

The Drive & Control



NG80

High performance
current vector
inverter

OPERATION INSTRUCTIONS

Call number for service: 135 3042 5402

Contents

Preface	1
Introduction	2
Chapter 1 Safety and Precautions	5
1.1 Safety Precautions	5
1.2 Precautions	7
Chapter 2 Product Information	10
2.1 Model Description	10
2.2 Description of Nameplate	10
2.3 Selection Guide	11
2.4 Technical Specifications	14
2.5 Outline Drawing & Installation Hole Dimension	17
2.6 Optional Accessories	21
2.7 Routine Maintenance of Inverter	22
2.8 Instructions on Warranty of Inverter	23
2.9 Selecting Guide for Brake Components	23
Chapter 3 Mechanical and Electrical Installation	27
3.1 Mechanical Installation	27
3.2 Electrical Installation	29
Chapter 4 Operation and Display	43
4.1 Keypad Description	43
4.2 Function Code Checking and Modification Methods Description	45
4.3 Parameter Display Method	45
4.4 User Customization Parameter Operation Method	47
4.5 Viewing Methods for Status Parameters	47
4.6 Password Setting	47
4.7 Motor Parameters Autotuning	48
Chapter 5 Function Parameter List	49
Chapter 6 EMC (Electromagnetic Compatibility)	89
6.1 Definition	89
6.2 EMC Standard Description	89
6.3 EMC Guide	89
Chapter 7 Trouble Shooting	92
7.1 Fault and Trouble Shooting	92
7.2 Common Faults and Solutions	99
Chapter 8 MODBUS Communication Protocol	101
8.1 About Protocol	101
8.2 Application Method	101
8.3 Bus Structure	101
8.4 Protocol Description	101
8.5 Communication Data Structure	101
8.6 Command Code and Communication Data Description	102
8.7 PD Group Communication Parameter Description	109
Appendix: Quick Guide to Frequency Converter Applications	111

Preface

Thank you for purchasing NG80 series inverters.

This manual describes how to use NG80 series inverter properly. Please read it carefully before installation, operation, maintenance and inspection. Besides, please use the product after understanding the safety precautions.

Precautions

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

Introduction

1) Rich voltage levels

Supports six voltage levels: single-phase 220V, three-phase 220V, three-phase 380V, three-phase 480V, three-phase 690V, and three-phase 1140V.

2) Rich motor variety support

Support vector control of three-phase AC asynchronous motors and three-phase AC permanent magnet synchronous motors.

3) Rich control methods

It enables V/F separation control in addition to vector control with speed sensor, vector control without speed sensor, and V/F control.

4) Rich fieldbus

Supports Modbus-RTU.

5) Rich encoder types

Differential encoder, open collector encoder, resolver, UVW encoder, and other devices are supported.

6) New speed sensorless vector control algorithm

The new SVC (speed sensorless vector control) inverter outperforms the previous inverter in terms of low-speed stability, low-frequency carrying capacity, and torque control.

7) Support user programmable

Users can realize the secondary development feature and create the program using ladder diagrams and other methods using the NG80 user programmable card. Our H1u PLC is completely compatible with the programming environment.

8) Powerful background software

Background program can do uploading, downloading, and real-time oscilloscope of inverter parameters.

9) More diverse features

The table below summarizes the functionalities added to the NG80 based on the original product.

Functions	Description
Virtual input/output IO	Flexibly implementing various simple logical functions
Motor overheat protection	A13 can accept motor temperature sensor input (PT100, PT1000) using the NG80 expansion card, triggering motor overheating protection.
Fast current limiting	Avoiding inverters frequent overcurrent faults
Multiple motor switching	Equipped with four sets of motor parameters, can achieve switching control of four motors
Restore user parameters	User can save or restore their own configured parameters using this method.
Higher precision AIAO	By factory calibration (and also field calibration), AIAO accuracy may be within 20mV.
User customization parameter display	The function parameters that are presented can be altered by the user.
User changed parameter display	The updated function parameters are visible to the user.
Optional fault handling methods	The user can choose between free stop, deceleration stop, and continuing operation when an inverter malfunction occurs. When continuing operation, the frequency can also be chosen.
PID parameter switching	There are two accessible sets of PID settings, which may be changed manually or automatically based on deviations.

Functions	Description
PID feedback loss detection	When PID is operating, set the PID feedback loss detection setting to achieve protection.
DIDO positive and negative logic	The positive and negative logic of DIDO can be individually adjusted by the user.
DIDO response delay	The DIDO response delay time is independently controlled by the user.
Instantaneous stop does not stop	When an inverter experiences a brief power outage or unexpected voltage decrease, it makes sure that it can keep running for a short while.
Timed operation	Supports maximum 6500 minutes of timed operation

Unpacking and inspection:

When unpacking, please check the following information seriously. Whether the model number and inverter rating on the nameplate of this machine are consistent with your order. The box contains the machine you ordered, the product certificate of conformity, the user operation manual and the warranty sheet.

Whether the product has been damaged during transportation. If some kind of omission or damage is found, please contact our company or your supplier to solve it quickly.

First time use:

You should carefully read this manual before using this product if you're a first-time user. Please contact our technical support staff for assistance if you need clarification on any function or performance-related information. It will help you utilize this product properly if you do this.

The information given by our firm may change at any time without prior notification due to our commitment to ongoing improvement on inverter.



The NG80 series inverter meets the following international standards, and some products have passed CE certification.

IEC/EN 61800-5-1: 2003 Safety requirements for adjustable speed electrical transmission systems;

IEC/EN 61800-3: 2004 Adjustable speed electrical transmission systems; Part III: Electromagnetic compatibility standards of products and their specific test methods.

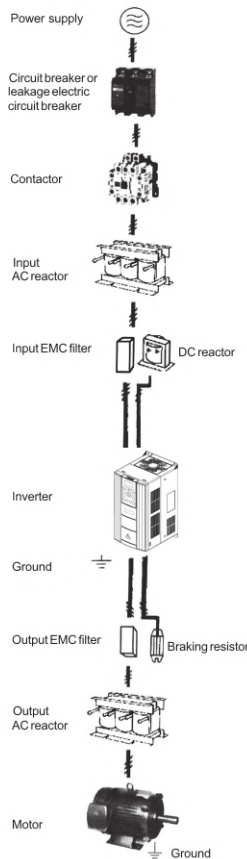


Diagram of the connection to peripheral devices

- Do not install the capacitor or surge suppressor at the output side of the inverter, otherwise it may cause inverter failure or capacitor and surge suppressor damaged.
- The Inverter input / output (main circuit) contains harmonic components, it may interfere with inverter accessories communications equipment. Therefore, please install anti-interference filter to minimize interference.
- The details of external devices and accessories selection refer to the manual of external devices.

Chapter 1 Safety and Precautions

Safety definition:

In this manual, safety precautions are classified as follows:

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

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

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

1.1 Safety Precautions

1.1.1 Before Installation:

 Danger	● Carefully handled when loading, otherwise it may damage the inverter. ● Please don't use the damaged driver or inverter with missing parts, there may be risk of injury. ● Do not touch the electronic parts and components; otherwise it will cause static electricity.
 Caution	● Do not use the water-logged inverter, damaged inverter or inverter with missing parts. Otherwise, there may be risk of injury. ● Please do not install when the packing list does not match the physical name!

1.1.2 During Installation:

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

1.1.3 During Wiring:

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

1.1.4 Before Power-on:

 Danger	- The cover must be well closed prior to the inverter power-on. Otherwise electric shock may be caused! - Whether all the external fittings are connected correctly in accordance with the circuit provided in this manual. Otherwise accident may occur!
 Caution	- Please confirm whether the power voltage class is consistent with the rated voltage of the inverter and whether the wiring positions on the power input terminals (R, S, T) and output terminals (U, V, W) are correct whether the external circuit is short circuited and whether the connecting line is firm. Otherwise it may damage the inverter. - The inverter is free from dielectric test because this test is performed prior to the delivery. Otherwise accident may occur.

1.1.5 After Power-on:

 Danger	- Do not open the cover of the inverter upon power-on. Otherwise there will be danger of electric shock! - Do not touch the inverter and its surrounding circuit with wet hand. Otherwise there will be danger of electric shock! - Do not touch the inverter terminals (including control terminal). Otherwise there will be danger of electric shock! - At power-on, the inverter will perform the security check of the external heavy-current circuit automatically. Thus, at the moment please do not touch the terminals U, V and W, or the terminals of motor, otherwise there will be danger of electric shock!
---	--

 Caution	- If parameter identification is required, due attention should be paid to the danger of injury arising from the rotating motor. Otherwise accident may occur! - Do not change the factory settings at will. Otherwise it may damage the equipment!
--	--

1.1.6 During Operation:

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

1.1.7 During Maintenance:

 Danger	- Do not repair and maintain the equipment with power connection. Otherwise there will be danger of electric shock! - Confirm that maintenance and repair of the drive can only be carried out when the voltage of the frequency converter is lower than AC36V, two minutes after the power outage. Otherwise, the residual charge on the capacitor may cause personal injury! - The inverter should be repaired and maintained only by the qualified person who has received professional training. Otherwise, it may cause personal injury or equipment damage! - Carry out parameter setting after replacing the inverter, all the plug-ins must be plug and play when power outage.
---	--

1.2 Precautions

1.2.1 Motor Insulation Inspection

When the motor is used for the first time, or when the motor is reused after being kept, or when periodical inspection is performed, it should conduct motor insulation inspection so as to avoid damaging the inverter because of the insulation failure of the motor windings. The motor wires must be disconnected from the inverter during the insulation inspection. It is recommended to use the 500V megameter, and the insulating resistance measured should be at least 5MΩ.

1.2.2 Thermal Protection of the Motor

If the ratings of the motor does not match those of the inverter, especially when the rated power of the inverter is higher than the rated power of the motor, the relevant motor protection parameters in the in the inverter should be adjusted, or thermal relay should be mounted to protect the motor.

1.2.3 Running with Frequency higher than Standard Frequency

This inverter can provide output frequency of 0Hz to 5000Hz. If the user needs to run the inverter with frequency of more than 50Hz, please take the resistant pressure of the mechanical devices into consideration.

1.2.4 Vibration of Mechanical Device

The inverter may encounter the mechanical resonance point at certain output frequencies, which can be avoided by setting the skip frequency parameters in the inverter.

1.2.5 Motor Heat and Noise

Since the output voltage of inverter is PWM wave and contains certain harmonics, the temperature rise, noise and vibration of the motor will be higher than those at power frequency.

1.2.6 Voltage-sensitive Device or Capacitor Improving Power Factor at the Output Side

Since the inverter output is PWM wave, if the capacitor for improving the power factor or voltage-sensitive resistor for lightning protection is mounted at the output side, it is easy to cause instantaneous over current in the inverter, which may damage the inverter. It is recommended that such devices not be used.

1.2.7 Switching Devices like Contactors Used at the Input and Output terminal

If a contactor is installed between the power supply and the input terminal of the inverter, it is not allowed to use the contactor to control the startup/stop of the inverter. If such contactor is unavoidable, it should be used with interval of at least one hour. Frequent charge and discharge will reduce the service life of the capacitor inside the inverter. If switching devices like contactor are installed between the output end of the inverter and the motor, it should ensure that the on/off operation is conducted when the inverter has no output. Otherwise the modules in the inverter may be damaged.

1.2.8 Use under voltage rather than rated voltage

If the NG80 series inverter is used outside the allowable working voltage range as specified in this manual, it is easy to damage the devices in the inverter. When necessary, use the corresponding step-up or step-down instruments to change the voltage.

1.2.9 Change Three-phase Input to Two-phase Input

It is not allowed to change the NG80 series three-phase inverter into two-phase one. Otherwise, it may cause fault or damage to the inverter.

1.2.10 Lightning Impulse Protection

The series inverter has lightning over current protection device, and has certain self-protection capacity against the lightning. In applications where lightning occurs frequently, the user should install additional protection devices at the front-end of the inverter.

1.2.11 Altitude and Derating

In areas with altitude of more than 1,000 meters, the heat sinking effect of the inverter may turn poorer due to rare air. Therefore, it needs to derate the inverter for use. Please contact our company for technical consulting in case of such condition.

1.2.12 Certain Special Use

If the user needs to use the inverter with the methods other than the recommended wiring diagram in this manual, such as shared DC bus, please consult our company.

1.2.13 Note of Inverter Disposal

The electrolytic capacitors on the main circuit and the PCB may explode when they are burnt. Emission of toxic gas may be generated when the plastic parts are burnt. Please dispose the inverter as industrial wastes.

1.2.14 Adaptable Motor

1) The standard adaptable motor is four-pole squirrel-cage asynchronous induction motor. If such motor is not available, be sure to select adaptable motors in according to the rated current of the motor. In applications where drive permanent magnetic synchronous motor is required, please consult our company;

2) The cooling fan and the rotor shaft of the non-variable-frequency motor adopt coaxial connection. When the rotating speed is reduced, the cooling effect will be poorer. Therefore, a powerful exhaust fan should be installed, or the motor should be replaced with variable frequency motor to avoid the over heat of the motor.

3) Since the inverter has built-in standard parameters of the adaptable motors, it is necessary to perform motor parameter identification or modify the default values so as to comply with the actual values as much as possible, or it may affect the running effect and protection performance;

4) The short circuit of the cable or motor may cause alarm or explosion of the inverter. Therefore, please conduct insulation and short circuit test on the newly installed motor and cable. Such test should also be conducted during routine maintenance. Please note that the inverter and the test part should be completely disconnected during the test.

Chapter 2 Product Information

2.1 Model Description

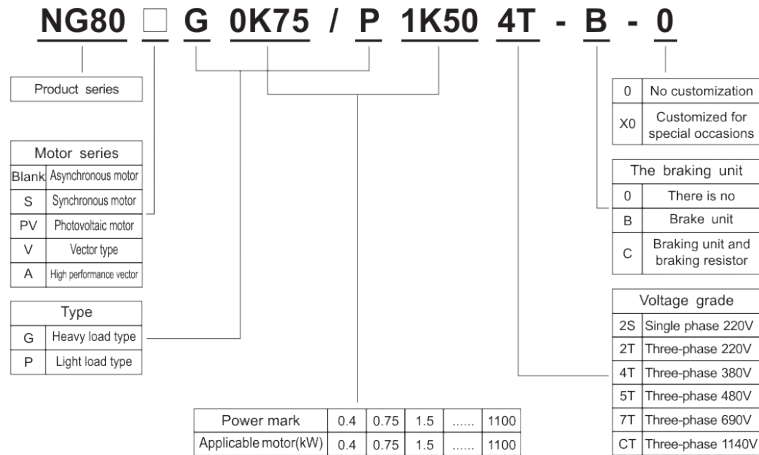


Figure 2-1 Naming meaning

2.2 Description of Nameplate



Figure 2-2 Nameplate

2.3 Selection Guide

Table 2-1 NG80 Series Inverter Model and Technical Data

Inverter Model	Motor		Rated Input Current (A)	Rated Output Current (A)	Power Capacity (kVA)
	kW	HP			
Single-phase power: 2S 220V 50/60Hz					
NG80-G 0K40 2S-B-0	0.4	0.5	5.4	2.3	1
NG80-G 0K75 2S-B-0	0.75	1	8.2	4	1.5
NG80-G 1K50 2S-B-0	1.5	2	14	7	3
NG80-G 2K20 2S-B-0	2.2	3	23	9.6	4
NG80-G 4K00 2S-B-0	4	5	39	19.2	5.9
Three-phase power: 2T 220V 50/60Hz					
NG80-G 0K40 2T-B-0	0.4	0.5	3.4	2.1	1.5
NG80-G 0K75 2T-B-0	0.75	1	5	3.8	3
NG80-G 1K50 2T-B-0	1.5	2	5.8	5.1	4
NG80-G 2K20 2T-B-0	2.2	3	10.5	9	5.9
NG80-G 4K00 2T-B-0	4	5	14.6	13	8.9
NG80-G 5K50 2T-B-0	5.5	7.5	26	25	17
NG80-G 7K50 2T-B-0	7.5	10	35	32	21
NG80-G 11K0 2T-B-0	11	15	46.5	45	30
NG80-G 15K0 2T-B-0	15	20	62	60	40
NG80-G 18K5 2T-0-0	18.5	25	76	75	57
NG80-G 22K0 2T-0-0	22	30	92	91	69
NG80-G 30K0 2T-0-0	30	40	113	112	85
NG80-G 37K0 2T-0-0	37	50	157	150	114
NG80-G 45K0 2T-0-0	45	60	180	176	134
NG80-G 55K0 2T-0-0	55	70	214	210	160
NG80-G 75K0 2T-0-0	75	100	307	304	231
Three-phase power: 4T 380V 50/60Hz					
NG80-G 0K75/P 1K50 4T-B-0	0.75	1	3.4	2.1	1.5
NG80-G 1K50/P 2K20 4T-B-0	1.5	2	5	3.8	3
NG80-G 2K20/P 4K00 4T-B-0	2.2	3	5.8	5.1	4
NG80-G 4K00/P 5K50 4T-B-0	4	5	10.5	9	5.9
NG80-G 5K50/P 7K50 4T-B-0	5.5	7.5	14.6	13	8.9
NG80-G 7K50/P 11K0 4T-B-0	7.5	10	20.5	17	11
NG80-G 11K0/P 15K0 4T-B-0	11	15	26	25	17
NG80-G 15K0/P 18K5 4T-B-0	15	20	35	32	21
NG80-G 18K5/P 22K0 4T-B-0	18.5	25	38.5	37	24
NG80-G 22K0/P 30K0 4T-B-0	22	30	46.5	45	30
NG80-G 30K0/P 37K0 4T-B-0	30	40	62	60	40
NG80-G 37K0/P 45K0 4T-0-0	37	50	76	75	57
NG80-G 45K0/P 55K0 4T-0-0	45	60	92	91	69
NG80-G 55K0/P 75K0 4T-0-0	55	70	113	112	85
NG80-G 75K0/P 90K0 4T-0-0	75	100	157	150	114
NG80-G 90K0/P 110K 4T-0-0	90	125	180	176	134

Inverter Model	Motor		Rated Input Current (A)	Rated Output Current (A)	Power Capacity (kVA)
	kW	HP			
NG80-G 110K/P 132K 4T-0-0	110	150	214	210	160
NG80-G 132K/P 160K 4T-0-0	132	175	256	253	192
NG80-G 160K/P 185K 4T-0-0	160	210	307	304	231
NG80-G 185K/P 200K 4T-0-0	185	245	330	340	240
NG80-G 200K/P 220K 4T-0-0	200	260	385	377	250
NG80-G 220K/P 250K 4T-0-0	220	300	430	426	280
NG80-G 250K/P 280K 4T-0-0	250	350	468	465	355
NG80-G 280K/P 315K 4T-0-0	280	370	525	520	396
NG80-G 315K/P 350K 4T-0-0	315	420	590	585	445
NG80-G 350K/P 400K 4T-0-0	350	470	665	650	500
NG80-G 400K/P 450K 4T-0-0	400	530	785	725	565
NG80-G 450K/P 500K 4T-0-0	450	600	883	820	630
NG80-G 500K/P 560K 4T-0-0	500	667	920	860	714
NG80-G 560K/P 630K 4T-0-0	560	767	1050	950	800
NG80-G 630K/P 710K 4T-0-0	630	840	1160	1100	900
NG80-G 710K/P 800K 4T-0-0	710	947	1320	1260	1015
NG80-G 800K/P 900K 4T-0-0	800	1067	1500	1440	1145
Three-phase power: 5T 480V 50/60Hz					
NG80-G 0K75/P 1K50 5T-B-0	0.75	1	3.4	2.1	1.5
NG80-G 1K50/P 2K20 5T-B-0	1.5	2	5	3.8	3
NG80-G 2K20/P 4K00 5T-B-0	2.2	3	5.8	5.1	4
NG80-G 4K00/P 5K50 5T-B-0	4	5	10.5	9	5.9
NG80-G 5K50/P 7K50 5T-B-0	5.5	7.5	14.6	13	8.9
NG80-G 7K50/P 11K0 5T-B-0	7.5	10	20.5	17	11
NG80-G 11K0/P 15K0 5T-B-0	11	15	26	25	17
NG80-G 15K0/P 18K5 5T-B-0	15	20	35	32	21
NG80-G 18K5/P 22K0 5T-B-0	18.5	25	38.5	37	24
NG80-G 22K0/P 30K0 5T-B-0	22	30	46.5	45	30
NG80-G 30K0/P 37K0 5T-B-0	30	40	62	60	40
NG80-G 37K0/P 45K0 5T-0-0	37	50	76	75	57
NG80-G 45K0/P 55K0 5T-0-0	45	60	92	91	69
NG80-G 55K0/P 75K0 5T-0-0	55	70	113	112	85
NG80-G 75K0/P 90K0 5T-0-0	75	100	157	150	114
NG80-G 90K0/P 110K 5T-0-0	90	125	180	176	134
NG80-G 110K/P 132K 5T-0-0	110	150	214	210	160
NG80-G 132K/P 160K 5T-0-0	132	175	256	253	192
NG80-G 160K/P 185K 5T-0-0	160	210	307	304	231
NG80-G 185K/P 200K 5T-0-0	185	245	330	340	240
NG80-G 200K/P 220K 5T-0-0	200	260	385	377	250
NG80-G 220K/P 250K 5T-0-0	220	300	430	426	280
NG80-G 250K/P 280K 5T-0-0	250	350	468	465	355
NG80-G 280K/P 315K 5T-0-0	280	370	525	520	396

Inverter Model	Motor		Rated Input Current (A)	Rated Output Current (A)	Power Capacity (kVA)
	kW	HP			
NG80-G 315K/P 350K 5T-0-0	315	420	590	585	445
NG80-G 350K/P 400K 5T-0-0	350	470	665	650	500
NG80-G 400K/P 450K 5T-0-0	400	530	785	725	565
NG80-G 450K/P 500K 5T-0-0	450	600	883	820	630
NG80-G 500K/P 560K 5T-0-0	500	667	920	860	714
NG80-G 560K/P 630K 5T-0-0	560	767	1050	950	800
NG80-G 630K/P 710K 5T-0-0	630	840	1160	1100	900
NG80-G 710K/P 800K 5T-0-0	710	947	1320	1260	1015
NG80-G 800K/P 900K 5T-0-0	800	1067	1500	1440	1145
Three-phase power: 7T 690V 50/60Hz					
NG80-G 55K0/P 75K0 7T-0-0	55	70	70	65	84
NG80-G 75K0/P 90K0 7T-0-0	75	100	90	86	107
NG80-G 90K0/P 110K 7T-0-0	90	125	105	100	125
NG80-G 110K/P 132K 7T-0-0	110	150	130	120	155
NG80-G 132K/P 160K 7T-0-0	132	175	170	150	192
NG80-G 160K/P 185K 7T-0-0	160	210	200	175	231
NG80-G 185K/P 200K 7T-0-0	185	260	235	215	250
NG80-G 200K/P 220K 7T-0-0	200	260	235	215	250
NG80-G 220K/P 250K 7T-0-0	220	300	247	245	280
NG80-G 250K/P 280K 7T-0-0	250	350	265	260	355
NG80-G 280K/P 315K 7T-0-0	280	370	305	299	396
NG80-G 315K/P 350K 7T-0-0	315	420	350	330	445
NG80-G 350K/P 400K 7T-0-0	350	470	382	374	500
NG80-G 400K/P 450K 7T-0-0	400	530	435	410	565
NG80-G 450K/P 500K 7T-0-0	450	600	490	465	630
NG80-G 500K/P 560K 7T-0-0	500	660	595	550	700

2.4 Technical Specifications

Table 2-2 NG80 Series Inverter Technical Specifications

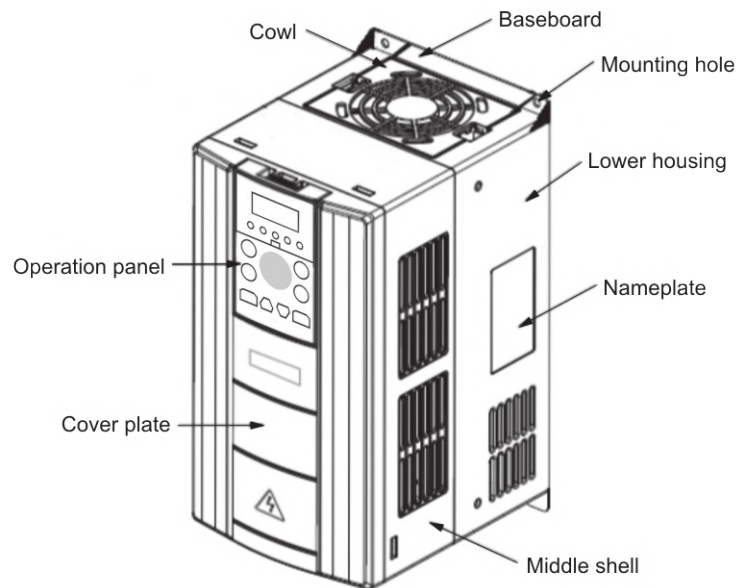
Item		Specification
Basic function	Maximum frequency	Vector control: 0 ~ 300Hz V/F control: 0 ~ 3200Hz
	Carrier frequency	0.5kHz ~ 16kHz The carrier frequency can be automatically adjusted according to the load characteristics.
	Input frequency resolution	Digital setting: 0.01Hz Analog setting: maximum frequency × 0.025%
	Control mode	Open-loop vector control (SVC) Closed-loop vector control (FVC) V/F control
	Starting torque	G model: 0.5Hz/150%(SVC); 0Hz/180%(FVC) P model: 0.5Hz/100%
	Speed regulation range	1: 100(SVC) 1: 1000(FVC)
	Steady speed accuracy	± 0.5%(SVC) ± 0.02%(FVC)
	Torque control accuracy	± 5%(FVC)
	Overload capacity	G model: 150% rated current 60s; 180% rated current 3s P model: 120% rated current 60s; 150% rated current 3s
	Torque boost	Automatically torque boost; manually torque boost: 0.1%~30.0%
	V/F curve	Three ways: linear; multi-point; Nth power type V/F curve (1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)
	V/F separation	2 method: full separation, semi-separation.
	Acceleration and deceleration curve	Straight line/S curve; four kinds of acceleration/deceleration time, range: 0.0s ~ 6500.0s
	DC braking	DC braking frequency: 0.0Hz ~ maximum frequency Braking time: 0.0s ~ 36.0s Braking action current value: 0.0% ~ 100.0%
	Jog control	Jog frequency range: 0.00Hz ~ 50.00Hz Jog acceleration and deceleration time: 0.0s ~ 6500.0s
	Simple PLC & multi-step speed operation	It can realize a maximum of 16 segments speed running via the built-in PLC or control terminal.
	Built-in PID	A closed-loop control system for process control can be easily implemented.
	Automatic voltage regulation (AVR)	It can automatically maintain the output voltage constant when the grid voltage varies.
	Overvoltage, over-current, stall control	To avoid frequent over-current and over-voltage trips, the current and voltage are automatically restricted when the device is in use.

Item		Specification
	Quick current limiting function	Minimize overcurrent faults and protect the normal operation of the inverter.
	Torque limitation and control	"Rooter" characteristics, limit the torque automatically and prevent frequent over-current tripping during the running process
Personal function	Excellent performance	Utilize high-performance current vector control technique to achieve synchronous and asynchronous motor control.
	Instantaneous stop does not stop	When there is a temporary power outage, the load return energy balances the voltage drop and the inverter keeps running for a brief amount of time.
	Fast current limiting	Avoid frequent overcurrent failures of the inverter
	Virtual IO	Five groups of virtual DIDO for simple logic control
	Timing control	Timing control function: setting time range 0.0min ~ 6500.0min.
	Multiple motor switching	Four groups of motor parameters. Four motor switching control can be realized.
	Multi threaded bus support	Supports four types of fieldbuses: RS485
	Motor overheat protection	Optional IO expansion card 1, analog input AI3 can accept motor temperature sensor input.
	Multi encoder support	Supports differential, open collector, UVW, resolver, sine and cosine encoders.
	User programmable	Optional user programmable card allows development.
	Powerful backend software	Support inverter parameter operation and virtual oscilloscope function. The virtual oscilloscope can realize the graphic monitoring of the internal state of the inverter.
Operation	Command source	The operation panel is preset, the control terminal is preset, and the serial communication port is preset. It can be switched by various ways.
	Frequency source	10 kinds of frequency sources: digital has been preset, analog voltage has been preset, analog current has been preset, pulse has been preset, and serial port has been preset. It can be switched in many ways.
	Auxiliary frequency source	10 kinds of auxiliary frequency sources. Auxiliary frequency trimming and frequency synthesis can be realized flexibly.
	Input terminal	Standard: 7 digital input terminals, one of which supports high-speed pulse input up to 100kHz 2 analog input terminals, one supporting only 0 ~ 10V voltage input 1 supporting 0 ~ 10V voltage input or 4 ~ 20mA current input
	Output terminal	Standard: 1 high-speed pulse output terminal (optional open collector type), supporting square wave signal output of 0 ~ 100kHz 1 digital output terminal 1 relay output terminal 1 analog output terminal, supporting 0 ~ 20mA current output or 0 ~ 10V voltage output

Item		Specification
Display and keyboard operation	LED display	Display parameters
	LCD display	Optional pieces; Chinese/English prompts for operating details.
	Parameter copy	Quick copy of parameters can be realized by LCD operation panel option.
	Key locking and function selection	Realize partial or full locking of keys and define the scope of action of some keys to prevent misoperation.
	Protection function	Power-on motor short-circuit detection, input and output phase loss protection, over-current protection, over-voltage protection, under-voltage protection, overheat protection, overload protection, etc.
	Optional accessories	LCD operation panel, brake assembly, IO expansion card 1, IO expansion card 2, user programmable card, RS485 communication card, Profibus-DP communication card, CANlink communication card, CANopen communication card, differential input PG card, UVW differential input PG card, resolver PG card, OC input PG card.
Environment	Using place	Indoor, not exposed to direct sunlight, free from dust, corrosive gases, flammable gases, oil mist, water vapor, dripping water or salt, etc
	Altitude	≤1000m
	Ambient temperature	-10℃ ~ +40℃(The ambient temperature is between 40℃ and 50℃, please reduce the rating for use)
	Humidity	Less than 95% RH, no condensation of water droplets
	Vibration	Less than 5.9m/s ² (0.6g)
	Storage temperature	-20℃ ~ +60℃
	Protection grade	IP=20(Open type)

2.5 Outline Drawing & Installation Hole Dimension

2.5.1 Outline drawing



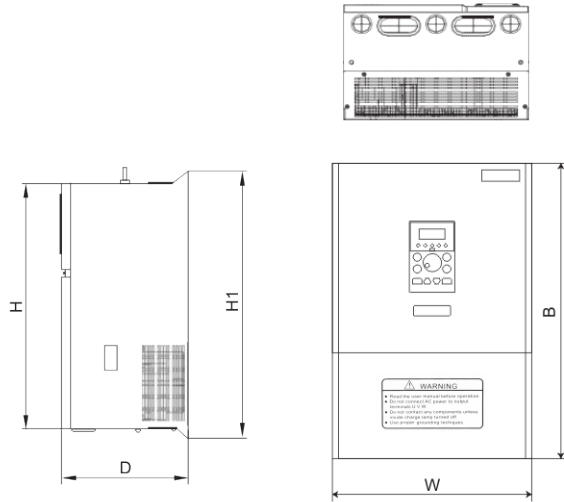


Figure 2-3 Outline and installation dimension diagram of NG80 series sheet metal structure

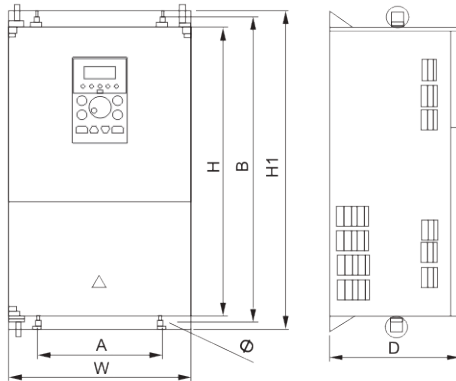


Figure 2-3-1 Outline and installation dimensions diagram of NG80 series

The shell structure of each NG80 model is as follows

Model	Housing type
Single phase 220V	
0.4kW ~ 2.2kW	Plastic structure
Three phase 220V	
0.4kW ~ 4kW	Plastic structure
7.5kW ~ 75kW	Sheet metal structure
Three phase 380V	
0.75kW ~ 11kW	Plastic structure
15kW ~ 800kW	Sheet metal structure
Three phase 480V	
0.75kW ~ 11kW	Plastic structure
15kW ~ 800kW	Sheet metal structure
Three phase 690V	
55kW ~ 800kW	Sheet metal structure

2.5.2 Outline and installation hole dimension of NG80 series

Table 2-3 Outline and Installation Dimension of NG80 Series Inverter

Inverter Model	Installation Hole (mm)		Outline Dimension (mm)			Installation Hole Diameter (mm)	Weight (kg)
	A	B	H	W	D		
Single phase 2S 220V							
NG80-G 0K75 2S-B-0	65	153	166	83	131	Φ5	1.15
NG80-G 1K50 2S-B-0							
NG80-G 2K20 2S-B-0							
NG80-G 4K00 2S-B-0	80	233	245	120	173	Φ5	2.7
Three phase 4T 380V							
NG80-G 0K75/P 1K50 4T-B-0	65	153	166	83	131	Φ5	1.15
NG80-G 1K50/P 2K20 4T-B-0							
NG80-G 2K20/P 4K00 4T-B-0							
NG80-G 4K00/P 5K50 4T-B-0	80	233	245	120	173	Φ5	2.7
NG80-G 5K50/P 7K50 4T-B-0							2.9
NG80-G 7K50/P 11K0 4T-B-0							2.9
NG80-G 11K0/P 15K0 4T-B-0	125.5	267.5	281	145	185	Φ6	3.9
NG80-G 15K0/P 18K5 4T-B-0	187	305	320	203	205	Φ6	7.0
NG80-G 18K5/P 22K0 4T-B-0							7.2
NG80-G 22K0/P 30K0 4T-B-0							7.4
NG80-G 30K0/P 37K0 4T-B-0							7.4

Inverter Model	Installation Hole (mm)		Outline Dimension (mm)			Installation Hole Diameter (mm)	Weight (kg)
	A	B	H	W	D		
NG80-G 37K0/P 45K0 4T-B-0	200	422	440	256	220	Φ 8	14.8
NG80-G 45K0/P 55K0 4T-0-0							25.2
NG80-G 55K0/P 75K0 4T-0-0							26
NG80-G 75K0/P 90K0 4T-0-0	237	465	490	330	263	Φ 8	43
NG80-G 90K0/P 110K0 4T-0-0							57.5
NG80-G 110K/P 132K 4T-0-0	240	575	600	397	263	Φ 8	89
NG80-G 123K/P 160K 4T-0-0							90.8
NG80-G 160K/P 185K 4T-0-0							152.7
NG80-G-185K/P 200K 4T-0-0	380	720	750	460	360	Φ 10	155
NG80-G 200K/P 220K 4T-0-0							
NG80-G 220K/P 250K 4T-0-0	560	1020	1055	638	410	Φ 10	
NG80-G 250K/P 280K 4T-0-0							
NG80-G 280K/P 315K 4T-0-0							
NG80-G 315K/P 350K 4T-0-0							
NG80-G 350K/P 400K 4T-0-0							

2.5.3 Outline and installation hole dimension of external keyboard

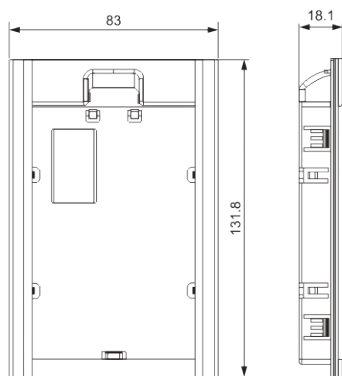


Figure 2-4 Outline and installation dimension of external keyboard

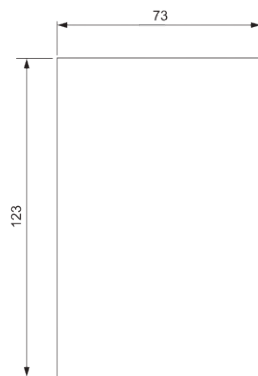


Figure 2-5 Installation hole dimension of external keyboard

2.6 Optional Accessories

If you need the following options, please specify them when ordering.

Table 2-4 NG80 Inverter Optional Accessories

Name	Model	Function	Note
Built-in brake unit	Product model followed by "B"	Single-phase from 0.4kW to 2.2kW, three-phase from 0.75kW to 15kW, with built-in brake unit as default.	18.5kW ~ 30kW built-in brake unit optional
External brake unit	GBU	37kW and above external brake unit	Multiple parallel units are used for 75kW and above
Energy feedback unit	GFB	Energy-saving product that feeds back power from the inverter to the AC grid.	
Rectifying unit	GRU	The inverter has an energy-saving function when used with a common bus.	
I/O expansion card 1	NG80IO1	It can add five digital inputs, an analog voltage input AI3 for isolated analog can be connected to PT100, PT1000. It can also add a relay output, a digital output, an analog output, with RS485/CAN.	Applicable to models of 4.0kW and above
I/O expansion card 2 -Size B	NG80IO2	Add three digital inputs	All series models available
MODBUS communication card	1) NG8032-232	RS232 communication interface without isolation	RJ45 and terminal interface compatible, available for all models
	2) NG80TX1	RS485 communication adapter card with isolation	All series models available
CANlink communication expansion card	NG80CAN1	CANlink communication adapter card	All series models available
CANopen communication expansion card	NG80CAN2	CANopen communication adapter card	All series models available
Profibus-DP communication card	NG80DP	Profibus-DP communication card	Applicable to models of 4.0kW and above
User programmable card	NG80PC1	User programmable expansion card	Applicable to models of 4.0kW and above
Differential encoder interface card	NG80PG1	Differential rotary encoder interface card, suitable for 5V power supply	All series models available
UVW encoder interface card	NG80PG3	Suitable for UVW differential encoder, suitable for synchronous motors, suitable for 5V power supply	All series models available
Resolver interface card	NG80PG4	Suitable for rotary encoders, excitation frequency 10kHz, DB9 interface	All series models available
Open collector electrode encoder interface card	NG80PG5	Open collector encoder interface card with 1:1 split output, adaptable to 15V power supply.	All series models available
External LED operation panel	GKE	External LED display and operation keyboard	NG80 series universal RJ45 interface
Extension cable		Standard 8-core network cable	Standard configuration 3 meters

2.7 Routine Maintenance of Inverter

2.7.1 Routine Maintenance

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

Routine inspection Items include:

- 1) Whether there is any abnormal change in the running sound of the motor;
- 2) Whether the motor has vibration during the running;
- 3) Whether there is any change to the installation environment of the inverter;
- 4) Whether the inverter cooling fan works normally;
- 5) Whether the inverter has over temperature.

Routine cleaning:

- 1) The inverter should be kept clean all the time.
- 2) The dust on the surface of the inverter should be effectively removed, so as to prevent the dust entering the inverter. Especially the metal dust is not allowed.
- 3) The oil stain on the inverter cooling fan should be effectively removed.

2.7.2 Periodic Inspection

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

Periodic inspection items include:

- 1) Check and clean the air duct periodically;
- 2) Check if the screws are loose;
- 3) Check if the inverter is corroded;
- 4) Check if the wire connector has arc signs;
- 5) Main circuit insulation test.

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

2.7.3 Replacement of Vulnerable Parts for Inverter

The vulnerable parts of the inverter include cooling fan and filter electrolytic capacitor, whose service life depends on the operating environment and maintenance status. General service life is shown as follows:

Part Name	Service Life
Fan	2~3 years
Electrolytic capacitor	4~5 years

The user can determine the year of replacement according to the operating time.

- 1) Cooling fan

Possible reason for damage: Bearing is worn and blade is aging.

Judging criteria: Whether there is crack on the blade and whether there is abnormal vibration noise upon startup.

- 2) Filter electrolytic capacitor

Possible reason for damage: Input power supply in poor quality, high ambient temperature, frequent load jumping, and electrolyte aging.

Judging criteria: Whether there is liquid leakage and whether the safe valve has projected, and measure the static capacitance, and the insulating resistance.

2.7.4 Storage of Inverter

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

- 1) Pack the inverter with original package and place back into the packing box of our company.
- 2) Long-term storage will degrade the electrolytic capacitor. Thus, the product should be powered up once every 2 years, each time lasting at least five hours. The input voltage should be increased slowly to the rated value with the regulator.

2.8 Instructions on Warranty of Inverter

Free warranty only applies to the inverter itself.

- 1) Company provides 12 month warranty (starting from the date of original shipment as indicated on the barcode) for the failure or damage under normal use conditions. If the equipment has been used for over 12 months, reasonable repair expenses will be charged;
- 2) Reasonable repair expenses will be charged for the following situations within 12 months;
 - a) The equipment is damaged because the user fails to comply with the requirements of the user's manual;
 - b) Damage caused by fire, flood and abnormal voltage;
 - 3) Damage caused when the inverter is used for abnormal function.

The service expenses will be calculated according to the standard of the manufacturer. If there is any agreement, the agreement should prevail.

2.9 Selecting Guide for Brake Components

(*): Table 2-5 is the guideline data. Depending on the scenario, the user may select a different resistor resistance and power, but the resistance value must not be less than the suggested value in the table and the power may be more. The power generated by the motor in the real application system, which is correlated with the system's inertia, deceleration time, and energy of the bit energy load, needs to be taken into account while choosing the brake resistor. The consumer must make their choice based on the circumstances at hand. The system's inertia increases with system size, reducing the amount of time needed to decelerate and increasing the frequency of braking. The brake resistor must therefore be chosen with a bigger power and lower resistance value.

2.9.1 Selection of Resistance Value

When braking, almost all of the regenerative energy of the motor is consumed in the braking resistor.

It can be based on the formula: $U \cdot I / R = P_b$

The formula U - system stability braking brake voltage

(For different systems, it is not the same. For 380VAC system generally take 700V.)

P_b —braking power

2.9.2 Power Selection of Braking Resistor

In theory, the power of the braking resistor is the same as the braking power, but with a derating of 70%.

It can be based on the formula: $0.7 \cdot P_r = P_b \cdot D$

P_r —power of the resistor

D —braking frequency (regeneration process accounted for the proportion of the entire work process)

Elevators—20% ~ 30% Uncoiling and coiling—20 ~ 30% Centrifuge—50% ~ 60% Accidental braking load -5%

Generally 10%

Table 2-5 Selection Table for Braking Components of NG80 Series Inverter

Inverter Model	Recommended Power of Braking Resistor	Recommended Resistance Value of Braking Resistor	Braking Unit	Note
Single phase 2S 220V				
NG80-G 0K75 2S-B-0	80W	≥ 200Ω	Standard built-in	No special instructions
NG80-G 1K50 2S-B-0	80W	≥ 150Ω		
NG80-G 2K20 2S-B-0	100W	≥ 100Ω		
NG80-G 4K00 2S-B-0	100W	≥ 70Ω		
Three phase 2T 220V				
NG80-G 0K40 2T-B-0	150W	≥ 150Ω	Standard built-in	No special instructions
NG80-G 0K75 2T-B-0	150W	≥ 110Ω		
NG80-G 1K50 2T-B-0	250W	≥ 100Ω		
NG80-G 2K20 2T-B-0	300W	≥ 65Ω		
NG80-G 4K00 2T-B-0	400W	≥ 45Ω		
NG80-G 5K50 2T-B-0	800W	≥ 22Ω		
NG80-G 7K50 2T-B-0	1000W	≥ 16Ω		
NG80-G 11K0 2T-B-0	1500W	≥ 11Ω	Built-in optional	Add "B" after the inverter model
NG80-G 15K0 2T-B-0	2500W	≥ 8Ω	External	
NG80-G 18K5 2T-0-0	3.7kW	≥ 8.0Ω	External	
NG80-G 22K0 2T-0-0	4.5kW	≥ 8Ω	External	
NG80-G 30K0 2T-0-0	5.5kW	≥ 4Ω	External	
NG80-G 37K0 2T-0-0	7.5kW	≥ 4Ω	External	
NG80-G 45K0 2T-0-0	4.5kW×2	≥ 4Ω×2	External	
NG80-G 55K0 2T-0-0	5.5kW×2	≥ 4Ω×2	External	
NG80-G 75K0 2T-0-0	16kW	≥ 1.2Ω	External	
Three phase 4T 380V				
NG80-G 0K75/P 1K50 4T-B-0	150W	≥ 300Ω	Standard built-in	No special instructions
NG80-G 1K50/P 2K20 4T-B-0	150W	≥ 220Ω		
NG80-G 2K20/P 4K00 4T-B-0	250W	≥ 200Ω		
NG80-G 4K00/P 5K50 4T-B-0	300W	≥ 130Ω		
NG80-G 5K50/P 7K50 4T-B-0	400W	≥ 90Ω		
NG80-G 7K50/P 11K0 4T-B-0	500W	≥ 65Ω		
NG80-G 11K0/P 15K0 4T-B-0	800W	≥ 43Ω		
NG80-G 15K0/P 18K5 4T-B-0	1000W	≥ 32Ω	Built-in optional	Add "B" after the inverter model
NG80-G 18K5/P 22K0 4T-B-0	1300W	≥ 25Ω		
NG80-G 22K0/P 30K0 4T-B-0	1500W	≥ 22Ω	Standard built-in	No special instructions
NG80-G 30K0/P 37K0 4T-B-0	2500W	≥ 16Ω		
NG80-G 37K0/P 45K0 4T-0-0	3.7kW	≥ 16Ω		
NG80-G 45K0/P 55K0 4T-0-0	4.5kW	≥ 16Ω		
NG80-G 55K0/P 75K0 4T-0-0	5.5kW	≥ 8Ω		
NG80-G 75K0/P 90K0 4T-0-0	7.5kW	≥ 8Ω		
NG80-G 90K0/P 110K 4T-0-0	4.5kW×2	≥ 8Ω×2		
NG80-G 110K/P 132K 4T-0-0	5.5kW×2	≥ 8Ω×2	External	
NG80-G 132K/P 160K 4T-0-0	6.5kW×2	≥ 8Ω×2	External	
NG80-G 160K/P 185K 4T-0-0	16kW	≥ 2.5Ω	External	

Inverter Model	Recommended Power of Braking Resistor	Recommended Resistance Value of Braking Resistor	Braking Unit	Note
NG80-G 185K/P 200K 4T-0-0	20kW	≥ 2.5 Ω	External	
NG80-G 200K/P 220K 4T-0-0	20kW	≥ 2.5 Ω	External	
NG80-G 220K/P 250K 4T-0-0	22kW	≥ 2.5 Ω	External	
NG80-G 250K/P 280K 4T-0-0	12.5kW×2	≥ 2.5 Ω×2	External	
NG80-G 280K/P 315K 4T-0-0	14kW×2	≥ 2.5 Ω×2	External	
NG80-G 315K/P 350K 4T-0-0	16kW×2	≥ 2.5 Ω×2	External	
NG80-G 350K/P 400K 4T-0-0	17kW×2	≥ 2.5 Ω×2	External	
NG80-G 400K/P 450K 4T-0-0	14kW×3	≥ 2.5 Ω×3	External	
NG80-G 450K/P 500K 4T-0-0	15kW×3	≥ 2.5 Ω×3	External	
NG80-G 500K/P 560K 4T-0-0	25kW×2	≥ 2.2 Ω×2	External	
NG80-G 560K/P 630K 4T-0-0	28kW×2	≥ 2.2 Ω×2	External	
NG80-G 630K/P 710K 4T-0-0	22kW×3	≥ 2.2 Ω×3	External	
NG80-G 710K/P 800K 4T-0-0	25kW×3	≥ 2.2 Ω×3	External	
NG80-G 800K/P 900K 4T-0-0	28kW×3	≥ 2.2 Ω×3	External	
Three phase 5T 480V				
NG80-G 0K75/P 1K50 5T-B-0	150W	≥ 300Ω	Standard built-in	No special instructions
NG80-G 1K50/P 2K20 5T-B-0	150W	≥ 220Ω		
NG80-G 2K20/P 4K00 5T-B-0	250W	≥ 200Ω		
NG80-G 4K00/P 5K50 5T-B-0	300W	≥ 130Ω		
NG80-G 5K50/P 7K50 5T-B-0	400W	≥ 90Ω		
NG80-G 7K50/P 11K0 5T-B-0	500W	≥ 65Ω		
NG80-G 11K0/P 15K0 5T-B-0	800W	≥ 43Ω		
NG80-G 15K0/P 18K5 5T-B-0	1000W	≥ 32Ω	Built-in optional	Add "B" after the inverter model
NG80-G 18K5/P 22K0 5T-B-0	1300W	≥ 25Ω		
NG80-G 22K0/P 30K0 5T-B-0	1500W	≥ 22Ω	External	
NG80-G 30K0/P 37K0 5T-B-0	2500W	≥ 16Ω		
NG80-G 37K0/P 45K0 5T-0-0	3.7kW	≥ 16Ω		
NG80-G 45K0/P 55K0 5T-0-0	4.5kW	≥ 16Ω		
NG80-G 55K0/P 75K0 5T-0-0	5.5kW	≥ 8Ω		
NG80-G 75K0/P 90K0 5T-0-0	7.5kW	≥ 8Ω		
NG80-G 90K0/P 110K 5T-0-0	4.5kW×2	≥ 8Ω×2		
NG80-G 110K/P 132K 5T-0-0	5.5kW×2	≥ 8Ω×2	External	
NG80-G 132K/P 160K 5T-0-0	6.5kW×2	≥ 8Ω×2	External	
NG80-G 160K/P 185K 5T-0-0	16kW	≥ 2.5 Ω	External	
NG80-G 185K/P 200K 5T-0-0	20kW	≥ 2.5 Ω	External	
NG80-G 200K/P 220K 5T-0-0	20kW	≥ 2.5 Ω	External	
NG80-G 220K/P 250K 5T-0-0	22kW	≥ 2.5 Ω	External	
NG80-G 250K/P 280K 5T-0-0	12.5kW×2	≥ 2.5 Ω×2	External	
NG80-G 280K/P 315K 5T-0-0	14kW×2	≥ 2.5 Ω×2	External	
NG80-G 315K/P 350K 5T-0-0	16kW×2	≥ 2.5 Ω×2	External	
NG80-G 350K/P 400K 5T-0-0	17kW×2	≥ 2.5 Ω×2	External	
NG80-G 400K/P 450K 5T-0-0	14kW×3	≥ 2.5 Ω×3	External	

Inverter Model	Recommended Power of Braking Resistor	Recommended Resistance Value of Braking Resistor	Braking Unit	Note
NG80-G 450K/P 500K 5T-0-0	15kW×3	≥2.5Ω×3	External	
NG80-G 500K/P 560K 5T-0-0	25kW×2	≥2.2Ω×2	External	
NG80-G 560K/P 630K 5T-0-0	28kW×2	≥2.2Ω×2	External	
NG80-G 630K/P 710K 5T-0-0	22kW×3	≥2.2Ω×3	External	
NG80-G 710K/P 800K 5T-0-0	25kW×3	≥2.2Ω×3	External	
NG80-G 800K/P 900K 5T-0-0	28kW×3	≥2.2Ω×3	External	

Note: × 2 means two braking units with their respective braking resistors used in parallel, × 3 meaning the same as × 2.

Chapter 3 Mechanical and Electrical Installation

3.1 Mechanical Installation

3.1.1 Installation environment

- 1) Ambient temperature: The ambient temperature exerts great influences on the service life of the inverter and is not allowed to exceed the allowable temperature range (-10℃ to 50℃).
- 2) The inverter should be mounted on the surface of incombustible articles, with sufficient spaces nearby for heat sinking. The inverter is easy to generate large amount of heat during the operation. The inverter should be mounted vertically on the base with screws.
- 3) The inverter should be mounted in the place without vibration or with vibration of less than 0.6G, and should be kept away from such equipment as punching machine.
- 4) The inverter should be mounted in locations free from direct sunlight, high humidity and condensate.
- 5) The inverter should be mounted in locations free from corrosive gas, explosive gas or combustible gas.
- 6) The inverter should be mounted in locations free from oil dirt, dust, and metal powder.

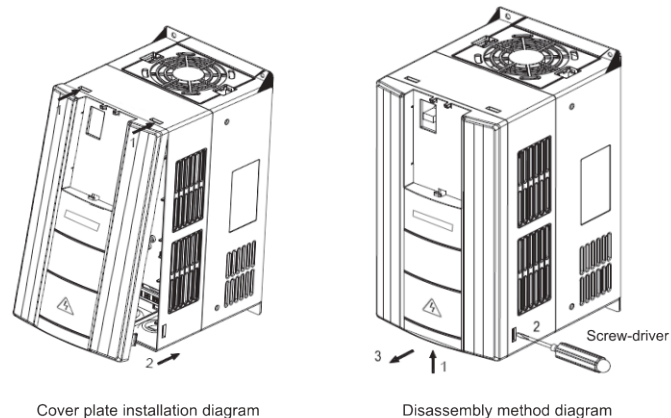


Figure 3-1 Installation diagram

Single Unit Installation: When the inverter power is not higher than 22kW, the A size can be omitted. When the inverter power is higher than 22kW, the A size should be higher than 50mm.

Installation of Upper and Lower Parts: When installing the upper and lower parts of the inverter, the insulating splitter is required.

Power Rating	Mounting Dimension	
	B	A
≤15kW	≥100mm	It is not required
18.5~30kW	≥200mm	≥50mm
≥37kW	≥300mm	≥50mm

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

- 1) Install the inverter vertically so that the heat may be expelled from the top. However, the equipment cannot be installed upside down. If there are multiple inverters, parallel installation is a better choice. In applications where the upper and lower inverters need to be installed, please refer to Figure 3-1 "NG80 Series Inverter Installation Diagram" and install an insulating splitter.
- 2) The mounting space should be as indicated as Figure 3-1, so as to ensure the heat dissipation space of the inverter. However, the heat dissipation of other devices in the cabinet should also be taken into account.
- 3) The installation bracket must be flame retardant.
- 4) In the applications where there are metal dusts, it is recommended to mount the radiator outside the cabinet. In this case, the space in the sealed cabinet should be large enough.

3.1.3 Disassembly and Installation of the Lower Cover Plate

For instructions on removing the lower cover of the plastic shell from the inverter series under 15kW, see Figure 3-2.

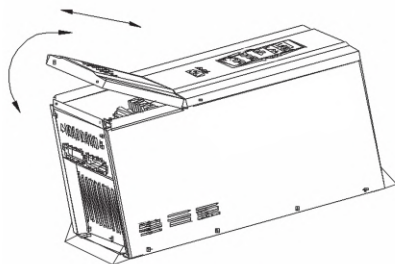


Figure 3-2 Dismantling diagram of the lower cover plate of the sheet metal shell

For inverter series exceeding 11kW, sheet metal housing is used; with a tool, the lower cover screws may be easily removed.

	Danger
●	Avoid the potential harm that may come to the person or the equipment if the bottom cover plate were to fall off when removing it.

3.2 Electrical Installation

3.2.1 Guide to the external electrical parts

Table 3-1 Selection Guide of External Electrical Parts of NG80 Series Inverter

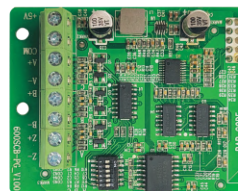
Inverter Model	Circuit Breaker (MCCB) A	Recommended Contactor A	Recommended Conducting Wire of Main Circuit at Input Side mm ²	Recommended Conducting Wire of Main Circuit at Output Side mm ²	Recommended Conducting Wire of Control Circuit mm ²
Single phase 2S 220V					
NG80-G 0K75 2S-B-0	16	10	2.5	2.5	1.0
NG80-G 1K50 2S-B-0	16	10	2.5	2.5	1.0
NG80-G 2K20 2S-B-0	20	16	4.0	2.5	1.0
NG80-G 4K00 2S-B-0	32	20	6.0	4.0	1.0
Three phase 2T 220V					
NG80-G 0K40 2T-B-0	10	10	2.5	2.5	1.0
NG80-G 0K75 2T-B-0	16	10	2.5	2.5	1.0
NG80-G 1K50 2T-B-0	16	10	2.5	2.5	1.0
NG80-G 2K20 2T-B-0	25	16	4.0	4.0	1.0
NG80-G 4K00 2T-B-0	32	25	4.0	4.0	1.0
NG80-G 5K50 2T-B-0	63	40	4.0	4.0	1.0
NG80-G 7K50 2T-B-0	63	40	6.0	6.0	1.0
NG80-G 11K0 2T-B-0	100	63	10	10	1.5
NG80-G 15K0 2T-B-0	125	100	16	10	1.5
NG80-G 18K5 2T-0-0	160	100	16	16	1.5
NG80-G 22K0 2T-0-0	200	125	25	25	1.5
NG80-G 30K0 2T-0-0	200	125	35	25	1.5
NG80-G 37K0 2T-0-0	250	160	50	35	1.5
NG80-G 45K0 2T-0-0	250	160	70	35	1.5
NG80-G 55K0 2T-0-0	350	350	120	120	1.5
NG80-G 75K0 2T-0-0	500	400	185	185	1.5

Inverter Model	Circuit Breaker (MCCB) A	Recommended Contactor A	Recommended Conducting Wire of Main Circuit at Input Side mm ²	Recommended Conducting Wire of Main Circuit at Output Side mm ²	Recommended Conducting Wire of Control Circuit mm ²
Three phase 4T 380V/5T 480V					
NG80-G 0K75/P 1K50 4T-B-0	10	10	2.5	2.5	1.0
NG80-G 1K50/P 2K20 4T-B-0	16	10	2.5	2.5	1.0
NG80-G 2K20/P 4K00 4T-B-0	16	10	2.5	2.5	1.0
NG80-G 4K00/P 5K50 4T-B-0	25	16	4.0	4.0	1.0
NG80-G 5K50/P 7K50 4T-B-0	32	25	4.0	4.0	1.0
NG80-G 7K50/P 11K0 4T-B-0	40	32	4.0	4.0	1.0
NG80-G 11K0/P 15K0 4T-B-0	63	40	4.0	4.0	1.0
NG80-G 15K0/P 18K5 4T-B-0	63	40	6.0	6.0	1.0
NG80-G 18K5/P 22K0 4T-B-0	100	63	6.0	6.0	1.5
NG80-G 22K0/P 30K0 4T-B-0	100	63	10	10	1.5
NG80-G 30K0/P 37K0 4T-B-0	125	100	16	10	1.5
NG80-G 37K0/P 45K0 4T-0-0	160	100	16	16	1.5
NG80-G 45K0/P 55K0 4T-0-0	200	125	25	25	1.5
NG80-G 55K0/P 75K0 4T-0-0	200	125	35	25	1.5
NG80-G 75K0/P 90K0 4T-0-0	250	160	50	35	1.5
NG80-G 90K0/P 110K 4T-0-0	250	160	70	35	1.5
NG80-G 110K/P 132K 4T-0-0	350	350	120	120	1.5
NG80-G 132K/P 160K 4T-0-0	400	400	150	150	1.5
NG80-G 160K/P 185K 4T-0-0	500	400	185	185	1.5
NG80-G 185K/P 200K 4T-0-0	600	600	150*2	150*2	1.5
NG80-G 200K/P 220K 4T-0-0	600	600	150*2	150*2	1.5
NG80-G 220K/P 250K 4T-0-0	600	600	150*2	150*2	1.5
NG80-G 250K/P 280K 4T-0-0	800	600	185*2	185*2	1.5
NG80-G 280K/P 315K 4T-0-0	800	800	185*2	185*2	1.5
NG80-G 315K/P 350K 4T-0-0	800	800	150*3	150*3	1.5
NG80-G 350K/P 400K 4T-0-0	800	800	150*4	150*4	1.5
NG80-G 400K/P 450K 4T-0-0	1000	1000	150*4	150*4	1.5
NG80-G 450K/P 500K 4T-0-0	1250	1250	185*4	185*4	1.5
NG80-G 500K/P 560K 4T-0-0	1250	1250	185*4	185*4	1.5
NG80-G 560K/P 630K 4T-0-0	1600	1600	185*4	185*4	1.5
NG80-G 630K/P 710K 4T-0-0	1600	1600	185*5	185*5	1.5
NG80-G 710K/P 800K 4T-0-0	2000	2000	185*6	185*6	1.5
NG80-G 800K/P 900K 4T-0-0	2500	2500	185*6	185*6	1.5

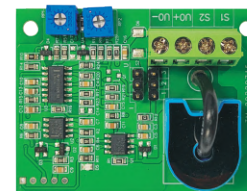
3.2.2 Using instruction of the external electrical parts

Table 3-2 Using Instruction of the External Electrical Parts

Part Name	Installing Location	Function Description
Circuit breaker	Front end of input circuit	Disconnect the power supply when the equipment at the lower part is over current.
Contactor	Between the circuit breaker and the inverter input side	During the power on/off operation of the inverter, frequent power on/off operations (less than twice per minute) should be avoided through contactors or direct startup operations.
AC input reactor	Input side of the inverter	Improve the power factor of the input side; Eliminate the higher harmonics of the input side effectively and prevent other equipment from damaging due to distortion of voltage wave. Eliminate the input current unbalance due to unbalance between the power phases.
EMC input filter	Input side of the inverter	Reduce the external conduction and radiation interference of the inverter. Decrease the conduction interference flowing from the power end to the inverter and improve the anti-interference capacity of the inverter.
DC reactor	DC reactor is optional for inverters above 7.5G	Improve the power factor of the input side; Improve the whole efficiency and thermal stability of the inverter. Eliminate the impact of higher harmonics of the input side on the inverter and reduce the external conduction and radiation interference.
AC output reactor	Between the inverter output side and the motor, close to the inverter	The inverter output side generally has higher harmonics. When the motor is far from the inverter, since there are many distributed capacitors in the circuit, certain harmonics may cause resonance in the circuit and bring about the following two impacts: Degrade the motor insulation performance and damage the motor for the long run. Generate large leakage current and cause frequent inverter protection. In general, the distance between the inverter and the motor exceeds 100 meters. Installation of output AC reactor is recommended.



Expansion card: differential encoder PG card (optional)



Expansion card: Current detection card (optional)

3.2.3 Wiring diagram

Typical wiring diagram of single-phase 220V inverter

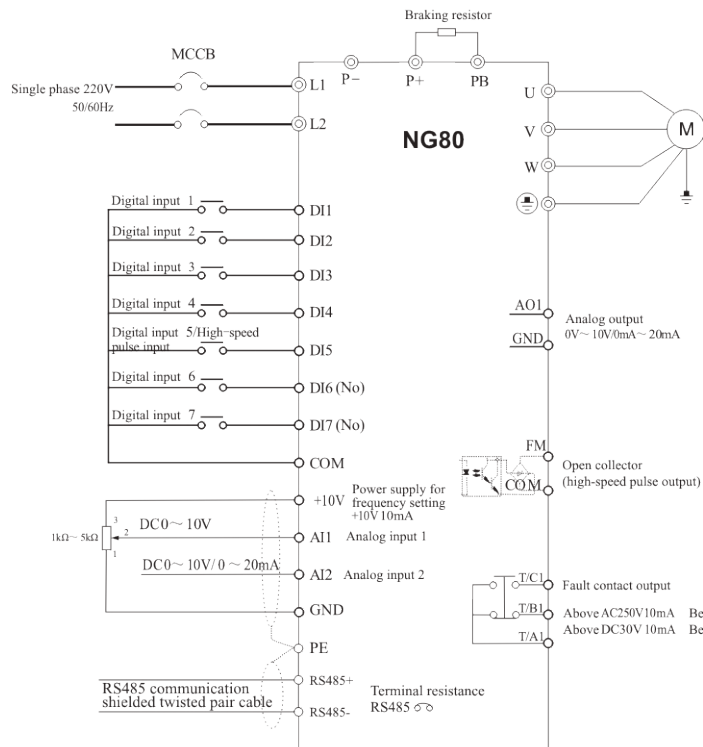


Figure 3-3 Typical wiring diagram of single-phase inverter

Note:

1. Terminal $\odot$ represents the main circuit terminal, and $\circ$ represents the control circuit terminal.
2. Single phase 220V 0.4kW ~ 2.2kW built-in brake unit is standard configuration.
3. The product model with a "B" after it indicates the built-in brake unit.
4. The braking resistor is selected according to the user's needs, as detailed in the selection guide for braking resistors.
5. Cables for power and signal must be routed separately. If the power and control cables intersect, they should do so as nearly as a 90-degree angle as practicable. The user manual for the inverter should be followed, or it is preferable to use shielded twisted pair for analog signal lines and shielded three-core cable for power cables (whose specifications should be one grade higher than those of regular motor cable).

Wiring diagram of three-phase 380V inverter

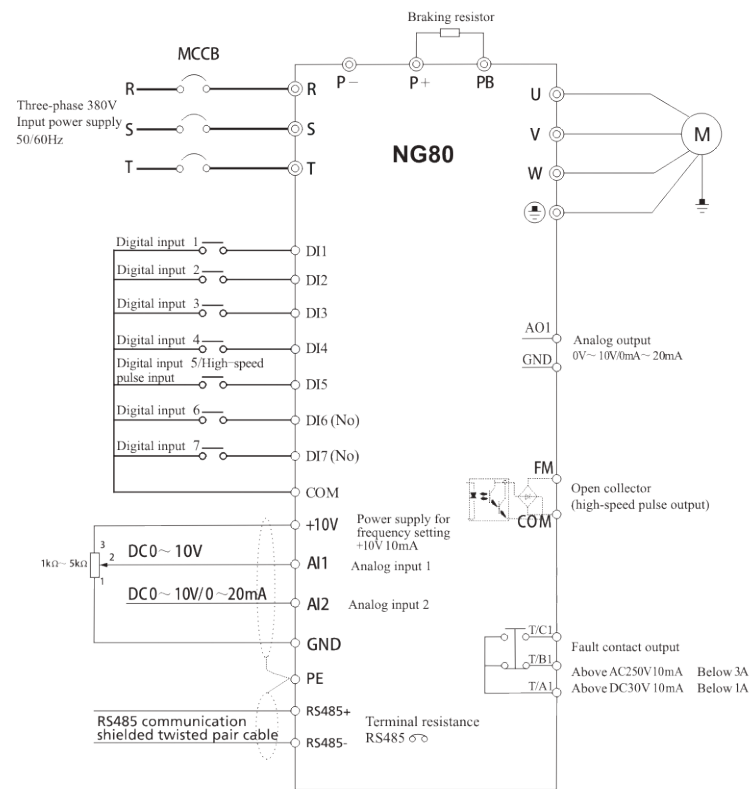


Figure 3-4 0.4 ~ 132kW Wiring diagram of three-phase 380V inverter

Note:

1. Terminal $\odot$ refers to the main circuit terminal, terminal $\circ$ refers to the control circuit terminal.
2. The 0.4 ~ 30kW built-in brake unit is standard and does not require additional installation.
3. The braking resistor is selected according to the user's needs, as detailed in the selection guide for braking resistors.

Wiring diagram of three-phase 380V inverter

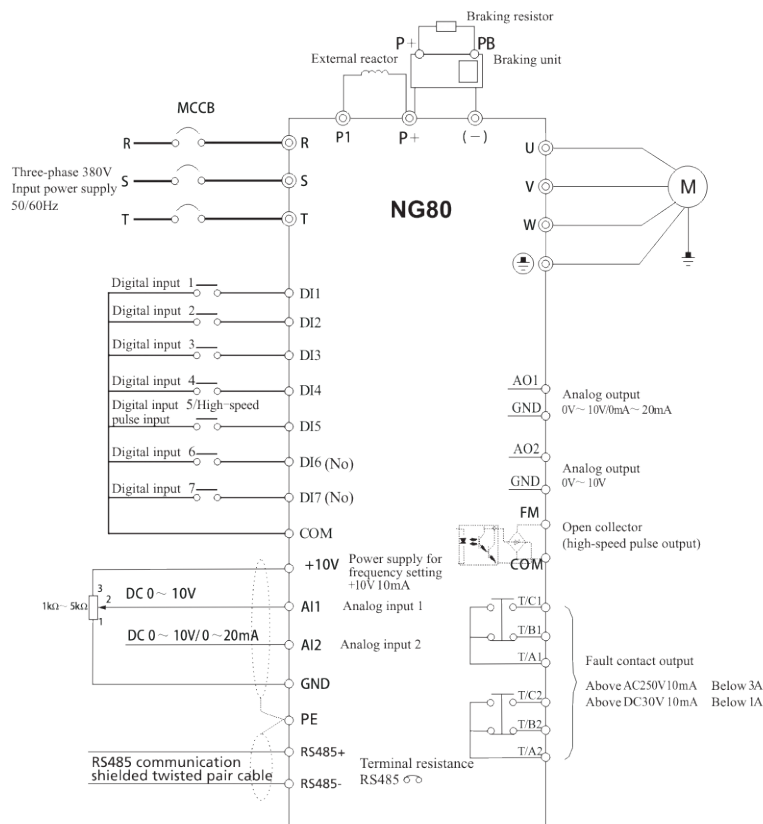


Figure 3-5 Wiring diagram of three-phase 380V inverter above 160kW

3.2.4 Main circuit terminals and connections



Danger

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



Caution

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

1) Description of the main circuit terminals of single-phase inverters

Terminal	Name	Description
L1, L2	Input terminal of single phase power supply	Connect to single-phase 220V AC power
P+, P-	Negative and positive terminals of DC bus	Common DC bus input point
P+, PB	Connection terminal of brake resistor	Connecting the braking resistor
U, V, W	Output terminal of inverter	Connect to the three phase motor
PE	Earth terminal	Earth connection terminal

2) Description of the main circuit terminals of three-phase inverters

Terminal	Name	Description
R, S, T	Input terminal of three phase power supply	Connect to three-phase AC power
P+, P-	Negative and positive terminals of DC bus	Common DC bus input point (connection points for external braking units with voltage levels of 220V/18.5kW and above, and other voltage levels of 37kW and above)
P+, PB	Connection terminal of brake resistor	Connection point of brake resistor of the inverter below 15kW (220V) & the inverter below 30kW (other voltages)
P, P1	Connection terminal of external DC reactor	Connection point of external DC reactor
U, V, W	Output terminal of inverter	Connect to the three phase motor
PE	Earth terminal	Earth connection terminal

Precautions on Wiring:

a) Input power L1, L2 or R, S and T:

There is no phase sequence requirement for the cable connection at the input side of the inverter.

b) DC bus P+ and P- terminals:

Note that the P+ and P- terminals of DC bus have residual voltage right after power-on. It needs to wait until the CHARGE indicator is OFF and make sure that the voltage is less than 36V prior to wiring connection. Otherwise there may be danger of electric shock.

When using external brake components with voltage levels of 220V18.5kW and above, and other voltage levels of 37kW and above, be careful not to reverse the polarity of P+ and P-, otherwise it may cause damage to the frequency converter or even fire.

The wiring length of the brake unit should not exceed 10 meters. Twisted wires or pair wires should be used and connected in parallel.

Do not connect the brake resistor directly to the DC bus, or it may damage the inverter and even cause fire.

c) Connecting terminals P+ and PB of brake resistor:

Only models with 220V voltage below 15kW and other voltage levels below 30kW and confirmed to have built -in braking units can have effective braking resistor connection terminals.

The prototype of brake resistor can refer to the recommended value and the wiring length should be less than 5 meters. Otherwise it may damage the inverter.

d) Connecting terminals P1 and (+) of external DC reactor:

220V37kW and above, inverters and reactors with other voltage levels of 75kW power and above are externally installed. During assembly, remove the connecting pieces between the P1 and (+) terminals, and connect the reactors between the two terminals.

e) Terminals U, V, W at the output side of the inverter:

The inverter output side cannot connect to the capacitor or surge absorber. Otherwise, it may cause frequent inverter protection and even damage the inverter.

In case the motor cable is too long, it may generate electrical resonance easily due to the impact of distributed capacitance, thus damaging the motor insulation or generating higher leakage current to invoke over current protection of the inverter. When the length of motor cable is longer than 100 meters, it needs to install a AC output reactor.

f) Earth terminal PE $\oplus$:

This terminal should be earthed reliably, with resistance of earth cable of less than 0.1Ω. Otherwise, it may cause fault or damage the inverter.

Do not share the earth terminal $\oplus$ and zero line of the power supply.

3.2.5 Control terminals and connections

1) Control circuit terminals

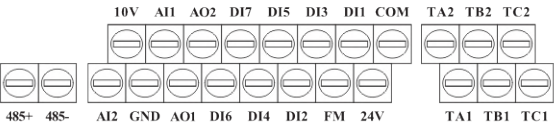


Figure 3-8 Terminal layout of control circuit (JZ0100-01-07)

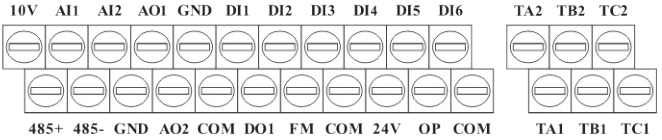
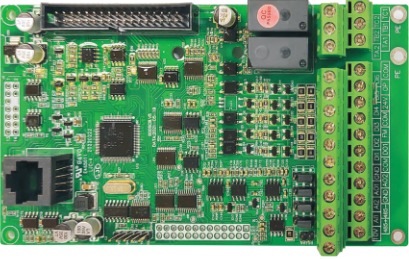


Figure 3-8-1 Terminal layout of 600SCB series control circuit
(This control board is an optional product)

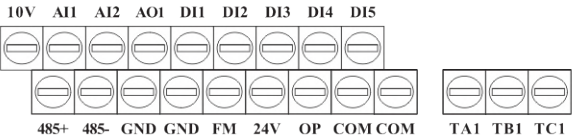
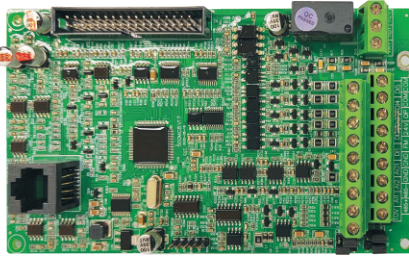


Figure 3-8-2 Terminal layout of 500MCB series control circuit

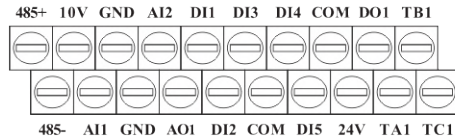
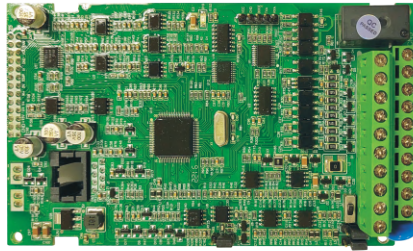


Figure 3-8-3 Terminal layout of 500SCB series control circuit
(Special motherboard for minicomputer)

2) Function description of control terminal

Table 3-3 Description of Control Terminal Function

Type	Terminal Symbol	Terminal Name	Function Description
Power Supply	+10V~GND	External +10V power	Provide +10V power supply for external units, and the maximum output current is 10mA. It is generally used as the operating power supply for the external potentiometer. The potentiometer resistance range is 1kΩ~5kΩ.
	+24V~COM	External +24V power	Provide +24V power supply for external units. It is generally used as the operating power supply for digital input/output terminals and the external sensor. The maximum output current is 200mA.
Analog Input	AI1~GND	Analog input terminal 1	1. Input range: DC 0V~10V/0mA~20mA, determined by AI1 jumper on the control board. 2. Input impedance: 22kΩ
	AI2~GND	Analog input terminal 2	1. Input range: DC 0V~10V/0mA~20mA, determined by AI2 jumper on the control board. 2. Input impedance: 22kΩ (voltage); 500Ω(current)
Digital Input	DI1~COM	Digital input 1	1. Optical coupling isolation, compatible with dual polarity input 2. Input impedance: 2.4kΩ 3. Voltage range for level input: 9V~30V
	DI2~COM	Digital input 2	
	DI3~COM	Digital input 3	
	DI4~COM	Digital input 4	In addition to the characteristics of DI1 to DI4, it can also be used as the high speed pulse input channel. Maximum input frequency is 100kHz
	DI5~COM	High-speed pulse input terminal	
Analog Output	AO1~GND	Analog output 1	The voltage or current output is determined by AO1 jumper on the control board. Output voltage range: 0V ~ 10V. Output current range: 0mA ~ 20mA.
Digital Output	DO1~COM	Digital output 1	Open collector output: Optical coupling isolation, dual polarity Output voltage range: 0V~24V Output current range: 0mA~50mA
	FM~COM	High speed pulse output	It can be used as high speed pulse output or open collector output which is determined by function code P5-00. High speed pulse output: maximum frequency is 100kHz. When used as open collector output, the specification is the same as that of DO1.
Relay Output	T/A~T/B	Normally closed terminal	Driving capacity: AC 250V, 3A, COSØ=0.4 DC 30V, 1A
	T/A~T/C	Normally open terminal	
Auxiliary interface	J12	Function expansion card interface	28 core terminal, interface with optional cards (such as I/O expansion cards, PLC cards, various bus cards, etc.)
	J3	PG card interface	Optional: OC, differential, UVW, resolver and other interfaces
	J7	External keyboard interface	External keyboard

3) Description of connection of control terminals

a) Analog input terminal

Since the weak analog voltage signal is easy to suffer external interferences, it needs to employ shielded cable generally and the length should be no longer than 20 meters, as shown in Figure 3-9. In case the analog signal is subject to severe interference, and filter capacitor or ferrite magnetic core should be installed at analog signal source side, as shown in Figure 3-10.

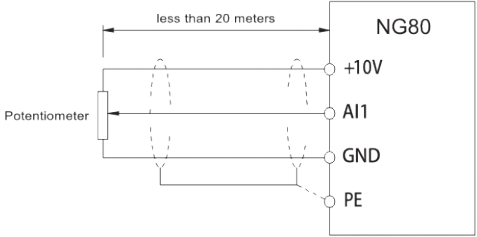


Figure 3-9 Wiring diagram of analog input terminal

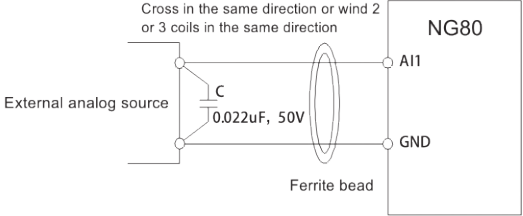


Figure 3-10 Processing wiring diagram of analog input terminal

b) Digital input terminal

It needs to employ shielded cable generally, with cable length of no more than 20 meters. When active driving is adopted, necessary filtering measures should be taken to prevent the interference to the power supply. It is recommended to use the contact control mode.

c) DI terminal connection

Drain wiring

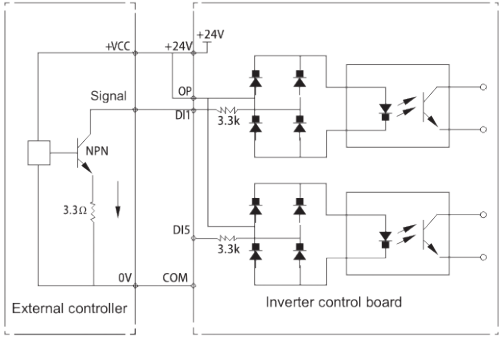


Figure 3-11 Drain wiring

One of the most popular wiring techniques is this one. In the event that an external power source is utilized, the positive terminal of the external power supply must be connected to 24V and the negative terminal to COM.

Source wiring

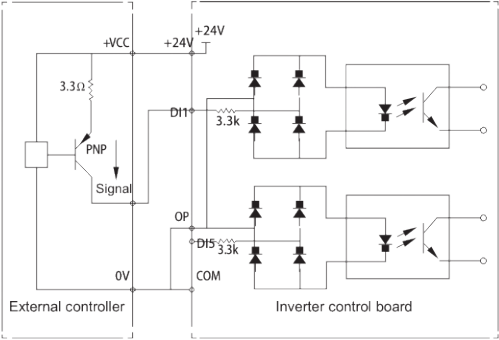


Figure 3-12 Source type wiring

The common terminal of +24V and the external controller must be linked together, and the OP of jumper J9 must be jumped to COM in this wiring approach together. The negative terminal of the external power supply must likewise be connected to OP if an external power source is being used.

d) Digital output terminal

An absorption diode should be placed to both ends of the relay coil whenever the digital output terminal needs to drive the relay. The 24V DC power supply is easily damaged if this is not the case.

Note: Make sure that the absorption diode's polarity is installed appropriately. Otherwise, the DC 24V power source will instantly burn out once the digital output terminal starts to output.

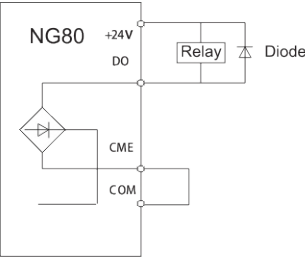


Figure 3-13 Schematic diagram of digital output terminal wiring

Chapter 4 Operation and Display

4.1 Keypad Description

With the operation keypad, it can perform such operations on the inverter as function parameter modification, working status monitor and running control (start and stop). Its appearance and functional area are shown in the following figure:

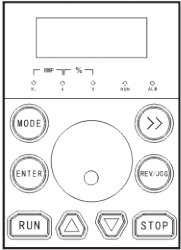
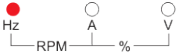
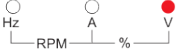
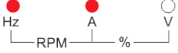


Figure 4-1 Schematic diagram of NG80 series operation panel

- 1) Function indicator light instructions:
- RUN: when the light is out, the inverter is down, and when the light is on, the inverter is in operation.
 - LOCAL/REMOTE: Indicator light for keyboard operation, terminal operation, and remote operation (communication control). When the light is off, it indicates the keyboard operation control status, when the light is on, it indicates the terminal operation control status, and when the light is flashing, it indicates that it is in remote operation control status.
 - FWD/REV: Forward and reverse indicator light, light on indicates that it is in a forward rotating state.
 - TUNE/TC: Tune/torque control/fault indicator light, light on indicates torque control mode, slow flashing light indicates tuning state, and fast flashing light indicates fault state.
- 2) Unit indicator lamp:
- | Hz | frequency unit | A | current unit | V | voltage unit |
|--------------|----------------|-----------|--------------|---|--------------|
| RMP (Hz + A) | speed per unit | % (A + V) | percentage | | |
- 3) Digital display area
- The 5-bit LED display, which can display the set frequency, output frequency, various monitoring data and alarm code, etc.
- 4) Keyboard button description table

Table 4-1 Keyboard Menu

Key	Name	Function
MODE	Programming key	Level 1 menu to enter or exit
ENTER	Confirm key	Enter the menu screen step by step to confirm the setting parameters
▲	Incremental key	Increasing number of the data and function codes
▼	Decremental key	Decreasing number of the data and functional codes
▶▶	Shift key	In the case of running the shutdown display interface and running the display interface, the display parameter can be selected periodically, and when modifying the parameter, the modification bit of the parameter can be selected.
RUN	Run key	In keyboard operation mode, used for running operations
STOP/RESET	Stop/reset	In the running state, press this key can be used to stop the running operation, when the fault alarm state, it is used to reset the operation.
REV/JOG	Multifunctional selection key	Function function selection according to P7-01

Name	Description					
Status indicator	RUN	When the lamp is on, the inverter is in operation, and when the lamp is out, the inverter is down.				
	LOCAL	○ LOCAL: Extinguish	Indicates that the inverter is in a shutdown state.			
		● LOCAL: Constantly light	Indicates the terminal start stop control method.			
		◐ LOCAL: Flicker	Indicates the communication start stop control method.			
Unit indicator lamp	Represents the unit currently displayed on the keyboard.					
	Hz		Frequency unit			
	A		Current unit			
	V		Voltage unit			
	RPM		Speed per unit			
	%		Percentage			
Digital display area	There are 5-bit 5-segment LED Nixie tube on the inverter operation panel, which display various monitoring data such as set frequency, output frequency and alarm code.					
	Digital display	Corresponding letter	Digital display	Corresponding letter	Digital display	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	.	.		—

4.2 Function Code Checking and Modification Methods Description

The operation keypad of the NG80 series inverter adopts three-level menu structure to carry out operations such as parameter setting.

The three-level menu includes function parameter group (level 1 menu) → Function code (level 2 menu) → Function code setting value (level 3 menu). Refer to Figure 4-2 for the operation procedure.

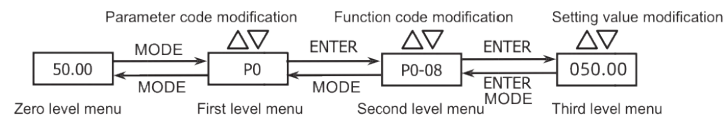
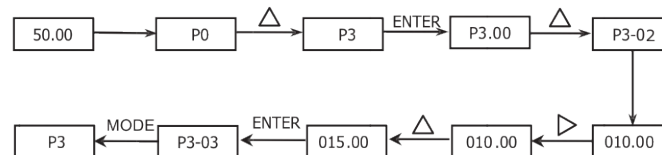


Figure 4-2 Operation Procedure of Three-level Menu

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

Example: Modify the function code P3-02 from 10.00Hz to 15.00Hz. (The bold-type word indicates the flashing bit.)



In level 3 menu, if there is no flashing bit, it indicates that the function code cannot be modified. The possible reasons include:

- 1) The function code is an unchangeable parameter, such as actual detection parameter, running record parameter, etc.
- 2) The function code cannot be modified in running status. It can be modified only after the unit is stopped.

4.3 Parameter Display Method

The purpose of the parameter display mode, which has three options, is to enable users to examine the function parameters in various arrangement formats in accordance with their real demands.

Name	Description
Functional parameter mode	P0 ~ PF, AO ~ AF, and U0 ~ UF function parameter groups are used in the orderly presentation of inverter function parameters.
User customization parameter mode	The user chooses which functional parameters should be displayed through the PE group and may modify the presentation of up to 32 functional parameters.
User changing parameter mode	Functional parameters that do not match those set by the factory.

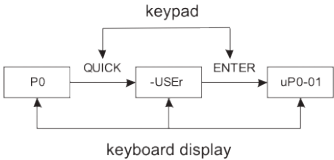
The relevant functional parameters are PP-02, PP-03, as follows:

PP-02	Display properties in functional parameter mode		Factory default	11
	Setting range	Units place	U group display selection	
		0	No display	
		1	Display	
		Tens place	A group display selection	
		0	No display	
		1	Display	
PP-03	Personality parameter display selection		Factory default	0
	Setting range	Units place	User customized parameter display selection	
		0	No display	
		1	Display	
		Tens place	User changes parameter display selection	
		0	No display	
		1	Display	

When one of the personality parameter mode display options (PP-03) exists for display. At this time, you can switch into different parameter display mode by QUICK key.
The display code of each parameter display mode is:

Parameter display method	Display
Functional parameter mode	- b A S E
User customization parameter mode	- H G F r
User changing parameter mode	- - [- -

Switching mode is as follows:
The current is the function parameter mode, and the switch is the user customized parameter mode.



4.4 User Customization Parameter Operation Method

The user customization menu is designed to make it easy for the user to inspect and change the common functional settings rapidly. The parameter's display form is "uP3-02" in the user customization menu. It refers to the function parameter P3-02, and changing the value there has the same result as changing the corresponding parameter in the regular programming state.

The PE group, which chooses the function parameters, is where the function parameters for the user customization menu originate from. P0-00 can be set to signal that nothing is selected, up to 30 can be set. The user customization menu is empty if "NULL" is shown while accessing the menu.

For the convenience of users, the user customization menu was initially saved in the 16 most often used parameters:

P0-01: Control method	P0-02: Command source selection
P0-03: Main frequency source selection	P0-07: Frequency source selection
P0-08: Preset frequency	P0-17: Acceleration time
P0-18: Deceleration time	P3-00: V/F curve setting
P3-01: Torque increase	P4-00: DI1 terminal function selection
P4-01: DI2 terminal function selection	P4-02: DI3 terminal function selection
P5-04: DO1 output selection	P5-07: AO1 output selection
P6-00: Starting method	P6-10: Shutdown method

Users can modify the user customization according to their specific needs.

4.5 Viewing Methods for Status Parameters

A variety of status parameters can be displayed by the shift key ">" in the stop or running state respectively. The function codes P7-03 (operation parameter 1), P7-04 (operation parameter 2) and P7-05 (shutdown parameter) are used to select whether the parameter is displayed by binary bits.

In the stop state, there are sixteen stop state parameters that can be selected for display or not. They are set frequency, bus voltage, DI input status, DO output status, analog input AI1 voltage, analog input AI2 voltage, analog input AI3 voltage, actual count value, actual length value, PLC running step, load speed display, PID setting, PULSE input pulse frequency and 3 reserved parameters. The display of selected parameters can be switched according to the key sequence.

In the operating state, there are five operating status parameters, including operating frequency, set frequency, bus voltage, output voltage, and output current are displayed by default. Other display parameters include output power, output torque, DI input status, DO output status, analog input AI1 voltage, analog input AI2 voltage, analog input AI3 voltage, actual count value, actual length value, line speed, PID setting, PID feedback, etc. Whether or not to display is selected by function codes P7-03 and P7-04 by bit (converted to binary). The display of selected parameters can be switched according to the key sequence.

When the inverter is powered off and then powered on again, the displayed parameters are defaulted to the parameters selected before the inverter was powered off.

4.6 Password Setting

The inverter provides user password protection function. When PP-00 is set to non-zero value, it indicates the user password, and the password protection turns valid after exiting the function code editing status. When pressing MODE key again, "-----" will be displayed, and common menu cannot be entered until user password is input correctly.

To cancel the password protection function, enter with password and set PP-00 to "0".

4.7 Motor Parameters Autotuning

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

The procedures for the automatic tuning of motor parameters are described below:

First, select the command source (P0-02) as the command channel of the operation keypad. Second, input the following parameters in accordance with the actual motor parameters:

Motor selection	Parameters	
Motor 1	P1-00: Motor type selection P1-01: Motor rated power P1-02: Motor rated voltage	P1-03: Motor rated current P1-04: Motor rated frequency P1-05: Motor rated speed
Motor 2	A2-00: Motor type selection A2-01: Motor rated power A2-02: Motor rated voltage	A2-03: Motor rated current A2-04: Motor rated frequency A2-05: Motor rated speed
Motor 3	A3-00: Motor type selection A3-01: Motor rated power A3-02: Motor rated voltage	A3-03: Motor rated current A3-04: Motor rated frequency A3-05: Motor rated speed
Motor 4	A4-00: Motor type selection A4-01: Motor rated power A4-02: Motor rated voltage	A4-03: Motor rated current A4-04: Motor rated frequency A4-05: Motor rated speed

For asynchronous motor

If the motor is completely disconnected from the load, set P1-37(motor 2/3/4 is A2/A3/A4-37), please select 2 (complete tuning of asynchronous motor), and press RUN key on the keyboard keypad, then the inverter will automatically calculate the following parameters:

Motor selection	Parameters
Motor 1	P1-16: Synchronous machine stator resistance P1-17: Synchronous machine D-axis inductance P1-18: Synchronous machine Q-axis inductance
Motor 2	A2-16: Synchronous machine stator resistance A2-17: Synchronous machine D-axis inductance A2-18: Synchronous machine Q-axis inductance
Motor 3	A3-16: Synchronous machine stator resistance A3-17: Synchronous machine D-axis inductance A3-18: Synchronous machine Q-axis inductance
Motor 4	A4-16: Synchronous machine stator resistance A4-17: Synchronous machine D-axis inductance A4-18: Synchronous machine Q-axis inductance

Complete motor parameters auto tuning.

If the motor is not completely disconnected from the load, set P1-37(motor 2/3/4 is A2/A3/A4-37), Please select 1(asynchronous motor static tuning), and press RUN key on the keyboard keypad.

Chapter 5 Function Parameter List

If PP-00 is set to non-zero value, it means parameter protection password is set, and the parameter menu cannot be entered until correct password is input. To cancel the password, please set PP-00 to "0".

The parameter menu in user customized parameter mode is not password protected.

P Group and A Group are basic functional parameters, while U Group is monitoring functional parameter.

The instruction of the symbols in function parameter list is as following:

"☆": means that the parameter setting value can be modified on stop and running status.

"★": means that the parameter setting value cannot be modified on the running status.

"●": means that the value of the parameter is the real detection value which cannot be modified.

"★": means that this parameter is "manufacturer parameter" and is only set by the manufacturer. Users are prohibited from operating it.

Basic Function Parameter Table

Function code	Name	Detailed instruction	Factory default	Modify
P0 Group: Basic Function				
P0-00	GP type display	1: G model (constant torque load model) 2: P model (fan and pump load model)	Model depend	★
P0-01	1st motor control mode	0: Speed sensorless vector control(SVC) 1: Vector control with speed sensor(FVC) 2: V/F control	2	★
P0-02	Running command source	0: Keypad (LED OFF) 1: Terminal (LED ON) 2: Communication (LED flickers)	0	☆
P0-03	Main frequency source X selection	0: Digital settings (Keypad ▲▼ settings, preset frequency P0-08, UP and DOWN modifiable, non-recorded) 1: Digital settings (Keypad ▲▼ settings, preset frequency P0-08, UP and DOWN recorded) 2: AI1 3: AI2 4: AI3 (Panel potentiometer) 5: PULSE pulse setting (DI5) 6: Multi segment instruction 7: Simple PLC 8: PID 9: Communication given	4	★
P0-04	Auxiliary frequency source Y selection	The same as P0-03 (Main frequency source X selection)	0	★
P0-05	Auxiliary frequency source Y range selection when stacking	0: Relative to maximum frequency 1: Relative to frequency source X	0	☆
P0-06	Auxiliary frequency source Y range when stacking	0% ~ 150%	100%	☆
P0-07	Frequency source superposition selection	Units place: frequency source selection 0: Main frequency source X 1: Calculation result of frequency (determined by tens place) 2: Switching between X and Y 3: Switching between X and calculation result 4: Switching between Y and calculation result Tens place: calculation relationship between frequency X and Y 0: X + Y	00	☆

Function code	Name	Detailed instruction	Factory default	Modify
		1: X - Y 2: Max (X, Y) 3: Min (X, Y)		
P0-08	Preset frequency	0.00Hz ~ maximum frequency (P0-10)	50.00Hz	☆
P0-09	Running direction	0: Forward 1: Reverse	0	☆
P0-10	Maximum frequency	50.00Hz ~ 600.00Hz	50.00Hz	★
P0-11	Frequency source upper limit	0: P0-12 setting 1: AI1 2: AI2 3: AI3 (Panel potentiometer) 4: PULSE pulse setting (DI5) 5: Communication given	0	★
P0-12	Frequency upper limit	P0-14 (frequency lower limit) ~ P0-10 (max. frequency)	50.00Hz	☆
P0-13	Frequency upper limit offset	0.00Hz ~ P0-10 (max. frequency)	0.00Hz	☆
P0-14	Frequency lower limit	0.00Hz ~ P0-12 (frequency upper limit)	0.00Hz	☆
P0-15	Carrier frequency	0.5kHz ~ 16.0kHz	Model depend	☆
P0-16	Carrier frequency adjusting according to temperature	0: No 1: Yes	1	☆
P0-17	Acceleration time 1	0.00s ~ 65000s	Model depend	☆
P0-18	Deceleration time 1	0.00s ~ 65000s	Model depend	☆
P0-19	ACC/DEC time unit	0: 1s 1: 0.1s 2: 0.01s	1	★
P0-21	Auxiliary frequency source offset frequency when stacking	0.00Hz ~ P0-10 (max. frequency)	0.00Hz	☆
P0-22	Frequency command resolution	1: 0.1Hz 2: 0.01Hz	2	★
P0-23	Digital setting frequency storage selection when stop	0: Not store 1: Store	1	☆
P0-24	Motor selection	0: Motor 1 1: Motor 2 2: Motor 3 3: Motor 4	0	★
P0-25	ACC/DEC time reference frequency	0: P0-10 (max. frequency) 1: Setting frequency 2: 100Hz	0	★

Function code	Name	Detailed instruction	Factory default	Modify
P0-26	Running frequency command UP/DOWN reference	0: Running frequency 1: Setting frequency	0	★
P0-27	Command source combination with frequency source	Units place: Operation keypad command combination with frequency source 0: No combination 1: Digitally set frequency 2: AI1 3: AI2 4: AI3 (Panel potentiometer) 5: PULSE pulse setting (DI5) 6: Multi-step speed 7: Simple PLC 8: PID 9: Communication given Tens place: Terminal command combination with frequency source Hundreds place: Communication command combination with frequency source Thousand place: Automatic operation combination with frequency source	0000	☆
P0-28	Communication expansion card type	0: Modbus communication card 1: Profibus-DP communication card 2: CANopen communication card 3: CANlink communication card	0	☆
P1 Group: First Motor Parameters				
P1-00	Motor type	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Permanent magnet synchronous motor	0	★
P1-01	Motor rated power	0.1kW ~ 1000.0kW	Model depend	★
P1-02	Motor rated voltage	1V ~ 2000V	Model depend	★
P1-03	Motor rated current	0.01A ~ 655.35A (Inverter power≤55kW) 0.1A ~ 6553.5A (Inverter power>55kW)	Model depend	★
P1-04	Motor rated frequency	0.01Hz ~ max. frequency	Model depend	★
P1-05	Motor rated speed	1rpm ~ 65535rpm	Model depend	★
P1-06	Asynchronous motor stator resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Tuning parameters	★

Function code	Name	Detailed instruction	Factory default	Modify
P1-07	Asynchronous motor rotor resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Tuning parameters	★
P1-08	Asynchronous motor leakage inductance	0.01mH ~ 655.35mH (Inverter power≤55kW) 0.001mH ~ 65.535mH (Inverter power>55kW)	Tuning parameters	★
P1-09	Asynchronous motor mutual inductance	0.1mH ~ 6553.5mH (Inverter power≤55kW) 0.01mH ~ 655.35mH (Inverter power>55kW)	Tuning parameters	★
P1-10	Asynchronous motor no-load current	0.01A ~ P1-03 (Inverter power≤55kW) 0.1A ~ P1-03 (Inverter power>55kW)	Tuning parameters	★
P1-16	Synchronous motor stator resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Tuning parameters	★
P1-17	Synchronous motor D-axis inductance	0.01mH ~ 655.35mH (Inverter power≤55kW) 0.001mH ~ 65.535mH (Inverter power>55kW)	Tuning parameters	★
P1-18	Synchronous motor Q-axis inductance	0.01mH ~ 655.35mH (Inverter power≤55kW) 0.001mH ~ 65.535mH (Inverter power>55kW)	Tuning parameters	★
P1-20	Counter-electromotive force of synchronous motor	0.1V ~ 6553.5V	Tuning parameters	★
P1-27	Number of encoder lines	1 ~ 65535	1024	★
P1-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 3: Sine cosine encoder 4: Provincial type UVW encoder	0	★
P1-30	ABZ incremental encoder AB phase sequence	0: Forward 1: Reverse	0	★
P1-31	Encoder installation angle	0.0 ~ 359.9°	0°	★
P1-32	UVW encoder UVW phase sequence	0: Forward 1: Reverse	0	★
P1-33	UVW encoder bias angle	0.0 ~ 359.9°	0°	★
P1-34	Resolver pole pairs	1 ~ 65535	1	★

Function code	Name	Detailed instruction	Factory default	Modify
P1-36	Speed feedback PG disconnection detection time	0.0: No action 0.1s ~ 10.0s	0.0	★
P1-37	Tuning selection	0: No action 1: Asynchronous machine static tuning 2: Asynchronous machine complete tuning 11: Synchronous machine static tuning 12: Synchronizer complete tuning	0	★
P2 Group: First Motor Vector Control Parameters				
P2-00	Speed loop proportional gain 1	1 ~ 100	30	☆
P2-01	Speed loop integration time 1	0.01s ~ 10.00s	0.50s	☆
P2-02	Switching frequency 1	0.00 ~ P2-05	5.00Hz	☆
P2-03	Speed loop proportional gain 2	1 ~ 100	20	☆
P2-04	Speed loop integration time 2	0.01s ~ 10.00s	1.00s	☆
P2-05	Switching frequency 2	P2-02 ~ max. frequency	10.00Hz	☆
P2-06	Vector control slip gain	50% ~ 200%	100%	☆
P2-07	Speed loop filtering time constant	0.000s ~ 0.100s	0.000s	☆
P2-08	Vector control over excitation gain	0 ~ 200	64	☆
P2-09	Torque upper limit source in speed control mode	0: P2-10 setting 1: AI1 2: AI2 3: AI3 (Panel potentiometer) 4: PULSE pulse setting (DI5) 5: Communication given 6: Min(AI1,AI2) 7: Max(AI1,AI2) Full scale of 1-7 selection corresponds to P2-10	0	☆
P2-10	Torque upper limit digital setting under speed control mode	0.0% ~ 200.0%	150.0%	☆
P2-13	Excitation regulation proportional gain	0 ~ 60000	2000	☆
P2-14	Excitation regulation integral gain	0 ~ 60000	1300	☆
P2-15	Torque regulation proportional gain	0 ~ 60000	2000	☆
P2-16	Torque regulation integral gain	0 ~ 60000	1300	☆

Function code	Name	Detailed instruction	Factory default	Modify
P2-17	Speed loop integral attribute	Units place: Integral separation 0: Invalid 1: Effective	0	☆
P2-18	Synchronous machine weak magnetic mode	0: Weak magnetic invalid 1: Direct calculation mode 2: Automatic adjustment mode	1	☆
P2-19	Synchronous machine weak magnetic depth	50% ~ 500%	100%	☆
P2-20	Maximum weak magnetic current	1% ~ 300%	50%	☆
P2-21	Automatic gain adjustment for weak magnetic field	10% ~ 500%	100%	☆
P2-22	Weak magnetic integral multiple	2 ~ 10	2	☆
P3 Group: V/F Control Parameters				
P3-00	V/F curve setting	0: Linear V/F 1: Multiple-point V/F 2: Square V/F 3: 1.2 power V/F 4: 1.4 power V/F 6: 1.6 power V/F 8: 1.8 power V/F 9: Reserved 10: V/F fully separated mode 11: V/F half separation mode	0	★
P3-01	Torque boost	0.0% (Automatic torque increase) 0.1% ~ 30.0%	Model depend	☆
P3-02	Torque boost cutoff frequency	0.00Hz ~ max. frequency	50.00Hz	★
P3-03	V/F frequency point 1	0.00Hz ~ P3-05	0.00Hz	★
P3-04	V/F voltage point 1	0.0% ~ 100.0%	0.0%	★
P3-05	V/F frequency point 2	P3-03 ~ P3-07	0.00Hz	★
P3-06	V/F voltage point 2	0.0% ~ 100.0%	0.0%	★
P3-07	V/F frequency point 3	P3-05 ~ P1-04 (motor rated frequency)	0.00Hz	★
P3-08	V/F voltage point 3	0.0% ~ 100.0%	0.0%	★
P3-09	V/F slip compensation gain	0.0% ~ 200.0%	0.0%	☆
P3-10	V/F over excitation gain	0 ~ 200	64	☆
P3-11	V/F oscillation suppression gain	0 ~ 100	Model depend	☆
P3-13	V/F separated voltage source	0: Digital setting (P3-14) 1: AI1 2: AI2 3: AI3 (Panel potentiometer)	0	☆

Function code	Name	Detailed instruction	Factory default	Modify
		4: PULSE pulse setting (DI5) 5: Multi segment instruction 6: Simple PLC 7: PID 8: Communication given Note: 100.0% corresponds to the rated voltage of the motor		
P3-14	Voltage digital setting for V/F separation	0V ~ Motor rated voltage	0V	☆
P3-15	Voltage rise time for V/F separation	0.0s ~ 1000.0s Note: Refers to the time when 0V changes to the rated voltage of the motor	0.0s	☆
P3-16	Voltage deceleration time for V/F separation	0.0s ~ 1000.0s Note: Refers to the time when 0V changes to the rated voltage of the motor	0.0s	☆
P3-17	V/F separation shutdown mode selection	0: Frequency/Voltage independently reduced to 0 1: Reduce the voltage to 0 and then reduce the frequency again	0	☆
P3-18	Overcurrent stall action current	50 ~ 200%	130%	☆
P3-19	Overcurrent stall suppression	0: Invalid 1: Effective	1	★
P3-20	Overcurrent stall suppression gain	0 ~ 100	20	★
P3-21	Compensation coefficient for double speed overcurrent stall action current	50 ~ 200%	50%	☆
P3-22	Overvoltage stall action voltage	200.0 ~ 2000.0%	Model depend 220V: 380V 380V: 760V 480V: 850V 690V: 1250V 1140V: 1900V	★
P3-23	Overvoltage stall enable	0: Invalid 1: Effective	1	★
P3-24	Overvoltage stall suppression frequency gain	0 ~ 100	30	☆
P3-25	Overvoltage stall suppression voltage gain	0 ~ 100	30	☆
P3-26	Overvoltage stall maximum rise frequency limit	0 ~ 50Hz	5Hz	★
P3-27	Slip compensation time constant	0.1 ~ 10.0s	0.5s	☆

Function code	Name	Detailed instruction	Factory default	Modify
P4 Group: Input Terminal				
P4-00	DI1 terminal function	0: No function	1	★
P4-01	DI2 terminal function	1: Forward (FWD)	4	★
P4-02	DI3 terminal function	2: Reverse (REV)	9	★
P4-03	DI4 terminal function	3: Three-line running control	12	★
P4-04	DI5 terminal function	4: Forward Jog (FJOG)	13	★
P4-05	DI6 terminal function	5: Reverse Jog (RJOG)	0	★
P4-06	DI7 terminal function	6: Terminal UP	0	★
P4-07	DI8 terminal function	7: Terminal DOWN	0	★
P4-08	DI9 terminal function	8: Freely stop	0	★
		9: Fault reset (RESET)	0	★
		10: Pause running	0	★
		11: External fault (normal open) input	0	★
		12: Multi-step speed terminal 1 (As shown in Table 1 on page 89)	0	★
		13: Multi-step speed terminal 2 (As shown in Table 1 on page 89)		
		14: Multi-step speed terminal 3 (As shown in Table 1 on page 89)		
		15: Multi-step speed terminal 4 (As shown in Table 1 on page 89)		
		16: ACC/DEC selection terminal 1 (As shown in Table 2 on page 89)		
		17: ACC/DEC selection terminal 2 (As shown in Table 2 on page 89)		
		18: Main frequency source switching		
		19: UP and DOWN setting clear (terminal and keypad)		
		20: Running command switching terminal		
		21: ACC/DEC invalid		
		22: PID Pause		
		23: PLC status reset		
		24: Wobble frequency pause		
		25: Counter input		
		26: Counter reset		
P4-09	DI10 terminal function	27: Length count input		
		28: Length reset		
		29: Torque control invalid		
		30: PULSE frequency input (only valid for DI5)		
		31: Reserved		
		32: DC braking command		
		33: External fault (normal closed) input		
		34: Frequency modification enabled		
		35: PID action direction reverse		
		36: External stop terminal 1		

Function code	Name	Detailed instruction	Factory default	Modify
		37: Control command switching terminal 2 38: PID integration stop 39: Switch frequency source X to preset frequency 40: Switch frequency source Y to preset frequency 41: Motor selection terminal 1 42: Motor selection terminal 2 43: PID parameter switching 44: Customized fault 1 45: Customized fault 2 46: Speed control / torque control 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: Zero the running time this time 51 ~ 59: Reserved		
P4-10	DI filter time	0.000s ~ 1.000s	0.10s	☆
P4-11	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	★
P4-12	Terminal UP/DOWN change rate	0.001Hz/s ~ 65.535Hz/s	1.00Hz/s	☆
P4-13	AI curve 1 minimum input	0.00V ~ P4-15	0.00V	☆
P4-14	AI curve 1 minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	☆
P4-15	AI curve 1 maximum input	P4-13 ~ +10.00V	10.00V	☆
P4-16	AI curve 1 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	☆
P4-17	AI1 filter time	0.00s ~ 10.00s	0.10s	☆
P4-18	AI curve 2 minimum input	0.00V ~ P4-20	0.00V	☆
P4-19	AI curve 2 minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	☆
P4-20	AI curve 2 maximum input	P4-18 ~ +10.00V	10.00V	☆
P4-21	AI curve 2 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	☆
P4-22	AI2 filter time	0.00s ~ 10.00s	0.10s	☆
P4-23	AI curve 3 minimum input	-10.00V ~ P4-25	-10.00V	☆
P4-24	AI curve 3 minimum input corresponding setting	-100.0% ~ +100.0%	-6.0%	☆
P4-25	AI curve 3 maximum input	P4-23 ~ +10.00V	9.7V	☆

Function code	Name	Detailed instruction	Factory default	Modify
P4-26	AI curve 3 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	☆
P4-27	AI3 filter time	0.00s ~ 10.00s	0.10s	☆
P4-28	Pulse minimum input	0.00kHz ~ P4-30	0.00kHz	☆
P4-29	Pulse minimum input corresponding setting	-100.0% ~ 100.0%	0.0%	☆
P4-30	Pulse maximum input	P4-28 ~ 100.00kHz	50.00kHz	☆
P4-31	Pulse maximum input corresponding setting	-100.0% ~ 100.0%	100.0%	☆
P4-32	Pulse filter time	0.00s ~ 10.00s	0.10s	☆
P4-33	AI curve selection	Units place: AI1 curve selection 1: Curve 1 (see P4-13 ~ P4-16) 2: Curve 2 (see P4-18 ~ P4-21) 3: Curve 3 (see P4-23 ~ P4-26) 4: Curve 4 (see A6-00 ~ A6-07) 5: Curve 5 (see A6-08 ~ A6-15) Tens place: AI2 curve selection, ditto Hundreds place: AI3 curve selection, ditto	321	☆
P4-34	AI below minimum input setting selection	Units place: AI1 below minimum input setting selection 0: Correspond to minimum input setting 1: 0.0% Tens place: AI2 below minimum input setting selection, ditto Hundreds place: AI3 below minimum input setting selection, ditto	000	☆
P4-35	DI1 delay time	0.0s ~ 3600.0s	0.0s	★
P4-36	DI2 delay time	0.0s ~ 3600.0s	0.0s	★
P4-37	DI3 delay time	0.0s ~ 3600.0s	0.0s	★
P4-38	DI terminal valid mode selection 1	0: High level effective 1: Low level effective Units place: DI1 Tens place: DI2 Hundreds place: DI3 Thousands place: DI4 Ten thousands place: DI5	00000	★
P4-39	DI terminal valid mode selection 2	0: High level effective 1: Low level effective Units place: DI6 Tens place: DI7 Hundreds place: DI8 Thousands place: DI9 Ten thousands place: DI10	00000	★

Function code	Name	Detailed instruction	Factory default	Modify
P5 Group: Output Terminal				
P5-00	FM terminal output mode selection	0: Pulse output (FMP) 1: Switching output (FMR)	0	☆
P5-01	FMR output function selection	0: No output 1: Inverter is running	0	☆
P5-02	Control board relay function selection (T/A-T/B-T/C)	2: Fault output (fault stop) 3: FDT1 output 4: Frequency arrival	2	☆
P5-03	Expansion card relay output function selection (P/A-P/B-P/C)	5: Zero-speed running (no output when stop) 6: Motor overload pre-alarm	0	☆
P5-04	DO1 output function selection	7: Inverter overload pre-alarm 8: Setting count value arrival 9: Designated count value arrival	1	☆
P5-05	Expansion card DO2 output selection	10: Length arrival 11: PLC loop completed 12: Accumulated running time arrival 13: Frequency limiting 14: Torque limiting 15: Ready for running 16: AI1>AI2 17: Frequency upper limit arrival 18: Frequency lower limit arrival (run related) 19: Under voltage status output 20: Communication setting 21: Orientation finished (reserved) 22: Orientation approach (reserved) 23: Zero-speed running 2 (output when stop) 24: Accumulated power-on time arrival 25: FDT2 output 26: Frequency 1 arrival output 27: Frequency 2 arrival output 28: Current 1 arrival output 29: Current 2 arrival output 30: Timing arrival output 31: AI1 input over limit 32: Off load 33: Reverse running 34: Zero-current status 35: Module temperature arrival 36: Output current over limit 37: Lower limit frequency arrival (output when stop) 38: Warning output (keep running) 39: Motor over temperature pre-alarm 40: This running time arrival	4	☆

Function code	Name	Detailed instruction	Factory default	Modify
P5-06	FMP output function selection	0: Running frequency (0 ~ max. output frequency)	0	☆
P5-07	AO1 output function selection	1: Setting frequency (0 ~ max. output frequency) 2: Output current (0 ~ 2 times the rated current of the motor) 3: Output torque (0 ~ 2 times the rated torque of the motor) 4: Output power (0 ~ 2 times rated power) 5: Output voltage (0 ~ 1.2 times the rated voltage of the inverter) 6: Pulse input (0.01kHz ~ 100.00kHz) 7: AI1 (0V ~ 10V) 8: AI2 (0V ~ 10V or 0 ~ 20mA) 9: AI3 (0V ~ 10V) 10: Length (0 ~ max. set length) 11: Count value (0 ~ max. count value) 12: Communication settings (0.0% ~ 100.0%) 13: Motor speed (0 ~ speed corresponding to max. output frequency) 14: Output current (0.0A ~ 1000.0A) 15: Output voltage (0.0V ~ 1000.0V)	0	☆
P5-08	Expansion card AO2 output function selection		1	☆
P5-09	FMP output maximum frequency	0.01kHz ~ 100.00kHz	50.00kHz	☆
P5-10	AO1 zero deviation coefficient	-100.0% ~ +100.0%	0.0%	☆
P5-11	AO1 gain	-10.00 ~ +10.00	1.00	☆
P5-12	Expansion card AO2 zero deviation coefficient	-100.0% ~ +100.0%	0.0%	☆
P5-13	Expansion card AO2 gain	-10.00 ~ +10.00	1.00	☆
P5-17	FMR output delay time	0.0s ~ 3600.0s	0.0s	☆
P5-18	Relay 1 output delay time	0.0s ~ 3600.0s	0.0s	☆
P5-19	Relay 2 output delay time	0.0s ~ 3600.0s	0.0s	☆
P5-20	DO1 output delay time	0.0s ~ 3600.0s	0.0s	☆
P5-21	DO2 output delay time	0.0s ~ 3600.0s	0.0s	☆
P5-22	DO output terminal effective state selection	0: Positive logic 1: Negative logic Units place: FMR Tens place: Relay 1 Hundreds place: Relay 2 Thousands place: DO1 Ten thousands place: DO2	00000	☆

Function code	Name	Detailed instruction	Factory default	Modify
P6 Group: Start and Stop Control				
P6-00	Start mode	0: Direct start 1: Speed tracking and restart 2: Pre-excitation start (AC asynchronous motor)	0	☆
P6-01	Speed tracking mode	0: Begin from stop frequency 1: Begin from zero speed 2: Begin from maximum frequency	0	★
P6-02	Speed tracking speed	1 ~ 100	20	☆
P6-03	Start frequency	0.00Hz	0.00Hz	☆
P6-04	Start frequency holding time	0.0s ~ 100.0s	0.0s	★
P6-05	Starting DC braking current /pre-excitation current	0% ~ 100%	0%	★
P6-06	Starting DC braking time /pre-excitation time	0.0s ~ 100.0s	0.0s	★
P6-07	ACC/DEC mode	0: Linear ACC/DEC 1: S-curve ACC/DEC A 2: S-curve ACC/DEC B	0	★
P6-08	Time of S curve's start part	0.0% ~ (100.0% ~ P6-09)	30.0%	★
P6-09	Time of S curve's end part	0.0% ~ (100.0% ~ P6-08)	30.0%	★
P6-10	Stop mode	0: Deceleration to stop 1: Freely stop	0	☆
P6-11	DC braking start frequency after stop	0.00Hz ~ maximum frequency	0.00Hz	☆
P6-12	DC braking delay time after stop	0.0s ~ 100.0s	0.0s	☆
P6-13	DC braking current after stop	0% ~ 100%	0%	☆
P6-14	DC braking time after stop	0.0s ~ 100.0s	0.0s	☆
P6-15	Braking usage ratio	0% ~ 100%	100%	☆
P6-23	Vector control zero frequency current output	0: No current output 1: With current output	0	★
P6-24	Zero frequency with output	0: With output 1: No output	0	★
P7 Group: Keypad and Display				
P7-01	REV/JOG function selection	0: Invalid 1: Switching between keypad command channel and remote command channel (terminal command channel and communication command channel) 2: FDW/REV Switching 3: Forward Jog 4: Reverse Jog	0	★

Function code	Name	Detailed instruction	Factory default	Modify
		5: Switching between panel frequency command channel and remote frequency command channel		
P7-02	STOP/RESET function	0: Valid when keypad control 1: Always valid	0	☆
P7-03	LED running display parameter 1	0000 ~ FFFF Bit00: Running frequency 1 (Hz) Bit01: Setting frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: AI3 voltage (V) Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting	1F	☆
P7-04	LED running display parameter 2	0000 ~ FFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input pulse frequency (kHz) Bit03: Running frequency 2 (Hz) Bit04: Remain running time Bit05: AI1 voltage before calibration (V) Bit06: AI2 voltage before calibration (V) Bit07: AI3 voltage before calibration (V) Bit08: Linear speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: PULSE input pulse frequency (Hz) Bit12: Communication setting value Bit13: Encoder feedback speed (Hz) Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	☆
P7-05	LED stop display parameters	0000 ~ FFFF Bit00: Setting frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status	33	☆

Function code	Name	Detailed instruction	Factory default	Modify
		Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: AI3 voltage (V) Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: PULSE input pulse frequency (kHz)		
P7-06	Load speed display coefficient	0.0001 ~ 6.5000	1.0000	☆
P7-07	IGBT module radiator temperature	0.0℃ ~ 100.0℃	-	☆
P7-09	Accumulated running time	0h ~ 65535h	00000	●
P7-10	Model No.	-	-	●
P7-11	Software version No.	-	-	●
P7-12	Load speed display decimal place	0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	1	☆
P7-13	Accumulated power on time	0h ~ 65535h	-	●
P7-14	Accumulated power consumption	0kW ~ 65535°	-	●
P8 Group: Auxiliary function				
P8-00	Jog running frequency	0.00Hz ~ max. frequency	2.00Hz	☆
P8-01	Jog acceleration time	0.0s ~ 6500.0s	20.0s	☆
P8-02	Jog deceleration time	0.0s ~ 6500.0s	20.0s	☆
P8-03	Acceleration time 2	0.0s ~ 6500.0s	Model depend	☆
P8-04	Deceleration time 2	0.0s ~ 6500.0s	Model depend	☆
P8-05	Acceleration time 3	0.0s ~ 6500.0s	Model depend	☆
P8-06	Deceleration time 3	0.0s ~ 6500.0s	Model depend	☆
P8-07	Acceleration time 4	0.0s ~ 6500.0s	Model depend	☆
P8-08	Deceleration time 4	0.0s ~ 6500.0s	Model depend	☆
P8-09	Jump frequency 1	0.00Hz ~ max. frequency	0.00Hz	☆
P8-10	Jump frequency 2	0.00Hz ~ max. frequency	0.00Hz	☆

Function code	Name	Detailed instruction	Factory default	Modify
P8-11	Jump frequency amplitude	0.00Hz ~ max. frequency	0.01Hz	☆
P8-12	FWD/REV dead time	0.0s ~ 3000.0s	0.0s	☆
P8-13	Reverse control enable	0: Enable 1: Disable	0	☆
P8-14	Action when setting frequency lower than frequency lower limit	0: Running at frequency lower limit 1: Stop 2: Zero-speed running	0	☆
P8-15	Droop control	0.00Hz ~ 10.00Hz	0.00Hz	☆
P8-16	Accumulated power-on arrival time	0h ~ 65000h	0h	☆
P8-17	Accumulated running arrival time	0h ~ 65000h	0h	☆
P8-18	Activate protection selection	0: No protection 1: Protection	0	☆
P8-19	Frequency detection value (FDT1)	0.00Hz ~ max. frequency	50.00Hz	☆
P8-20	Frequency detection lagging value (FDT1)	0.0% ~ 100.0% (FDT1 level)	5.0%	☆
P8-21	Frequency arrival detection amplitude	0.0% ~ 100.0% (maximum frequency)	0.0%	☆
P8-22	Jump frequency control during ACC/DEC	0: Invalid 1: Effective	0	☆
P8-25	Acceleration time 1 and acceleration time 2 switching frequency point	0.00Hz ~ max. frequency	0.00Hz	☆
P8-26	Deceleration time 1 and deceleration time 2 switching frequency point	0.00Hz ~ max. frequency	0.00Hz	☆
P8-27	Terminal jog priority	0: Invalid 1: Effective	1	☆
P8-28	Frequency detection value (FDT2)	0.00Hz ~ max. frequency	50.00Hz	☆
P8-29	Frequency detection lagging value (FDT2)	0.0% ~ 100.0% (FDT2 level)	5.0%	☆
P8-30	Any arrival frequency detection value 1	0.00Hz ~ max. frequency	50.00Hz	☆
P8-31	Any arrival frequency detection amplitude 1	0.0% ~ 100.0% (maximum frequency)	0.0%	☆
P8-32	Any arrival frequency detection value 2	0.00Hz ~ max. frequency	50.00Hz	☆

Function code	Name	Detailed instruction	Factory default	Modify
P8-33	Any arrival frequency detection amplitude 2	0.0% ~ 100.0% (maximum frequency)	0.0%	☆
P8-34	Zero-current detection level	0.0% ~ 300.0% 100.0% corresponds to motor rated current	5.0%	☆
P8-35	Zero-current detection delay time	0.01s ~ 600.00s	0.10s	☆
P8-36	Output current over limit value	0.0% (No detection) 0.1% ~ 300.0% (motor rated current)	200.0%	☆
P8-37	Output current over limit detection delay time	0.00s ~ 600.00s	0.00s	☆
P8-38	Any arrival current 1	0.0% ~ 300.0% (motor rated current)	100.0%	☆
P8-39	Any arrival current 1 amplitude	0.0% ~ 300.0% (motor rated current)	0.0%	☆
P8-40	Any arrival current 2	0.0% ~ 300.0% (motor rated current)	100.0%	☆
P8-41	Any arrival current 2 amplitude	0.0% ~ 300.0% (motor rated current)	0.0%	☆
P8-42	Timing function selection	0: Invalid 1: Effective	0	☆
P8-43	Timing running time selection	0: P8-44 setting 1: AI1 2: AI2 3: AI3 (Panel potentiometer) Analog input scale corresponds to P8-44	0	☆
P8-44	Timing running time	0.0Min ~ 6500.0Min	0.0Min	☆
P8-45	AI1 input voltage protection lower limit	0.00V ~ P8-46	3.10V	☆
P8-46	AI1 input voltage protection upper limit	P8-45 ~ 10.00V	6.80V	☆
P8-47	Module temperature arrival	0℃ ~ 100℃	75℃	☆
P8-48	Cooling fan control	0: Fan runs when inverter running 1: Fan always runs	0	☆
P8-49	Wake up frequency	Dormancy frequency (P8-51) ~ max. frequency (P0-10)	0.00Hz	☆
P8-50	Wake up delay time	0.0s ~ 6500.0s	0.0s	☆
P8-51	Dormancy frequency	0.00Hz ~ wake up frequency (P8-49)	0.00Hz	☆
P8-52	Dormancy delay time	0.0s ~ 6500.0s	0.0s	☆
P8-53	Running arrival time setting	0.0Min ~ 6500.0Min	0.0Min	☆

Function code	Name	Detailed instruction	Factory default	Modify
P9 Group: Fault and Protection				
P9-00	Motor overload protection selection	0: Disable 1: Enable	1	☆
P9-01	Motor overload protection gain	0.20 ~ 10.00	1.00	☆
P9-02	Motor overload pre-alarm coefficient	50% ~ 100%	80%	☆
P9-03	Overvoltage stall gain	0 ~ 100	0	☆
P9-04	Overvoltage stall protection voltage	200.0 ~ 2000.0V	760	☆
P9-05	Overcurrent stall gain	1 ~ 100	20	☆
P9-06	Overcurrent stall protection current	100% ~ 200%	150%	☆
P9-07	Short-circuit to ground protection selection when power-on	0: Invalid 1: Effective	1	☆
P9-08	Starting voltage of braking unit action	200.0 ~ 2000.0V	690	☆
P9-09	Fault auto reset times	0 ~ 20	0	☆
P9-10	Fault DO acts selection in fault auto reset	0: No action 1: Action	0	☆
P9-11	Fault automatic reset interval time	0.1s ~ 100.0s	1.0s	☆
P9-12	Input phase failure protection selection (18.5kW and below without)	Units place: Input phase loss detection 0: Disable 1: Enable Tens place: Input power detection 0: Disable 1: Enable	11	☆
P9-13	Output phase failure protection selection	0: Disable 1: Enable	1	☆
P9-14	The first fault type	0: No fault 1: Reserved 2: Over current in ACC process 3: Over current in DEC process 4: Over current in constant speed 5: Over voltage in ACC process 6: Over voltage in DEC process 7: Over voltage in constant speed 8: Buffer resistor overload fault 9: Under voltage 10: Inverter overload 11: Motor overload 12: Input phase failure	—	●

Function code	Name	Detailed instruction	Factory default	Modify
P9-15	The second fault type	13: Output phase failure 14: Module overheat 15: External fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor autotuning fault 20: Encoder/PG card fault 21: Parameter R/W fault 22: Inverter hardware fault 23: Motor short circuit to ground fault 24: Reserved 25: Reserved	—	●
P9-16	The third (latest) fault type	26: Running time arrival 27: Customized fault 1 28: Customized fault 2 29: Power-on time arrival 30: Off load 31: PID feedback lost when running 40: Fast current limiting over time 41: Switching the motor fault when running 42: Speed deviation oversize 43: Motor over speed 45: Motor overtemperature 51: Initial position error	—	●
P9-17	Frequency at the third (latest) fault	—	—	●
P9-18	Current at the third (latest) fault	—	—	●
P9-19	Bus voltage at the third (latest) fault	—	—	●
P9-20	Input terminal's status at the third (latest) fault	—	—	●
P9-21	Output terminal's status at the third (latest) fault	—	—	●
P9-22	Inverter status at the third (latest) fault	—	—	●
P9-23	Power-on time at the third (latest) fault	—	—	●
P9-24	Running time at the third (latest) fault	—	—	●
P9-27	Frequency at the second fault	—	—	●
P9-28	Current at the second fault	—	—	●

Function code	Name	Detailed instruction	Factory default	Modify
P9-29	Bus voltage at the second fault	—	—	●
P9-30	Input terminal's status at the second fault	—	—	●
P9-31	Output terminal's status at the second fault	—	—	●
P9-32	Inverter status at the second fault	—	—	●
P9-33	Power-on time at the second fault	—	—	●
P9-34	Running time at the second fault	—	—	●
P9-37	Frequency at the first fault	—	—	●
P9-38	Current at the first fault	—	—	●
P9-39	Bus voltage at the first fault	—	—	●
P9-40	Input terminal's status at the first fault	—	—	●
P9-41	Output terminal's status at the first fault	—	—	●
P9-42	Inverter status at the first fault	—	—	●
P9-43	Power-on time at the first fault	—	—	●
P9-44	Running time at the first fault	—	—	●
P9-47	Fault protection action selection 1	Units place: Motor overload (11) 0: Freely stop 1: Stop by stopping 2: Keep running Tens place: Input phase failure (12) Hundreds place: Output phase failure (13) Thousands place: External fault (15) Ten thousands place: communication fault (16)	00000	☆
P9-48	Fault protection action selection 2	Units place: Encoder/PG card fault (20) 0: Freely stop Tens place: Function code R/W fault (21) 0: Freely stop 1: Stop by stopping Hundreds place: Reserved Thousands place: Motor over heat (25) Ten thousands: Running time arrival (26)	00000	☆

Function code	Name	Detailed instruction	Factory default	Modify
P9-49	Fault protection action selection 3	Units place: Customized fault 1 (27) 0: Freely stop 1: Stop by stopping 2: Keep running Tens place: Customized fault 2 (28) 0: Freely stop 1: Stop by stopping 2: Keep running Hundreds place: Power-on time arrival time (29) 0: Freely stop 1: Stop by stopping 2: Keep running Thousands place: Off load (30) 0: Freely stop 1: Stop by stopping 2: Decelerate to 7% of motor rated power, then keep running; run at setting frequency when no off-load Ten thousands place: PID feedback lost when running (31) 0: Freely stop 1: Stop by stopping 2: Keep running	00000	☆
P9-50	Fault protection action selection 4	Units place: Speed deviation oversize (42) 0: Freely stop 1: Stop by stopping 2: Keep running Tens place: motor over speed (43) Hundreds place: Initial place fault (51)	00000	☆
P9-54	Running frequency selection when fault	0: Run at current running frequency 1: Run at setting frequency 2: Run at upper limit frequency 3: Run at lower limit frequency 4: Run at abnormal backup frequency	0	☆
P9-55	Abnormal backup frequency	60.0% ~ 100.0% (100.0% corresponds to maximum frequency P0-10)	100.0%	☆
P9-56	Motor temperature sensor type	0: No temperature sensor 1: PT100 2: PT1000	0	☆
P9-57	Motor overheat protection threshold	0℃ ~ 200℃	110.0℃	☆
P9-58	Motor overheat pre-alarm threshold	0℃ ~ 200℃	90℃	☆
P9-59	Instantaneous power-off action selection	0: Invalid 1: Deceleration 2: Dec-to-stop	0	☆
P9-60	Deceleration switching point when instantaneous power-off	P9-62 ~ 100.0%	85.0%	☆

Function code	Name	Detailed instruction	Factory default	Modify
P9-61	Voltage rise judgment time when instantaneous power-off	0.00s ~ 100.00s	0.50s	☆
P9-62	Action judgment voltage when instantaneous power-off	60.0% ~ 100.0% (standard bus voltage)	80.0%	☆
P9-63	Off-load protection selection	0: Invalid 1: Effective	0	☆
P9-64	Off-load detection level	0.0 ~ 100.0% (Motor rated current)	10.0%	☆
P9-65	Off-load detection time	0.0 ~ 60.0s	1.0s	☆
P9-67	Overspeed detection value	0.0% ~ 50.00% (maximum frequency)	20.0%	☆
P9-68	Overspeed detection time	0.0 ~ 60.0s	1.0s	☆
P9-69	Excessive speed deviation detection value	0.0% ~ 50.00% (maximum frequency)	20.0%	☆
P9-70	Excessive speed deviation detection time	0.0 ~ 60.0s	5.0s	☆
PA Group: PID Function				
PA-00	PID given source	0: PA-01 setting 1: AI1 2: AI2 3: AI3 (Panel potentiometer) 4: PULSE pulse setting (DI5) 5: Communication given 6: Multi-step command 7: A9-01 setting	0	☆
PA-01	PID value given	0.0 ~ 100.0%	50%	☆
PA-02	PID feedback source	0: AI1 1: AI2 2: AI3 (Panel potentiometer) 3: AI1-AI2 4: PULSE pulse setting (DI5) 5: Communication given 6: AI1+AI2 7: MAX (AI1 , AI2) 8: MIN (AI1 , AI2)	0	☆
PA-03	PID action direction	0: Positive 1: Negative	0	☆
PA-04	PID given feedback range	0 ~ 65535	1000	☆
PA-05	Proportional gain Kp1	0.0 ~ 100.0	20.0	☆
PA-06	Integration time T1	0.01s ~ 10.00s	2.00s	☆
PA-07	Differential time Td1	0.000s ~ 10.000s	0.000s	☆
PA-08	Cutoff frequency of PID reverse	0.00Hz ~ max. frequency	2.00Hz	☆

Function code	Name	Detailed instruction	Factory default	Modify
PA-09	PID deviation limit	0.0% ~ 100.0%	0.0%	☆
PA-10	PID differential amplitude	0.00% ~ 100.00%	0.10%	☆
PA-11	PID given filter time	0.00 ~ 650.00s	0.00s	☆
PA-12	PID feedback filter time	0.00 ~ 60.00s	0.00s	☆
PA-13	PID output filter time	0.00 ~ 60.00s	0.00s	☆
PA-15	Proportional gain Kp2	0.0 ~ 100.0	20.0	☆
PA-16	Integration time Ti2	0.01s ~ 10.00s	2.00s	☆
PA-17	Differential time Td2	0.000s ~ 10.000s	0.000s	☆
PA-18	PID parameter switching condition	0: No switching 1: Switching through DI terminals 2: Automatic switching according to the deviation	0	☆
PA-19	PID parameter switching deviation 1	0.0% ~ PA-20	20.0%	☆
PA-20	PID parameter switching deviation 2	PA-19 ~ 100.0%	80.0%	☆
PA-21	PID initial value	0.0% ~ 100.0%	0.0%	☆
PA-22	PID initial value holding time	0.00 ~ 650.00s	0.00s	☆
PA-23	Forward maximum value between two output deviation	0.00% ~ 100.00%	1.00%	☆
PA-24	Reverse maximum value between two output deviation	0.00% ~ 100.00%	1.00%	☆
PA-25	PID integration attribute	Units place: Integration separate 0: Invalid 1: Effective Tens place: Stop integrating or not after output reach limit 0: Keep integrating 1: Stop integrating	00	☆
PA-26	PID feedback lost detection value	0.0%: No judgment for feedback lost 0.1% ~ 100.0%	0.0%	☆
PA-27	PID feedback lost detection time	0.0s ~ 20.0s	0.0s	☆
PA-28	PID stop calculation	0: No calculation when stop 1: Calculation when stop	0	☆
PB Group: Wobble Frequency, Fixed Length, Counting				
PB-00	Wobble frequency setting mode	0: Relative to center frequency 1: Relative to maximum frequency	0	☆
PB-01	Wobble frequency amplitude	0.0% ~ 100.0%	0.0%	☆

Function code	Name	Detailed instruction	Factory default	Modify
PB-02	Sudden jump frequency amplitude	0.0% ~ 50.0%	0.0%	☆
PB-03	Wobble frequency cycle	0.1s ~ 3000.0s	10.0s	☆
PB-04	Triangular wave rise time of wobble frequency	0.1% ~ 100.0%	50.0%	☆
PB-05	Setting length	0m ~ 65535m	1000m	☆
PB-06	Actual length	0m ~ 65535m	0m	☆
PB-07	Number of pulses per meter	0.1 ~ 6553.5	100.0	☆
PB-08	Setting count value	1 ~ 65535	1000	☆
PB-09	Designated count value	1 ~ 65535	1000	☆
PC Group: Multi-step Command and Simple PLC				
PC-00	Multi-step command 0	-100.0% ~ 100.0%	0.0%	☆
PC-01	Multi-step command 1	-100.0% ~ 100.0%	0.0%	☆
PC-02	Multi-step command 2	-100.0% ~ 100.0%	0.0%	☆
PC-03	Multi-step command 3	-100.0% ~ 100.0%	0.0%	☆
PC-04	Multi-step command 4	-100.0% ~ 100.0%	0.0%	☆
PC-05	Multi-step command 5	-100.0% ~ 100.0%	0.0%	☆
PC-06	Multi-step command 6	-100.0% ~ 100.0%	0.0%	☆
PC-07	Multi-step command 7	-100.0% ~ 100.0%	0.0%	☆
PC-08	Multi-step command 8	-100.0% ~ 100.0%	0.0%	☆
PC-09	Multi-step command 9	-100.0% ~ 100.0%	0.0%	☆
PC-10	Multi-step command 10	-100.0% ~ 100.0%	0.0%	☆
PC-11	Multi-step command 11	-100.0% ~ 100.0%	0.0%	☆
PC-12	Multi-step command 12	-100.0% ~ 100.0%	0.0%	☆
PC-13	Multi-step command 13	-100.0% ~ 100.0%	0.0%	☆
PC-14	Multi-step command 14	-100.0% ~ 100.0%	0.0%	☆
PC-15	Multi-step command 15	-100.0% ~ 100.0%	0.0%	☆
PC-16	Simple PLC running mode	0: Stop after one cycle 1: Keep last frequency after one cycle 2: Circular running	0	☆
PC-17	Simple PLC storage selection when power-down	Units place: Storage selection when power-off 0: Not store 1: Store Tens place: Storage selection when stop 0: Not store 1: Store	00	☆

Function code	Name	Detailed instruction	Factory default	Modify
PC-18	0 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-19	0 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-20	1 st phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-21	1 st phase ACC/DEC time selection	0 ~ 3	0	☆
PC-22	2 nd phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-23	2 nd phase ACC/DEC time selection	0 ~ 3	0	☆
PC-24	3 rd phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-25	3 rd phase ACC/DEC time selection	0 ~ 3	0	☆
PC-26	4 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-27	4 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-28	5 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-29	5 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-30	6 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-31	6 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-32	7 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-33	7 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-34	8 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-35	8 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-36	9 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-37	9 th time selection	0 ~ 3	0	☆
PC-38	10 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-39	10 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-40	11 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-41	11 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-42	12 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-43	12 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-44	13 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆

Function code	Name	Detailed instruction	Factory default	Modify
PC-45	13 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-46	14 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-47	14 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-48	15 th phase running time	0.0s (h) ~ 6553.5s (h)	0.0s (h)	☆
PC-49	15 th phase ACC/DEC time selection	0 ~ 3	0	☆
PC-50	Timing unit (Simple PLC mode)	0: s (second) 1: h (hour)	0	☆
PC-51	Multi-step command 0 given mode	0: PC-00 1: AI1 2: AI2 3: AI3 (Panel potentiometer) 4: PULSE pulse setting (DI5) 5: PID 6: Keypad setting frequency (P0-08), can be modified via UP/DOWN	0	☆
PD Group: Communication Parameters				
PD-00	Baud rate	Units place: MODBUS 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens place: Profibus-DP 0: 115200BPS 1: 208300BPS 2: 256000BPS 3: 512000BPS Hundreds place: Reserved Thousands place: CANlink baud rate 0: 20 1: 50 2: 100 3: 125 4: 250 5: 500 6: 1M	5005	☆
PD-01	Data format	0: No parity check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No parity check (8-N-1)	0	☆
PD-02	Local address	1 ~ 247, 0 is broadcast address	1	☆
PD-03	Response delay	0ms ~ 20ms	2	☆

Function code	Name	Detailed instruction	Factory default	Modify
PD-04	Communication timeout time	0.0 (invalid) 0.1s ~ 60.0s	0.0	☆
PD-05	Data transmission format selection	Units place: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Tens place: Profibus-DP 0: PPO1 format 1: PPO2 format 2: PPO3 format 3: PPO5 format	31	☆
PD-06	Communication read current resolution	0: 0.01A 1: 0.1A	0	☆
PE Group: User Customized Function Code				
PE-00	User function code 0	P0-00 ~ PP-xx A0-00 ~ Ax-xx U0-xx ~ U0-xx	P 0.10	☆
PE-01	User function code 1		P 0.02	☆
PE-02	User function code 2		P 0.03	☆
PE-03	User function code 3		P 0.07	☆
PE-04	User function code 4		P 0.08	☆
PE-05	User function code 5		P 0.17	☆
PE-06	User function code 6		P 0.18	☆
PE-07	User function code 7		P 3.00	☆
PE-08	User function code 8		P 3.01	☆
PE-09	User function code 9		P 4.00	☆
PE-10	User function code 10		P 4.01	☆
PE-11	User function code 11		P 4.02	☆
PE-12	User function code 12		P 5.04	☆
PE-13	User function code 13		P 5.07	☆
PE-14	User function code 14		P 6.00	☆
PE-15	User function code 15		P 6.10	☆
PE-16	User function code 16		P 0.00	☆
PE-17	User function code 17		P 0.00	☆
PE-18	User function code 18		P 0.00	☆
PE-19	User function code 19		P 0.00	☆
PE-20	User function code 20		P 0.00	☆
PE-21	User function code 21		P 0.00	☆
PE-22	User function code 22		P 0.00	☆
PE-23	User function code 23		P 0.00	☆
PE-24	User function code 24		P 0.00	☆
PE-25	User function code 25		P 0.00	☆
PE-26	User function code 26		P 0.00	☆
PE-27	User function code 27		P 0.00	☆
PE-28	User function code 28		P 0.00	☆
PE-29	User function code 29		P 0.00	☆

Function code	Name	Detailed instruction	Factory default	Modify
PP Group: Function Code Management				
PP-00	User password	0 ~ 65535	0	☆
PP-01	Parameter initialization	000: No action 001: Restore factory default, but not including motor parameters 002: Clear the record 003: Restore factory default, including motor parameters 004: Restore user backup parameters 501: Backup user's current parameters	000	★
PP-02	Function parameter group display selection	Units place: U group display selection 0: No display 1: Display Tens place: A group display selection 0: No display 1: Display	11	★
PP-03	Personality parameter group display selection	Units place: User customized parameter group display selection 0: No display 1: Display Tens place: User changes parameter group display selection 0: No display 1: Display	00	☆
PP-04	Function code modification attribute	0: Modifiable 1: Not modifiable	0	☆
PP-05	Operating status monitoring parameters	00: Running frequency (Hz) 01: Setting frequency (Hz) 02: Bus voltage (V) 03: Output voltage (V) 04: Output current (A) 05: Output power (kW) 06: Output torque (%) 07: DI input status 08: DO output status 09: AI1 voltage (V) 10: AI2 voltage (V) 11: AI3 voltage (V) 12: Count value 13: Length value 14: Load speed display 15: PID setting 16: PID feedback 17: PLC stage 18: PULSE input pulse frequency (Hz) 19: Feedback speed (unit: 0.1Hz) 20: Remaining running time 21: AI1 voltage before calibration 22: AI2 voltage before calibration 23: AI3 voltage before calibration	04	☆

Function code	Name	Detailed instruction	Factory default	Modify
		24: Linear speed 25: Current power-on time 26: Current running time 27: PULSE input pulse frequency 28: Communication setting value 29: Encoder feedback speed 30: Main frequency X display 31: Auxiliary frequency Y display 32: View any memory address value		
A0 Group: Torque Control Parameters				
A0-00	Speed/torque control mode selection	0: Speed control 1: Torque control	0	★
A0-01	Selection of torque setting source in torque control mode	0: Digital setting 1 (A0-03) 1: AI1 2: AI2 3: AI3 (Panel potentiometer) 4: PULSE pulse setting (DI5) 5: Communication given 6: Min (AI1, AI2) 7: Max (AI1, AI2)(The full range of options 1-7 corresponds to the A0-03 digital setting)	0	★
A0-03	Torque digital setting in torque control mode	-200.0% ~ 200.0%	150.0%	☆
A0-05	Forward maximum frequency in torque control mode	0.00Hz ~ max. frequency	50.00Hz	☆
A0-06	Reverse maximum frequency in torque control mode	0.00Hz ~ max. frequency	50.00Hz	☆
A0-07	ACC time in torque control mode	0.00s ~ 65000s	0.00s	☆
A0-08	DEC time in torque control mode	0.00s ~ 65000s	0.00s	☆
A1 Group: Virtual IO				
A1-00	Virtual VDI1 terminal function selection	0 ~ 59	0	★
A1-01	Virtual VDI2 terminal function selection	0 ~ 59	0	★
A1-02	Virtual VDI3 terminal function selection	0 ~ 59	0	★
A1-03	Virtual VDI4 terminal function selection	0 ~ 59	0	★
A1-04	Virtual VDI5 terminal function selection	0 ~ 59	0	★

Function code	Name	Detailed instruction	Factory default	Modify
A1-05	Virtual VDI terminal status setting mode	0: Whether VDI is valid is determined by the status of virtual VDOx 1: Set whether VDI is valid by function code A1-06 Units place: Virtual VDI1 Tens place: Virtual VDI2 Hundreds place: Virtual VDI3 Thousands place: Virtual VDI4 Ten thousands place: Virtual VDI5	00000	★
A1-06	Virtual VDI terminal status setting	0: Invalid 1: Effective Units place: Virtual VDI1 Tens place: Virtual VDI2 Hundreds place: Virtual VDI3 Thousands place: Virtual VDI4 Ten thousands place: Virtual VDI5	00000	★
A1-07	Function selection when using AI1 terminal as DI	0 ~ 59	0	★
A1-08	Function selection when using AI2 terminal as DI	0 ~ 59	0	★
A1-09	Function selection when using AI3 terminal as DI	0 ~ 59	0	★
A1-10	Effective mode selection when AI terminal is used as DI	0: High level effective 1: Low level effective Units place: AI1 Tens place: AI2 Hundreds place: AI3	000	★
A1-11	Virtual VDO1 output function selection	0: Internal short circuit to physical DIx 1 ~ 40: See F5 group physical DO output selection	0	☆
A1-12	Virtual VDO2 output function selection	0: Internal short circuit to physical DIx 1 ~ 40: See F5 group physical DO output selection	0	☆
A1-13	Virtual VDO3 output function selection	0: Internal short circuit to physical DIx 1 ~ 40: See F5 group physical DO output selection	0	☆
A1-14	Virtual VDO4 output function selection	0: Internal short circuit to physical DIx 1 ~ 40: See F5 group physical DO output selection	0	☆
A1-15	Virtual VDO5 output function selection	0: Internal short circuit to physical DIx 1 ~ 40: See F5 group physical DO output selection	0	☆
A1-16	VDO1 output delay time	0.0s ~ 3600.0s	0.0s	☆
A1-17	VDO2 output delay time	0.0s ~ 3600.0s	0.0s	☆
A1-18	VDO3 output delay time	0.0s ~ 3600.0s	0.0s	☆

Function code	Name	Detailed instruction	Factory default	Modify
A1-19	VDO4 output delay time	0.0s ~ 3600.0s	0.0s	☆
A1-20	VDO5 output delay time	0.0s ~ 3600.0s	0.0s	☆
A1-21	VDO output terminal effective state selection	0: Positive logic 1: Negative logic Units place: VDO1 Tenth place: VDO2 Hundreds place: VDO3 Thousand place: VDO4 Ten thousand place: VDO5	00000	☆
A2-00	Motor type selection	0: Ordinary asynchronous motor 1: Variable frequency asynchronous motor	0	★
A2-01	Motor rated power	0.1kW ~ 1000.0kW	Model depend	★
A2-02	Motor rated voltage	1V ~ 2000V	Model depend	★
A2-03	Motor rated current	0.01A ~ 655.35A(Inverter power≤55kW) 0.1A ~ 6553.5A(Inverter power>55kW)	Model depend	★
A2-04	Motor rated frequency	0.01Hz ~max. frequency	Model depend	★
A2-05	Motor rated speed	1rpm ~ 65535rpm	Model depend	★
A2-06	Asynchronous motor stator resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Model depend	★
A2-07	Asynchronous motor rotor resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Model depend	★
A2-08	Asynchronous motor leakage inductance	0.01mH ~ 655.35mH (Inverter power≤55kW) 0.001mH ~ 65.535mH (Inverter power>55kW)	Model depend	★
A2-09	Asynchronous motor mutual inductance	0.01mH ~ 655.35mH (Inverter power≤55kW) 0.001mH ~ 65.535mH (Inverter power>55kW)	Model depend	★
A2-10	Asynchronous motor no-load current	0.01A ~ A2-03 (Inverter power≤55kW) 0.1A ~ A2-03 (Inverter power>55kW)	Model depend	★
A2-27	Number of encoder lines	1 ~ 65535	1024	★

Function code	Name	Detailed instruction	Factory default	Modify
A2-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 3: Sine cosine encoder 4: Provincial line mode UVW encoder	0	★
A2-29	Speed feedback PG selection	0: Local PG 1: Extended PG 2: PULSE pulse input (DI5)	0	★
A2-30	ABZ incremental encoder AB phase sequence	0: Forward 1: Reverse	0	★
A2-31	Encoder installation angle	0.0 ~ 359.9°	0.0°	★
A2-32	UVW encoder UVW phase sequence	0: Forward 1: Reverse	0	★
A2-33	UVW encoder bias angle	0.0 ~ 359.9°	0.0°	★
A2-34	Resolver pole pairs	1 ~ 65535	1	★
A2-36	Speed feedback PG disconnection detection time	0.0: No action 0.1s ~ 10.0s	0.0	★
A2-37	Tuning selection	0: No action 1: Asynchronous machine static tuning 1 2: Asynchronous machine dynamic tuning 3: Asynchronous machine static tuning 2	0	★
A2-38	Speed loop proportional gain 1	1 ~ 100	30	☆
A2-39	Speed loop integration time 1	0.01s ~ 10.00s	0.50s	☆
A2-40	Switching frequency 1	0.00 ~ A2-43	5.00Hz	☆
A2-41	Speed loop proportional gain 2	1 ~ 100	20	☆
A2-42	Speed loop integration time 2	0.01s ~ 10.00s	1.00s	☆
A2-43	Switching frequency 2	A2-40 ~ max. frequency	10.00Hz	☆
A2-44	Vector control slip gain	50% ~ 200%	100%	☆
A2-45	SVC torque filtering constant	1 ~ 31	28	☆
A2-47	Torque upper limit source in speed control mode	0: A2-48 setting 1: AI1 2: AI2 3: AI3(Panel potentiometer)	0	☆

Function code	Name	Detailed instruction	Factory default	Modify
		4: PULSE pulse setting (DI5) 5: Communication given 6: Min(AI1, AI2) 7: Max(AI1, AI2) The full range of options 1-7 corresponds to the A2-48 digital setting		
A2-48	Torque upper limit digital setting in speed control mode	0.0% ~ 200.0%	150.0%	☆
A2-51	Excitation regulation proportional gain	0 ~ 20000	2000	☆
A2-52	Excitation regulation integral gain	0 ~ 20000	1300	☆
A2-53	Torque regulation proportional gain	0 ~ 20000	2000	☆
A2-54	Torque regulation integral gain	0 ~ 20000	1300	☆
A2-55	Speed loop integral attribute	Units place: Integral separation 0: Invalid 1: Effective	0	☆
A2-61	2nd motor control method	0: Speed sensorless vector control (SVC) 1: Vector control with speed sensor (FVC) 2: V/F control	0	★
A2-62	Selection of acceleration and deceleration time for the second motor	0: Same as the first motor 1: ACC and DEC time 1 2: ACC and DEC time 2 3: ACC and DEC time 3 4: ACC and DEC time 4	0	☆
A2-63	2nd motor torque increase	0.0%: Automatic torque increase 0.1% ~ 30.0%	Model depend	☆
A2-65	2nd motor oscillation suppression gain	0 ~ 100	Model depend	☆
A5 Group: Control Optimization Parameters				
A5-00	DPWM switching upper limit frequency	5.00Hz ~max. frequency	8.00Hz	☆
A5-01	PWM modulation method	0: Asynchronous modulation 1: Synchronous modulation	0	☆
A5-02	Deadband compensation mode selection	0: No compensation 1: Compensation mode 1	1	☆
A5-03	Random PWM depth	0: Random PWM invalid 1 ~ 10: PWM carrier frequency random depth	0	☆
A5-04	Fast current limiting enable	0: Not enabled 1: Enable	1	☆

Function code	Name	Detailed instruction	Factory default	Modify
A5-05	Current detection compensation	0 ~ 100	5	☆
A5-06	Undervoltage point setting	200.00V~2000.0V	Model depend 220V: 200V 380V: 350V 480V: 350V 690V: 650V 1140V: 1100V	☆
A5-07	SVC optimization selection mode	1: Optimization mode 1 2: Optimization mode 2	2	☆
A5-08	Dead time adjustment	100% ~ 200%	150%	★
A5-09	Overvoltage point setting	200.0V ~ 2200.0V	Model depend	★
A6 Group: AI Curve Setting				
A6-00	AI curve 4 minimum input	-10.00V ~ A6-02	0.00V	☆
A6-01	AI curve 4 minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	☆
A6-02	AI curve 4 inflection point 1 input	A6-00 ~ A6-04	3.00V	☆
A6-03	AI curve 4 inflection point 1 input corresponding setting	-100.0% ~ +100.0%	30.0%	☆
A6-04	AI curve 4 inflection point 2 input	A6-02 ~ A6-06	6.00V	☆
A6-05	AI curve 4 inflection point 2 input corresponding setting	-100.0% ~ +100.0%	60.0%	☆
A6-06	AI curve 4 maximum input	A6-06 ~ +10.00V	10.00V	☆
A6-07	AI curve 4 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	☆
A6-08	AI curve 5 minimum input	-10.00V ~ A6-10	-10.00V	☆
A6-09	AI curve 5 minimum input corresponding setting	-100.0% ~ +100.0%	-100.0%	☆
A6-10	AI curve 5 inflection point 1 input	A6-08 ~ A6-12	-3.00V	☆
A6-11	AI curve 5 inflection point 1 input corresponding setting	-100.0% ~ +100.0%	-30.0%	☆
A6-12	AI curve 5 inflection point 2 input	A6-10 ~ A6-14	3.00V	☆
A6-13	AI curve 5 inflection point 2 input corresponding setting	-100.0% ~ +100.0%	30.0%	☆

Function code	Name	Detailed instruction	Factory default	Modify
A6-14	AI curve 5 maximum input	A6-12 ~ +10.00V	10.00V	☆
A6-15	AI curve 5 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	☆
A6-24	AI1 set jump point	-100.0% ~ 100.0%	0.0%	☆
A6-25	AI1 set jump range	0.0% ~ 100.0%	0.5%	☆
A6-26	AI2 set jump point	-100.0% ~ 100.0%	0.0%	☆
A6-27	AI2 set jump range	0.0% ~ 100.0%	0.5%	☆
A6-28	AI3 set jump point	-100.0% ~ 100.0%	0.0%	☆
A6-29	AI3 set jump range	0.0% ~ 100.0%	0.5%	☆
A7 Group: User Programmable Card Parameters				
A7-00	User programmable function selection	0: Invalid 1: Effective	0	★
A7-01	Control board output terminal control mode selection	0: Inverter control 1: User programmable control card control Units place: FMR (FM terminal as switch output) Tens place: Relay (T/A-T/B-T/C) Hundreds place: DO1 Thousands place: FMP (FM terminal as pulse output) Ten thousands place: AO1	0	★
A7-02	Programmable card extension AIAO terminal function configuration	0: AI3 voltage input, AO2 voltage output 1: AI3 voltage input, AO2 current output 2: AI3 current input, AO2 voltage output 3: AI3 current input, AO2 current output 4: AI3 PTC input, AO2 voltage output 5: AI3 PTC input, AO2 current output 6: AI3 PT100 input, AO2 voltage output 7: AI3 PT100 input, AO2 current output	0	★
A7-03	FMP output	0.0% ~ 100.0%	0.0%	☆
A7-04	AO1 output	0.0% ~ 100.0%	0.0%	☆
A7-05	Switching output	Binary settings Units place: FMR Tens place: Relay 1 Hundreds place: DO	1	☆
A7-06	Programmable card frequency setting	-100.00% ~ 100.00%	0.0%	☆
A7-07	Programmable card torque setting	-200.0% ~ 200.0%	0.0%	☆
A7-08	Programmable card command given	0: No command 1: Forward command	0	☆

Function code	Name	Detailed instruction	Factory default	Modify
		2: Reverse command 3: Forward jog 4: Reverse jog 5: Free shutdown 6: Deceleration shutdown 7: Fault reset		
A7-09	Programmable card given fault	0: No fault 80 ~ 89: Fault codes	0	☆
A8 Group: Point-to-Point Communication				
A8-00	Master slave control function selection	0: Invalid 1: Effective	0	☆
A8-01	Master-slave selection	0: Host 1: Slave machine	0	☆
A9 Group: Constant Pressure Water Supply Parameter Group				
A9-00	Set pressure value	0.001mpa ~ 60.000mpa	0.500mpa	☆
A9-01	Given pressure feedback range	0.001mpa ~ 60.000mpa	1.000mpa	☆
A9-02	Lower limit pressure	0.001mpa ~ 60.000mpa	0.001mpa	☆
A9-03	Upper limit pressure	0.001mpa ~ 60.000mpa	1.000mpa	☆
A9-04	Wake up pressure	0.001mpa ~ 60.000mpa	0.300mpa	☆
A9-05	Sleep pressure	0.001mpa ~ 60.000mpa	0.500mpa	☆
A9-06	Pressure sleep delay time	0s ~ 2500.0s	10s	☆
A9-07	Sleep delay hold frequency	0.00Hz~ max. frequency (P0-10)	40.00Hz	☆
A9-08	Frequency sleep delay duration	0s ~ 2500.0s	10s	☆
A9-09	Wake up delay time	0s ~ 2500.0s	0s	☆
A9-10	Reserve	Reserve	Reserve	
A9-11	Sleep mode selection	0: Invalid sleep 1: Sleep effective	0	☆

Note: 1. This function can be used to directly set the pressure to determine the sleep and wake-up switching of the inverter;
2. Add the up and down keys to set the pressure value.

Table-1

Multi-step frequency terminal 4	Multi-step frequency terminal 3	Multi-step frequency terminal 2	Multi-step frequency terminal 1	Set frequency
OFF	OFF	OFF	OFF	Multi-step frequency 0
OFF	OFF	OFF	ON	Multi-step frequency 1
OFF	OFF	ON	OFF	Multi-step frequency 2
OFF	OFF	ON	ON	Multi-step frequency 3
OFF	ON	OFF	OFF	Multi-step frequency 4
OFF	ON	OFF	ON	Multi-step frequency 5
OFF	ON	ON	OFF	Multi-step frequency 6
OFF	ON	ON	ON	Multi-step frequency 7
ON	OFF	OFF	OFF	Multi-step frequency 8
ON	OFF	OFF	ON	Multi-step frequency 9
ON	OFF	ON	OFF	Multi-step frequency 10
ON	OFF	ON	ON	Multi-step frequency 11
ON	ON	OFF	OFF	Multi-step frequency 12
ON	ON	OFF	ON	Multi-step frequency 13
ON	ON	ON	OFF	Multi-step frequency 14
ON	ON	ON	ON	Multi-step frequency 15

Table-2

ACC and DEC time selection 2	ACC and DEC time selection 1	ACC and DEC time selection
OFF	OFF	ACC and DEC time 1
OFF	ON	ACC and DEC time 2
ON	OFF	ACC and DEC time 3
ON	ON	ACC and DEC time 4

Monitoring Parameter Table

Function code	Name	Minimum unit
U0 Group: Basic Monitoring Parameter		
U0-00	Running frequency (Hz)	0.01Hz
U0-01	Setting frequency (Hz)	0.01Hz
U0-02	Bus voltage (V)	0.1V
U0-03	Output voltage (V)	1V
U0-04	Output current (A)	0.01A
U0-05	Output power (kW)	0.1kW
U0-06	Output torque (%)	0.1%
U0-07	DI input status	1
U0-08	DO output status	1
U0-09	AI1 voltage (V)	0.01V
U0-10	AI2 voltage (V)	0.01V
U0-11	AI3 voltage (V)	0.01V
U0-12	Count value	1
U0-13	Length value	1
U0-14	Load speed display	1
U0-15	PID setting	1
U0-16	PID feedback	1
U0-17	PLC stage	1
U0-18	PULSE input pulse frequency (Hz)	0.01kHz
U0-19	Feedback speed (unit : 0.1Hz)	0.1Hz
U0-20	Remaining running time	0.1Min
U0-21	AI1 voltage before calibration	0.001V
U0-22	AI2 voltage before calibration	0.001V
U0-23	AI3 voltage before calibration	0.001V
U0-24	Linear speed	1m/Min
U0-25	Current power-on time	1Min
U0-26	Current running time	0.1Min
U0-27	PULSE input pulse frequency	1Hz
U0-28	Communication setting value	0.01%
U0-29	Encoder feedback speed	0.01Hz

Function code	Name	Minimum unit
U0-30	Main frequency X display	0.01Hz
U0-31	Auxiliary frequency Y display	0.01Hz
U0-32	View any memory address value	1
U0-33	Synchronous machine rotor position	0.1°
U0-34	Motor temperature	1℃
U0-35	Target torque (%)	0.1%
U0-36	Rotational position	1
U0-37	Power factor angle	0.1°
U0-38	ABZ position	1
U0-39	VF separation target voltage	1V
U0-40	VF separation output voltage	1V
U0-41	DI input status visual display	1
U0-42	DO input status visual display	1
U0-43	DI function status display 1 (function 01-function 40)	1
U0-44	DI function status visual display 2 (function 41-function 80)	1
U0-59	Setting frequency (%)	0.01%
U0-60	Running frequency (%)	0.01%
U0-61	Inverter status	1

Chapter 6 EMC (Electromagnetic Compatibility)

6.1 Definition

Electromagnetic compatibility is the ability of the electric equipment to work in the electromagnetic interference environment and implement its function stably without interferences in the electromagnetic environment.

6.2 EMC Standard Description

In accordance with the requirements of the national standard GB/T12668.3, the inverter needs to comply with electromagnetic interference and anti-electromagnetic interference requirements.

Products apply the latest international standard—IEC/EN61800-3: 2004 (Adjustable speed electrical power drive systems part 3: EMC requirements and specific test methods), which is equivalent to the national standard GB/T12668.3.

IEC/EN61800-3 assesses the inverter in terms of electromagnetic interference and anti-electronic interference. Electromagnetic interference mainly tests the radiation interference, conduction interference and harmonics interference on the inverter (required for the inverter for civil use). Anti-electromagnetic interference mainly tests the conduction interference rejection, radiation interference rejection, surge interference rejection, fast and mutable pulse group interference rejection, ESD interference rejection and power low frequency end interference rejection (specific test items including: 1. Interference rejection tests of input voltage sag, interrupt and change; 2. Phase conversion interference rejection test; 3. Harmonic input interference rejection test; 4. Input frequency change test; 5. Input voltage unbalance test; 6. input voltage fluctuation test).

The tests should be conducted strictly in accordance with the above requirements of IEC/ EN61800-3, and the products of our company are installed and used according to Section 6.3 and have good electromagnetic compatibility in general industry environment.

6.3 EMC Guide

6.3.1 Harmonic effect

Higher harmonics of power supply may damage the inverter. Thus, at some places where mains quality is rather poor, it is recommended to install AC input reactor.

6.3.2 Electromagnetic interference and installation precautions

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

Installation precautions:

- 1) The earth wires of the Inverter and other electric products should be well grounded;
- 2) The power input and output power cables of the inverter and weak current signal cables (e.g. control line) should not be arranged in parallel and vertical arrangement is preferable.

3) It is recommended that the output power cables of the inverter employ shield cables or steel pipe shielded cables and that the shielding layer be earthed reliably. The lead cables of the equipment suffering interferences are recommended to employ twisted-pair shielded control cables, and the shielding layer should be earthed reliably.

4) When the length of motor cable is longer than 100 meters, it needs to install output filter or reactor.

6.3.3 Handling method for the interferences of the surrounding equipment on the inverter

The electromagnetic interference on the inverter is generated because plenty of relays, contactors and electromagnetic brakes are installed near the inverter. When the inverter has error action due to the interferences, the following measures can be taken:

- 1) Install surge suppressor on the devices generating interference;
- 2) Install filter at the input end of the inverter. Refer to Section 6.3.6 for the specific operations;
- 3) The lead cables of the control signal cable of the inverter and the detection line employ shielded cable and the shielding layer should be earthed reliably.

6.3.4 Handling method for the interferences of inverter on the surrounding equipment

These interferences include two types: one is radiation interference of the inverter, and the other is conduction interference of the inverter. These two types of interferences cause the surrounding electric equipment to suffer electromagnetic or electrostatic induction. The surrounding equipment hereby produces error action. For different interferences, it can be handled by referring to the following methods:

- 1) For the measuring meters, receivers and sensors, their signals are generally weak. If they are placed nearby the inverter or together with the inverter in the same control cabinet, they are easy to suffer interference and thus generate error actions. It is recommended to handle with the following methods: Put in places far away from the interference source; do not arrange the signal cables with the power cables in parallel and never bind them together; both the signal cables and power cables employ shielded cables and are well earthed; install ferrite magnetic ring (with suppressing frequency of 30 to 1,000MHz) at the output side of the inverter and wind it 2 to 3 cycles; install EMC output filter in more severe conditions.
- 2) When the equipment suffering interferences and the inverter use the same power supply, it may cause conduction interference. If the above methods cannot remove the interference, it should install EMC filter between the inverter and the power supply.
- 3) The surrounding equipment is separately earthed, which can avoid the interference caused by the leakage current of the inverter's earth wire when common earth mode is adopted.

6.3.5 Leakage current and handling

There are two forms of leakage current when using the inverter. One is leakage current to the earth, and the other is leakage current between the cables.

- 1) Factors influencing the leakage current to the earth and the solutions:

There are distributed capacitance between the lead cables and the earth. The larger the distributed capacitance is, the larger the leakage current will be. The distributed capacitance can be reduced by effectively reducing the distance between the inverter and the motor. The higher the carrier frequency is, the larger the leakage current will be. The leakage current can be reduced by reducing the carrier frequency. However, reducing the carrier frequency may result in addition of motor noise. Note that additional installation of reactor is also an effective method to remove the leakage current.

The leakage current may increase following the addition of circuit current. Therefore, when the motor power is high, the corresponding leakage current will be high too.

- 2) Factors of producing leakage current between the cables and solutions:

There is distributed capacitance between the output cables of the inverter. If the current passing the lines has higher harmonic, it may cause resonance and thus result in leakage current. If thermal relay is used, it may generate error action.

The solution is to reduce the carrier frequency or install output reactor. It is recommended that thermal relay not be installed before the motor when using the inverter, and that electronic over current protection function of the inverter be used instead.

6.3.6 Precautions for Installing EMC input filter at the input end of power supply

- 1) When using the inverter, please follow its rated values strictly. Since the filter belongs to Classification I electric appliances, the metal enclosure of the filter should be large and the metal ground of the installing cabinet should be well earthed and have good conduction continuity. Otherwise there may be danger of electric shock and the EMC effect may be greatly affected.
- 2) Through the EMC test, it is found that the filter ground must be connected with the PE end of the inverter at the same public earth. Otherwise the EMC effect may be greatly affected.
- 3) The filter should be installed at a place close to the input end of the power supply as much as possible.

Chapter 7 Trouble Shooting

7.1 Fault and Trouble Shooting

There are 24 warning messages and protection features on the NG80 inverter. When a fault occurs, the inverter's output is halted and the protection mechanism is activated. When the inverter fault relay makes contact, the inverter display screen shows the fault code. Users can perform a self-inspection using the advice in this area to identify the problem and locate a fix before calling for assistance. Please seek service if it relates to the cause listed in the dotted box. You can get in touch with our business or the person who sold you the inverter.

The hardware overcurrent or overvoltage signal appears as error code 22 in the 21 warning messages. Err22 alarms are often caused by hardware overvoltage failure.

Fault Name	Inverter unit protection
Fault Code	ERR01
Reason	1. Short-circuit at inverter output side 2. The cable connecting the motor with the inverter is too long 3. The module is over-heat 4. The cable connections inside the inverter are loosen 5. The main board is abnormal 6. The driver board is abnormal 7. The IGBT module is abnormal
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Install a reactor or output filter 3. Check if the air duct is blocked and if the fan is in normal status, and resolve the existing problems 4. Make sure the cables are connected well 5. Seeking technical support 6. Seeking technical support 7. Seeking technical support

Fault Name	Over current when acceleration
Fault Code	ERR02
Reason	1. Short-circuit or ground fault occurred at inverter output side 2. Control mode is vector control & motor parameters are not identified 3. The acceleration time is too short 4. The manual torque boost or V/F curve is not proper 5. The voltage is too low 6. Start the running motor 7. Load is added suddenly during the acceleration 8. Capacity of inverter is too small
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Increase the acceleration time 4. Adjust the manual torque boost or V/F curve 5. Make the voltage in the normal range 6. Select speed tracking start or start the motor till it stops 7. Cancel the sudden added load 8. Select bigger capacity inverter

Fault Name	Over-current when deceleration
Fault Code	ERR03
Reason	1. Short-circuit or ground fault occurred at inverter output side 2. Control mode is vector control & motor parameters are not identified 3. The deceleration time is too short 4. The voltage is too low 5. Load is added suddenly during the deceleration 6. Have not installed braking unit and braking resistor
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Increase the deceleration time 4. Make the voltage in the normal range 5. Cancel the sudden added load 6. Install braking unit and braking resistor

Fault Name	Over-current when constant speed running
Fault Code	ERR04
Reason	1. Short-circuit or ground fault occurred at inverter output 2. Control mode is vector control & motor parameters are not identified 3. The voltage is too low 4. Load is added suddenly during running 5. Capacity of inverter is too small
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Make the voltage in the normal range 4. Cancel the sudden added load 5. Select bigger capacity inverter

Fault Name	Over-voltage when acceleration
Fault Code	ERR05
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during acceleration 3. The acceleration time is too short 4. Have not installed braking unit and braking resistor
Solution	1. Make the voltage in the normal range 2. Cancel the external force 3. Increase the acceleration time 4. Install braking unit and braking resistor

Fault Name	Over-voltage when deceleration
Fault Code	ERR06
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during deceleration 3. The deceleration time is too short 4. Have not installed braking unit and braking resistor
Solution	1. Make the voltage in the normal range 2. Cancel the external force 3. Increase the deceleration time 4. Install braking unit and braking resistor

Fault Name	Over-voltage when constant speed running
Fault Code	ERR07
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during the inverter running
Solution	1. Make the voltage in the normal range 2. Cancel the external force or install braking resistor

Fault Name	Power-supply fault
Fault Code	ERR08
Reason	1. The input voltage is out of range
Solution	1. Make the voltage in the normal range

Fault Name	Under-voltage fault
Fault Code	ERR09
Reason	1. Instantaneous power-off 2. The input voltage is out of range 3. Bus voltage is abnormal 4. The rectifier bridge and buffer resistor are abnormal 5. The driver board is abnormal 6. The control board is abnormal
Solution	1. Fault reset 2. Make the voltage in the normal range 3. Seeking technical support 4. Seeking technical support 5. Seeking technical support 6. Seeking technical support

Fault Name	Inverter over load
Fault Code	ERR10
Reason	1. The load is too heavy or motor blockage occurs 2. Capacity of inverter is too small
Solution	1. Reduce the load, check the status of motor & machinery 2. Select bigger capacity inverter

Fault Name	Motor over load
Fault Code	ERR11
Reason	1. P9-01 is set improperly 2. The load is too heavy or motor blockage occurs 3. Capacity of inverter is too small
Solution	1. Set P9-01 properly 2. Reduce the load, check the status of motor & machinery 3. Select bigger capacity inverter

Fault Name	Output phase failure
Fault Code	ERR12
Reason	1. Three-phase input power supply is abnormal 2. The driver board is abnormal 3. The lightning protection board is abnormal 4. The main board is abnormal
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Seeking technical support 3. Seeking technical support 4. Seeking technical support

Fault Name	Output phase failure
Fault Code	ERR13
Reason	1. The connection between inverter and motor is abnormal 2. Three-phase output unbalance of inverter during the motor running 3. The driver board is abnormal 4. The IGBT module is abnormal
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Make sure the motor three phase winding is normal 3. Seeking technical support 4. Seeking technical support

Fault Name	Module over-heat
Fault Code	ERR14
Reason	1. Ambient temperature is too high 2. Air duct is blocked 3. Cooling fans are broken 4. Thermal resistor(temperature sensor) of the module is broken 5. IGBT module is broken
Solution	1. Reduce the ambient temperature 2. Clear the air duct 3. Replace cooling fans 4. Replace the thermal resistor 5. Replace IGBT module

Fault Name	Peripheral device fault
Fault Code	ERR15
Reason	1. Input external fault signal through multifunctional terminal DI 2. Input external fault signals through virtual IO function
Solution	1. Reset running 2. Reset running

Fault Name	Communication fault
Fault Code	ERR16
Reason	1. Master computer works abnormal 2. Communication cable is abnormal 3. The communication expansion card P0-28 setting is incorrect 4. The communication parameter PD group setting is incorrect
Solution	1. Check the connection of master computer 2. Check the communication connection 3. Correct setting of communication expansion card type 4. Set communication parameters correctly

Fault Name	Contact fault
Fault Code	ERR17
Reason	1. The driver board and power supply are abnormal 2. The contactor is abnormal
Solution	1. Replace the driver board or power board 2. Replace the contactor

Fault Name	Current detection fault
Fault Code	ERR18
Reason	1. Hall device is abnormal 2. The driver board is abnormal
Solution	1. Replace the Hall device 2. Replace the driver board

Fault Name	Motor tuning fault
Fault Code	ERR19
Reason	1. Motor parameters are set improperly 2. Parameter identification process is delayed
Solution	1. Set parameters according to the motor nameplate 2. Check the cables connecting inverter with motor

Fault Name	Encoding disk fault
Fault Code	ERR20
Reason	1. Encoder model mismatch 2. Encoder wiring error 3. Encoder damaged 4. PG card abnormality
Solution	1. Set the encoder type correctly according to the actual situation 2. Eliminate circuit faults 3. Replace encoder 4. Replace PG card

Fault Name	EEPROM read/write fault
Fault Code	ERR21
Reason	1. EEPROM chip is broken
Solution	1. Replace the main board

Fault Name	Inverter hardware fault
Fault Code	ERR22
Reason	1. Over voltage 2. Over current
Solution	1. Handle as over voltage fault 2. Handle as over current fault

Fault Name	Short-circuit to ground fault
Fault Code	ERR23
Reason	1. The motor is short-circuit to ground
Solution	1. Replace cables or motor

Fault Name	Accumulated running time arrival fault
Fault Code	ERR26
Reason	1. The accumulated running time reaches the setting value
Solution	1. Clear the record information via parameter initialization function

Fault Name	Customized fault 1
Fault Code	ERR27
Reason	1. Input user-defined fault 1 signal through multifunctional terminal DI 2. Input user-defined fault 1 signal through virtual IO function
Solution	1. Reset running 2. Reset running

Fault Name	Customized fault 2
Fault Code	ERR28
Reason	1. Input user-defined fault 2 signal through multifunctional terminal DI 2. Input user-defined fault 2 signal through virtual IO function
Solution	1. Reset running 2. Reset running

Fault Name	Accumulated power-on time arrival fault
Fault Code	ERR29
Reason	1. The accumulated power-on time reaches the setting value
Solution	1. Clear the record information via parameter initialization function

Fault Name	Off-load fault
Fault Code	ERR30
Reason	1. The inverter running current is smaller than P9-64
Solution	1. Confirm if the load breaks away and P9-64 & P9-65 are set properly

Fault Name	PID feedback lost fault when running
Fault Code	ERR31
Reason	1. PID feedback is smaller than PA-26
Solution	1. Check PID feedback signal or set PA-26 properly

Fault Name	Current-limiting fault
Fault Code	ERR40
Reason	1. Whether the load is heavy or the motor is blocked 2. Capacity of inverter is too small.
Solution	1. Reduce the load and detect the motor & machinery condition 2. Select bigger capacity inverter

Fault Name	Switching motor fault when running
Fault Code	ERR41
Reason	1. Change the current motor selection through terminals during the operation of the inverter
Solution	1. Perform motor switching operation after the inverter is shut down

Fault Name	Excessive speed deviation fault
Fault Code	ERR42
Reason	1. The encoder parameter setting is incorrect 2. No parameter identification conducted 3. The detection parameters P9-69 and P9-60 for excessive speed deviation are not set properly
Solution	1. Set encoder parameters correctly 2. Perform motor parameter identification 3. Reasonably set detection parameters based on actual situations

Fault Name	Motor over speed fault
Fault Code	ERR43
Reason	1. The encoder parameter setting is incorrect 2. No parameter identification conducted 3. Improper setting of motor over speed detection parameters P9-69 and P9-60
Solution	1. Set encoder parameters correctly 2. Perform motor parameter identification 3. Reasonably set detection parameters based on actual situations

Fault Name	Motor over temperature fault
Fault Code	ERR45
Reason	1. The temperature sensor wiring is loose 2. Motor temperature too high
Solution	1. Detect temperature sensor wiring and troubleshoot 2. Reduce the carrier frequency or take other heat dissipation measures to heat the motor

Fault Name	Initial position error
Fault Code	ERR51
Reason	1. The deviation between the motor parameters and the actual value is too large
Solution	1. Reconfirm whether the motor parameters are correct, focusing on whether the rated current is set too low

7.2 Common Faults and Solutions

No.	Fault	Reason	Solution
1	No display when power-on	The input voltage is 0 or too low. The switching power supply on the driver board is broken. Rectifier bridge is broken. Buffer resistors are broken. The control board or keypad is broken. The connection between the control board, driver board, and keyboard is broken.	Check the input power-supply. Check the bus voltage. Reseat the 8-core and 28-core ribbon cables. Seeking manufacturer service.
2	HC is displayed when power-on	The connection of the cables of the driver board and control board are not good. The relevant components on the control board are damaged. There is a short circuit to ground in the motor or motor wire. Hall fault. The grid voltage is too low.	Reseat the 8-core and 28-core ribbon cables. Seeking manufacturer service.
3	Power on display "ERR23" alarm	The motor or the output line is short circuited to the ground. The inverter is damaged.	Measure the insulation of the motor and output line with magneto-ohmmeter. Seeking manufacturer service.

No.	Fault	Reason	Solution
4	The power on inverter displays normally, and after running, it displays "HC" and immediately shuts down	Fan damaged or blocked. There is a short circuit in the wiring of the peripheral control terminal.	Replace the fan. Eliminate external short circuit faults
5	Frequent reporting of "ERR14" (module over-heating) fault	Carrier frequency is too high. Fans are broken or air duct is broken. The inverter inside components are broken (such as thermistor).	Reduce the carrier frequency (P0-15). Replace fans, clear the air duct. Seeking manufacturer service.
6	Motor does not run after the inverter runs	Motor and motor cables are abnormal. The inverter parameters are set improperly (motor parameter). The connection of the cables of the driver board and control board are not good. The driver board is broken.	Make sure the connection of the inverter and motor is very well. Replace the motor or clear the mechanical failure. Check & reset the motor parameters.
7	DI terminal is invalid	The parameter is set improperly. The external signal is wrong. The jumper between OP and +24V is loose. The control board is broken.	Check & reset P4 group parameters. Reconnect the external signal cable. Reconnect the jumper between OP and +24V. Seeking manufacturer service.
8	When the closed-loop vector control, the motor speed cannot be increased	Encoder is fault. Encoder is wired incorrectly or has poor contact. PG card is fault. Driver board is fault.	Replace the encoding disk and reconfirm the wiring. Replace the PG card. Seeking manufacturer service.
9	Over voltage and over current fault are displayed frequently	Motor parameters are set improperly. The ACC/DEC time is improper. The load fluctuates.	Reset motor parameters or perform auto tuning. Set proper ACC/DEC time. Seeking manufacturer service.
10	ERR17 is displayed when power-on or running	The soft-start contactor is not closed	Check if the contactor cables are loosened. Check if the contactor is broken. Check if the contactor 24V power supply is broken. Seeking manufacturer service.
11	Power on display <u>88888</u>	The relative components of the control board are broken.	Replace the control board.

Chapter 8 MODBUS Communication Protocol

NG80 series inverter provides RS232/RS485 communication interface, and adopts MODBUS communication protocol. User can realize centralized monitoring through PC/PLC, host computer, and also can set inverter's operating commands, modify or read function parameters, read operating status and fault information, etc.

8.1 About Protocol

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

8.2 Application Method

The inverter could be connected into a "Single-master Multi-slave" PC/PLC control network with RS232/RS485 bus.

8.3 Bus Structure

(1) Interface mode: RS232/RS485

(2) Transmission mode

There provide asynchronous series and half-duplex transmission mode. At the same time, just one can send the data and the other only receives the data between master and slave. In the series asynchronous communication, the data is sent out frame by frame in the form of message.

(3) Topological structure

In Single-master Multi-slave system, the setup range of slave address is 1 to 247. 0 refers to broadcast communication address. The address of slave must be exclusive in the network. That is basic condition of MODBUS communication.

8.4 Protocol Description

NG80 series inverter communication protocol is a kind of asynchronous serial master-slave communication protocol. In the network, only one equipment (master) can build a protocol (Named as "Inquiry/Command"). Other equipments (slave) response "Inquiry/Command" of master only by providing the data, or doing the action according to the master's "Inquiry/Command". Here, master is personnel computer, Industrial control equipments or programmable logical controller, and the slave is inverter or other communication equipments with the same communication protocol. Master not only can visit some slave separately for communication, but also sends the broadcast information to all the slaves. For the single "Inquiry/Command" of master, all of slaves will return a signal that is a response; for the broadcast information provided by master, slave needs not feedback a response to master.

8.5 Communication Data Structure

MODBUS protocol communication data format of NG80 series inverter is shown as following:

In RTU mode, the Modbus minimum idle time between frames should be no less than 3.5 bytes. The checksum adopts CRC-16 method. All data except checksum itself sent will be counted into the calculation. Please refer to section: CRC Check for more information. Note that at least 3.5 bytes of Modbus idle time should be kept and the start and end idle time need not be summed up to it.

The entire message frame must be transmitted as a continuous data stream. If a idle time is more than 1.5 bytes before completion of the frame, the receiving device flushes the incomplete message and assumes that the next byte will be the address field of a new message. Similarly, if a new message begins earlier than 3.5 bytes interval following a previous message, the receiving device will consider it as a continuation

of the previous message. Because of the frame's confusion, at last the CRC value is incorrect and communication fault will occur.

RTU frame format:

START	Transmission time of 3.5 bytes
Slave Address	Communication addr. : 1 to 247
Command Code	03H: Read slave parameters 06H: Write slave parameters
DATA (N-1)	Data: Function code parameter address, the number of function code parameter, function code parameter, etc.
DATA (N-2)	
.....	
DATA0	
CRC CHK High byte	Detection value: CRC value
CRC CHK Low byte	
END	Transmission time of 3.5 bytes

8.6 Command Code and Communication Data Description

8.6.1 Command code: 03H, reads N words. (There are 12 characters can be read at the most.)

For example: The inverter start address F002 of the slave 01 continuously reads two consecutive values.

Master command information

Address	01H
Command Code	03H
Start Address High byte	F0H
Start Address Low byte	02H
Register Number High byte	00H
Register Number Low byte	02H
CRC CHK Low byte	CRC CHK value to be calculated
CRC CHK High byte	

Slave response information

When PD-05 is set to 0

Address	01H
Command Code	03H
Byte Number High byte	00H
Byte Number Low byte	04H
Data F002H High byte	00H
Data F002H Low byte	00H
Data F003H High byte	00H
Data F003H Low byte	01H
CRC CHK Low byte	CRC CHK value to be calculated
CRC CHK High byte	

When PD-05 is set to 1

Address	01H
Command Code	03H
Byte Number	04H
Data F002H High byte	00H
Data F002H Low byte	00H
Data F003H High byte	00H
Data F003H Low byte	01H
CRC CHK Low byte	CRC CHK value to be calculated
CRC CHK High byte	

8.6.2 Command code: 06H, write a word

For example: Write 5000(1388H) into address F00AH, slave address 02H.

Master command information

Address	02H
Command Code	06H
Data Address High byte	F0H
Data Address Low byte	0AH
Data Content High byte	13H
Data Content Low byte	88H
CRC CHK Low byte	CRC CHK value to be calculated
CRC CHK High byte	

Slave responding information

Address	02H
Command Code	06H
Data Address High byte	F0H
Data Address Low byte	0AH
Data Content High byte	13H
Data Content Low byte	88H
CRC CHK Low byte	CRC CHK value to be calculated
CRC CHK High byte	

8.6.3 CRC checking

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

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

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

When the CRC is appended to the message, the low byte is appended first, followed by the high byte. The following are C language source code for CRC-16.

```
unsigned int crc_chk_value (unsigned char *data_value,unsigned char length) {
    unsigned int crc_value=0xFFFF;
    int i;
    while (length-->0) {
        crc_value^=*data_value++;
        for (i=0;i<8;i++) {
            if (crc_value&0x0001)
                crc_value= (crc_value>>1)
            else
                crc_value=crc_value<<1;
        }
    }
    return (crc_value) ;
}
```

8.6.4 Address definition of communication parameter

Here is about address definition of communication parameter. It's used to control the inverter operation, status and related parameter setting.

Reading and writing function code parameters (some function codes cannot be changed and are only for use by manufacturers or monitoring)

(1) The mark rules of function code parameters address:

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

High byte: P0 ~ PF (P Group), A0 ~ AF (A Group), 70 ~ 7F (U Group) Low byte: 00 ~ FF

For example: P3-12, the address is represented as P30C.

Note:

- 1. PF Group: Either the parameter cannot be read, nor be changed.
- 2. U Group: Only for reading parameter, cannot be changed parameters.
- 3. Some parameters cannot be changed during operation; some parameters regardless of what kind of status the inverter in, the parameters cannot be changed. Change the function code parameters, pay attention to the scope of the parameters, units, and relative instructions.

Besides, due to EEPROM be frequently stored, it will reduce the lifetime of EEPROM. So in the communication mode, some function code needn't be stored, only change the RAM value.

If it is a P-group parameter, to achieve this function, simply change the high bit F of the function code address to 0. If it is a group A parameter, to achieve this function, simply change the high bit A of the function code address to 4.

Corresponding function code addresses are indicated below:

High byte: 00 ~ 0F (P Group), 40 ~ 4F (A Group) Low Byte: 00-FF

For example:

Function code P3-12 is not stored in EEPROM, and the address is represented as 030C

Function code A0-05 is not stored in EEPROM, and the address is represented as 4005

These addresses can only act writing RAM, it cannot act reading. When act reading, it is invalid address.

For all parameters, the command code 07H can also be used to achieve this function.

(2) Stop/start parameter address

Parameter Address	Parameter Description
1000	Setting frequency (-10000 to 10000) (Decimal)
1001	Running frequency
1002	Bus voltage
1003	Output voltage
1004	Output current
1005	Output power
1006	Output torque
1007	Running speed
1008	DI input status
1009	DO output status
100A	AI1 voltage
100B	AI2 voltage
100C	AI3 voltage
100D	Counting value input
100E	Length value input
100F	Load speed

Parameter Address	Parameter Description
1010	PID setting
1011	PID feedback
1012	PLC stage
1013	PULSE input pulse frequency, unit is 0.01kHz
1014	Feedback speed, unit is 0.1Hz
1015	Remain running time
1016	AI1 voltage before calibration
1017	AI2 voltage before calibration
1018	AI3 voltage before calibration
1019	Linear speed
101A	Current power on time
101B	Current running time
101C	PULSE input pulse frequency, unit is 1Hz
101D	Communication setting value
101E	Actual feedback speed
101F	Main frequency X display
1020	Auxiliary frequency Y display

Note:

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

To the data of frequency, the percentage is the percentage of relative maximum frequency (P0-10). To the data of torque, the percentage is P2-10, A2-48, A3-48, A4-48 (torque upper limit numerical setting, corresponding to the first, second, third, and fourth motors respectively).

(3) Control command input to inverter (write only)

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

(4) Read inverter status: (read only)

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

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

Password Address	Content of Input password
1F00	*****

(6) Digital output terminal control: (write only)

Command Address	Command Content
2001	BIT0: DO1 output control BIT1: DO2 output control BIT2: RELAY1 output control BIT3: RELAY2 output control BIT4: FMR output control BIT5: VDO1 BIT6: VDO2 BIT7: VDO3 BIT8: VDO4 BIT9: VDO5

(7) Analog output AO1 control: (write only)

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

(8) Analog output AO2 control: (write only)

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

(9) Pulse output control: (write only)

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

(10) Inverter fault code description:

Inverter Fault Address	Inverter Fault Information
8000	0000: No fault 0001: Reserved 0002: Over current in ACC process 0003: Over current in DEC process 0004: Over current in constant speed 0005: Over voltage in ACC process 0006: Over voltage in DEC process 0007: Over voltage in constant speed 0008: Buffer resistor overload fault 0009: Under voltage fault 000A: Inverter overload 000B: Motor overload 000C: Input phase failure 000D: Output phase failure 000E: Module overheat 000F: External fault 0010: Communication fault 0011: Contactor fault 0012: Current detection fault 0013: Motor autotuning fault 0014: Encoder/PG card fault 0015: Parameter RW fault 0016: Inverter hardware fault 0017: Motor short circuit to ground fault 0018: Reserved 0019: Reserved 001A: Running time arrival 001B: Customized fault 1 001C: Customized fault 2 001D: Power on time arrival 001E: Off load 001F: PID feedback lost when running 0028: Fast current limiting over time fault 0029: Switching motor fault when running 002A: Speed deviation oversize 002B: Motor over speed 002D: Motor overtemperature 005A: Encoder line number setting error 005B: Encoder not connected 005C: Initial position error 005E: Speed feedback error

8.6.5 Description data of communication fault information (fault code)

Communication Fault Address	Fault function description
8001	0000: No fault 0001: Password error 0002: Command error 0003: CRC check error 0004: Invalid address 0005: Invalid parameter 0006: Parameter changing invalid 0007: System locked 0008: EEPROM operating

8.7 PD Group Communication Parameter Description

	Baud Rate	Factory Setting	5005
PD-00	Setting range	Units place: MODBUS 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens place: Profibus-DP 0: 115200BPS 1: 208300BPS 2: 256000BPS 3: 512000BPS Hundreds place: Reserved Thousands place: CANlink baud rate 0: 20 1: 50 2: 100 3: 125 4: 250 5: 500 6: 1M	

This parameter is used to set the data transmission rate between host computer and the inverter. Please note that baud rate of the host computer and inverter must be the same. Otherwise, the communication is impossible. The bigger baud rate is, the faster communication is.

	Data Format	Factory Setting	0
PD-01	Setting range	0: No parity check, data format (8-N-2) 1: Even parity check, data format (8-E-1) 2: Odd parity check, data format (8-O-1) 3: parity check, data format (8-N-1)	

The setting data format of host computer and inverter must be the same; otherwise, the communication is impossible.

	Local Address	Factory Setting	1
PD-02	Setting range	1~247, 0 is broadcast address	

When the local address is set to be 0, that is broadcast address, it can realize the broadcast function of host computer.

Local address must be unique (except broadcast address). This is the base of point-to-point communication between host computer and inverter.

PD-03	Response Delay	Factory Setting	2ms
	Setting range	0~20ms	

Response delay: It refers to the interval time from the inverter finishes receiving data to sending data to the host computer. If the response delay is less than system processing time, then the response delay is based on the system processing time. If the response delay is more than system processing time, after the system processing the data, it should be delayed to wait until the response delay time arrives, then sending data to host computer.

PD-04	Communication Timeout	Factory Setting	0.0s
	Setting range	0.0s (invalid) 0.1~60.0s	

When the function code set to be 0.0 s, the communication timeout parameter is invalid.

When the function code set to be valid value, if the interval time between the communication and the next communication is beyond the communication timeout, the system will report communication failure error (Err16). At normal circumstances, it is set to be invalid. If in the continuous communication system, set the parameter, you can monitor the communication status.

PD-05	Communication Protocol selection	Factory Setting	31
	Setting range	Units place: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Tens place: Profibus-DP 0: PPO1 format 1: PPO2 format 2: PPO3 format 3: PPO5 format	

PD-05=1: Select standard MODBUS protocol

PD-05=0: When reading the command, the slave return is one byte than the standard MODBUS protocol's, for details refer to communications Data Structure of this protocol.

PD-06	Communication Read Current Resolution	Factory Setting	0
	Setting range	0: 0.01A 1: 0.1A	

It is used to confirm the output current unit when communication reads output current.

Appendix: Quick Guide to Frequency Converter Applications

1	External start stop settings	P0-02=1 Terminal wiring: DI1 + COM
2	Speed regulation setting of external potentiometer	P0-03=2 Terminal wiring: +10V, AI1, GND, (P0-03=4 panel potentiometer)
3	Upper limit frequency setting	P0-10 and P0-12 Hz are consistent and increased
4	Terminal forward and reverse control	P0-02=1 P4-01=02 COM+DI1: Foreward COM+DI2: Reverse
5	Restore factory setting	PP-01=001
6	Carrier frequency	P0-15
7	Three wire mode 1	P0-02=1, P4-00=01, P4-01=02, P4-02=03, P4-11=2 Terminal wiring: COM+DI1: Foreward COM+DI2: Reverse COM+DI3: Stop
8	Braking resistor wiring	Braking resistor connected to P+ and PB Brake unit connected to P+ and P-
9	Switching between current signal and voltage signal dialing	AI1 dial code: 2+3 is the voltage signal, 1+2 is the current signal AI2 dial code: 2+3 is the voltage signal, 1+2 is the current signal AO1 dial code: 2+3 is the voltage signal, 1+2 is the current signal JP1 dial code: 2+3 for 485 communication on the matching resistor does not access 1+2 for the resistor matching on 485 communication to be connected
10	Two way relay settings	TA1-TC1, fault signaling: P5-02-02 TA2-TC2, running signaling: P5-03-01
11	ACC and DEC time setting	Acceleration time P0-17 Deceleration time P0-18
12	Free shutdown setting	P6-10=1
13	Inverter G/P setting	P0-00=2 (P-type machine)
14	Multi segment speed setting	P0-03=6 Set terminal multi speed function for P4 Set the corresponding frequency size for PC
15	PID simple control settings	P0-03=8 PA-01=50%
16	Terminal UP controls frequency rise and fall	P0-03=1 P4-01=6 P4-02=7 DI1+COM: Frequency plus DI3+COM: Frequency reduction
17	Panel forward and reverse settings	P7-01=2 "REV" for forward and reverse rotation switching button
18	Running display parameters P7-03	0001 Running frequency 4001 Running frequency Load speed 0002 Setting frequency 4002 Setting frequency Load speed 0008 Output voltage 4010 Load speed Output current 4000 Load speed 0011 Running frequency Output current 0010 Output current 401F Running frequency Setting frequency Bus voltage Output voltage Output current Load speed Note: Running display load speed: P7-03=4000, P7-06=motor speed+500 Note: P7-03 is adjusted to 401F above all parameters can be displayed

19	Permanent magnet self-learning	Permanent magnet synchronous motor self-learning: P0-02=0 Panel launch P0-01=0 Vector control method P0-10=0 According to the motor nameplate (motor rated frequency) P0-12=0 According to the motor nameplate (motor rated frequency) P1-00=2 Permanent magnet synchronous motor P1-01 According to the motor nameplate (motor rated power) P1-02 According to the motor nameplate (motor rated voltage) P1-03 According to the motor nameplate (motor rated current) P1-04 According to the motor nameplate (motor rated frequency) P1-05 According to the motor nameplate (motor rated speed) P1-37=12 (Permanent magnet synchronous complete coordination) When P1-37=12 is input, press "ENTER" to confirm, the indicator "ALM" will start flashing and the panel will pop up the English letter "FUNE". Then press "RUN" to run (the start mode must be panel start "RUN" to be effective), and the inverter starts to learn itself. Self-learning time is about 30 seconds.
20	Multi segment speed priority	P0-03=6, PC-51=3 The default is panel potentiometer speed control, potentiometer for multi-speed 0-segment.
21	Current overrun relay output	P5-02=36, P8-36=Set output ÷ Motor rated current (P1-03)
22	Switching between analog quantities of 0-20mA and 4-20mA	Input analog quantity A11: P4-13=02-00 Input analog quantity A12: P4-18=02-00 Input analog quantity A01: P5-10=020.0

Warranty Agreement

1. Warranty scope refers to the inverter body.
2. The inverter has a twelve-month factory warranty (twelve months for items sent internationally). If a breakdown or damage happens during the warranty term and it happens during regular usage, the company will repair it for free.
3. If any of the following failure occurrences take place while the device is still under warranty, the warranty will not apply, and a specified maintenance cost will be assessed:
 - a) Failure caused by not strictly in accordance with the "User's Manual" or beyond the standard specification requirements for use.
 - b) Damage caused by falling or brutal handling after purchase.
 - c) Aging or failure of the device caused by use in an environment that does not meet the requirements of this instruction manual.
 - d) Failure caused by self-repair or modification without permission.
 - e) Failure caused by improper storage.
 - f) Failure caused by using the inverter for other than normal functions.
 - g) Failure caused by fire, salt corrosion, gas corrosion, earthquake, storm, flood, lightning, voltage abnormality and metal dust pollution or other natural disasters or causes associated with disasters.
 - h) Unauthorized tearing of product identification (such as nameplate, etc.).
4. The service charge is determined using the actual cost. The other contract will take precedence if there is one.
5. Please save this card and provide it to the maintenance unit while the warranty is in effect as the warranty for this product is based on the warranty card and the purchase invoice.
6. You can get in touch with the agent or our company directly if you have any queries.

After the warranty expires, the company will provide lifelong maintenance services at a cost.