High-performance current vector frequency converter

EV210 series (Asynchronous)

User Manual

Previous remarks

First of all, thank you for purchasing the EV210 series of high-performance current vector converters!

The EV210 series of high-performance current vector frequency converters are mainly used to control and regulate the speed and torque of three-phase AC asynchronous motors, support a variety of PG cards, etc., and are powerful. It can be used to drive textile, paper, wire drawing, machine tools, packaging, food, fans, pumps and various automated production equipment.

This manual introduces the functional characteristics and usage methods of the EV210 series of high-performance current vector frequency converters, including product selection, parameter setting, operation debugging, maintenance inspection, etc. Please read this user manual carefully before use.

Notes on Matters

- The illustrations in this user manual are for illustration purposes only and may differ from the product you ordered.
- The company is committed to the continuous improvement of the product, and the product features will be continuously upgraded. The information provided is subject to change without notice.
- If you have problems using our products, please contact our regional agents or our customer service center directly.

When you receive the product, please confirm the following items:

Confirm items	Confirmation Method
Check if it matches the type and model of the ordered goods	Please check the nameplate on the side of the EV210
Are there any damaged or damaged parts	Look at the overall appearance and check for any damage during transportation
Check for loose fastening parts such as screws	Check with a screwdriver if necessary
Instruction manual, warranty card and other accessories	EV210 User manual and corresponding accessories

Catalogues

Chapter 1 Security Information and Precautions

When installing, commissioning and maintaining this system, users are requested to read this chapter carefully and be sure to follow the safety precautions required in this chapter. The Company is not responsible for any injury or loss resulting from the violation of operating procedures.

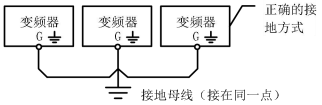
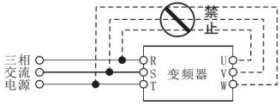
1.1 Marking and Definition of Safety Information

Marking	Definition
 Danger	This symbol indicates an accident that may result in death or serious injury if not performed as required.
 Warnings	This symbol indicates that failure to operate as required will result in moderate personal injury or minor injury and some material loss.
 Note	This symbol indicates matters that need attention in operation or use.
 Prohibited	Indicating something that is absolutely not allowed to be done.
 Compulsion	Indicating something that must be done.

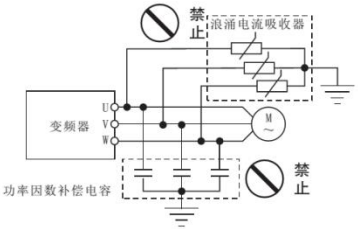
1.2 Safety Matters

Stages of Use	Safety Grade	Items
Scope of Use	 Note	● This inverter is suitable for general industrial three-phase AC asynchronous motors.
	 Warnings	● Do not use this inverter in equipment (nuclear power control equipment, aerospace equipment, vehicle equipment, life support systems, safety equipment, weapon systems, etc.) where a malfunction or malfunction of the inverter may pose a threat to life or harm to human health. If you need to use it for a special purpose, please consult our company in advance. ● This product is manufactured under strict quality management system supervision, but when used in critical equipment, safety protection measures must be in place to prevent the expansion of accident range in case of inverter failure.

Stages of Use	Safety Grade	Items
Installation environment	Note	● Install in an indoor, well-ventilated location and generally vertically to ensure optimal cooling. When installed horizontally, additional ventilation devices may be required. ● Ambient temperature should be within the range of -10 to 40 ° C. If the temperature exceeds 40 ° C, remove the top cover. If it exceeds 50 ° C, external forced cooling or derating is required. It is recommended that users do not use the frequency converter in such a high-temperature environment, as this will greatly reduce the lifespan of the frequency converter. ● Ambient humidity should be below 95% and no water droplets should condense. ● Install in a place with vibration less than 0.5G to prevent drop damage. Do not allow the inverter to be subjected to sudden impacts. ● Install in an environment away from electromagnetic fields and free of flammable and explosive substances.
Installation Safety instructions	Danger	● Do not work with wet hands. ● Wiring work must not be done when the power is not fully disconnected. ● Do not open the face cover or perform wiring while the inverter is powered on, otherwise there is a risk of electric shock. ● Wiring, inspection and other operations must be carried out 10 minutes after the power is turned off, otherwise there is a risk of electric shock.
	Warnings	● Do not install a frequency converter with damaged or missing components to prevent personal injury and property damage. ● The main circuit terminals must be securely connected to the cable; otherwise, poor contact may cause damage to the inverter. ● For safety reasons, the grounding terminals of the frequency converters must be reliably grounded. To avoid the influence of common ground impedance interference, the grounding of multiple frequency converters should be done in a one-point grounding manner, as shown in Figure 1-1.

Stages of Use	Safety Grade	Items
		 Figure 1-1
	Prohibition	● Do not connect an AC power supply to the output terminals U, V, W of the inverter, otherwise it will cause damage to the inverter, as shown in Figure 1-2.  Figure 1-2
	Mandatory	● On the input power side of the inverter, be sure to install a fuseless circuit breaker for circuit protection to prevent the escalation of accidents caused by inverter failure.
	Note	It is not advisable to install electromagnetic contactors on the output side of the frequency converter. This is because when the contactor is turned on or off during the operation of the motor, it will generate operating overvoltage, which can cause damage to the frequency converter. It is still necessary to configure it for the following three situations: a) A variable frequency speed regulator for energy-saving control, when the system often operates at rated speed and the frequency converter needs to be removed for economic operation.

Stages of Use	Safety Grade	Items
		b) When involved in important processes that cannot be shut down for long periods and when switching between various control systems is needed to improve system reliability. c) When one frequency converter controls multiple motors. Users should be aware that contactors must not operate when the inverter has an output!
Safety Instructions for Use	 Danger	● Do not operate with wet hands. ● For inverters that have been stored for more than one year, when powering on, gradually increase the voltage to the rated value with a voltage regulator first; otherwise, there is a risk of electric shock and explosion. ● Do not touch the inside of the inverter after it is powered on, and do not put rods or other objects inside the inverter, otherwise it will cause electric shock death or the inverter will not work properly. ● Do not open the face cover while the inverter is powered on, otherwise there is a risk of electric shock. ● Use the power-off restart function with caution as it may cause personal injury or death.

Stages of Use	Safety Grade	Items
	Warnings	● If operating beyond 50Hz, make sure the speed range of the motor bearings and mechanical devices in use. ● Mechanical devices that require lubrication, such as reducers and gears, should not be operated at low speeds for long periods, otherwise their service life will be reduced or even the equipment will be damaged. ● For ordinary motors operating at low frequencies, due to poor heat dissipation, they must be derated. If it is a constant torque load, forced heat dissipation by the motor or a variable frequency dedicated motor must be used. ● For frequency converters that are not in use for a long time, make sure to cut off the input power supply to prevent damage to the frequency converter due to foreign objects entering or other reasons, and even fire. Since the output voltage of the frequency converter is a PWM pulse wave, please do not install capacitors or surge current absorbers (such as varistors) at its output end. Otherwise, it may cause the frequency converter to trip and even damage the power components. If it is already installed, be sure to remove it. See Figure 1-3.  Figure 1-3

Stages of Use	Safety Grade	Items
	Note	● Before the motor is used for the first time or after a long period of storage, an insulation check should be conducted on the motor to ensure that the measured insulation resistance is no less than 5MΩ. ● If the inverter is to be used outside the allowable operating voltage range, a step-up or step-down device should be configured for voltage transformation. ● In areas with an altitude of over 1000 meters, due to the thin air, the heat dissipation effect of the inverter will be poor, and it should be derated at this time. Generally, for every 1000 meters of elevation, the derating should be reduced by about 10%.

Chapter 2 Product Information

2.1 Naming Rules

Figure 2-1 Naming Specifications

2.2 Technical Specifications

Item		Grid	
Input voltage		Three-phase AC380V ±10%; Single-phase AC220V ±10%	
Input frequency		50/60Hz	
Output voltage		0 to input voltage	
Output frequency		Vector control: 0-500Hz V/F control: 0-500Hz	
Overload capacity		150% rated current for 60 seconds; 180% rated current 3 seconds	
Control mode		V/F control, sensorless vector control (SVC)	
Control characteristics	Frequency setting resolution	Analog input	Maximum frequency × 0.025%

Item		Grid	
		Digital Settings	0.01 Hz
	V/F control	V/F curve	Three types: linear type; Multi-point type; NTH power V/F curve (1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)
		V/F separation	Two ways: full separation, half separation
		Torque boost	Manual setting: 0.0 to 30.0% of rated output Auto-lift: Automatically determine the lift torque based on the output current and in combination with motor parameters
		Automatic current limiting and voltage limiting	Automatically detect stator current and voltage during acceleration, deceleration, or stable operation, and suppress them within the allowable range based on a unique algorithm to minimize the possibility of system failure tripping
	Sensorless vector control	Voltage-frequency characteristics	Automatically adjust the output voltage-to-frequency ratio based on motor parameters and unique algorithms
		Torque characteristics	Starting torque: 150% rated torque at 3.0Hz (V/F control); 150% rated torque at 0.25Hz (vector control without speed sensor) Operating speed steady-state accuracy: ≤± 0.2% rated synchronous speed Speed fluctuation: ≤ ± 0.5% rated synchronous speed

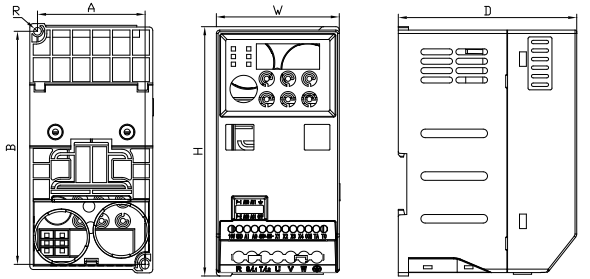
Item		Grid	
			Torque response: ≤20ms (vector control without speed sensor)
		Self-measurement of motor parameters	Without any restrictions, parameters can be automatically detected in both static and dynamic states of the motor for the best control effect
		Current and voltage suppression	Full current closed-loop control, complete avoidance of current surges, with perfect overcurrent and overvoltage suppression
	Under-voltage suppression during operation	Specifically for users with low grid voltages and frequent grid voltage fluctuations, the system can maintain the longest possible operating time even within the allowable voltage range based on unique algorithms and residual energy allocation strategies	
Typical Features	Multi-speed and swing frequency operation	16-segment programmable multi-speed control with multiple operation modes to choose from. Swing frequency operation: preset frequency, center frequency adjustable, power-off state memory and recovery	
	PID control RS485 communication	Built-in PID controller (with preset frequency), standard configuration RS485 communication function	
	Frequency setting	Analog input	Dc voltage 0 to 10V, DC current 0 to 20mA (upper and lower limits optional)
		Digital input	The operation panel setting, RS485 interface setting, UP/DOWN terminal control, and multiple combinations can be set with analog input
	Output signal	Digital output	1 programmable relay output (TA, TC), up to 58 meaning options

Item			Grid	
			Analog output	1 analog signal output with a range of 0 to 20mA or 0 to 10V, allowing for the output of physical quantities such as set frequency and output frequency
	Automatic voltage regulation operation		Dynamic voltage stabilization, static voltage stabilization, and no voltage stabilization are available as needed for the most stable operation	
	Acceleration and deceleration time Settings		From 0.0s to 6500.0s continuously configurable, S mode and linear mode are available	
	Brake	Energy consumption braking	The energy braking starting voltage, hysteresis voltage and energy braking rate are continuously adjustable	
		Dc braking	Stop DC braking start frequency: 0.00 to [P0-10] maximum frequency Braking time: 0.0 to 100.0 seconds; Braking current: 0% to 100% of rated current	
	Low noise operation		The carrier frequency is continuously adjustable from 0.5KHz to 16.0KHz to minimize motor noise to the greatest extent	
	Speed tracking speed restart function		It enables smooth restart of running motors and instant stop restart	
	Counter		One internal counter for system integration	
	Running functions		Upper and lower limit frequency setting, frequency jump operation, reverse operation limit, slip frequency compensation, RS485 communication, frequency increment and decrement control, fault self-recovery operation, etc	
Operation panel display	Running status		Output frequency, output current, output voltage, motor speed, set frequency, module temperature, PID setting, feedback quantity, analog input/output, etc	
	Alarm content		There are records of eight operating parameters during three fault trips, including output frequency, set frequency, output current, output voltage, DC voltage, module temperature, power-on time, and running time	

Item		Grid
Environment	Ambient temperature	-10 ° C to +40 ° C (If ambient temperature is between 40 ° C and 50 ° C, use with derating)
	Ambient humidity	5% to 95% RH, no water droplets condense
	Surrounding environment	Indoor (no direct sunlight, no corrosive, flammable gases, no oil mist, dust, etc.)
	Altitude	Use derating above 1000 meters, 10% derating for every 1000 meters increase
Structure	Protection grade	IP20
	Cooling method	Air-cooled with fan control
Protection features		Overcurrent, overvoltage, undervoltage, module failure, electronic thermal relay, overheat, short circuit, input and output phase loss, motor parameter tuning anomaly, internal memory failure, etc
Installation method		Wall-mounted, cabinet

2.3 Chassis and keyboard dimensions

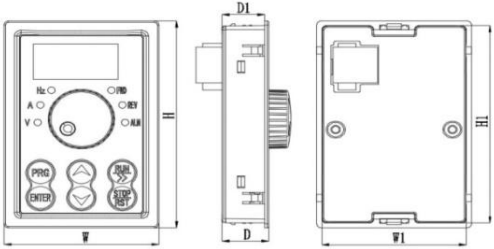
■Case size:



Voltage level	Model	Installation dimensions		Peripheral dimensions			R (mm)
		A (mm)	B (mm)	W (mm)	H (mm)	D (mm)	
Single-phase 220V	0.4 kW to 2.2 kW	63.0	136.5	72	146	105	2.3

Voltage level	Model	Installation dimensions		Peripheral dimensions			R (mm)
Three-phase 380V	0.75 kW to 2.2 kW						
	4 kW to 5.5 kW	78.0	172.5	87	183	127	2.3
	7.5 kW, 15 kW	106.0	229.0	118	241	154	2.8

■External keyboard mounting size:



The size of the opening for the keyboard base				Keyboard thickness	
W	W1	H	H1	D	D1
53mm	The 49.4 mm	79mm	The 75.4 mm	The 15.9 mm	The 14.5 mm

2.4 Rated output ammeter

Inverter model	Power capacity KVA	Input current A	Output Current A	Compatible motor kW
EV210-0004G-S2	1.0	5.4	2.3	0.4
EV210-0007G-S2	1.5	8.2	4.0	0.75
EV210-0015G-S2	3.0	14.0	7.0	1.5
EV210-0022G-S2	4.0	23.0	9.6	2.2
EV210-0007G-T4	1.5	3.4	2.1	0.75
EV210-0015G-T4	3.0	5.0	3.8	1.5
EV210-0022G-T4	4.0	5.8	5.1	2.2
EV210-0040G-T4	5.9	10.5	9.0	4.0
EV210-0055G-T4	8.9	14.6	13.0	5.5
EV210-0075G-T4	11.0	20.5	16.0	7.5

EV210-0110G-T4	17.0	26.0	24.0	11
EV210-0150G-T4	21.0	35.0	32.0	15

2.5 Brake Resistor Selection Table

Inverter model	Brake resistor specifications		Braking torque
	W	Ω	10%ED
EV210-0004G-S2	80	200	125
EV210-0007G-S2	80	150	125
EV210-0015G-S2	100	100	125
EV210-0022G-S2	100	70	125
EV210-0007G-T4	100	750	125
EV210-0015G-T4	300	400	125
EV210-0022G-T4	300	250	125
EV210-0040G-T4	400	150	125
EV210-0055G-T4	500	100	125
EV210-0075G-T4	1000	75	125
EV210-0110G-T4	3000	43	125
EV210-0150G-T4	3000	32	125

Note:

1. Please select the resistance value specified by our company.
2. The Company shall not be held responsible for any damage to the inverter or other equipment caused by the use of brake resistors not provided by the Company.
3. The installation of the brake resistor must take into account the safety and flammability of the environment, and be at least 100mm away from the frequency converter.
4. The parameters in the table are for reference only and are not standard.

Chapter 3 Storage and Installation

3.1 Storage

This product must be placed in the packing box before installation. If not in use, please note the following when storing:

- Must be placed in a dust-free, dry location;
- Store in an ambient temperature range of -20 ° C to +65 ° C;
- The relative humidity of the storage environment is 0% to 95% and there is no condensation;
- The storage environment is free of corrosive gases and liquids;
- It is best to store on a shelf and in packaging. The inverter should not be stored for a long time, as prolonged storage can cause deterioration of the electrolytic capacitors. If long-term storage is required, it must be powered on once every half a year for at least 5 hours, and the input voltage must be gradually increased to the rated value using a voltage regulator.

3.2 Installation location and environment

Note: The environmental conditions of the installation site will affect the service life of the inverter. Please install the inverter in the following locations:

- Ambient temperature: -10 ° C to 40 ° C with good ventilation;
- No dripping and low temperature areas;
- Places without sunlight, high temperatures and heavy dust;
- Places free of corrosive gases and liquids;
- A place with less dust, oil vapor and metal shavings;
- Vibration-free locations that are easy to maintain and inspect;
- A place free from electromagnetic noise.

3.3 Installation space and orientation

- Sufficient space should be left around the inverter for ease of maintenance.
- For good cooling, the inverter must be installed vertically and ensure good air circulation.
- If the installation is not secure. After placing a flat plate under the base of the inverter and installing it on a loose plane, stress may cause damage to the main circuit components and thus damage the inverter;
- The mounting wall should be made of non-combustible materials such as iron plates.
- When multiple inverters are installed in the same cabinet and installed up and down, while paying attention to the spacing, please add a baffle in the middle or install them out of alignment up and down.

Chapter 4 Wiring

4.1 Main circuit wiring diagram

Power supply: Please pay attention to whether the voltage levels are consistent to avoid damaging the frequency converter.

Fuseless switch: Please refer to the corresponding table.

Leakage circuit breaker: Please use a leakage circuit breaker with protection against high-order harmonics.

Electromagnetic contactor:

Please do not use the electromagnetic contactor as the power switch of the frequency converter.

Ac reactor: When the output capacity exceeds 1000KVA, it is recommended to install an AC reactor to improve the power factor.

Frequency converter:

Please make sure to connect the main return line of the frequency converter and the control signal line correctly.

4.2 Terminal diagram

■ Control loop terminal arrangement

10V	GND	AI	AO	485+	485-	X1	X2	X3	X4	COM	TA	TC

■ Single-phase 0.4kW-2.2kW, three-phase 0.75-2.2kW main circuit terminals

R	S/L1	T/L2	U	V	W	⏚

■ Three-phase 4kW-15kW main circuit terminals

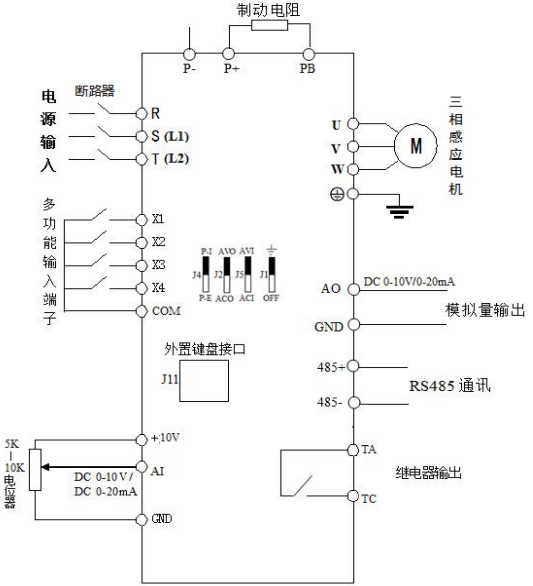
R	S	T	P+	PB	U	V	W	⏚

■ Jumper Settings for the main control board

J1	
⏚ block	Indicates that the main control board is grounded
OFF stop	Indicates that the main control board is grounded open (default open)
J2	
AVO setting	Represents analog AO output voltage signal, 0-10V
ACO stop	Represents the analog AO output current signal, 0-20mA
J4	
P-I range	Indicates selection of built-in keyboard potentiometer (default built-in keyboard potentiometer works)
P-E mode	Indicates the selection of the external keyboard potentiometer
J5	
AVI stop	Represents analog AI input voltage signal, 0-10V
ACI stop	Represents analog AI input current signal, 0-20mA

4.3 Basic Running wiring diagram

The inverter wiring is divided into the main circuit and the control circuit. The user can lift the cover of the housing to see the terminals of the main circuit and the control circuit. The user must connect them accurately according to the following wiring circuits.



Basic operating wiring diagram

4.4 Wiring Precautions

4.4.1 Main circuit wiring

- When wiring, the selection of wire diameter specifications should be carried out in accordance with the provisions of electrical regulations to ensure safety.
- For power wiring, it is best to use isolation wires or conduits and ground the isolation layer or conduits at both ends.

Please be sure to install an air circuit breaker NPB between the power supply and the input terminals (R, S, T). (If using a leakage circuit breaker, use a circuit breaker with a high-frequency countermeasure).

- Power lines and control lines should be placed separately and not in the same conduit.
- Do not connect AC power to the output terminals (U, V, W) of the inverter.
- Output wiring must not touch the metal parts of the inverter housing, otherwise it may cause a ground short circuit.
- Do not use components such as phase-shifting capacitors, LC, RC noise filters, etc. at the output of the inverter.
- The main circuit wiring of the inverter must be kept away from other control devices.
- When the wiring between the inverter and the motor exceeds 50 meters (220V series), (380V class 100 meters), high dv/dt will be generated inside the motor coil, which will damage the interlayer insulation of the motor. Please use an AC motor dedicated to the inverter or install a reactor on the inverter side.
- When the distance between the inverter and the motor is long, reduce the carrier frequency, as the larger the carrier, the greater the high-order harmonic leakage current on the cable, and the leakage current will have an adverse effect on the inverter and other equipment.

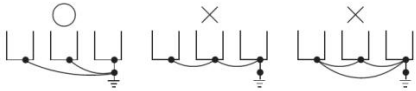
4.4.2 Control Circuit Wiring (Signal lines)

Signal lines must not be placed in the same wire slot as the main circuit wiring, otherwise interference may occur. Signal lines should be shielded and grounded at one end with a diameter of 0.5-2mm². Control lines are recommended to use 1mm² shielded wire. Use the control terminals on the control panel correctly as needed.

4.4.3 Ground wire

Grounding terminal E should be grounded in the third type of grounding (below 100Ω); Use the grounding wire in accordance with the basic technical length and dimensions of the electrical equipment; Avoid sharing grounding electrodes with large electrical equipment such as welding machines and power machinery. Grounding wires should be kept as far away from the power lines of large electrical equipment as possible. For the grounding wiring of multiple frequency converters, please use the method shown in Figure (a) below to avoid creating loops in (b) or (c).

- The grounding wiring must be as short as possible.
- Ground terminal E must be properly grounded and must never be connected to the neutral wire.



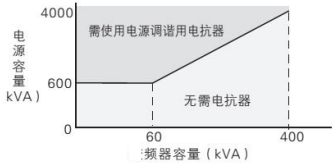
4.5 Specific application precautions

4.5.1 Selection

(1) Reactor installation

When connecting the inverter to a large capacity power transformer (600kVA or more) or switching the input capacitor, the power input circuit generates excessive peak current, which may damage the components of the converter section. To prevent this, install a DC reactor or an AC reactor. This also helps to improve the power factor on the power supply side. Also, when the

same power supply system is connected to thyristor converters such as DC drives, DC reactors or AC reactors must be set up regardless of the power supply conditions.



电抗器的安装条件

(2) Inverter capacity

When operating special motors, make sure the rated current of the motor does not exceed the rated output current of the inverter. In addition, when operating multiple induction motors in parallel with one frequency converter, choose the capacity of the frequency converter in such a way that 1.1 times the combined rated current of the motors is less than the rated output current of the frequency converter.

(3) Starting torque

The starting and acceleration characteristics of a motor driven by a frequency converter are limited by the combined overload rated current of the frequency converter. The torque characteristics are smaller compared to the starting of a general commercial power supply. If a larger starting torque is required, increase the capacity of the inverter by one size or increase the capacity of both the motor and the inverter.

(4) Emergency stop

Although the protection function will act and the output will stop when the inverter fails, the motor cannot be suddenly stopped at this time. Therefore, set up a mechanical stop, hold structure on the mechanical equipment that requires an emergency stop.

(5) Special options

Terminals PB and P+ are terminals for connecting the

dedicated option. Do not connect to machines other than the dedicated option.

(6) Precautions related to reciprocating loads

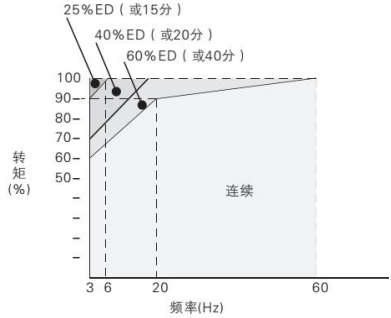
When the inverter is used for reciprocating loads (such as cranes, elevators, punch presses, washing machines, etc.), the IGBTs inside the inverter will have a shortened lifespan due to thermal fatigue if currents repeatedly flow through 150% or more than that value. As a rough standard, at a carrier frequency of 4kHz and a peak current of 150%, the number of starts/stops is approximately 800. Ten thousand times.

Lower the carrier frequency especially when low noise is not required. Also, reduce the peak current during reciprocation to less than 150% by reducing the load, extending the acceleration and deceleration time, or increasing the inverter capacity by one grade (be sure to confirm the peak current during reciprocation and adjust it as needed during trial runs for these purposes). In addition, when used for cranes, since the start/stop action is faster during micro-motion, it is recommended to make the following selection to ensure motor torque and reduce the current of the inverter. The capacity of the inverter should ensure that its peak current is less than 150%. The capacity of the inverter should be more than one class larger than that of the motor.

4.5.2 Precautions for Motor Use

(1) For existing standard motors

Using a frequency converter to drive a standard motor will result in a certain increase in losses compared to using a commercial power supply. The cooling effect will be worse at low speeds, and the temperature of the motor will rise. Therefore, in the low-speed range, reduce the load torque of the motor. The allowable load characteristics of our standard motor are shown in the figure. Also, when 100% continuous torque is required in the low-speed range, consider whether to use a motor dedicated to frequency converters.



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(2) Precautions when used for special motors

The rated current of a pole-changing motor is different from that of a standard motor. Please confirm the maximum current of the motor and select the appropriate frequency converter. Be sure to switch the number of poles after the motor stops. If switching is done while the motor is rotating, the regenerative overvoltage or overcurrent protection circuit will act and the motor will stop running freely.

Motors with brakes

When using a frequency converter to drive a motor with a brake, if the brake circuit is directly connected to the output side of the frequency converter, the brake will not open due to a lower voltage at startup. Use a brake power supply independent motor with a brake and connect the brake power supply to the power side of the inverter. In general, when using a motor with a brake, the noise may increase in the low-speed range.

(3) Power transmission structure (reducer, belt, chain, etc.)

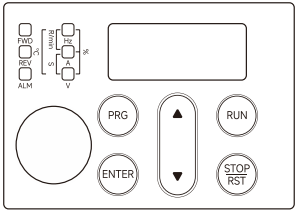
When using oil-lubricated gearboxes, gearboxes, reducers, etc. in the power transmission system, the oil lubrication effect will be poor if they only operate continuously in the low-speed range. Please note. Also, when operating at high speeds above 60Hz,

there will be problems with the power transmission structure in terms of noise, lifespan, and strength due to centrifugal force, please pay full attention.

Chapter 5 Operations and Displays

5.1 Instructions for the operation panel

5.1.1 Operation Panel illustration



5.1.2 Key instructions

Key symbols	Name	Feature Description
PRG	Programming keys	Menu entry or exit, parameter modification
ENTER	Determine the key	Go to the menu and confirm the parameter Settings
▲	Incrementing keys	Increment the data or function code
▼	Decrement key	Decrement of data or function code
RUN/► ►	Run keys	Run/Shift operations in keyboard operation mode
STOP/RESET	Stop/Reset key	The stop/reset operation can be used as a shift key to view the displayed content when the main interface is stopped

5.1.3 Function Indicator Light description

Indicator light names	Instructions
REV	Inverter reverse indicator light, when on, indicates reverse operation status
FWD	The forward rotation indicator light of the inverter, when on, indicates the forward rotation operation status

ALM	A constantly lit indicator light indicates torque control, a fast-flashing indicator light indicates fault, and a slow-flashing indicator light indicates tuning
Hz	Frequency unit
A	Units of current
V	Voltage units

5.1.4 Description of functional indicator light combinations:

Indicator light combination method	LED shows meaning	Symbols
Hz+A	Motor speed	r/min
A+V	Time (seconds)	s
Hz+V	Percentage actual value	%
Hz+A+V	Temperature	℃

5.2 Operating Procedures

5.2.1 Parameter Settings

The three-level menus are:

1. Function Code group number (first-level menu);
2. Function code labels (secondary menu);
3. Function code Settings (Level 3 menu).

Note: When operating in the third-level menu, you can press PRG or ENTER to return to the second-level menu. The difference between the two is: Press ENTER to save the set parameters to the control panel, then return to the secondary menu and automatically move on to the next function code; Pressing PRG goes straight back to the secondary menu, does not store parameters, and remains in the current function code.

In the third-level menu state, if the parameter has no flashing bit, it indicates that the function code cannot be modified. Possible reasons include:

1) The feature code is an unmodifiable parameter. Such as actual detection parameters, operation record parameters, etc.

2) The function code cannot be modified while in operation

and can only be modified after the machine is shut down.

5.2.2 Fault Reset

After a fault occurs in the inverter, the inverter will prompt the relevant fault information. The user can RESET the fault using the STOP/RESET key on the keyboard or the terminal function. After the fault reset of the inverter, it is in standby mode. If the inverter is in a faulty state and the user does not perform a fault reset on it, the inverter will be in operation protection mode and will not operate.

5.2.3 Motor parameter self-learning

Select vector control operation mode. Before the inverter operates, the nameplate parameters of the motor must be accurately input, and the inverter matches the standard motor parameters based on the nameplate parameters; Vector control mode is highly dependent on motor parameters. To achieve good control performance, accurate parameters of the controlled motor must be obtained.

Chapter 6 Functional Parameter Table

When PP-00 is set to a non-0 value, a parameter protection password is set. In both function parameter mode and User Change parameter mode, the parameter menu can only be accessed after the correct password is entered. To cancel the password, PP-00 needs to be set to 0. The parameter menu in user custom parameter mode is not password-protected.

The symbols in the menu are described as follows:

"☆" : indicates that the set value of this parameter can be changed when the inverter is off or in operation;

"★" : indicates that the set value of this parameter cannot be changed when the inverter is in operation;

"●" : indicates that the value of the parameter is the actual detection record value and cannot be changed;

"*" : indicates that the parameter is a "manufacturer parameter", which is only set by the manufacturer and prohibited from being

operated by the user.

6.1 Brief Table of Basic Function Parameters

Function Codes	Name	Set Scope	Factory values	Change
P0 Group Basic Function Group				
P0-01	Motor control mode	0: Sensorless vector control (SVC) 1: Velocity Sensor Vector Control (FVC) 2: V/F control	2	★
P0-02	Command source selection	0: Operation Panel Command Channel 1: Terminal Command channel 2: Communication Command Channel	0	☆
P0-03	Main frequency source A selection	0: Digital setting (preset frequency P0-08, UP/DOWN modifiable, no memory when power is off) 1: Digital Settings (Preset frequency P0-08, UP/DOWN modifiable, power-off memory) 2: AI (0 ~ 10V/20mA) 3: Retain 4: Panel potentiometer 5: Retain 6: Multi-segment instructions 7: Simple PLC 8: PID 9: Communication given 10: Multi-pump instructions 11: MPPT given (Photovoltaic water supply)	4	★
P0-04	Auxiliary frequency source B selection	The same as P0-03 (main frequency source A selection)	0	★
P0-05	Auxiliary frequency source B range selection when superimposed	0: Relative to the maximum frequency 1: Relative to frequency source A	0	☆
P0-06	Auxiliary frequency source B range when superimposed	0% to 150%	100%	☆
P0-07	Frequency source B overlay selection	Units: Frequency source selection 0: Main frequency source A 1: Result of primary and secondary operations (the operation relationship is determined by	00	☆

Function Codes	Name	Set Scope	Factory values	Change
		tens) 2: Switching between the main frequency source A and the auxiliary frequency source B 3: Switching between primary frequency source A and the results of primary and secondary operations 4: Switching between auxiliary frequency source B and the results of primary and secondary operations Tens: Relationship between the main and secondary operations of the frequency source 0: Primary + secondary 1: main-auxiliary 2: The maximum of both 3: The minimum of both		
P0-08	Preset frequency	0.00Hz to maximum frequency (P0-10)	50.00 Hz	☆
P0-09	Running direction	0: Consistent direction 1: Opposite directions	0	☆
P0-10	Maximum frequency	50.00Hz to 500.00Hz	50.00 Hz	★
P0-11	Upper limit frequency source	0: P0-12 setting 1: AI 2: Keep 3: Panel potentiometer 4: Retain 5: Communication given	0	★
P0-12	Upper limit frequency	Lower limit P0-14 to maximum P0-10	50.00 Hz	☆
P0-13	Upper limit frequency bias	0.00Hz to maximum frequency P0-10	0.00 Hz	☆
P0-14	Lower limit frequency	0.00Hz to upper limit frequency P0-12	0.00 Hz	☆
P0-15	Carrier frequency	0.5kHz to 16.0kHz	Model determination	☆
P0-16	Carrier frequency adjusts with temperature	0: No 1: Yes	1	☆
P0-17	Acceleration time 1	0.00s to 650.00s (P0-19=2) 0.0s to 6500.0s (P0-19=1) 0s to 65000s (P0-19=0)	Model determination	☆

Function Codes	Name	Set Scope	Factory values	Change
P0-18	Deceleration time 1	0.00s to 650.00s (P0-19=2) 0.0s to 6500.0s (P0-19=1) 0s to 65000s (P0-19=0)	Model confirmation	☆
P0-19	Acceleration and deceleration time units	0:1 second 1:0.1 seconds 2:0.1 seconds	1	★
P0-21	Auxiliary frequency source bias frequency when superimposed	0.00Hz to maximum frequency P0-10	0.00 Hz	☆
P0-22	Frequency Command resolution	1:0.1Hz 2:0.1Hz	2	★
P0-23	Digital setting frequency shutdown memory selection	0: No memory 1: Memory	0	☆
P0-24	Retain	-	0	★
P0-25	Reference frequency for acceleration and deceleration time	0: Maximum frequency (P0-10) 1: Set frequency 2:100 Hz	0	★
P0-26	Runtime frequency instructions UP/DOWN reference	0: Running frequency 1: Set frequency	0	★
P0-27	Command source bundles frequency source	Units: Operation panel command binding frequency source selection 0: Unbound 1: Set the frequency digitally 2: AI 3: Keep 4: Panel potentiometer 5: Retain 6: Multi-speed 7: Simple PLC 8: PID 9: Communication given Tens: Terminal command binding frequency source selection 100 bits: Frequency source selection for communication command binding Thousands: Automatically run the binding frequency source selection	0000	☆
P0-28	Serial communication protocol selection	0: Modbus protocol 1: Retain	0	☆

Function Codes	Name	Set Scope	Factory values	Change
P1 group motor parameters				
P1-00	Motor type selection	0: Regular asynchronous motor 1: Variable Frequency asynchronous motor	0	★
P1-01	Rated power of the motor	0.1kW to 1000.0kW	Model determination	★
P1-02	Motor rated voltage	1V to 2000V	Model determination	★
P1-03	Motor rated current	0.01A to 655.35A (inverter power ≤55kW) 0.1A to 6553.5A (frequency converter power >55kW)	Model determination	★
P1-04	Motor rated frequency	0.01Hz to maximum frequency	Model confirmed	★
P1-05	Rated speed of the motor	1rpm to 65,535 RPM	Model confirmed	★
P1-06	Asynchronous motor stator resistance	0.001Ω to 65.535Ω (frequency converter power ≤55kW) 0.0001Ω to 6.5535Ω (inverter power >55kW)	Tuning parameters	★
P1-07	Rotor resistance of asynchronous motor	0.001Ω to 65.535Ω (inverter power ≤55kW) 0.0001Ω to 6.5535Ω (inverter power >55kW)	Tuning parameters	★
P1-08	Asynchronous motor leakage inductive reactance	0.01mH to 655.35mH (frequency converter power ≤55kW) 0.001mH to 65.535mH (inverter power >55kW)	Tuning parameters	★
P1-09	Asynchronous motor mutual inductance reactance	0.1mH to 6553.5mH (frequency converter power ≤55kW) 0.01mH to 655.35mH (inverter power >55kW)	Tuning parameters	★
P1-10	Asynchronous motor no-load current	0.01A to P1-03 (frequency converter power ≤55kW) 0.1A to P1-03 (inverter power >55kW)	Tuning parameters	★
P1-11 ～ P1-36	Keep	-	0	★
P1-37	Tuning selection	0: No action 1: Asynchronous machine stationary	0	★

Function Codes	Name	Set Scope	Factory values	Change
		part parameter self-learning 2: Asynchronous machine dynamic complete self-learning 3: Asynchronous machine static complete self-learning		
P2 sets of motor vector control parameters				
P2-00	Speed loop proportional gain 1	1～100	30	☆
P2-01	Speed loop integration time 1	0.01s to 10.00s	0.50 s	☆
P2-02	Switching frequency 1	0.00 to P2-05	5.00 Hz	☆
P2-03	Speed loop proportional gain 2	1～100	20	☆
P2-04	Speed loop integral time 2	0.01s to 10.00s	1.00 s	☆
P2-05	Switching frequency 2	P2-02 ~ Maximum frequency	10.00 Hz	☆
P2-06	Vector control slip gain	50% to 200%	100%	☆
P2-07	Speed loop filtering time constant	0.000s to 0.100s	0.015 s	☆
P2-08	Vector-controlled overexcitation gain	0～200	64	☆
P2-09	Torque upper limit source in speed control mode	0: Function code P2-10 setting 1: AI 2: Keep 3: Panel potentiometer 4: Retain 5: Communication given 6: Retain 7: Preserve The full-scale of options 1-7 corresponds to P2-10	0	☆
P2-10	Torque upper limit digital setting in speed control mode	0.0% to 200.0%	150.0%	☆
P2-13	Excitation regulates proportional gain	0～60000	2000	☆
P2-14	Excitation	0～60000	1300	☆

Function Codes	Name	Set Scope	Factory values	Change
	regulates integral gain			
P2-15	Torque adjustment proportional gain	0～60000	2000	☆
P2-16	Torque regulation integral gain	0～60000	1300	☆
P2-17	Velocity loop integral separation	0: Invalid 1: Effective	0	☆
P2-18 ～ P2-20	Retain	-	0	☆
P2-21	Maximum torque coefficient in the demagnetization zone	50～200%	100%	☆
P2-22	Power generation capacity limit enable	0: Ineffective 1: Effective	0	☆
P2-23	Upper limit of power generation	0～200%	Model determination	☆
P3 group V/F control parameters				
P3-00	VF curve 3 Settings	0: Straight line V/F 1: Multi-point V/F 2: Square V/F 3:1 to the power of 2 V/F 4 to the power of 1.4 V/F 5: Retain 6 to the power of 1.6 V/F 7: Retain 8 to the power of 1.8 V/F 9: Reserve 10: VF complete separation mode 11: VF semi-separation mode	0	★
P3-01	Torque boost	0.0% : (Automatic torque boost) 0.1% to 30.0%	Model determination	☆
P3-02	Torque boost cut-off frequency	0.00Hz to maximum frequency	50.00 Hz	★
P3-03	Multi-point VF frequency point F1	0.00Hz to P3-05	0.00 Hz	★
P3-04	Multiple VF voltage points V1	0.0% to 100.0%	0.0%	★
P3-05	Multiple VF	P3-03 to P3-07	0.00 Hz	★

Function Codes	Name	Set Scope	Factory values	Change
	frequency points F2			
P3-06	Multiple VF voltage points V2	0.0% to 100.0%	0.0%	★
P3-07	Multi-point VF frequency point F3	P3-05 to motor rated frequency (P1-04)	0.00 Hz	★
P3-08	Multiple VF voltage points V3	0.0% to 100.0%	0.0%	★
P3-09	VF slip compensation gain	0.0% to 200.0%	0.0%	☆
P3-10	VF overexcitation gain	0～200	64	☆
P3-11	VF oscillation suppression gain	0～100	Model determination	☆
P3-13	Vf-separated voltage source	0: Digital setting (P3-14) 1: AI 2: Keep 3: Panel potentiometer 4: Retain 5: Multi-segment instructions 6: Simple PLC 7: PID 8: Communication given Note: 100.0% corresponds to the rated voltage of the motor	0	☆
P3-14	Vf-separated voltage digital setting	0V to motor rated voltage	0V	☆
P3-15	Voltage acceleration time for VF separation	0.0s to 1000.0s Note: Indicates the time it takes for 0V to change to the rated voltage of the motor	0.0 s	☆
P3-16	Voltage deceleration time for VF separation	0.0s to 1000.0s Note: Indicates the time it takes for 0V to change to the rated voltage of the motor	0.0 s	☆
P3-17	Selection of VF separation shutdown mode	0: Frequency/voltage independent reduction to 0 1: After the voltage is reduced to 0, the frequency is reduced again	0	☆
P3-18	VF overflows velocity operating current	50～200%	150%	☆
P3-19	VF over-loss velocity enables	0: Ineffective 1: Effective	1	☆

Function Codes	Name	Set Scope	Factory values	Change
P3-20	VF overflow rate suppression gain	0～100	20	
P3-21	VF double speed overcurrent velocity acting current compensation coefficient	50～200%	50%	☆
P3-22	VF overvoltage stall action voltage	200.0～2000.0	760.0	☆
P3-23	VF overvoltage stall enable	0: Ineffective 1: Effective	1	☆
P3-24	VF overvoltage stall suppression frequency gain	0～100	30	☆
P3-25	VF overvoltage stall suppression voltage gain	0～100	30	☆
P3-26	Overvoltage stall maximum rise limit frequency	0 to 50Hz	5Hz	☆
P3-27 ～ P3-33	Retain	-	0	☆
P4 group input terminals				
P4-00	Function selection of terminal X1	0: No function 1: Run FWD forward or run the command 2: Run REV in reverse or run in the forward and reverse direction (Note: When set to 1 or 2, it should be used in conjunction with P4-11, see function code parameter description for details) 3: Three-wire operation control 4: Forward jog (FJOG)	1	★

Function Codes	Name	Set Scope	Factory values	Change
P4-01	X2 terminal function selection	5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Free parking 9: Fault RESET 10: Run pause 11: External fault always open input 12: Multi-segment command terminal 1 13: Multi-segment command terminal 2 14: Multi-segment instruction terminal 3 15: Multi-segment command terminal 4 16: Acceleration/deceleration time selection terminal 1 17: Select terminal 2 for acceleration and deceleration time 18: Frequency source switching 19: UP/DOWN Settings Reset (terminals, keyboard) 20: Control Command switch terminal 1 21: Acceleration/deceleration prohibition 22: PID pause 23: PLC status reset 24: Pendulum pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30: Retain 31: Keep 32: Immediate DC braking 33: External fault normally closed input 34: Frequency modification enable 35: Reverse the direction of PID action 36: External stop terminal 1 37: Control Command switch terminal 2 38: PID integration pause	4	★
P4-02	X3 terminal function selection		9	★
P4-03	X4 terminal function selection		12	★
P4-04 ～ P4-09	Reserve		0	★

Function Codes	Name	Set Scope	Factory values	Change
		39: Frequency Source A switches to preset frequency 40: Frequency Source B switches to the preset frequency 41: Retain 42: Preserve 43: PID parameter switching 44: User-defined Faults 1 45: User-defined Faults 2 46: Speed control/Torque control switching 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: Reset the current running time 51: Two-wire/three-wire switch 52: Do not reverse 53-58: Keep		
P4-10	X Filter time	0.000s to 1.000s	0.010 s	☆
P4-11	Terminal command mode	0: Two-wire 1 1: Two-line 2 2: Three-line form 1 3: Three-line 2	0	★
P4-12	Terminal UP/DOWN rate of change	0.001Hz/s to 65.535Hz/s	1.000 Hz/s	☆
P4-13	Minimum input for AI curves	0.00V ~ P4-15	0.00 V	☆
P4-14	AI curve minimum input corresponding Settings	-100.0% to +100.0%	0.0%	☆
P4-15	AI curve maximum input	P4-13 ~ +10.00V	10.00 V	☆
P4-16	AI curve maximum input corresponding Settings	-100.0% to +150.0%	100.0%	☆
P4-17	AI filtering time	0.00s to 10.00s	0.10 s	☆
P4-18 ～ P4-22	Keep	-	0	☆
P4-23	Panel potentiometer minimum input	-10.00V ~ P4-25	9.50 V	☆

Function Codes	Name	Set Scope	Factory values	Change
P4-24	Panel potentiometer minimum input corresponding Settings	-100.0% to +100.0%	0.0%	☆
P4-25	Panel potentiometer maximum input	P4-23 to +10.00V	9.50 V	☆
P4-26	Panel potentiometer maximum input corresponding Settings	-100.0% to +150.0%	100.0%	☆
P4-27	Panel potentiometer filter time	0.00s to 10.00s	0.10 s	☆
P4-28 ～ P4-32	Keep	-	0	☆
P4-33	Keep	-	0	☆
P4-34	AI below the minimum input setting selection	Units digit: AI below the minimum input setting selection 0: Corresponds to the minimum input setting 1:0.0% Tens, hundreds: reserve	000	☆
P4-35	X1 Delay time	0.0s to 3600.0s	0.0 s	★
P4-36	X2 delay time	0.0s to 3600.0s	0.0 s	★
P4-37	X3 Delay time	0.0s to 3600.0s	0.0 s	★
P4-38	X terminal effective mode selection	0: Low level active 1: High level effective Units: X1 Tens place: X2 Hundreds: X3 Thousands: X4 Ten thousand: Reserve	00000	★
P4-39	Keep	-	0	★
P4-40	AI input signal selection	0: Voltage signal 1: Current signal	0	★
P4-41	AI input the anti-shake coefficient	0～1000	0	☆
P4-42	Keep	-	0	★
P5 group output terminals				

Function Codes	Name	Set Scope	Factory values	Change
P5-00 ～ P5-01	Retain	-	0	☆
P5-02	Relay R output function selection (TA-TC)	0: No output 1: The inverter is running 2: Fault output (fault for free shutdown) 3: Frequency Level detection FDT1 output 4: Frequency Arrival Signal (FAR) 5: Zero-speed operation (no output when the machine stops) 6: Motor overload pre-warning 7: Inverter overload warning 8: Set record value arrives 9: Specify the arrival of the recorded value 10: Length arrival 11: PLC cycle completed 12: Cumulative running time arrives 13: Frequency limited 14: Torque limited 15: Run ready 16: Keep	2	☆
P5-03 ～ P5-05	Retain	17: Upper limit frequency arrives 18: Lower limit frequency arrival (related to operation) 19: Under-voltage state output 20: Communication Settings 21: Retained 22: Preserve 23: Running at zero speed 2 (output when shut down) 24: Cumulative power-on time arrives 25: Frequency level detection FDT2 output 26: Frequency 1 arrives at output 27: Frequency 2 reaches the output 28: Current 1 arrives at the output 29: Current 2 reaches the output 30: Timed arrival output 31: AI input exceeds limit 32: Downloading 33: Running in reverse	0	☆

Function Codes	Name	Set Scope	Factory values	Change
		34: Zero current state 35: Module temperature reached 36: Output current exceeds limit 37: Lower limit frequency reached (output even when the machine stops) 38: Alarm output (All faults) 39: Motor over-temperature pre-alarm 40: The current running time has arrived 41: Fault output (No output for free-stop faults and under-voltage) 42-44: Retain		
P5-06	Retain	0: Operating frequency 1: Set frequency 2: Output Current (2 times the motor rated current) 3: Output Torque (2 times Motor rated torque) 4: Output Power (2 times rated power) Output voltage (1.2 times the rated voltage of the frequency converter) 6: Retention 7: AI 8 to 11: Keep 12: Communication Settings 13: Motor speed 14: Output Current (100.0% corresponds to 1000.0A) 15: Output Voltage (100.0% corresponds to 1000.0V) 16: Output Torque (actual torque value)	0	☆
P5-07	AO output function selection		0	☆
P5-08	Retain		0	☆
P5-09	Retain	-	0	☆

Function Codes	Name	Set Scope	Factory values	Change
P5-10	AO zero bias coefficient	-100.0% to +100.0%	0.0%	☆
P5-11	AO gain	-10.00～+10.00	1.00	☆
P5-12 ～ P5-17	Retain	-	0	☆
P5-18	R output delay time	0.0s to 3600.0s	0.0 s	☆
P5-19 ～ P5-21	Retain	-	0	☆
P5-22	Switch output terminal effective status selection	0: Positive logic 1: Reverse logic Units: Reserved Tens: Relay R Hundreds, thousands, tens of thousands: reserved	00000	☆
P5-23	AO output signal selection	0: Voltage signal 1: Current signal	0	★
P6 group start-stop control				
P6-00	Startup mode	0: Start directly 1: Speed tracking restart 2: Pre-excitation start (AC asynchronous machine) 3: Super Fast Start (effective in vector mode)	0	☆
P6-01	Speed tracking mode	0: Start with the shutdown frequency 1: Start from zero speed 2: Start from the maximum frequency	0	★
P6-02	Speed tracking fast or slow	1～100	20	☆
P6-03	Startup frequency	0.00Hz to 10.00Hz	0.00 Hz	☆
P6-04	Start frequency hold time	0.0s to 100.0s	0.0 s	★
P6-05	Start DC braking current/pre-excitation current	0% to 100%	50%	★
P6-06	Start DC braking time/pre-excitation time	0.0s to 100.0s	0.0 s	★

Function Codes	Name	Set Scope	Factory values	Change
P6-07	Acceleration and deceleration methods	0: Linear acceleration and deceleration 1: S-curve acceleration/deceleration A 2: S-curve acceleration and deceleration B	0	★
P6-08	The proportion of time at the beginning of the S-curve	0.0% ~ (100.0%-P6-09)	30.0%	★
P6-09	Proportion of time at the end of the S-curve	0.0% ~ (100.0%-P6-08)	30.0%	★
P6-10	Shutdown methods	0: Slow down stop 1: Free stop	0	☆
P6-11	Stop DC braking start frequency	0.00Hz to maximum frequency	0.00 Hz	☆
P6-12	Stop DC braking wait time	0.0s to 100.0s	0.0 s	☆
P6-13	Stop DC braking current	0% to 100%	50%	☆
P6-14	Stop DC braking time	0.0s to 100.0s	0.0 s	☆
P6-15	Brake utilization rate	0% to 100%	100%	☆
P6-16 ～ P6-20	Keep	-	0	☆
P6-21	Speed tracking delay	0.00 to 5.00 seconds	0.50 s	☆
P7 group keyboard and display				
P7-01	Reserve	-	0	★
P7-02	STOP/RESET key function	0: The STOP/RES key shutdown function works only in keyboard operation mode 1: The STOP/RES key shutdown function works in any mode of operation	1	☆

Function Codes	Name	Set Scope	Factory values	Change
P7-03	LED running main display parameters 1	0000 to FFFF Bit00: Operating frequency 1 (Hz) Bit01: Set Frequency (Hz) Bit02: Bus Voltage (V) Bit03: Output Voltage (V) Bit04: Output Current (A) Bit05: Output Power (kW) Bit06: Output Torque (%) Bit07: Terminal input status Bit08: Terminal output status Bit09: AI Voltage (V) Bit10: Hold Bit11: Pressure Feedback (MPa, Kg) Bit12: Hold Bit13: Hold Bit14: Load speed display Bit15: PID Settings	1F	☆
P7-04	LED running main display parameters 2	0000 to FFFF Bit00: PID feedback Bit01: PLC stage Bit02: Hold Bit03: Operating frequency 2 (Hz) Bit04: Remaining running time Bit05: Voltage (V) before AI correction Bit06: Hold Bit07: Pressure setting (MPa, Kg) Bit08: Linear velocity Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: Hold Bit12: Communication Settings Bit13: Hold Bit14: Main frequency A display (Hz) Bit15: Secondary frequency B display (Hz)	00	☆

Function Codes	Name	Set Scope	Factory values	Change
P7-05	LED shutdown main display parameters	0000 to FFFF Bit00: Set frequency (Hz) Bit01: Bus Voltage (V) Bit02: Terminal input status Bit03: Terminal output status Bit04: AI voltage (V) Bit05: Hold Bit06: Panel potentiometer voltage (V) Bit07: Reserve Bit08: Hold Bit09: PLC stage Bit10: Load speed Bit11: PID Settings Bit12: Hold Bit13: Pressure feedback (MPa, Kg) Bit14: Input Voltage (V) Bit15: Hold	33	☆
P7-06	Load speed display coefficient	0.0001～6.5000	1.0000	☆
P7-07	Inverter module heat sink temperature	0℃ to 100℃	-	●
P7-09	Cumulative running time	0 hours to 65,535 hours	-	●
P7-12	Speed shows decimal places	LED units: Load speed (d0-14) shows the coefficient 0:0 decimal places 1:1 decimal places 2:2 decimal places 3:3 decimal places LED tens: Feedback speed (d0-19) display coefficient 1:1 decimal place 2:2 decimal places	21	☆
P7-13	Cumulative power-on time	0 to 65,535 hours	-	●
P7-14	Cumulative power consumption	0 to 65,535 degrees	-	●
P7-15	LED running auxiliary display parameters	0～80	4	☆
P7-16	LED shutdown auxiliary display parameters	0～80	2	☆
P8 group auxiliary functions				

Function Codes	Name	Set Scope	Factory values	Change
P8-00	Jog the operating frequency	0.00Hz to maximum frequency	2.00 Hz	☆
P8-01	Jog acceleration time	0.0s to 6500.0s	20.0 s	☆
P8-02	Jog the deceleration time	0.0s to 6500.0s	20.0 s	☆
P8-03	Acceleration time 2	0.0s to 6500.0s	Model confirmed	☆
P8-04	Deceleration time 2	0.0s to 6500.0s	Model confirmed	☆
P8-05	Acceleration time 3	0.0s to 6500.0s	Model confirmed	☆
P8-06	Deceleration time 3	0.0s to 6500.0s	Model confirmed	☆
P8-07	Acceleration time 4	0.0s to 6500.0s	Model confirmed	☆
P8-08	Deceleration time 4	0.0s to 6500.0s	Model confirmed	☆
P8-09	Jump frequency 1	0.00Hz to maximum frequency	0.00 Hz	☆
P8-10	Jump frequency 2	0.00Hz to maximum frequency	0.00 Hz	☆
P8-11	Jump frequency amplitude	0.00Hz to maximum frequency	0.01 Hz	☆
P8-12	Forward and reverse dead time	0.0s to 3000.0s	0.0 s	☆
P8-13	Do not run the motor in reverse	0: Ineffective 1: Effective	0	☆
P8-14	Set the operating mode below the lower limit frequency	0: Run at the lower limit frequency 1: Shutdown 2: Running at zero speed	0	☆
P8-15	Drooping control	0.00Hz to 10.00Hz	0.00 Hz	☆
P8-16	Set the cumulative power-on arrival time	0 hours to 65,000 hours	0h	☆
P8-17	Set cumulative run arrival times	0 hours to 65,000 hours	0h	☆
P8-18	The power-on terminal operates	0: Not protected 1: Protection	0	☆

Function Codes	Name	Set Scope	Factory values	Change
	protection selection	Note: Terminal power-on test run command is valid when P8-18=0; When P8-18=1, the terminal power-on test run command is invalid.		
P8-19	Frequency detection value (FDT1)	0.00Hz to maximum frequency	50.00 Hz	☆
P8-20	Frequency detection lag value (FDT1)	0.0% to 100.0% (FDT1 level)	5.0%	☆
P8-21	Frequency arrival (FAR) detection width	0.0% to 100.0% (maximum frequency)	0.0%	☆
P8-22	Is the jump frequency effective during acceleration and deceleration	0: Ineffective 1: Effective	0	☆
P8-23 ～ P8-24	Keep	-	0	☆
P8-25	Switch frequency points between acceleration time 1 and acceleration Time 2	0.00Hz to maximum frequency	0.00 Hz	☆
P8-26	Deceleration time 1 and deceleration time 2 switch frequency points	0.00Hz to the maximum frequency	0.00 Hz	☆
P8-27	Terminal point movement priority	0: Ineffective 1: effective	0	☆
P8-28	Frequency detection values (FDT2)	0.00Hz to maximum frequency	50.00 Hz	☆
P8-29	Frequency detection lag value (FDT2)	0.0% to 100.0% (FDT2 level)	5.0%	☆
P8-30	Random arrival frequency detection value 1	0.00Hz to maximum frequency	50.00 Hz	☆
P8-31	Arbitrary arrival frequency detection width 1	0.0% to 100.0% (maximum frequency)	0.0%	☆
P8-32	Random arrival frequency	0.00Hz to maximum frequency	50.00 Hz	☆

Function Codes	Name	Set Scope	Factory values	Change
	detection value 2			
P8-33	Reach frequency detection width 2	0.0% to 100.0% (maximum frequency)	0.0%	☆
P8-34	Zero current detection level	0.0% to 300.0% 100.0% corresponds to the rated current of the motor	5.0%	☆
P8-35	Zero current detection delay time	0.01 seconds to 600.00 seconds	0.10 s	☆
P8-36	Output current exceeds limit	0.0% (not detected) 0.1% to 300.0% (motor rated current)	200.0%	☆
P8-37	Output current over-limit detection delay time	0.00s to 600.00s	0.00 s	☆
P8-38	Any incoming current 1	0.0% to 300.0% (motor rated current)	100.0%	☆
P8-39	Any incoming current 1 width	0.0% to 300.0% (motor rated current)	0.0%	☆
P8-40	Any incoming current 2	0.0% to 300.0% (motor rated current)	100.0%	☆
P8-41	Any incoming current 2 width	0.0% to 300.0% (motor rated current)	0.0%	☆
P8-42	Timing function selection	0: Ineffective 1: Effective	0	☆
P8-43	Timed runtime selection	0: P8-42 Settings 1: AI 2: Keep 3: Panel potentiometer Note: The analog input range corresponds to P8-42	0	☆
P8-44	Timed running time	0.0Min to 6500.0Min	0.0 Min	☆
P8-45	Lower limit of AI input voltage protection value	0.00V to P8-44	3.10 V	☆
P8-46	Upper limit of AI input voltage protection value	P8-43 to 11.00V	6.80 V	☆
P8-47	Module temperature arrives	0℃ to 100℃	75 ℃	☆
P8-48	Cooling fan control	0: The fan runs while running 1: The fan keeps running	0	☆
P8-49	Wake frequency	Hibernation frequency (P8-51) to	0.00 Hz	☆

Function Codes	Name	Set Scope	Factory values	Change
		maximum frequency (P0.10)		
P8-50	Wake-up delay time	0.0s to 6500.0s	0.0 s	☆
P8-51	Dormancy frequency	0.00Hz to wake frequency (P8-49)	0.00 Hz	☆
P8-52	Sleep delay time	0.0s to 6500.0s	0.0 s	☆
P8-53	This run's arrival time setting	0.0 to 6500.0 minutes	0.0 Min	☆
P8-54	Output power correction factor	0.00% to 200.0%	100.0%	☆
Group P9 Faults and Protections				
P9-00	Motor overload protection options	0: Prohibited 1: Allowed	1	☆
P9-01	Motor overload protection gain	0.01～10.00	1.00	☆
P9-02	Motor overload warning coefficient	50% to 100%	80%	☆
P9-03	Overvoltage stall gain	0～100	0	☆
P9-04	Overvoltage stall protection voltage	200.0～2000.0	760.0	☆
P9-05	Pass the loss rate gain	0～100	20	☆
P9-06	Overcurrent velocity protection current	100% to 200%	150%	☆
P9-07	Keep	-	0	☆
P9-08	Brake start voltage	200.0 to 2000.0V	690.0 V	☆
P9-09	The number of times the fault is automatically reset	0～200	0	☆
P9-10	Fault terminal output action selection during automatic fault reset	0: No action 1: Move	1	☆
P9-11	Fault auto-reset interval	0.1 seconds to 100.0 seconds	6.0 s	☆
P9-12	Enter the phase loss protection selection	0: Prohibited (inverter power ≤11kW) 1: Allowed (inverter power >11kW)	Model determination	☆

Function Codes	Name	Set Scope	Factory values	Change
P9-13	Output phase loss protection selection	0: Prohibited 1: Allow	1	☆
P9-14	First failure type	0: No fault 1: Retain 2: Accelerate overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Acceleration overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer resistor overload 9: Under-voltage 10: Inverter overload 11: Motor overload 12: Input a missing phase 13: Output phase loss 14: Module overheating 15: External failure 16: Communication anomaly 17: Retain 18: Abnormal current detection 19: Motor tuning anomaly 20: Retain 21: Parameter read-write exception 22: Inverter hardware anomaly 23: Retain 24: Keep 25: Preserve 26: Running time arrives 27: Retain 28: Retained 29: Power-on time arrives 30: Load drop 31: Missing PID feedback at runtime 40: Fast rate limiting timeout 41: Switching motors while running 42: Excessive speed deviation 43: Motor overspeed 45: Motor overheating 51: Incorrect initial position	—	•
P9-15	Second failure type	—	—	•

Function Codes	Name	Set Scope	Factory values	Change
P9-16	Third (most recent) failure type	—	—	●
P9-17	Frequency during the third (most recent) failure	—	—	●
P9-18	Current during the third (most recent) failure	—	—	●
P9-19	Busbar voltage during the third (most recent) failure	—	—	●
P9-20	Input terminal status during the third (most recent) failure	—	—	●
P9-21	Output terminal status during the third (most recent) failure	—	—	●
P9-22	The inverter status during the third (most recent) failure	—	—	●
P9-23	Power-on time for the third (most recent) failure	—	—	●
P9-24	Running time during the third (most recent) failure	—	—	●
P9-27	Frequency at the second failure	—	—	●
P9-28	Current during the second failure	—	—	●
P9-29	Busbar voltage at the second failure	—	—	●
P9-30	Input terminals for the second failure	—	—	●
P9-31	Output terminals during the second failure	—	—	●
P9-32	The inverter status during the	—	—	●

Function Codes	Name	Set Scope	Factory values	Change
	second failure			
P9-33	Power-on time during the second failure	—	—	●
P9-34	Running time during the second failure	—	—	●
P9-35	Inverter overload protection gain	0.01～10.00	1.00	☆
P9-36	Under-voltage fault reset time in operation	0.0s to 6553 s	0.0 s	☆
P9-37	Frequency at the first failure	—	—	●
P9-38	Current during the first failure	—	—	●
P9-39	Busbar voltage at the first failure	—	—	●
P9-40	Input terminals during the first failure	—	—	●
P9-41	Output terminal status during the first failure	—	—	●
P9-42	The inverter status during the first failure	—	—	●
P9-43	Power-on time during the first failure	—	—	●
P9-44	Running time during the first failure	—	—	●
P9-45	Block the "FU08" option	0: Invalid 1: valid	0	☆
P9-46	Power outage and restart Settings	Units: Power-off restart option 0: Ineffective 1: Effective Tens: Under-voltage restart option 0: Ineffective 1: Effective Hundreds: Hold Thousands: Reserve Ten thousand: Reserve	00000	☆
P9-47	Fault protection action option 1	Units: Motor Overload (FU11) 0: Free stop 1: Stop in the stop mode	00000	☆

Function Codes	Name	Set Scope	Factory values	Change
		2: Keep running Tens: Input missing phase (FU12) Hundreds: Output missing phase (FU13) Thousands: External fault (FU15) Ten thousand bits: Communication Anomaly (FU16)		
P9-48	Fault protection action option 2	Units: Retain 0: Free parking Tens: Function Code read-write Anomaly (FU21) 0: Free parking 1: Stop in the stop mode Hundreds: reserved Thousands: Motor overheating (FU25) Tens of thousands: Running time arrived (FU26)	00000	☆
P9-49	Fault protection action option 3	Units: User-defined Fault 1 (FU27) 0: Free parking 1: Stop in the stop mode 2: Keep running Tens: User-defined Fault 2 (FU28) 0: Free parking 1: Stop in the stop mode 2: Keep running 100th: Power-on time has arrived (FU29) 0: Free parking 1: Stop in the stop mode 2: Keep running Thousands: Drop (FU30) 0: Free parking 1: Slow down stop 2: Jump directly to 7% of the motor's rated frequency to continue running, and automatically return to the set frequency when no load drops Wan: Loss of PID feedback during operation (FU31) 0: Free stop 1: Stop in the stop mode 2: Keep running	00000	☆
P9-50	Fault protection action option 4	Units: Excessive speed deviation (FU42) 0: Free parking	00000	☆

Function Codes	Name	Set Scope	Factory values	Change
		1: Stop in the stop mode 2: Keep running Tens, hundreds, thousands, tens of thousands: hold		
P9-54	Continue running frequency selection in case of failure	0: Run at the current operating frequency 1: Run at the set frequency 2: Run at the upper limit frequency 3: Operate at the lower limit frequency 4: Run at abnormal standby frequency	0	☆
P9-55	Abnormal standby frequency	0.0% to 100.0% (100.0% corresponds to maximum frequency P0-10)	100.0%	☆
P9-56 ～ P9-58	Keep	-	0	☆
P9-59	Instantaneous power outage action selection	0: Invalid 1: Slow down 2: Slow down to stop	0	☆
P9-60	Transient stop action pause judgment voltage	80.0% to 100.0%	85.0%	☆
P9-61	Instantaneous power outage voltage rebound judgment time	0.00s to 100.00s	0.50 s	☆
P9-62	Instantaneous power outage action determines voltage	60.0% to 100.0% (standard bus voltage)	80.0%	☆
P9-63	Drop protection option	0: Invalid 1: Effective	0	☆
P9-64	Drop the detection level	0.0 to 100.0%	10.0%	☆
P9-65	Drop detection time	0.0 to 60.0 seconds	1.0 s	☆
P9-66	Keep	-	0	☆
P9-67	Pass the speed detection value	0.0% to 50.0% (maximum frequency)	20.0%	☆
P9-68	Pass the speed detection time	0.0s: Not detected 0.1 to 60.0 seconds	0.0 s	☆
P9-69	Excessive speed	0.0% to 50.0% (maximum frequency)	20.0%	☆

Function Codes	Name	Set Scope	Factory values	Change
	deviation detected value			
P9-70	Excessive speed deviation detects time	0.0s: Not detected 0.1 to 60.0 seconds	0.0 s	☆
P9-71	Instant Stop non-stop gain Kp	0~100	40	☆
P9-72	Instantaneous stop non-stop integral coefficient Ki	0~100	30	☆
P9-73	Pause pause pause action slow down time	0.0 to 300.0 seconds	20.0 s	☆
P9-76	GP type display	1: G type (Constant torque load type) 2: P type (fan, pump type load type)	Model determination	●
PA group PID function				
PA-00	PID Given source	0: PA-01 Settings 1: AI 2: Keep 3: Panel potentiometer 4: Retain 5: Communication given 6: Multi-segment instruction given 7: Pressure setting (MPa, Kg)	0	☆
PA-01	PID values given	0.0% to 100.0%	50.0%	☆
PA-02	PID feedback source	0: AI 1 to 8: Retain	0	☆
PA-03	Direction of PID action	0: Positive action 1: reaction	0	☆
PA-04	PID gives the feedback range	0~65535	1000	☆
PA-05	Proportional gain Kp1	0.0~999.9	20.0	☆
PA-06	Integration time Ti1	0.01s to 10.00s	2.00 s	☆
PA-07	Differential time Td1	0.000s to 10.000s	0.000 s	☆
PA-08	PID reverse cut-off frequency	0.00 to maximum frequency	2.00 Hz	☆
PA-09	PID deviation limit	0.0% to 100.0%	0.0%	☆
PA-10	PID differential	0.00% to 100.00%	0.50%	☆

Function Codes	Name	Set Scope	Factory values	Change
	limiting			
PA-11	The PID gives the change time	0.00 to 650.00s	0.00 s	☆
PA-12	PID feedback filtering time	0.00 to 60.00 seconds	0.00 s	☆
PA-13	PID output filtering time	0.0 to 600.0 seconds	100.0 s	☆
PA-14	Retain	-	-	☆
PA-15	Proportional gain Kp2	0.0~999.9	20.0	☆
PA-16	Integration time Ti2	0.01s to 10.00s	2.00 s	☆
PA-17	Differential time Td2	0.000 seconds to 10,000 seconds	0.000 s	☆
PA-18	PID parameter switching conditions	0: Do not switch 1: Switch via terminal X 2: Switch automatically based on bias 3 to 8: Hold	0	☆
PA-19	PID parameter switching bias 1	0.0% to PA-20	20.0%	☆
PA-20	PID parameter switching bias 2	PA-19 to 100.0%	80.0%	☆
PA-21	Initial PID values	0.0% to 100.0%	0.0%	☆
PA-22	PID initial value hold time	0.00 to 650.00s	0.00 s	☆
PA-23 ~ PA-24	Retain	-	0	☆
PA-25	The PID feedback upper limit is missing the detection value	0.0% : No judgment of feedback loss 0.1% to 100.0%	0.0%	☆
PA-26	PID feedback lower limit misses detection value		0.0%	☆
PA-27	PID feedback loss detection time	0.0 seconds to 20.0 seconds	0.0 s	☆
PA-28	PID shutdown operation	0: Stop the operation 1: Compute when the machine is shut down	0	☆
PB group faults and protection				
PB-00	Swing frequency	0: Relative to center frequency	0	☆

Function Codes	Name	Set Scope	Factory values	Change
	setting method	1: Relative to the maximum frequency		
PB-01	Swing amplitude	0.0% to 100.0%	0.0%	☆
PB-02	Jump frequency amplitude	0.0% to 50.0%	0.0%	☆
PB-03	Swing period	0.1s to 3000.0s	10.0 s	☆
PB-04	The rise time of the triangular wave of the swing frequency	0.1% to 100.0%	50.0%	☆
PB-05 ～ PB-07	Retain	-	0	☆
PB-08	Set count values	1～65535	1000	☆
PB-09	Specify count values	1～65535	1000	☆
PB-10 ～ PB-14	Retain	-	0	☆
PC group multi-segment instructions, simple PLC				
PC-00	Multisegment instructions 0	-100.0% to 100.0%	0.0%	☆
PC-01	Multisegment instructions 1	-100.0% to 100.0%	0.0%	☆
PC-02	Multisegment instructions 2	-100.0% to 100.0%	0.0%	☆
PC-03	Multisegment instructions 3	-100.0% to 100.0%	0.0%	☆
PC-04	Multi-segment instruction 4	-100.0% to 100.0%	0.0%	☆
PC-05	Multisegment instructions 5	-100.0% to 100.0%	0.0%	☆
PC-06	Multisegment instructions 6	-100.0% to 100.0%	0.0%	☆
PC-07	Multisegment instructions 7	-100.0% to 100.0%	0.0%	☆
PC-08	Multisegment instructions 8	-100.0% to 100.0%	0.0%	☆
PC-09	Multisegment instructions 9	-100.0% to 100.0%	0.0%	☆
PC-10	Multisegment instructions 10	-100.0% to 100.0%	0.0%	☆

Function Codes	Name	Set Scope	Factory values	Change
PC-11	Multisegment instructions 11	-100.0% to 100.0%	0.0%	☆
PC-12	Multisegment instructions 12	-100.0% to 100.0%	0.0%	☆
PC-13	Multisegment instructions 13	-100.0% to 100.0%	0.0%	☆
PC-14	Multisegment instructions 14	-100.0% to 100.0%	0.0%	☆
PC-15	Multisegment instructions 15	-100.0% ~ 100.0%	0.0%	☆
PC-16	Simple PLC operation mode	0: Shutdown at the end of a single run 1: Hold the end value at the end of a single run 2: Keep looping	0	☆
PC-17	Simple PLC power-off memory options	Units: Power-off memory selection 0: No memory after power failure 1: Power-off memory Tens: Shutdown memory selection 0: No memory when the machine stops 1: Shutdown memory	00	☆
PC-18	Simple PLC Segment 0 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-19	Simple PLC Section 0 Acceleration and deceleration time selection	0~3	0	☆
PC-20	Simple PLC Segment 1 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-21	Simple PLC Section 1 Acceleration and deceleration time selection	0~3	0	☆
PC-22	Simple PLC Segment 2 running time	0.0s (h) to 6500.0s (h)	0.0s (h	☆
PC-23	Simple PLC Section 2 Acceleration and deceleration time selection	0~3	0	☆
PC-24	Simple PLC Segment 3 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-25	Simple PLC Section 3 Acceleration and deceleration time selection	0~3	0	☆

Function Codes	Name	Set Scope	Factory values	Change
PC-26	Simple PLC Segment 4 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-27	Simple PLC Section 4 Acceleration and deceleration time selection	0~3	0	☆
PC-28	The operating time of the fifth segment of the simple PLC	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-29	Simple PLC Section 5 Acceleration and deceleration time selection	0~3	0	☆
PC-30	Simple PLC Segment 6 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-31	Simple PLC Section 6 Acceleration and deceleration time selection	0~3	0	☆
PC-32	Simple PLC Segment 7 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-33	Selection of acceleration and deceleration time in the 7th section of the simple PLC	0~3	0	☆
PC-34	Simple PLC Segment 8 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-35	Simple PLC Section 8 Acceleration and deceleration time selection	0~3	0	☆
PC-36	Simple PLC Section 9 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-37	Simple PLC Section 9 Acceleration and deceleration time selection	0~3	0	☆
PC-38	Simple PLC Segment 10 running time	0.0s (h) to 6500.0s (h)	0.0s (h	☆
PC-39	Selection of acceleration and deceleration time for the 10th section of the	0~3	0	☆

Function Codes	Name	Set Scope	Factory values	Change
	simple PLC			
PC-40	Simple PLC Section 11 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-41	Simple PLC Section 11 Acceleration and deceleration time selection	0~3	0	☆
PC-42	Simple PLC Section 12 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-43	Simple PLC Section 12 Acceleration and deceleration time selection	0~3	0	☆
PC-44	Simple PLC Section 13 Running time	0.0s (h) to 6500.0s (h)	0.0s (h	☆
PC-45	Simple PLC Section 13 Acceleration and deceleration time selection	0~3	0	☆
PC-46	Simple PLC Section 14 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-47	Simple PLC Section 14 Acceleration and deceleration time selection	0~3	0	☆
PC-48	Simple PLC Segment 15 running time	0.0s (h) to 6500.0s (h)	0.0s (h)	☆
PC-49	Simple PLC Section 15 Acceleration and deceleration time selection	0~3	0	☆
PC-50	Simple PLC operation time unit	0: s (seconds) 1: h (hour)	0	☆
PC-51	Multi-segment instruction 0 given mode	0: Function code PC-00 is given 1: AI 2: Keep 3: Panel potentiometer 4: Retain 5: PID 6: Preset frequency (P0-08) given, UP/DOWN modifiable	0	☆
Pd group communication parameters				
Pd-00	MODBUS communication baud	0 to 1: Hold 6:19,200 BPS 2:1200 BPS 7:38 400BPS	6	☆

Function Codes	Name	Set Scope	Factory values	Change
	rate	3:2400 BPS 8:57 600BPS 4:4800 BPS 9:11 5200BPS 5:9,600 BPS		
Pd-01	MODBUS data format	0: No parity (8-N-2) 1: Even parity (8-FU1) 2: Odd Parity (8-O-1) 3: No parity (8-N-1)	1	☆
Pd-02	Local address	1～247	1	☆
Pd-03	MODBUS response delay	0 to 20ms	2	☆
Pd-04	RS485 communication timeout	0.0: Invalid 0.1 to 60.0s	0.0 s	☆
Pd-05	MODBU protocol selection	0: Non-standard MODBUS protocol 1: Standard MODBUS protocol	1	☆
Pd-06	RS485 communication reads current resolution	0:0.01A 1. 0.1a	0	☆
Pd-07	RS485 communication protocol selection	0: K890 protocol 1: A900 protocol 2 to 10: Keep	0	☆
Pd-08	RS485 communication timeout detection selection	0: Valid throughout 1: Shutdown invalid	0	☆
PP group function code management				
PP-00	User password	0～65535	0	☆
PP-01	Parameter initialization	0: No action 1: Restore all user parameters except motor parameters to factory Settings 2: All user parameters are restored to factory Settings 3: Clear the record information	0	★
PP-02 ～ PP-03	Retain	-	0	☆
PP-04	Function code modifies attributes	0: Modifiable 1: Unmodifiable	0	☆
PP-05	Inverter Function Macro	0: General Mode 1 to 5: Keep 6: Single pump water supply (1	0	★

Function Codes	Name	Set Scope	Factory values	Change
		variable frequency pump) mode 7: Photovoltaic water supply voltage tracking mode 8: Photovoltaic water supply power tracking VF mode 9: Photovoltaic water supply power tracking SVC mode 10 to 100: Reserved Note: Initialize the parameters first, then set the macro functionality		
PF group manufacturer parameters				
PF-00	Manufacturer password	0~65535	0	★
A0 group of manufacturer parameters				
A0-00	Speed/torque control mode selection	0: Speed control 1: Torque control	0	★
A0-01	Torque setting source selection in torque control mode	0: Digital setting 1 (A0-03) 1: AI 2: Keep 3: Panel potentiometer 4: Retain 5: Communication given 6: Retain 7: Preserve (The full scale of the 1-7 option, corresponding to the A0-03 number setting)	0	★
A0-03	Torque digital setting in torque control mode	-200.0% to 200.0%	150.0%	☆
A0-05	Torque control forward maximum frequency	0.00Hz to maximum frequency	50.00 Hz	☆
A0-06	Torque control reverse maximum frequency	0.00Hz to maximum frequency	50.00 Hz	☆
A0-07	Torque rise filtering time	0.00s to 650.00s	0.00 s	☆
A0-08	Torque drop filtering time	0.00s to 650.00s	0.00 s	☆
Group A1 reserved				
Group A3 Water supply parameter group				

Function Codes	Name	Set Scope	Factory values	Change
A3-00 ~ A3-04	Keep	-	0	☆
A3-05	Pump sleep waiting time	0.0 to 3600.0 seconds	2.0	☆
A3-06	Pump wake-up wait time	0.0 to 3600.0 seconds	1.0	☆
A3-07	The pump wakes up the pressure point	(0.0 to 100.0%) * (A3-08)	80.0%	☆
A3-08	Preset pressure	0.00 ~ A3-09 (MPa, Kg)	5.00	☆
A3-09	Sensor range	0.00 to 100.00 (MPa, Kg)	10.00	☆
A3-10	Solar panel maximum power node	0.0% to 100.0%	81.0	☆
A3-11	VF speed regulation coefficient	0.000~2.000	1.000	☆
A3-12	MPPT high point operating voltage	(A3-13) ~ 200.0%	100.0%	☆
A3-13	MPPT low operating voltage	0.0% ~ (A3-12)	75.0%	☆
A3-14	MPPT high point voltage frequency point	0.00Hz to maximum frequency (P0-10)	50.00	☆
A3-15	MPPT low voltage frequency point	0.00Hz to maximum frequency (P0-10)	0.00	☆
A3-16	MPPT low-voltage protection point	40.0% to 100.0%	45.0%	☆
A3-17	Starting frequency for water shortage detection	0.00Hz to maximum frequency (P0-10)	10.00	☆
A3-18	The proportion of the no-load current corresponding to the water shortage detection current of the photovoltaic water pump	0.0% to 300.0%* no-load current (P1-10)	0.0	☆
A3-19	Photovoltaic water pump water shortage detection time	0 to 6000.0 seconds	0.0	☆
A3-20	Photovoltaic under-voltage	0.1 to 6000.0s (0.0 value turns off auto-start)	2.0	☆

Function Codes	Name	Set Scope	Factory values	Change
	auto-start delay			
A3-21	Photovoltaic water shortage self-start delay	0.1 to 6000.0s (0.0 value shuts off auto-start)	15.0	☆
A3-22	Power search time	0.050～60.000	0.500	☆
A3-23	Power search gain	10～500	125	☆
A3-24	Power search speed gain	1～1000	100	☆
A3-25	Pre-search upscaling time	0.01 to 600.00 seconds	15.00	☆
A3-26	Pre-search downclocking time	0.01 to 600.00 seconds	15.00	☆
A3-27	Pump sleep frequency	0.00 to upper limit frequency (P0-12)	20.00	★
Group A5 controls the optimization parameters				
A5-00	DPWM switches the upper limit frequency	0.00Hz to maximum frequency (P0-10)	8.00 Hz	☆
A5-01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
A5-02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode	1	☆
A5-03	Random PWM depth	0: Random PWM invalid 1 to 10: PWM carrier frequency random depth	0	☆
A5-04	Current-limiting enabled wave by wave	0: Do not enable 1: Enable	1	☆
A5-05	Voltage overmodulation coefficient	100～110	105	☆
A5-06	Under-voltage point setting	200.0V to 2000.0V	350.0 V	☆
A5-07	Keep	-	0	☆
A5-08	Dead time adjustment	100% to 200%	150%	★
A5-09	Overvoltage point setting	200.0V to 2200.0V	Model confirmed	★

Function Codes	Name	Set Scope	Factory values	Change
A5-10	Carrier automatic adjustment selection	Units: Overload carrier auto-adjustment 0: Prohibited 1: Effective Tens: Carrier automatic adjustment at startup 0: Prohibited 1: Effective Hundreds, thousands, tens of thousands: Hold	00011	☆
A5-11 ～ A5-12	Keep	-	0	☆

6.2 Brief Table of Monitoring Parameters

Function code	Name	Factory value	Change
d0 group basic monitoring parameters			
d0-00	Operating frequency (Hz)	0.01 Hz	7000H
d0-01	Set frequency (Hz)	0.01 Hz	7001H
d0-02	Bus voltage (V)	0.1 V	7002H
d0-03	Output voltage (V)	1V	7003H
d0-04	Output current (A)	0.01 A	7004H
d0-05	Output power (kW)	0.1 kW	7005H
d0-06	Output torque (%)	0.10%	7006H
d0-07	Terminal input status	1	7007H
d0-08	Terminal output status	1	7008H
d0-09	AI Voltage (V)/Current (mA)	0.01 V / 0.01 mA	7009H
d0-10	Retain	0.01 V	700AH
d0-11	Pressure feedback (MPa, Kg)	0.00	700BH
d0-12	Retain	0	700CH

Function code	Name	Factory value	Change
d0-13	Keep	0	700CH
d0-14	Load speed display	1	700EH
d0-15	PID Settings	1	700FH
d0-16	PID feedback	1	7010H
d0-17	PLC stage	1	7011H
d0-18	Retain	0	7012H
d0-19	Feedback speed (Hz)	0.01 Hz	7013H
d0-20	Remaining running time	0.1 Min	7014H
d0-21	Voltage (V)/current (mA) before AI correction	0.001 V / 0.01 mA	7015H
d0-22	Keep	0	7016H
d0-23	Pressure setting (MPa, Kg)	0.00	7017H
d0-24	Linear velocity	1m/Min	7018H
d0-25	Current power-on time	1Min	7019H
d0-26	Current running time	0.1 Min	701AH
d0-27	Keep	0	701BH
d0-28	Communication Settings	0.01%	701CH
d0-29	Keep	0	701CH
d0-30	Main frequency A shows	0.01 Hz	701FH
d0-31	Auxiliary frequency B shows	0.01 Hz	701FH
d0-32	Retain	0	7020H
d0-33	Keep	0	7021H
d0-34	Motor temperature values	1 ℃	7022H
d0-35	Target torque (%)	0.1%	7023H
d0-36	Keep	0	7024H
d0-37	Power factor Angle	0.1 °	7025H
d0-38	Input voltage (V)	0.0 V	7026H
d0-39	VF separates the target voltage	1V	7027H

Function code	Name	Factory value	Change
d0-40	VF separates the output voltage	1V	7028H
d0-41	Input terminal status is displayed intuitively	1	7029H
d0-42	Output terminal status is displayed intuitively	1	702AH
d0-43	Input terminal function status intuitive display 1 (Function 01-function 40)	1	702BH
d0-44	The function status of the input terminals is intuitively displayed 2 (Function 41- Function 80)	1	702CH
d0-45	Fault Information	1	702DH
d0-58	Keep	0	703AH
d0-59	Set frequency (%)	0.01%	703BH
d0-60	Operating frequency (%)	0.01%	703CH
d0-61	Inverter status	1	703DH
d0-62	Current Fault code	1	703EH
d0-63	Keep	0.00%	703FH
d0-64	Retain	0.01%	7040H
d0-65	Torque cap	0.10%	7041H
d0-66 ～ d0-78	Keep	-	-
d0-79	Set the temperature	1 ℃	704FH

Chapter 7 EMC (Electromagnetic Compatibility)

7.1 Definitions

Electromagnetic compatibility refers to the ability of electrical equipment to operate in an environment with electromagnetic interference without interfering with the electromagnetic environment and to perform its functions stably.

7.2 Introduction to EMC Standards

According to the requirements of the national standard

GB/T12668.3, the inverter needs to meet the requirements of both electromagnetic interference and anti-electromagnetic interference.

Our current products comply with the latest international standard: IEC/ EN61800-3:2004 (Adjustable speed electrical power drive systems part 3:) EMC requirements and specific test methods, equivalent to the national standard GB/T12668.3.

IEC/EN61800-3 examines frequency converters mainly from two aspects: electromagnetic interference and anti-electromagnetic interference. Electromagnetic interference mainly tests radiated interference, conducted interference and harmonic interference of frequency converters (corresponding to this requirement for frequency converters used for civilian purposes). Anti-electromagnetic interference mainly tests conducted immunity, radiated immunity, surge immunity, rapid burst immunity, ESD immunity and low-frequency power supply immunity (specific test items include:

1. Immunity tests for input voltage sags, interrupts and variations;
2. Commutation gap immunity test;
3. Harmonic input immunity test;
4. Input frequency variation test;
5. Input voltage unbalance test;
6. Conduct tests (input voltage fluctuation test). Tested in accordance with the strict requirements of the above IEC/EN61800-3, our products are installed and used in accordance with the instructions shown in 7.3 and will have good electromagnetic compatibility in general industrial environments.

7.3 EMC Guidance

7.3.1 Harmonics Effects:

Higher harmonics in the power supply can cause damage to the frequency converter. So in areas where the grid quality is poor, it is recommended to install an AC input reactor.

7.3.2 Electromagnetic interference and installation Precautions:

There are two types of electromagnetic interference: one is the interference of electromagnetic noise from the surrounding environment to the inverter, and the other is the interference generated by the inverter to the surrounding equipment.

Installation tips:

1) The grounding wire of the frequency converter and other electrical products should be well grounded;

2) The power input and output lines of the frequency converter and the weak current signal lines (e.g., control lines) should not be arranged in parallel as much as possible, and should be arranged vertically if there are strips.

3) For the output power lines of the frequency converter, it is recommended to use shielded cables or steel pipe shielded power lines, and the shielding layer should be reliably grounded. For the leads of disturbed equipment, it is recommended to use twisted-pair shielded control lines, and the shielding layer should be reliably grounded.

4) For motor cables longer than 100 meters, an output filter or reactor should be installed.

7.3.3 Methods for dealing with interference from peripheral electromagnetic equipment to the frequency converter:

The general cause of electromagnetic interference to the frequency converter is the installation of a large number of relays, contactors, or electromagnetic brakes near the frequency converter. When the inverter malfunctions due to interference,

the following solutions are recommended:

1) Install a surge suppressor on the device causing the interference;

2) Install a filter at the input of the frequency converter;

3) The leads of the control signal lines and detection lines of the frequency converter should be shielded cables, and the shielding layer should be reliably grounded.

7.3.4 How to deal with interference from the inverter to peripheral equipment:

This part of the noise is divided into two types: one is radiated interference from the frequency converter, and the other is conducted interference from the frequency converter. These two types of interference cause the surrounding electrical equipment to be subject to electromagnetic or electrostatic induction. This in turn causes the equipment to malfunction. For several different types of interference, refer to the following methods:

1) Instruments, receivers and sensors used for measurement usually have weak signals. If they are close to the frequency converter or in the same control cabinet, they are prone to interference and malfunction. It is recommended to use the following methods to solve the problem: Try to stay away from the interference source; Do not arrange the signal lines parallel to the power lines, especially not bundle them together in parallel; Signal lines and power lines should be shielded and well grounded; Add ferrite rings to the output side of the frequency converter (select to suppress frequencies within the range of 30 to 1000MHz), and wind 2 to 3 turns in the same direction. For harsh conditions, an EMC output filter can be installed.

2) When the interfered equipment and the inverter use the same power supply, it will cause conducted interference. If the above methods still cannot eliminate the interference, an EMC filter should be installed between the inverter and the power supply.

3) The peripheral equipment should be grounded separately to

eliminate the interference caused by leakage current in the grounding wire of the inverter when they share the ground.

7.3.5 Leakage Current and handling:

There are two forms of leakage current when using a frequency converter: one is leakage current to ground; The other is the leakage current between lines.

1) Factors affecting leakage current to the ground and solutions:

There is distributed capacitance between the wire and the ground. The greater the distributed capacitance, the greater the leakage current; Effectively reduce the distance between the inverter and the motor to reduce the distributed capacitance. The greater the carrier frequency, the greater the leakage current. The carrier frequency can be lowered to reduce the leakage current. But lowering the carrier frequency will cause an increase in motor noise. Note that installing a reactor is also an effective solution to leakage current.

The leakage current increases as the loop current grows, so when the motor power is high, the corresponding leakage current is also high.

2) Factors causing leakage current between lines and solutions:

There is distributed capacitance between the output lines of the inverter. If the current through the lines contains higher harmonics, it may cause resonance and result in leakage current. Using a thermal relay in this case may cause it to malfunction.

The solution is to lower the carrier frequency or install an output reactor. When using a frequency converter, it is recommended not to install a thermal relay between the frequency converter and the motor, and to use the electronic overcurrent protection function of the frequency converter.

7.3.6 Notes for Installing an EMC input filter at the power input:

1) Note: Use the filter strictly in accordance with the rated

values; ⚠Since the filter is a Class I electrical appliance, the metal casing of the filter should have a large area of good contact with the metal ground of the installation cabinet, and it is required to have good electrical continuity; otherwise, there will be an electric shock hazard and it will seriously affect the EMC effect;

2) Through EMC testing, it was found that the ground of the filter must be connected to the same common ground as the PE terminal ground of the frequency converter; otherwise, it will seriously affect the EMC effect.

3) Install the filter as close as possible to the power input of the inverter.

Chapter 8 Fault Diagnosis and Countermeasures

During operation, if an anomaly occurs, the inverter immediately blocks the PWM output and enters the fault protection state. At the same time, a flashing fault code on the keyboard indicates the current fault information. At the same time, the fault indicator ALM lights up. At this point, check the cause of the fault and the corresponding treatment method as indicated in this section. If the problem still cannot be solved, please contact our company directly. Please refer to Table 9-1 Fault Diagnosis and Troubleshooting for the corresponding solutions.

Table 8-1 Troubleshooting

Faults Name	Operation Panel Display	Troubleshooting	Troubleshooting countermeasures
Inverter unit protection	FU01	1. Short circuit in the inverter output circuit 2. The wiring between the motor and the inverter is too long 3. Module overheating 4. Loose wiring inside the inverter 5. Abnormality on the main control board 6. Abnormality of the driver board 7. Inverter module abnormality	1. Eliminate peripheral faults 2 Install a reactor or output filter 3 Check if the air duct is blocked, if the fan is working properly and eliminate any problems 4 Plug in all the wires 5 Seek technical support 6 Seek technical support 7 Seek technical support
Accelerate overcurrent	FU02	1 There is ground or short circuit in the inverter output circuit 2. The control mode is vector and no parameter identification is performed 3. The acceleration time is too short 4. Manual torque boost or an inappropriate V/F curve	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Increase the acceleration time 4 Adjust the manual boost torque or V/F curve 5 Adjust the voltage to the normal range 6 Select speed tracking start or wait for the

Faults Name	Operation Panel Display	Troubleshooting	Troubleshooting countermeasures
		5. Low voltage 6. Start a rotating motor 7. Sudden load increase during acceleration 8. The inverter is too small	motor to stop Then start again 7 Cancel the sudden load 8 Use a larger power rating inverter
Slow down overcurrent	FU03	1 There is ground or short circuit in the inverter output circuit 2. The control mode is vector and no parameter identification is performed 3. The deceleration time is too short 4. Low voltage 5. Sudden load increase during deceleration 6. No braking unit and braking resistor installed	1. Eliminate peripheral faults 2. Perform motor parameter identification 3 Increase deceleration time 4 Adjust the voltage to the normal range 5. Cancel the sudden load 6. Install braking units and resistors
Constant speed overcurrent	FU04	1 There is ground or short circuit in the inverter output circuit 2. The control mode is vector and no parameter identification is performed 3. Low voltage 4. Whether there is a sudden load during operation 5. The inverter is too small	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Adjust the voltage to the normal range 4. Cancel the sudden load 5 Use a larger power rating inverter
Accelerate overvoltage	FU05	1. High input voltage 2. There is an external force driving the motor during acceleration 3. Too short acceleration time 4. No brake unit and brake resistor installed	1 Adjust the voltage to the normal range 2 Remove additional power or add a braking resistor 3 Increase acceleration time 4 Add braking units and resistors
Decelerate overvoltage	FU06	1. High input voltage 2. There is an external force driving the motor during deceleration 3. The deceleration time	1 Adjust the voltage to the normal range 2 Remove additional power or add a braking resistor 3 Increase deceleration

Faults Name	Operation Panel Display	Troubleshooting	Troubleshooting countermeasures
		is too short 4. No braking unit or braking resistor was installed	time 4. Install brake units and resistors
Constant speed overvoltage	FU07	1. High input voltage 2. There is an external force driving the motor during operation	1 Adjust the voltage to the normal range 2 Remove additional power or add a braking resistor
Control power failure	FU08	The input voltage is not within the range specified by the specification	Adjust the voltage to the normal range
Under-voltage fault	FU09	1. Momentary power outage 2. The input voltage of the inverter is not within the range required by the specification 3. Abnormal bus voltage 4. The rectifier bridge and buffer resistor are not functioning properly 5. Abnormal driver board 6. Control board abnormality	1. Reset faults 2 Adjust the voltage to the normal range 3 Seek technical support 4 Seek technical support 5 Seek technical support 6 Seek technical support
Inverter overload	FU10	1. Whether the load is too heavy or the motor is locked 2. The inverter is too small	1. Reduce the load and check the motor and machinery 2 Use a higher power rating inverter
Motor overload	FU11	The three-phase input power supply is abnormal 2. Abnormal driver board 3. Lightning protection plate abnormality 4. Abnormality of the main control board	1 Check and eliminate problems in the peripheral circuits 2 Seek technical support 3 Seek technical support 4 Seek technical support
Input missing phase	FU12	1. The three-phase input power supply is abnormal 2. Abnormal driver board 3. Lightning protection plate abnormality 4. Abnormality of the main control board	1 Check and eliminate problems in the peripheral circuits 2 Seek technical support 3 Seek technical support 4. Seek technical support
Output missing phase	FU13	1. The lead from the inverter to the motor is not functioning properly	1. Troubleshoot peripheral faults 2 Check if the three-phase

Faults Name	Operation Panel Display	Troubleshooting	Troubleshooting countermeasures
		2. The three-phase output of the inverter is unbalanced when the motor is running 3. Abnormal drive board 4. Module abnormality	windings of the motor are functioning properly and eliminate any faults 3 Seek technical support 4 Seek technical support
Module overheating	FU14	1. Ambient temperature is too high 2. Air duct blockage 3. The fan is damaged 4. Module thermistor damage 5. The inverter module is damaged	1. Reduce the ambient temperature 2. Clean the air ducts 3. Replace the fan 4. Replace the thermistor 5. Replace the inverter module
External device failure	FU15	Input signals for external faults via multi-function terminal X	Reset operation
Communication failure	FU16	1. The host computer is not working properly 2. The communication line is not functioning properly 3. The communication expansion card P0-28 is not set up correctly 3. The Pd group of communication parameters is not set correctly	1. Check the upper computer wiring 2 Check the communication connection lines 3 Set the communication expansion card type correctly 4. Set communication parameters correctly
Current detection fault	FU18	1. Check for Hall device anomalies 2. Driver board anomaly	1. Replace Hall devices 2. Replace the driver board
Motor tuning failure	FU19	1. Motor parameters are not set as indicated on the nameplate 2. Parameter identification process timeout	1 Set the motor parameters correctly according to the nameplate 2 Check the inverter to motor leads
EEPROM read/write failure	FU21	1. The EEPROM chip is damaged	1. Replace the main control board
Inverter hardware failure	FU22	1. There is overvoltage 2. There is overcurrent	1. Handle as an overvoltage fault 2. Press overcurrent Fault
Cumulative running time reaches fault	FU26	Cumulative running time reaches the set value	Clear the record information using the parameter initialization

Faults Name	Operation Panel Display	Troubleshooting	Troubleshooting countermeasures
			function
User-defined faults 1	FU27	Input the user-defined fault 1 signal through the multifunction terminal X	Reset Run
User-defined faults 2	FU28	Enter the user-defined fault 2 signal via multi-function terminal X	Reset operation
Cumulative power-on time reaches fault	FU29	Cumulative power-on time reaches the set value	Use the parameter initialization function to clear the recorded information
Load drop failure	FU30	The operating current of the frequency converter is less than that of P9-64	Confirm whether the load is disconnected or whether the P9-64, P9-65 parameter Settings are in line with the actual operating conditions
Running PID Feedback loss fault	FU31	PID feedback is less than the PA-26 set value	Check the PID feedback signal or set PA-26 to a suitable value
Current-limiting faults wave by wave	FU40	1. Whether the load is too heavy or the motor is locked 2. The inverter is too small	1. Reduce the load and check the motor and machinery 2 Use a higher power rating inverter
Excessive speed deviation fault	FU42	1. No parameter identification was performed 2. Excessive speed deviation detection parameters P9-68 to P9-69 are set unreasonably	1. Identify the motor parameters 2 Set the detection parameters reasonably based on the actual situation
Incorrect initial position	FU51	The motor parameters deviate too much from the actual ones	Reconfirm that the motor parameters are correct, with a particular focus on whether the rated current is set too low
Master-slave control slave machine failure	FU55	If the slave fails, check the slave	Start troubleshooting according to the slave fault code
Brake tube protection failure	FU60	The braking resistor is short-circuited or the braking module is abnormal	Check the brake resistor or seek technical support

Faults Name	Operation Panel Display	Troubleshooting	Troubleshooting countermeasures
Photovoltaic water shortage detection faults	FU65	Photovoltaic water pump water shortage detection failure	See instructions A3-10 to A3-26

Table 8-2 Common Faults and How to Handle them

Serial Numbers	Fault phenomenon	Possible causes	Solution
1	No display when powered on	● There is no grid voltage or it is too low ● Switching power supply failure on the inverter drive board ● The rectifier bridge is damaged ● The inverter buffer resistor is damaged ● Control board, keyboard failure ● The connection between the control board and the driver board and keyboard is broken	● Check the input power ● Check the bus voltage ● Seek manufacturer service
2	Power-on display "P.OFF"	● Poor contact between the driver board and the control board ● The related components on the control board are damaged ● There is a short circuit to ground in the motor or motor wire ● Hall fault ● The grid voltage is too low	● Seek manufacturer service
3	When powered on, the inverter shows normal, and after running, it shows "P.OFF" and stops immediately	● The fan is damaged or blocked ● There is a short circuit in the peripheral control terminal wiring	● Replace the fan ● Rule out external short circuit faults

4	Frequent reports of FU14 (module overheating) faults	● The carrier frequency setting is too high ● The fan is broken or the air duct is blocked ● Damage to components inside the inverter (thermocouple or others)	● Reduce carrier frequency (P0-15) ● Replace the fan and clean the air duct ● Seek manufacturer service
5	The motor doesn't turn after the inverter is running	● Motors and motor wires ● The parameters of the frequency converter are set incorrectly (motor parameters) ● Poor contact between the driver board and the control board ● Driver board failure	● Reconfirm the connection between the inverter and the motor ● Replace the motor or clear mechanical faults ● Check and reset the motor parameters
6	Terminal X fails	● Incorrect parameter Settings ● External signal error ● Control board failure	● Check and reset the relevant parameters of group P07 ● Reconnect the external signal line ● Seek manufacturer service
7	The inverter frequently reports overcurrent and overvoltage faults	● The motor parameters are not set properly ● The acceleration and deceleration times are not appropriate ● Load fluctuation	● Reset motor parameters or perform motor tuning ● Set appropriate acceleration and deceleration times ● Seek manufacturer service
8	Power on all the digital tubes	● The related components on the control board are damaged	● Replace the control board

Appendix 1: Modbus Communication Protocol

The EV210 series converters offer RS485 communication interfaces and support Modbus-RTU slave communication protocol. Users can achieve centralized control via a computer or PLC, set inverter operation commands through this communication protocol, modify or read function code parameters, read the working status and fault information of the inverter, etc.

1. Protocol content

This serial communication protocol defines the content of the information transmitted in serial communication and the format used. This includes: host polling (or broadcast) format; The encoding method of the host, including: function codes that require actions, transmitted data, and error checks, etc. The slave's response also follows the same structure, including: action confirmation, return data, error checking, etc. If the slave makes an error while receiving the message, or fails to perform the action requested by the master, it will organize a fault message as a response and feed it back to the master.

2 Application mode

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

3. Bus structure

(1) Hardware interface

The inverter terminals 485+ and 485- are Modbus communication interfaces.

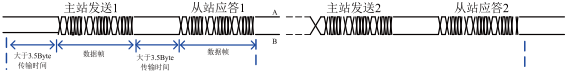
(2) Topological structure

Single-host multi-slave system. Each communication device in the network has a unique slave address. Among them, one device acts as the communication master (often a flat PC host, PLC, HMI, etc.), initiates communication, reads or writes parameters to the slave, and the other devices act as communication slaves, responding to the master's inquiries or communication operations

to their own devices. At any given moment, only one device can send data while the others are in the receiving state. Slave addresses are set in a range of 1 to 247, with 0 being the broadcast communication address. Slave addresses in the network must be unique.

(3) Mode of communication transmission

Asynchronous serial, half-duplex transmission mode. In serial asynchronous communication, data is sent in the form of messages, one frame at a time. According to the MODBUS-RTU protocol, when the idle time of no data on the communication data line is greater than the transmission time of 3.5 bytes, it indicates the beginning of a new communication frame.

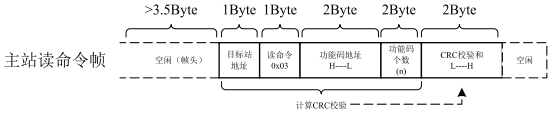


The communication protocol built into the EV210 series of frequency converters is the Modbus-RTU slave communication protocol, which can respond to the "query/command" of the host, or act accordingly based on the "query/command" of the host, and communicate the data response.

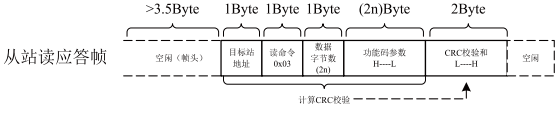
The host can refer to a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc. The host can not only communicate with a single slave but also broadcast information to all lower-level slaves. For a single access "query/command" to the host, the accessed slave is to return a response frame; For broadcast messages sent by the host, the slave does not need to give a feedback response to the host.

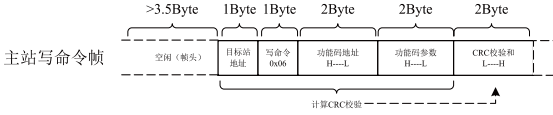
(4) Communication data structure

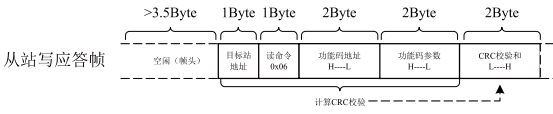
The Modbus protocol communication data format of the EV210 series frequency converter is as follows: The frequency converter only supports reading or writing of Word type parameters, and the corresponding communication read operation command is 0x03; The write operation command is 0x06, which does not support byte or bit read/write operations:

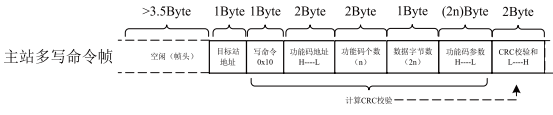


Theoretically, the host computer can read multiple consecutive parameters at once (i.e., up to 12 of them), but be careful not to skip the last parameter of this parameter group, otherwise the response will be incorrect.

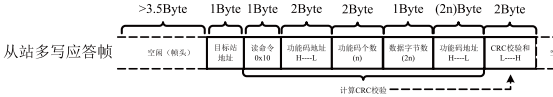








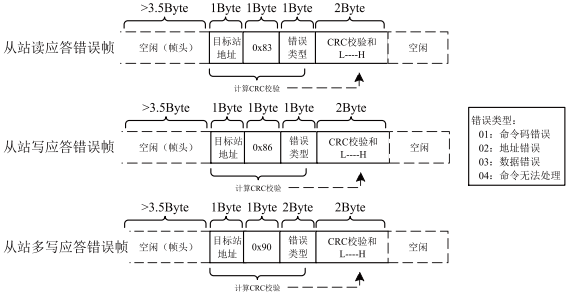
Multiwrite, like multiread, can only operate on a maximum of 12 parameters in a row.



If the slave machine detects a communication frame error, or for some other reason the read/write fails, it will reply with the error frame.

Note: CRC check errors do not respond.

The slave's read response error command is 0x83, the write response error command is 0x86, and the multiwrite response error command is 0x90:



Data frame field description:

Frame header START	Idle for more than 3.5 character transfer times
Slave address ADR	Communication address range: 1 to 247; 0 = Broadcast address
Command code CMD	03: Read slave parameters; 06: Write slave parameters; 10: Write multiple slave parameters
Function code address H	The parameter address inside the frequency converter, represented in hexadecimal. It is divided into functional code type and non-functional code type (such as running status parameters, running commands, etc.) parameters, etc. See the address definition. When transmitting, the high byte comes first, followed by the low byte.
Function code address L	
Number of function codes H	The number of function codes read in this frame, if 1, indicates reading 1 function code. When transmitting, the high byte comes first, followed by the low byte. This protocol can only rewrite one function code at a time and does not have this field.
Number of function codes L	
Data H	The response data, or the data to be written, is sent with the high byte first and the low byte behind.
Data L	
CRC high position	Detection value: CRC16 check value. When transmitted, the lower byte comes first, followed by the higher byte. For the calculation method, see the instructions for
CRC low bits	

	CRC check in this section.
END	3.5 characters

CRC check method:

CRC (Cyclical Redundancy Check) uses the RTU frame format, and the message includes the error detection domain based on the CRC method. The CRC field checks the entire content of the message. A CRC field is two bytes and contains 16-bit binary values. It is calculated by the transmission 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, it indicates a transmission error.

CRC is first stored at 0xFFFF and then a procedure is invoked to process consecutive 8-bit bytes in the message against the value in the current register. Only 8 bits of data per character are valid for CRC; start bits, stop bits, and parity bits are invalid.

During CRC generation, each 8-bit character is XOR separately with the register content, and the result moves towards the least significant bit and fills the most significant bit with 0. The LSB is extracted for detection. If the LSB is 1, the register is XORED separately with the preset value, and if the LSB is 0, it does not. The entire process is repeated eight times. After the last bit (the 8th bit) is completed, the next 8-bit byte is XORED separately with the current value of the register. The final value in the register is the CRC value after all the bytes in the message have been executed.

When CRC is added to the message, the lower byte is added first, followed by the higher byte. The simple CRC function is as follows:

```
unsigned int crc_chk_value (unsigned char *data_value,
unsigned char length)
{
unsigned int crc_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);
    }
```

Address definition of the communication parameter:

Read and write function code parameters (Some function codes cannot be changed and are only for manufacturer use or monitoring purposes).

4 Parameter address marking rules

Rule for parameter address representation by parameter group number and label:

High byte: F0 to FF (Group P), A0 to AF (Group A), 70 to 7F (Group d);

Lower byte: 00 ~ FF

For example: If you want the range function code P3-12, the access address of the function code is represented as 0xF30C;

Note: Some parameters cannot be changed when the inverter is in operation; Some parameters cannot be changed regardless of the state the inverter is in; When changing the function code parameters, pay attention to the range, unit and related instructions of the parameters.

Function code group number	Communication Access Address	Communication modifies the function code address in RAM

P0 to PE group	0xF000 to 0xFEFF	0x0000 to 0x0EFF
Groups A0 to AC	0xA000 to 0xACFF	0x4000 to 0x4CFF
Group d0	0x7000 to 0x70FF	

Note that since the EEPROM is frequently stored, which reduces its lifespan, some function codes do not need to be stored in communication mode; just change the values in RAM.

5 Shutdown/Running Parameters section

Parameter address	Parameter Description	Parameter address	Parameter Description
1000H	* Communication Settings (decimal) -10000 to 10000	1010H	PID Settings
1001H	Operating frequency	1011H	PID feedback
1002H	Bus voltage	1012H	PLC Steps
1003H	Output voltage	1013H	Keep
1004H	Output current	1014H	Feedback speed, in 0.1Hz
1005H	Output power	1015H	Remaining running time
1006H	Output torque	1016H	AI corrects the pre-voltage
1007H	Running speed	1017H	Keep
1008H	Digital input terminal input mark	1018H	Panel potentiometer calibrates pre-voltage
1009H	Digital output terminal output mark	1019H	Linear velocity
100AH	AI voltage	101AH	Current power-on time
100BH	Keep	101BH	Current running time
100CH	Panel potentiometer voltage	101CH	Keep
100DH	Keep	101DH	Communication setting value
100EH	Keep	101EH	Actual feedback speed
100FH	Load speed	101FH	Main frequency A shows
-	-	1020H	Auxiliary frequency B shows

Note:

Communication Settings are percentages of relative values,

10000 corresponds to 100.00%, -10000 corresponds to -100.00%.

Control command input to the inverter: (Write only)

Command word address	Command Functionality
2000H	0001: Forward running
	0002: Reverse operation
	0003: Forward rotation jog
	0004: Reverse jog
	0005: Free stop
	0006: Deceleration stop
	0007: Fault Reset

Read inverter status: (read-only)

Status word address	Status word function
3000H	0001: Forward rotation operation
	0002: Reverse operation
	0003: Shutdown

Parameter lock password check: (If it returns 8888H, the password check passes)

User password address	Enter the content of the password
1F00H	*****

Parameter initialization:

Command address	Command Content
AF01H	0 to FFFF represents 0 to 65535

Digital output terminal control: (write only)

Command Address	Command Content
2001H	BIT0 to BIT1: Hold BIT2: R output control BIT3: Hold

Analog output AO control: (Write only)

Command Address	Command Content
2002H	0 to 7FFF represents 0% to 100%

6. Inverter fault description

Inverter fault address	Inverter fault information	
8000H	0000: No fault 0001: Retained 0002: Accelerate overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Acceleration overvoltage 0006: Deceleration overvoltage 0007: Constant speed overvoltage 0008: Buffer Resistor overload fault 0009: Under-voltage fault 000A: Inverter overload 000B: Motor overload 000C: Input phase loss 000D: Output phase loss 000E: Module overheating 000F: External failure 0010: Communication anomaly 0011: Retain	0012: Current detection failure 0013: Motor tuning failure 0014: Hold 0015: Parameter read-write exception 0016: Inverter hardware failure 0017: Retain 0018: Reserve 0019: Reserve 001A: The running time has arrived 001B: User-defined Fault 1 001C: User-defined Fault 2 001D: Power-on time arrives 001E: Unloaded 001F: Missing runtime PID feedback 0028: Fast current limiting timeout failure 002A: Excessive speed deviation 005C: Incorrect initial position

Inverter fault address	Inverter fault information
	0041: Photovoltaic water shortage detection failure

7. The meaning of the error code for the slave's response to abnormal information

Error code address	Error code	Instructions
8001H	01H	Incorrect password
	02H	Read/Write command error
	03H	CRC check error
	04H	Invalid address
	05H	Invalid parameters
	06H	Parameter changes invalid
	07H	System Lock
	08H	Storing parameters

Appendix 2: Instructions for Setting macro parameters

Function macro definition	Setting parameters	Automatically modify Parameter list	Debugging Steps
Single pump water supply (1 variable frequency pump) mode	P0-00=6	P0-03=10; P7-02=11; P7-03=80; P7-04=2002; P7-05=11; P7-06=11; PA-00=7.	**Step1:** Determine the sensor feedback type. AI factory default input voltage feedback signal, or select AI input current feedback signal via patch socket J5; **Step2:** Terminal wiring. If the pressure gauge has an output of 0 to 10V, connect the signal line of the pressure gauge to AI, and the other two lines to +10V and GND respectively. If the output is 0 ~ 20mA, connect the pressure sensor signal line to AI and the other line to 24V. **Step3:** Parameter initialization (PP-01=2); **Step4:** Setting the sensor range (A3-09);

			Step5: Function macro selection P0-00=6; **Step6:** Set the target pressure, which can be set by parameter A3-08 or by the up and down keys on the keyboard.
Photovoltaic water supply voltage tracking mode	P0-00=7	P0-03=11; P0-17=7.5; P0-18=7.5; P9-45=1.	**Step1:** Parameter initialization (PP-02=2); P0-03=11. **Step2:** Function macro selection (P0-00=7, 8, 9). Note: Refer to A3-10 to A3-26 for photovoltaic water supply.
Photovoltaic water supply power and VF mode	P0-00=8		
Photovoltaic water supply power tracking SVC mode	P0-00=9		

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The company is committed to the continuous improvement of the product, and the product features will be continuously upgraded. The information provided is subject to change without further notice.