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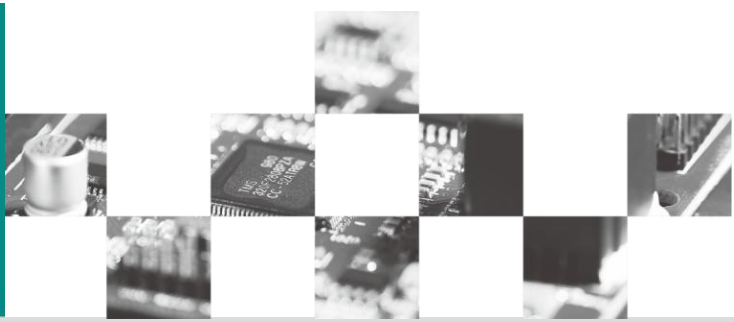


TI120 Series VFD
User Manual

Preface

First of all, thank you for purchasing and using the TI120 Series Variable Frequency Drive developed by Thinkvert Technology Limited.

TI120 series variable frequency drive is a general high-performance current vector variable frequency drive, which can be used for controlling AC asynchronous motor and synchronous motor. TI120 series adopt high-performance vector control technology to realize low speed and high torque output and has good dynamic characteristics and super overload capability. Through fast current control and voltage control technology, smooth and fast acceleration and deceleration characteristics are realized. It can be used for driving machine tools, cranes, paper-making, textile, printing, packing, food, fan, pumps and various automatic production equipment.

Brief Introduction Of TI120 Series VFD

Functions and Features

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

Precautions for Use

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

Unpacking Inspection

- ✧ When unpacking, please carefully confirm whether the model of the nameplate of this machine and the rated value of the variable frequency drive 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 variable frequency drive components with your hands directly! Please do not use the variable frequency drive 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 variable frequency drive shall be installed on metal or other flame retardant objects, otherwise there is fire danger! The installation of the variable frequency drive shall be far away from flammable objects and heat sources, otherwise there is fire danger! The variable frequency drive 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 variable frequency drive damage! Please install it in a place that can bear the weight of the variable frequency drive, 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 variable frequency drive during installation; otherwise it may cause failure of variable frequency drive. When the variable frequency drive 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 variable frequency drive may be more than 3.5mA. In order to ensure safety, the variable frequency drive 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 variable frequency drive 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 variable frequency drive; otherwise there is a risk of equipment damage! Terminal signal lines of the variable frequency drive 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 variable frequency drive 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 variable frequency drive can only be powered on; otherwise there is a risk of equipment damage or electric shock! After the variable frequency drive 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 variable frequency drive is powered on, do not touch the variable frequency drive and its peripheral circuits regardless of the state of the variable frequency drive, otherwise there is a risk of electric shock! Before running the variable frequency drive, 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 variable frequency drive, 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 variable frequency drive 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 variable frequency drive 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 variable frequency drive frequently by switching on and off, otherwise there is a risk of equipment damage!

Before switching on/off the variable frequency drive output switch or contactor, it must make sure that the variable frequency drive 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 variable frequency drive, it must be executed again in strict accordance with the above procedures!

⚠ Note

When maintaining, inspecting or replacing the parts, it shall not touch the part body; otherwise there is a risk of electrostatic damage to the part!

All pluggable devices can only be plugged and unplugged when power is off!

Contents

Chapter 1 Product Information

1.1 Product Naming

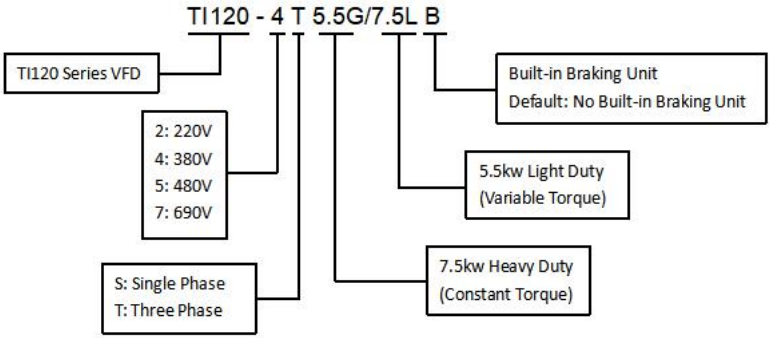


Figure 1-1 Product Naming

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

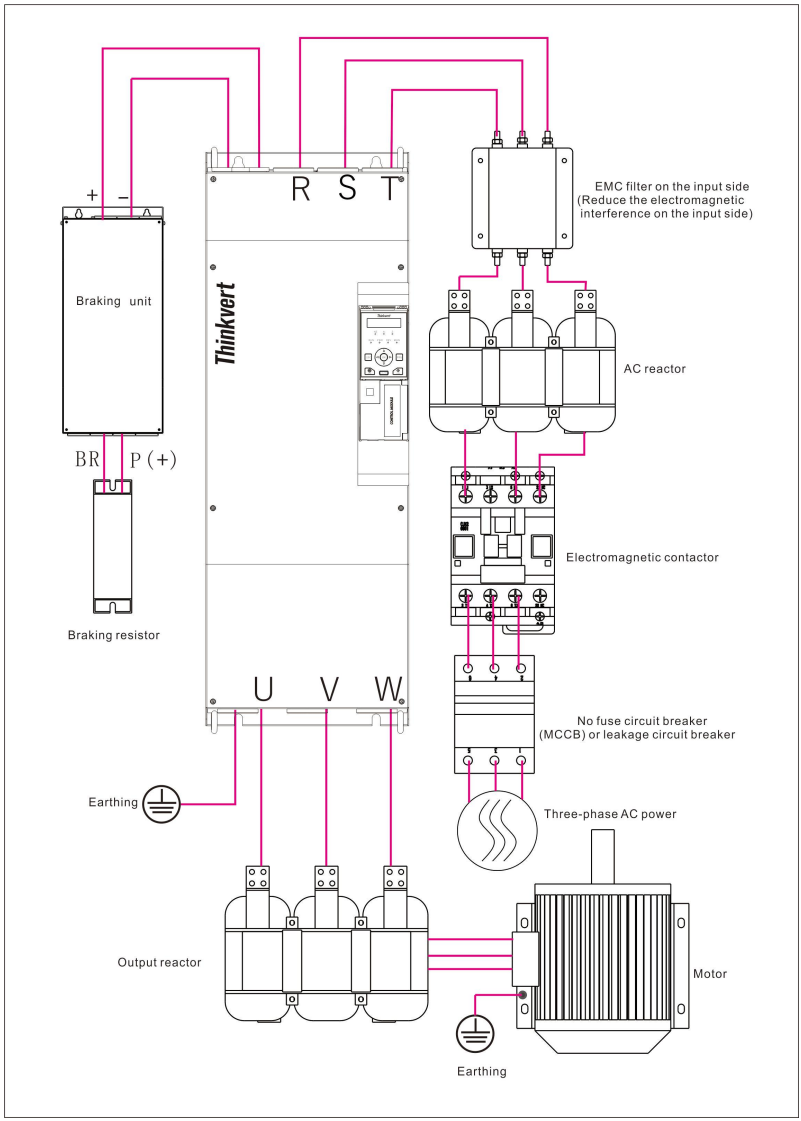


Figure 2-1 Connected peripheral system configuration diagram

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 variable frequency drive. The operating environment temperature of the variable frequency drive is not allowed to exceed the allowable temperature range (-10°C ~+50 °C).
2) The variable frequency drive is installed on the surface of the flame-retardant object, leaving enough heat dissipation space around. When the variable frequency drive 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 variable frequency drive 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 variable frequency drive 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

TI120 series variable frequency drives have different reserved sizes of surrounding installation space and spacing space according to different variable frequency drive power levels.

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

Specifically see the following figure:

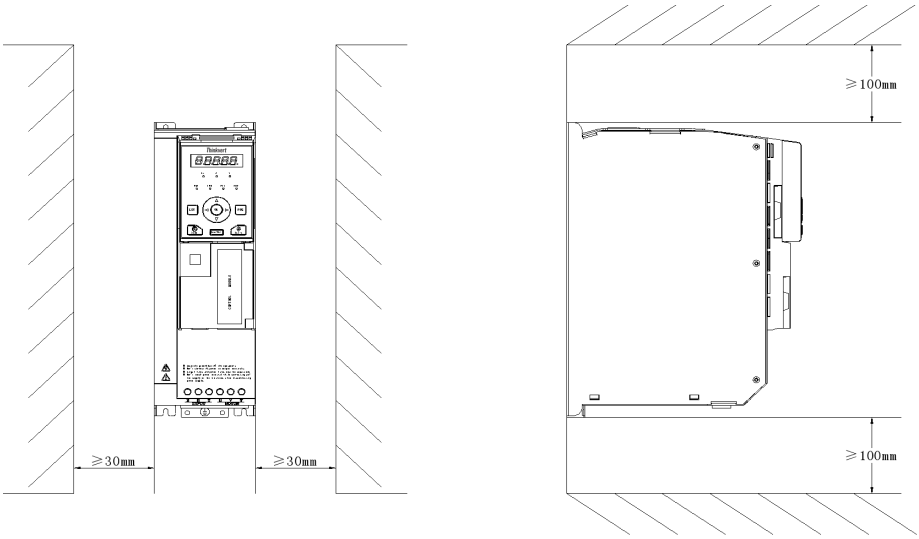


Figure 2-2 Installation direction and space requirements for power level with TI120-4T15GB and below

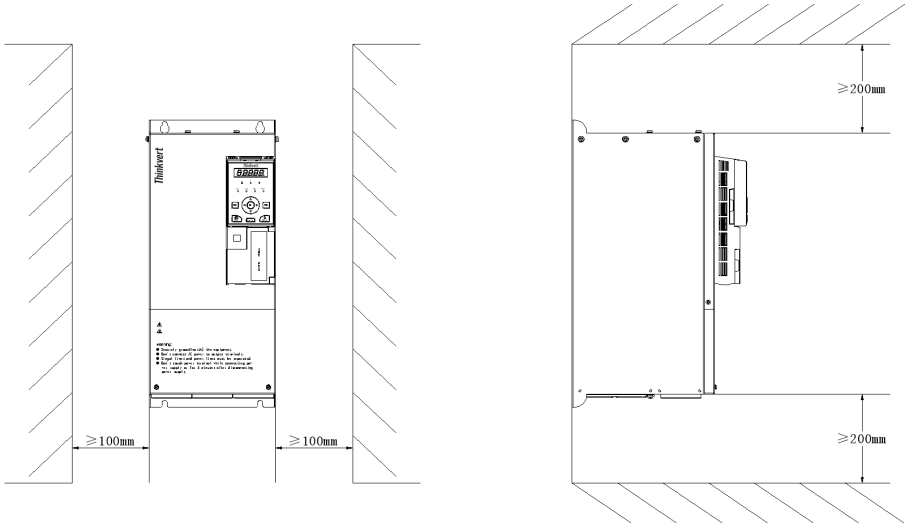


Figure 2-3 Installation direction and space requirements for power level with TI120-4T18.5GB and above

2.3 Wiring

2.3.1 Standard wiring diagram

The standard wiring is as shown in the following figure:

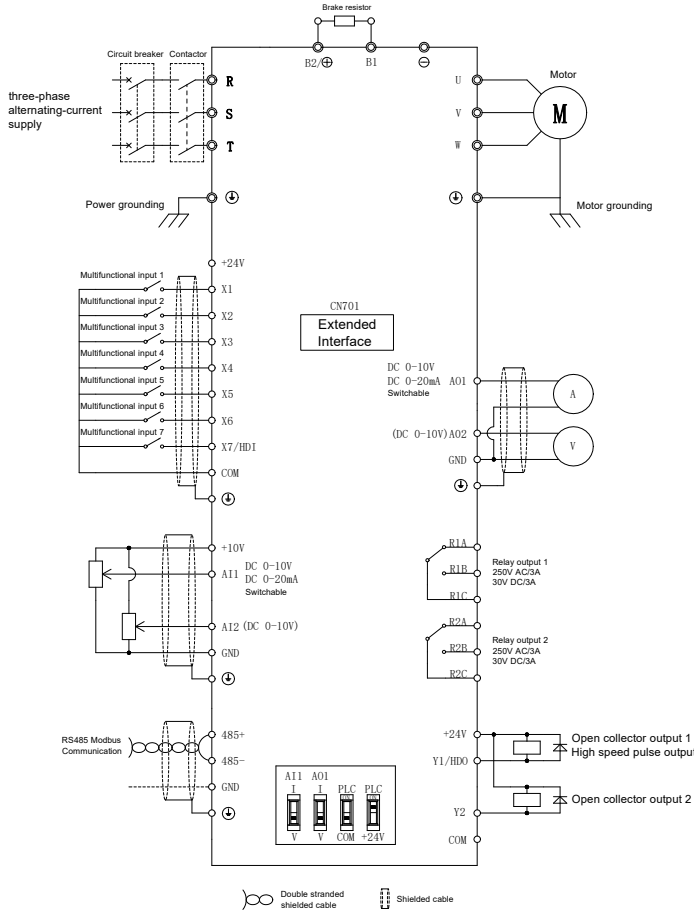
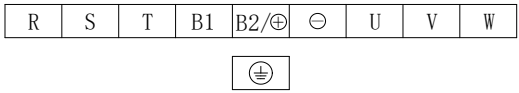


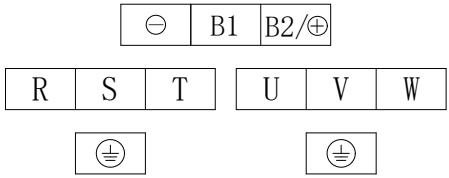
Figure 2-4 Standard Wiring Diagram

2.3.2 Functional description of main circuit terminal

1） TI120-4T1.5GB ~ TI120-4T5.5GB

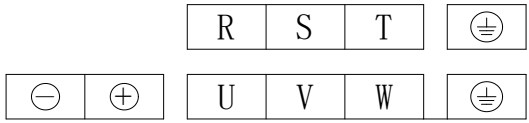


2） TI120-4T7.5GB～TI120-4T30GB

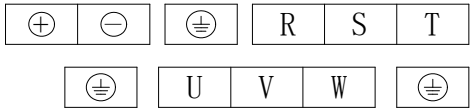


Terminal marking	Terminal name and function description
R、S、T	Three-phase AC input terminal
B1、B2/⊕	Connecting terminal of brake resistor
B2/⊕、Θ	Positive and negative terminals of DC bus; DC input terminal of external brake unit
U、V、W	variable frequency drive output terminal
⏚	Grounding terminal

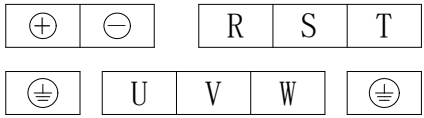
3） TI120-4T37G～TI120-4T45G



4） TI120-4T55G～TI120-4T75G

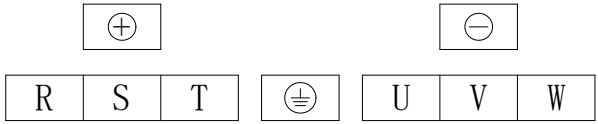


5） TI120-4T90G～TI120-4T132G



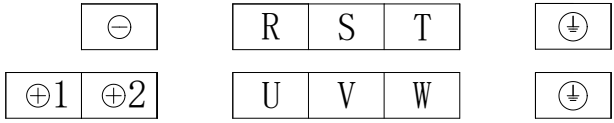
Terminal marking	Terminal name and function description
R、S、T	Three-phase AC input terminal
⊕、⊖	Positive and negative terminals of DC bus; DC input terminal of external brake unit
U、V、W	variable frequency drive output terminal
⏚	Grounding terminal

6） TI120-4T160G～TI120-4T450G



Terminal marking	Terminal name and function description
R、S、T	Three-phase AC input terminal
⊕、⊖	Positive and negative terminals of DC bus; DC input terminal of external brake unit
U、V、W	variable frequency drive output terminal
⏚	Grounding terminal

7） TI120-4T500G～TI120-4T710G



Terminal marking	Terminal name and function description
R、S、T	Three-phase AC input terminal
⊕1、⊕2	DC reactor connecting terminal
⊕、⊖	Positive and negative terminals of DC bus; DC input terminal of external brake unit
U、V、W	variable frequency drive output terminal
⏚	Grounding terminal

2.3.3 Terminal screw and wiring specifications

Table 2-1 Terminal Screw and Wiring Specifications

VFD Model	Power terminal			Grounding terminal		
	Screw	Fastening Torque (N.m)	Cable Specification (mm2)	Screw	Fastening Torque (N.m)	Cable Specification (mm2)
TI120-4T0.75G/1.5LB	M4	1.2～1.5	2.5	M3	0.5～0.6	2.5
TI120-4T1.5G/2.2LB	M4	1.2～1.5	2.5	M3	0.5～0.6	2.5
TI120-4T2.2G/3.7LB	M4	1.2～1.5	2.5	M3	0.5～0.6	2.5
TI120-4T3.7G/5.5LB	M4	1.2～1.5	4	M3	0.5～0.6	4
TI120-4T5.5G/7.5LB	M5	2.5～3.0	4	M5	2.5～3.0	4
TI120-4T7.5G/11LB	M5	2.5～3.0	6	M5	2.5～3.0	6
TI120-4T11G/15LB	M5	2.5～3.0	6	M5	2.5～3.0	6
TI120-4T15G/18.5LB	M5	2.5～3.0	6	M5	2.5～3.0	6
TI120-4T18.5G/22LB	M6	4.0～5.0	10	M6	4.0～5.0	10
TI120-4T22G/30LB	M6	4.0～5.0	16	M6	4.0～5.0	16
TI120-4T30G/37LB	M6	4.0～5.0	25	M6	4.0～5.0	16
TI120-4T37G/45L	M8	9.0～10.0	25	M8	9.0～10.0	16
TI120-4T45G/55L	M8	9.0～10.0	35	M8	9.0～10.0	16
TI120-4T55G	M8	9.0～10.0	50	M8	9.0～10.0	25
TI120-4T75G/90L	M10	17.6～22.5	60	M8	9.0～10.0	35
TI120-4T90G/110L	M10	17.6～22.5	70	M8	9.0～10.0	35
TI120-4T110G/132L	M10	17.6～22.5	100	M8	9.0～10.0	50
TI120-4T132G/160L	M10	17.6～22.5	120	M8	9.0～10.0	70
TI120-4T160G/185L	M12	31.4～39.2	150	M12	31.4～39.2	95
TI120-4T185G/200L	M12	31.4～39.2	150	M12	31.4～39.2	95
TI120-4T200G/220L	M12	31.4～39.2	185	M12	31.4～39.2	95
TI120-4T220G/250L	M12	31.4～39.2	185	M12	31.4～39.2	120
TI120-4T250G/280L	M12	31.4～39.2	120×2	M12	31.4～39.2	120
TI120-4T280G/315L	M12	31.4～39.2	150×2	M12	31.4～39.2	150
TI120-4T315G/355L	M12	31.4～39.2	185×2	M12	31.4～39.2	95×2
TI120-4T355G/400L	M12	31.4～39.2	240×2	M12	31.4～39.2	120×2
TI120-4T400G/450L	M12	31.4～39.2	240×2	M12	31.4～39.2	120×2
TI120-4T450G/500L	M12	31.4～39.2	300×2	M12	31.4～39.2	150×2
TI120-4T500G/560L	M12	31.4～39.2	300×2	M12	31.4～39.2	150×2
TI120-4T560G/630L	M12	31.4～39.2	400×2	M12	31.4～39.2	185×2
TI120-4T630G/710L	M12	31.4～39.2	400×2	M12	31.4～39.2	185×2
TI120-4T710G/800L	M12	31.4～39.2	400×2	M12	31.4～39.2	185×2

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 variable frequency drive.
- 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 variable frequency drive 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 variable frequency drive 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 variable frequency drive may be damaged.

4) variable frequency drive 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 variable frequency drive; otherwise the variable frequency drive 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 variable frequency drive over-current protection. When the length of the

motor cable is more than 100m, an AC output reactor must be installed near the variable frequency drive.

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
$S \leq 16mm^2$	S
$16mm^2 < S \leq 35mm^2$	$16mm^2$
$35mm^2 < S$	S/2

2.3.5 Control unit

1) Control unit layout

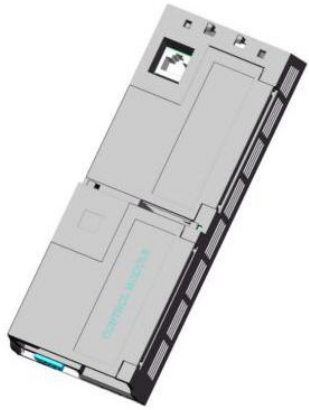


Figure 2-5 Control Unit

2) Wiring description for control terminals

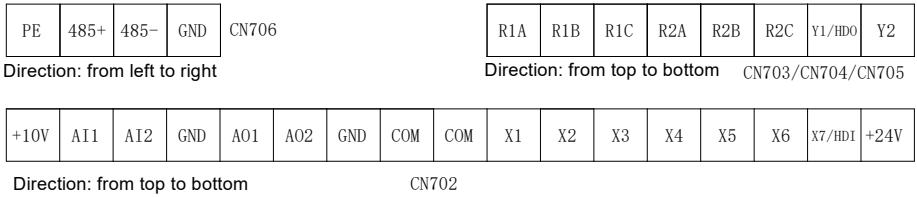


Figure 2-6 Layout of Control Terminal

Table 2-2 Function Description of Control Terminal

Analog input	+10V	Analog input reference voltage	10V ± 1%, internally isolated from COM
			The maximum output current is 20mA
	GND	Analog ground	Internal isolation from COM
	AI1	Analog input channel 1	0~10v: input impedance 22kΩ
			0~20mA: input impedance 500Ω
			The switch between 0~10V and 0~20mA analog input is realized through dial switch S300, and the factory default voltage is input.
	AI2	Analog input channel 2	0~10v: input impedance 22kΩ
Analog output	AO1	Analog output 1	0~10v: impedance requirement ≥10kΩ
			0~20mA:impedance requirement 200Ω~500Ω
			The switch between 0~10V and 0~20mA analog output is realized through dial switch S300, and the factory default voltage is output.
	AO2	Analog output 2	0~10v: impedance requirement ≥10kΩ
	GND	Analog ground	Internal isolation from COM
Digital input	+24V	+24V	24V± 20%, internally isolated from GND
			Maximum load 200mA
	COM	+24V ground	Internal isolation from GND
	X1~X7	Multi-functiona -l input	Input specifications:24VDC,5mA
			Frequency range:0~200Hz

			Voltage range:24V±20%
	X7/HDI	Multi-functiona -l Input /pulse input	Multi-function input: same as x1~x6
			Pulse input: 0.1Hz~50kHz; voltage range: 24V ±20%
Digital output	Y1/HDO	open collector output/pulse output	Open collector output: 1. Voltage range: 0~24V; 2. Current range: 0~50mA
			Pulse output:0~50kHz
	Y2	open collector output	Open collector output: 1. Voltage range: 0~24V; 2. Current range: 0~50mA
	COM	Open collector Output common terminal	Internal isolation from GND
Relay 1 output	R1A/R1B/R1C	Relay1 output	R1B—R1C: Normally opened
			R1A—R1C: Normally closed
			Contact capacity:250VAC/3A,30VDC/3A
Relay 2 output	R2A/R2B/R2C	Relay2 output	R2B—R2C: Normally opened
			R2A—R2C: Normally closed
			Contact capacity:250VAC/3A,30VDC/3A
Terminal 485	485+	485 differential signal positive	Rate:4800/9600/19200/38400/57600/115200bps The longest distance is 500m (adopting standard shielded twisted pair cable)
	485-	485 differential signal	
	GND	485 communicatio n shield grounding	Internal isolation from COM
Expansion card interface	CN701	Expansion card interface	

3) Control loop cable selection

Table 2-3 Control Loop Cable Specifications

Cable type	Cable specification (mm2)
Shielded cable	0.5

4) Instructions for use of analog input and output terminals

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

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

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

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

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

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

Dry contact mode

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

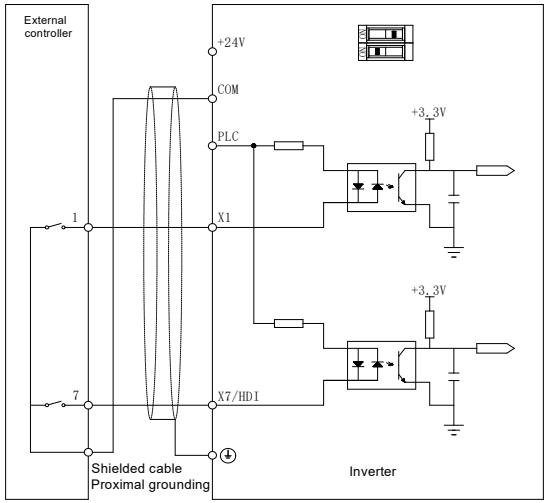


Figure 2-7 Use of Internal Power Dry Contact

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

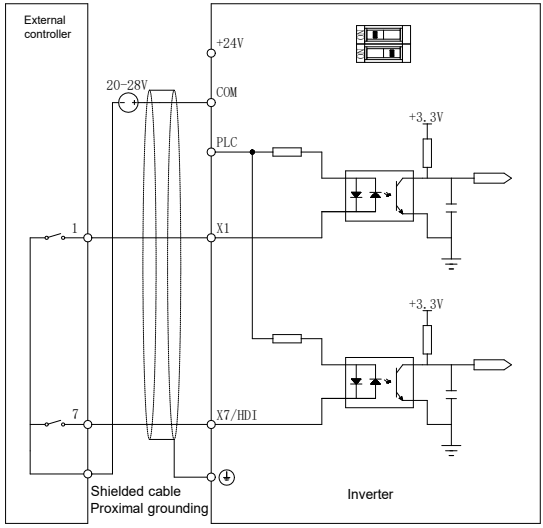


Figure 2-8 Use of External Power Dry Contact

NPN wiring mode of open collector

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

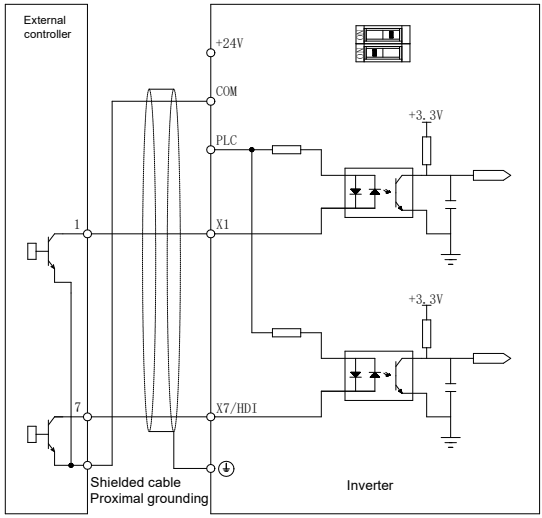


Figure 2-9 NPN Wiring Mode of Open Collector Using Internal Power

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

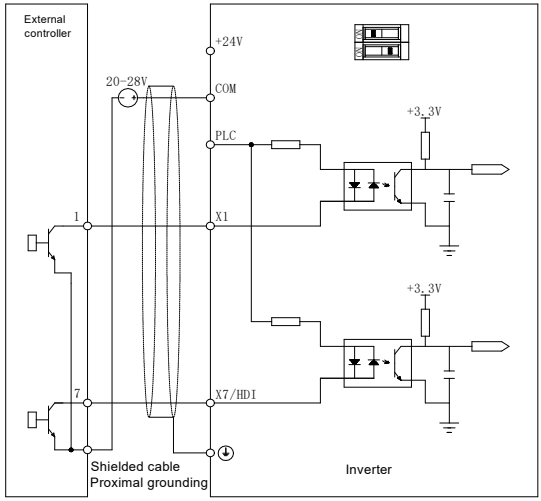


Figure 2-10 NPN Wiring Mode of Open Collector Using External Power

PNP wiring mode of open collector

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

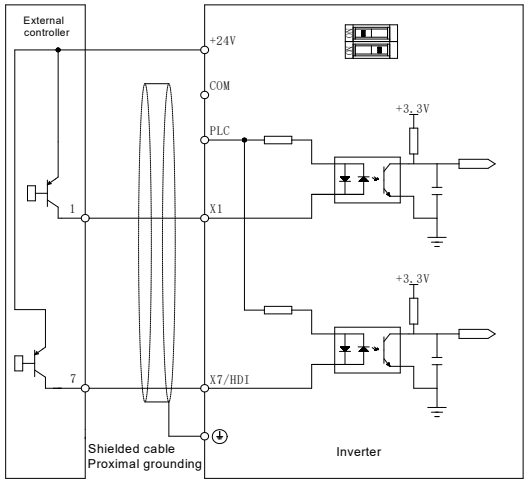


Figure 2-11 PNP Wiring Mode of Open Collector Using Internal Power

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

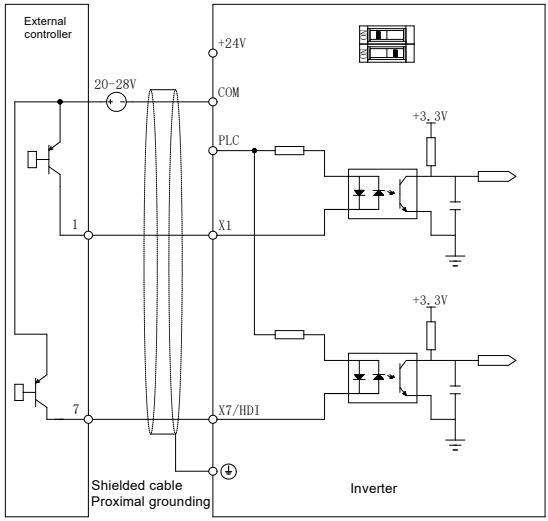


Figure 2-12 PNP Wiring Mode of Open Collector Using External Power

Multi-function output terminal connection wiring

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

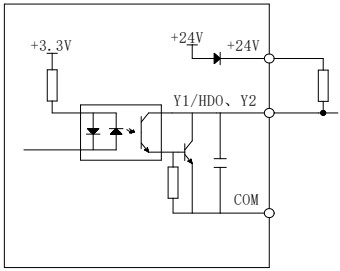


Figure 2-13 Use Internal Power Supply

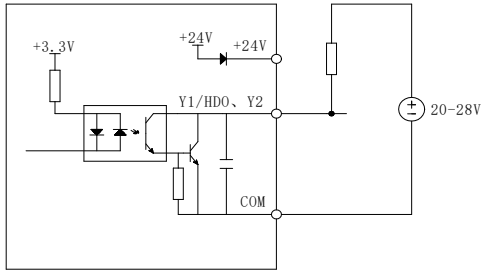


Figure 2-14 Use External Power Supply

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

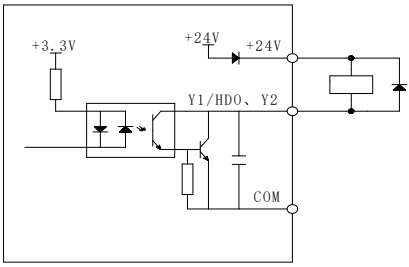


Figure 2-15 Use Internal Power Supply

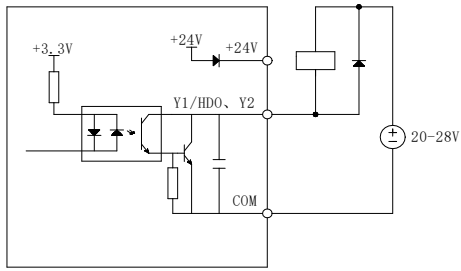


Figure 2-16 Use External Power Supply

Chapter 3 Keyboard Operation and Trial Operation

3.1 Instructions of Operating Keyboard

Figure 3-1 Diagram of Operation Keyboard

3.1.1 Key function of operation keyboard

There are 10 keys on the operation keyboard of the 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

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

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

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

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

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

3.1.2 Description of operating keyboard indicator light

Table 3-3 Description of Indicator Light

Indicator		Name	Meaning
State light	MON	Indicate the running command in a given mode	On: keyboard control 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 variable frequency drive runs in the forward direction.
	REV	Reverse rotation indication	On: in the running state, the variable frequency drive 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+A	Time indication	On: the current display parameter is time
		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.

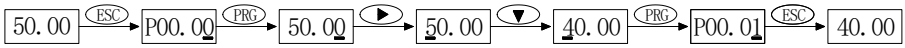


Figure 3-2 Function Parameter Setting

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

3.2 Basic Operation and Trial Operation

3.2.1 Identification of motor parameter

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

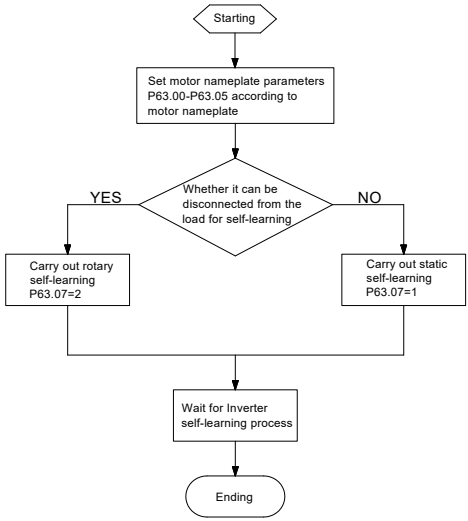


Figure 3-3 Motor Self-Learning Flow

3.2.2 Selection of motor control mode

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

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

3.2.3 Start and stop commands and modes

1) Start and stop command sources

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

2) Start and Stop Mode Selection

Function code	Setting range	Application description

Function code	Setting range	Application description
P01.05: start mode selection	0: start frequency starting	Starting from the setting frequency of P01.06, and after the holding time of P01.07, start to accelerate to the setting frequency for constant speed operation through acceleration time. However, when P01.09 is set to non-0, start DC brake firstly, and then start from P01.06 frequency.
	1: speed search starting	After receiving the start command, the 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 the operation.
P01.10: stop mode selection	0: slow down and stop	The variable frequency drive receives the stop command and starts to slow down; when the speed is reduced to the stop DC brake starting frequency of P01.11 and when P01.13 is set to non-0, it starts to stop DC brake; otherwise, it continues to slow down until the output frequency of the variable frequency drive is 0, and the stop is completed.
	1: free stop	When the variable frequency drive receives the stop command, it immediately blocks the output of the variable frequency drive, and the motor stops in a free stop mode.

3.2.4 Frequency source selection

1) Main given setting mode of frequency

Function code	Main given mode of frequency		Factory value	0
P00.01	Setting range	0	Number setting (P00.00)+ terminal Up/Down or keyboard ▲/▼ adjustment	
		1	Analog input AI1	

		2	Analog input AI2
		3	Reserve (for giving expansion card)
		4	Min[AI1,AI2]
		5	Max[AI1,AI2]
		6	Sub[AI1,AI2]
		7	Add[AI1,AI2]
		8	Pulse given HDI
		9	Process PID
		A	Simple PLC
		B	Keyboard potentiometer
		C	No given

2) Frequency auxiliary given setting mode

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

Chapter 4 Parameter List

Parameter symbol description:

○: indicate that the parameter can be modified during running

●: Indicate that the parameters cannot be modified during running and can be modified during shutdown.

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

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

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

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

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

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

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

Parameter	Name	Setting range	Factory default	Register address	Properties
P02.10	Jog deceleration time	0.1s~6000.0s	Model determination	0x020A	●
P02.11	Polyline acceleration time switching frequency	0.00Hz~upper limit frequency	0.00Hz	0x020B	●
P02.12	Polyline deceleration time switching frequency	0.00Hz~upper limit frequency	0.00Hz	0x020C	●
P03 vector control parameter					
P03.00	Speed/torque control selection	Ones: vector control selection 0: speed control 1: torque control Tens: power generation 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	○

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

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

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

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

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

Parameter	Name	Setting range	Factory default	Register address	Properties
P10.03	X4 terminal function selection		17	0x1003	●
P10.04	X5 terminal function selection		18	0x1004	●
P10.05	X6 terminal function selection		0	0x1005	●
P10.06	X7/HDI terminal function selection		0	0x1006	●
P10.08	AI·1 terminal function selection		0	0x1008	●
P10.09	AI2 terminal function selection		0	0x1009	●
P10.11	Terminal control operation mode selection	0: 2-wire operation mode 1 1: 2-wire operation mode 2 2: 3-wire operation mode 1 3: 3-wire operation mode 2	0	0x100B	●
P10.12	Logic state setting of input terminal	Ones: Bit0～Bit3:X1~X4 Tens: Bit4～Bit6:X5~X7 Hundreds: Bit8～Bit9:AI1~AI2 0: positive logic 1: negative logic	000	0x100C	●
P10.13	Input terminal filtering time	0.000s~2.000s	0.010s	0x100D	○
P10.14	X1 terminal conduction delay	0.0s~3600.0s	0.0s	0x100E	○

Parameter	Name	Setting range	Factory default	Register address	Properties
P10.15	X1 terminal disconnection delay	0.0s~3600.0s	0.0s	0x100F	○
P10.16	X2terminal conduction delay	0.0s~3600.0s	0.0s	0x1010	○
P10.17	X2 terminal disconnection delay	0.0s~3600.0s	0.0s	0x1011	○
P10.18	Terminal detection mode	Ones: Bit0～Bit3:X1~X4 Tens: Bit4～Bit6:X5~X7 Hundreds: Bit8～Bit9:AI1~AI2 0: level valid 1: edge valid	000	0x1012	●
P11 switching value Y/R output					
P11.00	Y1 terminal function	00: no output 01: variable frequency drive in operation 02: forward running of variable frequency drive 03: reverse running of variable frequency drive 04: ready to complete of variable frequency drive 05: variable frequency drive in zero frequency operation (stop ON) 06: variable frequency drive in zero frequency operation (stop OFF) 07: frequency reaching FAR 08: frequency level detection signal FDT1 09: frequency level detection signal FDT2 10: frequency upper limit 11: frequency lower limit	0	0x1100	●
P11.01	Y2 terminal function selection		0	0x1101	●
P11.02	R1 relay function selection		0	0x1102	●
P11.03	R2 relay function selection		19	0x1103	●

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

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

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

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

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

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

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

Parameter	Name	Setting range	Factory default	Register address	Properties
		2: inching forward rotation 3: inching reverse rotation 4: forward and reverse switching			
P21 Display Setting Parameters					
P21.00	Setting of running display parameter 1	00: invalid display 01: operating frequency 02: setting frequency 03: output frequency 04: synchronization frequency 05: local frequency 06: extended frequency 07: setting speed 08: operating speed 09: bus voltage 10: output voltage 11: output current 12: output power 13: output torque 14: output given 15: AI1 voltage 16: AI2 voltage 17-18: reserve 19: AO1 voltage 20: AO2 voltage 21: HDI input frequency 22: HDO output frequency 23: input terminal 24: output terminal 25: machine status 26: radiator temperature 27: motor temperature 28: PID given 29: PID feedback 30: PID error 31: PLC phase 32: main setting channel	1	0x2100	○
P21.01	Setting of run display parameter 2		11	0x2101	○
P21.02	Setting of run display parameter 3		9	0x2102	○
P21.03	Setting of run display parameter 4		0	0x2103	○
P21.04	Setting of stop display parameter 1		2	0x2104	○
P21.05	Setting of stop display parameter 2		9	0x2105	○
P21.06	Setting of stop display parameter 3		0	0x2106	○

Parameter	Name	Setting range	Factory default	Register address	Properties
P21.07	Setting of stop display parameter 4		0	0x2107	○
P30 Fault and Protection Parameters					
P30.00	Cooling fan control	0: Automatic control 1: power-on direct operation 2: stop immediately after shutdown	0	0x3000	○
P30.01	Selection of motor overheating detection	Ones: motor over-temperature protection 0: forbidden 1: action Tens: sensor type 0: temperature sensor PT100 1: temperature sensor PT1000 Hundreds: analog channel 0: analog Input AI1 1: analog Input AI2	000	0x3001	●
P30.02	Motor overheat detection level	0.0~200.0℃	85.0℃	0x3002	●
P30.03	Selection of	Ones: overload pre-alarm	000	0x3003	●

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

Parameter	Name	Setting range	Factory default	Register address	Properties
		constant speed (continuous operation) 3: always check during operation (free stop) 4: detection only at constant speed (free stop)			
P30.07	Output load drop detection level of variable frequency drive	0.0%~100.0%	30.0%	0x3007	●
P30.08	Output load drop detection time of variable frequency drive	0.0s~3600.0s	1.0s	0x3008	●
P30.09	Selection of automatic reset times	0~100 0: no automatic reset function	0	0x3009	●
P30.10	Automatic reset interval time	0.1s~100.0s	1.0s	0x300A	●
P30.11	Selection of fault relay action	Ones: during automatic reset 0: action 1: no action Tens: under-voltage period 0: action 1: no action	00	0x300B	●
P30.12	Option of enhanced protection function	Ones: output phase lack detection 0: forbidden 1: action Tens: input stage lack detection 0: forbidden	000	0x300C	●

Parameter	Name	Setting range	Factory default	Register address	Properties
		1: action Hundreds: motor overload detection 0: forbidden 1: action			
P30.13	Fault record saving method	0: reset of fault record in case of power failure 1: storage of fault record in case of power failure	1	0x300D	●
P30.14	Fault protection action attribute 1	Ones: EEPROM read-write failure 0: continue to run 1: free parking Tens: system interference fault 0: continue to run 1: free parking Hundreds: contactor suction fault 0: continue to run 1: free parking Thousands: current detection fault 0: continue to run 1: free parking	1111	0x300E	●
P30.15	Fault protection action attribute 2	Ones: variable frequency drive overheating 0: continue to run 1: free parking Tens: encoder fault 0: continue to run 1: free parking Hundreds: motor overheating 0: continue to run 1: free parking Thousands: system customization	1111	0x300F	●

Parameter	Name	Setting range	Factory default	Register address	Properties
		0: continue to run 1: free parking			
P40 Process PID Control Parameters					
P40.00	PID given mode selection	0: given by P40.01 1: analog input AI1 2: analog input AI2 3: reserve 4: Min[AI1,AI2] 5: Max[AI1,AI2] 6: Sub[AI1,AI2] 7: Add[AI1,AI2] 8: pulse given HDI	0	0x4000	●
P40.01	PID digital given	0.0%~100.0%	50.0%	0x4001	○
P40.02	PID feedback mode selection	0: constant zero feedback input 1: analog input AI1 2: analog input AI2 3: reserve 4: Min[AI1,AI2] 5: Max[AI1,AI2] 6: Sub[AI1,AI2] 7: Add[AI1,AI2] 8: pulse given HDI	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	○

Parameter	Name	Setting range	Factory default	Register address	Properties
P40.08	Differential time Td2	0.000s~50.000s	0.000s	0x4008	○
P40.09	PID parameter switching selection	0: use Kp1, Ki1 and Kd1 only 1: automatically switch according to input bias 2: switch according to terminals	0	0x4009	●
P40.10	Input bias in PID automatic switching	0.0%~100.0%	20.0%	0x400A	○
P40.11	PID adjustment selection	Ones: output frequency 0: it must be consistent with the set running direction 1: it can be opposite to the set running direction Tens: integral mode 0: when the integral reaches the upper and lower limits, continue to adjust the integral. 1: when the integral reaches the upper and lower limits, stop the integral adjustment.	11	0x400B	●
P40.12	PID positive and negative effects	0: positive effect 1: negative effect	0	0x400C	●
P40.13	PID given filtering time	0.00s~10.00s	0.00s	0x400D	○
P40.14	PID feedback filtering time	0.00s~10.00s	0.00s	0x400E	○
P40.15	PID output filtering time	0.00s~10.00s	0.00s	0x400F	○
P40.16	Sampling period	0.001s~50.000s	0.002s	0x4010	○

Parameter	Name	Setting range	Factory default	Register address	Properties
P40.17	Deviation limit	0.0%~100.0%	0.0%	0x4011	○
P40.18	Differential limit	0.0%~100.0%	0.5%	0x4012	○
P40.19	PID initial value	0.0%~100.0%	0.0%	0x4013	○
P40.20	PID initial value holding time	0.0s~3600.0s	0.0s	0x4014	○
P40.21	PID operation output maximum	0.0%~100.0%	100.0%	0x4015	○
P40.22	PID reverse output cutoff frequency	0.00Hz~upper limit frequency	0.00Hz	0x4016	○
P40.23	PID shutdown operation selection	0:no calculation during shutdown 1:operation during shutdown	0	0x4017	●
P40.24	PID given missing detection value	0.0%~100.0%	0.0%	0x4018	●
P40.25	PID given loss detection time	0.00s~30.00s 0.00s: not detect PID given loss	1.00s	0x4019	●
P40.26	PID feedback missing detection value	0.0%~100.0%	0.0%	0x401A	●
P40.27	PID feedback loss detection time	0.00s~30.00s 0.00s: not detect PID feedback loss	1.00s	0x401B	●
P40.28	PID signal loss shutdown mode	0: free shutdown 1: emergency shutdown	0	0x401C	○

Parameter	Name	Setting range	Factory default	Register address	Properties
P40.29	U Upper critical value of zero frequency operation	P40.30~upper limit frequency	0.00Hz	0x401D	●
P40.30	Lower critical value of zero frequency operation	0.00Hz~P40.29	0.00Hz	0x401E	●
P40.31	Sleep wake-up mode selection	0: Frequency sleep wake-up mode Sleep wake-up mode is determined by P40.29 and P40.30 parameter settings 1: Pressure sleep wake-up method Sleep wake-up mode is	0	0x401F	●
P40.32	Sleep pressure	P40.34~P40.37	1000	0x4020	●
P40.33	Sleep detection delay time	0.00s~30.00s Effective for frequency and pressure detection methods	1.00s	0x4021	●
P40.34	Wakeup pressure detection value	0~P40.32	0	0x4022	●
P40.35	Wakeup detection delay time	0.00s~30.00s Effective for frequency and pressure detection methods	0.50s	0x4023	●
P40.37	Given feedback range	0~10000	1000	0x4025	●
P41 Multistage Frequency					

Parameter	Name	Setting range	Factory default	Register address	Properties
P41.00	Multistage frequency digital given 1	Lower limit frequency~upper limit frequency	0.00Hz	0x4100	○
P41.01	Multistage ultistage frequency digital given 2	Lower limit frequency~upper limit frequency	0.00Hz	0x4101	○
P41.02	Multistage frequency digital given 3	Lower limit frequency~upper limit frequency	0.00Hz	0x4102	○
P41.03	Multistage frequency digital given 4	Lower limit frequency~upper limit frequency	0.00Hz	0x4103	○
P41.04	Multistage frequency digital given 5	Lower limit frequency~upper limit frequency	0.00Hz	0x4104	○
P41.05	Multistage frequency digital given 6	Lower limit frequency~upper limit frequency	0.00Hz	0x4105	○
P41.06	Multistage frequency digital given 7	Lower limit frequency~upper limit frequency	0.00Hz	0x4106	○
P41.07	Multistage frequency digital given 8	Lower limit frequency~upper limit frequency	0.00Hz	0x4107	○
P41.08	Multistage frequency digital given 9	Lower limit frequency~upper limit frequency	0.00Hz	0x4108	○

Parameter	Name	Setting range	Factory default	Register address	Properties
P41.09	Multistage frequency digital given 10	Lower limit frequency~upper limit frequency	0.00Hz	0x4109	○
P41.10	Multistage frequency digital given 11	Lower limit frequency~upper limit frequency	0.00Hz	0x410A	○
P41.11	Multistage frequency digital given 12	Lower limit frequency~upper limit frequency	0.00Hz	0x410B	○
P41.12	Multistage frequency digital given 13	Lower limit frequency~upper limit frequency	0.00Hz	0x410C	○
P41.13	Multistage frequency digital given 14	Lower limit frequency~upper limit frequency	0.00Hz	0x410D	○
P41.14	Multistage frequency digital given 15	Lower limit frequency~upper limit frequency	0.00Hz	0x410E	○
P41.15	Multistage frequency 1 command source selection	0: digital given P41.00 1: analog input AI1 2: analog input AI2 3: reserve 4: Min[AI1,AI2] 5: Max[AI1,AI2] 6: Sub[AI1,AI2] 7: Add[AI1,AI2] 8: pulse given HDI 9: process PID	0	0x410F	●
P42 Simple PLC					
P42.00	Selection of simple PLC	Ones: simple PLC operation mode	0000	0x4200	●

Parameter	Name	Setting range	Factory default	Register address	Properties
	operation mode	0: shutdown after single cycle 1: maintain final value after single cycle 2: continuous cycle Tens: simple PLC startup mode 0: run from stage 1 1: continue to operate from the stage frequency at the interruption time Hundreds: simple PLC power-down memory 0: power-down reset 1: power-down storage Thousands: simple PLC time unit 0: second (s) 1: minute (min)			
P42.01	Setting of PLC stage 1	Ones: operation direction of simple PLC stage 0: positive 1: negative Tens: acceleration and deceleration time of simple PLC stage 0: acceleration and deceleration time 1 1: acceleration and deceleration time 2 2: acceleration and deceleration time 3 3: acceleration and deceleration time 4	00	0x4201	●
P42.02	Running time in stage 1	0.0s(min)~3276.7s(min)	0.0s(min)	0x4202	○

Parameter	Name	Setting range	Factory default	Register address	Properties
P42.03	Setting of PLC stage 2	refers to the setting mode of stage 1	00	0x4203	●
P42.04	Running time in stage 2	0.0s(min)~3276.7s(min)	0.0s(min)	0x4204	○
P42.05	Setting of PLC stage 3	refers to the setting mode of stage 1	00	0x4205	●
P42.06	Running time in stage 3	0.0s(min)~3276.7s(min)	0.0s(min)	0x4206	○
P42.07	Setting of PLC stage 4	refers to the setting mode of stage 1	00	0x4207	●
P42.08	Running time in stage 4	0.0s(min)~3276.7s(min)	0.0s(min)	0x4208	○
P42.09	Setting of PLC stage 5	refers to the setting mode of stage 1	00	0x4209	●
P42.10	Running time in stage 5	0.0s(min)~3276.7s(min)	0.0s(min)	0x420A	○
P42.11	Setting of PLC stage 6	refers to the setting mode of stage 1	00	0x420B	●
P42.12	Running time in stage 6	0.0s(min)~3276.7s(min)	0.0s(min)	0x420C	○
P42.13	Setting of PLC stage 7	refers to the setting mode of stage 1	00	0x420D	●
P42.14	Running time in stage 7	0.0s(min)~3276.7s(min)	0.0s(min)	0x420E	○
P42.15	Setting of PLC stage 8	refers to the setting mode of stage 1	00	0x420F	●
P42.16	Running time in stage 8	0.0s(min)~3276.7s(min)	0.0s(min)	0x4210	○
P42.17	Setting of PLC stage 9	refers to the setting mode of stage 1	00	0x4211	●

Parameter	Name	Setting range	Factory default	Register address	Properties
P42.18	Running time in stage 9	0.0s(min)~3276.7s(min)	0.0s(min)	0x4212	○
P42.19	Setting of PLC stage 10	refers to the setting mode of stage 1	00	0x4213	●
P42.20	Running time in stage 10	0.0s(min)~3276.7s(min)	0.0s(min)	0x4214	○
P42.21	Setting of PLC stage 11	refers to the setting mode of stage 1	00	0x4215	●
P42.22	Running time in stage 11	0.0s(min)~3276.7s(min)	0.0s(min)	0x4216	○
P42.23	Setting of PLC stage 12	refers to the setting mode of stage 1	00	0x4217	●
P42.24	Running time in stage 12	0.0s(min)~3276.7s(min)	0.0s(min)	0x4218	○
P42.25	Setting of PLC stage 13	refers to the setting mode of stage 1	00	0x4219	●
P42.26	Running time in stage 13	0.0s(min)~3276.7s(min)	0.0s(min)	0x421A	○
P42.27	Setting of PLC stage 14	refers to the setting mode of stage 1	00	0x421B	●
P42.28	Running time in stage 14	0.0s(min)~3276.7s(min)	0.0s(min)	0x421C	○
P42.29	Setting of PLC stage 15	refers to the setting mode of stage 1	00	0x421D	●
P42.30	Running time in stage 15	0.0s(min)~3276.7s(min)	0.0s(min)	0x421E	○
P43 Fixed Length and Linear Speed					
P43.00	Set the counting value	1~65535	1000	0x4300	●

Parameter	Name	Setting range	Factory default	Register address	Properties
P43.01	Designated the counting value	1~p43.00 (set counting value)	1000	0x4301	●
P43.02	Selection of length reach action	Ones: length reaching 0: continue to run 1: shutdown Tens: unit of length 0: meter 1: 10 meters Hundreds: length shutdown reset 0: invalid 1: action Thousands: counting, stopping and clearing 0: invalid 1: action	0000	0x4302	●
P43.03	Setting length	0m~65535m	0m	0x4303	●
P43.04	Number of pulses per meter	0.1~6553.5	1000.0	0x4304	●
P43.05	Linear speed display coefficient	0.0%~1000.0%	0.0%	0x4305	○
P44 lifting function parameters (only for crane models)					
P44.00	Crane device selection	ones: device selection 0: forbidden 1: Promotion device 2: translation device Tens: reserve	00	0x4400	●
P44.01	Upward brake opening frequency	0.00Hz~10.00Hz	2.00Hz	0x4401	●
P44.02	Upward brake opening	0.0%~200.0%	30.0%	0x4402	●

Parameter	Name	Setting range	Factory default	Register address	Properties
P44.03	Downward brake opening frequency	0.00Hz~10.00Hz	3.00Hz	0x4403	●
P44.04	Downward brake opening current	0.0%~200.0%	30.0%	0x4404	●
P44.05	Holding time of brake opening current	0.0s~10.0s	0.5s	0x4405	●
P44.06	Upward brake off frequency	0.00Hz~10.00Hz	2.00Hz	0x4406	●
P44.07	Downward brake off frequency	0.00Hz~10.00Hz	3.00Hz	0x4407	●
P44.08	Holding time of brake off frequency	0.0s~10.0s	0.5s	0x4408	●
P44.09	brake off delay time	0.0s~10.0s	0.0s	0x4409	●
P44. 10	Stop delay time	0.0s~10.0s	0.5s	0x440A	●
P44. 11	Start direction control selection	0: The brake opening torque is consistent with the running direction 1: The brake opening torque is always in the	0	0x440B	●
P44. 12	Instruction reverse selection	0: Do not allow the running process to reverse directly 1: Allow the running process to be reversed directly	0	0x440C	●
P44. 15	Keyboard Up/Dn speed	0: speed adjustment is forbidden	0	0x440F	●
P50 Modbus Communication Parameters					

Parameter	Name	Setting range	Factory default	Register address	Properties
P50.00	Local address	0~247； 0: broadcast address	1	0x5000	○
P50.01	Communication rate selection	Ones: communication baud rate of terminal port Tens: communication baud rate of keyboard port 0:4800bps 1:9600bps 2:19200bps 3:38400bps 4:57600bps 5:115200bps	31	0x5001	○
P50.02	Data format	Ones: Terminal port data format Tens: Keyboard port data format 0:1-8-1-N format,RTU 1:1-8-1-E format,RTU 2:1-8-1-O format,RTU 3:1-7-1-N format,ASCII 4:1-7-1-E format,ASCII 5:1-7-1-O format,ASCII	00	0x5002	○
P50.03	Communication response delay	0.000s~60.000s	0.000s	0x5003	○
P50.04	Overtime detection time	0.0s~600.0s 0.0s:indicate no detection	0.0s	0x5004	○
P50.05	Selection of communication error response shield	Ones: selection of communication port error response shield Tens: selection of keyboard port error response shield 0: valid 1: invalid	00	0x5005	○

Parameter	Name	Setting range	Factory default	Register address	Properties
P50.06	Master-slave mode selection and slave function code setting	ones: master-slave selection for terminal port communication Tens: master-slave selection for keyboard port communication 0: stand-alone use 1: this machine is used as the host 2: this machine is a slave machine Hundreds: operation address of terminal port communication Thousands: communication operation address of extended port 0: P00.00 1: P40.01	0000	0x5006	●
P50.07	Interval time of host operation data	0.010s~1.000s	0.050s	0x5007	○
P50.08	Proportion coefficient of receiving date of slave machine	0.00~10.00	1.00	0x5008	○
P60 Motor Control Preparation					
P60.00	Carrier frequency setting	≤ 15kW:1.0kHz~16.0kHz, Factory value:6.0kHz 18.5kW-45kW:1.0kHz~10.0 kHz, Factory value:4.0kHz 55kW-75kW:1.0kHz~8.0kHz, Factory value:3.0kHz	Model determination	0x6000	●

Parameter	Name	Setting range	Factory default	Register address	Properties
		≥ 90kW:1.0kHz~3.0kHz, Factory value:2.0kHz			
P60.02	Pulse width modulation mode	0: 3-phase modulation 1: automatic switching	0	0x6002	●
P60.03	DPWM switching frequency	5.00Hz~maximum frequency	8.00Hz	0x6003	●
P60.04	Magnetic flux brake selection	0: forbidden 1: action	0	0x6004	●
P60.05	Energy consumption brake selection	0: forbidden 1: action	0	0x6005	●
P60.06	Energy consumption brake action voltage	650V~750V	720V	0x6006	●
P60.07	Over-voltage stall regulation selection	0: forbidden 1: action	1	0x6007	●
P60.08	Over-voltage stall action voltage	100.0%~150.0% (relative to rated bus voltage)	135.0%	0x6008	●
P60.09	Under-voltage stall regulation selection	0: forbidden 1: action	0	0x6009	●
P60.10	Under-voltage stall action voltage	50.0%~95.0% (relative to rated bus voltage)	85.0%	0x600A	●
P60.11	Current limiting action	0: forbidden 1: action	1	0x600B	●

Parameter	Name	Setting range	Factory default	Register address	Properties
	selection				
P60.12	Current limiting level	20.0%~200.0%(Relative rated current)	160.0%	0x600C	●
P60.13	Slip compensation gain	0.0~300.0%	100.0%	0x600D	○
P61 Encoder Parameters					
P61.00	Speed feedback encoder selection	0: Incremental encoder 1 1: Incremental encoder 2 2: Sine encoder	0	0x6100	●
P61.01	Encoder 1 resolution	1~10000	1024	0x6101	●
P61.02	Electrical angle offset 1	0.00°~359.99°	0.00°	0x6102	●
P61.03	Encoder 1 signal phase	0: normal; that is, A is ahead of B in forward rotation. 1: reverse; that is, B is ahead of B in forward rotation.	0	0x6103	●
P61.04	The numerator of the electronic gear ratio 1	1~65535	1000	0x6104	●
P61.05	Denominator of electronic gear ratio 1	1~65535	1000	0x6105	●
P61.06	Encoder 2 resolution	1~10000	1024	0x6106	●

Parameter	Name	Setting range	Factory default	Register address	Properties
P61.07	Electrical angle offset 2	0.00°~359.99°	0.00°	0x6107	●
P61.08	Encoder 2 signal phase	0: normal; that is, A is ahead of B in forward rotation. 1: reverse; that is, B is ahead of B in forward rotation.	0	0x6108	●
P61.09	The numerator of the electronic gear ratio 2	1~65535	1000	0x6109	●
P61.10	Denominator of electronic gear ratio 2	1~65535	1000	0x610A	●
P61.11	The number of pole pairs of resolver	1~32	1	0x610B	●
P61.12	Sinusoidal signal offset	1~65535	0	0x610C	●
P61.13	Cosine signal offset	1~65535	0	0x610D	●
P61.14	Sinusoidal signal gain	1~8192	4096	0x610E	●
P61.15	Cosine signal gain	1~8192	4096	0x610F	●
P62 Motor Characteristic Parameters					
P62.00	Stator resistance of asynchronous motor	0.001Ω~65.000Ω	Model determination	0x6200	●

Parameter	Name	Setting range	Factory default	Register address	Properties
P62.01	Rotor resistance of asynchronous motor	0.001Ω~65.000Ω	Model determination	0x6201	●
P62.02	Leakage inductance of asynchronous motor	0.01mH~650.00mH	Model determination	0x6202	●
P62.03	Mutual inductance of asynchronous motor	0.01mH~650.00mH	Model determination	0x6203	●
P62.04	No-load current of asynchronous motor	0.1A~P63.02	Model determination	0x6204	●
P62.05	Saturation coefficient of asynchronous motor	0.00%~100.00%	Model determination	0x6205	●
P62.06	Stator resistance of synchronous motor	0.001Ω~65.000Ω	Model determination	0x6206	●
P62.07	D-axis inductance of synchronous motor	0.01mH~650.00mH	Model determination	0x6207	●
P62.08	Q-axis inductance of synchronous motor	0.01mH~650.00mH	Model determination	0x6208	●

Parameter	Name	Setting range	Factory default	Register address	Properties
P62.09	Counter electromotive force of synchronous motor	0.1mV~2000.0mV	Model determination	0x6209	●
P63 Motor Nameplate Parameters					
P63.00	Rated power of motor	0.2kW~6000.0kW	Model determination	0x6300	●
P63.01	Rated voltage of motor	1V~480V	380V	0x6301	●
P63.02	Rated current of motor	0.1A~6000.0A	Model determination	0x6302	●
P63.03	Rated frequency of motor	10.00Hz~300.00Hz	50.00Hz	0x6303	●
P63.04	Rated speed of motor	1~63535 rpm	1500rpm	0x6304	●
P63.05	Pole number	2~80	4	0x6305	●
P63.07	Self-tuning of motor parameter	0: no request 1: motor static identification 2: motor rotation identification	0	0x6307	●
P63.08	Motor control mode	0: advanced scalar control 1: no PG vector control 2: PG vector control	0	0x6308	●
U00 Status Monitoring Data					
U00.00	Running frequency	0.00Hz~300.00Hz	Actual value	0x8100	★
U00.01	Setting frequency	0.00Hz~300.00Hz	Actual value	0x8101	★
U00.02	Output frequency	0.00Hz~300.00Hz	Actual value	0x8102	★
U00.03	Synchronization frequency	0.00Hz~300.00Hz	Actual value	0x8103	★

Parameter	Name	Setting range	Factory default	Register address	Properties
U00.04	Local frequency	0.00Hz~300.00Hz	Actual value	0x8104	★
U00.05	Extended frequency	0.00Hz~300.00Hz	Actual value	0x8105	★
U00.06	Setting rotary speed	0rpm~60000rpm	Actual value	0x8106	★
U00.07	Output rotary speed	0rpm~60000rpm	Actual value	0x8107	★
U00.08	Bus voltage	0V~2000V	Actual value	0x8108	★
U00.09	Output Voltage	0V~2000V	Actual value	0x8109	★
U00.10	Output current	0.0A~6000.0A	Actual value	0x810A	★
U00.11	Output power	0.0kW~6000.0kW	Actual value	0x810B	★
U00.12	Output torque	-300.0%~300.0%	Actual value	0x810C	★
U00.13	Given torque	-300.0%~300.0%	Actual value	0x810D	★
U00.14	AI1 voltage	-10.00V~10.00V	Actual value	0x810E	★
U00.15	AI2 voltage	-10.00V~10.00V	Actual value	0x810F	★
U00.18	AO1 voltage	0.00V~10.00V	Actual value	0x8112	★
U00.19	AO2 voltage	0.00V~10.00V	Actual value	0x8113	★
U00.20	HDI input frequency	0Hz~60000Hz	Actual value	0x8114	★
U00.21	HDO output frequency	0Hz~60000Hz	Actual value	0x8115	★
U00.22	Input terminal status	Bit0~Bit6 corresponds to X1~X7 Bit8~Bit9 corresponds to AI1~AI2	Actual value	0x8116	★

Parameter	Name	Setting range	Factory default	Register address	Properties
		0: input terminal OFF 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	Machine status	Ones: Bit0: run/stop Bit1: forward/reverse rotation Bit2: DC braking Bit3: parameter identification Tens: 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 given	-100.00%~100.00%	Actual value	0x811B	★
U00.28	PID feedback	-100.00%~100.00%	Actual value	0x811C	★
U00.29	PID error	-100.00%~100.00%	Actual value	0x811D	★
U00.30	PLC stage	0~15	Actual value	0x811E	★
U00.31	Main setting channel	0~11	Actual value	0x811F	★
U00.32	Auxiliary setting channel	0~11	Actual value	0x8120	★

Parameter	Name	Setting range	Factory default	Register address	Properties
U00.33	Main setting frequency	0.00Hz~300.00Hz	Actual value	0x8121	★
U00.34	Auxiliary setting frequency	0.00Hz~300.00Hz	Actual value	0x8122	★
U00.35	External counting value	0~65535	Actual value	0x8123	★
U00.36	Setting length value	0m~65535m	Actual value	0x8124	★
U00.37	Running length value	0m~65535m	Actual value	0x8125	★
U00.38	Operating linear speed	0m/s~65535m/s	Actual value	0x8126	★
U00.39	AI1 sampling value	-10.00V~10.00V	Actual value	0x8127	★
U00.40	AI2 sampling value	-10.00V~10.00V	Actual value	0x8128	★
U00.43	Current fault code	0~100	Actual value	0x812B	★
U00.44	Accumulated power-on time	0h~65535h	Actual value	0x812C	★
U00.45	Accumulated running time	0h~65535h	Actual value	0x812D	★
U00.46	High accumulated energy consumption of motor	0kW.h~59999kW.h	Actual value	0x812E	★

Parameter	Name	Setting range	Factory default	Register address	Properties
U00.47	Low accumulated energy consumption of motor	0.0kW.h~999.9kW.h	Actual value	0x812F	★
U00.48	High operation energy consumption	0kW.h~59999kW.h	Actual value	0x8130	★
U00.49	Low operation energy consumption	0.0kW.h~999.9kW.h	Actual value	0x8131	★
U01 Fault Record Data					
U01.00	Last fault code	1: over-current in acceleration 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: variable frequency drive under-voltage 8: current detection fault 9: system interference fault 10: module protection fault 11: motor identification fault 12: contactor suction fault 13: external terminal fault 14: variable frequency	Actual value	0x8200	★

Parameter	Name	Setting range	Factory default	Register address	Properties
		drive overheating 15: motor overheating 16: variable frequency drive overload 17: motor overload 18: variable frequency drive input phase lack 19: variable frequency drive output phase lack 20: variable frequency drive output off load 21: variable frequency drive short circuit to ground 22: EEPROM read-write failure 23: communication overtime fault 24: reaching power-on time 25: reaching running time 26: PID given loss 27: PID feedback loss 28: excessive speed bias 29: motor overspeed 30: encoder fault 31- 36: reserve 37: speed estimation fault 38: reserve 39: parameter copy fault			
U01.01	Given frequency at the last fault	0.00Hz~300.00Hz	Actual value	0x8201	★
U01.02	Output frequency at the last fault	0.00Hz~300.00Hz	Actual value	0x8202	★
U01.03	Output Current at the	0.0A~6000.0A	Actual value	0x8203	★

Parameter	Name	Setting range	Factory default	Register address	Properties
	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 of last fault	0x00～0x7F	Actual value	0x8206	★
U01.07	Output terminal status at the last fault	0x00～0x7F	Actual value	0x8207	★
U01.08	Machine running status of the last fault	0x00～0x2F	Actual value	0x8208	★
U01.09	Radiator temperature of the last fault	0.0℃~120.0℃	Actual value	0x8209	★
U01.10	Cumulative running time of the last fault	0.0h~6553.5h	Actual value	0x820A	★
U01.11	The last fault code	As U01.00	Actual value	0x820B	★
U01.12	Given frequency at previous fault	0.00Hz~300.00Hz	Actual value	0x820C	★
U01.13	Output frequency at previous fault	0.00Hz~300.00Hz	Actual value	0x820D	★
U01.14	Given current at previous fault	0.0A~6000.0A	Actual value	0x820E	★
U01.15	DC bus voltage at previous fault	0V~2000V	Actual value	0x820F	★
U01.16	Output	0V~2000V	Actual value	0x8210	★

Parameter	Name	Setting range	Factory default	Register address	Properties
	voltage at previous fault				
U01.17	Input terminal status at previous fault	0x00～0x7F	Actual value	0x8211	★
U01.18	Output terminal status at previous fault	0x00～0x7F	Actual value	0x8212	★
U01.19	Machine running status at previous fault	0x00～0x2F	Actual value	0x8213	★
U01.20	Radiator temperature at previous fault	0.0℃~120.0℃	Actual value	0x8214	★
U01.21	Cumulative running time at previous fault	0.0h~6553.5h	Actual value	0x8215	★
U01.22	The first two fault codes	As U01.00	Actual value	0x8216	★
U01.23	Given frequency during the first two faults	0.00Hz~300.00Hz	Actual value	0x8217	★
U01.24	Output frequency during the first two faults	0.00Hz~300.00Hz	Actual value	0x8218	★
U01.25	Output current during the first two faults	0.0A~6000.0A	Actual value	0x8219	★

Parameter	Name	Setting range	Factory default	Register address	Properties
U01.26	DC bus voltage during first two faults	0V~2000V	Actual value	0x821A	★
U01.27	Output voltage during the first two faults	0V~2000V	Actual value	0x821B	★
U01.28	Input terminal status during the first two faults	0x00～0x7F	Actual value	0x821C	★
U01.29	Output terminal status during the first two faults	0x00～0x7F	Actual value	0x821D	★
U01.30	achine operating status during the first two faults	0x00～0x2F	Actual value	0x821E	★
U01.31	Radiator temperature during the first two faults	0.0℃~120.0℃	Actual value	0x821F	★
U01.32	Cumulative operation time during the first two faults	0.0h~6553.5h	Actual value	0x8220	★
U01.33	The first three fault codes	As U01.00	Actual value	0x8221	★
U01.34	Cumulative operation time during the first three faults	0.0h~6553.5h	Actual value	0x8222	★
U02 variable frequency drive Information Data					

Parameter	Name	Setting range	Factory default	Register address	Properties
U02.00	Rated power of variable frequency	0.0kW~6000.0kW	Model determination	0x8300	★
U02.01	Rated voltage of variable frequency	0V~2000V	Model determination	0x8301	★
U02.02	Rated current of variable frequency	0.0A~6000.0A	Model determination	0x8302	★
U02.03	Software series of variable	120: represents TI120 series	Actual value	0x8303	★
U02.04	Functional version of variable	1.00~99.99	Actual value	0x8304	★
U02.05	Performance version of variable	1.00~99.99	Actual value	0x8305	★
U02.06	Production year of variable	2000~2999	Actual value	0x8306	★
U02.07	Production month of variable	01/01~12/31	Actual value	0x8307	★
U02.08	Custom series number	00~9999	Actual value	0x8308	★
U02.09	Customer non-label	00~9999	Actual value	0x8309	★
U02.10	Keyboard software version	0.00~99.99	Actual value	0x830A	★

Chapter 5 Detailed parameter introduction

P00 frequency given parameter

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

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

1: Analog input AI1

2: Analog output AI2

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

3: Reserve

4: Min[AI1,AI2]

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

5: Max[AI1,AI2]

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

6: Sub[AI1,AI2]

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

7: Add[AI1,AI2]

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

8: Pulse given HDI

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

9: Process PID

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

A: Simple PLC

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

B: Keyboard potentiometer

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

C: No given

The main given frequency output is 0

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

0: digital given (P00.02)

1: analog input AI1

2: analog input AI2

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

3: reserve

4: Min[AI1,AI2]

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

5: Max[AI1,AI2]

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

6: Sub[AI1,AI2]

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

7: Add[AI1,AI2]

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

8: pulse given HDI

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

9: reserve

A: reserve

B: no given

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

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

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

P00.06	Main and auxiliary overlay selection of frequency	range:0x00~0x34	Factory default:00

Ones: frequency given mode

0: frequency main given

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

1: main and auxiliary operation result of frequency

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

2: main given and auxiliary given switching of frequency

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

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

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

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

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

Tens: given operation relation of frequency main and auxiliary

0: Min [main, auxiliary]

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

1: Max [main, auxiliary]

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

2: Sub [main, auxiliary]

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

3: Add [main, auxiliary]

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

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

maximum frequency:Refers to the highest frequency that the variable frequency drive allows to output。

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

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

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

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

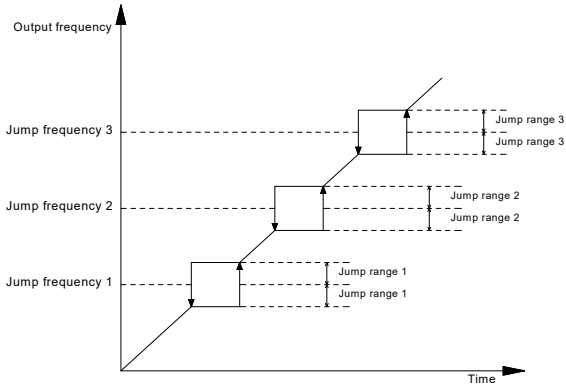


Figure 5-1 Schematic diagram of jumping frequency

P00.16	Inching frequency setting	range:0.00Hz~upper limit frequency	Factory default:5.00Hz

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

P01 start and stop control parameters

P01.00	Given mode of running command	range:0~4	Factory default:0

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

0: keyboard command mode

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

1: terminal command mode

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

2: Communication command mode

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

3: multi-segment command mode

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

P01.01	Command given mode to bundle frequency source	range:0x000~0xBBB	Factory default:000

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

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

Ones: selection of keyboard command binding frequency source

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

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

9: process PID

A: simple PLC

B: no given

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

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

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

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

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

0: positive direction

1: reverse direction

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

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

0: allow reverse rotation

1: forbid reverse rotation

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

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

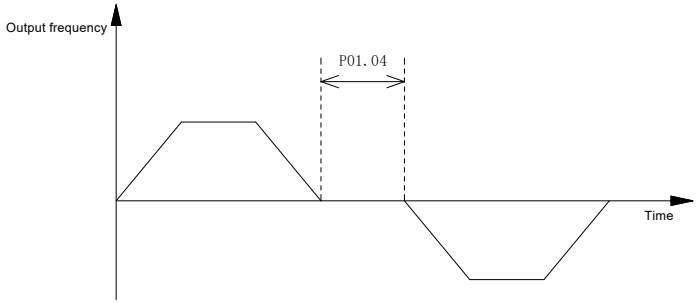


Figure 5-2 Schematic diagram of forward and reverse dead time

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

0: start from start frequency

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

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

1: speed search starting

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

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

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

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

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

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

0: slow down and stop

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

1: free stop

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

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

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

P01.12 stopping DC braking current is a percentage relative to the rated current of the variable frequency drive.

P02 acceleration and deceleration parameters

P02.00	Acceleration time 1	range:0.1s~3600.0s	Factory default: Model determination
P02.01	Deceleration time 1	range:0.1s~3600.0s	Factory default: Model determination
P02.02	Acceleration time 2	range:0.1s~3600.0s	Factory default: Model determination
P02.03	Deceleration time 2	range:0.1s~3600.0s	Factory default: Model determination
P02.04	Acceleration time 3	range:0.1s~3600.0s	Factory default: Model determination

P02.05	Deceleration time 3	range:0.1s~3600.0s	Factory default: Model determination
P02.06	Acceleration time 4	range:0.1s~3600.0s	Factory default: Model determination
P02.07	Deceleration time 4	range:0.1s~3600.0s	Factory default: Model determination

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

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

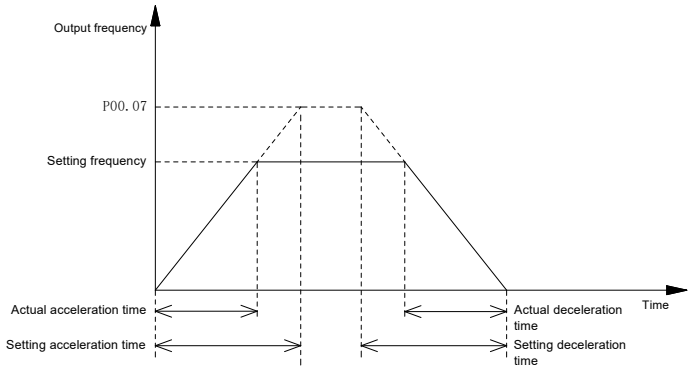


Figure 5-3 Schematic diagram of acceleration and deceleration time

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

P02.08	Emergency stop deceleration time	range:0.1s~3600.0s	Factory default: Model determination

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

P02.09	Inching acceleration time	range:0.1s~3600.0s	Factory default: Model determination
P02.10	Inching deceleration time	range:0.1s~3600.0s	Factory default: Model determination

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

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

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

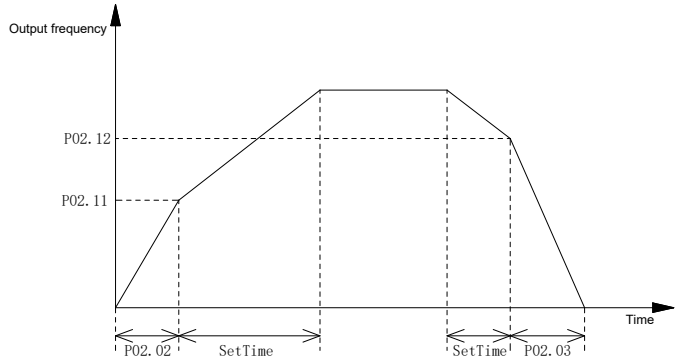


Figure 5-4 Schematic diagram of the acceleration and deceleration time switching of the broken line

P03 vector control parameter

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

Ones: Vector control selection

0: speed control 1: torque control

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

Tens: power generation limit

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

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

in constant speed, and deceleration limit means that the torque setting value is limited when the variable frequency drive is in deceleration.

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

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

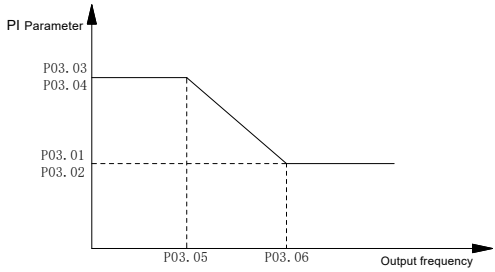


Figure 5-5 Schematic diagram of PI parameters of the speed loop

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

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

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

0: digital setting P03.09

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

9: maximum value of variable frequency drive

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

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

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

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

0: digital setting P03.11

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

9: maximum value of variable frequency drive

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

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

P03.12	Limiting channel of torque control frequency	range:0x00~0x88	Factory default:00
P03.13	Positive setting of torque control frequency	range:0.00Hz~maximum frequency	Factory default:50.00Hz
P03.14	Reverse setting of torque control frequency	range:0.00Hz~maximum frequency	Factory default:50.00Hz

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

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

1: analog input AI1

2: analog input AI2

3: reserve

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

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

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

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

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

The excitation current adjustment parameters and torque current adjustment parameters are suitable for current loop adjustment in vector control mode. After the motor is subjected to parameter

identification, two groups of adjustment parameters are automatically calculated, generally they are not needed to be modified. If the PI setting of the current loop is too large, the current shall oscillate and the torque shall fluctuate greatly.

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

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

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

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

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

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

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

Frequency difference of torque current regulator action judgment during torque control

P04 Scalar Control Parameters

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

0: straight line V/F

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

1: multi-stage V/F

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

2: 1.2 power

3: 1.4 power

4: 1.6 power

5:1.8 power

6: 2.0 power

It is suitable for variable torque loads.

7: separation V/F

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

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

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

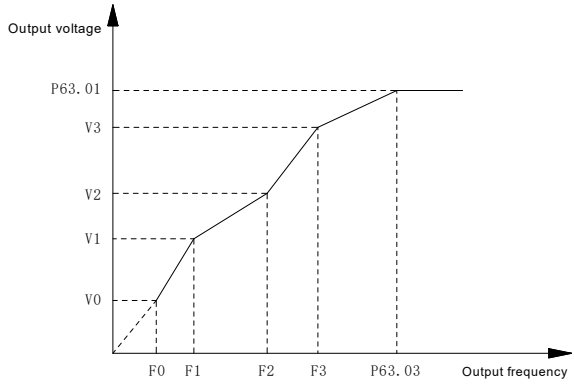


Figure 5-6 Schematic Diagram of Multi-stage V/F Curve

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

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

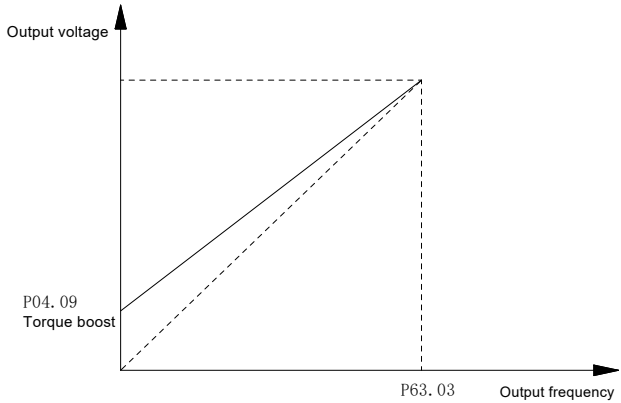


Figure 5-7 Schematic Diagram of Torque Boost

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

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

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

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

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

0: P04.14 digital setting

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

1: analog input AI1

2: analog input AI2

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

3: reserve

4: process PID output

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

5: process PID intput +AI1

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

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

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

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

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

P10 switching value x input

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

0:no function

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

1: forward running (FWD)

2: reverse running (REV)

3: forward running inching (FJOG)

4: reverse inching (RJOG)

Table 5-1 Inching Command Configuration

Run	K1	K2

command		
Forward inching	ON	OFF
Reverse inching	OFF	ON
Stop	OFF	OFF
Stop	ON	ON

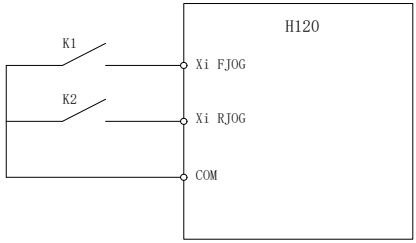


Figure 5-8 Schematic Diagram of Inching Command

5:3-wire operation

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

6: free stop

When the "free stop" terminal function is valid, the variable frequency drive shall stop freely.

7: emergency stop

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

8: external stop

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

9: operation forbidden

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

10: operation suspended

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

11: external fault input

After this function is valid, the variable frequency drive reports Er.EtE fault.

12: fault reset (RESET)

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

13: terminal adjustment Up

14: terminal adjustment Down

When the frequency selects "digital setting P00.00+Up/Down adjustment", the frequency can be increased and decreased through this terminal function.

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

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

16: multi-stage frequency terminal 1

17: multi-stage frequency terminal 2

18: multi-stage frequency terminal 3

19: multi-stage frequency terminal 4

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

Table 5-2 Multi-band frequency setting

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

20: selection of acceleration and deceleration time 1

21: selection of acceleration and deceleration time 2

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

Table 5-3 Acceleration and deceleration time selection

Acceleration and	Acceleration and	Acceleration and

deceleration time	deceleration time selection 1	deceleration time selection 2
P02.00、P02.01	OFF	OFF
P02.02、P02.03	ON	OFF
P02.04、P02.05	OFF	ON
P02.06、P02.07	ON	ON

22: acceleration and deceleration forbidding

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

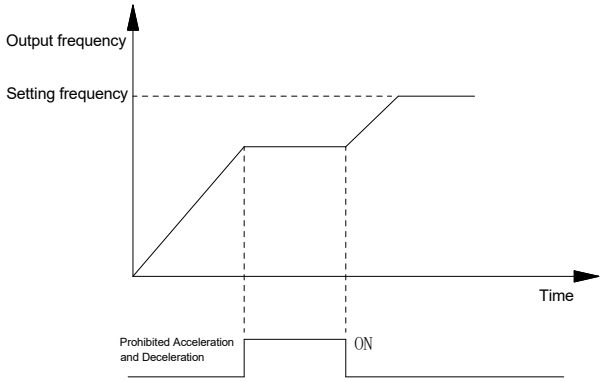


Figure 5-9 Schematic Diagram of Prohibited Acceleration and Deceleration

23: command switch to keyboard control

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

24: command switch to terminal control

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

25: command switch to communication control

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

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

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

27: main frequency source switch to frequency digital setting

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

28: auxiliary frequency source Switch to frequency digital setting

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

29: stop DC braking+ stop command

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

enter DC braking.

30: stop DC braking

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

31: running DC braking

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

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

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

33: count input

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

34: count clearing

Clear the counting value of the count input function.

35: length counting

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

36: length clearing

Clear the calculated length value of the length counting.

37: PID action direction

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

38: PID parameter switching

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

39: PID operation suspending

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

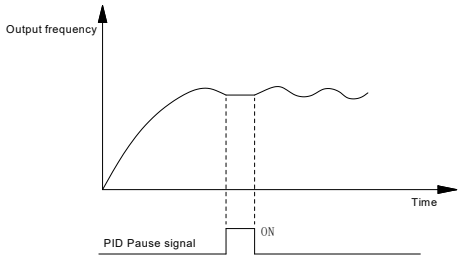


Figure 5-10 Schematic Diagram of PID Pause

40: PID integral suspending

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

41: PLC memory clear

The simple PLC status is restored to the initial status.

42: PLC operation failure

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

43: PLC operation suspending

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

44~45: reserve

46: speed/torque switching

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

47: torque control forbidding

The variable frequency drive is prohibited to work in torque mode.

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

0: 2-wire operation mode 1

1: 2-wire operation mode 2

Table 5-4 Configuration of Two-wire Operation Mode

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

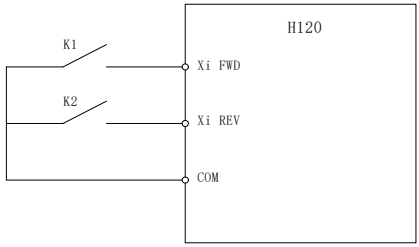


Figure 5-11 Schematic Diagram of Two-wire Mode

2: 3-wire operation mode 1

3: 3-wire operation mode 2

Table 5-5 Configuration of Three-wire Operation Mode

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

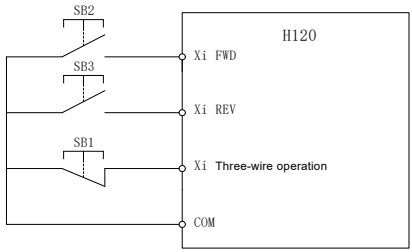


Figure 5-12 Schematic diagram of the three-wire mode

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

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

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

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

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

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

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

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

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

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

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

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

0: level valid

Indicate to detect the level signal of the input terminal.

1: edge valid

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

P11 switching value Y/R output

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

0: no output

The output terminal has no function.

1: variable frequency drive in operation

A valid signal is output when the variable frequency drive is running.

2: forward running of variable frequency drive

When the variable frequency drive is running forwards, a valid signal is output.

3: reverse running of variable frequency drive

When the variable frequency drive is running reversely, a valid signal is output.

4: ready to complete of variable frequency drive

After the variable frequency drive is powered on without any fault, a valid signal is output.

5: variable frequency drive in zero frequency operation (stop ON)

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

6: variable frequency drive in zero frequency operation (stop OFF)

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

7: frequency reaching FAR

When the output frequency of the variable frequency drive is within the range of the setting frequency (setting frequency ± F11.19), a valid signal is output.

8: frequency level detection signal FDT1

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

9: frequency level detection signal FDT2

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

10: frequency upper limit

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

11: frequency lower limit

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

12: torque limiting action (during speed control)

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

13: speed limiting action (during torque control)

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

14: X1 terminal status

15: X2 terminal status

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

16: zero current detection

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

When the variable frequency drive is in DC braking, a valid signal is output.

18: variable frequency drive under-voltage

When the variable frequency drive is under voltage, a valid signal is output.

19: variable frequency drive fault output

20: variable frequency drive alarm output

When the variable frequency drive fails or alarms, a valid signal is output.

21: variable frequency drive overload early warning

When the variable frequency drive overload pre-warning fault or warning prompt occurs, a valid

signal is output.

22: variable frequency drive overheating alarm

When the variable frequency drive overheats, a valid signal is output.

23: motor overload early warning

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

24: motor overheating alarm

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

25: PLC cycle completed

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

26: PLC stage completed

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

27: reserve

28: reaching cumulative power-on time

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

29: reaching cumulative running time

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

30: reaching the setting count value

31: reaching the specified count value

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

32: reaching the setting length

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

33: brake control output (for crane type only)

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

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

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

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

Each bit represents an input terminal respectively, represents Y1, Y2, R1 and R2 terminals in turn from the low position.

0: positive logic, current flowing means output ON

1: negative logic, no current flowing means output ON

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

0: check out by operating frequency

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

1: check out by output frequency

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

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

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

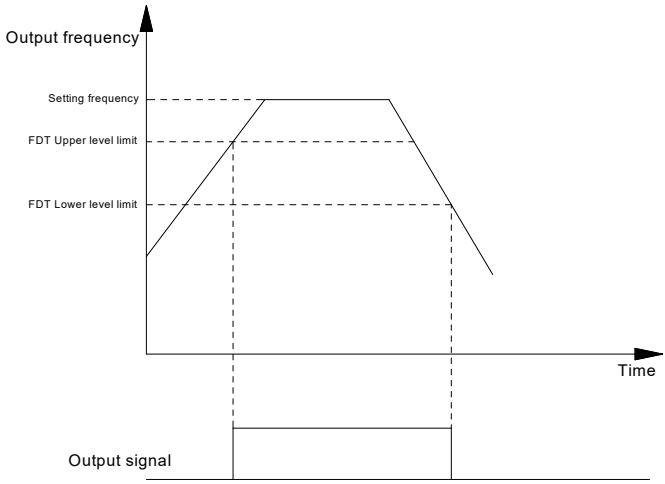


Figure 5-13 Schematic Diagram of FDT Working

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

Refer to FDT1 function introduction for FDT2 setting.

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

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

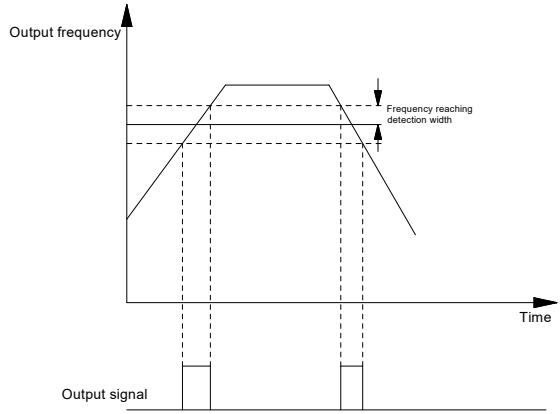


Figure 5-14 Schematic Diagram of Frequency Reaching Detection

P11.20	Zero frequency signal detection value	range:0.00Hz~maximum frequency	Factory default:0.50Hz
P11.21	Zero frequency return range	range:0.00Hz~maximum frequency	Factory default:0.00Hz

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

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

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

P12 analog AI and high-speed pulse HDI input

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

Ones: AI1 characteristic curve selection

0: no correction

1: curve 1(2 points)

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

2:curve 2(4 points)

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

3:curve 3(4 points)

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

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

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

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

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

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

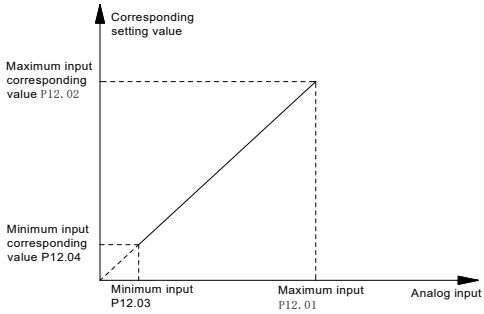


Figure 5-15 Schematic Diagram of Curve 1 Setting

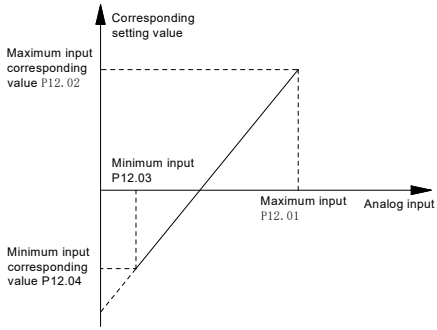


Figure 5-16 Schematic Diagram of Curve 2 Setting

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

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

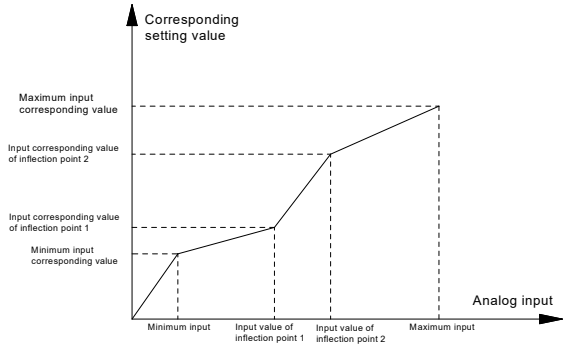


Figure 5-17 Schematic Diagram of Curve 1 setting

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

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

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

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

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

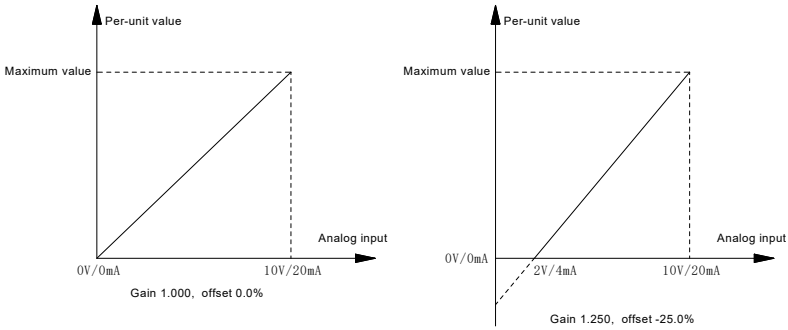


Figure 5-18 Schematic Diagram of AI Gain and Offset Settings

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

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

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

relationship between the input pulse frequency and the setting frequency.

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

P13 Analog AO and High Speed Pulse HDO Output

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

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

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

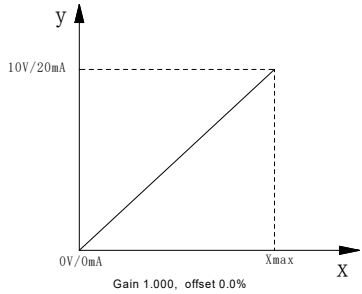
The analog output and pulse output function definition and output range are as shown in the following table:

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

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

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

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



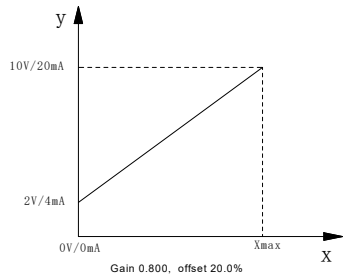


Figure 5-19 Schematic Diagram of AO Output

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

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

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

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

0: no center point

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

1: have center point

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

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

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

P20 Operating Keyboard Setting Parameters

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

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

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

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

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

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

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

0: All function codes are allowed to be modified

All functions of P group can modify the setting value.

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

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

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

0: no operation

1: restore factory parameters (no motor parameters)

2: restore factory parameters (including motor parameters)

3: clear fault record information

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

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

0: no operation

1: parameter uploading

The function code setting value of the variable frequency drive main control board is uploaded to the keyboard.

2: parameter downloading (no motor parameters)

The parameters saved in the keyboard are downloaded to the main control board of the variable frequency drive. The parameter of this download function code does not include the motor parameters.

3: parameter downloading (including motor parameters)

The parameters saved in the keyboard are downloaded to the main control board of the variable frequency drive. The parameter of this download function code does not include the motor parameters.

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

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

0: not locking

All keys on the keyboard can be operated.

1: full locking

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

2: locking except Loc/Rem key

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

3: locking except Start and Stop keys

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

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

0: no function

1: switch the given mode of operation command

The run command mode of the variable frequency drive is cyclically switched:

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

2: inching forward rotation

3: inching reverse rotation

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

4: forward and reverse switching

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

P21 Display Setting Parameters

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

P30 Fault and Protection Parameters

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

0: Automatic control

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

1: power-on direct operation

After the variable frequency drive is powered on, the fan runs immediately.

2: stop immediately after shutdown

When the variable frequency drive is running, the fan runs automatically; the fan stops after the variable frequency drive stops.

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

Ones: motor over-temperature protection

0: forbidden

The motor temperature is not protected.

1: action

The motor temperature detection and protection are allowed.

Tens: sensor type

0: temperature sensor PT100

1: temperature sensor PT1000

The sensor type used for motor temperature detection is selected.

Hundreds: analog channel

0: analog Input AI1

1: analog Input AI2

The input channel of the motor temperature sensor is selected.

P30.02	Motor overheat detection level	range:0.0℃~200.0℃	Factory default:85.0℃

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

P30.03	Selection of variable frequency drive overload pre-alarm detection	range:0x000~0x111	Factory default:000

Ones: overload pre-alarm detection selection

0: always check during operation

The overload pre-alarm is detected as soon as the variable frequency drive is running.

1: detection at constant speed operation only

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

Tens: selection of overload pre-alarm detection quantity

0: detection level is relative to rated current of motor

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

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

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

Hundreds: Overload pre-alarm protection selection

0: overload protection shield

The variable frequency drive prohibits overload pre-alarm protection detection.

1: overload protection enabled

The variable frequency drive enables detection of overload pre-alarm protection.

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

P30.04 is used for setting the current detection value of overload pre-alarm. Whether the percentage of the detected value is relative to the rated current of the motor or the rated current of the 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 greater than P30.05, the variable frequency drive reports an overload pre-alarm fault.

P30.06	Output load drop detection selection of variable frequency	range:0~4	Factory default:0

0: invalid detection of output load drop of variable frequency drive

1: always check during operation (continue operation)

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

2: detection only at constant speed (continuous operation)

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

3: always check during operation (free stop)

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

4: detection only at constant speed (free stop)

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

P30.07	Output load drop detection level of variable frequency	range:0.0%~100.0%	Factory default:30.0%
P30.08	Output load drop detection time of variable frequency	range:0.0s~3600.0s	Factory default:1.0s

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

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

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

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

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

Ones: during automatic reset

0: action

1: no action

Define whether the fault relay contact acts during automatic reset.

Tens: under-voltage period

0: action

1: no action

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

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

Ones: output phase loss detection

0: forbidden

1: action

Select whether to protect the output phase loss of the variable frequency drive.

Tens: input stage lack detection

0: forbidden

1: action

Select whether to protect the input phase loss of the variable frequency drive.

Hundreds: motor overload detection

0: forbidden

1: action

Select whether to protect the motor overload.

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

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

0: reset of fault record in case of power failure

1: storage of fault record in case of power failure

P30.14	Fault protection action attribute 1	range:0x0000~0x1111	Factory default:1111
P30.15	Fault protection action attribute 2	range:0x0000~0x1111	Factory default:1111

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

P40 Process PID Control Parameters

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

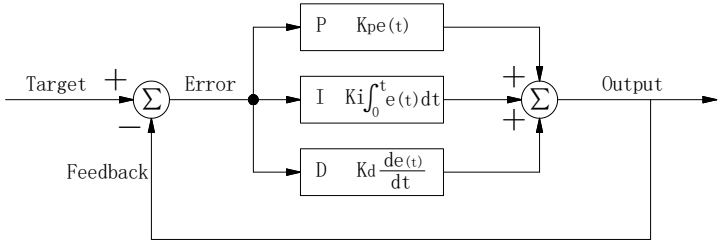


Figure 5-20 PID Control Principle Diagram

- Proportional control Kp: once the deviation between the feedback quantity and the target quantity occurs, the proportional gain Kp will act immediately, so that the feedback quantity changes in the direction of reducing the deviation. The larger Kp, the faster the system response, but too large Kp may cause system oscillation.
- Integral control Ti: 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 Td: it is mainly used for reflecting the change rate of deviation. A correction amount is introduced before the deviation signal changes, so the response speed of the system is quickened; the longer the differential time, the stronger the effect, and the shorter the differential time, the weaker the effect.

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

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

A given method for selecting the target quantity of PID

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

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

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

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

4: Min[AI1,AI2]

5: Max[AI1,AI2]

6: Sub[AI1,AI2]

7: Add[AI1,AI2]

8: pulse given HDI

A given method for selecting the feedback quantity of PID

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

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

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

0: use Kp1, Ki1 and Kd1 only

1: automatically switch according to input bias

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

2: switch according to terminals

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

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

The deviation reference value when PID parameters are automatically switched.

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

Ones: output frequency

0: it must be consistent with the set running direction

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

1:it can be opposite to the set running direction

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

Tens: integral mode

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

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

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

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

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

0: positive effect

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

1: negative effect

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

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

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

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

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

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

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

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

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

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

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

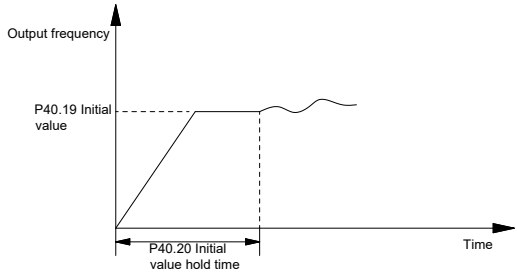


Figure 5-21 Schematic Diagram of PID Initial Value Function

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

Limit the maximum value of PID adjustment output

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

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

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

0: no calculation during shutdown

1: operation during shutdown

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

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

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

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

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

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

0: free stop

1: emergency stop

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

When P40.31=0, PID adjustment output frequency≥P40.29, and the duration is greater than the value of P40.35, the variable frequency drive runs with PID adjustment output frequency; when the run frequency≤P40.30, and the duration is greater than the value of P40.33, the variable frequency drive will be output at zero frequency.

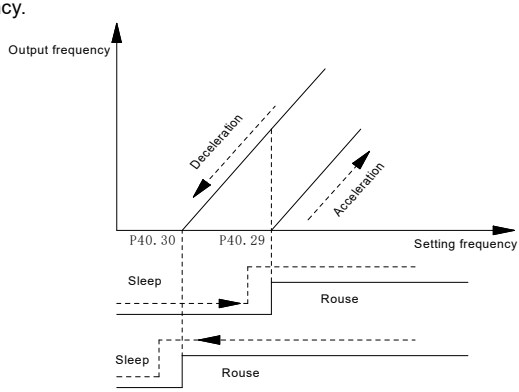


Figure 5-22 Schematic Diagram of the Upper and Lower Bounds of Zero-frequency Operation

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

0: Frequency sleep wake-up mode

The variable frequency drive sleeps and rouses based on frequency.

1: Pressure sleep wake-up method

The variable frequency drive sleeps and rouses based on pressure.

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

When P40.31=1, feedback pressure≥P40.32, and the duration is greater than the value of P40.33, the variable frequency drive enters the sleep status.

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

Judge the delay time to enter sleep.

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

When P40.31=1, feedback pressure≤P40.34, and the duration is greater than the value of P40.35, the variable frequency drive rouses from the sleep status.

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

Judge the delay time from sleep to rouse status

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

Set the range of the pressure sensor.

P41 Multistage Frequency

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

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

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

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

0: given by P41.00
1: analog input AI1
2: analog input AI2
3: reserve
4: Min[AI1,AI2]
5: Max[AI1,AI2]
6: Sub[AI1,AI2]
7: Add[AI1,AI2]
8: pulse given HDI
9: process PID
It is used for selecting the frequency setting source for multi-stage frequency 1.

P42 Simple PLC

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

The process is as shown in the figure:

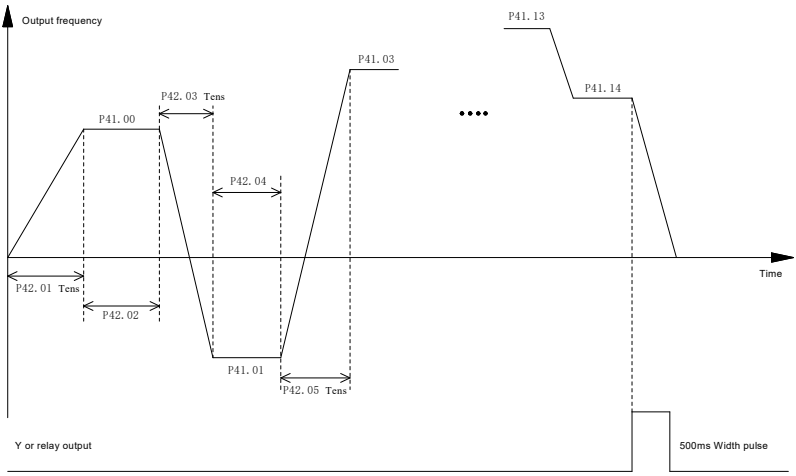


Figure 5-23 Simple PLC Operation Diagram

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

Ones: simple PLC operation mode

0: shutdown after single cycle

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

1: maintain final value after single cycle

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

2: continuous cycle

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

Tens: simple PLC startup mode

0: run from stage 1

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

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

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

Hundreds: simple PLC power-down memory

0: power-down reset

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

1: power-down storage

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

Thousands: simple PLC time unit

0: second (s)

1: minute (min)

Set the unit of PLC stage running time.

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

Ones: operation direction of simple PLC stage

0: positive

1: negative

Define the running direction of PLC stage 1.

Tens: acceleration and deceleration time of simple PLC stage

0: acceleration and deceleration time 1

1: acceleration and deceleration time 2

2: acceleration and deceleration time 3

3: acceleration and deceleration time 4

Select the acceleration and deceleration time of PLC stage 1.

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

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

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

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

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

P43 Fixed Length and Linear Speed

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

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

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

Ones: length reaching

0: continue to run

1: shutdown

Tens: unit of length

0: meter

1: 10 meters

Hundreds: length shutdown reset

0: invalid

1: action

Thousands: counting, stopping and clearing

0: invalid

1: action

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

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

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

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

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

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

P44 Lifting function parameters (only for crane models)

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

ones: device selection

0: forbidden

1: Promotion device

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

2: translation device

It is used for translation mechanism of cart or car.

Tens: reserve

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

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

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

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

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

When the output frequency of the variable frequency drive is equal to the brake release frequency, and the output current ≥ the brake release current; after the variable frequency drive passes the holding time of P44.05, the brake relay is energized.

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

For the starting frequency of the downstream brake, when the variable frequency drive is downstream, the output frequency ≤P44.07 value, control the brake relay to lose power.

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

For the starting frequency of the upstream brake, when the variable frequency drive is upstream, the output frequency ≤P44.06 value, control the brake relay to lose power.

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

The variable frequency drive maintains the output frequency unchanged during the brake frequency holding time.

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

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

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

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

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

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

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

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

0: Do not allow the running process to reverse directly

1: Allow the running process to be reversed directly

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

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

0: speed adjustment is forbidden

1: speed adjustment is Allowed

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

P50 Modbus Communication Parameters

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

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

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

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

Ones: communication baud rate of terminal port

Tens: communication baud rate of keyboard port

0:4800bps

1:9600bps

2:19200bps

3:38400bps

4:57600bps

5:115200bps

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

Ones: Terminal port data format

Tens: Keyboard port data format

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

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

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

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

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

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

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

Delay time for answering host communication.

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

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

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

Ones: selection of terminal port error response shield

Tens: selection of keyboard port error response shield

0: valid

1: invalid

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

Ones: master-slave selection for terminal port communication

Tens: master-slave selection for keyboard port communication

0: stand-alone use

1: this machine is used as the host

2: this machine is a slave machine

Hundreds: operation address of terminal port communication

Thousands: communication operation address of extended port

0: P00.00

1: P40.01

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

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

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

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

P60 Motor Control Preparation

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

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

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

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

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

0: 3-phase modulation

1: automatic switching

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

When P60.02=1, and the output frequency of the 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	Factory default:0

0: forbidden

1: action

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

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

0: forbidden

1: action

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

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

Cooperating with P60.05=1, when the bus voltage rises to the setting value, the braking unit is turned on, and the excessively high voltage of the bus is consumed in the form of heat energy through the braking resistor.

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

0: forbidden

1: action

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

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

The overvoltage stall operating voltage is a percentage relative to the rated bus voltage of the variable frequency drive.

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

0: forbidden

1: action

The undervoltage stall function is that when the bus voltage drops momentarily, the 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 the form of a generator to maintain the stability of the bus voltage of the variable frequency drive.

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

The undervoltage stall operating voltage is a percentage relative to the rated bus voltage of the variable frequency drive.

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

0: forbidden

1: action

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

prevent the variable frequency drive from reporting an overcurrent fault effectively.

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

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

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

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

P61 Encoder Parameters

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

0: incremental encoder 1

1: incremental encoder 2

2: sine encoder

Select the type of motor speed feedback encoder.

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

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

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

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

0: normal

Phase A is ahead of phase B during forward rotation.

1: reverse

Phase B is ahead of phase A during forward rotation.

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

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

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

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

P62 Motor characteristics parameter

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

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

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

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

P63Motor nameplate parameters

P63.00	Rated power of motor	range:0.2kW~6000.0kW	Factory
P63.01	Rated voltage of motor	range:1V~480V	Factory default: Model determination
P63.02	Rated current of motor	range:0.1A~6000.0A	Factory default: Model determination
P63.03	Rated frequency of motor	range:10.00Hz~300.00Hz	Factory default: Model determination
P63.04	Rated speed of motor	range:1~65535 rpm	Factory default: Model determination
P63.05	Pole number	range:2~80	Factory default: Model determination

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

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

0: no request

1: motor static identification

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

2: motor rotation identification

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

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

0: Advanced scalar control

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

1: No PG vector control

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

2: PG vector control

Refer to closed-loop vector control, the motor must be equipped with an encoder that matches the

PG card; it is suitable for high-precision speed control or torque control. One variable frequency drive can only drive 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 list countermeasures for simple troubleshooting.

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

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

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

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

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

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

Chapter 7 Daily Maintenance and Care

7.1 Daily Maintenance

Due to the influence of environment temperature, humidity, dust and vibration, the internal components of the frequency variable frequency drive will be aged, and it will result in the potential fault of the variable frequency 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 sound changes abnormally during motor operation;

2) Whether there is vibration in the motor operation.

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 is overheated;

Daily cleaning:

1) The variable frequency drive shall always be kept clean.

2) It shall remove dust on the surface of the variable frequency drive effectively to prevent dust from entering the variable frequency drive, especially metal dust.

3) Effectively remove oil stains from the cooling fan of the variable frequency drive.

7.2 Daily Inspection Item

Regular inspection items:

1) Check the air duct and clean it regularly.

2) Check whether the screw is loose.

3) Check if the variable frequency drive is corroded

4) Check whether the wiring terminals have arcing marks.

5) Insulation test of main circuit

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

Chapter 8 Specifications and Selection

8.1 Technical Specifications and Installation Dimensions of TI120 Series Drive

8.1.1 Technical specification

Table 8-1 TI120 Model and Specification of Series Driver

Program		Specification															
TI120-4TXXXG(B) TI120-4TXXXL(B)		1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Adapted motor power (kW)		1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Input	Rated input current (A)	4.6	6.3	11.4	16.7	21.9	32.2	41.3	49.5	59.0	57.0	69.0	89.0	106	139.0	164	196
Output	Rated output current (A)	3.8	5.1	9.0	13.0	17.0	24.0	32.0	37.0	45.0	60.0	75.0	90.0	110	150	180	210
	Output Voltage	3-phase 0V~rated input voltage															
	Maximum output frequency	300.00Hz (modified by parameters)															
	Carrier frequency	1.0 khz~16.0 KHz (carrier frequency can be automatically adjusted according to load characteristics)															
	Overload capacity	150% rated current 60s; 180% rated current 10s；; 200% rated current 0.5s															
High frequency leakage Current Countermeasure	DC reactor	External option															
Brake Function	Brake unit	Standard built-in												Built-in optional			
Power supply	Fixed voltage	AC: three-phase 380 V~460 V															

	Rated frequency	50Hz/60Hz																
	Allowable fluctuation range of voltage	-15%~10%, actual allowable range: AC323V~528V																
	Allowable fluctuation range of frequency	±5%																
	Power supply capacity (kVA)	5.0	6.7	12	17.5	22.8	33.4	42.8	45	54	52	63	81	97	127	150	179	
Program		Technical specification																
TI120-4TXXXG(B) TI120-4TXXXL(B)		132	160	185	200	220	250	280	315	355	400	450	500	560	630	710		
Adapted motor power (kW)		132	160	185	200	220	250	280	315	355	400	450	500	560	630	710		
Input	Rated input current (A)	240	287	326	365	410	441	495	565	617	687	782	835	920	1050	1180		
Output	Rated output current (A)	260	305	350	377	426	465	520	585	650	725	810	900	1090	1100	1300		
	Output Voltage	3-phase 0V~rated input voltage																
	Maximum output frequency	300.00Hz (modified by parameters)																
	Carrier frequency	1.0 khz~16.0 KHz (carrier frequency can be automatically adjusted according to load characteristics)																
	Overload capacity	150% rated current 60s; 180% rated current 10s；; 200% rated current 0.5s																
high	DC reactor	Extern-	Built-in								External option							

frequenc -y leakage Current Counter measure		al Option		
Brake Function	Brake unit	Built-in optional	External option	
Power supply	Fixed voltage Rated frequency	AC:3-phase 380V~460V 50Hz/60Hz		
	Allowable fluctuatio-n range of voltage	-15%~10%,Actual allowable range:AC 323V~528V		
	Allowable fluctuatio-n range of frequency	±5%		
	Power supply capacit y (kVA)	220	263	304

334	375	404	453	517	565	629	716	769	861	969	1092				

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

Table 8-2 Technical Specification of TI120 Series Driver

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

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

Program		Technical specification
		can be realized.
Personal -ized Function	Not stop of instantaneous stop	In case of instantaneous power failure, the drive will continue to operate for a short period of time through the reduction of load feedback energy compensation voltage.
	Fast current limiting	Avoid frequent over-current fault of the drive.
	Timing function	Realize timing control of the drive
	Motor overheat protection	The motor temperature detection can be conveniently realized through an external sensor
	Copy of parameters	Realize the uploading and downloading of parameters and the quick setting of parameters
	Double-port Modbus	The double-port supports Modbus protocol and realizes simple networking function.
	Power-on short circuit detection to ground	Power-on automatically completes short-circuit detection to ground
	Magnetic flux brake	In cooperation with magnetic flux brake, faster deceleration and shutdown can be realized.
Run	Running instructions	Keyboard command, terminal command, communication command can be switched in a variety of ways
	Main speed command	12 kinds of main speed command given way can be switched through a variety of ways
	Auxiliary speed command	9 kinds of auxiliary speed command given methods can flexibly realize auxiliary speed fine adjustment and speed synthesis.
	Input terminal	● 7 X terminals, one of which supports high speed pulse input. ● 2 AI terminals, one supports 0~10V voltage signal and one supports 0~10V voltage signal or 0~20mA current signal
	Output terminal	● 2 relay outputs ● 2 transistor outputs, one of which supports high speed pulse output. ● 2 AO outputs, one supports 0~10V voltage signal and one supports 0~10V voltage signal or 0~20mA current signal
Human-c -omputer interactio n	LED display	LED operation keyboard
	LED display	LED operation keyboard
	Key locking function	Realize all key locking or partial key locking functions of the keyboard to prevent misoperation of the keyboard.
	Keyboard emergency shutdown	Through the keyboard stop key, the machine can stop in any command source mode and reduce the operation risk.

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

8.1.2 Appearance and installation dimensions

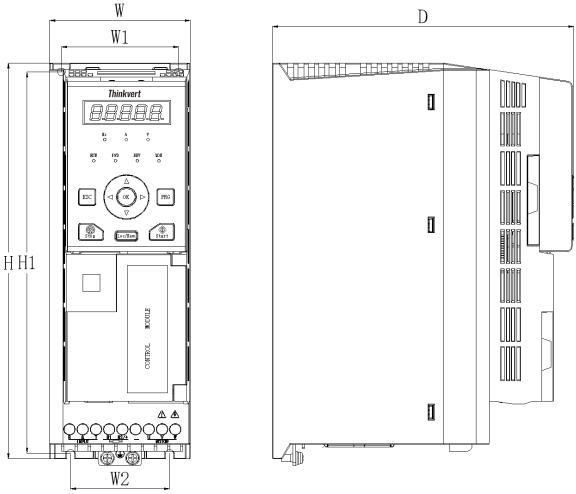


Figure 8-1 Installation Dimension Diagram of TI120-4T5.5GB and Below Power Level

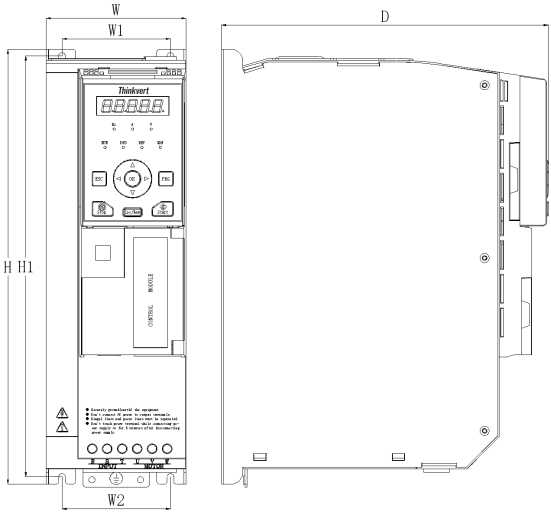


Figure 8-2 Installation Dimension Diagram of TI120-4T7.5GB～TI120-4T15GB

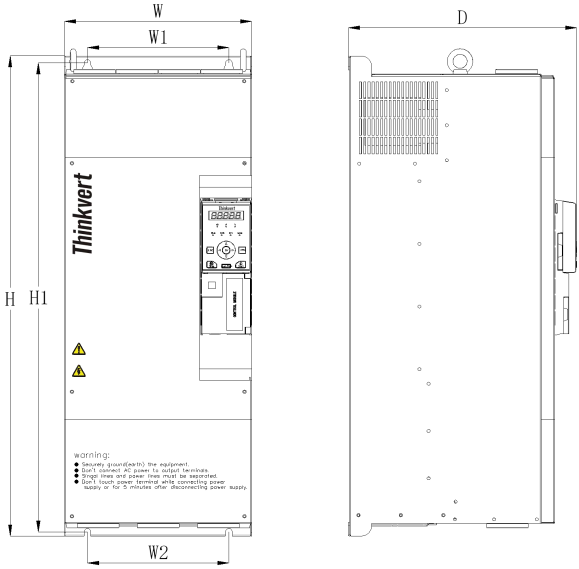


Figure 8-3 Installation Dimension Diagram of TI120-4T55G～TI120-4T75G

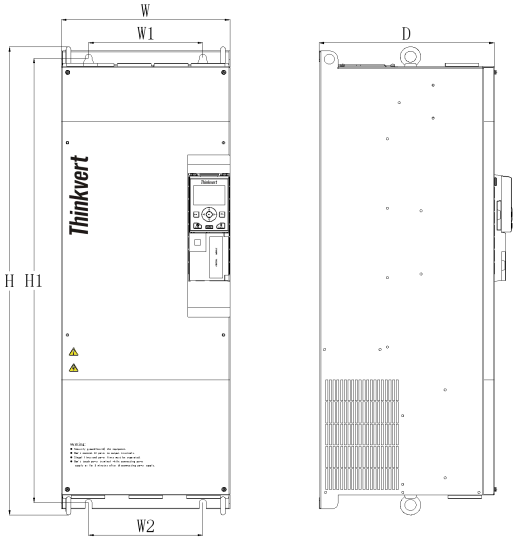


Figure 8-4 Installation Dimension Diagram of TI120-4T18.5GB～TI120-4T45G and TI120-4T90G～

TI120-4T132G

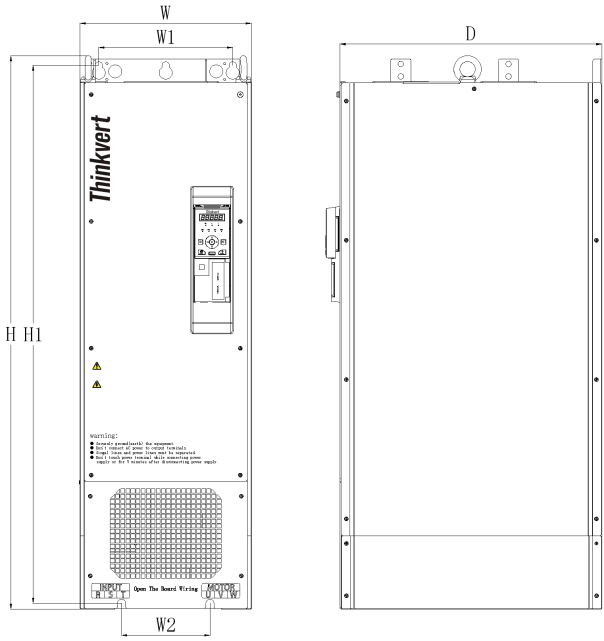


Figure 8-5 Installation Dimension Diagram of TI120-4T160G～TI120-4T450G

Table 8-3 TI120 Installation Dimensions

VFD model	Appearance and installation dimensions (mm)						
	W	**H**	**D**	**W1**	**W2**	**H1**	Installation Aperture
TI120-4T1.5G/2.2LB	81	237	173	67.5	57	224.5	4.5
TI120-4T2.2G/3.7LB							
TI120-4T3.7G/5.5LB							
TI120-4T5.5G/7.5LB							
TI120-4T7.5G/11LB	95	297	222	73.5	73.5	287.5	6
TI120-4T11G/15LB							
TI120-4T15G/18.5LB							
TI120-4T18.5G/22LB	185	440	245	140	140	427.5	7
TI120-4T22G/30LB							
TI120-4T30G/37LB							

TI120-4T37G/45L	265	604.5	269.5	180	148.5	580	9.5
TI120-4T45G/55L							
TI120-4T55G	265	690	323	200	200	674	9.5
TI120-4T75G/90L							
TI120-4T90G/110L	295	852	338.5	200	200	810	12
TI120-4T110G/132L							
TI120-4T132G/160L							
TI120-4T160G/185L	339	1113	546.5	265	175	1081.5	14
TI120-4T185G/200L							
TI120-4T200G/220L							
TI120-4T220G/250L							
TI120-4T250G/280L							
TI120-4T280G/315L							
TI120-4T315G/355L	339	1300	546.5	265	175	1267.5	16
TI120-4T355G/400L							
TI120-4T400G/450L							
TI120-4T450G/500L							
TI120-4T500G/560L	999	1300	500	750	-	1390	16
TI120-4T560G/630L							
TI120-4T630G/710L							
TI120-4T710G/800L							

8.1.3 Overall dimensions of operating keyboard

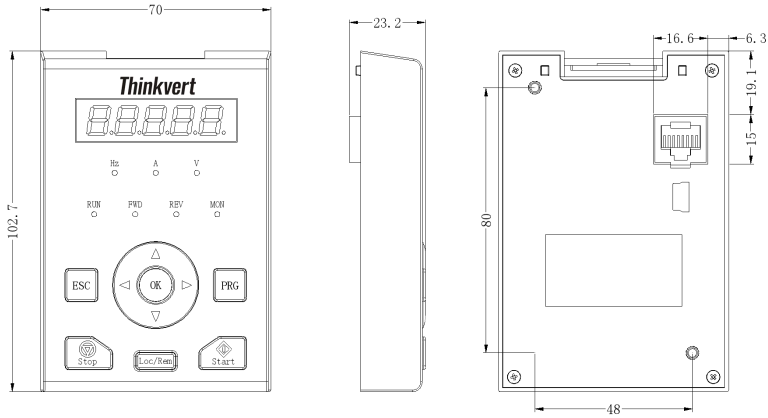


Figure 8-6 Overall Dimensions of Operating Keyboard

8.2 Specifications of Optional Parts

8.2.1 Selection of peripheral devices

Table8-5 Peripheral Devices

VFD model	Circuit breaker (A)	Contactor (A)
TI120-4T1.5G/2.2LB	10	9
TI120-4T2.2G/3.7LB	16	12
TI120-4T3.7G/5.5LB	20	18
TI120-4T5.5G/7.5LB	32	32
TI120-4T7.5G/11LB	32	32
TI120-4T11G/15LB	50	50
TI120-4T15G/18.5LB	63	50
TI120-4T18.5G/22LB	80	65
TI120-4T22G/30LB	100	80
TI120-4T30G/37LB	125	95
TI120-4T37G/45L	160	125
TI120-4T45G/55L	200	150
TI120-4T55G	225	185
TI120-4T75G/90L	250	225
TI120-4T90G/110L	315	265
TI120-4T110G/132L	350	330
TI120-4T132G/160L	400	400
TI120-4T160G/185L	500	400
TI120-4T185G/200L	500	500
TI120-4T200G/220L	630	500
TI120-4T220G/250L	630	630
TI120-4T250G/280L	800	630
TI120-4T280G/315L	800	800
TI120-4T315G/355L	800	800
TI120-4T355G/400L	1000	800
TI120-4T400G/450L	1250	1000
TI120-4T450G/500L	1250	1000

VFD model	Circuit breaker (A)	Contactor (A)
TI120-4T500G/560L	1600	1250
TI120-4T560G/630L	1600	1250
TI120-4T630G/710L	2000	1600
TI120-4T710G/800L	2000	1600

8.2.2 Selection table of brake resistor

Table 8-6 Reference Table for Selection of Brake Resistor

VFD model	Brake unit	Brake resistor		
		Standard power	Standard resistor	Minimum limit resistance
TI120-4T0.75G/1.5LB	Standard built-in	110W	750Ω	125Ω
TI120-4T1.5G/2.2LB		260W	400Ω	100Ω
TI120-4T2.2G/3.7LB		320W	250Ω	100Ω
TI120-4T3.7G/5.5LB		800W	150Ω	66.7Ω
TI120-4T5.5G/7.5LB		1600W	100Ω	40Ω
TI120-4T7.5G/11LB		1600W	75Ω	40Ω
TI120-4T11G/15LB		2000W	50Ω	25Ω
TI120-4T15G/18.5LB		2000W	40Ω	25Ω
TI120-4T18.5G/22LB		4800W	32Ω	20Ω
TI120-4T22G/30LB		4800W	27.2Ω	20Ω
TI120-4T30G/37LB		6000W	20Ω	14Ω
TI120-4T37G/45L	Built-in optional	9600W	15Ω	12Ω
TI120-4T45G/55L		9600W	15Ω	12Ω
TI120-4T55G		15000W	12Ω	10Ω
TI120-4T75G/90L		20000W	8Ω	5Ω
TI120-4T90G/110L		28800W	5Ω	4Ω
TI120-4T110G/132L		30000W	5Ω	4Ω
TI120-4T132G/160L		35000W	5Ω	4Ω

✧ Braking resistor value must be higher than the minimum limit value shown as above; otherwise it may damage the brake unit.

✧ Try to choose aluminum resistor instead of corrugated resistor, the parasitic inductance of corrugated resistance is higher; resistor presents negative temperature characteristics, after braking resistor keep running a period of time, resistance value decreases with temperature rising,

which is easy to damage the brake unit.

✧ The higher the power is, the better the braking performance is, please increase the power of braking resistor if the braking lasts for a long time or the load is too heavy.

Appendix A

Modbus communication protocol

1. Support protocol

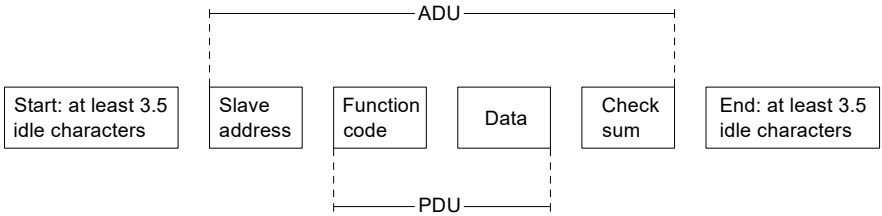
Support Modbus protocol, RTU format and ASCII code format; the broadcast address is 0, and the slave address setting values are 1~247, 248~255 reserved.

2. Interface mode

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

3. Protocol format

The ADU (Application Data Unit) check is the CRC16 check sum of the first three parts of the ADU obtained by high and low byte exchange.
The exception code indicates the specific cause of the error.
The RTU data frame format is as follows:



Exception codes are listed as follows:

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

4. Functional interpretation

◆ Function 0x03 reads multiple register parameters

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

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

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

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

Frame data content	Data length (bytes)	Scope
Request		
Slave address	1	0~247
Function code	1	0x10
Register start address	2	0x0000~0xFFFF
Number of registers	2	0x0001~0x0010
Number of bytes in register contents	1	2* number of registers

Register content	2* number of registers	0x0000~0xFFFF
Checksum	2	0x0000~0xFFFF
Response:		
Slave address	1	0~247
Function code	1	0x10
Register start address	2	0x0000~0xFFFF
Number of registers	2	0x0002~0x0020
Checksum	2	0x0000~0xFFFF

5. variable frequency drive register distribution

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

6. Bit definition of variable frequency drive control command word (0x8000)

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

7. Modbus communication example

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

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

Start the 1# variable frequency drive to rotate forward

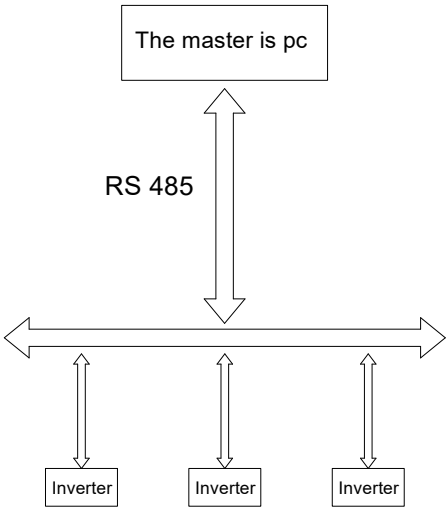
	Premises	Function code	Register address	Register content	Checksum
Request	0x01	0x06	0x8000	0x0001	0x61CA
Response	0x01	0x06	0x8000	0x0001	0x61CA

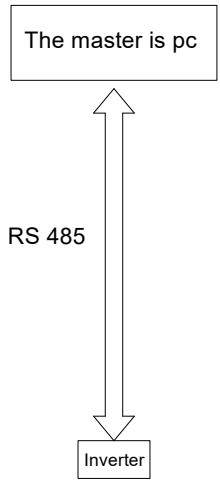
8. CRC16 function

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

9. Establishment of communication network

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


The master is pc
RS 485
Inverter
Inverter
Inverter


The master is pc
RS 485
Inverter

Thinkvert

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