Contents

Chapter 1 Safety Information

1.1 Symbols and Definitions of Safety Information

The safety clauses described in this user manual are very important. They can ensure that you use the inverter safely and prevent yourself or people around you from being injured or property in the work area from being damaged. Please be fully familiar with the following icons and their meanings, and be sure to follow the precautions indicated before continuing to read this user manual.

This symbol indicates that failure to follow the instructions may result in death or serious injury.

This symbol indicates that failure to follow the instructions may result in moderate personal injury or minor injury and certain material losses.

This symbol indicates matters that require attention during operation or use.

This symbol prompts the user with some useful information.

The following two icons are supplementary explanations to the above signs:

Indicates something that must never be done.

Indicates something that must be done.

1.2 Scope of use

This VFD is suitable for general industrial three-phase AC asynchronous motors.

● This inverter cannot be used in equipment that may threaten life or harm the human body due to inverter failure or working error (nuclear power control equipment, aerospace equipment, transportation equipment, life support systems, safety equipment, weapon systems, etc.). If you need to use it for special purposes, please consult our company in advance.

● This product is manufactured under the supervision of a strict quality management system, but when used in important equipment, safety protection measures must be taken to prevent the scope of the accident from expanding when the inverter fails.

1.3 Installation environment

● Install indoors in a well-ventilated place. Generally, it should be installed vertically to ensure the best cooling effect. When installed horizontally, additional ventilation devices may be required.

● The ambient temperature is required to be within the range of -10 to 40°C. If the temperature exceeds 40°C, please remove the upper cover. If it exceeds 50°C, external forced heat dissipation or derating is required. It is recommended that users do not use the inverter in such a high temperature environment, as this will greatly reduce the service life of the inverter.

● The ambient humidity is required to be less than 90%, without condensation of water droplets.

● Install in a place with vibration less than 0.5G to prevent damage from falling. The inverter is not allowed to be subjected to sudden impact.

● Install in an environment away from electromagnetic fields and without flammable and explosive substances.

1.4 Installation safety precautions

Danger

● It is strictly forbidden to operate with wet hands.

● It is strictly forbidden to perform wiring operations when the power supply is not completely disconnected.

● When the inverter is powered on, do not open the cover or perform wiring operations, otherwise there is a risk of electric shock.

● When performing wiring, inspection and other operations, it must be performed 10 minutes after turning off the power supply, otherwise there is a risk of electric shock.

Warning

● Do not install and use inverters with damaged or missing components to prevent personal accidents and property losses.

● The main circuit terminals and cables must be firmly connected, otherwise the inverter may be damaged due to poor contact.

● For safety reasons, the grounding terminal of the inverter must be reliably grounded. In order to avoid the influence of ground common impedance interference, the grounding of multiple inverters should adopt a single-point grounding method, as shown in Figure 1-1.

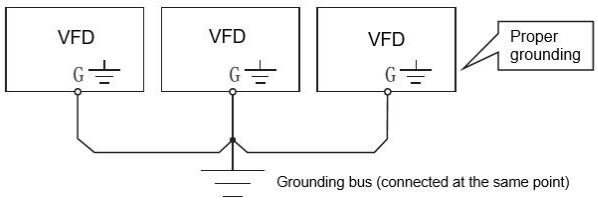


Figure 1-1

Prohibition

●It is strictly prohibited to connect the AC power supply to the output terminals U, V and W of the inverter, otherwise it will cause damage to the inverter, as shown in Figure 1-2.

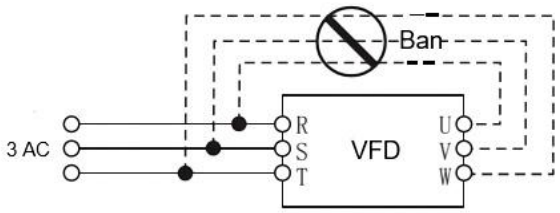


Figure 1-2

Compulsory

●Be sure to install a non-fused circuit breaker for circuit protection on the input power side of the inverter to prevent accidents caused by malfunctioning of the inverter from escalating.

Caution

●Electromagnetic contactors should not be installed on the output side of the frequency converter, because the contactors will be switched on and off when the motor is running, which will generate operational overvoltage and cause damage to the frequency converter. But for the following three cases is still necessary to configure:

For energy-saving control of the frequency converter governor, the system often works at rated speed, in order to achieve economic operation, need to remove the frequency converter.

Participate in the important process, can not be stopped for a long time, need to switch between various control systems to improve system reliability.

When one frequency converter controls several motors. Users need to pay attention to the inverter output, the contactor shall not act!

1.5 Safety precautions

Danger

● It is strictly forbidden to operate with wet hands.

● For inverters that have been stored for more than 1 year, the voltage should be gradually increased to the rated value with a voltage regulator when powered on, otherwise there is a risk of electric shock and explosion.

● Do not touch the inside of the inverter after powering on, and do not put rods or other objects into the inverter, otherwise it will cause electric shock or the inverter will not work properly.

● Do not open the cover of the inverter while it is powered on, otherwise there is a risk of electric shock.

● Use the power-off restart function with caution, otherwise it may cause personal injury or death.

Warning

●If the operation exceeds 50Hz, the speed range of the motor bearings and mechanical devices must be ensured.

●Mechanical devices that require lubrication, such as reduction gears and gears, should not be operated at low speed for a long time, otherwise their service life will be reduced or even the equipment will be damaged.

●When ordinary motors are operated at low frequencies, the heat dissipation effect becomes poor and they must be used at a reduced rating. If it is a constant torque load, the motor forced heat dissipation method or a special frequency conversion motor must be used.

●If the inverter is not used for a long time, please be sure to cut off the input power to avoid damage to the inverter due to foreign objects or other reasons, or even cause a fire.

●Since the output voltage of the inverter is a PWM pulse wave, please do not install capacitors or surge current absorbers (such as varistors) at its output end, otherwise it will cause the inverter to trip

due to faults or even damage to power components. If it has been installed, please be sure to remove it. See Figure 1-3.

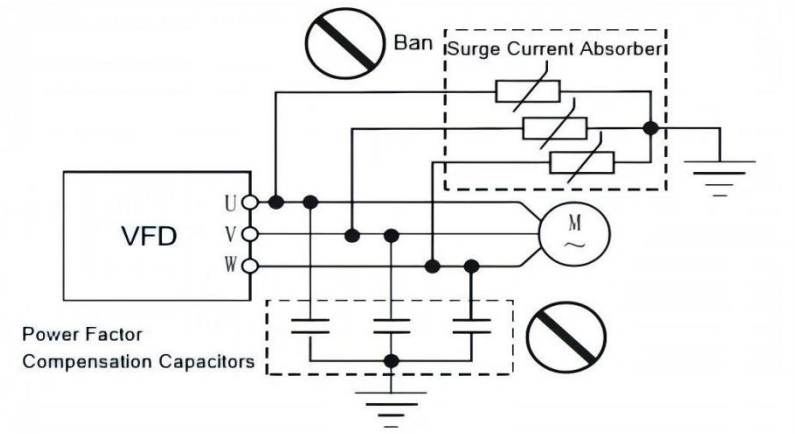


Figure 1-3

Caution

●Before using the motor for the first time or after long-term storage, the motor insulation should be checked and the measured insulation resistance should be no less than 5MΩ.

●If the inverter needs to be used outside the allowable operating voltage range, a step-up or step-down device should be configured for voltage conversion.

●In areas with an altitude of more than 1000 meters, the heat dissipation effect of the inverter will deteriorate due to the thin air, and it needs to be derated. Generally, the derate should be reduced by about 10% for every 1000m increase. See Figure 1-4 for the derating curve.

Chapter 2 Product Standards and Specifications

2.1 Technical Regulation

Input	Rated voltage, frequency	Three Phase AC380V;50/60Hz Single Phase AC220V;50/60Hz	
	Voltage allowable variation range	Three Phase AC360V～450V Single Phase AC190V～250V	
Output	voltage	0～460V 0～260V	
	Frequency	Vector control: 0～500Hz V/F control: 0～500Hz	
	Overload capacity	G type: 150% rated current for 60s; 180% rated current for 3s. P type: 120% rated current for 60s; 150% rated current for 3s.	
Control mode		V/F control, speed sensorless vector control (SVC)	
Control characteristics	Frequency setting Resolution	Analog input	Maximum frequency ×0.025%
		Digital setting	0.01Hz
	V/F control	V/F curve	Three modes: linear; multi-point; N-th power V/F curve (1.2th power, 1.4th power, 1.6th power, 1.8th power, 2nd power)
		V/F separation	2 modes: full separation, half separation
		Torque boost	Manual setting: 0.0~30.0% of rated output Automatic boost: Automatically determine the boost torque based on the output current and combined with the motor parameters
		Automatic current and voltage limiting	Whether in acceleration, deceleration or stable operation, it can automatically detect the motor stator current and voltage, and suppress them within the allowable range based on a unique algorithm to minimize the possibility of system fault tripping.
Control characteristic	non-sensing vector control	Voltage frequency characteristic	Automatic adjustment of output voltage-frequency ratio according to motor parameters and unique algorithm Starting torque: 150% of rated torque at 3.0Hz (V/F control) 150% of rated torque at 0.25Hz (vector control without speed sensor) Steady state accuracy of running speed: ≤±0.2% of rated synchronous speed Speed fluctuation: ≤±0.5% of rated synchronous speed Torque response: ≤20ms (without speed sensor vector control)
		Torque	

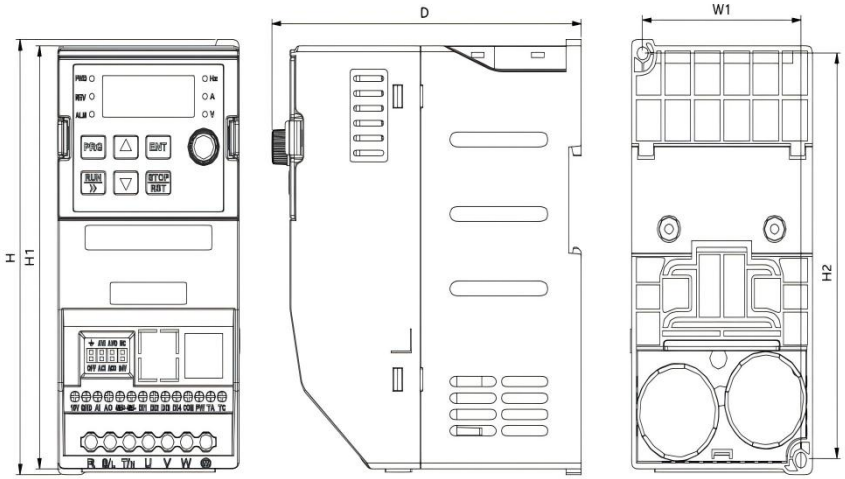
		characteristics	
		Motor parameter self-determination	Automatic detection of parameters in both static and dynamic motor conditions for optimal control without any limitations.
		Current and voltage suppression	Full current closed-loop control, completely avoiding current impact, with perfect overcurrent and overvoltage suppression function
	Undervoltage suppression during operation	Especially for low grid voltage and frequent fluctuations in grid voltage, the system maintains the longest possible operating time based on unique algorithms and residual energy allocation strategies, even when the voltage is below the permissible range.	
Typical functions	Multi-speed and pendulum operation	16-segment programmable multi-step speed control, multiple operation modes are optional. Pendulum frequency operation: preset frequency, center frequency adjustable, state memory and recovery after power failure	
	PID control RS485 communication	Built-in PID controller (presentable frequency), standard configuration RS485 communication function	
	Frequency setting	Analogue input	DC voltage 0~10V, DC current 0~20mA (upper and lower limits selectable)
		Digital input	Operation panel setting, RS485 interface setting, UP/DOWN terminal control, can also be combined with analogue inputs for a variety of settings
	Output signal	Digital output	1 programmable relay output (TA,TC), up to 58 kinds of meaning selection
		Analogue output	1 analogue signal output, the output range is set flexibly between 0-20mA or 0-10V, which can achieve the output of physical quantities such as set frequency and output frequency.
	Automatic voltage stabilization	Dynamic voltage stabilization, static voltage stabilization and no voltage stabilization can be selected according to the need to obtain the most stable operation effect	
	Acceleration and deceleration time setting	0.0s～6500.0s can be set continuously, S-type and linear mode can be selected.	
	Brakes	Energy consumption brakes	Continuously adjustable energy braking start voltage, return voltage and energy braking rate
		Direct current (D.C.) brakes	Stopping DC braking starting frequency: 0.00~[F00.10] maximum frequency Braking time: 0.0～100.0s; braking current: 0%～100% rated current
	Low noise operation	The carrier frequency is continuously adjustable from 0.5KHz to 16.0KHz to minimize motor noise.	
	RPM tracking speed Restart function	Smooth restarting of the motor during operation and restarting after an instantaneous stop can be realized.	
	Counters	One internal counter for easy system integration	
	Operational functions	Upper and lower limit frequency setting, frequency jumping operation, reversing operation limitation, rotational frequency compensation, RS485 communication, frequency incremental and decremental	

		control, fault self-recovery operation and so on.	
Display	Operation Panel Display	Operational state	Output Frequency, Output Current, Output Voltage, Motor Speed, Set Frequency, Module Temperature, PID Setting, Feedback, Analogue Inputs and Outputs, etc.
		Alarm content	Output frequency, set frequency, output current, output voltage, DC voltage, module temperature, power-on time, running time and other 8 operating parameters are recorded when there are three fault trips.
Protection function		Over-current, over-voltage, under-voltage, module failure, electronic thermal relay, overheating, short-circuit, input and output phase loss, abnormal motor parameter tuning, internal memory failure, etc.	
Environment	Ambient temperature	-10℃～＋40℃ (When the ambient temperature is 40℃～50℃, please use it at a reduced rating)	
	Ambient humidity	5%～95%RH, no condensation	
	Ambient environment	Indoors (no direct sunlight, no corrosion, no flammable gas, no oil mist, dust, etc.)	
	Altitude	Derate for use above 1000 meters, 10% for every 1000 meters increase	
Structure	Protection level	IP20	
	Cooling method	Air cooling, with fan control	
Installation method		Wall-mounted, cabinet-mounted	

2.2 Inverter model description

2.3 Chassis and keyboard dimensions

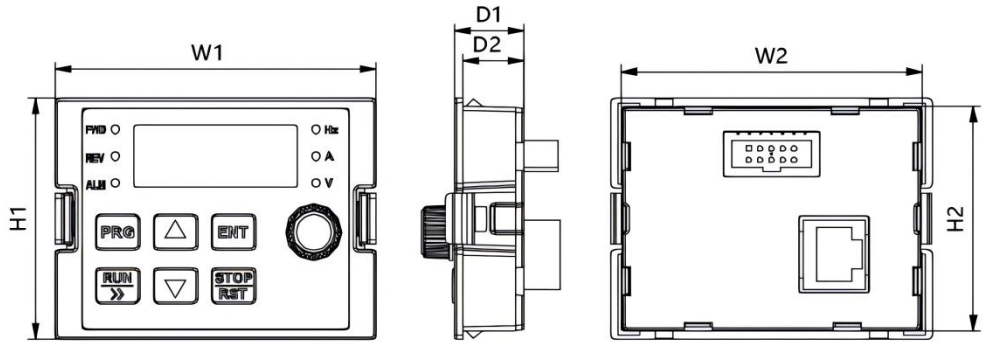
Chassis Dimensions:



Model	H2 (mm)	W1 (mm)	H (mm)	H1 (mm)	W (mm)	D (mm)	Mounting holes(mm)
	Installation Dimensions		External dimensions				
0.4KW-2.2KW/220V/380V	136.5	63	147	142	72	123.1	4
3.7KW-5.5KW/380V	172.5	78	185	182	87	144.4	4

Model	H2 (mm)	W1 (mm)	H (mm)	H1 (mm)	W (mm)	D (mm)	Mounting holes(mm)
	Installation Dimensions		External dimensions				

Keyboard installation dimensions:



Keyboard form factor and cutout dimensions				Keyboard Height	
W1	H1	W2	H2	D1	D2
72	54	67.4	50.4	15.7	13.9

External keyboard installation dimensions

2.4 Rated current output table

Voltage	Single phase	Three phase	
	220V	220V(240V)	380V(415V)
Power (KW)	Current (A)	Current (A)	Current (A)
0.4	2.3	2.3	-
0.75	4	4	2.1
1.5	7	7	3.8
2.2	9.6	9.6	5.1
4	17	17	8.5
5.5	25	25	13
7.5	-	-	16
11	-	-	24
15	-	-	32

2.5 Braking resistor selection table

Voltage (V)	Power (KW)	Braking resistor specification		Braking torque
		W	Ω	10%ED

Voltage (V)	Power (KW)	Braking resistor specification		Braking torque
		W	Ω	10%ED
Single phase 220V	0.4	80	200	125
	0.75	80	150	125
	1.5	100	100	125
	2.2	100	70	125
	4.0	300	50	125
Three phase 220V	0.75	150	110	125
	1.5	250	100	125
	2.2	300	65	125
	4	400	45	125
	5.5	800	22	125
	7.5	1000	16	125
Three phase 380V	0.75	100	750	125
	1.5	300	400	125
	2.2	300	250	125
	4	400	150	125
	5.5	500	100	125
	7.5	1000	75	125
	11	3000	43	125
	15	3000	32	125

Note:

1. Please select the resistance value specified by our company.

2. If the use of brake resistors not provided by our company causes damage to the inverter or other equipment, our company will not bear any responsibility.

3. When installing the brake resistor, be sure to consider the safety and flammability of the environment, and keep it at least 100mm away from the inverter.

4. The parameters in the table are for reference only and are not used as standards

Chapter 3 Storage and Installation

3.1 Storage

This product must be placed in a packaging box before installation. If it is not used temporarily, please pay attention to the following items when storing it:

● It must be placed in a dust-free, dry place;

● The storage environment temperature ranges from -20℃ to +65℃;

● The relative humidity of the storage environment ranges from 0% to 95%, and there is no condensation;

● The storage environment does not contain corrosive gases or liquids;

● It is best to place it on a shelf and store it in a well-packaged manner. It is best not to store the inverter for a long time. Long-term storage will cause the electrolytic capacitor to deteriorate. If long-term storage is required, it must be powered on once within half a year, and the power-on time must be at least 5 hours. When inputting, the voltage must be slowly increased to the rated voltage value using a voltage regulator.

3.2 Installation site 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 places:

● Ambient temperature: -5~40℃ ℃ and good ventilation;

● No dripping and low temperature;

● No sunlight, high temperature and severe dust;

● No corrosive gas and liquid;

● Less dust, oil and metal powder;

● No vibration, easy maintenance and inspection;

● No electromagnetic noise interference;

3.3 Installation space and direction

● For the convenience of maintenance, there must be enough space around the inverter. As shown in the figure.

● For good cooling effect, the inverter must be installed vertically and ensure smooth air circulation.

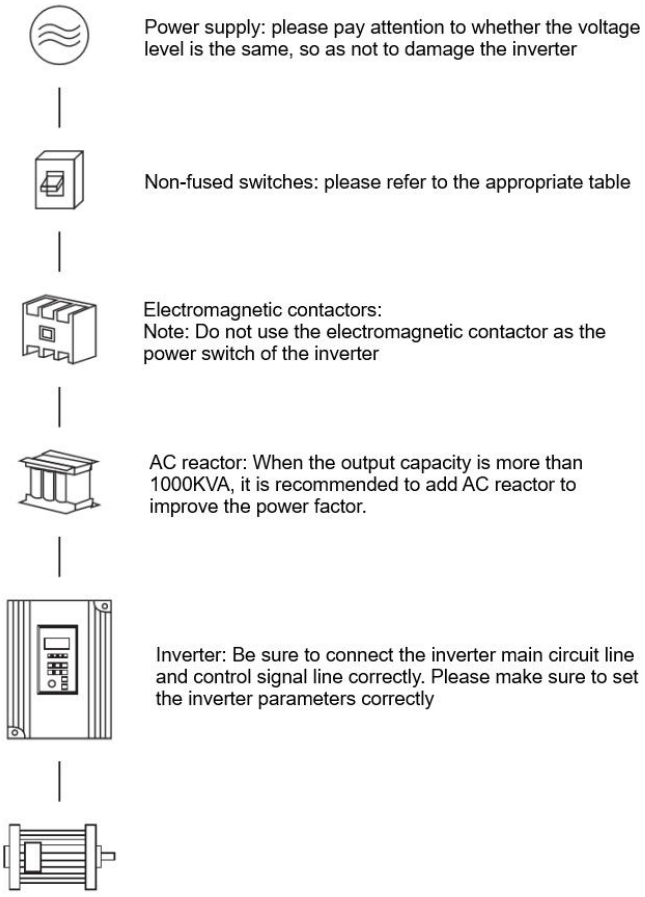
● If the installation is not firm. Place a flat plate under the inverter base before installing. If it is installed on a loose plane, the stress may cause damage to the main circuit parts and thus damage the inverter;

● The wall surface for installation should be made of non-flammable materials such as iron plate.

● When multiple inverters are installed in the same cabinet, use the method of up and down installation. While paying attention to the spacing, please add a guide partition in the middle or install them in an up and down staggered manner.

Chapter 4 Wiring

4.1 Main circuit wiring diagram



4.2 Wiring terminal diagram

4.2.1 Terminals of control circuit

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

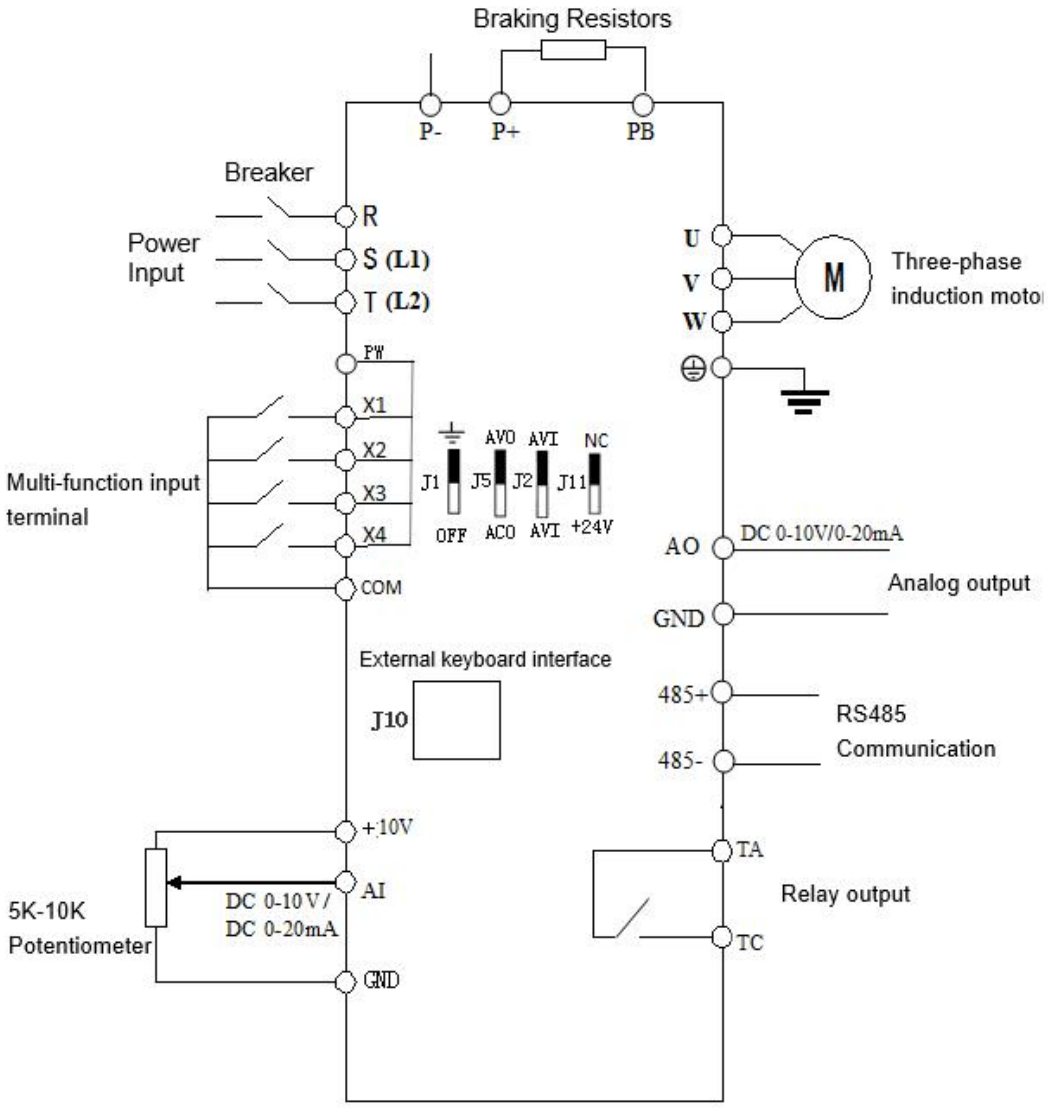
4.2.2 0.4KW-2.2KW main circuit terminal

R	S/L1	T/L2	U	V	W	⏚

4.2.3 3.7KW-5.5KW main circuit terminals

R	S	T	P+	PB	U	V	W	⏚

4.2.4 Control circuit wiring diagram

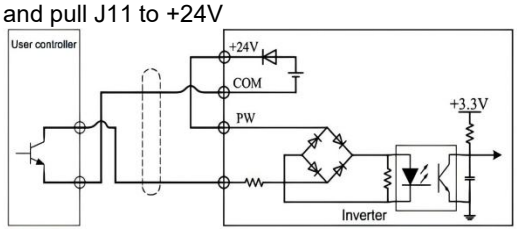


Terminal Name	Description
J1	Indicates that the main control board is grounded, OFF indicates that the main control board is disconnected from the ground (factory default disconnected)
J2	AVI indicates analog AI input voltage signal, 0(2)-10V, ACI indicates analog AI input current signal, 0(2)-20mA
AI	1. Input range: AI voltage and current can be selected from 0(2)~10V, 0(4)~20ma 2. Input impedance: 20kΩ for voltage input, 250Ω for current input, AI voltage or current input is set by the DIP switch J2, corresponding AVI indicates analog AI input voltage signal, 0-10V, corresponding ACI indicates analog AI input current signal, 0-20mA
10V/GND	This machine provides +10V power supply, +10V reference ground
J5	AVO indicates analog AO output voltage signal, 0-10V, ACO indicates analog AO output current signal, 0-20mA
AO	1. Output range: 0(2) ~ 10V voltage or 0(4) ~ 20ma current 2. AO voltage or current output is set by the DIP switch J5. The corresponding AVO indicates the analog AO output voltage signal, 0-10V, and the corresponding ACO indicates the analog AO output current signal, 0(4)-20mA

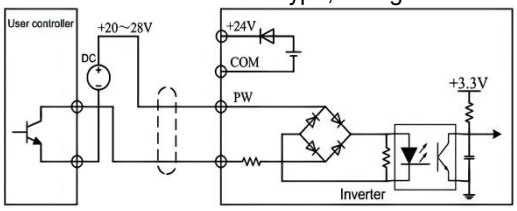
Terminal Name	Description	
TA	1. Relay output; TA -TC normally open 2. Terminal contact capacity: 3A/AC250V, 1A/DC30V	
T1B		
COM	+24V reference ground	
485+	485 communication port, 485 differential signal port, standard 485 communication interface, please use shielded twisted pair.	
485-		
PW	Switch quantity external power input terminal, voltage range: 12~30V	
J11	NC indicates that the multi-function input terminal is selected to use external power supply, +24V indicates that the multi-function input terminal is selected to use built-in +24V power supply	
DI1	Switch quantity input 1	1. Internal impedance: 3.3kΩ, can accept 12~30V voltage input, maximum input frequency: 1kHz 2. This terminal is a bidirectional input terminal. When the multi-function terminal uses the internal 24V power supply, it supports NPN connection. When using an external power supply, it supports NPN and PNP connection.
DI2	Switch quantity input 2	
DI3	Switch quantity input 3	
DI4	Switch quantity input 4	

4.2.5 Input/switch signal connection diagram

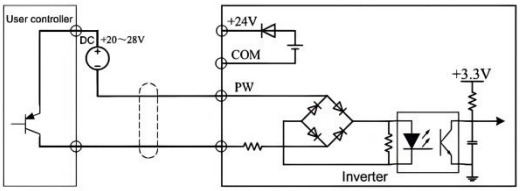
Use the inverter's internal +24V power supply, and the external controller is NPN type. The wiring method is as shown below, and pull J11 to +24V



Use external power supply, external controller is NPN type, wiring is as shown below, and pull J11 to NC



Use external power supply, external controller is PNP type. Wiring is as shown below, and pull J11 to NC



4.3 Wiring precautions

4.3.1 Main circuit wiring

● When wiring, please select the wire diameter specifications in accordance with the provisions of electrical regulations to ensure safety.

It is best to use isolated wires or wire tubes for power wiring, and ground both ends of the isolation layer or wire tube;;

● Be sure to install an air circuit breaker NPB between the power supply and the input terminals (R, S, T). (If you use a leakage circuit breaker, please use a circuit breaker with high-frequency countermeasures).

● Please lay the power line and control line separately and do not place them in the same wire duct.

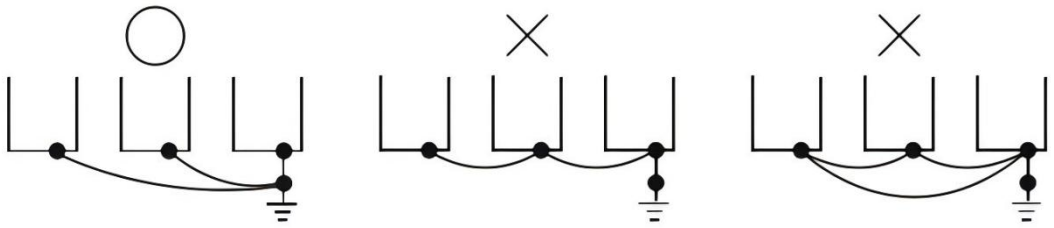
● Do not connect the AC power supply to the inverter output terminal (U, V, W);
● The output wiring should not touch the metal part of the inverter shell, otherwise it may cause a ground short circuit.
● Phase-shifting capacitors, LC, RC noise filters and other components should not be used at the output end of the inverter.
● The inverter main circuit wiring 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), a very 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, please reduce the carrier frequency, because 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.

4.3.2 Control circuit wiring (signal line)

The signal line should not be placed in the same wire duct as the main circuit wiring, otherwise interference may occur. Please use shielded wire for the signal line
and ground it at one end. The wire diameter should be 0.5-2mm^2. It is recommended to use shielded wire for the control line. Use the control terminals on the control panel
correctly as needed.

4.3.3 Grounding Wire Grounding Wire

Terminal E Please use the third type of grounding (less than 100ÿ) for grounding; please use the grounding wire in accordance with the basic length and size of the electrical equipment technology; absolutely avoid sharing the grounding electrode with large power equipment such as welding machines and power machinery, and the grounding wire should be kept as far away from the power line of large power equipment as possible; for the grounding wiring method of multiple inverters, please use the method shown in the following figure (a) to avoid loops (b) or (c)
• The grounding wire must be as short as possible.
• Grounding terminal E Please ground correctly and never connect to the neutral line.

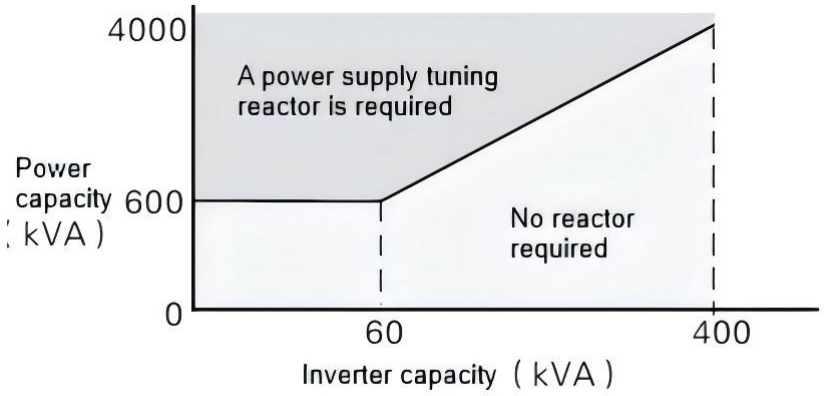


(a) True (b) False (c) False

4.4 Specific Application Notes

4.4.1 Selection

(1) Installation of Reactor
When the inverter is connected to a large-capacity power transformer (600kVA or more) or when switching the phase-advancing capacitor, the power input circuit will generate excessive peak current, which may damage the components of the converter. To prevent this from happening, please install a DC reactor or AC reactor. This also helps to improve the power factor on the power supply side. In addition, when a thyristor converter such as a DC drive is connected to the same power supply system, a DC reactor or AC reactor must be installed regardless of the power supply conditions.



Installation conditions of reactor

(2) Frequency inverter capacity

When operating a special motor with inverter capacity, please confirm that the motor rated current is not higher than the inverter rated output current. In addition, when operating multiple induction motors in parallel with one inverter, the inverter capacity should be selected so that 1.1 times the total motor rated current is less than the inverter rated output current.

(3) Starting torque

The starting and acceleration characteristics of the motor driven by the inverter are limited by the combined inverter overload rated current. The torque characteristics are smaller than those of the general commercial power supply. If a larger starting torque is required, please increase the inverter capacity by one level or increase the capacity of the motor and inverter at the same time.

(4) Emergency stop

Although the protection function will be activated and the output will stop when the inverter fails, the motor cannot be stopped suddenly at this time. Therefore, please install a mechanical stop and holding structure on the mechanical equipment that requires emergency stop.

(5) Special options

The special option terminals PB and P+ are terminals for connecting special options. Do not connect machines other than special options.

(6) Precautions related to reciprocating loads

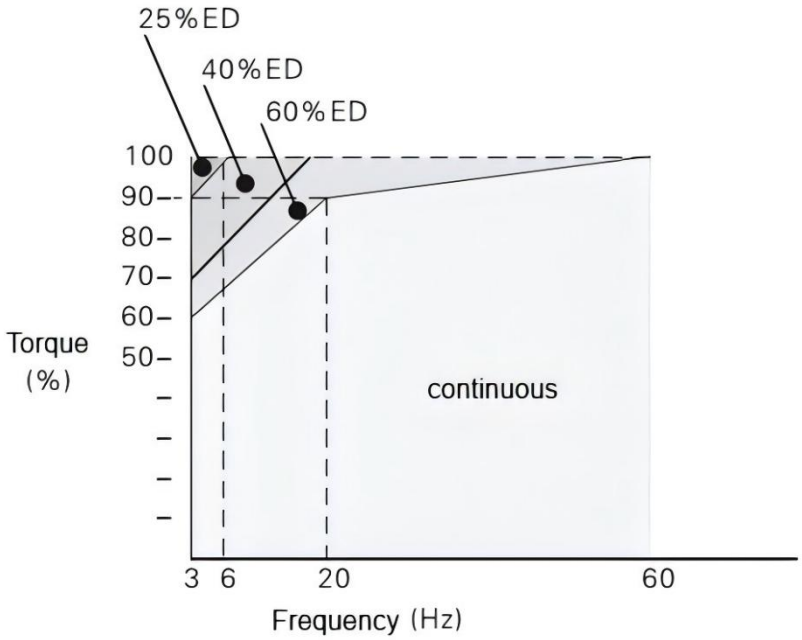
When the inverter is used for reciprocating loads (cranes, elevators, punching machines, washing machines, etc.), if a current of 150% or more is repeatedly passed through the inverter, the IGBT inside the inverter will be shortened due to thermal fatigue. As a rough guideline, the number of starts/stops is approximately 8 million times when the carrier frequency is 4kHz and the peak current is 150%.

In particular, when low noise is not required, please reduce the carrier frequency. In addition, please 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 level. (When conducting trial runs for these purposes, be sure to confirm the peak current during reciprocation and adjust it as needed.) In addition, when used for cranes, since the start/stop action during micro motion is faster, it is recommended to make the following selections to ensure motor torque and reduce inverter current. The capacity of the inverter should be able to ensure that its peak current is less than 150%. The capacity of the inverter should be at least one level larger than the motor capacity.

4.4.2 Precautions for using motors

(1) For use with existing standard motors

When using an inverter to drive a standard motor, the loss generated will be slightly greater than when using commercial power to drive it. The cooling effect will be poor at low speeds, and the temperature of the motor will rise. Therefore, please reduce the load torque of the motor at low speeds. The allowable load characteristics of our standard motors are shown in the figure. In addition, if 100% continuous torque is required at low speeds, please consider whether to use a motor dedicated to the inverter.



Permissible load characteristics of our standard motors

(2) Precautions for special motors Pole-changing motors

The rated current of pole-changing motors is different from that of standard motors. Please confirm the maximum current of the motor and select the corresponding inverter. Always switch the number of poles after the motor stops. If the switch is performed during rotation, the regenerative overvoltage or overcurrent protection circuit will be activated and the motor will stop by coasting.

Motor with brake

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

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

When using an oil-lubricated gearbox, speed changer, reducer, etc. in the power transmission system, please note that the oil lubrication effect will be reduced if it is continuously operated only in the low-speed range. In addition, high-speed operation of 60Hz or more will cause problems with the noise, life, and strength of the power transmission structure due to centrifugal force. Please pay full attention to this.

Chapter 5 Operation and Display

5.1 Operation panel description

5.1.1 Operation panel diagram

5.1.2 Button Description

Key Symbols	Name	Functional Description
PRG	Programming key	Menu entry or exit, parameter modification
ENT	Confirm key	Enter menu, confirm parameter setting
▲	Increase key	Increase data or function code
▼	Decrease key	Decrease data or function code
RUN/▶▶	Run key	Run/shift operation under keyboard operation mode
STOP/RST	Stop/reset key	Stop/reset operation, when in the stop state of the main interface, it can be used as a shift key to view the displayed content

5.1.3 Function indicator light description

Indicator light name	Description
REV	The inverter reverse indicator light, when the light is on, it indicates the reverse running state.
FWD	The inverter forward indicator light, when the light is on, it indicates the forward running state.
ALM	The indicator light is always on, indicating that it is in the torque control state, the indicator light flashes quickly, indicating that it is in the fault state, and the indicator light flashes slowly, indicating that it is in the tuning state.
Hz	Frequency unit
A	Current unit
V	Voltage unit

5.1.4 Function indicator light combination description

Indicator light	LED display meaning	Symbol

combination		
Hz + A	Motor speed	r/min
A + V	Time (seconds)	s
Hz + V	Percentage actual value	%
Hz + A + V	Temperature	℃

5.2 Operation process

5.2.1 Parameter settings

The three levels of menus are:
1. Function code group number (first level menu);
2. Function code number (secondary menu);
3. Function code setting value (three-level 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 Store the set parameters in the control panel, then return to the secondary menu and automatically transfer to the next function code; press PRG to return directly to the secondary menu Return to the secondary menu without storing parameters and keep staying at the current function code.

In the third-level menu state, if the parameter has no flashing bit, it means that the function code cannot be modified. Possible reasons are:
1) This function code is a parameter that cannot be modified, such as actual detection parameters, operation record parameters, etc.
2) This function code cannot be modified in the running state and can only be modified after stopping the machine.

5.2.2 Fault Reset

After the inverter fails, the inverter will prompt the relevant fault information. The user can reset the fault by pressing the STOP/ RESET key on the keyboard or the terminal function. After the inverter fault is reset, it is in standby state. If the inverter is in a fault state and the user does not reset it, the inverter will be in the running protection state and cannot run.

5.2.3 Motor parameter self-learning

When selecting the vector control mode, the nameplate parameters of the motor must be accurately input before the inverter is running. The inverter matches the standard motor parameters based on the nameplate parameters. The vector control mode is highly dependent on the motor parameters. To obtain good control performance, the accurate parameters of the controlled motor must be obtained.

Chapter 6 Function Parameter Table

When F15.00 is set to a non-zero value, the parameter protection password is set. In the function parameter mode and the user parameter change mode, the parameter menu can only be entered after the password is correctly entered. To cancel the password, F15.00 must be set to 0. The parameter menu in the user customized parameter mode is not protected by a password.

The symbols in the function table are as follows:
"☆": Indicates that the setting value of the parameter can be changed when the inverter is in the stop or running state;
"★": Indicates that the setting value of the parameter cannot be changed when the inverter is in the running state;
"●": Indicates that the value of the parameter is the actual detection record value and cannot be changed
"★": Indicates that the parameter is a "factory parameter" and is limited to the manufacturer's setting. Users are prohibited from operating

F00 Basic function group				
Function code	**Name**	**Setting range**	**Factory value**	**Changes**
F00.00	Function macro definition	0: General mode 1~5: Reserved 6: Single pump water supply (1 variable frequency pump) mode 7: Photovoltaic water supply voltage tracking mode 8: Photovoltaic water supply power tracking VF mode 9: Photovoltaic water supply power tracking SVC mode 10~100: Reserved Note: Initialize the parameters first, then set the macro function.	0	★
F00.01	Motor control mode	0: V/F control 1: Speed sensor less vector control (SVC)	0	★
F00.02	Command source selection	0: Operation panel command channel 1: Terminal command channel 2: Communication command channel	0	☆
F00.03	Main frequency source A selection	0: Digital setting (preset frequency F00.08, UP/DOWN Can be modified, no memory after power failure) 1: Digital setting (preset frequency F00.08, UP/DOWN Modifiable, power-off memory) 2: AI（0～10V/20mA） 3: Keep 4: Panel potentiometer 5: Keep 6: Multi-segment instructions 7: Simple PLC 8: PID 9: Communication setting 10: Multi-pump instruction 11: MPPT setting (photovoltaic water pump)	4	★
F00.04	Auxiliary frequency source B selection	Same as F00.03 (main frequency source A selection)	0	★
F00.05	Auxiliary frequency source B range selection when superimposing choice	0: relative to the maximum frequency 1: relative to frequency source A	0	☆
F00.06	Auxiliary frequency source B when superimposed Range	0% ～ 150%	100%	☆

F00.07	Frequency source B superposition selection	Units: Frequency source selection 0: Main frequency source A 1: Main and auxiliary operation results (operation relationship is determined by the tens digit) 2: Switch between main frequency source A and auxiliary frequency source B 3: Switch between main frequency source A and main and auxiliary operation results 4: Switch between auxiliary frequency source B and main and auxiliary operation results Tens: Main and auxiliary operation relationship of frequency source 0: Main + auxiliary 1: Main - auxiliary 2: Maximum of the two 3: Minimum of the two	OO	☆
F00.08	Preset frequency	0.00Hz～ Maximum frequency （F00.10）	50.00Hz	☆
F00.09	Direction of operation	0: Same direction 1: Opposite direction	0	☆
F00.10	Maximum frequency	50.00Hz ～ 500.00Hz	50.00Hz	★
F00.11	Upper frequency source	0: F00.12 setting 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: Communication setting	0	★
F00.12	Upper frequency limit	Lower frequency limit F00.14~Maximum frequency F00.10	50.00Hz	☆
F00.13	Upper frequency limit offset	0.00Hz~Maximum frequency F00.10	0.00Hz	☆
F00.14	Lower frequency limit	0.00Hz~Upper frequency limit F00.12	0.00Hz	☆
F00.15	Carrier frequency	0.5kHz ～ 16.0kHz	Model confirmation	☆
F00.16	Carrier frequency adjustment with temperature	0: No 1: Yes	1	☆
F00.17	Acceleration time 1	0.00s ～ 650.00s(F00.19=2) 0.0s ～ 6500.0s(F00.19=1) 0s ～ 65000s(F00.19=0)	Model confirmation	☆
F00.18	Deceleration time 1	0.00s ～ 650.00s(F00.19=2) 0.0s ～ 6500.0s(F00.19=1) 0s ～ 65000s(F00.19=0)	Model confirmation	☆
F00.19	Acceleration and deceleration time unit	0: 1 s 1: 0.1 s 2: 0.01 s	1	★
F00.21	Auxiliary frequency source bias frequency when superimposed	0.00Hz~Maximum frequency F00.10	0.00Hz	☆
F00.22	Frequency command resolution	1: 0.1Hz 2: 0.01Hz	2	★
F00.23	Digital setting frequency stop memory selection	0: Do not remember 1: Remember	0	☆
F00.24	Reserved	—	0	★
F00.25	Acceleration and deceleration time reference frequency	0: Maximum frequency (F00.10) 1: Set frequency 2: 100Hz	0	★
F00.26	Running frequency command UP/DOWN reference	0: Operating frequency 1: Setting frequency	0	★
F00.27	Command source bundled frequency source	Units: Operation panel command binding frequency source selection 0: No binding 1: Digital setting frequency 2: AI 3: Reserved 4: Panel potentiometer	OOOO	☆

		5: Reserved 6: Multi-speed 7: Simple PLC 8: PID 9: Communication setting Tens: Terminal command binding frequency source selection Hundreds: Communication command binding frequency source selection Thousands: Automatic operation binding frequency source selection		
F00.28	Serial communication protocol selection	0: Modbus protocol 1: Reserved	0	☆
F00.29	GP type display	1: G type (constant torque load type) 2: P type (fan, water pump load type)	Model confirmation	•
Group F01 Start/Stop Control				
Function Code	**Name**	**Setting Range**	**Factory Default**	**Change**
F01.00	Start mode	0: Direct start 1: Speed tracking restart 2: Pre-excitation start (AC asynchronous motor) 3: Super fast start (valid in vector mode)	0	☆
F01.01	Speed tracking mode	0: Start from the stop frequency 1: Start from zero speed 2: Start from the maximum frequency	0	★
F01.02	Speed tracking speed	1 ～ 100	20	☆
F01.03	Start frequency	0.00Hz ～ 10.00Hz	0.00Hz	☆
F01.04	Start frequency holding time	0.0s ～ 100.0s	0.0s	★
F01.05	Start DC braking current/pre-excitation current	0% ～ 100%	50%	★
F01.06	Start DC braking time/pre-excitation time	0.0s ～ 100.0s	0.0s	★
F01.07	Acceleration/deceleration mode	0: Linear acceleration/deceleration 1: S-curve acceleration/deceleration A 2: S-curve acceleration/deceleration B	0	★
F01.08	S-curve start time ratio	0.0% ～ (100.0%-F01.09)	30.0%	★
F01.09	S-curve end time ratio	0.0% ～ (100.0%-F01.08)	30.0%	★
F01.10	Stop mode	0: deceleration stop 1: free stop	0	☆
F01.11	Stop DC braking start frequency	0.00Hz~Maximum frequency	0.00Hz	☆
F01.12	Stop DC braking waiting time	0.0s ～ 100.0s	0.0s	☆
F01.13	Stop DC braking current	0% ～ 100%	50%	☆
F01.14	Stop DC braking time	0.0s ～ 100.0s	0.0s	☆
F01.15	Brake utilization rate	0% ～ 100%	100%	☆
F01.16～ F01.20	Reserved	—	0	☆
F01.21	Speed tracking delay	0.00 ～ 5.00s	0.50s	☆
Group F02 Auxiliary Functions				
Function Code	**Name**	**Setting Range**	**Factory Default**	**Change**
F02.00	Jog operation frequency	0.00Hz ～ Maximum frequency	2.00Hz	☆
F02.01	Jog acceleration time	0.0s ～ 6500.0s	20.0s	☆
F02.02	Jog deceleration time	0.0s ～ 6500.0s	20.0s	☆
F02.03	Acceleration time 2	0.0s ～ 6500.0s	机型确定	☆
F02.04	Deceleration time 2	0.0s ～ 6500.0s	机型确定	☆

F02.05	Acceleration time 3	0.0s ～ 6500.0s	机型确定	☆
F02.06	Deceleration time 3	0.0s ～ 6500.0s	机型确定	☆
F02.07	Acceleration time 4	0.0s ～ 6500.0s	机型确定	☆
F02.08	Deceleration time 4	0.0s ～ 6500.0s	机型确定	☆
F02.09	Jump frequency 1	0.00Hz ～ Maximum frequency	0.00Hz	☆
F02.10	Jump frequency 2	0.00Hz ～ Maximum frequency	0.00Hz	☆
F02.11	Jump frequency amplitude	0.00Hz ～ Maximum frequency	0.01Hz	☆
F02.12	Forward and reverse dead time	0.0s ～ 3000.0s	0.0s	☆
F02.13	Reverse frequency prohibition	0: Invalid 1: Valid	0	☆
F02.14	Set frequency lower than lower limit frequency Operation mode	0: Run at the lower frequency limit 1: Stop 2: Run at zero speed	0	☆
F02.15	Drop control	0.00Hz ～ 10.00Hz	0.00Hz	☆
F02.16	Set cumulative power-on arrival time	0h ～ 65000h	0h	☆
F02.17	Set cumulative operation arrival time	0h ～ 65000h	0h	☆
F02.18	Start protection selection	0: No protection 1: Protection Note: When F02.18=0, the terminal power-on detection run command is valid; when F02.18=1, the terminal power-on detection run command is invalid.	0	☆
F02.19	Frequency detection value (FDT1)	0.00Hz ～ Maximum frequency	50.00Hz	☆
F02.20	Frequency detection hysteresis value (FDT1)	0.0% ～ 100.0%(FDT1 level)	5.0%	☆
F02.21	Frequency arrival (FAR) detection width	0.0% ～ 100.0%(Maximum frequency)	0.0%	☆
F02.22	Whether the jump frequency is valid during acceleration and deceleration	0: Invalid 1: Effective	0	☆
F02.23	Switching frequency point between acceleration time 1 and acceleration time 2	0.00Hz to maximum frequency	0.00Hz	☆
F02.24	Switching frequency point between deceleration time 1 and deceleration time 2	0.00Hz to maximum frequency	0.00Hz	☆
F02.25	Terminal jog priority	0: Invalid 1: Effective	0	☆
F02.26	Frequency detection value (FDT2)	0.00Hz to maximum frequency	50.00Hz	☆
F02.27	Frequency detection hysteresis value (FDT2)	0.0% ～ 100.0%（FDT2 电平）	5.0%	☆
F02.28	Any arrival frequency detection value 1	0.00Hz to maximum frequency	50.00Hz	☆
F02.29	Any arrival frequency detection width 1	0.0% to 100.0% (maximum frequency)	0.0%	☆
F02.30	Any arrival frequency detection value 2	0.00Hz to maximum frequency	50.00Hz	☆
F02.31	Achieving frequency detection width 2	0.0% to 100.0% (maximum frequency)	0	☆
F02.32	Zero current detection level	0.0% ～ 300.0% 100.0% Corresponding to rated motor current	5.0%	☆
F02.33	Zero current detection delay time	0.01s ～ 600.00s	0.10s	☆
F02.34	Output current over limit value	0.0% (not detected) 0.1% to 300.0% (motor rated current)	200.0%	☆
F02.35	Output current over limit	0.00s ～ 600.00s	0.00s	☆

	detection delay time			
F02.36	Any arrival current 1	0.0% to 300.0% (motor rated current)	100.0%	☆
F02.37	Any arrival current 1 width	0.0% to 300.0% (motor rated current)	0.0%	☆
F02.38	Any arrival current 2	0.0% to 300.0% (motor rated current)	100.0%	☆
F02.39	Any arrival current 2 width	0.0% to 300.0% (motor rated current)	0.0%	☆
F02.40	Timing function selection	0: Invalid 1: Valid	0	☆
F02.41	Timing operation time selection	0: F02.42 setting 1: AI 2: Reserved 3: Panel potentiometer Note: The analog input range corresponds to F02.42	0	☆
F02.42	Timing operation time	0.0Min ～ 6500.0Min	0.0Min	☆
F02.43	AI input voltage protection value lower limit	0.00V ～ F02.44	3.10V	☆
F02.44	AI input voltage protection value upper limit	F02.43 ～ 11.00V	6.80V	☆
F02.45	Module temperature arrival	0℃～ 100℃	75℃	☆
F02.46	Cooling fan control	0: Fan runs during operation 1: Fan runs all the time	0	☆
F02.47	Wake-up frequency	Sleep frequency (F02.49) ~maximum frequency (F00.10)	0.00Hz	☆
F02.48	Wake-up delay time	0.0s ～ 6500.0s	0.0s	☆
F02.49	Sleep frequency	0.00Hz~wake-up frequency (F02.47)	0.00Hz	☆
F02.50	Sleep delay time	0.0s ～ 6500.0s	0.0s	☆
F02.51	This operation arrival time setting	0.0 ～ 6500.0 Min	0.0Min	☆
F02.52	Output power correction coefficient	0.00% ～ 200.0%	100.0%	☆
Group F03 Motor Parameters				
Function Code	**Name**	**Setting Range**	**Factory Default**	**Change**
F03.00	Motor type selection	0: Ordinary asynchronous motor 1: Variable frequency asynchronous motor	0	★
F03.01	Motor rated power	0.1kW ～ 1000.0kW	Model confirmation	★
F03.02	Motor rated voltage	1V ～ 2000V	Model confirmation	★
F03.03	Motor rated current	0.01A~655.35A (inverter power <= 55kW) 0.1A~6553.5A (inverter power > 55kW)	Model confirmation	★
F03.04	Motor rated frequency	0.01Hz ～ Maximum frequency	Model confirmation	★
F03.05	Motor rated speed	1rpm ～ 65535rpm	Model confirmation	★
F03.06	Asynchronous motor stator resistance	0.001Ω~65.535Ω (inverter power <= 55kW) 0.0001Ω~6.5535Ω (inverter power > 55kW)	Tuning parameters	★
F03.07	Asynchronous motor rotor resistance	0.001Ω~65.535Ω (inverter power <= 55kW) 0.0001Ω~6.5535Ω (inverter power > 55kW)	Tuning parameters	★
F03.08	Asynchronous motor leakage inductance	0.01mH~655.35mH (inverter power <=55kW) 0.001mH~65.535mH (inverter power>55kW)	Tuning parameters	★

F03.09	Asynchronous motor mutual inductance	0.1mH~6553.5mH (inverter power <=55kW) 0.01mH~655.35mH (inverter power >55kW)	Tuning parameters	★
F03.10	Asynchronous motor no-load current	0.01A~F03.03 (inverter power <= 55kW) 0.1A~F03.03 (inverter power > 55kW)	Tuning parameters	★
F03.11 ～ F03.36	Reserved	—	0	★
F03.27	Tuning selection	0: No operation 1: Asynchronous motor static tuning 2: Asynchronous motor complete tuning 3: Static complete parameter identification	0	★
F04 Motor vector control parameters				
Function Code	**Name**	**Setting Range**	**Factory Default**	**Change**
F04.00	Speed loop proportional gain 1	1 ～ 100	30	☆
F04.01	Speed loop integral time 1	0.01s ～ 10.00s	0.50s	☆
F04.02	Switching frequency 1	0.00 ～ F04.05	5.00Hz	☆
F04.03	Speed loop proportional gain 2	1 ～ 100	20	☆
F04.04	Speed loop integral time 2	0.01s ～ 10.00s	1.00s	☆
F04.05	Switching frequency 2	F04.02 ～最大频率	10.00Hz	☆
F04.06	Vector control slip gain	50% ～ 200%	100%	☆
F04.07	Speed loop filter time constant	0.000s ～ 0.100s	0.015s	☆
F04.08	Vector control overexcitation gain	0 ～ 200	64	☆
F04.09	Torque upper limit source under speed control mode	0: Function code F04.10 setting 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: Communication setting 6: Reserved 7: Reserved The full scale of options 1-7 corresponds to F04.10	0	☆
F04.10	Torque upper limit digital setting under speed control mode	0.0% ～ 200.0%	160.0%	☆
F04.13	Excitation regulation proportional gain	0 ～ 60000	2000	☆
F04.14	Excitation regulation integral gain	0 ～ 60000	1300	☆
F04.15	Torque regulation proportional gain	0 ～ 60000	2000	☆
F04.16	Torque regulation integral gain	0 ～ 60000	1300	☆
F04.17	Speed loop integral separation	0: Invalid 1: Valid	0	☆
F04.18 ～F04.20	Retained	—	0	☆
Group F05 Torque Control Parameters				
Function Code	**Name**	**Setting Range**	**Factory Default**	**Change**
F05.00	Speed/torque control mode selection	0: Speed control 1: Torque control	0	★

F05.01	Torque setting source selection under torque control mode	0: Digital setting 1 (F05.03) 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: Communication setting 6: Reserved 7: Reserved (Full scale of options 1-7 corresponds to F05.03 digital setting)	0	★
F05.03	Torque digital setting under torque control mode	—200.0% ～ 200.0%	150.0%	☆
F05.05	Torque control forward maximum frequency	0.00Hz~Maximum frequency	50.00Hz	☆
F05.06	Torque control reverse maximum frequency	0.00Hz~Maximum frequency	50.00Hz	☆
F05.07	Torque control acceleration time	0.00s ～ 650.00s	0.00s	☆
F05.08	Torque control deceleration time	0.00s ～ 650.00s	0.00s	☆
Group F06 V/F Control Parameters				
Function code	**Name**	**Setting range**	**Factory value**	**Change**
F06.00	VF curve 3 setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2th power V/F 4: 1.4th power V/F 5: Reserved 6: 1.6th power V/F 7: Reserved 8: 1.8th power V/F 9: Reserved 10: VF full separation mode 11: VF half separation mode	0	★
F06.01	Torque boost	0.0%: (Automatic torque boost) 0.1% ～ 30.0%	Model Determination	☆
F06.02	Torque boost cutoff frequency	0.00Hz ～ Maximum frequency	50.00Hz	★
F06.03	Multi-point VF frequency point F1	0.00Hz ～ F06.05	0.00Hz	★
F06.04	Multi-point VF voltage point V1	0.0% ～ 100.0%	0.0%	★
F06.05	Multi-point VF frequency point F2	F06.03 ～ F06.07	0.00Hz	★
F06.06	Multi-point VF voltage point V2	0.0% ～ 100.0%	0.0%	★
F06.07	Multi-point VF frequency point F3	F06.05 ～ Motor rated frequency (F03.04)	0.00Hz	★
F06.08	Multi-point VF voltage point V3	0.0% ～ 100.0%	0.0%	★
F06.09	VF slip compensation gain	0.0% ～ 200.0%	0.0%	☆
F06.10	VF overexcitation gain	0 ～ 200	64	☆
F06.11	VF oscillation suppression gain	0 ～ 100	Model Determination	☆

F06.13	VF separation voltage source	0: Digital setting (F06.14) 1: AI 2: Reserved 3: Panel potentiometer 4: PULSE setting (X7) 5: Multi-segment instruction 6: Simple PLC 7: PID 8: Communication setting Note: 100.0% corresponds to the rated voltage of the motor	0	☆
F06.14	VF separation voltage digital setting	0V ～ Motor rated voltage	0V	☆
F06.15	VF separation voltage acceleration time	0.0s ～ 1000.0s Note: It indicates the time from 0V to the rated voltage of the motor.	0.0s	☆
F06.16	VF separation voltage deceleration time	0.0s ～ 1000.0s Note: It indicates the time from 0V to the rated voltage of the motor.	0.0s	☆
F06.17	VF separation shutdown mode selection	0: Frequency/voltage are reduced to 0 independently 1: After the voltage is reduced to 0, the frequency is reduced again	0	☆
F06.18	VF over-voltage stall action current	50～ 200%	150%	☆
F06.19	VF over-voltage stall enable	0: Invalid 1: Valid	1	☆
F06.20	VF over-voltage stall suppression gain	0～ 100	20	
F06.21	VF double-speed over-voltage stall action	50～ 200%	50%	☆
F06.22	Current compensation coefficient	200.0～ 2000.0	760.0	☆
F06.23	VF over-voltage stall action voltage	0: Invalid 1: Valid	1	☆
F06.24	VF over-voltage stall enable	0～100	30	☆
F06.25	VF over-voltage stall suppression frequency gain	0～100	30	☆
F06.26	VF over-voltage stall suppression voltage gain	0～ 50Hz	5Hz	☆
F07 Group Input Terminals				
Function code	**Name**	**Setting range**	**Factory value**	**Change**
F07.00	DI1 terminal function selection	0: No function 1: Forward run FWD or run command 2: Reverse run REV or forward and reverse run direction. (Note: When setting 1 or 2, it should be used in conjunction with F07.11, please refer to the parameter description of function code for details.) 3: Three-wire operation control 4: Forward Jog (FJOG) 5: Reverse Jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Free stop 9: Fault reset (RESET) 10: Running pause 11: External fault normally open input 12: Multi-segment command terminal 1 13: Multi-segment command terminal 2 14: Multi-segment command terminal 3 15: Multi-segment command terminal 4 16: Acceleration/deceleration time selection terminal 1 17: Acceleration and deceleration time selection terminal	1	★
F07.01	DI2 terminal function selection		2	★

F07.02	DI3 terminal function selection	2 18: Frequency source switching 19: UP/DOWN setting clear (terminal, keypad) 20: Control command switching terminal 1 21: Acceleration and deceleration prohibit 22: PID pause 23: PLC status reset 24: Oscillation frequency pause 25: Counter input 26: Counter Reset 27: Length Count Input 28: Length reset 29: Torque Control Disable 30: Reserved 31: Reserved 32: Immediate DC braking 33: External fault normally closed input 34: Frequency modification enable 35: PID action direction reversal 36: External stop terminal 1 37: Control command switching terminal 2 38: PID integral pause 39: Switching between frequency source A and preset frequency 40: Switching between frequency source B and preset frequency 41: Reserved 42: Reserved 43: PID parameter switching 44: User defined fault 1 45: User defined fault 2 46: Speed control/torque control switching 47: Emergency Stop 48: External Stop Terminal 2 49: Deceleration DC Brake 50: Zeroing of current run time 51: 2-wire / 3-wire switching 52: Reverse rotation prohibited 53 to 58: Reserved	9	★
F07.03	DI4 terminal function selection		12	★
F07.04～ F07.09	Reserved		0	★
F07.10	X filter time	0.000s ～ 1.000s	0.010s	☆
F07.11	Terminal command mode	0: Two-wire 1 1: Two-wire 2 2: Three-wire 1 3: Three-wire 2	0	★
F07.12	Terminal UP/DOWN change rate	0.001Hz/s ～ 65.535Hz/s	1.00Hz/s	☆
F07.13	AI curve minimum input	0.00V ～ F07.15	0.00V	☆
F07.14	AI curve minimum input corresponding setting	—100.0% ～ +100.0%	0.0%	☆
F07.15	AI curve maximum input	F07.13 ～ +10.00V	10.00V	☆
F07.16	AI curve maximum input corresponding setting	—100.0% ～ +150.0%	100.0%	☆
F07.17	AI filter time	0.00s ～ 10.00s	0.10s	☆
F07.18～ F07.22	Reserved	_	0	☆
F07.23	Panel potentiometer minimum input	—10.00V ～ F07.25	—9.50V	☆
F07.24	Panel potentiometer minimum input corresponding setting	—100.0% ～ +100.0%	0.0%	☆
F07.25	Panel potentiometer maximum input	F07.23 ～ +10.00V	9.50V	☆
F07.26	Panel potentiometer maximum input corresponding setting	—100.0% ～ +150.0%	100.0%	☆
F07.27	Panel potentiometer filter time	0.00s ～ 10.00s	0.10s	☆

F07.28～F07.32	Reserved	_	0	☆
F07.33	Reserved	—	0	☆
F07.34	AI below minimum input setting selection	Units: AI is lower than the minimum input setting selection 0: corresponds to the minimum input setting 1: 0.0% Tens and hundreds: reserved	OOO	☆
F07.35	DI1 delay time	0.0s ～ 3600.0s	0.0s	★
F07.36	DI2 delay time	0.0s ～ 3600.0s	0.0s	★
F07.37	DI3 delay time	0.0s ～ 3600.0s	0.0s	★
F07.38	DI terminal effective mode selection	0: Low level is valid 1: High level is valid Units: DI1 Tens: DI2 Hundreds: DI3 Thousands: DI4 Tens of thousands: Reserved	00000	★
F07.39	Reserved	—	0	★
F07.40	AI input signal selection	0: voltage signal 1: current signal	0	★
F07.41	AI input anti-shake coefficient	0 ～ 1000	0	☆
F07.42	Reserved	—	0	★
F08 Group Output Terminals				
Function code	**Name**	**Setting range**	**Factory value**	**Change**
F08.00～F08.01	Reserved	—	0	☆
F08.02	Control panel relay R function selection	0: No output 1: Inverter running 2: Fault output (fault for free stop) 3: Frequency level detection FDT1 output 4: Frequency arrival signal (FAR) 5: Zero speed running (no output when stopped) 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8: Set count value reached 9: Specified count value reached 10: Length reached 11: PLC cycle completed 12: Accumulated running time reached 13: Frequency limited 14: Torque limited 15: Ready to run 16: Reserved 17: Upper frequency limit reached 18: Lower frequency limit reached (operation related) 19: Undervoltage status output 20: Communication setting 21: Reserved 22: Reserved 23: Zero speed running 2 (also output when stopped) 24: Accumulated power-on time reached 25: Frequency level detection FDT2 output 26: Frequency 1 reached output 27: Frequency 2 reaches output 28: Current 1 reaches output 29: Current 2 reaches output 30: Timing reaches output 31: AI input exceeds limit 32: Load loss 33: Reverse operation 34: Zero current state	2	☆
F08.03～F08.05	Reserved		0	☆

		35: Module temperature reaches 36: Output current exceeds limit 37: Lower frequency reaches (output also during shutdown) 38: Warning output (all faults) 39: Motor overtemperature warning 40: This run time arrives 41: Fault output (free stop fault and no output for undervoltage) 42~44: Reserved		
F08.06	Reserved	0: Operating frequency 1: Set frequency 2: Output current (2 times the rated current of the motor) 3: Output torque (2 times the rated torque of the motor) 4: Output power (2 times the rated power) 5: Output voltage (1.2 times the rated voltage of the inverter) 6: Reserved 7: AI 8~11: Reserved 12: Communication setting 13: Motor speed 14: Output current (100.0% corresponds to 1000.0A 15: Output voltage (100.0% corresponds to 1000.0V 16: Output torque (actual torque value)	0	☆
F08.07	AO output function selection		0	☆
F08.08	Reserved		0	☆
F08.09	Reserved	—	0	☆
F08.10	AO zero bias coefficient	—100.0% ～ +100.0%	0.0%	☆
F08.11	AO gain	—10.00 ～ +10.00	1.00	☆
F08.12～ F08.17	Reserved	—	0	☆
F08.18	R output delay time	0.0s ～ 3600.0s	0.0s	☆
F08.19～ F08.21	Reserved	—	0	☆
F08.22	Switch output terminal valid state selection	0: Positive logic 1: Negative logic Ones: Reserved Tens: R Hundreds, thousands, and ten thousand: Reserved	0000	☆
F08.23	AO output signal selection	0: voltage signal 1: current signal	0	★
F09 Group PID Function				
Function code	**Name**	**Setting range**	**Factory value**	**Change**
F09.00	PID given source	0: F09.01 setting 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: Communication setting 6: Multi-segment command setting 7: Pressure setting (MPa, Kg)	0	☆
F09.01	PID value given	0.0% ～ 100.0%	50.0%	☆
F09.02	PID feedback source	0: AI 1~8: Reserved	0	☆
F09.03	PID action direction	0: Positive effect 1: Negative effect	0	☆
F09.04	PID given feedback range	0 ～ 65535	1000	☆
F09.05	Proportional gain Kp1	0.0 ～ 999.9	20.O	☆
F09.06	Integral time Ti1	0.01s ～ 10.00s	2.00s	☆
F09.07	Differential time Td1	0.000s ～ 10.000s	0.000s	☆

F09.08	PID reverse cutoff frequency	0.00 ～ Maximum frequency	2.00Hz	☆
F09.09	PID deviation limit	0.0% ～ 100.0%	0.0%	☆
F09.10	PID differential limit	0.00% ～ 100.00%	0.50%	☆
F09.11	PID given change time	0.00 ～ 650.00s	0.00s	☆
F09.12	PID feedback filter time	0.00 ～ 60.00s	0.00s	☆
F09.13	PID output filter time	0.0 ～ 600.0s	100.0s	☆
F09.14	Reserved	-	-	☆
F09.15	Proportional gain Kp2	0.0 ～ 999.9	20.0	☆
F09.16	Integral time Ti2	0.01s ～ 10.00s	2.00s	☆
F09.17	Differential time Td2	0.000s ～ 10.000s	0.000s	☆
F09.18	PID parameter switching conditions	0: No switching 1: Switching via X terminal 2: Automatic switching based on deviation 3~8: Reserved	0	☆
F09.19	PID parameter switching deviation 1	0.0% ～ F09.20	20.0%	☆
F09.20	PID parameter switching deviation 2	F09.19 ～ 100.0%	80.0%	☆
F09.21	PID initial value	0.0% ～ 100.0%	0.0%	☆
F09.22	PID initial value retention time	0.00 ～ 650.00s	0.00s	☆
F09.23～F09.24	Reserved	—	0	☆
F09.25	PID feedback upper limit loss detection value	0.0%: Not judging feedback loss 0.1% ～ 100.0%	0.0%	☆
F09.26	PID feedback lower limit loss detection value		0.0%	☆
F09.27	PID feedback loss detection time	0.0s ～ 20.0s	0.0s	☆
F09.28	PID shutdown operation	0: No operation during shutdown 1: Operation during shutdown	0	☆
F10 Group Multi-segment instructions, simple PLC				
Function code	**Name**	**Setting range**	**Factory value**	**Change**
F10.00	Multi-segment instructions 0	-100.0% ～ 100.0%	0.0%	☆
F10.01	Multi-segment instructions 1	-100.0% ～ 100.0%	0.0%	☆
F10.02	Multi-segment instructions 2	-100.0% ～ 100.0%	0.0%	☆
F10.03	Multi-segment instructions 3	-100.0% ～ 100.0%	0.0%	☆
F10.04	Multi-segment instructions 4	-100.0% ～ 100.0%	0.0%	☆
F10.05	Multi-segment instructions 5	-100.0% ～ 100.0%	0.0%	☆
F10.06	Multi-segment instructions 6	-100.0% ～ 100.0%	0.0%	☆
F10.07	Multi-segment instructions 7	-100.0% ～ 100.0%	0.0%	☆
F10.08	Multi-segment instructions 8	-100.0% ～ 100.0%	0.0%	☆
F10.09	Multi-segment instructions 9	-100.0% ～ 100.0%	0.0%	☆
F10.10	Multi-segment instructions 10	-100.0% ～ 100.0%	0.0%	☆
F10.11	Multi-segment instructions 11	-100.0% ～ 100.0%	0.0%	☆
F10.12	Multi-segment instruction 12	-100.0% ～ 100.0%	0.0%	☆
F10.13	Multi-segment instruction 13	-100.0% ～ 100.0%	0.0%	☆
F10.14	Multi-segment instruction 14	-100.0% ～ 100.0%	0.0%	☆
F10.15	Multi-segment instruction 15	-100.0% ～ 100.0%	0.0%	☆
F10.16	Simple PLC operation mode	0: Stop at the end of a single run 1: Keep the final value at the end of a single run 2: Keep looping	0	☆

F10.17	Simple PLC power-off memory selection	Units: Power-off memory selection 0: No memory after power-off 1: Memory after power-off Tens: Stop memory selection 0: No memory after stop 1: Memory after stop	OO	☆
F10.18	Simple PLC segment 0 running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.19	Simple PLC segment 0 acceleration and deceleration time selection	0 ～ 3	0	☆
F10.20	Simple PLC segment 1 running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.21	Simple PLC segment 1 acceleration and deceleration time selection	0 ～ 3	0	☆
F10.22	Simple PLC segment 2 running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.23	Simple PLC segment 2 acceleration and deceleration time selection	0 ～3	0	☆
F10.24	Simple PLC segment 3 running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.25	Simple PLC segment 3 acceleration and deceleration time selection	0 ～3	0	☆
F10.26	Simple PLC segment 4 running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.27	Simple PLC segment 4 acceleration and deceleration time selection	0 ～3	0	☆
F10.28	Simple PLC segment 5 running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.29	Simple PLC segment 5 acceleration and deceleration time selection	0 ～3	0	☆
F10.30	Simple PLC segment 6 running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.31	Simple PLC segment 6 acceleration and deceleration time selection	0～3	0	☆
F10.32	Simple PLC segment 7 running time	0.0s(h)～6500.0s(h)	0.0s(h)	☆
F10.33	Simple PLC segment 7 acceleration and deceleration time selection	0～3	0	☆
F10.34	Simple PLC segment 8 running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.35	Simple PLC segment 8 acceleration and deceleration time selection	0 ～3	0	☆
F10.36	Simple PLC 9th segment running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.37	Simple PLC 9th segment acceleration and deceleration time selection	0 ～3	0	☆
F10.38	Simple PLC 10th segment running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.39	Simple PLC 10th segment acceleration and deceleration time selection	0 ～3	0	☆
F10.40	Simple PLC 11th segment running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.41	Simple PLC 11th segment acceleration and deceleration	0 ～3	0	☆

	time selection			
F10.42	Simple PLC 12th segment running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.43	Simple PLC 12th segment acceleration and deceleration time selection	0 ～3	0	☆
F10.44	Simple PLC 13th segment running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.45	Simple PLC 13th segment acceleration and deceleration time selection	0 ～3	0	☆
F10.46	Simple PLC 14th segment running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.47	Simple PLC 14th segment acceleration and deceleration time selection	0 ～3	0	☆
F10.48	Simple PLC 15th segment running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
F10.49	Simple PLC 15th segment acceleration and deceleration time selection	0 ～3	0	☆
F10.50	Simple PLC running time unit	0: s（second） 1: h（hour）	0	☆
F10.51	Multi-segment instruction 0 setting method	0: Function code F10.00 given 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: PID 6: Preset frequency (F00.08) given, UP/DOWN can be modified	0	☆
F11 Group Reserved				
Group F12 Fault and Protection				
Function code	**Name**	**Setting range**	**Factory value**	**Change**
F12.00	Motor overload protection selection	0: Prohibited 1: Allowed	1	☆
F12.01	Motor overload protection gain	0.01 ～ 10.00	1.OO	☆
F12.02	Motor overload warning coefficient	50% ～ 100%	80%	☆
F12.03	Overvoltage stall gain	0 ～ 100	0	☆
F12.04	Overvoltage stall protection voltage	200.0～ 2000.0	760.0	☆
F12.05	Overcurrent stall gain	0 ～ 100	20	☆
F12.06	Overcurrent stall protection current	100% ～ 200%	150%	☆
F12.07	Reserved	—	0	☆
F12.08	Brake start voltage	200.0～ 2000.0V	690.0V	☆
F12.09	Fault automatic reset times	0 ～ 200	0	☆
F12.10	Fault automatic reset period	0: No action 1: Action	1	☆
F12.11	Terminal output action selection	0.1s ～ 100.0s	6.0s	☆
F12.12	Fault automatic reset interval time	0: Prohibited (inverter power <=11kW) 1: Permitted (inverter power > 11kW)	Model Determination	☆
F12.13	Input phase loss protection selection	0: Prohibited 1: Allowed	1	☆

F12.14	First fault type	0: No fault 1: Reserved 2: Acceleration overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Acceleration overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer resistor overload 9: Undervoltage 10: Inverter overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: Module overheating 15: External fault 16: Communication abnormality 17: Reserved 18: Current detection abnormality 19: Motor tuning abnormality 20: Reserved 21: Parameter read and write abnormality 22: Inverter hardware abnormality 23: Reserved 24: Reserved 25: Reserved 26: Running time reached 27: Reserved 28: Reserved 29: Power-on time reached 30: Load loss 31: PID feedback lost during operation 40: Fast current limit timeout 41: Switch motor during operation 42: Speed deviation is too large 43: Motor overspeed 45: Motor overtemperature 51: Initial position error	—	●
F12.15	Second fault type		—	●
F12.16	Third (the latest) fault type		—	●
F12.17	Frequency at the third (most recent) fault	—	—	●
F12.18	Current at the third (most recent) fault	—	—	●
F12.19	Bus voltage at the third (most recent) fault	—	—	●
F12.20	Input terminal status at the third (most recent) fault	—	—	●
F12.21	Output terminal status at the third (most recent) fault	—	—	●
F12.22	Inverter status at the third (most recent) fault	—	—	●
F12.23	Power-on time at the third (most recent) fault	—	—	●
F12.24	Running time at the third (most recent) fault	—	—	●
F12.27	Frequency at the second fault	—	—	●
F12.28	Current at the second fault	—	—	●
F12.29	Bus voltage at the second fault	—	—	●
F12.30	Input terminals at the second fault	—	—	●
F12.31	Output terminals at the second fault	—	—	●
F12.32	Inverter status at the second fault	—	—	●

F12.33	Power-on time at the second fault	—	—	●
F12.34	Running time at the second fault	—	—	●
F12.35	Inverter overload protection gain	0.01 ～ 10.00	1.00	☆
F12.36	Undervoltage fault reset time during operation	0.0s ～ 6553.s	0.0s	☆
F12.37	Frequency at the first fault	—	—	●
F12.38	Current at the first fault	—	—	●
F12.39	Bus voltage at first fault	—	—	●
F12.40	Input terminals at first fault	—	—	●
F12.41	Output terminal status at first fault	—	—	●
F12.42	Inverter status at first fault	—	—	●
F12.43	Power-on time at first fault	—	—	●
F12.44	Running time at first fault	—	—	●
F12.45	Screen "E-08" selection	0: Invalid 1: Valid	0	☆
F12.46	Power failure restart setting	Units: Power-off restart selection 0: Invalid 1: Valid Tens: Undervoltage restart selection 0: Invalid 1: Valid Hundreds: Reserved Thousands: Reserved Tens: Reserved	00	☆
F12.47	Fault protection action selection 1	Units: Motor overload (11) 0: Free stop 1: Stop according to the stop method 2: Continue to run Tens: Input phase loss (12) Hundreds: Output phase loss (13) Thousands: External fault (15) Ten thousand: Communication abnormality (16)	OOOOO	☆
F12.48	Fault protection action selection 2	Units: Reserved 0: Free stop Tens: Function code read/write error (21) 0: Free stop 1: Stop according to stop mode Hundreds: Reserved Thousands: Motor overheat (25) Ten thousand: Running time reached (26)	OOOOO	☆
F12.49	Fault protection action selection 3	Units: User-defined fault 1 (27) 0: Free stop 1: Stop according to the stop mode 2: Continue to run Tens: User-defined fault 2 (28) 0: Free stop 1: Stop according to the stop mode 2: Continue to run Hundreds: Power-on time reached (29) 0: Free stop 1: Stop according to the stop mode 2: Continue to run Thousands: Load loss (30) 0: Free stop 1: Deceleration stop 2: Directly jump to 7% of the rated frequency of the motor and continue to run, Automatically restore to the set frequency when there is no load loss Ten thousandths: PID feedback loss during operation (31) 0: Free stop	OOOOO	☆

		1: Stop according to the stop mode 2: Continue to run		
F12.50	Fault protection action selection 4	Units: Speed deviation is too large (42) 0: Free stop 1: Stop according to the stop method 2: Continue to run Tens, hundreds, thousands, and ten thousand: Reserved	OOOOO	☆
F12.54	Fault-time continuous operation frequency selection	0: Run at the current operating frequency 1: Run at the set frequency 2: Run at the upper limit frequency 3: Run at the lower limit frequency 4: Run at the abnormal standby frequency	0	☆
F12.55	Abnormal backup frequency	0.0% ～ 100.0% (100.0% corresponds to the maximum frequency F00.10)	100.0%	☆
F12.56～ F12.58	Reserved	-	0	☆
F12.59	Momentary power failure action selection	0: Invalid 1: Deceleration 2: Deceleration stop	0	☆
F12.60	Momentary power failure action pause judgment voltage	80.0% ～ 100.0%	85.0%	☆
F12.61	Momentary power failure voltage recovery judgment time	0.00s ～ 100.00s	0.50s	☆
F12.62	Momentary power failure action judgment voltage	60.0% ～ 100.0%(Standard bus voltage)	80.0%	☆
F12.63	Load drop protection selection	0: Invalid 1: Valid	0	☆
F12.64	Load drop detection level	0.0 ～ 100.0%	10.0%	☆
F12.65	Load drop detection time	0.0 ～ 60.0s	1.0s	☆
F12.66	Reserved	—	0	☆
F12.67	Reserved	—	0	☆
F12.68	SVC speed deviation too large detection value	0.0%～ 50.0% (Maximum frequency)	20.0%	☆
F12.69	SVC speed deviation too large detection time	0.0s: No detection 0.1 ～ 60.0s	0.0s	☆
F12.70	Momentary stop and non-stop gain Kp	0 ～ 100	40	☆
F12.71	Momentary stop and non-stop integral coefficient Ki	0 ～ 100	30	☆
F12.72	Momentary stop and non-stop action deceleration time	0.0 ～ 300.0s	20.0s	☆
F12.73	Carrier automatic adjustment selection	Units: Automatic adjustment of overload carrier 0: Disable 1: Valid Tens: Automatic adjustment of carrier at start-up 0: Disable 1: Valid Hundreds, thousands, and ten thousand: Reserved	11	☆
F13 Group Communication Parameters				
Function code	**Name**	**Setting range**	**Factory value**	**Change**

F13.00	MODBUS communication baud rate	0～1: reserved 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS	6	☆
F13.01	MODBUS data format	0: No parity (8-N-2) 1: Even parity (8-E-1) 2: Odd parity (8-O-1) 3: No parity (8-N-1)	1	☆
F13.02	Local address	1 ～ 247	1	☆
F13.03	MODBUS response delay	0 ～ 20ms	2	☆
F13.04	RS485 communication timeout	0.0: Invalid 0.1 ～ 60.0s	0.0s	☆
F13.05	MODBU protocol selection	0: Non-standard MODBUS protocol 1: Standard MODBUS protocol	1	☆
F13.06	RS485 communication current reading resolution	0: 0.01A 1: 0.1A	0	☆
F13.07	RS485 communication protocol selection	0: CD20 protocol 1: CD21 protocol 2 to 10: Reserved	0	☆
F13.08	RS485 communication timeout detection selection	0: Valid throughout the process 1: Invalid during shutdown	0	☆
F13.09	Proportional linkage coefficient	0.01～10.00	1.00	☆
F14 Group Keyboard and Display				
Function code	**Name**	**Setting range**	**Factory value**	**Change**
F14.00	Reserved	—	0	★
F14.01	STOP/RESET key function	0: The STOP/RES key stop function is valid only in keyboard operation mode 1: The STOP/RES key stop function is valid in any operation mode	1	☆
F14.02	LED operation main display parameters 1	0000~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: Reserved Bit11: Pressure feedback (MPa, Kg) Bit12: Reserved Bit13: Reserved Bit14: Load speed display Bit15: PID setting	1F	☆

F14.03	LED operation main display parameters 2	0000~FFFF Bit00: PID feedback Bit01: PLC stage Bit02: Reserved Bit03: Operating frequency 2 (Hz) Bit04: Remaining running time Bit05: Voltage before AI correction (V) Bit06: Reserved Bit07: Pressure setting (MPa, Kg) Bit08: Line speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: Reserved Bit12: Communication setting value Bit13: Reserved Bit14: Main frequency A display (Hz) Bit15: Auxiliary frequency B display (Hz)	0	☆
F14.04	LED shutdown main display parameters	0000~FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: Terminal input status Bit03: Terminal output status Bit04: AI voltage (V) Bit05: Reserved Bit06: Panel potentiometer voltage (V) Bit07: Reserved Bit08: Reserved Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: Reserved Bit13: Pressure feedback (MPa, Kg) Bit14: Input voltage (V) Bit15: Operating frequency 1 (Hz)	33	☆
F14.05	LED operation auxiliary display parameters	0 ～ 80	4	☆
F14.06	LED shutdown auxiliary display parameters	0 ～ 80	38	☆
F14.07	Load speed display coefficient	0.0001 ～ 6.5000	1.0000	☆
F14.08	Inverter module heat sink temperature	0℃～ 100℃	-	●
F14.09	Cumulative operation time	0h ～ 65535h	-	●
F14.10	Number of decimal places for speed display	LED units: load speed (d00.14) display coefficient 0: 0 decimal places 1: 1 decimal places 2: 2 decimal places 3: 3 decimal places LED tens: feedback speed (d00.19) display coefficient 1: 1 decimal places 2: 2 decimal places	21	☆
F14.11	Cumulative power-on time	0~65535 hours	-	●
F14.12	Cumulative power consumption	0~65535 degrees	-	●
F14.13	Hardware version number	-	-	●
F14.14	Software version number	-	-	●
F14.15	Software batch number	-	4.0706	●
F15 Group: Function Code Management				
Function Code	**Name**		**Factory Default**	**Change**
F15.00	User password	0 ～ 65535	0	☆

F15.01	Parameter initialization	0: No operation 1: Restore all user parameters except motor parameters to factory settings 2: Restore all user parameters to factory settings 3: Clear record information	0	★
F15.02	Function code modification attributes	0: editable 1: uneditable	0	☆
F15.03	Reserved	—	0	●
F15.04	Reserved	—	0	●
Group F16 Water Supply Parameters				
Function Code	**Name**		**Factory Default**	**Change**
F16.00～F16.04	Reserved	—	0	☆
F16.05	Water pump sleep waiting time	0.0～3600.0s	2.0	☆
F16.06	Water pump wake-up waiting time	0.0～3600.0s	1.0	☆
F16.07	Water pump wake-up pressure point	(0.0～100.0%)*（F16.08）	80.0%	☆
F16.08	Preset pressure	0.00～F16.09（MPa、Kg）	5.00	☆
F16.09	Sensor range	0.00～100.00（MPa、Kg）	10.00	☆
F16.10	Solar panel maximum power node	0.0%～100.0%	81.0	☆
F16.11	VF speed adjustment coefficient	0.000～2.000	1.000	☆
F16.12	MPPT high point working voltage	（F16.13）～200.0%	100.0%	☆
F16.13	MPPT low point working voltage	0.0% ～（F16.12）	75.0%	☆
F16.14	MPPT high point voltage frequency point	0.00Hz～maximum frequency (F00.10)	50.00	☆
F16.15	MPPT low point voltage frequency point	0.00Hz～maximum frequency (F00.10)	0.00	☆
F16.16	MPPT low voltage protection point	40.0%～100.0%	45.0%	☆
F16.17	Water shortage detection starting frequency	0.00Hz～maximum frequency (F00.10)	10.00	☆
F16.18	PV water pump water shortage detection current corresponding to no-load current ratio	0.0%～300.0%*no-load current (F03.10)	0.0	☆
F16.19	PV water pump water shortage detection time	0～6000.0s	0.0	☆
F16.20	PV undervoltage self-start delay	0.1～6000.0s (0.0 value closes and starts automatically)	2.0	☆
F16.21	PV water shortage self-start delay	0.1～6000.0s (0.0 value closes and starts automatically)	15.0	☆
F16.22	Power search time	0.050～60.000	0.500	☆
F16.23	Power search gain	10～500	125	☆
F16.24	Power search speed gain	1～1000	100	☆
F16.25	Pre-search frequency increase time	0.01～600.00s	15.00	☆
F16.26	Pre-search frequency reduction time	0.01～600.00s	15.00	☆
F16.27	Water pump sleep frequency	0.00～Upper frequency limit (F00.12)	20.00	☆
F17 Group Control Optimization Parameters				
Function Code	**Name**		**Factory Default**	**Change**

F17.00	DPWM switching upper limit frequency	0.00Hz ～Maximum frequency (F00.10)	8.00Hz	☆
F17.01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
F17.02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode	1	☆
F17.03	Random PWM depth	0: Random PWM invalid 1~10: PWM carrier frequency random depth	0	☆
F17.04	Current limiting enable by wave	0: Disable 1: Enable	1	☆
F17.05	Voltage overmodulation coefficient	100～ 110	105	☆
F17.06	Undervoltage point setting	200.0V ～ 2000.0V	350.0V	☆
F17.07	Reserved	—	0	☆
F17.08	Overvoltage point setting	200.0V ～ 2200.0V	Model confirmation	★
F17.09～ F17.10	Reserved	—	0	☆

F18 Group Reserved

FFF Group Factory Parameters

Function Code	Name		Factory Default	Change
FFF.00	Manufacturer password	0 ～65535	0	★

Group d00: Basic monitoring parameters

Function Code	Name	Factory Default	Change
d00.00	Operating frequency (Hz)	0.01Hz	7000H
d00.01	Set frequency (Hz)	0.01Hz	7001H
d00.02	Bus voltage (V)	0.1V	7002H
d00.03	Output voltage (V)	1V	7003H
d00.04	Output current (A)	0.01A	7004H
d00.05	Output power (kW)	0.1kW	7005H
d00.06	Output torque (%)	0.10%	7006H
d00.07	Terminal input status	1	7007H
d00.08	Terminal output status	1	7008H
d00.09	AI voltage (V)/current (mA)	0.01V/0.01 mA	7009H
d00.10	Reserved	0.01V	700AH
d00.11	Pressure feedback (MPa, Kg)	0.00	700BH
d00.12	Reserved	0	700CH
d00.13	Reserved	0	700CH
d00.14	Load speed display	1	700EH
d00.15	PID setting	1	700FH
d00.16	PID feedback	1	7010H
d00.17	PLC stage	1	7011H
d00.18	Reserved	0	7012H
d00.19	Feedback speed (Hz)	0.01Hz	7013H
d00.20	Remaining running time	0.1Min	7014H
d00.21	AI voltage (V)/current (mA) before correction	0.001V/0.01 mA	7015H
d00.22	Reserved	0	7016H
d00.23	Pressure setting (MPa, Kg)	0.00	7017H
d00.24	Line speed	1m/Min	7018H

d00.25	Current power-on time	1Min	7019H
d00.26	Current running time	0.1Min	701AH
d00.27	Reserved	0	701BH
d00.28	Communication setting value	0.01%	701CH
d00.29	Reserved	0	701CH
d00.30	Main frequency A display	0.01Hz	701FH
d00.31	Auxiliary frequency B display	0.01Hz	701FH
d00.32	Reserved	0	7020H
d00.33	Reserved	0	7021H
d00.34	Motor temperature value	1℃	7022H
d00.35	Target torque (%)	O.1%	7023H
d00.36	Reserved	0	7024H
d00.37	Power factor angle	0.1°	7025H
d00.38	Input voltage (V)	0.0V	7026H
d00.39	VF separation target voltage	1V	7027H
d00.40	VF separation output voltage	1V	7028H
d00.41	Input terminal status visual display	1	7029H
d00.42	Output terminal status visual display	1	702AH
d00.43	Input terminal function status visual display 1 (Function 01-Function 40)	1	702BH
d00.44	Input terminal function status visual display 2 (Function 41-Function 80)	1	702CH
d00.45	Fault information	1	702DH
d00.58	Reserved	0	703AH
d00.59	Set frequency (%)	0.01%	703BH
d00.60	Operating frequency (%)	0.01%	703CH
d00.61	Inverter status	1	703DH
d00.62	Current fault code	1	703EH
d00.63	Reserved	0.00%	703FH
d00.64	Reserved	0.01%	7040H
d00.65	Torque upper limit	0.10%	7041H
d00.66～ d00.78	Reserved	-	-
d00.79	Set temperature	1℃	704FH

Chapter 7 Function Parameter Description

F00 Group - Basic Function Group

F00.00	Function Macro	
	0～100	0

F00.01	Control mode	
	0～1	0

0: General mode
1~5: Reserved
6: Single pump water supply (1 variable frequency pump) mode
7: Photovoltaic water supply voltage tracking mode
8: Photovoltaic water supply power tracking VF mode
9: Photovoltaic water supply power tracking SVC mode
10~100: Reserved
Note: Initialize the parameters first, then set the macro function.

0: V/F control is the control method selected when a single inverter is required to drive more than one motor, when the motor parameter self-learning cannot be performed correctly or the controlled motor parameters cannot be obtained through other means. This control method is the most commonly used motor control method and can be used in any occasion where the motor control performance is not required to be high.
1: Speed sensorless vector control (motor parameter sensitive method)
The true current vector control method, in addition to the high torque output performance of the flux control method, also has a flexible torque output effect, which can be said to be both rigid and flexible. However, this control method is sensitive to motor parameters. It is best to enable dynamic self-learning of motor parameters before using it, otherwise the effect will be poor.

F00.02	Run command channel selection	
	0～2	0

This function code selects the physical channel through which the inverter receives operation commands such as run and stop.
0: Operation panel operation command channel
The operation is controlled by the RUN , STOP/RESET ,
1: Terminal operation command channel.
The operation is controlled by the multifunctional terminals defined as FWD, REV, FJOG, RJOG, etc
2: Communication operation command channel.
The operation is controlled by the host computer through communication.

⚠**Note:**
Even during operation, the operation command channel can be changed by modifying the setting value of this function code. Please set it with caution!

F00.03	Main frequency source A	
	0～11	4

0: Digital setting (no memory after power failure)
The initial value of the set frequency is the value of F00.08 "preset frequency". The set frequency value

of the inverter can be changed by the ÿ and ÿ keys on the keyboard (or the UP and DOWN keys of the multi-function input terminal). When the inverter is powered off and then powered on again, the set frequency value is restored to F00.08 "Digital setting preset frequency" value.

1: Digital setting (power-off memory)

The initial value of the set frequency is the value of F00.08 "preset frequency". You can use the ÿ, ÿ keys on the keyboard (or the multi-function input terminal UP, DOWN) to change the set frequency value of the inverter.

When the inverter is powered off and then powered on again, the set frequency is the set frequency at the last power-off time. The correction amount of the UP and DOWN terminals is memorized.

It should be noted that F00.23 is "Digital setting frequency stop memory selection". F00.23 is used to select whether the frequency correction value is memorized or cleared when the inverter stops. F00.23 is related to shut down, not power-off memory. Please pay attention to it in application.

2: AI analog setting (0ÿ10V/20mA)

AI can be 0V~10V voltage input or 4mA~20mA current input, which is selected by the J5 jumper on the control board.

3: Reserved

4: Panel potentiometer Setting

5: Reserved

6: Multi-segment instruction

When selecting the multi-segment instruction operation mode, different state combinations of the digital input X terminal are required to correspond to different set frequency values.

4multi-segment instruction terminals (terminal functions 12~15) can be set. The 16 states of the 4 terminals can correspond to any 16 "multi-segment instructions" through the F10 group function code. The "multi-segment instruction" is the percentage of the maximum frequency F00.10. When the digital input X terminal is used as the multi-segment instruction terminal function, it is necessary to make corresponding settings in the F07 group. For details, please refer to the description of the relevant function parameters of the F07 group.

7: Simple PLC frequency source When the simple PLC is used, the inverter's operating frequency source can be switched between 1 to 16 arbitrary frequency commands. The retention time and respective acceleration and deceleration time of 1 to 16 frequency commands can also be set by the user. For details, refer to the relevant instructions of Group

8: PID

Select the output of process PID control as the operating frequency. It is generally used for on-site process closed-loop control, such as constant pressure closed-loop control, constant tension closed-loop control, etc. When using PID as the frequency source, it is necessary to set the relevant parameters of F09 group "PID function".

9: Communication setting

Change the set frequency through the serial port frequency setting command, see F13 group communication parameters for details.

10: Multi-pump instruction

F00.00 is 6 and is valid for constant pressure water supply.

MPPT setting (photovoltaic water pump)

F00.04	Auxiliary frequency source B	
	0～11 (same as main frequency channel selection)	0

0: Digital setting (no memory after power failure)

1: Digital setting (memory after power failure)

2: AI analog setting (0~10V/20mA)

3: Reserved

4: Panel potentiometer setting

5: Reserved

6: Multi-segment command

7: Simple PLC
8: PID 9: Communication setting
10: Multi-pump instruction
11: Reserve

F00.05	Range selection auxiliary frequency source B when superimposing.	
	0～1	0

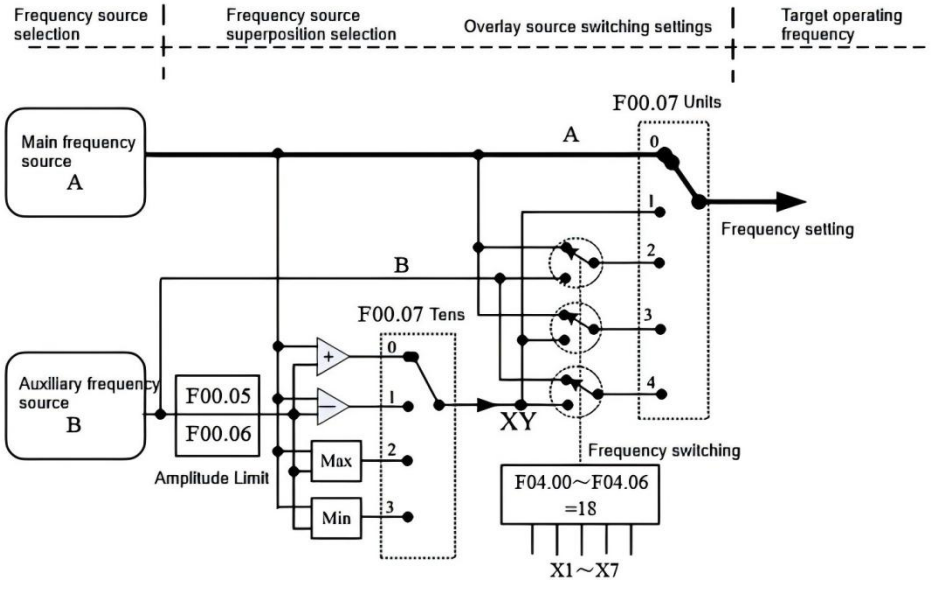
0: relative to the maximum frequency
1: Relative to frequency source A

F00.06	Auxiliary frequency source B range when superimposed	
	0% ～ 150%	100%

When the frequency source is selected as "frequency superposition" (i.e. F00.07 is set to 1, 3 or 4), these two parameters are used to determine the adjustment range of the auxiliary frequency source. F00.05 is used to determine the object corresponding to the auxiliary frequency source range. It can be selected relative to the maximum frequency or relative to the main frequency source A. If it is selected relative to the main frequency source, the range of the auxiliary frequency source will change with the change of the main frequency A.

F00.07	Frequency source B superposition selection	
	00～34	00

Units: Frequency source selection
0: Main frequency source A
1: Main and auxiliary operation results (operation relationship is determined by the tens digit)
2: Switch between main frequency source A and auxiliary frequency source B
3: Switch between main frequency source A and main and auxiliary operation results
4: Switch between auxiliary frequency source B and main and auxiliary operation results
Tens: Main and auxiliary operation relationship of frequency source
0: Main + auxiliary
1: Main - auxiliary
2: Maximum of the two
3: Minimum of the two Use this parameter to select the frequency setting channel. Frequency setting is achieved through the combination of main frequency source A and auxiliary frequency source B.



When the frequency source is selected as the main and auxiliary operation, the bias frequency can be

set by F00.21, and the bias frequency is superimposed on the main and auxiliary operation results.

F00.08	Preset frequency	
	0.00Hz～maximum frequency （F00.10）	50.00Hz

To flexibly respond to various needs

When the frequency source is selected as "digital setting" or "terminal UP/DOWN", the function code value is the frequency digital setting of the inverter.

F00.09	Running direction	
	0～1	0

0: Same direction
1: Opposite direction

By changing this function code, the purpose of changing the motor direction can be achieved without changing the motor wiring. Its function is equivalent to adjusting the motor (U,V, W) to achieve the conversion of the motor's rotation direction.

Tip: After the parameters are initialized, the motor's running direction will return to its original state. For the field where the motor's rotation direction is strictly prohibited after the system is debugged use with caution.

F00.10	Maximum frequency	
	50.00Hz ～ 500.00Hz	50.00

When analog input, multi-segment instructions, etc. are used as frequency sources, their respective 100.0% are calibrated relative to F00.10. The maximum output frequency can reach 5000.0Hz. In order to take into account both the frequency instruction resolution and the frequency input range, the number of decimal places of the frequency instruction can be selected through F00.22. When F00.22 is selected as 1, the frequency resolution is 0.1Hz, and the setting range of F00.10 is 50.0Hz~5000.0Hz; when F00.22 is selected as 2, the frequency resolution is 0.01Hz, and the setting range of F00.10 is 50.00Hz~500.00Hz.

Note: Modifying F00.22 will change the frequency resolution of all frequency-related function parameters.

F00.11	Upper limit frequency source	
	0～5	0

0: F00.12 setting
1: AI
2: Reserved
3: Panel potentiometer
4: Reserved
5: Communication setting

Define the source of the upper frequency limit. The upper frequency limit can come from digital setting (F00.12), or from analog input and communication setting. When using analog AI and communication setting, it is similar to the main frequency source, see F00.03 introduction. For example, when the torque control method is used in the winding control site, in order to avoid the "flying car" phenomenon caused by material breakage, the upper frequency limit can be set by analog. When the inverter runs to the upper frequency limit value, the inverter keeps running at the upper frequency limit.

F00.12	Upper limit frequency	
	Lower limit frequency F00.14~Maximum frequency F00.10	50.00

Set the upper limit frequency, the setting range is F00.14~F00.10.

F00.13	Upper frequency offset	
	0.00Hz~Maximum frequency F00.10	0.00

When the upper limit frequency source is set to analog, F00.13 is used as the offset of the set value, and the offset frequency is superimposed on the upper limit frequency value set by F00.11 as the final upper limit frequency setting value.

F00.14	Lower frequency	
	0.00Hz~upper limit frequency F00.12	0.00

When the upper limit frequency source is set to analog, F00.13 is used as the offset of the set value, and the offset frequency is superimposed on the upper limit frequency value set by F00.11 as the final upper limit frequency setting value.

F00.15	Carrier frequency	
	0.5～16.0KHz	Model settings

This function code is used to set the carrier frequency of the inverter output PWM wave. The carrier frequency will affect the noise of the motor during operation. For occasions where silent operation is required, the carrier frequency can be appropriately increased to meet the requirements. However, increasing the carrier frequency will increase the heat generated by the inverter and increase the electromagnetic interference to the outside world.

When the carrier frequency exceeds the factory setting value, the inverter needs to be derated. Generally, for every 1KHz increase in the carrier, the inverter current needs to be derated by about 5%.

F00.16	Carrier frequency adjusts with temperature	
	0～1	0

0: No
1: Yes
The carrier frequency is adjusted with the temperature. When the inverter detects that the temperature of its own heat sink is high, it automatically reduces the carrier frequency to reduce the temperature rise of the inverter. When the temperature of the heat sink is low, the carrier frequency gradually returns to the set value.

F00.17	Acceleration time 1	
	0.00s ～ 650.00s(F00.19=2) 0.0s ～ 6500.0s(F00.19=1) 0s ～ 65000s(F00.19=0)	Model settings
F00.18	Deceleration time 1	
	0.00s ～ 650.00s(F00.19=2) 0.0s ～ 6500.0s(F00.19=1) 0s ～ 65000s(F00.19=0)	Model settings

Acceleration time refers to the time required for the inverter to accelerate from zero frequency to the acceleration/deceleration reference frequency (determined by F00.25), see t1 in Figure F00-1.

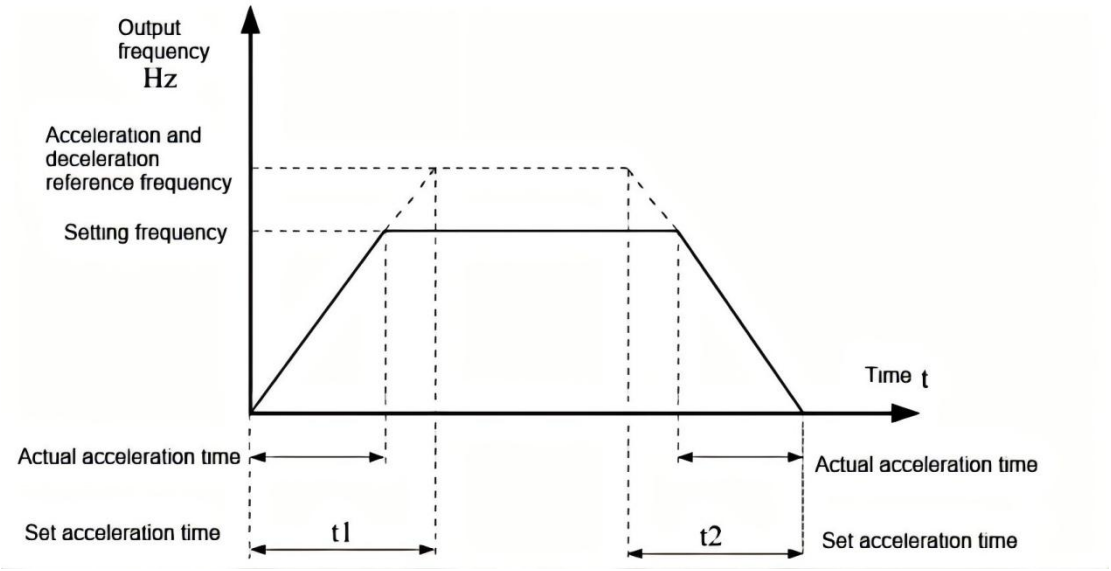


Figure F00-1 Schematic diagram of acceleration time and deceleration time

F00.19	Acceleration and deceleration time unit	
	0～2	1

0: 1 second
1: 0.1 second
2: 0.01 second
When modifying this function parameter, the number of decimal places displayed for the 4 groups of acceleration and deceleration time will change, and the corresponding acceleration and deceleration time will also change. Special attention should be paid to the application

F00.20	Reserved	
	Reserved	0
F00.21	Auxiliary frequency source bias frequency	
	0.00Hz~maximum frequency F00.10	0.00

When superimposed this function code is only valid when the frequency source is selected as the main and auxiliary operation. When the frequency source is the main and auxiliary operation, F00.21 is used as the bias frequency, and is superimposed with the main and auxiliary operation results as the final frequency setting value, making the frequency setting more flexible.

F00.22	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 0.1Hz, the maximum output frequency It can reach 5000.0Hz, and when the frequency resolution is 0.01Hz, the maximum output frequency is 500.00Hz.

F00.23	Digital setting frequency stop memory selection	
	0～1	0

0: No memory
1: Memory
This function is only valid when the frequency source is digital setting. "No memory" means that after the

inverter stops, the digital setting frequency value will be restored to the value of F00.08 (preset frequency) is reset to zero by pressing the ÿ and ÿ keys on the keyboard or the UP and DOWN keys on the terminals. "Memory" means that after the inverter stops, the digital setting frequency is retained as the setting frequency at the last stop down the frequency correction performed remains valid.

F00.24	Reserved	
	Reserved	0
F00.25	The reference frequency of the acceleration and deceleration time	
	0～2	0

0: Maximum frequency (F00.10)
1: Set frequency
2: 100Hz
Acceleration and deceleration time refers to the acceleration and deceleration time from zero frequency to the frequency set by F0-25. Figure F00-1 is a schematic diagram of acceleration and deceleration time. When F00.25 is selected as 1, the acceleration and deceleration time is related to the set frequency. If the set frequency changes frequently, the acceleration of the motor will change. Please pay attention to it when applying.

F00.26	Frequency command UP/DOWN during operation base	
	0～1	0

0: Running frequency
1: Setting frequency

F00.27	Command source bundled with frequency source	
	0000～9999	0

This parameter is valid only when the frequency source is digital setting. It is used to determine the method to correct the setting frequency when the ▲ and ▼ keys on the keyboard or the UP/DOWN terminal are in action, that is, whether the target frequency is increased or decreased based on the running frequency or the setting frequency.
The difference between the two settings is obvious when the inverter is in the acceleration and deceleration process, that is, if the running frequency of the inverter is different from the setting frequency, the inverter will be automatically set to the default setting.

At the same time, different choices of this parameter vary greatly.

Bits: Operation panel command binding frequency source Selection
0: No binding
1: Digital set frequency
2: AI
3: Reserved
4: Panel potentiometer
5: Reserved
6: Multi-segment speed
7: Simple PLC
8: PID
9: Communication given
Ten bits: terminal command binding frequency source selection (0～9, the same bit)
Hundred bits: communication command binding frequency source selection (0～9, the same bit)

Thousand bits: Automatic operation binding frequency source selection (0～9, same bit)Define the bundled combination between three operation command channels and nine frequency given channels to

facilitate synchronous switching. The meaning of the above frequency given channels is the same as that of the main frequency source A selection F00.03, please refer to the description of the F00.03 function code. Different operation command channels can be bundled with the same frequency given channel. When the command source has a bundled frequency source, the frequency source set by F00.03~F00.07 will no longer work during the validity period of the command source

F00.28	Serial communication protocol selection	
	0～1	0

0: Modbus protocol
1: Reserved

F01Group - Start-Stop Control

F01.00	Starting Mode	
	0～3	0

0: Direct start
If the start DC braking time is set to 0, the frequency converter runs from the start frequency. If the start DC braking time is not set to 0, the DC braking is done first, and then the inverter starts running from the start frequency. Applicable to small inertia loads, where the motor may rotate during startup.

1: Speed tracking and then start
The frequency converter first judges the speed and direction of the motor, and then starts the motor at the tracked motor frequency, and implements smooth and shock-free starting for the rotating motor. It is suitable for instantaneous power failure and restart of large inertia load. In order to ensure the performance of speed tracking restart, it is necessary to accurately set the parameters of motor F03 group.

2: Pre-excitation start for asynchronous motors
Only valid for asynchronous motors, used to establish the magnetic field before running the motor. For pre-excitation current and pre-excitation time, please refer to function codes F01.05 and F01.06. If the pre-excitation time is set to 0, the frequency converter cancels the pre-excitation process and starts from the start frequency. If the pre-excitation time is not 0, the inverter will be pre-excited before starting, which can improve the dynamic response performance of the motor.

3: Super-fast start

F01.01	Rotation speed tracking method	
	0～2	0

Valid only in vector mode.

0: Starting from the blackout frequency
Tracking downward from the frequency at the time of power failure is usually selected.
1: From zero frequency
Tracks upwards from the 0 frequency, used in the case of a long power failure and restart.
2: From maximum frequency
Tracking down from the maximum frequency, generally used for generating loads.

F01.02	RPM tracking fast and slow	
	1 ～ 100	20

When RPM tracking is restarted, select how fast or slow the RPM tracking will be. The larger the parameter, the faster the tracking speed. However, setting the parameter too large may cause unreliable

tracking results.

F01.03	Start-up frequency	
	0.00Hz ～ 10.00Hz	0.00Hz
F01.04	Starting frequency hold time	
	0.0s ～ 100.0s	0.0s

To ensure the motor torque at startup, please set a suitable starting frequency. To fully establish the magnetic flux when the motor starts, the starting frequency needs to be maintained for a certain time. The starting frequency F01.03 is not limited by the lower limit frequency. However, when the target frequency is set to be lower than the starting frequency, the inverter does not start and is in standby mode. During the forward and reverse switching process, the starting frequency holding time does not work. The starting frequency holding time is not included in the acceleration time, but is included in the running time of the simple PLC.

F01.05	Starting DC braking current/ pre-excitation current	
	0% ～ 100%	50%
F01.06	Starting DC braking time/ pre-excitation time	
	0.0s ～ 100.0s	0.0s

Starting DC braking is generally used to bring a running motor to a stop before starting it. Pre-excitation is used to establish the magnetic field of the asynchronous motor before starting to improve the response speed. Starting DC braking is only effective when the starting mode is direct starting. At this time, the frequency converter first performs DC braking according to the set start DC braking current, and then starts operation after the start DC braking time. If the set DC braking time is 0, then it will start directly without DC braking. The higher the DC braking current, the higher the braking force. If the start mode is asynchronous machine pre-excitation start, the frequency converter will first pre-excite the magnetic field according to the set pre-excitation current, and then start running after the set pre-excitation time. If the set pre-excitation time is 0, the inverter will start directly without pre-excitation.

Starting DC braking current/pre-excitation current, relative to the base value there are two cases:
1: When the motor rated current is less than or equal to 80% of the inverter rated current, it is relative to the motor rated current as a percentage of the base value.
2: When the motor rated current is greater than 80% of the inverter rated current, it is relative to 80% of the inverter rated current as a percentage base value.

F01.07	Acceleration and deceleration mode	
	0～ 2	0

0: Linear acceleration/deceleration
The output frequency increases or decreases in a straight line. 4 types of acceleration and deceleration times can be selected from the multi-function digital input terminals (F07.00 to F07.06).

1: S-curve acceleration/deceleration A
The output frequency increases or decreases in accordance with the S-curve, which is used in applications requiring gentle starting or stopping, such as elevators and conveyor belts. Function codes F01.08 and F01.09 define the time ratio of the start and end of the S-curve acceleration and deceleration respectively.

2: S-curve acceleration/deceleration B
In this S-curve acceleration/deceleration B, the rated frequency of the motor is always the inflection point of the S-curve. This is shown in Figure F01-1. This is generally used when rapid acceleration or deceleration is required in high-speed areas above the rated frequency.

When the set frequency is above the rated frequency, the acceleration and deceleration time is:

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

where f is the set frequency, fb is the rated frequency of the motor, and T is the time to accelerate from the 0 frequency to the rated frequency fb.

Where, is the set frequency, is the rated frequency of the motor, and is the time to accelerate from 0 to the rated frequency.

F01.08	Proportion of time at the beginning of the S-curve	
	0.0% ～ (100.0%-F01.09)	30.0%
F01.09	Proportion of time at the end of the S-curve	
	0.0% ～ (100.0%-F01.08)	30.0%

Function codes F01.08 and F01.09 define, respectively, the proportion of time between the beginning and the end of the S-curve acceleration and deceleration A. The two function codes must satisfy: F01.08 + F01.09 ≤ 100.0%. In Fig. F01-1, t1 is the parameter defined by F01.08, during which the slope of the output frequency change gradually increases. t2 is the time defined by F01.09, during which the slope of the output frequency change gradually changes to 0. In the time between t1 and t2, the slope of the output frequency change is fixed, i.e., linear acceleration and deceleration is performed in this interval.

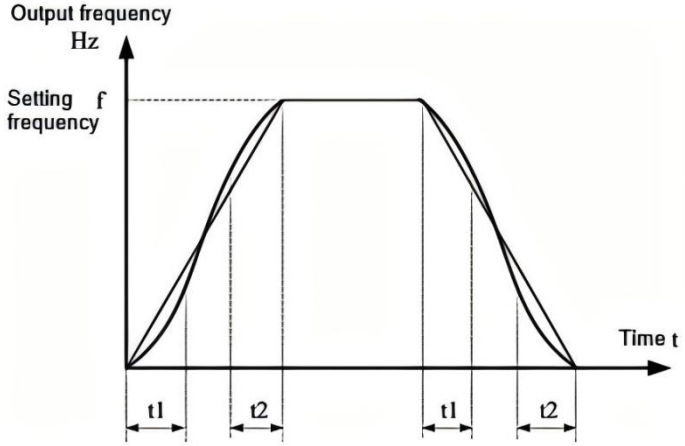
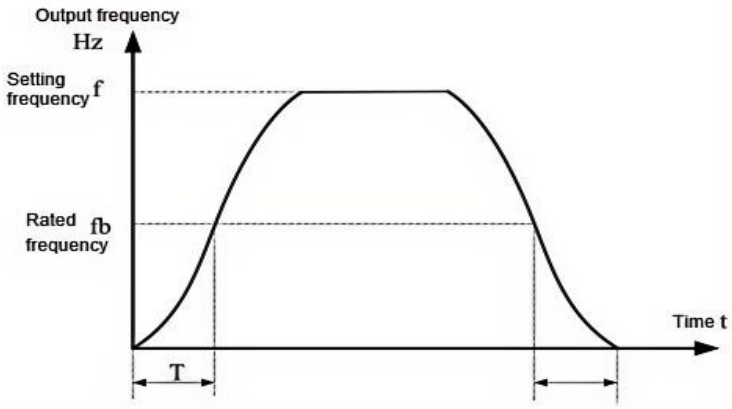


Figure F01-1 Schematic diagram of curve acceleration and deceleration



A

Figure F01-2 Curve acceleration and deceleration B schematic

F01.10	Shutdown mode	
	0～1	0

0: Deceleration stop

When the frequency converter receives the stop command, it gradually reduces the output frequency according to the deceleration time, and stops after the frequency drops to zero. If the shutdown DC braking function is effective, the DC braking process will be executed after reaching the shutdown DC braking start frequency (according to the setting of F01.11, it may also wait for a shutdown DC braking waiting time), and then shut down.

1: Free stop

When the inverter receives the stop command, it immediately terminates the output and the load stops freely according to the mechanical inertia.

F01.11	Stopping DC braking start frequency	
	0.00～Maximum frequency	0.00
F01.12	Shutdown DC braking wait time	
	0.0～100.0s	0.0
F01.13	Stopping DC braking current	
	0.0～100%	50%
F01.14	Stopping DC braking time	
	0.0: DC brake inoperative 0.0～100.0s	0.0

Stopping DC braking start frequency: during deceleration and stopping, when the running frequency is reduced to this frequency, the DC braking process will start. Stopping DC braking waiting time: after the running frequency is reduced to the starting frequency of stopping DC braking, the frequency converter stops the output for a period of time first, and then starts the DC braking process. It is used to prevent overcurrent and other faults that may be caused by starting DC braking at higher speeds.

Stopping DC braking current: The stopping DC braking current, relative to the base value, has two situations.

1. when the motor rated current is less than or equal to 80% of the rated current of the inverter, it is relative to the motor rated current as a percentage of the base value.

2. when the motor rated current is greater than 80% of the rated current of the frequency converter, is relative to 80% of the rated current of the frequency converter as a percentage of the base value.

Stopping DC braking time: DC braking amount of time to maintain. This value is 0 then DC braking process is canceled. The stopping DC braking process is shown in the schematic diagram of Fig. F01-3.

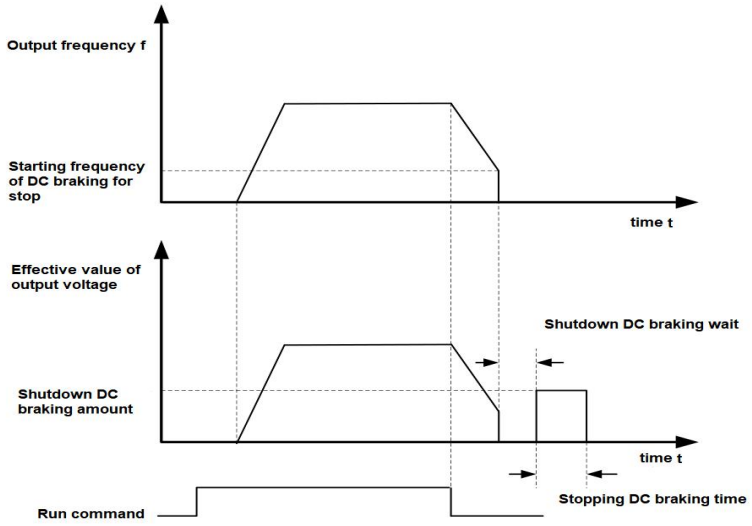


Figure F01-3 Schematic of DC braking at a standstill

F01.15	Brake utilization rate	
	0% ～ 100%	100%

Effective only for inverters with built-in braking unit; used to adjust the duty cycle of the braking unit, high braking utilization, then the braking unit action duty cycle is high, the braking effect is strong, but the braking process inverter bus voltage fluctuation is large.

F01.16～F01.20	Reserved	
	Reserved	0
F01.21	RPM tracking delay	
	0.00 ～ 5.00s	0.50s

This delay time elapses before the inverter speed tracking starts.

F02 Groups - Auxiliary functions

F02.00	Tap operation frequency	
	0.00Hz ～Maximum frequency	2.00Hz
F02.01	Tap acceleration time	
	0.0s ～ 6500.0s	20.0s
F02.02	Tap deceleration time	
	0.0s ～ 6500.0s	20.0s

Define the given frequency and acceleration/deceleration time of the frequency converter at the time of pointing; at the time of pointing operation, the starting mode is fixed as the direct starting mode (F01.00=0), and the stopping mode is fixed as the deceleration stopping mode (F01.10=0).

F02.03	Acceleration time 2	
	0.0s ～ 6500.0s	Model settings
F02.04	Deceleration time 2	
	0.0s ～ 6500.0s	Model settings
F02.05	Acceleration time 3	
	0.0s ～ 6500.0s	Model settings
F02.06	Deceleration time 3	
	0.0s ～ 6500.0s	Model settings
F02.07	Acceleration time 4	
	0.0s ～ 6500.0s	Model settings
F02.08	Deceleration time 4	
	0.0s ～ 6500.0s	Model settings
F02.09	Hop frequency 1	
	0.00Hz ～ Maximum frequency	0.00
F02.10	Hop frequency 2	

	0.00Hz ～ Maximum frequency	0.00
F02.11	Jump frequency amplitude	
	0.00Hz ～ Maximum frequency	0.00

Four acceleration and deceleration times can be defined, and the acceleration and deceleration during the operation of the inverter can be selected through different combinations of control terminals.
For times 1 to 4, see the definition of the acceleration and deceleration time terminal functions in F07.00 to F07.06.

When the set frequency is within the jump frequency range, the actual operating frequency will run at a jump frequency closer to the set frequency. By setting the jump frequency, the inverter can avoid the mechanical resonance point of the load. Two jump frequency points can be set, if both jump frequencies are set to 0, the jump frequency function is canceled.
Please refer to Fig. F01-4 for the schematic diagram of jump frequency and jump frequency amplitude.

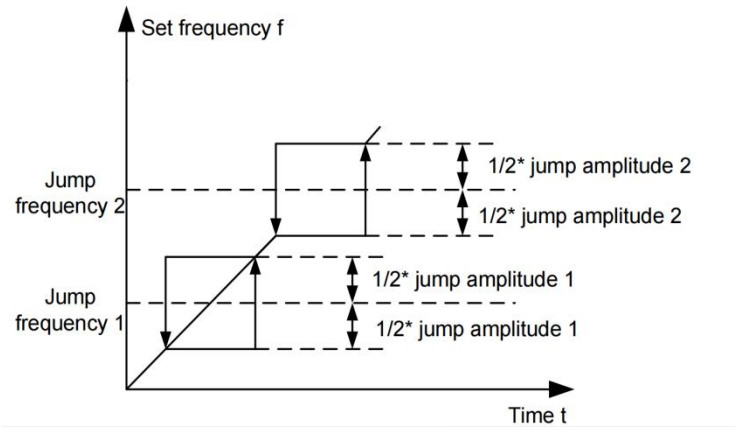


Figure F01-4 Schematic of Jump Frequency

F02.12	Forward and reverse dead time	
	0.0s ～ 3000.0s	0.0s

Set the transition time at output 0Hz during the inverter forward/reverse transition, as shown in Figure F01-5:

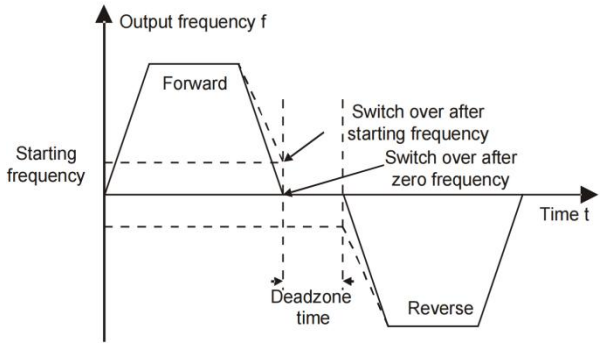


Figure F01-5 Forward and Reverse Dead Time Diagram

F02.13	Inversion frequency prohibition	
	0～1	0

0: Invalid
1: Valid

When the frequency given through the “communication given” or “analog given” is negative, the running

direction of the motor will be changed, and this frequency is called “reverse frequency”; through this parameter, it sets whether the inverter is allowed to run in the reverse state or not. This parameter sets whether the frequency converter is allowed to run in the reverse state, in the case of not allowing the motor to reverse, set F02.13=1.

F02.14	Set frequency below lower limit frequency operation mode	
	0～2	0

0: Run at lower limit frequency
When the set frequency is lower than the lower limit frequency setting value (F00.14), the inverter runs at the lower limit frequency.
1: Shutdown
When the set frequency is lower than the lower limit frequency setting value (F00.14), the inverter stops.
2: Zero speed operation
When the set frequency is lower than the lower limit frequency setting value (F00.14), the inverter runs at zero frequency.

F02.15	Sag control	
	0.00Hz ～ 10.00Hz	0.00Hz

This function is generally used for load distribution when multiple motors are dragging the same load; sag control means that with the increase of load, the frequency converter output frequency is made to drop, so that when multiple motors are dragging the same load, the output frequency of the motor in the load drops more, so that the load of the motor can be reduced and the load of multiple motors can be realized evenly. This parameter is the value of the frequency drop of the inverter output when outputting the rated load.

F02.16	Setting the cumulative power-up arrival time	
	0h ～ 65000h	0h
F02.17	Setting the cumulative running arrival time	
	0h ～ 65000h	0h
F02.18	Startup Protection Selection	
	0 ～ 1	0

When the accumulated power-on time (F14.11) reaches the power-on time set in F02.16, the inverter multifunction output terminal outputs the ON signal.

0: No protection
1: protection
This parameter relates to the safety protection function of the frequency converter; if this parameter is set to 1, if the frequency converter is powered on at the moment the run command is valid (e.g. the terminal run command is closed before powering on), the frequency converter does not respond to the run command, and the run command must be withdrawn once, and the frequency converter will respond only after the run command is valid again. In addition, if this parameter is set to 1, if the run command is valid at the time of inverter fault reset, the inverter does not respond to the run command, and the run command must be removed before eliminating the operation protection state. Setting this parameter to 1 prevents the danger caused by the motor responding to the run command at power-on or fault reset without knowing it.

F02.19	Frequency detection value (FDT1)	
	0.00Hz ～Maximum frequency	50.00Hz
F02.20	Frequency detection hysteresis value (FDT1)	
	0.0% ～ 100.0%（FDT1 Level）	5.0%

When the running frequency is higher than the frequency detection value, the multifunctional output terminal of the inverter outputs ON signal, and the frequency is lower than the detection value after a certain frequency value, the multifunctional output terminal outputs ON signal to cancel. The above parameters are used to set the detection value of output frequency, and the hysteresis value of output action release. F02.20 is the percentage of the hysteresis frequency relative to the frequency detection value F02.19. Figure F01-6 shows the schematic diagram of the FDT function.

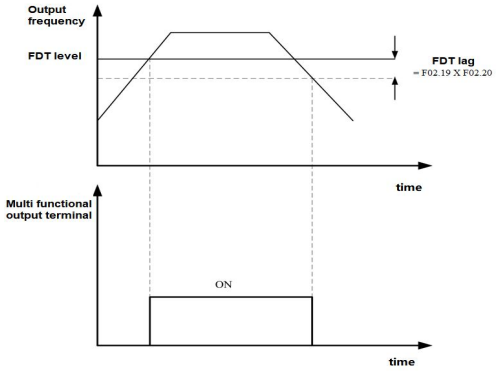


Figure F01-6 FDT level diagram

F02.21	Frequency Arrival (FAR) Detection Width	
	0.0% ～ 100.0%（Maximum frequency）	0.0%

This function is a supplementary description of function No. 4 of function codes F08.02 to F08.05. When the output frequency of the inverter is within the positive and negative detection width of the set frequency, the terminal outputs a valid signal (open collector signal, low level after resistor pull-up). This is shown in the figure below.

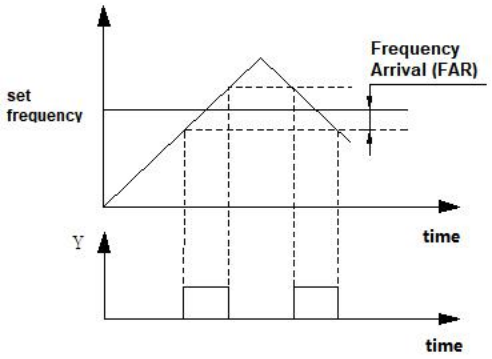


Figure F01-7 Frequency Arrival Detection Amplitude Diagram

F02.22	Whether the jump frequency is valid during acceleration and deceleration	
	0 ～ 1	0

0: Invalid

1: Valid

This function code is used to set whether the jump frequency is valid during acceleration and deceleration; when it is set to valid, the actual running frequency will jump over the set jump frequency boundary when the running frequency is in the range of jump frequency. Figure F01-8 shows the diagram of effective jump frequency during acceleration and deceleration.

F02.23	Acceleration time 1 and acceleration time 2 switching frequency points	
	0.00Hz ～Maximum frequency	0.00Hz
F02.24	Deceleration time 1 and deceleration time 2 switching frequency points	
	0.00Hz ～Maximum frequency	0.00Hz

This function is valid when the acceleration and deceleration times are not switched via the X terminal, and is used to select different acceleration and deceleration times according to the operating frequency range during inverter operation without using the X terminal.

F02.25	Terminal Tap Priority	
	0 ～ 1	0

0: Invalid
1: Valid
This parameter is used to set whether the priority of terminal tapping function is the highest; when the priority of terminal tapping is valid, the inverter switches to the terminal tapping operation state if there is a terminal tapping command during the operation.

F02.26	Frequency detection value (FDT2)	
	0.00Hz ～Maximum frequency	50.00Hz
F02.27	Frequency detection hysteresis value (FDT2)	
	0.0% ～ 100.0%（FDT2 Level）	5.0%

This frequency detection function is exactly the same as the function of FDT1, please refer to the relevant description of FDT1, i.e. the description of function codes F02.19 and F02.20.

F02.28	Any frequency detection value 1	
	0.00Hz to maximum frequency	50.00Hz
F02.29	Any frequency detection width 1	
	0.0% to 100.0% (maximum frequency)	0.0%
F02.30	Any frequency detection value 2	
	0.00Hz to maximum frequency	50.00Hz
F02.31	Any frequency detection width 2	
	0.0% to 100.0% (maximum frequency)	0.0%

When the output frequency of the inverter is within the positive and negative detection range of the arbitrary arrival frequency detection value, the multi-function output terminal outputs the ON signal.
There are two sets of arbitrary arrival frequency detection parameters to set the frequency value and frequency detection range respectively. Figure F01-9 shows the schematic diagram of this function.

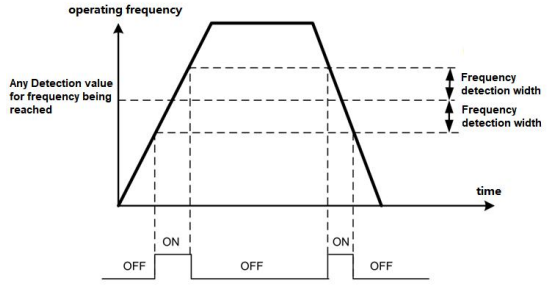


Fig. F01-9 Schematic diagram of arbitrary arrival frequency detection

F02.32	Zero current detection level	
	0.0%~300.0%	50.00Hz
F02.33	Zero current detection delay time	
	0.01s~600.00s	0.10s

When the output current of the inverter is greater than or exceeds the limit detection point and the duration exceeds the software overcurrent point detection delay time, the inverter multi-function output

terminal outputs the ON signal, and Fig. F01-10 shows the schematic diagram of the output current overlimit function.

F02.34	Output current over-limit value	
	0.0%~300.0%	200.0%
F02.35	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 limit detection point and the duration exceeds the software overcurrent point detection delay time, the inverter multi-function output terminal outputs the ON signal, and Fig. F01-11 shows the schematic diagram of the output current overlimit function.

F02.36	Any current 1	
	0.0% to 300.0% (motor rated current)	100.0%
F02.37	Any current 1 width	
	0.0% to 300.0% (motor rated current)	0.0%
F02.38	Any current 2	
	0.0% to 300.0% (motor rated current)	100.0%
F02.39	Any current 2 width	
	0.0% to 300.0% (motor rated current)	0.0%

When the output current of the inverter is within the positive and negative checking width of the set arbitrary arrival current, the multifunctional output terminal of the inverter outputs ON signal. There are two sets of arbitrary arrival current and check out width parameters, Fig. F01-12 is the function schematic diagram.

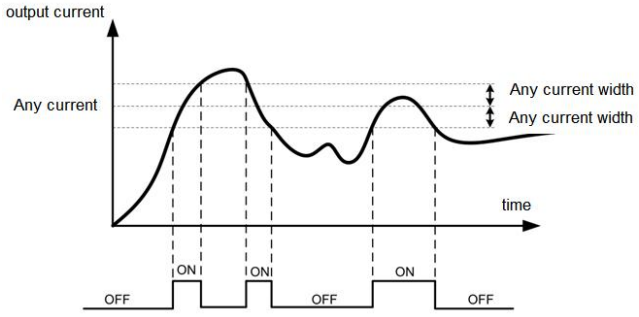


Figure F01-12 Arbitrary Arrival Frequency Detection Diagram

F02.40	Timer function selection	
	0 ～ 1	0

0: Invalid
1: Effective

F02.41	Timed runtime selection	
	0 ～ 3	0

0: F02.42 Setting
1: AI
2: Reserved
3: Panel potentiometer

F02.42	Timed Runtime

	0.0Min ～ 6500.0Min	0.0Min

This group of parameters is used to complete the timed running function of the frequency converter; when F02.40 Timing function is selected validly, the frequency converter starts timing when it starts, and when it reaches the set timed running time, the frequency converter stops automatically, and at the same time, the multi-function output terminal outputs ON signal. The frequency converter starts timing from 0 every time it starts, and the remaining running time of timing can be seen through d00.20. The timed running time is set by F02.41 and F02.42, and the time unit is minutes.

F02.43	AI Input voltage protection value lower limit	
	0.00V ～ F02.44	3.10V
F02.44	AI input voltage protection value upper limit	
	F02.43 ～ 11.00V	6.80V

When the value of the analog input AI is greater than F02.44 or the AI input is less than F02.43, the inverter multifunction output terminal outputs the “AI input overrun” ON signal, which is used to indicate whether or not the input voltage of AI is within the setting range.

F02.45	Module temperature reaches	
	0℃～ 100℃	75℃

When the temperature of the inverter heat sink reaches this temperature, the inverter multifunction output terminal outputs the “module temperature reached” ON signal.

F02.46	Cooling Fan Control	
	0～ 1	0

0: Fan running during operation
1: fan running all the time
It is used to select the action mode of the cooling fan, when the selection is 0, the fan runs in the running state of the inverter, if the temperature of the radiator is higher than 40 degrees in the shutdown state, the fan runs, and the fan doesn't run when the radiator is lower than 40 degrees in the shutdown state; when the selection is 1, the fan is running unanimously after the power is turned on.

F02.47	Wake-up frequency	
	Sleep frequency (F02.49) ～ maximum frequency (F00.10)	0.00Hz
F02.48	Wake-up delay time	
	0.0s ～ 6500.0s	0.0s
F02.49	Sleep frequency	
	0.00Hz ～ wake-up frequency (F02.47)	0.00Hz
F02.50	Sleep delay time	
	0.0s ～ 6500.0s	0.0s

This set of parameters is used to realize the function of hibernation and wake-up in water supply application; during the operation of the frequency converter, when the set frequency is less than or equal to the F02.49 hibernation frequency, after time F02.50 delay time, the frequency converter enters into hibernation state and stops automatically. If the frequency converter is in hibernation state and the current run command is valid, when the set frequency is greater than or equal to F02.47 wake-up frequency, after time F02.48 delay time, the frequency converter starts to start.
In general, please set the wake-up frequency greater than or equal to the hibernation frequency. Setting both the wake-up frequency and the hibernation frequency to 0.00Hz disables the hibernation and

wake-up functions. If PID is used for the frequency source when the hibernation function is enabled, whether the hibernation PID is operated or not is affected by the function code F09.28.

F02.51	Arrival time setting for this run	
	0.0 ～ 6500.0 Min	0.0Min

In this case, the PID stopping time operation must be selected (F09.28=1).

When the running time of the current startup reaches this time, the inverter multifunction output terminal outputs the “current running time reached” ON signal.

F02.52	Output power correction factor	
	0.00% ～ 200.0%	100.0%

When the output power (d00.05) does not correspond to the desired value, the output power can be linearly corrected by this value.

Group F03 - Motor Parameters

F03.00	Motor type selection	
	0～1	0

0: Ordinary asynchronous motor
1: Inverter asynchronous motor

F03.01	Motor rated power	
	0.1kW ～ 1000.0kW	Model Setting
F03.02	Motor rated voltage	
	1V ～ 2000V	Model Setting
F03.03	Motor rated current	
	0.01A ～ 655.35A（Frequency converter power <=55kW） 0.1A ～ 6553.5A （Frequency converter power >55kW）	Model Setting
F03.04	Motor rated frequency	
	0.01Hz ～Maximum frequency	Model Setting
F03.05	Rated motor speed	
	1rpm ～ 65535rpm	Model Setting

The above function codes are motor nameplate parameters. Whether VF control or vector control is used, it is necessary to accurately set the relevant parameters according to the motor nameplate. In order to obtain better VF or vector control performance, motor parameter tuning is required, and the accuracy of the tuning result is closely related to the correct setting of the motor nameplate parameters.

F03.06	Asynchronous motor stator resistance	
	0.001Ω ～ 65.535Ω(Inverter power≤ 55kW) 0.0001Ω ～ 6.5535Ω(Inverter power >55kW)	Tuning parameters
F03.07	Asynchronous motor rotor resistance	
	0.001Ω ～ 65.535Ω(Inverter power≤ 55kW) 0.0001Ω ～ 6.5535Ω(Inverter power >55kW)	Tuning parameters
F03.08	asynchronous motor leakage inductance	

	0.01mH ～ 655.35mH(Inverter power≤ 55kW) 0.001mH ～ 65.535mH(Inverter power >55kW)	Tuning parameters
F03.09	Asynchronous motor mutual inductive resistance	
	0.1mH ～ 6553.5mH(Inverter power≤ 55kW) 0.01mH ～ 655.35mH(Inverter power >55kW)	Tuning parameters
F03.10	Asynchronous motor no-load current	
	0.01A ～ F03.03(Inverter power≤ 55kW) 0.1A ～ F03.03(Inverter power >55kW)	Tuning parameters

F03.06～F03.10 are the parameters of asynchronous motor, which are generally not on the nameplate of the motor and need to be obtained through the automatic tuning of the frequency converter. Among them, “static tuning of asynchronous motor” can only obtain three parameters from F03.06 to F03.08, while “complete tuning of asynchronous motor” can obtain all the five parameters here in addition to the current loop PI parameters and so on. When changing the rated power (F03.01) or rated voltage (F03.02) of the motor, the frequency converter will automatically modify the parameter values of F03.06～F03.10, and restore these five parameters to the common standard Y series motor parameters. If it is not possible to tune the asynchronous motor on site, you can input the above corresponding function codes according to the parameters provided by the motor manufacturer.

F03.10～F03.36	Reserved	
	Reserved	0
F03.37	Tuning options	
	0 ～ 3	0

0: No operation, i.e. tuning is prohibited.

1: Static tuning of asynchronous machine

Applicable to the asynchronous motor and the load are not easy to disengage, and the complete tuning cannot be carried out. Before carrying out asynchronous machine stationary tuning, the motor type and motor nameplate parameters F03.00 ～ F03.05 must be set correctly. for asynchronous machine stationary tuning, the frequency converter can obtain three parameters F03.06～F03.08.

Action Description: Set this function code as 1, then press RUN key, the frequency converter will carry out stationary tuning

2: Complete tuning of asynchronous machine

To ensure the dynamic control performance of the inverter, please select complete tuning, at this time the motor must be disconnected from the load to keep the motor in no-load state.

In the process of complete tuning, the frequency converter first carries out static tuning, and then accelerates to 80% of the rated frequency of the motor according to the acceleration time F00.17, and keeps for a certain period of time, then decelerates and stops according to the deceleration time F00.18 and ends the tuning.

Action Description: Set this function code as 2, then press RUN key, the inverter will carry out complete tuning.

3: Static complete parameter identification

Apply to the complete self-learning of motor parameters in the static state of motor when there is no encoder (at this time, the motor may still have a slight jitter, need to pay attention to safety). Before static complete tuning of the asynchronous machine, the motor type and motor nameplate parameters must be set correctly.

F3-00 to F3-05. asynchronous machine stationary complete tuning, the inverter can get F03.06 to F03.10 five parameters.

F04 Group - Motor Vector Control Parameters

F04.00	Speed loop proportional gain 1	
	1~100	30
F04.01	Speed loop integral time 1	
	0.01s~10.00s	0.50s
F04.02	Switching frequency 1	
	0.00~F04.05	5.00Hz
F04.03	Speed loop proportional gain 1	
	1~100	20
F04.04	Speed loop integral time 1	
	0.01s~10.00s	1.00s
F04.05	Switching frequency 2	
	F04.02~maximum frequency	10.00Hz

When the frequency converter is running at different frequencies, different speed ring PI parameters can be selected. When the running frequency is less than the switching frequency 1 (F04.02), the speed ring PI parameters are F04.00 and F04.01. When the running frequency is greater than the switching frequency 2, the speed ring PI parameters are F04.03 and F04.04. The speed ring PI parameters between the switching frequency 1 and the switching frequency 2 are the linear switching of the two groups of PI parameters, as shown in Figure F04-1:

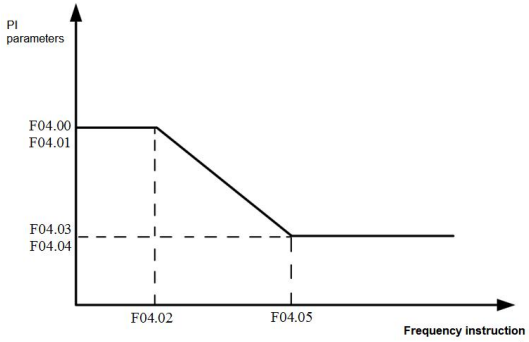


Figure F04-1 PI parameter diagram

By setting the proportionality coefficient and integration time of the speed regulator, the dynamic response characteristics of the speed of the vector control can be adjusted. Increasing the proportional gain and decreasing the integration time can speed up the dynamic response of the speed loop. However, too large a proportional gain or too small an integration time may cause the system to oscillate. It is suggested that the adjustment method is: if the factory parameters cannot meet the requirements, then fine-tuning on the basis of the factory value parameters, first increase the proportional gain, to ensure that the system does not oscillate; and then reduce the integration time, so that the system has a faster response characteristic, and the overshoot is small. If the PI parameters are not set properly, it may lead to excessive speed overshoot. Even overvoltage faults are generated when the overshoot falls back.

F04.06	Vector Control Differential Gain	
	50% ～ 200%	100%

For vector control without speed sensor, this parameter is used to adjust the accuracy of the motor's speed stabilization: when the motor speed is low with load, increase this parameter.
parameter, and vice versa. For vector control with speed sensor, this parameter can adjust the output current of inverter under the same load.

F04.07	Velocity loop filtering time constant	
	0.000s ～ 0.100s	0.000s

Under the vector control mode, the output of the speed loop regulator is the torque current command, and this parameter is used to filter the torque command. This parameter generally does not need to be adjusted, and the filtering time can be increased appropriately when the speed fluctuates greatly; if the motor oscillates, the parameter should be reduced appropriately. Speed loop filter time constant is small, the inverter output torque may fluctuate greatly, but the speed response is fast.

F04.08	Vector control overexcitation gain	
	0 ～ 200	64

During inverter deceleration, the overexcitation control suppresses the bus voltage rise and avoids overvoltage faults. The larger the overexcitation gain, the stronger the suppression effect. For the frequency converter deceleration process is easy to overvoltage alarm occasions, need to increase the overexcitation gain. However, too large an overexcitation gain can easily lead to an increase in output current, which needs to be weighed in the application. For the occasion of small inertia, motor deceleration will not appear in the voltage rise, it is recommended to set the overexcitation gain to 0; for the occasion of braking resistance, it is also recommended to set the overexcitation gain to 0.

F04.09	Torque upper limit source in speed control mode	
	0 ～ 7	64

0: Function code F04.10 Setting
1: AI
2: Reserved
3: Panel potentiometer
4: Reserved
5: Communication given
6 to 7: Reserved
In speed control mode, the maximum value of inverter output torque is controlled by the source of upper limit of torque. F04.09 is used to select the setting source of upper limit of torque. When set by analog and communication, the 100% of the corresponding setting corresponds to F04.10, and the 100% of F04.10 is the rated torque of inverter.

F04.10	Digital setting of torque upper limit in speed control mode	
	0.0% ～ 200.0%	160.0%
F04.11～ F04.12	Reserved	
	Reserved	0
F04.13	Excitation adjustment proportional gain	
	0～60000	2000
F04.14	Excitation adjustment integral gain	
	0～60000	1300
F04.15	Torque adjustment proportional gain	
	0～60000	2000
F04.16	Torque adjustment integral gain	
	0～60000	1300

Vector control current loop PI regulation parameters, which are automatically obtained after complete tuning of asynchronous machines or no-load tuning of synchronous machines, generally do not need to

be modified. It should be reminded that the integral regulator of the current loop, instead of using the integral time as the measure, sets the integral gain directly. Setting the current loop PI gain too large may cause the whole control loop to oscillate, so when the current oscillation or torque fluctuation is large, you can manually reduce the PI proportional gain or integral gain here.

F04.17	Speed loop integral separation	
	0 ～ 1	0

0: Invalid
1: Valid

F04.18～ F04.20	Reserved	
	Reserved	0

Group F05 - Torque control parameters

F05.00	Speed/torque control method selection	
	0～1	0

0: Speed control
1: Torque control
Used to select the inverter control mode: speed control or torque control; Multi-function input X terminal, with two functions related to torque control: torque control inhibit (function 29), speed control/torque control switching (function 46). These two terminals are used in conjunction with F05.00 to realize the switching between speed and torque control. When the speed control/torque control switching terminal is invalid, the control mode is determined by F05.00, and if the speed control/torque control switching is valid, the control mode corresponds to the reverse of the value of F05.00. In any case, when the torque control prohibition terminal is valid, the inverter is fixed to the speed control method.

F05.01	Torque setting source selection in torque control mode	
	0～7	0

0: Digital setting (F05.03)
Indicates that the F05.03 setting value is used directly for the target torque.
1: AI
Refers to the target torque being determined by AI, which is given as a percentage of the relative torque digital setting F05.03.
2: Reserved
3: Panel potentiometer
means that the target torque is determined by the panel potentiometer and the panel potentiometer given as a percentage of the relative torque digital setting F05.03.
4: Reserved
5: Communication given
Refers to the target torque is given by the communication method. When it is a point-to-point communication slave and receives data as the torque given, use the data transmitted by the host to be the communication given value (see the related description of group F13).
6 to 7: Reserved

F05.02	Reserved	
	Reserved	0
F05.03	Digital setting of torque in torque control mode	
	—200.0% ～ 200.0%	150.0%

The torque setting adopts relative value, 100.0% corresponds to the rated torque of the motor. The setting range of -200.0% to 200.0% indicates that the maximum torque of the frequency converter is 2

times the rated torque of the frequency converter. When the torque is given as positive, the frequency converter runs positively; when the torque is given as negative, the frequency converter runs inversely.

F05.04	Reserved	
	Reserved	0
F05.05	Maximum frequency of torque control forward direction	
	0.00Hz~maximum frequency	50.00Hz
F05.06	Maximum frequency of torque control reverse direction	
	0.00Hz~maximum frequency	50.00Hz

It is used to set the forward or reverse maximum running frequency of the frequency converter under torque control mode. When the frequency converter torque control, if the load torque is smaller than the motor output torque, the motor speed will rise continuously, in order to prevent the mechanical system from flying and other accidents, it is necessary to limit the maximum speed of the motor during torque control. If it is necessary to realize dynamic continuous change of the maximum frequency of torque control, it can be realized by controlling the upper limit frequency.

F05.07	Torque controlled acceleration time	
	0.00s ～ 650.00s	0.00s
F05.08	Torque control deceleration time	
	0.00s ～ 650.00s	0.00s

In the torque control method, the difference between the motor output torque and the load torque determines the rate of change of the speed of the motor and the load, so it is possible for the motor speed to change rapidly, causing problems such as noise or excessive mechanical stress. By setting the torque control acceleration and deceleration time, the motor speed can be made to change smoothly.

However, for the occasions which need fast response of torque, it is necessary to set the acceleration and deceleration time of torque control to 0.00 s. For example: two motors are hard connected to drag the same load, in order to ensure the even distribution of the load, one inverter is set as the host and adopts the speed control mode, another inverter is the follower and adopts the torque control, and the actual output torque of the host is taken as the follower's torque command, and the follower's torque at this time needs to follow the host quickly, then the follower's torque needs to follow the host quickly. The actual output torque of the host is used as the torque command of the slave, at this time, the torque of the slave needs to follow the host quickly, so the acceleration and deceleration time of the torque control of the slave is 0.00s.

F06 Group-V/F Control Parameters

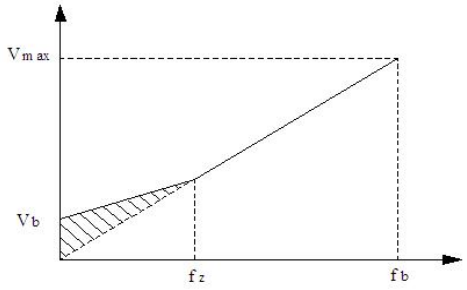
F06.00	VF curve setting	
	0～11	0

0: Linear V/F
Suitable for normal constant torque loads.
1: Multi-point V/F
Suitable for special loads such as dehydrators and centrifuges. In this case, by setting the parameters F06.03 to F06.08, you can obtain any VF relationship curve.
VF relationship curve can be obtained by setting parameters F06.03 to F06.08.
2: Square V/F
Suitable for centrifugal loads such as fans and pumps.
3: 1.2 times square V/F
4: 1.4 V/F

5: Reserved
6: 1.6 times square V/F
7: Reserved
8: 1.8th power V/F
3 to 8 VF relationship curve between linear VF and square VF.
9: Reserved
10: VF completely separated mode
At this time, the output frequency and output voltage of the frequency converter are independent of each other, the output frequency is determined by the frequency source, and the output voltage is determined by F06.13 (VF separated voltage source).VF completely separated mode, generally used in induction heating, inverter power supply, torque motor control and other occasions.
11: VF semi-separated mode.
In this case V and F are proportional, but the proportionality can be set by the voltage source F06.13, and the relationship between V and F is also related to the rated voltage and rated frequency of the motor in group F03. Assuming that the voltage source input is X (X is a value from 0 to 100%), the relationship between the inverter output voltage V and frequency F is: V/F = 2 * X * (motor rated voltage) / (motor rated frequency).

F06.01	Torque boost	
	0.1% to 30.0%	Model settings
F06.02	Torque boost cutoff frequency	
	0.00Hz to maximum frequency	50.00Hz

In order to compensate for the low frequency torque characteristics, some boost compensation can be made to the output voltage. This function code is set to 0.0% for automatic torque boosting, and set to any amount other than 0.0% for manual torque boosting mode. F06.02 defines the boost cutoff frequency point fz for manual torque boosting, as shown in Figure F06-1.



Vb-Manual torque boost

Figure F06-1 Torque boost diagram

F06.03	Multi-point VF frequency pointsF1	
	0.00Hz ～ F06.05	0.00Hz
F06.04	Multi-point VF voltage pointV1	
	0.0% ～ 100.0%	0.0%
F06.05	Multi-point VF frequency pointsF2	
	F06.03 ～ F06.07	0.00Hz
F06.06	Multi-point VF voltage pointV2	
	0.0% ～ 100.0%	0.0%
F06.07	Multi-point VF frequency pointsF3	

	F06.05 ～Motor rated frequency (F03.04)	0.00Hz
F06.08	Multi-point VF voltage point V 3	
	0.0% ～ 100.0%	0.0%

F06.03～F06.08 Six parameters define the multi-point V/F curve; the multi-point V/F curve should be set according to the load characteristics of the motor, and it should be noted that the relationship between the three voltage points and the frequency points must be satisfied: V1 ＜ V2 ＜ V3, and F1 ＜ F2 ＜ F3. Fig. F06-2 is the schematic diagram of the setting of the multi-point VF curve. Too high a voltage setting at low frequency may cause the motor to overheat or even burn out, and the inverter may lose speed or overcurrent protection.

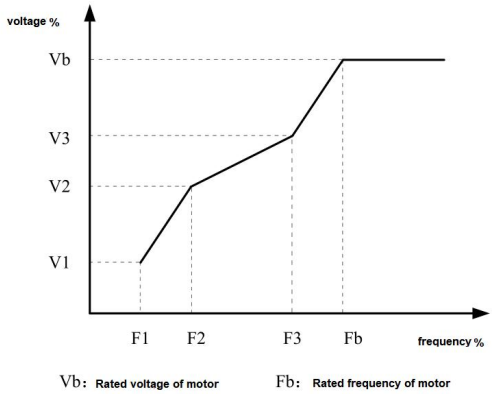


Fig. F06-2 Schematic of Multi-point V/F Curve Setting

F06.09	VF differential compensation gain	
	0.0% ～ 200.0%	0.0%

This parameter is only valid for asynchronous motor; VF rotational compensation can compensate the motor speed deviation generated by the asynchronous motor when the load increases, so that the motor speed can be basically kept stable when the load changes. VF rotational compensation gain is set to 100.0%, which means that the compensated rotational deviation is the rated slip of the motor when the motor carries the rated load, while the rated rotational deviation of the motor is obtained by the inverter through the calculation of the rated frequency of the motor of the F03 group and the rated rotational speed by itself. The rated motor slip is obtained by the inverter through the calculation of the rated frequency and rated speed of the motor in group F03. When adjusting the VF slip compensation gain, it is generally based on the principle that the motor speed is basically the same as the target speed under the rated load. When the motor speed is different from the target value, it is necessary to fine-tune the gain appropriately.

F06.10	VF Overexcitation Gain	
	0 ～ 200	64

During inverter deceleration, the overexcitation control suppresses the bus voltage rise and avoids overvoltage faults. The larger the overexcitation gain, the stronger the suppression effect. For the frequency converter deceleration process is easy to overvoltage alarm occasions, need to increase the overexcitation gain. However, too large an overexcitation gain can easily lead to an increase in output current, which needs to be weighed in the application. For the occasion of small inertia, motor deceleration will not appear in the voltage rise, it is recommended to set the overexcitation gain to 0; for the occasion of braking resistance, it is also recommended to set the overexcitation gain to 0.

F06.11	VF Oscillation Suppression Gain	
	0 ～ 100	Model set

The gain is chosen to be as small as possible under the premise of effectively suppressing oscillation, so

as not to adversely affect the operation of the VF. When there is no oscillation in the motor, please select the gain as 0. Only when there is obvious oscillation in the motor, it is necessary to increase the gain appropriately, and the larger the gain, the more obvious the suppression of oscillation. When using the oscillation suppression function, the motor rated current and no-load current parameters should be accurate, otherwise the VF oscillation suppression effect is not good.

F06.12	Reserved	
	Reserved	0
F06.13	VF separated voltage source	
	0 ～8	0

0: Digital setting (F06.14)
Voltage is set directly from F06.14.
1: AI
2: Reserved
1 to 2 Voltage is determined by the analog input terminals.
3: Panel potentiometer
Voltage is given by the panel potentiometer.
4: Reservation
5: Multi-segment command
When the voltage source is multi-segment instruction, set the parameters of group F07 and group F10 to determine the correspondence between the given signal and the given voltage. 100.0% of the multi-segment instruction given by the parameters of group F10 refers to the percentage of the rated voltage relative to the motor.
6: Simple PLC
When the voltage source is simple PLC, it is necessary to set the F10 group parameter to determine the given output voltage.
7: PID
Generate output voltage according to PID closed loop. For details, see F09 group PID introduction.
8: Communication given
It means that the voltage is given by the upper computer through communication.
VF separation voltage source selection and frequency source selection are used in a similar way, see F00.03 main frequency source selection introduction. Among them, 100.0% of the corresponding setting for each type of selection refers to the rated voltage of the motor (take the absolute value of the corresponding setting value).

F06.14	Digital setting of voltage for VF separation	
	0V ～ rated voltage of motor	0V
F06.15	Voltage acceleration time for VF separation	
	0.0s ～ 1000.0s	0.0s
F06.16	Voltage deceleration time for VF separation	
	0.0s ～ 1000.0s	0.0s

The voltage acceleration time for VF separation refers to the time required for the output voltage to accelerate from 0 to the rated voltage of the motor, see t1 in Figure F06-3; the voltage deceleration time for VF separation refers to the time required for the output voltage to decelerate from the rated voltage of the motor to 0, see t2 in Figure F06-3.

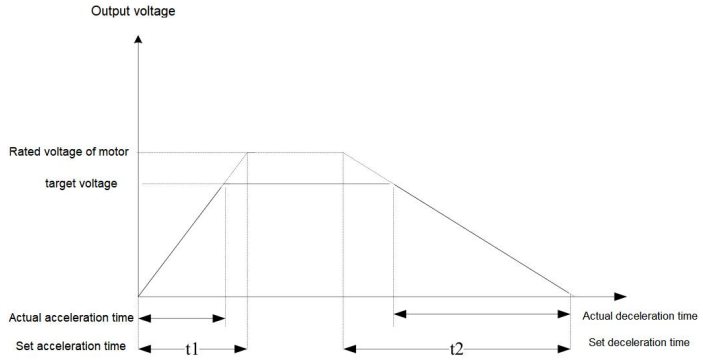


Figure F06-3 V/F separation diagram

F06.17	VF separation shutdown mode selection	
	0 ～ 1	0

0: Frequency/voltage independent reduction to 0
The VF separation output voltage is decremented to 0V by the voltage drop time (F06.16), and the VF separation output frequency is simultaneously decremented to 0Hz by the deceleration time (F00.18).

1: Frequency decreases again after voltage decreases to 0
The VF separation output voltage decreases to 0V according to the voltage drop time (F06.16), and the frequency then decreases to 0Hz according to the deceleration time (F00.18).

F06.18	VF over-current stall action current	
	50～ 200%	150%

The current that starts the overcurrent stall suppression action.

F06.19	VF overcurrent stall enable	
	0～1	1

0: Invalid
1: Valid

F06.20	VF overcurrent stall suppression gain	
	0～ 100	20

If the current exceeds the overrun current point, overrun inhibition will kick in and the actual acceleration time is automatically elongated.

F06.21	Compensation factor for VF times speed over loss speed action current	
	50～ 200%	50%

Reduce the high speed overcurrent action current, which is not valid when the compensation factor is 50, and the weak magnetic area action current corresponds to F06.18.

F06.22	VF overvoltage stall action voltage	
	200.0～ 2000.0	760.0
F06.23	VF overvoltage stall enable	
	0～ 1	1

0: Invalid
1: Valid

F06.24	VF overvoltage stall suppression frequency gain

	0～100	30
F06.25	VF overvoltage stall suppression voltage gain	
	0～100	30

Increasing F06.24 will improve the control effect of bus voltage, but the output frequency will fluctuate, if the output frequency fluctuation is large, you can appropriately reduce the F06.24 Increasing F06.25 can reduce the overshoot of the bus voltage

F06.26	Overpressure stall maximum rise limit frequency	
	0～50Hz	5Hz

Overvoltage suppression Maximum rise frequency limit.

F07 Group-Input Terminal

F07.00	Input Terminal DI1 Function	
	0～58	1
F07.01	Input Terminal DI2 Function	
	0～58	2
F07.02	Input Terminal DI3 Function	
	0～58	9
F07.03	Input terminal DI4 function	
	0～58	12
F07.04～F07.09	Reserved	
	—	0

0: No function
1: Forward running (FWD)
Terminal is shorted to COM, inverter runs forward, valid only when F00.02=1.
2: Reverse running (REV)
The terminal is shorted with COM, the inverter runs in reverse, valid only when F00.02=1.
3: Three-wire running control
Refer to F07.11 for the function description of running mode 2 and 3 (3-wire control mode 1 and 2).
4: Forward Jogging (FJOG)
Terminal is shorted to COM, the inverter runs in forward rotation pointing, only valid when F00.02=1.
5: Reverse rotation jog (RJOG)
The terminal is shorted with COM, the inverter runs in reverse rotation spotting, valid only when F00.02=1.
6: Terminal UP
7: Terminal DOWN
Incremental and decremental commands to modify the frequency when the frequency is given by the external terminal. The set frequency can be adjusted up or down when the frequency source setting is a digital setting.
8: Free Stop
This function has the same meaning as the free-running stop defined in F01.10, but here it is realized with the control terminal for remote control.
9: Fault reset (RESET)
This is a function to reset a fault using the terminal. The function is the same as the RESET key on the keypad. Fault reset can be realized remotely with this function.

10: Running pause

The inverter decelerates and stops, but all the running parameters are memorized. Such as PLC parameters, swing frequency parameters, PID parameters. After the signal of this terminal disappears, the frequency converter returns to the running state before stopping.

11: External fault normally open input

When this signal is sent to the frequency converter, the frequency converter reports fault E-15 and carries out fault processing according to the fault protection action mode (for details, refer to function code F12.47).

12: Multi-band speed selection 1

13: Multi-speed selection 2

14: Multi-speed selection 3

15: Multi-speed selection 4

By selecting the ON/OFF combination of these function terminals, up to 16-segment speeds can be selected. Details are shown in the table below:

Multi-speed selectionSS4	Multi-speed selectionSS3	Multi-speed selectionSS2	Multi-speed selectionSS1	segment speed
OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	ON	1
OFF	OFF	ON	OFF	2
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	4
OFF	ON	OFF	ON	5
OFF	ON	ON	OFF	6
OFF	ON	ON	ON	7
ON	OFF	OFF	OFF	8
ON	OFF	OFF	ON	9
ON	OFF	ON	OFF	10
ON	OFF	ON	ON	11
ON	ON	OFF	OFF	12
ON	ON	OFF	ON	13
ON	ON	ON	OFF	14
ON	ON	ON	ON	15

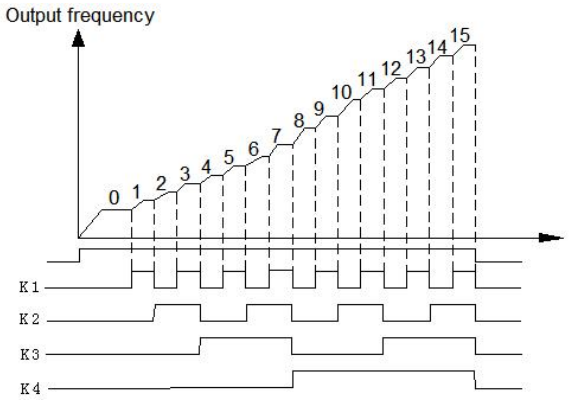


Figure F07-1 Schematic diagram of multi-speed operation

16: Acceleration and deceleration time selection terminal 1

17: Acceleration and deceleration time selection terminal 2

Up to 4 types of acceleration and deceleration times can be selected by selecting the ON/OFF combination of these function terminals. Details are shown in the table below:

Acceleration and deceleration time selection terminals 2	Acceleration and deceleration time selection terminals 1	Acceleration and deceleration time selection terminals
OFF	OFF	Acceleration time 1 / Deceleration time 1
OFF	ON	Acceleration time 2 / Deceleration time 2
ON	OFF	Acceleration time 3 / Deceleration time 3
ON	ON	Acceleration time 4 / Deceleration time 4

18: Frequency source switching

Used to switch to select different frequency sources; according to the setting of the frequency source selection function code (F00.07), this terminal is used to realize switching in two frequency sources when switching between certain two frequency sources is set as the frequency source.

19: UP/DOWN Setting clearing (terminal, keypad)

This terminal clears the frequency value changed by terminal UP/DOWN or keypad UP/DOWN when the frequency is given as digital frequency giving time, so that the given frequency is restored to the value set by F00.08.

20: Control command switching terminal 1

When the command source is set to terminal control (F00.02=1), this terminal can switch between terminal control and keyboard control; when the command source is set to communication control (F00.02=2), this terminal can switch between communication control and keyboard control.

21: Acceleration and deceleration prohibition

Ensure that the frequency converter is not affected by external signals (except the stop command) and maintains the current output frequency.

22: PID pause

PID is temporarily disabled, the frequency converter maintains the current output frequency and no longer performs PID adjustment of the frequency source.

23: PLC state reset

PLC is paused during execution, when running again, the inverter can be restored to the initial state of simple PLC through this terminal.

24: Swing frequency pause

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

25: Tally Input

Input terminal for tally pulse.

26: Counter Reset

Zeroes the counter status.

27 to 28: Reserved

29: Torque control forbidden

Prohibit the inverter from torque control, and the inverter enters the speed control mode.

30: Reserved

31: Reserved

32: Immediate DC braking

When this terminal is valid, the frequency converter switches to DC braking state directly.

33: External fault normally closed input

When the external fault normally closed signal is fed into the frequency converter, the frequency converter reports fault E-15 and stops.

34: Frequency modification prohibition

If this function is set to valid, when there is a change of frequency, the frequency converter does not

respond to the change of frequency until this terminal state is valid.
35: PID action direction reversal
If this terminal is valid, the PID acting direction is opposite to the direction set in F09.03.
36: External stop terminal 1
When controlled by the keyboard, this terminal can be used to stop the inverter, equivalent to the function of STOP key on the keyboard.
37: Control command switching terminal 2
Used for switching between terminal control and communication control; if the command source is selected as terminal control, the system switches to communication control when this terminal is valid; vice versa.
38: PID integral pause
When this terminal is valid, the integral adjustment function of PID is suspended, but the proportional and differential adjustment functions of PID are still valid.
39: Frequency source A and preset frequency switching
When this terminal is active, frequency source A is replaced by the preset frequency (F00.08).
40: Switching between frequency source B and preset frequency
This terminal is valid, then frequency source B is replaced by the preset frequency (F00.08).
41 to 42: Reserved
43: PID parameter switching
When the PID parameter switching condition is the X terminal (F09.18=1), the PID parameters use F09.05 ～ F09.07 when this terminal is invalid, and F09.15 ～ F09.17 when this terminal is valid.
44: User-defined fault 1
45: User-defined Fault 2
When user-defined faults 1 and 2 are valid, the inverter alarms E-27 and E-28 respectively, and the inverter will be processed according to the action mode selected by fault protection action selection F12.49.
46: Speed control/torque control switching
Enables the inverter to switch between torque control and speed control modes. When this terminal is invalid, the inverter runs in the mode defined in F05.00 (speed/torque control mode), and when this terminal is valid, it switches to another mode.
47: Emergency stop
When this terminal is valid, the inverter stops at the fastest speed and the current is at the upper limit of the set current during the stopping process. This function is used to meet the requirement that the frequency converter needs to stop as soon as possible when the system is in emergency.
48: External stop terminal 2
Under any control mode (panel control, terminal control, communication control), this terminal can be used to make the inverter decelerate and stop, and the deceleration time is fixed as deceleration time 4.
49: Deceleration DC braking
When this terminal is valid, the frequency converter first decelerates to the starting frequency of stopping DC braking and then switches to DC braking state.
50: This running time clear zero
When this terminal is valid, the timing time of this running of the frequency converter is cleared to zero, and this function needs to be used in conjunction with timing running (F02.42) and this running time arrival (F02.53).
51: Two-wire/three-wire switching
Used to switch between two-wire and three-wire control; if F07.11 is two-wire 1, then switch to three-wire 1 when this terminal function is valid; and so on.
52: Prohibit reversal
When this terminal is valid, only forward rotation is operated.
53 to 58: Reserved

F07.10	X filtering time	
	0.000s ～ 1.000s	0.010s

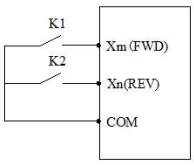
Set the software filter time of the X terminal state. If the input terminal is easily disturbed and causes malfunction, this parameter can be increased to enhance the anti-interference ability. However, the increase of this filter time will cause the response of the X terminal to slow down.

F07.11	Terminal command mode	
	0～3	0

This function code defines four different ways of controlling the operation of the inverter via the external terminals.

0: 2-wire 1

Xm: Forward command (FWD),Xn: Reverse command (REV), Xm, Xn denote any two terminals defined as FWD and REV function respectively in DI1~DI4. In this control mode, K1 and K2 can independently control the operation of the inverter.

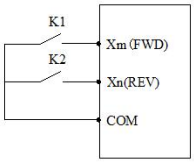


K2	K1	Run Instructions
0	0	stop
0	1	Forward
1	0	stop
1	1	Reversal

Figure F07-2 Schematic diagram of two-wire control mode 1

1: Two-wire type 2

Xm: forward command (FWD), Xn: reverse command (REV), Xm, Xn represent any two terminals defined as FWD and REV functions in DI1~DI4 respectively. In this control mode, K1 is the run/stop switch, and K2 is the direction switch.



K2	K1	Run Instructions
0	0	stop
0	1	Forward
1	0	stop
1	1	Reversal

Figure F07-3 Schematic diagram of two-wire control mode 2

2: Three-wire type 1

Xm: forward command (FWD), Xn: reverse command (REV),

Xx: stop command, Xm, Xn, Xx denote any three terminals defined as FWD, REV, three-wire operation control function respectively in DI1～DI4. Before K3 is accessed, the accessed K1 and K2 are invalid. When K3 is accessed, trigger K1, inverter forward; trigger K2, inverter reverse; disconnect K3, inverter stop.

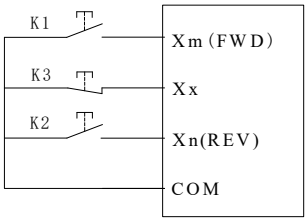
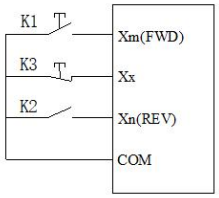


Figure F07-4 Schematic diagram of three-wire control mode 1

3: 3-wire 2

Xm: run command, Xn: run direction selection, Xx: stop command, Xm, Xn, Xx denotes any 3 terminals in DI1-DI4 defined as FWD, REV, 3-wire run control function respectively. before K3 is accessed, the accessed K1 and K2 are invalid. When K3 is accessed, trigger K1, the inverter turns positively; trigger K2 alone, it is invalid; after K1 is triggered to run, then trigger K2, the inverter running direction is switched; disconnect K3, the inverter stops.



K2	K1	Run Instructions
0	0	stop
0	1	Forward
1	0	stop
1	1	Reversal

Figure F07-5 Schematic diagram of 3-wire control mode 2

⚠ Caution:

In 3-wire control mode 2 forward operation, the terminal defined as REV is closed long enough to stabilize reverse rotation, and disconnected to return to forward rotation.

F07.12	Terminal UP/DOWN change rate	
	0.001Hz/s ～ 65.535Hz/s	1.000Hz/s

Used to set the speed of frequency change, i.e., the amount of frequency change per second, when the terminal UP/DOWN adjusts the set frequency; when F00.22 (frequency decimal point) is 2, the value ranges from 0.001 Hz/s to 65.535 Hz/s; when F00.22 (frequency decimal point) is 1, the value ranges from 0.01 Hz/s to 655.35 Hz/s.

F07.13	AI curve minimum input	
	0.00V ～ F07.15	0.00V
F07.14	AI curve minimum input corresponding setting	
	-100.00% ～ 100.0%	0.0%
F07.15	AI curve maximum input	
	F07.13 ～ 10.00V	10.00V
F07.16	AI curve maximum input corresponding setting	
	-100.00% ～ +150.0%	100.0%
F07.17	AI filter time	
	0.00s ～ 10.00s	0.10s

The above function codes are used to set the relationship between the analog input voltage and the setting value it represents; when the analog input voltage is greater than the set “Maximum input” (F07.15), the analog voltage is calculated according to the “Maximum input”; similarly, when the analog input voltage is less than the set “Minimum input” (F07.13), the analog voltage is calculated according to the “AI below minimum input setting selection” (F07.13). Similarly, if the analog input voltage is less than the set “Minimum input” (F07.13), the minimum input or 0.0% is calculated according to the setting of “AI lower than minimum input setting selection” (F07.34). When the analog input is a current input, 1mA current is equivalent to 0.5V voltage.

AI input filtering time is used to set the software filtering time of AI. When the analog quantity on site is easily interfered, please increase the filtering time in order to stabilize the detected analog quantity; however, the larger the filtering time is, the slower the response speed of analog quantity detection will be, so how to set the filtering time needs to be weighed according to the actual application situation.

The meaning of the nominal value corresponding to 100.0% of the analog setting varies in different applications, so please refer to the descriptions in each application section for details. The following diagrams show two typical settings:

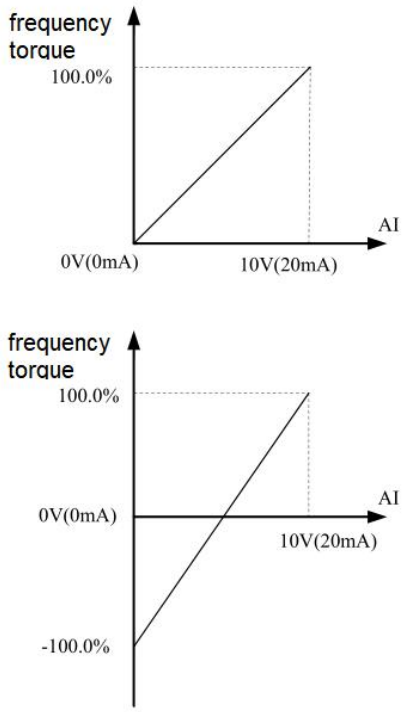


Figure F07-6 Correspondence between analog reference and set value

F07.18～F07.22	Reserved	
	Reserved	0
F07.23	Panel potentiometer minimum input	
	0.00V ～ F07.25	-9.50V
F07.24	Panel potentiometer minimum input corresponding setting	
	-100.00% ～ 100.0%	0.0%
F07.25	Panel potentiometer maximum input	
	F07.23 ～ 10.00V	8.50V
F07.26	Panel potentiometer maximum input corresponding setting	
	-100.00% ～ +150.0%	100.0%
F07.27	Panel potentiometer filter time	
	0.00s ～ 10.00s	0.10s

For the function and use of the panel potentiometer, refer to the description of curve F07-6.

F07.28～F07.33	Reserved	
	Reserved	0
F07.34	AI below minimum input setting selection	
	0000～0111	0000

Bit: AI below minimum input setting selection
0: Corresponds to the minimum input setting
1: 0.0%
Tenth, Hundredth, Thousandth digit: Reserved.

This function code is used to set the setting for the analog input when the analog input voltage is less

than the set “minimum input”;
The digit of this function code corresponds to the analog input AI; if 0 is selected, when the AI input is lower than the “Minimum input”, the setting corresponding to the analog input is the curve “Minimum input setting” (F07.14) determined by the function code. If 1 is selected, when the AI input is lower than the minimum input, the setting for the analog quantity is 0.0%.

F07.35	DI1 delay time	
	0.0s ～ 3600.0s	0.0s
F07.36	DI2 delay time	
	0.0s ～ 3600.0s	0.0s
F07.37	DI3 delay time	
	0.0s ～ 3600.0s	0.0s

It is used to set the delay time of the inverter for the change when the state of DI terminal changes; currently only DI1, DI2 and DI3 have the function of setting the delay time.

F07.38	DI-terminal active mode selection 1	
	00000 ～ 11111	00000

Bit: DI1 terminal valid state setting
0: low level active
1: High level active
Ten bits: DI2 terminal valid state setting (0 to 1, as above)
Hundred bits: DI3 terminal valid state setting (0 to 1, same as above)
Thousand bits: DI4 terminal valid state setting (0 to 1, same as above)
10,000 bits: Reserved

Used to set the valid state mode of the digital input terminals. When selected as high level valid, the corresponding DI terminal is valid when connected to COM and invalid when disconnected; when selected as low level valid, the corresponding DI terminal is invalid when connected to COM and valid when disconnected.

F07.39	Reserved	
	Reserved	0

F07.40	AI input signal selection	
	0 ～ 1	0

0: Voltage signal
1: Current signal

F07.41	AI input stabilization factor	
	0 ～ 1000	0
F07.42	Reserved	
	Reserved	0

Group F08 - Output terminals

F08.00～ F08.01	Reserved	
	Reserved	0
F08.02	Control Board Relay R Function Selection	

	0～44	3
F08.03～F08.05	Reserved	
	Reserved	0

0: No output
1: Inverter is running
Indicates that the frequency converter is running and there is an output frequency (can be zero), and the ON signal is output at this time.
2: Fault output (fault shutdown)
When the inverter is faulty and fault stop, output ON signal.
3: Frequency level detection FDT1 output
Please refer to the description of function codes F02.19 and F02.20.
4: Frequency Arrival
Refer to function code F02.21 for description.
5: Zero speed in operation (no output at shutdown)
When the inverter is running and the output frequency is 0, the ON signal is output. The signal is OFF when the frequency converter is in the shutdown state.
6: Motor overload pre-warning
Before motor overload protection action, judgment is made according to the overload pre-warning threshold, and the ON signal is output when the pre-warning threshold is exceeded. For motor overload parameter setting, refer to function codes F12.00 to F12.02.
7: Inverter overload pre-warning
10s before the overload protection of frequency converter occurs, output ON signal.
8: Setting count value reaches
When the count value reaches the value set in F11.08, the ON signal is output.
9: Arrival of specified count value
When the counting value reaches the value set in F11.09, the ON signal is output. For the counting function, refer to the function description of group F11.
10: Hold
11: PLC cycle completion
When the simple PLC operation completes a cycle, a pulse signal with a width of 250ms is output.
12: Accumulated Running Time Reached
When the accumulated running time of the inverter exceeds the time set in F02.17, an ON signal is output.
13: Frequency limit in
When the set frequency exceeds the upper limit frequency or the lower limit frequency, and the output frequency of the frequency converter also reaches the upper limit frequency or the lower limit frequency, the ON signal is output.
14: Torque limit
Under the speed control mode, when the output torque reaches the torque limit value, the frequency converter is in the state of stall protection, and at the same time, the frequency converter will output ON signal.
15: Ready to run
When the power supply of the main and control circuits of the frequency converter has been stabilized and the frequency converter has not detected any fault information, and the frequency converter is in a runnable state, the ON signal is output.
16: Reserved
17: Upper limit frequency reaches
When the running frequency reaches the upper limit frequency, output ON signal.
18: Lower limit frequency reaches (not output when stopping)
When the operation frequency reaches the lower limit frequency, the ON signal is output. This signal is OFF in the shutdown state.

19: Undervoltage state output
When the frequency converter is in the undervoltage state, the ON signal is output.
20: Communication setting
Please refer to the communication protocol.
21: Reservation
22: Reserved
23: In zero-speed operation 2 (also output during shutdown)
The ON signal is output when the inverter output frequency is 0. This signal is also ON in the shutdown state.
24: Accumulated power-on time arrival
The ON signal is output when the inverter's accumulated power-on time (F14.11) exceeds the time set in F02.16.
25: Frequency level detection FDT2 output
Refer to the description of function codes F02.28 and F02.29.
26: Frequency 1 arrival output
Please refer to function codes F02.30 and F02.31 for details.
27: Frequency 2 arrives at output
Please refer to function codes F02.32 and F02.33 for details.
28: Current 1 to output
Please refer to function codes F02.38 and F02.39 for details.
29: Current 2 arrives at the output
Please refer to function codes F02.40 and F02.41 for details.
30: Timed arrival output
When the timing function selection (F02.42) is valid, the inverter will output ON signal after the current running time reaches the set timing time.
31: AI input over limit
When the value of analog input AI is greater than F02.44 (AI input protection upper limit) or less than F02.43 (AI input protection lower limit), the ON signal is output.
32: In Load Loss
The ON signal is output when the frequency converter is in the off-load state.
33: In reverse operation
When the frequency converter is in reverse operation, the ON signal is output.
34: Zero current state
Please refer to the description of function codes F02.32 and F02.33.
35: Module temperature reached
When the inverter module heat sink temperature (F14.08) reaches the set module temperature arrival value (F02.45), the ON signal will be output.
36: Software current overrun
Please refer to function codes F02.34 and F02.35 for details.
37: Lower limit frequency reaches (output even at stoppage)
When the operating frequency reaches the lower limit frequency, an ON signal is output. The signal is also turned on in the shutdown state.
38: Alarm output
Translated with DeepL.com (free version)
When the inverter fails, and the processing mode of this failure is to continue running, the inverter alarm outputs.
39: Motor over-temperature alarm
When the motor temperature reaches F12.58 (motor overheat pre-alarm threshold), the ON signal is output. (Motor temperature can be viewed through d00.34)
40: Arrival of this running time
The ON signal is output when the inverter's current start running time exceeds the time set in F02.51.
41: Fault output (Fault for free stop and undervoltage is not output)

Translated with DeepL.com (free version)

F08.06	Reserved	
	Reserved	0
F08.07	AO Output function selection	
	0-16	0
F08.08	Reserved	
	Reserved	0

42～44: Reserved

Setting value	Function	Function range (corresponding to pulse or analog output 0.0% to 100.0%)
0	Operation frequency	0 to maximum output frequency
1	Setting frequency	0 to maximum output frequency
2	Output current	0 to 2 times rated motor current
3	Output torque (absolute value)	0 ～ 2 times the rated motor torque
4	Output power	0 ～ 2 times the rated power of the motor
5	Output voltage	0~1.2 times the rated voltage of the inverter
6	Reserved	Reserved
7	AI	0V ～ 10V（or 0 ～ 20mA）
8	Reserved	Reserved
9	Panel potentiometer	0V ～ 10V
10	Reserved	Reserved
11	Count value	0 ～maximum count value
12	Communication setting	0.0% ～ 100.0%
13	Motor rotation speed	0 to the rotation speed corresponding to the maximum output frequency
14	Output current	0.0A ～ 1000.0A
15	Output voltage	0.0V ～ 1000.0V
16	Output torque (actual value)	-2 times rated motor torque~2 times rated motor torque

The analog output AO output range is 0V to 10V, or 0mA to 20mA, and the calibration relationship with the corresponding function is shown in the table below.

F08.09	Reserved	
	Reserved	0
F08.10	AO zero bias coefficient	
	-100.0% ～ +100.0%	0.0%
F08.11	AO gain	
	-10.00 ～ +10.00	1.00
F08.12～ F08.17	Reserved	
	Reserved	0

F08.18	R output delay time	
	0.0s ～ 3600.0s	0.0s
F08.19～F08.21	Reserved	
	Reserved	0
F08.20	Y1 output delay time	
	0.0s ～ 3600.0s	0.0s

Set the delay time from when relay R changes state to when the actual output changes.

F08.22	Output terminal effective state selection	
	00000 ～ 11111	00000

Units: Reserved
Tens: R valid state setting
0: High level valid
1: Low level valid
Hundreds, thousands, and ten thousand: Reserved

F08.23	AO output signal selection	
	0 ～ 1	0

0: Voltage signal
1: Current signal
AO supports voltage/current signal output, which needs to be selected through jumpers. When the jumper selection is voltage or current, F08.23 needs to be set accordingly.

F09 Group - PID Function

F09.00	PID given source	
	0～7	0

0: F09.01 setting
1: AI
2: Reserved
3: Panel potentiometer
4: Reserved
5: Communication
6: Multi-segment instruction
This parameter is used to select the target quantity setting channel of process PID.
7: Pressure setting (MPa, Kg)

F09.01	PID given source	
	0.0% ～ 100.0%	50.0%

The set target quantity of process PID is a relative value, and the setting range is 0.0% to 100.0%. Similarly, the feedback quantity of PID is also a relative quantity, and the function of PID is to make these two relative quantities the same.

F09.02	PID feedback source	
	0～8	0

0: AI
1: Reserved

2: Panel potentiometer
3~4: Reserved
5: Communication
6~8: Reserved
This parameter is used to select the feedback signal channel of process PID; the feedback amount of process PID is also a relative value, and the setting range is 0.0%~100.0%.

F09.03	PID action direction	
	0～1	0

0: Positive action
When the PID feedback signal is less than the given value, the inverter output frequency increases. Such as the tension control of winding.
1: Negative action
When the PID feedback signal is less than the given value, the inverter output frequency decreases. Such as the tension control of unwinding.
This function is affected by the multi-function terminal PID action direction reversal (function 35), so please pay attention when using it.

F09.04	PID given feedback range	
	0 ～ 65535	1000

PID given feedback range is a dimensionless unit, used for PID given display d00.15 and PID feedback display d00.16. The relative value of PID given feedback is 100.0%, corresponding to the given feedback range F09.04. For example, if F09.04 is set to 2000, when the PID given is 100.0%, the PID given display d00.15 is 2000.

F09.05	Proportional gain Kp1	
	0.0 ～ 999.9	20.0
F09.06	Integral time Ti1	
	0.01s ～ 10.00s	2.00s
F09.07	Derivative time Td1	
	0.00 ～ 10.000	0.000s

Proportional gain Kp1:
Determines the regulation intensity of the entire PID regulator. The larger Kp1 is, the greater the regulation intensity is. This parameter is 100.0, which means that when the deviation between the PID feedback and the given amount is 100.0%, the adjustment amplitude of the PID regulator to the output frequency command is the maximum frequency.
Integral time Ti1:
Determines the intensity of the integral regulation of the PID regulator. The shorter the integral time, the greater the regulation intensity. The integral time means that when the deviation between the PID feedback and the given amount is 100.0%, the integral regulator continuously adjusts after this time, and the adjustment amount reaches the maximum frequency.

F09.10	PID differential limiting	
	0.00% ～ 100.00%	0.50%

Derivative time Td1:
Determines the intensity of the PID regulator's regulation of the deviation change rate. The longer the differential time is, the greater the regulation intensity is. The differential time means that when the feedback changes by 100.0% within this time, the adjustment amount of the differential regulator is the maximum frequency.

F09.08	PID reverse cut-off frequency limit 0.00~maximum frequency

	PID reverse cut-off frequency limit 0.00~maximum frequency	2.00Hz

In some cases, only when the PID output frequency is negative (i.e. the inverter reverses), PID can control the given value and the feedback value to the same state. However, too high a reverse frequency is not allowed in some occasions. F09.08 is used to determine the upper limit of the reverse frequency.

F09.09	PID Deviation Limit	
	0.0% ～ 100.0%	0.0%

When the deviation between the PID given value and the feedback value is less than F09.09, PID stops adjusting.

F09.10	PID differential limiting	
	0.00% ～ 100.00%	0.50%

In the PID regulator, the differential effect is relatively sensitive and can easily cause system oscillation. For this reason, the PID differential effect is generally limited to a smaller range. F09.10 is used to set the range of PID differential output.

F09.11	PID setting change time	
	0.00s ～ 650.00s	0.00s

PID given change time refers to the time required for the PID given value to change from 0.0% to 100.0%. When the PID given value is changed linearly according to the given change time, the adverse effect of sudden change on the system is reduced.

F09.12	PID feedback filter time	
	0.00s ～ 60.00s	0.00s
F09.13	PID output filter time	
	0.0s ～ 600.0s	100.0s

F09.12 is used to filter the PID feedback. This filtering is helpful to reduce the impact of interference on the feedback, but it will reduce the response performance of the process closed-loop system. F09.13 is used to filter the PID output frequency. This filtering will weaken the sudden change of the inverter output frequency, but it will also reduce the response performance of the process closed-loop system.

F09.14	Reserved	
	Reserved	0
F09.15	Proportional gain Kp2	
	0.0 ～ 999.9	20.0
F09.16	Integral timeTi2	
	0.01s ～ 10.00s	2.00s
F09.17	Derivative time Td2	
	0.00 ～ 10.000	0.000s

In some applications, one set of PID parameters cannot meet the requirements of the entire operation process, and different PID parameters need to be used in different situations.
This set of function codes is used to switch between two sets of PID parameters. The setting method of the regulator parameters F09.15~F09.17 is similar to that of parameters F09.05~F09.07.

F09.18	PID parameter switching conditions	
	0 ～ 8	0

0: No switching
1: Switching through X terminal
2: Automatic switching according to deviation
3~8: Reserved

The two groups of PID parameters can be switched through the multi-function digital X terminal, or they can be switched automatically according to the PID deviation. When the multi-function X terminal is selected for switching, the multi-function terminal function selection must be set to 43 (PID parameter switching terminal). When the terminal is invalid, select parameter group 1 (F09.05~F09.07), and when the terminal is valid, select parameter group 2 (F09.15~F09.17).

F09.19	PID parameter switching deviation 1	
	0.0% ～ F09.20	20.0%
F09.20	PIDPID parameter switching deviation 2	
	F09.19 ～ 100.0%	80.0%

When automatic switching is selected, when the absolute value of the deviation between the given and feedback is less than the PID parameter switching deviation 1 (F09.19), the PID parameters select parameter group 1. When the absolute value of the deviation between the given and feedback is greater than the PID switching deviation 2 (F09.20), the PID parameters select parameter group 2. When the deviation between the given and feedback is between the switching deviation 1 and the switching deviation 2, the PID parameters are the linear interpolation values of the two groups of PID parameters, as shown in Figure F09-1.

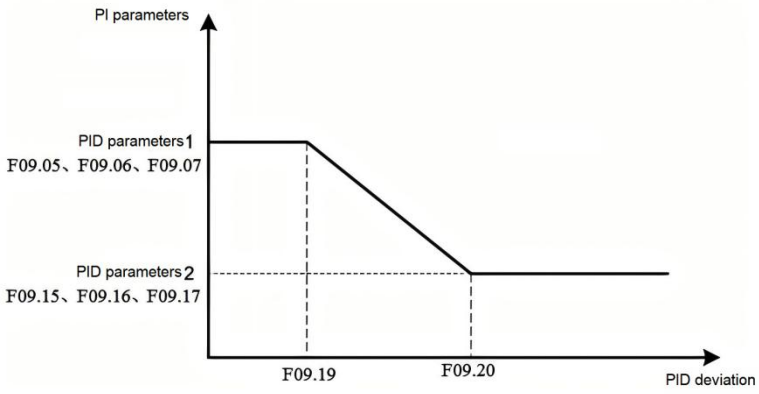


Figure F09-1 PID parameter switching

F09.21	PID initial value	
	0.0% ～ 100.0%	0.0%
F09.22	PID initial value holding time	
	0.00s ～ 650.00s	0.00s

When the inverter starts, the PID output is fixed to the PID initial value F09.21. After the PID initial value holding time F09.22 is reached, the PID starts closed-loop adjustment operation. Figure F09-2 is a functional diagram of the PID initial value.

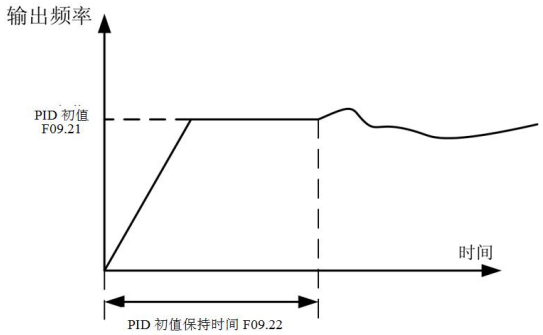


Figure F09-2 PID initial value function diagram

F09.23	Reserved	
	Reserved	0
F09.24	Reserved	
	Reserved	0
F09.25	PID feedback upper limit loss detection value	
	0.0%: Do not judge feedback loss；0.1% ～ 100.0%	0.0%
F09.26	PID feedback lower limit loss detection value	
	0.0%: Do not judge feedback loss；0.1% ～ 100.0%	0.0%
F09.27	PID feedback loss detection time	
	0.0s ～ 20.0s	0.0s

This function code is used to determine whether the PID feedback is lost; when the PID feedback is less than the feedback lower limit loss detection value F09.26, and greater than the feedback upper limit loss detection value F09.25, and the duration exceeds the PID feedback loss detection time F09.27, the inverter alarm fault E-31 and handles it according to the selected fault handling method.

F09.28	PID stop operation	
	0 ～ 1	0

0: Stop and do not calculate

1: Stop operation

It is used to select whether PID continues to operate when PID is in shutdown state. In general applications, PID should stop operating when in shutdown state.

F10 Group - Multi-segment instructions, simple PLC

F10.00	Multi-segment instruction0	
	-100.0% ～ 100.0%	0.0%
F10.01	Multi-segment instruction1	
	-100.0% ～ 100.0%	0.0%
F10.02	Multi-segment instruction2	
	-100.0% ～ 100.0%	0.0%
F10.03	Multi-segment instruction3	
	-100.0% ～ 100.0%	0.0%
F10.04	Multi-segment instruction4	
	-100.0% ～ 100.0%	0.0%

F10.05	Multi-segment instruction5	
	-100.0% ～ 100.0%	0.0%
F10.06	Multi-segment instruction6	
	-100.0% ～ 100.0%	0.0%
F10.07	Multi-segment instruction7	
	-100.0% ～ 100.0%	0.0%
F10.08	Multi-segment instruction8	
	-100.0% ～ 100.0%	0.0%
F10.09	Multi-segment instruction9	
	-100.0% ～ 100.0%	0.0%
F10.10	Multi-segment instruction10	
	-100.0% ～ 100.0%	0.0%
F10.11	Multi-segment instruction11	
	-100.0% ～ 100.0%	0.0%
F10.12	Multi-segment instruction12	
	-100.0% ～ 100.0%	0.0%
F10.13	Multi-segment instruction13	
	-100.0% ～ 100.0%	0.0%
F10.14	Multi-segment instruction14	
	-100.0% ～ 100.0%	0.0%
F10.15	Multi-segment instruction15	
	-100.0% ～ 100.0%	0.0%

Multi-segment instructions can be used in three occasions: as a frequency source, as a voltage source for VF separation, and as a setting source for process PID. In the three application occasions, the dimension of the multi-segment instruction is a relative value, ranging from -100.0% to 100.0%. When used as a frequency source, it is a percentage relative to the maximum frequency; when used as a VF separation voltage source, it is a percentage relative to the rated voltage of the motor; and because the PID given is originally a relative value, the multi-segment instruction does not require dimension conversion as a PID setting source. The multi-segment instruction needs to be switched and selected according to the different states of the multi-function digital X. For details, please refer to the relevant instructions of Group F07.

F10.16	Simple PLC operation mode	
	0～2	0

0: Stop after single operation

The inverter stops automatically after completing a single cycle. At this time, you need to give a running command again to start. If the running time of a certain stage is 0, the operation will skip this stage and go directly to the next stage. As shown in the figure below:

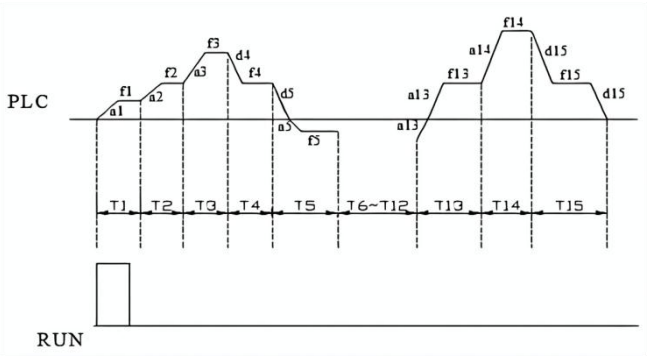


Figure F10-1 Schematic diagram of PLC stopping after a single cycle

1: After a single operation, the final value is maintained.

After the inverter completes a single cycle, it automatically maintains the last section of the operating frequency and direction. As shown in the following figure:

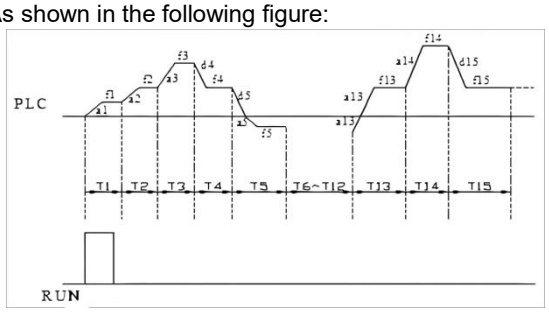


Figure F10-2 PLC single cycle hold diagram

2: Continuous cycle

The inverter automatically starts the next cycle after completing one cycle, and will not stop until there is a stop command. As shown in the following figure:

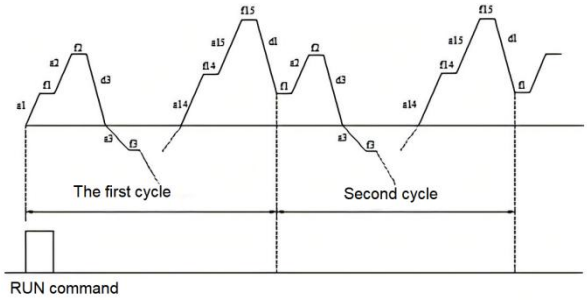


Figure F10-3 PLC continuous cycle diagram

F10.17	Simple PLC power-off memory selection	
	00～11	00

Units: Power-off memory selection

0: No memory after power failure

1: Power-off memory

Tens: Stop memory selection

0: No memory when stopping

1: Shutdown memory

PLC power-off memory refers to memorizing the PLC operation stage and frequency before power off, and continuing to operate from the memorized stage when power is on next time. If you choose not to memorize, the PLC process will be restarted every time you power on. PLC shutdown memory is to record the last PLC shutdown. The operation phase and frequency will continue from the memorized phase the next time you start. If you choose not to memorize, you will start over every time you start PLC process.

F10.18	Simple PLC 0th segment running time

	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.19	Simple PLC 0th stage acceleration/deceleration time	
	0 ～ 3	0
F10.20	Simple PLC first stage running time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.21	Simple PLC first stage acceleration/deceleration time	
	0 ～ 3	0
F10.22	Simple PLC second stage running time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.23	Simple PLC 2nd stage acceleration/deceleration time	
	0 ～ 3	0
F10.24	Simple PLC 3rd stage running time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.25	Simple PLC 3rd stage acceleration/deceleration time	
	0 ～ 3	0
F10.26	Simple PLC 4th stage running time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.27	Simple PLC 4th stage acceleration/deceleration time	
	0 ～ 3	0
F10.28	Simple PLC 5th segment running time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.29	Simple PLC 5th stage acceleration/ deceleration time	
	0 ～ 3	0
F10.30	Simple PLC 6th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.31	Simple PLC 6th stage acceleration/ deceleration time	
	0 ～ 3	0
F10.32	Simple PLC 7th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.33	Simple PLC 7th stage acceleration/ deceleration time	
	0 ～ 3	0
F10.34	Simple PLC 8th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.35	Simple PLC 8th stage acceleration/ deceleration time	
	0 ～ 3	0
F10.36	Simple PLC 9th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)

F10.37	Simple PLC 9th stage acceleration/ deceleration time	
	0 ～ 3	0
F10.38	Simple PLC 10th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.39	Simple PLC 10th stage acceleration/ deceleration time	
	0 ～ 3	0
F10.40	Simple PLC 11th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.41	Simple PLC 11th stage acceleration/deceleration time	
	0 ～ 3	0
F10.42	Simple PLC 12th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.43	Simple PLC 12th stage acceleration/ deceleration time	
	0 ～ 3	0
F10.44	Simple PLC 13th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.45	PLC 13th stage acceleration/deceleration time	
	0 ～ 3	0
F10.46	Simple PLC 14th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.47	Simple PLC 14th stage acceleration/deceleration time	
	0 ～ 3	0
F10.48	PLC 15th stage operation time	
	0.0s(h) ～ 6500.0s(h)	0.0s(h)
F10.49	PLC 15th stage acceleration/ deceleration time	
	0 ～ 3	0
F10.50	Simple PLC Run time unit	
	0 ～ 1	0

0: S(seconds)
1: h(hours)

F10.51	Multi-segment instruction 0 Setting mode	
	0 ～ 6	0

0: Function code F10.00 given
1: AI
2: Reserved
3: Panel potentiometer
4: Reserved
5: PID
6: Preset frequency (F00.08) given, UP/DOWN can be modified

This parameter determines the given channel of multi-segment instruction 0. In addition to F10.00, multi-segment instruction 0 has a variety of other options to facilitate switching between multi-short instructions and other given methods. When multi-segment instructions are used as frequency sources or simple PLC is used as frequency sources, the switching between the two frequency sources can be easily realized.

F11 Group - Reserved

F12 Group - Fault and Protection

F12.00	Motor overload protection selection	
	0～1	0

0: Disabled

Without motor overload protection function. There may be a risk of motor overheating and damage. It is recommended to heat the relay between the inverter and the motor.

1: Allowed.

At this time, the inverter determines whether the motor is overloaded according to the inverse time curve of the motor overload protection.

The inverse time curve of the motor overload protection is: 220% × (F12.01) × motor rated current. If it lasts for 1 minute, it will alarm the motor overload fault; 150% × (F12.01) × motor rated current. If it lasts for 5 minutes, it will alarm the motor overload.

F12.01	Motor overload protection gain	
	0.01～10.00	1.00

The user needs to correctly set the value of F12.01 according to the actual overload capacity of the motor. If this parameter is set too high, it may cause the motor to danger of overheating and damage without inverter alarm!

F12.02	Motor overload warning factor	
	50% ～ 100%	80%

This function is used to give the control system an early warning signal through the digital output terminal before the motor overload fault protection. The early warning coefficient is used to determine the extent of the early warning before the motor overload protection. The larger the value, the smaller the early warning advance. When the inverter output current accumulation is greater than the product of the overload inverse time curve and F12.02, the inverter multi-function digital output terminal outputs the "motor overload pre-alarm" ON signal.

F12.03	Overvoltage stall gain	
	0 (no overvoltage stall) ~100	30
F12.04	Overvoltage stall protection voltage	
	200V～2000V	760V

During the inverter deceleration process, when the DC bus voltage exceeds the overvoltage stall protection voltage, the inverter stops deceleration and maintains the current operating frequency, and continues to decelerate after the bus voltage drops. The overvoltage stall gain is used to adjust the inverter's ability to suppress overvoltage during deceleration. The larger this value is, the stronger the overvoltage suppression capability is. Under the premise that no overvoltage occurs, the smaller the gain is set, the better. For loads with small inertia, the overvoltage stall gain should be small, otherwise it will cause the system dynamic response to slow down. For loads with large inertia, this value should be large, otherwise the suppression effect is not good and an overvoltage fault may occur. When the overvoltage stall gain is set to 0, the overvoltage stall function is canceled.

F12.05	Overcurrent stall protection gain

	0 ～ 100	20
F12.06	Overcurrent stall protection current	
	100% ～ 200%	150%

Overcurrent stall: When the inverter output current reaches the set overcurrent stall protection current (F12.06), the inverter will reduce the output frequency during acceleration operation; reduce the output frequency during constant speed operation; slow down the deceleration speed during deceleration operation until the current is less than the overcurrent stall protection current (F12.06), and then the operating frequency will return to normal. See Figure F12-1 for details. Overcurrent stall protection current: select the current protection point of the overcurrent stall function. When this parameter value is exceeded, the inverter starts to perform the overcurrent stall protection function.

This value is a percentage of the rated current of the motor. Overcurrent stall gain: Used to adjust the inverter's ability to suppress overcurrent during acceleration and deceleration. The larger this value is, the stronger the overcurrent suppression ability is. Under the premise that no overcurrent occurs, the smaller the gain is set, the better.

For loads with small inertia, the overcurrent stall gain should be small, otherwise it will cause the system dynamic response to slow down. For loads with large inertia, this value should be large, otherwise the suppression effect is not good and overcurrent faults may occur. In situations where the inertia is very small, it is recommended to set the overcurrent suppression gain to less than 20. When the overcurrent stall gain is set to 0, the overcurrent stall function is canceled.

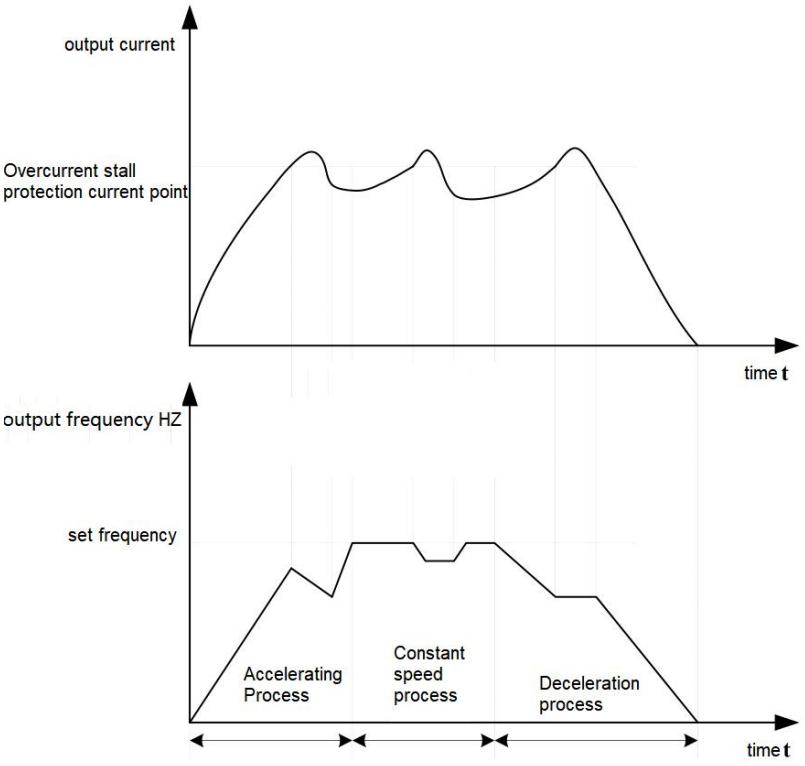


Figure F12-1 Schematic diagram of over-current stall protection

F12.07	Reserved.	
	Reserved.	0
F12.08	Braking start voltage	
	200.0～ 2000.0V	690.0V

If the DC voltage inside the inverter is higher than the energy-consuming braking start voltage, the built-in braking unit will be activated. If a braking resistor is connected

at this time, the pumped voltage energy inside the inverter will be released through the braking resistor, causing the DC voltage to drop. When the DC voltage is lower than the braking start voltage, the built-in braking unit will be turned off.

F12.09	Number of automatic fault reset	
	0 ～ 200	0

When the inverter selects automatic fault reset, it is used to set the number of times it can be automatically reset. After exceeding this number, the inverter will keep the fault reset fault status

F12.10	Fault digital output terminal action selection during fault automatic reset	
	0 ～ 1	0

0: No action
1: Action
If the inverter is set with the fault automatic reset function, during the fault automatic reset period, the fault digital output terminal will be activated can be set via F12.10.

F12.11	Fault automatic reset interval	
	0.1s ～ 100.0s	6.0s

The waiting time from inverter fault alarm to automatic fault reset.

F12.12	Input phase loss protection selection	
	0 ～ 1	Model confirmation

0: Disable (inverter power <= 11kW)
1: Allowed (inverter power > 11kW)

F12.13	Output phase loss protection selection	
	0 ～ 1	0

0: Disable
1: Allow

F12.14	First failure type	
	0 ～ 99	0
F12.15	Second fault type	
	0 ～ 99	0
F12.16	The third (most recent) fault type	
	0 ～ 99	0
F12.17	Frequency at the third fault	
	0.00Hz～maximum frequency (F00.10)	0.00Hz
F12.18	Current at the third fault	
	0.00A ～ 655.35A	0.00A
F12.19	Bus voltage at the third fault	
	0.0V ～ 3000.0V	0.0V
F12.20	Input terminal status at the third fault	
	0 ～ 127	0

F12.21	Output terminal at the third fault	
	0 ～ 15	0
F12.22	Inverter status at the third fault	
	0 ～ 1FH	0
F12.23	Power-on time at the third fault	
	0 ～ 65535 hours	0
F12.24	Running time at the third fault	
	0 ～ 65535 hours	0
F12.25～F12.26	Reserved	
	Reserved	0
F12.27	Frequency at the second fault	
	0.00Hz～maximum frequency (F00.10)	0.00Hz
F12.28	Current at the second fault	
	0.00A ～ 655.35A	0.00A
F12.29	Bus voltage at the second fault	
	0.0V ～ 3000.0V	0.0V
F12.30	Input terminal status at the second fault	
	0 ～ 127	0
F12.31	Output terminal at the second fault	
	0 ～ 15	0
F12.32	Inverter status at the second fault	
	0 ～ 1FH	0
F12.33	Power-on time at the second fault	
	0 ～ 65535 hours	0
F12.34	Running time at the second fault	
	0 ～ 65535 hours	0
F12.35	Inverter overload protection gain	
	0.01～10.00	1.00

The user needs to correctly set the value of F12.35 according to the actual overload capacity of the inverter. If this parameter is set too high, it may cause the inverter to danger of inverter overheating and damage without alarm!

F12.35	Reserved	
	Reserved	0
F12.36	The reset time of undervoltage fault during operation	
	0.0s ～ 6553.s	0.0s
F12.37	Frequency at the first fault	
	0.00Hz～maximum frequency (F00.10)	0.00Hz

F12.38	Current at the first fault	
	0.00A ～ 655.35A	0.00A
F12.39	Bus voltage at the first fault	
	0.0V ～ 3000.0V	0.0V
F12.40	Input terminal status at the first fault	
	0 ～ 127	0
F12.41	Output terminal at the first fault	
	0 ～ 15	0
F12.42	Inverter status at the first fault	
	0 ～ 1FH	0
F12.43	Power-on time at the first fault	
	0 ～ 65535 hours	0
F12.44	Running time at first failure	
	0 ～ 65535 hours	0
F12.45	Block "E-08" selection	
	0 ～ 1	0

0: Invalid
1: Valid

F12.46	Power failure restart setting	
	00000 ～ 00011	00000

Units: Power-off restart selection
0: Invalid
1: Valid
Tens: Undervoltage restart selection
0: Invalid
1: Valid
Hundreds, Thousands, Tens of Thousands: Reserved

F12.47	Fault protection action selection 1	
	00000 ～ 22222	00000

Units: Motor overload (E-11)
0: Free Stop
When "Free stop" is selected, the inverter displays E-** and stops directly.
1: Stop according to the stop mode
When "Stop according to the stop mode" is selected: the inverter displays A** and stops according to the stop mode, and displays E-** after stopping.
2: Continue to run
When "Continue to run" is selected: the inverter continues to run and displays A**, and the running frequency is set by F12.54.
Tens: Input phase loss (E-12) (same as units)
Hundreds: Output phase loss (E-13) (same as units)
Thousands: External fault (E-15) (same as units)
Tens of thousands: Communication abnormality (E-16) (same as units)

F12.48	Fault protection action selection 2	
	00000 ～ 22010	00000

Units: Reserved
Tens: Function code read/write abnormality (E-21)
0: Free stop
1: Stop according to the stop mode
Hundreds: Reserved
Thousands: Motor overheating (E-25) (same as F12.47 units)
Tens of thousands: Running time reached (E-26) (same as F12.47 units)

F12.49	Fault protection action selection 3	
	00000 ～ 22222	00000

Units: User-defined fault 1 (E-27) (same as F12.47 units)
Tens: User defined fault 2 (E-28) (same as F12.47 units)
Hundreds: Power-on time reached (E-29) (same as F12.47 units)
Thousands: Load loss (E-30)
0: Free stop
1: Stop according to the stop mode
2: Directly jump to 7% of the rated frequency of the motor and continue to run. If the load is not lost, it will automatically return to the set frequency. Ten thousand digit: PID feedback loss during operation (E-31) (same as F12.47 units)

F12.50	Fault protection action selection 4	
	00000 ～ 00002	00000

Units: Speed deviation is too large (E-42) (same as F12.47 units)
Tens: Reserved
Hundreds: Reserved
Thousands: Reserved
Tens of thousands: Reserved

F12.51～F12.53 Reserved		
F12.54	Fault-related frequency selection	
	0～4	0

0: Run at the current operating frequency
1: Run at the set frequency
2: Run at the upper limit frequency
3: Run at the lower limit frequency
4: Run at the abnormal backup frequency

F12.55	Abnormal backup frequency	
	0.0% ～ 100.0%(maximum frequency)	100.0%

When a fault occurs during the operation of the inverter, and the handling method of the fault is set to continue to run, the inverter displays A** and runs at the frequency determined by F12.54. When the abnormal backup frequency is selected for operation, the value set by F12.55 is a percentage relative to the maximum frequency

F12.56～F12.58	Reserved	
	Reserved	0
F12.59	Instantaneous power failure action selection	

	0～2	0

0: Invalid
1: Deceleration
2: Deceleration stop

F12.60	Momentary stop action pause judgment voltage	
	80.0% ～ 100.0%	90.0%
F12.61	Momentary power failure voltage recovery judgment time	
	0.00s ～ 100.00s	0.50s
F12.62	Momentary power failure action judgment voltage	
	60.0% ～ 100.0%(standard bus voltage)	80.0%

F12.59~F12.62 means that when there is a momentary power outage or a sudden drop in voltage, the inverter reduces the output speed and uses the load feedback energy to compensate for the reduction in the inverter DC bus voltage to maintain the inverter's continued operation. If F12.59=1, the inverter decelerates when there is a momentary power outage or a sudden drop in voltage. When the bus voltage returns to normal, the inverter accelerates normally to the set frequency. The basis for judging whether the bus voltage has returned to normal is that the bus voltage is normal and the duration exceeds the F12.61 setting time; if F12.59=2, when there is a momentary power outage or a sudden drop in voltage, the inverter decelerates until it stops.

F12.63	Momentary stop action pauses judgment voltage	
	80.0% ～ 100.0%	90.0%

0: Invalid
1: Valid

F12.64	Load drop detection level	
	0.0% ～ 100.0% (motor rated current)	10.0%
F12.65	Load drop detection time	
	0.0s ～ 60.0s	1.0s

If the load drop protection function is effective, when the inverter output current is less than the load drop detection level F12.64 and the duration is longer than when the load drop detection time is F12.65, the inverter output frequency is automatically reduced to 7% of the rated frequency. During the load drop protection period, if the load is restored, the inverter automatically returns to run at the set frequency.

F12.66	Reserve	
	Reserve	0
F12.67	Reserve	
	Reserve	0
F12.68	Speed deviation detection value	
	0.0%~50.0% (maximum frequency)	20.0%
F12.69	Speed deviation detection time	
	0.0s ～ 60.0s	0.0s

This function is only valid when the inverter is running in vector control with speed sensor; when the inverter detects that the actual speed of the motor deviates from the set frequency, and the deviation is

greater than the speed deviation detection value F12.68, and the duration is greater than the speed deviation detection time F12.69, the inverter fault alarm E-42 is issued and processed according to the fault protection action mode. When the speed deviation
detection time is 0.0s, the speed deviation fault detection is canceled.

F12.70	Instantaneous stop non-stop gain Kp	
	0 ～ 100	40
F12.71	Instantaneous stop non-stop integral coefficient Ki	
	0 ～ 100	30

This parameter is only valid for "bus voltage constant control (F12.59=1)". If the process of instantaneous stop without stopping is prone to undervoltage, please increase the instantaneous stop/Continue gain and instantaneous stop/Continue integral coefficient.

F12.72	Instantaneous stop/Continue action deceleration time	
	0.0 ～ 300.0s	20.0s

This parameter is only valid for "deceleration stop (F12.59 = 2)". When the bus voltage is lower than the action voltage set by F12.62, the frequency converter performs deceleration stop, and the deceleration time is determined by this parameter instead of F00.18.

F12.73	Carrier automatic adjustment selection	
	00000 ～ 11111	00011

Units: Automatic adjustment of overload
0: Disable
1:
Valid
Tens: Automatic adjustment of start
Carrier
0: Disable
1: Valid
Hundreds, thousands, and ten thousand: Reserved

F13 Group-Communication Parameters

0～1: Reserved
2: 1200

F13.00	MODBUS communication baud	
	0～9	6

BPS
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 inverter. The baud rate set by the host computer and the inverter should be the same. Otherwise, communication cannot be carried out. The larger the baud rate setting, the faster the data communication. However, setting it too high will affect the stability of communication.

F13.01	MODBUS data format	
	0～3	1

0: No check (8-N-2)
1: Even check (8-E-1)
2: Odd check (8-O-1)
3: No check (8-N-1)

The data format set by the host computer and the inverter should be consistent, otherwise normal communication will not be possible.

F13.02	Local address	
	1～247	1

In 485 communications, this function code is used to identify the address of this inverter.

F13.03	MODBUS response delay	
	0～20ms	2

This function code defines the time interval between the inverter receiving the data frame and sending the response data frame to the host computer. If the response time is less than the system processing time, the system processing time shall prevail. If the delay is greater than the system processing time, the system will wait for a delay after processing the data until the response delay time is reached before sending the data to the host computer.

F13.04	RS485 communication timeout	
	0.1～60.0s	5.0

If RS485 communication does not receive the correct data signal within the time interval defined by this function code, it is considered that RS485 communication is abnormal, and the inverter will take corresponding actions according to the setting of F10.24. When this value is set to 0.0, RS485 communication timeout detection will not be performed.

F13.05	MODBUS protocol selection	
	0～1	1

0: Non-standard MODBUS protocol
1: Standard MODBUS protocol

F13.06	RS485 communication reads current resolution	
	0～1	0

0: 0.01A

F13.07	RS485 communication protocol selection	
	0～10	0

1: 0.1A
0: CD20 protocol
1: CD21 protocol
2 to 10: Reserved

F13.08	RS485 communication timeout detection selection	
	0～1	0

F13.09	Proportional linkage coefficient	
	0.01～10.00	1.00

0: Valid throughout
1: Shutdown is invalid

This function code is used to set the weight coefficient of the frequency command received by the inverter as a slave through the RS485 interface. The actual operating
frequency of the inverter is equal to the value of this function code multiplied by the frequency setting command value received through the RS485 interface. In the linkage control,
this function code can set the ratio of the operating frequencies of multiple inverters.

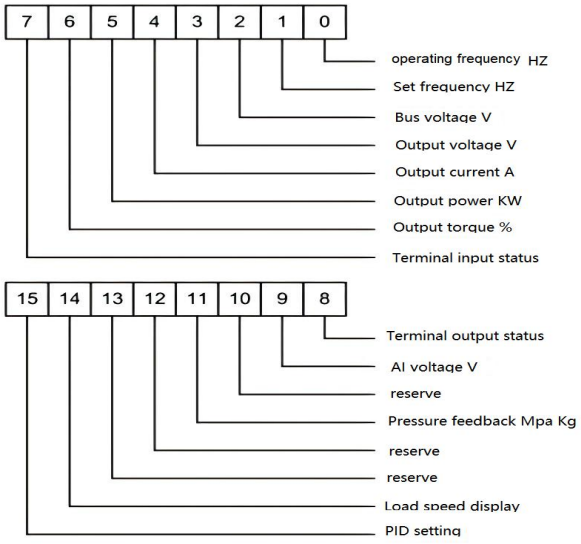
Model confirmation

F14.00	Retain	
	Retain	0
F14.01	STOP/RESET key function	
	0～1	1

0: The STOP/RES key stop function is valid only in keyboard operation mode
1: The STOP/RES key stop function is valid in any operation mode

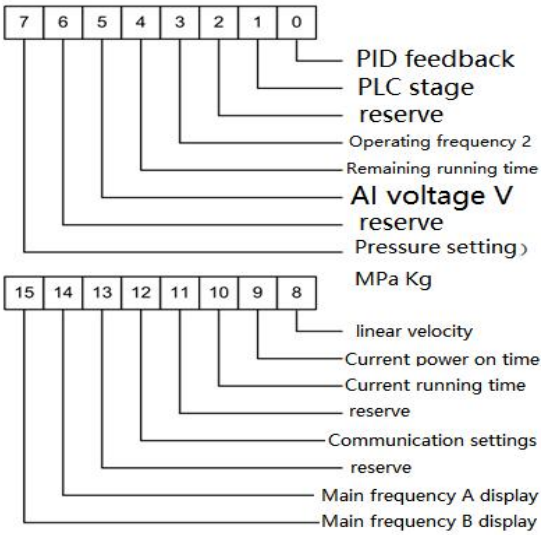
F14.02	LED operation display parameter 1	
	0000～FFFFH	1FH

If the above parameters need to be displayed during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it in F14.02.



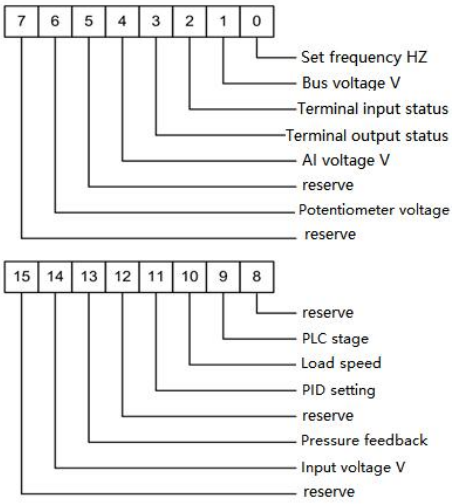
F14.03	LED operation display parameters 2	
	0000～FFFFH	1FH

If the above parameters need to be displayed during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it in F14.03.



F14.04	LED stop display parameter	
	0000～FFFFH	1FH

If you need to display the above parameters when the machine is stopped, set the corresponding position to 1, convert the binary number to hexadecimal and set it in F14.04.



F14.05	LED operation auxiliary display parameters	
	0 ～ 80	4
F14.06	LED stop auxiliary display parameter	
	0 ～ 80	38

By changing the setting value of the above function code, the monitoring items of the main monitoring interface can be changed. For example, if F14.05=3 is set, that is, if output voltage d00.03 is selected, during operation, the default display item of the auxiliary display interface is the current output voltage value.

F14.07	Load speed display coefficient	
	0.0001～6.5000	1.0000

When the load speed needs to be displayed, 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 F14.10.

F14.08	Inverter module heat sink temperature	
	0.0℃～ 100.0℃	0.0℃

Displays the temperature of the inverter module IGBT. The over-temperature protection value of the inverter module IGBT of different models is different.

F14.09	Cumulative running time	
	0h～65535h	0h

Displays the accumulated running time of the inverter. When the running time reaches the set running time F02.17, the inverter multi-function digital output function (12) Output ON signal.

F14.10	Load speed display decimal places	
	0～3	1

0: 0 decimal places
1: 1 decimal place 2:
2 decimal places 3: 3
decimal places are
used to set the number of decimal places for load speed display. If the load speed display coefficient F14.07 is 2.0000, the load speed the number of decimal places F12.10 is 2 (2 decimal places). When the inverter operating frequency is 40.00Hz, the load speed
is: 40.00*2.0000 = 80.00 (2 decimal places display); if the inverter is in the stop state, the load speed is displayed as the speed corresponding to the set frequency, that is, "set load speed". Taking the set frequency of 50.00Hz as an example, the load speed in the stop state is: 50.00*2.0000 = 100.00 (2 decimal places display)

F14.11	Accumulated power-on time	
	0h～ 65535h	0h

Displays the cumulative power-on time of the inverter since leaving the factory; when this time reaches the set power-on time (F02.16), the inverter function Digital output function (24) Output ON signal.

F14.12	Accumulated power consumption	
	0～65535 degrees	0 degrees

Displays the cumulative power consumption of the inverter so far.

F14.13	Hardware version number	
	V0.00～V9.99	V1.00
F14.14	Software version number	
	V0.00～V9.99	V1.00
F14.15	Software batch number	
	0.0000～9.9999	4.0706

F15 Group - Function Code

F15.00	User Password

	0～65535	00000

If F15.00 is set to any non-zero number, the password protection function will take effect. The next time you enter the menu, you must enter the password correctly, otherwise you will not be able to view and modify the function parameters. Please remember the set user password. If F15.00 is set to 00000, the set user password will be cleared and the password protection function will be invalid.

F15.01	Parameter initialization	
	0～3	0

0: No operation
The inverter is in normal parameter reading and writing state. Whether the function code setting value can be changed is related to the setting state of the user password and the current working state of the inverter.
1: All user parameters except motor parameters are restored to factory settings. Motor parameters are not restored, and other user parameters are restored to factory settings according to the model.
2: All user parameters are restored to factory settings. All user parameters are restored to factory settings according to the model.
3: Clear fault records. Clear the contents of the fault records (F12.14~F12.44).
After the operation is completed, this function code is automatically cleared to 0.

F15.02	Function code modification attributes	
	0～1	0

0: editable
1: uneditable
The user sets whether the function code parameters can be modified to prevent the function parameters from being modified by mistake. The function code is set to 0. When it is set to 1, all function codes can be modified; when it is set to 1, all function codes can only be viewed but cannot be modified

F15.03 ～F15.04	Reserved	
	Reserved	0

F16 Group - Water Supply Parameters Group

F16.00～ F16.04	Reserved	
	Reserved	0
F16.05	Water pump sleep waiting time	
	0.0～3600.0S	2.0
F16.06	Water pump wake-up waiting time	
	0.0～3600.0S	1.0
F16.07	Water pump wake-up pressure point	
	(0.0-100.0%)*（F16.08）	80.0%
F16.08	Pressure setting (MPa, Kg)	
	0.00～F15.09 (MPa, Kg)	5.00
F16.09	Sensor range	
	0.00-100.00 (MPa, Kg)	10.00

This function code can be used to set the minimum voltage reference for maximum power tracking. The minimum voltage reference for maximum power tracking = photovoltaic maximum operating voltage of the panel/open circuit voltage of the photovoltaic panel.

F16.10	Solar panel maximum power node	
	50.0%～100.0%	81.0

This parameter can adjust the output frequency corresponding to the maximum power point. It should be set reasonably. Setting it too high will cause weak magnetic field Valid for F00.00=8

F16.11	VF speed adjustment coefficient	
	0.000～2.000	1.000

This parameter can adjust the output frequency corresponding to the maximum power point. It should be set reasonably. Setting it too high will cause weak magnetic field. This parameter is only valid when F00.00=8.

F16.12	MPPT high point working voltage	
	（F16.13）～200.0%	100.0%
F16.13	MPPT low point working voltage	
	0.0%~(F16.12)	75.0%
F16.14	MPPT high point voltage frequency point	
	0.00Hz~maximum frequency (F00.10)	50.00
F16.15	MPPT low point voltage frequency point	
	0.00Hz~maximum frequency (F00.10)	0.00
F16.16	MPPT low voltage protection point	
	40.0%~100.0%	45.0%
F16.17	Water shortage detection starting frequency	
	0.00Hz~maximum frequency (F00.10)	10.00
F16.18	PV water pump water shortage detection current corresponding to no-load current ratio	
	0.0%~300.0%*no-load current (F03.10)	0.0
F16.19	Photovoltaic water pump water shortage detection time	
	0～6000.0s	0.0
F16.20	PV undervoltage self-start delay	
	0.1～6000.0s	2.0
F16.21	Photovoltaic water shortage self start delay	
	0.1～6000.0s	15.0

When F00.00=7 (PV water supply voltage tracking mode), when the bus voltage (d00.02) is higher than the MPPT high point working voltage (F16.12) setting value, it runs at the maximum frequency; if it is lower than the MPPT high point working voltage (F16.13) setting value, it runs at the frequency obtained by (bus voltage/MPPT high point working voltage) * maximum frequency. If the bus voltage reaches the MPPT low point working voltage (F16.13), it runs at the water shortage detection starting frequency (F16.17). If the inverter runs above the water shortage detection starting frequency, and the output current is less than the motor no-load current * the photovoltaic water pump water shortage detection current corresponding to the no-load current ratio (F16.18), after the photovoltaic water pump water shortage detection time (F16.19), the inverter reports a water shortage fault E-65.

F16.22	Power search time	
	0.050～60.000	0.500

F16.23	Power search speed gain	
	10～500	125
F16.24	Power search speed gain	
	1～1000	100
F16.25	Pre-search frequency rise time	
	0.01～600.00s	15.00
F16.26	Pre-search frequency reduction time	
	0.01～600.00s	15.00

F16.20=0.0, the undervoltage self-start function is invalid; when F16.21=0.0, the photovoltaic water shortage self-start function is invalid.

When F00.00=8 (PV water supply power tracking VF mode) and F00.00=9 (PV water supply power tracking SVC mode), F16.22~F16.26 are effective.

F16.27	Water pump sleep frequency	
	0.00~upper limit frequency (F00.12)	20.00

F17.00	DPWM switching upper limit frequency	
	0.00Hz~maximum frequency	8.00Hz

F17 group - control optimization parameters

Only valid for VF control; the wave mode of the asynchronous machine during VF operation is determined. If it is lower than this value, it is a 7-segment continuous modulation mode, otherwise it is a 5-segment intermittent modulation mode. When it is a 7-segment continuous modulation mode, the switching loss of the inverter is large, but the current ripple is small; in the 5-segment intermittent debugging mode, the switching loss is small and the current ripple is large; but at high frequencies, it may cause instability in motor operation, and generally no modification is required. For VF operation instability, please refer to function code F06.11, and for inverter loss and temperature rise, please refer to function code F00.15.

F17.01	PWM modulation method	
	0～1	0

0: Asynchronous modulation
1: Synchronous modulation

Only valid for VF control; synchronous modulation means that the carrier frequency changes linearly with the output frequency to ensure that the ratio of the two (carrier ratio) remains unchanged. It is generally used when the output frequency is high, which is beneficial to the output voltage quality. At lower output frequencies (below 100Hz), synchronous modulation is generally not required, because the ratio of the carrier frequency to the output frequency is relatively high, and the advantages of asynchronous modulation are more obvious. Synchronous modulation is only effective when the operating frequency is higher than 85Hz, and the asynchronous modulation mode is fixed below this frequency.

F17.02	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 used when there are special requirements for the quality of the output voltage waveform or when the motor oscillates or has other abnormalities.
You need to try switching to different compensation modes; compensation mode 2 is recommended for high power.

F17.03	Random PWM Depth	
	0～10	0

0: Random PWM is invalid
1 to 10: PWM carrier frequency random depth

Enabling the fast current limiting function can minimize the inverter overcurrent faults and ensure uninterrupted operation of the inverter.
If the inverter is in the fast current limiting state for a long time, it may be damaged by overheating, which is not allowed.
When the inverter is in rapid current limiting for a long time, an alarm fault E-40 will be issued, indicating that the inverter is overloaded and needs to be shut down.

F17.04	Wave-by-wave current limiting enable	
	0～1	1

0: Disable
1: Enable
Enabling the fast current limiting function can minimize the inverter overcurrent faults and ensure the uninterrupted operation of the inverter. If the inverter is in the fast current limiting state for a long time, the inverter may be damaged by overheating, which is not allowed. Therefore, when the inverter is in the fast current limiting state for a long time, the inverter will alarm fault E-40, indicating that the inverter is overloaded and needs to be shut down.

F17.05	Maximum output voltage coefficient	
	100～110%	105%
F17.06	Undervoltage point setting	
	200.0V～2000.0V	Model confirmation
F17.07	Reserved	
	Reserved	0
F17.08	Overvoltage point setting	
	200.0V～2200.0V	Model confirmation

Used to set the voltage value of the inverter overvoltage fault. The factory values of different voltage levels are:

Voltage level:	Overvoltage point factory value
Single-phase 220V,	400.0V
Three-phase 220V	400.0V
Three-phase 380V	800.0V

F17.09～ F17.10	Reserved	
	Reserved	0

FFF Group-Manufacturer Parameters

FFF.00	Manufacturer password	
	0 ～65535	00000

Chapter 8 EMC (Electromagnetic Compatibility)

8.1 Definitions

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

8.2 Introduction to EMC standards

According to the requirements of national standard GB/T12668.3, the inverter needs to meet the requirements of electromagnetic interference and anti-electromagnetic interference.
Our existing products implement the latest international standard: IEC / EN 61800-3: 2004 (Adjustable speed electrical power drive systems part 3: EMC requirements and specific test methods), which is equivalent to the national standard GB/T12668.3.

IEC/EN61800-3 mainly examines the inverter from two aspects: electromagnetic interference and anti-electromagnetic interference. Electromagnetic interference mainly tests the radiated interference, conducted interference and harmonic interference of the inverter (this requirement applies to inverters used for civil purposes). Anti-electromagnetic interference mainly tests the conducted immunity, radiated immunity, surge immunity, fast mutation pulse group immunity, ESD immunity and power supply low-frequency end immunity of the inverter specific test items are:
1. Input voltage sag, interruption and change immunity test;
2. Phase change notch immunity test;
3. Harmonic input immunity test;
4. Input frequency change test;
5. Input voltage imbalance test;
6. Input voltage fluctuation test). In accordance with the strict requirements
of the above IEC/EN61800-3, our company's products are tested.
The product is installed and used according to the instructions shown in 7.3 and will have good electromagnetic compatibility in general industrial environments

8.3 EMC Guidance

8.3.1 Impact of Harmonics:

The high-order harmonics of the power supply can damage the inverter. Therefore, in some places where the quality of the power grid is relatively 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 in the surrounding environment to the inverter, and the other is the interference generated by the inverter to the surrounding equipment.
Installation precautions:
1) The grounding wire of the inverter and other electrical products should be well grounded;
2) The power input and output wires and weak current signal wires (such as control lines) of the inverter should not be arranged in parallel as much as possible, and should be arranged vertically if conditions permit;
3) It is recommended to use shielded cables for the output power lines of the inverter, or use steel pipes to shield the power lines, and the shielding layer must be reliably grounded. For the leads of the interfered equipment, it is recommended to use twisted-pair shielded control wires, and the shielding layer must be reliably grounded;

4) For motor cables longer than 100m, it is required to install an output filter or reactor.

8.3.3 How to deal with the interference of surrounding electromagnetic equipment on the inverter:

The reason for the electromagnetic influence on the inverter is generally that a large number of relays, contactors or electromagnetic brakes are installed near the inverter.
When the inverter is disturbed and malfunctions, it is recommended to use the following solutions:
Install a surge suppressor on the device that generates interference;
2) Install a filter at the input end of the inverter. Refer to 7.3.6 for details.
3) Use shielded cables for the inverter control signal lines and detection circuit leads and ground the shielding layer reliably.

8.3.4 How to deal with the interference of the inverter to the peripheral equipment:

This part of noise is divided into two types: one is the radiation interference of the inverter, and the other is the conduction interference of the inverter. These two types of interference make the surrounding electrical equipment subject to electromagnetic or electrostatic induction, which in turn causes the equipment to malfunction. For several different interference situations, refer to the following methods to solve them:
1) The instruments, receivers and sensors used for measurement generally have weak signals. If they are close to the inverter or in the same control cabinet, they are easily interfered and malfunction. It is recommended to use the following methods to solve them: Try to stay away from the interference source; do not lay the signal line and the power line in parallel, especially do not bundle them together in parallel; use shielded wires for signal lines and power lines, and ground them well; add ferrite magnetic rings on the output side of the inverter (select the suppression frequency within the range of 30-1000MHz), and wind 2-3 turns in the same direction. For severe situations, you can choose to install EMC output filters;
2) When the interfered equipment and the inverter use the same power supply, it will cause conducted interference. If the above methods cannot eliminate the interference, you should install EMC filters between the inverter and the power supply (refer to 7.3.6 for selection operations);
3) Peripheral equipment is grounded separately to eliminate the interference caused by leakage current in the inverter grounding wire when the ground is shared.

8.3.5 Leakage current and treatment:

When using the inverter, there are two forms of leakage current: one is leakage current to the ground; the other is leakage current between lines.
1) Factors affecting leakage current to the ground and solutions:
There is distributed capacitance between the conductor and the earth. The larger the distributed capacitance, the greater the leakage current; effectively reduce the distance between the inverter and the motor to reduce the distributed capacitance. The larger the carrier frequency, the greater the leakage current. The carrier frequency can be reduced to reduce the leakage current. However, reducing the carrier frequency will cause the motor noise to increase. Please note that installing a reactor is also an effective way to solve the leakage current.
The leakage current will increase with the increase of the loop current, so when the motor power is large, the corresponding leakage current is large.
2) Factors causing leakage current between lines and solutions:
There is distributed capacitance between the inverter output wiring. If the current passing through the line contains high-order harmonics, it may cause resonance and generate leakage current. At this time, if a thermal relay is used, it may cause it to malfunction.
The solution is to reduce the carrier frequency or install an output reactor. When using the inverter, it is recommended not to install a thermal relay between the inverter and the motor, and use the inverter's electronic overcurrent protection function.

8.3.6 Precautions for installing an EMC input filter at the power input:

1) Note: Please use the filter strictly according to the rated value; since the filter belongs to Class I electrical appliances, the metal shell ground 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 conductive continuity, otherwise

there will be a risk of electric shock and serious impact on the EMC effect;
2) Through EMC testing, it was found that the filter ground must be connected to the same common ground as the inverter PE terminal ground, otherwise it will seriously affect the EMC effect;
3) The filter should be installed as close to the power input terminal of the inverter as possible.

8.3.7 Solutions to the interference of the inverter to the peripheral equipment:

There are two types of noise: one is the radiation interference of the inverter, and the other is the conduction interference of the inverter. These two types of interference cause the peripheral electrical equipment to be affected by electromagnetic or electrostatic induction, which in turn causes the equipment to malfunction. For different interference situations, refer to the following methods to solve them:
1) The signals of the instruments, receivers and sensors used for measurement are generally weak. If they are close to the inverter or in the same control cabinet, they are easily disturbed and malfunction. It is recommended to use the following solutions: Keep away from the interference source as much as possible; Do not lay the signal line and the power line in parallel, especially do not bundle them together in parallel; Use shielded wires for the signal line and the power line, and ground them well; Add a ferrite ring on the output side of the inverter (select the suppression frequency within the range of 30 to 1000MHz), and wind it 2 to 3 turns in the same direction. For severe conditions, you can choose to install an EMC output filter;
2) When the interfered device and the inverter use the same power supply, it will cause conducted interference. If the above methods cannot eliminate the interference. If there is interference, an EMC filter should be installed between the inverter and the power supply (refer to 7.3.6 for selection).
3) The peripheral equipment is grounded separately to eliminate the interference caused by leakage current in the inverter grounding wire when the equipment is grounded together.

8.3.8 Leakage current and treatment:

There are two forms of leakage current when using the inverter: one is the leakage current to the ground; the other is the leakage current between the wires.
1) Factors affecting the leakage current to the ground and solutions: There is distributed capacitance between the wire and the earth. The larger the distributed capacitance, the greater the leakage current; effectively reduce the distance between the inverter and the motor to reduce the distributed capacitance. The larger the carrier frequency, the greater the leakage current. The carrier frequency can be reduced to reduce the leakage current. However, reducing the carrier frequency will increase the motor noise. Please note that installing a reactor is also an effective way to solve the leakage current.
The leakage current will increase with the increase of the loop current, so when the motor power is large, the corresponding leakage current is large.
2) Factors causing leakage current between lines and solutions: There is distributed capacitance between the inverter output wiring. If the current passing through the line contains high order harmonics, it may cause resonance and generate leakage current. At this time, if a thermal relay is used, it may cause it to malfunction. The solution is to reduce the carrier frequency or install an output inductor. When using the inverter, it is recommended not to install a thermal relay between the inverter and the motor, and use the inverter's electronic overcurrent protection function.

8.3.9 Precautions for installing an EMC input filter at the power input :

1) Note: Please use the filter strictly according to the rated value; since the filter belongs to Class I electrical appliances, the metal shell of the filter should have good contact with the metal ground of the installation cabinet over a large area, and it is required to have good conductive continuity, otherwise there will be a risk of electric shock and serious impact on the EMC effect;
2) Through EMC testing, it is found that the filter ground must be connected to the same public ground as the inverter PE terminal ground, otherwise it will seriously affect the EMC effect.
3) The filter should be installed as close to the power input terminal of the inverter as possibl

Chapter 9 Fault Diagnosis and Countermeasures

Fault name	Operation panel Display	Troubleshooting	Troubleshooting measures
Inverter unit protection	E-01	1. Short circuit of inverter output circuit 2. Wiring between motor and inverter is too long 3. Module overheating 4. Loose wiring inside inverter 5. Abnormal main control board 6. Abnormal drive board 7. Abnormal inverter module	1. Eliminate peripheral faults 2. Install reactors or output filters 3. Check whether the air duct is blocked and whether the fan is working properly and eliminate any problems 4. Plug in all connecting wires 5. Seek technical support 6. Seek technical support 7. Seek technical support
Acceleration overcurrent	E-02	1. The inverter output circuit is grounded or short-circuited 2. The control mode is vector and parameter identification is not performed 3. The acceleration time is too short 4. Manual torque boost or V/F curve is not suitable 5. The voltage is too low 6. The rotating motor is started 7. The load is suddenly added during acceleration 8. The inverter is too small	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Increase acceleration time 4. Adjust manual torque increase or V/F curve 5. Adjust voltage to normal range 6. Select speed tracking start or wait for the motor to stop before restarting 7. Cancel sudden load 8. Select a frequency converter with a higher power rating
Deceleration overcurrent	E-03	1. The inverter output circuit is grounded or short-circuited 2. The control mode is vector and parameter identification is not performed 3. The deceleration time is too short 4. The voltage is low 5. The load is suddenly added during deceleration 6. The brake unit and brake resistor are not installed	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Increase deceleration time 4. Adjust voltage to normal range 5. Eliminate sudden load 6. Install brake unit and resistor
Constant speed overcurrent	E-04	1. The inverter output circuit is grounded or short-circuited 2. The control mode is vector and parameter identification is not performed 3. The voltage is too low 4. Is there a sudden load during operation	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Adjust the voltage to the normal range 4. Eliminate sudden loads 5. Select a frequency converter with a higher power rating

		5. The inverter is too small	
Acceleration overvoltage	E-05	1. The input voltage is too high 2. There is an external force dragging the motor during acceleration 3. The acceleration time is too short 4. The brake unit and brake resistor are not installed	1. Adjust the voltage to the normal range 2. Cancel the external power or install a brake resistor 3. Increase the acceleration time 4. Install a brake unit and resistor
Deceleration overvoltage	E-06	1. The input voltage is too high 2. There is an external force dragging the motor during deceleration 3. The deceleration time is too short 4. The brake unit and brake resistor are not installed	1. Adjust the voltage to the normal range 2. Cancel the external power or install a brake resistor 3. Increase the deceleration time 4. Install a brake unit and resistor
Constant speed overvoltage	E-07	1. The input voltage is too high 2. There is an external force dragging the motor during operation	1. Adjust the voltage to the normal range 2. Cancel the external power or install a braking resistor
Control power supply failure	E-08	1. The input voltage is not within the specified range	1. The input voltage is not within the specified range
Undervoltage fault	E-09	1. Momentary power failure 2. The voltage at the inverter input terminal is not within the range required by the specification 3. The bus voltage is abnormal 4. The rectifier bridge and buffer resistor are abnormal 5. The drive board is abnormal 6. The control board is abnormal	1. Reset the fault 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	E-10	1. Is the load too large or the motor is blocked? 2. The inverter is too small	1. Reduce the load and check the motor and mechanical condition 2. Choose a frequency converter with a higher power rating
Motor overload	E-11	1. Abnormal three-phase input power supply 2. Abnormal driver board 3. Abnormal lightning protection board 4. Abnormal main control board	1. Check and eliminate problems in peripheral circuits 2. Seek technical support 3. Seek technical support 4. Seek technical support
Input phase loss	E-12	1. Abnormal three-phase input power supply 2. Abnormal driver board 3. Abnormal lightning protection board 4. Abnormal main control board	1. Check and eliminate problems in peripheral circuits 2. Seek technical support 3. Seek technical support 4. Seek technical support

Output phase loss	E-13	1. The lead from the inverter to the motor is abnormal 2. The three-phase output of the inverter is unbalanced when the motor is running 3. The drive board is abnormal 4. The module is abnormal	1. Eliminate peripheral faults 2. Check whether the three-phase winding of the motor is normal and eliminate the faults 3. Seek technical support 4. Seek technical support
Module overheating	E-14	1. Ambient temperature is too high 2. Air duct is blocked 3. Fan is damaged 4. Module thermistor is damaged 5. Inverter module is damaged	1. Lower the ambient temperature 2. Clean the air duct 3. Replace the fan 4. Replace the thermistor 5. Replace the inverter module
External device failure	E-15	1. Input external fault signal through multi-function terminal X	1. Reset operation
Communication failure	E-16	1. The host computer is not working properly 2. The communication line is not working properly 3. The communication expansion card F00.28 is not set correctly 3. The communication parameter F13 group is not set correctly	1. Check the host computer wiring 2. Check the communication connection line 3. Correctly set the communication expansion card type 4. Correctly set the communication parameters
Current detection failure	E-18	1. Check if the Hall device is abnormal 2. Driver board is abnormal	1. Replace the Hall device 2. Replace the driver board
Motor tuning failure	E-19	1. The motor parameters are not set according to the nameplate 2. The parameter identification process has timed out	1. Correctly set the motor parameters according to the nameplate 2. Check the leads from the inverter to the motor
EEPROM 读写故障	E-21	1. EEPROM chip is damaged	1. Replace the main control board
Inverter hardware fault	E-22	1. Overvoltage exists 2. Overcurrent exists	1. Handle the overvoltage fault 2. Handle the overcurrent fault
Cumulative running time Arrival failure	E-26	1. The cumulative running time reaches the set value	1. Use parameter initialization function to clear recorded information
User defined Fault 1	E-27	1. Input the signal of user-defined fault 1 through multi-function terminal X	1. Reset operation
User defined Fault 2	E-28	1. Input the signal of user-defined fault 2 through multi-function terminal X	1. Reset operation
Cumulative power-on time Arrival fault	E-29	1. The cumulative power-on time reaches the set value	1. Use the parameter initialization function to clear the recorded information
Load drop fault	E-30	1. The inverter running current is less than F12-64	1. Confirm whether the load is disconnected or whether the F12-64, F12-65 parameter settings are consistent with the actual operating conditions

PID feedback loss fault during operation	E-31	1. PID feedback is less than the set value of F09.26	1. Check the PID feedback signal or set F09.26 to a suitable value
Wave-by-wave current limiting fault	E-40	1. Is the load too large or the motor is blocked? 2. The inverter is too small	1. Reduce the load and check the motor and mechanical condition 2. Choose a frequency converter with a higher power rating
Speed deviation is too large Fault	E-42	1. No parameter identification was performed 2. The speed deviation detection parameters F12.68~F12.69 are set unreasonably	1. Perform motor parameter identification 2. Set detection parameters reasonably according to actual conditions
Initial position error	E-51	1. The motor parameters deviate too much from the actual ones.	1. Reconfirm whether the motor parameters are correct, and pay special attention to whether the rated current is set too low.
Master-slave control slave failure	E-55	The slave fails, check the slave.	Start troubleshooting according to the slave fault code
Brake pipe protection failure	E-60	The brake resistor is short-circuited or the brake module is abnormal.	Check the brake resistor or seek technical support
PV water shortage detection failure	E-65	The photovoltaic water pump is short-circuited.	See F16.10~F16.26 for details

Common faults and their solutions

Serial number	Fault phenomenon	Possible causes	Workaround
1	No display after power on	The grid voltage is not available or is too low; The switch power supply on the inverter drive board is faulty; The rectifier bridge is damaged; The inverter buffer resistor is damaged; The control board or keyboard is faulty; The connection between the control board and the drive board or keyboard is broken	Check the input power; Check the bus voltage; Seek manufacturer service;
2	Displays "P.OFF" after power on	The connection between the drive board and the control board is poor; The related components on the control board are damaged; The motor or motor line is short-circuited to the ground; Hall fault; The grid voltage is too low	Seek manufacturer services;
3	The inverter displays normally after power on, displays "P.OFF" after operation and	The fan is damaged or blocked; The peripheral control terminal wiring is short-circuited;	Replace the fan; eliminate external short circuit fault;

	stops immediately		
4	Frequently reports E-14 (module overheating) fault	The carrier frequency is set too high. The fan is damaged or the air duct is blocked. The internal components of the inverter are damaged (thermocouple or other)	Reduce carrier frequency (F00.15); Replace the fan and clean the air duct; Seek manufacturer service;
5	The motor does not rotate after the inverter is running.	Motor and motor line; Inverter parameter setting error (motor parameters); Poor contact between the drive board and the control board; Drive board failure;	Reconfirm the connection between the inverter and the motor; Replace the motor or eliminate the mechanical fault; Check and reset the motor parameters;
6	X terminal is invalid.	Parameter setting error; External signal error; Control board failure;	Check and reset the relevant parameters of group F07; Reconnect the external signal line; Seek manufacturer service;
7	The inverter frequently reports overcurrent and overvoltage faults.	The motor parameters are set incorrectly; The acceleration and deceleration time is not appropriate; The load fluctuates;	Reset motor parameters or perform motor tuning; Set appropriate acceleration and deceleration time; Seek manufacturer service;
8	All digital tubes light up after power on	Related components on the control board are damaged;	Replace the control board;

During operation, if an abnormality occurs, the inverter will immediately block the PWM output and enter the fault protection state. At the same time, the fault code displayed on the keyboard flashes to indicate the current fault information. At the same time, the fault indicator ALM lights up. At this time, you need to check the cause of the fault and the corresponding treatment method according to the prompts in this section. If the problem still cannot be solved, please contact our company directly. For the corresponding solutions, please refer to Table 9-1 Fault Diagnosis and Troubleshooting.

Appendix 1: Modbus Communication Protocol

The CD20 series inverter provides RS485 communication interface and supports Modbus-RTU slave communication protocol. Users can realize centralized control through computer or PLC, set inverter operation command, modify or read function code parameters, read inverter working status and fault information through this communication protocol.

1. Protocol content

This serial communication protocol defines the information content and usage format transmitted in serial communication. It includes: host polling (or broadcast) format; host encoding method, including: function code for required action, transmission data and error checking, etc. The response of the slave also adopts the same structure, including: action confirmation, return data and error checking, etc. If the slave has an error when receiving information, or cannot complete the action required by the host, it will organize a fault message as a response to the host.

2. Application method

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

3. Bus structure

(1) Hardware interface

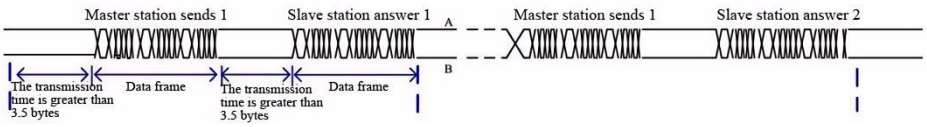
The inverter terminals 485+ and 485- are Modbus communication interfaces.

(2) Topology

Single host and multiple slaves system. Each communication device in the network has a unique slave address. One of the devices acts as the communication host (usually a PC host, PLC, HMI, etc.), actively initiates communication, and performs parameter read or write operations on the slave. The other devices act as communication slaves, responding to the host's inquiries or communication operations on the local device. Only one device can send data at the same time, while the other devices are in the receiving state. The setting range of the slave address is 1 to 247, and 0 is the broadcast communication address. The slave address in the network must be unique.

(3) Communication transmission mode

Asynchronous serial, half-duplex transmission mode. In the process of serial asynchronous communication, data is sent in the form of a message, one frame of data at a time. The MODBUS-RTU protocol stipulates that when the idle time without data on the communication data line is greater than the transmission time of 3.5 bytes, it indicates the start of a new communication frame.

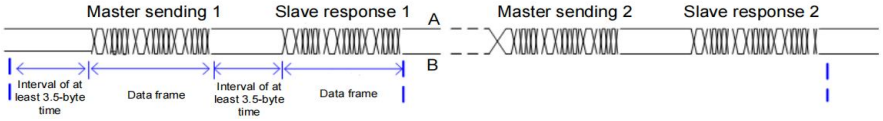


The built-in communication protocol of the C500 series inverter is the Modbus-RTU slave communication protocol, which can respond to the host's "query/command", or make corresponding actions according to the host's "query/command", and communicate data responses.

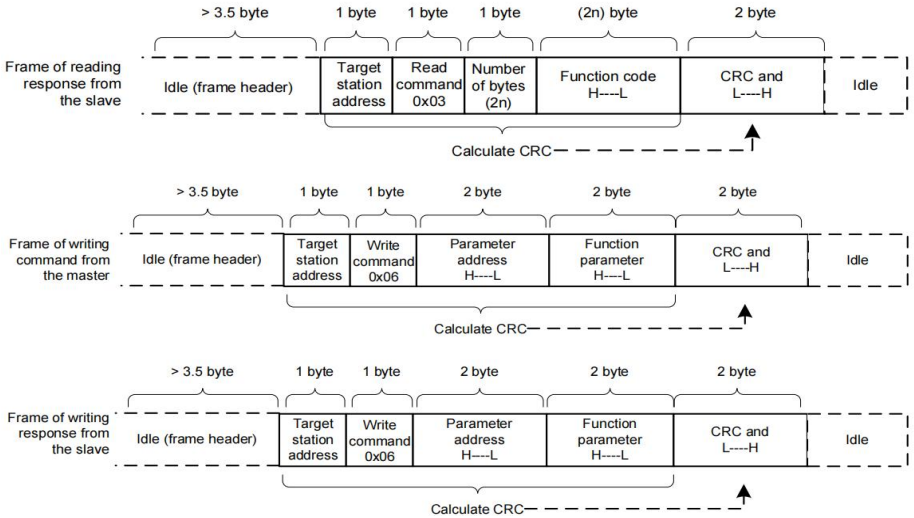
The host can refer to a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc. The host can communicate with a slave individually, and can also broadcast information to all lower-level slaves. For the host's individual access to "query/command", the accessed slave must return a response frame; for the broadcast information sent by the host, the slave does not need to feedback the response to the host.

4. Communication data structure

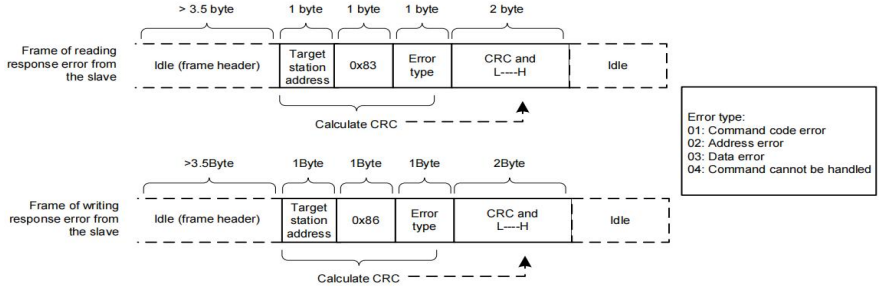
The Modbus protocol communication data format of the C500 series inverter is as follows. The inverter only supports the reading or writing of Word type parameters, and the corresponding communication read operation command is Ox03; the write operation command is 0x06, and does not support byte or bit read and write operations:



Theoretically, the host computer can read several consecutive function codes at a time (that is, n can be up to 12 at most), but be careful not to skip the last function code of this function code group, otherwise an error will be reported.



If the slave detects a communication frame error, or read/write failures due to other reasons, it will reply with an error frame.



Data frame field description:

Frame header START	Idle time greater than 3.5 characters transmission time
Slave address ADR	Communication address range: 1~247; 0 = broadcast address
Command code CMD	03: read slave parameters; 06: write slave parameters
Function code address H	Parameter address inside the inverter, hexadecimal representation; divided into function code type and non-function code type (such as operation status parameters, operation commands, etc.) parameters, etc., see address definition for details. When transmitting, the high byte is in front and the low byte is in the back.
Function code address L	
Number of function codes H	The number of function codes read in this frame, if 1, means reading 1 function code. When transmitting, the high byte is in front and the low byte is in the back.
Number of function codes L	
Data H	This protocol can only rewrite 1 function code at a time, and there is no such field.
Data L	
CRC CHK high bit	The data of the response, or the data to be written, when transmitted, the high byte is in front and the low byte is in the back.
CRC CHK low bit	

END	Detection value: CRC16 check value. When transmitting, the high byte is in front and the low byte is in the back. For the calculation method, please refer to the description of CRC check in this section.

CRC check method:

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

CRC is first stored in 0xFFFF, and then a process is called to process the continuous 8-bit bytes in the message with the value in the current register. Only the 8-bit data in each character is valid for CRC, and the start bit, stop bit and parity bit are invalid. During the CRC generation process, each 8-bit character is XORed with the register content individually, and the result moves toward the least significant bit, and the most significant bit is filled with 0. The LSB is extracted for detection. If the LSB is 1, the register is XORed with the preset value individually. If the LSB is 0, it is not performed. The whole process is repeated 8 times. After the last bit (the 8th bit) is completed, the next 8-bit byte is XORed with the current value of the register. The final value in the register is the CRC value after all bytes in the message are executed.

When the CRC is added to the message, the low byte is added first, then the high 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）;
}
```

4. Address definition of communication parameters

Read and write function code parameters (some function codes cannot be changed and are only used by manufacturers or monitoring):

Use function code group number and label as parameter address representation rule:

High byte: F00~FFF (F group), d00 (D group)

Low byte: 00~FF

For example: if you want to range function code F00.20, the access address of the function code is represented as 0xA014;

Note:

Some parameters cannot be changed when the inverter is in operation; some parameters cannot be changed regardless of the inverter state; when changing function code parameters, you must also pay attention to the parameter range, unit and related instructions.

Function code group number	Communication access address	Communication modifies the function code address in RAM

F00～F15 group	0xA000 ～ 0xAFFF	0x4000 ～ 0x4FFF
F16～F17 group	0xB000 ～ 0xB1FF	0x5000 ～ 0x51FF
FFF group	0xCF00 ～ 0xCFFF	0x6F00 ～ 0x6FFF
d00 group	0x7000 ～ 0x70FF	

Note that because EEPROM is frequently stored, it will reduce the service life of EEPROM. Therefore, some function codes do not need to be stored in the communication mode. You only need to change the value in RAM.

5. Stop/Run parameters:

Parameter address	Parameter description	Parameter address	Parameter description
1000H	* Communication setting value (decimal)	1010H	PID setting
1001H	－10000~10000	1011H	PID feedback
1002H	Operating frequency	1012H	PLC step
1003H	Bus voltage	1013H	Reserved
1004H	Output voltage	1014H	Feedback speed, unit 0.1Hz
1005H	Output current	1015H	Remaining running time
1006H	Output power	1016H	AI voltage before correction
1007H	Output torque	1017H	Reserved
1008H	Operating speed	1018H	Panel potentiometer voltage before correction
1009H	Input flag of digital input terminal	1019H	Line speed
100AH	Output flag of digital output terminal	101AH	Current power-on time
100BH	AI voltage	101BH	Current running time
100CH	Reserved	101CH	Reserved
100DH	Panel potentiometer voltage	101DH	Communication setting value
100EH	Reserved	101EH	Actual feedback speed
100FH	Reserved	101FH	Main frequency A display
–	–	1020H	Auxiliary frequency B display

Note:
The communication setting value is a percentage of the relative value, 10000 corresponds to 100.00%, -10000 corresponds to -100.00%.
Control command input to the inverter: (write only)

Command word address	Command function
2000H	0001: Forward operation
	0002: Reverse operation
	0003: Forward 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 operation
	0002: Reverse operation
	0003: Stop

Parameter lock password verification: (If the return value is 8888H, it means the password verification has passed)

User password address	Enter the password content
AF00H	*****

Parameter initialization:

Command address	Command content
AF01H	0～FFFF 表示 0～65535

Digital output terminal control: (write only)

Command address	Command content
2001H	BIT0～BIT1: Reserved BIT2: R output control BIT3: Reserved

Analog output AO control: (write only)

Command address	Command content
2002H	0 to 7FFF represents 0% to 100%

Inverter fault address	Inverter fault information	
8000H	0000: No fault 0001: Reserved 0002: Acceleration overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Acceleration overvoltage 0006: Deceleration Overvoltage 0007: Constant speed overvoltage 0008: Buffer resistor overload fault 0009: Undervoltage fault 000A: Inverter overload 000B: Motor overload 000C: Input phase loss 000D: Output phase loss 000E: Module overheated 000F: External fault 0010: Communication abnormality 0011: Reserved 0012: Current detection fault 0013: Motor tuning fault 0014: Reserved	0015: Parameter read and write abnormality 0016: Inverter hardware failure 0017: Reserved 0018: Reserved 0019: Reserved 001A: Running time reached 001B: User-defined fault 1 001C: User-defined fault 2 001D: Power-on time reached 001E: Load lost 001F: PID feedback lost during operation 0028: Fast current limiting timeout fault 002A: Speed deviation is too large 005C: Initial position error 0041:Photovoltaic water shortage detection failure

5. VFD fault description:

6. Meaning of error code when slave responds to abnormal information:

Error code address	Error code	Description
8001H	01H	Password error
	02H	Read/write command error
	03H	CRC check error
	04H	Invalid address
	05H	Invalid parameter
	06H	Invalid parameter change
	07H	System locked
	08H	Storing parameters

Appendix 2: Macro parameter setting instructions

Function macro definition	Setting parameters	Automatically modify parameter list	Debugging steps
Single pump water supply (1 variable frequency pump) mode	F00.00=6	F00.03=10；F14.02=11；F14.03=80；F14.04=2002；F14.05=11；F14.06=11；F09.00=7	Step 1: Determine the sensor feedback type. The AI factory default input voltage feedback signal. You can also select the AI input current feedback signal through the jumper seat J5. Step 2: Terminal wiring. If the pressure gauge has a 0-10V output, connect the signal line of the pressure gauge to AI, and the other two lines to +10V and GND; if the output is 0-20mA, connect the pressure sensor signal line to AI, and the other line to 24V. Step3: Initialize parameters (F15.01=2); Step4: Set sensor range (F16.09); Step5: Function macro selection F00.00=6; Step6: Set target pressure, which can be set by parameter F16.08 or by using the up and down keys on the keyboard.
PV water supply voltage tracking mode	F00.00=7	F00.03=11；F00.17=7.5；F00.18=7.5；F12.45=1	Step 2: Parameter initialization (F15.02=2); Step 3: Function macro selection (F00.00=7, 8, 9). Note: For photovoltaic water supply, refer to F16.10~F16.26.
PV water supply power following VF mode	F00.00=8		
PV water supply power tracking SVC mode	F00.00=9		

Warranty Agreement

1 The warranty period of this product is twelve months (subject to the barcode information on the body). During the warranty period, if the product fails or is damaged under
normal use according to the instruction manual, our company will be responsible for free repair.
2 During the warranty period, if the damage is caused by the following reasons, a certain repair fee will be charged:
A. Damage to the machine caused by incorrect use or unauthorized repair or modification;
B. Machine damage caused by fire, flood, voltage abnormality, other natural disasters and secondary disasters;
C. Hardware damage caused by dropping or transportation after purchase;
D. Damage to the machine caused by failure to operate according to the user manual provided by our company;
E. Failure and damage caused by obstacles other than the machine (such as external equipment factors);
3. When the product fails or is damaged, please fill in the details in the "Product Warranty Card" correctly and in detail.
4. The collection of maintenance fees shall be based on the latest "Maintenance Price List" adjusted by our company.
5 This warranty card will not be reissued under normal circumstances. Please be sure to keep this card and show it to the maintenance personnel during warranty service
6 If you have any questions during the service process, please contact our agent or our company in time.

Product warranty card

<table>
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<tr><td rowspan="2">Company Name:</td><td>Contact:</td></tr>
<tr><td>Contact Number:</td></tr>
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<tr><td colspan="2">Agent Name:</td></tr>
<tr><td>Fault Information</td><td colspan="2">(Maintenance time and content):

Maintenance Person:</td></tr>
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