High Performance Vector Control
Solar Pump AC Drive

Model : SET880
User manual

Preface

Thanks for purchasing our inverters.

This manual describes how to use this AC Drive properly. Please read it carefully before installation, operation, maintenance and inspection. Besides, please use the product after understanding the safety precautions.

Precautions
● In order to describe the product's details, the drawings presented in this instruction are sometimes shown without covers or protective guards. When using the product, please make sure to install the cover or protective guard as specified firstly, and operate the products in accordance with the instructions. ● Since the drawings in this manual are represented examples, some are subject to differ from delivered products. ● This manual may be modified when necessary because of improvement of the product, modification or changes in specifications. Such modifications are denoted by a revised manual No. ● If you want to order the manual due to loss or damage, please contact our company agents in each region or our company customer service center directly. ● If there is still any problem during using the products, please contact our company customer service center directly.

Contents

Chapter 1 Safety and Precautions

Safety definition:

In this manual, safety precautions are classified as follows:

 Danger: Operations which are not performed according to requirements may cause serious equipment loss or personnel injury.

 Caution: Operations which are not performed according to requirements may cause medium hurt or light hurt or material loss.

During the installation, commissioning and maintenance of the system, please make sure to follow the safety and precautions of this chapter. In case of a result of illegal operations, caused any harm and losses is nothing to do with the company.

1.1 Safety Precautions

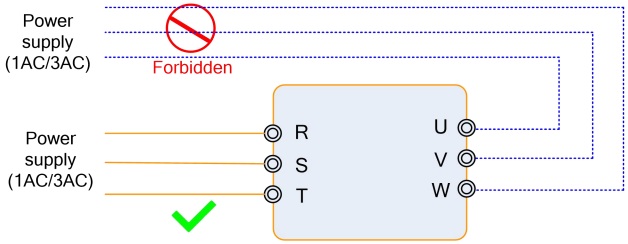
1.1.1 Before Installation:

 Danger	● Do not use the water-logged inverter, damaged inverter or inverter with missing parts. Otherwise, there may be risk of injury. ● Use the motor with Class B or above insulation. Otherwise, there may be risk of electric shock.
 Caution	● Carefully handled when loading, otherwise it may damage the inverter. ● Please don't use the damaged driver or inverter with missing parts, there may be risk of injury. ● Do not touch the electronic parts and components; otherwise it will cause static electricity.

1.1.2 During Installation:

 Danger	● Install the inverter on incombustible surface such as metal, and keep away from flammable substances. Otherwise it may cause fire. ● Do not loose the set screw of the equipment, especially the screws marked in RED.
 Caution	● Do not drop the cable residual or screw in the inverter. Otherwise it may damage the inverter. ● Please install the driver in the place where there is no direct sunlight or less vibratory. ● When more than two inverters are to be installed in one cabinet, due attention should be paid to the installation locations (refer to Chapter 3 Mechanical and Electrical Installation) to ensure the heat sinking effect.

1.1.3 During Wiring:

Danger	● Operation should be performed by the professional engineering technician. Otherwise there will be danger of electric shock! ● There should be circuit breaker between the inverter and power supply. Otherwise, there may cause fire! ● Make sure the power is disconnected prior to the connection. Otherwise there will be danger of electric shock! ● The ground terminal should be earthed reliably. Otherwise there may be danger of electric shock.
Caution	● Never connect AC power to output U, V, W terminals. Please note the remark of the wiring terminals, connect them correctly. Otherwise it will cause inverter be damaged.  ● Ensure the wiring circuit can meet the requirement of EMC and the area safety standard. Please follow the instructions in the manual before wiring. Otherwise may cause injury or electric shock. ● Never connect the braking resistor between DC Bus (+), (-) terminals. Otherwise may cause fire. ● Encoder must be used together with shielded wire, and ensure the single terminal of the shielded lay is connected with ground well.

1.1.4 Before Power-on:

Danger	● Please confirm whether the power voltage class is consistent with the rated voltage of the inverter and whether the I/O cable connecting positions are correct, and check whether the external circuit is short circuited and whether the connecting line is firm. Otherwise it may damage the inverter. The cover must be well closed prior to the inverter power-on. Otherwise electric shock may be caused. ● The inverter is free from dielectric test because this test is performed prior to the delivery. Otherwise accident may occur.
Caution	● The cover must be well closed prior to the inverter power-on. Otherwise electric shock may be caused! ● Whether all the external fittings are connected correctly in accordance with the circuit provided in this manual. Otherwise accident may occur!

1.1.5 After Power-on:

 Danger	● Do not open the cover of the inverter upon power-on. Otherwise there will be danger of electric shock! ● Do not touch the inverter and its surrounding circuit with wet hand. Otherwise there will be danger of electric shock! ● Do not touch the inverter terminals (including control terminal). Otherwise there will be danger of electric shock! ● At power-on, the inverter will perform the security check of the external heavy-current circuit automatically. Thus, at the moment please do not touch the terminals U, V and W, or the terminals of motor, otherwise there will be danger of electric shock.
 Caution	● If parameter identification is required, due attention should be paid to the danger of injury arising from the rotating motor. Otherwise accident may occur! ● Do not change the factory settings at will. Otherwise it may damage the equipment!

1.1.6 During Operation:

 Danger	● Do not touch the fan or discharge resistor to sense the temperature. Otherwise, you may get burnt! ● Detection of signals during the operation should only be conducted by qualified technician. Otherwise, personal injury or equipment damage may be caused!
 Caution	● During the operation of the inverter, keep items from falling into the equipment. Otherwise, it may damage the equipment! ● Do not start and shut down the inverter by connecting and disconnecting the contactor. Otherwise, it may damage the equipment!

1.1.7 During Maintain:

 Danger	● Do not repair and maintain the equipment with power connection. Otherwise there will be danger of electric shock! ● Be sure to conduct repair and maintenance after the charge LED indictor of the inverter is OFF. Otherwise, the residual charge on the capacitor may cause personal injury! ● The inverter should be repaired and maintained only by the qualified person who has received professional training. Otherwise, it may cause personal injury or equipment damage! ● Carry out parameter setting after replacing the inverter, all the plug-ins must be plug and play when power outage.

Chapter 2 Product Information

2.1 Selection Guide

Power	Motor		Rated Output Current (A)
	kW	HP	
3AC 380V±15%			
1.5kW	1.5	2	4.4
2.2kW	2.2	3	5.8
4.0kW	4.0	5	10
5.5kW	5.5	7.5	13
7.5kW	7.5	10	17
11kW	11	15	25
15kW	15	20	32
18.5kW	18.5	25	37
22kW	22	30	45
30kW	30	40	60
37kW	37	50	75
45kW	45	60	90
55kW	55	75	110
75kw	75	100	150
90kw	90	120	176
110kw	110	150	210
132kw	132	180	255
160kw	160	215	305
185kw	185	250	340
200kw	200	270	377

2.2 Technical Specifications

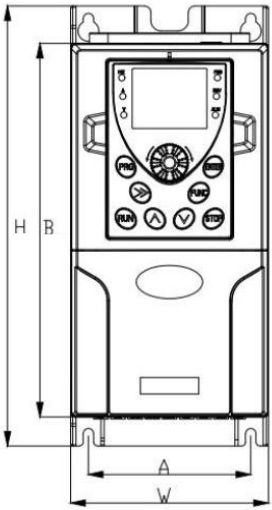
Item	Technical Index	Specification
Input	Input voltage	3AC 380V±15%
	Input frequency	50/60Hz±5%
Output	Output voltage	0～rated input voltage

	Output frequency	Low frequency mode: 0~300Hz High frequency mode: 0~3000Hz
Output	Overload capacity	G model: 150%/60s, 200%/4s P model: 120%/60s, 150%/1s
Control mode		V/F control, advanced V/F control, V/F separation control, no PG electric flow control
Control characte ristics	Frequency setting resolution	Digital setting: 0.01Hz Analog input: maximum output frequency 0.1%
	Frequency accuracy	Digital input: Within 0.2% of the maximum output frequency Analog input: Set output frequency within 0.01%
V/F control	V/F curve (voltage frequency characteristics)	The reference frequency can be set arbitrarily between 0.5~3000Hz, and the multi-point V/F curve can be set arbitrarily. Multiple fixed curves such as constant torque, reduced torque 1, reduced torque 2, and squared torque can also be selected
	Torque boost	**Automatically torque boost**;Automatically determine the lifting torque based on the output current and combined with motor parameters **manually torque boost:** 0.0%~30.0%
	Automatic current and voltage limiting	It can automatically detect the stator current and voltage of the motor during acceleration, deceleration, or stable operation, and suppress them within the allowable range based on a unique algorithm, minimizing the possibility of system fault tripping
Senseles s vector control	Voltage frequency characteristics	Automatically adjust the output voltage frequency ratio based on motor parameters and unique algorithms
	Torque characteristics	Starting torque: 150% rated torque at 3.0Hz (VF control) 150% rated torque at 1.0Hz (advanced VF control) 150% rated torque at 0.5Hz (without PG flow control) Steady state accuracy of operating speed: ⩽ ± 02% of rated synchronous speed Speed fluctuation: ⩽ ± 0.5% rated synchronous speed Torque response: ⩽ 20ms (without PG current vector control)
	Self-measurement of motor parameters	Without any limitations, automatic parameter detection can be completed under both static and dynamic conditions of the motor to achieve the best control effect
	Current and voltage suppression	Full process current closed-loop control, completely avoiding current surge, with complete overcurrent and overvoltage suppression function
Control characte ristics	Under voltage suppression during operation	Especially for users with low grid voltage and frequent fluctuations in grid voltage, even within the allowable voltage range, the system can maintain the longest possible operating time based on unique algorithms and residual energy allocation strategies
Typical functions	Multi stage speed and swing frequency operation	16 segments programmable multi speed control, with multiple operating modes to choose from. Swing frequency operation: preset frequency and center frequency adjustable, state memory and recovery after power failure
	PID Control RS485 Communication	Built-in PID contro(Pre set frequency) Standard RS485 communication interface, support MODBUS-RTU communication protocol

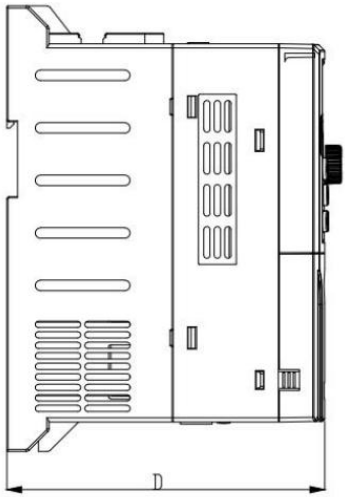
	Input terminals	**Programmable digital inputs**:Operation panel settings, RS485 interface settings, UP/DW terminal control, and multiple combination settings with analog inputs **Programmable analog inputs**: DC Voltage (0~10V), DC current (0～20mA).
	Output terminals	**Programmable digital outputs**:Two Y-terminal open collector outputs and two programmable relay outputs (TA, TB, TC), with up to 61 meaning options **Programmable analog outputs**: Two analog signal outputs, with a flexible output range between 0~20mA or 0~10V, can achieve the output of physical quantities such as set frequency and output frequency
	Automatic voltage stabilization operation	According to the needs, dynamic voltage regulation, static voltage regulation, and non voltage regulation can be selected to achieve the most stable operating effect
Typical functions	Acceleration and deceleration time setting	0.1s~3600.0min continuously adjustable, S-type and linear mode optional
	Low noise operation	The carrier frequency is continuously adjustable from 1.0KHz to 16.0KHz, minimizing motor noise to the greatest extent possible
	Speed tracking speed restart function	Can achieve smooth restart and instantaneous stop restart functions of the motor during operation
	Counter	One internal counter for easy system integration
	Running functions	Upper and lower frequency settings, frequency jump operation, reverse operation restriction, slip frequency compensation, RS485 communication, frequency increase and decrease control, fault self recovery operation, etc
Retardation	Energy consumption braking	The starting voltage, return voltage, and energy consumption braking rate of energy consumption braking can be continuously adjusted
	DC braking	Starting frequency of DC braking during shutdown: 0.00~upper limit frequency Braking time: 0.0~100.0 seconds; Braking current: 0.0%~150.0% rated current
	Magnetic flux braking	0~100 0: Invalid
Display	Running state	Output frequency, output current, output voltage, motor speed, set frequency, module temperature, PID setting, feedback quantity, analog input and output, etc
	Alarm content	Records of the last six faults, including output frequency, set frequency, output current, output voltage, DC voltage, module temperature, and other six operating parameters during the last fault trip
Fault protection function		Over current, over voltage, under voltage, module failure, electronic thermal relay, overheating, short circuit, input and output phase loss, abnormal motor parameter tuning, internal memory failure, etc
Environment	Ambient temperature	-10℃～40℃ (>40℃, output derated), without direct sunshine.
	Humidity	90%RH or less (non-condensing)

	Altitude	≤1000M: output rated power, ＞1000M: output derated
	Environment	Indoor (without direct sunlight, corrosion, flammable gases, oil mist, dust)
Structure	Protection level	IP20
	Cooling method	Air cooling with fan control
Installation method		Wall mounted, cabinet mounted

2.3 External and keypad dimensions



Front view

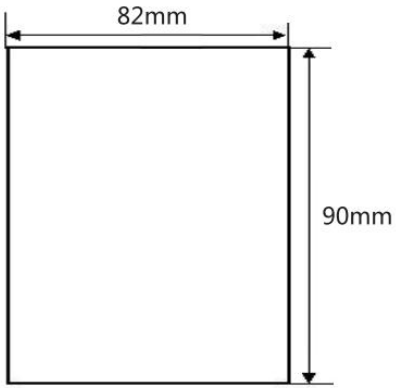


Side view

Power (kW)	Installation dimensions (mm)		Outlook dimensions (mm)			Installing hole diameter
	A	B	H	W	D	
1.5~5.5	78	200	212	95	154	Φ5
7.5~11	129	230	240	140	180.5	Φ5
15~30	188	305	322	205	199	Φ6
37 ~ 45	195	465	490	270	213	Φ6

55	240	546	565	320	283	Φ10
75~90	240	598	620	340	294	Φ10
110~132	240	630	660	400	313	Φ10
160~200	360	756	780	530	344	Φ10

d: Keypad bracket hole size



2.4 Selection Guide of the external electrical parts

(1) Selection guide of electric cable

Inverter Model	Circuit Breaker (MCCB) (A)	Recommended Contactor A	Recommended Conducting Wire of Main Circuit at Input Side (mm^2)	Recommended Conducting Wire of Main Circuit at Output Side (mm^2)	Recommended Conducting Wire of Control Circuit (mm^2)
3AC 380V±15%					
1.5kW	16	10	2.5	2.5	1.0
2.2kW	16	10	2.5	2.5	1.0
4.0kW	25	16	4.0	4.0	1.0
5.5kW	32	25	4.0	4.0	1.0
7.5kW	40	32	4.0	4.0	1.0
11kW	63	40	4.0	4.0	1.0
15kW	63	40	6.0	6.0	1.0
18.5kW	100	63	6.0	6.0	1.5

22kW	100	63	10	10	1.5
30kW	125	100	16	10	1.5
37kW	160	100	16	16	1.5
45kW	200	125	25	25	1.5
55kW	200	125	35	25	1.5
75kW	250	160	50	35	1.5
90kW	250	160	70	35	1.5
110kW	350	350	120	120	1.5
132kW	400	400	150	150	1.5
160kW	500	400	185	185	1.5
185kW	600	600	150*2	150*2	1.5
200kW	600	600	150*2	150*2	1.5

(2) Selection guide of braking system

Inverter Model	Braking unit		Braking unit (100% of the braking torque, 10% of the utilization rate)	
	Specification	Quantity	Equivalent braking resistor	Equivalent braking power
1.5	Build-in	1	≥400Ω	300W
2.2		1	≥250Ω	300W
4.0		1	≥150Ω	400W
5.5		1	≥100Ω	500W
7.5		1	≥75Ω	1000W
11		1	≥43Ω	3000W
15		1	≥32Ω	3000W
18.5		1	≥25Ω	3000W
22		1	≥22Ω	4000W
30		1	≥16Ω	5000W
37	DBU-030G-T4	1	≥13Ω	6000W
45		1	≥10Ω	6000W
55		1	≥10Ω	6000W
75	DBU-055G-T4	1	≥6.3Ω	7.5kw

Inverter Model	Braking unit		Braking unit (100% of the braking torque, 10% of the utilization rate)	
	Specification	Quantity	Equivalent braking resistor	Equivalent braking power
90		1	⩾9.4Ω*2	4.5kw*2
110		1	⩾9.4Ω*2	5.5kw*2
132		1	⩾6.3Ω*2	6.5kw*2
160	DBU-110G-T4	1	⩾6.3Ω*2	16kw
185		1	⩾2.5Ω	18.5kw
200	DBU-220G-T4	1	⩾2.5Ω	20kw

*Attention:

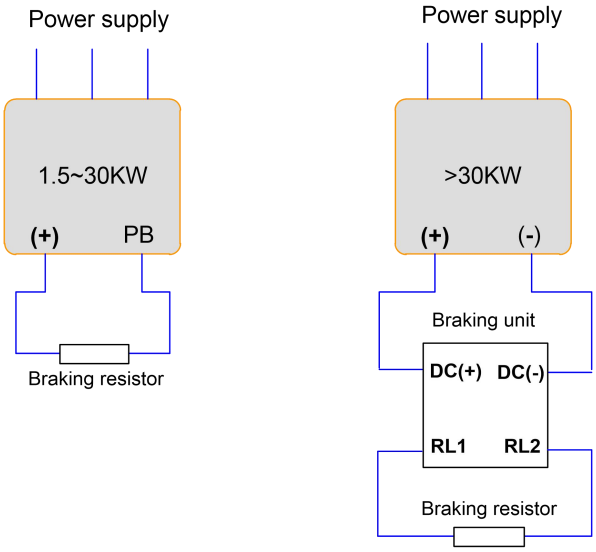
1. Please select the resistance value specified by our company.

2. If the use of brake resistors not provided by our company causes damage to the frequency converter or other equipment, our company shall not be held responsible.

3. The installation of brake resistors must consider the safety and flammability of the environment, and be at least 100mm away from the frequency converter.

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

d. Wiring connection of braking system



2.5 Routine Maintenance of Inverter

2.5.1 Routine Maintenance

The influence of the ambient temperature, humidity, dust and vibration will cause the aging of the devices in the inverter, which may cause potential fault of the inverter or reduce the service life of the inverter. Therefore, it is necessary to carry out routine and periodical maintenance on the inverter.

Routine inspection Items include:

1) Whether there is any abnormal change in the running sound of the motor;

2) Whether the motor has vibration during the running;

3) Whether there is any change to the installation environment of the inverter;

4) Whether the inverter cooling fan works normally;

5) Whether the inverter has over temperature.

Routine cleaning:

1) The inverter should be kept clean all the time.

2) The dust on the surface of the inverter should be effectively removed, so as to prevent the dust entering the inverter. Especially the metal dust is not allowed.

3) The oil stain on the inverter cooling fan should be effectively removed.

2.5.2 Periodic Inspection

Please perform periodic inspection on the places where the inspection is a difficult thing.

Periodic inspection Items include:

1) Check and clean the air duct periodically;

2) Check if the screws are loose;

3) Check if the inverter is corroded;

4) Check if the wire connector has arc signs;

5) Main circuit insulation test.

Remainder: When using the megameter (DC 500V megameter recommended) to measure the insulating resistance, the main circuit should be disconnected with the inverter. Do not use the insulating resistance meter to test the insulation of control circuit. It is not necessary to conduct the high voltage test (which has been completed upon delivery).

2.5.3 Storage of Inverter

Upon acquiring the inverter, the user should pay attention to the following points regarding the temporary and long-term storage of the inverter:

1) Pack the inverter with original package and place back into the packing box of our company.

2) Long-term storage will degrade the electrolytic capacitor. Thus, the product should be powered up once every 2 years, each time lasting at least five hours. The input voltage should be increased slowly to the rated value with the regulator.

Chapter 3 Installation and wiring

3.1 Mechanical Installation

3.1.1 Installation environment

1) Ambient temperature: The ambient temperature exerts great influences on the service life of the inverter and is not allowed to exceed the allowable temperature range (-5℃ to 40℃).

2) The inverter should be mounted on the surface of incombustible articles, with sufficient spaces nearby for heat sinking. The inverter is easy to generate large amount of heat during the operation. The inverter should be mounted vertically on the base with screws.

3) The inverter should be mounted in the place without vibration or with vibration of less than 0.6G, and should be kept away from such equipment as punching machine.

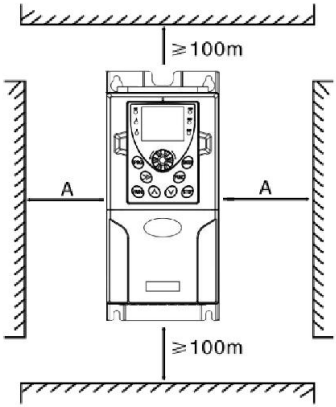
4) The inverter should be mounted in locations free from direct sunlight, high humidity and condensate.

5) The inverter should be mounted in locations free from corrosive gas, explosive gas or combustible gas.

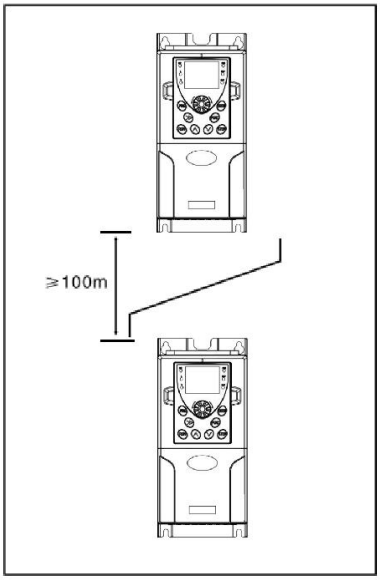
6) The inverter should be mounted in locations free from oil dirt, dust, and metal powder.

3.1.2 Installation diagram

a. Multiple inverters parallel installation



b. Multiple inverters vertical installation



Requirement of minimum mounting clearances

Drive model	Mounting clearances (mm)	
	A	B
1.5～15kW	≥50	≥100
18.5～45kW	≥50	≥200
55kW and above	≥150	≥300

3.1.3 Heat dissipation should be taken into account during the mechanical installation. Please pay attention the following items:

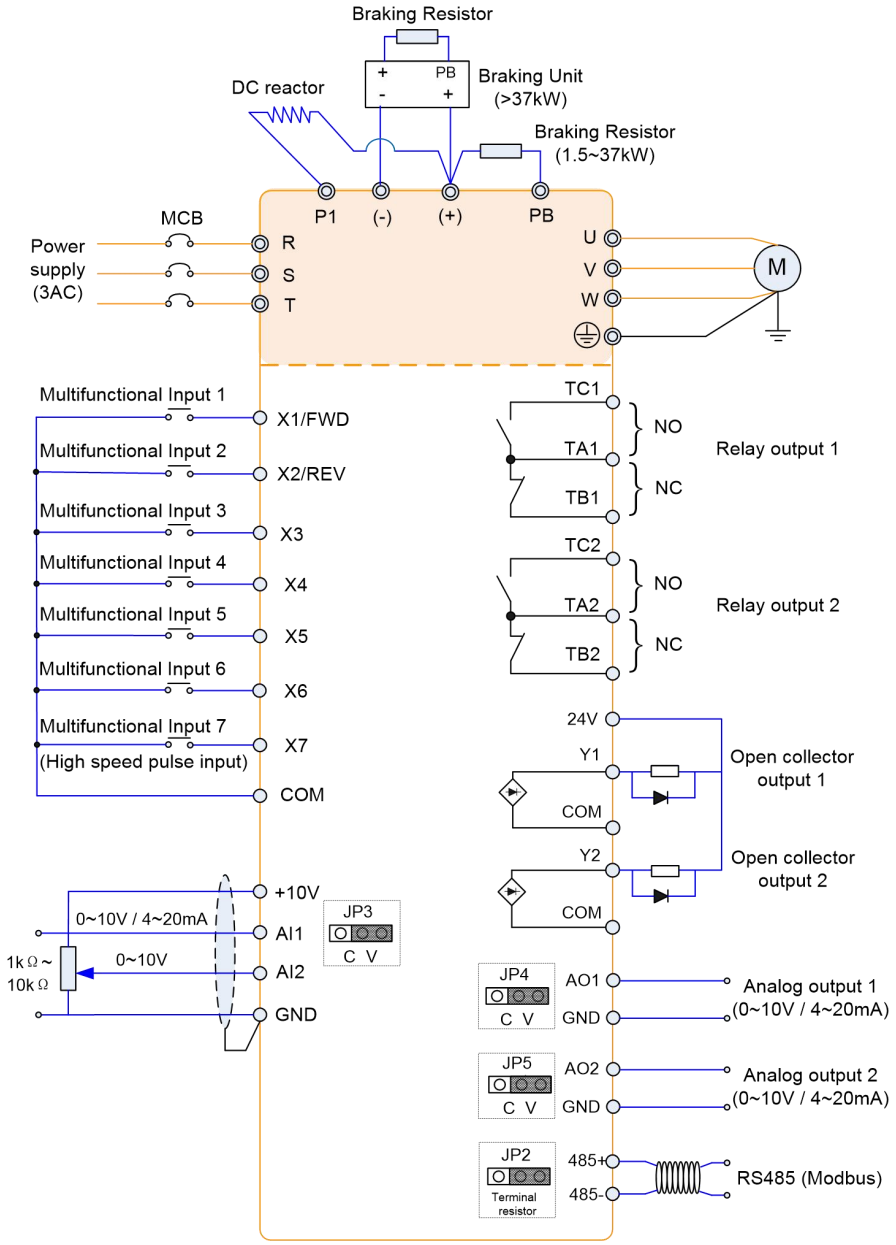
1) Install the inverter vertically so that the heat may be expelled from the top. However, the equipment cannot be installed upside down. If there are multiple inverters, parallel installation is a better choice. In applications where the upper and lower inverters need to be installed, please refer to 3.1.2 “Inverter Installation Diagram” and install an insulating splitter.

2) The mounting space should be as indicated as 3.1.2, so as to ensure the heat dissipation space of the inverter. However, the heat dissipation of other devices in the cabinet should also be taken into account.

3) The installation bracket must be flame retardant.

4) In the applications where there are metal dusts, it is recommended to mount the radiator outside the cabinet. In this case, the space in the sealed cabinet should be large enough.

3.2 Wiring diagram



Note:

1. Terminal ◎ refers to the main circuit terminal, terminal O refers to the control circuit terminal.
2. Braking resistor is optional for user.

3.2.1 Main circuit terminals and connections

Danger

- Make sure that the power switch is at OFF status prior to perform wiring connection. Otherwise there may be danger of electric shock!
- Only the qualified and trained personnel can perform wiring connection. Otherwise it may cause equipment and human injuries!
- It should be earthed reliably. Otherwise there may be danger of electric shock or fire!

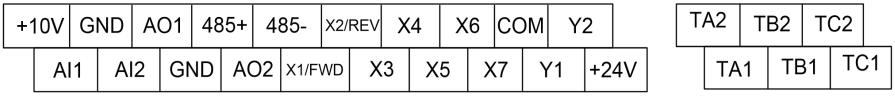
Caution

- Make sure that the rated value of the input power supply is consistent with that of the inverter. Otherwise it may damage the inverter!
- Make sure that the motor matches the inverter. Otherwise it may damage the motor or generate inverter protection!
- Do not connect the power supply to the terminals of U, V, W. Otherwise it may damage the inverter!
- Do not directly connect the brake resistor between the DC Bus terminals (+) and (-). Otherwise it may cause fire!

Instructions of main circuit terminals

Terminal	Description
R, S, T	Connect to three-phase AC power
P+, P-	Reserved terminals for external brake unit
P+, PB	Reserved terminals for braking resistor (1.5~30kW)
U, V, W	Connect to three phase motor
	Ground connection terminal

3.2.2 Control terminals and connections



3.2.3 Description of Control Terminals Function

Type	Terminal Symbol	Terminal Name	Function Description
Power Supply	10V-GND	+10V power supply	1. Provide +10V power supply for external units, and the maximum output current is 20mA. 2. It is generally used as the operating power supply for the external potentiometer. The potentiometer resistance range is 1kΩ~10kΩ.
	24V-GND	+24V power supply	1. Provide +24V power supply for external units. 2. It is generally used as the operating power supply for digital input/output terminals and the external sensor. The maximum output current is 200mA.
Analog Input	AI1~GND	Analog input terminal 1	1. Input range: DC 0~10V/4~20mA, determined by JP3 on the control board. 2. Current input impedance: 500Ω. 3. Voltage input impedance: 100kΩ.
	AI2~GND	Analog input terminal 2	1. Input range: DC 0~10V 2. Voltage input impedance: 100kΩ.
Digital Input	X1	Digital input 1	1. Optical coupling isolation, compatible with both PNP and NPN input 2. Input impedance: 2.4kΩ 3. Voltage range for level input: 9V～30V 4. X7 terminal can work at both digital input and high speed pulse (maximum input frequency is 100kHz) input.
	X2	Digital input 2	
	X3	Digital input 3	
	X4	Digital input 4	
	X5	Digital input 5	
	X6	Digital input 6	
	X7	Digital input 7	
Analog Output	AO1~GND	Analog output 1	Output range: DC 0~10V/4~20mA, determined by JP4 on the control board.

	AO2~GND	Analog output 2	Output range: DC 0~10V/4~20mA, determined by JP5 on the control board.
Digital Output	Y1-24V	open-collector output	1. Optical coupling isolation, open-collector output. 2. External connection voltage range: 0~24V 3. Output current range: 0~50mA
	Y2-24V		
Relay Output 1	TA1-TB1	Normally close output	Driving capacity: AC 250V/3A, DC 30V/1A
	TA1-TC1	Normally open output	
Relay Output 2 (extension card)	TA2-TB2	Normally close output	
	TA2-TC2	Normally open terminal	
RS485	485+	Modbus terminals	Communication interface of Modbus, it is suggested to use twisted-pair cable or shielded cable.
	485-		

3.2.4 Principle of wiring connection

(1) Power cables

◆ Please select the cables size (diameter) properly based on the power rating, current and electrician standard.

◆ It is suggested to install a MCB (Main Circuit Breaker) between power supply and R, S, T terminals, and the MCB should not be interfered by high frequency signals.

◆ The power cables must keep safe distance with control cables, don't put them in one wire casing.

◆ Never connect the power supply to U, V, W terminals.

◆ The output power cables cannot touch any point of AC Drive metal case, otherwise it will cause grounding short-circuited.

◆ The power cables must keep safe distance with other devices.

◆ If the cables' length between motor and AC Drive is longer than 50 meters (220V inverter) or 100 meters (380V inverter), it must install an additional output reactor in the system.

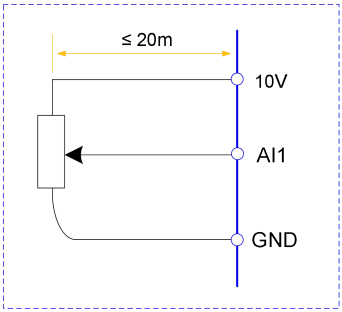
◆ If the cables' length between motor and AC Drive is long, please reduce the carrier frequency, if the carrier frequency is bigger, the leakage current of higher harmonic on the cable will be bigger, which will bring bad effect to AC Drive and other devices.

(2) Control cables

◆ Don't put the power cables and control cables in one wire casing, otherwise it will cause interferences.

◆ Please use shield cables for control circuit, and it is suggested to use 1mm^2 shield cables.

◆ Don't make the analog signal cables' length longer than 20 meters.



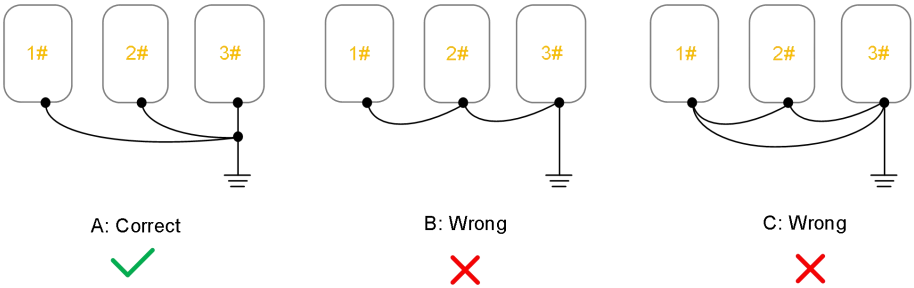
(3) Ground connection

◆ The grounding resistor should be less than 100.

◆ The grounding cables length is the shorter the better.

◆ Please don't make AC Drive' grounding point separated with other big power equipment (like electric welder and other large-scale mechanical devices)

◆ Please make correct grounding as below diagram（Please ground terminal E correctly and never connect it to the zero wire.）



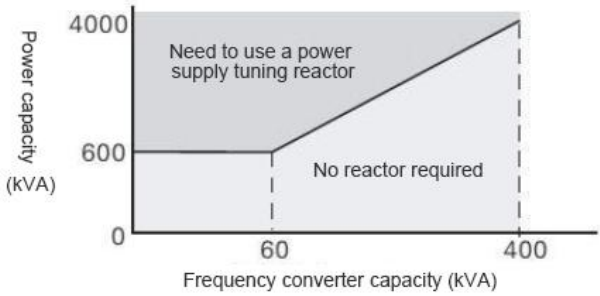
3.3 Specific application precautions

3.3.1 Selection

(1) Installation of Reactors

When connecting the frequency converter to a large capacity power transformer (above 600kVA) or switching the incoming capacitor, the power input circuit will generate excessive peak current, which may damage the components of the converter. To prevent this situation from happening, please install DC or AC reactors. This also helps to improve the power factor on the power side. In addition, when the same power system is connected to a thyristor converter such as a DC driver, regardless of the power supply conditions,

a DC reactor or an AC reactor must be set.



Installation conditions of reactors

（2）Frequency converter capacity

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

(3) Starting torque

The starting and accelerating characteristics of the motor driven by a frequency converter are limited by the overload rated current of the combined frequency converter. Compared to the starting of general commercial power sources, the torque characteristics are smaller. If a larger starting torque is required, please increase the capacity of the frequency converter by one level or simultaneously increase the capacity of the motor and frequency converter.

(4) Emergency stop

Although the protection function will activate and the output will stop when the frequency converter malfunctions, the motor cannot suddenly stop at this time. Therefore, please set up mechanical stop and hold structures on mechanical equipment that requires emergency stop.

(5) Special optional parts

Terminals PB (+) and P1 (+) are terminals for connecting specialized optional components. Do not connect machines other than dedicated optional parts

(6) Precautions related to reciprocating loads

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

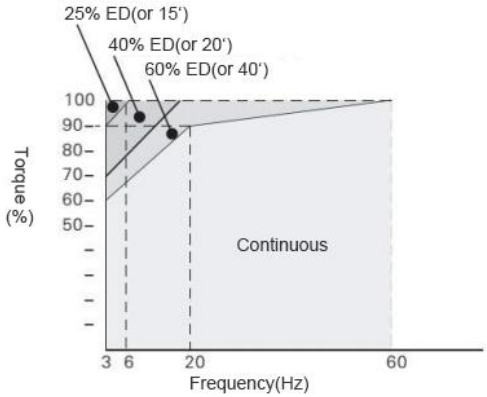
Especially when low noise is not required, please reduce the carrier frequency. Additionally, please reduce the load, extend the acceleration and deceleration time, or increase the frequency converter capacity by one level, Reduce the peak current during reciprocating to below 150% When conducting trial runs for these purposes, please make sure to confirm the peak current during reciprocating and adjust it as needed. In addition, when used in cranes, due to the fast start/stop action during micro movement, it is recommended to make the following choices to ensure motor torque and reduce the current of the frequency converter. The capacity of the frequency converter should ensure that its peak current is less than 150%. The capacity of the frequency converter should be more than one level larger than the motor capacity.

3.3.2 Selection

(1) Used for existing standard motors

Low speed range

Compared to using commercial power sources, using a frequency converter to drive a standard motor can result in several increases in losses. In the low-speed range, the cooling effect will deteriorate and the temperature 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 company's standard motor are shown in the figure. Additionally, when 100% continuous torque is required in the low-speed range, please explore whether to use a frequency converter specific motor.



The allowable load characteristics of our company's standard motors

(2) Precautions for special motors

Pole changing motor

The rated current of a variable pole motor is different from that of a standard motor. Please confirm the maximum current of the motor and select the corresponding frequency converter. Please make sure to switch the number of poles after the motor stops. If switching is performed during rotation, the regeneration over-voltage or over-current protection circuit will activate and the motor will stop running freely.

Motor with brake

When using a frequency converter to drive a motor with a brake, if the brake circuit is directly connected to the output side of the frequency converter, the brake will not be able to open due to a decrease in voltage during startup. Please use a motor with independent brake power supply and connect the brake power supply to the power side of the frequency converter. In general, when using motors with brakes, the noise in the low-speed range may increase.

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

When using oil lubrication for gearboxes, transmissions, reducers, etc. in the power transmission system, if it only operates continuously in the low-speed range, the oil lubrication effect will deteriorate. Please be aware. In addition, when operating at high speeds above 60Hz, there may be issues with the noise, lifespan, and strength of the power transmission structure caused by centrifugal force. Please pay full attention to these issues.

Chapter 4 Operation and Display

4.1 Keypad Description

With the operation keypad, it can perform such operations on the inverter as function parameter modification, working status monitor and running control (start and stop).

1) Function keys description

Functional indicator	Description
FWD	Indication of inverter is forward running
REV	Indication of inverter is reverse running
ALM	Indication of inverter is fault
Hz	Frequency unit
A	Current Units
V	voltage unit

2) Digital display zone

Five-number digit LED display, can display setting frequency, output frequency, various monitoring data

and alarm code.

3) Keypad push-button description

Button	Name	Function
PRG	Programming key	Entry and exit of primary menu
ENTER	Confirmation key	Progressively enter menu, and confirm parameters
	Increment key	Progressively increase of data or function codes
	Decrement key	Progressively decrease of data or function codes
	Shift key	Select the displayed parameters in turn on the stop display interface and running display interface, and select the modification bit of parameters when modifying parameters.
RUN	Running key	Start to run inverter under keyboard control mode
STOP	Stop / Reset	Stop inverter in running status and reset operation in fault alarm status. The reactions are controlled by F14.02.
FUNC	Multi-function selection key	The corresponding functions are defined by F14.00.

4.2 Function indicator light combination manual

Explanation of indicator light combination	LED Display Meaning	Symbol
Hz+A	Motor speed	r/min
A+V	Time (seconds)	s
Hz+V	Actual percentage value	%
Hz+A+V	Temperature	℃

4.3 Function Code Checking and Modification Methods Description

The operation keypad of the Inverter adopts three-level menu structure to carry out operations such as parameter setting.
1)Function parameter group (level 1 menu)
2)Function code (level 2 menu)
3)Function code setting value (level 3 menu)

Description: When operating on level 3 menu, press **PRG** key or **ENTER** key to return to level 2 menu. The difference between **PRG** key and **ENTER** key is described as follows:
1)Pressing **ENTER** key will save the setup parameter and return to the level 2 menu and then automatically shift to the next function code.
2)Pressing **PRG** key will directly return to level 2 menu without saving the parameter, and it will return to the current function code.

In level 3 menu, if there is no flashing bit, it means this function code cannot be modified. The possible reasons are:
1) The function code is an unchangeable parameter, such as actual detection parameter, running record parameter, etc.
2) The function code cannot be modified in running status. It can be modified only when the inverter is stopped.

4.4 Fault Reset

After the frequency converter malfunctions, it will prompt relevant fault information. Users can reset faults through the STOP/RESET key or terminal function on the keyboard. After resetting the frequency converter fault, it will be in standby mode. If the frequency converter is in a faulty state and the user does not reset it, the frequency converter is in a running protection state and cannot operate.

4.5 Motor Parameters Auto-tuning

To select the vector control running mode, it must input the nameplate parameter of the motor accurately prior to the running of the inverter. The Inverter will select standard motor parameters matching the nameplate parameter. Since the vector control mode relies highly on the motor parameters, it must acquire the accurate parameters of the controlled motor to ensure the good control performance.

Chapter 5 Function Parameter List

F15 .00 is set to a non-0 value, which means that a parameter protection password is set. In the function parameter mode and user change parameter mode, the parameter menu must be entered correctly after entering the password. 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 instruction of the symbols in function parameter list is as following:

"○" Means the parameter can be modified at stop and running status.

"◎" Means the parameter cannot be modified at the running status.

"●" Means the parameter is the real detection value which cannot be modified.

"*"Means the parameter is manufacturer parameter and can be set only by the manufacturer.

5.1 Basic Function Parameter Table

Function code	Name	Detailed instruction	Factory default	Modify
F00 Group: Basic Function				
F00.00	Functional Macro call	0: General mode 1: One variable frequency pump and two power frequency pumps water supply mode No.1 2:Three variable frequency pumps circulating soft start 3: One variable frequency pump and three power frequency pumps water supply mode 4: One variable frequency pump and two power frequency pumps water supply mode No.2 5:One variable frequency pump and one power frequency pump water supply mode 6: One 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: before selection the macro call function, please initialize the parameters firstly.	0	◎
F00.01	Control mode	0: General V/f mode (Manual torque boost) 1: Sensorless vector control (SVC)	0	◎
F0.02	Start command channel selection	0: Keypad 1: Digital input terminal 2: Modbus communication	0	○
F00.03	Main frequency source A selection	0: Keypad set (F00.08 + keypad UP and DOWN Adjustable,) 1: Keypad set (F00.08 + terminal UP and DOWN	4	◎

Function code	Name	Detailed instruction	Factory default	Modify
		Adjustable) 2: AI1 (0~10V/0~20mA) 3: AI2 (0~10V) 4: Keypad potentiometer 5:X7 (High speed pulse: 0~50kHz) 6: Multi-step speed 7: Simple PLC 8: PID 9: Communication given 10: Multi pumps command 11.MPPT given (photovoltaic water supply)		
F00.04	Auxiliary frequency source B selection	Same as F00.03	0	◎
F00.05	Range selection of Auxiliary Frequency source B when combination	0:Relative to maximum frequency 1:Relative to Main frequency source A	0	○
F00.06	Range of Auxiliary Frequency source B when combination	0%~150%	100%	○
F00.07	Selection of Auxiliary Frequency source B when combination	**Units bit**: frequency source selection 0: Main frequency source A 1: Calculation result of frequency A and B (determined by tens place) 2: Switching between A and B 3: Switching between A and calculation result 4: Switching between B and calculation result **Tens bit**: calculation relationship between frequency A and B 0: A + B 1: A - B 2: Max (A, B) 3: Min (A, B)	00	○
F00.08	Keypad reference frequency	0.00Hz ~ maximum frequency (F00.10)	50.00Hz	○

Function code	Name	Detailed instruction	Factory default	Modify
F00.09	Running direction selection	0: Same direction 1: Reverse direction	0	○
F00.10	Maximum frequency	50.00Hz ~ 500.00Hz	50.00Hz	◎
F00.11	Frequency source of upper limit	0:F00.12 1: AI1 2: AI2 3: Keypad potentiometer 4: High speed pulse setting 5: Communication (Modbus)	0	◎
F00.12	Frequency upper limit	F00.14 (frequency lower limit) ~ F00.10 (max. frequency)	50.00Hz	○
F00.13	Frequency upper limit offset	0.00Hz ~ F00.10 (max. frequency)	0.00Hz	○
F00.14	Frequency lower limit	0.00Hz ~ F00.12 (frequency upper limit)	0.00Hz	○
F00.15	Carrier frequency	0.5kHz ~ 16.0kHz	Model depend	○
F00.16	Carrier frequency adjusting according to 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 ~ 65000.0s(F00.19=0)	Model depend	○

Function code	Name	Detailed instruction	Factory default	Modify
F00.18	Deceleration time 1	0.00s ~ 650.00s(F00.19=2) 0.0s ~ 6500.0s(F00.19=1) 0s ~ 65000.0s(F00.19=0)	Model depend	○
F00.19	ACC/DEC time unit	0: 1s 1: 0.1s 2: 0.01s	1	◎
F00.21	Auxiliary frequency source offset frequency when combination	0.00Hz ~ F00.10(max. frequency)	0.00Hz	○
F00.22	Frequency command resolution	1: 0.1Hz 2: 0.01Hz	2	◎
F00.23	Digital setting frequency storage selection when stop	0: Not store 1: store	0	○
F00.24	Reserved	_	0	◎
F00.25	ACC/DEC time reference frequency	0: F00.10 (max. frequency) 1: Setting frequency 2: 100Hz	0	◎
F00.26	Running frequency command UP/DOWN reference	0: Running frequency 1: Setting frequency	0	◎
F00.27	Command source combination with frequency source	**Units bit:** Operation keypad command combine with frequency source 0: No combination 1: Keypad Potentiometer 2: AI1 3: AI2 4: Keypad potentiometer 5: X7 (High speed pulse) 6: Multi-step speed 7: Simple PLC 8: PID 9: Communication **Tens bit:** Terminal command combine with frequency source **Hundreds bit:** Communication command combine with frequency source	0000	○

Function code	Name	Detailed instruction	Factory default	Modify
		Thousands bit: Auto running combine with frequency source		
F00.28	Selection of serial communication protocol	0: Modbus protocol 1: Reserved	0	○
F00.29	GP type display	1: G-type (constant torque load model) 2: P-type (load models for fans and water pumps)	Model depend	●
F01 Group: Start and Stop control				
F01.00	Start mode	0: Direct start 1:Speed tracking and restart 2: Pre-excitation and then start(AC asynchronous machine) 3:Super fast start (valid in vector mode)	0	○
F01.01	Speed tracking mode	0: Begin from stop frequency 1: Begin from zero speed 2: Begin from maximum frequency	0	◎
F01.02	Speed tracking speed	1 ~ 100	20	○
F01.03	Start frequency	0.00Hz ~ 10.00Hz	0.00Hz	○
F01.04	Start frequency holding time	0.0s ~ 100.0s	0.0s	◎
F01.05	DC braking current before start/pre-excitation current	0% ~ 100%	50	◎
F01.06	DC braking time before start/pre-excitation time	0.0s ~ 100.0s	0.0s	◎
F01.07	ACC/DEC mode	0: Linear ACC/DEC 1: S-curve ACC/DEC A 2: S-curve ACC/DEC B	0	◎
F01.08	Time ratio of S curve's start part	0.0% ~ (100.0% - F01.09)	30.0%	◎
F01.09	Time ratio of S curve's end part	0.0% ~ (100.0% - F01.08)	30.0%	◎
F01.10	Stop mode	0: Deceleration to stop 1: Coast to stop	0	○

Function code	Name	Detailed instruction	Factory default	Modify
F01.11	DC braking start frequency while stopping	0.00Hz ~ maximum frequency	0.00Hz	○
F01.12	DC braking delay time while stopping	0.0s ~ 100.0s	0.0s	○
F01.13	DC braking current while stopping	0% ~ 100%	50%	○
F01.14	DC braking time while stopping	0.0s ~ 100.0s	0.0s	○
F01.15	Braking usage ratio	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	Jogging frequency	0.00Hz~maximum frequency	2.00Hz	○
F02.01	Jog acceleration time	0.0s~6500.0s	20.0s	○
F02.02	Jog deceleration time	0.0s~6500.0s	20.0s	○
F02.03	Acceleration time 2	0.0s~6500.0s	Model depend	○
F02.04	Deceleration time 2	0.0s~6500.0s	Model depend	○
F02.05	Acceleration time 3	0.0s~6500.0s	Model depend	○
F02.06	Deceleration time 3	0.0s~6500.0s	Model depend	○
F02.07	Acceleration time 4	0.0s~6500.0s	Model depend	○
F02.08	Deceleration time 4	0.0s~6500.0s	Model depend	○
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 ~ Max. frequency	0.01Hz	○

Function code	Name	Detailed instruction	Factory default	Modify
F02.12	FWD/REV dead time	0.0s ~ 3000.0s	0.0s	○
F02.13	Reverse control	0: Enable 1: Disable	0	○
F02.14	Action when setting frequency lower than frequency lower limit	0: Running at frequency lower limit 1: Stop 2: Zero-speed running	0	○
F02.15	Droop control	0.00Hz ~ 10.00Hz	0.00Hz	○
F02.16	Set accumulated power-on arrival time	0h ~ 65000h	0h	○
F02.17	Set accumulated running arrival time	0h ~ 65000h	0h	○
F02.18	Start protection selection	0: No protection 1: Protection Note：When F02.18=0, the terminal power on detection run command is valid.When F02.18=1, the terminal power on detection run command is invalid.	0	○
F02.19	Frequency detection value (FDT1)	0.00Hz ~ Max. frequency	50.00Hz	○
F02.20	Frequency detection lagging value (FDT1)	0.0% ~ 100.0% (FDT1)	5.0%	○
F02.21	Frequency arrival detection amplitude	0.0% ~ 100.0% (Max. frequency)	0.0%	○
F02.22	Jump frequency control valid selection during ACC/DEC	0: Invalid 1: Valid	0	○
F02.23	Acceleration time 1 and acceleration time 2 switching frequency point	0.00Hz ~ maximum frequency	0.00Hz	○
F02.24	Deceleration time 1 and deceleration time 2 switching frequency point	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 lagging value (FDT2)	0.0% ~ 100.0% (FDT2)	5.0%	○

Function code	Name	Detailed instruction	Factory default	Modify
F02.28	Any arrival frequency detection value 1	0.00Hz ~ maximum frequency	50.00Hz	○
F02.29	Any arrival frequency detection amplitude 1	0.0% ~ 100.0% (maximum frequency)	0.0%	○
F02.30	Any arrival frequency detection value 2	0.00Hz ~ maximum frequency	50.00Hz	○
F02.31	Any arrival frequency detection amplitude 2	0.0% ~ 100.0% (maximum frequency)	0	○
F02.32	Zero-current detection level	0.0% ~ 300.0% 100.0% corresponds to motor rated current	5.0%	○
F02.33	Zero-current detection delay time	0.10s ~ 600.00s	0.10s	○
F02.34	Output current over limit value	0.0% (No detection) 0.1% ~ 300.0% (motor rated current)	200.0%	○
F02.35	Output current over limit detection delay time	0.00s ~ 600.00s	0.00s	○
F02.36	Any arrival current 1	0.0% ~ 300.0% (motor rated current)	100.0%	○
F02.37	Any arrival current 1 amplitude	0.0% ~ 300.0% (motor rated current)	0.0%	○
F02.38	Any arrival current 2	0.0% ~ 300.0% (motor rated current)	100.0%	○
F02.39	Any arrival current 2 amplitude	0.0% ~ 300.0% (motor rated current)	0.0%	○
F02.40	Timing function selection	0: Invalid 1: Valid	0	○
F02.41	Timing running duration source selection	0: F02.42 1: AI1 2: AI2 3: Keypad potentiometer (Analog input scale corresponds to F02.42)	0	○
F02.42	Timing running duration	0.0Min ~ 6500.0Min	0.0Min	○
F02.43	AI1 input voltage protection lower limit	0.00V ~ F02.44	3.10V	○
F02.44	AI1 input voltage protection upper limit	F02.43 ~ 10.00V	6.80V	○
F02.45	Module temperature arrival	0℃ ~ 100℃	75℃	○
F02.46	Cooling fan control	0: Start the cooling fan while start the AC Drive	0	○

Function code	Name	Detailed instruction	Factory default	Modify
		1: Start the cooling fan while switch on the power supply		
F02.47	Wake-up frequency	Sleep frequency(F02.49) ~ maximum frequency(F00.10)	0.00Hz	○
F02.48	Wake up delay time	0.0s~6500.0s	0.0s	○
F02.49	Sleep frequency	0.0% ~Wake-up frequency(F02.47)	0.00Hz	○
F02.50	Sleep frequency delay time	0.0s~6500.0s	0.0s	○
F02.51	Present running arrival time setting	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: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Reserved	0	◎
F03.01	Motor rated power	0.1kW ~ 1000.0kW	Model depend	◎
F03.02	Motor rated voltage	1v~2000v	Model depend	◎
F03.03	Motor rated current	0.01A ~ 655.35A (Inverter power ≤ 55kW) 0.1A ~ 6553.5A (Inverter power > 55kW)	Model depend	◎
F03.04	Motor rated frequency	0.01Hz ~ max. frequency	Model depend	◎
F03.05	Motor rated speed	1rpm~ 65535rpm	Model depend	◎
F03.06	Asynchronous motor stator resistance	0.001Ω ~ 65.535Ω (Inverter power ≤ 55kW) 0.0001Ω ~ 6.5535Ω (Inverter power > 55kW)	Motor parameter	◎
F03.07	Asynchronous motor rotor resistance	0.001Ω ~ 65.535Ω (Inverter power ≤ 55kW) 0.0001Ω ~ 6.5535Ω (Inverter power > 55kW)	Motor parameter	◎
F03.08	Asynchronous motor leakage inductance	0.01mH ~ 655.35mH (Inverter power ≤ 55kW) 0.001mH ~ 65.535mH	Motor parameter	◎

Function code	Name	Detailed instruction	Factory default	Modify
		(Inverter power > 55kW)		
F03.09	Asynchronous motor mutual inductance	0.1mH ~ 6553.5mH (Inverter power ≤ 55kW) 0.01mH ~ 655.35mH (Inverter power > 55kW)	Motor parameter	◎
F03.10	Asynchronous motor no-load current	0.01A ~ F03.03 (Inverter power ≤ 55kW) 0.1A ~ F03.03 (Inverter power > 55kW)	Motor parameter	◎
F03.11 ~F03.36	Reserved	—	0	◎
F03.27	Auto-tuning	0: No action 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-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~max frequency	10.00Hz	○
F04.06	Vector control slip compensation coefficient	50% ~ 200%	100%	○
F04.07	Speed loop filter time	0.000s ~ 0.100s	0.015s	○
F04.08	Vector control over-excitation gain	0 ~ 200	64	○
F04.09	Torque upper limit source selection in speed control mode	0: F04.10 setting 1: AI1 2: AI2 3: Keypad potentiometer 4: High speed pulse setting	0	○

Function code	Name	Detailed instruction	Factory default	Modify
		5: Communication 6: Min (AI1, AI2) 7: Max (AI1, AI2) The full range of 1~7 corresponds to F04.10		
F04.10	Torque upper limit digital setting under speed control mode	0.0% ~ 200.0%	150.0%	○
F04.13	Excitation regulation proportion gain	0 ~ 60000	2000	○
F04.14	Excitation regulation integration gain	0 ~ 60000	1300	○
F04.15	Torque regulation proportion gain	0 ~ 60000	2000	○
F04.16	Torque regulation integration gain	0 ~ 60000	1300	○
F04.17	Speed-loop Integral attribute	Unit Bit:Integral separation 0: Invalid 1: Valid	0	○
F04.18~F 04.20	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 in Torque control mode	0: digital setting1(F05.03) 1: AI1 2: AI2 3: Keypad potentiometer 4: High speed pulse setting 5: Communication 6: Min (AI1, AI2) 7: Max (AI1, AI2) The full range of 1~7 corresponds to F05.03	0	◎
F05.03	Digital setting in torque control mode	-200.0%~200.0%	150.0%	○
F05.05	Torque control forward maximum frequency	0.00Hz~max frequency	50.00Hz	○
F05.06	Torque control reverse maximum frequency	0.00Hz~max frequency	50.00Hz	○
F05.07	Torque control acceleration time	0.00s~65000s	0.00s	○

Function code	Name	Detailed instruction	Factory default	Modify
F05.08	Torque control deceleration time	0.00s~65000s	0.00s	○
F06 Group: V/f Control Parameters				
F06.00	V/f curve setting	0: Linear V/F 1: Multiple-points V/F 2: Square V/F 3: 1.2th power V/F 4: 1.4th power V/F 5: Reversed 6: 1.6th power V/F 7: Reversed 8: 1.8th power V/F 9: Reserved 10: V/f separate completely 11: V/f separate partially	0	◎
F06.01	Torque boost	0.0: Torque boost automatically 0.1% ~ 30.0%	Model depend	○
F06.02	Torque boost cutoff frequency	0.00Hz ~ max frequency	50.00Hz	◎
F06.03	V/f frequency point 1	0.00Hz ~ F06.05	0.00Hz	◎
F06.04	V/f voltage point 1	0.0% ~ 100.0%	0.0%	◎
F06.05	V/f frequency point 2	F06.03 ~ F06.07	0.00Hz	◎
F06.06	V/f voltage point 2	0.0% ~ 100.0%	0.0%	◎
F06.07	V/f frequency point 3	F06.05 ~ motor rated frequency	0.00Hz	◎
F06.08	V/f voltage point 3	0.0% ~ 100.0%	0.0%	◎
F06.09	V/f slip compensation gain	0.0% ~ 200.0%	0.0%	○
F06.10	V/f over excitation gain	0 ~ 200	64	○
F06.11	V/f oscillation suppression gain	0 ~ 100	Model depend	○
F06.13	Voltage source of V/f separation	0: Digital setting (F06.14) 1: AI1 2: AI2 3: Keypad potentiometer 4: X7 (High speed pulse) 5: Multi-step speed 6: Simple PLC	0	○

Function code	Name	Detailed instruction	Factory default	Modify
		7: PID 8: Communication (Modbus) Note: 100% corresponds to motor rated voltage.		
F06.14	Voltage setting of V/f separation	0V~ Motor rated voltage	0V	○
F06.15	Voltage rise up time of V/f separation	0.0s~1000.0s Note: means voltage rise up time from 0 to motor rated voltage	0.0s	○
F06.16	Voltage fall time of V/f separation	0.0s~1000.0s Note: means voltage fall time from motor rated voltage to 0	0.0s	○
F06.17	Stop mode selection of V/f separation	0: Frequency / voltage decrease to 0 separately 1: Voltage falls to 0 then frequency start to decrease	0	○
F06.18	Stall over-current point	50 ~ 200%	150%	○
F06.19	Stall over-current restrain enable	0:invalid 1:valid	1	○
F06.20	Stall over-current restrain gain	0~100%	20	○
F06.21	Stall over-current compensation coefficient	50 ~ 200	50	○
F06.22	Stall over-voltage point	200.0V ~ 2000.0V	760V	○
F06.23	Stall over-voltage restrain enable	0: Invalid 1: Valid	1	○
F06.24	Stall over-voltage restrain frequency gain	0 ~ 100	30	○
F06.25	Stall over-voltage restrain voltage gain	0 ~ 100	30	○
F06.26	Stall over-voltage max. Frequency upper limitation	0 ~ 100Hz	5Hz	○
F07 Group: Input Terminals				
F07.00	X1 terminal function	0: No function 1: Forward (FWD) or Run command 2: Reverse (REV) or FWD/REV direction (Note:If the value is set to 1 or 2, it must be used with F07.11. For details,	1	◎
F07.01	X2 terminal function		4	◎
F07.02	X3 terminal function		9	◎
F07.03	X4 terminal function		12	◎

Function code	Name	Detailed instruction	Factory default	Modify
F07.04	X5 terminal function	see function code parameter description.) 3: Three-line 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: Pause running 11: External fault (normal open) input 12: Multi-step speed terminal 1 13: Multi-step speed terminal 2 14: Multi-step speed terminal 3 15: Multi-step speed terminal 4 16: ACC/DEC selection terminal 1 17: ACC/DEC selection terminal 2 18: Main frequency source switching 19: UP and DOWN setting clear (terminal and keypad) 20: Running command switching terminal 21: ACC/DEC invalid 22: PID pause 23: PLC status reset 24: Wobble frequency pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control invalid 30: X7(high speed pulse) frequency input 31: Reserved 32: DC braking command 33: External fault (normal closed) input 34: Frequency modification enabled 35: PID action direction reverse 36: External stop terminal 1 37: Control command switching terminal 2 38: PID integration stop	13	◎
F07.05	X6 terminal function		0	◎
F07.06	X7 terminal function		30	◎
F07.07	Reserved		0	◎
F07.08	Reserved		0	◎
F07.09	Reserved		0	◎

Function code	Name	Detailed instruction	Factory default	Modify
		39: Switch frequency source A to preset frequency 40: Switch frequency source B to preset frequency 41: Reserved 42: Reserved 43: PID parameters switching 44: User self-defined fault 1 45: User self-defined fault 2 46: Speed control / torque control switching 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: The running time reset 51: Two-line/Three-line switch 52. Reverse prohibited 53: Start/stop 54: Run allowed 55: Interlock 1 56: Interlock 2 57: Interlock 3 58: PFC Start/stop		
F07.10	X terminals filter time	0.000s ~ 1.000s	0.010s	○
F07.11	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	◎
F07.12	UP/DOWN change rate	0.001Hz/s~65.535Hz/s	1.00Hz/s	○
F07.13	AI1 minimum input	0.00V ~ F07.15	0.00V	○
F07.14	AI1 minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	○
F07.15	AI1 maximum input	F07.13~+10.00V	10.00V	○
F07.16	AI1 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	○
F07.17	AI1 input filter time	0.00s ~ 10.00s	0.10s	○
F07.18	AI2 minimum input	0.00V ~ F07.20	0.00V	○

Function code	Name	Detailed instruction	Factory default	Modify
F07.19	AI2 minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	○
F07.20	AI2 maximum input	F07.18~ +10.00V	10.00V	○
F07.21	AI2 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	○
F07.22	AI2 input filter time	0.00s ~ 10.00s	0.10s	○
F07.23	Keypad potentiometer minimum input	-10.00V ~ F07.25	-9.50V	○
F07.24	Keypad potentiometer minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	○
F07.25	Keypad potentiometer maximum input	F07.23~ +10.00V	9.50V	○
F07.26	Keypad potentiometer maximum input corresponding setting	-100.0% ~ +100.0%	100%	○
F07.27	Keypad potentiometer input filter time	0.00s ~ 10.00s	0.10s	○
F0728	High speed pulse minimum input	0.00kHz ~ F07.30	0.00kHz	○
F07.29	High speed pulse minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	○
F07.30	High speed pulse maximum input	F07.28~ 100.00kHz	50.00kHz	○
F07.31	High speed pulse maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	○
F07.32	High speed pulse input filter time	0.00s ~ 10.00s	0.10s	○
F07.33	AI Curve selection	**Unit bit:**Select for AI1 1:Curve1 (Point2, F07.13~F07.16） 2:Curve2 (Point2, F07.18~F07.21） 3:Reserved 4:Curve4 (Point4, F18.00~F18.07） 5:Curve5 (Point4, F18.08~F18.15) **Tens bit**: Select for AI2,Same as above **Hundreds bit**:Reserved	321	○

Function code	Name	Detailed instruction	Factory default	Modify
F07.34	Reaction select while AI signal is lower than minimum input setting	**Unit bit:** Select for AI1 0: Correspond to minimum input setting 1: 0.0% **Tens bit**:Select for AI2,same as above **Hundreds bit**: Select for keypad potentiometer,same as above	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 terminals valid mode selection 1	0: Active-high level signal 1: Active-low level signal **Units bit**: X1 **Tens bit**: X2 **Hundreds bit:** X3 **Thousands bit**: X4 **Ten thousands bit**: X5	00000	◎
F07.39	X terminals valid mode selection 2	0: Active-high level signal 1: Active-low level signal **Units bit**: X6 **Tens bit**: X7 **Hundreds bit:** Reserved **Thousands bit**: Reserved **Ten thousands bit**: Reserved	00000	◎
F07.40	Select for AI2 input signal	0:voltage signal 1:current signal	0	◎
F08 Group: Output Terminals				
F08.00	Reserved	—	2	○
F08.01	Reserved	0: No output 1: Inverter is running 2: Fault output (fault stop) 3: FDT1 output 4: Frequency arrival 5: Zero-speed running (no output when stop)	0	○
F08.02	Control board relay R1 function selection		2	○
F08.03	Control board relay R2 output function selection		0	○
F08.04	Open collector Y1 output function selection		1	○

Function code	Name	Detailed instruction	Factory default	Modify
F08.05	Open collector Y2 output function selection	6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8: Setting count value arrival 9: Designated count value arrival 10: Length arrival 11: Simple PLC circulate running completed 12: Accumulated running time arrival 13: Frequency limiting 14: Torque limiting 15: Ready for running 16: AI1>AI2 17: Frequency upper limit arrival 18: Frequency lower limit arrival 19: Under voltage status output 20: Communication setting 21: Reserved 22: Reserved 23: Zero-speed running 2 (output when stop) 24: Accumulated power-on time arrival 25: FDT2 output 26: Frequency 1 arrival output 27: Frequency 2 arrival output 28: Current 1 arrival output 29: Current 2 arrival output 30: Timing arrival output 31: AI1 input over limit 32: Off load 33: Reverse running 34: Zero-current status 35: Module temperature arrival 36: Output current over limit 37: Lower limit frequency arrival (output when stop) 38: Warning output (All faults) 39: Motor over temperature pre-alarm 40: This running time arrival 41: Fault output (no output when under voltage) 42:Interlock 1 output 43:Interlock 2 output 44:Interlock 3 output	0	○

Function code	Name	Detailed instruction	Factory default	Modify
F08.06	Reserved	0: Running frequency 1: Setting frequency	0	○
F08.07	A01 output function selection	2: Output current（2 times the rated motor current）	0	○
F08.08	AI2 output function selection	3: Output torque（2 times the rated motor torque） 4: Output power（2 times the rated motor power） 5: Output voltage（1.2 times the rated voltage of the inverter） 6: PULSE input (100% corresponds to 100.0kHz) 7: AI1 8: AI2 9: Reserved 10: Length 11: Count value 12: Communication setting 13: Motor speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Output torque (actual value, corresponds to the percentage of motor rated torque)	1	○
F08.09	Reserved	——	0	○
F08.10	AO1 offset coefficient	-100.0% ~ +100.0%	0.0%	○
F08.11	AO1 gain	-10.00V ~ +10.00	1.00	○
F08.12	AO2 offset coefficient	-100.0% ~ +100.0%	0.0%	○
F08.13	AO2 gain	-10.00V ~ +10.00	1.00	○
F08.14~F08.17	Reserved	—	0	○
F08.18	R1 output delay time	0.0 ~ 3600.0s	0.0s	○
F08.19	R2 output delay time	0.0 ~ 3600.0s	0.0s	○

Function code	Name	Detailed instruction	Factory default	Modify
F08.20	Y1 output delay time	0.0 ~ 3600.0s	0.0s	○
F08.21	Y2 output delay time	0.0 ~ 3600.0s	0.0s	○
F08.22	Output terminal valid status selection	0: Positive logic 1: Negative logic Units bit: Reserved Tens bit: R1 Hundreds bit: R2 Thousands bit:Y1 Ten thousands bit:Y2	0000	○
F08.23	AO1 output signal selection	0:voltage signal 1:current signal	0	◎
F09 Group: PID Function				
F09.00	PID set source	0: Set by F09.01 1: AI1 2: AI2 3: Keypad potentiometer 4: X7 (High speed pulse) 5: Communication (Modbus) 6: Multi-step command	0	○
F09.01	PID set through keypad	0.0 ~ 100.0%	50.0%	○
F09.02	PID feedback source	0: AI1 1: AI2 2: Reserved 3: AI1-AI2 4: X7 (High speed pulse) 5:Communication (Modbus) 6:AI1+AI2 7:MAX (|AI1|, |AI2|) 8:MIN (|AI1|, |AI2|)	0	○
F09.03	PID action direction	0: Positive 1: Negative	0	○
F09.04	PID given feedback range	0 ~65535	1000	○
F09.05	Proportional gain Kp1	0.0 ~ 100.0	20.0	○
F09.06	Integration time Ti1	0.01s ~ 10.00s	2.00s	○
F09.07	Differential time Td1	0.000s ~ 10.000s	0.000s	○

Function code	Name	Detailed instruction	Factory default	Modify
F09.08	Cutoff frequency of PID reverse	0.00 ~ maximum frequency	2.00Hz	○
F09.09	PID deviation limit	0.0% ~ 100.0%	0.0%	○
F09.10	PID differential amplitude	0.00% ~ 100.00%	0.10%	○
F09.11	PID given filter 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	0.00s	○
F09.14	Reserved	-	-	○
F09.15	Proportional gain Kp2	0.0 ~ 100.0	20.0	○
F09.16	Integration 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: No switching 1: Switching via X terminals 2: Automatic switching according to the deviation	0	○
F09.19	PID parameter switching deviation 1	0.0% ~F09.20	20.0%	○
F09.20	PID parameter switching deviation 2	F09.19 ~ 100.0%	80.0%	○
F09.21	PID initial value	0.0% ~ 100.0%	0.0%	○
F09.22	PID initial value holding time	0.00 ~ 650.00s	0.00s	○
F09.23	Forward maximum value between two output deviation	0.00% ~ 100.00%	1.00%	○
F09.24	Reverse maximum value between two output deviation	0.00% ~ 100.00%	1.00%	○
F09.25	PID integration attribute	Units place: Integration separate 0: Invalid 1: Valid	00	○

Function code	Name	Detailed instruction	Factory default	Modify
		Tens place: Whether Stop integrating after output reach the limitation 0: Keep integrating 1: Stop integrating		
F09.26	PID feedback lost detection value	0.0%: No judgment for feedback lost 0.1% ~ 100.0%	0.0%	○
F09.27	PID feedback lost detection time	0.0s ~ 20.0s	0.0s	○
F09.28	PID stop calculation	0: No calculation when stop 1: Calculation when stop	0	○
F10 Group: Multi-step Command and Simple PLC function				
F10.00	Multi-step speed 0	-100.0% ~ 100.0%	0.0%	○
F10.01	Multi-step speed 1	-100.0% ~ 100.0%	0.0%	○
F10.02	Multi-step speed 2	-100.0% ~ 100.0%	0.0%	○
F10.03	Multi-step speed 3	-100.0% ~ 100.0%	0.0%	○
F10.04	Multi-step speed 4	-100.0% ~ 100.0%	0.0%	○
F10.05	Multi-step speed 5	-100.0% ~ 100.0%	0.0%	○
F10.06	Multi-step speed 6	-100.0% ~ 100.0%	0.0%	○
F10.07	Multi-step speed 7	-100.0% ~ 100.0%	0.0%	○
F10.08	Multi-step speed 8	-100.0% ~ 100.0%	0.0%	○
F10.09	Multi-step speed 9	-100.0% ~ 100.0%	0.0%	○
F10.10	Multi-step speed 10	-100.0% ~ 100.0%	0.0%	○
F10.11	Multi-step speed 11	-100.0% ~ 100.0%	0.0%	○
F10.12	Multi-step speed 12	-100.0% ~ 100.0%	0.0%	○
F10.13	Multi-step speed 13	-100.0% ~ 100.0%	0.0%	○
F10.14	Multi-step speed 14	-100.0% ~ 100.0%	0.0%	○

Function code	Name	Detailed instruction	Factory default	Modify
F10.15	Multi-step speed 15	-100.0% ~ 100.0%	0.0%	○
F10.16	Simple PLC running mode	0: Stop after one cycle 1: Keep last frequency after one cycle 2: Circular running	0	○
F10.17	Simple PLC memory selection	**Units bit:** Memory selection when power-off 0: Not memory 1: Memory **Tens bit:** Memory selection when stop 0: Not memory 1: Memory	00	○
F10.18	Simple PLC 0th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.19	Simple PLC 0th step ACC/DEC time selection	0 ~ 3	0	○
F10.20	Simple PLC 1st step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.21	Simple PLC 1st step ACC/DEC time selection	0 ~ 3	0	○
F10.22	Simple PLC 2nd step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.23	Simple PLC 2nd step ACC/DEC time selection	0 ~ 3	0	○
F10.24	Simple PLC 3rd step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.25	Simple PLC 3rd step ACC/DEC time selection	0 ~ 3	0	○
F10.26	Simple PLC 4th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.27	Simple PLC 4th step ACC/DEC time selection	0 ~ 3	0	○
F10.28	Simple PLC 5th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.29	Simple PLC 5th step ACC/DEC	0 ~ 3	0	○

Function code	Name	Detailed instruction	Factory default	Modify
	time selection			
F10.30	Simple PLC 6th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.31	Simple PLC 6th step ACC/DEC time selection	0 ~ 3	0	○
F10.32	Simple PLC 7th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.33	Simple PLC 7th step ACC/DEC time selection	0 ~ 3	0	○
F10.34	Simple PLC 8th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.35	Simple PLC 8th step ACC/DEC time selection	0 ~ 3	0	○
F10.36	Simple PLC 9th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.37	Simple PLC 9th step ACC/DEC time selection	0 ~ 3	0	○
F10.38	Simple PLC 10th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.39	Simple PLC 10th step ACC/DEC time selection	0 ~ 3	0	○
F10.40	Simple PLC 11th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.41	Simple PLC 11th step ACC/DEC time selection	0 ~ 3	0	
F10.42	Simple PLC 12th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.43	Simple PLC 12th step ACC/DEC time selection	0 ~ 3	0	○
F10.44	Simple PLC 13th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.45	Simple PLC 13th step ACC/DEC time selection	0 ~ 3	0	○

Function code	Name	Detailed instruction	Factory default	Modify
F10.46	Simple PLC 14th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.47	Simple PLC 14th step ACC/DEC time selection	0 ~ 3	0	○
F10.48	Simple PLC 15th step running time	0.0s (h) ~ 6500.0s (h)	0.0s (h)	○
F10.49	Simple PLC 15th step ACC/DEC time selection	0 ~ 3	0	○
F10.50	Timing unit under simple PLC mode	0: s (second) 1: h (hour)	0	○
F10.51	Multi-step speed 0 given channel	0: F10.00 1: AI1 2: AI2 3: Keypad potentiometer 4: High speed pulse 5: PID control 6: Keypad setting frequency (F00.08), can be modified via UP/DOWN	0	○
F11 Group: Wobble Frequency, Fixed Length, Counting				
F11.00	Wobble frequency setting mode	0: Relative to center frequency 1: Relative to maximum frequency	0	○
F11.01	Wobble frequency amplitude	0.0% ~ 100.0%	0.0%	○
F11.02	Sudden Jump frequency amplitude	0.0% ~ 50.0%	0.0%	○
F11.03	Wobble frequency cycle	0.1s ~ 3000.0s	10.0s	○
F11.04	Triangular wave rise time coefficient	0.1% ~ 100.0%	50.0%	○
F11.05	Setting length	0m ~ 65535m	1000m	○
F11.06	Actual length	0m ~ 65535m	0m	○
F11.07	Number of pulses per meter	0.1 ~ 6553.5	100.0	○
F11.08	Setting count value	1 ~ 65535	1000	○
F11.09	Designated count value	1 ~ 65535	1000	○

Function code	Name	Detailed instruction	Factory default	Modify
F11.10~F 11.14	Reserved	—	0	○
F12 Group: Fault and Protection				
F12.00	Motor overload protection selection	0: Disable 1: Enable	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	Stall over-voltage gain	0 ~ 100	0	○
F12.04	Stall over-voltage protection voltage	200.0 ~ 2000.0	760.0	○
F12.05	Stall over current gain	0 ~ 100	20	○
F12.06	Stall over-current protection current	100% ~ 200%	150%	○
F12.07	Reserved	_	0	○
F12.08	Braking unit initial voltage	200.0 ~ 2000.0V	690V	○
F12.09	Fault auto-reset times	0 ~ 200	0	○
F12.10	Fault terminal output selection during fault auto-reset	0: No action 1: Action	1	○
F12.11	Fault auto-reset interval	0.1s ~ 100.0s	6.0s	○
F12.12	Input phase failure protection selection	**Unit bit:** Input phase failure protection selection **Tens bit**: Reserved 0: Disable 1: Enable	1	○
F12.13	Output phase failure protection selection	0: Disable 1: Enable	1	○
F12.14	The first fault type	0: No fault 1: Reserved 2: ACC over current 3: DEC over current 4: Over current in constant speed 5: Over voltage in ACC process 6: Over voltage in DEC process	—	●
F12.15	The second fault type		—	●
F12.16	The third (latest) fault type		—	●

Function code	Name	Detailed instruction	Factory default	Modify
		7: Over voltage in constant speed 8: Buffer resistor overload 9: Under voltage 10: Inverter overload 11: Motor overload 12: Input phase failure 13: Output phase failure 14: Module overheat 15: External fault 16: Communication fault 17: Reserved 18: Current detection fault 19: Motor auto-tuning fault 20: Reserved 21: Parameter R/W fault 22: Inverter hardware fault 23: Reserved 24: Reserved 25: Reserved 26: Running time arrival 27: Reserved 28: Reserved 29: Power-on time arrival 30: Off load 31: PID feedback lost when running 40: Fast current limiting over time 41:Switch motor during operation 42:Excessive velocity deviation 43:Motor over-speed 45:Motor over-temperature 51:Initial position error		
F12.17	Frequency at the third (latest) fault	—	—	●
F12.18	Current at the third (latest) fault	—	—	●
F12.19	Bus voltage at the third (latest) fault	—	—	●
F12.20	Input terminal's status at the third (latest) fault	—	—	●
F12.21	Output terminal's status at the third (latest) fault	—	—	●
F12.22	Inverter status at the third (latest) fault	—	—	●

Function code	Name	Detailed instruction	Factory default	Modify
F12.23	Power-on time at the third (latest) fault	—	—	●
F12.24	Running time at the third (latest) fault	—	—	●
F12.25 ~ F12.26	Reserved			
F12.27	Frequency at the second fault	—	—	●
F12.28	Current at the second fault	—	—	●
F12.29	Bus voltage at the second fault	—	—	●
F12.30	Input terminal's status at the second fault	—	—	●
F12.31	Output terminal's status at the second fault	—	—	●
F12.32	Inverter status at the second fault	—	—	●
F12.33	Power-on time at the second fault	—	—	●
F12.34	Running time at the second fault	—	—	●
F12.35 ~ F12.36	Reserved			
F12.37	Frequency at the first fault	—	—	●
F12.38	Current at the first fault	—	—	●
F12.39	Bus voltage at the first fault	—	—	●
F12.40	Input terminal's status at the first fault	—	—	●
F12.41	Output terminal's status at the first fault	—	—	●
F12.42	Inverter status at the first fault	—	—	●
F12.43	Power-on time at the first fault	—	—	●
F12.44	Running time at the first fault	—	—	●
F12.47	Inverter reaction select 1 while fault happen	**Unit bit**: Motor overload (11) **Tens bit**: Input phase failure (12) **Hundreds bit**: output phase failure	00000	○

Function code	Name	Detailed instruction	Factory default	Modify
		(13) **Thousands bit**: external fault (15) **Ten thousands bit**: Communication abnormal (16) 0: Coast to stop 1: Stop according to the stop method 2: Keep running		
F12.48	Inverter reaction select 2 while fault happen	**Unit bit**: Reserved 0: Coast to stop **Tens bit**: Parameters R/W error (21) 0: Coast to stop 1: Stop according to the stop method **Hundreds bit**: Reserved **Thousands bit**: Motor overheating(25) **Ten thousands bit**: Running time arrival (26)	00000	○
F12.49	Inverter reaction select 3 while fault happen	**Unit bit**: User self-defined fault 1(27) 0: Coast to stop 1: Stop according to the stop method 2: Keep running **Tens bit**: User self-defined fault 2 (28) 0: Coast to stop 1: Stop according to the stop method 2: Keep running **Hundreds bit**: Power on time arrival (29) 0: Coast to stop 1: Stop according to the stop method 2: Keep running **Thousands bit**: Off-load (30) 0: Coast to stop 1: Decelerate to stop 2: Keep running when the speed drops to 7% of inverter rated frequency. And recover to the set frequency if the load becomes normal. **Ten thousands bit**: PID feedback signal lost during running (31) 0: Coast to stop 1: Stop according to the stop method 2: Keep running	00000	○

Function code	Name	Detailed instruction	Factory default	Modify
F12.50	Inverter reaction select 4 while fault happen	**Unit bit**: Excessive velocity deviation(42) 0: Coast to stop 1: Stop according to the stop method 2: Keep running **Tens bit**: Motor over-speed(43) **Hundreds bit**: Reserved	00000	○
F12.54	Running frequency selection while fault happen	0: Keep running at present frequency 1: Keep running at set frequency 2: Keep running at upper limit frequency 3: Keep running at lower limit frequency 4: Keep running at abnormal standby frequency	0	○
F12.55	Abnormal standby frequency	0.0% ~100.0% (100.0% correspond to maximum frequency F00.10)	100.0%	○
F12.56	Type of motor temperature sensor	0:No temperature sensor 1:PT100 2:PT1000	0	○
F12.57	Motor overheat protection threshold	0℃~200℃	110℃	○
F12.58	Motor overheating alarm threshold	0℃~200℃	90℃	○
F12.59	Instantaneous power-off action selection	0: Invalid 1: Deceleration 2: Deceleration-to-stop	0	○
F12.60	Instantaneous stop non-stop frequency judgment voltage	80.0%~100.0%	90.0%	○
F12.61	Voltage recover judgment time when Instantaneous power-off	0.00s ~ 100.00s	0.50s	○
F12.62	Recover judgment voltage when Instantaneous power-off	60.0% ~ 100.0% (Standard BUS voltage)	80.0%	○
F12.63	Off-load protection selection	0: Disable 1: Enable	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	Detailed instruction	Factory default	Modify
F12.66	Reserved	_	0	○
F12.67	Reserved	_	0	○
F12.68	SVC Excessive speed deviation detection value	0.0 ~ 50.0%（Max frequency）	20.0%	○
F12.69	SVC Excessive speed deviation detection time	0.0s: no detection 0.1 ~ 60.0s	5.0s	○
F12.70	Instant stop non-stop gain Kp	0~100	40	○
F12.71	Instant stop non-stop integration coefficient Ki	0~100	30	○
F12.72	Instant stop non-stop action deceleration time	0.0~300.0s	20.0s	○
F13 Group:Modbus 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	5	○
F13.01	Modbus Data format	0: No parity check (8-N-1) 1: Even parity check (8-E-1) 2: Odd parity check (8-0-1) 3: No parity check (8-N-1)	0	○
F13.02	Inverter address	0: broadcast address 1 ~ 247	1	○
F13.03	Modbus communication delay time	0 ~ 20ms	2	○
F13.04	RS485 communication timeout time	0.0 (invalid) 0.1s ~ 60.0s	0.0s	○
F13.05	Modbus communication protocol selection	0: Non-standard MODBUS protocol 1: Standard MODBUS protocol	0	○
F13.06	RS485 communication read current resolution	0: 0.01A 1: 0.1A	0	○
F14 Group: Keypad and Display				
F14.00	FUNC function selection	0: Invalid 1: Switching between keypad command and remote command	3	◎

Function code	Name	Detailed instruction	Factory default	Modify
		(terminal command or communication command) 2: FDW/REV Switching 3: Forward Jog 4: Reverse Jog Note:When F14.00=1, switch to the terminal operation command, and the auxiliary display will slow flash with a 1 second interval; Switch to the communication operation command channel, and the auxiliary display will flash quickly with a 200ms interval.		
F14.01	STOP/RESET function	0: Valid only for keypad control 1: Always valid	1	○
F14.02	Running status display 1 (LED keypad upper line)	0000 ~ FFFF Bit00: Running frequency 1 (Hz) Bit01: Setting 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: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Pressure feedback(Mpa,Kg) Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting	1F	○
F14.03	Running status display 2 (LED keypad upper line)	0000 ~ FFFF Bit00: PID feedback Bit01: Simple PLC running step Bit02: Input pulse frequency (kHz) Bit03: Running frequency 2 (Hz) Bit04: Remain running time Bit05: AI1 voltage before calibration (V) Bit06: AI2 voltage before calibration (V) Bit07: Voltage setting (MPa,Kg) Bit08: Linear speed	0	○

Function code	Name	Detailed instruction	Factory default	Modify
		Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: Input pulse correspond frequency (Hz) Bit12: Communication setting frequency Bit13: Reserved Bit14: Main frequency A display (Hz) Bit15: Auxiliary frequency B display (Hz)		
F14.04	Stop status display (LED keypad upper line)	0000 ~ FFFF Bit00: Setting frequency (Hz) Bit01: Bus voltage (V) Bit02: Terminal input status Bit03: Terminal output status Bit04: AI1 voltage(V) Bit05: AI2 voltage(V) Bit06: Keypad potentiometer voltage (V) Bit07: Count value Bit08: Length value Bit09: Simple PLC running step Bit10: Load speed Bit11: PID setting Bit12: Pulse input frequency (kHz) Bit13: Pressure feedback(Mpa,Kg) Bit14: Input voltage(V) Bit15: Reserved	33	○
F14.05	Running status display (LED keypad lower line)	0~65	4	○
F14.06	Stop status display (LED keypad lower line)	0~65	38	○
F14.07	Load speed display coefficient	0.0001 ~ 6.5000	1.0000	○
F14.08	Inverter module radiator temperature	0.0℃~ 100.0℃	-	●
F14.09	Accumulated running time	0h ~ 65535h	-	●
F14.10	Speed display decimal place	**LED Unit bit**：load speed(d00.14) Display coefficient 0: 0 decimal place 1: 1 decimal place 2: 2 decimal places	21	○

Function code	Name	Detailed instruction	Factory default	Modify
		3: 3 decimal places **LED Tens bit:** feedback speed (d00.19) Display coefficient 1: 1 decimal place 2: 2 decimal places		
F14.11	Accumulated Power-on time	0h ~ 65535h	-	●
F14.12	Accumulated power consumption	0kWh ~ 65535kWh	-	●
F14.13	Hardware version No.	-	-	●
F14.14	Software version No.	-	-	●
F14.15	Software batch No.	-	3.0111	●
F15 Group:Function code management				
F15.00	User password	0~65535	0	○
F15.01	Parameter initialization	0:No operation 1:All user parameters except for 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 Modifies attributes	0:Modifiable 1:Not modifiable	0	○
F15.03	Reserved	-	0	●
F15.04	Reserved	-	0	●
F16 Group:Parameters for Water Supply				
F16.00	Terminal connection and disconnection delay	0.0~6000.0s	0.1	○
F16.01	Poll time	0.0~6000.0h	48.0	○
F16.02	Lower limit frequency of reducing pump	0.0~600.00HZ	35.00	○
F16.03	Add pump delay time	0.0~3600.0s	5.0	○
F16.04	Reduce pump delay time	0.0~3600.0s	5.0	○

Function code	Name	Detailed instruction	Factory default	Modify
F16.05	Pump sleep waiting time	0.0~3600.0s	2.0	○
F16.06	Pump wake up wait 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	○
F16.09	Sensor range	(0.0~100.00(MPa,Kg)	10.00	○
F16.10	Maximum power node of battery panel	50.0%~100.0%	81.0	○
F16.11	VF speed adjustment coefficient	0.000~2.000	1.000	○
F16.12	MPPT high point working voltage	(F16.11)~200.0%	100.0%	○
F16.13	MPPT low point working voltage	0.0%~(F16.10)	75.0%	○
F16.14	MPPT high voltage frequency point	0.00Hz~max frequency(F00.10)	50.00	○
F16.15	MPPT low voltage frequency point	0.00Hz~max frequency(F00.10)	0.00	○
F16.16	MPPT low voltage protection point	0~200.0%	45.0%	○
F16.17	Starting frequency of water shortage detection	0.00Hz~max frequency(F00.10)	10.00	○
F16.18	The proportion of no-load current corresponding to the detection current of photovoltaic water pump water shortage	80.0%~300.0%*max frequency(F00.10)	0.0	○
F16.19	Photovoltaic pump water shortage detection time	0~6000.0s	0.0	○
F16.20	Photovoltaic under-voltage auto start delay	0.1~6000.0s(0.0 value off auto start)	2.0	○
F16.21	Photovoltaic water shortage auto start delay	0.1~6000.0s(0.0 value off auto start)	15.0	○
F16.22	Power search time	0.050~60.000	0.500	○
F16.23	Power search gain	10~500	125	○
F16.24	Power search speed gain	1~1000	100	○

Function code	Name	Detailed instruction	Factory default	Modify
F16.25	Pre-search rise frequency time	0.01~600.00s	15.00	○
F16.26	Pre-search downfrequency time	0.01~600.00s	15.00	○
F17 Group: Control Optimized Parameters				
F17.00	DPWM switching upper limit frequency	0.00Hz ~max frequency(F00.10)	8.00Hz	○
F17.01	PWM regulation mode	0: Asynchronous mode 1: Synchronous mode	0	○
F17.02	Dead zone compensation mode selection	0: no compensation 1: compensation mode 1 2: compensation mode 2	1	○
F17.03	Depth of random PWM	0: Random PWM invalid 1~10: depth of random PWM	0	○
F17.04	Wave-by-wave current limitation enable	0: Disable 1: Enable	1	○
F17.05	Voltage overmodulation coefficient	100~110	105	○
F17.06	Under voltage level setting	200.0V ~ 2500.0V	350.0V	○
F17.07	Reserved	_	0	○
F17.08	Over voltage level setting	200.0V ~ 2200.0V	Model depends	◎
F18 Group:AI curve setting				
F18.00	AI curve 4 minimum input	-10.00V~F18.02	0.00V	○
F18.01	AI curve 4 minimum input corresponding setting	-100.0%~+100.0%	0.0%	○
F18.02	AI curve 4 inflection point 1 input	F18.00~F18.04	3.00V	○
F18.03	AI curve 4 inflection point 1 input corresponding setting	-100.0%~+100.0%	30.0%	○
F18.04	AI curve 4 inflection point 2 input	F18.02~F18.06	6.00V	○
F18.05	AI curve 4 inflection point 2 input corresponding setting	-100.0%~+100.0%	60.0%	○
F18.06	AI curve 4 maximum input	F18.06~+10.00V	10.00V	○

Function code	Name	Detailed instruction	Factory default	Modify
F18.07	AI curve 4 maximum input corresponding setting	-100.0%~+100.0%	100.0%	○
F18.08	AI curve 5 minimum input	-10.00V~F18.10	-10.00V	○
F18.09	AI curve 5 minimum input corresponding setting	-100.0%~+100.0%	-100.0%	○
F18.10	AI curve 5 inflection point 1 input	F18.08~F18.12	-3.00V	○
F18.11	AI curve 5 inflection point 1 input corresponding setting	-100.0%~+100.0%	-30.0%	○
F18.12	AI curve 5 inflection point 2 input	F18.10~F18.14	3.00V	○
F18.13	AI curve 5 inflection point 2 input corresponding setting	-100.0%~+100.0%	30.0%	○
F18.14	AI curve 5 maximum input	F18.12~+10.00V	10.00V	○
F18.15	AI curve5 maximum input corresponding setting	-100.0%~+100.0%	100.0%	○
F18.16	AI1 Setting Jump Points	-100.0%~+100.0%	0.0%	○
F18.17	AI1 Set Jump Range	0.0%~100.0%	0.1%	○
F18.18	AI2 Setting Jump Points	-100.0%~+100.0%	0.0%	○
F18.19	AI2 Set Jump Range	0.0%~100.0%	0.1%	○
F18.20	Panel potentiometer setting jump point	-100.0%~+100.0%	0.0%	○
F18.21	Set the jumping amplitude of the panel potentiometer	0.0%~100.0%	0.1%	○
FFF Group:Manufacturer parameter				
FFF.00	Manufacturer password	0~65536	0	◎
d00 Group:Monitoring Parameter				
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

Function code	Name	Detailed instruction	Factory default	Modify
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	Terminals input status		1	7007H
d00.08	Terminals output status		1	7008H
d00.09	AI1 voltage (V)/current(mA)		0 .01V/0. 01mA	7009H
d00.10	AI2 voltage (V)		0 .01V	700AH
d00.11	Pressure feedback(MPa,Kg)		0.00	700BH
d00.12	Count value		1	700CH
d00.13	Length value		1	700CH
d00.14	Load speed		1	700EH
d00.15	PID set value		1	700FH
d00.16	PID feedback value		1	7010H
d00.17	Simple PLC present running step		1	7011H
d00.18	Pulse input frequency (Hz)		0.01KHz	7012H
d00.19	Feedback speed (Hz)		0.01Hz	7013H
d00.20	Remain running time		0.1Min	7014H
d00.21	AI1 voltage(V)/ current(A) before calibration		0.001V/ 0.01mA	7015H
d00.22	AI2 voltage before calibration(V)		0.001V	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	Pulse input frequency		1Hz	701BH
d00.28	Communication setting value		0.01%	701CH
d00.29	Reserved		0	701CH
d00.30	Main frequency A display		0.01Hz	701FH
d00.31	Auxiliary frequency B display		0.01Hz	701FH
d00.32	Reserved		0	7020H
d00.33	Reserved		0	7021H
d00.34	Motor temperature value		1℃	7022H

Function code	Name	Detailed instruction	Factory default	Modify
d00.35	Target torque (%)		0.1%	7023H
d00.36	Reserved		0	7024H
d00.37	Angle of power factor		0.1°	7025H
d00.38	Input voltage(V)		0.0V	7026H
d00.39	Target voltage of V/f separate		1V	7027H
d00.40	Output voltage of V/f separate		1V	7028H
d00.41	Input terminals status		1	7029H
d00.42	Output terminals status		1	702AH
d00.43	Visual display1 of input terminals function status (Function 01-Function 40)		1	702BH
d00.44	Visual display2 of input terminals function status (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	Present error code		1	703EH
d00.63	Reserved		0.00%	703FH
d00.64	Reserved		0.01%	7040H
d00.65	Upper torque limit		0.10%	7041H

Chapter 6 Trouble Shooting

6.1 Fault and Trouble Shooting

During operation, if an abnormality occurs, the frequency converter immediately blocks the PMM output and enters a fault protection state. At the same time, the flashing fault code on the keyboard indicates the current fault information. At the same time, the fault indicator light ALM lights up. At this point, it is necessary to follow the prompts in this section to check the cause of the fault and corresponding solutions. If the problem still cannot be solved, please contact our company directly. Please refer to the table below for fault diagnosis and troubleshooting for the corresponding solution.

Fault Name	Inverter unit protection
Fault Code	**E-01**
Reason	1. Short circuit in the output circuit of the frequency converter 2. The wiring of the motor and frequency converter is too long 3. Module overheating 4. Loose internal wiring of the frequency converter 5. Main control board abnormality 6. Driver board abnormality 7. Abnormal inverter module
Solution	1. Troubleshooting peripheral faults 2. Install reactors or output filters 3. Check if the air duct is blocked, if the fan is working properly, and troubleshoot any issues 4. Insert all connecting wires properly 5-7. Ask for technical support

Fault Name	Over current when acceleration
Fault Code	**E-02**
Reason	1. Short-circuit or ground fault occurred at inverter output side 2. Control mode is vector control but don’t perform auto-tuning 3. The acceleration time is too short 4. The manual torque boost or V/f curve is not proper 5. The voltage is too low 6. Start the running motor 7. Load is added suddenly during the acceleration 8. Power selection of inverter is too small

Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Increase the acceleration time 4. Adjust the manual torque boost or V/f curve 5. Make the voltage in the normal range 6. Select speed tracking start or start the motor till it stops 7. Cancel the sudden added load 8. Select bigger power inverter

Fault Name	Over-current when deceleration
Fault Code	**E-03**
Reason	1. Short-circuit or ground fault occurred at inverter output side 2. Control mode is vector control but don't perform auto-tuning 3. The deceleration time is too short 4. The voltage is too low 5. Load is added suddenly during the deceleration 6. Have not installed braking unit and braking resistor
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Increase the deceleration time 4. Make the voltage in the normal range 5. Cancel the sudden added load 6. Install braking unit and braking resistor

Fault Name	Over-current when constant speed running
Fault Code	**E-04**
Reason	1. Short-circuit or ground fault occurred at inverter output 2. Control mode is vector control but don't perform auto-tuning 3. The voltage is too low 4. Load is added suddenly during running 5. Power selection of inverter is too small
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Make the voltage in the normal range 4. Cancel the sudden added load 5. Select bigger power inverter

Fault Name	Over-voltage when acceleration
Fault Code	**E-05**
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during acceleration 3. The acceleration time is too short 4. Have not installed braking unit and braking resistor
Solution	1. Make the voltage in the normal range 2. Cancel the external force 3. Increase the acceleration time 4. Install braking unit and braking resistor

Fault Name	Over-voltage when deceleration
Fault Code	**E-06**
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during deceleration 3. The deceleration time is too short 4. Have not installed braking unit and braking resistor
Solution	1. Make the voltage in the normal range 2. Cancel the external force 3. Increase the deceleration time 4. Install braking unit and braking resistor

Fault Name	Over-voltage when constant speed running
Fault Code	**E-07**
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during the inverter running
Solution	1. Make the voltage in the normal range 2. Cancel the external force or install braking resistor

Fault Name	Control power failure
Fault Code	**E-08**
Reason	1. The input voltage is not within the specified range
Solution	1. Make the voltage in the normal range

Fault Name	under voltage
Fault Code	**E-09**
Reason	1. Instantaneous power outage 2. The input voltage of the frequency converter is not within the specified range 3. Abnormal bus voltage 4. Rectifier bridge and buffer resistor are abnormal 5. The power board is abnormal 6. The control board is abnormal
Solution	1. Reset fault 2. Adjust the voltage to the normal range 3-6. Ask for technical support

Fault Name	Inverter over load
Fault Code	**E-10**
Reason	1. The load is too heavy or motor blockage occurs 2. Power selection of inverter is too small
Solution	1. Reduce the load, check the status of motor & machinery 2. Select bigger power inverter

Fault Name	Motor over load
Fault Code	**E-11**
Reason	1. The input power supply is abnormal 2. The power board is abnormal 3. The lightning protection board abnormality 4. The control board is abnormal
Solution	1. Check and eliminate issues in peripheral circuits 2-4. Ask for technical support

Fault Name	Input phase failure
Fault Code	**E-12**
Reason	1. The input power supply is abnormal 2. The power board is abnormal 3. The lightning protection board abnormality 4. The control board is abnormal

Solution	1. Check the power supply and eliminate the troubles 2-4: Seeking technical support

Fault Name	Output phase failure
Fault Code	**E-13**
Reason	1. The connection between inverter and motor is abnormal 2. Output voltage unbalance during the motor running 3. The power board is abnormal 4. The IGBT module is abnormal
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Make sure the motor three phase winding is normal 3, 4. Ask for technical support

Fault Name	IGBT over heating
Fault Code	**E-14**
Reason	1. Excessive ambient temperature 2. Air duct blockage 3. Fan damage 4. Damaged module thermistor 5. The inverter module is damaged
Solution	1. Reduce ambient temperature 2. Cleaning the air duct 3. Replacing the fan 4. Replace the thermistor 5. Replacing the inverter module

Fault Name	External device failure
Fault Code	**E-15**
Reason	1. Input external fault signals through multifunctional terminal X
Solution	1. Reset operation

Fault Name	Communication fault
Fault Code	**E-16**

Reason	1. The upper computer is not working properly 2. Abnormal communication line 3. Communication expansion card F00.28 is not set correctly 4. Communication parameter F13 group setting incorrect
Solution	1. Check the wiring of the upper computer 2. Check communication cables 3. Correctly set the communication expansion card type 4. Set communication parameters correctly

Fault Name	Current detection fault
Fault Code	**E-18**
Reason	1. Hall sensor is abnormal 2. The power board is abnormal
Solution	1. Check hall sensor and connection 2. Replace the power board

Fault Name	Motor auto-tuning fault
Fault Code	**E-19**
Reason	1. Motor parameters are set improperly 2. Parameter identification process is delayed
Solution	1. Set parameters according to the motor nameplate 2. Check the cables connecting inverter with motor

Fault Name	EEPROM read/write fault
Fault Code	**E-21**
Reason	1. EEPROM chip is broken
Solution	1. Replace the control board

Fault Name	Inverter hardware failure
Fault Code	**E-22**
Reason	1. There is over voltage present 2. There is over current present
Solution	1. Handle as over voltage fault 2. Handle according to over current fault

Fault Name	Accumulated running time reaches fault
Fault Code	**E-26**
Reason	1. Accumulated running time reaches the set value
Solution	1. Use parameter initialization function to clear record information

Fault Name	User defined fault 1/User defined fault 2
Fault Code	**E-27 ~ E-28**
Reason	1. Input user-defined fault signal 1 or 2 through multifunctional terminal X
Solution	1. Reset operation

Fault Name	Accumulated running time arrival
Fault Code	**E-29**
Reason	1. The accumulated running time reaches the setting value
Solution	1. Clear the record information via parameter initialization function

Fault Name	Load drop fault
Fault Code	**E-30**
Reason	1. The operating current of the frequency converter is less than F12-64
Solution	1. Confirm if the load is detached or if the F12-64 and F12-65 parameter settings match the actual operating conditions

Fault Name	PID feedback lost when running
Fault Code	**E-31**
Reason	1. PID feedback is smaller than F09.26
Solution	1. Check PID feedback signal or set F09.26 properly

Fault Name	Wave by wave current limiting fault
Fault Code	**E-40**
Reason	1. Is the load too large or if there is motor blockage 2. The selection of frequency converters is too small

Solution	1. Reduce the load and check the motor and mechanical condition 2. Choose a frequency converter with a higher power level

Fault Name	Speed deviation too large fault
Fault Code	**E-42**
Reason	1. No parameter identification was performed 2. The monitoring parameters F12.68~F12.69 for excessive speed deviation are not set properly
Solution	1. Perform motor parameter identification 2. Reasonably set detection parameters based on actual situations

Fault Name	Initial position error
Fault Code	**E-51**
Reason	1. The motor parameters deviate too much from the actual value
Solution	1. Reconfirm if the motor parameters are correct, with a focus on whether the rated current is set too low

Fault Name	Master slave control slave failure
Fault Code	**E-55**
Reason	The slave machine has malfunctioned, check the slave machine
Solution	Start troubleshooting according to the slave fault code

Fault Name	Brake pipe protection failure
Fault Code	**E-60**
Reason	The braking resistor is short circuited or the braking module is abnormal
Solution	Check the braking resistor or seek technical support

Fault Name	Photovoltaic water shortage detection fault
Fault Code	**E-65**
Reason	Photovoltaic water pump water shortage detection fault
Solution	Please refer to F16.10-F16.26 for details

6.2 Common Faults and Solutions

Fault	Reason	Solution
No display when power-on	1, The input voltage is 0 or too low. 2, The switching power supply on the power board is broken. 3, Rectifier bridge is broken. 4, Buffer resistors are broken. 5, The control board or keypad is broken. 6, Cables are loose connection	1, Check the input power-supply; 2, Check the DC Bus voltage; 3, Reconnect the cables; 4~6, Ask for technical support;
Power on display **"P.OFF"**	1.Poor contact in the wiring between the driver board and control board; 2.The relevant components on the control board are damaged; 3.The motor or motor wire has a short circuit to ground; 4.Hall fault; 5.Grid voltage too low	Seeking manufacturer services:
The power on frequency converter displays normally, but after running, it displays **"P.0FF"** and immediately shuts down	1.Fan damage or blockage; 2.There is a short circuit in the wiring of the peripheral control terminal;	1.Replace the fan; 2.Eliminate external short circuit faults;
Frequent E-14 (module overheating) fault reporting	1.The carrier frequency is set too high; 2.Fan damage or air duct blockage; 3.Damaged internal components of the torque converter (thermocouples or other)	1.Reduce carrier frequency (F00.15); 2.Replace the fan and clean the air duct; 3.Seeking manufacturer services;

The motor does not rotate after the frequency converter is running.	1. Motor and motor wires; 2. Transformer parameter setting error (motor parameters); 3. Poor connection between the driver board and control board; 4. Driver board failure;	1. Reconfirm the connection between the torque converter and the motor; 2. Replace the motor or clear mechanical faults; 3. Check and reset motor parameters;
Digital input (X) terminal is invalid	1, The parameter is set improperly. 2, The external signal is wrong. 3, The control board is broken.	1, Check & reset F07 group parameters; 2, Reconnect the external signal cable; 3.Seeking manufacturer services;
Over voltage and over current fault happens frequently	1, Motor parameters are set improperly. 2, The ACC/DEC time is improper. 3, The load has big fluctuation.	1, Reset motor parameters or perform auto tuning; 2, Set proper ACC/DEC time; 3.Seeking manufacturer services;
Power on display 	1, The control board is broken. 2, Loose connection of control board and power board.	1, Replace the control board; 2, Reconnect the control board and power board;

Appendix 1:MODBUS Communication Protocol

This 880P series inverter provides RS485 communication interface, and adopts MODBUS-RTU slave station communication protocol. User can realize centralized monitoring through PC/PLC can set inverter's operating commands, modify or read function parameters, read operating status and fault information, etc.

7.1 About Protocol

This serial communication protocol defines the transmission information and use format in the series communication. It includes the formats of master-polling, broadcast and slave response frame, and master coding method with the content including slave address (or broadcast address), command, transmitting data and error checking. The response of slave adopts the same structure, including action confirmation, returning the data and error checking etc. If slave takes place the error while it is receiving the information or cannot finish the action demanded by master, it will send one fault signal to master as a response.

7.2 Application Method

The inverter could be connected into a "Single-master & Multi-slaves" PC/PLC control network with RS485 bus,as a communication slave.

7.3 Bus Structure

(1) Interface mode

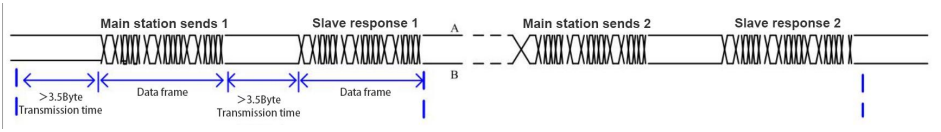
The frequency converter terminals 485+and 485- are Modbus communication interfaces

(2) Topological structure

In Single-master Multi-slave system, Each communication device in the network has a unique slave address, with one device serving as the communication host (usually a flat PC upper computer, PLC, HMI, etc.), actively initiating communication and performing parameter reading or writing operations on the slave. Other devices are serving as communication slaves, responding to inquiries or communication operations from the host to the local machine. At the same time, only one device can send data, while other devices are in a receiving state. the setup range of slave address is 1 to 247. 0 refers to broadcast communication address. The address of slave must be exclusive in the network. That is basic condition of MODBUS communication.

(3) Transmission mode

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

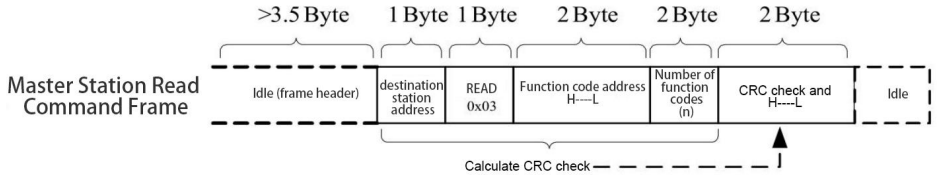


The communication protocol built into the 880P series frequency converter is the Modbus RTU slave communication protocol, which can respond to the host's "query command" or make corresponding actions based on the host's "query/command", and respond to communication data.

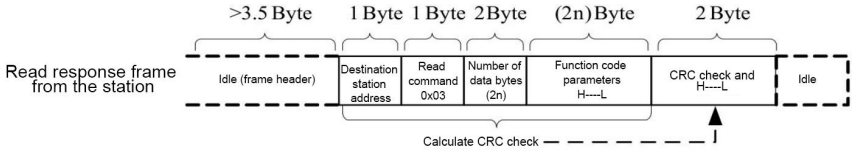
A host can refer to a personal computer (PC), industrial control equipment, or programmable logic controller (PLC), etc. The host can communicate with a specific slave separately and also broadcast information to all subordinate slaves. For individual access to queries/commands by the host, the accessed slave must return a response frame: for broadcast information issued by the host, the slave does not need to provide feedback to the host.

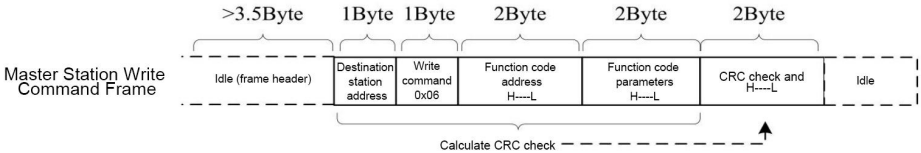
(4) Communication data structure

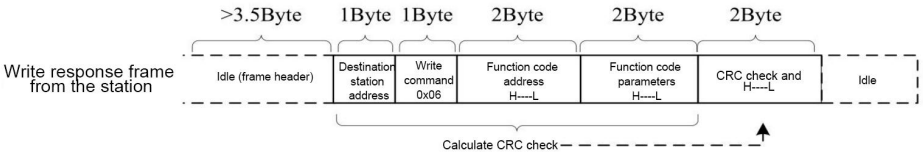
The Modbus protocol communication data format of the 880P series frequency converter is as follows. The frequency converter only supports reading or writing Word type parameters, and the corresponding communication read operation command is 0x03. The write operation command is 0x06, and it does not support byte or bit read and write operations:



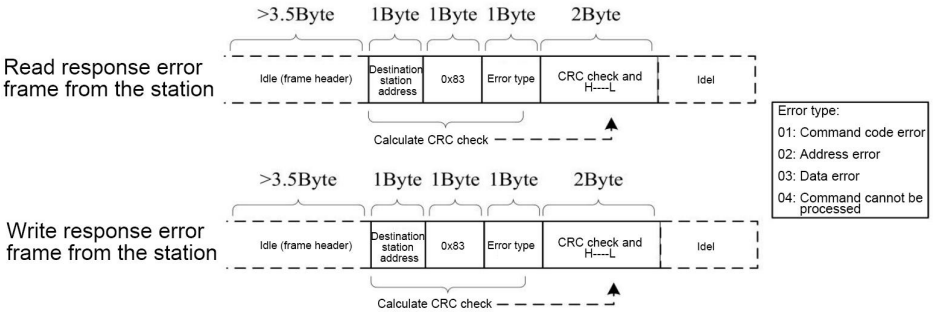
In theory, the upper computer can read several consecutive function codes at once (i.e., n can reach a maximum of 12), but be careful not to cross the last function code in this function code group, otherwise it will reply with an error.







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



Digital Frame Field Description：

START	Transmission time of 3.5 bytes
Slave Address ADR	Communication address : 1 to 247；0= broadcast address
Function code address H	03: Read Slave Parameter 06：Write Slave Parameter
Function code address L	The parameter address inside the frequency converter, represented in hexadecimal; It is divided into functional code type and non functional code type (such as running status parameters, running commands, etc.) parameters, etc., as detailed in the address definition. When transmitting, high bytes come first and low bytes come last.
Number of function codes H	

Number of function codes H	The number of function codes read in this frame, if it is 1, it means reading 1 function code. When transmitting, high bytes come first and low bytes come last. This agreement can only rewrite one function code at a time, without this field.
Number of function codes L	
DATA H	When transmitting the data to be answered or written, the high byte comes first and the low byte comes last.
DATA L	
CRC CHK High byte	Detection value: CRC16 verification value. When transmitting, high bytes come first and low bytes come last. The calculation method can be found in the instructions for CRC verification in this section.
CRC CHK Low byte	
END	Transmission time of 3.5 bytes

CRC checking：
In RTU mode, messages include an error-checking field that is based on a CRC method. The CRC field checks the contents of the entire message. The CRC field is two bytes, containing a 16-bit binary value. The CRC value is calculated by the transmitting device, which appends the CRC to the message. The receiving device recalculates a CRC during receipt of the message, and compares the calculated value to the actual value received in the CRC field. If the two values are not equal, an error results.

The CRC is started by 0xFFFF. Then a process begins of applying successive eight-bit bytes of the message to the current contents of the register. Only the eight bits of data in each character are used for generating the CRC. Start and stop bits, and the parity bit, do not apply to the CRC.

During generation of the CRC, each eight-bit character is exclusive ORed with the register contents. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB was a 1, the register is then exclusive ORed with a preset, fixed value. If the LSB was a 0, no exclusive OR takes place. This process is repeated until eight shifts have been performed. After the last (eighth) shift, the next eight-bit byte is exclusive ORed with the register's current value, and the process repeats for eight more shifts as described above. The final contents of the register, after all the bytes of the message have been applied, is the CRC value.

When the CRC is appended to the message, the low byte is appended first, followed by the high byte. The following are C language source code for CRC.

```
unsigned int crc_chk_value(unsigned char *data_value,unsigned char length)
{
    unsigned int crc_value = 0xffff;
    int i;
    while(data_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);
    }
```

7.4 Address definition of communication parameter

Read and write function code parameters (some function codes cannot be changed and are only for manufacturer use or monitoring):

The group number and mark of function code is the parameter address for indicating the rules.

High byte: F00~FFF(F Group),d000(d Group)

Low byte: 00 to FF

Note:

Some parameters cannot be changed during operation; some parameters regardless of what kind of status the inverter in, the parameters cannot be changed. Change the function code parameters, pay attention to the scope of the parameters, units, and relative instructions.

Function code group number	Communication access address	Communication modification of function code address in RAM
F00~F15Group	0xA000~0xAFFF	0x4000~0x4FFF
F16Group~F18Group	0xB000~0xB2FF	0x5000~0x52FF
FFFGroup	0xBF00~0xABFF	0x5F00~0x5FFF
d00Group	0x7000~0x70FF	

Besides, due to EEPROM be frequently stored, it will reduce the lifetime of EEPROM. So in the

7.5 Stop/start parameter address

Parameter Address	Parameter Description
1000H	* Communication setting frequency (-10000 ~ 10000) (Decimal)
1001H	Running frequency
1002H	DC Bus voltage
1003H	Output voltage
1004H	Output current
1005H	Output power
1006H	Output torque
1007H	Running speed
1008H	DIn input status
1009H	DO output status
100AH	AI1 voltage
100BH	AI2 voltage
100CH	Panel potentiometer voltage
100DH	Counting value input
100EH	Length value input
100FH	Load speed
1010H	PID setting
1011H	PID feedback
1012H	Simple PLC running step
1013H	High speed input pulse frequency setting (unit is 0.01kHz)
1014H	Feedback speed, unit is 0.1Hz
1015H	Remain running time
1016H	AI1 voltage before calibration
1017H	AI2 voltage before calibration
1018H	Voltage before panel potentiometer calibration
1019H	Linear speed

Parameter Address	Parameter Description
101AH	Current power on time
101BH	Current running time
101CH	pulse input frequency (unit is 1Hz)
101DH	Communication setting value
101EH	Actual feedback speed
101FH	Main frequency A display
1020H	Auxiliary frequency B display

Note:

Communication setting value is the percentage of relative value, and 10,000 corresponds to 100.00%, -10000 corresponds to -100.00%.

Control command input to inverter (write only)

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

Read inverter status: (read only)

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

Parameters locking password check: (If the return is 8888H, it means the password check passes.)

Password Address	Content of Input password
AF00H	*****

Digital output terminal control: (write only)

Command Address	Command Content
2001H	BIT0: Y1 output control
	BIT1: Y2 output control
	BIT2: RELAY1 output control
	BIT3: RELAY2 output control

Analog output AO1 control: (write only)

Command Address	Command Content
2002H	0～7FFF refers to 0%～100%

Analog output AO2 control: (write only)

Command Address	Command Content
2003H	0～7FFF refers to 0%～100%

Pulse output control: (write only)

Command Address	Command Content
2004H	0～7FFF refers to 0% ～100%

7.6 Inverter fault code description:

Inverter Fault Address	Inverter Fault Information
8000H	0000: No fault
	0001: Reserved
	0002: Over current when acceleration
	0003: Over current when deceleration
	0004: Over current when constant speed running

	0005: Over voltage when acceleration
	0006: Over voltage when deceleration
	0007: Over voltage when constant speed running
	0008: Buffer resistor overload
	0009: Under voltage
	000A: Inverter overload
	000B: Motor overload
	000C: Input phase failure
	000D: Output phase failure
	000E: Module overheat
	000F: External fault
	0010: Communication fault
	0011: Reserve
	0012: Current detection fault
	0013: Motor auto-tuning fault
	0014: Reserved
	0015: Parameter R/W fault
	0016: Inverter hardware fault
	0017: Reserved
	0018: Reserved
	0019: Reserved
	001A: Running time arrival
	001B: User self-defined fault 1
	001C: User self-defined fault 2
	001D: Power on time arrival
	001E: Off load
	001F: PID feedback lost when running
	0028: Fast current limiting over time
	002A: Speed deviation oversize

	005C: Motor initial position wrong
	0041: Photovoltaic water shortage detection fault

The meaning of error codes in slave response to abnormal information

Error code address	Error code	Explain
8001H	01H	Password error
	02H	Read and write command error
	03H	CRC check error
	04H	Invalid address
	05H	Invalid parameter
	06H	Invalid parameter change
	07H	System lock
	08H	Saving parameters

Appendix 2: Explanation of Macro Parameter Setting

Function Macro Definition	Set parameters	Automatically modify parameter list	Debugging steps
One frequency two power （1 variable frequency pump+2 power frequency pumps) water supply mode1	F00.00=1	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F07.00=53; F07.01=54; F07.02=55; F07.03=56; F07.04=57; F07.05=58; F08.02=42; F08.03=43; F08.04=44.	**Step 1:** Determine the type of sensor feedback. AI1 and AI2 default input voltage feedback signals at the factory, or AI1 input current feedback signals can be selected through jumper JP3; **Step 2:** Terminal wiring. If the pressure gauge outputs 0-10V, connect the signal wire of the pressure gauge to AI1, and the other two wires to+10V and GND. If the output is 0-20mA, short circuit COM and GND, connect the pressure gauge signal wire to AI1, and the other wire to 24V. For other terminal connections, please refer to the instructions for the three pump circulating soft start water supply. **Step 3:** Parameter initialization (F15.01=2); **Step 4:** Set sensor range (F16.09); **Step 5:** Macro selection (F00.00=1 or 2); **Step 6:** Set the target pressure, which can be set through parameter F16.08 or through the up and down keys on the keyboard.

<table>
<tr><td>Three pump circulating soft start (3 variable frequency pumps) water supply mode</td><td>F00.00=2</td><td></td><td></td></tr>
<tr><td>One frequency Three power （1 variable frequency pump+3 power frequency pumps) water supply mode</td><td>F00.00=3</td><td>F00.03=10;
F14.02=11;
F14.03=80;
F14.04=2002;
F14.05=11;
F14.06=11;
F08.02=42;
F08.03=43;
F08.04=44.</td><td rowspan="5">Step 1: Determine the type of sensor feedback. AI1 and AI2 default input voltage feedback signals at the factory, or AI1 input current feedback signals can be selected through jumper JP3;
Step 2: Terminal wiring. If the pressure gauge outputs 0-10V, connect the signal wire of the pressure gauge to AI1, and the other two wires to+10V and GND. If the output is 0-20mA, short circuit COM and GND, connect the pressure gauge signal wire to AI1, and the other wire to 24V.
Step 3: Parameter initialization (F14.12=2):
Step 4: Set sensor range (F15.07):
Step 5: Macro selection (F00.01=3, 4, 5, 6)
Step 6: Set the target pressure, which can be set through parameter F15.08 or by pressing the key Set up and down keys on the disk.
Attention: When F00.01=3, 4, 5, and 6, there is no need to connect the interlock circuit. The contactor can be controlled through the main control board relay and Y terminal.</td></tr>
<tr><td>One frequency two power （1 variable frequency pump+2 power frequency pumps) water supply mode2</td><td>F00.00=4</td><td>F00.03=10;
F14.02=11;
F14.03=80;
F14.04=2002;
F14.05=11;
F14.06=11;
F08.02=42;
F08.03=43;</td></tr>
<tr><td>One frequency One power （1 variable frequency pump+1 power frequency pumps) water supply mode2</td><td>F00.00=5</td><td>F00.03=10;
F14.02=11;
F14.03=80;
F14.04=2002;
F14.05=11;
F14.06=11;
F08.02=42;</td></tr>
<tr><td>Single pump water supply (one set frequency converter) mode</td><td>F00.00=6</td><td>F00.03=10;
F14.02=11;
F14.03=80;
F14.04=2002;
F14.05=11;
F14.06=11;</td></tr>
<tr><td>Photovoltaic water supply voltage tracking mode</td><td>F00.00=7</td><td rowspan="3">F00.03=11</td><td rowspan="3">Step 2: Parameter initialization (F15.02=2):
F00.03=11.
Step 3: Macro selection (F00.00=7, 8, 9).
Attention: Refer to F16.10~F16.26 for photovoltaic water supply</td></tr>
<tr><td>Photovoltaic water supply power tracking VF mode</td><td>F00.00=8</td></tr>
<tr><td>Photovoltaic water supply power tracking SVC mode</td><td>F00.00=9</td></tr>
</table>

Product Warranty Card

<table>
<tr><td rowspan="3">Customer information</td><td colspan="2">Unit address:</td></tr>
<tr><td rowspan="2">Unit name:

Postal code:</td><td>Contact:</td></tr>
<tr><td>Contact number:</td></tr>
<tr><td rowspan="3">Product information</td><td colspan="2">Product model:</td></tr>
<tr><td colspan="2">Body barcode (pasted here):</td></tr>
<tr><td colspan="2">Agent name:</td></tr>
<tr><td>Fault information</td><td colspan="2">(Maintenance time and content):

Maintained by:</td></tr>
</table>

Warranty Agreement

1.The warranty period of this product is 12 months (subject to the barcode information of the machine body). During the warranty period, under the normal use of the user manual, our company is responsible for free repair of the product sales failure or damage.

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

The machine is damaged due to errors in use and unauthorized repair and transformation;

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

Hardware damage caused by artificial fall and transportation after purchase;

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

Faults and damages caused by obstacles outside the machine (such as external equipment factors);

In case of product failure or damage, please fill in the contents of the “Product Warranty Card” correctly and in detail.

The charge of maintenance costs shall be subject to the latest adjusted “Maintenance Price List” of our company.

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

In case of any problem during the service, please contact our agent or our company in time.

The Company reserves the right to interpret this agreement.