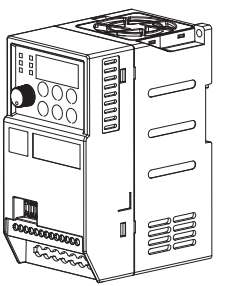
CV800D Series High Performance Current Vector Inverter

Instruction Manual



Please read this manual before use

Contents

1. Safety Information

1.1 Safety Information Signs And Definitions

The safety clauses described in this user manual are very important, which can ensure that you use the inverter safely to prevent yourself or the people around you from being hurt and the property in the working area from being damaged. Please be fully familiar with the following icons and their meanings, and be sure to follow the marked precautions items, then continue reading this user manual.

 Danger	This sign indicates that failure to operate as required may result in death or serious injury.
 Caution	This sign indicates matters needing attention during operation or use.

 Warning	This sign indicates that failure to perform operations as required will cause in moderate personal injury or minor injury or certain material loss.
 Prompt	This sign prompts some useful information to the user.

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

 Forbid	Indicates something absolutely not to be done.
 Enforce	Indicates something that must be done.

1.2 Scope Of Use

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

 Warning	▲ Do not use this inverter in equipment that may threaten life or harm the human body due to inverter failure or work error (nuclear power control equipment, aerospace equipment, vehicle equipment, life support systems, safety equipment, weapon systems, etc.). For special purposes, please consult our company in advance. ▲ This product is manufactured under the supervision of strict quality management system, but when used for important equipment, there must be safety protection measures to prevent the inverter failure to expand the scope of the accident.

1.3 Installation Environment

▲ Installed indoors, in a well–ventilated place, generally should be installed vertically to ensure the best cooling effect. For horizontal installations, additional ventilation 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 the temperature exceeds 50˚C, external heat dissipation or derating is required. It is recommended that users Do not use the inverter in such a high temperature environment, because it will greatly reduce the service life of the inverter.
▲ The ambient humidity is lower than 90%, and no condensation occurs.
▲ Install in a place with vibration less than 0.5G to prevent falling damage. The inverter is not allowed to suffer from sudden impact.
▲ Install in an environment far away from electromagnetic fields and without flammable and explosive substances.

1.4 Installation Safety Precautions

Danger

▲ Do not work with wet hands.
▲ Do not wiring when the power supply is not completely disconnected。
▲ Do not open the cover or perform wiring work when the inverter is powered on, otherwise there is a risk of electric shock.
▲ When carrying out wiring, inspection and other operations, it must be carried out after turning off the power for 10 minutes, otherwise there is a risk of electric shock.

Warning

▲ Do not install inverters with damaged or missing components to prevent personal accidents and property losses.
▲ The main circuit terminal and the cable must be firmly connected, otherwise the inverter may be damaged due to poor contact.
▲ For the purpose of safety, the ground terminal of the inverter must be reliably grounded. In order to avoid the influence of grounding common impedance interference, multiple inverters should be grounded at one point, as shown in Figure 1–1.

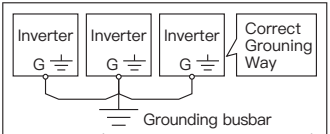
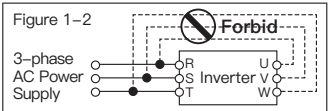


Figure 1–1 (connected at the same point)

Forbid

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

Figure 1–2



Enforce	On the input power side of the inverter, be sure to configure a no-fuse circuit breaker for circuit protection to prevent the expansion of the accident caused by the failure of the inverter.

Caution	It is not suitable to install an electromagnetic contactor on the output side of the inverter, because the contactor is switched on and off when the motor is running, which will generate operating overvoltage and cause damage to the inverter. However, it is still necessary for the following three situations: The inverter used for energy-saving control, the system often works at the rated speed, in order to achieve economical operation, when the inverter needs to be removed. Participate in important technological processes,can not be out of service for a long time, need to switch between various control systems to improve system reliability. When one inverter controls multiple motors, the user should pay attention that the contactor must not operate when the inverter has output!

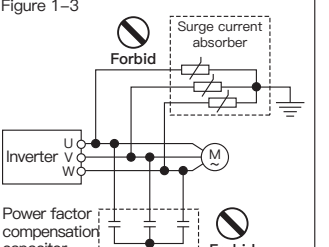
1.5 Operation Safety Precautions

Danger	▲ Do not 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 powering on, otherwise there is a risk of electric shock and explosion. ▲ Do not touch the inside of the inverter after power on, let alone put rods or other objects into the inverter, otherwise it will cause electric shock or the inverter cannot work normally. ▲ When the inverter is powered on, please do not open the cover, otherwise there is a risk of electric shock. ▲ Use the power failure restart function with caution, otherwise it may cause personal injury or death.

Warning

▲ If the operation exceeds 50Hz, the speed range of the motor bearing and mechanical device must be ensured.
▲ Mechanical devices that require lubrication, such as gearboxes 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 the ordinary motor is running at low frequency, it must be used with derating due to the poor cooling effect. If it is a constant torque load, it must adopt the forced cooling method of the motor or use a special variable frequency motor.
▲ If the inverter is not used for a long time, please be sure to cut off the input power supply to avoid damage to the inverter or even fire caused by foreign matter entering or other reasons.
▲ 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 the output end, otherwise it will cause fault tripping of the inverter or even damage to power components. If it is already installed, be sure to remove it. See Figure 1–3.

Figure 1–3



Caution

▲ Before the motor is used for the first time or reused after being placed for a long time, the insulation of the motor should be checked, and the measured insulation resistance should not be less than 5MΩ.
▲ If the inverter needs to be used outside the allowable operating voltage range, a step–up or step–down device is required for voltage transformation.
▲ In areas where the altitude exceeds 1000 meters, due to the thin air, the heat dissipation effect of the inverter will be deteriorated, so derating is required. Generally, about 10% derating is required for every 1000m increase.

2. Technical Index And Specification

2.1 Technical Specification

Input	Rated voltage, frequency	3–phase (4T) AC380V；47～63Hz 1–phase (2S) AC220V；47～63Hz	
	Allowed voltage range	3–phase (4T) AC320V～480V 1–phase (2S) AC160V～260V	
Output	Voltage	4T；0～480V 2S；0～260V	
	Frequency	Vector control：0～500Hz V/F control：0～500Hz	
	Overload capacity	150% rated current 60s；180% rated current 5s；195% rated current 0.5s	
Control Mode		V/F Control、Speed Sensorless Vector Control (SVC)	
Control Character	Frequency setting resolution	Analog input	Max. frequency × 0.025%
		Digital setting	0.01Hz
	V/F control	V/F curve	Three ways: linear type; multi–point type; Nth power type V/F curve (1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)
		V/F separation	2 types: full separation and half separation
		Torque boost	Manual setting: 0.0～30% of rated output. Automatic boost: automatically determine the boost torque according to the output current and combined with the motor parameters.
		Automatic current–limiting and voltage–limiting	During acceleration, deceleration or steady running, detect automatically the current and voltage of motor stator, and control it within bound sbased on unique algorithm, minimize fault–trip chance.

Control Character	Senseless vector control	Voltage frequency character	Adjust pressure/frequency ratio according to motor parameter and unique algorithm.
		Torque character	Starting torque: 0.1Hz 150% rated torque (V/F control) 0.25Hz 150% rated torque (SVC) Operating speed precision in steady state: ⩽±0.2% rated synchronous speed speed fluctuation: ⩽±0.5% rated synchronous speed Torque response: ⩽20ms (SVC)
		Motor parameter self-measurement	Without any restrictions, the automatic detection of parameters can be completed under the static and dynamic conditions of the motor to obtain the best control effect.
		Current and voltage restrain	Current closed-loop control, free from current impact, perfect restrain function of overcurrent and overvoltage.
	Undervoltage restrain during running	Specially for users with a low or unsteady voltage power grid: even lower than the allowable voltage range, the system can maintain the longest possible operating time based on its unique algorithm and residual energy allocation strategy.	
Typical Function	Multi-segment speed and swing frequency operation	16 segments programmable multi-segment speed control, a variety of operating modes are optional. Swing frequency operation: preset frequency, center frequency adjustable, state memory and recovery after power failure.	
	PID control RS485 communication	Built-in PID controller (able to preset frequency). Standard configuration RS485 communication function.	
	Frequency setting	Analog input	DC voltage 0～10V, DC current 0～20mA (upper and lower limit optional)
		Digital input	Operation panel setting, RS485 interface setting, UP/DOWN terminal control, and various combination setting with analog input.
	Output signal	Digital output	One relay output
		Analog output	One analog output, free switching between 4～20mA/0～10V
	Automatic steady voltage operation	Dynamic steady state, static steady state, and unsteady voltage for choices to obtain the steadiest operation.	
	Acceleration and deceleration time setting	0.0s～65000.0s min continuous setting, S type and linear type mode for choice.	

Typical Function	Braking	Dynamic braking	Dynamic braking initial voltage, backlash voltage and dynamic braking continuous adjustable.
		DC braking	Halt DC braking initial frequency：0.00～【F00.10】Max.frequency Braking time：0.0～100.0s；Braking current：0%～100% of rated current.
	Low noise running	Carrier frequency 1.0kHz~16.0kHz continuous adjustable, minimize motor noise.	
	Speed tracking and restart function	Smooth restart during operation, instantaneous stop and restart.	
	Counter	A built-in counter, facilitate system integration	
	Operation function	Upper limit and lower limit frequency setting, frequency hopping operation, reversal running restraint, slip frequency compensation, RS485 communication, frequency control of progressive increase and decrease, failure recovery automatically, etc.	
Display	Operation panel display	Running state	Output frequency, output current, output voltage, motor speed, set frequency, module temperature, PID setting, feedback, analog input and output, etc.
		Alarm	There are 8 operating parameter records including output frequency, output current, bus voltage, input terminal status, output terminal status, inverter status, power-on time, and running time when three faults trip.
Protective Function		Overcurrent, overvoltage, undervoltage, module fault, electric thermal relay, overheat, short circuit, default phase of input and output, motor parameter adjustment abnormality, internal memory fault, etc.	
Environment	Ambient temperature	-10℃～+40℃ (Please run the VFD in derated capacity when ambient temperature is 40℃～50℃).	
	Ambient humidity	5%～95%RH, without condensing drops	
	Surroundings	Indoors (without direct sunlight, corrosive or flammable gas, oil fog and dust)	
	Altitude	Running in derated capacity above 1000m, derate 10% for every 1000m rise.	
Structure	Protection level	IP20	
	Cooling method	Air cooling	
Installation Method		Wall-hanging type	

2.2 Nameplate Introduction

CV800D – 001 G –1 4 T F

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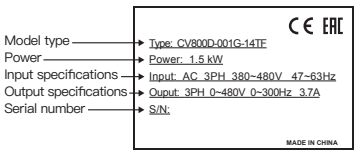


①	Product Series	CV800D general vector series		
②	Model Power	00A: 0.4KW ～ 005: 5.5KW		
③	Load Type	G: constant torque		
④	Output	1: 3–phase	2: 1–phase	
⑤	Voltage Grade	1：110V	2：220V	4：380V
⑥	Input	S: 1–phase	T: 3–phase	
⑦	Cooling Method	B: air cooling with built–in braking unit		
		F: air cooling, without built–in braking unit		

2.3 Inverter Series Type

Voltage Classes	Model No.	Rated Power (KW)	Rated Output Current (A)
220V 1–phase	CV800D–00AG–12SF	0.4	2.3
220V 1–phase	CV800D–00BG–12SF	0.75	4
220V 1–phase	CV800D–001G–12SF	1.5	7
220V 1–phase	CV800D–002G–12SF	2.2	9.6
380V 3–phase	CV800D–00BG–14TF	0.75	2.1
380V 3–phase	CV800D–001G–14TF	1.5	3.8
380V 3–phase	CV800D–002G–14TF	2.2	5.1
380V 3–phase	CV800D–004G–14TF	4	8.5
380V 3–phase	CV800D–005G–14TF	5.5	13

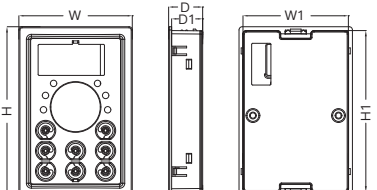
2.4 Braking Resistor Selection Table

Voltage (V)	Inverter Power (KW)	Braking Resistor Specification		Braking Torque
		Power (W)	Resistance Value (Ω)	10%ED
1–phase 220V series	0.4	80	200	125
	0.75	80	150	125
	1.5	100	100	125
	2.2	100	70	125
3–phase 380V series	0.75	100	750	125
	1.5	300	400	125
	2.2	300	250	125
	4	400	150	125
	5.5	500	100	125

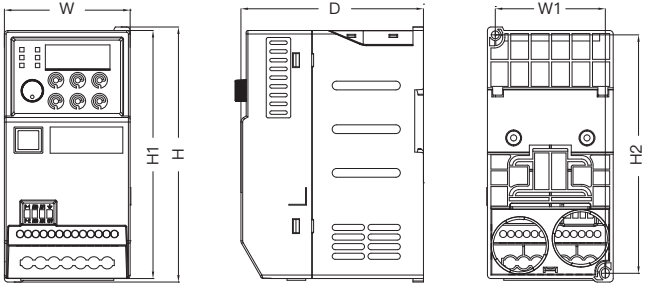
Note: ▲ Please select the resistance value specified by our company.
▲ If the braking resistor not provided by our company is used, resulting in damage to the inverter or other equipment, our company will not bear any responsibility.
▲ The installation of the braking resistor must consider the safety of the environment, and its flammability, and the distance from the inverter should be at least 100mm.
▲ The parameters in the table are for reference only, not as a standard.

2.5 Appearance And Dimension Of Keypad

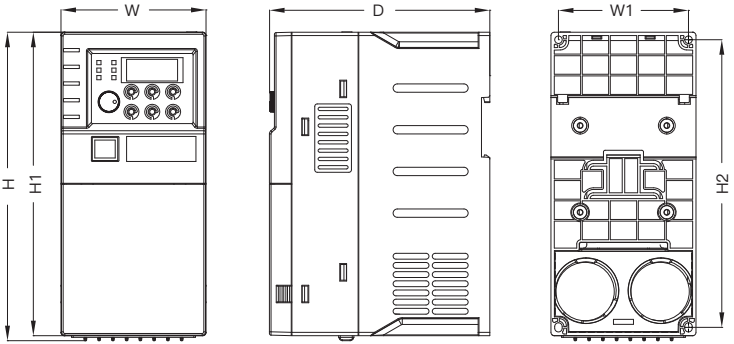
Panel Dimension		Hole Dimensions		Keyboard Thickness	
W (mm)	H (mm)	W1 (mm)	H1 (mm)	D (mm)	D1 (mm)
53	79	49.4	75.4	15.9	14.5



2.6 Product Overall Dimension And Installation Dimension



Model No.	Installation Size		Dimensions Size				Installation Hole (mm)
	H2 (mm)	W1 (mm)	H (mm)	H1 (mm)	W (mm)	D (mm)	
CV800D-00AG-12SF	136.5	63	146	142	72	104.5	4.5
CV800D-00BG-12SF	136.5	63	146	142	72	104.5	4.5
CV800D-001G-12SF	136.5	63	146	142	72	104.5	4.5
CV800D-002G-12SF	136.5	63	146	142	72	104.5	4.5
CV800D-00BG-14TF	136.5	63	146	142	72	104.5	4.5
CV800D-001G-14TF	136.5	63	146	142	72	104.5	4.5
CV800D-002G-14TF	136.5	63	146	142	72	104.5	4.5



Model No.	Installation Size		Dimensions Size				Installation Hole (mm)
	H2 (mm)	W1 (mm)	H (mm)	H1 (mm)	W (mm)	D (mm)	
CV800D-004G-14TF	172.5	78	185	182	87	132	4.5
CV800D-005G-14TF	172.5	78	185	182	87	132	4.5

3. Storage And Installation

3.1 Storage

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

▲ 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 is in the range of 0% to 95%, and there is no condensation;
▲ The storage environment does not contain corrosive gas and liquid;
▲ It is best placed on a shelf and packaged to store the inverter. It is best not to store for a long time, which will lead to the deterioration of electrolytic capacitors. If long–term storage is needed, it must be ensured that the power is on once in half a year, and the power–on time is at least 5 hours or more. The voltage must be slowly increased to the rated voltage value with the voltage regulator when input.

3.2 Installation Place 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;
▲ Places without dripping water and low temperature;
▲ Places without sunlight, high temperature and severe dust fall;
▲ Places without corrosive gases and liquids;
▲ Places with less dust, oil gas and metal powder;
▲ Places without vibration, easy maintenance and inspection;
▲ Places without electromagnetic noise interference;

3.3 Installation Space And Direction

▲ For the convenience of maintenance, enough space should be left around the inverter. as the picture shows.
▲ In order to ensure 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 base of the inverter before installing. Installed on a loose plane, the stress may cause damage to the main circuit parts, thus damaging the inverter;
▲ The wall surface of the installation should be made of non–combustible materials such as iron plate.
▲ Multiple inverters are installed in the same cabinet. When the up–down installation is adopted, pay attention to the spacing, add a diversion plate in the middle or install them in a up–down dislocation.

4. Wiring

4.1 Main Circuit Wiring Diagram

Power supply: Please pay attention to whether the voltage level is consistent, so as not to damage the inverter.

Electromagnetic contactor
Note: Please do not use the electromagnetic contactor as the power switch of the inverter.

Inverter:
Be sure to correctly connect the main circuit line and control signal line of the inverter.
Be sure to set the inverter parameters correctly.

No-fuse switch: Please refer to the corresponding table.
Leakage switch: Please use a leakage switch with anti-high harmonics.

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

4.2 Wiring Terminal Diagram

4.2.1 Control Loop Terminals

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

4.2.2 Main Circuit Terminals

0.4KW-2.2KW	R	S/L1	T/L2	U	V	W	⏚

3.7KW-5.5KW	R	S	T	P+	PB	U	V	W	⏚

4.2.3 Main Control Board Jumper Description

J1	⏚	Main control board grounding (Disconnect by default)
	OFF	The ground of the main control board is disconnected

J2	AVO	Analog AO output voltage signal, 0～10V
	ACO	Analog AO output current signal, 0～20mA
J4	P–I	Select built–in keypad potentiometer (The built–in keypad potentiometer is valid by default)
	P–E	Select External Keypad Potentiometer
J5	AVI	Analog AI input voltage signal, 0～10V
	ACI	Analog AI input current signal, 0～20mA

4.2.4 Wiring Notices

▲ Cut off the input power of inverter while dismantling and changing the motor.
▲ Switching of motor or work frequency power supply should only be conducted when the inverter stops output.
▲ To reduce the effect of EMI (electromagnetic interference), add a surge absorber when electromagnetic connector and relay are close to inverter.
▲ Do not connect AC input power to output terminal U, V, W of inverter.
▲ Add an isolating device to the external control line or use shield line.
▲ Input order signal line should be wired separately with shielding, and away from major loop wiring.
▲ When carrier frequency is less than 4kHz, keep the distance between inverter and motor within 50m; when carrier frequency exceeds 4kHz, make an appropriate reduction of the distance, and better lay the wire in metal tube.
▲ When adding peripherals (filters, reactors, etc.) to the inverter, check the ground resistance with 1000V tramegger and ensure thevalue is above 4MΩ.
▲ Do not add phase advance capacitor or RC snubber to the U, V, W terminal of inverter.
▲ If the inverter starts frequently, do not cut off the power, use the COM/RUN of control terminal to conduct start and stop so as not to damage the rectifier bridge.
▲ The earth terminal must be grounded reliably (grounding impedance should be under 10 Ω) to avoid accidents, or there might be electric leakage.
▲ Choose the wire diameter according to national electrical code while conducting major loop wiring.

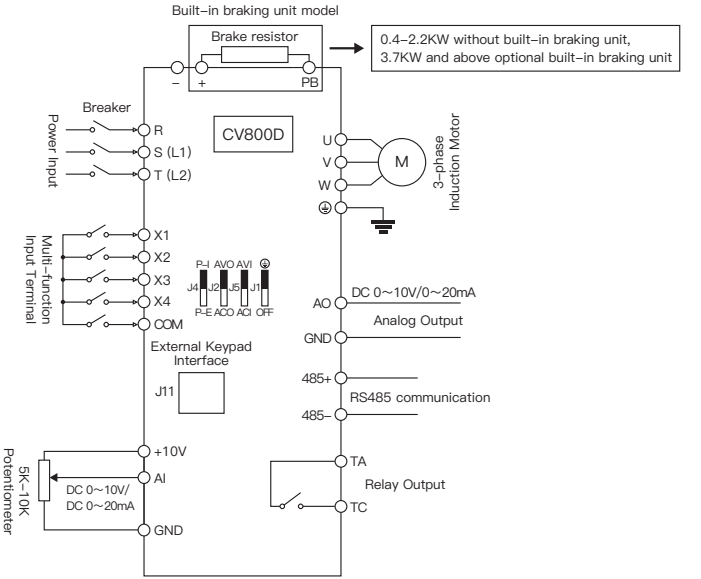
4.2.5 Spare Circuit

It may cause big downtime loss or other accidental failure during inverter failure or tripping. Adding spare circuit is recommended under this circumstance to ensure safety.

Note: confirm and test the operation characteristic of thespare circuit in advance to ensure the working frequency and the phase sequence of converted frequency are agreed.

4.3 Basic Running Wiring

The wiring parts of VFD include major loop and control loop. Open the cover of I/O terminals, users can see the major loop terminal and control loop terminal, and must conduct the wiring according to the following diagram.



4.4 Wiring Precautions

4.4.1 Main Circuit Wiring

When wiring, the selection of wiring diameter specifications, please implement wiring 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 the isolation layer or both ends of the wire tubes;

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

▲ Power wires and control wires should be arranged separately and not in the same slot.

▲ Do not connect the AC power supply to the inverter output terminals (U, V, W);

▲ The output wiring should not touch the metal part of the inverter casing, otherwise it may cause a grounding short circuit.

▲ Phase-shifting capacitors, LC, RC noise filters and other components cannot be used at the output terminals of the inverter.

▲ The main circuit wiring of the inverter must be far away from other control equipment.

▲ When the wiring between the inverter and the motor exceeds 50 meters (220V series), (380V series 100 meters), a high dv/dt will be generated inside the motor coil, which will damage the interlayer insulation of the motor , please use a dedicated AC motor for 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 leakage current of high harmonic wave on the cable, and the leakage current will have adverse effects on the inverter and other equipment.

4.4.2 Control Loop Wiring (Signal Wire)

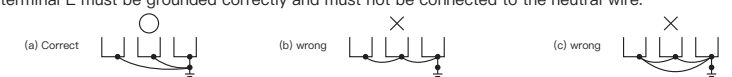
The signal wire and the main circuit wiring cannot be placed in the same wire slot, otherwise interference may occur. Please use shielded wires for signal wires and ground them at one end with a wire diameter of 0.5–2mm^2. It is recommended to use 1 shielded wires for control wires. Use the control terminals on the control panel correctly as required.

4.4.3 Grounding Wire

Please use the third grounding method (below 100Ω) for grounding wire terminal E; use the grounding wire according to the basic length and size of electrical equipment technology; absolutely avoid sharing the grounding electrode with welding machines, power machinery and other large power equipment, and the grounding wires should be as far away as possible from the power wires of large power equipment; for the grounding wiring method of multiple inverters, please use the method (a) in the following figure to avoid the loop of (b) or (c).

▲ The ground wire must be as short as possible.

▲ The ground terminal E must be grounded correctly and must not be connected to the neutral wire.

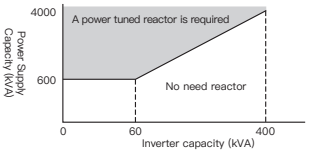


4.5 Specific Application Precautions

4.5.1 Model Selection

(1) Reactor installation

When the converter is connected to a large capacity power transformer (above 600kVA) or when the phase capacitor is switched, the power input loop will generate excessive peak current, which may damage the components of the converter. To prevent this from happening, install a DC or AC reactor. This also helps to improve the power factor on the power side. In addition, when the same power supply system is connected to a thyristor converter such as a DC driver, a DC or AC reactor must be set up regardless of the power supply condition.



Reactor Installation Conditions

(2) Inverter Capacity

When running a special motor, ensure that the rated current of the motor is not higher than the rated output current of the inverter. In addition, when multiple induction motors are run in parallel with one frequency inverter, the capacity of the inverter should be 1.1 times of the total rated current of the motor and less than the rated output current of the inverter.

(3) Starting torque

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

(4) Emergency stop

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

(5) Special option

Terminals PB(+) and P1(+) are terminals for connecting dedicated options. Do not connect devices other than dedicated options.

(6) Precautions related to reciprocating loads

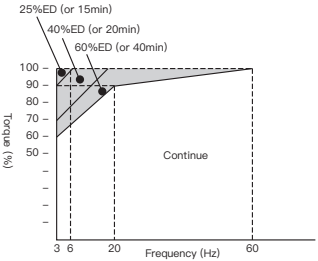
When the inverter is used for reciprocating loads (cranes, elevators, presses, washing machines, etc.), if a current of 150% or more flows repeatedly, the life of the IGBT inside the inverter will be shortened due to thermal fatigue. As a rough standard, when the carrier frequency is 4kHz and the peak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

Especially if low noise is not required, please lower the carrier frequency. In addition, please reduce the peak reciprocating current to less than 150% by reducing the load, extending the acceleration and deceleration time, or increasing the inverter capacity by 1 level, etc. (When conducting test runs for these purposes, please be sure to confirm the peak reciprocating current and adjust it as necessary). In addition, when used for cranes, due to the faster start/stop action during fretting, it is recommended to make the following choices to ensure the motor torque and reduce the current of the inverter.The capacity of the inverter should ensure that its peak current is less than 150%. The capacity of the inverter should be more than 1 level larger than that of the motor.

4.5.2 Precautions For Motor Use

(1) For existing standard motors low speed range

Using an inverter to drive a standard motor will result in a number of increased losses compared to using a commercial power source to drive.
In the low–speed range, the cooling effect will be deteriorated, and the tempera–ture of the motor will increase. Therefore, in the low speed range, please reduce the load torque of the motor. The allowable load characteristics of our standard motors are shown in the figure. In addition, when 100% continuous torque is required in the low–speed range, please consider whether to use an inverter–spe–cific motor.



Allowable load characteristics of our standard motors

(2) Precautions when use for special motors

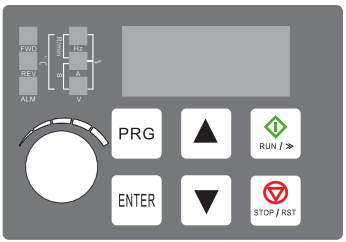
The rated current of the pole–changing motor is different from that of the standard motor. Please confirm the maximum current of the motor and select the corresponding inverter. Be sure to switch the number of poles after the motor stops. If switching is performed during rotation, the regenerative overvoltage or overcurrent protection loop will operate, and the motor will stop running freely.
Motor with brake
When using an inverter to drive a motor with a brake, if the brake loop is directly connected to the output side of the inverter, the brake cannot be opened due to the low voltage at startup.Use a motor with a brake that has a separate 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 oil–lubricated gearboxes, transmissions, and reducers in the power transmission system, please note that the oil lubrication effect will deteriorate if the operation is continued only in the low–speed range. In addition, when performing high–speed operation above 60Hz, there will be problems in terms of noise, life, and strength due to centrifugal force of the power transmission structure, so please pay sufficient attention.

5. Operation Panel and Operation Method

5.1 Operation Panel Keys Description



Key	Name	Function Description
PRG	Programming key	Menu entry or exit, parameter modification
▲	Increase key	Data or function code increase
▼	Decrease key	Data or function code decrease
ENTER	Enter Key	Enter the menu, confirm the parameter setting
RUN / ≫	Run key	Run/shift operation in keypad operation mode
STOP / RST	Stop/Reset key	Stop/reset operation, When the main interface is stopped, it can be used as a shift key to view the displayed content.
	Analog potentiometer knob	Select according to function switching

5.2 Function Indicators Description

Item	Function Description
REV	This indicator light turns red when the inverter is in reverse running status.
FWD	This indicator light turns green when the inverter is in forward running status.
ALM	If the indicator light is always on, it means it is in the torque control state. If it flashes quickly, it means it is in a fault state. If it flashes slowly, it means it is in the tuning state.
Hz	Frequency unit.
A	Current unit.
V	Voltage unit.

5.3 Function Indicators Combination Description

Indicator Combination Mode	LED Display Meaning	Symbol
Hz + A	Motor speed	r/min
A + V	Time (second)	s
Hz + V	Percentage actual value	%
Hz + A + V	Temperature	℃

5.4 Operation Process

5.4.1 Parameter Settings

The three-level menus are:
(1) Function code group number (Level 1 menu);
(2) Function code label (Level 2 menu);
(3) Function code setting value (level 3 menu)。
Note: When operating in the level 3 menu, press PRG or ENTER to return to the level 2 menu. The difference between the two is: press ENTER to save the set parameters into the control panel, then return to the level 2 menu, and automatically transfer to the next function code; press PRG to return directly to the level 2 menu without storing parameters, and stay at current function code.
In the level 3 menu state, if the parameter has no flashing bit, it means that the function code cannot be modified, and the possible reasons are as follows:
① This function code is an unmodifiable parameter. 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 the machine is stopped.

5.4.2 Fault Reset

When the inverter fails, the inverter displays related fault information. The user can reset the fault through the STOP/RESET key on the keypad or the terminal function. After the fault is reset, the inverter is in the standby state. If the inverter is in a fault state and the user does not reset the fault, the inverter is in a running protection state and cannot run.

5.4.3 Motor Parameter Self-learning

Select the vector control operation mode, before the operation of the inverter, the nameplate parameter of the motor must be accurately input, and the inverter matches the standard motor parameter according to the nameplate parameter; The vector control mode is highly dependent on the motor parameters. In order to obtain good control performance, the accurate parameters of the controlled motor must be obtained.

6. Function Parameters Table

F15.00 is set to a non-0 value, that is, the parameter protection password is set. In the function parameter mode and user change parameter mode, the parameter menu can only be entered after the correct password is entered. To cancel the password, F15.00 needs to be set to 0. The parameter menu in user-defined parameter mode is not password protected.

The symbols in the function table are explained as follows:

"☆": Indicates that the setting value of this parameter can be changed when the inverter is in stop or running state;

"★": Indicates that the setting value of this parameter cannot be changed when the inverter is running;

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

"✶": Indicates that the parameter is "Manufacturer Parameter", which can be set only by manufacturer and cannot be operated by users.

F00 Group – Basic Functions				
Function Code	Name	Set Range	Factory Default	Modification
F00.00	Macro function definition	0: Common mode 1～5: Reserved 6: Single pump (1 variable frequency pump) water supply 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 parameters before setting macro function.	0	★
F00.01	Motor control mode	0: V/F control 1: Speed Sensorless Vector Control (SVC)	0	★
F00.02	Command source selection	0: Operation panel command channel 1: Terminal command channel 2: Communication command channel	0	☆

Function Code	Name	Set Range	Factory Default	Modification
F00.03	Main frequency source A selection	0: Digital setting (preset frequency F00.08, UP/DOWN can be modified, no memory when power off) 1: Digital setting (preset frequency F00.08, UP/DOWN can be modified, power-off with memory) 2: AI (0～10V/20mA) 3: Reserved 4: Panel potentiometer 5: Reserved 6: Multi-segment command 7: Simple PLC 8: PID 9: Communication given 10: Multi pump command 11: Reserved	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 during superposition	0: Relative to the maximum frequency 1: Relative to frequency source A	0	☆
F00.06	Auxiliary frequency source B range during superposition	0%～150%	100%	☆
F00.07	Frequency source B superposition selection	Units: frequency source selection 0: Main frequency source A 1: Main and auxiliary calculation results (the 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 calculation results 4: Switch between auxiliary frequency source B and main and auxiliary calculation results Tens digit: frequency source main and auxiliary calculation relationship 0: Main + auxiliary 1: Main – auxiliary 2: Maximum value of both 3: Minimum value of both	00	☆

Function Code	Name	Set Range	Factory Default	Modification
F00.08	Preset frequency	0.00Hz～maximum frequency (F00.10)	50.00Hz	☆
F00.09	Running direction	0: Same direction 1: Opposite direction	0	☆
F00.10	Maximum frequency	50.00Hz～500.00Hz	50.00Hz	★
F00.11	Upper limit frequency source	0: F00.12 setting 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: Communication given	0	★
F00.12	Upper limit frequency	Lower limit frequency F00.14～maximum frequency F00.10	50.00Hz	☆
F00.13	Upper limit frequency bias	0.00Hz～maximum frequency F00.10	0.00Hz	☆
F00.14	Lower limit frequency	0.00Hz～upper limit frequency F00.12	0.00Hz	☆
F00.15	Carrier frequency	0.5kHz～16.0kHz	Depending on model	☆
F00.16	Carrier frequency adjusted 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)	Depending on model	☆
F00.18	Deceleration time 1	0.00s～650.00s (F00.19=2) 0.0s～6500.0s (F00.19=1) 0s～65000s (F00.19=0)	Depending on model	☆
F00.19	Acceleration and deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★

Function Code	Name	Set Range	Factory Default	Modifi-cation
F00.21	Auxiliary frequency source bias frequency during superposition	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: No memory 1: Memory	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	Frequency command UP/DOWN reference during running	0: Running frequency 1: Set 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 5: Reserved 6: Multi-segment speed 7: Simple PLC 8: PIDs 9: Communication given Tens digit: terminal command binding frequency source selection Hundreds place: communication command binding frequency source selection Thousands place: auto run binding frequency source selection	0000	☆
F00.28	Serial communication protocol selection	0: Modbus protocol 1: Reserved	0	☆

Function Code	Name	Set Range	Factory Default	Modification
F00.29	GP type display	1: G type (constant torque load model) 2: P type (fan and water pump load model)	Depending on model	●
F01 Group – Start–Stop Control Parameters				
F01.00	Start mode	0: Direct start 1: Speed tracking restart 2: Pre–excitation start (AC asynchronous machine) 3: Super fast start (valid in vector mode)	0	☆
F01.01	Speed tracking mode	0: Start from 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 hold time	0.0s～100.0s	0.0s	★
F01.05	DC braking current at startup/ Pre–excitation current	0%～100%	50%	★
F01.06	DC braking time at startup/ Pre–excitation time	0.0s～100.0s	0.0s	★
F01.07	Accelerating and decelerating mode	0: Linear Acc/Dec mode 1: S curve Acc/Dec mode A 2: S curve Acc/Dec mode B	0	★
F01.08	Time ratio of Initial segment in S curve	0.0%～(100.0%–F01.09)	30.0%	★
F01.09	Time ratio of ending segment in S curve	0.0%～(100.0%–F01.08)	30.0%	★
F01.10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
F01.11	Start frequency of DC braking at stop	0.00Hz～maximum frequency	0.00Hz	☆

Function Code	Name	Set Range	Factory Default	Modification
F01.12	DC braking waiting time at stop	0.0s～100.0s	0.0s	☆
F01.13	DC braking current at stop	0%～100%	50%	☆
F01.14	DC braking time at stop	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	☆
F02 Group – Auxiliary Functions				
F02.00	Jog running frequency	0.00Hz～maximum frequency	2.00Hz	☆
F02.01	Jog acc time	0.0s～6500.0s	20.0s	☆
F02.02	Jog dec time	0.0s～6500.0s	20.0s	☆
F02.03	Acc time 2	0.0s～6500.0s	Depending on model	☆
F02.04	Dec time 2	0.0s～6500.0s	Depending on model	☆
F02.05	Acc time 3	0.0s～6500.0s	Depending on model	☆
F02.06	Dec time 3	0.0s～6500.0s	Depending on model	☆
F02.07	Acc time 4	0.0s～6500.0s	Depending on model	☆
F02.08	Dec time 4	0.0s～6500.0s	Depending on model	☆

Function Code	Name	Set Range	Factory Default	Modification
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 deadband time	0.0s～3000.0s	0.0s	☆
F02.13	Reverse control prohibition	0: Invalid 1: Valid	0	☆
F02.14	Set frequency lower than the lower limit frequency running mode	0: Run at the lower limit frequency 1: Stop 2: Run at zero speed	0	☆
F02.15	Droop control	0.00Hz～10.00Hz	0.00Hz	☆
F02.16	Set the cumulative power-on arrival time	0h～65000h	0h	☆
F02.17	Set the cumulative running arrival time	0h～65000h	0h	☆
F02.18	Boot Protection Selection	0: No protection 1: Protect Note: When F02.18=0, the terminal power-on detection running command is valid; when F02.18=1, the terminal power-on detection running 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 Electrical Level)	5.0%	☆
F02.21	Frequency arrival (FAR) detection width	0.0%～100.0% (maximum frequency)	0.0%	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F02.22	Whether the jump frequency is valid during acceleration and deceleration	0: Invalid 1: Valid	0	☆
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	☆
F02.25	Terminal jog priority	0: Invalid 1: Valid	0	☆
F02.26	Frequency detection value (FDT2)	0.00Hz～maximum frequency	50.00Hz	☆
F02.27	Frequency detection hysteresis value (FDT2)	0.0%～100.0% (FDT2 Electrical Level)	5.0%	☆
F02.28	Arbitrary arrival frequency detection value 1	0.00Hz～maximum frequency	50.00Hz	☆
F02.29	Arbitrary arrival frequency detection width 1	0.0%～100.0% (maximum frequency)	0.0%	☆
F02.30	Arbitrary arrival frequency detection value 2	0.00Hz～maximum frequency	50.00Hz	☆
F02.31	Arbitrary arrival frequency detection width 2	0.0%～100.0% (maximum frequency)	0	☆
F02.32	Zero current detection level	0.0%～300.0% 100.0% Corresponding motor rated 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% (No detection) 0.1%～300.0% (motor rated current)	200.0%	☆

Function Code	Name	Set Range	Factory Default	Modification
F02.35	Output current over-limit detection delay time	0.00s～600.00s	0.00s	☆
F02.36	Arbitrary arrival current 1	0.0%～300.0% (motor rated current)	100.0%	☆
F02.37	Arbitrary arrival current 1 width	0.0%～300.0% (motor rated current)	0.0%	☆
F02.38	Arbitrary arrival current 2	0.0%～300.0% (motor rated current)	100.0%	☆
F02.39	Arbitrary arrival current 2 width	0.0%～300.0% (motor rated current)	0.0%	☆
F02.40	Timing function selection	0: Invalid 1: Valid	0	☆
F02.41	Timing running time selection	0: F02.42 setting 1: AI 2: Reserved 3: Panel potentiometer Note: Analog input range corresponds to F02.42	0	☆
F02.42	Timing running 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 upper limit	F02.43～11.00V	6.80V	☆
F02.45	Module temperature arrival	0℃～100℃	75℃	☆
F02.46	Cooling fan control	0: The fan runs during operation 1: The fan runs all the time	0	☆
F02.47	Wakeup 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～wakeup frequency (F02.47)	0.00Hz	☆

Function Code	Name	Set Range	Factory Default	Modification
F02.50	Sleep delay time	0.0s～6500.0s	0.0s	☆
F02.51	Arrival time setting for this run	0.0～6500.0Min	0.0Min	☆
F02.52	Output power correction factor	0.00%～200.0%	100.0%	☆
F03 Group – Motor Parameters				
F03.00	Motor type	0: Ordinary asynchronous motor 1: Variable frequency asynchronous motor	0	★
F03.01	Motor rated power	0.1kW～1000.0kW	Depending on model	★
F03.02	Motor rated voltage	1V～2000V	Depending on model	★
F03.03	Motor rated current	0.01A～655.35A (VFD power<=55kW) 0.1A～6553.5A (VFD power>55kW)	Depending on model	★
F03.04	Motor rated frequency	0.01Hz～maximum frequency	Depending on model	★
F03.05	Motor rated speed	1rpm～65535rpm	Depending on model	★
F03.06	Asynchronous motor stator resistance	0.001Ω～65.535Ω (VFD power<=55kW) 0.0001Ω～6.5535Ω (VFD power>55kW)	Tuning parameter	★
F03.07	Asynchronous motor rotor resistance	0.001Ω～65.535Ω (VFD power<=55kW) 0.0001Ω～6.5535Ω (VFD power>55kW)	Tuning parameter	★
F03.08	Asynchronous motor leakage inductance reactance	0.01mH～655.35mH (VFD power<=55kW) 0.001mH～65.535mH (VFD power>55kW)	Tuning parameter	★
F03.09	Asynchronous motor mutual inductance reactance	0.1mH～6553.5mH (VFD power<=55kW) 0.01mH～655.35mH (VFD power>55kW)	Tuning parameter	★

Function Code	Name	Set Range	Factory Default	Modification
F03.10	Asynchronous motor no-load current	0.01A～F03.03 (VFD power<=55kW) 0.1A～F03.03 (VFD power>55kW)	Tuning parameter	★
F03.11～F03.26	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 Group – Motor Vector Control Parameters				
F04.00	Speed loop proportional gain 1	1～100	30	☆
F04.01	Speed loop integration 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 integration time 2	0.01s～10.00s	1.00s	☆
F04.05	Switching frequency 2	F04.02～maximum frequency	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 given 6～7: Reserved The full range of 1–7 option corresponds to F04.10	0	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
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 properties	0: Invalid 1: Valid	0	☆
F04.18～F04.20	Reserved	——	0	☆
F05 Group – Torque Control Parameters				
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 given 6～7: Reserved (The full range of 1–7 option 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	☆

Function Code	Name	Set Range	Factory Default	Modification
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	☆
F06 Group – V/F Control Parameters				
F06.00	V/F curve setting	0: Linear V/F 1: Multi–point V/F 2: Square V/F 3: 1.2 power V/F 4: 1.4 power V/F 5: Reserved 6: 1.6 power V/F 7: Reserved 8: 1.8 power V/F 9: Reserved 10: VF complete separation mode 11: VF half–separated mode	0	★
F06.01	Torque boost	0.0%：(Automatic torque boost) 0.1%～30.0%	Depending on model	☆
F06.02	Torque boost cut–off 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%	★

Function Code	Name	Set Range	Factory Default	Modifi-cation
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	Depending on model	☆
F06.13	VF separation voltage source	0: Digital setting (F06.14) 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: Multi-segment command 6: Simple PLC 7: PIDs 8: Communication given Note: 100.0% corresponds to the motor rated voltage	0	☆
F06.14	Voltage digital setting of VF separation	0V～Motor rated voltage	0V	☆
F06.15	Voltage acceleration time of VF separation	0.0s～1000.0s Note: Indicates the time from 0V to the motor rated voltage	0.0s	☆
F06.16	Voltage deceleration time of VF separation	0.0s～1000.0s Note: Indicates the time from 0V to the motor rated voltage	0.0s	☆
F06.17	VF separation stop mode selection	0: Frequency/voltage independently reduced to 0 1: After the voltage is reduced to 0, the frequency will be reduced again	0	☆
F06.18	VF overcurrent stall action current	50～200%	150%	☆
F06.19	VF overcurrent stall enable	0: Invalid 1: Valid	1	☆
F06.20	VF overcurrent stall suppression gain	0～100	20	

Function Code	Name	Set Range	Factory Default	Modifi-cation
F06.21	VF time speed overcurrent stall action Current compensation coefficient	50～200%	50%	☆
F06.22	VF overvoltage stall action voltage	200.0～2000.0	760.0	☆
F06.23	VF overvoltage stall enable	0: Invalid 1: Valid	1	☆
F06.24	VF overvoltage stall suppression frequency gain	0～100	30	☆
F06.25	VF overvoltage stall suppression voltage gain	0～100	30	☆
F06.26	Overvoltage stall maximum rise limit frequency	0～50Hz	5Hz	☆
F07 Group – Input Terminals				
F07.00	X1 terminal function selection	0: No function 1: Forward running FWD or running command 2: Reverse running REV or forward and reverse running direction Note: When it is set to 1 or 2, it needs to be used in conjunction with F07.11, see the function code parameter description for details 3: Three–wire running control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to 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	1	★
F07.01	X2 terminal function selection		2	★
F07.02	X3 terminal function selection		9	★

Function Code	Name	Set Range	Factory Default	Modifi-cation
F07.03	X4 terminal function selection	14: Multi-segment command terminal 3 15: Multi-segment command terminal 4 16: Acceleration and deceleration time selection terminal 1 17: Acceleration and deceleration time selection terminal 2 18: Frequency source switching 19: UP/DOWN setting clear (terminal, keypad) 20: Control command switching terminal 1 21: Acceleration and deceleration prohibited 22: PID pause 23: PLC status reset 24:Swing frequency pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30: Reserved 31: Reserved 32: Immediate DC braking 33: External fault normally closed input 34: Frequency modification prohibited 35: Reverse PID action direction 36: External stop terminal 1 37: Control command switching terminal 2 38: PID integral pause 39: Switch between frequency source A and preset frequency 40: Switch 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	12	★
F07.04	Reserved		0	★
F07.05	Reserved		0	★
F07.06	Reserved		0	★
F07.07	Reserved		0	★
F07.08	Reserved		0	★

Function Code	Name	Set Range	Factory Default	Modifi-cation
F07.09	Reserved	48: External stop terminal 2 49: Deceleration DC braking 50: The current running time is cleared 51: Two-wire/three-wire switching 52: No reverse 53～58: Reserved	0	★
F07.10	X filter time	0.000s～1.000s	0.010s	☆
F07.11	Terminal command mode	0: Two-wire type 1 1: Two-wire type 2 2: Three-wire type 1 3: Three-wire type 2	0	★
F07.12	Terminal UP/DOWN change rate	0.001Hz/s～65.535Hz/s	1.00Hz/s	☆
F07.13	AI curve 1 minimum input	0.00V～F07.15	0.00V	☆
F07.14	AI curve 1 minimum input corresponding setting	-100.0%～+100.0%	0.0%	☆
F07.15	AI curve 1 maximum input	F07.13～+10.00V	10.00V	☆
F07.16	AI curve 1 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	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
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 ～ F07.33	Reserved	——	0	☆
F07.34	AI below minimum input setting selection	Units: AI below the minimum input setting selection 0: Corresponds to the minimum input setting 1: 0.0% Tens, Hundreds place: Reserved	000	☆
F07.35	X1 delay time	0.0s～3600.0s	0.0s	★
F07.36	X2 delay time	0.0s～3600.0s	0.0s	★
F07.37	X3 delay time	0.0s～3600.0s	0.0s	★
F07.38	X terminal valid state selection 1	0: Low electrical level valid 1: High electrical level valid Units: X1 Tens: X2 Hundreds: X3 Thousands: X4 Ten thousand digits: 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 Terminal				

Function Code	Name	Set Range	Factory Default	Modifi-cation
F08.00	Reserved	——	0	☆
F08.01	Reserved	——	0	☆
F08.02	Control board relay R function selection	0: No output 1: The inverter is running 2: Fault output (free stop fault) 3: Frequency level detection FDT1 output 4: Frequency arrival signal (FAR) 5: Running at zero speed (no output when stopped) 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8: The set count value arrives 9: The specified count value arrives 10: Length arrives 11: PLC cycle completed 12: Accumulated running time arrives 13: Frequency limiting 14: Torque limiting 15: Ready to run 16: Reserved 17: Upper limit frequency arrives 18: Lower limit frequency arrives (related to running) 19: Undervoltage status output 20: Communication setting 21: Reserved 22: Reserved 23: Running at zero speed 2 (output even when stopped) 24: Accumulated power-on time arrives 25: Frequency level detection FDT2 output 26: Frequency 1 arrival output 27: Frequency 2 arrival output 28: Current 1 arrival output 29: Current 2 arrival output	2	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F08.02	Control board relay R function selection	30: Timing arrival output 31: AI input over limit 32: Drop loading 33: Reverse running 34: Zero current state 35: Module temperature arrives 36: The output current exceeds the limit 37: The lower limit frequency arrives (output even when stopped) 38: Alarm output (all faults) 39: Motor over-temperature pre-alarm 40: The running time arrives 41: Fault output (free stop fault and undervoltage no output) 42～44: Reserved	2	☆
F08.03 ～ F08.06	Reserved	——	0	★
F08.07	AO output function selection	0: Running frequency 1: Set frequency 2: Output current (2 times the motor rated current) 3: Output torque (2 times the motor rated torque) 4: Output power (2 times rated power) 5: Output voltage (1.2 times the inverter rated voltage) 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 (torque actual value)	0	☆
F08.08	Reserved	——	0	☆

Function Code	Name	Set Range	Factory Default	Modification
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: Reverse logic Units: Reserved Tens: R Hundreds, thousands, ten thousands: Reserved	0000	☆
F08.23	Reserved	——	0	☆
F09 Group – PID Functions				
F09.00	PID given source	0: F09.01 setting 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: Communication given 6: Multi–segment command given 7: Pressure given (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	☆

Function Code	Name	Set Range	Factory Default	Modification
F09.03	PID action direction	0: Forward action 1: Reverse action	0	☆
F09.04	PID given feedback range	0～65535	1000	☆
F09.05	Proportional gain Kp1	0.0～999.9	20.0	☆
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 cut-off frequency	0.00～maximum frequency	2.00Hz	☆
F09.09	PID deviation limit	0.0%～100.0%	0.0%	☆
F09.10	PID differential limit range	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	0.00～60.00s	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 condition	0: Do not switch 1: Switch via X terminal 2: Automatic switching according to the 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%	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F09.21	PID initial value	0.0%～100.0%	0.0%	☆
F09.22	PID initial value hold time	0.00～650.00s	0.00s	☆
F09.23	Reserved	——	——	☆
F09.24	Reserved	——	——	☆
F09.25	PID feedback upper limit loss detection value	Does not judge 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 stop operation	0: No operation when stopped 1: Operation during stop	0	☆
F10 Group Multi-Segment Command, Simple PLC				
F10.00	Multi-segment command 0	-100.0%～100.0%	0.0%	☆
F10.01	Multi-segment command 1	-100.0%～100.0%	0.0%	☆
F10.02	Multi-segment command 2	-100.0%～100.0%	0.0%	☆
F10.03	Multi-segment command 3	-100.0%～100.0%	0.0%	☆
F10.04	Multi-segment command 4	-100.0%～100.0%	0.0%	☆
F10.05	Multi-segment command 5	-100.0%～100.0%	0.0%	☆
F10.06	Multi-segment command 6	-100.0%～100.0%	0.0%	☆
F10.07	Multi-segment command 7	-100.0%～100.0%	0.0%	☆
F10.08	Multi-segment command 8	-100.0%～100.0%	0.0%	☆
F10.09	Multi-segment command 9	-100.0%～100.0%	0.0%	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F10.10	Multi-segment command 10	-100.0%～100.0%	0.0%	☆
F10.11	Multi-segment command 11	-100.0%～100.0%	0.0%	☆
F10.12	Multi-segment command 12	-100.0%～100.0%	0.0%	☆
F10.13	Multi-segment command 13	-100.0%～100.0%	0.0%	☆
F10.14	Multi-segment command 14	-100.0%～100.0%	0.0%	☆
F10.15	Multi-segment command 15	-100.0%～100.0%	0.0%	☆
F10.16	Simple PLC running mode	0: Stop at the end of a single run 1: Keep the final value at the end of a single run 2: Continuous cycle	0	☆
F10.17	Simple PLC power-off memory selection	Units: Power-off memory selection 0: No memory when power off 1: Power-off memory Tens: Inverter stop memory selection 0: Stop without memory 1: Stop with memory	00	☆
F10.18	Simple PLC 0-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.19	Simple PLC 0-segment Acc/Dec time selection	0～3	0	☆
F10.20	Simple PLC 1-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.21	Simple PLC 1-segment Acc/Dec time selection	0～3	0	☆
F10.22	Simple PLC 2-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.23	Simple PLC 2-segment Acc/Dec time selection	0～3	0	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F10.24	Simple PLC 3-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.25	Simple PLC 3-segment Acc/Dec time selection	0～3	0	☆
F10.26	Simple PLC 4-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.27	Simple PLC 4-segment Acc/Dec time selection	0～3	0	☆
F10.28	Simple PLC 5-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.29	Simple PLC 5-segment Acc/Dec time selection	0～3	0	☆
F10.30	Simple PLC 6-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.31	Simple PLC 6-segment Acc/Dec time selection	0～3	0	☆
F10.32	Simple PLC 7-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.33	Simple PLC 7-segment Acc/Dec time selection	0～3	0	☆
F10.34	Simple PLC 8-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.35	Simple PLC 8-segment Acc/Dec time selection	0～3	0	☆
F10.36	Simple PLC 9-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.37	Simple PLC 9-segment Acc/Dec time selection	0～3	0	☆
F10.38	Simple PLC 10-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.39	Simple PLC 10-segment Acc/Dec time selection	0～3	0	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F10.40	Simple PLC 11-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.41	Simple PLC 11-segment Acc/Dec time selection	0～3	0	☆
F10.42	Simple PLC 12-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.43	Simple PLC 12-segment Acc/Dec time selection	0～3	0	☆
F10.44	Simple PLC 13-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.45	Simple PLC 13-segment Acc/Dec time selection	0～3	0	☆
F10.46	Simple PLC 14-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.47	Simple PLC 14-segment Acc/Dec time selection	0～3	0	☆
F10.48	Simple PLC 15-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	☆
F10.49	Simple PLC 15-segment Acc/Dec time selection	0～3	0	☆
F10.50	Simple PLC running time unit	0: s (second) 1: h (hour)	0	☆
F10.51	Multi-segment command 0 given mode	0: Function code F10.00 given 1: AI 2: Reserved 3: Panel potentiometer 4: Reserved 5: PIDs 6: Preset frequency (F00.08) given, UP/DOWN can be modified	0	☆
F11 Group – Reserved				
F12 Group – Fault And Protection				

Function Code	Name	Set Range	Factory Default	Modifi-cation
F12.00	Motor overload protection selection	0: Prohibited 1: Allowed	1	☆
F12.01	Motor overload protection gain	0.20～10.00	1.00	☆
F12.02	Motor overload pre-alarm 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	Braking initial voltage	200.0～2000.0V	690.0V	☆
F12.09	Fault automatic reset times	0～200	0	☆
F12.10	Fault digital output terminal action selection during fault automatic reset	0: No action 1: Action	1	☆
F12.11	Fault automatic reset interval time	0.1s～100.0s	6.0s	☆
F12.12	Input phase loss protection selection	0: Prohibited (inverter power <=11kW) 1: Allowed (inverter power >11kW)	Depending on model	☆
F12.13	Output phase loss protection selection	0: Prohibited 1: Allowed	1	☆
F12.14	1st fault type	0: No fault 1: Reserved 2: Acceleration overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Acceleration overvoltage	——	●

Function Code	Name	Set Range	Factory Default	Modifi-cation
F12.15	2nd fault type	6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer resistance overload 9: Undervoltage 10: Inverter overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: Module overheating 15: External fault 16: Abnormal communication 17: Reserved 18: Abnormal current detection 19: Abnormal motor tuning 20: Reserved 21: Abnormal parameters read and write 22: Abnormal Inverter hardware 23: Reserved 24: Reserved 25: Reserved 26: Run time arrives 27: Reserved 28: Reserved 29: The power-on time is arrives 30: Offload 31: Loss of PID feedback while running 40: Fast current limit timeout 41: Switch motors while running 42: Speed deviation too large 43: Motor overspeed 45: Motor over temperature 51: Initial position error	——	●
F12.16	3rd (latest) fault type		——	●
F12.17	Frequency at 3rd (latest) fault	——	——	●

Function Code	Name	Set Range	Factory Default	Modifi-cation
F12.18	Current at 3rd (latest) fault	——	——	●
F12.19	Bus voltage at 3rd (latest) fault	——	——	●
F12.20	Input terminal status at 3rd (latest) fault	——	——	●
F12.21	Output terminal status at 3rd (latest) fault	——	——	●
F12.22	Inverter status at 3rd (latest) fault	——	——	●
F12.23	Power-on time at 3rd (latest) fault	——	——	●
F12.24	Run time at 3rd (latest) fault	——	——	●
F12.27	Frequency at 2nd fault	——	——	●
F12.28	Current at 2nd fault	——	——	●
F12.29	Bus voltage at 2nd fault	——	——	●
F12.30	Input terminal status at 2nd fault	——	——	●
F12.31	Output terminal status at 2nd fault	——	——	●
F12.32	Inverter status at 2nd fault	——	——	●
F12.33	Power-on time at 2nd fault	——	——	●
F12.34	Run time at 2nd fault	——	——	●
F12.36	Undervoltage fault reset time during operation	0.0s～6553.s	0.0s	☆
F12.37	Frequency at 1st fault	——	——	●
F12.38	Current at 1st fault	——	——	●
F12.39	Bus voltage at 1st fault	——	——	●

Function Code	Name	Set Range	Factory Default	Modifi-cation
F12.40	Input terminal status at 1st fault	——	——	●
F12.41	Output terminal status at 1st fault	——	——	●
F12.42	Inverter status at 1st fault	——	——	●
F12.43	Power-on time at 1st fault	——	——	●
F12.44	Run time at 1st fault	——	——	●
F12.45	Shield "E-08" selection	0: Invalid 1: Valid	0	☆
F12.46	Power-off restart setting	Units digit: Power-off and restart selection 0: Invalid 1: Valid Tens digit: Under voltage restart selection 0: Invalid 1: Valid Hundreds: Reserved Thousands: Reserved Ten thousand digit: Reserved	00	☆
F12.47	Fault protection action selection 1	Units: Motor overload (11) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running Tens: Input phase loss (12) Hundreds: Output phase loss (13) Thousands: External fault (15) Ten thousands: Communication abnormal (16)	00000	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F12.48	Fault protection action selection 2	Units: Reserved 0: Coast to stop Tens: Function code read/write abnormal (21) 0: Coast to stop 1: Stop according to the stop mode Hundreds: Reserved Thousands: Motor overheating (25) Ten thousands: Runtime arrives (26)	00000	☆
F12.49	Fault protection action selection 3	Units: User-defined fault 1 (27) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running Tens: User-defined fault 2 (28) 0: Coast to stop 1: Stop according to the stop mode 2: keep running Hundreds: Power-on time arrival (29) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running Thousands: Drop loading (30) 0: Coast to stop 1: Decelerate to stop 2: Jump directly to 7% of the motor rated frequency and continue to run, when the load is not drop, it will automatically return to the set frequency running Tens thousands: PID feedback loss while running (31) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running	00000	☆

Function Code	Name	Set Range	Factory Default	Modification
F12.50	Fault protection action selection 4	Units: Speed deviation too large (42) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running Tens, hundreds, thousands, ten thousand: Reserved	00000	☆
F12.54	Continue to run frequency selection in case of fault	0: Run at the current running frequency 1: Run at the set frequency 2: Run at the upper limit frequency 3: Run at the lower limit frequency 4: Running at abnormal standby frequency	0	☆
F12.55	Abnormal standby frequency	0.0%～100.0% (100.0% corresponds to the maximum frequency F00.10)	100.0%	☆
F12.56～F12.58	Reserved	——	0	★
F12.59	Instantaneous power failure action selection	0: Invalid 1: Deceleration 2: Deceleration to stop	0	☆
F12.60	Instantaneous stop action pauses to judge voltage	80.0%～100.0%	85.0%	☆
F12.61	Instantaneous power failure voltage recovery judgment time	0.00s～100.00s	0.50s	☆
F12.62	Instantaneous power failure action judgment voltage	60.0%～100.0% (Standard bus voltage)	80.0%	☆
F12.63	Off load protection selection	0: Invalid 1: Valid	0	☆
F12.64	Off load detection level	0.0～100.0%	10.0%	☆
F12.65	Off load detection time	0.0～60.0s	1.0s	☆

Function Code	Name	Set Range	Factory Default	Modification
F12.66	Reserved	——	——	☆
F12.67	Reserved	——	——	☆
F12.68	SVC speed deviation excessive detection value	0.0%～50.0% (maximum frequency)	20.0%	☆
F12.69	SVC speed deviation excessive detection time	0.0s: No detection 0.1～60.0s	0.0s	☆
F12.70	Instantaneous stop non-stop gain Kp	0～100	40	☆
F12.71	Instantaneous stop non-stop integral coefficient Ki	0～100	30	☆
F12.72	Instantaneous stop non-stop action deceleration time	0.0～300.0s	20.0s	☆
F12.73	Carrier automatic adjustment selection	Units digit: Automatic adjustment of overload carrier 0: Prohibited 1: Valid Tens digit: Carrier automatically adjusted at startup 0: Prohibited 1: Valid Hundreds, thousands, ten thousand: Reserved	11	☆
F13 Group – Communication Parameters				
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	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
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 overtime time	0.0: Invalid 0.1～60.0s	0.0s	☆
F13.05	MODBUS protocol selection	0: Non-standard MODBUS protocol 1: Standard MODBUS protocol	1	☆
F13.06	RS485 communication read current resolution	0: 0.01A 1: 0.1A	0	☆
F13.07	RS485 communication protocol selection	0: 900N protocol 1: 900G protocol 2～10：Reserved	0	☆
F14 Group – Keypad And Display				
F14.00	Reserved	——	0	☆
F14.01	Key STOP/RESET function selection	0: Only in the keypad operation mode, the stop function of the STOP/RES key is valid 1: In any operation mode, the stop function of STOP/RES key is valid	1	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F14.02	LED running main display parameter 1	0000～FFFF Bit00: Running 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 Bit10: Reserved Bit11: Pressure feedback (MPa, Kg) Bit12: Reserved Bit13: Reserved Bit14: Load speed display Bit15: PID setting	1F	☆
F14.03	LED running main display parameter 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	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F14.04	LED stop 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: Reserved	33	☆
F14.05	LED running auxiliary display parameters	0～80	4	☆
F14.06	LED stop 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	0.0℃～100.0℃	——	●
F14.09	Cumulative running time	0h～65535h	——	●
F14.10	Load speed display decimal places	LED units: Load speed (d00.14) display coefficient 0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places LED ten digit: Feedback speed (d00.19) display coefficient 1: 1 ecimal place 2: 2 decimal places	21	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F14.11	Cumulative power-on time	0～65535 hour	——	●
F14.12	Cumulative power consumption	0～65535 kWh	——	●
F14.13	Hardware version number	——	——	●
F14.14	Software version number	——	——	●
F14.15	Software batch number	——	3.0410	●
F15 Group – Function Code Management				
F15.00	User password	0～65535	0	☆
F15.01	Parameter initialization	0: No operation 1: All user parameters except the motor parameters are restored to factory settings 2: All user parameters are restored to factory settings 3: Clear record information	0	★
F15.02	Function code modification attribute	0: Modifiable 1: Unmodifiable	0	☆
F15.03	Reserved	——	0	●
F15.04	Reserved	——	0	●
F16 Group – Water Supply Parameter Group				
F16.01～F16.04	Reserved	——	0	★
F16.05	Pump sleep waiting time	0.0～3600.0s	2.0	☆
F16.06	Pump wake-up waiting time	0.0～3600.0s	1.0	☆
F16.07	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	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F16.09	Sensor range	0.00～100.00 (MPa、Kg)	10.00	☆
F16.10	Maximum power node of the battery panel	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 initial frequency	0.00Hz～maximum frequency (F00.10)	10.00	☆
F16.18	Photovoltaic water pump water shortage detection current corresponds 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	Photovoltaic undervoltage self-start delay	0.1～6000.0s (0.0 value turn off self-start)	2.0	☆
F16.21	Photovoltaic water shortage self-start delay	0.1～6000.0s (0.0 value turn off self-start)	15.0	☆
F16.22	Power search time	0.050～60.000	0.500	☆
F16.23	Power search gain	10～500	125	☆

Function Code	Name	Set Range	Factory Default	Modification
F16.24	Power search speed gain	1～1000	100	☆
F16.25	Pre-search increase frequency time	0.01～600.00s	15.00	☆
F16.26	Pre-search decrease frequency time	0.01～600.00s	15.00	☆
F17 Group – Control Optimization Parameters				
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	Deadband 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	Pulse-by-wave current limit enable	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	Depending on model	★
F17.09	Reserved	——	0	☆
F17.10	Reserved	——	0	☆
F18 Group – Reserved				
FFF Group – Manufacturer Parameters				
FFF.00	Factory password	0～65535	0	★

d00 Group – Basic Monitoring Parameters			
Function Code	Name	Factory Value	Communication Address
d00.00	Running 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/0.01mA	7009H
d00.10	Reserved	——	700AH
d00.11	Pressure feedback (MPa、Kg)	0.00	700BH
d00.12	Reserved	——	700CH
d00.13	Reserved	——	700DH
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	——	7012H

Function Code	Name	Factory Value	Communication Address
d00.19	Feedback speed (Hz)	0.01Hz	7013H
d00.20	Remain run time	0.1Min	7014H
d00.21	Voltage (V) / current (mA) before AI correction	0.001V/0.01mA	7015H
d00.22	Reserved	——	7016H
d00.23	Pressure setting (MPa、Kg)	0.00	7017H
d00.24	Linear speed	1m/Min	7018H
d00.25	Current power-on time	1Min	7019H
d00.26	Current running time	0.1Min	701AH
d00.27	Reserved	——	701BH
d00.28	Communication set value	0.01%	701CH
d00.29	Reserved	0	701DH
d00.30	Main frequency A display	0.01Hz	701EH
d00.31	Auxiliary frequency B display	0.01Hz	701FH
d00.32	Reserved	——	7020H
d00.33	Reserved	——	7021H
d00.34	Motor temperature value	1℃	7022H
d00.35	Target torque (%)	0.1%	7023H
d00.36	Reserved	——	7024H
d00.37	Power factor angle (Hz)	0.1°	7025H
d00.38	Input voltage (V)	0.0V	7026H

Function Code	Name	Factory Value	Communication Address
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	Running frequency (%)	0.01%	703CH
d00.61	Inverter status	1	703DH
d00.62	Current fault code	1	703EH
d00.63	Reserved	——	703FH
d00.64	Reserved	——	7040H
d00.65	Torque upper limit	0.10%	7041H
d00.66 ~ d00.78	Reserved	——	——
d00.79	Set temperature	1℃	704FH

7. EMC (Electromagnetic Compatibility)

7.1 Definition

Electromagnetic compatibility (EMC) refers to the ability of electrical equipment to operate in an electromagnetic interference environment without interfering with the electromagnetic environment and to realize its function stably.

7.2 EMC Standard Introduction

According to the requirements of the 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 standards: I E C / E N 6 1 8 0 0 – 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 inspects the frequency converter from two aspects of electromagnetic interference and anti-electromagnetic interference. Electromagnetic interference mainly tests the radiated interference, conduction interference and harmonic interference of the frequency inverter (this requirement is required for frequency inverters used in civilian use).Anti-electromagnetic interference mainly affects the conduction immunity, radiation immunity, surge immunity, fast mutation pulse group immunity, ESD immunity and low-frequency power supply immunity (specific test items are):
① Immunity test for input voltage sags, interruptions and changes;
② Commutation notch immunity test;
③ Harmonic input immunity test;
④ Input frequency change test;
⑤ Input voltage unbalance test;
⑥ Input voltage fluctuation test) for testing. Tested in accordance with the strict requirements of IEC/EN61800-3 above, our products are installed and used in accordance with the guidance shown in 8.3, and will have good electromagnetic compatibility in general industrial environments.

7.3 EMC Guide

(1) Harmonic Wave Effect

The higher harmonics of the power supply will cause damage to the inverter. Therefore, in some places where the power grid quality is relatively poor, it is recommended to install an AC input reactor.

(2) Electromagnetic Interference And Installation Precautions

There are two kinds of electromagnetic interference, one is the interference of the electromagnetic noise of the surrounding environment on the inverter, and the other is the interference generated by the inverter on the surrounding equipment.

Installation Precautions:
① The grounding wires of inverters and other electrical products should be well grounded;
② The power input and output lines of the inverter and the weak current signal lines (such as: control lines) should not be arranged in parallel as much as possible, but vertically if possible;
③ It is recommended to use shielded cable or steel pipe shielded power line for the output power line of the inverter, and the shielding layer must be reliably grounded. It is recommended to use twisted-pair shielded control lines for the lead wires of the interfered equipment, and the shielding layer must be grounded reliably;
④ For motor cables longer than 100m, it is required to install an output filter or reactor.

(3) Method Of Interference Caused By Peripheral Electromagnetic Equipment To VFD

Generally, the reason for the electromagnetic impact on the frequency inverter is that there are a large number of relays, contactors or electromagnetic brakes installed near the frequency inverter. When the frequency inverter is disturbed and malfunctions, it is recommended to adopt the following solutions:
① Install a surge suppressor on the device that generates interference;
② Install a filter at the input end of the frequency inverter, refer to to point 6 for details;
③ Use shielded cables for the lead wires of inverter control signal lines and detection lines, and ground the shielding layer reliably.

(4) Method Of Dealing With Interference Caused By VFD To Peripheral Equipment

The noise in this part is divided into two types: one is the radiated interference of the frequency inverter, and the other is the conducted interference of the frequency inverter. These two kinds of interference cause the surrounding electrical equipment to be subjected to electromagnetic or electrostatic induction. Thus causing the equipment to malfunction. For several different interference situations, refer to the following solutions:
① The instruments, receivers and sensors used for measurement generally have relatively weak signals. If they are close to the frequency inverter or in the same control cabinet, they are susceptible to interference and malfunction. It is recommended to adopt the following solutions: keep away from Interference source; do not arrange signal lines and power lines in parallel, especially do not bundle them together in parallel; use shielded lines for signal lines and power lines, and have good grounding; add ferrite magnetic rings on the output side of the inverter (select the suppression frequency at 30～1000MHz range), and wind 2～3 turns in the same direction, for bad conditions, you can choose to install an EMC output filter;
② When the disturbed equipment and the inverter use the same power supply, it will cause conduction interference. If the above methods cannot eliminate the interference, an EMC filter should be installed between the inverter and the power supply (refer to point 6 for type selection) ;
③ The peripheral equipment is grounded separately, which can eliminate the interference caused by the leakage current of the ground wire of the inverter when it is common ground.

(5) Leakage Current And Treatment

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

① Factors affecting ground leakage current and solutions:
There is distributed capacitance between the wire and the ground, 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 greater the carrier frequency, the greater the leakage current. The carrier frequency can be lowered to reduce leakage current. However, reducing the carrier frequency will increase the noise of the motor. Please note that adding 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 and solutions that cause leakage current between lines:
There is distributed capacitance between the output wiring of the inverter, 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 malfunction.
The solution is to reduce the carrier frequency or install an output reactor. When using a frequency inverter, it is recommended not to install a thermal relay between the frequency inverter and the motor, and use the electronic overcurrent protection function of the frequency inverter.

(6) Precautions for installing an EMC input filter at the power input terminal

① Note: When using the filter, please use it strictly according to the rated value; since the filter belongs to Class I electrical appliances, the metal shell of the filter should be in good contact with the metal ground of the installation cabinet in a large area, and it is required to have good conductive continuity, otherwise there will be a risk of electric shock And seriously affect the EMC effect;
② Through the EMC test, it is found that the ground of the filter must be connected to the same common ground as the PE terminal of the inverter, otherwise the EMC effect will be seriously affected.
③ The filter should be installed as close as possible to the power input end of the inverter.

8. Fault Diagnosis And Solutions

8.1 Fault Alarm And Solution

Any abnormity occurs during operation, the inverter will lock PWM output immediately and enter the fault protection status. Meanwhile,the flashing fault code on the keyboard indicates 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 methods in this section. If the problem still cannot be solved, please contact our company directly. For the corresponding solutions, see the table below for fault diagnosis and troubleshooting.

Fault Name	Display Code	Possible Reasons	Solutions
Inverter unit protection	E-01	1. Inverter output circuit is short-circuited 2. The wire between the motor and the inverter too long 3. The module overheated 4. Inverter internal wiring is loose 5. Main control board abnormal 6. Driver board abnormal 7. Inverter module abnormal	1. Eliminate peripheral faults 2. Install reactor or output filter 3. Check whether the air duct is blocked, whether the fan is working normally and eliminate the existing problems 4. Plug in well all cables 5. Seek technical support 6. Seek technical support 7. Seek technical support
Overcurrent when accelerating	E-02	1. There is grounding or short circuit in the inverter output circuit 2. The control mode is vector without parameter identification 3. The acceleration time is too short 4. Manual torque boost or V/F curve is inappropriate 5. Low voltage 6. Start the rotating motor 7. Sudden load increase during acceleration 8. The selection of inverter power is small	1. Eliminate peripheral faults 2. Carry out motor parameter identification 3. Increase the acceleration time 4. Adjust manual boost torque or V/F curve 5. Adjust the voltage to the normal range 6. Select speed tracking start or start after the motor stops 7. Cancel sudden load increase 8. Choose a higher power level inverter

Fault Name	Display Code	Possible Reasons	Solutions
Overcurrent when decelerating	E–03	1. There is grounding or short circuit in inverter the output circuit 2. The control mode is vector without parameter identification 3. The deceleration time is too short 4. Low voltage 5. Sudden load increase during deceleration 6. No braking unit and braking resistor installed	1. Eliminate peripheral faults 2. Carry out motor parameter identification 3. Increase the deceleration time 4. Adjust the voltage to the normal range 5. Cancel sudden load increase 6. Install braking unit and resistor
Overcurrent at constant speed	E–04	1. There is grounding or short circuit in the inverter output circuit 2. The control mode is vector without parameter identification 3. Low voltage 4. Whether there is a sudden load increase during running 5.The selection of inverter power is small	1. Eliminate peripheral faults 2. Carry out motor parameter identification 3. Adjust the voltage to the normal range 4. Cancel sudden load increase 5. Choose a higher power level inverter
Overvoltage when accelerating	E–05	1. The input voltage is too high 2. During the acceleration process, there is an external force to drive the motor to run 3. Acceleration time is too short 4. No braking unit and braking resistor installed	1. Adjust the voltage to the normal range 2. Cancel the external force or install braking resistor 3. Increase the acceleration time 4. Install braking unit and resistor
Overvoltage when decelerating	E–06	1. The input voltage is too high 2. During the deceleration process, there is an external force to drive the motor to run 3. The deceleration time is too short 4. No braking unit and braking resistor installed	1. Adjust the voltage to the normal range 2. Cancel the external force or install braking resistor 3. Increase the deceleration time 4. Install braking unit and resistor
Overvoltage at constant speed	E–07	1. The input voltage is too high 2. During the operation, there is an external force to drive the motor to run	1. Adjust the voltage to the normal range 2. Cancel the external force or install braking resistor

Fault Name	Display Code	Possible Reasons	Solutions
Control power supply fault	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. Instantaneous power failure 2. The voltage at the inverter input terminal is not within the required range 3. The bus voltage abnormal 4. The rectifier bridge and buffer resistor are abnormal 5. Drive board abnormal 6. Control board abnormal	1. Reset 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. Whether the load is too large or the motor is blocked 2. The selection of inverter power is too small	1. Reduce the load and check the motor and mechanical condition 2. Choose a higher power level inverter
Motor overload	E–11	1. Three–phase input power supply abnormal 2. Driver board abnormal 3. lightning protection board abnormal 4. Main control board abnormal	1. Check and eliminate the problems in the peripheral circuit 2. Seek technical support 3. Seek technical support 4. Seek technical support
Input phase loss	E–12	1. Three–phase input power supply abnormal 2. Driver board abnormal 3. Lightning protection board abnormal 4. Main control board abnormal	1. Check and eliminate the problems in the peripheral circuit 2. Seek technical support 3. Seek technical support 4. Seek technical support
Output phase loss	E–13	1. The lead wire from the inverter to the motor is abnormal 2. The three–phase output of the inverter is unbalanced when the motor is running 3. Driver board abnormal 4. Module abnormal	1. Eliminate peripheral faults 2. Check whether the three–phase winding of the motor is normal and troubleshoot 3. Seek technical support 4. Seek technical support

Fault Name	Display Code	Possible Reasons	Solutions
Module overheat	E–14	1. The ambient temperature is too high 2. The air duct is blocked 3. The fan is damaged 4. The module thermistor is damaged 5. The inverter module is damaged	1. Reduce the ambient temperature 2. Clean the air duct 3. Replace the fan 4. Replace the thermistor 5. Replace the inverter module
External device fault	E–15	1. Input external fault signal through multi–function terminal X	1. Reset operation
Communi–cation fault	E–16	1. The upper computer is not working properly 2. The communication cable is abnormal 3. The setting of communication expansion card F00.28 is incorrect 4. The setting of communication parameter F13 group is incorrect	1. Check the wiring of the upper computer 2. Check the communication cable 3. Correctly set the communication expansion card type 4. Correctly set the communication parameters
Current detection fault	E–18	1. Check whether the hall device is abnormal 2. Driver board abnormal	1. Replace the hall device 2. Replace the driver board
Motor tuning fault	E–19	1. The motor parameters are not set according to the nameplate 2. The parameter identification process timed out	1. Correctly set the motor parameters according to the nameplate 2. Check the lead wires from the inverter to the motor
EEPROM read and write fault	E–21	1. EEPROM chip damage	1. Replace the main control board
Inverter hardware fault	E–22	1. Overvoltage 2. Overcurrent	1. Handle according to overvoltage fault 2. Handle according to overcurrent fault
Cumulative running time reached fault	E–26	1. The cumulative running time reaches the set value	1. Use the parameter initialization function to clear the record information

Fault Name	Display Code	Possible Reasons	Solutions
User–defined Fault 1	E–27	1. Input the signal of user–defined fault 1 through the multi–function terminal X	1. Reset operation
User–defined Fault 2	E–28	1. Input the signal of user–defined fault 2 through the multi–function terminal X	1. Reset operation
Cumulative power–on time reached fault	E–29	1. The cumulative running time reaches the set value	1. Use the parameter initialization function to clear the record information
Off load fault	E–30	1. The inverter running current is less than F12–64	1. Confirm whether the load is off or whether the parameter settings of F12–64 and F12–65 conform to the actual operating conditions
Runtime PID feedback loss fault	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 an appropriate value
Wave–by–wave current limiting fault	E–40	1. Whether the load is too large or the motor is blocked 2. The selection of inverter power is too small	1. Reduce the load and check the motor and mechanical condition 2. Choose a higher power level inverter
Excessive speed deviation fault	E–42	1. No parameter identification 2. The setting of the detection parameters F12.66～F12.69 for excessive speed deviation is unreasonable	1. Carry out motor parameter identification 2. Reasonably set the detection parameters according to the actual situation
Wrong initial position	E–51	1. The motor parameters and the actual deviation are too large	1. Reconfirm whether the motor parameters are correct, focusing on whether the rated current is set too small
Master–slave control slave fault	E–55	1. The slave machine fails, check the slave machine	1. Start troubleshooting according to the slave fault code

Fault Name	Display Code	Possible Reasons	Solutions
Brake tube protection fault	E-60	1. The braking resistor is short-circuited or the braking module is abnormal	1. Check braking resistor or seek technical support
Photovoltaic water shortage detection fault	E-65	1. Photovoltaic water pump water shortage detection fault	1. See F16.10～F16.26 for details

8.2 Common Faults And Solutions

No.	Fault Phenomenon	Possible Reasons	Solutions
1	No display after power on	The grid voltage is not available or is too low; The switching power supply on the inverter drive board is faulty; The rectifier bridge is damaged; The inverter buffer resistor is damaged; Control board, keypad fault; The connection between the control board, the driver board and the keypad is broken.	Check the input power; Check bus voltage; Seek manufacturer services.
2	Power on display “P.OFF”	Poor connection between the driver board and the control board; Related components on the control board are damaged; There is a short circuit to the ground of the motor or the motor line; Hall fault; Grid voltage is too low	Seek manufacturer services.

No.	Fault Phenomenon	Possible Reasons	Solutions
3	The display is normal when the inverter powered on, display “P.OFF” after running and stop immediately	The fan is damaged or blocked; There is a short circuit in the peripheral control terminal wiring.	Replace the fan; Eliminate external short circuit faults.
4	Frequent report of E–14 (module overheat) fault	The carrier frequency setting is too high; The fan is damaged or the air duct is blocked; The inverter internal components are damaged (thermocouple or others).	Reduce carrier frequency (F00.15); Replace the fan and clean the air duct; Seek manufacturer services.
5	The motor does not rotate after the inverter is running	Motors and motor cables; Inverter parameter setting error (motor parameter); Poor contact between the driver board and the control board; Driver board fault.	Reconfirm the connection between the inverter and the motor; Replace the motor or clear the mechanical fault; Check and reset the motor parameters.
6	X–terminal invalid	Parameter setting error; External signal error; Control board fault.	Check and reset the relevant parameters of Group F07; Reconnect the external signal line; Seek manufacturer services.
7	The inverter frequently reports overcurrent and overvoltage faults	Motor parameter setting is wrong; The acceleration and deceleration time is inappropriate; load fluctuations.	Reset the motor parameters or perform motor tuning; Set the appropriate acceleration and deceleration time; Seek manufacturer services.
8	Power–on digital tubes are all lit	Related components on the control board are damaged.	Replace the control board.

Appendix I: Modbus Communication Protocol

CV800D series inverters provide RS485 communication interface and support Modbus-RTU slave station communication protocol. Users can realize centralized control through a computer or PLC, set inverter running commands through this communication protocol, modify or read function code parameters, and read inverter working status and fault information, etc.

(1) Agreement Content

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

(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

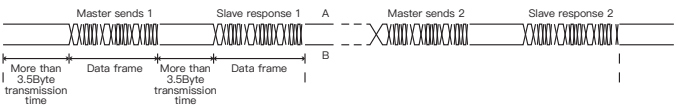
Inverter terminals 485+ and 485- are Modbus communication interfaces.

② Topology

Single-master multi-slave system. Each communication device in the network has a unique slave address, and one of the devices acts as a communication master(usually is PC upper computer, PLC, HMI, etc.), actively initiates communication, and performs parameter read or write operations on the slave. Other devices are communication slaves, responding to inquiries or communication operations from the master to the machine. Only one device can send data at a time, while other devices are receiving. The setting range of the slave address is 1～247, and 0 is the broadcast communication address. The slave address must be unique in the network.

③ Communication transmission method

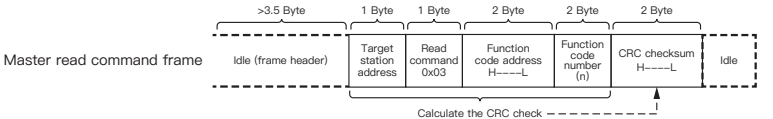
Asynchronous serial, half-duplex transmission mode. In the process of serial asynchronous communication, the data is sent one frame at a time in the form of a message. According to the MODBUS-RTU protocol, when the idle time of no data on the communication data line is greater than 3.5Byte transmission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



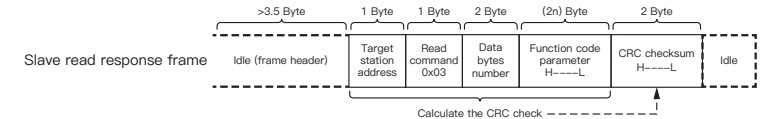
CV800D series inverter built-in communication protocol is the Modbus-RTU slave communication protocol, which can respond to the "query/command" of the master, or make corresponding actions according to the "query/command" of the master, and respond with communication data.
The master can refer to a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc. The master can not only communicate with a slave, but also issue broadcast information to all lower slaves. For the individual access "query/command" of the master, the accessed slave must return a response frame; for the broadcast information sent by the master, the slave does not need to feedback a response to the master.

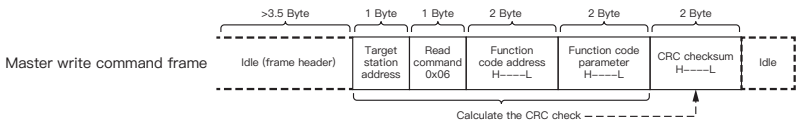
(4) Communication Data Structure

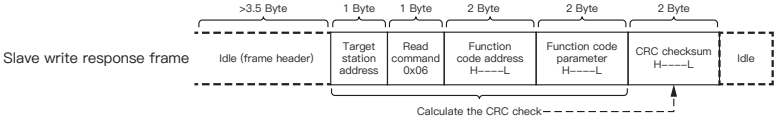
CV800D series inverter Modbus protocol communication data format is as follows. The inverter only supports reading or writing of Word parameters, and the corresponding communication read operation command is 0x03; the write operation command is 0x06, and does not support byte or bit read and write operations:



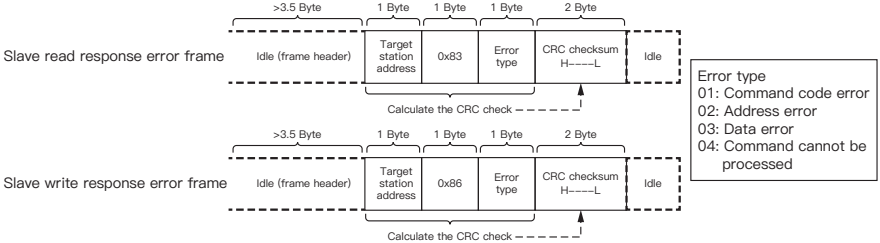
Theoretically, the upper computer can read several consecutive function codes at one time (that is, n can reach a maximum of 12), but be careful not to cross the last function code of this function code group, otherwise it will reply incorrectly.







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



Data Frame Field Description:

Frame Header START	The transmission time is more than 3.5 characters idle
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	The inverter internal parameter address is expressed in hexadecimal; it is divided into functional code type and non-functional code type (such as running status parameters, running commands, etc.) parameters, etc., see address definition for details. When transmitting, the high byte comes first and the low byte follows.
Function code address L	

Function codes number H	The number of function codes read in this frame, if it is 1, it means read 1 function code. When transmitting, the high byte comes first and the low byte follows. This protocol can only rewrite one function code at a time, without this field.
Function codes number L	
Data H	The response data, or the data to be written. When transmitting, the high byte comes first and the low byte follows.
Data L	
CRC CHK high bit	Detection value: CRC16 check value. When transmitting, the high byte comes first and the low byte follows. For the calculation method, please refer to the description of CRC check in this section.
CRC CHK low bit	
END	At 3.5 characters

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 checks 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 to store 0xFFFF first, and then call a process to process the continuous 8–bit bytes in the message with the value in the current register. Only the 8Bit data in each character is valid for CRC, the start and stop bits and parity bits are invalid. In the process of CRC generation, each 8–bit character is exclusive or (XOR) with the contents of the register, and the result moves to the least significant bit, and the most significant bit is filled with 0. The LSB is extracted and detected. If the LSB is 1, the register is exclusive or different from the preset value. If the LSB is 0, it will not be performed. The whole process is repeated 8 times. After the last bit (bit 8) is complete,the next 8–bit byte separately differs from the current value of the register. The value in the final register is the CRC value after all bytes in the message have been executed.

When the CRC is added to the message, the low byte is added first, followed by the high byte. CRC simple function 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) ;
}
```

(5) Communication Parameters Address Definitions

Read and write function code parameters (some function codes cannot be changed and are only used by manufacturers or monitored):
Use the function code group number and label as the parameter address to express the rule:
High byte: F00～FFF (F Group)、d00 (d Group)
Low byte: 00～FF
For example: if you want to access the function code F00.20, the access address of the function code is expressed as 0xA014;
Note: some parameters cannot be changed when the inverter is running; some parameters cannot be changed no matter what state the inverter is in; when changing function code parameters, pay attention to the range, unit and related instructions of the parameters.

Function Code Group No.	Communication Access Address	Communication Modify Function Code Address In RAM
F00～F15 Group	0xA000～0xAFFF	0x4000～0x4FFF
F16 Group～F18 Group	0xB000～0xB1FF	0x5000～0x51FF
FFF Group	0xCF00～0xCFFF	0x6F00～0x6FFF
d00 Group	0x7000～0x70FF	

Note: Since the EEPROM is frequently stored, the service life of the EEPROM will be reduced. Therefore, some function codes do not need to be stored in the communication mode, and only need to change the value in RAM.

(6) Stop/Run Parameters Section:

Parameter Address	Parameter Description	Parameter Address	Parameter Description
1000H	* Communication setting value (decimal) −10000～10000	1010H	PID setting
		1011H	PID feedback
1001H	Running frequency	1012H	PLC steps
1002H	Bus voltage	1013H	Reserved
1003H	Output voltage	1014H	Feedback speed, unit 0.1Hz
1004H	Output current	1015H	Remaining run time
1005H	Output power	1016H	AI voltage before correction
1006H	Output torque	1017H	Reserved
1007H	Running speed	1018H	Panel potentiometer voltage before correction
1008H	Digital input terminal input sign	1019H	Linear speed
1009H	Digital output terminal output sign	101AH	Current power−on time
100AH	AI voltage	101BH	Current running time
100BH	Reserved	101CH	Reserved
100CH	Panel potentiometer voltage	101DH	Communication setting value
100DH	Reserved	101EH	Actual feedback speed
100EH	Reserved	101FH	Main frequency A display
100FH	Load speed	1020H	Auxiliary frequency B display

Note:
The communication setting value is the percentage of the relative value, 10000 corresponds to 100.00%, and −10000 corresponds to −100.00%.

Control command input to the inverter: (write only)

Command Address	Command Function
2000H	0001: Forward running
	0002: Reverse running
	0003: Forward jog
	0004: Reverse jog
	0005: Coast to stop
	0006: Deceleration stop
	0007: Fault reset

Read inverter status: (read only)

Status Address	Status Function
3000H	0001: Forward running
	0002: Reverse running
	0003: Stop

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

User Password Address	Content Of The Enter Password
AF00H	*****

Parameter initialization:

Command Address	Command Content
AF01H	0～FFFF means 0～65535

Digital output terminal control: (write only)

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

Analog output AO control: (write only)

Command Address	Command Content
2002H	0～7FFF means 0%～100%

(7) Inverter Fault Description:

Inverter Fault Address	Inverter Fault Information	
8000H	0000: No fault 0001: Reserved 0002: Overcurrent when accelerating 0003: Overcurrent when decelerating 0004: Overcurrent at constant speed 0005: Overvoltage when accelerating 0006: Overvoltage when decelerating 0007: Overvoltage at constant speed 0008: Buffer resistor overload fault 0009: Undervoltage fault 000A: Inverter overload 000B: Motor overload 000C: Input phase loss 000D: Output phase loss 000E: Module overheat 000F: External device fault 0010: Communication fault 0011: Reserved	0012: Current detection fault 0013: Motor tuning fault 0014: Reserved 0015: Parameter read and write fault 0016: Inverter hardware fault 0017: Reserved 0018: Reserved 0019: Reserved 001A: Running time arrives 001B: User-Defined Fault 1 001C: User-Defined Fault 2 001D: Power-on time arrives 001E: Off load 001F: Runtime PID Feedback Loss 0028: Fast Current Limit Timeout Fault 002A: Excessive speed deviation 005C: Wrong initial position 0041: Photovoltaic water shortage detection fault

(8) The Meaning Of The Error Code That The Slave Responds To The Abnormal Message:

Error Code Address	Error Code	Description
8001H	01H	Wrong password
	02H	Read and write command error
	03H	CRC verification error
	04H	Invalid address
	05H	Invalid parameter
	06H	Invalid parameter
	07H	System lock
	08H	Saving parameters

Appendix II: Macro Parameter Settings Description

Function Macro Definition	Setting Parameters	Automatically Modify The Parameter List	Debugging Steps
Single pump (1 variable frequency pump) water supply 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。	Step1: Determine the sensor feedback type, AI factory default input voltage feedback signal, you can also select AI input current feedback signal through jumper JP5; Step2: Terminal wiring, if the pressure gauge is 0～10V output, connect the signal wire of the pressure gauge to AI, and connect the other two wires to +10V and GND; if the output is 0～20mA, short connect COM and GND, Connect the pressure gauge signal wire to AI, and the other wire to 24V. Step3: Parameter initialization (F15.01=2); Step4: Set the sensor range (F16.09); Step5: Function macro selection (F00.00=3、4、5、6) Step6: Set the target pressure, which can be set by parameter F16.08, or by the up and down keys on the keypad.
Photovoltaic water supply voltage tracking mode	F00.00=7	F00.03=11.	Step2: Parameter initialization (F15.02=2) ; F00.03=11; Step3: Function macro selection (F00.00=7、8、9) Note: Refer to F16.10～F16.26 for photovoltaic water supply.
Photovoltaic water supply power tracking VF mode	F00.00=8		
Photovoltaic water supply power tracking SVC mode	F00.00=9		

Warranty Card

Product Information:

Product Name: _____ Customer Name: _____

Model Type: _____ Customer Address: _____

Purchase Date: _____ Contact Number: _____

Warranty Terms:

1. From the date of original shipment, we guarantee warranty of 12 months for free, and paid service for a lifetime;
2. Product failure caused by the following reasons are not included in 12 months warranty guarantee:
   (1) Users didn't conduct right operation according to user's manual;
   (2) Eguipment has been repaired or modified by user's without consent of manufacturer;
   (3) Fault caused by operation outside standard scope of application;
   (4) Abnormal aging or fault result from bad operating environment;
   (5) Damage caused by force majeure lie earthquke, fire, flood, thunderstrike, abnormal voltage, or other naturtal disasters;
   (6) Damage caused by improper delivery or extermal force.
3. Manufacturer preserves the right to refuse warranty service for the following conditon:
   (1) Damage of beyond recognition of brand, trade mark, serial number, nameplate, and other manufacturer marks;
   (2) Payment is not finished according to contrace;
   (3) Intenional concealment to our after-sale service provider of wrong operation during setting, wirting, operation, maintenance or other process.
4. For failing products, Canroon preserve the right to entrust others for warranty issues.

Certificate

Inspector: QC 001

The product is inspected according to the standard.