Revision History

No.	Revision Abstract	Version	Revision Date
1	Initial release.	V1.0	1/2024

Preface

Thank you for using F580 series inverter.

F580 series high performance vector frequency inverter, simple and easy to use, can be applied to sewage treatment, HVAC, chemical, metallurgy, electric power and other industries of all kinds of load drive. F580 series inverter provided with excellent vector control performance, achieving the integration of torque control and speed control, can drive stably in various complex operating conditions. Built-in a variety of fan and pump application macros, such as PID, multi-pump control, constant pressure water supply, etc., can effectively reduce the commissioning difficulty for engineers. Independent air duct design and thickening circuit board coating, can adapt to harsh environment applications, ensure that the equipment runs reliably for a long time, and reduce maintenance cost.

F580 has better compatibility of industrial control system. The power density of the product is improved, which is more convenient for cabinet design and reduces the system cost for customers. The Optimization of circuit design, with excellent electromagnetic compatibility characteristics, ensures that the equipment runs stably in complex electromagnetic environment.

This manual provides related instructions on safety precautions, installation and wiring, parameter setting, fault tracking and routine maintenance. Please read this manual carefully before starting work on F580 series inverter in order to ensure proper installation and operation, and maximize excellent performance.

The company reserves the right to continuously improve the product without prior notice.

Contents

1. Safety Precautions

1.1 Contents of this chapter

This chapter describes the safety precautions required for using this product properly. Before using this product, please read this manual and correctly understand the relevant information on safety precautions. Failure to follow the safety precautions may result in death, serious injury, or equipment damage.

1.2 Safety class definition

Danger: Failure to comply with the relevant requirements can result in serious injury or even death.

Warning: Failure to comply with the relevant requirements can result in physical injury or equipment damage.

Note: Steps taken to ensure proper operation which can result in minor physical injury or damage to the equipment.

Qualified professional: refers to the personnel operating the equipment must have received professional electrical training and safety training and passed the examination, and must be familiar with the steps and requirements of equipment installation, commissioning, operation and maintenance, and can avoid all kinds of emergencies.

1.3 Warning symbols

Warning indicates a situation that may cause serious injury and/or equipment damage and provides recommendations to avoid the danger. The following warning symbols are used in this manual:

Symbol	Name	Description	Abbreviation
 Danger	Danger	Failure to comply with the relevant requirements can result in serious injury or even death.	
 Warning	Warning	Failure to comply with the relevant requirements can result in physical injury or equipment damage.	
 Prohibit	Electrostatic sensitivity	Failure to comply with the relevant requirements can result in damage to the PCBA board.	
 High temperature	High temperature	The base of the inverter produces high temperature. Do not touch it.	
	Electric shock	To prevent electric shock due to high voltage existing in the bus capacitor after power off, wait at least 5 minutes (or 15 minutes, 25 minutes, refer to the warning symbols on the machine).	

Symbol	Name	Description	Abbreviation
	Read manual	Read the manual before operating the equipment.	
Note	Note	Steps taken to ensure proper running.	**Note**

1.4 Safety guidelines

Only qualified personnel are allowed to perform relevant operations.

Do not perform operations such as wiring, inspection and replacing components while the power is on. Before wiring and inspection, confirm that all input power supplies have been disconnected, and wait for not less than the time marked on the inverter or confirm that the DC bus voltage is lower than 36V. The minimum waiting time is as follows:

Inverter model	Minimum waiting time
380V 0.75kW~110kW	5 minutes
380V 132kW~315kW	15 minutes
380V 355kW above	25 minutes

Unauthorized modification of the frequency converter is strictly prohibited; otherwise it may cause fire, electric shock or other injury.

When the machine is running, the radiator base may produce high temperature. Do not touch it to avoid burns.

The electronic components in the frequency converter are electrostatic sensitive, and anti-static measures must be taken during related operations.

1.4.1 Handling and installation

Do not install the frequency converter on flammable materials, and keep the frequency converter from contacting or adhering to flammable materials.

If the frequency converter is damaged or lacks components, do not run it.

Do not contact the frequency converter with damp objects or body parts. Otherwise, electric shock may occur.

Do not push the frequency converter sidewards during handling.

Prevent tipping to both sides during handling.

Note:

Choose the appropriate handling and installation tools to ensure the normal and safe operation of the inverter and avoid physical injury. Installation personnel must take mechanical protective measures to ensure personal safety, such as wearing safety shoes, work clothes and so on.

During the handling and installation, it is necessary to protect the frequency converter from physical impact and vibration.

Do not only hold the front cover plate when handling to avoid falling off.

The inverter must be installed in an area away from children and other members of the public.

When the altitude exceeds 1000m, please derate by 1% for every increase of 100m.

Use the inverter in a suitable environment (see section 4.2.1 Installation environment for details).

Prevent screws, cables, and other conductive objects from falling into the inverter.

When the inverter is running, the leakage current may exceed 3.5mA. Ensure reliable grounding and the grounding resistance less than 10Ω. The conductivity of the PE grounding conductor is the same as that of the phase conductor (using the same cross-sectional area).

R, S, T are the input terminals of the power supply, and U, V, W are the output motor terninals. Please connect the input power cable and the motor cable correctly; otherwise the inverter may be damaged.

1.4.2 Commissioning and operation

Before the inverter terminal wiring, all the power supplies connected to the inverter must be cut off, and wait for not less than the time marked on the inverter after disconnecting the power supplies.

When the inverter is running, there is high voltage inside. Do not perform any operations on the inverter except keypad setting. The control terminal of the frequency converter is ELV (Extra Low Voltage) circuit. In the case of no protection isolation, direct connection between the control terminal and the accessible terminal of other devices should be avoided.

When the power off restart function is enabled, the frequency converter may restart by itself. Do not get close to the frequency converter and the motor.

This device cannot be used as an "emergency stop device".

This equipment can not be used as an emergency brake motor. A mechanical braking device must be installed.

When driving the permanent magnet synchronous motor, in addition to paying attention to the above items before installation and maintenance, the following work must be confirmed:

1. All input power supplies have been disconnected, including the main power supply and control power supply.
2. The permanent magnet synchronous motor has stopped, and the voltabe on the output end of the inverter is lower than 36V.

	3. Wait for not less than the time marked on the inverter after the permanent magnet synchronous motor stops, and the voltage between + and - is lower than 36V. 4. During operation, it must be ensured that the permanent magnet synchronous motor is not possible to rotate again due to the action of external load. It is recommended to install an effective external brake device or directly disconnect direct electrical connection between the permanent magnet synchronous motor and the inverter.

Note:

Do not frequently switch on or switch off the input power supplies of the inverter.

If the inverter has been stored for a long time, it must be inspected, capacitive setting (see "9 Care and maintenance") and trial run before use.

The front cover plate must be covered before the frequency converter is run; otherwise there will be a risk of electric shock.

1.4.3 Service, maintenance and component replacement

	Maintenance, inspection and component replacement of the inverter must be carried out by trained and qualified professionals. Before the inverter terminal wiring, all the power supplies connected to the inverter must be cut off, and wait for not less than the time marked on the inverter after disconnecting the power supplies. In the process of service, maintenance and component replacement, measures must be taken to avoid screws, cables and other conductive objects entering inside the inverter.

Note:

The frequency converter cannot be tested for insulation withstand voltage, and the control circuit of the frequency converter cannot be tested with a megohm meter.

In the process of service, maintenance and component replacement, anti-static measures must be taken for the frequency converter and internal components.

1.4.4 Disposal after scrapping

	The frequency converter contains heavy metals, and it must be treated as industrial waste after scrapping.
	This product can not be disposed of at will when discarded, and it must be classified,collected and treated specially.

2. Quick Use

2.1 Contents of this chapter

This chapter introduces the basic principles that need to be paid attention to during the installation and commissioning of the inverter, so as to facilitate rapid installation and commissioning of the inverter.

2.2 Unpacking inspection

Carry out the following inspection after receiving the product:

1. Is the packing box complete, damaged or damp? If yes, do not install!
2. Is the model identification outside the packing box consistent with the model ordered? If there are any differences, do not install!
3. After unpacking, check whether there is any abnormal phenomenon such as water stain inside the packing box. Is the shell of the machine damaged or broken? If yes, do not install!
4. Check whether the machine nameplate is consistent with the model identification outside the packing box. If there are any problems, do not install!
5. Check whether the accessories (including the manual, control panel and expansion card) inside the packing box are complete. If there are any problems, do not install!

2.3 Use confirmation

Confirm the following before use:

1. Confirm the load mechanical type driven by the frequency converter and whether the frequency converter exists overload state in actual operation. Does the frequency converter need to amplify the power level?
2. Confirm whether the power grid voltage is consistent with the rated voltage of the inverter.
3. Confirm whether the control accuracy required by the actual load is the same as that provided by the inverter and whether the required function needs to be equipped with an expansion card.

2.4 Environment confirmation

Confirm the following before actual installation and use:

1. Is the actual ambient temperature for the inverter more than 40°C? If yes, please derate by 1% for every 1°C increase. Besides, do not use the inverter when the ambient temperature exceeds 50°C. **Note:** For the frequency converter installed in the cabinet, the ambient temperature is the air temperature in the cabinet.

2. Is the actual ambient temperature for the inverter lower than -10°C? If yes, it is necessary to increase heating devices. **Note:** For the frequency converter installed in the cabinet, the ambient temperature is the air temperature in the cabinet.
3. Is the altitude of the actual application environment for the frequency converter more than 1000m? If yes, please derate by 1% for every 100m increase.
4. Is the humidity of the actual application environment for the frequency converter more than 90%? Is there condensation phenomenon? If yes, take extra protection measures.
5. Is there direct sunlight or external biological invasion in the actual application environment for the frequency converter? If yes, take extra protection measures.
6. Is there dust, explosive and flammable gas in the actual application environment for the frequency converter? If yes, take extra protection measures.

2.5 Installation confirmation

Confirm the following after the installation of the inverter is completed:

1. Whether the current carrying capacity selection of the input power cable and motor cable meets the actual load requirements.
2. Whether the selection of accessories for the frequency converter is correct and installed properly. Whether the installation cable meets the requirements of its carrying capacity, including input reactor, input filter, output reactor, output filter and DC reactor.
3. Whether the frequency converter is installed on the flame retardant material. Whether its heating accessories (reactors, etc.) have been far away from flammable materials.
4. Whether all control cables have been routed separately from power cables. Whether its wiring is fully considered EMC characteristics requirements.
5. Whether all grounding systems have been properly grounded according to the requirements of the inverter.
6. Whether the installation spacing for the frequency converter meets the requirements in the manual.
7. Whether the installation method of the frequency converter meets the requirements in the manual. Try vertical installation.
8. Whether the external terminal of the inverter is tight and whether the torque meets the requirements.
9. Make sure that there are no screws, cables, and other conductive objects left inside the inverter. If so, please take it out.

2.6 Basic commissioning

Follow the following steps to complete the basic commissioning before use:

1. According to the actual motor parameters, select the motor type, set the accurate motor parameters, and select the inverter control mode.
2. Whether autotuning is required. If possible, de-couple the inverter from the motor load and carry out dynamic parameter autotuning. If the inverter cannnot be de-coupled from the load, choose static autotuning.
3. Adjust the acceleration and deceleration time according to the actual load conditions.
4. Perform device commissioning by means of jogging and confirm whether the motor steering is consistent with the required direction. If opposite, it is recommended to change the motor running direction by replacing any two-phase motor wiring.
5. Set all control parameters for actual operation.

3. Product Overview

3.1 Contents of this chapter

This chapter briefly introduces the operating principle of the inverter, product characteristics, layout, nameplate and model indication information.

3.2 Basic principle

F580 series frequency converter is a kind of frequency converter used to control asynchronous AC induction motor. The following figure shows the main circuit diagram of the frequency converter. The rectifier converts the three-phase AC voltage to DC voltage, the capacitor bank of the intermediate circuit stabilizes the DC voltage, and the inverter converts the DC voltage to the three-phase AC voltage with adjustable frequency and voltage.

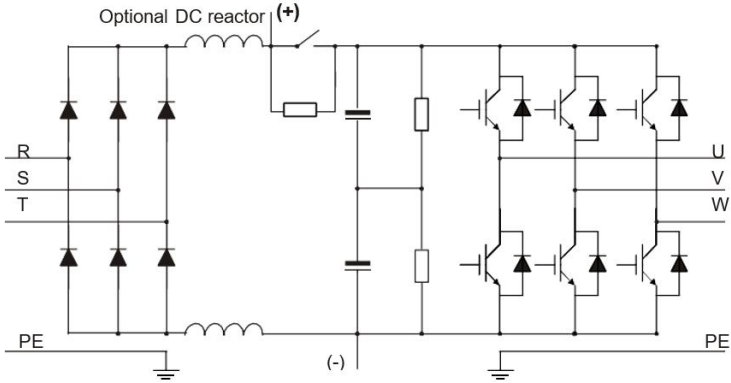


Figure 3-1 30kW to 500kW (included) main circuit (built-in optional DC reactors)

3.3 Product specifications

Function description		Specification
Power input	Input voltage (V)	AC 3PH 380~480V Rated voltage: 380V
	Allow transient voltage fluctuations	-15% ~ +10%
	Input current (A)	Please refer to "3.6 Product ratings"
	Input frequency (Hz)	50Hz or 60Hz, allowing range 47Hz to 63Hz
Power output	Output voltage (V)	0~ Input voltage
	Output current (A)	Please refer to "3.6 Product ratings"
	Output power (kW)	Please refer to "3.6 Product ratings"

Function description		Specification
	Output frequency (Hz)	0~500Hz
Technical control performance	Control mode	Space voltage vector control mode, no PG vector control mode
	Motor type	Asynchronous motor
	Speed regulation ratio	Asynchronous machine 1:200 (no PG vector control)
	Speed control accuracy	±0.2% (no PG vector control)
	Speed fluctuations	±0.3% (no PG vector control)
	Torque response	<20ms (no PG vector control)
	Torque control accuracy	±10% (no PG vector control)
	Overload capability	150% 1 minute; 180% 3 seconds; 2000% 0.5 seconds
Run control performance	Frequency setting mode	Digital setting, analog setting, pulse frequency setting, multi-step running setting, simple PLC setting, PID setting, communication setting, etc. It can realize the combination of settings and the switch of setting channels.
	Automatic voltage adjustment function	When the grid voltage changes, it can automatically keep the output voltage constant
	Fault protection function	Provide a variety of fault protection functions: over current, over voltage, under voltage, over temperature, lack of phase, overload etc. protection function
	Speed tracking restart function	To achieve smooth start of the rotating motor without impact
Peripheral interface	Terminal analog input resolution	Not greater than 20mV
	Terminal digital input resolution	Not greater than 2ms
	Analog input	22kW and below: Standard with 1 channel AI:0 (2)~10V/0(4)~20mA, 2 inputs can be extended
		22kW above: Standard with 2 channels AI:0(2)~10V/0(4)~20mA,

Function description		Specification
	Analog output	22kW and below: Standard with 1 channel AO: 0(2)~10V/0(4)~20mA, 1 output can be extended
		22kW above: Standard with 2 channels, AO:0 (2)~10V/0(4)~20mA
	Digital input	22kW and below: standard with 4 ordinary inputs, maximum frequency 1kHz, internal impedance: 3.3kΩ 1 high speed input, maximum frequency 50kHz, 5 inputs can be extended
		22kW and above: Standard with 8 inputs, 1 of which can be used as high speed pulse input (HDI)
	Digital output	22kW and below: standard with 1 HDO terminal, 1 DO collector open output can be extended
		22kW above: Standard with 2 multi-function collector outputs, 1 of which can be used as high speed pulse output (HDO).
	Relay output	22kW and below: Standard with 1 programmable relay output, 1 relay output can be extended
		22kW above: Standard with 2 programmable relay outputs Common contact capacity: 3A/AC250V, 1A/DC30V
	Expansion interface	1 expansion interface: can connect I/O card, incremental encoder, rotary transformer, sine-cosine encoder, PT100/1000 card, phase sequence card **Note:** Only one type of card can be connected
Other	Installation method	Support wall mounted, floor mounted two ways
	Operating ambient temperature	-10°C to 50°C, derated above 40°C for use
	Level of protection	160kW and below IP20 185kW and above IP00
	Pollution level	Level 2
	Cooling method	0.75kW (included) or more: forced air cooling

3.4 Product nameplate

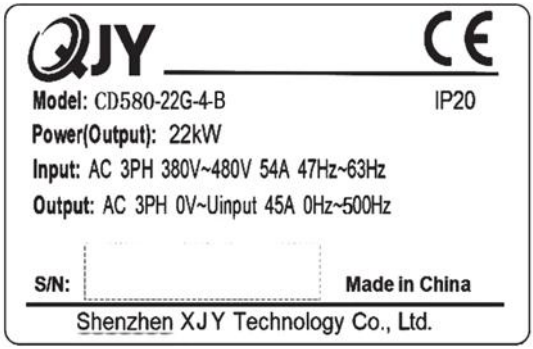


Figure 3-2 Product nameplate

Note: This is an example of the F580 standard product nameplate format, and CE/IP20 will be marked according to the actual certification of the product.

3.5 Model code

F580-22G-4-B-L1-O1

① ② ③ ④ ⑤ ⑥

Figure 3-3 Model description

Field	Identification	Sign instruction	Specific content
Product series abbreviation	①	Product series abbreviation	F580: F580 series inverter
Rated power	②	Power range	22G: 22kW
Voltage class	③	Voltage class	6: AC 3PH 660V to 690V 4: AC 3PH 380V to 480V 2 :AC 3PH 220V 2S:AC 2PH 220V
Brake unit	④	Brake unit	None: Built-in brake unit is not included B: Built-in brake unit, 37kW and below standard brake unit; 45kW-110kW optional brake unit; 132kW above external brake unit
Reactor configuration	⑤	Reactor configuration	Default: None L1: Built-in DC reactor, suitable for 37kW

Field	Identification	Sign instruction	Specific content
			to 500kW models. **Note:** 45kW~500kW is optional DC reactor.
Expansion ports	⑥	Expansion card types	1. I/O card 2. PG card 3-6. reserved

3.6 Product ratings

Table 3-1 Rated parameters of AC 3PH 380V models

Inverter model	Output power (kW)	Input current (A)	Output current (A)
F580-0R7G-4-B	0.75	3.4	2.5
F580-1R5G-4-B	1.5	5	3.7
F580-2R2G-4-B	2.2	6	5.3
F580-4R0G-4-B	4	15	9.5
F580-5R5G-4-B	5.5	20	13
F580-7R5G-4-B	7.5	27	17
F580-11G-4-B	11	35 (35)	25
F580-15G-4-B	15	44 (44)	32
F580-18G-4-B	18	46 (46)	38
F580-22G-4-B	22	54 (54)	45
F580-30G-4-B	30	75 (56)	60
F580-37G-4-B	37	90 (69)	75
F580-45G-4	45	108 (101)	92
F580-55G-4	55	142 (117)	115
F580-75G-4	75	177 (149)	150
F580-90G-4	90	200 (171)	180
F580-110G-4	110	240 (205)	215
F580-132G-4	132	278 (235)	250
F580-160G-4	160	310 (296)	305

Inverter model	Output power (kW)	Input current (A)	Output current (A)
F580-185G-4	185	335 (320)	330
F580-200G-4	200	385 (368)	380
F580-220G-4	220	430 (411)	425
F580-250G-4	250	465 (444)	460
F580-280G-4	280	540 (485)	530
F580-315G-4	315	605 (550)	600
F580-355G-4	355	655 (600)	650
F580-400G-4	400	660	720
F580-450G-4	450	745	820
F580-500G-4	500	800	860

Note:

Rated output current is defined as the output current when the output voltage is 380V.

The data given in the "Input current" column is the measured value at 380V voltage; The data in parentheses "()" indicates the measured value when the DC reactor is configured.

4. Installation Instructions

4.1 Contents of this chapter

This chapter describes the mechanical and electrical installation of the frequency converter.

Only trained and qualified professionals can perform the work described in this chapter. Follow the instructions in "1 Safety Precautions". Ignoring these safety precautions may result in physical injury or damage to the equipment.

Ensure that the power supply of the inverter is disconnected during installation. If the frequency converter has been powered on, then after the POWER is off, and the waiting time is not shorter than the time indicated on the frequency converter, and confirm that the power light has been turned off. It is recommended to directly use a multimeter to monitor the frequency converter DC bus voltage below 36V.

The installation design of the frequency converter must comply with the relevant laws and regulations of the installation place. If the installation of the inverter breaches local laws or regulations, the company does not assume any responsibility. In addition, if the user does not follow these suggestions, then the frequency converter may have some faults that are not covered by the warranty or quality guarantee.

4.2 Mechanical Installation

4.2.1 Installation environment

The installation environment is essential for the inverter to operate with best performance in the long run. Please install the inverter in the environment shown in the following table.

Environment	Conditions
Installation site	Indoors
Ambient temperature	-10°C to +50°C. When the ambient temperature exceeds 40°C, derate the output current by 1% for every 1°C increase. We do not recommend the use of inverter in the environment above 50°C. In order to improve the reliability of the machine, please use the inverter in a place where the temperature does not change dramatically. When the inverter is used in a closed space such as a control cabinet, use a cooling fan or cooling air conditioner for cooling to prevent the internal temperature from exceeding the condition temperature. When the temperature is too low and the inverter has been idled for a long time, install an external heating device before the use to eliminate the freeze inside the inverter. Otherwise, the inverter may be damaged.

Environment	Conditions
Humidity	The relative humidity of the air is less than 90%. No condensation is allowed. The maximum relative humidity should not exceed 60% in the environment where corrosive gases are present.
Storage temperature	-30°C ~ +60°C
Operating environmental conditions	Please install the inverter in the following places: Away from sources of electromagnetic radiation. Free of oil mist, corrosive gas, flammable gas, etc. Metal powder, dust, oil, water and other foreign objects will not enter into the inverter (please do not install the inverter on wood and other flammable materials). No radioactive substances, inflammable substances. Free of harmful gases or liquids. Low salt. No direct sunlight.
Altitude	Below 1000m. When the altitude exceeds 1000m above, derate 1% for every increase of 100m.
Vibration	Maximum acceleration no more than 5.8m/s^2 (0.6g).
Mounting direction	In order not to reduce the heat dissipation effect of the inverter, it is recommended to install the inverter vertically.

4.2.2 Installation direction

The inverter can be mounted on the wall or in a cabinet.

The inverter must be mounted in a vertical direction. Please check the installation position according to the requirements below. See "Appendix B Dimensional Drawing" for details on overall dimensions.

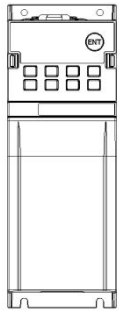


Figure 4-1 Installation direction (vertical installation)

4.2.3 Installation method

According to the overall size of the inverter, there are two installation methods: wall-mounted installation and floor installation (30~500kW frequency converter).

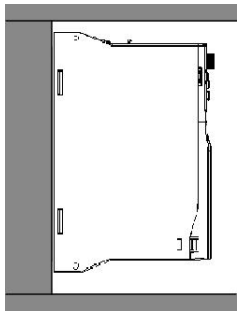


Figure 4-2 Installation method (wall-mounted installation)

The installation steps are as follows:

Step 1 Mark the location of the mounting holes. See "Appendix B Dimensional Drawing" for the location of mounting holes.

Step 2 Secure the screws or bolts to the marked positions.

Step 3 Place the frequency converter against the wall.

Step 4 Tighten the fastening screws on the wall.

4.2.4 Single mounting

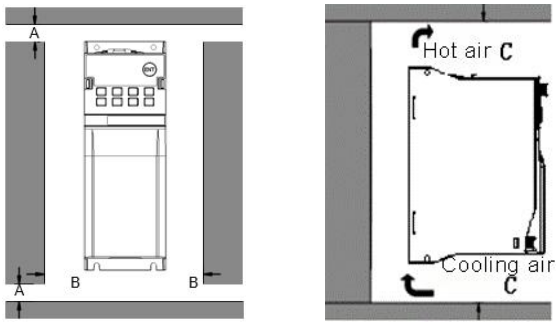


Figure 4-3 Single mounting

Note: The minimum mounting clearance required for B and C is 100mm.

4.2.5 Multiple mounting

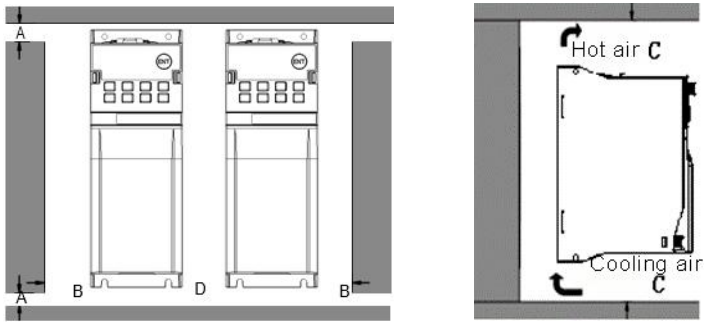


Figure 4-4 Parallel mounting

Note:

✧ When installing frequency converters of different sizes, align the upper part of the frequency converters before installation. This will facilitate later maintenance.

✧ The minimum mounting clearance required for B, and C is 100mm.

4.2.6 Mounting in cabinet

4.2.6.1 Heat dissipation instructions

All models of F580-55~500kW models support mounting in cabinet. Heat dissipation must be considered for mounting in cabinet. Figure 4-5 shows a direct exhaust cabinet (without fan at the top).

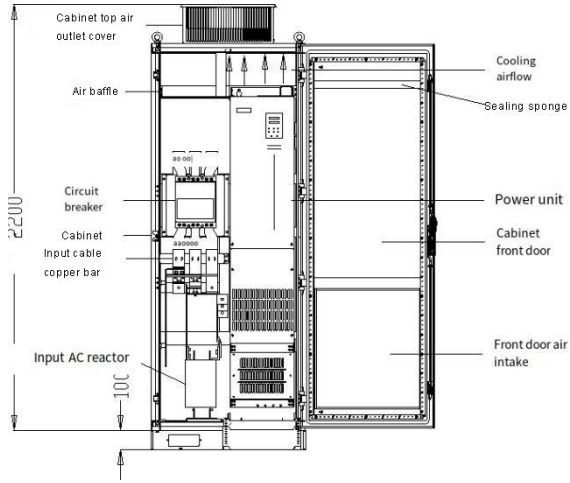


Figure 4-5 Direct exhaust cabinet

Note: Use a 40×40 sealing sponge on the front door panel corresponding to the internal air baffle to prevent short circuit of the air duct.

4.2.6.2 Steps of mounting in cabinet

No.	Operating instructions
1	Install the fixing beam for fixing the frequency converter in the cabinet.
2	Secure the bottom mounting beam and mounting bracket in the cabinet.
3	Assemble the mounting rail (optional) and attach it to the cabinet.
4	Align the casters of the frequency converter with the guide rail and push the inverter into the cabinet slowly (as shown in Figure 4-10 and Figure 4-11). During the installation, use the auxiliary strap to prevent the frequency converter from turning over during the process of pushing in or pulling out.
5	Remove the auxiliary strap, fasten the fixing holes at the top and bottom of the back of the inverter with screws respectively, and fix the inverter to the beam in the cabinet.
6	After confirming that the installation is secure, remove the mounting rail.

1. Fix the beam and reserve the fixing holes.

   a. It is recommended that the cabinet body use a nine-fold profile cabinet (PS cabinet). The section of the nine-fold profile cross section is shown in Figure 4-6.

   b. When F580 55~500kW models are loaded into the cabinet with nine-fold profile 600mm deep, the mounting beam must be bent inwards (as shown in the Figure 4-7), making use of the space of the

column (there is no restriction when installing the standard cabinet with a depth of 800mm or above).

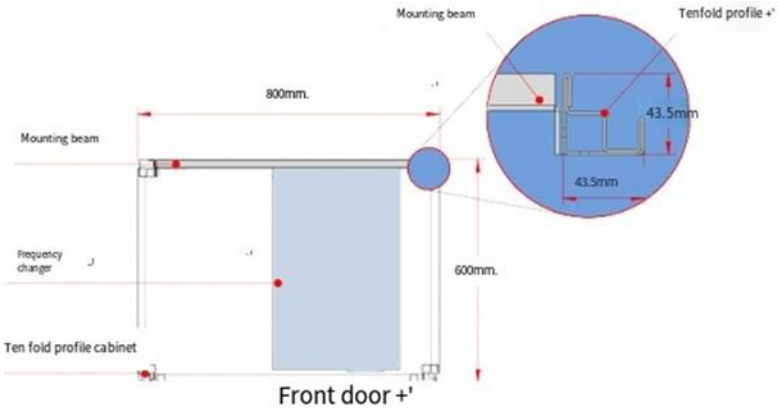


Figure 4-6 Top view of F580 55 to 500kW models in cabinet

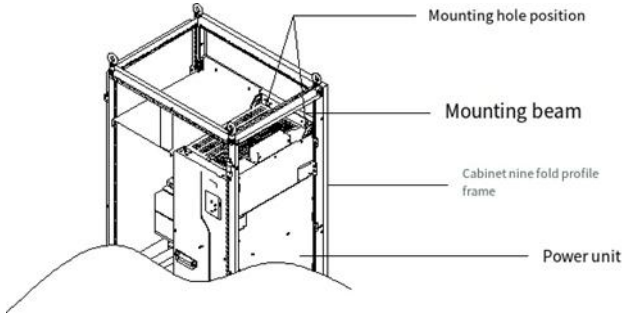


Figure 4-7 3D view of F580 55 to 500kW models in cabinet

2. Secure the bottom mounting beam and mounting bracket, as shown in Figure 4-10.

a. Fix the 2 bottom support beams on the base of the cabinet frame with nine-fold profile using 8 M8 clip nuts (support beams designed by the customer, T⩾2.5mm, firmly installed).

b. With 6 M5 self-tapping screws, fix the mounting brackets to the base of the nine-fold profile cabinet frame as shown in the picture below.

c. If the cabinet is not nine-fold profile, drill and assemble the fixing holes for the mounting brackets onsite.

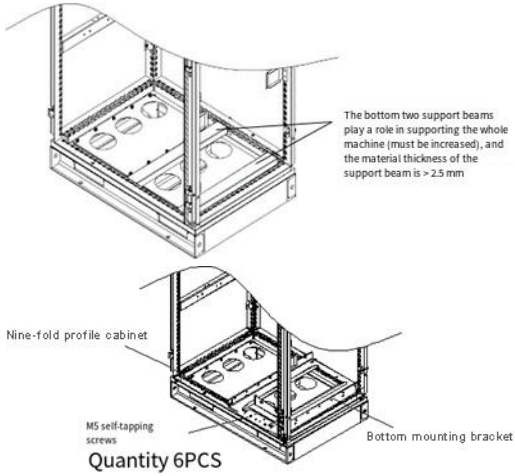


Figure 4-8 Bottom mounting bracket installation

3. Assemble the mounting rail (optional)

As shown in Figure 4-11, assemble the corresponding model mounting guide rail, align the two hooks at the front end with the gap of the nine-fold profile, and clamp into it to ensure that the clamp is in place.

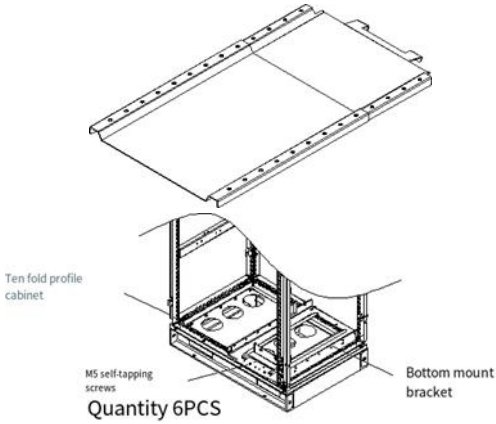


Figure 4-9 Installing the guide rail in the cabinet

4. Install the frequency converter into the cabinet

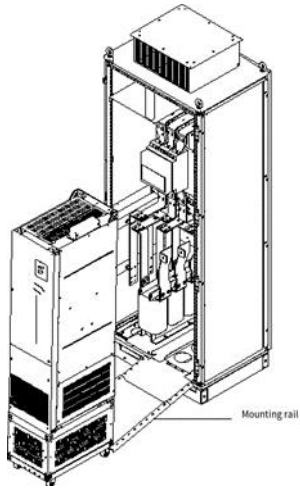


Figure 4-10

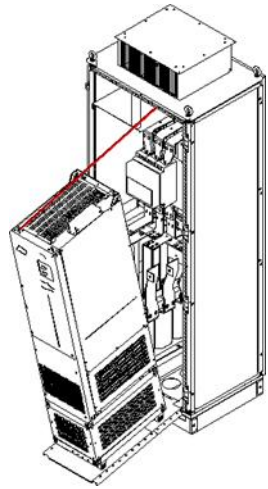


Figure 4-11

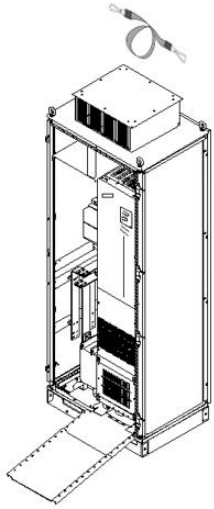


Figure 4-12

4.3 Standard wiring of main circuit

4.3.1 Wiring diagram of main circuit

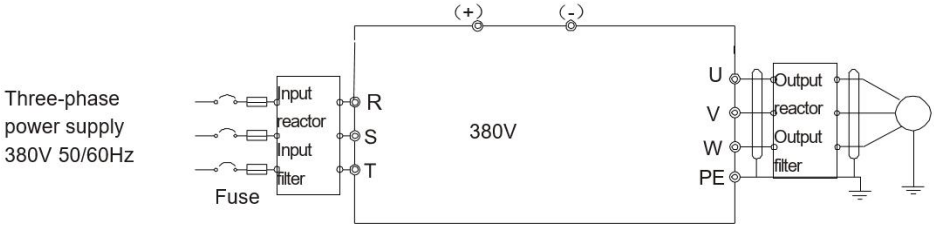


Figure 4-13 Wiring diagram of main circuit

Note:

Fuses, input reactors, input filters, output reactors, and output filters are optional accessories, see "Appendix C Optional Peripheral Accessories.

For an optional built-in DC reactor, purchase models with suffix -L1.

4.3.2 Schematic diagram of main circuit terminal

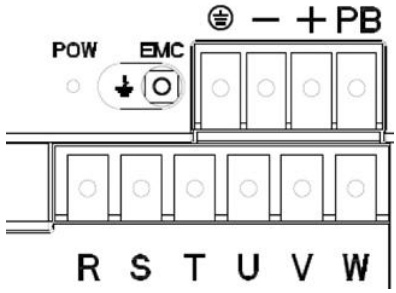


Figure 4-14 Three-phase 380V 1.5 to 15kW main circuit terminal (unit: mm)

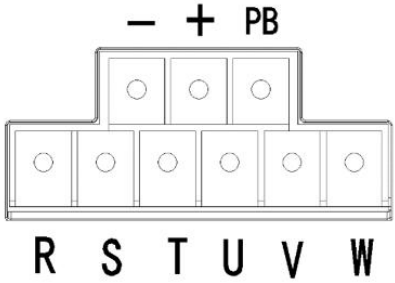
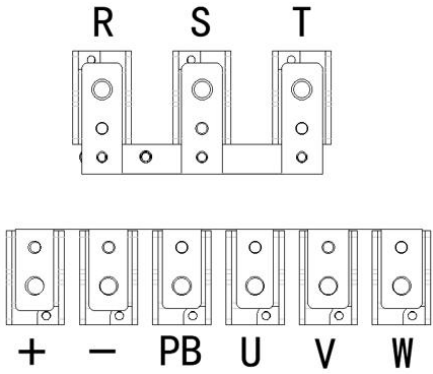


Figure 4-15 Three-phase 380V 18 to 37kW main circuit terminal (unit: mm)



Three-phase 380V 45KW to 55kW main circuit terminal (unit: mm)

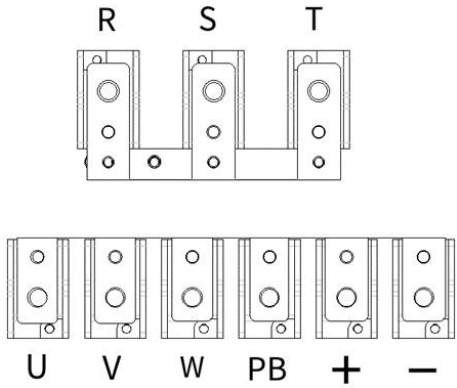


Figure 4-16 Three-phase 380V 75 to 110kW main circuit terminal (unit: mm)

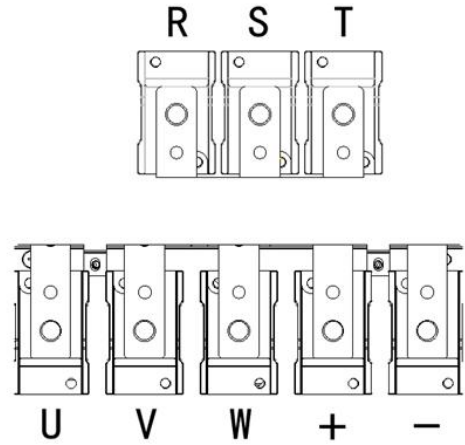


Figure 4-17 Three-phase 380V 132kW to 160kW main circuit terminal (unit: mm)

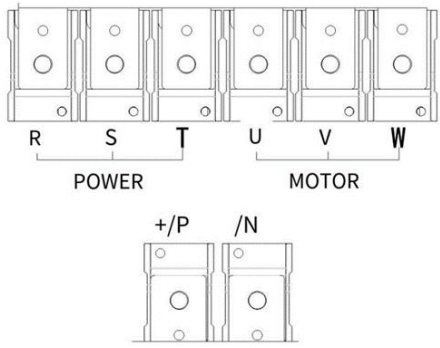


Figure 4-18 380V 185 to 500kW main circuit terminal

Terminal symbol	Function description
R, S, T	Three-phase AC input terminals, connected to the grid
U, V, W	Three-phase AC output terminal, generally connected to the motor
(+)	(+), (-) terminals can be common DC bus or external DC power supply
(-)	
PE	Safety protection ground terminal, each machine is equipped with two PE terminals, must be reliably grounded
PB	PB (+) External brake resistor

Note:

Asymmetrical motor cables are not recommended. If there is a symmetrical grounding conductor in the motor cable besides the conductive shield, ground the grounding conductor at the frequency converter end and the motor end.

Route the motor cable, input power cable, and control cable separately.

4.3.3 Main circuit wiring process

1. The grounding wire of the input power cable is directly connected to the ground terminal (PE) of the inverter, and the three-phase input cable is connected to the terminals R and S and T, and tighten.
2. Connect the grounding wire of the motor cable to the ground terminal of the frequency converter, connect the three-phase cable of the motor to the terminals U, V and W, and tighten.

4.4 Standard wiring of control circuit

4.4.1 Wiring diagram of basic control circuit

Description: The power of 22kW and below (including) is a type of control board, the digital and analog quantity are reduced correspondingly, and can be increased by expansion card.

The power of 22kW above is another type of control board, which is rich in digital and analog quantity.

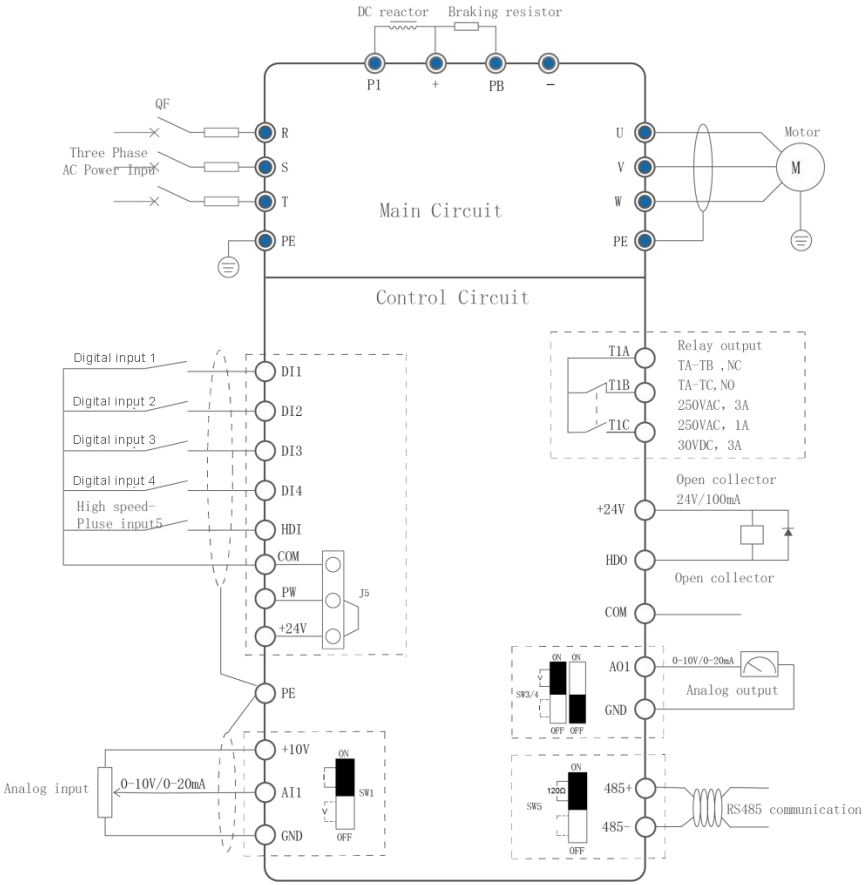
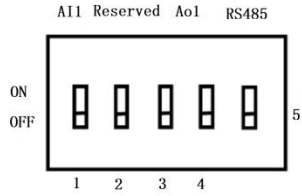


Figure 4-19 Wiring diagram of the control circuit at or below 22kW

Description of main control board terminals at or below 22kW:

Terminal name	Instructions
+10V	+10.5V power supply provided by the machine, 10V/5V power supply can be provided for models above 22kW
AI1	1. input range: AI1 voltage and current optional 0(2)~10V, 0(4)~20mA 2. input impedance: voltage input 20kΩ, current input 250Ω, AI1 voltage or current input by the code switch SW1 set 3. resolution: when 10V corresponds to 50Hz, the minimum

Terminal name	Instructions	
	resolution is 5mV 4. 25°C, input 5V or 10mA above, error ±0.5% 5. can be connected to the expansion card to increase 2 analog inputs	
GND	+10.5V reference ground	
AO1	1. output range: 0(2)~10V voltage or 0(4)~20mA current 2. AO voltage or current output is set by the code switch SW1 3. 25°C, output 5V, error ±0.5% 4. can be connected to the expansion card to increase 1 analog output	
T1A	1. relay output; T1A-T1B normally closed, T1A-T1C normally open 2. contact capacity: 3A/AC250V, 1A/DC30V 3. can be connected to the expansion card to increase 1 relay output	
T1B		
T1C		
COM	+24V reference ground	
485 +	Use shielded twisted pair cable for 485 communication port, 485 differential signal port, and standard 485 communication port. 120 OHM terminal of 485 communication matching resistor is connected through SW1.	
485 -		
PE	Ground terminal	
PW	Digital external power input terminals, voltage range: 12~30V	
24V	Inverter provides user power supply, 24V(-10%~+15%), maximum output current 200mA	
DI1	Digital input 1	1. internal impedance: 3.3kΩ 2. can accept 12~30V voltage input 3. the terminal is a two-way input terminal, supporting NPN and PNP connection
DI2	Digital input 2	

<table>
<tr><th>Terminal name</th><th colspan="2">Instructions</th></tr>
<tr><td>DI3</td><td>Digital input 3</td><td rowspan="2">4. the maximum input frequency: 1kHz
5. all for the programmable digital input terminal, the user can set the terminal function through the function code
6. can be connected to the expansion card to increase 4 digital inputs</td></tr>
<tr><td>DI4</td><td>Digital input 4</td></tr>
<tr><td>HDI</td><td colspan="2">In addition to the digital input function, it can also be used as a high-frequency pulse input channel
Maximum input frequency: 50kHz
Duty cycle: 30%~70%</td></tr>
<tr><td rowspan="4"> 
</td><td>AI1 Input voltage - current</td><td>1 dial to ON: 0mA ~ 20mA input;
1 dial to OFF: 0V ~ 10V input</td></tr>
<tr><td>AO1 Output voltage</td><td>3 dial to ON, 4 dial to OFF: 0-10V voltage output</td></tr>
<tr><td>AO1 Output current</td><td>3 dial to OFF, 4 dial to ON: 0-20mA current output</td></tr>
<tr><td>RS485 Terminal resistor</td><td>5 dial to ON: RS485 connects to 120Ω terminal resistor</td></tr>
</table>

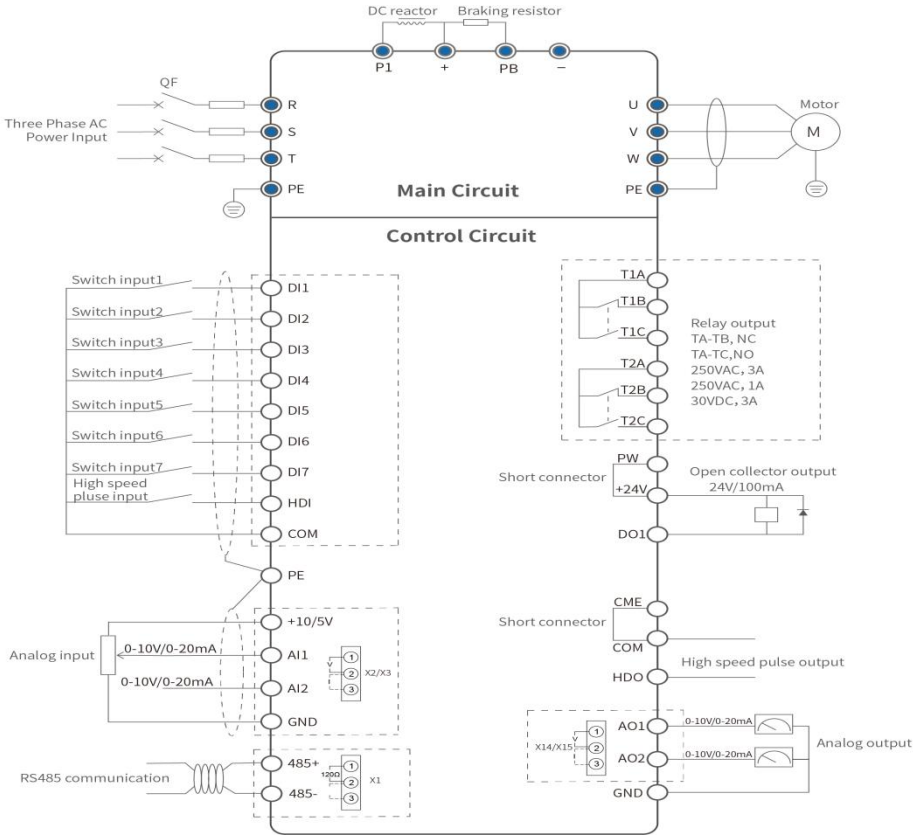


Figure 4-20 Wiring diagram of the main control circuit above 22kW

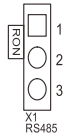
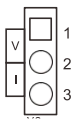
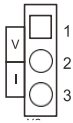
Description of terminals on the main control circuit above 22kW:

Types	Terminal symbol	Terminal function description	Technical specification
Digital input	+24V	+24V power supply	24V±10%, internally isolated from GND. Max load 200mA
	PW	External power input terminal (digital input terminal power supply)	Factory shorting with +24V
	DI1 ~ DI7	Digital input terminals 1 to 7	Input specifications: 24V, 5mA

Types	Terminal symbol	Terminal function description	Technical specification
	HDI	High speed pulse input or digital input	Pulse input frequency range: 0 ~ 50kHz high level voltage: 24V
	COM	+24V power supply or external power supply ground	Internal isolation from GND
Digital output	DO	Open collector output with CME at the common end	External voltage range: 0 ~ 24V
	CME	Open collector output common end	Factory shorting with COM
	HDO	High speed pulse output or open collector output with COM on the common end	Pulse output frequency range: 0 ~ 50kHz
	COM	HDO common end	Interior isolated from GND
Analog input	+10/5V	The inverter provides +10V or +5V power output	Output voltage :10V or 5V via X13 optional. Output current range: 0 ~ 50mA (If +10V or +5V and GND indirect potentiometer, potentiometer resistance should not be less than 2kΩ)
	AI1~AI2	Analog input terminals	Input voltage and current optional Input voltage range: 0V ~ 10V Input current range: 0/4 ~ 20mA
	GND	Analog ground	Internally isolated from COM
Analog output	AO1 ~ AO2	Analog output terminal	Output voltage and current optional Output voltage range: 0V ~ 10V Output current range: 0/4 ~ 20mA
Relay output	T1A/TIB/TIC	Relay output	T1A-T1B: normally closed T1A-T1C: normally open Contact capacity: 250VAC/3A, 30VDC/1A

Types	Terminal symbol	Terminal function description	Technical specification
	T2A/T2B/T2C	Relay output	T2A-T2B: normally closed T2A-T2C: normally open Contact capacity: 250VAC/3A, 30VDC/1A
Communication interface	485+ /485-	RS485 communication interface	RS485 communication interface

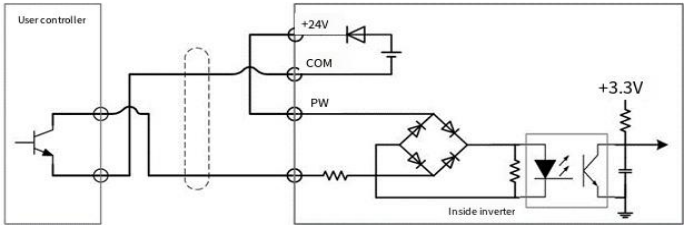
Instructions for using main control board terminals above 22kW

Bit number	Instructions	
X1	RS485 terminal matches resistance settings	
		Short-circuit module is used to short-circuit pin 1,2 of X1; RS485 bus uses the terminal matching resistor, 120Ω Short-circuit module is used to short-circuit pin 2,3 of X1; RS485 bus does not use the terminal matching resistor When short-circuit module is not used, RS485 bus does not use the terminal matching resistor.
X2	Analog input 1 current voltage selection	
		Short-circuit module is used to short-circuit pin 1,2 of X2, analog input 1 is voltage input (0 ~ 10V), short-circuit module is used to short-circuit pin 2,3 of X2, analog input 1 is current input (0/4 ~ 20mA); When short-circuit module is not used, analog input 1 is voltage input (0 ~ 10V).
X3	Analog input 2 current voltage select	
		Short-circuit module is used to short-circuit pin 1,2 of X3, analog output 2 is voltage input (0 ~ 10V), short-circuit module is used to short-circuit pin 2,3 of X3, analog input 2 is current input (0/4 ~ 20mA); When short-circuit module is not used, analog input 2 is voltage input (0 ~ 10V).
X8	10V/5V power supply voltage selection	
		Short-circuit module is used to short-circuit pin 1,2 of X8, and the terminal 10V/5V provides +10V power output; short-circuit module is used to short-circuit pin 2,3 of X8, and terminal 10V/5V provides +5V power output externally.
X14	Analog output 1 current voltage selection	

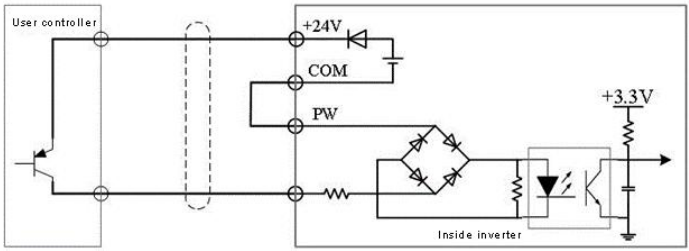
Bit number	Instructions	
		Short-circuit module is used to short-circuit pin 1,2 of X14, and analog output 2 is voltage output (0 ~ 10V); short-circuit module is used to short-circuit pin 2,3 of X14, analog output 2 is current output (0/4 ~ 20mA).
X15	Analog output 2 current voltage selection	
		Short-circuit module is used to short-circuit pin 1,2 of X15, and analog output 2 is voltage output (0 ~ 10V); short-circuit module is used to short-circuit pin 2,3 of X15, analog output 2 is current output (0/4 ~ 20mA).
X5	Expansion card interface	
J2	Control board CPU download special pin (has been set before the factory, the user does not need to change)	
J9	Native keypad interface	
J1	External keypad interface	

4.4.2 Input/Digital signal connection diagram

Use the internal +24V power supply of the inverter, and the external controller is NPN type wiring mode as shown in the following figure:

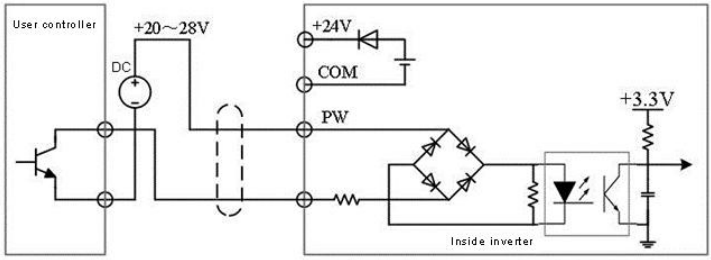


Using the internal +24V power supply of the inverter, the external controller is PNP type wiring mode as shown in the following figure:

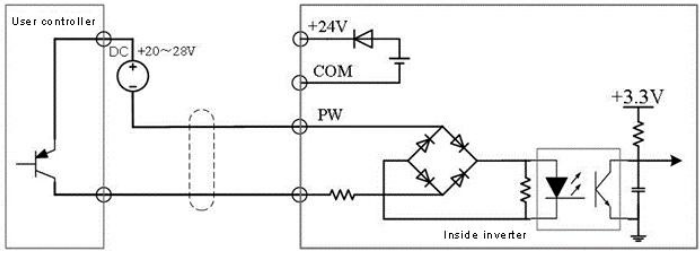


Note: Be sure to remove the short circuit strip between the +24V and PW terminals and connect the short circuit strip between the PW and COM terminals.

Use an external power supply, the external controller is NPN type wiring as shown below, and remove the short circuit strip between the +24V and PW terminals.



Use the external power supply, the external controller is PNP type wiring as shown in the following figure, and remove the short circuit strip between the +24V and PW terminals.



4.5 Wiring protection

1. In the case of short circuit, protect the inverter and input power cable to prevent thermal overload. Arrange protection according to the following guidelines.

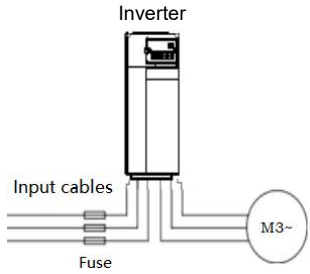


Figure 4-21 Fuse configuration

Note: Follow the instructions to select fuses. In case of short circuit, the fuse will protect the input power cable, prevent damage to the frequency converter, and protect adjacent equipment from damage in case of short circuit inside the frequency converter.

2. In the case of short circuit, protect the motor and the motor cable

   If the motor cable is selected according to the rated current of the inverter, then the inverter can short-circuit protection of the motor cable and the motor. No other protective equipment is required.

⚠	If the inverter is connected to multiple motors, separate thermal overload switches or circuit breakers must be used to protect the cables and motors. These devices may require the use of fuses to cut off short circuit current.

3. Protect the motor from thermal overload

   According to the regulations, the motor must be protected to prevent thermal overload, and the current must be cut off when overload is detected. The frequency converter comes with the motor thermal overload protection function, which can protect the motor and block the output if necessary to cut off the current.

4. Bypass connection

   For important occasions, it is usually necessary to set the frequency conversion circuit to ensure that the system can also maintain normal work when the frequency converter fails.

   For some special occasions, such as only for soft startup occasions, it can be directly converted to power frequency operation after startup, and the corresponding bypass link needs to be added.

⚠	The power supply shall not be connected to the output terminals U, V and W of the frequency converter. The voltage applied to the motor cable can cause permanent damage to the inverter.

   If frequent switching is required, a switch or contactor with a mechanical interlock can be used to ensure that the motor terminals are not connected at the same time as the input power cable and the inverter output.

5. Keypad Introduction

5.1 Keypad operation basic content

This chapter introduces the use of the frequency converter keypad and the commissioning steps of the common functions of the frequency converter.

5.2 Keypad introduction

LCD keypad is standard for F580 series frequency converter at or below 22kW and dual display LED keypad is standard for 22kW above. You can control the frequency converter start and stop, read status data and parameter settings through the keypad. LCD keypad is optional, supports 6 lines of high-definition multi-language display, with parameter copy function. The overall size of LCD keypad is the same as that of LED keypad.

Figure 5-1 Optional LCD keypad

5.3 LED keypad display and operation

The display states of F580 frequency converter series keypad contain stop parameters, operation parameters, fault alarm state and function code editing state.

Various operations can be carried out on the inverter through the keypad. The specific function code structure description, see the function code list.

Keypad identification		Name	Meaning
Unit indicator	Hz	Frequency indicator	The unit of the current display parameter is Hz
	A	Current indicator	The unit of the current display parameter is A
	V	Voltage indicator	The unit of the current display parameter is V
	%	Percentage	The unit of the current display parameter is %
Status indicator	FWD	Forward running	On: The inverter is running forward
	REV	Reverse running	Blinking: The inverter is running reversely
	RUN	Running	On : The inverter is running
	ERR	Malfunctions	On: The inverter is faulty
	LO/RE	Run command given	● Off: The operation panel run command given mode ● Blinking: The terminal run command given mode ● On: The communication run command given mode

Table 5-1 Keypad description of 22kW or below

Table 5-2 Dual display keypad of 22kW above

Keypad identification		Name	Meaning
Unit indicator	Hz	Frequency indicator	The unit of the current display parameter is Hz
	A	Current indicator	The unit of the current display parameter is A
	V	Voltage indicator	The unit of the current display parameter is V
	%	Percentage	Two lights corresponding to A and V are on
	RPM	RPM	Two lights corresponding to Hz and A are on
Status indicator	F/R	Forward and reverse running status indicator	On: The inverter is running forward Blinking: The inverter is running reversely Off: The inverter is switched between forward and reverse running or stops
	LO/RE	Run command given indicator	● Off: The operation panel run command given mode ● Blinking: The terminal run command given

Keypad identification		Name	Meaning
			mode ● On: The communication run command given mode
	Fault	Alarm indicator	The unit and status indicators in the first row are on

Dual-row display content switching:

The dual-row display content can be selected by ENT + >> key during operation and stop. The specific switching operation is as follows:

When the frequency converter runs or stops running, press the >> key, and the changed display content is the content of the current line can be switched. If you want to change the displayed content of another line, you can press ENT key first, and then press the >> key, you can switch to another line, at this time, press the >> key to switch the displayed content of the current line.

Table 5-3 Display letters

	Dual-row 5-bit LED display, display setting frequency, output frequency and other monitoring data as well as alarm code.					
Digital display area	**Display letter**	**Corresponding letter**	**Display letter**	**Corresponding letter**	**Display letter**	**Corresponding letter**
	0	0	1	1	2	2
	3	3	4	4	5	5
	6	6	7	7	8	8
	9	9	A	A	b	b
	C	C	d	d	E	E
	F	F	H	H	I	I
	L	L	n	N	n	n
	o	O	P	P	r	r
	S	S	t	t	U	U
	v	v		.	-	-

5.4 Keypad function key description

Keypad identification	Name	Meaning

Keypad identification	Name	Meaning
ESC	Program/exit key	Enter or exit Level 1 menu Level 2 menu returns to Level 1 menu Level 3 menu returns to Level 2 menu
MF	Multi-function key	Operate according to the multifunction selection
RUN	Run key	Used for inverter start control under the operation panel run command given mode Used to start the inverter for parameter self-identification after setting the parameter self-identification
ENT	Confirm key	Level 1 menu function group confirm, enter Level 2 menu Level 2 menu function code confirm, enter Level 3 menu Level 3 menu function code set value confirm, return to Level 2 menu In password verification state, password input completed.
>>	Shift key	Level 1 menu, function group editing step size selection Level 2 menu, function code editing step selection Level 3 menu, function code set value editing step selection Stop parameter display state, running parameter display state, fault display state, display parameter selection; Password verification state, editing digit selection.
STOP RESET	Stop/Reset key	Used for inverter stop control under the operation panel run command given mode Used for the inverter operation protection stop control under other running command given modes If the device is faulty and stopped, it is used as the reset button to clear the fault alarm.
∧	Increment key	Level 1 menu function group increments Level 2 menu function code increments Level 3 menu function code set value increments Set frequency increments
	Decrement key	Level 1 menu function group decrements Level 2 menu function code decrements

Keypad identification	Name	Meaning
		Level 3 menu function code set value decrements Set frequency decrements
	Digital potentiometer	Adjustable frequency, also acts as ENT confirm key

5.5 Stop parameter display status

The frequency converter can display a variety of state parameters in the stop, fault and running state. The function code F05.10 can be used to select whether the parameter is displayed according to the bits of binary.

In the stop state, a total of 12 stop state parameters can be selected whether to display, respectively: set frequency, bus voltage, input terminal state, output terminal state, panel potentiometer value, analog input AI1 value, high speed pulse HDI frequency, PID setting, PID feedback, PLC or number of multi-step speed, torque setting value. Whether to display by the function code F05.10 bit (converted to binary) selection, press the 》 key to the right to switch the selected parameters, press the MF key to the left to switch the selected parameters.

5.6 Run parameter display status

In the running state, a total of 22 state parameters can be selected whether to display, respectively: running frequency, set frequency, bus voltage, output current, output voltage, running speed, linear speed, output power, output torque, input terminal state, output terminal state, PID setting, PID feedback, high-speed pulse HDI frequency, count value, PLC and the number of speed steps, torque set value, panel potentiometer value, analog input AI1 value, motor overload percentage, inverter overload percentage. Whether to display by the function code F05.08, F05.09 according to the bit (converted to binary) selection, press the 》 key to the right to switch the selected parameters, press MF key to the left to switch the selected parameters.

5.7 Fault alarm display status

When the frequency converter detects the fault signal, it enters the fault alarm display state. The ERR light of the keypad below 22kW is on and the fault code is displayed. The unit light and indicator of the first row of the keypad above 22kW are all on, and the fault code of the second row can be reset by the STOP/RST key, control terminal or communication command on the keypad.

5.8 How to modify the function code

Frequency converter has three levels of menus, including:

- Function code group number (level 1 menu)
- Function code number (level 2 menu)

- Function code setting (level 3 menu)

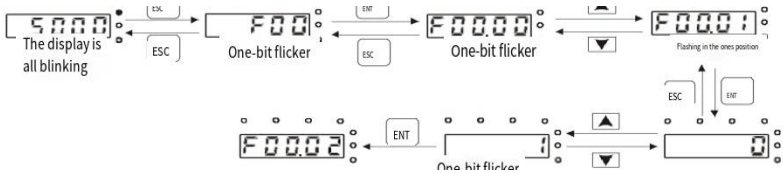
Steps: In the running or stop state, press ESC to enter the level-1 menu when parameter needs to be modified and F00 is displayed, ∧ and ∨ are used to enter the group number to be modified, ENT is used to enter the level-2 menu, and ∧ and ∨ are used to enter the function code label to be modified. Then press ENT to enter the three-level menu and modify it through ∧ and ∨.

Note: In the three-level menu state, if the parameter does not blink bit, it indicates that the function code cannot be modified. The possible causes are as follows:

The function code is an unmodifiable parameter, such as actual detection parameters, running record parameters, etc.

The function code cannot be modified in the running state, and can be modified only after stopping.

Example of changing the function code F00.01 from 0 to 1.



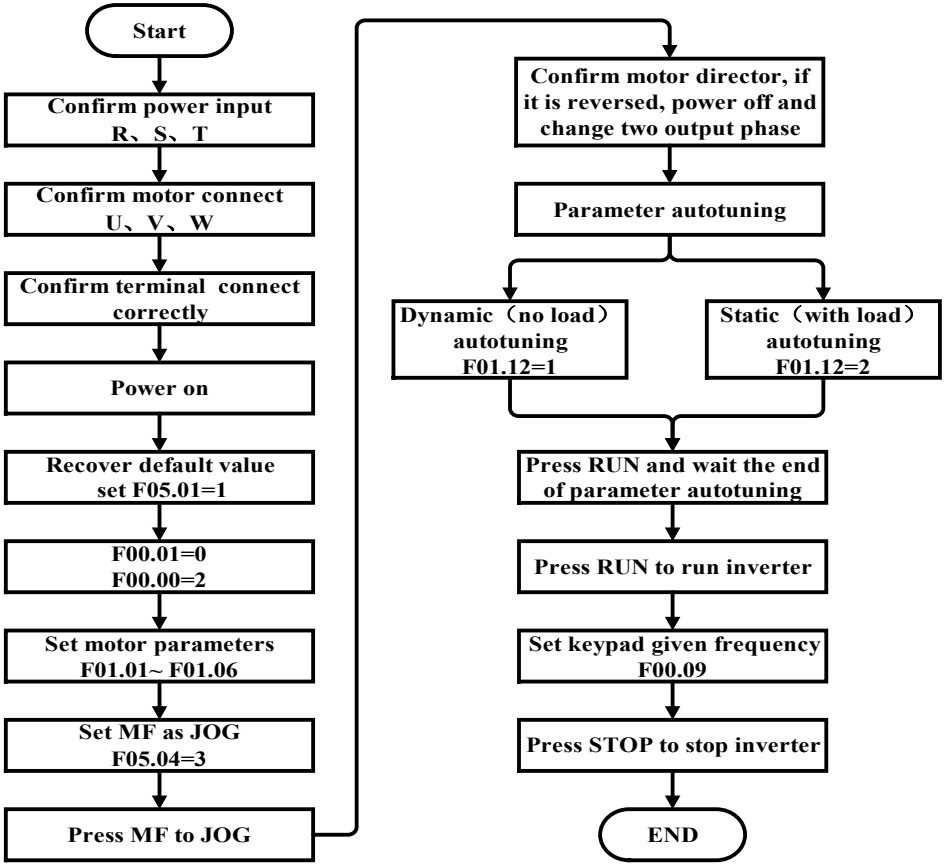
5.9 Basic Operating Instructions

5.9.1 Contents of this section

This section describes the internal function modules of the inverter.

⚠	Make sure that all terminals are securely connected. Make sure that the motor and inverter power match.

5.9.2 General commissioning steps



Note: If a fault occurs, please follow "7 Fault Tracking" to determine the cause and remove the fault.

6. List of Function Parameters

This chapter lists the general table of function codes, and gives a brief description of function codes.

6.1 List of function parameters

F580 series frequency converter function parameters are grouped according to functions. In order to facilitate the setting of function code, when using the keypad to operate, the function group number corresponds to the first-level menu, the function code number corresponds to the second-level menu, the function parameters correspond to the three-level menu.

1. The column content of the function list is described as follows:

   Column 1"Function code" : indicates the number of the function parameter group and parameter.

   Column 2 "Name" : is the full name of the function parameter.

   Column 3 "Parameter description" : is a detailed description of the function parameter.

   Column 4 "Factory value" : is the initial value of the function parameter set in factory.

   Column 5 "Attribute" : is the modified attribute of the function parameter (i.e., whether changes are allowed and conditions for changes), the description is as follows:

   "○" : indicates that the setting value of the parameter can be changed when the inverter is in the stop and running state.

   "☆" : indicates that the setting value of this parameter cannot be changed when the inverter is in operation.

   "●" : indicates that the value of the parameter is the actual detection parameter or running record which cannot be changed.

   (The frequency converter has made automatic check constraints on the modified attribute of each parameter, which can help users to avoid incorrect modification.)

2. "parameter decimal" is decimal (DEC). If the parameter is expressed in hexadecimal, the data of each bit is independent of each other when the parameter is edited, and the value range of some bits can be hexadecimal (0~F).

3. "Default value" indicates that when the default parameter is restored, the function parameter is refreshed and restored to the factory value; However, the actual detection parameter or running record will not be refreshed.

4. For better parameter protection, the frequency converter provides password protection for the function code. After setting the user password (that is, the parameter of user password F05.03 is not 0), when the user presses the ESC key to enter the function code editing state, the system will enter the user password verification state first, and the display is "-----". The operator must enter the user password correctly, otherwise it cannot enter. For the parameter area set by the manufacturer, the operator must enter the correct password before entering. (Remind the user not to try to modify the parameters set by the manufacturer. If the parameters are set improperly, it will easily lead to abnormal work of the inverter or even damage.) In the password protection is not in locked state, you

can change the user password at any time. The user password is based on the last entered value. If F05.03 is set to 0, the user password can be cancelled; If F05.03 is not 0 when powering on, the parameter is protected by the password.

Table 6-1 List of function parameters

Function code	Name	Parameter description	Factory value	Attribute
Group F00 Basic function group				
F00.00	First motor control mode	0: Sensorless vector control 1: Reserved 2: V/F control	2	☆
F00.01	Command source selection	0: Operation panel command channel (LED off) 1: Terminal command channel (LED blinking) 2: Serial port communication command channel (LED on)	0	○
F00.02	Primary frequency source X selection	0: Digital setting (preset frequency F00.09, UP/DOWN modifiable, no memory after power failure) 1: Digital setting (preset frequency F00.09, UP/DOWN modifiable, memory after power failure) 2: AI1 3: AI2 4: Panel potentiometer AI0 5: High speed pulse setting 6: Multi-step command 7: Simple PLC 8: PID 9: Communication given	0	☆
F00.03	Auxiliary frequency source Y selection	Same as F00.02 primary frequency source	0	☆
F00.04	Auxiliary frequency source Y range selection	0: relative to the maximum frequency 1: relative to the frequency source X	0	○

Function code	Name	Parameter description	Factory value	Attribute
F00.05	Frequency source selection	Units place: Frequency source selection 0: primary 1: result of primary and auxiliary operations (the operation relationship is determined by the tens place) 2: primary <--> auxiliary 3: primary <--> result of primary and auxiliary operations 4: auxiliary <--> result of primary and auxiliary operations Tens place: frequency source primary and auxiliary operation relationship 0: primary + auxiliary 1: primary - auxiliary 2: maximum value of both 3: minimum value of both	00	○
F00.06	Maximum frequency	50.00Hz to 500.00Hz	50.00	☆
F00.07	Upper limit frequency	Lower limit frequency F00.08 to maximum frequency F00.06	50.00	○
F00.08	Lower limit frequency	0.00Hz ~ Upper frequency F00.07	0.00	○
F00.09	Preset frequency	0.00Hz ~ Maximum frequency F00.06	50.00	○
F00.10	Running direction	0: consistent direction 1: opposite direction	0	○
F00.11	Carrier frequency	0.5kHz to 16.0kHz	6.0	○
F00.12	Carrier frequency is adjusted with temperature	0: no 1: yes	1	○
F00.13	Motor parameter group selection	0: Motor 1 1: Motor 2	0	☆

Function code	Name	Parameter description	Factory value	Attribute
F00.14	Acceleration time 1	0.00s ~ 650.00s (F00.16=2) 0.0s ~ 6500.0s (F00.16=1) 0s ~ 65000s (F00.16=0)	20.0	○
F00.15	Deceleration time 1	0.00s ~ 650.00s (F00.16=2) 0.0s ~ 6500.0s (F00.16=1) 0s ~ 65000s (F00.16=0)	20.0	○
F00.16	Unit of acceleration and deceleration time	0:1 second 1:0.1 seconds 2:0.01 seconds	1	☆
F00.17	Auxiliary frequency source Y range	0% to 150%	100	○
F00.18	Upper limit frequency source	0: F00.07 set 1: AI1 2: AI2 3: Reserved 4: High speed pulse set 5: Communication set	0	☆
F00.19	Upper limit frequency bias	0.00Hz ~ Maximum frequency F00.06	0.00	○
F00.20	Secondary group frequency source bias frequency when superimposed	0.00Hz ~ Maximum frequency F00.06	0.00	○
F00.21	Frequency command decimal point	1:0.1 Hz 2:0.01Hz	2	☆
F00.22	Number set frequency memory selection	0: No memory 1: Memory	0	○
F00.23	Acceleration and deceleration time reference frequency	0: Maximum frequency (F00.06) 1: Set frequency 2:100 Hz	0	☆
F00.24	Running frequency instruction UP/DOWN reference	0: Running frequency 1: Set frequency	1	☆

Function code	Name	Parameter description	Factory value	Attribute
F00.25	Command source binding frequency source	Units place: Operate panel command, bind frequency source selection 0: No binding 1: Number sets frequency 2: AI1 3: AI2 4: Reserved 5: High speed pulse setting 6: Multi-step command 7: Simple PLC 8: PID 9: Communication given Tens place: terminal command binding frequency source selection Hundreds place: communication command binding frequency source selection	000	○
F00.26	Serial communication protocol selection	0: Modbus-RTU protocol 1: Profibus-DP、Profinet protocol 2: Reserved 3: CAN protocol	0	☆
Group F01 Motor 1 parameter group				
F01.00	G/P models	1: Model G machine	1	☆
F01.01	Motor type selection	0: ordinary asynchronous motor 1: variable frequency asynchronous motor	0	☆
F01.02	Rated motor power	Model dependent		☆
F01.03	Rated motor frequency	0.01Hz ~ Maximum frequency F00.06	50.00	☆
F01.04	Rated motor speed	1rpm to 65,535rpm	1460	☆

Function code	Name	Parameter description	Factory value	Attribute
F01.05	Rated motor voltage	1V to 2000V	380	☆
F01.06	Rated motor current	0.01A~655.35A (inverter power <=55kW) 0.1A~6553.5A (inverter power >55kW)	9.00	☆
F01.07	Stator resistance of asynchronous motor	0.001Ω~65.535Ω (inverter power <=55kW) 0.0001 EUR ~6.5535 EUR (inverter power >55kW)	1.204	☆
F01.08	Asynchronous motor rotor resistance	0.001Ω~65.535Ω (inverter power <=55kW) 0.0001 EUR ~6.5535 EUR (inverter power >55kW)	0.908	☆
F01.09	Asynchronous motor leakage inductive reactance	0.01mH~655.35mH (inverter power <=55kW) 0.001mH~65.535mH (inverter power >55kW)	5.28	☆
F01.10	Asynchronous motor mutual inductance	0.1mH~6553.5mH (inverter power <=55kW) 0.01mH~655.35mH (inverter >55kW)	158.6	☆
F01.11	No-load current of asynchronous motor	0.01A~F01.06 (inverter power <=55kW) 0.1A~F01.06 (inverter power >55kW)	4.24	☆
F01.12	Motor parameter self-identification selection	0: no operation 1: asynchronous machine no-load (dynamic) self-identification 2: asynchronous machine load (static) self-identification 1 3: asynchronous machine with load (static) self-identification 2	0	☆
F01.13	Number of encoder pulse lines	1 to 65535	1024	☆

Function code	Name	Parameter description	Factory value	Attribute
F01.14	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: rotary encoder 3: sine-cosine encoder 4: provincial line mode UVW encoder	0	☆
F01.15	Speed feedback PG selection	0: Local PG 1: Extended PG 2: HDI high speed pulse input	0	☆
F01.16	ABZ encoder AB phase sequence	0: forward 1: reverse	0	☆
F01.17	Encoder mounting position angle	0.0 to 359.9°	0.0	☆
F01.18	UVW signal phase sequence	0: Forward 1: Reverse	0	☆
F01.19	UVW signal zero position angle	0.0 to 359.9°	0.0	☆
F01.20	Rotary pole pairs	1 to 65535	1	☆
F01.21	Reserved	Reserved	0	☆
F01.22	Speed feedback PG break detection time	0.0: No action 0.1s to 10.0s	0.0	☆
F01.23 ~ F01.38	Reserved	Reserved	0	●
Group F02 Start stop control				
F02.00	Start mode	0: Direct start 1: Speed tracking restart 2: Pre-excited start for asynchronous machine 3: SVC quick start	0	○
F02.01	Start delay time	0.0s to 1000.0s	0.0	○

Function code	Name	Parameter description	Factory value	Attribute
F02.02	Start frequency	0.00Hz to 10.00Hz	0.00	○
F02.03	Start frequency hold time	0.0s to 100.0s	0.0	☆
F02.04	Start DC braking/pre-excitation current	0% to 100%	0	☆
F02.05	Start DC braking/pre-excitation time	0.0s to 100.0s	0.0	☆
F02.06	Acceleration and deceleration mode	0: linear acceleration and deceleration 1: S curve acceleration and deceleration A 2: S curve acceleration and deceleration B	0	☆
F02.07	Whether the DI terminal is effectively selected during power-on	0: invalid 1: valid	0	☆
F02.08	Power outage restart selection	0: invalid 1: valid	0	☆
F02.09	Power outage restart wait time	0.0s to 100.0s	0.0	☆
F02.10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	○
F02.11	Forward/Reverse run dead zone time	0.0s to 3000.0s	0.0	○
F02.12	Stop DC braking start frequency	0.00Hz ~ Maximum frequency F00.06	0.00	○
F02.13	Stop DC braking wait time	0s to 100.0s	0.0	○
F02.14	Stop DC braking current	0.0% to 100%	0	○
F02.15	Stop DC braking time	0.0s ~ 100.0s	0.0	○
F02.16	Brake utilization rate	0% to 100%	100	○

Function code	Name	Parameter description	Factory value	Attribute
F02.17	Hibernation delay time	0.0 to 6500.0s	0.0	○
F02.18	Frequency run action below lower limit frequency	0: Run at lower limit frequency 1: Stop 2: Run at zero speed	0	○
F02.19	Wakeup delay time	0.0s to 6500.0s	0.0	○
F02.20	Rotation speed tracking method	0: Start with stop frequency 1: Start at power frequency 2: Start at the maximum frequency 3: Field orientation speed tracking 4: Field orientation speed tracking (static tuning required, F01.12 set to 1)	0	☆
F02.21	Rotation speed tracking fast or slow	1 to 100	20	○
F02.22	Rotation speed tracking KP	0 to 1000	500	○
F02.23	Rotation speed tracking KI	0 to 1000	800	○
F02.24	Rotation speed tracking current	30% to 200%	100	☆
F02.25	Rotation speed tracking lower limit	10 to 100%	30	☆
F02.26	Rotation speed tracking voltage rise time	0.5 to 3.0	1.1	☆
F02.27	Demagnetization time	0.00 ~ 15.00s	0.50	☆
F02.28	Time proportion of S-curve at start	0.0% ~ (100.0%-F06.29)	30.0	☆
F02.29	Time proportion of S-curve at end	0.0% ~ (100.0%-F06.28)	30.0	☆
Group F03 V/F control parameters				

Function code	Name	Parameter description	Factory value	Attribute
F03.00	V/F curve setting	0: linear V/F curve 1: multipoint V/F curve 2: Square V/F curve 3:1.2 V/F curve 4:1.4 V/F curve 6. 1.6 V/F curve 8:1.8 V/F curve 10: Complete V/F separation mode 11: Half V/F separation mode	0	☆
F03.01	Torque boost	0.0%: Automatic torque boost 0.1% ~ 30.0% V/F separation is not effective	Model dependent	○
F03.02	Torque boost cutoff frequency	0.00Hz ~ Maximum frequency F00.06	50.00	☆
F03.03	Multipoint V/F frequency point 1	0.00Hz to F03.05	0.00	☆
F03.04	Multipoint V/F voltage point 1	0.0% to 100.0%	0.0	☆
F03.05	Multipoint V/F frequency point 2	F03.03 ~ F03.07	0.00	☆
F03.06	Multipoint V/F voltage point 2	0.0% to 100.0%	0.0	☆
F03.07	Multipoint V/F frequency point 3	F03.05 ~ Motor rated frequency (F01.03)	0.00	☆
F03.08	Multipoint V/F voltage point 3	0.0% to 100.0%	0.0	☆
F03.09	Slip compensation factor	0.0% to 200.0%	0.0	○
F03.10	V/F overexcitation gain	0 to 200	64	○
F03.11	Oscillation suppression gain	0 to 100	40	○
F03.12	Oscillation suppression gain mode	0 to 4	3	☆

Function code	Name	Parameter description	Factory value	Attribute
F03.13	V/F separation voltage source	0: Digital setting (F03.14) 1: AI1 2: AI2 3: Reserved 4: HDI high speed pulse setting 5: Multi-step command 6: Simple PLC 7: PID 8: Communication given 100.0% corresponds to the rated voltage of the motor	0	○
F03.14	V/F separation voltage source digital setting	0V ~ Motor rated voltage F01.05	0	○
F03.15	V/F separation voltage acceleration time	0.0s to 1000.0s Indicates the time from 0V change to the rated voltage of the motor	0.0	○
F03.16	V/F separation voltage deceleration time	0.0s to 1000.0s Note: Indicates the time of 0V change to the rated voltage of the motor	0.0	○
F03.17	V/F separation stop mode selection	0: Frequency/voltage independence is reduced to 0 1: The frequency is reduced after the voltage is reduced to 0	0	☆
F03.18	Overcurrent stall action current	50 ~ 200%	150	☆
F03.19	Overcurrent stall suppression enabled	0: invalid 1: valid	1	☆
F03.20	Overcurrent stall suppression gain	0 to 100	20	○
F03.21	Double speed overcurrent stall action current compensation coefficient	50 to 200%	50	☆

Function code	Name	Parameter description	Factory value	Attribute
F03.22	Overvoltage stall action voltage	200.0V ~ 2000.0V Model dependent 220V: 380V 380V: 760V	760.0	☆
F03.23	Overvoltage stall enabled	0: invalid 1: valid	1	☆
F03.24	Overvoltage stall suppression frequency gain	0 to 100	30	○
F03.25	Overvoltage stall suppression voltage gain	0 to 100	30	○
F03.26	Overvoltage stall maximum rise frequency limit	0 to 50Hz	5	☆
F03.27	Slip compensation time constant	0.1 to 10.0s	0.5	○
F03.28	Automatic frequency boost enabled	0: invalid 1: valid	0	☆
F03.29	Minimum motor torque current	10% to 100%	50	☆
F03.30	Maximum motor torque current	10% to 100%	20	☆
F03.31	Automatic frequency boost KP	0 ~ 100	50	☆
F03.32	Automatic frequency boost KI	0 to 100	50	☆
F03.33	Online torque compensation gain	80% to 150%	100	☆
Group F04 First motor vector control parameters				
F04.00	Speed loop proportional gain 1	1 ~ 100	30	○
F04.01	Speed loop Integral time 1	0.01s to 10.00s	0.50	○
F04.02	Switching frequency 1	0.00 ~ F04.05	5.00	○
F04.03	Speed loop proportional gain 2	1 to 100	20	○

Function code	Name	Parameter description	Factory value	Attribute
F04.04	Speed loop integral Time 2	0.01s to 10.00s	1.00	○
F04.05	Switching frequency 2	F04.02 ~ Maximum frequency F00.06	10.00	○
F04.06	Vector control slip gain	50% to 200%	100	○
F04.07	SVC Speed feedback filter time	0.000s to 0.100 s	0.015	○
F04.08	Vector control overexcitation gain	0 to 200	64	○
F04.09	Speed control (drive) torque upper limit digital setting	0.0% to 200.0%	150.0	○
F04.10	Speed control (drive) torque upper limit source	0: Function code F04.09 set 1: AI1 2: AI2 3: Reserved 4: High speed pulse setting 5: Communication set 6: MIN (AI1, AI2) 7: MAX (AI1,AI2) The full scale of options 1 to 7 corresponds to F04.09	0	○
F04.11	Speed control (braking) torque upper limit source	0: Function code F04.12 set 1: AI1 2: AI2 3: Reserved 4: High speed pulse set 5: communication set 6: MIN (AI1, AI2) 7: MAX (AI1,AI2) 8: Function code F04.10 Settings (does not distinguish between drive and brake)	0	○

Function code	Name	Parameter description	Factory value	Attribute
		Full scale for options 1 to 7 corresponds to F04.12		
F04.12	Speed control (braking) torque upper limit digital setting	0.0% to 200.0%	150.0	○
F04.13	Excitation adjustment proportional gain	0 to 60,000	2000	○
F04.14	Excitation adjustment integral gain	0 to 60,000	1300	○
F04.15	Torque adjustment proportional gain	0 to 60,000	2000	○
F04.16	Torque adjustment integral gain	0 to 60,000	1300	○
F04.17	Speed loop integral properties	Units place: integral separation 0: Speed loop integral is always valid 1: Speed loop integral separation	0	○
F04.18	flux weakening mode of synchronous motor	0: Not weak magnetic 1: Direct calculation 2: Automatic adjustment	0	○
F04.19	Overmodulation enabled selection	0: Disable 1: Enable	0	○
F04.20	Maximum output voltage coefficient	100% to 110%	105	☆
F04.21	Weak field maximum torque coefficient	50% ~ 200%	100	○
F04.22	Power generation (braking) torque enabled selection in speed mode	0: Disable 1: Enable	0	○
F04.23	Power generation upper limit	0.0% ~ 200%	Model dependent	○
Group F05 Keypad and display				

Function code	Name	Parameter description	Factory value	Attribute
F05.00	Language selection	0：Chinese 1：English	0	○
F05.01	Parameter initialization	0: No operation 01: Restore factory parameters, excluding motor parameters 02: Clear the recorded information 04: Back up user parameters 501: Restore user parameters	0	☆
F05.02	Parameter copy selection	0: No operation 1: Upload parameters to the keypad 2: Download keypad parameters to the local 1 3: Download keypad parameters to the local 2 4: Download keypad parameters to the local 3	0	☆
F05.03	User password	0 ~ 65535	0	○
F05.04	MF key function selection	0: Invalid 1: Switch between operation panel command channel and remote command channel 2: Forward and reverse switchover 3: Forward jog 4: Reverse jog	0	☆
F05.05	STOP/RESET key function	0: Only in the keypad control mode STOP/RES key stop function is effective 1: No matter in which control mode STOP/RES key stop function is effective	1	○
F05.06	Load speed display coefficient	0.0001 to 6.5000	1.0000	○

Function code	Name	Parameter description	Factory value	Attribute
F05.07	Linear speed display coefficient	0.0001 to 6.5000	1.0000	○
F05.08	LED run display parameter 1	0000 ~ FFFF Bit00: Running frequency (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Reserved Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting	0x001F	○
F05.09	LED run display parameter 2	0000 ~ FFFF Bit00: PID feedback Bit01: PLC stage Bit02: High speed pulse input pulse frequency (kHz) Bit03: Running frequency 2 (Hz) Bit04: Remaining running time Bit05: AI1 voltage before correction Bit06: AI2 voltage before correction Bit07: Reserved Bit08: Linear speed Bit09: Current power-on time Bit10: Current running time	0x0000	○

Function code	Name	Parameter description	Factory value	Attribute
		Bit11: High speed pulse input pulse frequency, unit 1Hz Bit12: Communication setting value Bit13: Encoder feedback speed Bit14: Main frequency X display Bit15: Auxiliary frequency Y display		
F05.10	LED stop display parameter	0000 ~ FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Reserved Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: High speed pulse input pulse frequency (kHz)	0x0033	○
F05.11	Software version number 1	V0.0x	0.00	●
F05.12	Software version number 2	V0.0x	0.00	●
F05.13	Product number	F580	0	●
F05.14	Inverter module heat sink temperature	0.0℃ ~ 100.0℃	0	●
F05.15	Cumulative running time	0h to 65535h	0	●
F05.16	Number of decimal places for load speed display	Units place: The number of decimal places in B00.14 0:0 decimal place	21	○

Function code	Name	Parameter description	Factory value	Attribute
		1:1 decimal place 2:2 decimal places 3:3 decimal places Tens place: The number of decimal places in B00.19/B00.29 1:1 decimal place 2:2 decimal places		
F05.17	Total power-on time	0h to 65535h	0	●
F05.18	Cumulative power consumption	0 to 65535°	0	●
F05.19	Performance test version number		0.00	●
F05.20	Functional test version number		0.00	●
Group F06 Input terminals				
F06.00	DI1 terminal function selection	0: No function 1: Forward running (FWD) 2: Reverse running (REV) 3: Three-wire operation control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: Running pause 11: External fault normally open input 12: Multi-step command terminal 1 13: Multi-step command terminal 2 14: Multi-step command terminal 3 15: Multi-step command terminal 4	1	☆
F06.01	DI2 terminal function selection		4	☆
F06.02	DI3 terminal function selection		9	☆
F06.03	DI4 terminal function selection		12	☆
F06.04	DI5 terminal function selection		13	☆
F06.05	DI6 terminal function selection		0	☆
F06.06	DI7 terminal function selection		0	☆
F06.07	HDI terminal function selection		0	☆
F06.08	Reserved			

Function code	Name	Parameter description	Factory value	Attribute
		16: Acceleration and deceleration select terminal 1 17: Acceleration and deceleration select terminal 2 18: Frequency source switch 19: UP/DOWN setting clear (terminal, keypad) 20: Run command switch terminal 21: Acceleration and deceleration disabled 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 prohibited 30: High speed pulse frequency input 31: Reserved 32: Immediate DC braking 33: External fault normally closed input 34: Frequency setting effective terminal (if the terminal function is set, when the frequency is modified, the effective time of modification is controlled through this terminal) 35: PID action direction is reversed 36: External stop terminal 1 (keypad control, the terminal can be used to stop, equivalent to the STOP key on the keypad) 37: Control command switch terminal		

Function code	Name	Parameter description	Factory value	Attribute
		2: switch between terminal control and communication control 38: PID integral pause terminal 39: Frequency source X switches with preset frequency 40: Frequency source Y switches with preset frequency 41: Motor select terminal 1 42: Reserved 43: PID parameter switchover terminal 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/torque control switch 47: Emergency stop 48: External stop terminal 2 (under any control mode, the terminal can be stopped, according to the deceleration time 4 to stop) 49: Deceleration DC braking 50: The running time is cleared to zero 51: Two-wire/Three-wire switch 52: Reverse is prohibited 53: Motor overheat pre-warning 54: Motor overheat fault 55 ~ 59: Reserved		
F06.09	Reserved		0	☆
F06.10	DI filter time	0.000s to 1.000s	0.010	○
F06.11	Terminal command mode	0: Two-wire type 1 1: Two-wire style 2 2: Three-wire type 1	0	☆

Function code	Name	Parameter description	Factory value	Attribute
		3: Three-wire type 2		
F06.12	Rate of change of terminal UP/DOWN per s	0.001Hz/s to 65.535Hz/s	1.000	○
F06.13	Curve 1 minimum input	0.00V ~ F06.15	0.00	○
F06.14	Curve 1 minimum input corresponds to setting	-100.0% to 100.0%	0.0	○
F06.15	Curve 1 maximum input	F06.13 ~ 10.00V	10.00	○
F06.16	Curve 1 maximum input corresponds to setting	-100.0% ~ 100.0%	100.0	○
F06.17	AI1 filter time	0.00s to 10.00s	0.10	○
F06.18	Curve 2 minimum input	0.00V ~ F06.20	0.00	○
F06.19	Curve 2 minimum input corresponds to setting	-100.0% ~ 100.0%	0.0	○
F06.20	Curve 2 maximum input	F06.18 ~ 10.00V	10.00	○
F06.21	Curve 2 maximum input corresponds to setting	-100.0% ~ 100.0%	100.0	○
F06.22	AI2 filter time	0.00s to 10.00s	0.10	○
F06.23	Curve 3 minimum input	-10,00V ~ F06.25	10.00	○
F06.24	Curve 3 minimum input corresponds to setting	-100.0% ~ 100.0%	100.0	○
F06.25	Curve 3 maximum input	F06.23 ~ 10.00V	10.00	○
F06.26	Curve 3 maximum input corresponds to setting	-100.0% ~ 100.0%	100.0	○
F06.27	Reserved	0.00s ~ 10.00s	0.10	○
F06.28	High speed pulse minimum input	0.00kHz ~ F06.30	0.00	○
F06.29	High speed pulse minimum input setting	-100.0% to 100.0%	0.0	○

Function code	Name	Parameter description	Factory value	Attribute
F06.30	High speed pulse Max input	F06.28 ~ 100.00kHz	50.00	○
F06.31	High speed pulse maximum input setting	-100.0% ~ 100.0%	100.0	○
F06.32	High speed pulse filter time	0.00s to 10.00s	0.10	○
F06.33	AI set curve selection	Units place: AI1 curve selection 1: Curve 1 (2 points, see F06.13 ~ F06.16) 2: Curve 2 (2 points, see F06.18 ~ F06.21) 3: Curve 3 (2 points, see F06.23 ~ F06.26) 4: Curve 4 (4 points, see A06.00 ~ A06.07) 5: Curve 5 (4 points, see A06.08 ~ A06.15) Tens place: AI2 curve selection, same as above Hundreds place: Reserved	321	○
F06.34	AI below minimum input setting selection	Units place: AI1 is below minimum input setting selection 0: The minimum input corresponds to the setting 1:0.0% Tens place: AI2 is below minimum input setting selection, same as above Hundreds place: Reserved	000	○
F06.35	DI1 Delay time	0.0s ~ 3600.0s	0	○
F06.36	DI2 Delay time	0.0s ~ 3600.0s	0	○
F06.37	DI3 Delay time	0.0s ~ 3600.0s	0	○

Function code	Name	Parameter description	Factory value	Attribute
F06.38	DI1-DI5 input terminal effective mode selection	0: High level 1: Low level Units place: DI1 Tens place: DI2 Hundreds place: DI3 Thousands place: DI4 Ten thousands place: DI5	00000	☆
F06.39	DI6-DI8 (HDI) input terminal effective mode selection	0: High level 1: Low level Units place: DI6 Tens place: DI7 Hundreds place: DI8 (HDI) Thousands place: reserved Ten thousands place: reserved	00000	☆
Group F07 Output terminals				
F07.00	HDO terminal output selection	0: pulse output 1: digital output	0	○
F07.01	HDO digital output selection	0: No output 1: The frequency converter is running 2: Fault output (fault stop) 3: Frequency level detection FDT1 output 4: Frequency reached 5: Zero speed running (no output when stopping) 6: Motor overload pre-warning 7: Inverter overload pre-warning 8: Set count value reached 9: Specified count value reached 10: Length reached 11: The PLC cycle is complete 12: Running time reached	0	○
F07.02	Relay 1 output function selection		2	○
F07.03	Relay 2 output function selection		0	○
F07.04	DO output function selection		1	○

Function code	Name	Parameter description	Factory value	Attribute
		13: Frequency limited 14: Torque qualified 15: Ready for operation 16: AI1>AI2 17: Upper limit frequency reached 18: Lower limit frequency reached (run related) 19: Undervoltage state output 20: Communication setting 21: Positioning complete (reserved) 22: Positioning close (reserved) 23: Zero speed running 2 (also output when shut down) 24: Power-on time reached 25: Frequency level detection FDT2 output 26: Frequency reaches 1 output 27: Frequency reaches 2 output 28: Current reaches 1 output 29: Current reaches 2 output 30: Timing reaches output 31: AI1 input out of limit 32: Load lost 33: Reverse running 34: Zero current state 35: Module temperature reached 36: Output current limit exceeded 37: Lower limit frequency reached (run independent) 38: Fault output (all faults) 39: Motor overtemperature pre-warning 40: Running time reached		

Function code	Name	Parameter description	Factory value	Attribute
		41: Fault output (coast to stop fault and no output undervoltage)		
F07.05	Reserved	Reserved	4	○
F07.06	HDO pulse output selection	0: Running frequency 1: Set frequency 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: High speed pulse input (100.0% 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% for 1000.0V) 16: Motor output torque (actual value, relative to the percentage of the rated motor current) 17: Inverter output torque (actual value, relative to the percentage of the rated current of the inverter)	0	○
F07.07	AO1 output selection		0	○
F07.08	AO2 output selection		1	○
F07.09	HDO pulse output maximum frequency	0.01kHz to 100.00kHz	50.00	○
F07.10	AO1 zero offset coefficient	-100.0% to 100.0%	0.0	○
F07.11	AO1 gain	-10.00 ~ 10.00	1.00	○

Function code	Name	Parameter description	Factory value	Attribute
F07.12	AO2 zero offset coefficient	-100.0% to 100.0%	0.0	○
F07.13	AO2 gain	-10.00 ~ 10.00	1.00	○
F07.14	HDO digital output delay time	0.0s ~ 3600.0s	0.0	○
F07.15	Relay 1 output delay time	0.0s ~ 3600.0s	0.0	○
F07.16	Relay 2 output delay time	0.0s ~ 3600.0s	0.0	○
F07.17	DO output delay time	0.0s to 3600.0s	0.0	○
F07.18	Reserved			
F07.19	DO output terminal valid status selection	0-positive logic 1-negative logic Units place: HDO Tens place: Relay 1 Hundreds place: Relay 2 Thousands place: DO Ten thousands place: Reserved	00000	○
Group F08 Faults and protection				
F08.00	Motor overload protection selection	0: Disable 1: Allow	1	○
F08.01	Motor overload protection gain	0.20 ~ 10.00	1.00	○
F08.02	Motor overload pre-warning coefficient	50% ~ 100%	80	○
F08.03	Overload pre-warning detection time	0.20s to 10.00s	1.00	○
F08.04	Overload pre-warning action selection	0: No detection 1: Overload pre-warning is effective in operation, and continue to run after detection 2: Overload pre-warning is effective in operation, and alarm after	1	○

Function code	Name	Parameter description	Factory value	Attribute
		detection (OL3) and stop 3: Overload pre-warning is effective in constant speed operation, and continue to run after detection 4: Overload pre-warning is effective in constant speed operation, and alarm after detection (OL3) and stop		
F08.05	Overvoltage stall gain	0 to 100	30	○
F08.06	Overvoltage stall protection voltage	200.0 ~ 2000.0v Model dependent 220V: 380V 380V: 760V	760.0	☆
F08.07	Overcurrent stall gain	0 ~ 100	20	○
F08.08	Overcurrent stall protection current	100% to 200%	150	☆
F08.09	Instantaneous non-stop gain Kp	0 to 100	40	○
F08.10	Instantaneous non-stop integral coefficient Ki	0 to 100	30	○
F08.11	Instantaneous non-stop action deceleration time	0.0 ~ 300.0s	20.0	☆
F08.12	Input phase loss	0: Disable 1: Allow	1	○
F08.13	Output phase loss protection selection	Units place: Output phase loss protection selection during running 0: Disable 1: Allow Tens place: Output phase loss protection selection before running 0: Disable 1: Allow	01	○
F08.14	Automatic fault reset times	0 to 20	0	○
F08.15	Automatic fault reset interval	0.1s to 100.0s	1.0	○
F08.16	First fault type	0: No fault 1: Inverter unit U phase protection	0	●

Function code	Name	Parameter description	Factory value	Attribute
F08.17	Second fault type	(E.oUt1) 2: Inverter unit V phase protection (E.oUt2) 3: Inverter unit W phase protection (E.oUt3) 4: Acceleration overcurrent (E.oC1) 5: Decelerating overcurrent (E.oC2) 6: Constant speed overcurrent (E.oC3) 7: Accelerating overvoltage (E.oU1) 8: Decelerating overvoltage (E.oU2) 9: Constant speed overvoltage (E.oU3) 10: Bus undervoltage fault (E.Lv) 11: Motor overload (E.oL1) 12: Inverter overload (E.oL2) 13: Input side phase loss (E.ILF) 14: Output side phase loss (E.oLF) 15: Rectifier module overheat (E.oH1) 16: Inverter module overheat fault (E.oH2) 17: External fault (E.EF) 18:485 Communication fault (E.485) 19: Current detection fault (E.ItE) 20: Motor parameter identification fault (E.AUt) 21: EEFROM operation fault (E.EEP) 22: PID feedback disconnected fault (E.PIdE) 23: Brake unit fault (E.bC) 24: Running time reached (E.ENd) 25: Electronic overload (E.oL3) 26: Panel communication error (E.FCE) 27: Parameter upload error (E.UFE) 28: Parameter download error (E.dNE) 29-31: Reserved 32: To-ground short-circuit fault 1 (E.EAH1) 33: To-ground short-circuit fault 2 (E.EAH2) 34: Speed deviation fault (E.dEU) 35: Mal-adjustment fault (E.Sto) 36: Underload fault (E.LL) 37-39: Reserved 40: Fast current limit fault (E.CBC) 41: Running time switching motor (E.CrP) 42: User-defined fault 1 (E.uD1) 43: User-defined fault 2 (E.uD2)	0	•
F08.18	Third fault (most recent) type		0	•

Function code	Name	Parameter description	Factory value	Attribute
		44: Power-on time reached (E.PTo) 45: Motor overheat (E.oH3) 46: Motor overspeed (E.oSP) 47-48: Reserved 49: Motor overheat pre-warning(E.oH4)		
F08.19	Frequency at third fault		0.00	●
F08.20	Current at third fault		0.00	●
F08.21	Bus voltage at third fault		0.0	●
F08.22	Input terminal status at third fault		0	●
F08.23	Output terminal status at third fault		0	●
F08.24	Inverter status at third fault		0	●
F08.25	Third fault time (timing from this power-on)		0	●
F08.26	Third fault time (timing from running time)		0.0	●
F08.27	Frequency at second fault		0.00	●
F08.28	Current at second fault		0.00	●
F08.29	Bus voltage at second fault		0.0	●
F08.30	Input terminal status at second fault		0	●
F08.31	Output terminal status at second fault		0	●
F08.32	Inverter status at second fault		0	●
F08.33	Second fault time (timing from this power-on)		0	●
F08.34	Second fault time (timing from running time)		0.0	●
F08.35	Frequency at first fault		0.00	●
F08.36	Current at first fault		0.00	●
F08.37	Bus voltage at first fault		0.0	●
F08.38	Input terminal status at first fault		0	●

Function code	Name	Parameter description	Factory value	Attribute
F08.39	Output terminal status at first fault		0	●
F08.40	Inverter status at first fault		0	●
F08.41	Time at first fault (timing from this power-on)		0	●
F08.42	Time at first fault (timing from running time)		0.0	●
F08.43	Power-on to-ground short-circuit protection selection	Units place: To-ground short-circuit protection selection during power-on 0: invalid 1: valid Tens place: To-ground short-circuit protection selection before running 0: invalid 1: valid	01	○
F08.44	Braking start voltage	200.0 ~ 2000.0v Model dependent 220V: 360V 380V: 690V	690.0	○
F08.45	Fault DO action selection during automatic fault reset	0: No action 1: Action	0	○
F08.46	Fault protection action selection 1	Units place: Motor overload (E.oL1) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running Tens place: Input phase loss(E.ILF) Hundreds place: Output phase loss (E.oLF) Thousands place: External fault (E.EF) Ten thousands place: Abnormal communication (E.485)	00000	○

Function code	Name	Parameter description	Factory value	Attribute
F08.47	Fault protection action selection 2	Units place: Encoder fault (E.PGL) 0: Coast to stop Tens place: EEFROM operation fault (E.EEP) 0: Coast to stop 1: Stop according to the stop mode Hundreds place: reserved Thousands place: Motor overheat (E.oH3) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running Ten thousands place: running time reached (E.ENd)	00000	○
F08.48	Fault protection action selection 3	Units place: User-defined fault 1 (E.uD1) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running Tens place: User-defined fault 2 (E.uD2) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running Hundreds place: Power-on time reached (E.PTo) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running Thousands place: Underload fault (E.LL) 0: Coast to stop 1: Decelerate to stop	00000	○

Function code	Name	Parameter description	Factory value	Attribute
		2: Decelerate to 7% of the rated frequency of the motor and continue to run, and automatically restore to the set frequency when the load is not dropped Ten thousands place: PID feedback disconnected fault (E.PIdE) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running		
F08.49	Fault protection action selection 4	Units place: Excessive speed deviation (E.dEU) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running Tens place: Motor overspeed (E.oSP) Hundreds place: Reserved Thousands: Reserved Thousands: Panel communication error (E.FCE) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running	20000	○
F08.50	Reserved			
F08.51	Continue running frequency selection in fault	0: Run at the current running frequency 1: Run at the set frequency 2: Run at the upper limit frequency 3: Run at the lower limit frequency 4: Run at the standby frequency upon exceptions	0	○

Function code	Name	Parameter description	Factory value	Attribute
F08.52	Abnormal standby frequency setting	0.0% to 100.0% (current target frequency)	100	○
F08.53	Motor temperature sensor type	0: No temperature sensor 1: PT100 2: PT1000	0	○
F08.54	Motor overheat protection threshold	0℃ ~ 200℃	110	○
F08.55	Motor overheat pre-warning threshold	0℃ ~ 200℃	90	○
F08.56	Instantaneous stop non-stop action selection	0: Invalid 1: Decelerate 2: Decelerate to stop	0	☆
F08.57	Instantaneous stop action pause judgment voltage	80.0% ~ 100.0%	85.0	☆
F08.58	Instantaneous stop non-stop voltage rise judgment time	0.0s to 100.0s	0.5	☆
F08.59	Instantaneous stop non-stop action judgment voltage	60.0% ~ 100.0% (standard bus voltage)	80.0	○
F08.60	Load lost protection option	0: Invalid 1: Valid	0	○
F08.61	Load lost detection level	0.0 to 100.0%	10.0	○
F08.62	Load lost detection time	0.0 ~ 60.0s	1.0	○
F08.63	Reserved	0 to 65536	0	●
F08.64	Overspeed detection value	0.0% to 50.0% (maximum frequency)	20.0	○
F08.65	Overspeed detection time	0.0s: No detection 0.1 to 60.0s	1.0	○
F08.66	Excessive speed deviation detection value	0.0% ~ 50.0% (maximum frequency)	20.0	○
F08.67	Excessive speed deviation detection time	0.0s: No detection 0.1 to 60.0s	5.0	○

Function code	Name	Parameter description	Factory value	Attribute
Group F09 PID function				
F09.00	PID reference source	0: Function code F09.01 set 1: AI1 2: AI2 3: Reserved 4: High speed pulse setting 5: Communication set 6: Multi-step command given 7: Pressure setting	0	○
F09.01	PID reference value	0.0% to 100.0%	50.0	○
F09.02	PID feedback source	0: AI1 1: AI2 2: Reserved 3: AI1-AI2 4: High speed pulse setting 5: Communication set 6: AI1+AI2 7: Max. (|AI1|,|AI2|) 8: Min. (|AI1|,|AI2|)	0	○
F09.03	Direction of PID action	0: positive action 1: negative action	0	○
F09.04	PID reference feedback range	0 to 65535	1000	○
F09.05	PID inversion cutoff frequency	0.00Hz ~ Maximum frequency F00.06	0.00	○
F09.06	Proportional Gain P1	0.0 to 100.0	20.0	○
F09.07	Integral time I1	0.01s to 10.00s	2.00	○
F09.08	Differential time D1	0.000s to 10.000s	0.000	○
F09.09	Reserved	0 ~ 65535	0	●
F09.10	PID deviation limit	0.0% to 100.0%	0.0	○
F09.11	PID feedback loss detection value	0.0% : Feedback loss is not judged 0.1% to 100.0%	0.0	○

Function code	Name	Parameter description	Factory value	Attribute
F09.12	PID feedback lost detection time	0.0s to 20.0s	0.0	○
F09.13	PID differential limit	0.00% ~ 100.00%	0.10	○
F09.14	PID reference change time	0.00 ~ 650.00s	0.00	○
F09.15	PID feedback filter time	0.00 ~ 60.00s	0.00	○
F09.16	PID output filter time	0.00 ~ 60.00s	0.00	○
F09.17	Proportional gain P2	0.0 to 100.0	20.0	○
F09.18	Integral time I2	0.01s to 10.00s	2.00	○
F09.19	Differential time D2	0.000s to 10.000s	0.000	○
F09.20	PID parameter switchover condition	0: No switchover 1: DI terminal 2: Automatic switchover based on deviation 3: Automatic switchover based on running frequency	0	○
F09.21	PID parameter switchover deviation 1	0.0% ~ F10.22	20.0	○
F09.22	PID parameter switchover deviation 2	F10.21 ~ 100.0%	80.0	○
F09.23	PID initial value	0.0% to 100.0%	0.0	○
F09.24	PID initial hold time	0.00 to 650.00	0.00	○
F09.25	Positive maximum of two output deviations	0.00 ~ 100.00%	1.00	○
F09.26	Reverse maximum of two output deviations	0.00% ~ 100.00%	1.00	○
F09.27	PID integral attribute	Units place: integral separation 0- invalid; 1- valid Tens place: Output to limit value, whether to stop integrating 0- continue integrating; 1- stop	00	○

Function code	Name	Parameter description	Factory value	Attribute
		integrating		
F09.28	PID stop operation	0: No operation during stop 1: Operation during stop	0	○
Group F10 Wobble frequency, fixed length and count				
F10.00	Setting mode of wobble frequency	0: relative to the center frequency 1: relative to the maximum frequency	0	○
F10.01	Wobble amplitude	0.0% to 100.0%	0.0	○
F10.02	Jump frequency amplitude	0.0% to 50.0%	0.0	○
F10.03	Wobble cycle	0.1s to 3000.0s	10.0	○
F10.04	Triangular wave rise time of wobble frequency	0.1% to 100.0%	50.0	○
F10.05	Set length	0m to 65,535m	1000	○
F10.06	Actual length	0m to 65,535m	0	○
F10.07	Pulses per meter, unit: 0.1	0.1 to 6553.5	100.0	○
F10.08	Set count value	1 to 65535	1000	○
F10.09	Specified count value	1 to 65535	1000	○
Group F11 Multi-step command、simple PLC				
F11.00	Multi-step command 0	-100.0% to 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.01	Multi-step command 1	-100.0% to 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.02	Multi-step command 2	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.03	Multi-step command 3	-100.0% ~ 100.0% (100.0% corresponds to maximum	0	○

Function code	Name	Parameter description	Factory value	Attribute
		frequency F00.06)		
F11.04	Multi-step command 4	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.05	Multi-step command 5	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.06	Multi-step command 6	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.07	Multi-step command 7	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.08	Multi-step command 8	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.09	Multi-step command 9	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.10	Multi-step command 10	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.11	Multi-step command 11	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.12	Multi-step command 12	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.13	Multi-step command 13	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○

Function code	Name	Parameter description	Factory value	Attribute
F11.14	Multi-step command 14	-100.0% to 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.15	Multi-step command 15	-100.0% ~ 100.0% (100.0% corresponds to maximum frequency F00.06)	0	○
F11.16	Simple PLC operation mode	0: Stop at the end of a single run 1: End of a single run 2: Keep cycling	0	○
F11.17	Simple PLC power failure memory selection	Units place: 0: No memory at power failure 1: Memory at power failure Tens place: 0: Stop without memory 1: Stop memory	0	○
F11.18	Running time of step 0	0.0s (h) ~ 6553.5s (h)	0	○
F11.19	PLC ACC and DEC time selection of step 0	0 to 3	0	○
F11.20	Running time of step 1	0.0s (h) ~ 6553.5s (h)	0	○
F11.21	PLC ACC and DEC time selection of step 1	0 to 3	0	○
F11.22	Running time of step 2	0.0s (h) ~ 6553.5s (h)	0	○
F11.23	PLC ACC and DEC time selection of step 2	0 to 3	0	○
F11.24	Running time of step 3	0.0s (h) ~ 6553.5s (h)	0	○
F11.25	PLC ACC and DEC time selection of step 3	0 to 3	0	○
F11.26	Running time of step 4	0.0s (h) ~ 6553.5s (h)	0	○
F11.27	PLC ACC and DEC time	0 to 3	0	○

Function code	Name	Parameter description	Factory value	Attribute
	selection of step 4			
F11.28	Running time of step 5	0.0s (h) ~ 6553.5s (h)	0	○
F11.29	PLC ACC and DEC time selection of step 5	0 to 3	0	○
F11.30	Running time of step 6	0.0s (h) ~ 6553.5s (h)	0	○
F11.31	PLC ACC and DEC time selection of step 6	0 to 3	0	○
F11.32	Running time of step 7	0.0s (h) ~ 6553.5s (h)	0	○
F11.33	PLC ACC and DEC time selection of step 7	0 to 3	0	○
F11.34	Running time of step 8	0.0s (h) ~ 6553.5s (h)	0	○
F11.35	PLC ACC and DEC time selection of step 8	0 to 3	0	○
F11.36	Running time of step 9	0.0s (h) ~ 6553.5s (h)	0	○
F11.37	PLC ACC and DEC time selection of step 9	0 to 3	0	○
F11.38	Running time of step 10	0.0s (h) ~ 6553.5s (h)	0	○
F11.39	PLC ACC and DEC time selection of step 10	0 to 3	0	○
F11.40	Running time of step 11	0.0s (h) ~ 6553.5s (h)	0	○
F11.41	PLC ACC and DEC time selection of step 11	0 to 3	0	○
F11.42	Running time of step 12	0.0s (h) ~ 6553.5s (h)	0	○
F11.43	PLC ACC and DEC time selection of step 12	0 to 3	0	○
F11.44	Running time of step 13	0.0s (h) ~ 6553.5s (h)	0	○
F11.45	PLC ACC and DEC time selection of step 13	0 to 3	0	○
F11.46	Running time of step 14	0.0s (h) ~ 6553.5s (h)	0	○

Function code	Name	Parameter description	Factory value	Attribute
F11.47	PLC ACC and DEC time selection of step 14	0 to 3	0	○
F11.48	Running time of step 15	0.0s (h) ~ 6553.5s (h)	0	○
F11.49	PLC ACC and DEC time selection of step 15	0 to 3	0	○
F11.50	PLC running time unit	0: s (seconds) 1: h (hours)	0	○
F11.51	Multi-step command 0 given mode	0: Function code F11.00 is given 1: AI1 2: AI2 3: Reserved 4: High speed pulse 5: PID 6: Preset frequency (F00.09) given, UP/DOWN modifiable	0	○
Group F12 Communication parameters				
F12.00	Local address	1 to 247,0 broadcast address	1	○
F12.01	Baud rate	Units place: MODBUS 0:300BPS 1:600BPS 2:1,200BPS 3:2,400BPS 4:48,000BPS 5:9,600BPS 6:19,200BPS 7:38,400BPS 8:57,600BPS 9:115,200BPS Tens place: reserved Hundreds place: reserved Thousands place: reserved	5006	○

Function code	Name	Parameter description	Factory value	Attribute
F12.02	Data format	0: No check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: 8-N-1	1	○
F12.03	Response delay	0ms to 20ms	2	○
F12.04	Communication timeout	0.0 (invalid), 0.1s to 60.0s	0.0	○
F12.05	Data transmission format selection	Units place: MODBUS-RTU protocol 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Tens place: Reserved	31	○
F12.06	Communication read current resolution	0：0.01A 1：0.1A	0	○
F12.07	Reserved			
F12.08	Expansion card communication interruption detection time	0.0s: Invalid, 0.1~60.0s	0.0	○
F12.09	Slave address	0 ~ 512	1	○
Group F13 Auxiliary functions				
F13.00	Jog running frequency	0.00Hz ~ Maximum frequency F00.06	2.00	○
F13.01	Jog acceleration time	0.0s ~ 6500.0s	20.0	○
F13.02	Jog deceleration time	0.0s to 6500.0s	20.0	○
F13.03	Acceleration Time 2	0.0s ~ 6500.0s	20.0	○
F13.04	Deceleration Time 2	0.0s to 6500.0s	20.0	○
F13.05	Acceleration time 3	0.0s ~ 6500.0s	20.0	○

Function code	Name	Parameter description	Factory value	Attribute
F13.06	Deceleration time 3	0.0s to 6500.0s	20.0	○
F13.07	Acceleration time 4	0.0s ~ 6500.0s	0.0	○
F13.08	Deceleration time 4	0.0s to 6500.0s	0.0	○
F13.09	Jump frequency 1	0.00Hz to maximum frequency F00.06	0.00	○
F13.10	Jump Frequency 2	0.00Hz ~ Maximum frequency F00.06	0.00	○
F13.11	Jump frequency amplitude	0.00Hz ~ Maximum frequency F00.06	0.00	○
F13.12	Reverse control	0: Inversion allowed 1: Inversion disabled	0	○
F13.13	Droop control	Torque current equal to the slip at rated motor current 0.00Hz to 10.00Hz	0.00	○
F13.14	Set power-on arrival time	0h ~ 65535h	0	○
F13.15	Set run arrival time	0h ~ 65535h	0	○
F13.16	Start protection selection	0: No protection 1: Protection	0	○
F13.17	Frequency detection value (FDT1)	0.00Hz ~ Maximum frequency F00.06	50.00	○
F13.18	Frequency detection hysteresis value (FDT1)	0.0% to 100.0% (FDT1 level)	5.0	○
F13.19	Frequency arrival detection width	0.0% to 100.0% (maximum frequency)	0.0	○
F13.20	Whether jump frequency is valid during acceleration and deceleration	0: invalid 1: valid	0	○
F13.21	Running time arrival action selection	0: Continue to run 1: fault prompt	0	○

Function code	Name	Parameter description	Factory value	Attribute
F13.22	Power-on time arrival action selection	0: Continue running 1: fault information	0	○
F13.23	Acceleration time 1/2 switch frequency point	0.00Hz ~ Maximum frequency F00.06	0.00	○
F13.24	Deceleration time 1/2 switch frequency point	0.00Hz ~ Maximum frequency F00.06	0.00	○
F13.25	Terminal jogging priority	0: invalid 1: valid	0	○
F13.26	Frequency detection value (FDT2)	0.00Hz ~ Maximum frequency F00.06	50.00	○
F13.27	Frequency detection hysteresis value (FDT2)	0.0% to 100.0% (FDT2 level)	5.0	○
F13.28	Arbitrary arrival frequency detection value 1	0.00Hz ~ Maximum frequency F00.06	50.00	○
F13.29	Arbitrary arrival frequency detection amplitude 1	0.0% to 100.0% (maximum frequency)	0.0	○
F13.30	Arbitrary arrival frequency detection value 2	0.00Hz to maximum frequency F00.06	50.00	○
F13.31	Arbitrary arrival frequency detection amplitude 2	0.0% to 100.0% (maximum frequency)	0.0	○
F13.32	Zero current detection level	0.0% to 300.0% 100.0% corresponds to the rated motor current, and is not output at stop	5.0	○
F13.33	Zero current detection delay time	0.01s to 600.00s	0.10	○
F13.34	Output current limit exceeded	0.0% (not detected) 0.1% ~ 300.0% (rated motor current)	200.0	○
F13.35	Detection delay time of output current limit exceeded	0.00s ~ 600.00s	0.00	○
F13.36	Arbitrary arrival current 1	0.0% ~ 300.0% (rated motor current)	100.0	○

Function code	Name	Parameter description	Factory value	Attribute
F13.37	Arbitrary arrival current 1 width	0.0% to 300.0% (rated motor current)	0.0	○
F13.38	Any arrival current 2	0.0% to 300.0% (rated motor current)	100.0	○
F13.39	Arbitrary arrival current 2 width	0.0% to 300.0% (rated motor current)	0.0	○
F13.40	Timing function selection	0: Invalid 1: Valid	0	☆
F13.41	Timer running time selection	0: F13.42 setting 1: AI1 2: AI2 3: Reserved Analog input ranges correspond to F13.42	0	☆
F13.42	Timing running time	0.0min to 6500.0min	0.0	☆
F13.43	Lower limit of AI1 input voltage protection	0.00V to F13.44	3.10	○
F13.44	Upper limit of AI1 input voltage protection	F13.43 ~ 11.00V	6.80	○
F13.45	Module temperature reached	0℃ ~ 100℃	75	○
F13.46	Cooling fan control	0: Fan operation during operation 1: The cooling fan is always running	0	○
F13.47	Wakeup frequency	Hibernation frequency (F13.48) ~ Maximum frequency (F00.06)	0.00	○
F13.48	Hibernation frequency	0.00Hz ~ Wakeup frequency (F13.47)	0.00	○
F13.49	Current running arrival time	0.0s ~ 6500.0min	0.0	○
F13.50	Output power correction factor	0.0 to 200.0%	100.0	○
Group F14 User-defined function codes				
Group F15 Manufacturer parameters				

Function code	Name	Parameter description	Factory value	Attribute
Group F16 User group				
F16.00	Function parameter group display selection	Units place: B00 group display selection 0: No display 1: Display Tens place: A00-A15 group display selection 0: No display 1: Display	11	○
F16.01	Personality parameter group display selection	Units place: User customized parameter group display selection 0: No display 1: Display Tens place: User change parameter group display selection 0: No display 1: Display	00	○
F16.02	Function code read-only control	0: modifiable 1: cannot be modified	0	○
Group A00 Torque control and qualification parameters				
A00.00	Speed/torque control mode	0: Speed control 1: Torque control	0	☆
A00.01	Drive torque upper limit source	0: Digital setting (A00.03) 1: AI1 2: AI2 3: Reserved 4: High speed pulse setting 5: communication set 6: min (AI1,AI2) 7: MAX (AI1,AI2) The full scale of options 1-7	0	☆

Function code	Name	Parameter description	Factory value	Attribute
		corresponds to A00.03		
A00.02	Brake torque upper limit source	0: Digital setting (A00.03) 1: AI1 2: AI2 3: Reserved 4: High speed pulse setting 5: communication set	0	☆
A00.03	Drive torque upper limit digital setting	-200.0% to 200.0%	150.0	○
A00.04	Torque filtering	0.00 s to 10.00 s	0.00	●
A00.05	Torque control forward maximum frequency	0.00Hz ~ Maximum frequency F00.06	50.00	○
A00.06	Torque control reverse maximum frequency	0.00Hz ~ Maximum frequency F00.06	50.00	○
A00.07	Torque acceleration time	0.00s to 650.00s	0.00	○
A00.08	Torque deceleration time	0.00s to 650.00s	0.00	○
Group A01 Virtual DI/DO parameters				
A01.00	Virtual VDI1 terminal function selection	0 ~ 59	59	☆
A01.01	Virtual VDI2 terminal function selection	0 ~ 59	59	☆
A01.02	Virtual VDI3 terminal function selection	0 ~ 59	59	☆
A01.03	Virtual VDI4 terminal function selection	0 ~ 59	59	☆
A01.04	Virtual VDI5 terminal function selection	0 ~ 59	59	☆
A01.05	VDI terminal valid status source	0: Internal connection to virtual Dox 1: Whether the function code setting	11111	☆

Function code	Name	Parameter description	Factory value	Attribute
		is valid Units place: virtual VDI1 Tens place: virtual VDI2 Hundreds place: virtual VDI3 Thousands place: Virtual VDI4 Ten thousands place: virtual VDI5		
A01.06	Virtual VDI terminal function code set valid status	0: invalid; 1: valid Units place: virtual VDI1 Tens place: virtual VDI2 Hundreds place: virtual VDI3 Thousands place: Virtual VDI4 Ten thousands place: virtual VDI5	11111	○
A01.07	AI1 terminal function selection (as DI)	0 ~ 59	59	☆
A01.08	AI2 terminal function selection (as DI)	0 ~ 59	59	☆
A01.09	Reserved	0 ~ 59	59	☆
A01.10	AI as DI valid state selection	0: high 1: low Units place: AI1 Tens place: AI2 Hundreds place: reserved	111	☆
A01.11	Virtual VDO1 output selection	0~41 (selectable as communication control)	41	○
A01.12	Virtual VDO2 output selection	0~41 (optional as communication control)	41	○
A01.13	Virtual VDO3 output selection	0~41 (optional as communication control)	41	○
A01.14	Virtual VDO4 output selection	0~41 (optional as communication control)	41	○

Function code	Name	Parameter description	Factory value	Attribute
A01.15	Virtual VDO5 output selection	0~41 (optional as communication control)	41	○
A01.16	VDO1 output delay time	0.0s ~ 3600.0s	3600.0	○
A01.17	VDO2 output delay time	0.0s ~ 3600.0s	3600.0	○
A01.18	VDO3 output delay time	0.0s ~ 3600.0s	3600.0	○
A01.19	VDO4 output delay time	0.0s ~ 3600.0s	3600.0	○
A01.20	VDO5 output delay time	0.0s ~ 3600.0s	3600.0	○
A01.21	VDO output terminal valid status selection	0-positive logic; 1-negative logic Units place: VDO1 Tens place: VDO2 Hundreds place: VDO3 Thousands place: VDO4 Ten thousands place: VDO5	11111	☆
Group A02 Motor 2 parameters				
A02.00	Motor type selection	0: Ordinary asynchronous motor 1: Variable frequency asynchronous motor	0	☆
A02.01	Motor rating	0.1kW~1000.0kW Model dependent	4.0	☆
A02.02	Rated frequency of motor	0.01Hz~ Maximum frequency F00.06	50.00	☆
A02.03	Rated motor speed	1rpm~65535rpm	1460	☆
A02.04	Motor rated voltage	1V~2000V	380	☆
A02.05	Motor current rating	0.01A~655.35A (inverter power <=55kW) 0.1A~6553.5A (inverter power >55kW)	9.00	☆

Function code	Name	Parameter description	Factory value	Attribute
A02.06	Stator resistance of asynchronous motor	0.001Ω~65.535Ω (inverter power <=55kW) 0.0001 EUR ~6.5535 EUR (inverter power >55kW)	1.204	☆
A02.07	Asynchronous motor rotor resistance	0.001Ω~65.535Ω (inverter power <=55kW) 0.0001 EUR ~6.5535 EUR (inverter power >55kW)	0.908	☆
A02.08	Induction motor leakage inductive reactance	0.01mH~655.35mH (inverter power <=55kW) 0.001mH~65.535mH (inverter power >55kW)	5.28	☆
A02.09	Asynchronous motor mutual inductance	0.1mH~6553.5mH (inverter power <=55kW) 0.01mH~655.35mH (inverter >55kW)	158.6	☆
A02.10	No-load current of asynchronous motor	0.01A~A02.03 (inverter power <=55kW) 0.1A~A02.03 (inverter power >55kW)	4.24	☆
A02.11	Motor parameter self-identification selection	0: no operation 1: asynchronous machine no-load (dynamic) self-identification 2: asynchronous machine with load (static) self-identification 1 3: asynchronous machine with load (static) self-identification 2	0	☆
A02.12	Number of encoder pulses	1-65535	1024	☆
A02.13	Encoder Type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Rotary encoder 3: sine-cosine encoder 4: Provincial line mode UVW encoder	0	☆

Function code	Name	Parameter description	Factory value	Attribute
A02.14	Speed feedback PG selection	0: Local PG 1: Extended PG 2: HDI high speed pulse input	0	☆
A02.15	ABZ encoder AB phase sequence	0: forward 1: reverse	0	☆
A02.16	Encoder mounting position Angle	0.0 ~ 359.9°	0.0	☆
A02.17	UVW signal phase sequence	0: forward 1: reverse	0	☆
A02.18	UVW signal zero position Angle	0.0 ~ 359.9°	0.0	☆
A02.19	Rotary pole pairs	1-65535	1	☆
A02.20	Reserved			●
A02.21	Speed feedback PG break detection time	0.0: No action 0.1s to 10.0s	0.0	☆
A02.22	Speed loop proportional gain 1	1-100	30	○
A02.23	Speed loop integral time 1	0.01s to 10.00s	0.50	○
A02.24	Switching frequency 1	0.00 ~ A02.27	5.00	○
A02.25	Speed loop proportional gain 2	1-100	20	○
A02.26	Speed loop integral time 2	0.01 s to 10.00 s	1.00	○
A02.27	Switching frequency 2	A02.24~ Max frequency F00.06	10.00	○
A02.28	Slip compensation factor	50% ~ 200%	100	○
A02.29	SVC speed feedback filter time	0.000s to 0.100s	0.015	○
A02.30	Vector control overexcitation gain	0 ~ 200	64	○

Function code	Name	Parameter description	Factory value	Attribute
A02.31	Speed control (drive) torque upper limit digital setting	0.0% ~ 200.0%	150.0	○
A02.32	Speed control (drive) torque upper limit source	0: Set by function code A02.31 1: AI1 2: AI2 3: Reserved 4: HDI high speed pulse setting 5: Communication given 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) The full scale of options 1 to 7 corresponds to A02.31	0	○
A02.33	Speed control (braking) torque upper limit source	0: Function code A02.34 set 1: AI1 2: AI2 3: Reserved 4: HDI high speed pulse setting 5: Communication set 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) 8: Function code A02.32 setting (does not distinguish drive and brake) The full scale of options 1 to 7 corresponds to A02.34	0	●
A02.34	Speed control (braking) torque upper limit digital setting	0.0% ~ 200.0%	150.0	●
A02.35	M-axis current loop proportional gain	0 ~ 60000	2000	○
A02.36	M-axis current loop integral gain	0 ~ 60000	1300	○
A02.37	T-axis current loop proportional gain	0 ~ 60000	2000	○

Function code	Name	Parameter description	Factory value	Attribute
A02.38	T-axis current loop integral gain	0 ~ 60000	1300	○
A02.39	Speed loop integral properties	Units place: integral separation 0: Speed loop integral is always valid 1: Speed loop integral separation	0	○
A02.40	Synchro weak magnetic mode	0: Not weak magnetic 1: Direct calculation 2: Automatic adjustment	0	○
A02.41	Overmodulation Enable Select	0: Disable 1: Enable	0	○
A02.42	Maximum output voltage coefficient	100% ~ 110%	105	☆
A02.43	Maximum torque coefficient in weak field	50% ~ 200%	100	○
A02.44	Power generation (braking) torque enable selection under speed model	0: Disable 1: Enable	0	○
A02.45	Upper limit of generating power	0.0% ~ 200.0%	Model dependent	○
A02.46	Motor control mode	0: Sensorless vector control (SVC) 1: Reserved 2: V/F control	2	☆
A02.47	Acceleration and deceleration time selection	0: same as the first motor 1: Acceleration and deceleration time 1 2: acceleration and deceleration time 2 3: acceleration and deceleration time 3 4: acceleration and deceleration time 4	0	○

Function code	Name	Parameter description	Factory value	Attribute
A02.48	Motor torque boost	0.0%: Automatic torque boost 0.1%~30.0%	Model dependent	○
A02.49	Reserved	Reserved	0	●
A02.50	Oscillation suppression gain	0 ~ 100	40	○
Group A03 Reserved				
Group A04 Reserved				
Group A05 Control optimization parameters				
A05.00	DPWM switching upper limit frequency	5.00Hz ~ Maximum frequency F00.06	8.00	○
A05.01	PWM modulation mode	0: asynchronous modulation 1: synchronous modulation	0	○
A05.02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode 1	1	○
A05.03	Random PWM	0: Not selected 1 to 10: random depth selection	0	○
A05.04	Phase-by-phase current limit enabled	0: disabled 1: enabled	1	○
A05.05	Voltage overmodulation factor	100 ~ 110	105	○
A05.06	Undervoltage point setting	200.0v ~ 2000.0v Model dependent 220v: 200v 380v: 350v 480v: 350v 690v: 650v 1140v: 1100v	350.0	○
A05.07	Reserved	Reserved	2	☆
A05.08	Dead zone time adjustment	100% to 200%	150	☆

Function code	Name	Parameter description	Factory value	Attribute
A05.09	Overvoltage point setting	200.0v ~ 2200.0v Model dependent 220v: 400v 380v: 810v	810.0	☆
Group A06 AI curve setting				
A06.00	Curve 4 minimum input	-10.00 ~ A06.02	0.00	○
A06.01	Curve 4 minimum input setting	-100.0% to 100.0%	0.0	○
A06.02	Curve 4 inflection point 1 input	A06.00 ~ A06.04	3.00	○
A06.03	Curve 4 inflection point 1 input setting	-100.0% ~ 100.0%	30.0	○
A06.04	Curve 4 inflection point 2 input	A06.02 ~ A06.06	6.00	○
A06.05	Curve 4 inflection point 2 input setting	-100.0% ~ 100.0%	60.0	○
A06.06	Curve 4 maximum input	A06.04 ~ 10.00	10.00	○
A06.07	Curve 4 maximum input setting	-100.0% ~ 100.0%	100.0	○
A06.08	Curve 5 minimum input	-10.00 ~ A06.10	-10.00	○
A06.09	Curve 5 minimum input setting	-100.0% to 100.0%	-100.0	○
A06.10	Curve 5 inflection point 1 input	A06.08 ~ A06.12	-3.00	○
A06.11	Curve 5 inflection point 1 input setting	-100.0% ~ 100.0%	-30.0	○
A06.12	Curve 5 inflection point 2 input	A06.10 ~ A06.14	3.00	○
A06.13	Curve 5 inflection point 2 input setting	-100.0% ~ 100.0%	30.0	○
A06.14	Curve 5 maximum input	A06.12 ~ 10.00	10.00	○
A06.15	Curve 5 maximum input setting	-100.0% ~ 100.0%	100.0	○

Function code	Name	Parameter description	Factory value	Attribute
A06.16 ~ 23	Reserved	Reserved	0	●
A06.24	AI1 set jump point	-100.0% ~ 100.0%	0.0	○
A06.25	AI1 set jump amplitude	0.0 to 100.0%	0.5	○
A06.26	AI2 set jump point	-100.0% ~ 100.0%	0.0	○
A06.27	AI2 set jump amplitude	0.0 to 100.0%	0.5	○
A06.28	Reserved	Reserved	0.0	○
A06.29	Reserved	Reserved	0.5	○
Group A07 Reserved				
Group A08 Point-to-point communication				
A08.00	Master-slave control function selection	0: invalid 1: valid	0	☆
A08.01	Master-slave selection	0: master 1: slave	0	☆
A08.02	Master-slave information interaction	Units place: slave command follows 0: The slave does not follow the master run command 1: The slave follows the master run command Tens place: slave fault information transmission 0: The slave fault information is not transmitted 1: The slave fault information is transmitted Hundreds place: The master displays the slave offline 0: The master does not report a fault	11	☆

Function code	Name	Parameter description	Factory value	Attribute
		when the slave is offline 1: The master reports a fault (Err16) when the slave is offline		
A08.03	Master data sending action selection	0: running frequency 1: target frequency	0	☆
A08.04	Receive data zero offset	- 100.00% ~ 100.00%	0.00	○
A08.05	Receive data gain	10.00 ~ 10.00	1.00	○
A08.06	Point-to-point communication interruption detection time	0.0 ~ 10.0 s	1.0	☆
A08.07	Master data sending cycle in point-to-point communication	0.001 ~ 10.000	0.001	☆
A08.08	Frequency receive data zero offset	- 100.00% ~ 100.00%	0.00	○
A08.09	Frequency receive data gain	10.00 ~ 10.00	1.00	○
A08.10	Maximum forward deviation of slave frequency	0.00 ~ 100.00%	10.00	○
A08.11	Window	0.20 Hz ~ 10.00 Hz	0.50	○
Group A09 Water supply special group				
A09.00	Set pressure	0.000 ~ 60.000 Mpa	0.000	○
A09.01	Feedback full scale maximum pressure	0.000 ~ 60.000 Mpa	1.000	○
A09.02	Lower limit pressure	0.000 ~ 60.000 Mpa	0.000	○
A09.03	Upper limit pressure	0.000 ~ 60.000 Mpa	1.000	○
A09.04	Wakeup pressure	0.000 ~ 60.000 Mpa	0.000	○
A09.05	Hibernation pressure	0.000 ~ 60.000 Mpa	1.000	○

Function code	Name	Parameter description	Factory value	Attribute
A09.06	Feedback pressure greater than hibernation pressure program time	0.0 s to 2500.0 s	10.0	○
A09.07	Frequency hibernation	0.0Hz~ Max frequency (F00.06)	20.00	○
A09.08	Frequency below hibernation frequency duration	0.0 s to 2500.0 s	10.0	○
A09.09	Wakeup delay time	0.0 s to 2500.0 s	0.0	○
A09.10	Reserved			
A09.11	Hibernation selection	0: Frequency hibernation is effective; 1: Pressure hibernation is effective	0	○
A09.12	Keypad analog filter	0 ~ 8	3	○
Groups A10 to A15 Reserved				
Group b00 Display				
b00.00	Running frequency	Unit: Hz	0.01	●
b00.01	Set frequency	Unit: Hz	0.01	●
b00.02	Bus voltage	Unit: V	0.1	●
b00.03	Output voltage	Unit: V	1	●
b00.04	Output current	Unit: A	0.01	●
b00.05	Output power	Unit: kW	0.1	●
b00.06	Output torque	Unit: %	0.1	●
b00.07	DI input status		0x0000	●
b00.08	DO output status		0x0000	●

Function code	Name	Parameter description	Factory value	Attribute
b00.09	AI1 voltage/current	Unit: V/mA	0.01	●
b00.10	AI2 voltage/current	Unit: V/mA	0.01	●
b00.11	Reserved	Reserved	0.01	●
b00.12	Count value		1	●
b00.13	Length value		1	●
b00.14	Load speed display		1	●
b00.15	PID settings	Unit: %	1	●
b00.16	PID feedback	Unit: %	1	●
b00.17	PLC stage		1	●
b00.18	Input pulse frequency	Unit: kHz	0.01	●
b00.19	Feedback speed	Unit: Hz	0.01	●
b00.20	Remaining running time	Unit: min	0.1	●
b00.21	AI1 voltage/current before correction	Unit: V/mA	0.001	●
b00.22	AI2 voltage/current before correction	Unit: V/mA	0.001	●
b00.23	Reserved		0.001	●
b00.24	Linear speed	Unit: m/min	1	●
b00.25	Current power-on time	Unit: min	1	●
b00.26	Current running time	Unit: min	0.1	●
b00.27	Input pulse frequency	Unit: kHz	1	●

Function code	Name	Parameter description	Factory value	Attribute
b00.28	Communication setting value	Unit: Hz	0.01	●
b00.29	Encoder feedback speed	Unit: Hz	0	●
b00.30	Master frequency X display	Unit: Hz	0.01	●
b00.31	Auxiliary frequency Y display	Unit: Hz	0.01	●
b00.32	View any memory address value		1	●
b00.33	Synchro rotor position	Unit: °	0.1	●
b00.34	Reserved		1	●
b00.35	Target torque	Unit: %	0.1	●
b00.36	Reserved		1	●
b00.37	Power factor angle	Unit: °	0.1	●
b00.38	Reserved		1	●
b00.39	V/F separation target voltage	Unit: V	1	●
b00.40	V/F separation output voltage	Unit: V	1	●
b00.41	DI input status visual display		1	●
b00.42	DO output status visual display		1	●
b00.43	DI function status visual display 1 (Function 01 ~ Function 40)		1	●
b00.44	DI function status visual display 2 (Function 41 ~ Function 80)		1	●
b00.45	Fault information		1	●

Function code	Name	Parameter description	Factory value	Attribute
b00.46-b00.58 Reserved				
b00.59	Set frequency	Unit: %	0.01	●
b00.60	Running frequency	Unit: %	0.01	●
b00.61	Frequency converter state		1	●
b00.62	Current fault code		1	●
b00.65	Torque upper limit	Unit: %	0.1	●
b00.73	Motor serial number	0: Motor 1 1: Motor 2	0	●
b00.74	Inverter output torque	Unit: %	0.1	●
b00.75	Device code		1	●
b00.76	Running RPM	Unit: RPM	1	●

7. Fault Tracking

This chapter describes how to reset a fault and view the fault history. This chapter also lists all alarm and fault information, as well as possible causes and corrective measures.

	Only trained and qualified professionals should perform the operations described in this chapter. Follow the instructions in "1 Safety Precautions."

7.1 Alarm and fault indications

Faults are indicated by indicators. See "5.3 LED keypad display and operation". At that time, the alarm or fault code displayed on the keypad indicated that the frequency converter was in an abnormal state. Using the information given in this chapter, it is possible to find out the causes of most alarms or faults and their corrective measures. If you cannot find out the causes of the alarms or faults, contact your local office.

7.2 Fault reset

The frequency converter can be reset by the STOP/RST key on the keypad, digital input, or cutting off the inverter power. When the fault has been removed, the motor can be restarted.

7.3 Fault history

Function codes F08.16 to F08.18 record the last three fault types. Function codes F08.19~F08.40 record the operation data of the frequency converter when the last three faults occurred.

7.4 Faults and countermeasures

After a fault, the processing steps are as follows:

Step 1 When the frequency converter fails, check whether the keypad display is abnormal. If yes, consult the office.

Step 2 If no exception exists, check the function codes in Group F08 to check the corresponding fault record parameters to determine the actual status when the latest fault occurred.

Step 3 See the following table and check whether there is corresponding abnormal state according to the specific countermeasure.

Step 4 Rectify the fault or ask relevant personnel for help.

Step 5 After confirming that the fault is rectified, reset the fault and start running.

7.4.1 Faults and countermeasures

Fault code	Fault type	Possible cause	Countermeasure
E.oC1	Overcurrent during ACC	1. ACC or DEC too fast 2. The grid voltage is low 3. The inverter power is small 4. Load transient or abnormal 5. Short circuit to the ground, output phase loss 6. There is strong external interference source 7. Overcurrent stall protection is not enabled	1. Increase the acceleration and deceleration time 2. Check the input power supply 3. Choose the inverter with larger power 4. Check whether there is a short circuit in the load 5. (Short circuit to the ground or short circuit between lines) or blocked rotation phenomenon. Check the output wiring 6. Check whether there is strong interference 7. Check the setting of the relevant function code
E.oC2	Overcurrent during DEC		
E.oC3	Run overcurrent at constant speed		
E.oU1	Overvoltage during ACC	1. Abnormal input voltage 2. After instantaneous power failure, restart the rotating motor 3. Acceleration time is too fast	1. Check input power 2. Avoid restart after stop 3. Increase acceleration time
E.oU2	Overvoltage during DEC	1. Deceleration too fast 2. Large load inertia 3. Abnormal input voltage 4. Missing energy consumption brake assembly 5. Energy consumption brake function is not enabled	1. Increased deceleration time 2. Increase energy consumption brake assembly 3. Check input power 4. Add energy consumption brake assembly 5. Check the settings for the relevant function codes
E.oU3	Overvoltage during constant speed running	1. The input voltage changes abnormally 2. The load inertia is large	1. Install the input reactor 2. Add suitable energy consumption brake assembly
E.Lv	Bus undervoltage	1. Low grid voltage 2. Overvoltage stall protection is	1. Check the grid input power supply

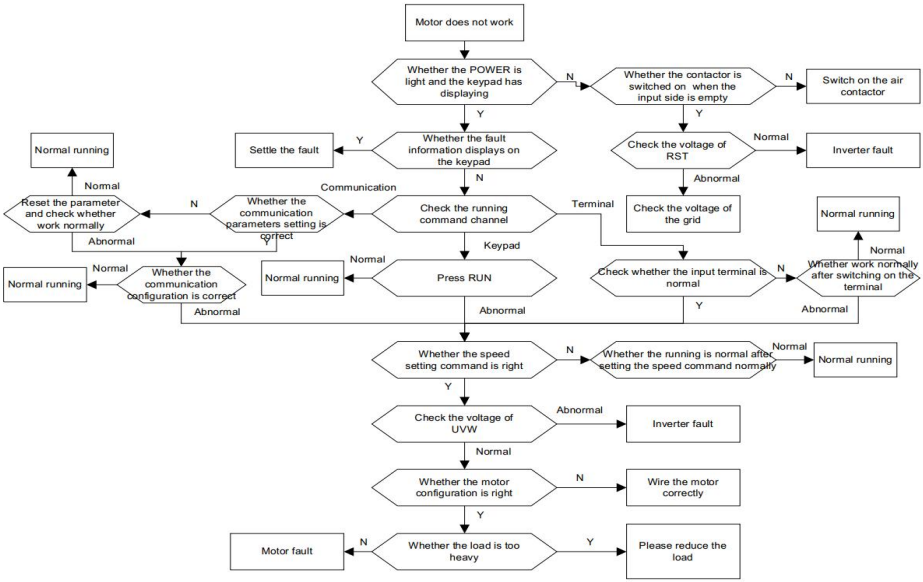
Fault code	Fault type	Possible cause	Countermeasure
		not on	2. Check the settings for the relevant function codes
E.oUt1	Inverter Unit U phase fault	1. Acceleration too fast 2. Internal damage to the phase IGBT 3. Interference causes misoperation 4. Whether grounding is good 5. Whether to-ground short circuit occurred	1. Increase acceleration time 2. Ask for help 3. Check that the peripherals have no strong interference sources 4. Check the grounding 5. Check that the output is not short-circuited to the ground, well-connected
E.oUt2	Inverter Unit V phase fault		
E.oUt3	Inverter Unit W phase fault		
E.oL1	Motor overload	1. The power grid voltage is too low 2. The rated motor current is set incorrectly 3. Motor stall or excessive load transient 4. Motor load capacity exceeds the actual load	1. Check the grid voltage 2. Reset the rated motor current 3. Check the load and adjust the torque boost 4. Choose the right motor
E.oL2	Inverter overload	1. Acceleration too fast 2. Restart the rotating motor 3. The grid voltage is too low 4. Load is too large	1. Reduce acceleration 2. Avoid restart after stop 3. Check the grid voltage 4. Choose an inverter with larger power
E.oL3	Overload pre-warning	1. Load is too large 2. The motor parameters are not lower than the grid voltage during vector control	1. Choose an inverter with larger power 2. Check voltage for motor rotation parameter identification
E.oH1	Rectifier module overheat	1. The inverter overcurrent instantaneously 2. The output three phase has an interphase or ground short circuit 3. Blocked air duct or damaged fan 4. Excessive ambient temperature	1. See overcurrent countermeasures 2. Rewiring 3. Ventilate the air duct or replace the fan 4. Reduce ambient temperature
E.oH2	Inverter module overheat		

Fault code	Fault type	Possible cause	Countermeasure
		5. The cable connection to the control board or plug-in is loose 6. The auxiliary power supply is damaged and the drive voltage is undervoltage 7. Power module bridge shoot-through 8. Abnormal control board	5. Check and reconnect 6. Seek service 7. Seek service 8. Seek service
E.ILF	Phase loss on input side	R,S,T input phase loss or fluctuation	1. Check the input power supply 2. Check the installation wiring
E.OLF	Phase loss on output side	1. U, V, W output phase loss 2. The three phases of the load are seriously asymmetrical	1. Check the output wiring 2. Check the motor and cables
E.bC	Brake unit fault	1. Faulty brake line or damaged brake tube 2. The resistance value of the external brake resistor is low	1. Check the brake unit and replace it with a new brake tube 2. Increase brake resistance
E.AUt	Motor parameter identification fault	1. The motor capacity does not match the frequency converter capacity 2. The rated parameters of the motor are set improperly 3. The deviation between the identified parameters and the standard parameters is too large 4. Parameter identification times out	1. Replace the inverter model 2. Set the rated parameters according to the motor nameplate 3. Make the motor no-load, re-identify 4. Check motor wiring and parameter setting
E.PIDE	PID feedback disconnection fault	1. The PID feedback is disconnected 2. The PID feedback source disappears	1. Check the PID feedback signal cable 2. Check the PID feedback source
E.485	Communication fault	1. The baud rate is set improperly 2. Communication error using	1. Set the appropriate baud rate 2. Press the STOP/RESET key to

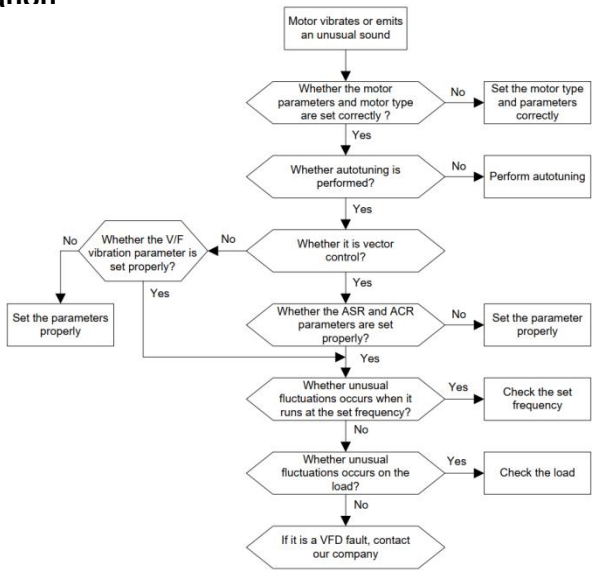
Fault code	Fault type	Possible cause	Countermeasure
		serial communication 3. Communication has been interrupted for a long time	reset and seek service 3. Check the wiring of the communication port
E.EF	External fault	1. SI external fault input terminal action	1. Check the external device input
E.EEP	EEPROM read write fault	1. Control parameter reading/writing error 2. The EEPROM is damaged	1. Press the STOP/RESET key to reset the EEPROM 2. Seek service
E.END	Running time reached	1. User trial time arrives	1. Ask the manufacturer for service
E.ItE	Current detection circuit fault	1. Control board connector is in poor contact 2. Auxiliary power supply damaged 3. Hall device damage 4. Abnormal amplification circuit	1. Check the connector and re-plug the cable 2. Seek service 3. Seek service 4. Seek service

7.5 Common fault analysis

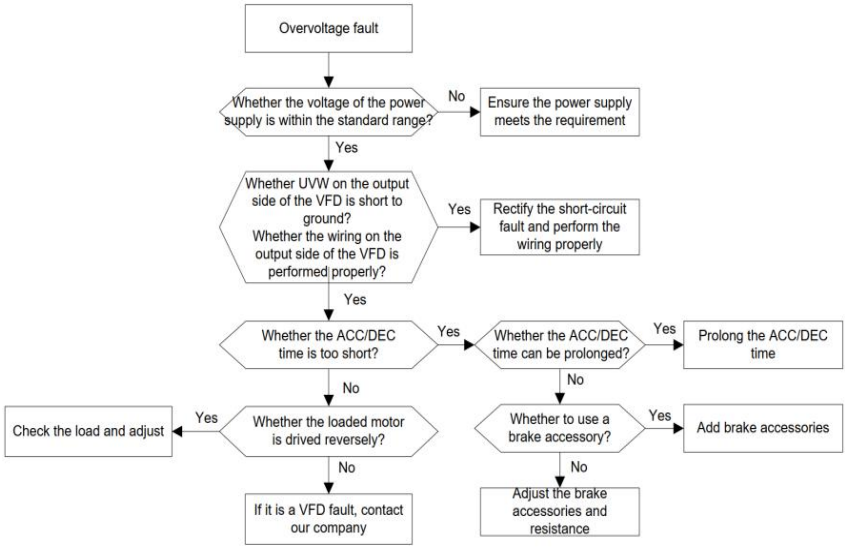
7.5.1 Motor does not work



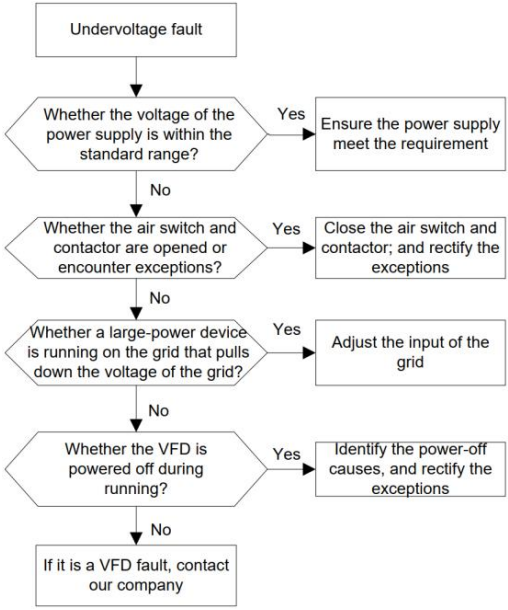
7.5.2 Motor vibration



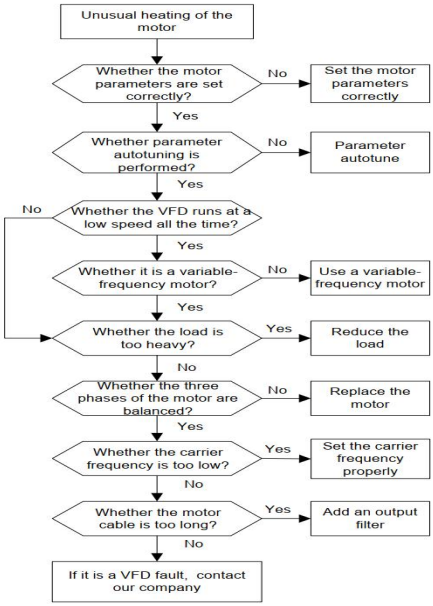
7.5.3 Overvoltage



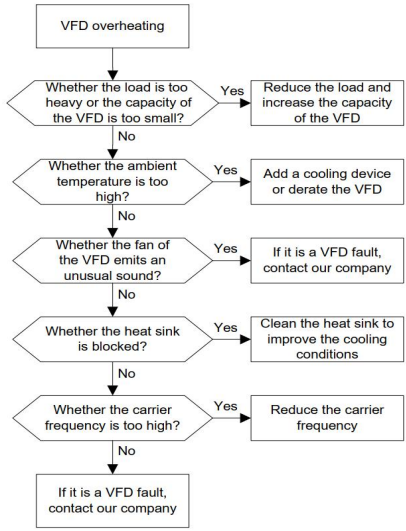
7.5.4 Undervoltage



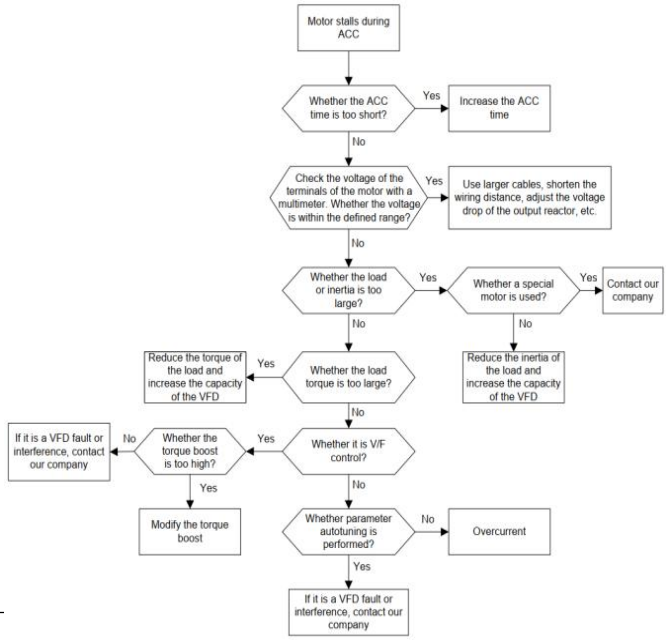
7.5.5 Abnormal heating of the motor



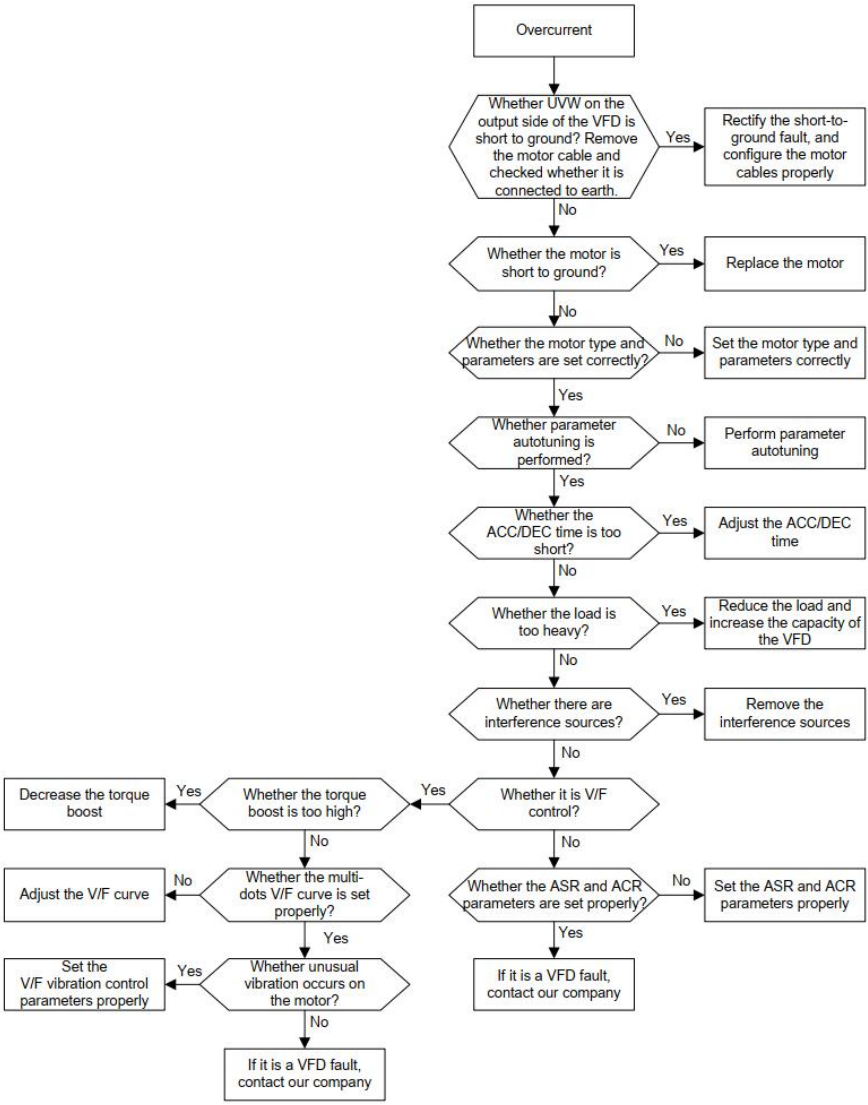
7.5.6 VFD overheating



7.5.7 Motor stalls during acceleration



7.5.8 Overcurrent



7.6 Solutions to common interferences

7.6.1 Interferences on the meter switch and sensor

Interference phenomena:

Sensor signals (pressure, temperature, displacement, etc.) are collected and displayed by the human-computer interaction device, and the sensor value display is not accurate after the inverter is turned on, which is as follows:

1. The upper or lower limit value is incorrectly displayed, such as 999 or -999.

2. Display value jumping (usually occurring on pressure transmitters).

3. The display value is stable, but there is a large deviation, such as the temperature value is dozens of degrees higher than the normal value (usually occurring on thermocouples).

4. The signal collected by the sensor is not directly displayed, but as a feedback signal of the transmission system operation, such as when the air compressor reaches the upper limit pressure, the inverter begins to decelerate, but the actual operation has not reached the upper limit pressure the inverter begins to decelerate.

5. All kinds of instruments (such as frequency meter, ammeter, etc.) connected by the frequency converter analog output (AO) display inaccurately when the frequency converter is started.

6. The system uses the proximity switch. When the frequency converter is started, the proximity switch indicator flickers and the output level flips.

Solutions:

1. Check and confirm that the sensor feedback cable and the motor cable are separated by more than 20cm.

2. Check that the motor ground cable is connected to the PE terminal of the frequency converter. (If the motor ground cable is connected to the ground bar of the frequency converter cabinet, use a multimeter to measure and ensure that the resistance between the ground bar and the PE terminal of the frequency converter is less than 1.5Ω.)

3. Try to add 0.1uF safety capacitor to the signal end of the sensor feedback signal terminal.

4. Try to add 0.1uF safety capacitor at the power end of the sensor instrument (pay attention to the power supply voltage and capacitor voltage).

5. For the interference on the frequency converter analog output (AO) connected to terminal instruments, if the AO uses 0~20mA current signal, the 0.47uF capacitor is installed between the AO terminal and GND; if the AO uses 0~10V voltage signal, the 0.1uF capacitor is installed between the AO terminal and GND.

Note:

On the terminal device terminals to which the decoupling capacitor is connected. If the thermocouple sends the 0~20mA signal to the temperature meter, the capacitor should be installed on the sensor temperature meter terminal. Electronic ruler will be 0~30V signal to the PLC signal terminal, then the decoupling capacitor should be installed on the PLC terminal.

If the number of interfered meters/sensors in the application site is too much, it is recommended to configure an external filter at the input power end of the inverter.

7.6.2 485 Communication interferences

Interference phenomena:

485 communication interferences include communication delay, asynchronous, occasionally normal or completely disconnected and so on when the frequency converter is running.

If no matter whether the frequency converter is running or not, the communication is abnormal, it is not necessarily caused by interference, which can be resolved by the following means:

1. Check the 485 communication bus whether there is a break or poor contact.

2. Check whether the A and B ends of the 485 communication bus are reversed.

3. Check whether the communication protocol between the frequency converter and the upper computer is consistent, such as baud rate, data bit check and other parameters.

If it is determined that the abnormal communication is really caused by interference, you can resolve the problem by the following means:

1. Simple inspection.

2. Avoid arranging the communication cable and the motor cable in the same slot.

3. In multi-machine applications, the connection of the communication cables between the frequency converters should be chrysanthemum connection method to improve anti-interference capability.

4. In multi-machine applications, it is necessary to confirm whether the drive capacity of the master is sufficient.

5. The two ends of the multi-machine connection must be connected with 120Ω terminal resistor.

Solutions:

1. Check and confirm that the motor ground cable is connected to the PE terminal of the inverter (if the motor ground cable is connected to the ground bar of the inverter cabinet, use a multimeter to measure and verify that the resistance between the ground bar and the PE terminal of the frequency converter is less than 1.5Ω).

2. The frequency converter and motor should not be in common ground terminal with the communication upper computer (PLC, HMI, touch screen, etc.). It is recommended that the frequency converter and the motor be connected to the power supply, and the communication upper computer be grounded separately.

3. Try to short-connect the frequency converter signal reference ground terminal (GND) and the signal reference ground terminal (GND) controlled by the upper computer to ensure that the frequency converter control board communication chip and the upper computer communication chip ground potential is consistent.

4. Try to install 0.1uF safety capacitor on the power terminal of the upper computer (PLC, HMI, touch screen, etc.) (pay attention to the power supply voltage and the voltage endurance capability of the capacitor). You can also use a magnetic ring (Fe-based nanocrystalline magnet ring is recommended) to

insert the L/N line or +/- line of the upper machine into the magnetic circle 8 times in the same direction.

7.6.3 Unable to stop and indicator shimmering caused by motor cable coupling

Interference phenomena:

1. Unable to stop

The start and stop of the frequency converter system is controlled by X terminal, the motor cable and the control cable go through the same slot. The system starts normally, but it cannot stop through X terminal after starting.

2. Indicator shimmering

When the inverter is running, the relay indicator, the power distribution box indicator, the PLC indicator, the indicating buzzer, should not appear slightly bright, blinking or abnormal sound.

Solutions:

1. Check and confirm that the abnormal signal line and the motor cable are separated by more than 20cm.

2. Install 0.1uF safety capacitor between the switching input terminal (S) and COM terminal.

3. Parallel the digital input terminal (S) used for start-stop control with other idle digital input terminals. For example, X1 terminal is used for start-stop control and X4 terminal is idle, then try to short-circuit X1 terminal and X4 terminal.

Note:

✧ If the controller in the system (such as PLC, etc.) controls more than 5 inverters at the same time through the switching input terminal (X), the scheme is not available.

7.6.4 Leakage current and residual current action protector

Because the frequency converter outputs high frequency PWM voltage to drive the motor, the distributed capacitance of IGBT to the radiator inside the frequency converter and the distributed capacitance between the fixed rotor of the motor will cause the frequency converter to inevitably produce high frequency leakage current to the ground. The residual current action protector is used to detect the power frequency leakage current when the electrical circuit is faulty to the ground, and the application of the inverter may cause the residual current action protector to misoperate.

1. Selection criteria of residual current action protector:

(1) Due to the particularity of the inverter system, the configuration of the ordinary residual current action protector at all levels requires the rated residual action current of 200mA. Above, and need to ensure reliable grounding of the inverter.

(2) For the selection of the setting time of the residual current action protector, the pre-action time limit is longer than the secondary action time limit, and the time difference between the front and back stages should be set above 20ms, such as: 1s, 0.5s, 0.2s.

(3) The electromagnetic residual current action protector is recommended for the electrical circuit of the

frequency converter system, which has strong anti-interference capability and can protect the influence of high frequency leakage current on the protector.

Electronic residual current action protector	Electromagnetic residual current action protector
Low cost, high sensitivity, small size, easy to be affected by power grid voltage fluctuations and ambient temperature, weak anti-interference capability	The requirement of zero sequence current transformer is very sensitive, accurate and stable, the use of Permo alloy high-permeability magnetic material, the process is complex, the cost is high, is not affected by power supply voltage fluctuations and environmental temperature, and the anti-interference capability is strong

2. residual current action protector wrong action solution (frequency converter processing) :

(1) Try to remove the EMC screw or jumper at the EMC point in the machine.

(2) Try lowering the carrier frequency to 1.5kHz.

(3) Try to change the modulation mode to "three phase modulation and two phase modulation".

3. residual current action protector wrong action solution (system power distribution processing).

(1) Check and confirm whether the power cable is soaked in water.

(2) Check whether the cable is damaged or diverted.

(3) Check and confirm whether the neutral line is twice grounded.

(4) Check whether the terminal of the main power cable is in poor contact with the circuit breaker or the contactor (the screws are not tightened or loose).

(5) For single-phase power devices in the system, check whether the ground cable is used as the neutral line by mistake.

(6) Do not use shielded cables for power cables and motor cables of the frequency converter.

7.6.5 The case of the device is charged

The main manifestation of this problem is that when the frequency converter runs, the transmission system shell has a voltage that can be sensed by people, and people feel electric shock after touching it. However, when the frequency converter is only powered on and not running, the system shell is not charged (or the voltage is much lower than the human body safety voltage).

Solutions:

1. If the user has a power distribution ground or ground pile on site, the inverter cabinet shell is grounded through the power supply ground or ground pile.

2. If there is no ground on site, electrical connection should be made between the motor shell and the ground terminal PE of the frequency converter. At the same time, make sure that the screw or jumper at EMC in the frequency converter is shorted.

8. The Quality Commitment of the Company

8.1 Warranty period

The F580 series comes with a warranty of 24 months from the company's shipping date.

During the warranty period, the repair or replacement of the parts does not affect the overall warranty period of the original product. If the warranty period of the original product is less than 3 months, repair or replacement parts will still be covered by a 3-month warranty.

8.2 After-sale instructions

Thank you very much for choosing F580 series inverter. F580 series adopts advanced drive technology and is manufactured under strict production management control. In case of product failure, the company and its office will be happy to provide you with timely quality service.

8.3 Services

The company solemnly promises, since the user from our company (hereinafter referred to as the manufacturer) to purchase products from the date, users enjoy the following product after-sales warranty service.

1. this product since the user from the date of purchase from the manufacturer, the implementation of a period of 24 months free warranty (export abroad and Hong Kong, Macao and Taiwan/non-standard machine products except).
2. this product since the user from the date of purchase from the manufacturer within a month of quality problems, the manufacturer guaranteed return, replacement, repair.
3. this product from the user from the date of purchase from the manufacturer within three months of quality problems occur, the manufacturer replacement, repair.
4. this product since the user from the date of purchase from the manufacturer, enjoy paid lifetime service.

Disclaimer clause: The product failure caused by the following reasons is not within the scope of the manufacturer's 24 months free warranty service commitment:

1. The user does not perform the correct operation according to the procedures listed in the "Product manual", repairs the product without communicating with the manufacturer or arbitrarily transforms the product to cause product failure.
2. The user exceeds the standard range of use of the product or the environment is poor, resulting in abnormal aging or failure of the product device.
3. Product damage caused by force majeure such as earthquake, fire, feng shui disaster, lightning strike, abnormal voltage or other natural disasters.
4. After the user purchases the product, in the process of transportation due to improper choice of transportation mode of loss or other external force intrusion leads to product loss; (Mode of transport by the user to choose a reasonable, the company to assist on behalf of the consignment procedures).

5. When the brand, trademark, serial number, nameplate and other marks marked by the manufacturer in the product are damaged or unrecognizable;
6. When the user fails to pay in full in accordance with the Purchase and Sales Contract signed by both parties;
7. When the user intentionally conceals from the manufacturer's after-sales service provider the adverse use of the product in the course of installation, wiring, operation, maintenance or other processes.

8.4 Liability

The Supplier and distributor shall not be liable for the following special, indirect or secondary losses arising from the use of the Equipment, whether in contract, warranty, tort or any other way. This includes, but is not limited to, loss of profits and revenue, loss of use of the Supplied equipment and related equipment, cost of funds, cost of substitute equipment, tool and service fees, cost of downtime, delay, and loss of the Purchaser's customers or any third party. In addition, unless the user can provide strong evidence, the company and its suppliers will not be liable for certain allegations, such as the use of substandard raw materials, faulty design, or improper production.

If you have any questions about the frequency converters, please contact the company or its office. Technical data, information and specifications are current at the time of publication. The Company reserves the right to change them without prior notice.

9. Care and Maintenance

9.1 Contents of this chapter

This chapter describes ways to perform preventive maintenance on your frequency converter.

9.1.1 Regular inspection

If the inverter is installed in an environment that meets the requirements, the amount of maintenance required is very small. The following table gives the recommended daily maintenance cycles.

Inspection section		Checking items	Check method	Judging Criteria
Surrounding environment		Check the ambient temperature, humidity, vibration, and absence of dust, gas, oil mist, water droplets, etc.	Visual and instrumental measurements	Compliance with product specifications
		Are there any foreign objects and dangerous goods such as tools around?	Visual inspection	No tools and dangerous goods around
Voltage		Is the voltage of the main circuit and control circuit normal?	Measure with a multimeter, etc	Comply with product instructions
Keypad		Is the display clear?	Visual inspection	Character display normally
		Are the characters displayed incomplete?	Visual inspection	Conform to product specifications
Main circuit	Common	Bolts, etc., are not loose and falling off?	Tighten	No abnormalities
		There is no distortion, crack, breakage or fault in the machine Is it discolored by heat or aging?	Visual inspection	No abnormalities
		Is there any dirt or dust attached?	Visual inspection	No abnormalities **Note:** Discoloration of the copper bar does not indicate a problem with the characteristic.
	Conductor	Is the conductor not discolored or	Visual	No abnormalities

Inspection section		Checking items	Check method	Judging Criteria
		deformed due to overheating?	Inspection	
		No cracked and discolored wire sheathing?	Visual inspection	No abnormalities
	Terminal holder	Is there damage?	Visual inspection	No abnormalities
	Filter capacitor	Are there any leaks, discoloration, cracks and housing expansion?	Visual inspection	No abnormalities
		Did the safety valve come out?	Determine the service life according to the maintenance information or use static electricity capacity measurement	No abnormalities
		Measure electrostatic capacity as needed?	The instrument measures the capacitance	Electrostatic capacity is greater than or equal to the initial value *0.85
	Resistance	Has it shifted due to overheating?	Smell, visual inspection	No abnormalities
		Are there any broken lines?	See or unplug one end to confirm, multimeter measurement	The resistance value is within the standard value of ±10%
	Transformer, electric reactor	No unusual vibrations or odors?	Hearing, smell, visual inspection	No abnormalities
	Electromagnetic contactors, relays	Does the studio have vibrating sounds?	Hearing	No abnormalities
		Are the contacts in good contact?	Visual inspection	No abnormalities
Control	Control	Are screws and connectors	Tighten	No abnormalities

Inspection section		Checking items	Check method	Judging Criteria
circuit	printed circuit board, connector	loose?		
		Any odors and discoloration?	Smell, visual inspection	No abnormalities
		Are there any cracks, breakage, deformation, rust?	Visual inspection	No abnormalities
		Do the capacitors have traces of leakage and distortion?	Judge service life by visual inspection and maintenance information	No abnormalities
Cooling system	Cooling fan	Any abnormal sounds and abnormal vibrations?	Hearing, visual inspection, rotate by hand	Rotate smoothly
		Are bolts, etc. loose?	Tighten	No abnormalities
		Any discoloration due to overheating?	Visual inspection and judge service life based on maintenance information	No abnormalities
	Air ducts	Are cooling fans, air intakes, and exhaust ports blocked and attached with foreign objects?	Visual inspection	No abnormalities

9.1.2 Fan

The life of the fan is more than 25,000 working hours. The actual service life is related to the use of the inverter and the ambient temperature. The running time of the inverter can be checked by F05.15 (cumulative running time).

The increase of the bearing noise indicates a fan fault. If the frequency converter is used in critical positions, then please replace the fan when the abnormal noise starts to occur, the company provides spare parts for the fan.

Replace cooling fan:

	Read and follow the instructions in "Safety Precautions" carefully. Ignoring these safety precautions may result in physical injury or damage to the equipment.

1. Stop the machine and cut off the AC power supply, and wait no less than the time marked on the inverter.
2. Release the fan cable from the cable clamp.
3. Remove the fan cable.
4. Remove the fan with a screwdriver.
5. Put the new cooling fan into the inverter, and insert the fan cable into the wire clamp in the opposite order. Install the inverter, please note that the wind direction of the fan is consistent with the wind direction of the inverter.

9.1.3 Capacitors

If the frequency converter is idle for too long, the DC bus capacitor must be reformed according to the operating instructions before use. The storage time is calculated from the delivery date.

Time	Operating principles
Less than 1 year	No charging operation required.
1 to 2 years	Before the first run, the inverter must be powered on for 1 hour.
2 to 3 years	Use a regulated power supply to charge the inverter: ● Add 25% rated voltage for 30 minutes, then 50% rated voltage for 30 minutes ● Add 75% rated voltage for another 30 minutes, then 100% rated voltage for another 30 minutes
More than 3 years	Use a regulated power supply to charge the inverter: ● Add 25% rated voltage for 2 hours, then 50% rated voltage for 2 hours ● Add 75% rated voltage for 2 hours, then 100% rated voltage for 2 hours

The operation method of charging the inverter using the voltage regulating power supply:

The choice of adjustable power supply depends on the power supply of the inverter. For the inverter whose incoming line voltage is single-phase/three-phase 220V AC, a single 220V AC/2A regulator can be used. Single-phase or three-phase inverter can be charged by single-phase voltage regulation power supply (L+ connected to R, N connected to S or T). Since it is the same rectifier, all DC bus capacitors will be charged at the same time.

The inverter with a high voltage class must be charged at the required voltage (e.g. 380V). Since little current is required for capacitor charging, a small capacity power supply (2A is sufficient) can be used.

How to use a resistor (incandescent lamp) to charge the inverter:

If the power supply is directly connected to the DC bus capacitor of the drive device, the charging time should be at least 60 minutes. This must be done at normal room temperature and without a connected load, and the resistance must be in series in the three-phase circuit of the power supply.

380V drive unit: Use a 1k/100W resistor. A 100W incandescent lamp can also be used if the supply voltage is not greater than 380V. If an incandescent lamp is used, it is possible to go out or the light is very

weak during the whole charging process.

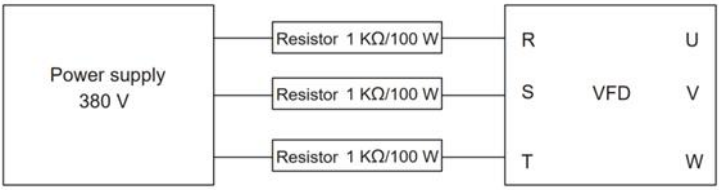


Figure 9-1 Example of a charging circuit for a 380V driver

9.1.4 Replace the electrolytic capacitor

⚠	Read and follow the instructions in "Safety Precautions" carefully. Ignoring these safety precautions may result in physical injury or damage to the equipment.

When the electrolytic capacitor in the frequency converter is used for more than 35,000 jobs, the electrolytic capacitor must be replaced. For specific operation methods, please contact the local office.

10. Communication Protocol

10.1 Content of this chapter

This chapter mainly introduces the communication protocol of F580 series.

F580 series frequency converter provides RS485 communication interface and use the international standard ModBus communication protocol for master-slave communication. Users can achieve centralized control (set inverter control commands, running frequency, modification of related function parameters, inverter working state and fault information monitoring, etc.) through PC/PLC, control upper computer, etc. to adapt to specific application requirements.

10.2 Introduction to Modbus protocol

The Modbus protocol is a software protocol that is a general-purpose language applied to electronic controllers. The controller can communicate with other devices via transmission lines by using this protocol,. It is a general industry standard that allows control devices from different manufacturers to be connected into an industrial network for centralized monitoring.

The Modbus protocol has two transmission modes: ASCII mode and RTU (Remote Terminal Units) mode. In the same Modbus network, all the basic parameters of the device including transmission mode, baud rate, data bit, check bit, stop bit, etc., must be consistent.

Modbus network is a single-master and multi-slave control network, that is, only one device in the same Modbus network is the master, and the other devices are the slaves. The master can communicate with one slave individually, and can also broadcast information to all slaves. For separate access commands, a slave needs to return a response. For broadcasted information, slaves do not need to return responses.

10.3 Application mode of the frequency converter

The Modbus protocol used by the inverter is RTU mode, and the network line is RS485.

10.3.1 RS485

RS485 interface works in half duplex, and the data signal adopts differential transmission mode, also known as balanced transmission. It uses a pair of twisted pairs, one line is defined as A (+), the other line is defined as B (-). Normally, if the positive electrical level between the transmission drives A and B ranges from +2V to +6V, the logic is "1"; and if it ranges from -2V to -6V, the logic is "0".

485+ on the frequency converter terminal board corresponds to A, and 485- corresponds to B.

Communication baud rate refers to the number of binary bits transmitted in one second, and its unit is bits per second in bits /s(bps). The higher the baud rate is set, the faster the transmission speed and the worse the anti-interference capability. When using 0.56mm (24AWG) twisted pair as a communication cable, the maximum transmission distance according to the baud rate is as follows:

Baud rate	Maximum transmission distance	Baud rate	Maximum transmission distance

Baud rate	Maximum transmission distance	Baud rate	Maximum transmission distance
2400bps	1800m	9600bps	800m
4800bps	1200m	19200bps	600m

It is recommended to use a shielded cable when RS485 is for remote communication, and use the shielding layer as the ground wire.

In the case of fewer devices and short transmission distance, the whole network can work well without terminal load resistor, but the performance will be reduced with the increase of distance, so it is recommended to use 120Ω terminal resistor for longer distances.

10.3.1.1 Single machine application

Figure 10-1 Modbus field wiring diagram for a single inverter and PC. Because the computer generally does not have RS485 interface, the RS232 interface or USB interface of the computer must be converted to RS485 through the converter. Connect the A end of RS485 to the 485+ port on the frequency converter terminal board, and connect the B end of RS485 to the 485- port on the frequency converter terminal board. It is recommended to use shielded twisted pair as much as possible. When the RS232-RS485 converter is used and the RS232 interface on the computer is connected to the RS232 interface on the RS232-RS485 converter, the line length should be as short as possible no more than 15m. It is recommended to insert the RS232-RS485 converter directly into the computer. Similarly, when using the USB-RS485 converter, the line should also be as short as possible.

After the line is connected, select the correct port (RS232-RS485 converter port, such as COM1) on the upper computer, and the communication baud rate and data bit check and other basic parameters are set to be consistent with the inverter.

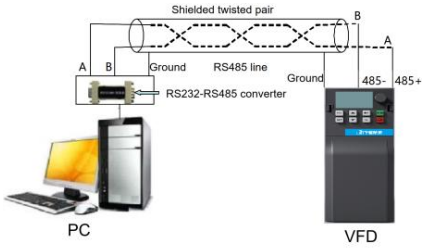


Figure 10-1 Physical wiring for an RS485 port in a single machine

10.3.1.2 Multimachine application

In actual multi-machine applications, chrysanthemum connection and star connection are generally used.

The RS485 industrial bus standard requires devices to be connected in chrysanthemum mode, and each end must be connected with a 120Ω terminal resistor, as shown in Figure 10-2. Figure 10-3 shows the simplified wiring diagram. Figure 10-4 shows the actual application diagram.

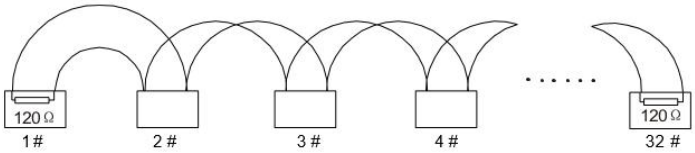


Figure 10-2 Onsite chrysanthemum connection

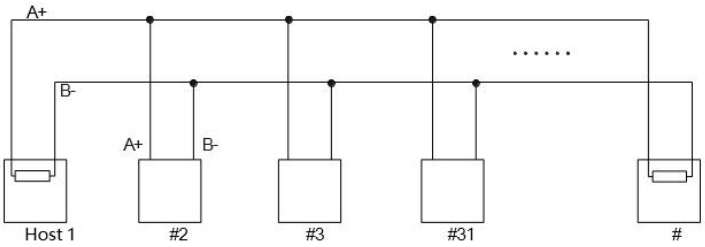


Figure 10-3 Simplified chrysanthemum connection

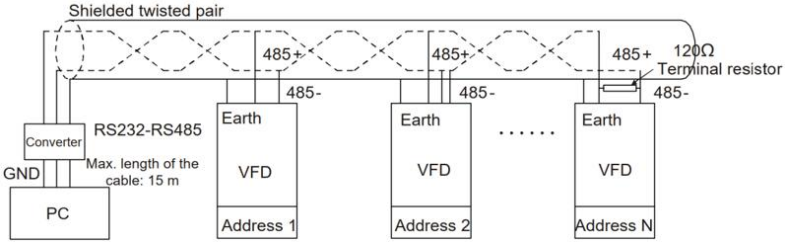


Figure 10-4 Chrysanthemum connection application

Figure 10-5 shows the star connection. The terminal resistors (1 # and 15 # devices) must be connected to the two devices with the farthest line distance.

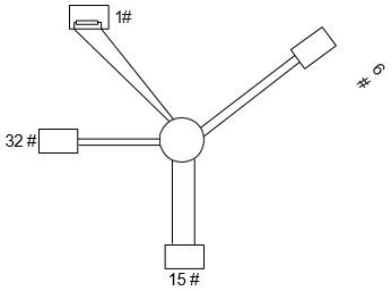


Figure 10-5 Star connection

The multi-machine connection should use shielded wires as much as possible. The basic parameters such as baud rate and data bit check of all devices on the RS485 line must be consistent, and the address must not be repeated.

10.3.2 RTU mode

10.3.2.1 RTU communication frame structure

When the controller is set to communicate in RTU mode over the Modbus network, each 8-bit byte in the message contains two 4-bit hexadecimal characters. The main advantage of this method is that it can transmit more data than ASCII at the same baud rate.

Code system

- 1 start bit.
- 7 or 8 data bits, the smallest significant bit sent first. 8-bit binary. Each frame domain of 8 bits includes 2

  hexadecimal characters (0–9, A–F).
- 1 parity check bit, none without a check.
- 1 stop bit (with a check), 2 bits (without a check).

Error detection field

- CRC (Cyclic Redundancy Check).

The data format is described in the following table:

11-BIT character frames (BIT1 to BIT8 are data bits) :

Start bit	BIT1	BIT2	BIT3	BIT4	BIT5	BIT6	BIT7	BIT8	Check bit	Stop bit

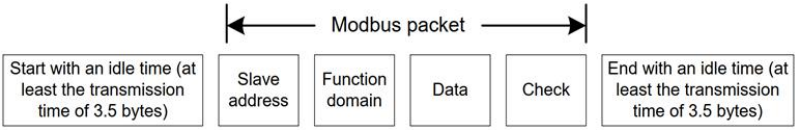
10-BIT character frame (BIT1 to BIT7 are data bits) :

Start bit	BIT1	BIT2	BIT3	BIT4	BIT5	BIT6	BIT7	Check bit	Stop bit

In a character frame, it is the data bit that really matters. The start, check, and stop bits are added only to properly transfer the data bits to the other device. Be sure to set the data bits, parity, and stop bits to be consistent in the actual application.

In RTU mode, a new frame always begins with a transmission time silence of at least 3.5 bytes. On networks where the transmission rate is calculated at baud rate, 3.5 bytes of transmission time can be easily grasped. The following data fields are: slave address, operation command code, data and CRC check character, each field transmission byte is hexadecimal 0... 9, A... F. The network device monitors the communication bus activity at all times. When the first field (address information) is received, each network device identifies the byte. As the last byte is transmitted, there is a similar 3.5-byte transmission interval to indicate the end of the frame, after which a new frame is transmitted.

RTU data frame format



A frame of information must be transmitted in a continuous data stream. If there is more than 1.5 bytes of

interval time before the end of the frame transmission, the receiving device will erase the incomplete information and mistakes the subsequent byte for the address field of a new frame. If the interval between the start of a new frame and the previous frame is less than 3.5 bytes, the receiving device will consider it to be the continuation of the previous frame. Due to the confusion of the frame, the CRC check value is incorrect, resulting in a communication fault.

The standard structure of an RTU frame:

Frame header START	T1-T2-T3-T4 (3.5 bytes of transmission time)
Slave address field ADDR	Communication address: 0~247 (in decimal) (0 is the broadcast address)
Function domain CMD	03H: Read slave parameters 06H: Write slave parameters
Data field DATA (N-1) ... DATA (0)	2*N bytes of data, which is the main content of communication and the core of data exchange in communication.
CRC CHK low	Detection value: CRC check value (16Bit)
CRC CHK high	
Frame END	T1-T2-T3-T4 (3.5 bytes of transmission time)

10.3.2.2 RTU communication frame error check method

In the process of data transmission, sometimes because of various factors make the data error. Without check, the device receiving the data will not identify that the information is incorrect, and it may respond incorrectly. This wrong response can lead to serious consequences, so the message must be checked.

The check is that the transmitter calculates the to-be-transmitted data based on a specific algorithm to obtain a result, adds the result to the rear of the message, and transmits them together. After receiving the message, the receiver calculates the data based on the same algorithm to obtain a result, and compares the result with that transmitted by the transmitter. If the results are the same, the message is correct. Otherwise, the message is considered incorrect.

The error check method of the frame mainly includes two parts of the check, that is, the bit check of the single byte (parity check, that is, the check bit in the character frame) and the whole data check of the frame (CRC check).

Byte bit check (parity check)

Users can choose different bit check methods according to their needs, or they can choose no check, which will affect the check bit setting for each byte.

The meaning of even check: an even bit is added before data transmission, which is used to indicate

whether the number of "1" in the data transmission is odd or even. If it is even, the check position is "0", otherwise it is set to "1", in order to keep the parity of the data unchanged.

The meaning of odd check: an odd bit is added before data transmission, which is used to indicate whether the number of "1" in the data transmission is odd or even. If it is odd, the check position is "0", otherwise it is set to "1", in order to keep the parity of the data unchanged.

For example, the data bit to be transmitted is "11001110", the data contains 5 "1", if the even check is used, the even bit is "1", if the odd check is used, the odd bit is "0". When the data is transmitted, the parity bit is calculated and placed in the position of the frame's check bit. The receiving device should also perform parity check. If it is found that the parity of the accepted data is inconsistent with the preset, it is considered that a communication error has occurred.

CRC (Cyclical Redundancy Check)

Using the RTU frame format, the frame includes a frame error detection field calculated based on the CRC method. The CRC field detects the contents of the entire frame. The CRC field is two bytes and contains 16 bits of binary value. It is calculated by the transmitting device and added to the frame. The receiving device recalculates the CRC of the received frame and compares it with the value in the received CRC field. If the two CRC values are not equal, there is an error in the transmission.

The CRC is stored at 0xFFFF and then a procedure is called to process more than 6 consecutive bytes in the frame with the value in the current register. Only the 8 bits of data in each character are valid for CRC, and the start and stop bits are not valid, as well as the parity bits.

During CRC generation, each 8-bit character is individually different from the register content or (XOR), and the result is moved in the direction of the least significant bit, and the most significant bit is filled with 0. The LSB is extracted for detection. If the LSB is 1, the register alone and the preset value are different OR. If the LSB is 0, no CRC is performed. The whole process is repeated 8 times. After the last bit (the 8th bit) is completed, the next 8-bit byte is separately different from the current value of the register. The value in the final register is the CRC value after all bytes in the frame have been executed.

This calculation method of CRC, using the international standard CRC check rule, the user can edit the CRC algorithm, you can refer to the relevant standard CRC algorithm, write a CRC calculation program that really meets the requirements.

The following example is a simple CRC calculation function for your reference (using the C programming language):

```
unsigned int crc_cal_value(unsigned char*data_value,unsigned char data_length)
{
int i;
unsigned int crc_value=0xffff; 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);
}
```

In the ladder logic, CKSM calculates CRC value according to the frame content, using the table lookup method. This method is simple and fast, but the program occupies a large ROM space. The program space is required, please use with caution.

10.4 RTU command code and communication data description

10.4.1 Command code: 03H, read N words (can read up to 16 words consecutively)

Command code 03H indicates that the master reads data from the inverter. The number of data to be read depends on the "Data count" in the command. A maximum of 16 data can be read. The parameter address to be read must be continuous. The byte length of each data is 2 bytes, that is, one word.

The following command formats are expressed in hexadecimal (a number followed by an "H" indicates a hexadecimal number), and each hexadecimal takes one byte. The function of this command is to read the parameters and working status of the frequency converter.

For example: baud rate 19200BPS, even check (E, 8,1) for RTU, from the function code F06.19 start address of the frequency converter whose address is 01 continuously read two consecutive values (that is, read the content of the data address F613H and F614H), then the structure of the frame is described as follows:

RTU master command information (the command sent by the master to the frequency converter):

START	T1-T2-T3-T4 (3.5 bytes of transmission time)
ADDR (address)	01H
CMD (command code)	03H
Start address high	F6H
Start address low	13H
Data count high	00H
Data count low	02H
CRC low	06H
CRC high	46H

END	T1-T2-T3-T4 (3.5 bytes of transmission time)

T1-T2-T3-T4 (3.5 bytes of transmission time) in START and END means to keep the RS485 idle for at least 3.5 bytes of transmission time. This allows a certain idle time between the two messages to distinguish the two messages and ensure that the device will not mistake the two messages for one message.

ADDR 01H indicates that the command is used to send data from the frequency converter whose address is 01H. ADDR occupies one byte.

CMD 03H indicates that the command is used to read data from the frequency converter. CMD occupies one byte.

"Start address" indicates that data is read from this address. The "Start address" occupies two bytes with the MSB on the left and LSB on the right.

"Data count" indicates the number of data to be read (unit: word). The "Start address" is F613H, and the "Data count" is 0002H, which indicates that the data is read from the two addresses F613H and F614H.

CRC check occupies two bytes with the LSB on the left and MSB on the right.

RTU slave response information (the information sent by the frequency converter to the master):

START	T1-T2-T3-T4 (3.5 bytes of transmission time)
ADDR	01H
CMD	03H
Bytes	04H
Address 0004H Data high	00H
Address 0004H Data low	00H
Address 0005H Data high	03H
Address 0005H Data low	E8H
CRC low	FAH
CRC high	8DH
END	T1-T2-T3-T4 (3.5 bytes of transmission time)

Meaning of the response message is:

ADDR 01H indicates that the command is sent by the frequency converter whose address is 01H. ADDR occupies one byte.

CMD 03H indicates that the information is sent by the converter to the master in response to the master read command (03H). CMD occupies one byte.

"Data count" indicates the number of all bytes from that byte (not included) to the CRC byte (not included). 04 indicates that there are 4 bytes of data between "Data count" and "CRC low", that is, the four bytes of

"Address F613H data high", "Address F613H data low", "Address F614H data high" and "Address F614H data low".

The data stored in a data is two bytes, with the high data in front and the low data in back. It can be seen from the information that the data address is 0000H in F613H, and the data address is 03E8H in F614H. CRC check occupies two bytes, the low is in the front, the high is in the back.

10.4.2 Command code: 06H, write one word

The command indicates that the master writes data to the frequency converter, a command can only write one data, can not write multiple data. Its function is to change the parameters and working mode of the inverter.

For example: baud rate 19200BPS, even check (E, 8,1) for RTU, 40.00Hz (communication without decimal point) (0FA0H) to the slave address 02H inverter function code F00.09H address, change the set frequency of the frequency converter panel to 40.00Hz. Then the structure of the frame is described as follows:

RTU master command information (the command that the master sends to the frequency converter):

START	T1-T2-T3-T4 (3.5 bytes of transmission time)
ADDR	02H
CMD	06H
Write data address high	F0H
Write data address low	09H
Data content high	0FH
Data content low	A0H
CRC low	6FH
CRC high	73H
END	T1-T2-T3-T4 (3.5 bytes of transmission time)

RTU slave response information (the information sent by the frequency converter to the master):

START	T1-T2-T3-T4 (3.5 bytes of transmission time)
ADDR	02H
CMD	06H
Write data address high	F0H
Write data address low	09H
Data content high	0FH
Data content low	A0H

CRC low	6FH
CRC high	73H
END	T1-T2-T3-T4 (3.5 bytes of transmission time)

Note: Sections 10.4.1 and 10.4.2 mainly introduce the format of the command. The specific usage will be illustrated in section 10.4.7.

10.4.3 Command code: 10H: indicates the continuous writing function

Command code 10H indicates that the master writes data to the inverter. The quantity of data to be written is determined by "Data count", and a maximum of 16 pieces of data can be written.

For example: baud rate 19200BPS, even check (E, 8,1) for RTU, 40.00Hz (communication without decimal point) (0FA0H) write to the slave address 02H inverter function code F00.09H address, change the set frequency of the frequency converter panel to 40.00Hz; write 1 (0001H) to the function code F00.10H address of the slave address 02H frequency converter, and reverse the running direction of the frequency converter. Then the structure of the frame is described as follows:

RTU master command information (the command that the master sends to the frequency converter):

START	T1-T2-T3-T4 (3.5 bytes of transmission time)
ADDR	02H
CMD	10H
Write data address high	F0H
Write data address low	09H
Data count high	00H
Data count low	02H
Number of bytes	04H
Data 0004H content high	0FH
Data 0004H content low	A0H
Data 0005H content high	00H
Data 0005H content low	01H
CRC low	FAH
CRC high	73H
END	T1-T2-T3-T4 (3.5 bytes of transmission time)

RTU slave response information (the information sent by the frequency converter to the master):

START	T1-T2-T3-T4 (3.5 bytes of transmission time)

ADDR	02H
CMD	10H
Write data address high	F0H
Write data address low	09H
Data count high	00H
Data count low	02H
CRC low	A2H
CRC high	F9H
END	T1-T2-T3-T4 (3.5 bytes of transmission time)

10.4.4 Definition of the data address

This part is the address definition of the communication data, which is used to control the operation of the frequency converter, obtain the status information of the frequency converter and set the relevant function parameters of the frequency converter.

10.4.4.1 Function code address representation rules

The function code address takes two bytes, with the high digit in front and the low digit in back. The range of high and low bytes is: high byte -F0 to FFH; Low byte - 0~FFH. The high byte is the group number before the function code dot number, and the low byte is the number after the function code dot number, but both are converted to hexadecimal. For example, F05.06, the group number before the function code point number is 05, then the high level of the parameter address is F5, and the number after the function code point number is 06, then the parameter ground

The lower part of the address is 06, and the hexadecimal number indicates that the function code address is F506H. For example, the parameter address of the F10.01 function code is FA01H.

Note: This part is the content of communication, which is used to control the operation of the frequency converter, the status of the frequency converter and the related parameter setting.

Read and write function code parameters (some function codes can not be changed, only for manufacturers to use):

Take the function code group number and bit number as the parameter address to indicate the rule:

High byte: Function code group number (F0 ~ FF) Group 0 to group 15 Low byte: function code number (00 ~ FF)

For example: F13.17, the address is represented as FD11H;

Function code group number	Communication access address (write EEPROM)	Communication modify function code address in RAM
Groups F00 ~ F15	0xF000 ~ 0xFFFF	0x0000 ~ 0x0EFF

Function code group number	Communication access address (write EEPROM)	Communication modify function code address in RAM
Groups A00 ~ A15	0xA000 ~ 0xAFFF	0x4000 ~ 0x4FFF
Group b00	0x7000 ~ 0x70FF	

Group F15 sets parameters for the manufacturer, and can neither read the group parameters nor change the group parameters; Some parameters can not be changed when the inverter is in the running state; Some parameters can not be changed no matter what state the inverter is in; Change the function parameters, but also pay attention to the setting range of parameters, units and related instructions.

10.4.4.2 Address description of other functions of Modbus

In addition to operating the parameters of the frequency converter, the master can also control the frequency converter, such as running, stopping, etc., and can also monitor the working state of the frequency converter.

Table 10-1 List of other function parameters

Function Description	Address definition	Data Meaning statement	R/W characteristics
Communication control commands	1000H	0001H: Forward running	W/R
		0002H: Reverse running	
		0003H: Stop	
		0004H: Coast to stop (emergency stop)	
		0005H: Fault reset	
		0006H: Forward jog	
		0007H: Reverse jog	
		0008H: Jog stop	
Inverter status word	1001H	0001H: Forward running 0002H: Reverse running 0003H: The frequency converter in stop 0004H: The frequency converter in fault	R
Communication setting value address	2000H	Set communication frequency (-10000 ~ 10000,10000 corresponds to 100.00%, -10000 corresponds to -100.00%)	W/R
	2001H	Torque setting value (-1000 ~ 1000,1000 corresponds to 100.0%)	W/R

Function Description	Address definition	Data Meaning statement	R/W characteristics
	2002H	Upper frequency setting value (0 ~ Fmax (unit: 0.01Hz)	W/R
	2003H	PID preset, ranging from 0 to 1000. 1000 corresponds to 100.0%	W/R
	2004H	PID feedback, ranging from 0 to 1000. 1000 corresponds to 100.0%	W/R
	2005H	V/F separation voltage setting value. The value ranges from 0 to 1000. 1000 corresponds to 100.0%	W/R
	200BH	Digital output terminal control: BIT0: DO output control BIT1: Reserved BIT2: RELAY1 output control BIT3: RELAY2 output control BIT4: FMR output control BIT5: VDO1 BIT6: VDO2 BIT7: VDO3 BIT8: VDO4 BIT9: VDO5	W/R
	200CH	HDO output setting value. The value ranges from 0 to 1000. 1000 corresponds to 100.0%	W/R
	200DH	AO1 output setting value. The value ranges from 0 to 1000. 1000 corresponds to 100.0%	W/R
	200EH	AO2 output setting value. The value ranges from 0 to 1000. 1000 corresponds to 100.0%	W/R
Run/Stop parameter address description	3000H	Running frequency, ranging from 0 to Fmax, unit 0.01Hz	R
	3001H	Set frequency, ranging from 0 to Fmax, unti 0.01Hz	R
	3002H	Output current, ranging from 0.0 to 3000.0, unit 0.1A	R

Function Description	Address definition	Data Meaning statement	R/W characteristics
	3003H	Output voltage, ranging from 0 to 1200V, unit 1V	R
	3004H	Running speed, ranging from 0 to 65535, unit 1RPM	R
	3005H	Bus voltage, range 0 to 2000.0, unit 0.1V	R
	3006H	Output power, ranging from -300.0 to 300.0%, unit 0.1%	R
	3007H	Output torque, range -250.0 to 250.0%, unit 0.1%	R
	3008H	Input terminal status, ranging from 000 to 0FF, unit 01H	R
	3009H	Output terminal status, ranging from 00 to 0F, unit 01H	R
	300AH	Analog AI1 value, ranging from 0.00 to 10.00V, unit 0.01V	R
	300BH	Analog AI2 value, ranging from 0.00 to 10.00V, unit 0.01V	R
	300CH	High speed pulse HDI, ranging from 0.00 to 50.00kHz, unit 0.01kHz	R
	300DH	PID reference value, ranging from 0 to 65535	R
	300EH	PID feedback value, ranging from 0 to 65535	R
	300FH	PLC and multi-step current step, ranging from 0 to 15	R
	3010H	External count value, ranging from 0 to 65535	R
	3011H	Torque setting value, ranging from -200.0 to 200.0%, unit 0.1%	R
	3012H	Fault code, ranging from 0 to 65535	R
	3013H	Device code, ranging from 0 to 65535	R
	3014H	External count value, ranging from 0 to 65535	R
	3015H	Load speed, ranging from 0 to 65535, unit 1RPM	R

Function Description	Address definition	Data Meaning statement	R/W characteristics
	3016H	Feedback speed, ranging from 0 to Fmax, unit 0.01Hz	R
	3017H	Remaining running time, ranging from 0.0 to 6553.5Min, unit 0.1Min	R
	3018H	AI1 voltage before correction, ranging from 0.00 to 10.00V, unit 0.01V	R
	3019H	AI2 voltage before correction, range is 0.00~10.00V, unit 0.01V	R
	301AH	Linear speed, ranging from 0 to 65,535m /Min, unit 1m/Min	R
	301BH	Current power-on time, ranging from 0 to 65,535min, unit 1Min	R
	301CH	Current running time, ranging from 0.0 to 6553.5Min, unit 0.1Min	R
	301DH	High speed pulse HDI, ranging from 0 to 50,00Hz, unit 1Hz	R
	301EH	Communication set frequency, ranging from -100.00 to 100.00%, unit 0.01%	R
	301FH	Encoder feedback speed, ranging from 0 to Fmax, unit 0.01Hz	R
	3020H	Main frequency X display, ranging from 0 to Fmax, unit 0.01Hz	R
	3021H	Auxiliary frequency Y display, ranging from 0 to Fmax, unit 0.01Hz	R

Note: Values such as "10000" and "1000" in the above table are decimal numbers, which need to be converted into hexadecimal in actual use.

The R/W feature indicates that the function is a read/write feature, for example, "communication control command" is a write feature, and the write command (06H) is used to control the frequency converter. The R feature can only read but not write, and the W feature can only write and not read.

Note: When using the above table to operate the inverter, some parameters must be enabled in order to work. For example, with the run and stop operation, the Command Source Selection (F00.01) must be set to the Serial Port Communication Command Channel.

10.4.5 Fieldbus scale value

In practical use, communication data is expressed in hexadecimal, and the hexadecimal cannot represent the decimal point. For example, 50.12Hz, which can not be expressed in hexadecimal, we can magnify 50.12 100 times into an integer (5012), so that we can use hexadecimal 1394H (i.e. 5012 in decimal) represents 50.12.

Multiply a non-integer by a multiple to get an integer, this multiple is called the fieldbus scale value.

The fieldbus scale value is based on the decimal point of the value in the "Set Range" or "Default value" in the function parameter table. If there are n decimal places after the decimal point (for example, n=1), the fieldbus scale value m is 10 to the power of n (m=10).

If the "Set Range" or "Default" has two decimal places, the fieldbus scale value is 100. If the value received by the upper computer is 4000, then the "preset frequency (F00.09)" of the inverter is 40.00 (40.00=4000÷100).

If the preset frequency (F00.09) is controlled by Modbus communication, it is 40.00Hz. First of all, 40.00 is scaled up 100 times to become an integer 4000, that is, 0FA0H send write instruction:

02	06	F0 09	0F A0	6F 73
Inverter address	Write command	Parameter address	Parameter data	CRC check

After receiving the instruction, the frequency converter will change 4000 into 40.00Hz according to the fieldbus ratio value convention, and then set the preset frequency (F00.09) to 40.00 Hz. For another example, after the upper computer finishes reading the parameter instruction of "preset frequency (F00.09)", the master receives the response information from the frequency converter as follows:

02	03	02	0F A0	F9 CC
Inverter address	Read command	Two-byte data	Parameter data	CRC check

Because the parameter data is 0FA0H, that is 4000, 4000 is divided by 100 proportionally into 40.00. The master then knows that the preset frequency (F00.09) is 40.00Hz.

10.4.6 Error message response

In the communication control, there will inevitably be operational errors, such as some parameters can only be read but not written, the result is sent a write command, then the inverter will send back an error message response information.

The error message response is sent by the frequency converter to the master, and its code and meaning are as follows:

Codes	Name	implication
01H	Illegal command	When the command code received from the upper computer is a disabled operation, the possible cause is that the function code is only applicable to the new device and is not implemented in this device or the slave machine

Codes	Name	implication
		processes the request in faulty state.
02H	Illegal data address	For the frequency converter, the upper computer's request data address is not allowed. In particular, the combination of the register address and the number of the to-be-sent bytes is invalid.
03H	Illegal data value	When the received data field contains a value that is not allowed, this value indicates an error in the remaining structure of the combined request. **Note:** It does not mean that the data item submitted for storage in the register includes a value unexpected by the program.
06H	Slave equipment busy	Inverter busy (EPPROM in storage)
10H	Wrong password	The password entered in the password verification address is different from that set in F05.03.
11H	Check error	When the RTU CRC check bit or ASCII LRC check bit in the frame information sent by the upper computer is different from the check calculation number of the lower computer, a check error message is reported.
12H	Invalid parameter change	In the parameter write command sent by the upper computer, the data sent is outside the range of the parameter or the write address is currently unalterable or the input terminal selection function is written. It has been occupied by another terminal.
13H	System locked	When the upper computer reads or writes and the user password is set without system unlocking, the effor of “system locked” is reported.

When the slave responds, it uses the function code field and fault address to indicate whether the response is normal (no errors) or some kind of error has occurred (called an objection response). For a normal response, the slave device responds with the corresponding function code and data address or subfunction code. For an objection response, a code equivalent to the normal code is returned from the device, but the top position is logical 1.

For example, a message from a master device to a slave device asking to read a set of frequency converter function code address data will produce the following function code:

0 0 0 0 0 0 1 1 (hexadecimal 03H)

On normal response, the slave device responds with the same function code. For dissenting response, it returns:

1 0 0 0 0 0 1 1 (hexadecimal 83H)

Except that the function code has been modified due to objection errors, the slave device will respond with a byte exception code, which defines the cause of the exception. When the master device application receives a response to the exception, it typically resends the message or makes a command change in response to the corresponding fault.

For example, set the Command Source Selection (F00.01, parameter address F001H) of a frequency converter with address 01H to 03 with the following instructions:

01	06	F0 01	00 03	AB 0B
Inverter address	Write command	Parameter address	Parameter data	CRC check

But the set range of "command source selection" is only 0~2, set to 3 is out of the range, then the inverter will return the error message response information, the response information is as follows:

01	86	03	02 61
Inverter address	Abnormal response code	Error code	CRC check

Abnormal response code 86H (from the highest position of 06H "1") represents the abnormal response of write instruction (06H); Error code 03H, as can be seen from the table above, its name is "operation failed", meaning "invalid setting for this parameter during parameter write operation".

10.4.7 Examples of read and write operations

See sections 10.4.1 and 10.4.2 for read/write instruction formats.

10.4.7.1 Read command 03H examples

Example 1: Read status word 1 of a frequency converter with address 01H. From Table 10-1, it can be seen that the parameter address of the status word of the converter is 1001H, and the read command sent to the converter is as follows:

01	03	10 01	00 01	D1 0A
Inverter address	Read command	Parameter address	Number of data	CRC check

Assume the response information is as follows:

01	03	02	00 03	F8 45
Inverter address	Read command	Data address	Number of data	CRC check

The data returned by the frequency converter is 0003H. It can be seen from the table that the frequency converter is in stop.

10.4.7.2 Write instruction 06H examples

Example 1: Run the frequency converter with address 03H in forward rotation. See "Table 10-1", the address of "Communication control command" is 1000H, and the forward transfer behavior is 0001H, see the table below.

Function Description	Address definition	Data Meaning statement	R/W characteristics
Communication control command	1000H	0001H: Forward running	R/W
		0002H: Reverse running	
		0003H: Stop	
		0004H: Coast to stop (emergency stop)	
		0005H: Fault reset	
		0006H: Forward jog	
		0007H: Reverse jog	
		0008H: Jog stop	

The command sent by the master is:

01	06	10 00	00 01	4C CA
Inverter address	Write command	Parameter address	Forward running	CRC check

If the operation is successful, the following response message is returned (the same as the command sent by the master)

01	06	10 00	00 01	4C CA
Inverter address	Write command	Parameter address	Forward running	CRC check

Note: the space in the above instruction is only for ease of explanation, do not add space in the actual use of the instruction.

10.4.7.3 Continuous instruction 10H example

Example 1: Set the communication setting frequency of the frequency converter addressed as 01H to 100.00%, set the torque setting value to 100.0%, see "Table 10-1", "communication setting frequency" address is 2000H, the hexadecimal corresponding to 100.00% is 2710H, "torque setting value" address is 2001H, The hexadecimal corresponding to 100.0% is 03E8H, as shown in the following table:

Function description	Address definition	Data Meaning statement	R/W characteristics
Communication setpoint address	2000H	Communication set frequency (-10000 ~ 10000,10000 corresponds 100.00%, -10000 corresponds to -100.00%)	R/W
	2001H	Torque setpoint (-1000 ~ 1000,1000 corresponds to 100.0%)	

Function description	Address definition	Data Meaning statement	R/W characteristics
	2002H	Upper frequency set value (0 ~ Fmax (unit: 0.01Hz)	
	2003H	PID preset, range 0 to 1000,1000 corresponds to 100.0%	
	2004H	PID feedback. The value ranges from 0 to 1000. 1000 corresponds to 100.0%	
	2005H	V/F separation voltage set values, ranging from 0 to 1000,1000 corresponds to 100.0%	

The command sent by the master is:

01	10	20 00	00 02	04	27 10	03 E8	61 A1
Inverter address	Conscript command	Parameter address	Data number	Bytes	Data content	Data content	CRC check

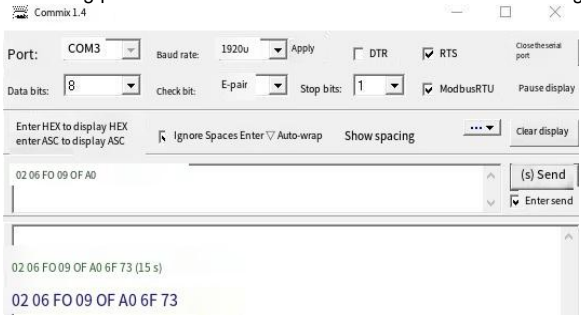
Frequency converter address conscript command parameter Address Data Number bytes Data Content Data content CRC check

If the operation is successful, the following response message is returned (the same as the command sent by the master) :

01	10	20 00	00 02	4A 08
Inverter address	Conscript command	Parameter address	Data number	CRC check

10.4.7.4 Example of Modbus communication commissioning

The master is a PC, and RS232-RS485 converter is used for signal conversion. The serial port of PC used by the converter is COM3 (RS232 port). PC commissioning software for serial commissioning assistant, the software can be downloaded on the Internet search, download as far as possible to find with automatic CRC check function. The following picture shows the interface of the serial commissioning assistant used.



First select COM3 for "Serial Port". The baud rate should be consistent with the Settings. Data bit, check

bit, stop bit must be consistent with the set. Because you are using RTU mode, choose HEX. To automatically add CRC to the software, be sure to select it, and select CRC16 (ModbusRTU) with a start byte of 1. Once CRC check is enabled, do not fill in CRC when filling in the instruction, otherwise it will repeat and cause the instruction error.

The commissioning instruction is to change the preset frequency (F00.09) of the frequency converter with the address of 02H to 40.00Hz (10.4.7 case 1), that is, the instruction:

03	**06**	**F0 09**	**0F A1**	**6F 73**
Inverter address	Write command	Parameter address	Forward running	CRC check

10.5 Common communication faults

Common communication faults are: communication without response and inverter return abnormal fault. Possible reasons for non-response of communication are:

1. The serial port selection is wrong, for example, the converter is using COM3, COM2 is selected during communication.
2. Baud rate, data bit, stop bit, check bit and other parameters are not consistent with the frequency converter.
3. RS485 bus +, - polarity in reverse connection.
4. The 485 terminals on the inverter terminal board matching the resistor is set improperly.

Appendix A Technical Data

A.1 Content of this chapter

This chapter introduces the technical data of the inverter, and the situation of compliance with CE and other quality certification systems.

A.2 Derating the frequency converter

A.2.1 Capacity

Determine the specifications of the inverter based on rated motor current and power. In order to achieve the motor power rating given in the table, the rated output current of the inverter must be greater than or equal to the rated motor current. The rated power of the inverter must also be greater than or equal to the rated power of the motor.

Note:

The rated capacity is the capacity at an ambient temperature of 40 °C.

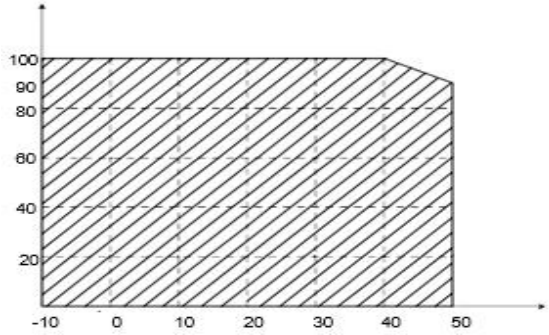
It must be checked and confirmed that the power flowing through the common DC connection must not exceed the rated motor power in a common DC system.

A.2.2 Derate

If the ambient temperature of the installation site exceeds 40°C, the altitude exceeds 1000m, the heat dissipation hole cover plate or the carrier frequency is greater than the recommended frequency in the manual, derate by 10% for every 1k increase in the carrier frequency.

A.2.2.1 Temperature derating

The temperature range is from +40°C to +50°C the rated output current is derated by 1% for each increased 1°C. Refer to the table below for actual derating.



Note: It is not recommended to use the frequency converter above 50°C; otherwise, the resulting consequences are the responsibility of the customer.

A.2.2.2 Altitude derating

The frequency converter installed at an altitude of 1000m below can output rated power. When the altitude exceeds 1000m, please derate by 1% for every 100m increase.

A.3 Grid specifications

Grid voltage	AC 3PH 380V~480V
Short circuit capacity	The maximum allowable short-circuit current at the inlet end is 100kA as defined in IEC 61439-1. The frequency converter is suitable for the application where the RMS of the circuit transmission current is not more than 100kA at the maximum rated voltage.
Frequency	50/60Hz±5% with a maximum change rate of 20%/s

A.4 Motor connection data

Motor type	Asynchronous induction motor or synchronous permanent magnet motor
Voltage	0 to U1 (rated voltage of motor), three-phase symmetry, voltage at weak magnetic point is Umax (rated voltage of inverter)
Short circuit protection	Short circuit protection for motor output complies with IEC 61800-5-1
Frequency	0~400Hz
Frequency resolution	0.01Hz
Current	See "3.6 Product ratings"
Power limit values	1.1 times of the rated motor power
Weak magnetic point	10~400Hz
Carrier frequency	2, 4, 8, 12 or 15kHz

A.4.1 EMC compatibility and motor cable length

To meet the requirements of IEC/EN 61800-3 Class II (C3) and Class I (C2) electromagnetic environments, the F580 series offers both built-in and external filter solutions. Measured according to 4K carrier frequency, the motor cable length that can be achieved is shown in the following table:

F580 power range	Length of motor cable supported (unit: m)			
	Built-in		External	
	Second class environment C3	First class environment C2	Second class environment C3	First class environment C2
22~1.5kW	20	20	1	/

30~500kW	30	No built-in solutions available	30	/

For an explanation of the electromagnetic environment (C3/C2), see "A.6 EMC specifications".

A.5 Application standards

Frequency converters follow the following standards:

EN/ISO 13849-1	Safety of machinery - Safety-related control system components - Part 1: General principles for design
IEC/EN 60204-1	Safety of machinery. Electrical equipment for machinery. Part 1: General requirements
IEC/EN 62061	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
IEC/EN 61800-3	Speed-controlled electrical drive systems. Part 3: Electromagnetic Compatibility (EMC) Electromagnetic compatibility standards and specific test methods for speed regulating electrical drive system products
IEC/EN 61800-5-1	Variable speed electrical drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy

A.5.1 CE marking

The CE marking on our nameplate indicates that this inverter has passed the CE certification, in accordance with the European Low Voltage Directive (2014/35/EU) and Electromagnetic Compatibility Directive (2014/30/EU).

A.5.2 Comply with the EMC specification declaration

The European Union stipulates that the electronic and electrical equipment sold in Europe must meet the requirements of not producing more than the electromagnetic disturbance emission limit specified in the relevant standards and have the electromagnetic immunity ability to work normally in a certain electromagnetic environment. The EMC Product Standard (EN 61800-3) details the electromagnetic compatibility standards and specific test methods for speed-controlled electrical drive system products. Our products strictly follow these specifications.

A.6 EMC specifications

The EMC Product Standard (EN 61800-3) specifies the EMC requirements for inverter products. Application environment classification:

The first type of environment: civil environment. Includes those application environments that are directly connected to the low-voltage power supply grid for civilian power supply without passing through an intermediate transformer.

The second type of environment: all applications other than those that are directly connected to the low-voltage power supply grid for civilian power supply. Four categories of frequency converters:

C1 frequency converter: Rated voltage is less than 1000V, and is used in the first type of environment frequency converter.

Class C2 frequency converters: rated voltage below 1000V, non-plug, socket or mobile devices; A power drive system that must be installed and operated by a professional when applied to a Class I environment.

Note: The EMC standard IEC/EN 61800-3 no longer restricts inverter power distribution, but defines use, installation and commissioning. A professional or organization needs to have the necessary skills to install and/or commission an electrical drive train, including EMC related knowledge.

Class C3 drives: Rated below 1000V for Class II environments and not for Class I environments.

C4 frequency converter: Rated voltage is higher than 1000V, or rated current ≧ 400A, and used in complex systems in the second class environment.

Appendix B Dimension Drawings

B.1 Content of this chapter

This chapter provides the dimension drawings of F580 series frequency converter. The unit in the dimension drawings is millimetres (mm).

B.2 Keypad structure

B.2.1 Keypad appearance and dimensions

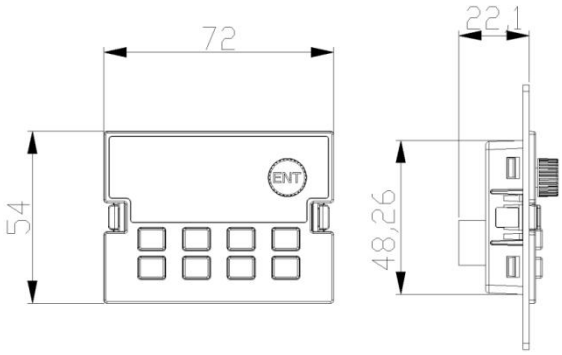


Figure B-1 Keypad appearance and dimensions of 22kW below (unit: mm)

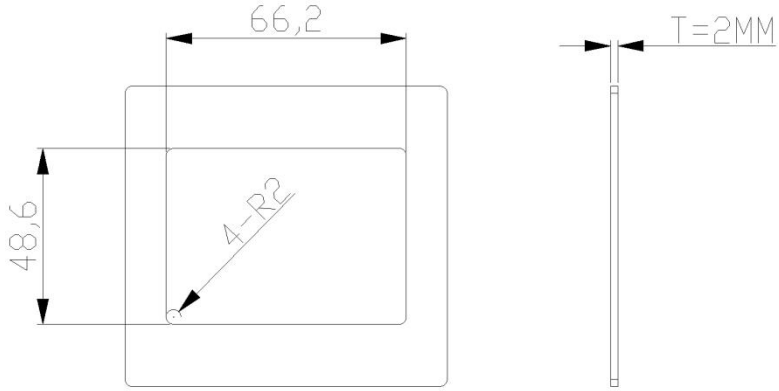


Figure B-2 Dimensions of an external opening hole for a keypad of 22kW below (unit: mm)

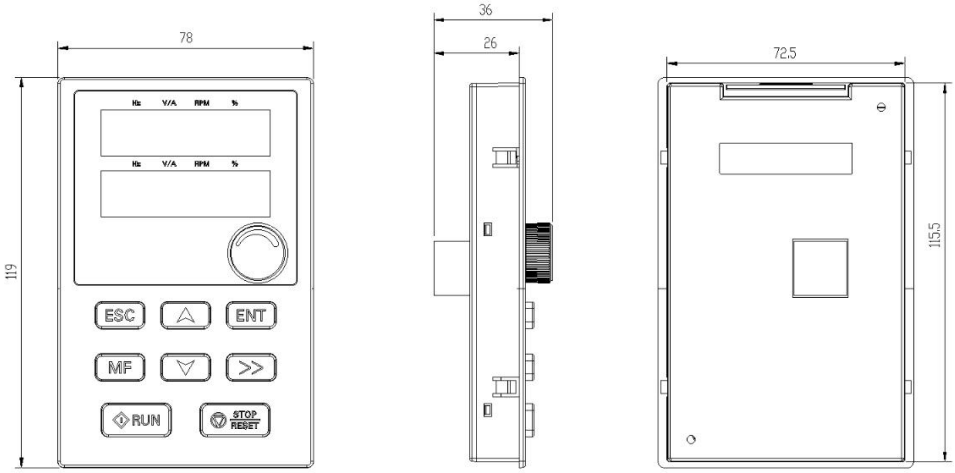


Figure B-3 Appearance and dimensions of a keypad of 22kW above (unit: mm)

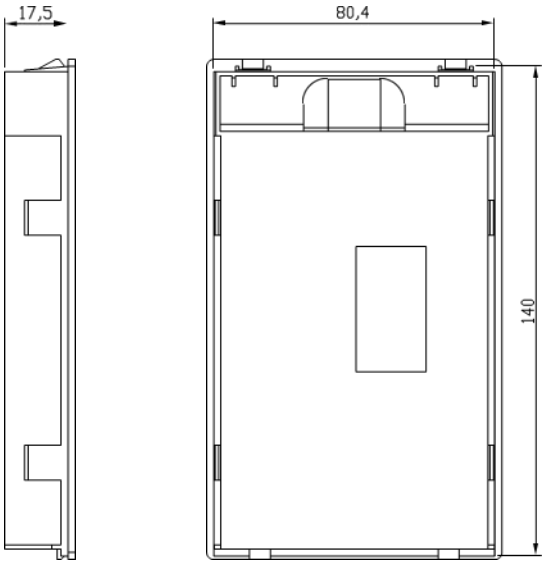


Figure B-4 Dimensions of the external keypad bracket of 22kW above (unit: mm)

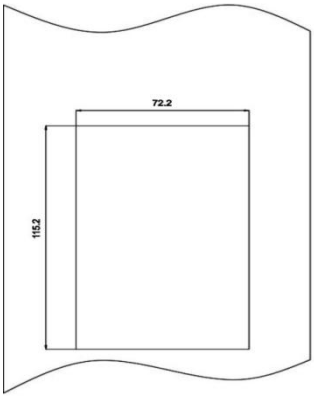


Figure B-5 Dimensions of opening holes on the operation panel (keypad)

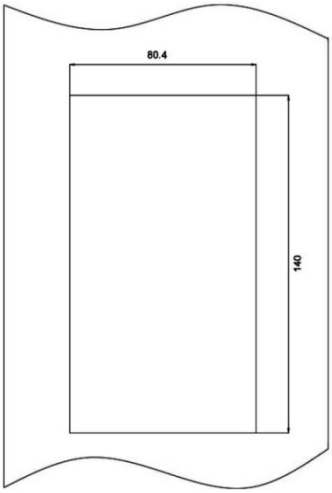


Figure B-6 Dimensions of opening holes on the operation panel support (keypad tray)

B.2.2 Frequency converter appearance and dimensions

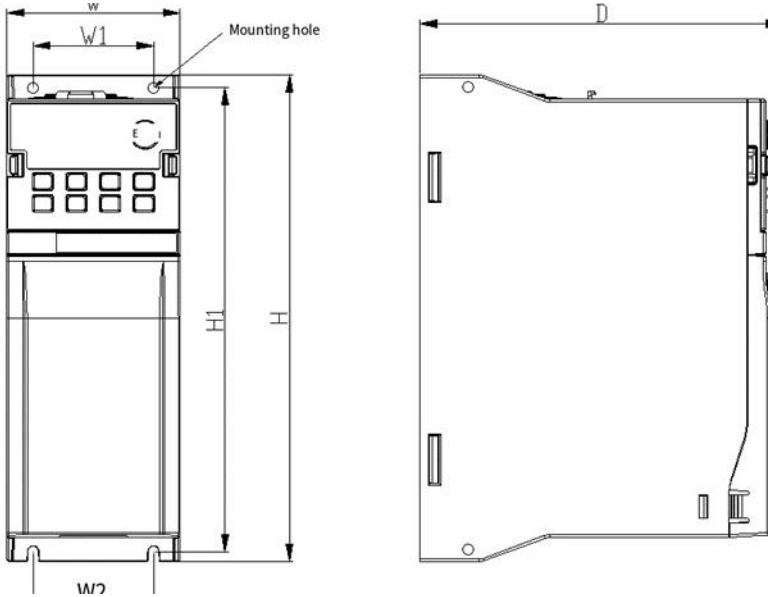


Figure B-7 Appearance of 1.5 to 22kW wall mounting

Inverter specifications	Overall dimensions (mm)			Mounting hole position (mm)			Mounting aperture	Set screws
	W	H	D	H1	W1	W2		
0.7~2.2kW/380V	72	200	150.5	190.8	50	50	ø 4	M4
4~7.5kW/380V	100	240	160.5	230.8	70	70	ø 4	M4
11~15kW/380V	120	330	172.5	321.5	111	107	ø 4	M4
18.5~22kW/380V	142	383	227.5	373.5	120	129	ø4	M4

Table B-1 Dimensions of 0.7KW to 22kW wall mounting

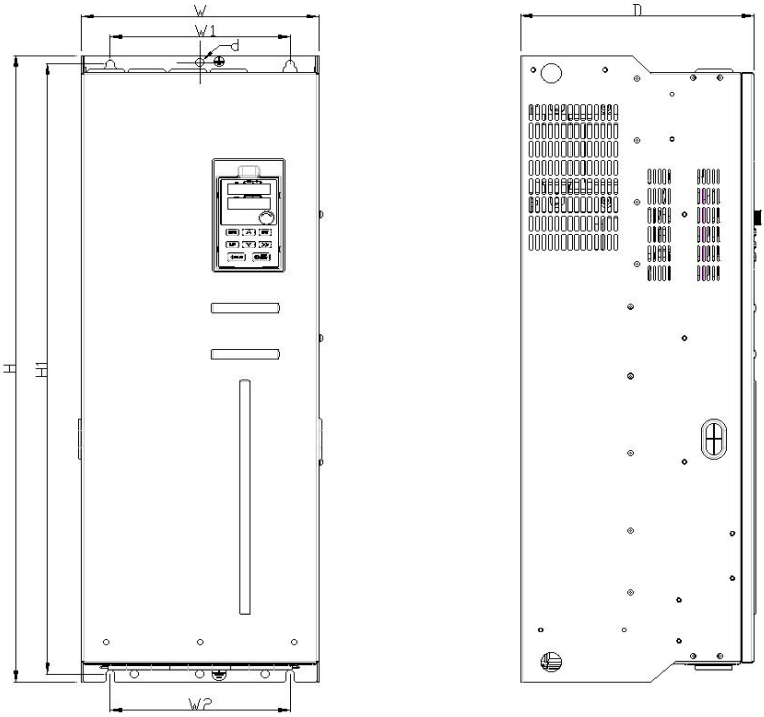


Figure B-8 Appearance of 380V 30KW to 500kW wall mounting

Inverter specifications	Mounting dimensions without base (mm)						Mounting aperture	Set screw
	W	H	D	W1	W2	H1		
30-37kW/380V	172	430	230	140	140	412	Φ 7	M6
45-55kW/380V	210	500	270	150	150	480	Φ 10	M10
75-110kW/380V	290	810	285	220	220	790	Φ 10	M10
132-160kW380V	315	970	310	250	250	940	Φ 12	M12
185-220kW/380V	360	995	480	180	180	953	Φ 18	M18
250-315kW/380V	370	1194	550	200	200	1164	Φ 18	M18
355-500kW/380V	410	1500	550	200	200	1470	Φ 18	M18

Table B-2 Dimensions of 380V 30KW to 500kW wall mounting

B.2.3 Floor mounting dimensions

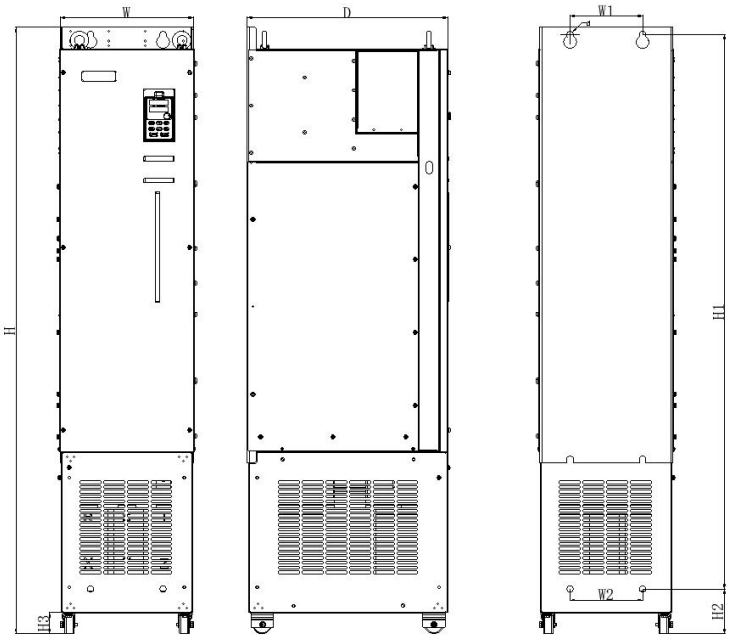


Figure B-9 380V 75KW~500kW floor mounting dimensions

Inverter specifications	Mounting dimensions with optional base (mm)								Mounting aperture
	W	H	D	W1	W2	H1	H2	H3	
75kW~110kW	290	1248	285	220	220	815	422	53	Φ 10
132kW~160kW	315	1408	310	250	250	970	422	53	Φ 12
185kW~220kW	360	1460	480	180	180	1315	118	57	Φ 18
250kW~315kW	370	1665	550	200	200	1520	123	57	Φ 18
355KW~500KW	410	2075	550	200	200	1942	112	57	Φ 18

Table B-3 Dimensions of 380V 75KW~500kW floor mounting

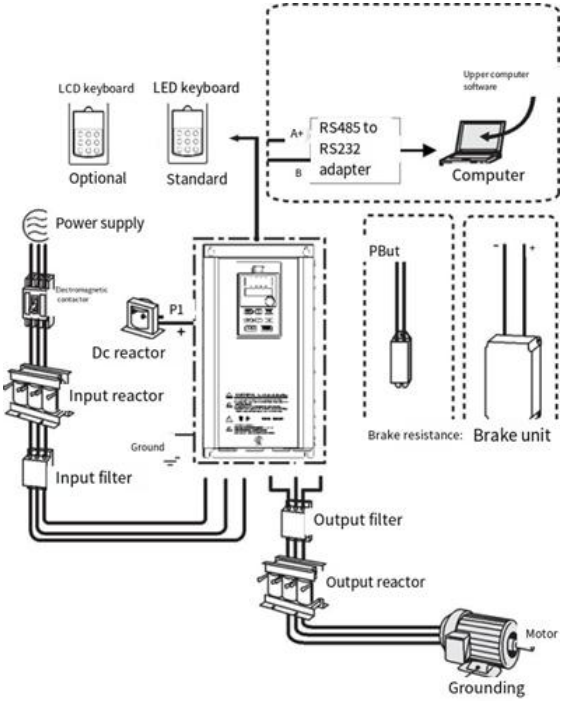
Appendix C Optional Peripheral Accessories

C.1 Content of this chapter

This chapter describes how to select optional accessories for the F580 series.

C.2 Peripheral wiring

The following figure shows the external connection diagram of the F580 series frequency converter.



Note: The DC reactor can be optional and built-in. It is shipped after installation by the manufacturer.

Photo	Name	Instructions
	Cable	A device to transmit electrical signals
	Circuit breaker	Prevent electric shock accidents and protect the ground short circuit that may cause leakage current fire (Please choose leakage circuit breakers for frequency converter devices with the function of suppressing higher harmonics. The rated sensitive current of the circuit breaker should be greater than 30mA for a frequency converter.)

Photo	Name	Instructions
	Input reactor	It is suitable for improving the input power factor of the inverter and suppressing high order harmonic current.
	Input filter	To prevent electromagnetic interference transmitted by the inverter to the public power grid through the input power cable. Try to install it as close to the input terminal of the frequency converter as possible.
	Output filter	Suppress interference from the wiring on the output side of the inverter. Try to install it as close to the output terminal of the frequency converter as possible.
	Output reactor	It is used to extend the effective transmission distance of the inverter and effectively inhibit the IGBT of the inverter instantaneous high voltage generated when the module is switched.
	Brake unit, brake resistor	When braking, the energy fed back by the motor is consumed to implement quick stop.

C.3 Power supply

See "4 Installation Instructions".

	Make sure the voltage class of the frequency converter is consistent with that of the grid.

C.4 Cable

C.4.1 Power cable

The sizes of input power cables and motor cables should be in accordance with local regulations.

The input power cables and motor cables must be able to withstand the corresponding load current.

The maximum rated temperature margin of the motor cable under continuous working conditions should not be less than 70°C.

The conductivity of the PE grounding conductor is the same as that of the phase conductor (using the same cross-sectional area).

See "Appendix A Technical Data" for EMC requirements.

In order to meet CE requirements for EMC, symmetrical shielded motor cables must be used, as shown in the following figure.

For input cables, four-core cables can be used, but it is still recommended to use shielded symmetrical cables. Compared with four-core cables, shielded symmetrical cables can reduce the current and loss flowing through the motor cables and also reduce electromagnetic radiation.

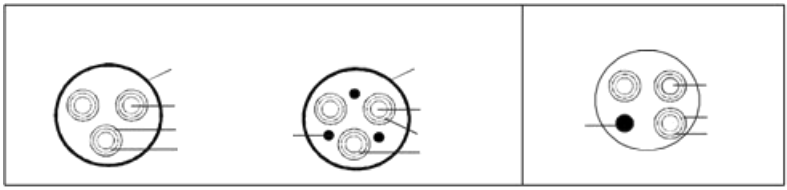


Figure C-1 Shielded symmetrical cables

Note: If the electrical conductivity of the motor cable shield does not meet the requirements, a separate PE conductor must be used.

C.4.2 Control cable

All analog control cables and cables for frequency input must use shielded cables. Analog signal cables use twisted-double shielded cables (Figure C-2 a). Each signal uses a separate shielded twisted pair. Do not use the same ground wire for different analog signals.

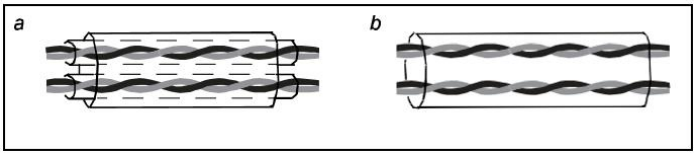


Figure C-2 Routing the power cable

For low-voltage digital signals, double-shielded cables are preferred, but single-shielded or unshielded twisted pairs can also be used (Figure C-2 b). However, only shielded cables can be used for frequency signals. For relay cables, use a cable with a metal braided shield.

The keypad must be connected with a network cable. For a complex electromagnetic environment, it is recommended to use a shielded network cable.

Note: Analog signals and digital signals are routed separately by using different cables.

Note: Before connecting the input power cable of the inverter, check the insulation of the input power cable according to local regulations.

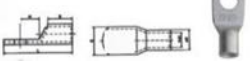
Table C-1 Recommended cable dimensions

Inverter model	R, S, T / U, V, W (+) (-)		PE		Tightening torque N.m
	Recommended cable mm^2	Recommended terminal model	Recommended cable mm^2	Recommended terminal model	
F580-1R5G-4	1	TNR1.25-4	1	TNR1.25-4	1.2~1.5
F580-2R2G-4	1	TNR1.25-4	1	TNR1.25-4	1.2~1.5
F580-004G-4	1.5	TNR1.25-4	1.5	TNR1.25-4	1.2~1.5

Inverter model	R, S, T / U, V, W (+) (-)		PE		Tightening torque
F580-5R5G-4	2.5	TNR2-4	2.5	TNR2-4	1.2~1.5
F580-7R5G-4	2.5	TNR2-4	2.5	TNR2-4	1.2~1.5
F580-11G-4	4	TNR3.5-5	4	TNR3.5-5	2~2.5
F580-15G-4	6	TNR5.5-5	6	TNR5.5-5	2~2.5
F580-18G-4	10	TNR8-5	10	TNR8-5	2~2.5

Note:

Copper tube terminals for cables (GTNR)



Round bare Terminal (TNR)

GTNR and TNR terminals of different brands may have different models. The specific model of the manufacturer shall prevail.

Table C-2 Recommended cable sizes (compliant with UL certification standards)

Inverter model	R, S, T / U, V, W (+) (-)		PE		Tightening torque N.m
	Recommended cable AWG/Kcmil	Recommended terminal model	Recommended cable AWG/Kcmil	Recommended terminal model	
F580-1R5G-4	16	TLK1.5-4	16	TLK1.5-4	1.2~1.5
F580-2R2G-4	16	TLK1.5-4	16	TLK1.5-4	1.2~1.5
F580-004G-4	14	TLK2.5-4	14	TLK2.5-4	1.2~1.5
F580-5R5G-4	14	TLK2.5-4	14	TLK2.5-4	1.2~1.5
F580-7R5G-4	12	TLK4-4	12	TLK4-4	1.2~1.5
F580-11G-4	10	TLK6-5	10	TLK6-5	2~2.5
F580-15G-4	8	TLK10-5	8	TLK10-5	2~2.5
F580-18G-4	6	TLK16-5	6	TLK16-5	2~2.5
F580-22G-4	4	TLK25-5	4	TLK25-5	2~2.5
F580-30G-4	4	TLK25-6	4	TLK25-5	3.5
F580-37G-4	3	TLK25-6	4	TLK25-5	3.5
F580-45G-4	3	TLK25-6	4	TLK25-5	3.5

Inverter model	R, S, T / U, V, W (+) (-)		PE		Tightening torque
F580-55G-4	2	TLK35-8	4	TLK25-6	9~11
F580-75G-4	1/0	TLK50-8	3	TLK25-6	9~11
F580-90G-4	3/0	TLK95-8	2	TLK35-6	9~11
F580-110G-4	4/0	TLK120-12	1/0	TLK50-8	31~40
F580-132G-4	4/0	TLK120-12	1/0	TLK50-8	31~40
F580-160G-4	300	TLK150-12	3/0	TLK95-8	31~40
F580-185G-4	400	TLK240-12	4/0	TLK120-8	31~40
F580-200G-4	400	TLK240-12	4/0	TLK120-8	31~40
F580-220G-4	2×4/0	2×TLK120-12	4/0	TLK120-12	31~40
F580-250G-4	2×4/0	2×TLK120-12	4/0	TLK120-12	31~40
F580-280G-4	2×300	2×TLK150-12	300	TLK150-12	31~40
F580-315G-4	2×300	2×TLK150-12	300	TLK150-12	31~40
F580-355G-4	2×400	2×TLK240-12	400	TLK240-12	31~40
F580-400G-4	2×400	2×SQNBS200-16	2×250	2×TLK150-12	96
F580-450G-4	2×500	2×SQNBS250-16	2×300	2×TLK150-12	96
F580-500G-4	2×600	2×SQNBS325-16	2×300	2×TLK150-12	96

Note: n=1 or 3.

TLK terminal

SQNBS narrow-head terminal

TLK terminals and SQNBS narrow-head terminals of different brands may have different models. The specific model of the manufacturer shall prevail.

C.4.3 Cable routing

The routing of the motor cable must be far away from the routing of other cables. The motor cables of several inverters can be routed in parallel. It is recommended to lay the motor cables, input power cables, and control cables in separate cable slots. The reason to avoid parallel wiring of other cables and motor cables is: the du/dt output of the inverter will increase electromagnetic interference to other cables.

If the control cable and the power cable must cross, then the angle between the control cable and the power cable must be guaranteed to be 90 degrees. The cable slots must be well connected and well

grounded. Aluminum slots allow local equipotential.

C.5 Circuit breakers and electromagnetic contactors

To prevent overload, fuses need to be added.

A manually manipulated molded case circuit breaker (MCCB) needs to be installed between the AC power supply and the inverter. The circuit breaker must be able to be locked in disconnected position to facilitate installation and maintenance. The capacity of the circuit breaker is selected to be between 1.5 and 2 times of the rated input current of the inverter.

	Depending on the working principle and structure of the circuit breaker, if the manufacturer's regulations are not followed, hot ionized gas may escape from the circuit breaker housing during short circuit. To ensure safe use, special care must be taken when installing and placing the circuit breaker. Follow the manufacturer's instructions.

In order to effectively cut off the input power of the inverter when the system fails, an electromagnetic contactor can be installed on the input side to control the power supply of the main circuit to ensure safety.

Table C-3 AC 3PH 380V models

Inverter model	Circuit breaker rated current (A)	Quick fuse (A)	Contactor rated operating current (A)
F580-1R5G-4	6	10	9
F580-2R2G-4	10	10	9
F580-004G-4	20	20	18
F580-5R5G-4	25	32	25
F580-7R5G-4	32	40	32
F580-11G-4	50	50	38
F580-15G-4	50	63	50
F580-18G-4	63	80	65
F580-22G-4	80	80	80
F580-30G-4	100	125	80
F580-37G-4	125	125	98
F580-45G-4	140	150	115
F580-55G-4	180	200	150
F580-75G-4	225	250	185
F580-90G-4	250	300	225

Inverter model	Circuit breaker rated current (A)	Quick fuse (A)	Contactor rated operating current (A)
F580-110G-4	315	350	265
F580-132G-4	400	400	330
F580-160G-4	500	500	400
F580-185G-4	500	600	400
F580-200G-4	630	600	500
F580-220G-4	630	700	500
F580-250G-4	700	800	630
F580-280G-4	800	1000	630
F580-315G-4	1000	1000	800
F580-355G-4	1000	1000	800
F580-400G-4	1000	1200	1000
F580-450G-4	1250	1200	1000
F580-500G-4	1250	1400	1000

Note: The parameters of each optional accessories in the table are ideal values. When selecting accessories, you can adjust them according to the market conditions, but not less than the parameter values in the table.

C.6 Reactor

When the distance between the frequency converter and the motor is too long, the parasitic capacitance to the ground is large and it is easy to produce high order harmonic current, and the frequency converter is easy to over-current protection, and even lead to motor insulation damage.

When the cable length is greater than or equal to the value in the following table, it is necessary to install an output reactor near the inverter.

Table C-4 Configuring the length of the output reactor cable

Inverter power	Rated voltage (V)	Motor cable length (m)
1.5~5.5kW	380~480	50
7.5~45kw	380~480	100
55~500kW	380~480	150

Note:

When a frequency converter has multiple motors, consider the sum of cable lengths of each motor as the total motor cable length.

The motor cable length given in the above table represents the ultimate capacity of the inverter. In practical application, it is recommended to design according to 80% of the motor cable length in the above table.

Input reactor with designed rated output voltage drop of 2%.

Output reactor with designed rated output voltage drop of 1%.

The above optional accessories are external; customers need to specify when purchasing.

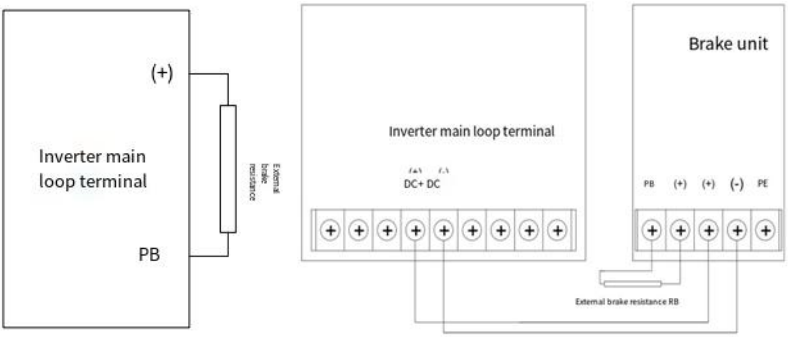
C.7 Brake series

C.7.1 Select brake system

When the frequency converter decelerates with a large inertial load or needs to decelerate sharply, the motor is in a power generation state, and the load energy is transferred to the DC link of the frequency converter through the inverter bridge, causing the bus voltage of the frequency converter to rise. When the frequency converter exceeds a certain value, the frequency converter will report an overvoltage fault. In order to prevent the occurrence of this phenomenon, the brake component must be configured.

The frequency converter 030G/037P and below are built-in brake units. 030G/037P above models need to choose external brake units.

Please select the resistance value and power of the brake resistance according to the specific field conditions (brake torque requirements and brake utilization requirements).



Built-in brake **External brake**

Table C-5 Brake resistance selection table

Inverter model	100% brake torque matching brake resistance (Ω)	Brake resistance dissipation power (kW) (10% braking amount)	Brake resistance dissipation power (kW) (50% braking amount)	Brake resistance dissipation power (kW) (80% braking amount)	MIN allowable brake resistance (Ω)
F580-1R5G-4	653	0.1	0.6	0.9	240
F580-2R2G-4	326	0.23	1.1	1.8	170
F580-004G-4	222	0.33	1.7	2.6	130
F580-5R5G-4	122	0.6	3	4.8	80
F580-7R5G-4	89	0.75	4.1	6.6	60
F580-11G-4	65	1.1	5.6	9	47
F580-15G-4	44	1.7	8.3	13.2	31
F580-18G-4	32	2	11	18	23
F580-22G-4	27	3	14	22	19
F580-30G-4	22	3	17	26	17
F580-37G-4	17	5	23	36	17
F580-45G-4	13	6	28	44	11.7
F580-55G-4	10	7	34	54	6.4
F580-75G-4	8	8	41	66	
F580-90G-4	6.5	11	56	90	
F580-110G-4	5.4	14	68	108	4.4
F580-132G-4	4.5	17	83	132	
F580-160G-4	3.7	20	99	158	3.2
F580-185G-4	3.1	24	120	192	2.2
F580-200G-4	2.8	28	139	222	
F580-220G-4	2.5	30	150	240	
F580-250G-4	2.2	33	165	264	1.8
F580-280G-4	2.0	38	188	300	
F580-315G-4	3.6*2	21*2	105*2	168*2	2.2*2
F580-355G-4	3.2*2	24*2	118*2	189*2	
F580-400G-4	2.8*2	27*2	132*2	210*2	
F580-450G-4	2.4*2	30*2	150*2	240*2	
F580-500G-4	2.2*2	34*2	168*2	270*2	1.8*2