Foreword

First of all, thank you for choosing this series of inverters.

This series of inverters adopt the most advanced current vector control technology, low-speed rated torque output, ultra-quiet and stable operation, various control methods, up to 31 kinds of perfect protection and alarm functions, and various parameters for online monitoring and online adjustment. Built-in RS-485 communication interface, flexible operation, can meet the various needs of users to the greatest extent.

This series of inverter is suitable for the field of synchronous motor drive, including industries such as air compressors and plastic machinery; as a speed regulating device, it has strong load adaptability, stable operation, high precision and good reliability. Can maximize power factor and efficiency, as electrical energy saving applications.

If there are still difficulties that cannot be resolved during use, please contact our local distributors or directly contact our company.

In order to make good use of this product and ensure the safety of users, please read this user manual carefully before you use it, and keep it in a safe place for future use.

Information is subject to change without notice.

Before installing, commissioning, and using the inverter, for your personal safety and to help extend the life of the equipment, you must read the safety rules and warnings in this book, and the warning signs affixed to the equipment. When using it, you must also pay attention to the condition of the driving machine or all safety-related precautions.

	Danger！
	◆ This equipment carries dangerous voltage. Operation that does not comply with the warning or violates this manual may cause danger to life and personal injury. Only the relevant professionals should be familiar with the safety matters and installation operations of this manual before operating this equipment.
	◆ The power must be turned off for wiring and inspection. Do not touch the circuit board and any parts inside the machine before the charge indicator on the machine's printed circuit board goes out or within 5 minutes after the keyboard display goes out. You must use a meter to confirm that the internal capacitors have been discharged before you can perform internal operations, otherwise there is a danger of electric shock.。

	◆ Never connect AC power to the output terminals U, V, W of the inverter. When using, the ground terminal of the inverter should be grounded correctly and reliably in accordance with IEC electrical safety regulations or other similar standards.
	**caveat！**
	◆ Unauthorized changes to the internal wiring and use of accessories sold or recommended by illegal manufacturers may cause fire, electric shock, and personal injury.
	◆ Because the static electricity of the human body can seriously damage the static-sensitive devices such as the internal MOSFET, please do not touch the internal components such as the printed circuit board and IGBT module with your hands without taking anti-static measures, otherwise it may cause failure.
	**note！**
	◆ Make sure all signs or labels are legible and replace lost or worn labels at any time.
	◆ Keep this user manual in an easily accessible place near the drive and give them to all users to read.

The company reserves the right to modify this manual without prior notice; if you have any questions or problems, please keep in touch with us or agents in time, and welcome suggestions for improvement.

Content

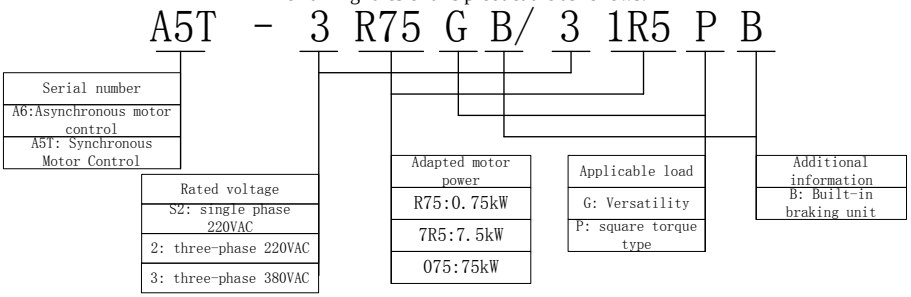
Chapter 1 Purchase check

1.1 Open box to check

The inverter is strictly tested before it leaves the factory. After the inverter is purchased, please check whether the product is damaged due to careless transportation; whether the product specifications and models are consistent with the model of the product ordered; Wait. If you have any questions, please contact your supplier.

1.2 Naming rules

The naming rules of this product are as follows:



1-1 Model Description

Chapter 2 Installation wiring

2.1 Installation site requirements and management

·During transportation, do not subject the operation panel and the cover to force, otherwise the inverter may fall and cause personal injury or property damage.

• When installing, install the inverter in a place that can bear the weight of the inverter, otherwise there is a danger of personal injury or property damage when dropped.

• It is strictly prohibited to install in places where water droplets may splash, such as water pipes, otherwise there is a danger of damaging property.

• Do not drop foreign objects such as screws, gaskets, and metal rods into the inverter, otherwise there is a danger of fire and property damage.

• If the inverter is damaged or the components are incomplete, do not install or run it, otherwise there is a danger of fire or injury.

• Do not install in a place exposed to direct sunlight, otherwise there is a danger of property damage.

• Do not short PB, + and-, otherwise there is danger of fire and property damage.

• The main circuit terminals and wire terminals must be firmly connected, otherwise there is a danger of property damage.

• Among the control terminals, only TA, TB, and TC can access the AC 220V signal, and other terminals are not allowed to access the AC 220V signal, otherwise there is a danger of damaging property.

Please install the inverter in the following applications and maintain proper conditions.

2.1.1 installation site

The installation site should meet the following conditions:

Good indoor ventilation;

Ambient temperature: -10 ℃ ～ 40 ℃. If the ambient temperature exceeds 40 ℃, external forced cooling or derating is required;

Humidity requirement is less than 95%, no condensation of water drops and rain dripping;

Do not install on flammable objects such as wood;

Avoid direct sunlight;

Never install in a place with flammable, explosive, corrosive gas or liquid;

No dust, oily dust, floating fibers and metal particles;

The installation foundation is firm and vibration-free;

No electromagnetic interference, keep away from interference sources;

If the altitude is over 1000m, the heat dissipation effect will be worse due to the thin air. Please derate it. The rated output will decrease by 6% for every 1000m above sea level.

2.1.2 Ambient temperature

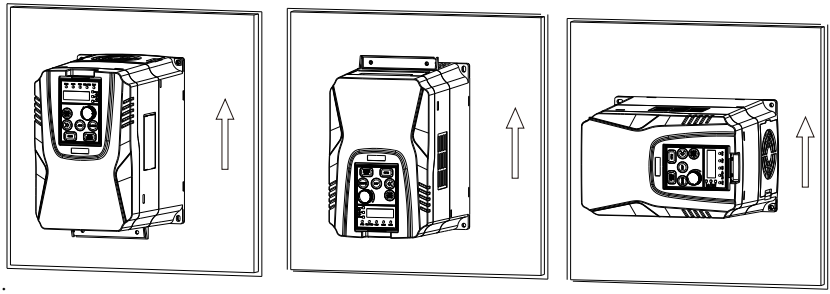
In order to improve the reliability of inverter operation, please install it in a place with good ventilation conditions; when using it in a closed box, please install a cooling fan or cooling air conditioner to keep the ambient temperature below 40 ° C.

2.1.3 Precautions

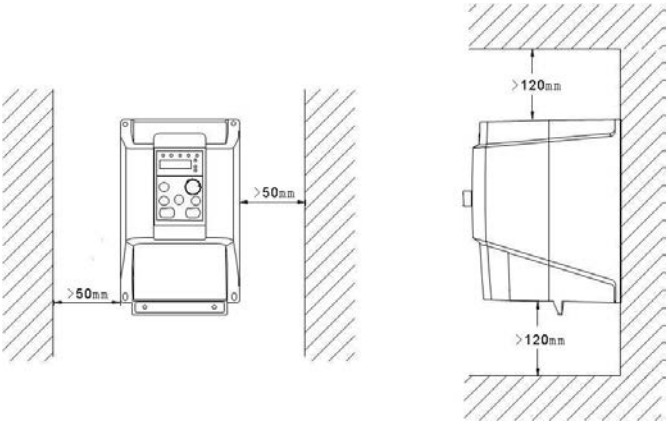
When installing, please cover the inverter with dust cover. Metal fragments generated by drilling, etc. must not fall into the inverter. After installation, remove the dust cover.
If the ambient temperature exceeds 40 ° C, or the internal temperature of the machine is too high for other reasons, remove the dust cover on the side of the machine. At this time, please pay attention to prevent small objects from falling into the machine.
If you need to install a dust cover, the machine needs to be derated.

2.2 Installation direction and space

This series of inverters are equipped with cooling fans for forced air cooling. In order to make the cooling cycle work well, the inverter must be installed in a vertical direction, and sufficient space must be maintained between the upper, lower, left, right, and adjacent items or baffles (walls)



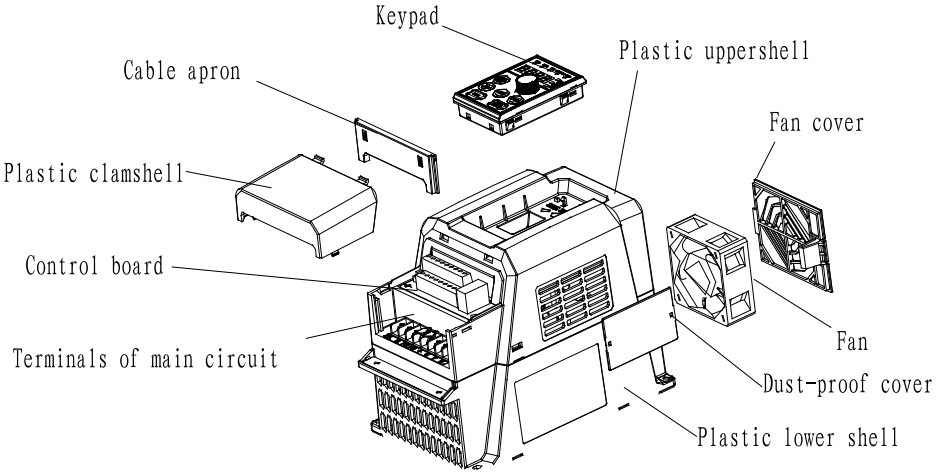
2-1 Installation orientation requirements



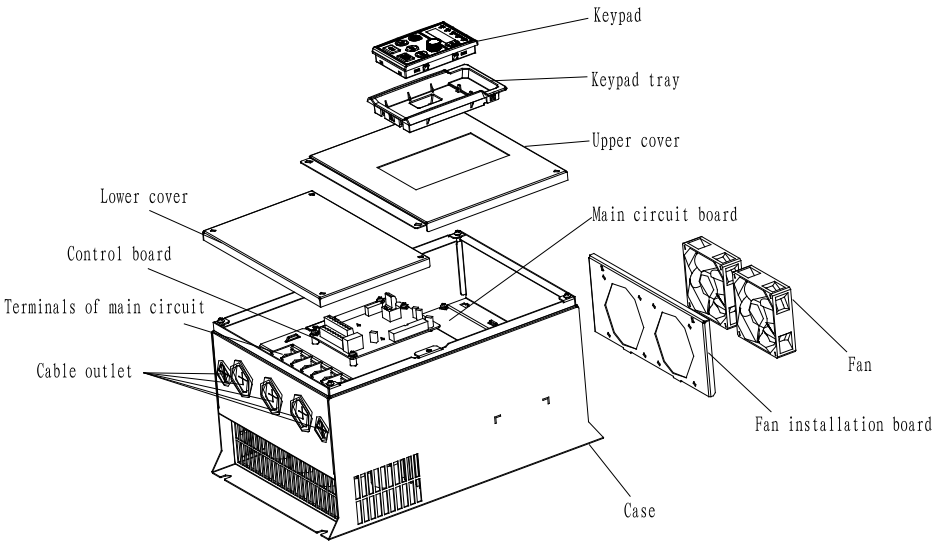
2-2 Installation orientation requirements

2.3 Connection of main circuit terminals

2.3.1 Product main component diagram

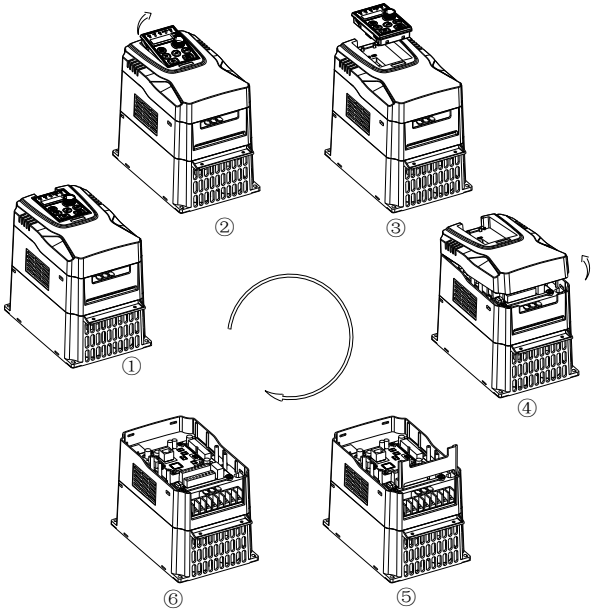


2-3 18.5kW and below 18.5kW component diagram

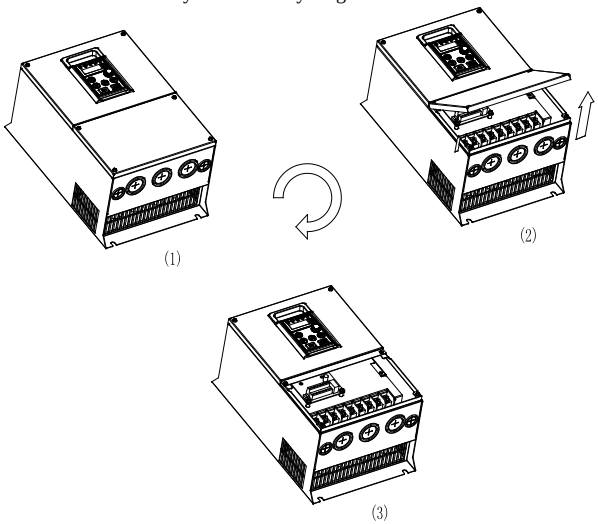


2-4 30kW-200kW component diagram

2.3.2 Schematic diagram of main circuit terminal wiring

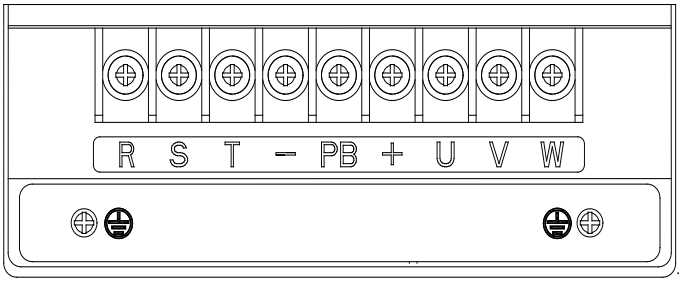


2-5 Disassembly and assembly diagram for 7.5kW and below

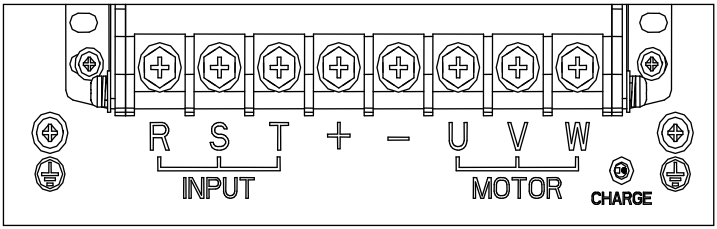


2-6 Disassembly and assembly diagram below 11kW-200kW

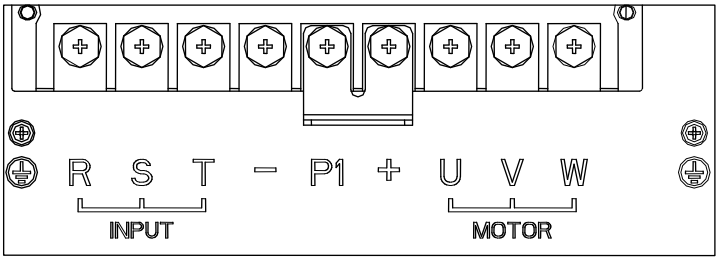
2.3.3 Main circuit terminal arrangement and wiring



2-7 3PH 380V 4-15kW main circuit terminal wiring



2-8 3PH 380V 18.5-37kW main circuit terminal wiring



2-9 3PH 380V 45-200kW main circuit terminal wiring

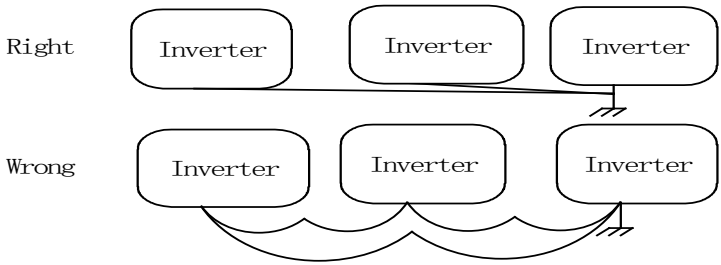
\ table 2-1 Function and description of main circuit terminals

Terminal symbol	Terminal name and function description
L、N / R、S、T	Single-phase AC 220V input terminal or three-phase 380V input terminal
+、PB	External braking resistor reserved terminal
-	DC negative bus output terminal
U、V、W	Three-phase AC output terminal
PE	Input power protection ground terminal or shielded ground terminal of motor cable and braking resistor cable

2.3.4 Main circuit terminal wiring instructions

Do not connect the input power cable to the output terminal by mistake, or the components inside the inverter will be damaged. It is forbidden to ground the output terminal. Do not touch or short the output wire with the case, otherwise the inverter will be damaged.

The ground terminal PE must be grounded. The 380V class grounding resistance should be less than 10Ω. The ground wire must not be shared with the electric welding machine or power equipment. Use the wire diameter specified by the technical standards for electrical equipment and keep the ground point as short as possible. When using more than two inverters at the same time, do not loop the ground wire. Figure 2-10 shows the correct grounding method and the incorrect grounding method.



2-10 Ground wire connection method

Note: The neutral point of the Y-connected motor must not be grounded.

Because the inverter output is a PWM wave, if a capacitor with improved power factor or a varistor for lightning protection is installed on the output side, it will cause the inverter to trip or damage the device. Be sure to remove it.

If you need to install a switching device such as a contactor between the inverter output and the motor, make sure that the inverter is switched on and off when there is no output, otherwise the inverter may be damaged.

2.4 Connection of control circuit terminals

2.4.1 Control circuit terminal function

485+	485-	AO1	10V	X1	X3	X5	DO1	COM	Y1	TC
AI1	AI2	GND	PT	X2	X4	COM	PLC	24V	TA	TB

2-11 Control board control circuit terminal arrangement

In order to reduce the interference and attenuation of the control signal, the length of the control signal cable should be limited to 50m and the distance from the power line should be greater than 30cm. Try to avoid the control line and power line running in parallel. When connecting analog input and output signals, use shielded twisted pair.

* Function of control circuit terminal

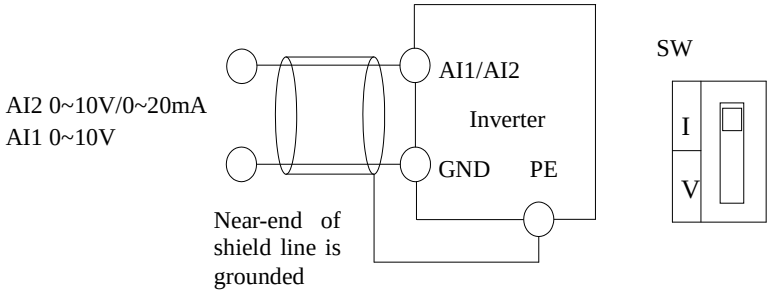
table 2-2 Control circuit terminal function table

category	Terminal Label	name	terminal function	specification
simulation Enter	AI1	simulation Enter 1	Receive analog voltage input.	AI1 input voltage range: 0 ～ 10V (Input impedance: 22kΩ) Reference ground: GND
	AI2	simulation Enter 2	Receive voltage / current input. Voltage and current are selected by jumper SW7. The factory default input voltage.	AI2 input voltage range: 0 ～ 10V AI2 input current range: 0 ～ 20mA (Input impedance: 22kΩ / 500Ω) Reference ground: GND
simulation Output	AO1	Analog output	Provide analog voltage / current output. The voltage and current are selected by jumper SW2. The factory default output voltage.	Voltage output range: 0 ～ 10V / 0 ～ 20mA Reference ground: GND
communication	485+	RS485 Communication Interface	485 Differential signal positive	Standard RS-485 communication interface, not isolated from GND, please use twisted pair or shielded wire
	485-		485 Differential signal negative	
Multifunctional input terminal	X1	Multifunctional input terminal1	Programmable is a digital input terminal with multiple functions. For details, please refer to the input terminal function introduction.	Optocoupler isolated input, input impedance R = 2.5kΩ Maximum input frequency: 400Hz, input voltage range: 0 ~ 30V, reference ground: COM
	X2	Multifunctional input terminal2		
	X3	Multifunctional input terminal3		
	X4	Multifunctional input terminal4		
Multifunctional input terminal	X5	Multifunctional input terminal5	In addition to being programmable as a digital input terminal for multiple functions, it is also programmable as a high-speed pulse input port.	Optocoupler isolated input, input impedance R = 1.2kΩ Maximum input frequency: 50kHz, input voltage range: 0 ～ 30V, reference ground: COM
Multifunctional output	DO1	Open collector output terminal	Programmable as multi-function pulse signal output terminal, can also be used as digital output terminal	Optocoupler isolated collector output. Operating voltage range 0V ～ 26V Maximum output current: 50mA Output frequency range: 0 ～ 100kHz
	Y1	Open collector output Y	Programmable is defined as digital output terminals with multiple functions, and I / O terminal control (P3 group) output terminal function introduction.	Optocoupler isolated output. Operating voltage range: 0V ～ 26V Maximum output current: 50mA See the description of function code P3 for usage
Relay input Out	TA	Relay output	Programmable relay output terminals defined for multiple functions	TA-TB: normally closed; TA-TC: normally open. Contact rating:250VAC/2A（COSΦ=1），250VAC/1A（COSΦ=0.4） 30VDC/1A
	TB			
	TC			
PLC	Multi-function input common terminal	Multi-function input common terminal	Shorted with 24V before delivery. The X terminal supports 24V external power supply. The J5 jumper on the right side of the control terminal must be disconnected.	X terminal supports external 24V power supply

power supply	10V	+10Vpower supply	Provide + 10V power to the outside (Reference ground: GND)	Output current 20 mA Open circuit voltage up to 12V
	24V	+24Vpower supply	Provide + 24V power to the outside (Reference ground: COM)	Output current 100mA
	GND	+10VGround reference	Ground reference for analog signals and + 10V power	Internally isolated from COM
	COM	+24VPower common	Use with other terminals	Isolated from GND
Jumper	SW7	AI2 voltage and current switching	AI2 voltage and current are selected by jumper SW7. The factory default input voltage.	
	SW2	AO1 voltage and current switching	AO1 voltage and current are selected by jumper SW2. The factory default output voltage.	
	J3	Temperature detection PT100, PT1000 switch	The J3 jumper is on the upper side and is set to PT100, otherwise it is PT1000. The factory default is PT100.	Need to set PB-36 function code

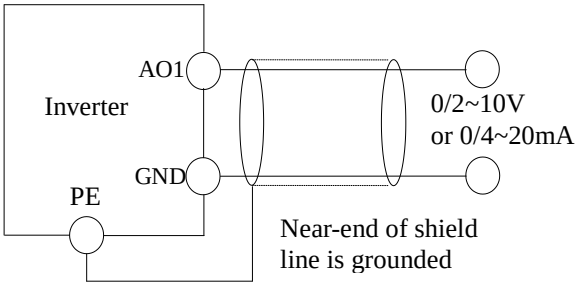
2.4.2 Control circuit terminal wiring

The AI2 terminal accepts analog signal input. For AI2, jumper SW7 selects the input voltage (0-10V) or input current (0-20mA). The terminal wiring method is asfollows:



2-12 Analog input terminal wiring

For the analog output terminal AO1, the jumper SW2 is used to select the output voltage (0-10V) or output current (0-20mA). The terminal wiring method is asfollows:



2-13 Analog output terminal wiring

Tip:

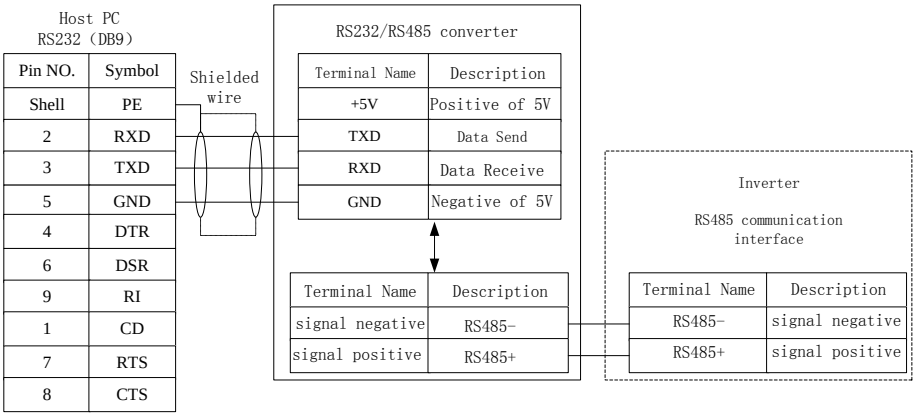
1) The SW7 / SW2 jumper is connected to the "I" position using a shorting cap to represent the amount of current, and the "V" position to represent the amount of voltage.

2) Analog input and output signals are susceptible to external interference. Shielded cables must be used for wiring and well grounded. The wiring length should be as short as possible.

* Serial communication interface wiring

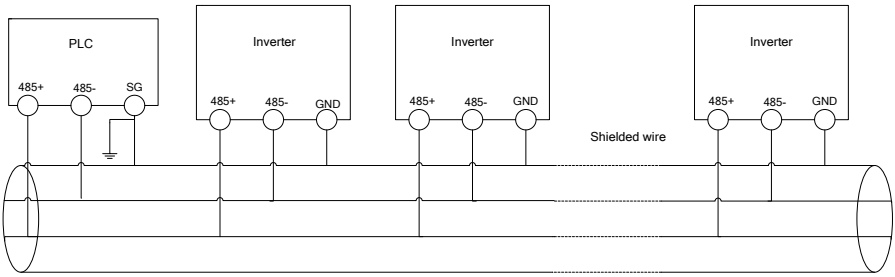
This series of inverters provide users with standard RS485 serial communication interface, which can form a master-slave control system. The upper computer (PC or PLC controller) can be used to realize real-time monitoring of the inverter in the network, complete remote control, automatic control, and achieve more complex operation control.

Connection diagram of host computer and inverter interface:



2-14 Connection diagram of host computer and inverter interface

When multiple inverters are connected in the same RS485 system, the communication interference is increased. Up to 31 units can be connected through the RS485 serial bus connection. The wiring is very important. The communication bus must use shielded twisted pair. It is recommended that users wire as follows:

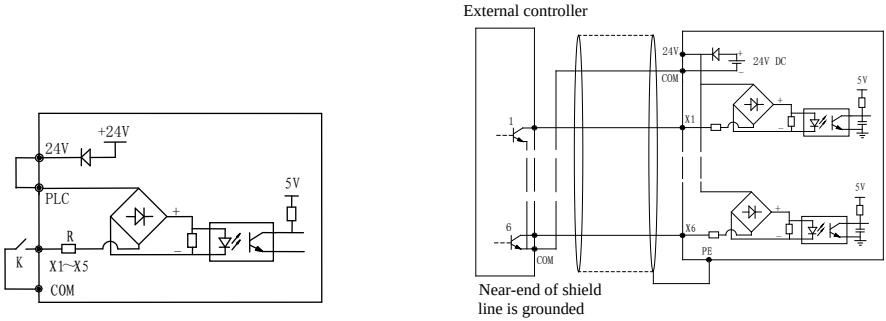


2-15 Recommended wiring diagram for multi-machine communication between PLC and inverter (the inverter and motor are all well grounded)

The host can be a personal computer PC or a PLC, and the slave is a series of inverters. When a PC is used as the host, an RS232 / RS485 adapter should be added between the host and the bus; when a PLC is used as the host, the RS485 terminal of the slave and the RS485 terminal of the host can be connected with the same name.

*** Input multi-function terminal wiring**

Main road contact method **Transistor mode**

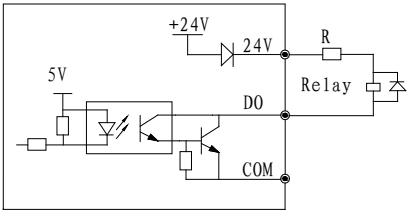


2-16 Input multi-function terminal wiring connection diagram

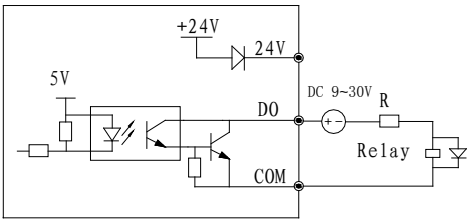
*** Multifunctional output terminal wiring**

1) When the multi-function output terminal DO1 is used as a digital output, you can use the 24V power supply inside the inverter.

2）When the multi-function output terminal DO1 is used as a digital output, an external power supply can also be used, 9 ~ 30V.



2-17 output wiring method 1



2-18 output wiring method 2

*** Relay output terminals TA, TB, TC wiring**

If driving inductive loads (such as electromagnetic relays, contactors), surge voltage absorption circuits such as RC absorption circuits, varistors or freewheeling diodes (for DC electromagnetic circuits, pay attention to diode polarity) should be installed. The components of the absorption circuit should be installed near the coils of the relay or contactor.。

Tip:

1. Do not short the 24V terminal and the COM terminal, otherwise the control board may be damaged.

2. Use multi-core shielded cables or stranded wires (1mm or more) to connect the control terminals.

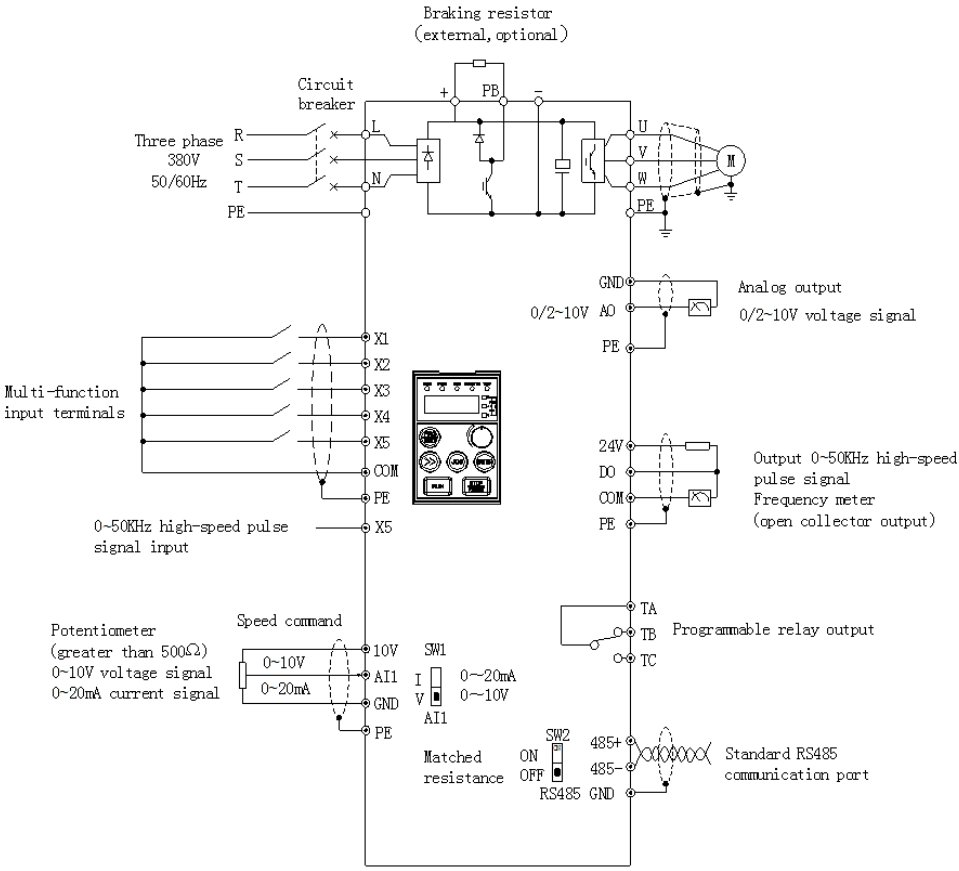
3. When using a shielded cable, the near end of the cable shield (the end near the frequency converter) should be connected to the ground plate PE of the frequency converter through the grounding clamp provided with the frequency converter.

4. When wiring, the control cable should be far away from the main circuit and strong current lines (including power lines, motor lines, relay lines, contactor connection lines, etc.) more than 30cm. Avoid parallel placement. The interference caused the inverter to malfunction.

The keyboard connection interface CN9 on the control board uses the RJ-45 network port with foolproof. By default, a board-to-board crystal head is used to connect the control board and the keyboard board, and the user can also customize the extended keyboard line according to actual needs. However, the keyboard extension cable does not exceed 5 meters, and normal operation cannot be guaranteed when it exceeds 5 meters.

The keyboard and control board's connection cable uses a standard ultra-category five network cable, and the RJ-45 interface connection uses a straight line method, that is, both ends are connected according to the EIA / TIA568B wire sequence standard. The user can make the keyboard connection line according to the actual needs.

2.5 Basic operation wiring connection



2-19 Wiring diagram

2.6 Wiring precautions

□ When disassembling or replacing the motor, first cut off the input power of the inverter.

 Only switch the motor or power frequency power supply when the inverter stops outputting.

 When installing peripheral equipment (braking unit, reactor, filter) on the inverter, first measure the insulation resistance of the peripheral equipment to ground with a 1000V class megohmmeter to ensure that its resistance is not less than 4MΩ.

 In addition to shielding, input command signal lines and frequency meters should be routed separately. Do not run parallel to the main circuit. It is better to keep away from the main circuit.

 To avoid malfunction caused by interference, the control circuit connection wire should be twisted shielded wire, and the wiring distance should be less than 50 meters.

 Do not touch the shielding layer of the shielded cable to other signal lines and equipment shells. Seal the bare shielded layer with insulating tape.

 The withstand voltage of all connecting wires must be consistent with the voltage level of the inverter.

 To prevent accidents, the control grounding terminal "PE" and the main circuit grounding terminal "PE" must be grounded. The grounding cannot be shared with the grounding wire of other equipment. The size of the main circuit grounding cable should be larger than half of the main circuit cable. After the wiring is completed, be sure to check whether the wiring, screws, terminals, etc. remain in the device, whether the screws are loose, and whether the bare wires of the terminal are shorted to other terminals.

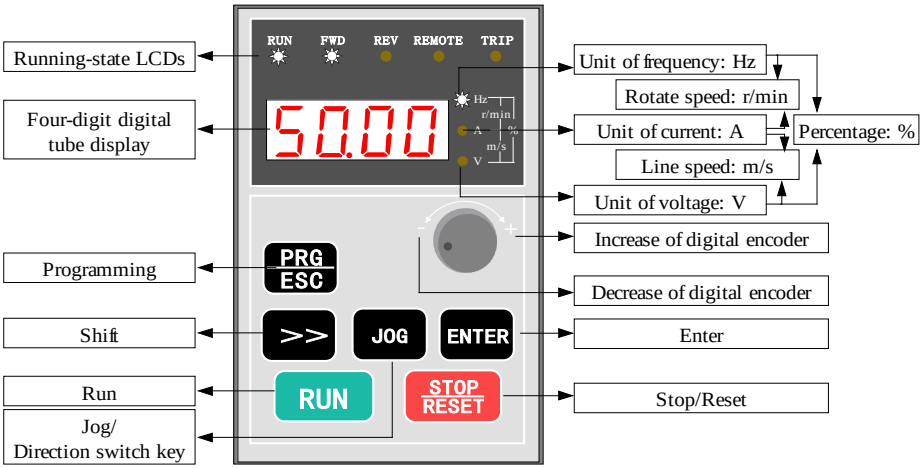
Chapter 3 Operation run

危险	1、 1. Make sure that the terminal cover is installed before closing the input power supply. Do not remove the cover while the power is on. There is danger of electric shock. 2、 2. Do not approach the mechanical equipment, because the inverter will start suddenly when an incoming call is received. There is danger of injury.
注意	1. When a braking device is installed, the high voltage discharge across the braking resistor will increase the temperature. Do not touch the braking resistor. Risk of electric shock and burns. 2. Before running, please confirm the allowable range of the motor and machinery again. There is danger of injury. 3. Do not check the signal during operation. Will damage the equipment. 4. Do not change the settings of the inverter at will. The inverters of this series have been properly set when they leave the factory.

3.1 Function and operation of keyboard

Different specifications of this series inverter may use keyboards with different appearances, but the operation keys and display arrangements of all keyboards are the same; the operation methods and related functions are also the same. The keyboard consists of a five-digit seven-segment LED digital tube monitor, operation keys, digital encoder, running status indicator, unit indicator, etc. The user can perform all functions such as function setting, running, parking, status monitoring, etc. of the machine through the keyboard.

3.1.1 Keyboard layout



3-1 Keyboard layout and parts names

The upper part of the keyboard is the status indicator, the RUN light is lit during operation, FWD is lit during forward rotation, REV is lit during reverse rotation, REMOTE light is illuminated when the run command is not under keyboard control, and the TRIP light is at the time of failure On (see the description in Table 3-2).

In the monitoring state, the nixie tube displays the current monitoring content: the fault code is displayed when the fault occurs; the alarm code is displayed when the alarm is displayed; the U0 group is displayed to control the selected monitoring object when the alarm is normal. For details, see the detailed description of the U0 group.

In the programming state, the digital tube displays three levels of menus: function group, function number and function parameter value. Under the function group display menu, the function groups "P0" to "PP" are displayed. Under the function number display menu, the corresponding function numbers in the group are displayed. Under the function parameter display menu, the parameter value will be displayed.

3.1.2 Key function description

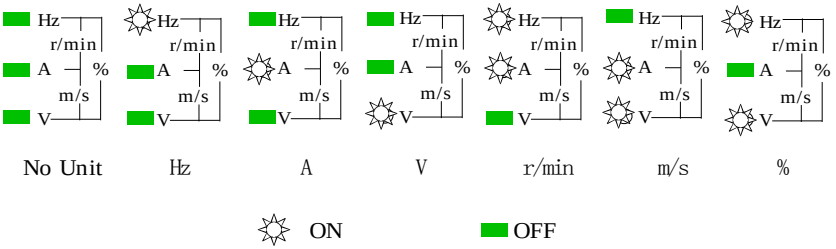
The inverter keyboard is provided with 6 keys and a digital encoder knob. The function definition of each key is shown in Table 3-1.

Table 3-1 Keyboard key functions

button	Button name	functions
PRG ESC	Program / Exit key	Enter or exit programming state. In the monitoring state, press the PRG / ESC key to switch to the programming state, first enter the function group, and then press the ENTER key to enter the function number and function parameter step by step; press PRG / ESC to go from the function parameter to the function number to the function group , And then to the monitoring state, exit step by step; when the inverter is faulty, switch the fault display and function group. When an alarm occurs, the alarm status and function group are switched.
ENTER	enter	Enter the lower level menu or store the parameter content value during parameter setting.
	Up key (clockwise) 	Function code group number, function code number or function code value can be added. In the parameter setting state, the LED digital tube blinks to display the modification bit. If you press this key, the function code value is increased. In the display state, if the setting is valid by the keyboard, you can increase the digital frequency setting through the knob. PID number given.
	Down key (counterclockwise) 	Can reduce function code group number, function code number or function code value. In the parameter setting state, the LED digital tube flashes to display the modification bit. If you press this key, the function code value is reduced. In the display state, if the keyboard is effective, the digital frequency setting, speed PID setting or analog PID number can be reduced. given.
>>	Shift key	In the editing state, you can select the modification bit of the setting data; In the monitoring state, the display status parameters can be switched.
JOG	Jog key	Jog key: In keyboard mode, press this key to jog.
RUN	run	In the keyboard control mode, the inverter is started to run and a run command is issued.
STOP RESET	stop/reset	In keyboard control mode, stop the inverter. When there is a fault, clear the fault and return to the normal state.

3.1.3 LED digital tube and indicator

The inverter keyboard is equipped with five-digit seven-segment LED digital tubes, three unit indicators, and five status indicators. The nixie tube can display the status parameters, function code parameters, fault alarm codes, etc. of the inverter. There are 8 combinations of 3 unit indicators, corresponding to 8 unit indicators respectively. The corresponding relationship between the combination status and the unit is shown in Figure 3-2:



3-2 Unit indicator status and unit correspondence diagram

5 status indicators: The running status indicators are located above the LED digital tube. The meanings of the indications are shown in Table 3-2.

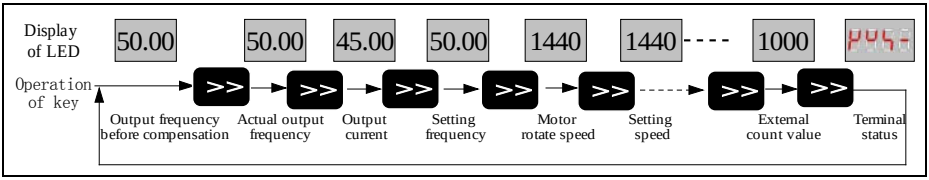
3-2 Status indicator description

Indicator light	Display state	Indicate the current status of the inverter
RUN status indicator	off	Down state
	bright	
FWDForward running direction indication	off	Reverse or not running
	Long bright	Forward stable operation
REVReverse running direction indication	off	Forward or not running
	Long bright	Reverse stable operation
TRIPFault indicator	off	normal
	Long bright	Torque mode control
	Flashes quickly	malfunction
	Slow flashing	Motor tuning
REMOTE indicator	off	Keyboard control status
	bight	Terminal control status
	flicker	Serial communication status

3.1.4 Keyboard operation method

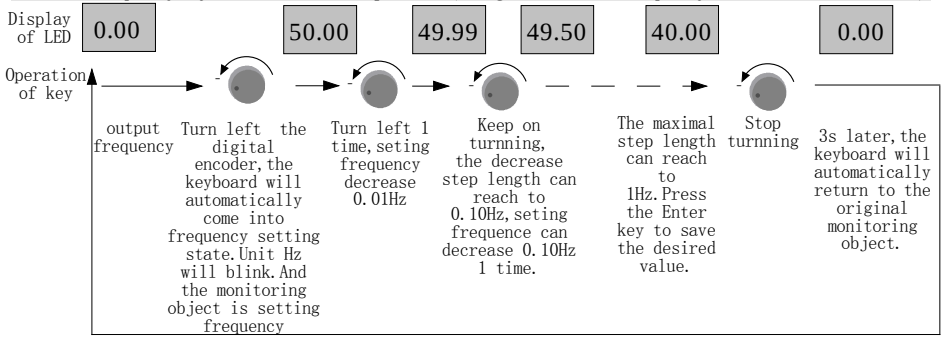
Various operations can be performed on the inverter through the keyboard, for example:

Display of status parameters:



3-3 Operation status parameter display operation example (Stop method for stopping status is the same as above)

Reference frequency adjustment for normal operation: (change the reference frequency from 50.00Hz to 40.00Hz).



3-4 Set frequency adjustment operation

- This method is suitable for a given frequency parameter adjustment in which the initial display state is arbitrary.
- When the monitoring display is set speed and analog PID digital setting, you can directly modify and display

- the set speed or analog PID digital setting by pressing the digital encoder.
- In the three-level menu state, if the parameter does not flash, it means that the function code cannot be modified. The possible reasons are:
- This function code is a parameter that cannot be modified. Such as actual detection parameters, running record parameters, fixed parameters, etc .;
- This function code cannot be modified in the running state, and it can be modified only after stopping;
- The parameters are protected. It is forbidden to modify the parameters. This is the parameter protection to avoid misoperation.

3.2 Selection of operating mode

The inverter running command channel specifies the way in which the inverter accepts operations such as start and stop. There are three types of running command channels:

Keyboard control: Use the Run, Stop / Reset and Jog keys on the keyboard for control.

Terminal control: control terminals FWD, REV, COM (two-wire type); FWD, REV, HLD (three-wire type) control.

Serial communication: Start and stop control through the host computer.

When the inverter is in the stop state, modify the content of P0-02 function code to realize the control mode conversion. The factory setting is keyboard control (control parameter P0-02 is set to 0). If the terminal controls running and stopping, it needs to be changed to terminal control. If the stop / reset key is effective during terminal control, you need to select the terminal Control (the STOP key is effective).

If it is controlled by serial communication, you need to set the running command channel to serial communication.

If the REMOTE indicator of the keyboard is off, it indicates the keyboard control status; if it is on, it indicates the terminal control status; if it is flashing, it indicates the serial communication status.

3.3 Trial run

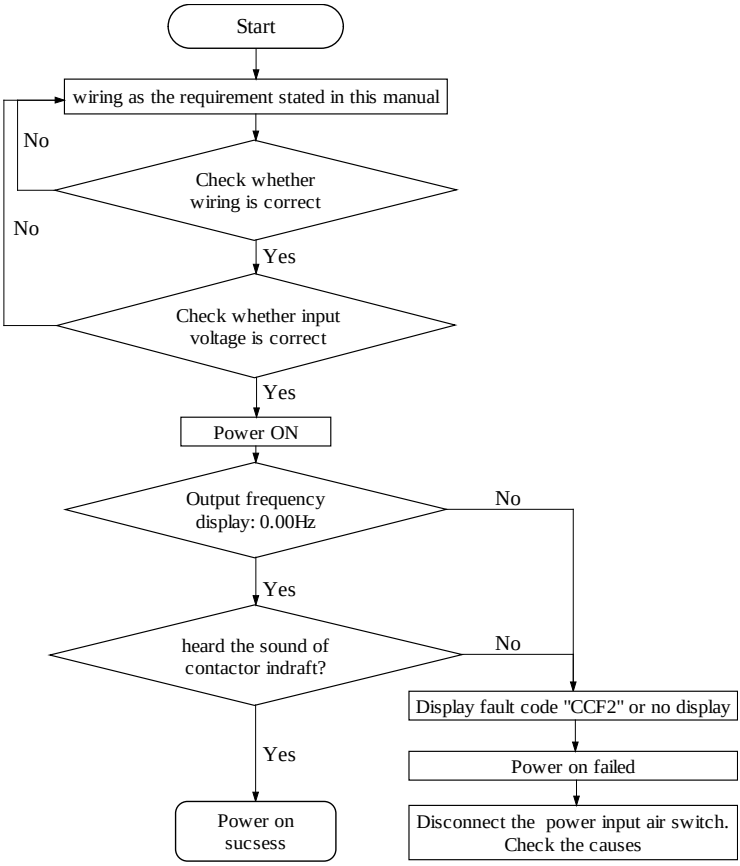
3.3.1 Inverter operation mode

- There are four types of inverter running modes, which are: JOG jog operation, PID closed-loop operation, PLC program timing operation and ordinary operation.
- JOG jog operation: When the inverter is in the stop state, after receiving the jog operation command (for example, press the jog key on the keyboard, it can be set through P5-50), and then run at the jog frequency (see function codes P5-00 ～ P5 -02).
- PID closed-loop operation: The PID closed-loop selection function is valid (P0-03 = 7), and the inverter will select the closed-loop operation mode, that is, PI adjustment according to the given and feedback amount (see Group P6 function code).
- PLC program timing operation: PLC function selection is valid (P0-03 = 6), the inverter will select PLC operation mode, and the inverter will run according to the preset operation mode (see the description of group P8 function code). The PLC program operation can be suspended through the multi-function terminal No. 10 function (for details, see Chapter 3 P2 function); the multi-function terminal No. 21 function can be used to reset the PLC stop status (for details, see Chapter 4 P2 function).
- Ordinary operation: It is a simple open-loop operation mode, including 6 methods: keyboard digital setting, analog terminal AI, pulse input, serial communication, multi-stage speed, and terminal UP / DOWN.

3.3.2 Initial power-on operation

Make wiring connections according to the technical requirements provided in this manual. After checking the wiring and power supply, make sure that the AC power supply air switch on the input side of the inverter is closed, power on the inverter, and the contactor is normally closed. When the digital tube displays the set frequency, the inverter is initialized.

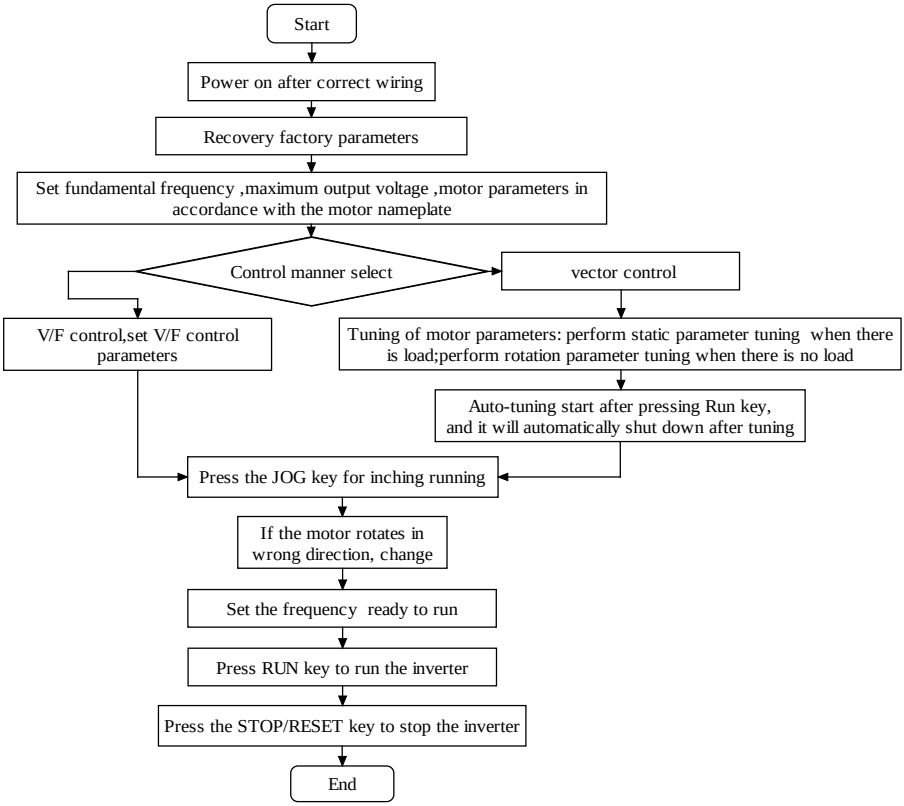
If the keyboard is not connected properly, the display is abnormal and you need to reconnect the keyboard. The first power-on operation process is shown in Figure 3-5:



3-5 Inverter first power-on operation process

3.3.3 First trial operation

Please follow the procedure below for the first trial operation。



3-6 First trial operation

Chapter 4 Summary of function parameters

Note: "○" running parameters can be changed; "×" running parameters cannot be changed.
"*" Actual detection value or fixed parameter cannot be changed; "-" factory setting, user cannot change.

P0 Basic Function Group

Features Code	Code name	Predetermined area	Leave the factory set up	change
P0-00	GPType display	1：G type (constant torque load model)	Model determination	*
P0-01	control method	0: VF control 1: Speed Sensorless Vector Control (SVC)	1	×
P0-02	Command source selection	0: Operation panel command channel (REMOTE off) 1: Terminal command channel (REMOTE on) 2: Serial port communication command channel (REMOTE flashes)	0	○
P0-03	Main frequency source X selection	0: Digital setting (digital knob adjustment) 1: AI1 2: AI2 3: Reserved 4: PULSE pulse setting 5: Multi-speed 6: PLC 7: PID 8: Communication settings	0	×
P0-04	keep			
P0-05	Auxiliary frequency source Y selection	Same as P0-03 (Main frequency source X selection)	0	×
P0-06	Value setting frequency memory selection	0: Do not remember 1: power-down memory 2: shutdown memory 3: Memory during shutdown and power failure	0	○
P0-07	Auxiliary frequency source Y range selection during superposition	0: Relative to the maximum frequency 1: Relative to frequency source X	0	○
P0-08	Auxiliary frequency source Y range when superimposed	0% ～ 150%	100%	○

P0-09	Frequency source overlay selection	Unit place: frequency source selection 0: Main frequency source X 1: Main and auxiliary operation results (the operation relationship is determined by the ten digits) 2: Switch between main frequency source X and auxiliary frequency source Y 3: Switch between the main frequency source X and the main and auxiliary calculation results 4: Switch between auxiliary frequency source Y and main and auxiliary calculation results Tens place: the relationship between the main and auxiliary operations of the frequency source 0: Primary + Secondary 1: primary-secondary 2: maximum of both 3: minimum of both	00	○
P0-10	keep			
P0-11	Preset frequency	0.00Hz ～ Max frequency (P0-12)	50.00Hz	○
P0-12	Maximum frequency	50.00Hz～630.00Hz	50.00Hz	×
P0-13	Upper frequency source	0: value setting (P0-14) 1: AI1 2: AI2 3: PULSE pulse setting	0	×
P0-14	Upper limit frequency value setting	Lower limit frequency (P0-15) to maximum frequency (P0-12)	50.00Hz	○
P0-15	Lower limit frequency value setting	0.00Hz～maximum frequency（P0-14）	0.00Hz	○
P0-16	Unit of acceleration and deceleration time	0: s (seconds) 1: m (minutes)	0	×
P0-17	Acceleration time 1	0.00s(m)～300.00s(m)	Model determination	○
P0-18	Deceleration time 1	0.00s(m)～300.00s(m)	Model determination	○
P0-19	Carrier frequency	0.5kHz～16.0kHz	Model determination	○
P0-20	Running direction	0: software default direction 1: opposite to the software default direction	0	○
P0-21	Acceleration / deceleration time reference frequency	0: maximum frequency 1: set frequency	0	×
P0-22	Frequency UP / DOWN benchmark during operation	0: operating frequency 1: set frequency	0	○

P0-23	Carrier frequency automatic adjustment selection	0: Carrier does not adjust with temperature 1: Carrier automatically adjusts with temperature	0	○
P0-30	Motor parameter group selection	0: Motor parameter group 1 1: Motor parameter group 2	0	×

P1 Motor parameters

Features Code	Code name	Predetermined area	Leave the factory set up	change
P1-00	Motor type selection	2: permanent magnet synchronous motor	2	*
P1-01	Motor rated power	0.2kW～1000.0kW	Model determination	×
P1-02	Motor rated voltage	0V～2000V	Model determination	×
P1-03	Motor rated current	0.1A～6553.5A	Model determination	×
P1-04	Motor rated frequency	0.01Hz～Maximum frequency（P0-12)	Model determination	×
P1-05	Motor rated speed	1rpm～65535rpm	Model determination	×
P1-12	Stator resistance of synchronous motor	1～60000	Tuning parameters	×
P1-13	D-axis inductance of synchronous motor	1～60000	Tuning parameters	×
P1-14	Q axis inductance of synchronous motor	1～60000	Tuning parameters	×
P1-15	Inductance and resistance units	0～12	Tuning parameters	×
P1-16	Back-EMF of synchronous motor	1～60000	Tuning parameters	×
P1-25	Tuning parameters	0: No operation 1: static tuning 2: Full tuning 3: static tuning 2	0	×

P2 Input terminal parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	change
P2-00	X1 terminal function selection	0: No function 1: Forward running (FWD) 2: Reverse operation (REV) 3: Three-line operation control 4: Forward Jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Free parking 9: Fault reset (RESET) 10: Operation pause 11: External fault input is normally open 12: External fault input normally closed 13: Multi-speed terminal 1 14: Multi-speed terminal 2 15: Multi-speed terminal 3 16: Acceleration / deceleration time selection terminal 17: UP / DOWN setting is cleared 18: DC brake terminal 19: acceleration / deceleration prohibited 20: PID suspended 21: PLC status reset 22: Swing frequency pause 23: counter input 24: Counter reset 25: Length count input 26: Length count reset 27: AI1 and AI2 settings interchange 28: User-defined fault 1 29: DC braking enabled at stop 30: keyboard command source switch 31: Terminal command source switching 32: 1st motor and 2nd motor switch 33: Frequency source switching 34: PID parameter switching 35: PID action direction is reversed 36 ～ 39: Reserved	1	×
P2-01	X2 terminal function selection		2	×
P2-02	X3 terminal function selection		4	×
P2-03	X4 terminal function selection		8	×
P2-04	X5 terminal function selection		0	×
P2-05	X6 terminal function selection		0	×
P2-06	X7 terminal function selection		0	×
P2-07	X8 terminal function selection		0	×
P2-08	X9 terminal function selection		0	×
P2-09	X10 terminal function selection		0	×
P2-10	XFilter time	1～10	4	○

P2-11	Terminal command mode	0: Two-line type 1 1: two-line type 2 2: Three-line type 1 3: three-line type 2	0	×
P2-12	Terminal UP / DOWN rate	0.01Hz/s～100.00Hz/s	1.00Hz/s	○
P2-13	AI1 minimum input corresponding setting	0.00V～P2-15	0.05V	○
P2-14	AI1 minimum input corresponding setting	-100.0%～100.0%	0.0%	○
P2-15	AI1 maximum input	P2-13～10.00V	10.00V	○
P2-16	AI1 maximum input corresponding setting method	0：P2-17 1：Set by AI2	0	×
P2-17	AI1 maximum input corresponding setting	-100.0%～100.0%	100.0%	○
P2-18	AI1 input filter time	0.00s～10.00s	0.10s	○
P2-19	AI2 minimum input	0.00V～P2-21	0.05V	○
P2-20	AI2 minimum input corresponding setting	-100.0%～100.0%	0.0%	○
P2-21	AI2 maximum input	P2-19～10.00V	10.00V	○
P2-22	AI2 maximum input corresponding setting method	0: P2-23 1: set by AI1	0	×
P2-23	AI2 maximum input corresponding setting	-100.0%～100.0%	100.0%	○
P2-24	AI2 input filtering time	0.00s～10.00s	0.10s	○
P2-25	PULSE (pulse) input minimum frequency	0.00kHz～P2-27	0.00kHz	○
P2-26	PULSE (pulse) input minimum frequency corresponding setting	-100.0%～100.0%	0.0%	○
P2-27	PULSE (pulse) input maximum frequency	P2-25～50.00kHz	50.00kHz	○
P2-28	PULSE (pulse) input maximum frequency corresponding setting method	0: P2-29 1: set by AI1 2: Set by AI2	0	×
P2-29	PULSE (pulse) input maximum frequency corresponding setting	-100.0%～100.0%	100.0%	○
P2-30	Filter time for PULSE (pulse) input	0.00s～10.00s	0.10s	○
P2-31	X input terminal valid state selection	0～31	0	○

P3 Output terminal parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P3-00	DO terminal output mode selection	0: DOP (pulse output) 1: DOR (switching output)	0	○
P3-01	DOR output selection	0: No output 1: Inverter is running 2: fault output 3: Frequency level detection FDT arrival	2	○
P3-02	TA/TB/TCOutput selection	4: frequency reached 5: upper frequency reached 6: Lower limit frequency reached (stop output) 7: Running at zero speed 8: Motor overload pre-alarm 9: Inverter overload pre-alarm 10: Set count value reached 11: The specified count value arrives	1	○
P3-03	TA3/TB3/TC3Output selection（扩展卡）	12: Length reached 13: PLC completes the cycle 14: Run time arrived 15: Communication control 16: Ready to run 17: AI1> AI2 18: Zero current detected 19: Motor over temperature alarm 20: Software overcurrent output 21: Reserved 22: reserved	0	○
P3-04	Y1Output selection	23: reserved 24: Reserved 25: reserved 26: Lower limit frequency reached (no output after shutdown)	7	○
P3-05	Y2 Output selection（Expansion Card）	27: Reverse running 28: Frequency is being limited 29: Limiting torque 30: reserved 31: Undervoltage status output	4	○
P3-06	DOP Output selection	0: operating frequency 1: set frequency 2: output current	0	○
P3-07	AO1 Output selection	3: output power 4: PULSE pulse input 5: AI1	0	○

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P3-08	AO2 Output selection (Expansion Card)	6: AI2 7: length value 8: count value 9: Communication control output	1	○
P3-09	DOPOutput maximum frequency	0.01kHz～100.00kHz	50.00kHz	○
P3-10	AO1 Work factor	-100.0%～100.0%	0.0%	○
P3-11	AO1 Gain	-10.00～10.00	1.00	○
P3-12	AO2 Work factor	-100.0%～100.0%	0.0%	○
P3-13	AO2 Gain	-10.00～10.00	1.00	○
P3-17	DOROutput delay time	0.0s～3600.0s	0.0s	○
P3-18	TA/TB/TCOutput delay time	0.0s～3600.0s	0.0s	○
P3-19	TA3/TB3/TC3 Output delay time	0.0s～3600.0s	0.0s	○
P3-20	Y1 Output delay time	0.0s～3600.0s	0.0s	○
P3-21	Y2 Output delay time	0.0s～3600.0s	0.0s	○
P3-22	YOutput terminal effective state selection	0～31	0	○

P4 Start and stop control parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	change
P4-00	Start way	0: Start directly 1: Speed tracking start	0	○
P4-01	Keep			
P4-02	Keep			
P4-03	Starting frequency	0.00Hz～Maximum frequency（P0-12）	0.00Hz	×
P4-04	Start frequency hold time	0.0s～36.0s	0.0s	×
P4-05	Starting DC braking current	0%～100%	0%	×
P4-06	Starting DC braking time	0.0s～36.0s	0.0s	×
P4-07	Acceleration and deceleration	0: linear acceleration / deceleration 1: S curve acceleration and deceleration A 2: S curve acceleration / deceleration B	0	×
P4-08	S curve start time S curve start time	0.0%～(100.0-P4-09)%	20.0%	×
P4-09	S curve end time	0.0%～(100.0-P4-08)%	20.0%	×
P4-10	Stop mode	0: deceleration stop 1: Free stop 2: Deceleration stop + free stop 3: Deceleration stop mode 2	0	○
P4-11	DC braking starting frequency at stop	0.00Hz～15.00 Hz	0.00Hz	○
P4-12	DC braking waiting time at stop	0.0s～36.0s	0.0s	○
P4-13	DC braking current at stop	0%～100%	0%	○
P4-14	DC braking time at stop	0.0s～36.0s	0.0s	○
P4-15	Brake usage	0%～100%	100%	○
P4-18	Stop speed	0.01Hz～Maximum frequency	0.10Hz	○

P5 Auxiliary function parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P5-00	Jog running frequency	0.00Hz～Maximum frequency (P0-12)	2.00Hz	○
P5-01	Jog acceleration time	0.00s～300.00s	20.00s	○
P5-02	Jog deceleration time	0.00s～300.00s	20.00s	○

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P5-03	Jog enable during operation	0: Disabled 1: enable	0	○
P5-04	acceleration time 2	0.00s(min)～300.00s(min)	Model determination	○
P5-05	deceleration time 2	0.00s(min)～300.00s(min)	Model determination	○
P5-06	Jump frequency	0.00Hz～Maximum frequency (P0-12)	0.00Hz	○
P5-07	Jump frequency amplitude	0.00Hz～Maximum frequency (P0-12)	0.00Hz	○
P5-08	Forward and reverse dead time	0.0s～100.0s	0.0s	○
P5-09	Reverse control	0: reverse allowed 1: Reverse is prohibited	0	○
P5-10	The frequency is lower than the lower limit frequency.	0: lower limit frequency operation 1: Delayed shutdown	0	○
P5-11	Delay time when the frequency is lower than the lower limit	0.0s～3600.0s	0.0s	○
P5-12	Set cumulative running arrival time	0h～65535h	0h	○
P5-13	Run time arrival action selection	0: keep running 1: downtime	0	○
P5-14	Boot protection selection	0: Invalid 1: valid	0	○
P5-15	Frequency detection value (FDT level)	0.00Hz～Maximum frequency (P0-12)	50.00Hz	○
P5-16	Frequency detection hysteresis	0.0%～100.0%	5.0%	○
P5-17	Frequency reach detection range	0.0%～100.0%	0.0%	○
P5-18	Random PWM gain	0～10	0	○
P5-19	Modulation mode selection	0: asynchronous modulation 1: synchronous modulation	0	×
P5-20	Fast current limit function selection	0: Invalid 1: valid	1	×
P5-21	Wake-up frequency	Sleep frequency (P5-23) to maximum frequency (P0-12)	0.00Hz	○
P5-22	Wake-up delay time	0.0s～6500.0s	0.0s	○

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P5-23	Sleep frequency	0.00Hz～Wake-up frequency（P5-21)	0.00Hz	○
P5-24	Sleep delay time	0.0s～6500.0s	0.0s	○
P5-25	Software overcurrent point	0.0%～300.0%（Motor rated current）	200.0%	○
P5-26	Software overcurrent detection delay time	0.00s（Not detect） 0.01s～600.00s	0.00s	○
P5-37	Deadband compensation mode selection	0: No compensation 1: compensation	1	×
P5-38	Keep			
P5-39	Cooling fan control	0: The cooling fan runs when the motor is running 1: The cooling fan keeps running after power on	0	○
P5-40	Keep			
P5-41	Keep			
P5-42	Keep			
P5-43	Keep			
P5-44	Keep			
P5-45	Load speed display factor	0.0001～6.5000	1.0000	○
P5-46	Decimal point position for load speed display	0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	2	○
P5-47	Cumulative running time	0h～65535h	-	*
P5-48	LED running display parameters	1～65535	0x3f	○
P5-49	LED shutdown display parameters	1～511	3	○
P5-50	JOG key function selection	0: JOG is invalid 1: Switch between the operation panel command channel and remote command channel (terminal command channel or serial port command channel) 2: forward and reverse switching 3: forward rotation 4: Reverse jog	0	×
P5-51	STOP / RES key function	0: Only in keyboard control mode, STOP / RES key stop function is valid 1: No matter what kind of control mode, the STOP / RES key stop function is effective	0	○
P5-52	Keep			

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P5-53	Software version number	0.01～655.35	-	*

P6 PIDfunction

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P6-00	PID reference source	0: P6-01 1: AI1 2: AI2 3: Reserved 4: PULSE pulse (X5) 5: Multi-speed 6: Communication settings	0	○
P6-01	PID value setting	0.0%～100.0%	50.0%	○
P6-02	PID given change time	0.00s～300.00s	0.00s	○
P6-03	PID feedback source	0: AI1 1: AI2 2: reserved 3: AI1-AI2 4: PULSE pulse (X5) 5: AI1 + AI2 6: Max (| AI1 |, | AI2 |) 7: Min (| AI1 |, | AI2 |) 8: Communication settings	0	○
P6-04	PID action direction	0: Positive action 1: reaction	0	○
P6-05	PID given feedback range	0～65535	1000	○
P6-06	Proportional gain P	0.0～100.0	20.0	○
P6-07	Integration time I	0.01～10.00	2.00s	○
P6-08	Differential time D	0.000s～10.000s	0.000s	○
P6-09	Deviation limit	0.0%～100.0%	0.0%	○
P6-10	PID operation mode	0: No operation during shutdown 1: Operation during shutdown	0	○
P6-11	PID reversal cut-off frequency	0.00Hz ～ Max frequency	0.00Hz	○
P6-12	PID feedback filtering time	0.00 ～ 60.00s	0.00s	○
P6-13	PID output filter time	0.00 ～ 60.00s	0.00s	○
P6-14	Proportional gain Kp2	0.0 ～ 100.0	20.0	○

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P6-15	Integration time Ti2	0.01s ～ 10.00s	2.00s	○
P6-16	Differential time Td2	0.000s ～ 10.000s	0.000s	○
P6-17	PID parameter switching conditions	0: Do not switch 1: Switch via X terminal 2: Automatic switching based on deviation	0	○
P6-18	PID parameter switching deviation 1	0.0% ～ P6-18	20.0%	○
P6-19	PID parameter switching deviation 2	P6-18 ～ 100.0%	80.0%	○
P6-20	Keep			
P6-21	Keep			
P6-22	Keep			
P6-23	PID initial value	0.0% ～ 100.0%	0.0%	○
P6-24	PID initial value holding time	0.00 ～ 650.00s	0.00s	○
P6-25	Maximum positive output deviation twice	0.00% ～ 100.00%	1.00%	○
P6-26	Maximum reverse output deviation twice	0.00% ～ 100.00%	1.00%	○
P6-27	PID integral properties	Units: integral separation 0: Invalid 1: valid Tens place: whether to stop integration after output to the limit 0: Continue to integrate 1: Stop integration	00	○
P6-28	PID feedback loss detection value	0.0%：Don't judge feedback lost 0.1% ～ 100.0%	0.0%	○
P6-29	PID feedback loss detection time	0.0s ～ 20.0s	0.0s	○
P6-30	PID differential limit	0.00% ～ 100.00%	0.10%	○

P7 Swing frequency, fixed length and count

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P7-00	Swing setting method	0: Relative to the center frequency 1: Relative to the maximum frequency	0	○

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P7-01	Swing frequency amplitude	0.0%～100.0%	0.0%	○
P7-02	Kick frequency amplitude	0.0%～50.0%	0.0%	○
P7-03	Swing frequency period	0.01s～300.00s	10.00s	○
P7-04	Triangle wave rise time coefficient	0.1%～100.0%	50.0%	○
P7-05	Set length	0m～65535m	1000m	○
P7-06	Current length	0m～65535m	0m	○
P7-07	Pulses per meter	0.1～6553.5	100.0	○
P7-08	Set count value	1～65535	1000	○
P7-09	Specify count value	1～65535	1000	○

P8 Multi-speed, PLC

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P8-00	Multi-speed 0 given mode	0: given by function code P8-01 1: AI1 2: AI2 3: PULSE pulse given 4: PID 5: Preset frequency (P0-11) given, UP / DOWN can be modified	0	×
P8-01	Multi-speed 0	-100.0%～100.0%（Upper frequencyP0-14）	0.0%	○
P8-02	Multi-speed 1	-100.0%～100.0%（Upper frequencyP0-14）	0.0%	○
P8-03	Multi-speed 2	-100.0%～100.0%（Upper frequencyP0-14）	0.0%	○
P8-04	Multi-speed 3	-100.0%～100.0%（Upper frequencyP0-14）	0.0%	○
P8-05	Multi-speed 4	-100.0%～100.0%（Upper frequencyP0-14）	0.0%	○
P8-06	Multi-speed 5	-100.0%～100.0%（Upper frequencyP0-14）	0.0%	○
P8-07	Multi-speed 6	-100.0%～100.0%（Upper frequencyP0-14）	0.0%	○
P8-08	Multi-speed 7	-100.0%～100.0%（Upper frequencyP0-14）	0.0%	○
P8-09	PLCOperation mode	0: Stop at the end of a single run 1: Keep the final value at the end of a single run 2: keep circulating	0	○
P8-10	PLC Power-down memory select	0: No memory when power off 1: power-down memory	0	○

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
P8-11	PLC operation hours unit	0: s (seconds) 1: h (hours)	0	○
P8-12	PLC segment 0 running time	0.0s(h)～6553.5s(h)	0.0s(h)	○
P8-13	PLC stage 0 acceleration / deceleration time selection	0: acceleration / deceleration time 1 1: acceleration / deceleration time 2	0	○
P8-14	PLC stage 1 running time	0.0s(h)～6553.5s(h)	0.0s(h)	○
P8-15	PLC step 1 acceleration / deceleration time selection	0: acceleration / deceleration time 1 1: acceleration / deceleration time 2	0	○
P8-16	PLC stage 2 running time	0.0s(h)～6553.5s(h)	0.0s(h)	○
P8-17	PLC step 2 acceleration / deceleration time selection	0: acceleration / deceleration time 1 1: acceleration / deceleration time 2	0	○
P8-18	PLC stage 3 running time	0.0s(h)～6553.5s(h)	0.0s(h)	○
P8-19	PLC step 3 acceleration / deceleration time selection	0: acceleration / deceleration time 1 1: acceleration / deceleration time 2	0	○
P8-20	PLC Section 4 Run Time	0.0s(h)～6553.5s(h)	0.0s(h)	○
P8-21	PLC step 4 acceleration / deceleration time selection	0: acceleration / deceleration time 1 1: acceleration / deceleration time 2	0	○
P8-22	PLC stage 5 running time	0.0s(h)～6553.5s(h)	0.0s(h)	○
P8-23	PLC step 5 acceleration / deceleration time selection	0: acceleration / deceleration time 1 1: acceleration / deceleration time 2	0	○
P8-24	PLC Section 6 Run Time	0.0s(h)～6553.5s(h)	0.0s(h)	○
P8-25	PLC step 6 acceleration / deceleration time selection	0: acceleration / deceleration time 1 1: acceleration / deceleration time 2	0	○
P8-26	PLC stage 7 running time	0.0s(h)～6553.5s(h)	0.0s(h)	○
P8-27	PLC step 7 acceleration / deceleration time selection	0: acceleration / deceleration time 1 1: acceleration / deceleration time 2	0	○

P9 VFparameter

Features Code	parameter name	Predetermined area	Leave the factory set up	change
P9-00	V/FCurve setting	0: straight V / F curve 1: Multi-point V / F curve 2: Square V / F curve	0	×
P9-01	Torque boost	0.0% (automatic) 0.1% to 30.0%	Model determinatio	○

Features Code	parameter name	Predetermined area	Leave the factory set up	change
			n	
P9-02	Cut-off frequency of torque boost	0.00Hz ～ Max frequency (P0-12)	50.00Hz	×
P9-03	Multi-point V / F frequency point F1	0.00Hz～P9-05	0.00Hz	×
P9-04	Multi-point V / F voltage pointV1	0.0%～100.0%	0.0%	×
P9-05	Multi-point V / F frequencyF2	P9-03～P9-07	0.00Hz	×
P9-06	Multi-point V / F voltage pointV2	0.0%～100.0%	0.0%	×
P9-07	Multi-point V / F frequencyF3	P9-05～Motor rated frequency (P1-04)	0.00Hz	×
P9-08	Multi-point V / F voltage pointV3	0.0%～100.0%	0.0%	×
P9-09	Slip compensation coefficient	0.0%～200.0%	0.0%	○
P9-10	Overexcitation gain	0～200	64	○
P9-11	Oscillation suppression gain	0～100	Model determinatio n	○
P9-12	Suppressed oscillation mode	0～3	1	○

PA Communication parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PA-00	Baud rate	0：300 BPS 1：600BPS 2：1200BPS 3：2400BPS 4：4800BPS 5：9600BPS 6：19200BPS 7：38400BPS	5	○
PA-01	Data Format	0: No check (8-N-2) 1: Even parity (8-E-1) 2: Odd check (8-O-1) 3: No check (8-N-1)	0	○
PA-02	Local address	0 ～ 247, 0 is the broadcast address	1	○
PA-03	Response delay	0ms～20ms	2ms	○
PA-04	Communication timeout	0.0s～60.0s	0.0s	○

Pb Fault and protection parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PB-00	Motor overload protection selection	0: Invalid 1: valid	1	○
PB-01	Motor overload protection gain	0.10～10.00	1.00	○
PB-02	Motor overload warning coefficient	50%～100%	80%	○
PB-03	Overvoltage stall gain	0～100	10	○
PB-04	Overvoltage stall protection voltage	120%～150%	130%	○
PB-05	Overcurrent stall gain	0～100	20	○
PB-06	Overcurrent stall protection current	100%～200%	150%	○
PB-07	Power-to-ground short-circuit protection	0: Invalid 1: valid	1	○
PB-08	Keep	——	——	○
PB-09	Instant stop function selection	0: Invalid 1: valid	0	○
PB-10	Non-stop frequency drop rate	0.00Hz/s～Maximum frequency（P0-12）/ s	10.00Hz/s	○
PB-11	Instantaneous stop non-stop voltage rise judgment time	0.00s～100.00s	0.50s	○
PB-12	Instantaneous stop non-stop operation judgment voltage	60.0%～100.0%	80.0%	○
PB-13	Automatic fault reset times	0～10	0	○
PB-14	Selection of fault relay action during fault automatic reset	0: No action 1: action	0	○
PB-15	Failure automatic reset interval	0.1s～60.0s	1.0S	○
PB-16	Automatic reset times for fault clear time	0.1h～1000.0h	1.0h	○
PB-17	Input phase loss protection selection	0: Invalid 1: valid	1	○
PB-18	Input phase loss detection reference	1% ～100%	100%	×
PB-19	Input phase loss detection time	2s ～ 255s	10s	×
PB-20	Output phase loss protection selection	0: Invalid 1: valid	1	○

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PB-21	Output phase loss detection time	1s ～ 255s	10s	×
PB-22	Rectifier bridge temperature	-10℃～100℃	-	*
PB-23	Inverter module heat sink temperature	-10℃～100℃	-	*
PB-24	First failure type	0: No fault 1: Inverter unit protection (E01) 2: Accelerated overcurrent (E02) 3: Deceleration overcurrent (E03) 4: Constant speed overcurrent (E04) 5: Accelerated overvoltage (E05) 6: Deceleration over voltage (E06) 7: Constant-speed overvoltage (E07) 8: Buffer resistor overload fault (E08) 9: Undervoltage fault (E09) 10: Inverter overload (E10) 11: Motor overload (E11) 12: Input phase loss (E12) 13: Output phase loss (E13) 14: Module is overheating (E14) 15: External fault (E15) 16: Communication timeout failure (E16) 17: Contactor pull-in failure (E17) 18: Current detection failure (E18) 19: Motor tuning failure (E19) 20: Reserved (E20) 21: EEPROM read and write failure (E21) 22: Reserved (E22) 23: Motor short-to-ground fault (E23) 24: Reserved (E24) 25: Motor over temperature fault (E25) 26: Operation time arrives (E26) 27: User-defined fault signal input via multi-function terminal (E27) 31: PID is lost during operation (E31) 32: Software overcurrent fault (E32) 40: Fast current limit timeout fault (E40) 41: Switching motor failure (E41) 42: Excessive speed deviation fault (E42) 43: Motor over speed fault (E43) 51: Initial position detection failure (E51)		*
PB-25	Second fault type		-	*
PB-26	Third (last) fault type		-	*
PB-27	Frequency at fault	--	-	*
PB-28	Current at fault	--	-	*
PB-29	Bus voltage at fault	--	-	*
PB-30	Input terminal status during fault	--	-	*

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PB-31	Output terminal status during fault	--	-	*
PB-32	Undervoltage point selection	60.0% to 140.0% Three-phase: 100.0% corresponds to bus voltage 350.0V Two phases: 100.0% corresponds to bus voltage 200.0V	100.0%	○
PB-33	Zero current detection level	0.0% ～ 300.0% 100.0% corresponding motor rated current	5.0%	○
PB-34	Zero current detection delay time	0.01s～600.00s	0.10s	○
PB-35	Overpressure point coefficient	120.0%～150.0%	150.0%	×
PB-36	Motor temperature sensor type	0～2	0	○
PB-37	Motor overheating protection temperature	0～200	110	○
PB-38	Motor overheating pre-alarm threshold	0～200	90	○
PB-39	Fault protection enable selection	0～1	00000	○
PB-40	Over speed detection value	0.0～50.0%	20.0%	○
PB-41	Over speed detection time	0.0～60.0s	1.0s	○
PB-42	Excessive speed deviation detection value	0.0～50.0%	20.0%	○
PB-43	Excessive speed deviation detection time	0.0～60.0s	5.0s	○
PB-44	Starting voltage of braking unit	350.0～800.0	780.0V	×
PB-45	keep			
PB-46	keep			
PB-47	keep			
PB-48	Fault protection action selection 1	0～2	00000	○
PB-49	Fault protection action selection 2	0～2	00000	○
PB-50	Fault protection action selection 3	0～2	00000	○
PB-51	Fault protection action selection 4	0～2	00000	○

PC Second motor parameter

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PC-00	Second motor type selection	2: permanent magnet synchronous motor	2	*
PC-01	Second motor motor rated power	0.2kW～1000.0kW	Model determination	×
PC-02	Second motor motor rated voltage	0V～2000V	Model determination	×
PC-03	Second motor motor rated current	0.1A～6553.5A	Model determination	×
PC-04	Second motor motor rated frequency	0.01Hz～Maximum frequency（P0-12）	Model determination	×
PC-05	Second motor motor rated speed	1rpm～65535rpm	Model determination	×
PC-12	2nd synchronous motor stator resistance	1～60000	Tuning parameters	×
PC-13	D-axis inductance of 2nd synchronous motor	1～60000	Tuning parameters	×
PC-14	Q axis inductance of 2nd synchronous motor	1～60000	Tuning parameters	×
PC-15	2nd synchronous motor inductance and resistance unit	0～12	Tuning parameters	×
PC-16	Back-EMF of 2nd synchronous motor	1～60000	Tuning parameters	×

PD Torque control parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PD-00	Speed / torque control mode selection	0: speed control 1: torque control	0	×
PD-01	Selection of torque setting source in torque control mode	0: Digital setting 1 (PD-03) 1: AI1 2: AI2 3: Reserved 4: PULSE pulse 5: Communication given 6: MIN (AI1, AI2) 7: MAX (AI1, AI2)	0	×

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PD-03	Digital setting of torque in torque control mode	-200.0% ～ 200.0%	150.0%	○
PD-05	Maximum torque forward frequency	0.00Hz ～Maximum frequency	50.00Hz	○
PD-06	Torque control reverse maximum frequency	0.00Hz ～Maximum frequency	50.00Hz	○
PD-07	Torque acceleration time	0.00～650.00s	0.00s	○
PD-08	Torque deceleration time	0.00～650.00s	0.00s	○

PE Vector control parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PE-00	Low-speed speed PI adjustment integration coefficient	1～6000	200	○
PE-01	Low-speed speed PI adjustment scale factor	1～6000	100	○
PE-02	Speed PI switching frequency point 1	0～PE-05	1.00	○
PE-03	High-speed speed PI adjustment integration coefficient	1～6000	80	○
PE-04	High-speed PI adjustment scaling factor	1～6000	40	○
PE-05	Speed PI switching frequency point 2	PE-02～Maximum frequency	5.00	○
PE-10	Torque upper limit source selection (electric)	0: Set by function code PE-11 1: Set by pulse input 2: AI1 3: AI2 4: Communication given 5: MIN (AI1, AI2) 6: MAX (AI1, AI2)	0	×
PE-11	Digitally set torque current (electric)	0%～200.0%	150.0%	○
PE-12	Torque upper limit source selection (power generation)	0: Set by function code PE-13 1: Set by pulse input 2: AI1 3: AI2 4: Communication given 5: MIN (AI1, AI2) 6: MAX (AI1, AI2)	0	×
PE-13	Digitally set torque current (power generation)	0%～200.0%	150.0%	○
PE-16	Field weakening	0: direct calculation 1: automatic adjustment 2: no field weakening	1	×
PE-17	Field weakening current coefficient	0～120	80	×
PE-18	Adjustment factor	1～10	4	×
PE-19	Field weakening output voltage adjustment factor	0～100	0	×
PE-21	Overspeed frequency coefficient	0～200	140	×

Features Code	parameter name	Predetermined area	Leave the factory set up	change
PE-22	High-speed speed filter coefficient	4～512	56	×
PE-23	Low speed speed filter coefficient	4～512	16	×
PE-24	Low-speed carrier frequency	15～80	20	×
PE-25	Low-speed excitation current	0～100	20	×
PE-30	Special processing parameters	0～200	0	×
PE-31	Speed estimation parameter 1	1～1000	20	×
PE-32	Speed estimation parameter 2	1～1000	30	×
PE-33	Start preset current	0～200	0	×
PE-37	Start the initial position detection method	0: Do not detect the initial position 1: Detect initial position mode 1	1	×
PE-38	Initial position detection pulse current	0～200	120	×
PE-39	Initial position detection time	0～60000	Tuning parameters	×
PE-45	D-axis current PI adjustment integration coefficient	0～6000	200	○
PE-46	D-axis current PI adjustment scale factor	0～6000	300	○
PE-47	Q-axis current PI adjustment integration coefficient	0～6000	200	○
PE-48	Q-axis current PI adjustment scale factor	0～6000	300	○

PF Manufacturer parameters

Features Code	parameter name	Predetermined area	出厂设定	Change
PF-00	Factory password	0 ～ 65535	Model determination	*

PP Function code management parameters

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
PP-00	user password	0～65535	0	○

PP-01	Parameter initialization	0: No operation 1: Restore factory value 2: Clear record information	0	×
PP-02	Parameter write protection	0: All parameters are allowed to be modified 1: All parameters except the set frequency (P0-11), user password and this parameter are prohibited from modification. 2: All parameters except user password and this parameter are forbidden to be modified.	0	○
PP-03	Parameter display mode	0: show all parameters 1: Only parameters that are different from the factory parameters are displayed	0	○

A0 AIAOCorrection

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
A0-00	AI1 Measured voltage 1	0.500V～4.000V	Factory calibration	○
A0-01	AI1 Display voltage 1	0.500V～4.000V	Factory calibration	○
A0-02	AI1 Measured voltage 2	6.000V～9.999V	Factory calibration	○
A0-03	AI1 Display voltage 2	6.000V～9.999V	Factory calibration	○
A0-04	AI2 Measured voltage 1	0.500V～4.000V	Factory calibration	○
A0-05	AI2 Display voltage 1	0.500V～4.000V	Factory calibration	○
A0-06	AI2 Measured voltage 2	6.000V～9.999V	Factory calibration	○
A0-07	AI2 Display voltage 2	6.000V～9.999V	Factory calibration	○
A0-08	AO1 Target voltage 1	0.500V～4.000V	Factory calibration	○
A0-09	AO1 Measured voltage 1	0.500V～4.000V	Factory calibration	○
A0-10	AO1 Target voltage 2	6.000V～9.999V	Factory calibration	○
A0-11	AO1 Measured voltage 2	6.000V～9.999V	Factory calibration	○
A0-12	AO2 Target voltage 1	0.500V～4.000V	Factory calibration	○
A0-13	AO2 Measured voltage 1	0.500V～4.000V	Factory calibration	○

Features Code	parameter name	Predetermined area	Leave the factory set up	Change
A0-14	AO2 Target voltage 2	6.000V～9.999V	Factory calibration	○
A0-15	AO2 Measured voltage 2	6.000V～9.999V	Factory calibration	○

U0 Basic monitoring parameters

Function code	parameter name	Smallest unit	mailing address
U0-00	Operating frequency (Hz)	0.01Hz	7000H
U0-01	Setting frequency (Hz)	0.01Hz	7001H
U0-02	Bus voltage (V)	0.1V	7002H
U0-03	Output voltage (V)	1V	7003H
U0-04	Output current (A)	0.1A	7004H
U0-05	Output power (kW)	0.1kW	7005H
U0-06	Output torque (%)	0.1%	7006H
U0-07	X input status	1	7007H
U0-08	Y output status	1	7008H
U0-09	AI1 voltage (V)	0.01V	7009H
U0-10	AI2 voltage (V) / current (mA)	0.01V/0.01mA	700AH
U0-11	AI3 voltage (V)	0.01V	700BH
U0-12	Count value	1	700CH
U0-13	Length value	1	700DH
U0-14	Load speed display	1	700EH
U0-15	PIDset up	1	700FH
U0-16	PIDFeedback	1	7010H
U0-17	PLCstage	1	7011H
U0-18	PULSEInput pulse frequency (Hz)	0.01kHz	7012H
U0-19	Feedback speed (Hz)	0.01Hz	7013H
U0-20	Keep		
U0-21	AI1 Voltage before calibration	0.001V	7015H
U0-22	AI2 Voltage before calibration（V）	0.001V	7016H
U0-23	Keep		
U0-24	Line speed	1m/Min	7018H
U0-25	Current power-on time	1Min	7019H
U0-26	Current running time	0.1Min	701AH
U0-27	PULSEInput pulse frequency	1Hz	701BH
U0-28	Communication setting	0.01%	701CH
U0-29	Keep		

Function code	parameter name	Smallest unit	mailing address
U0-30	Main frequency X display	0.01Hz	701EH
U0-31	Secondary frequency Y display	0.01Hz	701FH
U0-32	Keep		
U0-34	Motor temperature value	1℃	7022H
U0-35	Target torque (%)	0.1%	7023H
U0-36	Keep		
U0-37	Keep		
U0-38	Keep		
U0-39	Keep		
U0-40	Keep		
U0-41	Keep		
U0-42	Keep		
U0-43	Keep		
U0-44	Keep		
U0-45	accident details	1	702DH
U0-58	Keep		
U0-59	Setting frequency (%)	0.01%	703BH
U0-60	Operating frequency (%)	0.01%	703CH
U0-61	Inverter status	1	703DH
U0-62	Current fault code	1	703EH
U0-63	Keep		
U0-64	Keep		
U0-65	Upper torque limit	0.1%	7041H
U0-66	Excitation current reference	1	7042H
U0-67	Torque current reference	1	7043H
U0-68	Keep		
U0-69	Keep		
U0-70	Keep		
U0-71	Keep		
U0-72	Keep		
U0-73	Keep		
U0-74	Keep		

Chapter 5 Detailed function introduction

5.1 Basic function group (P0 group)

P0-00 GPType display	Setting range: 1 [Model determined]

1：G type (constant torque load model)

P0-01 control method	Setting range: 0 ～ 1 【1】

Explanation:
Select the speed control mode of the inverter.
0: V / F control
It is suitable for occasions with low load requirements, or one inverter driving multiple motors, such as fans and pumps. It can be used for the occasion where one inverter drives multiple motors.
1: speed sensorless vector control
When selecting the vector control mode, the motor parameter tuning process must be performed. Only accurate motor parameters can take advantage of the vector control method. By adjusting the speed regulator parameter PE group function code, better performance can be obtained.

P0-02 Command source selection	Setting range: 0～2【0】

Explanation:

Select the input channel of the inverter control command. Inverter control commands include: start, stop, forward, reverse, jog, etc.

0: Keyboard command channel (REMOTE off) is controlled by the RUN key and STOP / RES key on the keyboard.

1: The terminal command channel (REMOTE is on) is controlled by the multi-function input terminals FWD, REV, FJOG, RJOG and so on.

2: Communication command channel (REMOTE flashing) The running command is given by the host computer through communication mode, and the control command is written by address 0x2000. For the definition of control command, see Appendix III: Communication Address Definition and Communication Card Description.

P0-03 Main frequency source X selection	Setting range: 0～8【0】

Explanation:
Select the input channel of the main given frequency of the inverter. There are 9 main given frequency channels:
0: Digital setting (digital knob adjustment)
The initial setting frequency is the value of P0-11 (preset frequency). You can use the keyboard knob (or UP / DOWN of the multi-function input terminal) to change the set frequency value of the inverter.
1: AI1
2: AI2
The frequency source is given by the analog input AI1 or AI2. The A5T control board provides 2 analog inputs (AI1, AI2). Among them: AI1 is 0V ～ 10V voltage input.
AI2 can be 0V ～ 10V voltage input or 0mA ～ 20mA current input. It can be selected by SW7 jumper on the control board.
The corresponding relationship curve between the input voltage values of AI1 and AI2 and the target frequency is set by P2-13 ～ P2-24.
The analog input terminal is used as the frequency reference. The corresponding 100.0% of the voltage / current

input setting refers to the percentage of the maximum frequency P0-12.

4: PULSE pulse setting (X5)

The frequency source is given by the high-speed pulse of terminal X5. Pulse given signal specifications are: voltage range 9V ~ 30V, frequency range 0.0kHz ~ 50.0kHz. Pulse reference can only be input from multi-function input terminal X5.

The relationship between the input pulse frequency of the X5 terminal and the corresponding setting is set through P2-25 ～ P2-30. The corresponding relationship is a two-point linear correspondence relationship. The 100.0% of the corresponding setting of the pulse input refers to the relative maximum frequency P0 -12 percent.

5: Multi-speed

When multi-speed setting is selected, different state combinations of digital input X terminal are required to correspond to different set frequency values. A5T can set 3 multi-stage command terminals (terminal functions 13 to 15) and 8 states of 3 terminals. It can correspond to any 8 “multi-stage commands” through the P8 function code. Percentage.

When the digital input X terminal functions as a multi-segment command terminal, corresponding settings need to be made in the P2 group. For details, please refer to the related function parameter description of the P2 group.

6: PLC

When the frequency source is simple PLC setting, the running frequency source of the inverter can be switched between 1 to 8 arbitrary frequency instructions. The holding time of 1 to 8 frequency instructions and the respective acceleration and deceleration times can also be set by the user. For details, refer to the related description of the P8 group.

7: PID

The output of the process PID control is selected as the operating frequency. It is generally used for on-site process closed-loop control, such as constant pressure closed-loop control and constant tension closed-loop control. When using PID as the frequency source, you need to set the related parameters of the “PID function” of P6 group.

8: Communication settings

Select the communication reference as the operating frequency. A5T supports Modbus host computer communication mode, using 485 communication.

P0-04 keep	Setting range: --
P0-05 Auxiliary frequency source Y selection	Setting range: Same as P0-03 (Main frequency source X selection)
P0-06 Digital setting frequency memory selection	Setting range: 0～3【0】

0：Not remember　　1：Power-down memory

2：Shutdown memory　　3：Memory during shutdown and power failure

Explanation:

When setting the digital setting frequency, change the memory mode of the frequency change amount by the keyboard knob or the terminal UP / DOWN.

0: No memory. After stopping or powering off, the amount of frequency change by the keyboard knob or terminal UP / DOWN will be cleared to 0, and the set frequency will be restored to the preset frequency P0-11.

1: Power-down memory. After power-off, the amount of frequency change by the keyboard knob or terminal UP / DOWN will be saved. After power-on again, the set frequency is the frequency before power-down.

2: Stop memory. After the stop, the amount of frequency change by the keyboard knob or terminal UP / DOWN will not be cleared to 0, but it will be cleared to 0 after power failure

3: It is memorized during shutdown and power failure. After shutdown or power failure, the amount of frequency change by the keyboard knob or terminal UP / DOWN is not cleared.

P0-07 Auxiliary frequency source Y range selection during superposition	Setting range: 0～1【0】

Explanation:

0: Maximum output frequency. 100% of the Y frequency setting corresponds to the maximum output frequency.

1: X frequency command, 100% of Y frequency setting corresponds to the maximum output frequency. If you need to adjust based on the X frequency command, you can choose this setting.

Note: The P0-07 function code is only used when the Y frequency command is used as a superposition.

P0-08 Auxiliary frequency source Y range when superimposed	Setting range: 0%～150%【100%】

Explanation:

When the frequency source is selected as "Frequency Overlay", the two parameters P0-07 and P0-08 are used to determine the adjustment range of the auxiliary frequency source.

P0-09 Frequency source overlay selection	Setting range: Single digit: 0 to 4, ten digit:0～3【00】

Explanation:

Unit place: frequency source selection

0：Main frequency source X

1：Primary and secondary operation results (the operation relationship is determined by the tens place)

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

3：Switching of main frequency source X and main and auxiliary calculation results

4：Switch between auxiliary frequency source Y and main and auxiliary calculation results

Tens place: the relationship between the main and auxiliary operations of the frequency source

0：Primary + secondary

1：Primary-secondary

2：Maximum of both

3：Minimum of both

This parameter selects the frequency reference channel. Realize the frequency setting by the combination of the main frequency source X and the auxiliary frequency source Y。

When the frequency source is selected as the main and auxiliary calculation, you can set the preset frequency through P0-11, and superimpose the preset frequency on the main and auxiliary calculation results.

P0-11 Preset frequency	Setting range: 0.00Hz～Maximum frequency（P0-12)【50.00Hz】

Explanation:

When the frequency source is selected as "digital reference" (P0-03 = 0), this function code value is the initial value of the frequency digital setting of the inverter.

P0-12 Maximum frequency	Setting range: 50.00Hz～630.00Hz【50.00Hz】

Explanation:

When analog input, pulse input, PID, etc. are used as the frequency source, each 100.0% is calibrated relative to P0-12.

P0-13 Upper frequency source	Setting range: 0～3【0】

0：Value setting (P0-14)

1：AI1

2：AI2

3：PULSE pulse setting

Explanation:

Defines the source of the upper frequency. The upper limit frequency can come from digital setting (P0-14), or

from analog input or PULSE setting. When using the analog input to set the upper limit frequency, 100% of the analog input setting corresponds to P0-14.

P0-14 Upper limit frequency value setting	Setting range: Lower limit frequency (P0-15) to maximum frequency （P0-12）【50.00Hz】

Explanation:

Upper limit frequency value setting, the setting range is from lower limit frequency (P0-15) to maximum frequency (P0-12).

P0-15 Lower limit frequency value setting	Setting range: 0.00Hz～Upper frequency（P0-14）【0.00Hz】

Explanation:

When the frequency command is lower than the lower limit frequency set by P0-15, the inverter can stop, run at the lower limit frequency, or run at zero speed. Which operation mode can be adopted by P5-10 (the set frequency is lower than the lower limit frequency operation mode) Settings.

P0-16 Acceleration / deceleration time unit	Setting range: 0～1【1】

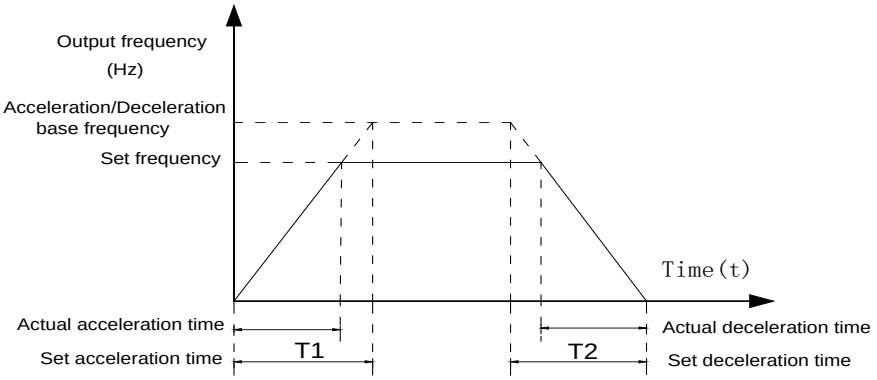
Explanation:

In order to meet the needs of various sites, A5T provides two kinds of acceleration and deceleration time units, which are 1 second and 1 minute, respectively.

P0-17 acceleration time 1	Predetermined area:0.00s(m) ～ 300.00s(m) 【 Model determination】
P0-18 deceleration time 1	Predetermined area:0.00s(m) ～ 300.00s(m) 【 Model determination】

Explanation:

Acceleration time refers to the time required for the inverter to accelerate from 0 rate to the acceleration / deceleration time reference frequency P0-21, see t1 in the figure below. Deceleration time refers to the time required for the inverter to decelerate from the acceleration / deceleration time reference frequency P0-21 to 0 frequency, see t2 in the figure below.



5-0-1 Schematic of acceleration and deceleration time

P0-19 Carrier frequency	Predetermined area:0.5kHz～16.0kHz【Model determination】

Explanation:

This function adjusts the carrier frequency of the inverter. By adjusting the carrier frequency, you can reduce the motor noise, avoid the resonance point of the mechanical system, reduce the line leakage current to the ground, and reduce the interference generated by the inverter. The carrier frequency range for vector control is 1.5 kHz to 8.0 kHz.

When the carrier frequency is low, the higher harmonic components of the output current increase, the motor loss increases, and the motor temperature rise increases. When the carrier frequency is high, the motor loss decreases and the motor temperature rise decreases, but the inverter loss increases, the inverter temperature rise increases, and the interference increases.

Adjusting the carrier frequency will affect the following performance:

Carrier frequency	Low → high
Motor noise	Big → small
Output current waveform	Poor → good
Motor temperature rise	high→low
Inverter temperature rise	Low → high
Leakage current	small→big
External radiation interference	small→big

P0-20 Running direction	Predetermined area:0～1【0】

0：Software default orientation 1：Opposite software default direction

Explanation:

By changing this function code, the purpose of changing the direction of the motor can be achieved without changing the motor wiring. Its function is equivalent to adjusting any two wires of the motor (U, V, W) to achieve the conversion of the motor rotation direction.

Note: After the parameters are initialized, the running direction of the motor will return to its original state. It is forbidden to change the direction of the motor after the system is debugged.

P0-21 Acceleration / deceleration time reference frequency	Predetermined area:0～1【0】

0：Maximum frequency 1：Set frequency

Explanation:

Acceleration / deceleration time refers to the acceleration / deceleration time from zero frequency to the frequency set by P0-21. Figure 5-0-1 shows the acceleration / deceleration time.

When P0-21 is set to 1, the acceleration / deceleration time is related to the set frequency. If the set frequency changes frequently, the acceleration of the motor will change, so you need to pay attention during application.

P0-22 Frequency UP / DOWN benchmark when running	Predetermined area:0～1【0】

0：Operating frequency 1：Set frequency

Explanation:

This parameter is valid only when the frequency source is digitally set. It is used to determine the method to modify the set frequency when the knob or terminal UP / DOWN of the keyboard is operated, that is, whether the target frequency increases or decreases based on the running frequency, or increases or decreases based on the set frequency.

The difference between the two settings is obvious when the inverter is in the process of acceleration and deceleration, that is, if the inverter's operating frequency is different from the set frequency, the different choices of this parameter are very different.

P0-23 Carrier frequency automatic adjustment selection	Predetermined area:0～1【0】

0 ： Carrier does not adjust with temperature

1：Carrier automatically adjusts with temperature

Explanation:

Carrier frequency adjustment with temperature means that when the inverter detects that the temperature of its radiator is high, it will automatically reduce the carrier frequency in order to reduce the temperature rise of the inverter. When the heat sink temperature is low, the carrier frequency is gradually restored to the set value. This function can reduce the frequency of the inverter overheating alarm.

P0-30 Motor parameter group selection	Predetermined area:0～1【0】

0：Motor parameter group 1

1：Motor parameter group 2

Explanation:

The A5T inverter supports the application of dragging two motors in a time-sharing manner. The two motors can set motor nameplate parameters, select different control methods, and independently set parameters related to running performance. Motor parameter group 1 corresponds to function parameter group P1, and motor parameter group 2 corresponds to function parameter group PC.

The user selects the current motor parameter group through the P0-30 function code, and can also switch the motor parameters through the digital input terminal X. When the function code selection conflicts with the terminal selection, the terminal selection shall prevail.

note:

The identification of the second motor parameter is also realized through P1-25. That is: when P0-30 = 1, the motor parameters will be saved to the PC group after parameter identification through P1-25. Therefore, the PC group does not set a separate parameter tuning function code.

5.2 The first motor parameter group (P1 group)

P1-00 Motor type selection	Setting range: 2: permanent magnet synchronous motor [2]
P1-01 Motor rated power	Setting range: 0.2kW ～ 1000.0kW [Model determined]
P1-02 Motor rated voltage	Setting range: 1 ～ 2000V [Model determined]
P1-03 Motor rated current	Setting range: 0.1A ～ 6553.5A [Model determined]
P1-04 Motor rated frequency	Setting range: 0.01Hz to the maximum frequency [Model determined]
P1-05 Motor rated speed	Setting range: 1 ～ 65535rpm [Model determined]

Explanation:

The above function codes are parameters of the motor nameplate. Regardless of whether VF control or vector control is used, the relevant parameters need to be set accurately according to the motor nameplate. If the vector

control method is adopted, in order to obtain better vector control performance, it is necessary to perform automatic tuning of the motor parameters, and the accuracy of the automatic tuning results is closely related to the correct setting of the motor nameplate parameters.

P1-12 Stator resistance of synchronous motor	Setting range: 1 to 60000 [tuning parameters]
P1-13 D-axis inductance of synchronous motor	Setting range: 1 to 60000 [tuning parameters]
P1-14 Q axis inductance of synchronous motor	Setting range: 1 to 60000 [tuning parameters]
P1-15 Inductance and resistance units	Setting range: 0 to 12 [tuning parameters]
P1-16 Back-EMF of synchronous motor	Setting range: 1 to 60000 [tuning parameters]

Explanation:

P1-12 ～ P1-16 are the parameters of synchronous motors. These parameters are generally not on the nameplate of the motor and need to be obtained through automatic tuning of the inverter. Among them, the motor static tuning can only obtain P1-12 ～ P1-15, and complete tuning can obtain all the above parameters.

P1-15:

Units are used to set the unit of inductance,

0: Inductance unit is microhenry (μH);

1: The unit of inductance is 10μH;

2: The unit of inductance is 100uH.

Ten digits are used to set the resistance unit,

0: Resistance unit is milliohm (mΩ);

1: The unit of resistance is 10mΩ.

P1-25 Tuning selection	Predetermined area:0～3【0】

Explanation:

0: No operation, that is, no tuning.

1: Static tuning, suitable for occasions where the synchronous motor and the load are not easy to detach, but cannot be fully tuned. Before performing synchronous motor static tuning, the motor nameplate parameters P1-00 ～ P1-04 must be set correctly. Synchronous motor static self-learning, the inverter can obtain P1-12 ～ P1-15 parameters.

2: Complete tuning. To ensure the dynamic control performance of the inverter, please select complete tuning. At this time, the motor must be disconnected from the load to keep the motor in a no-load state. During the complete tuning process, the inverter first performs static tuning, then accelerates to 40% of the rated frequency of the motor according to the acceleration time P0-17. After holding for a period of time, it decelerates and stops according to the deceleration time P0-18 and ends the tuning.

Before complete tuning, you need to set the motor type and motor nameplate parameters P1-00 ～ P1-04. Complete tuning and self-learning, the inverter can obtain four motor parameters of P1-12 ～ P1-16.

3: Standstill tuning 2. Based on the standstill tuning 1, the values of P1-16 are obtained by calculating the motor parameters.

note:

1: Tuning can only be performed in the keyboard operation mode, and cannot be performed in the terminal

operation and communication operation modes.

2: In most cases, the motor parameter identification value is accurate, but if the motor runs abnormally or the efficiency is significantly low, you can check the recognition accuracy of the synchronous motor back electromotive force coefficient (P1-16), which is subject to the rated frequency of the motor In some occasions, the nameplate of the motor may not have the rated frequency, or the marked rated frequency and the actual value of the motor are very different, which will cause the identification of the electromotive force coefficient (P1-16) to be inaccurate. In this case, if you find that the operation is not normal, you can check the accuracy of P1-16 in the following ways:

method one:

The inverter is set to stop freely, the motor runs to a certain frequency, and then stops freely. Connect an oscilloscope to a high-voltage probe to test the AC effective value and frequency of the back-EMF between phases (such as UV), so that the back-EMF coefficient can be accurately calculated. . For example: the motor is dragged to run at 100Hz, and the effective value of the phase-to-phase voltage of the motor is 148V, then the parameters of P1-16 should be

1000 * 148 * 1.4 / 1.732 / (100 * 2 * 3.14) = 190.

Method Two:

If it is no-load, you can obtain parameters through dynamic identification or static identification 2, run the motor to half of the rated frequency, and then check the output voltage value through the keyboard. P1-16 is calculated from the output voltage value. For example, when running to 25Hz and the output voltage is displayed as 50V, the parameters of P1-16 should be 1000 * 50 * 1.4142 / 1.732 / (25 * 2 * 3.14).

In addition, U0-66 can be used to check whether the back-EMF coefficient is reasonable. When running at 20Hz under no load, U0-66 should be around 50 ～ 500. If U0-66 is displayed as 0, it means that the actual torque current is negative, and the back-EMF coefficient is too small. You can appropriately increase the back-EMF coefficient before running. Observe the U0-66 value. If the U0-66 display is too large at 20Hz, for example, it exceeds 1500, it will reflect the back-EMF coefficient being too large. You can reduce the back-EMF coefficient to run and observe the U0-66 value.

5.3 Input terminal (P2 group)

P2-00 X1 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-01 X2 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-02 X3 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-03 X4 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-04 X5 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-05 X6 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-06 X7 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-07 X8 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-08 X9 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]
P2-09 X10 Terminal function selection	Setting range: 0 to 35 (36 to 39: reserved) [0]

Explanation:

These parameters are used to set the functions of the digital multi-function input terminals. The functions that can be selected are shown in the following table:

Option	Features	Detailed description
0	No function	Unused terminals can be set to "No Function" to prevent malfunction.
1	Forward running（FWD）	When the running command channel is a terminal, the external terminal is used to control the forward rotation and reverse rotation of the inverter. For details, please refer to the description of the function code "P2-11 Terminal Command Mode".
2	Run in reverse（REV）	
3	Three-line operation control	This terminal is the enable terminal in the three-wire control mode. For details, please refer to the description of the function code "P2-11 Terminal Command Mode".
4	Forward Jog (FJOG)	FJOG is jog forward running, RJOG is jog reverse running. Refer to the description of function codes P5-00, P5-01, P5-02 for jog running frequency and jog acceleration / deceleration time.
5	Reverse Jog (RJOG)	
6	Terminal UP	When the frequency is given by the external terminal, the frequency increase and decrease instructions are modified. When the frequency source is set to digital setting, the set frequency can be adjusted up and down.
7	Terminal DOWN	
8	Free parking	The inverter blocks the output. At this time, the stopping process of the motor is not controlled by the inverter. This method has the same meaning as free parking described in P4-10.
9	Fault reset (RESET)	A function for resetting faults using terminals. Has the same function as the RESET key on the keyboard. With this function, remote fault reset can be realized.
10	Operation suspended	The inverter decelerates to stop, but all operating parameters are memorized. Such as PLC parameters, swing frequency parameters, PID parameters. After this terminal signal disappears, the inverter returns to the running state before stopping.
11	External fault input normally open	When this signal is sent to the inverter, the inverter reports fault E15.
12	External fault input normally closed	When this signal is sent to the inverter, the inverter reports fault E15.
13	Multi-speed terminal 1	It can realize 8-stage speed running through 8 states of these three terminals. For details, see Schedule 1.
14	Multi-speed terminal 2	
15	Multi-speed terminal3	
16	Acceleration / deceleration time selection terminal	Through the two states of this terminal, two kinds of acceleration and deceleration time can be selected. For details, see Appendix 2.
17	UP / DOWN setting is cleared	When the frequency is given as a digital frequency, this terminal can clear the frequency value changed by the terminal UP / DOWN or the keyboard digital knob, so that the given frequency returns to the value set by P0-11.
18	DC brake terminal	When this terminal is valid, the inverter directly switches to the DC braking state.

Option	Features	Detailed description
19	Acceleration / deceleration prohibited	Ensure that the inverter is not affected by external signals (except the stop command) and maintain the current output frequency.
20	PID pause	The PID is temporarily disabled. The inverter maintains the current output frequency and no longer performs PID adjustment of the frequency source.
21	PLC status reset	The PLC is paused during execution. When it is running again, the inverter can be restored to the initial state of the simple PLC through this terminal.
22	Swing frequency pause	The inverter outputs at the current frequency. The wobble frequency function is suspended.
23	Counter input	Input terminal for counting pulses.
24	Counter reset	Clear the counter status.
25	Length count input	Input terminal for length counting.
26	Length reset	The length is cleared.
27	AI1 and AI2 settings are interchangeable	Swap the setting parameters of AI1 and AI2.
28	User-defined fault 1	When user-defined fault 1 is valid, the inverter will alarm E27, and the inverter will select the action mode selected by PB-50 for processing according to the fault protection action.
29	Stop DC braking enabled	Enable stop DC braking When this terminal command is valid, stop DC braking is performed according to the starting DC braking frequency, stopping DC braking waiting time, stopping DC braking current and stopping DC braking time set by the P4-11 ～ P4-14 function codes. . When this function is not selected, the default stop DC braking function is effective.
30	Keyboard command source switching	Switch the command source to the keyboard.
31	Terminal command source switching	Switch the command source to the terminal.
32	1st motor and 2nd motor switch	Switching signals for motor 1 and motor 2
33	Frequency source switching	Used to switch between different frequency sources (for use with P0-09).
34	PIDParameter switch	When the PID parameter switching condition is X terminal (P6-17 = 1): When this terminal is invalid, PID parameters use P6-06 ～ P6-08; when this terminal is valid, use P6-14 ～ P6-16.
35	PIDReverse the direction of action	When this function is valid, the PID direction is opposite to the set direction

Three multi-stage command terminals can be combined into eight states. These eight states correspond to eight

multi-stage speed setting values. As shown in Schedule 1：

K3	K2	K1	Speed setting	Corresponding parameter
OFF	OFF	OFF	Multi-speed 0	P8-01
OFF	OFF	ON	Multi-speed 1	P8-02
OFF	ON	OFF	Multi-speed 2	P8-03
OFF	ON	ON	Multi-speed 3	P8-04
ON	OFF	OFF	Multi-speed 4	P8-05
ON	OFF	ON	Multi-speed 5	P8-06
ON	ON	OFF	Multi-speed 6	P8-07
ON	ON	ON	Multi-speed 7	P8-08

Schedule 1 Multi-segment instruction function description

When the frequency source is selected as multi-speed, 100.0% of function codes P8-01 ～ P8-08 correspond to the upper limit frequency P0-14.

Terminal	Acceleration or deceleration time selection	Corresponding parameter
OFF	acceleration time 0	P0-17、P0-18
ON	acceleration time 1	P5-04、P5-05

Schedule 2 Function description of acceleration / deceleration time selection terminal

P2-10 X filtering time	Setting range: 1 to 10 [4]

Explanation:

Set the filter time for X1 ～ X5 terminal sampling. In the case of large interference, this parameter can be increased to prevent malfunction, but the increase of the filtering time will cause the response of the X terminal to slow down.

P2-11 Terminal command mode	Setting range: 0 ～ 3 【0】

0：Two-line type 1　　1：Two-line type 2

2：Three-line type 1　　3：Three-line type 2

Explanation:

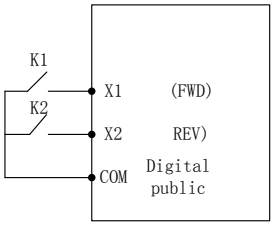
This parameter defines four different ways to control the inverter operation through external terminals. Note: For the convenience of explanation, X1, X2, and X3 among the multifunctional input terminals of X1 to X10 are selected as external terminals. That is, X1, X2 are selected by setting the values of P2-00 to P2-02 The function of the three terminals of X3. For detailed function definition, please refer to the setting range of P2-00 ～ P2-02.

0: Two-wire operation mode 1: This mode is the most commonly used two-wire mode. The terminals X1 and X2 determine the forward and reverse running of the motor. The function code is set as follows:：

function code	Name	Set value	Function description
P2-11	Terminal command mode	0	Two-line operation mode 1
P2-00	X1 Terminal function selection	1	Forward running（FWD）

P2-01	X2 Terminal function selection	2	Run in reverse（REV）

K1	K2	Run command
1	0	Forward
0	1	Reverse
1	1	stop
0	0	stop



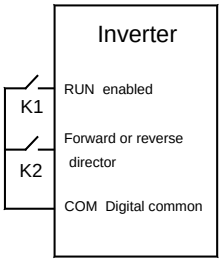
5-2-1 Two-line mode 1

As shown in the figure above, in this control mode, K1 is closed and the inverter is running forward. K2 closes and reverses, K1 and K2 close or open at the same time, and the inverter stops running.

1: Two-wire operation mode 2: When using this mode, the function of X1 terminal is the operation enable terminal, and the function of X2 terminal determines the running direction. The function code is set as follows:：

function code	name	Set value	Function description
P2-11	Terminal command mode	1	Two-wire operation mode 2
P2-01	X1 Terminal function selection	1	Run enable
P2-02	X2 Terminal function selection	2	Forward and reverse running direction

K1	K2	RUN Command
OFF	OFF	STOP
ON	OFF	FWD RUN
OFF	ON	STOP
ON	ON	REV RUN



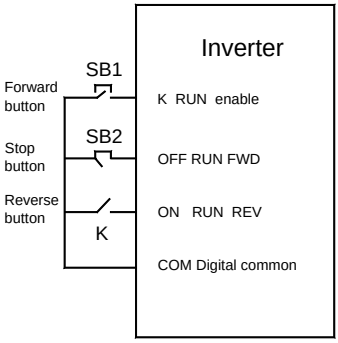
5-2-2 Two-line mode 2

As shown in the figure above, when the control mode is K1 closed, K2 opens the inverter to run forward, K2 closes the inverter to run in the reverse direction; K1 opens, and the inverter stops running.

2: Three-wire operation mode 1: In this mode, X3 is an enable terminal, and the directions are controlled by X1 and X2 respectively. The function code is set as follows:

function code	name	Set value	Function description
P2-11	Terminal command mode	2	Three-line operation mode 1

P2-00	X1 Terminal function selection	1	Forward running（FWD）
P2-01	X2 Terminal function selection	2	Run in reverse（REV）
P2-02	X3 Terminal function selection	3	Three-line operation control



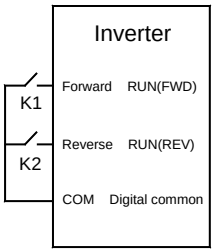
5-2-3 Three-wire control mode 1

As shown in the figure above, in the control mode of the SB3 button, press the SB1 button to forward the inverter, press the SB2 button to reverse the inverter, and the SB3 button to disconnect the inverter will stop immediately. During normal startup and operation, it is necessary to keep the SB3 button closed. The commands of the SB1 and SB2 buttons are effective when the operation is closed. The running state of the inverter is subject to the last button operation of the three buttons.

3: Three-wire running mode 2: X3 in this mode is an enable terminal. The running command is given by X1, and the direction is determined by the state of X2. The function code is set as follows

function code	name	Set value	Function description
P2-11	Terminal command mode	3	Three-line operation mode 2
P2-00	X1 Terminal function selection	1	Run enable
P2-01	X2 Terminal function selection	2	Forward and reverse running direction
P2-02	X3 Terminal function selection	3	Three-line operation control

K1	K2	RUN Command
OFF	OFF	STOP
ON	OFF	FWD RUN
OFF	ON	REV RUN
ON	ON	KEEP



5-2-4 Three-wire control mode 2

As shown in the figure above, in the control mode of the SB3 button, press the SB1 button to run the inverter, K disconnects the inverter to run forward, and K closes the inverter to reverse; when the SB3 button is disconnected, the inverter stops. During normal startup and operation, it is necessary to keep the SB3 button closed, and the command of the SB1 button will take effect during the closing action.

P2-12 Terminal UP / DOWN rate	Predetermined area:0.01Hz/s～100.00Hz/s【1.00Hz/s】

Explanation:

Used to set the speed at which the terminal UP / DOWN adjusts the set frequency, that is, the amount of change in frequency per second.

P2-13 AI1 Minimum input	Predetermined area:0.00V～P2-15【0.05V】
P2-14 AI1 Minimum input correspondence setting	Predetermined area:-100.0%～100.0%【0.0%】
P2-15 AI1 Maximum input	Predetermined area:P2-13～10.00V【10.00V】
P2-16 AI1 Maximum input correspondence setting method	Predetermined area:0 ～1【0】

0：P2-17 1：Set by AI2

P2-17 AI1 Maximum input correspondence setting	-100.0%～100.0%【100.0%】
P2-18 AI1 Input filtering time	0.00s～10.00s【0.10s】

Explanation:

The above function code is used to set the relationship between the voltage input by the analog AI1 and the set value it represents. When the analog input voltage is greater than the set "Maximum Input" (P2-15), the analog voltage is calculated as "Maximum Input"; Similarly, when the analog input voltage is less than the set "Minimum Input" (P2-13), it is calculated based on the minimum input or 0.0%.

AI1 maximum input corresponding setting method, used to select the setting value of "AI1 maximum input corresponding setting", the user can choose to be set by function code P2-17 or AI2.

AI1 input filtering time, used to set the software filtering time of AI1. When the on-site analog quantity is easy to be disturbed, please increase the filtering time to make the detected analog quantity become stable, but the larger the filtering time is, The slower the response speed, the settings need to be weighed according to the actual application.

P2-19 AI2 Minimum input	Predetermined area:0.00V～P2-21【0.05V】
P2-20 AI2 Minimum input correspondence setting	Predetermined area:-100.0%～100.0%【0.0%】
P2-21 AI2 Maximum input	Predetermined area:P2-19～10.00V【10.00V】
P2-22 AI2 Maximum input correspondence setting method	Predetermined area:0～1【0】

0：P2-23　　1：Set by AI1

P2-23 AI2 Maximum input correspondence setting	Predetermined area:-100.0%～100.0%【100.0%】
P2-24 AI2 Input filtering time	Predetermined area:0.00s～10.00s【0.10s】

Explanation:

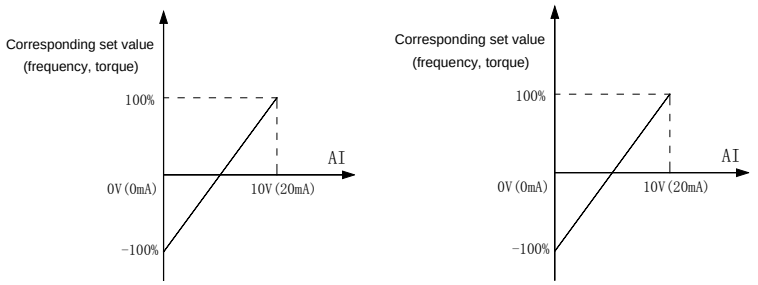
The above function code is used to set the relationship between the voltage input by the analog AI2 and the set value it represents. When the analog input voltage is greater than the set "Maximum Input" (P2-21), the analog voltage is calculated as "Maximum Input"; similarly, when the analog input voltage is less than the set "Min Input" P2-19), it is calculated with the minimum input.

AI2 maximum input corresponding setting method, used to select the setting value of "AI2 maximum input corresponding setting", the user can choose to be set by function code P2-23 or AI1.

AI2 input filter time. It is used to set the software filter time of AI2. When the field analog quantity is easy to be disturbed, please increase the filter time to make the detected analog quantity become stable. The slower the response speed, the settings need to be weighed according to the actual application.

The AI2 terminal is shipped from 0 to 10V. If the AI2 terminal input is required to be 0-20mA, then the "SW7" shorting cap in the lower left corner of the control board must be shorted to the "I" position. When the analog input is a current input, 1mA is equivalent to 0.5V.

The following illustration shows two typical settings:



5-2-5 Correspondence between analog given and set amount

P2-25 PULSE(Pulse) minimum input frequency	Predetermined area:0.00kHz～P2-27【0.00kHz】
P2-26 PULSE(Pulse) Input minimum frequency corresponding setting	Predetermined area:-100.0%～100.0%【0.0%】
P2-27 PULSE(Pulse) input maximum frequency	Predetermined area:P2-25～50.00kHz【50.00kHz】
P2-28 PULSE（Pulse) Input maximum frequency corresponding setting method	Predetermined area:0～2【0】

0：P2-27　　1：Set by AI1

2：Set by AI2

P2-29 PULSE(Pulse) Input maximum frequency corresponding setting	Predetermined area:-100.0%～100.0%【100.0%】
P2-30 PULSE(Pulse) input filter time	Predetermined area:0.00s～10.00s【0.10s】

Explanation:

This group of function codes is used to set the relationship between X5 pulse frequency and corresponding settings. The pulse frequency can only be input to the inverter through the X5 channel.

P2-31 X input terminal valid state selection	Predetermined area:0～31【0】

Explanation:

This function code is used to set the input polarity of X1 ～ X5 terminals, where bit0 ～ bit4 correspond to X1 ～ X5. If the corresponding bit is set to 0, the input terminal is positive polarity. When it is short-circuited to COM, it is valid state input. When it is disconnected, it is invalid state input. If the corresponding bit is set to 1, the input terminal is negative polarity. It is invalid state input when it is COM, and valid state input when it is disconnected.

5.4 Output terminal (P3 group)

A5T series inverters are equipped with one analog output terminal, one DO1 terminal (which can be used for digital output or high-speed pulse output), one Y output terminal, and one multi-function relay output terminal. The above output terminals cannot meet the field application. You need to choose a multi-function input and output expansion card.

P3-00 DO1 Terminal output mode selection	Predetermined area:0～1【0】

0：DOP（Pulse output） 1：DOR（Digital output）

Explanation:

The DO1 terminal is a programmable multiplexing terminal, which can be used as a high-speed pulse output terminal or as a switch output terminal with an open collector. When used as pulse output, the maximum frequency of the output pulse is 100kHz. For related functions, refer to the description of P3-06.

P3-01 DOROutput selection	Predetermined area:0～31【2】
P3-02 TA/TB/TCOutput selection	Predetermined area:0～31【1】
P3-03 TA3/TB3/TC3 Output selection (extension card)	Predetermined area:0～31【0】
P3-04 Y1 Output selection	Predetermined area:0～31【7】
P3-05 Y2 Output selection (extension card)	Predetermined area:0～31【0】

Explanation:

The above 5 function codes are used to select the functions of 5 digital outputs. The function of multi-function output terminal is as follows:

Option	Features	Detailed description
0	no output	The output terminal has no action.
1	Inverter running	It means that the inverter is in running state and has output frequency (can be zero). At this time, an ON signal is output.

Option	Features	Detailed description
2	Fault output	When the inverter fails, it outputs ON signal.
3	Frequency level detection FDT arrival	Please refer to the description of function codes P5-15 and P5-16.
4	Frequency arrival	When the output frequency of the inverter reaches the set frequency, an ON signal is output at this time. Please use it with function code P5-17.
5	Upper frequency reached	When the running frequency reaches the upper limit frequency, an ON signal is output.
6	Lower limit frequency reached (stop output)	When the running frequency reaches the lower limit frequency, an ON signal is output. This signal is ON in the stop state.
7	Zero speed operation	When the inverter is running and the output frequency is 0, it outputs ON signal. When the inverter is stopped, this signal is OFF.
8	Motor overload pre-alarm	When the inverter output current exceeds the motor overload pre-alarm action value, it outputs ON signal. Please refer to the description of function code PB-02.
9	Inverter overload pre-alarm	When the output current of the inverter exceeds the overload pre-alarm action value of the inverter, an ON signal is output.
10	Set count value reached	When the count value reaches the value set in P7-08, an ON signal is output.
11	The specified count value arrives	When the count value reaches the value set in P7-09, an ON signal is output.
12	Reach length	When the detected actual length exceeds the length set in P7-05, an ON signal is output.
13	PLCComplete the loop	When the simple PLC runs a cycle, it outputs a pulse signal with a pulse width of about 250ms.
14	Arrival time	When the current running time of the inverter reaches the timing set by P5-12, it will output ON signal.
15	Communication control	Please refer to the communication protocol.
16	Ready to run	When the power supply of the main circuit and control circuit of the inverter has been stabilized, and no fault information is detected by the inverter, and the inverter is in a running state, it outputs an ON signal.
17	AI1>AI2	When the value of AI1 is greater than the value of AI2, an ON signal is output.
18	Zero current detected	When the output current of the inverter is less than or equal to the zero current detection level and continues to exceed the zero current check delay time, an ON signal is output.
19	Motor over temperature alarm	When the motor temperature reaches PB-38 (motor overheating pre-alarm threshold), it outputs ON signal. (The motor temperature can be viewed through U0-34)
20	Software overcurrent	See P5-25, P5-26 description

Option	Features	Detailed description
	output	
21	Keep	
22	Keep	
23	Keep	
24	Keep	
25	Keep	
26	Lower limit frequency reached (no output when stop)	When the running frequency reaches the lower limit frequency, an ON signal is output. This signal is OFF in the stop state.
27	Reverse running	When the inverter is running in reverse, it outputs ON signal.
28	Frequency limited	When the set frequency exceeds the upper limit frequency or is lower than the lower limit frequency, and the inverter output frequency also reaches the upper limit frequency or the lower limit frequency, an ON signal is output.
29	Limiting torque	When the inverter is in the speed control mode, when the output torque reaches the torque limit, the inverter is in the stall protection state and outputs an ON signal at the same time.
30	Keep	
31	Undervoltage status output	When the inverter is under voltage, it outputs ON signal.

P3-06 DOPOutput selection	Predetermined area:0～9【0】
P3-07 AO1 Output selection	Predetermined area:0～9【0】
P3-08 AO2 Output selection (extension card)	Predetermined area:0～9【1】

Explanation:

When DO1 is used as open collector high-speed pulse output, the frequency range is 0.00 ～ 100.00kHz (DO1 maximum output pulse frequency). P3-09 can be set between 0.00 ～ 100.00kHz.

Analog output AO output range is 0V ~ 10V, or 0mA ~ 20mA. The factory output is 0V ～ 10V.

The range of the pulse output or analog output, and the scaling relationship with the corresponding function are shown in the following table:

Option	Features	Pulse or analog output 0.0% ～ 100.0% corresponding function
0	Operating frequency	0～Output frequency
1	Set frequency	0～Output frequency
2	Output current	0～2 Times the rated current of the motor

Option	Features	Pulse or analog output 0.0% ～ 100.0% corresponding function
3	Output Power	0～2 Times the rated current of the motor
4	PULSEPulse input	0.00～50.00kHz
5	AI1	0V～10V
6	AI2	0V～10V（或者 0～20mA）
7	Length value	0～Maximum length value
8	Count value	0～Maximum count value
9	Communication control output	0.0%～100.0%

P3-09 DOPOutput maximum frequency	Predetermined area:0.01kHz～100.00kHz【50.0kHz】

Explanation:

When DO1 terminal is selected as pulse output, this function code is used to select the maximum frequency value of output pulse.

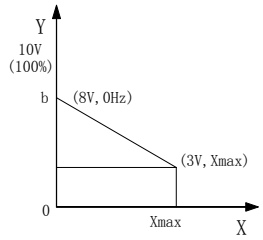
P3-10 AO1 Work factor	Predetermined area:-100.0%～100.0%【0.0%】
P3-11 AO1 Gain	Predetermined area:-10.00～10.00【1.00】
P3-12 AO2 Work factor	Predetermined area:-100.0%～100.0%【0.0%】
P3-13 AO2 Gain	Predetermined area:-10.00～10.00【1.00】

Explanation:

The above function codes are generally used to correct the zero drift of the analog output and the deviation of the output amplitude. If the zero offset is represented by "b", the gain is represented by k, the actual output is represented by Y, and the standard output is represented by X. The actual output is: Y = kX + b.

Among them, 100% of AO's zero bias coefficient corresponds to 10V (or 20mA), and the standard output refers to the amount represented by analog output with 0V-10V (or 0mA-20mA) without zero bias and gain correction.

For example: if the content of the analog output is the operating frequency, if the actual output is 8V when the frequency is 0, you need to set the zero offset to "80%"; if you want to actually output 3V when the frequency is the maximum frequency, you need to set the gain to "-0.50". As shown below:



5-3-1 Output diagram with bias or gain (voltage type)

Zero offset b = y-kx = y (when x = 0) = 8V

The zero bias coefficient corresponds to 10v when 100%, so the corresponding zero bias coefficient when b = 8v = (8v / 10v) × 100% = 80%

k = (y-b) / x = (actual output-zero offset) / standard output = (3v-8v) /10V=-0.5

P3-17 DOROutput delay time	Predetermined area:0.0s～3600.0s【0.0s】
P3-18 TA/TB/TCOutput delay time	Predetermined area:0.0s～3600.0s【0.0s】
P3-19 TA3/TB3/TC3 Output delay time	Predetermined area:0.0s～3600.0s【0.0s】
P3-20 Y1 Output delay time	Predetermined area:0.0s～3600.0s【0.0s】
P3-21 Y2 Output delay time	Predetermined area:0.0s～3600.0s【0.0s】

Explanation:

Set the delay time from the state change of the relay and digital output terminal to the actual output change.

P3-22 Y output terminal valid state selection	Predetermined area:0～31【0】

Explanation:

Define the output logic of relays and digital output terminals. bit1 corresponds to digital output DO1, bit1 corresponds to relay 1, bit2 corresponds to relay 3, bit3 corresponds to digital output Y1, and bit4 corresponds to digital output Y2,

0: Positive logic, ON signal is output when the signal is valid, OFF signal is output when the signal is invalid;

1: Negative logic, output OFF signal when the signal is valid, and ON signal when the signal is invalid.

5.5 Start-stop control parameters (P4 group)

P4-00 Start way	Predetermined area:0～1【0】

Explanation:

0: Direct start: If the starting DC braking time is set to 0, the inverter starts running from the starting frequency; if the starting DC braking time is not 0, then the DC braking is performed first, and then the running starts from the starting frequency. It is suitable for small inertia loads, where the motor may rotate during startup.

1: Speed tracking and restart: The frequency converter first judges the speed of the motor, and then starts at the tracked motor frequency. It implements smooth and non-shock start of the rotating motor, and is suitable for restarting when the power is momentarily interrupted due to large inertia loads.

P4-03 Starting frequency	Setting range: 0.00Hz to the maximum frequency (P0-12) [0.00Hz]
P4-04 Start frequency hold time	Setting range: 0.0s to 36.0s [0.0s]

Explanation:

To ensure the motor torque during startup, please set a proper starting frequency. The starting frequency P4-03 is not limited by the lower limit frequency. However, when the set target frequency is lower than the starting frequency, the inverter will not start and will be in standby state.

During the forward and reverse switching process, the hold time of the start frequency has no effect. The startup frequency holding time is not included in the acceleration time, but is included in the running time of the simple PLC.

Example 1: P0-03 = 0 The frequency source is digital given

P0-11 = 2.00Hz Digital setting frequency is 2.00Hz, P4-03 = 5.00Hz Start frequency is 5.00Hz, P4-04 = 2.0s Start frequency hold time is 2.0s, at this time, the inverter will be in standby state, The output frequency of the

inverter is 0.00Hz.

Example 2: P0-03 = 0 The frequency source is digitally given

P0-11 = 10.00Hz Digital set frequency is 10.00Hz, P4-03 = 5.00Hz Start frequency is 5.00Hz, P4-04 = 2.0s Start frequency hold time is 2.0s At this time, the inverter accelerates to 5.00Hz and continues After 2.0s, accelerate to the given frequency of 10.00Hz.

P4-05 Start DC braking current	Setting range: 0% to 100% [0%]
P4-06 Start DC braking time	Setting range: 0.0s to 36.0s [0.0s]

Explanation:

Starting DC braking is generally used to stop the running motor and then start it. Starting DC braking is only effective when the starting mode is direct starting. At this time, the inverter performs DC braking according to the set starting DC braking current, and then starts running after the starting DC braking time. If the starting DC braking time is set to 0, it will start without DC braking. The greater the DC braking current, the greater the braking force.

The starting DC braking current relative to the base value is a percentage of the rated current of the motor.

P4-07 Acceleration / deceleration mode	Setting range: 0 ～ 2 【0】

Explanation:

Select the frequency change mode of the inverter during startup and shutdown.

0: Linear acceleration / deceleration. The output frequency increases or decreases in a straight line. Provide two sets of acceleration and deceleration time options.

1: S curve acceleration / deceleration A. The output frequency is increased or decreased according to the S curve. The S curve is used in occasions requiring gentle start or stop, such as elevators and conveyors. Function codes P4-08 and P4-09 respectively define the time proportion of the start and end sections of the S curve acceleration and deceleration.

2: S curve acceleration / deceleration B. In this S-curve acceleration / deceleration, the rated frequency fb of the motor is always the inflection point of the S-curve. As shown below. It is generally used in situations where fast acceleration and deceleration are required in high-speed areas above the rated frequency. When the set frequency is above the rated frequency, the acceleration and deceleration time is: $t = ((\frac{4}{9} x (\frac{f}{f_b})^2) + \frac{5}{9}) x T$

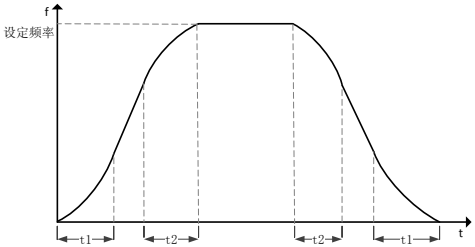
Among them, f is the set frequency, fb is the rated frequency of the motor, and T is the time to accelerate from 0 frequency to the rated frequency.

P4-08 SCurve start time	Setting range: 0.0% ～ (100.0 -P4-09)% [20.0%]
P4-09 SEnd time of curve	Setting range: 0.0% ～ (100.0 -P4-08)% [20.0%]

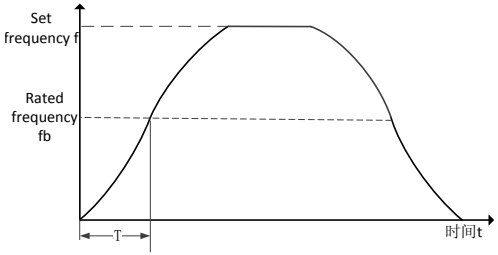
Explanation:

Function codes P4-08 and P4-09 respectively define the time ratio of the beginning and end of the S curve acceleration and deceleration A. The two function codes must satisfy: P4-08 + P4-09≤100.0%.

In Figure 5-4-1, t1 is the parameter defined by parameter P4-08. During this period, the slope of the output frequency change gradually increases. t2 is the time defined by parameter P4-09, during which the slope of the output frequency change gradually changes to 0. During the time between t1 and t2, the slope of the output frequency change is fixed, that is, the linear acceleration and deceleration are performed in this interval.



5-4-1 Curve acceleration and deceleration A



5-4-2 Curve acceleration and deceleration B

P4-10 Stop mode	Setting range: 0 ～ 3 【0】

Explanation:

0: Deceleration stop After the stop command is valid, the inverter reduces the output frequency according to the deceleration time. The frequency will stop after the frequency is reduced to 0.

1: Free stop After the stop command is valid, the inverter immediately terminates the output. At this time, the motor stops freely according to the mechanical inertia.

2: Deceleration stop + free stop After the stop command is valid, reduce the output frequency according to the deceleration time. When the stop speed is reached, the free stop is started. Refer to P4-18 for the stop speed.

3. Deceleration stop mode 2, the stop logic is similar to mode 0, but in some large inertia loads, the situation may be reversed, try mode 3. At the same time, in the situation where the deceleration requirements are more stringent, this mode can also be tried when the inverter is liable to report an overvoltage fault during deceleration.

P4-11 DC braking starting frequency at stop	Predetermined area:0.00Hz～15.00 Hz【0.00Hz】
P4-12 DC braking waiting time at stop	Predetermined area:0.0s～36.0s【0.0s】
P4-13 DC braking current at stop	Predetermined area:0%～100% 【0%】
P4-14 DC braking time at stop	Predetermined area:0.0s～36.0s【0.0s】

Explanation:

Starting DC braking frequency at stop: During the deceleration stop, when the running frequency is reduced to this frequency, the DC braking process starts.

Waiting time for DC braking at stop: After the running frequency is reduced to the starting frequency of DC

braking at stop, the inverter stops outputting for a period of time before starting the DC braking process. It is used to prevent overcurrent and other faults that may be caused by DC braking at high speeds.

DC braking current at stop: DC braking current at stop, the relative base value is the percentage of the rated current of the motor.

DC braking time at stop: The time for which the DC braking amount is maintained. The DC braking time at stop is 0, then the DC braking process at stop is canceled.

P4-15 Brake usage	Predetermined area:0%～100%【100%】

Explanation:

Only valid for inverters with built-in braking unit. Used to adjust the duty cycle of the braking unit. If the usage rate of the braking unit is high, the duty cycle of the braking unit will be high and the braking effect will be strong, but the inverter bus voltage will fluctuate greatly during braking.

P4-18 Stop speed	Setting range: 0.01Hz to the maximum frequency [0.10Hz]

Explanation:

Defined the free stop point during stop mode 2 (deceleration stop + free stop).

5.6 Auxiliary function parameters (P5 group)

P5-00 Jog running frequency	Setting range: 0.00Hz to the maximum frequency (P0-12) [2.00Hz]
P5-01 Jog acceleration time	Predetermined area:0.00s～300.00s【20.00s】
P5-02 Jog deceleration time	Predetermined area:0.00s～300.00s【20.00s】

Explanation:

The above function code defines the given frequency and acceleration / deceleration time of the inverter when jogging. The jog start process is fixedly started by the direct start mode of P4-00 = 0, and the stop mode is fixedly stopped by the deceleration stop mode of P4-10 = 0. Jog acceleration time refers to the time required for the inverter to accelerate from 0Hz to the maximum frequency P0-12; jog deceleration time refers to the time required for the inverter to decelerate from the maximum frequency P0-12 to 0Hz.

P5-03 Jog enable during operation	Predetermined area:0～1【0】

0：Disabled 1：Enable

说明：

Select whether jog operation is possible in the running state. If enabled, the inverter will switch to the jog running state when there is a jog command in the running state. After the jog command is withdrawn, the inverter will return to the original running state.

P5-04 Acceleration time 2	Predetermined area:0.00s(min)～300.00s(min)【Model determination】
P5-05 Deceleration time 2	Predetermined area:0.00s(min) ～ 300.00s(min) 【 Model determination】

Explanation:

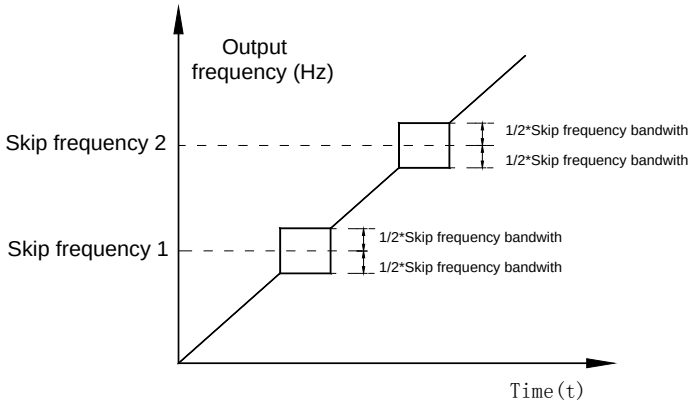
A5T provides two groups of acceleration and deceleration time, which are P0-17, P0-18 and P5-04, P5-05. The definition of the two groups of acceleration and deceleration time is exactly the same, please refer to the related description of P0-17 and P0-18.

Through the multifunctional digital input X terminal, you can switch between two groups of acceleration and deceleration time. For specific usage, please refer to the relevant description in function codes P2-00 ～ P2-09.

P5-06 Jump frequency	Predetermined area:0.00Hz ～Maximum frequency (P0-12)【0.00Hz】
P5-07 Jump frequency amplitude	Predetermined area:0.00Hz ～Maximum frequency (P0-12)【0.00Hz】

Explanation:

When the set frequency is within the skip frequency range, the actual running frequency will run at the skip frequency that is closer to the set frequency. By setting the skip frequency, the inverter can avoid the mechanical resonance point of the load. If the jump frequency is set to 0 or the jump frequency amplitude is set to 0, the jump frequency function is cancelled. The principle of jumping frequency and jumping frequency amplitude is shown in the figure below.

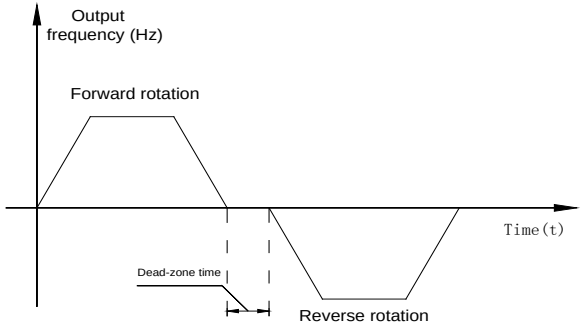


5-5-1 Jump frequency diagram

P5-08 Forward and reverse dead time	Predetermined area:0.0s～100.0s【0.0s】

Explanation:

Set the transition time at the output of 0Hz during the forward and reverse transition of the inverter, as shown in the figure below:



5-5-2 Forward and reverse dead time diagram

P5-09 Reverse control	Predetermined area:0～1【0】

0：Allow reverse 1：No reverse

Explanation:

This parameter is used to set whether the inverter is allowed to run in the reverse state. If the motor is not allowed to reverse, set P5-09 = 1.

P5-10 The frequency is lower than the lower limit frequency.	Predetermined area:0～1【0】

0：Lower limit frequency operation 1：Delayed shutdown

Explanation:

When the set frequency is lower than the lower limit frequency, the running status of the inverter can be selected through this parameter. Two running statuses are provided for users to choose.

P5-11 Delay time when the frequency is lower than the lower limit	Predetermined area:0.0s～3600.0s【0.0s】

Explanation:

When the set frequency is lower than the lower limit frequency, if P5-10 is selected as "1: Delayed stop", the inverter will stop after the time set by P5-11.

P5-12 Set cumulative running arrival time	Predetermined area:0h～65535h【0】
P5-13 Run time arrival action selection	Predetermined area:0～1【0】

0：Keep running 1：Downtime

Explanation:

This group of parameters is used to complete the timing operation of the inverter. When the "set running time" is not 0 and the inverter running time is greater than or equal to the "set cumulative running arrival time", the output terminal function "run time reached" outputs ON signal. Whether the inverter stops at this time will be determined according to P5-13 "Operation Time Reached Action Selection".

P5-14 Boot protection selection	Predetermined area:0～1【0】

0：invalid 1：effective

Explanation:

This parameter relates to the safety protection function of the inverter. If this parameter is set to 1, if the running command is valid when the inverter is powered on (for example, the terminal running command is closed before the power is turned on), the inverter does not respond to the running command, and the running command must be removed once. After the running command is valid again The inverter responds. In addition, if the running command is valid at the time of the inverter's fault reset, the inverter will not respond to the running command. The running command must be removed to eliminate the running protection status. It can prevent the danger caused by the motor responding to the running command when the power is turned on or the fault is reset without knowing it.

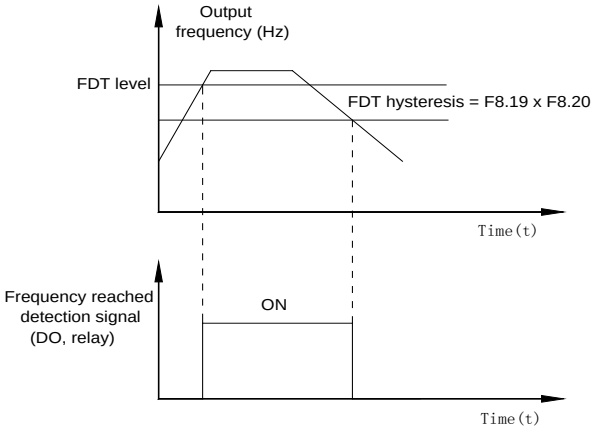
If set to 0, this function is invalid.

P5-15 Frequency detection value (FDT level)	Predetermined area:0.00Hz ～ Maximum frequency (P0-12)【50.00Hz】
P5-16 Frequency detection hysteresis	Predetermined area:0.0%～100.0%【5.0%】

Explanation:

When the running frequency is higher than the frequency detection value, the terminal of the multi-function output of the inverter is set to 3 (frequency level detection FDT arrives) to output an ON signal, and the frequency is lower than a certain frequency value (frequency detection hysteresis value). The ON signal output from the function output terminal is canceled.

The above parameters are used to set the detection value of the output frequency and the hysteresis value when the output operation is canceled. Among them, P5-16 is the percentage of the hysteresis frequency relative to the frequency detection value P5-15. The following figure is a schematic diagram of the FDT function.

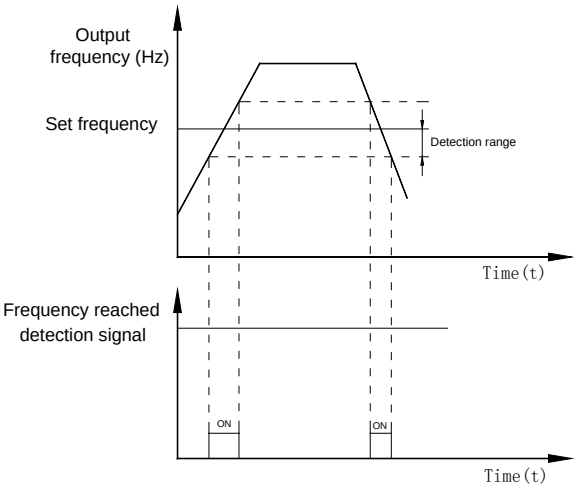


5-5-3 FDTFunction diagram

P5-17 Frequency reach detection range	Predetermined area:0.0%～100.0%【0.0%】

Explanation:

When the operating frequency of the inverter is within a certain range of the set frequency, the inverter's multi-function output terminal outputs an ON signal. This parameter is used to set the detection range of frequency arrival. The following figure shows the frequency arrival:



5-5-4 Schematic of frequency arrival

P5-18 Random PWM gain	Predetermined area:0～10【0】

Explanation:

Only valid for VF.

Setting random PWM can make the monotonous harsh motor sound softer, and can help reduce external electromagnetic interference. When the random PWM gain is set to 0, the random PWM is invalid. Adjusting different gains of random PWM will get different effects.

P5-19 Modulation mode selection	Setting range: 0 ～ 1 【0】

0：Asynchronous modulation 1：Synchronous modulation

Explanation:

Only valid for VF. Synchronous modulation refers to the linear change of the carrier frequency with the change of the output frequency, to ensure that the ratio (carrier ratio) of the two does not change. It is generally used when the output frequency is high, which is beneficial to the output voltage quality.

At lower output frequencies (below 100Hz), synchronous modulation is generally not needed, because the ratio of carrier frequency to output frequency is higher at this time, and the advantages of asynchronous modulation are more obvious.

P5-20 Fast current limit function selection	Setting range: 0 ～ 1 【1】

0：invalid 1：effective

Explanation:

Start the fast current limit function, which can minimize the overcurrent fault of the inverter and ensure the uninterrupted operation of the inverter. If the inverter is in the fast current limiting state for a long time, the inverter may be damaged due to overheating, which is not allowed.

Therefore, when the inverter is fast-limiting for a long time, it will alarm E40, which means that the inverter is

overloaded and needs to stop.

P5-21 Wake-up frequency	Setting range: sleep frequency (P5-23) to maximum frequency (P0-12) [0.00Hz]
P5-22 Wake-up delay time	Setting range: 0.0s to 6500.0s [0.0s]
P5-23 Sleep frequency	Setting range: 0.00Hz to wake-up frequency (P5-21) [0.00Hz]
P5-24 Sleep delay time	Setting range: 0.0s to 6500.0s [0.0s]

Explanation:

The above parameters are used to implement the sleep and wake functions in constant pressure water supply applications.

During the operation of the inverter, when the set frequency is less than or equal to P5-23 sleep frequency, after the delay time of P5-24, the inverter enters the sleep state and the output frequency is zero.

If the inverter is in sleep state and the current running command is valid, when the set frequency is greater than or equal to the wake-up frequency of P5-21, the inverter starts to start after the delay time of P5-22.

Generally, please set the wake-up frequency to be equal to or higher than the sleep frequency. If the wake-up frequency and sleep frequency are set to 0.00Hz, the sleep and wake-up functions are invalid.

When the sleep function is enabled, if the frequency source uses PID, whether the sleep status PID is calculated or not is affected by the function code P6-10. At this time, the PID must be selected for operation at shutdown (P6-10 = 1).

P5-25 Software overcurrent point	Setting range: 0.0% ～ 300.0% [200.0%] (rated motor current)
P5-26 Software overcurrent detection delay time	Setting range: 0.00s to 600.00s [0.00s]

Explanation:

When the output current of the inverter is greater than or equal to the software overcurrent point and the duration exceeds the software overcurrent detection delay time, the inverter will report an overcurrent fault. The delay time is set to 0.00s for no detection.

P5-37 Deadband compensation mode selection	Setting range: 0 ～ 1 【1】

0：No compensation 1：make up

Explanation:

This parameter generally does not need to be modified. Only when there are special requirements on the quality of the output voltage waveform, or when the motor has an abnormality such as oscillation, you need to try to select compensation or no compensation. Select 0 for no compensation and 1 for compensation.

P5-39 Cooling fan control	Setting range: 0 ～ 1 【0】

0：Cooling fan runs when the motor is running 1：Cooling fan keeps running after power on

Explanation:

0: The cooling fan is running when the motor is running. During the inverter running, the cooling fan is always running. After the shutdown, the fan will stop running after a delay of 10 seconds, and whether the fan will run is determined based on the temperature detected inside the inverter. It is recommended to use this mode, which can effectively extend the life of the cooling fan, and when the inverter is not running, there is no fan running noise.

1: The cooling fan keeps running after power-on. After the inverter is powered on, the cooling fan is always running. This mode is only considered in an environment with a lot of dust, so as to prevent the inverter from

running for a long time, and a large amount of dust will accumulate in the inverter, causing the inverter to malfunction or even be damaged. In a dusty environment, this mode is not recommended, because it will shorten the life of the cooling fan and increase the noise for no reason.

P5-45 Load speed display factor	Setting range: 0.0001 to 6.5000 [1.0000]

Explanation:

When the load speed needs to be displayed, this parameter is used to adjust the correspondence between the inverter output frequency and the load speed. For the specific correspondence, please refer to the description of P5-46.

P5-46 Decimal point position for load speed display	Setting range: 0 to 3 [2]

Explanation:

Used to set the number of decimal places for the load speed display. The following example illustrates the calculation method of the load speed:

If the load speed display coefficient P5-45 is 2.000, and the load speed decimal point P5-46 is 2 (2 decimal places), when the inverter running frequency is 40.00Hz, the load speed is: 40.00 * 2.0000 = 80.00 (2 decimal places (Display) If the inverter is in the stop state, the load speed is displayed as the speed corresponding to the set frequency, that is, "set load speed".

Taking the setting frequency of 50.00Hz as an example, the load speed in the stop state is: 50.00 * 2.0000 = 100.00 (2 decimal places display)

P5-47 Cumulative running time	Setting range: 0h to 65535h [-]

Explanation:

It displays the accumulated running time of the inverter. This function code is the status value of the inverter and cannot be changed by the user.

P5-48 LEDRunning display parameters	Setting range: 1 to 65535 [0x3f]
P5-49 LEDStop display parameters	Setting range: 1 to 511 [3]

Explanation:

These two parameters give the user the option to switch the displayed parameters under the running state and the stopped state through the shift key. The user sets the bit corresponding to the parameter to be displayed to 1. At this time, the user can press the shift key. Switch to view the monitored status parameters. When the corresponding bit is set to 0, this parameter is not displayed. The corresponding parameter display table is as follows:

P5-48	LED running display parameters	Bit0: operating frequency Bit1: Set frequency Bit2: bus voltage Bit3: Output voltage Bit4: Output current Bit5: output power Bit6: Digital input terminal status Bit7: Digital output terminal status Bit8: AI1 voltage Bit9: AI2 voltage Bit10: count value Bit11: length value

		Bit12: PID setting Bit13: PID feedback Bit14: Input pulse frequency Bit15: Load speed
P5-49	LED shutdown display parameters	Bit0: set frequency Bit1: bus voltage Bit2: Digital input terminal status Bit3: Digital output terminal status Bit4: AI1 voltage Bit5: AI2 voltage Bit6: count value Bit7: length value Bit8: Input pulse frequency

P5-50 JOG key function selection	Setting range: 0 ～ 4 【0】

Explanation:

The JOG key is a multi-function key. The function of the JOG key can be set by this function code. This button can be used to switch between stopping and running.

0: JOG key function is invalid.

1: Switch between keyboard command and remote operation. Refers to the switch of command source, that is, the switch of the current command source and keyboard control (local operation). If the current command source is keyboard control, this key function is invalid.

2: Forward and reverse switching. When the operation command is selected as the keyboard operation, the JOG key on the keyboard is used to switch between forward and reverse.

3: Jog forward. The JOG key on the keyboard is used to realize forward jog operation.

4: Reverse jog. The JOG key on the keyboard is used to realize forward jog operation.

P5-51 STOP / RES key function	Setting range: 0 ～ 1 【0】

Explanation:

0: Only in keyboard control mode, STOP / RES key stop function is valid

1: No matter what kind of control mode, the STOP / RES key stop function is effective

This function code defines the range and function of the STOP key.

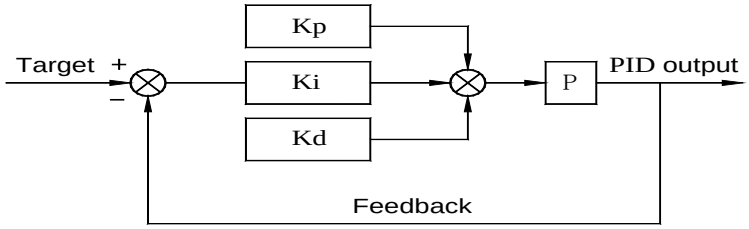
P5-53 Software version number	Setting range: 0.01 ～ 655.35

Explanation:

Displays the current software version number of the drive.

5.7 PID function (P6 group)

PID control is a commonly used method of process control. By performing proportional, integral, and differential operations on the difference between the feedback signal of the controlled quantity and the target signal, the closed-loop system is formed by adjusting the output frequency of the inverter to stabilize the controlled quantity Target value. Suitable for process control occasions such as flow control, pressure control and temperature control。



5-6-1 Process PID Block Diagram

When PID is selected as the frequency source, that is, P0-03 or P0-05 is selected as 7, this group of functions works. (See function code P0-03,
P0-05).

P6-00 PID reference source	Setting range: 0 ～ 6 【0】

0：P6-01　　1：AI1

2：AI2　　3：keep

4：PULSE pulse (X5)　　5：Multi-speed

6：Communication settings

Explanation:

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

The setting target quantity of the process PID is a relative value, and the setting range is 0.0% to 100.0%. The feedback amount of the same PID is also a relative amount. The function of the PID is to make the two relative amounts equal.

P6-01 PID value setting	Predetermined area:0.0%～100.0%【50.0%】

Explanation:

This parameter is the target value given by the process PID when P6-00 is selected as 0.

P6-02 PID given change time	Setting range: 0.00s to 300.00s [0.00s]

Explanation:

PID given change time refers to the time required for the PID given value to change from 0.0% to 100.0%. When the PID setting changes, the PID setting value changes linearly according to the given change time, which reduces the adverse effect of a given sudden change on the system.

P6-03 PID feedback source	Setting range: 0 ～ 8 【0】

0：AI1　　1：AI2

2：keep　　3：AI1-AI2

4：PULSE pulse (X5)　　5：AI1+AI2

6：Max(|AI1|，|AI2|)　　7：Min(|AI1|，|AI2|)

8：Communication feedback

This parameter is used to select the feedback signal channel of the PID. The feedback value of the process PID is also a relative value, and the setting range is 0.0% to 100.0%.

P6-04 PID action direction	Setting range: 0 ～ 1 【0】

Explanation:

0: Positive action: When the PID feedback signal is less than the given amount, the inverter output frequency rises. Such as constant pressure water supply control occasions.

1: Reverse effect: When the feedback signal of PID is less than the given amount, the output frequency of the inverter decreases. Such as unwinding tension control occasions.

This function is affected by the inversion of the function direction of the multi-function terminal PID (function 35), and you need to pay attention during use.

P6-05 PID given feedback range	Setting range:0～65535【1000】

Explanation:

PID given feedback range is a dimensionless unit, used for PID given and PID feedback monitoring display. The relative value of PID given feedback is 100.0%, corresponding to the given feedback range P6-05. For example, if P6-05 is set to 2000, when the PID is set to 100.0%, the PID setting monitor displays U0-15 and PID feedback shows U0-16 to 2000.

P6-06 Proportional gainP	Setting range:0.0～100.0【20.0】
P6-07 Integration timeI	Setting range:0.01～10.00【2.00s】
P6-08 Differential timeD	Setting range:0.000s～10.000s【0.000s】

Explanation:

Proportional coefficient P: Determines the adjustment strength of the entire PID regulator. When the proportional coefficient is large, the system is sensitive and the response is accelerated. However, if the frequency is too large, the number of oscillations will increase and the system will become unstable. If the proportional coefficient is too small, the system will become unstable. Slow action and delayed response.

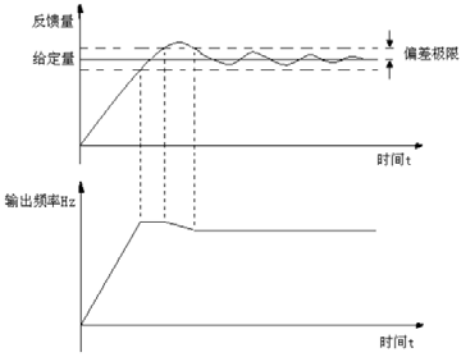
Integral time I: Determines the intensity of the integral adjustment of the PID regulator. The longer the integral time, the slower the response, and the poorer the ability to control external disturbances; the shorter the integral time, the greater the intensity of the adjustment, the faster the system's response speed, and the too small it will cause oscillation and make System stability has decreased.

Differential time D: Determines the intensity of the PID regulator's adjustment of the deviation change rate. The longer the differential time, the greater the adjustment intensity, which can quickly damp the oscillation caused by P action when the deviation occurs, and the adjustment time is short, but when the differential time is too large, it will cause oscillation; when the differential time is small, the attenuation effect is small when the deviation occurs, and the adjustment It's also long. Only when the differential time is appropriate can the adjustment time be shortened.

P6-09 Deviation limit	Setting range:0.0%～100.0%【0.0%】

Explanation:

When the deviation between PID given value and feedback value is less than P6-09, PID stops adjusting action. In this way, the output frequency is stable when the deviation between the reference and the feedback is small, which is effective for some closed-loop control applications.



5-6-2 Deviation limit diagram

P6-10 PID operation mode	Setting range：0～1【0】

0：No calculation during shutdown 1：Computation on shutdown

Explanation:

It is used to select whether the PID continues to operate in the stop state. In general applications, the PID should stop computing in the shutdown state.

P6-11 PID reversal cut-off frequency	Predetermined area:0.00Hz～Maximum frequency【0.00Hz】

Explanation:

In some cases, only when the PID output frequency is negative (that is, the inverter reverses) can the PID control the given quantity and the feedback quantity to the same state, but too high reverse frequency is not allowed for some occasions Yes, P6-11 is used to determine the upper limit of the inversion frequency. When the frequency source is primary + secondary (PID), the upper limit of PID reverse cut-off frequency is not limited, that is, P6-11 is invalid.

P6-12 PID feedback filtering time	Setting range:0.00 ～ 60.00s【0.00s】
P6-13 PID output filter time	Predetermined area:0.00 ～ 60.00s【0.00s】

Explanation:

P6-12 is used to filter the PID feedback quantity. This filtering is helpful to reduce the influence of the feedback quantity being disturbed, but it will bring down the response performance of the process closed-loop system. P6-13 is used to filter the PID output frequency. This filtering will reduce the abrupt change of the output frequency of the inverter, but it will also reduce the response performance of the process closed-loop system.

P6-14 Proportional gainKp2	Predetermined area:0.0～100.0【20.0】
P6-15 Integration timeKi2	Predetermined area:0.01～10.00【2.00s】
P6-16 Differential timeTd2	Predetermined area:0.000s～10.000s【0.000s】

P6-17 PIDParameter switching conditions	Predetermined area:0～2【0】

0：Do not switch

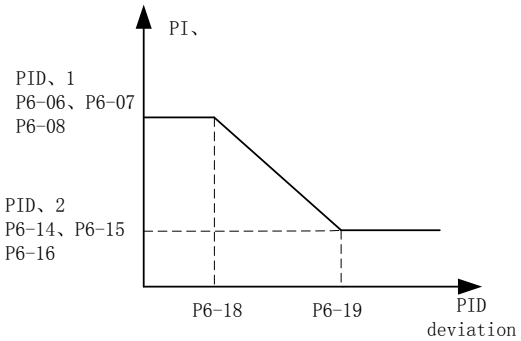
1：Switching via X terminal

2：Automatic switching based on deviation

P6-18 PIDParameter switching deviation1	Predetermined area:0.0%～P6-19【20.0%】
P6-19 PIDParameter switching deviation2	Predetermined area:P6-18～100.0%【80.0%】

Explanation:

In some applications, a set of PID parameters cannot meet the needs of the entire operation process, and different PID parameters need to be used in different situations. This group of function codes is used to switch between two sets of PID parameters. The setting method of regulator parameters P6-14 ～ P6-16 is similar to that of parameters P6-06 ～ P6-08. The two sets of PID parameters can be switched through the multi-function digital X terminal, or they can be switched automatically according to the deviation of the PID. When multi-function X terminal selection is selected, the multi-function terminal function selection should be set to 34 (PID parameter switching terminal). When this terminal is invalid, select parameter group 1 (P6-06 ～ P6-08). When the terminal is valid, select parameter group. 2 (P6-14 ~ P6-16). When the automatic switching is selected, the absolute value of the deviation between the reference and feedback is less than the PID parameter switching deviation 1 When P6-18, the PID parameter selects parameter group 1. When the absolute value of the deviation between the reference and feedback is greater than the PID switching deviation 2 P6-19, PID parameter selection selects parameter group 2. When the deviation between the reference and the feedback is between the switching deviation 1 and the switching deviation 2, the PID parameters are linear interpolation values of the two groups of PID parameters, as shown in the figure below.



5-6-3 PID parameter switching diagram

P6-23 PID initial value	Predetermined area:0.0～100.0%【0.0%】

P6-24 PID initial value holding time	Setting range: 0.00 ～ 650.00s [0.00s]
P6-25 Maximum positive output deviation twice	Predetermined area:0.00～100.00%【1.00%】
P6-26 Maximum reverse output deviation twice	Predetermined area:0.00～100.00%【1.00%】

Explanation:

This function is used to limit the difference between the two beats of the PID output (2ms / beat) in order to suppress the PID output from changing too fast and make the inverter run more stable. P6-25 and P6-26 respectively correspond to the maximum value of the absolute value of the output deviation in the forward and reverse directions.

P6-27 PID integral properties	Setting range:0～1【00】

Explanation:

Units: integral separation

0: Invalid

1: valid

Tens place: whether to stop integration after output to the limit

0: Continue to integrate

1: Stop integration

Integral separation: If the integral separation is set to be effective, when the multifunctional digital X integration pause (function 20) is enabled, the PID integration of PID integration is stopped. At this time, only the proportional and differential functions of PID are effective. When the integral separation selection is invalid, the integral separation is invalid regardless of whether the multifunctional number X is valid or not.

Whether to stop integration after output to the limit: After the PID operation output reaches the maximum or minimum value, you can choose whether to stop the integration. If you choose to stop the integration, the PID integration calculation will stop at this time, which may help reduce the overshoot of the PID.

P6-28 PID feedback loss detection value	Setting range：0.0～100.0%【0.00%】
P6-29 PID feedback loss detection time	Setting range：0.0s～20.0s【0.0s】

Explanation:

This function code is used to judge whether PID feedback is lost. When the PID feedback amount is less than the feedback loss detection value P6-28 and the duration exceeds the PID feedback loss detection time P6-29, the inverter alarms E31 and handles it according to the selected fault handling method. When the feedback loss detection value is 0.0%, the feedback loss is not judged.

Note: It is not detected in the stop state.

P6-30 PID differential limit	Predetermined area:0.00% ～100.00%【0.10%】

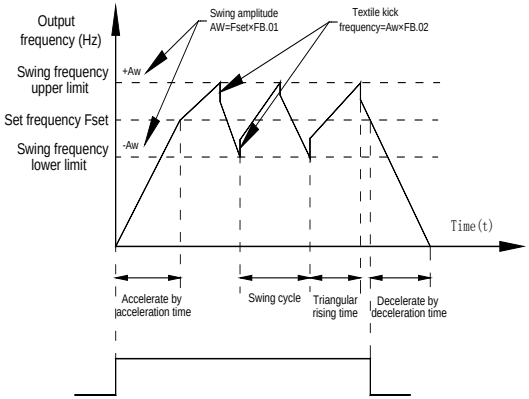
Explanation:

In the PID regulator, the function of the derivative is relatively sensitive, which can easily cause system oscillation. Therefore, the function of the PID derivative is generally limited to a small range. P6-30 is used to set the range of the PID differential output.

5.8 Swing frequency, fixed length and count (P7 group)

The wobble frequency function is suitable for textile, chemical fiber and other industries, as well as occasions that require traversing and winding functions. The wobble frequency function refers to the output frequency of the

inverter. It swings up and down with the set frequency as the center. The trajectory of the running frequency on the time axis is shown in the following figure. The swing amplitude is the amplitude of the running frequency swinging around the center frequency. It is set by P7-01. The swing amplitude is 0 when P7-01 is set to 0. At this time, the swing frequency has no effect.



5-7-1 Swing frequency working diagram

P7-00 Swing setting method	Setting range: 0 ～ 1 【0】

Explanation:

Use this parameter to determine the reference amount of the swing.

0: Relative to the center frequency. To change the swing amplitude system, the swing amplitude changes with the change of the center frequency (set frequency).

1: Relative to the maximum frequency P0-12, it is a fixed swing system with a fixed swing.

P7-01 Swing frequency amplitude	Predetermined area:0.0%～100.0%【0.0%】
P7-02 Kick frequency amplitude	Predetermined area:0.0%～50.0%【0.0%】

Explanation:

Use this parameter to determine the value of the swing amplitude and jump frequency.

When the swing amplitude is set relative to the center frequency (P7-00 = 0), the swing amplitude AW = frequency source P0-11 × swing amplitude P7-01. When the swing amplitude is set relative to the maximum frequency (P7-00 = 1), the swing amplitude AW = the maximum frequency P0-12 × the swing amplitude P7-01.

The jump frequency amplitude is the frequency percentage of the jump frequency relative to the swing frequency when the swing frequency is running, that is: jump frequency = swing amplitude AW × jump frequency amplitude P7-02. If the swing amplitude is selected relative to the center frequency (P7-00 = 0), the jump frequency is a change value. If the swing amplitude is selected relative to the maximum frequency (P7-00 = 1), the jump frequency is a fixed value. The swing frequency operation frequency is restricted by the upper and lower frequency limits.

P7-03 Swing frequency period	Predetermined area:0.01s～300.00s【10.00s】
P7-04 Triangle wave rise time coefficient	Predetermined area:0.1%～100.0%【50.0%】

Explanation:

Swing frequency cycle: The time value of a complete swing frequency cycle.

Triangular wave rise time coefficient is the percentage of triangle wave rise time relative to the swing frequency period P7-03. Triangle wave rise time = swing frequency period P7-03 × triangle wave rise time coefficient P7-04; triangle wave fall time = swing frequency period P7-03 × (1- triangle wave rise time coefficient P7-04).

P7-05 Set length	Predetermined area:0m～65535m【1000m】
P7-06 Current length	Predetermined area:0m～65535m【0m】
P7-07 Pulses per meter	Predetermined area:0.1～6553.5【100.0】

Explanation:

The above function codes are used for fixed-length control. The length pulse is collected through the X digital input (X digital input terminal function selection is 25) terminal. When the pulse frequency is high, the X5 port must be used. The number of pulses sampled by the terminal is divided by the number of pulses per meter P7-07, and the actual length P7-06 can be calculated. When the actual length is greater than the set length P7-05, the multi-function digital Y outputs the "length reached" ON signal.

During the fixed length control, the length reset operation can be performed through the multifunctional X digital input terminal (X digital input terminal function selection is 26).

P7-08 Set count value	Setting range:1～65535【1000】
P7-09 Specify count value	Setting range:1～65535【1000】

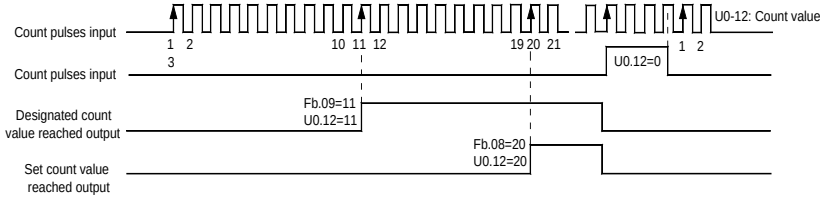
Explanation:

The count value needs to be collected through the multifunctional digital input terminal. In the application, the corresponding input terminal function needs to be set to "counter input". When the pulse frequency is high, the X5 port must be used.

When the count reaches the set count value P7-08, the multi-function digital Y outputs the "set count value reached" ON signal, and then the counter stops counting.

When the count reaches the designated count value P7-09, the multi-function digital Y outputs the ON signal of "designated count value reached", and the counter continues to count until the count reaches the set count value P7-08.

The specified count value P7-09 should not be greater than the set count value P7-08. The figure below is a schematic diagram of the counting function:



5-7-2

5.9 Multi-speed, PLC (P8 group)

P8-00 Multi-speed 0 given mode	Predetermined area:0～5【0】

0：Function code P8-01 is given　　1：AI1

2：AI2　　3：PULSE pulse reference

4：PID　　5：Preset frequency (P0-11) given, UP / DOWN can be modified

Explanation:

Select the given mode of the first speed when the frequency source is multi-speed or PLC operation.

P8-01 Multi-speed 0	Setting range: -100.0% ～ 100.0% (upper limit frequency P0-14) [0.0%]
P8-02 Multi-speed 1	Setting range: -100.0% ～ 100.0% (upper limit frequency P0-14) [0.0%]
P8-03 Multi-speed 2	Setting range: -100.0% ～ 100.0% (upper limit frequency P0-14) [0.0%]
P8-04 Multi-speed 3	Setting range: -100.0% ～ 100.0% (upper limit frequency P0-14) [0.0%]
P8-05 Multi-speed 4	Setting range: -100.0% ～ 100.0% (upper limit frequency P0-14) [0.0%]
P8-06 Multi-speed 5	Setting range: -100.0% ～ 100.0% (upper limit frequency P0-14) [0.0%]
P8-07 Multi-speed 6	Setting range: -100.0% ～ 100.0% (upper limit frequency P0-14) [0.0%]
P8-08 Multi-speed 7	Setting range: -100.0% ～ 100.0% (upper limit frequency P0-14) [0.0%]

Explanation:

Set the running frequency of each speed when the frequency source is multi-speed or PLC operation. The multi-speed can be switched according to the different states of the multi-function digital input X terminal, and each speed can be selected to run; the simple PLC can also be used to control the running time and logic of each speed.

The dimension of multi-step speed is a relative value, ranging from -100.0% to 100.0%, which is a percentage relative to the upper limit frequency. A negative percentage indicates a reversal.

P8-09 PLC operation mode	Setting range: 0 ～ 2 【0】

0：Stop at the end of a single run　　1: Keep the final value at the end of a single run

2：Keep circulating

Explanation:

When used as a frequency source, the PLC has three operating modes:

0: Single cycle. The inverter will stop automatically after completing a single cycle. You need to give a run command again to start.

1: Keep the final value after a single cycle. After the inverter completes a single cycle, it automatically maintains the running frequency and direction of the last segment.

2: Continuous cycle. After the inverter completes one cycle, it automatically starts the next cycle until it stops when there is a stop command.

P8-10 PLC power-down memory selection	Setting range: 0 ～ 1 【0】

0：No memory when power off 1：Power-down memory

Explanation:

PLC state storage at power failure refers to the memory of the PLC's operating phase and operating time before power failure.

P8-11 PLC running time unit	Setting range: 0 ～ 1 【0】

0：second 1：hour

Explanation:

This parameter is used to select the time unit for each speed when the frequency source is PLC operation.

P8-12 PLCStage 0 run time	Setting range: 0.0s (h) ～ 6553.5s (h) 【0.0s (h)】
P8-14 PLCStage 1run time	Setting range: 0.0s (h) ～ 6553.5s (h) 【0.0s (h)】
P8-16 PLCStage 2run time	Setting range: 0.0s (h) ～ 6553.5s (h) 【0.0s (h)】
P8-18 PLCStage 3run time	Setting range: 0.0s (h) ～ 6553.5s (h) 【0.0s (h)】
P8-20 PLCStage 4run time	Setting range: 0.0s (h) ～ 6553.5s (h) 【0.0s (h)】
P8-22 PLCStage 5 run time	Setting range: 0.0s (h) ～ 6553.5s (h) 【0.0s (h)】
P8-24 PLCStage 6 run time	Setting range: 0.0s (h) ～ 6553.5s (h) 【0.0s (h)】
P8-26 PLCStage 7 run time	Setting range: 0.0s (h) ～ 6553.5s (h) 【0.0s (h)】

Explanation:

The above parameters are used to set the running time of each speed when the PLC is running. The unit of time is determined by P8-11. If P8-11 = 0, the time unit is second, and if P8-11 = 1, the time unit is hour.

P8-13 PLC stage 0 acceleration / deceleration time selection	Setting range: 0 ～ 1 【0】
P8-15 PLC step 1 acceleration / deceleration time selection	Setting range: 0 ～ 1 【0】
P8-17 PLC step 2 acceleration / deceleration time selection	Setting range: 0 ～ 1 【0】
P8-19 PLC step 3 acceleration / deceleration time selection	Setting range: 0 ～ 1 【0】
P8-21 PLC step 4 acceleration / deceleration time selection	Setting range: 0 ～ 1 【0】
P8-23 PLC step 5 acceleration / deceleration time selection	Setting range: 0 ～ 1 【0】
P8-25 PLC step 6 acceleration / deceleration time selection	Setting range: 0 ～ 1 【0】
P8-27 PLC step 7 acceleration / deceleration time selection	Setting range: 0 ～ 1 【0】

Explanation:

The above parameters are used to set the acceleration and deceleration time of each segment speed when the PLC is running. When 0 is selected, the acceleration and deceleration of the corresponding segment speed are determined by P0-17 and P0-18. When selected, the corresponding segment speed is accelerated Deceleration is determined by P5-04 and P5-05.

5.10 VF parameter (P9 group)

This group of function codes is only valid for V / F control, and is invalid for vector control.

P9-00 V / F curve setting	Setting range: 0 ～ 2 【0】

Explanation:

0: straight V / F. Suitable for ordinary constant torque load.

1: Multi-point V / F. Suitable for special loads such as dehydrators and centrifuges. At this time, by setting the parameters of P9-03 to P9-08, an arbitrary VF relationship curve can be obtained.

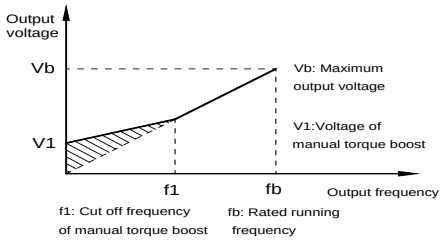
2: Squared V / F. Suitable for centrifugal loads such as fans and pumps.

P9-01 Torque boost	Predetermined area:0.0%～30.0%【Model determination】
P9-02 Cut-off frequency of torque boost	Setting range: 0.00Hz to the maximum frequency (P0-12) [50.00Hz]

Explanation:

In order to compensate the low-frequency torque characteristics of V / F control, some boost compensation is made to the output voltage of the inverter at low frequency. However, if the torque boost is set too large, the motor will easily overheat and the inverter will easily overcurrent. When the load is heavy and the motor starting torque is not enough, it is recommended to increase this parameter. Reduces torque boost when the load is light. When the torque boost is set to 0.0, the inverter is automatic torque boost.

Torque boost torque cut-off frequency: Below this frequency, the torque boost torque is valid, and beyond this set frequency, the torque boost is invalid. See the following figure for details.



5-9-1 Torque boost diagram

P9-03 Multi-point V / F frequency point F1	Predetermined area:0.00Hz～P9-05【0.00Hz】
P9-04 Multi-point V / F voltage point V1	Predetermined area:0.0%～100.0%【0.0%】
P9-05 Multi-point V / F frequency point F2	Predetermined area:P9-03～P9-07【0.00Hz】

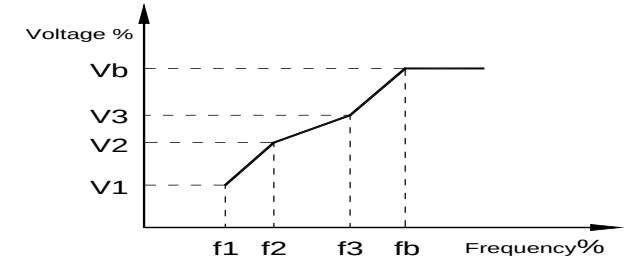
P9-06 Multi-point V / F voltage point V2	Predetermined area:0.0%～100.0%【0.0%】
P9-07 Multi-point V / F frequency point F3	Predetermined area: P9-05 ～ Rated motor frequency (P1-04) [0.00Hz]
P9-08 Multi-point V / F voltage point V3	0.0%～100.0%【0.0%】

Explanation:

The six parameters of P9-03 to P9-08 define multi-segment V / F curve.

The multi-point V / F curve should be set according to the load characteristics of the motor. It should be noted that the relationship between the four voltage points and the frequency points must meet: V1 <V2 <V3 <Vb, F1 <F2 <F3 <Fb. The figure below is a schematic diagram of the multi-point VF curve setting.

Setting the voltage too high at low frequencies may cause the motor to overheat or even burn out, and the inverter may be over-current stalled or over-current protected.



V1-V3: 1st, 2nd and 3rd voltage percentages of multi-point V/F

F1-F3: 1st, 2nd and 3rd voltage percentages of multi-point V/F

Vb: Rated motor voltage

Fb: Rated motor running frequency

5-9-2 Multi-point V / F curve diagram

P9-09 Slip compensation coefficient	Predetermined area:0.0%～200.0%【0.0%】

Explanation:

VF slip compensation can compensate the speed deviation of the asynchronous motor when the load increases, so that the speed of the motor can be kept basically stable when the load changes.

The VF slip compensation gain is set to 100.0%, which means that the slip compensated when the motor has a rated load is the rated slip of the motor, that is, the slip compensation value at the rated torque is the slip compensation coefficient (P9-09) × rated slip (Synchronous speed-rated speed), and the rated slip of the motor is obtained by the inverter through the rated frequency and rated speed of the P1 group of motors.

When adjusting the VF slip compensation gain, it is generally based on the principle that when the rated load, the motor speed is basically the same as the target speed. When the motor speed is different from the target value, the gain needs to be fine-tuned appropriately.

P9-10 Overexcitation gain	Predetermined area:0～200【64】

Explanation:

During the deceleration of the inverter, over-excitation control can suppress the rise of the bus voltage and avoid over-voltage faults. The larger the overexcitation gain, the stronger the suppression effect.

Where overvoltage alarm is easy to occur during the deceleration of the inverter, the overexcitation gain needs to be increased. However, if the over-excitation gain is too large, the output current will increase easily, which needs

to be weighed in the application.

It is recommended to set the overexcitation gain to 0 when the inertia is small and the voltage does not increase during the motor deceleration. It is also recommended to set the overexcitation gain to 0 when there is a braking resistor.

P9-11 Oscillation suppression gain	Setting range: 0 ～ 100 [Model determined]

Explanation:

The gain is selected as small as possible on the premise of effectively suppressing the oscillation, so as not to adversely affect the VF operation. When the motor has no oscillation phenomenon, please select this gain as 0. Only when the motor obviously oscillates, it is necessary to appropriately increase the gain. The larger the gain, the more obvious the suppression of the oscillation.

When using the oscillation suppression function, the motor rated current and no-load current parameters must be accurate, otherwise the VF oscillation suppression effect is not good.

P9-12 Suppressed oscillation mode	Setting range: 0 ～ 3 【1】

0：Suppression of oscillation does not depend on no-load current, only effective below 15Hz;

1：Suppression of oscillation does not depend on no-load current, which is effective throughout (default);

2：Suppression of oscillation depends on no-load current, which is only effective below 15Hz;

3：Suppression of oscillation depends on no-load current, which is effective throughout.

5.11 Communication parameters (PA group)

PA-00 Baud rate	Predetermined area:0～7【5】
0：300BPS	1：600BPS
2：1200BPS	3：2400BPS
4：4800BPS	5：9600BPS
6：19200BPS	7：38400BPS

Explanation:

This parameter is used to set the data transmission rate between the host computer and the inverter. Note that the baud rate set by the host computer and the inverter must be the same, otherwise communication cannot be performed. The higher the baud rate, the faster the communication speed.

PA-01 Data Format	Setting range: 0 ～ 3 【0】
0: No check（8-N-2）	1: Even parity（8-E-1）
2: Odd parity（8-O-1）	3: No check（8-N-1）

Explanation:

The data format set by the host computer and the inverter must be consistent; otherwise, communication cannot be performed.

PA-02 Local address	Setting range: 0 to 247 [1]

Explanation:

When the local address is set to 0, it is the broadcast address, which realizes the broadcast function of the upper computer.

The local address is unique (except for the broadcast address), which is the basis for the point-to-point communication between the host computer and the inverter.

PA-03 Response delay	Setting range: 0ms to 20ms [2ms]

Explanation:

Response delay: It refers to the interval between the end of the inverter data reception and the sending of data to the upper computer. If the response delay is less than the system processing time, the response delay is based on the system processing time. If the response delay is longer than the system processing time, after the system has processed the data, it must wait until the response delay time is reached before sending it to the host send data.

PA-04 Communication timeout	Setting range: 0.0s to 60.0s [0.0s]

Explanation:

When the function code is set to 0.0 s, the communication timeout parameter is invalid.

When the function code is set to a valid value, if the interval between a communication and the last communication exceeds the communication timeout time, the system will report a communication failure error. Usually, it is set to invalid. If you set this parameter in a continuous communication system, you can monitor the communication status.

5.12 Fault and protection parameters (PB group)

PB-00 Motor overload protection selection	Setting range: 0 ～ 1 【1】

0：invalid 1：effective

PB-01 Motor overload protection gain	Predetermined area:0.10～10.00【1.00】

Explanation:

PB-00 = 0: without motor overload protection function, there may be danger of motor overheating damage, it is recommended to heat the relay between the inverter and the motor

PB-00 = 1: At this time, the inverter judges whether the motor is overloaded according to the inverse time curve of motor overload protection.

The inverse time curve of motor overload protection is:

225% × (PB-01) × rated motor current, alarming motor overload fault for 10 seconds;

150% × (PB -01) × rated motor current, alarming motor overload for 5 minutes.

Specifically (when the overload protection gain is 1.00):

Overload factor	duration
115%	1 hour and 20 minutes
125%	40 minutes
135%	15 minutes

Overload factor	duration
145%	6 minutes
155%	4 minutes
165%	2.5 minutes
175%	2 minutes
185%	90s
195%	60s
205%	40s
215%	25s
225%	10s

Increasing PB-01 will increase the time of overload fault at the same overload multiple; decreasing PB-01 will decrease the time of overload fault at the same overload multiple.

Example 1: What is the time when the motor is overloaded by 150% by default? It is calculated as follows:

150% (I) current in the current range of 145% (I1) and 155% (I2), 145%

If the current is overloaded for 6 minutes (T1), and 155% of the current is overloaded for 4 minutes (T2), then the default setting of 150% of the rated current of the motor for 5 minutes is calculated as follows:

T = T1 + (T2-T1) * (I – I1) / (I2 –I1) = 4 + (6-4) * (150% – 145%) / (155% –145%) = 5 (minutes)

Example 2: When the motor is overloaded at 150%, the time to report the overload is 60s, how to set PB-01:

As shown in the table above, the 150% overload time is 5 minutes and the 195% overload time is 60s. Therefore, the PB-01 setting needs to be reduced. The motor overload protection gain: P9-01 = (150/195) = 0.64

The user needs to set the value of PB-01 correctly according to the actual overload capacity of the motor. If this parameter is set too large, the motor may overheat and be damaged without the inverter alarming!

PB-02 Motor overload warning coefficient	Predetermined area:50%～100%【80%】

Explanation:

This function is used to output an early warning signal to the control system through the multi-function digital port Y before the motor overload fault protection. This early warning coefficient is used to determine the degree of early warning before motor overload protection. The larger the value, the smaller the early warning amount.

When the cumulative output current of the inverter is greater than the product of the overload inverse time curve and PB-02, the multi-function digital port Y of the inverter outputs the "motor overload pre-alarm" ON signal.

For example: when the motor overload protection gain is set to 1.00 and PB-02 is set to 80%, if the motor current reaches 155% of the rated motor current for 3.2 minutes (80% * 4 minutes), the multi-function output terminal or The relay outputs a motor overload warning signal.

PB-03 Overvoltage stall gain	Predetermined area:0～100【10】

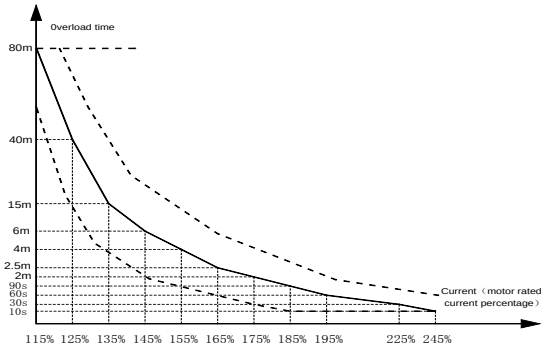
PB-04 Overvoltage stall protection voltage	Predetermined area:120%～150%【130%】

Explanation:

During the inverter deceleration, when the DC bus voltage exceeds the over-voltage stall protection voltage, the inverter stops decelerating to maintain the current operating frequency, and continues to decelerate after the bus voltage drops.

Overvoltage stall gain is used to adjust the inverter's ability to suppress overvoltage during deceleration. The larger the value, the stronger the ability to suppress overvoltage. Under the premise of no overvoltage, the smaller the gain setting, the better.

For small inertia loads, the overvoltage stall gain should be small, otherwise the dynamic response of the system will be slow. For loads with large inertia, this value should be large, otherwise the suppression effect is not good and overvoltage fault may occur.



5-11-1 Overvoltage stall action diagram

When the overvoltage stall gain is set to 0, the overvoltage stall function is canceled. The corresponding base value of overvoltage stall protection voltage setting 100% is as follows:

Voltage level	Overvoltage stall protection voltage base value
Simplex 220V	270V
Three phase 220V	270V
Three phase 380V	530V
Three phase 480V	620V
Three phase 690V	880V
Three phase 1140V	1380V

PB-05 Overcurrent stall gain	Setting range: 0 to 100 [20]
PB-06 Overcurrent stall protection current	Predetermined area:100%～200%【150%】

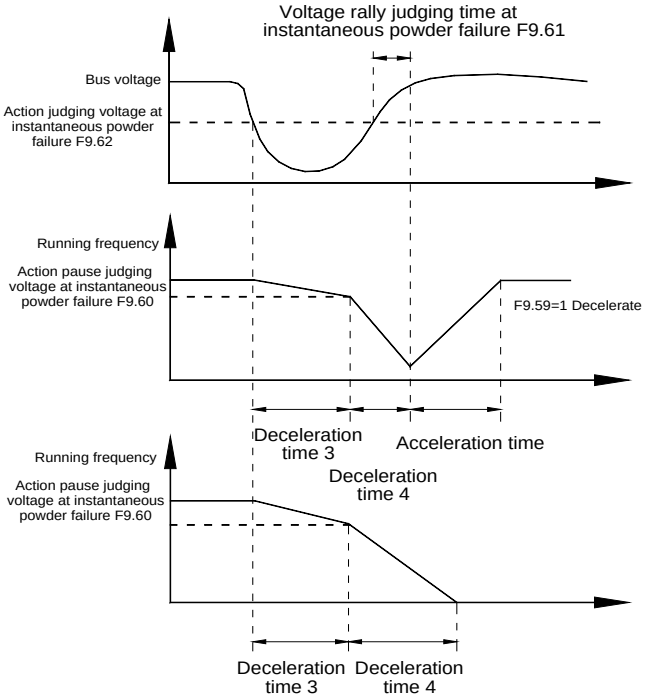
Explanation:

Overcurrent stall: When the inverter output current reaches the set overcurrent stall protection current (PB-06), the inverter reduces the output frequency during accelerated operation; decreases the output frequency during constant speed operation; during decelerated operation , Slow down the decline speed, until the current is less than the overcurrent stall protection current (PB-06), the operating frequency will return to normal.

Overcurrent stall protection current: Select the current protection point for the overcurrent stall function. When the value exceeds this parameter, the inverter starts to implement the overcurrent stall protection function. This value is a percentage of the rated current of the motor.

Overcurrent stall gain: used to adjust the ability of the inverter to suppress overcurrent during acceleration and deceleration. The larger the value, the stronger the ability to suppress overcurrent.

Under the premise of no overcurrent, the smaller the gain setting, the better. For small inertia loads, the overcurrent stall gain should be small, otherwise the dynamic response of the system will be slowed down. For loads with large inertia, this value should be large, otherwise the suppression effect is not good and overcurrent fault may occur. In the case of very small inertia, it is recommended to set the overcurrent suppression gain to less than 20. When the overcurrent stall gain is set to 0, the overcurrent stall function is canceled.



5-11-2 Overvoltage stall action diagram

PB-07 Power-to-ground short-circuit protection	Setting range: 0 ～ 1 【1】

0：invalid 1：effective

Explanation:

You can choose to detect whether the motor is short-circuited to ground when the inverter is powered on. If this function is valid, the inverter UVW terminal will output voltage for a period of time after power-on.

PB-08	keep

Explanation:

This function code is reserved by the manufacturer.

PB-09 Instant stop function selection	Setting range: 0 ～ 1 【0】

0：invalid 1：effective

PB-10 Non-stop frequency drop rate	Setting range: 0.00Hz / s to the maximum frequency (P0-12) / s [10.00Hz / s]
PB-11 Instantaneous stop non-stop voltage rise judgment time	Setting range: 0.00s to 100.00s [0.50s]
PB-12 Non-stop operation judgment voltage	Setting range: 60.0% ～ 100.0% (standard bus voltage) [80.0%]

Explanation:

This function means that when the power is cut off suddenly or the voltage suddenly drops, the inverter will reduce the output frequency and compensate the load's DC bus voltage reduction by reducing the output frequency to keep the inverter running.

If PB-09 = 1, the inverter will decelerate when the power is cut off or the voltage suddenly drops. When the bus voltage returns to normal, the inverter will normally accelerate to the set frequency. The basis for judging that the bus voltage returns to normal is that the bus voltage is normal and the duration exceeds the PB-11 set time.

In PB-12, 100% corresponds to the standard bus voltage, 220V models correspond to 310V, 380V models correspond to 537V

PB-13 Automatic fault reset times	Setting range: 0 ～ 10 【0】

Explanation:

When the inverter selects fault automatic reset, it is used to set the number of automatic resets. After this number of times, the inverter remains in a fault state.

PB-14 Selection of fault relay action during fault automatic reset	Setting range: 0 ～ 1 【0】

0：No action 1：action

Explanation:

If the inverter is equipped with an automatic fault reset function, whether the multi-function digital port Y operates during the automatic fault reset can be set through PB-14.

PB-15 Failure automatic reset interval	Setting range: 0.1s to 60.0s [1.0s]

Explanation:

Waiting time from inverter fault alarm to automatic fault reset.

PB-16 Automatic reset times for fault clear time	Setting range: 0.1h to 1000.0h [1.0h]

Explanation:

Interval time for the inverter to automatically clear the number of automatic resets. For example, the number of

automatic fault resets is set to 10, and the number of automatic fault reset times is set to 1h. If there are more than 10 failures in 1 hour, the failure will not be reset automatically and need to be cleared manually; but if there is no failure within 1 hour after 5 failures, the previous 5 failures will be cleared , Recount the number of times the fault occurred.

PB-17 Input phase loss protection selection	Setting range: 0 ～ 1 【1】

0：invalid 1：effective

Explanation:

Select whether to protect input phase loss or contactor pull-in.

The inverter below 45KW calculates the change of the bus voltage after the internal bus voltage sampling software calculates whether to input the phase loss. The phase loss protection and the protection threshold and time are determined by PB-18 and PB-19.

PB-18 Input phase loss detection reference	Setting range: 1% to 100% [100%]
PB-19 Enter missing item detection time	Setting range: 2s to 255s [10s]

Explanation:

Threshold and time for phase loss protection for power input below 380V voltage level 45KW. The detection reference 1% corresponds to 8V, and the default 100% is forbidden input phase loss protection. This function can detect input phase loss or serious three-phase imbalance to protect the inverter. If the input phase loss is too sensitive, you can increase the detection time of the reference PB-18 and PB-19. On the contrary, the detection time of the detection reference PB-18 and PB-19 is reduced.

PB-20 Output phase loss protection selection	Setting range: 0 ～ 1 【1】

0：invalid 1：effective

PB-21 Output phase loss protection time	Setting range:1s ～ 255s【10s】

Explanation:

Select whether to protect the output phase loss and the output phase loss protection time. If the output phase loss is too sensitive, you can increase the detection time PB-21 appropriately; otherwise, decrease the detection time PB-21.

PB-22 Rectifier bridge temperature	Predetermined area:-10℃～100℃【-】
PB-23 Inverter module heat sink temperature	Predetermined area:-10℃～100℃【-】

Explanation:

PB-22 displays the current temperature of the inverter rectifier bridge; PB-23 displays the temperature of the inverter module heat sink.

PB-24 First failure type	Setting range:0～99【-】
PB-25 Second fault type	Setting range:0～99【-】
PB-26 Third (last) fault type	Setting range:0～99【-】

Explanation:

Displays the type of the last three faults of the inverter. The fault types are shown in the following table:

Code	Fault type	Code		Code	
0	Trouble-free	14	Module overheating	28	Keep
1	Inverter unit protection	15	External fault	29	Keep
2	Accelerated overcurrent	16	Communication timeout failure	30	Keep
3	Deceleration overcurrent	17	Contactor pull-in failure	31	Failure of PID feedback during operation
4	Constant speed overcurrent	18	Current detection failure	32	Software overcurrent fault
5	Accelerated overvoltage	19	Motor tuning failure	33	Keep
6	Deceleration overvoltage	20	Keep	34	Keep
7	Constant speed over voltage	21	EEPROMRead and write failure	35	Keep
8	Buffer resistor overload fault	22	Keep	36	Keep
9	Undervoltage fault	23	Motor short to ground fault	37	Keep
10	Inverter overload	24	Keep	38	Keep
11	Motor overload	25	Motor over temperature	39	Keep
12	Input phase loss	26	Arrival time	40	Fast Current Limit Timeout Fault
13	Output phase loss	27	User-defined fault input via multi-function terminal 1	41	Switching motor failure
				42	Excessive speed deviation
				43	Motor over speed fault
				51	Wrong initial position

PB-27 Frequency at fault	Predetermined area:--【-】
PB-28 Current at fault	Predetermined area:--【-】
PB-29 Bus voltage at fault	Predetermined area:---【-】
PB-30 Input terminal status during fault	Predetermined area:---【-】
PB-31 Output terminal status during fault	Predetermined area:---【-】

Explanation:

Display the status parameters of the inverter when it was last faulted.

PB-32 Undervoltage point selection	Predetermined area:60.0%～140.0%【100.0%】

Explanation:

Single-phase 220V:100.0% corresponding bus voltage 200.0V

Three-phase 380V: 100.0% corresponds to bus voltage 350.0V

Used to set the voltage value of inverter undervoltage fault E09.

PB-33 Zero current detection level	Setting range:0.0%～300.0%【5.0%】

100.0% corresponds to the rated current of the motor.

PB-34 Zero current detection delay time	Setting range:0.01s～600.00s【0.10s】

Explanation:

When the output current of the inverter is less than or equal to the zero-current detection level and the duration exceeds the zero-current detection delay time, the multi-function digital port Y of the inverter outputs an ON signal.

PB-35 Overpressure point coefficient	Setting range:120.0%～150.0%【150.0%】

Explanation:

Over-voltage point threshold adjustment, used to set the voltage value of the inverter over-voltage fault. For three-phase 380V models, 120% corresponds to 648V and 150% corresponds to 810V. For 220V models, 120% corresponds to 318V and 150% corresponds to 397V.

PB-36 Motor temperature sensor type	Setting range:0～2【0】

0：No temperature sensor　　1：PT100

2：PT1000

note:
When PT100 is selected, the jumper J3 on the control board uses a shorting cap to connect 2-3 pins, and PT1000 is short to 1-2 pins.

PB-37 Motor overheating protection temperature	0～200【110】

Explanation:

When the motor temperature exceeds the motor overheating protection temperature PB-37, the inverter alarms E25 and handles it according to the selected fault protection PB-49 action mode.

PB-38 Motor overheating pre-alarm threshold	0～200【90】

Explanation:

The temperature signal of the motor temperature sensor is connected to the PT and GND terminals. The inverter supports PT100 and PT1000 motor temperature sensors. The sensor type must be set correctly when using it. The motor temperature value is displayed in U0-34. When the motor temperature exceeds the motor overheating protection threshold PB-37, the inverter fault alarms and handles according to the selected fault protection action mode (PB-49). When the motor temperature exceeds the motor overheating pre-alarm threshold PB-38, the inverter multi-function digital input Y outputs the motor over-temperature pre-alarm ON signal.

PB-39 Fault protection enable selection	00000～11111【00000】

Explanation:

This function code is used to shield some faults. For example, E51 fault will be reported when the motor is started without a motor under vector control. If you want to run without a motor, you can set this parameter to 1. The specific parameter meanings are shown in the following table:

Bit	Value	Features
Singles	0	EnableE51 malfunction
	1	ForbidE51 malfunction
Ten	0	EnableE42 malfunction
	1	ForbidE42 malfunction
hundreds	0	EnableE43 malfunction
	1	ForbidE43 malfunction
Thousands	0	Enable E19 failure caused by abnormal back-EMF during parameter identification
	1	E19 failure caused by abnormal back-EMF during parameter identification is prohibited
Million	0	Enable E32 fault
	1	Disable E32 fault

PB-40 Over speed detection value	0.0～50.0%【20.0%】
PB-41 Over speed detection time	0.0～60.0s【1.0s】

Explanation:

This function is only valid when the inverter is running with speed sensor vector control. When the inverter detects that the actual speed of the motor exceeds the maximum frequency, the excess value is greater than the overspeed detection value PB-40, and the duration is greater than the overspeed detection time PB- At 41 o'clock, the inverter fault alarm E43, and deal with it according to the fault protection action mode. When the overspeed detection time is 0.0s, the overspeed fault detection is canceled.

PB-42 Excessive speed deviation detection value	0.0～50.0%【20.0%】
PB-43 Excessive speed deviation detection time	0.0～60.0s【5.0s】

Explanation:

This function is only valid when the inverter is running with speed sensor vector control. When the inverter detects that the actual speed of the motor deviates from the set frequency, the deviation is greater than the excessive speed deviation detection value PB-42, and the duration is greater than the speed. When the deviation is too large and the detection time is PB-43, the inverter fault alarm E42 will be handled according to the fault protection action mode. When the excessive speed deviation detection time is 0.0s, the excessive speed deviation fault detection is cancelled.

PB-44 Starting voltage of braking unit	350.0V～800.0V（Model settings）【780.0V】

Explanation:
The starting voltage Vbreak of the built-in braking unit. Refer to this voltage value setting: 800> Vbreak> (1.414Vs +30)
Vs: AC power voltage input to the inverter
Note: Improper voltage setting may cause the braking unit to run abnormally.

PB-48 Fault protection action selection 1	0～2【00000】

Explanation:

Single digit: motor overload (E11)

0: Free stop　　1: stop according to stop mode

2: keep running

Tens place: input phase loss (E12) (same place)
Hundreds place: output phase loss (E13) (same place)
Thousands place: external fault (E15) (same place)
Tens place: communication error (E16) (same place)

PB-49 Fault protection action selection 2	0～1【00000】

Explanation:

Units: reserved

Tens place: Function code read / write abnormal (E21)

0：Free stop　　1：Shut down

Hundreds: reserved

Thousands: Motor overheating (E25) (same as PB-48)

Tens of thousands: Operation time reached (E26) (same as PB-48)

PB-50 Fault protection action selection 3	0～2【00000】

Explanation:

Unit: User-defined fault 1 (E27) (same as PB-48)

Tens place: reserved

Hundreds: reserved

Thousands: reserved

Ten thousand bits: PID feedback is lost during operation (E31) (same as PB-48 bits)

PB-51 Fault protection action selection 4	0～2【00000】

Explanation:

Unit digits: Excessive speed deviation (E42) (same as PB-48 digits)

Tens place: motor overspeed (E43) (same as PB-48 place)

Hundreds place: Initial position error (E51) (same as PB-48 bits). Sometimes the motor inductance may be extremely large and cause a false alarm. You can set this function to 0.

Thousands: reserved

Thousands: reserved

When “Free stop” is selected, the inverter displays E ** and stops directly.

When “Stop by Stop Mode” is selected: the inverter displays E **, and stops by stop mode

When “Continue” is selected: the inverter continues to run.

5.13 Second motor parameter (PC group)

PC-00 Second motor type selection	2【2】

2： Permanent magnet synchronous motor

PC-01 Second motor motor rated power	0.2kW～1000.0kW【Model determination】
PC-02 Second motor motor rated voltage	0V～2000V【Model determination】
PC-03 Second motor motor rated current	0.1A～6553.5A【Model determination】
PC-04 Second motor motor rated frequency	0.01Hz～Maximum frequency（P0-12）【Model determination】
PC-05 Second motor motor rated speed	1rpm～65535rpm【Model determination】

Explanation:

The above function codes are the parameters of the second group of motor nameplates provided by the inverter, which are the same as those of the first group (P1 group). The user can switch between the two sets of parameters through the terminal as required.

PC-12 2nd synchronous motor stator resistance	0～60000【Tuning parameters】
PC-13 D-axis inductance of 2nd synchronous motor	0～60000【Tuning parameters】
PC-14 Q axis inductance of 2nd synchronous motor	0～60000【Tuning parameters】
PC-15 2nd synchronous motor inductance and resistance unit	0～12【Tuning parameters】
PC-16 Back-EMF of 2nd synchronous motor	0～60000【Tuning parameters】

Explanation:

The above function codes are the second group of motor parameters, which are the same as those of the first group (P1 group). It is obtained by tuning the second set of nameplate parameters of the motor. If it is impossible to tune the synchronous motor on site, you can enter the corresponding function code above according to the parameters provided by the motor manufacturer.

PC-15:

Units are used to set the unit of inductance,

0: Inductance unit is microhenry (μH);

1: The unit of inductance is 10μH;

2: The unit of inductance is 100uH.

Ten digits are used to set the resistance unit,

0: Resistance unit is milliohm (mΩ);

1: The unit of resistance is 10mΩ.

5.14 Torque control parameters (PD group)

PD-00 Speed / torque control mode selection	0～1【0】

0：speed control 1：Torque control

Used to select the inverter control mode: speed control or torque control. Note: This function code cannot be used to switch during inverter operation.。

PD-01 Selection of torque setting source in torque control mode	0～6【0】

0：Digital setting (PD-03) 1：PULSE pulse

2：AI1 3：AI2

4：Communication given 5：MIN(AI1,AI2)

6：MAX(AI1,AI2)

PD-01 is used to select the torque setting source. There are 7 types of torque setting methods.

The torque setting adopts a relative value, and 100.0% corresponds to the rated torque of the motor. The setting range is -200.0 ～ 200.0%, which indicates that the maximum torque of the inverter is 2 times the rated torque of the inverter. When the torque reference is positive, the inverter runs forward; when the torque reference is negative, the inverter runs reverse.

0: Digital setting (PD-03)

Refers to the target torque directly using the PD-03 set value.

1: AI1 2: AI2

The target torque is determined by the analog input terminal. The inverter control board provides two analog input terminals (AI1, AI2). AI1 is a 0 to 10V voltage input. AI2 can be a 0 to 10V voltage input or a 0 to 20mA current input. It is jumped by SW7 on the control board. Line selection.

The corresponding relationship curve between the input voltage values of AI1 and AI2 and the target torque can be freely selected by users through P2-13 ～ P2-17 (AI1), P2-19 ～ P2-23 (AI2).

The analog is used as the frequency reference, and the voltage / current input corresponds to 100.0% of the setting, which refers to the percentage of the relative torque digital setting PD-03.

3. PULSE pulse (X5)

The target torque is given by the high-speed pulse of terminal X5. Pulse given signal specifications: voltage range 9 ～ 30V, frequency range 0 ～ 50kHz. Pulse reference can only be input from multi-function input terminal X5. The relationship between the input pulse frequency of the X5 terminal and the corresponding setting is set through P2-25 ～ P2-29. The corresponding relationship is a 2-point straight line correspondence. The corresponding setting of the pulse input is 100.0%, which refers to the relative torque number. Set the percentage of PD-03.

4.Communication given

Refers to the target torque given by the communication method. When using Modbus communication, the data is given by the host computer through the communication address 0x1000. The data format is data with 2 decimal places, and the data range is -P0-12 ~ + P0-12.

PD-03 Digital setting of torque in torque control mode	200.0% ～ 200.0%【150.0%】
PD-05 Maximum torque forward frequency	0.00Hz ～Maximum frequency【50.00Hz】
PD-06 Torque control reverse maximum frequency	0.00Hz ～Maximum frequency【50.00Hz】

Explanation:

In torque control, the acceleration / deceleration time of the upper frequency limit can be set by P0-17 (acceleration) / P0-18 (deceleration) or P5-04 (acceleration) / P5-05 (deceleration). PD-05 and PD-06 are used to set the maximum forward or reverse running frequency of the inverter in torque control mode. When the inverter torque control, if the load torque is less than the motor output torque, the motor speed will continue to increase. To prevent accidents such as speeding in the mechanical system, the maximum motor speed must be limited during torque control. If you need to dynamically change the maximum frequency of the torque control, you can use the method of controlling the upper limit frequency.

PD-07 Torque acceleration time	0.00～650.00s【0.00s】
PD-08 Torque deceleration time	0.00～650.00s【0.00s】

Explanation:

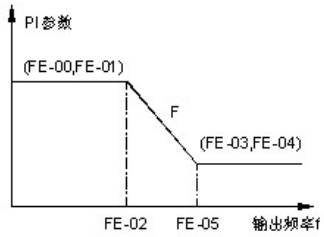
In torque control mode, the difference between the output torque of the motor and the load torque determines the rate of change of the speed of the motor and the load. Therefore, the speed of the motor may change rapidly, causing problems such as noise or excessive mechanical stress. By setting the acceleration / deceleration time of the torque control, the speed of the motor can be changed gently. It is not recommended to set the torque acceleration / deceleration time in the torque control with small torque start; if the torque acceleration / deceleration time is set, it is recommended to appropriately increase the speed filter coefficient; when fast torque response is required, set the torque control acceleration / deceleration time It is 0.00s. For example: two motors are hard-connected and drag the same load. To ensure the load is evenly distributed, set one inverter as the master and adopt the speed control method, and the other inverter as the slave and adopt the torque control. The torque is used as the torque command of the slave. At this time, the torque of the slave needs to quickly follow the master, so the torque control acceleration / deceleration time of the slave is 0.00s.

5.15 Vector control parameters (PE group)

PE-00 Vector control parameters (PE group)	1～6000【200】
PE-01 Low-speed speed PI adjustment scale factor	1～6000【100】
PE-02 Speed PI switching frequency point 1	0～PE-05【1.00】
PE-03 High-speed speed PI adjustment integration coefficient	1～6000【80】
PE-04 High-speed PI adjustment scaling factor	1～6000【40】
PE-05 Speed PI switching frequency point 2	PE-02～最大频率【5.00】

Explanation:

The inverter runs at different frequencies, and can choose different speed loop PI parameters. When the running frequency is less than the switching frequency 1 (PE-02), the speed loop PI adjustment parameters are PE-00 and PE-01. When the running frequency is greater than the switching frequency 2, the speed loop PI adjustment parameters are PE-04 and PE-05. The speed loop PI parameters between switching frequency 1 and switching frequency 2 are linearly switched between the two sets of PI parameters, as shown in the figure below:



5-14-1 Schematic diagram of PI parameters

By setting the proportional coefficient and integration time of the speed regulator, the speed dynamic response characteristics of the vector control can be adjusted. Increasing the proportional gain and decreasing the integration time can speed up the dynamic response of the speed loop. However, if the proportional gain is too large or the integration time is too small, the system may oscillate. The recommended adjustment method is: if the factory

parameters do not meet the requirements, fine-tuning based on the factory value parameters, first increase the proportional gain to ensure that the system does not oscillate; then reduce the integration time to make the system have faster response characteristics, The tone is smaller.

Note: Improper PI parameter setting may cause excessive speed overshoot. Even an overvoltage fault occurs when the overshoot drops.

PE-10 Torque upper limit source selection (electric)	0～6【0】

0：Set by function code PE-11　　1：Set by pulse input

2：AI1　　3：AI2

4：Communication given　　5：MIN(AI1,AI2)

6：MAX(AI1,AI2)

PE-11 Digitally set torque current (electric)	0.0%～200.0%【150.0%】

PE-12 Torque upper limit source selection (power generation)	0～6【0】

0：Set by function code PE-13　　1：Set by pulse input

2：AI1　　3：AI2

4：Communication given　　5：MIN(AI1,AI2)

6：MAX(AI1,AI2)

PE-13 Digitally set torque current (power generation)	0.0%～200.0%【150.0%】

Explanation:

In speed control mode, the maximum value of inverter output torque is controlled by the torque upper limit source. PE-10 is used to select the setting source of the torque upper limit. When setting by analog, X5 terminal pulse, communication, 100% of the corresponding setting corresponds to PE-11, and 100% of PE-11 corresponds to the motor. Rated output current. For the setting of AI1 and AI2, please refer to the related introduction of the analog input curve of group P2 (selected by P2-13 ～ P2-17 (AI1), P2-19 ～ P2-23 (AI2)), and the pulse of X5 terminal see P2-25 ～ P2- 29 Introduction When the communication setting is selected, the host computer writes -100.00% to 100.00% data through the communication address 0x1000, of which 100.00% corresponds to PE-11.

PE-12 and PE-13 can be set appropriately when the power generation needs to be restricted or prohibited. The full range corresponding to options 1 to 7 in PE-10 and PE-12 corresponds to PE-11 and PE-13, respectively.

PE-16 Field weakening	0～2【1】

0：Direct calculation　　1：Automatic adjustment

2：Not weak

PE-17 Field weakening current coefficient	0～120【80】
PE-18 Adjustment factor	1～10【4】
PE-19 Field weakening output voltage adjustment factor	0～100【0】

Explanation:

The actual field weakening current is equal to the theoretical field weakening current multiplied by the field weakening current coefficient. The larger the PE-17 setting, the larger the field weakening current, and the better the dynamic effect of the motor after field weakening. However, it is too easy to cause shock, and is generally set to 80.

Effective when the field weakening control mode is automatic adjustment. Used to set the speed of adjusting the field weakening current. The larger PE-18, the faster the field weakening current can be adjusted, and it can quickly approach the required minimum field weakening current, which is too easy to cause shock. Normally set to 4.

PE-19 is used to adjust the voltage output value during field weakening. The larger the PE-19, the higher the output voltage and the smaller the current during field weakening.

PE-21 Overspeed frequency coefficient	0～200【140】

Explanation:

It is used to set the upper limit of the speed overspeed alarm in percentage of the maximum frequency (P0-12). When the speed exceeds the set speed, E43 fault will be reported.

note:

When the motor is not connected, the identification speed may be incorrect, and sometimes E43 fault is reported. At this time, it can be set to 0 to shield the fault.

PE-22 High-speed speed filter coefficient	4～512【56】

Explanation:

Set the speed filter coefficient above PE-05 frequency, generally set to 56.

PE-23 Low speed speed filter coefficient	4～512【16】

Explanation:

Set the speed filter coefficient below the frequency of PE-02, generally set to 16.

PE-24 Low-speed carrier frequency	15～80【20】

Explanation:It is used to set the low-speed carrier frequency, the unit is 0.1kHz, and it is generally set to 20.

PE-25 Low-speed excitation current	0～100【20】

Explanation:

During parameter identification, the percentage of the rated current of the motor is used to set the current that the motor runs when the motor recognizes the back-EMF coefficient. If the back-EMF coefficient is recognized, the current must be increased if the motor does not rotate. Set the minimum output current at low speed during normal operation. When the output voltage is small, a certain minimum current is required for the motor to run normally.

note:

Decreasing the PE-25 setting can reduce the no-load current at low speed, but it may affect the output torque. Generally, this parameter does not need to be changed.

PE-30 Special processing parameters	0～200【0】

Explanation:

The single digit is a special processing parameter of the current loop. Due to the large ripple current of small-inductance motors, it is sometimes necessary to amplify the current loop PI adjustment parameter, and the amplification factor is the ten-digit value of PE-30. Too much amplification sometimes leads to loss of control of the current and the motor emits high-frequency electromagnetic noise.

The tens place is the resistance estimation coefficient. Determine the speed of resistance estimation. If resistance compensation is needed, the tens place is generally set to 1.

PE-31 Speed estimation parameter 1	1～1000【20】
PE-32 Speed estimation parameter 2	1～1000【30】

Explanation:

For two speed estimation parameters, for debugging parameters, the user should not change.

PE-33 Start preset current	0～200【0】

Explanation:

Set the torque current at startup as a percentage of the rated motor current.

PE-37 Start the initial position detection method	0～1【1】

0：Do not detect initial position 1：Detection of initial position mode 1

PE-38 Initial position detection pulse current	0～200【120】
PE-39 Initial position detection time	0～60000【Tuning parameters】

Explanation:

The initial position angle detection is generally used for SVC. Its advantage is that there is no reversal at startup. The disadvantage is that there is a certain sound. For situations where reverse rotation is not allowed at startup and the motor rotor position will change after stopping, PE-37 Must be set to 1, otherwise it can be set to 0.

PE-38 can set the detected current value. The smaller the current is, the lower the sound will be, but too small may cause the position detection to be inaccurate. This value will be modified automatically after parameter identification, there is no need to modify it later. PE-39 will not be restored when the factory parameters are restored.

PE-45 D-axis current PI adjustment integration coefficient	0～6000【200】
PE-46 D-axis current PI adjustment scale factor	0～6000【300】
PE-47 Q-axis current PI adjustment integration coefficient	0～6000【200】
PE-48 Q-axis current PI adjustment scale factor	0～6000【300】

Explanation:

Vector control current loop PI adjustment parameter. This parameter will be obtained automatically after tuning, and generally does not need to be modified. It should be reminded that instead of using the integral time as a dimension, the integral regulator of the current loop directly sets the integral gain. If the current loop PI gain is set too large, the entire control loop may oscillate. Therefore, when the current oscillation or torque fluctuation is large, you can manually reduce the PI proportional gain or integral gain here.

5.16 Manufacturer parameters (PF group)

PF-00 Factory password	0 ～ 65535【Model determination】

Explanation:

PF-00 is the factory parameter group password. To access the factory parameters, you must enter the correct factory password.

5.17 Function code management (PP group)

PP-00 user password	0～65535【0】

Explanation:

If PP-00 is set to any non-zero number, the password protection function takes effect. The next time you enter the menu, you must enter the password correctly, otherwise you cannot view and modify the function parameters. Please remember the user password you set.

If PP-00 is set to 00000, the user password will be cleared and the password protection function will be invalid.

PP-01 Parameter initialization	0～2【0】

0：No operation 1：Restore factory value

2：Clear log information

Explanation:

1. Restore factory settings. After setting PP-01 to 1, most of the inverter's functional parameters are restored to the factory's factory parameters, but the motor parameters, fault record information, and accumulated running time are not restored.

2. Clear the record information. Clear the inverter fault record information and accumulated running time.

PP-02 Parameter write protection	0～2【0】

0：All parameters can be modified 1：Except for the set frequency (P0-11), user password and this parameter, all parameters cannot be modified.

2：All parameters except user password and this parameter cannot be modified.

Explanation:

The user can set whether the function code parameters can be modified to prevent the danger of the function parameters being changed by mistake. When the function code is set to 0, all function codes can be modified; when set to 1 or 2, the function takes effect.

PP-03 Parameter display mode	0～1【0】

0：Show all parameters 1：Display only parameters that are different from the factory parameters

Explanation:

The inverter provides two sets of parameter display modes: all parameter modes and user-change parameter modes.

When the user changes the parameter mode, a symbol C is added by default before the user-defined function code.

For example: P1-00, when the user changes the parameter mode, the display effect is CP1-00

5.18 AIAO correction (A0 group)

A0-00 AI1实测电压1	设定范围：0.500～4.000V【出厂校正】
A0-01 AI1 Display voltage 1	0.500～4.000V【Factory calibration】
A0-02 AI1 Measured voltage 2	6.000～9.999V【Factory calibration】
A0-03 AI1 Display voltage 2	6.000～9.999V【Factory calibration】
A0-04 AI2 Measured voltage 1	0.500～4.000V【Factory calibration】

A0-05 AI2 Display voltage 1	0.500～4.000V【Factory calibration】
A0-06 AI2 Measured voltage 2	6.000～9.999V【Factory calibration】
A0-07 AI2 Display voltage 2	-9.999～10.000V【Factory calibration】

Explanation:

This group of function codes is used to correct the analog input port to eliminate the influence of zero offset and gain of the analog input port.

This group of function parameters has been calibrated when leaving the factory. When it is restored to the factory value, it will be restored to the value after factory calibration. Generally, no calibration is required at the application site. The measured voltage refers to the actual voltage measured by a measuring instrument such as a multimeter, and the displayed voltage refers to the voltage display value sampled by the inverter. See the U0-21 voltage (U0-21, U0-22) display before the calibration.

During calibration, input two voltage values to each analog input port, and separately input the value measured by the multimeter and the value read by the U0 group into the above function code, and the inverter will automatically perform the analog input port. Correction of zero offset and gain. For the occasion where the user's given voltage does not match the actual sampling voltage of the inverter, the on-site correction method can be used to make the inverter sampling value consistent with the expected reference value. Take AI1 as an example.

Given AI1 voltage signal (around 2V)

Actually measure the voltage value of AI1 and save it into function parameter A0-00

View the display value of U0-21, and save the function parameter A0-01

Given AI1 voltage signal (around 8V)

Actually measure the voltage value of AI1 and store it into function parameter A0-02

View the display value of U0-21 and save it into function parameter A0-03

When correcting AI2, the actual sampling voltage viewing positions are U0.22

For AI1 and AI2, it is recommended to use 2V and 8V as the correction points.

A0-08 AO1 Target voltage 1	0.500～4.000V【Factory calibration】
A0-09 AO1 Measured voltage 1	0.500～4.000V【Factory calibration】
A0-10 AO1 Target voltage 2	6.000～9.999V【Factory calibration】
A0-11 AO1 Measured voltage 2	6.000～9.999V【Factory calibration】
A0-12 AO2 Target voltage 1	0.500～4.000V【Factory calibration】
A0-13 AO2 Measured voltage 1	0.500～4.000V【Factory calibration】
A0-14 AO2 Target voltage 2	6.000～9.999V【Factory calibration】
A0-15 AO2 Measured voltage 2	6.000～9.999V【Factory calibration】

Explanation:

This group of function codes is used to correct the analog output AO. This group of function parameters has been calibrated when leaving the factory. When it is restored to the factory value, it will be restored to the value after factory calibration. Generally, no calibration is required at the application site. The target voltage refers to the theoretical output voltage value of the inverter. The measured voltage refers to the actual output voltage value measured by instruments such as a multimeter.

5.19 U0 monitoring parameters (U0 group)

The U0 parameter group is used to monitor the running status of the inverter. Customers can view it through the panel to facilitate on-site debugging, or read the parameter group value through communication for monitoring by the upper computer. The communication address is 0x7000 ～ 0x7043. Among them, U0-00 ～ U0-31 are the running and shutdown monitoring parameters defined in P5-48 and P5-49.

U0-00 Operating frequency	0.00～630.00Hz
U0-01 Set frequency	

Explanation:

Displays the absolute value of the theoretical operating frequency and set frequency of the inverter. See U0-19 for the actual output frequency of the inverter

U0-02 bus voltage	0.0～3000.0V
U0-03 The output voltage	0～999V
U0-04 Output current	0.0～6553.5A
U0-05 Output Power	0～3276.7KW
U0-06 Output torque	-200.0%～200.0%

Explanation:

The output torque unit is percentage, which is relative to the rated torque percentage. Positive numbers represent electric and negative numbers represent power generation.

U0-07 X terminal input status	0～32767

Explanation:

Displays the current X terminal input status value. After converted to binary data, each bit corresponds to an X terminal input signal. A value of 1 indicates that the input is a high-level signal, and a value of 0 indicates that the input is a low-level signal. The corresponding relationship between each bit and the input terminal is as follows:

Bit0	Bit1	Bit2	Bit3
X1	X2	X3	X4
Bit4	Bit5	Bit6	Bit7
X5	X6	X7	X8
Bit8	Bit9	Bit10	Bit11
X9	X10		

U0-08 Y output status	0～1023

Explanation:

Displays the current Y terminal output status value. After converted to binary data, each bit corresponds to a Y signal. A value of 1 indicates that the output is high, and a value of 0 indicates that the output is low. The corresponding relationship between each bit and output terminal is as follows:

Bit0	Bit1	Bit2	Bit3
DOR	Relay 1	Relay 3	Y1
Bit4	Bit5	Bit6	Bit7

Y2			

U0-09 AI1 Voltage（V）	0.00～10.57V

U0-10 AI2 Voltage (V) / current（mA）	0.00～10.57V

U0-12 Count value	0～65535
U0-13 Length value	0～65535

U0-14 Load speed display	0～65535

Explanation:

See P5-45 for the displayed value.

U0-15 PID set up	0～65535
U0-16 PID Feedback	0～65535

Explanation:

Display PID set value and feedback value, the value format is as follows:

PID setting = PID setting (percent) × P6-05

PID feedback = PID feedback (percent) × P6-05

U0-18 X5 terminal input pulse frequency	0.00～100.00kHz

Explanation:

Display X5 high-speed pulse sampling frequency, the minimum unit is 0.01kHz

U0-19 Feedback speed	-320.00～320.00Hz

Explanation:

Display The actual output frequency display range of the inverter is -320.00 ～ 320.00Hz.

U0-21 AI1 Voltage before calibration	0.000～10.570V
U0-22 Voltage before AI2 correction	0.000～10.570V

Explanation:

Displays the analog input sampled voltage / current actual value.

The voltage / current actually used is linearly corrected so that the deviation between the sampled voltage / current and the actual input voltage / current is smaller. See U0-09 and U0-10 for the actual correction voltage / current, and see the introduction of group A0 for the correction method.

U0-24 Line speed	0～65535 M / min

Explanation:

Displays the line speed of high-speed pulse sampling at the X5 terminal, in meters / minute. According to the actual number of sampling pulses per minute and P7-07 (pulses per meter), calculate the linear velocity value.

U0-25 Current power-on time	0～65535分钟
U0-26 Current running time	0～6553.5分钟

Explanation:

The maximum current power-on time is 65535 minutes, and it will not increase after 65535 minutes. The

maximum current running time is 6553.5 minutes, and it will not increase any more than 6553.5.

U0-27 PULSEInput pulse frequency	0～65535Hz

Explanation:

Display X5 terminal high-speed pulse sampling frequency, unit is 1Hz. It is the same data as U0-18, except that the displayed unit is different.

U0-28 Communication setting	-100.00% ～ 100.00%

Explanation:

Display the data written by the communication address 0x1000

U0-30 Main frequency X display	0.00～630.00Hz
U0-31 Auxiliary frequency Y display	0.00～630.00Hz
U0-34 Motor temperature value	0℃～200℃

Explanation:

Display the motor temperature value sampled by PT. For the motor temperature detection, please refer to PB-37.

U0-35 Target torque	-200.0%～200.0%

Explanation:

Display the current torque upper limit set value

U0-59 Set frequency	-100.0%～100.0%
U0-60 Operating frequency	-100.0%～100.0%

Explanation:

The current set frequency and running frequency are displayed. 100.00% corresponds to the maximum frequency (P0-12) of the inverter.

U0-61 Inverter running status	0～65535

Explanation:

Display inverter running status information, the data definition format is as follows:

U0-61	Bit0	0：Downtime；1：Forward；2：Reverse
	Bit1	
	Bit2	0：Constant speed；1：accelerate；2：slow down
	Bit3	
	Bit4	0：Bus voltage is normal；1：Undervoltage

U0-62 Current fault code	0～99

Explanation:

Display the current fault code

U0-65 Upper torque limit	
U0-66 Excitation current reference	-8192～8192
U0-67 Torque current reference	-8192～8192

Explanation:

The current output excitation current and torque current are displayed, and the display reference is Q12 format.

For example:

Excitation current:

410, corresponding to 10% of rated current

-819, corresponding to the field weakening state, which is 20% of the rated current

Torque current:

410, corresponding to electric 10% rated current

-819, corresponding to the power generation state, which is 20% of the rated current

Chapter 6 Troubleshooting and Troubleshooting

6.1 Fault information and troubleshooting

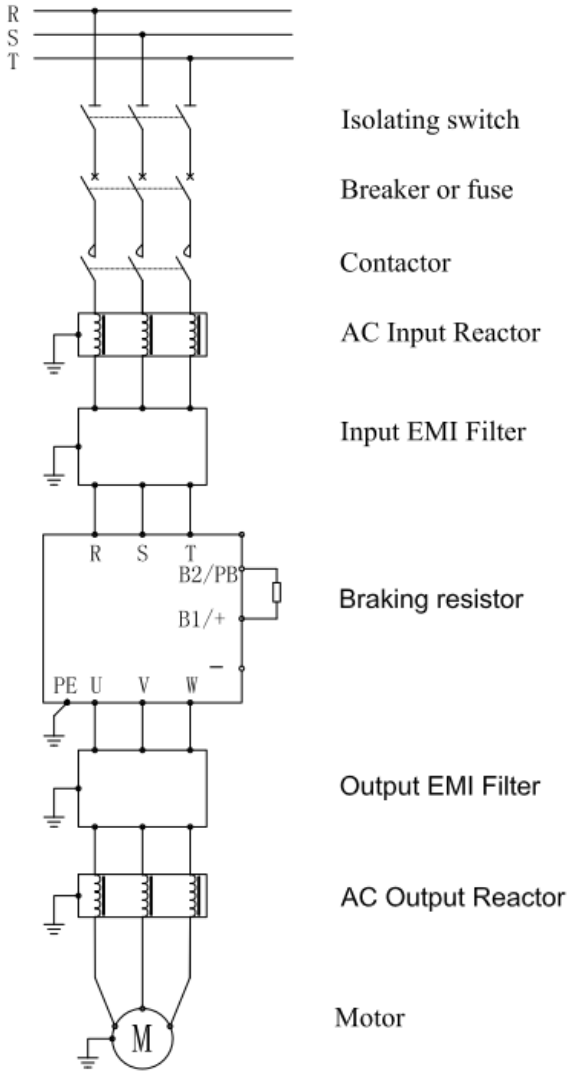
Fault name	Operating surface Board display	Troubleshooting cause	Countermeasures
Inverter unit protection	E01	1.Inverter output circuit is short-circuited 2.Motor and inverter wiring is too long 3.The module is overheating 4.The internal wiring of the inverter is loose 5.The main control board is abnormal. 6.Drive board is abnormal 7, inverter module is abnormal	1.Remove peripheral faults 2.Install reactor or output filter 3.Check whether the air duct is blocked, the fan is working normally, and eliminate the problem. 4.Plug all the cables 5. Seek technical support 6. Seek technical support 7. Seek technical support
Accelerated overcurrent	E02	1.The output circuit of the inverter is grounded or short-circuited 2.The control mode is vector without parameters Identify 3.The acceleration time is too short 4. Manual torque boost or V / F curve is not suitable 5.Low voltage 6.Start the rotating motor 7. Sudden load during acceleration 8.Inverter selection is too small	1.Remove peripheral faults 2.Identify motor parameters 3.Increase acceleration time 4.Adjust manual lifting torque or V / F curve 5.Adjust the voltage to the normal range 6, select the speed tracking start or wait until the motor stops 7.Cancel sudden load 8.Select a higher power inverter
Deceleration overcurrent	E03	1.The output circuit of the inverter is grounded or short-circuited 2.The control mode is vector without parameters Identify 3.The deceleration time is too short 4.Low voltage 5. Sudden load increase during deceleration 6.No braking unit and braking resistor are installed	1.Remove peripheral faults 2.Identify motor parameters 3.Increase the deceleration time 4.Adjust the voltage to the normal range 5.Cancel sudden load 6.Install braking unit and resistor
Constant speed overcurrent	E04	1.The output circuit of the inverter is grounded or short-circuited 2.The control mode is vector without parameters Identify 3.Low voltage 4.Is there any sudden load during operation? 5.The selection of the inverter is too small	1.Remove peripheral faults 2.Identify motor parameters 3.Adjust the voltage to the normal range 4.Cancel sudden load 5.Select a higher power inverter
Accelerated overvoltage	E05	1.The input voltage is too high 2.External force drags the motor during acceleration Row 3.The acceleration time is too short 4. No braking unit and braking resistor are installed	1.Adjust the voltage to the normal range 2. Cancel the additional power or install a braking resistor 3.Increase acceleration time 4.Install braking unit and resistor
Deceleration overvoltage	E06	1.The input voltage is too high 2.External force drags the motor during deceleration. Row 3.The deceleration time is too short 4. No braking unit and braking resistor are installed	1.Adjust the voltage to the normal range 2. Cancel the additional power or install a braking resistor 3.Increase the deceleration time 4.Install braking unit and resistor
Constant speed over voltage	E07	1.The input voltage is too high 2.External force drags the motor during operation. Row	1.Adjust the voltage to the normal range 2. Cancel the additional power or install a braking resistor

Fault name	Operating surface Board display	Troubleshooting cause	Countermeasures
Buffer resistor overload fault	E08	1.The input voltage is not within the scope of the specification	1.Adjust the voltage to the range required by the specification
Undervoltage fault	E09	1. Instantaneous power failure 2.The input voltage of the inverter is not in the specification Range 3.The bus voltage is abnormal 4.The rectifier bridge and buffer resistance are abnormal. 5.The driver board is abnormal 6.The control board is abnormal	1.Reset fault 2.Adjust the voltage to the normal range 3. Seek technical support 4. Seek technical support 5. Seek technical support 6. Seek technical support
Inverter overload	E10	1. Whether the load is too large or the motor stalls 2.Inverter selection is too small	1. Reduce the load and check the motor and mechanical conditions 2.Select a higher power inverter
Motor overload	E11	1. Whether the motor protection parameter Pb-01 is set properly 2. Whether the load is too large or the motor is blocked 3.The selection of the inverter is too small	1.Set this parameter correctly 2. Reduce the load and check the motor and mechanical conditions 3.Select a higher power inverter
Input phase loss	E12	1.Three-phase input power is abnormal 2.The driver board is abnormal. 3.The lightning protection board is abnormal 4.The main control board is abnormal.	1.Check and eliminate problems in peripheral circuits 2. Seek technical support 3. Seek technical support 4. Seek technical support
Output phase loss	E13	1.The lead from the inverter to the motor is abnormal 2. When the motor is running, the inverter three-phase output is uneven. Weigh 3.The driver board is abnormal 4.Module exception	1.Remove peripheral faults 2.Check whether the three-phase winding of the motor is normal and remove the fault 3. Seek technical support 4. Seek technical support
Module overheating	E14	1.The ambient temperature is too high 2.The air duct is blocked 3.The fan is damaged 4.The module thermistor is damaged 5.Inverter module is damaged	1. Reduce the ambient temperature 2.Clean the air duct 3.Replace the fan 4.Replace the thermistor 5.Replace the inverter module
External device failure	E15	Signal of external fault input through multi-function terminal X	1.Reset operation 2.Reset operation
Communication timeout failure	E16	1. The upper computer is not working properly 2.The communication line is abnormal 3.The communication expansion card is abnormal 4.Communication parameter PA group setting is incorrect	1.Check the upper computer wiring 2.Check the communication cable 3. Correctly set the type of communication expansion card 4. Correctly set communication parameters
Contactor pull-in failure	E17	1.The driver board and power supply are abnormal. 2.The contactor is abnormal	1.Check if the contactor cable is loose 2.Check if the contactor is faulty 3.Check whether the contactor 24V power supply is faulty. 4. Seek manufacturer services
Current detection failure	E18	1.Check Hall device for abnormality 2.The driver board is abnormal.	1.Replace Hall device 2.Replace the driver board

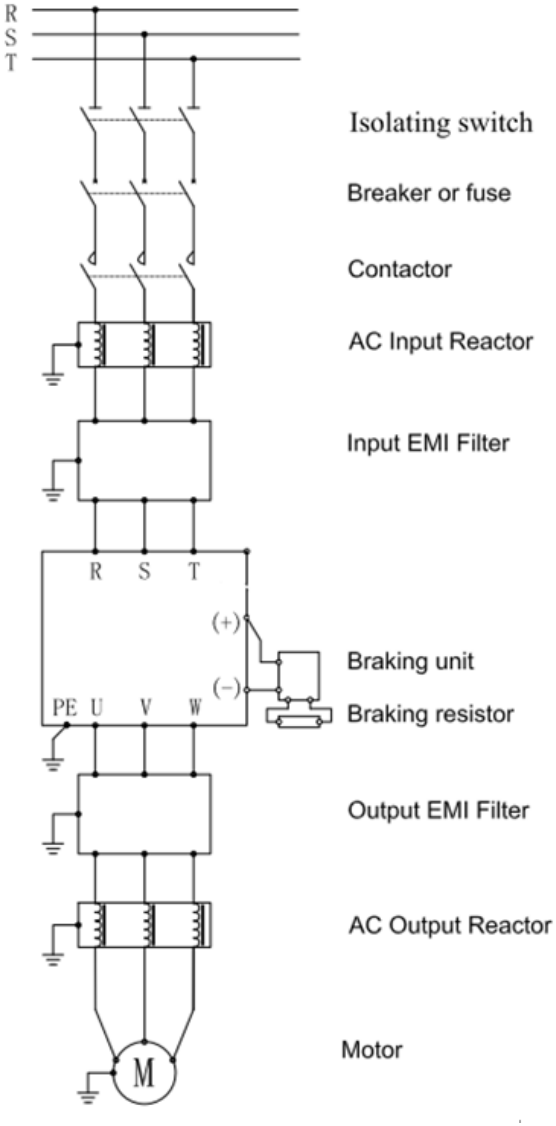
Fault name	Operating surface Board display	Troubleshooting cause	Countermeasures
Motor tuning failure	E19	1.The motor parameters are not set according to the nameplate 2. The parameter identification process has timed out	1.Set the motor parameters correctly according to the nameplate 2.Check the lead from the inverter to the motor 3. Check if the motor is demagnetized, it will not run normally after demagnetization
		3. Back EMF abnormal during dynamic identification	4Check whether the motor runs to about 40% of the rated frequency during the identification process. If not, the motor may be overloaded. You can increase the PE-25 parameter to identify it again. If it still does not reach 40% of the rated frequency, it needs to be disconnected for identification. 5. If it is confirmed that there is no problem with the back electromotive coefficient, it can be run after resetting the fault.
EPROMRead and write failure	E21	1、EEPROM Chip damage	1、Replace the main control board
Motor short to ground fault	E23	1、Motor short to ground	1、Replace the cable or motor
Motor over temperature fault	E25	1.The temperature sensor wiring is loose 2.The motor temperature is too high	1.Check the temperature sensor wiring and troubleshoot 2. Reduce the carrier frequency or take other cooling measures to cool the motor.
Arrival time	E26	1. Cumulative running time reaches the set value	1.Use the parameter initialization function to clear the record information
User-defined fault 1	E27	User-defined fault signal via multi-function terminal input	Reset operation
Failure of PID feedback during operation	E31	PID feedback is less than the set value of P6-28	Check the PID feedback signal or set P6-28 to a suitable value
Software overcurrent fault	E32	When the current exceeds the software over-current point (P5-25) and the duration reaches the software over-current detection delay time (P5-26), a fault E32 (software over-current fault) is reported.	1. Check if the output current is too large, reduce the load and check the motor and mechanical conditions 2.Check if the setting value of P5-25.P5-26 is too small
Fast current limit fault	E40	1. Whether the load is too large or the motor stalls 2.Inverter selection is too small	1. Reduce the load and check the motor and mechanical conditions 2.Select a higher power inverter
Switching motor failure	E41	1. During terminal operation, change the terminal Change current motor selection	1.After the inverter is stopped, switch the motor.
Excessive speed deviation	E42	1.The encoder parameters are set incorrectly 2.Motor stall 3. Excessive speed deviation detection parameters PB-42, PB-43 are not set reasonably 4.The wiring from the inverter's output UVW to the motor is abnormal	1.Set the encoder parameters correctly 2. Check whether the machine is abnormal, whether the motor is parameter tuning, and whether the torque setting is too small. 3. Excessive speed deviation detection parameters PB-42, PB-43 are not set reasonably 4.Check whether the wiring between the inverter and the motor is disconnected
Motor over speed fault	E43	1.The encoder parameters are set incorrectly 2. No parameter tuning 3.The motor over-speed detection parameters PB-40 and PB-41 are not set properly.	1.Set the encoder parameters correctly 2.Tune motor parameters 3. Reasonably set the detection parameters according to the actual situation
Initial position detection failure	E51	Motor parameters are too different from actual parameters	1.Reconfirm whether the motor parameters are correct 2.Check whether the motor output phase is missing or not connected to the motor line

Chapter 7 Peripheral Equipment

7.1 Peripheral equipment and optional connection diagrams



7-1 3R75GB-3022GBPeripheral equipment connection diagram



7-2 3030GAnd above peripheral equipment connection diagram

7.2 Functional description of peripherals

7-1 Function of each peripheral device

Peripherals and options	breaker	Contactor	* AC reactor	* EMI filter	* Braking unit and braking resistor
Description	Used to quickly cut off the fault current of the inverter and prevent the inverter and its wiring from causing power failure	Cut off the main power when the inverter fails, and prevent power failure and restart after failure	Used to improve the input power factor, reduce higher harmonics and suppress power surges	Used to reduce radio interference from the inverter. When the wiring distance between the motor and the inverter is less than 20 meters, it is recommended to connect to the power supply side, and when the wiring distance is greater than 20 meters, connect to the output side	Select when the braking torque cannot meet the requirements, suitable for occasions with large inertia loads and frequent braking or fast stopping

Note: Those with * are optional。

- The AC input reactor can suppress the higher harmonics of the input current of the inverter and significantly improve the power factor of the inverter. It is recommended to use the AC reactor in the following situations:
- □ The ratio of the power supply capacity to the capacity of the inverter is more than 10: 1.
- □ A thyristor load or a power factor compensation device with switch control is connected to the same power supply.
- □ Large voltage imbalance of three-phase power supply (≥3%)

7.2.2 Braking unit and braking resistor

This series of 15kw and below inverters have a built-in braking unit. When energy-consuming braking is required, the user only needs to connect an external braking resistor. 18.5kw to 93kw, optional braking unit. 110kw and above models do not have a built-in braking unit. If energy-consuming braking is required, an external braking unit is required. The built-in braking unit includes a control part, a driving part, and a discharge resistor. The control part should be adjusted according to the overvoltage protection action value of this series of inverters. If the discharge resistance part is equipped with overheat protection, it is recommended that its control contact should be connected to the main control circuit.

The general braking rate is 10%. Refer to the following table for the braking resistor resistance and power:

7-2 Corresponding table of motor power and braking resistance selection

Voltage（V）	Motor Power（kW）	Resistance（Ω）	Resistance power（kW）	Voltage（V）	Motor Power（kW）	Resistance（Ω）	Resistance power（kW）
Single phase 220	0.4	200	0.1	**Three-phase 380**	55	20/2	12
	0.75	150	0.2		75	13.6/2	18
	1.5	100	0.4		93	20/3	18
	2.2	75	0.5		110	20/3	18
Three-phase 380	0.75	300	0.4		132	20/4	24
	1.5	300	0.4		160	13.6/4	36
	2.2	200	0.5		185	13.6/4	36
	4	200	0.5		200	13.6/5	45
	5.5	100	0.8		220	13.6/5	45
	7.5	75	0.8		250	13.6/5	45
	11	50	1		280	13.6/6	54
	15	40	1.5		315	13.6/6	54
	18.5	30	4		355	13.6/7	63
	22	30	4		400	13.6/8	72
	30	20	6		450	13.6/8	81
	37	16	9		500	13.6/8	90
	45	13.6	9				

Almost all the regenerative energy of the motor is consumed by the braking resistor during braking. The braking power can be calculated according to the following formula:

$$U \times U \div R = Pb$$

In the formula, R is the resistance value of the selected braking resistor, U is the braking voltage when the system is braking stably (different systems are different, generally 700V for 380VAC systems; 350V for 220VAC), and Pb is braking power. Theoretically, the power of the braking resistor is the same as the braking power, but generally the derating should be considered to be 70%. The power required by the braking resistor can be calculated according to the following formula:

$$0.7 \times Pr = Pb \times D$$

In the formula, Pr is the power of the braking resistor, and D is the braking rate (the ratio of the regeneration process to the entire working process), which can be selected with reference to the following table:

7-3 Braking rate reference table

Application	elevator	Uncoiling and unwinding	Centrifuge	Accidental braking load	General application
Braking rate	20%～30%	20～30%	50%～60%	5%	10%

7.2.3 leakage protector

Because there are safety capacitors or distributed capacitors to the ground inside the inverter, the motor, and the input and output leads, and because this series of inverters are low-noise types, the carrier used is high. Therefore, the earth leakage current of the inverter is large, and the large-capacity models are more obvious, and sometimes even the leakage protection circuit malfunctions.

When encountering the above problems, in addition to properly reducing the carrier frequency, shortening the leads, and installing the output reactor, a leakage protector should also be installed. When installing and using a leakage protector, pay attention to the following points:

The leakage protector should be placed on the input side of the inverter, and it is more suitable to be located behind the circuit breaker.

The operating current of the earth leakage protector should be more than 10 times the leakage current (sum of the leakage current of the line, EMI filter, motor, etc.) when the line is not used under the power supply of the frequency converter.

7.2.4 Capacitor box

This option is specially used in situations where the power supply sometimes needs to run continuously when the power outage is longer (more than 20ms).
It can be ordered from our company. The size of the actual load and the time required for continuous operation after a power outage should be stated at the time of ordering for our company to manufacture.
It is not recommended for users to install this option because this option will affect some parameters in the machine.

Chapter 8 Maintenance

Danger

1. Do not touch the terminals of the inverter. There is high voltage on the terminals. There is danger of electric shock.
2. Before powering on, be sure to install the terminal cover. When removing the cover, be sure to disconnect the power supply. There is danger of electric shock.
3. Turn off the power of the main circuit and confirm that the CHARGE LED is off before performing maintenance and inspection.
Danger of residual voltage on electrolytic capacitors.
4. Non-professional technical personnel, please do not carry out maintenance and inspection work. There is danger of electric shock.

note

1. CMOS integrated circuits are installed on the keyboard board, control circuit board, and driver circuit board. Please pay special attention when using them. Touch the circuit board directly with your fingers. Static induction may damage the integrated chip on the circuit board.
2. Do not change the wiring or remove the terminal wires while the power is on. There is danger of electric shock.
3. Do not check the signal during operation. Will damage the equipment.

8.1 Care and maintenance

Since the inverter is a typical product combining power electronics technology and microelectronic technology, it has the dual characteristics of industrial equipment and microelectronic devices. Changes in the environment in which the inverter is used, such as the effects of temperature, humidity, smoke, and the aging of the internal components of the inverter, may cause various failures of the inverter. Therefore, in order to make this product operate normally for a long time, it is necessary to carry out daily inspection and regular (3 months or 6 months) maintenance of the inverter during storage and use.

8.1.1 Routine maintenance

When the inverter is turned on normally, please confirm the following:

- Whether the motor has abnormal sound and vibration.

- Whether the inverter and motor are abnormally hot;
- Whether the ambient temperature is too high;
- Is the load current meter the same as usual?
- Whether the cooling fan of the inverter is running normally;
- Whether the braking resistor is well insulated from the ground.
- Table 8-1 shows the daily maintenance and inspection contents.

8-1 Points of routine maintenance inspection content and precautions

Serial number	Check item	Check parts	Inspection matters	judgement standard
1	display	LED display	Show if there is any abnormality	Determine according to the use state (if there is no display after power on, you can check whether the braking resistor and the ground insulation are good)
2	cooling system	Fan	Whether the rotation is flexible, whether there is abnormal sound, whether the dust is clogged	nothing unusual
3	Ontology	Inside the case	Temperature rise, abnormal noise, odor, dust accumulation	nothing unusual
4	Use environment	surroundings	Temperature, humidity, dust, harmful gases, etc.	As specified in Section 2.2
5	Voltage	Input and output terminals	Input and output voltage	According to Appendix 2 Technical Specifications
6	load	Motor	Temperature rise, abnormal noise, vibration	nothing unusual

8.1.2 Regular maintenance

During the periodic maintenance and inspection of the inverter, be sure to cut off the power. Only after the monitor has no display and the main circuit power indicator goes out for 5 to 10 minutes, can the inspection be performed to prevent the residual voltage of the inverter capacitor from hurting the maintenance personnel.
The regular maintenance and inspection contents are shown in Table 8-2.

8-2 Regular maintenance inspection content

Check item	Check content	Countermeasure
Screws for main circuit terminals and control circuit terminals	Whether the screws are loose	Tighten with a screwdriver
heat sink	Whether there is dust	Blow it out with dry compressed air at a pressure of 4 ～ 6kg / cm2
PCB printed circuit board	Whether there is dust	Blow it out with dry compressed air at a pressure of 4 ～ 6kg / cm2
cooling fan	Whether the rotation is flexible, whether there is abnormal sound, abnormal vibration, whether there is dust or clogging	Replace the cooling fan to remove dust and foreign matter
Power element	Whether there is dust	Blow it out with dry compressed air at a pressure of 4 ～ 6kg / cm2

Electrolytic capacitor	Whether discoloration, odor, bubbling, leakage, etc.	Replace electrolytic capacitor
Braking resistor	Is it well insulated from the ground	Keep the braking resistor in a dry, insulated place

During the inspection, do not disassemble or shake the device at will, and do not unplug the connector at will, otherwise it may cause the inverter to fail to run normally or enter the fault display state, or even cause the device to fail or damage the main switching device IGBT module or other devices.

When you need to measure, you should pay attention to that different instruments may get different measurement results. It is recommended to use a dynamic coil voltmeter to measure the input voltage, a bridge voltmeter to measure the output voltage, a clamp-type ammeter to measure the input and output current, and an electric wattmeter to measure the power. When conditions are not met, the same table can be used for measurements and records to facilitate comparison.

If waveform testing is required, it is recommended to use an oscilloscope with a sweep frequency greater than 40MHz. It is advisable to use an oscilloscope with a frequency above 100MHz when testing transient waveforms. The oscilloscope must be electrically isolated before testing.

When the power supply is severely asymmetric or the three-phase current is unbalanced, it is recommended to use the three wattmeter method to measure the power.

Since this product has been tested for electrical insulation and dielectric strength before leaving the factory, users do not need to perform such tests and each such test will reduce the product's insulation withstand voltage level. Improper such tests may even be possible Cause damage to product components. If such tests are indeed required, it is recommended that they be performed by a skilled technician.

If the main circuit withstand voltage test is performed, a pressure withstand device with an equivalent capacity that can be set for time and leakage current must be used. This test will reduce product life. For the main circuit insulation test, the main circuit terminals R, S, T, U, V, W, PB (P1), +,-, etc. must all be reliably short-circuited, and then a megohmmeter with a similar voltage level (250V for 250V level For 380V, use 500V, for 660V, use 1000V). The control loop cannot be measured with a megohmmeter, it can be measured with a multimeter resistance file.

For 380V products, the insulation resistance to ground of the main circuit should not be less than 5MΩ, and the insulation resistance to ground of the control circuit should not be less than 3MΩ.

8.1.3 Regularly replaced devices

In order to make the inverter run reliably for a long time, it is necessary to regularly perform maintenance and maintenance on the service life of the electronic components inside the inverter. The service life of the electronic components of the inverter is different due to the different environment and conditions. In general continuous use, it can be replaced as specified in the table below. It should also depend on the specific conditions such as the use environment, load conditions and the status of the inverter.

As shown in Table 8-3, the maintenance period of the inverter is only for users' reference.

8-3 Frequency converter replacement time

Device name	Standard replacement years
cooling fan	2～3year
Electrolytic capacitor	4～5year
A printed circuit board	5～8year

8.2 Storage and protection

The inverter is not used immediately after purchase. When it needs to be stored temporarily or for a long time, it should be done as follows:

 It should be placed in a well-ventilated place within the specified temperature and humidity range without humidity, dust, metal dust.

 If it has not been used for more than one year, a charging test should be performed. In order to restore the characteristics of the main circuit electrolytic capacitor in the machine. When charging, you should use a voltage regulator to slowly increase the input voltage of the inverter to the rated voltage.

 The above tests should be performed at least once a year.

Do not carry out withstand voltage experiments at will, it will cause the life of the inverter to decrease, and even damage the product components. For the insulation test, a 500V megohmmeter can be used for the measurement test, and its insulation resistance must not be less than 4MΩ.

Chapter 9 Quality Assurance

The quality guarantee of this product is handled according to the following regulations:

The warranty scope only refers to the inverter itself. The warranty period starts from the date of shipment from the company. The warranty period of this product is twelve months after purchase, but does not exceed 24 months after the date of manufacture stated on the nameplate.

If the failure is caused by the following reasons, even during the warranty period, it is a paid repair:

- Problems caused by incorrect operation or self-repair and modification without permission;
- Problems caused by using the inverter beyond the standard specifications;
- Damage caused by drop or rough handling after purchase;
- Device aging or failure caused by using in an environment that does not meet the requirements of this user manual;
- The inverter is damaged by foreign objects (such as insects) entering from the outside;
- The inverter is damaged due to incorrect connection lines;
- Failures caused by earthquakes, fires, feng shui disasters, lightning strikes, abnormal voltages, or other natural disasters and their causes.

For products that fail, the company has the right to entrust others to take care of the warranty.

The quality assurance content that is indeed our responsibility, when used in China:

- Replacement, return and warranty within one month of shipment;
- Replacement and warranty within three months of shipment;
- Warranty within 12 months of shipment.

When shipped overseas, it will be guaranteed within three months after shipment. Relevant service costs are calculated based on actual costs, and if there is an agreement, the principle of agreement will be given priority.

The company's sales and agents throughout the country can provide after-sales service for this product.

Additional information:

About exemption

- The company cannot take responsibility for the liability caused or induced by the use of this product in violation of the provisions of this user manual;
- The company is not responsible for compensation for loss or pervasive and secondary damages caused to you by the failure of this product.

Notes for users:

This user manual is only applicable to this series of products.

The company has a lifetime responsibility for this product and provides all services related to the use of this product.

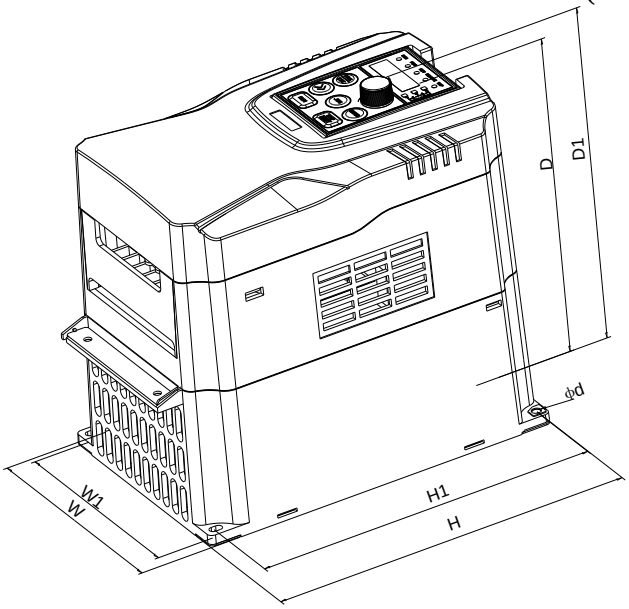
Although this product is designed and manufactured under strict quality control, if you use it for the following purposes that may endanger the human body or its life due to its malfunction or operation error, please ask us in advance.

- Used for transportation equipment;
- medical devices;
- nuclear energy and power equipment;
- Aviation and space equipment;
- various safety devices;
- Other special uses.

Regarding hope for users:

We sincerely hope that customers will put forward suggestions on the product design, performance, quality and service of the company, and we will greatly appreciate it.

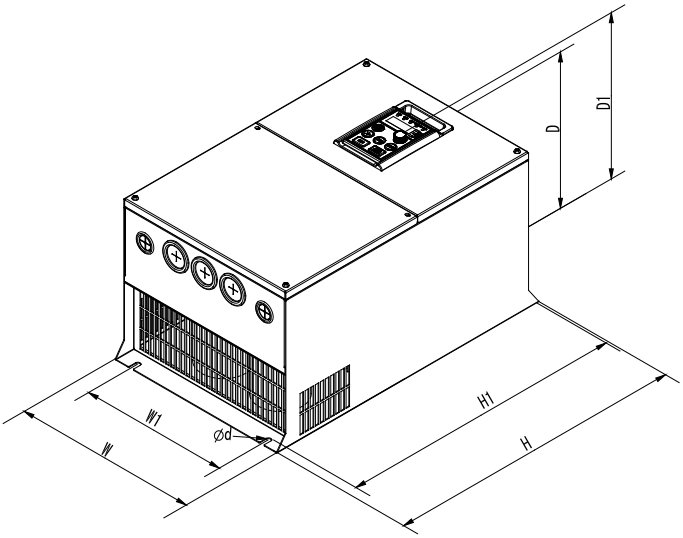
Appendix 1 Dimensions and Installation Dimensions (Unit: mm)



A1-1 Schematic diagram

A1-1 Dimensions (Unit: mm)

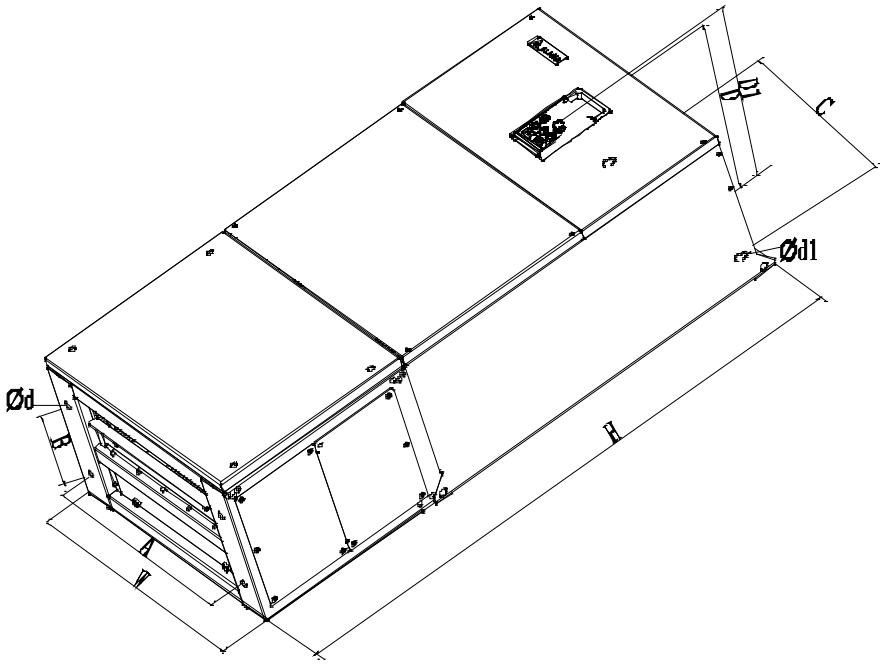
Dimensions (Unit: mm)	specification	H	H1	W	W1	D	D1	d
A5T	S21R5GB~S22R2GB 3R75GB~32R2GB	195	175	120	110	162	172	4.5
	3004GB~35R5GB	210	182	130	119	175	185	4.5
	37R5GB~3011GB	255	238	180	166	191	200	7
	3015GB/3018PB~3018GB/3022PB	295	284	180	135	210	220	6



A1-2 Schematic diagram

A1-2 Dimensions (Unit: mm)

Product Series	specification	H	H1	W	W1	D	D1	d
A5T	3022GB	375	360	235	193	184	199	8
	3030G～3037G	460	440	285	230	188	203	8
	3045G～3055G	535	512	320	180	231	250	8
	3075G～3093G	560	542	375	245	274	292	8
	3110G～3132G	657	630	458	338	285	303	10
	3160G～3200G	809	783	520	420	360	378	10



A1-3 Schematic diagram

A1-3 Dimensions (Unit: mm)

Product Series	specification	H	W	D	D1	A	B	C	Φd	Φd1
A5T	3220G～3250G	1274	620	385	404	550.5	239	420	14	12

Appendix 2 Technical Specifications

Model information

series	model	Input power	battery capacity（kVA）	Input Current（A）	Output current（A）	Adapted motor（kW）
A5T	S21R5GB	3PH 380V 50 / 60Hz Voltage range: 304 ～ 456V Voltage imbalance rate: less than 3% Frequency imbalance rate: less than ± 5%	2.8	13.1	7.0	1.5
	S22R2GB		4.0	23	10	2.2
	3R75GB	3PH 380V 50 / 60Hz Voltage range: 304 ～ 456V Voltage imbalance rate: less than 3% Frequency imbalance rate: less than ± 5%	1.6	3.7	2.5	0.75
	31R5GB		3.2	5.4	4.0	1.5
	32R2GB		4.8	7.0	6.0	2.2
	3004GB		6.0	10.7	9.0	4
	35R5GB		8.6	15.5	13.0	5.5
	37R5GB		11.2	20.5	17.0	7.5
	3011GB		17.0	26.0	25.0	11
	3015GB		21.0	35.0	32.0	15
	3018GB		24.0	38.5	37.0	18.5
	3022GB		30.0	46.5	45.0	22
	3030G		40.0	62.0	60.0	30
	3037G		50.0	76.0	75.0	37
	3045G		60.0	92.0	90.0	45
	3055G		72.0	113.0	110.0	55
	3075G		100.0	157.0	152.0	75
	3093G		116.0	180.0	176.0	93
	3110G		138.0	214.0	210.0	110
	3132G		167.0	256.0	253.0	132
	3160G		200.0	307.0	304.0	160
	3185G		230.0	350.0	342.0	185.0
	3200G		250.0	385.0	380.0	200.0
	3220G		280.0	430.0	426.0	220.0
	3250G		320.0	500.0	480.0	250.0

Other technical data

Rated output voltage	0～Rated input voltage
Overload current	G type machine: 150% for 1 minute, 180% for 20 seconds;
control method	Current vector control / VF control
Frequency accuracy	Digital instruction ± 0.01% (-10 ℃ ～ + 40 ℃) Analog instruction ± 0.01% (25 ℃ ± 10 ℃)
Set frequency resolution	Digital instruction 0.01Hz; analog instruction 1/1000 maximum frequency
Output frequency resolution Output frequency resolution Output frequency resolution	0.01Hz
Frequency setting signal	0～10V，0～20mA
Acceleration and deceleration time	0 ～ 1800 seconds (independent setting of acceleration and deceleration time)
Braking torque	Additional braking resistance up to 125%
Protective function	Over-voltage, under-voltage, current limit, over-current, overload, electronic thermal relay, over-heat, over-voltage stall, load short circuit, grounding, under voltage protection, input phase loss, output phase loss, short circuit to ground and phase, motor overload Protection, etc.
Use ambient temperature	-10℃～+40℃
humidity	5 ～ 95% RH (non-condensing)
Storage temperature	-40℃～+70℃
Use place	Indoor (no corrosive gas)
Installation site	Altitude is not higher than 1000 meters, no dust, no corrosive gas and no direct sunlight.
vibration	Less than 5.9m / s2 (0.6g)
Protection class	IP20

Appendix 3 Modbus communication protocol of inverter

1 Overview

A5T series inverters provide RS485 communication interface and support Modbus communication protocol. The user can implement centralized control through a computer or PLC. Through this communication protocol, the inverter runs commands, modifies or reads function code parameters, and reads the operating status and fault information of the inverter.

2.Interface method

RS485: asynchronous, half-duplex.

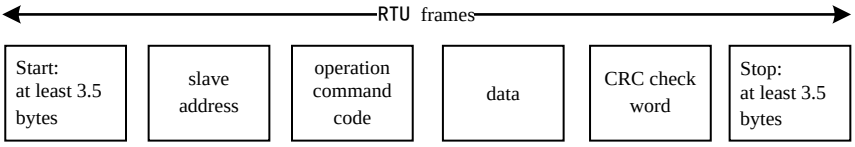
Default data format: 8-N-2 (no parity, 8 data bits, 2 stop bits), 9600BPS.

3.Network structure diagram

The MODBUS protocol includes two transmission modes (RTU mode and ASCII mode). The A5T series inverter only supports RTU mode. The communication byte consists of: a start bit, 8 data bits, a check bit and a stop bit. When there is a parity bit, there is one odd or even parity bit and one stop bit; when there is no parity bit, there are two stop bits.

start bit	BIT0	BIT1	BIT2	BIT3	BIT4	BIT5	BIT6	BIT7	Check bit	stop bit

In RTU mode, new frames always start with a transmission time pause of at least 3.5 bytes. The data fields transmitted are: slave address, operation command code, data, and CRC check word. Each byte transmitted is hexadecimal. The data frame format is as follows:



⑴Frame header and frame end define the frame by the bus idle time is greater than or equal to 3.5 byte time.

After the start of the frame, the gap between characters must be less than 1.5 characters communication time, otherwise the newly received characters will be treated as the new frame header.

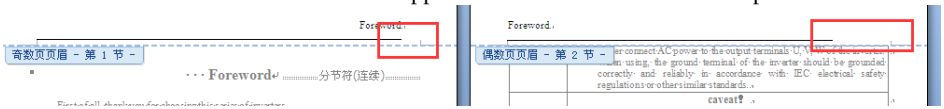
(3) The data check adopts CRC-16. The entire information participates in the check. The high and low bytes of the checksum need to be exchanged and sent.

保持 The bus idle time of at least 3.5 characters can be maintained between frames, and the bus idle between frames does not need to accumulate the start and end idle.

5. Application layer protocols

Read single or multiple data (0x03)

Host sends:



Slave address	xx
Command code	0x03
Start address high order	xx
Lower address	xx
High number of data	xx
Number of data status	xx
CRC check low	xx
CRC check high	xx

Slave response:

Slave address	xx
Command code	0x03
Number of bytes N * 2	N*2
Data 1 high	xx
Data 1 low	xx
	xx
Data N High	xx
Data N low	xx
CRC check low	xx
CRC check high	xx

(1) Write a single data (0x06)

Host sends:

Slave address	xx
Command code	0x06
Register address high order	xx
Register address low order	xx
Write data high	xx
Write data low	xx
CRC check low	xx
CRC check high	xx

Slave response:

Slave address	xx
Command code	0x06

Register address high order	xx
Register address low order	xx

Write data high	xx
Write data low	xx
CRC check low	xx
CRC check high	xx

CRC check

The CRC field is two bytes and contains a 16-bit binary value. It is added to the message after being calculated by the transmission device. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two values are different, there is an error.

The CRC first transfers a 16-bit register whose value is all "1", and then calls a process to process the value of each successive 8-bit byte in the message in the current register. Only the 8-bit data in each character is valid for the CRC, and the start and stop bits and parity are invalid. During the CRC generation, each 8-bit character is XORed with the contents of the register individually, and the result moves to the least significant bit direction, and the most significant bit is filled with 0. The LSB is extracted and detected. If the LSB is 1, the register alone and the preset value or one, or if the LSB is 0, it is not performed. The whole process is repeated 8 times. After the last bit (eighth bit) is completed, the next 8-bit byte is individually ORed with the current value of the register. The final register value is the CRC value after all bytes in the message have been executed. When the CRC is added to the message, the low byte is added first, then the high byte. The following simple functions calculated by CRC are for user reference:unsigned int crc_cal_value(unsigned char*data_value,unsigned char data_length)

```
{
      int I;
      unsigned int crc_value=0xffff;
       while(data_length--)
       {
            crc_value^=*data_value++;
            for(i=0;i<8;i++)
            {
                 if(crc_value&0x0001) crc_value=(crc_value>>1)^0xa001;
                 else crc_value=crc_value>>1;
             }
        }
        return(crc_value);
   }
```

6.Communication parameter address

MODBUS communication includes the reading and writing of function parameters and the reading and writing of some special registers.

Function parameter address definition

The address of the function parameter is a 16-bit word, which is represented by the function code group number and label as the parameter address. High byte: F0 ～ FF (Group P), A0 ～ AF (Group A), 70 (U0 group) Low byte: 00 ～ FF.

For example: P3-12, the address is F30C; A0-01, the address is A001

note:

PF group can neither read parameters nor change parameters;

The U group can only be read, and the parameters cannot be changed.

Some parameters cannot be changed while the inverter is in the running state; some parameters cannot be changed regardless of the state of the inverter; to change the function code parameters, pay attention to the parameter range, unit, and related instructions.

In addition, since the EEPROM is frequently stored, the service life of the EEPROM will be reduced. Therefore, some function codes do not need to be stored in the communication mode, just change the value in the RAM. If it is a P group parameter, to realize this function, just change the high-order F of the function code address to 0. If it is a group A parameter, to realize this function, just change the high-order A of the function code address to 4. The corresponding function code address is represented as follows: high byte: 00 ～ 0F (P group), 40 ～ 4F (group A) low byte: 00 ～ FF

For example: the function code P3-12 is not stored in the EEPROM, the address is 030C; the function code A0-05 is not stored in the EEPROM, the address is 4005; the address indicates that it can only be written to RAM, and cannot be read Is an invalid address. For all parameters, you can also use command code 07H to achieve this function.

When reading the function code parameters, the user can only read the parameters of up to 12 consecutive addresses at a time, and more than 12 inverters will return illegal data errors. When writing function parameters, only one parameter can be written at a time.

Parameter address definition

Parameter address	Parameter Description
1000	* Communication setting value (-10000 ～ 10000) (decimal)
1001	Operating frequency
1002	bus voltage
1003	The output voltage
1004	Output current
1005	Output Power
1006	Output torque
1007	Running speed
1008	DI input flag
1009	Y output flag
100A	AI1 voltage
100B	AI2 voltage
100C	Keep
100D	Count value input
100E	Length value input

Parameter address	Parameter Description
100F	Load speed
1010	PID settings
1011	PID feedback
1012	PLC steps
1013	PULSE input pulse frequency, unit is 0.01kHz
1014	Feedback speed, unit is 0.01Hz
1015	Keep
1016	AI1 Voltage before calibration
1017	AI2 Voltage before calibration
1018	Keep
1019	Line speed
101A	Current power-on time
101B	Current running time
101C	PULSE input pulse frequency, unit is 1Hz
101D	Communication settings,
101E	Encoder feedback speed
101F	Main frequency X display
1020	Secondary frequency Y display

note:

The communication setting value is a percentage of the relative value, 10000 corresponds to 100.00%, and -10000 corresponds to -100.00%. For frequency dimension data, the percentage is a percentage of the relative maximum frequency (P0-12); for torque dimension data, the percentage is PE-11 (digitally set torque current).

Control command input to inverter: (write only)

Command word address	Command function
2000H	0001：Forward running
	0002：Run in reverse
	0003：Forward jog
	0004：Reverse jog
	0005：Free stop
	0006：Deceleration stop (stop according to stop mode)
	0007：Fault reset

Read inverter status: (read-only)

When the inverter reads the running status of the communication, the communication address is fixed at 3000H. The host computer can obtain the current running status information of the inverter by reading the address data, which is defined as follows:

Status word address	Status word function
3000H	0001：Status word function
	0002：Run in reverse
	0003：Downtime

Parameter lock password verification: (If it returns 8888H, it means the password verification passed)

Password address	Enter your password
1F00H	*****

Parameter initialization

This function is needed when the inverter needs to be initialized by the host computer.

If PP-00 (user password) is not 0, then the password verification needs to be performed through communication. After the verification is passed, the host computer will initialize the parameters within 30 seconds.

The communication address for user password verification during communication is 1F00H. Write the correct user password directly to this address to complete the password verification.

The address for communication parameter initialization is 1F01H, and its data content is defined as follows:

Parameter initialization communication address	Command function
1F01H	1 ： Restore factory parameters
	2：Clear log information

Communication setting

The communication setting values are mainly selected by the user as the frequency source, torque upper limit source, VF separated voltage source, PID given source, PID feedback source, etc. as the given data for communication timing. Its communication address is 1000H. When the host computer sets the communication address value, its data range is -10000 ～ 10000, corresponding to the relative given value of -100.00% ～ 100.00%.

Digital output terminal control: (write only)

When the digital output terminal function is selected as 15: communication control, the upper computer can control the digital output terminal of the inverter through this communication address, which is defined as follows:

Command address	Command content
2001H	BIT0: Y1 output control BIT1: Y2 output control BIT2: TA / TB / TC output control BIT3: TA3 / TB3 / TC3 output control BIT4: DOR output control

When the analog output AO1, AO2, and the high-speed pulse output DO output function are selected as 9: communication setting, the upper computer can control the analog and high-speed pulse output of the inverter through this communication address. The definition is as follows:

Analog output AO1 control:

Command address	Command content
2002H	0 ～ 7FFF Express 0％～ 100％

Analog output AO2 control: (write only)

Command address	Command content
2003H	0 ～ 7FFF Express 0％～ 100％

Pulse (PULSE) output control: (write only)

Command address	Command content
2004H	0 ～ 7FFF Express 0％～ 100％

Inverter fault description:

When reading the fault description of the inverter through communication, the communication address is fixed at 8000H. The host computer can obtain the current inverter fault code by reading the address data. For the description of the fault code, see the definition in the function code.

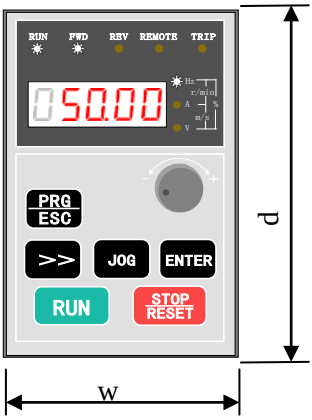
Inverter fault address	Inverter fault information	
8000H	0000: No fault 0001: Inverter unit protection 0002: accelerated overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Accelerated overvoltage 0006: Deceleration overvoltage 0007: Constant speed over voltage 0008: Buffer resistor overload fault 0009: Undervoltage fault 000A: inverter overload 000B: Motor overload 000C: input phase loss 000D: output phase loss 000E: Module is overheating 000F: external fault 0010: Communication error	0011: Contactor abnormal 0012: Current detection failure 0013: Motor tuning failure 0014: Reserved 0015: EPROM read and write errors 0016: Reserved 0017: Motor short to ground fault 0018: Reserved 0019: Motor over temperature fault 001A: Run time arrived 001B: User-defined fault 1 001F: PID feedback lost when running 0020: PID feedback is lost during operation 0028: Fast current limit timeout fault 0029: Switching motor failure during operation 002A: Excessive speed deviation fault 002B: Motor over speed fault 0033: Initial position detection failure

Communication fault information description data (fault code):

Communication failure address	Fault function description
8001H	0000: No fault 0001: Incorrect password 0002: Command code error 0003: CRC check error 0004: Invalid address 0005: Invalid parameter 0006: Parameter change is invalid 0007: The system is locked 0008: Parameter is being stored

Appendix 4 Keyboard and Tray Installation (Opening) Dimensions

4.1 keyboard



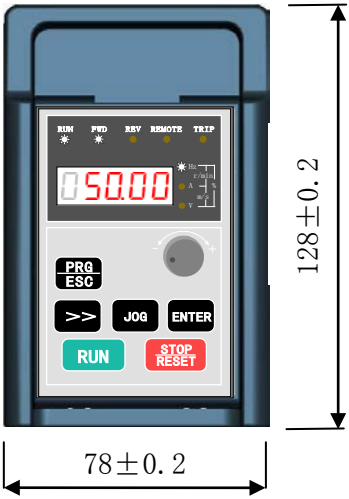
A4-1 Keyboard shape

A4-1 Keyboard installation size (unit: mm)

specification	w	d
S2R4GB～S22R2GB 3R75GB～35R5GB	49±0.2	76.5±0.2
37R5GBAnd above	61±0.2	96.5±0.2

Note: There are two types of keyboards: ordinary keyboards and keyboards with parameter copy function. The two keyboards have the same size.

4.2 Keyboard tray



A4-2 Tray size

Appendix 5 Inverter Warranty Card

Inverter Warranty Card

Name of User:	
Address of User:	
Contact Person:	Tel.:
P.C.:	Fax:
Type:	Serial No.:
Date of Purchase:	Date of Fault:

Fault Details

Motor: _____KW _____Pole	Application of Motor: _____
Fault Occurrence Time: power supply, no-load, load __% Others: _____	
Fault Phenomena:	
Fault Display: OC OL OU OH LU None Others:	
Control Terminal Used:	
Operation after Resetting: Yes No	Output Voltage: Yes No
Total Working Time: _____Hrs	Fault Frequency: _____Hz

Installation Site Details

Power Voltage: U-V: ____ V, V-W: ____ V, W-U: ____V	
Transformer CapAI3ty: KVA	Inverter Earthing: Yes No
Distance from the Power Source: __m	Distance from the Motor: ___m
Vibration: No, Medium, Strong	Dust: No, Medium, Much
Others:	