Preface

Thank you for using A1 series variable frequency drive (VFD).

This series driver adopts the most advanced current vector control technology that features low speed rated torque output and ultra-quiet stable running. They are characterized by diverse control modes, up to 36 perfect protection and alarm functions, on-line monitoring and on-line adjustment of a variety of parameters, built-in RS-485 communication interface, flexible operation, and thus satisfy various needs of users.

This series driver applies to most asynchronous motor applications, including paper making, textile, food, cement, printing and dyeing, plastic machinery, and other industries. As speed controllers, this series driver possesses good adaptability of load, running stability, high precision and good reliability. They can improve the power factor and efficiency, and be used as a power-efficient application.

If you have some problems that can't be solved in operation, please contact the nearest local agents, or contact our company directly.

To ensure the perfect use of this product and the safety of users, please read the user manual carefully before the operation of inverter and keep the manual in proper place for future reference.

The information contained in this manual is subject to change without notice.

Before mounting, commissioning and using the driver, it is strongly suggested that you must read the safety rules and warnings listed in this book and cautions marked on the inverter to ensure your safety and extending the service life of this equipment. When in operation, pay attention to the situation of load and all notes that related to safety.

Note:

The inverters, drivers, AC drives, and variable frequency drives mentioned in the subsequent descriptions of this manual refer to variable frequency drives (VFD).

	**Danger!**
	This equipment contains dangerous voltage. Operations not accordant with this manual might cause life risk and human injury. Only qualified personnel shall wire the drive.
	➢ Please cut off the power before wiring and inspecting. It is not permissible to touch PCB or interior components before battery control lamp goes off or until 5 minutes after the power has been removed. It is necessary to use meters to confirm the charging capacitor has discharged off. Otherwise, a risk of electric shock may happen.
	➢ Don't connect AC power source to the output terminals U, V, W of the driver. When using the driver, the earthing terminal of the driver must be grounded correctly and reliably according to IEC electrical safety regulation.
	**Warning!**
	➢ Unauthorized change of inner wiring and using accessories sold or recommended by unqualified manufacturer may cause fire, electric shock and injury.
	➢ Since body static electricity may cause serious damage to MOS field-effect transistor and other sensitive elements. Please don't touch the interior devices, such as PCB, IGBT module etc. before any measure is taken to prevent static electricity.
	**Caution!**
	➢ Keep all marks and labels are clear to read. Replace the lost or worn mark at any moment.
	➢ Please keep the user manual near the driver that can be reached easily and give this manual to the users who use the product.

Contents

Chapter 1 Purchase Inspection

1.1 Unpacking Inspection

The VFD has passed the strict tests before delivery. After unpacking, please check if the product is damaged by careless transport, whether the product specification and model are complied with the order, and if it has a quality check passed mark. If there is any problem, please contact the supplier.

1.2 Naming Rule

The naming rule of the product is as following

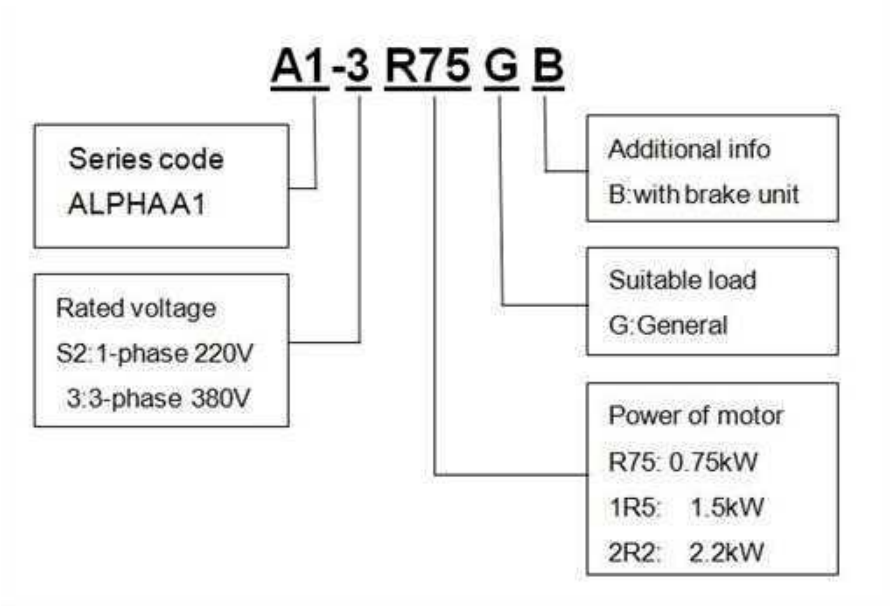


Figure 1-1 Model code

Chapter 2 Installation and Wiring

2.1 Mounting Place Requirements and Management

Attention

◆Don't carry the driver by its cover. The cover cannot support the weight of the driver and the driver may drop.

◆Please install the driver on a strong support, failing which the driver may fall off.

◆Don't install the driver in places where water pipes may leak onto it.

◆Don't allow screws, washers and other metal foreign matters to fall inside the driver, otherwise there is a danger of fire or damage.

◆Don't operate the driver if parts are not complete, otherwise there is a danger of fire or human injury.

◆Don't install the driver under direct sunshine; otherwise, it may be damaged.

◆Don't short circuit PB, + and -, otherwise there is a danger of fire or the driver may be damaged.

◆Cable lugs must be connected to main terminals firmly.

◆Don't apply supply voltage (AC 220V) to control terminals except terminals TA, TB, TC.

Please mount the driver as following instructions and maintain appropriate conditions

2.1.1 Installation Location

The installation location should meet the following conditions:

- ◆ Good indoor ventilation
- ◆ Ambient temperature: -10 °C ~ 40 °C. If the temperature is higher than 40 °C, forced ventilation or derating use is required.
- ◆ Humidity should be lower than 95%, no condensing and rain water drops.
- ◆ Do not mount the driver on the timber or other combustible matters.
- ◆ Avoid direct sunlight.
- ◆ It is strictly prohibited to install the drivers in places where have flammable, explosive, corrosive gases or liquids;
- ◆ Mount in the location free of dust, metal powder, corrosive gas or combustible gas.

- The installation foundation should be solid and free of vibration.
- No electromagnetic interference, away from source of interference.
- Derating use must be considered when the driver is installed at high altitude greater than 1000 m. This is because the cooling effect of driver is deteriorated because of the thin air. Derating 6% per 1000 m above 1000m altitude.

2.1.2 Ambient Temperature

In order to enhance operating reliability of the driver, be sure where the driver mounted has a good ventilation; when the driver is used in a closed case, cooling fans or an air-conditioning must be installed to keep the ambient temperature below 40℃

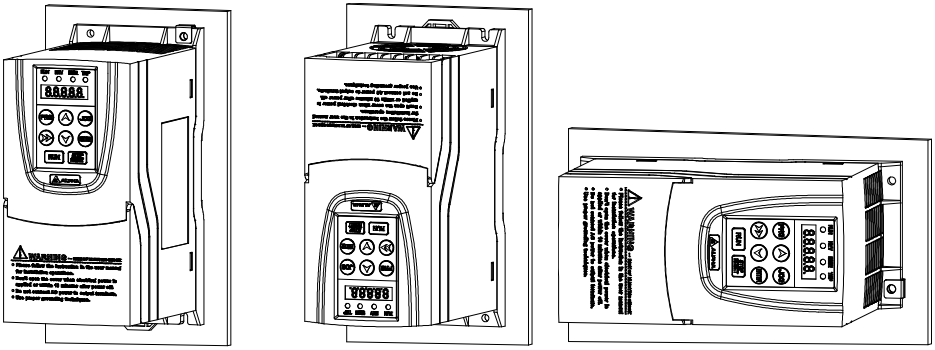
2.1.3 Preventive Measures

During installing, please set a shield to prevent metal debris falling into it, and remove the shield after installing.

Please remove the protection cover board when the ambient temperature is over 40° C or the internal temperature is too high due to other reasons. Otherwise the inverter should be derated. After removing the protection cover, pay attention to avoid small parts falling into the inverter.

2.2 Installation Direction and Space

Inverters of this series are all equipped fans for forced cooling. In order to be an effective cooling cycle, the inverter must be mounted in the vertical direction, up, down, left and right away from adjacent articles or baffle (wall) maintain adequate space, as Figure 2-1, 2-2:



Correct direction Wrong direction (1)(upside down) Wrong direction (2)(transverse)

Figure 2-1 Installation Direction Requirement

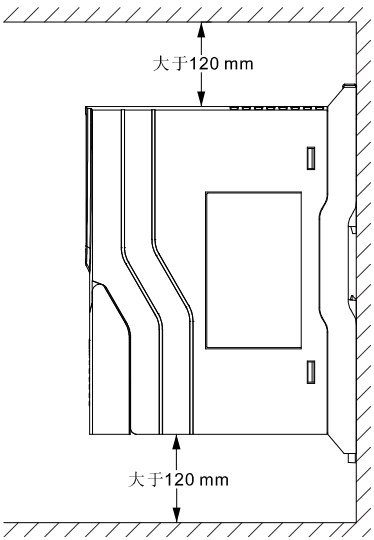


Figure 2-2 Installation Direction and Space

2.3 Main Circuit Wiring

2.3.1 The Main Circuit Terminals Arrangement and Wiring

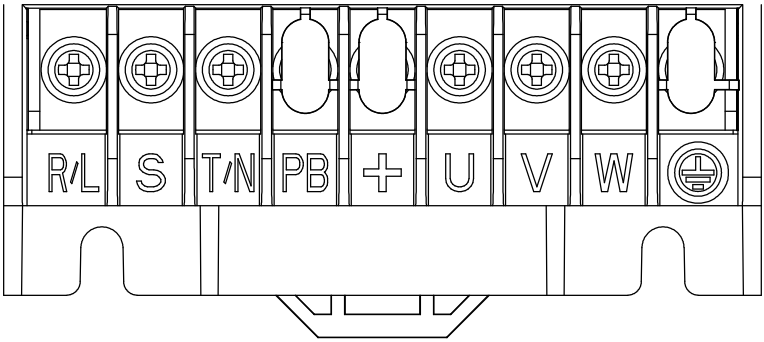


Figure 2-3 Wiring of terminals of main circuit of 1PH 220V 1.5&2.2kW 3PH 380V 0.75-2.2kW

Table 2-1 Description of terminals of main circuit

Terminal symbol	Terminal name and function
L, N / R, S, T	Single-phase AC 220V input terminals or Three-phase AC 380V input terminals
+, PB	Terminals for an external braking resistor
U, V, W	Three-phase AC output terminals
PE	Protective earth terminals for input power or earthing terminals for motor cable shield and braking resistor cable shield.

2.3.2 Main Circuit Wiring Operation

Do not mistakenly connect the input power cable to the output terminal; otherwise the components in the inverter will be damaged. Output terminals are prohibited to be grounded. The lines should not be collided with the enclosure, or short connected; otherwise the inverter will be damaged.

Earth terminal PE must be grounded. 380V class grounding resistance should be 10Ω or less. The earth wire should never share with electric welder or power equipment. The earth wire should be of conductor diameter specified in the technical standard for electrical equipment, and should be as close to the ground point as possible. On occasions using more than two inverters at the same time, please do not form the earth wire into ring circuit. Proper grounding method and incorrect grounding method are shown in Figure 2-4

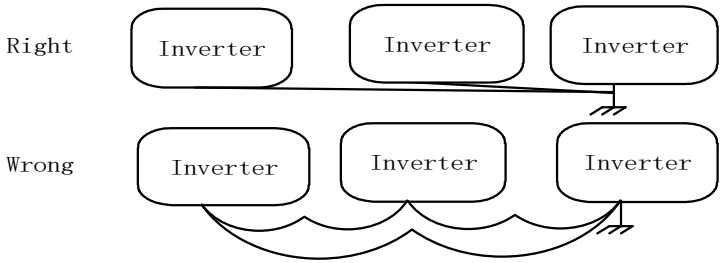


Figure 2-4 Earthing Connection Method

Notes: The neutral point of motor using DO connection can't be connected to earth. Since the inverter output PWM wave, if a capacitor for improving power factor or a lightning varistor is installed on the output side, which would cause tripping or damage to parts, be sure to remove it.

If a contactor or other on-off part is installed between the output and the motor, be sure the on-off operation is done when the inverter has no output, otherwise the inverter would be damaged.

2.4 Control Circuit Connection

2.4.1 Function of Control Circuit Terminals

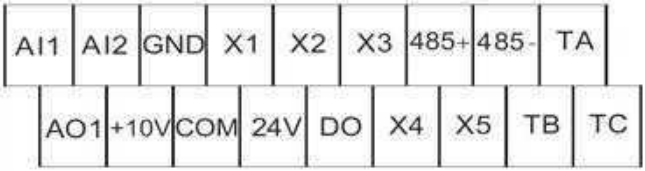


Figure 2-5Terminal arrangement

In order to reduce interference and attenuation of control signal, the length of control cables should be limited in 50m and away from power cables for more than 30cm. Avoid control wire and power wire being parallel. Try to use STP (Shielded Twisted Pair) to connect analog input and output signal.

Table 2-2 Function of control circuit terminals

Category	Terminal label	Name	Description of terminal function	Specification
Analog input	AI1	Analog input 1	Receive voltage input.	Input voltage range: 0~10V (input resistance: 30kΩ)
	AI2	Analog input 2	Receive voltage/current input. Voltage or current are selected by DIP switch J2. Voltage input mode is the default mode.	Input voltage range: 0~10V (input resistance: 30kΩ) Input current range: 0~20mA Reference ground: GND
Analog output	AO1	Analog output	Be able to output analog voltage/current. Voltage or current are selected by DIP switch J3.	Output voltage range: 0/2~10V Output current range: 0/4~20mA Reference ground: GND
Communication	485+	RS485 communication interface	485 differential signal positive terminal	Standard RS-485 communication interface, Not isolated to GND Please use twisted-pair cable or shielded cable
	485-		485 differential signal negative terminal	

Category	Terminal label	Name	Description of terminal function	Specification
Multi-function input terminal	X1	Multi-function input terminal 1	It can be defined as a multi-function discrete input terminal through programming.	Optical-isolator input Input resistance: R=3.9kΩ Max input frequency: 400Hz/ 50kHz Input voltage range: 0~30V Reference ground: COM
	X2	Multi-function input terminal 2		
	X3	Multi-function input terminal 3		
	X4	Multi-function input terminal 4		
Multi-function input terminal	X5	Multi-function input terminal 5	Terminals X5 can be used as common multi-function terminals (same with X1~X4), it can also be used as high speed pulse input port.	Opto-coupler isolation input Input impedance R = 3.9kΩ Maximum input frequency: 50kHz Input voltage range: 0~30V Reference ground: COM
Multi-function output	DO	Open collector output terminal	It can be defined as a multi-function output terminal for pulse signal through programming. It can also be used as an on-off output terminal.	Opto-coupler isolated open collector output. Range of operating voltage: 0V~26V Maximum output current: 50mA Range of Output frequency: 0~50kHz Reference ground: COM

Category	Terminal label	Name	Description of terminal function	Specification
Relay output	TA	Relay output	It can be defined as a multi-function relay output terminal through programming, Please refer to Section 5.4 I/O terminals control (Group P3) for details.	TA-TB: NC; TA-TC: NO. Contact capacity: 250VAC/2A (COSΦ=1.0) 250VAC/1A (COSΦ=0.4) 30VDC/1A
	TB			
	TC			
Power	+10V	+10V power supply	Provide +10V power supply externally (Reference ground: GND)	Maximum output current 20 mA Open circuit voltage can be up to 12V
	24V	+24V power supply	Provide +24V power supply externally (Reference ground: COM)	Maximum output current 100mA
Power	GND	+10V Reference GND	Reference GND for analog signal and +10V power supply	Inner Isolated from COM COM for +10V, AI1, AI2, and AO1
	COM	+24V Common GND	Used with other terminals	Isolated from GND
	PE	Shield ground	It is used for grounding of terminal wiring shield layer. Shield layer of analog signal lines, 485 communication lines, and motor cables can be connected to this terminal	It is internally connected to connection terminal PE of main circuit.

2.4.2 Wiring of Control Circuit Terminals

● Wiring of Analog Input Terminals

AI2 terminal accepts analog signal input, DIP switch J2 select the input voltage (0 ~ 10V) or the input current (0 ~ 20mA). The wiring of terminals is shown in Figure 2-6:

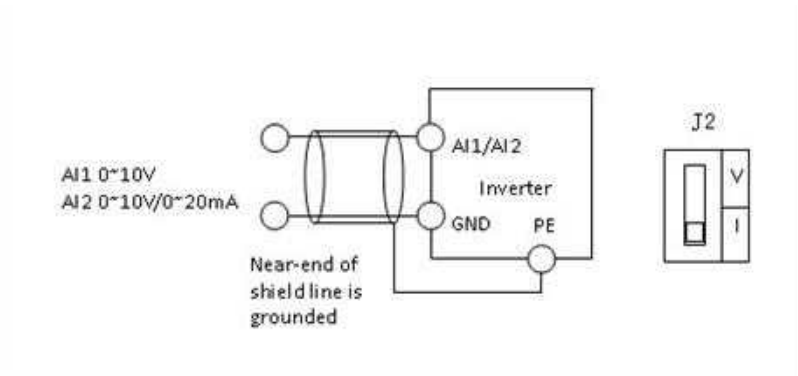


Figure 2-6 Wiring diagram of analog input terminals

● Wiring of Analog Output Terminal

If the analog output terminal AO1 is connected to analog meters, then various kinds of physical values can be indicated. The analog output terminal AO1 is only support the voltage signal output, for S2R4GB and S2R75GB, for S21R5GB, S22R2GB, 3R75GB and above, DIP switch J3 can select current output (0/4~20mA) and voltage output(0/2~10V). The wiring of terminals is shown in Figure 2-7:

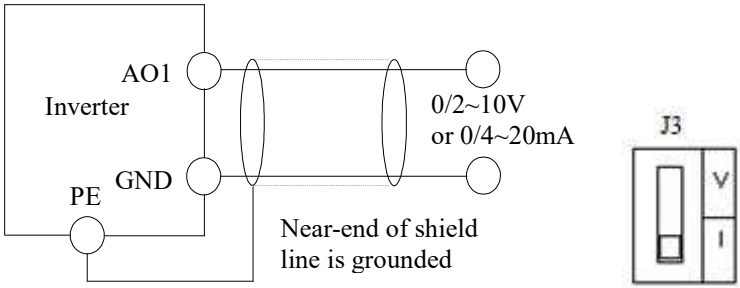


Figure 2-7 Wiring diagram of analog output terminals

Tips

1) Dialing J3 to “I” represents current; dialing to “V” represents voltage.
2) Analog input and output signals are easily disturbed by exterior environment, so shielded cables must be used for wiring and the length of the cables should be as short as possible.

● Wiring of Serial Communication Interface

The series of inverters provides users with RS485 serial communication interface, and can compose master-slave control system. The upper computer (a personal computer or PLC controller) can be used for real-time monitoring, implementation remote control , automatic control and others more complicated operations to inverters in network.

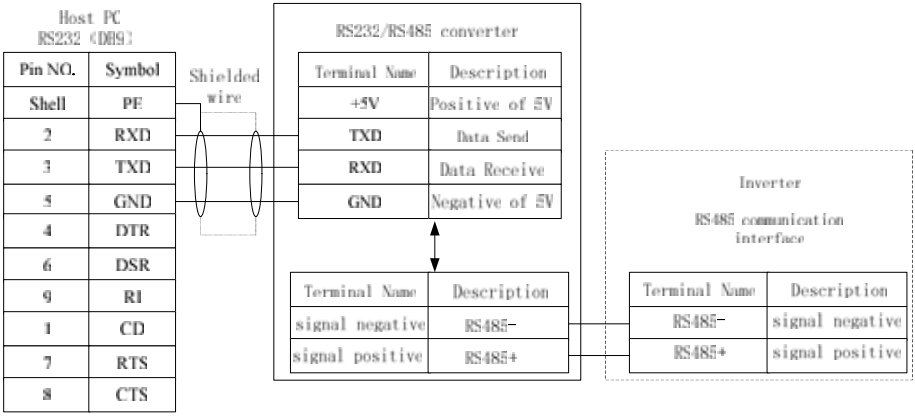


Figure 2-8 Illustration of wiring between the upper computer and the inverter interface

When multiple inverters are connected in one RS485 system, the communication suffers more interference, and a maximum of 31 inverters can be connected through RS485 serial bus. Wiring is very important. Communication bus must be shielded twisted pair wiring. The following connection method is recommended:

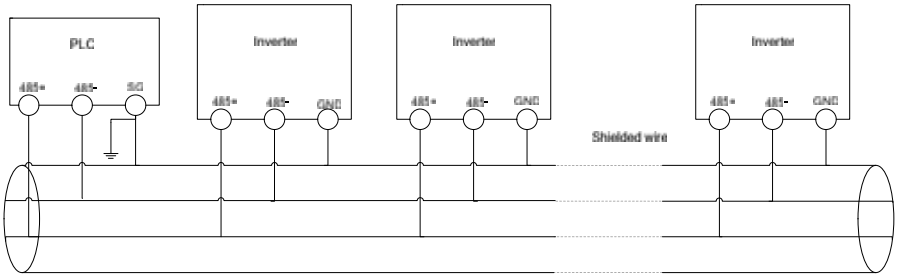


Figure 2-9 Recommended wiring diagrams (inverters and motors are all well grounded) when PLC is in communication with multiple inverters

The host machine can be a personal computer or PLC controller, and the slave-based machine is this series of inverter. When a PC is used as the host machine, a RS232/RS485 bus adapter should be added between the host machine and the bus; when a PLC controller is used as the host machine, connect the dotted terminals, namely RS485 terminal of slave-based machine and RS485 terminal of the host machine.

●Multi-Function Input Terminal Wiring

Dry Contact Way **NPN Transistor Mode**

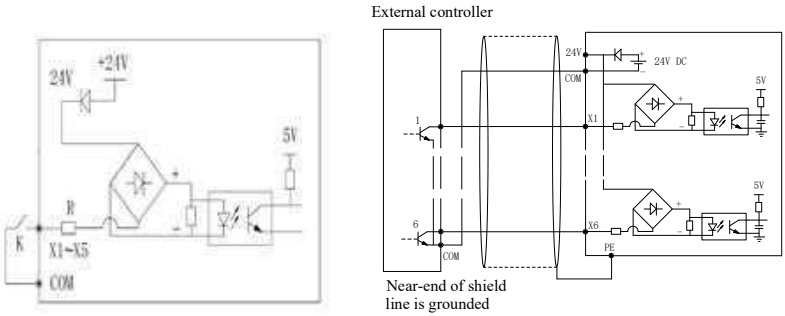


Figure 2-10 Wiring diagram of multi-function input terminals

● Wire Multi-Function Output Terminals

1) Multi-function output terminals DO as discrete output can use the internal 24V power supply of inverter and the wiring method is shown in Figure 2-11.

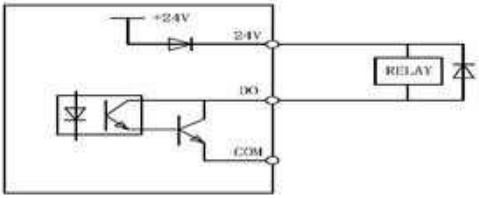


Figure 2-11 On-off output connection mode 1 of multi-function output terminals

2) Multi-function output terminals Y as discrete output can also use the external, 9~30V, power supply and the wiring method is shown in Figure 2-12

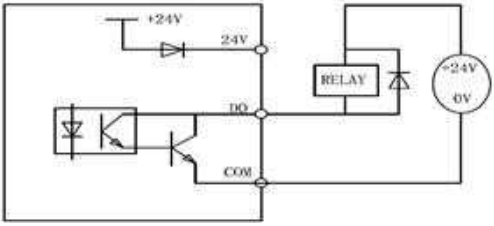


Figure 2-12 On-off output connection mode 2 of multi-function output terminals

- Wiring of Relay Output Terminals TA, TB, TC

  To drive inductive loads (e.g. electromagnetic relays, contactors), it is suggested to add surge voltage absorption circuit, such as the RC absorption circuit, piezoresistor or flywheel diode (pay attention to the diode polarity when used for DC electromagnetic circuit), etc. Components of absorption circuit should be installed close to both ends of coil of relay or contactor.

Tips

1. Don't short circuit terminals 24V and COM, otherwise the control board may be damaged.
2. Please use multi-core shielded cable or multi-stranded cable (above 1 mm) to connect the control terminals.
3. When using a shielded cable, the shielded lay's end that is nearer to the inverter should be connected to PE.
4. The control cables should be as far away (at least 30 cm) from the main circuit and high-voltage cables as possible (including power supply cables, motor cables, relay cables and cables of contactor). The cables should be vertical to each other to reduce the disturbance to minimum.

2.5 Wiring of Inverter for Basic Operation

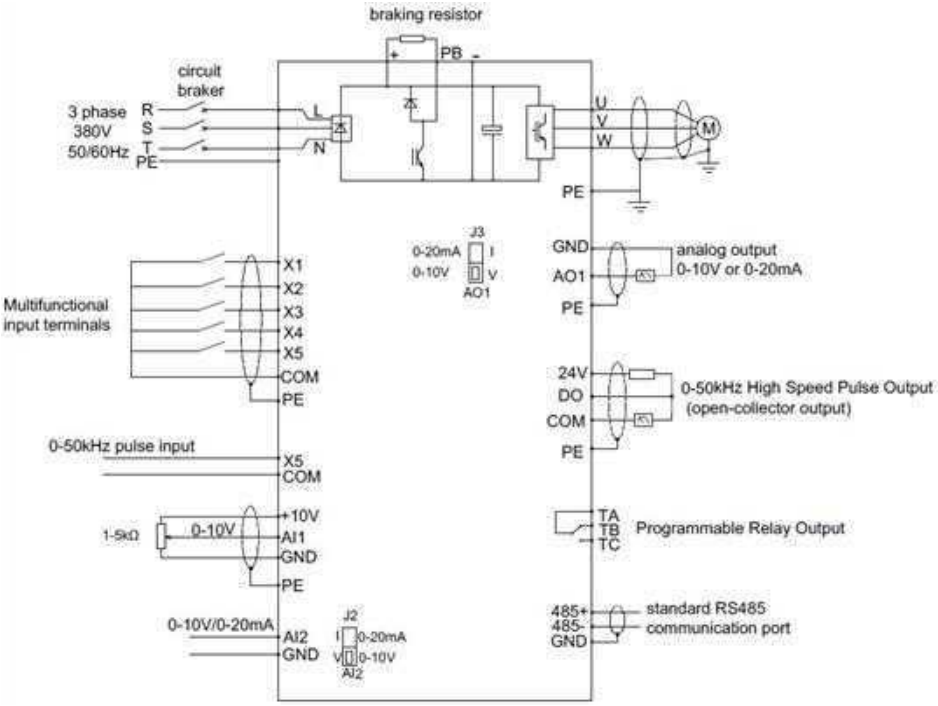


Figure 2-13 wiring diagram

2.6 Wiring Attentions

- Be sure the input power supply of the inverter is cut off then you can remove or replace the motor.
- Be sure the inverter has stopped output then you can switch the motor or switch to mains power supply.
- If a peripheral (brake unit, reactor and filter) is added, test the insulation resistance of the peripheral to earth first and be sure the value not below 4 MΩ.
- Besides shielding the input signal cable and the cable of frequency meter, the cables should be disposed solely, not parallel with the main circuit cable, and far away from it as possible.
- In order to avoid error action caused by interference, the control circuit cable should use stranding shielded cables, and the wiring distance should be less than 50 meters.
- Be sure the shielded layers of shielded cables are not touching other signal cables or shell of equipment, you can use insulating tape to enswathe bare shielding layer.

- The withstand voltage of all the cables should match with the voltage class of the inverter.
- In order to prevent aAI2dent, be sure that the control circuit terminal "PE" and the main circuit terminal "PE" are connected to earth, and the earthing cable can’t be shared with other equipment. The size of main circuit earthing cable should be more than one and a half of the main circuit cable. After completion of wiring, please check whether a cable, a bolt or a connector etc. is left inside the inverter, whether the bolts are fastened firmly, and whether the bare cable of terminals short circuit to other terminals.

Chapter 3 Operation

 DANGER	1 Only turn on the input power supply after close the front cover. Do not remove the cover while the inverter is powered on. Otherwise there is risk of electric shock. 2 Keep away from the machinery. Otherwise there is risk of injury when the inverter power supply recovers and runs suddenly.
 CAUTION	1 When braking resistor is used, the high voltage discharging at its two ends will increase its temperature. Do not touch the braking resistor to avoid danger of electric shock and burn. 2 Before running the inverter, do check again the motor and machinery operating precautions to avoid risk. 3 Do not check signals during operation. It may damage the equipment. 4 All inverter parameters have been preset at the factory. Do not change the settings unless it is required.

3.1 Function and Operation of Keypad

The keypads of the different power rating inverters may have different exterior dimensions. However, all of them have the same array of buttons and LED display. Moreover, operation and function of them are all the same. Every keypad has a LED monitor of 4 digits with 7 segments, buttons, a digital encoder, and LED indicators. User can perform function setting, inverter running, stop, and status monitoring with the keypad.

3.1.1 Keypad Layout

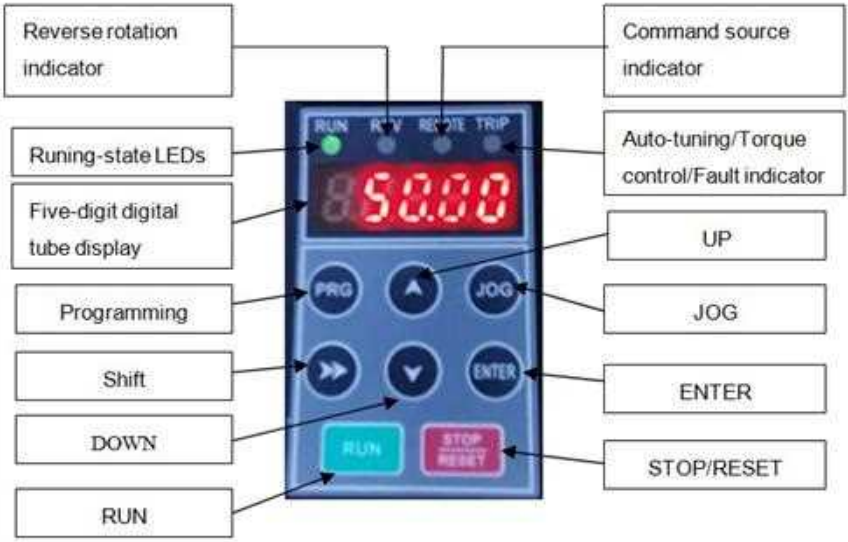


Figure 3-1 Keypad layout and name of each part

Keypad upper part has four status indicators: RUN, REV, REMOTE and TRIP. The indicator RUN will be lit up if the inverter is running forward; The indicator RUN and REV will be lit up if the inverter is running reverse. The indicator REMOTE will be lit up if the inverter is not controlled by keypad. The indictor TRIP will be lit up if fault occurs. To see the details, see table 3-2 description.
In monitoring status, the LED will display the status of monitored objects. At abnormal state it will display the fault code when the inverter fails to run and show the warn code when the inverter is warning. At normal state, it will display the object selected by parameter group PH. Refer to the detailed description of PH groups for the specific corresponding relation.
In programming mode, nixie tube displays three-level menus: function group, function codes and function parameter values. Under the function group display menu, it displays function group from "-P0-" to "-PF-"; under function code menu, it displays the corresponding function codes in the group. Under the parameters displayed in the function menu, the parameter values will be displayed.

3.1.2 Description of Button Function

On the inverter keypad, there are eight buttons. In addition, the function of each button is defined as table 3-1.

Table 3-1 Keypad menu

key	Name of key	Key functions
	Programming	Enter or exit Level I menu Return to the previous menu
	Confirm	Enter each level of menu interface.Confirm displayed parameter setting.
	Increment	When navigating a menu, it moves the selection up through the screens available. When editing a parameter value, it increases the displayed value. When the AC drive is in RUN mode, it increases the speed
	Decrement	When navigating a menu, it moves the selection down through the screens available. When editing a parameter value, it decreases the displayed value. When the AC drive is in RUNNING mode, it decreases the speed.
	Shift	In edit mode, the modified digit of the set data can be selected; In monitoring mode, displayed parameters can be switched.
	JOG	In keypad mode, press this key to enter JOG running mode. Perform a function switchover as defined by the setting of PH-01
	Run	Start the AC drive when using the operating panel control mode.It is inactive when using the terminal or communication control mode.
	Stop/Reset	Stop the AC drive when the AC drive is in the RUNNING status. Perform a reset operation when the AC drive is in the FAULT status

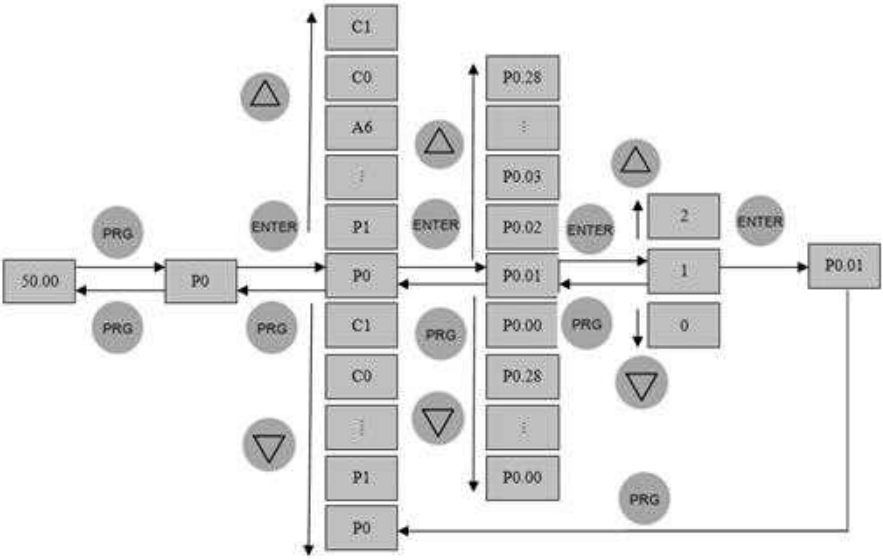
3.1.3 Description of LED Digital Tube and Indicators

On the inverter keypad there are five digits seven segments LEDs, 4 status indicators. The LED can display the monitoring object, the function parameter values, the fault code, and the warning code. The four status indicators are just above the LED and the meaning of each indicator is shown in table 3-2

Table 3-2 Description of state indicators

Indicator	Display state	The current state of the inverter indicated
RUN Running-state indication	Off	Stop
	On	Running
	Flicker	Zero frequency operation
REV Reverse running direction indication	Off	Forward rotation or not run
	Normally on	Stable reverse rotation
TRIP failure indicator	Off	Normal
	Flicker	Failure
REMOTE indicator (Exclusive for control keypad)	Off	Keypad control state
	On	Terminal control state
	Flicker	Serial communication state

3.1.4 Operations of Parameters



3.2 Run Command Mode Select

Operation of Initial Power On

Please follow technical requirements provided in this manual for wiring and connections. After correct wiring and checking power supply, power on air switch of AC power on input side of the inverter to supply power to the inverter, the contactor operates normally. When nixie tube displays output frequency, the inverter has been

initialized.

If the keypad is not correctly connected, the display will be abnormal. And the keypad should be reconnected. Operation of initial power on is shown in Figure 3-6:

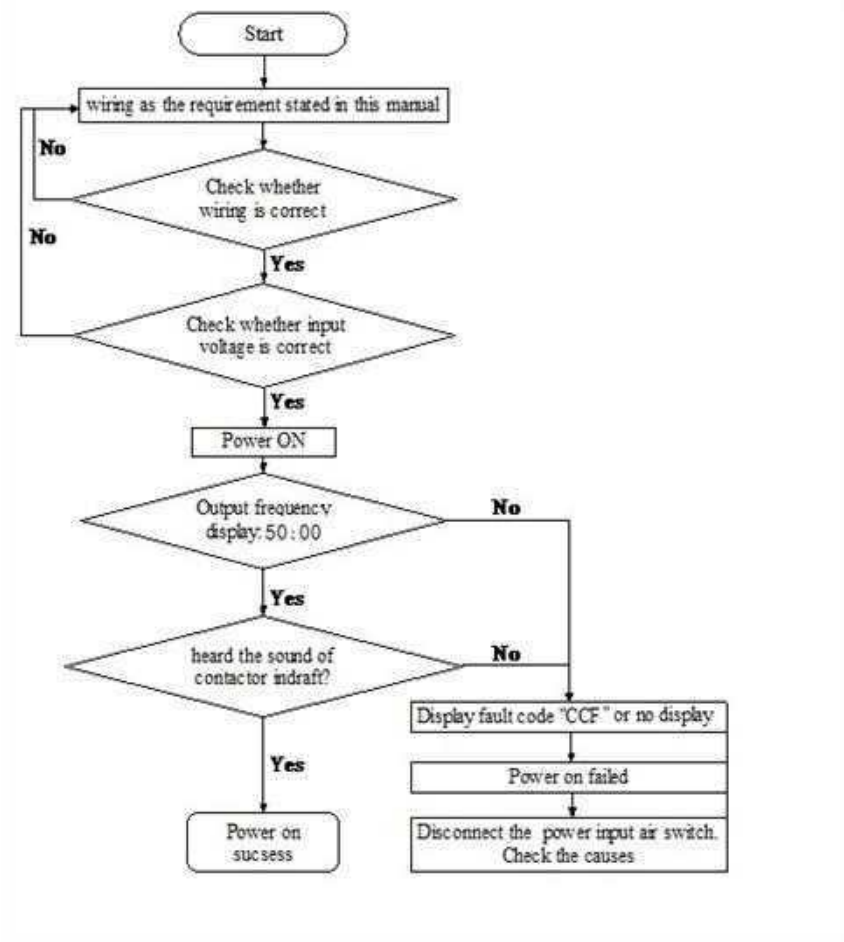


Figure 3-6 Operation process of initially powering on the inverter

3.2.1 First Test Run Operation

Please perform the first test run operation according to the following processes.

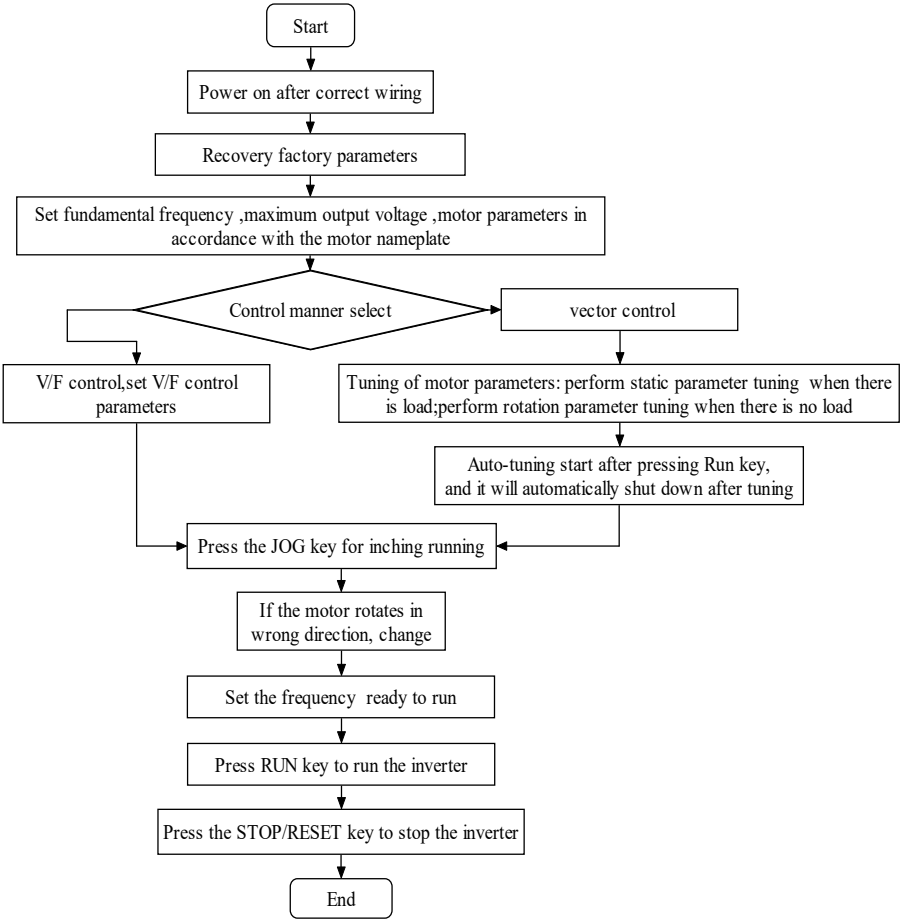


Figure 3-7 Operation process of inverter first test run operation

Chapter 4 Parameter Index

Notes:

If PP-00 is set to a non-zero number, parameter protection is enabled. You must enter the correct user password to enter the menu.
To cancel the password protection function, enter with password and set PP-00 to 0.
Group P and Group A are standard function parameters. Group C includes the monitoring function parameters.
The symbols in the function code table are described as follows:
"☆": The parameter can be modified when the AC drive is in either stop or running state.
"★": The parameter cannot be modified when the AC drive is in the running state.
"●": The parameter is the actually measured value and cannot be modified.
"*": The parameter is factory parameter and can be set only by the manufacturer.

4.1 Standard Function Parameters

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P0 Group:Basic Function					
P0.00	G/P type display	1: G type (constant torque load) 2: Reserved	Model dependent	★	0x5000
P0.01	Motor 1 control mode	0: Sensorless vector control(SVC) 1: Reserved 2: Voltage/Frequency (V/F) control	0	★	0x5001
P0.02	Command source selection	0: Operation panel control (LED off) 1: Terminal control (LED on) 2: Communication control (LED blinking)	0	☆	0x5002

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P0.03	Main frequency source X selection	0: Digital setting (non.retentive at power failure) 1: Digital setting (retentive at power failure) 2: AI1 3: AI2 4: Reserved 5: Pulse setting (X5) 6: Multi reference 7: Simple PLC 8: PID 9: Communication setting	0	★	0x5003
P0.04	Auxiliary frequency source Y selection	The same as P0.03 (Main frequency source X selection)	0	★	0x5004
P0.05	Reference value of auxiliary frequency Y	0: Relative to maximum frequency 1: Relative to main frequency X	0	☆	0x5005
P0.06	Range of auxiliary frequency Y	0%–150%	100%	☆	0x5006
P0.07	Frequency source superposition selection	1st digit (Frequency source selection) 0: Main source X 1: X and Y calculation (calculation relationship determined by 2nd digit) 2: Switchover between X and Y 3: Switchover between X and "X and Y calculation" 4: Switchover between Y and "X and Y calculation"	00	☆	0x5007
		2nd digit (X and Y calculation relationship)			

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
		0: X+Y 1: X-Y 2: Maximum of X,Y 3: Minimum of X,Y			
P0.08	Preset frequency	0.00 to maximum frequency (valid when frequency source is digital setting)	50.00 Hz	☆	0x5008
P0.09	Rotation direction	0: Same direction 1: Reverse direction	0	☆	0x5009
P0.10	Maximum frequency	50.00–320.00 Hz	50.00 Hz	★	0x500A
P0.11	Source of frequency upper limit	0: Set by P0.12 1: AI1 2: AI2 3: Reserved 4: Pulse setting (X5) 5: Communication setting	0	★	0x500B
P0.12	Frequency upper limit	Frequency lower limit (P0.14) to maximum frequency (P0.10)	50.00 Hz	☆	0x500C
P0.13	Frequency upper limit offset	0.00 Hz to maximum frequency (P0.10)	0.00 Hz	☆	0x500D
P0.14	Frequency lower limit	0.00 Hz to frequency upper limit (P0.12)	0.00 Hz	☆	0x500F
P0.15	Carrier frequency	0.5–16.0 kHz	Model dependent	☆	0x5010
P0.16	Carrier frequency adjustment with temperature	0: No1: Yes	1	☆	0x5011
P0.17	Acceleration time 1	0.00–650.00s (P0.19 = 2) 0.0–6500.0s (P0.19 = 1) 0–65000s (P0.19 = 0)	Model dependent	☆	0x5012

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P0.18	Deceleration time 1	0.00–650.00s (P0.19 = 2) 0.0–6500.0s (P0.19 = 1)0–65000s (P0.19 = 0)	Model dependent	☆	0x5013
P0.19	Acceleration/Deceleration time unit	0:1s 1: 0.1s 2: 0.01s	1	★	0x5014
P0.21	Frequency offset of auxiliary frequency source for X and Y calculation	0.00 Hz to maximum frequency (P0.10)	0.00 Hz	☆	0x5015
P0.22	Frequency reference resolution	1: 0.1 Hz 2: 0.01 Hz	2	★	0x5016
P0.23	Retentive of digital setting frequency upon stop	0: Not retentive 1: Retentive	1	☆	0x5017
P0.24	Motor parameter group selection	0: Motor parameter group 1 1: Motor parameter group 2	0	★	0x5018
P0.25	Acceleration/Deceleration time base frequency	0: Maximum frequency (P0.10) 1: Set frequency 2: 100 Hz	0	★	0x5019
P0.26	Base frequency for UP/ DOWN modification during	0: Running frequency 1: Set frequency	0	★	0x501A
P0.27	Binding command source to frequency source	1st digit (Binding operation panel command to frequency source)	000	☆	
		0: No binding 1: Frequency source by digital setting 2: AI1 3: AI2 4: Reserved 5: Pulse setting (X5) 6: Multi.reference 7: Simple PLC			0x501B

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
		8: PID 9: Communication setting			
P0.27	Binding command source to frequency source	2nd digit (Binding terminal command to frequency source) 0–9, same as 1st digit 3rd digit (Binding communication command to frequency source) 0–9, same as 1st digit	000	☆	
P0.28	Serial communication protocol	0: Modbus protocol 1: Reserved	0	☆	0x501C
P1 Group:Motor Parameters					
P1.00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Reserved	1	★	0x5100
P1.01	Rated motor power	0.1–1000.0 kW	Model dependent	★	0x5101
P1.02	Rated motor voltage	1–2000 V	Model dependent	★	0x5102
P1.03	Rated motor current	0.01–655.35 A (AC drive power ≤ 55 kW)0.1–6553.5 A (AC drive power > 55 kW)	Model dependent	★	0x5103
P1.04	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★	0x5104
P1.05	Rated motor rotational speed	1–65535 RPM	Model dependent	★	0x5105
P1.06	Stator resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW)0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★	0x5106

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P1.07	Rotor resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW)0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★	0x5107
P1.08	Leakage inductive reactance (asynchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW)0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★	0x5108
P1.09	Mutual inductive reactance (asynchronous motor)	0.1–6553.5 mH (AC drive power ≤ 55 kW)0.01–.655.35 mH (AC drive power > 55 kW)	Model dependent	★	0x5109
P1.10	No.load current (asynchronous motor)	0.01 to P1.03 (AC drive power ≤ 55 kW)0.1 to P1.03 (AC drive power > 55 kW)	Model dependent	★	0x510A
P1.37	Auto tuning selection	0: No auto tuning 1: Asynchronous motor static auto tuning 2: Asynchronous motor complete auto tuning	0	★	0x5125
P2 Group Input terminals					
P2.00	X1 function selection	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) 3: Three line control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG) 6: Terminal UP 7: Terminal DOWN	1	★	0x5200

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P2.01	X2 function selection	8: Coast to stop 9: Fault reset (RESET) 10: RUN pause 11: Normally open (NO) input of external fault 12: Multi reference signal 1 13: Multi reference signal 2 14: Multi reference signal 3 15: Multi reference signal 4 16: Signal 1 for acc./ dec. time selection 17: Signal 2 for acc./ dec. time selection 18: Frequency source switchover 19: UP and DOWN setting clear (terminal, operation panel) 20: Command source switchover signal 1 21:Acc./Dec. prohibited	2	★	0x5201
P2.02	X3 function selection		9	★	0x5202
P2.03	X4 function selection		12	★	0x5203

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P2.04	X5 function selection	23: PLC status reset 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30:Pulse input(only for X5) 32:ImmediateDC braking 33: Normally closed (NC) input of external fault 34:Frequency modification forbidden 35:Reverse PID action direction 36: External STOP signal 1 37: Command source switchover signal 2 38: PID integral pause 39: Switchover between main frequency source X and preset frequency 40: Switchover between auxiliary frequency source Y and preset frequency 41: Motor selection signal 43: PID parameter switchover 44: User defined fault 1 45: User defined fault 2 46: Speed control/Torque control switchover	13	★	0x5204

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
		47: Emergency stop 48: External STOP signal 2 49: Deceleration DC braking 50: Clear the current running time 51: Switchover between two line mode and three line mode 52–59: Reserved			
P2.10	digital input X filter time	0.000–1.000s	0.010s	☆	0x520A
P2.11	Terminal command mode	0: Two line mode 1 1: Two line mode 2 2: Three line mode 1 3: Three line mode 2	0	★	0x520B
P2.12	Terminal UP/DOWN rate	0.01–65.535 Hz/s	1.00 Hz/s	☆	0x520C
P2.13	AI curve 1 minimum input	0.00 V to P2.15	0.00 V	☆	0x520D
P2.14	Corresponding setting of AI curve 1 minimum input	100.00%–100.0%	0.0%	☆	0x520E
P2.15	AI curve 1 maximum input	P4.13 to 10.00 V	10.00 V	☆	0x520F
P2.16	Corresponding setting of AI curve 1 maximum input	100.00%–100.0%	100.0%	☆	0x5210
P2.17	AI1 filter time	0.00–10.00s	0.10s	☆	0x5211
P2.18	AI curve 2 minimum input	0.00 V to P2.20	0.00 V	☆	0x5212
P2.19	Corresponding setting of AI curve 2 minimum input	100.00%–100.0%	0.0%	☆	0x5213
P2.20	AI curve 2 maximum input	P2.18 to 10.00 V	10.00 V	☆	0x5214
P2.21	Corresponding setting of AI curve 2 maximum input	100.00%–100.0%	100.0%	☆	0x5215

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P2.22	AI2 filter time	0.00–10.00s	0.10s	☆	0x5216
P2.23	AI curve 3 minimum input	0.00 V to P2.25	0.00 V	☆	0x5217
P2.24	Corresponding setting of AI curve 3 minimum input	100.00%–100.0%	0.0%	☆	0x5218
P2.25	AI curve 3 maximum input	P2.23 to 10.00 V	10.00 V	☆	0x5219
P2.26	Corresponding setting of AI curve 3 maximum input	100.00%–100.0%	100.0%	☆	0x521A
P2.28	X5 Pulse minimum input	0.00 kHz to P2.30	0.00 kHz	☆	0x521C
P2.29	X5 Corresponding setting of pulse minimum input	.100.00%–100.0%	0.0%	☆	0x521D
P2.30	X5 Pulse maximum input	P2.28 to 50.00 kHz	50.00 kHz	☆	0x521E
P2.31	X5 Corresponding setting of pulse maximum input	100.00%–100.0%	100.0%	☆	0x521F
P2.32	X5 Pulse filter time	0.00–10.00s	0.10s	☆	0x5220
P2.33	AI curve selection	1st digit (AI1 curve selection)	321	☆	0x5221
		Curve 1 (2 points, see P2.13 to P2.16) Curve 2 (2 points, see P2.18 to P2.21) Curve 3 (2 points, see P2.23 to P2.26) Curve 4 (4 points, see A1.00 to A1.07) Curve 5 (4 points, see A1.08 to A1.15) 2nd digit (AI2 curve selection)			

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
		Curve 1 to curve 5 (same as AI1) 3rd digit (Reserved)			
P2.34	Setting for AI less than minimum input	1st digit (Setting for AI1 less than minimum input) 0: Minimum value 1: 0.0% 2nd digit (Setting for AI2 less than minimum input) 0, 1 (same as AI1) 3rd digit Reserved	000	☆	0x5222
P2.35	X1 delay time	0.0–3600.0s	0.0s	★	0x5223
P2.36	X2 delay time	0.0–3600.0s	0.0s	★	0x5224
P2.37	X3 delay time	0.0–3600.0s	0.0s	★	0x5225
P2.38	X valid mode selection 1	1st digit (X1 valid mode)	00000	★	0x5226
		0: High level valid 1: Low level valid 2nd digit (X2 valid mode) 0, 1 (same as X1) 3rd digit (X3 valid mode) 0, 1 (same as X1) 4th digit (X4 valid mode) 0, 1 (same as X1) 5th digit (X5 valid mode) 0, 1 (same as X1)			
P2.40	Analog AI2 signal input selection	0:Voltage signal 1:current signal	0	☆	0x5228
P3 Group Output Terminals					
P3.00	DO terminal output mode	0: Pulse output (DOP) 1: Switch signal output (DOR)	1	☆	0x5300

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P3.01	D0R function (open collector output terminal)	0: No output 1: AC drive running 2: Fault output (stop) 3: Frequency level detection FDT1 output 4: Frequency reached 5: Zero speed running (no output at stop) 6: Motor overload pre warning 7: AC drive overload pre. warning 8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle complete 12: Accumulative running time reached 13: Frequency limited 14: Torque limited 15: Ready for RUN 16: AI1 larger than AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Under voltage state output 20: Communication setting 21: Reserved 22: Reserved 23: Zero speed running 2 (having output at stop) 24: Accumulative power on time reached 25: Frequency level detection FDT2 output 26: Frequency 1 reached 27: Frequency 2 reached	0	☆	0x5301
P3.02	Relay function (T/A.T/B.T/C)		2	☆	0x5302
P3.03	Extension card relay function (reserved)		0	☆	0x5303
			0	☆	0x5304

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P3.04	DO1 function selection(reserved)	28: Current 1 reached 29: Current 2 reached 30: Timing reached 31: AI1 input limit exceeded 32: Load becoming 0 33: Reverse running 34: Zero current state 35: Module temperature reached 36: Software current limit exceeded stop) 37: Frequency lower limit reached (having output at stop) 38: Alarm output 39: Motor overheat warning 40: Current running time reached 41: Fault output (There is no output if it is the coast to stop fault and under voltage occurs.)			
P3.05	Extension card DO2 function selection (reserved)		1	☆	0x5305
P3.06	DOP function selection	0: Running frequency 1: Set frequency 2: Output current 3: Output torque (absolute value) 4: Output power 5: Output voltage 6: Pulse input 7: AI1 8: AI2 9: Reserved 10: Length 11: Count value	0	☆	0x5306

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P3.07	AO1 function selection	12: Communication setting 13: Motor rotational speed 14: Output current 15: Output voltage 16: Output torque (actual value)	0	☆	0x5307
P3.09	Maximum D0 output frequency	0.01–100.00 kHz	50.00 kHz	☆	0x5309
P3.10	AO1 offset coefficient	100.0%–100.0%	0.0%	☆	0x530A
P3.11	AO1 gain	10.00–10.00	1.00	☆	0x530B
P3.17	D0 output delay time	0.0–3600.0s	0.0s	☆	0x5311
P3.18	Relay 1 output delay time	0.0–3600.0s	0.0s	☆	0x5312
P3.22	DO valid mode selection	1st digit (D0 valid mode) 0: Positive logic 1: Negative logic 2nd digit (Relay 1 valid mode) 0, 1 (same as DO) 3rd digit (Reserved) 4rd digit (Reserved 5th digit (Reserved)	00000	☆	0x5316
P3.23	AO1 output signal selection	0~1	0	★	0x5317
GroupP4: Start/Stop Control					
P4.00	Start mode	0: Direct start 1:Rotational speed tracking restart 2: Pre excited start (asynchronous motor)	0	☆	0x5400
P4.01	Rotational speed tracking mode	0: From frequency at stop 1: From zero speed 2: From maximum frequency	0	★	0x5401
P4.02	Rotational speed tracking speed	1–100	20	☆	0x5402

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P4.03	Startup frequency	0.00–10.00 Hz	0.00 Hz	☆	0x5403
P4.04	Startup frequency holding time	0.0–100.0s	0.0s	★	0x5404
P4.05	Startup DC braking current/ Pre excited current	0%–100%	0%	★	0x5405
P4.06	Startup DC braking time/ Pre excited	0.0–100.0s	0.0s	★	0x5406
P4.07	Acceleration/Deceleration mode	0: Linear acceleration/ deceleration 1: S curve acceleration/ deceleration A 2: S curve acceleration/ deceleration B	0	★	0x5407
P4.08	Time proportion of S curve start segment	0.0% to (100.0% – P4.09)	30.0%	★	0x5408
P4.09	Time proportion of S curve end segment	0.0% to (100.0% – P4.08)	30.0%	★	0x5409
P4.10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆	0x540A
P4.11	Starting frequency of stop DC braking	0.00 Hz to maximum frequency	0.00 Hz	☆	0x540B
P4.12	Waiting time of stop DC braking	0.0–36.0s	0.0s	☆	0x540C
P4.13	Stop DC braking current	0%–100%	0%	☆	0x540D
P4.14	Stop DC braking time	0.0–36.0s	0.0s	☆	0x540E
P4.15	Brake use ratio	0%–100%	100%	☆	0x540F
P4.18	Rotational speed tracking current	30%~200%	Model dependent	×	0x5412
P4.21	Demagnetization time	0.00~5.00s	1.00s	×	0x5415
Group P5: Auxiliary Functions					

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P5.00	JOG running frequency	0.00 Hz to maximum frequency	2.00 Hz	☆	0x5500
P5.01	JOG acceleration time	0.0–6500.0s	6.0s	☆	0x5501
P5.02	JOG deceleration time	0.0–6500.0s	6.0s	☆	0x5502
P5.03	Acceleration time 2	0.0–6500.0s	Model dependent	☆	0x5503
P5.04	Deceleration time 2	0.0–6500.0s	Model dependent	☆	0x5504
P5.05	Acceleration time 3	0.0–6500.0s	Model dependent	☆	0x5505
P5.06	Deceleration time 3	0.0–6500.0s	Model dependent	☆	0x5506
P5.07	Acceleration time 4	0.0–500.0s	Model dependent	☆	0x5507
P5.08	Deceleration time 4	0.0–6500.0s	Model dependent	☆	0x5508
P5.09	Jump frequency 1	0.00 Hz to maximum frequency	0.00 Hz	☆	0x5509
P5.10	Jump frequency 2	0.00 Hz to maximum frequency	0.00 Hz	☆	0x550A
P5.11	Frequency jump amplitude	0.00 Hz to maximum frequency	0.00 Hz	☆	0x550B
P5.12	Forward/Reverse rotation dead zone time	0.0–3000.0s	0.0s	☆	0x550C
P5.13	Reverse control	0: Enabled1: Disabled	0	☆	0x550D
P5.14	Running mode when set frequency lower than frequency lower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	0	☆	0x550E
P5.15	Droop control	0.00–10.00 Hz	0.00 Hz	☆	0x550F
P5.16	Accumulative power on time threshold	0–65000 h	0 h	☆	0x5510

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P5.17	Accumulative running time threshold	0–65000 h	0 h	☆	0x5511
P5.18	Startup protection	0: No1: Yes	0	☆	0x5512
P5.19	Frequency detection value (FDT1)	0.00 Hz to maximum frequency	50.00 Hz	☆	0x5513
P5.20	Frequency detection hysteresis (FDT hysteresis 1)	0.0%–100.0% (FDT1 level)	5.0%	☆	0x5514
P5.21	Detection range of frequency reached	0.00–100% (maximum frequency)	0.0%	☆	0x5515
P5.22	Jump frequency during acceleration/decelera	0: Disabled1: Enabled	0	☆	0x5516
P5.25	Frequency switchover point between acceleration	0.00 Hz to maximum frequency	0.00 Hz	☆	0x5519
P5.26	Frequency switchover point between deceleration	0.00 to maximum frequency	0.00 Hz	☆	0x551A
P5.27	Terminal jog priority selection	0: Disabled 1: Enabled	0	☆	0x551B
P5.28	Frequency detection value (FDT2)	0.00 to maximum frequency	50.00 Hz	☆	0x551C
P5.29	Frequency detection hysteresis (FDT hysteresis 2)	0.0%–100.0% (FDT2 level)	5.0%	☆	0x551D
P5.30	Any frequency reaching detection value 1	0.00 Hz to maximum frequency	50.00 Hz	☆	0x551E
P5.31	Any frequency reaching detection amplitude 1	0.0%–100.0% (maximum frequency)	0.0%	☆	0x551F
P5.32	Any frequency reaching detection value 2	0.00 Hz to maximum frequency	50.00 Hz	☆	0x5520

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P5.33	Any frequency reaching detection amplitude 2	0.0%–100.0% (maximum frequency)	0.0%	☆	0x5521
P5.34	Zero current detection level	0.0%–300.0% (rated motor current)	5.0%	☆	0x5522
P5.35	Zero current detection delay time	0.00–600.00s	0.10s	☆	0x5523
P5.36	Output over current threshold	0.0% (no detection)0.1%–300.0% (rated motor current)	200.0%	☆	0x5524
P5.37	Output over current detection delay time	0.00–600.00s	0.00s	☆	0x5525
P5.38	Any current reaching 1	0.0%–300.0% (rated motor current)	100.0%	☆	0x5526
P5.39	Any current reaching 1 amplitude	0.0%–300.0% (rated motor current)	0.0%	☆	0x5527
P5.40	Any current reaching 2	0.0%–300.0% (rated motor current)	100.0%	☆	0x5528
P5.41	Any current reaching 2 amplitude	0.0%–300.0% (rated motor current)	0.0%	☆	0x5529
P5.42	Timing function	0: Disabled1: Enabled	0	☆	0x552A
P5.43	Timing duration source	0: P5.44 1: AI1 2: AI2 3: Reserved (100% of analog input corresponds to the value of P5.44)	0	☆	0x552B
P5.44	Timing duration	0.0–6500.0 min	0.0 min	☆	0x552C
P5.45	AI1 input voltage lower limit	0.00 V to P5.46	3.10 V	☆	0x552D
P5.46	AI1 input voltage upper limit	P5.45 to 10.00 V	6.80 V	☆	0x552E

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P5.47	Module temperature threshold	0–100°C	75°C	☆	0x552F
P5.48	Cooling fan control	0: Fan working during running 1: Fan working continuously	0	☆	0x5530
P5.49	Wakeup frequency	Dormant frequency (P5.51) to maximum frequency (P0.10)	0.00 Hz	☆	0x5531
P5.50	Wakeup delay time	0.0–6500.0s	0.0s	☆	0x5532
P5.51	Dormant frequency	0.00 Hz to wakeup frequency (P5.49)	0.00 Hz	☆	0x5533
P5.52	Dormant delay time	0.0–6500.0s	0.0s	☆	0x5534
P5.53	Current running time reached	0.0–6500.0 min	0.0 min	☆	0x5535
P5.54	Output power correction coefficient	0.00%–200 .0%	100.0%	☆	0x5536
P6Group Process Control PID Function					
P6.00	PID setting source	0: P6.01 1: AI1 2:AI2 3: Reserved 4: Pulse setting (X5) 5: Communication setting	0	☆	0x5600
P6.01	PID digital setting	0.0%–100.0%	50.0%	☆	0x5601
P6.02	PID feedback source	0: AI1 1: AI2 2: Reserved 3: AI1 – AI2 4: Pulse setting (X5) 5: Communication setting	0	☆	0x5602

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P6.03	PID action direction	0: Forward action 1: Reverse action	0	☆	0x5603
P6.04	PID setting feedback range	0–65535	1000	☆	0x5604
P6.05	Proportional gain Kp1	0.0–100.0	20.0	☆	0x5605
P6.06	Integral time Ti1	0.01–10.00s	2.00s	☆	0x5606
P6.07	Differential time Td1	0.00–10.000	0.000s	☆	0x5607
P6.08	Cut.off frequency of PID reverse rotation	0.00 to maximum frequency	2.00 Hz	☆	0x5608
P6.09	PID deviation limit	0.0%–100.0%	0.0%	☆	0x5609
P6.10	PID differential limit	0.00%–100.00%	0.10%	☆	0x560A
P6.11	PID setting change time	0.00–650.00s	0.00s	☆	0x560B
P6.12	PID feedback filter time	0.00–60.00s	0.00s	☆	0x560C
P6.13	PID output filter time	0.00–60.00s	0.00s	☆	0x560D
P6.15	Proportional gain Kp2	0.0–100.0	20.0	☆	0x560F
P6.16	Integral time Ti2	0.01–10.00s	2.00s	☆	0x5610
P6.17	Differential time Td2	0.000–10.000s	0.000s	☆	0x5611
P6.18	PID parameter switchover condition	0: No switchover 1: Switchover via X5 2: Automatic switchover based on deviation	0	☆	0x5612

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P6.19	PID parameter switchover deviation 1	0.0% to P6.20	20.0%	☆	0x5613
P6.20	PID parameter switchover deviation 2	P6.19 to 100.0%	80.0%	☆	0x5614
P6.21	PID initial value	0.0%–100.0%	0.0%	☆	0x5615
P6.22	PID initial value holding time	0.00–650.00s	0.00s	☆	0x5616
P6.23	Maximum deviation between two PID outputs in forward	0.00%–100.00%	1.00%	☆	0x5617
P6.24	Maximum deviation between two PID outputs in reverse	0.00%–100.00%	1.00%	☆	0x5618
P6.25	PID integral property	Unit's digit (Integral separated) 0: Invalid 1: Valid Ten's digit (Whether to stop integral operation when the output reaches the limit) 0: Continue integral operation 1: Stop integral operation	00	☆	0x5619
P6.26	Detection value of PID feedback loss	0.0%: Not judging feedback loss0.1%–100.0%	0.0%	☆	0x561A
P6.27	Detection time of PID feedback loss	0.0–20.0s	0.0s	☆	0x561B
P6.28	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	0	☆	0x561C
P7 Group Swing Frequency, Fixed Length and Count					

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P7.00	Swing frequency setting mode	0: Relative to the central frequency 1: Relative to the maximum frequency	0	☆	0x5700
P7.01	Swing frequency amplitude	0.0%–100.0%	0.0%	☆	0x5701
P7.02	Jump frequency amplitude	0.0%–50.0%	0.0%	☆	0x5702
P7.03	Swing frequency cycle	0.0–3000.0s	10.0s	☆	0x5703
P7.04	Triangular wave rising time coefficient	0.0%–100.0%	50.0%	☆	0x5704
P7.05	Set length	0–65535 m	1000 m	☆	0x5705
P7.06	Actual length	0–65535 m	0 m	☆	0x5706
P7.07	Number of pulses per meter	0.1–6553.5	100.0	☆	0x5707
P7.08	Set count value	1–65535	1000	☆	0x5708
P7.09	Designated count value	1–65535	1000	☆	0x5709
P8 Group Multi Reference and Simple PLC Function					
P8.00	Reference 0	100.0%–100.0%	0.0%	☆	0x5800
P8.01	Reference 1	100.0%–100.0%	0.0%	☆	0x5801
P8.02	Reference 2	100.0%–100.0%	0.0%	☆	0x5802
P8.03	Reference 3	100.0%–100.0%	0.0%	☆	0x5803
P8.04	Reference 4	100.0%–100.0%	0.0%	☆	0x5804

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P8.05	Reference 5	100.0%–100.0%	0.0%	☆	0x5805
P8.06	Reference 6	100.0%–100.0%	0.0%	☆	0x5806
P8.07	Reference 7	100.0%–100.0%	0.0%	☆	0x5807
P8.08	Reference 8	100.0%–100.0%	0.0%	☆	0x5808
P8.09	Reference 9	100.0%–100.0%	0.0%	☆	0x5809
P8.10	Reference 10	100.0%–100.0%	0.0%	☆	0x580A
P8.11	Reference 11	100.0%–100.0%	0.0%	☆	0x580B
P8.12	Reference 12	100.0%–100.0%	0.0%	☆	0x580C
P8.13	Reference 13	100.0%–100.0%	0.0%	☆	0x580D
P8.14	Reference 14	100.0%–100.0%	0.0%	☆	0x580E
P8.15	Reference 15	100.0% ～ 100.0%	0.0%	☆	0x580F
P8.16	Simple PLC running mode	0: Stop after the AC drive runs one cycle 1: Keep final values after the AC drive runs one cycle 2: Repeat after the AC drive runs one cycle	0	☆	0x5810
P8.17	Simple PLC retentive selection	1st digit (Retentive upon power failure) 0: No 1: Yes 2nd digit (Retentive upon stop) 0: No 1: Yes	00	☆	0x5811

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P8.18	Running time of simple PLC reference 0	0.0–6553.5s (h)	0.0s (h)	☆	0x5812
P8.19	Acceleration/deceleration time of simple PLC reference 0	0–3	0	☆	0x5813
P8.20	Running time of simple PLC reference 1	0.0–6553.5s (h)	0.0s (h)	☆	0x5814
P8.21	Acceleration/deceleration time of simple PLC reference 1	0–3	0	☆	0x5815
P8.22	Running time of simple PLC reference 2	0.0–6553.5s (h)	0.0s (h)	☆	0x5816
P8.23	Acceleration/deceleration time of simple PLC reference 2	0–3	0	☆	0x5817
P8.24	Running time of simple PLC reference 3	0.0–6553.5s (h)	0.0s (h)	☆	0x5818
P8.25	Acceleration/deceleration time of simple PLC reference 3	0–3	0	☆	0x5819
P8.26	Running time of simple PLC reference 4	0.0–6553.5s (h)	0.0s (h)	☆	0x581A
P8.27	Acceleration/deceleration time of simple PLC reference 4	0–3	0	☆	0x581B
P8.28	Running time of simple PLC reference 5	0.0–6553.5s (h)	0.0s (h)	☆	0x581C
P8.29	Acceleration/deceleration time of simple PLC reference 5	0–3	0	☆	0x581D

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P8.30	Running time of simple PLC reference 6	0.0–6553.5s (h)	0.0s (h)	☆	0x581E
P8.31	Acceleration/deceleration time of simple PLC reference 6	0–3	0	☆	0x581F
P8.32	Running time of simple PLC reference 7	0.0–6553.5s (h)	0.0s (h)	☆	0x5820
P8.33	Acceleration/deceleration time of simple PLC reference 7	0–3	0	☆	0x5821
P8.34	Running time of simple PLC reference 8	0.0–6553.5s (h)	0.0s (h)	☆	0x5822
P8.35	Acceleration/deceleration time of simple PLC reference 8	0–3	0	☆	0x5823
P8.36	Running time of simple PLC reference 9	0.0–6553.5s (h)	0.0s (h)	☆	0x5824
P8.37	Acceleration/deceleration time of simple PLC reference 9	0–3	0	☆	0x5825
P8.38	Running time of simple PLC reference 10	0.0–6553.5s (h)	0.0s (h)	☆	0x5826
P8.39	Acceleration/deceleration time of simple PLC reference 10	0–3	0	☆	0x5827
P8.40	Running time of simple PLC reference 11	0.0–6553.5s (h)	0.0s (h)	☆	0x5828
P8.41	Acceleration/deceleration time of simple PLC reference 11	0–3	0	☆	0x5829

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P8.42	Running time of simple PLC reference 12	0.0–6553.5s (h)	0.0s (h)	☆	0x582A
P8.43	Acceleration/deceleration time of simple PLC reference 12	0–3	0	☆	0x582B
P8.44	Running time of simple PLC reference 13	0.0–6553.5s (h)	0.0s (h)	☆	0x582C
P8.45	Acceleration/deceleration time of simple PLC reference 13	0–3	0	☆	0x582D
P8.46	Running time of simple PLC reference 14	0.0–6553.5s (h)	0.0s (h)	☆	0x582E
P8.47	Acceleration/deceleration time of simple PLC reference 14	0–3	0	☆	0x582F
P8.48	Running time of simple PLC reference 15	0.0–6553.5s (h)	0.0s (h)	☆	0x5830
P8.49	Acceleration/deceleration time of simple PLC reference 15	0–3	0	☆	0x5831
P8.50	Time unit of simple PLC running	0: s (second) 1: h (hour)	0	☆	0x5832
P8.51	Reference 0 source	0: Set by PC.00 1: AI1 2: AI2 3: (reserved) 4: Pulse setting X5 5.: PID 6: Set by preset frequency (P0.08), modified via terminal UP/ DOWN	0	☆	0x5833

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P9 Group V/F Control Parameters					
P9.00	V/F curve setting	0: Linear V/P 1: Multi point V/F 2: Square V/P 3: 1.2.power V/F 4: 1.4.power V/F 6: 1.6.power V/F 8: 1.8.power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation	0	★	0x5900
P9.01	Torque boost	0.0% (fixed torque boost)0.1%–30.0%	Model dependent	☆	0x5901
P9.02	Cut off frequency of torque boost	0.00 Hz to maximum output frequency	50.00 Hz	★	0x5902
P9.03	Multi point V/F frequency 1 (P1)	0.00 Hz to P9.05	0.00 Hz	★	0x5903
P9.04	Multi point V/F voltage 1 (V1)	0.0%–100.0%	0.0%	★	0x5904
P9.05	Multi point V/F frequency 2 (P2)	P3.03 to P3.07	0.00 Hz	★	0x5906
P9.06	Multi point V/F voltage 2 (V2)	0.0%–100.0%	0.0%	★	0x5907
P9.07	Multi point V/F frequency 3 (P9)	P9.05 to rated motor frequency (P1.04)Note: The rated frequencies of motors 2, are respectively set in PC.04	0.00 Hz	★	0x5908
P9.08	Multi point V/F voltage 3 V3	0.0%–100.0%	0.0%	★	0x5909
P9.09	V/F slip compensation gain	0%–200.0%	0.0%	☆	0x590A
P9.10	V/F over excitation gain	0–200	64	☆	0x590B

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P9.11	V/F oscillation suppression gain	0–100	Model dependent	☆	0x590C
P9.13	Voltage source for V/F separation	0: Digital setting (P9.14) 1: AI1 2: AI2 3: Reserved 4: Pulse setting (X5) 5: Multi reference 6: Simple PLC 7: PID 8: Communication setting100.0% corresponds to the rated motor voltage (P1.02,PC.02).	0	☆	0x590D
P9.14	Voltage digital setting for V/ F separation	0 V to rated motor voltage	0 V	☆	0x590E
P9.15	Voltage rise time of V/F separation	0.0–1000.0sIt indicates the time for the voltage rising from 0 V to rated motor voltage.	0.0s	☆	0x590F
P9.16	Voltage decline time of V/F separation	0.0–1000.0sIt indicates the time for the voltage to decline from rated motor voltage to 0 V.	0.0s	☆	0x5910
P9.17	Stop mode selection upon V/F separation	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declines to 0	0	☆	0x5911
P9.18	Current limit level	50~200%	150%	×	0x5912
P9.19	Current limit level	0: disabled 1: enabled	1	×	0x5913
P9.20	Current limit gain	0~100	20	○	0x5914
P9.21	Compensation factor of speed multiplying current limit	50~200%	50%	×	0x5915

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
P9.22	Voltage limit	650.0V~800.0V	760.0V	×	0x5916
P9.23	Voltage limit selection	0 disabled、1 enabled	1	×	0x5917
P9.24	Frequency gain for voltage limit	0~100	30	○	0x5918
P9.25	Voltage gain for voltage limit	0~100	30	○	0x5919
P9.26	Frequency rise threshold during voltage limit	0~50Hz	5Hz	×	0x591A
P9.27	Slip compensation time constant	0.1～10.0s	0.5s	○	0x591B
PA Group Communication Parameter					
PA.00	Baud rate	1st digit (Modbus baud rate) 0: 300 BPs 1: 600 BPs 2: 1200 BPs 3: 2400 BPs 4: 4800 BPs 5: 9600 BPs 6: 19200 BPs 7: 38400 BPs 8: 57600 BPs 9: 115200 BPs 2nd digit (reserved) 3rd digit (reserved) 4th digit (reserved)	5005	☆	0x5A00
PA.01	Data format	0: No check, data format <8,N,2> 1: Even parity check, data format <8,E,1> 2: Odd Parity check, data format <8,O,1> 3: No check, data format <8,N,1>Valid for Modbus	0	☆	0x5A01

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PA.02	Local address	0: Broadcast address 1–247Valid for Modbus	1	☆	0x5A02
PA.03	Response delay	0–20 ms Valid for Modbus	2 ms	☆	0x5A03
PA.04	Communication timeout	0.0s (invalid) 0.1–60.0sValid for Modbus	0.0s	☆	0x5A04
PA.05	Modbus protocol data format	1st digit: Modbus protocol 0: Reserved 1: Standard Modbus	31	☆	0x5A05
PA.06	Communication reading current resolution	0: 0.01A 1: 0.1A	0	☆	0x5A06
PB Group Fault and Protection					
PB.00	Motor overload protection selection	0:Disabled 1:Enabled	1	☆	0x5B00
PB.01	Motor overload protection gain	0.20–10.00	1.00	☆	0x5B01
PB.02	Motor overload warning coefficient	50%–100%	80%	☆	0x5B02
PB.03	Overvoltage stall gain	0 (no stall overvoltage)–100	0	☆	0x5B03
PB.04	Overvoltage stall protective voltage	120%–150%	130%	☆	0x5B04
PB.05	Overcurrent stall gain	0–100	20	☆	0x5B05
PB06	Overcurrent stall protective current	100%–200%	150%	☆	0x5B06
PB.07	Detection selection for short circuit to ground	0: Disabled 1: Enabled	1	☆	0x5B07
PB.08	Braking start voltage	700 ～ 800V	690V		0x5B08
PB.09	Fault auto reset times	0–20	0	☆	0x5B09
PB.10	DO action during fault auto reset	0: Not act 1: Act	0	☆	0x5B0A
PB.11	Time interval of fault auto reset	0.1s–100.0s	1.0s	☆	0x5B0B

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PB.13	Output phase loss protection selection	0: Disabled1: Enabled	1	☆	0x5B0D
PB.14	1st fault type	0: No fault 1: Reserved 2:Overcurrent during acceleration 3: Over current during deceleration 4: Over current at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Buffer resistance overload 9: Under voltage	.	★	0x5B0E

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PB.15	2nd fault type	10: AC drive overload 11: Motor overload 12:Power input phase loss 13: Power output phase loss 14: Module overheat 15: External equipment fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto tuning fault 20: Encoder/PG card fault 21: EEPROM read write fault 22: AC drive hardware fault 23: Short circuit to ground 24: Reserved 25:Reserved 26:Accumulative running time reached 27: User defined fault 1 28: User defined fault 2 29: Accumulative power on time reached 30: Load becoming 0 31: PID feedback lost during running 32: With wave current limit fault 33: Motor switchover fault during running 34: Too large speed deviation 35: Motor over speed 36: Motor overheat3rd (latest) fault type	-	★	0x5B0F
PB.16	3rd fault type(Latest)				0x5B10

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PB.17	Frequency upon 3rd fault	-	-	★	0x5B11
PB.18	Current upon 3rd fault	-	-	★	0x5B12
PB.19	Bus voltage upon 3rd fault	-	-	★	0x5B13
PB.20	X status upon 3rd fault	-	-	★	0x5B14
PB.21	Output terminal status upon 3rd fault	-	-	★	0x5B15
PB.22	AC drive status upon 3rd fault	-	-	★	0x5B16
PB.23	Power on time upon 3rd fault	-	-	●	0x5B17
PB.24	Running time upon 3rd fault	-	-	★	0x5B18
PB.27	Frequency upon 2nd fault	-	-	★	0x5B1B
PB.28	Current upon 2nd fault	-	-	★	0x5B1C
PB.29	Bus voltage upon 2nd fault	-	-	★	0x5B1D
PB.30	X status upon 2nd fault	-	-	★	0x5B1E
PB.31	Output terminal status upon 2nd fault	-	-	●	0x5B1F
PB.32	Frequency upon 2nd fault	-	-	★	0x5B20
PB.33	Current upon 2nd fault	-	-	★	0x5B21
PB.34	Bus voltage upon 2nd fault	-	-	★	0x5B22
PB.37	X status upon 1st fault	-	.	★	0x5B25
PB.38	Output terminal status upon 1st fault	-	.	★	0x5B26
PB.39	Frequency upon 1st fault	-	.	★	0x5B27
PB.40	Current upon 1st fault	-	.	★	0x5B28

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PB.41	Bus voltage upon 3rd fault	-	.	★	0x5B29
PB.42	X status upon 1st fault	-	.	★	0x5B2A
PB.43	Output terminal status upon 1st fault	-	.	★	0x5B2B
PB.44	Frequency upon 1st fault	-	.	★	0x5B2C
PB.47	Fault protection action selection 1	1st digit (Motor overload, oL2) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run 2nd digit (Power input phase loss, SPI) Same as 1st digit 3rd digit (Power output phase loss, SPO) Same as 1st digit 3rd digit (External equipment fault, EFI) Same as 1st digit 4th digit (Communication	00000	☆	0x5B2F
PB.48	Fault protection action selection 2	1st digit (Encoder fault, EncF) 0: Coast to stop 1: Switch over to V/F control, stop according to the stop mode 2: Switch over to V/F control, continue to run 2nd digit (EEPROM read write fault, EEF) 0: Coast to stop 1: Stop according to the stop mode 3rd digit: reserved 4th digit (Motor overheat, oH2)	00000	☆	0x5B30

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
		Same as 1st digit in PB.47 5th digit (Accumulative running time reached tIE0) Same as 1st digit in PB.47			
PB.49	Fault protection action selection	1st digit (User defined fault 1, udE1) Same as 1st digit in P9.47 2nd digit (User defined fault 2, udE2) Same as 1st digit in P9.47 2nd digit (Accumulative power on time reached, tIE2) Same as 1st digit in PB.47 2nd digit (Load becoming 0, LoFF) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run at 7% of rated motor frequency and resume to the set frequency if the load recovers 3rd digit (PID feedback lost during running, PId1) Same as 1st digit in PB.47	00000	☆	0x5B31
PB.50	Fault protection action selection 4	1st digit (Too large speed deviation, oSE) Same as 1st digit in PB.47 2nd digit (Motor over. speed, oSF) Same as 1st digit in PB.47 3rd digit (Initial position fault, EroP) Same as 1st digit in PB.47 4th digit (reserved) Same as 1st digit in PB.47 5th digit: Reserved	00000	☆	0x5B32

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PB.54	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Set frequency 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	0	☆	0x5B36
PB.55	Backup frequency upon abnormality	0.0%–100.0% (maximum frequency)	100.0%	☆	0x5B37
PB.56	Type of motor temperature sensor	0: No temperature sensor 1: PT100 2:PT1000	1	☆	0x5B38
PB.57	Motor overheat protection threshold	0–200°C	110°C	☆	0x5B39
PB.58	Motor overheat warning threshold	0–200°C	90°C	☆	0x5B3A
PB.59	Action selection at instantaneous power failure	0: Invalid 1: Decelerate 2: Decelerate to stop	0	☆	0x5B3B
PB.60	Action pause judging voltage at instantaneous power failure	80.0%–100.0%	90.0%	☆	0x5B3C
PB.61	Voltage rally judging time at instantaneous power failure	0.00–100.00s	0.50s	☆	0x5B3D
PB.62	Action judging voltage at instantaneous power failure	60.0%–100.0% (standard bus voltage)	80.0%	☆	0x5B3E
PB.63	Protection upon load becoming 0	0: Disabled 1: Enabled	0	☆	0x5B3F
PB.64	Detection level of load becoming 0	0.0%–100.0% (rated motor current)	10.0%	☆	0x5B40
PB.65	Detection time of load becoming 0	0.0–60.0s	1.0s	☆	0x5B41
PB.67	Over speed detection value	0.0%–50.0% (maximum frequency)	20.0%	☆	0x5B42

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PB.68	Over speed detection time	0.0–60.0s	1.0s	☆	0x5B43
PB.71	Power dip ride through gain Kp	0~100	40	○	0x5B46
PB.72	Power dip ride through intrfral coefficient Ki	0~100	30	○	0x5B47
PB.73	Deceleration time of Power dip ride through	0~300.0s	20.0s	○	0x5B48
PB.74	Module overheat protection threshold	0~200	85°C	○	0x5B49
PC Group Motor 2 Parameters					
PC.00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Reserved	0	★	0x5C00
PC.01	Rated motor power	0.1–1000.0 kW	Model dependent	★	0x5C01
PC.02	Rated motor voltage	1–2000 V	Model dependent	★	0x5C02
PC.03	Rated motor current	0.01–655.35 A (AC drive power ≤ 55 kW)0.1–6553.5 A (AC drive power > 55 kW)	Model dependent	★	0x5C03
PC.04	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★	0x5C04
PC.05	Rated motor rotational speed	1–65535 RPM	Model dependent	★	0x5C05
PC.06	Stator resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW)0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★	0x5C06

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PC.07	Rotor resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW)0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★	0x5C07
PC.08	Leakage inductive reactance (asynchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW)0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★	0x5C08
PC.09	Mutual inductive reactance (asynchronous motor)	0.1–6553.5 mH (AC drive power ≤ 55 kW)0.01–655.35 mH (AC drive power > 55 kW)	Model dependent	★	0x5C09
PC.10	No load current (asynchronous motor)	0.01 A to A2.03 (AC drive power ≤ 55 kW)0.1 A to A2.03 (AC drive power > 55 kW)	Model dependent	★	0x5C0A
PC.37	Auto tuning selection	0: No auto tuning 1: Asynchronous motor static auto tuning 2: Asynchronous motor complete auto tuning	0	★	0x5C25
PC.38	Speed loop proportional gain 1	0–100	30	☆	0x5C26
PC.39	Speed loop integral time 1	0.01–10.00s	0.50s	☆	0x5C27
PC.40	Switchover frequency 1	0.00 to PC.43	5.00 Hz	☆	0x5C28
PC.41	Speed loop proportional gain 2	0–100	15	☆	0x5C29
PC.42	Speed loop integral time 2	0.01–10.00s	1.00s	☆	0x5C2A
PC.43	Switchover frequency 2	PC.40 to maximum output frequency	10.00 Hz	☆	0x5C2B

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PC.44	Vector control slip gain	50%–200%	100%	☆	0x5C2C
PC.45	Time constant of speed loop filter	0.000–0.100s	0.000s	☆	0x5C2D
PC.46	Vector control over excitation gain	0–200	64	☆	0x5C2E
PC.47	Torque upper limit source in speed control mode	0: PC.48 1: AI1 2: AI2 3: Reserved 4: Pulse setting (X5) 5: Via communication 6: MIN(AI1,AI2) 7: MIN(AI1,AI2)	0	☆	0x5C2F
PC.48	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆	0x5C30
PC.49	Torque limit source in speed control （regenerative）	0:set by A2.50 1:AI1 2:AI2 3:Reserved 4:PULSE setting 5:communication setting 6:MIN(AI1,AI2) 7:MAX(AI1,AI2) 8:set by P2.12	0	○	0x5C31
PC.50	Digital setting of torque limit in speed contro	0.0%～200.0%	150.0%	○	0x5C32
PC.51	Excitation adjustment	0–60000	2000	☆	0x5C33
PC.52	Excitation adjustment integral	0–60000	1300	☆	0x5C34
PC.53	Torque adjustment proportional gain	0–60000	2000	☆	0x5C35
PC.54	Torque adjustment integral gain	0–60000	1300	☆	0x5C36

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PC.55	Speed loop integral property	0: Disabled 1: Enabled	0	☆	0x5C37
PC.59	Weak Sectors Max torque coefficient	50.0%–200.0%	100%	☆	0x5C3B
PC.60	Generated power upper limit	0:invalid 1: entire valid 2. constant speed valid 3. decelerate valid	0	☆	0x5C3C
PC.61	Generated power limit	0.200%	Model dependent	☆	0x5C3D
PC.61	Motor 2 control mode	0: Sensorless flux vector control (SVC) 1: Reserved 2: Voltage/Frequency (V/F) control	0	☆	0x5C3E
PC.62	Motor 2 acceleration/ deceleration time	0: Same as motor 1 1:Acceleration/Deceleration time 1 2:Acceleration/Deceleration time 2 3:Acceleration/Deceleration time 3 4:Acceleration/Deceleration time 4	0	☆	0x5C3F
PC.63	Motor 2 torque boost	0.0%: Automatic torque boost0.1%–30.0%	Model dependent	☆	0x5C40
PC.65	Motor 2 oscillation suppression gain	0–100	Model dependent	☆	0x5C41
PC.66	Regenerative power limit	0%~50%	5%	○	0x5C42
PD Group Torque Control Parameters					
PD.00	Speed/Torque control selection	0: Speed control 1: Torque control	0	★	0x5D00

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PD.01	Torque setting source in torque control	0: Digital setting (PD.03) 1: AI1 2: AI2 3: Reserved 4: Pulse setting (X5) 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2)Full range of values 1–7corresponds to the digital setting of PD.03.	0	★	0x5D01
PD.03	Torque digital setting in torque	.200.0%–200.0%	150.0%	☆	0x5D03
PD.05	Forward maximum frequency in torque control	0.00 Hz to maximum frequency (P0.10)	50.00 Hz	☆	0x5D05
PD.06	Reverse maximum frequency in torque control	0.00 Hz to maximum frequency (P0.10)	50.00 Hz	☆	0x5D06
PD.07	Acceleration time in torque control	0.00–65000s	0.00s	☆	0x5D07
PD.08	Deceleration time in torque control	0.00–65000s	0.00s	☆	0x5D08
PE Group Vector Control Parameters					
PE.00	Speed loop proportional gain 1	0–100	30	☆	0x5E00
PE.01	Speed loop integral time 1	0.01–10.00s	0.50s	☆	0x5E01
PE.02	Switchover frequency 1	0.00 to PE.05	5.00 Hz	☆	0x5E02
PE.03	Speed loop proportional gain 2	0–100	20	☆	0x5E03
PE.04	Speed loop integral time 2	0.01–10.00s	1.00s	☆	0x5E04
PE.05	Switchover frequency 2	PE.02 to maximum output frequency	10.00 Hz	☆	0x5E05

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PE.06	Vector control slip gain	50%–200%	100%	☆	0x5E06
PE.07	Time constant of speed loop filter	0.000–0.100s	0.000s	☆	0x5E07
PE.08	Vector control over excitation gain	0–200	64	☆	0x5E08
PE.09	Torque upper limit source in speed control mode	0: PE.10 1: AI1 2: AI2 3: Reseved 4: Pulse setting (X5) 5: Communication setting	0	☆	0x5E09
PE.10	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆	0x5E0A
PE.11	Torque upper limit source in speed control model	0:PE.10 1:AI1 2:AI2 3: Reseved 4:X5setting 5:communication setting 6:Min(AI1,AI2) 7:Max(AI1 AI2) 8:PE.12 setting	0	☆	0x5E0B
PE.12	Digital setting of torque upper limit in speed control model	0.0.200.0%	150.0%	☆	0x5E0C
PE.13	Excitation adjustment proportional gain	0–60000	2000	☆	0x5E0D
PE.14	Excitation adjustment integral gain	0–60000	1300	☆	0x5E0E
PE.15	Torque adjustment proportional gain	0–60000	2000	☆	0x5E0F
PE.16	Torque adjustment integral gain	0–60000	1300	☆	0x5E10

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PE.17	Speed loop integral property	0: Disabled 1: Enabled	0	☆	0x5E11
PE.20	Maximum field weakening current	1%–300%	50%	☆	0x5E14
PE.21	Field weakening automatic adjustment gain	10%–500%	100%	☆	0x5E15
PH Group Operating Panel and Display					
PH.01	MJOG Key function selection	0: MJOG key disabled 1: Switchover between operation panel control and remote command control (terminal or communication) 2: Switchover between forward rotation and reverse rotation 3: Forward JOG 4: Reverse JOG	3	★	0x6000
PH.02	STOP/RESET key function	0: STOP/RESET key enabled only in operation panel control 1: STOP/RESET key enabled in any operation mode	1	☆	0x6001
PH.03	LED display running parameters 1	0000–FFFF Bit00: Running frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power(kW) Bit06: Output torque (%) Bit07: X input status	1F	☆	0x6002

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PH.03	LED display running parameters 1	Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Reserved Bit12: Count value Bit13: Length valueBit 14: Load speed displayBit 15: PID setting	1F	☆	0x6003
PH.04	LED display running parameters 2	0000–FFFF Bit00: PID feedback Bit01: PLC stage Bit02: X5 Pulse setting frequency (kHz) Bit03: Running frequency 2 (Hz) Bit04: Remaining running time Bit05: AI1 voltage before correction (V) Bit06: AI2 voltage before correction (V) Bit07: Reserved Bit08: Linear speed Bit09: Current power on time (Hour) Bit10: Current running time (Min) Bit11:X 5Pulse setting frequency (Hz) Bit12: Communication setting value Bit13: Encoder feedback speed (Hz) Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	☆	0x6004

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PH.05	LED display stop parameters	0000–FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: X input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Reserved Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: X5 Pulse setting frequency (kHz)	33	☆	0x6005
PH.06	Load speed display coefficient	0.001–65.000	1.000	☆	0x6006
PH.07	Heat sink temperature of inverter module	0.0–100°C	.	★	0x6007
PH.08	Temporary software version	.	.	★●	0x6008
PH.09	Accumulative running time	0–65535 h	.	★	0x6009
PH.10	Product number	.	.	★	0x601A
PH.11	Software version	.	.	★	0x601B
PH.12	Number of decimal places for load speed display	1st digit : C0.14 Number of decimal points 0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places 2nd digit: C0.19/C0.29 Number of decimal points 1: 1 decimal place 2: 2 decimal places	1	☆	0x601C

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PH.13	Accumulative power on time	0–65535 h	0 h	★	0x601D
PH.14	Accumulative power consumption	0–65535 kWh	.	★	0x601E
PH.15	Non standard version number		-	★	0x601F
PL Group Control Optimization Parameters					
PL.00	DPWM switchover frequency upper limit	0.00–15.00 Hz	8.00 Hz	☆	0x6100
PL.01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆	0x6101
PL.02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode 1 2: Compensation mode 2	1	☆	0x6102
PL.03	Random PWM depth	0: Random PWM invalid1–10	0	☆	0x6103
PL.04	Rapid current limit	0: Disabled 1: Enabled	1	☆	0x6104
PL.05	Current detection compensation	0–100	5	☆	0x6105
PL.06	Under-voltage point setting	210 to 420 V	350	☆	0x6106
PL.07	SVC optimization mode selection	0: No optimization 1: Optimization mode 1 2: Optimization mode 2	1	☆	0x6107
PL.08	Dead zone time adjustment	100%–200%	150%	☆	0x6108
PL.09	Overvoltage threshold	200.0–2500.0 V	Model dependent	☆	0x6109
PP Group User Password and Parameter Management					

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
PP.00	User password	0–65535	0	☆	0x6200
PP.01	Restore default settings	0: No operation0 1:Restore factory settings except motor parameters 02: Clear records 04: Restore user backup parameters 501: Back up current user	0	★	0x6201
PP.03	Menu display mode	0:Standard menu 1:Check mode menu	0	☆	0x6203
PP.04	Parameter modification property	0: Modifiable 1: Not modifiable	0	☆	0x6204
PP.05	Enable pre-charging selection	0: Disabled 1: Enabled	1	☆	0x6205
A0 Group AI/AO Correction					
A0.00	AI1 measured voltage 1	0.500–4.000 V	Factory corrected	☆	0x6300
A0.01	AI1 displayed voltage 1	0.500–4.000 V	Factory corrected	☆	0x6301
A0.02	AI1 measured voltage 2	6.000–9.999 V	Factory corrected	☆	0x6302
A0.03	AI1 displayed voltage 2	6.000–9.999 V	Factory corrected	☆	0x6303
A0.04	AI2 measured voltage 1	0.500–4.000 V	Factory corrected	☆	0x6304
A0.05	AI2 displayed voltage 1	0.500–4.000 V	Factory corrected	☆	0x6305
A0.06	AI2 measured voltage 2	6.000–9.999 V	Factory corrected	☆	0x6306
A0.07	AI2 displayed voltage 2	6.000–9.999 V	Factory corrected	☆	0x6307

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
A0.12	AO1 target voltage 1	0.500–4.000 V	Factory corrected	☆	0x630C
A0.13	AO1 measured voltage 1	0.500–4.000 V	Factory corrected	☆	0x630D
A0.14	AO1 target voltage 2	6.000–9.999 V	Factory corrected	☆	0x630E
A0.15	AO1 measured voltage 2	6.000–9.999 V	Factory corrected	☆	0x630F
A0.20	AI2 measured current 1	0.000–20.000 mA	Factory corrected	☆	0x6314
A0.21	AI2 sampling current 1	0.000–20.000 mA	Factory corrected	☆	0x6315
A0.22	AI2 measured current 2	0.000–20.000 mA	Factory corrected	☆	0x6316
A0.23	AI2 sampling current 2	0.000–20.000 mA	Factory corrected	☆	0x6317
A0.24	AO1 ideal current 1	0.000–20.000 mA	Factory corrected	☆	0x6318
A0.25	AO1 sampling current 1	0.000–20.000 mA	Factory corrected	☆	0x6319
A0.26	AO1 ideal current 2	0.000–20.000 mA	Factory corrected	☆	0x631A
A0.27	AO1 sampling current 2	0.000–20.000 mA	Factory corrected	☆	0x631B
A1 Group AI Curve Setting					
A1.00	AI curve 4 minimum input	.10.00 V to A6.02	0.00 V	☆	0x6400
A1.01	Corresponding setting of AI curve 4 minimum input	.100.0%–100.0%	0.0%	☆	0x6401

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
A1.02	AI curve 4 inflexion 1 input	A6.00 to A6.04	3.00 V	☆	0x6402
A1.03	Corresponding setting of AI curve 4 inflexion 1 input	.100.0%–100.0%	30.0%	☆	0x6403
A1.04	AI curve 4 inflexion 1 input	A6.02 to A6.06	6.00 V	☆	0x6404
A1.05	Corresponding setting of AI curve 4 inflexion 1 input	.100.0%–100.0%	60.0%	☆	0x6405
A1.06	AI curve 4 maximum input	A6.06 to 10.00 V	10.00 V	☆	0x6406
A1.07	Corresponding setting of AI curve 4 maximum input	.100.0%–100.0%	100.0%	☆	0x6407
A1.08	AI curve 5 minimum input	.10.00 V to A6.10	0.00 V	☆	0x6408
A1.09	Corresponding setting of AI curve 5 minimum input	.100.0%–100.0%	0.0%	☆	0x6409
A1.10	AI curve 5 inflexion 1 input	A6.08 to A6.12	3.00 V	☆	0x640A
A1.11	Corresponding setting of AI curve 5 inflexion 1 input	.100.0%–100.0%	30.0%	☆	0x640B
A1.12	AI curve 5 inflexion 1 input	A6.10 to A6.14	6.00 V	☆	0x640C
A1.13	Corresponding setting of AI curve 5 inflexion 1 input	.100.0%–100.0%	60.0%	☆	0x640D
A1.14	AI curve 5 maximum input	A6.14 to 10.00 V	10.00 V	☆	0x640E

Function	Parameter Name	Setting Range	Default	Property	MODBUS Address
A1.15	Corresponding setting of AI curve 5 maximum input	.100.0%–100.0%	100.0%	☆	0x640F
A1.24	Jump point of AI1 input corresponding setting	.100.0%–100.0%	0.0%	☆	0x6418
A1.25	Jump amplitude of AI1 input corresponding setting	0.0%–100.0%	0.5%	☆	0x6419
A1.26	Jump point of AI2 input corresponding setting	.100.0%–100.0%	0.0%	☆	0x641A
A1.27	Jump amplitude of AI2 input corresponding setting	0.0%–100.0%	0.5%	☆	0x641B

4.2 Monitoring Parameters

Function Code	Parameter Name	Min. Unit	Communication Address
C0.00	Running frequency (Hz)	0.01 Hz	7000H
C0.01	Set frequency (Hz)	0.01 Hz	7001H
C0.02	Bus voltage	0.1 V	7002H
C0.03	Output voltage	1 V	7003H
C0.04	Output current	0.01 A	7004H
C0.05	Output power	0.1 kW	7005H
C0.06	Output torque	0.1%	7006H
C0.07	X state	1	7007H
C0.08	DO state	1	7008H
C0.09	AI1 voltage (V)	0.01 V	7009H
C0.10	AI2 voltage (V)/current (mA)	0.01 V/0.01 mA	700AH
C0.11	Reserved	0.01 V	7007BH
C0.12	Count value	1	700CH

Function Code	Parameter Name	Min. Unit	Communication Address
C0.13	Length value	1	700DH
C0.14	Load speed	1	700EH
C0.15	PID setting	1	700FH
C0.16	PID feedback	1	7010H
C0.17	PLC stage	1	7011H
C0.18	X5 Input pulse frequency (Hz)	0.01 kHz	7012H
C0.20	Remaining running time	0.1 Min	7014H
C0.21	AI1 voltage before correction	0.001 V	7015H
C0.22	AI2 voltage (V)/current (mA) before correction	0.01 V/0.01 mA	7016H
C0.24	Linear speed	1 m/Min	7018H
C0.25	Accumulative power-on time	1 Min	7019
C0.26	Accumulative running time	0.1 Min	701AH
C0.27	X5 Input pulse frequency	1 Hz	701BH

Function Code	Parameter Name	Min. Unit	Communication Address
C0.28	Communication setting value	0.01%	701CH
C0.30	Main frequency X	0.01 Hz	701EH
C0.31	Auxiliary frequency Y	0.01 Hz	701FH
C0.32	Viewing any register address value	1	7020H
C0.33	Reserved	0.1°	7021H
C0.34	Motor temperature	1°C	7022H
C0.35	Target torque	0.1%	7023H
C0.36	Resolver position	1	7024H
C0.37	Power factor angle	0.1°	7025H
C0.38	Reserved	1	7026H
C0.39	Target voltage upon V/F separation	1 V	7027H
C0.40	Output voltage upon V/F	1V	7028H
C0.41	X terminals state visual display	1	7029H
C0.42	Y state visual display	1	702AH
C0.43	X terminals function state visual display 1	1	702BH

Function Code	Parameter Name	Min. Unit	Communication Address
C0.44	X terminals function state visual display 2	1	702CH
C0.45	Fault information	1	702DH
C0.59	Current set frequency	0.01%	703BH
C0.60	Current running frequency	0.01%	703CH
C0.61	AC drive running state	1	703DH
C0.62	Current fault code	1	703EH
C0.63	Sent value of point-point communication	0.01%	703FH
C0.64	Received value of point-point communication	0.01%	7040H
C0.65	Torque upper limit	0.1%	7041H
C0.67	Communication expand	-	
C0.71	Current of communication card	-	-
C0.72	Communication card fault status	-	-
C0.73	Motor NO	0: Motor 1 1: Motor 2	7046H
C0.74	AC drive output torque	-300.00%–300.00%	7047H

Chapter 5 Detailed Function Introductions

5.1 Basic Function(Group P0)

P0.00 G/P type display	Setting range: 1-2 [1]

1: G type 2: P type (Reserved)

P0.01 motor 1 Control mode	Setting range: 0-2 [0]

Notes:

This parameter is used to select the control mode for motor 1.

0: Sensorless flux vector (SVC) control mode

SVC mode indicates open-loop vector control, and is applicable to high-performance control applications such as machine tool, centrifuge, wire drawing machine and injection moulding machine. One AC drive can operate only one motor.

1: Reserved

2: Voltage/Frequency (V/F) control mode

V/F mode is suitable for cases where load requirements are not high, or one frequency converter drives multiple motors, such as fan and pump loads. It can be used when one frequency converter drives multiple motors.

Notes:

When selecting the vector control method, the motor parameter tuning process must be carried out. Only accurate motor parameters can leverage the advantages of vector control. By adjusting the speed regulator parameter PE group function code (the second motor is PC group), better performance can be achieved.

P0.02 Command source selection	Setting range: 0-2 [0]

Notes:

The control commands of inverter include start,stop, forward run, reverse run, jog and fault reset and so on.

0: Keypad (REMOTE light off)

Both RUN and STOP key are used for running command control. In running status. pressing RUN and STOP in the same time will cause the inverter coast to stop.

1: Terminal (REMOTE light on)

The operation including forward run. reverse run. forward jog. reverse jog etc. It can be controlled by multifunctional input terminals.

2: Communication (REMOTE light flickering)

Commands are given from host controller via RS485 port.

P0.03 Main Frequency command X selection	Setting range: 0-9 [0]

Notes:

It is used to select the setting channel of the main frequency. You can set the main frequency in the following 10 channels:

0: Digital setting via Keypad (non-retentive at power failure)

The initial value of the set frequency is the value of P0-08 (Preset frequency). You can change the set frequency by pressing ↑UP and ↓DOWN on the keypad (or using the UP/DOWN function of input terminals).When the AC drive is powered on again after power failure, the set frequency reverts to the value of P0-08.

1: Digital setting via Keypad (retentive at power failure)

The initial value of the set frequency is the value of P0-08 (Preset frequency). You can change the set frequency by pressing ↑UP and ↓DOWN on the keypad (or using the UP/DOWN function of input terminals).When the AC drive is powered on again after power failure, the set frequency is the value memorized at the moment of the last power failure.

2: Analog AI1 setting

3: Analog AI2 setting

Analog setting means the frequency is set by analog signal on the terminal. A1 series VFD provides 2 analog input AI1 and AI2. The AI1 is 0~10V voltage input,and AI2 is 0~10 V voltage input or 0/4~20 mA current input, determined by jumper J2.

4: Reserved

5: Pulse setting (X5)

The frequency is set by X5 (high-speed pulse). The signal specification of pulse setting is 9 – 30 V (voltage range) and 0 – 100 kHz (frequency range). The corresponding value 100% of pulse setting corresponds to the value of maximum frequency P0.10.

6: Multi-reference setting

In multi section mode, it is needed to set the group P2 and P8 to confirm setting frequency.

7: built in simple PLC setting

When the simple programmable logic controller (PLC) mode is used as the frequency source. You can set P8 group “simple PLC and multi speed control group” to confirm given frequency and running direction, even holding time and acceleration/deceleration time of the 16 frequency references. For details, refer to the

descriptions of Group P8.

8: PID setting

The output of PID control is used as the running frequency. When applying PID as the frequency source, you need to set parameters of PID function in group P6.

9: Communication setting

When Modbus communication is used, the upper computer gives data through the communication address 0x1000, the data format is data with two decimal points, and the data range is - P010~+P010.

If the communication protocol is Modbus RTU, select the corresponding serial communication protocol according to P0.28.

P0.04 Auxiliary Frequency command Y selection	Setting range: 0-9 [0]
0: Digital setting via Keypad (non-retentive at power failure)	1: Digital setting via Keypad (retentive at power failure)
2: AI1	3: AI2
4: Reserved	5: Pulse setting (X5)
6: Multi-reference	7: Simple PLC
8: PID	9: Communication setting

When Y frequency command is the only frequency reference channel. its application is the same with X frequency command. For details. please refer to P0.03.

P0.05 reference value of auxiliary frequency Y	Setting range: 0-1 [0]

Notes:

0: Maximum output frequency

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

1: X frequency command

100% of Y frequency setting corresponds to the main frequency command X. Select this setting if it needs to adjust on the base of X frequency command.

P0.06 Range of auxiliary frequency Y	Setting range: 0%–150%

Notes:

When the frequency source is selected as "frequency superposition", this parameter is used to determine the adjustment range of the auxiliary frequency source. The auxiliary frequency adjustment range=P0.06 * maximum frequency (when P0.05=0) or=P0.06 * X main frequency (when P0.05=1).

P0.07 Frequency source superposition selection	Setting range: 1st digit /0-4 [0] 2nd digit/0-3[0]

Notes:

1st digit (Frequency source selection):

0: Main frequency source X

1: X and Y calculation (calculation relationship determined by 2nd digit)

2: Switchover between X and Y

3: Switchover between X and "X and Y calculation"

4: Switchover between Y and "X and Y calculation"

2nd digit (X and Y calculation relationship):

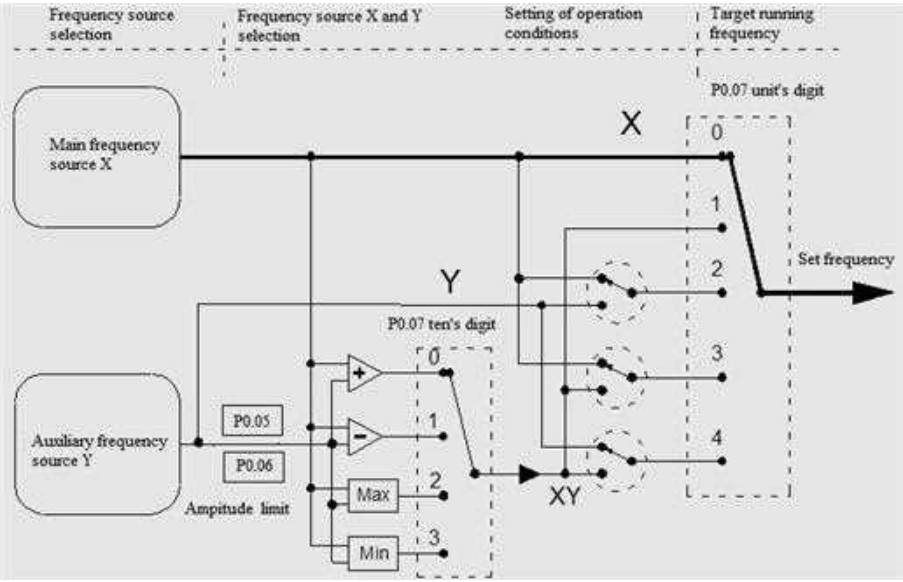
0: X+Y

1: X-Y

2: Maximum of X and Y

3: Minimum of X and Y

It is used to select the frequency setting channel. If the frequency source involves X and Y calculation, you can set the frequency offset in P0-21 for superposition to the X and Y calculation result, flexibly satisfying various requirements.



P0.08 Preset frequency	Setting range: 0.00-P0.10 [50.00Hz]

Notes:

When Frequency X command source is set to be Keypad, this parameter is the initial value of inverter reference frequency.

P0.09 Rotation direction	Setting range: 0-1[0]

Notes:

0: Default direction

After the inverter is powered on, it drives the motor in default direction.

1: Reverse direction

It is used to change the rotation direction of the motor, which is equivalent to changing the rotation direction of the motor by adjusting any two motor lines.

P0.10 Maximum frequency	Setting range: 50.00H~500.00HZ[50.00Hz]

Notes:

This parameter is used to set the Max Output frequency of the inverter. It is the basis of frequency setting and the speed of ACC/DEC. Please pay attention to it.

When the frequency source is AI, pulse setting (X5), or multi-reference, 100% of the input corresponds to the value of this parameter.

P0.11 Source of frequency upper limit	0-5 [0]
0: Set by P0-12	1: AI1
2: AI1	3: Reserved
4: Pulse setting (X5)	5: Communication setting

Notes:

It is used to set the source of the frequency upper limit, including digital setting (P0.12), AI, pulse setting or communication setting. If the frequency upper limit is set by means of AI1, AI2, X5 or communication, the setting is similar to that of the main frequency source X. For details, see the description of P0.03.

P0.12 Frequency upper limit	Setting range: Frequency lower limit (P0.14) to maximum frequency (P0.10)

Notes:

This parameter is used to set the frequency upper limit.

P0.13 Frequency upper limit offset	Setting range: 0.00 Hz to maximum frequency (P0.10)

Notes:

If the source of the frequency upper limit is analog input or pulse setting, the final frequency upper limit is obtained by adding the offset in this parameter to the frequency upper limit set in P0.11.

P0.14 Frequency lower limit	Setting range: 0.00 Hz to frequency upper limit (P0.12)

Notes:

If the frequency reference is lower than the value of this parameter, the AC drive can stop, run at the frequency lower limit, or run at zero speed, determined by P5.14.

P0.15 Carrier frequency	Setting range: 0.5–16.0 kHz

Notes:

It is used to adjust the carrier frequency of the AC drive, helping to reduce the motor noise, avoiding the resonance of the mechanical system, and reducing the leakage current to the earth and interference generated by the AC drive.

If the carrier frequency is low, output current has high harmonics, and the power loss and temperature rise of the motor increase.

If the carrier frequency is high, power loss and temperature rise of the motor declines. However, the AC drive has an increase in power loss, temperature rise and interference.

Carrier frequency	Low	High
Motor noise	Large	Small
Output current waveform	Bad	Good
Motor temperature rise	High	Low
AC drive temperature rise	Low	High
Leakage current	Small	Large
External radiation interference	Small	Large

P0.16 Carrier frequency adjustment with temperature	Setting range: 0~1
0: No	1: Yes

Notes:

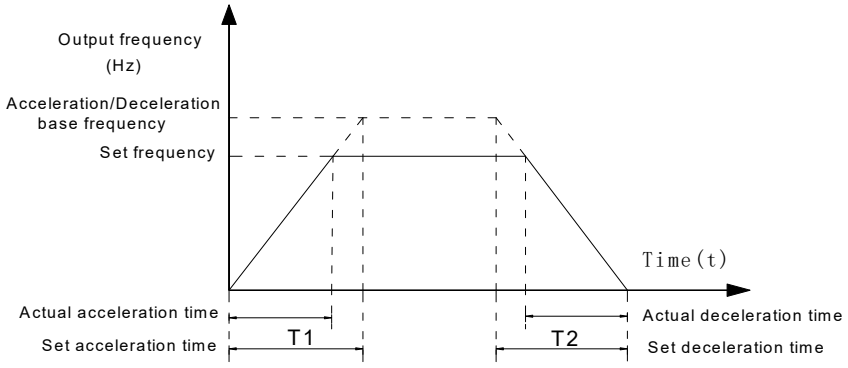
It is used to set whether the carrier frequency is adjusted based on the temperature. The AC drive automatically reduces the carrier frequency when detecting that the heat sink temperature is high. The AC drive resumes the carrier frequency to the set value when the heat sink temperature becomes normal. This function reduces the overheat alarms.

P0.17 Acceleration time 1	Setting range: 0.00–650.00s (P0.19 = 2) 0.0–6500.0s (P0.19 = 1) 0–65000s (P0.19 = 0)
P018 Deceleration time 1	Setting range: 0.00–650.00s (P0.19 = 2) 0.0–6500.0s (P0.19 = 1) 0–65000s (P0.19 = 0)

Notes:

Acceleration time indicates the time required by the AC drive to accelerate from 0 Hz to "Acceleration/Deceleration base frequency" (P0.25), that is, T_1 in Figure.

Deceleration time indicates the time required by the AC drive to decelerate from "Acceleration/Deceleration base frequency" (P0.25) to 0 Hz, that is, T_2 in Figure.



The A1 series VFD provides totally four groups of acceleration/deceleration time for selection. You can perform switchover by using a X terminal.

Group 1: P0.17, P0.18 Group 2: P5.03, P5.04
Group 3: P5.05, P5.06 Group 4: P5.07, P5.08

P0.19 Acceleration/Deceleration Time unit	Setting range: 0~2
0: seconds	1: 0.1 seconds
2: 0.01 seconds	

P0.21 Frequency offset of auxiliary frequency source for X and Y calculation	Setting range: 0.00 Hz to maximum frequency (P0.10)

This function code is only valid when the frequency source is selected as the main X and auxiliary Y calculation. When the frequency source is used as the main X and

auxiliary Y calculation, P0.21 is used as the bias frequency, which is superimposed with the results of the main X and auxiliary Y calculation as the final frequency setting value, making the frequency setting more flexible.

P0.23 Retentive of digital setting frequency upon stop	Setting range: 0~1[0]
0: Not retentive	1: Retentive

Notes:

This parameter is valid only when the frequency source is digital setting.

If P0.23 is set to 0, the digital setting frequency value resumes to the value of P0.08 (Preset frequency) after the AC drive stops The modification by using keys UP/DOWN or the terminals UP/DOWN function is clear.

If P0-23 is set to 1, the digital setting frequency value is the set frequency at the moment when the AC drive stops. The modification by using keys UP/DOWN or the terminals UP/DOWN function remains effective.

P0.24 Motor parameter group selection	Setting range: 0~1[0]
0: Motor parameter group 1	1: Motor parameter group 2

Notes:

The A1 series VFD can drive two motors at different time. You can set the motor nameplate parameters respectively, independent motor auto-tuning, different control modes, and parameters related to running performance respectively for the two motors.

Motor parameter group 1 corresponds to groups P1 and P2. Motor parameter groups 2 correspond to groups PC.

You can select the current motor parameter group by using P0-24 or perform switchover between the motor parameter groups by means of a X terminal. If motor parameters selected by means of P0-24 conflict with those selected by means of X terminal, the selection by X is preferred.

P0.25 Acceleration/Deceleration time base frequency	Setting range: 0~2[0]
0: Maximum frequency (P0-10)	1: Set frequency
2: 100 Hz	

Notes:

The acceleration/deceleration time indicates the time for the AC drive to increase from 0 Hz to the frequency set in P0-25. If this parameter is set to 1, the acceleration/deceleration time is related to the set frequency. If the set frequency changes frequently, the motor's acceleration/deceleration also changes.

P0.26 Base frequency for UP/DOWN modification during running	Setting range: 0~1[0]

Notes:

This parameter is valid only when the frequency source is digital setting.

It is used to set the base frequency to be modified by using keys UP and DOWN or the terminal UP/DOWN function, if the running frequency and setting frequency are different,there will be a large difference between the AC drive's performance during the acceleration/ deceleration process.

P0.27 Binding command source to frequency source	Setting range: 1st digit 0-9 [0] 2nd digit 0-9 [0] 3rd digit 0-9 [0]
0: No binding	1: Frequency source by digital setting
2: AI1	3:AI2
4: Reserved	5: Pulse setting (X5)
6: Multi section	7: Simple PLC
8: PID	9: Communication setting

Notes:

1st digit : Operation panel command binding frequency source selection.

2nd digit : Terminal command binding frequency source selection.

3rd digit : Communication command binding frequency source selection.

It is used to bind the three running command sources with the nine frequency sources, implement synchronous switchover. For details on the frequency sources, see the description of P0.03 (Main frequency source X selection). Different running command sources can be bound to the same frequency source. If a command source has a bound frequency source, the frequency source set in P0.03 to P0.07 no longer takes effect when the command source is effective.

P0.28 Serial communication protocol	Setting range: 0-1 [0]

0: Modbus-RTU 1: reserved

The driver supports the MODBUS-RTU communication protocol.

5.2 Motor Parameters(Group P1)

P1.00 Motor model	Setting range: 0-1 [0]
0: Common asynchronous motor	1: Variable Frequency asynchronous motor

P1.01 Rated Motor power	Setting range: 0.4~1000.0kW
P1.02 Rated motor voltage	Setting range: 1-2000V
P1.03 Rated motor current	Setting range: 0.01–655.35 A (AC drive power ≤ 55 kW) 0.1–6553.5 A (AC drive power > 55 kW)
P1.04 Rated motor frequency	Setting range: 0.01~ max frequency
P1.05 Rated motor rotational speed	Setting range: 1~ 65535 rpm

Notes:

Set the parameters according to the motor nameplate no matter whether V/F control or vector control is adopted.

To achieve better V/F or vector control performance, motor auto-tuning is required. The motor auto-tuning accuracy depends on the correct setting of motor nameplate parameters.

Reset P1.00 can initialize P1.06~P1.10 automatically.

P1.06 Motor stator resistance (asynchronous motor)	Setting range: 0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)
P1.07 Motor rotor resistance (asynchronous motor)	Setting range: 0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)
P1.08 Leakage inductive reactance (asynchronous motor)	Setting range: 0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)
P1.09 Mutual inductive reactance (asynchronous motor)	Setting range: 0.1–6553.5 mH (AC drive power ≤ 55 kW) 0.01–-655.35 mH (AC drive power > 55 kW)
P1.10 No-load current (asynchronous motor)	Setting range: 0.01 to P1-03 (AC drive power ≤ 55 kW) 0.1 toP1-03 (AC drive power > 55 kW)

Notes:

The parameters in P1.06 to P.10 are asynchronous motor parameters. These parameters are unavailable on the motor nameplate and are obtained by means of motor auto-tuning. Only P1.06 to P1.08 can be obtained through static motor auto-tuning. Through complete motor auto-tuning, encoder phase sequence and current loop PI can be obtained besides the parameters in P1.06 to P1.10.

Each time "Rated motor power" (P1.01) or "Rated motor voltage" (P1.02) is changed, the AC drive automatically restores values of P1.06 to P1.10 to the parameter setting for the common standard Y series asynchronous motor.

If it is impossible to perform motor auto-tuning onsite, manually input the values of these parameters according to data provided by the motor manufacturer

P1.37 Auto-tuning selection	Setting range: 0-3 [0]
0: No auto-tuning	1: Asynchronous motor static auto-tuning 1
2: Asynchronous motor dynamic auto-tuning	3. Asynchronous motor static auto-tuning 2

To ensure the optimal control performance of the frequency converter during vector control of asynchronous motors, please disconnect the load from the motor and use rotary tuning for motor parameter self-learning. Otherwise, it will affect the vector control effect. When the motor has a large inertia load that is difficult to detach and vector control is required, please use static tuning 2. Before self-learning parameters, it is necessary to correctly set the motor type and nameplate parameters P1.00~P1.05. For closed-loop vector control, additional encoder type and pulse number P1.27 and P1.28 need to be set.

Tuning action description: Set the motor nameplate parameters and self-learning type, then press the RUN key, and the frequency converter will perform static tuning.

0: No operation, i.e. tuning is prohibited.

1: Asynchronous machine static tuning 1, suitable for situations where asynchronous motors have high inertia loads that are difficult to detach and cannot be rotated for tuning.

2: Asynchronous machine dynamic tuning. During the dynamic tuning process, the frequency converter first performs static tuning, and then accelerates to 80% of the rated frequency of the motor according to the acceleration time P0.17. After holding for a period of time, it slows down and stops according to the deceleration time P0.18, and ends the tuning.

3: Asynchronous machine static tuning 2, suitable for self-learning of motor parameters when the motor is stationary without an encoder (there may still be slight vibration in the motor at this time, please pay attention to safety). Action description: Set the function code to 3, then press the RUN button, and the frequency converter will perform no-load tuning.

Note:

The driver supports motor tuning in keyboard operation mode, terminal mode, and communication mode.

5.3 Input terminals (Group P2)

The A1 series VFD provides five X terminals (X5 can be used for high-speed pulse input) and two analog input terminals.

P2.00 X1 function selection	Setting range: 0~59 (default: 1)
P2.01 X2 function selection	Setting range: 0~59 (default: 4)
P2.02 X3 function selection	Setting range: 0~59 (default: 9)
P2.03 X4 function selection	Setting range: 0~59 (default: 12)
P2.04 X5 function selection	Setting range: 0~59 (default: 13)

Notes:

The following table lists the functions available for the X terminals.

Table Functions of X terminals

Value	Function	Description
0	No function	Set 0 for reserved terminals to avoid malfunction.
1	Forward RUN (FWD)	The terminal is used to control forward or reverse RUN of the AC drive.
2	Reverse RUN (REV)	
3	Three-line control	The terminal determines three-line control of the AC drive. For details, see the description of P2.11.
4	Forward JOG (FJOG)	FJOG indicates forward JOG running, while RJOG indicates reverse JOG running. The JOG frequency, acceleration time and deceleration time are described respectively in P5.00~P5.02.
5	Reverse JOG (RJOG)	
6	Terminal UP	If the frequency is determined by external terminals, the terminals with the two functions are used as increment and decrement commands for frequency modification. When the frequency source is digital setting, they are used to adjust the frequency.
7	Terminal DOWN	

Value	Function	Description
8	Coast to stop	The AC drive blocks its output, the motor coasts to rest and is not controlled by the AC drive. It is the same as coast to stop described in P4.10.
9	Fault reset (RESET)	The terminal is used for fault reset function, the same as the function of RESET key on the operation panel. Remote fault reset is implemented by this function.
10	RUN pause	The AC drive decelerates to stop, but the running parameters are all memorized, such as PLC, swing frequency and PID parameters. After this function is disabled, the AC drive resumes its status before stop.
11	Normally open (NO) input of external fault	If this terminal becomes ON, the AC drive reports EFI and performs the fault protection action. For more details, see the description of PB-47.
12	Multi-reference select SS1	The setting of 16 speeds or 16 other references can be implemented through combinations of 16 states of these four terminals.
13	Multi-reference select SS2	
14	Multi-reference select SS3	
15	Multi-reference select SS4	
16	Terminal 1 for acc./ dec. time selection	Totally four groups of acceleration/deceleration time can be selected through combinations of two states of these two terminals.
17	Terminal 2 for acc./ dec. time selection	
18	Frequency source switchover	The terminal is used to perform switchover between two frequency sources according to the setting in P0.07.
19	UP and DOWN setting clear (terminal, operation panel)	If the frequency source is digital setting, the terminal is used to clear the modification by using the UP/ DOWN function or the increment/decrement key on the operation panel, returning the set frequency to the value of P0.08.

Value	Function	Description
20	Command source switchover terminal	If the command source is set to terminal control (P0.02 = 1), this terminal is used to perform switchover between terminal control and operation panel control. If the command source is set to communication control (P0.02 = 2), this terminal is used to perform switchover between communication control and operation panel control.
21	Acc./Dec. prohibited	It enables the AC drive to maintain the current frequency output without being affected by external signals (except the STOP command).
22	PID pause	PID is invalid temporarily. The AC drive maintains the current frequency output without supporting PID adjustment of frequency source.
23	PLC status reset	The terminal is used to restore the original status of PLC control for the AC drive when PLC control is started again after a pause.
24	Swing pause	The AC drive outputs the central frequency, and the swing frequency function pauses.
25	Counter input	This terminal is used to count pulses.
26	Counter reset	This terminal is used to clear the counter status.
27	Length count input	This terminal is used to count the length.
28	Length reset	This terminal is used to clear the length.
29	Torque control prohibited	The AC drive is prohibited from torque control and enters the speed control mode.
30	Pulse input (enabled only for X5)	X5 is used for pulse input.
31	Reserved	Reserved
32	Immediate DC braking	After this terminal becomes ON, the AC drive directly switches over to the DC braking state.

Value	Function	Description
33	Normally closed (NC) input of external fault	After this terminal becomes ON, the AC drive reports EFI and stops.
34	Frequency modification forbidden	If X terminal is avalid,then allow frequency modification., if X terminal unavalid, then forbid frequency modification.
35	Reverse PID action direction	After this terminal becomes ON, the PID action direction is reversed to the direction set in P6.03.
36	External STOP terminal 1	In operation panel mode, this terminal can be used to stop theAC drive, equivalent to the function of the STOP key on the operation panel.
37	Command source switchover terminal 2	It is used to perform switchover between terminal control and communication control. If the command source is terminal control, the system will switch over to communication control after this terminal becomes ON.
38	PID integral pause	After this terminal becomes ON, the integral adjustment function pauses. However, the proportional and differentiation adjustment functions are still valid
39	Switchover between main frequency source X and preset frequency	After this terminal becomes ON, the frequency source X is replaced by the preset frequency set in P0.08.
40	Switchover between auxiliary frequency source Y and preset frequency	After this terminal is enabled, the frequency source Y is replaced by the preset frequency set in P0.08.
41	Motor selection terminal	Switchover among the four groups of motor parameters can be implemented through the four state combinations of these two terminals.
42	Reserved	Reserved

Value	Function	Description
43	PID parameter switchover	If the PID parameters switchover performed by means of X terminal (P6.18 = 1), the PID parameters are P6.05 to P6.07 when the terminal becomes OFF; the PID parameters are P6.15 to P6-17 when this terminal becomes ON.
44	User-defined fault 1	If these two terminals become ON, the AC drive reports udE1 and udE2 respectively, and performs fault protection actions based on the setting in PB-49.
45	User-defined fault 2	Same as 44
46	Speed control/Torque control switchover	This terminal enables the AC drive to switch over between speed control and torque control. When this terminal becomes OFF, the AC drive runs in the mode set in A0.00. When this terminal becomes ON, the AC drive switches over to the other control mode.
47	Emergency stop	When this terminal becomes ON, the AC drive stops within the shortest time. During the stop process, the current remains at the set current upper limit. This function is used to satisfy the requirement of stopping the AC drive in emergency state.
48	External STOP terminal 2	In any control mode (operation panel, terminal or communication), it can be used to make the AC drive decelerate to stop. In this case, the deceleration time is deceleration time 4.
49	Deceleration DC braking	When this terminal becomes ON, the AC drive decelerates to the initial frequency of stop DC braking and then switches over to DC braking state.
50	Clear the current running time	When this terminal becomes ON, the AC drive's current running time is cleared. This function must be supported by P5.42 and P5.53.

Value	Function	Description
51	Switchover between two-line mode and three-line mode	It is used to perform switchover between two-line control and three-line control. If P2.11 is set to Two-line mode 1, the system switches over to three-line mode 1 when the X allocated with this function becomes ON
52	Reverse running prohibited	When terminal set for this function becomes ON, reverse running of the AC drive is prohibited, same function as P5.13.

The four multi-reference terminals have 16 state combinations, corresponding to 16 reference values, as listed in the following table.

Table: Multi reference instruction function description

SS4	SS3	SS2	SS1	Reference Setting	Corresponding Parameter
OFF	OFF	OFF	OFF	Reference 0	P8.00
OFF	OFF	OFF	ON	Reference 1	P8.01
OFF	OFF	ON	OFF	Reference 2	P8.02
OFF	OFF	ON	ON	Reference 3	P8.03
OFF	ON	OFF	OFF	Reference 4	P8.04
OFF	ON	OFF	ON	Reference 5	P8.05
OFF	ON	ON	OFF	Reference 6	P8.06
OFF	ON	ON	ON	Reference 7	P8.07
ON	OFF	OFF	OFF	Reference 8	P8.08
ON	OFF	OFF	ON	Reference 9	P8.09
ON	OFF	ON	OFF	Reference 10	P8.10
ON	OFF	ON	ON	Reference 11	P8.11
ON	ON	OFF	OFF	Reference 12	P8.12
ON	ON	OFF	ON	Reference 13	P8.13
ON	ON	ON	OFF	Reference 14	P8.14
ON	ON	ON	ON	Reference 15	P8.15

If the frequency source is multi-reference ,the value 100% if P8.00 to P8.15 corresponds to the vaule of P0.10 (Maximum frequency).

Besides the multi-speed function, the multi-reference can be also used as the PID setting source or the voltage source for V/F separation, satisfying the requirement on switchover of different setting values.

Two terminals for acceleration/deceleration time selection have four state combinations, as listed in the following table.

Table: Function Description of Acc. and Dec. Time Selection Terminal

Terminal 2	Terminal 1	Acceleration/Deceleration Time Selection	Corresponding parameters
OFF	OFF	Acc./Dec.time 1	P0.17, P0.18
OFF	ON	Acc./Dec. time 2	P5.03, P5.04
ON	OFF	Acc./Dec. time 3	P5.05, P5.06
ON	ON	Acc./Dec. time 4	P5.07, P5.08

P2.10 X filter time	Setting range: 0.000-1.000S [0.010S]

Notes:

It is used to set the software filter time of X terminal status. If X terminals are liable to interference and may cause malfunction, increase the value of this parameter to enhance the anti-interference capability. However, increase of X filter time will reduce the response of X terminals.

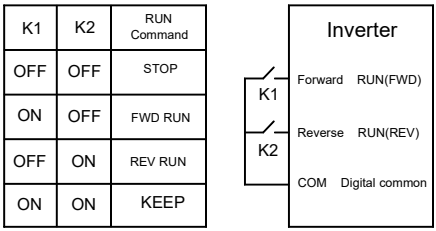
P2.11 Terminal command mode	Setting range: 0-3 [0]

Notes:

This parameter is used to set the mode in which the AC drive is controlled by external terminals.

0: Two-line mode 1, This is the most commonly used model of two lines. Such as P2.11=0,P2.00=1,P2.01=2

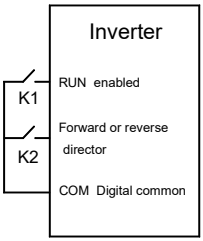
Figure Setting of two-line mode 1



1: Two-line mode 2

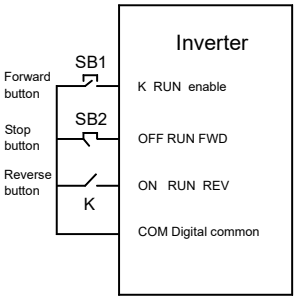
Figure setting of two-line mode 2

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

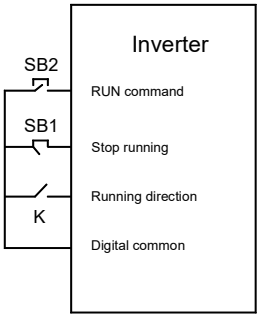


2: Three-line mode 1

Figure setting of three-line mode 1



3: Three-line mode 2



As shown in the preceding figure, if SB1 is ON, theAC drive starts running when SB2 is pressed to be ON; the AC drive instructs forward rotation when K is OFF and instructs reverse rotation when K is ON. The AC drive stops immediately after SB1 becomes OFF. During normal startup and running, SB1 must remain ON. The AC drive's running

state is determined by the final actions of SB1, SB2 and K.

P2.12 Terminal UP/DOWN rate	Setting range: 0.01–65.535 Hz/s[1.00Hz/s]

Notes:

It is used to adjust the rate of change of frequency when the frequency is adjusted by means of terminal UP/DOWN.

P2.13 AI curve 1 minimum input	Setting range: 0.00 V to P2.15[0.00V]
P2.14 Corresponding setting of AI curve 1 minimum input	Setting range: -100.00%–100.0%[100.0%]
P2.15 AI curve 1 maximum input	Setting range: P2.13 to 10.00 V[10.00V]
P2.16 Corresponding setting of AI curve 1 maximum input	Setting range: -100.00%–100.0%[100.0%]
P2.17 AI2 filter time	Setting range: 0.00–10.00s[0.10S]

Notes:

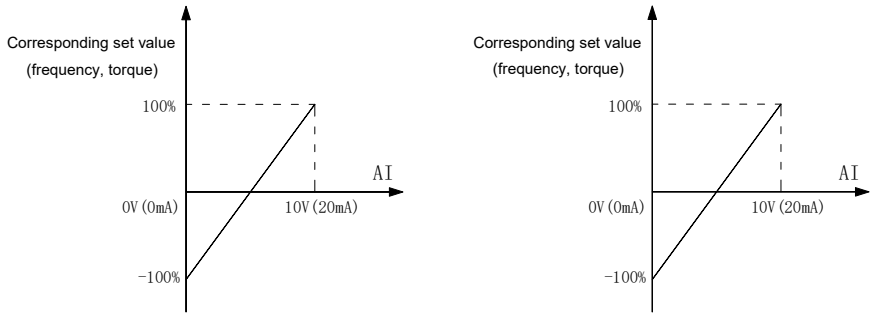
These parameters are used to define the relationship between the analog input voltage and the corresponding setting. When the analog input voltage exceeds the maximum value (P2.15), the maximum value is used. When the analog input voltage is less than the minimum value (P2.13), the value set in P2.34 (Setting for AI less than minimum input) is used.

When the analog input is current input, 1 mA current corresponds to 0.5 V voltage.

P2.17 (AI filter time) is used to set the software filter time of AI. If the analog input is liable to interference, increase the value of this parameter to stabilize the detected analog input. However, increase of the AI filter time will slow the response of analog detection. Set this parameter properly based on actual conditions.

In different applications 100% if analog input corresponds to different nominal values.For details, refer to the description of different applications.

Two typical setting examples are shown in the following figure.



P2.18 AI curve 2 minimum input	Setting range: 0.00 V to P2.20[0.00V]
P2.19 Corresponding setting of AI curve 2 minimum input	Setting range: -100.00%–100.0%[100.0%]
P2.20 AI curve 2 maximum input	Setting range: P2.18 to 10.00 V[10.00V]
P2.21 Corresponding setting of AI curve 2 maximum input	Setting range: -100.00%–100.0%[100.0%]
P2.22 AI2 filter time	Setting range: 0.00–10.00s[0.10S]

P2.23 AI curve 3minimum input	Setting range: 0.00 V to P2.25[0.00V]
P2.24 Corresponding setting of AI curve 3 minimum input	Setting range: -100.00%–100.0%[100.0%]
P2.25 AI curve 3 maximum input	Setting range: P2.23 to 10.00 V[10.00V]
P2.26 Corresponding setting of AI curve 3 maximum input	Setting range: -100.00%–100.0%[100.0%]

Notes:

The method of setting AI2 functions is similar to that of setting AI1 function

P2.28 X5 terminal Pulse minimum input	Setting range: 0.00 kHz to P2.30[0.00khz]
P2.29 X5 terminal Corresponding setting of pulse minimum input	Setting range: -100.00%–100.0%[0.0%]
P2.30 X5 terminal Pulse maximum input	Setting range: P2.28 to 50.00KHZ[50.0KHZ]
P2.31 X5 terminal Corresponding setting of pulse maximum input	Setting range: -100.00%–100.0%[100.0%]
P2.32 X5 terminal Pulse filter time	Setting range: 0.00–10.00s[0.10S]

Notes:

These parameters are used to set the relationship between X5 pulse input and corresponding settings. The pulses can only be input by X5. The method of setting this function is similar to that of setting AI1 function.

P2.33 AI curve selection	Setting range: 321[1-5]

Notes:

1st digit (AI1 curve selection):

Curve 1 (2 points, see P2.13 to P2.16)

Curve 2 (2 points, see P2.18 to P2.21)

Curve 3 (2 points, see P2.23 to P2.26)

Curve 4 (4 points, see A1.00 to A1.07)

Curve 5 (4 points, see A1.08 to A1.15)

2nd digit (AI2 curve selection):

Curve 1 to curve 5 (same as AI1)

3rd digit :Reserved

The 1st digit, 2nd digit of this parameter are respectively used to select the corresponding curve of AI1and AI2. Any of the five curves can be selected for AI1 and AI2. Curve 1, curve 2 and curve 3 are all 2-point curves, set in group P2. Curve 4 and curve 5 are both 4-point curves, set in group A1.

P2.34 Setting for AI less than minimum input	Setting range: 000[0-1]

Notes:

1st digit (Setting for AI1 less than minimum input):

0: Minimum value 1: 0.0%

2nd digit (Setting for AI2 less than minimum input):

0, 1 (same as AI1)

3rd digit :Reserved

This parameter is used to determine the corresponding setting when the analog input voltage is less than the minimum value, The 1st digit and 2nd digit of this parameter respectively correspond to the setting for AI1 and AI2.

If the value of a certain digit is 0, when analog input voltage is less than the minimum input, the corresponding setting of the minimum input (P2.14, P2.19, P2.24) is used.

If the value of a certain digit is 1, when analog input voltage is less than the minimum input, the corresponding value of this analog input is 0.0%.

P2.35 X1 delay time	Setting range: 0.0–3600.0s[0.0S]
P2.36 X2 delay time	Setting range: 0.0–3600.0s[0.0S]
P2.37 X3 delay time	Setting range: 0.0–3600.0s[0.0S]

Notes:

These parameters are used to set the delay time of the AC drive when the status of X terminals changes.

Currently, only X1, X2 and X3 support the delay time function

P2.38 X valid mode selection 1	Setting range: 00000[0-1]

Notes:

Unit's digit (X1 valid mode)

0: High level valid

1: Low level valid

Ten's digit XI2 valid mode)

0, 1 (same as X1)

Hundred's digit (X3 valid mode)

0, 1 (same as X1)

Thousand's digit (X4 valid mode)

0, 1 (same as X1)

Ten thousand's digit (X5 valid mode)

0, 1 (same as X1)

The X terminal is valid when being connected with COM, and invalid when being disconnected from COM.

1: Low level valid

The X terminal is invalid when being connected with COM, and invalid when being disconnected from COM.

5.4 Output Terminals(Group P3)

This series drive is equipped with a multi-function relay output terminal (TA-TB-TC) and a DO terminal (which can be selected as a high-speed pulse output terminal or as a switching output of Open collector circuit) and an analog output AO1 as standard. This series drive does not support expansion cards.

P3.00 DO output mode	Setting range: 0-1 [1]

Notes:

The DO terminal is programmable multiplexing terminal.

0: Open collector high-speed pulse output DOP. The highest pulse frequency is 100.00kHz, and the relevant functions are shown in P3.06.

1: Open collector output DOR, see P3.01 for relevant functions.

P3.01 DOR function (open -collector output terminal)	Setting range: 0-41 [0]
P3.02 Relay output function selection (TA-TB-TC)	Setting range:0~41[2]

Notes:

These two parameters are used to select the functions of the two digital output terminals.

The functions of the output terminals are described in the following table.

Value	Function	Description
0	No output	The terminal has no function.
1	VFD running	When the VFD is running, the terminal becomes ON.
2	Fault output (stop)	When the VFD stops due to a fault, the terminal becomes ON.
3	Frequency-level detection FDT1 output	Refer to the descriptions of P5.19 and P5.20.
4	Frequency reached	Refer to the descriptions of P5.21.
5	Zero-speed running (no output at stop)	If the AC drive runs with the output frequency of 0, the terminal becomes ON. If the AC drive is in the stop state, the terminal becomes OFF.
6	Motor overload pre-warning	The FVD judges whether the motor load exceeds the overload pre-warning threshold before performing the protection action. If the pre-warning threshold is exceeded, the terminal becomes ON. For motor overload parameters, see the descriptions of PB.00 to PB.02.
7	AC drive overload pre-warning	The terminal becomes ON 10s before the AC drive overload protection action is performed.
8	Set count value reached	The terminal becomes ON when the count value reaches the value set in P7.08.
9	Designated count value reached	The terminal becomes ON when the count value reaches the value set in P7.09.
10	Length reached	The terminal becomes ON when the detected actual length exceeds the value set in P7.05.
11	PLC cycle complete	When simple PLC completes one cycle, the terminal outputs a pulse signal with width of 250 ms.
12	Accumulative running time reached	If the accumulative running time of the AC drive exceeds the time set in P5.17, the terminal becomes ON.

Value	Function	Description
13	Frequency limited	If the set frequency exceeds the frequency upper limit or lower limit and the output frequency of the AC drive reaches the upper limit or lower limit, the terminal becomes ON.
14	Torque limited	In speed control mode, if the output torque reaches the torque limit, the AC drive enters the stall protection state and meanwhile the terminal becomes ON.
15	Ready for RUN	If the AC drive main circuit and control circuit become stable, and the AC drive detects no fault and is ready for RUN, the terminal becomes ON.
16	AI1 larger than AI2	When the input of AI1 is larger than the input of AI2, the terminal becomes ON
17	Frequency upper limit reached	If the running frequency reaches the upper limit, the terminal becomes ON.
18	Frequencylower limit reached (nooutput at stop)	if the running frequency reaches the lower limit, the terminal becomes ON. In the stop state, the terminal becomes OFF.
19	Under voltage state output	If theAC drive is in undervoltage state, the terminal becomes ON.
20	Communication setting	Refer to the communication protocol.
21	Reserved	Reserved.
22	Reserved	Reserved.
23	Zero-speed running 2 (having output at stop)	If the output frequency of the AC drive is 0, the terminal becomes ON. In the state of stop, the signal is still ON.
24	Accumulative power-on time reached	If theAC drive accumulative power-on time (PH.13) exceeds the value set in P5.16, the terminal becomes ON.
25	Frequencylevel detection FDT2 output	Refer to the descriptions of P5.28 and P5.29.
26	Frequency 1 reached	Refer to the descriptions of P5.30 and P5.31.
27	Frequency 2 reached	Refer to the descriptions of P5.32 and P5.33.
28	Current 1 reached	Refer to the descriptions of P5.38 and P5.39.

Value	Function	Description
29	Current 2 reached	Refer to the descriptions of P5.40 and P5.41.
30	Timing reached	If the timing function (P5.42) is valid, the terminal becomes ON after the current running time of the AC drive reaches the set time.
31	AI1 input limit exceeded	If AI1 input is larger than the value of P5.46 (AI1 input voltage upper limit) or lower than the value of P5-45 (AI1 input voltage lower limit), the terminal becomes ON
32	Load becoming 0	If the load becomes 0, the terminal becomes ON.
33	Reverse running	If theAC drive is in the reverse running state, the terminal becomes ON
34	Zero current state	Refer to the descriptions of P5.34 and P5.35.
35	Module temperature reached	If the heatsink temperature of the inverter module (PH.07) reaches the set module temperature threshold (P5.47), the terminal becomes ON.
36	Software current limit exceeded	Refer to the descriptions of P5.36 and P5.37
37	Frequency lower limit reached (having output at stop)	If the running frequency reaches the lower limit, the terminal becomes ON. In the stop state, the signal is still ON.
38	Alarm output	If a fault occurs on the AC drive and the AC drive continues to run, the terminal outputs the alarm signal.
39	Motoroverh eat warning	If the motor temperature reaches the temperature set in PB.58 (Motor overheat warning threshold), the terminal becomes ON. You can view the motor temperature by using C0-34.
40	Current running time reached	If the current running time of AC drive exceeds the value of P5.53, the terminal becomes ON.
41	Fault output	Fault of free stop and undervoltage no output

P3.06 DOP function selection	Setting range: 0~16 [0]
P3.07 AO1 function selection	Setting range: 0~16 [0]

Notes:

The frequency range of high-speed pulse output from DO open collector is 0.01kHz~P3.09 (the maximum frequency of DO open collector output), and P3.09 can be set between 0.01kHz~100.00kHz. The output range of analog output AO1 is 0V~10V, or 0mA~20mA.

The relationship between pulse and analog output ranges and corresponding functions is listed in the following table.

Set value	Function	Range (Corresponding to Pulse or Analog Output Range 0.0%–100.0%)
0	Running frequency	0 to maximum output frequency
1	Set frequency	0 to maximum output frequency
2	Output current	0 to 2 times of rated motor current
3	Output torque (absolute value)	0 to 2 times of rated motor torque
4	Output power	0 to 2 times of rated power
5	Output voltage	0 to 1.2 times of rated AC drive voltage
6	X5 Pulse input	0.01–100.00 kHz
7	AI1	0–10 V
8	AI2	0–10 V (or 0–20 mA)
9	Reserved	/
10	Length	0 to maximum set length
11	Count valu	0 to maximum count value
12	Communication setting	0.0%–100.0%
13	Motor rotational speed	0 to rotational speed corresponding to maximum output frequency
14	Output current	0.0–1000.0 A
15	Output voltage	0.0–000.0 V
16	Output torque (actual value)	-2 times to +2 times of rated motor torque

.

P3.09 DO Max. output frequency	Setting range:0.01–100.00kHz[50.00KHZ]
P3.10 AO1 offset coefficient	Setting range: -100.0%–100.0%[0.0%]
P3.11 AO1 gain	Setting range: -10.00–10.00[1.00]

Notes:

These parameters are used to correct the zero drift of analog output and the output amplitude deviation. They can also be used to define the desired AO curve.

If "b" represents zero offset, "k" represents gain, "Y" represents actual output, and "X" represents standard output, the actual output is: Y = kX + b.

The zero offset coefficient 100% of AO1 corresponds to 10 V (or 20 mA). The standard output refers to the value corresponding to the analog output of 0 to 10 V (or 0 to 20 mA) with no zero offset or gain adjustment.

For example, if the analog output is used as the running frequency, and it is expected that the output is 8 V when the frequency is 0 and 3 V at the maximum frequency, the gain shall be set to -0.50, and the zero offset shall be set to 80%.

P3.17 DO output delay time	Setting range: 0.0–3600.0s[0.0S]
P3.18 Relay 1 output delay time	Setting range: 0.0–3600.0s[0.0S]

Notes:

These parameters are used to set the delay time of output terminals D0 and relay 1, from status change to actual output.

P3.22 DO valid mode selection	Setting range: 0-1[00000]

Notes:

1st digit (DO valid mode):

0: Positive logic 1: Negative logic

2nd digit (Relay 1 valid mode):

0, 1 (same as DO)

3rd~5th digit :Reserved

It is used to set the logic of output terminals DO and relay 1

0: Positive logic

The output terminal is valid when being connected with COM, and invalid when being disconnected from COM.

1: Positive logic

The output terminal is invalid when being connected with COM, and valid when being disconnected from COM.

P3.23 AO1 output signal selection	Setting range: 0-1[0]

0: voltage signal 1: current signal.

AO1 supports voltage/current signal output and requires jumper selection. When selecting voltage or current as the jumper, P3.23 needs to be set accordingly.

5.5 Start/Stop Control(Group P4)

P4.00 Start mode	Setting range: 0~2 [0]

Notes:

0: Direct start.

If the DC braking time is set to 0, the AC drive starts to run at the startup frequency.If the DC braking time is not 0, the AC drive performs DC braking first and then starts to run at the startup frequency. It is applicable to small-inertia load application where the motor is likely to rotate at startup.

1: Rotational speed tracking restart

The AC drive judges the rotational speed and direction of the motor first and then starts at the tracked frequency. Such smooth start has no impact on the rotating motor. It is applicable to the restart upon instantaneous power failure of large-inertia load. To ensure the performance of rotational speed tracking restart, set the motor parameters in group P1 correctly.

2: Pre-excited start (asynchronous motor)

It is valid only for asynchronous motor and used for building the magnetic field before the motor runs. For pre-excited current and pre-excited time, see parameters of P4.05 and P4.06.If the pre-excited time is 0, the AC drive cancels pre-excitation and starts to run at startup frequency.If the pre-excited time is not 0, the AC drive pre-excites first before startup, improving the dynamic response of the motor.

P4.01 Rotational speed tracking mode	Setting range: 0-2 [0]

Notes:

0: from frequency at stop

It is the commonly selected mode.

1: From zero frequency

It is applicable to restart after a long time of power failure.

2: From the maximum frequency

It is applicable to the power-generating load.

P4.02 Rotational speed tracking speed	Setting range: 0-100 [20]

Notes:

In the rotational speed tracking restart mode, select the rotational speed tracking speed. The larger the value is, the faster the tracking is. However, too large value may cause unreliable tracking.

P4.03 Startup frequency	Setting range: 0.00-10.00Hz [0.00Hz]
P4.04 Startup frequency holding time	Setting range: 0.0–100.0s[0.0s]

Notes:

To ensure the motor torque at AC drive startup, set a proper startup frequency. In addition, to build excitation when the motor starts up, the startup frequency must be held for a certain period.

The startup frequency (P4-03) is not restricted by the frequency lower limit. If the set target frequency is lower than the startup frequency, the AC drive will not start and stays in the standby state.

During switchover between forward rotation and reverse rotation, the startup frequency holding time is disabled. The holding time is not included in the acceleration time but in the running time of simple PLC.

P4.05 Startup DC braking current/Pre-excited current	Setting range: 0%–100%[0%]
P4.06 Startup DC braking time/Pre-excited time	Setting range: 0.0–100.0s[0.0s]

Notes:

Startup DC braking is generally used during restart of the AC drive after the rotating motor stops. Pre-excitation is used to make the AC drive build magnetic field for the asynchronous motor before startup to improve the responsiveness.

Startup DC braking is valid only for direct start (P4.00 = 0). In this case, the AC drive performs DC braking at the set startup DC braking current. After the startup DC braking time, the AC drive starts to run. If the startup DC braking time is 0, the AC drive starts directly without DC braking. The larger the startup DC braking current is, the larger the braking force is.

If the startup mode is pre-excited start (P4.00 = 3), the AC drive builds magnetic field based on the set pre-excited current. After the pre-excited time, the AC drive starts to run. If the pre-excited time is 0, the AC drive starts directly without pre-excitation.

The startup DC braking current or pre-excited current is a percentage relative to the base value.

If the rated motor current is less than or equal to 80% of the rated AC drive current, the base value is the rated motor current.

If the rated motor current is greater than 80% of the rated AC drive current, the base value is 80% of the rated AC drive current.

P4.07 Acceleration/ Deceleration mode	Setting range: 0–2[0]

Notes:

It is used to set the frequency change mode during the AC drive start and stop process.

0: Linear acceleration/deceleration

The output frequency increases or decreases in linear mode. This driver provides four group of acceleration/deceleration time, which can be selected by using P5.03 to P5.08 and P0.17,P0.18

1: S-curve acceleration/deceleration A

The output frequency increases or decreases along the S curve. This mode is generally used in the applications where start and stop processes are relatively smooth, such as elevator and conveyor belt. P4.08 and P4.09 respectively define the time proportions of the start segment and the end segment.

2: S-curve acceleration/deceleration B

In this curve, the rated motor frequency fb is always the inflexion point. This mode is usually used in applications where acceleration/deceleration is required at the speed higher than the rated frequency.

P4.08 Time proportion of S-curve start segment	Setting range: 0.0% to (100.0% – P4.09) [30%]
P4.09 Time proportion of S-curve end segment	Setting range: 0.0% to (100.0% – P4.08) [30%]

Notes:

These two parameters respectively define the time proportions of the start segment and the end segment of S-curve acceleration/deceleration. They must satisfy the requirement: P4.08 + P4.09 ≤ 100.0%.

In Figure A, t1 is the time defined in P4.08, within which the slope of the output frequency change increases gradually. t2 is the time defined in P4.09, within which the slope of the output frequency change gradually decreases to 0. Within the time between t1 and t2, the slope of the output frequency change remains unchanged, that is, linear acceleration/ deceleration.

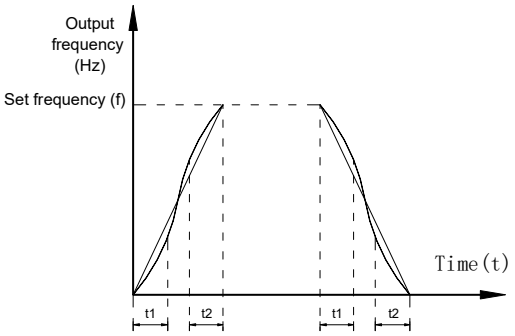


Figure-A S-curve acceleration/deceleration A

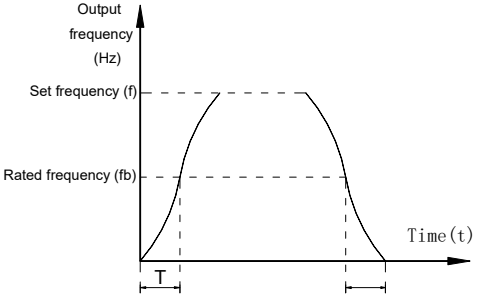


Figure-B S-curve acceleration/deceleration B

P4.10 Stop mode	Setting range: 0-1[0]

Notes:

0: Decelerate to stop

After the stop command is enabled, the AC drive decreases the output frequency according to the deceleration time and stops when the frequency decreases to zero.

1: Coast to stop

After the stop command is enabled, the AC drive immediately stops the output. The motor will coast to stop based on the mechanical inertia.

P4.11 Starting frequency of stop DC braking	Setting range: 0.00 Hz –P0.10 [0.00Hz]
P4.12 Waiting time of stop DC braking	Setting range: 0.0–36.0s[0.0s]
P4.13 Stop DC braking current	Setting range: 0%–100%[0%]

P4.14 Stop DC braking time	Setting range: 0.0–36.0s[0.0s]

Notes:

P4.11 (Starting frequency of stop DC braking):

During the process of decelerating to stop, the AC drive starts DC braking when the running frequency is lower than the value set in P4.11.

P4.12 (Waiting time of stop DC braking):

When the running frequency decreases to the initial frequency of stop DC braking, the AC drive stops output for a certain period and then starts DC braking. This prevents faults such as overcurrent caused due to DC braking at high speed.

P4.13 (Stop DC braking current):

This parameter specifies the output current at DC braking and is a percentage relative to the base value.

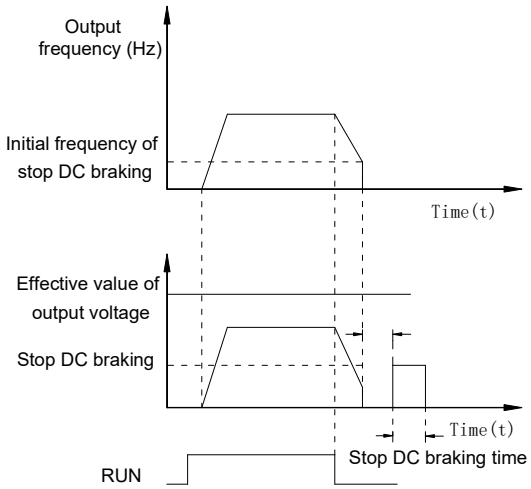
–If the rated motor current is less than or equal to 80% of the rated AC drive current, the base value is the rated motor current.

–If the rated motor current is greater than 80% of the rated AC drive current, the base value is 80% of the rated AC drive current.

P4.14 (Stop DC braking time):

This parameter specifies the holding time of DC braking. If it is set to 0, DC braking is cancelled.

The stop DC braking process is shown in the following figure.



P4.15 Brake use ratio	Setting range: 0%–100%[100%]

Notes:

It is valid only for the AC drive with internal braking unit and used to adjust the duty ratio of the braking unit. The larger the value of this parameter is, the better the braking result will be. However, too larger value causes great fluctuation of the AC drive bus voltage during the braking process.

P4.18 Rotational speed tracking current	Setting range: 30%–200%[depend motor]

Note:

The maximum current during the speed tracking process is limited to the set value range of "Rotational Speed Tracking Current". If the set value is too small, the effect of speed tracking will deteriorate.

P4.21 Demagnetization time	Setting range: 0.0-0.5S[depend motor]

Note:

The demagnetization time is the minimum interval between shutdown and startup, and this function code will only take effect after the speed tracking function is activated. Setting a value too small can easily cause overvoltage faults.

5.6 Auxiliary Function(Group P5)

P5.00 JOG running frequency	Setting range: 0-P0.10[2.00Hz]
P5.01 JOG acceleration time	Setting range: 0.0–6500.0s[6s]
P5.02 JOG deceleration time	Setting range: 0.0–6500.0s[6s]

Notes:

These parameters are used to define the set frequency and acceleration or deceleration time of the AC drive when jogging. The startup mode is "Direct start" (P4.00 = 0) and the stop mode is "Decelerate to stop" (P4.10 = 0) during jogging.

P5.03 Acceleration time 2	Setting range: 0.0–6500.0s[Depend on Model]
P5.04 Deceleration time 2	Setting range: 0.0–6500.0s[Depend on Model]
P5.05 Acceleration time 3	Setting range: 0.0–6500.0s[Depend on Model]
P5.06 Deceleration time 3	Setting range: 0.0–6500.0s[Depend on Model]
P5.07 Acceleration time 4	Setting range: 0.0–6500.0s[Depend on Model]
P5.08 Deceleration time 4	Setting range: 0.0–6500.0s[Depend on Model]

Notes:

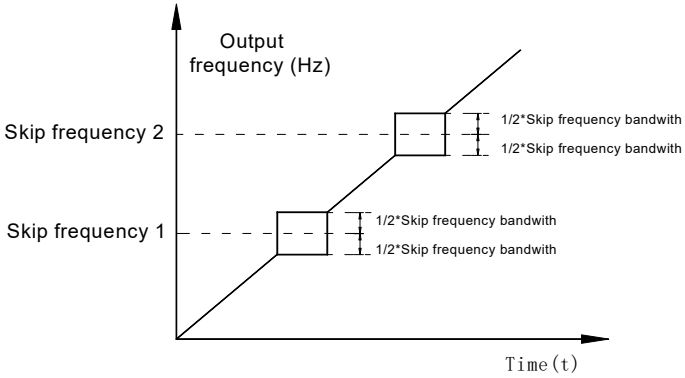
The A1 series AC driver provides a total of four groups of acceleration and deceleration time, that is, the preceding three groups and the group defined by P0.17 and P0.18. Definitions of four groups are completely the same. You can switch over between the four groups of acceleration and deceleration time through different state combinations of X terminals. For more details, see the descriptions of P5.03 to P5.08.

P5.09 Skip frequency 1	Setting range: 0.00 Hz to P0.10 [0.00Hz]
P5.10 Skip frequency 2	Setting range: 0.00 Hz to P0.10 [0.00Hz]
P5.11 Frequency jump amplitude	Setting range: 0.00 Hz to P0.10 [0.00Hz]

Notes:

If the set frequency is within the frequency skip range, the actual running frequency is the skip frequency close to the set frequency. Setting the skip frequency helps to avoid the mechanical resonance point of the load.

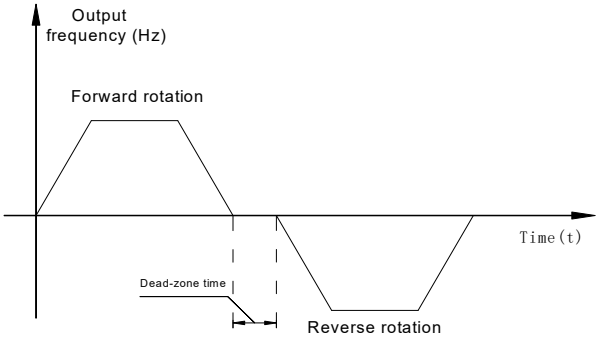
This AC driver supports two skip frequencies. If both are set to 0, the frequency skip function is disabled. The principle of the skip frequencies and skip amplitude is shown in the following figure.



P5.12 Forward/Reverse rotation dead-zone time	Setting range: 0.0–3000.0s [0.0S]

Notes:

It is used to set the time when the output is 0 Hz at transition of the AC drive forward rotation and reverse rotation, as shown in the following figure.



P5.13 Reverse control	Setting range: 0-1 [0]
0: Enabled	1: Disabled

Notes:

It is used to set whether the AC drive allows reverse rotation. In the applications where reverse rotation is prohibited, set this parameter to 1.

P5.14 Running mode when set frequency lower than frequency lower limit	Setting range: 0-2 [0]

0: Run at frequency lower limit 1: Stop 2: Run at zero speed

It is used to set the AC drive running mode when the set frequency is lower than the frequency lower limit. The AC driver provides three running modes to satisfy requirements of various applications..

P5.15 Droop control	Setting range: 0.00–10.00 Hz [0.00Hz]

Notes:

This function is used for balancing the workload allocation when multiple motors are used to drive the same load. The output frequency of the AC drives decreases as the load increases. You can reduce the workload of the motor under load by decreasing the output frequency for this motor, implementing workload balancing between multiple motors.

P5.16 Accumulative power-on time threshold	Setting range: 0–65000 h[0h]

Notes:

If the accumlative power on time PH.13 reaches the value set in this paramter, the corresponding DO terminal becomes ON.

P5.17 Accumulative running time threshold	Setting range: 0–65000 h[0h]

Notes:

It is used to set the accumulative running time threshold of the AC drive. If the accumulative running time (PH.09) reaches the value set in this parameter, the corresponding DO terminal becomes ON.

P5.18 Startup protection	Setting range: 0–1[0]
0: No	1: Yes

Notes:

This parameter is used to set whether to enable the safety protection. If it is set to 1, the AC drive does not respond to the run command valid upon AC drive power-on (for example, an input terminal is ON before power-on). The AC drive responds only after the run command is cancelled and becomes valid again.

In addition, the AC drive does not respond to the run command valid upon fault reset of the AC drive. The run protection can be disabled only after the run command is cancelled.

In this way, the motor can be protected from responding to run commands upon power-on or fault reset in unexpected conditions.

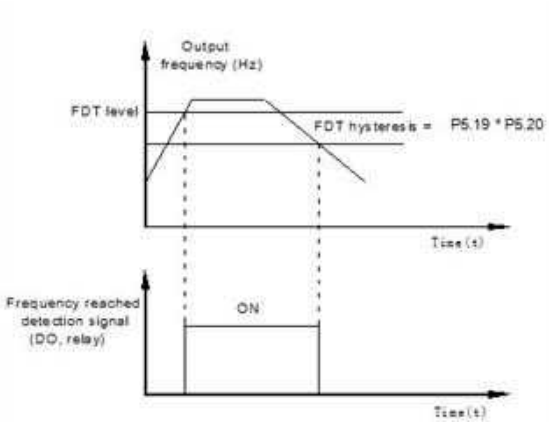
P5.19 Frequency detection value (FDT1)	Setting range: 0.00 Hz–P0.10[50.00Hz]
P5.20 Frequency detection hysteresis (FDT hysteresis 1)	Setting range: 0.0%–100.0%(FDT1 level)[5.0%]

Notes:

If the running frequency is higher than the value of P5.19, the corresponding DO terminal becomes ON. If the running frequency is lower than value of P5.19, the DOterminal goes OFF.

These two parameters are respectively used to set the detection value of output frequency and hysteresis value upon cancellation of the output. The value of P5.20 is a percentage of the hysteresis frequency to the frequency detection value (P5.19).

The FDT function is shown in the following figure.

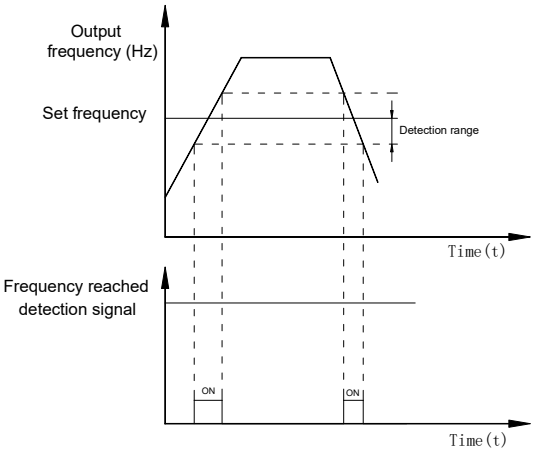


P5.21 Detection range of frequency reached	Setting range: 0.00–100%[0.0%]

Notes:

If the AC drive running frequency is within the certain range of the set frequency, the corresponding DO terminal becomes ON.

This parameter is used to set the range within which the output frequency is detected to reach the set frequency. The value of this parameter is a percentage relative to the maximum frequency. The detection range of frequency reached is shown in the following figure.



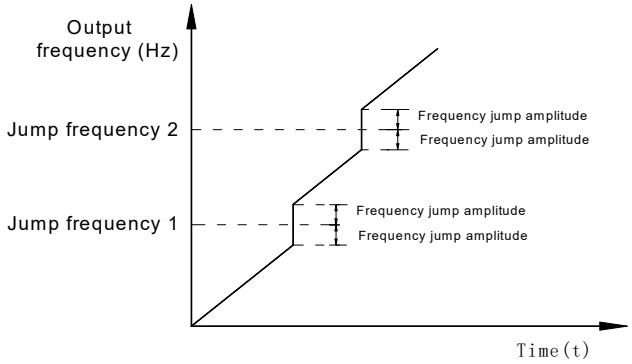
P5.22 Jump frequency during acceleration/deceleration	Setting range: 0–1 [0]
0: Disabled	1: Enabled

Notes:

It is used to set whether the jump frequencies are valid during acceleration/deceleration.

When the jump frequencies are valid during acceleration/deceleration, and the running frequency is within the frequency jump range, the actual running frequency will jump over the set frequency jump amplitude (rise directly from the lowest jump frequency to the highest jump frequency). The following figure shows the diagram when the jump frequencies are valid during acceleration/deceleration.

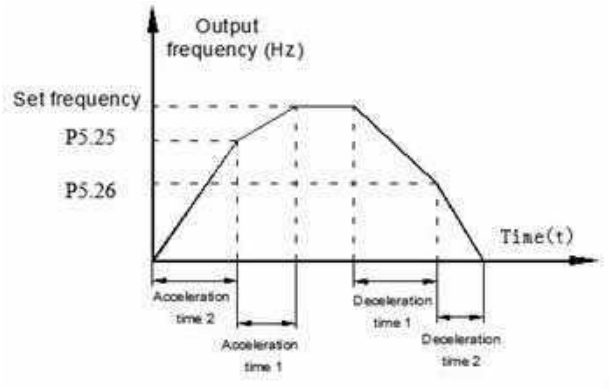
Figure Diagram when the jump frequencies are valid during acceleration/deceleration



P5.25 Frequency switchover point between acceleration time 1 and acceleration time 2	Setting range: 0.00 Hz - P0.10 [0.00Hz]
P5.26 Frequency switchover point between deceleration time 1 and deceleration time 2	Setting range: 0.00 Hz - P0.10 [0.00Hz]

Notes:

This function is valid when motor 1 is selected and acceleration/deceleration time switchover is not performed by means of X terminal. It is used to select different groups of acceleration/ deceleration time based on the running frequency range rather than X terminal during the running process of the AC drive.



During acceleration, if the running frequency is smaller than the value of P5.25, acceleration time 2 is selected. If the running frequency is larger than the value of P5.25, acceleration time 1 is selected.

During deceleration, if the running frequency is larger than the value of P5.26, deceleration time 1 is selected. If the running frequency is smaller than the value of P5.26, deceleration time 2 is selected.

P5.27 Terminal jog priority selection	Setting range: 0-1 [0]
0: Disabled	1: Enabled

Notes:

It is used to set whether terminal JOG is preferred.

If terminal JOG is preferred, the AC drive switches to terminal JOG running state when there is a terminal JOG command during the running process of the AC drive.

P5.28 Frequency detection value (FDT2)	Setting range: 0.00-P0.10 [50.00Hz]
P5.29 Frequency detection hysteresis (FDT hysteresis 2)	Setting range: 0.0-100.0%[5.0%]

Notes:

The frequency detection function is the same as FDT1 function. For details, refer to the descriptions of P5.19 and P5.20.

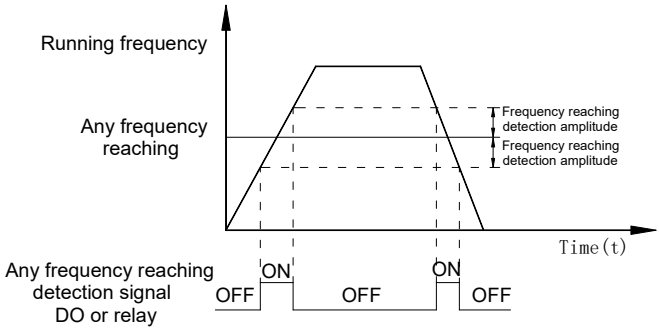
P5.30 Any frequency reaching detection value 1	Setting range: 0.00-P0.10 [50.00Hz]
P5.31 Any frequency reaching detection amplitude 1	Setting range: 0.0-100.0%[0.0%]

P5.32 Any frequency reaching detection value 2	Setting range: 0.00-P0.10 [50.00Hz]
P5.33 Any frequency reaching detection amplitude 2	Setting range: 0.0-100.0%[0.0%]

Notes:

If the output frequency of the AC drive is within the positive and negative amplitudes of the any frequency reaching detection value, the corresponding DO becomes ON.

This AC driver provides two groups of any frequency reaching detection parameters, including frequency detection value and detection amplitude, as shown in the following figure.



P5.34 Zero current detection level	Setting range: 0.0%–300.0% [5.0%]
P5.35 Zero current detection delay time	Setting range: 0.00–600.00s[0.10s]

Notes:

If the output current of the AC drive is equal to or less than the zero current detection level and the duration exceeds the zero current detection delay time, the corresponding DO becomes ON. The zero current detection is shown in the following figure.

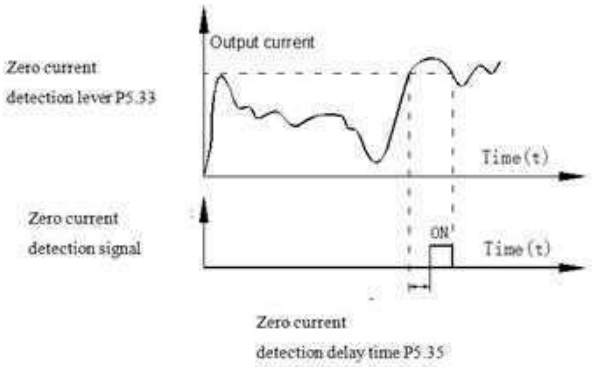
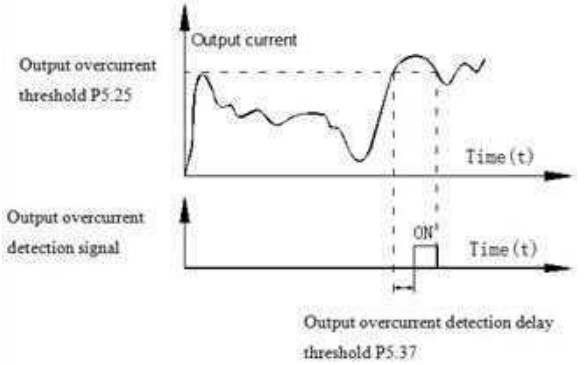


Figure Zero current detection

P5.36 Output overcurrent threshold	Setting range: 0.1%-300.0%[200.0%]
P5.37 Output overcurrent detection delay time	Setting range: 0.00–600.00s[0.0s]

Notes:

If the output current of the AC drive is equal to or higher than the overcurrent threshold and the duration exceeds the detection delay time, the corresponding DO becomes ON. The output overcurrent detection function is shown in the following figure.

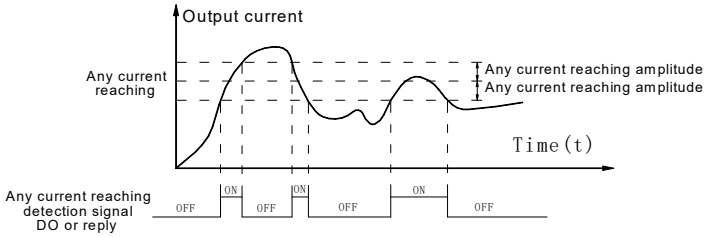


P5.38 Any current reaching 1	Setting range: 0%-300.0%[100.0%]
P5.39 Any current reaching 1 amplitude	Setting range: 0.0%-300.0%[0.0%]
P5.40 Any current reaching 2	Setting range: 0.0%-300.0%[100.0%]
P5.41 Any current reaching 2 amplitude	Setting range: 0.0%-300.0%[0.0%]

Notes:

If the output current of the AC drive is within the positive and negative amplitudes of any current reaching detection value, the corresponding DO becomes ON.

The AC driver provides two groups of any current reaching detection parameters, including current detection value and detection amplitudes, as shown in the following figure.



P5.42 Timing function	Setting range: 0-1[0]
0: Disabled	1: Enabled

P5.43 Timing duration source	Setting range: 0-3[0]
0: P8-44	1: AI1
2: AI2	3: Reserved

(100% of analog input corresponds to the value of 5.44)

P5.44 Timing duration	Setting range: 0.0–6500.0 min[0.0min]

Notes:

These parameters are used to implement the AC drive timing function.

If P5.42 is set to 1, the AC drive starts to time at startup. When the set timing duration is reached, the AC drive stops automatically and meanwhile the corresponding DO becomes ON.

The AC drive starts timing from 0 each time it starts up and the remaining timing duration can be queried by C0.20.

The timing duration is set in P5.43 and P5.44, in unit of minute.

P5.45 AI1 input voltage lower limit	Setting range: 0.00 V to P5.46[3.10v]
P5.46 AI1 input voltage upper limit	Setting range: P5.45 to 10.00 V[6.80v]

Notes:

These two parameters are used to set the limits of the input voltage to provide protection on the AC drive. When the AI1 input is larger than the value of P5.46 or smaller than the value of P5.45, the corresponding DO becomes ON, indicating that AI1 input exceeds the limit.

P5.47 Module temperature threshold	Setting range: 0–100 °C[75 °C]

Notes:

When the heatsink temperature of the AC drive reaches the value of this parameter, the corresponding DO becomes ON, indicating that the module temperature reaches the threshold.

P5.48 Cooling fan control	Setting range: 0-1[0]
0: Fan working during running	1: Fan working continuously

Notes:

It is used to set the working mode of the cooling fan. If this parameter is set to 0, the fan works when the AC drive is in running state. When the AC drive stops, the cooling fan works if the heatsink temperature is higher than 40°C, and stops working if the heatsink temperature is lower than 40°C.

If this parameter is set to 1, the cooling fan keeps working after power-on.

P5.49 Wakeup frequency	Setting range: (P5.51)- (P0.10)[0.00 Hz]
P5.50 Wakeup delay time	Setting range: 0.0–6500.0s[0.0s]
P5.51 Dormant frequency	Setting range: 0.00 Hz - P5.49[0.00 Hz]
P5.52 Dormant delay time	Setting range: 0.0–6500.0s[0.0s]

Notes:

These parameters are used to implement the dormant and wakeup functions in the water supply application.

When the AC drive is in running state, the AC drive enters the dormant state and stops automatically after the dormant delay time (P5.52) if the set frequency is lower than or equal to the dormant frequency (P5.51).

When the AC drive is in dormant state and the current running command is effective, the AC drives starts up after the wakeup delay time (P5.50) if the set frequency is higher than or equal to the wakeup frequency (P5.49).

Generally, set the wakeup frequency equal to or higher than the dormant frequency. If the wakeup frequency and dormant frequency are set to 0, the dormant and wakeup functions are disabled.

When the dormant function is enabled, if the frequency source is PID, whether PID operation is performed in the dormant state is determined by P6.28. In this case, select PID operation enabled in the stop state (P6.28 = 1).

P5.53 Current running time reache	Setting range: 0.0–6500.0 min[0.0 min]

Notes:

If the current running time reaches the value set in this parameter, the corresponding DO becomes ON, indicating that the current running time is reached.

P5.54 Output power correction coefficient	Setting range: 0.00%–200 .0%[100.0%]

Notes:

When the output power (C0.05) is not equal to the required value, you can perform linear correction on output power by using this parameter

5.7 Process Control PID Function(Group P6)

PID control is a general process control method. By performing proportional, integral and differential operations on the difference between the feedback signal and the target signal, it adjusts the output frequency and constitutes a feedback system to stabilize the controlled counter around the target value.

It is applied to process control such as flow control, pressure control and temperature control. The following figure shows the principle block diagram of PID control.

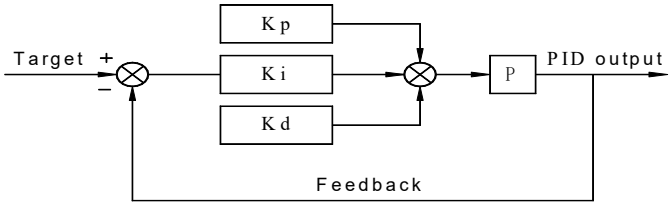


Figure Principle block diagram of PID control

P6.00 PID setting source	Setting range: 0–6 [0]
0: P6.01	1: AI1
2: AI2	3: Reserved

4: Pulse setting (X5)	5: Communication setting
6: Multi-reference	

P6.01 PID digital setting	Setting range: 0.0%–100.0% [50.0%]

Notes:

P6.00 is used to select the channel of target process PID setting. The PID setting is a relative value and ranges from 0.0% to 100.0%. The PID feedback is also a relative value. The purpose of PID control is to make the PID setting and PID feedback equal.

P6.02 PID feedback source	Setting range: 0–8 [0]
0:AI1	1: AI2
2: Reserved	3: AI1–AI2
4: Pulse setting (X5)	5: Communication setting
6: AI1 + AI2	7: MAX (|AI1|, |AI2|)
8: MIN (|AI1|, |AI2|)	

This parameter is used to select the feedback signal channel of process PID.The PID feedback is a relative value and ranges from 0.0% to 100.0%.

P6.03 PID action direction	Setting range: 0–1 [0]
0: Forward action	1: Reverse action

Notes:

When the feedback value is smaller than the PID setting, the AC drive's output frequency rises. For example, the winding tension control requires forward PID action.

When the feedback value is smaller than the PID setting, the AC drive's output frequency reduces. For example, the unwinding tension control requires reverse PID action.

Note that this function is influenced by the X function 35 "Reverse PID action direction".

P6.04 PID setting feedback range	Setting range: 0–65535 [1000]

Notes:

This parameter is a non-dimensional unit. It is used for PID setting display (C0.15) and PID feedback display (C0.16).

Relative value 100% of PID setting feedback corresponds to the value of P6.04. If P6.04 is set to 2000 and PID setting is 100.0%, the PID setting display (C0.15) is 2000.

P6.05 Proportional gain Kp1	Setting range: 0.0–100.0 [20.0]
P6.06 Integral time Ti1	Setting range: 0.01–10.00s[2.00s]
P6.07 Differential time Td1	Setting range: 0.00–10.000[0.000s]

Notes:

P6.05 (Proportional gain Kp1):

It decides the regulating intensity of the PID regulator. The higher the Kp1 is, the larger the regulating intensity is. The value 100.0 indicates when the deviation between PID feedback and PID setting is 100.0%, the adjustment amplitude of the PID regulator on the output frequency reference is the maximum frequency.

P6.06 (Integral time Ti1):

It decides the integral regulating intensity. The shorter the integral time is, the larger the regulating intensity is. When the deviation between PID feedback and PID setting is 100.0%, the integral regulator performs continuous adjustment for the time set in P6.06. Then the adjustment amplitude reaches the maximum frequency.

P6.07 (Differential time Td1):

It decides the regulating intensity of the PID regulator on the deviation change. The longer the differential time is, the larger the regulating intensity is. Differential time is the time within which the feedback value change reaches 100.0%, and then the adjustment amplitude reaches the maximum frequency.

P6.08 Cut-off frequency of PID reverse rotation	Setting range: 0.00–P0.10 [2.00Hz]

Notes:

In some situations, only when the PID output frequency is a negative value (AC drive reverse rotation), PID setting and PID feedback can be equal. However, too high reverse rotation frequency is prohibited in some applications, and P6.08 is used to determine the reverse rotation frequency upper limit.

P6.09 PID deviation limit	Setting range: 0.0%–100.0% [0.0%]

Notes:

If the deviation between PID feedback and PID setting is smaller than the value of P6.09, PID control stops. The small deviation between PID feedback and PID setting will make the output frequency stabilize, effective for some closed-loop control applications.

P6.10 PID differential limit	Setting range: 0.00%–100.00% [0.10%]

Notes:

It is used to set the PID differential output range. In PID control, the differential operation may easily cause system oscillation. Thus, the PID differential regulation is restricted to a small range.

P6.11 PID setting change time	Setting range: 0.00–650.00s [0.00s]

Notes:

The PID setting change time indicates the time required for PID setting changing from 0.0% to 100.0%. The PID setting changes linearly according to the change time, reducing the impact caused by sudden setting change on the system

P6.12 PID feedback filter time	Setting range: 0.00–60.00s [0.00s]
P6.13 PID output filter time	Setting range: 0.00–60.00s [0.00s]

Notes:

P6.12 is used to filter the PID feedback, helping to reduce interference on the feedback but slowing the response of the process closed-loop system.

P6.13 is used to filter the PID output frequency, helping to weaken sudden change of the AC drive output frequency but slowing the response of the process closed-loop system.

P6.15 Proportional gain Kp2	Setting range: 0.0–100.0 [20.0s]
P6.16 Integral time Ti2	Setting range: 0.01–10.00s [2.00s]
P6.17 Differential time Td2	Setting range: 0.000–10.000s[0.000S]

P6.18 PID parameter switchover condition	Setting range: 0–3 [0]
0: No switchover	1: Switchover via X terminal
2: based on deviation	3: based on running frequency

P6.19 PID parameter switchover deviation 1	Setting range: 0.0%–P6.20 [20.0%]
P6.20 PID parameter switchover deviation 2	Setting range: P6.19 -100.0%[80.0%]

Notes:

In some applications, PID parameters switchover is required when one group of PID parameters cannot satisfy the requirement of the whole running process.

These parameters are used for switchover between two groups of PID parameters. Regulator parameters P6.15 to P6.17 are set in the same way as P6.05 to P6.07.

The switchover can be implemented either via a X terminal or automatically implemented based on the deviation.

If you select switchover via a X terminal, the X must be allocated with function 43 "PID parameter switchover". If the X is OFF, group 1 (P6.05 to P6.07) is selected. If the X is ON, group 2 (P6.15 to P6.17) is selected.

If you select automatic switchover, when the absolute value of the deviation between PID feedback and PID setting is smaller than the value of P6.19, group 1 is selected. When the absolute value of the deviation between PID feedback and PID setting is higher than the value of P6-20, group 2 is selected. When the deviation is between P6.19 and P6.20, the PID parameters are the linear interpolated value of the two groups of parameter value.

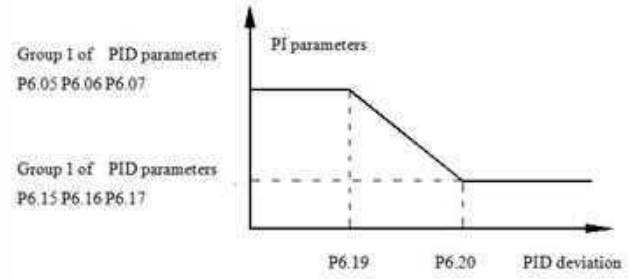


Figure PID parameters switchover

P6.21 PID initial value	Setting range: 0.0%–100.0%[0.0%]
P6.22 PID initial value holding time	Setting range: 0.00–650.00s[0.00s]

Notes:

When the AC drive starts up, the PID starts closed-loop algorithm only after the PID output is fixed to the PID initial value (P6.21) and lasts the time set in P6.22.

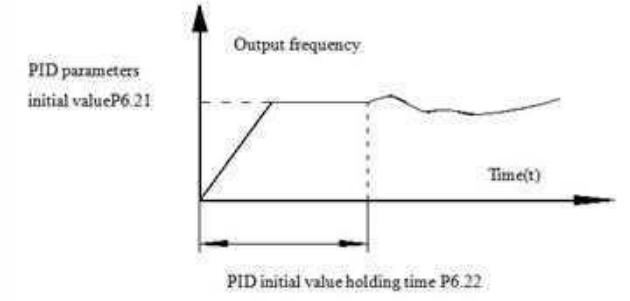


Figure PID initial value function

P6.23 Maximum deviation between two PID outputs in forward direction	Setting range: 0.0%–100.0%[1.00%]
P6.24 Maximum deviation between two PID outputs in reverse direction	Setting range: 0.0%–100.0%[1.00%]

Notes:

This function is used to limit the deviation between two PID outputs (2 ms per PID output) to suppress the rapid change of PID output and stabilize the running of the AC drive.

P6.23 and P6.24 respectively correspond to the maximum absolute value of the output deviation in forward direction and in reverse direction.

P6.25 PID integral property	Setting range: 0–1[00]

Notes:

1st digit (Integral separated):

0: Invalid 1: Valid

2nd digit (Whether to stop integral operation when the output reaches the limit):

0: Continue integral operation 1: Stop integral operation

Integral separated

If it is set to valid,the PID integral operation stops when the X allocated with function 38 "PID integral pause" is ON In this case, only proportional and differential operations take effect.

If it is set to invalid, integral separated remains invalid no matter whether the X allocated with function 38 "PID integral pause" is ON or not.

Whether to stop integral operation when the output reaches the limit

If "Stop integral operation" is selected, the PID integral operation stops, which may help to reduce the PID overshoot.

P6.26 Detection value of PID feedback loss	Setting range: 0.0%: Not judging feedback loss 0.1%–100.0%[0.0%]
P6.27 Detection time of PID feedback loss	Setting range: 0.0–20.0s

Notes:

These parameters are used to judge whether PID feedback is lost.

If the PID feedback is smaller than the value of P6.26 and the lasting time exceeds the value of P6.27, the AC drive reports PId1 and acts according to the selected fault protection action.

P6.28 PID operation at stop	Setting range: 0-1[0]

Notes:

It is used to select whether to continue PID operation in the state of stop. Generally, the PID operation stops when the AC drive stops.

5.8 Swing Frequency, Fixed Length and Count(Group P7)

The swing frequency function is applied to the textile and chemical fiber fields and the applications where traversing and winding functions are required.

The swing frequency function indicates that the output frequency of the AC drive swings up and down with the set frequency as the center. The trace of running frequency at the time axis is shown in the following figure.

The swing amplitude is set in P7.00 and P7.01. When P7.01 is set to 0, the swing amplitude is 0 and the swing frequency does not take effect.

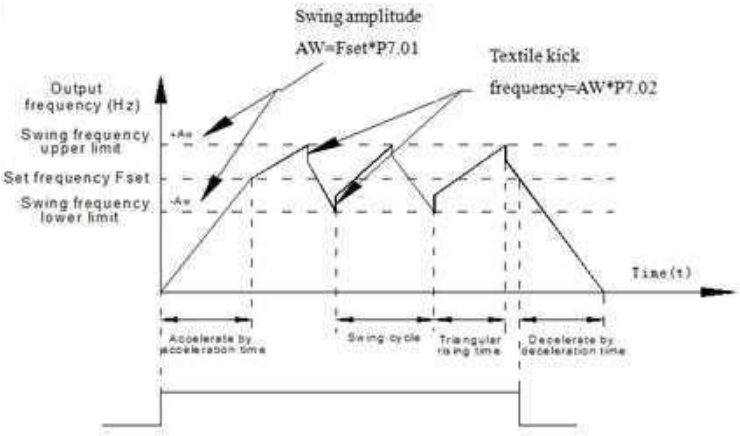


Figure Swing frequency control

P7.00 Swing frequency setting mode	Setting range: 0-1[0]

Notes:

0: Relative to the central frequency 1: Relative to the maximum frequency

This parameter is used to select the base value of the swing amplitude.

0: Relative to the central frequency (P0.07 frequency source selection)

It is variable swing amplitude system. The swing amplitude varies with the central frequency (set frequency).

1: Relative to the maximum frequency (P0.10 maximum output frequency)

It is fixed swing amplitude system. The swing amplitude is fixed.

P7.01 Swing frequency amplitude	Setting range: 0.0%–100.0%[0.0%]
P7.02 Jump frequency amplitude	Setting range: 0.0%–50.0%[50.0%]

Notes:

This parameter is used to determine the swing amplitude and jump frequency amplitude. The swing frequency is limited by the frequency upper limit and frequency lower limit.

•If relative to the central frequency (P7.00 = 0), the actual swing amplitude AW is the calculation result of P0.07 (Frequency source selection) multiplied by P7.01.

•If relative to the maximum frequency (P7.00 = 1), the actual swing amplitude AW is the calculation result of P0.10 (Maximum frequency) multiplied by P7.01.

Jump frequency = Swing amplitude AW x P7.02 (Jump frequency amplitude).

•If relative to the central frequency (P7.00 = 0), the jump frequency is a variable value.

•If relative to the maximum frequency (P7.00 = 1), the jump frequency is a fixed value.

The swing frequency is limited by the frequency upper limit and frequency lower limit.

P7.03 Swing frequency cycle	Setting range: 0.0–3000.0s[10.0S]
P7.04 Triangular wave rising time coefficient	Setting range: 0.0%–100.0%[50.0%]

Notes:

P7.03 specifies the time of a complete swing frequency cycle.

P7.04 specifies the time percentage of triangular wave rising time to P7.03 (Swing frequency cycle).

•Triangular wave rising time = P7.03 (Swing frequency cycle) x P7.04 (Triangular wave rising time coefficient, unit: s)

•Triangular wave falling time = P7.03 (Swing frequency cycle) x (1 – P7.04 Triangular wave rising time coefficient ,unit: s)

P7.05 Set length	Setting range: 0–65535m[1000m]
P7.06 Actual length	Setting range: 0–65535m[0m]
P7.07 Number of pulses per meter	Setting range: 0.1–6553.5[100.0]

Notes:

The preceding parameters are used for fixed length control.

The length information is collected by X terminal. P7.06 (Actual length) is calculated by dividing the number of pulses collected by the X terminal by P7.07 (Number of pulses each meter).

When the actual length P7.06 exceeds the set length in P7.05, the Y terminal allocated with function 10 (Length reached) becomes ON.

During the fixed length control, the length reset operation can be performed via the X terminal allocated with function 28. For details, see the descriptions of P2.00 to P2.09.

Allocate corresponding X terminal with function 27 (Length count input) in applications. If the pulse frequency is high, X5 must be used.

P7.08 Set count value	Setting range: 0–65535[1000]
P7.09 Designated count value	Setting range: 0–65535[1000]

Notes:

The count value needs to be collected by X terminal. Allocate the corresponding X terminal with function 25 (Counter input) in applications. If the pulse frequency is high, X5 must be used.

When the count value reaches the set count value (P7.08), the DO terminal allocated with function 8 (Set count value reached) becomes ON. Then the counter stops counting.

When the counting value reaches the designated counting value (P7.09), the DO terminal allocated with function 9 (Designated count value reached) becomes ON. Then the counter continues to count until the set count value is reached.

P7.09 should be equal to or smaller than P7.08.

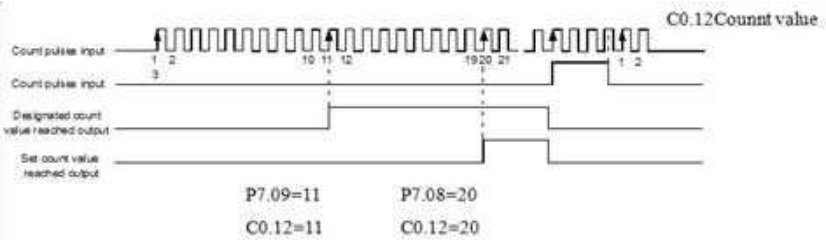


Figure reaching the set count value and designated count value

5.9 Multi-Reference and Simple PLC Function(Group P8)

P8.00 Reference 0	Setting range: -100.0%–100.0%[0.0%]
P8.01 Reference 1	Setting range: -100.0%–100.0%[0.0%]
P8.02 Reference 2	Setting range: -100.0%–100.0%[0.0%]
P8.03 Reference 3	Setting range: -100.0%–100.0%[0.0%]
P8.04 Reference 4	Setting range: -100.0%–100.0%[0.0%]
P8.05 Reference 5	Setting range: -100.0%–100.0%[0.0%]
P8.06 Reference 6	Setting range: -100.0%–100.0%[0.0%]
P8.07 Reference 7	Setting range: -100.0%–100.0%[0.0%]
P8.08 Reference 8	Setting range: -100.0%–100.0%[0.0%]
P8.09 Reference 9	Setting range: -100.0%–100.0%[0.0%]
P8.10 Reference 10	Setting range: -100.0%–100.0%[0.0%]
P8.11 Reference 11	Setting range: -100.0%–100.0%[0.0%]
P8.12 Reference 12	Setting range: -100.0%–100.0%[0.0%]
P8.13 Reference 13	Setting range: -100.0%–100.0%[0.0%]
P8.14 Reference 14	Setting range: -100.0%–100.0%[0.0%]
P8.15 Reference 15	Setting range: -100.0%–100.0%[0.0%]

Notes:

Multi-reference can be the setting source of frequency, V/F separated voltage and process PID. The multi-reference is relative value and ranges from -100.0% to 100.0%.

As frequency source, it is a percentage relative to the maximum frequency. As V/F separated voltage source, it is a percentage relative to the rated motor voltage. As process PID setting source, it does not require conversion.

Multi-reference can be switched over based on different states of X terminal. For details, see the descriptions of group P2.

P8.16 Simple PLC running mode	Setting range: 0–2[0]
0: Stop after the AC drive runs one cycle	

1: Keep final values after the AC drive runs one cycle
2: Repeat after the AC drive runs one cycle

Notes:

0: Stop after the AC drive runs one cycle

The AC drive stops after running one cycle, and will not start up until receiving another command.

1: Keep final values after the AC drive runs one cycle:

The AC drive keeps the final running frequency and direction after running one cycle.

2: Repeat after the AC drive runs one cycle:

The AC drive automatically starts another cycle after running one cycle, and will not stop until receiving the stop command.

Simple PLC can be either the frequency source or V/F separated voltage source.

When simple PLC is used as the frequency source, whether parameter values of P8.00 to P8.15 are positive or negative determines the running direction. If the parameter values are negative, it indicates that the AC drive runs in reverse direction.

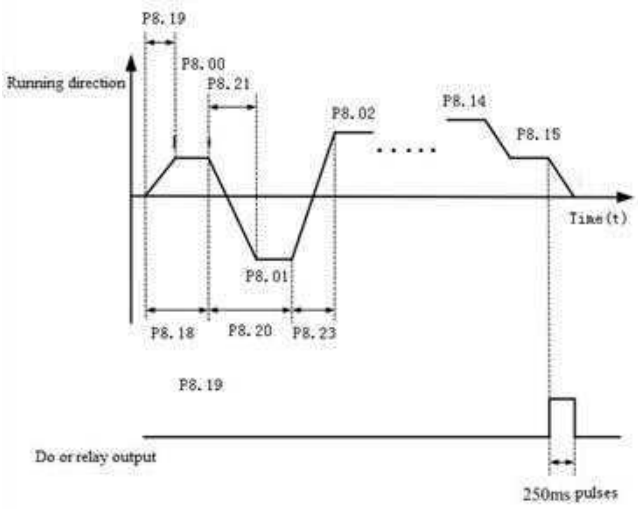


Figure6-1 Simple PLC when used as frequency source

P8.17 Simple PLC retentive selection	Setting range: 0–1[00]

Notes:

PLC retentive upon power failure indicates that the AC drive memorizes the PLC running moment and running frequency before power failure and will continue to run from the memorized moment after it is powered on again. If the unit's digit is set to 0, the AC drive restarts the PLC process after it is powered on again.

PLC retentive upon stop indicates that the AC drive records the PLC running moment and running frequency upon stop and will continue to run from the recorded moment after it starts up again. If the ten's digit is set to 0, the AC drive restarts the PLC process after it starts up again.

P8.18 Running time of simple PLC reference 0	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.19 Acceleration/deceleration time of simple PLC reference 0	Setting range: 0-3[0]
P8.20 Running time of simple PLC reference 1	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.21 Acceleration/deceleration time of simple PLC reference 1	Setting range:0-3[0]
P8.22 Running time of simple PLC reference 2	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.23 Acceleration/deceleration time of simple PLC reference 2	Setting range: 0-3[0]
P8.24 Running time of simple PLC reference 3	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.25 Acceleration/deceleration time of simple PLC reference 3	Setting range: 0-3[0]
P8.26 Running time of simple PLC reference 4	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.27 Acceleration/deceleration time of simple PLC reference 4	Setting range: 0-3[0]
P8.28 Running time of simple PLC reference 5	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.29 Acceleration/deceleration time of simple PLC reference 5	Setting range: 0-3[0]
P8.30 Running time of simple PLC reference 6	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.31 Acceleration/deceleration time of simple PLC reference 6	Setting range: 0-3[0]
P8.32 Running time of simple PLC reference 7	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.33 Acceleration/deceleration time of simple PLC reference 7	Setting range: 0-3[0]

P8.34 Running time of simple PLC reference 8	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.35 Acceleration/deceleration time of simple PLC reference 8	Setting range: 0-3[0]
P8.36 Running time of simple PLC reference 9	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.37 Acceleration/deceleration time of simple PLC reference 9	Setting range: 0-3[0]
P8.38 Running time of simple PLC reference 10	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.39 Acceleration/deceleration time of simple PLC reference 10	Setting range: 0-3[0]
P8.40 Running time of simple PLC reference 11	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.41 Acceleration/deceleration time of simple PLC reference 11	Setting range: 0-3[0]
P8.42 Running time of simple PLC reference 12	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.43 Acceleration/deceleration time of simple PLC reference 12	Setting range: 0-3[0]
P8.44 Running time of simple PLC reference 13	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.45 Acceleration/deceleration time of simple PLC reference 13	Setting range: 0-3[0]
P8.46 Running time of simple PLC reference 14	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.47 Acceleration/deceleration time of simple PLC reference 14	Setting range: 0-3[0]
P8.48 Running time of simple PLC reference 15	Setting range: 0.0–6500.0s (h)[0.0s(h)]
P8.49 Acceleration/deceleration time of simple PLC reference 15	Setting range: 0-3[0]

P8.50 Time unit of simple PLC running	Setting range: 0-1[0]
0: s (second)	1: h (hour)
P8.51 Reference 0 source	Setting range: 0-6[0]
0: Set by P8.00	1: AI1
2: AI2	3: Reserved
4: X5	5: PID
6: Set by preset frequency (P0.08), modified via terminal UP/DOWN	

Notes:

It determines the setting channel of reference 0. You can perform convenient switchover between the setting channels. When multi-reference or simple PLC is used as frequency source, the switchover between two frequency sources can be realized easily.

5.10 V/F Control Parameters(Group P9)

Group P9 is valid only for V/F control.The V/F control mode is applicable to low load applications (fan or pump) or applications where one AC drive operates multiple motors or there is a large difference between the AC drive power and the motor power.

P9.00 V/F curve setting	Setting range: 0-11 [0]
0: Linear V/F	1: Multi-point V/F
2: Square V/F	3: 1.2-power V/F
4: 1.4-power V/F	6: 1.6-power V/F
8: 1.8-power V/F	9: Reserved
10: V/F complete separation	11: V/F half separation

0: Linear V/F, It is applicable to common constant torque load.

1: Multi-point V/F,It is applicable to special load such as dehydrator and centrifuge. Any such V/F curve can be obtained by setting parameters of P9-03 to P9-08.

2: Square V/F,It is applicable to centrifugal loads such as fan and pump.

3 to 8: V/F curve between linear V/F and square V/F

10: V/F complete separation,In this mode, the output frequency and output voltage of the AC drive are independent. The output frequency is determined by the frequency source, and the output voltage is determined by "Voltage source for V/F separation" (P9.13). It is applicable to induction heating, inverse power supply and torque motor control.

11: V/F half separation,In this mode, V and F are proportional and the proportional relationship can be set in P9-13. The relationship between V and F are also related to the rated motor voltage and rated motor frequency in Group P1.

Assume that the voltage source input is X (0 to 100%), the relationship between V and F is:V/F = 2 * X *(Rated motor voltage)/(Rated motor frequency)

P9.01 Torque boost	Setting range: 0%–30%[Model dependent]
P9.02 Cut-off frequency of torque boost	Setting range: 0.00 Hz to maximum output frequency[50]

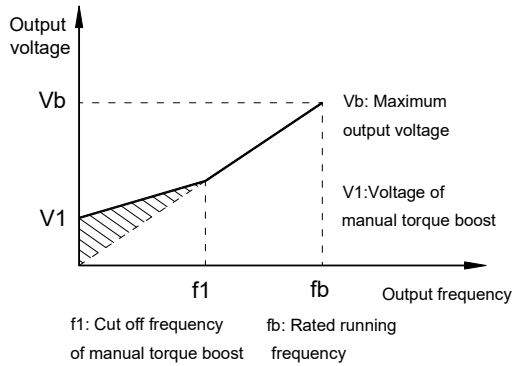
Notes:

To compensate the low frequency torque characteristics of V/F control, you can boost the output voltage of the AC drive at low frequency by modifying P9.01.

If the torque boost is set to too large, the motor may overheat, and the AC drive may suffer over current.

If the load is large and the motor startup torque is insufficient, increase the value of P9.01. If the load is small, decrease the value of P9.01. If it is set to 0.0, the AC drive performs automatic torque boost. In this case, the AC drive automatically calculates the torque boost value based on motor parameters including the stator resistance.

P9.02 specifies the frequency under which torque boost is valid. Torque boost becomes invalid when this frequency is exceeded, as shown in the following figure.



P9.03 Multi-point V/F frequency 1 (f1)	Setting range: 0.00 Hz to P9.05[0.00Hz]
P9.04 Multi-point V/F voltage 1 (V1)	Setting range: 0.0%–100.0%[0.0%]
P9.05 Multi-point V/F frequency 2 (f2)	Setting range: P9.03 to P9.07[0.00]
P9.06 Multi-point V/F voltage 2 (V2)	Setting range: P9.05 to rated motor frequency
P9.07 Multi-point V/F frequency 3 (f3)	Setting range: P9.05 to rated motor frequency (P1.04)[0.00] Note: The rated frequencies of motors 2 is respectively set in PC.04
P9.08 Multi-point V/F voltage 3 (V3)	Setting range: 0.0%–100.0%[0.0%]

Notes:

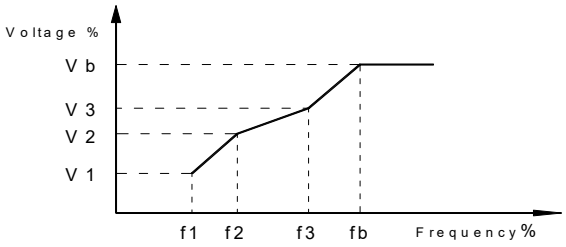
These six parameters are used to define the multi-point V/F curve.

The multi-point V/F curve is set based on the motor's load characteristic. The relationship between voltages and frequencies is:

V1 < V2 < V3, f1 < f2 <f3

At low frequency, higher voltage may cause overheat or even burnt out of the motor and over current stall or over current protection of the AC drive.

Setting of multi-point V/F curve



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

P9.09 V/F slip compensation gain	Setting range: 0.0-200.0%[0.00%]

Notes:

This parameter is valid only for the asynchronous motor.

It can compensate the rotational speed slip of the asynchronous motor when the load of the motor increases, stabilizing the motor speed in case of load change. If this parameter is set to 100%, it indicates that the compensation when the motor bears rated load is the rated motor slip. The rated motor slip is automatically obtained by the AC drive through calculation based on the rated motor frequency and rated motor rotational speed in group P1.

Generally, if the motor rotational speed is different from the target speed, slightly adjust this parameter.

P9.10 V/F over-excitation gain	Setting range: 0-200 [64]

Notes:

During deceleration of the AC drive, over-excitation can restrain rise of the bus voltage, preventing the over voltage fault. The larger the over-excitation is, the better the restraining result is.

Increase the over-excitation gain if the AC drive is liable to over voltage error during deceleration. However, too large over-excitation gain may lead to an increase in the output current. Set P9.09 to a proper value in actual applications.

Set the over-excitation gain to 0 in the applications where the intertia is samll and the bus voltage will not rise during motor deceleration or where there is a braking resistor.

P9.11 V/F oscillation suppression gain	Setting range: 0-100 [40]

Notes:

Set this parameter to a value as small as possible in the prerequisite of efficient oscillation suppression to avoid influence on V/F control.

Set this parameter to 0 if the motor has no oscillation. Increase the value properly only when the motor has obvious oscillation. The larger the value is, the better the oscillation suppression result will be.

When the oscillation suppression function is enabled, the rated motor current and no-load current must be correct. Otherwise, the V/F oscillation suppression effect will not be satisfactory.

P9.13 Voltage source for V/F separation	Setting range: 0-8 [0]
0: Digital setting (P9.14)	1: AI1
2: AI2	3:Reservd
4: Pulse setting (X5)	5: Multi-reference
6: Simple PLC	7: PID
8: Communication setting	

P9.14 Voltage digital setting for V/F separation	Setting range: 0 V to rated motor voltage[0]

Notes:

100.0% corresponds to the rated motor voltage (P1.02,PC.02).

V/F separation is generally applicable to scenarios such as induction heating, inverse power supply and motor torque control.

If V/F separated control is enabled, the output voltage can be set in P3.14 or by means of analog, multi-reference, simple PLC, PID or communication. If you set the output voltage by means of non-digital setting, 100% of the setting corresponds to the

rated motor voltage. If a negative percentage is set, its absolute value is used as the effective value.

0: Digital setting (P9.14)

The output voltage is set directly in P9.14.

1: AI1; 2: AI2;

The output voltage is set by AI terminals.

4: Pulse setting (X5)

The output voltage is set by pulses of the terminals X5

Pulse setting specification:volatge range 9-30V,frequency range 0-100khz,

5: Multi-reference

If the voltage source is multi-reference, parameters in group P2 and P8 must be set to determine the corresponding relationship between setting signal and setting voltage. 100.0% of the multi-reference setting in group P8 corresponds to the rated motor voltage.

6: Simple PLC

If the voltage source is simple PLC mode, parameters in group P8 must be set to determine the setting output voltage.

7: PID

The output voltage is generated based on PID closed loop. For details, see the description of PID in group P6.

8: Communication setting

The output voltage is set by the host computer by means of communication.

The voltage source for V/F separation is set in the same way as the frequency source. For details, see P0-03. 100.0% of the setting in each mode corresponds to the rated motor voltage. If the corresponding value is negative, its absolute value is used.

P9.15 Voltage rise time of V/F separation	Setting range: 0-1000.0s [0]
P9.16 Voltage decline time of V/F separation	Setting range: 0-1000.0s [0]

Notes:

P9.15 indicates the time required for the output voltage to rise from 0 V to the rated motor voltage shown as t1 in the following figure.

P9.16 indicates the time required for the output voltage to decline from the rated motor voltage to 0 V, shown as t2 in the following figure.

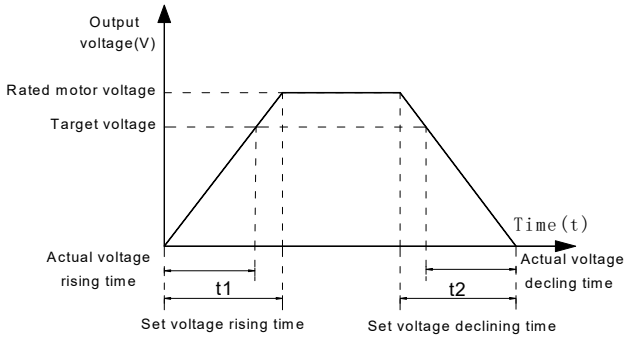


Figure Voltage of V/F separation

P9.17 Stop method of V/F separation	Setting range: 0-1 [0]

Notes:

0: the frequency /voltage reduce to 0 alone

V/F separation output voltage according to Voltage decline time(P9.15) reduce to 0V.

V/F separation output frequency according to deline time P0.18 reduce to 0V at same time.

1: frquency reduce after the voltage reduce to 0

V/F separation output voltage according to Voltage decline time(P9.15) reduce to 0V.

V/F separation output frequency according to decline time P0.18 reduce to 0V at same time.

P9.18 Over current stall current	Setting range: 50-200% [150%]
P9.19 Over current stall restrain	Setting range: 0-1[1]
0:Enabled	1:Disable

P9.20 Over current stall restrain gain	Setting range: 0-100 [20]
P9.21 Multiplier Over current stall compensation factor	Setting range: 50-200% [50%]

P9.22 Over voltage stall protection voltage	Setting range: 200.0-2000.0V[Model dependend]

Notes:

220V,380V,760V,480V,850V,690V,1250V,1140V,1900V

P9.23 Over voltage stall protection	Setting range: 0-1[1]

0:Disabled	1:Enabled

P9.24 Over voltage stall restrain frequency gain	Setting range: 0-100 [30]
P9.25 Over voltage stall restrain voltage gain	Setting range: 0-100 [30]

Notes:

Increase P9.24 can improve the bus voltage the control effect,but the output frequency the output frequency can be affected,if output frequency fluctuation is bigger,can adjust P9.24, if increase P9.25,can reduce the bus voltage.

P9.26 Over voltage stall biggest Rising frequency limit	Setting range: 0-50Hz[5Hz]

Notes:

When connect brake resistance or brake unit,set the P9.11 to 0,if not 0,the running current will be over current, set the P9.23 to 0, if not 0,the decelerate time will be delay.

P9.27 Slip compensation constant time	Setting range: 0.1-10.0s[0.5s]

Notes:

The set value is too small,the large inertia load easy over voltage faults (oU3), slip compensation response value more small the response more faster.

5.11 Communication Parameter(Group PA)

Please reference (A1 Communication Protocol)

5.12 Fault and Protection(Group PB)

PB.00 Motor overload protection selection	Setting range: 0-1[0]

0: Disabled

The motor overload protective function is disabled. The motor is exposed to potential damage due to overheating. A thermal relay is suggested to be installed between the AC drive and the motor

1: Enabled

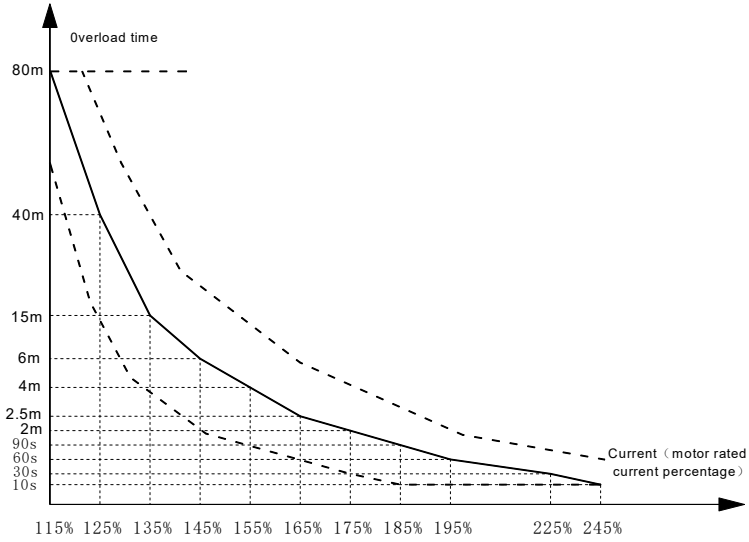
The motor overload protective function is enabled. More details in PB.01,PB.02.

PB.01 Motor overload protection gain	Setting range: 0.20–10.00 [1.00]
PB.02 Motor overload warning coefficient	Setting range: 50%–120%[80%]

Notes:

The AC drive judges whether the motor is overloaded according to the inverse time-lag curve of the motor overload protection.

The inverse time-lag curve of the motor overload protection is:



1) When motor running current reach to 175% times as rated current for 2 minutes, ac drive would report overload fault(oL2); when motor running current reach to 115% times as rated current for 80 minutes, ac drive would report overload fault(oL2). For example, the motor rated current is 100A, when motor running current reaches to 125A (125% times as 100A), if set PB.01 to 1.00, ac drive would report overload fault after 40 minutes; if set PB.01 to 1.20, ac drive would report overload fault after40*1.2=48 minutes. The longest overload time is 80 minutes, shortest is 10 seconds.

2) Motor overload protection modify example: Motor should run 2 minutes under 150% rated current before report overload fault. From the picture we can see that 150%(I) current is between 145%(I1) and 155%(I2), ac drive report overload fault after 6 minutes under 145% current, 4 minutes under 155% current. So it will be after 5 minutes under 150% current:

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

Thereby if need ac drive report overload fault after 2 minutes running under 150% rated current, motor overload protection gain should be set:

PB.01=2÷5=0.4

Attention: Set PB.01 properly based on the actual overload capacity. If the value of PB.01 is set too large, damage to the motor may result because the motor overheats but the AC drive does not report the alarm.

3) Motor overload warning coefficient: When motor overload detection level reached to setting value, the multi-function output terminal DO or fault relay output motor overload pre-alarm signal, this parameter is counted on the time percentage of certain overload point when ac drive continues running without warning.

This function is used to give a warning signal to the control system via DO before motor overload protection. This parameter is used to determine the percentage, at which pre-warning is performed before motor overload. The larger the value is, the less advanced the pre-warning will be.

When the accumulative output current of the AC drive is greater than the value of the overload inverse time-lag curve multiplied by PB.02, the DO terminal on the AC drive allocated with function 6 (Motor overload pre-warning) becomes ON.

PB.07 Short-circuit to ground upon power-on	Setting range: 0–1 [1]
0: Disabled	1: Enabled

Notes:

It is used to determine whether to check the motor is short-circuited to ground at power-on of the AC drive. If this function is enabled, the AC drive's UVW will have voltage output a while after power-on.

PB.08 Braking unit operation initial voltage	Setting range: 200.0-2000.0V [model dependand]

Notes:

Built-in braking unit operation intial voltage Vbreak, set this voltage value refer to 800≥Vbreak≥(1.414Vs+30)

Vs- Input AC voltage

Attention: Improper setting of this voltage may cause abnormal operation of built-in braking unit.

PB.09 Fault auto reset times	Setting range: 0-20 [0]

Notes:

It is used to set the times of fault auto resets if this function is used. After the value is exceeded, the AC drive will remain in the fault state.

PB.10 DO action during fault auto reset	Setting range: 0-1 [0]

Notes:

It is used to decide whether the DO acts during the fault auto reset if the fault auto reset function is selected.

PB.11 Time interval of fault auto reset	Setting range: 0.1s–100.0s [1.0s]

Notes:

It is used to set the waiting time from the alarm of the AC drive to fault auto reset.

PB.12 Input phase loss protection/contactor energizing protection selection	Setting range: 0–1 [1]
0: Disabled	1: Enabled

Unit's digit: Input phase loss protection

Ten's digit: Contactor energizing protection

PB.13 Output phase loss protection selection	Setting range: 0–1 [1]

Notes:

It is used to determine whether to perform output phase loss protection. If select 0, when output phase happened, it won't warning, the actually current is bigger than display showed, there's risk, pls be careful.

PB.14 1st fault type	Setting range: 0–99
PB.15 2nd fault type	
PB.16 3rd (latest) fault type	

Notes:

It is used to record the types of the most recent three faults of the AC drive. 0 indicates no fault. For possible causes and solution of each fault, refer to Chapter 8.

PB.17 Frequency upon 3rd fault	Setting range: It displays the frequency when the latest fault occurs.
PB.18 Current upon 3rd fault	Setting range: It displays the current when the latest fault occurs.
PB.19 Bus voltage upon 3rd fault	Setting range: It displays the bus voltage when the latest fault occurs.
PB.20 X status upon 3rd fault(Latest)	Setting range: It displays the status of all X terminals when the latest fault occurs. The sequence is as follows: BIT0-BIT5 corresponding X1-X5 If a X is ON, the setting is 1. If theX is OFF, the setting is 0. The value is the equivalent decimal number converted from the X status.
PB.21 Output terminal status upon 3rd fault	Setting range: It displays the status of all output terminals when the latest fault occurs. The sequence is as follows: BIT0-BIT4 orresponding DO REL1 If an output terminal is ON, the setting is 1.If the output terminal is OFF, the setting is 0. The value is the equivalent decimal number converted from the X statuses.
PB.22 AC drive status upon 3rd fault	Setting range: Reserved
PB.23 Power-on time upon 3rd fault	Setting range: It displays the present power-on time when the latest fault occurs.
PB.24 Running time upon 3rd fault	Setting range: It displays the present running time when the latest fault occurs
PB.27 Bus voltage upon 2nd fault	Setting range: Same as PB17–PB.24.
PB.28 X status upon 2nd fault	Setting range: Same as PB.17–PB.24.

PB.29 Bus voltage upon 2nd fault	Setting range: Same as PB.17–PB.24.
PB.30 X status upon 2nd fault	Setting range: Same as PB.17–PB.24.
PB.31 Output terminal status upon 2nd fault	Setting range: Same as PB.17–PB.24.
PB.32 AC drive status upon 2nd fault	Setting range: Same as PB.17–PB.24.
PB.33 Power-on time upon 2nd fault	Setting range: Same as PB.17–PB.24.
PB.34 Running time upon 2nd fault	Setting range: Same as PB.17–PB.24.
PB.37 Frequency upon 1st fault	Setting range: Same as PB.17–PB.24.
PB.38 Current upon 1st fault	Setting range: Same as PB.17–PB.24.
PB.39 Bus voltage upon 1st fault	Setting range: Same as PB.17–PB.24.
PB.40 X status upon 1st fault	Setting range: Same as PB.17–PB.24.
PB.41 Output terminal status upon 3rd fault	S Setting range: ame as PB.17–PB.24.
PB.42 AC drive status upon 1st fault	Setting range: Same as PB.17–PB.24.
PB.43 Power-on time upon 1st fault	Setting range: Same as PB.17–PB.24.
PB.44 Running time upon 1st fault	Setting range: Same as PB.17–PB.24.

PB.47Fault protection action selection 1	Setting range: 0-2[00000]

Notes:

1st digit (Motor overload, oL2):

0: Coast to stop 1: Stop according to the stop mode 2: Continue to run

2nd digit (Power input phase loss, SPI):

Same as 1st digit

3rd digit (Power output phase loss, SPO):

Same as 1st digit

4th digit (External equipment fault, EFI):

Same as 1st digit

5th digit (Communication fault, CCF):

Same as 1st digit

PB.48 Fault protection action selection 2	Setting range: 0-2[00000]

Notes:

1st digit (Encoder fault, EncF)

0: Coast to stop

1: Switch over to V/F control, stop according to the stop mode
2: Switch over to V/F control, continue to run
2nd digit (EEPROM read-write fault, EEF)
0: Coast to stop
1: Stop according to the stop mode
3rd digit: reserved
4th digit (Motor overheat, oH2)
Same as 1st digit in PB.47
5th digit (Accumulative running time reached)
Same as 1st digit in PB.47

PB.49 Fault protection action selection 3	Setting range: 0-2[00000]

Notes:
1st digit (User-defined fault 1, udE1)
Same as 1st digit in PB.47
2nd digit (User-defined fault 2, udE2)
Same as 2nd digit in PB.47
3rd digit (Accumulative power-on time reached, tIE2)
Same as 3rd digit in PB.47
4th digit (Load becoming 0, LoFF)
0: Coast to stop
1: Stop according to the stop mode
2: Continue to run at 7% of rated motor frequency and resume to the set frequency if the load recovers
5th digit (PID feedback lost during running, PId1)
Same as 1st digit in PB.47

PB.50 Fault protection action selection 4	Setting range: 0-2[00000]

Notes:
1st digit (Too large speed deviation, oSE)
Same as 1st digit in PB.47
2nd digit (Motor over-speed, oSF)
Same as 1st digit in PB.47
3rd digit (Initial position fault, Er.oP)

Same as 1st digit in PB.47

4th digit (reserved)

Same as 1st digit in PB.47

5th digit: Reserved

PB.54 Frequency selection for continuing to run upon fault	Setting range: 0-4[0]
0: Current running frequency	1: Set frequency
2: Frequency upper limit	3: Frequency lower limit
4: Backup frequency upon abnormality	

PB.55 Backup frequency upon abnormality	Setting range: 0.0%–100.0% [100.0%]

Notes:

If a fault occurs during the running of the AC drive and the handling of fault is set to "Continue to run", the AC drive displays A** and continues to run at the frequency set in PB.54.

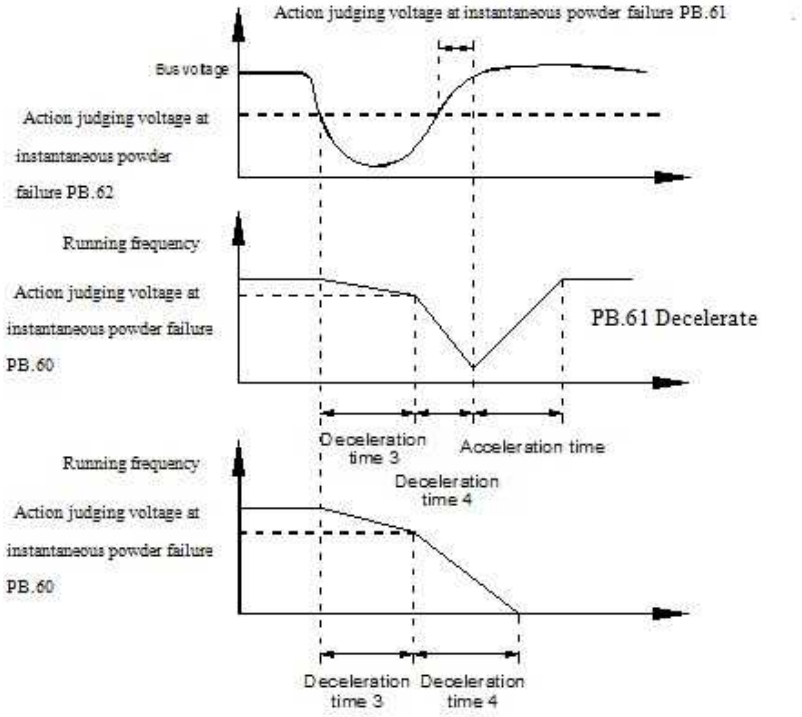
The setting of PB.55 is a percentage relative to the maximum frequency.

PB.59 Action selection at instantaneous power failure	Setting range: 0–2 [0]
0: Invalid	1: Decelerate
2: Decelerate to stop	
PB.60 Action pause judging voltage at instantaneous power failure	Setting range: 80.0%–100.0% [85.0%]
PB.61 Voltage rally judging time at instantaneous power failure	Setting range: 0.00–100.00s[0.50S]
PB.62 Action judging voltage at instantaneous power failure	Setting range: 60.0%–100.0%[80.0%]

Notes:

As shown in the following figure: When the bus voltage drops below the "instantaneous stop and no stop action judgment voltage", the instantaneous-stop-and-no-stop-process takes effect, and the output frequency of the frequency converter automatically decreases, allowing the motor to be in a power generation state. The instantaneous stop and no stop function can feedback the energy to the bus voltage,

maintaining the bus voltage around the "instantaneous stop and no stop action judgment voltage", and allowing the system to decelerate to 0Hz normally.



PB.63 Protection upon load becoming 0	Setting range: 0–1 [0]
0: Disabled	1: Enabled

PB.64 Detection level of load becoming 0	Setting range: 0.0%–100.0% [10.0%]
PB.65 Detection time of load becoming 0	Setting range: 0.0–60.0s[1.0s]

Notes:

If protection upon load becoming 0 is enabled, when the output current of the AC drive is lower than the detection level (PB.64) and the lasting time exceeds the detection time (PB.65), the output frequency of the AC drive automatically declines to

7% of the rated frequency. During the protection, the AC drive automatically accelerates to the set frequency if the load resumes to normal.

PB.67 Over-speed detection value	Setting range: 0.0%–50.0% [20.0%]
PB.68 Over-speed detection time	Setting range: 0.0–60.0s[1.0s]

Notes:

This function is valid only when the AC drive runs in the FVC mode.

If the actual motor rotational speed detected by the AC drive exceeds the maximum frequency and the excessive value is greater than the value of PB.67 and the lasting time exceeds the value of PB.68, the AC drive reports oSF and acts according to the selected fault protection action.

If the over-speed detection time is 0.0s, the over-speed detection function is disabled.

PB.74 Module overheat protection threshold	Setting range: 0–200[85]

5.13 Motor 2 Parameters(Group PC)

This series inverter can switch over the running among two motors. For the two motors, you can:

- Set motor nameplate parameters respectively
- Perform motor parameter auto-tuning respectively
- Select V/F control or vector control respectively
- Set encoder-related parameters respectively
- Set parameters related to V/F control or vector control independently

All parameters in group PC have the same definition and usage as parameters of motor 1 (Group P1). For more details, refer to the descriptions of motor 1 parameters.

5.14 Torque Control Parameters(Group PD)

PD.00 Speed/Torque control selection	Setting range: 0-1 [0]
0: Speed control	1: Torque control

Notes:

It is used to select the AC drive's control mode: speed control or torque control.

The drive provides X terminal with two torque related functions, function 29 (Torque control prohibited) and function 46 (Speed control/Torque control switchover). The two X terminal need to be used together with PD.00 to implement speed control/torque control switchover.

If the X terminal allocated with function 46 (Speed control/Torque control switchover) is OFF, the control mode is determined by PD.00. If the X terminal allocated with function 46 is ON, the control mode is reverse to the value of PD.00.

However, if the X terminal with function 29 (Torque control prohibited) is ON, the AC drive is fixed to run in the speed control mode.

PD.01 Torque setting source in torque control	Setting range: 0-7 [0]
0: Digital setting (PD.03)	1:AI1
2: AI2	3:Reserved
4:X5	5: Reserved
6: MIN (AI1, A I 2)	7: MAX (AI1, A I 2)

Notes:

PD.01 is used to set the torque setting source. There are a total of eight torque setting sources.

The torque setting is a relative value. 100.0% corresponds to the AC drive's rated torque. The setting range is -200.0% to 200.0%, indicating the AC drive's maximum torque is twice of the AC drive's rated torque.

If the torque setting is positive, the AC drive rotates in forward direction. If the torque setting is negative, the AC drive rotates in reverse direction.

• 0: Digital setting (PD.03)

The target torque directly uses the value set in PD.03.

• 1: AI1

• 2: AI2

• 3: Reserved

The target torque is decided by analog input. The A1 control board provides two AI terminals (AI1, AI2). AI1 is 0–10 V voltage input, AI2 is 0–10 V voltage input or 4–20 mA current input decided by jumper J2 on the control board.

The A1 series AC driver provides five curves indicating the mapping relationship between the input voltage of AI1andAI2 and the target frequency, two of which are linear (point-point) correspondence and two of which are four-point correspondence

curves. You can set the curves by using function codes P2.13 to P2.27 and function codes in group A1, and select curves for AI1 and AI2 in P2.33.

When AI is used as torque setting source, the corresponding value 100% of voltage/ current input corresponds to the value of PD.03.

• 4: Pulse setting (X5)

The target torque is set by X5 (high-speed pulse). The pulse setting signal specification is 9–30 V (voltage range) and 0–100 kHz (frequency range). The pulse can only be input via X5. The relationship (which is a two-point line) between X5 input pulse frequency and the corresponding value is set in P4.28 to P4.31. The corresponding value 100.0% of pulse input corresponds to the value of PD.03.

PD.03 Torque digital setting in torque control	Setting range: -200.0%–+200.0% [150.0%]

PD.05 Forward maximum frequency in torque control	Setting range: 0.00Hz-P0.10[50.00Hz]
PD.06 Reverse maximum frequency in torque control	Setting range: 0.00Hz-P0.10[50.00Hz]

Notes:

The two parameters are used to set the maximum frequency in forward or reverse rotation in torque control mode.

In torque control, if the load torque is smaller than the motor output torque, the motor's rotational speed will rise continuously. To avoid runaway of the mechanical system, the motor maximum rotating speed must be limited in torque control.

You can implement continuous change of the maximum frequency in torque control dynamically by controlling the frequency upper limit.

PD.07 Acceleration time in torque control	Setting range: 0.00–650.00s [0.00s]
PD.08 Deceleration time in torque control	Setting range: 0.00–650.00s [0.00s]

Notes:

In torque control, the difference between the motor output torque and the load torque determines the speed change rate of the motor and load. The motor rotational speed may change quickly and this will result in noise or too large mechanical stress. The setting of acceleration/deceleration time in torque control makes the motor rotational speed change softly.

However, in applications requiring rapid torque response, set the acceleration deceleration time in torque control to 0.00s. For example, two AC drives are connected to drive the same load. To balance the load allocation, set one AC drive as master in speed control and the other as slave in torque control. The slave receives the master's output torque as the torque command and must follow the master rapidly. In this case, the acceleration/deceleration time of the slave in torque control is set to 0.0s.

5.15 Vector Control Parameters(Group PE)

PE.00 Speed loop proportional gain 1	Setting range: 0-100 [30]
PE.01 Speed loop integral time 1	Setting range: 0.01-10.00s[0.05s]
PE.02 Switchover frequency 1	Setting range: 0.00 to PE.05[5.00Hz]
PE.03 Speed loop proportional gain 2	Setting range: 0-100[20]
PE.04 Speed loop integral time 2	Setting range: 0.01-10.00[1.00]
PE.05 Switchover frequency 2	Setting range: PE-02 to maximum output frequency[10.00Hz]

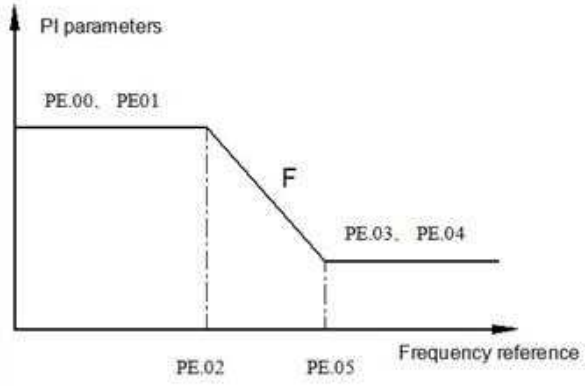
Notes:

Speed loop PI parameters vary with running frequencies of the AC drive.

•If the running frequency is less than or equal to "Switchover frequency 1" (PE-02), the speed loop PI parameters are PE-00 and PE-01.

•If the running frequency is equal to or greater than "Switchover frequency 2" (PE-05), the speed loop PI parameters are PE-03 and PE-04.

•If the running frequency is between PE-02 and PE-05, the speed loop PI parameters are obtained from the linear switchover between the two groups of PI parameters, as shown in Figure.



The speed dynamic response characteristics in vector control can be adjusted by setting the proportional gain and integral time of the speed regulator.

To achieve a faster system response, increase the proportional gain and reduce the integral time. Be aware that this may lead to system oscillation.

The recommended adjustment method is as follows:

If the factory setting cannot meet the requirements, make proper adjustment. Increase the proportional gain first to ensure that the system does not oscillate, and then reduce the integral time to ensure that the system has quick response and small overshoot.

Note: Improper PI parameter setting may cause too large speed overshoot, and over voltage fault may even occur when the overshoot drops.

PE.06 Vector control slip gain	Setting range: 50%-200% [100%]

Notes:

For SVC, it is used to adjust speed stability accuracy of the motor. When the motor with load runs at a very low speed, increase the value of this parameter; when the motor with load runs at a very large speed, decrease the value of this parameter.

PE.07 Time constant of speed loop filter	Setting range: 0.000s-1.000s [0.005s]

Notes:

In the vector control mode, the output of the speed loop regulator is torque current reference. This parameter is used to filter the torque references. It need not be adjusted generally and can be increased in the case of large speed fluctuation. In the case of motor oscillation, decrease the value of this parameter properly.

If the value of this parameter is small, the output torque of the AC drive may fluctuate greatly, but the response is quick.

PE.09 Torque upper limit source in speed control mode	Setting range: 0-7 [0]
0: PE.10	1: AI1
2: AI2	3: Reserved
4: Pulse setting (X5)	5: Communication setting
6:MIN(AI1,AI2)	7.MAX(AI1,AI2)

PE.10 Digital setting of torque upper limit in speed control mode	Setting range: 0.0-200.0% [150.0%]

PE.11 Torque upper limit source in speed control mode	Setting range: 0-8 [0]
0: PE.10	1: AI1
2: AI2	3: Reserved
4: Pulse setting (X5)	5: Communication setting
6:MIN(AI1,AI2)	7.MAX(AI1,AI2)
8.PE.12 setting	

PE.12 Digital setting of torque upper limit in speed control mode(generate electricity)	Setting range: 0.0-200.0% [150.0%]

Notes:

In the speed control mode, the maximum output torque of the AC drive is restricted by PE.09. If the torque upper limit is analog, X5 pulse or communication setting, 100% of the setting corresponds to the value of PE.10, and 100% of the value of PE.10 corresponds to the AC drive rated torque.

For details on the AI1 and AI2 setting, see the description of the AI curves in group P2.

For details on the pulse setting, see the description of P2.28 to P2.32.

When the AC drive is in communication with the master, if PE.09 is set to 5 “communication setting”, PE.10 “Digital setting of torque upper limit in speed control mode” can be set via communication from the master.

In other conditions, the host computer writes data -100.00% to 100.00% by the communication address 0x1000, where 100.0% corresponds to the value of PE.10. The communication protocol can be Modbus.

PE.13 Excitation adjustment proportional gain	Setting range: 0–60000 [2000]
PE.14 Excitation adjustment integral gain	Setting range: 0–60000 [1300]
PE.15 Torque adjustment proportional gain	Setting range: 0–60000 [2000]
PE.16 Torque adjustment integral gain	Setting range: 0–60000 [1300]

Notes:

These are current loop PI parameters for vector control. These parameters are automatically obtained through "Asynchronous motor complete auto-tuning" or "Synchronous motor no-load auto-tuning", and need not be modified.

The dimension of the current loop integral regulator is integral gain rather than integral time.

Note that too large current loop PI gain may lead to oscillation of the entire control loop. Therefore, when current oscillation or torque fluctuation is great, manually decrease the proportional gain or integral gain here.

PE.20 Maximum output voltage factor	Setting range: 100-110% [105%]

Notes:

The maximum output voltage factor meaning the inverter maximum output voltage improving capacity,increase PE.20 can improve motor weak magnetic fileds maximum load capacity.But motor current wave increase,and motor calorific value increase; or reducing PE.20 can lower the motor weak magnetic fileds maximum load capacity,motor current wave and motor calorific value, as usual no need adjust.

PE.21 Maximum torque coefficient of weak magnetic fields	Setting range: 50-200% [100%]

Notes:

This parameter only takes effect when the motor is running above the rated frequency. When the motor needs to accelerate rapidly to over 2 times the rated frequency of the motor and the actual acceleration time is long, appropriately reduce PE.21; When the speed drop of the motor is significant after loading at twice the rated frequency, an appropriate increase of PE.21 is required, and generally there is no need to change it.

5.16 Operation Panel and Display(Group PH)

PH.01 MJOG Key function selection	Setting range: 0-4 [0]

Notes:

MJOG key refers to multifunctional key. You can set the function of the MJOG key by using this parameter. You can perform switchover by using this key both in stop or running state.

• 0: This key is disabled.

• 1: Switchover between operation panel control and remote command control (terminal or communication)

You can perform switchover from the current command source to the operation panel control (local operation). If the current command source is operation panel control, this key is invalid.

• 2: Switchover between forward rotation and reverse rotation

You can change the direction of the frequency reference by using the MF.K key. It is valid only when the current command source is operation panel control.

• 3: Forward MJOG

You can perform forward FJOG by using the MJOG key.

• 4: Reverse MJOG

You can perform reverse RJOG by using the MJOG key.

PH.02 STOP/RESET key function	Setting range: 0-1 [1]
PH.03 LED display running parameters 1	Setting range: 0000-FFFF [1F]

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10
PID Setting	Load Speed	Length Value	Count Value	Reserved	AI2 Voltage
BIT9	BIT8	BIT7	BIT6	BIT5	BIT4
AI1 Voltage	DO Output Status	X Input Status	Output Torque	Output Power	Output Current
BIT3	BIT2	BIT1	BIT0		
Output Voltage	Bus voltage	Setting frequency(KHz)	Running Frequency		

If a parameter needs to be displayed during the running, set the corresponding bit to 1, and set PH.03 to the hexadecimal equivalent of this binary number.

PH.04 LED display running parameters 2	Setting range: 0000-FFFF [0]

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10
Auxiliary frequency DO display (Hz)	Main frequency X display (Hz)	Encoder feedback speed (Hz)	Communication setting value	X5 Pulse setting frequency (Hz)	Current running time(Minute)
BIT9	BIT8	BIT7	BIT6	BIT5	BIT4

Current power-on time (Hour)	Linear speed	Reserved	VCC voltage before correction	AI1 voltage before correction	Remaining Running time
BIT3	BIT2	BIT1	BIT0		
Running frequency 2	X5 Pulse setting frequency (kHz)	PLC Stage	PID feedback		

If a parameter needs to be displayed during the running, set the corresponding bit to 1, and set PH.03 to the hexadecimal equivalent of this binary number

These two parameters are used to set the parameters that can be viewed when the AC drive is in the running state. You can view a maximum of 32 running state parameters that are displayed from the lowest bit of PH.03.

PH.05 LED display stop parameters	Setting range: 0000-FFFF [0]

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10
Reserved	Reserved	Reserved	X5Pulse setting frequency KHz	PID setting	Load speed
BIT9	BIT8	BIT7	BIT6	BIT5	BIT4
PLC stage	Length value	Countvalue	Reserved)	AI2 voltage (V)	AI1 voltage (V)
BIT3	BIT2	BIT1	BIT0		
Youtput status	Diinput status	Bus voltage(V)	Setfrequency (Hz)		

PH.07Heatsink temperature of inverter module	Setting range: -20~100°C [-]

Notes:

It is used to display the insulated gate bipolar transistor (IGBT) temperature of the inverter module, and the IGBT overheat protection value of the inverter module depends on the model.

PH.09 Accumulative running time	Setting range: 0–65535 h[-]

PH.10 Product number	Setting range: [-]
PH.11 Software version	Setting range: [-]

PH.12 Number of decimal places for load speed display	21

Notes:

1st digit : C0.14 Number of decimal points
0: 0 decimal place
1: 1 decimal place
2: 2 decimal places
3: 3 decimal places
2nd digit: C0.19/C0.29 Number of decimal points
1: 1 decimal place
2: 2 decimal places

PH.12 is used to set the number of decimal places for load speed display. The following gives an example to explain how to calculate the load speed:

Assume that PH.06 (Load speed display coefficient) is 2.000 and PH.12 is 2 (2 decimal places). When the running frequency of the AC drive is 40.00 Hz, the load speed is 40.00 x 2.000 = 80.00 (display of 2 decimal places).

If the AC drive is in the stop state, the load speed is the speed corresponding to the set frequency, namely, "set load speed". If the set frequency is 50.00 Hz, the load speed in the stop state is 50.00 x 2.000 = 100.00 (display of 2 decimal places).

PH.13 Accumulative power-on time	Setting range: 0–65535 h [0]

Notes:

It is used to display the accumulative power-on time of the AC drive since the delivery. If the time reaches the set power-on time (P5.17), the terminal with the digital output function 24 becomes ON.

PH.14 Accumulative power consumption	Setting range: 0–65535 kWh [0]
PH.15 Non standard version number	Setting range: [-]

5.17 Control Optimization Parameters(Group PL)

PL.00 DPWM switchover frequency upper limit	Setting range: 5.00–P0.10 Hz [8.00Hz]

Notes:

Adjusting this parameter to the maximum frequency can reduce motor noise.

PL.01 PWM modulation mode	Setting range: 0–1 [0]

Notes:

0: Asynchronous modulation 1: Synchronous modulation

Synchronous modulation indicates that the carrier frequency varies linearly with the change of the output frequency, ensuring that the ratio of carrier frequency to output frequency remains unchanged. Synchronous modulation is generally used at high output frequency, which helps improve the output voltage quality.

At low output frequency (100 Hz or lower), synchronous modulation is not required. This is because asynchronous modulation is preferred when the ratio of carrier frequency to output frequency is high.

Synchronous modulation takes effect only when the running frequency is higher than 85 Hz. If the frequency is lower than 85 Hz, asynchronous modulation is always used.

PL.02 Dead zone compensation mode selection	Setting range: 0–1 [1]

Notes:

0: no compensation 1: compensation

Generally, you need not modify this parameter. Try to use a different compensation mode only when there is special requirement on the output voltage waveform quality or oscillation occurs on the motor.

PL.03 Random PWM depth	Setting range: 0-10[0]

Notes:

0: Random PWM invalid 1~10: PWM carrier frequency random depth

Changing the random depth of PWM carrier frequency can affect motor operating noise and harmonic current.

PL.04 Rapid current limit	Setting range: 0–1 [1]

Notes:

0: Disabled 1: Enabled

When enabled, the output current is quickly limited by adjusting the PWM pulse width in real-time.

However, long-time rapid current limit may cause the AC drive to overheat, which is not allowed. In this case, the AC drive will report CBC, indicating the AC drive is overloaded and needs to stop.

PL.06 Under-voltage point setting	Setting range: 200–2000 [Model dependent]

Notes:

It is used to set the undervoltage threshold of Uu1. The undervoltage threshold 100% of the AC drive of different voltage classes corresponds to different nominal values, as listed in the following table.

Table 6-11 Under-voltage thresholds for different voltage classes

Voltage Class	Nominal Value of Undervoltage threshold
Single-phase 220 V	200 V
Three-phase 220 V	200 V
Three-phase 380 V	350 V

PL.09 Overvoltage point setting	Setting range: 200.0–2200.0V[Model dependent]

Notes:

It is used to set the overvoltage threshold of the AC drive. The default values of different voltage classes are listed in the following table.

Table 6-12 Overvoltage thresholds for different voltage classes

Voltage Class	Default Overvoltage Threshold
Single-phase 220 V	400.0 V
Three-phase 220 V	400.0 V
Three-phase 380 V	810.0 V

Setting this parameter can change the bus voltage value for overvoltage alarms. Do not easily change the default values, unreasonable setting values may cause abnormal operation.

5.18 User Password and Parameter Management(Group PP)

PP.00 User password	Setting range: 0–65535[0]

Notes:

If it is set to any non-zero number, the password protection function is enabled. After a password has been set and taken effect, you must enter the correct password in

order to enter the menu. If the entered password is incorrect you cannot view or modify parameters.

If PP.00 is set to 00000, the previously set user password is cleared, and the password protection function is disabled.

PP.01 Restore default settings	Setting range: 0/1/2/4/501[0]

Notes:

0: No operation 1: Restore factory settings except motor parameters

2: Clear records

•1: Restore default settings except motor parameters

If PP.01 is set to 1, most function codes are restored to the default settings except motor parameters, frequency reference resolution (P0.22), fault records, accumulative running time (PH.09), accumulative power-on time (PH.13) and accumulative power consumption (PH.14).

•2: Clear records

If PP.01 is set to 2, the fault records, accumulative running time (PH.09), accumulative power-on time (PH.13) and accumulative power consumption (PH.14) are cleared.

If PP.01 is set to 501, the previous backup user parameters are restored.

PP.03	Menu display mode	0:Standard menu 1:Check mode menu	0	☆	0x6203

0: Standard menu 1:Check mode menu

Notes:

When PP.03 it set to, the display enters the check memu mode .In this mode,you can view and modify each modified funtion code by the knob adjustment and the remaining unmodified function codes will not be display unless you change the setting to 0 again.

PP.04 Parameter modification property	Setting range: 0-1[0]
0: Modifiable	1: Not modifiable

Notes:

It is used to set whether the parameters are modifiable to avoid mal-function. If it is set to 0, all parameters are modifiable. If it is set to 1, all parameters can only be viewed.

5.19 AI/AO Correction(Group A0)

A0.00 AI1 measured voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
A0.01 AI1 displayed voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
A0.02 AI1 measured voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
A0.03 AI1 displayed voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
A0.04 AI2 measured voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
A0.05 AI2 displayed voltage 1	Setting range: 0.500–4.000 V[Factory-corrected]
A0.06 AI2 measured voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
A0.07 AI2 displayed voltage 2	Setting range: -9.999–10.000 V [Factory-corrected]

Notes:

These parameters are used to correct the AI to eliminate the impact of AI zero offset and gain.

They have been corrected upon delivery. When you resume the factory values, these parameters will be restored to the factory-corrected values. Generally, you need not perform correction in the applications

Measured voltage indicates the actual output voltage value measured by instruments such as the multimeter. Displayed voltage indicates the voltage display value sampled by the AC drive. For details, refer to C0.21,and C0-22

During correction, send two voltage values to each AI terminal, and save the measured values and displayed values to the function codes A0.00 to A0.11. Then the AC drive will automatically perform AI zero offset and gain correction.

If the input voltage and the actual voltage sampled by the AC drive are inconsistent, perform correction on site. Take AI1 as an example. The on-site correction is as follows:

1) Send a voltage signal (approximately 2 V) to AI1.

2) Measure the AI1 voltage and save it to A0.00.

3) View the displayed value of C0.21 and save the value to A0.01.

4) Send a voltage signal (approximately 8 V) to AI1.

5) Measure AI1 voltage and save it to A0.02.

6) View the displayed value of C0.21 and save the value to A0.03.

At correction of AI2, the actually sampled voltage is respectively queried in C0.22.

For AI1 and AI2, 2 V and 8 V are suggested as the correction voltages.

A0.12 AO1 target voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
A0.13 AO1 measured voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
A0.14 AO1 target voltage 2	Setting range: 6.000–.999 V [Factory-corrected]
A0.15 AO1 measured voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
A0.20 AI2 measured current 1	Setting range: 0.000–20.000 mA [Factory-corrected]
A0.21 AI2 sampling current 1	Setting range: 0.000–20.000 mA [Factory-corrected]
A0.22 AI2 measured current 2	Setting range: 0.000–20.000 mA [Factory-corrected]
A0.23 AI2 sampling current 2	Setting range: 0.000–20.000 mA[Factory-corrected]
A0.24 AO1 ideal current 1	Setting range: 0.000–20.000 mA [Factory-corrected]
A0.25 AO1 sampling current 1	Setting range: 0.000–20.000 mA [Factory-corrected]
A0.26 AO1 ideal current 2	Setting range: 0.000–20.000 mA [Factory-corrected]
A0.27 AO1 sampling current 2	Setting range: 0.000–20.000 mA [Factory-corrected]

Notes:

These parameters are used to correct the AO.

They have been corrected upon delivery. When you resume the factory values, these parameters will be restored to the factory-corrected values. You need not perform correction in the applications.

Target voltage indicates the theoretical output voltage of the AC drive. Measured voltage indicates the actual output voltage value measured by instruments such as the multimeter.

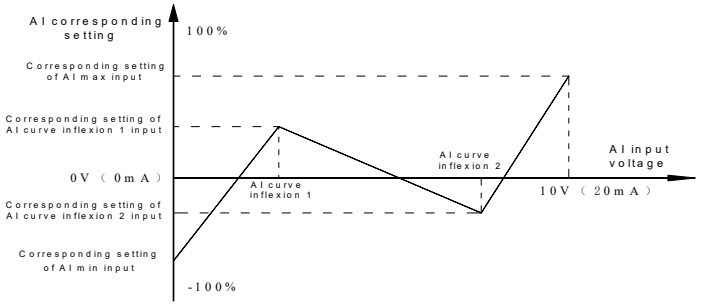
5.20 AI Curve Setting(Group A1)

A1.00 AI curve 4 minimum input	Setting range: -10.00 V to A1.02

	[0.00V]
A1.01 Corresponding setting of AI curve 4 minimum input	Setting range: -100.0%–100.0% [0.0%]
A1.02 AI curve 4 inflexion 1 input	Setting range: A1.00 to A1.04 [3.00V]
A1.03 Corresponding setting of AI curve 4 inflexion 1 input	Setting range: -100.0%–100.0% [30.0%]
A1.04 AI curve 4 inflexion 1 input	Setting range: A6.02 to A6.06 [6.00V]
A1.05 Corresponding setting of AI curve 4 inflexion 1 input	Setting range: -100.0%–100.0% [60.0%]
A1.06 AI curve 4 maximum input	Setting range: A1.06 to 10.00 V [10.00V]
A1.07 Corresponding setting of AI curve 4 maximum input	Setting range: -100.0%–100.0% [100.0%]
A1.08 AI curve 5 minimum input	Setting range: -10.00 V to A1.10 [0.00V]
A1.09 Corresponding setting of AI curve 5 minimum input	Setting range: -100.0%–100.0% [0.00%]
A1.10 AI curve 5 inflexion 1 input	Setting range: A1.08 to A1.12 [3.00V]
A1.11 Corresponding setting of AI curve 5 inflexion 1 input	Setting range: -100.0%–100.0%[30.0%]
A1.12 AI curve 5 inflexion 1 input	Setting range: A1.10 to A1.14 [3.00V]
A1.13 Corresponding setting of AI curve 5 inflexion 1 input	Setting range: -100.0%–100.0% [60.0%]
A1.14 AI curve 5 maximum input	Setting range: A1.12 to 10.00 V [10.0V]
A1.15 Corresponding setting of AI curve 5 maximum input	Setting range: -100.0%–100.0% [100.0%]

Notes:

The function of curve 4 and curve 5 is similar to that curve 1 to curve 3, but curve 1 to curve 3 are lines, and curve 4 and curve 5 are 4-point curves, implementing more flexible corresponding relationship. The schematic diagram of curve 4 and curve 5 is shown in the following figure.



When setting curve 4 and curve 5, note that the curve's minimum input voltage, inflexion 1 voltage, inflexion 2 voltage and maximum voltage must be in increment order.

P2.33 (AI curve selection) is used to select curve for AI1 to AI2.

A1.24 Jump point of AI1 input correspondingsetting	Setting range: -100.0%–100.0% [0.0%]
A1.25 Jump amplitude of AI1 input corresponding setting	Setting range: 0.0%–100.0% [0.5%]
A1.26 Jump point of AI2 input corresponding setting	Setting range: -100.0%–100.0% [0.0%]
A1.27 Jump amplitude of AI2 input corresponding setting	Setting range: 0.0%–100.0% [0.5%]

Notes:

The AI terminals (AI1 to AI2) all support the corresponding setting jump function, which fixes the AI input corresponding setting at the jump point when AI input corresponding setting jumps around the jump range.

For example, AI1 input voltage jumps around 5.00V and the jump range is 4.90–5.10 V. AI1 minimum input 0.00 V corresponds to 0.0% and maximum input 10.00 V corresponds to 100.0%. The detected AI1 input corresponding setting varies between 49.0% and 51.0%.

If you set A1.16 to 50.0% and A1.17 to 1.0%, then the obtained AI1 input corresponding setting is fixed to 50.0%, eliminating the fluctuation effect.

5.21 Monitoring Parameters(Group C0)

Group C0 is used to monitor the AC drive's running state. You can view the parameter values by using operation panel, convenient for on-site commissioning, or from the host computer by means of communication (address: 0x7000-0x7044).

C0.00 to C0.31 are the monitoring parameters in the running and stop state defined by PH.03 and PH.04. For more details, see Table

C0.00 Running frequency	Setting range: 0.00–500Hz
C0.01 Set frequency	Setting range: 0.00–500Hz

Notes:

These two parameters display the absolute value of theoretical running frequency and set frequency. For the actual output frequency of the AC drive, see C0.19.

C0.02 Bus voltage	Setting range: 0.0–3000.0 V

Notes:

It displays the AC drive's bus voltage.

C0.03 Output voltage	Setting range: 0–1140 V

Notes:

It displays the AC drive's output voltage in the running state.

C0.04 Output current	Setting range: 0.00–655.35 A (AC drive power ≤ 55 kW) 0.0–6553.5 A (AC drive power > 55 kW)

Notes:

It displays the AC drive's output current in the running state.

C0.05 Output power	Setting range: 0–32767

Notes:

It displays the AC drive's output power in the running state

C0.06 Output torque	Setting range: -200.0%–200.0%

Notes:

It displays the AC drive's output torque in the running state.

C0.07 X terminal state	Setting range: 0–32767

Notes:

It displays the current state of X terminals. After the value is converted into a binary number, each bit corresponds to a X. "1" indicates high level signal, and "0" indicates low level signal. The corresponding relationship between bits and Xs is described in the following table.

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit8	Bit9
X1	X2	X3	X4	X5	/	/	/	/	//
Bit10	Bit11	Bit12	Bit13	Bit10	Bit11	Bit12	Bit13	Bit14	Bit15
/	/	/	/	/	/	/	/	/	/

C0.08 DO state	Setting range:0–1023

Notes:

It indicates the current state of DO terminals. After the value is converted into a binary number, each bit corresponds to a DO. "1" indicates high level signal, and "0" indicates low level signal. The corresponding relationship between bits and Ys is described in the following table.

Corresponding relationship between bits and Ys

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5
DO	Relay 1				
Bit6	Bit7	Bit8	Bit9	Bit10	Bit11

C0.10 AI2 voltage (V)/current (mA)	Setting range: 0.00–10.57 V 0.00–20.00 mA

Notes:

When P2.40 is set to 0, AI2 sampling data is displayed in the unit of V.

When P2.40 is set to 1, AI2 sampling data is displayed in the unit of mA.

C0.14 Load speed	Setting range: 0–65535

Notes:

For more details, see the description of PH.12.

C0.15 PID setting	Setting range: 0–65535
C0.16 PID feedback	Setting range: 0–65535

Notes:

They display the PID setting value and PID feedback value.

•PID setting = PID setting (percentage) x P6.04

•PID feedback = PID feedback (percentage) x P6.04

C0.18 X5 Input pulse frequency	Setting range: 0.00–100.00 kHz

Notes:

It displays the high-speed pulse sampled frequency of X5, in minimum unit of 0.01 kHz.

C0.19 Feedback speed	Setting range: -320.00–320.00Hz -500.0–500.0 Hz

Notes:

It displays the actual output frequency of the AC drive.

•If P0.22 (Frequency reference resolution) is set to 1, the display range is -3200.00– 3200.00 Hz.

•If P0.22 (Frequency reference resolution) is set to 2, the display range is -5000.00Hz– 500.00 Hz

C0.20 Remaining running time	Setting range: 0.0–6500.0 min

Notes:

It displays the remaining running time when the timing operation is enabled. For details on timing operation, refer to P5.42 to P5.44.

C0.21 AI1 voltage before correction	0.00–10.57 V
C0.22 AI2 voltage/current before correction	0.00–10.57 V/0.00–20.00 mA

Notes:

They display the AI sampleding voltage/current value of AI. The actually used voltage/ current is obtained after linear correction to reduce the deviation between the sampled voltage/current and the actual input voltage/current.

For actual corrected voltage, see C0.09 and C0.10. Refer to group AC for the correction mode.

C0.24 linear velocity	Setting range: 0–65535 m/min

Notes:

It displays the linear speed of the X5 high-speed pulse sampling. The unit is meter/minute. The linear speed is obtained according to the actual number of pulses sampled per minute and PB.07 (Number of pulses per meter).

C0.27 Pulse input frequency	Setting range: 0–65535 Hz

Notes:

It displays the X5 high-speed pulse sampling frequency, in minimum unit of 1 Hz. It is the same as U0.18, except for the difference in units.

C0.28 Communication setting value	Setting range: -100.00%–100.00%

Notes:

It displays the data written by means of the communication address 0x1000.

C0.30 Main frequency X	Setting range: 0.00–500.00 Hz
C0.31 Auxiliary frequency Y	Setting range: 0.00–500.00 Hz

C0.35 Target torque	Setting range:-200.0%–200.0%

Notes:

It displays the current torque upper limit.

C0.39 Target voltage upon V/F separation	Setting range: 0 V to rated motor voltage
C0.40 Output voltage upon V/F separation	Setting range: 0 V to rated motor voltage

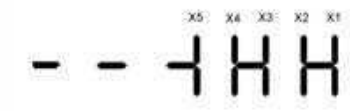
Notes:

They display the target output voltage and current actual output voltage in the V/F separation state. For V/F separation, see the descriptions of group P9

C0.41 X terminals state visual display	Setting range: -

Notes:

It displays the X terminals state visually and the display format is shown in the following figure.



C0.42 DO state visual display	Setting range: -

Notes:

It display the DO state visually and the display format is shown in the following figure.

C0.43 X function state visual display 1	Setting range: -

Notes:

It displays whether the X functions 1-40 are valid. The operation panel has five 7-segment LEDs and each 7-segment LED displays the selection of eight functions. The 7-segment LED is defined in the following figure.

X function display, on indicates valid, off indicates invalid

the 7-segment LED display functions 1-8, 9-16, 17-24, 25-32 and 33-40 respectively from right to left.

C0.59 Current set frequency	Setting range: -100.00%–100.00%
C0.60 Current running frequency	Setting range: -100.00%–100.00%

Notes:

It displays the current set frequency and running frequency. 100.00% corresponds to the AC drive's maximum frequency (P0.10).

C0.61 AC drive running state	Setting range: -100.00%–100.00%

It displays the running state of the AC drive. The data format is listed in the following table:

C0.61	Bit0	0: Stop 1: Forward 2: Reverse
	Bit1	
	Bi2	0:Constant 1:Accelerate 2: Decelerate
	Bit3	
	Bit4	0: Bus voltage normal 1: Undervoltage

C0.62 Current fault code	Setting range: 0–99

Notes:

It displays the current fault code.

C0.65 Torque upper limit	Setting range: -200.00%–200.00%

Notes:

It displays the current setting torque upper limit.

C0.67 Communication expand	Setting range: -
C0.73 Motor NO	Setting range: 0: Motor 1 /1: Motor 2
C0.74 AC drive output torque	Setting range: -300.00%–300.00%

Chapter 6 Troubleshooting

6.1 Troubleshooting

When the inverter has detected a fault, the keypad will display the fault code, and the inverter will stop PWM output and come into fault protection state. In the fault indicator TRIP will flicker, the fault relay has output and the motor will coast to stop. At this time, you should find the reason of fault and apply corrective actions. If the listed troubleshooting cannot solve the problem, please contact our company directly. After debugging, you can press “STOP/RESET” or reset external terminals to restart the inverter. Notes: the inverter can’t startup even through debugging has been finished if operating signal isn’t removed. You should cut operating signal first and then close again or remove main circuit power supply once to make the fault reset. If the SC fault appeared, the reset is only permitted after 10 seconds.

Table 6-1 Troubleshooting

Fault Name	Display	Possible Causes	Solutions
Over-current during acceleration	oC1	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The acceleration time is too short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during acceleration. 8: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the acceleration time. 4: Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6: Select rotational speed tracking restart or start the motor after it stops. 7: Remove the added load. 8: Select an AC drive of higher power class.

Fault Name	Display	Possible Causes	Solutions
Overcurrent during deceleration	oC2	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The deceleration time is too short. 4: The voltage is too low. 5: A sudden load is added during deceleration. 6: The braking unit and braking resistor are not installed.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor.
Overcurrent at constant speed	oC3	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The voltage is too low. 4: A sudden load is added during operation. 5: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Select an AC drive of higher power class.
Overvoltage during acceleration	ou1	1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor.

Fault Name	Display	Possible Causes	Solutions
Overvoltage during deceleration	ou2	1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor. 3: Increase the deceleration time. 4: Install the braking unit and braking resistor.
Overvoltage at constant speed	ou3	1: The input voltage is too high. 2: An external force drives the motor during deceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.
Control power supply fault	uUc	The input voltage is not within the allowable range.	Adjust the input voltage to the allowable range
Under-voltage	Uu1	1: Instantaneous power failure occurs on the input power supply. 2: The AC drive's input voltage is not within the allowable range. 3: The bus voltage is abnormal. 4: The rectifier bridge and buffer resistor are faulty. 5: The drive board is faulty. 6: The main control board is faulty.	1: Reset the fault. 2: Adjust the voltage to normal range. 3: Contact the agent or our company

Fault Name	Display	Possible Causes	Solutions
AC drive overload	oL2	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
Motor overload	oL1	1: PB-01 is set improperly. 2: The load is too heavy or locked-rotor occurs on the motor.3: The AC drive model is of too small power class.	1: Set PB-01 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3: Select an AC drive of higher power class
Power input phase loss	SPI	1: The three-phase power input is abnormal. 2: The drive board is faulty. 3: The lightening board is faulty. 4: The main control board is faulty.	1: Eliminate external faults. 2: Contact the agent or our company
Power output phase loss	SPO	1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase outputs are unbalanced when the motor is running. 3: The drive board is faulty. 4: The module is faulty.	1: Eliminate external faults. 2: Check whether the motor three-phase winding is normal. 3: Contact the agent or our company

Fault Name	Display	Possible Causes	Solutions
Module overheat	oH1	1: The ambient temperature is too high. 2: The air filter is blocked. 3: The fan is damaged. 4: The thermally sensitive resistor of the module is damaged. 5: The inverter module is damaged.	1: Lower the ambient temperature. 2: Clean the air filter. 3: Replace the damaged fan. 4: Replace the damaged thermally sensitive resistor. 5: Replace the inverter module.
External equipment fault	EFI	1: External fault signal is input via X. 2: External fault signal is input via virtual I/O.	Reset the operation.
Communication fault	CCF	1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: P0-28 is set improperly. 4: The communication parameters in group PD are set improperly.	1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set P0-28 correctly. 4: Set the communication parameters properly.
Contactor fault	uU3	1: The drive board and power supply are faulty. 2: The contactor is faulty.	1: Replace the faulty drive board or power supply board. 2: Replace the faulty contactor.

Fault Name	Display	Possible Causes	Solutions
Current detection fault	HEF	1: The HALL device is faulty. 2: The drive board is faulty.	1: Replace the faulty HALL device. 2: Replace the faulty drive board.
Motor auto-tuning fault	tunF	1: The motor parameters are not set according to the nameplate. 2: The motor auto-tuning times out.	1: Set the motor parameters according to the nameplate properly. 2: Check the cable connecting the AC drive and the motor.
EEPROM read-write fault	EEF	The EEPROM chip is damaged.	Replace the main control board.
AC drive hardware fault	IPF	1: Overvoltage exists. 2: Overcurrent exists.	1: Handle based on overvoltage. 2: Handle based on overcurrent.
Short circuit to ground	GF	The motor is short circuited to the ground.	Replace the cable or motor.
Accumulative running time reached	tIE0	The accumulative running time reaches the setting value.	Clear the record through the parameter initialization function.
User-defined fault 1	udE1	1: The user-defined fault 1 signal is input via X.terminal 2: User-defined fault 1 signal is input via virtual I/O.	Reset the operation.
User-defined fault 2	udE2	1: The user-defined fault 2 signal is input via X terminal 2: The user-defined fault 2 signal is input via virtual I/O.	Reset the operation.

Fault Name	Display	Possible Causes	Solutions
Accumulative power-on time reached	tIE2	The accumulative power-on time reaches the setting value.	Clear the record through the parameter initialization function.
Load becoming 0	LoFF	The AC drive running current is lower than PB-64.	Check that the load is disconnected or the setting of PB-64 and PB-65 is correct.
PID feedback lost during running	PId1	The PID feedback is lower than the setting of P6-26.	Check the PID feedback signal or set P6-26 to a proper value.
Pulse-by-pulse current limit fault	cbc	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
Motor switchover fault during running	LSF	Change the selection of the motor via terminal during running of the AC drive	Perform motor switchover after the AC drive stops.
Too large speed deviation	oSE	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed.3: PB-69 and PB-70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto-tuning.3: Set PB-69 and PB-70 correctly based on the actual situation.

Fault Name	Display	Possible Causes	Solutions
Motor over-speed	oSF	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed.3: PB-69 and PB-70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto-tuning.3: Set PB-69 and PB-70 correctly based on the actual situation.
Motor overheat	oH2	1: The cabling of the temperature sensor becomes loose. 2: The motor temperature is too high.	1: Check the temperature sensor cabling and eliminate the cabling fault. 2: Lower the carrier frequency or adopt other heat radiation measures.
Brake pipe protection fault	brF	Brake resistance be shorted or brake moudle abnormal	Check the brake resistance or Contact the agent or company for technical support

6.2 Common Faults and Solutions

You may come across the following faults during the use of the AC drive. Refer to the following table for simple fault analysis

Troubleshooting to common faults of the AC drive

SN	Fault	Possible Causes	Solutions
1	There is no display at power-on.	1: There is no power supply to the AC drive or the power input to the AC drive is too low. 2: The power supply of the switch on the drive board of the AC drive is faulty. 3: The rectifier bridge is damaged. 4: The control board or the operation panel is faulty. 5: The cable connecting the control board and the drive board and the operation panel breaks.	1: Check the power supply. 2: Check the bus voltage. 3: Re-connect the 8-core and 28-core cables. 4: Contact the agent or company for technical support.
2	“--A-1” is displayed at power-on.	1: The cable between the drive board and the control board is in poor contact. 2: Related components on the control board are damaged. 3: The motor or the motor cable is short circuited to the ground. 4: The HALL device is faulty. 5: The power input to the AC drive is too low.	1: Re-connect the 8-core and 28-core cables. 2: Contact the agent or company for technical support.
3	“GF” is displayed at power-on.	1: The motor or the motor output cable is short-circuited to the ground. 2: The AC drive is damaged.	1: Measure the insulation of the motor and the output cable with a megger. 2: Contact the agent or company for technical support.

SN	Fault	Possible Causes	Solutions
4	The AC drive display is normal upon power-on. But “--A-1” is displayed after running and stops immediately.	1:The cooling fan is damaged or locked-rotor occurs. 2: The external control terminal cable is short circuited.	1: Replace the damaged fan. 2: Eliminate external fault.
5	oH1 (module overheat) fault is reported frequently.	1: The setting of carrier frequency is too high. 2: The cooling fan is damaged, or the air filter is blocked. 3: Components inside the AC drive are damaged (thermal coupler or others).	1: Reduce the carrier frequency (P0-15). 2: Replace the fan and clean the air filter. 3: Contact the agent or company for technical support.

Chapter 7 Peripheral Equipment

7.1 Peripheral Equipment Connection Diagrams

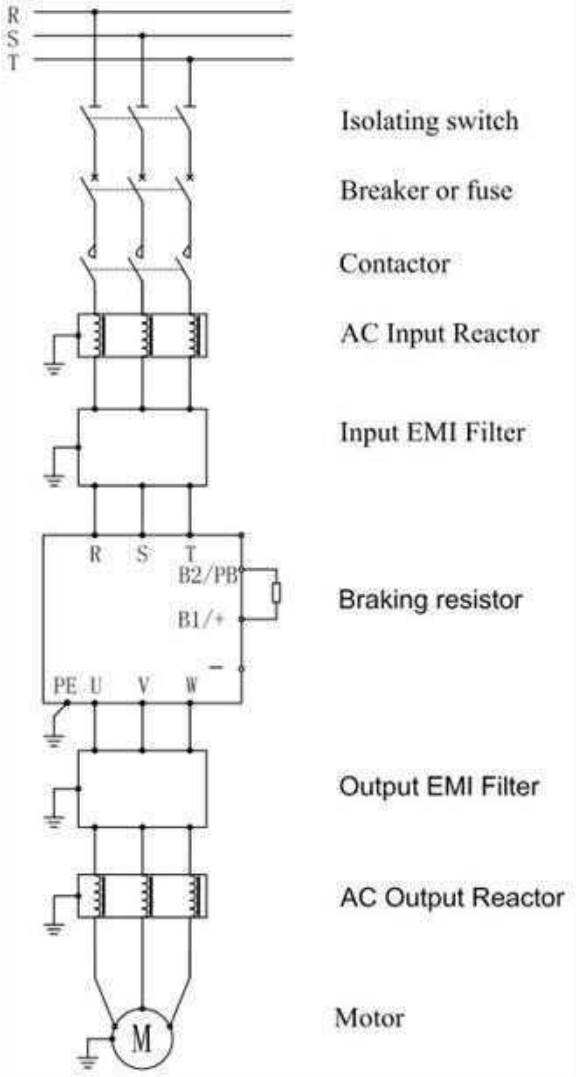


Figure 7-1 Peripheral Equipment Connection Diagram

7.2 Function of Peripheral Equipment

Table 7-1 Function of Peripheral Equipment

Peripheral Equipment & Optional parts	Description
Breaker	It is used to cut off the fault current of the inverter rapidly and prevent the power fault caused by fault with the inverter and its circuits.
Contactor	It is used to cut off the main power supply at the time of inverter fault and prevent power failure & restarting after the fault
* AC Reactor	It is used to improve the input power factor, reduce the higher harmonic and inhibit the power surge
*EMI Filter	It is used reduce the radio disturbance caused by the inverter. When the wiring distance between the motor and the inverter is less than 20m, it is suggested to be connected to the power supply side; when the distance is over 20m, is suggested to be connected at the output side.
* Braking Unit and Braking resistor	They are selected and used when the braking torque cannot meet the requirements, and are applicable on occasions of high-inertia load & frequent braking or rapid stop.

Remarks: *-marked items are optional parts.

7.2.1 AC Input Reactor

Using AC input reactor can restrain higher harmonic wave and improve power factor obviously. In the following situation, users are advised to use ac reactor.

- Power supply capacity: Inverter capacity>10: 1
- Silicon controlled load and switching controlled power factor compensator are on the same power supply line.
- Degree of three-phase voltage imbalance is more than 3%

7.2.2 Braking Unit and Braking resistor

Brake units are in-built in this series of inverters whose power rating is 15kW and below. When dynamic braking is required, the user just has to connect the braking resistor. The inverter whose power rating is from 18.5kw to 93kw can equip with braking unit..There are not in-built brake units with the inverters of 110kW and above. When the dynamic braking is required, the additional braking unit should be connected. The braking unit consists of the control part, the driving part and the discharging resistance. The control part should be adjusted according to the overvoltage protection action values for this series of inverters. If the discharging resistance part is provided

with the overheating protection, it is suggested that the controlling connection point be connected to the main control circuit.

Refer to the following table for common braking resistors specifications.

Table 7-2 Motor power and brake resistor selection

Voltage (V)	Motor Power (kW)	Resistance Value (Ω)	Resistance Power (kW)
Single- phase 220V	0.4	200	0.1
	0.75	150	0.2
	1.5	100	0.4
	2.2	75	0.5
Three- phase 380V	0.75	300	0.4
	1.5	300	0.4
	2.2	200	0.5
	4	200	0.5

At braking, the regenerated energy of motor is almost consumed on the braking resistor. The braking power can be calculated according to the following formula:

$$U * U / R = Pb$$

In the formula, R is the value of selected braking resistor, U is the braking voltage at stable braking of the system (it varies with different systems; for the 380VAC system, it is generally taken as 700V), and Pb is the braking power. Theoretically, the power of braking resistor is the same with the braking power, but generally 70% of it will be used. Power required by the braking resistor can be calculated according to the following formula:

$$0.7 * Pr = Pb * D$$

In the formula, Pr is power of the braking resistor, and D is the braking frequency (proportion of the regeneration process in the whole working process), which can be selected according to the following table:

Table 7-3 Reference for Braking Frequency

Application Occasion	Elevator	Uncoiling & Coil Taking	Centrifuge	AAI2dental Braking Load	General Application
Braking Frequency	20%~30%	20~30%	50%~60%	5%	10%

7.2.3 Leakage Protector

There is direct earth safety capacitor or distributed capacitor inside the inverter, the motor and with the input & output lead wires. At the same time this series of inverters is of low-noise type, and the higher carrier wave is used. Thus, the earth leakage current of the inverter is large, which is more obvious for the large capacity inverters. Sometimes, it may cause mistaken action of the leakage protection circuit.

In the above cases, not only the carrier frequency should be reduced appropriately, the lead wire should be shortened and the output reactor as well as the leakage protector should be installed. When the protector is installed, attention should be paid to the following points:

The leakage protector should be installed at the input side of inverter and had better behind the breaker.

The leakage protector functioning current should be 10 times larger than the leakage current of this circuit under the fundamental frequency power supply and with the inverter unused (total leakage current of circuits, EMI filter and motor, etc).

Chapter 8 Maintenance

Danger

1. Please do not touch the terminals of inverter, which are provided with the high voltage.
   There is the danger of electric shock.
2. Before power is supplied, please do install the terminal casing well. When the casing is dismantled, please do cut off the power supply.
   There is the danger of electric shock.
3. Maintenance and inspection cannot be started until the main circuit power supply is cut off and the CHARGE LED indicator light is confirmed to go out.
   There is the danger of residual voltage on the electrolytic capacitor.
4. Non-professionals are not allowed to do the job of maintenance and inspection.
   There is the danger of electric shock.

Caution

1. As the CMOS integrated circuit is installed on the keypad panel, the control circuit board and the driving circuit board, please pay special attention when they are used. If the circuit boards are touched with the finger directly, the integrated chips on them may be damaged by the electrostatic induction.
2. Please do not change the connection lines or dismantle the terminal lines when power is supplied.
   There is the danger of electric shock.
3. Please do not check the signal during operation. Otherwise, the equipment may be damaged.

8.1 Inspection and Maintenance

Inverter is a typical product which combines the power electronics technology with the microelectronics technology. Therefore, it double features with industrial Equipment and microelectronics Equipment. The change of environment such as temperature, humidity, smog and internal components aging will cause kinds of faults to the inverter. For long time reliable operation, daily inspection and regular maintenance (at least 3 or 6 months interval) is needed.

8.1.1 Daily Inspection

Before inverter running, please check below:

- Whether there is abnormal sound or vibration with the motor;

- whether the inverter and the motor heat up abnormally;
- whether the environment temperature is too high;
- whether the load ammeter indicates the same value as usual:
- whether the cooling fan of inverter operates normally;
- Whether the braking resistor has the good earthing insulation.

The daily maintenance and inspection content is showed in Table 8-1.

Table 8-1 Content and Notice for Daily Maintenance & Inspection

No.	Inspection Item	Inspection Part	Inspection Content	Judgment Standard
1	Display	LED Monitor	Whether the display is abnormal.	Determine according to the use state (e.g. when nothing is displayed after power is supplied, the braking resistor and the earthing insulation can be checked)
2	Cooling System	Fan	Check whether it rotates flexibly, whether there is abnormal sound, and whether it is jammed by dust.	No abnormality
3	Inverter Body	Inside the Machine Case	Temperature rising, abnormal sound, peculiar smell and accumulated dust	No abnormality
4	Working Environment	Surrounding Environment	Temperature, humidity, dust and harmful gas, etc	According to Clause 2.2
5	Voltage	Input & Output Terminals	Input and output voltage	According to the technical specifications in Appendix 2
6	Load	Motor	Temperature rising, abnormal sound and vibration	No abnormality

8.1.2 Regular Maintenance

The power supply must be cut off before regular maintenance. Only after the monitor

has no display and charge LED has gone off 5~10 minutes can the maintenance begin. Otherwise, you will risk electric shock because there are storage capacitors within the inverter that will hold charge even after the input power is disconnected.
The regular maintenance contents and cautions are listed in Table 8-2.

Table 8-2 Content of Regular Maintenance & Inspection

Inspection Item	Inspection Content	Countermeasure
Screws of main circuit terminals and control circuit terminals	whether the screws are loosened	Tighten them with the screwdrivers
Heat Radiator	whether there is dust	Purge it with the 4~6kg/cm^2 dry compressed air
PCB (Printed Circuit Board)	whether there is dust	Purge it with the 4~6kg/cm^2 dry compressed air
Cooling Fan	whether it rotates flexibly, whether there is abnormal sound or vibration, and whether there is accumulated dust or blocking object	Replace the cooling fan and clear the dust & foreign objects
Power device	whether there is dust	Purge it with the 4~6kg/cm^2 dry compressed air
Electrolytic Capacitor	Check whether there is color variation, peculiar smell, bubbles and liquid leaked, etc.	Replace the electrolytic capacitor
Braking resistor	whether the earthing insulation is good	Put the braking resistor at the dry and insulated place

During the inspection, elements cannot be dismantled or shaken casually. Moreover, connectors cannot be pulled out casually. Otherwise, the inverter may not be able to run normally or may enter the fault display state. Even, components faults may be caused or the main switch device IGBT module or other elements may be damaged.
When measurement is required, it should be noted that results with great difference may be got with different instruments. It is recommended that the moving-coil voltmeter be used to measure the input voltage, the bridge voltmeter be used to measure the output voltage, clamp-on ammeter be used to measure the input & output current, and the electric wattmeter be used to measure the power. If conditions are inadequate, the same meter can be used for measurement and record should be reserved to facilitate

comparison.
If the waveform test is required, it is suggested the oscilloscope with the scanning frequency larger than 40MHz be used. When the instantaneous waveform is tested, the oscilloscope with the frequency over 100MHz should be used. Before the test, electric isolation should be done for the oscilloscope.
In the case of serious power supply asymmetry or three-phase current imbalance, it is suggested the three-wattmeter method be used to measure the power.
As the electric insulation test and the dielectric strength test have been done for the product before it leaves the factory, the users don't have to do such tests again. Moreover, such tests will reduce the insulation and voltage withstand performance of the product. If such tests are conducted inappropriately, product elements may even be damaged. If such tests have to be done really, it is suggested they be conducted by the skilled technicians.
If the main circuit voltage withstand test is to be done, the withstand voltage tester with the time & leakage current settable and the similar capacity should be used. The test may reduce the life of product. If the main circuit insulation test is to be done, the main circuit terminals R, S, T, U, V, W, PB(P1), and +etc should be short-circuited reliably and then the meg-ohmmeter with the near voltage grade (250V for 220V, 500V for 380V) should be used for measurement. The control circuit should be measured with the resistance shift of the universal meter instead of the meg-ohmmeter.

For the 380V main circuit, the ground insulation resistance should not be less than 5 MΩ; for the control circuit, the ground insulation resistance should not be less than 3 MΩ.

8.1.3 Regularly-replaced Elements

To ensure the long-term and reliable operation of inverter, regular care and maintenance should be carried out for internal electronic elements of the inverter. The life of these electronic elements varies with the environment and conditions where the inverters are used. Generally, if the inverter is used continuously, the elements can be replaced according to the following table, which also depends on the using environment, load conditions and inverter state, and other specific conditions.
As showed in Table 8-3, the maintenance term is just for user's reference when it is used.

Table 8-3 Replacement Time for Wearing Elements of Inverter

Name of Element	Standard Years for Replacement
Cooling Fan	2~3 years
Electrolytic Capacitor	4~5 years
Printed Circuit Board	5~8 years

8.2 Storage and Protection

If the inverter is not used immediately after purchased and has to be stored temporarily or permanently, the following should be done:

- It should be put in the place within the specified temperature & humidity scope, without damp, dust and metal dust, and with good ventilation.
- If it is unused for over one year, the charging test should be conducted to restore the characteristics of electrolytic capacitor of the main circuit. During charging, the input voltage of the inverter should be increased to the rating value slowly with the voltage regulator. The energizing time should be at least 1~2 hours.
- The above test should be conducted at least once a year.

  The voltage withstand test cannot be conducted casually, as it will reduce the life of inverter and even damage the elements. For the insulation test, the 500V mega-ohmmeter whose insulation resistance is not less than 4 MΩ can be used.

Appendix 1 External Dimension and Installation Dimension

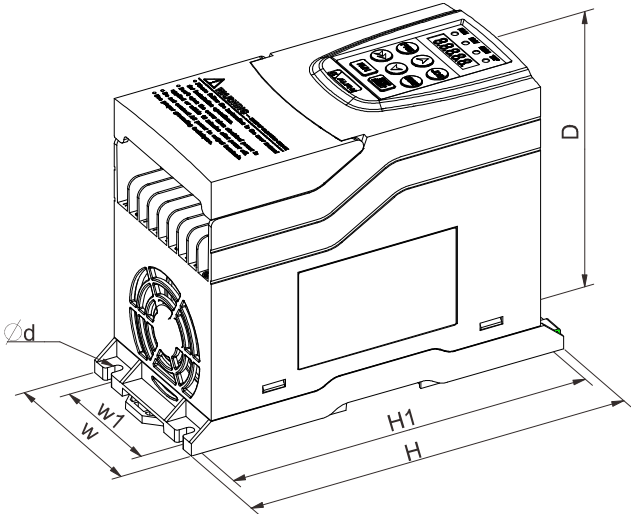


Figure A1-1 Schematic outline

Table A1-1 External Dimension (unit: mm)

	Model	H	H1	W	W1	D	d
A1	3 R75GB ~3 004GB	180	170	81	60	135	4.5
	S2 R75GB ~S22R2GB	180	170	81	60	135	4.5

Appendix 2 Technical Specifications

Inverter model information

Series	Model	Input Voltage	Power capacity (kVA)	Input current	Output current (A)	Moter power （kW）
A1	S2 R4GB	Single-phase 200V~240V 50/60Hz	1.0	5.1	2.3	0.4
	S2R75GB		1.7	9.2	4.0	0.75
	S21R5GB		2.8	13.1	7.0	1.5
	S22R2GB		4.0	23	9.6	2.2
	3R75GB	Three-phase 380Vto480V 50/60Hz	1.6	3.7	2.1	0.75
	31R5GB		3.2	5.4	3.8	1.5
	32R2GB		4.8	7.0	5.1	2.2
	3004GB		6.0	10.7	9.0	4.0

Other technical specifications

Rated Output Voltage	0~Rated input voltage
Maximum Overload Current	Type G: 150% 1minute, 180% 20s
Control Mode	V/F control, open-loop vector control
Frequency Control Scope	low frequency mode: 0.00~400.0Hz high frequency mode: 0.0~500Hz(Reserve)
Frequency Precision	digital command ±0.01％ (-10℃~+40℃) analog command ±0.01％ (25℃±10℃)
Set Frequency Resolution	digital command 0.01Hz; analog command 1/1000 maximum frequency
Output Frequency Resolution	0.01Hz
Frequency Setting Signal	0~10V, 0~20mA
Acceleration & Deceleration Time	0.1~3600s (acceleration and deceleration time are set independently)

Braking Torque	reach 125% with additional braking resistor
Voltage/Frequency Characteristic	4 types of fixed V/F characteristics are optional; any V/F characteristic can be set;
Protection Function	overvoltage, under-voltage, current limit, overcurrent, overload, electronic thermal relay, overheat, overvoltage stalling, load short circuit, earthing, under-voltage protection, input phase loss, output phase loss, earthing and interphase short circuit, and motor overload protection, etc
Ambient Environment Temperature	-10℃~+40℃
Humidity	5~95% RH (without condensation)
Storage Temperature	-40℃~+70℃
Application Site	indoors (without corrosive gas)
Installation Site	With the altitude not more than 1000m, and free of dust, corrosive gas and direct sun shining. Deration 6% per 1000 meters above 1000m.
Vibration	＜5.9m/s^2(0.6g)
Protection Class	IP20

Appendix 3 Use of MODBUS Communication

Communication Data Address Definition

Modbus-RTU communication protocol..Host computer through these communication protocols can be achieved on the inverter control, monitoring and function parameters to modify the view operation. A1 communication data can be divided into functional code data, non-functional code data, which includes running commands, operating status, operating parameters, alarm information

Function Code Data

The drive Function code data	P Grope read and write）	P0、P1、P2、P3、P4、P5、P6、P7、P8、P9、PA、PB、PC、PD、PE、PH、PL、PP
	A Grope read and write）	A0、A1
	C Grope read	C0

Function code data communication address is defined as follows:

1, when reading the function code data for communication

For P0 ~ PP, A0 ~ A1 group, The address of the higher 16 bits are functional group NO., the lower 16 bits are the NO. of function code in the functional group.

P0.16 function parameter, its communication address is 0510H, among them 05H represents the function parameter of P0 group, 10H represents the hexadecimal data format of function code No. 16 in functional group

A0.08 function parameter, its communication address is 6308H, among them 63H stands for the function parameter of A0 group, 08H is the hexadecimal data format of function code number 8 in function group

2, when writing function code data for communication

For the function code data of P0 ~ PP, the communication address is 16 bits high. According to whether to write to EEPROM, it is divided into 00 ~ 0F or P0 ~ PF. The lower 16 bits are the serial number of the function code in the function group directly.

Write function parameters P0.16, do not write to EEPROM, the communication address is 0010H; need to write to the EEPROM, the communication address P010H.

For the function code data of A0 ~ AF group, the communication address is 16 bits high. According to the need to write EEPROM, it is divided into

40 ~ 4F or A0 ~ A1, the lower 16-bit function code directly in the functional group number, for example as follows:

Write function parameters A0.08, do not need to write to the EEPROM, the communication address is 4C08H; need to write EEPROM, the communication address is AC08H.

8.2.1 A1 NON-Function Code Data

The drive Non-functio	Status data read only）	monitoring parameter group C, the AC drive fault description, the AC drive running status

n code data	Control parameter(w rite only)	Control command, communication setting value, digital output terminal control, analog output AO1 control, high-speed pulse (DO) output control, parameter initialization

1, Status data

Status data is divided into monitoring parameters grope C, AC drive fault description, inverter running status.

C group parameter monitoring parameters

The monitoring data of groupC are described in Chapter 5 and Chapter 6, and their addresses are defined as follows:

C0 ~ CF, its communication address high 16 bits are 70 ~ 7F,the low 16 bits are the serial numbers of the monitoring parameters in the group, for example :

C0.11, communication address is 700BH.

AC drive Fault description

When the communication Reads the AC drive fault description, the communication address is fixed to 8000H, the host reads the address data, then can get:

The current fault code of the AC drive and the fault code are defined in Chapter 5 PB.14 Function Code.

AC drive running status

When the communication Reads the AC drive running status, the communication address is fixed to 3000H, the host reads the address data, then can get:

The current running status of the AC drive,the definition as follows:

AC drive running status address	Read the status word definition
3000H	1:Run forward
	2:Run reverse
	3:Stop

2, Control parameters

Control parameters are divided into control commands, digital output terminal control, analog output AO1 control, analog output AO2 control, high-speed pulse output control

Control command

When P0.02 (command source) is set to 2: communication control, the host can control the related commands such as start and stop of the inverter through the

communication address. The control commands are defined as follows:

Control command address	Command function
2000H	1:Run forward
	2:Run reverse
	3:Forward jog
	4:Reverse jog
	5:Coast to stop
	6:Decelerate to stop
	7:Fault reset

3,Communication setting

Communication setting Main user A1 middle frequency source, torque upper limit source, VF separation voltage source, PID reference source, PID feedback source are selected as the given data of the given communication. Its communication address is 1000H, when the host sets the communication address value, the data range is -10000 ~ 10000, corresponding to the given value -100.00% ~ 100.00%

Digital output terminal control

When the digital output terminal function is selected as 20: communication control, the host computer through the communication address, can realize the control of AC drive the digital output terminal, defined as follows:

Digital output terminal control address	Commend content
2001H	BIT0:DO output control BIT1:Reserved BIT2:RELAY1 output control BIT3: Reserved BIT4: Reserved BIT5: Reserved BIT6: Reserved BIT7: Reserved BIT8: Reserved BIT9: Reserved

Analog output AO1, high-speed pulse output DO control

When the analog output AO1, high-speed pulse output Y output function is selected as 12: communication setting, the host through the communication address, can realize the control of AC drive analog, high-speed pulse output , defined as follows:

Output Control Address		Commend content
AO1	2002H	0 ~7FFF represent

Reserved	2003H	0%~100%
Pulse output	2004H	

4,Parameter initialization

When you want to achieve initialize operation of the AC drive parameters through the host computer, you need use this function.

If PP.00 (user password) is not 0, firstly you need verify password through the communication, after verification, in 30 seconds, the host computer initializes the parameters.

The user's password verification address is 1F00H, and write the correct user password directly to the address，then the password verification finish。

Communication parameters for the initialization address is 1F01H, the data content is defined as follows:

Parameter Initializes communication address	Command function
1F01H	1:Restore factory parameters
	2:Clear the log information
	4:Restore the user backup parameters
	501:Backs up the user's current parameters

8.3 Modbus communication protocol

A1 series AC drive provides RS485 communication interface, and supports Modbus-RTU slave communication protocol. Users can achieve centralized control through the computer or PLC, through the communication protocol to set the AC drive running command, modify or read the function code parameters, read the working status of the AC drive and fault information.

8.3.1 Protocol content

The serial communication protocol defines the content and using format of the serial communication . It includes: host polling (or broadcast) format; host coding methods, including: the requirements action function code , transmission data and error checking. The response from the slave is also the same structure, including: action confirmation, return data and error checking. If the slave occurs error when it receives message or can not complete the action requested by the host, it will send a fault message as a response to the host.

8.3.1.1 Application

The AC drive access the “Single-master multi-slave” PC/PLC control network which has RS485 Modbus and as the slave.

8.3.1.2 BUS structure

(1) Topological structure

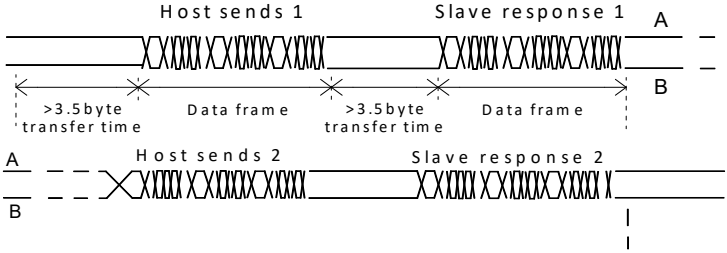
Single-master multi-slave system. Each communication device in the network has a unique slave address. One of them is the communication host (usually PC, PLC, HMI, etc.), initiates communication and reads or writes the parameters to the slave.

Other devices are the communication slaves, in response to the host query or communication operation.One time only one device can send data, while the other devices are receiving.

Slave address setting range is 1 ~ 247, 0 is the broadcast communication address. The address of the slave in the network must be unique.

(2) communication transmission

Asynchronous serial, half-duplex transmission.The data in the serial asynchronous communication process as a form of message one time can only send one frame.In MODBUS-RTU agreement when the communication line idle time is longer than 3.5Byte transmission time that means a new start of a communication frame.

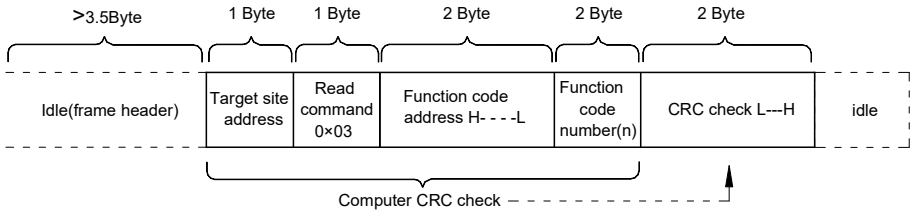


A1 series AC drive built-in communication protocol is Modbus-RTU slave communication protocol, can respond to the host's "query / command", or according to the host's "query / command" to make the appropriate action and response communication data . Host can be a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., the host can either communicate to a slave, or send broadcast information to all the slaves.

8.3.2 Protocol Format

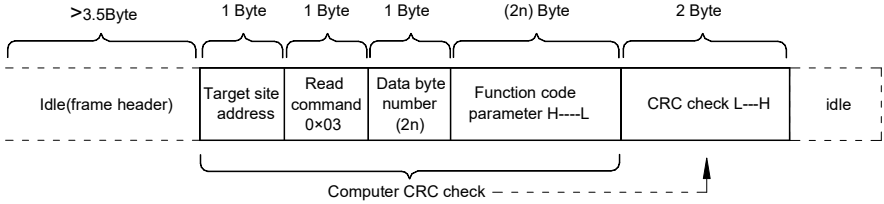
A1 series AC drive Modbus-RTU protocol communication data format is as follows, the AC drive supports only Word-type parameter read or write, the corresponding communication read operation command is Ox03; write operation command is 0x06, does not support byte or bit Read and write operations:

The master reads command frame:

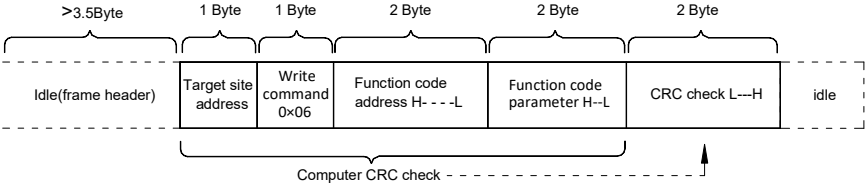


In theory, the host can read several function codes at a time (n can be up to 12), but pay attention to be not over the last function code of the group. Otherwise, it will reply the error

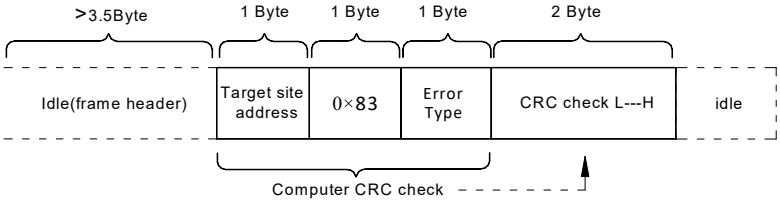
The slave reads command frame:



The master write command frame:



The slave write command frame:



If the slave detects a communication frame error, or if the read or write is otherwise unsuccessful, the error frame is acknowledged.

Error type:
01:Command code error
02:address error
03:data error
04:command can not be processed

Data frame field description:

START	More than 3.5 bytes idle time between frames
ADR	Communication address range:1 ～ 247；0 ＝broadcast address
CMD	03:read slave parameter；06:write slave parameter
CMD ADR H	Parameter address in the AC drive is hexadecimal notation, divided into function code and non-function code (such as running status parameter, running command, etc.). See address definition. Function code Address L when transmitting, the high byte in front, low byte in the post.
CMD ADR L	
CMD NO H	The number of function codes read in this frame. If 1, it means reading 1 function code. When transmitting, the high byte is first and the low byte is followed. This protocol can only overwrite one function code at a time, without this field.
CMD NO L	
DATA H	The data to be responded, or the data to be written,When transmitting , with the high byte first and the low byte being the last。
DATA L	
CRC CHK LOW Byte	Detected value: CRC16 Check value. When transmitting, the low byte first and the high byte second. CRC CHK high-bit calculation method is described in this section CRC check.
CRC CHK HIGH Byte	
END	3.5 bytes idle time

CRC check:

The CRC (Cyclical Redundancy Check) uses the RTU frame format, and the message includes an error detection field based on the CRC method. The CRC field detects the contents of the entire message. The CRC field is two bytes and contains a 16-bit binary value. It is calculated by the transmission device to be added to the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two CRC values are not equal, then the transmission has an error. CRC is first stored 0xFFFF, and then call a process will message in the 8-bit bytes and the value of the current register for processing. Only the 8Bit data in each character is valid for the CRC, the start and stop bits, and the parity bit are invalid. During CRC generation, each 8-bit character is individually or differently than the register contents (XOR). The result is shifted to the least significant bit and the most significant bit is padded with zeros. LSB is extracted

and detected. If LSB is '1', the register is exclusive or different from the preset value. If LSB is 0, it will not be executed. The whole process is repeated 8 times. After the last bit (8th bit) is completed, the next 8-bit byte will be separate from the current value of the register. The value in the final register is the CRC value after all the bytes in the message have been executed. When the CRC is added to the message, the low byte is first added and then the high byte.The following are C language source code for CRC checking:

```
unsigned int crc_chk_value（unsigned char *data_value,unsigned char length）
{
unsigned int crc_value=0xFFFF;
      int i;
      while（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）;
}
```

Address definition of communication parameters

Read and write function code parameters (some function codes can not be changed, only for manufacturers using or monitoring).

8.3.3 Function Code Parameter Address Identification rule

Read and write function code parameters, The rule is represented by the function code group number and label as the parameter address: High byte:It's completely determined by the group number, Low byte: 00 ~ FF, It is determined by the sequence number in the group, See function code table for details.

Stop / Run Parameters section:

Parameter address	Parameter description
1000H	Comunication setting value (decimalism)-10000~10000

Parameter address	Parameter description
1001H	Running freqeuncy
1002H	Bus voltage
1003H	Output voltage
1004H	Output current
1005H	Output power
1006H	Output torque
1007H	Running speed
1008H	X terminals input symbol;
1009H	DO output symbol
100AH	AI1 voltage
100BH	AI2 voltage
100CH	Reserved
100DH	Count value input
100EH	Length input
100FH	Load speed
1010H	PID setting
1011H	PID feedback
1012H	PLC step
1013H	X5 terminals unit:0.1Hz
1014H	Feedback speed，unit:0.1Hz
1015H	Remaining runtime
1016H	AI1 Preregulation voltage
1017H	AI2 Preregulation voltage
1018H	Reserved
1019H	Line speed
101AH	The current power-on time
101BH	The current running time
101CH	X5 input pules frequency，unit:1Hz
101DH	Communication setting value
101EH	Actual feedback speed
101FH	Main frequency X
1020H	Auxiliary frequency Y

Note:

The communication setting value is a percentage of the relative value, 10000 corresponds to 100.00%, - 10000 corresponds to -100.00%.

For the data of the frequency dimension, the percentage is the percentage of the maximum frequency (P0.10); for the data of the torque dimension, the percentage is P2.10, PC.48 (the upper limit of the torque is set numerically, Respectively, corresponding to the first and second motor).

Control command input to the AC drive: (write only)

Command word address	Command function
2000H	1:Forward running
	2:Reverse running
	3:Forward jog
	4:Reverse jog
	5:Coastal stop
	6:Deceleration stop
	7:Fault reset

Read drive status: (read-only)

Status word address	Status word function
3000H	0001:forward running
	0002:reverse running
	0003:stop

Parameter lock password verification: (If the return is 8888H, which means that the password check passed)

Password address	Password contents
1F00H	*****

Digital output terminal control: (write only)

Command address	Command contents
2001H	BIT0:DO output control BIT1:Reserved BIT2:RELAY1 output control BIT3: Reserved BIT4: Reserved BIT5: Reserved BIT6: Reserved BIT7: Reserved BIT8: Reserved BIT9: Reserved

Analog output AO1 control: (write only)

Command address	Command contents
2002H	0~7FFF represents 0%~100%

Analog Output AO2 Control: (write only)

Command address	Command contents
2003H	0~7FFF represents 0%~100%

Pulse (X5) Output Control: (write only)

Command address	Command contents
2004H	0~7FFF represents 0%~100%

The AC Drive fault description:

The AC Drive Fault address	The AC Drive fault information
8000H	0000:No fault 0001:Reserve 0002:Accelerated overcurrent 0003:Decelerated overcurrent 0004:Constant speed overcurrent 0005:Accelerated overvoltage 0006:Decelerated overvoltage 0007:Constant speed overvoltage 0008:Buffer resistance overload fault 0009:Undervoltage fault 000A:The AC drive overload 000B:Motor overload 000C:Input phase loss 000D:output phase loss 000E:module overheat 000F:external fault 0010:communication error 0011:contactor error 0012: Current detection fault 0013:Motor tuning fault 0014:Encoder / PG card fault 0015:Parameter read and write exception 0016:The AC drive hardware fault 0017:Motor ground short fault 0018:reserved 0019:reserved 001A:Running time arrives 001B: User - defined fault 1 001C: User - defined fault 2 001D: Power-up time is reached 001E:Out of load 001F:PID feedback is lost during running 0028: Fast current limit timeout fault 0029:Switch the motor fault during running 002A: The speed deviation is too large 002B:Motor over speed
8000H	002D: Motor overtemperature

	005A:The encoder line number setting is incorrect 005B:Missing encoder 005C:Initial position error 005E:Speed feedback error

8.3.4 Communication Parameter Description(Group PA)

PA.00	Baud rate	Factory default	6005
	RANGE	Digit:MODBUS Baud rate	
		0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS	

This parameter is used to set the data transfer rate between host and AC drive. Note that the host and the AC drive must set the same baud rate, otherwise, communication cannot be carried out. The higher the baud rate, the faster the communication speed.

PA.01	Data Format	Factory default	0
	Setting range	0:No parity: Data format <8,N,2> 1:Even parity: data format <8,E,1> 2:Odd parity: data format <8,O,1> 3:No parity: Data format <8-N-1>	
PA.02	Native address	Factory default	1
	Setting address	1~247，0 broadcast address	

When the native address is stetted to 0, is the broadcast address, to achieve PC broadcast function.

Local address is unique (except broadcast address), which is to achieve the host computer and inverter point-to-point communication.

PA.03	Response delay	Factory default	2ms
	Setting range	0~20ms	

Response delay: refers to the middle interval time from AC drive Data reception ends to send data to the host. 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 processing the data, the system waits until the response delay time is reached before sending data to the upper computer.

PA.04	Communication overtime time	Factory default	0.0 s
	Setting range	0.0 s（invalid）；0.1~60.0s	

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, the communication error (CCF) is reported if the interval between the primary communication and the next communication exceeds the communication timeout. Normally, it is set to invalid. If the secondary parameters are set in the system for continuous communication, the communication status can be monitored.

PA.05	Communication protocol selection	Factory default	1
	Setting range	0:Non-standard Modbus-RTU protocol； 1:Standard Modbus-RTU protocol	

PA.05 = 1: Selects the standard Modbus protocol.

PA.05 = 0: When read command, the slave returns one byte more than the standard Modbus protocol, refer to "5 Communication Data Structure" in this protocol.

PA.06	Communication Read current resolution	Factory fault	0
	Setting range	0:0.01A； 1:0.1A	

Used to determine the unit of output current when the communication reads the output current.

Appendix 4 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 Capacity: 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:	