

HONWIN TECH



H600 Series

High-end Engineering Drive User Manual

Honwin Technology Co.,Ltd

Preface

First of all, we would like to thank you for purchasing and using the H600 high-end engineering series drive developed by Honwin Technology.

The H600 series drive is a universal high-performance current vector type drive, which can be used to control AC asynchronous motors and synchronous motors. The H600 series adopts high-performance vector control technology, achieving low-speed high-torque output, with excellent dynamic characteristics and strong overload capacity. Through rapid current control and voltage control technologies, it realizes smooth and rapid acceleration and deceleration characteristics. It is applied in fields such as steel metallurgy, rail transportation, ships, petrochemicals, natural gas, coal mines (mining), wind power, hydropower, nuclear power, airports, ports, and other mines, wind power, hydropower, nuclear power, airports, ports.

Brief Introduction Of H600 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: 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.
- ◇ Accurate motor parameter identification, vector control is more accurate.
- ◇ 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.

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!

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Chapter 1 Product Information

1.1 Product Naming

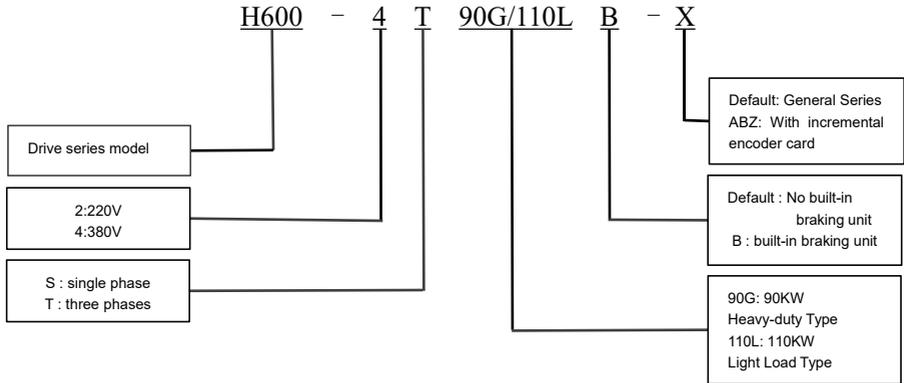


Figure 1-1 Product Naming

1.2 Description of Product Nameplate

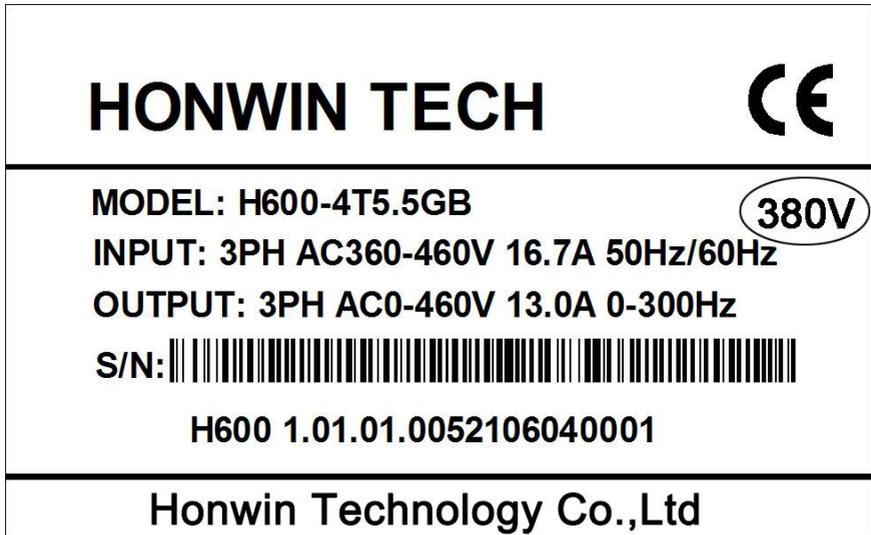


Figure 1-2 Description of Product Nameplate

Chapter 2 System Installation and Wiring

2.1 Peripheral system connection diagram

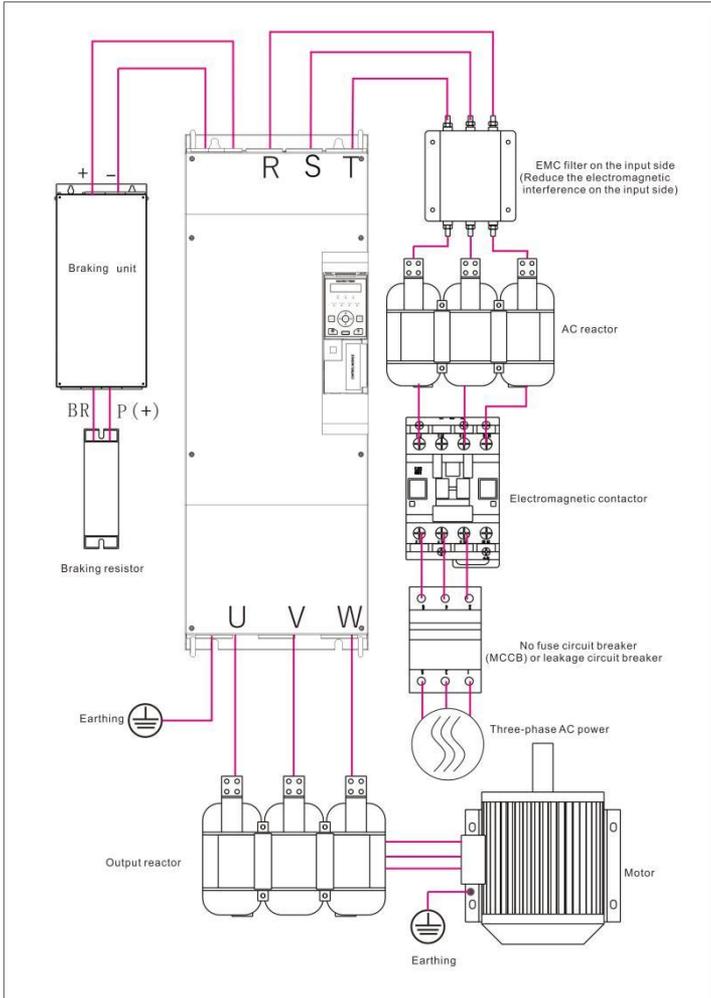


Figure 2-1 Connected peripheral system configuration diagram

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

H520 series 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:

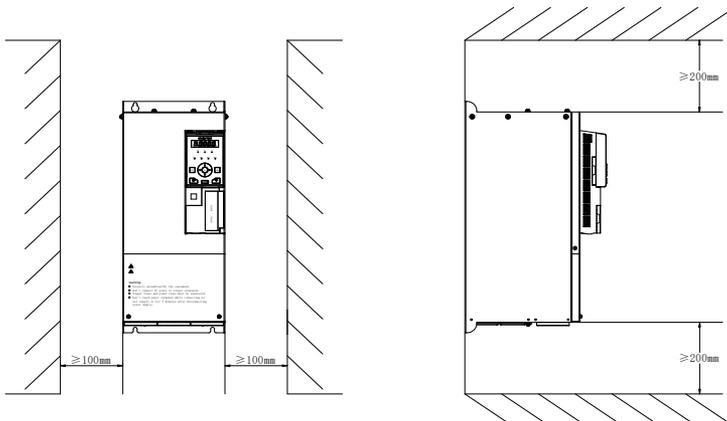


Figure 2-2 Installation directions and space requirements for H600-4T37GB and power ratings above 37GB

2.3 Wiring

2.3.1 Standard wiring diagram

The standard wiring is as shown in the following figure:

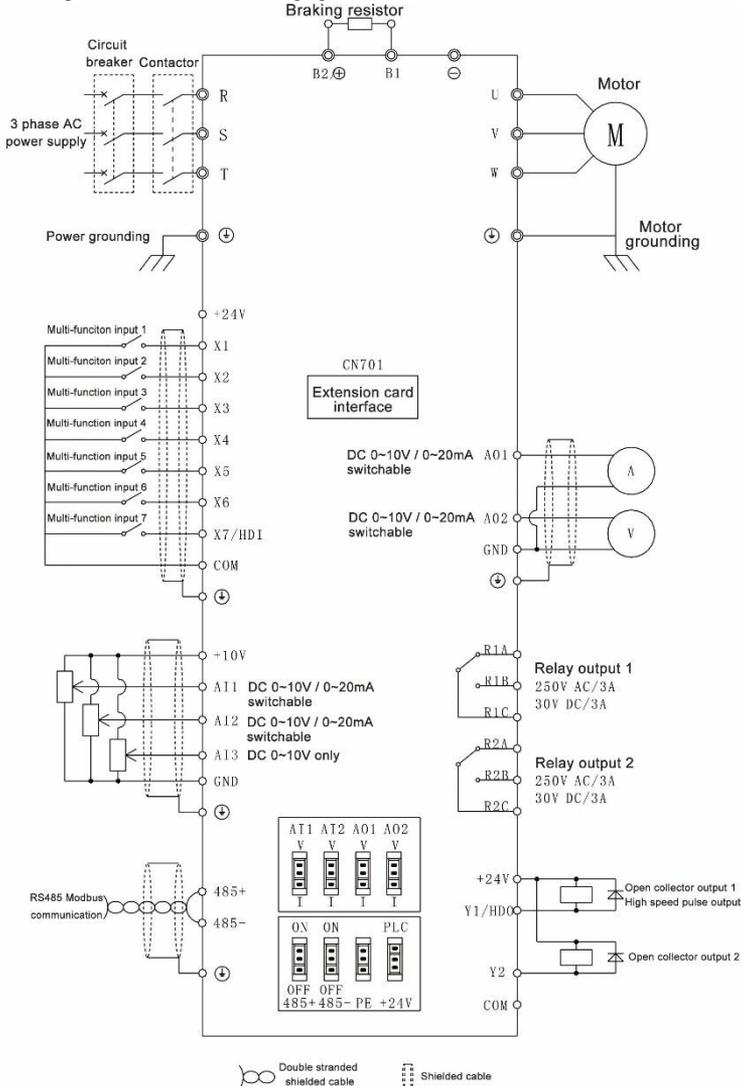
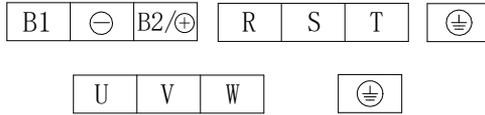


Figure 2-3 Standard Wiring Diagram

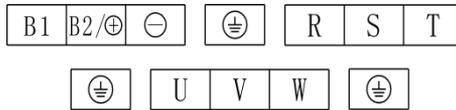
2.3.2 Functional description of main circuit terminal

1) H600-4T37G~H600-4T45G



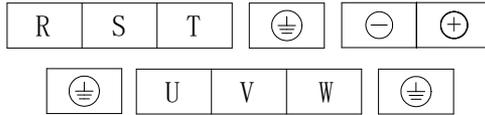
| Terminal marking | Terminal name and function description |
|------------------|--|
| R、S、T | Three-phase AC input terminal |
| B1、B2/⊕ | Connecting terminal of brake resistor |
| B2/⊕、⊖ | Positive and negative terminals of DC bus; DC input terminal |
| U、V、W | Inverter output terminal |
| ⊕ | Grounding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

2) H600-4T55G~H600-4T132G



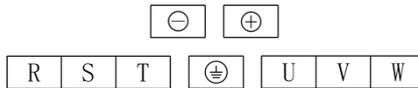
| Terminal marking | Terminal name and function description |
|------------------|--|
| R、S、T | Three-phase AC input terminal |
| B1、B2/⊕ | Connecting terminal of brake resistor |
| B2/⊕、⊖ | Positive and negative terminals of DC bus; DC input terminal |
| U、V、W | Inverter output terminal |
| ⊕ | Grounding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

3) H600-4T160G~H600-4T200G



| Terminal marking | Terminal name and function description |
|------------------|--|
| R、S、T | Three-phase AC input terminal |
| U、V、W | Drive output terminal |
| ⊕、⊖ | Positive and negative terminals of the DC bus; DC input terminals of the external braking unit |
| ⊕ | Grounding terminal |

4) H600-4T220G~H600-4T450G



| Terminal marking | Terminal name and function description |
|------------------|--|
| ⊕、⊖ | Positive and negative terminals of the DC bus; DC input terminals of the external braking unit |
| R、S、T | Three-phase AC input terminal |
| U、V、W | Drive output terminal |
| ⊕ | 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 (mm ²) | Screw | Fastening Torque (N.m) | Cable Specification (mm ²) |
| H600-4T37LB | M6 | 4.0~5.0 | 25 | M6 | 4.0~5.0 | 16 |
| H600-4T37G | M8 | 9.0~10.0 | 25 | M8 | 9.0~10.0 | 16 |
| H600-4T45L | | | | | | |
| H600-4T45G | M8 | 9.0~10.0 | 35 | M8 | 9.0~10.0 | 16 |
| H600-4T55L | | | | | | |
| H600-4T55G | M8 | 9.0~10.0 | 50 | M8 | 9.0~10.0 | 25 |
| H600-4T75L | | | | | | |
| H600-4T75G | M10 | 17.6~22.5 | 60 | M8 | 9.0~10.0 | 35 |
| H600-4T90L | | | | | | |
| H600-4T90G | M10 | 17.6~22.5 | 70 | M8 | 9.0~10.0 | 35 |
| H600-4T110L | | | | | | |
| H600-4T110G | M10 | 17.6~22.5 | 100 | M8 | 9.0~10.0 | 50 |
| H600-4T132L | | | | | | |
| H600-4T132G | M10 | 17.6~22.5 | 120 | M8 | 9.0~10.0 | 70 |
| H600-4T160L | | | | | | |
| H600-4T160G | M12 | 31.4~39.2 | 150 | M12 | 31.4~39.2 | 95 |
| H600-4T185L | | | | | | |
| H600-4T185G | M12 | 31.4~39.2 | 150 | M12 | 31.4~39.2 | 95 |
| H600-4T200L | | | | | | |
| H600-4T200G | M12 | 31.4~39.2 | 185 | M12 | 31.4~39.2 | 95 |
| H600-4T220L | | | | | | |
| H600-4T220G | M12 | 31.4~39.2 | 185 | M12 | 31.4~39.2 | 120 |
| H600-4T250L | | | | | | |
| H600-4T250G | M12 | 31.4~39.2 | 120×2 | M12 | 31.4~39.2 | 120 |
| H600-4T280L | | | | | | |
| H600-4T280G | M12 | 31.4~39.2 | 150×2 | M12 | 31.4~39.2 | 150 |
| H600-4T315L | | | | | | |
| H600-4T315G | M12 | 31.4~39.2 | 185×2 | M12 | 31.4~39.2 | 95×2 |
| H600-4T355L | | | | | | |
| H600-4T355G | M12 | 31.4~39.2 | 240×2 | M12 | 31.4~39.2 | 120×2 |
| H600-4T400L | | | | | | |
| H600-4T400G | M12 | 31.4~39.2 | 240×2 | M12 | 31.4~39.2 | 120×2 |
| H600-4T450L | | | | | | |
| H600-4T450G | M12 | 31.4~39.2 | 300×2 | M12 | 31.4~39.2 | 150×2 |

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⊕

- 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 (⊕) 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 |
| $16\text{mm}^2 < S \leq 35\text{mm}^2$ | 16mm^2 |
| $35\text{mm}^2 < S$ | $S/2$ |

2.3.5 Control unit

1) Control unit layout

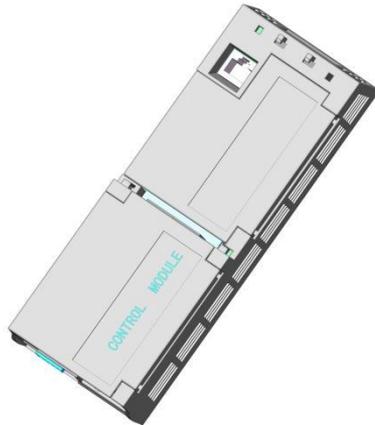


Figure 2-4 Control Unit

2) Wiring description for control terminals

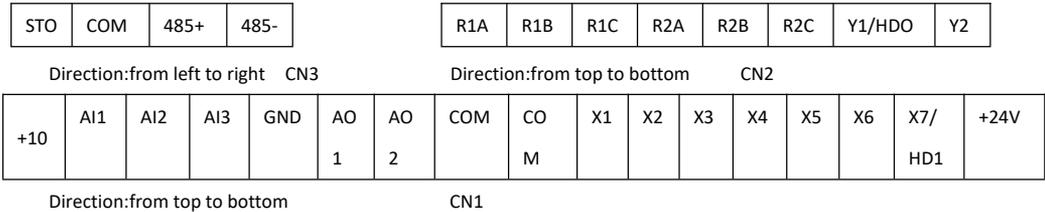


Figure 2-5 Layout of Control Terminal

Table 2-2 Control Terminals Function Description

| Analog Input | +10V | AI reference voltage | 10V ± 1%, internally isolated from COM The maximum output current is 20mA |
|----------------|---------|-----------------------------------|--|
| | GND | Analog ground | Internally isolation from COM |
| | AI1/AI2 | Analog input 1/2 | 0~10V: input impedance 22 kΩ 0~20mA: input impedance 500Ω Switching between 0~10V and 0~20mA analog input by jumper setting, factory default is voltage input |
| | AI3 | Analog input 3 | 0~10V: input impedance 22 kΩ |
| Analog output | AO1/AO2 | Analog output 1/2 | 0~10V: impedance requirement ≥ 10kΩ 0~20mA: impedance requirement 200Ω~500Ω Switching between 0~10V and 0~20mA analog output by jumper setting, factory default is voltage output. |
| | GND | Analog grounding | Internally isolated from COM |
| Digital Inputs | +24V | +24V | 24V± 20%, internally isolated from GND Maximum load 200 mA |
| | COM | +24V grounding | Internal isolation from GND |
| | X1~X7 | Multi-function input terminal 1~7 | Input specifications: 24 VDC, 5 mA Frequency range: 0~200Hz Voltage range: 24V±20% |
| | X7/HDI | Multi-function input /Pulse input | Multi-functions input: Same as X1~X7 |

| | | | |
|---------------------|----------------------------------|--|--|
| | | | Pulse input: 0.1Hz~50kHz; Voltage range: 24V ±20% |
| Digital Outputs | Y1/HDO | open collector output/pulse output | Open collector output: 1. Voltage range: 0~24V; 2. Current range: 0~50mA Pulse output: 0~100.00kHz |
| | Y2 | open collector output | Open collector output: 1. Voltage range: 0~24V; 2. Current range: 0~50mA |
| | COM | Open collector outputs common terminal | Internally isolated from GND |
| Relay1 output | R1A/R1B/R1C | Relay output 1 | R1B— R1C: Normally opened |
| | | | R1A— R1C: Normally closed |
| | | | Contact capacity:250VAC/3A ,30VDC/3A |
| Relay2 output | R2A/R2B/R2C | Relay output 2 | R2B— R2C: Normally opened |
| | | | R2A— R2C: Normally closed |
| | | | Contact capacity:250VAC/3A ,30VDC/3A |
| STO /485 | STO | Safe Torque Off | If STO is activated when motor stands still, it prevents motor from start accidentally. |
| | | | If STO is activated when motor is running, motor freewheels untill stop. And if motor has mechanical brake, the brake would closed immediately |
| | COM | The safety torque is turned off at the common terminal | Internally isolated from GND |
| | 485+ | 485 differential signal positive | Baud rate: 4800/9600/19200/38400/57600/115200bps |
| 485- | 485 differential signal negative | The longest distance is 500m (adopting standard shielded twisted pair cable) | |
| Extension interface | CN701 | Port for expansion card | |

3) Control loop cable selection

Table 2-3 Control loop cable specifications

| Cable type | Cable specification (mm ²) |
|----------------|--|
| Shielded cable | 0.5 |

4) Analog inputs and outputs usage instruction

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 variable frequency drive shall be well grounded, and the transmission distance shall not exceed 20 meters.

When wiring, the control cable shall keep a distance of more than 20cm from the main circuit and high-voltage lines (such as power cable, motor cable, relays and contactor cables), and avoid parallel placement with high-voltage lines. When crossing with high-voltage lines cannot be avoided, vertical wiring is recommended to prevent mis-operation of variable frequency drive caused by interference.

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

5) 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 variable frequency drive shall be well grounded, and the transmission distance is not more than 20m. 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 mis-operation of variable frequency drive caused by interference.

Dry contact mode wiring method

When using internal power supply, the jumper switch(PLC-24V) short-circuit connection is shown in Figure 2-6

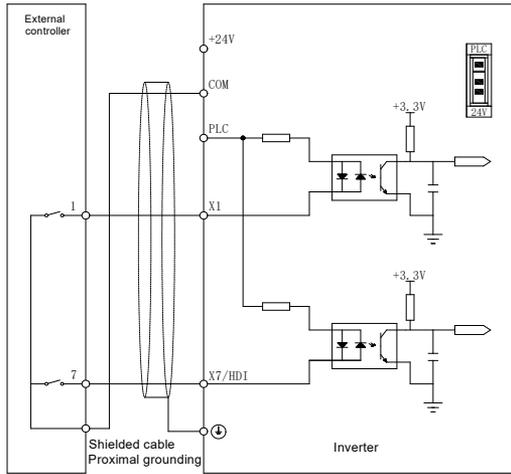


Figure 2-6 Dry contact mode using internal power supply

When using external power supply, the jumper switch(PLC-24V) short-circuit connection is shown in Figure 2-7.

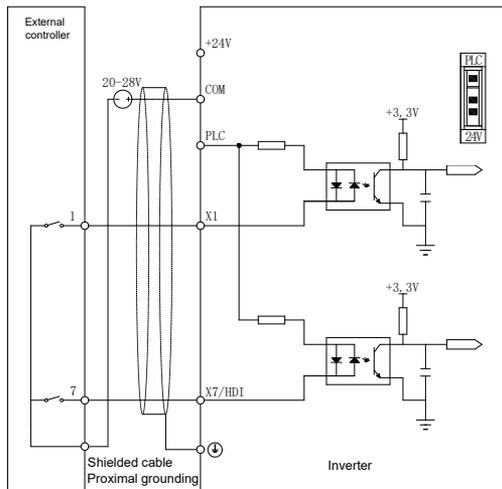


Figure 2-7 Dry contact mode using external power supply

Open collector NPN wiring method

When using internal power supply in open collector NPN mode, the jumper switch(PLC-24V) short-circuit connection is shown in Figure 2-8.

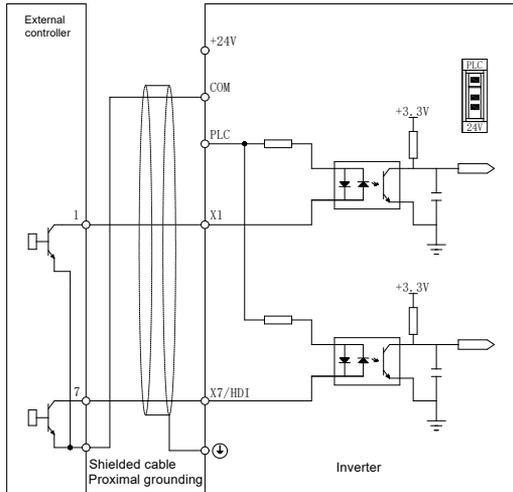


Figure 2-8 Open collector NPN mode using internal power supply

When using external power supply in open collector NPN mode, the jumper switch(PLC-24V) short-circuit connection is shown in Figure 2-9.

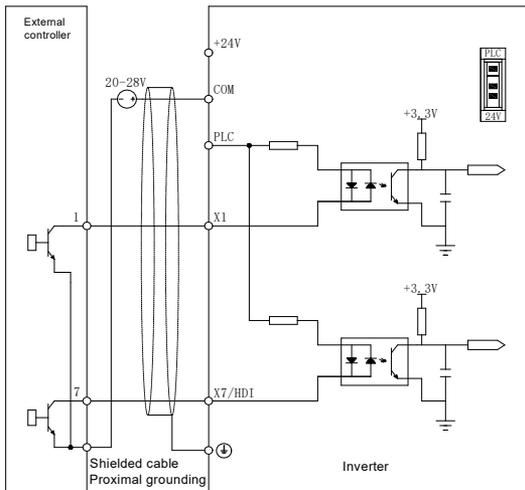


Figure 2-9 Open collector NPN mode using external power supply

Open collector PNP wiring method

When using internal power supply in open collector PNP mode, the jumper switch(PLC-24V) short-circuit connection is shown in Figure 2-10.

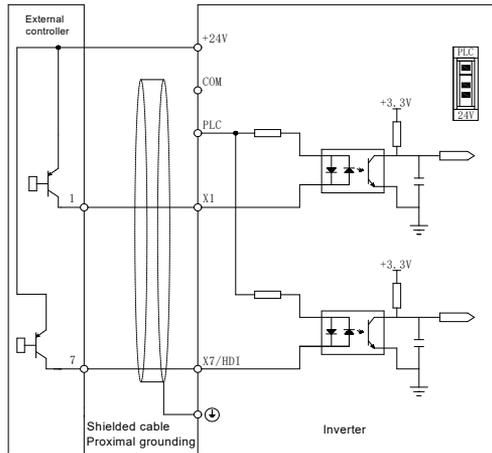


Figure 2-10 Open collector PNP mode using internal power supply

The open-circuit collector PNP connection mode using an external power supply, the selection and wiring of the dip switch S700 are shown in Figure 2-11.

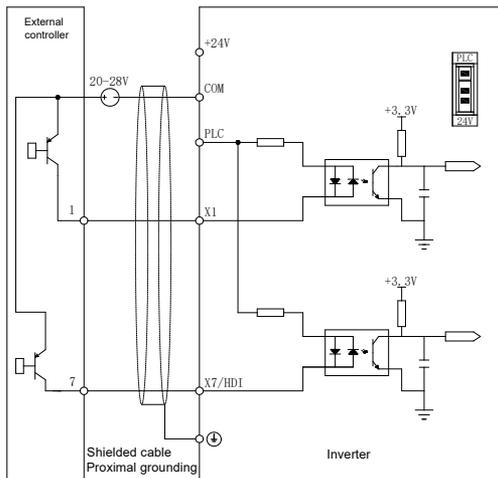


Figure 2-11 Open collector PNP mode using external power supply

Multifunction terminals wiring

Wiring of Y1/HDO and Y2 is shown in figures 2-12 and 2-13.

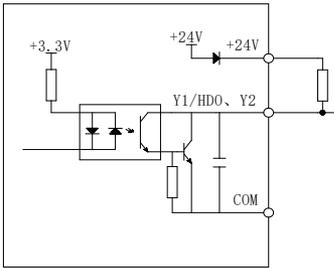


Fig. 2-12 Internal power supply adopted

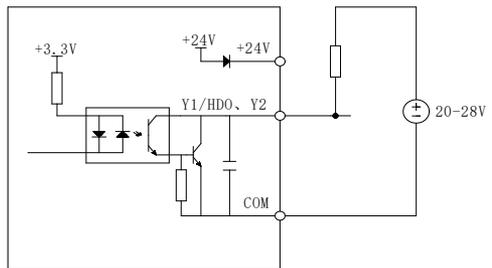


Fig. 2-13 External power supply adopted

When Y1/HDO and Y2 are used to activate the relay, wiring is shown in figures 2-14 and 2-15.

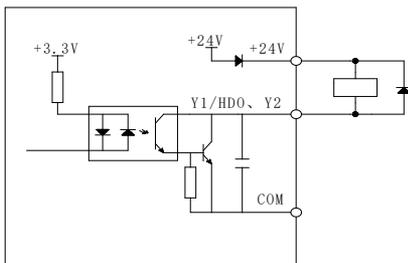


Fig. 2-14 Internal power supply adopted

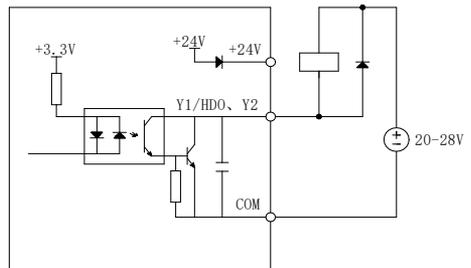


Fig. 2-15 External power supply adopted

Chapter 3 Operation Keypad and Trial Run

3.1 Operation keypad instruction



Fig. 3-1 Operation keypad drawing

3.1.1 Key function of operation keyboard

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

Table 3-1 Key Function Table of Operation Keyboard

| Key | Key Description | Key Functions |
|-----|-----------------------------------|---|
| PRG | Programming key | 1. Enter the next level of menu or enter monitoring parameters group 2. Parameter value saving |
| ESC | Escape key /Enter level-1 menu | Return to previous menu or Enter level-1 menu |
| OK | Confirm Key | Parameter saving or Monitoring menu |
| ▲ | Increase key | 1. Increase the number of the selected bit of function code 2. Increase the number of edited bit of parameter value 3. Increase the frequency reference digital setting value |
| ▼ | Decrease key | 1. Decrease the number of the selected bit of function code 2. Decrease the number of edited bit of parameter value 3. Decrease the frequency reference digital setting value |

| Key | Key Description | Key Functions |
|---------|-------------------|--|
| ◀ | Left shift key | <ol style="list-style-type: none"> 1. Left shift the selected digit of the function code 2. Left shift the edited digit of parameter value 3. Switch the displayed parameters of STOP/RUN state 4. Switch the fault state to parameter display state |
| ▶ | Right shift key | <ol style="list-style-type: none"> 1. Right shift the selected digit of the function code 2. Right shift the edited digit of parameter value 3. Switch the displayed parameters of STOP/RUN state 4. Switch the fault state to parameter display state |
| Start | Run key | Run the variable frequency inverter |
| Stop | Stop key | <ol style="list-style-type: none"> 1. Stop running 2. Fault reset |
| Loc/Rem | Multifunction key | Refer to Table 3-2 Multifunction Loc/Rem key Function Definition for details |

Table 3-2 Multifunction Loc/Rem key Function Definition

| Loc/Rem Definition (P20.08) | Function | Function explanation |
|-----------------------------|-----------------------------|---|
| 0 | No function | Multi-function key invalid |
| 1 | RUN command modes switching | Keypad control → Terminal control → Communication control cycle switching |
| 2 | Jog forward | Jog in forward direction |
| 3 | Jog reversely | Jog in reverse direction |
| 4 | FWD/REV switching | Switch the motor running direction between Forward and Reverse |

3.1.2 Description of operation 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 Off: terminal control Flash: communication control |
| | RUN | Indication of running state | On: run 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 | Power indication | On: the current display parameter is power |
| | Hz+V+ | Time indication | On: the current display parameter is time |
| A | Dimensionless indication | Off: the current display parameter is dimensionless | |

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.

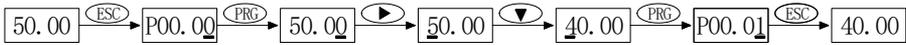


Figure 3-2 Functional Parameter Setting

2. Long pressing "►" for 3 seconds, the keyboard enters the non-factory-default value menu mode for viewing the parameters which have been modified by the user.
3. When the parameter has set keypad lock function, press "ESC+▲" together at the same time will lock the keys on keypad. And the keypad would display "Lock".
4. Press "ESC+▼" together at the same time would unlock the keypad keys, and the keypad display "ULock"

3.2 Basic Operation and Trial Operation

3.2.1 Motor parameters learning(tuning)

After power up the variable frequency drive, firstly set P63 group parameters of the drive according to the actual nameplate specifications of the motor, then choose the appropriate tuning mode according to the working conditions by setting the correspond value to P63.07, and press the "Start" key to do tuning of motor parameters. See Figure 3-3 for the specific flow of procedures:

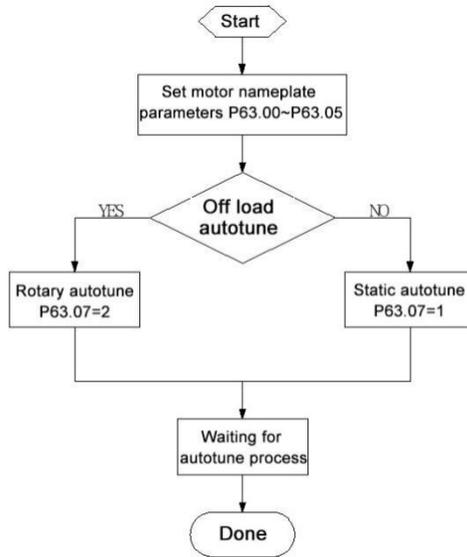


Figure 3-3 Motor self-tuning procedures

3.2.2 Motor control mode selection

| Function code | Detailed description | Application |
|----------------------------|----------------------------------|---|
| P63.08: Motor control mode | 0: advanced scalar control | It is suitable for occasions where the load has lower control requirements or occasions where one variable frequency drive control multiple motors, such as fan and water pump loads. |
| | 1: PG-free Vector Control (SVC) | It is suitable for general high performance control occasions such as lathe, wire-drawing machines where high torque output is required. One drive could only control one motor |
| | 2: It has PG vector control (VC) | Motor encoder should be added to use this control mode. It is suitable for occasions where high precision speed control or torque control is required such as lifting, slitting machine, and rolling etc. One drive could only drive one motor. |

3.2.3 Start and stop commands and modes

1) Start and stop command sources

| Function code | Setting range | Application description |
|--|----------------------------------|---|
| P01.00: Run command source selection | 0: Keyboard command mode | Control the start and stop of the drive by pressing the "start" and "stop" keys on the keyboard. |
| | 1: Terminal command mode | Control the start and stop of the variable frequency drive by setting the multi-functional input X terminal as FWD, REV, FJOG and RJOG command. |
| | 2: Communication command mode | Control the start and stop of the drive by communication with the upper controller. |
| | 3: Multi-step command mode | The multi-functional input X terminals are set as multi-step frequency command to directly control the start and stop of the variable frequency drive . |

2) Start and stop mode selection

| Function code | Setting range | Application description |
|-----------------------------------|---|---|
| P01.05 Start mode selection | 0: start from starting frequency | The inverter starts to run from the frequency set in P01.06, holds this frequency for a period of time set in P01.07, and then starts to speed up by acceleration time to the frequency reference setting for constant speed operation. However, when P01.09 is set to non-0, the drive performs start-stage DC brake firstly, and then start from frequency set in P01.06. |
| | 1: Start with speed tracking /Flying start (realized by software) | After receiving the start command, the variable frequency drive 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. |
| | 2: Start with speed tracking /Flying start (realized by hardware) | This start mode requires to add a flying start expansion card. Once receive the start command, the variable frequency drive starts to search for the actual speed of the motor, then |

| Function code | Setting range | Application description |
|----------------------------------|-------------------------|---|
| | | 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. |
| P01.10 Stop mode selection | 0: Stop by deceleration | Once the variable frequency drive receives the stop command, it starts to slow down; when the speed is reduced to the stop-stage DC brake activation frequency set in P01.11 and when P01.13 is set to non-0, it performs the stop-stage DC brake; otherwise it continues to slow down until the output frequency of the variable frequency drive is 0 and the stop process is completed. |
| | 1: freewheeled stop | When the variable frequency drive receives the stop command, it immediately blocks the output of the drive, and the motor has freewheeled stop mode. |

3.2.4 Frequency reference source selection

1) Frequency main reference setting

| Function code | Frequency main reference setting | Factory default | 0 |
|---------------|----------------------------------|-----------------|---|
| P00.01 | Setting range | 0 | Digital setting (P00.00) + terminal Up/Down or keyboard ▲/▼ up/down |
| | | 1 | Analog input AI1 |
| | | 2 | Analog input AI2 |
| | | 3 | Analog input AI3 |
| | | 4 | Min[AI1,AI2] |
| | | 5 | Max[AI1,AI2] |
| | | 6 | Sub[AI1,AI2] |
| | | 7 | Add[AI1,AI2] |
| | | 8 | Pulse setting by HDI |
| | | 9 | Process control PID |
| | | A | Simple PLC |
| | | B | Keyboard potentiometer |
| C | No setting | | |

2) Frequency auxiliary reference setting

| Function code | Auxiliary frequency reference setting | Factory default | 0 |
|---------------|---------------------------------------|-----------------|--------------------------|
| P00.03 | Setting range | 0 | Digital setting (P00.02) |
| | | 1 | Analog input AI1 |
| | | 2 | Analog input AI2 |
| | | 3 | Analog input AI3 |
| | | 4 | Min[AI1,AI2] |
| | | 5 | Max[AI1,AI2] |
| | | 6 | Sub[AI1,AI2] |
| | | 7 | Add[AI1,AI2] |
| | | 8 | Pulse setting by HDI |
| | | 9 | Reserved |
| | | A | Reserved |
| | | B | No setting |

Chapter 4 Parameter List

Parameter Flag description:

○: indicate that the parameter can be modified during running

●: Indicate that the parameter cannot be modified during running and can be modified during STOP.

★: Indicate that the parameter is read-only, such as monitoring parameters

| Parameter | Description | Setting Range | Default | Register | Flag |
|---|--|---|---------|----------|------|
| P00 Frequency reference setting parameters | | | | | |
| P00.00 | Main frequency reference digital setting | 0.00Hz ~ Frequency upper limit | 50.00Hz | 0x0000 | ○ |
| P00.01 | Main frequency reference source selection | 0: digital setting (P00.00) +Up/Down adjustment 1: analog input AI1 2: analog input AI2 3: Reserved 4: Min [AI1, AI2] 5: Max [AI1, AI2] 6: Sub [AI1, AI2] 7: Add [AI1, AI2] 8: pulse setting by HDI 9: process PID A: simple PLC B: keyboard potentiometer C: no setting | 0 | 0x0001 | ○ |
| P00.02 | Auxiliary frequency reference digital setting | 0.00Hz ~ Frequency upper limit | 50.00Hz | 0x0002 | ○ |
| P00.03 | Auxiliary frequency reference source selection | 0: digital setting (P00.02) 1: analog input AI1 2: analog input AI2 3: analog input AI3 4: Min [AI1, AI2] 5: Max [AI1, AI2] 6: Sub [AI1, AI2] 7: Add [AI1, AI2] 8: Pulse setting by HDI | B | 0x0003 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|--|---|---------|----------|------|
| | | 9: Reserved A: Reserved B: No setting | | | |
| P00.04 | Main frequency reference coefficient | 0.0%~200.0% | 100.0% | 0x0004 | ○ |
| P00.05 | Auxiliary frequency reference coefficient | 0.0%~200.0% | 100.0% | 0x0005 | ○ |
| P00.06 | Main and auxiliary frequency reference combination selection | <p>Ones place: Frequency reference mode selection 0: Main frequency reference 1: Main and auxiliary frequency setting calculation result 2: Switching between main reference setting and auxiliary reference setting 3: Switching between main frequency setting and the calculation result of main and auxiliary frequency setting 4: Switching between auxiliary frequency setting and the calculation result of main and auxiliary frequency setting</p> <p>Tens place: Calculation method of main and auxiliary frequency setting 0: Min [main, auxiliary] 1: Max [main, auxiliary] 2: Sub [main, auxiliary] 3: Add [main, auxiliary]</p> | 00 | 0x0006 | ○ |
| P00.07 | Max. frequency | 10.00Hz~300.00Hz | 50.00Hz | 0x0007 | ● |
| P00.08 | Frequency upper limit | Freq. lower limit~Max. frequency | 50.00Hz | 0x0008 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--|---|--|---------|----------|------|
| P00.09 | Frequency lower limit | 0.00Hz~ Freq. upper limit | 0.00Hz | 0x0009 | ● |
| P00.10 | Frequency jumping point 1 | 0.00Hz ~ Freq. upper limit | 0.00Hz | 0x000A | ● |
| P00.11 | Jumping range 1 | 0.00Hz ~ 30.00Hz | 0.00Hz | 0x000B | ● |
| P00.12 | Frequency jumping point 2 | 0.00Hz ~ Freq. upper limit | 0.00Hz | 0x000C | ● |
| P00.13 | Jumping range 2 | 0.00Hz ~30.00Hz | 0.00Hz | 0x000D | ● |
| P00.14 | Frequency jumping point 3 | 0.00Hz ~ Freq. upper limit | 0.00Hz | 0x000E | ● |
| P00.15 | Jumping range 3 | 0.00Hz ~ 30.00Hz | 0.00Hz | 0x000F | ● |
| P00.16 | Jog frequency setting | 0.00Hz ~ Freq. upper limit | 5.00Hz | 0x0010 | ● |
| P01 Start and Stop Control Parameters | | | | | |
| P01.00 | Run command source selection | 0: Keypad command mode 1: Terminal command mode 2: Communication command mode 3: Multi-step command mode | 0 | 0x0100 | ○ |
| P01.01 | Run command source bonds with frequency reference setting | Ones: Frequency reference setting bonded to Keypad run command mode Tens: Frequency reference setting bonded to Terminal run command mode Hundreds: Frequency reference setting bonded to Communication run command mode 0: digital setting (P00.00) +Up/Down adjustment 1: analog input AI1 2: analog input AI2 3: analog input AI3 4: Min [AI1, AI2] 5: Max [AI1, AI2] 6: Sub [AI1, AI2] 7: Add [AI1, AI2] | BBB | 0x0101 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|--|--|---------|----------|------|
| | | 8: pulse setting by HDI 9: process PID A: simple PLC B: no bonding | | | |
| P01.02 | Running direction selection | 0: Forward 1: Reverse | 0 | 0x0102 | ● |
| P01.03 | Reverse running control selection | 0: Reverse allowed 1: Reverse forbidden | 0 | 0x0103 | ● |
| P01.04 | FWD/REV rotation dead-zone | 0.0s ~ 3600.0s | 0.0s | 0x0104 | ● |
| P01.05 | Start mode selection | 0: start from starting frequency 1: Flying start (Software) 2: Flying start (Hardware) | 0 | 0x0105 | ● |
| P01.06 | Starting frequency | 0.00Hz ~ frequency upper limit | 0.50Hz | 0x0106 | ● |
| P01.07 | Starting frequency holding time | 0.0s~3600.0s | 0.0s | 0x0107 | ● |
| P01.08 | Start stage DC brake current /pre-excitation current | 0.0%~100.0% | 50.0% | 0x0108 | ● |
| P01.09 | Start stage DC brake time /pre-excitation time | 0.00s~30.00s 0.00s means start-stage DC brake function invalid | 0.00s | 0x0109 | ● |
| P01.10 | Stop mode | 0: Stop by deceleration 1: Freewheeled stop | 0 | 0x010A | ● |
| P01.11 | Stop stage DC brake activation frequency | 0.00Hz~ Freq. upper limit | 0.50Hz | 0x010B | ● |
| P01.12 | Stop stage DC brake current | 0.0%~100.0% | 50.0% | 0x010C | ● |
| P01.13 | Stop stage DC brake time | 0.00s~30.00s 0.00s means stop stage DC brake function invalid | 0.00s | 0x010D | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|---|--|---------------------------|------------------|----------|------|
| P02 Acceleration(Acc.) and Deceleration(Dec.) Parameters | | | | | |
| P02.00 | Acc. time 1 | 0.1s~6000.0s | Depends on model | 0x0200 | ○ |
| P02.01 | Dec. time 1 | 0.1s~6000.0s | Depends on model | 0x0201 | ○ |
| P02.02 | Acc. time 2 | 0.1s~6000.0s | Depends on model | 0x0202 | ○ |
| P02.03 | Dec. time 2 | 0.1s~6000.0s | Depends on model | 0x0203 | ○ |
| P02.04 | Acc. time 3 | 0.1s~6000.0s | Depends on model | 0x0204 | ○ |
| P02.05 | Dec. time 3 | 0.1s~6000.0s | Depends on model | 0x0205 | ○ |
| P02.06 | Acc. time 4 | 0.1s~6000.0s | Depends on model | 0x0206 | ○ |
| P02.07 | Dec. time 4 | 0.1s~6000.0s | Depends on model | 0x0207 | ○ |
| P02.08 | Emergency stop Dec. time | 0.1s~6000.0s | Depends on model | 0x0208 | ● |
| P02.09 | Jog Acc. time | 0.1s~6000.0s | Depends on model | 0x0209 | ● |
| P02.10 | Jog Dec. time | 0.1s~6000.0s | Depends on model | 0x020A | ● |
| P02.11 | Polyline Acc. time switching frequency | 0.00Hz~ Freq. upper limit | 0.00Hz | 0x020B | ● |
| P02.12 | Polyline Dec. time switching frequency | 0.00Hz~ Freq. upper limit | 0.00Hz | 0x020C | ● |
| P02.13 | Acc./Dec. curve selection | 0~1 | 0 | 0x020D | ● |
| P02.14 | Acc. curve starting slope | 0%~200% | 50% | 0x020E | ● |
| P02.15 | Acc. curve ending slope | 0%~200% | 50% | 0x020F | ● |
| P02.16 | Acc. middle slope | 0%~200% | 0% | 0x0210 | ● |
| P02.17 | Dec. curve starting slope | 0%~200% | 50% | 0x0211 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--------------------------------------|---|---|---------|----------|------|
| P02.18 | Dec. curve ending slope | 0%~200% | 50% | 0x0212 | ● |
| P02.19 | Dec. middle slope | 0%~200% | 0% | 0x0213 | ● |
| P03 Vector Control Parameters | | | | | |
| P03.00 | Speed/Torque control selection | Ones: Vector control selection 0: speed control 1: torque control Tens: Generative power limit 0: invalid 1: full time limit 2: constant speed limit 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 | ○ |
| 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~ Freq. upper limit | 10.00Hz | 0x0306 | ○ |
| P03.07 | Speed feedback filtering time | 0.0ms~1000.0ms | 15.0ms | 0x0307 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|--|---------|----------|------|
| P03.08 | Motoring torque channel selection | Ones: torque control channel selection Tens: speed control motoring torque upper limit 0: digital setting P03.09 1: analog input AI1 2: analog input AI2 3: analog input AI3 4: Min [AI1, AI2] 5: Max [AI1, AI2] 6: Sub [AI1, AI2] 7: Add [AI1, AI2] 8: pulse setting by HDI 9: maximum value of variable frequency converter | 90 | 0x0308 | ● |
| P03.09 | Motoring torque digital setting | -200.0%~200.0% | 150.0% | 0x0309 | ○ |
| P03.10 | Generating torque channel selection | Ones: torque control channel selection Tens: speed control generating torque upper limit 0: digital setting P03.11 1: analog input AI1 2: analog input AI2 3: analog input AI3 4: Min [AI1, AI2] 5: Max [AI1, AI2] 6: Sub [AI1, AI2] 7: Add [AI1, AI2] 8: pulse setting by HDI 9: maximum value of variable frequency drive | 99 | 0x030A | ● |
| P03.11 | Generating torque digital setting | -200.0%~200.0% | 150.0% | 0x030B | ○ |
| P03.12 | Torque control frequency limiting channel | Ones: frequency forward limit channel Tens: frequency reverse limit channel | 00 | 0x030C | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|--|---|---------|----------|------|
| | | 0: digital setting P03.13 /P03.14 1: analog input AI1 2: analog input AI2 3: analog input AI3 4: Min [AI1, AI2] 5: Max [AI1, AI2] 6: Sub [AI1, AI2] 7: Add [AI1, AI2] 8: pulse setting by HDI | | | |
| P03.13 | Torque control frequency forward limit digital setting | 0.00Hz~Max. frequency | 50.00Hz | 0x030D | ○ |
| P03.14 | Torque control frequency reverse limit digital setting | 0.00Hz~Max. frequency | 50.00Hz | 0x030E | ○ |
| P03.15 | Torque control frequency limit increment | 0.00Hz~Max. frequency | 0.00Hz | 0x030F | ○ |
| P03.16 | Proportional gain of excitation current tuning | 0~60000 | 2000 | 0x0310 | ○ |
| P03.17 | Integral gain of excitation current tuning | 0~60000 | 1000 | 0x0311 | ○ |
| P03.18 | Proportional gain of torque current tuning | 0~60000 | 2000 | 0x0312 | ○ |
| P03.19 | Integral gain of torque current tuning | 0~60000 | 1000 | 0x0313 | ○ |
| P03.20 | Driving torque rising filter time | 0.0s~6000.0s | 0.3s | 0x0314 | ○ |
| P03.21 | Driving torque descending filter time | 0.0s~6000.0s | 0.3s | 0x0315 | ○ |
| P03.22 | Torque limitation coefficient in | 0.0%~200.0% | 100.0% | 0x0316 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-------------------------------|---|--|---------|----------|------|
| | weak magnetic area | | | | |
| P03.23 | Power limitation coefficient in generating area | 0.0%~200.0% | 100.0% | 0x0317 | ○ |
| P03.24 | Frequency deviation of torque control | 0.00Hz~10.00Hz | 0.00Hz | 0x0318 | ○ |
| P03.25 | Current loop parameters adjustment | 0x0000~0xFFFF | 0x0000 | 0x0319 | ○ |
| P04 Scalar Control Parameters | | | | | |
| P04.00 | V/F curve setting | 0: straight line V/F 1: multi-segment V/F 2: 1.2 Exponentiation 3: 1.4 Exponentiation 4: 1.6 Exponentiation 5: 1.8 Exponentiation 6: 2.0 Exponentiation 7: V/F separation | 0 | 0x0400 | ● |
| P04.01 | V/F frequency F0 | 0.00Hz~P04.03 | 0.00Hz | 0x0401 | ● |
| P04.02 | V/F voltage V0 | 0.0%~P04.04 | 0.0% | 0x0402 | ● |
| P04.03 | V/F frequency F1 | P04.01~P04.05 | 0.00Hz | 0x0403 | ● |
| P04.04 | V/F voltage V1 | P04.02~P04.06 | 0.0% | 0x0404 | ● |
| P04.05 | V/F frequency F2 | P04.03~P04.07 | 0.00Hz | 0x0405 | ● |
| P04.06 | V/F voltage V2 | P04.04~P04.08 | 0.0% | 0x0406 | ● |
| P04.07 | V/F frequency F3 | P04.05~P63.03 | 50.00Hz | 0x0407 | ● |
| P04.08 | V/F voltage V3 | P04.06~100.0% | 100.0% | 0x0408 | ● |
| P04.09 | Torque boost | 0.0%~30.0% 0.0%: Automatic torque boost | 0.0% | 0x0409 | ○ |
| P04.10 | Droop control volume | 0.00Hz~10.00Hz | 0.00Hz | 0x040A | ● |
| P04.11 | V/F oscillation suppression | 0~1024 | 160 | 0x040B | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-------------------------------------|---|---|---------|----------|------|
| | gain 1 | | | | |
| P04.12 | V/F oscillation suppression gain 2 | 0~1024 | 160 | 0x040C | ○ |
| P04.13 | V/F separation mode voltage reference channel | 0: P04.14 digital setting 1: analog input AI1 2: analog input AI2 3: analog input AI3 4: process PID output 5: process PID output +AI1 | 0 | 0x040D | ● |
| P04.14 | V/F separation voltage digital setting | 0.0%~100.0% | 0.0% | 0x040E | ○ |
| P04.15 | V/F separation voltage slope time | 0.00s~600.00s | 0.01s | 0x040F | ○ |
| P10 Digital input terminal X | | | | | |
| P10.00 | X1 function selection | 00: no function | 1 | 0x1000 | ● |
| P10.01 | X2 function selection | 01: Forward running (FWD) 02: Reverse running (REV) | 2 | 0x1001 | ● |
| P10.02 | X3 function selection | 03: Forward jogging (FJOG) 04: Reverse jogging (RJOG) | 16 | 0x1002 | ● |
| P10.03 | X4 function selection | 05: 3-wire running 06: Freewheeled stop | 17 | 0x1003 | ● |
| P10.04 | X5 function selection | 07: Emergency stop 08: External stop | 18 | 0x1004 | ● |
| P10.05 | X6 function selection | 09: Run forbidden 10: Run pause | 0 | 0x1005 | ● |
| P10.06 | X7/HDI function selection | 11: External fault input 12: Fault reset (RESET) | 0 | 0x1006 | ● |
| P10.08 | AI1 function selection | 13: Terminal Up 14: Terminal Down | 0 | 0x1008 | ● |
| P10.09 | AI2 function selection | 15: Up/Down clearance (Terminal, keypad) | 0 | 0x1009 | ● |
| P10.10 | AI3 function selection | 16: Multi-step terminal 1 17: Multi-step terminal 2 18: Multi-step terminal 3 19: Multi-step terminal 4 20: Acc./Dec. time selection 1 | 0 | 0x1009 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|-------------------------------------|---|---------|----------|------|
| | | 21: Acc./Dec. time selection 2 22: Acc./Dec. forbidden 23: Switching to Keypad control command 24: Switching to terminal control command 25: Switching to communication control command 26: Frequency reference source switching (P00.06 ones place) 27: Main frequency reference switch to frequency digital setting 28: Auxiliary frequency reference switch to frequency digital setting 29: Stop stage DC brake+ Stop command 30: Stop stage DC brake 31: DC brake during running 32: Pulse input (X7/HDI workable for high speed) 33: Count input 34: Count clearance 35: Length counting 36: Length clearance 37: PID reaction direction 38: PID parameters switching 39: PID operation pause 40: PID integration pause 41: PLC memory clearance 42: PLC running disabled 43: PLC running pause 44~45: Reserved 46: Speed/Torque control switch 47: Torque control forbidden | | | |
| P10.11 | Terminal control run mode selection | 0: two-wire run mode 1 1: two-wire run mode 2 2: Three-wire run mode 1 3: three-wire run mode 2 | 0 | 0x100B | ● |
| P10.12 | Input terminal action logic setting | Ones: Bit0~Bit3: X1~X4 Tens: Bit4~Bit6: X5~X7 Hundreds: Bit8~Bit9: AI1~AI2 | 000 | 0x100C | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---------------------------------|--|---------|----------|------|
| | | 0: Positive logic 1: Negative logic | | | |
| P10.13 | Input terminal filtering time | 0.000s~2.000s | 0.010s | 0x100D | ○ |
| P10.14 | X1 conduction delay | 0.0s~3600.0s | 0.0s | 0x100E | ○ |
| P10.15 | X1 disconnection delay | 0.0s~3600.0s | 0.0s | 0x100F | ○ |
| P10.16 | X2 conduction delay | 0.0s~3600.0s | 0.0s | 0x1010 | ○ |
| P10.17 | X2 disconnection delay | 0.0s~3600.0s | 0.0s | 0x1011 | ○ |
| P10.18 | Terminal detection mode | Ones: Bit0~Bit3: X1~X4 Tens: Bit4~Bit6: X5~X7 Hundreds: Bit8~Bit9: AI1~AI2 0: Electric level effective 1: Rising edge effective | 000 | 0x1012 | ● |
| P10.19 | Virtual terminal input enabling | 0x000~0x7FF | 0x000 | 0x1013 | ○ |
| P10.20 | Virtual terminal input setting | 0x000~0x7FF | 0x000 | 0x1014 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-------------------------------|-----------------------------|---|---------|----------|------|
| P11 Digital Y/R output | | | | | |
| P11.00 | Y1 function selection | 00: No output function 01: Running | 0 | 0x1100 | ● |
| P11.01 | Y2 function selection | 02: Running forward 03: Running in reverse | 0 | 0x1101 | ● |
| P11.02 | R1 relay function selection | 04: Inverter ready to work 05: Zero frequency running (Stop state ON) 06: Zero frequency running (Stop state OFF) | 19 | 0x1102 | ● |
| P11.03 | R2 relay function selection | 07: Frequency arrival (FAR) 08: Frequency detection FDT1 09: Frequency detection FDT2 10: Frequency upper limitation 11: Frequency lower limitation 12: Torque limitation 13: Speed limitation 14: X1 terminal state 15: X2 terminal state 16: Zero current detection 17: Inverter DC braking 18: Inverter under-voltage 19: Inverter fault output 20: Inverter alarm output 21: Inverter overload alarm 22: Inverter overheat alarm 23: Motor overload alarm 24: Motor overheat alarm 25: PLC cycle completed 26: PLC stage completed 27: Reserved 28: Total power-on time arrival 29: Total running time arrival 30: Preset count number arrival 31: Specified count number arrival 32: Preset length arrival 33: Mechanical brake control output (dedicated for Lifting) | 0 | 0x1103 | ● |
| P11.04 | Y1 output connection delay | 0.0s~3600.0s | 0.0s | 0x1104 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|--|---------|----------|------|
| P11.05 | Y1 output disconnection delay | 0.0s~3600.0s | 0.0s | 0x1105 | ○ |
| P11.06 | Y2 output connection delay | 0.0s~3600.0s | 0.0s | 0x1106 | ○ |
| P11.07 | Y2 output disconnection delay | 0.0s~3600.0s | 0.0s | 0x1107 | ○ |
| P11.08 | R1 output connection delay | 0.0s~3600.0s | 0.0s | 0x1108 | ○ |
| P11.09 | R1 output disconnection delay | 0.0s~3600.0s | 0.0s | 0x1109 | ○ |
| P11.10 | R2 output connection delay | 0.0s~3600.0s | 0.0s | 0x110A | ○ |
| P11.11 | R2 output disconnection delay | 0.0s~3600.0s | 0.0s | 0x110B | ○ |
| P11.12 | Output terminal action logic setting | Bit0: Y1/HDO Bit1: Y2 Bit2: R1 Bit3: R2 Bit4: Reserved 0: Positive logic 1: Negative logic | 00 | 0x110C | ○ |
| P11.13 | FDT1 detection mode | 0: Detect by running freq. 1: Detect by output frequency | 0 | 0x110D | ○ |
| P11.14 | FDT1 upper limit | P11.15~ Max. Frequency | 2.50Hz | 0x110E | ○ |
| P11.15 | FDT1 lower limit | 0.00Hz~P11.14 | 2.00Hz | 0x110F | ○ |
| P11.16 | FDT2 detection mode | 0: Detect by running freq. 1: Detect by output frequency | 0 | 0x1110 | ○ |
| P11.17 | FDT2 upper limit | P11.15~ Max. Frequency | 2.50Hz | 0x1111 | ○ |
| P11.18 | FDT2 lower limit | 0.00Hz~P11.17 | 2.00Hz | 0x1112 | ○ |
| P11.19 | Frequency arrival (FAR) detection width | 0.00Hz~ Max. Frequency | 2.50Hz | 0x1113 | ○ |
| P11.20 | Zero frequency | 0.00Hz~ Max. Frequency | 0.50Hz | 0x1114 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--|---|--|---------|----------|------|
| | detection value | | | | |
| P11.21 | Zero frequency hysteresis | 0.00Hz~ Max. 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 Tens: AI2 characteristic curve selection Hundreds: AI3 characteristic curve selection 0: No curve correction 1: curve 1 (2 points) 2: curve 2 (4 points) 3: curve 3 (4 points) | 000 | 0x1200 | ● |
| P12.01 | Curve1 Max. input voltage | Minimum input (P12.03)~10.00V | 10.00V | 0x1201 | ○ |
| P12.02 | Curve1 Max. input relative level value | -100.0%~100.0% | 100.0% | 0x1202 | ○ |
| P12.03 | Curve1 Min. input voltage | -10.00V~ Maximum input (P12.01) | 0.00V | 0x1203 | ○ |
| P12.04 | Curve1 Min. input relative level value | -100.0%~100.0% | 0.0% | 0x1204 | ○ |
| P12.05 | Curve2 Max. input voltage | Inflection point 2 input (P12.07) ~10.00V | 10.00V | 0x1205 | ○ |
| P12.06 | Curve2 Max. input relative level value | -100.0%~100.0% | 100.0% | 0x1206 | ○ |
| P12.07 | Curve2 Inflection point 2 input | Inflection point 1 input (P12.09)~ Maximum input (P12.05) | 0.00V | 0x1207 | ○ |
| P12.08 | Curve2 inflection point2 input relative level | -100.0%~100.0% | 0.0% | 0x1208 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|---|---------|----------|------|
| | value | | | | |
| P12.09 | Curve2 Inflection point 1 input | Minimum input (P12.11) ~ inflection point2 input (P12.07) | 0.00V | 0x1209 | ○ |
| P12.10 | Curve2 Inflection point1 input relative level value | -100.0%~100.0% | 0.0% | 0x120A | ○ |
| P12.11 | Curve2 Min. input voltage | -10.00V~ inflection point1 input (P12.09) | 0.00V | 0x120B | ○ |
| P12.12 | Curve2 Min. input relative level value | -100.0%~100.0% | 0.0% | 0x120C | ○ |
| P12.13 | Curve3 Max. input voltage | Inflection point2 input (P12.15) ~10.00V | 10.00V | 0x120D | ○ |
| P12.14 | Curve3 Max. input relative level value | -100.0%~100.0% | 100.0% | 0x120E | ○ |
| P12.15 | Curve3 Inflection point 2 input | Inflection point1 (P12.17)~ Max. input (P12.13) | 0.00V | 0x120F | ○ |
| P12.16 | Curve3 Inflection point2 input relative level value | -100.0%~100.0% | 0.0% | 0x1210 | ○ |
| P12.17 | Curve3 Inflection point 1 input | Min. input (P12.19)~ inflection point2 input (P12.15) | 0.00V | 0x1211 | ○ |
| P12.18 | Curve3 Inflection point1 input relative level value | -100.0%~ 100.0% | 0.0% | 0x1212 | ○ |
| P12.19 | Curve 3 Min. input voltage | -10.00V~ inflection point1 input (P12.17) | 0.00V | 0x1213 | ○ |
| P12.20 | Curve 3 Min. input relative level value | -100.0%~ 100.0% | 0.0% | 0x1214 | ○ |
| P12.21 | AI1 input offset | -100.0%~ 100.0% | 0.0% | 0x1215 | ○ |
| P12.22 | AI1 input gain | -2.000~ 2.000 | 1.000 | 0x1216 | ○ |
| P12.23 | AI1 input filtering | 0.000s~ 10.000s | 0.050s | 0x1217 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|--|------------------|----------|----------|------|
| | time | | | | |
| P12.24 | AI2 input offset | -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 | ○ |
| P12.27 | AI3 input offset | -100.0%~100.0% | 0.0% | 0x121B | ○ |
| P12.28 | AI3 input gain | -2.000~2.000 | 1.000 | 0x121C | ○ |
| P12.29 | AI3 input filtering time | 0.000s~10.000s | 0.050s | 0x121D | ○ |
| P12.33 | HDI Max. input frequency | P12.35~100.00kHz | 10.00kHz | 0x1221 | ○ |
| P12.34 | HDI Max. input corresponding level value | -100.0%~100.0% | 100.0% | 0x1222 | ○ |
| P12.35 | HDI Min. input frequency | 0.00kHz~P12.33 | 0.00kHz | 0x1223 | ○ |
| P12.36 | HDI Min. input corresponding level value | -100.0%~100.0% | 0.0% | 0x1224 | ○ |
| P12.37 | HDI input filtering time | 0.000s~1.000s | 0.001s | 0x1225 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|---|------------------------------------|---|----------|----------|------|
| P13 Analog output AO and High Speed Pulse output HDO | | | | | |
| P13.00 | AO1 output function selection | 00: no output 01: Preset frequency 02: Output frequency 03: Output current (relative to inverter) 04: Output torque (absolute value) 05: output voltage 06: bus voltage 07: output power 08: AI1 input 09: AI2 input 10: AI3 input 11: pulse output (0-50kHz) 12: motor current 13: output torque (relative value) 14: torque command | 2 | 0x1300 | ○ |
| P13.01 | AO2 output function selection | | 1 | 0x1301 | ○ |
| P13.02 | HDO output function selection | | 0 | 0x1302 | ○ |
| P13.03 | AO1 output offset | -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 offset | -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~100.00kHz | 10.00kHz | 0x1309 | ○ |
| P13.10 | HDO output zero point selection | 0: starts from 0 1: starts from center point (P13.09)/2. When frequency is higher than center point value, it corresponds to positive measuring range of the chosen function | 0 | 0x130A | ● |
| P13.11 | HDO output filtering time | 0.000s~10.000s | 0.0s | 0x130B | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--|--|---|---------|----------|------|
| P20 Operation panel (keypad) Setting Parameters | | | | | |
| P20.00 | Password setting | 00000~65535 | 00000 | 0x2000 | ○ |
| P20.01 | LCD brightness | 10%~100% | 80% | 0x2001 | ● |
| P20.02 | LCD language | 0: Chinese 1: English | 0 | 0x2002 | ● |
| P20.03 | Function parameters modification protection | 0: All function codes are allowed to be modified 1: Only P20.00 and P20.03 are allowed to be modified | 0 | 0x2003 | ● |
| P20.04 | Function code initialization | 0: no operation 1: Reset to factory default (Except motor parameters) 2: Reset to factory default (Including motor parameters) 3: Clear fault history record (Reserved) | 0 | 0x2004 | ● |
| P20.05 | Copy of Parameters | 0: No operation 1: Parameters upload 2: Parameters download (except motor parameters) 3: Parameters download (including motor parameters) | 0 | 0x2005 | ● |
| P20.06 | Keypad lock function | 0: no lock 1: all keys locked 2: keys locked except Loc/Rem 3: keys locked except Start/Stop | 0 | 0x2006 | ● |
| P20.08 | Loc/Rem key function selection | 0: no function 1: Run command source switching 2: Jog forward 3: Jog reverse 4: FWD/REV running switching | 2 | 0x2008 | ● |
| P20.09 | ▲/▼ keys and Up/Dn terminal regulation setting | Ones: Action at stop 0: Up/Dn value clearance at stop 1: Up/Dn value maintained at stop Tens: Action at power failure 0: Up/Dn value clearance at power failure 1: Up/Dn value maintained at | 1011 | 0x2009 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|---------------------------------------|------------------------------------|---|----------|----------|------|
| | | power failure Hundreds: Up/Dn tuning rate selection 0: Automatic rate 1: Customized rate 2: Frequency setting Up/Dn invalid Thousands: PID digital setting value Up/Down 0: Forbidden 1: Allowed | | | |
| P20.10 | Manual Up/Down tuning rate | 0.00Hz/s~10.00Hz/s | 1.00Hz/s | 0x200A | ○ |
| P21 Display Setting Parameters | | | | | |
| P21.00 | Running state displayed parameter1 | 00: No display 01: Running frequency 02: Preset frequency | 1 | 0x2100 | ○ |
| P21.01 | Running state displayed parameter2 | 03: Output frequency 04: Synchronous frequency 05: Speed measuring frequency | 11 | 0x2101 | ○ |
| P21.02 | Running state displayed parameter3 | 06: Reserved 07: Preset rotary speed 08: Running rotary speed | 9 | 0x2102 | ○ |
| P21.03 | Running state displayed parameter4 | 09: Bus voltage 10: Output voltage 11: Output current 12: Output power | 0 | 0x2103 | ○ |
| P21.04 | Stop state displayed parameter1 | 13: Output torque 14: Preset torque 15: AI1 voltage | 2 | 0x2104 | ○ |
| P21.05 | Stop state displayed parameter2 | 16: AI2 voltage 17: AI3 voltage 18: Reserved | 9 | 0x2105 | ○ |
| P21.06 | Stop state displayed parameter3 | 19: AO1 voltage 20: AO2 voltage 21: HDI input frequency 22: HDO output frequency | 0 | 0x2106 | ○ |
| P21.07 | Stop state displayed parameter4 | 23: Input terminal 24: Output terminal 25: Inverter state 26: Heatsink temperature | 0 | 0x2107 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--|-------------|--|---------|----------|------|
| | | 27: Motor temperature 28: PID preset value 29: PID feedback value 30: PID error 31: PLC stage 32: Main frequency setting channel 33: Auxiliary frequency setting channel 34: Main channel preset frequency 35: Auxiliary channel preset frequency 36: External count number 37: Preset length 38: Run length 39: Running linear velocity | | | |
| P23 Communication Free Mapping Configuration Parameters | | | | | |
| P23.00 | Source ID0 | 0x0000~0xFFFF | 0000 | 0x2300 | ● |
| P23.01 | Mapping ID0 | 0x0000~0xFFFF | 0000 | 0x2301 | ● |
| P23.02 | Source ID1 | 0x0000~0xFFFF | 0000 | 0x2302 | ● |
| P23.03 | Mapping ID1 | 0x0000~0xFFFF | 0000 | 0x2303 | ● |
| P23.04 | Source ID2 | 0x0000~0xFFFF | 0000 | 0x2304 | ● |
| P23.05 | Mapping ID2 | 0x0000~0xFFFF | 0000 | 0x2305 | ● |
| P23.06 | Source ID3 | 0x0000~0xFFFF | 0000 | 0x2306 | ● |
| P23.07 | Mapping ID3 | 0x0000~0xFFFF | 0000 | 0x2307 | ● |
| P23.08 | Source ID4 | 0x0000~0xFFFF | 0000 | 0x2308 | ● |
| P23.09 | Mapping ID4 | 0x0000~0xFFFF | 0000 | 0x2309 | ● |
| P23.10 | Source ID5 | 0x0000~0xFFFF | 0000 | 0x230A | ● |
| P23.11 | Mapping ID5 | 0x0000~0xFFFF | 0000 | 0x230B | ● |
| P23.12 | Source ID6 | 0x0000~0xFFFF | 0000 | 0x230C | ● |
| P23.13 | Mapping ID6 | 0x0000~0xFFFF | 0000 | 0x230D | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|--------------|---------------|---------|----------|------|
| P23.14 | Source ID7 | 0x0000~0xFFFF | 0000 | 0x230E | ● |
| P23.15 | Mapping ID7 | 0x0000~0xFFFF | 0000 | 0x230F | ● |
| P23.16 | Source ID8 | 0x0000~0xFFFF | 0000 | 0x2310 | ● |
| P23.17 | Mapping ID8 | 0x0000~0xFFFF | 0000 | 0x2311 | ● |
| P23.18 | Source ID9 | 0x0000~0xFFFF | 0000 | 0x2312 | ● |
| P23.19 | Mapping ID9 | 0x0000~0xFFFF | 0000 | 0x2313 | ● |
| P23.20 | Source ID10 | 0x0000~0xFFFF | 0000 | 0x2314 | ● |
| P23.21 | Mapping ID10 | 0x0000~0xFFFF | 0000 | 0x2315 | ● |
| P23.22 | Source ID11 | 0x0000~0xFFFF | 0000 | 0x2316 | ● |
| P23.23 | Mapping ID11 | 0x0000~0xFFFF | 0000 | 0x2317 | ● |
| P23.24 | Source ID12 | 0x0000~0xFFFF | 0000 | 0x2318 | ● |
| P23.25 | Mapping ID12 | 0x0000~0xFFFF | 0000 | 0x2319 | ● |
| P23.26 | Source ID13 | 0x0000~0xFFFF | 0000 | 0x231A | ● |
| P23.27 | Mapping ID13 | 0x0000~0xFFFF | 0000 | 0x231B | ● |
| P23.28 | Source ID14 | 0x0000~0xFFFF | 0000 | 0x231C | ● |
| P23.29 | Mapping ID14 | 0x0000~0xFFFF | 0000 | 0x231D | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--|---|--|---------|----------|------|
| P30 Fault and Protection Parameters | | | | | |
| P30.00 | Cooling fan control | 0: Automatic control 1: Working right after power-on 2: Stop working immediately after inverter stop | 0 | 0x3000 | ○ |
| P30.01 | Motor thermal protection selection | Ones place: motor thermal protection 0: forbidden 1: enabled Tens place: sensor type 0: temperature sensor PT100 1: temperature sensor PT1000 Hundreds place: Analog channel 0: Analog input AI1 1: Analog input AI2 | 000 | 0x3001 | ● |
| P30.02 | Motor overheat detection value | 0.0~200.0°C | 85.0°C | 0x3002 | ● |
| P30.03 | Inverter overload pre-alarm detection selection | Ones place: Overload pre-alarm detection selection 0: always check during running 1: detection at constant speed operation only Tens place: Overload pre-alarm detection level selection 0: detection level is relative to rated current of motor 1: detection level is relative to rated current of variable frequency drive Hundreds place: Overload pre-alarm protection validation 0: overload pre-alarm disabled 1: overload pre-alarm enabled | 000 | 0x3003 | ● |
| P30.04 | Detection level of overload | 20.0%~200.0% | 160.0% | 0x3004 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|--|---|---------|----------|------|
| | pre-alarm | | | | |
| P30.05 | Overload pre-alarm detection time | 0.0s~60.0s | 5.0s | 0x3005 | ● |
| P30.06 | Inverter output side load loss detection | 0: Inverter output side load loss detection invalid 1: Always detect during running (Continue running) 2: Only detect during constant speed (continue running) 3: Always detect during running (freewheeled stop) 4: Only detect during constant speed (freewheeled stop) | 0 | 0x3006 | ● |
| P30.07 | Inverter output side load loss detection level | 0.0%~100.0% | 30.0% | 0x3007 | ● |
| P30.08 | Inverter output side load loss detection time | 0.0s~3600.0s | 1.0s | 0x3008 | ● |
| P30.09 | Automatic reset time(s) | 0~100 0 means automatic reset invalid | 0 | 0x3009 | ● |
| P30.10 | Automatic reset interval | 0.1s~100.0s | 1.0s | 0x300A | ● |
| P30.11 | Fault relay action selection | Ones place: action during automatic reset 0: Active 1: No action Tens place: action during under-voltage 0: Active 1: No action | 00 | 0x300B | ● |
| P30.12 | Option of enhanced protection functions | Ones place: output phase loss detection 0: disabled 1: enabled Tens place: input phase loss detection 0: disabled 1: enabled | 101 | 0x300C | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|-----------------------------------|---|---------|----------|------|
| | | Hundreds place: motor overload detection 0: disabled 1: enabled | | | |
| P30.13 | Fault history record saving | 0: fault history reset at power failure 1: fault history saved at power failure | 1 | 0x300D | ● |
| P30.14 | Fault protection action options 1 | Ones place: EEPROM read/write fault 0: continue running 1: freewheeled stop Tens place: system interference fault 0: continue running 1: freewheeled stop Hundreds place: contactor actuation fault 0: continue running 1: freewheeled stop Thousands place: current detection fault 0: continue running 1: freewheeled stop | 1111 | 0x300E | ● |
| P30.15 | Fault protection action options 2 | Ones place: Inverter overheat 0: continue running 1: freewheeled stop Tens place: encoder fault 0: continue running 1: freewheeled stop Hundreds place: motor overheating fault 0: continue running 1: freewheeled stop Thousands place: system self-defined 0: continue running 1: freewheeled stop | 1111 | 0x300F | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|---|---|--|---------|----------|------|
| P40 Process PID Control Parameters | | | | | |
| P40.00 | PID reference setting channel selection | 0: digital setting in P40.01 1: setting by analog input AI1 2: setting by analog input AI2 3: setting by analog input AI3 4: Min[AI1,AI2] 5: Max[AI1,AI2] 6: Sub[AI1,AI2] 7: Add[AI1,AI2] 8: Setting by pulse input HDI | 0 | 0x4000 | ● |
| P40.01 | PID digital setting value | 0.0%~100.0% | 50.0% | 0x4001 | ○ |
| P40.02 | PID feedback channel selection | 0: Constant zero feedback 1: feedback by analog input AI1 2: feedback by analog input AI2 3: feedback by analog input AI3 4: Min[AI1,AI2] 5: Max[AI1,AI2] 6: Sub[AI1,AI2] 7: Add[AI1,AI2] 8: feedback by pulse input 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 parameters switching method | 0: use Kp1、Ki1 and Kd1 only (no switching) 1: Switching according to input bias value 2: Switching by terminal | 0 | 0x4009 | ● |
| P40.10 | Input bias value for PID switching | 0.0%~100.0% | 20.0% | 0x400A | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|--------------------------------------|--|---------|----------|------|
| P40.11 | PID regulating selection | <p>Ones place: Output frequency 0: shall be same as preset running direction 1: could be reversed to preset running direction</p> <p>Tens place: Integral mode 0: Integral regulating continues when it reaches upper/lower limit 1: Integral regulating stops when it reaches upper/lower limit</p> | 11 | 0x400B | ● |
| P40.12 | PID positive and negative effect | 0: Positive effect 1: Negative effect | 0 | 0x400C | ● |
| P40.13 | PID giving 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 tolerance | 0.0%~100.0% | 0.0% | 0x4011 | ○ |
| P40.18 | Differential amplitude 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 | ○ |
| P40.21 | PID operation output maximum value | 0.0%~100.0% | 100.0% | 0x4015 | ○ |
| P40.22 | PID reverse output cutoff frequency | 0.00Hz~ Freq. upper limit | 0.00Hz | 0x4016 | ○ |
| P40.23 | PID operator selection at stop state | 0: no PID operating at stop state 1: PID operating at stop state | 0 | 0x4017 | ● |
| P40.24 | PID reference loss detection | 0.0%~100.0% | 0.0% | 0x4018 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|---|---------|----------|------|
| | level | | | | |
| P40.25 | PID reference loss detection time | 0.00s~30.00s 0.00s: PID reference loss detection invalid | 1.00s | 0x4019 | ● |
| P40.26 | PID feedback loss detection level | 0.0%~100.0% | 0.0% | 0x401A | ● |
| P40.27 | PID feedback loss detection time | 0.00s~30.00s 0.00s: PID feedback loss detection invalid | 1.00s | 0x401B | ● |
| P40.28 | PID signal loss stop mode | 0: Freewheeled stop 1: Emergency stop | 0 | 0x401C | ○ |
| P40.29 | Zero frequency upper threshold | P40.30~ Freq. upper limit | 0.00Hz | 0x401D | ● |
| P40.30 | Zero frequency lower threshold | 0.00Hz~P40.29 | 0.00Hz | 0x401E | ● |
| P40.31 | Dormancy waking up mode | 0: Waking up by frequency threshold (parameters setting in P40.29 and P40.30) 1: Waking up by pressure threshold (parameters setting in P40.32 and P40.34) | 0 | 0x401F | ● |
| P40.32 | Dormancy pressure detection value | P40.34~P40.37 | 1000 | 0x4020 | ● |
| P40.33 | Dormancy detection delay time | 0.00s~30.00s Valid for both frequency and pressure detection modes | 1.00s | 0x4021 | ● |
| P40.34 | Waking up pressure value | 0~P40.32 | 0 | 0x4022 | ● |
| P40.35 | Waking up detection delay time | 0.00s~30.00s Valid for both frequency and pressure detection modes | 0.50s | 0x4023 | ● |
| P40.37 | PID reference and feedback pressure measuring range | 0~10000 | 1000 | 0x4025 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|---------------------------------|--|--|---------|----------|------|
| P41 Multi-step Frequency | | | | | |
| P41.00 | Multi-step digital setting 1 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4100 | ○ |
| P41.01 | Multi-step digital setting 2 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4101 | ○ |
| P41.02 | Multi-step digital setting 3 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4102 | ○ |
| P41.03 | Multi-step digital setting 4 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4103 | ○ |
| P41.04 | Multi-step digital setting 5 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4104 | ○ |
| P41.05 | Multi-step digital setting 6 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4105 | ○ |
| P41.06 | Multi-step digital setting 7 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4106 | ○ |
| P41.07 | Multi-step digital setting 8 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4107 | ○ |
| P41.08 | Multi-step digital setting 9 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4108 | ○ |
| P41.09 | Multi-step digital setting 10 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x4109 | ○ |
| P41.10 | Multi-step digital setting 11 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x410A | ○ |
| P41.11 | Multi-step digital setting 12 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x410B | ○ |
| P41.12 | Multi-step digital setting 13 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x410C | ○ |
| P41.13 | Multi-step digital setting 14 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x410D | ○ |
| P41.14 | Multi-step digital setting 15 | Freq. lower limit ~ Freq. upper limit | 0.00Hz | 0x410E | ○ |
| P41.15 | Multi-step frequency 1 setting channel | 0: Digital setting P41.00 1: Analog input AI1 2: Analog input AI2 3: Analog input AI3 4: Min[AI1,AI2] 5: Max[AI1,AI2] 6: Sub[AI1,AI2] 7: Add[AI1,AI2] | 0 | 0x410F | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------------------|-------------------------------------|--|------------|----------|------|
| | | 8: Pulse setting by HDI 9: Process PID | | | |
| P42 Simple PLC | | | | | |
| P42.00 | Simple PLC operation mode selection | <p>Ones place: Simple PLC running mode 0: Run a single cycle and stop 1: Run a single cycle and maintain final value 2: Continuous cycle running</p> <p>Tens place: Simple PLC starting mode 0: Start from stage-1 1: Start from frequency of the interrupted stage</p> <p>Hundreds place: Simple PLC saving options at power failure 0: Reset at power failure 1: Saved at power failure</p> <p>Thousands place: Simple PLC time unit 0: Second (s) 1: Minute (min)</p> | 0000 | 0x4200 | ● |
| P42.01 | PLC stage 1 setting | <p>Ones place: Stage running direction of simple PLC 0: Forward 1: Reverse</p> <p>Tens place: Stage Acc./Dec. time of simple PLC 0: Acc./Dec. time 1 1: Acc./Dec. time 2 2: Acc./Dec. time 3 3: Acc./Dec. time 4</p> | 00 | 0x4201 | ● |
| P42.02 | Stage 1 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4202 | ○ |
| P42.03 | PLC stage 2 setting | Refer to stage 1 setting | 00 | 0x4203 | ● |
| P42.04 | Stage 2 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4204 | ○ |
| P42.05 | PLC stage 3 setting | Refer to stage 1 setting | 00 | 0x4205 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|-----------------------|---------------------------|------------|----------|------|
| P42.06 | Stage 3 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4206 | ○ |
| P42.07 | PLC stage 4 setting | Refer to stage 1 setting | 00 | 0x4207 | ● |
| P42.08 | Stage 4 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4208 | ○ |
| P42.09 | PLC stage 5 setting | Refer to stage 1 setting | 00 | 0x4209 | ● |
| P42.10 | Stage 5 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x420A | ○ |
| P42.11 | PLC stage 6 setting | Refer to stage 1 setting | 00 | 0x420B | ● |
| P42.12 | Stage 6 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x420C | ○ |
| P42.13 | PLC stage 7 setting | Refer to stage 1 setting | 00 | 0x420D | ● |
| P42.14 | Stage 7 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x420E | ○ |
| P42.15 | PLC stage 8 setting | Refer to stage 1 setting | 00 | 0x420F | ● |
| P42.16 | Stage 8 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4210 | ○ |
| P42.17 | PLC stage 9 setting | Refer to stage 1 setting | 00 | 0x4211 | ● |
| P42.18 | Stage 9 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4212 | ○ |
| P42.19 | PLC stage 10 setting | Refer to stage 1 setting | 00 | 0x4213 | ● |
| P42.20 | Stage 10 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4214 | ○ |
| P42.21 | PLC stage 11 setting | Refer to stage 1 setting | 00 | 0x4215 | ● |
| P42.22 | Stage 11 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4216 | ○ |
| P42.23 | PLC stage 12 setting | Refer to stage 1 setting | 00 | 0x4217 | ● |
| P42.24 | Stage 12 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x4218 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--|-------------------------------------|--|------------|----------|------|
| P42.25 | PLC stage 13 setting | Refer to stage 1 setting | 00 | 0x4219 | ● |
| P42.26 | Stage 13 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x421A | ○ |
| P42.27 | PLC stage 14 setting | Refer to stage 1 setting | 00 | 0x421B | ● |
| P42.28 | Stage 14 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x421C | ○ |
| P42.29 | PLC stage 15 setting | Refer to stage 1 setting | 00 | 0x421D | ● |
| P42.30 | Stage 15 running time | 0.0s (min) ~3276.7s (min) | 0.0s (min) | 0x421E | ○ |
| P43 Fixed length control and Linear Velocity Parameters | | | | | |
| P43.00 | Preset count number | 1~65535 | 1000 | 0x4300 | ● |
| P43.01 | Specified count number | 1~ P43.00(Preset count number) | 1000 | 0x4301 | ● |
| P43.02 | Length arrival action selection | Ones place: Length arrival 0: Continue running 1: Stop Tens place: Length unit 0: meter 1: 10 meters Hundreds place: Length clearance at stop state 0: Invalid 1: Action Thousands place: The count stops and is reset to zero 0: Invalid 1: Action | 0000 | 0x4302 | ● |
| P43.03 | Preset length | 0m~65535m | 0m | 0x4303 | ● |
| P43.04 | Pulse number per meter | 0.1~6553.5 | 1000.0 | 0x4304 | ● |
| P43.05 | Linear velocity display coefficient | 0.0%~1000.0% | 0.0% | 0x4305 | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--|-----------------------------------|--|---------|----------|------|
| P44 Lifting Function Parameters (Special Lifting Model) | | | | | |
| P44.00 | Selection of lifting mechanism | Ones: Mechanism Selection 0: Prohibited 1: Elevate Mechanism 2: Conical Motor 3: Linear Mechanism Tens: Reserve | 00 | 0x4400 | ● |
| P44.01 | Upstream release frequency | 0.00Hz~10.00Hz | 2.00Hz | 0x4401 | ● |
| P44.02 | Upstream release current | 0.0%~200.0% | 30.0% | 0x4402 | ● |
| P44.03 | Downward release frequency | 0.00Hz~10.00Hz | 3.00Hz | 0x4403 | ● |
| P44.04 | Downstream release current | 0.0%~200.0% | 30.0% | 0x4404 | ● |
| P44.05 | Relaxation frequency holding time | 0.0s~10.0s | 0.5s | 0x4405 | ● |
| P44.06 | Upward brake frequency | 0.00Hz~10.00Hz | 2.00Hz | 0x4406 | ● |
| P44.07 | Downward brake frequency | 0.00Hz~10.00Hz | 3.00Hz | 0x4407 | ● |
| P44.08 | Brake holding time | 0.0s~10.0s | 0.5s | 0x4408 | ● |
| P44.09 | Brake hold-off time | 0.0s~10.0s | 0.0s | 0x4409 | ● |
| P44.10 | Downtime delay time | 0.0s~10.0s | 0.5s | 0x440A | ● |
| P44.11 | Start direction control selection | 0: The release torque is in the same direction as the operation direction. 1: The release torque is always in the positive direction. | 0 | 0x440B | ● |
| P44.12 | Reverse selection of instructions | 0: Direct reversal of the running process is not permitted. 1: Direct reversal of the running process is permitted. | 0 | 0x440C | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|--|---|--|---------|----------|------|
| P50 Modbus Communication Parameters | | | | | |
| P50.00 | Local address | 0~247; 0: Broadcast address | 1 | 0x5000 | ○ |
| P50.01 | Communication baud rate selection | Ones place: terminal port communication baud rate Tens place: Keypad port communication baud rate 0: 4800bps 1: 9600bps 2: 19200bps 3: 38400bps 4: 57600bps 5: 115200bps | 31 | 0x5001 | ○ |
| P50.02 | Data format | Ones place: Terminal port data format Tens place: 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 | 00 | 0x5002 | ○ |
| P50.03 | Local response delay | 0.000s~60.000s | 0.000s | 0x5003 | ○ |
| P50.04 | Overtime detection time | 0.0s~600.0s 0.0s: no overtime detection | 0.0s | 0x5004 | ○ |
| P50.05 | Communication error response masking selection | Ones place: terminal port error response masking(screening) Tens place: keypad port error response masking(screening) 0: valid 1: invalid | 00 | 0x5005 | ○ |
| P50.06 | Master-follower mode selection and follower function code setting | Ones place: Terminal port communication master/follower selection 0: Operate stand-alone 1: Operate as Master 2: Operate as Follower Tens place: Terminal port | 0000 | 0x5006 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|---|---------|----------|------|
| | | communication operation address 0: Frequency setting 1: PID target quantity setting | | | |
| P50.07 | Master data operation time interval | 0.010s~1.000s | 0.050s | 0x5007 | ○ |
| P50.08 | Follower received data proportional coefficient | 0.00~10.00 | 1.00 | 0x5008 | ○ |
| P50.11 | Communication special functions | Ones place: 0: communication written parameters are not saved. 1: communication written parameters are saved. Tens place: 0: Register mapping function disabled 1: Register mapping function enabled | 0x0000 | 0x500B | ○ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-------------------------------------|-------------------------------------|---|------------------|----------|------|
| P60 Motor Control Parameters | | | | | |
| P60.00 | Carrier frequency | ≤ 15kW: 1.0kHz~16.0kHz, Default value: 6.0kHz 18.5kW-45kW: 1.0kHz~10.0kHz Default value: 4.0kHz 55kW-75kW: 1.0kHz~8.0kHz Default value: 3.0kHz ≥ 90kW: 1.0kHz~3.0kHz, Default value: 2.0kHz | Depends on model | 0x6000 | ○ |
| P60.01 | Carrier frequency adjustment option | Ones place: Random carrier frequency. Only used in asynchronous motor scalar control. Noise is relatively large. 0: Random carrier frequency disabled 1: Random carrier frequency enabled Tens place: Carrier frequency varying with temperature 0: carrier frequency varying temperature 1: Preset carrier frequency Hundreds place: Carrier frequency automatic switching according to running frequency 0: carrier frequency switching enabled. 1: carrier frequency switching disabled | 000 | 0x6001 | ● |
| P60.02 | Pulse width modulation mode | 0: three phase modulation 1: automatic switching | 0 | 0x6002 | ● |
| P60.03 | DPWM switching frequency | 5.00Hz~ Max. frequency | 8.00Hz | 0x6003 | ● |
| P60.04 | Magnetic flux brake selection | 0: disabled 1: enabled | 1 | 0x6004 | ● |
| P60.05 | Energy consumption brake selection | 0: disabled 1: enabled | 0 | 0x6005 | ● |
| P60.06 | Energy consumption brake activation | 650V~750V | 720V | 0x6006 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|--|---------|----------|------|
| | voltage | | | | |
| P60.07 | speed adjusting for suppressing over-voltage | 0: disabled 1: enabled | 1 | 0x6007 | ● |
| P60.08 | Activation voltage for oV suppression speed adjusting | 100.0%~150.0% (corresponds to rated DC bus voltage) | 135.0% | 0x6008 | ● |
| P60.09 | speed adjusting for countering under-voltage | 0: disabled 1: enabled | 0 | 0x6009 | ● |
| P60.10 | Activation voltage for uV countering speed adjusting | 50.0%~95.0% (corresponds to rated DC bus voltage) | 85.0% | 0x600A | ● |
| P60.11 | Current limit action selection | 0: disabled 1: enabled | 1 | 0x600B | ● |
| P60.12 | Current limit level | 20.0%~200.0% (relative to inverter rated current) | 160.0% | 0x600C | ● |
| P60.13 | Slip compensation gain | 0.0~300.0% | 100.0% | 0x600D | ○ |
| P60.14 | Frequency resolution selection | 0: 0.01Hz (Maximum frequency 300Hz and below) 1: 0.1Hz (300Hz-1500Hz) | 0 | 0x600E | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-------------------------------|--------------------------------------|---|---------|----------|------|
| P61 Encoder Parameters | | | | | |
| P61.00 | Speed feedback encoder type | 0: Incremental encoder (without UVW hall sensor) 1: Incremental encoder (with UVW hall sensor) 2: Resolver encoder 3: Sine encoder | 0 | 0x6100 | ☆ |
| P61.01 | Encoder resolution | 1~10000 | 1024 | 0x6101 | ☆ |
| P61.02 | Electric angle offset | 0.00° ~359.99° | 0.00° | 0x6102 | ☆ |
| P61.03 | Encoder signal phase | 0: Normal, i.e. A phase leads B phase in forward running 1: Reverse, i.e. B phase leads A phase in forward running | 0 | 0x6103 | ☆ |
| P61.04 | Numerator of electronic gear ratio | 1~65535 | 1000 | 0x6104 | ☆ |
| P61.05 | Denominator of electronic gear ratio | 1~65535 | 1000 | 0x6105 | ☆ |
| P61.06 | Resolver pole pairs number | 1~32 | 1 | 0x6106 | ☆ |
| P61.07 | Sine signal offset | 1~65535 | 0 | 0x6107 | ☆ |
| P61.08 | Cosine signal offset | 1~65535 | 0 | 0x6108 | ☆ |
| P61.09 | Sine signal gain | 1~8192 | 4096 | 0x6109 | ☆ |
| P61.10 | Cosine signal gain | 1~8192 | 4096 | 0x610A | ☆ |
| P61.11 | Over-speed detection level | 0.0%~120.0% | 120.0% | 0x610B | ☆ |
| P61.12 | Over-speed detection time | 0.00s~20.00s | 0.00s | 0x610C | ☆ |
| P61.13 | Over-deviation detection level | 0.0%~50.0% | 10.0% | 0x610D | ☆ |
| P61.14 | Over-deviation detection time | 0.00s~20.00s | 0.00s | 0x610E | ☆ |
| P61.15 | Off-line detection time | 0.0s~8.0s | 0.0s | 0x610F | ☆ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|---|--|--------------------|------------------|----------|------|
| P62 Motor Characteristics Parameters | | | | | |
| P62.00 | Asynchronous motor stator resistance | 0.001 Ω ~ 65.000 Ω | Depends on model | 0x6200 | ● |
| P62.01 | Asynchronous motor rotor resistance | 0.001 Ω ~ 65.000 Ω | Depends on model | 0x6201 | ● |
| P62.02 | Asynchronous motor leakage inductance | 0.01mH~650.00mH | Depends on model | 0x6202 | ● |
| P62.03 | Asynchronous motor mutual inductance | 0.01mH~650.00mH | Depends on model | 0x6203 | ● |
| P62.04 | Asynchronous motor no-load current | 0.1A~P63.02 | Depends on model | 0x6204 | ● |
| P62.05 | Asynchronous motor stator resistance high level | 0~65535 | Depends on model | 0x6205 | ● |
| P62.06 | Asynchronous motor rotor resistance high level | 0~65535 | Depends on model | 0x6206 | ● |
| P62.07 | Asynchronous motor leakage inductance high level | 0~65535 | Depends on model | 0x6207 | ● |
| P62.08 | Asynchronous motor mutual inductance high level | 0~65535 | Depends on model | 0x6208 | ● |
| P62.09 | Synchronous motor stator resistance | 0.001 Ω ~ 65.000 Ω | Depends on model | 0x6209 | ● |
| P62.10 | Synchronous motor direct axis inductance | 0.01mH~650.00mH | Depends on model | 0x620A | ● |
| P62.11 | Synchronous motor quadrature axis inductance | 0.01mH~650.00mH | Depends on model | 0x620B | ● |
| P62.12 | Synchronous | 0.1V~2000.0V | Depends on model | 0x620C | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|--|------------------|----------|------|
| | motor counter EMF | | | | |
| P62.13 | Synchronous motor stator resistance high level | 0~65535 | Depends on model | 0x620D | ● |
| P62.14 | Synchronous motor direct axis inductance high level | 0~65535 | Depends on model | 0x620E | ● |
| P62.15 | Synchronous motor quadrature axis inductance high level | 0~65535 | Depends on model | 0x620F | ● |
| P62.16 | Synchronous motor field-weakening mode | 0: no field-weakening function 1: Automatic regulating mode 2: Direct calculation mode | 0 | 0x6210 | ● |
| P62.17 | Synchronous motor field-weakening gain | 0.0%~100.0% | 10.0% | 0x6211 | ● |
| P62.18 | Synchronous motor initial angle detection mode | 0: Detection disabled 1: Detection in each time of run 2: Detection in first time of run after powered up | 1 | 0x6212 | ● |
| P62.19 | Synchronous motor initial angle detection current | 30.0%~100.0% | 100.0% | 0x6213 | ● |
| P62.20 | Synchronous motor Max. torque/current ratio | Ones place: Maximum torque/current ratio 0: Disabled 1: Enabled Tens place: Reserved Hundreds place: Reserved Thousands place: Synchronous motor current loop adjustment 0: Current decoupling mode 1 1: Current decoupling mode 2 | 0 | 0x6214 | ● |
| P62.21 | Synchronous | 50.0%~500.0% | 100.0% | 0x6215 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|---------------------------------------|---|---|------------------|----------|------|
| | motor salient pole ratio adjusting gain | | | | |
| P62.22 | Synchronous motor inductance detection current | 30.0%~120.0% | 80.0% | 0x6216 | ● |
| P62.23 | Synchronous motor running excitation current | 0.0%~P62.24 | 0.0% | 0x6217 | ● |
| P62.24 | Synchronous motor low speed excitation current | P62.23~120.0% | 30.0% | 0x6218 | ● |
| P62.25 | Synchronous motor low speed switching frequency | 0.0%~100.0% | 20.0% | 0x6219 | ● |
| P63 Motor Nameplate Parameters | | | | | |
| P63.00 | Motor rated power | 0.2kW~6000.0kW | Depends on model | 0x6300 | ● |
| P63.01 | Motor rated voltage | 1V~480V | 380V | 0x6301 | ● |
| P63.02 | Motor rated current | 0.1A~6000.0A | Depends on model | 0x6302 | ● |
| P63.03 | Motor rated frequency | 10.00Hz~300.00Hz | 50.00Hz | 0x6303 | ● |
| P63.04 | Motor rated rotary speed | 1~65535rpm | 1500rpm | 0x6304 | ● |
| P63.05 | Motor pole number | 2~80 | 4 | 0x6305 | ● |
| P63.06 | Motor type | 0: Asynchronous motor 1: PM synchronous motor | 0 | 0x6306 | ● |
| P63.07 | Motor parameters autotune | 0: No autotune 1: Static autotune 2: Dynamic autotune | 0 | 0x6307 | ● |
| P63.08 | Motor control mode | 0: Advanced scalar control 1: No-PG vector control (SVC) 2: With-PG vector control (VC) | 0 | 0x6308 | ● |

| Parameter | Description | Setting Range | Default | Register | Flag |
|---|---------------------------|---|--------------|----------|------|
| U00 Status Monitoring Parameters | | | | | |
| U00.00 | Running frequency | 0.00Hz~300.00Hz | Actual value | 0x8100 | ★ |
| U00.01 | Preset frequency | 0.00Hz~300.00Hz | Actual value | 0x8101 | ★ |
| U00.02 | Output frequency | 0.00Hz~300.00Hz | Actual value | 0x8102 | ★ |
| U00.03 | Synchronous frequency | 0.00Hz~300.00Hz | Actual value | 0x8103 | ★ |
| U00.04 | Speed-detection frequency | 0.00Hz~300.00Hz | Actual value | 0x8104 | ★ |
| U00.05 | Reserved | | | 0x8105 | ★ |
| U00.06 | Preset rotary speed | 0rpm~60000rpm | Actual value | 0x8106 | ★ |
| U00.07 | Output rotary speed | 0rpm~60000rpm | Actual value | 0x8107 | ★ |
| U00.08 | DC 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 | Preset 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 | ★ |
| U00.16 | AI3 voltage | -10.00V~10.00V | Actual value | 0x8110 | ★ |
| 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 Bit8~Bit9 corresponds to AI1~AI2 0: input terminal OFF | Actual value | 0x8116 | ★ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|-------------------------------------|---|--------------|----------|------|
| | | 1: input terminal ON | | | |
| U00.23 | Output terminal status | Bit0~Bit1 corresponds to Y1~Y2 Bit2~Bit3 corresponds to R1~R2 0: output terminal OFF 1: output terminal ON | Actual value | 0x8117 | ★ |
| U00.24 | Inverter status | Ones place: Bit0: 1 for running /0 for stop Bit1: 1 for REV /0 for FWD Bit2: 1 for DC brake /0 for no DC brake Bit3: 1 for parameters recognition/0 for no parameters recognition Tens place: 0: Constant speed 1: Acceleration 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 preset value | -100.00%~100.00% | Actual value | 0x811B | ★ |
| U00.28 | PID feedback value | -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 reference channel | 0~11 | Actual value | 0x811F | ★ |
| U00.32 | Auxiliary reference channel | 0~11 | Actual value | 0x8120 | ★ |
| U00.33 | Main frequency reference value | 0.00Hz~300.00Hz | Actual value | 0x8121 | ★ |
| U00.34 | Auxiliary frequency reference value | 0.00Hz~300.00Hz | Actual value | 0x8122 | ★ |
| U00.35 | External count number | 0~65535 | Actual value | 0x8123 | ★ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|--|-------------------|--------------|----------|------|
| U00.36 | Preset length | 0m~65535m | Actual value | 0x8124 | ★ |
| U00.37 | Ran length | 0m~65535m | Actual value | 0x8125 | ★ |
| U00.38 | Running linear velocity | 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 | ★ |
| U00.41 | AI3 sampling value | -10.00V~10.00V | Actual value | 0x8129 | ★ |
| U00.43 | Present fault code | 0~100 | Actual value | 0x812B | ★ |
| U00.44 | Total power-on time | 0h~65535h | Actual value | 0x812C | ★ |
| U00.45 | Total running time | 0h~65535h | Actual value | 0x812D | ★ |
| U00.46 | Motor total electricity consumption data higher digit | 0kW.h~59999kW.h | Actual value | 0x812E | ★ |
| U00.47 | Motor total electricity consumption data lower digit | 0.0kW.h~999.9kW.h | Actual value | 0x812F | ★ |
| U00.48 | This time of running electricity consumption data higher digit | 0kW.h~59999kW.h | Actual value | 0x8130 | ★ |
| U00.49 | This time of running electricity consumption data lower digit | 0.0kW.h~999.9kW.h | Actual value | 0x8131 | ★ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-------------------------------|------------------------------------|---|--------------|----------|------|
| U01 Fault History Data | | | | | |
| U01.00 | The last fault code | 1: Over-current in acceleration 2: Over-current in deceleration 3: Over-current in constant speed 4: Over-voltage in acceleration 5: Over-voltage in deceleration 6: Over-voltage in constant speed 7: Inverter under-voltage 8: Current detection fault 9: System interference fault 10: Module protection fault 11: Motor tuning fault 12: Contactor actuation fault 13: External terminal fault 14: Inverter overheat 15: Motor overheat 16: Inverter overload 17: Motor overload 18: Inverter input phase loss 19: Inverter output phase loss 20: Inverter output load loss 21: Inverter SC to ground 22: EEPROM read/writ fault 23: Communication overtime 24: Power-on time arrival 25: Running time arrival 26: PID reference loss 27: PID feedback loss 28: Speed over-deviation 29: Motor over-speed 30: Encoder fault 31~36: Reserved 37: Speed estimation error 38: Reserved 39: Parameter copy error | Actual value | 0x8200 | ★ |
| 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 | 0.0A~6000.0A | Actual value | 0x8203 | ★ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|-----------------|--------------|----------|------|
| | the last fault | | | | |
| 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 at the last fault | 0x00~0x7F | Actual value | 0x8206 | ★ |
| U01.07 | Output terminal status at the last fault | 0x00~0x7F | Actual value | 0x8207 | ★ |
| U01.08 | Inverter status at the last fault | 0x00~0x2F | Actual value | 0x8208 | ★ |
| U01.09 | Heatsink temperature at the last fault | 0.0℃~120.0℃ | Actual value | 0x8209 | ★ |
| U01.10 | Total running time until the last fault | 0.0h~6553.5h | Actual value | 0x820A | ★ |
| U01.11 | Second to last fault code | As U01.00 | Actual value | 0x820B | ★ |
| U01.12 | Given frequency at second to last fault | 0.00Hz~300.00Hz | Actual value | 0x820C | ★ |
| U01.13 | Output frequency at second to last fault | 0.00Hz~300.00Hz | Actual value | 0x820D | ★ |
| U01.14 | Output current at second to last fault | 0.0A~6000.0A | Actual value | 0x820E | ★ |
| U01.15 | DC bus voltage at second to last fault | 0V~2000V | Actual value | 0x820F | ★ |
| U01.16 | Output voltage at second to last fault | 0V~2000V | Actual value | 0x8210 | ★ |
| U01.17 | Input terminal status at second to last fault | 0x00~0x7F | Actual value | 0x8211 | ★ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|-----------|---|-----------------|--------------|----------|------|
| U01.18 | Output terminal status at second to last fault | 0x00~0x7F | Actual value | 0x8212 | ★ |
| U01.19 | Inverter status at second to last fault | 0x00~0x2F | Actual value | 0x8213 | ★ |
| U01.20 | Heatsink temperature at second to last fault | 0.0℃~120.0℃ | Actual value | 0x8214 | ★ |
| U01.21 | Total running time until second to last fault | 0.0h~6553.5h | Actual value | 0x8215 | ★ |
| U01.22 | Third from last fault code | Same as U01.00 | Actual value | 0x8216 | ★ |
| U01.23 | Given frequency at third from last fault | 0.00Hz~300.00Hz | Actual value | 0x8217 | ★ |
| U01.24 | Output frequency at third from last fault | 0.00Hz~300.00Hz | Actual value | 0x8218 | ★ |
| U01.25 | Output current at third from last fault | 0.0A~6000.0A | Actual value | 0x8219 | ★ |
| U01.26 | DC bus voltage at third from last fault | 0V~2000V | Actual value | 0x821A | ★ |
| U01.27 | Output voltage at third from last fault | 0V~2000V | Actual value | 0x821B | ★ |
| U01.28 | Input terminal status at third from last fault | 0x00~0x7F | Actual value | 0x821C | ★ |
| U01.29 | Output terminal status at third from last fault | 0x00~0x7F | Actual value | 0x821D | ★ |
| U01.30 | Inverter status at third from last fault | 0x00~0x2F | Actual value | 0x821E | ★ |

| Parameter | Description | Setting Range | Default | Register | Flag |
|------------------------------|--|----------------------------|------------------|----------|------|
| U01.31 | Heatsink temperature at third from last fault | 0.0℃～120.0℃ | Actual value | 0x821F | ★ |
| U01.32 | Total running time until third from last fault | 0.0h～6553.5h | Actual value | 0x8220 | ★ |
| U01.33 | Forth from last fault code | Same as U01.00 | Actual value | 0x8221 | ★ |
| U01.34 | Total running time until forth from last fault | 0.0h～6553.5h | Actual value | 0x8222 | ★ |
| U02 VFD Information and Data | | | | | |
| U02.00 | VFD rated power | 0.0kW～6000.0kW | Depends on model | 0x8300 | ★ |
| U02.01 | VFD rated voltage | 0V～2000V | Depends on model | 0x8301 | ★ |
| U02.02 | VFD rated current | 0.0A～6000.0A | Depends on model | 0x8302 | ★ |
| U02.03 | VFD software series | 600: refers to H600 series | Actual value | 0x8303 | ★ |
| U02.04 | VFD function version | 1.00～99.99 | Actual value | 0x8304 | ★ |
| U02.05 | VFD performance version | 1.00～99.99 | Actual value | 0x8305 | ★ |
| U02.06 | Year of production | 2000～2999 | Actual value | 0x8306 | ★ |
| U02.07 | Month and date of production | 01/01～12/31 | Actual value | 0x8307 | ★ |
| U02.08 | Customization series number | 00～9999 | Actual value | 0x8308 | ★ |
| U02.09 | Customization non-standard version | 00～9999 | Actual value | 0x8309 | ★ |
| U02.10 | Keypad software version | 0.00～99.99 | Actual value | 0x830A | ★ |

☆: Indicate that the function is supported on the expansion card

Chapter 5 Detailed Introduction of Parameters

P00 group: Frequency reference setting parameters

| | | | |
|--------|---|---------------------------------------|------------------|
| P00.00 | Main frequency reference digital setting | Range: 0.00Hz ~ Frequency upper limit | Default: 50.00Hz |
| P00.01 | Main frequency reference source selection | Range: 0~C | Default: 0 |

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

1: analog input AI1

2: analog input AI2

3: analog input AI3

Analog AI1 input specification is 0~ 10V or 0~20mA, which can be selected by DIP switches on the control board. Analog AI2/AI3 input specification is 0~ 10V. The corresponding relationship between the analog input and the frequency reference value is defined by the P12 group of parameters.

4: Min [AI1, AI2]

Take the minimum value between AI1 and AI2 analog input as the frequency reference setting source; and the output frequency is limited by the upper and lower limits.

5: Max [AI1, AI2]

Take the maximum value between AI1 and AI2 analog input as the frequency reference setting source; and the output frequency is limited by the upper and lower limits.

6: Sub [AI1, AI2]

Take [AI1-AI2] as the frequency reference value; and the output frequency is limited by the upper and lower limits.

7: Add [AI1, AI2]

Take [AI1+AI2] as the frequency reference value; and the output frequency is limited by the upper and lower limits.

8: pulse setting by HDI

Take the high-speed pulse signal receiving from terminal X7/HDI as the frequency reference, the correspondence between HDI and frequency value 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 reference source, please refer to the P40 group parameter function code for details.

A: simple PLC

The output controlled by 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 is needed for frequency reference setting by this way.

C: no setting

The main frequency reference output is 0.

| | | | |
|--------|--|---------------------------------------|------------------|
| P00.02 | Auxiliary frequency reference digital setting | Range: 0.00Hz ~ Frequency upper limit | Default: 50.00Hz |
| P00.03 | Auxiliary frequency reference source selection | Range: 0~B | Default: B |

0: digital setting (P00.02)

1: analog input AI1

2: analog input AI2

3: analog input AI3

Analog AI1 input specification is 0~ 10V or 0~20mA, which can be selected by DIP switches on the control board. Analog AI2/AI3 input specification is 0~ 10V. The corresponding relationship between the analog input and the frequency reference value is defined by the P12 group of parameters.

4: Min [AI1, AI2]

Take the minimum value between AI1 and AI2 analog input as the frequency reference setting source; and the output frequency is limited by the upper and lower limits.

5: Max [AI1, AI2]

Take the maximum value between AI1 and AI2 analog input as the frequency reference setting source; and the output frequency is limited by the upper and lower limits.

6: Sub [AI1, AI2]

Take [AI1-AI2] as the frequency reference value; and the output frequency is limited by the upper and lower limits.

7: Add [AI1, AI2]

Take [AI1+AI2] as the frequency reference value; and the output frequency is limited by the upper and lower limits.

8: Pulse setting by HDI

Take the high-speed pulse signal receiving from terminal X7/HDI as the frequency reference, the

correspondence between HDI and frequency value is determined by P12.33~P12.36 function codes.

9: Reserved

A: Reserved

B: No setting

| | | | |
|--------|---|--------------------|-----------------|
| P00.04 | Main frequency reference coefficient | Range: 0.0%~200.0% | Default: 100.0% |
| P00.05 | Auxiliary frequency reference coefficient | Range: 0.0%~200.0% | Default: 100.0% |

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

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

the final output value of frequency auxiliary reference = frequency auxiliary setting × P00.05.

| | | | |
|--------|--|------------------|-------------|
| P00.06 | Main and auxiliary frequency reference combination selection | Range: 0x00~0x34 | Default: 00 |
|--------|--|------------------|-------------|

Ones place: Frequency reference mode selection

0: Main frequency reference

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

1: Main and auxiliary frequency setting calculation result

The frequency setting is determined by the calculation result of the main and auxiliary operation, and the main and auxiliary calculation method is determined by the tens-place setting value of this parameter.

2: Switching between main reference setting and auxiliary reference setting

The input terminal could be defined as function "No. 26: Frequency reference source switching (P00.06 ones-place)" to realize the switching between main reference and auxiliary reference value. When this terminal is disabled, the main frequency reference is adopted, otherwise the auxiliary reference is adopted.

3: Switching between main frequency setting and the calculation result of main and auxiliary frequency setting

The input terminal could be defined as function "No. 26: Frequency reference source switching (P00.06 ones-place)" to realize the switching between main reference and the calculation result of main and auxiliary frequency setting. When this terminal is disabled, the MAIN frequency reference is

adopted, otherwise the operation result of main and auxiliary reference is adopted.

4: Switching between auxiliary frequency setting and the calculation result of main and auxiliary frequency setting

The input terminal could be defined as function "No. 26: Frequency reference source switching (P00.06 ones-place)" to realize the switching between auxiliary reference and the calculation result of main and auxiliary frequency setting. When this terminal is disabled, the AUXILIARY frequency reference is adopted, otherwise the operation result of main and auxiliary reference is adopted.

Tens place: Calculation method of main and auxiliary frequency setting

0: Min [main, auxiliary]

Take the smaller one between absolute values of main reference and auxiliary reference as the frequency reference value; and the output frequency is limited by the upper and lower limits.

1: Max [main, auxiliary]

Take the larger one between absolute values of main reference and auxiliary reference as the frequency reference value; and the output frequency is limited by the upper and lower limits.

2: Sub [main, auxiliary]

Subtracting the auxiliary reference value from the main reference value, take the result of it as final frequency reference; and the output frequency is limited by the upper and lower limits.

3: Add [main, auxiliary]

Adding the auxiliary reference value to the main reference value, take the result of it as final frequency reference; and the output frequency is limited by the upper and lower limits.

| | | | |
|--------|-----------------------|--|------------------|
| P00.07 | Max. frequency | Range: 10.00Hz~300.00Hz | Default: 50.00Hz |
| P00.08 | Frequency upper limit | Range: Freq. lower limit ~Max. frequency | Default: 50.00Hz |
| P00.09 | Frequency lower limit | Range: 0.00Hz ~Freq. upper limit | Default: 0.00Hz |

Maximum frequency refers to the highest frequency that the variable frequency drive allows to output.(Note: When the maximum frequency exceeds 300Hz, P60.14 changes to 1)

Frequency upper limit: the allowable highest running frequency that user set according to the actual process technique requirement.

Frequency lower limit: the allowable lowest running frequency that user set according to the actual process technique requirement.

| | | | |
|--------|---------------------------|-----------------------------------|-----------------|
| P00.10 | Frequency jumping point 1 | Range: 0.00Hz ~ Freq. upper limit | Default: 0.00Hz |
| P00.11 | Jumping range 1 | Range: 0.00Hz~30.00Hz | Default: 0.00Hz |
| P00.12 | Frequency jumping point 2 | Range: 0.00Hz ~ Freq. upper limit | Default: 0.00Hz |
| P00.13 | Jumping range 2 | Range: 0.00Hz~30.00Hz | Default: 0.00Hz |
| P00.14 | Frequency jumping point 3 | Range: 0.00Hz ~ Freq. upper limit | Default: 0.00Hz |
| P00.15 | Jumping volume 3 | Range: 0.00Hz~30.00Hz | Default: 0.00Hz |

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

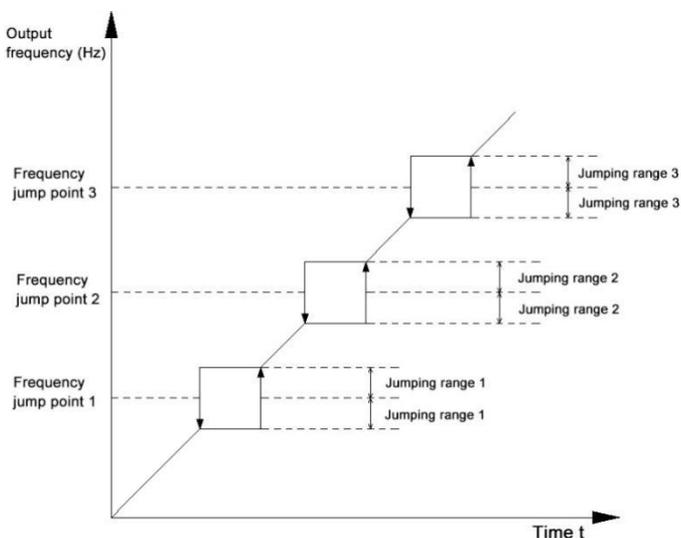


Figure 5-1 Frequency jumping schematic diagram

| | | | |
|--------|-----------------------|----------------------------------|-----------------|
| P00.16 | Jog frequency setting | Range: 0.00Hz~ Freq. upper limit | Default: 5.00Hz |
|--------|-----------------------|----------------------------------|-----------------|

This parameter is to set the running frequency of jogging. The Acc./Dec. time of jogging is determined by P02.09 and P02.10.

P01 group: Start and Stop Control Parameters

| | | | |
|--------|------------------------------|------------|------------|
| P01.00 | Run command source selection | Range: 0~3 | Default: 0 |
|--------|------------------------------|------------|------------|

Select the input channel for the variable frequency drive control commands which include start, stop, forward, reverse, and jogging.

0: Keypad command mode

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

2: Communication command mode

Control the start, stop, forward running, reverse running, and jogging of the drive through communication, please refer to Appendix A for related communication operations. The "MON" light on the keyboard flashes.

3: Multi-step command mode

Control the running commands of the drive by input terminal functions "Multi-step terminal 1 ~ Multi-step terminal 4"

| | | | |
|--------|---|--------------------|--------------|
| P01.01 | Run command source bonds with frequency reference setting | Range: 0x000~0xBBB | Default: 000 |
|--------|---|--------------------|--------------|

This parameter is to bond a specific frequency reference channel to a specific run command mode and thus facilitates the synchronous switching of run command mode and frequency source channel.

Ones place: Frequency reference setting bonded to Keypad run command mode

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

1: analog input AI1

2: analog input AI2

3: analog input AI3

4: Min [AI1, AI2]

5: Max [AI1, AI2]

6: Sub [AI1, AI2]

7: Add [AI1, AI2]

8: pulse setting by HDI

9: process PID

A: simple PLC

B: no bonding

Tens place: Frequency reference setting bonded to Terminal run command mode

Hundreds place: Frequency reference setting bonded to Communication run command mode

Setting range of tens place and hundreds place is the same as that of ones-place. For detailed explanation of frequency reference setting channels, refer to P00.01 function codes

| | | | |
|--------|-----------------------------|------------|------------|
| P01.02 | Running direction selection | Range: 0~1 | Default: 0 |
|--------|-----------------------------|------------|------------|

It is used for changing the rotating direction of the motor when the keyboard controls the running commands. Terminal control and communication control are not controlled by this parameter.

0: Forward running

1: Reverse running

| | | | |
|--------|-------------------------|------------|------------|
| P01.03 | Reverse running control | Range: 0~1 | Default: 0 |
|--------|-------------------------|------------|------------|

For some applications, the reverse rotation of the motor is not allowed. This function code is used to forbid the reverse rotation of the motor. When the actual rotating direction of the motor is opposite to what is required, you may exchange the cables of any two output phases of inverter to make the positive direction of the equipment consistent with the inverter's output direction.

0: Reverse allowed

1: Reverse forbidden

| | | | |
|--------|---------------------------------|---------------------|---------------|
| P01.04 | FWD/REV rotation dead-zone time | Range: 0.0s~3600.0s | Default: 0.0s |
|--------|---------------------------------|---------------------|---------------|

It is used for setting the transition time of the variable frequency drive with 0.00Hz output when the it turns from forward to reverse or from reverse to forward.

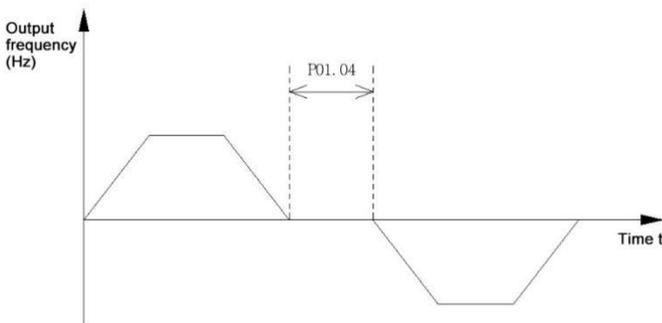


Figure 5-2 FWD/REV rotation dead-zone time schematic diagram

| | | | |
|--------|----------------------|------------|------------|
| P01.05 | Start mode selection | Range: 0~1 | Default: 0 |
|--------|----------------------|------------|------------|

0: start from starting frequency

When the variable frequency drive starts running from the stop status, it starts directly from the starting frequency set by P01.06 and maintains this frequency for a period of time set in P01.07. And then it accelerates to the preset frequency according to chosen Acc./Dec. time and mode.

In this starting mode, if the setting value of P01.09 is not 0, function of DC braking is firstly performed before it starts from the starting frequency.

1: Flying start (Software)

The motor rotation speed is firstly detected and then the drive starts smoothly from the detected speed. It is suitable for starting the equipment where the motor is still rotating with large inertia load.

2: Flying start (Hardware)

This mode requires assembling an extension card into the drive. The motor rotation speed is firstly detected and then the drive starts smoothly from the detected speed. It is suitable for starting the equipment where the motor is still rotating with large inertia load.

| | | | |
|--------|---------------------------------|---------------------------------------|-----------------|
| P01.06 | Starting frequency | Range: 0.00Hz ~ frequency upper limit | Default: 0.50Hz |
| P01.07 | Starting frequency holding time | Range: 0.0s~3600.0s | Default: 0.0s |

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

| | | | |
|--------|--|---------------------|----------------|
| P01.08 | Start stage DC brake current /pre-excitation current | Range: 0.0%~100.0% | Default: 50.0% |
| P01.09 | Start stage DC brake time /pre-excitation time | Range: 0.00s~30.00s | Default: 0.00s |

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

| | | | |
|--------|---------------------|------------|------------|
| P01.10 | Stop mode selection | Range: 0~1 | Default: 0 |
|--------|---------------------|------------|------------|

0: Stop by deceleration

Once the VFD receives the stop command, it starts process of “stop by deceleration” according to the preset deceleration time. In this stop mode, if the value of P01.13 is greater than 0.00s, when the output frequency decelerates and gets lower than P01.11, it enters stop-stage DC braking status and maintains this braking state for a period of time set in P01. 12. When DC braking is completed, it stops.

1: Freewheeled stop

After receiving the stop command, the variable frequency drive immediately blocks the output, and the motor freewheels by mechanical inertia until stops.

| | | | |
|--------|--|----------------------------------|-----------------|
| P01.11 | Stop stage DC brake activation frequency | Range: 0.00Hz~ Freq. upper limit | Default: 0.50Hz |
| P01.12 | Stop stage DC brake current | Range: 0.0%~100.0% | Default: 50.0% |
| P01.13 | Stop stage DC brake time | Range: 0.00s~30.00s | Default: 0.00s |

For the function description of P01.11 and P01.12, please refer to introduction of P01.10 when it is set as “Stop by deceleration”

P01.12 Stop stage DC brake current is the percentage level relative to the rated current of the variable frequency drive.

P02 group: Acceleration(Acc.) and Deceleration(Dec.) Parameters

| | | | |
|--------|-------------|---------------------|---------------------------|
| P02.00 | Acc. time 1 | Range: 0.1s~3600.0s | Default: Depends on model |
| P02.01 | Dec. time 1 | Range: 0.1s~3600.0s | Default: Depends on model |
| P02.02 | Acc. time 2 | Range: 0.1s~3600.0s | Default: Depends on model |
| P02.03 | Dec. time 2 | Range: 0.1s~3600.0s | Default: Depends on model |
| P02.04 | Acc. time 3 | Range: 0.1s~3600.0s | Default: Depends on model |
| P02.05 | Dec. time 3 | Range: 0.1s~3600.0s | Default: Depends on model |
| P02.06 | Acc. time 4 | Range: 0.1s~3600.0s | Default: Depends on model |
| P02.07 | Dec. time 4 | Range: 0.1s~3600.0s | Default: Depends on model |

Acceleration time: The time it takes to speed up from 0Hz to maximum frequency (P00.07).

Deceleration time: The time it takes to slow down from maximum frequency (P00.07) to 0Hz.

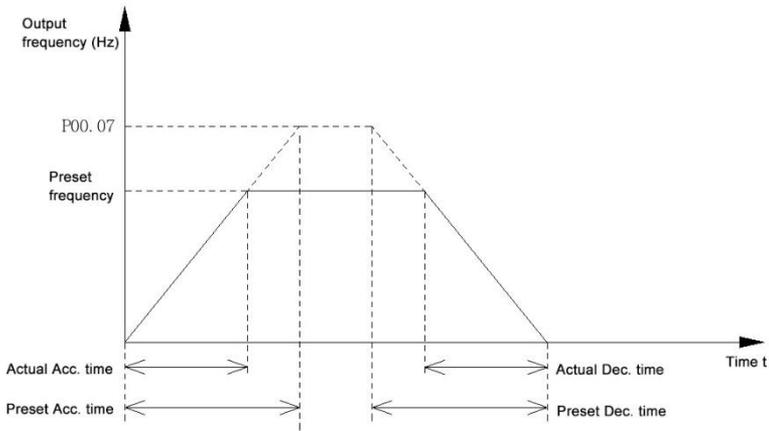


Figure 5-3 Acceleration/deceleration time schematic diagram

4 groups of acceleration and deceleration time are selected through digital input terminals defined as “Acc./Dec. time selection 1” and “Acc./Dec. time selection 2”. Please refer to the P10 group function code for specific usage instruction.

| | | | |
|--------|--------------------------|---------------------|---------------------|
| P02.08 | Emergency stop Dec. time | Range: 0.1s~3600.0s | Default: Depends on |
|--------|--------------------------|---------------------|---------------------|

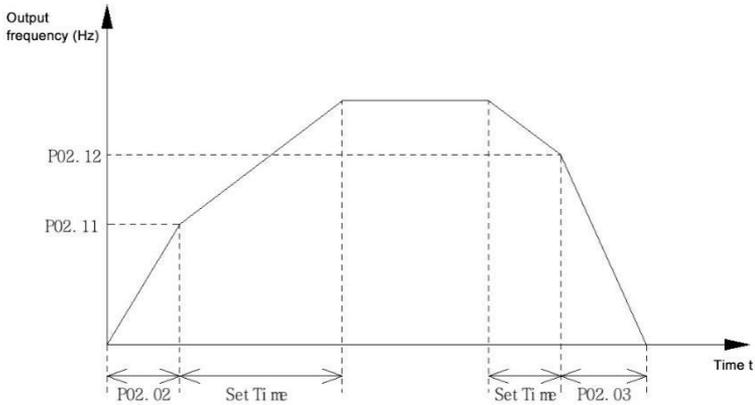
When the drive receives the emergency stop command, it decelerates and stops according to the deceleration time defined in P02.08. The emergency stop command is realized by the digital input terminal function “Emergency stop”.

| | | | |
|--------|---------------|---------------------|---------------------|
| P02.09 | Jog Acc. time | Range: 0.1s~3600.0s | Default: Depends on |
| P02.10 | Jog Dec. time | Range: 0.1s~3600.0s | Default: Depends on |

When the drive is jogging, it accelerates or decelerates according to the time set here.

| | | | |
|--------|--|----------------------------------|-----------------|
| P02.11 | Polyline Acc. time switching frequency | Range: 0.00Hz~ Freq. upper limit | Default: 0.00Hz |
| P02.12 | Polyline Dec. time switching frequency | Range: 0.00Hz~ Freq. upper limit | Default: 0.00Hz |

In acceleration stage, when the output frequency is less than the setting value of P02.11, acceleration time switches to P02.02; in deceleration stage, when the output frequency is less than P02.12, deceleration time switches to P02.03. When P02.11 and P02.12 are set to 0, the polyline acceleration and deceleration time switching is invalid.



picture 5-4 Polyline acceleration and deceleration time switching schematic diagram

| | | | |
|--------|---------------------------|------------|---|
| P02.13 | Acc./Dec. curve selection | Range: 0~1 | 0 |
|--------|---------------------------|------------|---|

0: Straight line acceleration or deceleration

Output frequency rises/drops by constant slope rate

1: Curve line acceleration or deceleration

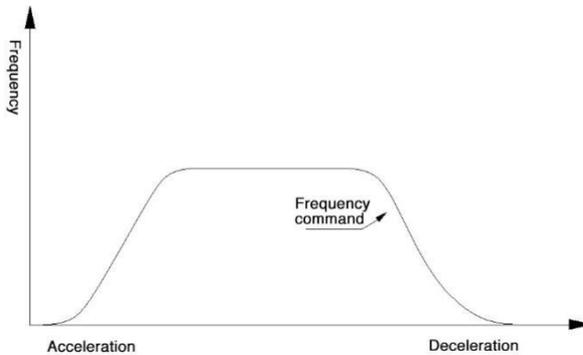
Adding a curve section at the beginning and ending phase of acceleration and deceleration could improve the smoothness of start and stop. It helps to prevent from the load shock which usually happens in transportation equipment.

The characteristics of the curve at the acceleration stage and deceleration stage could be set independently. And the starting and ending curvature as well as the middle section slope of acceleration or deceleration could be set independently.

P02.14~P02.16 is for acceleration curve setting; P02.17~P02.19 is for deceleration curve setting.

| | | | |
|--------|-------------------------------|----------------|-----|
| P02.14 | Acc. curve starting curvature | Range: 0%~200% | 50% |
| P02.15 | Acc. curve ending curvature | Range: 0%~200% | 50% |
| P02.16 | Acc. middle slope | Range: 0%~200% | 0% |
| P02.17 | Dec. curve starting curvature | Range: 0%~200% | 50% |
| P02.18 | Dec. curve ending curvature | Range: 0%~200% | 50% |
| P02.19 | Dec. middle slope | Range: 0%~200% | 0% |

When the curve acceleration or deceleration is selected, the frequency arrival time is determined by the setting of P02.14~P02.19.



P03 group: Vector Control Parameters

| | | | |
|--------|--------------------------------|------------------|-------------|
| P03.00 | Speed/Torque control selection | Range: 0x00~0x13 | Default: 00 |
|--------|--------------------------------|------------------|-------------|

Ones place: Vector control selection

- 0: speed control;
- 1: torque control

The speed control mode and torque control mode can be switched or inhibited through the ones place of this parameter or by digital input terminal function "46: Speed/Torque control switching" and "47: Torque control forbidden". When running in the torque control mode, No-PG vector control (SVC) or With-PG vector control (VC) shall be selected in P63.08 function code.

Tens place: Generative power limit

- 0: invalid;
- 1: full time limit;
- 2: constant speed limit;
- 3: deceleration limit

This parameter is to set the output torque limit when the motor works in the power generation mode. Invalid means output torque is automatically limited by the drive's maximum torque.

Full-time limit means that the torque is limited by the preset values in accelerating, decelerating, and constant speed.

Constant speed limit means that the output torque is limited by the preset value only when the drive runs at constant speed.

Deceleration speed limit means that the output torque is limited by the preset value only when the

drive runs in deceleration stage.

| | | | |
|--------|---|----------------------------------|------------------|
| P03.01 | Speed loop high speed proportional gain | Range: 0.00s~30.00s | Default: 2.00s |
| P03.02 | Speed loop high speed Integration time | Range: 0.001s~5.000s | Default: 0.200s |
| P03.03 | Speed loop low speed proportional gain | Range: 0.00s~30.00s | Default: 2.00s |
| P03.04 | Speed loop low speed integration time | Range: 0.001s~5.000s | Default: 0.200s |
| P03.05 | Speed loop PI switching frequency 1 | Range: 0.00Hz~P03.06 | Default: 5.00Hz |
| P03.06 | Speed loop PI switching frequency 2 | Range: P03.05~ Freq. upper limit | Default: 10.00Hz |
| P03.07 | Speed feedback filtering time | Range: 0.0ms~1000.0ms | 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 running 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 running frequency is greater than the setting value of P03.06, the PI parameters of the speed loop are P03.01 and P03.02.

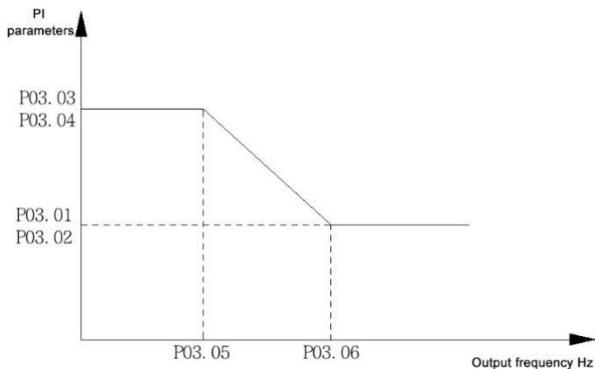


Figure 5-5 speed loop PI parameters schematic diagram

It is recommended to fine-tune the PI parameters of the speed loop on the basis of the factory default values; improper setting of the PI parameters of the speed loop may cause system oscillation, or even overshoot in speed regulating, over-current, and over-voltage faults of the variable frequency drive.

The speed feedback filtering time is adjusted to improve the speed stability of the motor. Increase the filtering time, the dynamic response is weakened; and vice versa.

| | | | |
|--------|-----------------------------------|-----------------------|-----------------|
| P03.08 | Motoring torque channel selection | Range: 0x00~0x99 | Default: 90 |
| P03.09 | Motoring torque digital setting | Range: -200.0%~200.0% | Default: 150.0% |

P3.08 **Ones place:** torque control channel selection

P3.08 **Tens place:** speed control motoring torque upper limit

0: digital setting P03.09

1: analog input AI1

2: analog input AI2

3: analog input AI3

4: Min [AI1, AI2]

5: Max [AI1, AI2]

6: Sub [AI1, AI2]

7: Add [AI1, AI2]

8: pulse setting by HDI

9: maximum torque of variable frequency drive

The ones place of P03.08 defines the motoring torque reference channel under torque control mode; while its tens place defines the upper limit of motoring torque under speed control mode.

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

| | | | |
|--------|-------------------------------------|-----------------------|-----------------|
| P03.10 | Generative torque channel selection | Range: 0x00~0x99 | Default: 99 |
| P03.11 | Generative torque digital setting | Range: -200.0%~200.0% | Default: 150.0% |

P03.10 **Ones place:** torque control channel selection

P03.10 **Tens place:** speed control generating torque upper limit

0: digital setting P03.11

1: analog input AI1

2: analog input AI2

3: analog input AI3

4: Min [AI1, AI2]

5: Max [AI1, AI2]

6: Sub [AI1, AI2]

7: Add [AI1, AI2]

8: pulse setting by HDI

9: maximum torque of variable frequency drive

The ones place of P03.10 defines the generative torque reference channel under torque control mode; while its tens place defines the upper limit of generative torque under speed control mode.

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

| | | | |
|--------|--|--------------------------------|------------------|
| P03.12 | Torque control frequency limiting channel | Range: 0x00~0x88 | Default: 00 |
| P03.13 | Torque control forward frequency limit digital setting | Range: 0.00Hz ~ Max. frequency | Default: 50.00Hz |
| P03.14 | Torque control reverse frequency limit digital setting | Range: 0.00Hz ~Max. frequency | Default: 50.00Hz |

P03.12 **Ones place**: Forward frequency limit channel

P03.12 **Tens place**: Reverse frequency limit channel

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

1: analog input AI1

2: analog input AI2

3: analog input AI3

4: Min [AI1, AI2]

5: Max [AI1, AI2]

6: Sub [AI1, AI2]

7: Add [AI1, AI2]

8: pulse setting by HDI

This function is to set the maximum frequency of forward running or reverse running under torque control mode. if the load torque is less than the motor output torque, the motor continues accelerating faster and faster. In order to prevent runaway accidents, the maximum speed of the motor under torque control must be limited.

| | | | |
|--------|--|-------------------------------|-----------------|
| P03.15 | Torque control frequency limit increment | Range: 0.00Hz ~Max. frequency | Default: 0.00Hz |
|--------|--|-------------------------------|-----------------|

This value is the increment of the frequency amplitude during torque control, the actual frequency limiting value under torque control is the preset limit value plus the value of P03.15; and the final output is limited by the maximum frequency of the variable frequency drive.

| | | | |
|--------|--|----------------|---------------|
| P03.16 | Proportional gain of excitation current tuning | Range: 0~60000 | Default: 2000 |
| P03.17 | Integral gain of excitation current tuning | Range: 0~60000 | Default: 1000 |
| P03.18 | Proportional gain of torque current tuning | Range: 0~60000 | Default: 2000 |
| P03.19 | Integral gain of torque current tuning | Range: 0~60000 | Default: 1000 |

The excitation current and torque current tuning parameters work for current loop adjusting under vector control mode. After auto-tune operation is performed to the motor, two sets of parameters are automatically calculated. Generally speaking, they do not need to be modified. If the PI setting of the current loop is too large, the current may oscillate and the torque may fluctuate greatly.

| | | | |
|--------|---------------------------------------|---------------------|---------------|
| P03.20 | Driving torque rising filter time | Range: 0.0s~6000.0s | Default: 0.3s |
| P03.21 | Driving torque descending filter time | Range: 0.0s~6000.0s | Default: 0.3s |

In the torque control mode, when the load torque is very different from the motor output torque, the change rate of the motor output speed is very fast, which may cause excessive shock to the motor output side. By setting the filtering time of P03.20 and P03.21, the motor output speed can be changed smoothly and thus reduce the mechanical shock.

| | | | |
|--------|---|--------------------|-----------------|
| P03.22 | Torque limitation coefficient in weak magnetic area | Range: 0.0%~200.0% | Default: 100.0% |
|--------|---|--------------------|-----------------|

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

| | | | |
|--------|--|--------------------|-----------------|
| P03.23 | Power limitation coefficient in generating state | Range: 0.0%~200.0% | Default: 100.0% |
|--------|--|--------------------|-----------------|

This parameter is to set the limiting coefficient of the output power when the drive is working in generating mode.

| | | | |
|--------|---------------------------------------|-----------------------|-----------------|
| P03.24 | Frequency deviation of torque control | Range: 0.00Hz~10.00Hz | Default: 0.00Hz |
|--------|---------------------------------------|-----------------------|-----------------|

This is to set the frequency deviation value for activating the current regulator under torque control mode.

| | | | |
|--------|------------------------------------|----------------------|-----------------|
| P03.25 | Current loop parameters adjustment | Range: 0x0000~0xFFFF | Default: 0x0000 |
|--------|------------------------------------|----------------------|-----------------|

This is for adjustment of motor current loop parameters Kp and Ki under vector control mode.

Ones place: Excitation current Kp

The default value is automatically calculated; ones-place value increases and Kp decreases.

Tens place: Excitation current Ki

The default value is automatically calculated; tens-place value increases and Ki decreases.

Hundreds place: Torque current Kp

The default value is automatically calculated; hundreds-place value increases and Kp decreases.

Thousands place: Torque current Ki

The default value is automatically calculated; thousands-place value increases and Ki decreases

P04 group: Scalar Control Parameters

| | | | |
|--------|-------------------|------------|------------|
| P04.00 | V/F curve setting | Range: 0~7 | 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-segment V/F

The multi-segment 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 variable frequency drive automatically limits the upper and lower limit of V/F setting value of each point to prevent mistake setting.

2: 1.2 Exponentiation

3: 1.4 Exponentiation

4: 1.6 Exponentiation

5: 1.8 Exponentiation

6: 2.0 Exponentiation

It is suitable for variable torque loads.

7: V/F separation

The output frequency and output voltage of the variable frequency drive can be controlled independently. It is suitable for the occasion where the drive is used as a variable frequency power supply. Refer to P04.13~P04.15 for specific parameters setting.

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

The multi-segment V/F curve should be properly set according to the characteristics of the motor and the load. Improper setting may cause the increased output current, or even burn the motor seriously. For specific multi-segment V/F curve settings, please refer to the following figure.

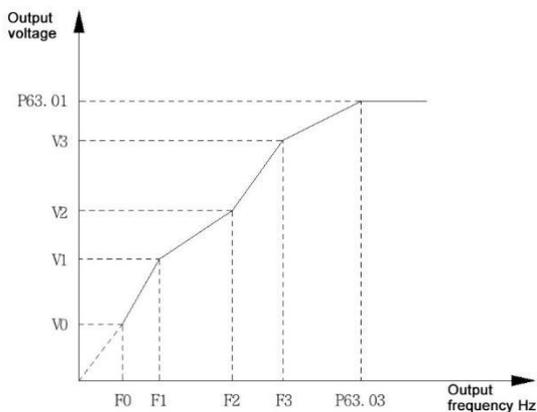


Figure 5-6 Multi-segment V/F curve schematic diagram

| | | | |
|--------|--------------|-------------------|---------------|
| P04.09 | Torque boost | Range: 0.0%~30.0% | Default: 0.0% |
|--------|--------------|-------------------|---------------|

The torque boost function is only valid during scalar control. Increasing the torque boost value can improve the output torque capability of the motor at low frequency. The torque boost value shall be set appropriately according to the actual load characteristic. If the setting value is too large, it would cause excessive current surge at startup. When the torque boost is set to 0.0%, automatic torque boost is adopted.

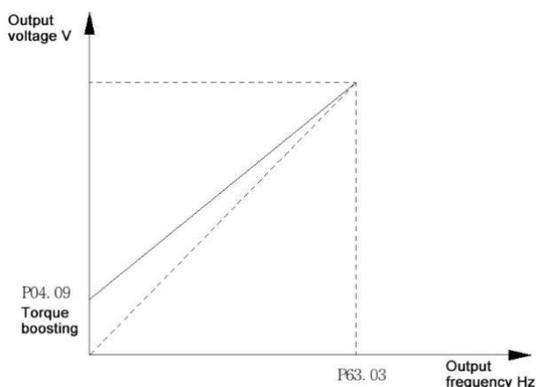


Figure 5-7 Torque boosting schematic diagram

| | | | |
|--------|----------------------|-----------------------|-----------------|
| P04.10 | Droop control volume | Range: 0.00Hz~10.00Hz | Default: 0.00Hz |
|--------|----------------------|-----------------------|-----------------|

When multiple inverters together drive the same load, the load amount that each drive takes might be different. By setting this parameter, different drives would get automatic load allocation proportionally.

This function is only applicable to scalar control mode

| | | | |
|--------|------------------------------------|---------------|--------------|
| P04.11 | V/F oscillation suppression gain 1 | Range: 0~1024 | Default: 160 |
| P04.12 | V/F oscillation suppression gain 2 | Range: 0~1024 | Default: 160 |

By reasonably setting the oscillation suppression parameters, the oscillation of the motor speed and current can be effectively suppressed. This value could be gradually adjusted based on factory default value if the current or speed fluctuation occurs, especially when the motor is running with no-load or light-load. Don't set this parameter too large or too small. This set of parameters is only valid in scalar control mode.

| | | | |
|--------|---|------------|------------|
| P04.13 | V/F separation mode voltage reference channel | Range: 0~5 | Default: 0 |
|--------|---|------------|------------|

0: P04.14 digital setting

Set the voltage output value of V/F separation mode in P04.14. It is percentage level relative to motor rated voltage.

1: analog input AI1

2: analog input AI2

3: analog input AI3

Voltage output value in V/F separation mode is determined by analog input terminal AI1/AI2/AI3.

The maximum analog input corresponds to motor rated voltage.

4: process PID output

Voltage output value in V/F separation mode is determined by PID operation output. Refer to P40 group of parameters for PID setting.

5: process PID output +AI1

Voltage output value in V/F separation mode is determined by the sum of PID output and AI1 output.

| | | | |
|--------|--|--------------------|--------------|
| P04.14 | V/F separation voltage digital setting | Range: 0.0%~100.0% | Default: 160 |
|--------|--|--------------------|--------------|

When P04.13=0, the voltage in V/F separation mode is determined by P04.14 setting value.

| | | | |
|--------|-----------------------------------|----------------------|----------------|
| P04.15 | V/F separation voltage slope time | Range: 0.00s~600.00s | Default: 0.01s |
|--------|-----------------------------------|----------------------|----------------|

This is to set the voltage variation time in V/F separation mode. It refers to the time that voltage changes from 0 to motor rated voltage or reversely from motor rated voltage to 0.

P10 group: Digital input terminal X

| | | | |
|--------|---------------------------|-------------|-------------|
| P10.00 | X1 function selection | Range: 0~63 | Default: 1 |
| P10.01 | X2 function selection | Range: 0~63 | Default: 2 |
| P10.02 | X3 function selection | Range: 0~63 | Default: 16 |
| P10.03 | X4 function selection | Range: 0~63 | Default: 17 |
| P10.04 | X5 function selection | Range: 0~63 | Default: 18 |
| P10.05 | X6 function selection | Range: 0~63 | Default: 0 |
| P10.06 | X7/HDI function selection | Range: 0~63 | Default: 0 |
| P10.08 | AI1 function selection | Range: 0~63 | Default: 0 |
| P10.09 | AI2 function selection | Range: 0~63 | Default: 0 |
| P10.10 | AI3 function selection | Range: 0~63 | Default: 0 |

00: no function

Please set the not used terminals to "no function" to prevent malfunction of the terminal.

01: Forward running (FWD)

02: Reverse running (REV)

03: Forward jogging (FJOG)

04: Reverse jogging (RJOG)

Table 5-1 Jog commands configuration

| Commands | K1 | K2 |
|-------------|-----|-----|
| Forward Jog | ON | OFF |
| Reverse Jog | OFF | ON |
| Stop | OFF | OFF |
| Stop | ON | ON |

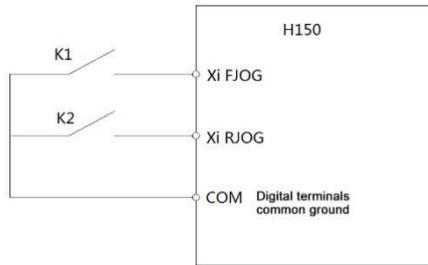


Figure 5-8 Jog commands schematic diagram

05: 3-wire running control

The above 01~05 function only works in Terminal Command Mode (P01.00=1). As for 3-wires running please check P10.11 function code description.

06: Freewheeled stop

When the terminal set as "Freewheeled stop" is ON, the drive freewheels until stop.

07: Emergency stop

When the terminal set as "Emergency stop" is ON, the drive stops by deceleration according to deceleration time set in P02.08.

08: External stop

When the terminal set as "External stop" is ON, the drive stops according to preset stop mode.

09: Run forbidden

When the terminal set as "Run forbidden" function is ON, the drive refuses any start command and keeps stop state.

10: Run pause

If the terminal set as "Run pause" is ON when the drive is running, the drive keeps running at zero frequency until the "Run pause" terminal is OFF. After that the running resumes.

11: External fault input

When the terminal of "External fault input" is ON, the drive indicates Er.EtE fault.

12: Fault reset (RESET)

When the inverter is in fault state, it could be reset by the terminal set as "Fault Reset" function. It works the same as the fault reset method by Stop key on keypad.

13: Terminal Up

14: Terminal Down

When frequency reference channel "digital setting (P00.00) +Up/Down adjustment" is selected, the terminal up/down function could increase/decrease the frequency setting.

15: Up/Down clearance (Terminal, keypad)

Clear the Up/Down frequency adjustments set by terminal and keypad.

16: Multi-step terminal 1

17: Multi-step terminal 2

18: Multi-step terminal 3

19: Multi-step terminal 4

By combinedly setting 4 multi-step terminals, up to 16 steps of speed control could be achieved. Multi-step function is set in P41.00~P41.14 and detailed configuration of terminals is shown as the table below.

Table 5-2 Multi-step frequency setting

| Preset frequency | Multi-step terminal 1 | Multi-step terminal 2 | Multi-step terminal 3 | Multi-step 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: Acc./Dec. time selection terminal 1

21: Acc./Dec. time selection terminal 2

By combinedly using 2 terminals of Acc./Dec. time selection, up to 4 pairs of acceleration and deceleration time could be set.

Table 5-3 Acc./Dec. time selection

| Acc./Dec. time | Acc./Dec. time selection terminal 1 | Acc./Dec. time selection terminal 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: Acc./Dec. forbidden

When the terminal of "Acc./Dec. forbidden" function is ON, the inverter maintains the output frequency unchanged.

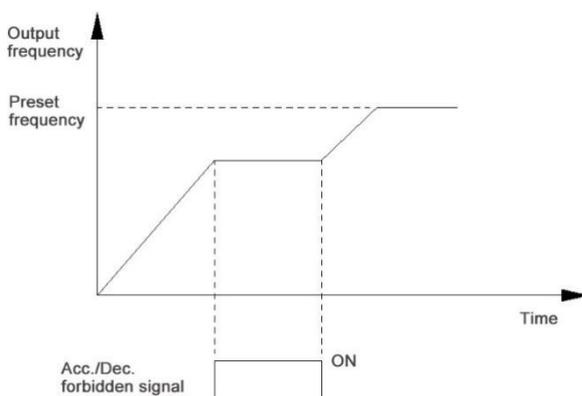


Figure 5-9 Schematic diagram of Acceleration/Deceleration forbidden

23: Switching to Keypad control command

When the terminal of this function is ON, the run command is switched to keypad control mode.

24: Switching to terminal control command

When the terminal of this function is ON, the run command is switched terminal control mode.

25: Switching to communication control command

When the terminal of this function is ON, the run command is switched to communication control mode.

26: Frequency reference source switching (P00.06 ones-place)

When this terminal is ON, the frequency reference channel is switched according to ones-place setting of P00.06.

27: Main frequency reference switch to frequency digital setting

When this terminal function is enabled, the main frequency reference is switched to P00.00 digital setting value.

28: Auxiliary frequency reference switch to frequency digital setting

When this terminal function is enabled, the auxiliary frequency reference is switched to P00.02 digital setting value.

29: Stop stage DC brake+ Stop command

When this terminal function is enabled, the inverter starts the process of “stop by deceleration”. When the output frequency is lower than P01.11 value (Stop stage DC brake activation frequency), the drive enters DC braking state.

30: Stop stage DC brake

When the drive receives the stop command and at the same time when this terminal function is active, it performs DC braking when the output frequency is lower than P01.11 value (Stop stage DC brake activation frequency).

31: DC brake upon start command

When the drive receives the start command and at the same time if this terminal function is active, the drive firstly do the DC braking and then starts from the preset starting frequency.

32: Pulse input (only X7/HDI supports high speed)

Take the high speed pulse input signal as the frequency reference. For the corresponding relationship of high speed pulse and frequency reference value, refer to P12.33~P12.36 function codes instruction.

33: Count input

This terminal function is to realize the counting technique through input signal. Please see P43.00~P43.01 parameter description.

34: Count clearance

Clear the data generated by count input function.

35: Length counting

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

36: Length clearance

Clear the calculated length value of the length counting.

37: PID reaction direction

When this terminal function is active, the PID reaction direction is opposite to direction set in P40.12.

38: PID parameters switching

When P40.09=2, and at the same time if the terminal of this function is enabled, PID control switches to second group of PID parameters P40.06~P40.08. When this terminal function is disabled, PID parameters P40.03~P40.05 are restored.

39: PID operation pause

When the terminal of "PID operation pause" is ON, PID regulating pauses and the drive maintains the current PID output. When this terminal is OFF, the PID control is resumed.

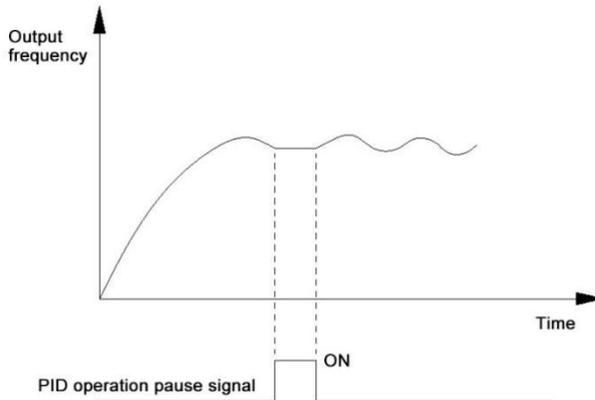


Figure 5-10 Schematic diagram of PID pause

40: PID integration pause

When the terminal is enabled, the PID integrator stops working and maintains the present value; when the terminal is disabled, the PID integrator resumes working of integration.

41: PLC memory clearance

Then the terminal is activated, simple PLC status is reset to initial state.

42: PLC running disabled

When the terminal is activated, PLC running status is cleared and the drive output 0Hz frequency; when the terminal is off, the PLC running restarts from the beginning.

43: PLC running pause

When the terminal is enabled, PLC running status is memorized and the drive outputs 0Hz frequency; while the terminal is off, the PLC resumes working from the memorized stage.

44~45: Reserved

46: Speed/Torque control switching

By on/off of this terminal, the torque control mode and speed control mode is switched under vector control mode.

47: Torque control forbidden

The drive is prohibited to work in torque mode.

| | | | |
|--------|-------------------------------------|------------|------------|
| P10.11 | Terminal control run mode selection | Range: 0~3 | Default: 0 |
|--------|-------------------------------------|------------|------------|

0: two-wire run mode 1

1: two-wire run mode 2

Table 5-4 Terminal configuration of two-wire run mode

| Commands | two-wire run mode 1 | | two-wire run mode 2 | |
|-------------|---------------------|-----|---------------------|-----|
| | K1 | K2 | K1 | K2 |
| FWD running | ON | OFF | ON | OFF |
| REV running | OFF | ON | ON | ON |
| Stop | OFF | OFF | OFF | OFF |
| Stop | ON | ON | OFF | ON |

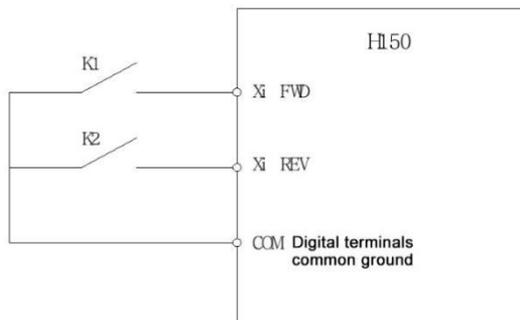


Figure 5-11 Schematic diagram of two-wire run mode

2: three-wire run mode 1

3: three-wire run mode 2

Table 5-5 Terminal configuration of 3-wire run mode

| Commands | three-wire run mode 1 | | | three-wire run mode 2 | | |
|-------------|-----------------------|------|-----|-----------------------|-----|-----|
| | SB2 | SB3 | SB1 | SB2 | SB3 | SB1 |
| FWD running | RISE | - | ON | RISE | OFF | ON |
| REV running | - | RISE | ON | RISE | ON | ON |
| Stop | - | - | OFF | - | - | OFF |
| Stop | - | - | OFF | - | - | OFF |

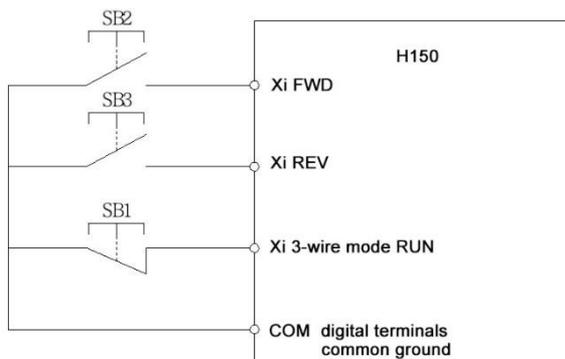


Table 5-12 Schematic diagram of three-wire run mode

Note: "RISE" refers to rising edge; "-" refers to any status.

| | | | |
|--------|-------------------------------------|--------------------|--------------|
| P10.12 | Input terminal action logic setting | Range: 0x000~0x7FF | Default: 000 |
|--------|-------------------------------------|--------------------|--------------|

Ones place: Bit0~Bit3;

Tens place: Bit4~Bit6;

Hundreds place: Bit8~Bit11

Each bit represents logic of one input terminal. The data from low bit to high bit represents X1~AI2 respectively.

0: Positive logic. When the terminal is live with current flow, the terminal is ON.

1: Negative logic. When the terminal has no current flow, the terminal is ON.

| | | | |
|--------|-------------------------------|----------------------|-----------------|
| P10.13 | Input terminal filtering time | Range: 0.000s~2.000s | Default: 0.010s |
|--------|-------------------------------|----------------------|-----------------|

Increasing the setting value of P10.13 can effectively prevent the malfunction of the input terminal.

But too large setting value may cause the terminal response delay.

| | | | |
|--------|------------------------|---------------------|---------------|
| P10.14 | X1 conduction delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P10.15 | X1 disconnection delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P10.16 | X2 conduction delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P10.17 | X2 disconnection delay | Range: 0.0s~3600.0s | Default: 0.0s |

By setting the two sets of function codes, the X1~X2 terminal electric connection and disconnection delay is realized. This function makes terminal input signal response delaying adjustable.

| | | | |
|--------|-------------------------|--------------------|--------------|
| P10.18 | Terminal detection mode | Range: 0x000~0x7FF | Default: 000 |
|--------|-------------------------|--------------------|--------------|

Ones place: Bit0~Bit3: X1~X4

Tens place: Bit4~Bit6: X5~X7

Hundreds place: Bit8~Bit11: AI1~AI2

Each bit represents detection mode of one terminal. From low digit to high digit it is X1~AI2 respectively.

0: Level triggering

The input terminal level trigger signal is detected.

1: Edge triggering

The input terminal edge trigger signal is detected.

| | | | |
|--------|---------------------------------|--------------------|----------------|
| P10.19 | Virtual terminal input enabling | Range: 0x000~0x7FF | Default: 0x000 |
| P10.20 | Virtual terminal input setting | Range: 0x000~0x7FF | Default: 0x000 |

In communication control, the virtual terminal function is used to control the X1 terminal. For example, firstly enable the virtual terminal function on X1 by setting P10.19=0x001, and then enable the terminal by setting P10.20=0x001. When P10.20=0x000, the virtual terminal X1 is disabled.

P11 group: Digital Y/R output

| | | | |
|--------|-----------------------------|-------------|-------------|
| P11.00 | Y1 function selection | Range: 0~33 | Default: 0 |
| P11.01 | Y2 function selection | Range: 0~33 | Default: 0 |
| P11.02 | R1 relay function selection | Range: 0~33 | Default: 19 |
| P11.03 | R2 relay function selection | Range: 0~33 | Default: 0 |

00: No output function

The output terminal has no function.

01: Running

The terminal outputs the valid signal when the drive is running.

02: Running forward

The terminal outputs the valid signal when the drive is running forward.

03: Running in reverse

The terminal outputs the valid signal when the drive is running reversely.

04: Inverter ready to work

The terminal outputs the valid signal when the drive is powered up and there is no fault indication.

05: Zero frequency running (Stop state ON)

The terminal output is active when the drive outputs 0Hz, stop state included.

06: Zero frequency running (Stop state OFF)

The terminal output is active when the drive outputs 0Hz, stop state excluded, i.e. the terminal has no output when the drive is in stop state.

07: Frequency arrival (FAR)

When the output frequency of the drive is within the preset range (frequency setting \pm F11.19), the terminal output is active.

08: Frequency detection FDT1

When the output frequency of the drive is higher than FDT1 upper limit, the terminal output is active; and when the frequency gets lower than FDT1 lower limit, the terminal output is disabled. Refer to P11.13~P11.15 for FDT1 setting.

09: Frequency detection FDT2

When the output frequency of the drive is higher than FDT2 upper limit, the terminal output is active; and when the frequency gets lower than FDT2 lower limit, the terminal output is disabled. Refer to P11.16~P11.18 for FDT2 setting.

10: Frequency upper limitation

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

11: Frequency lower limitation

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

12: Torque limitation

In speed control mode, when the output torque reaches the motoring torque limit or generative torque limit value, the terminal output signal is active.

13: Speed limitation

In torque control mode, when the output frequency reaches the forward or reverse frequency limit value, the terminal output signal is active.

14: X1 terminal state

15: X2 terminal state

The terminal outputs the X1 or X2 terminal status. When X1 or X2 terminal is active, the valid signal is output.

16: Zero current detection

When the output current of the variable frequency drive 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: Inverter DC braking

When the variable frequency drive is in DC braking, the terminal output is active

18: Inverter under-voltage

When the drive is in under-voltage status, the terminal output is active.

19: Inverter fault output**20: Inverter alarm output**

When the drive is in fault or gets alarm, the terminal output is active.

21: Inverter overload alarm

When the drive gets overload pre-alarm fault or overload alarming, the terminal output is active.

22: Inverter overheat alarm

When the drive gets overheat alarm, the terminal output is active.

23: Motor overload alarm

When the drive gets the motor overload fault or alarm, the terminal output is active.

24: Motor overheat alarm

When the motor temperature reaches the overheat detection level of P30.02, the terminal output is active. It only works when motor thermal detection is enabled.

25: PLC cycle completed

When one cycle of PLC running is completed, the terminal outputs a pulse signal lasting 500ms.

26: PLC stage completed

When each stage of PLC is completed, the terminal outputs a pulse signal lasting 500ms.

27: Reserved**28: Total power-on time arrival**

When the total power-on time reaches the preset value, the terminal output active signal. The total power-on time is saved in power failure.

29: Total running time arrival

When the total running time reaches the preset value, the terminal outputs active signal. The total running time is saved in power failure.

30: Preset count number arrival

31: Specified count number arrival

Refer to P43.00~P43.01 instructions.

32: Preset length arrival

Refer to P43.02~P43.04 instructions.

33: Mechanical brake control output (dedicated for Lifting Drive model)

This terminal function is used for mechanical brake actuation logic control of lifting dedicated drive.

| | | | |
|--------|-------------------------------|---------------------|---------------|
| P11.04 | Y1 output connection delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P11.05 | Y1 output disconnection delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P11.06 | Y2 output connection delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P11.07 | Y2 output disconnection delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P11.08 | R1 output connection delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P11.09 | R1 output disconnection delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P11.10 | R2 output connection delay | Range: 0.0s~3600.0s | Default: 0.0s |
| P11.11 | R2 output disconnection delay | Range: 0.0s~3600.0s | Default: 0.0s |

The 4 pairs of function codes are used to set Y1, Y2, R1, R2 output's connection and disconnection response delay time. When the terminal status changes, the indication signal would not be output immediately but after the preset delay time.

| | | | |
|--------|------------------------------|----------------|------------|
| P11.12 | Output terminal action logic | Range: 0x0~0xF | Default: 0 |
|--------|------------------------------|----------------|------------|

Each bit represents logic option of one output terminal. The data from low digit to high digit corresponds to Y1, Y2, R1, R2 respectively.

0: Positive logic. When the terminal has active current flow, it is ON(Active).

1: Negative logic. When the terminal has no current flow, it is ON(Active).

| | | | |
|--------|---------------------|------------|------------|
| P11.13 | FDT1 detection mode | Range: 0~1 | Default: 0 |
|--------|---------------------|------------|------------|

0: Detect by running freq.

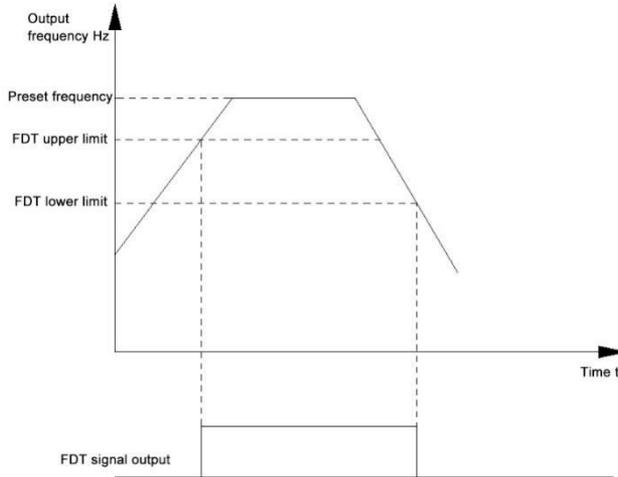
The FDT1 detected value is determined by the frequency reference value after Acc./Dec.

1: Detect by output frequency

The FDT1 detected value is determined by the actual output frequency.

| | | | |
|--------|------------------|---------------------------------|-----------------|
| P11.14 | FDT1 upper limit | Range: P11.15~Maximum frequency | Default: 2.50Hz |
| P11.15 | FDT1 lower limit | Range: 0.00Hz~P11.14 | Default: 2.00Hz |

Judge the drive is working within FDT1 range or not according to selected detection mode P11.13. When the output terminal is set as "frequency detection FDT1", and if at the same time the drive is running within this FDT1 range, the terminal outputs valid signal.



| | | | |
|--------|---------------------|---------------------------------|-----------------|
| P11.16 | FDT2 detection mode | Range: 0~1 | Default: 0 |
| P11.17 | FDT2 upper limit | Range: P11.18~Maximum frequency | Default: 2.50Hz |
| P11.18 | FDT2 lower limit | Range: 0.00Hz~P11.17 | Default: 2.00Hz |

Figure 5-13 Schematic diagram of FDT working

For FDT2 setting, refers to FDT1 function description.

| | | | |
|--------|---|---------------------------------|-----------------|
| P11.19 | Frequency arrival (FAR) detection width | Range: 0.00Hz~Maximum frequency | Default: 2.50Hz |
|--------|---|---------------------------------|-----------------|

It is used for detecting the deviation between the output frequency and the preset frequency; when the deviation between the output frequency and the preset frequency is within the range set here, and if at the same time the output terminal is set as "frequency arrival (FAR)" function, the terminal outputs

valid signal.

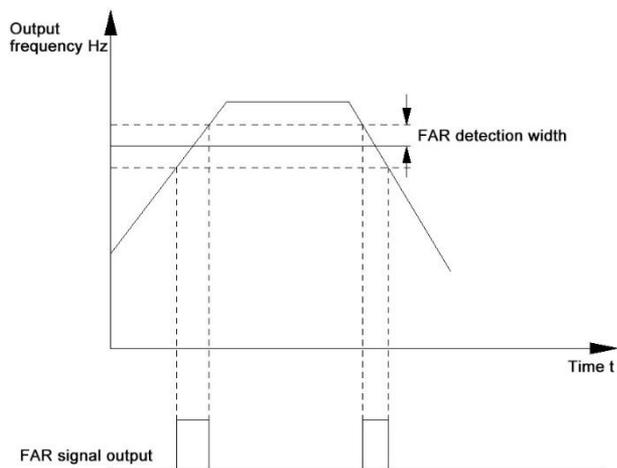


Figure 5-14 Schematic diagram of Frequency Arrival (FAR) function

| | | | |
|--------|--------------------------------|--------------------|-----------------|
| P11.20 | Zero frequency detection value | Range: 0.00Hz~最大频率 | Default: 0.50Hz |
| P11.21 | Zero frequency hysteresis | Range: 0.00Hz~最大频率 | Default: 0.00Hz |

Reserved.

| | | | |
|--------|------------------------------|---------------------|----------------|
| P11.22 | Zero current detection level | Range: 0.0%~50.0% | Default: 5.0% |
| P11.23 | Zero current detection time | Range: 0.00s~50.00s | Default: 0.50s |

When the output terminal is set as "zero current detection" function, if the drive is in running status and its output current gets lower than value set in P11.22 and lasts this status over a duration time set in P11.23, the terminal outputs valid signal.

The zero current detection level is a percentage relative to the rated current of the variable frequency drive.

P12 group: Analog AI and High Speed Pulse HDI Input

| | | | |
|--------|---------------------------|--------------------|--------------|
| P12.00 | AI analog curve selection | Range: 0x000~0x333 | Default: 000 |
|--------|---------------------------|--------------------|--------------|

Ones place: AI1 characteristic curve selection

0: No curve correction

1: curve 1 (2 points)

Set AI curve by parameters P12.01~P12.04.

2: curve 2 (4 points)

Set AI curve by parameters P12.05~P12.12.

3: curve 3 (4 points)

Set AI curve by parameters P12.13~P12.20

Tens place: AI2 characteristic curve selection

Hundreds place: AI3 characteristic curve selection

Refer to ones-place AI1 instruction for details.

Analog input AI1/AI2 can select 0~10V voltage input or 0~20mA current input (Current or voltage input is determined by setting of dials on control board). When current input is chosen, 2mA input corresponds to 1V voltage input, and 20mA corresponds to 10V.

Analog input AI3 could only receive 0~10V voltage input.

| | | | |
|--------|----------------------------------|-----------------------|-----------------|
| P12.01 | Curve1 Max. input voltage | Range: P12.03~10.00V | Default: 10.00V |
| P12.02 | Curve1 Max. input relative level | Range: -100.0%~100.0% | Default: 100.0% |
| P12.03 | Curve1 Min. input voltage | Range: -10.00V~P12.01 | Default: 0.00V |
| P12.04 | Curve1 Min. input relative level | Range: -100.0%~100.0% | Default: 0.0% |

Typical setting of curve1 is shown as below.

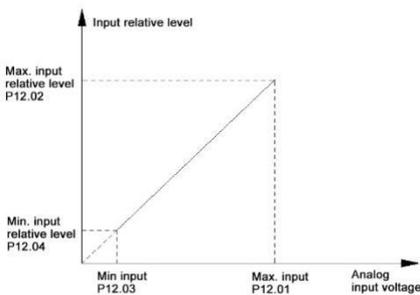


Figure 5-15 Curve 1 setting example 1

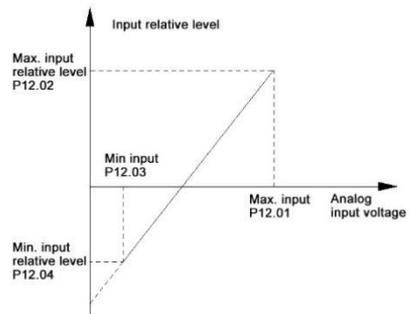


Figure 5-16 Curve 1 setting example 2

| | | | |
|--------|---|-----------------------|-----------------|
| P12.05 | Curve2 Max. input voltage | Range: P12.07~10.00V | Default: 10.00V |
| P12.06 | Curve2 Max. input relative level | Range: -100.0%~100.0% | Default: 100.0% |
| P12.07 | Curve2 Inflection point 2 input voltage | Range: P12.09~P12.05 | Default: 0.00V |
| P12.08 | Curve2 inflection point2 input relative level | Range: -100.0%~100.0% | Default: 0.0% |
| P12.09 | Curve2 Inflection point 1 input voltage | Range: P12.11~P12.07 | Default: 0.00V |
| P12.10 | Curve2 Inflection point1 input relative level | Range: -100.0%~100.0% | Default: 0.0% |
| P12.11 | Curve2 Min. input voltage | Range: -10.00V~P12.09 | Default: 0.00V |
| P12.12 | Curve2 Min. input relative level | Range: -100.0%~100.0% | Default: 0.0% |

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

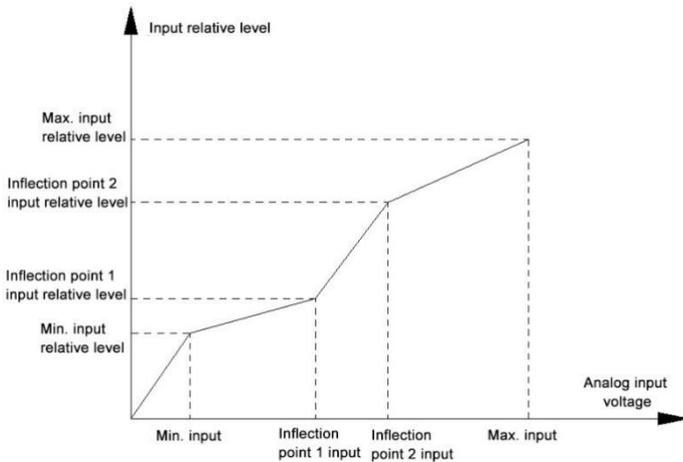


Figure 5-17 Schematic diagram of Curve 2/3 setting

| | | | |
|--------|---|-----------------------|-----------------|
| P12.13 | Curve3 Max. input voltage | Range: P12.15~10.00V | Default: 10.00V |
| P12.14 | Curve3 Max. input relative level | Range: -100.0%~100.0% | Default: 100.0% |
| P12.15 | Curve3 Inflection point 2 input voltage | Range: P12.17~P12.13 | Default: 0.00V |
| P12.16 | Curve3 Inflection point2 input relative level | Range: -100.0%~100.0% | Default: 0.0% |
| P12.17 | Curve3 Inflection point 1 input voltage | Range: P12.19~P12.15 | Default: 0.00V |
| P12.18 | Curve3 Inflection point1 input relative level | Range: -100.0%~100.0% | Default: 0.0% |
| P12.19 | Curve 3 Min. input voltage | Range: -10.00V~P12.17 | Default: 0.00V |
| P12.20 | Curve 3 Min. input relative level value | Range: -100.0%~100.0% | Default: 0.0% |

Curve 3 setting method is the same as Curve 2

| | | | |
|--------|--------------------------|-----------------------|-----------------|
| P12.21 | AI1 input offset | Range: -100.0%~100.0% | Default: 0.0% |
| P12.22 | AI1 input gain | Range: -2.000~2.000 | Default: 1.000 |
| P12.23 | AI1 input filtering time | Range: 0.000s~10.000s | Default: 0.050s |
| P12.24 | AI2 input offset | Range: -100.0%~100.0% | Default: 0.0% |
| P12.25 | AI2 input gain | Range: -2.000~2.000 | Default: 1.000 |
| P12.26 | AI2 input filtering time | Range: 0.000s~10.000s | Default: 0.050s |
| P12.27 | AI3 input offset | Range: -100.0%~100.0% | Default: 0.0% |
| P12.28 | AI3 input gain | Range: -2.000~2.000 | Default: 1.000 |
| P12.29 | AI3 input filtering time | Range: 0.000s~10.000s | Default: 0.050s |

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

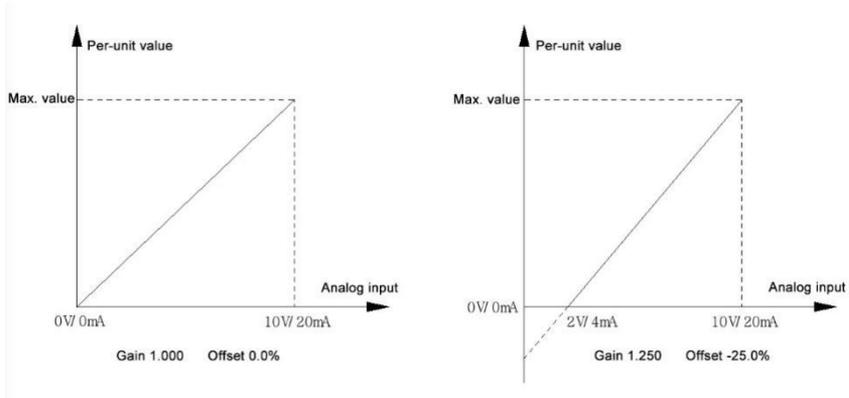


Figure 5-18 AI gain and offset setting schematic diagram

P12.23, P12.26, P12.29 analog inputs filtering time is to perform the filtering operation to AI1, AI2, and AI3 input signals. 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 Max. input frequency | Range: P12.35~100.00kHz | Default: 10.00kHz |
| P12.34 | HDI Max. input corresponding level | Range: -100.0%~100.0% | Default: 100.0% |
| P12.35 | HDI Min. input frequency | Range: 0.00kHz~P12.33 | Default: 0.00kHz |
| P12.36 | HDI Min. input corresponding level | Range: -100.0%~100.0% | Default: 0.0% |
| P12.37 | HDI input filtering time | Range: 0.000s~1.000s | Default: 0.001s |

When X7/HDI is used as high-speed pulse input, this collection of parameters defines the corresponding relationship between the input pulse frequency and the setting frequency output.

P12.37 defines the filtering time of X7/HDI terminal. Longer filtering time means stronger anti-interference ability but slower response; shorter filtering time means faster response but weaker anti-interference capability.

P13 group: Analog output AO and High Speed Pulse output HDO

| | | | |
|--------|-------------------------------|-------------|------------|
| P13.00 | AO1 output function selection | Range: 0~14 | Default: 2 |
| P13.01 | AO2 output function selection | Range: 0~14 | Default: 1 |
| P13.02 | HDO output function selection | Range: 0~14 | Default: 0 |

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

Analog output AO1 and AO2 can select 0~10V voltage output or 0 ~ 20 mA current output (current or voltage output is determined by the dial code on the control board).

The analog output and pulse output function definition and output measuring range are 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 | Preset 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 drive corresponds to 10V/20mA | 2 times of rated current of the drive 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 corresponds 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 drive corresponds to 10V/20mA | 2 times of rated power of the drive corresponds to P13.09 |
| 8 | AI1 input | AI1 10V input corresponds to 10V/20mA | AI1 10V input corresponds to P13.09 |
| 9 | AI2 input | AI2 10V input corresponds to 10V/20mA | AI2 10V input corresponds to P13.09 |
| 10 | AI3 input | AI3 10V input corresponds to 10V/20mA | AI3 10V input corresponds to P13.09 |
| 11 | pulse output | 100kHz corresponds to 10V/20mA | 100kHz corresponds to P13.09 |

| | | | |
|----|--------------------------------|---|---|
| 12 | motor current | 2 times of rated current of the motor corresponds 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 offset | Range: -100.0%~100.0% | Default: 0.0% |
| P13.04 | AO1 output gain | Range: -2.000~2.000 | Default: 1.000 |
| P13.05 | AO1 output filtering time | Range: 0.000s~10.000s | Default: 0.000s |
| P13.06 | AO2 output offset | Range: -100.0%~100.0% | Default: 0.0% |
| P13.07 | AO2 output gain | Range: -2.000~2.000 | Default: 1.000 |
| P13.08 | AO2 output filtering time | Range: 0.000s~10.000s | Default: 0.000s |

The default output is 0- 10V or 0-20mA. If the range of the analog output needs to be adjusted, it could be set by the above 2 pairs of parameters. The following figure shows the setting for typical industrial application.

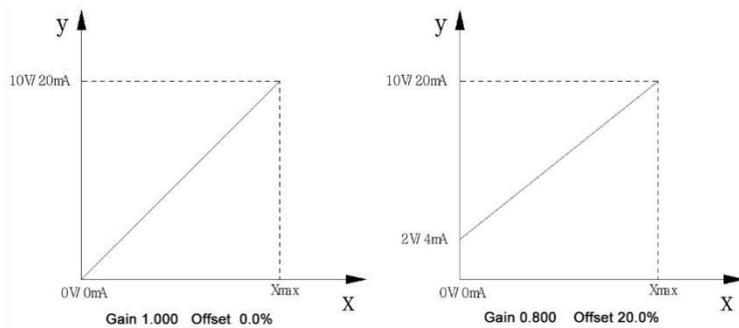


Figure 5-19 AO output schematic diagram

When the output signal fluctuates 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~100.00kHz | Default: 10.00kHz |
|--------|------------------------------------|--------------------------|-------------------|

Define the maximum output frequency when the Y1/HDO is used as high speed pulse output terminal.

| | | | |
|--------|---------------------------------|------------|------------|
| P13.10 | HDO output zero point selection | Range: 0~1 | Default: 0 |
|--------|---------------------------------|------------|------------|

0: starts from 0

No center point. HDO output 0~P13.09 corresponds to 0~Max. measuring range of chosen function

1: starts from center point (P13.09)/2.

Set P13.09/2 as the center point. P13.09/2~P13.09 corresponds to 0~Positive Max. measuring range of chosen function; while 0~P13.09 corresponds to Negative Max. measuring range~0

| | | | |
|--------|---------------------------|-----------------------|-----------------|
| P13.11 | HDO output filtering time | Range: 0.000s~10.000s | Default: 0.000s |
|--------|---------------------------|-----------------------|-----------------|

This is to set the filtering time of HDO high speed pulse output, which means that the longer the filtering time the slower the pulse frequency changes, while the shorter the filtering time the faster the pulse frequency changes.

P20 group: Operation panel (keypad) Setting Parameters

| | | | |
|--------|------------------|--------------------|----------------|
| P20.00 | Password setting | Range: 00000~65535 | Default: 00000 |
|--------|------------------|--------------------|----------------|

Password setting: When this parameter value is set to non-00000 and confirmed by OK key, the password is set and effective. To get into parameter groups for checking or modification, the correct password should be input from the next time.

Password clearing: Input the correct password to enter P20.00 and set it to 00000 again, confirm it by Ok key. The password is removed.

Password change: Input the correct password to enter P20.00 and set it to new password, confirm it by Ok key. The new password is set and effective.

| | | | |
|--------|----------------|-----------------|--------------|
| P20.01 | LCD brightness | Range: 10%~100% | Default: 80% |
| P20.02 | LCD language | Range: 0~1 | Default: 0 |

These two parameters are only effective for the LCD keyboard. P20.01 is used to set the LCD brightness, P20.02 is used for LCD display language selection. Only Chinese is available right now.

| | | | |
|--------|---|------------|------------|
| P20.03 | Function parameters modification protection | Range: 0~1 | Default: 0 |
|--------|---|------------|------------|

0: All function codes are allowed to be modified

The setting value of all parameter codes in P group could be modified.

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

Only the values of P20.00 and P20.03 could be modified. Modification of the other parameters in P group is prohibited to prevent mistake operation.

| | | | |
|--------|------------------------------|------------|------------|
| P20.04 | Function code initialization | Range: 0~3 | Default: 0 |
|--------|------------------------------|------------|------------|

0: no operation

1: Reset to factory default (Except motor parameters)

2: Reset to factory default (Including motor parameters)

3: Clear fault history record

When this parameter is set to non-0, its value automatically restores to 0 after initialization is done.

| | | | |
|--------|--------------------|------------|------------|
| P20.05 | Copy of Parameters | Range: 0~3 | Default: 0 |
|--------|--------------------|------------|------------|

0: No operation

1: Parameters upload

Upload the parameter setting in control board to keypad

2: Parameters download (except motor parameters)

Download the parameter setting saved in keypad to control board; this download option does not include the motor parameters.

3: Parameters download (including motor parameters)

Download the parameter setting saved in keypad to control board; this download option includes the motor parameters.

Note: Make sure the parameter setting has been uploaded to keypad before you use the download function. It is not allowed to use download function when the keypad has no uploaded parameter setting.

| | | | |
|--------|----------------------|------------|------------|
| P20.06 | Keypad lock function | Range: 0~3 | Default: 0 |
|--------|----------------------|------------|------------|

0: no lock

All keys on keypad could be pressed for operation.

1: all keys locked

All keys on keypad are locked. Keypad indicates "Loc1" if any key is pressed.

2: keys locked except Loc/Rem

Except Loc/Rem, other keys on keypad are locked. Keypad indicates "Loc2" if any key other than Loc/Rem is pressed.

3: keys locked except Start/Stop

Except Start/Stop, other keys on keypad are locked. Keypad indicates "Loc3" if any key other than Start/Stop is pressed.

| | | | |
|--------|--------------------------------|------------|------------|
| P20.08 | Loc/Rem key function selection | Range: 0~4 | Default: 0 |
|--------|--------------------------------|------------|------------|

0: no function

1: Run command source switching

The run command mode will be switched by this sequence: Keypad command →Terminal command →Communication command →Multi-step terminal command

2: Jog forward

3: Jog reverse

Control the forward or reverse jogging of the drive under keypad command mode. The jogging frequency and acceleration/deceleration time are determined by P00.16, P02.09 and P02.10.

4: FWD/REV running switching

This is used to switch the motor running direction in keypad command mode.

| | | | |
|--------|--|----------------------|---------------|
| P20.09 | ▲/▼ keys and Up/Dn terminal regulation setting | Range: 0x0000~0x1111 | Default: 1011 |
|--------|--|----------------------|---------------|

Ones place: Action at stop

0: Up/Dn value clearance at stop

1: Up/Dn value maintained at stop

Tens place: Action at power failure

0: Up/Dn value clearance at power failure

1: Up/Dn value maintained at power failure

Hundreds place: Up/Dn tuning rate selection

0: Automatic rate

1: User-defined rate

2: Up/Dn invalid for frequency setting

Thousands place: PID digital setting value Up/Down

0: Forbidden

1: Allowed

| | | | |
|--------|-------------------------------------|---------------------------|-------------------|
| P20.10 | User-defined Up/Down tuning rate | Range: 0.00Hz/s~10.00Hz/s | Default: 1.00Hz/s |
|--------|-------------------------------------|---------------------------|-------------------|

When the P20.09 hundreds place setting value is 1, the keypad ▲/▼ and terminal Up/Dn changing rate is set by P20.10.

P21 group: Display Setting Parameters

Refer to parameter list for detailed table of displayed parameter setting.

P23 group: Communication Free Mapping Configuration Parameters

| | | | |
|--------|--------------|----------------------|---------------|
| P23.00 | Source ID0 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.01 | Mapping ID0 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.02 | Source ID1 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.03 | Mapping ID1 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.04 | Source ID2 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.05 | Mapping ID2 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.06 | Source ID3 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.07 | Mapping ID3 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.08 | Source ID4 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.09 | Mapping ID4 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.10 | Source ID5 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.11 | Mapping ID5 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.12 | Source ID6 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.13 | Mapping ID6 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.14 | Source ID7 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.15 | Mapping ID7 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.16 | Source ID8 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.17 | Mapping ID8 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.18 | Source ID9 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.19 | Mapping ID9 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.20 | Source ID10 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.21 | Mapping ID10 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.22 | Source ID11 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.23 | Mapping ID11 | Range: 0x0000~0xFFFF | Default: 0000 |

| | | | |
|--------|--------------|----------------------|---------------|
| P23.24 | Source ID12 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.25 | Mapping ID12 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.26 | Source ID13 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.27 | Mapping ID13 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.28 | Source ID14 | Range: 0x0000~0xFFFF | Default: 0000 |
| P23.29 | Mapping ID14 | Range: 0x0000~0xFFFF | Default: 0000 |

Source ID is the upper controller host address, and the mapping ID is the corresponding function code register of the drive. Every 2 parameters form a pair, such as P23.00/P23.01 which shall not be mixed up. After the mapping setting, please set P50.11=0010.

P30 group: Fault and Protection Parameters

| | | | |
|--------|---------------------|------------|------------|
| P30.00 | Cooling fan control | Range: 0~2 | Default: 0 |
|--------|---------------------|------------|------------|

0: Automatic control

When the temperature of the radiator is detected to be higher 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: Working right after power-on

After the variable frequency drive is powered up, the fan runs immediately

2: Stop working immediately after inverter stop

When the variable frequency drive is running, the fan runs with automatic control and it stops working after the inverter stops.

| | | | |
|--------|------------------------------------|--------------------|--------------|
| P30.01 | Motor thermal protection selection | Range: 0x000~0x111 | Default: 000 |
|--------|------------------------------------|--------------------|--------------|

Ones place: motor thermal protection

0: forbidden.

The motor thermal protection is disabled.

1: enabled.

The motor thermal protection is enabled.

Tens place: sensor type

0: temperature sensor PT100

1: temperature sensor PT1000

Choose the sensor type of motor thermal protection.

Hundreds place: Hundred-bit: Analog channel

0: Analog input AI1

1: Analog input AI2

Select the input channel of the motor temperature sensor.

| | | | |
|--------|--------------------------------|--------------------|----------------|
| P30.02 | Motor overheat detection value | Range: 0.0℃~200.0℃ | Default: 85.0℃ |
|--------|--------------------------------|--------------------|----------------|

When the ones place of P30.01 is set to 1, and at the same time if the temperature detected by the sensor is greater than value of P30.02, the variable frequency drive reports a motor overheat fault.

| | | | |
|--------|---|--------------------|--------------|
| P30.03 | Inverter overload pre-alarm detection selection | Range: 0x000~0x111 | Default: 000 |
|--------|---|--------------------|--------------|

Ones place: Overload pre-alarm detection selection

0: always check during running

The overload pre-alarm detection is always effective if the drive is running.

1: detection at constant speed operation only

The overload pre-alarm detection is only effective when the drive runs with constant speed, i.e. it is not detected during acceleration or deceleration process.

Tens place: Overload pre-alarm detection level selection

0: detection level is relative to rated current of motor

This setting is to determine that P30.04 level value is relative to motor's rated current. If the output current reaches the overload pre-alarm level and lasts for the time set in P30.05, the drive gets overload pre-alarm fault.

1: detection level is relative to rated current of variable frequency drive

This setting is to determine that P30.04 level value is relative to inverter's rated current. If the output current reaches the overload pre-alarm level and lasts for the time set in P30.05, the drive gets overload pre-alarm fault.

Hundreds place: Overload pre-alarm protection validation

0: The overload pre-alarm detection is disabled.

1: The overload pre-alarm detection is enabled.

| | | | |
|--------|---------------------------------------|---------------------|-----------------|
| P30.04 | Detection level of overload pre-alarm | Range: 20.0%~200.0% | Default: 160.0% |
|--------|---------------------------------------|---------------------|-----------------|

| | | | |
|--------|-----------------------------------|-------------------|---------------|
| P30.05 | Overload pre-alarm detection time | Range: 0.0s~60.0s | Default: 5.0s |
|--------|-----------------------------------|-------------------|---------------|

P30.04 is used to set the current detection value of overload pre-alarm. Whether the detected percentage value is relative to the rated current of the motor or the rated current of the variable frequency drive 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 over the time set in P30.05, the drive reports an overload pre-alarm fault.

| | | | |
|--------|--|------------|------------|
| P30.06 | Inverter output side load loss detection | Range: 0~4 | Default: 0 |
|--------|--|------------|------------|

0: Inverter output side load loss detection invalid

1: Always detect during running (Continue running)

The detection is always effective when the drive is running. If load loss is detected, the drive indicates Er.LLd and continue running.

2: Only detect during constant speed (continue running)

The detection is effective when the drive is running with constant speed. If load loss is detected, the drive indicates Er.LLd and continue running.

3: Always detect during running (freewheeled stop)

The detection is always effective when the drive is running. If load loss is detected, the drive indicates Er.LLd and then freewheels until stop.

4: Only detect during constant speed (freewheeled stop)

The detection is effective when the drive is running with constant speed. If load loss is detected, the drive indicates Er.LLd and then freewheels until stop.

| | | | |
|--------|--|---------------------|----------------|
| P30.07 | Inverter output side load loss detection level | Range: 0.0%~100.0% | Default: 30.0% |
| P30.08 | Inverter output side load loss detection time | Range: 0.0s~3600.0s | Default: 1.0s |

P30.07 is to used to set the detected current level of load loss fault, the percentage level is relative to the rated current of the drive.

P30.08 is to used to set the duration of detected level for load loss error. If the detected current level is lower than P30.07 and lasts over the time set in P30.08, the drive gets load loss error.

| | | | |
|--------|--------------------------|--------------------|---------------|
| P30.09 | Automatic reset time(s) | Range: 0~100 | Default: 0 |
| P30.10 | Automatic reset interval | Range: 0.1s~100.0s | Default: 1.0s |

After a fault occurs during the running process of the drive, the drive automatically resets the fault after waiting the time set in P30.10; When the reset times reached the number set in P30.09, the drive would not reset the fault automatically. When P30.09 is set to 0, automatic reset is prohibited.

| | | | |
|--------|------------------------------|------------------|-------------|
| P30.11 | Fault relay action selection | Range: 0x00~0x11 | Default: 00 |
|--------|------------------------------|------------------|-------------|

Ones place: action during automatic reset

0: Active

1: No action

This is to set the fault relay actuation works or not during automatic reset.

Tens place: action during under-voltage

0: Active

1: No action

This is to set the fault relay actuation works or not when the drive in under-voltage status.

| | | | |
|--------|--------------------------------|--------------------|--------------|
| P30.12 | Option of enhanced protections | Range: 0x000~0x111 | Default: 101 |
|--------|--------------------------------|--------------------|--------------|

Ones place: output phase loss detection

0: disabled

1: enabled

Choose the drive output phase loss detection works or not.

Tens place: input phase loss detection

0: disabled

1: enabled

Choose the drive input phase loss detection works or not.

Hundreds place: motor overload detection

0: disabled

1: enabled

Choose the motor overload protection works or not.

| | | | |
|--------|----------------------------------|------------|------------|
| P30.13 | Fault history record saving mode | Range: 0~1 | Default: 1 |
|--------|----------------------------------|------------|------------|

It is used to set the way of the fault information data saving when the variable frequency drive gets power failure. It is not recommended to modify this parameter.

0: fault history reset at power failure

1: fault history saved at power failure

| | | | |
|--------|-----------------------------------|----------------------|---------------|
| P30.14 | Fault protection action selector1 | Range: 0x0000~0x1111 | Default: 1111 |
| P30.15 | Fault protection action selector2 | Range: 0x0000~0x1111 | Default: 1111 |

These two selectors are to set whether the drive continues running or enters freewheeled stop when specific types of fault occurs. Check the parameter list for specific fault types.

P40 group: 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, which is a commonly used method in industrial process control. Choose PID control output as the frequency setting to form a closed-loop control system. Generally, it is suitable for applications such as constant pressure water supply and constant tension control.

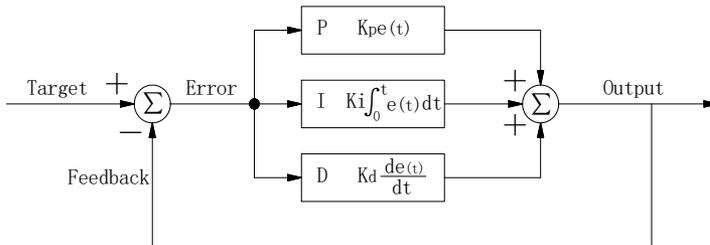


Figure 5-20 PID control schematic diagram

- ◆ 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 reference setting channel selection | Range: 0~8 | Default: 0 |
|--------|---|------------|------------|

0: digital setting in P40.01

1: setting by analog input AI1

2: setting by analog input AI2

3: setting by analog input AI3

4: $\text{Min}[\text{AI1}, \text{AI2}]$

5: $\text{Max}[\text{AI1}, \text{AI2}]$

6: $\text{Sub}[\text{AI1}, \text{AI2}]$

7: $\text{Add}[\text{AI1}, \text{AI2}]$

8: Setting by pulse input HDI

This parameter is used to choose the reference channel of PID target quantity

| | | | |
|--------|---------------------------|--------------------|----------------|
| P40.01 | PID digital setting value | Range: 0.0%~100.0% | Default: 50.0% |
|--------|---------------------------|--------------------|----------------|

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

| | | | |
|--------|--------------------------------|------------|------------|
| P40.02 | PID feedback channel selection | Range: 0~8 | Default: 1 |
|--------|--------------------------------|------------|------------|

0: Constant zero feedback

1: feedback by analog input AI1

2: feedback by analog input AI2

3: feedback by analog input AI3

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: feedback by pulse input HDI

This parameter is to choose the feedback channel.

| | | | |
|--------|-----------------------|-----------------------|-----------------|
| P40.03 | Proportional gain Kp1 | Range: 0.0~100.0 | Default: 50.0 |
| P40.04 | Integral time Ti1 | Range: 0.000s~50.000s | Default: 0.500s |
| P40.05 | Differential time Td1 | Range: 0.000s~50.000s | Default: 0.000s |
| P40.06 | Proportional gain Kp2 | Range: 0.0~100.0 | Default: 50.0 |
| P40.07 | Integral time Ti2 | Range: 0.000s~50.000s | Default: 0.500s |
| P40.08 | Differential time Td2 | Range: 0.000s~50.000s | Default: 0.000s |

Refer to the PID control instruction for the usage of the two groups of Kp, Ti, Td parameters. For general applications, PI adjustment is enough. Improper use of differential control can easily cause system oscillation.

| | | | |
|--------|---------------------------------|------------|------------|
| P40.09 | PID parameters switching method | Range: 0~2 | Default: 0 |
|--------|---------------------------------|------------|------------|

0: use Kp1、Ki1 and Kd1 only (no switching)

1: Switching according to input deviation value

When the difference between target and feedback is larger than P40.10, PID operation switches to P40.06~P40.08; while the deviation is smaller than P40.10, PID control returns to P40.03~P40.05.

2: Switching by terminal

When the input terminal set as "PID parameters switching" is activated, PID switches to P40.06~P40.08; when this terminal is off, PID operation gets back to P40.03~P40.05

| | | | |
|--------|---|--------------------|----------------|
| P40.10 | Input deviation value for PID switching | Range: 0.0%~100.0% | Default: 20.0% |
|--------|---|--------------------|----------------|

The deviation benchmark value when PID parameters are automatically switched.

| | | | |
|--------|--------------------------|------------------|-------------|
| P40.11 | PID regulating selection | Range: 0x00~0x11 | Default: 11 |
|--------|--------------------------|------------------|-------------|

Ones place: Output frequency

0: shall be same as preset running direction

When the PID regulated output frequency is inconsistent with the preset running direction, the PID output is forced to be 0.

1: could be reversed to preset running direction

When the PID adjustment output frequency is opposite to the preset running direction, the PID outputs as usual.

Tens place: Integral mode

0: Integral regulating continues when it reaches upper/lower limit

When the PID adjustment reaches the upper or lower limit, the integrator continues accumulation. In this way, it takes quite long time to get out of integral saturation status.

1: Integral regulating stops when it reaches upper/lower limit

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 effect | Range: 0~1 | Default: 0 |
|--------|----------------------------------|------------|------------|

0: Positive effect

When the feedback is lower than the target, the output frequency rises.

1: Negative effect

When the feedback is lower than the target, the output frequency drops.

| | | | |
|--------|-----------------------------|---------------------|----------------|
| P40.13 | PID giving filtering time | Range: 0.00s~10.00s | Default: 0.00s |
| P40.14 | PID feedback filtering time | Range: 0.00s~10.00s | Default: 0.00s |
| P40.15 | PID output filtering time | Range: 0.00s~10.00s | Default: 0.00s |

Increasing the filtering time can improve the anti-interference ability of the system; but it will bring about a decrease in the system response capability.

| | | | |
|--------|-----------------|-----------------------|-----------------|
| P40.16 | Sampling period | Range: 0.001s~50.000s | Default: 0.002s |
|--------|-----------------|-----------------------|-----------------|

It is a cycle period for sampling the feedback signal and doing the calculation. The longer the sampling period, the slower the system response.

| | | | |
|--------|---------------------|--------------------|---------------|
| P40.17 | Deviation tolerance | Range: 0.0%~100.0% | 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 is larger than this value, the PID regulating works. This function helps to balance the stability and accuracy of the system.

| | | | |
|--------|------------------------------|--------------------|---------------|
| P40.18 | Differential amplitude limit | Range: 0.0%~100.0% | Default: 0.5% |
|--------|------------------------------|--------------------|---------------|

Limiting the amplitude of PID differential adjustment helps to improve the stability of the differential operator.

| | | | |
|--------|--------------------------------|---------------------|---------------|
| P40.19 | PID initial value | Range: 0.0%~100.0% | Default: 0.0% |
| P40.20 | PID initial value holding time | Range: 0.0s~3600.0s | Default: 0.0s |

When the variable frequency drive starts running, it outputs frequency of initial value firstly, and after holding it for a period of time set in P40.20, PID adjustment starts to take control.

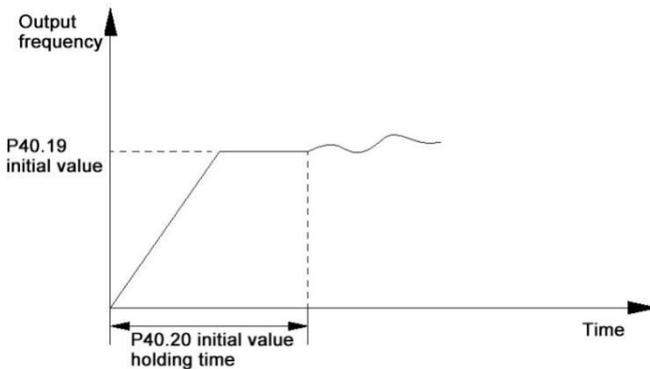


Figure 5-21 PID initial value schematic diagram

| | | | |
|--------|------------------------------------|--------------------|-----------------|
| P40.21 | PID operation output maximum value | Range: 0.0%~100.0% | Default: 100.0% |
|--------|------------------------------------|--------------------|-----------------|

Limit the maximum value of PID regulated output.

| | | | |
|--------|-------------------------------------|---------------------------------|-----------------|
| P40.22 | PID reverse output cutoff frequency | Range: 0.00Hz~Maximum frequency | Default: 0.00Hz |
|--------|-------------------------------------|---------------------------------|-----------------|

Limit the maximum frequency when the PID regulated output direction is opposite to the preset running command.

| | | | |
|--------|--------------------------------|------------|------------|
| P40.23 | PID operator selection at stop | Range: 0~1 | Default: 0 |
|--------|--------------------------------|------------|------------|

| | | | |
|--|-------|--|--|
| | state | | |
|--|-------|--|--|

0: PID stops regulating at stop state

1: PID keeps working at stop state

This is to choose whether the PID regulating continues when the drive is in stop state.

| | | | |
|--------|------------------------------------|---------------------|----------------|
| P40.24 | PID reference loss detection level | Range: 0.0%~100.0% | Default: 0.0% |
| P40.25 | PID reference loss detection time | Range: 0.00s~30.00s | Default: 1.00s |

When the PID reference is less than the setting value of P40.24 and the duration is greater than the value of P40.25, the variable frequency drive will have freewheeled stop or emergency stop according to setting of P40.28.

| | | | |
|--------|-----------------------------------|---------------------|----------------|
| P40.26 | PID feedback loss detection level | Range: 0.0%~100.0% | Default: 0.0% |
| P40.27 | PID feedback loss detection time | Range: 0.00s~30.00s | Default: 1.00s |

When the PID feedback value is less than the value of P40.26 and the duration is greater than the value of P40.27, the variable frequency drive will have freewheeled stop or emergency stop according to setting of P40.28.

| | | | |
|--------|---------------------------|------------|------------|
| P40.28 | PID signal loss stop mode | Range: 0~1 | Default: 0 |
|--------|---------------------------|------------|------------|

0: Freewheeled stop

1: Emergency stop

| | | | |
|--------|--------------------------------|-------------------------------------|-----------------|
| P40.29 | Zero frequency upper threshold | Range: P40.30~upper frequency limit | Default: 0.00Hz |
| P40.30 | Zero frequency lower threshold | Range: 0.00Hz~P40.29 | Default: 0.00Hz |

If P40.31=0 (Waking up by frequency threshold), when PID regulated output frequency \geq P40.29, and its duration is longer than the time set in P40.35, the variable frequency drive starts to run with PID regulated output frequency; when the run frequency \leq P40.30, and its duration is longer than the value of P40.33, the variable frequency drive stops running and outputs zero frequency.

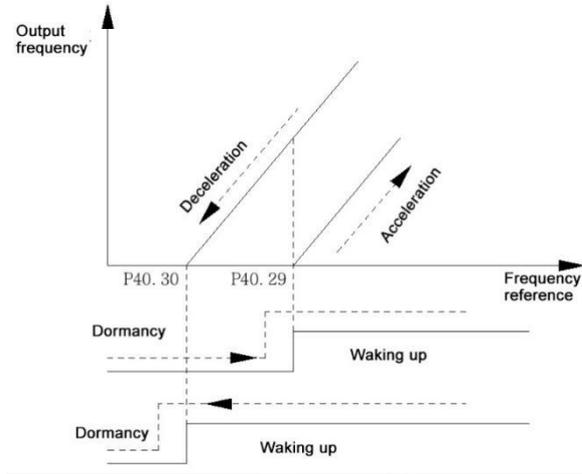


Figure 5-22 Schematic diagram of zero frequency running upper and lower threshold

| | | | |
|--------|-------------------------|------------|------------|
| P40.31 | Dormancy waking up mode | Range: 0~1 | Default: 0 |
|--------|-------------------------|------------|------------|

0: Waking up by frequency threshold

The drive gets into dormancy or wakes up based on PID output frequency.

1: Waking up by pressure threshold

The drive gets into dormancy or wakes up based on detected pressure level.

| | | | |
|--------|-----------------------------------|----------------------|---------------|
| P40.32 | Dormancy pressure detection value | Range: P40.34~P40.37 | Default: 1000 |
|--------|-----------------------------------|----------------------|---------------|

If P40.31=1, when the feedback pressure \geq P40.32, and lasts over the time set in P40.33, the drive enters dormancy.

| | | | |
|--------|-------------------------------|---------------------|----------------|
| P40.33 | Dormancy detection delay time | Range: 0.00s~30.00s | Default: 1.00s |
|--------|-------------------------------|---------------------|----------------|

The delay time the drive takes to enter the dormancy state.

| | | | |
|--------|--------------------------|-----------------|------------|
| P40.34 | Waking up pressure value | Range: 0~P40.32 | Default: 0 |
|--------|--------------------------|-----------------|------------|

If P40.31=1, when feedback pressure \leq P40.34, and the duration is over the time set in P40.35, the variable frequency drive wakes up from dormancy.

| | | | |
|--------|---------------------------|---------------------|----------------|
| P40.35 | Waking up detection delay | Range: 0.00s~30.00s | Default: 0.50s |
|--------|---------------------------|---------------------|----------------|

The delay time the drive takes to wake up from dormancy state.

| | | | |
|--------|---|----------------|---------------|
| P40.37 | PID reference and feedback pressure measuring range | Range: 0~10000 | Default: 1000 |
|--------|---|----------------|---------------|

Set the measuring range of the pressure sensor.

P41 group: Multi-step Frequency Parameters

| | | | |
|--------|-------------------------------|----------------------|-----------------|
| P41.00 | Multi-step digital setting 1 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.01 | Multi-step digital setting 2 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.02 | Multi-step digital setting 3 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.03 | Multi-step digital setting 4 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.04 | Multi-step digital setting 5 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.05 | Multi-step digital setting 6 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.06 | Multi-step digital setting 7 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.07 | Multi-step digital setting 8 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.08 | Multi-step digital setting 9 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.09 | Multi-step digital setting 10 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.10 | Multi-step digital setting 11 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.11 | Multi-step digital setting 12 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.12 | Multi-step digital setting 13 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.13 | Multi-step digital setting 14 | Range: P00.09~P00.08 | Default: 0.00Hz |
| P41.14 | Multi-step digital setting 15 | Range: P00.09~P00.08 | Default: 0.00Hz |

Up to 16 steps of frequency could be switched by using different combinations of Multi-step terminals 1~4. Please refer to the section of introduction for digital terminals for the specific setting method.

| | | | |
|--------|--|------------|------------|
| P41.15 | Multi-step frequency 1 setting channel | Range: 0~9 | Default: 0 |
|--------|--|------------|------------|

- 0: Digital setting P41.00
- 1: Analog input AI1
- 2: Analog input AI2
- 3: Analog input AI3
- 4: Min[AI1,AI2]
- 5: Max[AI1,AI2]
- 6: Sub[AI1,AI2]
- 7: Add[AI1,AI2]
- 8: Pulse setting by HDI
- 9: Process PID

This parameter is to set the step-1 frequency reference channel.

P42 group: Simple PLC

The simple PLC function is to realize the automatic switching of actual running conditions of the variable frequency drive according to the preset stage frequency and stage time so as to meet the production techniques requirement. Its control flow diagram is as below.

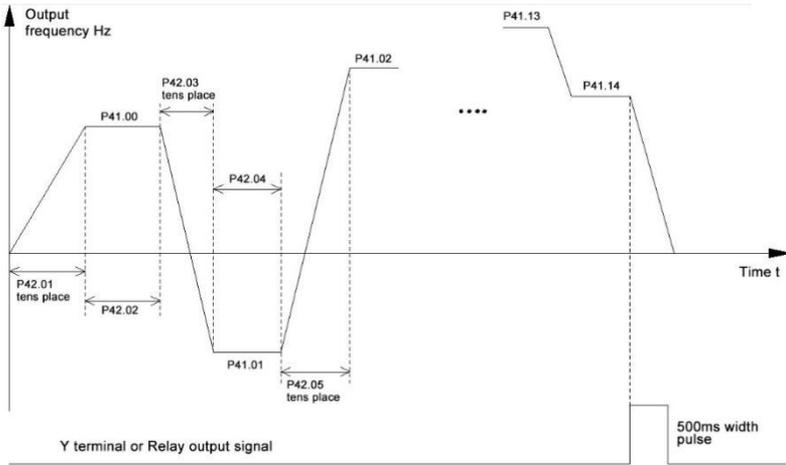


Figure 5-23 Simple PLC running schematic diagram

| | | | |
|--------|-------------------------------------|----------------------|---------------|
| P42.00 | Simple PLC operation mode selection | Range: 0x0000~0x1111 | Default: 0000 |
|--------|-------------------------------------|----------------------|---------------|

Ones place: Simple PLC running mode

0: Run a single cycle and stop

The variable frequency drive stops automatically when one cycle of PLC operation is completed. It would not start until a new run command is given.

1: Run a single cycle and maintain final value

When one cycle of PLC operation is completed, the drive continues running with the final stage frequency until stop command is given.

2: Continuous cycle running

When one cycle of PLC operation is completed, the drive automatically starts from the first stage of a new cycle until stop command is given.

Tens place: Simple PLC starting mode

0: Start from stage-1

The drive does not memorize the current running stage when it stops and would run from the first stage when restarting.

1: Start from frequency of the interrupted stage

The drive memorizes the current running stage when it stops and would start again from this memorized stage where it stopped.

Hundreds place: Simple PLC saving options at power failure

0: Reset at power failure

The drive does not memorize the current running stage when it gets power failure and would restart from the first stage when it is powered up again.

1: Saved at power failure

The drive memorizes the current running stage when it gets power failure and would restart from this memorized stage where it stopped when it is powered up again.

Thousands place: Simple PLC time unit

0: Second (s)

1: Minute (min)

This place is to set the running time unit of PLC stages.

| | | | |
|--------|---------------------|------------------|-------------|
| P42.01 | PLC stage 1 setting | Range: 0x00~0x13 | Default: 00 |
|--------|---------------------|------------------|-------------|

Ones place: Stage running direction of simple PLC

0: Forward

1: Reverse

This is to define the running direction of PLC stage-1

Tens place: Stage Acc./Dec. time of simple PLC

0: Acc./Dec. time 1

1: Acc./Dec. time 2

2: Acc./Dec. time 3

3: Acc./Dec. time 4

This is to choose the PLC stage-1 Acc./Dec. time

| | | | |
|--------|----------------------|-------------------|--------------|
| P42.02 | Stage 1 running time | Range: 0.0~3276.7 | Default: 0.0 |
|--------|----------------------|-------------------|--------------|

This parameter is used to set the running time of PLC stage-1, time unit is determined in P42.00 thousands place setting. PLC stage-1 running frequency is determined by P41.00 value, and PLC stage-2 frequency is determined by P41.02, and on the analogy of this PLC stage-15 frequency is determined by P41.14.

| | | | |
|--------|----------------------|-------------------|--------------|
| P42.03 | PLC stage 2 setting | Range: 0x00~0x13 | Default: 00 |
| P42.04 | Stage 2 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.05 | PLC stage 3 setting | Range: 0x00~0x13 | Default: 00 |
| P42.06 | Stage 3 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.07 | PLC stage 4 setting | Range: 0x00~0x13 | Default: 00 |
| P42.08 | Stage 4 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.09 | PLC stage 5 setting | Range: 0x00~0x13 | Default: 00 |
| P42.10 | Stage 5 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.11 | PLC stage 6 setting | Range: 0x00~0x13 | Default: 00 |
| P42.12 | Stage 6 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.13 | PLC stage 7 setting | Range: 0x00~0x13 | Default: 00 |
| P42.14 | Stage 7 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.15 | PLC stage 8 setting | Range: 0x00~0x13 | Default: 00 |
| P42.16 | Stage 8 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.17 | PLC stage 9 setting | Range: 0x00~0x13 | Default: 00 |
| P42.18 | Stage 9 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.19 | PLC stage 10 setting | Range: 0x00~0x13 | Default: 00 |

| | | | |
|--------|-----------------------|-------------------|--------------|
| P42.20 | Stage 10 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.21 | PLC stage 11 setting | Range: 0x00~0x13 | Default: 00 |
| P42.22 | Stage 11 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.23 | PLC stage 12 setting | Range: 0x00~0x13 | Default: 00 |
| P42.24 | Stage 12 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.25 | PLC stage 13 setting | Range: 0x00~0x13 | Default: 00 |
| P42.26 | Stage 13 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.27 | PLC stage 14 setting | Range: 0x00~0x13 | Default: 00 |
| P42.28 | Stage 14 running time | Range: 0.0~3276.7 | Default: 0.0 |
| P42.29 | PLC stage 15 setting | Range: 0x00~0x13 | Default: 00 |
| P42.30 | Stage 15 running time | Range: 0.0~3276.7 | Default: 0.0 |

The PLC stage2~stage15 setting method is the same as that of stage-1. Please refer to the stage-1 instruction for details.

P43 group: Fixed length control and Linear Velocity Parameters

| | | | |
|--------|------------------------|-----------------|---------------|
| P43.00 | Preset count number | Range: 1~65535 | Default: 1000 |
| P43.01 | Specified count number | Range: 1~P43.00 | Default: 1000 |

This parameter, assisted with digital input and output terminals setting, is able to realize the number count function of terminal X and the count number arrival output of terminal Y.

| | | | |
|--------|---------------------------------|----------------------|---------------|
| P43.02 | Length arrival action selection | Range: 0x0000~0x1111 | Default: 0000 |
|--------|---------------------------------|----------------------|---------------|

Ones place: Length arrival

0: Continue running

1: Stop

Tens place: Length unit

0: meter

1: 10 meters

Hundreds place: Length clearance at stop state

0: Invalid

1: Action

Thousands place:

0: Invalid

1: Action

| | | | |
|--------|---------------|------------------|-------------|
| P43.03 | Preset length | Range: 0m~65535m | Default: 0m |
|--------|---------------|------------------|-------------|

When the detected length reaches the preset length value of P43.03, the digital output terminal set as "Preset length arrival" output valid signal and the drive would act by the way set in ones place of P43.02.

| | | | |
|--------|------------------------|-------------------|-----------------|
| P43.04 | Pulse number per meter | Range: 0.1~6553.5 | Default: 1000.0 |
|--------|------------------------|-------------------|-----------------|

Set the pulse number that corresponds to one meter for length calculation.

| | | | |
|--------|-------------------------------------|---------------------|---------------|
| P43.05 | Linear velocity display coefficient | Range: 0.0%~1000.0% | Default: 0.0% |
|--------|-------------------------------------|---------------------|---------------|

This is to set the adjustment coefficient for linear velocity display.

P44 Lifting Function Parameters (Special Lifting Model)

| | | | |
|--------|---------------------------|------------------|-------------|
| P44.00 | Type of Lifting mechanism | Range: 0x00~0x12 | Default: 00 |
|--------|---------------------------|------------------|-------------|

Ones place: Mechanism type

0: Prohibited

1: Elevate Mechanism

When the drive is used to vertical lifting hoist, please make sure the drive's forward running for going up and reversed running for going down. If the actual direction is not consistent with the demand, please exchange the wiring on any two output phases of the drive. When the vertical lifting mechanism is chosen, the drive switches to terminal command control and the mechanical output terminal control is effective.

2:Conical Motor

When the motor is a conical motor, set up it.

3: Linear Mechanism

It is used for translation mechanism of cart or car.

Tens place: Reserved

| | | | |
|--------|--------------------------------|-----------------------|-----------------|
| P44.01 | Upward brake release frequency | Range: 0.00Hz~10.00Hz | Default: 2.00Hz |
| P44.02 | Upward brake release current | Range: 0.0%~200.0% | Default: 30.0% |

This pair of parameters are to set the lifting upward frequency and current values used for brake releasing judgment. When the drive runs forward for lifting upward, if both the output frequency and current reach the preset values, it starts timing before brake releasing. When the timing is up, the brake is released and the drive speeds up.

| | | | |
|--------|----------------------------------|-----------------------|-----------------|
| P44.03 | Downward brake release frequency | Range: 0.00Hz~10.00Hz | Default: 3.00Hz |
| P44.04 | Downward brake release current | Range: 0.0%~200.0% | Default: 30.0% |

This pair of parameters are to set the downward frequency and current values used for brake releasing judgment. When the drive runs reversely for going downward, if both the output frequency and current reach the preset values, it starts timing before brake releasing. When the timing is up, the brake is released and the drive speeds up.

| | | | |
|--------|--------------------------------------|-------------------|---------------|
| P44.05 | Brake release frequency holding time | Range: 0.0s~10.0s | Default: 0.5s |
|--------|--------------------------------------|-------------------|---------------|

When the drive output frequency is equal to the brake releasing frequency, and at the same time if output current \geq brake releasing current, the drive holds the frequency output for a period of time set in P44.05 and then the brake controlling relay is energized.

| | | | |
|--------|----------------------------------|-----------------------|-----------------|
| P44.06 | Upward brake actuation frequency | Range: 0.00Hz~10.00Hz | Default: 2.00Hz |
|--------|----------------------------------|-----------------------|-----------------|

This is the brake actuation starting frequency for upward running.

When the output frequency \leq P44.06, the brake controlling relay electricity is removed.

| | | | |
|--------|------------------------------------|-----------------------|-----------------|
| P44.07 | Downward brake actuation frequency | Range: 0.00Hz~10.00Hz | Default: 3.00Hz |
|--------|------------------------------------|-----------------------|-----------------|

This is the brake actuation starting frequency for downward running.

When the output frequency \leq P44.07, the brake controlling brake electricity is removed.

| | | | |
|--------|--|-------------------|---------------|
| P44.08 | Brake actuation frequency holding time | Range: 0.0s~10.0s | Default: 0.5s |
|--------|--|-------------------|---------------|

Within the brake actuation frequency holding time, the output frequency maintains unchanged.

| | | | |
|--------|----------------------------|-------------------|---------------|
| P44.09 | Brake actuation delay time | Range: 0.0s~10.0s | Default: 0.0s |
| P44.10 | Stop delay time | Range: 0.0s~10.0s | Default: 0.5s |

When the the drive gets stop command, after the brake actuation frequency holding period is completed, and then wait for the time P44.10, the drive stops.

| | | | |
|--------|-----------------------------------|------------|------------|
| P44.11 | Starting torque direction control | Range: 0~1 | Default: 0 |
|--------|-----------------------------------|------------|------------|

0: Brake release torque direction same as the running direction

1: Brake release torque direction always be forward direction

It is to determine the torque direction at the time of brake releasing.

| | | | |
|--------|---------------------------|------------|------------|
| P44.12 | Reverse command selection | Range: 0~1 | Default: 0 |
|--------|---------------------------|------------|------------|

0: Directly reverse forbidden during running

1: Directly reverse allowed during running

This is to set whether the drive follows the reverse running command directly. When the direct reverse is forbidden, if the reverse command is given, the drive shall firstly control the brake actuation signal output when it is passing the zero speed, and after this it runs reversely. When direct reverse is allowed, the drive does not output brake actuation control signal when passing the zero speed.

P50 group: Modbus Communication Parameters

The drive supports general Modbus protocol, refer to Appendix A for detailed protocol content.

| | | | |
|--------|---------------|--------------|------------|
| P50.00 | Local address | Range: 0~247 | Default: 1 |
|--------|---------------|--------------|------------|

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

| | | | |
|--------|-------------------------|------------------|-------------|
| P50.01 | Communication baud rate | Range: 0x10~0x55 | Default: 31 |
|--------|-------------------------|------------------|-------------|

Ones place: terminal port communication baud rate

Tens place: Keypad port communication baud rate

0: 4800bps

1: 9600bps

2: 19200bps

3: 38400bps

4: 57600bps

5: 115200bps

| | | | |
|--------|-------------|------------------|-------------|
| P50.02 | Data format | Range: 0x00~0x55 | Default: 00 |
|--------|-------------|------------------|-------------|

Ones place:

Terminal port data format

Tens place:

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 | Default: 0.000s |
|--------|----------------------|-----------------------|-----------------|

Delay time for answering the host in communication.

| | | | |
|--------|-------------------------|--------------------|---------------|
| P50.04 | Overtime detection time | Range: 0.0s~600.0s | Default: 0.0s |
|--------|-------------------------|--------------------|---------------|

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

| | | | |
|--------|--|------------------|-------------|
| P50.05 | Communication error response masking selection | Range: 0x00~0x11 | Default: 00 |
|--------|--|------------------|-------------|

Ones place: terminal port error response masking(screening)

Tens place: keypad port error response masking(screening)

0: Masking valid

1: Masking invalid

| | | | |
|--------|--|----------------------|---------------|
| P50.06 | Master-follower mode selection and follower function setting | Range: 0x0000~0x1122 | Default: 0000 |
|--------|--|----------------------|---------------|

Ones place: Terminal port communication master/follower selection

0: Operate stand-alone

1: Operate as Master

2: Operate as Follower

Tens place: Terminal port communication operation address

0: Frequency setting

1: PID target quantity setting

| | | | |
|--------|-------------------------------------|----------------------|-----------------|
| P50.07 | Master data operation time interval | Range: 0.010s~1.000s | Default: 0.050s |
|--------|-------------------------------------|----------------------|-----------------|

When the drive is used as a master, this is to define the interval of data sending.

| | | | |
|--------|---|-------------------|---------------|
| P50.08 | Follower received data proportional coefficient | Range: 0.00~10.00 | Default: 1.00 |
|--------|---|-------------------|---------------|

When the drive is used as a follower, the received data is scaled by the proportion set here before being written to the operation address (P00.00 or P40.01).

| | | | |
|--------|------------------------------------|----------------------|---------------|
| P50.11 | Communication particular functions | Range: 0x0000~0x3111 | Default: 0000 |
|--------|------------------------------------|----------------------|---------------|

Ones place:

0: communication written parameters are not saved.

1: communication written parameters are saved.

Tens place:

0: Register mapping function disabled

1: Register mapping function enabled

P60 group: Motor Control Parameters

| | | | |
|--------|-------------------|-----------------------|---------------------|
| P60.00 | Carrier frequency | Range: 1.0kHz~16.0kHz | Default: Depends on |
|--------|-------------------|-----------------------|---------------------|

Carrier frequency's influences on the drive and motor running mainly include temperature rise, motor wear, interference, leakage current, etc.

High carrier frequency: more temperature rising of the drive, higher output leakage current, and more interference to the external devices; while the motor mechanical deterioration is smaller, motor temperature rising as well as the motor noise also smaller.

Low carrier frequency: smaller temperature rising of the drive, enhanced output current harmonics, lower output leakage current and reduced interference to the external devices. But the motor wear increases and noise gets higher.

| | | | |
|--------|--------------------------------------|------------|--------------|
| P60.01 | Carrier frequency adjustment setting | Range: 111 | Default: 000 |
|--------|--------------------------------------|------------|--------------|

Ones place: Random carrier frequency. Only used in asynchronous motor scalar control. Noise is relatively large.

0: Random carrier frequency disabled

1: Random carrier frequency enabled

Tens place: Carrier frequency varying with temperature

0: carrier frequency varying temperature

1: Preset carrier frequency

Hundreds place: Carrier frequency automatic switching according to running frequency

0: carrier frequency switching enabled.

1: carrier frequency switching disabled

| | | | |
|--------|-----------------------------|------------|------------|
| P60.02 | Pulse width modulation mode | Range: 0~1 | Default: 0 |
|--------|-----------------------------|------------|------------|

0: three phase modulation

1: automatic switching

| | | | |
|--------|--------------------------|-------------------------------|-----------------|
| P60.03 | DPWM switching frequency | Range: 5.00Hz~ Max. frequency | Default: 8.00Hz |
|--------|--------------------------|-------------------------------|-----------------|

When P60.02=1, and the output frequency of the variable frequency drive 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 | Default: 1 |
|--------|-------------------------------|------------|------------|

0: disabled

1: enabled

When the magnetic flux braking function is enabled, the motor deceleration time could be shortened and thus realize the effect of faster motor deceleration.

| | | | |
|--------|------------------------------------|------------|------------|
| P60.05 | Energy consumption brake selection | Range: 0~1 | Default: 0 |
|--------|------------------------------------|------------|------------|

0: disabled

1: enabled

Where braking resistor is used together with the drive for fast stop, the energy consumption brake function shall be chosen.

| | | | |
|--------|---|------------------|---------------|
| P60.06 | Energy consumption brake activation voltage | Range: 650V~750V | Default: 720V |
|--------|---|------------------|---------------|

It is used when P60.05=1. When the DC bus voltage rises to this value, the braking unit is activated and the extra energy brought by the higher voltage in the bus could be consumed in the form of heating through the braking resistor.

| | | | |
|--------|--|------------|------------|
| P60.07 | Over-voltage suppression speed adjusting | Range: 0~1 | Default: 1 |
|--------|--|------------|------------|

0: disabled

1: enabled

The over-voltage suppression speed adjusting function is to detect the bus voltage and compare it with the value set in P60.08. When the bus voltage exceeds the setting value, the variable frequency drive automatically adjusts the output frequency to maintain the stability of the bus voltage. When the variable frequency drive works with over-voltage suppression speed adjusting, the actual deceleration time is longer than the setting time.

| | | | |
|--------|---|----------------------|-----------------|
| P60.08 | Activation voltage for oV suppression speed adjusting | Range: 100.0%~150.0% | Default: 135.0% |
|--------|---|----------------------|-----------------|

The value of activation voltage for over-voltage suppression is the percentage level relative to the drive's rated DC bus voltage.

| | | | |
|--------|--|------------|------------|
| P60.09 | speed adjusting to counter under-voltage | Range: 0~1 | Default: 1 |
|--------|--|------------|------------|

0: disabled

1: enabled

The function of speed adjusting to counter under-voltage is that when the bus voltage drops instantaneously, the variable frequency drive reduces the motor speed by reducing the output frequency, and the inertial energy of the load is fed back to the bus side in generating form to maintain the stability of the bus voltage of the variable frequency drive.

| | | | |
|--------|--|--------------------|----------------|
| P60.10 | Activation voltage for under-voltage counter speed adjusting | Range: 50.0%~95.0% | Default: 85.0% |
|--------|--|--------------------|----------------|

The value of activation voltage for under-voltage counter is a percentage level relative to the rated DC bus voltage of the drive.

| | | | |
|--------|--------------------------------|------------|------------|
| P60.11 | Current limit action selection | Range: 0~1 | Default: 1 |
|--------|--------------------------------|------------|------------|

0: disabled

1: enabled

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

| | | | |
|--------|---------------------|---------------------|-----------------|
| P60.12 | Current limit level | Range: 20.0%~200.0% | Default: 160.0% |
|--------|---------------------|---------------------|-----------------|

The current limit level setting value is a percentage level relative to the rated current of the variable frequency drive.

| | | | |
|--------|------------------------|--------------------|-----------------|
| P60.13 | Slip compensation gain | Range: 0.0%~300.0% | Default: 100.0% |
|--------|------------------------|--------------------|-----------------|

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 in case of load fluctuation or heavy load.

| | | | |
|--------|--------------------------------|------------|------------|
| P60.14 | Frequency resolution selection | Range: 0~1 | Default: 0 |
|--------|--------------------------------|------------|------------|

0: 0.01Hz

User to choose this based on application demand, the maximum frequency P00.07 could be set 300Hz and below

1: 0.1Hz

User to choose this based on application demand, the maximum frequency P00.07 could be set 300Hz~1500Hz.

P61 group: Encoder Parameters

| | | | |
|--------|-----------------------------|------------|------------|
| P61.00 | Speed feedback encoder type | Range: 0~3 | Default: 0 |
|--------|-----------------------------|------------|------------|

0: Incremental encoder (without UVW hall sensor)

1: Incremental encoder (with UVW hall sensor)

2: Resolver encoder

3: Sine encoder

The encoder type for speed feedback is set in this parameter.

| | | | |
|--------|--------------------|----------------|---------------|
| P61.01 | Encoder resolution | Range: 0~10000 | Default: 1024 |
|--------|--------------------|----------------|---------------|

When with-PG vector control (VC) is selected, the resolution of the motor speed feedback encoder must be set correctly, otherwise the motor cannot run properly.

| | | | |
|--------|-----------------------|-----------------------|----------------|
| P61.02 | Electric angle offset | Range: 0.00° ~359.99° | Default: 0.00° |
|--------|-----------------------|-----------------------|----------------|

The initial angle of the encoder installation position, it is recognized by motor tuning; this determines the angle of the encoder installation origin relative to the magnetic pole.

| | | | |
|--------|-------------------------------|------------|------------|
| P61.03 | Encoder signal phase sequence | Range: 0~1 | Default: 0 |
|--------|-------------------------------|------------|------------|

0: Normal, i.e. Phase-A is leading phase-B in forward running

1: Reverse, i.e. Phase-B is leading phase-A in forward running

| | | | |
|--------|--------------------------------------|----------------|---------------|
| P61.04 | Numberator of electronic gear ratio | Range: 1~65535 | Default: 1000 |
| P61.05 | Denominator of electronic gear ratio | Range: 1~65535 | Default: 1000 |

This is to set the transmission ratio between encoder installation shaft and motor shaft.

| | | | |
|--------|----------------------------|-------------|------------|
| P61.06 | Resolver pole pairs number | Range: 1~32 | Default: 1 |
|--------|----------------------------|-------------|------------|

Set how many pole pairs does the resolver encoder have.

| | | | |
|--------|----------------------------|---------------------|-----------------|
| P61.07 | Sine signal offset | Range: 1~65535 | Default: 0 |
| P61.08 | Cosine signal offset | Range: 1~65535 | Default: 0 |
| P61.09 | Sine signal gain | Range: 1~8192 | Default: 4096 |
| P61.10 | Cosine signal gain | Range: 1~8192 | Default: 4096 |
| P61.11 | Over-speed detection value | Range: 0.0%~120.0% | Default: 120.0% |
| P61.12 | Over-speed detection time | Range: 0.00s~20.00s | Default: 0.00s |

When the encoder measured speed is larger than the over-speed detection value set in P61.11 and the duration is longer than Over-speed detection time, the drive reports over-speed error. The over-speed detection value is P61.11 * Max. Frequency.

| | | | |
|--------|--------------------------------|---------------------|----------------|
| P61.13 | Over-deviation detection value | Range: 0.0%~50.0% | Default: 10.0% |
| P61.14 | Over-deviation detection time | Range: 0.00s~20.00s | Default: 0.00s |

When the value (running frequency - set frequency) is larger than the over-deviation detection value and the duration is longer than Over-deviation detection time, the drive reports over-deviation error. The over-deviation detection actual value is P61.13* Max. Frequency.

| | | | |
|--------|-------------------------|------------------|---------------|
| P61.15 | Off-line detection time | Range: 0.0s~8.0s | Default: 0.0s |
|--------|-------------------------|------------------|---------------|

When the encoder speed measuring is enabled, if there is no encoder signal could be detected over a period of time set in P61.15, the drive reports Encoder error.

P62 group: Motor Characteristics Parameters

| | | | |
|--------|--|--|---------------------------|
| P62.00 | Asynchronous motor stator resistance | Range: 0.001 Ω ~65.000 Ω | Default: Depends on model |
| P62.01 | Asynchronous motor rotor resistance | Range: 0.001 Ω ~65.000 Ω | Default: Depends on model |
| P62.02 | Asynchronous motor leakage inductance | Range: 0.01mH~650.00mH | Default: Depends on model |
| P62.03 | Asynchronous motor mutual inductance | Range: 0.01mH~650.00mH | Default: Depends on model |
| P62.04 | Asynchronous motor no-load current | Range: 0.1A~P63.02 | Default: Depends on model |
| P62.05 | Asynchronous motor stator resistance high level | Range: 0~65535 | Default: Depends on model |
| P62.06 | Asynchronous motor rotor resistance high level | Range: 0~65535 | Default: Depends on model |
| P62.07 | Asynchronous motor leakage inductance high level | Range: 0~65535 | Default: Depends on model |

| | | | |
|--------|---|----------------|---------------------------|
| P62.08 | Asynchronous motor mutual inductance high level | Range: 0~65535 | Default: Depends on model |
|--------|---|----------------|---------------------------|

The above group is characteristic parameters of asynchronous motors, whose default values are automatically set according to the drive's power rating. These characteristic parameters could be also recognized automatically by static or dynamic motor tuning. They could be also provided by the motor manufacturer.

| | | | |
|--------|---|--------------------------|---------------------------|
| P62.09 | Synchronous motor stator resistance | Range: 0.001 Ω ~65.000 Ω | Default: Depends on model |
| P62.10 | Synchronous motor direct axis inductance | Range: 0.01mH~650.00mH | Default: Depends on model |
| P62.11 | Synchronous motor quadrature axis inductance | Range: 0.01mH~650.00mH | Default: Depends on model |
| P62.12 | Synchronous motor counter EMF | Range: 0.1V~2000.0V | Default: Depends on model |
| P62.13 | Synchronous motor stator resistance high level | Range: 0~65535 | Default: Depends on model |
| P62.14 | Synchronous motor direct axis inductance high level | Range: 0~65535 | Default: Depends on model |
| P62.15 | Synchronous motor quadrature axis inductance high level | Range: 0~65535 | Default: Depends on model |

This group is characteristic parameters of synchronous motor. The default values are set automatically in software according to the drive's power rating. The static or dynamic motor tuning function could also identify these characteristics and automatically set the value to each parameter. They could be also provided by the motor manufacturer.

| | | | |
|--------|--|--------------------|----------------|
| P62.16 | Synchronous motor field-weakening mode | Range: 0~2 | Default: 0 |
| P62.17 | Synchronous motor field-weakening gain | Range: 0.0%~100.0% | Default: 10.0% |

0: no field-weakening function

The synchronous motor does not perform the field-weakening function. In this mode, the synchronous motor shall run within rated speed and the motor running current is small.

1: Automatic regulating mode

The higher the speed, the larger the field-weakening current. When it reaches the motor rated current, the speed could not increase any longer. When faster speeding up is needed in field-weakening, the gain value could be increased appropriately.

2: Direct calculation mode

| | | | |
|--------|---|---------------------|-----------------|
| P62.18 | Synchronous motor initial angle detection mode | Range: 0~2 | Default: 1 |
| P62.19 | Synchronous motor initial angle detection current | Range: 30.0%~100.0% | Default: 100.0% |

0: Detection disabled

1: Detection in each time of run

2: Detection in first time of run after powered up

The initial angle detection is normally used in No-PG vector control(SVC). Its advantage is that the motor would not run reversely at starting, but the motor gets some noise in the process of this detection.

| | | | |
|--------|---|------------|------------|
| P62.20 | Synchronous motor Max. torque/current ratio | Range: 0~1 | Default: 0 |
|--------|---|------------|------------|

Ones place: Maximum torque/current ratio

0: Disabled

1: Enabled

When the PM synchronous motor of salient pole type is used, by setting P62.20=1 the drive is enabled to output lower current at the same load.

Tens place: Reserved

Hundreds place: Reserved

Thousands place: Synchronous motor current loop adjustment

0: Current decoupling mode 1

1: Current decoupling mode 2

| | | | |
|--------|---|---------------------|-----------------|
| P62.21 | Synchronous motor salient pole ratio adjusting gain | Range: 50.0%~500.0% | Default: 100.0% |
| P62.22 | Synchronous motor inductance detection current | Range: 30.0%~120.0% | Default: 80.0% |

This is to set the current level when the synchronous motor direct axis and quadrature axis inductance values are identified in motor tuning.

| | | | |
|--------|---|----------------------|----------------|
| P62.23 | Synchronous motor running excitation current | Range: 0.0%~P62.24 | Default: 0.0% |
| P62.24 | Synchronous motor low speed excitation current | Range: P62.23~120.0% | Default: 30.0% |
| P62.25 | Synchronous motor low speed switching frequency | Range: 0.0%~100.0% | Default: 20.0% |

This is to set the synchronous motor running excitation current, low speed running excitation current and low speed switching frequency.

P63 group: Motor Nameplate Parameters

| | | | |
|--------|--------------------------|-------------------------|---------------------------|
| P63.00 | Motor rated power | Range: 0.2kW~6000.0kW | Default: Depends on model |
| P63.01 | Motor rated voltage | Range: 1V~480V | Default: Depends on model |
| P63.02 | Motor rated current | Range: 0.1A~6000.0A | Default: Depends on model |
| P63.03 | Motor rated frequency | Range: 10.00Hz~300.00Hz | Default: Depends on model |
| P63.04 | Motor rated rotary speed | Range: 1~65535 rpm | Default: Depends on model |
| P63.05 | Motor pole number | Range: 2~80 | Default: Depends on model |

Please input the correct motor rated values according to the motor nameplate, otherwise the motor might run with under performance or even run abnormally.

| | | | |
|--------|------------|------------|------------|
| P63.06 | Motor type | Range: 0~1 | Default: 0 |
|--------|------------|------------|------------|

0: Asynchronous motor

1: PM synchronous motor

| | | | |
|--------|---------------------------|------------|------------|
| P63.07 | Motor parameters autotune | Range: 0~2 | Default: 0 |
|--------|---------------------------|------------|------------|

0: No autotune

1: Static autotune

It is used when the motor load could not be removed. After correct motor rated values setting, set P63.07=1, press Start key on keypad, the motor starts the process of autotuning. When the tuning is completed, the P63.07 value restores to 0. The static autotuning could identify all motor parameters to ensure the vector control performance.

2: Dynamic autotune

It is used when the motor load is allowed to be removed. After correct motor rated values setting, set P63.07=2, press Start key on keypad, the motor starts the process of autotuning. When the tuning is completed, the P63.07 value restores to 0. The dynamic autotuning could identify all motor parameters to ensure the vector control performance. When dynamic tuning is chosen, the motor shaft is rotating

during the tuning process. Please stay away from the rotating shaft of the motor.

| | | | |
|--------|--------------------|------------|------------|
| P63.08 | Motor control mode | Range: 0~2 | Default: 0 |
|--------|--------------------|------------|------------|

0: Advanced scalar control

It is suitable to sites where the load control performance requirement is not high or in case of one drive controls multiple motors.

1: No-PG vector control (SVC)

It refers to open-loop vector control, which is suitable to high performance control application sites where motor encoder is not installed or not available. One drive could only control one motor.

2: With-PG vector control (VC)

It refers to closed-loop vector control. Appropriate encoder matched with the PG card should be installed to the motor. It is suitable for high precision speed control or torque control application sites. One drive could control only one motor.

Chapter 6 Fault Diagnosis and Countermeasures

6.1 Fault list and countermeasures

The variable frequency drive may encounter the following fault types during use. Please refer to the countermeasures list for simple problems troubleshooting.

| Fault S.N. | Fault code | Fault description | Causes | Countermeasures |
|------------|------------|--|--|---|
| 1 | Er.oc1 | Over-current in acceleration | Torque boosting value too large in scalar control mode | Reduce the torque boosting value |
| | | | Starting frequency too high | Reduce the starting frequency |
| | | | Acceleration time too short | Prolong acceleration time |
| | | | Incorrect motor parameters | Set motor parameters correctively according to motor nameplate. |
| | | | Load too heavy | Reduce the load |
| | | | Restart the rotating motor | Reduce current limit value or use flying start mode |
| | | | Output phase to phase or phase to ground SC | Check motor wiring and impedance from output to the ground |
| | | | Improper V/F curve in scalar control mode. | Set V/F curve correctly |
| 2 | Er.oc2 | Over-current in deceleration | Deceleration time too short | Extend deceleration time |
| | | | Braking unit and braking resistor not installed | Add braking unit and braking resistor to the drive |
| 3 | Er.oc3 | Over-current in constant speed running | Drive power rating too small | Choose variable frequency drive with enough power rating. |
| | | | Power grid voltage is low | Check power grid voltage |
| | | | Load too heavy | Reduce the load |
| 4 | Er.ou1 | Over-voltage in acceleration | Input voltage abnormal | Check power grid voltage |
| | | | Acceleration time too short | Prolong acceleration time |
| | | | Load inertia too large | Use energy consumption braking |
| 5 | Er.ou2 | Over-voltage in deceleration | Deceleration time too short | Extend deceleration time |
| | | | Input voltage abnormal | Check power grid voltage |
| | | | Load inertia too large | Use energy consumption braking |

| Fault S.N. | Fault code | Fault description | Causes | Countermeasures |
|------------|------------|--|--|--|
| 6 | Er.ou3 | Over-voltage in constant speed running | Input voltage abnormal | Check power grid voltage |
| | | | Load fluctuates too much | Check the load |
| 7 | Er.Lu1 | The drive has under-voltage | Input voltage not within the allowable range | Adjust the input voltage within normal rated range. |
| | | | Momentary power failure | Reset the fault |
| | | | DC bus voltage abnormal | Request technical support |
| | | | Rectifier bridge and charging resistor (buffer) abnormal | Request technical support |
| | | | Driving board abnormal | Request technical support |
| | | | Control board abnormal | Request technical support |
| 8 | Er.Cur | Current sensing error | Abnormal connection of control board and driving board | Check the flat cable, unplug and plug in again |
| | | | Control board current sensing circuit abnormal | Request technical support |
| | | | Driving board current sensing circuit abnormal | Request technical support |
| | | | Current sensor damaged | Request technical support |
| | | | SMPS damaged | Request technical support |
| 9 | Er.CPU | System interference fault | Severe external interference signal | Request technical support |
| 10 | Er.FAL | Fault of Module protection | Output phase to phase SC or phase to ground SC | Check motor wiring and impedance from output to the ground |
| | | | Over-voltage or over-current | Follow measures of over-voltage or over-current |
| | | | Loose connection of control board cable | Unplug and plug in the control board cable again |
| | | | Inverting module direct passing | Request technical support |
| | | | Control board abnormal | Request technical support |
| | | | SMPS damaged | Request technical support |
| 11 | Er.tun | Motor autotune error | Motor parameters not set or wrongly set | Set motor parameters correctly |

| Fault S.N. | Fault code | Fault description | Causes | Countermeasures |
|------------|------------|-------------------------|--|--|
| | | | Wrong motor wiring | Check motor wiring |
| 12 | Er.CCL | Relay actuation fault | Power grid input voltage abnormal | Check power grid voltage |
| | | | Contactor damaged | Request technical support |
| | | | Buffer resistor damaged | Request technical support |
| | | | SMPS abnormal | Request technical support |
| 13 | Er.EtE | External terminal fault | Multi-function terminal X of external fault has valid input signal | Reset the fault |
| | | | Terminal X of external fault is activated by reversing action logic of I/O terminals | Reset the fault |
| 14 | Er.oH1 | Drive overheat | Ambient temperature too high | Reduce environment temperature |
| | | | Fan damaged | Replace the fan |
| | | | Air passage blocked | Clear the air passage of the fan |
| | | | Temperature detection abnormal | Request technical support |
| | | | Inverting module damaged | Request technical support |
| 15 | Er.oH2 | Motor overheat | Ambient temperature too high | Reduce environment temperature |
| | | | Motor heat dissipation is abnormal or the load is too heavy. | Check the motor heat dissipation conditions or reduce the motor load |
| | | | Temperature sensing circuit damaged | Request technical support |
| 16 | Er.oL1 | Drive overload | Input voltage too low | Check the power grid voltage |
| | | | Rushy restart of the drive when the motor is still running fast | Wait until the motor stop before restarting |
| | | | Too heavy load for long time | Shorten the overload time or reduce the load |
| | | | Acc./Dec. time too short | Prolong the Acc./Dec. time |
| | | | V/F curve ratio setting too high | Adjust V/F curve setting and torque boosting value |

| Fault S.N. | Fault code | Fault description | Causes | Countermeasures |
|------------|------------|-------------------------|--|--|
| | | | Drive power rating too small | Change to proper power rating drive |
| 17 | Er.oL2 | Motor overload | Input voltage too low | Check the power grid voltage |
| | | | Motor rotating stuck or sudden and severe change of the load | Prevent the motor from being stuck, Avoid sudden and severe change of the load |
| | | | Normal motor long time running at low speed with heavy load | Replace with variable frequency motor or increase the running frequency |
| | | | Preset motor overload protection time too short | Raise the motor overload protection detection time |
| | | | V/F curve ratio setting too high | Adjust V/F curve setting and torque boosting value |
| | | | DC braking current setting too high | Set the DC braking current level lower |
| 18 | Er.ILF | Drive input phase loss | 3 phase input power supply abnormal | Check and remove the problem of external wiring |
| | | | Driving board abnormal | Request technical support |
| | | | Control board abnormal | Request technical support |
| 19 | Er.oLF | Drive output phase loss | Drive output side wiring abnormal | Check and remove the problem of external wiring |
| | | | Motor 3 phases imbalance | Check the motor or replace the motor |
| | | | Driving board abnormal | Request technical support |
| | | | Inverting module abnormal | Request technical support |
| 20 | Er.LLd | Drive output load loss | Drive running current less tan P30.07 | Check whether the load breaks off or if the P30.07 and P30.08 setting is not suitable for the actual running conditions. |
| 21 | Er.GdF | Drive to ground SC | Output wiring short circuit to the ground | Check motor wiring and impedance from output to the ground |
| | | | Motor insulation abnormal | Check the motor |
| | | | Inverting module abnormal | Request technical support |
| | | | Leakage current from the output to the ground is too much. | Request technical support |

| Fault S.N. | Fault code | Fault description | Causes | Countermeasures |
|------------|------------|-------------------------------|--|--|
| 22 | Er.EEP | EEPROM writing/reading error | EEPROM writing/reading gets problem | Request technical support |
| 23 | Er.Sci | Communication overtime fault | Incorrect setting of communication baud rate | Set correct baud rate |
| | | | Communication port disconnection | Reconnect the communication port cable |
| | | | Upper controller is not working | Make the upper controller working |
| | | | Drive communication parameters wrongly set | Use correct setting |
| | | Interference too much on site | Check peripheral equipment or seek technical support | |
| 24 | Er.tPA | Total power-on time arrival | The accumulated power-on time has reached the preset value | Request technical support |
| 25 | Er.trA | Total running time arrival | The accumulated running time has reached the preset value | Request technical support |
| 26 | Er.rEF | PID reference loss in running | PID reference channel abnormal | Check the PID reference channel |
| | | | P40.24 parameter setting improper | Use correct setting |
| 27 | Er.FbL | PID feedback loss in running | PID feedback channel abnormal | Check the PID feedback channel |
| | | | P40.26 parameter setting improper | Use correct setting |
| 28 | Er.oEP | Speed deviation too large | Speed over-deviation value setting too small | Set the speed over-deviation value correctly |
| | | | Load fluctuates too much | Stabilize the load |
| 29 | Er.oSP | Motor over-speed | Over-speed value setting too small | Set the over-speed value correctly |
| | | | Load fluctuates too much | Stabilize the load |
| 30 | Er.Enc | Encoder error | Encoder connection wrong | Change encoder wiring |
| | | | Encoder no signal output | Check the encoder functioning and power supply condition |
| | | | Encoder cable disconnected | Repair the connection |
| | | | Function code setting abnormal | Check and apply correct encoder parameter setting |

| Fault S.N. | Fault code | Fault description | Causes | Countermeasures |
|------------|------------|------------------------|---|----------------------------------|
| 37 | Er.SEF | Speed evaluation fault | Motor unrecognized or parameter incorrect | Re-identify the motor parameters |
| 39 | Er.Cpy | Parameter copy error | Parameter upload/download abnormal | Request technical support |
| | | | No parameter saved in keypad for download | Request technical support |

Chapter 7 Daily Care and Maintenance

7.1 Daily Care

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

Daily inspection item:

- 1) Whether the motor running sound changes abnormally;
- 2) Whether there is vibration when the motor is running;
- 3) Whether the installation environment of the variable frequency drive has changed;
- 4) Whether the cooling fan of the variable frequency drive is working normally;
- 5) Whether the variable frequency drive gets overheat;

Daily cleaning:

- 1) The variable frequency drive shall always be kept clean.
- 2) Dust on the surface of the variable frequency drive, especially metal powder, shall be removed effectively to prevent it from entering the variable frequency drive.
- 3) Effectively remove oil stains from the cooling fan of the variable frequency drive.

7.2 Routine inspection item

- 1) Check the air passage of the fan and clean it regularly;
- 2) Check whether the screws are loose;
- 3) Check whether the drive is corroded;
- 4) Check whether there is electrical arcing trace on terminals wiring
- 5) Main circuit loop insulation test

Reminder: when measuring insulation resistance with a meg-ohmmeter (please use a DC 500V meg-ohmmeter), the variable frequency drive shall be disconnected from the main circuit loop. Do not test the insulation of the control circuit loop with an insulation resistance meter. High voltage withstanding test is not necessary (it was completed in exit factory testing).

Chapter 8 Specifications and Model Selection

8.1 H600 Series Technical Specifications and Installation Dimensions

8.1.1 Technical Specifications

Table 8-1 H600 series variable frequency drive model numbers and specifications

| Item | | Specifications | | | | | | | | | | | | | | | | |
|--|-----------------------|--|------|-----|-----|-----|-----|-----|-----|-----|---|--|-----|-----|-----|-----|-----|-----|
| H600-4TXXXG(B) H600-4TXXXL(B) | | 37 | 45 | 55 | 75 | 90 | 110 | 132 | 160 | 185 | 200 | 220 | 250 | 280 | 315 | 355 | 400 | 450 |
| Adapted motor power (kW) | | 37 | 45 | 55 | 75 | 90 | 110 | 132 | 160 | 185 | 200 | 220 | 250 | 280 | 315 | 355 | 400 | 450 |
| Input rated current | | 69.0 | 89.0 | 106 | 139 | 164 | 196 | 240 | 287 | 326 | 365 | 410 | 441 | 495 | 565 | 617 | 687 | 782 |
| Output rated current | | 75.0 | 90.0 | 110 | 150 | 180 | 210 | 260 | 305 | 350 | 377 | 426 | 465 | 520 | 585 | 650 | 725 | 810 |
| Output | Output voltage | Three phase 0V ~ Rated input voltage | | | | | | | | | | | | | | | | |
| | Max. output frequency | 300.00Hz (Adjustable by parameter) | | | | | | | | | | | | | | | | |
| | Carrier frequency | 1.0kHz~16.0kHz (Automatic adjusted according to load characteristics) | | | | | | | | | 1.0kHz to 8.0kHz(The carrier frequency can be automatically adjusted according to the load characteristics) | | | | | | | |
| | Overload capacity | 150% 60 seconds, 180% 10 seconds, 200% 0.5 second. (Relative to rated current) | | | | | | | | | | | | | | | | |
| Countermeasures for high-frequency leakage current | DC reactor | Built-in optional accessories | | | | | | | | | | Standard built-in Note: (315-450 standard external) | | | | | | |
| Brake | Braking unit | Built-in optional | | | | | | | | | | External optional accessories | | | | | | |
| Power supply | Rated voltage & Freq. | AC: 3phase 360V~460V 50Hz/60Hz | | | | | | | | | | | | | | | | |
| | Voltage fluctuation | Allowable fluctuation: -15%~10%; Actual allowable range: AC 323V~528V | | | | | | | | | | | | | | | | |
| | Freq. fluctuation | Allowable frequency fluctuation range: ±5% | | | | | | | | | | | | | | | | |
| | Power capacity (kVA) | 63 | 81 | 97 | 127 | 150 | 179 | 220 | 263 | 304 | 334 | 375 | 404 | 453 | 517 | 565 | 629 | 716 |

*1: The more rigorous selection method is that the rated output current of the variable frequency drive shall be larger than the rated current of the motor or the maximum load current.

Table 8-2 H600 series variable frequency drive technical specifications

| Item | | Technical Specifications | | |
|-----------------------------|--|--|--|--|
| Basic Function | Input frequency resolution | Digital setting: 0.01Hz Analog setting: Maximum speed $\times 0.025\%$ | | |
| | Control mode | Advanced scalar control No-PG vector control (SVC) With-PG vector control (VC) | | |
| | Starting torque | SVC: 0.25Hz 150% VC: 0.00Hz 180% | | |
| | Speed regulation range | SVC: 1:200 | VC: 1:1000 | |
| | Speed stabilization precision | SVC: $\pm 0.5\%$ | VC: $\pm 0.2\%$ | |
| | Torque control precision | SVC: $\pm 5\%$ (for frequency above 5Hz) | VC: $\pm 3\%$ (for frequency above 5Hz) | |
| | Torque repeat input precision | $\leq 0.5\%$ of motor rated torque | | |
| | Torque response time | SVC: $\leq 10\text{ms}$ (motor rated torque) | VC: $\leq 5\text{ms}$ (motor rated torque) | |
| | Torque boosting | Automatic torque boosting; Manually set torque boosting 0.1%~30.0% | | |
| | V/F curve | Straight line, multiple power curve, multiple points curve, V/F separation | | |
| | Acc./Dec. curve | Straight line, polyline, S curve | | |
| | DC brake | DC braking activation frequency: 0.00~300.00Hz; DC braking current: constant torque load 0.0~120.0%, variable torque load 0.0~90.0%; DC braking time: 0.0~30.0s; (Fast DC brake activation without the need of waiting time) | | |
| | Jog control | Jog run frequency range: 0.00Hz~50.00Hz Jog Acc./Dec. time range: 0.0s~3600.0s | | |
| | Process closed-loop PID | Process closed-loop control could be realized conveniently. | | |
| | Simple PLC, Multi-step command | Achieve up to 16 segment speeds of frequency control by simple PLC setting or by X terminals | | |
| Voltage automatic adjusting | When the power grid voltage fluctuates, the output voltage can be automatically kept stable. | | | |

| Item | | Technical Specifications |
|-----------------|---|--|
| | OC and OV speed adjusting | The current and voltage during operation are automatically limited to prevent the drive from frequent over-current and over-voltage tripping. |
| | Automatic fast current limit | Minimize over-current fault possibility and thus ensure the normal operation of the drive. |
| | Torque limit and control | "Excavator" feature automatically limits the torque during operation to prevent the drive from frequent over-current tripping. Torque control is realized under vector control mode. |
| Unique Function | Motorary power loss ride-through | In case of instantaneous power failure, the drive will continue running for a short period of time by compensating the drop voltage with energy feedbacked from the load. |
| | Fast current limit | Avoid frequent over-current fault of the drive |
| | Timing | Realize preset timing control of the drive |
| | Motor thermal protection | Convenient motor temperature detection could be realized by external sensors. |
| | Parameter copy | Parameters upload and download enable the fast parameter duplicating from one drive to other drives. |
| | Dual-port Modbus | The double ports support Modbus protocol to realize simple networking function. |
| | Drive-to-ground SC detection right after powered up | Drive-to-ground short circuit detection is automatically done when the drive is powered up. |
| | Magnetic flux brake | By using magnetic flux brake function, faster deceleration and stop can be realized. |
| Running | Running command | Keyboard command, terminal command, communication command can be switched in a variety of ways. |
| | Main speed reference | 12 types of main speed reference channels can be switched by different ways |
| | Auxiliary speed reference | 9 kinds of auxiliary speed command channels enable flexible auxiliary speed fine adjustment or speed combination. |
| | Input terminal | <ul style="list-style-type: none"> ● 7 X terminals, 1 supports high speed pulse input ● 3 AI terminals, 1 support 0~10V voltage signal only, 2 supports 0~10V voltage signal and 0~20mA current signal |
| | Output terminal | <ul style="list-style-type: none"> ● 2 relay outputs ● 2 transistor outputs, only 1 supports high speed pulse output ● 2 AO outputs, 1 support 0~10V voltage signal only, the other 1 support 0~10V voltage signal or 0 ~ 20 mA current signal. |

| Item | | Technical Specifications |
|-------------------------|--------------------------|---|
| Human machine interface | LED display | LED operation keypad |
| | LCD display | LCD operation keypad |
| | Keys lock | All keys or partial keys could be locked by setting to avoid mistake operation from the keypad. |
| | Emergency Stop by keypad | Realize emergency stop from keypad Stop key no matter what command mode is used, reducing the risk of mistake operation. |
| Protection | SC | Output side phase to phase SC protection; output side phase to ground SC protection |
| | Over-current | For the purpose of protection, the drive stops when the output current is over 2.2 times of its rated current. |
| | Over-voltage | For the purpose of protection, the drive stops when the main loop DC bus voltage is higher than 800V. |
| | Under-voltage | For the purpose of protection, the drive stops when the main loop DC bus voltage is less than 320V. |
| | Overload | The drive stops when the output current lasts 150% for 60 seconds. |
| | Overheat protection | It is the IGBT module overheat protection |
| | Phase loss | 3 phase input phase loss and output phase loss protection |
| Environment | Applicable environment | Installed indoor; not exposed to direct sunlight; free of dust, corrosive gas, flammable gas, oil mist, water vapor, water droplets and salt, etc. |
| | Altitude | Derating is not required below 1000m; derating 1% for every 100m higher above 1000m; and the highest altitude for using the drive shall not be more than 3000m. |
| | Ambient temperature | -10~+40℃; Derating use in span of 40~50℃, derating 1.5% for every 1℃ higher. |
| | Humidity | 5~95%, no condensation |
| | Vibration | Less than 5.9 m/s ² |
| | Storage temperature | -40~+70℃ |

Table 8-3 H600 installation dimensions (G type model)

| Drive model | Outlines and installation dimensions (mm) | | | | | | |
|-------------|---|---|-------|-----|-------|---|-----------------------|
| | W | H | D | W1 | W2 | H1 | Installation Aperture |
| H600-4T37G | 239 | 604.5 | 269.5 | 180 | 148.5 | 580 | 9.5 |
| H600-4T45G | | | | | | | |
| H600-4T55G | 265 | 690 | 323 | 200 | 200 | 674 | 9.5 |
| H600-4T75G | | | | | | | |
| H600-4T90G | 295 | 833.5 | 338.5 | 200 | 200 | 810 | 12 |
| H600-4T110G | | | | | | | |
| H600-4T132G | | | | | | | |
| H600-4T160G | 399 | 950 | 407 | 265 | 265 | 926.5 | 14 |
| H600-4T185G | | | | | | | |
| H600-4T200G | | | | | | | |
| H600-4T220G | 339 | 1104.5 | 498 | 265 | 175 | 1081.5 | 14 |
| H600-4T250G | | | | | | | |
| H600-4T280G | | | | | | | |
| H600-4T315G | 660 | 989.5 Note: Optional base 350 | 392 | 600 | 550 | 962 Note: Optional base 350 | 14 |
| H600-4T355G | | | | | | | |
| H600-4T400G | | | | | | | |
| H600-4T450G | | | | | | | |

Table 8-4 H600 installation dimensions (L type model)

| Drive model | Outlines and installation dimensions (mm) | | | | | | |
|-------------|---|---|-------|-----|-------|---|-----------------------|
| | W | H | D | W1 | W2 | H1 | Installation Aperture |
| H600-4T37LB | 185 | 440 | 249 | 140 | 140 | 427.5 | 7 |
| H600-4T45L | 239 | 604.5 | 269.5 | 180 | 148.5 | 580 | 9.5 |
| H600-4T55L | | | | | | | |
| H600-4T75L | 265 | 690 | 323 | 200 | 200 | 674 | 9.5 |
| H600-4T90L | | | | | | | |
| H600-4T110L | 295 | 833.5 | 338.5 | 200 | 200 | 810 | 12 |
| H600-4T132L | | | | | | | |
| H600-4T160L | | | | | | | |
| H600-4T185L | 350 | 1070 | 407 | 265 | 265 | 1046.5 | 14 |
| H600-4T200L | | | | | | | |
| H600-4T220L | | | | | | | |
| H600-4T250L | 339 | 1104.5 | 498 | 265 | 175 | 1081.5 | 14 |
| H600-4T280L | | | | | | | |
| H600-4T315L | | | | | | | |
| H600-4T355L | 660 | 989.5 Note: Optional base 350 | 392 | 600 | 550 | 962 Note: Optional base 350 | 14 |
| H600-4T400L | | | | | | | |
| H600-4T450L | | | | | | | |

8.1.3 Operation keypad outlines and keypad holder dimensions

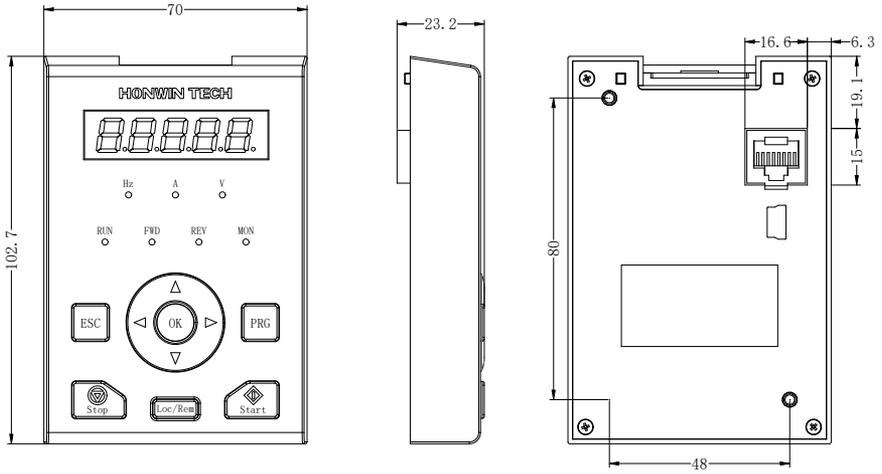


Figure 8-6 Keypad outlines dimensions

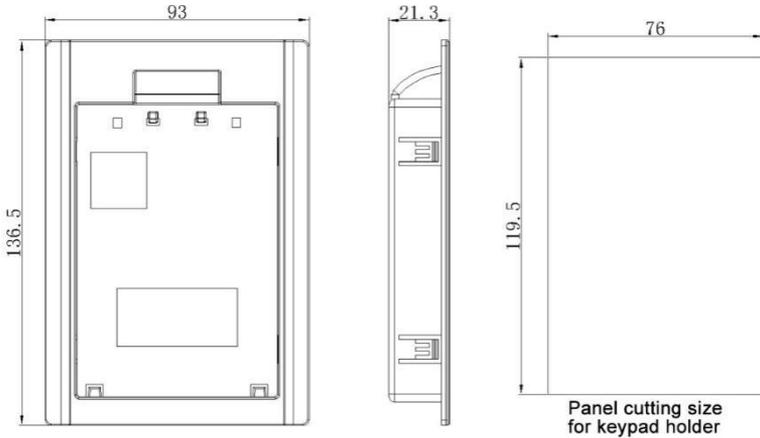


Figure 8-7 Keypad holder dimensions

8.2 Optional parts specifications

8.2.1 Peripheral devices selection guide

Table 8-5 Peripheral devices

| Drive model | Circuit Breaker (A) | Contactor (A) |
|-------------|---------------------|---------------|
| H600-4T37LB | 125 | 95 |
| H600-4T37G | 160 | 125 |
| H600-4T45L | | |
| H600-4T45G | 200 | 150 |
| H600-4T55L | | |
| H600-4T55G | 225 | 185 |
| H600-4T75L | | |
| H600-4T75G | 250 | 225 |
| H600-4T90L | | |
| H600-4T90G | 315 | 265 |
| H600-4T110L | | |
| H600-4T110G | 350 | 330 |
| H600-4T132L | | |
| H600-4T132G | 400 | 400 |
| H600-4T160L | | |
| H600-4T160G | 500 | 400 |
| H600-4T185L | | |
| H600-4T185G | 500 | 500 |
| H600-4T200L | | |
| H600-4T200G | 630 | 500 |
| H600-4T220L | | |
| H600-4T220G | 630 | 630 |
| H600-4T250L | | |
| H600-4T250G | 800 | 630 |
| H600-4T280L | | |
| H600-4T280G | 800 | 800 |
| H600-4T315L | | |
| H600-4T315G | 800 | 800 |
| H600-4T355L | | |
| H600-4T355G | 1000 | 800 |

| Drive model | Circuit Breaker (A) | Contactor (A) |
|-------------|---------------------|---------------|
| H600-4T400L | | |
| H600-4T400G | 1250 | 1000 |
| H600-4T450L | | |
| H600-4T450G | 1250 | 1000 |

8.2.2 Braking Resistor Selection Table

Table 8-6 Braking resistor selection reference

| Drive model | Braking resistor | | | Braking unit |
|-------------|-------------------------|--------------------------------|--------------------|----------------------|
| | Standard Power | Standard resistance | Minimum resistance | |
| H600-4T37LB | 6000W | 20Ω | 14Ω | Built-in optional |
| H600-4T37G | 9600W (Total power) | 15Ω(Total resistance value) | 12Ω | |
| H600-4T45L | | | | |
| H600-4T45G | 9600W (Total power) | 15Ω(Total resistance value) | 12Ω | |
| H600-4T55L | | | | |
| H600-4T55G | 15000W (Total power) | 12Ω(Total resistance value) | 10Ω | |
| H600-4T75L | | | | |
| H600-4T75G | 20000W (Total power) | 8Ω(Total resistance value) | 5Ω | |
| H600-4T90L | | | | |
| H600-4T90G | 28800W (Total power) | 5Ω(Total resistance value) | 4Ω | |
| H600-4T110L | | | | |
| H600-4T110G | 30000W (Total power) | 5Ω(Total resistance value) | 4Ω | |
| H600-4T132L | | | | |
| H600-4T132G | 35000W (Total power) | 5Ω(Total resistance value) | 4Ω | |
| H600-4T160L | | | | |

Appendix A

Modbus Communication Protocol

1. Supported protocol

Support Modbus protocol, RTU format and ASCII code format; broadcast address is 0, follower address setting range is 1~247; address 248~255 is reserved.

2. Interface method

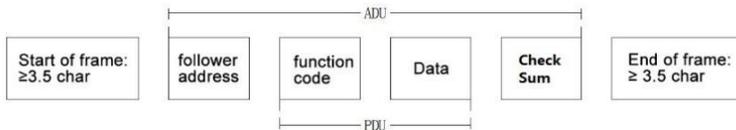
RS485: Asynchronous half-duplex; Lsb(least significant bit) has priority of sending; the higher byte precedes the lower byte.

3. Protocol format

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

If the operation request fails, PDU (Protocol Data Unit) responses with Error code or Abnormal code. The Error code is equal to Function code+0x80. While the Abnormal code indicates the specific cause of the error.

The RTU data frame format is as follows:



Abnormal code is listed below.

| Abnormal code | Abnormal code description | Abnormal code | Abnormal code description |
|---------------|---------------------------|---------------|---|
| 0x01 | Invalid function code | 0x18 | Information frame error |
| 0x02 | Invalid register | 0x20 | Parameter modification forbidden |
| 0x03 | Data error | 0x21 | Parameter modification during running forbidden |
| 0x04 | Follower operation fails | 0x22 | Parameter protected by password |

4. Function illustration

- ◆ Function 0x03 reading parameter from multiple registers

| Frame data | Data length (bytes) | Range |
|------------------------|-----------------------|------------------------|
| Request: | | |
| Follower address | 1 | 0~247 |
| Function code | 1 | 0x03 |
| Register start address | 2 | 0x0000~0xFFFF |
| Number of registers | 2 | 0x0001~0x0010 |
| Check Sum | 2 | 0x0000~0xFFFF |
| Response: | | |
| Follower address | 1 | 0~247 |
| Function code | 1 | 0x03 |
| Number of read bytes | 1 | 2* number of registers |
| Read content | 2*number of registers | 0x0000~0xFFFF |
| Check Sum | 2 | 0x0000~0xFFFF |

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

| Frame data | Data length (bytes) | Range |
|------------------|---------------------|---------------|
| Request: | | |
| Follower address | 1 | 0~247 |
| Function code | 1 | 0x06 |
| Register address | 2 | 0x0000~0xFFFF |
| Register content | 2 | 0x0000~0xFFFF |
| Check Sum | 2 | 0x0000~0xFFFF |
| Response: | | |
| Follower address | 1 | 0~247 |
| Function code | 1 | 0x06 |
| Register address | 2 | 0x0000~0xFFFF |
| Register content | 2 | 0x0000~0xFFFF |
| Check Sum | 2 | 0x0000~0xFFFF |

- ◆ Function 0x10(Save) or 0x42(Not save) writes multiple registers

| Frame data | Data length (bytes) | Range |
|-------------------------------|------------------------|------------------------|
| Request: | | |
| Follower address | 1 | 0~247 |
| Function code | 1 | 0x10 |
| Register start address | 2 | 0x0000~0xFFFF |
| Number of registers | 2 | 0x0001~0x0010 |
| Register content bytes number | 1 | 2* number of registers |
| Register content | 2* number of registers | 0x0000~0xFFFF |
| Check Sum | 2 | 0x0000~0xFFFF |
| Response: | | |
| Follower address | 1 | 0~247 |
| Function code | 1 | 0x10 |
| Register start address | 2 | 0x0000~0xFFFF |
| Number of registers | 2 | 0x0002~0x0020 |
| Check Sum | 2 | 0x0000~0xFFFF |

5. Variable frequency drive register distribution

Refer to the parameter list for exact address of each function code.

6. Variable frequency drive control command word (0x8000) bit description

| Control command word (bit) | Description | Control command word (bit) | Description |
|----------------------------|---|----------------------------|--|
| bit0 | 0: No operation 1: Run command valid | bit5 | 0: Stop at fault disabled 1: Stop at fault enabled |
| bit1 | 0: Forward Run 1: Reversed Run | bit6 | 0: Jog forward disabled 1: Jog forward enabled |
| bit2 | 0: Stop by deceleration disabled 1: Stop by deceleration enabled | bit7 | 0: Jog reverse disabled 1: Jog reverse enabled |
| bit3 | 0: emergency stop disabled 1: emergency stop enabled | bit8 | 0: Fault reset command invalid 1: Fault reset command valid |
| bit4 | 0: Freewheeled stop disabled 1: Freewheeled stop enabled | bit9~bit15 | Reserved |

7. Modbus communication examples

Read Drive-#1 preset frequency, and the responded preset frequency is 50.00Hz

| | Add. | Function Code | Register add. | Number of register | Number of content bytes | Register content | Check Sum |
|---------|------|---------------|---------------|--------------------|-------------------------|------------------|-----------|
| Request | 0x01 | 0x03 | 0x0000 | 0x0001 | Null | Null | 0x840A |
| Respond | 0x01 | 0x03 | Null | Null | 0x02 | 0x1388 | 0xB512 |

Start the Drive-#1 to run forwardly

| | Add. | Function Code | Register add. | Register content | Check Sum |
|---------|------|---------------|---------------|------------------|-----------|
| Request | 0x01 | 0x06 | 0x8000 | 0x0001 | 0x61CA |
| Respond | 0x01 | 0x06 | 0x8000 | 0x0001 | 0x61CA |

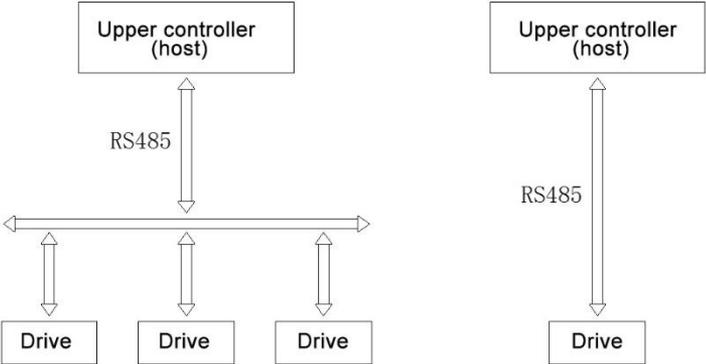
8. CRC16 function

```
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) );
    //Exchange high and low bytes
}
```

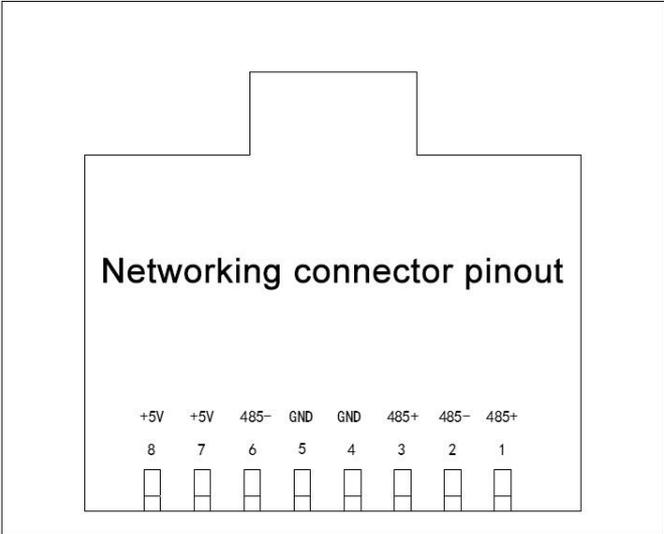
9. Establishment of communication networking

There are 2 types of networking, i.e. Single host/multiple followers and single host/single follower.



Appendix B

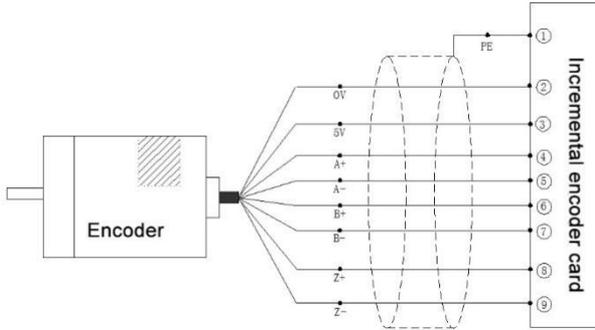
1. Networking connector pinout



Definition of network port terminal serial number

Appendix C

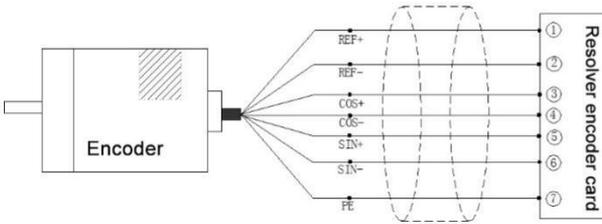
1、HW-PG-ABZ Wiring



**Incremental encoder card
HW-PG-ABZ**

| Wiring Instruction | | |
|--------------------|----|--------------------------|
| 1 | PE | Earthing signal |
| 2 | 0V | GND |
| 3 | 5V | Encoder power supply |
| 4 | A+ | channel output signal A+ |
| 5 | A- | channel output signal A- |
| 6 | B+ | channel output signal B+ |
| 7 | B- | channel output signal B- |
| 8 | Z+ | channel output signal Z+ |
| 9 | Z- | channel output signal Z- |

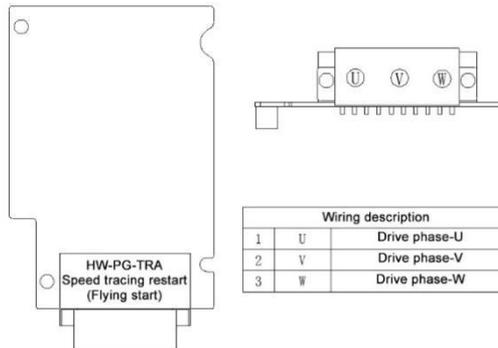
2、HW-PG-RB Wiring



**Resolver encoder card
HW-PG-RB**

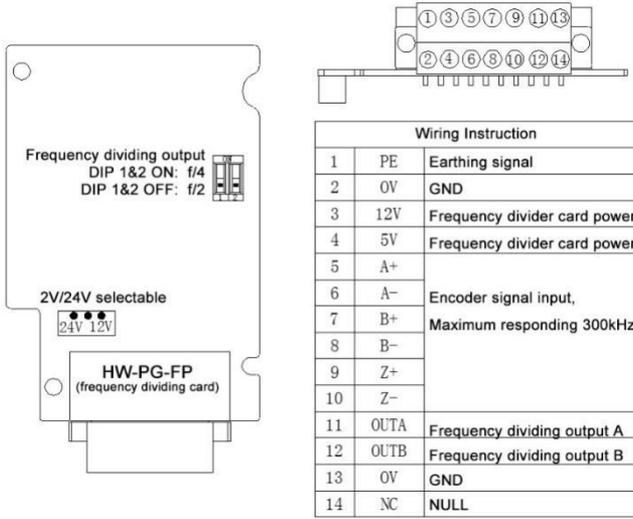
| Wiring Instruction | | |
|--------------------|------|--------------------------|
| 1 | REF+ | Resolver excitation + |
| 2 | REF- | Resolver excitation - |
| 3 | COS+ | Resolver feedback COS + |
| 4 | COS- | Resolver feedback COS - |
| 5 | SIN+ | Resolver feedback SIN + |
| 6 | SIN- | Resolver feedback SIN - |
| 7 | PE | Shielded cable grounding |

3、HW-PG-TRA Wiring

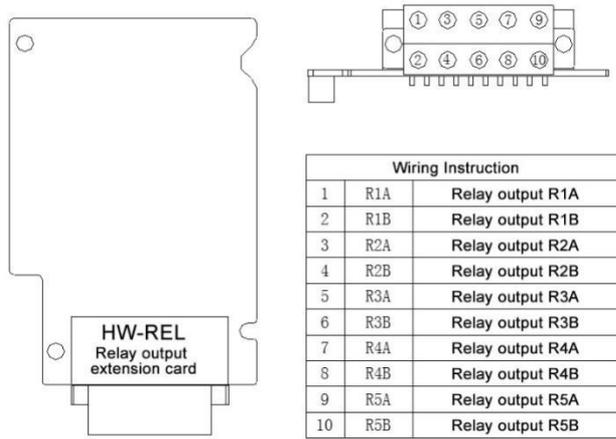


| Wiring description | | |
|--------------------|---|---------------|
| 1 | U | Drive phase-U |
| 2 | V | Drive phase-V |
| 3 | W | Drive phase-W |

4. HW-PG-FP Wiring



5. HW-REL Wiring



HONWIN TECH

Warranty card

| | | | |
|------------------------------------|--|-----------------|-------|
| Client Information | User address: | | |
| | User name: | Contact person: | |
| | Zip code: | Contact number: | |
| Product Information | Product model: | | |
| | Body bar code: | | |
| | Name of the agent / joint warranty center: | | |
| Fault Information | (Maintenance time and content): | | |
| | Repairman: Repair date: | | |
| User evaluation of service quality | <input type="checkbox"/> Very Good <input type="checkbox"/> Good <input type="checkbox"/> General <input type="checkbox"/> Bad | | |
| | User signature: | | Date: |

HONWIN TECH

Warranty Agreement

1. Warranty period is 18 months. If the drive gets fault or damage within warranty period, on the precondition that normal usage according to the manual is employed, the company is responsible for the repairing.
2. Warranty period starts from the date of factory exit; the serial number is the only basis for judging the warranty period.
3. During the warranty period, if damage occurs due to the following reasons, a certain maintenance fee will be charged:
 - A. Product damage caused by misuse, unauthorized repair or modification;
 - B. Damages due to fire, flood, earthquake, lightning, abnormal voltage, other natural disasters and secondary disasters, etc.
 - C. Product damage caused by human dropping and transportation after purchase.
 - D. Product failure and damage caused by problems other than the product (such as external equipment factors).
 - E. Damage due to harsh environments such as gas corrosion, salt corrosion, metal dust, etc. which is beyond the environmental requirements stated in user manual,
4. When the product fails or is damaged, please fill in "Product Warranty Card" correctly.
5. The service fee is calculated based on the actual cost. If there is other contract, the contract shall take precedence.
6. Please be sure to keep this card and show it to the maintenance party during warranty.
7. The right to interpret this agreement belongs to Honwin Technology Co., Ltd.

Honwin Technology Co., Ltd

Company address: Floor 3-5, Building A, Xiwan National Major Instrument Science Park, No.34,
Xiangshan Avenue, Cuiheng New District, Zhongshan, Guangdong, China

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