HORKE

Frequency converter manual



Human-Machine Interconnection
Driving the World
Touching the Future

PREFACE

Thank you for using our high-performance vectorial frequency converter.

This manual in HK company the functional characteristics and usage methods of our vectorial frequency converter, including product selection, installation and wiring, parameter setting, operation and debugging, fault diagnosis, etc. Please read this manual carefully before use. Improper use may cause abnormal operation of the converter, malfunction, reduced service life, and even equipment damage, personal injury or death.

This manual is a random attachment, please hand it over to the actual user and keep it properly for easy reference.

The company is committed to the continuous improvement and update of products, product hardware and software will be continuously upgraded, and the provided information is subject to change without notice.

SAFETY PRECAUTIONS

The safe operation of this product depends on the correct installation, operation, maintenance and maintenance. Please read it carefully and pay attention to the safety tips in this manual.

	**DANGER** Information marked as dangerous is essential to avoid security incidents.
	**CAUTION** The information marked as warning is necessary to avoid damage to the product or other equipment.
	**NOTICE** Information marked as attention helps ensure correct product operation.

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Chapter 1 Product Introduction

This product is a vectorial frequency converter product, mainly used to drive three-phase AC induction motors and sensorless permanent magnet synchronous motors. It adopts advanced vector control technology, large low-frequency output torque, fast dynamic response, strong overload capacity, modular control components and rich expansion functions. It can be widely used in machine tools, packaging, textiles, ceramics, mining, food, chemical, transportation, woodworking, wire and cable industries.

1.1 Unpacking inspection

After opening packing box, please confirm whether converter and accessories are damaged during transportation, and whether the parts are damaged or falling off. The box should contain the machine you ordered, operation manual, product certificate and warranty. If there is any omission or damage, please contact the supplier as soon as possible.

The product arrives, please confirm the following before unpacking:

⑴Whether the outer packaging is damaged.

⑵Whether the model and specifications on the outer packaging label are consistent with your order requirements.

1.2 Description of nameplate

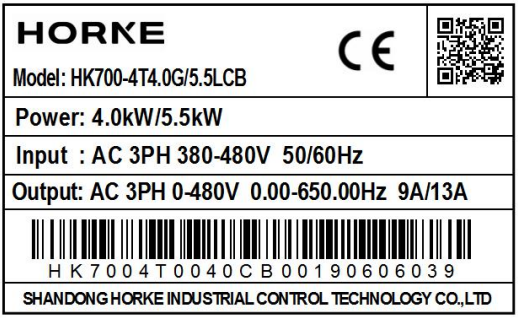


Figure1-1 Product nameplate

1.3 Product model description

HK700 – QM 4 T 11 G / 15 L C B T

Code	Model Type
HK300	300 series
HK500	500 series
HK700	700 series

Code	Model Type
Omitted	Universal Type
QM	Special for ball mills
GS	Special for water supply
LS	Special for drawing machines
JC	Special for machine tools
FZ	Special for textiles industry
YJ	Special for metallurgical industry
TC	Special for ceramics

Code	Voltage
2	220
4	400
6	690

Code	Number of Phases
S	Single-phase
T	Three-phase

Code	Adapted motor
0.4	0.4kW
0.75	0.75kW
1.5	1.5kW
2.2	2.2kW
3.0	3.0kW
4.0	4.0kW
5.5	5.5kW
7.5	7.5kW
11	11kW
15	15kW
–	–
630	630kW

Code	Load Type
G	Constant torque /heavy duty
L	Variable torque /light duty

Code	Structural Form
C	Wall-mounted
D	Floor-type

Code	DC Reactor
T	Built-in
Omitted	No built-in

Code	Brake Unit
B	Built-in
Omitted	No built-in

Figure1-2 Product nameplate

NOTICE

1. Three-phase 400V 30kW and below power comes standard with braking unit, single-phase 0.4~2.2Kw and three-phase 400V 37kW, 45kW optional built-in braking unit, three-phase 400V 55kW and above power without built-in braking unit;

2. Three-phase 400V 200kW and above are wall-mounted and floor-standing all-in-one machines, wall-mounted models are external DC reactors, and floor-standing models are standard built-in DC reactors;

3. The load types of HK500 series are only constant torque/heavy load type, no variable torque/light load type;

Altitude and derating

In areas with an altitude of more than 1,000 meters, the heat dissipation effect of the drive becomes worse due to thin air, and the drive must be derated for use at this time.

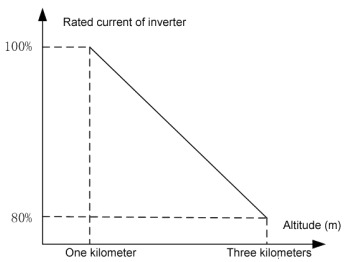


Figure1-3 Altitude and derating

Chapter 2 System connection

2.1 Product peripheral wiring

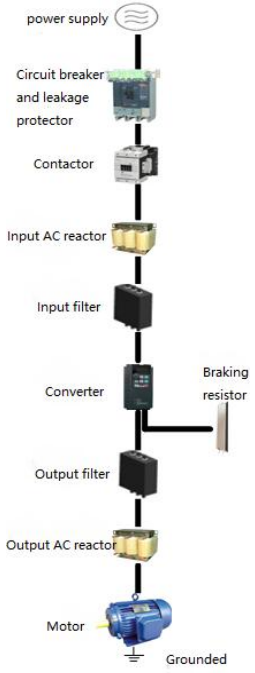


Figure2-1 Peripheral wiring of the converter

Table2-1 Instructions for use of peripheral electrical components of the convertor system

Name	Installation location	Function Description
breaker	Between power supply and convertor input side	Short circuit breaker: cut off the power when the downstream equipment is overcurrent to prevent accidents.
		Leakage protection circuit breaker: High frequency leakage current may be generated when the convertor is working. In order to prevent electric shock accidents and fires, please choose and install a suitable leakage protection circuit breaker according to the site conditions.
contactor	Between circuit breaker and converter input side	When the convertor is powered on and off, it is necessary to avoid frequent power-on and power-off operations (with an interval of not less than one hour) or direct start-up operations on the convertor through the contactor.
Input reactor	convertor input side	Improve the power factor of the input side; Effectively eliminate high-order harmonics on the input side to prevent damage to other equipment caused by voltage waveform distortion; Eliminate the unbalanced input current caused by the unbalanced power supply phase.
Input filter	convertor input side	Reduce the external conduction and radiation interference of the convertor; Reduce the conduction interference flowing from the power supply end to the convertor and improve the anti-interference ability of the convertor.
DC reactor	Optional DC reactor for 55kW and above;	Improve the power factor of the input side; Improve the efficiency and thermal stability of the convertor; Effectively eliminate the influence of higher harmonics on the input side on the convertor and reduce external conduction and radiation interference.
Braking resistor	45kW and below Model with B	For models with power of 45kW and below, please use the optional braking resistor; The motor consumes regenerative energy through the braking resistor when it decelerates.
Braking unit	Full series without B model	For the whole series of models without B, please use our braking unit and recommended braking resistor; The motor consumes regenerative energy through the braking resistor when it decelerates.
Output filter	Install near the convertor on the output side of the convertor	Effectively eliminate high-order harmonics on the output side.
Output reactor	Install close to the convertor between the output side of the convertor and the motor	The output side of the convertor generally contains more high-order harmonics. When the distance between the motor and the convertor is far, there is a larger distributed capacitance in the line. One of the harmonics may cause resonance in the loop, bringing two effects: a) Destroy the insulation performance of the motor, which will damage the motor for a long time. b) Large leakage current is generated, causing frequent convertor protection. Generally, the distance between the convertor and the motor is more than 100m, it is recommended to install an output AC reactor.
Motor	convertor output side	Please select a suitable motor as recommended.

2.2 Precautions

1）RCD requirements for leakage protectors

When the equipment is running, a large leakage current will flow through the protective grounding conductor. Please install a B-type leakage current protector (RCD) on the primary side of the power supply. When selecting a leakage current protector (RCD), the transient and steady-state leakage current to the ground that may occur during the start up and operation of the equipment should be considered, and a special RCD with measures to suppress high-order harmonics or a general RCD of 300mA (I∆n is 2 to 4 times the current of the protective conductor).

2）Motor insulation inspection

When the motor is used for the first time, before reuse after a long period of time, and during regular inspection, the motor insulation should be checked to prevent damage to the convertor due to the insulation failure of the motor winding. The motor connection must be separated from the convertor during the insulation inspection. It is recommended to use a 500V voltage type megohmmeter to ensure that the measured insulation resistance is not less than 5MΩ.

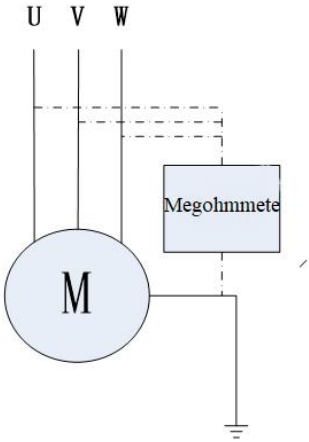


Figure2-2 Motor insulation inspection

3） Thermal protection of the motor

If the selected motor does not match the rated capacity of the convertor, especially when the rated power of the convertor is greater than the rated power of the motor, be sure to adjust the motor protection related parameter values in the convertor or install a thermal relay before the motor to protect the motor.

4） Operation above power frequency

This convertor provides an output frequency of 0Hz~650Hz. If the customer needs to operate above 50Hz, please consider the endurance of the mechanical device.

5） Vibration of machinery

The convertor may encounter the mechanical resonance point of the load device at some output frequencies, which can be avoided by setting the jump frequency parameter in the convertor.

6） Regarding motor heating and noise

Since the output voltage of the convertor is a PWM wave and contains certain harmonics, the temperature rise, noise and vibration of the motor will slightly increase compared to the power frequency operation.

7）When there are pressure-sensitive devices or capacitors to improve power factor on the output side

The convertor outputs PWM waves. Do not install capacitors for improving power factor or varistors for lightning protection on the output side, which may easily cause transient overcurrent or even damage the convertor.

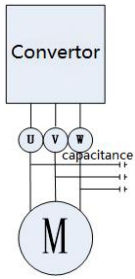


Figure2-3 Do not install capacitors on the output side of the convertor

8）Switching devices such as contactors used at the input and output terminals of the convertor

If a contactor is installed between the power supply and the input terminal of the convertor, it is not allowed to use this contactor to control the start and stop of the convertor. When the contactor must be used to control the start and stop of the convertor, the interval should not be less than 1 hour. Frequent charging and discharging can easily reduce the service life of the capacitor in the convertor. If switching devices such as contactors are installed between the output terminal and the motor, ensure that the convertor is switched on and off when there is no output, otherwise the modules in the convertor may be damaged.

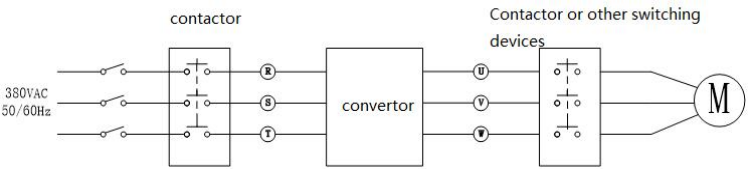


Figure2-4 Add switching devices to the input and output terminals of the convertor

9）Use beyond the rated voltage

It is not suitable to use the convertor outside the allowable working voltage range specified in the manual, which will easily cause damage to the components in the convertor. If necessary, please use the corresponding step-up or step-down device to transform the power supply and input it to the convertor.

10）Three-phase input changed to two-phase input

Do not change the three-phase convertor to two-phase use. Otherwise it will cause malfunction or damage to the convertor.

11）Surge suppressor

The convertor is equipped with a varistor, which can suppress the surge voltage generated when the inductive load around the convertor is switched on and off. When the surge voltage energy generated by the surrounding inductive load is large, be sure to use a surge suppressor or a diode on the inductive load.

12）Altitude and derating use

In areas where the altitude exceeds 1000m, the heat dissipation effect of the convertor is deteriorated due to the thin air, it is necessary to derate the use (for every 100m increase in altitude, derate 1%, the maximum use altitude is 3000m; when it exceeds 40℃, it needs to be used according to the temperature Derating 1.5% for every 1°C increase, and the maximum operating temperature is 50°C). In this case, please consult our company for technical advice.

13）Some special usage

If customers need to use methods other than the suggested wiring diagrams provided in this manual, such as common DC bus, please consult our company.

14）Pay attention to when the convertor is scrapped

The electrolytic capacitor of the main circuit and the electrolytic capacitor on the printed circuit board may explode when burned. Toxic gas is generated when plastic parts are burned. Please dispose of it as industrial waste.

15）About the adapted motor

●The standard adapted motor is a four-pole squirrel cage asynchronous induction motor. If it is not the above motor, please select the convertor according to the rated current of the motor.

●The cooling fan of the non-frequency conversion motor is coaxially connected with the rotor shaft, and the cooling effect of the fan is reduced when the speed is reduced. Therefore, when the motor is overheated, a strong exhaust fan should be installed or replaced with a frequency conversion motor.

●The convertor has built-in standard parameters of the adapted motor. According to the actual situation, it is necessary to identify the motor parameters or modify the default values to meet the actual values as much as possible, otherwise it will affect the running effect and protection performance.

●The rated current of the pole-changing motor is different from that of the standard motor. Please confirm the maximum current of the motor and select the corresponding convertor. Be sure to switch the number of poles after the motor stops.

●A short circuit in the cable or motor will cause the convertor to alarm or even blow up the machine. Therefore, please perform an insulation short-circuit test on the initially installed motor and cable first, and this test should be performed frequently during routine maintenance. Note that when doing this kind of test, be sure to disconnect the convertor from the tested part.

●The speed control range of the motor varies with the lubrication method and the manufacturer.

●When running the motor outside the speed control range, please consult the motor manufacturer.

16）Product design implementation standards

● IEC/EN 61800-5-1: 2007 safety requirements for adjustable-speed electric drive systems—electricity, heat and energy;

● IEC/EN 61800-3:2004/+A1:2012 adjustable speed electrc drive system; Part 3: Product electromagnetic compatibility standards and specific test methods.

Chapter 3 Installation and Wiring

This chapter will introduce the correct method of installation and wiring of the vector type universal convertor. To ensure the safety of the system and the normal operation of the equipment, please read this manual carefully before installation. When wiring, be sure to follow the wiring method provided in this chapter.

DANGER

- Do not install if the convertor components are incomplete or damaged.
- The convertor must be installed on metal and other flame-retardant objects, away from flammable and explosive objects.
- The operation should be performed 10 minutes after the convertor is disconnected from the power supply.

CAUTION

- When transporting, please hold the bottom of the convertor, not just the operation panel and cover.
- During installation, do not drop the drilling residue into the convertor.

3.1 Installation

In order for the convertor to have a good heat dissipation effect, the convertor must be installed vertically, and there must be enough space for heat dissipation around the adjacent objects, as shown in **Figure 3-1**.

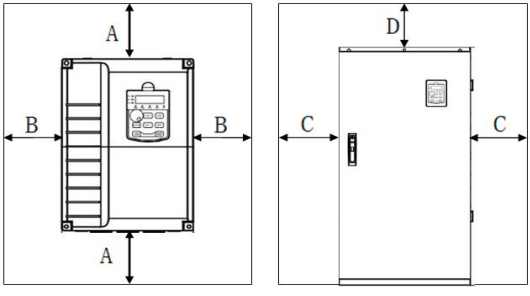


Figure3-1 Installation method

convertor installation clearance recommendation table:

convertor type	Gap size	
Wall-mounted（<37KW）	A≥150mm	B≥100mm
Wall-mounted（≥37KW）	A≥200mm	B≥100mm
Floor-standing（200KW-630KW）	C≥250mm	D≥100mm

3.2 Wiring

Typical wiring is shown below:

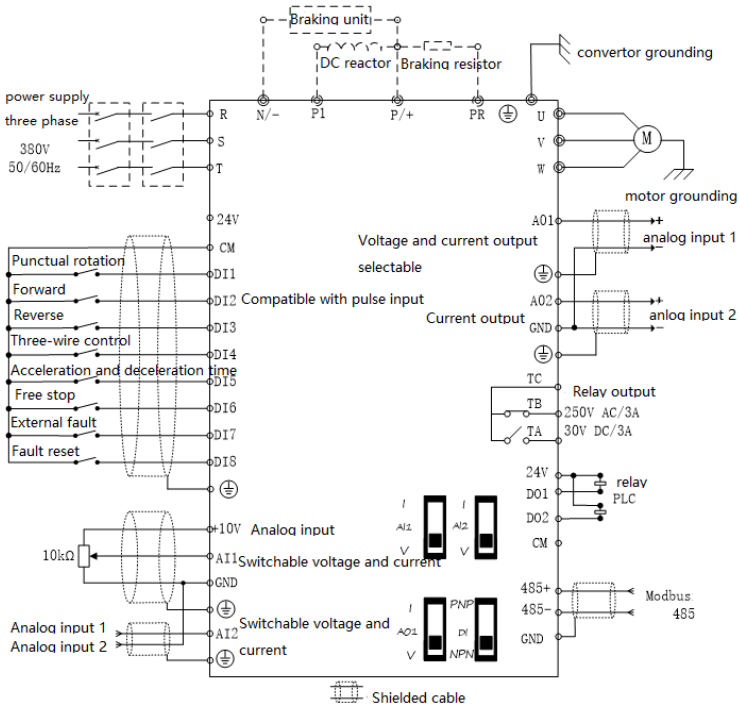


Figure3-2 Overall wiring diagram of the convertor

Please note that some models have different wiring at the dotted line in the figure. Please seat according to the product model and specifications.

3.2.1 Main circuit terminals

The main circuit terminal distribution is shown in the following table:

Table3-1 Main circuit terminal indication

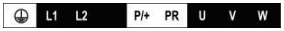
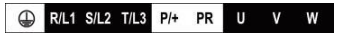
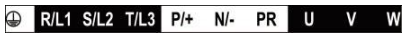
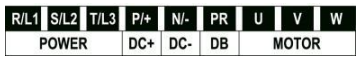
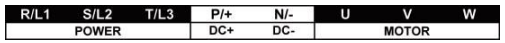
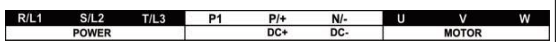
model	Main circuit terminal diagram
Single phaseH1/H2	
Three phase H1/H2/H3/H4	
Three phase H5	
Three phase H6	
Three phase H7/H8/H9	
Three phase HA/HB/HC/ HA1/HB1/HC1	

Table3-2 Main circuit terminals

Terminal symbol	Terminal name and function description
L1、L2	Single-phase AC input side wiring of the convertor
R/L1、S/L2、T/L3	Three-phase AC input side wiring of the convertor, no phase sequence requirements
U、V、W	Connect the three-phase AC output side of the convertor to the motor
P/+、PR	Braking resistor wiring
P/+、N/-	DC bus (+), (-)
P1、P/+	DC reactor wiring
⏚	Grounded

3.2.2 Control circuit terminals

PE	485+	485-	CM	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8
+10V	AI1	AI2	GND	AO1	AO2	24V	DO1	DO2	TA	TB	TC

Figure3-3 Schematic diagram of control circuit terminals

Table3-3 Function description of control circuit terminals

Type	Terminal label	Name	Terminal function description and specifications
Digital input	DI1	Multi-function input/pulse input	Input voltage specification: 0~30VDC Pulse input: 0.1KHz~100KHz (higher frequency can be customized) (HK500 does not support pulse input) Programmable input selection
	DI2~DI8	Multi-function digital input2~8	Input voltage specification: 0~30VDC Input frequency: 0~200Hz Programmable input selection
Analog input	AI1	Analog input 1	Input voltage/current signal optional: Switch S1 (corresponding to AI1) selection Switch S2 (corresponding to AI2) selection Input signal range: 0~10V/0~20mA/4~20mA
	AI2	Analog input 2	
Digital output	DO1	Open collector/pulse output	Open collector output Output voltage range: 0~30VDC Maximum output current: 50mA Pulse output: 0.1KHz~100KHz (Higher frequency can be customized)
	DO2	Open collector	Open collector output Output voltage range: 0~30VDC Maximum output current: 50mA
Analog output	AO1	Analog output 1	Output voltage/current signal optional: switch S3 selection Output signal range: 0~10V/0~20mA/4~20mA optional
	AO2	Analog output 2	Output current signal Output signal range: 0~20mA/4~20mA optional
Relay output	TA/TB/ TC	Relay contact output	Programmable output Contact capacity 250VAC/3A or 30VDC/3A TB, TC: normally closed contacts TA, TC: normally open contacts
Termin al 485	485+	485 differential signal positive terminal	Communication rate: 2400bps~38400bps; The longest transmission distance is 500m (using standard twisted pair shielded wire)
	485-	485 differential signal negative terminal	
power supply	24V	24V power supply	Power supply specification: 24V±10%; maximum output current: 200mA
	CM	24V power ground	Digital input and output ground Internally isolated from GND
	10V	10V power supply	Analog input +10V power supply; Maximum output current: 20mA
	GND	10V power ground	The analog ground is isolated from the CM

3.2.3 Control circuit terminal wiring

DI wiring when using external 24V power supply:

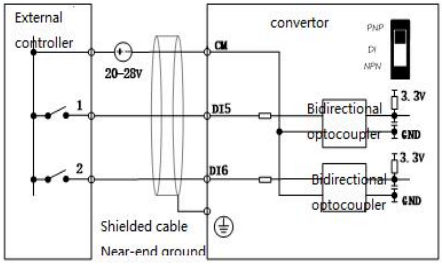


Figure3-4 DI wiring with external 24V power supply

DI wiring when using internal 24V power supply:

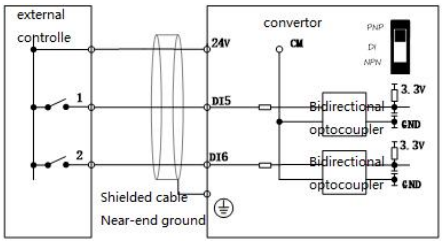


Figure3-5 DI wiring with internal 24V power supply

NPN and PNP wiring method

The DI wiring of NPN when using the internal 24V power supply:

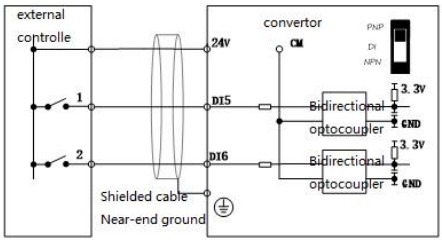


Figure3-6 DI wiring of NPN with internal 24V power supply

Internal 24V power supply PNP DI wiring:

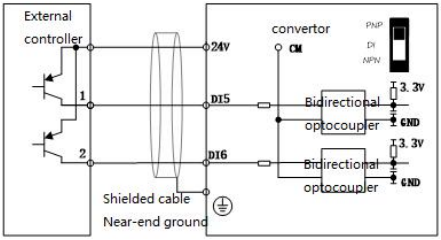


Figure3-7 Internal 24V power supply PNP DI wiring

Use external power supply DO wiring:

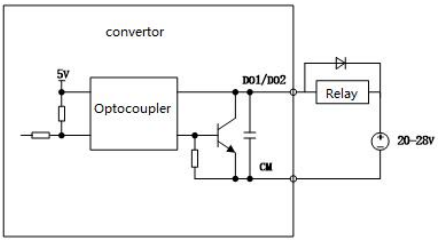


Figure3-8 Use external power supply DO wiring

3.3 Installation instructions

3.3.1 Motor wiring

distance between the convertor and the motor, the higher the carrier frequency and the higher the harmonic leakage current on the cable. Leakage current will adversely affect the convertor and nearby equipment.

When the cable between the motor and the convertor exceeds 100 meters, it is recommended to install an AC output reactor, and refer to the following table to set the carrier frequency.

Table3-4 Wiring distance and carrier frequency between convertor and motor

Wiring distance between convertor and motor	<30m	30－50m	50－100m	≥100m
Set carrier frequency	Below 15kHz	Below 10kHz	Below 5kHz	Below 2kHz

When the motor cable is too long or the cross-sectional area of the motor cable is too large, derating should be used, and the cable of the convertor should be used with the specified area. Since the larger the cross-sectional area of the cable, the greater the capacitance to ground and the greater the leakage current to ground. The use of a cable with a larger cross-sectional area should reduce the output current and reduce the current by about 5% for each increase in area.

3.3.2 Grounding

The ground terminal of the convertor must be grounded. The grounding point should be as short as possible (the grounding point should be as close as possible to the convertor), and the grounding area should be as large as possible.

The grounding resistance should be less than 10Ω.

Do not share the grounding wire with other power equipment, you can share the grounding electrode, but when each has a dedicated grounding electrode, the effect is best. The recommended and avoided grounding methods are shown in **Figure 3-9** Recommended grounding and Figure 3-10 Avoided grounding:

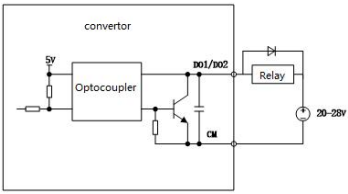


Figure3-9 Recommended grounding

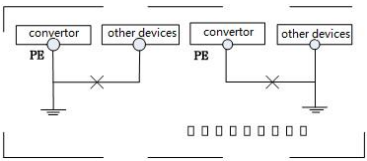
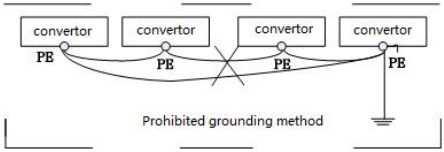


Figure3-10 Avoid grounding

When using more than two convertors at the same time, do not loop the grounding wire, as shown in **Figure 3-11** forbidden grounding.



3.3.3 EMI filter

Equipment that can produce strong interference and equipment that is sensitive to external interference should use EMI filters. EMI filters are two-way low-pass filters that allow low-frequency currents to pass, but higher-frequency electromagnetic interference currents are not easy to pass.

The role of EMI filter:

1. The equipment can meet the requirements for conducted emission and conduction sensitivity in the electromagnetic compatibility standard, and can suppress the radiation emission of the equipment.

2. Prevent electromagnetic interference generated by the device itself from entering the power cord, and at the same time prevent interference from the power cord from entering the device.

Common mistakes in EMI filter installation

1. The wiring between the EMI filter and the convertor is too long

The installation position of the filter in the cabinet should be close to the entrance of the power cord, and the power input line of the filter should be as short as possible in the chassis.

2. The input line and output line of the EMI filter are too close

The input line and output line of the filter are too close, and high-frequency interference signals are directly coupled through the input and output lines of the filter, bypassing the filter, so that the power line filter is useless.

3. Poor EMI filter grounding

The shell of the EMI filter must be reliably connected to the metal box. The housing of the filter usually has a dedicated ground terminal, but a wire is used to connect the filter to the housing, which is useless for high-frequency interference signals, because the impedance (non-resistance) of the long wire is very large at high frequencies , It is not an effective bypass at all.

The correct installation method: Attach the EMI filter shell directly to the conductive surface of the metal case of the equipment, and pay attention to removing the insulating paint.

3.3.4 Conduction, radiation, and radio frequency interference countermeasures

convertor radiation emission

The working principle of the convertor determines that the radiated emission of the convertor is inevitable. The frequency converter is generally installed in a metal cabinet, and for the instruments and equipment outside the metal cabinet, the radiation emission of the frequency converter itself is little affected. The external connecting cable is the main source of radiation emission, and wiring according to the cable requirements described in this section can effectively suppress the radiation emission of the cable.

If the convertor and other control devices are in the same metal cabinet, you should carefully consider when designing the cabinet in accordance with the aforementioned partitioning principle, pay attention to the isolation of each section, and the wiring, shielding and overlapping of cables.

Conducted interference countermeasures

To suppress the conducted interference on the output side, in addition to the method of installing a noise filter, it is also possible to use the method of introducing all the output wires into the grounded metal pipe. The distance between the output wiring and the signal line is greater than 0.3m, and the influence of conducted interference is also significantly reduced.

Radio frequency interference countermeasures

The input wiring, output wiring and the convertor itself will generate radio frequency interference. Install EMI filters on both sides of the input and output, and shield them with iron utensils to reduce radio frequency interference. The connection between the convertor and the motor should be as short as possible. Measures to reduce radio frequency interference are shown in the figure.

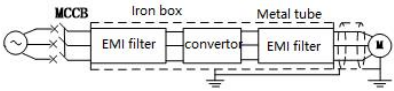


Figure3-12 Radio frequency interference suppression measures

3.3.5 Input and output reactor

AC input reactor

The purpose of the AC incoming line reactor is to: improve the power factor of the input side; effectively eliminate the higher harmonics on the input side, prevent other equipment damage due to voltage waveform distortion; eliminate the input current imbalance caused by the imbalance between the power phases.

AC output reactor

When the cable between the motor and the convertor exceeds 100 meters, a large leakage current will be generated, causing convertor protection. At this time, it is recommended to install an output AC reactor.

Chapter 4 Panel Operation

This chapter will give a detailed introduction to the usage and display information of the operation panel of the convertor. Please read this chapter carefully before operating the convertor.

4.1 Introduction to Operation Panel

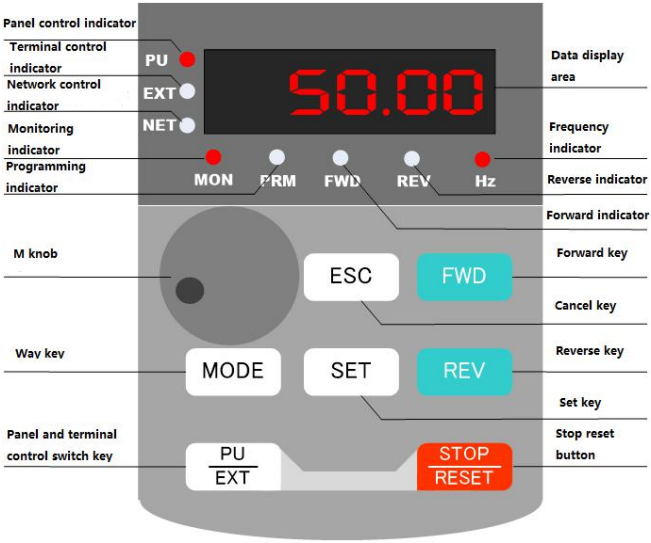


Figure4-1 Introduction to the operation panel

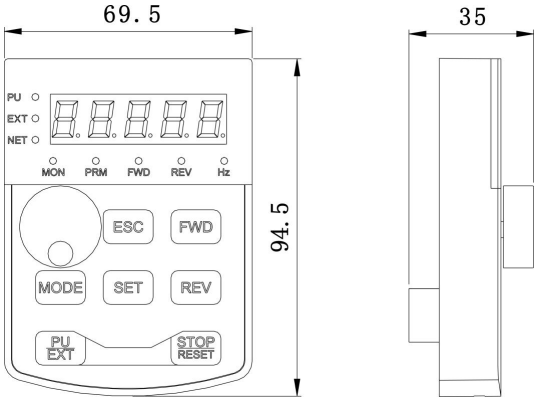


Figure4-2 Operation panel size

4.2 Panel function description

<table>
<tr><th>Name</th><th colspan="3">Function Description</th></tr>
<tr><td>Data display area</td><td colspan="3">Display frequency, parameter number, etc.</td></tr>
<tr><td rowspan="8">Indicator light</td><td colspan="3">PU: Light on when the panel control start-stops</td></tr>
<tr><td colspan="3">EXT: Light on when the terminal controls start-stops</td></tr>
<tr><td colspan="3">NET: Light on when communication control start-stops</td></tr>
<tr><td colspan="3">Lit in monitoring mode; flashes quickly when the protection function is activated</td></tr>
<tr><td colspan="3">PRM: Lit in parameter setting mode</td></tr>
<tr><td colspan="2">FWD: On when running forward</td><td rowspan="2">The FWD and REV indicators flash in the following situations:
1. When there is a forward/reverse rotation command but no frequency command
2. When the frequency command is less than the start frequency</td></tr>
<tr><td colspan="2">REV: Lit during reverse operation</td></tr>
<tr><td colspan="3">Hz: Frequency unit, lit when frequency is displayed</td></tr>
<tr><td rowspan="2">M Knob</td><td>Turn M knob</td><td colspan="2">1. Realize the frequency modulation function in the frequency monitoring interface.
2. Modify function codes and parameters in the parameter setting interface.
3. Adjust PID setting, PID feedback, torque setting, etc.
4. When the panel potentiometer function is selected, rotate the display panel potentiometer value.</td></tr>
<tr><td>Press M knob</td><td colspan="2">1. When selecting the panel potentiometer function, press the display panel potentiometer value.
2. Realize the shift function under the parameter setting interface.</td></tr>
<tr><td>MODE</td><td colspan="3">Cyclically switch the monitoring mode interface, parameter setting mode interface and panel jog JOG interface.</td></tr>
<tr><td>SET</td><td colspan="3">1. Determine the parameter settings.
2. Switch and view monitoring items under the monitoring interface.
3. Long press to lock the keyboard, and HOLD will be displayed at this time.</td></tr>
<tr><td>ESC</td><td colspan="3">1. Return to the previous interface.
2. Long press this key in the HOLD interface to cancel the keyboard lock, and HOLD disappears.</td></tr>
<tr><td>PU/EXT</td><td colspan="3">Switch panel control mode, terminal control mode</td></tr>
<tr><td>STOP/RESET</td><td colspan="3">1. Stop instruction
2. Fault reset instruction</td></tr>
<tr><td>FWD</td><td colspan="3">Forward start; in jog mode, forward jog start</td></tr>
<tr><td>REV</td><td colspan="3">Reverse start; in jog mode, reverse jog start</td></tr>
</table>

4.3 Panel display description

Panel Display	Function Name	Content
P.	Parameter setting mode	Read and change the parameter setting value of the corresponding number.
Err.CL	Clearing the fault	
P.LOAd	Parameter restoration	It is displayed when the setting content of the parameter is cleared and restored to the factory value, see parameter P.1101.
E.OC1	malfunction	The specific display content is different, please refer to Chapter 8.

4.4 Panel operation method

4.4.1 MODE cycle view

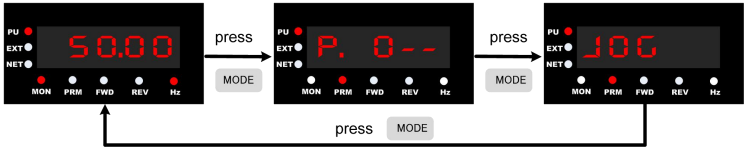


Figure4-3 Cycle view of MODE

4.4.2 SET cycle view

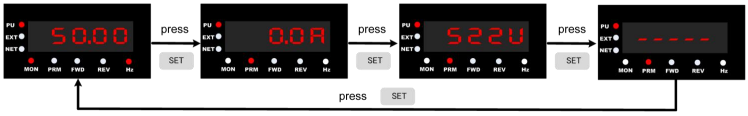


Figure4-4 Cycle view of SET

4.4.3 Keyboard locking and unlocking

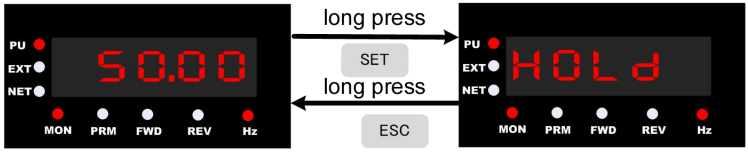


Figure4-5 Keyboard locking and unlocking

4.4.4 Function parameter query and modification

Take changing the preset frequency of P.010 as an example:

step	usage
1	After turning on the power, the operation panel displays the frequency monitoring interface, and 50.00 flashes.
2	Press the MODE button to switch to the parameter setting mode and display P.0--.
3	Press the SET key to display P.000.
4	Turn the M knob to adjust to P.010.
5	Press the SET key to display "50.00", and the last digit flashes.
6	Rotate the M knob to modify the set value to 20.00.
7	Press the SET key to save the parameters and return to the previous interface P.010.

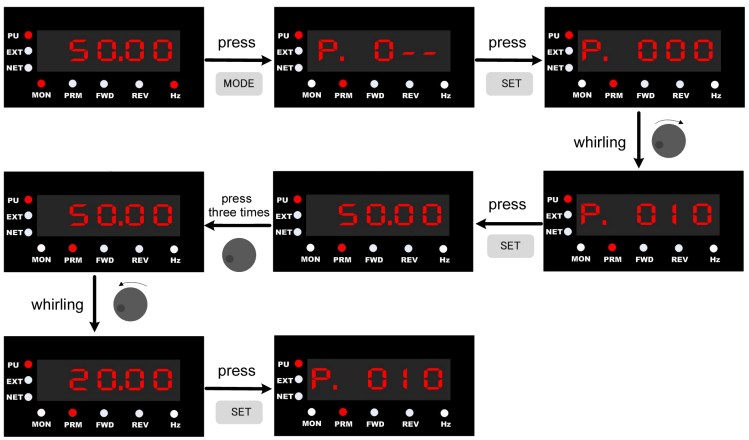


Figure4-6 Operation to change the target frequency of P.010

4.4.5 Parameter copy

Parameter copy needs to be operated in P.818. After entering P.818, the displayed content and meaning are as follows:

Display content	significance	Instructions
0.----	Parameter copy start and end interface	The parameter settings saved in the convertor can be copied to the operation panel. The parameters copied to the operation panel can be copied to other convertors.
1.uL	Parameter upload	
2.dL	Parameter download	

How to use parameter upload:

step	Instructions
1	After turning on the power, the operation panel displays the frequency monitoring interface, and 50.00 flashes.
2	Press the MODE button to switch to the parameter setting mode and display P.0--.
3	Adjust to P.8-- by turning the M knob.
4	Press the SET button to display P.800.
5	Adjust to P.818 by turning the M knob.
6	Press the SET key to enter the parameter copy interface and display "0.----".
7	By turning the M knob, change the setting value to "1.uL".
8	Press the SET key to select parameter upload, the panel starts to read the parameter settings of the convertor, uL** is displayed when uploading, ** indicates the progress of the copy, from 0 to 100.
9	After the upload is complete, the initial interface "0.----" is displayed.

How to use parameter download:

step	Instructions
1	After turning on the power, the operation panel displays the frequency monitoring interface, and 50.00 flashes.
2	Press the MODE button to switch to the parameter setting mode and display P.0--.
3	Adjust to P.8-- by turning the M knob.
4	Press the SET key to display P.800.
5	Adjust to P.818 by turning the M knob.
6	Press the SET key to enter the parameter copy interface and display "0.----".
7	By turning the M knob, change the setting value to "2.dL".
8	Press the SET key to select parameter download, the parameters in the panel will start to be copied to the convertor, and dL** will be displayed when downloading. ** means the progress of the copying, increasing from 0 to 100.
9	After the download is complete, the initial interface "0.----" is displayed.

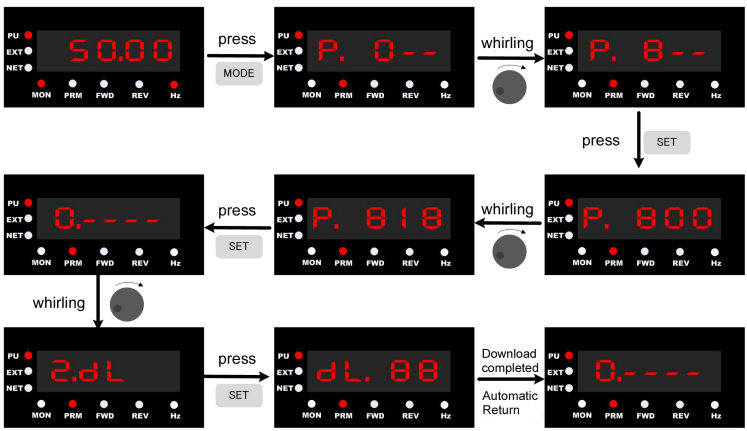


Figure4-7 Operation of parameter copy

Note: The parameter copy function of the control panel is optional. The panel without parameter copy function will skip "0.Err4 fault during copy operation.

4.5 Introduction of LCD operation panel

The liquid crystal display operation panel adopts LCD liquid crystal display. On the basis of ordinary panel functions, users can change the function code more conveniently through this panel. In addition, the Chinese name of each function code is displayed in Chinese, making it easier and more convenient to use. For details of the LCD operation panel, please refer to the relevant user manual.

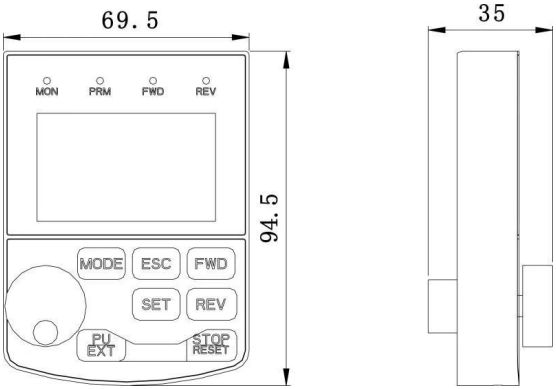


Figure4-8 LCD display operation panel and size

4.6 Introduction of two-line display operation panel

The two-line display operation panel adopts a double-line digital tube display. On the basis of the ordinary panel function, a second-line digital tube is added to display output voltage, current and other information, which is convenient for users to view the current convertor status in time.

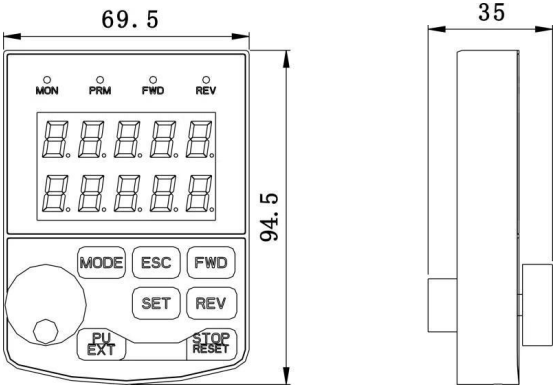


Figure4-9 Two-line display operation panel and size

Note: Function code P.822 can select the content displayed on the second line of digital tube.

Chapter 5 Basic Operation

This chapter introduces the basic debugging steps of the convertor, mainly including the frequency command setting of the convertor, and the control of start and stop. According to this chapter, the test operation of the convertor controlled motor can be realized.

5.1 Quick Commissioning Guide

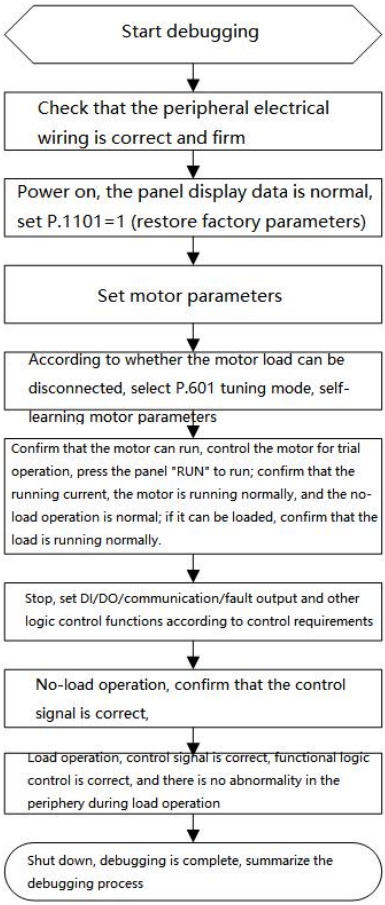


Figure5-1 Quick commissioning step guide

5.2 Check items before turning on the power

Be sure to confirm the following items before turning on the power.

Item	Content
Confirmation of power supply voltage	Please confirm that the power supply voltage is correct.
Please connect the power input terminal (R/S/T) reliably	
Confirm that the convertor and motor are properly grounded	
Confirm the connection between the convertor output terminal and the motor terminal	Please confirm whether the connection between the convertor output terminal (U/V/W) and the motor terminal is secure.
Confirm the connection with the convertor control circuit terminal	Please confirm whether the connection between the control circuit terminals of the convertor and other control devices is secure.
Status confirmation of convertor control terminals	Please confirm whether the control circuit terminals of the convertor are all in the OFF state (the convertor is not running).
Load confirmation	Please confirm whether the motor is in no-load state and not connected to the mechanical system.

5.3 Display status confirmation after power on

After the power is turned on, the operator display in the normal state is as follows.

status	displow	description
Normal time	50.00	The factory default display is digital setting 50.00Hz
In case of failure	Error code, see fault code	In the event of a fault, the convertor is in a stop state and the fault type is displayed

Chapter 6 Function Code Quick Reference Table

The frequency converter is divided into 13 groups of functional parameters according to the attributes of the parameters, among which the 0th group of basic parameter areas: run command, frequency command, acceleration and deceleration time; the first group of signal input areas: digital input terminals, analog input terminals; the second group of signals Output area: digital output terminal, analog output terminal. The third group of communication parameter area: communication address, baud rate; the fourth group of motor control parameter area 1: motor operation control related parameters; the fifth group of motor control parameter area 2; the sixth group of motor parameter area; the seventh group of fault parameters Area; the eighth group of system parameter area: password, convertor power, software version number; the 9th and 10th group of application parameter area; the 11th group of communication control, the 12th group of monitoring parameter area, grouping enables parameter setting and viewing It's easier and more intuitive. In most applications, users can complete the settings before starting operation according to the relevant parameter settings in the parameter group.

The symbols in the function list are explained as follows:

“★”means that the set value of this parameter can be changed when the convertor is in stop or running state;

“☆” means that the set value of this parameter cannot be changed when the convertor is running;

“●”indicates that the value of this parameter is the actual test record value and cannot be changed;

“◆”means that the value of this parameter is related to the power, and the value is different for different powers.

Function code	Name	factory default	range	alter	Factory reset
P.000	load type selection	0	0: Constant torque/heavy load 1: Variable torque/light load	☆	Y
P.001	command source selection	0	0: Operation panel command channel 1: Terminal command channel 2: Communication command channel 3: Operation panel command and terminal command channel switching	★	Y
P.002	running direction selection	0	0: Run in default direction 1: Run in the opposite direction to the default direction	★	Y
P.003	Main frequency source X selection	0	0: Digital setting 1: Analog input 1 2: Analog input 2 3: Panel potentiometer 4: Pulse frequency 5: Multiple instructions 6: Simple PLC 7: PID 8: Communication setting	☆	Y
P.004	Auxiliary frequency source Y selection	0		☆	Y
P.005	frequency source superposition mode selection	0	Units 0: Main frequency source X 1: Main frequency and auxiliary frequency calculation result 2: Switch between main frequency source X and auxiliary frequency source Y 3: Switch between main frequency source X and main and auxiliary calculation results 4: Switch between auxiliary frequency source Y and main and auxiliary calculation results Tens place 0: main frequency + auxiliary frequency 1: Main frequency-auxiliary frequency 2: The maximum value of the main frequency and auxiliary frequency 3: The minimum of main frequency and auxiliary frequency	★	Y
P.006	Selection of auxiliary frequency source Y range during superposition	0	0: Relative to the maximum frequency 1: Relative to the main frequency source	★	Y
P.007	Auxiliary frequency source Y range when superimposing	100.0%	0.0%~100.0%	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.008	Auxiliary frequency source bias frequency during superposition	0.00Hz	0.00Hz~P.012Hz	★	Y
P.009	Command source bundling frequency source	0	Units: Operation panel command binding frequency source selection Tens place: terminal command bundling frequency source selection Hundreds place: communication command bundle frequency source selection The contents of the hundred and ten places are as follows: 0: No binding 1: Digital setting 2: Analog input 1 3: Analog input 2 4: Panel potentiometer 5: Pulse frequency 6: Multiple instructions 7: Simple PLC 8: PID 9: Communication setting	☆	Y
P.010	preset frequency	50.00Hz	0.00Hz~P.012Hz	★	Y
P.011	Digital setting frequency memory selection	11	Units: Power-down memory selection 0: no memory 1: Memory Ten place: stop memory selection 0: no memory 1: Memory	★	Y
P.012	Maximum frequency	50.00Hz	50.00Hz~650.00Hz	☆	Y
P.013	Upper limit frequency source selection	0	0: P.014 1: Analog input 1 2: Analog input 2 3: Panel potentiometer 4: Pulse frequency 5: Communication settings	☆	Y
P.014	Upper limit frequency	50.00Hz	0.50Hz~P.012Hz	★	Y
P.015	Lower limit frequency	0.50Hz	0.50Hz~P.014Hz	★	Y
P.016	Upper limit frequency offset	0.00Hz	0.00Hz~P.012Hz	★	Y
P.018	Panel potentiometer speed regulation accuracy	1.00Hz	0.01Hz~1.00Hz	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.020	Acceleration and deceleration curve	0	0: straight line 1: S curve	☆	Y
P.021	The first acceleration time	◆	0.1s~3000.0s	★	Y
P.022	The first deceleration time	◆	0.1s~3000.0s	★	Y
P.023	The second acceleration time	◆	0.1s~3000.0s	★	Y
P.024	The second deceleration time	◆	0.1s~3000.0s	★	Y
P.025	The third acceleration time	◆	0.1s~3000.0s	★	Y
P.026	The third deceleration time	◆	0.1s~3000.0s	★	Y
P.027	The fourth acceleration time	◆	0.1s~3000.0s	★	Y
P.028	The fourth deceleration time	◆	0.1s~3000.0s	★	Y
P.031	S segment time 1	30.0%	0.0%~100.0%	☆	Y
P.032	S segment time during acceleration 2	30.0%	0.0%~100.0%	☆	Y
P.033	S segment time 1	30.0%	0.0%~100.0%	☆	Y
P.034	S segment time 2	30.0%	0.0%~100.0%	☆	Y
P.035	Reference value of acceleration and deceleration time	50.00Hz	1.00Hz~650.00Hz	★	Y
P.036	Acceleration/deceleration time switching frequency	0.00Hz	0.00Hz~650.00Hz 0.00Hz:无效	★	Y
P.040	Jog frequency	5.00Hz	0.00Hz~650.00Hz	★	Y
P.041	Jog acceleration time	◆	0.1s~3000.0s	★	Y
P.042	Jog deceleration time	◆	0.1s~3000.0s	★	Y
P.043	Negative frequency enable	0	0: prohibit negative frequency 1: Allow negative frequency	☆	Y
P.044	Dead time for forward and reverse switching	0.0s	0.0s~3000.0s	★	Y
P.045	Reverse rotation prohibited	0	0: invalid 1: Reverse is prohibited	☆	Y
P.050	Start mode	0	0: direct start 1: Speed tracking start	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.051	Stop mode	0	0: Decelerate to stop 1: Free stop 2: Deceleration and DC braking to stop	★	Y
P.052	Free stop delay time	0.0s	0.0s~3000.0s	★	Y
P.053	Starting frequency	0.00Hz	0.00Hz~50.00Hz	☆	Y
P.054	Starting frequency holding time	0.0s	0.0s~60.0s	☆	Y
P.055	Frequency is lower than lower limit selection	1	0: Lower limit operation 1: shutdown	☆	Y
P.056	Power-on terminal operation selection	1	0: do not start 1: Start	★	Y
P.057	Whether to start automatically after power-on	0	0: invalid 1: Effective	★	Y
P.058	Self-start delay time	3.0s	0.0s~3000.0s	★	Y
P.059	Whether to start automatically after fault reset	0	0: invalid 1: Effective	★	Y
P.060	Setting of the number of restarts after failure	10	0~50	★	Y
P.061	Number of restarts after fault	0	0~50	★	Y
P.062	Fault restart waiting time	3.0s	0.0s~10.0s	★	Y
P.070	Torque control selection	0	0: Speed control 1: Torque control	☆	Y
P.071	Torque command source	0	0: P.072 1: Analog input 1 2: Analog input 2 3: Panel potentiometer	★	Y
P.072	Torque command value	100.0%	-200.0%~200.0%	★	Y
P.074	Torque command negative enable	0	0: invalid 1: Effective	☆	Y
P.075	Speed limit source selection	0	0: number 1: Analog input 1 2: Analog input 2 3: Panel potentiometer 4: Pulse frequency	☆	Y
P.076	Forward speed limit	50.00Hz	0.00Hz~650.00Hz	★	Y
P.077	Reverse speed limit	50.00Hz	0.00Hz~650.00Hz	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.078	Speed limit mode	2	1: Speed limit mode 1 2: Speed limit mode 2 3: Speed limit mode 3 4: Speed limit mode 4	☆	Y
P.079	Torque acceleration time	1.0s	0.1s~3000.0s	★	Y
P.080	Torque deceleration time	1.0s	0.1s~3000.0s	★	Y
P.100	Terminal command mode	0	0: Two-line type 1 1: Two-wire type 2 2: Three-wire type 1 3: Three-wire type 2	☆	Y
P.101	DI1 function selection	4	0~199	☆	Y
P.102	DI2 Function Selection	1	0~199	☆	Y
P.103	DI3 Function Selection	2	0~199	☆	Y
P.104	DI4 Function Selection	3	0~199	☆	Y
P.105	DI5 Function Selection	6	0~199	☆	Y
P.106	DI6 Function Selection	8	0~199	☆	Y
P.107	DI7 Function Selection	18	0~199	☆	Y
P.108	DI8 Function Selection	9	0~199	☆	Y
P.109	Terminal filtering time	0ms	0ms~100ms	★	Y
P.110	VDI State setting mode	0	bit0~bit7:VDI1~VDI8 0: VDIx is associated with VDOx 1: VDIx is associated with P.119	☆	Y
P.111	VDI1 Function Selection	0	0~199	☆	Y
P.112	VDI2 Function Selection	0	0~199	☆	Y
P.113	VDI3 Function Selection	0	0~199	☆	Y
P.114	VDI4 Function Selection	0	0~199	☆	Y
P.115	VDI5 Function Selection	0	0~199	☆	Y
P.116	VDI6 Function Selection	0	0~199	☆	Y

Function code	Name	factory default	range	alter	Factory reset
P.117	VDI7 Function Selection	0	0~199	☆	Y
P.118	VDI8 Function Selection	0	0~199	☆	Y
P.119	VDI State settings	0	bit0~bit7:VDI1~VDI8: 0: Invalid 1: Valid	★	Y
P.151	Analog input 1 (Ai1) signal selection	0	0: 0~10V 1: 0~20mA 2: 4~20mA 3: 0~5V	☆	Y
P.152	Analog input 2 (AI2) signal selection	0		☆	Y
P.155	Analog input 1 (Ai1) minimum input	0.0%	0.0%~100.0%	★	Y
P.156	Analog input 1 (Ai1) minimum input corresponding setting	0.0%	-100.0%~100.0%	★	Y
P.157	Analog input 1(AI1) Maximum input	100.0%	0.0%~100.0%	★	Y
P.158	Analog input 1(AI1) maximum input corresponding setting	100.0%	-100.0%~100.0%	★	Y
P.159	Analog input 1 (Ai1) filtering time	0.10s	0.01s~10.00s	★	Y
P.160	Analog input 2 (AI2) minimum input	0.0%	0.0%~100.0%	★	Y
P.161	Analog input 2 (AI2) minimum input corresponding setting	0.0%	-100.0%~100.0%	★	Y
P.162	Analog input 2 (AI2) maximum input	100.0%	0.0%~100.0%	★	Y
P.163	Analog input 2 (AI2) maximum input corresponding setting	100.0%	-100.0%~100.0%	★	Y
P.164	Analog input 2 (AI2) filtering time	0.10s	0.01s~10.00s	★	Y
P.165	Panel potentiometer minimum input	0.0%	0.0%~100.0%	★	Y
P.166	Set the minimum potentiometer for panel input	0.0%	-100.0%~100.0%	★	Y
P.167	Panel potentiometer maximum input	100.0%	0.0%~100.0%	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.168	Maximum input corresponding setting of panel potentiometer	100.0%	-100.0%~100.0%	★	Y
P.169	Panel potentiometer value	0.0%	0.0%~100.0%	★	Y
P.170	Minimum frequency of pulse input	0.00kHz	0.00 kHz~100.00kHz	★	Y
P.171	Pulse input minimum frequency corresponding setting	0.0%	-100.0%~100.0%	★	Y
P.172	Pulse input maximum frequency	10.00kHz	0.00kHz~100.00kHz	★	Y
P.173	Pulse input maximum frequency corresponding setting	100.0%	-100.0%~100.0%	★	Y
P.174	Pulse input filter constant	0	0~100	★	Y
P.200	Relay output function selection	4	0~199	★	Y
P.201	DO1 output function selection	1	0~199	★	Y
P.202	DO2 output function selection	3	0~199	★	N
P.211	VDO1 output function selection	0	0~199	★	Y
P.212	VDO2 output function selection	0	0~199	★	Y
P.213	VDO3 output function selection	0	0~199	★	Y
P.214	VDO4 output function selection	0	0~199	★	Y
P.215	VDO5 output function selection	0	0~199	★	Y
P.216	VDO6 output function selection	0	0~199	★	Y
P.217	VDO7 output function selection	0	0~199	★	Y
P.218	VDO8 output function selection	0	0~199	★	Y
P.231	Frequency reaches the detection width	0.00%	0.00%~10.00%	★	Y
P.232	Frequency detection value 1	10.00Hz	0.00Hz~650.00Hz	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.233	Frequency detection lag value 1	10.0%	0.0%~100.0%	★	Y
P.234	Frequency detection value 2	50.00Hz	0.00Hz~650.00Hz	★	Y
P.235	Frequency detection lag value 2	10.0%	0.0%~100.0%	★	Y
P.236	Detection value 1 at any frequency	0.00Hz	0.00Hz~650.00Hz	★	Y
P.237	Detection width 1 at any frequency	0.0%	0.0%~100.0%	★	Y
P.238	Any frequency reaches the detection value 2	0.00Hz	0.00Hz~650.00Hz	★	Y
P.239	ArbiHKary frequency arrival detection width 2	0.0%	0.0%~100.0%	★	Y
P.240	Current detection value	100.0%	0.0%~300.0%	★	Y
P.241	Current detection width	10.0%	0.0%~100.0%	★	Y
P.242	Zero current detection current	5.0%	0.0%~30.0%	★	Y
P.243	Zero current detection delay time	0.5s	0.0s~3000.0s	★	Y
P.247	Set count times	1000	1~65535	★	Y
P.248	Specified count reached value	500	1~65535	★	Y
P.249	Count frequency	1	1~65535	★	Y
P.250	Count value power down memory	0	0: Don't remember 1: Remember	★	Y
P.251	Analog output (AO1) Analog output function selection	0	0: Frequency 1: Output current 2: Output voltage 3: Input AI1 4: Input AI2 5: Panel potentiometer input 6: AO1 output 7: AO2 output	★	Y
P.252	Analog output (AO2) Analog output function selection	1		★	Y
P.253	Pulse output function selection	0		★	Y
P.255	Analog output 1 signal selection	0	0:0~10V 1:0~20mA 2:4~20mA 3:0~5V	☆	Y

Function code	Name	factory default	range	alter	Factory reset
P.256	Analog output 2 signal selection	1	1: 0~20mA 2: 4~20mA	☆	Y
P.257	Pulse output signal selection	0	0: Digital output 1: Pulse output	☆	Y
P.260	Analog output (AO1) output bias	0.0%	0.0%~100.0%	★	Y
P.261	Analog output (AO1) output gain	100.0%	0.0%~1000.0%	★	Y
P.262	Analog output (AO2) output bias	0.0%	0.0%~100.0%	★	Y
P.263	Analog output (AO2) output gain	100.0%	0.0%~1000.0%	★	Y
P.264	Pulse output frequency bias	0.00%	0.00%~100.00%	★	Y
P.265	Pulse output frequency gain	100.00%	0.00%~1000.00%	★	Y
P.266	Maximum frequency of pulse output	50.00kHz	0.00kHz~100.00kHz	★	Y
P.305	Rs-485 mailing address	1	0~255	★	Y
P.307	The RS - 485 stop bit	2	1:One stop bit 2:Two stop bit	★	Y
P.308	Check whether the RS-485 is even or odd	0	0: No check 1: Odd check 2: Even check	★	Y
P.309	RS-485 Communication BPS	3	1: 2400 2: 4800 3: 9600 4: 19200 5: 38400	★	Y
P.400	Motor 1 control mode	0	0:VVVF 1: Advanced flux vector control 2: Sensorless vector control 3: Sensor vector control 6: Sensorless vector control of permanent magnet synchronous motor	☆	Y
P.401	Motor 1 torque curve selection	0	0: straight line 1: Multipoint 2: Square 3: 1.5th power 4: 1.8th power 5: 1.9th power 6: Voltage frequency separation	☆	Y

Function code	Name	factory default	range	alter	Factory reset
P.402	Motor 1 linear compensation	◆	1~20	☆	Y
P.403	Motor 2 control mode	0	0: VVVF 1: Advanced flux vector control 2: Sensorless vector control 3: Sensor vector control 6: Sensorless vector control of permanent magnet synchronous motor	☆	Y
P.404	Motor 2 torque curve selection	0	0: straight line 1: Multipoint 2: Square 3: 1.5th power 4: 1.8th power 5: 1.9th power 6: Voltage frequency separation	☆	Y
P.405	Motor 2 linear compensation	◆	1~20	☆	Y
P.406	Custom frequency point 1	1.00Hz	0.00Hz~650.00Hz	☆	Y
P.407	Custom voltage point 1	4%	0%~100%	☆	Y
P.408	Custom frequency point 2	5.00Hz	0.00Hz~650.00Hz	☆	Y
P.409	Custom voltage point 2	13%	0%~100%	☆	Y
P.410	Custom frequency point 3	10.00Hz	0.00Hz~650.00Hz	☆	Y
P.411	Custom voltage point 3	24%	0%~100%	☆	Y
P.412	Custom frequency point 4	20.00Hz	0.00Hz~650.00Hz	☆	Y
P.413	Custom voltage point 4	45%	0%~100%	☆	Y
P.414	Custom frequency point 5	30.00Hz	0.00Hz~650.00Hz	☆	Y
P.415	Custom voltage point 5	63%	0%~100%	☆	Y
P.416	Custom frequency point 6	40.00Hz	0.00Hz~650.00Hz	☆	Y
P.417	Custom voltage point 6	81%	0%~100%	☆	Y
P.418	VF separated voltage source	0	0: digital setting 1: Analog input 1 2: Analog input 2 3: Panel potentiometer	☆	Y

Function code	Name	factory default	range	alter	Factory reset
P.419	VF separation voltage source setting	0.0%	0.0%~100.0%	★	Y
P.420	VF separation voltage rise time	5.0s	0.1s~3000.0s	★	Y
P.421	VF separation voltage drop time	5.0s	0.1s~3000.0s	★	Y
P.422	VF separation and shutdown mode selection	0	0: the voltage frequency is reduced to 0 independently 1: When the voltage is reduced to 0, the frequency is reduced to 0	★	Y
P.423	Slip compensation	0%	0%~100%	☆	Y
P.424	Slip compensation time constant	0.0s	0.0s~10.0s	☆	Y
P.426	Carrier frequency setting	◆	◆	☆	Y
P.429	Random carrier selection	0	0: fixed carrier 1: Random carrier	☆	Y
P.430	Temperature control carrier frequency	1	0: Invalid 1: Valid	☆	Y
P.431	Temperature control carrier frequency temperature	70°C	0°C~100°C	★	Y
P.433	DC braking current before starting	0%	0%~100%	☆	Y
P.434	Braking duration before starting	0.00s	0.00s~60.00s	☆	Y
P.435	Starting frequency of DC braking	1.00Hz	0.20Hz~5.00Hz	☆	Y
P.436	Stop DC braking current	0%	0%~100%	☆	Y
P.437	Stop brake duration	0.00s	0.00s~60.00s	☆	Y
P.440	Stall adjustment function selection	1	0: the adjustment is invalid 1: Current regulation 2: Voltage regulation 3: Current and voltage regulation	☆	Y
P.441	Stall current regulation	160%	60%~200%	☆	Y
P.442	Stall voltage regulation	140%	100%~200%	☆	Y
P.444	Energy consumption braking mode	0	0: variable frequency 1: PI regulation 2: Fixed frequency	☆	Y
P.445	Energy consumption braking voltage	700V	200V~1000V	☆	N

Function code	Name	factory default	range	alter	Factory reset
P.446	Energy consumption braking voltage efficiency	80%	0%~100%	☆	Y
P.448	Oscillation suppression enable	0	0: Invalid 1: Valid	★	Y
P.458	Blackout stop mode	0	0:Invalid 1: Non-stop when instant power off 2: Quick stop when instant power off	☆	Y
P.459	Blackout judgment voltage	80%	50%~90%	☆	Y
P.460	Power recovery judgment voltage	85%	50%~90%	☆	Y
P.461	Blackout deceleration time	◆	0.0s~3000.0s	☆	Y
P.464	Power recovery judgment time	5.0s	1.0s~3000.0s	☆	Y
P.466	Frequency search mode	1	1: Search from maximum frequency 2: Search from stop frequency	☆	Y
P.469	Search acceleration and deceleration time	◆	1.0s~3000.0s	☆	Y
P.473	Automatic voltage regulation	0	0: Invalid 1: Valid	☆	Y
P.475	Frequency avoidance point 1A	0.00Hz	0.00Hz~650.00Hz	★	Y
P.476	Frequency avoidance point 1B	0.00Hz	0.00Hz~650.00Hz	★	Y
P.477	Frequency avoidance point 2A	0.00Hz	0.00Hz~650.00Hz	★	Y
P.478	Frequency avoidance point 2B	0.00Hz	0.00Hz~650.00Hz	★	Y
P.501	Motor 1 speed ring KP1	◆	0.01~100.00	☆	N
P.502	Motor 1 speed ring KI1	◆	0.01~2.00	☆	N
P.503	Motor 1 speed ring KP2	◆	0.01~100.00	☆	N
P.504	Motor 1 speed ring KI2	◆	0.01~2.00	☆	N
P.505	Motor 1 speed ring KP3	◆	0.01~100.00	☆	N
P.506	Motor 1 speed ring KI3	◆	0.01~2.00	☆	N
P.507	Switching frequency F1	5.00Hz	0.00Hz~650.00Hz	☆	N

Function code	Name	factory default	range	alter	Factory reset
P.508	Switching frequency F2	50.00Hz	0.00Hz~650.00Hz	☆	N
P.509	Switching frequency F3	100.00Hz	0.00Hz~650.00Hz	☆	N
P.511	Motor 2 speed ring KP1	◆	0.01~100.00	☆	N
P.512	Motor 2 speed ring KI1	◆	0.01~2.00	☆	N
P.513	Motor 2 speed ring KP2	◆	0.01~100.00	☆	N
P.514	Motor 2 speed ring KI2	◆	0.01~2.00	☆	N
P.515	Motor 2 speed ring KP3	◆	0.01~100.00	☆	N
P.516	Motor 2 speed ring KI3	◆	0.01~2.00	☆	N
P.600	The current motor	1	1: Motor 1 2: Motor 2	●	N
P.601	Parameter tuning of motor 1	0	0: invalid 1: Rotary tuning 2: Static tuning	☆	Y
P.602	Rated power of motor 1	◆	0.1kW~1000.0kW	☆	Y
P.603	Rated frequency of motor 1	50.00Hz	1.00Hz~650.00Hz	☆	Y
P.604	Rated voltage of motor 1	◆	1V~1140V	☆	Y
P.605	Rated current of motor 1	◆	0.2A~1400.0A	☆	Y
P.606	Motor 1 pole number	4	2~100	●	Y
P.607	Rated speed of motor 1	1460rpm	1rpm~65535rpm	☆	Y
P.608	Motor 1 stator resistance	◆	0.001Ω~65.535Ω	☆	Y
P.609	Motor 1 rotor resistance	◆	0.001Ω~65.535Ω	☆	Y
P.610	Leakage inductance of motor 1	◆	0.01mH~655.35mH	☆	Y
P.611	Mutual inductance of motor 1	◆	0.1mH~6553.5mH	☆	Y
P.612	Excitation current of motor 1	◆	0.2A~6553.5A	☆	Y
P.621	Parameter tuning of motor 2	0	0: Invalid 1: Rotary tuning 2: Static tuning	☆	Y

Function code	Name	factory default	range	alter	Factory reset
P.622	Rated power of motor 2	◆	0.1kW~1000.0kW	☆	Y
P.623	Rated frequency of motor 2	50.00Hz	1.00Hz~650.00Hz	☆	Y
P.624	Rated voltage of motor 2	◆	1V~1140V	☆	Y
P.625	Rated current of motor 2	◆	0.2A~1400.0A	☆	Y
P.626	Motor 2 poles	4	2~100	☆	Y
P.627	Rated speed of motor 2	1460rpm	1rpm~30000rpm	☆	Y
P.628	Motor 2 stator resistance	◆	0.001Ω~32.000Ω	☆	Y
P.629	Motor 2 rotor resistance	◆	0.001Ω~32.000Ω	☆	Y
P.630	Leakage inductance of motor 2	◆	0.01mH~320.00mH	☆	Y
P.631	Mutual inductance of motor 2	◆	0.1mH~3200.0mH	☆	Y
P.632	Excitation current of motor 2	◆	0.2A~3200.0A	☆	Y
P.640	Number of encoder lines	1024	1~65535	☆	N
P.641	Type of encoder	0	0: ABZ incremental encoder 1: UVW incremental encoder 2: Rotary transformer 3: Sine and cosine encoder 4: Dart type UVW encoder	☆	N
P.642	ABZ incremental encoder AB phase sequence	0	0:Positive 1:Reverse	☆	N
P.643	Encoder mounting angle	0.0°	0.0°~359.9°	☆	N
P.644	UVW encoder UVW phase sequence	0	0: Positive 1: Reverse	☆	N
P.645	UVW encoder offset angle	0.0°	0.0°~359.9°	☆	N
P.646	Pole pairs of Rotary transformer	1	1~65535	☆	N
P.647	Detection time	0.0s	0.0s~10.0s	☆	N
P.680	Back EMF of PMSM motor	◆	0.1mV/rpm~999.9mV/rpm	☆	N
P.681	PMSMD axis inductance	◆	0.01mH~655.35mH	☆	N

Function code	Name	factory default	range	alter	Factory reset
P.682	PMSMQ axis inductance	◆	0.01mH~655.35mH	☆	N
P.683	PMSM stator resistance	◆	0.001Ω~65.535Ω	☆	N
P.700	Last fault type	0	0~65535	●	N
P.701	Second to last fault type	0	0~65535	●	N
P.702	Third to last fault type	0	0~65535	●	N
P.703	Fourth to last fault type	0	0~65535	●	N
P.704	Fifth to last fault type	0	0~65535	●	N
P.705	Sixth to last fault type	0	0~65535	●	N
P.706	Seventh to last fault type	0	0~65535	●	N
P.707	Eighth to last fault type	0	0~65535	●	N
P.708	Number of over current protection faults	0	0~6553	●	N
P.709	Number of over voltage protection faults	0	0~6553	●	N
P.710	Number of overheat protection failures	0	0~6553	●	N
P.711	Number of overload protection faults	0	0~6553	●	N
P.722	Cooling fan action selection	2	0: Temperature control 1: Power on turning 2: Operation turning	☆	N
P.723	Fan operating temperature	45°C	0°C~100°C	☆	N
P.724	Motor overload factor	100.0%	10.0%~200.0%	☆	Y
P.725	Motor overload warning	80.0%	10.0%~100.0%	☆	Y
P.732	Under voltage protection voltage	◆	0V~450V	☆	N
P.734	Input phase loss	◆	0: Invalid 1: Valid	☆	N
P.736	Output phase loss	0	0: Invalid 1: Valid	☆	Y
P.739	Is overheating protection effective	1	0: Invalid 1: Valid	☆	N

Function code	Name	factory default	range	alter	Factory reset
P.740	Overheat temperature	95°C	25°C~100°C	★	N
P.742	Overheat warning point 1	80°C	0°C~100°C	★	Y
P.746	Communication fault selection	0	0: Invalid 1: Valid	★	Y
P.747	Communication fault judgment time	3.0	0.0~3000.0	★	Y
P.750	Last fault type	0	0~65535	●	N
P.751	Frequency at the last fault	0.00	0.00Hz~655.35Hz	●	N
P.752	Current at last fault	0.0A	0.0A~6553.5A	●	N
P.753	Voltage at last fault	0V	0V~65535V	●	N
P.755	Second to last fault type	0	0~65535	●	N
P.756	Frequency at second to last fault	0.00	0.00Hz~655.35Hz	●	N
P.757	Current at second to last fault	0.0A	0.0A~6553.5A	●	N
P.758	Voltage at second to last fault	0V	0V~65535V	●	N
P.760	Third to last fault type	0	0~65535	●	N
P.761	Frequency at third to last fault	0.00Hz	0.00Hz~655.35Hz	●	N
P.762	Current at third to last fault	0.0A	0.0A~6553.5A	●	N
P.763	Voltage at third to last fault	0V	0V~65535V	●	N
P.765	Fourth to last fault type	0	0~65535	●	N
P.766	Frequency at fourth to last fault type	0.00Hz	0.00Hz~655.35Hz	●	N
P.767	Current at fourth to last fault type	0.0A	0.0A~6553.5A	●	N
P.768	Voltage at fourth to last fault type	0V	0V~65535V	●	N
P.770	Fifth to last fault type	0	0~65535	●	N
P.771	Frequency at fifth to last fault type	0.00Hz	0.00Hz~655.35Hz	●	N
P.772	Current at fifth to last fault type	0.0A	0.0A~6553.5A	●	N
P.773	Voltage at fifth to last fault type	0V	0V~65535V	●	N

Function code	Name	factory default	range	alter	Factory reset
P.775	Sixth to last fault type	0	0~65535	●	N
P.776	Frequency at sixth to last fault type	0.00Hz	0.00Hz~655.35Hz	●	N
P.777	Current at sixth to last fault type	0.0A	0.0A~6553.5A	●	N
P.778	Voltage at sixth to last fault type	0V	0V~65535V	●	N
P.780	Seventh to last fault type	0	0~65535	●	N
P.781	Frequency at seventh to last fault type	0.00Hz	0.00Hz~655.35Hz	●	N
P.782	Current at seventh to last fault type	0.0A	0.0A~6553.5A	●	N
P.783	Voltage at seventh to last fault type	0V	0V~65535V	●	N
P.785	Eighth to last fault type	0	0~65535	●	N
P.786	Frequency at eighth to last fault type	0.00Hz	0.00Hz~655.35Hz	●	N
P.787	Current at eighth to last fault type	0.0A	0.0A~6553.5A	●	N
P.788	Voltage at eighth to last fault type	0V	0V~65535V	●	N
P.800	User password input	0			
P.801	User password settings	8888	0~65535		
P.807	Software version number		1.00~10.00	●	N
P.808	User password enable	0	0: Invalid Password 1: Valid Password	★	N
P.818	Parameter copy	0		☆	N
P.820	Panel potentiometer monitoring selection	0	0: Automatic display according to function 1~59	★	Y
P.821	First monitoring option	3	0~59	★	Y
P.822	Second monitoring option	7	0~59	★	Y
P.823	Third monitoring option	8	0~59	★	Y
P.824	Fourth monitoring option	12	0~59	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.831	Decimal digits of monitored frequency	2	0~2	★	Y
P.850	Converter type	◆	1: Single-phase 220VAC 2: Three-phase 220VAC 3: Three-phase 380VAC	●	N
P.851	Converter power	◆	0.0kW~1000.0kW	●	N
P.852	Rated current of converter	◆	0.1A~6553.5A	●	N
P.901	PID polarity	0	0: Negative feedback 1: Positive feedback	☆	Y
P.902	PID given source	0	0: The number given is P.903 1: Analog input 1 2: Analog input 2 3: Panel potentiometer 4: Pulse frequency 5: Multiple instructions 6: Correspondence (address P.1121)	★	Y
P.903	PID digital setting	50.0%	0.0%~100.0%	★	Y
P.904	PID feedback source	0	0: Analog input 1 1: Analog input 2 2: Panel potentiometer 3: Pulse frequency 4: Analog input 1+ analog input 2 5: Analog input 1- Analog input 2 6: Correspondence (Address P.1122) 7: Maximum value of analog input 1 and analog input 2 8: Minimum values of analog input 1 and analog input 2	★	Y
P.905	PID proportional gain P1	20.0%	0%~100.0%	★	Y
P.906	PID integral time I1	2.0s	1s~10.0s	★	Y
P.907	PID differential time 1	0s	0.000s~10.000s	★	Y
P.908	PID proportional gain P2	20.0%	0%~100.0%	★	Y
P.909	PID integral time I2	2.0s	1s~10.0s	★	Y
P.910	PID differential time 2	0s	0.000s~10.000s	★	Y
P.911	PID parameter switching conditions	0	0: No switch 1: DI terminal 2: Automatic switching according to the deviation	★	Y
P.912	PID parameter switching deviation 1	20.0%	0.0%~100.0%	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.913	PID parameter switching deviation 2	80.0%	0.0%~100.0%	★	Y
P.915	PID preset output mode	0	0: do not enable preset frequency 1: Output by holding time 2: Output when PID feedback < switching threshold 3: Output when PID feedback > switching threshold	★	Y
P.916	PID preset output source selection	0	0: P.917 1: Analog channel 1 2: Analog channel 2 3: Panel potentiometer 4: Pulse frequency 5: Multiple instructions	★	Y
P.917	PID preset output frequency	10.0%	0.0%~100.0%	★	Y
P.918	PID preset output hold time	1.00s	0.00s~600.00s	★	Y
P.919	PID preset output switching threshold	50.0%	0.0%~100.0%	★	Y
P.920	Maximum PID output	100.0%	0.0%~100.0%	★	Y
P.921	PID output minimum	0.0%	-100.0%~100.0%	★	Y
P.922	PID deviation limit	1.0%	0.0%~20.0%	★	Y
P.927	PID given maximum value	100%	0%~100%	★	Y
P.930	PID sleep enable	0	0: Invalid 1: Sleep Mode1 2: Sleep Mode2	★	Y
P.931	PID sleep frequency	0.0%	0.0%~100.0%	★	Y
P.932	PID sleep threshold selection	0	0: P.933 1: Analog channel 1 2: Analog channel 2 3: Panel potentiometer	★	Y
P.933	PID sleep threshold	100.0%	0.0%~100.0%	★	Y
P.934	PID wake up threshold	10.0%	0.0%~100.0%	★	Y
P.935	PID sleep waiting time	1.0s	0.0s~3000.0s	★	Y
P.936	PID wake up waiting time	1.0s	0.0s~3000.0s	★	Y
P.942	PID feedback line break detection value	0.0%	0.0%~100.0%	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.943	PID feedback line break detection time	0.0s	0.0s~3000.0s	★	Y
P.944	PID feedback line break detection frequency	20.0%	0.0%~100.0%	★	Y
P.1000	Paragraph 0 instruction	10.0%	-100%~100.0%	★	Y
P.1001	Paragraph 1 instruction	20.0%	-100%~100.0%	★	Y
P.1002	Paragraph 2 instruction	30.0%	-100%~100.0%	★	Y
P.1003	Paragraph 3 instruction	40.0%	-100%~100.0%	★	Y
P.1004	Paragraph 4 instruction	50.0%	-100%~100.0%	★	Y
P.1005	Paragraph 5 instruction	60.0%	-100%~100.0%	★	Y
P.1006	Paragraph 6 instruction	70.0%	-100%~100.0%	★	Y
P.1007	Paragraph 7 instruction	80.0%	-100%~100.0%	★	Y
P.1008	Paragraph 8 instruction	90.0%	-100%~100.0%	★	Y
P.1009	Paragraph 9 instruction	100.0%	-100%~100.0%	★	Y
P.1010	Paragraph 10 instruction	90.0%	-100%~100.0%	★	Y
P.1011	Paragraph 11 instruction	80.0%	-100%~100.0%	★	Y
P.1012	Paragraph 12 instruction	70.0%	-100%~100.0%	★	Y
P.1013	Paragraph 13 instruction	60.0%	-100%~100.0%	★	Y
P.1014	Paragraph 14 instruction	50.0%	-100%~100.0%	★	Y
P.1015	Paragraph 15 instruction	40.0%	-100%~100.0%	★	Y
P.1016	Instruction setting mode of segment 0	0	0: P.1000 1: Analog channel 1 2: Analog channel 2 3: Panel potentiometer 4: Pulse frequency 5: PID	☆	Y
P.1017	Simple PLC operation mode	0	0: Cycle complete shutdown 1: Keep the last part running after the loop is completed	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.1018	Simple PLC segment number setting	15	0~15	★	Y
P.1019	Simple PLC cycle number setting	0	0: Infinite loop 1~65535	★	Y
P.1020	Section 0 Speed acceleration and deceleration time selection	0	0: The first acceleration and deceleration time 1: The second acceleration and deceleration time 2: The third acceleration and deceleration time 3: The fourth acceleration and deceleration time	★	Y
P.1021	Stage 1 Speed acceleration and deceleration time selection	0		★	Y
P.1022	Section 2 Speed acceleration and deceleration time selection	0		★	Y
P.1023	Section 3 Speed acceleration and deceleration time selection	0		★	Y
P.1024	Section 4 Speed acceleration and deceleration time selection	0		★	Y
P.1025	Section 5 Speed acceleration and deceleration time selection	0		★	Y
P.1026	Section 6 Speed acceleration and deceleration time selection	0		★	Y
P.1027	Section 7 Speed acceleration and deceleration time selection	0		★	Y
P.1028	Section 8 Speed acceleration and deceleration time selection	0		★	Y
P.1029	Section 9 Speed acceleration and deceleration time selection	0		★	Y
P.1030	Section 10 Speed acceleration and deceleration time selection	0		★	Y
P.1031	Section 11 Speed acceleration and	0		★	Y

Function code	Name	factory default	range	alter	Factory reset
	deceleration time selection				
P.1032	Section 12 Speed acceleration and deceleration time selection	0		★	Y
P.1033	Section 13 Speed acceleration and deceleration time selection	0		★	Y
P.1034	Section 14 Speed acceleration and deceleration time selection	0		★	Y
P.1035	Section 15 Speed acceleration and deceleration time selection	0		★	Y
P.1040	Speed running time at stage 0	1.0s	0.1s~3600.0s	★	Y
P.1041	Stage 1 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1042	Section 2 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1043	Stage 3 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1044	Stage 4 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1045	Section 5 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1046	Stage 6 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1047	Section 7 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1048	Section 8 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1049	Section 9 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1050	Section 10 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1051	Section 11 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1052	Stage 12 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1053	Section 13 Speed running time	1.0s	0.1s~3600.0s	★	Y
P.1054	Section 14 Speed running time	1.0s	0.1s~3600.0s	★	Y

Function code	Name	factory default	range	alter	Factory reset
P.1055	Segment 15 speed running time	1.0s	0.1s~3600.0s	★	Y
P.1056	Simple PLC memory mode	0	Ones place:power off memory option 0: no memory 1: memory Tens place: Down memory option 0: No memory 1: memory	★	Y
P.1101	Factory reset	0	0~1	☆	N
P.1109	Control instruction	0	Bit0: stop Bit1: free stop Bit2: forward rotation Bit3: reverse Bit4: FWD JOG Bit5: REV JOG Bit6: fault reset	★	N
P.1110	Communication instruction frequency	50.00Hz	0.00Hz~650.00Hz	★	Y
P.1112	DO set 1	0	0~1	★	Y
P.1113	DO set 2	0	0~1	★	Y
P.1114	DO set 3	0	0~1	★	Y
P.1115	DO set 4	0	0~1	★	Y
P.1116	AO set 1	0.0%	0.0%~100.0%	★	Y
P.1117	AO set 2	0.0%	0.0%~100.0%	★	Y
P.1118	AO set 3	0.0%	0.0%~100.0%	★	Y
P.1119	AO set 4	0.0%	0.0%~100.0%	★	Y
P.1120	Communication given maximum frequency	0.0%	0.0%~100.0%	★	Y
P.1121	Communication given PID set value	0.0%	0.0%~100.0%	★	Y
P.1122	Communication given PID feedback value	0.0%	0.0%~100.0%	★	Y
P.1200	Converter status	0	1~0bit: 0: STOP 1: FWD RUN 2: REV RUN 2bit: 0: NO FAULT 1: FAULT	●	N
P.1201	Target frequency	0.00hz	0Hz~655.35Hz	●	N
P.1202	Operating frequency	0.00Hz	0Hz~655.35Hz	●	N

Function code	Name	factory default	range	alter	Factory reset
P.1203	Operating frequency 1	0.00Hz	0Hz~655.35Hz	●	N
P.1204	Target speed	0rpm	0rpm~65535rpm	●	N
P.1205	Actual speed	0rpm	0rpm~65535rpm	●	N
P.1206	AC output voltage	0V	0V~65535V	●	N
P.1207	AC output current	0A	0A~65535A	●	N
P.1208	DC Bus Voltage	0V	0V~65535V	●	N
P.1209	Target torque	0.0%	0%~6553.5%	●	N
P.1210	Actual torque	0.0%	0%~6553.5%	●	N
P.1211	Converter output power	0.00kW	0kW~655.35kW	●	N
P.1212	Input and output terminal status	0	0~7bit:DI1~DI8 8bit:relay 9bit:DO1 10bit:DO2	●	N
P.1213	Analog input 1 (AI1) input	0.00	0.00V~10.00V or 0.00 mA~20.00mA	●	N
P.1214	Analog input 1 (AI2) input	0.00	0.00V~10.00V or 0.00 mA~20.00mA	●	N
P.1215	Panel potentiometer input	0.0%	0%~6553.5%	●	N
P.1216	Pulse input frequency	0.00kHz	0kHz~655.35kHz	●	N
P.1217	Virtual I/O terminal status	0	0~7bit:VDI1~VDI8 8~15bit:VDO1~VDO8	●	N
P.1218	AO1 output	0.00	0.00V~10.00V or 0.00 mA~20.00mA	●	N
P.1219	AO2 output	0.00	0.00V~10.00V or 0.00 mA~20.00mA	●	N
P.1221	Pulse output frequency	0.00kHz	0kHz~655.35kHz	●	N
P.1222	Count value	0	0~65535	●	N
P.1223	PID target value	0.0%	0~6553.5%	●	N
P.1224	PID feedback value	0.0%	0~6553.5%	●	N
P.1225	PID deviation	0.0%	0~6553.5%	●	N
P.1226	PID output	0.0%	0.0~6553.5%	●	N
P.1228	Carrier frequency display	0Hz	0~65535Hz	●	N
P.1229	Radiator temperature	0°C	0~65535°C	●	N
P.1231	Simple PLC cycle number	0	0~65535	●	N
P.1238	Dominant frequency	0.00Hz	-327.67~327.66Hz	●	N

Function code	Name	factory default	range	alter	Factory reset
P.1239	Auxiliary frequency	0.00Hz	-327.67~327.66Hz	●	N
P.1240	Feedback speed	0.00Hz	-327.67~327.66Hz	●	N
P.1241	Encoder feedback speed	0.00Hz	-327.67~327.66Hz	●	N
P.1250	Given torque	0.0%	-3276.7~3276.6%	●	N
P.1251	Actual torque	0.0%	-3276.7~3276.6%	●	N
P.1253	PID set value	0.0%	-3276.7~3276.6%	●	N
P.1254	PID feedback value	0.0%	-3276.7~3276.6%	●	N

Chapter 7 Detailed description of function code

7.1 P0 group parameters: basic parameter area

P.000	Load type		Factory value	Related to the model
	Setting range	0	Constant torque / heavy duty type	
		1	Variable torque / light load type	

1:Constant torque load for specified rated parameters

2:Variable torque load for specified rated parameters (fan, pump load)

P.001	Command source selection		Factory value	0
	Setting range	0	Operation panel command channel	
		1	Terminal command channel	
		2	Communication command channel	
		3	Switch between operation panel command and terminal command channel	

Select the input channel of converter control command.

Converter control commands include: start, stop, forward rotation, reverse rotation, jogging, etc.

0: command channel of operation panel; it is controlled by FWD, REV, JOGF, JOGR keys on operation panel.

1: command channel of terminal;It is controlled by multi-function input terminals FWD,REV, JOGF, JOGR etc.

2: Communication command channel; for communication related function parameters, please refer to communication related description.

3: Switch command channel and terminal command channel of operation panel; after selecting this value, the command channel and terminal command channel of operation panel can be switched through PU / EXT key of operation panel.

P.002	Operation direction selection		Factory value	0
	Setting range	0	Run in default direction	
		1	Run in the opposite direction from the default direction	

By changing the function code, the motor direction can be changed without changing the motor wiring. Its function is equivalent to adjusting any two lines of motor (U, V, W) to realize the conversion of motor rotation direction.

Please note: after parameter initialization, the motor running direction will return to the original state. It should be used with caution when it is strictly forbidden to change the direction of motor after system debugging.

P.003	Main frequency source X select	Factory value	0

	Setting range	0	Digital setting (power off memory)
		1	1 Analog input 1
		2	2 Analog input 2
		3	Panel potentiometer
		4	Pulse frequency
		5	Multi segment instruction
		6	Simple PLC
		7	PID
		8	Communication setting

Select the input channel of frequency converter. There are 9 main given frequency channels:

0: Digital setting

Set the initial frequency value to the value of the preset frequency (p.010).The set frequency of the converter can be changed through the M knob of the keyboard (or the UP and DOWN of the multi-function input terminals).

When the converter is switched off and on again, set the frequency at frequency of the last time when the power is switched off, and the corrections of the M knob or terminals UP and DOWN of the keyboard are remembered.

1: Analog input 1

The frequency is determined by the analog input 1.

2: Analog input 2

The frequency is determined by analog input 2.

The converter control board provides two analog input terminals (AI1, AI2).Among them, AI1 and AI2 can be input with 0V ~ 10V voltage or 0mA ~ 20mA current. AI1 is selected by S1 jumper on the control board, and AI2 is selected by S2 jumper on the control board.

3: Panel potentiometer

Frequency is adjusted by the panel M knob to simulate potentiometer.Remember the current value when power off.

4: Given pulse (DI1)

The frequency is given by terminal pulse.

Specification of pulse signal: voltage range 9V-30V, frequency range 0kHz-50kHz. Pulse setting can only be input from multifunctional input terminal DI1.

The relationship between input pulse frequency of DI1 terminal and corresponding setting is set by corresponding parameters.

5: Multi segment instruction

When selecting the operation mode of multi segment instructions, different state combinations of Di terminals need to be input by digital quantity, corresponding to different set frequency values. The frequency converter can set 4 multi segment command terminals and 16 states of 4 terminals, which can

correspond to any 16 "multi segment instructions" through P10 group function code, and "multi segment instruction" is the percentage of relative maximum frequency.

When the DI terminal of digital input is used as the function of multi-segment instruction terminal, the P2 parameter needs to be set accordingly.

6: Simple PLC

When the frequency source is a simple PLC, the frequency source of converter can be switched between 1 ~ 16 arbitrary frequency instructions, and the acceleration and deceleration time of 1 ~ 16 frequency instructions can also be set by the user. Refer to P10 group parameter description for specific contents.

7: PID

Select the output of PID control as the operating frequency.Generally used in the field of process closed-loop control, such as constant pressure closed-loop control, constant tension closed-loop control and other occasions.When PID is used as frequency source, P9 group parameters need to be set.

8: Communication assignment

It refers to that the main frequency source is given by the upper computer through communication.

P.004	Auxiliary frequency source Y Select		Factory value	0
	Setting range	0	Digital setting	
		1	Analog input 1	
		2	Analog input 2	
		3	Panel potentiometer	
		4	Pulse frequency	
		5	Multistage instruction	
		6	PLC	
		7	PID	
		8	Communication assignment	

When the auxiliary frequency source is used as an independent frequency given channel (i.e. the frequency source is selected as X to y switch), its usage is the same as that of the main frequency source X. The use method can refer to the relevant instructions in P.003.

When the auxiliary frequency source is used as superposition setting (i.e., the frequency source is selected as X+Y, X to X+Y switch, or Y to X+Y switch), it should be noted that:

1）When the auxiliary frequency source is digital, the preset frequency (P.010) does not work. The user can adjust the frequency through the M knob of the keyboard (or up and down of the multi-function input terminal) directly on the basis of the main given frequency.。

2）When the auxiliary frequency source is given for analog input (analog input 1, analog input 2, panel potentiometer) or pulse input, 100% of the input setting corresponds to the auxiliary frequency source range, which can be set through P.006 and P.007.

3）When the frequency source is pulse input, it is similar to the analog quantity.

<table>
<tr><td rowspan="11">P.005</td><td colspan="3">Selection of superposition mode of frequency source</td><td>Factory value</td><td>0</td></tr>
<tr><td rowspan="10">Setting range</td><td rowspan="5">Ones place</td><td>0</td><td colspan="2">Main frequency source X</td></tr>
<tr><td>1</td><td colspan="2">The calculation result of main frequency and auxiliary frequency</td></tr>
<tr><td>2</td><td colspan="2">Switch the primary frequency source X to the secondary frequency source Y</td></tr>
<tr><td>3</td><td colspan="2">Switch between the main frequency source X and the main and auxiliary operation results</td></tr>
<tr><td>4</td><td colspan="2">Switch between auxiliary frequency source Y and primary and secondary operation results</td></tr>
<tr><td rowspan="5">Tens place</td><td>0</td><td colspan="2">Main frequency + auxiliary frequency</td></tr>
<tr><td>1</td><td colspan="2">Main frequency - auxiliary frequency</td></tr>
<tr><td>2</td><td colspan="2">The maximum value of the main frequency and the auxiliary frequency</td></tr>
<tr><td>3</td><td colspan="2">The minimum value of the main frequency and the auxiliary frequency</td></tr>
</table>

This parameter is used to select a given channel of frequency.The given frequency is realized by combining the primary frequency source X with the secondary frequency source Y.

Ones bit: Frequency source selection:

0: main frequency source X

The main frequency X is used as the target frequency.

1: Main and auxiliary operation results

The main and auxiliary operation results are used as the target frequency. See the "ten bit" description of the function code for the relationship between the main and auxiliary operations.。

2: Switch between main frequency source X and auxiliary frequency source Y

When the multi-function input terminal function 10 (frequency source switching) is invalid, the main frequency rate X is taken as the target frequency.

When the multi-function input terminal function 10 (frequency source switching) is valid, the auxiliary frequency Y is taken as the target frequency.

3: Switch between the main frequency source X and the main and auxiliary operation results

When the multi-function input terminal function 10 (frequency source switching) is invalid, the main frequency X is used as the target frequency.

When the multi-function input terminal function 10 (frequency source switching) is valid, the main and auxiliary operation results are taken as the target frequency.

4: Switching between auxiliary frequency source Y and main and auxiliary operation results

When the multi-function input terminal function 10 (frequency source switching) is invalid, the auxiliary frequency Y is taken as the target frequency.

When the multi-function input terminal function 10 (frequency source switching) is valid, the main and auxiliary operation results are taken as the target frequency.

Ten bits: frequency source primary and secondary operation relationship:

0: main frequency source X + auxiliary frequency source Y
The sum of the main frequency X and the auxiliary frequency Y is taken as the target frequency. Realize the function of frequency superposition.

1: Main frequency source X- auxiliary frequency source Y

The difference between the main frequency X minus the auxiliary frequency Y is taken as the target frequency.

2: MAX（Main frequency source X,auxiliary frequency source Y）

Take the maximum of the main frequency X and the auxiliary frequency Y as the target frequency.

3: MIN (main frequency source X, auxiliary frequency source Y)

Take the minimum of the main frequency X and the auxiliary frequency Y as the target frequency.In addition, when the frequency source is selected as the main and auxiliary operations, the bias frequency can be set through P.008 and the bias frequency can be superimposed on the results of the main and secondary operations, so as to meet various demands flexibly.

P.006	Range selection of auxiliary frequency source Y during superposition		Factory value	0
	Setting range	0	Relative to maximum frequency	
		1	Relative to the main frequency source	

P.007	Range of auxiliary frequency source Y during superposition	Factory value	0
	Setting range	0.0%~100.0%	

When the frequency source is selected as "frequency superposition" (i.e. P.005 is set to 1, 3 or 4), these two parameters are used to determine the adjustment range of the auxiliary frequency source.

P. 006 is used to determine the object corresponding to the range of the auxiliary frequency source. It can be selected relative to the maximum frequency or relative to the main frequency source X. if it is selected to be relative to the main frequency source, the range of the auxiliary frequency source will change with the change of the main frequency rate X.

P.008	Offset frequency of auxiliary frequency source in superposition	Factory value	0.00
	Setting range	0.00Hz~P.012Hz	

The function code is only valid when the frequency source is selected as the main and auxiliary operation.

When the frequency source is the main and auxiliary operation, P.008 is used as the bias frequency, which is superimposed with the main and auxiliary operation results as the final frequency setting value, which makes the frequency setting more flexible.

<table>
<tr><td rowspan="11">P.009</td><td colspan="2">The command source bundles the frequency source
Ones: operation panel command bundle frequency source selection
Tens: terminal command bundle frequency source selection
Hundreds: communication command bundle frequency source selection</td><td>Factory value</td><td>0</td></tr>
<tr><td rowspan="10">Setting range</td><td>0</td><td colspan="2">No binding</td></tr>
<tr><td>1</td><td colspan="2">Digital setting</td></tr>
<tr><td>2</td><td colspan="2">Analog input 1</td></tr>
<tr><td>3</td><td colspan="2">Analog input 2</td></tr>
<tr><td>4</td><td colspan="2">Panel potentiometer</td></tr>
<tr><td>5</td><td colspan="2">Pulse frequency</td></tr>
<tr><td>6</td><td colspan="2">Multi segment instruction</td></tr>
<tr><td>7</td><td colspan="2">Simple PLC</td></tr>
<tr><td>8</td><td colspan="2">PID</td></tr>
<tr><td>9</td><td colspan="2">Communication assignment</td></tr>
</table>

The bundling combination of three operation command channels and nine given frequency channels is defined to facilitate synchronous switching. The meaning of the above frequency given channel is the same as that of P.003 selected by the main frequency source X. different operation command channels can be bundled with the same frequency given channel.

When the command source has a binding frequency source, the frequency source set by P.003-P.007 will not work during the validity of the command source.

P.010	Preset frequency	Factory value	50.00Hz
	Setting range	0.00Hz~P.012Hz	

When the frequency source is selected as "digital setting" or "terminal UP/DOWN", the value of this function code is the initial value of frequency set by converter。

P.011	Memory selection of digital setting frequency Ones place:Power off memory selection Tens place:Stop memory selection		Factory value	11
	Setting range	0	Don’t remember	
		1	1 Remember	

This function only works when the frequency source is set digitally.

"Don’t remember" refers to the value of the digital set frequency restored to P.010 (preset frequency) after the converter is stopped, and the frequency correction of the keyboard or terminals UP and DOWN is cleared.

"Remember" means that after the converter is stopped, the digital set frequency shall be retained as the set frequency of the last downtime, and the frequency correction made by the keyboard or terminals UP and DOWN shall be effective.

P.012	Maximum Frequency	Factory value	50.00Hz
	Setting range	50.00Hz~650.00Hz	

When analog input, pulse input, and multi-segment instruction are used as frequency sources, 100.0% of each is calibrated relative to P.012.

P.013	Upper limit frequency source selection	Factory value	0
	Setting range	0	P.014
		1	Analog input 1
		2	Analog input 2
		3	Panel potentiometer
		4	Pulse frequency
		5	Communication settings

Define the source of the upper frequency limit.The upper frequency can come from the digital setting P.014 or from the analog input channel.When the upper frequency is set with analog input, 100% of the analog input setting corresponds to P.014.

For example, when using the torque control method in the winding control field, in order to avoid the phenomenon of disconnected "the coasters", the upper frequency can be set by analogue quantity. When the frequency converter runs to the upper frequency value, the frequency converter keeps running at the upper frequency.

P.014	Upper limit frequency	Factory value	50.00Hz
	Setting range	0.00Hz~P.012Hz	
P.015	Lower Limit Frequency	Factory value	0.50Hz
	Setting range	0.00Hz~P.014Hz	

When the frequency instruction is lower than the lower limit frequency set by P.015, the frequency converter can stop and operate at the lower limit frequency. The operation mode adopted can be set by P.015 (the setting frequency lower than the lower limit frequency operation mode).

P.016	Upper limit frequency bias	Factory value	0.00Hz
	Setting range	0.00Hz~P.012Hz	

When the upper limit frequency is set to analogue or PULSE, P.016 is used as the offset of the set value, and the offset frequency is superimposed with the upper limit frequency value set to P.014 as the set value of the final upper limit frequency.

P.018	Panel potentiometer speed control accuracy	Factory value	1.00Hz
	Setting range	0.01Hz~1.00Hz	

P.018 for adjusting the panel potentiometer (M knob) speed step unit.

P.020	Acceleration and deceleration curves	Factory value	0
	Setting range	0	Straight line
		1	S curves

Select acceleration and deceleration curve, S-curve acceleration and deceleration, and accelerate and decelerate from the current frequency to the target frequency in the form of S-shape acceleration and deceleration to ease the impact of acceleration and deceleration.

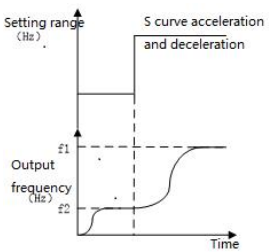
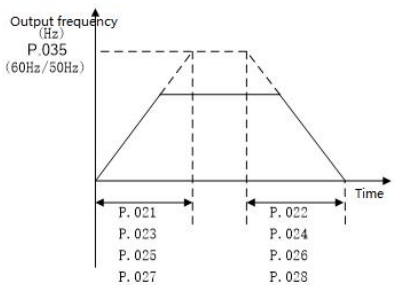


Figure7-1 Acceleration and deceleration curve

P.021	First Acceleration Time		Factory value	◆
	Setting range	0.1s~3000.0s		
P.022	First deceleration time		Factory value	◆
	Setting range	0.1s~3000.0s		
P.023	Second Acceleration Time		Factory value	◆
	Setting range	0.1s~3000.0s		
P.024	Second deceleration time		Factory value	◆
	Setting range	0.1s~3000.0s		
P.025	Third Acceleration Time		Factory value	◆
	Setting range	0.1s~3000.0s		
P.026	Third deceleration time		Factory value	◆
	Setting range	0.1s~3000.0s		
P.027	Fourth Acceleration Time		Factory value	◆
	Setting range	0.1s~3000.0s		
P.028	Fourth deceleration time		Factory value	◆
	Setting range	0.1s~3000.0s		

Acceleration time refers to the time required for the converter to accelerate from zero frequency to the reference value of acceleration and deceleration time (determined by P.035).Deceleration time refers to the time required for the converter to decelerate to zero frequency from the reference value of acceleration and deceleration time (determined by P.035).

The converter provides 4 sets of acceleration and deceleration time, which can be switched and selected by using the digital input terminal DI.



P.031	S Time 1 at acceleration		Factory value	30.0%
	Setting range	0.0%~100.0%		
P.032	S Time 2 at acceleration		Factory value	30.0%
	Setting range	0.0%~100.0%		
P.033	S Time 1 at deceleration		Factory value	30.0%
	Setting range	0.0~100.0		
P.034	S Time 2 at deceleration		Factory value	30.0%
	Setting range	0.0%~100.0%		

These parameters are the percentage of the current acceleration and deceleration time.

T1 is the time defined by the parameter P.031, during which the slope of output frequency change gradually increases.T2 is the time defined by P.032, during which the slope of output frequency change gradually changes to 0.In the time period between T1 and T2, the output frequency is accelerated and decelerated linearly.

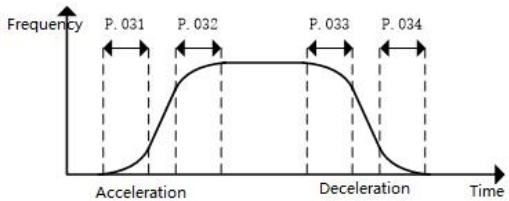


Figure7-2 S period at acceleration and deceleration

P.035	Acceleration and deceleration time reference value		Factory value	50.00Hz
	Setting range	1.00Hz~650.00Hz		

See P.021~P.028.

P.036	Acceleration and deceleration time switching frequency		Factory value	0.00Hz
	Setting range	0.00Hz~650.00Hz		

P.036=0.0 Don't switch.

P.040	Jog frequency		Factory value	5.00Hz
	Setting range	0.00Hz~650.00Hz		

P.041	Jog acceleration time		Factory value	◆
	Setting range	0.1s~3000.0s		
P.042	Jog deceleration time		Factory value	◆
	Setting range	0.1s~3000.0s		

There are three types of jog function: operation panel jog, external terminal jog and communication jog.The converter runs to the frequency set by P.040 according to the acceleration and deceleration time set by P.041 and P.042 when the jog is running.

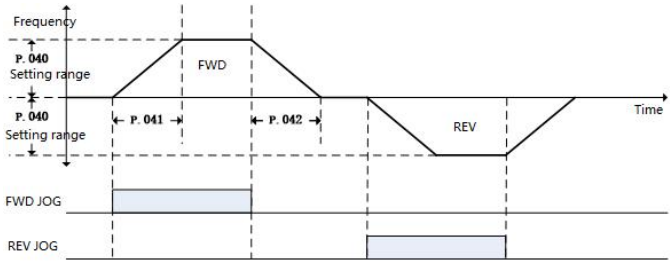


Figure7-3 Terminal Jog Run

P.043	Negative Frequency Enabling	Factory value	0
	Setting range	0	Forbid negative frequency
		1	Allow negative frequency

Set the instruction, whether to allow negative frequency.

P.044	Forward and Reverse Switching Dead Zone Time	Factory value	0.0s
	Setting range	0.0s~3000.0s	

Set the transition time at output frequency 0 HZ during frequency converter switching, as shown in the following figure:

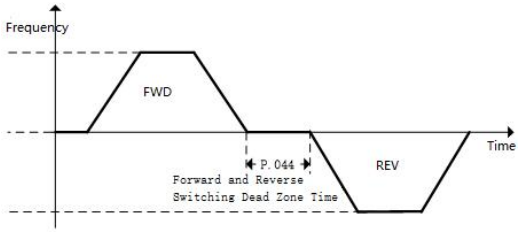


Figure7-4 Forward and Reverse Switching Dead Zone

P.045	Prohibit Inversion			Factory value	0
	Setting range	0	Invalid		
		1	Prohibit Inversion		

Set the rotation direction of the motor to only one direction.

Operating panel, external terminal and communication inversion instructions are invalid.

P.050	Start Method			Factory value	0
	Setting range	0	Direct start		
		1	Speed tracking start		

0: Direct start

If the starting DC braking time is set to 0, the converter will start to operate from the starting frequency.

If the starting DC braking time is not 0, DC braking is applied first, then starting from the starting frequency.

Suitable for small inertial load, motor may have rotation when starting.

1:Speed tracking start

The converter first judges the speed and direction of the motor, and then starts the motor with the tracked frequency, so as to start the motor smoothly and without impact during rotation.

It is suitable for the instantaneous power failure of large inertial load.

P.051	Stop method	Factory value	0	
	Setting range	0	Decelerates the engine off	
		1	Free engine off	
		2	Decelerated DC Brake Stop	

P.051=1,The frequency converter will not terminate the output immediately after receiving the stop orde, but does it until the setted time of P.052.The motor will stop account of action of mechanical inertia.

P.052	Delay time of coast stop	Factory default	0.0s
	Setting range	0.0~3600.0s	

P.051=1 it will work，see details of P.051.

P.053	Start frequency	Factory default	0.00
	Setting range	0.00~50.00	
P.054	Hold time of start frequency	Factory default	0.0
	Setting range	0.0~60.0	

To ensure the motor torque when starting, please set the appropriate start frequency.In order to fully establish the magnetic flux when the motor starts, it is necessary to keep the starting frequency for a certain time.

The starting frequency is limited by the lower frequency.However, when the target frequency is less than the starting frequency, the inverter will not start and will be in standby state.

In the positive and negative switching process, the holding time of startup frequency does not work.

The startup frequency hold time is not included in the acceleration time, but in the running time of the simple PLC.

P.055	The frequency is lower than lower limit	Factory default	1
	Setting range 0	Run at lower limit	
	Setting range 1	Stop	

When the setted frequency is lower than the lower-limit frequency, the operating state of the converter can be selected by this parameter.

P.056	Operation select of power-on terminal	Factory default	1
	Setting range 0	No start	
	Setting range 1	Start	

The running command of terminal is invalid when power-on:

When the frequency converter is powered on, if the terminal running command is always effective, the frequency converter will not respond to the terminal running command after power on, and the frequency converter will start to respond to the terminal running command normally after the terminal running command is invalid for a period of time.In addition, when the converter fails, the terminal running command must be invalid for a period of time, otherwise the converter will not respond to the terminal running command.

The running command of terminal is valid when power-on:

When the frequency converter is powered on or fails, the terminal running command is always in effect. Then the frequency converter will directly start the motor running according to the terminal running command.This situation may lead to unintended consequences or dangers.

P.057	Automatic start or not when power-on again		Factory default	0
	Setting range	0	invalid	
		1	valid	
P.058	Delay time of automatic start		Factory default	60.0
	Setting range	0.0s~3000.0s		

P.057 Set automatic start when power-on again.P.058 set delay time of automatic start.

When P.057=1, after the frequency converter is switched on again after power down, the time set by delay P.058 will start itself according to the state of frequency converter before power down.The frequency converter is in running state before power off. The frequency converter starts up after power on again.The frequency converter is shut down before power off. The frequency converter is not started after power on again.

P.059	Automatic start after fault resetting		Factory default	0
	Setting range	0	invalid	
		1	valid	

P.059 sets automatic start after fault resetting.

When P.058=1, after the fault reset of the converter, the time set by the delay P.059 starts again.Failure self-reset and self-start will no longer occur after the number of times of failure self-reset reaches the set number of P.060.

P.060	Number of restart after fault		Factory default	0
	Setting range	0~50		

The frequency converter is used to set the number of automatic reset when selecting fault automatic reset.After the frequency of frequency converter fault reset reaches the setting value of P.060, the frequency converter will maintain the fault state and no longer start itself.

P.061	Number of restart after fault		Factory default	0
	Setting range	0~50		

The actual number of fault restarts is recorded. When the set value of P.060 is reached, the frequency converter will no longer start itself.

P.062	Waiting time of restart after fault		Factory default	3.0s
	Setting range	0.0s~10.0s		

The waiting time between frequency converter fault alarm and automatic fault reset.

P.070	Selection of Torque control		Factory default	0
	Setting range	0	Speed control	
		1	Torque control	

Torque control is carried out by the converter to ensure that the torque instruction value is generated.

When the output torque of the motor and the load torque are balanced, the motor speed is constant.Therefore, the motor speed during torque control is determined by the load.

During torque control, if the output torque of the motor is greater than the load of the motor, the motor will be accelerated.In order to prevent the occurrence of excessive speed, speed limit should be set to avoid excessive increase of motor speed.

P.071	Order source of torque		Factory default	0
	Setting range	0	P.072	
		1	Analog input 1	
		2	Analog input 2	
		3	Panel potentiometer	

P.071Order source of torque，which can be selected according to requirements

P.072	Torque instruction value	Factory default	100.0%
	Setting range	-200.0%~200.0%	

P.072 The input torque instruction value shall be saved in RAM,Power-off memory.

Torque setting adopts relative value, 100.0% corresponds to the rated torque of the motor.the setting range of -200.0%~200.0%,Indicates that the maximum torque can be set to 2 times the rated torque of the motor.

P.074	Negative enablement of Torque instruction	Factory default	0
	Setting range	0	invalid
		1	valid

P.078=1，the input negative torque is valid.

P.075	the selction of speed limit source		Factory default	0
	Setting range	0	Number	
		1	Analog input 1	
		2	Analog input 2	

		3	Panel potentiometer
		4	Impulse frequency

P.075 Select speed limit source, see details of P.078.

P.076	Forward speed limit	Factory default	50.00Hz
	Setting range	0.00Hz~650.00Hz	
P.077	Reverse speed limit	Factory default	50.00Hz
	Setting range	0.00Hz~650.00Hz	

P.078=1:Limit the speed with P.076 and P.077.

P.078	the selction of speed limit source	Factory default	0
	Setting range	1	Model 1 of speed limit
		2	Model 2 of speed limit
		3	Model 3 of speed limit
		4	Model 4 of speed limit

During the operation of torque control, it is necessary to prevent the motor from overspeed because the load torque is smaller than the torque instruction value.To prevent overspeed, you need to set the speed limit.

When the actual speed is above the speed limit, switch from torque control to speed control to prevent overspeed.

P.078=1，Model 1 of speed limit

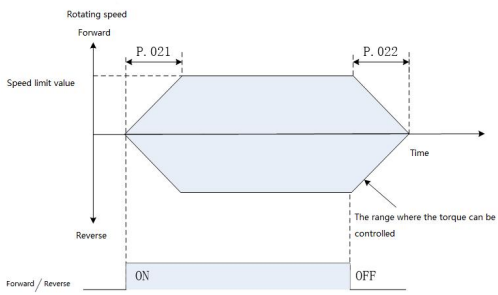


Figure7-5 Model1 of speed control

P.078=2，model 2 of speed control，The positive and negative polarity of torque instruction is related to the speed limit value.

When the troque instruction is positive,the speed limit value of forward direction is the one setted by P.075;When negenative, the speed limit value is P.077.

When the troque instruction is negative,the speed limit value of reverse direction is the one setted by P.075, and the speed limit value of forward direction is P.077.

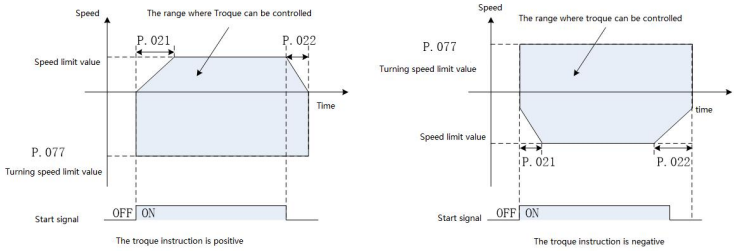


Figure7-6 Model2 of speed control

P.078=3，Model 3 of speed control，When the torque instruction value is positive, select the mode, and roll up through the forward instruction, reverse instruction unroll.

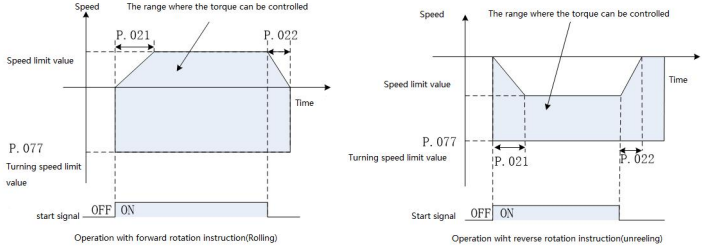


Figure7-7 Model3 of speed control

P.078=4，Model4 of speed control,When the torque instruction value is negative, select this mode, unroll the instruction by positive turning instruction, reverse the instruction unroll.

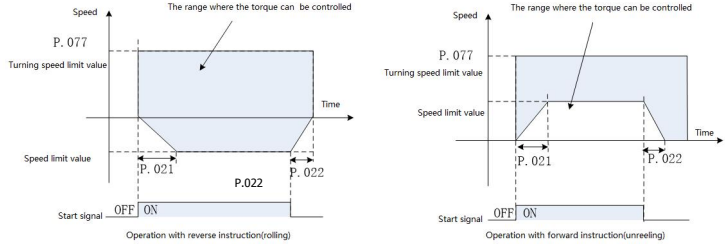


Figure7-8 Model4 of speed control

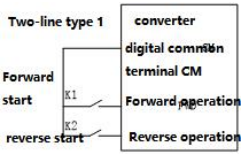
P.079	Torque acceleration time	Factory default	1.0
	Setting range	0.1s~3000.0s	
P.080	Torque deceleration time	Factory default	1.0
	Setting range	0.1s~3000.0s	

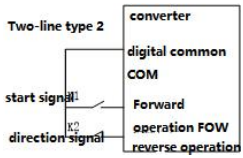
P.079Torque acceleration time is the one used for increasing the torque from 0% to 100%P.080Torque deceleration time is the one used for reducing the torque from 100% to 0%.

7.2 P1 group of parameter:Signal input area

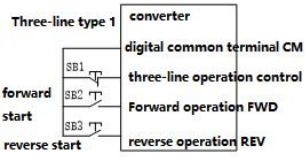
P.100	Terminal command mode		Factory default	0
	Setting range	0	Two-line type 1	
		1	Two-line type 2	
		2	Three-line type 1	
		3	Three-line type 2	

There are four modes for terminal operation control, and this function code defines four modes for controlling inverter operation through external terminals.“Forward-rotation operation FWD”、“Reverse-rotation operation REV”、“Three-line control”are the three appointed terminals in the programme of DI1-DI8.





Pic.7-1 Sketch map of two-line type



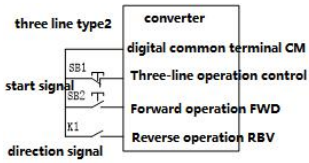


Figure7-9 Sketch map of three-line type

0: Two-line type 1:

This is the most common two-line type.The terminal command of “Forward-rotation operation” and “Reverse-rotation operation”can be used to select the forward and reserve rotation of motor. As the above picture shows:The terminal of “Forward-rotation operation”—“On”:Stop，“Off”:Forward-rotation operation

The terminal of“Reverse-rotation operation”—“On”:stop ，“Off”；Forward-rotation operation.

“CM”Terminal—Common terminal

K1	K2	Running command
0	0	Stop
1	0	Forward-rotation operation
0	1	Reverse-rotation operation
1	1	Stop

1: Two-line type 2:

With the type,the terminal of“Forward-rotation operation FWD” is used for control,the direction is controlled by the state of the terminal of“Reverse-rotation operation”.

For instance:The terminal of“Forward-rotation operation FWD”—“On”:stop ，“Off”:Running

The terminal of“Reverse-rotation operation”—“On”:Forward rotation，“Off”:Reverse totation

The terminal of “CM”—Common terminal

K1	K2	Command
0	0	Stop
0	1	Stop
1	0	Forward rotation
1	1	Reverse rotation

2: Three-line type 1:

In the type, The terminal of “three-line ” is used for control, and the direction is controlled by “Forward-rotation operation FWD”and “Reverse-rotation operation REV ”the pulse is effective, and switch off the terminal signal of “Three-line”control.

The terminal of “Three-line”control—（“On”:stop ，“Off”:the rotation is carried out）

The terminal of “Forward-rotation operation FWD”—（the signal of forward rotation，“Off”:Forward rotation operation）

The terminal of “Reverse-rotation operation REV ”—（The signal of reverse rotation，“Off”:reverse rotation operation）

The terminal of “CM”—Common terminal

Including:SB1:The botton of “Off”；SB2:The botton of “Forward rotation”；SB3:The botton of “Reverse rotation”

With “Three-line”Type 1, P100=2 P104=103,the start and stop of pulse can be realized:

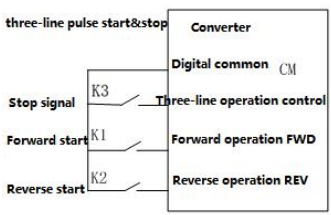
The direction of pulse can be used for controlling the start and stop:

The terminal of “CM”—Common terminal

The terminal of “FWD”—（the signal of pulse:Forward rotation）

The terminal of “REV”—（the signal of pulse:Reverse rotation）

The terminal of “Three-line operation control” -（the signal of pulse:stop）



3: Three-line type 2:

Under this type:

“The three-line operation” is used for control

The command of operation is given out by the terminal of “Forward rotation operation FWD”

The command of direction is given out by the terminal of“Reverse rotation REV”

The command of stop can be realzied by the terminal of“The three-line operation”

The terminal of “Forward rotation operation FWD”—（“Off”:Running）

The terminal of“The three-line operation”—（“On”:Stop）

The terminal of “Reverse rotation operation REV”—（“On”Forward rotation operation:，“Off”:Reverse rotation operation）

The terminal of “CM”—Common terminal

Including:

SB1:The botton of“Direction” SB2:The botton of“Operation” K1:The selection of Direction

P.101	DI1 Function Selection		Factory Default	4:Normal inching turning
	Setting range	0~199		
P.102	DI2 Function Selection		Factory Default	1:Forward rotation operation FWD
	Setting range	0~199		
P.103	DI3Function Selection		Factory Default	2:Reverse rotation operation REV
	Setting range	0~199		
P.104	DI4Function Selection		Factory Default	3:Three-line operation control
	Setting range	0~199		
P.105	DI5Function Selection		Factory Default	6:The selection terminal of acceleration and deceleration time 1
	Setting range	0~199		
P.106	DI6Function Selection		Factory Default	8:Inertia stop
	Setting range	0~199		
P.107	DI7Function Selection		Factory Default	18:Common input of external fault
	Setting range	0~199		
P.108	DI8Function Selection		Factory Default	9:Fault resetting
	Setting range	0~199		

The corresponding functions of the digital multi-function input terminal can be set：

See details of Function Selection of DI terminal as follows:

Table7-1 Functions of the digital multi-function input terminal

Setting value		Function	Specification
Positive logic	Antilogical		
0	-	Non-function	Set Non-function terminal as 0,which can prevent mul function.
1	101	Forward rotation operation FWD	The forward and reverse rotation can be controlled via external terminal.
2	102	Reverse rotation operation REV	
3	103	Three-line operation control	With the terminal, the operation mode of converter is three-line operation control.Please refer to the description of command of function code p. 100 terminal for details.
4	104	Normal inching turning	FJOG represents Inching Forward rotation operation，RJOG represent Inching Reverse rotation operation.Refer to the description of function codes P.040, P.041, and P.042 for inching operation frequency and inching acceleration and deceleration time.
5	105	Reverse inching turning	
6	106	Acceleration and deceleration time Of Selecting terminal 1	With 4 conditons of the two terminals , four kinds of acceleration and deceleration time can be realized, please see details in table7-2deceleration time choose terminal function.
7	107	Acceleration and deceleration time Of Selecting terminal 2	
8	108	Inertia stop	The frequency converter blocks the output, and the motor shutdown process is not controlled by the frequency converter.This means the same as free parking as described in P.051.
9	109	Fault resetting	The function of using terminals for fault recovery.It has the same function as the RESET button on the keyboard.With this function, remote fault reset can be realized.
10	110	Switchover of frequency source	It's used to switch between different frequency sources. The function code (p.005) is selected according to the frequency source. When switching between two frequency sources is set as the frequency source, the terminal is used to switch between the two frequency sources.
11	111	Terminal 1 of Multistage instruction	Through 16 states of these four terminals, 16 sections of speed or 16 other instructions can be set.See details in the Table 7-3 Function description of Multistage instruction terminal.
12	112	Terminal 2 of Multistage instruction	
13	113	Terminal 3 of Multistage instruction	
14	114	Terminal 4 of Multistage instruction	
15	115	Terminal of UP	An increment or decrement instruction that modifies a frequency given by an external terminal.When the frequency source is set as a number, the set frequency can be adjusted up and down.
16	116	Terminal of DOWN	

Setting value		Function	Specification
Positive logic	Antilogical		
17	117	Set of UP/DOWN	When the frequency is set as the digital frequency, the terminal can clear the frequency value changed by the terminal UP/DOWN or the keyboard UP/DOWN, so that the given frequency can be restored to the value set by P.010.
18	118	Normally open input of external fault	With closed signal, the converter gives out fault signal of E.ETF and stop.
19	119	Normally closed input of external fault	With disconnected signal, the converter gives out fault signal of E.ETF and stop.
20	120	Swicthover terminal 1 of control command	When the terminal is in effect, switch to the first other control command mode according to the order of panel, terminal and communication.
21	121	Swicthover terminal 2 of control command	When the terminal is effective, switch to the second other control command mode according to the order of panel, terminal and communication.
22	122	Forbidding acceleration and deceleration	Ensure that the frequency converter is not affected by external signals (except the command of stop), maintain the current output frequency.
23	123	Forbidding reverse rotation	Forbid Reverse rotation operation of converter.
24	124	Forbidding torque control	Forbidding the torque control and ensure the speed control of converter.
25	125	Switchover of speed control/torque control	When the terminal is effective, the opposite control mode set by P.070 will be selected.
26	126	The switchover of Two-line type/three-line type	It's used for switchover of Two-line type 1/Two-line type 2 or the one of Three-line type 1/Three-line type 2
27	127	Motor selection terminal	The parameters of the two motors can be selected through two states of terminal, see details in table 7-4 Function description of motor selection terminal
28	128	Frequency modification control terminal	The terminal is effective or undefined, and the frequency modification is allowed.
29	129	Running suspension	The converter slows down and stops, but all operating parameters are memorized.Such as PLC parameters, swing frequency parameters, PID parameters.After the terminal signal disappears, the inverter will return to the running state before the stop.
30	130	Pulse frequency input	DI1 works as the terminal of pulse frequency input.
31	131	The terminal 1 of external stop	With keyboard control type, the converter can be stopped by the terminal, which has the same function of key of STOP/RESET.
32	132	The terminal 2 of external stop	The terminal has the function of deceleration stop under the control modes(panel control, terminal control and communication control) .
33	133	PID parameter switchover	When DI terminal works as the switch condition of PID parameter（P.911=1）, with invalid terminal,PID parameter is P.905~P.907; with valid one, PID parameter is P.908~P.910.

Setting value		Function	Specification
Positive logic	Antilogical		
34	134	PID suspension	PID temporarily fails, the frequency converter maintains the current output frequency, PID frequency adjustment can't work.
36	136	PID opposite polarity	When the terminal is valid, the polarity of PID and P.901 is opposite.
37	137	The switchover between frequency source X and preset frequency	The the terminal is valid,the frequency source X can be replaced by the preset frequency P.010.
38	138	The switchover between frequency source Y and preset frequency	The the terminal is valid,the frequency source Y can be replaced by the preset frequency P.010.
39	139	Counter input	Input terminal of counter pulse.
40	140	Counter reset	the state of the couter is cleared.
43	143	PLC state reset	If PLC pauses in the operation process, when restarting,restore the inverter to the initial state of simple PLC through the terminal.
46	146	Emergency stop	When the terminal is in effect, the converter stops at the fastest speed, and the current in the stopping process is at the upper limit of the set current.This function is used to meet the need to shut down as soon as possible when the system is in a state of emergency.

Table7-2 Function description of Acceleration and Deceleration time

Selecting terminal 2 of Acceleration and Deceleration time	Selecting terminal 1 of Acceleration and Deceleration time	Acceleration or Deceleration time selection	Parameter
OFF	OFF	The first acceleration(deceleration)time	P.021、P.022
OFF	ON	The second acceleration(deceleration)time	P.023、P.024
ON	OFF	The third acceleration(deceleration)time	P.025、P.026
ON	ON	The forth acceleration(deceleration)time	P.027、P.028

Table7-3 Function description of Multistage instruction terminal

Period of speed	Multiple command terminal 4	Multiple command terminal 3	Multiple command terminal 2	Multiple command terminal 1	Parameter
0	OFF	OFF	OFF	OFF	P.1000
1	OFF	OFF	OFF	ON	P.1001
2	OFF	OFF	ON	OFF	P.1002
3	OFF	OFF	ON	ON	P.1003
4	OFF	ON	OFF	OFF	P.1004
5	OFF	ON	OFF	ON	P.1005
6	OFF	ON	ON	OFF	P.1006
7	OFF	ON	ON	ON	P.1007
8	ON	OFF	OFF	OFF	P.1008
9	ON	OFF	OFF	ON	P.1009
10	ON	OFF	ON	OFF	P.1010
11	ON	OFF	ON	ON	P.1011
12	ON	ON	OFF	OFF	P.1012
13	ON	ON	OFF	ON	P.1013
14	ON	ON	ON	OFF	P.1014
15	ON	ON	ON	ON	P.1015

Table7-4 Function description of motor selection terminal

Motor selection terminal	Acceleration or Deceleration time selection	Parameter
OFF	No.1 motor（motor 1）	P.602~P.612
ON	No.2 motor（motor 2）	P.622~P.632

P.109	Prop filter	Factory Default	0ms
	Setting range	0ms~100ms	

Set the software filtering time for DI terminal state.If the input terminal in use is easily interfered and causes false action, this parameter can be increased to enhance the anti-interference ability.However, the increase of the filtering time will cause the response of DI terminal to slow down.

P.110	VDI State setting mode	Factory Default	0
	Setting range	0~255	

Virtual digital input function, similar to digital DI input terminal function, can be used as multifunctional digital input.Different from ordinary digital input terminals, the virtual VDI can be set in two ways, through P.110.

Meaning of all bits of P.110:

Bit	Description
0	0:Correlation between VDI1 and VDO1 1:Bit 0 correlation between VDI1 and P.119
1	0:Bit 1 correlation between VDI2 and VDO1 1:Bit 1 correlation between VDI2 and P.119
2	0:Correlation between VDI3 and VDO1 1:Bit 2 correlation between VDI3 and P.119
3	0:Correlation between VDI4 and VDO1 1:Bit 3 correlation between VDI4 and P.119
4	0:Correlation between VDI5 and VDO1 1:Bit 4 correlation between VDI5 and P.119
5	0:Correlation between VDI6 and VDO1 1:Bit 5 correlation between VDI6 and P.119
6	0:Correlation between VDI7 and VDO1 1:Bit 6 correlation between VDI7 and P.119
7	0:Correlation between VDI8 and VDO1 1:Bit 7 correlation between VDI8 and P.119

P.111	VDI1Function Selection	Factory Default	0
	Setting range	0~199	
P.112	VDI2Function Selection	Factory Default	0
	Setting range	0~199	
P.113	VDI3Function Selection	Factory Default	0
	Setting range	0~199	
P.114	VDI4Function Selection	Factory Default	0
	Setting range	0~199	
P.115	VDI5Function Selection	Factory Default	0
	Setting range	0~199	
P.116	VDI6Function Selection	Factory Default	0
	Setting range	0~199	

P.117	DI7Function Selection	Factory Default	0
	Setting range	0~199	
P.118	VDI8Function Selection	Factory Default	0
	Setting range	0~199	

Virtual VDI1~VDI8 has the same function of DI in the control panel, which can work as multi-function digital input. Refer to the introduction of P.101~P.108 for detailed setting.

P.119	VDI state	Factory Default	0
	Setting range	0~255	

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
VDI8	VDI7	VDI6	VDI5	VDI4	VDI3	VDI2	VDI1

The meaning of bit:0:Invalid，1:Valid。

P.151	AI1 Analog input selection		Factory Default	0
	Setting range	0	0~10V	
		1	0~20mA	
		2	4~20mA	
		3	0~5V	
P.152	AI2 Analog input selection		Factory Default	0
	Setting range	0	0~10V	
		1	0~20mA	
		2	4~20mA	
		3	0~5V	

Select the signal type of Analog input channel AI1、AI2, and the selected signal type is the same with practical signal type of AI1、AI2.

The following two parameters can determin wether the voltage or current can be displayed by P.1213，P.1214.

P.155	AI1 the least input	Factory Default	0.0%
	Setting range	0.0%~100.0%	
P.156	AI1 least Input corresponding Settings	Factory Default	0.0%
	Setting range	-100.0%~100.0%	
P.157	AI1 uttermost input	Factory Default	100.0%
	Setting range	0.0%~100.0%	

P.158	AI1 uttermost Input corresponding Settings	Factory Default	100.0%
	Setting range	-100.0%~100.0%	

The above function code is used to set the relationship between the analog input voltage and the set value it represents.When the input voltage of the analog quantity is less than the set minimum input P.155 of AI1, the output of the analog quantity is the set value of P.156.When the input voltage of the analog quantity is greater than the set maximum input P.157 of AI1, the output of the analog quantity is the set value of P.158.

P.159	AI1 filter time constant	Factory Default	0.10s
	Setting range	0.01s~10.00s	

AI1 input filtering time is used to set the software filtering time of AI1.When the field analog quantity is easy to be interfered, please increase the filtering time to make the detected analog quantity tend to be stable. However, the larger the filtering time is, the slower the response speed of the simulated quantity detection will be. How to set the filtering time should be weighed according to the actual application situation.

P.160	AI2 Least input	Factory Default	0.0%
	Setting range	0.0%~100.0%	
P.161	AI2 least Input corresponding Settings	Factory Default	0.0%
	Setting range	-100.0%~100.0%	
P.162	AI2 uttermost input	Factory Default	100.0%
	Setting range	0.0%~100.0%	
P.163	AI2 uttermost Input corresponding Settings	Factory Default	100.0
	Setting range	-100.0%~100.0%	

The relation between the input voltage of AI1 and setting value.

P.154	AI2 Filtering time constant	Factory Default	0.10s
	Setting range	0.01s~10.00s	

AI2 input filtering time to set the software filtering time of AI2. When the field analog quantity is easy to be interfered, please increase the filtering time to make the detected analog quantity tend to be stable, but the larger the filtering time is, the slower the response speed of the analog quantity detection will be. How to set it needs to be weighed according to the actual application.

P.165	The least input of panel potentiometer	Factory Default	0.0%
	Setting range	0.0%~100.0%	
P.166	The least input corresponding Setting of panel potentiometer	Factory Default	0.0%
	Setting range	-100.0%~100.0%	
P.167	The uttermost input of panel potentiometer	Factory Default	100.0%
	Setting range	0.0%~100.0%	
P.168	The uttermost input corresponding Setting of panel potentiometer	Factory Default	100.0%
	Setting range	-100.0%~100.0%	
P.169	Value of panel potentiometer	Factory Default	0.0%
	Setting range	0.0%~100.0%	

The relation between the input voltage of AI1 and setting value.

P.170	Least frequency of pulse input	Factory Default	0.00kHz
	Setting range	0.00kHz~100.00kHz	
P.171	The least input corresponding Setting of pulse input	Factory Default	0.0%
	Setting range	-100.0%~100.0%	
P.172	The uttermost input of pulse input	Factory Default	50.00kHz
	Setting range	0.00kHz~100.00kHz	
P.173	The uttermost input corresponding Setting of pulse input	Factory Default	100.0%
	Setting range	-100.0%~100.0%	

The relation between the input pulse frequency of DI1 terminal and the corresponding setted value through P.170~P.173.As the fllowing picture shows:

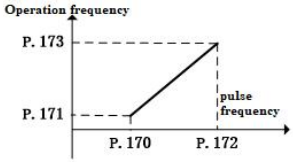


Figure7-10 The relational graph between pulse frequency and output frequency

P.174	Pulse input filter constant	Factory Default	0
	Setting range	0~100	

Pulse input filter time is used to set software filtering of the input pulse time, when the scene was easy to input pulse interference, please increase the filtering time, so that the detection of analog tends to be stable, but the greater the filtering time is to slow to test the response of the input pulse, how to set up the need according to the practical application of trade-offs.

7.3 P2 Group parameter:Signal output aera

P.200	Relay Output Function Selection		Factory Default	4
	Setting range	0~199		
P.201	DO1Function Selection		Factory Default	1
	Setting range	0~199		
P.202	DO2Function Selection		Factory Default	3
	Setting range	0~199		

Select the function of relay output terminal and Open collector output terminal. Refer to the following table:

Table7-5 Digital output Function Selection

Setting value		Function	Description
Positive logic	Antilogical		
0	-	Non-function	Output terminal has non-function.
1	101	Converter in service 1	It indicates that converter is in service, the signal of ON will be given out if any output.
2	102	Converter in service 2	It indicates that converter is in service,or the signal of On will be given out if any command code.
3	103	Frequency arrival	Refer to the description of function code P.231.
4	104	Fault output	The signal of ON will be given out if any fault and fault stop.
5	105	Motor overload warning	Before the overload protection of the motor, it is judged according to the threshold value of overload warning. After exceeding the threshold value of overload warning, the signal of On is given out.Refer the function code P.724、P.725 for the parameter of motor overload.
6	106	Converter overload warning	The signal of ON will be given out before converter's overload protection acts and after 80% of the whole overload protection time passes.
7	107	Arbitrary frequency inspection 1	Refer to the description of function code P.232、P.233.
8	108	Arbitrary frequency inspection 2	Refer to the description of function code P.234、P.235.
9	109	Current measurement output	Refer to the description of function code P.240、P.241.
11	111	Arbitrary frequency arrival 1	Refer to the description of function code P.236、P.237.

Setting value		Function	Description
12	112	Arbitrary frequency arrival 2	Refer to the description of function code P.238、P.239.
13	113	Reach upper limit frequency	When the operation frequency reaches upper limit frequency, the signal of ON will be given out.
14	114	Reach floor limit frequency	When the operation frequency reaches floor limit frequency, the signal of ON will be given out. The signal of OFF will be given out under stop state.
15	115	Retain	Retain
16	116	Reach the setted counter value	The signal of ON will be given out, when the couter value reaches the setted one P.247.
17	117	Reach the setted counter value	The signal of ON will be given out, when the couter value reaches the setted one P.248.
18	118	Retain	Retain
19	119	PLC Loop	When one PLC Loop ends,one 250mm-wide signal pulse will be given out.
20	120	Operation is ready	When the power supply of the main loop and control loop of the converter is stable, and the converter does not detect any fault information, and the converter is in operational state, the signal of ON will be given out.
21	121	Zero-current state	Refer to the description of function code P.242、P.243.
24	124	Forward running	Converter works in forward running, the signal of ON will be given out.
25	125	Reverse running	Converter works in reverse running, the signal of ON will be given out.
26	126	The output of under voltage condition	Converter works in undervoltage condition, the signal of ON will be given out.
30	130	tracking state	Converter works in frequency-research state, the signal of ON will be given out.
36	136	Radiator overheat warning	The temperature（P.1229）reach the setted value, and the signal of ON will be given out.
41	141	Communication control digital output 1	P.1112 control digital output state.
42	142	Communication control digital output 2	P.1113 control digital output state.
43	143	Communication control digital output 3	P.1114 control digital output state.

P.211	VDO1Function Selection	Factory Default	0
	Setting range	0~199	
P.212	VDO2Function Selection	Factory Default	0
	Setting range	0~199	
P.213	VDO3Function Selection	Factory Default	0
	Setting range	0~199	
P.214	VDO4Function Selection	Factory Default	0
	Setting range	0~199	
P.215	VDO5Function Selection	Factory Default	0
	Setting range	0~199	
P.216	VDO6Function Selection	Factory Default	0
	Setting range	0~199	
P.217	VDO7Function Selection	Factory Default	0
	Setting range	0~199	
P.218	VDO8Function Selection	Factory Default	0
	Setting range	0~199	

The virtual digital output function, similar to the DO output function, can be used in conjunction with the virtual digital input VDIx to achieve some simple logical controls.

When digital VDOx outputs Function Selection of 0，the output of VDO1~VDO5 is confirmed by input of DI1~DI5 on the control panel, and there is one-to-one conrrespondence between VDOx and DIx.

When digital VDOx outputs Function Selection of non-zero value, the function and usage of VDOx are the same with output parameter of DO. Please refer to the description of parameters.

P.231	The frequency reaches detection width	Factory Default	0.00%
	Setting range	0.00%~10.00%	

The operation frequency is within the target frequency +/-P.012(uttermost frequency)*P.231(unit of %)，the terminal will act.This parameter is used to set the detection range of frequency arrival. Note that this parameter is calculated as a percentage of the maximum frequency.

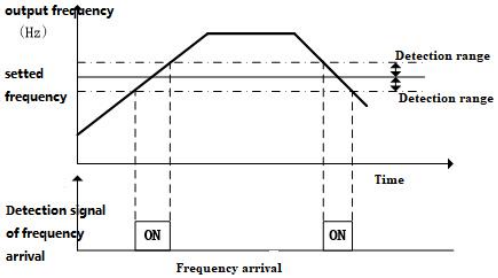


Figure7-11 Frequency reach the detection standard

P.232	Frequency detection value 1	Factory Default	10.00Hz
	Setting range	0.00Hz~650.00Hz	
P.233	Frequency detection lagging value 1	Factory Default	10.00%
	Setting range	0.0%~100.0%	
P.234	Frequency detection value 2	Factory Default	50.00Hz
	Setting range	0.00Hz~650.00Hz	
P.235	Frequency detection lagging value 2	Factory Default	10.00%
	Setting range	0.0%~100.0%	

When the operating frequency is higher than the frequency detection value, the frequency converter will output the DO function, and when the frequency is lower than the detection value, the DO output signal will be cancelled.

The above parameters are used to set the detection value of output frequency and the hysteresis value of output action release.Where P.233 is the percentage relative to the frequency test value p.232 and P.233 is the percentage relative to the frequency test value P.232.

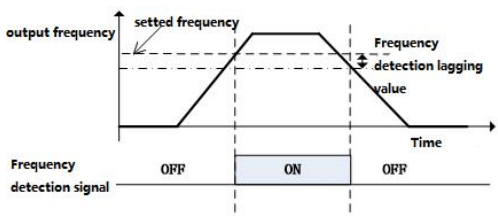


Figure7-12 sketch map of frequency detection

P.236	Random frequency arrival detection value 1	Factory Default	0.00Hz
	Setting range	0.00Hz~650.00Hz	
P.237	Random frequency arrival detection width 1	Factory Default	0.0%
	Setting range	0.0%~100.0%	
P.238	Random frequency arrival detection value 2	Factory Default	0.00Hz
	Setting range	0.00Hz~650.00Hz	
P.239	Random frequency arrival detection width 2	Factory Default	0.0%
	Setting range	0.0%~100.0%	

When the output frequency of the converter is within the range of positive and negative detection range of any frequency detection value, the multi-function DO action is performed.

The frequency converter provides two sets of detection parameters for arbitrary arrival frequency, and sets the frequency value and frequency detection range respectively.

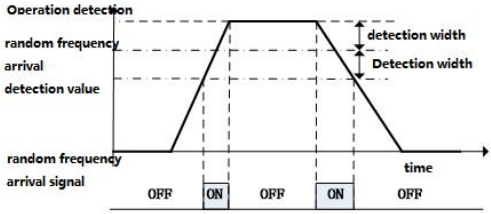


Figure7-13 Sketch map of random frequency arrival detection

P.240	Current value	Factory Default	100%
	Setting range	0.0%~300.0%	
P.241	Current detection width	Factory Default	10%
	Setting range	0.0%~100.0%	

When the output current of the converter is greater than the detection value of P.240, the output signal action of the current detection is invalid when the output current is less than the rated current of the motor × (1-detection width /100).

P.242	Zero-current detection current	Factory Default	5.0%
	Setting range	0.0%~30.0%	
P.243	Zero-current detection lagging current	Factory Default	0.5s
	Setting range	0.0s~3000.0s	

When the output current of the converter is lower than or equal to the set current of P.242, the delay time of P.243 and the zero-current state signal is effective.

As Figure 7-14 zero-current detection skect map of zero-current shows.

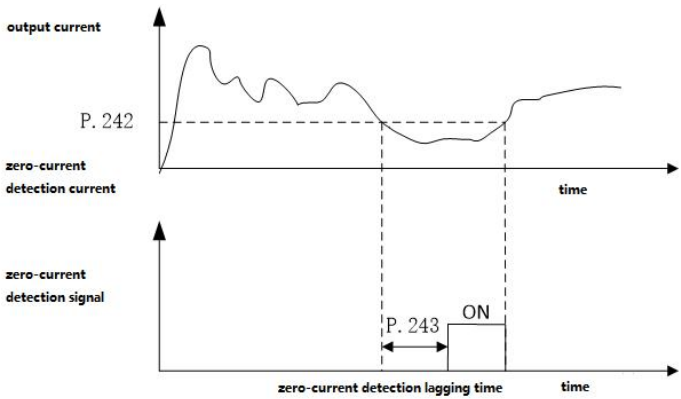


Figure7-14 skect map of zero-current detection

P.247	Set counter		Factory Default	1000
	Setting range	1~65535		
P.248	Appointed couter arrival		Factory Default	500
	Setting range	1~65535		
P.249	Count frequency		Factory Default	1
	Setting range	1~65535		
P.250	Power-off memory of count		Factory Default	0
	Setting range	0	No memory when power off	
		1	Power-off memory	

When the digital input terminal sets the function of counter input (39), the input pulse is counted after the frequency separation of p. 249. When the value is greater than P.248, the count reaches the signal action; when the value is greater than P.247, the count number is set to reach and one counting pulse is reset.

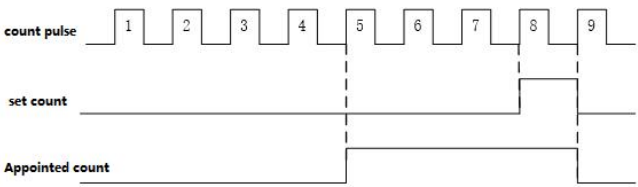


Figure7-15 Set count and appointed count

P.251	Analog output (AO1) Analog output Function Selection		Factory Default	0
	Setting range	0~7		
P.252	Analog output (AO2) Analog output Function Selection		Factory Default	1
	Setting range	0~7		
P.253	Fulse outpue Function Selection		Factory Default	0
	Setting range	0~7		

See the selectable setted value and description in the following table:

Table7-6 Setted value and description of analog and pulse output

Set value	Function	Description	Function range
0	Running frequency		0~P.012
1	Output current		0~2×P.852
2	Output voltage		0~1.2×rated voltage
3	Analog input 1	transmit the signal of AI1	0V~10V（or 0~20mA）
4	Analog input2	transmit the signal of AI2	0V~10V（or 0~20mA）
5	Panel potentiometer input		0~100.0
6	Communication control analog output 1	Communication parameter address	0~100.0
7	Communication control analog output 2	Communication parameter address	0~100.0

P.255	Analog output(AO1)signal selection		Factory Default	0
	Setting range	0	0~10V	
		1	0~20mA	
		2	4~20mA	
		3	0~5V	
P.256	Analog output(AO2)signal selection		Factory Default	1
	Setting range	1	0~20mA	
		2	4~20mA	

The signal type of AO1 and AO2 of the analog output channel is selected. The selected signal type should be consistent with the actual SIGNAL type of AO1 and AO2.

P.257	Analog output signal selection		Factory Default	0
	Setting range	1	Digital output	
		2	Pulse output	

DIO terminal is a programmable multiplexed terminal, which can be used as high-speed pulse output terminal, as well as open collector switch output terminal.

As the pulse output terminal, the highest frequency of the output pulse is P.266, and the related functions are shown in the description of P.253.

P.260	Analog output(AO1)offset	Factory Default	0.0%
	Setting range	0.0%~100.0%	
P.261	Analog output(AO1)gain	Factory Default	100.0%
	Setting range	0.0%~1000.0%	
P.262	Analog output(AO2)offset	Factory Default	0.0%
	Setting range	0.0%~100.0%	
P.263	Analog output(AO2)gain	Factory Default	100.0%
	Setting range	0.0%~1000.0%	

The above function code is used to correct the bias of analog output and the deviation of output amplitude.The above function code is used to correct the bias of analog output and the deviation of output amplitude.If the bias is represented by "b", the gain is represented by K, the actual output is represented by Y, and the standard input is represented by X,and the practical output:Y=kX＋b.

Where, the offset of AO1 and AO2 is 100% corresponding to 10V (or 20mA), and the standard output refers to the amount of 0V ~ 10V (or 0mA ~ 20mA) corresponding to the analog output under the bias and gain correction.

P.264	Pulse output frequency offset	Factory Default	0.0%
	Setting range	0.0%~100.0%	
P.265	Pulse output frequency gain	Factory Default	100.0%
	Setting range	0.0%~1000.0%	

The same analog has similar output.

P.266	Uttermost pulse frequency	Factory Default	50.00kHz
	Setting range	0.00kHz~100.00kHz	

The maximum output frequency of the output pulse can be set. The maximum output frequency can be up to 100kHz on the hardware. It can be selected according to actual needs.

7.4 P3 Group of parameter:Communication parameter zone

P.305	RS-485Communication address		Factory Default	1
	Setting range	0~255		

When the local address is set to 0, it is the broadcast address to realize the broadcast function of upper computer.The address of the machine is unique (except the broadcast address), which is the basis of realizing the point-to-point communication between the upper computer and the frequency converter.

P.307	RS-485 stop bit		Factory Default	2
	Setting range	1	1 stop bit	
		2	2 stop bit	

The stop position set by upper computer and frequency converter must be consistent, otherwise, communication cannot be carried out.

P.308	RS-485 if odd-even check or not		Factory Default	0
	Setting range	0	No check	
		1	Odd check	
		2	Even check	

The calibration mode set by the upper computer and the frequency converter must be consistent; otherwise, communication cannot be carried out.

P.309	RS-485 Communication BPS		Factory Default	3
	Setting range	1	2400	
		2	4800	
		3	9600	
		4	19200	
		5	38400	

This parameter is used to set the data transfer rate between the upper computer and the frequency converter.Note that the baud rate set by the upper computer and the frequency converter must be consistent, otherwise the communication cannot be carried out.The higher the baud rate, the faster the communication speed.

7.5 P4 group parameter:Motor control parameter 1 zone

P.400	Control type of motor 1		Factory Default	0
	Setting range	0	VVVF	
		1	Advanced flux vector control	
		2	Speed Sensorless Vector Control	
		3	Sensor vector control	
		6	Speed Sensorless Vector Control of PMSM	

P.When 400=0，VVVF control

It is suitable for the occasions where the load requirement is not high, or a frequency converter drives multiple motors, such as the load of fan and pump.It can be used for driving multiple motors with one frequency converter.

P.400=1，Advanced flux vector control

According to the output voltage and current of the frequency converter, the difference of the motor is estimated, and the compensation of the difference and the voltage is carried out to improve the low speed torque, so that the actual speed of the motor is closer to the target speed.

This control mode drives only one motor.

P.When 400=2，Speed Sensorless Vector Control

Realize the control of flux and torque of induction motor separately, select sensorless vector control and implement off-line automatic tuning when high precision and high response speed control are needed.

Suitable for general high performance control occasions, a frequency converter can only drive one motor.Such as machine, centrifuge, drawing machine, injection molding machine load.

When P.400=3，Sensor vector control

The speed sensor vector control refers to the closed loop vector control. The motor end must be equipped with an encoder, and the frequency converter must be equipped with a PG card of the same type as the encoder.Suitable for high precision speed control or torque control.A frequency converter can drive only one motor.Such as high - speed paper machinery, lifting machinery, elevators and other loads.

When P.400=6，Speed Sensorless Vector Control of PMSM

To realize the separate control of flux and torque of permanent magnet synchronous motor, there is no need to install encoder at the motor end, so it is suitable for high precision speed and torque control.A frequency converter can drive only one motor.

Tip: All vector control methods must be used for motor parameter identification.Only accurate motor parameters can play the advantages of vector control mode.

P.401	Torque curve selection of Motor 1		Factory Default	0
	Setting range	0	Straight line	
		1	Multipoint	
		2	Square	
		3	1.5 power	
		4	1.8 power	
		5	1.9 power	
		6	Voltage frequency separation	

In order to compensate V/F control low frequency torque characteristics, the output voltage of frequency converter is improved to compensate.However, the torque lifting setting is too large, the motor is easy to overheat, and the converter is easy to overflow.

P.401=0，Choose straight line compensation, suitable for ordinary constant torque load;

P.401=1，Choose multi-point compensation, suitable for dehydrator, centrifuge and other special loads;

P.401=2，P.401=3，P.401=4，Select power compensation, suitable for fan, water pump load;

P.401=6，Select the voltage and frequency separation, the output voltage and frequency separation of the converter;

P.402	Linear compensation of motor 1		Factory Default	◆
	Setting range	1~20		

It is recommended to increase this parameter when the load is heavy and the motor starting torque is insufficient.Torque lifting can be reduced when the load is light.

P.403	Control type of motor 2		Factory Default	0
	Setting range	0	VVVF	
		1	Advanced flux vector control	
		2	Speed Sensorless Vector Control	
		3	Sensor vector control	
		6	Speed Sensorless Vector Control of PMSM	

The same as P.400.

P.404	Torque curve selection of Motor 2		Factory Default	0
	Setting range	0	Straight line	
		1	Multipoint	
		2	Square	
		3	1.5 power	
		4	1.8 power	
		5	1.9 power	
		6	Voltage frequecy separation	

The same as P.401.

P.405	Linear compensation of motor 2	Factory Default	◆
	Setting range	1~20	

The same as P.402.

P.406	Custom frequency point 1	Factory Default	1.00Hz
	Setting range	0.00Hz~650.00Hz	
P.407	Custom voltage point 1	Factory Default	4%
	Setting range	0%~100%	
P.408	Custom frequency point 2	Factory Default	5.00Hz
	Setting range	0.00Hz~650.00Hz	
P.409	Custom voltage point 2	Factory Default	13%
	Setting range	0%~100%	
P.410	Custom frequency point 3	Factory Default	10.00Hz
	Setting range	0.00Hz~650.00Hz	
P.411	Custom voltage point 3	Factory Default	24%
	Setting range	0%~100%	
P.412	Custom frequency point 4	Factory Default	20.00Hz
	Setting range	0.00Hz~650.00Hz	
P.413	Custom voltage point 4	Factory Default	45%
	Setting range	0%~100%	
P.414	Custom frequency point 5	Factory Default	30.00Hz
	Setting range	0.00Hz~650.00Hz	

P.415	Custom voltage point 5	Factory Default	63%
	Setting range	0%~100%	
P.416	Custom frequency point 6	Factory Default	40.00Hz
	Setting range	0.00Hz~650.00Hz	
P.417	Custom voltage point 6	Factory Default	81%
	Setting range	0%~100%	

P.406~P.417Six parameters define a multi-segment V/F curve.

The multi-point V/F curve should be set according to the load characteristics of the motor. It should be noted that the relationship between the three voltage points and the frequency points must meet the following requirements: the customized voltage points V1 < V2 < V3 < V4 < V5 < V6, and the customized frequency points F1 < F2 < F3 < F4 < F5 < F6.The picture shows the setting diagram of multi-point VF curve.

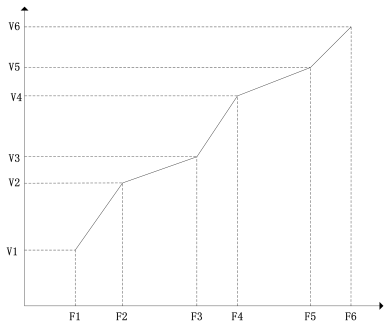


Figure7-16 user-defined multi-step V/F curve

If the voltage setting is too high at low frequency, the motor may overheat or even burn out, and the frequency converter may overrun the loss rate or overcurrent protection.

P.418	VF separated voltage source		Factory Default	0
	Setting range	0	Digital setting	
		1	Analog input 1	
		2	Analog input 2	
P.419	VF separated voltage source setting		Factory Default	0.0%
	Setting range	0.0%~100.0%		

VF separation is generally used in induction heating, inverter power supply and torque motor conHKol and other occasions.

When choosing the VF separation control, the output voltage can be set by the function code p.419 or from the analog quantity given.When non-digital setting is used, 100% of the set voltage corresponds to the rated voltage of the motor. When the percentage of the set output, such as analog quantity, is negative, the set absolute value is taken as the effective set value.

P.420	VF separation voltage rise time		Factory Default	5.0s
	Setting range	0.1s~3000.0s		
P.421	VF separation voltage decline time		Factory Default	5.0s
	Setting range	0.1s~3000.0s		

VF separation uptime refers to the time required for the output voltage to change from 0V to the rated voltage of the motor.As shown in the figure:

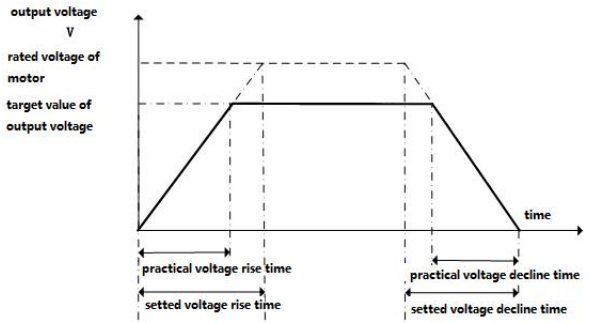


Figure7-17 VF separation rise&decline time

P.422	VF separation stop type selection	Factory Default	0
	Setting range	0	the voltage frequency decline to 0 by itself
		1	the frquency decline to 0 after the voltage decline to 0.

0:the voltage/frequency decline to 0 by itself

V/F separation output voltage decreases to 0V according to voltage drop time (p.421);The output frequency of V/F separation simultaneously decreases to 0Hz according to the deceleration time (P.022 as an example).

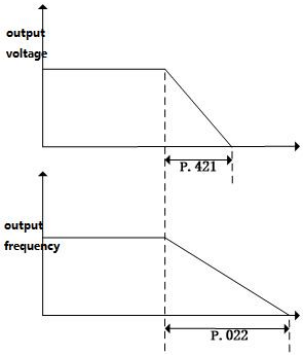


Figure7-18 V/F the voltage/frequency decline to 0 by itself

1:the frquency decline to 0 after the voltage decline to 0.

The output voltage of V/F separation first decreases to 0V according to the voltage drop time (P.421), and then decreases to 0Hz according to the deceleration time (P.022 for example).

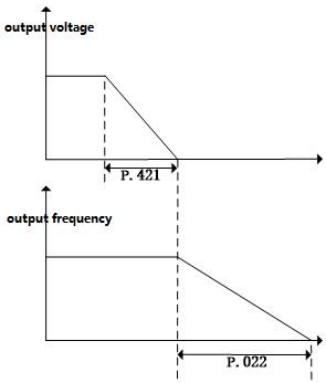


Figure7-19 V/F the frquency decline to 0 after the voltage decline to 0

P.423	Slip compensation	Factory Default	0%
	Setting range	0%~100.0%	
P.424	Slip compensation time constant	Factory Default	0.0s
	Setting range	0.0s~10.0s	

This parameter is valid only for asynchronous motors.The slip compensation can compensate the motor speed deviation when the load increases, so that the motor speed can be basically stable when the load changes.

VF slip compensation is set at 100.0%, indicating that the slip compensated when the motor is with rated load is the rated slip of the motor, while the rated slip of the motor is calculated by the frequency and speed of the motor.

When adjusting the slip compensation gain, the principle is that the motor speed is basically the same as the target speed under the rated load.When the motor speed is different from the target value, the parameter needs to be adjusted appropriately.

P.426	Carrier frequency setting	Factory Default	◆
	Setting range	◆	

The carrier frequency can reduce the electromagnetic noise of the motor, avoid the resonance of the mechanical system, reduce the ground leakage current of the line, and reduce the interference of the frequency converter to the surrounding equipment.Adjusting the carrier frequency will affect the following performance:

Carrier frequency	Low → high
Motor noise	B → small
Output current waveform	Bad → good
Motor temperature rise	High → low
Converter temperature rise	Low → high
Leak current	Small → big
External radiation interference	Small → big

In order to compensate V/F control low frequency torque characteristics, the output voltage of frequency converter is improved to compensate.However, the torque lifting setting is too large, the motor is easy to overheat, and the converter is easy to overflow.

It is recommended to increase this parameter when the load is heavy and the motor starting torque is insufficient.Torque lifting can be reduced when the load is light.

Carrier frequency switching frequency point: under this frequency, the torque lifting torque is effective, beyond this set frequency, the torque lifting failure, as shown in the figure

P.429	Random carrier selection		Factory Default	0
	Setting range	0	Fixed carrier	
		1	Random carrier	

P.429=1,The random carrier is a control method to change the metal timbre of motor noise into composite timbre.

P.430	Temperature control carrier frequency		Factory Default	1
	Setting range	0	Invalid	
		1	Valid	
P.431	Temperature controlled carrier frequency temperature	Factory Default	70℃	
	Setting range	0℃~100℃		

P.430=1，The function of PWM carrier frequency automatic reduction is effective. When the load of the converter is large, the heat sink temperature of the converter is higher than the set temperature of P.431. In order to avoid the frequency converter overheating and tripping, the carrier frequency will be reduced.

P.433	Dc braking current before starting		Factory Default	0%
	Setting range	0%~100%		
P.434	Braking duration before starting		Factory default	0.00s
	Setting range		0.00s~60.00s	
P.435	DC braking start frequency		Factory default	1.00Hz
	Setting range		0.20Hz~5.00Hz	
P.436	Stop DC braking current		Factory default	0%
	Setting range		0%~100%	
P.437	Stop braking duration		Factory default	0.00s
	Setting range		0.00s~60.00s	

Start the DC brake, which is used to stop the running motor and then start it.

When P.432=1 or 3, start the DC braking function. When the inverter starts, it will first perform DC braking according to the startup DC braking voltage P.433, and then exit the DC braking after the continuous start of DC braking time P.434 move.

When P.432=2, 3, the stop DC braking function is turned on, the inverter will decelerate to the DC braking frequency P.435 at stop, and perform DC braking according to the stop DC braking voltage P.436, and continue to stop the DC braking time After P.437, exit DC braking and stop.

P.440	Stall adjustment function selection		Factory default	1
	Predetermined area	0	Ineffective adjustment	
		1	Current regulation	
		2	Voltage regulation	
		3	Current and voltage regulation	

P.441	Stall current adjustment		Factory default	160%
	Predetermined area	60%~200%		
P.442	Stall voltage regulation		Factory default	140%
	Predetermined area	100%~200%		

When the set speed or the motor load changes sharply, the output current of the inverter may reach above the overcurrent point, causing an overcurrent fault. The current stall adjustment function is that the inverter controls the instantaneous output to limit the sharply changing output current not to exceed the protection action value, which can effectively reduce the occurrence of overcurrent faults and ensure the reliable operation of the system.

Voltage stall adjustment function. When the motor has a large inertia load and stops quickly, or when the regenerative braking is caused by sudden changes in the load during operation, the DC bus voltage of the inverter will rise, which may cause the overvoltage protection action . The overvoltage stall adjustment function is to control the stability of the DC bus voltage and prevent overvoltage faults by adjusting the output frequency, extending the deceleration time, and reducing the braking torque under these conditions.

For elevator systems, current stall adjustment and voltage stall adjustment functions are not suitable.

P.444	Dynamic braking mode			Factory default	0
	Predetermined area	0	Variable frequency		
		1	PI adjustment		
		2	Fixed frequency		
P.445	Energy consumption braking voltage			Factory default	700V
	Predetermined area	200V~1000V			
P. 446	Energy consumption braking voltage efficiency			Factory default	80%
	Predetermined area	0%~100%			

For occasions with large moment of inertia and rapid braking to stop, the matching braking unit and braking resistor can be selected, and braking parameters can be set to achieve rapid braking to stop.

The dynamic braking voltage P.445 is only valid for the inverter with built-in braking unit. When the DC bus voltage of the inverter exceeds the set voltage of P.445, the braking unit will act.

When P.444=0, the frequency of the braking unit changes with the efficiency of the energy consumption braking voltage of P.446. When P.444=2, the frequency of the braking unit is fixed. When P.444=1, the energy consumption braking efficiency is automatically adjusted by PI according to the DC bus voltage braking, and the bus voltage control is smoother and more stable.

P.448	Oscillation suppression enable			Factory default	0
	Predetermined area	0	invalid		
		1	effective		

Only when the motor oscillates obviously, turning on this function can suppress the oscillation. When using the oscillation suppression function, the motor rated current and no-load current parameters are required to be accurate, otherwise the VF oscillation suppression effect will not be good.

P.458	Power failure stop method			Factory default	0
	Predetermined area	0	Invalid		
		1	Non-stop		
		2	Instant stop		
P.459	Power failure judgment voltage			Factory default	80%
	Predetermined area	50%~90%			
P.460	Incoming call judgment voltage			Factory default	85%
	Predetermined area	50%~90%			
P.461	Power failure deceleration time			Factory default	1.0s
	Predetermined area	0.0s~3000.0s			
P.464	Incoming call judgment time			Factory default	5.0s
	Predetermined area	1.0s~3000.0s			

When P.458=1, the instantaneous stop non-stop function is enabled to ensure that the inverter will continue to run for a short time when the inverter is temporarily powered off or the voltage drops suddenly.

When the power failure occurs, when the DC bus voltage drops below the power failure judgment voltage P.459, the momentary stop process will take effect, the inverter output frequency will automatically drop, the motor is in the power generation state, and the feedback bus voltage energy is used to maintain the DC bus voltage at the power failure judgment voltage about. When a call comes in, the DC bus voltage rises and the call judgment voltage is higher than P.460, after delaying the call judgment time P.464, the instantaneous stop non-stop process is exited, and the operating frequency is accelerated to the target frequency.

When P.458=2, the instantaneous stop and quick stop function is enabled. When the power fails, the inverter will decelerate and stop at the fastest speed without failure. During the deceleration, the inverter will continue to decelerate and stop even if the power is restored.

P.466	Frequency search mode		Factory default	1
	Predetermined area	1	Search from the maximum frequency	
		2	Search from the frequency of shutdown	

The inverter first judges the speed of the motor, and then starts at the trcked motor frequency, and implements a smooth and non-impact start to the rotating motor. It is suitable for restart after instantaneous power failure of large inertia load.

When P.466=1, the search frequency will be decelerated downward from the maximum frequency. When P.466=2, search from the stop frequency

In order to complete the speed tracking process in the shortest time, select the way the inverter tracks the motor speed:

1: Search from the maximum frequency, generally used for generating load.

2: Start searching from the stop frequency, usually this method is used.

P.469	Search acceleration and deceleration time		Factory default	◆
	Predetermined area	1.0s~3000.0s		

In frequency search, the smaller the parameter, the faster the tracking speed. But setting too small may cause unreliable tracking effect.

P.473	Automatic voltage adjustment		Factory default	0
	Predetermined area	0	invalid	
		1	effective	

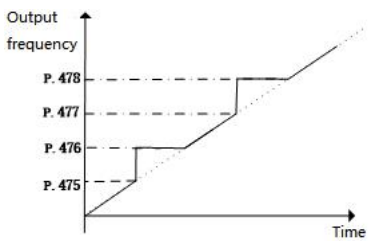
When the grid voltage fluctuates or the motor regeneration automatically changes the DC bus voltage, P.473=1 can keep the output voltage stable.

P.475	Frequency avoidance point 1A	Factory default	0.00Hz
	Predetermined area	0.00Hz~650.00Hz	
P.476	Frequency avoidance point 1B	Factory default	0.00Hz
	Predetermined area	0.00Hz~650.00Hz	
P.477	Frequency avoidance point 2A	Factory default	0.00Hz
	Predetermined area	0.00Hz~650.00Hz	
P.478	Frequency avoidance point 2B	Factory default	0.00Hz
	Predetermined area	0.00Hz~650.00Hz	

By setting the frequency avoidance point setting, the inverter can avoid the mechanical resonance point of the load. The inverter can set three groups of skip frequency points. If the skip frequency avoidance points are all set to 0, the skip frequency function will be cancelled.

The setting value of frequency avoidance point B (P.476/P.478) should be greater than the corresponding point A (P.475/P.477) setting value, otherwise the avoidance frequency is invalid, and the frequency in the avoidance interval will be set according to point B Constant frequency operation.

For example, when running at 25Hz between 20Hz~25Hz, set P.476 to 20.00 and P.475 to 25.00.



Schematic diagram of 7-20 frequency avoidance points

7.6 P5 group parameters: motor control parameter area 2

P.501	Motor 1 speed ring KP1		Factory default	◆
	Predetermined area	0.01~100.00		
P.502	Motor 1 speed ring KI1		Factory default	◆
	Predetermined area	0.01~2.00		
P.503	Motor 1 speed ring KP2		Factory default	◆
	Predetermined area	0.01~100.00		
P.504	Motor 1 speed ring KI2		Factory default	◆
	Predetermined area	0.01~2.00		
P.505	Motor 1 speed ring KP3		Factory default	◆
	Predetermined area	0.01~100.00		
P.506	Motor 1 speed ring KI3		Factory default	◆
	Predetermined area	0.01~2.00		

By adjusting the proportional and integral gain of the speed loop, the dynamic response characteristics of the vector control can be adjusted. Increasing KP and reducing KI can speed up the response of the speed loop, but if it is too large, it will cause oscillation.

Adjustment steps: Make fine adjustments on the basis of the factory value, and the adjustment range cannot be too large each time.

If the load capacity is poor, or the speed rises slowly, increase the KP line under the condition that it does not oscillate, and the KI value can be appropriately reduced after stability. If there is oscillation of current or speed, please decrease KP and increase KI appropriately.

Note: If the KP and KI settings are improper, it may cause the system to oscillate or even fail to work, please set it carefully.

P.507	Switching frequency F1		Factory default	5.00
	Predetermined area	0.00Hz~650.00Hz		
P.508	Switching frequency F2		Factory default	50.00
	Predetermined area	0.00Hz~650.00Hz		
P.509	Switching frequency F3		Factory default	100.00
	Predetermined area	0.00Hz~650.00Hz		

When the inverter runs at different frequencies, different speed loop PI parameters can be selected. When the running frequency is less than the switching frequency F1 (P.507), the speed loop PI adjustment parameters are P.501 and P.502. When the running frequency is greater than the switching frequency F2, the speed change PI adjustment parameters are P.503 and P.504. When the running frequency is greater than the switching frequency F3, the speed change PI adjustment parameters are

P.505 and P.506. The speed loop PI parameter between switching frequencies is a linear switch between two groups of PI parameters.

P.511	Motor 2 speed ring KP1		Factory default	◆
	Predetermined area	0.01~100.00		
P.512	Motor 2 speed ring KI1		Factory default	◆
	Predetermined area	0.01~2.00		
P.513	Motor 2 speed ring KP2		Factory default	◆
	Predetermined area	0.01~100.00		
P.514	Motor 2 speed ring KI2		Factory default	◆
	Predetermined area	0.01~2.00		
P.515	Motor 2 speed ring KP3		Factory default	◆
	Predetermined area	0.01~100.00		
P.516	Motor 2 speed ring KI3		Factory default	◆
	Predetermined area	0.01~2.00		

See P501~P506.

7.7 P6 group parameters: motor parameter area

P.600	Current motor			Factory default	1
	Predetermined area	1	Motor 1		
		2	Motor 2		

Through parameter P.600, you can view the current effective motor parameter group.

P.601	Motor 1 parameter tuning			Factory default	0
	Predetermined area	0	Invalid		
		1	Rotary tuning		
		2	Static tuning		

Motor tuning: The process in which the inverter obtains the parameters of the controlled motor.

Motor tuning methods include: asynchronous motor static part parameter tuning, asynchronous motor dynamic complete tuning, asynchronous motor static complete tuning.

The tuning effects of several tuning methods are compared in the following table:

Tuning method	Applicable situation	Tuning effect
Asynchronous machine static part parameter tuning	Where it is difficult to separate the motor from the load and dynamic tuning operation is not allowed	general
Asynchronous motor dynamic complete tuning	Where the motor and the application system are easily separated	optimal
Asynchronous machine static complete tuning	It is difficult to separate the motor from the load, and dynamic and complete tuning operation is not allowed	better

When selecting advanced magnetic flux vector control mode (P.400=1), real-time sensorless vector control mode (P.400=2) or permanent magnet synchronous motor sensorless vector control operation, the inverter will automatically measure the motor constant (offline automatic Tuning). In the case of deviations in motor constants, use of motors manufactured by different companies, or long wiring lengths, the motor can still be operated with the best operating characteristics.

In offline auto tuning, the motor rotating tuning has higher tuning accuracy than the motor static tuning. During offline auto tuning, the tuned motor constants can be read and written. Offline auto tuning data (motor constants) can be copied to other inverters through the operation panel.

Before auto tuning, please make sure that the motor is connected to ensure that the motor will not rotate due to external force during tuning. The steps of motor automatic tuning are as follows:

1.Wiring the inverter power cord.

2.Connect the inverter output to the motor.

3.Frequency conversion power on.

4.Set P.602~P.607 according to the motor nameplate.

5.Choose advanced magnetic flux vector control mode (P.400=3) or real-time sensorless vector control mode (P.400=0).

6.According to the actual situation, select the automatic tuning state P.601=1 (rotary tuning) or P.601=2 (static tuning).

In the offline auto-tuning mode (P.601=2) when the motor is not running, the motor may undergo very slight movement. Please fix it reliably by a mechanical brake or confirm that there is no problem in safety even if the motor is rotating. Tuning (especially pay attention to when used in elevators). At the same time, the slight rotation of the motor will not affect the tuning performance.

If a surge voltage suppression filter is connected between the inverter and the motor, the correct tuning will not be possible when performing offline auto tuning. Please remove these filters before performing the tuning operation.

7.The operation panel will display an interface, indicating that the motor is in offline auto tuning mode.

8.When running, please press or on the operation panel. During external operation, please turn on the start command (FWD signal or REV signal) to start tuning.

If you want to force the end during the tuning process, stop or any input on the operation panel can be forced to end (set the start signal FWD signal or REV signal to OFF to also end.)

9.After offline auto tuning is completed, the tuning interface disappears. For panel control, please press the shutdown reset button on the operation panel. For external operation, set the start signal (FWD signal or REV signal) to OFF.

The motor constants measured by performing offline auto-tuning once will be stored in the inverter, until the offline auto-tuning is executed again, the new tuning data will overwrite the old tuning data. Note: The tuning data will be cleared when restoring the factory.

P.602	Motor 1 rated power		Factory default	◆
	Predetermined area	0.1kW~1000.0kW		
P.603	Motor 1 rated frequency		Factory default	50.00Hz
	Predetermined area	1.00Hz~650.00Hz		
P.604	Motor 1 rated voltage		Factory default	◆
	Predetermined area	1V~1140V		
P.605	Motor 1 rated current		Factory default	◆
	Predetermined area	0.2A~1400.0A		
P.606	Number of poles of motor 1		Factory default	4
	Predetermined area	2~100		
P.607	Motor 1 rated speed		Factory default	1460rpm
	Predetermined area	1rpm~65535rpm		

Motor nameplate parameters, when using V/F control or vector control, in order to obtain better control performance, motor parameter tuning is required, and the accuracy of the adjustment results is closely related to the correct setting of motor nameplate parameters.

P.608	Motor 1 stator resistance		Factory default	◆
	Predetermined area	0.001Ω~65.535Ω		
P.609	Motor 1 rotor resistance		Factory default	◆
	Predetermined area	0.001Ω~65.535Ω		
P.610	Motor 1 leakage inductance		Factory default	◆
	Predetermined area	0.01mH~655.35mH		
P.611	Motor 1 mutual inductance		Factory default	◆
	Predetermined area	0.1mH~6553.5mH		
P.612	Motor 1 excitation current		Factory default	◆
	Predetermined area	0.2A~6553.5A		

P.608~P.612, these parameters are generally not on the motor nameplate, and need to be obtained through automatic tuning of the inverter.

If it is not possible to tune the asynchronous motor on site, you can enter the corresponding function code above according to the parameters provided by the motor manufacturer.

P.621	Motor 2 parameter tuning			Factory default	0
	Predetermined area	0	Invalid		
		1	Rotary tuning		
		2	Static tuning		

Same as P.601.

P.622	Motor 2 rated power		Factory default	◆
	Predetermined area	0.1kW~1000.0kW		
P.623	Motor 2 rated frequency		Factory default	50.00Hz
	Predetermined area	1.00Hz~650.00Hz		
P.624	Motor 2 rated voltage		Factory default	◆
	Predetermined area	1V~1140V		
P.625	Motor 2 rated current		Factory default	◆
	Predetermined area	0.2A~1400.0A		

P.626	Motor 2 poles		Factory default	4
	Predetermined area	2~100		
P.627	Motor 2 rated speed		Factory default	1460rpm
	Predetermined area	1rpm~65535rpm		

See P.602~P.607.

P.628	Motor 2 stator resistance		Factory default	◆
	Predetermined area	0.001Ω~65.535Ω		
P.629	Motor 2 rotor resistance		Factory default	◆
	Predetermined area	0.001Ω~65.535Ω		
P.630	Motor 2 leakage inductance		Factory default	◆
	Predetermined area	0.01mH~655.35mH		
P.631	Electric motor 2 mutual inductance		Factory default	◆
	Predetermined area	0.1mH~6553.5mH		
P.632	Motor 2 excitation current		Factory default	◆
	Predetermined area	0.2A~6553.5A		

See P.608~P.612.

P.640	Encoder line number		Factory default	1024
	Predetermined area	1~65535		

Set the number of pulses per revolution of ABZ or UVW incremental encoder.

In the vector control mode with speed sensor, the encoder pulse number must be set correctly, otherwise the motor will run abnormally.

P.641	Encoder type		Factory default	0
	Predetermined area	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 3: Sin-Cos encoder 4: Line-saving UVW encoder		

Please choose the correct type according to the encoder type of the motor.

P.642	ABZ incremental encoder AB phase sequence		Factory default	0
	Predetermined area	0: Forward 1: Reverse		
P.643	Encoder installation angle		Factory default	0.0°
	Predetermined area	0.0°~359.9°		
P.644	UVW encoder UVW phase sequence		Factory default	0
	Predetermined area	0: Forward 1: Reverse		
P.645	UVW encoder offset angle		Factory default	0.0°
	Predetermined area	0.0°~359.9°		

P.646	Number of pole pairs of resolver		Factory default	1
	Predetermined area	1~65535		

P.641=2 When selecting resolver for encoder type, the number of pole pairs of resolver must be set correctly.

P.647	Check out time		Factory default	0.0s
	Predetermined area	0.0s~10.0s		

It is used to set the detection time of the encoder disconnection fault. When it is set to 0.0s, the inverter will not detect the encoder disconnection fault.

When the inverter detects a disconnection fault and the duration exceeds the time set in P.647, the inverter alarms E.PG.

P.680	PMSM motor back EMF		Factory default	◆
	Predetermined area	0.1mV/rpm~999.9mV/rpm		
P.681	PMSMD shaft inductance		Factory default	◆
	Predetermined area	0.01mH~655.35mH		
P.682	PMSMQ shaft inductance		Factory default	◆
	Predetermined area	0.01mH~655.35mH		
P.683	PMSM stator resistance		Factory default	◆
	Predetermined area	0.001Ω~65.535Ω		

P.680~P.683 are the parameters of synchronous motors. Some synchronous motor nameplates provide some parameters, but most of the motor nameplates do not provide the above parameters. They need to be automatically tuned by the inverter, and the synchronous motor must be tuned without load. Because synchronous motor no-load tuning can obtain the 4 motor parameters of P.680~P.68, while "synchronous motor on-load tuning" can only obtain the parameters such as the phase sequence and installation angle of the synchronous motor encoder.

The above-mentioned synchronous machine parameters can also be directly set according to the data provided by the manufacturer.

7.8 P7 group parameters: fault parameter area

P.700	Type of first-to-last failure	Factory default	0
P.701	Type of second-to-last failure	Factory default	0
P.702	Type of third-to-last failure	Factory default	0
P.703	Type of fourth-to-last failure	Factory default	0
P.704	Type of fifth-to-last failure	Factory default	0
P.705	Type of sixth-to-last failure	Factory default	0
P.706	Type of seventh-to-last failure	Factory default	0
P.707	Type of eighth-to-last failure	Factory default	0

You can view the fault type information of the last eight faults of the inverter through the above function codes.

P.708	Overcurrent protection failure times	Factory default	0
P.709	Overvoltage protection failure times	Factory default	0
P.710	Overheat protection failure times	Factory default	0
P.711	Overload protection failure times	Factory default	0

The above function codes can be used to view the statistics of the frequency of the latest four faults of the inverter.

P.722	Cooling fan action selection			Factory default	2
	Predetermined area	0	Temperature control		
		1	Power on to		
		2	Run to		
P.723	Fan operating temperature			Factory default	45℃
	Predetermined area	0℃~100℃			

When P.722 is set to 0, when the radiator temperature exceeds 45°C, the fan starts to run; the radiator temperature falls below 40°C, and the fan stops.

When P.722 is set to 1, when the inverter is powered on, the fan starts to run;

When P.722 is set to 2, the fan will run when the inverter is running; when the inverter is stopped, it is controlled by the temperature of the radiator. When the temperature of the radiator exceeds 45℃, the fan will start to run. Stop operation.

P.724	Motor overload factor		Factory default	100.0%
	Predetermined area	10.0%~200.0%		

The user needs to correctly set the value of P.724 according to the actual overload capacity of the motor. If this parameter is set too large, it will cause the motor to overheat and damage the inverter without warning!

P.725	Motor overload warning		Factory default	80.0%
	Predetermined area	10.0%~100.0%		

This function is used to give an early warning signal to the control system through DO before the motor overload fault protection. The pre-warning coefficient is used to determine the degree of pre-warning before the motor overload protection. The larger the value, the smaller the warning advance.

When the cumulative output current of the inverter is greater than the product of the overload inverse time curve and P.725, the inverter multi-function digital DO output "motor overload pre-alarm" action.

P.732	Undervoltage protection voltage		Factory default	◆
	Predetermined area	0V~450V		
P.734	Input phase loss		Factory default	◆
	Predetermined area	0	invalid	
		1	effective	
P.736	Output phase loss		Factory default	0
	Predetermined area	0	invalid	
		1	effective	

P.739	Overheating protection effectivness		Factory default	1
	Predetermined area	0	invalid	
		1	effective	
P.740	Overheating temperature		Factory default	95℃
	Predetermined area	25℃~100℃		

If P.739=1, the overheating protection is effective. If the inverter module radiator temperature (P.1229) reaches or exceeds the set module temperature reach value (P.740), the inverter overheating fault E.OH1 will be reported.

P.742	Overheating pre-alarm point 1	Factory default	80℃
	Predetermined area	0℃~100℃	

P.746	Communication fault selection			Factory default	0
	Predetermined area	0	invalid		
		1	effective		
P.747	Communication failure judgment time			Factory default	3.0s
	Predetermined area	0.0s~3000.0s			

When P.746 communication fault selection 1 is valid, the communication fault is enabled. In the communication control mode, if the value of the communication fault judgment time exceeds the host does not issue a communication command, the inverter outputs a fault signal and stops.

P.750	Type of last failure	Factory default	0
P.751	Frequency of failure during the last failure	Factory default	0.00Hz
P.752	Fault current at the last fault	Factory default	0.0A
P.753	Fault voltage at the last fault	Factory default	0V
P.755	Penultimate failure type	Factory default	0
P.756	Failure frequency at the penultimate failure	Factory default	0.00Hz
P.757	Fault current at the penultimate fault	Factory default	0.0A
P.758	Fault voltage at the second to last fault	Factory default	0V
P.760	The third-to-last failure type	Factory default	0
P.761	Failure frequency at the third to last failure	Factory default	0.00Hz
P.762	Fault current at the third to last fault	Factory default	0.0A
P.763	Fault voltage at the third to last fault	Factory default	0V
P.765	The fourth-to-last failure type	Factory default	0
P.766	Failure frequency at the fourth to last failure	Factory default	0.00Hz
P.767	Fault current at the fourth to last fault	Factory default	0.0A
P.768	Failure voltage at the fourth to last failure	Factory default	0V
P.770	The fifth-to-last failure type	Factory default	0
P.771	Failure frequency at the fifth to last failure	Factory default	0.00Hz
P.772	Fault current at the fifth to last fault	Factory default	0.0A
P.773	Failure voltage at the fifth to last failure	Factory default	0V

P.775	Sixth to last failure type	Factory default	0
P.776	Failure frequency at the sixth to last failure	Factory default	0.00Hz
P.777	Fault current at the sixth to last fault	Factory default	0.0A
P.778	Failure voltage at the sixth to last failure	Factory default	0V
P.780	The seventh-to-last failure type	Factory default	0
P.781	Failure frequency at the seventh to last failure	Factory default	0.00Hz
P.782	Fault current at the seventh to last fault	Factory default	0.0A
P.783	Fault voltage at the seventh to last fault	Factory default	0V
P.785	The eighth last failure type	Factory default	0
P.786	Frequency of failure at the eighth last failure	Factory default	0.00Hz
P.787	Fault current at the eighth last fault	Factory default	0.0A
P.788	Fault voltage at the eighth to last fault	Factory default	0V

The fault information of the last eight faults of the inverter can be viewed through the above function codes.

7.9 P8 group parameters: system parameter area

P.800	User password input		Factory default	0
	Predetermined area	0~65535		
P.801	User password setting		Factory default	8888
	Predetermined area	0~65535		

P.808=1 User password is enabled. When entering the menu next time, the password must be entered correctly, otherwise the function parameters cannot be modified.

P.807	Software version number		Factory default	1.10
	Predetermined area	1.00~10.00		

This parameter is for viewing only and cannot be modified.

P.808	User password enable		Factory default	2
	Predetermined area	0	Invalid user password	
		1	User password is valid	

P.808=1, enable user password.

P.818	Parameter copy		Factory default	0
	Predetermined area	0	0.---	
		1	1.uL	
		2	2.dL	

See 4.4.5 parameter copy.

P.820	Panel M knob monitor selection		Factory default	0
	Predetermined area	0~59		
P.821	First surveillance option		Factory default	3: Operating frequency 1
	Predetermined area	0~59		
P.822	Second monitoring option		Factory default	7: AC output current
	Predetermined area	0~59		
P.823	Third surveillance option		Factory default	8: DC bus voltage
	Predetermined area	0~59		
P.824	Fourth monitoring option		Factory default	12: Input and output terminal status
	Predetermined area	0~59		

The meaning of the setting value is as follows:

1	Target frequency	13	Analog input 1 (AI1) input	26	PID output
2	Operating frequency	14	Analog input 2 (AI2) input	28	Carrier frequency display
3	Operating frequency 1	15	Panel potentiometer input	29	Radiator temperature
4	Target speed	16	Pulse input frequency	31	Simple PLC cycle times
5	Actual speed	17	Virtual input and output terminal status	38	Main frequency
6	AC output voltage	18	AO1 output	39	Auxiliary frequency
7	AC output current	19	AO2 output	40	Feedback speed
8	DC bus voltage	21	Pulse output frequency	41	Encoder feedback speed
9	Given torque	22	Count value	50	Given torque (signed)
10	Actual torque	23	PID given value	51	Actual torque (signed)
11	Inverter output power	24	PID feedback value	53	PID given value (signed)
12	Input and output terminal status	25	PID deviation	54	PID feedback value (signed)

P.850	Inverter type			Factory default	◆
	Predetermined area	1	Single phase 220VAC		
		2	Three-phase 220VAC		
		3	Three-phase 380VAC		
P.851	Inverter power			Factory default	◆
	Predetermined area	0.0kW~1000.0kW			
P.852	Inverter rated current			Factory default	◆
	Predetermined area	0.1A~6553.5A			

7.10 P9 group parameters: PID function area

PID control is a common method of process control. It performs proportional, integral, and differential calculations on the difference between the feedback signal of the controlled quantity and the target signal, and adjusts the output frequency of the inverter to form a closed loop system to stabilize the conHKolled quantity. Target value. It is suitable for process control occasions such as flow control, pressure conHKol and temperature control.

P.901	PID polarity		Factory default	0
	Predetermined area	0	Negative feedback	
		1	Positive feedback	

Negative feedback: When the PID feedback signal is less than the given amount, the inverter output frequency increases. Such as winding tension control occasions.

Positive feedback: When the PID feedback signal is less than the given amount, the inverter output frequency will decrease. Such as unwinding tension control occasions.

P.902	PID given source		Factory default	0
	Predetermined area	0	Number given P.903	
		1	Analog input 1	
		2	Analog input 2	
		3	Panel potentiometer	
		4	Pulse frequency	
		5	Multiple instructions	
		6	Communication (Address P.1121)	
P.903	PID number given		Factory default	50.0%
	Predetermined area	0.0%~100.0%		

This parameter is used to select the target quantity given channel of the process PID.

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

P.904	PID feedback source		Factory default	0
	Predetermined area	0	Analog input 1	
		1	Analog input 2	
		2	Panel potentiometer	
		3	Pulse frequency	
		4	Analog input 1+Analog input 2	
		5	Analog input 1-Analog input 2	
		6	Communication (Address P.1122)	
		7	Analog input 1 and analog input 2 Max	
		8	Analog input 1 and analog input 2 Minimum	

This parameter is used to select the feedback signal channel of PID.

P.905	PID proportional gain P1		Factory default	50.0
	Predetermined area	0~100.0		
P.906	PID integration time I1		Factory default	1.0
	Predetermined area	1~10.0		
P.907	PID differential time D1		Factory default	0.0
	Predetermined area	0. 0~10.0		
P.908	PID proportional gain P2		Factory default	50.0
	Predetermined area	0~100.0		
P.909	PID integration time I2		Factory default	1.0
	Predetermined area	1~10.0		
P.910	PID derivative time D2		Factory default	0.0
	Predetermined area	0.0~10.0		

Proportional gain P:

Decide the adjustment intensity of the entire PID regulator, the greater the P1, the greater the adjustment intensity. The parameter 100.0 indicates that when the deviation between the PID feedback amount and the given amount is 100.0%, the adjustment range of the PID regulator to the output frequency command is the maximum frequency.

Integration time I:

Determine the intensity of PID regulator integral adjustment. The shorter the integration time, the greater the adjustment intensity. Integral time means that when the deviation between PID feedback quantity and given quantity is 100.0%, the integral regulator continuously adjusts after this time, and the adjustment quantity reaches the maximum frequency.

Differential time D:

Determine the intensity of the PID regulator to adjust the rate of deviation change. The longer the derivative time, the greater the adjustment intensity. Differential time means that when the feedback amount changes by 100.0% within this time, the adjustment amount of the differential regulator is the maximum frequency.

P.911	PID parameter switching conditions			Factory default	0
	Predetermined area	0	No switch		
		1	DI terminal		
		2	Automatically switch according to deviation		
P.912	PID parameter switching deviation 1			Factory default	20.0%
	Predetermined area	0.0%~100.0%			
P.913	PID parameter switching deviation 2			Factory default	80.0
	Predetermined area	0.0%~100.0%			

In some applications, a set of PID parameters cannot meet the requirements of the entire running process, and different PID parameters need to be used in different situations.

This group of function codes is used to switch the two groups of PID parameters. The two sets of PID parameters can be switched through the multi-function digital DI terminal, and can also be switched automatically according to the deviation of the PID.

When the multi-function DI terminal switch is selected, the multi-function terminal function selection should be set as the PID parameter switch terminal. When the terminal is invalid, select parameter group 1 (P.905~P.907), and when the terminal is valid, select parameter group 2 (P. .908~P.910).

When automatic switching is selected, when the absolute value of the deviation between the reference and feedback is less than the PID parameter switching deviation P.912, the PID parameter selects PID parameter group 1. When the absolute value of the deviation between reference and feedback is greater than PID switching deviation 2P.913, PID parameter selection selects PID parameter group 2. When the deviation between reference and feedback is between switching deviation 1 and switching deviation 2, the PID parameters are the linear interpolation values of the two groups of PID parameters.

P.915	PID preset output mode		Factory default	0
	Predetermined area	0	Do not enable preset frequency	
		1	Output according to hold time	
		2	Output when PID feedback<switching threshold	
		3	Output when PID feedback>switching threshold	

P.916	PID preset output source selection		Factory default	0
	Predetermined area	0	P.917	
		1	Analog channel 1	
		2	Analog channel 2	
		3	Panel potentiometer	
		4	Pulse frequency	
		5	Multiple instructions	

P.917	PID preset output frequency		Factory default	10.0%
	Predetermined area	0.0%~100.0%		
P.918	PID preset output hold time		Factory default	0.50s
	Predetermined area	0.00s~600.00s		
P.919	PID preset output switching threshold		Factory default	50.0%
	Predetermined area	0.0%~100.0%		

The PID preset output value frequency is relative to the maximum frequency.

When the inverter is started, the PID output is fixed to the PID preset output value P.917, after the PID preset output hold time P.918, the PID starts the closed loop adjustment calculation.

P.920	PID output maximum		Factory default	100.0%
	Predetermined area	0.0%~100.0%		
P.921	PID output minimum		Factory default	0.0
	Predetermined area	-100.0%~100.0%		

P.920 and P.921 are the maximum and minimum values of PID output frequency, relative to the maximum frequency.

P.922	PID deviation limit	Factory default	1.0%
	Predetermined area	0.0%~20.0%	

When the deviation between the PID given value and the feedback value is less than P.922, PID stops adjusting. In this way, the output frequency is stable when the deviation between the given and the feedback is small, which is very effective for some closed-loop control situations.

P.927	PID maximum value	Factory default	100%
	Predetermined area	0%~100%	

When the PID setting value is greater than the P.927 PID setting maximum value, the setting value is limited to this value.

P.930	PID sleep enable		Factory default	0
	Predetermined area	0	Invalid	
		1	Sleep mode 1	
		2	Sleep mode 2	
P.931	PID sleep frequency		Factory default	0.0%
	Predetermined area	0.0%~100.0%		
P.932	PID sleep threshold selection		Factory default	0
	Predetermined area	0	P.933	
		1	Analog channel 1	
		2	Analog channel 2	
		3	Panel potentiometer	
P.933	PID sleep threshold		Factory default	100.0%
	Predetermined area	0.0%~100.0%		
P.934	PID wake up threshold		Factory default	10.0%
	Predetermined area	0.0%~100.0%		
P.935	PID sleep waiting time		Factory default	1.0s
	Predetermined area	0.0s~3000.0s		

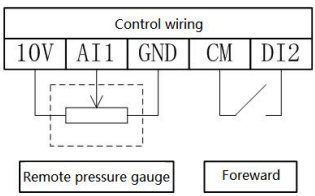
This set of parameters is used to realize sleep and wake-up functions in water supply applications. P.930=1, enable sleep mode 1. When the feedback value is greater than the set value during inverter operation, the output frequency drops below the set frequency of P.931, and the PID set by P.935 sleeps. After waiting time, it enters sleep state and displays SLP. P.930=2, enable sleep mode 2. When the feedback value is greater than the sleep threshold, after the PID sleep waiting time set by P.935, the inverter enters the sleep state and displays SLP.

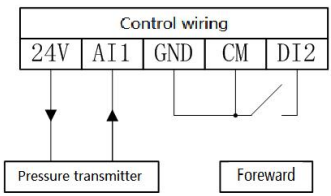
If the inverter is in the sleep state, when the feedback is less than the PID wake-up threshold set in P.934, after the PID wake-up waiting time set in P.936 has elapsed, the inverter exits the sleep state for PID adjustment.

P.942	PID feedback disconnection detection value		Factory default	0.0%
	Predetermined area	0.0%~100.0%		
P.943	PID feedback disconnection detection time		Factory default	0.0s
	Predetermined area	0.0s~3000.0s		
P.944	PID feedback disconnection detection frequency		Factory default	20.0%
	Predetermined area	0.0%~100.0%		

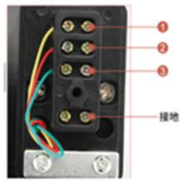
This function code is used to judge whether PID feedback is lost. When the PID feedback amount is less than the PID feedback disconnection detection value P.942 and the duration exceeds the PID feedback disconnection detection time P.943, the inverter will alarm the corresponding fault and deal with it according to the selected fault handling method.

The default setting in this manual takes a pressure gauge with a total range of 1.6Mpa as an example to explain the wiring and use. Please set other ranges according to the actual application.











Serial number	Name	Wiring
1	Common terminal	Connect to GND
2	Low voltage contact	Connect AI1
3	High voltage contacts	Connect to 10V
4		Grounded

Pressure transmitters	Powered by	Output
	24VDC	4-20mA

Note:

When the two-wire 4-20mA input inverter is used, short-circuit the inverter CM\GND terminal, connect 24V to the power terminal of the remote pressure sensor, and connect the remote pressure sensor signal, AI1 or AI2.

Constant pressure control parameter setting (take the set pressure 0.8Mpa as an example):

Parameter	Name	Description
P.001=1	Command source selection	1: Terminal command channel terminal start and stop
P.003=7	Main frequency source X selection	7:PID
P.921=30	PID output minimum	The minimum output frequency of the inverter in PID mode, the set value is the percentage of the maximum frequency, namely: 50HZ (P012)* 30% (P921)=15HZ
P.051=1	Stop mode	1: Free stop
P.100=0	Terminal command mode	0: Two-line type 1
P.151=0	AI1 type selection	0: 0-10V 1: 0-20mA 2: 4-20mA 3: 0-5V Choose according to sensor type: choose 0 for remote pressure gauge, choose 2 for pressure transmitter
P.903=50	PID number given	The percentage of the total range, the factory default value is 50% of the total range, namely: 1.6Mpa*50%=0.8Mpa.
P.904=0	PID feedback source	The feedback source is: P.904=0 for AI1; P.904=1 for AI2.

When the sleep function is required, the sleep parameters are set as follows:

Take the sleep pressure of 1Mbar and the wake-up pressure of 0.6Mbar, as an example:

Parameter	Name	Description
P930=1	PID sleep enable	1: Sleep mode 1
P.931=40	PID sleep frequency	The percentage of the maximum frequency P.012, namely: 50HZ (P012)*40%=20HZ
P.933=62.5	PID sleep threshold	PID sleep threshold = 1Mpa/1.6Mpa=62.5%
P.934=37.5	PID wake up threshold	PID wake-up threshold=0.6 Mpa /1.6Mpa=37.5%
P.935=3.0	PID sleep waiting time	Unit second
P.936=3.0	PID wake-up waiting time	Unit second

When the inverter is running, if the feedback value is greater than the set value P903 (0.8Mpa), and the output frequency is lower than the set value of P.931 (20HZ), or the feedback value is higher than the sleep valve set by P.933 Value (1Mpa), after delaying the time (3S) set by P.935, it will enter the dormant state and display SLP.

When the inverter is in the sleep state, if the feedback value is less than the wake-up threshold (0.6Mpa) set in P.934, after the wake-up waiting time (3S) set in P.936, the inverter automatically exits the sleep state and performs PID adjustment again.

7.11 P10 group parameters: multi-speed and simple PLC area

Multi-stage speed needs to set the following multi-stage commands:

P.1000	Section 0 instruction	Factory default	10.0%
P.1001	Section 1 instruction	Factory default	20.0%
P.1002	Section 2instruction	Factory default	30.0%
P.1003	Section 3 instruction	Factory default	40.0%
P.1004	Section 4 instruction	Factory default	50.0%
P.1005	Section 5 instruction	Factory default	60.0%
P.1006	Section 6 instruction	Factory default	70.0%
P.1007	Section 7 instruction	Factory default	80.0%
P.1008	Section 8 instruction	Factory default	90.0%
P.1009	Section 9 instruction	Factory default	100.0%
P.1010	Section 10 instruction	Factory default	90.0%
P.1011	Section 11 instruction	Factory default	80.0%
P.1012	Section 12 instruction	Factory default	70.0%
P.1013	Section 13 instruction	Factory default	60.0%
P.1014	Section 14 instruction	Factory default	50.0%

P.1015	Section 15 instruction	Factory default	40.0%
Above parameters	Predetermined area	-100.0%~100.0%	

The dimension of the multi-step command is a relative value, ranging from -100.0% to 100.0%. When used as a frequency source, it is a percentage of the relative maximum frequency.

Multi-segment commands need to be switched according to the different states of the multi-function digital DI. For details, please refer to the relevant description table 73 Multi-segment command terminal function description.

P.1016	The 0th segment command setting method		Factory default	0
	Predetermined area	0: P.1000 1: Analog input 1 2: Analog input 2 3: Panel potentiometer 4: Pulse frequency 5: PID speed regulation		

P.1017	Simple PLC operation mode		Factory default	0
	Predetermined area	0: Stop when the cycle is complete 1: The cycle is complete and keep the last segment running		
P.1018	Simple PLC segment number setting		Factory default	15
	Predetermined area	0~15		
P.1019	Simple PLC cycle times setting		Factory default	0
	Predetermined area	0:Infinite loop 1~65535		

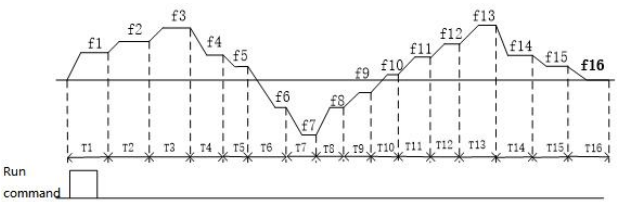


Figure 7-20 Simple PLC setting operation

f1~f16 are the 1st to 16th speed frequency, T1-T16 the 1st to 16th speed running time.

Setting of multi-speed acceleration and deceleration time:

P.1020	0 stage speed acceleration and deceleration time selection	Factory default	0
P.1021	1 stage speed acceleration and deceleration time selection	Factory default	0
P.1022	2 stage speed acceleration and deceleration time selection	Factory default	0
P.1023	3 stage speed acceleration and deceleration time selection	Factory default	0
P.1024	4 stage speed acceleration and deceleration time selection	Factory default	0
P.1025	5 stage speed acceleration and deceleration time selection	Factory default	0
P.1026	6 stage speed acceleration and deceleration time selection	Factory default	0
P.1027	7 stage speed acceleration and deceleration time selection	Factory default	0
P.1028	8 stage speed acceleration and deceleration time selection	Factory default	0
P.1029	9 stage speed acceleration and deceleration time selection	Factory default	0
P.1030	10 stage speed acceleration and deceleration time selection	Factory default	0
P.1031	11 stage speed acceleration and deceleration time selection	Factory default	0
P.1032	12 stage speed acceleration and deceleration time selection	Factory default	0
P.1033	13 stage speed acceleration and deceleration time selection	Factory default	0
P.1034	14 stage speed acceleration and deceleration time selection	Factory default	0
P.1035	15 stage speed acceleration and deceleration time selection	Factory default	0

Above parameters	Predetermined area	0	1 acceleration and deceleration time
		1	2 acceleration and deceleration time
		2	3 acceleration and deceleration time
		3	4 acceleration and deceleration time

Setting of multi-speed running time:

P.1040	0 stage speed running time	Factory default	1.0s
P.1041	1 stage speed running time	Factory default	1.0s
P.1042	2 stage speed running time	Factory default	1.0s
P.1043	3 stage speed running time	Factory default	1.0s
P.1044	4 stage speed running time	Factory default	1.0s
P.1045	5 stage speed running time	Factory default	1.0s
P.1046	6 stage speed running time	Factory default	1.0s
P.1047	7 stage speed running time	Factory default	1.0s
P.1048	8 stage speed running time	Factory default	1.0s
P.1049	9 stage speed running time	Factory default	1.0s
P.1050	10 stage speed running time	Factory default	1.0s
P.1051	11 stage speed running time	Factory default	1.0s
P.1052	12 stage speed running time	Factory default	1.0s
P.1053	13 stage speed running time	Factory default	1.0s
P.1054	14 stage speed running time	Factory default	1.0s
P.1055	15 stage speed running time	Factory default	1.0s
Above parameters	Predetermined area	0.1s~3600.0s	

P.1056	Simple PLC memory method	Factory default	0
	Predetermined area	Units: Power-down memory selection 0: No memory 1: Memory Ten place: stop memory selection 0: No memory 1: Memory	

7.12 P11 group parameters: communication control parameter area

P.1101	Restore factory value		Factory default	0
	Predetermined area	0~1		

The host computer can restore the factory value of the inverter by writing this parameter P.1101 address (0x44D) or directly setting this parameter.

P.1109	Control instruction		Factory default	0
	Predetermined area	bit0	Stop	
		bit1	Free stop	
		bit2	Forward	
		bit3	Reverse	
		bit4	Forward jog	
		bit5	Reverse jog	
		bit6	Fault reset	

The upper computer can write this parameter P.1109 address (0x455), in the communication command channel, it can control the inverter.

P.1110	Communication command frequency		Factory default	50.00Hz
	Predetermined area	0.00Hz~650.00Hz		

The host computer can write this parameter P.1110 address (0x456), and it can directly realize frequency conversion speed regulation in the communication command channel.

P.1112	DO setting 1		Factory default	0
	Predetermined area	0~1		
P.1113	DO setting 2		Factory default	0
	Predetermined area	0~1		
P.1114	DO setting 3		Factory default	0
	Predetermined area	0~1		

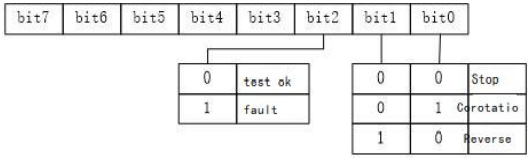
When the digital output DO1, DO2 and RELAY, when the output function is selected as communication control.

① The host computer can control the analog DO of the inverter by writing the parameter P.1112 address (0x458);

②The upper computer can control the analog DO of the inverter by writing the parameter P.1113 address (0x459);

③The host computer can control the analog DO of the inverter by writing the parameter P.1114 address (0x45A);

7.13 P12group parameters:Monitoring parameters area

Function code	Name	Factory value	Range
P.1200	Inverter status	0	Two-bit (bit) parameter
			
P.1201	Target frequency	0.00Hz	0.00Hz~655.35Hz
P.1202	Operating frequency	0.00Hz	0.00Hz~655.35Hz
P.1203	Operating frequency 1	0.00Hz	0.00Hz~655.35Hz
P.1204	Target speed	0rpm	0rpm~65535rpm
P.1205	Target speed	0rpm	0rpm~65535rpm
P.1206	AC output voltage	0V	0V~65535V
P.1207	AC output current	0A	0A~65535A
P.1208	DC bus voltage	0V	0V~65535V
P.1209	Given torque	0.0%	0%~6553.5%
P.1210	Actual torque	0%	0%~6553.5%
P.1211	Inverter output power	0.00kW	0~655.35kW
P.1212	Input and output terminal status	0	10-bit parameter

bit15	bit14	bit13	Bit12	bit11	bit10	bit9	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
–	–	–	–	–	DO2	DO1	RELAY	DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1

P.1213	Analog input1(AI1) input	0.00	0.00V~10.00V or 0.00 mA~20.00mA
P.1214	Analog input 2(AI2) input	0.00	0.00V~10.00V or 0.00 mA~20.00mA
P.1215	Panel potentiometer input	0.0%	0.0%~6553.5%
P.1216	Pulse input frequency	0.00kHz	0.00kHz~655.35kHz
P.1217	Virtual input and output terminal status	0	16-bit (bit) parameter

bit15	bit14	bit13	Bit12	bit11	bit10	bit9	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
VDO8	VDO7	VDO6	VDO5	VDO4	VDO3	VDO2	VDO1	VDI8	VDI7	VDI6	VDI5	VDI4	VDI3	VDI2	VDI1

P.1218	AO1 output	0.00	0.00V~10.00V or 0.00 mA~20.00mA

P.1219	AO2 output	0.00	0.00V~10.00V or 0.00 mA~20.00mA
P.1221	Pulse output frequency	0.00kHz	0.00kHz~655.35kHz
P.1222	Count value	0	0~65535
P.1223	PID given value	0.0%	0.0%~6553.5%
P.1224	PID feedback value	0.0%	0.0%~6553.5%
P.1225	PID deviation	0.0%	0.0%~6553.5%
P.1226	PID output	0.0%	0.0%~6553.5%
P.1228	Carrier frequency display	0Hz	0Hz~65535Hz
P.1229	Radiator temperature	0℃	0℃~65535℃
P.1231	Simple PLC cycle times	0	0~65535
P.1238	Main frequency	0.00Hz	-327.67Hz~327.66Hz
P.1239	Auxiliary frequency	0.00Hz	-327.67Hz~327.66Hz
P.1240	Feedback speed	0.00Hz	-327.67Hz~327.66Hz
P.1241	encoder feedback speed	0.00Hz	-327.67Hz~327.66Hz
P.1250	given torque (signed)	0.0%	-3276.7%~3276.6%
P.1251	given torque (signed)	0.0%	-3276.7%~3276.6%
P.1253	PID given value (signed)	0.0%	-3276.7%~3276.6%
P.1254	PID feedback value (signed)	0.0%	-3276.7%~3276.6%

Chapter 8 Failure and Diagnosis

When the inverter fails, the digital tube will display the corresponding fault code, the fault relay will act, the inverter will stop output, and the motor will stop running freely. When a fault occurs during the operation of the inverter, please check the fault type, cause and countermeasures according to the content in this chapter. The list in the table is for reference only. Please do not disassemble or modify the machine without authorization. If the cause cannot be eliminated, please seek technical support from our company or our agent.

After the fault is eliminated, It can be reset in the following ways:

1. The operation panel is reset.
2. External reset terminal reset.
3. Communication mode failure reset.
4. Turn on the inverter after completely losing power.

Fault code	Fault type	Code	Code possible cause of fault	trouble shooting countermeasures
E.OC1	Over current 1	1	Incorrect wiring of inverter and motor Incorrect motor parameters Inverter power selection is too small Acceleration and deceleration time is too short Restart the rotating motor at momentary power failure	Correct the inverter and motor wiring Set the correct motor parameters Choose the right inverter power Set appropriate acceleration and deceleration time
E.OC2	Over current 2	3		
E.OC3	Over current 3	5		
E.OU1	Over voltage 1	2	Input voltage is too high Deceleration time is too short Irregular wiring leads to hardware over voltage Restart the rotating motor at momentary power failure Improper selection of brake components	Check the input power voltage Set the appropriate deceleration time Check system wiring and standardize wiring
E.OU2	Over voltage 2	4		
E.OU3	Over voltage 3	6		
E.LU1	Shutdown undervoltage	9	Instantaneous power failure Inverter input voltage is low Low bus voltage Rectifier bridge and buffer resistance are abnormal	reset fault Adjust the voltage to the normal range Seek technical support Seek technical support
E.LU2	Running undervoltage	10		
E.OL1	Frequency converter overload	11	The acceleration time is set too short Improper setting of V/F curve or torque boost causes a momentary stop to restart the rotating motor Grid voltage is too low Motor load is too large	Adjust acceleration time Adjust the motor VF curve and torque boost Check the input grid voltage Select the inverter with matching power
E.OL2	Motor overload	12	Whether the load is too large or the motor is blocked Inverter selection is too small	Reduce the load and check the motor and mechanical conditions Choose a frequency converter with a higher power rating

Fault code	Fault type	Code	Code possible cause of fault	trouble shooting countermeasures
E.OH1	Frequency conversion overheating	14	Ambient temperature exceeds specifications demand Poor ventilation outside the inverter Fan failure The temperature detection circuit is malfunctioning	Derating for use, power amplification Rectify the external ventilation of the inverter Replace the fan Seek technical support
E.OH2	Motor overheated	15	temperature sensor wiring loosing	Check the temperature sensor wiring and troubleshoot Reduce the carrier frequency or take other heat dissipation measures to the motor
E.PF1	Input phase loss	16	For the three-phase input inverter, the three-phase input power supply lacks phase	Check the three-phase input power Seek technical support
E.PF2	Output phase loss	17	The three-phase output of the inverter is disconnected or lacking phase The three-phase load carried by the inverter is seriously unbalanced	Check the wiring between the inverter and the motor Check motor quality
E.CSE	Current sampling error	18	The drive board and the control board cable are loose Damaged of the current detection circuit	Check the connection Contact factory for repair
E.rEr	Parameter identification error	19	Damaged current detection circuit No motor connected	Check motor parameters Connect the motor
E.EtF	External fault	20	terminal action of the External equipment failure	Check external equipment
E.GP	protection to Short circuit ground	21	Motor short circuit to ground	Replace cable or motor
E.AF1	Wire break protection	22	PID feedback disconnection	Check wiring
E.FtF	Search frequency failure	23	High Speed tracking failed	Seek technical support
E.PG	Encoder Fault PG	24	Encoder model does not match Encoder connection error Encoder is damaged PG card abnormal	Set the encoder type correctly according to the actual situation troubleshoot the line Replace the encoder Replace PG card
E.rr25	Speed deviation is too large	25	Encoder parameter setting is incorrect No parameter identification The speed deviation is too large and the detection parameter setting is unreasonable	Set the encoder type correctly according to the actual situation troubleshoot the line Replace the encoder

Fault code	Fault type	Code	Code possible cause of fault	trouble shooting countermeasures
E.r26	Motor Over speed	26	Encoder parameter setting is incorrect No parameter identification The motor over speed detection parameter setting is unreasonable	Set the encoder type correctly according to the actual situation troubleshoot the line Replace the encoder
E.r27	Communication fail	27	The upper computer is not working properly The communication line is abnormal Communication parameters are not set correctly	Check the upper computer wiring Check the communication cable Set communication parameters correctly

Chapter 9 Care and Maintenance

Due to the influence of environmental temperature, humidity, pH, dust, vibration and other factors, as well as the aging and wear of the internal components of the inverter, potential failures of the inverter will occur. Therefore, it is necessary to correct the problem during storage and use. The frequency converter need daily or regular maintenance and maintenance.

• If the inverter is transported over long distances, you should routinely check whether the product components are complete and whether the screws are fastened before use.

• During the use of the inverter, the dust inside the inverter should be cleaned regularly, and the internal fastening screws should be checked for looseness.



• Only qualified professionals who have received professional training and authorization can maintain the inverter.

• The maintenance personnel must remove the metal jewelry before maintenance. During maintenance, clothing and tools that meet insulation requirements must be used.

• Dangerous high voltage still exists inside the inverter when it is live and running.

• Before inspecting and maintaining the inverter, disconnect the input power of the inverter reliably and wait at least 10 minutes. Make sure that the internal charging indicator lamp of the inverter and all the indicators on the operation panel have been extinguished, and the voltage between the power terminals (+) and (-) is lower than 36V, then the inverter cover can be opened for maintenance.



• For inverters stored for more than 2 years, the power supply should be slowly boosted through a voltage regulator when the power is turned on.

• Do not leave metal objects such as wires, tools, screws, etc. inside the inverter.

• Do not modify the interior of the inverter without authorization.

• There are IC components sensitive to static electricity inside the inverter, please do not directly touch the components on the board

9.1 Daily maintenance and repair

The inverter must be running in the specified environment, in addition, the operation of accidents may occur. Therefore, the user should be in accordance with table 9-1 routine inspection items, do a good job of daily maintenance.

Keep a good running environment, record the daily running data, and find abnormal phenomena in time, can extend the life of inverter.

Table9-1 Daily inspection items

Inspection object	Inspection content	Inspection content
Operating environment	Operating environment	-10℃~+40℃，40℃~50℃ need derating
	Dust, water and drips	No trace of water leakage
	Gas	no odor
inverters	vibration, heating	stable vibration, reasonable wind temperature
	Noise	No unusual noise
Motor	heating	no abnormal heating
	Noise	uniform noise
Running state parameters	Output current	in the rated value range
	Output voltage	in the rated value range

9.2 Regular maintenance

According to the operating environment, users can conduct regular inspections on the inverter every 3 to 6 months to eliminate hidden troubles and ensure long-term high-performance and stable operation of the equipment.

Check contents:

·Check whether the air inlet of the radiator is blocked, and regularly use an air gun to remove oil, dust and lint on the air inlet of the radiator;

·Clean up oil, dust and lint on fan blades;

·Whether the screw of the control terminal is loose, if it is loose, it can be tightened with a screw of appropriate torque and size;

·Whether the power terminals are in poor contact, and whether there are traces of overheating at the copper bar or cable connection;

·Whether the power cables and control cables are damaged, especially whether the skin contacting the metal surface has cut marks;

·Whether the insulation bandage of the nose of the power cable and control signal line is off or broken;

1. The inverter has passed the withstand voltage test before leaving the factory, and the user does not need to perform the withstand voltage test, otherwise the inverter will be damaged due to improper testing.

2. If the insulation test of the motor is performed, the input terminal U/V/W of the motor must be disconnected from the inverter and then the motor must be tested separately, otherwise the inverter will be damaged.

3. For inverters stored for a long time, a power-on experiment must be conducted within 2 years, at least 5 hours when power-on, and a voltage regulator is used to slowly increase to the rated value.

9.3 Replacement of vulnerable parts of the inverter

The vulnerable parts of the frequency converter are mainly cooling fans and filter electrolytic capacitors. Their service life is closely related to the environment and maintenance conditions. Users can set the replacement period according to the operating time.

cooling fan

Life time: 30,000 to 40,000 hours

Possible reasons for damage: bearing wear, blade aging.

Judgment criteria: When the inverter is powered off, check whether there are cracks in the fan blades, etc.; when the inverter is powered on, check whether the fan is running normally, whether there is abnormal vibration, noise, etc.

Filter electrolytic capacitor

Life time: 40,000 to 50,000 hours

Possible causes of damage: high ambient temperature, frequent load jumps cause increased pulsating current and electrolyte aging.

Judgment criteria: Whether the inverter often has overcurrent, overvoltage and other faults when running with load; whether there is liquid leakage, whether the safety valve has protruded, the measurement of electrostatic capacitance, and the measurement of insulation resistance.

9.4 Waste Disposal

When scrapping, please note:

The electrolytic capacitor inside the inverter may explode when burned.

Toxic gas is generated when plastic parts are burned.

Please dispose of it as industrial waste.

Appendix 1 Product Technical Specifications

Item		specifications
Input	Rated voltage	S2:220V~240V（±15%） T3:380V~480V（+10%/-15%）
	Rated frequency	50/60Hz
Output	Output voltage	three-phase 0~input voltage
	Output frequency	0.50~650.0Hz
	Overload capacity	150% rated current for 60 seconds (constant torque/heavy load) 120% rated current for 60 seconds (variable torque/light load)
Control characteristics	Control mode	Asynchronous motor:SVC、VVVF synchronous motor:SVC
	Starting torque	0.5Hz150%(SVC)
	Speed range	1:100(VVVF) 1:200(SVC)
	Speed range	≤±0.6%(SVC)
	Torque response	≤40ms(SVC)
	Frequency resolution Digital setting	Digital setting: 0.01Hz Analog setting: maximum frequency×0.1%
	Control mode	SVPWM
	Carrier frequency	0.8~16kHz, adjusted according to power
	Carrier automatic adjustment	When this function is selected, the inverter can automatically adjust the carrier frequency according to the internal temperature
	Torque boost	In VVVF control mode, manual torque boost is 0.1%~30.0%
	Acceleration and deceleration time	0~6500.0s, linear acceleration and deceleration or S curve acceleration and deceleration mode, four groups of acceleration and deceleration time are optional
	Jog function	Jog frequency range:lower limit frequency ~ upper limit frequency Jog acceleration and deceleration time: 0.1~3000s
	Overvoltage stall control	Suppress the DC bus voltage during inverter operation to prevent DC bus over voltage
	MODBUS communication	Standard MODBUS communication
Operation and running	Frequency setting	Frequency setting, keyboard setting, external terminal setting and communication setting three ways
	Main frequency	source Digital setting, analog setting, pulse setting, multi-speed, communication setting, etc.
	Auxiliary frequency source	7 kinds of auxiliary frequencies, which can flexibly realize auxiliary frequency fine-tuning, frequency synthesis, etc.
	Input terminals	8 digital input terminals, which can be used for sink and source input selection DI1 can be used as high-speed pulse input, the highest frequency is 50KHz
		2 analog input terminals: AI1: 0~5V, 0~10V, 4~20mA or 0~20mA optional AI2: 0~5V, 0~10V, 4~20mA or 0~20mA optional
	Output terminal	2 programmable switch output, output level 24V when turned on
		1 programmable relay output, 250VAC/3A30VDC/3A

Item		specifications
		2 analog output terminals: AO1: 0~5V, 0~10V, 4~20mA or 0~20mA optional; AO2: 4~20mA or 0~20mA optional
Featured function	Independent power supply for the control board	Non-complete machine power on, you can operate the control box to read the function code
	Simple PLC	Simple PLC realizes up to 15-speed operation through automatic circulation or control terminals
	Built-in PID	can easily realize process closed-loop control system
	Automatic voltage adjustment	When the grid voltage changes, it can automatically keep the output voltage constant
	Temperature control	carrier frequency Automatically adjust the carrier frequency as the internal temperature of the machine changes
	Temperature-controlled fan	The operation of the fan is controlled by temperature to extend the life of the fan
	DC braking	initial frequency of DC braking: 0.00-Maximum set frequency
		DC braking time: 0.01~60.00s (0.0: no action)
		DC braking current: 0.0~100.0% inverter rated current
	Stall adjustment	When the output current reaches the automatic current limit value, adjust the output frequency of the inverter so that the current does not exceed the set value to prevent the inverter from over-current fault to the greatest extent and ensure the inverter's uninterrupted operation
	Common DC bus	18.5kW and above power, can realize common DC bus application
	Oscillation suppression	Improve smooth start of current waveform during operation
	Speed tracking	Smooth start without shock
	VF separation	Inverter output voltage and frequency separation
	Instantaneous power failure function:	nstantaneous power failure without stopping: When the busbar drops instantly or power failure, energy is fed back through the load to maintain the inverter running for a short time
		nstantaneous power failure without stopping: When the busbar drops instantly or power failure, energy is fed back through the load to maintain the inverter running for a short time
	Over modulation	increase output voltage
	increase output voltage	Upload and download parameters through the operation panel
Protection function		Input phase loss, output phase loss, input under voltage, DC over voltage, over current, inverter overload, motor overload, current stall, overheating, etc.

Item		specifications
Display		The panel displays the current output frequency, speed, output current, output voltage, DC bus voltage, PID feedback value/set value, fault type and parameters, and indicates the working status of the inverter, etc.
Environmental conditions	Equipment location	Indoor installation, avoid direct sunlight, free of dust, corrosive gas, flammable and explosive gas, oil mist, water vapor, dripping water or salt, etc
	Ambient temperature	-10℃~+50℃ (no freezing)
	Environmental humidity	below 90% (no condensation)
	Vibration intensity	below 4.9m/s2 (acceleration)
	Altitude	below 1000 meters (for each increase of 500m, the rated current needs to be reduced by 5%
Protection grade		IP20
Adapted motor		2S:0.4kW~2.2kW 4T:0.75kW~630kW

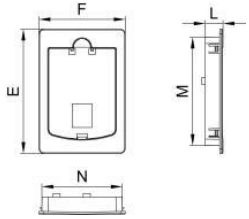
Appendix 2 Product Technical Parameters

Reference	power	Output current	Structure code	weight	Cooling mode	Remarks
HK500/HK700-2S0.4GC(B)	0.40kW	2.5A	H1	1kg	Self-cooling	Wall-mounted
HK500/HK700-2S0.75GC(B)	0.75kW	4A	H1	1kg	Self-cooling	Wall-mounted
HK500/HK700-2S1.5GC(B)	1.5kW	7A	H1	1kg	Self-cooling	Wall-mounted
HK500/HK700-2S2.2GC(B)	2.2kW	10A	H2	2kg	Self-cooling	Wall-mounted
HK500/HK700-4T0.75GCB	0.75kW	2.5A	H1	1kg	Self-cooling	Wall-mounted
HK500/HK700-4T1.5GCB	1.5kW	4A	H1	1kg	Self-cooling	Wall-mounted
HK500/HK700-4T2.2GCB	2.2kW	6A	H2	2kg	Self-cooling	Wall-mounted
HK500/HK700-4T3.0GCB	3.0kW	7A	H2	2kg	Self-cooling	Wall-mounted
HK500/HK700-4T4.0G/5.5LCB	4.0kW	9A/13A	H3	2kg	Self-cooling	Wall-mounted
HK500/HK700-4T5.5G/7.5LCB	5.5kW	13A/17A	H3	2kg	Self-cooling	Wall-mounted
HK500/HK700-4T7.5G/11LCB	7.5kW	17A/25A	H4	3kg	Self-cooling	Wall-mounted
HK500/HK700-4T11G/15LCB	11kW	25A/32A	H4	4kg	Self-cooling	Wall-mounted
HK500/HK700-4T15G/18.5LCB	15kW	32A/38A	H4	4kg	Self-cooling	Wall-mounted
HK700-4T18.5G/22LCB	18.5kW	38A/45A	H5	6kg	Self-cooling	Wall-mounted
HK700-4T22G/30LCB	22kW	45A/60A	H5	6kg	Self-cooling	Wall-mounted
HK700-4T30G/37LCB	30kW	60A/75A	H5	7kg	Self-cooling	Wall-mounted
HK700-4T37G/45LC(B)	37kW	75A/90A	H6	14kg	Self-cooling	Wall-mounted
HK700-4T45G/55LC(B)	45kW	90A/110A	H6	15kg	Self-cooling	Wall-mounted
HK700-4T55G/75LC	55kW	110A/150A	H7	27kg	Self-cooling	Wall-mounted
HK700-4T55G/75LCT	55kW	110A/150A	H7	34kg	Self-cooling	Wall-mounted
HK700-4T75G/90LC	75kW	150A/180A	H7	28kg	Self-cooling	Wall-mounted
HK700-4T75G/90LCT	75kW	150A/180A	H7	35kg	Self-cooling	Wall-mounted
HK700-4T90G/110LC	90kW	180A/220A	H8	35kg	Self-cooling	Wall-mounted
HK700-4T90G/110LCT	90kW	180A/220A	H8	42kg	Self-cooling	Wall-mounted
HK700-4T110G/132LC	110kW	220A/260A	H8	36kg	Self-cooling	Wall-mounted
HK700-4T110G/132LCT	110kW	220A/260A	H8	43kg	Self-cooling	Wall-mounted
HK700-4T132G/160LC	132kW	260A/320A	H9	58kg	Self-cooling	Wall-mounted
HK700-4T132G/160LCT	132kW	260A/320A	H9	69kg	Self-cooling	Wall-mounted
HK700-4T160G/185LC	160kW	320A/360A	H9	64kg	Self-cooling	Wall-mounted
HK700-4T160G/185LCT	160kW	320A/360A	H9	75kg	Self-cooling	Wall-mounted
HK700-4T185G/200LC	185kW	360A/400A	H9	64kg	Self-cooling	Wall-mounted
HK700-4T185G/200LCT	185kW	360A/400A	H9	75kg	Self-cooling	Wall-mounted
HK700-4T200G/220LC	200kW	400A/440A	HA	95kg	Self-cooling	Wall-mounted

Reference	power	Output current	Structure code	weight	Cooling mode	Remarks
HK700-4T220G/250LC	220kW	440A/480A	HA	96kg	Self-cooling	Wall-mounted
HK700-4T250G/280LC	250kW	480A/520A	HA	111kg	Self-cooling	Wall-mounted
HK700-4T280G/315LC	280kW	520A/580A	HA	112kg	Self-cooling	Wall-mounted
HK700-4T315G/355LC	315kW	580A/650A	HB	143kg	Self-cooling	Wall-mounted
HK700-4T355G/400LC	355kW	650A/725A	HB	149kg	Self-cooling	Wall-mounted
HK700-4T400G/450LC	400kW	725A/770A	HB	154kg	Self-cooling	Wall-mounted
HK700-4T450G/500LC	450kW	770A/900A	HB	162kg	Self-cooling	Wall-mounted
HK700-4T500G/560LC	500kW	900A/950A	HC	198kg	Self-cooling	Wall-mounted
HK700-4T560G/630LC	560kW	950A/1100A	HC	209kg	Self-cooling	Wall-mounted
HK700-4T630G/710LC	630kW	1100A/1300A	HC	211kg	Self-cooling	Wall-mounted
HK700-4T90G/110LDT	90kW	180A/220A	H8D	52kg	Self-cooling	Wall-mounted
HK700-4T110G/132LDT	110kW	220A/260A	H8D	53kg	Self-cooling	Wall-mounted
HK700-4T132G/160LDT	132kW	260A/320A	H9D	79kg	Self-cooling	Wall-mounted
HK700-4T160G/185LDT	160kW	320A/360A	H9D	85kg	Self-cooling	Wall-mounted
HK700-4T185G/200LDT	185kW	360A/400A	H9D	85kg	Self-cooling	Wall-mounted
HK700-4T200G/220LDT	200kW	400A/440A	HA1	151kg	Self-cooling	Wall-mounted
HK700-4T220G/250LDT	220kW	440A/480A	HA1	152kg	Self-cooling	Wall-mounted
HK700-4T250G/280LDT	250kW	480A/520A	HA1	167kg	Self-cooling	Wall-mounted
HK700-4T280G/315LDT	280kW	520A/580A	HA1	168kg	Self-cooling	Wall-mounted
HK700-4T315G/355LDT	315kW	580A/650A	HB1	195kg	Self-cooling	Wall-mounted
HK700-4T355G/400LDT	355kW	650A/725A	HB1	201kg	Self-cooling	Wall-mounted
HK700-4T400G/450LDT	400kW	725A/770A	HB1	207kg	Self-cooling	Wall-mounted
HK700-4T450G/500LDT	450kW	770A/900A	HB1	214kg	Self-cooling	Wall-mounted
HK700-4T500G/560LDT	500kW	900A/950A	HC1	270kg	Self-cooling	Wall-mounted
HK700-4T560G/630LDT	560kW	950A/1100A	HC1	280kg	Self-cooling	Wall-mounted
HK700-4T630G/710LDT	630kW	1100A/1300A	HC1	280kg	Self-cooling	Wall-mounted

Appendix 3 Product installation dimensions

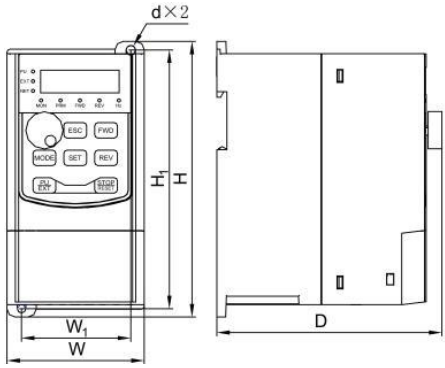
1.Schematic diagram of panel mounting bracket structure size:



Appendix3 Figure1 Panel mounting bracket structure size

Structure code	Structure dimension			Hole size	
	E(mm)	F(mm)	L(mm)	M(mm)	N(mm)
CP1	131	91	23	115±0.5	85±0.5

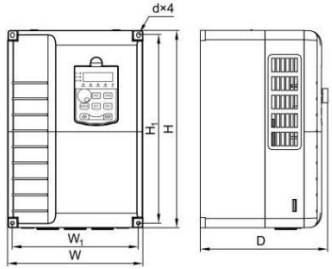
2.Schematic diagram of structure and size of H1 and H2 models:



Appendix3 Figure 2 H1/H2 model size

Structure code	H(mm)	H1(mm)	W(mm)	W1(mm)	D(mm)	d
H1	170	160	84.5	67.5	139	M4
H2	194	185	97	85	153.5	M4

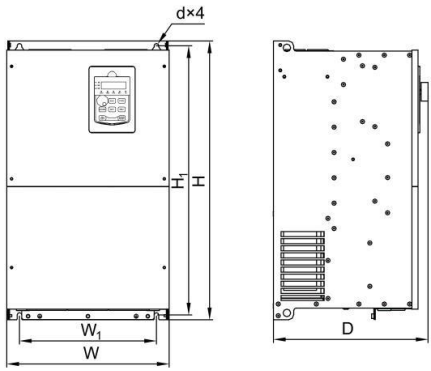
2.H3, H4, H5 model structure size diagram:



Appendix3 Figure 3 H3/H4/H5 model size

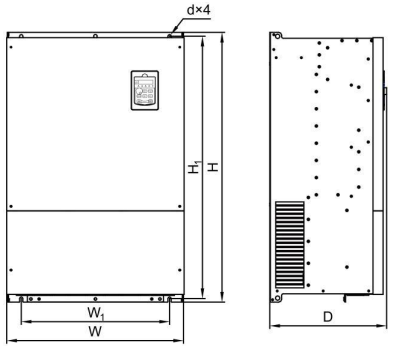
Structure code	H(mm)	H1(mm)	W(mm)	W1(mm)	D(mm)	d
H3	185	175.5	118	106.5	167	M4
H4	247	235	160	148	188	M5
H5	320	305	220	205	207.5	M5

3.H6, H7, H8,H9 model structure size diagram:



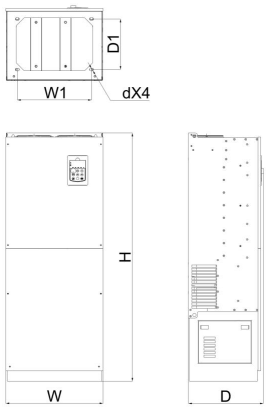
Appendix III Figure 4 H6/H7/H8/H9 model size

Structure code	H(mm)	H1(mm)	W(mm)	W1(mm)	D(mm)	d
H6	450	430	282	240	247	M6
H7	550	531	320	270	300	M8
H8	580	560	338	270	329	M8
H9	820	795.5	430	365	334	M10



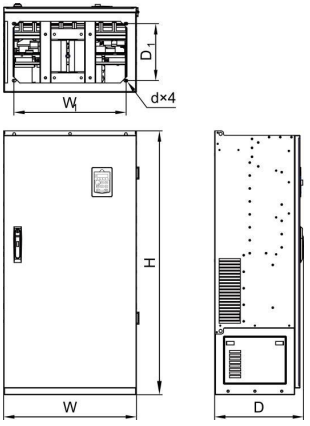
Appendix 3 Figure 5 Dimensions of wall-mounted models

Structure	H(mm)	H1(mm)	W(mm)	W1(mm)	D(mm)	d
HA	910	885	594	500	396	M10
HB	1060	1035	725	660	427	M10
HC	1200	1170	880	780	442	M12



Appendix 3 Figure 6 Floor-standing model dimensions

Structure code	H(mm)	W1(mm)	W(mm)	D1(mm)	D(mm)	d
H8D	950	236	338	219	329	M10
H9D	1100	328	430	224	334	M10



Appendix III Figure 7 Floor-standing model dimensions

Structure code	H(mm)	W1(mm)	W(mm)	D1(mm)	D(mm)	d
HA1	1182	500	594	255	394	M10
HB1	1405	650	725	300	427	M10
HC1	1550	740	880	305	442	M12

Appendix 4 Selection of Peripheral Electrical Components

reference	Incoming line protection		Power cable		Signal line (mm2)	Grounded (mm2)
	air switch (A)	Contactor (A)	power cable (mm2)	Motor wire (mm2)		
HK500/HK700-4T0.75GCB	4	9	3×0.75	3×0.75	≥0.5	0.75
HK500/HK700-4T1.5GCB	6	9	3×0.75	3×0.75	≥0.5	0.75
HK500/HK700-4T2.2GCB	10	9	3×0.75	3×0.75	≥0.5	0.75
HK500/HK700-4T3.0GCB	13	12	3×1	3×1	≥0.5	1
HK500/HK700-4T4.0G/5.5LCB	16	16	3×1.5	3×1.5	≥0.5	1.5
HK500/HK700-4T5.5G/7.5LCB	25	26	3×2.5	3×2.5	≥0.5	2.5
HK500/HK700-4T7.5G/11LCB	32	26	3×4	3×4	≥0.5	4
HK500/HK700-4T11G/15LCB	50	38	3×6	3×6	≥0.5	6
HK500/HK700-4T15G/18.5LCB	63	50	3×6	3×6	≥0.5	10
HK700-4T18.5G/22LCB	63	65	3×10	3×10	≥0.5	10
HK700-4T22G/30LCB	80	65	3×16	3×16	≥0.5	16
HK700-4T30G/37LCB	80	65	3×16	3×16	≥0.5	16
HK700-4T37G/45LC(B)	100	80	3×25	3×25	≥0.5	16
HK700-4T45G/55LC(B)	160	95	3×35	3×35	≥0.5	16
HK700-4T55G/75LC	160	115	3×35	3×35	≥0.5	25
HK700-4T75G/90LC	250	150	3×50	3×50	≥0.5	35
HK700-4T90G/110LC	250	170	3×70	3×70	≥0.5	50
HK700-4T110G/132LC	250	205	3×95	3×95	≥0.5	70
HK700-4T132G/160LC	400	245	3×150	3×150	≥0.5	95
HK700-4T160G/186LC	400	300	3×185	3×185	≥0.5	95
HK700-4T185G/200LC	500	410	2×(3×95)	2×(3×95)	≥0.5	95
HK700-4T200G/220LC	630	410	2×(3×120)	2×(3×120)	≥0.5	120
HK700-4T220G/250LC	630	410	2×(3×120)	2×(3×120)	≥0.5	120
HK700-4T250G/280LC	630	475	2×(3×120)	2×(3×120)	≥0.5	120
HK700-4T280G/315LC	800	620	2×(3×150)	2×(3×150)	≥0.5	150
HK700-4T315G/355LC	800	620	2×(3×185)	2×(3×185)	≥0.5	185
HK700-4T355G/400LC	800	620	2×(3×185)	2×(3×185)	≥0.5	185
HK700-4T400G/450LC	1000	800	2×(3×240)	2×(3×240)	≥0.5	240
HK700-4T450G/500LC	1000	800	2×(3×240)	2×(3×240)	≥0.5	240

reference	Incoming line protection		Power cable		Signal line （mm2）	Grounded （mm2）
	air switch （A）	Contactor （A）	power cable （mm2）	Motor wire （mm2）		
HK700-4T500G/560LC	1250	1000	2×(3×240)	2×(3×240)	≥0.5	240
HK700-4T560G/630LC	1250	1000	2×(3×300)	2×(3×300)	≥0.5	300
HK700-4T630G/710LC	1600	1250	2×(3×300)	2×(3×300)	≥0.5	300
HK700-4T90G/110LDT	250	170	3×70	3×70	≥0.5	50
HK700-4T110G/132LDT	250	205	3×95	3×95	≥0.5	70
HK700-4T132G/160LDT	400	245	3×150	3×150	≥0.5	95
HK700-4T160G/186LDT	400	300	3×185	3×185	≥0.5	95
HK700-4T185G/200LDT	500	410	2×(3×95)	2×(3×95)	≥0.5	95
HK700-4T200G/220LDT	630	410	2×(3×120)	2×(3×120)	≥0.5	120
HK700-4T220G/250LDT	630	410	2×(3×120)	2×(3×120)	≥0.5	120
HK700-4T250G/280LDT	630	475	2×(3×120)	2×(3×120)	≥0.5	120
HK700-4T280G/315LDT	800	620	2×(3×150)	2×(3×150)	≥0.5	150
HK700-4T315G/355LDT	800	620	2×(3×185)	2×(3×185)	≥0.5	185
HK700-4T355G/400LDT	800	620	2×(3×185)	2×(3×185)	≥0.5	185
HK700-4T400G/450LDT	1000	800	2×(3×240)	2×(3×240)	≥0.5	240
HK700-4T450G/500LDT	1000	800	2×(3×240)	2×(3×240)	≥0.5	240
HK700-4T500G/560LDT	1250	1000	2×(3×240)	2×(3×240)	≥0.5	240
HK700-4T560G/630LDT	1250	1000	2×(3×300)	2×(3×300)	≥0.5	300
HK700-4T630G/710LDT	1600	1250	2×(3×300)	2×(3×300)	≥0.5	300

Appendix 5 Braking resistor selection

When the inverter drives the motor to reverse or decelerate to stop, the DC bus voltage of the inverter will increase due to the energy feedback of the motor. In order to prevent the inverter from suspending operation due to over voltage protection, before the DC bus voltage reaches the protection point, the inverter automatically turns on the energy-consuming braking circuit, and uses the braking resistor to release the excess energy in the form of heat, thereby suppressing the voltage Continue to increase to ensure normal operation of the inverter. When braking, almost all the regenerative energy of the motor is consumed on the braking resistor.

According to the formula: U×U/R=Pb

In theory, the power of the braking resistor is the same as the braking power, but in practice, the braking resistor is generally used in derating.

According to the formula: λ×Pr=Pb×ED%

① Selection of braking resistor resistance

② Selection of braking resistor power

③Brake resistor selection table

U—The braking voltage when the system is stably braking (different system voltage values are different, 380VAC system generally takes 700V)

Pb—brake power

λ—Derating factor, generally 70%

Pr—brake resistance power

ED%—brake utilization rate (the ratio of energy regeneration process to the entire working process), generally.

Load type	Elevator	Rewinding and unwinding	Crane centrifuge	Accidental braking load	Injection molding machine	General occasion
Braking utilization rate	20%~30%	20%~30%	50%~60%	5%	5%~10%	10%

Recommended table of inverter braking resistance

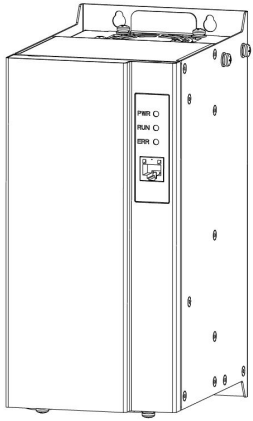
Inverter model	Braking unit	Standard resistance	Standard power	Minimum limit resistance
HK500/HK700-2S0.4GC(B)	Built-in optional	300Ω	200W	125Ω
HK500/HK700-2S0.75GC(B)		300Ω	200W	125Ω
HK500/HK700-2S1.5GC(B)		300Ω	200W	125Ω
HK500/HK700-2S2.2GC(B)		250Ω	260W	100Ω

Inverter model	Braking unit	Standard resistance	Standard power	Minimum limit resistance
HK500/HK700-4T0.75GCB	Standard built-in	300Ω	110W	125Ω
HK500/HK700-4T1.5GCB		250Ω	260W	100Ω
HK500/HK700-4T2.2GCB		200Ω	320W	100Ω
HK500/HK700-4T3.0GCB		100Ω	800W	66.7Ω
HK500/HK700-4T4.0G/5.5LCB		100Ω	800W	66.7Ω
HK500/HK700-4T5.5G/7.5LCB		50Ω	1600W	40Ω
HK500/HK700-4T7.5G/11LCB		50Ω	1600W	40Ω
HK500/HK700-4T11G/15LCB		40Ω	2000W	25Ω
HK500/HK700-4T15G/18.5LCB		40Ω	2000W	25Ω
HK700-4T18.5G/22LCB		32Ω	4800W	20Ω
HK700-4T22G/30LCB		27.2Ω	4800W	20Ω
HK700-4T30G/37LCB		20Ω	6000W	14Ω
HK700-4T37G/45LC(B)	Built-in optional	16Ω	9600W	14Ω
HK700-4T45G/55LC(B)		13.6Ω	9600W	10Ω

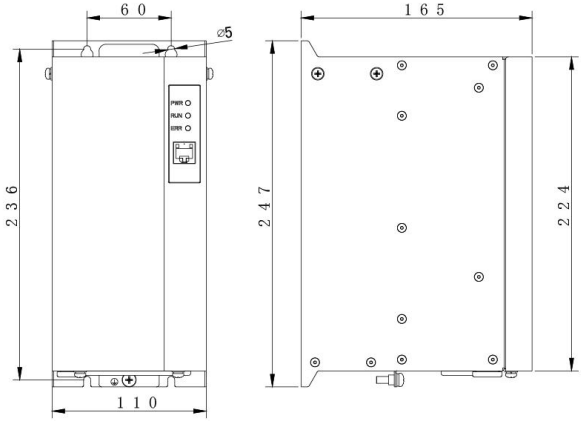
The value of the brake resistance must be greater than the minimum limit resistance on the table, otherwise the brake unit may be damaged. As far as possible choose aluminum shell resistance, do not use ripple resistance, ripple resistance parasitic inductance, resistance is negative temperature characteristics, brake resistance work for a period of time, the value of resistance with temperature rise and reduce, easy to damage the brake unit. The greater the power of the brake resistance, the better, if the brake duration is longer, please increase the power of the brake resistance. A plurality of brake resistors are connected in parallel.

Appendix 6 Selection of Braking Unit

1.The outline and installation dimensions of the brake unit



Appendix 6 Figure 1 Outline of the brake unit



Appendix 6 Figure 2 Brake unit model size (unit: mm)

2.Brake unit selection table

Frequency Rated power	Braking unit model	Braking resistor recommended resistance	Recommended braking resistor power (ED=10%)	Recommended braking resistor power (ED=50%)
Three-phase 380V, starting brake voltage 670V				
18.5KW	HKBR-4T-35	＞20Ω	＞3KW	＞15KW
22KW	HKBR-4T-35	＞20Ω	＞3KW	＞15KW
30KW	HKBR-4T-35	＞20Ω	＞3KW	＞15KW
37KW	HKBR-4T-35	＞15Ω	＞4KW	＞19KW
45KW	HKBR-4T-50	＞15Ω	＞5KW	＞23KW
55KW	HKBR-4T-50	＞11Ω	＞6KW	＞28KW
75KW	HKBR-4T-70	＞8Ω	＞8KW	＞38KW
90KW	HKBR-4T-90	＞8Ω	＞9KW	＞46KW
110KW	HKBR-4T-70×2	＞11Ω×2	＞6KW×2	＞28KW×2
132KW	HKBR-4T-70×2	＞11Ω×2	＞7KW×2	＞34KW×2
160KW	HKBR-4T-90×2	＞8Ω×2	＞9KW×2	＞40KW×2
185KW	HKBR-4T-90×2	＞8Ω×2	＞9KW×2	＞40KW×2
200KW	HKBR-4T-90×2	＞8Ω×2	＞11KW×2	＞50KW×2
220KW	HKBR-4T-90×2	＞8Ω×2	＞11KW×2	＞50KW×2
250KW	HKBR-4T-90×3	＞8Ω×3	＞9KW×3	＞40KW×3
280KW	HKBR-4T-90×3	＞8Ω×3	＞10KW×3	＞45KW×3
315KW	HKBR-4T-90×3	＞8Ω×3	＞11KW×3	＞50KW×3

Appendix 7 Selection of Reactor

Voltage level	Power AC	AC input reactor model	DC reactor model	AC output reactor model
380V	7.5KW	HK-ACL-7.5	HK-DCL-7.5	HK-OCL-7.5
	11KW	HK-ACL-11	HK-DCL-11	HK-OCL-11
	15KW	HK-ACL-15	HK-DCL-15	HK-OCL-15
	18.5KW	HK-ACL-18.5	HK-DCL-18.5	HK-OCL-18.5
	22KW	HK-ACL-22	HK-DCL-22	HK-OCL-22
	30KW	HK-ACL-30	HK-DCL-30	HK-OCL-30
	37KW	HK-ACL-37	HK-DCL-37	HK-OCL-37
	45KW	HK-ACL-45	HK-DCL-45	HK-OCL-45
	55KW	HK-ACL-55	HK-DCL-55	HK-OCL-55
	75KW	HK-ACL-75	HK-DCL-75	HK-OCL-75
	90KW	HK-ACL-90	HK-DCL-90	HK-OCL-90
	110KW	HK-ACL-110	HK-DCL-110	HK-OCL-110
	132KW	HK-ACL-132	HK-DCL-132	HK-OCL-132
	160KW	HK-ACL-160	HK-DCL-160	HK-OCL-160
	185KW	HK-ACL-185	HK-DCL-185	HK-OCL-185
	200KW	HK-ACL-200	HK-DCL-200	HK-OCL-200
	220KW	HK-ACL-220	HK-DCL-220	HK-OCL-220
	250KW	HK-ACL-250	HK-DCL-250	HK-OCL-250
	280KW	HK-ACL-280	HK-DCL-280	HK-OCL-280
	315KW	HK-ACL-315	HK-DCL-315	HK-OCL-315
	355KW	HK-ACL-355	HK-DCL-355	HK-OCL-355
	400KW	HK-ACL-400	HK-DCL-400	HK-OCL-400
	450KW	HK-ACL-450	HK-DCL-450	HK-OCL-450
	500KW	HK-ACL-500	HK-DCL-500	HK-OCL-500
	560KW	HK-ACL-560	HK-DCL-560	HK-OCL-560
	630KW	HK-ACL-630	HK-DCL-630	HK-OCL-630

Appendix 8 Selection of accessories

1. Operation panel selection

Name	Reference	Note
Control panel	HKCP100	Standard configuration, see 4.1 Introduction to Operation Panel
Two-line display operation panel	HKCP200	Optional, see 4.6 Introduction to Two-line Display Operation Panel
LCD operation panel	HKCP300	Optional, see 4.5 Introduction to LCD Operation Panel

Note that the optional operation panel can be installed in the inverter body. For external installation, an optional mounting bracket (CP1) is required.

2. Remote operation extension cable

Name	Reference	Note
Remote operation extension cable	8P_RJ45_26AWG_500mm	0.5M
Remote operation extension cable	8P_RJ45_26AWG_1000mm	1M
Remote operation extension cable	8P_RJ45_26AWG_1500mm	1.5M
Remote operation extension cable	8P_RJ45_26AWG_2000mm	2M
Remote operation extension cable	8P_RJ45_26AWG_3000mm	3M
Remote operation extension cable	8P_RJ45_26AWG_5000mm	5M
Remote operation extension cable	8P_RJ45_26AWG_10000mm	10M

3. Encoder expansion card

Name	Reference	Note
Differential encoder card	HKPG100	Optional, see HKPG100 instruction manual for details
Non-differential encoder card	HKPG200	Optional, see HKPG200 instruction manual for details
Differential encoder card (including frequency division)	HKPG300	Optional, see HKPG300 instruction manual for details
Non-differential encoder card (including frequency division)	HKPG400	Optional, see HKPG400 instruction manual for details

Please select the appropriate encoder expansion card according to the actual encoder type.

4. Panel mounting bracket

Name	Reference	Note
Panel mounting bracket	CP1	Suitable for all types of operation panels

Appendix 9 MODBUS protocol description

The frequency converter provides 1 RS485 communication interface and adopts standard MODBUS communication protocol. The user can perform the following operations through the host computer (including communication equipment such as computers and PLC): read and write inverter function parameters, read status parameters, write control commands, etc.

1. Interface mode and pin definition

See control circuit terminal wiring.

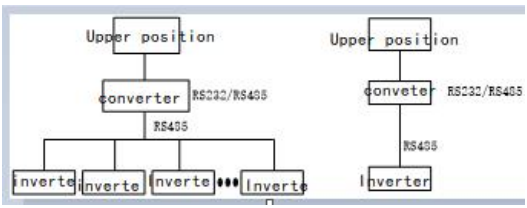
2. transfer method

RS485 interface: asynchronous, half-duplex.

Factory default format: 8 data bits, no parity check, 2 stop bits.

Baud rate: 9600bps.

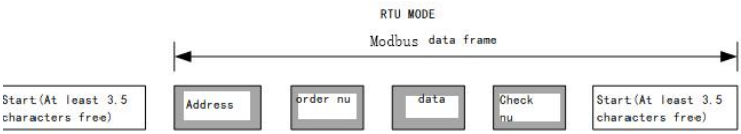
3.Networking method



Appendix 8 Figure1 Networking method

4. Protocol mode

The MODBUS protocol only supports RTU mode, and the corresponding frame format is as follows:



Appendix 8 Figure 2 RTU frame format

MODBUS adopts the "BigEndian" coding method, sending the high byte first, then the low byte.

In the RTU mode, the frame header and frame tail define the frame through the bus idle time not less than 3.5 bytes. Data check uses CRC-16, and the entire information is involved in the check. For specific CRC check, please refer to the example behind the protocol.

Function code parameter address rules:

Take the numeric part of the function code as the parameter address, such as P.1110, the numeric part of the parameter is 1110, which is one thousand one hundred and ten, which is converted into a hexadecimal number to 0456, which is the communication address of the parameter. The complete example is as follows:

Read the internal register P.1110=50.00Hz of No. 1 machine. The read and write address of the parameter is the same as the function code. For example, the address of P.1110 is 1110 in decimal, and the corresponding hexadecimal is 0456.

Request frame:

Adress	Function code	Register address		Number of registers		Checksum	
0x01	0x03	0x04	0x56	0x00	0x01	0x65	0x2A

Reply frame:

Adress	Function code	Response bytes	Register content		Checksum	
0x01	0x03	0x02	0x13	0x88	0xB5	0x12

The scaling relationship corresponding to the transmitted value:

The transmitted value is all numbers excluding the decimal point. In the above example, the received register content is 0x13, 0x88, which is converted into a decimal number of 5000. According to the function parameter table, the number of decimal places is determined to be 2, then the value of P.1110 of No. 1 machine is 50.00, which needs to be converted by the host computer during processing.

Note: As the EEPROM is frequently stored, it will reduce the service life of the EEPROM. Therefore, some function codes in the communication mode only change the value in the RAM.

5. Protocol function

1) Support function

The MODBUS protocol supports the following functional operations:

Function code	Function code meaning
0x03	Read the inverter function parameters or status parameters
0x06	Rewrite a single function parameter or control parameter of the inverter

If the operation request fails, the response is an error code. For example, if 13 function codes are read continuously from P.0000, the return frame is:

Adress	Function code	Abnormal code	Checksum	
0x01	0x83	0x03	0x01	0x31

The error code is equal to (function code + 0x80)

The meanings of abn codes are listed as follows:

Abnormal code	The meaning of abnormal code

Abnormal code	The meaning of abnormal code
0x01	Illegal function code
0x02	Illegal register address
0x03	Data error, that is, the data exceeds the upper or lower limit
0x04	Operation of the slave failed (including errors caused by data within the upper and lower limits but invalid data)
0x16	Unsupported operations (mainly for conHKol parameters and status parameters, such as not supporting factory values, reading of upper and lower limits, etc.)
0x17	Wrong number of registers in request frame
0x18	Message frame error: including message length error and check error
0x20	Parameters cannot be modified
0x21	Parameters cannot be modified while running
0x22	Parameters are protected by password

2) Request frame and response frame of MODBUS protocol

a. Read the inverter function parameters or status parameters (function code 0x03)

	Protocol data unit	Data length (number of bytes)	Value or range
Request frame	Adress	1	0－247，0 is the broadcast address
	Function code	1	0x03
	Starting register address	2	0x0000－0xFFFF
	Number of registers	2	0x0001－0x000C
	CRC check	2	
Reply frame	address	1	1－247
	Function code	1	0x03
	Number of bytes read	1	2×Number of registers
	Read content	2×Number of registers	
	CRC check	2	

b. Rewrite a single function parameter or control parameter of the inverter (function code 0x06)

	Protocol data unit	Data length (number of bytes)	Value or range
Request frame	address	1	0－255，0 is the broadcast address
	Function code	1	0x06
	Register address	2	0x0000－0xFFFF
	Register content	2	0x0000－0xFFFF
	CRC check	2	0x0000－0xFFFF
Reply frame	address	1	0－255
	Function code	1	0x06
	Register address	2	0x0000－0xFFFF
	Register content	2	0x0000－0xFFFF
	CRC check	2	0x0000－0xFFFF

6. Control instructions

The upper computer chooses to use communication to set the running command, which can realize the control of the inverter's forward, reverse, start and stop.

Parameter	Name	Select range	Ex-factory value
P.1109	Control instruction	The meaning of each bit value: 0: invalid 1: valid 0~7bit: bit0: stop bit1: Free stop bit2: forward rotation bit3: reverse bit4: forward jog bit5: Reverse jog bit6: reset	0

The specific list is as follows:

Control instruction			
Address	**Parameter Value**	**Function definition**	**Manual framing**
1109 （0x455H）	1H	stop	010604550001592A
	2H	free stop	010604550002192B
	4H	forward run	0106045500049929
	8H	reverse run	010604550008992C
	10H	forward jog	0106045500109926
	20H	reverse jog	0106045500209932
	40H	reset	010604550040991A

Warning

To respected user:

Thank you very much for choosing our products. In order to ensure that you get the best after-sales service from our company, please read the following terms carefully and do the relevant matters.

1. Product warranty scope

The failure caused by normal use according to the use requirements.

2. Product warranty period

The warranty period of our products is within 12 months from the date of delivery. Long-term technical services will be implemented after the warranty period.

3. Non-warranty coverage

Any damage caused by human accidents, natural disasters, etc., in violation of the use requirements, as well as unauthorized disassembly, modification and repair of the inverter, shall be deemed to automatically give up the warranty service.

4. Purchase products from middlemen

Anyone who purchases products from a sales agent should contact the distributor or agent when the product fails.

5. Disclaimer: Product failures caused by the following reasons are not covered by the manufacturer's 12-month free warranty service:

(1). The manufacturer does not perform correct operations in accordance with the procedures listed in the "Product Manual";

(2). The user repairs the product by himself or modifies the product without communicating with the manufacturer;

(3). Product components are abnormally aging or malfunction due to poor user environment;

(4). The user uses the product beyond the standard range of the product;

(5). Product damage caused by force majeure such as earthquakes, fires,wind and rain disasters, lightning strikes, abnormal voltages or other natural disasters;

(6). The hardware is damaged due to artificial drop and transportation after purchase.

6. Liability: Regardless of the contract, warranty period, negligence, tort, strict liability, or any other point of view, our company, suppliers and distributors do not bear the following special and indirect caused by the use of equipment , Liability for subsequent losses. These include, but are not limited to, loss of profit and income, loss of using supplied equipment and related equipment, capital expenditure, substitute equipment expenditure, tool and service fees, downtime costs, delays, and purchasers' customers Or any third party's loss. In addition, unless the user can provide strong evidence, the company and its suppliers will not be held responsible for certain allegations such as the use of substandard raw materials, incorrect design, or irregular production. The right of interpretation belongs to our company. To

If you have any questions about our inverter, please contact our company or its office. The technical data, information, and specifications are the latest materials at the time of publication. Our company reserves the right to change without prior notice, and will not be liable for any losses caused thereby. The right of interpretation belongs to our company.

Thank you for your understanding and support!

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