaic pump special parameter table

H3 Group of photovoltaic pump parameters (when PP-01=10 is set, the following table is the default parameter values after initialization)				
Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P0-02	Command source	1: Terminal command channel (LED on)	1	☆
P0-10	Maximum frequency	50.00Hz~320.00Hz	55.00Hz	★
P0-12	Frequency upper limit	Frequency lower limit (P0-14) ～ Maximum frequency (P0-10)	55.00Hz	☆
P0-17	Acceleration time 1	0.00s~65000s	2.0s	☆
P0-18	Deceleration time 1	0.00s~65000s	2.0s	☆
P3-00	V/f curve setting	2: Square V/f curve	2	★
P6-10	Stop mode	1: Coast to stop	1	☆
P7-03	Parameter 1 displayed during operation	0000~FFFF Bit00: Running frequency (Hz) Bit02: Bus voltage (V) Bit04:Output current (A)	0013	☆
P7-05	Parameter displayed at stop	0000~FFFF Bit01:Bus voltage (V)	02	☆
P8-18	Startup protection	0: Disabled	1	☆
P9-09	Automatic fault reset count	0~20	10	☆
P9-11	Automatic fault reset interval	0.1s~100.0s	5.0s	☆
P4-00	DI1 function	1: Forward run (FWD) 100: photovoltaic pump ban: photovoltaic pump work, the use of external power supply 101: water full warning: accept water level warning device signal 102: water warning: accept water level warning signal	1	★
P4-01	DI2 function		101	★
P4-02	DI3 function		102	★
P4-03	DI4 function		100	★
P5-00	FM terminal output mode selection	1: Open Collector output (FM)	1	☆

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P5-01	FM open collector output function selection	100: photovoltaic pump total warning: water full, water shortage, light weak, dry pump warning combined output signal. 101: water full warning (A - tF) : receives the water tank will be full, output ON signal. 102: the lack of warning (A.t L) : receives the water source water, the output ON signal. 103: A weak light warning (A - LS) : detect the light intensity is not enough (weak light), the output ON signal. 104: dry pump warning (A - LL) : detected idle running (no load), the output ON signal.	103	☆
P5-02	Relay 1 Function selection (T1/A-T1/B-T1/C)		101	☆
P5-03	Relay output function selection 2 (T2 / A - T2 / C)		102	☆
H3-00	Pv inverter selection	0:Disabled 1:Enabled Automatically track maximum output power (MPPT) when enabled	1	☆
H3-01	Water shortage detection selection	0:Disabled 1：AI1 2：AI2 3：AI3 4：DI terminal	4	☆
H3-02	Water shortage threshold	0.0%~100.0% When the detected water level control analog signal is greater than H3.02, and continues this state after a delay time of H3.03, the water shortage warning (A.L) is reported, and the sleep is reported.	75.0%	☆
H3-03	Water shortage alarm delay	0s~3600s	10s	☆
H3-04	Dehydration reset delay	0s~3600s	300s	☆
H3-05	Water full detection selection	0:Disabled 1：AI1 2：AI2 3：AI3 4：DI terminal	4	☆
H3-06	Water full threshold	0.0%~100.0% When the detected water level control analog signal is less than H3-06, and continues this state after H3.07 delay time, report full water warning (A-tF), and sleep.	25.0%	☆
H3-07	Water full alarm delay	0s~3600s	10s	☆
H3-08	Water full reset delay	0s~3600s	300s	☆
H3-09	Hydraulic probe damage monitoring threshold	0%~100.0% 0.0% : invalid; Than 0.0%, when the water level control of analog signal is greater than the H3_09 hydraulic probe faults (tSF) downtime.	0.0%	☆
H3-10	Dry pump detection enabled	0:Disabled 1:Enable	0	☆
H3-11	Dry pump current threshold	0.0%~100.0%	50.0%	☆
H3-12	Dry pump frequency threshold	0.00Hz~50.00Hz	30.00Hz	☆
H3-13	Dry pump warning delay	0s~3600s When the motor current is less than H3-11 and the motor operating frequency is greater than H3-12, the duration of this state is greater than H3.13, the dry pump warning (A-LL) is reported, and the sleep is reported.	60s	☆

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
H3-14	Dry pump reset delay	0s~3600s	120s	☆
H3-15	Low light frequency	0.00Hz~50.00Hz	0.00Hz	☆
H3-16	Light weakness warning delay	0s~3600s When the output frequency is less than or equal to H3-15, and the duration is greater than H3-16, the light weakness warning is reported, and the sleep is reported. Note: when the bus voltage electric light weak lower (H3-26), directly submitted to the weak light warning (A - LS), don't need delay to wait.	100s	☆
H3-17	Low light reset delay	0s~3600s	300s	☆
H3-18	Frequency setting mode	0:Maximum frequency 1:Given according to the frequency source parameter	0	☆
H3-19	MPPT mode acceleration and deceleration time	0.1s~6500.0s The shorter the time, the faster the response speed and the worse the stability; The longer the time, the slower the response speed and stability, the better; But too big and too small may cause system oscillation.	50.0s	☆
H3-20	MPPT frequency adjustment amplitude	0.01Hz~10.00Hz The smaller the frequency, the slower the response speed and the better the stability; The frequency, the greater the response speed, stability, the worse; But too big and too small may cause system oscillation.	0.25Hz	☆
H3-21	MPPT control cycle	0.0s~5.00s Time is smaller, the faster response speed, stability, the better the greater the time, the slower the response speed and stability, the worse but too big and too small can cause shock.	0.50s	☆
H3-22	MPPT minimum operating voltage	0.0V to 500.0V (When the bus voltage is below H3-22, the frequency drop will be performed until the voltage is restored to allow the frequency rise.)	220V：180.0 380V：350.0	☆
H3-23	MPPT allows minimum voltage drop time	0.1s~100.0s	5.0s	☆
H3-24	Automatic downfrequency adjustment factor	0.1~10.0	5.0	☆
H3-25	The natural drop of the bus voltage during frequency upturn	0.0V~20.0V	5.0V	☆
H3-26	Low light voltage	0V~500V	300V	☆
H3-27	Enable automatic restart after fault recovery	0:Disabled 1:Enable	1	☆
H3-28	Force boot frequency setting	0.00Hz~P0-12	5.00Hz	☆
H3-29	Display frequency filter depth Settings	10~400	20	☆
H3-30	reserve	---	---	★
H3-31	reserve	---	---	★
H3-32	MPPT control mode selection	0: Common VF control mode 1: CVT fixed voltage control mode 2:MPPT mode	2	★
H3-33	MPPT reference voltage setting	0.0V~3000.0V	550.0V	★
H3-34	MPPT Search voltage step	0.1~30.0V	1.0V	★

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
H3-35	MPPT search cycle	0.2s~8.0s	1.0s	★
H3-36	Voltage closed loop PI control deviation limit	0.0%~100.0%	0.0%	★
H3-37	Voltage closed loop PI output upper limit frequency	0.0%~100.0%	100.0%	★
H3-38	Voltage closed loop PI output lower limit frequency	0.0%~100.0%	0.0%	★
H3-39	Voltage closed loop PI controls Kp gain 1	102~20000	8192	☆
H3-40	Voltage closed loop PI control Ki gain 1	102~20000	256	☆
H3-41	Voltage closed loop PI controls Kp gain 2	102~20000	1024	☆
H3-42	Voltage closed loop PI control Ki gain 2	102~20000	1024	☆
H3-43	Voltage closed loop PI controls the gain switching point	0~1000	500	☆
H3-44	mppt reference voltage set maximum value	0.0V~3000.0V	750.0V	★
H3-45	mppt reference voltage set minimum	100.0V~3000.0V	350.0V	★
H3-46	MPPT control algorithm selection	0:mppt algorithm 0 1:mppt Algorithm 1 (New version algorithm program)	1	★
H3-47	MPPT output acceleration time	0.1s~6500.0s	20.0s	☆
H3-48	The busbar undervoltage suppression function was enabled	0:Disabled 1:Enable	1	☆
H3-49	Busbar undervoltage suppression protection point	180.0V~500.0V	430.0V	☆
H3-50	Busbar undervoltage suppression protection gain	0.1~500.0	100.0	☆
H3-52	Voltage light if reset delay time	0s~3600s	30s	☆

6 Modbus communication protocol

6.1 Modbus communication protocol

6.1.1 Summarize

It provides RS485 communication interface and supports Modbus-RTU slave station communication protocol. Users can achieve centralized control through the computer or PLC, through the communication protocol to set the inverter running commands, modify or read parameters, read the working status of the inverter and fault information.

The serial communication protocol defines the content and format of information transmitted in serial communication. These include: host polling (or broadcast) formats; The coding method of the host machine, including the parameters of the required action, the transmitted data and the error check. The slave's response also adopts the same structure, including action confirmation, return data and error checking. If the slave machine makes an error while receiving the information, or fails to perform the action required by the host, it will organize a fault message as a response to the host.

6.1.2 Application mode

The inverter is connected to the "single master and multiple slave" PC/PLC control network with RS485 bus as a communication slave.

6.1.3 Hardware interface

Connect 485+ and 485- on the inverter control board.

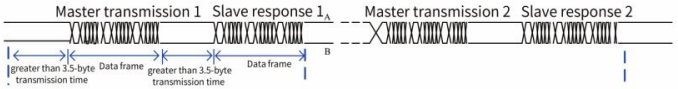
6.1.4 Topological structure

Single host multiple slave system. Each communication device in the network has a unique slave address, in which a device as a communication host (often PC upper computer, PLC, HMI, etc.), actively initiates communication, reads or writes parameters to the slave, and other devices are the communication slave, responding to the host's inquiry or communication operation to the machine. Only one device can send data at a time, while the other devices are in the receiving state.

The slave IP address ranges from 1 to 247. 0 indicates the broadcast IP address. The slave address in the network must be unique.

6.1.5 Communication transmission mode

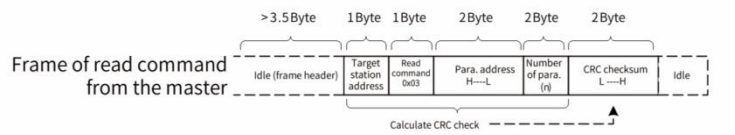
Asynchronous serial, half duplex transmission mode. In the process of serial asynchronous communication, data is sent one frame at a time in the form of packets. According to the Modbus-RTU protocol, when the idle time on the communication data line is greater than 3.5Byte transmission time, it indicates the start of a new communication frame.



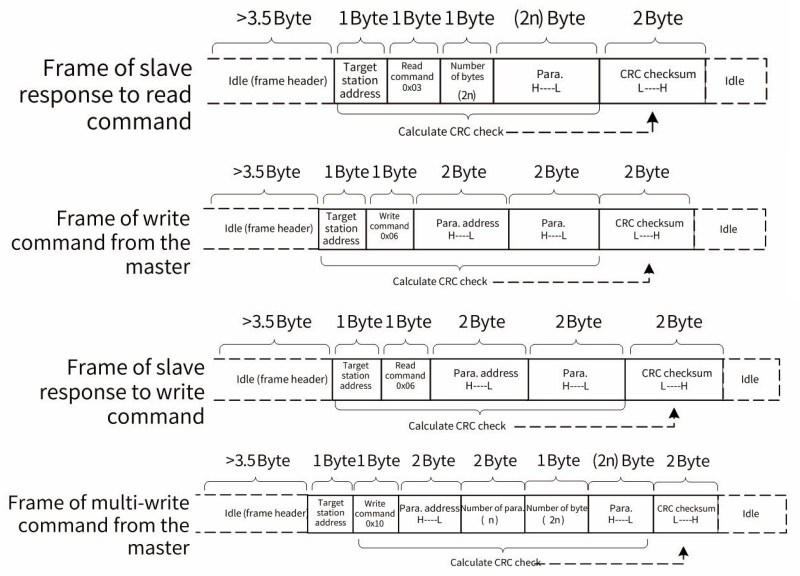
The built-in communication protocol is Modbus-RTU slave communication protocol, which can respond to the "query/command" of the host, or make corresponding actions according to the "query/command" of the host, and carry out communication data response. The host can refer to a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., the host can communicate with a slave machine individually, but also broadcast information to all slaves. For a single access "query/command" from the host, the accessed slave will return a reply frame; The slave does not need to respond to the broadcast message sent by the host.

6.2 Communication data frame structure

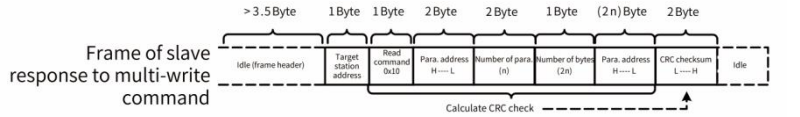
The Modbus-RTU protocol communication data format of this series of inverter is as follows. The inverter only supports Word type parameter reading or writing, and the corresponding communication read operation command is 0x03. The write command is 0x06, and the multiple write command is 0x10. The read and write operations of bytes or bits are not supported：



In theory, the host computer can read consecutive multiple parameters at one time (that is, n can reach a maximum of 12), but it should be noted that the last parameter of this parameter group cannot be crossed, otherwise it will reply incorrectly.



Multi-write is the same as multi-read and up to 12 parameters can be continuously written.

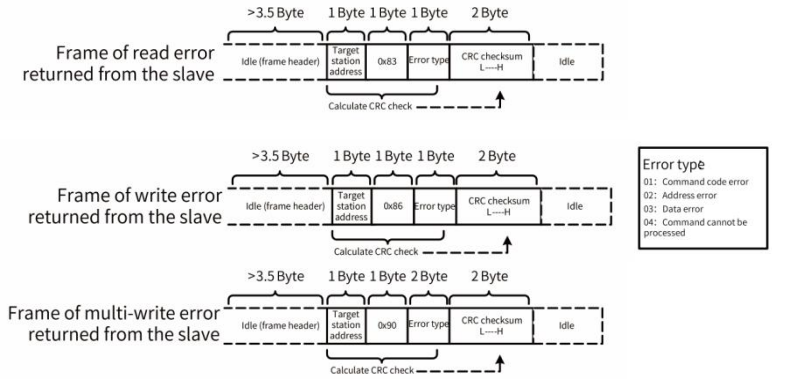


If the slave detects a communication frame error or read/write failure due to other causes, the slave returns a frame of error.

Note

No response is returned for CRC check error.

A read error returned from the slave is 0x83. A write error returned from the slave is 0x86. A multi-write error returned from the slave is 0x90.



Data frame field description table

Frame header (START)	Idle time greater than 3.5-byte transmission time
Slave address (ADR)	Communication address range: 1 to 247; 0 = Broadcast
Command code (CMD)	03: Read slave parameters; 06: Write slave parameters; 10: Multi- write slave parameters
Parameter address (H)	Internal parameter address of the AC drive, expressed in hexadecimal. Parameters are divided into parameter type and non-parameter type (for example, operation status parameters and operation commands). See the definition of addresses. Low-order bytes follow high-order bytes during transmission.
Parameter address (L)	
Parameter count (H)	Number of parameters read in this frame. The value 1 indicates reading one parameter. Low-order bytes follow high-order bytes during transmission. According to this protocol, only one parameter can be rewritten at a time without this field.
Parameter count (L)	
Data bytes	The data length, which is twice the number of parameters
Data (H)	Response data or data to be written. Low-order bytes follow high-order bytes during transmission.
Data (L)	
CRC low bit	Detection value: CRC16 check value. High-order bytes follow low- order bytes during transmission. For details of the calculation method, see the description of CRC in this section.
CRC high bit	
END	3.5-byte transmission time

CRC Check way:

CRC (Cyclical Redundancy Check) using RTU frame format, Modbus message includes based on the method of CRC error detection domain. The CRC domain detects the contents of the entire message. The CRC field is a two-byte, 16-bit binary value. It is calculated by the transmitting device and added to the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two CRC values are not equal, there is a transmission error.

The CRC first stores 0xFFFF and then invokes a procedure to process the consecutive 8-bit bytes in the message with the value in the current register. Only 8 bits of data per character are valid for CRC, and the start and stop bits and parity bits are not valid. CRC produced in the process, each 8-bit characters and register separately mutually exclusive or (XOR), the results to the lowest effective direction, MSB to 0. The LSB is extracted for detection, if the LSB is 1, the register alone is different from the preset value or if the LSB is 0, it is not performed. The whole process is repeated eight times. After the last bit (the 8th bit) is completed, the next 8-bit byte separately differs from the current value of the register. The value in the final register is the CRC value after all bytes in the message have been executed.

When a CRC is added to a message, low bytes are added first, followed by high bytes. The CRC simple function is as follows:

```
unsigned intcrc_chk_value（unsigned char *data_value,unsigned char length）
{
unsigned intcrc_value=0xFFFF;
    int i;
    while（length--）
        {
            crc_value^=*data_value++;
            for（i=0;i<8;i++）
            {
                if（crc_value&0x0001）
                    {
                        crc_value=（crc_value>>1）^0xa001;
                }
                else
```

```
                    {
                        crc_value=crc_value>>1;}
                }
            }
    return（crc_value）；
    }
```

Communication parameter definition address:

reading and writing parameter (some parameters cannot be changed, only for the use of manufacturers or monitoring）

6.3 Parameter address marking rule

Parameter address rules are represented by parameter group numbers and labels：

high byte： P0~PP(P Group)、H0~HF(H Group)、70~7F(U Group)

low order byte：00~FF

Some parameters cannot be changed when the inverter is in operation; Some parameters cannot be changed no matter what state the inverter is in. Change parameter parameters, but also pay attention to the range of parameters, units and related descriptions.

Parameter group number	Communication access address	Communication Modifies the parameter address in RAM
0～PE Group	0xF000～0xFEFF	0x0000～0x0EFF
H0～HC Group	0xA000～0xACFF	0x4000～0x4CFF
U0 Group	0x7000～0x70FF	

Note

Because EEPROM is frequently stored, it will reduce the service life of EEPROM, so some parameters in the mode of communication, do not need to be stored, just change the value in RAM.

If it is a P group parameter, to achieve this function, as long as the high P of the parameter address becomes 0 can be achieved. If the parameter is group H, to achieve this function, as long as the high-level H of the parameter address becomes 4 can be achieved.

The corresponding parameter addresses are represented as follows：

high byte：00~0P(P Group)、40~4F(H Group)

low order byte：00~PP

For example：

Parameter P3-12 is not stored in EEPROM, and the address is 030C. Parameter H0-05 is not stored in EEPROM and the address is represented as 4005. This address indicates that the RAM can only be written, but cannot be read. The read address is invalid.

See the following table for the shutdown/operation parameters.

Stop/Run parameters			
Addresses	Parametric description	Addresses	Parametric description
1000H	*Communication Settings (decimal) –10000～10000	1010H	PID setting
1001H	Operating frequency	1011H	PID feedback
1002H	Busbar voltage	1012H	PLC step
1003H	Output voltage	1013H	PULSE Input pulse frequency (unit: 0.01kHz)
1004H	Output current	1014H	Feedback speed, unit 0.1Hz
1005H	Output power	1015H	Remaining running time
1006H	Output torque	1016H	AI1 Voltage before correction

Stop/Run parameters			
Addresses	Parametric description	Addresses	Parametric description
1007H	Running speed	1017H	AI2 Voltage before correction
1008H	DI input flag	1018H	AI3 Voltage before correction
1009H	DO output flag	1019H	Linear speed
100AH	AI1 voltage	101AH	Current power-on time
100BH	AI2 voltage	101BH	Current running time
100CH	AI3 voltage	101CH	PULSE Input pulse frequency (unit: 1Hz)
100DH	Count input	101DH	Communication Settings
100EH	Length value input	101EH	Actual feedback velocity
100EH	Loading speed	101FH	Master frequency X display
-	-	1020H	Master frequency Y display
Note： Communication value is relative percentage, corresponding 100.00%, 10000-10000, corresponding to 100.00% of frequency dimension data, the percentage is relative to the percentage of maximum frequency (P0-10). For the data of the torque dimension, the percentage is P2-10 and H2-48 (the torque upper limit is set, corresponding to the first and second motors respectively)			

Control command input to inverter: (write only)	
Command word address	Command function
2000H	0001: indicates forward running
	0002: Inverted operation
	0003: Forward turning point
	0004: Reverse the dots
	0005: free stop
	0006: Slow down and stop
	0007: Reset the fault

Read inverter status: (Read only)	
status word address	Status word function
3000H	0001: indicates forward running
	0002: Inverted operation
	0003: Shut down

Parameter lock Password verification: If the actual password value is returned, the password verification succeeds. (If there is no password, that is, the password is 0, 0000H is returned.)	
Password address	Enter the contents of the password
1F00H	*****

Digital output terminal control: (write only)	
command address	Command contents
2001H	BIT0: DO1 output control
	BIT1: DO2 output control
	BIT2: RELAY1 output control
	BIT3: RELAY2 output control
	BIT4: FMR output control
	BIT5: VDO1
	BIT6: VDO2
	BIT7: VDO3
	BIT8: VDO4
	BIT9: VDO5

Analog output AO1 control: (write only)	
Command address	Command contents
2002H	0～7FFF indicates 0%～100%

Analog output AO2 control: (write only)	
command address	Command contents
2003H	0～7FFF indicates 0%～100%

PULSE output control: (write only)	
command address	Command contents
2004H	0～7FFF indicates 0%～100%

Inverter fault description	
inverter fault address	Inverter fault information
8000H	0000: No fault
	0001: Reserved

Inverter fault description	
inverter fault address	inverter fault address
8000H	0002: Accelerates overcurrent
	0003: Decelerating overcurrent
	0004: Constant overcurrent
	0005: Acceleration overvoltage
	0006: Decelerating overvoltage
	0007:Constant speed overvoltage
	0008: Buffer resistance overload fault
	0009: Undervoltage fault
	000A: The inverter is overloaded
	000B: Motor overload
	000C: The input phase is missing
	000D: Output phase missing
	000E: The module overheats
	000F: External fault
	0010: The communication is abnormal
	0011: The contactor is abnormal
	0012: Current detection fault
	0013: Motor tuning failure
	0014: The encoder /PG card is faulty
	0015: parameter read and write exception
	0016: The inverter hardware is faulty
	0017: Motor short circuit to ground fault
	0018: Reserved
	0019: Reserved
	001A: The running time is up
	001B: User-defined fault 1
	001C: User-defined fault 2
	001D: The power-on time arrives
	001E: Load dropped
	001F: PID feedback is lost during running
	0028: The fast current limiting times out

inverter fault address	inverter fault address
	0029: Switch motor failure during operation
	002A: Speed deviation is too large
	002B: Motor excess speed
	002D: The motor is overheated
	005A: The number of encoder lines is incorrectly set
	005B: No encoder
	005C: The initial position is incorrect
	005E: Speed feedback error

6.4 PD group communication parameters

Parameter	Name	Default value	Setting range
Pd-00	Baud rate	5005	Ones: Modbus baud rate
			0:300BPS
			1:600BPS
			2:1200BPS
			3:2400BPS
			4:4800BPS
			5:9600BPS
			6:19200BPS
			7:38400BPS
			8:57600BPS
			9:115200BPS
The Pd-00 parameter is used to set the data transmission rate between the host computer and the inverter. Note that the baud rate set by the upper computer and the inverter must be consistent, otherwise, communication cannot be carried out. The higher the baud rate, the faster the communication speed.			

Parameter	Name	Default value	Setting range
Pd-01	data format	0	0: none Check: Data format <8,N,2>
			1: Even check: Data format <8,E,1>

Parameter	Name	Default value	Setting range
Pd-01	data forma	0	2: odd check: Data format <8,O,1>
			3: None Check: Data format <8,N,1>
The data format set by the upper computer and the inverter must be consistent, otherwise, the communication cannot be carried out.			

Parameter	Name	Default value	Setting range
Pd-02	Local address	1	1 ~ 247,0 indicates the broadcast address
When the local address is set to 0, it is the broadcast address, and the host computer broadcast function is realized. The local address is unique (except the broadcast address), which is the basis of point-to-point communication between the host computer and the inverter.			

Parameter	Name	Default value	Setting range
Pd-03	Response delay	2ms	0ms~20ms
Response delay: refers to the intermediate interval between the end of the inverter data acceptance and the sending of data to the upper machine. If the response delay is less than the system processing time, the response delay is based on the system processing time. If the response delay is longer than the system processing time, the system will wait until the response delay time reaches the upper computer before sending the data.			

Parameter	Name	Default value	Setting range
Pd-04	Communication timeout	0.0s	0.0s（invalid）;0.1~60.0s
When this parameter is set to 0.0s, the communication timeout parameter is invalid. When this parameter is set to valid values, if a communication and the interval time of the next communication beyond the communication timeout, system will be submitted to the communication failure error (Err16). Usually, this is set to invalid. If you set this parameter in a continuous communication system, you can monitor the communication status.			

Parameter	Name	Default value	Setting range
Pd-05	Communication protocol selection	0	0: indicates the non-standard Modbus-RTU protocol 1: Standard Modbus-RTU protocol
Pd-05=1: Select the standard Modbus protocol. For details, see section B.3 Communication Data Structure of this protocol. Pd - 05 = 0: read command, from the machine returns number of bytes a byte more than the standard Modbus protocol and other read/write operation in accordance with standard Modbus protocol operation.			

Parameter	Name	Default value	Setting range
Pd-06	Communication read current resolution	0	0：0.01A 1：0.1A
Pd-06 is used to determine the output unit of the current value when the communication reads the output current.			

7 Fault Diagnosis and Countermeasures

7.1 Fault Diagnosis and Countermeasures

The following types of faults may occur when the driver is in use. For simple fault analysis, refer to the following methods.

Fault name	Panel display	Fault cause investigation	Troubleshooting countermeasure
Flood warning	A-tF	Whether the water tank is full	When receiving the signal that the water level of the tank will be full, output the ON signal.
Water shortage warning	A.tL	Whether the water is short of water	When receiving the water shortage signal of the water source, output the ON signal.
Low light warning	A-LS	Whether the photovoltaic panel is blocked	When the light intensity is not enough (weak light) is detected, the ON signal is output.
Dry pump warning	A-LL	Whether the pump is loaded	When the pump is detected idling (no load), the output ON signal.
The current sampling circuit is damaged	E01.01	The inverter current sampling is abnormal	Check whether the main circuit is powered on. Hall sensor damage, current sampling current damaged, contact the manufacturer.
Contactor fault	E01.02	The driver board and power supply are abnormal	Seek factory service.
		Contactor anomaly	Seek factory service.
		The surge protection board is abnormal	Seek factory service.
Accelerating overcurrent	E02.00	The output circuit of the inverter is grounded or short-circuited	Detect motor or interrupt contactor for short circuit.
		For FVC or SVC control way and has no into the line parameters tuning	Set motor parameters according to motor nameplate and perform motor parameter tuning.
		Under rapid acceleration condition, the acceleration time is set too short	Increase the acceleration time (P0-17).
		Excessive loss rate suppression is not set properly	The loss rate inhibition function (P3-19) has been enabled. A loss of quick acting as current (P3-18) value is too large, recommend adjustment within 120% to 160%; Erosion speed inhibits gain (P3-20) setting is too small, recommend adjustment within 20 to 40.
		Manual torque lift or V/F curve is not appropriate	Adjust manual lifting torque or V/F curve.
		Start the rotating motor	Choose speed tracking start or wait until the motor stops to start.
		External interference	Through historical fault record, check whether the fault current value to flow (P3-18), if not reach, the judgment is an external interference, needs the external interference sources, remove fault. If no external interference source is found, the driver board or Hall component may be damaged, and you need to contact the manufacturer to replace it.
Retarding overcurrent	E03.00	The output circuit of the inverter is grounded or short-circuited	Detect whether the motor has short circuit or open circuit.
		For FVC or SVC control way and has no into the line parameters tuning	Set motor parameters according to motor nameplate and perform motor parameter tuning.
		Under rapid deceleration condition, the deceleration time is set too short	Increase deceleration time (P0-18).
		Excessive loss rate suppression is not set properly	The loss rate inhibition function (P3-19) has been enabled. A loss of quick acting as current (P3-18) value is too large, recommend adjustment within 120% to 150%; Erosion speed inhibits gain (P3-20) setting is too small, recommend adjustment within 20 to 40.

Fault name	Panel display	Fault cause investigation	Troubleshooting countermeasure
		No additional brake unit and brake resistance	Install brake unit and resistor.
		External interference	Through historical fault record, check whether the fault current value to flow (P3-18), if not reach, the judgment is an external interference, needs the external interference sources, remove fault. No external interference sources after screening, could be driven plate or hall device is damaged, need to contact the manufacturer to replace.
Constant velocity overcurrent	E04.00	Grounded or short-circuited output circuit of the AC drive	Detect whether the motor has short circuit or open circuit.
		Auto-tuning is not performed in SVC or FVC control mode.	Set motor parameters according to motor nameplate and perform motor parameter tuning.
		Inappropriate overcurrent stall suppression	The loss rate inhibition function (P3-19) has been enabled. A loss of quick acting as current (P3-18) value is too large, recommend adjustment within 120% to 150%; Erosion speed inhibits gain (P3-20) setting is too small, recommend adjustment within 20 to 40.
		Inadequate power rating of the AC drive	Under stable operation condition, if the running current exceeds the motor rated current or inverter rated output current value, please choose more variable frequency device power level.
		External interference to the AC drive	Through historical fault record, check whether the fault current value to flow (P3-18), if not reach, the judgment is an external interference, needs the external interference sources, remove fault. No external interference sources after screening, could be driven plate or hall device is damaged, need to contact the manufacturer to replace.
Accelerating overvoltage	E05.00	The input power grid voltage is high	Adjust the voltage to normal range.
		There is an external force driving the motor during the acceleration process	Cancel additional power or install brake resistance; Rising in frequency overvoltage suppression biggest (P3-26), smaller recommended adjustment within 5 hz to 15 hz, places that have requirements of drag force to adjust the parameters.
		The overvoltage suppression setting is not appropriate	Confirm that the overvoltage suppression function (P3-23) has been enabled. Over-voltage suppression action (P3-22) value is too large, recommend adjustment within 770 v to 700 v; Overvoltage suppression gain (P3-24) set is too small, recommend adjustment within 30 to 50.
		No additional brake unit and brake resistance	Install brake unit and resistor.
		The acceleration time is too short	Increase the acceleration time.
Retarding overvoltage	E06.00	The overvoltage suppression setting is not appropriate	Confirm that the overvoltage suppression function (P3-23) has been enabled. Over-voltage suppression action (P3-22) value is too large, recommend adjustment within 770 v to 700 v; Overvoltage suppression gain (P3-24) set is too small, recommend adjustment within 30 to 50.
		There is an external force driving the motor during the deceleration process	Cancel additional power or install brake resistance; Rising in frequency overvoltage suppression biggest (P3-26), smaller recommended adjustment within 5 hz to 15 hz, places that have requirements of drag force to adjust the parameters.
		Slow down time is too short	Increase deceleration time.
		No additional brake unit and brake resistance	Install brake unit and resistor.
Constant speed overvoltage	E07.00	The overvoltage suppression setting is not appropriate	Confirm that the overvoltage suppression function (P3-23) has been enabled. Over-voltage suppression action (P3-22) value is too large, recommend adjustment within 770 v to 700 v; Overvoltage suppression gain (P3-24) set is too small, recommend adjustment within 30 to 50.

Fault name	Panel display	Fault cause investigation	Troubleshooting countermeasure
		There is an external force to drive the motor during operation	Cancel additional power or install brake resistance; Rising in frequency overvoltage suppression biggest (P3-26), smaller recommended adjustment within 5 hz to 15 hz, places that have requirements of drag force to adjust the parameters.
Undervoltage fault	E09.00	Instantaneous outage	Enabling instantaneous stop function (P9-59), can prevent the instantaneous power failure under-voltage fault.
		The voltage of the inverter input is not in the scope of the specification requirements	Adjust voltage to normal range.
		The bus voltage is abnormal	Seek technical support.
		Rectifier, inverter driver board, inverter control board	Seek technical support.
Inverter overload	E10.00	Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition.
		Inverter selection is small	Choose an inverter with a larger power class.
		For FVC or SVC control way and has no into the line parameters tuning	Set motor parameters according to motor nameplate and perform motor parameter tuning.
		The control mode is V/F	Torque boost (P3-01) set value is too large, reduce by 1.0% to try or try P3-01 set to "0" (automatic torque boost mode).
Current limiting by wave	E10.01	Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition.
		Inverter selection is small	Reduce load and check motor and mechanical condition.
Motor overload	E11.00	Motor protection parameter P9-01 setting is appropriate	This parameter is set correctly, increase the P9-01, can extend the motor overload time.
		Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition.
Input phase loss	E12.00	Input phase deficiency fault	Check whether the input RST cable and three-phase input voltage are normal.
Output phase loss	E13.00	motor fault	Detect whether the motor is disconnected.
		The lead from the inverter to the motor is abnormal	Troubleshoot peripheral faults.
		The inverter three-phase output is unbalanced when the motor is running	Check whether the three-phase winding of the motor is normal and remove the fault.
		The driver or IGBT module is abnormal	Seek technical support.
IGBT overtemperature	E14.00	Ambient temperature is too high	Reduce the ambient temperature.
		Duct clogging	Clean the air duct.
		Fan failure	Replace the fan.
		The module thermistor is damaged	Seek technical support.
		Module failure	Seek technical support.
External fault	E15.01	Input external faults through the multi-function DI on	The peripheral breakdown, confirming mechanical allow restart (P8-18), reset operation.
	E15.02	Input external faults through multi-function DI normal closure	The peripheral breakdown, confirming mechanical allow restart (P8-18), reset operation.
Communication fault	E16.01	Modbus communication timeout	Check whether the 485-communication cable is correctly connected. Check the Pd - 04 set data communication with PLC cycle is reasonable.
	E16.11	CANopen communication timeout	Check whether the CAN communication cable is connected correctly. Check the parameters of Pd - 15 ~ 17, confirm the interference.
	E16.12	Inconsistency between the configured CANopen-based PDO mapping and the actual mapping	Check the PDO mapping of AF group parameters.

Fault name	Panel display	Fault cause investigation	Troubleshooting countermeasure
Motor tuning fault	E19.02	Synchronous machine pole position Angle tuning fault	The motor may not be connected, or the output is out of phase.
	E19.06	Stator resistance tuning fault	No access motor; Please make sure the motor rated current parameter set (P1-03) according to the motor nameplate.
	E19.07	Asynchronous machine transient leakage induction tuning fault	The motor may not be connected, or the output phase is missing; Verify valid motor connection.
	E19.08		
	E19.09		
	E19.10	Inertia tuning fault	Please confirm that the motor rated current parameter (P1-03) is set according to the motor nameplate; Increase inertia tuning and dynamic setting speed (P2-43) setting values. Please confirm that the motor rated current parameter (P1-03) is set according to the motor nameplate; Increase inertia tuning and dynamic setting speed (P2-43) setting values.
	E19.11		
	E19.20	Synchro no-load zero Angle tuning process timed out	Check the feedback Z signal.
	E19.23	Synchronous pole position tuning fault	Please confirm that the motor rated current parameter (P1-03) is set according to the motor nameplate; Reduce the initial position Angle detection current (P2-29) set value of synchro.
	E19.24	Asynchronous machine transient leakage sensing tuning error	Inverter power selection is small; Select the appropriate inverter according to the motor power.
Encoder fault	E20.00	Encoder break	Correction of broken line position; PG cable wiring error; Confirm the PG cable power supply connection; Confirm whether encoder line number and the encoder line number are accordance (P1-27); AB line connection is wrong.
	E20.01	Encoder fault	
	E20.02	Encoder break fault	
	E20.03	Synchronizer no-load tuning encoder fault	
	E20.04	Synchronizer no-load tuning encoder fault	
	E20.06	Synchronizer no-load tuning encoder fault	
	E20.07	Synchronizer no-load tuning encoder fault	
	E20.08	Synchronizer no-load tuning encoder fault	
	E20.09	Synchronizer tuning encoder fault	Encoder z signal is abnormal, please confirm the PG card connection.
	E20.10	Synchronizer encoder fault	
	E20.11	Asynchronous machine closed loop vector no-load tuning encoder fault	Properly connect the encoder; Please confirm whether encoder line number and the encoder line number are accordance (P1-27).
	E20.12	There is a large deviation between the feedback speed of encoder and the estimated speed of SVC	Check whether the encoder is disconnected; Check if motor parameter set right; Confirm motor tuning.
	E20.13	Rotary encoder hardware disconnection fault	Check encoder wiring
	E20.17	23-bit encoder disconnected fault	Check encoder wiring
EEPROM Read/write fault	E21.01	EEPROM Read/write fault	If the function code is written for communication, check whether the RAM address of the corresponding function code is operated, and the RAM address mapping of each function code is performed. See 6.2.4 Parameter Address Representation Rules. If EEROM chip is damaged, contact the manufacturer to replace the control panel.
	E21.02		
	E21.03		
	E21.04		
Motor tuning result warning	E22.00	The stator resistance tuned out is out of the reasonable range	Motor rated voltage, rated current parameter setting error, please according to the motor nameplate brand set right group F1 motor rated voltage (P1-02), rated current (P1-03) parameters;

Fault name	Panel display	Fault cause investigation	Troubleshooting countermeasure
Motor tuning result warning	E22.01	Tuning out of the asynchronous machine rotor resistance is beyond reasonable range	Confirm that the parameter tuning is performed when the motor is already stationary.
	E22.02	The tuned no-load current and mutual inductance of the asynchronous machine are beyond the reasonable range. If quote us such warnings, inverter according to the known motor parameter calculation a mutual inductance and no-load current value, and the optimal value, there is a certain difference	Please correctly set F1 motor parameters according to motor nameplate; Make sure the motor is idle before tuning.
	E22.03	Tuning of synchronous machine against potential beyond reasonable range	Please confirm that the rated voltage parameter of the motor (P1-02) is set according to the nameplate of the motor; Make sure the motor is in no-load state when tuning.
	E22.04	Inertia tuning fault	Please confirm that the motor rated current parameter (P1-03) is set according to the motor nameplate.
Ground short circuit fault	E23.00	The motor is short circuit to the ground	Replace the cable or motor and check whether there is a short circuit to the ground.
Interphase short circuit	E24.00	Interphase short circuit	A two-phase short circuit exists in the output UVW.
Rectification fault	E25.00	The rectifier is faulty	Rectify the fault, such as input phase, overtemperature fault, etc. 1: can run to make 2: feedback into line circuit breaker 3: auxiliary circuit breaker feedback 4: leakage protection switch feedback, the feedback signal, is used to 6: inverter unit prohibit operation 7: inverter unit 8: free parking inverter unit by way of setting down, effective, if the terminal is at fault
The accumulated running time reaches the fault	E26.00	The accumulated running time reaches the set value	Use the parameter initialization function to clear record information.
User-defined Fault 1	E27.00	Through the multi-function terminal DI input user-defined signal failure 1	Reset run
		Through the virtual IO function input user custom barrier 1 signal	Reset run
User-defined Fault 2	E28.00	Through the multi-function terminal DI input user custom fault signal of 2	Reset run
		Through the virtual IO function input user custom barrier signals of 2	Reset run
The cumulative power on time reaches the fault	E29.00	The cumulative power-on time reaches the set value	Use the parameter initialization function to clear record information.
Load drop fault	E30.00	Inverter running current is less than P9-64	Confirm whether the load from or P9-64, P9-65 parameter Settings is in line with the actual operation condition.
Runtime PID feedback lost fault	E31.00	The PID feedback is less than the PA-26 set value	Check the PID feedback signal or set PA-26 to an appropriate value.
The speed deviation is too large	E42.00	Encoder parameters are not set correctly	Set encoder parameters correctly.
		Parameter tuning is not performed	Perform motor parameter tuning.
		Excessive speed deviation detection parameters P9-69, P9-70 set is not reasonable	Set detection parameters reasonably according to the actual situation.

Warranty Agreement

1 The warranty period of this product is 18 months (subject to the information of the fuselage strip code), the warranty period according to the normal use of the manual, the product failure or damage, our company is responsible for free maintenance.

2 During the warranty period, certain maintenance fees will be charged for damage caused by the following reasons:

2.1 Damage to the machine caused by errors in use and repairs and modifications made by oneself;

2.2 Machine damage caused by fire, flood, abnormal voltage, other natural disasters and secondary disasters;

2.3 Hardware damage caused by human falling and transportation after purchase;

2.4 Machine damage caused by not operating according to the user manual provided by our company;

2.5 Failure and damage caused by obstacles other than the machine (such as external equipment factors);

3 If the product is faulty or damaged, please fill in the contents of the Product Warranty Card correctly and in detail.

4 Maintenance fees shall be charged in accordance with the latest Maintenance Price List adjusted by our company.

5 This warranty card will not be reissued under normal circumstances, please be sure to keep this card, and show it to the maintenance personnel during the warranty.

6 If there is any problem in the service process, please contact our agent or our company in time.

Warranty card

Customer information	Company Name:			
	Company address:			
	Contact person:		Phone:	
	Zip Code:		Fax:	
Product information	Product model:			
	Body bar code:			
	Agent:			
Fault message	Maintenance information: Maintenance person：			

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