High-performance current vector frequency converter

EV210B series (Asynchronous)

User Manual

Previous remarks

First of all, thank you for purchasing the EV210B series of high-performance current vector converters!

The EV210B 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, 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 EV210B 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 EV210B
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	EV210B User manual and corresponding accessories

Catalogues

Chapter 1 Security Information and Precautions

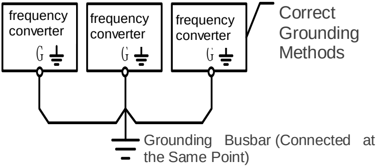
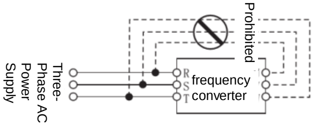
When installing, commissioning and maintaining this system, users are requested to read this chapter carefully and be sure to follow the safety precautions required in this chapter. The Company is not responsible for any injury or loss resulting from the violation of operating procedures.

1.1 Marking and Definition of Safety Information

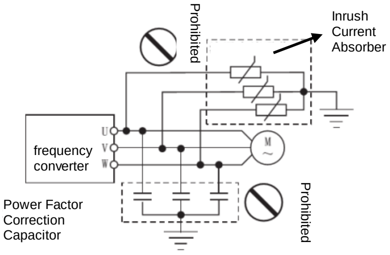
Marking	Definition
Danger	This symbol indicates an accident that may result in death or serious injury if not performed as required.
Warnings	This symbol indicates that failure to operate as required will result in moderate personal injury or minor injury and some material loss.
Note	This symbol indicates 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.
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℃. If the temperature exceeds 40℃, remove the top cover. If it exceeds 50℃, 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.

Stages of Use	Safety Grade	Items
		● 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.  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.

Stages of Use	Safety Grade	Items
	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. 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.
	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.

Stages of Use	Safety Grade	Items
		 Figure 1-3
	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

EV210 - 0007G - T4
① ② ③

① Product Line

② Power Code:
0007：0.75kW
G:General-Purpose

③ Voltage Rating:
S2:Single-Phase220V
T4:Three-Phase 380V

Figure 2-1 Naming Specifications

2.2 Technical Specifications

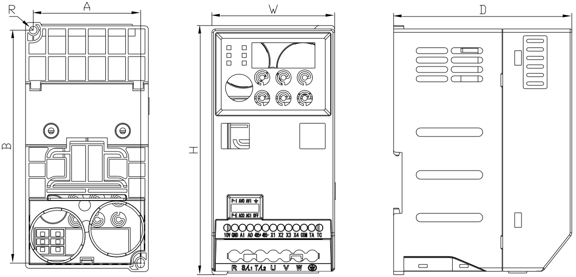
Item		Grid	
Input voltage		Three-phase AC380V ±10%; Single-phase AC220V ±10%	
Input frequency		50/60Hz	
Output voltage		0 to input voltage	
Output frequency		Vector control: 0-500Hz V/F control: 0-500Hz	
Overload capacity		150% rated current for 60 seconds; 180% rated current 3 seconds	
Control mode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

Item			Grid	
				Speed fluctuation: ≤± 0.5% rated synchronous speed 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 RS485communication		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
			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,	

Item		Grid
		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
Environment	Ambient temperature	-10℃ to +40℃ (If ambient temperature is between 40℃ and 50℃, 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

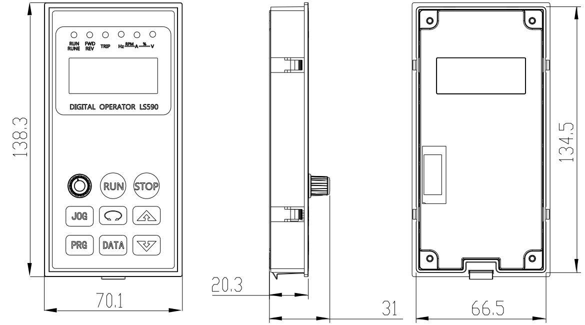
2.3 Chassis and panel dimensions

■ 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
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 panel mounting size:



2.4 Rated output ammeter

Inverter model	Power capacity KVA	Input current A	Output Current A	Compatible motor kW
EV210B-0004G-S2	1.0	5.4	2.3	0.4
EV210B-0007G-S2	1.5	8.2	4.0	0.75
EV210B-0015G-S2	3.0	14.0	7.0	1.5
EV210B-0022G-S2	4.0	23.0	9.6	2.2
EV210B-0007G-T4	1.5	3.4	2.1	0.75
EV210B-0015G-T4	3.0	5.0	3.8	1.5
EV210B-0022G-T4	4.0	5.8	5.1	2.2
EV210B-0040G-T4	5.9	10.5	9.0	4.0
EV210B-0055G-T4	8.9	14.6	13.0	5.5
EV210B-0075G-T4	11.0	20.5	16.0	7.5
EV210B-0110G-T4	17.0	26.0	24.0	11
EV210B-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
EV210B-0004G-S2	80	200	125
EV210B-0007G-S2	80	150	125
EV210B-0015G-S2	100	100	125
EV210B-0022G-S2	100	70	125
EV210B-0007G-T4	100	750	125
EV210B-0015G-T4	300	400	125
EV210B-0022G-T4	300	250	125
EV210B-0040G-T4	400	150	125
EV210B-0055G-T4	500	100	125
EV210B-0075G-T4	1000	75	125
EV210B-0110G-T4	3000	43	125
EV210B-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℃ to +65℃;
- 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℃ to 40℃ 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.

Please make sure to set the parameters of the frequency converter 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

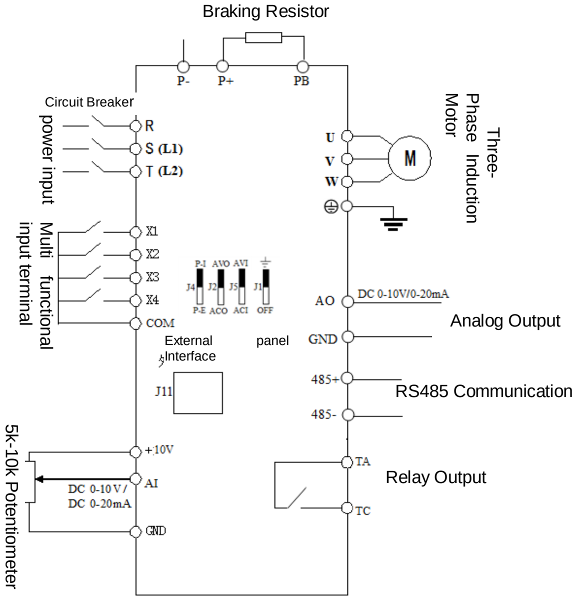
R	S	T	P+	PB	U	V	W	⏚

■ 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 panel potentiometer (default built-in panel potentiometer works)
P-E mode	Indicates the selection of the external panel 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.

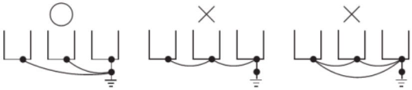
4.4.2 Control Circuit Wiring (Signal lines)

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.



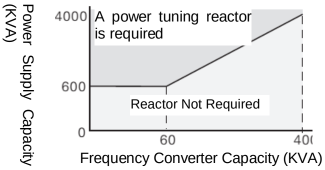
(a) correct (b) incorrect (c) incorrect

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.



Installation Conditions for Reactors

(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

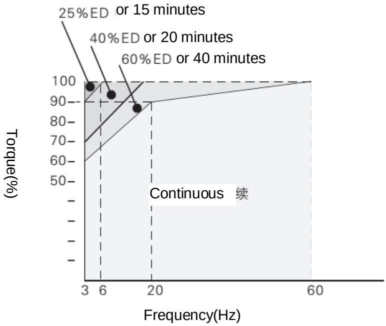
When the inverter is used for reciprocating loads (such as cranes, elevators, punch presses, washing machines, etc.), the IGBTs inside the inverter will have a shortened lifespan due to thermal fatigue if currents repeatedly flow through 150% or more than that value. As a rough standard, at a carrier 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.



Allowable Load Characteristics of Our Standard Motors

(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.

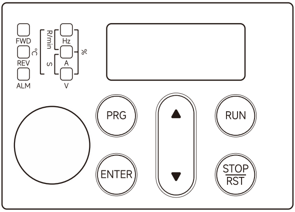
(3) Power transmission structure (reducer, belt, chain, etc.)

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	Under the Monitoring Menu, a short press enables navigation; there is no confirmation function. Under the 1st-level Menu and 2nd-level Menu, a short press acts as a confirmation; navigation is not supported. Under the 3rd-level Menu, a short press allows navigation, while a long press is for confirmation.
▲	Incrementing keys	Increment the data or function code
▼	Decrement key	Decrement of data or function code
RUN	Run keys	Run operations in panel operation mode
STOP/RESET	Stop/Reset key	The stop/reset operation

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 (1st menu);
2. Function code labels (2nd menu);
3. Function code Settings (3rd 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 panel 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
Group P0 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: Reserved 4: Panel potentiometer 5: Reserved 6: Multi-segment instructions 7: Simple PLC 8: PID 9: Communication given	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	☆

Function Codes	Name	Set Scope	Factory values	Change
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 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	00	☆
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 3: Panel potentiometer 1: AI 4: Reserved 2: Reserved 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	☆
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	☆

Function Codes	Name	Set Scope	Factory values	Change
P0-19	Acceleration and deceleration time units	0:1 s 1:0.1 s 2:0.1 s	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	Reserved	-	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: Reserved 4: Panel potentiometer 5: Reserved 6: Multi-speed 7: Simple PLC 8: PID 9: Communication given Tens: Terminal command binding frequency source selection Hundred: 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: Reserved	0	☆
Group P1 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	★

Function Codes	Name	Set Scope	Factory values	Change
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	Reserved	-	0	★
P1-37	Tuning selection	0: No action 1: Asynchronous machine stationary part parameter self-learning 2: Asynchronous machine dynamic complete self-learning 3: Asynchronous machine static complete self-learning	0	★
Group 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	0.50s	☆
P2-02	Switching frequency 1	0.00 to P2-05	5.00 Hz	☆
P2-03	Speed loop proportional gain 2	1～100	15	☆
P2-04	Speed loop integral time 2	0.01s to 10.00s	1.00 s	☆

Function Codes	Name	Set Scope	Factory values	Change
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	0.040 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: Reserved 3: Panel potentiometer 4: Reserved 5: Communication given 6: Reserved 7: Reserved 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 regulates integral gain	0～60000	1300	☆
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	Reserved	-	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	☆
Group P3 V/F Control Parameters				
P3-00	VF curve 3 Settings	0: Linear V/F 1: Multi-point V/F 2: Square-Law V/F	0	★

Function Codes	Name	Set Scope	Factory values	Change
		3:to the power of 1.2 V/F 4 to the power of 1.4 V/F 5: Reserved 6 to the power of 1.6 V/F 7: Reserved 8 to the power of 1.8 V/F 9: Reserved 10: VF complete separation mode 11: VF semi-separation mode		
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 frequency points F2	P3-03 to P3-07	0.00 Hz	★
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: Reserved 3: Panel potentiometer 4: Reserved 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	☆

Function Codes	Name	Set Scope	Factory values	Change
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	☆
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	Model determination	☆
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	Reserved	-	0	☆
Group P4 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) 5: Reverse jog (RJOG)	1	★
P4-01	Function selection of terminal X2		4	★
P4-02	Function selection of terminal X3		9	★
P4-03	Function selection of terminal X4		12	★
P4-04	Reserve		0	★

Functio n Codes	Name	Set Scope	Factory values	Chan ge
～ P4-09		6: Terminal UP 7: Terminal DOWN 8: Free parking 9: Fault RESET 10: Run pause 11: External Fault Normally Open Input 12: Multi-speed Selection 1 13: Multi-speed Selection 2 14: Multi-speed Selection 3 15: Multi-speed Selection 4 16: Acceleration/deceleration time selection terminal 1 17: Acceleration/deceleration time selection terminal 2 18: Frequency source switching 19: UP/DOWN Settings Reset (terminals, Panel) 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: Reserved 31: Reserved 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 39: Frequency Source A switches to preset frequency 40: Frequency Source B switches to the preset frequency 41: Reserved 42: Reserved 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		

Function Codes	Name	Set Scope	Factory values	Change
		49: Deceleration DC braking 50: Reset the current running time 51: Two-wire/three-wire switch 52: Do not reverse 53-58: Reserved		
P4-10	X Filter time	0.000s to 1.000s	0.010 s	☆
P4-11	Terminal command mode	0: Two-wire 1 2: Three-line 1 1: Two-line 2 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	Reserved	-	0	☆
P4-23	Panel potentiometer minimum input	-10.00V ~ P4-25	0.00 V	☆
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	8.60 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	Reserved	-	0	☆
P4-33	Reserved	-	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	★

Function Codes	Name	Set Scope	Factory values	Change
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	Reserved	-	0	★
Group P5 Output Terminals				
P5-00 ～ P5-01	Reserved	-	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: Reserved 17: Upper limit frequency arrives 18: Lower limit frequency arrival (related to operation) 19: Under-voltage state output 20: Communication Settings 21: Reserved 22: Reserved 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	2	☆
P5-03 ～ P5-05	Reserved		0	☆

Function Codes	Name	Set Scope	Factory values	Change
		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 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: Reserved		
P5-06	Reserved	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) 5:Output voltage (1.2 times the rated voltage of the frequency converter) 6: Reserved 7: AI 8 to 11: Reserved 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	Reserved		0	☆
P5-09	Reserved	-	0	☆
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	Reserved	-	0	☆
P5-18	R output delay time	0.0s to 3600.0s	0.0 s	☆
P5-19 ～ P5-21	Reserved	-	0	☆

Function Codes	Name	Set Scope	Factory values	Change
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	☆
Group P6 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	★
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%	☆

Function Codes	Name	Set Scope	Factory values	Change
P6-18	Speed tracking current	30% to 200%	Model determination	☆
P6-21	Speed tracking delay	0.00 to 5.00 s	Model determination	☆
		Group P7 Panel and Display		
P7-01	Reserve	-	0	★
P7-02	STOP/RESET key function	0: The STOP/RES key shutdown function works only in Panel operation mode 1: The STOP/RES key shutdown function works in any mode of operation	1	☆
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	-	●
P7-17	Display Selection 1	0～73	0	☆
P7-18	Display Selection 2	0～73	1	☆
P7-19	Display Selection 3	0～73	2	☆
P7-20	Display Selection 4	0～73	3	☆
Group P8 Auxiliary Functions				
P8-00	Jog frequency	0.00Hz to maximum frequency	2.00 Hz	☆

Function Codes	Name	Set Scope	Factory values	Change
P8-01	Jog acceleration time	0.0s to 6500.0s	20.0 s	☆
P8-02	Jog 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 protection selection	0: Not protected 1: Protection 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.	0	☆
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	☆

Function Codes	Name	Set Scope	Factory values	Change
P8-23 ～ P8-24	Reserved	-	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 detection value 2	0.00Hz to maximum frequency	50.00 Hz	☆
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 s to 600.00 s	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: Reserved 3: Panel potentiometer	0	☆

Function Codes	Name	Set Scope	Factory values	Change
		Note: The analog input range corresponds to P8-42		
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	Frequency Mode Wake-Up frequency	Dormancy frequency (P8-51) to maximum frequency (P0.10)	0.00 Hz	☆
P8-50	Frequency Mode Wake-up delay time	0.0s to 6500.0s	0.0 s	☆
P8-51	Frequency Mode Dormancy frequency	0.00Hz to wake frequency (P8-49)	0.00 Hz	☆
P8-52	Frequency Mode 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%	☆
P8-55	Sleep mode selection	0： Frequency Mode 1： Pressure Mode	0	☆
P8-56	Pressure mode overpressure setting	0. 0% to 200.0%	150.0%	☆
P8-57	Pressure mode, sleep pressure setting	90. 0% to 100.0%	98.0%	☆
P8-58	Pressure mode wake-up pressure setting	0. 0% to 100.0%	35.0%	☆
P8-59	Pressure mode sleep frequency setting	0.00Hz to Wake frequency（P8-60）	30.00Hz	☆
P8-60	Pressure mode wake-up frequency setting	Dormancy frequency（P8-59）to maximum frequency（P0.10）	40.00Hz	☆
P8-61	Pressure mode wake-up delay setting	0. 0s～6500.0s	3.0s	☆
P8-62	Pressure mode sleep delay setting	0. 0s～6500.0s	5.0s	☆
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	☆

Function Codes	Name	Set Scope	Factory values	Change
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	Model confirmed	☆
P9-05	Pass the loss rate gain	0～100	20	☆
P9-06	Overcurrent velocity protection current	100% to 200%	150%	☆
P9-07	Reserved	-	0	☆
P9-08	Brake start voltage	200.0 to 2000.0V	Model confirmed	☆
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 s to 100.0 s	1.0 s	☆
P9-12	Enter the phase loss protection selection	0: Prohibited (inverter power ≤11kW) 1: Allowed (inverter power >11kW)	Model determination	☆
P9-13	Output phase loss protection selection	0: Prohibited 1: Allow	1	☆
P9-14	First failure type	0: No fault 1: Reserved 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 19: Motor tuning anomaly 20: Reserved 21: Parameter read-write exception 22: Inverter hardware anomaly 23: Reserved 24: Reserved 25: Reserved 26: Running time arrives 27: Reserved 28: Reserved 29: Power-on time arrives 30: Load drop 31: Missing PID feedback at runtime 40: Fast rate limiting timeout 41: Switching motors	—	●

Function Codes	Name	Set Scope	Factory values	Change
		overheating 15: External failure 16: Communication anomaly 17: Reserved 18: Abnormal current detection while running 42: Excessive speed deviation 43: Motor overspeed 45: Motor overheating 51: Incorrect initial position		
P9-15	Second failure type	—	—	●
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 second failure	—	—	●
P9-33	Power-on time during the second failure	—	—	●

Function Codes	Name	Set Scope	Factory values	Change
P9-34	Running time during the second failure	—	—	●
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	—	—	●
P9-47	Fault protection action option 1	Units: Motor Overload (FU11) 0: Free stop 1: Stop in the stop mode 2: Keep running Tens: Input missing phase (FU12) Hundreds: Output missing phase (FU13) Thousands: External fault (FU15) Ten thousand bits: Communication Anomaly (FU16)	OOOOO	☆
P9-48	Fault protection action option 2	Units: Reserved 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)	OOOOO	☆
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	OOOOO	☆

Function Codes	Name	Set Scope	Factory values	Change
		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		
P9-50	Fault protection action option 4	Units: Excessive speed deviation (FU42) 0: Free parking 1: Stop in the stop mode 2: Keep running Tens, hundreds, thousands, tens of thousands: hold	OOOOO	☆
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	Reserved	-	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 s	1.0 s	☆
P9-66	Reserved	-	0	☆

Function Codes	Name	Set Scope	Factory values	Change
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 s	5.0 s	☆
P9-69	Excessive speed deviation detected value	0.0% to 50.0% (maximum frequency)	20.0%	☆
P9-70	Excessive speed deviation detects time	0.0s: Not detected 0.1 to 60.0 s	5.0 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 s	20.0 s	☆
Group PA PID Function				
PA-00	PID Given source	0: PA-01 Settings 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 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: Reserved	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 limiting	0.00% to 100.00%	0.50%	☆
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 s	0.00 s	☆

Function Codes	Name	Set Scope	Factory values	Change
PA-13	PID output filtering time	0.0 to 600.0 s	100.0 s	☆
PA-14	Reserved	-	-	☆
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 s to 10,000 s	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	Reserved	-	0	☆
PA-25	PID integral Property	Units digit: Integral separation 0: Invalid 1: Valid Tens digit: Whether to stop integration when output reaches limit value 0: Continue integration 1: Stop integration	0.0%	☆
PA-26	PID feedback misses detection value	0.0% : No judgment of feedback loss 0.1% to 100.0%	0.0%	☆
PA-27	PID feedback loss detection time	0.0 s to 20.0 s	0.0 s	☆
PA-28	PID shutdown operation	0: Stop the operation 1: Compute when the machine is shut down	0	☆
Group PB Wobble Function,Fixed Length And Count				
PB-00	Swing frequency setting method	0: Relative to center frequency 1: Relative to the maximum frequency	0	☆
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	☆

Function Codes	Name	Set Scope	Factory values	Change
PB-04	The rise time of the triangular wave of the swing frequency	0.1% to 100.0%	50.0%	☆
PB-05	Set length	0～65535m	1000	☆
PB-06	Actual length	0～65535m	0	☆
PB-07	Number of pulses per meter	0.1～6553.5m	100.0	☆
PB-08	Set count values	1～65535	1000	☆
PB-09	Specify count values	1～65535	1000	☆
Group PC 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%	☆
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%	☆

Function Codes	Name	Set Scope	Factory values	Change
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	OO	☆
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	☆
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)	☆

Function Codes	Name	Set Scope	Factory values	Change
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 simple PLC	0～3	0	☆
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	☆

Function Codes	Name	Set Scope	Factory values	Change
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: Reserved 3: Panel potentiometer 4: Reserved 5: PID 6: Preset frequency (P0-08) given, UP/DOWN modifiable	0	☆
Group Pd Communication Parameters				
Pd-00	MODBUS communication baud rate	0 to 1: Hold 2:1200 BPS 3:2400 BPS 4:4800 BPS 5:9,600 BPS 6:19,200 BPS 7:38 400BPS 8:57 600BPS 9:11 5200BPS	5	☆
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)	3	☆
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	Units digit: Modbus 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol	31	☆

Function Codes	Name	Set Scope	Factory values	Change
Pd-06	RS485 communication reads current resolution	0:0.01A 1. 0.1a	0	☆
Pd-07 ～ Pd-08	Reserved	0	0	☆
Group PF Manufacturer Parameters				
PF-00	Manufacturer password	0～65535	0	★
Group PP Function Parameters 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	Reserved	-	0	☆
PP-04	Function code modifies attributes	0: Modifiable 1: Unmodifiable	0	☆
PP-05	Parameter Macro	0：Parameterless Macro 1：Negative pressure machine parameter macro 2：Constant pressure water supply parameter macro	0	★
Group A0 Torque Control and Limit				
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: Reserved 3: Panel potentiometer 4: Reserved 5: Communication given 6: Reserved 7: Reserved (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	☆

Function Codes	Name	Set Scope	Factory values	Change
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 A5 Controls 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	Current detection delay time	0～100	0	☆
A5-06	Under-voltage point setting	200.0V to 2000.0V	Model determination	☆
A5-07	Reserved	-	0	☆
A5-08	Dead time adjustment	100% to 200%	150%	★
A5-09	Overvoltage point setting	200.0V to 2200.0V	Model confirmed	★
Group AC AIAO Calibration				
AC-00	AI1 Measured voltage 1	-10.00V～10.000V	出厂校正	☆
AC-01	AI1 Display Voltage 1	-10.00V～10.000V	出厂校正	☆
AC-02	AI1 Measured voltage 2	-10.00V～10.000V	出厂校正	☆
AC-03	AI1 Display Voltage 2	-10.00V～10.000V	出厂校正	☆
AC-12	AO1 Target Voltage 1	-10.00V～10.000V	出厂校正	☆
AC-13	AO1 Measured voltage 1	-10.00V～10.000V	出厂校正	☆
AC-14	AO1 Target Voltage 2	-10.00V～10.000V	出厂校正	☆
AC-15	AO1 Measured voltage 2	-10.00V～10.000V	出厂校正	☆

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	Reserved	0.01 V	700AH
d0-11	Panel potentiometer voltage(AI3)	0.01V	700BH
d0-12	Reserved	0	700CH
d0-13	Reserved	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	Reserved	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	Reserved	0	7016H
d0-23	Panel potentiometer voltage(AI3) before AI correction	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	Reserved	0	701BH

Function code	Name	Factory value	Change
d0-28	Communication Settings	0.01%	701CH
d0-29	Reserved	0	701CH
d0-30	Main frequency A shows	0.01 Hz	701FH
d0-31	Auxiliary frequency B shows	0.01 Hz	701FH
d0-32	Reserved	0	7020H
d0-33	Reserved	0	7021H
d0-34	Motor temperature values	1℃	7022H
d0-35	Target torque (%)	O.1%	7023H
d0-36	Reserved	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
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	Reserved	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	Reserved	0.00%	703FH
d0-64	Reserved	0.01%	7040H
d0-65	Torque Cap	0.10%	7041H
d0-66 ～ d0-74	Reserved	-	-

Chapter 7 Detailed Function Description

Group P0 Basic Function Group

P0-01	Motor control mode	
	0～2	2

0: Sensorless vector control (SVC)

The true current vector control mode. In addition to the high torque output performance of the flux control mode, this control mode also has a flexible torque output effect, which can be described as a combination of rigidity and flexibility. However, this control mode is sensitive to motor parameters, so it is best to enable dynamic self-learning of motor parameters before use; otherwise, the effect will be poor.

1: Reserved

2: V/F control

This is the control mode to select when a single frequency converter is required to drive more than one motor, and when accurate motor parameter self-learning cannot be performed or the parameters of the controlled motors cannot be obtained through other means.

It is the most commonly used motor control mode and can be adopted in any application scenario where high requirements for motor control performance are not needed.

P0-02	Command source selection	
	0～2	0

This function code selects the physical channel through which the frequency converter accepts operation commands such as start and stop.

0: Operation Panel Command Channel

Run control is implemented via the keys (RUN、STOP/RESET) on the operation panel.

1: Terminal Command Channel

Run control is implemented via the multi-function terminals defined with functions including FWD, REV, FJOG and RJOG.

2: Communication Command Channel

Run control is implemented by the upper computer through communication.

⚠ Note:

The operation command channel can be switched by modifying the setting value of this function code even during operation. Please set it with caution!

P0-03	Main frequency source A selection	
	0～9	4

0: Digital Setting (Non-volatile Memory Disabled)

The initial value of the set frequency is the value of P0-08 Preset Frequency. The set frequency of the frequency converter can be adjusted via the ▲ and ▼ keys on the keypad (or the UP and DOWN multifunction input terminals). When the frequency converter is powered off and then restarted, the set frequency will revert to the value of P0-08 Digital Setting Preset Frequency.

1: Digital Setting (Non-volatile Memory Enabled)

The initial value of the set frequency is the value of P0-08 Preset Frequency. The set frequency of the frequency converter can be adjusted via the ▲ and ▼ keys on the keypad (or the UP and DOWN multifunction input terminals). When the frequency converter is powered off and then restarted, the set frequency will be the value configured at the moment of power-off, and the adjustment increments/decrements made via the keypad ▲/▼ keys or the terminal UP/DOWN signals will be retained.

Reminder: P0-23 is Digital Setting Frequency Stop Memory Selection, which is used to choose whether the frequency adjustment increments/decrements are retained or cleared when the frequency converter stops. Note that P0-23 is associated with stopping of the converter, not with power-off memory, and this distinction must be observed in application.

2: AI Analog Command (0～10V/4～20mA)

The AI input can be configured as either 0V～10V voltage input or 4mA～20mA current input, selected via the J5 jumper on the control board.

3: Reserved

4: Panel Potentiometer Command

5: Reserved

6: Multi-step Command

When the multi-step command operation mode is selected, different combinations of states of the digital input X terminals correspond to different set frequency values. Up to 4 multi-step command terminals (terminal functions 12 to 15) can be configured, providing 16 possible state combinations. These 16 combinations can be mapped to 16 arbitrary multi-step commands via the F10 group of function codes. The multi-step commands are expressed as a percentage of the maximum frequency (P0-10). When the digital input X terminals are configured for multi-step command functions, corresponding settings must be made in the P4 parameter group. For details, refer to the relevant parameter descriptions in the P07 group.

7: Simple PLC

When the frequency source is set to Simple PLC, the operating frequency of the converter can be switched between 1 to 16 arbitrary frequency commands. The dwell time for each of the 1 to 16 frequency commands, as well as their respective acceleration and deceleration times, can be customized by the user. For details, refer to the relevant descriptions in the PA parameter group.

8: PID

Selects the output of process PID control as the operating frequency. This mode is generally used for on-site process closed-loop control applications, such as constant pressure closed-loop control and constant tension closed-loop control. When PID is used as the frequency source, relevant parameters in the P9 PID Function group must be configured.

9: Communication Command

The set frequency can be adjusted via serial port frequency setting commands. For details, refer to the Pd communication parameter group

P0-04	**Auxiliary Frequency Source B Selection**	
	0～9（The same as P0-03）	0

0: Digital Setting (Non-volatile Memory Disabled)

1: Digital Setting (Non-volatile Memory Enabled)

2: AI Analog Command (0～10V/4～20mA)

3: Reserved

4: Panel Potentiometer Command

5: Reserved

6: Multi-step Command

7: Simple PLC

8: PID

9: Communication Command

P0-05	Auxiliary frequency source B range selection when superimposed	
	0～1	0

0: Relative to the maximum frequency

1: Relative to frequency source A

P0-06	Auxiliary frequency source B range when superimposed	
	0%～150%	100%

When the frequency source is set to "Frequency Superposition" (i.e., P0-07 is set to 1, 3 or 4), these two parameters are used to define the adjustment range of the auxiliary frequency source.

P0-05 is used to specify the reference object corresponding to the auxiliary frequency source range, which can be selected as relative to the maximum frequency or relative to the main frequency source A. If the option of relative to the main frequency source is selected, the range of the auxiliary frequency source will change with the variation of the main frequency source A.

P0-07	Frequency source B overlay selection	
	00～34	00

Units: Frequency source selection

0: Main frequency source A

1: Result of primary and secondary operations (the operation relationship is determined by 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

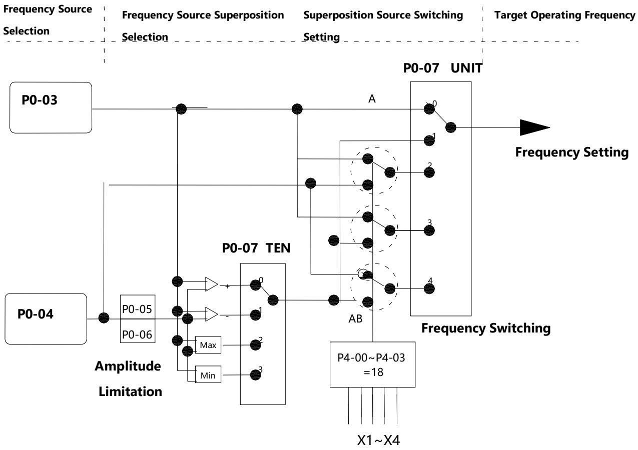
0: Primary + secondary

1: main-auxiliary

2: The maximum of both

3: The minimum of both

Select the frequency command channel via this parameter. The frequency command is realized through the combination of the main frequency source A and the auxiliary frequency source B.



When the frequency source is set to main-auxiliary operation, the offset frequency can be configured via parameter P0-21, which is superimposed on the result of the main-auxiliary operation to flexibly meet various requirements. When the frequency source is set to "digital setting" or "terminal UP/DOWN", the value of this function code shall be the digital frequency setting value of the frequency converter.

P0-08	Preset frequency	
	0.00Hz～Maximum frequency（P0-10）	50.00Hz
P0-09	Running direction	
	0～1	0

0: Consistent direction

1: Opposite directions

By modifying this function code, the motor rotation direction can be changed without altering the motor wiring — this effect is equivalent to swapping any two of the motor terminals (U, V, W) to reverse the rotation direction.

Note: The motor rotation direction will revert to its original state after parameter initialization. This function should be used with caution in applications where changing the motor rotation direction is strictly prohibited after the system has been commissioned.

P0-10	Maximum frequency	
	50.00Hz～500.00Hz	50.00Hz

When analog input, multi-step commands, etc., are used as frequency sources, their respective 100.0%

values are calibrated relative to P0-10. The maximum output frequency can reach 5000.0 Hz. To balance the two indicators of frequency command resolution and frequency input range, the number of decimal places of the frequency command can be selected via P0-22.

When P0-22 is set to 1, the frequency resolution is 0.1 Hz, and the setting range of P0-10 is 50.0 Hz to 5000.0 Hz in this case. When P0-22 is set to 2, the frequency resolution is 0.01 Hz, and the setting range of P0-10 is 50.00 Hz to 500.00 Hz in this case.

Note: Modifying P0-22 will change the frequency resolution of all frequency-related functional parameters.

P0-11	Upper limit frequency source	
	0～5	0

0: P0-12 setting

1: AI

2: Reserved

3: Panel potentiometer

4: Reserved

5: Communication given

Defines the source of the upper limit frequency. The upper limit frequency can be derived from digital setting (P0-12), analog input or communication-based setting.

When analog input (AI) or communication setting is adopted, the configuration principle is similar to that of the main frequency source, please refer to the description of P0-03.

For example, in a winding control scenario where torque control mode is applied, the upper limit frequency can be set via analog input to prevent the runaway caused by material breakage. When the frequency converter operates up to the upper limit frequency, it will maintain operation at this frequency.

P0-12	Upper limit frequency	
	Lower limit P0-14～Maximum frequency P0-10	50.00Hz

Set the upper limit frequency, with a setting range of P0-14 to P0-10.

P0-13	Upper limit frequency bias	
	0.00Hz～Maximum frequency P0-10	0.00Hz

When the upper limit frequency source is set to analog input, P0-13 acts as the offset value of the setting. This offset frequency is superimposed on the upper limit frequency set in P0-11 to form the final upper limit frequency setting.

P0-14	Lower limit frequency	
	0.00Hz～upper limit frequency P0-12	0.00Hz

When the frequency command is lower than the lower limit frequency set in P0-14, the frequency converter can either shut down, operate at the lower limit frequency, or run at zero speed. The operation mode can be configured via P8-14 (Operation Mode When Set Frequency Is Below Lower Limit Frequency).

P0-15	Carrier frequency	
	0.5～16.0KHz	Model determination

This function code is used to set the carrier frequency of the PWM wave output by the frequency converter. The carrier frequency will affect the noise generated during motor operation. For applications requiring quiet operation, the carrier frequency can be appropriately increased to meet the requirements. However, increasing the carrier frequency will lead to higher heat generation of the frequency converter and stronger electromagnetic interference to the external environment.

When the carrier frequency exceeds the factory-set value, the frequency converter must be operated in derating mode. Generally, the output current of the frequency converter needs to be derated by approximately 5% for every 1 kHz increase in the carrier frequency.

P0-16	Carrier frequency adjusts with temperature	
	0～1	1

0: NO

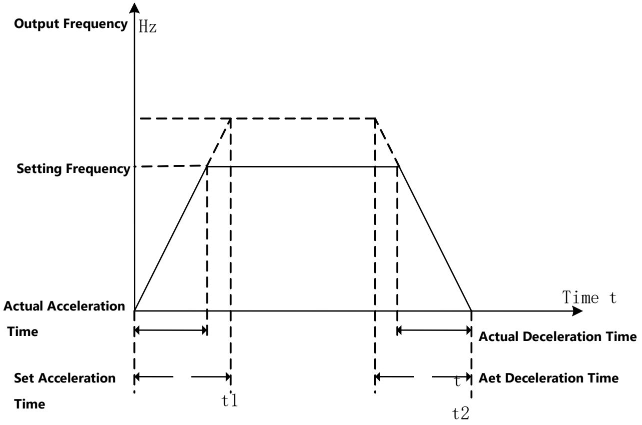
1: YES

Automatic Carrier Frequency Adjustment Based on Temperature

Automatic carrier frequency adjustment by temperature means that when the frequency converter detects a high temperature of its own heat sink, it will automatically reduce the carrier frequency to decrease the temperature rise of the frequency converter. When the temperature of the heat sink is low, the carrier frequency will be gradually restored to the set value. This function can reduce the chance of overheating alarms of the frequency converter.

P0-17	Acceleration time 1	
	0.00s～650.00s(P0-19=2) 0.0s～6500.0s(P0-19=1) 0s～65000s(P0-19=0)	Model determination
P0-18	Deceleration time 1	
	0.00s～650.00s(P0-19=2) 0.0s～6500.0s(P0-19=1) 0s～65000s(P0-19=0)	Model determination

Acceleration time refers to the duration required for the frequency converter to accelerate from zero frequency to the acceleration/deceleration reference frequency (determined by parameter P0-25), as illustrated by t1



P0-1 Acceleration/Deceleration Time Diagram

P0-19	Acceleration and deceleration time units	
	0～2	1

0: 1s

1: 0.1s

2: 0.01s

When modifying this function parameter, the number of decimal places displayed for the 4 groups of acceleration/deceleration time will change, and the corresponding acceleration/deceleration time will also change. Special attention should be paid during the application process.

P0-21	Auxiliary frequency source bias frequency when superimposed	
	0.00Hz～Maximum Frequency P0-10	0.00Hz

This function code is only valid when the frequency source is selected for main and auxiliary operations. When the frequency source is used for main and auxiliary operations, P0-21 serves as an offset frequency, which is superimposed with the results of the main and auxiliary operations to form the final frequency setting value, allowing for more flexible frequency setting.

P0-22	Frequency Command resolution	
	1～2	2

1: 0.1Hz

2: 0.01Hz

This parameter is used to determine the resolution of all frequency-related function codes. When the frequency resolution is 0.1 Hz, the maximum output frequency can reach 5000.0 Hz, whereas when the frequency resolution is 0.01 Hz, the maximum output frequency is 500.00 Hz.

P0-23	Digital setting frequency shutdown memory selection	
	0～1	0

0: No memory

1: Memory

This function is only valid when the frequency source is set digitally.

Nomemory mode: When the inverter shuts down, the digitally set frequency value reverts to the value of P0-08 (Preset Frequency), and the frequency adjustments made via the ▲/▼ keys on the keypad or the UP/DOWN terminals are cleared.

Memory mode: When the inverter shuts down, the digitally set frequency retains the value configured at the moment of the last shutdown, and the frequency adjustments made via the ▲/▼ keys on the keypad or the UP/DOWN terminals remain in effect.

P0-25	Reference frequency for acceleration and deceleration time	
	0～2	0

0: Maximum Frequency (P0-10)

1: Set frequency

2: 100Hz

Acceleration/deceleration time refers to the time elapsed when the frequency ramps up or down between 0 Hz and the frequency set in P0-25. Figure P0-1 shows the acceleration/deceleration time diagram. When P0-25 is set to 1, the acceleration/deceleration time is correlated with the set frequency. Frequent variations in the set frequency will result in changes to the motor acceleration, which requires attention during application.

P0-26	Runtime frequency instructions UP/DOWN reference	
	0～1	0

0: Running frequency

1: Set frequency

This parameter is only valid when the frequency source is set digitally. It is used to determine the method of adjusting the set frequency when the ▲/▼ keys on the keypad or the UP/DOWN terminals are activated, i.e., whether the target frequency is increased or decreased based on the operating frequency or the set frequency. The difference between the two settings is pronounced when the inverter is in the acceleration/deceleration phase—specifically, significant discrepancies will arise from different selections of this parameter if the operating frequency of the inverter does not match the set frequency.

P0-27	Command source bundles frequency source	
	0000～9999	0000

Units: Operation panel command binding frequency source selection

0: Unbound

1: Set the frequency digitally

2: AI

3: Keep

4: Panel potentiometer

5: Reserved

6: Multi-speed

7: Simple PLC

8: PID

9: Communication given

Tens: Terminal command binding frequency source selection

Hundred: Frequency source selection for communication command binding

Thousands: Automatically run the binding frequency source selection

It defines the binding combinations between three operation command channels and nine frequency reference channels to facilitate synchronous switching. The definition of the above frequency reference channels is consistent with that of the main frequency source A selected via P0-03; refer to the functional code description of P0-03 for details. Different operation command channels can be bound to the same frequency reference channel. When a command source has a bound frequency source, the frequency sources set by P0-03 to P0-07 shall be invalid during the active period of this command source.

P0-28	Serial communication	
	0～1	0

0: Modbus protocol

1: Reserved

Group P1 Motor Parameters

P1-00	Motor type selection	
	0～1	0

0: Regular asynchronous motor

1: Variable Frequency asynchronous motor

P1-01	Rated power of the motor	
	0.1kW～1000.0Kw	Model determination
P1-02	Motor rated voltage	
	1V～2000V	Model determination
P1-03	Motor rated current	
	0.01A～655.35A（Inverter power≤55kW） 0.1A～6553.5A（Inverter power>55kW）	Model determination
P1-04	Motor rated frequency	
	0.01Hz～Maximum Frequency	Model determination

P1-05	Rated speed of the motor	
	1rpm～65535rpm	Model determination

The aforementioned function codes correspond to the motor nameplate parameters. Regardless of whether V/F control or vector control is adopted, these parameters must be set accurately in accordance with the motor nameplate. To achieve optimal V/F or vector control performance, motor parameter tuning is required, and the accuracy of the tuning results is closely related to the correct configuration of the motor nameplate parameters.

P1-06	Asynchronous motor stator resistance	
	0.001Ω～65.535Ω(Inverter power≤55kW) 0.0001Ω～6.5535Ω(Inverter power>55kW)	Tuning parameters
P1-07	Rotor resistance of asynchronous motor	
	0.001Ω～65.535Ω(Inverter power≤55kW) 0.0001Ω～6.5535Ω(Inverter power>55kW)	Tuning parameters
P1-08	Asynchronous motor leakage inductive reactance	
	0.01mH～655.35mH(Inverter power≤55kW) 0.001mH～65.535mH(Inverter power>55kW)	Tuning parameters
P1-09	Asynchronous motor mutual inductance reactance	
	0.1mH～6553.5mH(Inverter power≤55kW) 0.01mH～655.35mH(Inverter power>55kW)	Tuning parameters
P1-10	Asynchronous motor no-load current	
	0.01A～P1-03(Inverter power≤55kW) 0.1A～P1-03(Inverter power>55kW)	Tuning parameters

P1-06 to P1-10 are parameters for asynchronous motors. These parameters are generally not indicated on the motor nameplate and need to be obtained via automatic tuning of the inverter. Among them, Asynchronous Motor Static Tuning can only acquire three parameters (P1-06 to P1-08), while Asynchronous Motor Full Tuning can not only obtain all five parameters listed here, but also acquire parameters such as current loop PI parameters. When modifying the motor rated power (P1-01) or motor rated voltage (P1-02), the inverter will automatically revise the values of P1-06 to P1-10 and restore these five parameters to the standard parameters of commonly used Y-series motors. If on-site tuning of the asynchronous motor is not feasible, the corresponding values can be input into the aforementioned function codes according to the parameters provided by the motor manufacturer.

P1-37	Tuning selection	
	0～3	0

0: No action

1: Asynchronous machine stationary part parameter self-learning

This function applies to scenarios where the asynchronous motor is difficult to decouple from the load, making full tuning infeasible. Prior to performing asynchronous motor static tuning, it is imperative to correctly configure the motor type and motor nameplate parameters (P1-00 to P1-05). During asynchronous motor static tuning, the inverter can acquire three parameters: P1-06 to P1-08.

Operation Instructions: Set this function code to 1, then press the RUN key, and the inverter will initiate static tuning.

2: Asynchronous machine dynamic complete self-learning

To ensure the dynamic control performance of the inverter, select Full Tuning. In this case, the motor must be decoupled from the load to keep it in a no-load state.

During the Full Tuning process, the inverter first performs Static Tuning, then accelerates to 80% of the motor rated frequency according to the acceleration time (P0-17). After maintaining this frequency for a certain period, it decelerates to a stop based on the deceleration time (P0-18) and terminates the tuning process.

Operation Instructions: Set this function code to 2, then press the RUN key, and the inverter will start Full Tuning.

3: Asynchronous machine static complete self-learning

This function applies to scenarios without an encoder for the complete self-learning of motor parameters in a motor stationary state (note that slight motor jitter may still occur during this process; safety precautions are required). Prior to performing asynchronous motor static full tuning, it is mandatory to correctly configure the motor type and motor nameplate parameters (P3-00 to P3-05). During asynchronous motor static full tuning, the inverter can acquire five parameters: P1-06 to P1-10.

Group 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～10.00s	0.50s
P2-02	Switching frequency 1	
	0.00～P2-05	5.00Hz
P2-03	Speed loop proportional gain 2	
	1～100	20
P2-04	Speed loop integral time 2	
	0.01s～10.00s	1.00s
P2-05	Switching frequency 2	
	P2-02～Maximum frequency	10.00Hz

The inverter can select different speed loop PI parameters when operating at different frequencies.

When the operating frequency is lower than switchover frequency 1 (P2-02), the speed loop PI regulation parameters are P2-00 and P2-01.

When the operating frequency is higher than switchover frequency 2, the speed loop PI regulation parameters are P2-03 and P2-04.

For the speed loop PI parameters corresponding to the frequency range between switchover frequency 1 and switchover frequency 2, a linear switchover between the two sets of PI parameters is adopted, as illustrated in Figure P2-1.

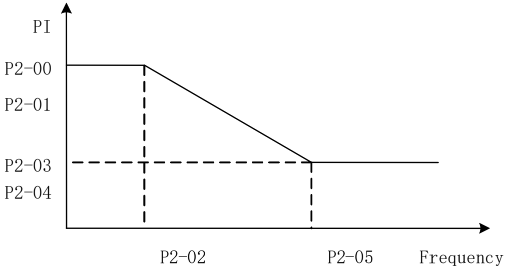


图 P2-1 PIParameter Diagram

The dynamic speed response characteristics of vector control can be adjusted by setting the proportional gain and integral time of the speed regulator. Increasing the proportional gain or decreasing the integral time can both accelerate the dynamic response of the speed loop. However, an excessively high proportional gain or excessively short integral time may cause system oscillation.

Recommended Tuning Method:

If the factory default parameters fail to meet the requirements, fine-tune them on the basis of the default values. First, increase the proportional gain to ensure the system operates without oscillation. Then, decrease the integral time to achieve both a fast response characteristic and minimal overshoot for the system. Improper PI parameter settings may lead to excessive speed overshoot and even result in an overvoltage fault when the overshoot subsides.

P2-06	Vector control slip gain	
	50%～200%	100%

For sensorless vector control, this parameter is used to adjust the speed regulation accuracy of the motor: if the motor speed runs low under load, increase the value of this parameter; otherwise, decrease it.

For vector control with a speed sensor, this parameter can adjust the output current of the inverter under the same load condition.

P2-07	Speed loop filtering time constant	
	0.000s～0.100s	0.040s

In vector control mode, the output of the speed loop regulator is the torque current command, and this parameter is used for filtering the torque command. Generally, there is no need to adjust this parameter. When the speed fluctuates significantly, the filtering time can be appropriately increased; if the motor oscillates, this parameter should be appropriately decreased. A small time constant of the speed loop filter may lead to large fluctuations in the inverter's output torque, but it ensures a fast speed response.

P2-08	Vector-controlled overexcitation gain	
	0～200	64

During the inverter deceleration phase, over-excitation control can suppress the DC bus voltage rise and prevent overvoltage faults. The higher the over-excitation gain, the stronger the suppression effect. For applications where the inverter is prone to overvoltage alarms during deceleration, it is necessary to increase the over-excitation gain. However, an excessively high over-excitation gain tends to cause an increase in output current, which requires trade-off in practical applications.

For scenarios with extremely small inertia, the bus voltage will not rise during motor deceleration; thus, it is recommended to set the over-excitation gain to 0. The same setting is also recommended for systems equipped with braking resistors.

P2-09	Torque upper limit source in speed control mode	
	0～7	0

0: Function code P2-10 setting

1: AI

2: Keep

3: Panel potentiometer

4: Reserved

5: Communication given

6: Reserved

7: Reserved

In the speed control mode, the maximum output torque of the inverter is controlled by the torque limit source. P2-09 is used to select the setting source of the torque limit. When the setting is configured via analog signals or communication, the corresponding 100% of the setting corresponds to P2-10, while 100% of P2-10 represents the rated torque of the inverter.

P2-10	Torque upper limit digital setting in speed control mode	
	0.0%～200.0%	150.0%
P2-13	Excitation regulates proportional gain	
	0～60000	2000
P2-14	Excitation regulates integral gain	
	0～60000	1300
P2-15	Torque adjustment proportional gain	
	0～60000	2000
P2-16	Torque regulation integral gain	
	0～60000	1300

These are the current loop PI regulation parameters for vector control. The parameters are automatically obtained after asynchronous motor full tuning or synchronous motor no-load tuning, and generally do not require modification. It should be noted that the integral regulator of the current loop does not use integral time as the dimension, but directly sets the integral gain. Excessively high PI gain settings for the current loop may cause oscillation of the entire control loop. Therefore, if current oscillation or large torque fluctuations occur, the PI proportional gain or integral gain here can be manually reduced.

P2-17	Velocity loop integral separation	
	0～1	0

0: Invalid

1: Effective

P2-18～P2-20	Reserved	
	Reserved	0
P2-21	Maximum torque coefficient in the demagnetization zone	
	50～200%	100%
P2-22	Power generation capacity limit enable	
	0～1	0

0: Invalid

1: Effective

P2-23	Upper limit of power generation	
	0～200%	Model determination

Group P3 V/F Control Parameters

P3-00	VF curve Settings	
	0～11	0

0: Linear V/F

Suitable for general constant torque loads.

1: Multi-point V/F

It is suitable for special loads such as dehydrators and centrifuges. In this case, an arbitrary V/F characteristic curve can be obtained by setting parameters P3-03 to P3-08.

2: Square-law V/F

Suitable for centrifugal loads such as fans and water pumps.

3: to the power of 1.2

4: to the power of 1.4 V/F

5: Reserved

6: to the power of 1.6 V/F

7: Reserved

8: to the power of 1.8 V/F

A V/F characteristic curve with an exponent ranging from 3 to 8, which lies between the linear V/F curve and the square-law V/F curve.

9: Reserved

10: V/F Full Separation Mode

In this mode, the output frequency and output voltage of the inverter are independent of each other. The output frequency is determined by the frequency source, while the output voltage is determined by P3-13 (V/F Separation Voltage Source). The V/F Full Separation Mode is generally applied to scenarios such as induction heating, inverter power supplies, and torque motor control.

11: V/F Semi-Separation Mode

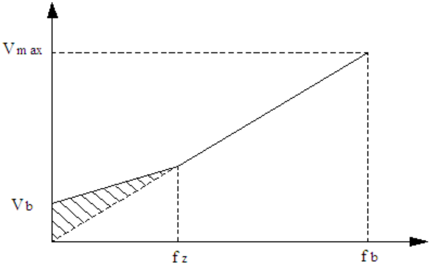
In this case, V and F are proportional to each other, but the proportional relationship can be set via the voltage source parameter P3-13. Meanwhile, the V/F relationship is also correlated with the motor rated voltage and rated frequency specified in Parameter Group P3.

Assume that the input value of the voltage source is X (where X ranges from 0 to 100%). The relationship between the inverter output voltage V and output frequency F is expressed as follows:

$$\frac{V}{F} = 2 \times X \times \frac{\text{Motor Rated Voltage}}{\text{Motor Rated Frequency}}$$

P3-01	Torque boost	
	0.1%～30.0%	Model determination
P3-02	Torque boost cut-off frequency	
	0.00Hz～Maximum Frequency	50.00Hz

To compensate for the low-frequency torque characteristics, the output voltage can be appropriately boosted. When this function code is set to 0.0%, the automatic torque boost mode is activated. When it is set to any value other than 0.0%, the manual torque boost mode is enabled. P3-01 defines the boost cut-off frequency point fz for manual torque boost, as illustrated in Figure P3-1.



Vb- Manual Torque Boost Level

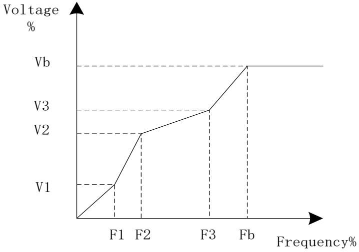
Figure P3-1 Torque Boost Diagram

P3-03	Multi-point VF frequency point F1	
	0.00Hz～P3-05	0.00Hz
P3-04	Multiple VF voltage points V1	
	0.0%～100.0%	0.0%
P3-05	Multiple VF frequency points F2	

	P3-03～P3-07	0.00Hz
P3-06	Multiple VF voltage points V2	
	0.0%～100.0%	0.0%
P3-07	Multi-point VF frequency point F3	
	P3-05～Rated Frequency (P1-04)	0.00Hz
P3-08	Multiple VF voltage points V3	
	0.0%～100.0%	0.0%

Parameters P3-03 to P3-08 define the multi-segment V/F curve. The multi-point V/F curve should be set according to the load characteristics of the motor. It should be noted that the relationship between the three voltage points and frequency points must satisfy the following condition: V1 < V2 < V3, F1 < F2 < F3. Figure P3-2 shows the schematic diagram for setting the multi-point V/F curve.

Excessively high voltage settings at low frequencies may cause motor overheating or even burnout, and the inverter may trigger overcurrent stall protection or overcurrent protection.



V1-V3: Segment 1–3 Voltage Percentage Vb for Multi-speed V/F: Motor Rated Voltage

F1-F3: Segment 1–3 Frequency Percentage Fb for Multi-speed V/F: Motor Rated Operating Frequency

Figure P3-2 Schematic Diagram for Multi-point V/F Curve Configuration

P3-09	VF slip compensation gain	
	0.0%～200.0%	0.0%

This parameter is only valid for asynchronous motors. V/F slip compensation can offset the motor speed deviation caused by increasing load, ensuring that the motor speed remains basically stable when the load changes.

When the V/F slip compensation gain is set to 100.0%, it indicates that the compensated slip equals the motor rated slip under the rated load condition. The motor rated slip is automatically calculated by the inverter based on the motor rated frequency and rated speed specified in Parameter Group P3.

The adjustment of V/F slip compensation gain should follow the principle that the motor speed is basically consistent with the target speed under the rated load. If there is a deviation between the actual motor speed and the target value, the gain needs to be fine-tuned appropriately.

P3-10	VF overexcitation gain	
	0～200	64

During the inverter deceleration process, over-excitation control can suppress the DC bus voltage rise and prevent overvoltage faults. The higher the over-excitation gain, the stronger the suppression effect.

For applications where overvoltage alarms are prone to occur during inverter deceleration, the over-excitation gain needs to be increased. However, an excessively high over-excitation gain may easily lead to an increase in output current, which requires a trade-off in practical applications.

For scenarios with extremely low inertia, the bus voltage will not rise during motor deceleration, so it is recommended to set the over-excitation gain to 0. This setting is also recommended for systems equipped with braking resistors.

P3-11	VF oscillation suppression gain	
	0～100	Model determination

The selection principle for this gain is to set it to the minimum possible value on the premise of effectively suppressing oscillation, so as to avoid adverse effects on V/F operation.

Set this gain to 0 if there is no oscillation in the motor. Increase this gain appropriately only when obvious oscillation occurs; the higher the gain, the more significant the oscillation suppression effect.

When using the oscillation suppression function, it is required that the parameters of motor rated current and no-load current are accurate; otherwise, the V/F oscillation suppression effect will be compromised.

P3-13	Vf-separated voltage source	
	0～8	0

0: Digital setting (P3-14)

The voltage is set directly via parameter P3-14.

1: AI

2: Reserved

The voltage for segments 1 and 2 is determined by the analog input terminal.

3: Panel potentiometer

The voltage command is set via the panel potentiometer.

4: Reserved

5: Multi-segment instructions

When the voltage source is configured for multi-step commands, parameters in Group P4 and Group PC need to be set to define the corresponding relationship between the command signal and the target voltage.

The 100.0% value specified by the multi-step command parameters in Group PC refers to the percentage relative to the motor rated voltage.

6: Simple PLC

When the voltage source is set to the simple PLC mode, parameters in Group F10 need to be configured to define the target output voltage.

7: PID

The output voltage is generated based on the PID closed-loop control. For details, refer to the PID description in Parameter Group PA.

8: Communication given

It means the voltage is set by the host computer via communication.

The selection method for the V/F separation voltage source is similar to that for the frequency source; refer to the description of P0-03 Main Frequency Source Selection for details. For all selection options, the set value of 100.0% refers to the motor rated voltage (take the absolute value of the corresponding set value).

P3-14	Vf-separated voltage digital setting	
	0V～Motor rated voltage	0V
P3-15	Voltage acceleration time for VF separation	
	0.0s～1000.0s	0.0s
P3-16	Voltage deceleration time for VF separation	
	0.0s～1000.0s	0.0s

The voltage acceleration time for V/F separation refers to the duration required for the output voltage to ramp up from 0 to the motor rated voltage, as denoted by t1 in Figure P6-3. The voltage deceleration time for V/F separation refers to the duration required for the output voltage to ramp down from the motor rated voltage to 0, as denoted by t2 in Figure P3-3.

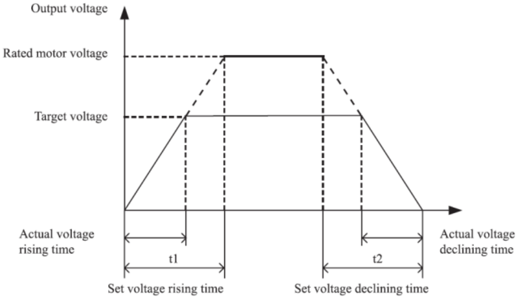


Figure P3-3 V/F Separation Schematic Diagram

P3-17	Selection of VF separation shutdown mode	
	0～1	0

0: Frequency/voltage independent reduction to 0

In V/F separation mode, the output voltage decreases to 0V according to the voltage deceleration time (P3-16); meanwhile, the output frequency decreases to 0Hz according to the deceleration time (P0-18).1: After the voltage is reduced to 0, the frequency is reduced again

P3-18	VF overflows velocity operating current	
	50～200%	150%

Start-up Overcurrent Stall Suppression Trigger Current

P3-19	VF over-loss velocity enables	
	0～1	1

0: Ineffective
1: Effective

P3-20	VF overflow rate suppression gain	
	0～100	20

If the current exceeds the overcurrent stall threshold, the overcurrent stall suppression function will be activated, and the actual acceleration time will be automatically extended.

P3-21	VF double speed overcurrent velocity acting current compensation coefficient	
	50～200%	50%

Reduce the overcurrent trip current for high-speed operation. This setting will be ineffective when the compensation coefficient is set to 50, and the trip current in the field weakening region corresponds to parameter P3-18.

P3-22	VF overvoltage stall action voltage	
	200.0～2000.0	Model determination
P3-23	VF overvoltage stall enable	
	0～1	1

0: Ineffective

1: Effective

P3-24	VF overvoltage stall suppression frequency gain	
	0～100	30
P3-25	VF overvoltage stall suppression voltage gain	
	0～100	30

Increasing the value of P3-24 will improve the control effect of the DC bus voltage, but it will cause fluctuations in the output frequency. If the output frequency fluctuates significantly, the value of P3-24 can be appropriately reduced. Increasing the value of P3-25 can reduce the overshoot of the DC bus voltage.

P3-26	Overvoltage stall maximum rise limit frequency	
	0～50Hz	5Hz

Maximum rising frequency limit for overvoltage suppression.

Group P4 Input Terminals

P4-00	Function selection of terminal X1	
	0～58	1
P4-01	Function selection of terminal X2	
	0～58	4
P4-02	Function selection of terminal X3	
	0～58	9
P4-03	Function selection of terminal X4	
	0～58	12
P4-04 ～ P4-09	保留	
	—	0

0: No Function

1: Forward Run (FWD)

Short-circuit the terminal to COM, and the inverter will run in the forward direction. This function is only valid when P0-02 = 1.

2: Reverse Run (REV)

Short-circuit the terminal to COM, and the inverter will run in the reverse direction. This function is only valid when P0-02 = 1.

3: Three-wire Operation Control

Refer to the function description of Operation Mode 2 and 3 (Three-wire Control Mode 1 and 2) in P4-11.

4: Forward Jog (FJOG)

Short-circuit the terminal to COM, and the inverter will perform forward jog operation. This function is only valid when P0-02 = 1.

5: Reverse Jog (RJOG)

Short-circuit the terminal to COM, and the inverter will perform reverse jog operation. This function is only valid when P0-02 = 1.

6: Terminal UP

7: Terminal DOWN

These are the frequency increment and decrement commands for modifying the frequency when the frequency is set by external terminals. When the frequency source is set to digital setting, the set frequency can be adjusted up and down.

8: Free Stop

This function has the same meaning as the coast-to-stop function defined in P6-10, but it is implemented via control terminals for convenient remote control.

9: Fault Reset (RESET)

This function enables fault reset via the terminal, with the same function as the RESET key on the keypad. It can realize remote fault reset.

10: RUN Pause

The inverter decelerates to a stop, but all operation parameters are retained, such as PLC parameters, swing frequency parameters and PID parameters. After the terminal signal disappears, the inverter will resume the operating state before stopping.

11: External Fault Normally Open Input

When this signal is sent to the inverter, the inverter will report fault FU15 and perform fault handling according to the fault protection action mode (refer to function code P9-47 for details).

12: Multi-speed Selection 1

13: Multi-speed Selection 2

14: Multi-speed Selection 3

15: Multi-speed Selection 4

By combining the ON/OFF status of these function terminals, up to 16 speeds can be selected. The details are shown in the table below:

SS4	SS3	SS2	SS1	Multi-speed	Group PC
OFF	OFF	OFF	OFF	0	PC-00
OFF	OFF	OFF	ON	1	PC-01
OFF	OFF	ON	OFF	2	PC-02
OFF	OFF	ON	ON	3	PC-03
OFF	ON	OFF	OFF	4	PC-04
OFF	ON	OFF	ON	5	PC-05
OFF	ON	ON	OFF	6	PC-06
OFF	ON	ON	ON	7	PC-07
ON	OFF	OFF	OFF	8	PC-08
ON	OFF	OFF	ON	9	PC-09
ON	OFF	ON	OFF	10	PC-10
ON	OFF	ON	ON	11	PC-11
ON	ON	OFF	OFF	12	PC-12
ON	ON	OFF	ON	13	PC-13
ON	ON	ON	OFF	14	PC-14
ON	ON	ON	ON	15	PC-15

16: Acceleration/Deceleration Time Selection Terminal 1

17: Acceleration/Deceleration Time Selection Terminal 2

By combining the ON/OFF status of these function terminals, up to 4 acceleration/deceleration time profiles can be selected. Details are shown in the table below:

Selection Terminal 2	Selection Terminal 1	Selection
OFF	OFF	Acceleration/Deceleration Time 1

Selection Terminal 2	Selection Terminal 1	Selection
OFF	ON	Acceleration/Deceleration Time 2
ON	OFF	Acceleration/Deceleration Time 3
ON	ON	Acceleration/Deceleration Time 4

18: Frequency Source Switching

Used to switch and select different frequency sources. According to the setting of the frequency source selection function code (P0-07), when switching between two specified frequency sources is configured as the frequency source mode, this terminal is used to realize switching between these two frequency sources.

19: UP/DOWN Setting Reset (Terminal & Keypad)

When the frequency command is set to digital frequency setting, this terminal can clear the frequency value modified by the terminal UP/DOWN or keypad UP/DOWN, restoring the command frequency to the value set in P0-08.

20: Control Command Switching Terminal 1

When the command source is set to terminal control (P0-02 = 1), this terminal can switch between terminal control and keypad control. When the command source is set to communication control (P0-02 = 2), this terminal can switch between communication control and keypad control.

21: Acceleration/Deceleration Inhibit

Ensures the inverter is not affected by external signals (except stop commands) and maintains the current output frequency.

22: PID Pause

The PID function is temporarily disabled. The inverter maintains the current output frequency and stops performing PID regulation on the frequency source.

23: PLC State Reset

The PLC operation is paused during execution. When restarting operation, this terminal can be used to restore the inverter to the initial state of the simplified PLC.

24: Swing Frequency Pause

The inverter outputs at the center frequency, and the swing frequency function is suspended.

25: Counter Input

A terminal for inputting counting pulses.

26: Counter Reset

Clears the current state of the counter.

27–28: Reserved

29: Torque Control Inhibit

Disables the torque control function of the inverter, switching the inverter to speed control mode.

30: Reserved

31: Reserved

32: Immediate DC Braking

When this terminal is activated, the inverter switches directly to the DC braking state.

33: External Fault Normally Closed Input

When an external fault normally closed signal is input to the inverter, the inverter will report fault FU15 and shut down.

34: Frequency Modification Inhibit

If this function is enabled, the inverter will not respond to any frequency modification commands when frequency changes are attempted, until this terminal is activated.

35: PID Action Direction Reverse

When this terminal is activated, the PID action direction is reversed relative to the direction set in PA-03.

36: External Stop Terminal 1

In keypad control mode, this terminal can be used to stop the inverter, which is equivalent to the function of the STOP key on the keypad.

37: Control Command Switching Terminal 2

Used to switch between terminal control and communication control. If the command source is set to terminal control, the inverter will switch to communication control when this terminal is activated, and vice versa.

38: PID Integral Pause

When this terminal is activated, the PID integral regulation function is suspended, while the PID proportional and derivative regulation functions remain active.

39: Frequency Source A and Preset Frequency Switching

When this terminal is activated, frequency source A is replaced by the preset frequency (P0-08).

40: Frequency Source B and Preset Frequency Switching

When this terminal is activated, frequency source B is replaced by the preset frequency (P0-08).

41–42: Reserved

43: PID Parameter Switching

When the PID parameter switching condition is set to Terminal X (PA-18 = 1), the inverter uses PID parameters PA-05 to PA-07 when this terminal is deactivated, and switches to parameters PA-15 to PA-17 when this terminal is activated.

44: User-defined Fault 1

45: User-defined Fault 2

When User-defined Fault 1 or 2 is activated, the inverter will report alarms FU27 and FU28 respectively, and execute fault handling according to the action mode set in function code P9-49.

46: Speed Control/Torque Control Switching

Switches the inverter between torque control and speed control modes. When this terminal is deactivated, the inverter operates in the mode defined by A0-00 (Speed/Torque Control Mode); when activated, it switches to the alternative mode.

47: Emergency Stop

When this terminal is activated, the inverter stops at the fastest possible rate, with the current limited to the set current upper limit during the stop process. This function is designed to meet the requirement of rapid inverter shutdown in emergency system conditions.

48: External Stop Terminal 2

In any control mode (keypad control, terminal control, communication control), this terminal can be used to decelerate the inverter to a stop, with the deceleration time fixed at Deceleration Time 4.

49: Deceleration to DC Braking

When this terminal is activated, the inverter first decelerates to the DC braking start frequency, then switches to the DC braking state.

50: Current Operating Time Reset

When this terminal is activated, the accumulated current operating time of the inverter is cleared. This function must be used in conjunction with Timed Operation (P8-42) and Current Operating Time Elapsed (P8-53).

51: Two-wire/Three-wire Control Switching

Used to switch between two-wire and three-wire control modes. If P4-11 is set to Two-wire Mode 1, activating this terminal will switch the inverter to Three-wire Mode 1, and so on.

52: Reverse Operation Inhibit

When this terminal is activated, only forward operation is allowed.

53–58: Reserved

P4-10	X Filter time	
	0.000s～1.000s	0.010s

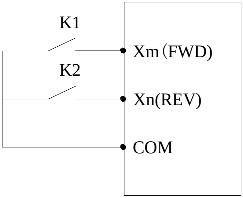
Set the software filtering time for the status of X terminals. If the input terminals are prone to interference and thus cause malfunctions in the application scenario, this parameter can be increased to enhance anti-interference capability. However, increasing the filtering time will slow down the response speed of the X terminals.

P4-11	Terminal command mode	
	0～3	0

This function code defines four distinct modes for controlling inverter operation via external terminals.

0: Two-wire Mode 1

Xm: Forward Command (FWD); Xn: Reverse Command (REV). Xm and Xn refer to any two terminals among X1–X4 that are respectively configured with the FWD and REV functions. In this control mode, both K1 and K2 can independently control the operation and direction of the inverter.

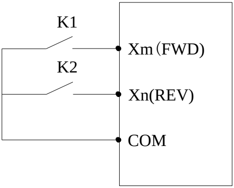


K2	K1	Run command
0	0	STOP
0	1	FWD
1	0	REV
1	1	STOP

Figure P4-1 Schematic Diagram of Two-wire Control Mode 1

1: Two-wire Mode 2

Xm: Forward Command (FWD); Xn: Reverse Command (REV). Xm and Xn refer to any two terminals among X1–X4 that are respectively configured with the FWD and REV functions. In this control mode, K1 serves as the start/stop switch, and K2 serves as the direction switch.



K2	K1	Run command
0	0	STOP
0	1	FWD
1	0	STOP
1	1	REV

Figure P4-2 Schematic Diagram of Two-wire Control Mode 2

2: Three-line Mode 1

Xm: Forward Command (FWD); Xn: Reverse Command (REV); Xx: Stop Command. Xm, Xn and Xx refer to any three terminals among X1–X4 that are respectively configured with the functions of FWD, REV and Three-wire Operation Control.

The connected K1 and K2 remain inactive until K3 is connected. When K3 is connected, triggering K1 will activate the inverter's forward operation; triggering K2 will activate its reverse operation. Disconnecting K3 will shut down the inverter.

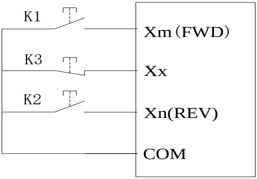


Figure P4-3 Schematic Diagram of Three-wire Control Mode 1

3: Three-line Mode 2

Xm: Run Command; Xn: Operation Direction Selection; Xx: Stop Command. Xm, Xn and Xx refer to any three terminals among X1–X4 that are respectively configured with the functions of FWD, REV and Three-wire Operation Control.

The connected K1 and K2 remain inactive until K3 is connected. When K3 is connected, triggering K1 will activate the inverter's forward operation; triggering K2 alone will have no effect. After K1 is triggered to start operation, triggering K2 again will switch the inverter's operation direction. Disconnecting K3 will shut down the inverter.

During the forward operation of Three-wire Control Mode 2, the terminal configured as REV must be kept in a normally closed state to ensure stable reverse operation; once the terminal is disconnected, the inverter will switch back to forward operation.

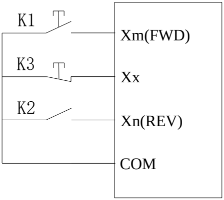


Figure P4-4 Schematic Diagram of Three-wire Control Mode 2

P4-12	Terminal UP/DOWN rate of change	
	0.001Hz/s～65.535Hz/s	1.000Hz/s

This parameter is used to set the rate of frequency change when adjusting the set frequency via the terminal UP/DOWN, i.e., the frequency variation per second. When P0-22 (Frequency Decimal Point) is set to 2, the value range is 0.001 Hz/s to 65.535 Hz/s; when P0-22 (Frequency Decimal Point) is set to 1, the value range is 0.01 Hz/s to 655.35 Hz/s.

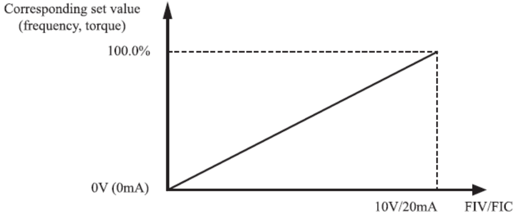
P4-13	Minimum input for AI curves	
	0.00V～P4-15	0.00V
P4-14	AI curve minimum input corresponding Settings	
	-100.00%～100.0%	0.0%

P4-15	AI curve maximum input	
	P4-13～10.00V	10.00V
P4-16	AI curve maximum input corresponding Settings	
	-100.00%～+150.0%	100.0%
P4-17	AI filtering time	
	0.00s～10.00s	0.10s

The aforementioned function code is used to set the relationship between the analog input voltage and the set value it represents. When the analog input voltage exceeds the configured Maximum Input (P4-15), the analog voltage will be calculated based on the Maximum Input value. Similarly, when the analog input voltage is lower than the configured Minimum Input (P4-13), the calculation will be based on either the Minimum Input value or 0.0%, depending on the setting of AI Selection for Below Minimum Input (P4-34). For analog current input, 1 mA of current is equivalent to 0.5 V of voltage.

AI Input Filtering Time is used to configure the software filtering time for analog input (AI). If the on-site analog signal is susceptible to interference, increase the filtering time to stabilize the detected analog value. However, a longer filtering time will slow down the response speed of analog detection. The optimal setting should be determined based on the actual application requirements.

In different application scenarios, the nominal value corresponding to 100.0% of the analog setting has different meanings. For details, refer to the instructions in each application section. The following figures illustrate two typical setting cases:



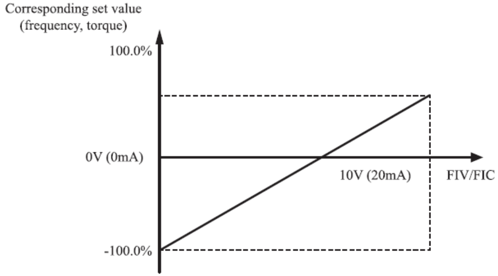


Figure P4-5 Corresponding Relationship Between Analog Command and Set Value

P4-23	Panel potentiometer minimum input	
	0.00V～P4-25	0.00V
P4-24	Panel potentiometer minimum input corresponding Settings	
	-100.00%～100.0%	0.0%
P4-25	Panel potentiometer maximum input	
	P4-23～10.00V	8.60V
P4-26	Panel potentiometer maximum input corresponding Settings	
	-100.00%～+150.0%	100.0%
P4-27	Panel potentiometer filter time	
	0.00s～10.00s	0.10s

For the functions and operating instructions of the keypad potentiometer, please refer to the description in Curve P4-5.

P4-34	AI below the minimum input setting selection	
	000～001	000

Units Digit: AI Selection for Below Minimum Input

0: Corresponding to the Minimum Input Setting

1: 0.0%

Tens and Hundreds Digits: Reserved

This function code is used to define how the set value corresponding to the analog input is determined when the analog input voltage is lower than the configured Minimum Input.

The units digit of this function code corresponds to the analog input (AI). If set to 0, when the AI input is below the Minimum Input, the set value corresponding to the analog input will follow the Minimum Input Corresponding Set Value (P4-14) specified by the function code curve. If set to 1, when the AI input is below the Minimum Input, the set value corresponding to the analog input will be 0.0%.

P4-35	X1 Delay time	
	0.0s～3600.0s	0.0s
P4-36	X2 Delay time	
	0.0s～3600.0s	0.0s
P4-37	X3 Delay time	
	0.0s～3600.0s	0.0s

This parameter is used to set the delay time for the inverter to respond when the status of an X terminal changes. Currently, only terminals X1, X2, and X3 support the configuration of delay time.

P4-38	X terminal effective mode selection 1	
	00000～11111	00000

Units Digit: X1 Terminal Active State Setting

0: Low Level Active

1: High Level Active

Tens Digit: X2 Terminal Active State Setting (0–1, Same as Above)

Hundreds Digit: X3 Terminal Active State Setting (0–1, Same as Above)

Thousands Digit: X4 Terminal Active State Setting (0–1, Same as Above)

Ten-thousands Digit: Reserved

This function code is used to set the active state mode of digital input terminals. When High Level Active is selected, the corresponding X terminal will be activated when connected to COM and deactivated when disconnected. When Low Level Active is selected, the corresponding X terminal will be deactivated when connected to COM and activated when disconnected.

Group P5 Output Terminals

P5-00 ～ P5-01	Reserved	
	Reserved	0
P5-02	Relay R output function selection (TA-TC)	
	0～44	2
P5-03 ～ P5-05	Reserved	
	Reserved	0

0: No Output

1: Inverter Running

Indicates that the inverter is in the running state with output frequency (which can be zero), and the ON signal is output at this time.

2: Fault Output (Fault Stop)

The ON signal is output when the inverter detects a fault and shuts down due to the fault.

3: Frequency Detection Threshold 1 (FDT1) Output

Refer to the descriptions of function codes P8-19 and P8-20.

4: Frequency Reached Output

Refer to the description of function code P8-21.

5: Zero-speed Running (No Output During Stop)

The ON signal is output when the inverter is running and the output frequency is 0. The signal is OFF when the inverter is in the stop state.

6: Motor Overload Pre-alarm

Before the motor overload protection is activated, the judgment is made according to the overload pre-alarm threshold. The ON signal is output when the threshold is exceeded. Refer to function codes P9-00 to P9-02 for motor overload parameter settings.

7: Inverter Overload Pre-alarm

The ON signal is output 10 seconds before the inverter overload protection is triggered.

8: Set Count Value Reached Output

The ON signal is output when the count value reaches the value set in PB-08.

9: Designated Count Value Reached Output

The ON signal is output when the count value reaches the value set in PB-09. Refer to the description of the PB group function codes for counting function details.

10: Reserved

11: PLC Cycle Complete

A pulse signal with a width of 250 ms is output when the simplified PLC completes one operation cycle.

12: Cumulative Operating Time Reached Output

The ON signal is output when the cumulative operating time of the inverter exceeds the time set in P8-17.

13: Frequency Limiting Active

The ON signal is output when the set frequency exceeds the upper or lower frequency limit, and the inverter output frequency also reaches the corresponding upper or lower frequency limit.

14: Torque Limiting Active

In speed control mode, the ON signal is output when the output torque reaches the torque limit value and the inverter enters the stall protection state.

15: Operation Ready

The ON signal is output when the main circuit and control circuit power supplies of the inverter are stable, no fault is detected, and the inverter is in the ready-to-run state.

16: Reserved

17: Upper Frequency Limit Reached Output

The ON signal is output when the operating frequency reaches the upper frequency limit.

18: Lower Frequency Limit Reached Output (No Output During Stop)

The ON signal is output when the operating frequency reaches the lower frequency limit. The signal is OFF when the inverter is in the stop state.

19: Undervoltage Status Output

The ON signal is output when the inverter is in the undervoltage state.

20: Communication Setting

Refer to the Communication Protocol for details.

21: Reserved

22: Reserved

23: Zero-speed Running 2 (Output During Stop)

The ON signal is output when the inverter output frequency is 0. The signal remains ON even when the inverter is in the stop state.

24: Cumulative Power-on Time Reached Output

The ON signal is output when the cumulative power-on time of the inverter (P7-11) exceeds the time set in P8-16.

25: Frequency Detection Threshold 2 (FDT2) Output

Refer to the descriptions of function codes P8-28 and P8-29.

26: Frequency 1 Reached Output

Refer to the descriptions of function codes P8-30 and P8-31.

27: Frequency 2 Reached Output

Refer to the descriptions of function codes P8-32 and P8-33.

28: Current 1 Reached Output

Refer to the descriptions of function codes P8-38 and P8-39.

29: Current 2 Reached Output

Refer to the descriptions of function codes P8-40 and P8-41.

30: Timer Reached Output

When the timer function (P8-42) is enabled, the ON signal is output when the current operating time of the inverter reaches the set timer value.

31: AI Input Over-limit

The ON signal is output when the analog input (AI) value exceeds the AI input protection upper limit (P8-44) or falls below the AI input protection lower limit (P8-43).

32: Load Loss Active

The ON signal is output when the inverter is in the load loss state.

33: Reverse Running Active

The ON signal is output when the inverter is in the reverse running state.

34: Zero-current Status

Refer to the descriptions of function codes P8-32 and P8-33.

35: Module Temperature Reached Output

The ON signal is output when the temperature of the inverter module heatsink (P7-08) reaches the set module temperature threshold (P8-45).

36: Software Current Over-limit

Refer to the descriptions of function codes P8-34 and P8-35.

37: Lower Frequency Limit Reached Output (Output During Stop)

The ON signal is output when the operating frequency reaches the lower frequency limit. The signal remains ON even when the inverter is in the stop state.

38: Alarm Output

The alarm signal is output when the inverter detects a fault and the fault handling mode is set to continue running.

39: Motor Over-temperature Alarm

The ON signal is output when the motor temperature reaches the motor over-temperature pre-alarm threshold (P9-58).

(Motor temperature can be monitored via d0-34.)

40: Current Operating Time Reached Output

The ON signal is output when the elapsed time of the current inverter operation cycle exceeds the time set in P8-51.

41: Fault Output (Fault with Coast-to-stop, No Output for Undervoltage)

42–44: Reserved

P5-06	Reserved	
	Reserved	0
P5-07	AO output function selection	
	0-16	0
P5-08	Reserved	
	Reserved	0

The output range of the Analog Output (AO) is 0 V to 10 V or 0 mA to 20 mA. Its scaling relationship with the corresponding functions is shown in the table below:

Setting	Funtion	Function Range (Corresponding to 0.0%–100.0% of Pulse or Analog Output)
0	Operating frequency	0～Maximum frequency
1	Set frequency	0～Maximum frequency
2	Output Current	0～2 times the motor rated current
3	Output Torque	0～2 times Motor rated torque
4	Output Power	0～2 times rated power
5	Output voltage	0～1.2 times the rated voltage of the Interver

Setting	Funtion	Function Range (Corresponding to 0.0%–100.0% of Pulse or Analog Output)
6	Reserved	Reserved
7	AI	0V～10V（or 0～20mA）
8	Reserved	Reserved
9	Reserved	Reserved
10	Reserved	Reserved
11	Count Value	0～Maximum count value
12	Communication Settings	0.0%～100.0%
13	Motor speed	0～Speed corresponding to maximum output frequency
14	Output Current	0.0A～1000.0A
15	Output Voltage	0.0V～1000.0V
16	Output Torque (actual torque value)	-2 × Motor Rated Torque to 2 × Motor Rated Torque

P5-09	Reserved	
	Reserved	0
P5-10	AO zero bias coefficient	
	-100.0%～+100.0%	0.0%
P5-11	AO gain	
	-10.00～+10.00	1.00
P5-12～P5-17	Reserved	
	Reserved	0
P5-18	R output delay time	
	0.0s～3600.0s	0.0s
P5-19～P5-21	Reserved	
	Reserved	0
P5-20	R output delay time	
	0.0s～3600.0s	0.0s

Set the delay time for the relay R from status change to actual output change.

P5-22	Switch output terminal effective status selection	
	00000～11111	00000

Units Digit: Reserved

Tens Digit: Relay R Active State Setting

0: High Level Active

1: Low Level Active

Hundreds Digit, Thousands Digit, Ten-thousands Digit: Reserved

Group P6 Start-Stop Control

P6-00	Startup mode	
	0～3	0

0: Direct Start

If the DC braking time for start-up is set to 0, the inverter will start running from the start frequency. If the DC braking time for start-up is not set to 0, it will perform DC braking first, and then start running from the start frequency. This mode is applicable to low-inertia loads and scenarios where the motor may be rotating during start-up.

1: Speed Tracking Restart

The inverter first detects the motor speed and rotation direction, then starts operation at the tracked motor frequency to achieve smooth, shock-free start-up for rotating motors. This mode is designed for instantaneous power failure restart of high-inertia loads. To ensure optimal performance of speed tracking restart, the motor parameters in Group P1 must be configured accurately.

2: Asynchronous Motor Pre-excitation Start

This mode is only valid for asynchronous motors and is used to establish a magnetic field before the motor starts running. Refer to the descriptions of function codes P6-05 and P6-06 for pre-excitation current and pre-excitation time settings. If the pre-excitation time is set to 0, the inverter will skip the pre-excitation process and start directly from the start frequency. If the pre-excitation time is not set to 0, pre-excitation will be executed first before start-up, which can improve the dynamic response performance of the motor.

3: Ultra-fast Start

This mode is only valid in vector control mode.

P6-01	Speed tracking mode	
	0～2	0

0: Start from Stop Frequency

Track downward from the frequency at the moment of power failure. This mode is typically recommended.

1: Start from Zero Speed

Track upward from 0 Hz. This mode is applicable for restart scenarios after a prolonged power outage.

2: Start from Maximum Frequency

Track downward from the maximum frequency. This mode is generally used for regenerative loads.

P6-02	Speed tracking fast or slow	
	1～100	20

This parameter is used to select the speed of rotation tracking during speed tracking restart. A larger parameter value results in a faster tracking speed, but an excessively high setting may compromise tracking reliability.

P6-03	Startup frequency	
	0.00Hz～10.00Hz	0.00Hz
P6-04	Start frequency hold time	
	0.0s～100.0s	0.0s

To ensure the motor torque during startup, please set an appropriate start frequency. A certain holding time of the start frequency is required to fully establish the magnetic flux of the motor during startup.

The start frequency (P6-03) is not subject to the lower frequency limit. However, if the set target frequency is lower than the start frequency, the inverter will not start and will remain in standby mode.

The start frequency holding time does not take effect during the forward-reverse rotation switching process. It is not included in the acceleration time, but is counted within the operating time of the simplified PLC.

P6-05	Start DC braking current/pre-excitation current	
	0%～100%	50%
P6-06	Start DC braking time/pre-excitation time	
	0.0s～100.0s	0.0s

Startup DC braking is generally used to stop a running motor before subsequent restart. Pre-excitation is applied to establish a magnetic field in the asynchronous motor first prior to startup, so as to improve response speed.

Startup DC braking is only valid when the startup mode is set to direct start. In this case, the inverter will first perform DC braking at the set startup DC braking current, and then start operation after the elapse of the set startup DC braking time. If the startup DC braking time is set to 0, the inverter will start directly without undergoing the DC braking process. The higher the DC braking current, the greater the braking torque.

If the startup mode is set to asynchronous motor pre-excitation start, the inverter will first pre-establish a magnetic field at the set pre-excitation current, and then start operation after the elapse of the set pre-excitation time. If the pre-excitation time is set to 0, the inverter will start directly without undergoing the pre-excitation process.

There are two scenarios for the base value reference of startup DC braking current / pre-excitation current:

When the motor rated current is less than or equal to 80% of the inverter rated current, the percentage is based on the motor rated current.

When the motor rated current is greater than 80% of the inverter rated current, the percentage is based on 80% of the inverter rated current.

P6-07	Acceleration and deceleration methods	
	0～2	0

0: Linear Acceleration/Deceleration

The output frequency increases or decreases in a linear manner. Four acceleration/deceleration time profiles are selectable via the multi-function digital input terminals (P4-00～P4-03).

1: S-curve Acceleration/Deceleration A

The output frequency increases or decreases following an S-curve. This S-curve mode is applicable to scenarios requiring smooth start-up or stop, such as elevators and conveyor belts. Function codes P6-08 and P6-09 define the time ratios of the initial and final segments of the S-curve acceleration/deceleration respectively.

2: S-curve Acceleration/Deceleration B

In this S-curve Acceleration/Deceleration B mode, the motor rated frequency \(f_b\) always serves as the inflection point of the S-curve, as illustrated in Figure P6-1. It is generally used in applications where rapid acceleration/deceleration is required in the high-speed range above the rated frequency.

When the set frequency is above the motor rated frequency, the acceleration/deceleration time is calculated as follows:

$$t = \left(\frac{4}{9} \times \left(\frac{f}{f_b}\right)^2 + \frac{5}{9}\right) \times T$$

其中，f=Set frequency，f_b=Motor rated frequency，T=Time to accelerate from 0 Hz to the motor rated frequency fb。

<table>
<tr><td rowspan="2">P6-08</td><td colspan="2">The proportion of time at the beginning of the S-curve</td></tr>
<tr><td>0.0%～(100.0%-P6-09)</td><td>30.0%</td></tr>
<tr><td rowspan="2">P6-09</td><td colspan="2">Proportion of time at the end of the S-curve</td></tr>
<tr><td>0.0%～(100.0%-P6-08)</td><td>30.0%</td></tr>
</table>

Function codes P6-08 and P6-09 define the time ratios of the initial segment and final segment of S-curve Acceleration/Deceleration A respectively. The two function codes must satisfy the following condition: P6-08 + P6-09 ≤ 100.0%.

In Figure P6-1, t1 refers to the parameter defined by P6-08, during which the slope of the output frequency variation increases gradually. t2 refers to the parameter defined by P6-09, during which the slope of the output frequency variation decreases gradually to 0.

During the period between t1 and t2, the slope of the output frequency variation remains constant, meaning that linear acceleration/deceleration is performed in this interval.

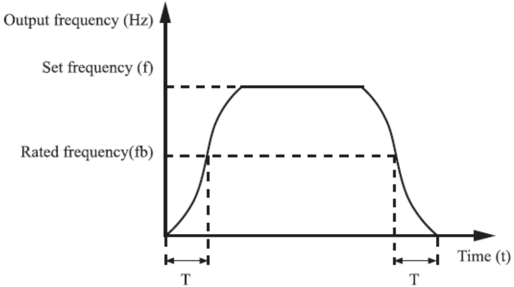


Figure P6-1 Schematic Diagram of S-curve Acceleration/Deceleration A

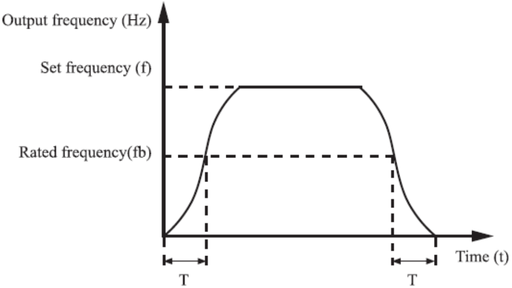


Figure P6-2 Schematic Diagram of S-curve Acceleration/Deceleration B

P6-10	Shutdown methods	
	0～1	0

0: Deceleration Stop

After receiving the stop command, the inverter gradually reduces the output frequency according to the deceleration time and shuts down when the frequency drops to zero. If the DC braking at stop function is enabled, the inverter will execute the DC braking process after reaching the DC braking start frequency at stop (set according to P6-11, and may also need to wait for a DC braking delay time at stop), and then shut down.

1: Coast Stop

Upon receiving the stop command, the inverter immediately terminates the output, and the load stops freely according to its mechanical inertia.

P6-11	Stop DC braking start frequency	
	0.00～Maximum frequency	0.00Hz
P6-12	Stop DC braking wait time	
	0.0～100.0s	0.0S
P6-13	Stop DC braking current	
	0.0～100%	50%
P6-14	Stop DC braking time	
	0.0: DC Braking Inactive 0.0～100.0s	0.0S

DC Braking Start Frequency at Stop: During the deceleration stop process, the DC braking process initiates when the operating frequency drops to this set frequency.

DC Braking Delay Time at Stop: After the operating frequency decreases to the DC braking start frequency at stop, the inverter suspends output for a specified duration before activating the DC braking process. This parameter is designed to prevent faults such as overcurrent that may occur if DC braking is initiated at relatively high speeds.

DC Braking Current at Stop: The DC braking current applied during the stop phase. There are two scenarios for its reference base value:

When the motor rated current is less than or equal to 80% of the inverter rated current, the percentage is based on the motor rated current.

When the motor rated current is greater than 80% of the inverter rated current, the percentage is based on 80% of the inverter rated current.

DC Braking Duration at Stop: The length of time the DC braking is maintained. If this value is set to 0, the DC braking process will be cancelled. The DC braking process at stop is illustrated in Figure P01-3 Schematic Diagram.

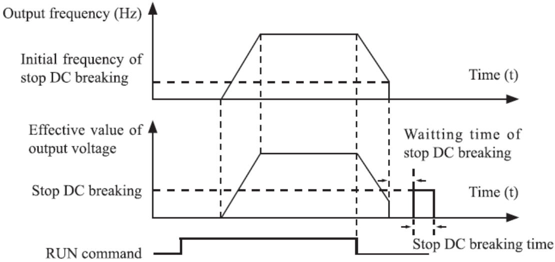


Figure P6-3 Schematic Diagram of DC Braking at Stop

P6-15	Brake utilization rate	
	0%～100%	100%

This function is only valid for inverters with a built-in braking unit. It is used to adjust the duty cycle of the braking unit. A higher braking utilization rate corresponds to a higher duty cycle of the braking unit operation, resulting in stronger braking performance. However, this will cause larger fluctuations in the inverter's DC bus voltage during the braking process.

P6-18	Speed tracking current	
	30%-200%	Model determination
P6-21	Speed tracking delay	
	0.00～5.00s	Model determination

Group P7 Panel and Display

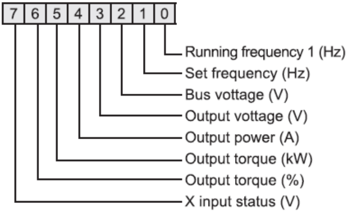
P7-02	STOP/RESET key function	
	0～1	1

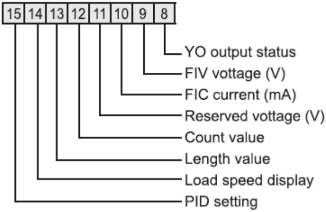
0: The STOP/RES key shutdown function works only in Panel operation mode

1: The STOP/RES key shutdown function works in any mode of operation

P7-03	LED running main display parameters 1	
	0000～FFFFH	1FH

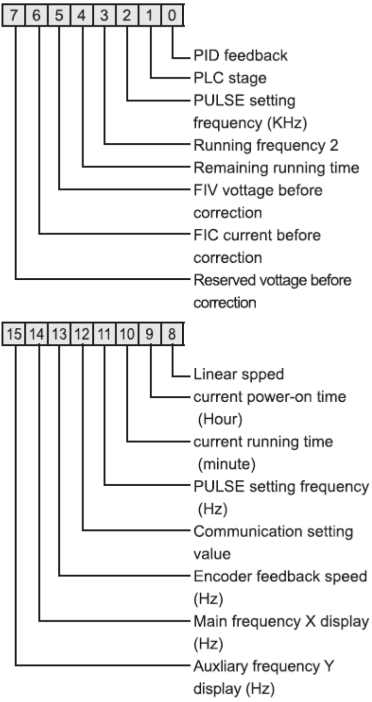
If it is necessary to display the above parameters during operation, set the corresponding bits to 1, convert the binary number to hexadecimal, and then assign the value to P7-03.





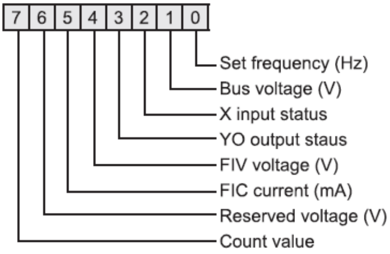
P7-04	LED running main display parameters 2	
	0000～FFFFH	00H

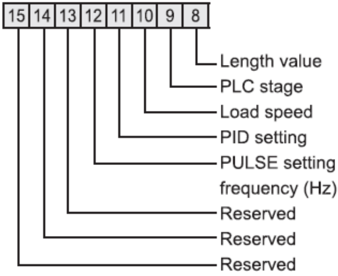
If it is necessary to display the above parameters during operation, set the corresponding bits to 1, convert the binary number to hexadecimal, and then assign the value to P7-04.



P7-05	LED shutdown main display parameters	
	0000～FFFFH	33H

If it is necessary to display the above parameters during shutdown, set the corresponding bits to 1, convert the binary number to hexadecimal, and then assign the value to P7-05.





P7-06	Load speed display coefficient	
	0.0001～6.5000	1.0000

When it is necessary to display the load speed, this parameter is used to adjust the corresponding relationship between the inverter output frequency and the load speed. For the specific corresponding relationship, refer to the description of P7-12.

P7-07	Inverter module heat sink temperature	
	0.0℃～100.0℃	-

Displays the temperature of the inverter module IGBT. The over-temperature protection threshold of the inverter module IGBT varies with different models.

P7-09	Cumulative running time	
	0h～65535h	-

Displays the cumulative operating time of the inverter. When the operating time reaches the set operating time (P8-17), the multi-function digital output (Function 12) of the inverter will output an ON signal.

P7-12	Speed shows decimal places	
	10～23	21

Units digit of the LED display: Display coefficient for load speed (d0-14)

0: 0 decimal places

1: 1 decimal place

2: 2 decimal places

3: 3 decimal places

Tens digit of the LED display: Display coefficient for feedback speed (d0-19)

1: 1 decimal place

2: 2 decimal places

This parameter is used to set the number of decimal places for load speed display. If the load speed display coefficient P7-07 is set to 2.0000 and the number of decimal places for load speed P9-10 is set to 2 (2 decimal places), the load speed will be calculated as follows when the inverter operating frequency is 40.00 Hz:

40.00 × 2.0000 = 80.00 (displayed with 2 decimal places).

If the inverter is in the stop state, the load speed will display the value corresponding to the set frequency, i.e., the set load speed. Taking the set frequency of 50.00 Hz as an example, the load speed in the stop state is calculated as follows:

50.00 × 2.0000 = 100.00 (displayed with 2 decimal places).

P7-13	Cumulative power-on time	
	0h～65535h	-
P7-14	Cumulative power consumption	
	0～65535 degrees	-

Display the cumulative on-time and cumulative power consumption of the inverter

P7-17	Display Selection 1	
	0～73	0
P7-18	Display Selection 2	
	0～73	1
P7-19	Display Selection 3	
	0～73	2
P7-20	Display Selection 4	
	0～73	3

By changing the set values of P7-17, the monitoring items displayed on the auxiliary display of the dual-display keyboard can be altered, as well as the monitoring content on the first line of the LCD keyboard. By changing the values of P7-18, P7-19, and P7-20, the monitoring content on the second to fourth lines of the LCD keyboard can be individually modified

Group P8 Auxiliary Functions

P8-00	Jog frequency	
	0.00Hz～Maximum frequency	2.00Hz
P8-01	Jog acceleration time	
	0.0s～6500.0s	20.0s
P8-02	Jog the deceleration time	
	0.0s～6500.0s	20.0s

Defines the given frequency and acceleration/deceleration time of the inverter during jog operation. During jog operation, the startup mode is fixed as direct start (P6-00=0) and the stop mode is fixed as deceleration stop (P6-10=0).

P8-03	Acceleration time 2	
	0.0s～6500.0s	Model confirmed
P8-04	Deceleration time 2	
	0.0s～6500.0s	Model confirmed
P8-05	Acceleration time 3	
	0.0s～6500.0s	Model confirmed
P8-06	Deceleration time 3	
	0.0s～6500.0s	Model confirmed
P8-07	Acceleration time 4	
	0.0s～6500.0s	Model confirmed
P8-08	Deceleration time 4	
	0.0s～6500.0s	Model confirmed

Four acceleration/deceleration times can be defined, and the acceleration/deceleration time 1 to 4 during the inverter operation can be selected through different combinations of control terminals. Please refer to the definitions of the acceleration/deceleration time terminal functions in P4-00～P4-06.

P8-09	Jump frequency 1	
	0.00Hz～Maximum frequency	0.00Hz
P8-10	Jump frequency 2	
	0.00Hz～Maximum frequency	0.00Hz

P8-11	Jump frequency amplitude	
	0.00Hz～Maximum frequency	0.00Hz

When the set frequency falls within the skip frequency range, the actual operating frequency will run at the skip frequency closest to the set frequency. By setting skip frequencies, the inverter can avoid the mechanical resonance points of the load. Two skip frequency points can be configured. If both skip frequencies are set to 0, the skip frequency function will be disabled.

For the schematic diagram illustrating the principle of skip frequencies and skip frequency ranges, please refer to Figure P8-4.

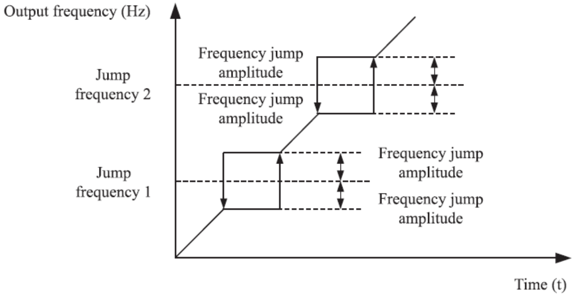


Figure P8-4 Schematic Diagram of Jump Frequency

P8-12	Forward and reverse dead time	
	0.0s～3000.0s	0.0s

Sets the transition time at 0 Hz output during the inverter's forward/reverse rotation switching process, as illustrated in Figure P8-5.

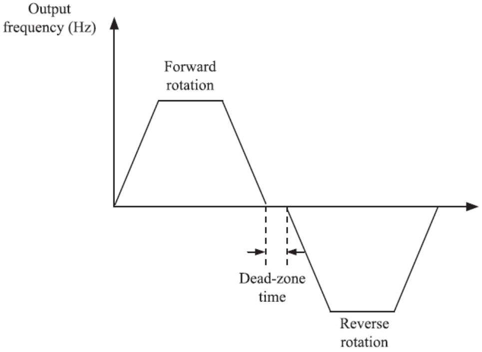


Figure P8-5 Schematic Diagram of Forward/Reverse Rotation Dead Time

P8-13	Do not run the motor in reverse	
	0～1	0

0: Ineffective

1: Effective

When the frequency given via communication input or analog input is a negative value, the motor rotation direction will reverse, and such a frequency is defined as reverse frequency. This parameter is used to set whether the inverter is allowed to operate in the reverse rotation state. For applications where motor reverse rotation is prohibited, set P8-13=1.

P8-14	Set the operating mode below the lower limit frequency	
	0～2	0

0: Run at Lower Limit Frequency

When the set frequency is lower than the lower limit frequency setting value (P0-14), the inverter will run at the lower limit frequency.

1: Shut Down

When the set frequency is lower than the lower limit frequency setting value (P0-14), the inverter will shut down.

2: Run at Zero Speed

When the set frequency is lower than the lower limit frequency setting value (P0-14), the inverter will run at zero frequency.

P8-15	Drooping control	
	0.00Hz～10.00Hz	0.00Hz

This function is generally used for load sharing when multiple motors drive the same load. Droop control means that the output frequency of the inverter decreases as the load increases. In this way, when multiple motors drive the same load, the motor bearing a heavier load in the system will experience a greater drop in output frequency, thereby reducing its load and achieving uniform load distribution among multiple motors. This parameter refers to the frequency drop value of the inverter when it outputs the rated load.

P8-16	Set the cumulative power-on arrival time	
	0h～65000h	0h
P8-17	Set cumulative run arrival times	
	0h～65000h	0h

When the accumulated power-on time (P7-11) reaches the power-on time set by P8-16, the multi-function output terminal of the inverter will output an ON signal.

P8-18	The power-on terminal operates protection selection	
	0～1	0

0: Not protected

1: Protection

This parameter is related to the safety protection function of the inverter.

If this parameter is set to 1:

If the run command is valid when the inverter is powered on (e.g., the terminal run command remains closed before power-on), the inverter will not respond to the run command. The run command must be deactivated once, and then reactivated for the inverter to respond to it.

If the run command is valid when the inverter fault is reset, the inverter will also not respond to the run command. The run command must be deactivated first to exit the run protection state.

Setting this parameter to 1 can prevent potential hazards caused by the motor responding to the run command unintentionally during power-on or fault reset.

P8-19	Frequency detection value (FDT1)	
	0.00Hz～Maximum frequency	50.00Hz
P8-20	Frequency detection lag value (FDT1)	
	0.0%～100.0%（FDT1 level）	5.0%

When the operating frequency is higher than the frequency detection value, the multi-function output terminal of the inverter will output an ON signal. When the frequency drops below the detection value by a certain margin, the ON signal output by the multi-function terminal will be deactivated.

The above parameters are used to set the detection value of the output frequency and the hysteresis value for deactivating the output action. Among them, P8-20 represents the percentage of the hysteresis frequency relative to the frequency detection value P8-19.

Figure P8-6 shows the schematic diagram of the FDT function.

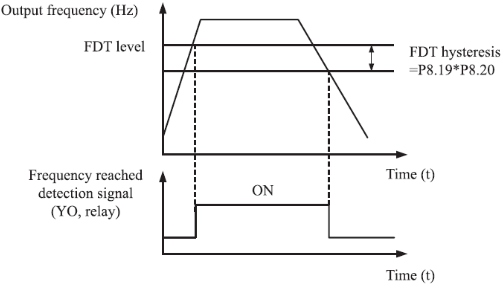


Figure P8-6 Schematic Diagram of FDT Level

P8-21	Frequency arrival (FAR) detection width	
	0.0%～100.0%（Maximum frequency）	0.0%

This function is a supplementary description of Function No.4 of parameter codes P5-02～P5-05. When the output frequency of the inverter falls within the positive and negative detection bandwidth of the set frequency, the terminal will output a valid signal (open-collector signal, which is a low level after resistor pull-up), as shown in the figure below.

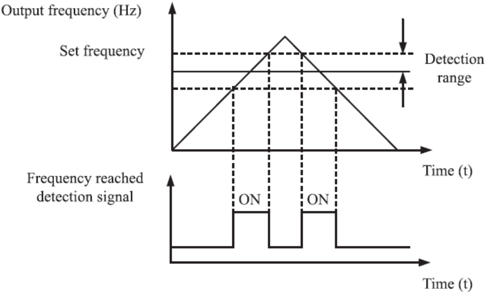


Figure P8-7 Schematic Diagram of Frequency Arrival Detection Amplitude

P8-22	Is the jump frequency effective during acceleration and deceleration	
	0～1	0

0: Ineffective

1: Effective

This parameter code is used to set whether the skip frequency function is valid during the acceleration/deceleration process. When it is set to valid, if the operating frequency falls within the skip frequency range, the actual operating frequency will skip the set skip frequency boundary. Figure P8-8 shows the schematic diagram of the skip frequency function being valid during acceleration/deceleration.

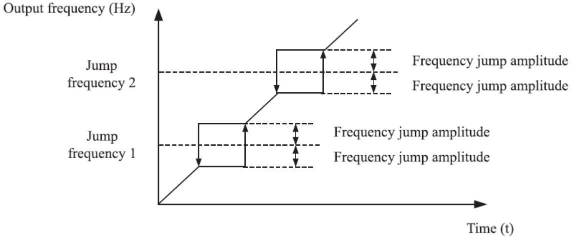


Figure P8-8 Schematic Diagram of Valid Skip Frequency During Acceleration/Deceleration

P8-25	Switch frequency points between acceleration time 1 and acceleration Time 2	
	0.00Hz～Maximum frequency	0.00Hz
P8-26	Deceleration time 1 and deceleration time 2 switch frequency points	
	0.00Hz～Maximum frequency	0.00Hz

This function is valid when the acceleration/deceleration time is not selected via the X terminal. It is used to enable the inverter to automatically select different acceleration/deceleration times according to the operating frequency range during operation, instead of relying on the X terminal for switching. Figure P8-9 shows the schematic diagram of Switch frequency points between acceleration time and acceleration Time

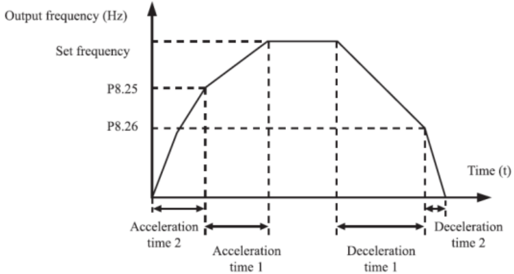


Figure P8-9 Schematic Diagram of Switch frequency points between acceleration time and acceleration Time

P8-27	Terminal point movement priority	
	0～1	0

0: Ineffective

1: Effective

This parameter is used to set whether the terminal jog function has the highest priority. When the terminal jog priority is enabled, if a terminal jog command is issued during normal operation, the inverter will switch to the terminal jog operation mode.

P8-28	Frequency detection values (FDT2)	
	0.00Hz～Maximum frequency	50.00Hz
P8-29	Frequency detection lag value (FDT2)	
	0.0%～100.0%（FDT2 level）	5.0%

This frequency detection function is identical to FDT1. Please refer to the relevant descriptions of FDT1, i.e., the explanations of parameter codes P8-19 and P8-20.

P8-30	Random arrival frequency detection value 1	
	0.00Hz～Maximum frequency	50.00Hz
P8-31	Arbitrary arrival frequency detection width 1	
	0.0%～100.0%（Maximum frequency）	0.0%
P8-32	Random arrival frequency detection value 2	
	0.00Hz～Maximum frequency	50.00Hz
P8-33	Reach frequency detection width 2	
	0.0%～100.0%（Maximum frequency）	0.0%

When the output frequency of the inverter falls within the positive and negative detection range of any target frequency detection value, the multi-function output terminal will output an ON signal. There are two sets of parameters for arbitrary frequency arrival detection, which are used to set the target frequency value and its corresponding detection range respectively. Figure P8-10 shows the schematic diagram of this function.

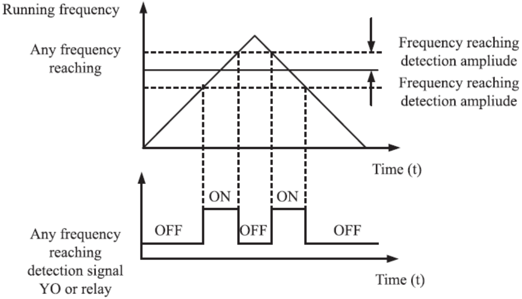


Figure P8-10 Schematic Diagram of Arbitrary Frequency Arrival Detection

P8-34	Zero current detection level	
	0.0%～300.0%	5.0%
P8-35	Zero current detection delay time	
	0.01s～600.00s	0.10s

When the output current of the inverter is greater than or exceeds the overcurrent detection point, and the duration exceeds the software overcurrent point detection delay time, the multi-function output terminal of the inverter will output an ON signal. Figure P8-11 shows the schematic diagram of the output current overlimit function.

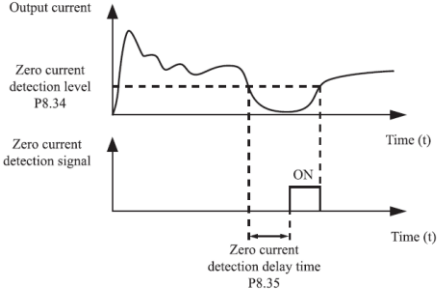


Figure P8-11 Schematic Diagram of Zero Current Detection

P8-36	Output current exceeds limit	
	0.0%～300.0%	200.0%
P8-37	Output current over-limit detection delay time	
	0.00s～600.00s	0.00s

When the output current of the inverter is greater than or exceeds the overcurrent detection point, and the duration exceeds the software overcurrent point detection delay time, the multi-function output terminal of the inverter will output an ON signal. Figure P8-12 shows the schematic diagram of the output current overlimit function.

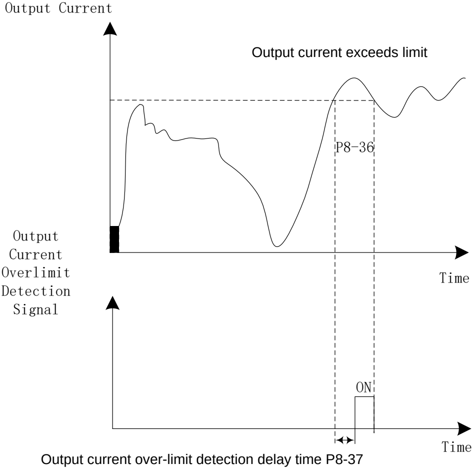


Figure P8-12 Schematic Diagram of Output Current Overlimit Detection

P8-38	Any incoming current 1	
	0.0%～300.0%(Motor rated current)	100.0%
P8-39	Any incoming current 1 width	
	0.0%～300.0%(Motor rated current)	0.0%
P8-40	Any incoming current 2	
	0.0%～300.0%(Motor rated current)	100.0%
P8-41	Any incoming current 2 width	
	0.0%～300.0%(Motor rated current)	0.0%

When the output current of the inverter falls within the positive and negative detection bandwidth of the set arbitrary target current, the multi-function output terminal of the inverter will output an ON signal. There are two sets of parameters for arbitrary current arrival detection and its corresponding detection bandwidth. Figure P8-13 shows the schematic diagram of this function.

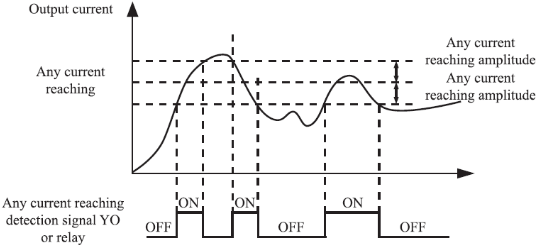


Figure P8-13 Schematic Diagram of Arbitrary Frequency Arrival Detection

P8-42	Timing function selection	
	0～1	0

0: Ineffective

1: Effective

P8-43	Timed runtime selection	
	0～3	0

0: P8-42 Settings

1: AI

2: Reserved

3: Panel potentiometer

P8-44	Timed running time	
	0.0Min～6500.0Min	0.0Min

This group of parameters is used to implement the timer operation function of the inverter.

When the timer function selection (P8-42) is enabled, the inverter starts timing upon activation. When the set timer operation duration is reached, the inverter shuts down automatically, and the multi-function output terminal outputs an ON signal simultaneously.

The inverter resets the timer to zero every time it is started. The remaining timer operation time can be monitored via d0-20.

The timer operation duration is set by P8-43 and P8-44, with the unit of time being minutes.

P8-45	Lower limit of AI input voltage protection value	
	0.00V～P8-44	3.10V
P8-46	Upper limit of AI input voltage protection value	
	P8-43～11.00V	6.80V

When the value of the analog input AI is greater than P8-46 or less than P8-45, the multi-function output terminal of the inverter will output an ON signal for "AI Input Overlimit", which is used to indicate whether the input voltage of AI is within the set range.

P8-47	Module temperature arrives	
	0℃～100℃	75℃

When the temperature of the inverter heat sink reaches this threshold, the multi-function output terminal of the inverter will output an ON signal for "Module Temperature Reached".

P8-48	Cooling fan control	
	0～1	0

0: The fan runs while running

1: The fan keeps running

This parameter is used to select the operation mode of the cooling fan:

When set to 0: the fan operates while the inverter is running; after the inverter stops, the fan continues to operate if the heat sink temperature is higher than 40℃, and stops running if the heat sink temperature is lower than 40℃.

When set to 1: the fan runs continuously once the inverter is powered on.

P8-49	Frequency Mode Wake-Up frequency	
	Dormancy frequency (P8-51) ～Maximum Frequency（P0-10)	0.00Hz
P8-50	Frequency Mode Wake-up delay time	
	0.0s～6500.0s	0.0s
P8-51	Frequency Mode Dormancy frequency	
	0.00Hz～wake-up frequency（P8-49)	0.00Hz
P8-52	Frequency Mode Sleep delay time	
	0.0s～6500.0s	0.0s

This group of parameters is used to implement the sleep and wake-up functions in water supply applications:

During the operation of the inverter, when the set frequency is less than or equal to the sleep frequency (P8-51), the inverter will enter the sleep state and shut down automatically after the delay time set in P8-50.

If the inverter is in sleep state and the current run command is valid, when the set frequency is greater than or equal to the wake-up frequency (P8-49), the inverter will start up automatically after the delay time set in P8-50.

In general, please set the wake-up frequency to be greater than or equal to the sleep frequency. If both the wake-up frequency and sleep frequency are set to 0.00 Hz, the sleep and wake-up functions will be disabled.

When the sleep function is enabled, if the frequency source is set to PID control, whether the PID controller continues to calculate in sleep state is subject to the parameter PA-28. In this case, it is mandatory to select

PID calculation during inverter shutdown (PA-28 = 1).

P8-53	This run's arrival time setting	
	0.0～6500.0Min	0.0Min

When the operating duration of the current startup reaches this threshold, the multi-function output terminal of the inverter will output an ON signal for "Current Operating Duration Reached".

P8-54	Output power correction factor	
	0.00%～200.0%	100.0%

When the output power (d0-05) does not match the expected value, the output power can be linearly calibrated using this parameter.

P8-55	Sleep mode selection	
	0～1	0

0：In frequency mode, the associated parameters are P8-48 to P8-52. Please refer to the relevant parameter descriptions for details

1：In pressure mode, the associated parameters are P8-56 to P8-62. Please refer to the relevant parameter descriptions for details

P8-56	Pressure mode overpressure setting	
	0.0%～200.0%	150.0%
P8-57	Pressure mode, sleep pressure setting	
	90.0%～100.0%	98.0%
P8-58	Pressure mode awakens pressure setting	
	0.0%～100.0%	35.0%
P8-59	Pressure mode sleep frequency setting	
	0.00Hz～Wake-up frequency（P8-60)	30.00Hz
P8-60	Pressure mode wake-up frequency setting	
	Sleep frequency (P8-59)～Maximum Frequency（P0-10)	40.00Hz
P8-61	Pressure mode wake-up delay setting	
	0.0s～6500.0s	3.0s
P8-62	Pressure mode sleep delay setting	
	0.0s～6500.0s	5.0s

This set of parameters is used to implement the sleep and wake-up functions in water supply applications. When P8-55=1 and the sleep mode is set to pressure mode, the above parameters come into play. During the operation of the frequency converter, when the feedback pressure is greater than or equal to P8-57 sleep pressure and the operating frequency is less than P8-59 sleep frequency, after a delay time of P8-62, the frequency converter enters a sleep state and automatically stops. If the frequency converter is in a sleep state and the current operation command is valid, when the feedback pressure is less than or equal to P8-58 wake-up pressure, after a delay time of P8-61, the frequency converter starts to boot up.

Generally, please set the wake-up frequency to be greater than or equal to the sleep frequency. If both the wake-up frequency and sleep frequency are set to 0.00Hz, the sleep and wake-up functions will be ineffective.

Group P9 Faults and Protections

P9-00	Motor overload protection options	
	0～1	1

0: Prohibited

The motor overload protection function is not available, which may pose a risk of motor overheating and damage. It is recommended to install a thermal relay between the inverter and the motor.

1: Allowed

At this point, the inverter determines whether the motor is overloaded based on the inverse time - limit curve of motor overload protection.

The inverse time - limit curve of motor overload protection is as follows:

When the current reaches 220% × (P9 - 01) × the rated current of the motor and lasts for 1 minute, an alarm for motor overload fault will be triggered.

When the current reaches 150% × (P9 - 01) × the rated current of the motor and lasts for 5 minutes, an alarm for motor overload will be triggered.

P9-01	Motor overload protection gain	
	0.01～10.00	1.00

The user shall set the value of P9-01 correctly according to the actual overload capacity of the motor. An excessively high setting of this parameter may cause the motor to overheat and get damaged without the inverter triggering an alarm, which poses a potential hazard.

P9-02	Motor overload warning coefficient	
	50%～100%	80%

This function is used to send a pre-alarm signal to the control system via the digital output terminal before the motor overload fault protection is activated.

The pre-alarm coefficient is used to determine the advance level of the pre-alarm prior to the motor overload protection being triggered. The larger the value, the smaller the advance margin of the pre-alarm.

When the cumulative value of the inverter's output current exceeds the product of the overload inverse time-limit curve and P9-02, the inverter's multi-function digital output terminal will output an ON signal for "Motor Overload Pre-alarm".

P9-03	Overvoltage stall gain	
	0（No protection）～100	30
P9-04	Overvoltage stall protection voltage	
	200.0V～2000.0V	Model confirmed

During the inverter deceleration process, when the DC bus voltage exceeds the overvoltage stall protection voltage, the inverter will stop decelerating and maintain the current operating frequency. It will resume deceleration only after the bus voltage drops to the normal range.

The overvoltage stall gain is used to adjust the inverter's capability to suppress overvoltage during deceleration. The larger the gain value, the stronger the overvoltage suppression capability. On the premise of no overvoltage occurrence, it is better to set this gain to a smaller value.

For low-inertia loads, the overvoltage stall gain should be set to a small value; otherwise, the dynamic response speed of the system will be reduced. For high-inertia loads, this value should be set to a large value; otherwise, the suppression effect will be poor, and overvoltage faults may occur.

When the overvoltage stall gain is set to 0, the overvoltage stall function will be disabled.

P9-05	Pass the loss rate gain	
	0～100	20
P9-06	Overcurrent velocity protection current	
	100%～200%	150%

When the inverter output current reaches the set overcurrent stall protection current (P9-06), the inverter will reduce the output frequency during acceleration and constant-speed operation; during deceleration, it will slow down the frequency drop rate. The operating frequency will only return to normal until the current drops below the overcurrent stall protection current (P9-06). For details,

Overcurrent Stall Protection Current: This parameter specifies the current threshold for activating the overcurrent stall function. The inverter will initiate overcurrent stall protection when the output current exceeds this value. This value is expressed as a percentage of the motor rated current.

Overcurrent Stall Gain: This parameter is used to adjust the inverter's capability to suppress overcurrent during acceleration and deceleration. The larger the gain value, the stronger the overcurrent suppression capability. On the premise of no overcurrent occurrence, it is better to set this gain to a smaller value.

For low-inertia loads, the overcurrent stall gain should be set to a small value; otherwise, the dynamic response speed of the system will be reduced. For high-inertia loads, this value should be set to a large value; otherwise, the suppression effect will be poor, and overcurrent faults may occur.

In applications with extremely low inertia, it is recommended to set the overcurrent suppression gain to a value less than 20.

When the overcurrent stall gain is set to 0, the overcurrent stall function will be disabled.

P9-08	Brake start voltage	
	200.0～2000.0V	Model confirmed

If the DC-side voltage inside the inverter is higher than the dynamic braking starting voltage, the built-in braking unit will be activated. If a braking resistor is connected at this time, the energy of the pump-up voltage inside the inverter will be dissipated through the braking resistor, causing the DC voltage to drop. When the DC-side voltage falls below the dynamic braking starting voltage, the built-in braking unit will be turned off.

P9-09	The number of times the fault is automatically reset	
	0～200	0

When the inverter is configured with automatic fault reset, this parameter is used to set the maximum number of automatic resets. Once this number is exceeded, the inverter will remain in the fault state.

P9-10	Fault terminal output action selection during automatic fault reset	
	0～1	1

0: No action

1: Action

If the automatic fault reset function is enabled on the inverter, whether the fault digital output terminal is activated during the automatic fault reset period can be configured via P9-10.

P9-11	Fault auto-reset interval	
	0.1s～100.0s	1.0s

The delay time from inverter fault alarm triggering to automatic fault reset execution

P9-12	Input Phase Loss Protection Selection	
	0～1	Model determination

0: Prohibited (inverter power ≤11kW)

1: Allowed (inverter power >11kW)

P9-13	Output phase loss protection selection	
	0～1	1

0: Prohibited

1: Allow

P9-14	First failure type	
	0～99	-
P9-15	Second failure type	
	0～99	-
P9-16	Third (most recent) failure type	
	0～99	-
P9-17	Frequency during the third (most recent) failure	
	0.00Hz～Maximum Frequency（P0-10）	-
P9-18	Current during the third (most recent) failure	
	0.00A～655.35A	-
P9-19	Busbar voltage during the third (most recent) failure	
	0.0V～3000.0V	-
P9-20	Input terminal status during the third (most recent) failure	
	0～127	-
P9-21	Output terminal status during the third (most recent) failure	
	0～15	-

P9-22	The inverter status during the third (most recent) failure	
	0～1FH	-
P9-23	Power-on time for the third (most recent) failure	
	0～65535 Hour	-
P9-24	Running time during the third (most recent) failure	
	0～65535 Hour	-
P9-25～P9-26	Reserved	
	Reserved	-
P9-27	Frequency at the second failure	
	0.00Hz～Maximum Frequency（P0-10）	-
P9-28	Current during the second failure	
	0.00A～655.35A	-
P9-29	Busbar voltage at the second failure	
	0.0V～3000.0V	-
P9-30	Input terminals for the second failure	
	0～127	-
P9-31	Output terminals during the second failure	
	0～15	-
P9-32	The inverter status during the second failure	
	0～1FH	-
P9-33	Power-on time during the second failure	
	0～65535 Hour	-
P9-34	Running time during the second failure	
	0～65535 Hour	-
P9-37	Frequency at the first failure	
	0.00Hz～Maximum Frequency（P0-10）	-
P9-38	Current during the first failure	
	0.00A～655.35A	-

P9-39	Busbar voltage at the first failure	
	0.0V～3000.0V	-
P9-40	Input terminals during the first failure	
	0～127	-
P9-41	Output terminal status during the first failure	
	0～15	-
P9-42	The inverter status during the first failure	
	0～1FH	-
P9-43	Power-on time during the first failure	
	0～65535 Hour	-
P9-44	Running time during the first failure	
	0～65535 Hour	-
P9-47	Fault protection action option 1	
	00000～22222	00000

Units digit: Motor Overload (FU11)

0: Coast Stop

When this option is selected, the inverter will display FU code and shut down immediately without deceleration.

1: Stop According to Preset Mode

When this option is selected, the inverter will first display A code, stop following the preset shutdown mode, and then display FU code after shutdown.

2: Continue Operation

When this option is selected, the inverter will keep running with the display of A code; the operating frequency will be determined by parameter P9-54.

Tens digit: Input Phase Loss (FU12) (Same as the units digit)

Hundreds digit: Output Phase Loss (FU13) (Same as the units digit)

Thousands digit: External Fault (FU15) (Same as the units digit)

Ten-thousands digit: Communication Abnormality (FU16) (Same as the units digit)

P9-48	Fault protection action option 2	
	00000～22010	00000

Units digit: Reserved

Tens digit: Parameter Read/Write Error (FU21)

0: Coast Stop

The inverter shuts down immediately by cutting off the output, and the motor coasts to a stop relying on inertia.

1: Stop According to Preset Mode

The inverter stops following the pre-configured shutdown mode (e.g., ramp deceleration).

Hundreds digit: Reserved

Thousands digit: Motor Overheating (FU25) (Same as the units digit of P9-47)

Ten-thousands digit: Operating Duration Reached (FU26) (Same as the units digit of P9-47)

P9-49	Fault protection action option 3	
	00000～22222	00000

Units digit: User-defined Fault 1 (FU27) (Same as the units digit of P9-47)

Tens digit: User-defined Fault 2 (FU28) (Same as the units digit of P9-47)

Hundreds digit: Power-on Duration Reached (FU29) (Same as the units digit of P9-47)

Thousands digit: Load Loss (FU30)

0: Coast Stop

The inverter cuts off the output immediately, and the motor coasts to a stop under inertia.

1: Stop According to Preset Mode

The inverter stops following the pre-configured shutdown mode (e.g., ramp deceleration).

2: Switch Directly to 7% of the Motor Rated Frequency and Continue Operation

The inverter will automatically restore to the set frequency once the load is recovered.

Ten-thousands digit: PID Feedback Loss During Operation (FU31) (Same as the units digit of P9-47)

P9-50	Fault protection action option 4	
	00000～00002	00000

Units digit: Excessive Speed Deviation (FU42) (Same as the units digit of P9-47)

Tens digit: Reserved

Hundreds digit: Reserved

Thousands digit: Reserved

Ten-thousands digit: Reserved

P9-54	Continue running frequency selection in case of failure	
	0～4	0

0: Operate at the current running frequency

1: Operate at the set frequency

2: Operate at the upper-limit frequency

3: Operate at the lower-limit frequency

4: Operate at the abnormal standby frequency

P9-55	Abnormal standby frequency	
	0.0%～100.0%(Maximum frequency)	100.0%

When a fault occurs during the operation of the inverter and the fault handling mode is set to Continue Operation, the inverter will display A code and run at the frequency specified by P9-54.

When the Abnormal Standby Frequency operation mode is selected, the value set in P9-55 is expressed as a percentage of the maximum frequency.

P9-59	Instantaneous power outage action selection	
	0～2	0

0: Invalid

1: Slow down

2: Slow down to stop

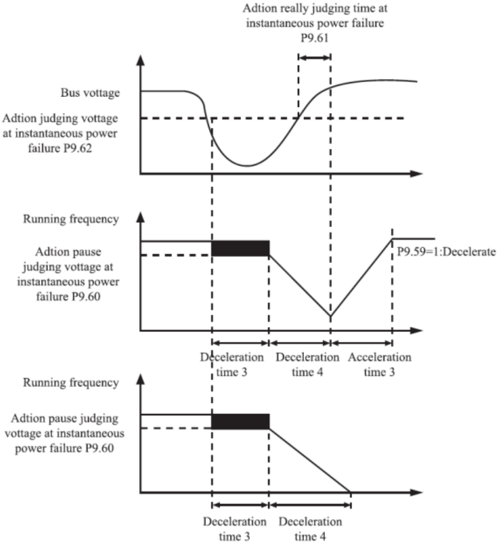
P9-60	Transient stop action pause judgment voltage	
	80.0%～100.0%	85.0%
P9-61	Instantaneous power outage voltage rebound judgment time	
	0.00s～100.00s	0.50s
P9-62	Instantaneous power outage action determines voltage	
	60.0%～100.0%(Standard bus voltage)	80.0%

Parameters P9-59 to P9-62 are used to enable the inverter to maintain continuous operation during a momentary power failure or sudden voltage drop. The inverter achieves this by reducing the output speed, and utilizing the regenerative energy fed back from the load to compensate for the drop in DC bus voltage.

When P9-59 = 1: During a momentary power failure or sudden voltage drop, the inverter will reduce its output speed. Once the DC bus voltage returns to normal, the inverter will accelerate back to the set frequency for normal operation.

The criterion for determining the recovery of the DC bus voltage is that the bus voltage remains within the normal range for a duration exceeding the time set in P9-61.

When P9-59 = 2: During a momentary power failure or sudden voltage drop, the inverter will reduce its output speed continuously until it shuts down completely.



P9-63	Drop protection option	
	0: Invalid 1: Effective	0
P9-64	Drop the detection level	
	0.0%～100.0%（Motor rated current）	10.0%
P9-65	Drop detection time	
	0.0s～60.0s	1.0s

If the load loss protection function is enabled, the inverter will automatically reduce the output frequency to 7% of the rated frequency when the output current is lower than the load loss detection level (P9-64) and the duration exceeds the load loss detection time (P9-65).

During the load loss protection period, the inverter will automatically resume operation at the set frequency once the load is recovered.

P9-67	Pass the speed detection value	
	0.0％～50.0％（Maximum frequency）	20.0%

P9-68	Pass the speed detection time	
	0.0s: Not detected 0.1～60.0s	0.0S
P9-69	Excessive speed deviation detected value	
	0.0%～50.0%（Maximum frequency）	20.0%
P9-70	Excessive speed deviation detects time	
	0.0s～60.0s	0.0s

This function is only valid when the inverter is operating in the sensorless vector control mode.

When the inverter detects a deviation between the actual motor speed and the set frequency, where the deviation value exceeds the speed deviation overshoot detection value (P9-69) and the duration exceeds the speed deviation overshoot detection time (P9-70), the inverter will trigger the FU42 fault alarm and execute the corresponding response based on the preset fault protection action mode.

When the speed deviation overshoot detection time is set to 0.0s, the speed deviation overshoot fault detection function will be disabled.

P9-71	Instant Stop non-stop gain Kp	
	0～100	40
P9-72	Instantaneous stop non-stop integral coefficient Ki	
	0～100	30

This parameter is only valid for DC bus voltage constant control (P9-59=1). If an undervoltage fault tends to occur during the ride-through process of momentary power failure, increase the momentary power failure ride-through gain and momentary power failure ride-through integral coefficient.

P9-73	Pause pause pause action slow down time	
	0.0～300.0s	20.0s

This parameter is only valid for deceleration shutdown (P9-59=2). When the DC bus voltage drops below the activation voltage set in P9-62, the inverter will perform deceleration shutdown. The deceleration time is determined by this parameter instead of P0-18.

Group PA PID Function

PA-00	PID Given source	
	0～7	0

0: PA-01 Settings

1: AI

2: Reserved

3: Panel potentiometer

4: Reserved

5: Communication given

6: Multi-segment instruction given

7: Pressure setting (MPa, Kg)

PA-01	PID values given	
	0.0%～100.0%	50.0%

The set target value of the process PID is a relative value, with a setting range of 0.0%～100.0%. Similarly, the feedback value of the PID is also a relative value. The function of the PID is to make these two relative values consistent.

PA-02	PID feedback source	
	0～8	0

0: AI

1: Reserved

2: Panel potentiometer

3～4: Reserved

5: Communication given

6～8: Reserved

This parameter is used to select the feedback signal channel of the process PID. The feedback value of the process PID is also a relative value, with a setting range of 0.0%～100.0%.

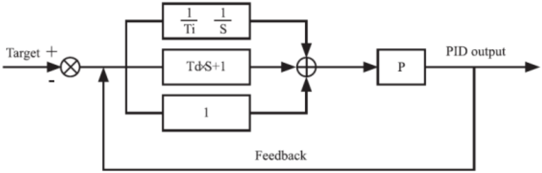


Figure PA-1 PID Parameter

PA-03	Direction of PID action	
	0～1	0

0: Direct Action

When the PID feedback signal is lower than the set value, the inverter output frequency will increase. Typical application: tension control for winding systems.

1: Reverse Action

When the PID feedback signal is lower than the set value, the inverter output frequency will decrease. Typical application: tension control for unwinding systems.

This function is affected by the multi-function terminal for PID action direction inversion (Function 35), which requires attention during operation.

PA-04	PID gives the feedback range	
	0～65535	1000

The PID setpoint/feedback range is a dimensionless unit, which is used for the PID setpoint display (d0-15) and the PID feedback display (d0-16).

The relative value of 100.0% for the PID setpoint and feedback corresponds to the setpoint/feedback range (PA-04). For example, if PA-04 is set to 2000, the PID setpoint display (d0-15) will read 2000 when the PID setpoint is at 100.0%.

PA-05	Proportional gain Kp1	
	0.0～999.9	20.0
PA-06	Integration time Ti1	
	0.01s～10.00s	2.00s
PA-07	Differential time Td1	
	0.00～10.000	0.000s

Proportional Gain (Kp1)

It determines the adjustment intensity of the entire PID regulator; the larger the Kp1 value, the stronger the adjustment intensity.

A value of 100.0 for this parameter indicates that when the deviation between the PID feedback value and the set value reaches 100.0%, the adjustment amplitude of the PID regulator to the output frequency command will be equal to the maximum frequency.

Integral Time (Ti1)

It determines the adjustment intensity of the integral control in the PID regulator; the shorter the integral time, the stronger the adjustment intensity.

Integral time refers to the duration required for the integral regulator to achieve an adjustment amount equal to the maximum frequency through continuous adjustment, when the deviation between the PID feedback value and the set value remains at 100.0%.

Derivative Time (Td1)

It determines the adjustment intensity of the PID regulator to the deviation change rate; the longer the derivative time, the stronger the adjustment intensity.

Derivative time refers to the time period during which if the feedback value changes by 100.0%, the adjustment amount of the derivative regulator will be equal to the maximum frequency.

PA-08	PID reverse cut-off frequency	
	0．00～Maximum frequency	2.00Hz

In some cases, the PID controller can only equalize the set value and the feedback value when the PID output frequency is a negative value (i.e., the inverter runs in reverse rotation). However, an excessively high reverse rotation frequency is not allowed in certain applications. PA-08 is used to set the upper limit of the reverse rotation frequency.

PA-09	PID deviation limit	
	0.0%～100.0%	0.0%

When the deviation between the PID set value and the feedback value is less than PA-09, the PID regulator will stop its adjustment action. In this way, the output frequency remains stable when the deviation between the set value and the feedback value is small, which is very effective in certain closed-loop control applications.

PA-10	PID differential limiting	
	0.00%～100.00%	0.50%

In the PID regulator, the derivative action is highly sensitive and can easily cause system oscillation. For this reason, the derivative action of the PID is generally limited to a narrow range. PA-10 is used to set the range of the PID derivative output.

PA-11	The PID gives the change time	
	0.00s～650.00s	0.00s

PID Setpoint Ramp Time refers to the duration required for the PID setpoint to change linearly from 0.0% to 100.0%. When the PID setpoint changes, it will follow this ramp time to adjust gradually, which reduces the adverse effects of sudden setpoint changes on the control system.

PA-12	PID feedback filtering time	
	0.00s～60.00s	0.00s
PA-13	PID output filtering time	
	0.0s～600.0s	100.0s

PA-12 is used for filtering the PID feedback value. This filtering helps reduce the impact of interference on the feedback value, but it will compromise the response performance of the process closed-loop system.

PA-13 is used for filtering the PID output frequency. This filtering can mitigate sudden changes in the inverter output frequency, but it will also result in a reduction in the response performance of the process closed-loop system.

PA-15	Proportional gain Kp2	
	0.0～999.9	20.0
PA-16	Integration time Ti2	
	0.01s～10.00s	2.00s
PA-17	Differential time Td2	
	0.00～10.000	0.000s

In certain applications, a single set of PID parameters cannot meet the requirements of the entire operation process, and different PID parameter sets need to be adopted under different conditions.

This group of function codes is used for switching between two sets of PID parameters. Among them, the setting method of regulator parameters PA-15～PA-17 is similar to that of parameters PA-05～PA-07.

PA-18	PID parameter switching conditions	
	0～8	0

0: No Switching

1: Switching via X Terminal

2: Automatic Switching Based on Deviation

3～8: Reserved

The two sets of PID parameters can be switched either through the multifunctional digital X terminal or automatically according to the PID deviation.

When the multifunctional X terminal switching is selected, the multifunctional terminal function should be set to 43 (PID Parameter Switching Terminal). The parameter set 1 (PA-05～PA-07) is activated when the terminal is inactive, and the parameter set 2 (PA-15～PA-17) is activated when the terminal is active.

PA-19	PID parameter switching bias 1	
	0.0%～PA-20	20.0%
PA-20	PID parameter switching bias 2	
	PA-19～100.0%	80.0%

When automatic switching is selected:

The PID controller will adopt Parameter Set 1 if the absolute value of the deviation between the set value and the feedback value is less than PID Parameter Switching Deviation 1 (PA-19).

The PID controller will adopt Parameter Set 2 if the absolute value of the deviation between the set value and the feedback value is greater than PID Parameter Switching Deviation 2 (PA-20).

If the absolute value of the deviation falls between Switching Deviation 1 and Switching Deviation 2, the PID parameters will be the linear interpolation value of the two parameter sets, as illustrated in Figure PA-2.

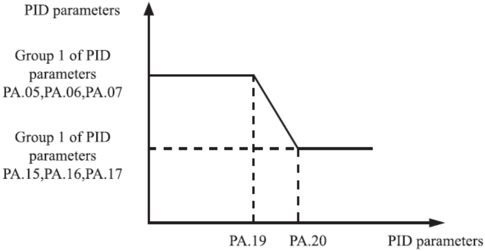


Figure PA-2 PID Parameter Switching

PA-21	Initial PID values	
	0.0%～100.0%	0.0%
PA-22	PID initial value hold time	
	0.00s～650.00s	0.00s

When the inverter starts, the PID output is fixed at the PID initial value (PA-21). The PID will not start closed-loop adjustment calculation until the duration of the PID initial value hold time (PA-22) has elapsed.

Figure PA-3 is the functional schematic diagram of the PID initial value.

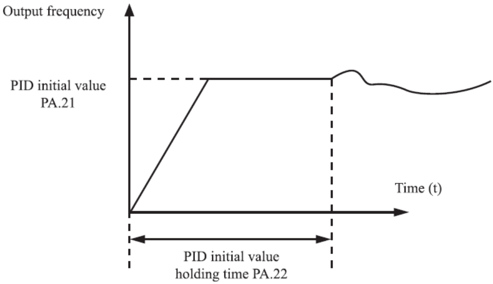


Figure PA-3 PID Initial Value Functional Schematic Diagram

PA-25	PID integral Property	
	Units digit: Integral separation 0: Invalid 1: Valid Tens digit: Whether to stop integration when output reaches limit value 0: Continue integration 1: Stop integration	00
PA-26	PID feedback misses detection value	
	0.0% : No judgment of feedback loss 0.1% to 100.0%	0.0%
PA-27	PID feedback loss detection time	
	0.0s～20.0s	0.0s

This function code is used to determine whether the PID feedback signal is lost. When the PID feedback value is lower than the feedback lower-limit loss detection value (PA-26) and higher than the feedback upper-limit loss detection value (PA-25), and this state persists for longer than the PID feedback loss detection time (PA-27), the inverter will trigger the FU31 fault alarm and execute the corresponding action according to the selected fault handling mode.

PA-28	PID shutdown operation	
	0～1	0

0: Stop the operation

1: Compute when the machine is shut down

This function code is used to select whether the PID continues calculation when the inverter is in the stop state. For general applications, the PID should stop calculation when the inverter is stopped.

Group PB Wobble Function,Fixed Length And Count

PB-00	Swing frequency setting method	
	0～1	0

0: Relative to center frequency

The relative center frequency (P0-07 frequency source) is applicable to the variable swing amplitude system. The swing amplitude changes with the variation of the center frequency (set frequency).

1: Relative to the maximum frequency

The relative maximum frequency (P0-10) is applicable to the fixed swing amplitude system, where the swing amplitude remains constant.

PB-01	Swing amplitude	
	0.0%～100.0%	0.0%
PB-02	Jump frequency amplitude	
	0.0%～50.0%	0.0%

This parameter is used to determine the value of the swing amplitude and the jump frequency.

When the swing amplitude is set relative to the center frequency (PB-00=0):

Swing amplitude AW = Frequency Source (P0-07) × Swing Amplitude Ratio (PB-01)

When the swing amplitude is set relative to the maximum frequency (PB-00=1):

Swing amplitude AW = Maximum Frequency (PB-10) × Swing Amplitude Ratio (PB-01)

The jump frequency ratio refers to the percentage of the jump frequency relative to the swing amplitude during frequency swing operation. The calculation formula is as follows:

Jump Frequency = Swing Amplitude (AW) × Jump Frequency Ratio (PB-02)

If the swing amplitude is set relative to the center frequency (PB-00=0), the jump frequency is a variable value.

If the swing amplitude is set relative to the maximum frequency (PB-00=1), the jump frequency is a fixed value.

The operating frequency during frequency swing operation is subject to the constraints of the upper limit frequency and the lower limit frequency.

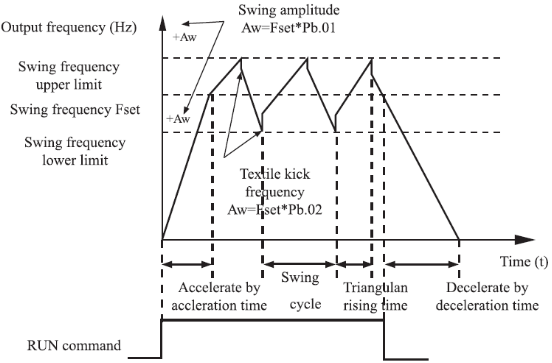


Figure PB-1 Frequency Swing Operation Schematic Diagram

PB-03	Swing period	
	0.0s～3000.0s	10.0s
PB-04	The rise time of the triangular wave of the swing frequency	
	0.0%～100.0%	50.0%

The frequency swing cycle refers to the time value of one complete frequency swing cycle. The triangular wave rise time coefficient (PB-04) is the percentage of the triangular wave rise time relative to the frequency swing cycle (PB-03). The calculation formulas are as follows:

Triangular wave rise time = Frequency swing cycle (PB-03) × Triangular wave rise time coefficient (PB-04) (Unit: second)

Triangular wave fall time = Frequency swing cycle (PB-03) × (1 − Triangular wave rise time coefficient (PB-04)) (Unit: second)

PB-05	Set length	
	1～65535m	1000
PB-06	Actual length	
	1～65535m	0
PB-07	Number of pulses per meter	
	1～6553.5	100.0

The above function codes are used for fixed-length control.

Length information needs to be collected via the multifunctional digital input terminal. The actual length (PB-06) can be calculated by dividing the number of pulses sampled by the terminal by the pulses per meter

(PB-07). When the actual length exceeds the set length (PB-05), the multifunctional digital HDO outputs an ON signal indicating "length reached".

During the fixed-length control process, the length reset operation (function 28) can be performed through the multifunctional S terminal. For details, refer to parameters P4-00~P4-04.

In application, the corresponding input terminal function must be set to "length counting input" (function 27). When the pulse frequency is high, the S5 port must be used.

PB-08	Set count values	
	1～65535	1000
PB-09	Specify count values	
	1～65535	1000

The count value needs to be collected via the multifunctional digital input terminal. In application, the function of the corresponding input terminal must be set to Counter Input (Function 25).

When the count value reaches the Set Count Value (PB-08), the multifunctional digital DO outputs an ON signal indicating "Set Count Value Reached", and then the counter stops counting.

When the count value reaches the Designated Count Value (PB-09), the multifunctional digital output terminal outputs an ON signal indicating "Designated Count Value Reached". At this time, the counter continues counting until it reaches the Set Count Value (PB-08).

The Designated Count Value (PB-09) shall not be greater than the Set Count Value (PB-08).

Figure PB-2 is the schematic diagram illustrating the functions of "Set Count Value Reached" and "Designated Count Value Reached".

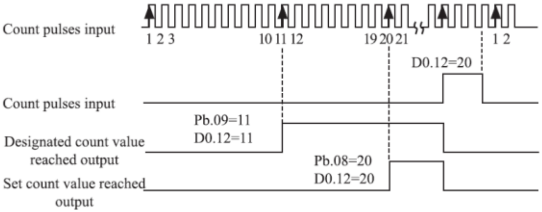


Figure PB-2 Schematic Diagram of Set Count Value Assignment and Designated Count Value Assignment

Group PC Multi-segment Instructions, Simple PLC

PC-00	Multisegment instructions 0	
	-100.0%～100.0%	0.0%
PC-01	Multisegment instructions 1	
	-100.0%～100.0%	0.0%
PC-02	Multisegment instructions 2	
	-100.0%～100.0%	0.0%
PC-03	Multisegment instructions 3	
	-100.0%～100.0%	0.0%
PC-04	Multisegment instructions 4	
	-100.0%～100.0%	0.0%
PC-05	Multisegment instructions 5	
	-100.0%～100.0%	0.0%
PC-06	Multisegment instructions 6	
	-100.0%～100.0%	0.0%
PC-07	Multisegment instructions 7	
	-100.0%～100.0%	0.0%
PC-08	Multisegment instructions 8	
	-100.0%～100.0%	0.0%
PC-09	Multisegment instructions 9	
	-100.0%～100.0%	0.0%
PC-10	Multisegment instructions 10	
	-100.0%～100.0%	0.0%
PC-11	Multisegment instructions 11	
	-100.0%～100.0%	0.0%
PC-12	Multisegment instructions 12	
	-100.0%～100.0%	0.0%
PC-13	Multisegment instructions 13	
	-100.0%～100.0%	0.0%

PC-14	Multisegment instructions 14	
	-100.0%～100.0%	0.0%
PC-15	Multisegment instructions 15	
	-100.0%～100.0%	0.0%

Multi - segment commands can be applied in three scenarios: as a frequency source, as a voltage source for V/F separation, and as a setpoint source for process PID control. In these three application scenarios, the multi - segment commands are dimensionless relative values, ranging from - 100.0% to 100.0%. Specific rules are as follows:

When used as a frequency source, the value is a percentage relative to the maximum frequency.

When used as a voltage source for V/F separation, it represents a percentage relative to the rated motor voltage.

Since the PID setpoint is inherently a relative value, no dimensional conversion is required when multi - segment commands serve as the PID setpoint source.

Multi - segment commands are switched based on the different states of the multifunctional digital X terminals. For details, refer to parameters P4 - 00 ~ P4 - 04.

PC-16	Simple PLC operation mode	
	0～2	0

0: Stop after single-cycle operation

The inverter will stop automatically after completing one full operation cycle, and a new operation command is required to restart it. If the running time of any stage is set to 0, the inverter will skip this stage and directly proceed to the next stage during operation, as illustrated in the figure below:

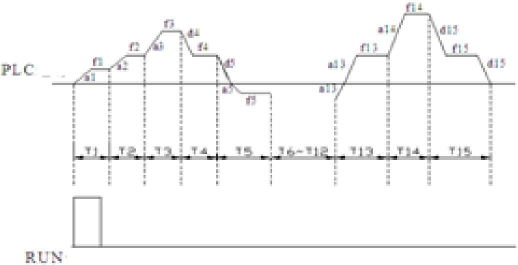


Figure PC-1 PLC Single-Cycle Operation Stop Schematic Diagram

1: Stop after single-cycle operation with final value hold

After completing one full operation cycle, the inverter will automatically maintain the running frequency and direction of the last stage for continuous operation. As illustrated in the figure below:

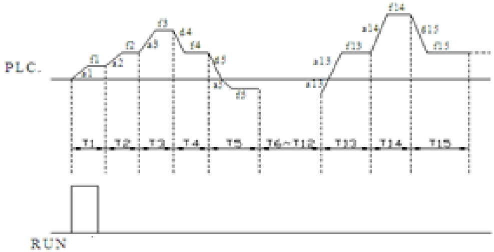


Figure PC-2 PLC Single-Cycle Operation with Final Value Hold Schematic Diagram

2: Continuous Cycle Operation

After completing one operation cycle, the inverter will automatically start the next cycle and keep running in such a loop until a stop command is received. As illustrated in the figure below:

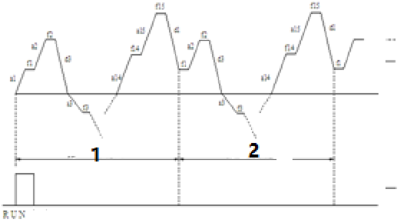


Figure PC-3 PLC Continuous Cycle Operation Schematic Diagram

PC-17	Simple PLC power-off memory options	
	00～11	00

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

PLC Power - off Memory refers to the function of memorizing the running stage and operating frequency of the PLC before power failure, so that the PLC will resume operation from the memorized stage when it is powered on next time. If the non - memory option is selected, the PLC process will restart from the beginning every time it is powered on.

PLC Stop Memory refers to the function of recording the running stage and operating frequency of the PLC during the last operation when it stops, so that the PLC will continue to run from the memorized stage when it is started next time. If the non - memory option is selected, the PLC process will restart from the beginning every time it is activated.

PC-18	Simple PLC Segment 0 running time	
	0.0s(h)～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)～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)～6500.0s(h)	0.0s(h)
PC-23	Simple PLC Section 2Acceleration and deceleration time selection	
	0～3	0
PC-24	Simple PLC Segment 3 running time	
	0.0s(h)～6500.0s(h)	0.0s(h)
PC-25	Simple PLC Section 3Acceleration and deceleration time selection	
	0～3	0
PC-26	Simple PLC Segment 4 running time	
	0.0s(h)～6500.0s(h)	0.0s(h)
PC-27	Simple PLC Section 4 Acceleration and deceleration time selection	
	0～3	0
PC-28	Simple PLC Segment 5 running time	
	0.0s(h)～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)～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)～6500.0s(h)	0.0s(h)
PC-33	Simple PLC Section 7 Acceleration and deceleration time selection	
	0～3	0
PC-34	Simple PLC Segment 8 running time	
	0.0s(h)～6500.0s(h)	0.0s(h)
PC-35	Simple PLC Section 8 Acceleration and deceleration time selection	
	0～3	0
PC-36	Simple PLC Segment 9 running time	
	0.0s(h)～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)～6500.0s(h)	0.0s(h)
PC-39	Simple PLC Section 10 Acceleration and deceleration time selection	
	0～3	0
PC-40	Simple PLC Segment 11 running time	
	0.0s(h)～6500.0s(h)	0.0s(h)
PC-41	Simple PLC Section 11 Acceleration and deceleration time selection	
	0～3	0
PC-42	Simple PLC Segment 12 running time	
	0.0s(h)～6500.0s(h)	0.0s(h)
PC-43	Simple PLC Section 12 Acceleration and deceleration time selection	
	0～3	0
PC-44	Simple PLC Segment 13 running time	
	0.0s(h)～6500.0s(h)	0.0s(h)
PC-45	Simple PLC Section 13 Acceleration and deceleration time selection	
	0～3	0

PC-46	Simple PLC Segment 15 running time	
	0.0s(h)～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)～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	
	0～1	0

0: S（seconds）

1: h（hour）

PC-51	Multi-segment instruction 0 given mode	
	0～6	0

0: Function code PC-00 is given

1: AI

2: Reserved

3: Panel potentiometer

4: Reserved

5: PID

6: Preset frequency (P0-08) given, UP/DOWN modifiable

This parameter determines the setpoint channel for Multi-segment Command 0. In addition to PC-00, Multi-segment Command 0 supports a variety of other options, facilitating the switching between multi-segment commands and other setpoint modes.

This function enables easy switching between the two frequency sources, whether the multi-segment command or the simple PLC is used as the frequency source.

Group Pd Communication Parameters

Pd-00	MODBUS communication baud rate	
	0～9	5

0～1: Reserved

2: 1200BPS

3: 2400BPS

4: 4800BPS

5: 9600BPS

6: 19200BPS

7: 38400BPS

8: 57600BPS

9: 115200BPS

This function code is used to define the data transmission rate between the host computer and the frequency converter. The baud rate set on the host computer must be consistent with that set on the frequency converter; otherwise, communication cannot be performed. A higher baud rate setting enables faster data communication, but an excessively high setting will affect communication stability.

Pd-01	MODBUS data format	
	0～3	3

0: No parity (8-N-2)

1: Even parity (8-E-1)

2: Odd Parity (8-O-1)

3: No parity (8-N-1)

The data format set on the host computer must be consistent with that set on the frequency converter; otherwise, normal communication cannot be achieved.

Pd-02	Local address	
	1～247	1

In RS-485 communication, this function code is used to identify the address of the frequency converter.

Pd-03	MODBUS response delay	
	0～20ms	2

This function code defines the intermediate time interval from the end of the frequency converter's data frame reception to the transmission of the response data frame to the host computer. If the response time is shorter than the system processing time, the system processing time shall prevail. If the delay time is longer than the system processing time, the system shall wait for the remaining delay time after processing the data, and then transmit the data to the host computer only when the response delay time elapses.

Pd-04	RS485 communication timeout	
	0.0: Invalid 0.1～60.0s	0.0S

If no valid data signal is received within the time interval defined by this function code during RS-485 communication, the RS-485 communication will be deemed abnormal, and the frequency converter will perform corresponding actions according to the settings of PC-24. When this value is set to 0.0, the RS-485 communication timeout detection function will be disabled.

Pd-05	MODBU protocol selection	
	0～51	31

Units digit: Modbus

0: Non-standard MODBUS protocol

1: Standard MODBUS protocol

Pd-06	RS485 communication reads current resolution	
	0～1	0

0: 0.01A; 1: 0.1A

Group PF Manufacturer Parameters

PF-00	Manufacturer password	
	0～65535	0

Group PP Function Parameters Management

PP-00	User password	
	0～65535	0

If a non-zero value is set for PP-00, the password protection function will take effect. When accessing the menu next time, you must enter the password correctly; otherwise, you will not be able to view or modify the function parameters. Please keep the set user password in mind. Setting PP-00 to 00000 will clear the set user password and disable the password protection function.

PP-01	Parameter initialization	
	0～3	0

0: No operation

The frequency converter is in the normal parameter reading and writing state. Whether the function code setting value can be modified is related to the user password setting status and the current operating status of the frequency converter.

1: Restore all user parameters except motor parameters to factory settings

Motor parameters will not be restored, while other user parameters will be restored to factory settings according to the model.

2: Restore all user parameters to factory settings

All user parameters will be restored to factory settings according to the model.

3: Clear fault records

Clear the contents of fault records (P9-14～P9-44).

After the operation is completed, this function code will be automatically reset to 0.

PP-04	Function code modifies attributes	
	0～1	0

0: Modifiable

1: Unmodifiable

This function is used to determine whether the function code parameters set by the user can be modified, so as to prevent the risk of accidental modification of the function parameters. When this function code is set to 0, all function codes can be modified; when it is set to 1, all function codes can only be viewed but cannot be modified.

PP-05	Parameter Macro	
	0～5	0

0：Parameterless Macro

1：Negative pressure machine parameter macro

2：Constant pressure water supply parameter macro

Group A0 Torque Control and Limit

A0-00	Speed/torque control mode selection	
	0～1	0

0: Speed control

1: Torque control

It is used to select the control mode of the frequency converter: speed control or torque control. The multi-function input X terminal has two functions related to torque control: torque control disable (Function 29) and speed control/torque control switching (Function 46). These two terminals must be used in conjunction with A0-00 to realize the switching between speed control and torque control.

When the speed control/torque control switching terminal is inactive, the control mode is determined by A0-00. If the speed control/torque control switching is active, the control mode will be equivalent to the inverse value of A0-00. In any case, when the torque control disable terminal is active, the frequency converter will be fixed in the speed control mode.

A0-01	Torque setting source selection in torque control mode	
	0～7	0

0: Digital setting (A0-03)

Refers to the target torque directly using the set value of A0-03.

1: AI

Refers to the target torque determined by AI. The AI given value is a percentage relative to the torque digital setting (A0-03).

2: Reserved

3: Panel potentiometer

Refers to the target torque determined by the panel potentiometer. The panel potentiometer given value is a percentage relative to the torque digital setting (A0-03).

4: Reserved

5: Communication given

Refers to the target torque given by means of communication. When it is a peer-to-peer communication slave and the received data is used as the torque given value, the data transmitted by the host shall be used as the communication given value.

6–7: Reserved

A0-03	Torque digital setting in torque control mode	
	—200.0%～200.0%	150.0%

Torque setting adopts relative values, where 100.0% corresponds to the rated torque of the motor. The setting range is -200.0% to 200.0%, indicating that the maximum torque of the frequency converter is twice its rated torque. When the torque given value is positive, the frequency converter runs in the forward direction; when the torque given value is negative, the frequency converter runs in the reverse direction.

A0-05	Torque control forward maximum frequency	
	0.00Hz～Maximum frequency	50.00Hz
A0-06	Torque control reverse maximum frequency	
	0.00Hz～Maximum frequency	50.00Hz

It is used to set the maximum forward or reverse operating frequency of the frequency converter in torque control mode. When the frequency converter is in torque control mode, if the load torque is less than the motor output torque, the motor speed will keep rising. To prevent accidents such as motor overspeed in the mechanical system, it is necessary to limit the maximum motor speed during torque control. If it is required to dynamically and continuously modify the maximum frequency in torque control mode, this can be achieved by controlling the upper limit frequency.

A0-07	Torque rise filtering time	
	0.00s～650.00s	0.00s
A0-08	Torque drop filtering time	
	0.00s～650.00s	0.00s

In torque control mode, the difference between the motor output torque and the load torque determines the speed change rate of the motor and the load. Therefore, the motor speed may change rapidly, leading to problems such as excessive noise or mechanical stress. By setting the torque control acceleration/deceleration time, the motor speed can be adjusted smoothly.

However, for applications requiring a fast torque response, the torque control acceleration/deceleration time needs to be set to 0.00s. For example, when two motors are rigidly connected to drive the same load, to ensure uniform load distribution, one frequency converter is set as the master and operates in speed control mode, while the other is set as the slave and operates in torque control mode. The actual output torque of the master serves as the torque command for the slave. In this case, the slave's torque needs to follow that of the master rapidly, so the torque control acceleration/deceleration time of the slave should be set to 0.00s.

Group A5 Controls Optimization Parameters

A5-00	DPWM switches the upper limit frequency	
	0.00Hz～Maximum Frequency	8.00Hz

Valid only for V/F control; it determines the waveform generation mode when an induction motor operates in V/F mode. Below this value, the 7-segment continuous modulation mode is adopted; otherwise, the 5-segment discontinuous modulation mode is used.

In 7-segment continuous modulation mode, the frequency converter has higher switching losses but lower current ripple. In 5-segment discontinuous modulation mode, the switching losses are lower while the current ripple is higher; however, this may cause motor operation instability at high frequencies, so modification is generally unnecessary. For details about V/F operation instability, refer to function code P3-11; for details about frequency converter losses and temperature rise, refer to function code P0-15.

A5-01	PWM modulation mode	
	0～1	0

0: Asynchronous modulation

1: Synchronous modulation

Valid only for V/F control. Synchronous modulation means that the carrier frequency changes linearly with the output frequency, ensuring a constant ratio between them (the carrier ratio). It is generally used at high output frequencies, which helps improve the quality of the output voltage.

At low output frequencies (below 100Hz), synchronous modulation is generally unnecessary. This is because the ratio of carrier frequency to output frequency is relatively high in this range, and asynchronous modulation offers more distinct advantages. Synchronous modulation takes effect only when the operating frequency is above 85Hz; below this frequency, the mode is fixed as asynchronous modulation.

A5-02	Dead zone compensation mode selection	
	0～1	1

0: No compensation

1: Compensation mode

This parameter generally does not need to be modified. It is only necessary to try switching and selecting different compensation modes when there are special requirements for the quality of the output voltage waveform, or when the motor has abnormalities such as oscillation. Compensation mode 2 is recommended for high-power applications.

A5-03	Random PWM depth	
	0～10	0

0: Random PWM invalid

1～10: PWM carrier frequency random depth

Setting random PWM can make the monotonous and harsh motor noise softer and help reduce external electromagnetic interference. When the random PWM depth is set to 0, the random PWM function is disabled. Adjusting the random PWM to different depths will yield different effects.

A5-04	Current-limiting enabled wave by wave	
	0～1	1

0: Disable

1: Enable

Enabling the fast current limiting function can minimize overcurrent faults of the frequency converter and ensure its uninterrupted operation. If the frequency converter remains in the fast current limiting state for a long time, it may suffer damage such as overheating, which is not allowed. Therefore, the frequency converter will trigger the alarm fault FU40 when it stays in the fast current limiting state for an extended period, indicating that the frequency converter is overloaded and needs to be shut down.

A5-05	Current detection delay time	
	0～100	0
A5-06	Under-voltage point setting	
	200.0V～2000.0V	Model confirmed
A5-08	Dead time adjustment	
	100%～200%	150%
A5-09	Overvoltage point setting	
	200.0V～2200.0V	Model confirmed

Chapter 8 EMC (Electromagnetic Compatibility)

8.1 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.

8.2 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.

8.3 EMC Guidance

8.3.1 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.

8.3.2 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.

8.3.3 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.

8.3.4 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.

8.3.5 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.

8.3.6 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 9 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 Panel 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 9-1 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 5. Low voltage 6. Start a rotating motor 7. Sudden load increase during acceleration 8. The inverter is too small	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 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	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

Faults Name	Operation Panel Display	Troubleshooting	Troubleshooting countermeasures
		5. The inverter is too small	
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 is too short 4. No braking unit or braking resistor was installed	1 Adjust the voltage to the normal range 2 Remove additional power or add a braking resistor 3 Increase deceleration 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 2. The three-phase output of the inverter is unbalanced when the motor is running 3. Abnormal drive board 4. Module abnormality	1. Troubleshoot peripheral faults 2 Check if the three-phase windings of the motor are functioning properly and eliminate any faults 3 Seek technical support 4 Seek technical support

Faults Name	Operation Panel Display	Troubleshooting	Troubleshooting countermeasures
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 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

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

Table 9-2 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, Panel failure ● The connection between the control board and the driver board and Panel 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
9	Display CTERR	● Display chip data is missing or corrupted	● Power on again or replace the control board

Appendix 1: Modbus Communication Protocol

The EV210B 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

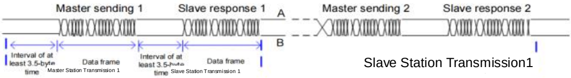
The inverter terminals 485+ and 485- are Modbus communication interfaces.

(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.



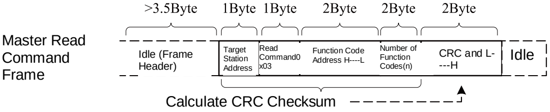
The communication protocol built into the EV210B series of frequency converters is the

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.

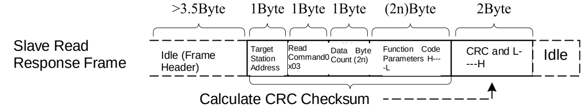
The host can refer to a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc. The host can not only communicate with a single slave but also broadcast information to all lower-level slaves. For a single access "query/command" to the host, the accessed slave 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.

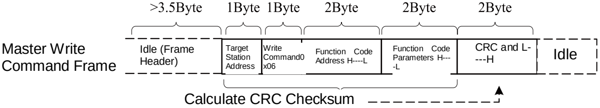
(4) Communication data structure

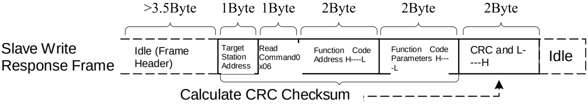
The Modbus protocol communication data format of the EV210 series frequency converter is as follows: The frequency converter only supports reading or writing of Word type parameters, and the corresponding communication read operation command is Ox03; The write operation command is 0x06, which does not support byte or bit read/write operations:

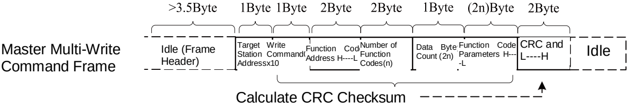


Theoretically, the host computer can read multiple consecutive parameters at once (i.e., up to 12 of them), but be careful not to skip the last parameter of this parameter group, otherwise the response will be incorrect.

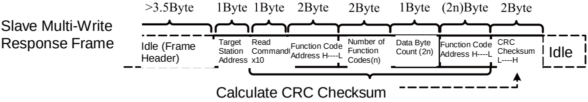








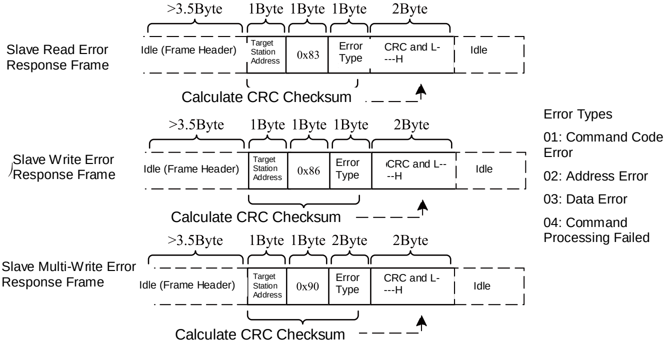
Multiwrite, like multiread, can only operate on a maximum of 12 parameters in a row.



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 check in this section.
CRC low bits	
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	Reserved
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	Reserved
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	Reserved	101BH	Current running time
100CH	Panel potentiometer voltage	101CH	Reserved
100DH	Reserved	101DH	Communication setting value
100EH	Reserved	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: Reserved 0002: Accelerate overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Acceleration overvoltage	0012: Current detection failure 0013: Motor tuning failure 0014: Hold 0015: Parameter read-write exception 0016: Inverter hardware failure 0017: Reserved

Inverter fault address	Inverter fault information	
	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: Reserved	0018: Reserved 0019: Reserved 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 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 Inverter Parameter Macro Description

Before using parameter macros, it is recommended to set PP-01=1 to restore the factory default value

a) When PP-05 is set to 1, it indicates the negative pressure machine parameter macro, and the frequency converter will automatically update the following parameters:

Function code	Name	Setpoint
P0-02	Operation instruction channel	1：Terminal instruction
P0-03	Operating frequency source	8：PID control
P0-17	Accelerate time	5.0S
P0-18	Deceleration time	5.0S
P4-00	X1 Terminal function	1：Forward rotation operation
P4-01	X2 Terminal function	0：non-functional
P4-02	X3 Terminal function	12：Multi-step instruction 1
P4-03	X4 Terminal function	13：Multi-step instruction 2
P4-13	AI1 Curve Minimum	2.00：Aorrespond to 4mA
P5-02	Relay output	1：Running
P7-03	Run display 1	H8015：Operating frequency, bus voltage, output current, PIDsetting
P7-04	Run display 2	H0001：PID feedback
P7-05	Stop display	H0802： Bus voltage, PIDsetting
PA-00	PID setpoint source	6：Multi-step instruction
PA-02	PID feedback source setting	0：AI
PA-03	PID action direction	1：Opposite effect
PA-06	PID integral time	0.3s：PID integral time
PC-00	Multi-step instruction 0	55.0%：55.0% of Target pressure
PC-01	Multi-step instruction 1	50.0%：50.0% of Target pressure
PC-02	Multi-step instruction 2	60.0%：60.0% of Target pressure

Note: By default, this parameter macro assumes the pressure sensor is a 4-20mA current-type sensor, and AI needs to be manually configured to ACI mode; if using a 0-10V voltage-type sensor, AI should be configured to ACV mode, and P4-13 needs to be manually changed to 0.00.

b) When PP-05 is set to 2, it corresponds to the constant pressure water supply parameter macro, and the frequency converter automatically updates the following parameters:

Function code	Name	Setpoint
P0-02	Operation instruction channel	1：：Terminal instruction
P0-03	Operating frequency source	8：PID control
P0-17	Accelerate time	10.0S
P0-18	Deceleration time	10.0S
P4-00	X1 Terminal function	1：Forward rotation operation
P5-02	Relay output	1：Running
P7-03	Run display 1	H8015：Operating frequency, bus voltage, output current, PIDsetting
P7-04	Run display 2	H0001： PID feedback
P7-05	Stop display	H0802： Bus voltage, PIDsetting
P8-55	Sleep mode selection	1：Judge hibernation based on feedback pressure
PA-00	PID Given source	0：PA-01 Setting
PA-01	PID Digital Setting	0.0%～100.0%
PA-02	PID Feedback source setting	0：AI

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.