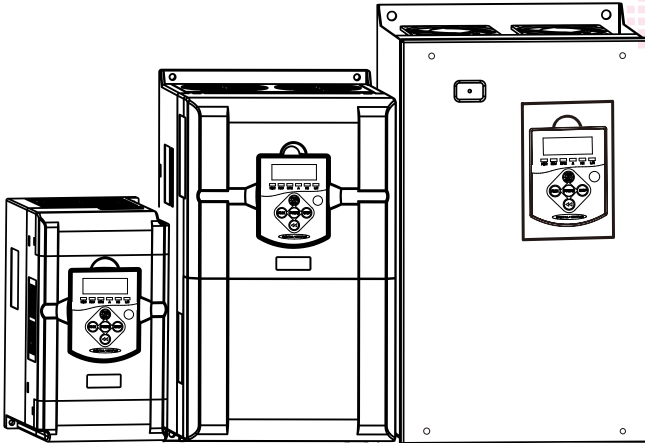


# 200 Series Instruction Manual







## Foreword

Thank you for selecting our 200 Series AC Drive.

Before using the AC drive, please read this manual carefully, so as to correctly install and use the AC drive, give full play to its function, and ensure safety. Please keep the instruction manual properly for future maintenance, maintenance and maintenance.

AC drive belongs to power electronic products, for your safety, please be sure to be installed and debugged by professional electrical engineering personnel. There are  (Attention) and  (Danger) symbols in this manual to remind you of the safety precautions during the handling, installation, operation and inspection of the frequency converter. Please cooperate to make the frequency converter safer. If you have any doubt, please consult our company or our local agents. Our professionals are happy to serve you.

Due to the upgrade of our products, this manual is subject to change without further notice, please understand.



# Catalogue

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## Chapter 1 Precautions for Safe Use

### Security Definition:

In this manual, safety precautions are divided into the following two categories:



(Attention) Due to the danger caused by failure to operate as required, the AC drive or mechanical system may be damaged.



(Danger) The danger caused by failure to operate as required may cause casualties.

### 1.1 Before power on



#### Attention

- The power voltage input must be the same as the AC drive input voltage specification.
- Please choose a safe area to install the AC drive, to prevent high temperature and direct sunlight, to avoid moisture and water droplets.
- The AC drive can only be used in the occasions approved by our company. The unauthorized use environment may lead to fire, gas explosion, electric induction and other accidents.
- If multiple AC drives are installed in the one control cabinet, please add cooling fan to make the temperature in the cabinet lower than 40 ° C to prevent overheating or fire.
- If a contactor is installed on the input side to control the start and stop of the AC drive, the AC drive may be damaged. Generally, it is required to control the start and stop of frequency converter by terminal command. In places where the start and stop are frequent, special attention should be paid to the use of AC drive.
- Please do not install air switch, contactor and other switch devices on the output side. If it is necessary to install due to process and other needs, it must be ensured that the AC drive has no output when the switch acts. In addition, it is forbidden to install capacitance or voltage-sensitive resistance for lightning protection with improved power factor on the output side, otherwise, it will cause frequency converter failure, jump protection or component damage.
- Please use independent power supply, absolutely avoid sharing the same power supply with strong interference equipment such as electric welding machine, otherwise it will cause AC drive protection or AC drive damage.
- Do not conduct voltage withstand test on the components inside the AC drive, which are vulnerable to high voltage damage.
- The IC of AC drive circuit board is easy to be affected and damaged by static electricity. Please do not touch the circuit board.
- Only professional electrical engineers can install, debug and maintain the AC drive.
- When handling the frequency converter, please do not take out the cover directly. It should be carried by the base of the frequency converter to prevent the cover from falling off and avoid the frequency converter from falling down, causing personal injury or damage to the AC drive.

**Danger**

- Be sure to cut off the power before wiring.
- Please install the frequency converter on metal and other non combustible materials to prevent fire.
- Please do not install the frequency converter in the environment containing explosive gas, otherwise there is a risk of explosion.
- The wiring of main circuit terminals must be correct. R, S and T are power input terminals. They must not be mixed with U, V and W. Otherwise, the AC drive will be damaged during power transmission.
- The terminal must be grounded separately, and the zero line must not be connected, otherwise, the internal fault or protection of the AC drive will be easily caused.
- Do not disassemble or change the internal connection line or parts of the AC drive.
- It is strictly forbidden to refit and replace the control panel and parts without permission, otherwise there will be electric shock, explosion and other dangers.
- Please prevent children or irrelevant persons from approaching the AC drive.

## 1.2 Power On

**Danger**

- Never plug in or out any connector on the AC drive (except the operation panel) during power on, so as to avoid damage to the AC drive and casualties.
- Please cover the cover before power on to prevent electric shock and personal injury.

## 1.3 Operating

**Attention**

- Do not check the signal on the circuit board during the operation of the AC drive to avoid danger.
- The parameters of the AC drive are optimized when they are delivered. Please adjust them according to the required functions.
- Be sure to consider the speed range allowed by vibration, noise, motor bearing and mechanical device.



**Danger**

- It is strictly forbidden to put the motor unit into or cut off during the operation of the frequency converter, otherwise it will cause the over-current tripping of the AC drive, and even burn the main circuit of the AC drive.
- Do not remove the cover when the AC drive is running to prevent injury due to induction.
- When the fault restart function is turned on, the motor will automatically restart after the operation stops. Do not approach the equipment to avoid accidents.

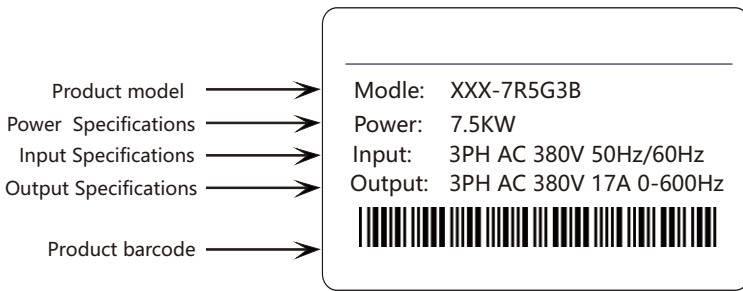
**1.4 Power Cut Off****Attention**

- Even if the main power supply, other voltage inputs and shared load (such as the middle DC circuit sharing) have been disconnected, there may still be residual electric energy in the AC drive. Before contacting the electronic devices of the AC drive, the AC drive must wait at least 4 minutes, otherwise there is a risk of electric shock.

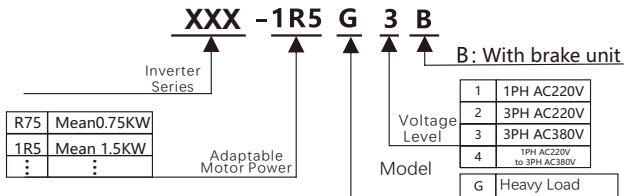
## Chapter 2 Product Standard Specification

### 2.1 Product Nameplate

Product Name Plate and the Description of the Type Code:



#### A Model explanation



## 2.2 Product Model Specification

| Model        | Input Voltage | Input Current (A) | Output Current (A) | Rated Power (KW) |
|--------------|---------------|-------------------|--------------------|------------------|
| SW200-5R5G1B | 1×200-240V    | 62.4              | 25                 | 5.5              |
| SW200-7R5G1B | 1×200-240V    | 73                | 32                 | 7.5              |
| SW200-011G1B | 1×200-240V    | 84                | 45                 | 11               |
| SW200-015G1  | 1×200-240V    | 93                | 60                 | 15               |
| SW200-018G1  | 1×200-240V    | 104               | 75                 | 18.5             |
| SW200-022G1  | 1×200-240V    | 135               | 91                 | 22               |
| SW200-5R5G2B | 3×200-240V    | 35.1              | 25                 | 5.5              |
| SW200-7R5G2B | 3×200-240V    | 43.4              | 32                 | 7.5              |
| SW200-011G2B | 3×200-240V    | 61                | 45                 | 11               |
| SW200-015G2B | 3×200-240V    | 73                | 60                 | 15               |
| SW200-018G2  | 3×200-240V    | 88                | 75                 | 18.5             |
| SW200-022G2  | 3×200-240V    | 106               | 91                 | 22               |
| SW200-030G2  | 3×200-240V    | 130               | 112                | 30               |
| SW200-037G2  | 3×200-240V    | 171               | 150                | 37               |
| SW200-045G2  | 3×200-240V    | 200               | 176                | 45               |
| SW200-055G2  | 3×200-240V    | 239               | 210                | 55               |
| SW200-R75G3B | 3×380-440V    | 3.7               | 2.3                | 0.75             |
|              | 3×440-480V    | 3.2               | 2.1                |                  |
| SW200-1R5G3B | 3×380-440V    | 6.4               | 4                  | 1.5              |
|              | 3×440-480V    | 5.5               | 3.6                |                  |
| SW200-2R2G3B | 3×380-440V    | 8.9               | 5.6                | 2.2              |
|              | 3×440-480V    | 7.7               | 5.1                |                  |
| SW200-004G3B | 3×380-440V    | 15.8              | 9.9                | 4                |
|              | 3×440-480V    | 13.6              | 9                  |                  |
| SW200-5R5G3B | 3×380-440V    | 21.3              | 13.3               | 5.5              |
|              | 3×440-480V    | 18.4              | 12.1               |                  |
| SW200-7R5G3B | 3×380-440V    | 28.3              | 17.7               | 7.5              |
|              | 3×440-480V    | 24.4              | 16.1               |                  |
| SW200-011G3B | 3×380-440V    | 35.9              | 25                 | 11               |
|              | 3×440-480V    | 31.4              | 22.7               |                  |
| SW200-015G3B | 3×380-440V    | 43.4              | 32                 | 15               |
|              | 3×440-480V    | 38.8              | 29.1               |                  |
| SW200-018G3B | 3×380-440V    | 51.5              | 38                 | 18.5             |
|              | 3×440-480V    | 46.1              | 34.5               |                  |
| SW200-022G3B | 3×380-440V    | 61.0              | 45                 | 22               |
|              | 3×440-480V    | 54.5              | 40.9               |                  |

| Model        | Input Voltage | Input Current (A) | Output Current (A) | Rated Power (KW) |
|--------------|---------------|-------------------|--------------------|------------------|
| SW200-030G3B | 3×380-440V    | 73                | 61                 | 30               |
|              | 3×440-480V    | 64                | 52                 |                  |
| SW200-037G3  | 3×380-440V    | 72                | 75                 | 37               |
|              | 3×440-480V    | 65                | 68                 |                  |
| SW200-045G3  | 3×380-440V    | 86                | 91                 | 45               |
|              | 3×440-480V    | 80                | 82                 |                  |
| SW200-055G3  | 3×380-440V    | 110               | 112                | 55               |
|              | 3×440-480V    | 108               | 110                |                  |
| SW200-075G3  | 3×380-440V    | 148               | 150                | 75               |
|              | 3×440-480V    | 135               | 140                |                  |
| SW200-090G3  | 3×380-440V    | 175               | 180                | 93               |
|              | 3×440-480V    | 154               | 160                |                  |
| SW200-110G3  | 3×380-440V    | 206               | 215                | 110              |
|              | 3×440-480V    | 183               | 190                |                  |
| SW200-132G3  | 3×380-440V    | 251               | 260                | 132              |
|              | 3×440-480V    | 231               | 240                |                  |
| SW200-160G3  | 3×380-440V    | 304               | 315                | 160              |
|              | 3×440-480V    | 291               | 302                |                  |
| SW200-185G3  | 3×380-440V    | 350               | 365                | 187              |
|              | 3×440-480V    | 320               | 335                |                  |
| SW200-200G3  | 3×380-440V    | 381               | 395                | 200              |
|              | 3×440-480V    | 348               | 361                |                  |
| SW200-220G3  | 3×380-440V    | 420               | 435                | 220              |
|              | 3×440-480V    | 383               | 398                |                  |
| SW200-250G3  | 3×380-440V    | 472               | 480                | 250              |
|              | 3×440-480V    | 436               | 443                |                  |
| SW200-280G3  | 3×380-440V    | 525               | 540                | 280              |
|              | 3×440-480V    | 475               | 490                |                  |
| SW200-315G3  | 3×380-440V    | 590               | 605                | 315              |
|              | 3×440-480V    | 531               | 540                |                  |
| SW200-350G3  | 3×380-440V    | 647               | 660                | 350              |
|              | 3×440-480V    | 580               | 590                |                  |
| SW200-400G3  | 3×380-440V    | 715               | 745                | 400              |
|              | 3×440-480V    | 653               | 678                |                  |
| SW200-450G3  | 3×380-440V    | 771               | 800                | 450              |
|              | 3×440-480V    | 704               | 730                |                  |
| SW200-500G3  | 3×380-440V    | 835               | 860                | 500              |
|              | 3×440-480V    | 761               | 784                |                  |

| Model        | Input Voltage | Input Current (A) | Output Current (A) | Rated Power (KW) |
|--------------|---------------|-------------------|--------------------|------------------|
| SW200-5R5G4B | 1×200-240V    | 45                | 13                 | 5.5              |
| SW200-7R5G4B | 1×200-240V    | 56                | 17                 | 7.5              |
| SW200-011G4B | 1×200-240V    | 85                | 25                 | 11               |
| SW200-015G4B | 1×200-240V    | 110               | 32                 | 15               |
| SW200-018G4  | 1×200-240V    | 125               | 38                 | 18.5             |
| SW200-022G4  | 1×200-240V    | 153               | 45                 | 22               |

## 2.3 Product Technical Specification

| Name                               |   | Specification  |
|------------------------------------|---|--|
| Input Power                        | Voltage   | 1PH/3PH200~240V -20%~+10%;<br>3PH380~480V -20%~+10%;               |
|                                    | Frequency   | 48-62HZ;   |
|                                    | Max Unbalance   | 3%;  |
| Output Power                       | Output Voltage  | 3PH0~ 100 full voltage input;                                      |
|                                    | Output Frequency  | Vector control;V/F:0-600Hz;  |
| Main Control Function              | Control Mode  | V/F,Vector control;  |
|                                    | Start Torque  | 0.5Hz 150%;  |
|                                    | Overload Capacity   | 150% Rated output current(60s) ,<br>200% Rated output current(1s); |
|                                    | Carrier Frequency   | VF:2K~ 16kHz,Vector: 2 K~ 10KHz;                                   |
|                                    | Speed Setting Resolution  | Digital: 0.001Hz;<br>analog: 0.5% of Max Operation Frequency;      |
|                                    | Open Loop Speed Control Accuracy  | 30~4000rpm:Error±8rpm;   |
|                                    | Control Command Source  | Operate Panel, Digital Terminal;Communication;                     |
|                                    | SetFrequency Source   | Panel;Analog; Pulse;Communication;                                 |
| Acceleration and Deceleration time |   | 4 Groups Acceleration and Deceleration time is 0.05-3600.00S;      |
| Basic Function                     | Torque open loop control, Motor self-learn, Motor Pre-excitation, Motor Rotation Compensation, Automatic Load Compensation, Automatic Voltage Stabilizing Function, Multi-Point V/F curve, Acceleration and Deceleration Curve, DC Braking, AC Braking, Rotation Speed Limited, Current Limited, Torque Limited, Frequency Tracking Start, Auto Reset Restart, Inching Control, External Control of Multistage Speed, Mechanical Braking, UP/DOWN Function, High speed pulse input and output function, Counter, Built in PID Controller; |  |
| Protect Function                   | Phase Loss Protection of Power Supply, Short-voltage Protection, Over-voltage Protection, Over-current Protection, Over-load Protection, Phase Loss Protection of Output, Output short circuit Protection, Output Grounded Protection, Signal Disconnection, AMA Fail, CPU Fault, Button Inhibit, Copy Failure, LCP Communication Error, Parameter Read Only, Value Out of Range, Not executable in Running;  |  |

| Name                            |                              | Specification   |
|---------------------------------|------------------------------|---|
| IO<br>Panel/Control<br>Terminal | Input Terminal               | 6 digital input terminals, One channel (X3) supports high-speed pulse input up to 100KHZ;<br>2 analog input terminals (0-10V voltage signal, 0-20mA current signal);  |
|                                 | Output Terminal              | 2 analog output terminals, support 0-10V voltage output or 0-20mA current output.(Only 1 channel output is supported below 30KW,Default: Voltage variable 0-10V) 2 relay output terminals (KA/KB is normally open, KA/KC is normally closed)( Only 1 channel relay output terminal is supported below 30KW) |
|                                 | Power Supply Terminals       | 1 Group10V Power Supply Terminal, Max Output Current:10mA;<br>1Group 24VPower Supply Terminal, Max Output Current:100mA;  |
|                                 | Communication Terminals      | Max Baud Rate 38400bit/s  |
| Panel                           | 5-Digit8-Segment LED display | Display the frequency/alarm/Status and other information  |
|                                 | Monitoring Function          | Set Value, Output Frequency, Feedback Value, Output Current, DC Bus Voltage, Output Voltage, Output Power, Output Terminals State, Input Terminals State, Input Analog Value, Analog B Output Value, History 1-3 Fault Records and Accumulated Working Hours;   |
|                                 | Indicator Light              | Indicator Light FOR, REV, RPM, Hz, A, L/R display various states of AC drive;   |
| Environment                     | Protection Level             | Ip20;   |
|                                 | Operation Temperature        | -10°C~40°C, Over 40°C need bigger capacity inverter;  |
|                                 | Operation Humidity           | 5%-85%(95% No drops of water);  |
|                                 | Vibration                    | < 5.9m/S <sup>2</sup> (0.6g);   |
|                                 | Highest altitude             | 1000m, Over 1000m need bigger power inverter;   |
| Others                          | Length of Motor Wire line    | Shielding wire: 50m; Unshielding wire: 10m;   |
|                                 | DC reactor                   | NO;   |
|                                 | Braking Unit                 | Built-in (built-in below 30KW, external for other power segments).  |



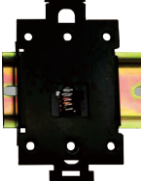
## 2.4 Description of volume reduction

1.Temperature Derating: If the ambient temperature exceeds 40 °C, the inverter must be used with reduced capacity.

2.Altitude Capacity Reduction: The cooling capacity of air decreases at low pressure.It is not necessary to reduce the capacity when the altitude is lower than 1000m, but the ambient temperature or maximum output current shall be reduced when the altitude is above 1000m. For altitudes above 1000 meters, the output should be reduced by 1% every 100 meters, or the maximum ambient temperature should be reduced by 1 °C every 200 meters.

## 2.5 Accessory

The following accessories are optional. If necessary, the order needs to be explained separately.

|   |  |
|---|--|
|  | <p>Name: Operate Panel E20<br/>Model: LCP-E20.<br/>Function: It is used to modify the parameters, monitor the working state and control the operation of the inverter.<br/>The panel can be used in a long distance, generally within 15m.</p> |
|  | <p>Name: Network Line<br/>Model: NO<br/>Function: As the connecting line of the operation panel.<br/>Standard: 1.5m(Special length required, marked in order).</p>   |
|  | <p>Name: Guide rail buckle<br/>Model: NO<br/>Function: Used as frequency converter holder, Fix the inverter with 2 screws in the middle of the inverter, Then it is stuck on the guide rail.</p>   |

## Chapter 3 Mechanical and Electrical Installation

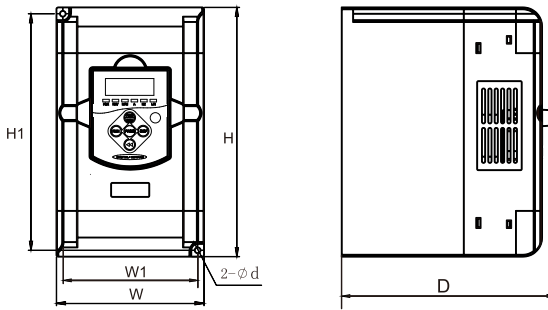
### 3.1 Mechanical Installation

#### 3.1.1 Installation Environment

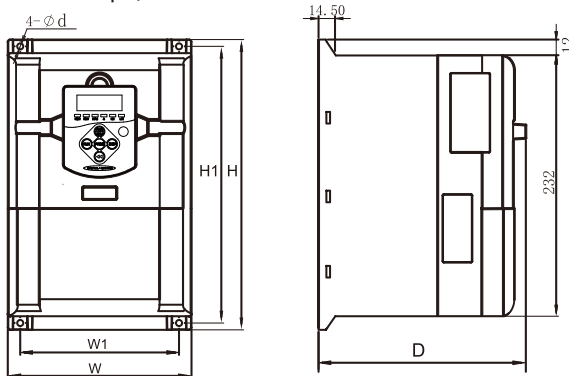
1. Please install the inverter in the place where the ambient temperature is  $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$ .
2. Please install the frequency converter on the surface of the flame retardant object and install it on the mounting support vertically with screws. There should be enough space around for heat dissipation.
3. Please install it in places where vibration is not easy. Vibration shall not be greater than 1.14g.
4. Avoid direct sunlight, humidity, condensation or water drops.
5. Avoid the place with corrosive, flammable and explosive gas in the air.
6. Avoid installing in places with oil, dust and metal dust.
7. During installation, drilling residues, thread ends and screws should be avoided to fall into the inverter, otherwise, the inverter may fail or be damaged.

#### 3.1.2 Appearance and Installation Size

200-1 (0.4~7.5KW Shape)

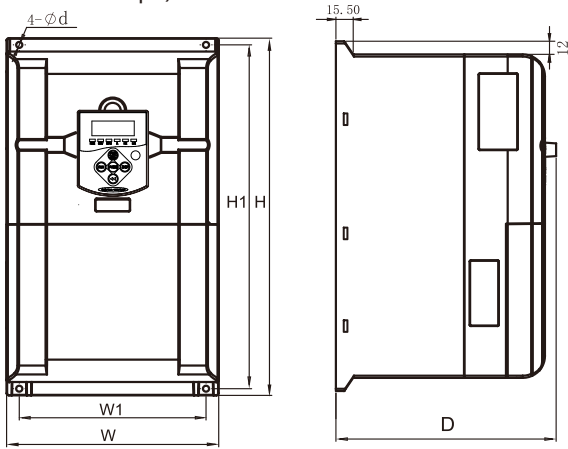


200-2 (11~15KW Shape)

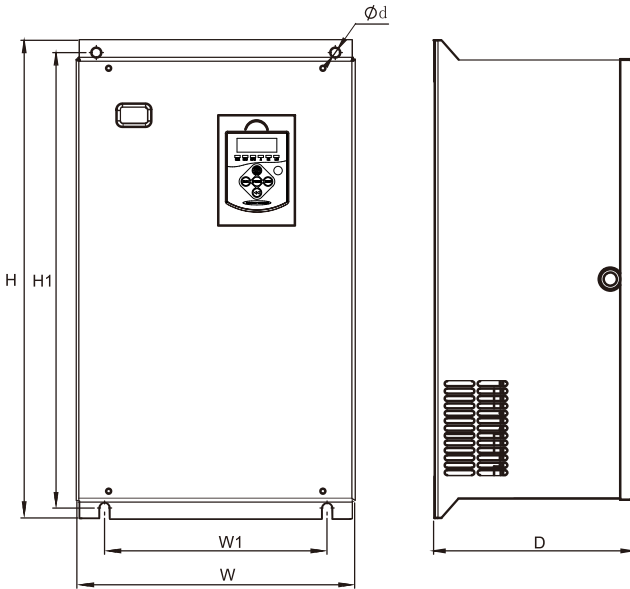




200-3 (18.5~30KW Shape)



200-4 (37~500KW Shape)

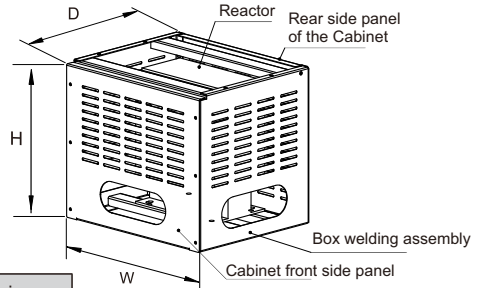
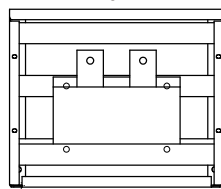


| Model        | Outline Dimensions |     |     | Installation dimensions |     |       |
|--------------|--------------------|-----|-----|-------------------------|-----|-------|
|              | H                  | W   | D   | H1                      | W1  | d     |
| SW200-5R5G1B | 256                | 183 | 162 | 244                     | 140 | 4*5.4 |
| SW200-7R5G1B | 320                | 198 | 184 | 308                     | 162 | 4*5.4 |
| SW200-011G1B | 320                | 198 | 184 | 308                     | 162 | 4*5.4 |
| SW200-015G1  | 430                | 223 | 288 | 414                     | 170 | 7     |
| SW200-018G1  | 430                | 223 | 288 | 414                     | 170 | 7     |
| SW200-022G1  | 580                | 242 | 337 | 553                     | 270 | 12    |
| SW200-5R5G2B | 256                | 183 | 162 | 244                     | 140 | 4*5.4 |
| SW200-7R5G2B | 256                | 183 | 162 | 244                     | 140 | 4*5.4 |
| SW200-011G2B | 320                | 198 | 184 | 308                     | 162 | 4*5.4 |
| SW200-015G2B | 320                | 198 | 184 | 308                     | 162 | 4*5.4 |
| SW200-018G2  | 430                | 223 | 288 | 414                     | 170 | 7     |
| SW200-022G2  | 430                | 223 | 288 | 414                     | 170 | 7     |
| SW200-030G2  | 580                | 242 | 337 | 553                     | 270 | 12    |
| SW200-037G2  | 580                | 242 | 337 | 553                     | 270 | 12    |
| SW200-045G2  | 650                | 242 | 379 | 623                     | 270 | 12    |
| SW200-055G2  | 650                | 242 | 379 | 623                     | 270 | 12    |
| SW200-R75G3B | 196                | 168 | 116 | 186                     | 106 | 2*4.5 |
| SW200-1R5G3B | 196                | 168 | 116 | 186                     | 106 | 2*4.5 |
| SW200-2R2G3B | 196                | 168 | 116 | 186                     | 106 | 2*4.5 |
| SW200-004G3B | 196                | 168 | 116 | 186                     | 106 | 2*4.5 |
| SW200-5R5G3B | 196                | 168 | 116 | 186                     | 106 | 2*4.5 |
| SW200-7R5G3B | 196                | 168 | 116 | 186                     | 106 | 2*4.5 |
| SW200-011G3B | 256                | 183 | 162 | 244                     | 140 | 4*5.4 |
| SW200-015G3B | 256                | 183 | 162 | 244                     | 140 | 4*5.4 |
| SW200-018G3B | 320                | 198 | 184 | 308                     | 162 | 4*5.4 |
| SW200-022G3B | 320                | 198 | 184 | 308                     | 162 | 4*5.4 |
| SW200-030G3B | 320                | 198 | 184 | 308                     | 162 | 4*5.4 |
| SW200-037G3  | 430                | 223 | 288 | 414                     | 170 | 7     |
| SW200-045G3  | 430                | 223 | 288 | 414                     | 170 | 7     |
| SW200-055G3  | 580                | 242 | 337 | 553                     | 270 | 12    |
| SW200-075G3  | 580                | 242 | 337 | 553                     | 270 | 12    |
| SW200-093G3  | 650                | 242 | 379 | 623                     | 270 | 12    |
| SW200-110G3  | 650                | 242 | 379 | 623                     | 270 | 12    |

| Model        | Outline Dimensions |     |     | Installion dimensions |     |         |
|--------------|--------------------|-----|-----|-----------------------|-----|---------|
|              | H                  | W   | D   | H1                    | W1  | d       |
| SW200-132G3  | 700                | 410 | 350 | 678                   | 280 | 14      |
| SW200-160G3  | 700                | 410 | 350 | 678                   | 280 | 14      |
| SW200-187G3  | 888                | 570 | 390 | 850                   | 380 | 12      |
| SW200-200G3  | 888                | 570 | 390 | 850                   | 380 | 12      |
| SW200-220G3  | 888                | 570 | 390 | 850                   | 380 | 12      |
| SW200-250G3  | 1050               | 665 | 392 | 1012                  | 515 | 14      |
| SW200-280G3  | 1050               | 665 | 392 | 1012                  | 515 | 14      |
| SW200-315G3  | 1050               | 665 | 392 | 1012                  | 515 | 14      |
| SW200-350G3  | 1100               | 824 | 417 | 1060                  | 600 | 14      |
| SW200-400G3  | 1100               | 824 | 417 | 1060                  | 600 | 14      |
| SW200-450G3  | 1100               | 824 | 417 | 1060                  | 600 | 14      |
| SW200-500G3  | 1100               | 824 | 417 | 1060                  | 600 | 14 </td |
| SW200-5R5G4B | 256                | 183 | 162 | 244                   | 140 | 4*5.4   |
| SW200-7R5G4B | 256                | 183 | 162 | 244                   | 140 | 4*5.4   |
| SW200-011G4B | 320                | 198 | 184 | 308                   | 162 | 4*5.4   |
| SW200-015G4B | 320                | 198 | 184 | 308                   | 162 | 4*5.4   |
| SW200-018G4  | 430                | 223 | 288 | 414                   | 170 | 7       |
| SW200-022G4  | 430                | 223 | 288 | 414                   | 170 | 7       |

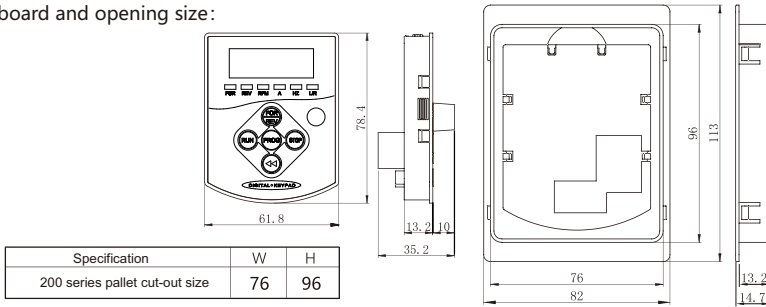
Base mounting dimensions of 200-9 (132KW~500KW)

Front renderings of add reactor



| Power Range | Shape DIM | Machine Dimensions |     |     |
|-------------|-----------|--------------------|-----|-----|
|             |           | W                  | H   | D   |
| 132~160KW   | 200-9     | 405                | 350 | 337 |
| 185~220KW   | 200-10    | 561                | 506 | 376 |
| 250~315KW   | 200-11    | 656                | 540 | 379 |
| 355~500KW   | 200-12    | 814                | 640 | 404 |

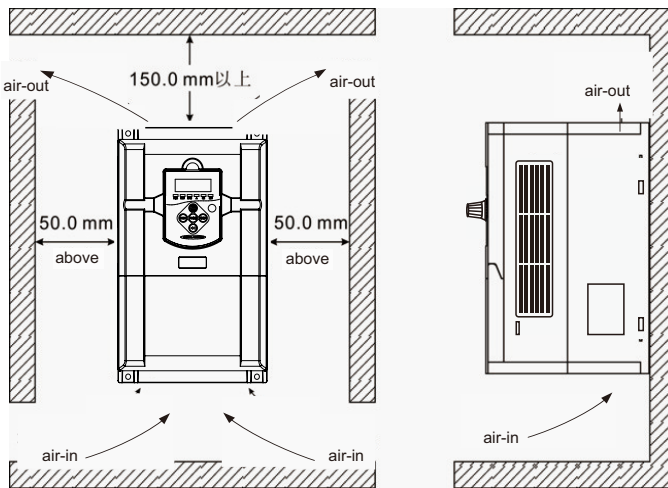
Keyboard and opening size:



### 3.1.3 Installation of the whole machine

#### 1. Single or Multiple side by side installation

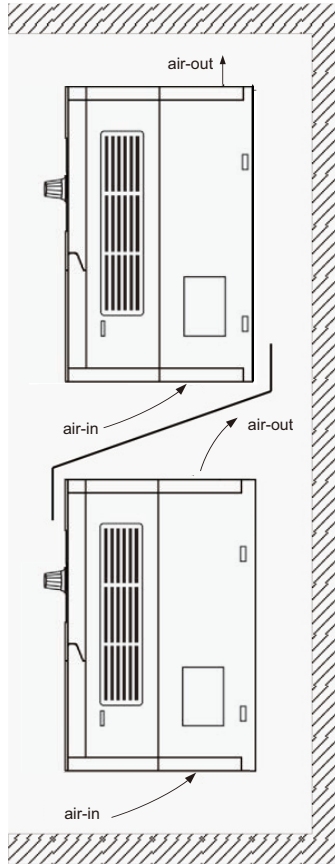
The frequency converter can be installed in a single or side by side. Due to the use of air cooling, in order to ensure the heat dissipation effect, a certain space is reserved above and below the frequency converter, as shown in the figure below.



200 0.4~30KW single or parallel installation

## 2. Up and Down Installation

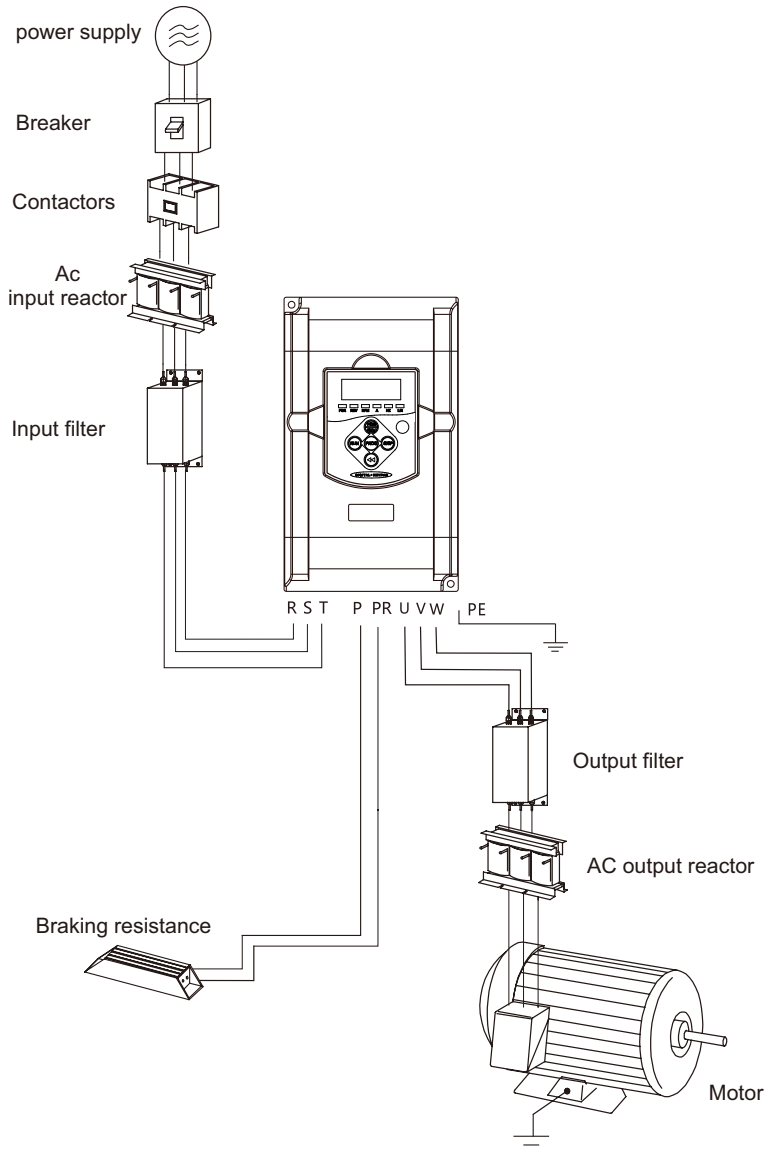
When multiple inverters are installed up and down, due to the heat of the down converter, the temperature of the up converter will rise, resulting in failure. Measures such as installing heat insulation deflector should be taken to ensure the heat dissipation effect, as shown in the figure.



200 0.4~30KW  
Up-down installation mode

### 3.2 Product Peripheral Devices

The figure below is the standard configuration diagram of inverter peripheral devices.



| Device Name        | Installation Position                      | Function Description  |
|--------------------|--|---|
| Air Switch         | Input front end                            | In case of abnormal over-current in the later stage equipment, it can cut off the power supply and protect the later stage.   |
| Contacts           | Between air switch and inverter input side | Please don't close and open the contactor frequently (less than twice per minute) when the inverter is on or off. This will cause the failure of the frequency converter. Do not control the start and stop of the frequency converter by closing and opening the contactor, which will reduce the service life of the frequency converter. |
| AC Input Reactor   | Inverter input side                        | Increase the input side power factor; Improving the influence of unbalanced three phase input AC power supply on the system; Suppression of high order harmonics; Reduce the interference of external conduction and radiation, effectively restrain the influence of pulse current on rectifier bridge.                                    |
| Input Filter       | Inverter input side                        | Reduce the conduction interference from the power supply end to the inverter, and improve the anti-interference ability of the inverter; Reduce the external conduction and radiation interference of frequency converter.  |
| Braking Resistance |  | When braking, it can effectively consume the feedback energy of the motor to achieve rapid braking.   |
| Output Filter      | Inverter input side                        | Reduce the external conduction and radiation interference of frequency converter.   |

### 3.2.1 Air switch (circuit breaker), fuse, cable and contactor selection:

The following table is a guide for the selection of air switches (circuit breakers), fuses, cables and contactors:

| Model        | Air switch/fuse(A) | Copper core cable input/output(mm <sup>2</sup> ) | Rated working current of contactor(A) |
|--------------|--------------------|--|---------------------------------------|
| SW200-5R5G1B | 100                | 10/2.5   | 100                                   |
| SW200-7R5G1B | 150                | 16/8   | 100                                   |
| SW200-011G1B | 175                | 25/10  | 135                                   |
| SW200-015G1  | 200                | 35/16  | 150                                   |
| SW200-018G1  | 200                | 35/25  | 150                                   |
| SW200-022G1  | 250                | 50/35  | 200                                   |
| SW200-5R5G2B | 63                 | 6/6  | 40                                    |
| SW200-7R5G2B | 63                 | 8/8  | 63                                    |
| SW200-011G2B | 100                | 10/10  | 100                                   |
| SW200-015G2B | 100                | 16/16  | 100                                   |
| SW200-018G2  | 150                | 25/25  | 100                                   |
| SW200-022G2  | 175                | 35/35  | 135                                   |
| SW200-030G2  | 200                | 35/35  | 150                                   |
| SW200-037G2  | 250                | 50/50  | 200                                   |
| SW200-045G2  | 350                | 70/70  | 300                                   |
| SW200-055G2  | 400                | 95/95  | 350                                   |
| SW200-R75G3B | 10                 | 1/1  | 10                                    |
| SW200-1R5G3B | 10                 | 1.5/1.5  | 10                                    |
| SW200-2R2G3B | 16                 | 2.5/2.5  | 10                                    |
| SW200-004G3B | 25                 | 4/4  | 25                                    |
| SW200-5R5G3B | 32                 | 4/4  | 25                                    |
| SW200-7R5G3B | 40                 | 6/6  | 32                                    |
| SW200-011G3B | 63                 | 6/6  | 40                                    |

| Model        | Air switch/fuse(A) | Copper core cable input/output(mm <sup>2</sup> ) | Rated working current of contactor(A) |
|--------------|--------------------|--|---------------------------------------|
| SW200-015G3B | 63                 | 10/10  | 63                                    |
| SW200-018G3B | 100                | 10/10  | 63                                    |
| SW200-022G3B | 100                | 10/10  | 100                                   |
| SW200-030G3B | 150                | 16/16  | 150                                   |
| SW200-037G3  | 150                | 25/25  | 150                                   |
| SW200-045G3  | 175                | 35/35  | 175                                   |
| SW200-055G3  | 200                | 35/35  | 200                                   |
| SW200-075G3  | 250                | 50/50  | 250                                   |
| SW200-090G3  | 300                | 70/70  | 300                                   |
| SW200-110G3  | 350                | 95/95  | 350                                   |
| SW200-132G3  | 400                | 95/95  | 400                                   |
| SW200-160G3  | 500                | 150/150  | 500                                   |
| SW200-185G3  | 630                | 185/185  | 630                                   |
| SW200-200G3  | 630                | 240/240  | 630                                   |
| SW200-220G3  | 800                | 2*150/2*150                                      | 800                                   |
| SW200-250G3  | 800                | 2*150/2*150                                      | 800                                   |
| SW200-280G3  | 800                | 2*185/2*185                                      | 800                                   |
| SW200-315G3  | 1000               | 2*240/2*240                                      | 1000                                  |
| SW200-350G3  | 1000               | 2*240/2*240                                      | 1000                                  |
| SW200-400G3  | 1200               | 3*185/3*185                                      | 1200                                  |
| SW200-450G3  | 1200               | 3*185/3*185                                      | 1200                                  |
| SW200-5R5G4B | 63                 | 10/4   | 63                                    |
| SW200-7R5G4B | 80                 | 16/6   | 80                                    |
| SW200-011G4B | 125                | 30/6   | 125                                   |
| SW200-015G4B | 160                | 35/10  | 160                                   |
| SW200-018G4  | 160                | 35/10  | 160                                   |
| SW200-022G4  | 200                | 55/10  | 200                                   |

### 3.2.2 Selection of Brake Components

Users can choose different braking resistance and power according to the actual situation, the calculation method is as follows. However, the resistance value should not be less than the minimum value in the recommended table, otherwise there is a risk of damage to the inverter, and the power can be greater. The greater the inertia of the system, the shorter the deceleration time and the more frequent the braking, the greater the braking resistance power and the smaller the resistance value.

#### 1. Selection of braking resistance

Calculation formula of brake resistance:  $R = U_{DH} \times U_{DH} + (K_B \times P_{MN})$ .

$U_{DH}$  is Upper limit of DC bus, generally 380V equipment's is 700V, 220V equipment's is 400V.

$P_{MN}$  is the rated power of motor.

$K_B$  is the automatic torque coefficient, with a value of 0.8-2.0, 1.0 for general machinery; 1.5 for larger inertia; 2.0 for steel mills and mining machinery.

#### 2. Power selection of braking resistor

Resist Power:  $P_b = U_{DH} \times U_{DH} \div R$

Theoretically, the braking resistance power can be the same as the braking power, but in general, the actual selection will be multiplied by the correction factor, that is braking resistor power,  $P_r = aP_b$ .



The correction coefficient  $\alpha = 0.12 - 0.9$ , 0.12 for frequent acceleration and deceleration, and 0.12 for frequent acceleration and deceleration. For the down escalator and other equipment that need to be in regenerative braking state for a long time, take 0.9; Centrifuge and other equipment, take 0.6.

### 3.Recommended selection table of brake components

| Model        | Recommended value of braking resistance | Recommended power of brake resistor | Brake unit |
|--------------|---|-------------------------------------|------------|
| SW200-5R5G1B | 900W                                    | $\geq 130\Omega$                    | Built-in   |
| SW200-7R5G1B | 1200W                                   | $\geq 80\Omega$                     |            |
| SW200-011G1B | 1200W                                   | $\geq 30\Omega$                     |            |
| SW200-5R5G2B | 900W                                    | $\geq 130\Omega$                    |            |
| SW200-7R5G2B | 1200W                                   | $\geq 80\Omega$                     |            |
| SW200-011G2B | 1200W                                   | $\geq 30\Omega$                     |            |
| SW200-015G2B | 4000W                                   | $\geq 10\Omega$                     |            |
| SW200-R75G3B | 150W                                    | $\geq 300\Omega$                    |            |
| SW200-1R5G3B | 250W                                    | $\geq 300\Omega$                    |            |
| SW200-2R2G3B | 500W                                    | $\geq 100\Omega$                    |            |
| SW200-004G3B | 500W                                    | $\geq 100\Omega$                    |            |
| SW200-5R5G3B | 700W                                    | $\geq 80\Omega$                     |            |
| SW200-7R5G3B | 900W                                    | $\geq 65\Omega$                     |            |
| SW200-011G3B | 1200W                                   | $\geq 40\Omega$                     |            |
| SW200-015G3B | 1500W                                   | $\geq 30\Omega$                     |            |
| SW200-018G3B | 2000W                                   | $\geq 25\Omega$                     |            |
| SW200-022G3B | 2500W                                   | $\geq 20\Omega$                     |            |
| SW200-030G3B | 4000W                                   | $\geq 10\Omega$                     |            |
| SW200-5R5G4B | 700W                                    | $\geq 80\Omega$                     |            |
| SW200-7R5G4B | 900W                                    | $\geq 65\Omega$                     |            |
| SW200-011G4B | 1200W                                   | $\geq 40\Omega$                     |            |
| SW200-015G4B | 1500W                                   | $\geq 30\Omega$                     |            |
| SW200-018G4  | 2000W                                   | $\geq 25\Omega$                     |            |
| SW200-022G4  | 2500W                                   | $\geq 20\Omega$                     |            |

Note: The frequency converter within 30KW (including 30KW) comes with the brake unit; Above 30KW, the user needs to configure external driving units.

### 3.2.3 Type selection of input and output reactors

Guidance on selection of AC input reactor (AC reactor)

| Model        | Rated Current of Reactor(A) | Maximum Continuous Current of Reactor(A) | Inductance(mH) &3%Impedance |
|--------------|-----------------------------|--|-----------------------------|
| SW200-5R5G1B | 62                          | 93.6                                     | 0.26                        |
| SW200-7R5G1B | 84                          | 126                                      | 0.19                        |
| SW200-5R5G2B | 35                          | 52.65                                    | 0.46                        |
| SW200-7R5G2B | 43                          | 65.1                                     | 0.37                        |
| SW200-011G2B | 61                          | 91.5                                     | 0.27                        |
| SW200-015G2B | 73                          | 109.5                                    | 0.22                        |
| SW200-018G2  | 88                          | 132                                      | 0.18                        |
| SW200-022G2  | 106                         | 159                                      | 0.15                        |
| SW200-030G2  | 130                         | 190                                      | 0.12                        |
| SW200-037G2  | 171                         | 256.5                                    | 0.09                        |
| SW200-R75G3B | 3.7                         | 5.5                                      | 8.74                        |
| SW200-1R5G3B | 6.4                         | 9.6                                      | 5.05                        |
| SW200-2R2G3B | 8.9                         | 13.35                                    | 3.63                        |
| SW200-004G3B | 15.8                        | 23.7                                     | 2.05                        |
| SW200-5R5G3B | 21.3                        | 31.9                                     | 1.52                        |
| SW200-7R5G3B | 28.3                        | 42.5                                     | 1.14                        |
| SW200-011G3B | 35.9                        | 53.8                                     | 0.9                         |
| SW200-015G3B | 43.4                        | 65.1                                     | 0.75                        |
| SW200-018G3B | 51.5                        | 77.25                                    | 0.63                        |
| SW200-022G3B | 61                          | 91.5                                     | 0.53                        |
| SW200-030G3B | 80                          | 120                                      | 0.45                        |

Guidance on Selection of AC Output Reactor (AC reactor).

| Model        | Rated Current of Reactor(A) | Maximum Continuous Current of Reactor(A) | Inductance(mH) &3%Impedance |
|--------------|-----------------------------|--|-----------------------------|
| SW200-5R5G1B | 25                          | 37.5                                     | 0.65                        |
| SW200-7R5G1B | 32                          | 48                                       | 0.51                        |
| SW200-5R5G2B | 25                          | 37.5                                     | 0.65                        |
| SW200-7R5G2B | 32                          | 48                                       | 0.51                        |
| SW200-011G2B | 45                          | 67.5                                     | 0.36                        |
| SW200-015G2B | 61                          | 91.5                                     | 0.27                        |
| SW200-018G2  | 75                          | 112.5                                    | 0.22                        |
| SW200-022G2  | 91                          | 136.5                                    | 0.18                        |
| SW200-030G2  | 112                         | 168                                      | 0.14                        |
| SW200-037G2  | 150                         | 225                                      | 0.11                        |
| SW200-R75G3B | 2.3                         | 3.45                                     | 14.06                       |
| SW200-1R5G3B | 4                           | 6  | 8.08                        |
| SW200-2R2G3B | 5.6                         | 5.4                                      | 5.77                        |
| SW200-004G3B | 9.9                         | 14.8                                     | 3.27                        |
| SW200-5R5G3B | 13.3                        | 19.9                                     | 2.43                        |
| SW200-7R5G3B | 17.7                        | 26.5                                     | 1.83                        |
| SW200-011G3B | 25                          | 37.5                                     | 1.29                        |
| SW200-015G3B | 32                          | 48                                       | 1.01                        |
| SW200-018G3B | 38                          | 57                                       | 0.85                        |
| SW200-022G3B | 45                          | 67.5                                     | 0.72                        |
| SW200-030G3B | 61                          | 129                                      | 0.36                        |

### 3.2.4 Filter selection

| Model        | Input Filter     | Output Filter    |
|--------------|------------------|------------------|
|              | Rated Current(A) | Rated Current(A) |
| SW200-5R5G1B | 80               | 36               |
| SW200-7R5G1B | 100              | 36               |
| SW200-5R5G2B | 36               | 36               |
| SW200-7R5G2B | 50               | 36               |
| SW200-011G2B | 80               | 50               |
| SW200-015G2B | 80               | 80               |
| SW200-018G2  | 100              | 100              |
| SW200-022G2  | 150              | 100              |
| SW200-030G2  | 150              | 150              |
| SW200-037G2  | 200              | 200              |
| SW200-R75G3B | 5                | 5                |
| SW200-1R5G3B | 5                | 5                |
| SW200-2R2G3B | 10               | 10               |
| SW200-004G3B | 10               | 10               |
| SW200-5R5G3B | 20               | 20               |
| SW200-7R5G3B | 20               | 20               |
| SW200-011G3B | 36               | 36               |
| SW200-015G3B | 36               | 36               |
| SW200-018G3B | 50               | 50               |
| SW200-022G3B | 50               | 50               |
| SW200-030G3B | 65               | 65               |

### 3.2.5 Installation of residual current circuit breaker

When using frequency converter, it is not recommended to install residual current circuit breaker.

If the frequency converter is equipped with leakage breaker as leakage fault protection, in order to prevent the leakage breaker from misoperation, please select the current sensitivity rating of more than 200mA, and the action time is 0.1s or more.

3.3 Main circuit

3.3.1 Schematic diagram of main circuit terminal

(0.4~7.5KW) Main circuit terminal



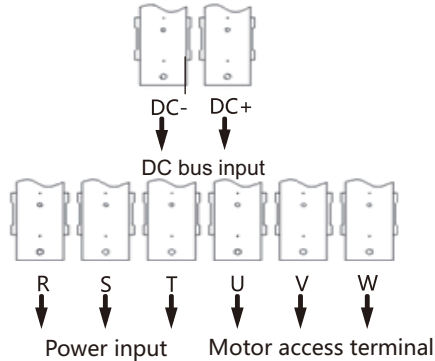
(11~30KW) Main circuit terminal



(37~45KW) Main circuit terminal



(55~110KW) Main circuit terminal



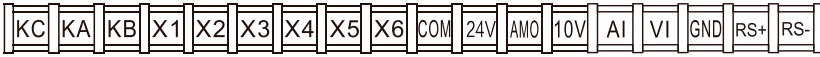
Main circuit terminal description:

| Terminals  | Terminal function  |
|------------|--|
| R、 S、 T    | Power input terminals  |
| U、 V、 W    | Power output terminals,connect to motor                                  |
| P、 PR      | Brake resistor connection terminal                                       |
| P、 N (DC-) | Dc bus output terminal (connecting brake unit)                           |
| P、 DC+     | DC reactor connection terminal<br>(132KW or more remove the short joint) |
| ⊕          | Ground terminal  |

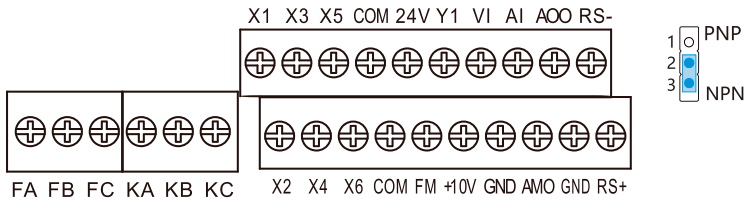
### 3.4 Control circuit

#### 3.4.1 Schematic diagram of control circuit terminal

##### 200 (0.4~30KW) Control loop terminals



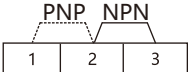
##### 200 (37~500KW) Control loop terminals



#### Control Terminal Description:

| Terminals | Description             | Specifications  |
|-----------|-------------------------|---|
| X1-X6     | Digital input terminal  | 1.Logic: >DC19V logic is 0;<br><DC14V logic is 1;<br>2.Input Voltage: 0-30V;<br>3.Input impedance: 3.6KΩ;<br>4.DI3 (X3) Configurable as pulse input,<br>range is: 0.00-100.00kHz;             |
| COM       | Digital signal ground   | A common port linking digital signal inputs   |
| FM        | High speed pulse output | The terminal output mode is selected as high-speed pulse output, with the highest frequency up to 100kHz  |
| Y1        | Digital output 1        | Optocoupler isolation, bipolar open collector output. Output voltage range: 0-24V, output current range: 0-50mA   |
| +24V      | 24V power supply        | It provides 24V power supply to the outside, which is generally used as working power supply for digital input / output terminals and external sensor power supply; Max output current: 100mA |

## Control Terminal Description:

| Terminals            | Description                 | Specifications  |
|----------------------|-----------------------------|---|
| +10V                 | 10V power supply            | Max load 10mA   |
| VI                   | Analog input terminals      | Select 0-10V voltage input or 0-20mA current input through dial switch VI default as voltage input;<br>AI default as current input;<br>1: voltage input; Input impedance 10K $\Omega$<br>2: current input; Input impedance $\leq$ 500 $\Omega$ ;                  |
| AI                   | Analog input terminals      | AI default: current input;<br>1. Voltage input: input impedance is about 10K $\Omega$ ;<br>2. Current input: input impedance $\leq$ 500 $\Omega$ ;  |
| GND                  | Signal ground               | Two signals ground internal connectivity  |
| AMO<br>AOO           | Analog output terminals     | Through the software parameters to select 0-10V voltage output or 0-20mA current output, AMO default: 0-10V voltage output;<br>1. Voltage output: load greater than 500 $\Omega$ ;<br>2. Current output: load greater than 500 $\Omega$ ;                         |
| RS+,RS-              | RS485 Communication         | Maximum baud rate: 9600bit/s;   |
| KA-KB-KC<br>FA-FB-FC | Relay output                | 1. Resistive load: 250VAC 3A/30VDC 3A;<br>2. Inductive load: 250VAC 0.2A/24VDC 0.1 A;<br>( $\cos \varphi = 0.4$ ) ;<br>3. KA and KB are normally open,<br>KA and KC are normally close<br>FA and FB are normally open,<br>FA and FC are normally close            |
| J2                   | Used for external keyboard  | For external keyboard   |
| J4                   | Digital input jumper switch |  <p>Selection switch for PNP and NPN.<br/>The jumper switches 1-2 are connected in PNP mode;<br/>The jumper switch 2-3 is connected in NPN mode, which is the default state.</p> |

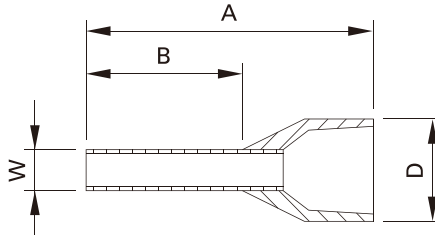
## Note:

1. For series below 30KW, the GND and COM on the main board can be used in common;
2. For series below 30KW, the relay output is only one set of KA-KB-KC;
3. For series below 30KW, FM, Y1, AOO port reserved;

### 3.4.2 Control circuit terminals specifications

The control terminal uses the shrapnel type terminal block:

1. Tube type terminals are recommended for control lines. The recommended specifications are as follows:



| A  | B | D (Max) | W   |
|----|---|---------|-----|
| 14 | 8 | 3.5     | 1.4 |

Unit: mm

Diameter specification: Recommended cable size of control terminal:0.3mm<sup>2</sup>.

2. The access line can be directly nailed in and locked.

3. When withdrawing the wire, use a slotted screwdriver to counter the lock to exit,

Specification of slotted screw driver: wide 2.5mm<sup>2</sup>,thickness 0.4mm<sup>2</sup>;

4. Ideal stripping diameter: Stripping diameter of wiring end : 9mm<sup>2</sup> is the best diameter.

5. When bare wire wiring, the wiring shall be neatly placed in the middle of the wiring hole.

The relay terminal uses screw type terminal block:

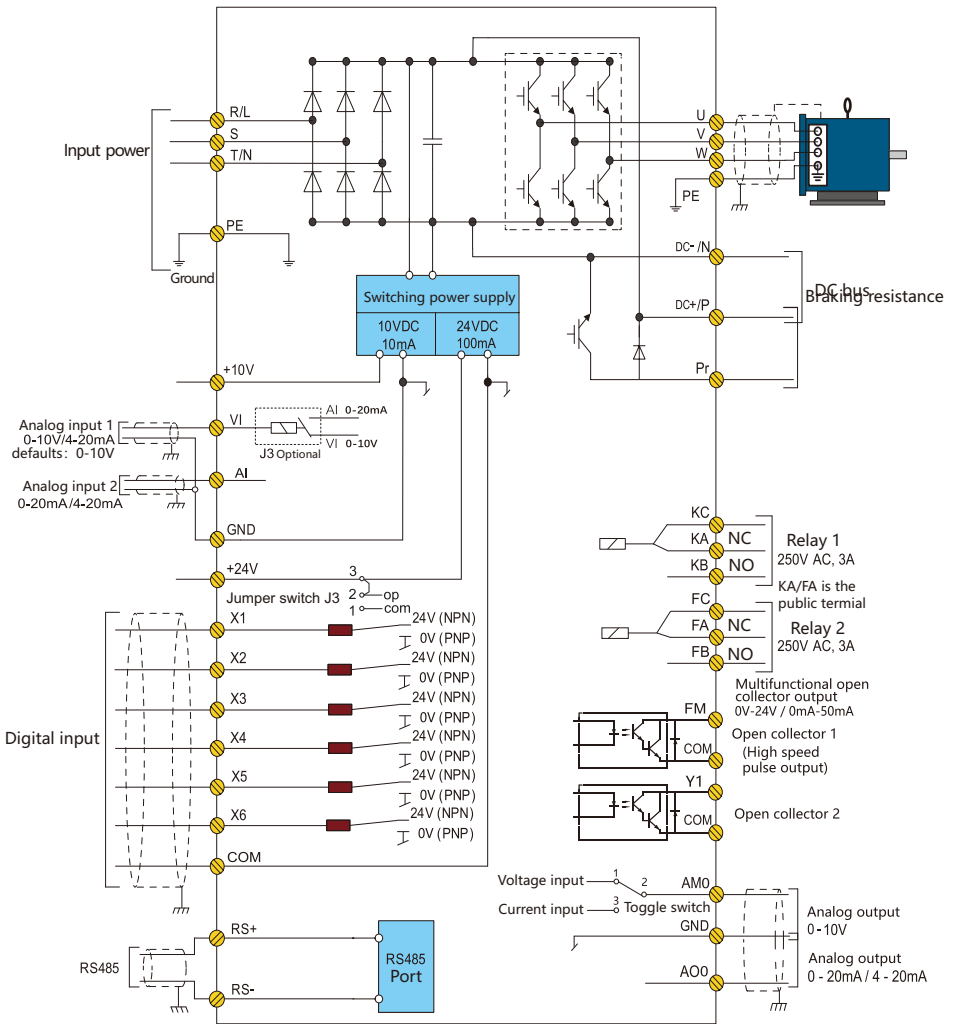
1. Wiring with a flat blade screwdriver, Specification of slotted screw driver: wide 3.5mm<sup>2</sup>, thickness 0.6mm<sup>2</sup>;

2. Ideal stripping diameter: Stripping diameter of wiring end : 6-7mm<sup>2</sup> is the best diameter;

3. When bare wire wiring, the wiring shall be neatly placed in the middle of the wiring hole.

4. Wire diameter specification: 0.4-1.0mm<sup>2</sup>, Torque: 0.4Nm.

3.4.3 Control circuit wiring diagram

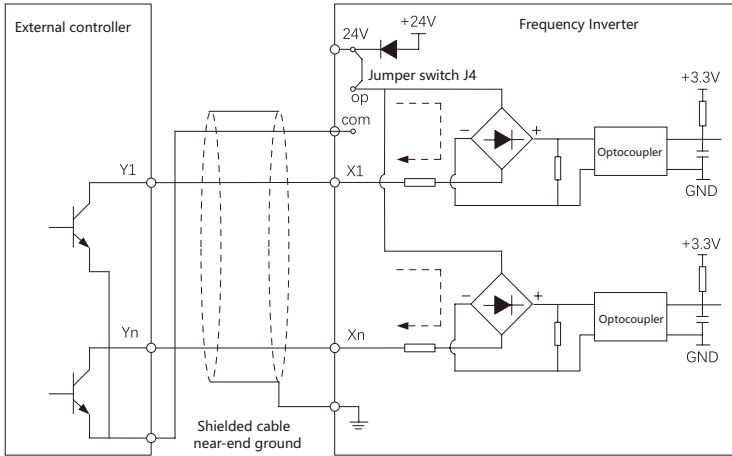


200 Series 0.4-500KW Wiring Diagram

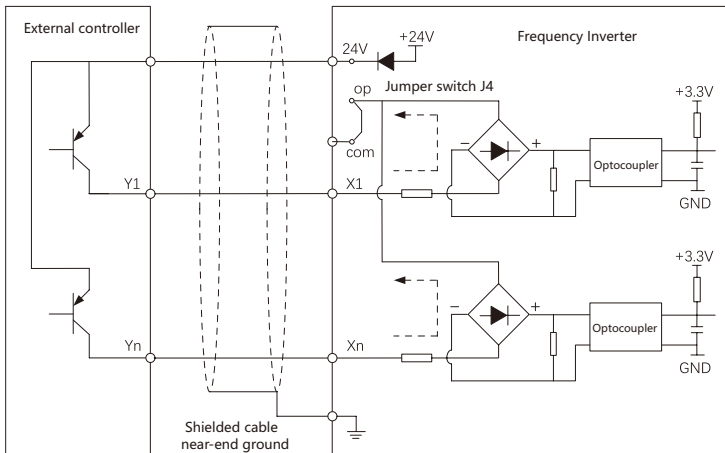
Note: 200 0.4-30KW wiring terminal only has 1 set of analog output, 1 set of relay output, no FM and Y1 functions, wiring diagrams for products below 30KW, the terminals are subject to the actual machine



### 3.4.4 Instruction of digital input terminal

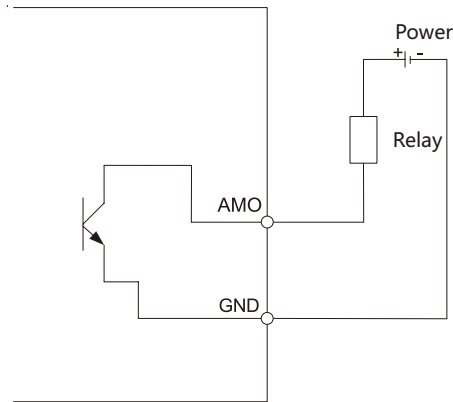


This connection mode must connect the op of jumper switch J4 to +24V (the factory jumper switch J4 of the frequency converter defaults to NPN mode, that is, OP link+24V).  
 200 series 0.4-500KW multi-function terminal input X1-X6 corresponding common terminal is COM



This connection mode must connect the op of jumper switch J4 to com (that is, jumper switch J4 uses PNP mode), otherwise it cannot work normally.

### 3.4.5 Instruction of analog output terminal



## 3.5 EMC guidance in electrical wiring

### 3.5.1 Introduction to EMC standards

200 series inverter is the latest international standard: IEC/EN61800-3:2004 (Adjustable speed electrical drive systems part3: EMC requirements and specific test methods) .

IEC/EN61800-3 Mainly from the electromagnetic interference and anti electromagnetic interference two aspects of the inverter are investigated, Electromagnetic interference mainly tests the radiation interference, conduction interference and harmonic interference of frequency converter (Corresponding to the civil inverter has this requirement).

EMI immunity mainly includes conduction immunity, radiation immunity, surge immunity, fast read burst immunity, ESD immunity and low frequency short circuit immunity of power supply. (The specific test items are: 1. Immunity experiment of input voltage sag, terminal and change.2. Experiment on immunity of commutation notch.3. Experiment on immunity of harmonic input.4. Input frequency change experiment.5. Input voltage unbalance test.6. Input voltage fluctuation experiment)

200 series frequency converter shall be tested in accordance with the strict requirements of IEC/EN61800-3. It will have good electromagnetic compatibility in an industrial environment until installation and use as shown in this section.

### 3.5.2 Noise control measures

1. When peripheral equipment and frequency converter share the power supply of the same system, the noise generated by frequency converter will spread to other equipment in the same system through the power line and cause misoperation. At this time, the following measures can be taken:

- a. Adding input noise filter at the input end of frequency converter.
- b. Install power filter at the power input end of the affected equipment.
- c. Isolation transformer is used to separate the noise transmission path between other equipment and frequency converter.

2. The wiring between the peripheral equipment and the frequency converter forms a loop, and the inevitable grounding leakage current of the frequency converter will make the equipment malfunction. At this time, if the grounding of the equipment is disconnected, the misoperation will be reduced.

3. Easily affected equipment and signal lines should be installed as far away from the frequency converter as possible.

4. Shielded cable shall be used for the signal line, and the shielding layer shall be reliably grounded. The signal line cable can be sheathed in the metal tube, and the distance between the metal tubes shall be at least 20cm, and it shall be far away from the frequency converter and its peripheral devices and cables as far as possible, so as to avoid parallel wiring of signal line and power line or bundled wiring of power line.

5. When the signal line must pass through the power cable, it should keep orthogonal crossing.

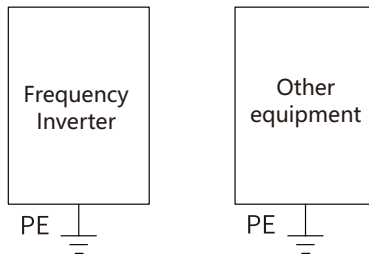
6. The motor cable should be placed in a thick barrier, such as a pipe with a thickness of more than 2mm or buried in a cement tank. The power cable can also be placed in a metal pipe and grounded with a shielded cable .

7. 4-core motor cable is used, one of which is grounded at the near end of the converter and the other side is connected to the motor housing.

8. The input and output of frequency converter are equipped with radio noise filter and line radiation noise filter respectively, such as ferrite mold choke, which can suppress the radiated noise of power line.

### 3.5.3 Grounding treatment

The recommended special grounding electrode is shown in the figure below:



1. The maximum standard size of grounding cable should be used as far as possible to reduce the grounding system impedance.

2. The ground wire should be as short as possible.

3. The grounding point should be as close to the frequency converter as possible.

4. One of the four core motor cables should be grounded on the inverter side, and the other side should be connected to the motor grounding terminal. If the motor and inverter have special grounding electrode, the effect is better.

5. When the grounding terminals of all parts of the system are connected together, the leakage current will become a noise source, which will affect other equipment in the system. Therefore, the grounding terminals of the inverter and other equipment that are vulnerable to interference need to be separated.

6. The grounding cable should be arranged away from the input and output wiring of noise sensitive equipment.

### 3.5.4 Countermeasures for leakage current suppression.

The leakage current flows through the distributed capacitance between the input and output lines and to the ground of the inverter, which is related to the capacitance value of the distributed capacitance and the carrier frequency. Leakage current is divided into two types: leakage current to ground and leakage current between lines.

1. The leakage current to the ground is not only flowing in the inverter system, it may affect other equipment because of the ground loop, and these leakage currents may make the leakage protector and other equipment malfunction. The higher the carrier frequency of the inverter, the greater the leakage to the ground; The longer the motor cable is, the greater the parasitic capacitance and the greater the leakage current to the ground. Therefore, reducing carrier frequency and selecting motor cable as short as possible are the most direct and effective ways to suppress leakage current.

2. The high-order harmonics of the leakage current between the cables at the output side of the inverter will accelerate the aging of the cables, and may also make other equipment malfunction. The higher the frequency of frequency converter carrier, the larger the leakage current between lines; The longer the motor cable is, the larger the parasitic capacitance is and the larger the leakage current is. Therefore, reducing the carrier frequency and selecting the motor cable as short as possible are the most direct and effective methods to suppress the leakage current. Increasing the output reactor can also effectively suppress the leakage current between lines.

## Charter 4 Operation and Display

### 4.1 Operation panel

The operation panel can modify the parameters, copy, monitor the working status of the inverter and control the operation of the inverter (start and stop) and so on. The shape is shown in the following figure:



#### 1. Indicator light descriptio

FOR/REV Indicator light:

| FOR | REV | State       |
|-----|-----|-------------|
| On  | Off | Running FOR |
| Off | On  | Running REV |
| Off | Off | Stop        |













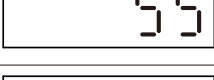




Indicator light HZ、A、RPM : The significance of monitoring the display data of frequency converter.

#### 2. Display Screen

A total of 5 LED display, can display the set frequency, output frequency, various monitoring data and alarm code.



4.3 Monitor running status

| Specification        | Button  | Display on screen   | Introduction  |
|----------------------|---|---|---|
| Output Frequency     | Initial interface   | FOR ●  ● A<br>REV ○<br>RPM ○ ● HZ<br>● L/R   | The monitored output frequency parameter is P11.00 -- 50.0Hz, and the display accuracy is: 0.1        |
| Set value            |    | FOR ●  ● A<br>REV ○<br>RPM ○ ● HZ<br>● L/R   | The monitoring preset setpoint parameter is P11.01 -- 50%, and the display accuracy is : 0.1          |
| Motor Current        |    | FOR ●  ● A<br>REV ○<br>RPM ○ ● HZ<br>● L/R   | The monitoring click current parameter is P11.04 -- 9.00A, and the display accuracy is: 0.01          |
| Motor Voltage        |    | FOR ●  ● A<br>REV ○<br>RPM ● ● HZ<br>● L/R   | The output voltage parameter P11.03 of the monitored inverter is 380V, and the display accuracy is: 1 |
| Motor RPM            |    | FOR ●  ● A<br>REV ○<br>RPM ● ● HZ<br>● L/R   | The monitoring speed parameter P11.14 is 1440R, and the display precision is: 1                       |
| DC Voltage           |    | FOR ●  ● A<br>REV ○<br>RPM ● ● HZ<br>● L/R   | The monitoring DC voltage parameter P11.02 is 540V, and the display precision is: 1                   |
| Inverter temperature |   | FOR ●  ● A<br>REV ○<br>RPM ● ● HZ<br>● L/R  | The temperature parameter P11.35 of the monitoring converter is 55 C, and the display precision is 1  |
| Feedback value       |  | FOR ○  ● A<br>REV ●<br>RPM ● ● HZ<br>● L/R | The monitoring feedback value parameter P11.16 is 28.000, and the display precision is 0.001          |
| Analog VI input      |  | FOR ○  ● A<br>REV ●<br>RPM ● ● HZ<br>● L/R | The parameter P11.09 of monitoring analog quantity VI is 10.00V, and the display precision is 0.01    |

### 4.4 Check alarm records

If the frequency converter fails, the operation panel will display the fault code, and the reason has been explained. The frequency converter can save the last three fault records. Through P10 parameter group check.

### 4.5 Display letters comparison table

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| A | B | C | D | E | F | G | H | I | J |
| A | B | C | D | E | F | G | H | I | J |
| K | L | M | N | O | P | Q | R | S | T |
|   | L |   | n | o | p | q | r | s | t |
| U | V | W | X | Y | Z | - | + | . | = |
| U | U |   |   | y | z | - | + | . | = |
| a | b | c | d | e | f | g | h | i | j |
| A | B | C | D | E | F | G | H | I | J |
| k | l | m | n | o | p | q | r | s | t |
|   | L |   | n | o | p | q | r | s | t |
| u | v | w | x | y | z |   |   |   |   |
| U | U |   |   | y | z |   |   |   |   |



## Charter 5 Function Parameter List

| Parameter                          | Name  | Range  | Default value | Change |
|------------------------------------|---|--|---------------|--------|
| Group P00 Basic Function Parameter |   |  |               |        |
| P00.01                             | Control Mode                                    | 0:VF Control<br>1:Vector Control   | 1             | ★      |
| P00.02                             | Command Source Selection                        | 0:Panel Control<br>1:Terminal Control<br>2:Communication Control<br>3:Communication or terminal control  | 0             | ★      |
| P00.03                             | Main frequency source X selection               | 0:Digital Setting (Preset parameter values)<br>1:Reserved<br>2:VI<br>3:AI<br>4:Keyboard Potentiometer<br>5:Pulseinput<br>6:Multi-reference<br>7:Simple PLC<br>8:PID<br>9:Communication setting | 4             | ★      |
| P00.04                             | Auxiliary frequency source Y selection          | 0:Digital Setting<br>1:Reserved<br>2:VI<br>3:AI(Reserved)<br>4:Keyboard Potentiometer<br>5:Pulse input<br>6:Multi-reference<br>7:Simple PLC<br>8:PID9:Communication setting                    | 0             | ★      |
| P00.05                             | Range of auxiliary frequency source Y selection | 0:Relative to Max frequency<br>1:Relative to main frequency X  | 0             | ☆      |
| P00.06                             | Range of auxiliary frequency source Y           | 0-200%   | 100           | ☆      |
| P00.07                             | Bias rate of auxiliary frequency source Y       | 0-P0.10  | 0             | ☆      |
| P00.08                             | Frequency source selection                      | Ten's digit:X and Y operation relationship<br>0:X+Y<br>1:X-Y<br>2:Maximum<br>3:MinimumUnit's   | 0             | ☆      |

| Parameter | Name                                       | Range   | Default value | Change |
|-----------|--|---|---------------|--------|
| P00.08    | Frequency source selection                 | digit:Frequencysourceselection<br>0:Main frequency source X<br>1:XandYoperation(operation relationship determined by ten's digit)<br>2:Switchover between X and Y<br>3:Switchover between X and "Xand Yoperation"<br>4:Switchover between Y and "Xand Yoperation" | 0             | ☆      |
| P00.09    | Preset reference value                     | -100%-100%  | 0             | ☆      |
| P00.10    | Maximum Frequency                          | 0~655.35Hz  | 50            | ★      |
| P00.12    | Frequency upper limit                      | 0-P00.10  | 50            | ☆      |
| P00.14    | Frequency lower limit                      | 0-P00.10  | 0             | ☆      |
| P00.15    | Below lower limit frequency operation mode | 0:Lower limit frequency operate<br>1:Stop<br>2:0 speed operate  | 0             | ☆      |
| P00.16    | Rotation direction                         | 0:Same direction<br>1:Reverse direction   | 0             | ☆      |
| P00.17    | Reverse operation forbidden                | 0:Invalid<br>1:Valid  | 1             | ☆      |
| P00.20    | Time precision                             | 0:1s<br>1:0.1s<br>2:0.01s   | 1             | ☆      |
| P00.22    | Acceleration time 1                        | 0~65535s  | 10            | ☆      |
| P00.23    | Deceleration time 1                        | 0~65535s  | 10            | ☆      |
| P00.25    | Acceleration time 2                        | 0~65535s  | 10            | ☆      |
| P00.26    | Deceleration time 2                        | 0~65535s  | 10            | ☆      |
| P00.28    | Acceleration time 3                        | 0~65535s  | 10            | ☆      |
| P00.29    | Deceleration time 3                        | 0~65535s  | 10            | ☆      |
| P00.31    | Acceleration time 4                        | 0~65535s  | 10            | ☆      |
| P00.32    | Deceleration time 4                        | 0~65535s  | 10            | ☆      |
| P00.33    | Acceleration time 1 and 2 switch frequency | 0~650.00Hz  | 0             | ☆      |

| Parameter | Name  | Range  | Default value | Change |
|-----------|---|--|---------------|--------|
| P00.34    | Deceleration time 1 and 2 switch frequency                  | 0-650.00HZ   | 0             | ☆      |
| P00.40    | UP/DOWN Power down memory selection                         | 0:No<br>1:Yes  | 0             | ☆      |
| P00.41    | UP/DOWN stop memory selection                               | 0:No<br>1:Yes  | 0             | ☆      |
| P00.42    | Base frequency for UP/DOWN modification duringrunning       | 0:Running frequency<br>1:Set frequency                 | 0             | ☆      |
| P00.43    | UP/DOWN Step  | 0.01-100.00HZ  | 0.01          | ☆      |
| P00.44    | Jump frequency 1  | 0-P00.10   | 0             | ★      |
| P00.45    | Jump frequency 2  | 0-P00.10   | 0             | ★      |
| P00.46    | Jump frequency width  | 0-P00.10   | 0             | ★      |
| P00.47    | JOG frequency   | 0-P00.12   | 5             | ☆      |
| P00.48    | JOG Acceleration time                                       | 0-65535S (relative to P00.20)                          | 10            | ☆      |
| P00.49    | JOG Deceleration time                                       | 0-65535S (relative to P00.20)                          | 10            | ☆      |
| P00.50    | Emergency stop deceleration time                            | 0-65535S (relative to P00.20)                          | 10            | ☆      |
| P00.60    | Start delay time  | 0~100s   | 0             | ☆      |
| P00.61    | Start delay function  | 0:Direct clamping<br>2:Free running                    | 2             | ☆      |
| P00.62    | Frequency tracking start                                    | 0:Invalid<br>1:Valid                                   | 0             | ☆      |
| P00.63    | Minimum starting frequency set value                        | 0-50HZ   | 0             | ★      |
| P00.64    | Minimum running frequency                                   | 0~20Hz   | 0             | ☆      |
| P00.65    | Synchronous motor start mode                                | 0:Initial position detection start<br>1:Magnetic start | 1             | ☆      |
| P00.66    | Power down start delay                                      | 0-3600S  | 0             | ☆      |
| P00.70    | DC clamping current   | 0-150%   | 50            | ☆      |
| P00.71    | Stop brake current  | 0-150%   | 50            | ☆      |
| P00.72    | Stop brake time   | 0-60S  | 0             | ☆      |
| P00.73    | Cut in frequency of stop brake                              | 0-500HZ  | 0             | ☆      |
| P00.74    | Influence of synchronous motor on magnetic starting current | 0-150%   | 80            | ☆      |

| Parameter                 | Name                                    | Range   | Default value       | Change |
|---------------------------|---|---|---------------------|--------|
| P00.75                    | Magnetization time of synchronous motor | 0.1-60s   | 3                   | ☆      |
| P00.80                    | Stop function                           | 0:Free stop<br>1:DC clamping  | 0                   | ☆      |
| P00.81                    | Minimum stop frequency                  | 0-400Hz   | 0                   | ☆      |
| P00.88                    | 0 speed holding time                    | 1-60  | 0                   | ☆      |
| P00.89                    | Current drop time                       | 1-60  | 0                   | ☆      |
| Group P01 Motor Parameter |   |   |                     |        |
| P01.00                    | Motor Type                              | 0:Asynchronous motor<br>1:Surface mounted synchronous motor<br>2:Unsaturated embedded synchronous motor<br>3:Saturated embedded synchronous motor | 0                   | ★      |
| P01.01                    | Motor Power                             | Depends on motor specification  | Model determination | ★      |
| P01.02                    | Motor Voltage                           | Depends on motor specification  | Model determination | ★      |
| P01.03                    | Motor Frequency                         | Depends on motor specification  | Model determination | ★      |
| P01.04                    | Motor Current                           | Depends on motor specification  | Model determination | ★      |
| P01.05                    | Motor RPM                               | Depends on motor specification  | Model determination | ★      |
| P01.06                    | Motor Rated Torque                      | Depends on motor specification  | Model determination | ★      |
| P01.07                    | Motor Rated Torque                      | Depends on motor specification  | Tuning parameters   | ★      |
| P01.08                    | Rotor resistance                        | Depends on motor specification  | Tuning parameters   | ★      |
| P01.09                    | Stator leakage reactance                | Depends on motor specification  | Tuning parameters   | ★      |
| P01.10                    | Motor main reactance                    | Depends on motor specification  | Tuning parameters   | ★      |
| P01.11                    | D-axis inductance                       | Depends on motor specification  | Tuning parameters   | ★      |
| P01.12                    | Q-axis inductance                       | Depends on motor specification  | Tuning parameters   | ★      |
| P01.13                    | Number of motor poles                   | 2-100   | Model determination | ★      |
| P01.14                    | Negative electrical potential           | 5-9000  | Model determination | ★      |
| P01.15                    | D-axis Saturation inductance            | 0-655.36  | Tuning parameters   | ★      |
| P01.16                    | Q-axis Saturation inductance            | 0-655.36  | Tuning parameters   | ★      |
| P01.17                    | D-axis Saturation inductanceswitch      | 0-655.36  | Tuning parameters   | ★      |
| P01.18                    | Q-axis Saturation inductanceswitch      | 0-655.36  | Tuning parameters   | ★      |
| P01.20                    | System inertia                          | 0-65.535  | Tuning parameters   | ★      |
| P01.37                    | Motor parameter learn own               | 0:Invalid<br>1:All parameters learn own<br>2:Stator resistance learn own  | 0                   | ★      |

| Parameter                         | Name                                       | Range  | Default value | Change |
|-----------------------------------|--|--|---------------|--------|
| Group P02 Control Mode Parameters |  |  |               |        |
| P02.00                            | V/F curve set                              | 0: Straight line<br>1~9: Reserved  | 0             | ☆      |
| P02.01                            | V/F Torque boost                           | 0-30%  | 0             | ☆      |
| P02.02                            | Cut-off frequency of torque boost          | 0-655.35Hz   | 50            | ☆      |
| P02.03                            | Multi-point V/F frequency point 1          | 0.00Hz~P02-05  | 0             | ☆      |
| P02.04                            | Multi-point V/F voltage point 1            | 0.0%~100.0%  | 0             | ☆      |
| P02.05                            | Multi-point V/F frequency point 2          | 0.00Hz~P02-07  | 0             | ☆      |
| P02.06                            | Multi-point V/F voltage point 2            | 0.0%~100.0%  | 0             | ☆      |
| P02.07                            | Multi-point V/F frequency point 3          | 0.00Hz~P02-09  | 0             | ☆      |
| P02.08                            | Multi-point V/F voltage point 3            | 0.0%~100.0%  | 0             | ☆      |
| P02.09                            | Multi-point V/F frequency point 4          | 0.00Hz~P02-12  | 0             | ☆      |
| P02.10                            | Multi-point V/F voltage point 4            | 0.0%~100.0%  | 0             | ☆      |
| P02.11                            | Multi-point V/F frequency point 5          | 0.00Hz~P01.03  | 0             | ☆      |
| P02.12                            | Multi-point V/F voltage point 5            | 0.0%~100.0%  | 0             | ☆      |
| P02.15                            | Voltage source for V/F separation          | 0: Digital setting(P02-16)<br>1: VI<br>2: AI<br>4: Pulse input<br>5: Multi-reference<br>6: Simple PLC<br>7: PID, process closed loop<br>8: Communication | 0             | ☆      |
| P02.16                            | Voltage digital setting for V/F separation | 0V↔ motor rated voltage  | 0             | ☆      |

| Parameter | Name   | Range   | Default value | Change |
|-----------|--|---|---------------|--------|
| P02.17    | Voltage rise time of V/F separation                      | 0~1000s   | 0             | ☆      |
| P02.18    | Voltage decline time of V/F separation                   | 0~1000s   | 0             | ☆      |
| P02.19    | Stop mode selection upon V/F separation                  | 0:Frequency and voltage declining to 0 independently<br>1:Frequency declining after voltage declines to 0 | 0             | ☆      |
| P02.20    | Automatic voltage stabilizing function                   | 0:OFF<br>1:ON   | 1             | ★      |
| P02.30    | Low frequency compensation torques                       | 0-199%  | 100           | ☆      |
| P02.31    | High frequency compensation torques                      | 0-199%  | 100           | ☆      |
| P02.32    | Slip Compensation  | -400~399%   | 80            | ☆      |
| P02.33    | Slip Compensation Time Constant                          | -400~399%   | 0.1           | ☆      |
| P02.34    | Resonance Dampening                                      | 0-3000%   | 50            | ☆      |
| P02.35    | Resonance Dampening time Constant                        | 0.001-0.05s   | 0.005         | ☆      |
| P02.36    | Open Magnetisation                                       | 0-300%  | 100           | ☆      |
| P02.37    | Normal Magnetisation Switch point                        | 0-10  | 1             | ☆      |
| P02.38    | Open Torque compensation                                 | 0-25%   | 0             | ☆      |
| P02.40    | Synchronous motor low speed compensation                 | 0-120%  | 80            | ☆      |
| P02.41    | Synchronous motor load compensation                      | 0-500%  | 120           | ☆      |
| P02.42    | Low speed synchronous motor compensation filtering time  | 0.01-20s  | 0.8           | ☆      |
| P02.43    | High speed synchronous motor compensation filtering time | 0.01-20s  | 0.8           | ☆      |
| P02.44    | Synchronous motor current filtering time                 | 0.001-1s  | 0.5           | ☆      |
| P02.45    | Synchronous motor high-speed compensation                | -400~400%   | 10            | ☆      |
| P02.50    | Torque type  | 0:Constant torque<br>1:Adjustable torque<br>3:Optimize torque   | 0             | ★      |
| P02.51    | Adjust adjustable torque                                 | 40-90%  | 90            | ★      |
| P02.52    | Automatic optimum energy consumption minimum flux        | 40-75%  | 66            | ★      |

| Parameter                            | Name                       | Range  | Default value | Change |
|--------------------------------------|----------------------------|--|---------------|--------|
| Group P03 Input Terminals Parameters |                            |  |               |        |
| P03.00                               | Terminal DI Filtering time | 2-16ms   | 4             |        |
| P03.01                               | DI logic                   | 0-65535  | 0             | ☆      |
| P03.04                               | DI 1(X1) Input             | 0:Invalid<br>1:Forward running<br>2:Reverse running<br>3:Change to Reverse running<br>4:JOG FWD<br>5:JOG REV<br>6:Frequency up<br>7:Frequency down<br>8:Slow down and stop<br>9:Free stop<br>10:Reset + Free stop<br>11:Reset<br>12:Reserved<br>13:Emergency stop (Free stop)<br>14:Multi- speed set value bit 0<br>15:Multi- speed set value bit 1<br>16:Multi- speed set value bit 2<br>17:Multi- speed set value bit 3<br>18:Acc and Dec time 0<br>19:Acc and Dec time 1<br>20:Pulse forward running<br>21:Pulse reverse running<br>22:Reserved<br>24:Frequency source switch<br>32:Command source switch1<br>33:Command source switch2<br>34:Outside failure<br>35:Reserved<br>37:Reserved<br>38:Reserved<br>40:Reserved<br>41:PID pause<br>42:PID opposite direction<br>43:PID Integral to suspend<br>44:PID parameter switch<br>45:PLC reset condition<br>46:Input high-speed pulse(DI3) | 1             | ☆      |
| P03.05                               | Terminal DI 2(X2)Input     | Parameter as P03.04  | 2             | ☆      |
| P03.06                               | Terminal DI 3(X3) Input    | Parameter as P03.04  | 14            | ☆      |

| Parameter | Name   | Range   | Default value | Change |
|-----------|--|---|---------------|--------|
| P03.07    | Terminal DI 4 (X4)Input  | Parameter as P03.04   | 15            | ☆      |
| P03.08    | Terminal DI 5 (X5)Input  | Parameter as P03.04   | 16            | ☆      |
| P03.09    | Terminal DI 6(X6)Input   | Parameter as P03.04   | 17            | ☆      |
| P03.10    | Terminal DI 3 (X3)Input min frequency                          | 0-99.99kHz  | 0.02          | ☆      |
| P03.11    | Terminal DI3(X3)Input max frequency                            | 0.01-100kHz   | 50            | ☆      |
| P03.12    | Terminal DI3 Input min -corresponding reference/feedbackvalue  | Reference / feedback value -200-+200%   | 0             | ☆      |
| P03.13    | Terminal DI3 Input max -corresponding reference/feedback value | Reference / feedback value -200-+200%   | 100           | ☆      |
| P03.14    | Terminal DI 3 Filtering time                                   | 1-1000ms  | 100           | ☆      |
| P03.20    | Interrupt signal detection time                                | 1-99s   | 10            | ☆      |
| P03.21    | Interrupt signal action  | 0:Invalid<br>2:Stop<br>3:Inching running<br>4:Running with MAX frequency<br>5:Stop then warning | 0             | ☆      |
| P03.30    | Terminal VI Model  | 0:Voltage<br>1:Current  | 0             | ☆      |
| P03.31    | Terminal VI Min current  | 0-9.99V   | 0.20          | ☆      |
| P03.32    | Terminal VI Max current  | 0.01-10V  | 10            | ☆      |
| P03.33    | Terminal AI Minimum  | 0-19.99mA   | 0.14          | ☆      |
| P03.34    | Terminal AI Maximum  | 0.01-20mA   | 20            | ☆      |
| P03.35    | Terminal VI Min reference/feedback value                       | -200~200%   | 0             | ☆      |
| P03.36    | Terminal VI Max reference/feedback value                       | -200~200%   | 100           | ☆      |
| P03.37    | Terminal VI Filtering time                                     | 0.001-10s   | 0.01          | ☆      |
| P03.38    | Terminal VI Zero Dead Band                                     | 0-20V/mA  | 0             | ☆      |
| P03.40    | (Reserved)   |   | 1             | ☆      |
| P03.41    | Terminal AI Min voltage  | 0-9.99V   | 0.07          | ☆      |
| P03.42    | Terminal AI Max voltage  | 0.01-10V  | 10            | ☆      |



| Parameter                           | Name                                     | Range  | Default value | Change |
|-------------------------------------|--|--|---------------|--------|
| P03.43                              | Terminal AI Minimum                      | 0-19.99mA  | 0.14          | ☆      |
| P03.44                              | Terminal AI Maximum                      | 0.01-20mA  | 20            | ☆      |
| P03.45                              | Terminal AI Min reference/feedback value | -200~200%  | 0             | ☆      |
| P03.46                              | Terminal AI Max reference/feedback value | -200~200%  | 100           | ☆      |
| P03.47                              | Terminal AI Filtering time               | 0.001-10s  | 0.01          | ☆      |
| P03.48                              | Terminal AI Zero Dead Band               | 0-20V/mA   | 0             | ☆      |
| Group 4 Output Terminals Parameters |  |  |               |        |
| P04.00                              | Relay 1 Function (KA KB KC)              | 0:Invalid<br>1:Running<br>2:Fault output<br>3:Frequency horizontal detect FDT1 output<br>4:Frequency arrived<br>5:0speed running<br>6:Motor overload protection<br>7:Converter overload protection<br>8:Reserved<br>9:Reserved<br>10:Reserved<br>11:PLC circulation<br>12:Total power on time arrived<br>13:Frequency limiting<br>14:Torque limiting<br>15:Inverter ready<br>16:VI>AI<br>17:Limited frequency arrived<br>18:Lower limited frequency arrived<br>19:Under-voltage indicate<br>20:Communication set<br>21:Reserved<br>22:Reserved<br>23:0 Speed Running 2<br>24:Total power on time arrived<br>25:Frequency Horizontal Detect FDT 2 Output<br>26:Frequency 1 Arrived<br>27:Frequency 2 Arrived<br>28:Current 1 Arrived<br>29:Current 2 Arrived<br>30:Timing arrive<br>31:VI Output Over Limited<br>32:Drop Loading<br>33:REV Running<br>34:0 Current<br>35:Module temperature arrived<br>36:Output current over limited | 2             | ☆      |

| Parameter | Name                               | Range  | Default value       | Change |
|-----------|------------------------------------|--|---------------------|--------|
|           |                                    | 37:Still output even lower limited frequency arrived<br>38:Failure or warning<br>39:Over temperature warning<br>40:Running time arrived<br>41:Failure no under-voltage<br>42:High pressure<br>43:Low pressure<br>44:Pressure arrived   | 2                   | ☆      |
| P04.01    | Relay 2 Function (FA/FB/FC)        | Parameters same asP04.00 (Model determination)   | Model determination | ☆      |
| P04.02    | D01(Y1)output function selection   | Parameters same asP04.00 (Model determination)   | Model determination | ☆      |
| P04.03    | FM output function selection       | Parameters same asP04.00 (Model determination)   | Model determination | ☆      |
| P04.09    | Reserved                           |  | 0                   | ☆      |
| P04.10    | Relay 1 On Delay Time              | 0-600s   | 0                   | ☆      |
| P04.11    | Relay 2 On Delay Time              | 0-600S,(Reserved)  | 0                   | ☆      |
| P04.20    | AMO output type                    | 0:Reserved<br>1:Reserved<br>3:0-10V  | 3                   | ☆      |
| P04.21    | AMO output function                | 0:None<br>10:Output frequency*<br>11:Feference value<br>12:Feedback value<br>13:Motor current<br>16:Output power<br>17:Motor Rotational Speed<br>18:Voltage output<br>20:Communication control<br>21:Pulse input<br>22:nput VI<br>23:Input AI<br>26:Busbar voltage<br>30:Torsional moment output<br>80:Application control | 11                  | ☆      |
| P04.22    | Terminal AMO Min output proportion | 0-200%   | 0                   | ☆      |
| P04.23    | Terminal AMO Max output proportion | 0-200%   | 100                 | ☆      |
| P04.24    | Terminal AMO Min output            | 0-20   | 0.00                | ☆      |
| P04.25    | Terminal AMO Max output            | 0.01-20  | 10.00               | ☆      |
| P04.30    | Reserved                           |  | 0                   | ☆      |

| Parameter                | Name                                  | Range   | Default value | Change |
|--------------------------|---------------------------------------|---|---------------|--------|
| P04.31                   | AOO outputFunction option             | Same as P4-21   | 10            | ☆      |
| P04.32                   | AOO Min output proportion             | 0-200%  | 0             | ☆      |
| P04.33                   | AOO Max output                        | 0-200%  | 100           | ☆      |
| P04.34                   | AOO Min output                        | 0-20  | 0             | ☆      |
| P04.35                   | AOO Max output                        | 0.01-20   | 20            | ☆      |
| P04.60                   | Pulse output function selection       | 0:Digital setting (P04.03 setting)<br>10:output frequency<br>11:set value<br>12:Feedback value<br>13:Motor Current<br>16:Output frequency<br>17:Motor speed<br>18:output voltage<br>20:bus-mastering<br>21:impulse input<br>22:Vi input value<br>23:AI input value<br>26:DC bus voltage<br>30:Output torque<br>38:Communication control | 0             |        |
| P04.61                   | Pulse output minimum output frequency | 0-99.99k  | 0             |        |
| P04.62                   | Pulse output maximum output frequency | 0.01-100k   | 100K          |        |
| P04.63                   | Pulse minimum output ratio            | 0-200%  | 0             |        |
| P04.64                   | Pulse maximum output ratio            | 0-200%  | 100%          |        |
| Group P05 PID Parameters |                                       |   |               |        |
| P05.00                   | PID setting source                    | 0:Set P05.01 parameter<br>1:Vi<br>2:AI<br>3:Panel Coder<br>4:Pulse Input<br>5:Communication given<br>6:Multistage speed<br>7:P05.01 + Up/Down   | 0             | ☆      |

| Parameter | Name                                      | Range   | Default value | Change |
|-----------|---|---|---------------|--------|
| P05.01    | PID value given                           | -3000~3000  | 3             | ☆      |
| P05.02    | Feedback source of process control        | 0:VI<br>1:AI<br>2:Coder<br>3:VI-AI<br>4:Pulse input Di3<br>5:Communication given<br>6:VI+AI<br>7:VI AI Max<br>8:VI AI Min | 0             | ☆      |
| P05.03    | Positive and negative logic of process PI | 0:Forward<br>1:Reverse  | 0             | ☆      |
| P05.04    | PID Feedback basic value given            | 0.1-6553.5  | 10            | ☆      |
| P05.05    | Process PI Proportional Gain              | 0-1000  | 20            | ☆      |
| P05.06    | Process PI Integral Time                  | 0.01-655.35s  | 2             | ☆      |
| P05.07    | Process PI Differential Time              | 0-10.000s   | 0             | ☆      |
| P05.08    | PID Reverse stop frequency                | 0-655.35Hz  | 0             | ☆      |
| P05.09    | Deviation Limit                           | 0-200%  | 0             | ☆      |
| P05.10    | Process PID Differential limit            | 0.1-100   | 0.1           | ☆      |
| P05.11    | PID Changing time given                   | 0-650s  | 0.1           | ☆      |
| P05.12    | PID time of filter feedback               | 0-60s   | 0             | ☆      |
| P05.13    | PID time of filter output                 | 0-60s   | 0             | ☆      |
| P05.15    | PID time of filter output                 | 0-1 Os (Reserved)   |               | ☆      |
| P05.16    | Process PI Integration time               | 0.1-655.35 (Reserved)   |               | ☆      |
| P05.17    | Process PI Calculus time                  | 0-10 (Reserved)   |               | ☆      |
| P05.18    | PID parameter switchover condition        | 0:No switch(Reserved)<br>2:Deviation switch(Reserved)<br>3:Frequency switch(Reserved)                                     |               | ☆      |

| Parameter | Name   | Range   | Default value | Change |
|-----------|--|---|---------------|--------|
| P05.19    | Process PID Parameter Switchover Deviation 1 | 0-100% (Reserved)   |               | ☆      |
| P05.20    | Process PID Parameter Switchover Deviation 2 | 0-100% (Reserved)   |               | ☆      |
| P05.21    | PID Starting value                           | 0-10.00   | 0             | ☆      |
| P05.22    | PID Time of starting value keeping           | 0-650.00s   | 0             | ☆      |
| P05.23    | Output FOR deviation MAX value               | 0-100%  | 1             | ☆      |
| P05.24    | Output REV deviation MAX value               | 0-100%  | 1             | ☆      |
| P05.25    | PID Integral attribute                       | 00-11   | 0             | ☆      |
| P05.26    | PID Detection value of feedback lost         | 0-100%  | 0             | ☆      |
| P05.27    | PID Detection time of feedback lost          | 0-20S   | 0             | ☆      |
| P05.28    | PID Run out and operation                    | 0:Run out but no operation<br>1:Run out and operation   | 0             | ☆      |
| P05.29    | Wake up pressure                             | 0-6500  | 2             | ☆      |
| P05.30    | Wake up delayed time                         | 0-6500s   | 0             | ☆      |
| P05.31    | Dormant pressure                             | 0-6500  | 4             | ☆      |
| P05.32    | Dormant delayed time                         | 0-6500s   | 60            | ☆      |
| P05.33    | Dormant mode set                             | 0:Forbid dormant<br>1:Pressure arrived<br>2:Frequency arrived<br>3:Pressure and frequency arrived at sametime | 1             | ☆      |
| P05.34    | Dormant frequency                            | 0-655.35Hz  | 30            | ☆      |
| P05.35    | Pressure proportion linkage                  | 0:workable<br>1:forbid  | 1             | ☆      |
| P05.36    | Wake up pressure linkage setting value       | 0-6500  | 1             | ☆      |
| P05.37    | Dormant pressure linkage setting value       | 0-6500  | 1             | ☆      |
| P05.38    | High pressure alarm difference set           | 0-6500  | 0             | ☆      |
| P05.39    | High pressure alarm delay time               | 0-6500s   | 0             | ☆      |
| P05.40    | Low pressure alarm difference set            | 0-6500  | 0             | ☆      |
| P05.41    | Low pressure alarm delay time                | 0-6500s   | 0             | ☆      |

| Parameter                              | Name                     | Range   | Default value | Change |
|--|--------------------------|---|---------------|--------|
| P05.50                                 | MPPT Function Select     | 0: frequency control mode<br>1: Mppt mode 1<br>2: Mppt mode 2<br>3: Mppt mode 3 | 0             | ☆      |
| P05.51                                 | MPPT Min Ref             | 0-100%  | 40            | ☆      |
| P05.52                                 | MPPT Max Ref             | 0-100%  | 100           | ☆      |
| P05.53                                 | MPPT Min DC Voltage      | 0-800   | 200           | ☆      |
| P05.54                                 | MPPT Max DC Voltage      | 0-800   | 365           | ☆      |
| P05.55                                 | MPPT Search Time         | 0.1-500   | 1             | ☆      |
| P05.56                                 | MPPT Search Threshold    | Mode1:0.01-20V<br>Mode2:0.01-20%<br>Mode3:0.01-20%                              | 0.2           | ☆      |
| P05.57                                 | MPPT Start Delay Time    | 1-6000S   | 240           | ☆      |
| P05.58                                 | MPPT Target DC Voltage   | 1-65535S  | 270           | ☆      |
| P05.59                                 | MPPT Water Lack Current  | 1-500%  | 50            | ☆      |
| P05.60                                 | MPPT Water Lack Time     | 0-6000s   | 0             | ☆      |
| Group P06 Multistage Command Parameter |                          |   |               |        |
| P06.00                                 | Multi-speed frequency 0  | -100~100%   | 0             | ☆      |
| P06.01                                 | Multi-speed frequency 1  | -100~100%   | 0             | ☆      |
| P06.02                                 | Multi-speed frequency 2  | -100~100%   | 0             | ☆      |
| P06.03                                 | Multi-speed frequency 3  | -100~100%   | 0             | ☆      |
| P06.04                                 | Multi-speed frequency 4  | -100~100%   | 0             | ☆      |
| P06.05                                 | Multi-speed frequency 5  | -100~100%   | 0             | ☆      |
| P06.06                                 | Multi-speed frequency 6  | -100~100%   | 0             | ☆      |
| P06.07                                 | Multi-speed frequency 7  | -100~100%   | 0             | ☆      |
| P06.08                                 | Multi-speed frequency 8  | -100~100%   | 0             | ☆      |
| P06.09                                 | Multi-speed frequency 9  | -100~100%   | 0             | ☆      |
| P06.10                                 | Multi-speed frequency 10 | -100~100%   | 0             | ☆      |
| P06.11                                 | Multi-speed frequency 11 | -100~100%   | 0             | ☆      |
| P06.12                                 | Multi-speed frequency 12 | -100~100%   | 0             | ☆      |
| P06.13                                 | Multi-speed frequency 13 | -100~100%   | 0             | ☆      |
| P06.14                                 | Multi-speed frequency 14 | -100~100%   | 0             | ☆      |

| Parameter | Name                                   | Range  | Default value | Change |
|-----------|--|--|---------------|--------|
| P06.15    | Multi-speed frequency 15               | -100~100%  | 0             | ☆      |
| P06.16    | Simple PLC running way                 | 0:Running single time then stop<br>1:Running single time then stop and keepfinal digital<br>2:Circulating all the time   | 1             | ☆      |
| P06.17    | Simple PLC option of drop power memory | Unit:option of drop power memory<br>0:drop power no memory<br>1:drop power memory<br>Decade:option of drop power memory<br>0:drop power no memory<br>1:drop power memory | 0             | ☆      |
| P06.18    | Simple PLC running time unit           | 0:S, Second<br>1:H,Hour  | 0             | ☆      |
| P06.19    | Simple PLC0 running time               | 0-6500   | 0             | ☆      |
| P06.20    | Simple PLC0variable speed time option  | 0-3  | 0             | ☆      |
| P06.21    | Simple PLC1 running time               | 0-6500   | 0             | ☆      |
| P06.22    | Simple PLC1 variable speed time option | 0-3  | 0             | ☆      |
| P06.23    | Simple PLC2 running time               | 0-6500   | 0             | ☆      |
| P06.24    | Simple PLC2 variable speed time option | 0-3  | 0             | ☆      |
| P06.25    | Simple PLC3 running time               | 0-6500   | 0             | ☆      |
| P06.26    | Simple PLC3 variable speed time option | 0-3  | 0             | ☆      |
| P06.27    | Simple PLC4 running time               | 0-6500   | 0             | ☆      |
| P06.28    | Simple PLC4variable speed time option  | 0-3  | 0             | ☆      |
| P06.29    | Simple PLC5 running time               | 0-6500   | 0             | ☆      |
| P06.30    | Simple PLC5 variable speed time option | 0-3  | 0             | ☆      |
| P06.31    | Simple PLC6 running time               | 0-6500   | 0             | ☆      |
| P06.32    | Simple PLC6 variable speed time option | 0-3  | 0             | ☆      |
| P06.33    | Simple PLC7 running time               | 0-6500   | 0             | ☆      |
| P06.34    | Simple PLC7 variable speed time option | 0-3  | 0             | ☆      |
| P06.35    | Simple PLC8 running time               | 0-6500   | 0             | ☆      |

| Parameter                                | Name                                    | Range  | Default value | Change |
|--|---|--|---------------|--------|
| P06.36                                   | Simple PLC8 variable speed time option  | 0-3  | 0             | ☆      |
| P06.37                                   | Simple PLC9 running time                | 0-6500   | 0             | ☆      |
| P06.38                                   | Simple PLC9 variable speed time option  | 0-3  | 0             | ☆      |
| P06.39                                   | Simple PLC10 running time               | 0-6500   | 0             | ☆      |
| P06.40                                   | Simple PLC10 variable speed time option | 0-3  | 0             | ☆      |
| P06.41                                   | Simple PLC11 running time               | 0-6500   | 0             | ☆      |
| P06.42                                   | Simple PLC11 variable speed time option | 0-3  | 0             | ☆      |
| P06.43                                   | Simple PLC12 running time               | 0-6500   | 0             | ☆      |
| P06.44                                   | Simple PLC12 variable speed time option | 0-3  | 0             | ☆      |
| P06.45                                   | Simple PLC13 running time               | 0-6500   | 0             | ☆      |
| P06.46                                   | Simple PLC13 variable speed time option | 0-3  | 0             | ☆      |
| P06.47                                   | Simple PLC14 running time               | 0-6500   | 0             | ☆      |
| P06.48                                   | Simple PLC14 variable speed time option | 0-3  | 0             | ☆      |
| P06.49                                   | Simple PLC15 running time               | 0-6500   | 0             | ☆      |
| P06.50                                   | Simple PLC15 variable speed time option | 0-3  | 0             | ☆      |
| P06.51                                   | Multistage speed 0 given way            | 0:P06.00 given<br>1:Analog VI<br>2:Analog AI)<br>4:PID<br>5: Preset value                                | 0             | ☆      |
| <b>Group P07 Communication Parameter</b> |   |  |               |        |
| P07.03                                   | Communication Timeout Time              | 0.1-650.00s  | 1             | ☆      |
| P07.04                                   | Communication Timeout Function          | 0:Invalid<br>2:Stop<br>3:Inching operation<br>4:Max operation frequency<br>5:Stop then warn<br>6:Warning | 0             | ☆      |
| P07.06                                   | Reset Communication Timeout             | 0:Invalid<br>1:Reset communication cut   | 0             | ☆      |



| Parameter                     | Name                            | Range  | Default value | Change |
|-------------------------------|---------------------------------|--|---------------|--------|
| P07.30                        | Protocol                        | 0:MODBUS-RTU<br>2:Reserved   | 0             | ☆      |
| P07.31                        | Address                         | 1-247  | 1             | ☆      |
| P07.32                        | Baud Rate                       | 0:300b                    6:19200b<br>1:600b                    7:38400b<br>2:1200b<br>3:2400b<br>4:4800b<br>5:9600b             | 5             | ☆      |
| P07.33                        | Digital Form                    | 0:No parity (1Position Stop)<br>1:Even parity (1Position Stop)<br>2:Odd parity (1Position Stop)<br>3:No parity (2Position Stop)  | 0             | ☆      |
| P07.35                        | Min. Response Delay             | 0-0.5s   | 0.002         | ☆      |
| P07.36                        | Max. Response Delay             | 0.1-10s  | 5             | ☆      |
| P07.38                        | Message Response                | 0:Every time<br>1:Only response abnormal message<br>2:No response  | 0             | ☆      |
| P07.39                        | Programme control               | 0:Parameter do not save when power off<br>1:Parameter save when power off  | 1             | ☆      |
| Group P08 Assistant Parameter |                                 |  |               |        |
| P08.01                        | Over Modulation Function        | 90-105.5%  | 100           | ★      |
| P08.02                        | Deadband Compensation           | 0-200  | 100           | ☆      |
| P08.07                        | Max Deadband Compensation       | 20-1000Hz  | 500           | ★      |
| P08.10                        | DC Circuit Voltage Compensation | 0:No compensation<br>1:Compensation1<br>2:Compensation2  | 0             | ★      |
| P08.20                        | Switching Frequency             | 2-16kHz  | 5             | ☆      |
| P08.22                        | Multi Derating Ctrl Val         | 0: invalid<br>1: Turn off DPWM<br>3: turn off DPWM and carrier drop above 2HZ<br>5: Turn off PWM and all frequency drop carriers | 0             | ☆      |
| P08.30                        | Operating mode                  | 0:Normal operating<br>2:Reset the parameters to default<br>3: Backup user parameters<br>4: Restore user parameters               | 0             | ☆      |

| Parameter                                   | Name  | Range      | Default value | Change |
|---|---|------------|---------------|--------|
| P08.40                                      | Frequency detected value 1                          | 0-655.35Hz | 50            | ☆      |
| P08.41                                      | Frequency detected value 1 hysteresis of instrument | 0-100%     | 5             | ☆      |
| P08.42                                      | Frequency reach to detection width                  | 0-100%     | 0             | ☆      |
| P08.43                                      | Frequency detected value 2                          | 0-655.35Hz | 50            | ☆      |
| P08.44                                      | Frequency detected value 2 hysteresis of instrument | 0-100%     | 5             | ☆      |
| P08.45                                      | Any reach frequency detected value 1                | 0-655.35Hz | 50            | ☆      |
| P08.46                                      | Any reach frequency detected width 1                | 0-100%     | 0             | ☆      |
| P08.47                                      | Any reach frequency detected value 2                | 0-655.35Hz | 50            | ☆      |
| P08.48                                      | Any reach frequency detected width 2                | 0-100%     | 0             | ☆      |
| P08.49                                      | 0 current detection level                           | 0-300%     | 5             | ☆      |
| P08.50                                      | 0 current detection delayed time                    | 0-600s     | 0.1           | ☆      |
| P08.51                                      | Output current over limited                         | 0-300%     | 200           | ☆      |
| P08.52                                      | Output current over limited detection delayed       | 0-600s     | 0             | ☆      |
| P08.53                                      | Any arrived electron flow 1                         | 0-300%     | 100           | ☆      |
| P08.54                                      | Width of any arrived electron flow 1                | 0-300%     | 0             | ☆      |
| P08.55                                      | Any arrived electron flow 2                         | 0-300%     | 100           | ☆      |
| P08.56                                      | Width of any arrived electron flow 2                | 0-300%     | 0             | ☆      |
| P08.57                                      | Module temperature                                  | 0-200°C    | 75            | ☆      |
| P08.58                                      | Running time  | 0-6500min  | 0             | ☆      |
| P08.59                                      | Cumulative power on time                            | 0-6500min  | 0             | ☆      |
| P08.60                                      | Inverter fan control                                | 0-7        | 7             | ☆      |
| P08.61                                      | Motor speed ratio                                   | 0-200      | 50            | ☆      |
| Group P09 Malfunction and Protect Parameter |   |            |               |        |
| P09.00                                      | Limited value prevent over current losing speed     | 0-300%     | 200           | ☆      |
| P09.01                                      | Current controller 1 proportion                     | 0-300%     | 100           | ☆      |

| Parameter | Name   | Range   | Default value        | Change |
|-----------|--|---|----------------------|--------|
| P09.02    | Current controller 1 integral  | 0.005-2s  | 0.02                 | ☆      |
| P09.04    | Torque limited when motor on   | 0-1000%   | 150                  | ☆      |
| P09.05    | Torque limited when generate electricity                               | 0-1000%   | 150                  | ☆      |
| P09.08    | Over current losing speed alarm delayed                                | 0-60s   | 60                   | ☆      |
| P09.09    | Torque reached to limited alarm delayed                                | 0-60s   | 60                   | ☆      |
| P09.20    | Braking function   | 0:Invalid<br>1:Rheostatic brake<br>2:Alternating braking  | 0                    | ☆      |
| P09.21    | The resistance braking threshold depends on the voltage specifications | Depend to voltage specification   | Depends on the model | ★      |
| P09.24    | The over-voltage stall prevent threshold depends on the specifications | Depend to voltage specification   | Depends on the model | ☆      |
| P09.25    | Over voltage control   | 0:Invalid<br>2:Model 1<br>3:Model 2   | 2                    | ☆      |
| P09.26    | Over voltage control integral coefficient                              | 0.01-0.1s   | 0.05                 | ☆      |
| P09.27    | Over voltage control proportion coefficient                            | 0-200%  | 100                  | ☆      |
| P09.28    | Alternating braking integral coefficient                               | 1.0-2.0   | 1.4                  | ☆      |
| P09.29    | Maximum current of alternating braking                                 | 0-150%  | 100                  | ☆      |
| P09.40    | Motor phases detection   | 0:Off<br>1:On   | 1                    | ★      |
| P09.41    | Power imbalance option   | 0:Failure stop<br>1:Warning<br>2:Invalid<br>4:Warning mid-sensitivity<br>5:Failure stop mid-sensitivity<br>6:Failure stop high-sensitivity                                      | 0                    | ☆      |
| P09.42    | Voltage net drop function  | 0:Invalid<br>1:Speed cut<br>2:Speed cut failure<br>3:Free revolve stop motor<br>4:Instantaneous power lost non-stop<br>5:Instantaneous power lost non-stop failure<br>6:Failure | 0                    | ★      |
| P09.43    | Reserve  |   |                      |        |
| P09.44    | Moment non-stop gain when power supply drop                            | 0-500%  | 100                  | ☆      |
| P09.45    | Moment non-stop recovery threshold when power supply drop              | 0-65535   | 200                  | ☆      |

| Parameter                          | Name  | Range   | Default value | Change |
|------------------------------------|---|---|---------------|--------|
| P09.46                             | Converter action after voltage failure        | 0:Failure locked<br>1:Speed start   | 0             | ☆      |
| P09.47                             | Motor ground detection                        | 0-400   | 0             | ☆      |
| P09.50                             | Motor overload protection option              | 0:Prohibition<br>1:Warning after motor overload<br>2:Alarm after motor overload   | 0             | ☆      |
| P09.51                             | Motor Overload Protection Factor              | 0.2-60  | 1             | ☆      |
| P09.52                             | Motor Overheating Protection Warning Factor   | 50-100%   | 80            | ☆      |
| P09.58                             | Synchronous motor stalling protection         | 0:Off<br>1:On   | 0             | ☆      |
| P09.59                             | Time of Synchronous motor stalling protection | 0.05-1s   | 0.1           | ☆      |
| P09.60                             | Malfunction warning display                   | 0:Blank<br>1:Normally display<br>2:Power on failure clearance   | 2             | ☆      |
| P09.61                             | Malfunction locked                            | 0:Unlocked<br>1:Locked  | 0             | ☆      |
| P09.62                             | Actions when converter breakdown              | 0:Display fault and Stop motor<br>1:Sop motor after warning   | 1             | ☆      |
| P09.70                             | Time of automatic reset                       | 0:Manual reset<br>1:Automatic reset 1 time<br>2:Automatic reset 2 times<br>3:Automatic reset 3 times<br>4:Automatic reset 4 times<br>5:Automatic reset 5 times<br>6:Automatic reset 6 times<br>7:Automatic reset 7 times<br>8:Automatic reset 8 times<br>9:Automatic reset 9 times<br>10:Automatic reset 10 times<br>11:Automatic reset 15 times<br>12:Automatic reset 20 times<br>13:Automatic reset unlimited times | 0             | ☆      |
| P09.71                             | Automatic reset time                          | 0-600s  | 10            | ☆      |
| Group P10 Failure Record Parameter |   |   |               |        |
| P10.00                             | LCP menu options                              | 1:Motor voltage<br>2:Motor rotational speed<br>4:DC voltage<br>8:Temperature<br>16:Process PID feedback digital   | 6             | ☆      |

| Parameter | Name                                      | Range   | Default value | Change |
|-----------|---|---|---------------|--------|
| P10.00    | LCP menu options                          | 32:Counter A<br>64:Counter B<br>128:Input VI<br>256:Input AI<br>512:Input pulse<br>1024:Output pulse<br>2048:Custom physical quantities (reserved)<br>4096:Output power<br>8192:Process PID given digital | 6             | ☆      |
| P10.01    | RUN button                                | 0:Invalid<br>1:Valid  | 1             | ☆      |
| P10.02    | OFF button                                | 0:Invalid<br>1:Valid<br>2:Reset valid   | 1             | ☆      |
| P10.04    | Parameter locked                          | 0:Invalid<br>1:Protect  | 0             | ☆      |
| P10.05    | Copy parameter                            | 1:Sectional parameter up load<br>2:All parameter up load<br>3:Down load parameter(To be on again when the power is cut off the electricity)   | 0             | ★      |
| P10.10    | Days of running                           | 0-9999d   | —             | ●      |
| P10.11    | Hours of running                          | 0-60000h  | —             | ●      |
| P10.12    | Total power                               | 0-65535kwh  | —             | ●      |
| P10.13    | Time of electricity on                    | 0-65535   | —             | ●      |
| P10.14    | Number of overheating                     | 0-65535   | —             | ●      |
| P10.15    | Number of over voltage                    | 0-65535   | —             | ●      |
| P10.16    | Number of reset power                     | 0:No reset<br>1:Reset   | 0             | ●      |
| P10.17    | Hours of reset running                    | 0:No reset<br>1:Reset   | 0             | ●      |
| P10.20    | First failure type refer to failure form  | Refer to Failure list   | —             | ●      |
| P10.21    | Second failure type refer to failure form | Refer to Failure list   | —             | ●      |
| P10.22    | Third failure type refer to failure form  | Refer to Failure list   | —             | ●      |
| P10.30    | First failure frequency                   | ---   | —             | ●      |
| P10.31    | First failure current                     | ---   | —             | ●      |
| P10.32    | First failure voltage                     | ---   | —             | ●      |
| P10.33    | First failure DI                          | ---   | —             | ●      |
| P10.34    | First failure DO                          | ---   | —             | ●      |

| Parameter                              | Name                            | Range | Default value | Change |
|--|---------------------------------|-------|---------------|--------|
| P10.35                                 | Power on time of first failure  | ---   | —             | ●      |
| P10.36                                 | Running time of first failure   | ---   | —             | ●      |
| P10.40                                 | Second failure frequency        | ---   | —             | ●      |
| P10.41                                 | Second failure current          | ---   | —             | ●      |
| P10.42                                 | Second failure voltage          | ---   | —             | ●      |
| P10.43                                 | Second failure DI               | ---   | —             | ●      |
| P10.44                                 | Second failure DO               | ---   | —             | ●      |
| P10.45                                 | Power on time of second failure | ---   | —             | ●      |
| P10.46                                 | Running time of second failure  | ---   | —             | ●      |
| P10.50                                 | Third failure frequency         | ---   | —             | ●      |
| P10.51                                 | Third failure current           | ---   | —             | ●      |
| P10.52                                 | Third failure voltage           | ---   | —             | ●      |
| P10.53                                 | Third failure DI                | ---   | —             | ●      |
| P10.54                                 | Third failure DO                | ---   | —             | ●      |
| P10.55                                 | Power on time of third failure  | ---   | —             | ●      |
| P10.56                                 | Running time of third failure   | ---   | —             | ●      |
| P10.70                                 | Software version                | ---   | —             | ●      |
| P10.71                                 | Main board Software version     | ---   | —             | ●      |
| Group P11 Digital Monitoring Parameter |                                 |       |               |        |
| P11.00                                 | Frequency output                |       |               | ●      |
| P11.01                                 | Set digital                     |       |               | ●      |
| P11.02                                 | DC voltage                      |       |               | ●      |
| P11.03                                 | Motor voltage                   |       |               | ●      |
| P11.04                                 | Motor current                   |       |               | ●      |
| P11.05                                 | Frequency output                |       |               | ●      |
| P11.06                                 | Torsional moment output %       |       |               | ●      |
| P11.07                                 | DI input condition              |       |               | ●      |
| P11.08                                 | DO output condition             |       |               | ●      |
| P11.09                                 | VI digital input                |       |               | ●      |
| P11.10                                 | AI digital input                |       |               | ●      |

| Parameter | Name  | Range | Default value | Change |
|-----------|---|-------|---------------|--------|
| P11.11    | AI digital input 3  |       |               | ●      |
| P11.12    | Counter A   |       |               | ●      |
| P11.13    | Counter B   |       |               | ●      |
| P11.14    | Motor rotational speed                                      |       |               | ●      |
| P11.15    | PID reference value   |       |               | ●      |
| P11.16    | Feedback value  |       |               | ●      |
| P11.17    | PLC stage   |       |               | ●      |
| P11.18    | Pulse frequency input                                       |       |               | ●      |
| P11.19    | Frequency feedback Hz                                       |       |               | ●      |
| P11.20    | Rest of running time  |       |               | ●      |
| P11.21    | VI voltage before emended                                   |       |               | ●      |
| P11.22    | AI voltage before emended                                   |       |               | ●      |
| P11.23    | AI voltage before emended 3                                 |       |               | ●      |
| P11.25    | Current time of power on                                    |       |               | ●      |
| P11.26    | Total time of power on                                      |       |               | ●      |
| P11.27    | Current running time  |       |               | ●      |
| P11.29    | Set communication value                                     |       |               | ●      |
| P11.30    | Coder feedback speed P11.31 display main frequency X        |       |               | ●      |
| P11.31    | Display main frequency X                                    |       |               | ●      |
| P11.32    | Display main frequency Y                                    |       |               | ●      |
| P11.34    | Synchronous motor rotor Angle P11- 35 converter temperature |       |               | ●      |
| P11.35    | Inverter Temperature  |       |               | ●      |

Attention: labeled"\*" is tolerant parameter,

P010、P011 Parameter is subject to frequency converter actually display,

☆ means that the setting value of this parameter can be changed when the inverter is in shutdown or running state.

★ means that the setting value of the parameter cannot be changed when the inverter is in operation.

• means that the value of this parameter is the record value of actual detection and cannot be changed.

- means that the factory value of the parameter is related to the power or model.

See the corresponding parameter description for the specific value.

## Chapter 6 Parameters Introduction

### P00 Basic Function Parameters

| Parameter | Name         | Range                    | Default value | Change |
|-----------|--------------|--------------------------|---------------|--------|
| P00.01    | Control Mode | 0:VF<br>1:Vector Control | 1             |        |

#### 0: V/F control :

It is suitable for application scenarios such as low control performance requirements, special motor types or multiple motors driven by one inverter, such as fan and water pump loads, The value of V/F could be set in Parameter P00.02.

#### 1: Vector control:

It is suitable for applications with high requirements for low frequency torque or control performance. The performance of vector control is better than that of V / F control, but it is more sensitive to motor parameters. Before use, the motor parameters need to be static fully self-learning, corresponding to P01 group of parameters to set.

Noted that the motor parameter identification process must be carried out when the vector control mode is selected. Only accurate motor parameters can give full play to the advantages of vector control. For PMSM, vector control is generally selected, and V/F control can also be selected for small power motor applications.

| Parameter | Name                   | Range   | Default value | Change |
|-----------|------------------------|---|---------------|--------|
| P00.02    | Option of order source | 0:Panel Control<br>1:Terminal control<br>2:Communication control<br>3:Communication or terminal control | 0             |        |

Select input channel of inverter control command.

Frequency converter control commands include: start, stop, forward rotation, reverse rotation, inching, etc.

#### 0: Panel control

The operation panel is controlled by the run and stop / reset buttons on the operation panel.

#### 1: Terminal control

The terminal command is controlled by the multi-function input terminals FWD, REV, JOG FWD, JOG REV, etc.

#### 2:Communication control

The communication command is given by the upper computer through communication. For functions related to communication, please refer to the description of communication parameter group (group P07) and communication protocol.

#### 3: Communication or terminal control

When this channel is selected, when the terminal and communication channel inform the access status, any channel can control the frequency converter by giving the action command.



| Parameter | Name                           | Range   | Default value | Change |
|-----------|--------------------------------|---|---------------|--------|
| P00.03    | Main frequency source X option | 0:Digital set<br>(Preset reference value)<br>2:VI<br>3:AI<br>4:Panel coder<br>5:Input pulse<br>6:Command of multi-speed<br>7:Simple PLC<br>8:PID<br>9:Communication given | 4             |        |

There are nine kinds of input channels for the main frequency X of the inverter.

0:Digital set(Preset reference value)

Set the initial value of frequency to P00.09. When the external UP/Down is connected, the frequency can be changed by UP/Down. When the inverter is powered off and then powered on, the set frequency will be restored to P00.09. It can also be used with P00.40 and P00.41 memory functions.

2: VI

The frequency is set by 0-10V analog (default), and the user can freely select the analog quantity setting of VI port as 0-20mA or 4-20mA through the dial switch.

3: AI

Frequency in set by 0-20mA or 4-20mA analog.

4:Panel coder;

The frequency given from analog terminal VI.

5:Pulse input

The frequency given from terminals pulse. Pulse decide the sign specification. Frequency range from 0KHz to 100KHz. Pulse given only can input from multi-function terminal.

6:Command of multi-speed

When selecting the operation mode of multi section command, different set frequency values should be corresponding to different state combinations of digital input terminals.

When the digital input terminal is used as a multi segment command terminal, it needs to be set in group P03.

7 :Simple PLC

When the frequency source is simple PLC, the frequency source of the inverter can switch between 0-15 arbitrary frequency commands. The holding time of 0-15 frequency commands can be set by the user of their acceleration and deceleration time.

8: PID;

The feedback of PID control is selected as the given frequency, which is generally used in the process closed-loop control on site. When PID is used as a given frequency source, it is necessary to set P05 groups of relevant parameters.

9:Communication given

Users can choose according to P07 group parameters.

| Parameter | Name                                | Range   | Default value | Change |
|-----------|-------------------------------------|---|---------------|--------|
| P00.04    | Assistant frequency source Y option | 0:Digital set<br>2:VI<br>3:AI<br>4:Panel coder<br>5:Input pulse<br>6:Order of multi-speed<br>7:Simple PLC<br>8:PID<br>9:Communication given | 0             |        |

When the auxiliary frequency source is used as an independent frequency given channel, its usage is the same as that of the main frequency source X for the usage, please refer to the relevant description of P00.03.

When the auxiliary frequency source is used as the superposition timing(frequency switch between X+Y,X to X+Y or Y to X+Y), please noted.

1.When the auxiliary frequency source is digital, the prefabricated frequency does not work. The frequency adjustment by the user through the potentiometer is directly based on the main given frequency.

2.When the auxiliary frequency source is given by analog input or pulse input, 100% of the input setting corresponds to the auxiliary frequency source range, which can be set through P00.05/P00.06.

3.The frequency source is pulse input timing, similar to analog quantity timing.

Noted:Auxiliary frequency source y selection and main frequency x selection cannot be set to the same channel, that is, p00.03 and p00.04 should not be set to the same channel, otherwise it is easy to cause confusion.

| Parameter | Name   | Range  | Default value | Change |
|-----------|--|--|---------------|--------|
| P00.05    | Option range of assistant frequency source Y | 0:Relative maximum frequency<br>1:Relative main frequency source X | 0             |        |
| P00.06    | Range of assistant frequency source          | 0~200%   | 100           |        |

When the frequency source is selected as "frequency superposition", these two parameters are used to determine the adjustment range of the auxiliary frequency source.

P00.05 is used to determine the corresponding object in the range of auxiliary frequency source. You can select the relative maximum frequency or relative to the main frequency source X.

If the relative main frequency source is selected, the range of the auxiliary frequency source will change with the change of the main frequency X.

| Parameter | Name   | Range   | Default value | Change |
|-----------|--|---------|---------------|--------|
| P00.07    | Biased frequency of assistant frequency source Y | 0~P0.10 | 0             |        |

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

When the frequency source is used as the main and auxiliary operation, p00.07 is used as the offset frequency, and the superposition of the main and auxiliary operation results is used as the final frequency setting value, which makes the frequency setting more flexible.

| Parameter | Name                       | Range   | Default value | Change |
|-----------|----------------------------|---|---------------|--------|
| P00.08    | Frequency source selection | Ten's digit:X and Y operation relationship<br>0:X+Y<br>1:X-Y<br>2:Maximum<br>3:Minimum<br>Unit's digit:Frequency source selection<br>0:Main frequency source X<br>1:X and Y operation(operation relationship determined by ten's digit)<br>2:Switchover between X and Y<br>3:Switchover between X and "X and Y operation"<br>4:Switchover between Y and "X and Y operation" | 0             |        |

The given frequency channel is selected by this parameter. Through the combination of the main frequency source X and the auxiliary frequency source y, the frequency source is given.

0: Bit: main frequency source x

The main frequency source x is used as the target frequency.

1: Main and auxiliary operation results;

The main and auxiliary operation results are taken as the target frequency, and the main and auxiliary operation relationship is shown in the "ten bit" description of the function code.

2: Switching between main frequency source X and auxiliary frequency source y

When p00.08 = 24 (frequency source switching) is invalid, the main frequency x is the target frequency. When p00.08 = 24 is valid, the auxiliary frequency y is the target frequency.

3: When the main frequency source X switches with the main and auxiliary operation results

When p00.08 = 24 (frequency source switching) is invalid, the main frequency x is used as the target frequency. When p00.08 = 24 (frequency source switching) is valid, the result of primary and secondary frequency operation is taken as the target frequency.

4: When the main frequency source Y switches with the main and auxiliary operation results

When p00.08 = 24 (frequency source switching) is invalid, the main frequency x is used as the target frequency. When p00.08 = 24 (frequency source switching) is valid, the result of primary and secondary frequency operation is taken as the target frequency.

Ten bits: main and auxiliary operation relationship of frequency source.

0: X+Y

1: X-Y

2: Maximum

The absolute maximum of the main frequency X and the auxiliary frequency y is taken as the target frequency.

3: Minimum

The absolute minimum of the main frequency X and the auxiliary frequency y is taken as the target frequency

In addition, when the frequency source is selected as the main and auxiliary operation, the offset frequency can be set through P00.07, and the offset frequency can be superimposed on the main and auxiliary operation results, so as to flexibly respond to various needs.

| Parameter | Name                   | Range      | Default value | Change |
|-----------|------------------------|------------|---------------|--------|
| P00.09    | Preset reference value | -100%~100% | 50            |        |

When the frequency source (p00.03) is selected as "digital setting" or "terminal up, terminal down", the function code value is the initial value of frequency digital setting of frequency converter.

| Parameter | Name              | Range      | Default value | Change |
|-----------|-------------------|------------|---------------|--------|
| P00.10    | Maximum frequency | 0~655.35Hz | 50            |        |

Used to set the maximum output frequency of the inverter. Its frequency setting is the basis of acceleration and deceleration. Please pay attention to it. In VFD, when analog input, pulse input and multi section command are used as frequency source, 100% of them are calibrated relative to P00.10.

| Parameter | Name              | Range    | Default value | Change |
|-----------|-------------------|----------|---------------|--------|
| P00.12    | Limited frequency | 0~P00.10 | 50            |        |

The upper limit value of the output frequency of the frequency converter, which should be less than or equal to the maximum frequency P00.10.

| Parameter | Name            | Range    | Default value | Change |
|-----------|-----------------|----------|---------------|--------|
| P00.14    | Floor frequency | 0~P00.10 | 0             |        |

The floor limit value of the output frequency of the frequency converter.

| Parameter | Name                                  | Range   | Default value | Change |
|-----------|---------------------------------------|---|---------------|--------|
| P00.15    | Below floor frequency operation model | 0:Floor frequency operation<br>1:Motor stop<br>2:No speed operation | 0             |        |

When the set frequency is lower than the lower limit frequency, the running state of the inverter can be selected by this parameter. VFD provides three modes, low frequency operation, 0-speed operation and shutdown.

| Parameter | Name                         | Range   | Default value | Change |
|-----------|------------------------------|---|---------------|--------|
| P00.16    | Rotation Direction Selection | 0:default direction<br>1:opposite default direction | 0             |        |

By changing the function code, the purpose of motor turning can be realized without changing the motor wiring, which is equivalent to adjusting any two of the motor (U / V / W) to realize the conversion of motor rotation direction.

Tips: after parameter initialization, the motor running direction will return to the original state, and it is strictly forbidden to change the motor steering after system debugging.

| Parameter | Name       | Range                | Default value | Change |
|-----------|------------|----------------------|---------------|--------|
| P00.17    | Forbid REV | 0:Invalid<br>1:Valid | 1             |        |

This parameter is used to set whether the inverter is allowed to reverse the running state, and the system defaults to reverse prohibition. In the case of motor reversal, the parameter value of P00.17 must be "0".

| Parameter | Name           | Range                     | Default value | Change |
|-----------|----------------|---------------------------|---------------|--------|
| P00.20    | Time precision | 0:1s<br>1:0.1s<br>2:0.01s | 1             |        |

In order to meet the needs of all kinds of sites, VFD provides three kinds of acceleration and deceleration time units, which are 1s, 0.1s and 0.01s.

Note: when modifying this function parameter, the decimal places displayed by the four groups of acceleration and deceleration time will change, and the corresponding acceleration and deceleration time will also change. Special attention should be paid in the application process.

| Parameter | Name                | Range    | Default value | Change |
|-----------|---------------------|----------|---------------|--------|
| P00.22    | Acceleration time 1 | 0~65535s | 3             |        |
| P00.23    | Deceleration time 1 | 0~65535s | 3             |        |
| P00.25    | Acceleration time 2 | 0~65535s | 3             |        |
| P00.26    | Deceleration time 2 | 0~65535s | 3             |        |
| P00.28    | Acceleration time 3 | 0~65535s | 3             |        |
| P00.29    | Deceleration time 3 | 0~65535s | 3             |        |
| P00.31    | Acceleration time 4 | 0~65535s | 3             |        |
| P00.32    | Deceleration time 4 | 0~65535s | 3             |        |

Acceleration time refers to the time required for the output frequency of the converter to rise from zero frequency to the target frame rate. Deceleration time refers to the time required for the output frequency of the inverter to decrease from the target frequency to zero frequency. VFD provides four groups of acceleration and deceleration time, and the definition of acceleration and deceleration time is exactly the same.

| Parameter | Name                                       | Range      | Default value | Change |
|-----------|--|------------|---------------|--------|
| P00.33    | Acceleration time 1 and 2 switch frequency | 0~650.00Hz | 0             |        |
| P00.34    | Deceleration time 1 and 2 switch frequency | 0~650.00Hz | 0             |        |

This function is valid when motor 1 is selected and acceleration and deceleration time is not selected through DI (x) terminal switching. It is used to select different acceleration and deceleration time according to the operating frequency range instead of DI (x) terminals during the operation of the inverter.

In acceleration process 1, if the operation frequency is less than p00.33, select acceleration time 2; if the operation frequency is greater than p00.33, select acceleration time 1.

During deceleration, if the running frequency is greater than p00.34, select deceleration time 1, if the running frequency is less than p00.34, select acceleration time 2.

| Parameter | Name                                | Range         | Default value | Change |
|-----------|-------------------------------------|---------------|---------------|--------|
| P00.40    | UP/DOWN Power down memory selection | 0:No<br>1:Yes | 0             |        |
| P00.41    | UP/DOWN stop memory selection       | 0:No<br>1:Yes | 0             |        |

This function is only valid when the frequency source is set as digital.

"No memory" means that after the power failure of the inverter, the digital set frequency value is restored to the preset frequency value, and the frequency correction of the encoder or terminal is cleared.

"Memory" means that after the frequency converter is shut down, the digital set frequency remains the set frequency of the last shutdown time, and the frequency correction made by the encoder or terminal remains effective.

| Parameter | Name   | Range                                  | Default value | Change |
|-----------|--|--|---------------|--------|
| P00.42    | Base frequency for UP/DOWN modification during running | 0:Running frequency<br>1:Set frequency | 0             |        |

This parameter is only valid when the frequency source is set as digital.

It is used to determine the way to correct the set frequency when the keyboard encoder or terminal up / down acts, that is, whether the target frequency is increased or decreased on the basis of the set frequency or on the basis of the operation frequency.

The difference between the two settings is obvious when the frequency converter is in the process of acceleration and deceleration, that is, if the operating frequency of the frequency converter is different from the set frequency, the different selection of this parameter is very different.

| Parameter | Name         | Range         | Default value | Change |
|-----------|--------------|---------------|---------------|--------|
| P00.43    | UP/DOWN Step | 0.01~100.00Hz | 0.01          |        |

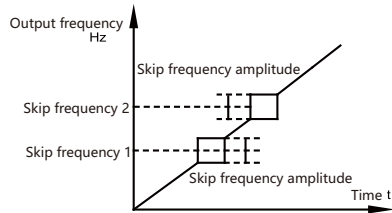
It is used to set the speed of frequency change when the terminal up / down adjusts the set frequency, that is, the change of frequency per second.

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| Parameter | Name                 | Range    | Default value | Change |
|-----------|----------------------|----------|---------------|--------|
| P00.44    | Jump frequency 1     | 0~P00.10 | 0             |        |
| P00.45    | Jump frequency 2     | 0~P00.10 | 0             |        |
| P00.46    | Jump frequency width | 0~P00.10 | 0             |        |

When the set frequency is within the range of jumping frequency, the actual running frequency will run at the jumping frequency which is far away from the set frequency. By setting the jumping frequency, the inverter can avoid the mechanical resonance point of the load.

VFD can set two jumping frequency points. If both jumping frequencies are set to 0, the jumping frequency function will be canceled.



| Parameter | Name                             | Range                         | Default value | Change |
|-----------|----------------------------------|-------------------------------|---------------|--------|
| P00.47    | Jog frequency                    | 0~P00.12                      | 5             |        |
| P00.48    | Jog Acceleration time            | 0-65535S (relative to P00.20) | 10            |        |
| P00.49    | Jog Deceleration time            | 0-65535S (relative to P00.20) | 10            |        |
| P00.50    | Emergency stop deceleration time | 0-65535S (relative to P00.20) | 10            |        |

Define the given frequency and acceleration and deceleration time of frequency converter when inching.

During inching operation, the start mode is fixed as direct start mode, and the stop mode is fixed as deceleration stop mode.

| Parameter | Name                 | Range                               | Default value | Change |
|-----------|----------------------|-------------------------------------|---------------|--------|
| P00.60    | Start delay time     | 0~100s                              | 0             |        |
| P00.61    | Start delay function | 0:Direct clamping<br>2:Free running | 2             |        |

The start delay time is the delay time from the start command to the motor acceleration. When it is set to 0.0, the start delay function is invalid. The start delay function refers to the function executed by the inverter within the start delay time.

0: Direct clamping

During the start delay time, the inverter uses DC clamping function to brake the motor.

2: Free running

During the starting delay time, the motor is in free running state and is not controlled by the inverter.

Note: all acceleration times do not include start-up delay time. When the frequency tracking start is valid, the start delay function is invalid.

| Parameter | Name                     | Range                | Default value | Change |
|-----------|--------------------------|----------------------|---------------|--------|
| P00.62    | Frequency tracking start | 0:Invalid<br>1:Valid |               | 0      |

The frequency tracking function is suitable for inertial load, which can be started after the power supply is cut off suddenly. When the frequency tracking is effective, the frequency converter first judges the speed and direction of the motor, and then starts the motor with the tracking frequency, and starts the motor smoothly and without impact.

| Parameter | Name                                 | Range  | Default value | Change |
|-----------|--------------------------------------|--------|---------------|--------|
| P00.63    | Minimum starting frequency set value | 0~50Hz | 0             |        |

When the absolute value of the frequency reference value of the inverter is greater than or equal to the minimum operating frequency, the inverter will output. This feature is off by default.

| Parameter | Name                      | Range  | Default value | Change |
|-----------|---------------------------|--------|---------------|--------|
| P00.64    | Minimum running frequency | 0~20Hz | 0             |        |

When the absolute value of frequency converter operating frequency is less than the minimum frequency, the motor directly changes from the current value to the minimum frequency with negative minimum frequency. This function is off by default.

| Parameter | Name                         | Range  | Default value | Change |
|-----------|------------------------------|--|---------------|--------|
| P00.65    | Synchronous motor start mode | 0:Initial position detection start<br>1:Magnetic start | 1             |        |

Because synchronous motor does not know the actual position of rotor when starting, it needs a process of magnetic field (parking) or initial position detection (IPD). This parameter is used to set the starting mode of synchronous motor. The starting time of initial position detection is very fast, and  $t_s$  can be ignored. When starting, the magnetization time is determined by the parameter P00.75.

| Parameter | Name                | Range  | Default value | Change |
|-----------|---------------------|--------|---------------|--------|
| P00.70    | DC clamping current | 0-150% | 50            |        |

The DC clamping function uses top heating motor or brake motor. The essence of DC clamping and DC braking control is the same, both of them brake the motor by supplying DC power to the motor, and both of them need the degaussing process of the motor. But the timing of DC clamping and DC braking is different; DC clamping can be used to start the delayed preheating motor and stop the motor. There is no time limit for DC clamping when it stops. DC braking can only be used to stop the motor when it stops, which is limited by DC braking time.



| Parameter | Name                           | Range   | Default value | Change |
|-----------|--------------------------------|---------|---------------|--------|
| P00.71    | Stop brake current             | 0-150%  | 50            |        |
| P00.72    | Stop brake time                | 0-60s   | 0             |        |
| P00.73    | Cut in frequency of stop brake | 0-500Hz | 0             |        |

DC braking: it is applicable to the situation where the torque output needs to be maintained after braking to zero speed.

DC braking current: refers to the output current during DC braking, which is the percentage of the value relative to the rated current of the motor. The larger the value is, the stronger the DC effect is, the greater the heating of the motor and frequency converter is, and the greater the overcurrent risk of the frequency converter is.

DC braking time: the holding time of DC braking amount. If it is set to 0.0, the DC braking is closed.

DC braking cut in frequency: when the output frequency of the frequency converter is lower than this frequency, the DC braking process starts. When it is set to 0.0, the DC braking is closed.

| Parameter | Name  | Range   | Default value | Change |
|-----------|---|---------|---------------|--------|
| P00.74    | Influence of synchronous motor on magnetic starting current | 0-150%  | 80            |        |
| P00.75    | Magnetization time of synchronous motor                     | 0.1-60s | 3             |        |

When the starting mode of synchronous motor is equal to 1 at P00.65, this group of parameters has effect on magnetic starting. P00.75 is used to determine the start-up time, P00.74 is used to determine the start-up current, and 100% corresponds to the rated current of P01.04 motor.

| Parameter | Name                   | Range                        | Default value | Change |
|-----------|------------------------|------------------------------|---------------|--------|
| P00.80    | Stop function          | 0:Free stop<br>1:DC clamping | 0             |        |
| P00.81    | Minimum stop frequency | 0-400Hz                      | 0             |        |

Stop function refers to the action performed by the frequency converter when the frequency converter receives the stop signal or the running signal is disconnected and the output frequency drops to P00.81 of stop function.

0: Free stop

When the frequency converter receives the stop signal or the operation signal is disconnected, the output frequency drops to P00.81 of the stop function.

1: DC clamping

When the frequency converter reaches the stop signal or the running signal is disconnected, and the motor decelerates to P00.81 according to the mechanical inertia, the frequency converter uses the DC clamping function to brake the motor. Refer to P00.70-P00.73 for DC clamping instructions.

## P01 Motor Parameter

| Parameter | Name       | Range   | Default value | Change |
|-----------|------------|---|---------------|--------|
| P01.00    | Motor Type | 0:Asynchronous motor<br>1:Surface mounted synchronous motor<br>2:Unsaturated embedded synchronous motor<br>3:Saturated embedded synchronous motor | 0             |        |

This parameter is used to select the motor type. Depending on the type of motor, the following parameters will be different when applied.

| Parameter | Name               | Range                          | Default value       | Change |
|-----------|--------------------|--------------------------------|---------------------|--------|
| P01.01    | Motor Power        | Depends on motor specification | Model determination |        |
| P01.02    | Motor Voltage      | Depends on motor specification | Model determination |        |
| P01.03    | Motor Frequency    | Depends on motor specification | Model determination |        |
| P01.04    | Motor Current      | Depends on motor specification | Model determination |        |
| P01.05    | Motor RPM          | Depends on motor specification | Model determination |        |
| P01.06    | Motor Rated Torque | Depends on motor specification | Model determination |        |

The factory values of the above motor parameters are determined by the inverter model. No matter which control mode is adopted, it is recommended to set the relevant parameters accurately according to the motor nameplate. After changing the motor parameters, the parameter value of P01.07-P01.10 will be automatically modified in the inverter.

| Parameter | Name                     | Range                          | Default value | Change |
|-----------|--------------------------|--------------------------------|---------------|--------|
| P01.07    | Stator resistance        | Depends on motor specification |               |        |
| P01.08    | Rotor resistance         | Depends on motor specification |               |        |
| P01.09    | Stator leakage reactance | Depends on motor specification |               |        |
| P01.10    | Motor main reactance     | Depends on motor specification |               |        |
| P01.11    | D-axis inductance        | Depends on motor specification |               |        |
| P01.12    | Q-axis inductance        | Depends on motor specification |               |        |

Generally, this group of parameters is not on the motor nameplate, which needs to be obtained by setting motor parameters or motor self-learning. Note: users should not change this group of parameters at will.

| Parameter | Name                  | Range | Default value | Change |
|-----------|-----------------------|-------|---------------|--------|
| P01.13    | Number of motor poles | 2-100 |               | 4      |

This parameter is used to set the number of motor poles.

| Parameter | Name                          | Range  | Default value             | Change |
|-----------|-------------------------------|--------|---------------------------|--------|
| P01.14    | Negative electrical potential | 5-9000 | Depends on the motor data |        |

When the magnetic field changes, the conductor nearby will produce an induced electromotive force, which is in the opposite direction to the voltage originally applied to both ends of the coil. Back EMF is usually determined by rated current and self-learning of motor.

| Parameter | Name                         | Range    | Default value             | Change |
|-----------|------------------------------|----------|---------------------------|--------|
| P01.15    | D-axis Saturation inductance | 0-655.36 | Depends on the motor data |        |
| P01.16    | Q-axis Saturation inductance | 0-655.36 | Depends on the motor data |        |

Generally, this group of parameters is not on the motor nameplate, which needs to be obtained through motor self-learning.

| Parameter | Name                                | Range    | Default value | Change |
|-----------|-------------------------------------|----------|---------------|--------|
| P01.17    | D-axis Saturation inductance switch | 0-655.36 | 100           |        |
| P01.18    | Q-axis Saturation inductance switch | 0-655.36 | 100           |        |

Generally, this group of parameters is not on the motor nameplate, which needs to be obtained through motor self-learning.

| Parameter | Name           | Range    | Default value             | Change |
|-----------|----------------|----------|---------------------------|--------|
| P01.20    | System inertia | 0-65.535 | Depends on the motor data |        |

Generally, this group of parameters is not on the motor nameplate, which needs to be obtained through motor self-learning.

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| Parameter | Name                      | Range  | Default value | Change |
|-----------|---------------------------|--|---------------|--------|
| P01.37    | Motor parameter learn own | 0:Invalid<br>1:All parameters learn own<br>2:Stator resistance learn own | 0             |        |

Using the motor self-learning function can obtain accurate motor parameters and further optimize the control performance. With the same power motor configuration, the inverter has built-in reasonable motor parameters, so there is no need for self-learning in general.

0: Invalid

1: Self-learning all parameter.

Including P01.07 Stator resistance, P01.09 Stator leakage reactance, P01.10 Motor main reactance, P01.11 D-axis inductance and P01.12 Q-axis inductance.

If LC filter is used between inverter and motor, only this option can be selected; Both full parameter self-learning and stator resistance self-learning are static self-learning, so the motor does not need to be disconnected from the load. Before using the motor self-learning function, the following parameters should be set according to the motor nameplate:

P01.01 motor power, P01.02 motor voltage, P01.03 motor frequency, P01.04 motor current, P01.05 motor RPM, P01.06 motor torque, P01.13 number of motor poles.

In order to obtain accurate motor data, the inverter should carry out self-learning in the motor cooling state. This function is not available when the motor is running.

## P02 Control Mode Parameter

| Parameter | Name          | Range                            | Default value | Change |
|-----------|---------------|----------------------------------|---------------|--------|
| P02.00    | V/F curve set | 0: Straight line<br>1~9 Reserved | 0             |        |

0: Straight line V/F

Suitable for ordinary torque load.

| Parameter | Name                              | Range      | Default value | Change |
|-----------|-----------------------------------|------------|---------------|--------|
| P02.01    | V/F Torque boost                  | 0-30%      | 0             |        |
| P02.02    | Cut-off frequency of torque boost | 0-655.35Hz | 50            |        |

In order to compensate the low-frequency torque characteristics of V / F control, the output voltage of the inverter at low frequency is compensated. But the torque lifting setting is too large, the motor is easy to overheat, and the frequency converter is easy to over-current.

When the load is heavy and the motor starting torque is not enough, it is suggested to increase this parameter. The torque increase can be reduced when the load is light. When the torque increase is set to 0.0, the inverter will automatically calculate the required torque increase value according to the parameters of motor electronic resistance.

Torque boost, torque cut-off frequency: under this frequency, torque boost is effective; beyond this set frequency, torque boost is invalid.

| Parameter | Name                              | Range         | Default value | Change |
|-----------|-----------------------------------|---------------|---------------|--------|
| P02.03    | Multi-point V/F frequency point 1 | 0.00Hz~P02-05 | 0             |        |
| P02.04    | Multi-point V/F voltage point 1   | 0.0%~100.0%   | 0             |        |
| P02.05    | Multi-point V/F frequency point 2 | 0.00Hz~P02-07 | 0             |        |
| P02.06    | Multi-point V/F voltage point 2   | 0.0%~100.0%   | 0             |        |
| P02.07    | Multi-point V/F frequency point 3 | 0.00Hz~P02-09 | 0             |        |
| P02.08    | Multi-point V/F voltage point 3   | 0.0%~100.0%   | 0             |        |

P02.03~P02.08 Six parameters define 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 point must be satisfied that  $V1 < V2 < V3, F1 < F2 < F3$ .

If the voltage is set too high at low frequency, the motor may overheat or even burn down, and the inverter may stall or protect against over-current.

| Parameter | Name                                       | Range   | Default value | Change |
|-----------|--|---|---------------|--------|
| P02.15    | Voltage source for V/F separation          | 0:Digital setting(P02-16)<br>1:VI<br>2:AI<br>4:Pulse input<br>5:Multi-reference<br>6:Simple PLC<br>7:PID,process closed loop<br>8:Communication | 0             |        |
| P02.16    | Voltage digital setting for V/F separation | 0V↔motor rated voltage  | 0             |        |

V/F separation is generally used in induction heating, inverter power supply and torque motor control.

When VF separation control is selected, the output voltage can be set by function code P02.16, or from analog quantity, multi section instruction, PLC, PID or communication. When non digital setting is used, 100% of each setting corresponds to the rated voltage of the motor. When the percentage of analog output setting is negative, the absolute value set is taken as the effective setting value.

0: Digital Setting

Voltage set by P02.16 directly.

1: VI (Analog quantity setting)

2: AI (Analog quantity setting)

4: Pulse input

The voltage is given by terminal pulse.

Pulse given signal specification:Voltage range 9V~30V、frequency range 0kHz~100kHz.

5: Multi-reference

When the voltage source is multi segment command.

To set P6 group parameters to determine the corresponding relationship between the given signal and the given voltage.

6: Simple PLC

When the voltage source is simple PLC, it is necessary to set P06 parameters to determine the given output voltage.

7: PID,process closed loop

The output voltage is generated according to the PID closed loop. Refer to the introduction of PID for details.

8: Communication

The voltage is given by upper computer through communication.

When the above voltage source is 1-8, 0-100% of the output voltage is from 0 V to the rated voltage of the motor.

| Parameter | Name                                   | Range         | Default value | Change |
|-----------|--|---------------|---------------|--------|
| P02.20    | Automatic voltage stabilizing function | 0:OFF<br>1:ON | 1             |        |

When the motor is operated under 12% - 20% of the rated voltage, the temperature of the motor will increase, the insulation capacity will be damaged, the torque output will be unstable, and the long-term operation will shorten the motor life.

The automatic voltage stabilizing function can automatically stabilize the output voltage at the rated voltage of the motor when the input power supply voltage exceeds the rated voltage of the motor. Turning off the automatic voltage stabilizing function can improve the deceleration ability during rapid deceleration, but you need to be careful when turning off this option. It will lead to different voltage output to the motor due to different grid voltage, which will increase the risk of motor heating and damage. This function can only be turned off in V / F mode.

| Parameter | Name                                | Range  | Default value | Change |
|-----------|-------------------------------------|--------|---------------|--------|
| P02.30    | Low frequency compensation torques  | 0-199% | 100           |        |
| P02.31    | High frequency compensation torques | 0-199% | 100           |        |

Load compensation means that the inverter automatically compensates the output voltage of the inverter according to the load compensation amount by detecting the load current, so as to improve the load carrying capacity of the inverter. 100% refers to complete compensation for voltage drop caused by stator resistance, motor loss, etc. Low frequency load compensation is used to set the load compensation amount of the inverter at low speed, and high speed load compensation is used to set the load compensation amount of the inverter at high speed.

Low, high-speed switching point is generally about 5Hz, converter power is different, switching point is different. Low load compensation also has effect on high speed, but the effect decreases with the increase of speed; High speed load compensation also has some effects on low speed, but its effect gradually decreases with the decrease of speed. The compensation process is automatically controlled by the inverter.

Most applications only need to set low speed load compensation. When adjusting this parameter, please adjust it within 100%. When the input voltage is low and the frequency converter is running above 10Hz, the high-speed load compensation can be increased to improve the load carrying capacity of the frequency converter. When the output current is too high, it is necessary to reduce the value.

| Parameter | Name              | Range     | Default value | Change |
|-----------|-------------------|-----------|---------------|--------|
| P02.32    | Slip Compensation | -400~399% | 80            |        |

When the motor drives the electric load, the motor speed will decrease with the increase of the load; When the motor drives the generating load, the motor speed will rise with the increase of the load. By setting the appropriate differential compensation, the output frequency of the converter can be dynamically adjusted so that the motor can keep running at constant speed without changing with the load.

In order to use the slip compensation function normally, the rated speed of p01.05 motor must be set correctly according to the motor nameplate parameters. P01.05 the rated speed of the motor refers to the speed when the motor drives the rated electric load, and the speed difference between it and the rotating magnetic field of the motor stator is the slip.

Slip compensation can reduce the influence of load change on motor speed by monitoring motor current in real time and automatically adjusting the output frequency of frequency converter according to slip and motor current.

Slip compensation adjustment method: please adjust within 100%. When the motor drives the motor load, if the motor speed is low, increase the compensation appropriately; If the motor speed is too high, reduce the compensation appropriately; When the motor drives the generating load, if the motor speed is low, reduce the compensation appropriately, if the motor speed is high, increase the compensation appropriately.

| Parameter | Name                            | Range      | Default value | Change |
|-----------|---------------------------------|------------|---------------|--------|
| P02.33    | Slip Compensation Time Constant | 0.05~5.00s | 0.1           |        |

This parameter is used to control the corresponding speed of slip compensation. The larger the parameter value is, the slower the response is. The larger the value is, the faster the response is. If there is low frequency resonance problem, the parameter can be increased appropriately.

| Parameter | Name                              | Range       | Default value | Change |
|-----------|-----------------------------------|-------------|---------------|--------|
| P02.34    | Resonance Dampening               | 0-3000%     | 50            |        |
| P02.35    | Resonance Dampening time Constant | 0.001-0.05s | 0.005         |        |

The motor (especially the high-power motor) is disturbed by the load or oscillates in the speed and current at some frequencies, which will lead to the system unable to operate normally or even over-current protection when it is serious, especially when it is no-load or light load. The motor speed and current oscillation can be restrained by increasing the resonance attenuation value of p02.34; The larger the value is, the more obvious the suppression is. However, if the setting is too large, the control performance of the inverter will be affected. Therefore, when setting the resonance attenuation, please gradually increase the value, and try to reduce it as small as possible on the premise of effectively suppressing the oscillation, so as to avoid adverse effects on the control performance. Do not set resonance suppression when the motor has no oscillation.

The resonance suppression time constant is used to control the response speed of resonance suppression. The smaller the value is, the faster the response is; The larger the value is, the slower the response will be, but if the value is too small, there is a risk of restraining instability.

| Parameter | Name                              | Range  | Default value | Change |
|-----------|-----------------------------------|--------|---------------|--------|
| P02.36    | Open Magnetisation                | 0-300% | 100           |        |
| P02.37    | Normal Magnetisation Switch point | 0-10   | 1             |        |

The zero speed excitation current of the motor is used to set the excitation current of the motor at the leading frequency, which is the percentage relative to the rated current of the motor. The normal excitation current frequency is used to set the frequency switching point of the normal excitation current. When the inverter output frequency is lower than the normal excitation current frequency, the excitation current increases or decreases linearly to 100% of the motor rated current; When the inverter output frequency is higher than the normal excitation current frequency, the motor excitation current is 100% of the motor rated current.

Through this group of parameters, different thermal loads can be realized on the motor when the motor is running at low speed. Increasing the zero speed excitation current of the motor can improve the starting torque of the inverter. For the occasion of insufficient starting torque, please gradually increase the value until it meets the starting requirements.

Note: setting the zero speed excitation current too low may reduce the output torque of the motor.

| Parameter | Name                                     | Range  | Default value | Change |
|-----------|--|--------|---------------|--------|
| P02.40    | Synchronous motor low speed compensation | 0-120% | 80            |        |

If the output frequency is lower than 10Hz, the inverter will operate at this current. Increasing this parameter is helpful to improve the motor torque at low speed. 100% to motor rated current.

| Parameter | Name                                | Range  | Default value | Change |
|-----------|-------------------------------------|--------|---------------|--------|
| P02.41    | Synchronous motor load compensation | 0-500% | 120           |        |

This parameter is used to control the dynamic performance of synchronous motor. The higher the parameter value is, the better the dynamic performance is, and vice versa. Dynamic performance depends on the type of load. But if the parameter value is too high or too low, the control may become unstable.

| Parameter | Name   | Range    | Default value | Change |
|-----------|--|----------|---------------|--------|
| P02.42    | Low speed synchronous motor compensation filtering | 0.01-20s | 0             |        |

This parameter is used when the speed is less than 100% of the rated speed. The smaller filtering time can achieve faster control, but the parameter value is too small, which may lead to unstable control.

| Parameter | Name   | Range    | Default value | Change |
|-----------|--|----------|---------------|--------|
| P02.43    | High speed synchronous motor compensation filtering time | 0.01-20s | 0.8           |        |

This parameter is used when the speed is 10% higher than the rated speed. The smaller filtering time can achieve faster control, but the parameter value is too small, which may lead to unstable control.



| Parameter | Name                                     | Range    | Default value | Change |
|-----------|--|----------|---------------|--------|
| P02.44    | Synchronous motor current filtering time | 0.001-1s |               | 0.5    |

This parameter is used to reduce the influence of high frequency pulsation and system resonance when calculating DC bus. If there is no filtering time, the fluctuation component in the current may distort the calculated voltage, thus affecting the stability of the system.

| Parameter | Name        | Range   | Default value | Change |
|-----------|-------------|---|---------------|--------|
| P02.50    | Torque type | 0:Constant torque<br>1:Adjustable torque<br>3:Optimize torque | 0             |        |

0: Constant torque

Suitable for constant torque load, most of the mechanical load is constant torque load.

1: Adjustable torque

Suitable for fans, pumps, etc.

3: Optimize torque

Suitable for fans, pumps, etc. For such load changing according to the square rule, the torque optimization function not only sets v/f which changes according to the square rule, but also adjusts the voltage according to the current exact load condition, so as to reduce the motor energy consumption and noise.

Note: if the application of constant torque is set to 1 variable torque or 3 automatic optimization, it may cause current oscillation.

| Parameter | Name  | Range  | Default value | Change |
|-----------|---|--------|---------------|--------|
| P02.51    | Adjust adjustable torque                          | 40-90% | 90            |        |
| P02.52    | Automatic optimum energy consumption minimum flux | 40-75% | 66            |        |

This parameter is used to set the minimum flux in the variable torque and automatic energy consumption optimization mode. It is the percentage of the normal flux. Setting a small value can reduce the energy consumption of the motor, but the load mutation will reduce the impedance of the motor and increase the output power.

### P03 Input Terminals Parameter

| Parameter | Name                       | Range  | Default value | Change |
|-----------|----------------------------|--------|---------------|--------|
| P03.00    | Terminal DI Filtering time | 2-16ms | 4             |        |

When there is interference to digital input, the value of p03.00 can be increased to improve the anti-interference ability of digital input terminal. But the longer the filtering time is, the slower the response time to the digital terminal is. How to set it needs to be weighed according to the actual application.

| Parameter | Name     | Range   | Default value | Change |
|-----------|----------|---------|---------------|--------|
| P03.01    | DI logic | 0-65535 | 0             |        |

This parameter is used to control the positive and negative logic of digital input terminal. Each digital input terminal corresponds to a weight, which is set to this parameter after adding the weights. Anti logic needs weights, while positive logic does not.

For example, X1 and X4 are set as anti logic inputs.

| Terminals | X4 | X3 | X2 | X1 |
|-----------|----|----|----|----|
| Weight    | 8  | 4  | 2  | 1  |

When positive logic is selected for digital input, the digital input terminal is in on state (valid) when connected with GND and off state (invalid) when disconnected.

When reverse logic is selected for digital input, the digital input terminal will be in off state (invalid) when connected with GND and on state (valid) when disconnected.

| Parameter | Name          | Range  | Default value | Change |
|-----------|---------------|--|---------------|--------|
| P03.04    | DI1(X1) Input | 0:Invalid<br>1:Forward running<br>2:Reverse running<br>3:Change to Reverse running<br>4:JOG FWD<br>5:JOG REV<br>6:Terminal frequency up<br>7:Terminal frequency down<br>8:Slow down and stop<br>9:Free stop<br>10:Reset + Free stop<br>11:Reset<br>12:Reserved<br>13:Emergency stop (Free stop)<br>14:Multi- speed set value bit 0<br>15:Multi- speed set value bit 1<br>16:Multi- speed set value bit 2<br>17:Multi- speed set value bit 3<br>18:Acc and Dec time 0<br>19:Acc and Dec time 1<br>20:Pulse forward running<br>21:Pulse reverse running<br>22:Reserved<br>24:Frequency source switch<br>32:Command source swithch1<br>33:Command source swithch2<br>34:Outside failure | 8             |        |

| Parameter | Name                   | Range  | Default value | Change |
|-----------|------------------------|--|---------------|--------|
| P03.04    | DI 1(X1) Input         | 35:Reserved<br>37:Reserved<br>38:Reserved<br>40:Reserved<br>41:PID pause<br>42:PID opposite direction<br>43:PID Integral to suspend<br>44:PID parameter switch<br>45:PLC reset condition<br>46:Input high-speed pulse(DI3) |               | 0      |
| P03.05    | Terminal DI 2(X2)Input | Parameter as P03.04  |               | 2      |
| P03.06    | Terminal DI 3(X3)Input | Parameter as P03.04  |               | 14     |
| P03.07    | Terminal DI 4(X4)Input | Parameter as P03.04  |               | 15     |
| P03.08    | Terminal DI 5(X5)Input | Reserved   |               | 16     |
| P03.09    | Terminal DI 6(X6)Input | Reserved   |               | 17     |

0: Invalid

set unused terminals to "invalid" to prevent incorrect actions.

1: Forward running

Through the terminal control inverter forward operation. When the terminal is in on state, the inverter starts to rotate forward; When the terminal is in off state, the inverter stops.

2: Reverse running

The DI terminal is used to control the forward or reverse operation of the VFD. When the terminal is in the closed state, VFD runs according to the given forward or reverse rotation . When the loop of the terminal is disconnected, the VFD stops running.

3: Change to Reverse running

The DI terminal is used for reverse switchover. This function is only used for reverse switchover.

4: JOG FWD

5: JOG REV

The DI terminal is used to control the forward or reverse motion of the VFD. Please see P00.47, P00.48, and P00.49 function codes for the dot motion frequency, dot motion acceleration and deceleration time.

6: Terminal frequency up

7: Terminal frequency down

When the frequency source is set to a given digit (preset reference value), the DI terminal can be used to increase or decrease the given frequency.

8: Slow down and stop

When the terminal is open, the vfd is allowed to be started. When the terminal is closed , the vfd decelerat stop , AS the function of the STOP key on the keyboard. If the three-wire stop function is required, use it with P03.01 (DI logic).

9: Free stop

When this terminal is closed, the inverter stops output, and the stopping process of the motor is not controlled by the VFD. The method is the same as the free parking mentioned in P00.80/P00.81.

10: Reset + Free stop

The function of this terminal is contrary to [9]. When the terminal is closed, the VFD is allowed to start. When in the open state, the inverter stops output and state reset, and the motor parking process is not controlled by the VFD.

11: Reset

Use the terminal for fault reset function. Same as the STOP function on the keyboard, the

terminal can achieve remote fault reset.

12: Reserved

13: Emergency stop (Free stop)

Similar to [10] option, no reset function.

14: Multi- speed set value bit 0

15: Multi- speed set value bit 1

16: Multi- speed set value bit 2

17: Multi- speed set value bit 3

Through the Di of the terminal, the 16 states of the four terminals can realize the setting of 16 section speed or 16 other commands.

18: Acc and Dec time 0

19: Acc and Dec time 1

Through the four states of the two terminals, four kinds of acceleration and deceleration time can be selected.

20: Pulse forward running

When the terminal receives the pulse signal (the pulse width is not less than 4ms, that is, the terminal switches from OFF to ON, keeps the ON state not less than 4ms, and then switches to OFF state), it starts to start forward rotation.

21: Pulse reverse running

22-23:Reserved

24: Frequency source switch

Used to switch and select different frequency sources.

According to the setting of frequency source selection function code, the terminal is used to realize the switching between two frequencies when the switching between two frequency sources is set as the frequency source.

32: Command source switch1

33: Command source switch 2

34: Outside failure

When the external fault input terminal is on, the inverter stops working.

35-40: Reserved

41: PID pause

42: PID opposite direction

When the terminal is effective, the PID action direction is opposite to the set direction.

43: PID Integral to suspend

When the terminal is effective, the integral adjustment function of PID is suspended, but the proportional and differential adjustment functions of PID are still valid.

44: PID parameter switch

When the switch condition of PID parameter is di (x) terminal and the terminal is invalid, the PID parameter uses P05.05-P05.07; When the terminal is valid, use P05.15-P05.17.

45: PLC reset condition

The PLC pauses in the process of execution, the frequency converter maintains the current output frequency, and the PID adjustment of the frequency source is not in progress.

46: Input high-speed pulse(DI3)

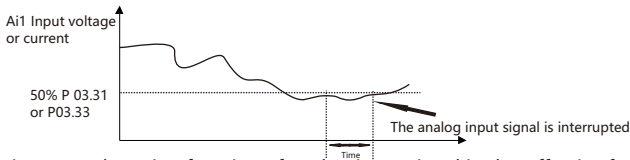
| Parameter | Name  | Range                                 | Default value | Change |
|-----------|---|---------------------------------------|---------------|--------|
| P03.10    | Terminal DI 3 (X3)Input min frequency                           | 0-99.99kHz                            | 0.02          |        |
| P03.11    | Terminal DI3(X3) Input max frequency                            | 0.01-100kHz                           | 50            |        |
| P03.12    | Terminal DI 3 Input min corresponding reference /feedback value | Reference / feedback value -200-+200% | 0             |        |
| P03.13    | Terminal DI 3 Input max corresponding reference /feedback value | Reference / feedback value -200-+200% | 100           |        |
| P03.14    | Terminal DI 3 Filtering time                                    | 1-1000ms                              | 100           |        |

X3 terminal is a programmable multiplex terminal, which can be used as high-speed pulse input terminal or ordinary digital input terminal. When parameter p0.36 is selected as pulse input, X3 is used as high-speed pulse input terminal; When other options are selected for parameter p0.36, X3 is used as a common digital input terminal. Other digital input terminals do not have this function.

This group of parameters is used to set the relationship between the pulse frequency of X4 terminal and its representative setting value. This method is applied to analog input terminal VI.

| Parameter | Name                            | Range | Default value | Change |
|-----------|---------------------------------|-------|---------------|--------|
| P03.20    | Interrupt signal detection time | 1-99s | 10            |        |

The frequency converter has the function of analog input signal interrupt detection. When analog input terminal VI selects voltage input, P03.31 ≥ 1.00v; Or VI select the current input, when P03.31 ≥ 2.00ma, the analog input signal interrupt detection function will automatically start. If the VI input signal is lower than 50% of the set value in P03.31 and P03.33, and the duration exceeds the interruption detection time of P03.20 analog input signal, the system will judge that the analog input signal is interrupted.



The interrupt detection function of analog input signal is also effective for analog input terminal AI, but the corresponding parameters are AI related parameters.

| Parameter | Name                    | Range   | Default value | Change |
|-----------|-------------------------|---|---------------|--------|
| P03.21    | Interrupt signal action | 0:Invalid<br>2:Stop<br>3:Inching running<br>4:Running with MAX frequency<br>5:Stop then warning | 0             |        |

This parameter is used to set the action of the inverter after the analog input signal is interrupted.

- 0: Invalid
- 1: The output frequency is frozen, and the frequency converter continues to operate at the output frequency before signal interruption.
- 2: Stop, The frequency converter stops running.
- 3: Inching running, Frequency converter operates at jog frequency.
- 4: Running with MAX frequency, Frequency converter operates at maximum frequency.
- 5: Stop then warning, The inverter stops output and reports "E.96" fault.

| Parameter | Name     | Range | Default value | Change |
|-----------|----------|-------|---------------|--------|
| P03.30    | Reserved |       |               |        |

| Parameter | Name                                      | Range     | Default value | Change |
|-----------|---|-----------|---------------|--------|
| P03.31    | Terminal VI Min current                   | 0-9.99V   | 0.20          |        |
| P03.32    | Terminal VI Max current                   | 0.01-10V  | 10            |        |
| P03.33    | Terminal AI Minimum                       | 0-19.99mA | 0.14          |        |
| P03.34    | Terminal AI Maximum                       | 0.01-20mA | 20            |        |
| P03.35    | Terminal VI Min reference /feedback value | -200~200% | 0             |        |
| P03.36    | Terminal VI Max reference /feedback value | -200~200% | 100           |        |

The above parameters are used to set the relationship between the input voltage or current of terminal VI and the set value represented by it, and the input voltage or current of VI is linear with the set value represented by the VI input. However, when the input voltage of terminal VI is greater than the set maximum input voltage of P03.32 VI, the upper and lower key values corresponding to the input voltage of VI are calculated according to the set value corresponding to the maximum input of P03.36 VI; Similarly, when VI input voltage is less than P03.31 VI minimum input voltage, the upper and lower key values corresponding to VI input voltage are calculated according to the setting value corresponding to P03.35 VI minimum input. When the VI input is current, the situation is similar.

| Parameter | Name                       | Range     | Default value | Change |
|-----------|----------------------------|-----------|---------------|--------|
| P03.37    | Terminal VI Filtering time | 0.001-10s | 0.01          |        |

VI filtering time refers to the software filtering time of analog input terminal VI. When the onsite analog quantity is easy to interfere, please increase the filtering time to make the detected analog quantity tend to be stable. However, the longer the filtering time is, the slower the response speed to the detection of analog quantity is. How to set it will take a long time to balance the actual application situation.

| Parameter | Name                       | Range    | Default value | Change |
|-----------|----------------------------|----------|---------------|--------|
| P03.38    | Terminal VI Zero Dead Band | 0-20V/mA | 0             |        |

When the change of VI input value is less than VI dead zone, it is considered that VI input value has no change. This parameter can prevent VI input value fluctuation or set value change caused by interference.

| Parameter | Name     | Range | Default value | Change |
|-----------|----------|-------|---------------|--------|
| P03.40    | Reserved |       |               |        |

| Parameter | Name                                      | Range     | Default value | Change |
|-----------|---|-----------|---------------|--------|
| P03.41    | Terminal AI Min voltage                   | 0-9.99V   | 0.07          |        |
| P03.42    | Terminal AI Max voltage                   | 0.01-10V  | 10            |        |
| P03.43    | Terminal AI Minimum                       | 0-19.99mA | 0.14          |        |
| P03.44    | Terminal AI Maximum                       | 0.01-20mA | 20            |        |
| P03.45    | Terminal AI Min reference /feedback value | -200~200% | 0             |        |
| P03.46    | Terminal AI Max reference /feedback value | -200~200% | 100           |        |

The above parameters are used to set the relationship between the input voltage or current of terminal AI and the set value represented by it, and the input voltage or current of AI is linear with the set value represented by the AI input. However, when the input voltage of terminal AI is greater than the set maximum input voltage of P03.42 AI, the upper and lower key values corresponding to the input voltage of AI are calculated according to the set value corresponding to the maximum input of P03.46 AI;

Similarly, when AI input voltage is less than P03.41 AI minimum input voltage, the upper and lower key values corresponding to AI input voltage are calculated according to the setting value corresponding to P03.45 AI minimum input. When the AI input is current, the situation is similar.

| Parameter | Name                       | Range     | Default value | Change |
|-----------|----------------------------|-----------|---------------|--------|
| P03.47    | Terminal AI Filtering time | 0.001-10s | 0.01          |        |

When the change of AI input value is less than AI dead zone, it is considered that AI input value has no change. This parameter can prevent AI input value fluctuation or set value change caused by interference.

| Parameter | Name              | Range    | Default value | Change |
|-----------|-------------------|----------|---------------|--------|
| P03.48    | AI Zero Dead Zone | 0-20V/mA | 0             |        |

When the change of the VI input value is smaller than the AI dead zone, the AI input value is considered unchanged. This parameter prevents the AI input value from fluctuating or changing the set value caused by interference.

P04 Output Terminals Parameters

| Parameter | Name                           | Range  | Default value | Change |
|-----------|--------------------------------|--|---------------|--------|
| P04.00    | Relay 1 Function<br>(KA KB KC) | 0:invalid<br>1:Running<br>2:Failure<br>3:Frequency horizontal detect FDT1 output<br>4:Frequency arrived<br>5:0 speed running<br>6:Motor overload protection<br>7:Converter overload protection<br>8:Reserved<br>9:Reserved<br>10:Reserved<br>11:PLC circulation<br>12:Total power on time arrived<br>13:Frequency limiting<br>14:Torque limiting<br>15:Converter ready<br>16:VI>AI<br>17:Limited frequency arrived<br>18:Floor frequency arrived<br>19:Under-voltage condition output<br>20:Communication set<br>21:Position approaching<br>22:Completed to Locate<br>23:0Speed Running 2<br>24:Total power on time arrived<br>25:Frequency Horizontal Detect FDT 2 Output<br>26:Frequency 1 Arrived<br>27:Frequency 2 Arrived<br>28:Current 1 Arrived<br>29:Current 2 Arrived<br>30:Timing arrived<br>31:VI Output Over Limited<br>32:Drop Loading<br>33:REV Running<br>34:0 Current<br>35:Module temperature arrived<br>36:Output current over limited<br>37:Still output even floor frequency arrived<br>38:Failure or warning<br>39:Over temperature warning<br>40:Running time arrived<br>41:Failure no under-voltage<br>42:High pressure<br>43:Low pressure<br>44:Pressure arrived |               | 2      |



P04.00 Relay Output 1 (KA.KB.KC)

0: Invalid

The unused terminals can be set as "invalid" to prevent misoperation.

1: Running

It indicates that the frequency converter is in operation and has output frequency (can be zero). At this time, the ON signal is output.

2: Failure (Fault of free stop)

When the inverter fails and stops, the ON signal is output.

3: Frequency horizontal detect FDT1 output

4: Frequency arrived

5: 0 speed running (No output when stopped)

When the frequency converter runs and the output frequency is 0, the ON signal is output.

When the frequency converter is in the shutdown state, the signal is OFF.

6: Motor overload protection

Before the motor overload protection action, judge according to the overload pre alarm threshold, and output ON signal after exceeding the pre alarm threshold.

7: Converter overload protection

The ON signal is output 10 seconds before the overload protection of frequency converter.

8: Reserved

9: Reserved

10: Reserved

11: PLC circulation

When the simple PLC completes a cycle, it outputs a pulse signal with a width of 250ms.

12: Total power on time arrived

When the accumulated running time of the inverter exceeds the set time, the ON signal is output.

13: Frequency limiting

When the set frequency exceeds the upper limit or lower limit frequency, and the frequency of the inverter reaches the upper or lower limit frequency, the ON signal is output.

14: Torque limiting

In the speed control mode, when the output torque reaches the torque limit value, the frequency converter is in the stall protection state, and the ON signal is output at the same time.

15: Converter ready

When the power supply of the inverter main loop and control loop is stable, and the transducer does not detect any fault information, the frequency converter is in the running state, and outputs the ON signal.

16: VI>AI

When the input value of the analog input VI is greater than the input value of AI, output the ON signal.

17: Limited frequency arrived

When the operating frequency reaches the upper limit frequency, the ON signal is output.

18: Floor frequency arrived(Operation related)

When the operating frequency reaches the lower limit frequency, the ON signal is output, and the information is OFF at the downtime state.

19: Under-voltage condition output

When the inverter is in an under voltage state, it outputs ON signal.

20: Communication set

23: 0 Speed Running 2 (Keep output when stopped)

When the inverter output frequency is zero, the on signal is output. The signal is also on in the shutdown state.

24: Total power on time arrived

When the output frequency of the inverter is zero. the ON signal is output, and the signal is also ON at the downtime state.

25: Frequency Horizontal Detect FDT 2 Output

26: Frequency 1 Arrived

27: Frequency 2 Arrived

28: Current 1 Arrived

29: Current 2 Arrived

30: Timing arrived

When the timing function selection is effective, the ON signal is output after the operation time of the converter reaches the set time.

31: VI Output Over Limited

When the value of the analog output VI is greater than the VI output protection upper limit or less than the VI protection output lower limit, output the ON signal.

32: Drop Loading

When the inverter is in the off load state, it outputs ON signal.

33: REV Running

When the inverter is in reverse operation, it outputs ON signal.

34: 0 Current

35: Module temperature arrived

When the temperature of the radiator of the inverter module reaches the temperature value of the module set, it outputs the ON signal.

36: Output current over limited

37: Still output even floor frequency arrived

When the operating frequency reaches the lower limit frequency, the ON signal is output, and the output of the signal is also ON at the downtime state.

38: Failure or warning

When the operating frequency reaches the lower limit frequency, the ON signal is output, and the output of the signal is also ON at the downtime state.

39: Over temperature warning

When the motor temperature reaches the overheating alarm threshold, the A.14 fault is displayed.

40: Running time arrived

When the frequency of the inverter starts to exceed the set time, the ON signal is output.

41: Failure no under-voltage (Fault of free shutdown and no output under voltage)

When the frequency converter fails and the output voltage is not output, output the ON signal.

42: High pressure

When the PID feedback pressure reaches the high voltage value, the ON signal is output.

43: Low pressure

When PID feedback pressure reaches low voltage, output ON signal.

44: Pressure arrived

When the PID feedback pressure reaches the target value, the ON signal is output.

| Parameter | Name                             | Range  | Default value       | Change |
|-----------|----------------------------------|--|---------------------|--------|
| P04.01    | Relay 2 Function (FA/FB/FC)      | Parameters same asP04.00 (Model determination) | Model determination |        |
| P04.02    | D01(Y1)output function selection | Parameters same asP04.00 (Model determination) | Model determination |        |
| P04.03    | FM output function selection     | Parameters same asP04.00 (Model determination) | Model determination |        |

Same as P04.00

| Parameter | Name               | Range            | Default value | Change |
|-----------|--------------------|------------------|---------------|--------|
| P04.09    | DO logic(Reserved) | 0-255,(Reserved) | 0             |        |

This parameter is used to control the positive and negative logic of the digital output / relay output terminals. Each digital output / relay output terminal corresponds to a weight, and the weights are added to this parameter. Inverse logic needs weights, and true logic does not.

If DO1 and relay 1 are set as anti logic inputs,  
 $P04.09=1+4=5$

| Terminals | X4 | X3 | X2 | X1 |
|-----------|----|----|----|----|
| Weight    | 8  | 4  | 2  | 1  |

Positive logic: when the function of the digital output / relay output terminal is satisfied, the ON signal is output. Output OFF signal when not satisfied.

Anti logic: when the function of the digital output / relay output terminal is satisfied, the OFF signal is output. When not satisfied, output the ON signal.

| Parameter | Name                  | Range             | Default value | Change |
|-----------|-----------------------|-------------------|---------------|--------|
| P04.10    | Relay 1 On Delay Time | 0-600s            | 0             |        |
| P04.11    | Relay 2 On Delay Time | 0-600S,(Reserved) | 0             |        |

Set the output terminals FMR, relay 1, relay 2, DO1 and DI2, and change the delay time from the change of state to the actual output.

| Parameter | Name                 | Range   | Default value | Change |
|-----------|----------------------|---|---------------|--------|
| P04.20    | VO (AMO) output type | 0:0-20mA (Reserved)<br>1:4-20mA (Reserved)<br>3:0-10V | 3             |        |

This parameter is used to set the type of the output signal of the analog output terminal VO.

| Parameter | Name                 | Range   | Default value | Change |
|-----------|----------------------|---|---------------|--------|
| P04.21    | VO (AMO) output type | 0:None<br>10:Output frequency*<br>11: Feference value<br>12:Feedback value<br>13:Motor current<br>16:Output power<br>17:Motor Rotational Speed<br>18:Voltage output<br>20:Communication control<br>21:Pulse input22: Input VI<br>23:Input AI<br>26:Busbar voltage<br>30:Torsional moment output<br>80:Application control | 10            |        |

The proportional relationship between the AMO output function and its counterpart is as follows:

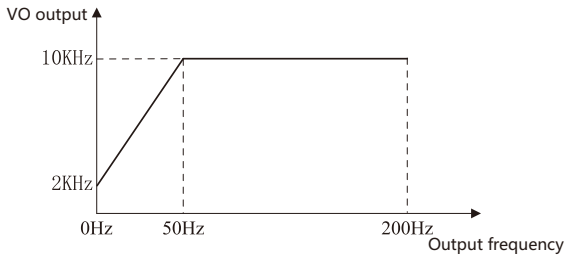
| Option | Function                 | Proportional relationships  |
|--------|--------------------------|---|
| 0      | Digital output           |   |
| 10     | Output frequency         | Torque open-loop and process closed-loop modes :<br>0%=0Hz,100%= P00.10<br>Speed open-loop mode :<br>0%=0Hz,100%=P00.12 |
| 11     | Set value                | 0 ~ maximum frequency   |
| 12     | Feedback value           | 0~2 times the rated current of the motor  |
| 13     | Motor current            | 0~2 times the rated torque of the motor   |
| 16     | Output power             | 0~2 times the rated torque of the motor   |
| 17     | Motor speed              | 0~2 times the rated power   |
| 18     | Output voltage           | 0~1.2 times the rated voltage of the inverter   |
| 20     | Bus-mastering            |   |
| 21     | Pulse input              | 0.01kHz~100.00kHz   |
| 22     | Enter a value for the VI | 0V~10V  |
| 23     | Enter a value for the AI | 0~20mA  |
| 26     | DC bus voltage           | 0%=0V, 100%=1000V   |
| 30     | Output torque            | 0%=0N·m, 100%=P01.06  |
| 38     | Communication control    |   |

The ratio of the VO output function and its counterpart is as follows

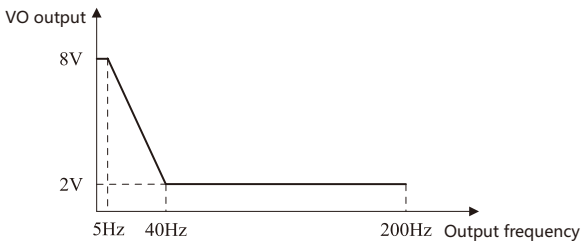
| Parameter | Name                               | Range   | Default value | Change |
|-----------|------------------------------------|---------|---------------|--------|
| P04.22    | Terminal AMO Min output proportion | 0-200%  | 0             |        |
| P04.23    | Terminal AMO Max output proportion | 0-200%  | 100           |        |
| P04.24    | Terminal AMO Min output            | 0-20    | 0             |        |
| P04.25    | Terminal AMO Max output            | 0.01-20 | 10            |        |

Parameters P04.24 and P04.25 are used to set the minimum and maximum values of AMO output, respectively; Parameters P04.22 and P04.23 are used to set the functional ratios corresponding to the minimum and maximum outputs of AMO, respectively.

For example, set P04.21=10, P04.22=0.00% (0.0Hz), P04.23=100.00% (50.0Hz), P04.24=2V, P04.65=8V. The relationship between the output frequency of the frequency converter and the output voltage of the AMO is shown in the following figure:



If P04.22=80.00% (40.0Hz) and P04.23=10.00% (5.0Hz), the relationship between the output frequency of the frequency converter and the output voltage of the AMO is shown in the following figure:



Detailed description of the parameters 200 Series Inverter Operation Guide

| Parameter | Name                           | Range                                      | Default value | Change |
|-----------|--------------------------------|--|---------------|--------|
| P04.30    | AO (AOO) output type(reserved) | 0:0-20mA (reserved)<br>1:4-20mA (reserved) | 0             |        |

This parameter is used to set the type of the output signal of the analog output terminal AO.

Note: this parameter should correspond to the jumper J3. When selecting the voltage output, the jumper switch should be provided with 1.2 pin conduction. When selecting current output, the jumper switch shall be provided with 2.3 pins to turn on.

| Parameter | Name                               | Range         | Default value | Change |
|-----------|------------------------------------|---------------|---------------|--------|
| P04.31    | Terminal AO Output function option | Same as P4-21 | 10            |        |

Refer to P04.20.

| Parameter | Name                              | Range   | Default value | Change |
|-----------|-----------------------------------|---------|---------------|--------|
| P04.32    | Terminal AO Min output proportion | 0-200%  | 0             |        |
| P04.33    | Terminal AO Output proportion     | 0-201%  | 100           |        |
| P04.34    | Terminal AO Min output            | 0-20    | 0             |        |
| P04.35    | Terminal AO Max output            | 0.01-20 | 20            |        |

Refer to P04.23~P04.25.

| Parameter | Name                            | Range   | Default value | Change |
|-----------|---------------------------------|---|---------------|--------|
| P04.60    | Pulse output function selection | 0:Digital setting (P04.03 setting)<br>10:output frequency<br>11:set value<br>12:Feedback value<br>13:Motor Current<br>16:Output frequency<br>17:Motor speed<br>18:output voltage<br>20:bus-mastering<br>21:impulse input<br>22:Vi input value<br>23:AI input value<br>26:DC bus voltage<br>30:Output torque<br>38:Communication control |               |        |

| Parameter | Name                                  | Range     | Default value | Change |
|-----------|---------------------------------------|-----------|---------------|--------|
| P04.61    | Pulse output minimum output frequency | 0-99.99k  | 0             |        |
| P04.62    | Pulse output maximum output frequency | 0.01-100k | 100K          |        |
| P04.63    | Pulse minimum output ratio            | 0-200%    | 0             |        |
| P04.64    | Pulse maximum output ratio            | 0-200%    | 100%          |        |

Parameters P04.62 and P04.63 are used to set the minimum and maximum values of pulse output, respectively; Parameters P04.61, P04.62It is used to set the functional ratios corresponding to the minimum output and maximum output of the pulse, respectively.

**P05 PID Parameters**

| Parameter | Name               | Range   | Default value | Change |
|-----------|--------------------|---|---------------|--------|
| P05.00    | PID setting source | 0:Set P05.01 parameter<br>1:VI<br>2:AI<br>3:Panel Coder<br>4:Pulse Input<br>5:Communication given<br>6:Multistage speed<br>7:P05.01 add Up/Down | 0             |        |

| Parameter | Name            | Range      | Default value | Change |
|-----------|-----------------|------------|---------------|--------|
| P05.01    | PID value given | -3000~3000 | 3             |        |

This parameter is used to select the target path for the process PID.

The target volume of the process PID is the true value, the set range is -3000 to 3000., and the feedback quantity of the same PID is also valid value. The function of PID is to make the two relative quantities equal.

| Parameter | Name                               | Range   | Default value | Change |
|-----------|------------------------------------|---|---------------|--------|
| P05.02    | Feedback source of process control | 0:VI<br>1:AI<br>2:Coder<br>3:VI-AI (Reserved)<br>4:Pulse input Di4<br>5:Communication given<br>6:VI+AI (Reserved)<br>7:VI AI Max(Reserved)<br>8:VI AI Min(Reserved) | 0             |        |

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

The feedback value of the process PID is also the effective value, and the setting range is 0.0.

| Parameter | Name                                      | Range                  | Default value | Change |
|-----------|---|------------------------|---------------|--------|
| P05.03    | Positive and negative logic of process PI | 0:Forward<br>1:Reverse | 0             |        |

Positive effect: when the feedback signal of PID is smaller than the quantity given, the output frequency of the inverter rises.

Reaction: when the feedback signal of PID is smaller than the quantity given, the output frequency of the inverter decreases.

This function is affected by the reverse action direction of multi-function terminal PID (function 35). Please pay attention to it in use.

| Parameter | Name                           | Range      | Default value | Change |
|-----------|--------------------------------|------------|---------------|--------|
| P05.04    | PID Feedback basic value given | 0.1-6553.5 | 10            |        |

PID the given feedback range is a dimensionless unit, used for PID feedback display P11.16.

PID Given feedback range is the actual rms value of the pressure gauge, for example the range of the pressure gauge is: 1.6Mp, then P05.04 is set to 16, when the PID is given 16 (P05.01=10), the PID reference value is displayed as 10 (P11.15=10).

| Parameter | Name                         | Range        | Default value | Change |
|-----------|------------------------------|--------------|---------------|--------|
| P05.05    | Process PI Proportional Gain | 0-1000       | 20            |        |
| P05.06    | Process PI Integral Time     | 0.01-655.35s | 2             |        |
| P05.07    | Process PI Differential Time | 0-10.000s    | 0             |        |

**Proportional Gain Kp1:**

The adjustment speed of the whole PID regulator is decided. The greater the Kp1, the greater the adjustment intensity. The parameter 100 indicates that when the deviation between PID feedback and the determined quantity is 100%, the PID regulator adjuster the output frequency instruction to the maximum frequency.

**Integral timeTi1:**

PID determines the intensity of integral adjustment. The shorter the integration time, the greater the intensity of regulation. Integral time refers to the deviation between PID feedback quantity and the determined quantity 100%. When the integral regulator adjusts continuously through this time, the adjustment reaches the maximum frequency.

**Differential time Td1:**

Determine the strength of PID regulator to adjust the deviation change rate. The longer the differential time is, the stronger the regulation is. Differential time means that the feedback value changes by 100.0% in this decade, and the adjustment value of differential regulator is the maximum frequency.

| Parameter | Name                       | Range      | Default value | Change |
|-----------|----------------------------|------------|---------------|--------|
| P05.08    | PID Reverse stop frequency | 0-655.35Hz | 0             |        |

In some cases, only when the PID output frequency is negative (inverter inversion), PID can control the given quantity and feedback quantity to the same state, but too high inversion frequency is not allowed in some cases. P05.08 is used to determine the upper limit of inversion frequency.

| Parameter | Name            | Range  | Default value | Change |
|-----------|-----------------|--------|---------------|--------|
| P05.09    | Deviation Limit | 0-200% | 0             |        |

When the deviation between the given quantity of PID and the feedback value is less than P05.09, the PID stops adjusting. In this way, the output frequency is stable when the deviation between given and feedback is small, which is very effective for some closed-loop control situations.



| Parameter | Name                           | Range   | Default value | Change |
|-----------|--------------------------------|---------|---------------|--------|
| P05.10    | Process PID Differential limit | 0.1-100 | 0.1           |        |

In PID regulator, the function of differential is more sensitive, and it is easy to cause system oscillation. Therefore, the function of PID differential is generally limited to a small range. P05.10 is used to set the output range of PID differential.

| Parameter | Name                    | Range  | Default value | Change |
|-----------|-------------------------|--------|---------------|--------|
| P05.11    | PID Changing time given | 0-650s | 0.1           |        |

The given change time of PID refers to the time required for the given value of PID to change from 0.0 to p05.04.

When the given time of PID changes, the given value of PID changes linearly according to the given time of change to reduce the adverse impact of the given mutation on the system.

| Parameter | Name                        | Range | Default value | Change |
|-----------|-----------------------------|-------|---------------|--------|
| P05.12    | PID time of filter feedback | 0-60s | 0             |        |
| P05.13    | PID time of filter output   | 0-60s | 0             |        |

P05.12 is used to filter the PID feedback, which is helpful to reduce the influence of disturbance on the feedback, but will bring about the response performance of the process closedloop system.

P05.13 is used to filter the PID output frequency, which will weaken the mutation of the inverter output frequency, but also bring about the response performance of the process closedloop system.

| Parameter | Name   | Range   | Default value | Change |
|-----------|--|---|---------------|--------|
| P05.15    | PID time of filter output                    | 0-10 s  |               |        |
| P05.16    | Process PI Integration time                  | 0.1-65535   |               |        |
| P05.17    | Process PI Calculus time                     | 0-10  |               |        |
| P05.18    | PID parameter switchover condition           | 0:No switch<br>2:Deviation switch<br>3:Frequency switch |               |        |
| P05.19    | Process PID Parameter Switchover Deviation 1 | 0-100%  |               |        |
| P05.20    | Process PID Parameter Switchover Deviation 2 | 0-100%  |               |        |

In some applications, a group of PID parameters can not meet the needs of the whole motion process, so different PID parameters are needed in different situations.

This set of function codes is used to switch two groups of PID parameters. The setting of adjusting parameter P05.15-P05.17 is similar to that of parameter P05.05-P05.07.

The two groups of PID parameters can be switched through the multi-function digital DI (x) terminal, and can also be switched automatically according to the deviation of PID.

When the multi kinetic DI (X) terminal is switched, the function selection of the multi-function terminal must be set to 43 (PID parameter switching terminal). Of course, when the terminal is invalid, the parameter group 1 (P05.05-P05.07) is selected, and the parameter group 2 (P05.15-P05.17) is selected when the terminal is valid.

When automatic switching is selected, the absolute value of deviation between given and feedback is less than PID parameter switching deviation 1. When P05.19, PID parameter selection parameter group 1. When the absolute value of deviation between given and feedback is greater than PID switching deviation 2, when P05.20, PID parameter selection parameter group 2. When the deviation between given and feedback is between switching deviation 1 and switching deviation 2, PID parameter is linear difference compensation value of two groups of PID parameters.

| Parameter | Name                               | Range     | Default value | Change |
|-----------|------------------------------------|-----------|---------------|--------|
| P05.21    | PID Starting value                 | 0-10.00   | 0             |        |
| P05.22    | PID Time of starting value keeping | 0-650.00s | 0             |        |

When the frequency converter starts, the PID output is fixed to PID initial value P05.21, and the PID PID initial holding time P05.22.

This function is used to limit the difference between the PID output two hundred (2ms/beat), so that the PID output changes too fast, so that the frequency converter runs steadily.

| Parameter | Name                           | Range  | Default value | Change |
|-----------|--------------------------------|--------|---------------|--------|
| P05.23    | Output FOR deviation MAX value | 0-100% | 1             |        |
| P05.24    | Output REV deviation MAX value | 0-100% | 1             |        |

P05.23 and P05.24 correspond to the maximum value of the absolute value of the output deviation respectively when the forward and reverse turns.

| Parameter | Name                   | Range | Default value | Change |
|-----------|------------------------|-------|---------------|--------|
| P05.25    | PID Integral attribute | 00-11 | 0             |        |

Individual bit: integral separation.

If the integral separation is set to be effective, when the multi-function digital DI (x) integral pause (function 22) is effective, the PID integral operation stops, and at this time, only the proportional and differential functions of PID are effective.

When the integral separation selection is invalid, the integral separation is invalid no matter whether the multi-function digital DI (x) is valid or not.

Ten: whether to stop the integral when the input reaches the limit.

Ten: output to limit whether to stop integration.

After the PID operation output reaches the maximum or minimum value, you can choose whether to stop the integral action. If stop integral is selected, PID integral calculation will stop at this time, which may help to reduce the overshoot of PID.

| Parameter | Name                                 | Range  | Default value | Change |
|-----------|--------------------------------------|--------|---------------|--------|
| P05.26    | PID Detection value of feedback lost | 0-100% | 0             |        |
| P05.27    | PID Detection time of feedback lost  | 0-20s  | 0             |        |

This function code is used to judge whether PID feedback is lost.

When the PID feedback quantity is less than the feedback loss detection value P05.26, and the duration is longer than the PID feedback loss time P05.27, the frequency converter alarm fault serial number 31=E.PID, and is processed according to the selected fault handling mode.

| Parameter | Name                      | Range   | Default value | Change |
|-----------|---------------------------|---|---------------|--------|
| P05.28    | PID Run out and operation | 0:Run out but no operation<br>1:Run out and operation | 0             |        |

It is used to select whether the PID continues to calculate in PID shutdown state. In general application, PID should stop operation in shutdown state.

| Parameter | Name                 | Range  | Default value | Change |
|-----------|----------------------|--|---------------|--------|
| P05.29    | Wake up pressure     | 0-6500   | 2             |        |
| P05.30    | Wake up delayed time | 0-6500s  | 0             |        |
| P05.31    | Dormant pressure     | 0-6500   | 4             |        |
| P05.32    | Dormant delayed time | 0-6500s  | 60            |        |
| P05.33    | Dormant mode set     | 0:Forbid dormant<br>1:Pressure arrived<br>2:Frequency arrived<br>3:Pressure and frequency arrived at same time | 1             |        |
| P05.34    | Dormant frequency    | 0-655.35Hz   | 30            |        |

P05.29-P05.34 this set of parameters is used to achieve sleep and wake up functions in water supply applications.

When the sleep mode P05.33=0 and PID are adjusted, the sleep and wakeup function is invalid.

When the sleep mode is P05.33=1, during the operation of the frequency converter, when the PID is adjusted, the feedback pressure is greater than or equal to P05.29, when the wake-up pressure is applied, after the time P05.30 delay time, the frequency converter starts to start. Under normal circumstances, please set wake-up pressure > set pressure > sleep pressure.

When the sleep mode P05.33=2 and PID are adjusted, the frequency is low to the dormancy setting frequency (P05.34).

When the sleep mode P05.33=3 and PID are adjusted, the feedback pressure reaches the dormancy pressure, and the frequency is low to the dormancy setting frequency (P05.34).

When the sleep function is enabled, if the frequency source uses PID, then the sleep state PID is calculated and affected by the function code P05.28. At this time, PID downtime operation must be selected (P05.28=1).

| Parameter | Name                                   | Range                | Default value | Change |
|-----------|--|----------------------|---------------|--------|
| P05.35    | Pressure proportion linkage            | 0:Valid<br>1:Invalid | 1             |        |
| P05.36    | Wake up pressure linkage setting value | 0-6500               | 1             |        |
| P05.37    | Dormant pressure linkage setting value | 0-6500               | 0             |        |

The pressure proportion linkage setting is on. The user can set the target pressure directly according to the difference between the wake-up pressure and sleep pressure of P05.36 and P05.37, and follow it automatically;

Of course, users can not choose to activate the linkage following function, P05.35=0.

| Parameter | Name                               | Range   | Default value | Change |
|-----------|------------------------------------|---------|---------------|--------|
| P05.38    | High pressure alarm difference set | 0-6500  | 0             |        |
| P05.39    | High pressure alarm delay time     | 0-6500s | 0             |        |
| P05.40    | Low pressure alarm difference set  | 0-6500  | 0             |        |
| P05.41    | Low pressure alarm delay time      | 0-6500s | 0             |        |

After setting the high pressure alarm function, when the feedback pressure reaches the set value of high pressure alarm (P05.38), the delay time (P05.39), the inverter will alarm and stop, and the fault e.46 will be displayed. When the feedback pressure is lower than the high pressure alarm, the fault will reset automatically, and when the feedback pressure reaches the wakeup pressure (the starting signal of inverter is still in the given state), the inverter will wake up and start automatically;

When the low pressure alarm function is set, when the feedback pressure reaches the low pressure alarm setting point (P05.40), the delay time (P05.41), the inverter alarm stops, and the fault is displayed.

| Parameter | Name                 | Range  | Default value | Change |
|-----------|----------------------|--|---------------|--------|
| P05.50    | MPPT function select | 0: Variable frequency drive control<br>1: MPPT function1<br>2: MPPT function2<br>3: MPPT function3 | 0             |        |

0: VFD mode

Turn off the MPPT function, and the inverter is controlled by the conventional mode.

1: MPPT function1

P5.51(minimum reference value) corresponds to P5.53(low bus operating voltage)P5.52(maximum reference value) corresponds to P5.54(maximum bus operating voltage). when the bus voltage is between P5.53-P5.54, the output frequency is converted according to the ratio. When the bus voltage is lower than P5.53, the output frequency runs according to P5.51. When the bus voltage is higher than P5.54, the output frequency runs at P5.52.

2: MPPT function2

P5.51(minimum reference value) corresponds to P5.53(low bus operating voltage)P5.52(maximum reference value) corresponds to P5.54(maximum bus operating voltage). When the bus voltage is between P5.53-P5.54, Through P05.58 target voltage setting, the output frequency is automatically adjusted to find the best frequency operating point.

3: MPPT function3

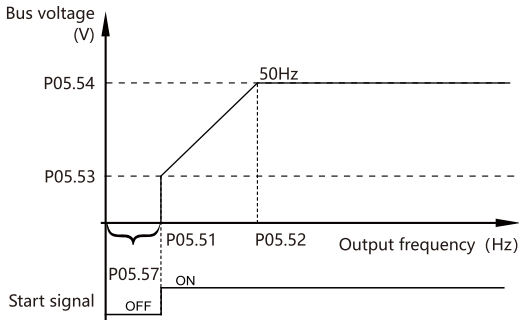
MPPT internal PID automatic operation mode. It is controlled by PID logic operation inside the inverter, no need parameter setting.

| Parameter | Name         | Range  | Default value | Change |
|-----------|--------------|--------|---------------|--------|
| P05.51    | MPPT Min Ref | 0-100% | 20            |        |
| P05.52    | MPPT Max Ref | 0-100% | 100           |        |

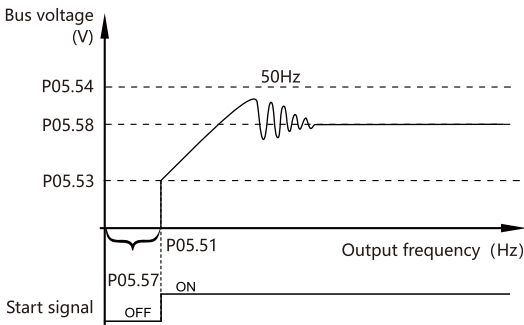
Reshuffle parameters to the given MPPT minimum/maximum reference value, control the operation in the range.

| Parameter | Name                | Range | Default value | Change |
|-----------|---------------------|-------|---------------|--------|
| P05.53    | MPPT Min DC voltage | 0-800 | 380           |        |
| P05.54    | MPPT Max DC voltage | 0-800 | 600           |        |

It is used for MPPT function P05.51, P05.52 and corresponding proportional relationship of P05.53 and P05.54 to control the output frequency adjustment of the inverter. As shown in the figure:



The icon of MPPT mode 1



The icon of MPPT mode 2

## Detailed description of the parameters 200 Series Inverter Operation Guide

| Parameter | Name             | Range   | Default value | Change |
|-----------|------------------|---------|---------------|--------|
| P05.55    | MPPT search time | 0.1-500 | 1.0           |        |

The parameter is to adjust the control period of MPPT mode 2/ Mode 3, the shorter the time, the faster the response. Too short period is easy to cause system instability.

| Parameter | Name                  | Range   | Default value | Change |
|-----------|-----------------------|---------|---------------|--------|
| P05.56    | MPPT search threshold | 0.01-20 | 0.2           |        |

The parameter is controlled by 3 modes of change amplitude.

In the case of mode 1, 0.01-20V is the range value for detecting the amplitude of the voltage change of the target bus. For example, if the current bus voltage is 300V, P05.56=5V. then the 296V-304V range, the output frequency will not operate.

In the case of mode 2 /3 , 0.01-20% is the change in step size. The larger the setting the faster the change, too long step will cause the output frequency to change too much the system adjustment accuracy will become worse.

| Parameter | Name                  | Range   | Default value | Change |
|-----------|-----------------------|---------|---------------|--------|
| P05.57    | MPPT start delay time | 0.1-500 | 240           |        |

The parameter is the time for MPPT function to start, the length of time, according to the actual demand on the site.

When VFD detects that the bus voltage is higher than P5.53, the VFD is started after a delay of P5.57. The purpose is to prevent the VFD from starting immediately when the voltage just reaches P5.57, which may cause the bus voltage to be pulled down again, resulting in repeated start and stop of the machine, resulting in unstable operation of the system.

| Parameter | Name                   | Range   | Default value | Change |
|-----------|------------------------|---------|---------------|--------|
| P05.58    | MPPT target DC voltage | 0.01-20 | 450           |        |

Set the target voltage value of MPPT mode 2, and automatically adjust the output frequency. The value is set according to the actual voltage situation and demand on the site, and the best frequency operating point is found.

| Parameter | Name                    | Range   | Default value | Change |
|-----------|-------------------------|---------|---------------|--------|
| P05.59    | MPPT Water Lack Current | 1-500%  | 240           |        |
| P05.60    | MPPT Water Lack Time    | 0-6000s | 0             |        |

When the inverter detects that the output current is lower than P5.59 and the duration is longer than P5.60. Report fault code A.103.If P5.60 is set to 0, no detection is performed.

### P06 Multistage Command Parameter

| Parameter | Name                        | Range     | Default value | Change |
|-----------|-----------------------------|-----------|---------------|--------|
| P06.00    | Multistage speed commands 0 | -100~100% | 0             |        |
| P06.01    | Multistage speed commands 1 | -100~100% | 0             |        |
| P06.02    | Multistage speed commands 2 | -100~100% | 0             |        |

| Parameter | Name                         | Range     | Default value | Change |
|-----------|------------------------------|-----------|---------------|--------|
| P06.03    | Multistage speed commands 3  | -100~100% | 0             |        |
| P06.04    | Multistage speed commands 4  | -100~100% | 0             |        |
| P06.05    | Multistage speed commands 5  | -100~100% | 0             |        |
| P06.06    | Multistage speed commands 6  | -100~100% | 0             |        |
| P06.07    | Multistage speed commands 7  | -100~100% | 0             |        |
| P06.08    | Multistage speed commands 8  | -100~100% | 0             |        |
| P06.09    | Multistage speed commands 9  | -100~100% | 0             |        |
| P06.10    | Multistage speed commands 10 | -100~100% | 0             |        |
| P06.11    | Multistage speed commands 11 | -100~100% | 0             |        |
| P06.12    | Multistage speed commands 12 | -100~100% | 0             |        |
| P06.13    | Multistage speed commands 13 | -100~100% | 0             |        |
| P06.14    | Multistage speed commands 14 | -100~100% | 0             |        |
| P06.15    | Multistage speed commands 15 | -100~100% | 0             |        |

Multi-speed instruction can be used in three situations: as frequency source, as voltage source of VF separation, as setting source of process PID. In the three applications, the dimension of multi segment instruction is relative value, ranging from - 100% to 100%. When it is used as frequency source, it is the percentage of relative maximum frequency; When VF is used as voltage source, multi-stage instruction as PID setting source does not need dimensional conversion. According to the different states of multi-function digital DI (x), multi segment instruction needs to be switched.

| Parameter | Name                   | Range   | Default value | Change |
|-----------|------------------------|---|---------------|--------|
| P06.16    | Simple PLC running way | 0:Running single time then stop<br>1:Running single time then stop and keep final digital<br>2:Circulating all the time | 1             |        |

Simple PLC function has two functions: as frequency source or VF separated voltage source. When simple PLC is used as frequency source, the positive and negative values of P06.00-P06.15 determine the operation direction. If the value is negative, it means the inverter runs in the opposite direction. As a frequency source, PLC has three modes of operation. As VF separation voltage, there are no three ways.

0: Shutdown at the end of single operation

The inverter stops automatically after a single cycle and needs to give the operation command again to start.

1: Keep the final value at the end of single operation

After the inverter completes a cycle, the operation frequency and direction of the last section will be maintained automatically.

2: Cycle all the time

After the inverter completes a cycle, the next cycle will start automatically, and stop when the stop command is known.

| Parameter | Name                                   | Range  | Default value | Change |
|-----------|--|--|---------------|--------|
| P06.17    | Simple PLC option of drop power memory | Unit:option of drop power memory<br>0:drop power no memory<br>1:drop power memory<br>Decade:option of drop power memory<br>0:drop power no memory<br>1:drop power memory | 0             |        |

PLC power down memory refers to memorizing the operation stage and frequency of PLC before power down, and continuing to run from the memory stage when next power on. If no memory is selected, the PLC process will be restarted every time the power is on.

PLC shutdown memory is to record the previous PLC operation stage and frequency during shutdown, and continue to run from the memory stage during the next operation. If no memory is selected, the PLC process will be restarted every time.

| Parameter | Name                                   | Range                     | Default value | Change |
|-----------|--|---------------------------|---------------|--------|
| P06.18    | Simple PLC running time unit           | 0: S, Second<br>1: H,Hour | 0             |        |
| P06.19    | Simple PLCO running time               | 0-6500                    | 0             |        |
| P06.20    | Simple PLCO variable speed time option | 0-3                       | 0             |        |
| P06.21    | Simple PLC1 running time               | 0-6500                    | 0             |        |
| P06.22    | Simple PLC1 variable speed time option | 0-3                       | 0             |        |
| P06.23    | Simple PLC2 running time               | 0-6500                    | 0             |        |
| P06.24    | Simple PLC2 variable speed time option | 0-3                       | 0             |        |
| P06.25    | Simple PLC3 running time               | 0-6500                    | 0             |        |
| P06.26    | Simple PLC3 variable speed time option | 0-3                       | 0             |        |
| P06.27    | Simple PLC4 running time               | 0-6500                    | 0             |        |
| P06.28    | Simple PLC4variable speed time option  | 0-3                       | 0             |        |
| P06.29    | Simple PLC5 running time               | 0-6500                    | 0             |        |
| P06.30    | Simple PLC5variable speed time option  | 0-3                       | 0             |        |
| P06.31    | Simple PLC6 running time               | 0-6500                    | 0             |        |
| P06.32    | Simple PLC6variable speed time option  | 0-3                       | 0             |        |
| P06.33    | Simple PLC7 running time               | 0-6500                    | 0             |        |
| P06.34    | Simple PLC7variable speed time option  | 0-3                       | 0             |        |
| P06.35    | Simple PLC8 running time               | 0-6500                    | 0             |        |
| P06.36    | Simple PLC8variable speed time option  | 0-3                       | 0             |        |



| Parameter | Name                                   | Range  | Default value | Change |
|-----------|--|--|---------------|--------|
| P06.37    | Simple PLC9 running time               | 0-6500   | 0             |        |
| P06.38    | Simple PLC9variable speed time option  | 0-3  | 0             |        |
| P06.39    | Simple PLC10 running time              | 0-6500   | 0             |        |
| P06.40    | Simple PLC10variable speed time option | 0-3  | 0             |        |
| P06.41    | Simple PLC11 running time              | 0-6500   | 0             |        |
| P06.42    | Simple PLC11variable speed time option | 0-3  | 0             |        |
| P06.43    | Simple PLC12 running time              | 0-6500   | 0             |        |
| P06.44    | Simple PLC12variable speed time option | 0-3  | 0             |        |
| P06.45    | Simple PLC13 running time              | 0-6500   | 0             |        |
| P06.46    | Simple PLC13variable speed time option | 0-3  | 0             |        |
| P06.47    | Simple PLC14 running time              | 0-6500   | 0             |        |
| P06.48    | Simple PLC14variable speed time option | 0-3  | 0             |        |
| P06.49    | Simple PLC15 running time              | 0-6500   | 0             |        |
| P06.50    | Simple PLC15variable speed time option | 0-3  | 0             |        |
| P06.51    | Multistage speed 0 given way           | 0:Parameter P06.00 is set<br>1:Analog VI<br>2:Analog AI<br>3:Pulse input<br>5:Preset values<br>7:Encoder | 0             |        |

This parameter determines the given channel for multi segment instruction 0.

In addition to selecting P06.00, there are many other options for multistage instruction 0, which facilitates switching between multiple count instructions and other given modes. When multi segment instruction is used as frequency source or simple PLC is used as frequency source, it is easy to switch between two kinds of frequency sources.

## P07 Communication Parameter

| Parameter | Name                       | Range       | Default value | Change |
|-----------|----------------------------|-------------|---------------|--------|
| P07.03    | Communication Timeout Time | 0.1-650.00s | 1             |        |

When this parameter is set to 0.0, the communication interrupt function is invalid.

When the grade parameter is set to a valid value, if the interval between the first communication and the next communication exceeds the communication interruption time, the inverter will judge the communication interruption. In the continuous communication system, setting this parameter can monitor the communication status.

Note: after receiving the correct communication message, the frequency converter starts to time the communication interruption. If the inverter does not receive the correct communication message after power on, the communication interruption will not be reported.

| Parameter | Name                           | Range  | Default value | Change |
|-----------|--------------------------------|--|---------------|--------|
| P07.04    | Communication Timeout Function | 0:Invalid<br>2:Stop<br>3:Inching operation<br>4:Max operation frequency<br>5:Stop then warn<br>6:Warning | 0             |        |

This parameter is used to set the action of frequency converter when communication is interrupted.

0: Invalid.

1: The output frequency is frozen, and the frequency converter continues to operate at the output frequency before signal interruption.

2: Stop, inverter stop output.

3: Inching operation, inverter runs with inching frequency.

4: Max operation frequency, inverter runs with max frequency.

5: Stop then warn, inverter stop out and display E.97 error.

| Parameter | Name                        | Range                                  | Default value | Change |
|-----------|-----------------------------|--|---------------|--------|
| P07.06    | Reset Communication Timeout | 0:Invalid<br>1:Reset communication cut | 0             |        |

After communication interruption occurs, there will be communication interruption mark inside the frequency converter. The user must set this parameter to restore the communication interruption and clear the mark. Otherwise, even if the communication is restored or e.97 fault is cleared, the frequency converter will continue to report communication interruption.

| Parameter | Name                   | Range                      | Default value | Change |
|-----------|------------------------|----------------------------|---------------|--------|
| P07.30    | Communication Protocol | 0:MODBUS-RTU<br>2:Reserved | 0             |        |

This parameter is used to set the communication protocol type. When the communication protocol is changed, the value of the parameter P07.31 P07.32 P07.33 will return to the default value.

| Parameter | Name    | Range | Default value | Change |
|-----------|---------|-------|---------------|--------|
| P07.31    | Address | 1-247 | 1             |        |

This parameter is used to set the communication address of the inverter. The address range of FC protocol is 1-126, and the address range of Modbus RTU protocol is 1-247.

| Parameter | Name      | Range  | Default value | Change |
|-----------|-----------|--|---------------|--------|
| P07.32    | Baud Rate | 0:300b<br>1:600b<br>2:1200b<br>3:2400b<br>4:4800b<br>5:9600b | 5             |        |

This parameter is used to set the baud rate of communication between PC and inverter.

Note: 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.

| Parameter | Name         | Range   | Default value | Change |
|-----------|--------------|---|---------------|--------|
| P07.33    | Digital Form | 0:No parity (1Position Stop)<br>1:Even parity (1Position Stop)<br>2:Odd parity (1Position Stop)<br>3:No parity (2Position Stop) | 0             |        |

This parameter is used to set the communication data format between the host computer and the inverter. The data format set by the upper computer and the frequency converter must be consistent, otherwise, communication cannot be carried out.

| Parameter | Name                | Range   | Default value | Change |
|-----------|---------------------|---------|---------------|--------|
| P07.35    | Min. Response Delay | 0-0.5s  | 0.002         |        |
| P07.36    | Max. Response Delay | 0.1-10s | 5             |        |

Response delay refers to the interval between the end of data receiving and the sending of data to the host computer.

Min. Response Delay:If the minimum response delay is less than the system processing time, the response delay is subject to the processing time of the west system, that is, the system sends the data to the upper computer immediately after processing the data; If the minimum response delay is greater than the system processing time, the system will delay and wait until the minimum response delay time arrives, and then send data to the upper computer.

Max. Response Delay:If the frequency converter processing time exceeds the maximum response delay, the frequency converter will not respond to the received data.

| Parameter | Name             | Range   | Default value | Change |
|-----------|------------------|---|---------------|--------|
| P07.38    | Message Response | 0:Every time<br>1:Only response abnormal message<br>2:No response | 0             |        |

0: Reply, every message sent by the host computer, the inverter will reply.

1: Only reply to abnormal message, every message sent by upper computer, inverter only reply to abnormal message.

2: No reply, the inverter will not reply to every message sent by the upper computer.

Note: that the broadcast message and frequency converter do not need to reply, and the read message still responds normally.

| Parameter | Name              | Range   | Default value | Change |
|-----------|-------------------|---|---------------|--------|
| P07.39    | Programme control | 0:Parameter do not save when power off<br>1:Parameter save when power off | 1             |        |

This parameter is used to control whether the parameters changed by communication are saved after power off.

### P08 Auxiliary parameters

| Parameter | Name                     | Range     | Default value | Change |
|-----------|--------------------------|-----------|---------------|--------|
| P08.01    | Over Modulation Function | 90-105.5% | 100           |        |

The over modulation function can make the output voltage greater than the input voltage at the rated frequency.

| Parameter | Name                   | Range | Default value | Change |
|-----------|------------------------|-------|---------------|--------|
| P08.02    | Dead band Compensation | 0-200 | 100           |        |

In order to prevent the upper and lower tubes of the inverter bridge from conducting at the same time, a fixed dead time is usually set in the driving signal sent by the single chip microcomputer. The existence of this dead time will cause the distortion of the motor control voltage and the current distortion, which is more significant at low frequency and may lead to the risk of system oscillation. However, due to the discreteness of the device characteristics, there is a certain difference between the actual dead time and the theoretical dead time.

The dead time compensation adjustment system coefficient is used to adjust the difference between the actual dead time and the theoretical dead time. 100% represents compensation according to the theoretical dead time, and less than 100% represents that the actual dead time is less than the theoretical dead time. In debugging, it can be judged according to the sinusoidal degree of current at low frequency.

| Parameter | Name                       | Range     | Default value | Change |
|-----------|----------------------------|-----------|---------------|--------|
| P08.07    | Max Dead band Compensation | 20-1000Hz | 500           |        |

When the motor runs at high frequency, the influence of dead time on the control voltage can be ignored. After P08.07 is set up, the dead time compensation will not be carried out when the motor running frequency is higher than the P08.07 setting value. It should be noted that the compensation coefficient decreases linearly from 0Hz to P08.07, so adjusting P08.07 has certain effect on the compensation effect at low frequencies. Usually, there is no need to adjust the P08.07 setting value.

| Parameter | Name                            | Range   | Default value | Change |
|-----------|---------------------------------|---|---------------|--------|
| P08.10    | DC Circuit Voltage Compensation | 0:No compensation<br>1:Compensation1<br>2:Compensation2 | 0             |        |

Turning on the DC bus voltage compensation function can ensure that the output voltage is not affected by bus voltage fluctuation (such as fast reading fluctuation of input power supply voltage), and can obtain very stable torque (low torque fluctuation) under most main power supply conditions. But in the case of silent writing, this kind of dynamic compensation will cause DC bus oscillation and should be disabled. Mode 2 has better compensation effect on DC bus voltage of single inverter.

| Parameter | Name                | Range   | Default value | Change |
|-----------|---------------------|---------|---------------|--------|
| P08.20    | Switching Frequency | 2-16kHz | 5             |        |

This parameter is used to adjust the carrier frequency of frequency converter. The influence of carrier frequency on frequency converter and motor is as follows.

|   |              |
|---|--------------|
| carrier frequency                       | Low to high  |
| Motor noise                             | Big to small |
| Temperature rise of frequency converter | Low to high  |
| Output leakage current                  | Small to big |
| Output current harmonics                | Big to small |
| External radiation interference         | Small to big |
| Temperature rise of frequency converter | High to low  |

Carrier frequency setting method :

- 1: When the motor line is too long, reduce the carrier frequency.
- 2: When the low frequency torque is unstable, reduce the carrier frequency.
- 3: When the external interference of frequency converter is large, reduce the carrier frequency.
- 4: When the leakage current of frequency converter is large, reduce the carrier frequency.
- 5: When the temperature rise of frequency converter is high, reduce the carrier frequency.
- 6: When the motor is noisy, please increase the carrier frequency.

Note: if the carrier frequency is set high, the temperature of the converter will be increased.

At this point, users need to reduce the frequency converter, otherwise the inverter will be overheated.

| Parameter | Name           | Range  | Default value | Change |
|-----------|----------------|--|---------------|--------|
| P08.30    | Operating mode | 0:Normal operating<br>2:Reset the parameters to default<br>3: Backup user parameters<br>4: Restore user parameters | 0             |        |

0: Normal operating

2: Reset

All the parameters except the output frequency converter information and recorded parameters are restored to the factory values. After setting this option, you need to turn on the power and power on. The frequency converter displays "E.98", and press the "STOP" key to remove the hints.

3: Backup user parameters

4: Restore user parameters

| Parameter | Name  | Range      | Default value | Change |
|-----------|---|------------|---------------|--------|
| P08.40    | Frequency detected value                            | 0-655.35Hz | 50            |        |
| P08.41    | Frequency detected value 1 hysteresis of instrument | 0-100%     | 5             |        |

When the operation frequency is higher than the frequency detection value, the frequency converter outputs DO (Y) output ON signal, while the frequency is lower than the detection value, then the DO (Y) output ON signal cancels.

The above parameters are used to set the detection value of the output frequency and the hysteresis value of the output action cancellation. where P08.41 is the percentage of hysteresis frequency relative to the frequency detection value P08.40. The figure below shows a schematic diagram of the FDT function.

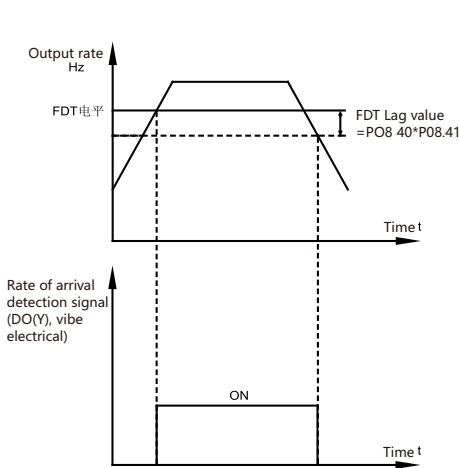


Figure 5-16 Diagram of the FDT level

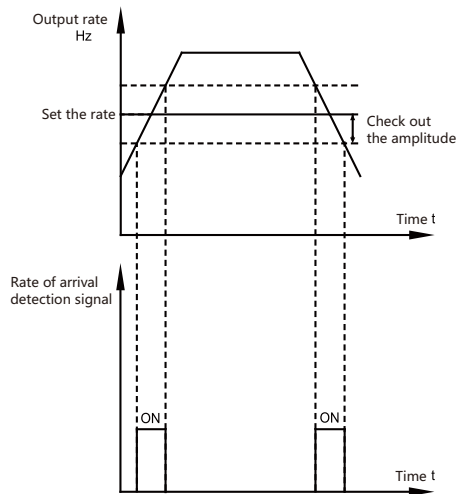


Figure 5-17 Schematic diagram of detection amplitude of frequency arrival

| Parameter | Name                               | Range  | Default value | Change |
|-----------|------------------------------------|--------|---------------|--------|
| P08.42    | Frequency reach to detection width | 0-100% | 0             |        |

When the operating frequency of the inverter is within a certain range of the target frequency, the multifunction DO (y) of the inverter outputs on signal. This parameter is used to set the detection range of frequency, which is the percentage of relative maximum frequency.

| Parameter | Name  | Range      | Default value | Change |
|-----------|---|------------|---------------|--------|
| P08.43    | Frequency detected value 2                          | 0-655.35Hz | 50            |        |
| P08.44    | Frequency detected value 2 hysteresis of instrument | 0-100%     | 5             |        |

The function of frequency detection is exactly the same as that of FDT1. Please refer to the related instructions of FDT1, that is, the description of function code P08.40 and P08.41.

| Parameter | Name                                 | Range      | Default value | Change |
|-----------|--------------------------------------|------------|---------------|--------|
| P08.45    | Any reach frequency detected value 1 | 0-655.35Hz | 50            |        |
| P08.46    | Any reach frequency detected width 1 | 0-100%     | 0             |        |
| P08.47    | Any reach frequency detected value 2 | 0-655.35Hz | 50            |        |
| P08.48    | Any reach frequency detected width 2 | 0-100%     | 0             |        |

When the output frequency of the frequency converter is within the positive and negative detection range of the detected frequency of any incoming frequency, the multi-function DO (Y) outputs the ON signal.

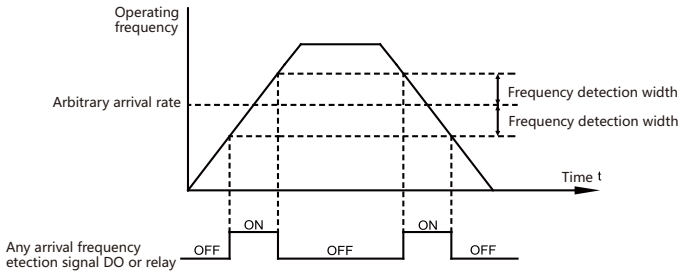


Figure 5-20 Schematic diagram of detecting any arrival frequency

| Parameter | Name                             | Range  | Default value | Change |
|-----------|----------------------------------|--------|---------------|--------|
| P08.49    | 0 current detection level        | 0-300% | 5             |        |
| P08.50    | 0 current detection delayed time | 0-600s | 0.1           |        |

When the output current of the inverter is less than or equal to the zero current detection level, and the duration is longer than the zero current detection delay time, the frequency converter DO (Y) outputs the ON signal.

Figure 5-21 shows the zero-current detection diagram

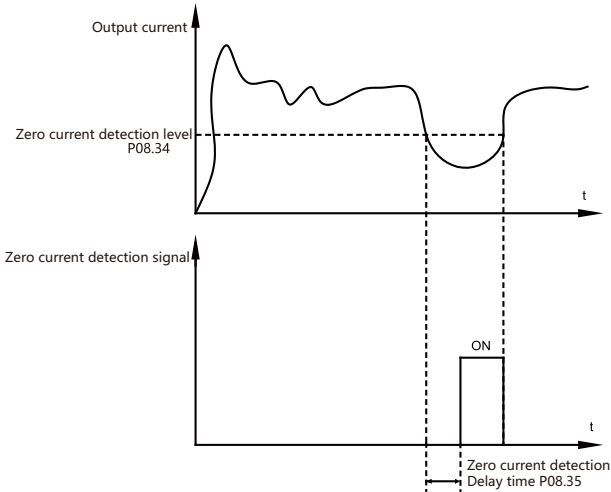


Figure 5-21 Zero-current detection diagram

| Parameter | Name  | Range  | Default value | Change |
|-----------|---|--------|---------------|--------|
| P08.51    | Output current over limited                   | 0-300% | 200           |        |
| P08.52    | Output current over limited detection delayed | 0-600s | 0             |        |

When the output current of the frequency converter exceeds or exceeds the monitoring point, and the duration exceeds the software over current detection delay time, the frequency converter DO (Y) outputs the ON signal.

Figure 5-22 shows the output current overload function

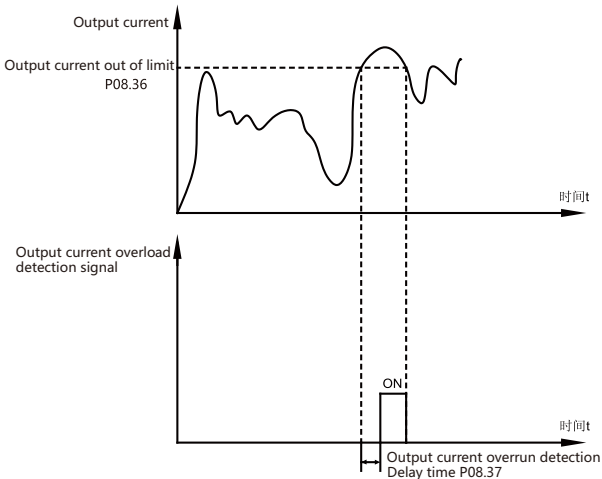


Figure 5-22 Schematic diagram of detecting output current overload



| Parameter | Name                                 | Range  | Default value | Change |
|-----------|--------------------------------------|--------|---------------|--------|
| P08.53    | Any arrived electron flow 1          | 0-300% | 100           |        |
| P08.54    | Width of any arrived electron flow 1 | 0-300% | 0             |        |
| P08.55    | Any arrived electron flow 2          | 0-300% | 100           |        |
| P08.56    | Width of any arrived electron flow 2 | 0-300% | 0             |        |

When the output current of the frequency converter is within the set positive and negative detection width of any arriving current, the multi-function Do (y) of the frequency converter outputs on signal.

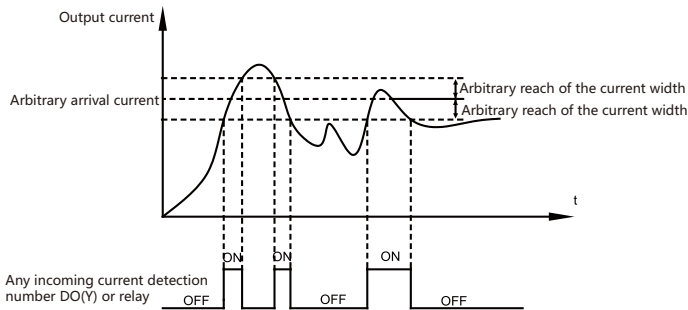


Figure 5-23 Schematic diagram of arbitrary arrival current detection

| Parameter | Name               | Range   | Default value | Change |
|-----------|--------------------|---------|---------------|--------|
| P08.57    | Module temperature | 0-200°C | 75            |        |

When the inverter radiator reaches the temperature, the DO (Y) output of the frequency converter "module temperature reaches" ON signal.

| Parameter | Name         | Range     | Default value | Change |
|-----------|--------------|-----------|---------------|--------|
| P08.58    | Running time | 0-6500min | 0             |        |

When the running time of this start-up reaches this time, the inverter multi-function digital DO (Y) outputs the "run-time arrival" ON signal.

| Parameter | Name                     | Range     | Default value | Change |
|-----------|--------------------------|-----------|---------------|--------|
| P08.59    | Cumulative power on time | 0-6500min | 0             |        |

It is used to set the running time of frequency converter.

When the total power up time reaches the set running time, the inverter multi-function digital DO (Y) outputs the ON signal.

## P09 Fault and protection parameters

| Parameter | Name  | Range  | Default value | Change |
|-----------|---|--------|---------------|--------|
| P09.00    | Limited value prevent over current losing speed | 0-300% | 200           |        |

This parameter is used to set the upper limit of the motor current, and 100% corresponds to the rated current of the P01.04 motor. When the output current exceeds the P09.00 motor current limit, the frequency converter will report the A.25 warning and limit the current through the P09.01 current controller.

Note: if the setting value is changed in parameter P01.01-P01.05, this parameter will not be automatically reset to the factory setting value.

| Parameter | Name                            | Range    | Default value | Change |
|-----------|---------------------------------|----------|---------------|--------|
| P09.01    | Current controller 1 proportion | 0-300%   | 100           |        |
| P09.02    | Current controller 1 integral   | 0.005-2s | 0.02          |        |

The inverter has two PI current controllers, which will be enabled when the output current is higher than the upper limit of p09.00. The current controller 1 controls the current by reducing the output frequency, and the current controller 2 controls the output current by controlling the output voltage. In general, it is recommended to use current controller 1.

By setting the proportional coefficient and integral time of the current controller, the dynamic response characteristics of the current controller can be adjusted.

Increasing the proportional gain and decreasing the integration time can accelerate the dynamic response of the current controller. However, too much proportional gain or too little integration time may make the current control unstable.

Note: when the current controller is activated, the inverter can only be stopped by setting a digital input terminal to 2 free running stop or 3 reset and free running stop. Unless the frequency converter is no longer near the current limit, any signal on the digital input terminal will be invalid.

Since the frequency converter is set to run freely and stop, the motor will not use the deceleration time. If you want to perform the fast stop, please use it together with the external electro-mechanical system equipped in the application to realize the mechanical braking control function.

| Parameter | Name                                     | Range   | Default value | Change |
|-----------|--|---------|---------------|--------|
| P09.04    | Torque limited when motor on             | 0-1000% | 150           |        |
| P09.05    | Torque limited when generate electricity | 0-1000% | 150           |        |

This set of parameters is used to set the torque limit on the shaft to protect the mechanical system. 100% corresponding to the rated torque of the motor. When the motor shaft torque exceeds P09.04 and P09.05 setting value, the frequency converter will report A.12 warning.

| Parameter | Name                                    | Range | Default value | Change |
|-----------|---|-------|---------------|--------|
| P09.08    | Over current losing speed alarm delayed | 0-60s | 60            |        |

When the inverter reaches the limit of A.25 current and reaches the P09.08 current limit protection time, the inverter will report the E.25 current limit fault. Set to 60 to turn off the fault.

| Parameter | Name                                    | Range | Default value | Change |
|-----------|---|-------|---------------|--------|
| P09.09    | Torque reached to limited alarm delayed | 0-60s | 60            |        |

When the inverter reaches A.24 torque limit and the duration reaches P09.09 torque limit protection time, the inverter reports E.24 torque limit failure. Set to 60 to turn off the fault.

| Parameter | Name             | Range  | Default value | Change |
|-----------|------------------|--|---------------|--------|
| P09.20    | Braking function | 0:Invalid<br>1:Resistance braking<br>2:Alternating braking | 0             |        |

0: Invalid

1: Resistance braking

The resistance braking transforms the power generation energy in the deceleration process into the heat energy of the braking resistance, so as to realize the rapid deceleration. It is suitable for high inertia load braking or frequency fast braking

For the built-in brake unit, the P09.21=1 must be set up, and the resistance braking will take effect. The colleagues need to set the external brake resistor value at P09.21. For external brake units, the resistance is braking, and the P09.20 holds the default value of 0.

2: Alternating braking

By increasing the magnetic flux of the motor, part of the energy in the deceleration process is consumed on the motor stator, so as to achieve rapid deceleration. After choosing AC motor braking, the deceleration time can be reduced, but the current will increase during deceleration, and the motor heating will increase. It is suitable for heavy inertia load braking with less frequent braking. The effect of AC braking is not as good as resistance braking. AC braking only works in vector mode.

| Parameter | Name   | Range                           | Default value | Change               |
|-----------|--|---------------------------------|---------------|----------------------|
| P09.21    | The resistance braking threshold depends on the voltage specifications | Depend to voltage specification |               | Depends on the model |

After braking with resistance, when the DC bus voltage of frequency converter reaches the threshold voltage of resistance braking, the built-in braking unit is on, and the energy can be released quickly through the braking resistance, so as to realize fast braking and shutdown. This value allows the brake effect of the built-in brake unit to be adjusted.

The following table shows the setting range and factory value of Resistance Braking threshold voltage.

| Grid type | Setting range | Factory value |
|-----------|---------------|---------------|
| 200~240V  | 360~395V      | 390V          |
| 380~440V  | 680~780V      | 700V          |
| 440~480V  | 750~780V      | 770V          |

Note: this parameter has no effect on the external brake unit.

## Detailed description of the parameters 200 Series Inverter Operation Guide

| Parameter | Name   | Range                           | Default value | Change               |
|-----------|--|---------------------------------|---------------|----------------------|
| P09.24    | The over-voltage stall prevent threshold depends on the specifications | Depend to voltage specification |               | Depends on the model |

When the converter DC bus voltage reaches the overvoltage control threshold voltage, the over voltage control begins to work. Through this value, the starting time of over voltage control can be adjusted.

The following table shows the setting range and factory value of Resistance Braking threshold voltage.

| Grid type | Setting range | Factory value |
|-----------|---------------|---------------|
| 200~240V  | 360~395V      | 395V          |
| 380~440V  | 680~780V      | 710V          |
| 440~480V  | 750~780V      | 780V          |

| Parameter | Name                 | Range                               | Default value | Change |
|-----------|----------------------|-------------------------------------|---------------|--------|
| P09.25    | Over voltage control | 0:Invalid<br>2:Model 1<br>3:Model 2 | 2             |        |

Over voltage control (OVC) can reduce the risk of converter tripping due to the increase of bus voltage caused by load feedback energy.

0: Invalid

2: Mode 1

3: Mode 2

It is suitable for over voltage control under extremely short deceleration:

Note: over voltage control only works when mode 1 or mode 2 is selected. By default, because the Resistance Braking threshold voltage is lower than the over voltage control threshold voltage, the resistance braking takes effect first. If the set over voltage control threshold voltage is lower than the Resistance Braking threshold voltage, the over voltage control will work first.

| Parameter | Name  | Range     | Default value | Change |
|-----------|---|-----------|---------------|--------|
| P09.26    | Over voltage control integral coefficient   | 0.01-0.1s | 0.05          |        |
| P09.27    | Over voltage control proportion coefficient | 0-200%    | 100           |        |

Parameters p09.26 and p09.27 are PI controller parameters of overvoltage control, which work when DC bus voltage of inverter is higher than overvoltage control threshold voltage. By setting different proportional gain and integration time, the dynamic response characteristics of overvoltage controller can be adjusted. Increasing the proportional gain and decreasing the integration time can accelerate the dynamic response of the over-voltage controller. However, too large proportional gain or too small integration time may make the overvoltage control unstable. Generally, no adjustment is required.

Note: parameters P09.26 and P09.27 are valid only in P09.25 overvoltage control select mode 1(2) or mode 2(3).

| Parameter | Name                                     | Range   | Default value | Change |
|-----------|--|---------|---------------|--------|
| P09.28    | Alternating braking integral coefficient | 1.0-2.0 | 1.4           |        |

The larger the value of this parameter, the faster the AC braking response, but too high setting will make the controller unstable.

Note: generally no adjustment is required.

| Parameter | Name                                   | Range  | Default value | Change |
|-----------|--|--------|---------------|--------|
| P09.29    | Maximum current of alternating braking | 0-150% |               | 100    |

The maximum current allowed in deceleration process when AC braking is used to avoid overheating of motor bypass resistance. This value is a percentage of the rated current of the motor. The larger the ratio is, the stronger the AC braking effect is, but the greater the motor heating is.

| Parameter | Name                   | Range         | Default value | Change |
|-----------|------------------------|---------------|---------------|--------|
| P09.40    | Motor phases detection | 0:Off<br>1:On | 1             |        |

The lack of phase of motor will lead to the decrease of motor torque and the risk of motor overheating. It is recommended to turn off the motor open phase protection in case of short acceleration and deceleration time, heavy load or motor power far less than the inverter power. In these two cases, the inverter can protect the motor through over-current protection even if the phase loss really occurs.

| Parameter | Name                   | Range  | Default value | Change |
|-----------|------------------------|--|---------------|--------|
| P09.41    | Power imbalance option | 0:Failure stop<br>1:Warning<br>2:Invalid<br>4:Warning mid-sensitivity<br>5:Failure stop mid-sensitivity<br>6:Failure stop high-sensitivity | 0             |        |

This parameter is used to set the response action of the inverter when the input power supply is out of phase. The detection of the input power by the inverter depends on the load. In order to meet the needs of different customers for the sensitivity of open phase detection; This parameter sets different sensitivity options.

0: Failure stop

When the inverter detects the missing phase of the input power, it sends out the E.12 fault and stops.

1: Warning

When the inverter detects the missing phase of the input power, it sends out the A.12 warning and continues to run.

Option 0-1, the sensitivity of the phase loss detection method is low, even if the input power supply is seriously unbalanced, if the load remains unchanged, the inverter can still bear the load output, and the inverter will not report the phase loss warning or fault, which will not cause damage to the inverter and motor. Only when the load is large and beyond the range of the inverter, the phase loss warning or fault will be reported.

2: Invalid

When the inverter detects that the input power supply is lack of phase, it will not take any action and continue to run. Caution is required to select this.

4: Warning mid-sensitivity

When the inverter detects the missing phase of the input power, it sends out the E.12 fault and stops.

5: Failure stop mid-sensitivity

When the inverter detects the missing phase of the input power, it sends out the A.12 warning and continues to run.

Option 4-5, the phase missing detection method adopted is of medium sensitivity, and a phase shortage warning or fault will be reported in case of low frequency and heavy load or light high frequency load.

6: Failure stop high-sensitivity

When the inverter detects the missing phase of the input power, it sends out the E.12 fault and stops.

In option 6, the phase loss detection method is very sensitive, and can be detected immediately in case of phase loss. But there is little risk of false alarm (generally occurs in the presence of other abnormalities in the power grid or frequency converter frequent over-current protection).

| Parameter | Name                      | Range   | Default value | Change |
|-----------|---------------------------|---|---------------|--------|
| P09.42    | Voltage net drop function | 0:Invalid<br>1:Speed cut<br>2:Speed cut failure<br>3:Free revolve stop motor<br>4:Instantaneous power lost non-stop<br>5:Instantaneous power lost non-stop failure<br>6:Failure | 0             |        |

This parameter is used in the case of an instantaneous power failure or a sudden decrease in the main power supply (as judged by P09.34).

0: Invalid

The inverter will not compensate for the interruption of the main power supply. The DC bus voltage will drop rapidly and lose control of the motor in the range of milliseconds to seconds.

1: Speed cut

When the frequency converter decelerates, the output frequency will always obey the motor speed. When the power supply is restored, the output frequency will accelerate the motor to the reference speed. If the power grid is interrupted for a long time, the deceleration function may reduce the output frequency to 0Hz, and after the power supply of the power grid is restored, it will accelerate from 0Hz to the previous reference value through normal acceleration. If the energy in the DC circuit disappears before the motor decelerates to zero, the motor will stop inertia.

2: Speed cut failure

Similar to option 1, the difference is if the deceleration to 0Hz, the frequency converter will jump off (A.95 fault), regardless of whether the main power is restored.

3: Free revolve stop motor

The frequency converter performs free operation and stops, and frequency tracking starts when the power grid is restored.

4: Instantaneous power lost non-stop

When the inverter detects the missing phase of the input power, it sends out the E.12 fault and stops.

5: Instantaneous power lost non-stop failure

When the inverter detects the missing phase of the input power, it sends out the E.12 warning and continues to stop.

Option 4-5. The phase failure detection method adopted is of medium sensitivity. In case of low frequency and heavy load, or high frequency load is light, phase failure warning or fault will be reported.

6: Failure

When the inverter detects the missing phase of the input power, it sends out the E.12 fault and stops.

In option 6, the phase loss detection method is very sensitive, and can be detected immediately in case of phase loss. But there is little risk of false alarm (generally occurs in the presence of other abnormalities in the power grid or frequency converter frequent over-current protection).

| Parameter | Name                                  | Range               | Default value        | Change |
|-----------|---------------------------------------|---------------------|----------------------|--------|
| P09.43    | Judge voltage from power grid failure | 100-800V (Reserved) | Depends on the model |        |

When the DC bus voltage is lower than this parameter set, the frequency converter operates according to P09.42.

| Parameter | Name                             | Range   | Default value | Change |
|-----------|----------------------------------|---|---------------|--------|
| P09.50    | Motor overload protection option | 0:Prohibition<br>1:Warning after motor overload<br>2:Alarm after motor overload | 0             |        |
| P09.51    | Motor Overload Protection Factor | 0.2-60  | 1             |        |

1: Under the condition that the motor operating current reaches 175% of the rated current of the motor, report the motor overload after 2 minutes of continuous operation (E.45);

Under the condition that the motor operating current reaches 115% of the motor's rated current, a motor overload (E.45)i is reported after 80 minutes of continuous operation

For example: Rated motor current 100A if FB-01 is set to 1.00, then when the motor running current reaches 125% (125A) of 100A, after 40 minutes, the inverter will report motor overload fault; If FB-01 is set to 1.20; Then, when the motor running current reaches 125% (125A) of 100A, lasting 40x1.2 =48 minutes, the inverter reported motor overload fault; The maximum overload time is 80 minutes, the minimum overload time is 10 seconds

2: Motor overload protection adjustment example: the motor is required to run for 2 minutes in the case of 150% of the motor current to report overload, through the motor overload graph to know, 150% (I) of the current is located in the current range of 145% (I1) and 155% (I2), 145% of the current 6 minutes (T1) overload, 155% of the current 4 minutes (T2) overload, you can get the default setting of 150% of the motor rated current 5 minutes overload calculation is as follows:

$$T = T1 + (T2 - T1) * (I - I1) / (I2 - I1) = 4 + (6 - 4) * (150\% - 145\%) / (155\% - 145\%) = 5(\text{minute})$$

Thus, it can be concluded that the motor is required to report overload in 150% motor current for 2 minutes and the motor overload protection gain

$$F9-01 = 2/5 = 0.4$$

Note: The user needs to correctly set the value of F9-01 according to the actual overload capacity of the motor, the parameter setting is too large to easily cause motor overheating damage and the inverter is not timely alarm protection danger!

3: Motor overload early warning coefficient indicates: When the motor overload detection level reaches the set value of this parameter, the multi-function output terminal DO or fault relay outputs the electric shock overload pre-alarm signal, which is calculated according to the percentage of time that the motor continues to run under an overload point without reporting overload fault. For example, when the motor overload protection gain is set to 1.00, the motor overload warning coefficient is set to 80%, such as the motor current reaches 145% of the rated motor current for 4.8 minutes (80% x6 minutes), the multi-function output terminal DO or fault relay output motor overload warning signal.

| Parameter | Name  | Range   | Default value | Change |
|-----------|---|---------|---------------|--------|
| P09.52    | Motor Overheating Protection Warning Factor | 50-100% | 80            |        |

This function is used to give the control system an early warning signal through DO (Y) before the overload fault is protected. The warning signal coefficient is used to determine the degree of warning before motor overload protection. The larger the value is, the smaller the warning advance is. When the accumulative output of the inverter output current is larger than the overload inverse time curve and the product of P09.52, the inverter multi-function digital DO (Y) outputs the "motor overload warning" ON signal.

| Parameter | Name               | Range                  | Default value | Change |
|-----------|--------------------|------------------------|---------------|--------|
| P09.61    | Malfunction locked | 0:Unlocked<br>1:Locked | 0             |        |

The fault indicates that the frequency converter has exceeded the set limit for some reason. After the fault is sent, the frequency converter will trip off and must be reset before it can run again.

The fault that has a great influence on the inverter will be locked after the inverter trips. This kind of fault is called the trip lock fault. The fixed type fault of trip lock has additional protection. By default, the fault can be reset only after being powered on again. You can set the parameter P09.61=0 to make the tripping and fixing fault happen, and you can reset it without power down. However, there is a risk of accidents. Before setting up, please be familiar with the system where the inverter is located, and do well in protective measures.

If the fault belongs to trip lock type, please refer to the fault table.

| Parameter | Name                             | Range   | Default value | Change |
|-----------|----------------------------------|---|---------------|--------|
| P09.62    | Actions when converter breakdown | 0:Display fault and Stop motor<br>1:Sop motor after warning | 1             |        |

This parameter is used to set the response action of frequency converter in case of output short circuit, over-current, grounding fault, over-current and other faults.

0: Display fault and Stop motor

When the frequency converter detects the above fault, it sends out E.XX fault indication and stops.

1: Sop motor after warning

When the frequency converter detects the above fault, A.xx warning indication is issued, the colleague turns off the PWM output, and then tries to turn on PWM normally several times. If the fault still cannot be eliminated, send out E.xx fault indication and stop motor.



| Parameter | Name                    | Range   | Default value | Change |
|-----------|-------------------------|---|---------------|--------|
| P09.70    | Time of automatic reset | 0:Manual reset<br>1:Automatic reset 1 time<br>2:Automatic reset 2 times<br>3:Automatic reset 3 times<br>4:Automatic reset 4 times<br>5:Automatic reset 5 times<br>6:Automatic reset 6 times<br>7:Automatic reset 7 times<br>8:Automatic reset 8 times<br>9:Automatic reset 9 times<br>10:Automatic reset 10 times<br>11:Automatic reset 15 times<br>12:Automatic reset 20 times<br>13:Automatic reset unlimited times | 0             |        |

0: Manual reset

After the frequency converter fails, the user shall power down and power on after trouble -shooting. Reset by pressing the off button key or the "reset" function of digital input terminal.

1-10: After the fault occurs, it will reset automatically for 1-10 times.

11: After the fault occurs, it will reset automatically for 15 times.

12: After the fault occurs, it will reset automatically for 20 times.

13: After the fault occurs, it will automatically reset infinitely

When it is set to 1-13, the frequency converter will reset automatically after the fault is reported. If the reset is successful and the operation signal is invalid, the frequency converter will start to run automatically. For 1-12, if the fault cannot be eliminated after the automatic reset of the set number of times, the inverter will maintain the fault state. At this time, the user needs to remove the fault, power down and power on to reset the fault.

Note: be careful when setting it to 13. This setting may cause the inverter to reset all the time.

| Parameter | Name                 | Range  | Default value | Change |
|-----------|----------------------|--------|---------------|--------|
| P09.71    | Automatic reset time | 0-600s | 10            |        |

Set the time from the warning or fault of the inverter to the automatic reset. During the automatic reset, the inverter remains stopped. This parameter is valid when parameter p09.70 is set to 1-13.

### P10 Failure Record Parameter

| Parameter | Name             | Range  | Default value | Change |
|-----------|------------------|--|---------------|--------|
| P10.00    | LCP menu options | 1:Motor voltage<br>2:Motor rotational speed<br>4:DC voltage<br>8:Temperature<br>16:Process PID feedback digital<br>32:Counter A<br>64:Counter B<br>128:Input VI<br>256:Input AI<br>512:Input pulse<br>1024:Output pulse<br>2048:Custom physical quantities (reserved)<br>4096:Output power<br>8192:Process PID given digital | 6             |        |

By default, the inverter operation panel only displays the output frequency, reference value and motor current (switched by shift key ◀◀).

This parameter can choose to display a variety of other state parameters of the inverter, and each state parameter corresponds to a weight, which is set to this parameter after adding the weight.

For example, set the display contents: operating frequency, target frequency, DC voltage, motor voltage, detection current, actual speed, process PID feedback value, then the corresponding parameters are set as follows:

$P10.00 = 23 (1 + 2 + 4 + 16)$  (motor voltage + motor speed + DC voltage + process PID feedback value).

| Parameter | Name       | Range                | Default value | Change |
|-----------|------------|----------------------|---------------|--------|
| P10.01    | RUN button | 0:Invalid<br>1:Valid | 1             |        |

0: Invalid: cannot enter the run state by pressing the run key.

1: Valid: enter the run state by pressing the run key.

| Parameter | Name       | Range                                 | Default value | Change |
|-----------|------------|---------------------------------------|---------------|--------|
| P10.02    | OFF button | 0:Invalid<br>1:Valid<br>2:Reset valid | 1             |        |

0: Invalid: "OFF" is invalid on the panel.

1: Valid: "OFF" can stop fault and reset fault on the panel.

2: Reset valid: "OFF" only can reset fault but stop on the panel.

| Parameter | Name             | Range                  | Default value | Change |
|-----------|------------------|------------------------|---------------|--------|
| P10.04    | Parameter locked | 0:Invalid<br>1:Protect |               |        |

This function is used to prevent non debugging personnel from modifying parameters.

0: Invalid

1: Valid

Except this parameter can be changed, other parameters cannot be changed;

Note: parameter locking is only valid for panel modification parameters, but not for communication modification parameters.

| Parameter | Name           | Range   | Default value | Change |
|-----------|----------------|---------|---------------|--------|
| P10.10    | Copy parameter | 0-9999d |               |        |

Check the power on flag of the inverter. After power on, start timing. When power is off, it will be saved automatically. Add 1 every 24 hours, and it cannot be reset.

| Parameter | Name                   | Range      | Default value | Change |
|-----------|------------------------|------------|---------------|--------|
| P10.11    | Hours of running       | 0-60000h   |               |        |
| P10.12    | Total power            | 0-65535kwh |               |        |
| P10.13    | Time of electricity on | 0-65535    |               |        |
| P10.14    | Number of overheating  | 0-65535    |               |        |
| P10.15    | Number of over voltage | 0-65535    |               |        |

| Parameter | Name                  | Range                 | Default value | Change |
|-----------|-----------------------|-----------------------|---------------|--------|
| P10.16    | Number of reset power | 0:No reset<br>1:Reset |               |        |

This parameter is used to reset P10.12 power consumption.

Note: this parameter cannot be modified by communication.

| Parameter | Name                   | Range                 | Default value | Change |
|-----------|------------------------|-----------------------|---------------|--------|
| P10.17    | Hours of reset running | 0:No reset<br>1:Reset |               |        |

This parameter is used to reset P10.11 operating time.

Note: this parameter cannot be modified by communication.

| Parameter | Name                           | Range | Default value | Change |
|-----------|--------------------------------|-------|---------------|--------|
| P10.35    | Power-up time at first failure |       |               |        |

Current power-on time of the last fault.

| Parameter | Name                      | Range | Default value | Change |
|-----------|---------------------------|-------|---------------|--------|
| P10.36    | Run time on first failure |       |               |        |

Current running time of the last failure.

| Parameter | Name                        | Range | Default value | Change |
|-----------|-----------------------------|-------|---------------|--------|
| P10.40    | Frequency of second failure |       |               |        |

Frequency at the time of the last failure.

| Parameter | Name                      | Range | Default value | Change |
|-----------|---------------------------|-------|---------------|--------|
| P10.41    | Current at second failure |       |               |        |

Current at the time of last failure.

| Parameter | Name                      | Range | Default value | Change |
|-----------|---------------------------|-------|---------------|--------|
| P10.42    | Voltage at second failure |       |               |        |

Bus voltage at the time of last failure.

| Parameter | Name                         | Range | Default value | Change |
|-----------|------------------------------|-------|---------------|--------|
| P10.43    | DI during the second failure |       |               |        |

The status of the digital input terminals at the time of the most recent failure, in the following order:

|          |        |        |        |        |        |        |        |        |        |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| BIT9     | BIT8   | BIT7   | BIT6   | BIT5   | BIT4   | BIT3   | BIT2   | BIT1   | BIT0   |
| D10(X10) | D9(X9) | D8(X8) | D7(X7) | D6(X6) | D5(X5) | D4(X4) | D3(X3) | D2(X2) | D1(X1) |

When the input terminal is ON, its corresponding two-level system is 1, and OFF is 0. All DI (X) states are displayed as decimal numbers.

| Parameter | Name                                      | Range                 | Default value | Change |
|-----------|---|-----------------------|---------------|--------|
| P10.20    | First failure type refer to failure form  | Refer to Failure list |               |        |
| P10.21    | Second failure type refer to failure form | Refer to Failure list |               |        |
| P10.22    | Third failure type refer to failure form  | Refer to Failure list |               |        |

Record the latest three fault types of frequency converter, 0 is no fault. For the possible causes and solutions of each fault code, please refer to the relevant fault description.

| Parameter | Name                    | Range | Default value | Change |
|-----------|-------------------------|-------|---------------|--------|
| P10.30    | First failure frequency |       |               |        |

Frequency of last failure.

| Parameter | Name                  | Range | Default value | Change |
|-----------|-----------------------|-------|---------------|--------|
| P10.31    | First failure current |       |               |        |

Current at last fault.

| Parameter | Name                  | Range | Default value | Change |
|-----------|-----------------------|-------|---------------|--------|
| P10.32    | First failure voltage |       |               |        |

Bus voltage at last fault.

| Parameter | Name             | Range | Default value | Change |
|-----------|------------------|-------|---------------|--------|
| P10.33    | First failure DI |       |               |        |

The status of all input terminals in the latest fault is as follows:

|          |         |         |         |         |         |         |         |         |         |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| BIT9     | BIT8    | BIT7    | BIT6    | BIT5    | BIT4    | BIT3    | BIT2    | BIT1    | BIT0    |
| D10(X10) | D19(X9) | D18(X8) | D17(X7) | D16(X6) | D15(X5) | D14(X4) | D13(X3) | D12(X2) | D11(X1) |

When the input terminal is ON, its corresponding two level system is 1, OFF is 0, and the state of all DI (X) is converted to decimal number display.

| Parameter | Name             | Range | Default value | Change |
|-----------|------------------|-------|---------------|--------|
| P10.34    | First failure DO |       |               |        |

The status of all input terminals in the latest fault is as follows:

|      |         |      |      |      |
|------|---------|------|------|------|
| BIT4 | BIT3    | BIT2 | BIT1 | BIT0 |
| DO2  | DO1(Y1) | REL2 | REL1 | FMP  |

When the input terminal is ON, its corresponding two level system is 1, OFF is 0, and the state of all DI (X) is converted to decimal number display.

| Parameter | Name              | Range | Default value | Change |
|-----------|-------------------|-------|---------------|--------|
| P10.44    | Second failure DO |       |               |        |

The status of all input terminals in the latest fault is as follows:

|      |         |      |      |      |
|------|---------|------|------|------|
| BIT4 | BIT3    | BIT2 | BIT1 | BIT0 |
| DO2  | DO1(Y1) | REL2 | REL1 | FMP  |

When the input terminal is ON, its corresponding two level system is 1, OFF is 0, and the state of all DI (X) is converted to decimal number display.

| Parameter | Name                            | Range | Default value | Change |
|-----------|---------------------------------|-------|---------------|--------|
| P10.45    | Power on time of second failure |       |               |        |

Current power on time of the latest fault.

| Parameter | Name                           | Range | Default value | Change |
|-----------|--------------------------------|-------|---------------|--------|
| P10.46    | Running time of second failure |       |               |        |

Current running time of the latest failure.

| Parameter | Name                    | Range | Default value | Change |
|-----------|-------------------------|-------|---------------|--------|
| P10.50    | Third failure frequency |       |               |        |

Frequency of last failure.

| Parameter | Name                  | Range | Default value | Change |
|-----------|-----------------------|-------|---------------|--------|
| P10.51    | Third failure current |       |               |        |

Current at last fault.

| Parameter | Name                  | Range | Default value | Change |
|-----------|-----------------------|-------|---------------|--------|
| P10.52    | Third failure voltage |       |               |        |

Bus voltage at last fault.

| Parameter | Name             | Range | Default value | Change |
|-----------|------------------|-------|---------------|--------|
| P10.53    | Third failure DI |       |               |        |

The status of digital input terminal in the latest fault, in the order of.

|          |         |         |         |         |         |         |         |         |         |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| BIT9     | BIT8    | BIT7    | BIT6    | BIT5    | BIT4    | BIT3    | BIT2    | BIT1    | BIT0    |
| DI0(X10) | DI9(X9) | DI8(X8) | DI7(X7) | DI6(X6) | DI5(X5) | DI4(X4) | DI3(X3) | DI2(X2) | DI1(X1) |

When the input terminal is ON, its corresponding two level system is 1, OFF is 0, and the state of all DI (X) is converted to decimal number display.

| Parameter | Name             | Range | Default value | Change |
|-----------|------------------|-------|---------------|--------|
| P10.54    | Third failure DO |       |               |        |

The status of all input terminals in the latest fault, in the order of.

|      |         |      |      |      |
|------|---------|------|------|------|
| BIT4 | BIT3    | BIT2 | BIT1 | BIT0 |
| DO2  | DO1(Y1) | REL2 | REL1 | FMP  |

When the input terminal is ON, its corresponding two level system is 1, OFF is 0, and the state of all DI (X) is converted to decimal number display.

| Parameter | Name                           | Range | Default value | Change |
|-----------|--------------------------------|-------|---------------|--------|
| P10.55    | Power on time of third failure |       |               |        |

Current power on time of the latest fault.

| Parameter | Name                          | Range | Default value | Change |
|-----------|-------------------------------|-------|---------------|--------|
| P10.56    | Running time of third failure |       |               |        |

Current running time of the latest fault.

### P1 1 Data Monitoring Parameter

| Parameter | Name             | Range | Default value | Change |
|-----------|------------------|-------|---------------|--------|
| P11.00    | Frequency output |       |               |        |
| P11.01    | Set digital      |       |               |        |
| P11.02    | DC voltage       |       |               |        |
| P11.03    | Motor voltage    |       |               |        |
| P11.04    | Motor current    |       |               |        |

| Parameter | Name   | Range | Default value | Change |
|-----------|--|-------|---------------|--------|
| P11.05    | Frequency output   |       |               |        |
| P11.06    | Torsional moment output %                                      |       |               |        |
| P11.07    | DI input condition   |       |               |        |
| P11.08    | DO output condition  |       |               |        |
| P11.09    | VI digital input   |       |               |        |
| P11.10    | AI digital input   |       |               |        |
| P11.11    | AI digital input 3   |       |               |        |
| P11.12    | Counter A  |       |               |        |
| P11.13    | Counter B  |       |               |        |
| P11.14    | Motor rotational speed   |       |               |        |
| P11.15    | PID reference value  |       |               |        |
| P11.16    | Feedback value   |       |               |        |
| P11.17    | PLC stage  |       |               |        |
| P11.18    | Pulse frequency input  |       |               |        |
| P11.19    | Frequency feedback (Hz)  |       |               |        |
| P11.20    | Rest of running time   |       |               |        |
| P11.21    | VI voltage before emended                                      |       |               |        |
| P11.22    | AI voltage before emended                                      |       |               |        |
| P11.23    | AI voltage before emended 3                                    |       |               |        |
| P11.25    | Current time of power on                                       |       |               |        |
| P11.26    | Total time of power on   |       |               |        |
| P11.27    | Current running time   |       |               |        |
| P11.29    | Set communication value  |       |               |        |
| P11.30    | Coder feedback speed P11.31 display main frequency X           |       |               |        |
| P11.31    | Display main frequency X                                       |       |               |        |
| P11.32    | Display main frequency Y                                       |       |               |        |
| P11.34    | Synchronous motor rotor Angle<br>P11- 35 converter temperature |       |               |        |
| P11.35    | Inverter Temperature   |       |               |        |



## Chapter 7 Fault alarm and treatment

### 7.1 Fault list

200 series inverter fault is divided into two types: warning and fault. They indicate in code on the inverter panel.

The warning indicates that the working state of the inverter is close to the design limit due to some reason, but it can still continue to work. If the cause no longer exists, the warning will disappear; If the cause is persistent or even more serious, the inverter will report a fault. When the warning is generated, the panel displays "A.XX" (XX refers to the figure, as shown in the table below).

The fault indicates that the frequency converter has exceeded the design limit for some reason. After the fault occurs, the frequency converter trips and must be reset before it can run again. When the fault occurs, the panel displays "E.XX (XX refers to the number, see the table below)".

If the fault has a great influence on the frequency converter, the frequency converter will be locked after tripping. This kind of fault is called tripping locking fault. The trip lock fault has additional protection. By default, the fault must be powered off before it is reset, and it can be reset after it is powered on again.

| Warning | Fault | Fault name                  | Treatment  |
|---------|-------|-----------------------------|--|
| -       | E.01  | Output short circuit        | Check the wiring and insulation of the motor   |
| A.02    | E.02  | Acceleration over current   | 1.Increase acceleration time<br>2.Manual torque lifting<br>3.Remove peripheral faults<br>4.Carry out self-learning of motor parameters<br>5.Select speed tracking start or start after motor stop<br>6.Cancel sudden loading<br>7.Choose a converter with higher power level |
| A.03    | E.03  | Deceleration over current   | 1.Remove peripheral faults<br>2.Carry out self-learning of motor parameters<br>3.Increase deceleration time<br>4.Cancel sudden loading<br>5.Add brake unit and resistor  |
| A.04    | E.04  | Constant speed over current | 1.Remove peripheral faults<br>2.Carry out self-learning of motor parameters<br>3.Cancel sudden loading<br>4.Use bigger power model   |
| A.05    | E.05  | Acceleration over voltage   | 1.Check the power supply and adjust the voltage to normal<br>2.Increase the acceleration time appropriately<br>3.Cancel sudden loading<br>4.Identification of motor parameters or selection of larger frequency converter  |
| A.06    | E.06  | Deceleration over voltage   | 1.Check the power supply and adjust the voltage to normal<br>2.Cancel external power or add braking unit and resistance<br>3.Increase acceleration time<br>4.free stop   |
| A.07    | E.07  | Constant speed over voltage | 1.Check the power supply and adjust the voltage to normal<br>2.Cancel sudden loading or add braking unit and resistor<br>3.Identification of motor parameters or selection of larger frequency converter   |
| A.09    | E.09  | Under voltage               | Ensure the normal operation of power grid  |

| Warning | Fault | Fault name   | Treatment  |
|---------|-------|--|--|
| A.10    | E.10  | Overload   | 1.Choose higher power products<br>2.Set correctly according to the motor nameplate   |
| A.12    | E.12  | Input phase loss   | Check the connection of the input power line   |
| -       | E.13  | Motor phase loss   | 1.Check motor wiring<br>2.Check motor  |
| A.14    | E.14  | IGBT temperature too high                                    | 1.Clean fan duct<br>2.Replace the cooling fan  |
| -       | E.16  | Internal alarm   | Return to factory for maintenance  |
| -       | E.19  | Motor parameter self learning failure                        | Correct setting of motor name plate parameters   |
| -       | E.23  | Ground alarm   | 1.Motor short circuit to ground<br>2.Replace the motor wire or motor   |
| A.24    | E.24  | Torque limit   | Set motor parameters correctly or adjust P09.04 parameters.  |
| A.25    | E.25  | Current limit  | Set motor parameters correctly or adjust P09.05 parameters.  |
| A.27    | E.27  | External alarm   | Correct set the terminals parameters   |
| A.31    | E.31  | Feedback alarm   | Check feedback or feedback source  |
| A.45    | E.45  | Motor overload   | 1.choose bigger power model<br>2.correctly set parameter based on motor parameter  |
| A.46    | E.46  | High pressure alarm  | Check the water pressure or pressure gaug  |
| A.47    | E.47  | Low pressure alarm   | Check for air and water leakage  |
| -       | E.48  | Fault that Cumulative time to arrive                         | Use parameter initialization function to record information clearly  |
|         | E.88  | Abnormal communication between control board and drive board | Return to factory for maintenance  |
| -       | E.89  | Button disable   | Set the P10.01.02.03 parameters correctly according to the actual situation  |
|         | E.91  | Parameter error  | The parameters are not set correctly according to the regulations  |
|         | E.92  | Parameter over limit   | The parameters are not set correctly   |
| A.95    | E.95  | Power alarm  | Check grid voltage   |
| A.96    | E.96  | Disconnection alarm  | Check whether the terminal analog wiring or signal is normal   |
| A.97    | E.97  | Communication control word timeout                           | 1.Check the upper computer program<br>2.Check the communication cable<br>3.Set communication parameters correctly<br>3.Using shielded wire |
| -       | E.98  | Restore factory settings                                     | Press“STOP” button to reset.   |
| -       | E.99  | Turn on the brake resistor brake                             | Set P00.72 correctly according to actual situation   |
| -       | E.100 | Drive voltage alarm  | Reserved   |
| -       | E.101 | Locked rotor   | Locked rotor of synchronous motor  |

If the above operation is not solved, please find technical support.

## Chapter 8 Daily maintenance

Due to the influence of environmental temperature, humidity, salt spray, dust and vibration, the internal components of the inverter will be aging, leading to the potential failure of the inverter or reducing the service life of the inverter. Therefore, in the process of use and storage, the inverter should be maintained daily and regularly.

### 8.1 Daily inspection and maintenance

Daily inspection items:

1. Is there any abnormal change of sound during motor operation;
2. Does the sound vibrate when the motor is running;
3. Whether the installation environment of frequency converter changes;
4. Whether the cooling fan of frequency converter works normally;
5. Is the frequency converter overheated;
6. Inverter output voltage, output current, output frequency, monitoring display is greater than the usual value;
7. Is there any dust, scrap iron and corrosive liquid inside the inverter.

### 8.2 Regular maintenance

According to the working conditions of the environment, the user can check the inverter regularly in a short time or 3-6 months to eliminate the hidden trouble.

Note:

1. Please confirm that the inverter has been powered off and fully discharged before maintenance;
2. Do not leave metal objects such as screws, gaskets, wires and tools in the inverter, otherwise there is a risk of equipment damage;
3. It is forbidden to carry out any transformation inside the frequency converter, otherwise the normal operation of the frequency converter will be affected, and even the equipment may be damaged.

| Inspection item                                       | Measures                             |
|---|--------------------------------------|
| Is the screw of control terminal loose                | Tighten with a screwdriver           |
| Is the main circuit terminal screw loose              | Tighten with a screwdriver or sleeve |
| Is the ground terminal screw loose                    | Tighten with a screwdriver or sleeve |
| Is the mounting screw of frequency converter loose    | Tighten with a screwdriver or sleeve |
| Whether the power cable and control cable are damaged | Replace the damaged cable            |
| Is the circuit board dusty                            | Clean up                             |
| Is the air duct blocked                               | Clean up                             |

## Appendix A RS485 Communication protocol

The 200 series inverter provides RS-485 communication interface and adopts standard Modbus-RTU format protocol to carry out master slave communication. Users can realize centralized control through PC/PLC and control host computer (setting control command, operation frequency, modification of relevant function code parameters, monitoring of inverter working status and fault information, etc.) to adapt to specific application requirements.

### 1.1 Content of the protocol

The Modbus serial communication protocol defines the frame content and format of asynchronous transmission in serial communication. Including: host polling and broadcast frame, slave response frame format; The frame content of host organization includes: slave address (or broadcast address), execution command, data and error checking, etc. The slave's response uses the same structure, including action confirmation, returned data and error checking. If the slave makes an error when receiving the frame, or fails to complete the action required by the host, it will organize a fault frame as a response to the host.

### 1.2 Application mode

200 series inverter can be connected to the "single main multi slave" control network with RS-485 bus.

### 1.3 Bus structure

- 1) Interface mode: RS-485 hardware interface.
- 2) transmission mode

Asynchronous serial, half duplex transmission mode. At the same time, only one master and slave can send data and the other can receive data. In the process of serial asynchronous communication, data is sent frame by frame in the form of message.

- 3) topological structure

Single host multi slave system. The setting range of slave address is: 1-247, 0 is the broadcast address. The address of each slave in the network is unique. This is the basis of Modbus serial communication.

### 1.4 Protocol instructions

200 series inverter communication protocol is an asynchronous serial master-slave Modbus communication protocol. Only one device (host) in the network can establish the protocol (called "query / command"). Other devices (slaves) can only respond to the "query / command" of the host by providing data, or make corresponding actions according to the "query / command" of the host. Host here refers to personal computer PC, industrial equipment control or programmable logic controller PLC, etc. The host can not only communicate with one slave independently, but also release broadcast information to all slaves. For the "query / command" of the single access host, the slave must return a message (called response). For the broadcast information sent by the host, the slave does not need to feedback the response information to the host.

### 1.5 Communication frame structure

The Modbus protocol communication data format of 200 series inverter is divided into RTU (remote terminal unit) mode.

In RTU mode, the number of each byte is as follows:

Encoding system: 8 bit binary, each 8 bit frame field, contains two sixteen character characters, sixteen hexadecimal 0-9, A-F.

### 8.3 Replacement of vulnerable parts

The wearing parts of frequency converter mainly include cooling fan, electrolytic capacitor, relay or contactor, etc. its service life is closely related to the use environment and maintenance. Maintaining a good working environment is conducive to improving the service life of parts. In order to improve the overall service life of the inverter, the cooling fan, electrolytic capacitor, relay or contactor and other vulnerable parts need to be inspected daily according to the requirements in the table below. If there is any abnormality, please replace them in time.

The service life indicated in the table below is only for good service environment:

| Part                   | Service life            | Cause of damage  | Situation requiring replacement   |
|------------------------|-------------------------|--|---|
| Cooling fan            | 4~5years                | Bearing wear; Leaf aging;  | 1.Whether there are cracks in fan blades, etc;<br>2.Whether there isabnormal vibration sound during operation;  |
| Electrolytic capacitor | 4~5years                | 1.The quality of input power is poor;<br>2.The environment tempera-<br>-ture is high;<br>3.Frequent load jump;<br>4.Electrolyte aging; | 1.Whether there is liquid leakage;<br>2.Whether the safety valve has protruded;<br>3.Determination of electrostatic capacitance;<br>4.Measurement of insulation resistance; |
| Relay or contactor     | 5~10 Ten thousand times | 1.Corrosion and dust affect the contact effect;<br>2.The contact action is too frequent;   | Opening and closing failure   |

### 8.4 Storage and transportation

This product must be placed in the packing box before installation. If it is not used for the time being, please pay attention to the following items during storage:

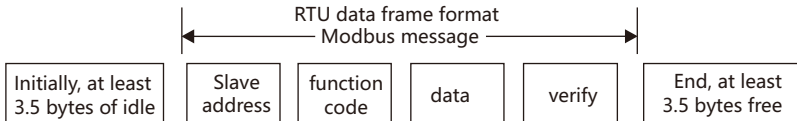
- 1 Must be placed in a dust-free, dry environment;
- 2.Storage ambient temperature:  $-25^{\circ}\text{C}\sim 60^{\circ}\text{C}$ ;
- 3.The relative humidity of storage environment is within 5% to 95%, and there is no condensation;
4. No corrosive gas or liquid in storage environment;
- 5.It's better to put it on the shelf and pack it properly.
- 6.Transportation environment temperature:  $-25^{\circ}\text{C}\sim 70^{\circ}\text{C}$ ;
- 7.The relative humidity of transportation environment is less than 95% (the ambient temperature is  $40^{\circ}\text{C}$ );

Note: it is better not to store the inverter for a long time, which will lead to the deterioration of the electrolytic capacitor. If it needs to be stored for a long time, it must be powered on once a year for at least 5 hours, and the input voltage must be slowly increased to the rated voltage value with a voltage regulator.

### 8.5 Scrapping of frequency converter

The raw materials used in the drive unit of frequency converter are recyclable, which can save energy and natural resources. Packaging materials are degradable and recyclable. Generally, all metal parts (such as steel, aluminum, copper and their alloys) can be recycled. Plastic, rubber, cardboard and other packaging materials can also be recycled. Printed circuit boards and DC capacitors should be treated selectively according to ec62635 standard. For more detailed environmental and recycling guidance, please contact us. The treatment must comply with nationality and local regulations. No burning

Data format: Start bit, 8 data bits, check bit and stop bit. The data format is described in the following table: in RTU mode, a new frame always starts with a transmission time silence of at least 3.5 bytes. The transmission time of 3.5 bytes can be easily controlled on the network where the baud rate is used to calculate the transmission rate. The data domains immediately followed by transmission are: slave address, operation command code, data and CRC check word, and each domain transfer byte is sixteen binary 0-9, A-F. Network devices always monitor the activity of communication bus. When the first domain (address information) is received, each network device confirms the byte. With the transmission of the last byte completed, there is a similar 3.5-byte transmission interval to indicate the end of this frame. After that, a new frame will be transmitted.



The information of a frame must be transmitted as a continuous data. If there is an interval of more than 3.5 bytes before the end of the whole frame transmission, the receiving device will understand the incomplete information and mistakenly think that the next byte is the address domain of the new frame. Similarly, if the interval between the beginning of a new frame and the previous frame is less than 3.5 bytes, the receiving device will think it is the continuation of the previous frame. Due to the frame disorder, the final CRC check value is incorrect, leading to communication failure.

Standard structure of RTU frame:

|                                |   |
|--------------------------------|---|
| Frame header START             | T1-T2-T3-T4(Transmission time of 3.5 bytes)   |
| Slave address field ADDR       | Communication address (decimal system)<br>(0 is the broadcast address)  |
| Functional domain CMD          | 03H:Read slave parameter<br>06H:Write slave parameter   |
| Data field(DATA N-1)...DATA(0) | 2*N byte data, which is the main content of communication, and also the core of data exchange in communication. |
| CRC CHK Low                    | Detection value: CRC check value (16bit)  |
| CRC CHK High                   |   |
| Frame tail END                 | T1-T2-T3-T4(Transmission time of 3.5 bytes)   |

## 1.6 Command code and communication data description

### 1.6.1 Command code: 03H (00000011) , Read N words (WORD)

For example, if the slave address is 01, the starting address of memory is 1001h (operation frequency address), and five consecutive bytes (operation frequency, bus voltage, output voltage, output current and output power) are read, the frame structure is described as follows:

Host command information

|                          |             |
|--------------------------|-------------|
| START                    | T1-T2-T3-T4 |
| ADDR                     | 01H         |
| CMD                      | 03H         |
| Start address high order | 10H         |
| Start address low order  | 01H         |

|               |  |
|---------------|--|
| Data bit high | 00H                                      |
| Data bit low  | 05H                                      |
| CRC CHK Low   | The CRC CHK value needs to be calculated |
| CRC CHK High  |  |
| END           | T1-T2-T3-T4                              |

Slave response information:

P07-30=0

|                          |  |
|--------------------------|--|
| START                    | T1-T2-T3-T4                              |
| ADDR                     | 01H                                      |
| CMD                      | 03H                                      |
| Number of bytes          | 10H                                      |
| Operating frequency low  | xxH                                      |
| Operating frequency high | xxH                                      |
| Bus voltage high         | xxH                                      |
| Bus voltage low          | xxH                                      |
| Output voltage high      | xxH                                      |
| Output voltage low       | xxH                                      |
| Output current high      | xxH                                      |
| Output current low       | xxH                                      |
| Output power high        | xxH                                      |
| Output power low         | xxH                                      |
| CRC CHK Low              | The CRC CHK value needs to be calculated |
| CRC CHK High             |  |
| END                      | T1-T2-T3-T4                              |

### 1.6.2 Command code:06H(0000110),write one word(Word)

For example, the frequency requirement of sending 30.00Hz to the frequency converter is about 3000 (0BB8H) to write slave address 01H converter 1000H (communication setting address). The structure of the frame is described as follows:

Host command information:

|       |             |
|-------|-------------|
| START | T1-T2-T3-T4 |
| ADDR  | 01H         |

|                             |             |
|-----------------------------|-------------|
| CMD                         | 06H         |
| Write data address high bit | 10H         |
| Write data address low bit  | 00H         |
| Data content high           | 0BH         |
| Data content low            | B8H         |
| CRC CHK Low                 | 8AH         |
| CRC CHK High                | 48H         |
| END                         | T1-T2-T3-T4 |

Slave response information:

|                             |             |
|-----------------------------|-------------|
| START                       | T1-T2-T3-T4 |
| ADDR                        | 01H         |
| CMD                         | 06H         |
| Write data address high bit | 10H         |
| Write data address low bit  | 00H         |
| Data content high           | 0BH         |
| Data content low            | B8H         |
| CRC CHK Low                 | 97H         |
| CRC CHK High                | 36H         |
| END                         | T1-T2-T3-T4 |

### 1.6.3 Communication frame error check mode

The error checking method of the frame mainly consists of two parts, that is, byte check (odd / even check) and the whole data CRC check of the frame.

#### 1.6.3.1 Byte bit check

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

Meaning of even check: an even check bit is added before data transmission to indicate whether the number of transmitted data "1" is odd or even. When it is even, the check position is "0", otherwise it is "1", so as to keep the parity of data unchanged.

Meaning of odd check: add a bit of odd check before data transmission to indicate whether the number of "1" in the data transmitted is odd or even. If it is odd, the check position is "0", otherwise it is "1", so as to keep the parity of data unchanged.



### 1.6.3.2 CRC check

Using RTU frame format, the frame includes the frame error check domain based on CRC method. CRC domain detects the content of the whole frame. The CRC field is a two byte, 16 bit binary value. It is calculated by the transmission device and added to the frame. The receiving device recalculates the CRC of the received frame and compares it with the value in the received CRC field. If the two CRC values are different, it indicates that there is an error in the transmission.

CRC is first stored in 0xFFFF, and then invoked a process to process the values of more than 6 consecutive bytes in the current register in the frame. Only 8bit data in each character is valid for CRC, and start bit, stop bit and parity bit are invalid.

In the process of CRC generation, each 8-bit character is different from or (XOR) in the register content. As a result, the least significant direction is moved and the most significant bit is filled with 0. LSB is extracted to detect. If LSB is 1, the register is different from the preset value or if LSB is 0, it is not detected. The whole process is repeated eight times. After the last bit (the 8th bit) is completed, the next 8-bit byte is different from or different from the current value of the register. The value in the final register is the CRC value after all bytes in the frame are executed.

This calculation method of CRC adopts the international standard CRC check rule. When editing CRC algorithm, users can refer to the relevant standard CRC algorithm to write a CRC calculation program that really meets the requirements.

Now provide a simple function of CRC calculation for users from the reference (with C language programming).

```

unsigned int crc_chk_value (unsigned char*data_value, unsigned char
*data_length)
{
    int i;
    unsigned int crc_value=0xffff;
    while (data_length-->0)
    {
        crc_value ^= *data_value++;
        for (i=0; i < 8; i++)
        {
            if (crc_value & 0x0001)
            {
                crc_value = (crc_value >> 1) ^ 0xa001;
            }
            else
            {
                crc_value = crc_value >> 1;
            }
        }
    }
    return (crc_value);
}

```

In ladder logic, CKSM calculates the CRC value according to the frame content, and uses the look-up table method. This method has simple program and fast operation speed, but the ROM space occupied by the program is large. Please use it carefully when there is a requirement for the program space.

### 1.6.4 Definition of communication data address

This part is the communication content, which is used to control the operation of the frequency converter, the status of the frequency converter and the setting of relevant parameters. Read and write function code parameters (some function codes cannot be changed and are only used by manufacturers).

Function code parameter address identification rules:

For example: P00.10, Address expressed as 000A

Group P11: can only read parameters, can not be modified

Some parameters cannot be changed when the inverter is in operation; Some parameters can not be changed no matter what state the inverter is in; To change the function code parameters, pay attention to the range, unit and relevant description of the parameters.

Shutdown / operation parameters:

| Communication address | Communication content            | Read write properties (R/W) |
|-----------------------|----------------------------------|-----------------------------|
| 1000H                 | Communication settings (decimal) | W                           |
| 1001H                 | Operating frequency              | R                           |
| 1002H                 | DC bus voltage                   | R                           |
| 1003H                 | Output voltage                   | R                           |
| 1004H                 | Output current                   | R                           |
| 1005H                 | Output power                     | R                           |
| 1006H                 | Output torque %                  | R                           |
| 1007H                 | DI Input sign                    | R                           |
| 1008H                 | DO output sign                   | R                           |
| 1009H                 | VI Voltage                       | R                           |
| 100AH                 | Reserved                         | R                           |
| 100BH                 | Reserved                         | R                           |
| 100CH                 | Counter A                        | R                           |
| 100DH                 | Counter B                        | R                           |
| 100EH                 | Overload speed                   | R                           |
| 100FH                 | PID reference value              | R                           |
| 1010H                 | PID feedback value               | R                           |
| 1011H                 | PLC step                         | R                           |
| 1012H                 | Pulse input frequency (0.01KHz)  | R                           |
| 1013H                 | Feedback speed (0.1Hz)           | R                           |
| 1014H                 | Remaining running time           | R                           |
| 1015H                 | VI voltage before correction     | R                           |

| Communication address | Communication content            | Read write properties (R/W) |
|-----------------------|----------------------------------|-----------------------------|
| 1016H                 | Reserved                         | R                           |
| 1017H                 | Reserved                         | R                           |
| 1018H                 | Linear velocity                  | R                           |
| 1019H                 | Current power on time            | R                           |
| 101AH                 | Cumulative power on time         | R                           |
| 101BH                 | Current operating time           | R                           |
| 101DH                 | Communication set point          | R                           |
| 101EH                 | Actual feedback speed            | R                           |
| 101FH                 | Main frequency X display         | R                           |
| 1020H                 | Secondary frequency Y display    | R                           |
| 1022H                 | Rotor angle of synchronous motor | R                           |
| 1023H                 | Inverter temperature             | R                           |

Note: the actual given value of target frequency of 1000h communication setting value is two decimal places; For example, 50.00Hz corresponds to the given requirement of 5000 (decimal).

Control command input to inverter: (write only).

| Command word address | Command function        |
|----------------------|-------------------------|
| 2000H                | 0001H:FOR run           |
|                      | 0002H:REV run           |
|                      | 0003H:FOR inching       |
|                      | 0004H:REV inching       |
|                      | 0005H:Free stop         |
|                      | 0006H:Deceleration stop |
|                      | 0007H:Fault reset       |
|                      | 0008H:Emergency stop    |

Read converter status: (read only).

| Status word address | Status function                         |
|---------------------|---|
| 3000H               | 0001H:FOR run                           |
|                     | 0002H:REV run                           |
|                     | 0003H:Stop                              |
|                     | 0101:All parameter self learning        |
|                     | 0202:Self learning of stator resistance |

Digital output terminal control: (write only).

| Command address | Command function  |
|-----------------|---|
| 2001H           | BIT0:RELAY 1 output control<br>BIT1:RELAY 2 output control<br>BIT2:DO1 (Y1) output control<br>BIT3:DO2 output control<br>BIT4:Reserved<br>BIT5:Reserved<br>BIT6:Reserved<br>BIT7:Reserved<br>BIT8:Reserved<br>BIT9:Reserved |

Note: some models only have relay1 output control.

Analog output terminal AM0 control: (write only).

| Command address | Command function     |
|-----------------|----------------------|
| 2002H           | 0-7FFF means 0%-100% |

Analog output terminal AO0 control: (write only).

| Command address | Command function     |
|-----------------|----------------------|
| 2003H           | 0-7FFF means 0%-100% |

Note: some models only have AM0 output control.

Pulse output control:(Write only).

| Command address | Command function     |
|-----------------|----------------------|
| 2004H           | 0-7FFF means 0%-100% |

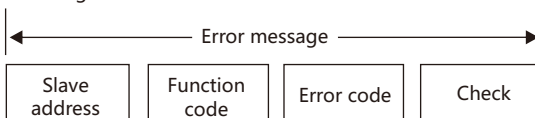
Frequency converter fault description:

| Frequency converter fault address | Frequency converter fault information  |
|-----------------------------------|--|
| 8000H                             | 0000:NO fault<br>0001:output short circuit<br>0002:acceleration over current<br>0003:deceleration over current<br>0004:constant over current<br>0005:acceleration over voltage<br>0006:deceleration over voltage<br>0007:constant over voltage<br>0009:under voltage protection<br>000A:inverter overload<br>000B:motor overload<br>000C:input phase loss<br>000D:motor phase loss<br>000E:IGBT temperature high<br>0010:inverter internal fault<br>0013:Motor parameter self learning failure<br>0017:Motor grounding alarm<br>0018:torque limit<br>0019:current limit<br>001B:external alarm<br>001F:feedback alarm<br>002D:motor temperature high<br>002E:High pressure alarm<br>002F:Low pressure alarm<br>0030:Cumulative working hours arrive<br>0058:Communication failure between control board and drive board<br>0059:Button disabled<br>005B:parameter error<br>005C:parameter over limit<br>005F:power alarm<br>0060:Disconnection alarm<br>0061:Communication control word timeout<br>0062:reset parameter factory value<br>0063:Starting braking resistance braking<br>0064:Drive voltage alarm<br>0065:Locked rotor (locked rotor of synchronous motor) |

### 1.6.5 Error message response

In the process of communication, there may be wrong operation. For example, if some parameters are read-only and a single host computer sends a write instruction, the inverter will reply to an error message.

The error message format is as follows:



Error message function code = request function code+0x80

| Error code | Error code   |
|------------|--|
| 0x01       | Illegal function code, which is not implemented in the inverter                                |
| 0x02       | Illegal data address. The requested data address is not allowed                                |
| 0x03       | Illegal number range. The number of registers or coils requested for operation is out of range |
| 0x04       | operation failed   |

Description of common communication parameters (please refer to group P07 parameters for details).

|        |                        |                                     |
|--------|------------------------|-------------------------------------|
| P07-30 | Communication protocol | Default value:0                     |
|        | Setting range          | 0:standard Modbus-RTU<br>2:reserved |

|        |               |                              |
|--------|---------------|------------------------------|
| P07-31 | Local address | Default value:1              |
|        | Setting range | 1-247,0 is Broadcast address |

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

|        |  |  |
|--------|--|--|
| P07-32 | Baud rate  | Default: 5   |
|        | Setting range:<br>(Individual position:<br>Modbus baud rate) | 0000:300bps;<br>0001:600bps;<br>0002:1200bps;<br>0003:2400bps;<br>0004:4800bps;<br>0005:9600bps; |

This parameter is used to set the data transmission rate between the host computer and the inverter.

Note: 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 is, the faster the communication speed is.

|        |                |   |
|--------|----------------|---|
| P07-33 | Data form      | Default:0   |
|        | Setting range: | 0:No check:data form <8-N-1>;<br>1:Pair check:data form<8-E-1>;<br>2:Odd parity check:data form<8-O-1>;<br>3:No check:data form<8-N-2>; |

The data format set by the host computer and the frequency converter must be consistent, otherwise the communication cannot be carried out.

Please read through this manual after receiving the product and before first use for future reference;  
The contents of this manual may be revised without notice in response to software upgrades;  
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