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# **SCK-500**

## **General Inverter User Manual**



**Zhejiang Chuanken Electric Co.,Ltd.**

## **Preface**

First of all, thank you for purchasing and using the SCK500 series general inverter developed by Our Company

SCK500 series inverter is a general high-performance current vector inverter, which can be used for controlling AC asynchronous motor and synchronous motor. SCK500 series adopt high-performance vector control technology to realize low speed and high torque output and has good dynamic characteristics and super overload capability. Through fast current control and voltage control technology, smooth and fast acceleration and deceleration characteristics are realized. It can be used for driving machine tools, cranes, paper-making, textile, printing bags, food, fan water pumps and various automatic production equipment.

## Brief Introduction Of SCK500 Series Products

### Functions and Features

- ✧ Compared with common products in the same industry, the product has smaller structure volume and larger power density.
- ✧ Design of wide voltage range: rated input three-phase AC 380-460V, wide voltage range can reach 323V-528V.
- ✧ Built-in DC reactor: built-in DC reactor of 160 kW~450 kW model.
- ✧ More perfect built-in brake unit: built-in brake unit below 37kW, 37kW~132kW optional built-in brake unit.
- ✧ Fast and smooth wave-by-wave current limiting function can avoid over-current faults of frequent inverter.
- ✧ The perfect over-excitation function can inhibit the rise of bus voltage during deceleration process effectively, avoid frequent reporting of over-voltage fault and realize fast braking under the condition of not connecting the brake resistor.
- ✧ V/F separation function can realize the using requirements of variable-frequency power source.
- ✧ Perfect complete machine protection function, short-circuit protection to ground, output short-circuit protection, short-circuit protection of various power supplies, etc.

### Precautions for Use

- ✧ For users who use this product for the first time, they shall carefully read this manual firstly. If they have any questions about some functions and performance, please consult our technical personnel for timely help so as to use this product conveniently, quickly and correctly.

### Unpacking Inspection

- ✧ When unpacking, please carefully confirm whether the model of the nameplate of this machine and the rated value of the inverter are consistent with your order. The box contains the machine you ordered (attached product certificate) and user manual (attached product warranty card). Whether the products are damaged during transportation; if any omission or damage is found, please contact our company or your supplier to solve it immediately






## Safety Precautions

### Safety Statement

- ◆ Please read carefully and observe the safety precautions when installing, operating and maintaining the product.
- ◆ To ensure personal and equipment safety, when installing, operating and maintaining the product, please follow all safety precautions indicated on the product and the manual.
- ◆ The "precautions" and "danger" items in the manual do not represent all safety items that should be followed, but only supplement all safety precautions.
- ◆ This product shall be used in an environment that meets the design specification requirements, otherwise it may cause faults, and functional abnormalities or component damage caused by failure to comply with relevant regulations are not within the scope of product quality assurance.
- ◆ Our company will not bear any legal liability for personal safety accidents and property losses caused by violation operation of the products.

### Definition of Safety Level

 "Danger" means death or serious personal injury if you do not follow the regulations.

 "Notice" means that if you do not follow the regulations, it may cause minor physical injury or equipment damage.

### Safety Precautions

- Before installation

#### Danger

- Do not touch control terminals, single board components and inverter components with your hands directly!
- Please do not use the inverter with missing or damaged components; otherwise there is a risk of failure expansion and personal injury!

#### Note

- Whether the rated value of the product nameplate is consistent with your order requirements, if not, please do not install it!
- Please do not install when the packing list is not consistent with the actual object.

### ■ Installation

#### Danger

- Installation must be carried out by qualified personnel, otherwise there is a risk of electric shock!
- The inverter shall be installed on metal or other flame retardant objects, otherwise there is fire danger!
- The installation of the inverter shall be far away from flammable objects and heat sources, otherwise there is fire danger!
- The inverter can not be installed in an environment containing explosive gas, otherwise there is a risk of explosion!
- Do not twist the fixing bolts of equipment components at will, especially the bolts marked with red, otherwise there is a risk of equipment damage!

#### Note

- It shall be handled gently, and the bottom plate of the product is held to prevent foot injury or inverter damage!
- Please install it in a place that can bear the weight of the inverter, otherwise there is risk of equipment damage and personal injury when falling!
- Please confirm that the installation environment meets the requirements of section 2.2.1. If it cannot meet the requirements, it shall be derated or cannot be used; otherwise, it may cause equipment failure or damage!
- Avoid dropping drilling residues, thread ends and screws into the inverter during installation; otherwise it may cause failure of inverter.
- When the inverter is installed in the cabinet, heat dissipation shall be properly handled; otherwise it may cause product failure or damage!

### ■ Wiring

#### Danger

- Wiring must be carried out by qualified personnel; otherwise there is a risk of electric shock or equipment damage!
- Strictly follow this manual during wiring; otherwise there is a risk of electric shock or equipment damage!
- Only when the input power supply is completely disconnected can wiring be carried out, otherwise there is a risk of electric shock!
- All wiring and circuits shall meet the requirements of EMC and safety standards. Please refer to the recommendations in this manual for wire diameter, otherwise accidents may occur!

- The leakage current of the whole inverter may be more than 3.5mA. In order to ensure safety, the inverter and the motor must be grounded; otherwise there is a risk of electric shock!
- It must be wired in strict accordance with the screen printing of inverter terminals, it is forbidden to connect the three-phase power supply to the output terminals U, V and W, otherwise there is a risk of equipment damage!
- Please install the brake resistor at B1 and B2/+ ends correctly, and do not connect to other terminals, otherwise there is a risk of equipment damage!
- Main circuit terminal wiring screw bolts must be tightened; otherwise there is a risk of equipment damage!
- It is forbidden to connect AC 220V voltage grade signals to terminals other than control terminals R1A, R1B, R1C, and R2A, R2B and R2C; otherwise there is a risk of equipment damage!

### Note

- All our products have been subjected to withstand voltage test before leaving the factory. It is forbidden to conduct this test on the inverter; otherwise there is a risk of equipment damage!
- Terminal signal lines of the inverter shall be far away from main power line, and they be vertically crossed under the condition that the distance cannot be guaranteed, otherwise the control signals shall be interfered!
- When the length of motor cable is more than 100m, it is recommended to select output reactor, otherwise there is a risk of equipment failure!
- The encoder must use shielded cable and the shielding layer must be grounded correctly!

### ■ Operation

#### Danger

- If the storage time of the inverter exceeds 2 years, the voltage regulator shall be applied to boost the voltage gradually, otherwise there is a risk of equipment damage!
- After the wiring is finished according to the requirements of section 2.3, the inverter can only be powered on; otherwise there is a risk of equipment damage or electric shock!
- After the inverter wiring is confirmed to be correct, the power can only be turned on after the cover plate is covered. It is forbidden to open the cover plate after the power is turned on; otherwise there is a risk of electric shock!
- After the inverter is powered on, do not touch the inverter and its peripheral circuits regardless of the state of the inverter, otherwise there is a risk of electric shock!
- Before running the inverter, it must check there is no person in surrounding area who can reach the motor so as to prevent personal injury.

## User Manual of SCK500 Series General Inverter

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- During the operation of the inverter, foreign matters shall be avoided from falling into the equipment; otherwise there is a risk of equipment damage!
- Non-professional technicians are forbidden to test signals during operation, otherwise there is a risk of personal injury or equipment damage!
- Do not change inverter parameters at will; otherwise there is a risk of equipment damage!

### Note

- Please confirm whether the number of phases and rated voltage of the power supply are consistent with the nameplate of the product, otherwise equipment damage may be caused!
- Check whether there is short circuit in the peripheral circuit connected to the inverter and whether the wiring is tight, otherwise the equipment damage may be caused!
- Before operation, please make sure that the motor and machinery are within the allowable range of use, otherwise the equipment may be damaged!
- It is forbidden to touch the fan, radiator and brake resistor directly; otherwise there is a risk of mechanical damage and scalding!
- Do not control the start and stop of the inverter frequently by switching on and off, otherwise there is a risk of equipment damage!
- Before switching on/off the inverter output switch or contactor, it must make sure that the inverter is in a no-output state, otherwise there is a risk of equipment damage!

### ■ Maintenance

#### Danger

- Product maintenance, inspection or replacement of parts must be carried out by engineers with professional qualifications!
- It is forbidden to maintain, inspect or replace parts of the product with electricity; otherwise there is a risk of electric shock!
- It must wait for 10 minutes at least after power failure to ensure the residual voltage of electrolytic capacitor drops below 36V before maintaining, inspecting or replacing the parts!
- After replacing the inverter, it must be executed again in strict accordance with the above procedures!

### Note

- When maintaining, inspecting or replacing the parts, it shall not touch the part body; otherwise there is a risk of electrostatic damage to the part!
- All pluggable devices can only be plugged and unplugged when power is off!



## Contents

|   |            |
|---|------------|
| <b>Chapter 1 Product Information .....</b>                    | <b>1</b>   |
| 1.1 Product Naming .....                                      | 1          |
| 1.2 Description of Product Nameplate .....                    | 1          |
| <b>Chapter 2 System Installation and Wiring .....</b>         | <b>2</b>   |
| 2.1 Peripheral system connection diagram .....                | 2          |
| 2.2 Installation .....  | 2          |
| 2.2.1 Installation environment .....                          | 2          |
| 2.2.2 Installation space and direction .....                  | 3          |
| 2.3 Wiring .....  | 5          |
| 2.3.1 Standard wiring diagram .....                           | 5          |
| 2.3.2 Functional description of main circuit terminal .....   | 5          |
| 2.3.3 Terminal screw and wiring specifications .....          | 8          |
| 2.3.4 Wiring note of main circuit .....                       | 9          |
| 2.3.5 Control unit .....                                      | 11         |
| <b>Chapter 3 Keyboard Operation and Trial Operation .....</b> | <b>19</b>  |
| 3.1 Instructions of Operating Keyboard .....                  | 19         |
| 3.1.1 Key function of operation keyboard .....                | 19         |
| 3.1.2 Description of operating keyboard indicator light ..... | 21         |
| 3.1.3 Examples of keyboard operation .....                    | 21         |
| 3.2 Basic Operation and Trial Operation .....                 | 22         |
| 3.2.1 Identification of motor parameter .....                 | 22         |
| 3.2.2 Selection of motor control mode .....                   | 22         |
| 3.2.3 Start and stop commands and modes .....                 | 23         |
| 3.2.4 Frequency source selection .....                        | 24         |
| <b>Chapter 4 Parameter List .....</b>                         | <b>26</b>  |
| <b>Chapter 5 Detailed parameter introduction .....</b>        | <b>78</b>  |
| <b>Chapter 6 Fault Diagnosis and Countermeasures .....</b>    | <b>136</b> |
| 6.1 Fault List and Countermeasures .....                      | 136        |

|   |            |
|---|------------|
| <b>Chapter 7 Daily Maintenance and Care .....</b>                                     | <b>142</b> |
| 7.1 Daily Maintenance .....   | 142        |
| 7.2 Daily Inspection Item .....   | 142        |
| <b>Chapter 8 Specifications and Selection .....</b>                                   | <b>143</b> |
| 8.1 Technical Specifications and Installation Dimensions of SCK500 Series Drive ..... | 143        |
| 8.1.1 Technical specification .....   | 143        |
| 8.1.2 Appearance and installation dimensions .....                                    | 148        |
| 8.1.3 Overall dimensions of operating keyboard .....                                  | 153        |
| 8.2 Specifications of Optional Parts .....  | 154        |
| 8.2.1 Selection of peripheral devices .....   | 154        |
| 8.2.2 Selection table of brake resistor .....   | 156        |
| <b>Appendix A .....</b>   | <b>158</b> |
| 1. Support protocol .....   | 158        |
| 2. Interface mode .....   | 158        |
| 3. Protocol format .....  | 158        |
| 4. Functional interpretation .....  | 159        |
| 5. inverter register distribution .....   | 160        |
| 6. Bit definition of inverter control command word (0x8000) .....                     | 160        |
| 7. Modbus communication example .....   | 161        |
| 8. CRC16 function .....   | 161        |
| 9. Establishment of communication network .....                                       | 162        |



Chapter 1 Product Information

1.1 Product Naming

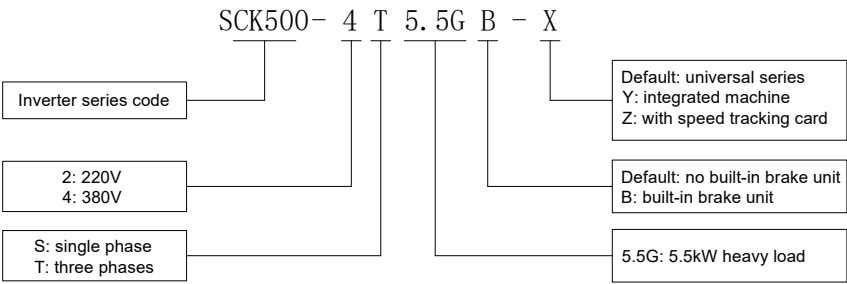


Figure 1-1 Product Naming

1.2 Description of Product Nameplate

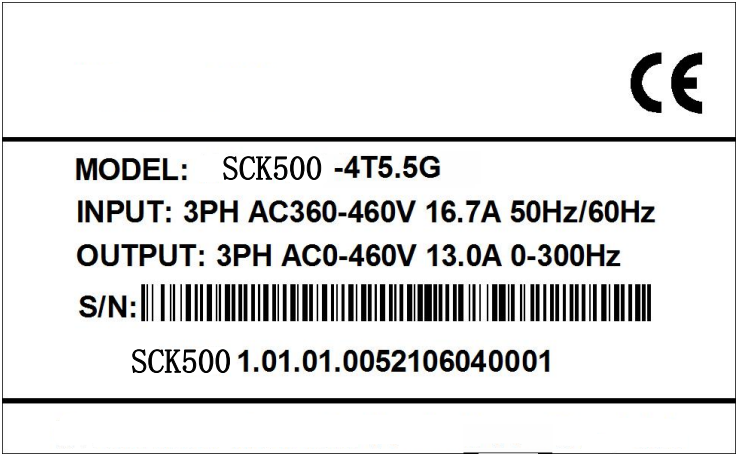


Figure 1-2 Description of Product Nameplate

Chapter 2 System Installation and Wiring

2.1 Peripheral system connection diagram

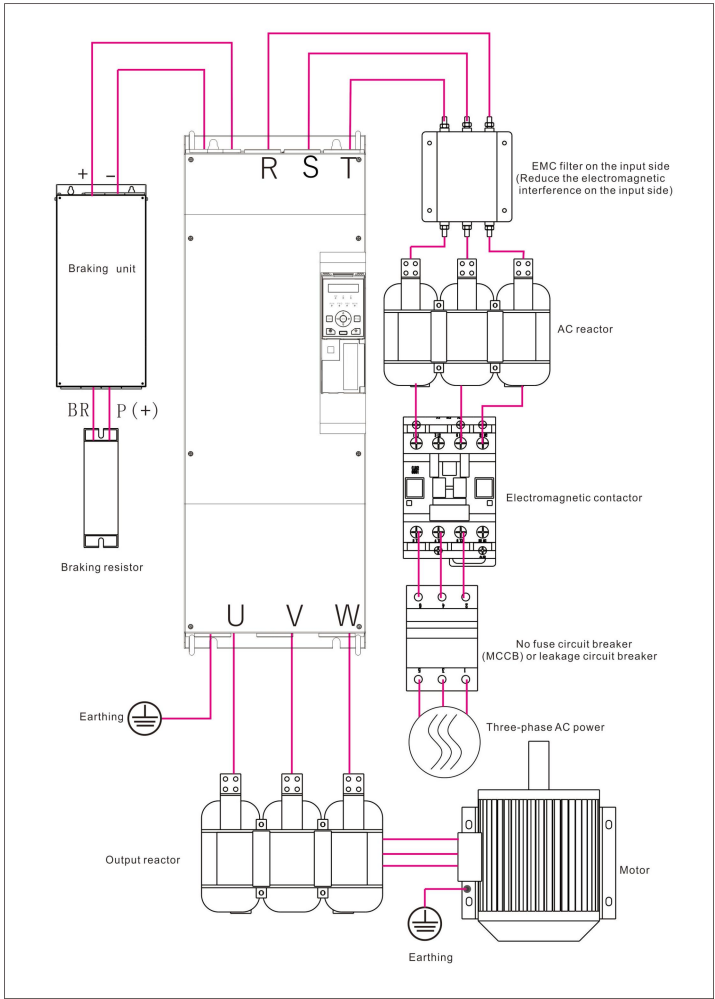


Figure 2-1 Connected peripheral system configuration diagram

2.2 Installation

2.2.1 Installation environment

- 1) Environment temperature: the operating environment temperature has a great influence on the service life of the inverter. The operating environment temperature of the inverter is not allowed to exceed the allowable temperature range ( $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$ ).
- 2) The inverter is installed on the surface of the flame-retardant object, leaving enough heat dissipation space around. When the inverter works, it is easy to generate a large amount of heat. And it is vertically installed on the installation support base by screws.
- 3) The inverter is installed in a place that is not easy to vibrate. If it is installed in a vibrating place, it must ensure that the vibration is not more than 0.6g. Pay special attention to keep away from punching machines and other equipment.
- 4) The inverter shall be avoided being installed in places with direct sunlight, humidity and condensed water drops.
- 5) It is avoided being installed in corrosive, flammable and explosive air.
- 6) It is avoided being installed in occasions with oil stains and dust.

### 2.2.2 Installation space and direction

SCK500series inverters have different reserved sizes of surrounding installation space and spacing space according to different inverter power levels.

When installing the inverter, it shall be installed in a vertical and upward direction. It is forbidden to install it by lying down, lying on one's side, upside down and other installation methods that do not meet the installation requirements.

Specifically see the following figure:

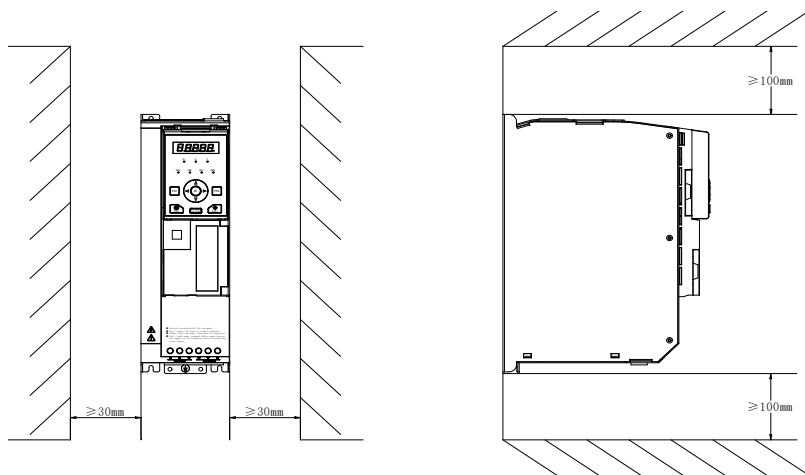


Figure 2-2 Installation direction and space requirements for power level with SCK500 -4T15G and below

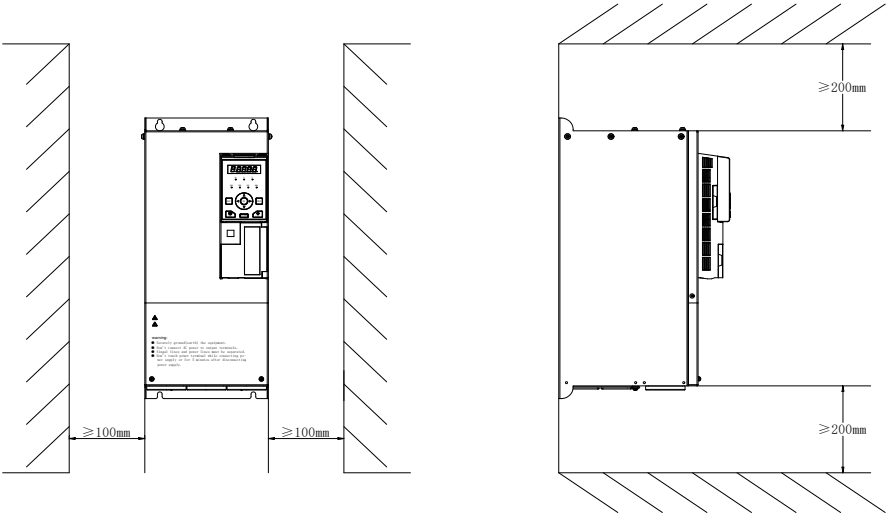
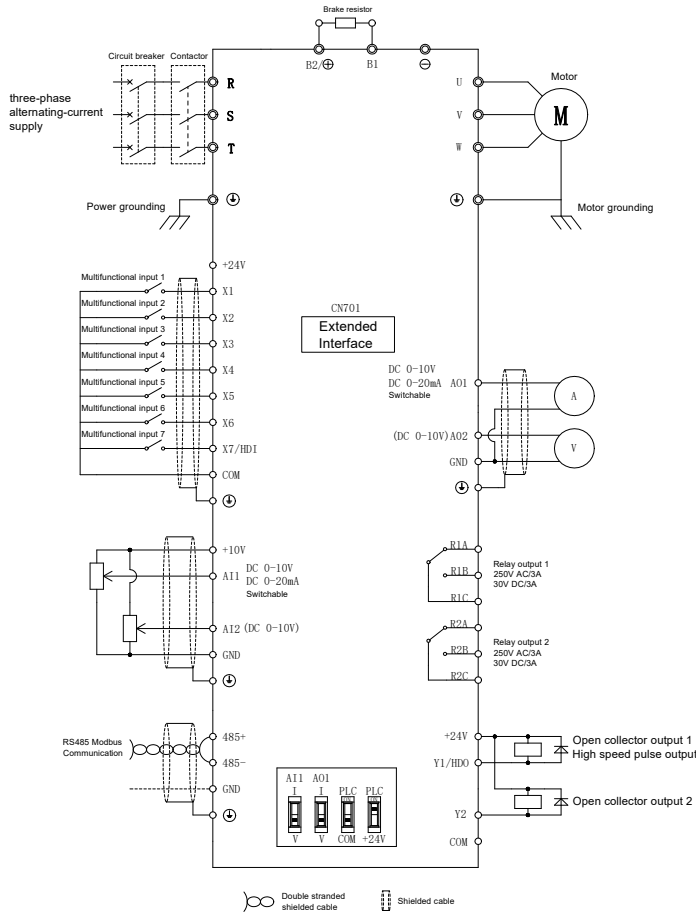


Figure 2-3 Installation direction and space requirements for power level with SCK500 -4T18.5G and above

## 2.3 Wiring

### 2.3.1 Standard wiring diagram

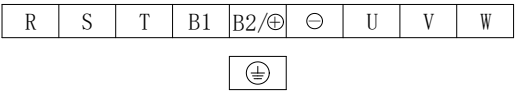
The standard wiring is as shown in the following figure:



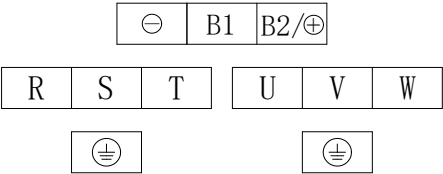
**Figure 2-4 Standard Wiring Diagram**

### 2.3.2 Functional description of main circuit terminal

1) SCK500-4T1.5G~SCK500-4T5.5G

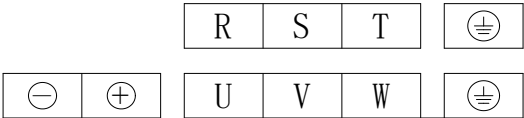


2) SCK500 -4T7. 5G ~ SCK500 -4T30G

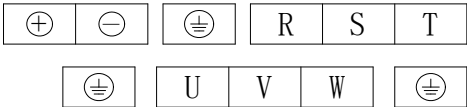


| Terminal marking | Terminal name and function description  |
|------------------|---|
| R、S、T            | Three-phase AC input terminal   |
| B1、B2/⊕          | Connecting terminal of brake resistor   |
| B2/⊕、⊖           | Positive and negative terminals of DC bus; DC input terminal of external brake unit |
| U、V、W            | Inverter output terminal  |
| ⊕                | Grounding terminal  |

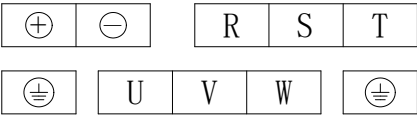
3) SCK500 -4T37G~ SCK500 -4T45G



4) SCK500 -4T55G~ SCK500 -4T132G

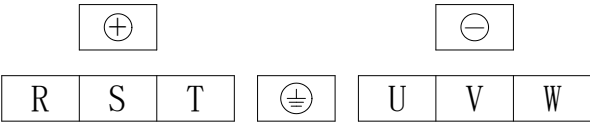


5) SCK500 -4T160G~ SCK500 -4T200G



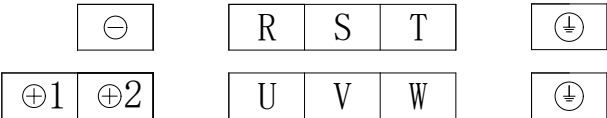
| Terminal marking     | Terminal name and function description  |
|----------------------|---|
| R、S、T                | Three-phase AC input terminal   |
| $\oplus$ 、 $\ominus$ | Positive and negative terminals of DC bus; DC input terminal of external brake unit |
| U、V、W                | Inverter output terminal  |
| $\oplus$             | Grounding terminal  |

6) SCK500-4T220G～SCK500-4T400G



| Terminal marking     | Terminal name and function description  |
|----------------------|---|
| R、S、T                | Three-phase AC input terminal   |
| $\oplus$ 、 $\ominus$ | Positive and negative terminals of DC bus; DC input terminal of external brake unit |
| U、V、W                | Inverter output terminal  |
| $\oplus$             | Grounding terminal  |

7) SCK500-4T450G～SCK500-4T710G



| Terminal marking        | Terminal name and function description  |
|-------------------------|---|
| R、S、T                   | Three-phase AC input terminal   |
| $\oplus 1$ 、 $\oplus 2$ | DC reactor connecting terminal  |
| $\oplus$ 、 $\ominus$    | Positive and negative terminals of DC bus; DC input terminal of external brake unit |

|       |                          |
|-------|--------------------------|
| U、V、W | Inverter output terminal |
| ⓪     | Grounding terminal       |

2.3.3 Terminal screw and wiring specifications

Table 2-1 Terminal Screw and Wiring Specifications

| Inverter model   | Power terminal |                        |                           | Grounding terminal |                        |                           |
|------------------|----------------|------------------------|---------------------------|--------------------|------------------------|---------------------------|
|                  | Screw          | Fastening Torque (N.m) | Cable Specification (mm2) | Screw              | Fastening Torque (N.m) | Cable Specification (mm2) |
| SCK500 - 4T1.5G  | M4             | 1.2~1.5                | 2.5                       | M3                 | 0.5~0.6                | 2.5                       |
| SCK500 - 4T2.2P  |                |                        |                           |                    |                        |                           |
| SCK500 - 4T2.2G  | M4             | 1.2~1.5                | 2.5                       | M3                 | 0.5~0.6                | 2.5                       |
| SCK500 - 4T3.7P  |                |                        |                           |                    |                        |                           |
| SCK500 - 4T3.7G  | M4             | 1.2~1.5                | 4                         | M3                 | 0.5~0.6                | 4                         |
| SCK500 - 4T5.5P  |                |                        |                           |                    |                        |                           |
| SCK500 - 4T5.5G  | M5             | 2.5~3.0                | 4                         | M5                 | 2.5~3.0                | 4                         |
| SCK500 - 4T7.5P  |                |                        |                           |                    |                        |                           |
| SCK500 - 4T7.5G  | M5             | 2.5~3.0                | 6                         | M5                 | 2.5~3.0                | 6                         |
| SCK500 - 4T11P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T11G   | M5             | 2.5~3.0                | 6                         | M5                 | 2.5~3.0                | 6                         |
| SCK500 - 4T15P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T15G   | M5             | 2.5~3.0                | 6                         | M5                 | 2.5~3.0                | 6                         |
| SCK500 - 4T18.5P |                |                        |                           |                    |                        |                           |
| SCK500 - 4T18.5G | M6             | 4.0~5.0                | 10                        | M6                 | 4.0~5.0                | 10                        |
| SCK500 - 4T22P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T22G   | M6             | 4.0~5.0                | 16                        | M6                 | 4.0~5.0                | 16                        |
| SCK500 - 4T30P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T30G   | M6             | 4.0~5.0                | 25                        | M6                 | 4.0~5.0                | 16                        |
| SCK500 - 4T37P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T37G   | M8             | 9.0~10.0               | 25                        | M8                 | 9.0~10.0               | 16                        |
| SCK500 - 4T45P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T45G   | M8             | 9.0~10.0               | 35                        | M8                 | 9.0~10.0               | 16                        |
| SCK500 - 4T55P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T55G   | M8             | 9.0~10.0               | 50                        | M8                 | 9.0~10.0               | 25                        |
| SCK500 - 4T75P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T75G   | M10            | 17.6~22.5              | 60                        | M8                 | 9.0~10.0               | 35                        |
| SCK500 - 4T90P   |                |                        |                           |                    |                        |                           |
| SCK500 - 4T90G   | M10            | 17.6~22.5              | 70                        | M8                 | 9.0~10.0               | 35                        |
| SCK500 - 4T110P  |                |                        |                           |                    |                        |                           |



|                |     |           |       |     |           |       |
|----------------|-----|-----------|-------|-----|-----------|-------|
| SCK500 -4T110G | M10 | 17.6~22.5 | 100   | M8  | 9.0~10.0  | 50    |
| SCK500 -4T132P |     |           |       |     |           |       |
| SCK500 -4T132G | M10 | 17.6~22.5 | 120   | M8  | 9.0~10.0  | 70    |
| SCK500 -4T160P |     |           |       |     |           |       |
| SCK500 -4T160G | M12 | 31.4~39.2 | 150   | M12 | 31.4~39.2 | 95    |
| SCK500 -4T185P |     |           |       |     |           |       |
| SCK500 -4T185G | M12 | 31.4~39.2 | 150   | M12 | 31.4~39.2 | 95    |
| SCK500 -4T200P |     |           |       |     |           |       |
| SCK500 -4T200G | M12 | 31.4~39.2 | 185   | M12 | 31.4~39.2 | 95    |
| SCK500 -4T220P |     |           |       |     |           |       |
| SCK500 -4T220G | M12 | 31.4~39.2 | 185   | M12 | 31.4~39.2 | 120   |
| SCK500 -4T250P |     |           |       |     |           |       |
| SCK500 -4T250G | M12 | 31.4~39.2 | 120×2 | M12 | 31.4~39.2 | 120   |
| SCK500 -4T280P |     |           |       |     |           |       |
| SCK500 -4T280G | M12 | 31.4~39.2 | 150×2 | M12 | 31.4~39.2 | 150   |
| SCK500 -4T315P |     |           |       |     |           |       |
| SCK500 -4T315G | M12 | 31.4~39.2 | 185×2 | M12 | 31.4~39.2 | 95×2  |
| SCK500 -4T355P |     |           |       |     |           |       |
| SCK500 -4T355G | M12 | 31.4~39.2 | 240×2 | M12 | 31.4~39.2 | 120×2 |
| SCK500 -4T400P |     |           |       |     |           |       |
| SCK500 -4T400G | M12 | 31.4~39.2 | 240×2 | M12 | 31.4~39.2 | 120×2 |
| SCK500 -4T450P |     |           |       |     |           |       |
| SCK500 -4T450G | M12 | 31.4~39.2 | 300×2 | M12 | 31.4~39.2 | 150×2 |
| SCK500 -4T500P |     |           |       |     |           |       |
| SCK500 -4T500G | M12 | 31.4~39.2 | 300×2 | M12 | 31.4~39.2 | 150×2 |
| SCK500 -4T560P |     |           |       |     |           |       |
| SCK500 -4T560G | M12 | 31.4~39.2 | 400×2 | M12 | 31.4~39.2 | 185×2 |
| SCK500 -4T630P |     |           |       |     |           |       |
| SCK500 -4T630G | M12 | 31.4~39.2 | 400×2 | M12 | 31.4~39.2 | 185×2 |
| SCK500 -4T710P |     |           |       |     |           |       |
| SCK500 -4T710G | M12 | 31.4~39.2 | 400×2 | M12 | 31.4~39.2 | 185×2 |
| SCK500 -4T800P |     |           |       |     |           |       |

### 2.3.4 Wiring note of main circuit

#### 1) Input power supply R,S,T

- There is no phase sequence requirement for the input side wiring of the inverter.
- The specifications and installation methods of external power wiring shall conform to the requirements of local regulations and relevant IEC standards.
- For power cable wiring, please select copper wires with corresponding sizes according to the values in the recommendation table in chapter 2.3.3.

#### 2) DC bus+,-

- Pay attention to the residual voltage at the terminals (+), (-) of the DC bus just after the power

failure, and wait for the indicator lamp to turn off, and confirm that the power failure will last for 10 minutes before wiring operation, otherwise there is a risk of electric shock.

- When selecting external brake components for 160kW and above, pay attention to that the polarity of (+), (-) cannot be reversed, otherwise the inverter will be damaged or even fire disaster.
- Wiring length of brake unit shall not exceed 10m. Twisted pair or tight two-wire parallel wiring shall be used.
- Do not connect the brake resistor directly to the DC bus, and it may cause damage to the inverter or even fire disaster.

3) Brake resistor terminals B1, B2/+

- For models with 132kW or below and confirmed to have built-in brake unit, the brake resistor wiring terminal is valid.
- The brake resistor selection shall be selected according to the recommended value and the wiring distance shall be less than 5m. Otherwise, the inverter may be damaged.

4) Inverter outputs U, V, W

- The specifications and installation methods of external power wiring shall conform to the requirements of local regulations and relevant IEC standards.
- For power cable wiring, please select copper wires with corresponding sizes according to the values in the recommendation table in 2.3.3.
- Capacitors or surge absorbers shall not be connected to the output side of the inverter; otherwise the inverter will be frequently protected or even damaged.
- When the motor cable is too long, it is easy to generate electrical resonance due to the influence of distributed capacitance, so it shall cause insulation damage of the motor or larger leakage current to make the inverter over-current protection. When the length of the motor cable is more than 100m, an AC output reactor must be installed near the inverter.

5) Grounding terminal<sup>④</sup>

- Terminals must be reliably grounded and the resistance of grounding wire must be less than 10Ω. Otherwise, the equipment will work abnormally or even be damaged.
- Do not share the grounding terminal<sup>④</sup> with the N terminal of the neutral line of the power supply.
- The impedance of the protective grounding conductor must meet the requirement of withstanding short-circuit large current in case of failure.
- The size of the protective grounding conductor shall be selected according to the following table.

| The sectional area (S) of a stage line | Minimum sectional Area (Sp) of protective conductors |
|--|--|
| $S \leq 16\text{mm}^2$                 | S  |
| $16\text{mm}^2 < S \leq 35\text{mm}^2$ | $16\text{mm}^2$                                      |
| $35\text{mm}^2 < S$                    | S/2  |

2.3.5 Control unit

1) Control unit layout

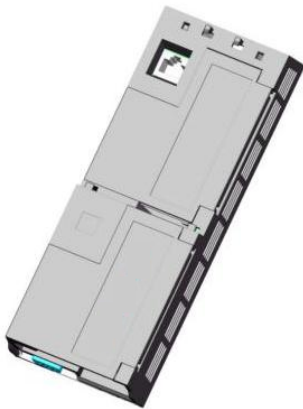


Figure 2-5 Control Unit

2) Wiring description for control terminals

|                               |      |      |     |                               |     |     |     |       |    |    |    |    |    |     |        |      |     |     |     |                   |    |  |  |
|-------------------------------|------|------|-----|-------------------------------|-----|-----|-----|-------|----|----|----|----|----|-----|--------|------|-----|-----|-----|-------------------|----|--|--|
| PE                            | 485+ | 485- | GND | CN706                         |     |     |     |       |    |    |    |    |    | R1A | R1B    | R1C  | R2A | R2B | R2C | Y1/HDO            | Y2 |  |  |
| Direction: from left to right |      |      |     | Direction: from top to bottom |     |     |     |       |    |    |    |    |    |     |        |      |     |     |     | CN703/CN704/CN705 |    |  |  |
| +10V                          | AI1  | AI2  | GND | AO1                           | AO2 | GND | COM | COM   | X1 | X2 | X3 | X4 | X5 | X6  | X7/HDI | +24V |     |     |     |                   |    |  |  |
| Direction: from top to bottom |      |      |     |                               |     |     |     | CN702 |    |    |    |    |    |     |        |      |     |     |     |                   |    |  |  |

Figure 2-6 Layout of Control Terminal

Table 2-2 Function Description of Control Terminal

|              |      |                        |  |
|--------------|------|------------------------|--|
| Analog input | +10V | Analog input reference | 10V ± 1%, internally isolated from COM |
|              |      |                        | The maximum output current is 20mA     |

|                |        |  |  |
|----------------|--------|--|--|
|                |        | voltage  |  |
|                | GND    | Analog ground                                  | Internal isolation from COM  |
|                | AI1    | Analog input channel 1                         | 0~10v: input impedance 22k $\Omega$  |
|                |        |  | 0~20mA: input impedance 500 $\Omega$   |
|                |        |  | The switch between 0~10V and 0~20mA analog input is realized through dial switch S300, and the factory default voltage is input.   |
|                | AI2    | Analog input channel 2                         | 0~10v: input impedance 22k $\Omega$  |
| Analog output  | AO1    | Analog output 1                                | 0~10v: impedance requirement $\geq 10k\Omega$  |
|                |        |  | 0~20mA: impedance requirement 200 $\Omega$ ~500 $\Omega$   |
|                |        |  | The switch between 0~10V and 0~20mA analog output is realized through dial switch S300, and the factory default voltage is output. |
|                | AO2    | Analog output 2                                | 0~10v: impedance requirement $\geq 10k\Omega$  |
|                | GND    | Analog ground                                  | Internal isolation from COM  |
| Digital input  | +24V   | +24V   | 24V $\pm$ 20%, internally isolated from GND  |
|                |        |  | Maximum load 200mA   |
|                | COM    | +24V ground                                    | Internal isolation from GND  |
|                | X1~X7  | Multi-functiona<br>-I input<br>terminals 1~7   | Input specifications:24VDC,5mA   |
|                |        |  | Frequency range:0~200Hz  |
|                |        |  | Voltage range:24V $\pm$ 20%  |
|                | X7/HDI | Multi-functiona<br>-I Input /pulse<br>input    | Multi-function input: same as x1~x6  |
|                |        |  | Pulse input: 0.1Hz~50kHz; voltage range: 24V $\pm$ 20%   |
| Digital output | Y1/HDO | open collector<br>output/pulse<br>output       | Open collector output: 1. Voltage range: 0~24V; 2. Current range: 0~50mA   |
|                |        |  | Pulse output:0~50kHz   |
|                | Y2     | open collector<br>output                       | Open collector output: 1. Voltage range: 0~24V; 2. Current range: 0~50mA   |
|                | COM    | Open collector<br>Output<br>common<br>terminal | Internal isolation from GND  |

|                          |             |                                    |  |
|--------------------------|-------------|------------------------------------|--|
| Relay 1 output           | R1A/R1B/R1C | Relay1 output                      | R1B—R1C: Normally opened   |
|                          |             |                                    | R1A—R1C: Normally closed   |
|                          |             |                                    | Contact capacity:250VAC/3A, 30VDC/3A   |
| Relay 2 output           | R2A/R2B/R2C | Relay2 output                      | R2B—R2C: Normally opened   |
|                          |             |                                    | R2A—R2C: Normally closed   |
|                          |             |                                    | Contact capacity:250VAC/3A,30VDC/3A  |
| Terminal 485             | 485+        | 485 differential signal positive   | Rate:4800/9600/19200/38400/57600/115200bps<br>The longest distance is 500m (adopting standard shielded twisted pair cable) |
|                          | 485-        | 485 differential signal            |  |
|                          | GND         | 485 communication shield grounding | Internal isolation from COM  |
| Expansion card interface | CN701       | Expansion card interface           |  |

3) Control loop cable selection

Table 2-3 Control Loop Cable Specifications

| Cable type     | Cable specification (mm2) |
|----------------|---------------------------|
| Shielded cable | 0.5                       |

4) Instructions for use of analog input and output terminals

Analog input and output voltage signals are particularly subjected to external interference, so shielded cables are generally used for transmission, and the wiring distance shall be as short as possible, and one end of the shielding layer closed to the inverter shall be well grounded, and the transmission distance shall not exceed 20m as far as possible.

When wiring, the control cable shall keep a distance of more than 20cm from the main circuit and high-voltage lines (such as power line, motor line, relay connection line and contactor connection line), and avoid parallel placement with high-voltage lines. When crossing with high-voltage lines cannot be avoided, vertical wiring is recommended to prevent misoperation of inverter caused by interference.

When some analog input and output signals are seriously disturbed, filter capacitors or ferrite cores shall be installed on the analog signal source side.

### 5) Put operating instructions for multi-functional input/out terminals

Multi-functional input and output signals are generally transmitted by shielded cables, and the wiring distance is as short as possible, and one end of the shielding layer closed to the inverter shall be well grounded, and the transmission distance is not more than 20m as far as possible. When driving in active mode, necessary filtering measures shall be taken for crosstalk of power supply, and dry contact control mode is usually recommended.

When wiring, the control cable shall keep a distance of more than 20cm from the main circuit and high-voltage lines (such as power line, motor line, relay connection line and contactor connection line), and avoid parallel placement with high-voltage lines. When crossing with high-voltage lines cannot be avoided, vertical wiring is recommended to prevent misoperation of inverter caused by interference.

### Dry contact mode

When using internal power supply, the selection and wiring of dial switch S700 are as shown in Figure 2-7.

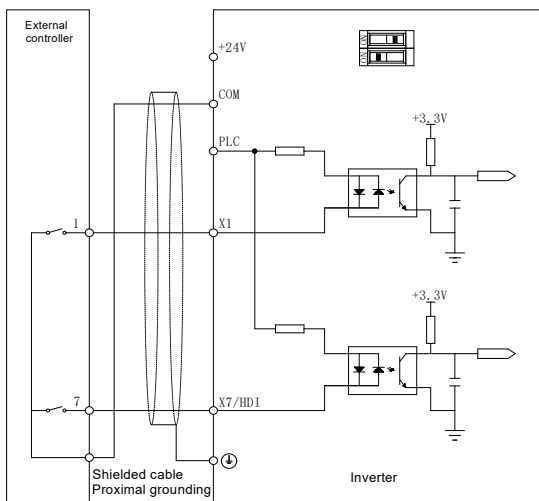


Figure 2-7 Use of Internal Power Dry Contact

When using external power supply, the selection and wiring of the dial switch S700 are as shown in Figure 2-8

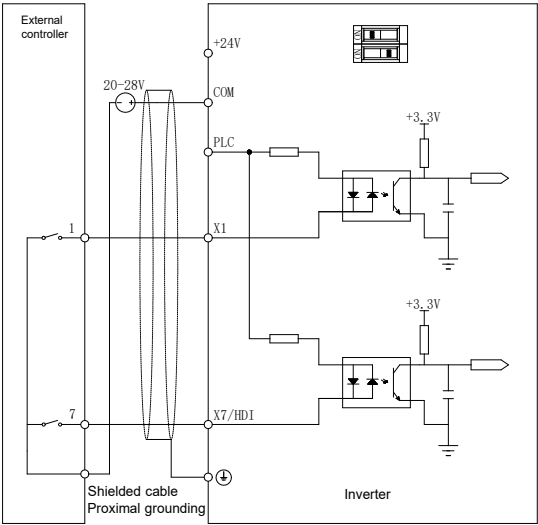


Figure 2-8 Use of External Power Dry Contact

NPN wiring mode of open collector

For the NPN wiring mode of open collector using internal power supply is used, the selection and connection of the dial switch S700 are as shown in Figure 2-9.

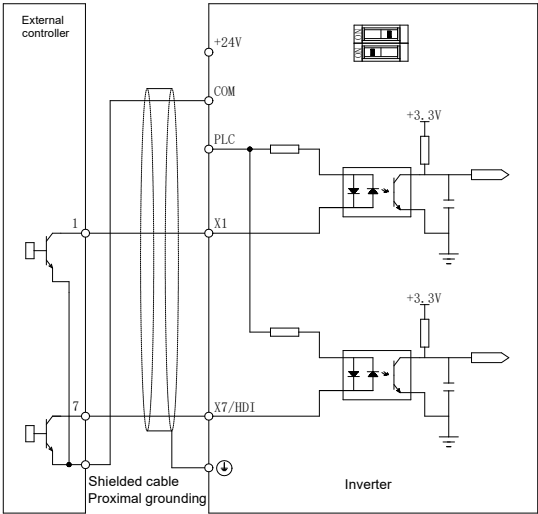


Figure 2-9 NPN Wiring Mode of Open Collector Using Internal Power

For the NPN wiring node of open collector using internal power supply is used, the selection and connection of the dial switch S700 are as shown in Figure 2-10

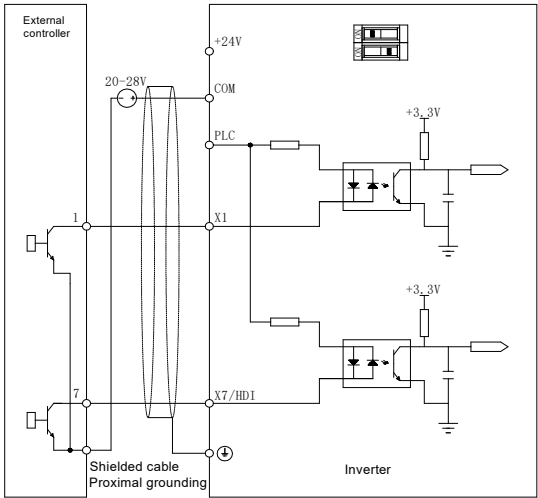


Figure 2-10 NPN Wiring Mode of Open Collector Using External Power

PNP wiring mode of open collector

For the PNP wiring node of open collector using internal power supply is used, the selection and connection of the dial switch S700 are as shown in Figure 2-11.

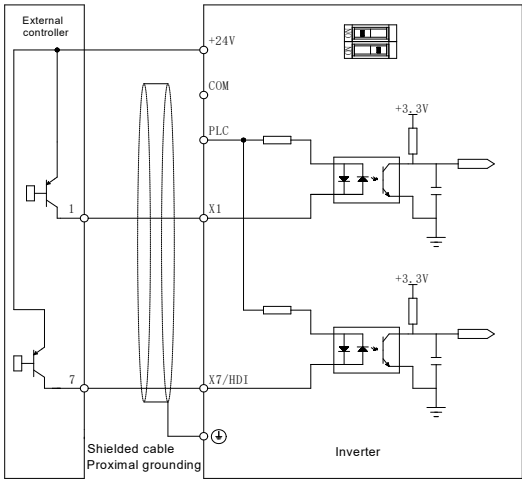


Figure 2-11 PNP Wiring Mode of Open Collector Using Internal Power



For the PNP wiring mode of open collector using internal power supply is used, the selection and connection of the dial switch S700 are as shown in Figure 2-12.

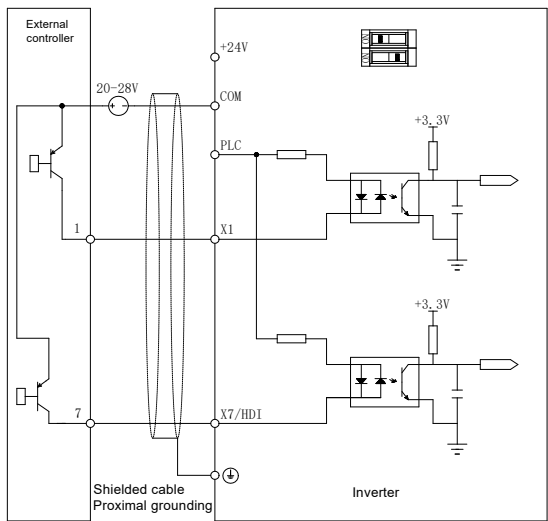


Figure 2-12 PNP Wiring Mode of Open Collector Using External Power

Multi-function output terminal connection wiring

Wiring for Y1/HDO and Y2 output terminals is as shown in Figures 2- 13 and 2-14.

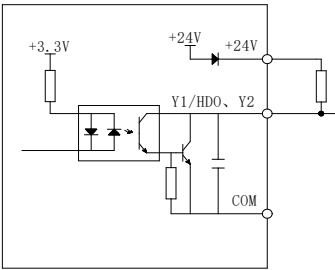


Figure 2-13 Use Internal Power Supply

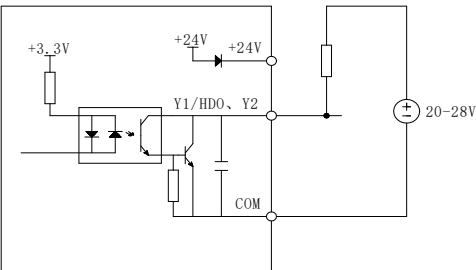


Figure 2-14 Use External Power Supply

Wiring used when Y1/HDO and Y2 output terminals drive relays is as shown in Figures 2-15 and 2-16.

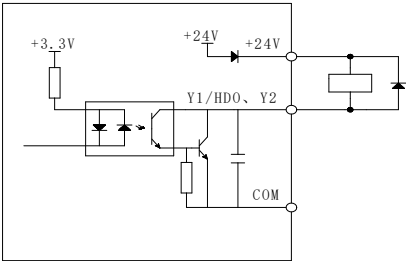


Figure 2-15 Use Internal Power Supply

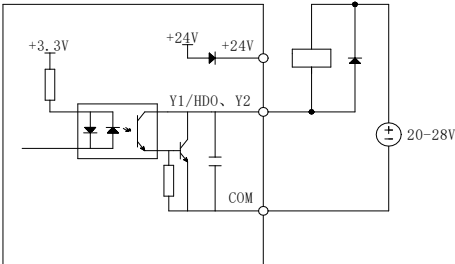


Figure 2-16 Use External Power Supply

Chapter 3 Keyboard Operation and Trial Operation

3.1 Instructions of Operating Keyboard



Figure 3-1 Diagram of Operation Keyboard

3.1.1 Key function of operation keyboard

There are 10 keys on the operation keyboard of the inverter, and the function definition of each key is as shown in Table 3-1.

Table 3-1 Key Function Table of Operation Keyboard

| Press | Button Name                         | Button Function  |
|-------|-------------------------------------|--|
| PRG   | Programming key                     | 1.Enter the lower menu or monitor menu<br>2.Parameter saving   |
| ESC   | Return key/Enter the first menu key | Return to the previous menu and enter the first menu   |
| OK    | Enter key                           | Parameter saving or monitoring menu  |
| ▲     | Add key                             | 1.The selected bit of function code serial number is increased<br>2.The selected bit of parameter editing value is increased<br>3.The digital set frequency is increased |
| ▼     | Decrease key                        | 1.The selected bit of function code serial number is decreased   |

| Press   | Button Name          | Button Function   |
|---------|----------------------|---|
|         |                      | 2.The selected bit of parameter editing value is decreased<br>3.The digital set frequency is decreased  |
| ◀       | Left shift key       | 1.The serial number bit of the function code is selected to shift left<br>2.The parameter editing value bit is selected to shift left<br>3.Switch of shutdown/operation status display parameters<br>4.The fault state is switched to the parameter display state       |
| ▶       | Right shift key      | 1. The serial number bit of the function code is selected to shift right<br>2. The parameter editing value bit is selected to shift right<br>3. Switch of shutdown/operation status display parameters<br>4. The fault state is switched to the parameter display state |
| Start   | Run key              | Run   |
| Stop    | Stop key             | 1. Shutdown<br>2. Fault reset   |
| Loc/Rem | Multi-functional key | See Table 3-2 of functional definition for multi-functional Loc/Rem key   |

Table 3-2 Function Definition Table of Multi-functional Loc/Rem Key

| Loc/Rem definition<br>( P20.08 ) | Function                                   | Function meaning  |
|----------------------------------|--|---|
| 0                                | No function                                | Invalid multi-functional key  |
| 1                                | Switch the running command in a given mode | Keyboard control-> terminal control-> communication control cycle switching |
| 2                                | Inching forward rotation                   | Inching forward rotation function   |
| 3                                | Inching reverse rotation                   | Inching reverse rotation function   |

|   |                               |  |
|---|-------------------------------|--|
| 4 | Forward and reverse switching | The running direction switch key switches between forward rotation and reverse rotation. |
|---|-------------------------------|--|

3.1.2 Description of operating keyboard indicator light

Table 3-3 Description of Indicator Light

| Indicator   |        | Name   | Meaning   |
|-------------|--------|--|---|
| State light | MON    | Indicate the running command in a given mode | On: keyboard control<br>Off: terminal control<br>Flash: communication control |
|             | RUN    | Indication of running state                  | On: run<br>Off: stop  |
|             | FWD    | Forward rotation indication                  | On: in the running state, the inverter runs in the forward direction.         |
|             | REV    | Reverse rotation indication                  | On: in the running state, the inverter runs in the reverse direction.         |
| Unit light  | Hz     | frequency indication                         | On: the current display parameter is frequency                                |
|             | A      | Current indication                           | On: the current display parameter is current                                  |
|             | V      | Voltage indication                           | On: the current display parameter is voltage                                  |
|             | Hz+A   | Rotary speed indication                      | On: the current display parameter is rotary speed                             |
|             | A+V    | Percentage indication                        | On: the current display parameter is percentage                               |
|             | Hz+V+A | Hz+V   | Power indication  |
|             |        |  | Time indication   |
|             |        |  | Dimensionless indication  |

3.1.3 Examples of keyboard operation

1、For example, the setting value of function parameter P00.00 is changed from 50.00Hz to 40.00Hz, as shown in Figure 3- 2.

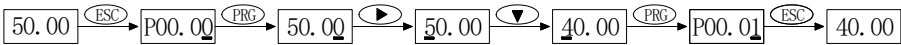


Figure 3-2 Function Parameter Setting

2、Pressing “▶” for 3 seconds for a long time, the keyboard enters the non-factory value menu mode for viewing the parameters modified by the user.

3.2 Basic Operation and Trial Operation

3.2.1 Identification of motor parameter

After the power-up of the inverter is completed, the nameplate parameters of the motor are input into P63 group parameters of the inverter according to the actual nameplate parameters of the motor, then the appropriate setting method is selected according to the requirements of the working conditions, the corresponding parameter value is set to P63.07, and the "Start" key of the keyboard is pressed to start the self-setting of the motor parameters. See Figure 3-3 for the specific flow:

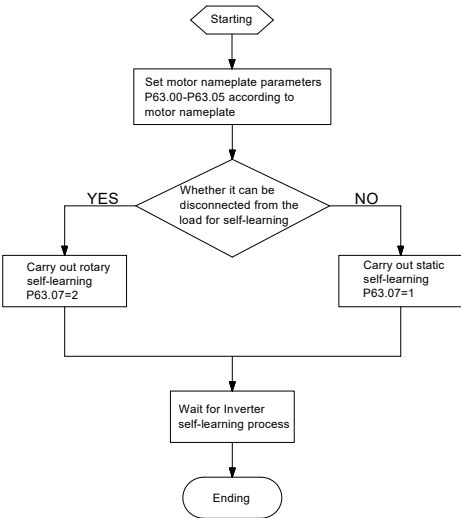


Figure 3-3 Motor Self-Learning Flow

3.2.2 Selection of motor control mode

| Function code              | Detailed description          | Application   |
|----------------------------|-------------------------------|---|
| P63.08: motor control mode | 0: advanced scalar control    | It is suitable for occasions with low load requirements or occasions where one inverter drives multiple motors, such as fan and water pump loading. |
|                            | 1: no PG vector control (SVC) | It is suitable for general high-performance control occasions. One inverter can only  |

|  |                          |   |
|--|--------------------------|---|
|  |                          | drive one motor, such as machine tools, wire drawing machines and other loads requiring high torque output.   |
|  | 2:PG vector control (VC) | When adopting this control method, an encoder must be installed at the tail end of the motor. It is suitable for high-precision speed control or torque control. One inverter can only drive one motor, such as lifting, slitting machines, winding and unwinding, etc. |

### 3.2.3 Start and stop commands and modes

#### 1) Start and stop command sources

| Function code                        | Setting range                 | Application description   |
|--------------------------------------|-------------------------------|---|
| P01.00: running command given method | 0: keyboard command mode      | Start and Stop of the inverter are controlled by operating the "start" and "stop" keys on the keyboard.                                 |
|                                      | 1: terminal command mode      | Control the start and stop of the inverter by setting the multi-functional input X terminal as FWD, REV, FJOG and RJOG commands.        |
|                                      | 2: communication command mode | Through communication with the upper computer, start-stop control of the inverter is carried out.                                       |
|                                      | 3: multi-segment command mode | The multi-functional input X terminal is set as a multi-stage frequency command to directly control the start and stop of the inverter. |

#### 2) Start and Stop Mode Selection

| Function code                | Setting range               | Application description   |
|------------------------------|-----------------------------|---|
| P01.05: start mode selection | 0: start frequency starting | Starting from the setting frequency of P01.06, and after the holding time of P01.07, start to accelerate to the setting frequency for constant speed operation through acceleration time. |

| Function code               | Setting range            | Application description   |
|-----------------------------|--------------------------|---|
|                             |                          | However, when P01.09 is set to non-0, start DC brake firstly, and then start from P01.06 frequency.   |
|                             | 1: speed search starting | After receiving the start command, the inverter starts to search for the actual speed of the motor, then starts to run from the searched speed, and judges whether the searched speed is greater than or less than the set frequency so as to speed down or accelerate the operation.                                     |
| P01.10: stop mode selection | 0: slow down and stop    | The inverter receives the stop command and starts to slow down; when the speed is reduced to the stop DC brake starting frequency of P01.11 and when P01.13 is set to non-0, it starts to stop DC brake; otherwise, it continues to slow down until the output frequency of the inverter is 0, and the stop is completed. |
|                             | 1: free stop             | When the inverter receives the stop command, it immediately blocks the output of the inverter, and the motor stops in a free stop mode.   |

### 3.2.4 Frequency source selection

#### 1) Main given setting mode of frequency

| Function code | Main given mode of frequency |   | Factory value  | 0 |
|---------------|------------------------------|---|--|---|
| P00.01        | Setting range                | 0 | Number setting (P00.00)+ terminal Up/Down or keyboard ▲/▼ adjustment |   |
|               |                              | 1 | Analog input AI1   |   |
|               |                              | 2 | Analog input AI2   |   |
|               |                              | 3 | Reserve (for giving expansion card)                                  |   |
|               |                              | 4 | Min[AI1,AI2]   |   |
|               |                              | 5 | Max[AI1,AI2]   |   |
|               |                              | 6 | Sub[AI1,AI2]   |   |
|               |                              | 7 | Add[AI1,AI2]   |   |
|               |                              | 8 | Pulse given HDI  |   |



|  |  |   |                        |
|--|--|---|------------------------|
|  |  | 9 | Process PID            |
|  |  | A | Simple PLC             |
|  |  | B | Keyboard potentiometer |
|  |  | C | No given               |

2) Frequency auxiliary given setting mode

| Function code | Main given mode of frequency | Factory default | 0                                   |
|---------------|------------------------------|-----------------|-------------------------------------|
| P00.03        | Setting range                | 0               | Digital given (P00.02)              |
|               |                              | 1               | Analog input AI1                    |
|               |                              | 2               | Analog input AI2                    |
|               |                              | 3               | Reserve (for giving expansion card) |
|               |                              | 4               | Min[AI1,AI2]                        |
|               |                              | 5               | Max[AI1,AI2]                        |
|               |                              | 6               | Sub[AI1,AI2]                        |
|               |                              | 7               | Add[AI1,AI2]                        |
|               |                              | 8               | Pulse given HDI                     |
|               |                              | 9               | Reserve                             |
|               |                              | A               | Reserve                             |
|               |                              | B               | No given                            |

# Chapter 4 Parameter List

Parameter symbol description:

- : indicate that the parameter can be modified during running
- : Indicate that the parameters cannot be modified during running and can be modified during shutdown.
- ★: Indicate that the parameters are read-only, such as monitoring parameters
- ☆: Indicate that the function is supported on the expansion card

| Parameter                      | Name                                   | Setting range   | Factory default | Register address | Properties |
|--------------------------------|--|---|-----------------|------------------|------------|
| P00 frequency given parameters |  |   |                 |                  |            |
| P00.00                         | Digital setting of main frequency      | 0.00Hz~upperlimit frequency   | 50.00Hz         | 0x0000           | ○          |
| P00.01                         | Main frequency source selection        | 0: digital given (P00.00)+Up/Down adjustment<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve<br>4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]<br>8: pulse given HDI<br>9: process PID<br>A: simple PLC<br>B: keyboard potentiometer<br>C: no given | 0               | 0x0001           | ○          |
| P00.02                         | Digital setting of auxiliary frequency | 0.00Hz~upper limit frequency  | 50.00Hz         | 0x0002           | ○          |
| P00.03                         | Auxiliary frequency source selection   | 0: digital given (P00.02)<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve<br>4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]   | B               | 0x0003           | ○          |

| Parameter | Name  | Setting range   | Factory default | Register address | Properties |
|-----------|---|---|-----------------|------------------|------------|
|           |   | 8: pulse given HDI<br>9: reserve<br>A: reserve<br>B: no given   |                 |                  |            |
| P00.04    | Main given coefficient of frequency               | 0.0%~200.0%   | 100.0%          | 0x0004           | ○          |
| P00.05    | Auxiliary given coefficient of frequency          | 0.0%~200.0%   | 100.0%          | 0x0005           | ○          |
| P00.06    | Main and auxiliary overlay selection of frequency | Ones: frequency given mode<br>0: frequency main given<br>1: main and auxiliary operation result of frequency<br>2: main given and auxiliary given switching of frequency<br>3: main given and main auxiliary operation result switching of frequency<br>4: auxiliary given and main auxiliary operation result switching of frequency<br>Tens: given operation relation of frequency main and auxiliary<br>0: Min [main, auxiliary]<br>1: Max [main, auxiliary]<br>2: Sub [main, auxiliary]<br>3: Add [main, auxiliary] | 00              | 0x0006           | ○          |
| P00.07    | Maximum frequency                                 | 10.00Hz~300.00Hz  | 50.00Hz         | 0x0007           | ●          |
| P00.08    | upper limit frequency                             | Lower limit frequency~maximum frequency   | 50.00Hz         | 0x0008           | ●          |

| Parameter                             | Name  | Setting range   | Factory default | Register address | Properties |
|---------------------------------------|---|---|-----------------|------------------|------------|
| P00.09                                | Lower limit frequency                         | 0.00Hz~upper limit frequency  | 0.00Hz          | 0x0009           | •          |
| P00.10                                | Jumping frequency 1                           | 0.00Hz~upper limit frequency  | 0.00Hz          | 0x000A           | •          |
| P00.11                                | Jumping range 1                               | 0.00Hz~30.00Hz  | 0.00Hz          | 0x000B           | •          |
| P00.12                                | Jumping frequency 2                           | 0.00Hz~upper limit frequency  | 0.00Hz          | 0x000C           | •          |
| P00.13                                | Jumping range 2                               | 0.00Hz~30.00Hz  | 0.00Hz          | 0x000D           | •          |
| P00.14                                | Jumping frequency 3                           | 0.00Hz~upper limit frequency  | 0.00Hz          | 0x000E           | •          |
| P00.15                                | Jumping range 3                               | 0.00Hz~30.00Hz  | 0.00Hz          | 0x000F           | •          |
| P00.16                                | Jog frequency setting                         | 0.00Hz~upper limit frequency  | 5.00Hz          | 0x0010           | •          |
| P01 start and stop control parameters |   |   |                 |                  |            |
| P01.00                                | Running command source selection              | 0: keyboard command mode<br>1: terminal command mode<br>2: communication command mode<br>3: multi-segment command mode  | 0               | 0x0100           | •          |
| P01.01                                | Command given mode to bundle frequency source | Ones: selection of keyboard command binding frequency source<br>Tens: selection of terminal command binding frequency source<br>Hundreds: selection of communication command binding frequency source<br>0: digital given | BBB             | 0x0101           | •          |

| Parameter | Name   | Setting range   | Factory default | Register address | Properties |
|-----------|--|---|-----------------|------------------|------------|
|           |  | (P00.00)+Up/Down adjustment<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve<br>4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]<br>8: pulse given HDI<br>9: process PID<br>A: simple PLC<br>B: no binding |                 |                  |            |
| P01.02    | Running direction selection                      | 0: positive direction<br>1: reverse direction   | 0               | 0x0102           | ●          |
| P01.03    | Reverse control selection                        | 0: allow reverse rotation<br>1: forbid reverse rotation   | 0               | 0x0103           | ●          |
| P01.04    | Forward/Reverse rotation dead-zone               | 0.0s~3600.0s  | 0.0s            | 0x0104           | ●          |
| P01.05    | Selection of starting mode                       | 0: start from start frequency<br>1: speed search starting   | 0               | 0x0105           | ●          |
| P01.06    | Starting frequency setting                       | 0.00Hz~upper limit frequency  | 0.50Hz          | 0x0106           | ●          |
| P01.07    | Hold time of start                               | 0.0s~3600.0s  | 0.0s            | 0x0107           | ●          |
| P01.08    | Starting DC brake current/pre-excitation current | 0.0%~100.0%   | 50.0%           | 0x0108           | ●          |
| P01.09    | Starting DC braking time/pre-excitation          | 0.00s~30.00s<br>0.00s: Indicate that starting DC brake is invalid   | 0.00s           | 0x0109           | ●          |

| Parameter                                    | Name                                | Setting range   | Factory default     | Register address | Properties |
|--|-------------------------------------|---|---------------------|------------------|------------|
|  | ation time                          |   |                     |                  |            |
| P01.10                                       | Selection of stop mode              | 0: slow down and stop<br>1: free stop                             | 0                   | 0x010A           | ●          |
| P01.11                                       | Starting frequency of stop DC brake | 0.00Hz~upper limit frequency                                      | 0.50Hz              | 0x010B           | ●          |
| P01.12                                       | Stop DC brake current               | 0.0%~100.0%   | 50.0%               | 0x010C           | ●          |
| P01.13                                       | Stop DC braking time                | 0.00s~30.00s<br>0.00s: indicate that the stop DC brake is invalid | 0.00s               | 0x010D           | ●          |
| P02 acceleration and deceleration parameters |                                     |   |                     |                  |            |
| P02.00                                       | Acceleration time 1                 | 0.1s~6000.0s  | Model determination | 0x0200           | ○          |
| P02.01                                       | Deceleration time 1                 | 0.1s~6000.0s  | Model determination | 0x0201           | ○          |
| P02.02                                       | Acceleration time 2                 | 0.1s~6000.0s  | Model determination | 0x0202           | ○          |
| P02.03                                       | Deceleration time 2                 | 0.1s~6000.0s  | Model determination | 0x0203           | ○          |
| P02.04                                       | Acceleration time 3                 | 0.1s~6000.0s  | Model determination | 0x0204           | ○          |
| P02.05                                       | Deceleration time 3                 | 0.1s~6000.0s  | Model determination | 0x0205           | ○          |
| P02.06                                       | Acceleration time 4                 | 0.1s~6000.0s  | Model determination | 0x0206           | ○          |
| P02.07                                       | Deceleration time 4                 | 0.1s~6000.0s  | Model determination | 0x0207           | ○          |
| P02.08                                       | Emergency stop deceleration         | 0.1s~6000.0s  | Model determination | 0x0208           | ●          |
| P02.09                                       | Jog acceleration time               | 0.1s~6000.0s  | Model determination | 0x0209           | ●          |

| Parameter                    | Name   | Setting range   | Factory default     | Register address | Properties |
|------------------------------|--|---|---------------------|------------------|------------|
| P02.10                       | Jog deceleration time                          | 0.1s~6000.0s  | Model determination | 0x020A           | ●          |
| P02.11                       | Polyline acceleration time switching frequency | 0.00Hz~upper limit frequency  | 0.00Hz              | 0x020B           | ●          |
| P02.12                       | Polyline deceleration time switching frequency | 0.00Hz~upper limit frequency  | 0.00Hz              | 0x020C           | ●          |
| P03 vector control parameter |  |   |                     |                  |            |
| P03.00                       | Speed/torque control selection                 | Ones: vector control selection<br>0: speed control<br>1: torque control<br>Tens: power generation limit<br>0: invalid<br>1: full time limit<br>2: constant speed limit<br>3: deceleration limit | 00                  | 0x0300           | ●          |
| P03.01                       | Speed loop high speed proportional gain        | 0.00~30.00  | 2.00                | 0x0301           | ○          |
| P03.02                       | Speed loop high speed integration time         | 0.001~5.000s  | 0.200s              | 0x0302           | ○          |
| P03.03                       | Speed loop low speed proportional gain         | 0.00~30.00  | 2.00                | 0x0303           | ○          |

| Parameter | Name                                  | Setting range  | Factory default | Register address | Properties |
|-----------|---------------------------------------|--|-----------------|------------------|------------|
| P03.04    | Speed loop low speed integration time | 0.001~5.000s   | 0.200s          | 0x0304           | ○          |
| P03.05    | Speed loop PI switching frequency 1   | 0.00Hz~P03.06  | 5.00Hz          | 0x0305           | ○          |
| P03.06    | Speed loop PI switching frequency 2   | P03.05~upper limit frequency   | 10.00Hz         | 0x0306           | ○          |
| P03.07    | Speed feedback filtering time         | 0.0ms~1000.0ms   | 15.0ms          | 0x0307           | ○          |
| P03.08    | Drive torque selection channel        | Ones: torque control selection channel<br>Tens: speed control selection channel<br>0: digital setting P03.09<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve<br>4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]<br>8: pulse given HDI<br>9: maximum value of inverter | 90              | 0x0308           | ●          |
| P03.09    | Digital setting of drive torque       | -200.0%~200.0%   | 150.0%          | 0x0309           | ○          |
| P03.10    | Generation torque selection channel   | Ones: torque control selection channel<br>Tens: speed control selection channel<br>0: digital setting P03.11<br>1: analog input AI1  | 99              | 0x030A           | ●          |



| Parameter | Name   | Setting range  | Factory default | Register address | Properties |
|-----------|--|--|-----------------|------------------|------------|
|           |  | 2: analog input AI2<br>3: reserve<br>4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]<br>8: pulse given HDI<br>9: maximum value of inverter  |                 |                  |            |
| P03.11    | Digital setting of generation torque         | -200.0%~200.0%   | 150.0%          | 0x030B           | ○          |
| P03.12    | Limiting channel of torque control frequency | Ones: frequency forward limit channel<br>Tens: frequency reverse limit channel<br>0: digital setting P03.13/<br>P03.14<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve<br>4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]<br>8: pulse given HDI | 00              | 0x030C           | ●          |
| P03.13    | Positive setting of torque control frequency | 0.00Hz~maximum frequency   | 50.00Hz         | 0x030D           | ○          |
| P03.14    | Reverse setting of torque control frequency  | 0.00Hz~maximum frequency   | 50.00Hz         | 0x030E           | ○          |

| Parameter | Name  | Setting range            | Factory default | Register address | Properties |
|-----------|---|--------------------------|-----------------|------------------|------------|
| P03.15    | Limiting bias of torque control frequency               | 0.00Hz~maximum frequency | 0.00Hz          | 0x030F           | ○          |
| P03.16    | Adjustment proportional gain of excitation              | 0~60000                  | 2000            | 0x0310           | ○          |
| P03.17    | Adjustment integral gain of excitation current          | 0~60000                  | 1000            | 0x0311           | ○          |
| P03.18    | Adjustment proportional gain of torque current          | 0~60000                  | 2000            | 0x0312           | ○          |
| P03.19    | Adjustment integral gain of torque current              | 0~60000                  | 1000            | 0x0313           | ○          |
| P03.20    | Ascending filtering time of drive torque                | 0.0s~6000.0s             | 0.3s            | 0x0314           | ○          |
| P03.21    | Declining filtering time of drive torque                | 0.0s~6000.0s             | 0.3s            | 0x0315           | ○          |
| P03.22    | Torque limitation coefficient in the weak magnetic area | 0.0%~200.0%              | 100.0%          | 0x0316           | ○          |

| Parameter                     | Name  | Setting range   | Factory default | Register address | Properties |
|-------------------------------|---|---|-----------------|------------------|------------|
| P03.23                        | Power limit coefficient in power generation | 0.0%~200.0%   | 100.0%          | 0x0317           | ○          |
| P03.24                        | Torque control deviation frequency setting  | 0.00Hz~10.00Hz  | 0.00Hz          | 0x0318           | ○          |
| P04 Scalar Control Parameters |   |   |                 |                  |            |
| P04.00                        | V/F curve setting                           | 0: straight line V/F<br>1: multi-stage V/F<br>2: 1.2 power<br>3: 1.4 power<br>4: 1.6 power<br>5: 1.8 power<br>6: 2.0 power<br>7: separation V/F | 0               | 0x0400           | ●          |
| P04.01                        | V/F frequency value F0                      | 0.00Hz~P04.03   | 0.00Hz          | 0x0401           | ●          |
| P04.02                        | V/F voltage value V0                        | 0.0%~P04.04   | 0.0%            | 0x0402           | ●          |
| P04.03                        | V/F frequency value F1                      | P04.01~P04.05   | 0.00Hz          | 0x0403           | ●          |
| P04.04                        | V/F voltage value V1                        | P04.02~P04.06   | 0.0%            | 0x0404           | ●          |
| P04.05                        | V/F frequency value F2                      | P04.03~P04.07   | 0.00Hz          | 0x0405           | ●          |
| P04.06                        | V/F voltage value V2                        | P04.04~P04.08   | 0.0%            | 0x0406           | ●          |
| P04.07                        | V/F frequency value F3                      | P04.05~P63.03   | 50.00Hz         | 0x0407           | ●          |
| P04.08                        | V/F voltage value V3                        | P04.06~100.0%   | 100.0%          | 0x0408           | ●          |
| P04.09                        | Torque boost                                | 0.0%~30.0%  | 0.0%            | 0x0409           | ●          |

| Parameter                   | Name  | Setting range   | Factory default | Register address | Properties |
|-----------------------------|---|---|-----------------|------------------|------------|
|                             |   | 0.0%: effective automatic torque promotion  |                 |                  |            |
| P04.10                      | Droop control quantity                      | 0.00Hz~10.00Hz  | 0.00Hz          | 0x040A           | ●          |
| P04.11                      | V/F oscillation suppression gain 1          | 0~1024  | 160             | 0x040B           | ○          |
| P04.12                      | V/F oscillation suppression gain 2          | 0~1024  | 160             | 0x040C           | ○          |
| P04.13                      | V/F separation mode voltage given selection | 0: P04.14 digital setting<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve<br>4: process PID output<br>5: process PID output +AI1                  | 0               | 0x040D           | ●          |
| P04.14                      | V/F separation mode voltage digital given   | 0.0%~100.0%   | 0.0%            | 0x040E           | ○          |
| P04.15                      | V/F separation mode voltage change time     | 0.00s~600.00s   | 0.01s           | 0x040F           | ○          |
| P10 switching value x input |   |   |                 |                  |            |
| P10.00                      | X1 terminal function selection              | 00: no function<br>01: forward running (FWD)<br>02: reverse running (REV)<br>03: forward running inching (FJOG)   | 1               | 0x1000           | ●          |
| P10.01                      | X2 terminal function selection              | 04: reverse inching (RJOG)<br>05: 3-wire operation<br>06: free stop<br>07: emergency stop<br>08: external shutdown  | 2               | 0x1001           | ●          |
| P10.02                      | X3 terminal function selection              | 09: The operation is prohibited<br>10: The running stops<br>11: external fault input<br>12: Fault RESET<br>13: The terminal is Up<br>14: The terminal is Down | 16              | 0x1002           | ●          |

| Parameter | Name                                      | Setting range  | Factory default | Register address | Properties |
|-----------|---|--|-----------------|------------------|------------|
| P10.03    | X4 terminal function selection            | 15: Up/Down reset (terminal, keyboard)<br>16: multi-frequency terminal 1<br>17: multi-segment frequency terminal 2<br>18: multi-frequency terminal 3<br>19: multi-frequency terminal 4   | 17              | 0x1003           | ●          |
| P10.04    | X5 terminal function selection            | 20: Acceleration and deceleration time select 1<br>21: Acceleration and deceleration time select 2<br>22: Acceleration and deceleration are prohibited   | 18              | 0x1004           | ●          |
| P10.05    | X6 terminal function selection            | 23: The command switches to keyboard control<br>24: The command switches to terminal control<br>25: The command switches to communication control  | 0               | 0x1005           | ●          |
| P10.06    | X7/HDI terminal function selection        | 26: Frequency source switch (P00.06[bits])<br>27: Main frequency source switch to frequency digital setting<br>28: Secondary frequency source switch to frequency digital setting  | 0               | 0x1006           | ●          |
| P10.08    | AI-1 terminal function selection          | 29: Stop DC brake + stop command<br>30: Stop DC braking<br>31: Operate DC brake<br>32: Pulse input (X7/HDI supports high speed)<br>33: count input<br>34: Count clear to zero  | 0               | 0x1008           | ●          |
| P10.09    | AI2 terminal function selection           | 35: length count<br>36: The length is cleared<br>37: direction of PID action<br>38: PID parameter switching<br>39: PID running is suspended<br>40: PID integration is suspended<br>41: PLC memory clearing<br>42: PLC operation fails<br>43: PLC operation is suspended<br>44-45: Reserved<br>46: Speed/torque switch<br>47: Torque control prohibited | 0               | 0x1009           | ●          |
| P10.11    | Terminal control operation mode selection | 0: 2-wire operation mode 1<br>1: 2-wire operation mode 2<br>2: 3-wire operation mode 1<br>3: 3-wire operation mode 2   | 0               | 0x100B           | ●          |
| P10.12    | Logic state setting of input terminal     | Ones: Bit0~Bit3: X1~X4<br>Tens: Bit4~Bit6: X5~X7<br>Hundreds: Bit8~Bit9: AI1~AI2<br>0: positive logic<br>1: negative logic   | 000             | 0x100C           | ●          |
| P10.13    | Input terminal filtering time             | 0.000s~2.000s  | 0.010s          | 0x100D           | ○          |
| P10.14    | X1 terminal conduction delay              | 0.0s~3600.0s   | 0.0s            | 0x100E           | ○          |

| Parameter                      | Name                            | Setting range  | Factory default | Register address | Properties |
|--------------------------------|---------------------------------|--|-----------------|------------------|------------|
| P10.15                         | X1 terminal disconnection delay | 0.0s~3600.0s   | 0.0s            | 0x100F           | ○          |
| P10.16                         | X2 terminal conduction delay    | 0.0s~3600.0s   | 0.0s            | 0x1010           | ○          |
| P10.17                         | X2 terminal disconnection delay | 0.0s~3600.0s   | 0.0s            | 0x1011           | ○          |
| P10.18                         | Terminal detection mode         | Ones: Bit0~Bit3: X1~X4<br>Tens: Bit4~Bit6: X5~X7<br>Hundreds: Bit8~<br>Bit9: AI1~AI2<br>0: level valid<br>1: edge valid  | 000             | 0x1012           | ●          |
| P11 switching value Y/R output |                                 |  |                 |                  |            |
| P11.00                         | Y1 terminal function            | 00: no output<br>01: inverter in operation<br>02: forward running of inverter<br>03: reverse running of inverter<br>04: ready to complete of inverter<br>05: inverter in zero frequency operation (stop ON)<br>06: inverter in zero frequency operation (stop OFF)<br>07: frequency reaching FAR<br>08: frequency level detection signal FDT1<br>09: frequency level detection signal FDT2<br>10: frequency upper limit<br>11: frequency lower limit<br>12: torque limiting action | 0               | 0x1100           | ●          |
| P11.01                         | Y2 terminal function selection  |  | 0               | 0x1101           | ●          |
| P11.02                         | R1 relay function selection     |  | 0               | 0x1102           | ●          |
| P11.03                         | R2 relay function selection     |  | 19              | 0x1103           | ●          |

| Parameter | Name                                   | Setting range   | Factory default | Register address | Properties |
|-----------|--|---|-----------------|------------------|------------|
| P11.04    | Y1 output closing delay                | 0.0s~3600.0s  | 0.0s            | 0x1104           | ○          |
| P11.05    | Y1 output disconnecting delay          | 0.0s~3600.0s  | 0.0s            | 0x1105           | ○          |
| P11.06    | Y2 output closing delay                | 0.0s~3600.0s  | 0.0s            | 0x1106           | ○          |
| P11.07    | Y2 output disconnecting delay          | 0.0s~3600.0s  | 0.0s            | 0x1107           | ○          |
| P11.08    | R1 output closing delay                | 0.0s~3600.0s  | 0.0s            | 0x1108           | ○          |
| P11.09    | R1 output disconnecting delay          | 0.0s~3600.0s  | 0.0s            | 0x1109           | ○          |
| P11.10    | R2 output closing delay                | 0.0s~3600.0s  | 0.0s            | 0x110A           | ○          |
| P11.11    | R2 output disconnecting delay          | 0.0s~3600.0s  | 0.0s            | 0x110B           | ○          |
| P11.12    | Logic state setting of output terminal | Bit0: Y1/HDO<br>Bit1: Y2<br>Bit2: R1<br>Bit3: R2<br>Bit4: reserve<br>0: positive logic<br>1: negative logic | 00              | 0x110C           | ○          |
| P11.13    | FDT1 detection mode                    | 0: check out by operating frequency<br>1: check out by output frequency                                     | 0               | 0x110D           | ○          |
| P11.14    | FDT1 upper level limit                 | P11.15~ maximum frequency   | 2.50Hz          | 0x110E           | ○          |

| Parameter                                    | Name                                    | Setting range  | Factory default | Register address | Properties |
|--|---|--|-----------------|------------------|------------|
| P11.15                                       | FDT1 lower level limit                  | 0.00Hz~P11.14  | 2.00Hz          | 0x110F           | ○          |
| P11.16                                       | FDT2 detection mode                     | 0: check out by operating frequency<br>1: check out by output frequency  | 0               | 0x1110           | ○          |
| P11.17                                       | FDT2 upper level limit                  | P11.18~maximum frequency   | 2.50Hz          | 0x1111           | ○          |
| P11.18                                       | FDT2 lower level limit                  | 0.00Hz~P11.17  | 2.00Hz          | 0x1112           | ○          |
| P11.19                                       | Frequency arrival (FAR) detection width | 0.00Hz~maximum frequency   | 2.50Hz          | 0x1113           | ○          |
| P11.20                                       | Zero frequency signal detection value   | 0.00Hz~maximum frequency   | 0.50Hz          | 0x1114           | ○          |
| P11.21                                       | Zero frequency return range             | 0.00Hz~maximum frequency   | 0.00Hz          | 0x1115           | ○          |
| P11.22                                       | Zero current detection level            | 0.0%~50.0%   | 5.0%            | 0x1116           | ○          |
| P11.23                                       | Zero current detection time             | 0.00s~50.00s   | 0.50s           | 0x1117           | ○          |
| P12 analog AI and high speed pulse HDI input |   |  |                 |                  |            |
| P12.00                                       | AI analog curve selection               | Ones: AI1 characteristic curve selection<br>Tens: AI2 characteristic curve selection<br>0: no correction<br>1: curve 1(2 points) | 00              | 0x1200           | ●          |



| Parameter | Name   | Setting range  | Factory default | Register address | Properties |
|-----------|--|--|-----------------|------------------|------------|
|           |  | 2: curve 2 (4 points)<br>3: curve 3 (4 points)           |                 |                  |            |
| P12.01    | Maximum input of curve                                     | Minimum input (P12.03)~10.00V                            | 10.00V          | 0x1201           | ○          |
| P12.02    | Maximum input corresponding value of curve 1               | -100.0%~100.0%   | 100.0%          | 0x1202           | ○          |
| P12.03    | Minimum input of curve                                     | -10.00 v~maximum input (P12.01)                          | 0.00V           | 0x1203           | ○          |
| P12.04    | Minimum input corresponding value of curve                 | -100.0%~100.0%   | 0.0%            | 0x1204           | ○          |
| P12.05    | Maximum input value of curve 2                             | Inflection point 2 input (p12.07)~10.00 v                | 10.00V          | 0x1205           | ○          |
| P12.06    | Maximum input corresponding value of curve 2               | -100.0%~100.0%   | 100.0%          | 0x1206           | ○          |
| P12.07    | Inflection point 2 input value of curve 2                  | Inflection point 1 input (p12.09)~maximum input (P12.05) | 0.00V           | 0x1207           | ○          |
| P12.08    | Input corresponding value of inflection point 2 of curve 2 | -100.0%~100.0%   | 0.0%            | 0x1208           | ○          |
| P12.09    | Input value of inflection point 1 of curve 1               | Minimum input (p12.11)~inflection point 2 input          | 0.00V           | 0x1209           | ○          |
| P12.10    | Input corresponding  | -100.0%~100.0%   | 0.0%            | 0x120A           | ○          |

| Parameter | Name   | Setting range  | Factory default | Register address | Properties |
|-----------|--|--|-----------------|------------------|------------|
|           | value of inflection point 1 of curve 2                     |  |                 |                  |            |
| P12.11    | Minimum input value of curve 2                             | -10.00 V~inflection point 1 input (P12.09)               | 0.00V           | 0x120B           | ○          |
| P12.12    | Minimum input corresponding value of curve 2               | -100.0%~100.0%   | 0.0%            | 0x120C           | ○          |
| P12.13    | Maximum input value of curve 3                             | Inflection point 2 input (P12.15)~10.00 v                | 10.00V          | 0x120D           | ○          |
| P12.14    | Maximum input corresponding value of curve 3               | -100.0%~100.0%   | 100.0%          | 0x120E           | ○          |
| P12.15    | Inflection point 2 input value of curve 3                  | Inflection point 1 input (P12.17)~maximum input (P12.13) | 0.00V           | 0x120F           | ○          |
| P12.16    | Input corresponding value of inflection point 2 of curve 3 | -100.0%~100.0%   | 0.0%            | 0x1210           | ○          |
| P12.17    | Inflection point 1 input value of curve 3                  | Minimum input (p12.19)~inflection point 2 input (P12.15) | 0.00V           | 0x1211           | ○          |
| P12.18    | Input corresponding value of inflection point 1 of curve 3 | -100.0%~100.0%   | 0.0%            | 0x1212           | ○          |
| P12.19    | Minimum input value of curve 3                             | -10.00 V~inflection point 1 input (P12.17)               | 0.00V           | 0x1213           | ○          |

| Parameter                                     | Name   | Setting range  | Factory default | Register address | Properties |
|---|--|--|-----------------|------------------|------------|
| P12.20  | Minimum input corresponding value of curve 3 | -100.0%~100.0%   | 0.0%            | 0x1214           | ○          |
| P12.21  | AI1 input bias                               | -100.0%~100.0%   | 0.0%            | 0x1215           | ○          |
| P12.22  | AI1 input gain                               | -2.000~2.000   | 1.000           | 0x1216           | ○          |
| P12.23  | AI1 input filtering time                     | 0.000s~10.000s   | 0.050s          | 0x1217           | ○          |
| P12.24  | AI2 input bias                               | -100.0%~100.0%   | 0.0%            | 0x1218           | ○          |
| P12.25  | AI2 input gain                               | -2.000~2.000   | 1.000           | 0x1219           | ○          |
| P12.26  | AI2 input filtering time                     | 0.000s~10.000s   | 0.050s          | 0x121A           | ○          |
| P12.33  | HDI maximum input frequency                  | P12.35~100.00kHz   | 10.00kHz        | 0x1221           | ○          |
| P12.34  | HDI maximum corresponding value              | -100.0%~100.0%   | 100.0%          | 0x1222           | ○          |
| P12.35  | HDI minimum input frequency                  | 0.00kHz~P12.33   | 0.00kHz         | 0x1223           | ○          |
| P12.36  | HDI minimum corresponding value              | -100.0%~100.0%   | 0.0%            | 0x1224           | ○          |
| P12.37  | HDI input filtering time                     | 0.000s~1.000s  | 0.001s          | 0x1225           | ○          |
| P13 Analog AO and High Speed Pulse HDO Output |  |  |                 |                  |            |
| P13.00  | AO1 terminal output function selection       | 00: no output<br>01: setting frequency<br>02: output frequency<br>03: output current (relative | 2               | 0x1300           | ○          |

| Parameter                                 | Name                                   | Setting range  | Factory default | Register address | Properties |
|---|--|--|-----------------|------------------|------------|
| P13.01                                    | AO2 terminal output function selection |  | 1               | 0x1301           | ○          |
| P13.02                                    | HDO terminal output function selection |  | 0               | 0x1302           | ○          |
| P13.03                                    | AO1 output bias                        | -100.0%~100.0%   | 0.0%            | 0x1303           | ○          |
| P13.04                                    | AO1 output gain                        | -2.000~2.000   | 1.000           | 0x1304           | ○          |
| P13.05                                    | AO1 output filtering time              | 0.000s~10.000s   | 0.0s            | 0x1305           | ○          |
| P13.06                                    | AO2 output bias                        | -100.0%~100.0%   | 0.0%            | 0x1306           | ○          |
| P13.07                                    | AO2 output gain                        | -2.000~2.000   | 1.000           | 0x1307           | ○          |
| P13.08                                    | AO2 output filtering time              | 0.000s~10.000s   | 0.0s            | 0x1308           | ○          |
| P13.09                                    | HDO maximum output pulse frequency     | 0.01kHz~50.00kHz   | 10.00kHz        | 0x1309           | ○          |
| P13.10                                    | HDO output zero selection              | 0: starting from 0<br>1: from the center point, the center point is (P13.09)/2, and the corresponding functional quantity when the frequency is greater than the center point,It is positive | 0               | 0x130A           | ●          |
| P13.11                                    | HDO output filtering time              | 0.000s~10.000s   | 0.0s            | 0x130B           | ○          |
| P20 Operating Keyboard Setting Parameters |  |  |                 |                  |            |

| Parameter | Name                                  | Setting range  | Factory default | Register address | Properties |
|-----------|---------------------------------------|--|-----------------|------------------|------------|
| P20.00    | Password setting                      | 00000~65535  | 00000           | 0x2000           | ○          |
| P20.01    | LCD brightness control                | 10%~100%   | 80%             | 0x2001           | ●          |
| P20.02    | LCD language selection                | 0:Chinese<br>1:English   | 0               | 0x2002           | ●          |
| P20.03    | Function code modification protection | 0: all function codes can be modified<br>1: only P20.00 and P20.03 are allowed to be modified  | 0               | 0x2003           | ●          |
| P20.04    | Function code initialization          | 0: no operation<br>1: restore factory parameters (no motor parameters)<br>2: restore factory parameters (including motor parameters)<br>3: clear fault record information (reserved) | 0               | 0x2004           | ●          |
| P20.05    | Copy of parameters                    | 0: no operation<br>1: parameter uploading<br>2: parameter downloading (no motor parameters)<br>3: parameter downloading (including motor parameters)                                 | 0               | 0x2005           | ●          |
| P20.06    | Keyboard locking function             | 0: not locking<br>1: full locking<br>2: locking except Loc/Rem key<br>3: locking except Start and Stop keys  | 0               | 0x2006           | ●          |
| P20.08    | Loc/Rem key function selection        | 0: no function<br>1: switch the given mode of operation command  | 2               | 0x2008           | ●          |

| Parameter                      | Name                                   | Setting range   | Factory default | Register address | Properties |
|--------------------------------|--|---|-----------------|------------------|------------|
|                                |  | 2: inching forward rotation<br>3: inching reverse rotation<br>4: forward and reverse switching  |                 |                  |            |
| P21 Display Setting Parameters |  |   |                 |                  |            |
| P21.00                         | Setting of running display parameter 1 | 00: invalid display<br>01: operating frequency<br>02: setting frequency 03: output frequency<br>04: synchronization frequency                         | 1               | 0x2100           | ○          |
| P21.01                         | Setting of run display parameter 2     | 05: local frequency<br>06: extended frequency<br>07: setting speed  | 11              | 0x2101           | ○          |
| P21.02                         | Setting of run display parameter 3     | 08: operating speed<br>09: bus voltage<br>10: output voltage<br>11: output current  | 9               | 0x2102           | ○          |
| P21.03                         | Setting of run display parameter 4     | 12: output power<br>13: output torque<br>14: output given   | 0               | 0x2103           | ○          |
| P21.04                         | Setting of stop display parameter 1    | 15: AI1 voltage<br>16: AI2 voltage<br>17-18: reserve<br>19: AO1 voltage   | 2               | 0x2104           | ○          |
| P21.05                         | Setting of stop display parameter 2    | 20: AO2 voltage<br>21: HDI input frequency<br>22: HDO output frequency<br>23: input terminal  | 9               | 0x2105           | ○          |
| P21.06                         | Setting of stop display parameter 3    | 24: output terminal<br>25: machine status<br>26: Radiator temperature<br>27: Motor temperature<br>28: PID is set<br>29: PID feedback<br>30: PID error | 0               | 0x2106           | ○          |

| Parameter                           | Name                                     | Setting range  | Factory default | Register address | Properties |
|-------------------------------------|--|--|-----------------|------------------|------------|
| P21.07                              | Setting of stop display parameter 4      | 31: PLC stage<br>32: Main setting channel<br>33: Auxiliary setting channel<br>34: Main set frequency<br>35: Auxiliary set frequency<br>36: external count<br>37: Set the length value<br>38: Run length value<br>39: Line speed    | 0               | 0x2107           | ○          |
| P30 Fault and Protection Parameters |  |  |                 |                  |            |
| P30.00                              | Cooling fan control                      | 0: Automatic control<br>1: power-on direct operation<br>2: stop immediately after shutdown   | 0               | 0x3000           | ○          |
| P30.01                              | Selection of motor overheating detection | Ones: motor over-temperature protection<br>0: forbidden<br>1: action<br>Tens: sensor type<br>0: temperature sensor PT100<br>1: temperature sensor PT1000<br>Hundreds: analog channel<br>0: analog Input AI1<br>1: analog Input AI2 | 000             | 0x3001           | ●          |
| P30.02                              | Motor overheat detection level           | 0.0~200.0℃   | 85.0℃           | 0x3002           | ●          |
| P30.03                              | Selection of                             | Ones: overload pre-alarm   | 000             | 0x3003           | ●          |

| Parameter | Name   | Setting range   | Factory default | Register address | Properties |
|-----------|--|---|-----------------|------------------|------------|
|           | inverter overload pre-alarm detection            | detection selection<br>0: always check during operation<br>1: detection at constant speed operation only<br>Tens: selection of overload pre-alarm detection quantity<br>0: detection level is relative to rated current of motor<br>1: detection level is relative to rated current of inverter<br>Hundreds: Overload pre-alarm protection selection<br>0: overload protection shield<br>1: overload protection enabled |                 |                  |            |
| P30.04    | Detection level of inverter overload pre-alarm   | 20.0%~200.0%  | 160.0%          | 0x3004           | ●          |
| P30.05    | Detection time of inverter overload pre-alarm    | 0.0s~60.0s  | 5.0s            | 0x3005           | ●          |
| P30.06    | Output load drop detection selection of inverter | 0: invalid detection of output load drop of inverter<br>1: always check during operation (continue operation)<br>2: detection only at constant speed (continuous operation)<br>3: always check during operation (free stop)   | 0               | 0x3006           | ●          |



| Parameter | Name   | Setting range  | Factory default | Register address | Properties |
|-----------|--|--|-----------------|------------------|------------|
|           |  | 4: detection only at constant speed (free stop)  |                 |                  |            |
| P30.07    | Output load drop detection level of inverter | 0.0%~100.0%  | 30.0%           | 0x3007           | •          |
| P30.08    | Output load drop detection time of inverter  | 0.0s~3600.0s   | 1.0s            | 0x3008           | •          |
| P30.09    | Selection of automatic reset times           | 0~100<br>0: no automatic reset function  | 0               | 0x3009           | •          |
| P30.10    | Automatic reset interval time                | 0.1s~100.0s  | 1.0s            | 0x300A           | •          |
| P30.11    | Selection of fault relay action              | Ones: during automatic reset<br>0: action<br>1: no action<br>Tens: under-voltage period<br>0: action<br>1: no action   | 00              | 0x300B           | •          |
| P30.12    | Option of enhanced protection function       | Ones: output phase lack detection<br>0: forbidden<br>1: action<br>Tens: input stage lack detection<br>0: forbidden<br>1: action<br>Hundreds: motor overload detection<br>0: forbidden<br>1: action | 000             | 0x300C           | •          |
| P30.13    | Fault record saving method                   | 0: reset of fault record in case of power failure<br>1: storage of fault record in   | 1               | 0x300D           | •          |

| Parameter                          | Name                                | Setting range   | Factory default | Register address | Properties |
|------------------------------------|-------------------------------------|---|-----------------|------------------|------------|
|                                    |                                     | case of power failure   |                 |                  |            |
| P30.14                             | Fault protection action attribute 1 | Ones: EEPROM read-write failure<br>0: continue to run<br>1: free parking<br>Tens: system interference fault<br>0: continue to run<br>1: free parking<br>Hundreds: contactor suction fault<br>0: continue to run<br>1: free parking<br>Thousands: current detection fault<br>0: continue to run<br>1: free parking | 1111            | 0x300E           | •          |
| P30.15                             | Fault protection action attribute 2 | Ones: inverter overheating<br>0: continue to run<br>1: free parking<br>Tens: encoder fault<br>0: continue to run<br>1: free parking<br>Hundreds: motor overheating<br>0: continue to run<br>1: free parking<br>Thousands: system customization<br>0: continue to run<br>1: free parking                           | 1111            | 0x300F           | •          |
| P40 Process PID Control Parameters |                                     |   |                 |                  |            |
| P40.00                             | PID given mode selection            | 0: given by P40.01<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve  | 0               | 0x4000           | •          |

| Parameter | Name                              | Setting range   | Factory default | Register address | Properties |
|-----------|-----------------------------------|---|-----------------|------------------|------------|
|           |                                   | 4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]<br>8: pulse given HDI  |                 |                  |            |
| P40.01    | PID digital given                 | 0.0%~100.0%   | 50.0%           | 0x4001           | ○          |
| P40.02    | PID feedback mode selection       | 0: constant zero feedback input<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve<br>4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]<br>8: pulse given HDI | 1               | 0x4002           | ●          |
| P40.03    | Proportional gain Kp1             | 0.0~100.0   | 50.0            | 0x4003           | ○          |
| P40.04    | Integral time Ti1                 | 0.000s~50.000s  | 0.500s          | 0x4004           | ○          |
| P40.05    | Differential time Td1             | 0.000s~50.000s  | 0.000s          | 0x4005           | ○          |
| P40.06    | Proportional gain Kp2             | 0.0~100.0   | 50.0            | 0x4006           | ○          |
| P40.07    | Integral time Ti2                 | 0.000s~50.000s  | 0.500s          | 0x4007           | ○          |
| P40.08    | Differential time Td2             | 0.000s~50.000s  | 0.000s          | 0x4008           | ○          |
| P40.09    | PID parameter switching selection | 0: use Kp1, Ki1 and Kd1 only<br>1: automatically switch according to input bias<br>2: switch according to terminals   | 0               | 0x4009           | ●          |

| Parameter | Name                                  | Setting range   | Factory default | Register address | Properties |
|-----------|---------------------------------------|---|-----------------|------------------|------------|
| P40.10    | Input bias in PID automatic switching | 0.0%~100.0%   | 20.0%           | 0x400A           | ○          |
| P40.11    | PID adjustment selection              | Ones: output frequency<br>0: it must be consistent with the set running direction<br>1: it can be opposite to the set running direction<br>Tens: integral mode<br>0: when the integral reaches the upper and lower limits, continue to adjust the integral.<br>1: when the integral reaches the upper and lower limits, stop the integral adjustment. | 11              | 0x400B           | ●          |
| P40.12    | PID positive and negative effects     | 0: positive effect<br>1: negative effect  | 0               | 0x400C           | ●          |
| P40.13    | PID given filtering time              | 0.00s~10.00s  | 0.00s           | 0x400D           | ○          |
| P40.14    | PID feedback filtering time           | 0.00s~10.00s  | 0.00s           | 0x400E           | ○          |
| P40.15    | PID output filtering time             | 0.00s~10.00s  | 0.00s           | 0x400F           | ○          |
| P40.16    | Sampling period                       | 0.001s~50.000s  | 0.002s          | 0x4010           | ○          |
| P40.17    | Deviation limit                       | 0.0%~100.0%   | 0.0%            | 0x4011           | ○          |
| P40.18    | Differential limit                    | 0.0%~100.0%   | 0.5%            | 0x4012           | ○          |
| P40.19    | PID initial value                     | 0.0%~100.0%   | 0.0%            | 0x4013           | ○          |
| P40.20    | PID initial value holding time        | 0.0s~3600.0s  | 0.0s            | 0x4014           | ○          |

| Parameter | Name   | Setting range   | Factory default | Register address | Properties |
|-----------|--|---|-----------------|------------------|------------|
| P40.21    | PID operation output maximum                       | 0.0%~100.0%   | 100.0%          | 0x4015           | ○          |
| P40.22    | PID reverse output cutoff frequency                | 0.00Hz~upper limit frequency                                    | 0.00Hz          | 0x4016           | ○          |
| P40.23    | PID shutdown operation selection                   | 0:no calculation during shutdown<br>1:operation during shutdown | 0               | 0x4017           | ●          |
| P40.24    | PID given missing detection value                  | 0.0%~100.0%   | 0.0%            | 0x4018           | ●          |
| P40.25    | PID given loss detection time                      | 0.00s~30.00s<br>0.00s: not detect PID given loss                | 1.00s           | 0x4019           | ●          |
| P40.26    | PID feedback missing detection value               | 0.0%~100.0%   | 0.0%            | 0x401A           | ●          |
| P40.27    | PID feedback loss detection time                   | 0.00s~30.00s<br>0.00s: not detect PID feedback loss             | 1.00s           | 0x401B           | ●          |
| P40.28    | PID signal loss shutdown mode                      | 0: free shutdown<br>1: emergency shutdown                       | 0               | 0x401C           | ○          |
| P40.29    | U Upper critical value of zero frequency operation | P40.30~upper limit frequency                                    | 0.00Hz          | 0x401D           | ●          |
| P40.30    | Lower critical value of zero frequency operation   | 0.00Hz~P40.29   | 0.00Hz          | 0x401E           | ●          |

| Parameter                | Name   | Setting range  | Factory default | Register address | Properties |
|--------------------------|--|--|-----------------|------------------|------------|
| P40.31                   | Sleep wake-up mode selection                   | 0: Frequency sleep wake-up mode<br>Sleep wake-up mode is determined by P40.29 and P40.30 parameter settings<br>1: Pressure sleep wake-up method<br>Sleep wake-up mode is | 0               | 0x401F           | •          |
| P40.32                   | Sleep pressure                                 | P40.34~P40.37  | 1000            | 0x4020           | •          |
| P40.33                   | Sleep detection delay time                     | 0.00s~30.00s<br>Effective for frequency and pressure detection methods   | 1.00s           | 0x4021           | •          |
| P40.34                   | Wakeup pressure detection value                | 0~P40.32   | 0               | 0x4022           | •          |
| P40.35                   | Wakeup detection delay time                    | 0.00s~30.00s<br>Effective for frequency and pressure detection methods   | 0.50s           | 0x4023           | •          |
| P40.37                   | Given feedback range                           | 0~10000  | 1000            | 0x4025           | •          |
| P41 Multistage Frequency |  |  |                 |                  |            |
| P41.00                   | Multistage frequency digital given 1           | Lower limit frequency~upper limit frequency  | 0.00Hz          | 0x4100           | ○          |
| P41.01                   | Multistage ultistage frequency digital given 2 | Lower limit frequency~upper limit frequency  | 0.00Hz          | 0x4101           | ○          |
| P41.02                   | Multistage frequency digital given 3           | Lower limit frequency~upper limit frequency  | 0.00Hz          | 0x4102           | ○          |

| Parameter | Name                                  | Setting range                               | Factory default | Register address | Properties |
|-----------|---------------------------------------|---|-----------------|------------------|------------|
| P41.03    | Multistage frequency digital given 4  | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x4103           | ○          |
| P41.04    | Multistage frequency digital given 5  | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x4104           | ○          |
| P41.05    | Multistage frequency digital given 6  | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x4105           | ○          |
| P41.06    | Multistage frequency digital given 7  | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x4106           | ○          |
| P41.07    | Multistage frequency digital given 8  | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x4107           | ○          |
| P41.08    | Multistage frequency digital given 9  | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x4108           | ○          |
| P41.09    | Multistage frequency digital given 10 | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x4109           | ○          |
| P41.10    | Multistage frequency digital given 11 | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x410A           | ○          |
| P41.11    | Multistage frequency digital given 12 | Lower limit frequency~upper limit frequency | 0.00Hz          | 0x410B           | ○          |

| Parameter      | Name  | Setting range  | Factory default | Register address | Properties |
|----------------|---|--|-----------------|------------------|------------|
| P41.12         | Multistage frequency digital given 13           | Lower limit frequency~upper limit frequency  | 0.00Hz          | 0x410C           | ○          |
| P41.13         | Multistage frequency digital given 14           | Lower limit frequency~upper limit frequency  | 0.00Hz          | 0x410D           | ○          |
| P41.14         | Multistage frequency digital given 15           | Lower limit frequency~upper limit frequency  | 0.00Hz          | 0x410E           | ○          |
| P41.15         | Multistage frequency 1 command source selection | 0: digital given P41.00<br>1: analog input AI1<br>2: analog input AI2<br>3: reserve<br>4: Min[AI1,AI2]<br>5: Max[AI1,AI2]<br>6: Sub[AI1,AI2]<br>7: Add[AI1,AI2]<br>8: pulse given HDI<br>9: process PID  | 0               | 0x410F           | ●          |
| P42 Simple PLC |   |  |                 |                  |            |
| P42.00         | Selection of simple PLC operation mode          | Ones: simple PLC operation mode<br>0: shutdown after single cycle<br>1: maintain final value after single cycle<br>2: continuous cycle<br>Tens: simple PLC startup mode<br>0: run from stage 1<br>1: continue to operate from the stage frequency at the interruption time<br>Hundreds: simple PLC power-down memory | 0000            | 0x4200           | ●          |



| Parameter | Name                    | Setting range   | Factory default | Register address | Properties |
|-----------|-------------------------|---|-----------------|------------------|------------|
|           |                         | 0: power-down reset<br>1: power-down storage<br>Thousands: simple PLC time unit<br>0: second (s)<br>1: minute (min)   |                 |                  |            |
| P42.01    | Setting of PLC stage 1  | Ones: operation direction of simple PLC stage<br>0: positive<br>1: negative<br>Tens: acceleration and deceleration time of simple PLC stage<br>0: acceleration and deceleration time 1<br>1: acceleration and deceleration time 2<br>2: acceleration and deceleration time 3<br>3: acceleration and deceleration time 4 | 00              | 0x4201           | ●          |
| P42.02    | Running time in stage 1 | 0.0s (min) ~3276.7s (min)   | 0.0s (min)      | 0x4202           | ○          |
| P42.03    | Setting of PLC stage 2  | refers to the setting mode of stage 1   | 00              | 0x4203           | ●          |
| P42.04    | Running time in stage 2 | 0.0s (min) ~3276.7s (min)   | 0.0s (min)      | 0x4204           | ○          |
| P42.05    | Setting of PLC stage 3  | refers to the setting mode of stage 1   | 00              | 0x4205           | ●          |
| P42.06    | Running time in stage 3 | 0.0s (min) ~3276.7s (min)   | 0.0s (min)      | 0x4206           | ○          |
| P42.07    | Setting of PLC stage 4  | refers to the setting mode of stage 1   | 00              | 0x4207           | ●          |

| Parameter | Name                     | Setting range                         | Factory default | Register address | Properties |
|-----------|--------------------------|---------------------------------------|-----------------|------------------|------------|
| P42.08    | Running time in stage 4  | 0.0s (min) ~3276.7s (min)             | 0.0s (min)      | 0x4208           | ○          |
| P42.09    | Setting of PLC stage 5   | refers to the setting mode of stage 1 | 00              | 0x4209           | ●          |
| P42.10    | Running time in stage 5  | 0.0s (min) ~3276.7s (min)             | 0.0s (min)      | 0x420A           | ○          |
| P42.11    | Setting of PLC stage 6   | refers to the setting mode of stage 1 | 00              | 0x420B           | ●          |
| P42.12    | Running time in stage 6  | 0.0s (min) ~3276.7s (min)             | 0.0s (min)      | 0x420C           | ○          |
| P42.13    | Setting of PLC stage 7   | refers to the setting mode of stage 1 | 00              | 0x420D           | ●          |
| P42.14    | Running time in stage 7  | 0.0s (min) ~3276.7s (min)             | 0.0s (min)      | 0x420E           | ○          |
| P42.15    | Setting of PLC stage 8   | refers to the setting mode of stage 1 | 00              | 0x420F           | ●          |
| P42.16    | Running time in stage 8  | 0.0s (min) ~3276.7s (min)             | 0.0s (min)      | 0x4210           | ○          |
| P42.17    | Setting of PLC stage 9   | refers to the setting mode of stage 1 | 00              | 0x4211           | ●          |
| P42.18    | Running time in stage 9  | 0.0s (min) ~3276.7s (min)             | 0.0s (min)      | 0x4212           | ○          |
| P42.19    | Setting of PLC stage 10  | refers to the setting mode of stage 1 | 00              | 0x4213           | ●          |
| P42.20    | Running time in stage 10 | 0.0s (min) ~3276.7s (min)             | 0.0s (min)      | 0x4214           | ○          |
| P42.21    | Setting of PLC stage 11  | refers to the setting mode of stage 1 | 00              | 0x4215           | ●          |
| P42.22    | Running time in stage 11 | 0.0s (min) ~3276.7s (min)             | 0.0s (min)      | 0x4216           | ○          |

| Parameter                         | Name                             | Setting range  | Factory default | Register address | Properties |
|-----------------------------------|----------------------------------|--|-----------------|------------------|------------|
| P42.23                            | Setting of PLC stage 12          | refers to the setting mode of stage 1  | 00              | 0x4217           | ●          |
| P42.24                            | Running time in stage 12         | 0.0s (min) ~3276.7s (min)  | 0.0s (min)      | 0x4218           | ○          |
| P42.25                            | Setting of PLC stage 13          | refers to the setting mode of stage 1  | 00              | 0x4219           | ●          |
| P42.26                            | Running time in stage 13         | 0.0s (min) ~3276.7s (min)  | 0.0s (min)      | 0x421A           | ○          |
| P42.27                            | Setting of PLC stage 14          | refers to the setting mode of stage 1  | 00              | 0x421B           | ●          |
| P42.28                            | Running time in stage 14         | 0.0s (min) ~3276.7s (min)  | 0.0s (min)      | 0x421C           | ○          |
| P42.29                            | Setting of PLC stage 15          | refers to the setting mode of stage 1  | 00              | 0x421D           | ●          |
| P42.30                            | Running time in stage 15         | 0.0s (min) ~3276.7s (min)  | 0.0s (min)      | 0x421E           | ○          |
| P43 Fixed Length and Linear Speed |                                  |  |                 |                  |            |
| P43.00                            | Set the counting value           | 1~65535  | 1000            | 0x4300           | ●          |
| P43.01                            | Designated the counting value    | 1~p43.00 (set counting value)  | 1000            | 0x4301           | ●          |
| P43.02                            | Selection of length reach action | Ones: length reaching<br>0: continue to run<br>1: shutdown<br>Tens: unit of length<br>0: meter<br>1: 10 meters<br>Hundreds: length shutdown reset<br>0: invalid<br>1: action<br>Thousands: counting, | 0000            | 0x4302           | ●          |

| Parameter   | Name                                  | Setting range   | Factory default | Register address | Properties |
|---|---------------------------------------|---|-----------------|------------------|------------|
|   |                                       | stopping and clearing<br>0: invalid<br>1: action  |                 |                  |            |
| P43.03  | Setting length                        | 0m~65535m   | 0m              | 0x4303           | ●          |
| P43.04  | Number of pulses per meter            | 0.1~6553.5  | 1000.0          | 0x4304           | ●          |
| P43.05  | Linear speed display coefficient      | 0.0%~1000.0%  | 0.0%            | 0x4305           | ○          |
| P44 lifting function parameters (only for crane models) |                                       |   |                 |                  |            |
| P44.00  | Crane device selection                | ones: device selection<br>0: forbidden<br>1: Promotion device<br>2: translation device<br>Tens: reserve | 00              | 0x4400           | ●          |
| P44.01  | Upward brake opening frequency        | 0.00Hz~10.00Hz  | 2.00Hz          | 0x4401           | ●          |
| P44.02  | Upward brake opening                  | 0.0%~200.0%   | 30.0%           | 0x4402           | ●          |
| P44.03  | Downward brake opening frequency      | 0.00Hz~10.00Hz  | 3.00Hz          | 0x4403           | ●          |
| P44.04  | Downward brake opening current        | 0.0%~200.0%   | 30.0%           | 0x4404           | ●          |
| P44.05  | Holding time of brake opening current | 0.0s~10.0s  | 0.5s            | 0x4405           | ●          |
| P44.06  | Upward brake off frequency            | 0.00Hz~10.00Hz  | 2.00Hz          | 0x4406           | ●          |

| Parameter                           | Name                                | Setting range   | Factory default | Register address | Properties |
|-------------------------------------|-------------------------------------|---|-----------------|------------------|------------|
| P44.07                              | Downward brake off frequency        | 0.00Hz~10.00Hz  | 3.00Hz          | 0x4407           | ●          |
| P44.08                              | Holding time of brake off frequency | 0.0s~10.0s  | 0.5s            | 0x4408           | ●          |
| P44.09                              | brake off delay time                | 0.0s~10.0s  | 0.0s            | 0x4409           | ●          |
| P44.10                              | Stop delay time                     | 0.0s~10.0s  | 0.5s            | 0x440A           | ●          |
| P44.11                              | Start direction control selection   | 0: The brake opening torque is consistent with the running direction<br>1: The brake opening torque is always in the  | 0               | 0x440B           | ●          |
| P44.12                              | Instruction reverse selection       | 0: Do not allow the running process to reverse directly<br>1: Allow the running process to be reversed directly   | 0               | 0x440C           | ●          |
| P44.15                              | Keyboard Up/Dn speed                | 0: speed adjustment is forbidden  | 0               | 0x440F           | ●          |
| P50 Modbus Communication Parameters |                                     |   |                 |                  |            |
| P50.00                              | Local address                       | 0~247; 0: broadcast address   | 1               | 0x5000           | ○          |
| P50.01                              | Communication rate selection        | Ones: communication baud rate of terminal port<br>Tens: communication baud rate of keyboard port<br>0:4800bps<br>1:9600bps<br>2:19200bps<br>3:38400bps<br>4:57600bps<br>5:115200bps | 31              | 0x5001           | ○          |

| Parameter | Name  | Setting range  | Factory default | Register address | Properties |
|-----------|---|--|-----------------|------------------|------------|
| P50.02    | Data format   | Ones: Terminal port data format<br>Tens: Keyboard port data format<br>0:1-8-1-N format,RTU<br>1:1-8-1-E format,RTU<br>2:1-8-1-O format,RTU<br>3:1-7-1-N format,ASCII<br>4:1-7-1-E format,ASCII<br>5:1-7-1-O format,ASCII   | 00              | 0x5002           | ○          |
| P50.03    | Communication response delay                                | 0.000s~60.000s   | 0.000s          | 0x5003           | ○          |
| P50.04    | Overtime detection time                                     | 0.0s~600.0s<br>0.0s:indicate no detection  | 0.0s            | 0x5004           | ○          |
| P50.05    | Selection of communication error response shield            | Ones: selection of communication port error response shield<br>Tens: selection of keyboard port error response shield<br>0: valid<br>1: invalid  | 00              | 0x5005           | ○          |
| P50.06    | Master-slave mode selection and slave function code setting | ones: master-slave selection for terminal port communication<br>Tens: master-slave selection for keyboard port communication<br>0: stand-alone use<br>1: this machine is used as the host<br>2: this machine is a slave machine<br>Hundreds: operation address of terminal port communication<br>Thousands: communication operation address of | 0000            | 0x5006           | ●          |

| Parameter                     | Name  | Setting range   | Factory default     | Register address | Properties |
|-------------------------------|---|---|---------------------|------------------|------------|
|                               |   | extended port<br>0: P00.00<br>1: P40.01   |                     |                  |            |
| P50.07                        | Interval time of host operation data                      | 0.010s~1.000s   | 0.050s              | 0x5007           | ○          |
| P50.08                        | Proportion coefficient of receiving date of slave machine | 0.00~10.00  | 1.00                | 0x5008           | ○          |
| P60 Motor Control Preparation |   |   |                     |                  |            |
| P60.00                        | Carrier frequency setting                                 | ≤ 15kW:1.0kHz~16.0kHz,<br>Factory value:6.0kHz<br>18.5kW-45kW:1.0kHz~10.0 kHz,<br>Factory value:4.0kHz<br>55kW-75kW:1.0kHz~8.0kHz,<br>Factory value:3.0kHz<br>≥ 90kW:1.0kHz~3.0kHz,<br>Factory value:2.0kHz | Model determination | 0x6000           | ●          |
| P60.02                        | Pulse width modulation mode                               | 0: 3-phase modulation<br>1: automatic switching   | 0                   | 0x6002           | ●          |
| P60.03                        | DPWM switching frequency                                  | 5.00Hz~maximum frequency  | 8.00Hz              | 0x6003           | ●          |

| Parameter              | Name                                     | Setting range  | Factory default | Register address | Properties |
|------------------------|--|--|-----------------|------------------|------------|
| P60.04                 | Magnetic flux brake selection            | 0: forbidden<br>1: action                            | 0               | 0x6004           | ●          |
| P60.05                 | Energy consumption brake selection       | 0: forbidden<br>1: action                            | 0               | 0x6005           | ●          |
| P60.06                 | Energy consumption brake action voltage  | 650V~750V  | 720V            | 0x6006           | ●          |
| P60.07                 | Over-voltage stall regulation selection  | 0: forbidden<br>1: action                            | 1               | 0x6007           | ●          |
| P60.08                 | Over-voltage stall action voltage        | 100.0%~150.0% (relative to rated bus voltage)        | 135.0%          | 0x6008           | ●          |
| P60.09                 | Under-voltage stall regulation selection | 0: forbidden<br>1: action                            | 0               | 0x6009           | ●          |
| P60.10                 | Under-voltage stall action voltage       | 50.0%~95.0% (relative to rated bus voltage)          | 85.0%           | 0x600A           | ●          |
| P60.11                 | Current limiting action selection        | 0: forbidden<br>1: action                            | 1               | 0x600B           | ●          |
| P60.12                 | Current limiting level                   | 20.0%~200.0%( Relative rated current)                | 160.0%          | 0x600C           | ●          |
| P60.13                 | Slip compensation gain                   | 0.0~300.0%   | 100.0%          | 0x600D           | ○          |
| P61 Encoder Parameters |  |  |                 |                  |            |
| P61.00                 | Speed feedback                           | 0: Incremental encoder 1<br>1: Incremental encoder 2 | 0               | 0x6100           | ●          |



| Parameter | Name   | Setting range   | Factory default | Register address | Properties |
|-----------|--|---|-----------------|------------------|------------|
|           | encoder selection                            | 2: Sine encoder   |                 |                  |            |
| P61.01    | Encoder 1 resolution                         | 1~10000   | 1024            | 0x6101           | ●          |
| P61.02    | Electrical angle offset 1                    | 0.00°~359.99°   | 0.00°           | 0x6102           | ●          |
| P61.03    | Encoder 1 signal phase                       | 0: normal; that is, A is ahead of B in forward rotation.<br>1: reverse; that is, B is ahead of B in forward rotation. | 0               | 0x6103           | ●          |
| P61.04    | The numerator of the electronic gear ratio 1 | 1~65535   | 1000            | 0x6104           | ●          |
| P61.05    | Denominator of electronic gear ratio 1       | 1~65535   | 1000            | 0x6105           | ●          |
| P61.06    | Encoder 2 resolution                         | 1~10000   | 1024            | 0x6106           | ●          |
| P61.07    | Electrical angle offset 2                    | 0.00°~359.99°   | 0.00°           | 0x6107           | ●          |
| P61.08    | Encoder 2 signal phase                       | 0: normal; that is, A is ahead of B in forward rotation.<br>1: reverse; that is, B is ahead of B in forward rotation. | 0               | 0x6108           | ●          |

| Parameter                           | Name   | Setting range   | Factory default     | Register address | Properties |
|-------------------------------------|--|-----------------|---------------------|------------------|------------|
| P61.09                              | The numerator of the electronic gear ratio 2 | 1~65535         | 1000                | 0x6109           | ●          |
| P61.10                              | Denominator of electronic gear ratio 2       | 1~65535         | 1000                | 0x610A           | ●          |
| P61.11                              | The number of pole pairs of resolver         | 1~32            | 1                   | 0x610B           | ●          |
| P61.12                              | Sinusoidal signal offset                     | 1~65535         | 0                   | 0x610C           | ●          |
| P61.13                              | Cosine signal offset                         | 1~65535         | 0                   | 0x610D           | ●          |
| P61.14                              | Sinusoidal signal gain                       | 1~8192          | 4096                | 0x610E           | ●          |
| P61.15                              | Cosine signal gain                           | 1~8192          | 4096                | 0x610F           | ●          |
| P62 Motor Characteristic Parameters |  |                 |                     |                  |            |
| P62.00                              | Stator resistance of asynchronous motor      | 0.001Ω~65.000Ω  | Model determination | 0x6200           | ●          |
| P62.01                              | Rotor resistance of asynchronous motor       | 0.001Ω~65.000Ω  | Model determination | 0x6201           | ●          |
| P62.02                              | Leakage inductance of asynchronous motor     | 0.01mH~650.00mH | Model determination | 0x6202           | ●          |

| Parameter                      | Name   | Setting range   | Factory default     | Register address | Properties |
|--------------------------------|--|-----------------|---------------------|------------------|------------|
| P62.03                         | Mutual inductance of asynchronous motor          | 0.01mH~650.00mH | Model determination | 0x6203           | ●          |
| P62.04                         | No-load current of asynchronous motor            | 0.1A~P63.02     | Model determination | 0x6204           | ●          |
| P62.05                         | Saturation coefficient of asynchronous motor     | 0.00%~100.00%   | Model determination | 0x6205           | ●          |
| P62.06                         | Stator resistance of synchronous motor           | 0.001Ω~65.000Ω  | Model determination | 0x6206           | ●          |
| P62.07                         | D-axis inductance of synchronous motor           | 0.01mH~650.00mH | Model determination | 0x6207           | ●          |
| P62.08                         | Q-axis inductance of synchronous motor           | 0.01mH~650.00mH | Model determination | 0x6208           | ●          |
| P62.09                         | Counter electromotive force of synchronous motor | 0.1mV~2000.0mV  | Model determination | 0x6209           | ●          |
| P63 Motor Nameplate Parameters |  |                 |                     |                  |            |
| P63.00                         | Rated power of motor                             | 0.2kW~6000.0kW  | Model determination | 0x6300           | ●          |

| Parameter                  | Name                           | Setting range   | Factory default     | Register address | Properties |
|----------------------------|--------------------------------|---|---------------------|------------------|------------|
| P63.01                     | Rated voltage of motor         | 1V~480V   | 380V                | 0x6301           | ●          |
| P63.02                     | Rated current of motor         | 0.1A~6000.0A  | Model determination | 0x6302           | ●          |
| P63.03                     | Rated frequency of motor       | 10.00Hz~300.00Hz  | 50.00Hz             | 0x6303           | ●          |
| P63.04                     | Rated speed of motor           | 1~63535 rpm   | 1500rpm             | 0x6304           | ●          |
| P63.05                     | Pole number                    | 2~80  | 4                   | 0x6305           | ●          |
| P63.07                     | Self-tuning of motor parameter | 0: no request<br>1: motor static identification<br>2: motor rotation identification | 0                   | 0x6307           | ●          |
| P63.08                     | Motor control mode             | 0: advanced scalar control<br>1: no PG vector control<br>2: PG vector control       | 0                   | 0x6308           | ●          |
| U00 Status Monitoring Data |                                |   |                     |                  |            |
| U00.00                     | Running frequency              | 0.00Hz~300.00Hz   | Actual value        | 0x8100           | ★          |
| U00.01                     | Setting frequency              | 0.00Hz~300.00Hz   | Actual value        | 0x8101           | ★          |
| U00.02                     | Output frequency               | 0.00Hz~300.00Hz   | Actual value        | 0x8102           | ★          |
| U00.03                     | Synchronization frequency      | 0.00Hz~300.00Hz   | Actual value        | 0x8103           | ★          |
| U00.04                     | Local frequency                | 0.00Hz~300.00Hz   | Actual value        | 0x8104           | ★          |
| U00.05                     | Extended frequency             | 0.00Hz~300.00Hz   | Actual value        | 0x8105           | ★          |
| U00.06                     | Setting rotary speed           | 0rpm~60000rpm   | Actual value        | 0x8106           | ★          |

| Parameter | Name                   | Setting range   | Factory default | Register address | Properties |
|-----------|------------------------|---|-----------------|------------------|------------|
| U00.07    | Output rotary speed    | 0rpm~60000rpm   | Actual value    | 0x8107           | ★          |
| U00.08    | Bus voltage            | 0V~2000V  | Actual value    | 0x8108           | ★          |
| U00.09    | Output Voltage         | 0V~2000V  | Actual value    | 0x8109           | ★          |
| U00.10    | Output current         | 0.0A~6000.0A  | Actual value    | 0x810A           | ★          |
| U00.11    | Output power           | 0.0kW~6000.0kW  | Actual value    | 0x810B           | ★          |
| U00.12    | Output torque          | -300.0%~300.0%  | Actual value    | 0x810C           | ★          |
| U00.13    | Given torque           | -300.0%~300.0%  | Actual value    | 0x810D           | ★          |
| U00.14    | AI1 voltage            | -10.00V~10.00V  | Actual value    | 0x810E           | ★          |
| U00.15    | AI2 voltage            | -10.00V~10.00V  | Actual value    | 0x810F           | ★          |
| U00.18    | AO1 voltage            | 0.00V~10.00V  | Actual value    | 0x8112           | ★          |
| U00.19    | AO2 voltage            | 0.00V~10.00V  | Actual value    | 0x8113           | ★          |
| U00.20    | HDI input frequency    | 0Hz~60000Hz   | Actual value    | 0x8114           | ★          |
| U00.21    | HDO output frequency   | 0Hz~60000Hz   | Actual value    | 0x8115           | ★          |
| U00.22    | Input terminal status  | Bit0~Bit6 corresponds to X1~X7<br>Bit8~Bit9 corresponds to AI1~AI2<br>0: input terminal OFF<br>1: input terminal ON | Actual value    | 0x8116           | ★          |
| U00.23    | Output terminal status | Bit0~Bit1 corresponds to Y1~Y2<br>Bit2~Bit3 corresponds to R1~R2<br>0: output terminal OFF                          | Actual value    | 0x8117           | ★          |

| Parameter | Name                        | Setting range   | Factory default | Register address | Properties |
|-----------|-----------------------------|---|-----------------|------------------|------------|
|           |                             | 1: output terminal ON   |                 |                  |            |
| U00.24    | Machine status              | Ones:<br>Bit0: run/stop<br>Bit1: forward/reverse rotation<br>Bit2: DC braking<br>Bit3: parameter identification<br>Tens:<br>0: constant speed<br>1: acceleration<br>2: deceleration | Actual value    | 0x8118           | ★          |
| U00.25    | Heatsink temperature        | 0.0℃~120.0℃   | Actual value    | 0x8119           | ★          |
| U00.26    | Motor temperature           | 0.0℃~200.0℃   | Actual value    | 0x811A           | ★          |
| U00.27    | PID given                   | -100.00%~100.00%  | Actual value    | 0x811B           | ★          |
| U00.28    | PID feedback                | -100.00%~100.00%  | Actual value    | 0x811C           | ★          |
| U00.29    | PID error                   | -100.00%~100.00%  | Actual value    | 0x811D           | ★          |
| U00.30    | PLC stage                   | 0~15  | Actual value    | 0x811E           | ★          |
| U00.31    | Main setting channel        | 0~11  | Actual value    | 0x811F           | ★          |
| U00.32    | Auxiliary setting channel   | 0~11  | Actual value    | 0x8120           | ★          |
| U00.33    | Main setting frequency      | 0.00Hz~300.00Hz   | Actual value    | 0x8121           | ★          |
| U00.34    | Auxiliary setting frequency | 0.00Hz~300.00Hz   | Actual value    | 0x8122           | ★          |

| Parameter | Name   | Setting range     | Factory default | Register address | Properties |
|-----------|--|-------------------|-----------------|------------------|------------|
| U00.35    | External counting value                      | 0~65535           | Actual value    | 0x8123           | ★          |
| U00.36    | Setting length value                         | 0m~65535m         | Actual value    | 0x8124           | ★          |
| U00.37    | Running length value                         | 0m~65535m         | Actual value    | 0x8125           | ★          |
| U00.38    | Operating linear speed                       | 0m/s~65535m/s     | Actual value    | 0x8126           | ★          |
| U00.39    | AI1 sampling value                           | -10.00V~10.00V    | Actual value    | 0x8127           | ★          |
| U00.40    | AI2 sampling value                           | -10.00V~10.00V    | Actual value    | 0x8128           | ★          |
| U00.43    | Current fault code                           | 0~100             | Actual value    | 0x812B           | ★          |
| U00.44    | Accumulated power-on time                    | 0h~65535h         | Actual value    | 0x812C           | ★          |
| U00.45    | Accumulated running time                     | 0h~65535h         | Actual value    | 0x812D           | ★          |
| U00.46    | High accumulated energy consumption of motor | 0kW.h~59999kW.h   | Actual value    | 0x812E           | ★          |
| U00.47    | Low accumulated energy consumption of motor  | 0.0kW.h~999.9kW.h | Actual value    | 0x812F           | ★          |

| Parameter             | Name                              | Setting range  | Factory default | Register address | Properties |
|-----------------------|-----------------------------------|--|-----------------|------------------|------------|
| U00.48                | High operation energy consumption | 0kW.h~59999kW.h  | Actual value    | 0x8130           | ★          |
| U00.49                | Low operation energy consumption  | 0.0kW.h~999.9kW.h  | Actual value    | 0x8131           | ★          |
| U01 Fault Record Data |                                   |  |                 |                  |            |
| U01.00                | Last fault code                   | 1: over-current in acceleration<br>2: over-current in deceleration<br>3: over current in constant speed<br>4: over-voltage in acceleration<br>5: over-voltage in deceleration<br>6: over-voltage in constant speed<br>7: inverter under-voltage<br>8: current detection fault<br>9: system interference fault<br>10: module protection fault<br>11: motor identification fault<br>12: contactor suction fault<br>13: external terminal fault<br>14: inverter overheating<br>15: motor overheating<br>16: inverter overload<br>17: motor overload<br>18: inverter input phase lack<br>19: inverter output phase | Actual value    | 0x8200           | ★          |



| Parameter | Name                                | Setting range   | Factory default | Register address | Properties |
|-----------|-------------------------------------|---|-----------------|------------------|------------|
|           |                                     | lack<br>20: inverter output off load<br>21: inverter short circuit to ground<br>22: EEPROM read-write failure<br>23: communication overtime fault<br>24: reaching power-on time<br>25: reaching running time<br>26: PID given loss<br>27: PID feedback loss<br>28: excessive speed bias<br>29: motor overspeed<br>30: encoder fault<br>31- 36: reserve<br>37: speed estimation fault<br>38: reserve<br>39: parameter copy fault |                 |                  |            |
| U01.01    | Given frequency at the last fault   | 0.00Hz~300.00Hz   | Actual value    | 0x8201           | ★          |
| U01.02    | Output frequency at the last fault  | 0.00Hz~300.00Hz   | Actual value    | 0x8202           | ★          |
| U01.03    | Output Current at the last fault    | 0.0A~6000.0A  | Actual value    | 0x8203           | ★          |
| U01.04    | DC bus voltage at the last fault    | 0V~2000V  | Actual value    | 0x8204           | ★          |
| U01.05    | Output Voltage at the last fault    | 0V~2000V  | Actual value    | 0x8205           | ★          |
| U01.06    | Input terminal status of last fault | 0x00~0x7F   | Actual value    | 0x8206           | ★          |

| Parameter | Name                                      | Setting range   | Factory default | Register address | Properties |
|-----------|---|-----------------|-----------------|------------------|------------|
| U01.07    | Output terminal status at the last fault  | 0x00~0x7F       | Actual value    | 0x8207           | ★          |
| U01.08    | Machine running status of the last fault  | 0x00~0x2F       | Actual value    | 0x8208           | ★          |
| U01.09    | Radiator temperature of the last fault    | 0.0℃~120.0℃     | Actual value    | 0x8209           | ★          |
| U01.10    | Cumulative running time of the last fault | 0.0h~6553.5h    | Actual value    | 0x820A           | ★          |
| U01.11    | The last fault code                       | As U01.00       | Actual value    | 0x820B           | ★          |
| U01.12    | Given frequency at previous fault         | 0.00Hz~300.00Hz | Actual value    | 0x820C           | ★          |
| U01.13    | Output frequency at previous fault        | 0.00Hz~300.00Hz | Actual value    | 0x820D           | ★          |
| U01.14    | Given current at previous fault           | 0.0A~6000.0A    | Actual value    | 0x820E           | ★          |
| U01.15    | DC bus voltage at previous fault          | 0V~2000V        | Actual value    | 0x820F           | ★          |
| U01.16    | Output voltage at previous fault          | 0V~2000V        | Actual value    | 0x8210           | ★          |
| U01.17    | Input terminal status at previous fault   | 0x00~0x7F       | Actual value    | 0x8211           | ★          |
| U01.18    | Output terminal status at previous fault  | 0x00~0x7F       | Actual value    | 0x8212           | ★          |
| U01.19    | Machine                                   | 0x00~0x2F       | Actual value    | 0x8213           | ★          |

| Parameter | Name  | Setting range   | Factory default | Register address | Properties |
|-----------|---|-----------------|-----------------|------------------|------------|
|           | running status at previous fault                  |                 |                 |                  |            |
| U01.20    | Radiator temperature at previous fault            | 0.0℃~120.0℃     | Actual value    | 0x8214           | ★          |
| U01.21    | Cumulative running time at previous fault         | 0.0h~6553.5h    | Actual value    | 0x8215           | ★          |
| U01.22    | The first two fault codes                         | As U01.00       | Actual value    | 0x8216           | ★          |
| U01.23    | Given frequency during the first two faults       | 0.00Hz~300.00Hz | Actual value    | 0x8217           | ★          |
| U01.24    | Output frequency during the first two faults      | 0.00Hz~300.00Hz | Actual value    | 0x8218           | ★          |
| U01.25    | Output current during the first two faults        | 0.0A~6000.0A    | Actual value    | 0x8219           | ★          |
| U01.26    | DC bus voltage during first two faults            | 0V~2000V        | Actual value    | 0x821A           | ★          |
| U01.27    | Output voltage during the first two faults        | 0V~2000V        | Actual value    | 0x821B           | ★          |
| U01.28    | Input terminal status during the first two faults | 0x00~0x7F       | Actual value    | 0x821C           | ★          |
| U01.29    | Output  | 0x00~0x7F       | Actual value    | 0x821D           | ★          |

| Parameter                     | Name  | Setting range                  | Factory default     | Register address | Properties |
|-------------------------------|---|--------------------------------|---------------------|------------------|------------|
|                               | terminal status during the first two faults             |                                |                     |                  |            |
| U01.30                        | achine operating status during the first two faults     | 0x00~0x2F                      | Actual value        | 0x821E           | ★          |
| U01.31                        | Radiator temperature during the first two faults        | 0.0℃~120.0℃                    | Actual value        | 0x821F           | ★          |
| U01.32                        | Cumulative operation time during the first two faults   | 0.0h~6553.5h                   | Actual value        | 0x8220           | ★          |
| U01.33                        | The first three fault codes                             | As U01.00                      | Actual value        | 0x8221           | ★          |
| U01.34                        | Cumulative operation time during the first three faults | 0.0h~6553.5h                   | Actual value        | 0x8222           | ★          |
| U02 Inverter Information Data |   |                                |                     |                  |            |
| U02.00                        | Rated power of inverter                                 | 0.0kW~6000.0kW                 | Model determination | 0x8300           | ★          |
| U02.01                        | Rated voltage of inverter                               | 0V~2000V                       | Model determination | 0x8301           | ★          |
| U02.02                        | Rated current of inverter                               | 0.0A~6000.0A                   | Model determination | 0x8302           | ★          |
| U02.03                        | Software series of inverter                             | 500 : represents SCK500 series | Actual value        | 0x8303           | ★          |

| Parameter | Name                            | Setting range | Factory default | Register address | Properties |
|-----------|---------------------------------|---------------|-----------------|------------------|------------|
| U02.04    | Functional version of inverter  | 1.00~99.99    | Actual value    | 0x8304           | ★          |
| U02.05    | Performance version of inverter | 1.00~99.99    | Actual value    | 0x8305           | ★          |
| U02.06    | Production year of inverter     | 2000~2999     | Actual value    | 0x8306           | ★          |
| U02.07    | Production month of inverter    | 01/01~12/31   | Actual value    | 0x8307           | ★          |
| U02.08    | Custom series number            | 00~9999       | Actual value    | 0x8308           | ★          |
| U02.09    | Customer non-label              | 00~9999       | Actual value    | 0x8309           | ★          |
| U02.10    | Keyboard software version       | 0.00~99.99    | Actual value    | 0x830A           | ★          |

## Chapter 5 Detailed parameter introduction

### P00 frequency given parameter

|        |   |                                    |                         |
|--------|---|------------------------------------|-------------------------|
| P00.00 | Main given digital setting of frequency | range:0.00Hz~upper limit frequency | Factory default:50.00Hz |
| P00.01 | Main given mode of frequency            | range:0~C                          | Factory default:0       |

0: Digital given P00.00+Up/Down adjustment

1: Analog input AI1

2: Analog output AI2

Analog AI1 input specification:0~10V and 0~20mA,Can be selected by dialing code on the control panel,Analog AI2 input specification:0~10V。The corresponding relationship between the analog input and the given frequency is defined by the P12 group.

3: Reserve

4: Min[AI1,AI2]

Take the minimum value of analog input AI1, AI2 as the frequency setting source,The output frequency is limited by the upper and lower limits.

5: Max[AI1,AI2]

The maximum value of the analog input AI1, AI2 given as the frequency setting source, the output frequency is limited by the upper and lower limits.

6: Sub[AI1,AI2]

Using [AI1-AI2] as the frequency setting source, the output frequency is limited by the upper and lower limits.

7: Add[AI1,AI2]

Using [AI1+AI2] as the frequency setting source, the output frequency is limited by the upper and lower limits.

8: Pulse given HDI

Receive high-speed pulse signal through terminal X7/HDI,As a frequency setting method, the correspondence between HDI and frequency is determined by P12.33~P12.36 function codes.

9: Process PID

The result output by the process PID operation is used as the frequency setting source, please refer to the P40 group parameter function code for details.

A: Simple PLC

The control output of the simple PLC is used as the frequency setting source, please refer to the P42 group parameter function code for details.

B: Keyboard potentiometer

The keyboard panel with a potentiometer can be used to adjust the frequency.

C: No given

The main given frequency output is 0

|        |  |                                    |                         |
|--------|--|------------------------------------|-------------------------|
| P00.02 | Auxiliary given digital setting of frequency | range:0.00Hz~upper limit frequency | Factory default:50.00Hz |
| P00.03 | Frequency auxiliary given mode               | range:0~B                          | Factory default:B       |

0: digital given (P00.02)

1: analog input AI1

2: analog input AI2

Analog AI1 input specifications:0~10V and 0~20mA,can be selected by dialing on the control panel,Analog AI2 input specifications:0~10V。 The corresponding relationship between the analog input and the given frequency is defined by the P12 group.

3: reserve

4: Min[AI1,AI2]

The minimum value of the analog input AI1, AI2 is given as the frequency setting source, and the output frequency is limited by the upper and lower limits.

5: Max[AI1,AI2]

The maximum value of the analog input AI1, AI2 given as the frequency setting source, the output frequency is limited by the upper and lower limits.

6: Sub[AI1,AI2]

Using [AI1-AI2] as the frequency setting source, the output frequency is limited by the upper and lower limits.

7: Add[AI1,AI2]

Using [AI1+AI2] as the frequency setting source, the output frequency is limited by the upper and lower limits.

8: pulse given HDI

High-speed pulse signal is received through terminal X7/HDI. As the frequency setting method, the corresponding relationship between HDI and frequency is determined by P12.33~P12.36 function codes.

9: reserve

A: reserve

B: no given

|        |  |                   |                        |
|--------|--|-------------------|------------------------|
| P00.04 | Main given coefficient of frequency      | range:0.0%~200.0% | Factory default:100.0% |
| P00.05 | Auxiliary given coefficient of frequency | range:0.0%~200.0% | Factory default:100.0% |

Proportionally enlarge or reduce the output frequency value given by the main frequency and the auxiliary frequency given by the frequency.

For example: the final output value of main frequency setting = main frequency setting × P00.04;  
the final output value of frequency auxiliary setting = frequency auxiliary setting × P00.05.

|        |  |                 |                    |
|--------|--|-----------------|--------------------|
| P00.06 | Main and auxiliary overlay<br>selection of frequency | range:0x00~0x34 | Factory default:00 |
|--------|--|-----------------|--------------------|

Ones: frequency given mode

0: frequency main given

The frequency source is determined by P00.01 frequency main setting mode, please refer to P00.01 parameter function code for details.

1: main and auxiliary operation result of frequency

The frequency setting is determined by the result of the main and auxiliary operations, and the relationship between the main and auxiliary operations is determined by the ten-digit setting value of this parameter.

2: main given and auxiliary given switching of frequency

The frequency source switching terminal can be input through the switching value, so that the frequency main setting and frequency auxiliary setting can be switched. When the frequency source switching terminal is invalid, the frequency main setting is used as the frequency setting source; otherwise, the frequency auxiliary setting is used as the frequency setting source.

3: main given and main auxiliary operation result switching of frequency

The frequency source switching terminal can be input through the switching value, so that the frequency main setting and main and auxiliary calculation results can be switched. When the frequency source switching terminal is invalid, the frequency main setting is used as the frequency setting source; otherwise, the main and auxiliary operation result is used as the frequency setting source.

4: auxiliary given and main auxiliary operation result switching of frequency

The frequency source switching terminal can be input through the switching value, so that the frequency auxiliary setting and main and auxiliary calculation results can be switched. When the frequency source switching terminal is invalid, the frequency auxiliary setting is used as the frequency setting source; otherwise, the main and auxiliary operation result is used as the frequency setting source.

Tens: given operation relation of frequency main and auxiliary

0: Min [main, auxiliary]

The smaller absolute value of the frequency main setting and the frequency auxiliary setting is taken as the setting frequency, and the final result is limited by the upper and lower limits.

1: Max [main, auxiliary]

The greater absolute value of the frequency main setting and the frequency auxiliary setting is taken as the setting frequency, and the final result is limited by the upper and lower limits.

2: Sub [main, auxiliary]

The result that the frequency main setting minuses the frequency auxiliary setting is used as the setting frequency, and the final result is limited by the upper and lower limits.

3: Add [main, auxiliary]

The sum of the frequency main setting and the frequency auxiliary setting is used as the setting frequency, and the final result is limited by the upper and lower limits.



|        |                       |   |                            |
|--------|-----------------------|---|----------------------------|
| P00.07 | Maximum frequency     | range:10.00Hz~300.00Hz                              | Factory<br>default:50.00Hz |
| P00.08 | upper limit frequency | range: Lower limit frequency ~<br>maximum frequency | Factory<br>default:50.00Hz |
| P00.09 | Lower limit frequency | range:0.00Hz~upper limit<br>frequency               | Factory<br>default:0.00Hz  |

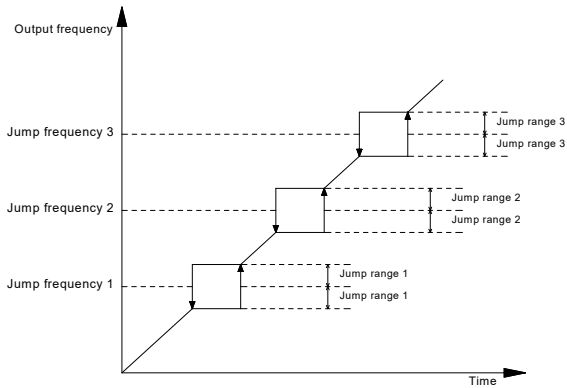
maximum frequency:Refers to the highest frequency that the inverter allows to output.

upper limit frequency: According to the actual process requirements, the user sets the maximum frequency allowed to run.

Lower limit frequency: The user sets the lowest frequency allowed to operate according to the actual process requirements.

|        |                     |                                       |                           |
|--------|---------------------|---------------------------------------|---------------------------|
| P00.10 | Jumping frequency 1 | range:0.00Hz~upper limit<br>frequency | Factory<br>default:0.00Hz |
| P00.11 | Jumping range 1     | range:0.00Hz~30.00Hz                  | Factory<br>default:0.00Hz |
| P00.12 | Jumping frequency 2 | range:0.00Hz~upper limit<br>frequency | Factory<br>default:0.00Hz |
| P00.13 | Jumping range 2     | range:0.00Hz~30.00Hz                  | Factory<br>default:0.00Hz |
| P00.14 | Jumping frequency 3 | range:0.00Hz~upper limit<br>frequency | Factory<br>default:0.00Hz |
| P00.15 | Jumping range 3     | range:0.00Hz~30.00Hz                  | Factory<br>default:0.00Hz |

The mechanical resonance point of the load can be effectively avoided by setting the jump frequency, when the parameter setting value is 0, the jump frequency function is disabled. When the setting frequency of the inverter is within the range of the jump frequency, it shall be adjusted to the upper or lower bound of the jump frequency automatically according to the acceleration and deceleration status.



**Figure 5-1 Schematic diagram of jumping frequency**

|        |                           |                                       |                           |
|--------|---------------------------|---------------------------------------|---------------------------|
| P00.16 | Inching frequency setting | range:0.00Hz~upper limit<br>frequency | Factory<br>default:5.00Hz |
|--------|---------------------------|---------------------------------------|---------------------------|

The setting frequency and inching acceleration/deceleration time during the inching operation are determined by the function codes of P02.09 and P02.10.

### **P01 start and stop control parameters**

|        |                                  |           |                   |
|--------|----------------------------------|-----------|-------------------|
| P01.00 | Given mode of running<br>command | range:0~4 | Factory default:0 |
|--------|----------------------------------|-----------|-------------------|

Select the input channel for the inverter control commands. The control commands include: start, stop, forward, reverse, and inching.

0: keyboard command mode

The run command is controlled by the "Start" and "Stop" buttons on the keyboard panel. The "MON" light on the keyboard is on.

1: terminal command mode

The run command is controlled by the switching value input terminal functions FWD, REV, FJOG, RJOG, etc. The "MON" light on the keyboard is off.

2: Communication command mode

Start, stop, forward, reverse, and inching control of the inverter are carried out through communication, please refer to Appendix A for related communication operations. The "MON" light on the keyboard flashes.

3: multi-segment command mode

The run command is controlled by 1~multi-stage frequency terminal 4 of the switching value input terminal function "multi-stage frequency terminal".

|        |  |                   |                     |
|--------|--|-------------------|---------------------|
| P01.01 | Command given mode to<br>bundle frequency source | range:0x000~0xBBB | Factory default:000 |
|--------|--|-------------------|---------------------|

This parameter is used for defining the use of bundling combination of run command and frequency

source to facilitate the synchronous switching of run command and frequency source.

Ones: selection of keyboard command binding frequency source

0: digital given (P00.00)+Up/Down adjustment

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

9: process PID

A: simple PLC

B: no given

Tens: selection of terminal command binding frequency source (Choose the same as above)

Hundreds: selection of communication command binding frequency source (Choose the same as above)

For the description of the above frequency setting mode, please refer to P00.01 function code.

|        |                               |           |                   |
|--------|-------------------------------|-----------|-------------------|
| P01.02 | Operation direction selection | range:0~1 | Factory default:0 |
|--------|-------------------------------|-----------|-------------------|

It is used for changing the rotating direction of the motor when the keyboard controls the run command. Terminal control and communication control are not affected by this parameter.

0: positive direction

1: reverse direction

|        |                           |           |                   |
|--------|---------------------------|-----------|-------------------|
| P01.03 | Reverse control selection | range:0~1 | Factory default:0 |
|--------|---------------------------|-----------|-------------------|

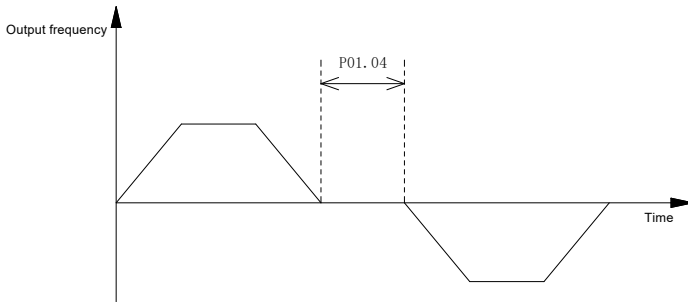
For some applications, the reverse rotation of the motor is not allowed, and the reverse rotation can be prohibited by the function. When the rotating direction of the actual motor is opposite to the equipment requirements, the positive direction of the equipment is consistent with the output of the inverter by exchanging any two-phase wiring at the output side of the inverter.

0: allow reverse rotation

1: forbid reverse rotation

|        |                                 |                     |                      |
|--------|---------------------------------|---------------------|----------------------|
| P01.04 | Positive and negative dead time | range: 0.0s~3600.0s | Factory default:0.0s |
|--------|---------------------------------|---------------------|----------------------|

It is used for defining the transition time of the inverter with 0.00Hz output frequency when the inverter goes from forward to reverse or from reverse to forward.



**Figure 5-2 Schematic diagram of forward and reverse dead time**

|        |                            |           |                   |
|--------|----------------------------|-----------|-------------------|
| P01.05 | Selection of starting mode | range:0~1 | Factory default:0 |
|--------|----------------------------|-----------|-------------------|

0: start from start frequency

When the inverter starts running from the stop status, it is started directly from the setting frequency of the starting frequency P01.06, and the setting time of P01.07 is kept at this frequency, and then it is accelerated to the setting frequency to run according to the setting acceleration time and acceleration mode.

In this starting mode, if the setting value of P01.09 is not 0, then DC braking is performed firstly and then it is started from the starting frequency.

1: speed search starting

Firstly, the current rotating speed of the motor is identified, and then the smooth start is carried out from the searched speed. It is suitable for starting large inertia loads, rotating motors and other equipment.

|        |                              |                                    |                        |
|--------|------------------------------|------------------------------------|------------------------|
| P01.06 | Starting frequency setting   | range:0.00Hz~upper limit frequency | Factory default:0.50Hz |
| P01.07 | Hold time of start frequency | range:0.0s~3600.0s                 | Factory default:0.0s   |

In order to ensure the motor torque when starting, please set a suitable starting frequency. The starting frequency holding time is used for establishing sufficient magnetic flux during the motor starting process. The starting frequency holding time is not included in the acceleration time.

|        |  |                    |                       |
|--------|--|--------------------|-----------------------|
| P01.08 | Starting DC brake current/pre-excitation current | range:0.0%~100.0%  | Factory default:50.0% |
| P01.09 | Starting DC braking time/pre-excitation time     | range:0.00s~30.00s | Factory default:0.00s |

When the setting value of P01.09 is greater than 0.00s, and the starting mode is selected to start from the starting frequency, the inverter performs DC braking firstly, and then it starts from the starting frequency, the DC braking current is determined by P01.08, and DC braking current is a percentage relative to the rated current of the inverter.

|        |                        |           |                   |
|--------|------------------------|-----------|-------------------|
| P01.10 | Selection of stop mode | range:0~1 | Factory default:0 |
|--------|------------------------|-----------|-------------------|

0: slow down and stop

The inverter receives the stop command and starts deceleration stopping according to the setting deceleration time. In this stop mode, if the setting value of P01.13 is greater than 0.00s, then it is decelerated and stopped firstly. When the output frequency is lower than the setting value of P01.11, it starts to enter the stopping DC braking status and keeps the setting time of P01.12; then it stops.

1: free stop

After receiving the stop command, the inverter immediately blocks the output, and the motor stops freely stop according to the mechanical inertia.

|        |                                     |                                     |                        |
|--------|-------------------------------------|-------------------------------------|------------------------|
| P01.11 | Starting frequency of stop DC brake | range:0.00Hz~ upper limit frequency | Factory default:0.50Hz |
| P01.12 | Stop DC brake current               | range:0.0%~100.0%                   | Factory default:50.0%  |
| P01.13 | Stop DC braking time                | range:0.00s~30.00s                  | Factory default:0.00s  |

Please refer to P01.10 for the detailed explanation of P01.11 and P01.13, and it is set as deceleration stop mode.

P01.12 stopping DC braking current is a percentage relative to the rated current of the inverter.

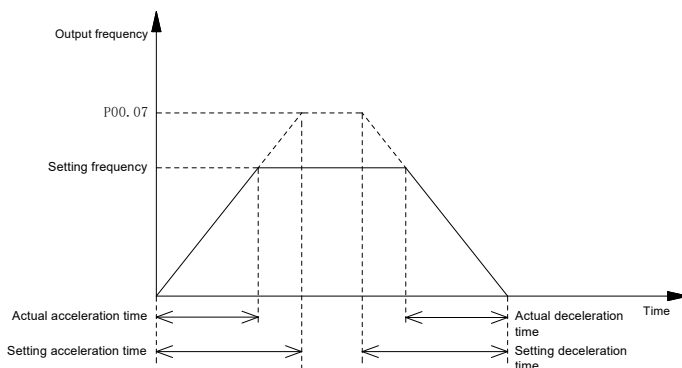
## **P02 acceleration and deceleration parameters**

|        |                     |                    |   |
|--------|---------------------|--------------------|---|
| P02.00 | Acceleration time 1 | range:0.1s~3600.0s | Factory default:<br>Model determination |
| P02.01 | Deceleration time 1 | range:0.1s~3600.0s | Factory default:<br>Model determination |
| P02.02 | Acceleration time 2 | range:0.1s~3600.0s | Factory default:<br>Model determination |
| P02.03 | Deceleration time 2 | range:0.1s~3600.0s | Factory default:<br>Model determination |
| P02.04 | Acceleration time 3 | range:0.1s~3600.0s | Factory default:<br>Model determination |
| P02.05 | Deceleration time 3 | range:0.1s~3600.0s | Factory default:<br>Model determination |

|        |                     |                    |   |
|--------|---------------------|--------------------|---|
| P02.06 | Acceleration time 4 | range:0.1s~3600.0s | Factory default:<br>Model determination |
| P02.07 | Deceleration time 4 | range:0.1s~3600.0s | Factory default:<br>Model determination |

Acceleration time: refer to the time required for the inverter to accelerate from zero frequency to the maximum frequency P00.07.

Deceleration time: refer to the time required for the inverter to decelerate from the maximum frequency P00.07 to zero frequency.



**Figure 5-3 Schematic diagram of acceleration and deceleration time**

4 groups of acceleration and deceleration time are selected through the switching value input "acceleration and deceleration time selection 1, acceleration and deceleration time selection 2" terminal function. Please refer to the P10 group function code for specific usage.

|        |                                  |                    |   |
|--------|----------------------------------|--------------------|---|
| P02.08 | Emergency stop deceleration time | range:0.1s~3600.0s | Factory default:<br>Model determination |
|--------|----------------------------------|--------------------|---|

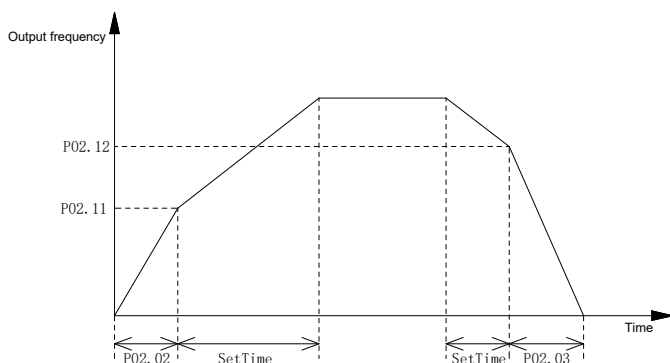
When the inverter receives the emergency stop command, it decelerates and stops according to the deceleration time defined in P02.08. The emergency stop command is determined by the switching value input "emergency stop" terminal function.

|        |                           |                    |   |
|--------|---------------------------|--------------------|---|
| P02.09 | Inching acceleration time | range:0.1s~3600.0s | Factory default:<br>Model determination |
| P02.10 | Inching deceleration time | range:0.1s~3600.0s | Factory default:<br>Model determination |

The acceleration and deceleration time of the inverter during inching operation; when the inverter is in inching operation, the acceleration or deceleration control is performed according to the setting acceleration and deceleration time.

|        |  |                                    |                         |
|--------|--|------------------------------------|-------------------------|
| P02.11 | Polyline acceleration time switching frequency | range:0.00Hz~upper limit frequency | Factory default: 0.00Hz |
| P02.12 | Polyline deceleration time switching frequency | range:0.00Hz~upper limit frequency | Factory default: 0.00Hz |

When the output frequency is less than the setting value of P02.11 during acceleration, it is switched to the acceleration time set by P02.02; when the output frequency is less than P02.12 during deceleration, it is switched to the deceleration time set by P02.03. When P02.11 and P02.12 are set to 0, the acceleration and deceleration switching of the polyline is invalid.



**Figure 5-4 Schematic diagram of the acceleration and deceleration time switching of the broken line**

### P03 vector control parameter

|        |                                |                 |                    |
|--------|--------------------------------|-----------------|--------------------|
| P03.00 | Speed/torque control selection | range:0x00~0x13 | Factory default:00 |
|--------|--------------------------------|-----------------|--------------------|

Ones: Vector control selection

0: speed control      1: torque control

The speed control mode and torque control mode of the inverter can be switched or inhibited through the ones unit of this parameter or the switching value input "speed/torque switching" and "torque control inhibiting" functions. When running in the torque control mode, no PG vector control or PG vector control can be selected through the P63.08 function code.

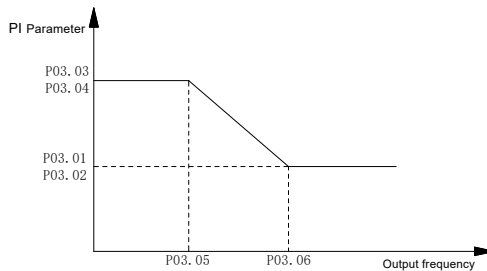
Tens: power generation limit

0: invalid      1: Full time limit      2: Constant speed limit      3: Deceleration limit

Select the torque limit of the inverter working in the power generation mode. Invalid means that the inverter automatically limits with the maximum torque; full-range limit means that the inverter is limited by the setting torque setting value when accelerating, decelerating, and constant speed; the constant speed limit means that the torque setting value is limited in constant speed, and deceleration limit means that the torque setting value is limited when the inverter is in deceleration.

|        |   |                                     |                         |
|--------|---|-------------------------------------|-------------------------|
| P03.01 | Speed loop high speed proportional gain | range:0.00s~30.00s                  | Factory default:2.00s   |
| P03.02 | Speed loop high speed integration time  | range:0.001s~5.000s                 | Factory default:0.200s  |
| P03.03 | Speed loop low speed proportional gain  | range:0.00s~30.00s                  | Factory default:2.00s   |
| P03.04 | Speed loop low speed integration time   | range:0.001s~5.000s                 | Factory default:0.200s  |
| P03.05 | Speed loop PI switching frequency 1     | range:0.00Hz~P03.06                 | Factory default:5.00Hz  |
| P03.06 | Speed loop PI switching frequency 2     | range: P03.05~upper limit frequency | Factory default:10.00Hz |
| P03.07 | Speed feedback filtering time           | range:0.0ms~1000.0ms                | Factory default:15.0ms  |

Increasing the proportional gain and reducing the integration time can speed up the dynamic response of the speed loop, but too large proportional gain or too small integration time may cause system oscillation. When the run frequency is less than the setting value of P03.05, the PI parameters of the speed loop are P03.03 and P03.04; when the run frequency is greater than the setting value of P03.06, the PI parameters of the speed loop are P03.01 and P03.02.



**Figure 5-5 Schematic diagram of PI parameters of the speed loop**

It is recommended to fine-tune the PI parameters of the speed loop on the basis of the manufacturer's factory values; improper setting of the PI parameters of the speed loop may cause system oscillation, or even excessive speed overshoot or overcurrent and overvoltage faults of the inverter.

The speed feedback filtering time is adjusted to improve the speed stability of the motor, increase the filtering time, the dynamic response is weakened; otherwise the dynamic response is strengthened.



|        |                                 |                       |                        |
|--------|---------------------------------|-----------------------|------------------------|
| P03.08 | Drive torque selection channel  | range:0x00~0x99       | Factory default:90     |
| P03.09 | Digital setting of drive torque | range: -200.0%~200.0% | Factory default:150.0% |

P03.08 Ones: torque control selection channel      Tens: speed control selection channel

0: digital setting P03.09

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

9: maximum value of inverter

The ones of P03.08 define the channel selection of the driving torque in the torque control mode; the tens define the upper limit value of the driving torque in the speed control mode.

The percentage of the setting value of P03.09 is relative to the rated torque of the inverter.

|        |                                      |                       |                        |
|--------|--------------------------------------|-----------------------|------------------------|
| P03.10 | Generation torque selection channel  | range:0x00~0x99       | Factory default:99     |
| P03.11 | Digital setting of generation torque | range: -200.0%~200.0% | Factory default:150.0% |

P03.10 Ones: torque control selection channel      Tens: speed control selection channel

0: digital setting P03.11

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

9: maximum value of inverter

The ones of P03.10 define the channel selection of the generation torque in the torque control mode; the tens define the upper limit value of the generation torque in the speed control mode.

The percentage of the setting value of P03.11 is relative to the rated torque of the inverter.

|        |  |                 |                    |
|--------|--|-----------------|--------------------|
| P03.12 | Limiting channel of torque control frequency | range:0x00~0x88 | Factory default:00 |
|--------|--|-----------------|--------------------|

|        |  |                                |                         |
|--------|--|--------------------------------|-------------------------|
| P03.13 | Positive setting of torque control frequency | range:0.00Hz~maximum frequency | Factory default:50.00Hz |
| P03.14 | Reverse setting of torque control frequency  | range:0.00Hz~maximum frequency | Factory default:50.00Hz |

P03.12 Ones: frequency forward limit channel      Tens: frequency reverse limit channel

0: digital setting P03.13 (Forward) /P03.14(Reverse)

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

It is used for setting the maximum run frequency in forward or reverse in torque control mode. When the inverter works in torque control mode, if the load torque is less than the motor output torque, the motor shall continue to accelerate. In order to prevent run-away accidents, the maximum speed of the motor under torque control must be limited.

|        |   |                                |                        |
|--------|---|--------------------------------|------------------------|
| P03.15 | Limiting bias of torque control frequency | range:0.00Hz~maximum frequency | Factory default:0.00Hz |
|--------|---|--------------------------------|------------------------|

The offset of the frequency amplitude during torque control, the frequency limiting value under actual torque control are the setting frequency limit plus the value set by P03.15; the final output is limited by the maximum frequency of the inverter.

|        |  |               |                      |
|--------|--|---------------|----------------------|
| P03.16 | Adjustment proportional gain of excitation current | range:0~60000 | Factory default:2000 |
| P03.17 | Adjustment integral gain of excitation current     | range:0~60000 | Factory default:1000 |
| P03.18 | Adjustment proportional gain of torque current     | range:0~60000 | Factory default:2000 |
| P03.19 | Adjustment integral gain of torque current         | range:0~60000 | Factory default:1000 |

The excitation current adjustment parameters and torque current adjustment parameters are suitable for current loop adjustment in vector control mode. After the motor is subjected to parameter identification, two groups of adjustment parameters are automatically calculated, generally they are not needed to be modified. If the PI setting of the current loop is too large, the current shall oscillate and the torque shall fluctuate greatly.

|        |  |                    |                      |
|--------|--|--------------------|----------------------|
| P03.20 | Ascending filtering time of drive torque | range:0.0s~6000.0s | Factory default:0.3s |
| P03.21 | Declining filtering time of drive torque | range:0.0s~6000.0s | Factory default:0.3s |

In the torque control mode, when the difference between the load torque and the motor output torque is large, the change rate of the motor output speed is very fast, which may cause excessive shock to the motor output end. By setting the filtering time of P03.20 and P03.21, the motor output speed can be changed smoothly and the mechanical shock can be reduced.

|        |   |                   |                        |
|--------|---|-------------------|------------------------|
| P03.22 | Torque limitation coefficient in the weak magnetic area | range:0.0%~200.0% | Factory default:100.0% |
|--------|---|-------------------|------------------------|

This parameter takes effect only when the motor is running above the rated frequency. When running in a weak magnetic area, the acceleration time is too long, and the value of P03.22 can be appropriately reduced.

|        |   |                   |                        |
|--------|---|-------------------|------------------------|
| P03.23 | Power limit coefficient in power generation | range:0.0%~200.0% | Factory default:100.0% |
|--------|---|-------------------|------------------------|

It is used for limiting the coefficient factor of the output power of the inverter working in the power generation status.

|        |  |                      |                        |
|--------|--|----------------------|------------------------|
| P03.24 | Torque control deviation frequency setting | range:0.00Hz~10.00Hz | Factory default:0.00Hz |
|--------|--|----------------------|------------------------|

Frequency difference of torque current regulator action judgment during torque control

#### P04 Scalar Control Parameters

|        |                   |           |                   |
|--------|-------------------|-----------|-------------------|
| P04.00 | V/F curve setting | range:0~7 | Factory default:0 |
|--------|-------------------|-----------|-------------------|

0: straight line V/F

When running below the rated frequency, the output frequency is linearly related to the output voltage. It is suitable for general mechanical transmission occasions, such as machine tools, large inertia fans, centrifuges, etc.

1: multi-stage V/F

The multi-stage V/F curve is generally set by the user according to the motor load characteristics. The setting function codes include P04.01~P04.08. The inverter automatically limits the upper and lower limit of V/F setting value of each point to prevent setting error.

2: 1.2 power

3: 1.4 power

4: 1.6 power

5: 1.8 power

6: 2.0 power

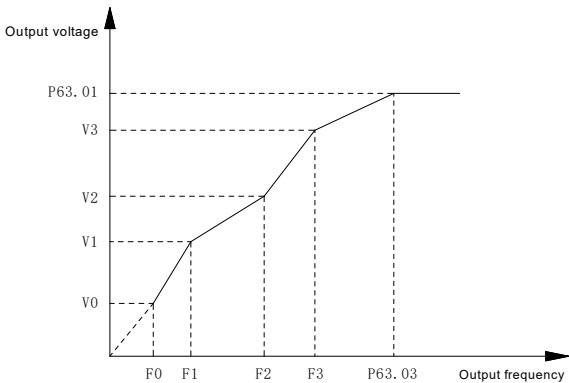
It is suitable for variable torque loads.

7: separation V/F

The output frequency and output voltage of the inverter can be controlled independently, it is suitable for the occasion of frequency conversion power supply; for specific parameter settings, please refer to P04.13~P04.15.

|        |                        |                      |                         |
|--------|------------------------|----------------------|-------------------------|
| P04.01 | V/F frequency value F0 | range: 0.00Hz~P04.03 | Factory default:0.00Hz  |
| P04.02 | V/F voltage value V0   | range: 0.0%~P04.04   | Factory default:0.0%    |
| P04.03 | V/F frequency value F1 | range: P04.01~P04.05 | Factory default:0.00Hz  |
| P04.04 | V/F voltage value V1   | range: P04.02~P04.06 | Factory default:0.0%    |
| P04.05 | V/F frequency value F2 | range: P04.03~P04.07 | Factory default:0.00Hz  |
| P04.06 | V/F voltage value V2   | range: P04.04~P04.08 | Factory default:0.0%    |
| P04.07 | V/F frequency value F3 | range: P04.05~P63.03 | Factory default:50.00Hz |
| P04.08 | V/F voltage value V3   | range: P04.06~100.0% | Factory default:100.0%  |

The multi-stage V/F curve is reasonably set according to the characteristics of the motor and the load characteristics; improper setting may cause the increased output current, or even burn the motor seriously. For specific multi-stage V/F curve settings, please refer to the following figure



**Figure 5-6 Schematic Diagram of Multi-stage V/F Curve**

|        |              |                  |                      |
|--------|--------------|------------------|----------------------|
| P04.09 | Torque boost | range:0.0%~30.0% | Factory default:0.0% |
|--------|--------------|------------------|----------------------|

The torque boost function is only valid during scalar control. Increasing the torque boost setting value can improve the output torque capability of the motor at low frequencies. The torque boost value

shall be set appropriately according to the actual load. If the setting value is too large, it shall cause excessive current surge at startup. When the torque boost is set to 0.0%, automatic torque boost is effective.

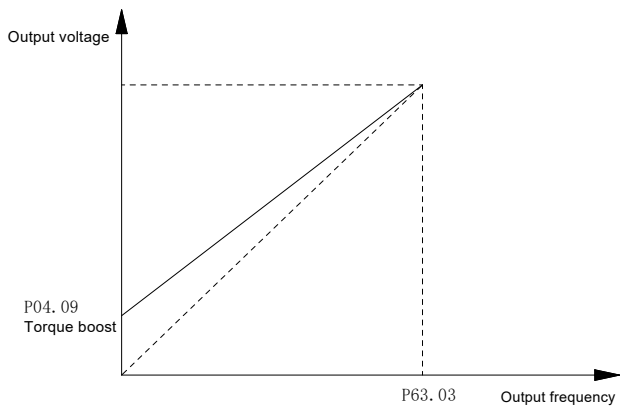


Figure 5-7 Schematic Diagram of Torque Boost

|        |                        |                      |         |
|--------|------------------------|----------------------|---------|
| P04.10 | Droop control quantity | range:0.00Hz~10.00Hz | Factory |
|--------|------------------------|----------------------|---------|

When multiple inverters drive the same load, different inverters may share different loads; multiple inverters can automatically distribute the load in proportion by adjusting this parameter. This function is only applicable to scalar control mode.

|        |                                    |              |                     |
|--------|------------------------------------|--------------|---------------------|
| P04.11 | V/F oscillation suppression gain 1 | range:0~1024 | Factory default:160 |
| P04.12 | V/F oscillation suppression gain 2 | range:0~1024 | Factory default:160 |

By reasonably setting the oscillation suppression parameters, the oscillation of the motor speed and current can be effectively suppressed; especially when the motor is under no-load or light-load, if the current or speed fluctuations occur, it can be adjusted gradually on the basis of Factory default, and this parameter cannot be too large or too small. This parameter is only valid in scalar control mode.

|        |   |           |                   |
|--------|---|-----------|-------------------|
| P04.13 | V/F separation mode voltage given selection | range:0~5 | Factory default:0 |
|--------|---|-----------|-------------------|

0: P04.14 digital setting

The voltage amount of V/F separation can be set through P04.14 parameter, the percentage is the rated voltage relative to the motor.

1: analog input AI1

2: analog input AI2

The voltage amount of V/F separation can be adjusted through the analog input terminals AI1 or AI2.

The maximum analog input corresponds to the rated voltage of the motor.

3: reserve

4: process PID output

The voltage amount separated by V/F is determined by the process PID output. For debugging application of process PID, please refer to P40 group parameters.

5: process PID input +AI1

The voltage amount separated by V/F is determined by the sum of the PID output of the process and the output of AI1.

|        |   |                   |                     |
|--------|---|-------------------|---------------------|
| P04.14 | V/F separation mode voltage digital given | range:0.0%~100.0% | Factory default:160 |
|--------|---|-------------------|---------------------|

When P04.13 is set to 0, the voltage of V/F separation is determined by P04.14.

|        |   |                     |                       |
|--------|---|---------------------|-----------------------|
| P04.15 | V/F separation mode voltage change time | range:0.00s~600.00s | Factory default:0.01s |
|--------|---|---------------------|-----------------------|

It is used for setting the voltage output change time when V/F is separated. This parameter indicates the time when the output voltage rises from 0 to the rated voltage of the motor or decreases from the rated voltage to 0.

### P10 switching value x input

|        |                                    |            |                    |
|--------|------------------------------------|------------|--------------------|
| P10.00 | X1 terminal function selection     | range:0~63 | Factory default:1  |
| P10.01 | X2 terminal function selection     | range:0~63 | Factory default:2  |
| P10.02 | X3 terminal function selection     | range:0~63 | Factory default:16 |
| P10.03 | X4 terminal function selection     | range:0~63 | Factory default:17 |
| P10.04 | X5 terminal function selection     | range:0~63 | Factory default:18 |
| P10.05 | X6 terminal function selection     | range:0~63 | Factory default:0  |
| P10.06 | X7/HDI terminal function selection | range:0~63 | Factory default:0  |
| P10.08 | AI1 terminal function selection    | range:0~63 | Factory default:0  |
| P10.09 | AI2 terminal function selection    | range:0~63 | Factory default:0  |

0:no function

Please set the unused terminals to "no function" to prevent malfunction.

1: forward running (FWD)

2: reverse running (REV)

3: forward running inching (FJOG)

4: reverse inching (RJOG)

**Table 5-1 Inching Command Configuration**

|                 |    |     |
|-----------------|----|-----|
| Run command     | K1 | K2  |
| Forward inching | ON | OFF |

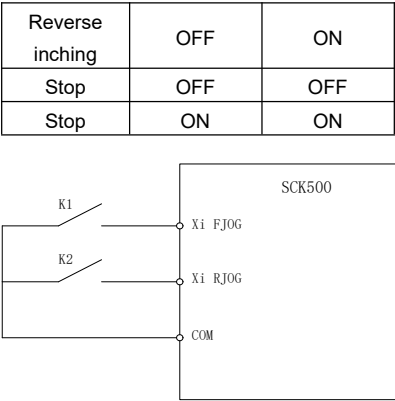


Figure 5-8 Schematic Diagram of Inching Command

5:3-wire operation

The above 1~5 functions are only valid under the terminal run command (P01.00=1); for the use of three-wire operation, please refer to the description of the function code P10.11.

6: free stop

When the "free stop" terminal function is valid, the inverter shall stop freely.

7: emergency stop

When the "emergency stop" terminal function is valid, the inverter decelerates and stops according to the time set in P02.08.

8: external stop

When the "external stop" terminal function is valid, the inverter stops according to the setting stop mode.

9: operation forbidden

When the "run prohibited" terminal function is valid, the inverter does not receive any start command and keeps stopping.

10: operation suspended

During the operation of the inverter, after the function of the "operation pause" terminal is valid, the inverter runs at zero frequency. When the "operation pause" terminal is invalid, the inverter resumes operation.

11: external fault input

After this function is valid, the inverter reports Er.EtE fault.

12: fault reset (RESET)

After the inverter fails, this function can be used for resetting the inverter, which is the same as the Stop function on the keyboard.

13: terminal adjustment Up

14: terminal adjustment Down

When the frequency selects "digital setting P00.00+Up/Down adjustment", the frequency can be

increased and decreased through this terminal function.

15: Up/Down setting clearing (terminal, keyboard)

The frequency of Up/Down adjustment is cleared, which is effective for terminal adjustment frequency and keyboard adjustment frequency.

16: multi-stage frequency terminal 1

17: multi-stage frequency terminal 2

18: multi-stage frequency terminal 3

19: multi-stage frequency terminal 4

Through the combination of four terminal functions, at most 16-stage speed control can be achieved, and the multi-stage frequency is set from P41.00 to P41.14; the specific use method is as described in the Table.

**Table 5-2 Multi-band frequency setting**

| frequency setting | multi-stage frequency terminal 1 | multi-stage frequency terminal 2 | multi-stage frequency terminal 3 | multi-stage frequency terminal 4 |
|-------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| P00.00            | OFF                              | OFF                              | OFF                              | OFF                              |
| P41.00            | ON                               | OFF                              | OFF                              | OFF                              |
| P41.01            | OFF                              | ON                               | OFF                              | OFF                              |
| P41.02            | ON                               | ON                               | OFF                              | OFF                              |
| P41.03            | OFF                              | OFF                              | ON                               | OFF                              |
| P41.04            | ON                               | OFF                              | ON                               | OFF                              |
| P41.05            | OFF                              | ON                               | ON                               | OFF                              |
| P41.06            | ON                               | ON                               | ON                               | OFF                              |
| P41.07            | OFF                              | OFF                              | OFF                              | ON                               |
| P41.08            | ON                               | OFF                              | OFF                              | ON                               |
| P41.09            | OFF                              | ON                               | OFF                              | ON                               |
| P41.10            | ON                               | ON                               | OFF                              | ON                               |
| P41.11            | OFF                              | OFF                              | ON                               | ON                               |
| P41.12            | ON                               | OFF                              | ON                               | ON                               |
| P41.13            | OFF                              | ON                               | ON                               | ON                               |
| P41.14            | ON                               | ON                               | ON                               | ON                               |

20: selection of acceleration and deceleration time 1

21: selection of acceleration and deceleration time 2

Through the combination of two terminal functions, at most 4 groups of acceleration and deceleration time can be set.

**Table 5-3 Acceleration and deceleration time selection**

| Acceleration and deceleration time | Acceleration and deceleration time selection 1 | Acceleration and deceleration time selection 2 |
|------------------------------------|--|--|
|                                    |  |  |



|               |     |     |
|---------------|-----|-----|
| P02.00、P02.01 | OFF | OFF |
| P02.02、P02.03 | ON  | OFF |
| P02.04、P02.05 | OFF | ON  |
| P02.06、P02.07 | ON  | ON  |

22: acceleration and deceleration forbidding

When the "acceleration and deceleration prohibited" terminal function is valid, the inverter maintains the output frequency unchanged.

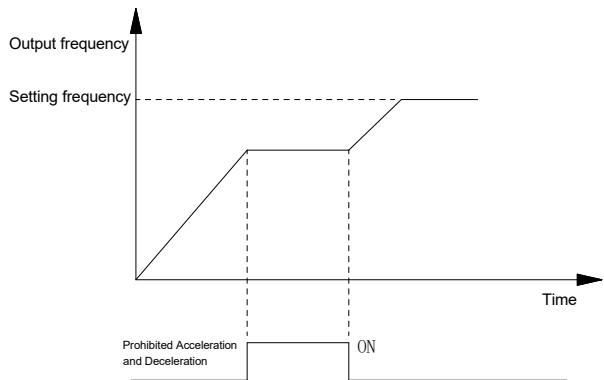


Figure 5-9 Schematic Diagram of Prohibited Acceleration and Deceleration

23: command switch to keyboard control

When the terminal function is valid, the run command is switched to keyboard control.

24: command switch to terminal control

When the terminal function is valid, the run command is switched to terminal control.

25: command switch to communication control

When the terminal function is valid, the run command is switched to communication control.

26: frequency source switching (P00.06[ ones])

When the terminal function is valid, it is switched according to the frequency source selected by the ones of P00.06.

27: main frequency source switch to frequency digital setting

When the terminal function is valid, the frequency setting mode is switched to P00.00 setting.

28: auxiliary frequency source Switch to frequency digital setting

When the terminal function is valid, the frequency setting mode is switched to P00.02 setting.

29: stop DC braking+ stop command

When the terminal function is valid, the inverter decelerates and stops firstly. When the output frequency is lower than the setting value of DC braking initial frequency P01.11, it starts to enter DC braking.

30: stop DC braking

When the inverter receives the stop command, and this terminal function is valid, when the output frequency is lower than the setting value of the DC braking start frequency P01.11, it starts to enter DC braking.

#### 31: running DC braking

When the inverter receives the start command and this terminal function is valid, the inverter performs DC braking and starts from the starting frequency.

#### 32: pulse input (X7/HDI support high speed)

The input high-speed pulse signal is used as the frequency setting. For the corresponding relationship between the high-speed pulse frequency and the setting frequency, refer to P12.33~P12.36 function codes.

#### 33: count input

To realize the function in counting process and count the input signal, please refer to the parameter description of P43.00~P43.01.

#### 34: count clearing

Clear the counting value of the count input function.

#### 35: length counting

It is suitable for functions requiring length calculation. For specific length calculation and setting, please refer to P43.02~P43.04 parameter description.

#### 36: length clearing

Clear the calculated length value of the length counting.

#### 37: PID action direction

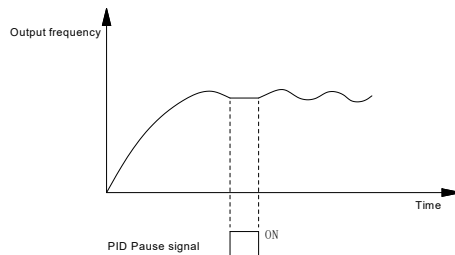
When the terminal function is valid, the PID action direction is opposite to the action direction set by P40.12.

#### 38: PID parameter switching

When P40.09=2, and the terminal function is valid, it is switched to the second group of PID parameters P40.06~P40.08, and when the terminal function is invalid, it is restored to P40.03~P40.05.

#### 39: PID operation suspending

When the terminal function is valid, the PID stops the adjustment and maintains the current PID output. When the terminal is invalid, the PID adjustment function is restored.



**Figure 5-10 Schematic Diagram of PID Pause**

#### 40: PID integral suspending

When this function is valid, the PID integrator stops accumulation and keeps the current value unchanged; after invalid, the accumulation function of the integrator is restored.

41: PLC memory clear

The simple PLC status is restored to the initial status.

42: PLC operation failure

When the terminal function is valid, the PLC running status is cleared, and the output frequency of the inverter is 0; after the terminal function is invalid, the PLC restarts operation.

43: PLC operation suspending

When the terminal function is valid, the PLC running status is memorized, and the output frequency of the inverter is 0; after the terminal function is invalid, the PLC resumes operation.

44~45: reserve

46: speed/torque switching

In vector control mode, the inverter can be switched between speed control mode and torque control mode through the terminal.

47: torque control forbidding

The inverter is prohibited to work in torque mode.

|        |   |           |                   |
|--------|---|-----------|-------------------|
| P10.11 | Terminal control operation mode selection | range:0~3 | Factory default:0 |
|--------|---|-----------|-------------------|

0: 2-wire operation mode 1

1: 2-wire operation mode 2

Table 5-4 Configuration of Two-wire Operation Mode

| Run command     | 2-wire operation mode 1 |     | 2-wire operation mode 2 |     |
|-----------------|-------------------------|-----|-------------------------|-----|
|                 | K1                      | K2  | K1                      | K2  |
| Forward running | ON                      | OFF | ON                      | OFF |
| Reverse running | OFF                     | ON  | ON                      | ON  |
| Stop            | OFF                     | OFF | OFF                     | OFF |
| Stop            | ON                      | ON  | OFF                     | ON  |

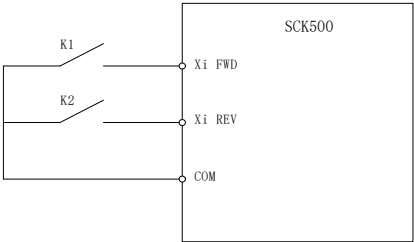


Figure 5-11 Schematic Diagram of Two-wire Mode

2: 3-wire operation mode 1

3: 3-wire operation mode 2

Table 5-5 Configuration of Three-wire Operation Mode

| Run command     | 3-wire operation mode 1 |      |     | 3-wire operation mode 2 |     |     |
|-----------------|-------------------------|------|-----|-------------------------|-----|-----|
|                 | SB2                     | SB3  | SB1 | SB2                     | SB3 | SB1 |
| Forward running | RISE                    | -    | ON  | RISE                    | OFF | ON  |
| Reverse running | -                       | RISE | ON  | RISE                    | ON  | ON  |
| Stop            | -                       | -    | OFF | -                       | -   | OFF |
| Stop            | -                       | -    | OFF | -                       | -   | OFF |

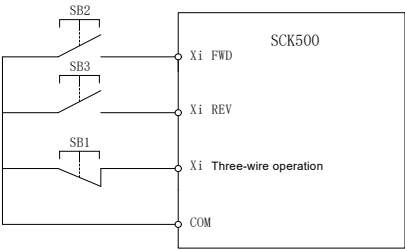


Figure 5-12 Schematic diagram of the three-wire mode

Note: "RISE" means rising edge; "-" means any status.

|        |                                       |                   |                     |
|--------|---------------------------------------|-------------------|---------------------|
| P10.12 | Logic state setting of input terminal | range:0x000~0x7FF | Factory default:000 |
|--------|---------------------------------------|-------------------|---------------------|

Ones: Bit0~Bit3      Tens: Bit4~Bit7      Hundreds: Bit8~Bit11

Each bit represents an input terminal respectively, represents X1 ~ AI2 terminals in turn from the low position.

0: positive logic, current flowing means ON      1: negative logic, no current flowing means ON

|        |                               |                     |                        |
|--------|-------------------------------|---------------------|------------------------|
| P10.13 | Input terminal filtering time | range:0.000s~2.000s | Factory default:0.010s |
|--------|-------------------------------|---------------------|------------------------|

Increasing the setting value of P10.13 can effectively prevent the malfunction of the input terminal, but too large setting value will cause the terminal response delay.

|        |                                 |                    |                      |
|--------|---------------------------------|--------------------|----------------------|
| P10.14 | X1 terminal conduction delay    | range:0.0s~3600.0s | Factory default:0.0s |
| P10.15 | X1 terminal disconnection delay | range:0.0s~3600.0s | Factory default:0.0s |
| P10.16 | X2 terminal conduction delay    | range:0.0s~3600.0s | Factory default:0.0s |
| P10.17 | X2 terminal disconnection delay | range:0.0s~3600.0s | Factory default:0.0s |

Through these two groups of function codes, the turn-on and turn-off delay of the X1~X2 terminals can be realized to achieve the function of delaying the response to the input signal of the terminal.

|        |                         |                   |                     |
|--------|-------------------------|-------------------|---------------------|
| P10.18 | Terminal detection mode | range:0x000~0x7FF | Factory default:000 |
|--------|-------------------------|-------------------|---------------------|

Ones: BIT0~BIT3: X1~X4    Tens: BIT0~BIT2: X5~X7    Hundreds: BIT0~BIT1: AI1~AI2

Each bit represents an input terminal respectively, represents X1 ~ AI2 terminals in turn from the low position.

0: level valid

Indicate to detect the level signal of the input terminal.

1: edge valid

Indicate to detect the edge trigger signal of the input terminal.

### P11 switching value Y/R output

|        |                                |            |                    |
|--------|--------------------------------|------------|--------------------|
| P11.00 | Y1 terminal function selection | range:0~33 | Factory default:0  |
| P11.01 | Y2 terminal function selection | range:0~33 | Factory default:0  |
| P11.02 | R1 relay function selection    | range:0~33 | Factory default:0  |
| P11.03 | R2 relay function selection    | range:0~33 | Factory default:19 |

0: no output

The output terminal has no function.

1: inverter in operation

A valid signal is output when the inverter is running.

2: forward running of inverter

When the inverter is running forwards, a valid signal is output.

3: reverse running of inverter

When the inverter is running reversely, a valid signal is output.

4: ready to complete of inverter

After the inverter is powered on without any fault, a valid signal is output.

5: inverter in zero frequency operation (stop ON)

When the inverter outputs zero frequency, a valid signal is output; the valid signal is also output when the inverter is stopped.

6: inverter in zero frequency operation (stop OFF)

When the inverter runs at zero frequency, and valid signal is output; there is no output in the stop status.

7: frequency reaching FAR

When the output frequency of the inverter is within the range of the setting frequency (setting frequency  $\pm$  F11.19), a valid signal is output.

8: frequency level detection signal FDT1

When the output frequency is greater than the upper level limit of FDT1, a valid signal is output, and when it is less than the lower limit level of FDT1, an invalid signal is output. For the frequency setting of FDT1, please refer to the parameter description of P11.13~P11.15.

9: frequency level detection signal FDT2

When the output frequency is greater than the upper level limit of FDT2, a signal is output, and when it is less than the lower limit level of FDT2, an invalid signal is output. For the frequency setting of FDT2, please refer to the parameter description of P11.16~P11.18.

10: frequency upper limit

When the output frequency reaches the upper limit frequency P00.08, a valid signal is output.

11: frequency lower limit

When the output frequency reaches the lower limit frequency P00.09, a valid signal is output.

12: torque limiting action (during speed control)

In speed control mode, when the output torque reaches the limit value of drive torque or generated torque, a valid signal is output.

13: speed limiting action (during torque control)

在 In the torque control mode, when the output frequency reaches the forward frequency or reverse frequency limit value, a valid signal is output.

14: X1 terminal status

15: X2 terminal status

Output the terminal status of X1 or X2. When X1 or X2 is valid, a valid signal is output.

16: zero current detection

When the output current of the inverter is less than the zero current detection level and the duration is greater than the zero current detection time, a valid signal is output. For details, please refer to P11.22~P11.23 function codes.

17: DC braking of inverter

When the inverter is in DC braking, a valid signal is output.

18: inverter under-voltage

When the inverter is under voltage, a valid signal is output.

19: inverter fault output

20: inverter alarm output

When the inverter fails or alarms, a valid signal is output.

21: inverter overload early warning

When the inverter overload pre-warning fault or warning prompt occurs, a valid signal is output.

22: inverter overheating alarm

When the inverter overheats, a valid signal is output.

23: motor overload early warning

When the motor overload pre-warning fault or warning prompt occurs, a valid signal is output.

24: motor overheating alarm

When the motor temperature reaches the overheat detection level of P30.02 motor, a valid signal is output. It is only valid when motor temperature detection is carried out.

25: PLC cycle completed

When the PLC completes a cycle of operation, a pulse signal lasting 500 ms is output.

26: PLC stage completed

When PLC completes a phase, a pulse signal lasting 500 ms is output.

27: reserve

28: reaching cumulative power-on time

The cumulative power-on time of the inverter reaches the setting power-on time, and a valid signal is output. Accumulated time and power-down memory is powered on.

29: reaching cumulative running time

The cumulative running time of the inverter reaches the set running time, and a valid signal is output. Accumulated running time power-down memory.

30: reaching the setting count value

31: reaching the specified count value

Please refer to P43.00~P43.01 description.

32: reaching the setting length

Please refer to P43.02~P43.04 description.

33: brake control output (for crane type only)

It is used for the logic control of the brake for special lifting models.

|        |                               |                    |                      |
|--------|-------------------------------|--------------------|----------------------|
| P11.04 | Y1 output closing delay       | range:0.0s~3600.0s | Factory default:0.0s |
| P11.05 | Y1 output disconnecting delay | range:0.0s~3600.0s | Factory default:0.0s |
| P11.06 | Y2 output closing delay       | range:0.0s~3600.0s | Factory default:0.0s |
| P11.07 | Y2 output disconnecting delay | range:0.0s~3600.0s | Factory default:0.0s |
| P11.08 | R1 output closing delay       | range:0.0s~3600.0s | Factory default:0.0s |
| P11.09 | R1 output disconnecting delay | range:0.0s~3600.0s | Factory default:0.0s |
| P11.10 | R2 output closing delay       | range:0.0s~3600.0s | Factory default:0.0s |
| P11.11 | R2 output disconnecting delay | range:0.0s~3600.0s | Factory default:0.0s |

The four groups of function codes define the response time of the closing delay and opening delay of Y1, Y2, R1, and R2 output respectively. When the output changes, it will not be output immediately, but the indication signal shall be output after the setting delay.

|        |  |               |                   |
|--------|--|---------------|-------------------|
| P11.12 | Logic state setting of output terminal | range:0x0~0xF | Factory default:0 |
|--------|--|---------------|-------------------|

Each bit represents an input terminal respectively, represents Y1, Y2, R1 and R2 terminals in turn

from the low position.

0: positive logic, current flowing means output ON

1: negative logic, no current flowing means output ON

|        |                     |           |                   |
|--------|---------------------|-----------|-------------------|
| P11.13 | FDT1 detection mode | range:0~1 | Factory default:0 |
|--------|---------------------|-----------|-------------------|

0: check out by operating frequency

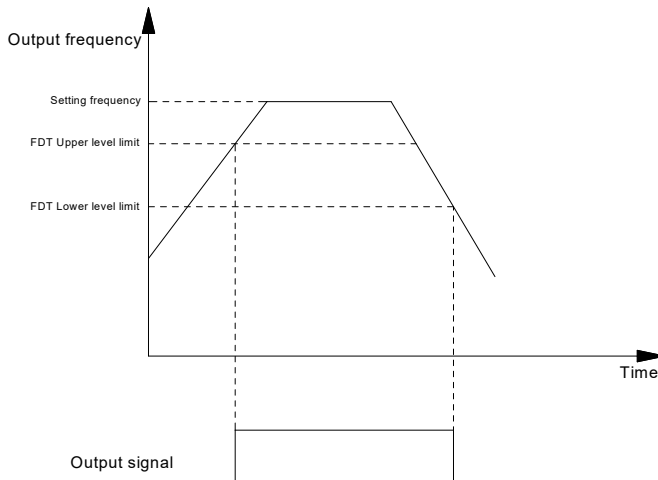
The frequency value detected by FDT1 is judged according to the frequency command after acceleration and deceleration.

1: check out by output frequency

The frequency value detected by FDT1 is judged according to the actual output frequency of the inverter.

|        |                        |                       |         |
|--------|------------------------|-----------------------|---------|
| P11.14 | FDT1 upper level limit | range: P11.15~maximum | Factory |
| P11.15 | FDT1 lower level limit | range:0.00Hz~P11.14   | Factory |

Determine whether the inverter works in FDT1 according to the detection standard set in P11.13. When the output terminal function is set to "frequency level detection signal FDT1" and the inverter is in the corresponding FDT1, a valid signal is output.



**Figure 5-13 Schematic Diagram of FDT Working**

|        |                        |                                 |                        |
|--------|------------------------|---------------------------------|------------------------|
| P11.16 | FDT2 detection mode    | range:0~1                       | Factory default:0      |
| P11.17 | FDT2 upper level limit | range: P11.18~maximum frequency | Factory default:2.50Hz |
| P11.18 | FDT2 lower level limit | range: 0.00Hz~P11.17            | Factory default:2.00Hz |

Refer to FDT1 function introduction for FDT2 setting.



|        |  |                                   |                           |
|--------|--|-----------------------------------|---------------------------|
| P11.19 | Frequency arrival (FAR)<br>detection width | range:0.00Hz~maximum<br>frequency | Factory<br>default:2.50Hz |
|--------|--|-----------------------------------|---------------------------|

It is used for detecting the deviation between the output frequency and the setting frequency; when the deviation between the output frequency and the setting frequency is within the range of this function code, and the output terminal is set to the "frequency reaching FAR" function, a valid signal is output.

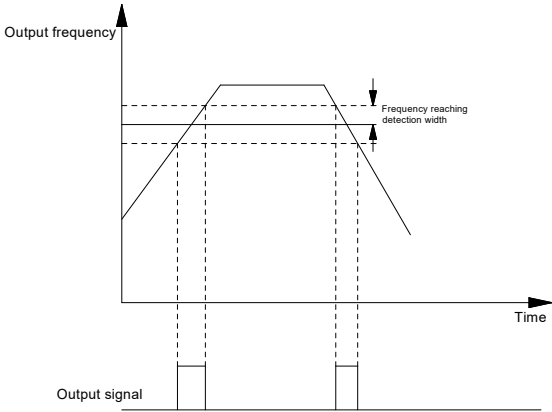


Figure 5-14 Schematic Diagram of Frequency Reaching Detection

|        |  |                                   |                           |
|--------|--|-----------------------------------|---------------------------|
| P11.20 | Zero frequency signal<br>detection value | range:0.00Hz~maximum<br>frequency | Factory<br>default:0.50Hz |
| P11.21 | Zero frequency return range              | range:0.00Hz~maximum<br>frequency | Factory<br>default:0.00Hz |

|        |                              |                    |                          |
|--------|------------------------------|--------------------|--------------------------|
| P11.22 | Zero current detection level | range:0.0%~50.0%   | Factory default:5.0%     |
| P11.23 | Zero current detection time  | range:0.00s~50.00s | Factory<br>default:0.50s |

The output terminal function is set to "zero current detection", when the inverter is in the running status, and the output current is less than the setting level of P11.22, the duration is greater than the time of P11.23, then a valid signal is output.

The zero current detection level is a percentage relative to the rated current of the inverter.

**P12 analog AI and high-speed pulse HDI input**

|        |                           |                 |                    |
|--------|---------------------------|-----------------|--------------------|
| P12.00 | AI analog curve selection | range:0x00~0x33 | Factory default:00 |
|--------|---------------------------|-----------------|--------------------|

Ones: AI1 characteristic curve selection

0: no correction

1: curve 1(2 points)

The AI analog quantity is defined by the P12.01~P12.04 function codes.

2:curve 2 (4 points)

The AI analog quantity is defined by P12.05~P12.12 function codes.

3:curve 3 (4 points)

The AI analog quantity is defined by P12.13~P12.20 function codes.

Tens: AI2 characteristic curve selection (Explanation of the same bit AI1)

Analog input AI1 can select 0~10V voltage input or 0~20mA current input (current or voltage input is determined by dial code on the control panel). When current input is selected, 2mA current input is equivalent to 1V voltage input, that is, 20mA corresponds to 10V.

Analog input AI2 can only receive 0~10V voltage input.

|        |  |                       |                        |
|--------|--|-----------------------|------------------------|
| P12.01 | Maximum input of curve 1                     | range: P12.03~10.00V  | Factory default:10.00V |
| P12.02 | Maximum input corresponding value of curve 1 | range: -100.0%~100.0% | Factory default:100.0% |
| P12.03 | Minimum input of curve 1                     | range: -10.00V~P12.01 | Factory                |
| P12.04 | Minimum input corresponding value of curve 1 | range: -100.0%~100.0% | Factory default:0.0%   |

The typical setting of curve 1 is as shown in the figure below:

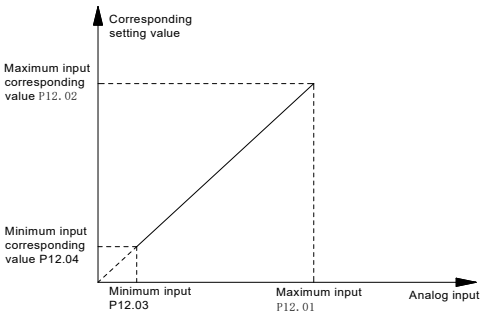


Figure 5-15 Schematic Diagram of Curve 1 Setting

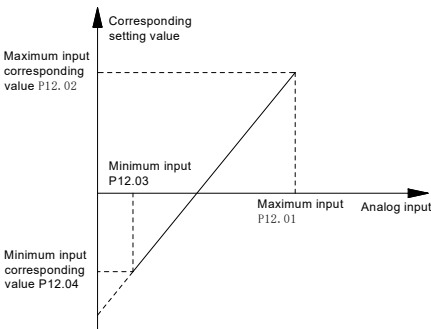
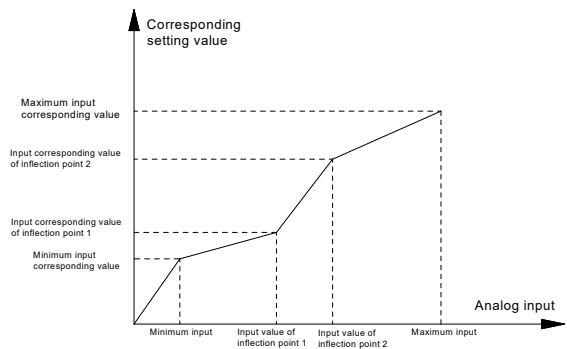


Figure 5-16 Schematic Diagram of Curve 2 Setting

|        |  |                       |                        |
|--------|--|-----------------------|------------------------|
| P12.05 | Maximum input value of curve 2                             | range: P12.07~10.00V  | Factory default:10.00V |
| P12.06 | Maximum input corresponding value of curve 2               | range: -100.0%~100.0% | Factory default:100.0% |
| P12.07 | Inflection point 2 input value of curve 2                  | range: P12.09~P12.05  | Factory default:0.00V  |
| P12.08 | Input corresponding value of inflection point 2 of curve 2 | range: -100.0%~100.0% | Factory default:0.0%   |
| P12.09 | Input value of inflection point 1 of curve 1               | range: P12.11~P12.07  | Factory default:0.00V  |
| P12.10 | Input corresponding value of inflection point 1 of curve 2 | range: -100.0%~100.0% | Factory default:0.0%   |
| P12.11 | Minimum input value of curve 2                             | range: -10.00V~P12.09 | Factory default:0.00V  |
| P12.12 | Minimum input corresponding value of curve 2               | range: -100.0%~100.0% | Factory default:0.0%   |

The curve 2 and curve 3 are 4-point polylines, and the using method is similar to curve 1. Refer to the following figure for usage settings:



**Figure 5-17 Schematic Diagram of Curve 1 setting**

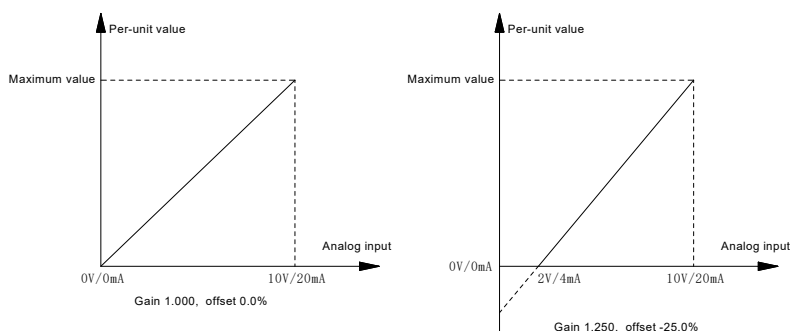
|        |  |                       |                        |
|--------|--|-----------------------|------------------------|
| P12.13 | Maximum input value of curve 3                             | range: P12.15~10.00V  | Factory default:10.00V |
| P12.14 | Maximum input corresponding value of curve 3               | range: -100.0%~100.0% | Factory default:100.0% |
| P12.15 | Inflection point 2 input value of curve 3                  | range: P12.17~P12.13  | Factory default:0.00V  |
| P12.16 | Input corresponding value of inflection point 2 of curve 3 | range: -100.0%~100.0% | Factory default:0.0%   |
| P12.17 | Inflection point 1 input value of curve 3                  | range: P12.19~P12.15  | Factory default:0.00V  |
| P12.18 | Input corresponding value of inflection point 1 of curve 3 | range: -100.0%~100.0% | Factory default:0.0%   |
| P12.19 | Minimum input value of curve 3                             | range: -10.00V~P12.17 | Factory default:0.00V  |
| P12.20 | Minimum input corresponding value of curve 3               | range: -100.0%~100.0% | Factory default:0.0%   |

Please refer to curve 2 for the using method of curve 3.

|        |                |                       |                       |
|--------|----------------|-----------------------|-----------------------|
| P12.21 | AI1 input bias | range: -100.0%~100.0% | Factory default:0.0%  |
| P12.22 | AI1 input gain | range: -2.000~2.000   | Factory default:1.000 |

|        |                          |                       |                        |
|--------|--------------------------|-----------------------|------------------------|
| P12.23 | AI1 input filtering time | range: 0.000s~10.000s | Factory default:0.050s |
| P12.24 | AI2 input bias           | range: -100.0%~100.0% | Factory default:0.0%   |
| P12.25 | AI2 input gain           | range: -2.000~2.000   | Factory default:1.000  |
| P12.26 | AI2 input filtering time | range: 0.000s~10.000s | Factory default:0.050s |

The effect achieved by the analog input offset and gain settings is the same as the setting effect of the curve 1.



**Figure 5-18 Schematic Diagram of AI Gain and Offset Settings**

P12.23, P12.26 analog inputs filtering time, the AI1, AI2 input signals are filtered so that the input signal is smooth without distortion, and the anti-interference ability of the analog input is improved; but too long filtering time will cause analog input response delay.

|        |                                 |                         |                          |
|--------|---------------------------------|-------------------------|--------------------------|
| P12.33 | HDI maximum input frequency     | range: P12.35~100.00kHz | Factory default:10.00kHz |
| P12.34 | HDI maximum corresponding value | range: -100.0%~100.0%   | Factory default:100.0%   |
| P12.35 | HDI minimum input frequency     | range:0.00kHz~P12.33    | Factory default:0.00kHz  |
| P12.36 | HDI minimum corresponding value | range: -100.0%~100.0%   | Factory default:0.0%     |
| P12.37 | HDI input filtering time        | range:0.000s~1.000s     | Factory default:0.001s   |

When X7/HDI is input as a high-speed pulse, this group of parameters defines the corresponding

relationship between the input pulse frequency and the setting frequency.

P12.37 defines the filtering time of X7/HDI terminal. Long filtering time means strong anti-interference ability, but the response becomes slow; short filtering time means fast response, but the anti-interference ability becomes weak.

### P13 Analog AO and High Speed Pulse HDO Output

|        |  |            |                   |
|--------|--|------------|-------------------|
| P13.00 | AO1 terminal output function selection | range:0~14 | Factory default:2 |
| P13.01 | AO2 terminal output function selection | range:0~14 | Factory default:1 |
| P13.02 | HDO terminal output function selection | range:0~14 | Factory default:0 |

AO1 and AO2 are analog output terminals, HDO is a high-speed pulse output terminal. When P13.02 is set to a non-zero value and P11.00 is set to 0, Y1/HDO is used as a high-speed pulse output function.

Analog output AO1 can select 0~10V voltage output or 0~20mA current output (current or voltage output is determined by dialing code on the control panel). Analog output AO2 can only output 0 ~ 10V voltage signal.

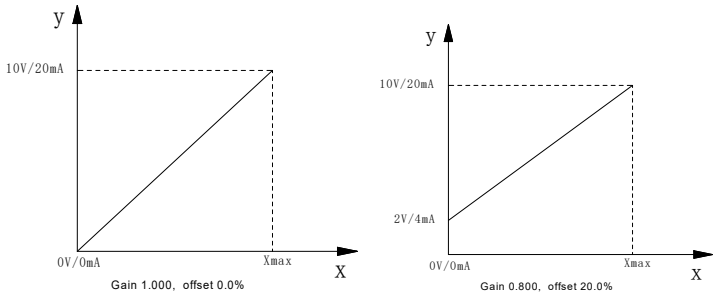
The analog output and pulse output function definition and output range are as shown in the following table:

| Function setting | Output selection               | Analog output range  | High-speed pulse output range                                  |
|------------------|--------------------------------|--|--|
| 0                | no output                      | no output  | no output  |
| 1                | setting frequency              | Maximum frequency corresponds to 10V/20mA                        | Maximum frequency corresponds to P13.09                        |
| 2                | output frequency               | Maximum frequency corresponds to 10V/20mA                        | Maximum frequency corresponds to P13.09                        |
| 3                | output current                 | 2 times of rated current of the inverter corresponds to 10V/20mA | 2 times of rated current of the inverter corresponds to P13.09 |
| 4                | output torque (absolute value) | 2 times of rated torque of the motor corresponds to 10V/20mA     | 2 times of rated torque of the motor corresponds to P13.09     |
| 5                | output voltage                 | 2 times of rated voltage of the motor corresponding to 10V/20mA  | 2 times of rated voltage of the motor corresponds to P13.09    |
| 6                | bus voltage                    | 1000V corresponds to 10V/20mA                                    | 1000V corresponds to P13.09                                    |
| 7                | output power                   | 2 times of rated power of the inverter corresponds to 10V/20mA   | 2 times of rated power of the inverter corresponds to P13.09   |
| 8                | AI1 input                      | AI1 input 10V corresponds to                                     | AI1 input 10V corresponds to                                   |

|    |                                |   |   |
|----|--------------------------------|---|---|
|    |                                | 10V/20mA  | P13.09  |
| 9  | AI2 input                      | AI2 input 10V corresponds to 10V/20mA                           | AI2 input 10V corresponds to P13.09                         |
| 10 | reserve                        | -   | -   |
| 11 | pulse input                    | 100kHz corresponds to 10V/20mA                                  | 100kHz corresponds to P13.09                                |
| 12 | motor current                  | 2 times of rated current of the motor corresponding to 10V/20mA | 2 times of rated current of the motor corresponds to P13.09 |
| 13 | output torque (relative value) | 2 times of rated torque of the motor corresponds to 10V/20mA    | 2 times of rated torque of the motor corresponds to P13.09  |
| 14 | torque command                 | 2 times of rated torque of the motor corresponds to 10V/20mA    | 2 times of rated torque of the motor corresponds to P13.09  |

|        |                           |                       |                        |
|--------|---------------------------|-----------------------|------------------------|
| P13.03 | AO1 output bias           | range: -100.0%~100.0% | Factory default:0.0%   |
| P13.04 | AO1 output gain           | range: -2.000~2.000   | Factory default:1.000  |
| P13.05 | AO1 output filtering time | range:0.000s~10.000s  | Factory default:0.000s |
| P13.06 | AO2 output bias           | range: -100.0%~100.0% | Factory default:0.0%   |
| P13.07 | AO2 output gain           | range: -2.000~2.000   | Factory default:1.000  |
| P13.08 | AO2 output filtering time | range: 0.000s~10.000s | Factory default:0.000s |

The default output is 0-10V or 0-20mA. If the range of the analog output is adjusted, it can be set through the gain and offset of the above two groups of parameters; the following figure shows the typical application settings of the industry.



**Figure 5-19 Schematic Diagram of AO Output**

When the output signal causes output fluctuation due to environmental interference, the filtering time can be increased appropriately to filter the output signal.

|        |                                    |                        |                          |
|--------|------------------------------------|------------------------|--------------------------|
| P13.09 | HDO maximum output pulse frequency | range:0.01kHz~50.00kHz | Factory default:10.00kHz |
|--------|------------------------------------|------------------------|--------------------------|

When Y1/HDO is used as the high-speed pulse output terminal, the maximum output frequency is allowed.

|        |                           |           |                   |
|--------|---------------------------|-----------|-------------------|
| P13.10 | HDO output zero selection | range:0~1 | Factory default:0 |
|--------|---------------------------|-----------|-------------------|

0: no center point

HDO output 0~P13.09 corresponds to 0~maximum range of selected function.

1: have center point

P13.09/2 is taken as the center point, P13.09/2~P13.09 correspond to the 0~maximum range of the selected function; 0~P13.09/2 correspond to the negative maximum range~0 of the selected function.

|        |                           |                      |                        |
|--------|---------------------------|----------------------|------------------------|
| P13.11 | HDO output filtering time | range:0.000s~10.000s | Factory default:0.000s |
|--------|---------------------------|----------------------|------------------------|

The filtering time of HDO high-speed pulse output is set. The filtering time is long, the pulse frequency changes slowly, the filtering time is short, and the pulse frequency changes quickly.

## **P20 Operating Keyboard Setting Parameters**

|        |                  |                   |                       |
|--------|------------------|-------------------|-----------------------|
| P20.00 | Password setting | range:00000~65535 | Factory default:00000 |
|--------|------------------|-------------------|-----------------------|

Password setting: when it is set to non-zero and the enter key is pressed, it means that the password is effective. When entering to view or modifying parameters in next time, it needs to enter the correct password to enter the parameter group.

Password clearing: after entering the correct password, re-enter the P20.00 parameter, enter 00000 and press the enter key, the password is cleared.

Password change: after entering the correct password, re-enter the P20.00 parameter, set a new password, and press the enter key, the new password is set successfully.

|        |                        |                |                     |
|--------|------------------------|----------------|---------------------|
| P20.01 | LCD brightness control | range:10%~100% | Factory default:80% |
| P20.02 | LCD language selection | range:0~1      | Factory default:0   |

These two parameters are only valid for the LCD keyboard. P20.01 is used for setting the LCD brightness function, P20.02 is used for selecting the LCD display language, currently only supports Chinese.

|        |                                       |           |                   |
|--------|---------------------------------------|-----------|-------------------|
| P20.03 | Function code modification protection | range:0~1 | Factory default:0 |
|--------|---------------------------------------|-----------|-------------------|

0: All function codes are allowed to be modified

All functions of P group can modify the setting value.

1: Only P20.00 and P20.03 are allowed to be modified



When this option is selected, all functions in group P can be modified except P20.00 and P20.03, and the remaining function codes cannot be modified. This function mainly prevents the function codes set by the inverter from being modified by mistake.

|        |                              |           |                   |
|--------|------------------------------|-----------|-------------------|
| P20.04 | Function code initialization | range:0~3 | Factory default:0 |
|--------|------------------------------|-----------|-------------------|

0: no operation

1: restore factory parameters (no motor parameters)

2: restore factory parameters (including motor parameters)

3: clear fault record information

When it is set as a non-zero value, the value of P20.04 automatically returns to 0 after the operation is completed.

|        |                    |           |                   |
|--------|--------------------|-----------|-------------------|
| P20.05 | Copy of parameters | range:0~3 | Factory default:0 |
|--------|--------------------|-----------|-------------------|

0: no operation

1: parameter uploading

The function code setting value of the inverter main control board is uploaded to the keyboard.

2: parameter downloading (no motor parameters)

The parameters saved in the keyboard are downloaded to the main control board of the inverter.

The parameter of this download function code does not include the motor parameters.

3: parameter downloading (including motor parameters)

The parameters saved in the keyboard are downloaded to the main control board of the inverter.

The parameter of this download function code does not include the motor parameters.

Note: when selecting the parameter download function, please confirm that the setting value of the function code has been uploaded in the keyboard, and the keyboard that does not upload parameters is not allowed to be used directly for the parameter download function.

|        |                           |           |                   |
|--------|---------------------------|-----------|-------------------|
| P20.06 | Keyboard locking function | range:0~3 | Factory default:0 |
|--------|---------------------------|-----------|-------------------|

0: not locking

All keys on the keyboard can be operated.

1: full locking

All keys on the keyboard are locked. Press any key and the keyboard displays the "Loc1" prompt.

2: locking except Loc/Rem key

Except for the Loc/Rem key, all other keys on the keyboard are in the locked status. When pressing all keys except Loc/Rem, the keyboard displays the "Loc2" prompt

3: locking except Start and Stop keys

Except for the Start and Stop keys, the other keys on the keyboard are locked. When pressing all keys except for Start and Stop keys, the keyboard displays the "Loc3" prompt.

|        |                                |           |                   |
|--------|--------------------------------|-----------|-------------------|
| P20.08 | Loc/Rem key function selection | range:0~4 | Factory default:0 |
|--------|--------------------------------|-----------|-------------------|

0: no function

1: switch the given mode of operation command

The run command mode of the inverter is cyclically switched:

Keyboard commands → Terminal commands → Communication commands → Multi-stage terminal commands

2: inching forward rotation

3: inching reverse rotation

It is used for inching the forward or reverse of the inverter in the keyboard command mode; the inching frequency and inching acceleration/deceleration time are determined by P00.16, P02.09 and P02.10.

4: forward and reverse switching

It is used for switching the forward or reverse running of the motor in keyboard command mode.

## P21 Display Setting Parameters

The keyboard displays the parameter setting, and refers to the brief table of parameter settings displayed on the keyboard for the detailed list.

## P30 Fault and Protection Parameters

|        |                     |           |                   |
|--------|---------------------|-----------|-------------------|
| P30.00 | Cooling fan control | range:0~2 | Factory default:0 |
|--------|---------------------|-----------|-------------------|

0: Automatic control

When the temperature of the radiator is detected to be greater than 42°C, the cooling fan starts to work. When the temperature is lower than 40°C and lasts for 30 seconds, the fan stops working.

1: power-on direct operation

After the inverter is powered on, the fan runs immediately.

2: stop immediately after shutdown

When the inverter is running, the fan runs automatically; the fan stops after the inverter stops.

|        |  |                   |                     |
|--------|--|-------------------|---------------------|
| P30.01 | Selection of motor overheating detection | range:0x000~0x111 | Factory default:000 |
|--------|--|-------------------|---------------------|

Ones: motor over-temperature protection

0: forbidden

The motor temperature is not protected.

1: action

The motor temperature detection and protection are allowed.

Tens: sensor type

0: temperature sensor PT100

1: temperature sensor PT1000

The sensor type used for motor temperature detection is selected.

Hundreds: analog channel

0: analog Input AI1

1: analog Input AI2

The input channel of the motor temperature sensor is selected.

|        |                                |                     |                        |
|--------|--------------------------------|---------------------|------------------------|
| P30.02 | Motor overheat detection level | range:0.0°C~200.0°C | Factory default:85.0°C |
|--------|--------------------------------|---------------------|------------------------|

When the ones of P30.01 are set to 1; and the temperature detected by the temperature sensor is greater than the setting value of P30.02, the inverter reports a motor overheat fault.

|        |  |                   |                     |
|--------|--|-------------------|---------------------|
| P30.03 | Selection of inverter overload pre-alarm detection | range:0x000~0x111 | Factory default:000 |
|--------|--|-------------------|---------------------|

Ones: overload pre-alarm detection selection

0: always check during operation

The overload pre-alarm is detected as soon as the inverter is running.

1: detection at constant speed operation only

The overload pre-alarm is detected only when the inverter is running at a constant speed, and acceleration or deceleration is not detected.

Tens: selection of overload pre-alarm detection quantity

0: detection level is relative to rated current of motor

P30.04 sets the parameter percentage relative to the rated current of the motor; if the overload pre-alarm level is reached and continues for the time set by P30.05, the inverter reports a motor overload fault.

1: detection level is relative to rated current of inverter

P30.04 sets the parameter percentage relative to the rated current of the inverter; if it reaches the overload pre-alarm level and continues for the time set by P30.05, the inverter reports a inverter overload fault.

Hundreds: Overload pre-alarm protection selection

0: overload protection shield

The inverter prohibits overload pre-alarm protection detection.

1: overload protection enabled

The inverter enables detection of overload pre-alarm protection.

|        |  |                    |                        |
|--------|--|--------------------|------------------------|
| P30.04 | Detection level of inverter overload pre-alarm | range:20.0%~200.0% | Factory default:160.0% |
| P30.05 | Detection time of inverter overload pre-alarm  | range:0.0s~60.0s   | Factory default:5.0s   |

P30.04 is used for setting the current detection value of overload pre-alarm. Whether the percentage of the detected value is relative to the rated current of the motor or the rated current of the inverter depends on the tens setting value of P30.03.

P30.05 is used for setting the detection time of overload pre-alarm. When the actual output current is greater than the setting value of P30.04 and the duration is greater than P30.05, the inverter reports an overload pre-alarm fault.

|        |   |           |                   |
|--------|---|-----------|-------------------|
| P30.06 | Output load drop detection<br>selection of inverter | range:0~4 | Factory default:0 |
|--------|---|-----------|-------------------|

0: invalid detection of output load drop of inverter

1: always check during operation (continue operation)

The detection starts when the inverter is running. If a load loss condition is detected, the inverter continues to run.

2: detection only at constant speed (continuous operation)

The detection starts only at constant speed. If a load loss is detected, the inverter continues to run.

3: always check during operation (free stop)

The detection starts when the inverter is running. If a load loss condition is detected, the inverter stops freely.

4: detection only at constant speed (free stop)

The detection starts only at constant speed. If a load loss is detected, the inverter stops freely.

|        |   |                    |                          |
|--------|---|--------------------|--------------------------|
| P30.07 | Output load drop detection<br>level of inverter | range:0.0%~100.0%  | Factory<br>default:30.0% |
| P30.08 | Output load drop detection<br>time of inverter  | range:0.0s~3600.0s | Factory default:1.0s     |

P30.07 is used for setting the percentage of the current value of the load loss detection. The percentage is relative to the rated current of the inverter.

P30.08 is used for setting the time of load loss detection. If the output current of the inverter is less than the setting value of P30.07 and the duration is greater than the setting value of P30.08, the load loss fault of the inverter takes effect.

|        |                                       |                   |                      |
|--------|---------------------------------------|-------------------|----------------------|
| P30.09 | Selection of automatic reset<br>times | range:0~100       | Factory default:0    |
| P30.10 | Automatic reset interval time         | range:0.1s~100.0s | Factory default:1.0s |

After a fault occurs during the running process of the inverter, after the interval of P30.10, the inverter automatically resets the fault; the number of reset is set by P30.09. When the number of reset is reached, the inverter will not automatically reset after a fault. When P30.09 is set to 0, it means that automatic reset is prohibited.

|        |                                 |                 |                    |
|--------|---------------------------------|-----------------|--------------------|
| P30.11 | Selection of fault relay action | range:0x00~0x11 | Factory default:00 |
|--------|---------------------------------|-----------------|--------------------|

Ones: during automatic reset

0: action

1: no action

Define whether the fault relay contact acts during automatic reset.

Tens: under-voltage period

0: action

1: no action

Define whether the fault relay contact carries out action selection during undervoltage.

|        |  |                   |                     |
|--------|--|-------------------|---------------------|
| P30.12 | Option of enhanced protection function | range:0x000~0x111 | Factory default:000 |
|--------|--|-------------------|---------------------|

Ones: output phase loss detection

0: forbidden

1: action

Select whether to protect the output phase loss of the inverter.

Tens: input stage lack detection

0: forbidden

1: action

Select whether to protect the input phase loss of the inverter.

Hundreds: motor overload detection

0: forbidden

1: action

Select whether to protect the motor overload.

|        |                            |           |                   |
|--------|----------------------------|-----------|-------------------|
| P30.13 | Fault record saving method | range:0~1 | Factory default:1 |
|--------|----------------------------|-----------|-------------------|

It is used for setting the way to save the fault information data when the inverter has a fault. It is not recommended to modify this parameter.

0: reset of fault record in case of power failure

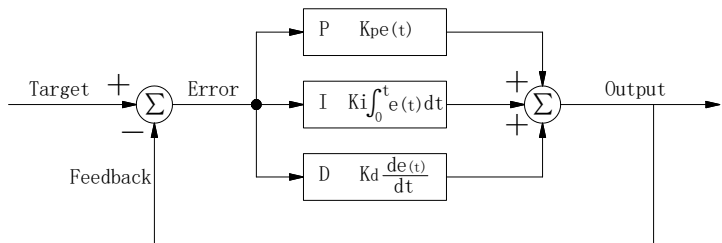
1: storage of fault record in case of power failure

|        |  |                     |                      |
|--------|--|---------------------|----------------------|
| P30.14 | Fault protection action attribute<br>1 | range:0x0000~0x1111 | Factory default:1111 |
| P30.15 | Fault protection action attribute<br>2 | range:0x0000~0x1111 | Factory default:1111 |

It is used for setting the inverter to stop freely or continue running after some inverter faults occur. See the parameter brief list for the specific fault type.

## P40 Process PID Control Parameters

Process PID control carries out the proportional, integral, and differential operations based on the difference between the feedback signal and the target signal of the controlled object; and it is a commonly used method in industrial process control. Select PID control output as the frequency setting to form a closed-loop control system, which is generally suitable for constant pressure water supply and constant tension control.



**Figure 5-20 PID Control Principle Diagram**

- ◆ Proportional control  $K_p$ : once the deviation between the feedback quantity and the target quantity occurs, the proportional gain  $K_p$  will act immediately, so that the feedback quantity changes in the direction of reducing the deviation. The larger  $K_p$ , the faster the system response, but too large  $K_p$  may cause system oscillation.
- ◆ Integral control  $T_i$ : it is mainly used for eliminating the static deviation. The integral control depends on the length of the integral time; the longer the integral time, the weaker the integral action and the slower the system response; the shorter the integral time, the stronger the integral action and the faster the system response.
- ◆ Differential control  $T_d$ : it is mainly used for reflecting the change rate of deviation. A correction amount is introduced before the deviation signal changes, so the response speed of the system is quickened; the longer the differential time, the stronger the effect, and the shorter the differential time, the weaker the effect.

|        |                          |           |                   |
|--------|--------------------------|-----------|-------------------|
| P40.00 | PID given mode selection | range:0~8 | Factory default:0 |
|--------|--------------------------|-----------|-------------------|

- 0: given by P40.01  
 1: analog input AI1  
 2: analog input AI2  
 3: reserve  
 4: Min[AI1,AI2]  
 5: Max[AI1,AI2]  
 6: Sub[AI1,AI2]  
 7: Add[AI1,AI2]  
 8: pulse given HDI

A given method for selecting the target quantity of PID

|        |                   |                   |         |
|--------|-------------------|-------------------|---------|
| P40.01 | PID digital given | range:0.0%~100.0% | Factory |
|--------|-------------------|-------------------|---------|

When P40.00 is set to 0, the PID target quantity is set by P40.01.

|        |                             |           |                   |
|--------|-----------------------------|-----------|-------------------|
| P40.02 | PID feedback mode selection | range:0~8 | Factory default:1 |
|--------|-----------------------------|-----------|-------------------|

- 0: constant zero feedback input  
 1: analog input AI1  
 2: analog input AI2  
 3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

A given method for selecting the feedback quantity of PID

|        |                       |                      |                      |
|--------|-----------------------|----------------------|----------------------|
| P40.03 | Proportional gain Kp1 | range:0.0~100.0      | Factory default:50.0 |
| P40.04 | Integral time Ti1     | range:0.000s~50.000s | Factory              |
| P40.05 | Differential time Td1 | range:0.000s~50.000s | Factory              |
| P40.06 | Proportional gain Kp2 | range:0.0~100.0      | Factory default:50.0 |
| P40.07 | Integral time Ti2     | range:0.000s~50.000s | Factory              |
| P40.08 | Differential time Td2 | range:0.000s~50.000s | Factory              |

Refer to the PID control instructions for the use instruction of the two groups of Kp, Ti, Td parameter. For general applications, PI adjustment is used; improper use of differential control can easily cause system oscillation.

|        |                                   |           |                   |
|--------|-----------------------------------|-----------|-------------------|
| P40.09 | PID parameter switching selection | range:0~2 | Factory default:0 |
|--------|-----------------------------------|-----------|-------------------|

0: use Kp1, Ki1 and Kd1 only

1: automatically switch according to input bias

When the deviation between the target quantity and the feedback quantity is greater than the setting value of P40.10, it is switched to P40.06~P40.08; when it is less than the setting value of P40.10, it is returned to P40.03~P40.05.

2: switch according to terminals

When the "PID parameter switch" terminal function is valid, it is switched to P40.06~P40.08; when the terminal function is invalid, it is restored to P40.03~P40.05.

|        |                                       |                   |                       |
|--------|---------------------------------------|-------------------|-----------------------|
| P40.10 | Input bias in PID automatic switching | range:0.0%~100.0% | Factory default:20.0% |
|--------|---------------------------------------|-------------------|-----------------------|

The deviation reference value when PID parameters are automatically switched.

|        |                          |                 |                    |
|--------|--------------------------|-----------------|--------------------|
| P40.11 | PID adjustment selection | range:0x00~0x11 | Factory default:11 |
|--------|--------------------------|-----------------|--------------------|

Ones: output frequency

0: it must be consistent with the set running direction

When the PID adjustment output frequency is inconsistent with the setting running direction, the PID output is forced to 0.

1: it can be opposite to the set running direction

When the PID adjustment output frequency is opposite to the setting running direction, the PID is output normally.

Tens: integral mode

0: when the integral reaches the upper and lower limits, continue to adjust the integral.

When the PID adjustment reaches the upper or lower limit, the integrator continues to accumulate, and in this way, the integral saturation time is longer.

1: when the integral reaches the upper and lower limits, stop the integral adjustment.

When the PID adjustment reaches the upper or lower limit, the integrator stops accumulating, and in this way, the integral saturation status can be quickly exited;

|        |                                   |           |                   |
|--------|-----------------------------------|-----------|-------------------|
| P40.12 | PID positive and negative effects | range:0~1 | Factory default:0 |
|--------|-----------------------------------|-----------|-------------------|

0: positive effect

When the feedback quantity is less than the given quantity, the output frequency rises.

1: negative effect

When the feedback quantity is less than the given quantity, the output frequency decreases.

|        |                             |                    |                       |
|--------|-----------------------------|--------------------|-----------------------|
| P40.13 | PID given filtering time    | range:0.00s~10.00s | Factory default:0.00s |
| P40.14 | PID feedback filtering time | range:0.00s~10.00s | Factory default:0.00s |
| P40.15 | PID output filtering time   | range:0.00s~10.00s | Factory default:0.00s |

Set PID given, feedback and output filtering time. Increasing the filtering time can improve the anti-interference ability of the system; but it will bring about a decrease in the system response.

|        |                 |                      |                        |
|--------|-----------------|----------------------|------------------------|
| P40.16 | Sampling period | range:0.001s~50.000s | Factory default:0.002s |
|--------|-----------------|----------------------|------------------------|

For the cycle time for sampling and calculating the feedback signal, the longer the sampling period, the slower the system response.

|        |            |                   |                      |
|--------|------------|-------------------|----------------------|
| P40.17 | Bias limit | range:0.0%~100.0% | Factory default:0.0% |
|--------|------------|-------------------|----------------------|

When the deviation between the feedback quantity and the target quantity is less than this value, the PID stops adjusting. When it greater than this value, the PID adjusts it. This function helps to balance the stability and accuracy of the system.

|        |                            |                   |                      |
|--------|----------------------------|-------------------|----------------------|
| P40.18 | Differential term clipping | range:0.0%~100.0% | Factory default:0.5% |
|--------|----------------------------|-------------------|----------------------|

Limiting the differential adjustment term of PID helps to improve the stability of the differential control term.

|        |                                |                    |                      |
|--------|--------------------------------|--------------------|----------------------|
| P40.19 | PID initial value              | range:0.0%~100.0%  | Factory default:0.0% |
| P40.20 | PID initial value holding time | range:0.0s~3600.0s | Factory default:0.0s |

When the inverter starts, it is output with the initial value firstly, and after being held for the time in P40.20, it is subjected to PID adjustment.



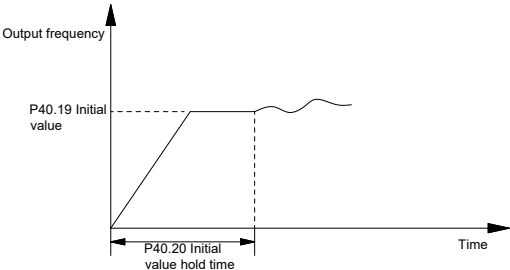


Figure 5-21 Schematic Diagram of PID Initial Value Function

|        |                              |                   |                        |
|--------|------------------------------|-------------------|------------------------|
| P40.21 | PID operation output maximum | range:0.0%~100.0% | Factory default:100.0% |
|--------|------------------------------|-------------------|------------------------|

Limit the maximum value of PID adjustment output

|        |                                     |                                |                        |
|--------|-------------------------------------|--------------------------------|------------------------|
| P40.22 | PID reverse output cutoff frequency | range:0.00Hz~maximum frequency | Factory default:0.00Hz |
|--------|-------------------------------------|--------------------------------|------------------------|

Limit the frequency value when the PID adjustment output is opposite to the given run command.

|        |                                  |           |                   |
|--------|----------------------------------|-----------|-------------------|
| P40.23 | PID shutdown operation selection | range:0~1 | Factory default:0 |
|--------|----------------------------------|-----------|-------------------|

0: no calculation during shutdown

1: operation during shutdown

It is used for selecting whether to continue the operation of PID adjustment when the inverter stops.

|        |                                   |                    |                       |
|--------|-----------------------------------|--------------------|-----------------------|
| P40.24 | PID given missing detection value | range:0.0%~100.0%  | Factory default:0.0%  |
| P40.25 | PID given loss detection time     | range:0.00s~30.00s | Factory default:1.00s |

When the PID setting is less than the setting value of P40.24 and the duration is greater than the value of P40.25, the inverter will perform a free stop or emergency stop according to the setting value of P40.28.

|        |                                      |                    |                       |
|--------|--------------------------------------|--------------------|-----------------------|
| P40.26 | PID feedback missing detection value | range:0.0%~100.0%  | Factory default:0.0%  |
| P40.27 | PID feedback loss detection time     | range:0.00s~30.00s | Factory default:1.00s |

When the PID feedback is less than the setting value of P40.26 and the duration is greater than the value of P40.27, the inverter will perform a free stop or emergency stop according to the setting value of P40.28.

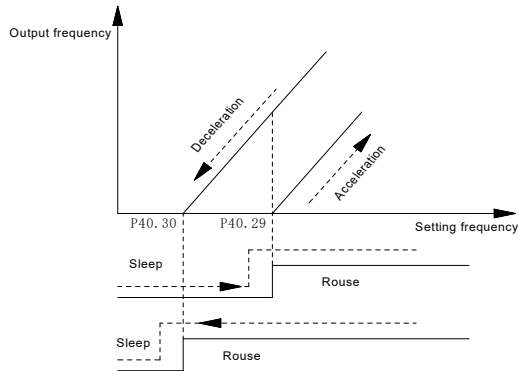
|        |                               |           |                   |
|--------|-------------------------------|-----------|-------------------|
| P40.28 | PID signal loss shutdown mode | range:0~1 | Factory default:0 |
|--------|-------------------------------|-----------|-------------------|

0: free stop

1: emergency stop

|        |  |                                     |                        |
|--------|--|-------------------------------------|------------------------|
| P40.29 | Upper critical value of zero frequency operation | range: P40.30~upper limit frequency | Factory default:0.00Hz |
| P40.30 | Lower critical value of zero frequency operation | range:0.00Hz~P40.29                 | Factory default:0.00Hz |

When P40.31=0, PID adjustment output frequency $\geq$ P40.29, and the duration is greater than the value of P40.35, the inverter runs with PID adjustment output frequency; when the run frequency $\leq$  P40.30, and the duration is greater than the value of P40.33, the inverter will be output at zero frequency.



**Figure 5-22 Schematic Diagram of the Upper and Lower Bounds of Zero-frequency Operation**

|        |                              |           |                   |
|--------|------------------------------|-----------|-------------------|
| P40.31 | Sleep wake-up mode selection | range:0~1 | Factory default:0 |
|--------|------------------------------|-----------|-------------------|

0: Frequency sleep wake-up mode

The inverter sleeps and rouses based on frequency.

1: Pressure sleep wake-up method

The inverter sleeps and rouses based on pressure.

|        |                                |                      |                      |
|--------|--------------------------------|----------------------|----------------------|
| P40.32 | Sleep pressure detection value | range: P40.34~P40.37 | Factory default:1000 |
|--------|--------------------------------|----------------------|----------------------|

When P40.31=1, feedback pressure $\geq$ P40.32, and the duration is greater than the value of P40.33, the inverter enters the sleep status.

|        |                            |                    |                       |
|--------|----------------------------|--------------------|-----------------------|
| P40.33 | Sleep detection delay time | range:0.00s~30.00s | Factory default:1.00s |
|--------|----------------------------|--------------------|-----------------------|

Judge the delay time to enter sleep.

|        |                               |                |                   |
|--------|-------------------------------|----------------|-------------------|
| P40.34 | Wake pressure detection value | range:0~P40.32 | Factory default:0 |
|--------|-------------------------------|----------------|-------------------|

When P40.31=1, feedback pressure $\leq$ P40.34, and the duration is greater than the value of P40.35, the inverter rouses from the sleep status.

|        |                             |                    |                       |
|--------|-----------------------------|--------------------|-----------------------|
| P40.35 | Wakeup detection delay time | range:0.00s~30.00s | Factory default:0.50s |
|--------|-----------------------------|--------------------|-----------------------|

Judge the delay time from sleep to rouse status

|        |                               |               |                      |
|--------|-------------------------------|---------------|----------------------|
| P40.37 | Given feedback pressure range | range:0~10000 | Factory default:1000 |
|--------|-------------------------------|---------------|----------------------|

Set the range of the pressure sensor.

### P41 Multistage Frequency

|        |                                       |                      |                        |
|--------|---------------------------------------|----------------------|------------------------|
| P41.00 | Multistage frequency digital given 1  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.01 | Multistage frequency digital given 2  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.02 | Multistage frequency digital given 3  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.03 | Multistage frequency digital given 4  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.04 | Multistage frequency digital given 5  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.05 | Multistage frequency digital given 6  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.06 | Multistage frequency digital given 7  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.07 | Multistage frequency digital given 8  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.08 | Multistage frequency digital given 9  | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.09 | Multistage frequency digital given 10 | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.10 | Multistage frequency digital given 11 | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.11 | Multistage frequency digital given 12 | range: P00.09~P00.08 | Factory default:0.00Hz |

|        |                                       |                      |                        |
|--------|---------------------------------------|----------------------|------------------------|
| P41.12 | Multistage frequency digital given 13 | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.13 | Multistage frequency digital given 14 | range: P00.09~P00.08 | Factory default:0.00Hz |
| P41.14 | Multistage frequency digital given 15 | range: P00.09~P00.08 | Factory default:0.00Hz |

16-speed switching can be achieved through different combinations of switching value input terminals "multi-stage frequency terminal 1-4". For the specific setting method, refer to the content of the switching value input terminal.

|        |  |           |                   |
|--------|--|-----------|-------------------|
| P40.15 | Setting method of multistage frequency 1 | range:0~9 | Factory default:0 |
|--------|--|-----------|-------------------|

0: given by P41.00

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

9: process PID

It is used for selecting the frequency setting source for multi-stage frequency 1.

### **P42 Simple PLC**

The simple PLC function is to automatically switch the actual operating conditions of the inverter according to the frequency and time set by the user so as to meet the technological requirements.

The process is as shown in the figure:

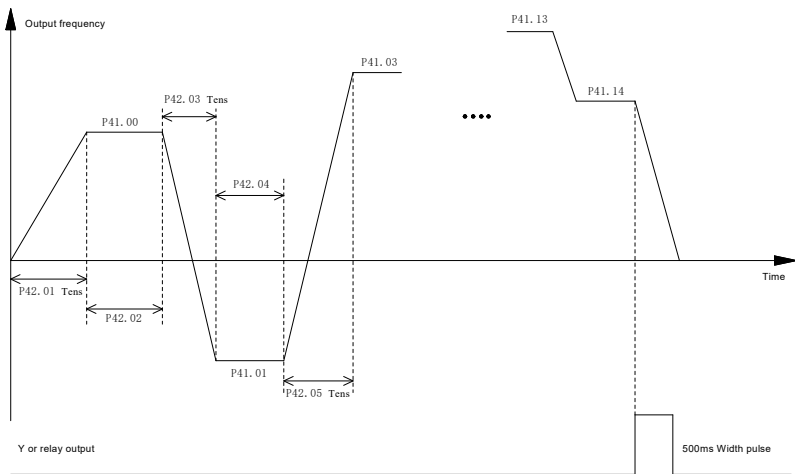


Figure 5-23 Simple PLC Operation Diagram

|        |  |                     |                      |
|--------|--|---------------------|----------------------|
| P42.00 | Selection of simple PLC operation mode | range:0x0000~0x1111 | Factory default:0000 |
|--------|--|---------------------|----------------------|

Ones: simple PLC operation mode

0: shutdown after single cycle

The inverter stops automatically after completing one cycle of operation. It can be started when giving the run command again.

1: maintain final value after single cycle

After the inverter finishes one cycle of operation, it keeps the run frequency of the last stage and continues to run until the stop command is given.

2: continuous cycle

After the inverter completes one cycle, it enters the next cycle automatically until the stop command is given.

Tens: simple PLC startup mode

0: run from stage 1

The inverter does not memorize the current running stage, and it starts from stage 1 when it is restarted.

1: continue to operate from the stage frequency at the interruption time

The inverter memorizes the current running stage, and when it starts again, it starts to run from the memorized stage.

Hundreds: simple PLC power-down memory

0: power-down reset

After power-on again, start from the initial stage.

1: power-down storage

The stage before the memory is powered off, and it starts from the stage of the memory when the power is on again.

Thousands: simple PLC time unit

0: second (s)

1: minute (min)

Set the unit of PLC stage running time.

|        |                        |                 |                    |
|--------|------------------------|-----------------|--------------------|
| P42.01 | Setting of PLC stage 1 | range:0x00~0x13 | Factory default:00 |
|--------|------------------------|-----------------|--------------------|

Ones: operation direction of simple PLC stage

0: positive

1: negative

Define the running direction of PLC stage 1.

Tens: acceleration and deceleration time of simple PLC stage

0: acceleration and deceleration time 1

1: acceleration and deceleration time 2

2: acceleration and deceleration time 3

3: acceleration and deceleration time 4

Select the acceleration and deceleration time of PLC stage 1.

|        |                         |                  |                     |
|--------|-------------------------|------------------|---------------------|
| P42.02 | Running time in stage 1 | range:0.0~3276.7 | Factory default:0.0 |
|--------|-------------------------|------------------|---------------------|

Set the running time of stage1, the time unit is determined by the thousands of function code P42.00. The run frequency of PLC stage 1 is set by P41.00 function code, and the run frequency of PLC stage 2 is set by P41.01 function code; in turn, the run frequency of PLC stage 15 is set by function code P41.14.

|        |                         |                  |                     |
|--------|-------------------------|------------------|---------------------|
| P42.03 | Setting of PLC stage 2  | range:0x00~0x13  | Factory default:00  |
| P42.04 | Running time in stage 2 | range:0.0~3276.7 | Factory default:0.0 |
| P42.05 | Setting of PLC stage 3  | range:0x00~0x13  | Factory default:00  |
| P42.06 | Running time in stage 3 | range:0.0~3276.7 | Factory default:0.0 |
| P42.07 | Setting of PLC stage 4  | range:0x00~0x13  | Factory default:00  |
| P42.08 | Running time in stage 4 | range:0.0~3276.7 | Factory default:0.0 |
| P42.09 | Setting of PLC stage 5  | range:0x00~0x13  | Factory default:00  |
| P42.10 | Running time in stage 5 | range:0.0~3276.7 | Factory default:0.0 |
| P42.11 | Setting of PLC stage 6  | range:0x00~0x13  | Factory default:00  |
| P42.12 | Running time in stage 6 | range:0.0~3276.7 | Factory default:0.0 |
| P42.13 | Setting of PLC stage 7  | range:0x00~0x13  | Factory default:00  |
| P42.14 | Running time in stage 7 | range:0.0~3276.7 | Factory default:0.0 |
| P42.15 | Setting of PLC stage 8  | range:0x00~0x13  | Factory default:00  |
| P42.16 | Running time in stage 8 | range:0.0~3276.7 | Factory default:0.0 |
| P42.17 | Setting of PLC stage 9  | range:0x00~0x13  | Factory default:00  |

|        |                          |                  |                     |
|--------|--------------------------|------------------|---------------------|
| P42.18 | Running time in stage 9  | range:0.0~3276.7 | Factory default:0.0 |
| P42.19 | Setting of PLC stage 10  | range:0x00~0x13  | Factory default:00  |
| P42.20 | Running time in stage 10 | range:0.0~3276.7 | Factory default:0.0 |
| P42.21 | Setting of PLC stage 11  | range:0x00~0x13  | Factory default:00  |
| P42.22 | Running time in stage 11 | range:0.0~3276.7 | Factory default:0.0 |
| P42.23 | Setting of PLC stage 12  | range:0x00~0x13  | Factory default:00  |
| P42.24 | Running time in stage 12 | range:0.0~3276.7 | Factory default:0.0 |
| P42.25 | Setting of PLC stage 13  | range:0x00~0x13  | Factory default:00  |
| P42.26 | Running time in stage 13 | range:0.0~3276.7 | Factory default:0.0 |
| P42.27 | Setting of PLC stage 14  | range:0x00~0x13  | Factory default:00  |
| P42.28 | Running time in stage 14 | range:0.0~3276.7 | Factory default:0.0 |
| P42.29 | Setting of PLC stage 15  | range:0x00~0x13  | Factory default:00  |
| P42.30 | Running time in stage 15 | range:0.0~3276.7 | Factory default:0.0 |

The setting method of PLC stage 2 ~ PLC stage 15 is the same as PLC stage 1; please refer to the setting instructions of PLC stage 1.

### **P43 Fixed Length and Linear Speed**

|        |                          |                |                      |
|--------|--------------------------|----------------|----------------------|
| P43.00 | Set the counting value   | range:1~65535  | Factory default:1000 |
| P43.01 | Point the counting value | range:1~P43.00 | Factory default:1000 |

This parameter cooperates with the switching value input terminal and switching value output terminal functions to complete the counting function of the X terminal and the counting reaching output function of the Y terminal.

|        |                                  |                     |                      |
|--------|----------------------------------|---------------------|----------------------|
| P43.02 | Selection of length reach action | range:0x0000~0x1111 | Factory default:0000 |
|--------|----------------------------------|---------------------|----------------------|

Ones: length reaching

0: continue to run

1: shutdown

Tens: unit of length

0: meter

1: 10 meters

Hundreds: length shutdown reset

0: invalid

1: action

Thousands: counting, stopping and clearing

0: invalid

1: action

|        |                |                 |                    |
|--------|----------------|-----------------|--------------------|
| P43.03 | Setting length | range:0m~65535m | Factory default:0m |
|--------|----------------|-----------------|--------------------|

When the detected length reaches the setting length, the switching value output terminal "set length

reaching" terminal outputs a valid signal; and acts according to the mode set by the P43.02 ones.

|        |                            |                  |         |
|--------|----------------------------|------------------|---------|
| P43.04 | Number of pulses per meter | range:0.1~6553.5 | Factory |
|--------|----------------------------|------------------|---------|

Set the pulse number per meter length to calculate the length value.

|        |                                  |                    |                      |
|--------|----------------------------------|--------------------|----------------------|
| P43.05 | Linear speed display coefficient | range:0.0%~1000.0% | Factory default:0.0% |
|--------|----------------------------------|--------------------|----------------------|

#### **P44 Lifting function parameters (only for crane models)**

|        |                        |                 |                    |
|--------|------------------------|-----------------|--------------------|
| P44.00 | Crane device selection | range:0x00~0x12 | Factory default:00 |
|--------|------------------------|-----------------|--------------------|

ones: device selection

0: forbidden

1: Promotion device

When the inverter is used in the lifting mechanism, please keep the inverter up when it is rotating forwards and downward when it is reverse. If the actual direction is different from the required direction, please replace any two-phase wiring of the three-phase output of the inverter. Selecting the lifting mechanism is switched to the terminal control automatically, and the brake output is opened at the same time.

2: translation device

It is used for translation mechanism of cart or car.

Tens: reserve

|        |                                |                      |                        |
|--------|--------------------------------|----------------------|------------------------|
| P44.01 | Upward brake opening frequency | range:0.00Hz~10.00Hz | Factory default:2.00Hz |
| P44.02 | Upward brake opening current   | range:0.0%~200.0%    | Factory                |

It is used for judging the value of the frequency and current of the brake release when lifting up. When the inverter is running forwards and the output frequency and current reach the setting value, the brake release time is counted; after the timer is reached, the brake release is in accelerated running.

|        |                                  |                      |                        |
|--------|----------------------------------|----------------------|------------------------|
| P44.03 | Downward brake opening frequency | range:0.00Hz~10.00Hz | Factory default:3.00Hz |
| P44.04 | Downward brake opening current   | range:0.0%~200.0%    | Factory default:30.0%  |

It is used for judging the value of the frequency and current of the brake release when lifting down. When the inverter is running reversely and declines, and the output frequency and current reach the setting value, the brake release time is counted; after the timer is reached, the brake release is in accelerated running.

|        |                                       |                  |                      |
|--------|---------------------------------------|------------------|----------------------|
| P44.05 | Holding time of brake opening current | range:0.0s~10.0s | Factory default:0.5s |
|--------|---------------------------------------|------------------|----------------------|

When the output frequency of the inverter is equal to the brake release frequency, and the output



current  $\geq$  the brake release current; after the inverter passes the holding time of P44.05, the brake relay is energized.

|        |                            |                      |         |
|--------|----------------------------|----------------------|---------|
| P44.06 | Upward brake off frequency | range:0.00Hz~10.00Hz | Factory |
|--------|----------------------------|----------------------|---------|

For the starting frequency of the downstream brake, when the inverter is downstream, the output frequency  $\leq$  P44.07 value, control the brake relay to lose power.

|        |                              |                      |         |
|--------|------------------------------|----------------------|---------|
| P44.07 | Downward brake off frequency | range:0.00Hz~10.00Hz | Factory |
|--------|------------------------------|----------------------|---------|

For the starting frequency of the upstream brake, when the inverter is upstream, the output frequency  $\leq$  P44.06 value, control the brake relay to lose power.

|        |                                     |                  |                      |
|--------|-------------------------------------|------------------|----------------------|
| P44.08 | Holding time of brake off frequency | range:0.0s~10.0s | Factory default:0.5s |
|--------|-------------------------------------|------------------|----------------------|

The inverter maintains the output frequency unchanged during the brake frequency holding time.

|        |                      |                  |                      |
|--------|----------------------|------------------|----------------------|
| P44.09 | brake off delay time | range:0.0s~10.0s | Factory default:0.0s |
|--------|----------------------|------------------|----------------------|

|        |                 |                  |                      |
|--------|-----------------|------------------|----------------------|
| P44.10 | Stop delay time | range:0.0s~10.0s | Factory default:0.5s |
|--------|-----------------|------------------|----------------------|

After receiving the stop command, when the brake frequency holding time ends, and after the time of P44.10, the inverter completes the stop.

|        |                                   |           |                   |
|--------|-----------------------------------|-----------|-------------------|
| P44.11 | Start direction control selection | range:0~1 | Factory default:0 |
|--------|-----------------------------------|-----------|-------------------|

0: The brake opening torque is consistent with the running direction

1: The brake opening torque is always in the positive direction

It is used for controlling the torque direction of the brake release.

|        |                               |           |                   |
|--------|-------------------------------|-----------|-------------------|
| P44.12 | Instruction reverse selection | range:0~1 | Factory default:0 |
|--------|-------------------------------|-----------|-------------------|

0: Do not allow the running process to reverse directly

1: Allow the running process to be reversed directly

It is used for selecting whether the inverter receives the direct reverse command during the running process. When reverse is not allowed, after receiving the reverse command, when the inverter is in zero speed, the brake output action is controlled firstly, and runs reversely; when reverse is allowed, after receiving the reverse command and when the inverter is in zero speed, the brake output does not act.

|        |                                |           |                   |
|--------|--------------------------------|-----------|-------------------|
| P44.15 | Keyboard Up/Dn speed selection | range:0~1 | Factory default:0 |
|--------|--------------------------------|-----------|-------------------|

0: speed adjustment is forbidden

1: speed adjustment is Allowed

In the special lifting products, it is used for selecting the Up/Dn speed control function of keyboard.

## P50 Modbus Communication Parameters

Support general Modbus protocol, please refer to Appendix A for detailed protocol content.

|        |               |             |                   |
|--------|---------------|-------------|-------------------|
| P50.00 | Local address | range:0~247 | Factory default:1 |
|--------|---------------|-------------|-------------------|

Set the local communication address, 0 stands for broadcast address, the address range for normal communication is 1~247.

|        |                              |                 |                    |
|--------|------------------------------|-----------------|--------------------|
| P50.01 | Communication rate selection | range:0x00~0x55 | Factory default:31 |
|--------|------------------------------|-----------------|--------------------|

Ones: communication baud rate of terminal port

Tens: communication baud rate of keyboard port

0:4800bps

1:9600bps

2:19200bps

3:38400bps

4:57600bps

5:115200bps

|        |             |                 |                    |
|--------|-------------|-----------------|--------------------|
| P50.02 | Data format | range:0x00~0x55 | Factory default:00 |
|--------|-------------|-----------------|--------------------|

Ones: Terminal port data format

Tens: Keyboard port data format

0:1-8-1-N format, RTU

1:1-8-1-E format, RTU

2:1-8-1-O format, RTU

3:1-7-1-N format, ASCII

4:1-7-1-E format, ASCII

5:1-7-1-O format, ASCII

|        |                      |                      |         |
|--------|----------------------|----------------------|---------|
| P50.03 | Local response delay | range:0.000s~60.000s | Factory |
|--------|----------------------|----------------------|---------|

Delay time for answering host communication.

|        |                         |                   |                      |
|--------|-------------------------|-------------------|----------------------|
| P50.04 | Overtime detection time | range:0.0s~600.0s | Factory default:0.0s |
|--------|-------------------------|-------------------|----------------------|

It is used for communication timeout detection, 0.0s: mean no detection.

|        |  |                 |                    |
|--------|--|-----------------|--------------------|
| P50.05 | Selection of communication error response shield | range:0x00~0x11 | Factory default:00 |
|--------|--|-----------------|--------------------|

Ones: selection of terminal port error response shield

Tens: selection of keyboard port error response shield

0: valid

1: invalid

|        |   |                     |                      |
|--------|---|---------------------|----------------------|
| P50.06 | Master-slave mode selection and slave function code setting | range:0x0000~0x1122 | Factory default:0000 |
|--------|---|---------------------|----------------------|

Ones: master-slave selection for terminal port communication

Tens: master-slave selection for keyboard port communication

0: stand-alone use

1: this machine is used as the host

2: this machine is a slave machine

Hundreds: operation address of terminal port communication

Thousands: communication operation address of extended port

0: P00.00

## 1: P40.01

|        |                                      |                     |                        |
|--------|--------------------------------------|---------------------|------------------------|
| P50.07 | Interval time of host operation data | range:0.010s~1.000s | Factory default:0.050s |
|--------|--------------------------------------|---------------------|------------------------|

When used as a host, define the interval of the sending data.

|        |   |                  |                      |
|--------|---|------------------|----------------------|
| P50.08 | Proportion coefficient of receiving date of slave machine | range:0.00~10.00 | Factory default:1.00 |
|--------|---|------------------|----------------------|

When the inverter is used as a slave, the received data is scaled before being written to the operation address (P00.00 or P40.01).

**P60 Motor Control Preparation**

|        |                           |                      |                    |
|--------|---------------------------|----------------------|--------------------|
| P60.00 | Carrier frequency setting | range:1.0kHz~16.0kHz | Factory default:机型 |
|--------|---------------------------|----------------------|--------------------|

Carrier frequency mainly focuses on temperature rise, loss, interference, leakage current, etc. for inverter and motor operation.

High carrier frequency: the temperature rise of the inverter increases, the output leakage current is large, and the external interference is increased; but the motor loss is reduced, the motor temperature rise is small, and the noise is small.

Low carrier frequency: the temperature rise of the inverter is reduced, the output current harmonics are increased, the output leakage current is small, and the external interference is reduced; but the motor loss increases and the noise increases.

|        |                             |           |                   |
|--------|-----------------------------|-----------|-------------------|
| P60.02 | Pulse width modulation mode | range:0~1 | Factory default:0 |
|--------|-----------------------------|-----------|-------------------|

0: 3-phase modulation

1: automatic switching

|        |                          |                      |         |
|--------|--------------------------|----------------------|---------|
| P60.03 | DPWM switching frequency | range:5.00Hz~maximum | Factory |
|--------|--------------------------|----------------------|---------|

When P60.02=1, and the output frequency of the inverter is greater than the setting value of P60.03, the pulse width modulation mode is automatically switched.

|        |                               |           |                   |
|--------|-------------------------------|-----------|-------------------|
| P60.04 | Magnetic flux brake selection | range:0~1 | Factory default:0 |
|--------|-------------------------------|-----------|-------------------|

0: forbidden

1: action

When the flux braking action is selected, the motor deceleration time can be shortened, and the motor can be quickly decelerated.

|        |                          |           |                   |
|--------|--------------------------|-----------|-------------------|
| P60.05 | Energy consumption brake | range:0~1 | Factory default:0 |
|--------|--------------------------|-----------|-------------------|

0: forbidden

1: action

When an application is quickly realized in cooperation with the braking resistor, please select dynamic braking action.

|        |   |                 |                      |
|--------|---|-----------------|----------------------|
| P60.06 | Energy consumption brake action voltage | range:650V~750V | Factory default:720V |
|--------|---|-----------------|----------------------|

Cooperating with P60.05=1, when the bus voltage rises to the setting value, the braking unit is

turned on, and the excessively high voltage of the bus is consumed in the form of heat energy through the braking resistor.

|        |   |           |                   |
|--------|---|-----------|-------------------|
| P60.07 | Over-voltage stall regulation selection | range:0~1 | Factory default:1 |
|--------|---|-----------|-------------------|

0: forbidden

1: action

The overvoltage stall function is to detect the bus voltage and compare it with the overvoltage stall operating voltage set in P60.08. When the bus voltage exceeds the setting value, the inverter automatically adjusts the output frequency to control the stability of the bus voltage. When the inverter works in overvoltage stall, the actual deceleration time is longer than the setting time.

|        |                                   |                     |                        |
|--------|-----------------------------------|---------------------|------------------------|
| P60.08 | Over-voltage stall action voltage | range:100.0%~150.0% | Factory default:135.0% |
|--------|-----------------------------------|---------------------|------------------------|

The overvoltage stall operating voltage is a percentage relative to the rated bus voltage of the inverter.

|        |  |           |                   |
|--------|--|-----------|-------------------|
| P60.09 | Under-voltage stall regulation selection | range:0~1 | Factory default:1 |
|--------|--|-----------|-------------------|

0: forbidden

1: action

The undervoltage stall function is that when the bus voltage drops momentarily, the inverter reduces the motor speed by reducing the output frequency, and the inertial energy of the load is fed back to the bus side in the form of a generator to maintain the stability of the bus voltage of the inverter.

|        |                                    |                   |                       |
|--------|------------------------------------|-------------------|-----------------------|
| P60.10 | Under-voltage stall action voltage | range:50.0%~95.0% | Factory default:85.0% |
|--------|------------------------------------|-------------------|-----------------------|

The undervoltage stall operating voltage is a percentage relative to the rated bus voltage of the inverter.

|        |                                   |           |                   |
|--------|-----------------------------------|-----------|-------------------|
| P60.11 | Current limiting action selection | range:0~1 | Factory default:1 |
|--------|-----------------------------------|-----------|-------------------|

0: forbidden

1: action

If the output current exceeds the current limiting value set by P60.12, the inverter starts to reduce the output frequency until the output current is less than the setting current limit value, and then starts to accelerate to the target frequency. When the inverter enters the current limit status, it causes the actual acceleration and deceleration time to be extended, but it can prevent the inverter from reporting an overcurrent fault effectively.

|        |                        |                    |         |
|--------|------------------------|--------------------|---------|
| P60.12 | Current limiting level | range:20.0%~200.0% | Factory |
|--------|------------------------|--------------------|---------|

The current limit level setting value is a percentage relative to the rated current of the inverter.

|        |                        |                   |         |
|--------|------------------------|-------------------|---------|
| P60.13 | Slip compensation gain | range:0.0%~300.0% | Factory |
|--------|------------------------|-------------------|---------|

When the load increases, it causes the motor speed to decrease. By setting an appropriate slip compensation gain value, it helps to maintain the motor speed stable under load fluctuation or heavy load.

### P61 Encoder Parameters

|        |                                  |           |                   |
|--------|----------------------------------|-----------|-------------------|
| P61.00 | Speed feedback encoder selection | range:0~2 | Factory default:0 |
|--------|----------------------------------|-----------|-------------------|

0: incremental encoder 1

1: incremental encoder 2

2: sine encoder

Select the type of motor speed feedback encoder.

|        |                      |               |                      |
|--------|----------------------|---------------|----------------------|
| P61.01 | Encoder 1 resolution | range:0~10000 | Factory default:1024 |
|--------|----------------------|---------------|----------------------|

When PG vector control is selected, the resolution of the motor speed feedback encoder must be set correctly, otherwise the motor cannot run normally.

|        |                           |                     |         |
|--------|---------------------------|---------------------|---------|
| P61.02 | Electrical angle offset 1 | range:0.00°~359.99° | Factory |
|--------|---------------------------|---------------------|---------|

|        |                        |           |                   |
|--------|------------------------|-----------|-------------------|
| P61.03 | Encoder 1 signal phase | range:0~1 | Factory default:0 |
|--------|------------------------|-----------|-------------------|

0: normal

Phase A is ahead of phase B during forward rotation.

1: reverse

Phase B is ahead of phase A during forward rotation.

|        |  |               |                      |
|--------|--|---------------|----------------------|
| P61.04 | The numerator of the electronic gear ratio 1 | range:1~65535 | Factory default:1000 |
| P61.05 | Denominator of electronic gear               | range:1~65535 | Factory default:1000 |

|        |  |                     |                      |
|--------|--|---------------------|----------------------|
| P61.06 | Encoder 2 resolution                         | range:0~10000       | Factory default:1024 |
| P61.07 | Electrical angle offset 2                    | range:0.00°~359.99° | Factory              |
| P61.08 | Encoder 2 signal phase                       | range:0~1           | Factory default:0    |
| P61.09 | The numerator of the electronic gear ratio 2 | range:1~65535       | Factory default:1000 |
| P61.10 | Denominator of electronic gear ratio 2       | range:1~65535       | Factory default:1000 |

For the parameter setting of encoder 2, refer to the setting of encoder 1.

|        |                                      |               |                      |
|--------|--------------------------------------|---------------|----------------------|
| P61.11 | The number of pole pairs of resolver | range:1~32    | Factory default:1    |
| P61.12 | Sinusoidal signal offset             | range:1~65535 | Factory default:0    |
| P61.13 | Cosine signal offset                 | range:1~65535 | Factory default:0    |
| P61.14 | Sinusoidal signal gain               | range:1~8192  | Factory default:4096 |
| P61.15 | Cosine signal gain                   | range:1~8192  | Factory default:4096 |

**P62 Motor characteristics parameter**

|        |  |                       |   |
|--------|--|-----------------------|---|
| P62.00 | Stator resistance of asynchronous motor      | range:0.001Ω~65.000Ω  | Factory default:<br>Model determination |
| P62.01 | Rotor resistance of asynchronous motor       | range:0.001Ω~65.000Ω  | Factory default:<br>Model determination |
| P62.02 | Leakage inductance of asynchronous motor     | range:0.01mH~650.00mH | Factory default:<br>Model determination |
| P62.03 | Mutual inductance of asynchronous motor      | range:0.01mH~650.00mH | Factory default:<br>Model determination |
| P62.04 | No-load current of asynchronous motor        | range:0.1A~P63.02     | Factory default:<br>Model determination |
| P62.05 | Saturation coefficient of asynchronous motor | range:0.00%~100.00%   | Factory default:<br>Model determination |

The above group of parameters is characteristic parameters of asynchronous motors, which are automatically defaulted as Factory default according to the power. The characteristic parameters of the actual motor can be automatically obtained by static or rotating identification of the motor, or can be provided by the motor manufacturer.

|        |  |                       |   |
|--------|--|-----------------------|---|
| P62.06 | Stator resistance of synchronous motor           | range:0.001Ω~65.000Ω  | Factory default:<br>Model determination |
| P62.07 | D-axis inductance of synchronous motor           | range:0.01mH~650.00mH | Factory default:<br>Model determination |
| P62.08 | Q-axis inductance of synchronous motor           | range:0.01mH~650.00mH | Factory default:<br>Model determination |
| P62.09 | Counter electromotive force of synchronous motor | range:0.1mV~2000.0mV  | Factory default:<br>Model determination |

The above group of parameters is characteristic parameters of synchronous motors, which are automatically defaulted as Factory default according to the power. The characteristic parameters of the actual motor can be automatically obtained by static or rotating identification of the motor, or can be provided by the motor manufacturer.

**P63Motor nameplate parameters**

|        |                        |                      |   |
|--------|------------------------|----------------------|---|
| P63.00 | Rated power of motor   | range:0.2kW~6000.0kW | Factory                                 |
| P63.01 | Rated voltage of motor | range:1V~480V        | Factory default:<br>Model determination |
| P63.02 | Rated current of motor | range:0.1A~6000.0A   | Factory default:<br>Model determination |

|        |                          |                        |   |
|--------|--------------------------|------------------------|---|
| P63.03 | Rated frequency of motor | range:10.00Hz~300.00Hz | Factory default:<br>Model determination |
| P63.04 | Rated speed of motor     | range:1~65535 rpm      | Factory default:<br>Model determination |
| P63.05 | Pole number              | range:2~80             | Factory default:<br>Model determination |

Please refer to the actual motor to enter the motor nameplate parameters correctly, otherwise it may cause the motor performance to deteriorate or not to run normally.

|        |                                |           |                   |
|--------|--------------------------------|-----------|-------------------|
| P63.07 | Self-tuning of motor parameter | range:0~2 | Factory default:0 |
|--------|--------------------------------|-----------|-------------------|

0: no request

1: motor static identification

It is suitable for identifying the motor parameters when the motor cannot be disconnected from the load. After setting the motor nameplate parameters correctly, set P63.07=1, press the Start key on the keyboard, the motor starts the static identification, and P63.07 returns to 0 after completing identification. Motor static identification can identify all motor parameters successfully to ensure the performance of vector control.

2: motor rotation identification

It is suitable for identifying the motor parameters when the motor is disconnected from the load. After setting the motor nameplate parameters correctly, set P63.07=2, press the Start key on the keyboard, the motor starts the rotary identification, and P63.07 returns to 0 after completing identification. Motor rotary identification can identify all motor parameters successfully to ensure the performance of vector control. When the motor rotary identification is selected, the motor rotates, so please stay away from the end of the motor rotary shaft.

|        |                    |           |                    |
|--------|--------------------|-----------|--------------------|
| P63.08 | Motor control mode | range:0~2 | Factory default: 0 |
|--------|--------------------|-----------|--------------------|

0: advanced scalar control

It is suitable for occasions where the load requirement is not high, or one inverter drives multiple motors.

1: no PG vector control

Refer to open-loop vector control, which is suitable for high-performance control occasions where the motor is not provided an encoder or an encoder cannot be installed; and one inverter can only drive one motor.

2: PG vector control

Refer to closed-loop vector control, the motor must be equipped with an encoder that matches the PG card; it is suitable for high-precision speed control or torque control. One inverter can only drive one motor.

## Chapter 6 Fault Diagnosis and Countermeasures

### 6.1 Fault List and Countermeasures

The inverter may encounter the following fault types during use. Please refer to the list countermeasures for simple troubleshooting.

| Fault code | Failure Display | Fault name                       | Cause  | Countermeasure  |
|------------|-----------------|----------------------------------|--|---|
| 1          | Er.oc1          | Over-current in acceleration     | Torque boost value is too large at scalar control          | Reduce torque boost value                                 |
|            |                 |                                  | Great starting frequency                                   | Reduce the starting frequency value                       |
|            |                 |                                  | Short acceleration time                                    | Prolong acceleration time                                 |
|            |                 |                                  | Improper setting of motor parameters                       | Correct setting of motor nameplate                        |
|            |                 |                                  | Weight overload  | Reduce overload   |
|            |                 |                                  | Restart the rotating motor                                 | Reduce the current limit value or start with speed search |
|            |                 |                                  | Output interphase short circuit or short circuit to ground | Check motor wiring and output impedance to ground         |
|            |                 |                                  | V/F curve is not suitable at scalar control                | Correct set of V/F curve                                  |
| 2          | Er.oc2          | Over-current during deceleration | Short deceleration time                                    | Prolong deceleration time                                 |
|            |                 |                                  | There is no additional brake unit and brake resistor       | Add braking unit and resistance                           |
| 3          | Er.oc3          | Over current in constant speed   | Small inverter power level                                 | Select the appropriate inverter power                     |
|            |                 |                                  | Low grid input voltage                                     | Check grid voltage  |
|            |                 |                                  | Weight overload  | Reduce overload   |
| 4          | Er.ou1          | Over-voltage during acceleration | Abnormal input voltage                                     | Check grid voltage  |
|            |                 |                                  | Short acceleration time                                    | Prolong acceleration time                                 |
|            |                 |                                  | Large load inertia   | Use energy braking  |
| 5          | Er.ou2          | Over-voltage during deceleration | Short deceleration time                                    | Prolong deceleration time                                 |
|            |                 |                                  | Abnormal input voltage                                     | Check grid voltage  |
|            |                 |                                  | Large load inertia   | Use energy braking  |
| 6          | Er.ou3          | Over-voltage in constant         | Abnormal input voltage                                     | Check grid voltage  |



| Fault code | Failure Display | Fault name              | Cause   | Countermeasure  |
|------------|-----------------|-------------------------|---|---|
|            |                 |                         | Large load fluctuation  | Check load  |
| 7          | Er.Lu1          | Inverter under-voltage  | The input terminal voltage of the inverter is not within the range required by the specification. | Adjust voltage to normal range                                |
|            |                 |                         | Momentary interruption  | Reset fault   |
|            |                 |                         | Abnormal bus voltage  | Seek technical support  |
|            |                 |                         | Abnormal rectifier bridge and buffer resistance   | Seek technical support  |
|            |                 |                         | Abnormal driving plate  | Seek technical support  |
|            |                 |                         | Abnormal control plate  | Seek technical support  |
| 8          | Er.Cur          | Current detection fault | Abnormal connection between control plate and driving plate                                       | Check the cable and reset it                                  |
|            |                 |                         | Abnormal control plate current detection circuit  | Seek technical support  |
|            |                 |                         | Abnormal driving plate current detection circuit  | Seek technical support  |
|            |                 |                         | Damaged current sensor  | Seek technical support  |
|            |                 |                         | Damaged switch power supply   | Seek technical support  |
| 9          | Er.CPU          | System interferenc      | Serious external interference signal  | Seek technical support  |
| 10         | Er.FAL          | Module protection fault | Output interphase short circuit or short circuit to ground  | Check motor wiring and output impedance to ground             |
|            |                 |                         | Over-voltage or over-current  | Process according to the over-voltage and over-current method |
|            |                 |                         | Loose connection of control plate   | Reset the control plate connector                             |
|            |                 |                         | Direct connection of inverter module  | Seek technical support  |
|            |                 |                         | Abnormal control plate  | Seek technical support  |

| Fault code | Failure Display | Fault name                   | Cause  | Countermeasure                              |
|------------|-----------------|------------------------------|--|---|
|            |                 |                              | Damaged switch power supply  | Seek technical support                      |
| 11         | Er.tun          | Motor identification failure | Motor parameters are not set or set incorrectly                          | Setting motor parameters correctly          |
|            |                 |                              | Motor wiring error   | Check motor wiring                          |
| 12         | Er.CCL          | Contactor suction failure    | Abnormal grid input voltage  | Check input grid voltage                    |
|            |                 |                              | Contactor damage   | Seek technical support                      |
|            |                 |                              | Damaged buffer resistance  | Seek technical support                      |
|            |                 |                              | Abnormal switch power supply   | Seek technical support                      |
| 13         | Er.EtE          | External terminal fault      | Input signal of external fault through multi-functional terminal X       | Reset                                       |
|            |                 |                              | Input signal of external fault through logic state inversion IO function | Reset                                       |
| 14         | Er.oH1          | Inverter overheating         | High environment temperature   | Reduce environment temperature              |
|            |                 |                              | Damaged fan  | Replace fan                                 |
|            |                 |                              | Air duct blockage  | Clean air duct                              |
|            |                 |                              | Abnormal temperature detection   | Seek technical support                      |
|            |                 |                              | Damaged inverter module  | Seek technical support                      |
| 15         | Er.oH2          | Motor overheating            | High environment temperature   | Reduce environment temperature              |
|            |                 |                              | Abnormal heat dissipation or heavy load of motor                         | Check motor heat dissipation or reduce load |
|            |                 |                              | Damaged temperature detection circuit                                    | Seek technical support                      |
| 16         | Er.oL1          | Inverter overload            | Low input power supply voltage   | Check grid voltage                          |
|            |                 |                              | Quick start in high speed rotation of motor                              | Start the motor after stopping rotating     |
|            |                 |                              | Long-term weight overload  | Shorten overload time and reduce load       |
|            |                 |                              | Short acceleration and deceleration time                                 | Prolong acceleration and deceleration time  |

| Fault code | Failure Display | Fault name                       | Cause  | Countermeasure   |
|------------|-----------------|----------------------------------|--|--|
|            |                 |                                  | High setting of V/F curve ratio                              | Adjust V/F curve setting and torque lifting amount   |
|            |                 |                                  | Small power selection of inverter                            | Replace the inverter with suitable type  |
| 17         | Er.oL2          | Motor overload                   | Low input power supply voltage                               | Check grid voltage   |
|            |                 |                                  | Motor stalling or serious load mutation                      | Prevent motor stalling and reduce load mutation  |
|            |                 |                                  | Long-term, low-speed and heavy-load running of common motors | Change to variable frequency motor or increase operating frequency   |
|            |                 |                                  | Short motor overload protection time                         | Increase motor overload protection time  |
|            |                 |                                  | High setting of V/F curve ratio                              | Adjust V/F curve setting and torque lifting amount   |
|            |                 |                                  | Large DC brake current setting                               | Reduce DC braking current  |
| 18         | Er.ILF          | Inverter input<br>Phase loss     | Abnormal three-phase input power supply                      | Check and eliminate problems in peripheral circuits  |
|            |                 |                                  | Abnormal driving plate                                       | Seek technical support   |
|            |                 |                                  | Abnormal control plate                                       | Seek technical support   |
| 19         | Er.oLF          | Inverter output<br>Phase loss    | Abnormal wiring at output side of inverter                   | Eliminate peripheral faults  |
|            |                 |                                  | Motor three-phase unbalance                                  | Check the motor or replace the motor   |
|            |                 |                                  | Abnormal driving plate                                       | Seek technical support   |
|            |                 |                                  | Abnormal module  | Seek technical support   |
| 20         | Er.LLd          | Inverter output<br>Off load      | The operating current of the inverter is less than P30.07    | Confirm whether the load is disengaged or whether the P30.07 and P30.08 parameter settings conform to the actual operating conditions. |
| 21         | Er.GdF          | Inverter Short circuit to ground | Output wiring short circuit to ground                        | Check motor wiring and output impedance to ground  |
|            |                 |                                  | Abnormal motor insulation                                    | Check motor  |
|            |                 |                                  | Abnormal inverter module                                     | Seek technical support   |

| Fault code | Failure Display | Fault name                       | Cause  | Countermeasure                              |
|------------|-----------------|----------------------------------|--|---|
|            |                 |                                  | Large output current to floor drain                              | Seek technical support                      |
| 22         | Er.EEP          | EEPROM read and write Failur     | Abnormal EEPROM read-write                                       | Seek technical support                      |
| 23         | Er.Sci          | Communication overtime fault     | Improper setting of communication baud rate                      | Correct setting                             |
|            |                 |                                  | Disconnected wiring at communication port                        | Reconnect                                   |
|            |                 |                                  | The upper computer is not working                                | Make the upper computer work                |
|            |                 |                                  | Communication parameter error of inverter                        | Correct setting                             |
|            |                 |                                  | Large interference on site                                       | Check peripheral equipment or seek services |
| 24         | Er.tPA          | Reaching power-on time           | Accumulative power-on time reaches the setting value.            | Seek technical support                      |
| 25         | Er.trA          | Reaching running time            | Accumulative running time reaches the setting value.             | Seek technical support                      |
| 26         | Er.rEF          | PID given loss during running    | PID given channel exception                                      | Check given channel                         |
|            |                 |                                  | P40.24 unreasonable parameter setting                            | Correct setting                             |
| 27         | Er.FbL          | PID feedback loss during running | PID feedback channel exception                                   | Check feedback channel                      |
|            |                 |                                  | P40.26 unreasonable parameter setting                            | Correct setting                             |
| 28         | Er.oEP          | Excessive speed bias             | Small bias setting between the motor speed and the setting speed | Correctly set the speed bias point          |
|            |                 |                                  | Large load fluctuation   | Stable load                                 |
| 29         | Er.oSP          | Motor over-speed                 | Small setting value of over-speed value                          | Correctly set the speed bias point          |

| Fault code | Failure Display | Fault name             | Cause  | Countermeasure   |
|------------|-----------------|------------------------|--|--|
|            |                 |                        | Large load fluctuation                                       | Stable load  |
| 30         | Er.Enc          | Encoder fault          | Incorrect encoder connection                                 | Change encoder wiring  |
|            |                 |                        | Encoder has no signal output                                 | Check encoder quality and power supply                                     |
|            |                 |                        | Encoder wiring disconnected                                  | Repair disconnection   |
|            |                 |                        | Abnormal function code setting                               | Confirm the relevant function code settings of inverter encoder<br>Correct |
| 37         | Er.SEF          | Speed estimation fault | The motor is not recognized or the parameters are incorrect. | Re-identification of motor parameters                                      |
| 39         | Er.Cpy          | Parameter copy fault   | Parameter upload or download exception                       | Seek technical support   |
|            |                 |                        | Download directly without parameter on operation keyboard    | Seek technical support   |

## Chapter 7 Daily Maintenance and Care

### 7.1 Daily Maintenance

Due to the influence of environment temperature, humidity, dust and vibration, the internal components of the frequency inverter will be aged, and it will result in the potential fault of the inverter or reducing the service life of the inverter. Therefore, it is necessary to carry out daily and regular maintenance and care of the inverter.

Daily inspection item:

- 1) Whether the sound changes abnormally during motor operation;
- 2) Whether there is vibration in the motor operation.
- 3) Whether the installation environment of the inverter has changed;
- 4) Whether the cooling fan of the inverter is working normally;
- 5) Whether the inverter is overheated;

Daily cleaning:

- 1) The inverter shall always be kept clean.
- 2) It shall remove dust on the surface of the inverter effectively to prevent dust from entering the inverter, especially metal dust.
- 3) Effectively remove oil stains from the cooling fan of the inverter.

### 7.2 Daily Inspection Item

Regular inspection items:

- 1) Check the air duct and clean it regularly.
- 2) Check whether the screw is loose.
- 3) Check if the inverter is corroded
- 4) Check whether the wiring terminals have arcing marks.
- 5) Insulation test of main circuit

Reminder: when measuring insulation resistance with a megohmmeter (please use a DC 500V megohmmeter), disconnect the main circuit from the inverter. Do not test the insulation of the control loop with an insulation resistance meter. High voltage test is not necessary (it was completed when leaving the factory).

Chapter 8 Specifications and Selection

8.1 Technical Specifications and Installation Dimensions of SCK500 Series Drive

8.1.1 Technical specification

Table 8-1 SCK500 Model and Specification of Series Driver

| Program   |                                   | Specification  |     |      |      |      |      |      |      |      |      |      |                   |     |           |     |     |
|---|-----------------------------------|--|-----|------|------|------|------|------|------|------|------|------|-------------------|-----|-----------|-----|-----|
| SCK500-4TXXXG<br>SCK500- 4TXXXP                               |                                   | 1.5  | 2.2 | 3.7  | 5.5  | 7.5  | 11   | 15   | 18.5 | 22   | 30   | 37   | 45                | 55  | 75        | 90  | 110 |
| Adapted motor power<br>(kW)                                   |                                   | 1.5  | 2.2 | 3.7  | 5.5  | 7.5  | 11   | 15   | 18.5 | 22   | 30   | 37   | 45                | 55  | 75        | 90  | 110 |
| Input   | Rated<br>input<br>current<br>(A)  | 4.6  | 6.3 | 11.4 | 16.7 | 21.9 | 32.2 | 41.3 | 49.5 | 59.0 | 57.0 | 69.0 | 89.0              | 106 | 139.<br>0 | 164 | 196 |
| Output  | Rated<br>output<br>current<br>(A) | 3.8  | 5.1 | 9.0  | 13.0 | 17.0 | 24.0 | 32.0 | 37.0 | 45.0 | 60.0 | 75.0 | 90.0              | 110 | 150       | 180 | 210 |
|   | Output<br>Voltage                 | 3-phase 0V~rated input voltage   |     |      |      |      |      |      |      |      |      |      |                   |     |           |     |     |
|   | Maximum<br>output<br>frequency    | 300.00Hz (modified by parameters)  |     |      |      |      |      |      |      |      |      |      |                   |     |           |     |     |
|   | Carrier<br>frequency              | 1.0 khz~16.0 KHz (carrier frequency can be automatically adjusted according to load characteristics) |     |      |      |      |      |      |      |      |      |      |                   |     |           |     |     |
|   | Overload<br>capacity              | 150% rated current 60s; 180% rated current 10s; ; 200% rated current 0.5s                            |     |      |      |      |      |      |      |      |      |      |                   |     |           |     |     |
| High<br>frequency<br>leakage<br>Current<br>Counterme<br>asure | DC<br>reactor                     | External option  |     |      |      |      |      |      |      |      |      |      |                   |     |           |     |     |
| Brake<br>Function   | Brake unit                        | Standard built-in  |     |      |      |      |      |      |      |      |      |      | Built-in optional |     |           |     |     |
| Power<br>supply   | Fixed<br>voltage                  | AC: three-phase 380 V~460 V  |     |      |      |      |      |      |      |      |      |      |                   |     |           |     |     |

|                          |  |  |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
|--------------------------|--|--|----------|-----|------|------|------|------|-----|-----|-----------------|-----|-----|------|------|------|-----|
|                          | Rated frequency                          | 50Hz/60Hz  |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
|                          | Allowable fluctuation range of voltage   | -15%~10%, actual allowable range: AC323V~528V  |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
|                          | Allowable fluctuation range of frequency | ±5%  |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
|                          | Power supply capacity (kVA)              | 5.0  | 6.7      | 12  | 17.5 | 22.8 | 33.4 | 42.8 | 45  | 54  | 52              | 63  | 81  | 97   | 127  | 150  | 179 |
| Program                  |  | Technical specification  |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
| SCK500 -4TXXXG           |  | 132  | 160      | 185 | 200  | 220  | 250  | 280  | 315 | 355 | 400             | 450 | 500 | 560  | 630  | 710  |     |
| SCK500 -4TXXXP           |  |  |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
| Adapted motor power (kW) |  | 132  | 160      | 185 | 200  | 220  | 250  | 280  | 315 | 355 | 400             | 450 | 500 | 560  | 630  | 710  |     |
| Input                    | Rated input current (A)                  | 240  | 287      | 326 | 365  | 410  | 441  | 495  | 565 | 617 | 687             | 782 | 835 | 920  | 1050 | 1180 |     |
| Output                   | Rated output current (A)                 | 260  | 305      | 350 | 377  | 426  | 465  | 520  | 585 | 650 | 725             | 810 | 900 | 1090 | 1100 | 1300 |     |
|                          | Output Voltage                           | 3-phase 0V~rated input voltage   |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
|                          | Maximum output frequency                 | 300.00Hz (modified by parameters)  |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
|                          | Carrier frequency                        | 1.0 khz~16.0 KHz (carrier frequency can be automatically adjusted according to load characteristics) |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
|                          | Overload capacity                        | 150% rated current 60s; 180% rated current 10s; ; 200% rated current 0.5s                            |          |     |      |      |      |      |     |     |                 |     |     |      |      |      |     |
| high                     | DC reactor                               | Extern-  | Built-in |     |      |      |      |      |     |     | External option |     |     |      |      |      |     |



|   |   |  |                 |     |     |     |     |     |     |     |     |     |     |     |     |      |  |  |  |
|---|---|--|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|--|--|
| frequency<br>leakage<br>Current<br>Counter<br>measure |   | al<br>Option                                 |                 |     |     |     |     |     |     |     |     |     |     |     |     |      |  |  |  |
| Brake<br>Function                                     | Brake unit  | Built-in<br>optional                         | External option |     |     |     |     |     |     |     |     |     |     |     |     |      |  |  |  |
| Power<br>supply                                       | Fixed<br>voltage<br>Rated<br>frequency              | AC:3-phase 380V~460V<br>50Hz/60Hz            |                 |     |     |     |     |     |     |     |     |     |     |     |     |      |  |  |  |
|   | Allowable<br>fluctuatio-<br>n range of<br>voltage   | -15%~10%,Actual allowable range:AC 323V~528V |                 |     |     |     |     |     |     |     |     |     |     |     |     |      |  |  |  |
|   | Allowable<br>fluctuatio-<br>n range of<br>frequency | ±5%  |                 |     |     |     |     |     |     |     |     |     |     |     |     |      |  |  |  |
|   | Power<br>supply<br>capacit<br>y (kVA)               | 220  | 263             | 304 | 334 | 375 | 404 | 453 | 517 | 565 | 629 | 716 | 769 | 861 | 969 | 1092 |  |  |  |

\*1: the more rigorous selection method is that the rated output current of the inverter is greater than the rated current of the motor or the maximum load current.

Table 8-2 Technical Specification of SCK500 Series Driver

| Program           |                               | Technical specification   |
|-------------------|-------------------------------|---|
| Basic<br>function | Input frequency<br>resolution | Digital setting: 0.01Hz<br>Simulation setting: maximum speed ×0.025%            |
|                   | Control mode                  | Advanced scalar control<br>No PG vector control (SVC)<br>PG vector control (VC) |

| Program                         |   | Technical specification  |                                   |
|---------------------------------|---|--|-----------------------------------|
|                                 | Starting torque   | SVC:0.25Hz 150%<br>VC: 0.00Hz 180%   |                                   |
|                                 | Speed regulation range  | SVC: 1:200   | VC: 1:1000                        |
|                                 | Speed stabilization precision   | SVC: ±0.5%   | VC: ±0.2%                         |
|                                 | Torque control precision  | SVC: above 5Hz±5%  | VC: above 5Hz±3%                  |
|                                 | Torque reentry precision  | ≤0.5% rated torque of motor  |                                   |
|                                 | Torque response time  | SVC: ≤ 10ms (rated torque of motor)  | VC: ≤ 5ms (rated torque of motor) |
|                                 | Torque boost  | Automatic torque lifting function; manual torque increases by 0.1%~30.0%   |                                   |
|                                 | V/F curve   | Straight line, multiple power curve, multiple point curve, V/F separation  |                                   |
|                                 | Acceleration and deceleration curve   | Straight line, broken line, S curve  |                                   |
|                                 | Direct current brake  | Starting frequency of DC brake :0.00~300.00Hz; DC braking current: constant torque 0.0~120.0%; variable torque 0. 0~90.0%<br>Direct current brake time: 0.0~30.0s; realize quick brake without direct current brake initial waiting time |                                   |
|                                 | Inching control   | Inching frequency range:0.00Hz~50.00Hz<br>Inching acceleration and deceleration time range:0.0s~3600.0s  |                                   |
|                                 | Process closed loop PID   | The process closed loop control system can be conveniently realized  |                                   |
|                                 | Simple PLC, multi-stage instruction   | At most 16 speed stages can be easily realized through built-in simple PLC or X terminal.  |                                   |
|                                 | Automatic voltage regulation  | When the power grid voltage fluctuates, the output voltage can be automatically kept stable.   |                                   |
|                                 | Overflow, over-voltage and stall control  | The current and voltage during operation are automatically limited to prevent frequent over-current and over-voltage tripping.   |                                   |
| Automatic fast current limiting | Minimize over-current faults and protect the normal operation of the drive.   |  |                                   |
| Torque limit and control        | "Excavator" feature automatically limits torque during operation to prevent frequent over-current tripping; in vector control, torque control |  |                                   |

| Program                       |  | Technical specification   |
|-------------------------------|--|---|
|                               |  | can be realized.  |
| Personal<br>-ized<br>Function | Not stop of instantaneous stop             | In case of instantaneous power failure, the drive will continue to operate for a short period of time through the reduction of load feedback energy compensation voltage.   |
|                               | Fast current limiting                      | Avoid frequent over-current fault of the drive.   |
|                               | Timing function                            | Realize timing control of the drive   |
|                               | Motor overheat protection                  | The motor temperature detection can be conveniently realized through an external sensor   |
|                               | Copy of parameters                         | Realize the uploading and downloading of parameters and the quick setting of parameters   |
|                               | Double-port Modbus                         | The double-port supports Modbus protocol and realizes simple networking function.   |
|                               | Power-on short circuit detection to ground | Power-on automatically completes short-circuit detection to ground  |
|                               | Magnetic flux brake                        | In cooperation with magnetic flux brake, faster deceleration and shutdown can be realized.  |
| Run                           | Running instructions                       | Keyboard command, terminal command, communication command can be switched in a variety of ways  |
|                               | Main speed command                         | 12 kinds of main speed command given way can be switched through a variety of ways  |
|                               | Auxiliary speed command                    | 9 kinds of auxiliary speed command given methods can flexibly realize auxiliary speed fine adjustment and speed synthesis.  |
|                               | Input terminal                             | <ul style="list-style-type: none"> <li>● 7 X terminals, one of which supports high speed pulse input.</li> <li>● 2 AI terminals, one supports 0~10V voltage signal and one supports 0~10V voltage signal or 0~20mA current signal</li> </ul>                                  |
|                               | Output terminal                            | <ul style="list-style-type: none"> <li>● 2 relay outputs</li> <li>● 2 transistor outputs, one of which supports high speed pulse output.</li> <li>● 2 AO outputs, one supports 0~10V voltage signal and one supports 0~10V voltage signal or 0~20mA current signal</li> </ul> |
| Human-computer<br>interaction | LED display                                | LED operation keyboard  |
|                               | LED display                                | LED operation keyboard  |
|                               | Key locking function                       | Realize all key locking or partial key locking functions of the keyboard to prevent misoperation of the keyboard.   |
|                               | Keyboard emergency shutdown                | Through the keyboard stop key, the machine can stop in any command source mode and reduce the operation risk.   |

| Program             |                          | Technical specification   |
|---------------------|--------------------------|---|
| Protection function | Short circuit protection | Output interphase short circuit protection, output short circuit protection to ground.  |
|                     | Over-current protection  | Shutdown protection exceeding 2.2 times of the rated current of the drive   |
|                     | Over-voltage protection  | Stop when the DC bus voltage of the main circuit is greater than 800V   |
|                     | Under-voltage protection | Stop when the DC bus voltage of the main circuit is less than 320V  |
|                     | Overload protection      | At 150% rated current, stop the machine after 60 seconds of operation.  |
|                     | Overheat protection      | Overheating protection of drive IGBT module   |
|                     | Phase-break protection   | three-phase input phase-break protection and three-phase output phase-break protection  |
| Environment         | Use place                | Indoor, not exposed to direct sunlight, no dust, corrosive gas, flammable gas, oil mist, water vapor, water droplets and salt, etc. |
|                     | Altitude                 | No derating is required below 1000m, derating is 1% for every 100m above 1000m, and the highest altitude is not more than 3000m.    |
|                     | Ambient temperature      | 10 ~+40℃, derating between 40~50℃, derating 1.5% for every 1℃ increasing.   |
|                     | Humidity                 | 5-95%, no water condensation  |
|                     | Vibration                | Less than 5.9 m/s <sup>2</sup>  |
|                     | Storage temperature      | -40~+70℃  |

8.1.2 Appearance and installation dimensions

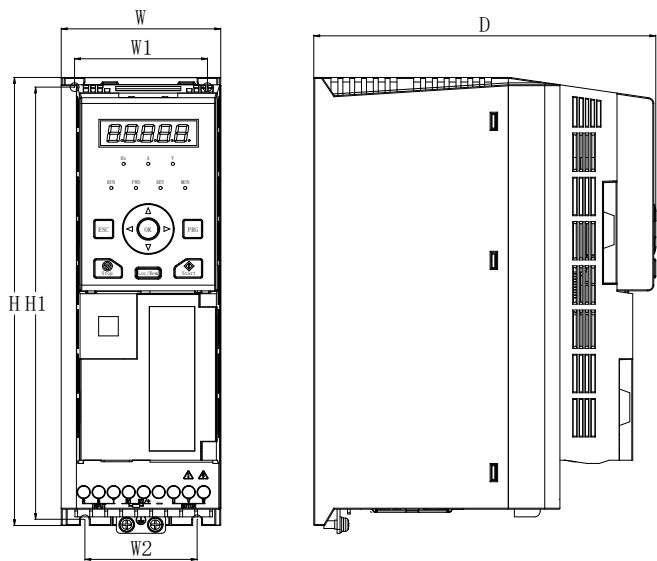


Figure 8-1 Installation Dimension Diagram of SCK500-4T5.5G and Below Power Level

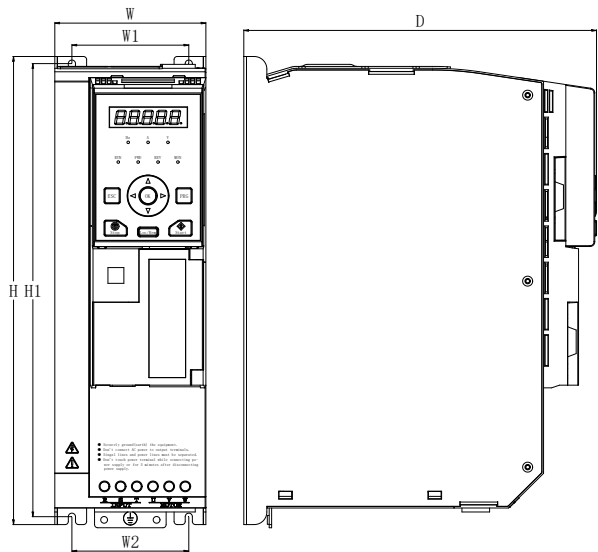


Figure 8-2 Installation Dimension Diagram of SCK500-4T7.5G ~ SCK500-4T15G

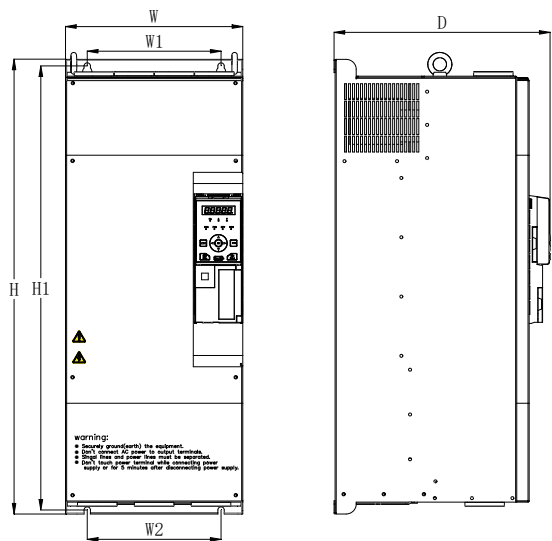


Figure 8-3 Installation Dimension Diagram of SCK500 -4T55G~ SCK500 -4T75G

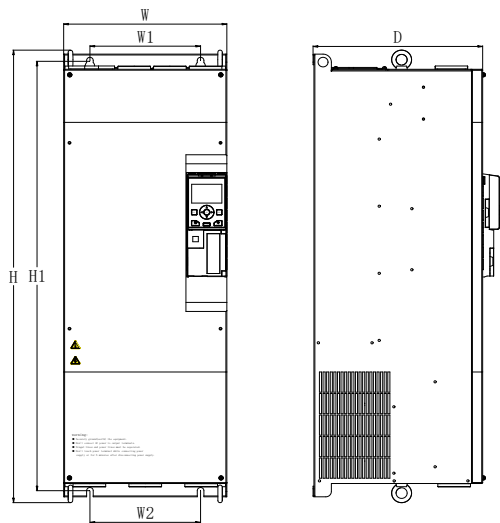


Figure 8-4 Installation Dimension Diagram of SCK500 -4T18.5GB~ SCK500 -4T45G and SCK500 -4T90G~

SCK500 -4T132G

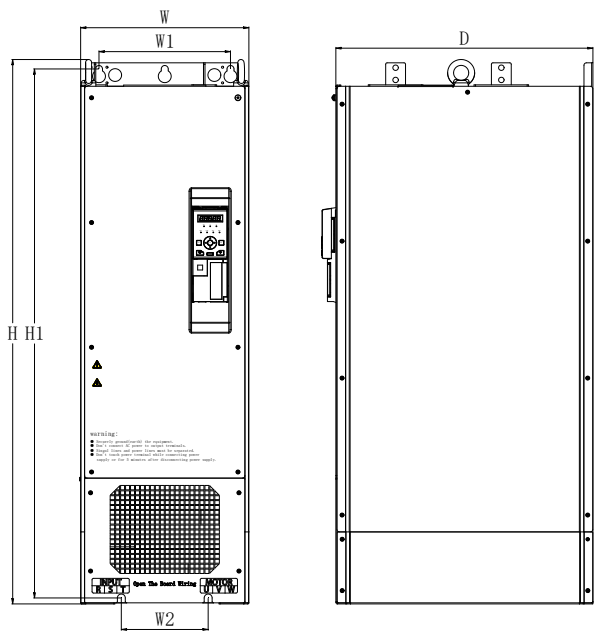


Figure 8-5 Installation Dimension Diagram of SCK500 -4T160G~SCK500 -4T450G

Table 8-3 SCK500 Installation Dimensions(G type machine)

| Inverter model  | Appearance and installation dimensions (mm) |       |       |      |       |       |                       |
|-----------------|---|-------|-------|------|-------|-------|-----------------------|
|                 | W   | H     | D     | W1   | W2    | H1    | Installation Aperture |
| SCK500 -4T1.5G  | 81  | 237   | 173   | 67.5 | 57    | 224.5 | 4.5                   |
| SCK500 -4T2.2G  |   |       |       |      |       |       |                       |
| SCK500 -4T3.7G  |   |       |       |      |       |       |                       |
| SCK500 -4T5.5G  |   |       |       |      |       |       |                       |
| SCK500 -4T7.5G  | 95  | 297   | 222   | 73.5 | 73.5  | 287.5 | 6                     |
| SCK500 -4T11G   |   |       |       |      |       |       |                       |
| SCK500 -4T15G   |   |       |       |      |       |       |                       |
| SCK500 -4T18.5G | 185   | 440   | 245   | 140  | 140   | 427.5 | 7                     |
| SCK500 -4T22G   |   |       |       |      |       |       |                       |
| SCK500 -4T30G   |   |       |       |      |       |       |                       |
| SCK500 -4T37G   | 265   | 604.5 | 269.5 | 180  | 148.5 | 580   | 9.5                   |
| SCK500 -4T45G   |   |       |       |      |       |       |                       |

|                |     |      |       |     |     |        |     |
|----------------|-----|------|-------|-----|-----|--------|-----|
| SCK500 -4T55G  | 265 | 690  | 323   | 200 | 200 | 674    | 9.5 |
| SCK500 -4T75G  |     |      |       |     |     |        |     |
| SCK500 -4T90G  |     |      |       |     |     |        |     |
| SCK500 -4T110G | 295 | 852  | 338.5 | 200 | 200 | 810    | 12  |
| SCK500 -4T132G |     |      |       |     |     |        |     |
| SCK500 -4T160G |     |      |       |     |     |        |     |
| SCK500 -4T185G | 339 | 1113 | 546.5 | 265 | 175 | 1081.5 | 14  |
| SCK500 -4T200G |     |      |       |     |     |        |     |
| SCK500 -4T220G |     |      |       |     |     |        |     |
| SCK500 -4T250G |     |      |       |     |     |        |     |
| SCK500 -4T280G |     |      |       |     |     |        |     |
| SCK500 -4T315G | 339 | 1300 | 546.5 | 265 | 175 | 1267.5 | 16  |
| SCK500 -4T355G |     |      |       |     |     |        |     |
| SCK500 -4T400G |     |      |       |     |     |        |     |
| SCK500 -4T450G |     |      |       |     |     |        |     |
| SCK500 -4T500G | 999 | 1300 | 500   | 750 | -   | 1390   | 16  |
| SCK500 -4T560G |     |      |       |     |     |        |     |
| SCK500 -4T630G |     |      |       |     |     |        |     |
| SCK500 -4T710G |     |      |       |     |     |        |     |

Table 8-4 SCK500 Installation Dimensions (L-type machine)

| Inverter model  | Appearance and installation dimensions (mm) |       |       |      |       |       |                       |
|-----------------|---|-------|-------|------|-------|-------|-----------------------|
|                 | W   | H     | D     | W1   | W2    | H1    | Installation Aperture |
| SCK500 -4T2.2P  | 81  | 237   | 173   | 67.5 | 57    | 224.5 | 4.5                   |
| SCK500 -4T3.7P  |   |       |       |      |       |       |                       |
| SCK500 -4T5.5P  |   |       |       |      |       |       |                       |
| SCK500 -4T7.5P  |   |       |       |      |       |       |                       |
| SCK500 -4T11P   | 95  | 297   | 222   | 73.5 | 73.5  | 287.5 | 6                     |
| SCK500 -4T15P   |   |       |       |      |       |       |                       |
| SCK500 -4T18.5P |   |       |       |      |       |       |                       |
| SCK500 -4T22P   | 185   | 440   | 245   | 140  | 140   | 427.5 | 7                     |
| SCK500 -4T30P   |   |       |       |      |       |       |                       |
| SCK500 -4T37P   |   |       |       |      |       |       |                       |
| SCK500 -4T45P   | 265   | 604.5 | 269.5 | 180  | 148.5 | 580   | 9.5                   |
| SCK500 -4T55P   |   |       |       |      |       |       |                       |
| SCK500 -4T75P   | 265   | 690   | 323   | 200  | 200   | 674   | 9.5                   |



|                |     |      |       |     |     |        |    |
|----------------|-----|------|-------|-----|-----|--------|----|
| SCK500 -4T90P  |     |      |       |     |     |        |    |
| SCK500 -4T110P | 295 | 852  | 338.5 | 200 | 200 | 810    | 12 |
| SCK500 -4T132P |     |      |       |     |     |        |    |
| SCK500 -4T160P |     |      |       |     |     |        |    |
| SCK500 -4T185P | 339 | 1113 | 546.5 | 265 | 175 | 1081.5 | 14 |
| SCK500 -4T200P |     |      |       |     |     |        |    |
| SCK500 -4T220P |     |      |       |     |     |        |    |
| SCK500 -4T250P |     |      |       |     |     |        |    |
| SCK500 -4T280P |     |      |       |     |     |        |    |
| SCK500 -4T315P | 339 | 1300 | 546.5 | 265 | 175 | 1267.5 | 16 |
| SCK500 -4T355P |     |      |       |     |     |        |    |
| SCK500 -4T400P |     |      |       |     |     |        |    |
| SCK500 -4T450P |     |      |       |     |     |        |    |
| SCK500 -4T500P |     |      |       |     |     |        |    |
| SCK500 -4T560P | 999 | 1300 | 500   | 750 | -   | 1390   | 16 |
| SCK500 -4T630P |     |      |       |     |     |        |    |
| SCK500 -4T710P |     |      |       |     |     |        |    |
| SCK500 -4T800P |     |      |       |     |     |        |    |

8.1.3 Overall dimensions of operating keyboard

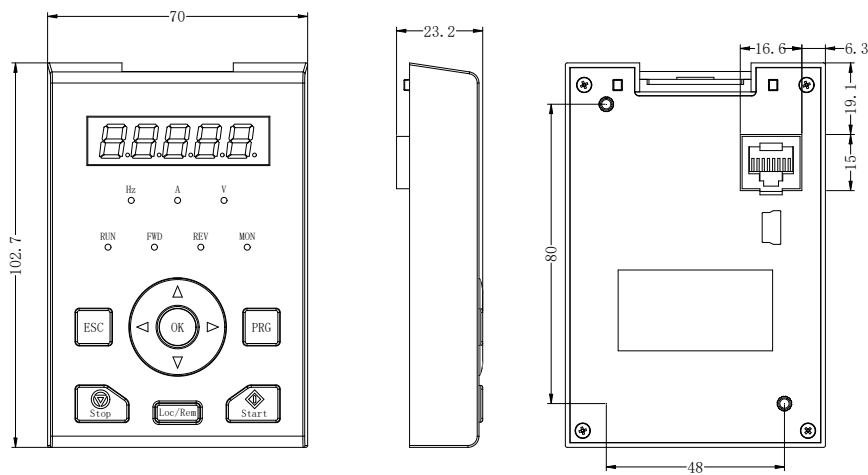


Figure 8-6 Overall Dimensions of Operating Keyboard

### 8.2 Specifications of Optional Parts

#### 8.2.1 Selection of peripheral devices

Table8-5 Peripheral Devices

| Inverter model   | Circuit breaker (A) | Contactor (A) |
|------------------|---------------------|---------------|
| SCK500 - 4T1.5G  | 10                  | 9             |
| SCK500 - 4T2.2P  |                     |               |
| SCK500 - 4T2.2G  | 16                  | 12            |
| SCK500 - 4T3.7P  |                     |               |
| SCK500 - 4T3.7G  | 20                  | 18            |
| SCK500 - 4T5.5P  |                     |               |
| SCK500 - 4T5.5G  | 32                  | 32            |
| SCK500 - 4T7.5P  |                     |               |
| SCK500 - 4T7.5G  | 32                  | 32            |
| SCK500 - 4T11P   |                     |               |
| SCK500 - 4T11G   | 50                  | 50            |
| SCK500 - 4T15P   |                     |               |
| SCK500 - 4T15G   | 63                  | 50            |
| SCK500 - 4T18.5P |                     |               |
| SCK500 - 4T18.5G | 80                  | 65            |
| SCK500 - 4T22P   |                     |               |
| SCK500 - 4T22G   | 100                 | 80            |
| SCK500 - 4T30P   |                     |               |
| SCK500 - 4T30G   | 125                 | 95            |
| SCK500 - 4T37P   |                     |               |
| SCK500 - 4T37G   | 160                 | 125           |
| SCK500 - 4T45P   |                     |               |
| SCK500 - 4T45G   | 200                 | 150           |
| SCK500 - 4T55P   |                     |               |
| SCK500 - 4T55G   | 225                 | 185           |
| SCK500 - 4T75P   |                     |               |
| SCK500 - 4T75G   | 250                 | 225           |
| SCK500 - 4T90P   |                     |               |

| Inverter model  | Circuit breaker (A) | Contactor (A) |
|-----------------|---------------------|---------------|
| SCK500 - 4T90G  | 315                 | 265           |
| SCK500 - 4T110P |                     |               |
| SCK500 - 4T110G | 350                 | 330           |
| SCK500 - 4T132P |                     |               |
| SCK500 - 4T132G | 400                 | 400           |
| SCK500 - 4T160P |                     |               |
| SCK500 - 4T160G | 500                 | 400           |
| SCK500 - 4T185P |                     |               |
| SCK500 - 4T185G | 500                 | 500           |
| SCK500 - 4T200P |                     |               |
| SCK500 - 4T200G | 630                 | 500           |
| SCK500 - 4T220P |                     |               |
| SCK500 - 4T220G | 630                 | 630           |
| SCK500 - 4T250P |                     |               |
| SCK500 - 4T250G | 800                 | 630           |
| SCK500 - 4T280P |                     |               |
| SCK500 - 4T280G | 800                 | 800           |
| SCK500 - 4T315P |                     |               |
| SCK500 - 4T315G | 800                 | 800           |
| SCK500 - 4T355P |                     |               |
| SCK500 - 4T355G | 1000                | 800           |
| SCK500 - 4T400P |                     |               |
| SCK500 - 4T400G | 1250                | 1000          |
| SCK500 - 4T450P |                     |               |
| SCK500 - 4T450G | 1250                | 1000          |
| SCK500 - 4T500P |                     |               |
| SCK500 - 4T500G | 1600                | 1250          |
| SCK500 - 4T560P |                     |               |
| SCK500 - 4T560G | 1600                | 1250          |
| SCK500 - 4T630P |                     |               |
| SCK500 - 4T630G | 2000                | 1600          |
| SCK500 - 4T710P |                     |               |
| SCK500 - 4T710G | 2000                | 1600          |

| Inverter model | Circuit breaker (A) | Contactor (A) |
|----------------|---------------------|---------------|
| SCK500 -4T800P |                     |               |

8.2.2 Selection table of brake resistor

Table 8-6 Reference Table for Selection of Brake Resistor

| Inverter model  | Brake resistor      |                       |                          | Brake unit        |
|-----------------|---------------------|-----------------------|--------------------------|-------------------|
|                 | Standard power      | Standard resistor     | Minimum limit resistance |                   |
| SCK500 -4T1.5G  | 260W                | 400Ω                  | 100Ω                     | Standard built-in |
| SCK500 -4T2.2P  |                     |                       |                          |                   |
| SCK500 -4T2.2G  | 320W                | 250Ω                  | 100Ω                     |                   |
| SCK500 -4T3.7P  |                     |                       |                          |                   |
| SCK500 -4T3.7G  | 800W                | 150Ω                  | 66.7Ω                    |                   |
| SCK500 -4T5.5P  |                     |                       |                          |                   |
| SCK500 -4T5.5G  | 1600W               | 100Ω                  | 40Ω                      |                   |
| SCK500 -4T7.5P  |                     |                       |                          |                   |
| SCK500 -4T7.5G  | 1600W               | 75Ω                   | 40Ω                      |                   |
| SCK500 -4T11P   |                     |                       |                          |                   |
| SCK500 -4T11G   | 2000W               | 50Ω                   | 25Ω                      |                   |
| SCK500 -4T15P   |                     |                       |                          |                   |
| SCK500 -4T15G   | 2000W               | 40Ω                   | 25Ω                      |                   |
| SCK500 -4T18.5P |                     |                       |                          |                   |
| SCK500 -4T18.5G | 4800W               | 32Ω                   | 20Ω                      |                   |
| SCK500 -4T22P   |                     |                       |                          |                   |
| SCK500 -4T22G   | 4800W               | 27.2Ω                 | 20Ω                      |                   |
| SCK500 -4T30P   |                     |                       |                          |                   |
| SCK500 -4T30G   | 6000W               | 20Ω                   | 14Ω                      |                   |
| SCK500 -4T37P   |                     |                       |                          |                   |
| SCK500 -4T37G   | 9600W（Total power）  | 15Ω（Total resistance） | 12Ω                      | Built-in optional |
| SCK500 -4T45P   |                     |                       |                          |                   |
| SCK500 -4T45G   | 9600W（Total power）  | 15Ω（Total resistance） | 12Ω                      |                   |
| SCK500 -4T55P   |                     |                       |                          |                   |
| SCK500 -4T55G   | 15000W（Total power） | 12Ω（Total resistance） | 10Ω                      |                   |
| SCK500 -4T75P   |                     |                       |                          |                   |
| SCK500 -4T75G   | 20000W（Total power） | 8Ω（Total resistance）  | 5Ω                       |                   |
| SCK500 -4T90P   |                     |                       |                          |                   |

|                |                      |                       |    |  |
|----------------|----------------------|-----------------------|----|--|
| SCK500 -4T90G  | 28800W (Total power) | 5Ω (Total resistance) | 4Ω |  |
| SCK500 -4T110P |                      |                       |    |  |
| SCK500 -4T110G | 30000W (Total power) | 5Ω (Total resistance) | 4Ω |  |
| SCK500 -4T132P |                      |                       |    |  |
| SCK500 -4T132G | 35000W (Total power) | 5Ω (Total resistance) | 4Ω |  |
| SCK500 -4T160P |                      |                       |    |  |

## Appendix A

### Modbus communication protocol

#### 1. Support protocol

Support Modbus protocol, RTU format and ASCII code format; the broadcast address is 0, and the slave address setting values are 1~247, 248~255 reserved.

#### 2. Interface mode

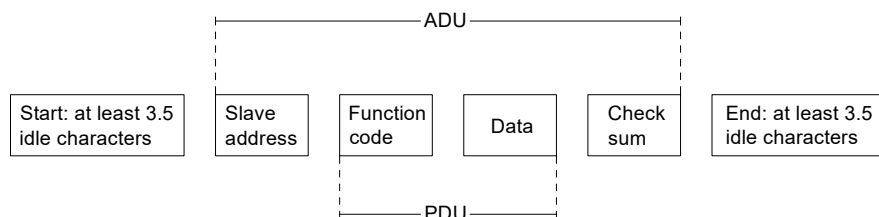
RS485: asynchronous half duplex, least significant bit preferred to send; the high byte precedes the low byte.

#### 3. Protocol format

The ADU (Application Data Unit) check is the CRC16 check sum of the first three parts of the ADU obtained by high and low byte exchange.

The exception code indicates the specific cause of the error.

The RTU data frame format is as follows:



Exception codes are listed as follows:

| Exception code | Significance of exception code | Exception code | Significance of exception code       |
|----------------|--------------------------------|----------------|--------------------------------------|
| 0x01           | Illegal function code          | 0x18           | Information frame error              |
| 0x02           | Illegal register               | 0x20           | Parameters cannot be modified        |
| 0x03           | Data error                     | 0x21           | Operation cannot be modified         |
| 0x04           | Slave operation failed         | 0x22           | Parameters are protected by password |

#### 4. Functional interpretation

- ◆ Function 0x03 reads multiple register parameters

| Frame data content      | Data length (bytes)    | Scope                  |
|-------------------------|------------------------|------------------------|
| Request:                |                        |                        |
| Slave address           | 1                      | 0~247                  |
| Function code           | 1                      | 0x03                   |
| Register start address  | 2                      | 0x0000~0xFFFF          |
| Number of registers     | 2                      | 0x0001~0x0010          |
| Checksum                | 2                      | 0x0000~0xFFFF          |
| Response:               |                        |                        |
| Slave address           | 1                      | 0~247                  |
| Function code           | 1                      | 0x03                   |
| Number of reading bytes | 1                      | 2* number of registers |
| Reading content         | 2* number of registers | 0x0000~0xFFFF          |
| Checksum                | 2                      | 0x0000~0xFFFF          |

- ◆ Function 0x06 (save) or 0x41 (not save) writes a single register parameter

| Frame data content | Data length (bytes) | Scope         |
|--------------------|---------------------|---------------|
| Request:           |                     |               |
| Slave address      | 1                   | 0~247         |
| Function code      | 1                   | 0x06          |
| Register address   | 2                   | 0x0000~0xFFFF |
| Register content   | 2                   | 0x0000~0xFFFF |
| Checksum           | 2                   | 0x0000~0xFFFF |
| Response:          |                     |               |
| Slave address      | 1                   | 0~247         |
| Function code      | 1                   | 0x06          |
| Register address   | 2                   | 0x0000~0xFFFF |
| Register content   | 2                   | 0x0000~0xFFFF |
| Checksum           | 2                   | 0x0000~0xFFFF |

- ◆ Function 0x10 (save) or 0x42 (not save) writes multiple register parameters

| Frame data content     | Data length (bytes) | Scope         |
|------------------------|---------------------|---------------|
| Request                |                     |               |
| Slave address          | 1                   | 0~247         |
| Function code          | 1                   | 0x10          |
| Register start address | 2                   | 0x0000~0xFFFF |

|                                      |                        |                        |
|--------------------------------------|------------------------|------------------------|
| Number of registers                  | 2                      | 0x0001~0x0010          |
| Number of bytes in register contents | 1                      | 2* number of registers |
| Register content                     | 2* number of registers | 0x0000~0xFFFF          |
| Checksum                             | 2                      | 0x0000~0xFFFF          |
| Response:                            |                        |                        |
| Slave address                        | 1                      | 0~247                  |
| Function code                        | 1                      | 0x10                   |
| Register start address               | 2                      | 0x0000~0xFFFF          |
| Number of registers                  | 2                      | 0x0002~0x0020          |
| Checksum                             | 2                      | 0x0000~0xFFFF          |

## 5. inverter register distribution

Please refer to the function code list for the detailed address.

## 6. Bit definition of inverter control command word (0x8000)

| Control command word (bit) | Meaning  | Control command word (bit) | Meaning  |
|----------------------------|--|----------------------------|--|
| bit0                       | 0: no operation<br>1: valid running command                            | bit5                       | 0: invalid fault shutdown<br>1: valid fault shutdown                     |
| bit1                       | 0: forward rotation<br>1: reverse rotation                             | bit6                       | 0: invalid inching forward rotation<br>1: valid inching forward rotation |
| bit2                       | 0: invalid deceleration shutdown<br>1: valid deceleration and shutdown | bit7                       | 0: invalid inching reverse rotation<br>1: valid inching reverse rotation |
| bit3                       | 0: invalid emergency shutdown<br>1: valid emergency shutdown           | bit8                       | 0: invalid fault reset command<br>1: valid fault reset command           |
| bit4                       | 0: invalid free shutdown   | bit9~bit15                 | Reserve  |



|  |                        |  |  |
|--|------------------------|--|--|
|  | 1: valid free shutdown |  |  |
|--|------------------------|--|--|

7. Modbus communication example

Read the setting frequency of 1# inverter, and the setting frequency of inverter response is 50.00Hz.

|          | Premises | Function code | Register address | Number of register | Number of bytes in contents | Register content | Checksum |
|----------|----------|---------------|------------------|--------------------|-----------------------------|------------------|----------|
| Request  | 0x01     | 0x03          | 0x0000           | 0x0001             | No                          | No               | 0x840A   |
| Response | 0x01     | 0x03          | No               | No                 | 0x02                        | 0x1388           | 0xB512   |

Start the 1# inverter to rotate forward

|          | Premises | Function code | Register address | Register content | Checksum |
|----------|----------|---------------|------------------|------------------|----------|
| Request  | 0x01     | 0x06          | 0x8000           | 0x0001           | 0x61CA   |
| Response | 0x01     | 0x06          | 0x8000           | 0x0001           | 0x61CA   |

8. CRC16 function

```
unsigned int  crc16 (unsigned char *data,unsigned char length)
{
    int i,crc_result=0xffff;
    while (length--)
    {
        crc_result^=*data++;
        for (i=0; i<8; i++)
        {
            if (crc_result&0x01)
                crc_result= (crc_result>>1) ^0xa001;
            else
                crc_result=crc_result>>1;
        }
    }
    return (crc_result= ( (crc_result&0xff) <<8) | (crc_result>>8) ) ; // Swap high and low bytes
}
```

**9. Establishment of communication network**

There are two networking modes for inverters: single master/multiple slave mode and single master/single slave mode. It is as shown in the following figure:

