Preface

Thank you for using ALPHA6000E, F20/F21 series inverters.

This series of inverters adopt 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 of inverters apply to most motor and synchronous motor drive applications, including paper making, textile, food, cement, printing and dyeing, plastic machinery, and other industries. As speed controllers, this series of inverters 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 inverter, 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.

	**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 capAI3tor 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 inverter. When using the inverter, the earthing terminal of the inverter 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 inverter that can be reached easily and give this manual to the users who use the product.

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Chapter 1 Purchase Inspection

1.1 Unpacking Inspection

All inverters have 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

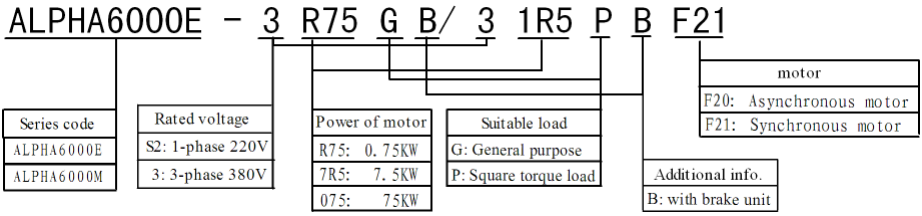


Fig. 1-1 Model code

Chapter 2 Installation and Wiring

2.1 Mounting Place Requirements and Management

Attention

·Don’t carry the inverter by its cover. The cover cannot support the weight of the inverter and the inverter may drop.

·Please install the inverter on a strong support, failing which the inverter may fall off.

·Don’t install the inverter in places where water pipes may leak onto it.

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

·Don’t operate the inverter if parts are not complete, otherwise there is a danger of fire or human injury.

·Don’t install the inverter under direct sunshine; otherwise, it may be damaged.

·Don’t short circuit PB, + and -, otherwise there is a danger of fire or the inverter 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 inverter 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 inverter on the timber or other combustible matters.
- Avoid direct sunlight.
- It is strictly prohibited to install the inverters 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 inverter is installed at high altitude greater than 1000 m. This is because the cooling effect of inverter 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 inverter, be sure where the inverter mounted has a good ventilation; when the inverter is used in a closed case, cooling fans or an air-conditioning must be installed to keep the ambient temperature below 40℃

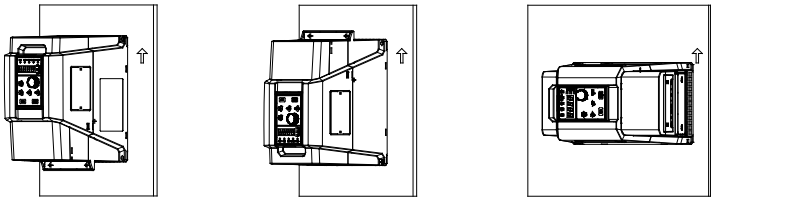
2.1.3 Preventive Measures

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 Fig. 2-1, 2-2:



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

Fig. 2-1 Installation Direction Requirement

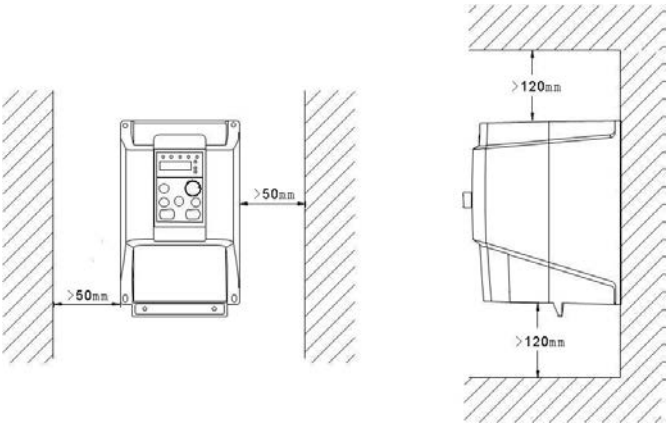


Fig. 2-2 Installation Direction and Space

2.3 Main Circuit Wiring

2.3.1 Main parts of product

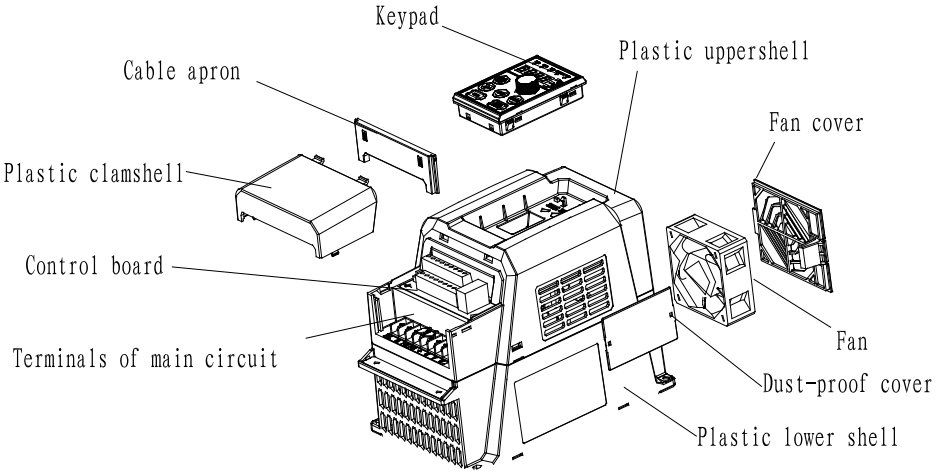


Fig. 2-3 Main parts of 5.5kW and below

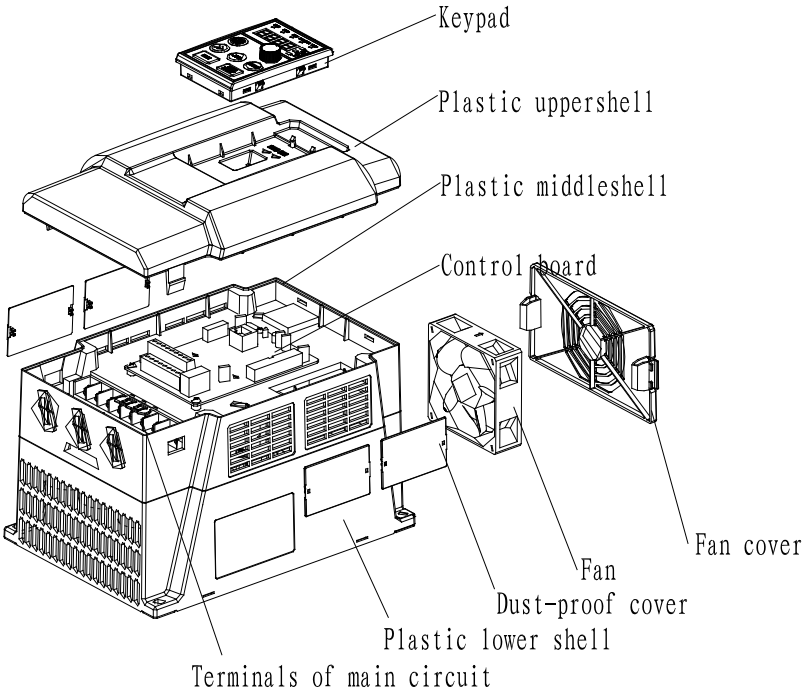


Fig. 2-4 Main parts of 7.5kW-11kW

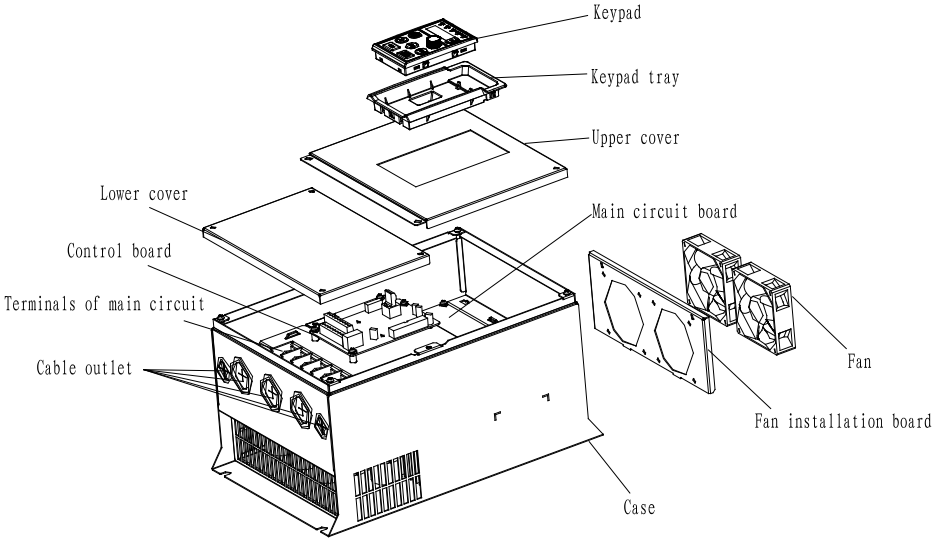


Fig. 2-5 Main parts of 15kW-160kW

2.3.2 Schematic diagram of connection and disassembly main circuit terminals

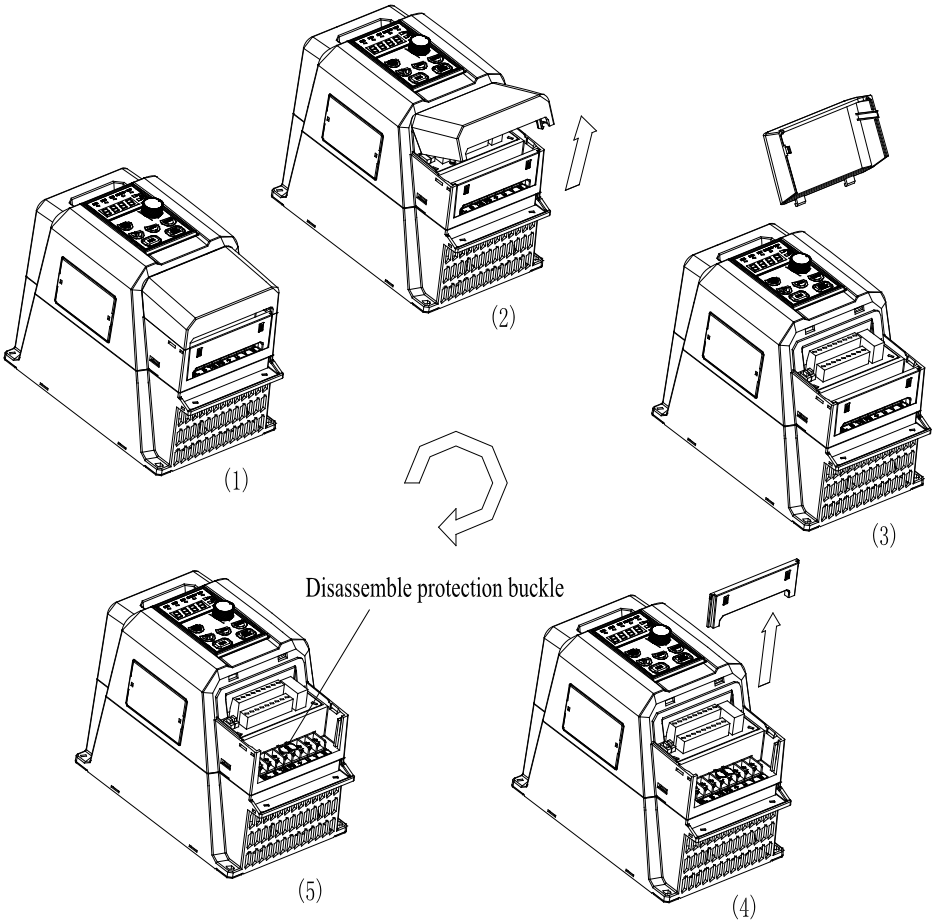


Fig. 2-6 Disassembly schematic diagram of 5.5kW and below

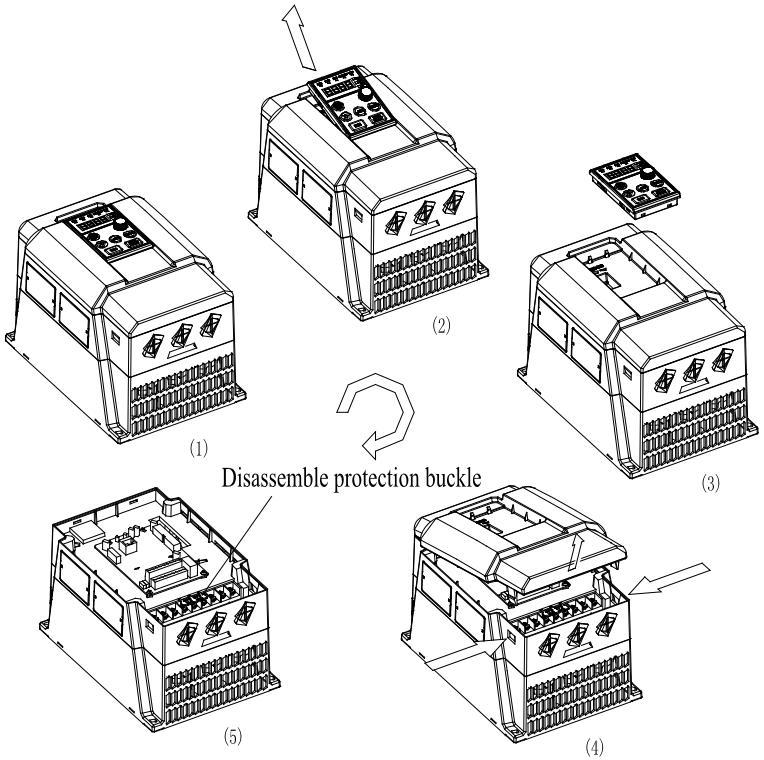


Fig. 2-7 Disassembly schematic diagram of 7.5kW-11kW

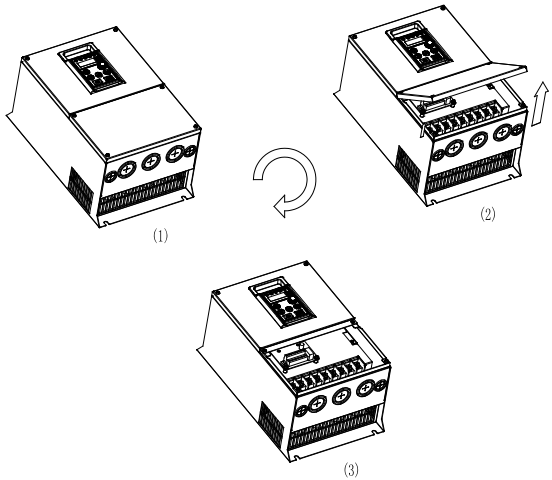


Fig. 2-8 Disassembly schematic diagram of 15kW-160kW

2.3.3 The Main Circuit Terminals Arrangement and Wiring

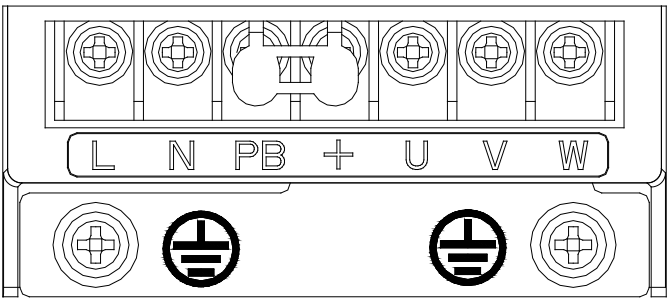


Fig. 2-9 Wiring of terminals of main circuit of 1PH 220V 0.4&0.75kW

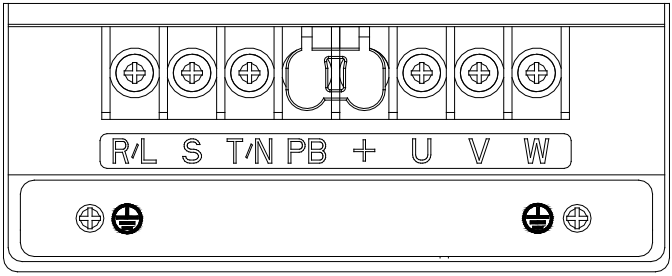


Fig. 2-10 Wiring of terminals of main circuit of 1PH 220V 1.5&2.2kW 3PH 380V 0.75-2.2kW

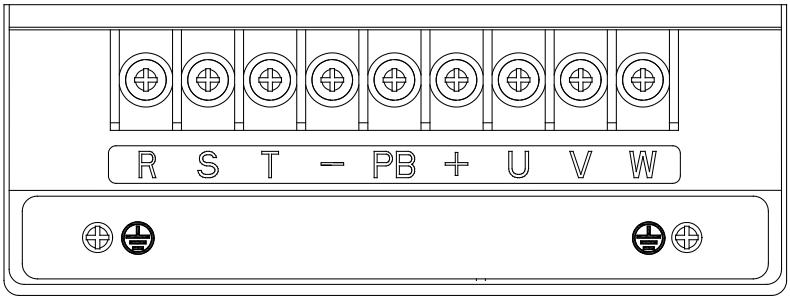


Fig. 2-11 Wiring of terminals of main circuit of 3PH 380V 4-15kW

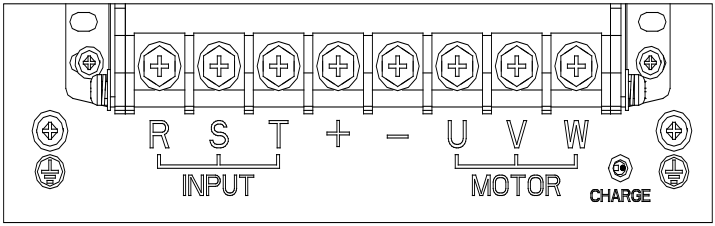


Fig. 2-12 Wiring of terminals of main circuit of 3PH 380V 18.5-30kW

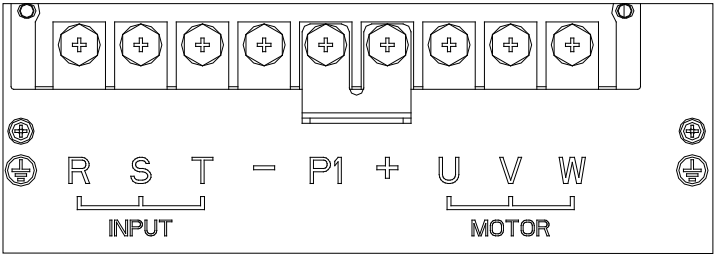


Fig. 2-13 Wiring of terminals of main circuit of 3PH 380V 37-160kW

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
-	DC negative bus output terminal
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.

2.3.4 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 Fig. 2-14.

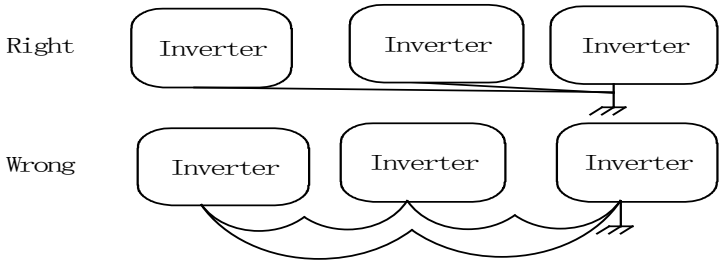


Fig. 2-14 Earthing Connection Method

Notes: The neutral point of motor using Y connection can't be connected to earth. Since the inverter output PWM wave, if a capAI3tor 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

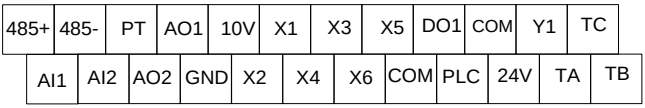


Fig. 2-15 Terminal arrangement

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)

Category	Terminal label	Name	Description of terminal function	Specification
	AI2	Analog input 2	Receive voltage/current input. Voltage or current are selected by DIP switch SW7. 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 SW2.	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	
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=3.9k Ω 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		

Category	Terminal label	Name	Description of terminal function	Specification
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	Y1	Open collector output terminal	It can be used as an on-off output terminal. Please refer to Section	Opto-coupler isolated open collector output. Range of operating voltage: 0V~26V Maximum output current: 50mA Reference ground: COM
	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 capAI3ty: 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

AI1,AI2 terminals accept analog signal input, DIP switch SW3 select the input voltage (0 ~ 10V) or the input current (0 ~ 20mA). The wiring of terminals is shown in Fig. 2-16:

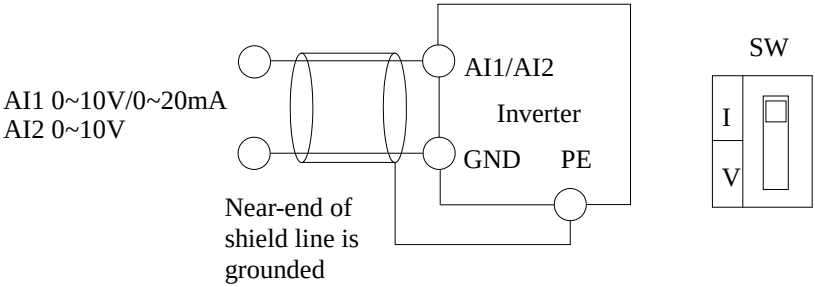


Fig. 2-16 Wiring diagram of analog input terminals

● 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 SW2 can select current output (0/4~20mA) and voltage output(0/2~10V). The wiring of terminals is shown in Fig. 2-17:

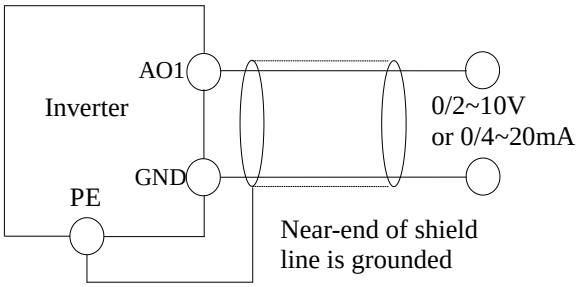


Fig. 2-17 Wiring diagram of analog output terminals

Tips

1) Dialing SW 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.

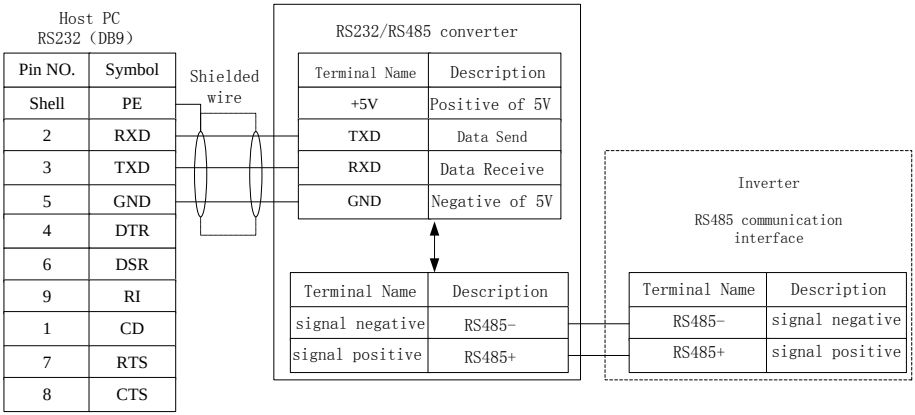


Fig. 2-18 Illustration of wiring between the upper computer and the inverter interface

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:

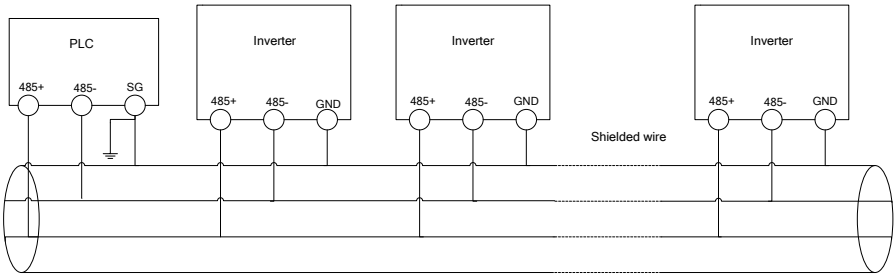


Fig. 2-19 Recommended wiring diagrams (inverters and motors are all well grounded) when PLC is in communication with multiple inverters

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**

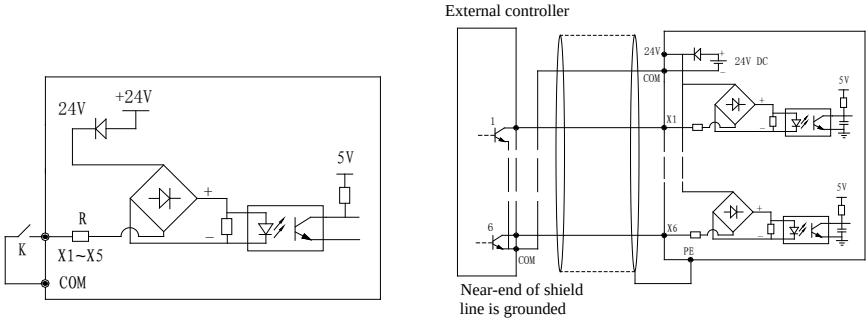


Fig. 2-20 Wiring diagram of multi-function input terminals

● Wire Multi-Function Output Terminals

1） Multi-function output terminals Y as discrete output can use the internal 24V power supply of inverter and the wiring method is shown in Fig. 2-21.

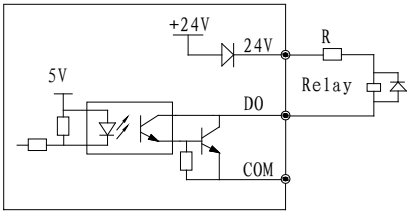


Fig. 2-21 On-off output connection mode 1 of multi-function output terminals

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 Fig. 2-22

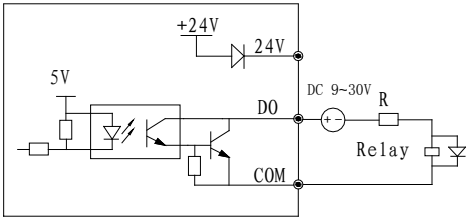


Fig. 2-22 On-off output connection mode 2 of multi-function output terminals

● 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.

   Keypad connection interface on the control board adopts RJ-45 fool-proof ports. The control board and key board are connected by RJ-45 plug under default condition. Users can customize extended keypad cable according to actual needs. But the keypad extension cable shall not exceed 1 m, because when it exceeds 1 m, normal work cannot be guaranteed.

   The cables connecting keypad and control board use standard Cat-5e network cable. RJ-45 Interface uses direct connection, namely both sides are connected according to EIA/TIA568B standard. Users can make keypad connection cable by themselves.

2.5 Wiring of Inverter for Basic Operation

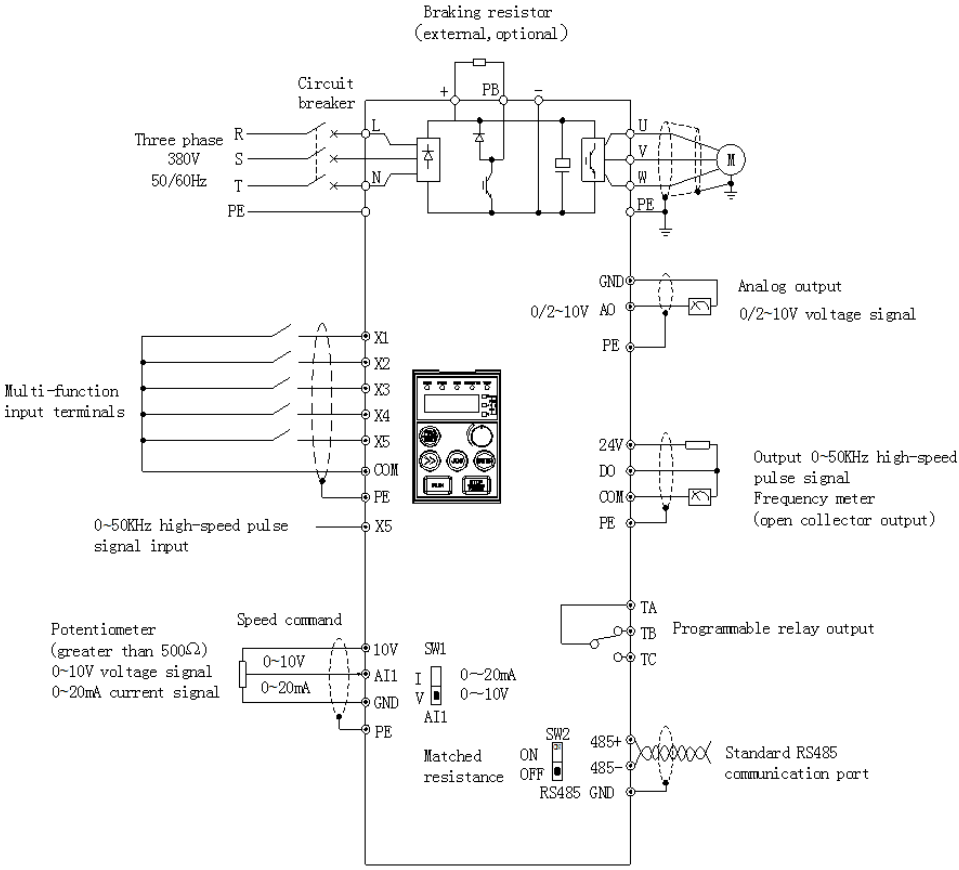


Fig. 2-23 wiring diagram

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

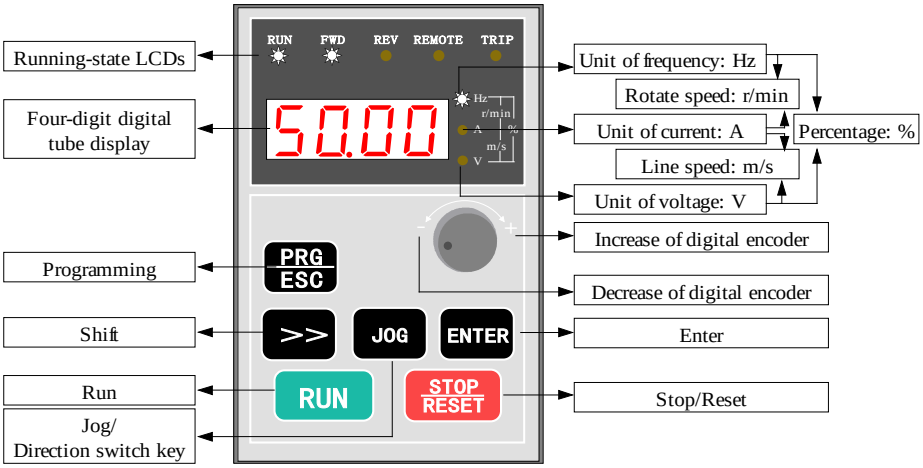


Fig. 3-1 Keypad layout and name of each part

Keypad upper part has five status indicators: RUN, FWD, REV, REMOTE and TRIP. The indicator RUN will be lit up if the inverter is running; the indicator FWD will be lit up if it running forward and the indicator REV will be lit up if it runs 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 PC. Refer to the detailed description of PC 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
PRG ESC	Programming /Exit	Enter or exit programming mode. In monitoring mode, press PRG/ESC key to switch to programming mode. First, enter function group, and press ENTER key to enter function code and then function parameters progressively; press PRG/ESC, it will exit from function parameters to function code, then function group, next monitoring state, exit step by step like this; in case of an inverter failure, it can switch failure display and function group. When giving an alarm, switch alarm state and function group.
ENTER	Enter	Enter the sub-menu, or store parameters during parameter setting.
Digital encoder 	Up (clockwise) 	It can increase the function group number, function code number or function code value. In parameter setting mode, LED nixie tube blinking displays modified digit. If turn the knob clockwise, the function code value will increase; in display mode, if the keypad is set to be effective, digital frequency setting, speed PID setting or analog PID digital setting can be increased.
	Down (counterclockwise) 	It can reduce the function code group number, function code number or function code value. In parameter setting mode, LED nixie tube blinking displays modified bit. If turn the knob CCW, the function code value will decrease; in display mode, if the keypad is set to be effective, digital frequency setting, speed PID setting or analog PID digital setting can be decreased.
>>	Shift	In edit mode, the modified digit of the set data can be selected; In monitoring mode, displayed parameters can be switched.
JOG	P2.51=0	Jog: In keypad mode, press this key to enter JOG running mode.
	P2.51=1	Direction switch key: Press this button to change the direction of rotation. See P0.08 function description for details.
RUN	Run	In keypad control mode, it is to run the inverter, and a running command will be given.
STOP RESET	Stop/Reset	In keypad control mode, the key is used to stop the inverter. Clear the failure and return to normal state when there is a failure.

3.1.3 Description of LED Digital Tube and Indicators

On the inverter keypad there are four digits seven segments LEDs, 3 unit indicators, 5 status indicators. The LED can display the monitoring object, the function parameter values, the fault code, and the warning code. The three unit indicators have eight combinations, and each combination corresponds to one-unit. The combinations and their corresponding units are as Fig. 3-2.

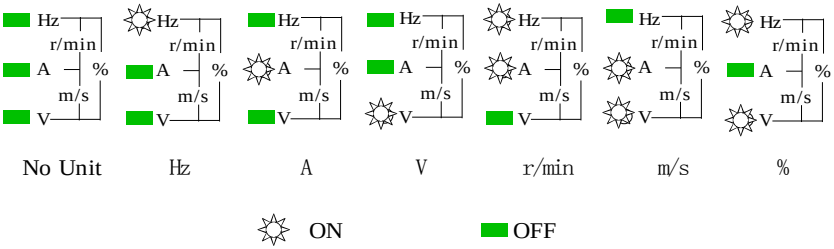


Fig. 3-2 Combinations of unit indicator and their means

The five 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
FWD Forward running direction indication	Off	Reverse rotation or not run
	Normally on	Stable forward rotation
	Quick flicker	Acceleration and deceleration of forward rotation
	Slow flicker	Going to stop, the direction is forward
REV Reverse running direction indication	Off	Forward rotation or not run
	Normally on	Stable reverse rotation
	Quick flicker	Acceleration and deceleration of reverse rotation
	Slow flicker	Going to stop, reverse direction
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 Operation Method of Keypad

Here are some examples of how to run the inverter by the keypad:

Monitoring object switching:

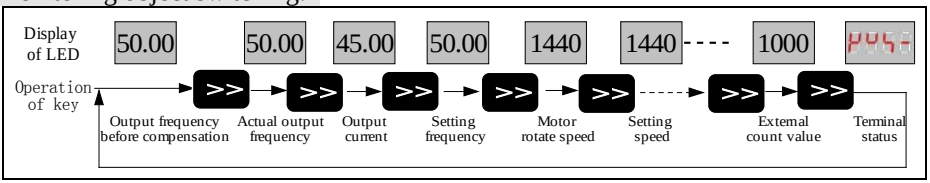


Fig. 3-3 Operation of parameters display at running/stop status

Frequency adjustment at common running: (Example: change the setting frequency from 50.00 Hz to 40.00 Hz)

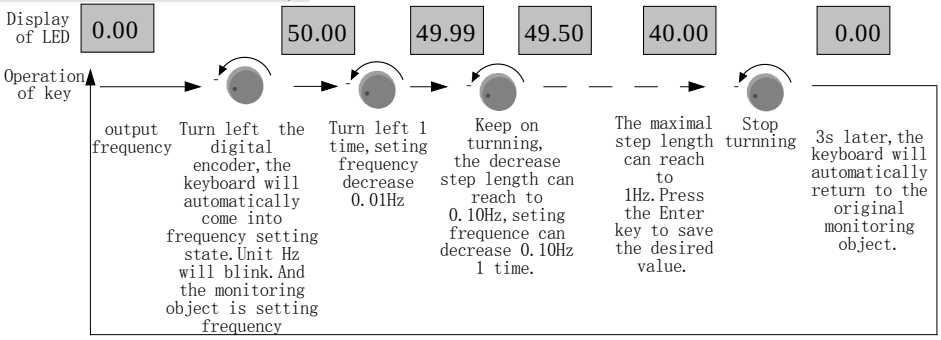


Fig. 3-4 Flow chart of frequency setting

This method applies to given frequency parameter adjustment when the initial display state is any state.

When the monitor display is speed setting and analog PID digital setting, these parameters can be modified and displayed directly by turning the knob.

Setting of function code parameters: (example of changing Jog acceleration time, function code P2.01 from 6.0s to 3.2s)

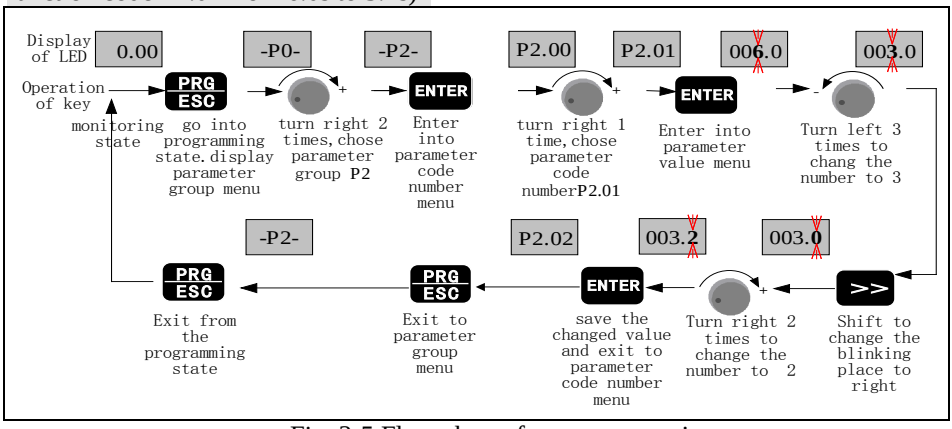


Fig. 3-5 Flow chart of parameter setting

In three-level menu state, no flicker digit for a parameter indicates that the function code cannot be modified, and the possible reasons include:

- Modifying the value is forbidden because the parameter is actual measure value, or running record value or fixed value.
- The function parameter cannot be changed when the inverter is at running state. However, it can be changed at stop state. So stop the inverter and then change the parameter value.
- The inverter parameters are protected. If function parameter value PF.01=1 or 2, the parameters are forbidden to be changed. This parameter protection function is to avoid operation mistake. To change the protection parameters, change value of function code PF.01 to zero, then all the parameters can be changed

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 Fig. 3-6:

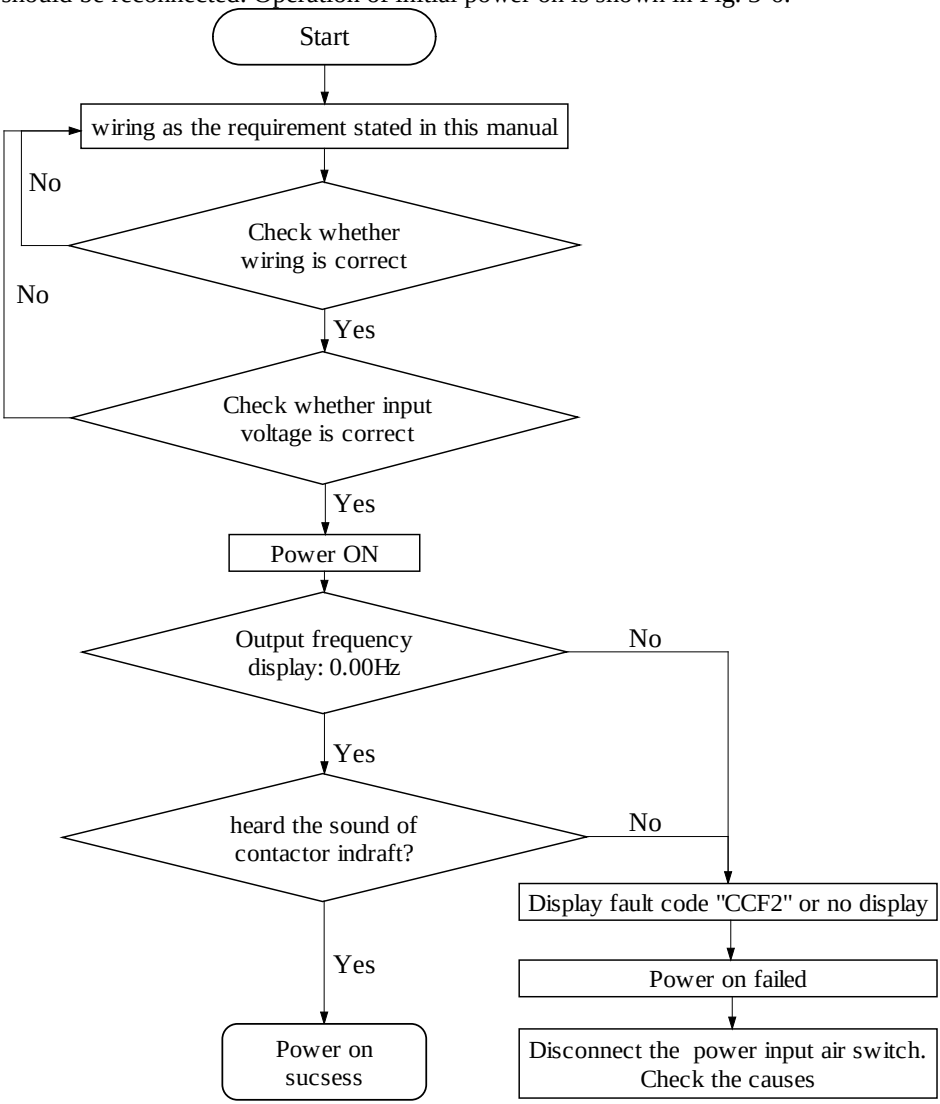


Fig. 3-6 Operation process of initially powering on the inverter

3.3.3 First Test Run Operation

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

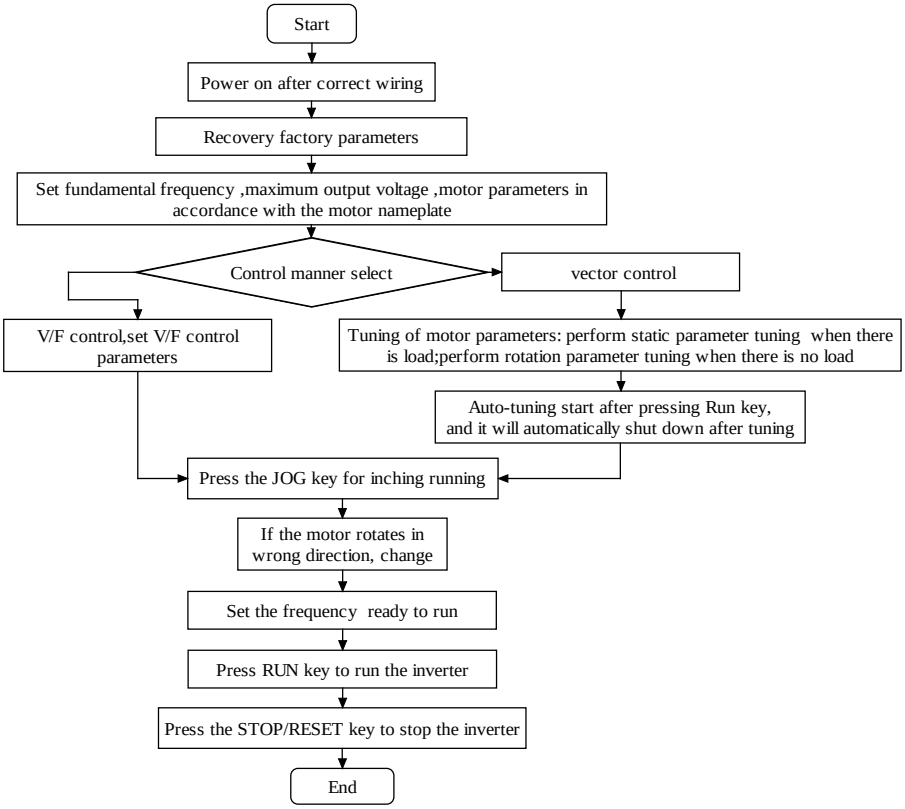


Fig. 3-7 Operation process of inverter first test run operation

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 F and Group A are standard function parameters. Group U 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.

Standard Function Parameters

Function Code	Parameter Name	Setting Range	Default	Property
P0 Group:Basic Function				
P0.00	G/P type display	1: G type (constant torque load) 2: P type (variable torque load e.g. fan and pump)	Model dependent	★
P0.01	Motor 1 control mode	0: Senseless flux vector control (SFVC)1: Closed.loop vector control (CLVC)2: Voltage/Frequency (V/F) control	2	★
P0.02	Command source selection	0: Operation panel control (LED off) 1: Terminal control (LED on)2: Communication control (LED blinking)	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
P0.03	Main frequency source X selection	0: Digital setting (non.retentive at power failure)1: Digital setting (retentive at power failure)2: AI13: AI24: AI35: Pulse setting (X5) 6: Multi.reference7: Simple PLC 8: PID9: Communication setting	0	★
P0.04	Auxiliary frequency source Y selection	The same as P0.03 (Main frequency source X selection)	0	★
P0.05	Range of auxiliary frequency Y for X and Y operation	0: Relative to maximum frequency1: Relative to main frequency X	0	☆
P0.06	Range of auxiliary frequency Y for X and Y operation	0%–150%	100%	☆
P0.07	Frequency source selection	Unit's digit (Frequency source selection)	00	☆
		0: Main frequency source X 1: X and Y operation(operation relationship determined by ten's digit)2: Switchover between X and Y3: Switchover between X and "X and Y operation"4: Switchover between Y and "X and Y operation"		
		Ten's digit (X and Y operation relationship)		
		0: X+Y 1: X.Y2: Maximum3: Minimum		

Function Code	Parameter Name	Setting Range	Default	Property
P0.08	Preset frequency	0.00 to maximum frequency (valid when frequency source is digital setting)	50.00 Hz	☆
P0.09	Rotation direction	0: Same direction1: Reverse direction	0	☆
P0.10	Maximum frequency	50.00–320.00 Hz	50.00 Hz	★
P0.11	Source of frequency upper limit	0: Set by P0.12 1: AI12: AI2 3: AI34: Pulse setting (X5)5: Communication setting	0	★
P0.12	Frequency upper limit	Frequency lower limit (P0.14) to maximum frequency (P0.10)	50.00 Hz	☆
P0.13	Frequency upper limit offset	0.00 Hz to maximum frequency (P0.10)	0.00 Hz	☆
P0.14	Frequency lower limit	0.00 Hz to frequency upper limit (P0.12)	0.00 Hz	☆
P0.15	Carrier frequency	0.5–16.0 kHz	Model dependent	☆
P0.16	Carrier frequency adjustment with temperature	0: No1: Yes	1	☆
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	☆
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	☆
P0.19	Acceleration/Deceleration time unit	0:1s1: 0.1s2: 0.01s	1	★

Function Code	Parameter Name	Setting Range	Default	Property
P0.21	Frequency offset of auxiliary frequency source for X and Y operation	0.00 Hz to maximum frequency (P0.10)	0.00 Hz	☆
P0.22	Frequency reference resolution	1: 0.1 Hz2: 0.01 Hz	2	★
P0.23	Retentive of digital setting frequency upon power failure	0: Not retentive 1: Retentive	2	☆
P0.24	Motor parameter group selection	0: Motor parameter group 1 1: Motor parameter group 2 2: Motor parameter group 3 3: Motor parameter group 4	0	★
P0.25	Acceleration/Deceleration time base frequency	0: Maximum frequency (P0.10) 1: Set frequency2: 100 Hz	0	★
P0.26	Base frequency for UP/ DOWN modification during running	0: Running frequency 1: Set frequency	0	★
P0.27	Binding command source to frequency source	Unit's digit (Binding operation panel command to frequency source) 0: No binding1: Frequency source by digital setting2: AI1 3: AI2 4: AI35: Pulse setting (X5) 6: Multi.reference7: Simple PLC 8: PID9: Communication setting	000	☆

Function Code	Parameter Name	Setting Range	Default	Property
P0.27	Binding command source to frequency source	Ten's digit (Binding terminal command to frequency source) 0–9, same as unit's digit Hundred's digit (Binding communication command to frequency source) 0–9, same as unit's digit	000	☆
P0.28	Serial communication protocol	0: Modbus protocol	0	☆
P1 Group:Motor Parameters				
P1.00	Motor type selection	0: Common asynchronous motor1: Variable frequency asynchronous motor2: Permanent magnetic synchronous motor	1	★
P1.01	Rated motor power	0.1–1000.0 kW	Model dependent	★
P1.02	Rated motor voltage	1–2000 V	Model dependent	★
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	★
P1.04	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★
P1.05	Rated motor rotational speed	1–65535 RPM	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
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	★
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	★
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	★
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	★
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	★
P1.16	Stator resistance (synchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW)0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
P1.17	Shaft D inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW)0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
P1.18	Shaft Q inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW)0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
P1.20	Back EMF (synchronous motor)	0.1–6553.5 V	Model dependent	★
P1.27	Encoder pulses per revolution	1–65535	1024	★
P1.28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver3: SIN/COS encoder4: Wire.saving UVW encoder	0	★
P1.30	A/B phase sequence of ABZ incremental encoder	0: Forward1: Reserve	0	★
P1.31	Encoder installation angle	0.0°–359.9°	0.0°	★
P1.32	U, V, W phase sequence of UVW encoder	0: Forward1: Reverse	0	★
P1.33	UVW encoder angle offset	0.0°–359.9°	0.0°	★
P1.34	Number of pole pairs of resolver	1–65535	1	★
P1.36	Encoder wire.break fault detection time	0.0s: No action0.1–10.0s	0.0s	★
P1.37	Auto.tuning selection	0: No auto.tuning1: Asynchronous motor static auto.tuning2: Asynchronous motor complete auto.tuning11: Synchronous motor with.load auto.tuning12: Synchronous motor no.load auto.tuning	0	★

Function Code	Parameter Name	Setting Range	Default	Property
P2 Group Vector Control ParametersP2 Group Vector Control ParametersP2 Group Vector Control ParametersP2 Group Vector Control ParametersP2 Group Vector Control Parameters				
P2.00	Speed loop proportional gain 1	0–100	30	☆
P2.01	Speed loop integral time 1	0.01–10.00s	0.50s	☆
P2.02	Switchover frequency 1	0.00 to P2.05	5.00 Hz	☆
P2.03	Speed loop proportional gain 2	0–100	20	☆
P2.04	Speed loop integral time 2	0.01–10.00s	1.00s	☆
P2.05	Switchover frequency 2	P2.02 to maximum output frequency	10.00 Hz	☆
P2.06	Vector control slip gain	50%–200%	100%	☆
P2.07	Time constant of speed loop filter	0.000–0.100s	0.000s	☆
P2.08	Vector control over.excitation gain	0–200	64	☆
P2.09	Torque upper limit source in speed control mode	0: P2.10 1: AI12: AI2 3: AI34: Pulse setting (X5)5: Communication setting	0	☆
P2.10	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆
P2.11	Torque upper limit source in speed control model	0:P2.10 1:AI1 2:AI2 3:AI3 4:X5 setting5:communication setting 6Min(AI1,AI2)7Max(AI1 AI2) 8:P2.12 setting	0.8[0]	☆

Function Code	Parameter Name	Setting Range	Default	Property
P2.12	Digital setting of torque upper limit in speed control model	0.0.200.0%	150.0%	☆
P2.13	Excitation adjustment proportional gain	0–60000	2000	☆
P2.14	Excitation adjustment integral gain	0–60000	1300	☆
P2.15	Torque adjustment proportional gain	0–60000	2000	☆
P2.16	Torque adjustment integral gain	0–60000	1300	☆
P2.17	Speed loop integral property	Unit's digit: integral separation 0: Disabled1: Enabled	0	☆
P2.18	Field weakening mode of synchronous motor	0: No field weakening 1: Direct calculation2: Automatic adjustment	1	☆
P2.19	Field weakening depth of synchronous motor	50%–500%	100%	☆
P2.20	Maximum field weakening current	1%–300%	50%	☆
P2.21	Field weakening automatic adjustment gain	10%–500%	100%	☆
P2.22	Power limit	0:Invalid 1:Valid 3.Constant speed valid 4:Decelerate speed valid	0	☆
P2.23	Power upper limit	0.200%	100%	☆
P2.24	Initial position angle detection current of synchronous motor	50%~180%	80%	○

Function Code	Parameter Name	Setting Range	Default	Property
P2.25	Initial position angle detection of synchronous motor	0,1,2	0	○
P2.27	Salient.pole rate adjustment gain of synchronous motor	50~500	100	○
P2.28	MTPA control	0,1	0	○
P2.32	Z sigal correction	0,1	1	○
P2.36	Low speed excitation current	0~80%	30%	○
P2.37	Low speed frequency	0.8K~P0.15	1.5K	○
P2.38	SVC low frequency braking mode	0,1	0	○
P2.39	SVC low frequency braking valid frequency	0~10.00Hz	2.00Hz	○
P2.40	SVC low frequency braking change step	0.0005~1.0000Hz	0.0010Hz	○
P2.41	Synchronous motor electromechanical sensing current	0~80%	50%	○
P2.42	Synchronous motor SVC speed tracking	0~1	0	○
P2.43	Zero servo enabling	0~1	0	○
P2.44	Switchover frequency	0.00 ～ P2.02	0.30Hz	○
P2.45	Zero servo speed loop proportional gain	1 ～ 100	10	○

Function Code	Parameter Name	Setting Range	Default	Property
P2.46	Zero servo speed loop integral time	0.01s ～ 10.00s	0.50s	○
P2.47	Stop anti.reversion enabling	0~1	0	○
P2.48	Stop angle	0.0°～ 10.0°	0.8°	○
P2.49	No.auto.tuning mode	0,1,2	0	☆
P2.50	Online counter electromotive force calculation	0,1	0	☆
P3 Group V/F Control Parameters				
P3.00	V/F curve setting	0: Linear V/P1: Multi.point V/F 2: Square V/P3: 1.2.power V/F 4: 1.4.power V/F 6: 1.6.power V/F 8: 1.8.power V/F 9: Reserved10: V/F complete separation11: V/F half separation	0	★
P3.01	Torque boost	0.0% (fixed torque boost)0.1%–30.0%	Model dependent	☆
P3.02	Cut.off frequency of torque boost	0.00 Hz to maximum output frequency	50.00 Hz	★
P3.03	Multi.point V/F frequency 1 (P1)	0.00 Hz to P3.05	0.00 Hz	★
P3.04	Multi.point V/F voltage 1 (V1)	0.0%–100.0%	0.0%	★
P3.05	Multi.point V/F frequency 2 (P2)	P3.03 to P3.07	0.00 Hz	★
P3.06	Multi.point V/F voltage 2 (V2)	0.0%–100.0%	0.0%	★

Function Code	Parameter Name	Setting Range	Default	Property
P3.07	Multi.point V/F frequency 3 (P3)	P3.05 to rated motor frequency (P1.04)Note: The rated frequencies of motors 2, 3, and 4 arerespectively set in A2.04, A3.04, and A4.04.	0.00 Hz	★
P3.08	Multi.point V/F voltage 3 V3	0.0%–100.0%	0.0%	★
P3.09	V/F slip compensation gain	0%–200.0%	0.0%	☆
P3.10	V/F over.excitation gain	0–200	64	☆
P3.11	V/F oscillation suppression gain	0–100	Model dependent	☆
P3.13	Voltage source for V/F separation	0: Digital setting (P3.14) 1: AI12: AI2 3: AI34: Pulse setting (X5) 5: Multi.reference6: Simple PLC 7: PID8: Communication setting100.0% corresponds to the rated motor voltage (P1.02, A4.02, A5.02, A6.02).	0	☆
P3.14	Voltage digital setting for V/ F separation	0 V to rated motor voltage	0 V	☆
P3.15	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	☆
P3.16	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	☆

Function Code	Parameter Name	Setting Range	Default	Property
P3.17	Stop mode selection upon V/F separation	0: Frequency and voltage declining to 0 independently1: Frequency declining after voltage declines to 0	0	☆
P3.18	Current limit level	50~200%	150%	×
P3.19	Current limit level	0 disabled、1 enabled	1	×
P3.20	Current limit gain	0~100	20	○
P3.21	Compensation factor of speed multiplying current limit	50~200%	50%	×
P3.22	Voltage limit	650.0V~800.0V	760.0V	×
P3.23	Voltage limit selection	0 disabled、1 enabled	1	×
P3.24	Frequency gain for voltage limit	0~100	30	○
P3.25	Voltage gain for voltage limit	0~100	30	○
P3.26	Frequency rise threshold during voltage limit	0~50Hz	5Hz	×
P4 Group Input terminals 1				
P4.00	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	1	★

Function Code	Parameter Name	Setting Range	Default	Property
P4.01	X2 function selection	7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: RUN pause 11: Normally open (NO) input of external fault 12: Multi.reference terminal 1 13: Multi.reference terminal 2 14: Multi.reference terminal 3 15: Multi.reference terminal 4 16: Terminal 1 for acceleration/ deceleration time selection 17: Terminal 2 for acceleration/ deceleration time selection 18: Frequency source switchover 19: UP and DOWN setting clear (terminal, operation panel) 20: Command source switchover terminal 1 21:Acceleration/Deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30: Pulse input (enabled only for X5)	4	★
P4.02	X3 function selection		9	★
P4.03	X4 function selection		12	★
P4.04	X5 function selection		13	★

Function Code	Parameter Name	Setting Range	Default	Property
P4.05	X6 function selection	31:Reserved 32: Immediate DC braking 33: Normally closed (NC) input of external fault 34: Frequency modification forbidden 35: Reverse PID action direction 36: External STOP terminal 1 37: Command source switchover terminal 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 terminal 1 42: Motor selection terminal 2 43: PID parameter switchover 44: User.defined fault 1 45: User.defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop 48: External STOP terminal 2 49: Deceleration DC braking 50: Clear the current running time 51: Switchover between two.line mode and three.line mode 52–59: Reserved	U	★
P4.06	X7 function selection		0	★
P4.07	X8 function selection		0	★
P4.08	X9 function selection		0	★
P4.09	X10 function selection		0	★

Function Code	Parameter Name	Setting Range	Default	Property
P4.10	X filter time	0.000–1.000s	0.010s	☆
P4.11	Terminal command mode	0: Two.line mode 1 1: Two.line mode 2 2: Three.line mode 13: Three.line mode 2	0	★
P4.12	Terminal UP/DOWN rate	0.01–65.535 Hz/s	1.00 Hz/s	☆
P4.13	AI curve 1 minimum input	0.00 V to P4.15	0.00 V	☆
P4.14	Corresponding setting of AI curve 1 minimum input	.100.00%–100.0%	0.0%	☆
P4.15	AI curve 1 maximum input	P4.13 to 10.00 V	10.00 V	☆
P4.16	Corresponding setting of AI curve 1 maximum input	.100.00%–100.0%	100.0%	☆
P4.17	AI1 filter time	0.00–10.00s	0.10s	☆
P4.18	AI curve 2 minimum input	0.00 V to P4.20	0.00 V	☆
P4.19	Corresponding setting of AI curve 2 minimum input	.100.00%–100.0%	0.0%	☆
P4.20	AI curve 2 maximum input	P4.18 to 10.00 V	10.00 V	☆
P4.21	Corresponding setting of AI curve 2 maximum input	.100.00%–100.0%	100.0%	☆
P4.22	AI2 filter time	0.00–10.00s	0.10s	☆

Function Code	Parameter Name	Setting Range	Default	Property
P4.23	AI curve 3 minimum input	0.00 V to P4.25	0.00 V	☆
P4.24	Corresponding setting of AI curve 3 minimum input	.100.00%–100.0%	0.0%	☆
P4.25	AI curve 3 maximum input	P4.23 to 10.00 V	10.00 V	☆
P4.26	Corresponding setting of AI curve 3 maximum input	.100.00%–100.0%	100.0%	☆
P4.27	AI3 filter time	0.00–10.00s	0.10s	☆
P4.28	X5 Pulse minimum input	0.00 kHz to P4.30	0.00 kHz	☆
P4.29	X5 Corresponding setting of pulse minimum input	.100.00%–100.0%	0.0%	☆
P4.30	X5 Pulse maximum input	P4.28 to 50.00 kHz	50.00 kHz	☆
P4.31	X5 Corresponding setting of pulse maximum input	.100.00%–100.0%	100.0%	☆
P4.32	X5 Pulse filter time	0.00–10.00s	0.10s	☆

Function Code	Parameter Name	Setting Range	Default	Property
P4.33	AI curve selection	Unit's digit (AI1 curve selection) Curve 1 (2 points, see P4.13 to P4.16)Curve 2 (2 points, see P4.18 to P4.21)Curve 3 (2 points, see P4.23 to P4.26)Curve 4 (4 points, see A6.00 to A6.07)Curve 5 (4 points, see A6.08 to A6.15) Ten's digit (AI2 curve selection) Curve 1 to curve 5 (same as AI1) Hundred's digit (AI3 curve selection) Curve 1 to curve 5 (same as AI1)	321	☆
P4.34	Setting for AI less than minimum input	Unit's digit (Setting for AI1 less than minimum input) 0: Minimum value1: 0.0% Ten's digit (Setting for AI2 less than minimum input) 0, 1 (same as AI1) Hundred's digit (Setting for AI3 less than minimum input) 0, 1 (same as AI1)	000	☆
P4.35	X1 delay time	0.0–3600.0s	0.0s	★
P4.36	X2 delay time	0.0–3600.0s	0.0s	★
P4.37	X3 delay time	0.0–3600.0s	0.0s	★

Function Code	Parameter Name	Setting Range	Default	Property
P4.38	X valid mode selection 1	Unit's digit (X1 valid mode) 0: High level valid1: Low level valid Ten's digit (X2 valid mode) 0, 1 (same as X1) Hundred's digit (X3 valid mode) 0, 1 (same as X1)	00000	★
P4.38	X valid mode selection 1	Thousand's digit (X4 valid mode) 0, 1 (same as X1) Ten thousand's digit (X5 valid mode) 0, 1 (same as X1)	00000	★
P4.39	X valid mode selection 2	Unit's digit (X6 valid mode) 0, 1 (same as X1) Ten's digit (X7 valid mode) 0, 1 (same as X1) Hundred's digit (X8 state) 0, 1 (same as X1) Thousand's digit (X9 valid mode) 0, 1 (same as X1) Ten thousand's digit (X10 valid mode) 0, 1 (same as X1)	00000	★

Function Code	Parameter Name	Setting Range	Default	Property
P5 Group Output Terminals				
P5.00	DO terminal output mode	0: Pulse output 1: Switch signal output (	0	☆
P5.01	D0 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: Undervoltage state output 20: Communication setting 21: Reserved	2	☆
P5.02	Relay function (T/A.T/B.T/C)		2	☆

Function Code	Parameter Name	Setting Range	Default	Property
P5.03	Extension card relay function (P/A.P/B.P/C)	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 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 undervoltage occurs.)	0	☆
P5.04			0	☆
P5.05	O1 function selection (open.collector output terminal)		1	☆

Function Code	Parameter Name	Setting Range	Default	Property
P5.06	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: AI3 10: Length 11: Count value 12: Communication setting 13: Motor rotational speed 14: Output current 15: Output voltage 16: Output torque (actual value)	0	☆
P5.07	AO1 function selection		0	☆
P5.08	AO2 function selection		1	☆
P5.09	Maximum D0 output frequency	0.01–100.00 kHz	50.00 kHz	☆
P5.10	AO1 offset coefficient	.100.0%–100.0%	0.0%	☆
P5.11	AO1 gain	.10.00–10.00	1.00	☆
P5.12	AO2 offset coefficient	.100.0%–100.0%	0.00%	☆
P5.13	AO2 gain	.10.00–10.00	1.00	☆
P5.17	D0 output delay time	0.0–3600.0s	0.0s	☆
P5.18	Relay 1 output delay time	0.0–3600.0s	0.0s	☆
P5.19	Relay 2 output delay time	0.0–3600.0s	0.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
P5.20	Y1 output delay time	0.0–3600.0s	0.0s	☆
P5.21	Y2 output delay time	0.0–3600.0s	0.0s	☆
P5.22	Y valid mode selection	Unit's digit (D0 valid mode) 0: Positive logic1: Negative logic Ten's digit (Relay 1 valid mode) 0, 1 (same as Y) Hundred's digit (Relay 2 valid mode) 0, 1 (same as Y) Thousand's digit (Y1 valid mode) 0, 1 (same as Y) Ten thousand's digit (Y2 valid mode) 0, 1 (same as Y)	00000	☆
P6 Group Start/Stop Control				
P6.00	Start mode	0: Direct start1: Rotational speed tracking restart2: Pre.excited start (asynchronous motor)	0	☆
P6.01	Rotational speed tracking mode	0: From frequency at stop 1: From zero speed2: From maximum frequency	0	★
P6.02	Rotational speed tracking speed	1–100	20	☆
P6.03	Startup frequency	0.00–10.00 Hz	0.00 Hz	☆

Function Code	Parameter Name	Setting Range	Default	Property
P6.04	Startup frequency holding time	0.0–100.0s	0.0s	★
P6.05	Startup DC braking current/ Pre.excited current	0%–100%	0%	★
P6.06	Startup DC braking time/ Pre.excited time	0.0–100.0s	0.0s	★
P6.07	Acceleration/Deceleration mode	0: Linear acceleration/ deceleration1: S.curve acceleration/ deceleration A2: S.curve acceleration/ deceleration B	0	★
P6.08	Time proportion of S.curve start segment	0.0% to (100.0% – P6.09)	30.0%	★
P6.09	Time proportion of S.curve end segment	0.0% to (100.0% – P6.08)	30.0%	★
P6.10	Stop mode	0: Decelerate to stop1: Coast to stop	0	☆
P6.11	Initial frequency of stop DC braking	0.00 Hz to maximum frequency	0.00 Hz	☆
P6.12	Waiting time of stop DC braking	0.0–36.0s	0.0s	☆
P6.13	Stop DC braking current	0%–100%	0%	☆
P6.14	Stop DC braking time	0.0–36.0s	0.0s	☆
P6.15	Brake use ratio	0%–100%	100%	☆
P6.18	Rotational speed tracking current	30%~200%		×
P6.21	Demagnetization time	0.00~5.00s	1.00s	×
P7 Group Operation Panel and Display				

Function Code	Parameter Name	Setting Range	Default	Property
P7.01	MJOG Key function selection	0: MJOG key disabled1: Switchover between operation panel control and remote command control (terminal or communication)2: Switchover between forward rotation and reverse rotation3: Forward JOG4: Reverse JOG	0	★
P7.02	STOP/RESET key function	0: STOP/RESET key enabled only in operation panel control1: STOP/RESET key enabled in any operation mode	1	☆
P7.03	LED display running parameters 1	0000–FFFFBit00: 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	☆
P7.03	LED display running parameters 1	Bit08: Y output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: AI3 voltage (V) Bit12: Count value Bit13: Length valueBit14: Load speed displayBit15: PID setting	1F	☆

Function Code	Parameter Name	Setting Range	Default	Property
P7.04	LED display running parameters 2	0000–FFFFBit00: PID feedback Bit01: PLC stageBit02: X5 Pulse setting frequency (kHz)Bit03: Running frequency 2 (Hz) Bit04: Remaining running timeBit05: AI1 voltage before correction (V)Bit06: AI2 voltage before correction (V)Bit07: AI3 voltage before correction (V) Bit08: Linear speedBit09: Current power.on time (Hour)Bit10: Current running time (Min)Bit11:X 5Pulse setting frequency (Hz)Bit12: Communication setting valueBit13: Encoder feedback speed (Hz)Bit14: Main frequency X display (Hz)Bit15: Auxiliary	0	☆
P7.05	LED display stop parameters	0000–FFFFBit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: X input status Bit03: Y output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: AI3 voltage (V) Bit07: Count valueBit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID settingBit12: X5 Pulse setting frequency (kHz)	33	☆
P7.06	Load speed display coefficient	0.0001–6.5000	1.0000	☆

Function Code	Parameter Name	Setting Range	Default	Property
P7.07	Heatsink temperature of inverter module	0.0–100.0°C	.	★
P7.08	Temporary software version	.	.	★●
P7.09	Accumulative running time	0–65535 h	.	★
P7.10	Product number	.	.	★
P7.11	Software version	.	.	★
P7.12	Number of decimal places for load speed display	0: 0 decimal place 1: 1 decimal place 2: 2 decimal places3: 3 decimal places	1	☆
P7.13	Accumulative power.on time	0–65535 h	0 h	★
P7.14	Accumulative power consumption	0–65535 kWh	.	★
P8 Group Enhanced Function				
P8.00	JOG running frequency	0.00 Hz to maximum frequency	2.00 Hz	☆
P8.01	JOG acceleration time	0.0–6500.0s	20.0s	☆
P8.02	JOG deceleration time	0.0–6500.0s	20.0s	☆
P8.03	Acceleration time 2	0.0–6500.0s	Model dependent	☆
P8.04	Deceleration time 2	0.0–6500.0s	Model dependent	☆
P8.05	Acceleration time 3	0.0–6500.0s	Model dependent	☆
P8.06	Deceleration time 3	0.0–6500.0s	Model dependent	☆

Function Code	Parameter Name	Setting Range	Default	Property
P8.07	Acceleration time 4	0.0–500.0s	Model dependent	☆
P8.08	Deceleration time 4	0.0–6500.0s	Model dependent	☆
P8.09	Jump frequency 1	0.00 Hz to maximum frequency	0.00 Hz	☆
P8.10	Jump frequency 2	0.00 Hz to maximum frequency	0.00 Hz	☆
P8.11	Frequency jump amplitude	0.00 Hz to maximum frequency	0.00 Hz	☆
P8.12	Forward/Reverse rotation dead.zone time	0.0–3000.0s	0.0s	☆
P8.13	Reverse control	0: Enabled1: Disabled	0	☆
P8.14	Running mode when set frequency lower than frequency lower limit	0: Run at frequency lower limit 1: Stop2: Run at zero speed	0	☆
P8.15	Droop control	0.00–10.00 Hz	0.00 Hz	☆
P8.16	Accumulative power.on time threshold	0–65000 h	0 h	☆
P8.17	Accumulative running time threshold	0–65000 h	0 h	☆
P8.18	Startup protection	0: No1: Yes	0	☆
P8.19	Frequency detection value (FDT1)	0.00 Hz to maximum frequency	50.00 Hz	☆
P8.20	Frequency detection hysteresis (FDT hysteresis 1)	0.0%–100.0% (FDT1 level)	5.0%	☆
P8.21	Detection range of frequency reached	0.00–100% (maximum frequency)	0.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
P8.22	Jump frequency during acceleration/deceleration	0: Disabled1: Enabled	0	☆
P8.25	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 Hz to maximum frequency	0.00 Hz	☆
P8.26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 to maximum frequency	0.00 Hz	☆
P8.27	Terminal JOG preferred	0: Disabled1: Enabled	0	☆
P8.28	Frequency detection value (FDT2)	0.00 to maximum frequency	50.00 Hz	☆
P8.29	Frequency detection hysteresis (FDT hysteresis 2)	0.0%–100.0% (FDT2 level)	5.0%	☆
P8.30	Any frequency reaching detection value 1	0.00 Hz to maximum frequency	50.00 Hz	☆
P8.31	Any frequency reaching detection amplitude 1	0.0%–100.0% (maximum frequency)	0.0%	☆
P8.32	Any frequency reaching detection value 2	0.00 Hz to maximum frequency	50.00 Hz	☆
P8.33	Any frequency reaching detection amplitude 2	0.0%–100.0% (maximum frequency)	0.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
P8.34	Zero current detection level	0.0%–300.0% (rated motor current)	5.0%	☆
P8.35	Zero current detection delay time	0.00–600.00s	0.10s	☆
P8.36	Output overcurrent threshold	0.0% (no detection)0.1%–300.0% (rated motor current)	200.0%	☆
P8.37	Output overcurrent detection delay time	0.00–600.00s	0.00s	☆
P8.38	Any current reaching 1	0.0%–300.0% (rated motor current)	100.0%	☆
P8.39	Any current reaching 1 amplitude	0.0%–300.0% (rated motor current)	0.0%	☆
P8.40	Any current reaching 2	0.0%–300.0% (rated motor current)	100.0%	☆
P8.41	Any current reaching 2 amplitude	0.0%–300.0% (rated motor current)	0.0%	☆
P8.42	Timing function	0: Disabled1: Enabled	0	☆
P8.43	Timing duration source	0: P8.44 1: AI12: AI2 3: AI3(100% of analog input corresponds to the value of P8.44)	0	☆
P8.44	Timing duration	0.0–6500.0 min	0.0 min	☆
P8.45	AI1 input voltage lower limit	0.00 V to P8.46	3.10 V	☆
P8.46	AI1 input voltage upper limit	P8.45 to 10.00 V	6.80 V	☆
P8.47	Module temperature threshold	0–100°C	75°C	☆

Function Code	Parameter Name	Setting Range	Default	Property
P8.48	Cooling fan control	0: Fan working during running1: Fan working continuously	0	☆
P8.49	Wakeup frequency	Dormant frequency (P8.51) to maximum frequency (P0.10)	0.00 Hz	☆
P8.50	Wakeup delay time	0.0–6500.0s	0.0s	☆
P8.51	Dormant frequency	0.00 Hz to wakeup frequency (P8.49)	0.00 Hz	☆
P8.52	Dormant delay time	0.0–6500.0s	0.0s	☆
P8.53	Current running time reached	0.0–6500.0 min	0.0 min	☆
P8.54	Output power correction coefficient	0.00%–200 .0%	100.0%	☆
P9 Group Fault and Protection				
P9.00	Motor overload protection selection	0:Disabled 1:Enabled	1	☆
P9.01	Motor overload protection gain	0.20–10.00	1.00	☆
P9.02	Motor overload warning coefficient	50%–100%	80%	☆
P9.03	Overvoltage stall gain	0 (no stall overvoltage)–100	0	☆
P9.04	Overvoltage stall protective voltage	120%–150%	130%	☆
P9.05	Overcurrent stall gain	0–100	20	☆
P9.06	Overcurrent stall protective current	100%–200%	150%	☆
P9.07	Short.circuit to ground upon power.on	0: Disabled1: Enabled	1	☆

Function Code	Parameter Name	Setting Range	Default	Property
P9.08	Braking unit operation initial voltage	700 ～ 800V	780V	
P9.09	Fault auto reset times	0–20	0	☆
P9.10	Y action during fault auto reset	0: Not act1: Act	0	☆
P9.11	Time interval of fault auto reset	0.1s–100.0s	1.0s	☆
P9.12	Input phase loss protection/ contactor energizing protection selection	Unit's digit: Input phase loss protectionTen's digit: Contactor energizing protection0: Disabled1: Enabled	11	☆
P9.13	Output phase loss protection selection	0: Disabled1: Enabled	1	☆
P9.14	1st fault type	0: No fault 1: Reserved 2:Overcurrent during acceleration 3: Overcurrent during deceleration 4: Overcurrent at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Buffer resistance overload 9: Undervoltage	.	★

Function Code	Parameter Name	Setting Range	Default	Property
P9.15	2nd fault type	10: AC drive overload 11: Motoroverload 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	-	★
P9.16	3rd fault type(Latest)			
P9.17	Frequency upon 3rd fault	-	-	★
P9.18	Current upon 3rd fault	-	-	★

Function Code	Parameter Name	Setting Range	Default	Property
P9.19	Bus voltage upon 3rd fault	-	-	★
P9.20	X status upon 3rd fault	-	-	★
P9.21	Output terminal status upon 3rd fault	-	-	★
P9.22	AC drive status upon 3rd fault	-	-	★
P9.23	Power.on time upon 3rd fault	-	-	●
P9.24	Running time upon 3rd fault	-	-	★
P9.27	Frequency upon 2nd fault	-	-	★
P9.28	Current upon 2nd fault	-	-	★
P9.29	Bus voltage upon 2nd fault	-	-	★
P9.30	X status upon 2nd fault	-	-	★
P9.31	Output terminal status upon 2nd fault	-	-	●
P9.32	Frequency upon 2nd fault	-	-	★
P9.33	Current upon 2nd fault	-	-	★
P9.34	Bus voltage upon 2nd fault	-	-	★
P9.37	X status upon 1st fault	-	.	★
P9.38	Output terminal status upon 1st fault	-	.	★

Function Code	Parameter Name	Setting Range	Default	Property
P9.39	Frequency upon 1st fault	-	.	★
P9.40	Current upon 1st fault	-	.	★
P9.41	Bus voltage upon 3rd fault	-	.	★
P9.42	X status upon 1st fault	-	.	★
P9.43	Output terminal status upon 1st fault	-	.	★
P9.44	Frequency upon 1st fault	-	.	★
P9.47	Fault protection action selection 1	Unit's digit (Motor overload, Err11)	0000000000	☆☆
		0: Coast to stop 1: Stop according to the stop mode 2: Continue to run		
		Ten's digit (Power input phase loss, Err12)		
		Same as unit's digit		
		Hundred's digit (Power output phase loss, Err13)		
		Same as unit's digit		
		Thousand's digit (External equipment fault, Err15)		
		Same as unit's digit		
		Ten thousand's digit (Communication fault, Err16)		
		Same as unit's digit		

Function Code	Parameter Name	Setting Range	Default	Property
P9.48	Fault protection action selection 2	Unit's digit (Encoder fault, Err20)	00000	☆
		0: Coast to stop 1: Switch over to V/F control, stop according to the stop mode2: Switch over to V/F control, continue to run		
		Ten's digit (EEPROM read.write fault, Err21)		
		0: Coast to stop 1: Stop according to the stop mode		
		Hundred's digit: reserved	00000	☆
		Thousand's digit (Motor overheat, Err25)		
		Same as unit's digit in P9.47		
		Ten thousand's digit (Accumulative running time reached)		
		Same as unit's digit in P9.47		

Function Code	Parameter Name	Setting Range	Default	Property
P9.49	Fault protection action selection	Unit's digit (User.defined fault 1, Err27)	00000000 00	☆☆
		Same as unit's digit in P9.47		
		Ten's digit (User.defined fault 2, Err28)		
		Same as unit's digit in P9.47		
		Hundred's digit (Accumulative power.on time reached, Err29)		
		Same as unit's digit in P9.47		
		Thousand's digit (Load becoming 0, Err30)		
		0: Coast to stop 1: Stop according to the stop mode 2: Continue to run at 7% of rated motor frequency and resumeto the set frequency if the load recovers		
		Ten thousand's digit (PID feedback lost during running, Err31)		
		Same as unit's digit in P9.47		

Function Code	Parameter Name	Setting Range	Default	Property
P9.50	Fault protection action selection 4	Unit's digit (Too large speed deviation, Err42) Same as unit's digit in P9.47 Ten's digit (Motor over.speed, Err43) Same as unit's digit in P9.47 Hundred's digit (Initial position fault, Err51) Same as unit's digit in P9.47 Thousand's digit (Speed feedback fault, Err52) Same as unit's digit in P9.47 Ten thousand's digit: Reserved	00000	☆
P9.54	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	☆
P9.55	Backup frequency upon abnormality	0.0%–100.0% (maximum frequency)	100.0%	☆
P9.56	Type of motor temperature sensor	0: No temperature sensor 1: PT100 2:PT1000	1	☆
P9.57	Motor overheat protection threshold	0–200°C	110°C	☆
P9.58	Motor overheat warning threshold	0–200°C	90°C	☆

Function Code	Parameter Name	Setting Range	Default	Property
P9.59	Action selection at instantaneous power failure	0: Invalid 1: Decelerate 2: Decelerate to stop	0	☆
P9.60	Action pause judging voltage at instantaneous power failure	80.0%–100.0%	90.0%	☆
P9.61	Voltage rally judging time at instantaneous power failure	0.00–100.00s	0.50s	☆
P9.62	Action judging voltage at instantaneous power failure	60.0%–100.0% (standard bus voltage)	80.0%	☆
P9.63	Protection upon load becoming 0	0: Disabled1: Enabled	0	☆
P9.64	Detection level of load becoming 0	0.0%–100.0% (rated motor current)	10.0%	☆
P9.65	Detection time of load becoming 0	0.0–60.0s	1.0s	☆
P9.67	Over.speed detection value	0.0%–50.0% (maximum frequency)	20.0%	☆
P9.68	Over.speed detection time	0.0–60.0s	1.0s	☆
P9.69	Detection value of too large speed deviation	0.0%–50.0% (maximum frequency)	20.0%	☆
P9.70	Detection time of too large speed deviation	0.0–60.0s	5.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
P9.71	Power dip ride through gain Kp	0~100	40	○
P9.72	Power dip ride through intrfral coefficient Ki	0~100	30	○
P9.73	Deceleration time of Power dip ride through	0~300.0s	20.0s	○
P9.74	UVW encoder fault （Err20） enabling	0,1	1	○
P9.75	Fault protection action selection 5	Units position:initial position angle identification （51）0:continue to run1:coast to stop Tens position:with load auto tuning fault（19） 0:continue to run1:coast to stop	11	○
PA Group Process Control PID Function				
PA.00	PID setting source	0: PA.01 1: AI1 2:AI2 3:AI3 4: Pulse setting (X5) 5: Communication setting 6: Multi.reference	0	☆
PA.01	PID digital setting	0.0%–100.0%	50.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
PA.02	PID feedback source	0: AI1 1: AI2 2: AI3 3: AI1 – AI2 4: Pulse setting (X5) 5: Communication setting 6: AI1 + AI2 7: MAX (AI1, AI2) 8: MIN (AI1, AI2)	0	☆
PA.03	PID action direction	0: Forward action1: Reverse action	0	☆
PA.04	PID setting feedback range	0–65535	1000	☆
PA.05	Proportional gain Kp1	0.0–100.0	20.0	☆
PA.06	Integral time Ti1	0.01–10.00s	2.00s	☆
PA.07	Differential time Td1	0.00–10.000	0.000s	☆
PA.08	Cut.off frequency of PID reverse rotation	0.00 to maximum frequency	2.00 Hz	☆
PA.09	PID deviation limit	0.0%–100.0%	0.0%	☆
PA.10	PID differential limit	0.00%–100.00%	0.10%	☆
PA.11	PID setting change time	0.00–650.00s	0.00s	☆
PA.12	PID feedback filter time	0.00–60.00s	0.00s	☆
PA.13	PID output filter time	0.00–60.00s	0.00s	☆
PA.14	Reserved	-	-	☆
PA.15	Proportional gain Kp2	0.0–100.0	20.0	☆
PA.16	Integral time Ti2	0.01–10.00s	2.00s	☆

Function Code	Parameter Name	Setting Range	Default	Property
PA.17	Differential time Td2	0.000–10.000s	0.000s	☆
PA.18	PID parameter switchover condition	0: No switchover 1: Switchover via X5 2: Automatic switchover based on deviation	0	☆
PA.19	PID parameter switchover deviation 1	0.0% to PA.20	20.0%	☆
PA.20	PID parameter switchover deviation 2	PA.19 to 100.0%	80.0%	☆
PA.21	PID initial value	0.0%–100.0%	0.0%	☆
PA.22	PID initial value holding time	0.00–650.00s	0.00s	☆
PA.23	Maximum deviation between two PID outputs in forward direction	0.00%–100.00%	1.00%	☆
PA.24	Maximum deviation between two PID outputs in reverse direction	0.00%–100.00%	1.00%	☆
PA.25	PID integral property	Unit's digit (Integral separated)	00	☆
		0: Invalid1: Valid		
		Ten's digit (Whether to stop integral operation when the output reaches the limit)		
		0: Continue integral operation1: Stop integral operation		

Function Code	Parameter Name	Setting Range	Default	Property
PA.26	Detection value ofPID feedback loss	0.0%: Not judging feedback loss0.1%–100.0%	0.0%	☆
PA.27	Detection time ofPID feedback loss	0.0–20.0s	0.0s	☆
PA.28	PID operation at stop	0: No PID operation at stop1: PID operation at stop	0	☆
PB Group Swing Frequency, Fixed Length and Count				
PB.00	Swing frequency setting mode	0: Relative to the central frequency 1: Relative to the maximum frequency	0	☆
PB.01	Swing frequency amplitude	0.0%–100.0%	0.0%	☆
PB.02	Jump frequency amplitude	0.0%–50.0%	0.0%	☆
PB.03	Swing frequency cycle	0.0–3000.0s	10.0s	☆
PB.04	Triangular wave rising time coefficient	0.0%–100.0%	50.0%	☆
PB.05	Set length	0–65535 m	1000 m	☆
PB.06	Actual length	0–65535 m	0 m	☆
PB.07	Number of pulses per meter	0.1–6553.5	100.0	☆
PB.08	Set count value	1–65535	1000	☆
PB.09	Designated count value	1–65535	1000	☆
PC Group Multi.Reference and Simple PLC Function				
PC.00	Reference 0	.100.0%–100.0%	0.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
PC.01	Reference 1	.100.0%–100.0%	0.0%	☆
PC.02	Reference 2	.100.0%–100.0%	0.0%	☆
PC.03	Reference 3	.100.0%–100.0%	0.0%	☆
PC.04	Reference 4	.100.0%–100.0%	0.0%	☆
PC.05	Reference 5	.100.0%–100.0%	0.0%	☆
PC.06	Reference 6	.100.0%–100.0%	0.0%	☆
PC.07	Reference 7	.100.0%–100.0%	0.0%	☆
PC.08	Reference 8	.100.0%–100.0%	0.0%	☆
PC.09	Reference 9	.100.0%–100.0%	0.0%	☆
PC.10	Reference 10	.100.0%–100.0%	0.0%	☆
PC.11	Reference 11	.100.0%–100.0%	0.0%	☆
PC.12	Reference 12	.100.0%–100.0%	0.0%	☆
PC.13	Reference 13	.100.0%–100.0%	0.0%	☆
PC.14	Reference 14	.100.0%–100.0%	0.0%	☆
PC.15	Reference 15	.100.0% ～ 100.0%	0.0%	☆
PC.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	☆
PC.17	Simple PLC retentive selection	Unit's digit (Retentive upon power failure)	00	☆
		0: No1: Yes		
		Ten's digit (Retentive upon stop)		
		0: No1: Yes		

Function Code	Parameter Name	Setting Range	Default	Property
PC.18	Running time of simple PLC reference 0	0.0–6553.5s (h)	0.0s (h)	☆
PC.19	Acceleration/deceleration time of simple PLC reference 0	0–3	0	☆
PC.20	Running time of simple PLC reference 1	0.0–6553.5s (h)	0.0s (h)	☆
PC.21	Acceleration/deceleration time of simple PLC reference 1	0–3	0	☆
PC.22	Running time of simple PLC reference 2	0.0–6553.5s (h)	0.0s (h)	☆
PC.23	Acceleration/deceleration time of simple PLC reference 2	0–3	0	☆
PC.24	Running time of simple PLC reference 3	0.0–6553.5s (h)	0.0s (h)	☆
PC.25	Acceleration/deceleration time of simple PLC reference 3	0–3	0	☆
PC.26	Running time of simple PLC reference 4	0.0–6553.5s (h)	0.0s (h)	☆
PC.27	Acceleration/deceleration time of simple PLC reference 4	0–3	0	☆
PC.28	Running time of simple PLC reference 5	0.0–6553.5s (h)	0.0s (h)	☆
PC.29	Acceleration/deceleration time of simple PLC reference 5	0–3	0	☆
PC.30	Running time of simple PLC reference 6	0.0–6553.5s (h)	0.0s (h)	☆

Function Code	Parameter Name	Setting Range	Default	Property
PC.31	Acceleration/deceleration time of simple PLC reference 6	0–3	0	☆
PC.32	Running time of simple PLC reference 7	0.0–6553.5s (h)	0.0s (h)	☆
PC.33	Acceleration/deceleration time of simple PLC reference 7	0–3	0	☆
PC.34	Running time of simple PLC reference 8	0.0–6553.5s (h)	0.0s (h)	☆
PC.35	Acceleration/deceleration time of simple PLC reference 8	0–3	0	☆
PC.36	Running time of simple PLC reference 9	0.0–6553.5s (h)	0.0s (h)	☆
PC.37	Acceleration/deceleration time of simple PLC reference 9	0–3	0	☆
PC.38	Running time of simple PLC reference 10	0.0–6553.5s (h)	0.0s (h)	☆
PC.39	Acceleration/deceleration time of simple PLC reference 10	0–3	0	☆
PC.40	Running time of simple PLC reference 11	0.0–6553.5s (h)	0.0s (h)	☆
PC.41	Acceleration/deceleration time of simple PLC reference 11	0–3	0	☆
PC.42	Running time of simple PLC reference 12	0.0–6553.5s (h)	0.0s (h)	☆

Function Code	Parameter Name	Setting Range	Default	Property
PC.43	Acceleration/deceleration time of simple PLC reference 12	0–3	0	☆
PC.44	Running time of simple PLC reference 13	0.0–6553.5s (h)	0.0s (h)	☆
PC.45	Acceleration/deceleration time of simple PLC reference 13	0–3	0	☆
PC.46	Running time of simple PLC reference 14	0.0–6553.5s (h)	0.0s (h)	☆
PC.47	Acceleration/deceleration time of simple PLC reference 14	0–3	0	☆
PC.48	Running time of simple PLC reference 15	0.0–6553.5s (h)	0.0s (h)	☆
PC.49	Acceleration/deceleration time of simple PLC reference 15	0–3	0	☆
PC.50	Time unit of simplePLC running	0: s (second)1:h (hour)	0	☆
PC.51	Reference 0 source	0: Set by PC.00 1: AI1 2: AI2 3: AI3 4: Pulse setting X5 5.: PID 6: Set by preset frequency (P0.08), modified via terminal UP/ DOWN	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
PD Group Communication Parameter				
PD.00	Baud rate	Unit's 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 Ten's digit (PROFIBUS.DP baud rate) 0: 115200 BPs 1: 208300 BPs 2: 256000 BPs 3: 512000 Bps Hundred's digit (reserved) Thousand's digit (CANlink baud rate) 0: 20 1: 50 2:100 3:125 4: 250 5: 500 6: 1 M	60056005	☆☆

Function Code	Parameter Name	Setting Range	Default	Property
PD.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	☆
PD.02	Local address	0: Broadcast address 1–247Valid for Modbus, PROFIBUS.DP and CANlink	1	☆
PD.03	Response delay	0–20 msValid for Modbus	2 ms	☆
PD.04	Communication timeout	0.0s (invalid) 0.1–60.0sValid for Modbus	0.0s	☆
PD.05	Modbus protocol selection and PROFIBUS.DP data format	Unit's digit: Modbus protocol	30	☆
		0: Non.standard Modbus protocol1: Standard Modbus protocol		
		Ten's digit: PROFIBUS.DP data format		
		0: PPO1 format 1: PPO2 format 2: PPO3 format 3: PPO5 format		

Function Code	Parameter Name	Setting Range	Default	Property
PD.06	Communication reading current resolution	0: 0.01A1: 0.1A	0	☆
PD.08	CANlink communication timeout time	0.0s: Invalid0.1–60.0s	0	☆
PE Group User.Defined Function Codes				
PE.00	User.defined function code 0	P0.00 to PP.xxA0.00 to Ax.xxU0.xx to U0.xx	P0.10	☆
PE.01	User. defined function code 1		P0.02	☆
PE.02	User.defined function code 2		P0.03	☆
PE.03	User.defined function code 3		P0.07	☆
PE.04	User.defined function code 4		P0.08	☆
PE.05	User.defined function code 5		P0.17	☆
PE.06	User.defined function code 6		P0.18	☆
PE.07	User.defined function code 7		P3.00	☆
PE.08	User.defined function code 8		P3.01	☆
PE.09	User.defined function code 9		P4.00	☆
PE.10	User.defined function code 10		P4.01	☆
PE.11	User.defined function code 11		P4.02	☆
PE.12	User.defined function code 12		P5.04	☆

Function Code	Parameter Name	Setting Range	Default	Property
PE.13	User.defined function code 13	P0.00 to PP.xxA0.00 to Ax.xxU0.xx to U0.xx	P5.07	☆
PE.14	User.defined function code 14		P6.00	☆
PE.15	User.defined function code 15		P6.10	☆
PE.16	User.defined function code 16		P0.00	☆
PE.17	User.defined function code 17		P0.00	☆
PE.18	User.defined function code 18		P0.00	☆
PE.19	User.defined function code 19		P0.00	☆
PE.20	User.defined function code 20		P0.00	☆
PE.21	User.defined function code 21		P0.00	☆
PE.22	User.defined function code 22		P0.00	☆
PE.23	User.defined function code 23		P0.00	☆
PE.24	User.defined function code 24		P0.00	☆
PE.25	User.defined function code 25		P0.00	☆
PE.26	User.defined function code 26		P0.00	☆
PE.27	User.defined function code 27		P0.00	☆
PE.28	User.defined function code 28		P0.00	☆
PE.29	User.defined function code 29		P0.00	☆

Function Code	Parameter Name	Setting Range	Default	Property
PP Group User Password				
PP.00	User password	0–65535	0	☆
PP.01	Restore default settings	0: No operation0 1:Restore factory settings except motor parameters 02: Clear records04: Restore user backup parameters 501: Back up currentuser parameters	0	★
PP.02	AC drive parameter display property	Unit's digit (Group U display selection)	11	★
		0: Not display1: Display		
		Ten's digit (Group A display selection)		
		0: Not display1: Display		
PP.03	Individualizedparameter display property	Unit's digit (User.defined parameter display selection)	00	☆
		0: Not display1: Display		
		Ten's digit (User.modified parameter display selection)		
		0: Not display1: Display		
PP.04	Parametermodification property	0: Modifiable1: Not modifiable	0	☆
A0 Group Torque Control and Restricting Parameters				
A0.00	Speed/Torquecontrol selection	0: Speed control1: Torque control	0	★

Function Code	Parameter Name	Setting Range	Default	Property
A0.01	Torque setting source in torque control	0: Digital setting (A0.03) 1: AI1 2: AI2 3: AI3 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 A0.03.	0	★
A0.03	Torque digital setting in torque control	.200.0%–200.0%	150.0%	☆
A0.05	Forward maximumfrequency in torque control	0.00 Hz to maximum frequency (P0.10)	50.00 Hz	☆
A0.06	Reverse maximumfrequency in torque control	0.00 Hz to maximum frequency (P0.10)	50.00 Hz	☆
A0.07	Acceleration time in torque control	0.00–65000s	0.00s	☆
A0.08	Deceleration time in torque control	0.00–65000s	0.00s	☆
A1 Group Virtual X /Virtual Y				
A1.00	VX1 function selection	0–59	0	★
A1.01	VX2 function selection	0–59	0	★
A1.02	VX3 function selection	0–59	0	★
A1.03	VX4 function selection	0–59	0	★

Function Code	Parameter Name	Setting Range	Default	Property
A1.04	VX5 function selection	0–59	0	★
A1.05	VX state setting mode	Unit's digit (VX1)	00000	★
		0: Decided by state of VYx1: Decided by A1.06		
		Ten's digit (VX2)		
		0, 1 (same as VX1)		
		Hundred's digit (VX3)		
		0, 1 (same as VX1)		
		Thousand's digit (VX4)		
		0, 1 (same as VX1)		
		Ten thousand's digit (VX5)		
		0, 1 (same as VX1)		
A1.06	VX state selection	Unit's digit (VX1)	00000	★
		0: Invalid 1: Valid		
		Ten's digit (VX2)		
		0, 1 (same as VX1)		
		Hundred's digit (VX3)		
		0, 1 (same as VX1)		
		Thousand's digit (VX4)		
		0, 1 (same as VX1)		
		Ten thousand's digit (VX5)		
		0, 1 (same as VX1)		
A1.07	Function selection for AI1 used as X	0–59	0	★

Function Code	Parameter Name	Setting Range	Default	Property
A1.08	Function selection for AI2 used as X	0–59	0	★
A1.09	Function selection for AI3 used as X	0–59	0	★
A1.10	State selection for AI used as X	Unit's digit (AI1)		
		0: High level valid 1: Low level valid		
		Ten's digit (AI2)		
		0, 1 (same as unit's digit)		
		Hundred's digit (AI3)		
		0, 1 (same as unit's digit)		
A1.11	VY1 function selection	0: Short with physical Xx internally1–40: Refer to function selection of physical Y in group P5.	0	☆
A1.12	VY2 function selection	0: Short with physical Xx internally1–40: Refer to function selection of physical Y in group P5.	0	☆
A1.13	VY3 function selection	0: Short with physical Dix internally1–40: Refer to function selection of physical Y in group P5.	0	☆
A1.14	VY4 function selection	0: Short with physical Xx internally1–40: Refer to function selection of physical Y in group P5.	0	☆
A1.15	VY5 function selection	0: Short with physical Xx internally1–40: Refer to function selection of physical Y in group P5.	0	☆
A1.16	VY1 output delay	0.0–3600.0s	0.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
A1.17	VY2 output delay	0.0–3600.0s	0.0s	☆
A1.18	VY3 output delay	0.0–3600.0s	0.0s	☆
A1.19	VY4 output delay	0.0–3600.0s	0.0s	☆
A1.20	VY5 output delay	0.0–3600.0s	0.0s	☆
A1.21	VY state selection	Unit's digit (VY1) 0: Positive logic 1: Reverse logic Ten's digit (VY2) 0, 1 (same as unit's digit) Hundred's digit (VY3) 0, 1 (same as unit's digit) Thousand's digit (VY4) 0, 1 (same as unit's digit) Ten thousand's digit (VY5) 0, 1 (same as unit's digit)		
A2 Group Motor 2 Parameters				
A2.00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Permanent magnetic synchronous motor	0	★
A2.01	Rated motor power	0.1–1000.0 kW	Model dependent	★
A2.02	Rated motor voltage	1–2000 V	Model dependent	★
A2.03	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	★

Function Code	Parameter Name	Setting Range	Default	Property
A2.04	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★
A2.05	Rated motor rotational speed	1–65535 RPM	Model dependent	★
A2.06	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	★
A2.07	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	★
A2.07	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	★
A2.08	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	★
A2.09	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	★
A2.10	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	★
A2.16	Stator resistance (synchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW)0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
A2.17	Shaft D inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW)0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A2.18	Shaft Q inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW)0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A2.20	Back EMF (synchronous motor)	0.1–6553.5 V	Model dependent	★
A2.27	Encoder pulses per revolution	1–65535	1024	★
A2.28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver3: SIN/COS encoder4: Wire.saving UVW encoder	0	★
A2.29	Speed feedback PG selection	0:local PG1:Extend PG2: X5 Pulse input	0	★
A2.30	A, B phase sequence ofABZ incremental encoder	0: Forward1: Reserve	0	★
A2.31	Encoder installation angle	0.0°–359.9°	0.0°	★
A2.32	U, V, W phase sequence of UVW encoder	0: Forward1: Reverse	0	★
A2.33	UVW encoder angle offset	0.0°–359.9°	0.0°	★
A2.34	Number of pole pairs of resolver	1–65535	1	★

Function Code	Parameter Name	Setting Range	Default	Property
A2.36	Encoder wire.break fault detection time	0.0s: No action0.1–10.0s	0.0s	★
A2.37	Auto.tuning selection	0: No auto.tuning 1: Asynchronous motor static auto.tuning 2: Asynchronous motor complete auto.tuning11: Synchronous motor with.load auto.tuning12: Synchronous motor no.load auto.tuning	0	★
A2.38	Speed loop proportional gain 1	0–100	30	☆
A2.39	Speed loop integral time 1	0.01–10.00s	0.50s	☆
A2.40	Switchover frequency 1	0.00 to A2.43	5.00 Hz	☆
A2.41	Speed loop proportional gain 2	0–100	15	☆
A2.42	Speed loop integral time 2	0.01–10.00s	1.00s	☆
A2.43	Switchover frequency 2	A2.40 to maximum output frequency	10.00 Hz	☆
A2.44	Vector control slip gain	50%–200%	100%	☆
A2.45	Time constant of speed loop filter	0.000–0.100s	0.000s	☆
A2.46	Vector control over.excitation gain	0–200	64	☆

Function Code	Parameter Name	Setting Range	Default	Property
A2.47	Torque upper limit source in speed control mode	0: A2.48 1: AI1 2: AI2 3: AI3 4: Pulse setting (X5) 5: Via communication 6: MIN(AI1,AI2) 7: MIN(AI1,AI2)	0	☆
A2.48	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆
A2.49	Torque limit source in speed control （regenerative）	0:set by A2.50 1:AI1 2:AI2 3:AI3 4:PULSE setting 5:communication setting 6:MIN(AI1,AI2) 7:MAX(AI1,AI2) 8:set by P2.12	0	○
A2.50	Digital setting of torque limit in speed control（regenerative）	0.0%～200.0%	150.0%	○
A2.51	Excitation adjustment proportional gain	0–60000	2000	☆
A2.52	Excitation adjustment integral gain	0–60000	1300	☆
A2.53	Torque adjustment proportional gain	0–60000	2000	☆
A2.54	Torque adjustment integral gain	0–60000	1300	☆

Function Code	Parameter Name	Setting Range	Default	Property
A2.55	Speed loop integral property	Unit's digit: Integral separated0: Disabled 1: Enabled	0	☆
A2.56	Field weakening mode of synchronous motor	0: No field weakening 1: Direct calculation 2: Adjustment	0	☆
A2.57	Field weakening degree of synchronous motor	50%–500%	100%	☆
A2.58	Maximum field weakening current	1%–300%	50%	☆
A2.59	Weak Sectors Max torque coefficient	50.0%–200.0%	100%	☆
A2.60	Generated power upper limit	0:invalid 1: entire valid 2. constant speed valid 3. decelerate valid	0	☆
A2.61	Generated power limit	0.200%	Model dependent	☆
A2.61	Motor 2 control mode	0: Sensorless flux vector control (SVC) 1: Closed.loop vector control (FVC) 2: Voltage/Frequency (V/F) control	0	☆
A2.62	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	☆

Function Code	Parameter Name	Setting Range	Default	Property
A2.63	Motor 2 torque boost	0.0%: Automatic torque boost0.1%–30.0%	Model dependent	☆
A2.65	Motor 2 oscillation suppression gain	0–100	Model dependent	☆
A2.66	Regenerative power limit	0%~50%	5%	○
A2.67	Initial position angle detection current of synchronous motor	50%~180%	80%	○
A2.68	Initial position angle detection of synchronous motor	0,1,2	0	○
A2.70	Salient.pole rate adjustment gain of synchronous motor	50~500	100	○
A2.71	MTPA control	0,1	0	○
A2.75	Z sigal correction	0,1	1	○
A2.79	Low speed excitation current	0~80%	30%	○
A2.80	Low speed frequency	0.8K~P0.15	1.5K	○
A2.81	SVC low frequency braking mode	0,1	0	○
A2.82	SVC low frequency braking valid frequency	0~10.00Hz	2.00Hz	○
A2.83	SVC low frequency braking change step	0.0005~1.0000Hz	0.0010Hz	○

Function Code	Parameter Name	Setting Range	Default	Property
A2.84	SVC low frequency braking current	0~80%	50%	○
A2.85	Synchronous motor SVC speed tracking	0~1	0	○
A2.86	Zero servo enabling	0~1	0	○
A2.87	Switchover frequency	0.00～P2.02	0.30Hz	○
A2.88	Zero servo speed loop proportional gain	1～100	10	○
A2.89	Zero servo speed loop integral time	0.01s～10.00s	0.50s	○
A2.90	Stop anti.reversion enabling	0~1	0	○
A2.91	Stop angle	0.0°～10.0°	0.8°	○
A5 Group Control Optimization Parameters				
A5.00	DPWM switchover frequency upper limit	0.00–15.00 Hz	12.00 Hz	☆
A5.01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
A5.02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode 1 2: Compensation mode 2	1	☆
A5.03	Random PWM depth	0: Random PWM invalid1–10	0	☆
A5.04	Rapid current limit	0: Disabled 1: Enabled	1	☆

Function Code	Parameter Name	Setting Range	Default	Property
A5.05	Current detection compensation	0–100	5	☆
A5.06	Undervoltage threshold	60.0%–140.0%	100.0%	☆
A5.07	SFVC optimization mode selection	0: No optimization 1: Optimization mode 1 2: Optimization mode 2	1	☆
A5.08	Dead.zone time adjustment	100%–200%	150%	☆
A5.09	Overvoltage threshold	200.0–2500.0 V	2000.0 V	☆
A6 Group AI Curve Setting				
A6.00	AI curve 4 minimum input	.10.00 V to A6.02	0.00 V	☆
A6.01	Corresponding setting of AI curve 4 minimum input	.100.0%–100.0%	0.0%	☆
A6.02	AI curve 4 inflexion 1 input	A6.00 to A6.04	3.00 V	☆
A6.03	Corresponding setting of AI curve 4 inflexion 1 input	.100.0%–100.0%	30.0%	☆
A6.04	AI curve 4 inflexion 1 input	A6.02 to A6.06	6.00 V	☆
A6.05	Corresponding setting of AI curve 4 inflexion 1 input	.100.0%–100.0%	60.0%	☆
A6.06	AI curve 4 maximum input	A6.06 to 10.00 V	10.00 V	☆
A6.07	Corresponding setting of AI curve 4 maximum input	.100.0%–100.0%	100.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
A6.08	AI curve 5 minimum input	.10.00 V to A6.10	0.00 V	☆
A6.09	Corresponding setting of AI curve 5 minimum input	.100.0%–100.0%	0.0%	☆
A6.10	AI curve 5 inflexion 1 input	A6.08 to A6.12	3.00 V	☆
A6.11	Corresponding setting of AI curve 5 inflexion 1 input	.100.0%–100.0%	30.0%	☆
A6.12	AI curve 5 inflexion 1 input	A6.10 to A6.14	6.00 V	☆
A6.13	Corresponding setting of AI curve 5 inflexion 1 input	.100.0%–100.0%	60.0%	☆
A6.14	AI curve 5 maximum input	A6.14 to 10.00 V	10.00 V	☆
A6.15	Corresponding setting of AI curve 5 maximum input	.100.0%–100.0%	100.0%	☆
A6.24	Jump point of AI1 input corresponding setting	.100.0%–100.0%	0.0%	☆
A6.25	Jump amplitude of AI1 input corresponding setting	0.0%–100.0%	0.5%	☆
A6.26	Jump point of AI2 input corresponding setting	.100.0%–100.0%	0.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
A6.27	Jump amplitude of AI2 input corresponding setting	0.0%–100.0%	0.5%	☆
A6.28	Jump point of AI3 input corresponding setting	.100.0%–100.0%	0.0%	☆
A6.29	Jump amplitude of AI3 input corresponding setting	0.0%–100.0%	0.5%	☆
A7 Group User Programmable Function				
A7.00	User programmable function selection	0: Disabled1: Enabled	0	★
A7.01	Selection of control mode of the output terminals on the control board	Unit's digit: Y1	0	★
		0: Controlled by the AC drive 1: Controlled by the user programmable card		
		Ten's digit: relay (TA.TB.TC)		
		Same as unit's digit		
		Hundred's digit: Y1		
		Same as unit's digit		
		Thousand's digit D0		
		Same as unit's digit		
		Ten thousand's digit: AO1		
		Same as unit's digit		

Function Code	Parameter Name	Setting Range	Default	Property
A7.02	AI/AO function selection of the user programmable card	0: AI3 (voltage input), AO2 (voltage output) 1: AI3 (voltage input), AO2 (current output) 2: AI3 (current input), AO2 (voltage output) 3: AI3 (current input), AO2 (current output) 4: AI3 (PTC input), AO2 (voltage output) 5: AI3 (PTC input), AO2 (current output) 6: AI3 (PTC100 input), AO2 (voltage output) 7: AI3 (PTC100 input), AO2 (current output)	0	★
A7.03	D0 output	0.0%–100.0%	0.0%	☆
A7.04	AO1 output	0.0%–100.0%	0.0%	☆
A7.05	Digital output	Binary setting Unit's digit: Ten's digit: Relay1Hundred's digit: Y	1	☆
A7.06	Frequency setting through the user programmable card	.100.00% to 100.00%	0.0%	☆
A7.07	Torque setting through the user programmable card	.200.00% to 200.00%	0.0%	☆
A7.08	Command given by the user programmable card	1: Forward RUN 2: Reverse RUN 3: Forward JOG 4: Reverse JOG 5: Coast to stop 6: Decelerate to stop 7: Fault reset	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
A7.09	Faults given by the user programmable card	0: No fault80–89: Fault codes	0	☆
A8 Group Point.point Communication				
A8.00	Point.point communication selection	0: Disabled 1: Enabled	0	☆
A8.01	Master and slave selection	0: Master 1: Slave	0	☆
A8.02	Slave following master command selection	0: Slave not following running commands of the master 1: Slave following running commands of the master	0	☆
A8.03	Usage of data received by slave	0: Torque setting 1: Frequency setting	0	☆
A8.04	Zero offset of received data (torque)	.100.00%–100.00%	0.00%	★
A8.05	Gain of received data (torque)	.10.00–10.00	1.00	★
A8.06	Point.point communication interruption detection time	0.0–10.0s	1.0s	☆
A8.06	Point.point communication interruption detection time	0.0–10.0s	1.0s	☆
A8.07	Master data sending cycle	0.001–10.000s	0.001s	☆

Function Code	Parameter Name	Setting Range	Default	Property
A8.08	Zero offset of received data zero offset (frequency)	.100.00%–100.00%	0.00%	★
A8.09	Gain of received data gain (frequency)	.10.00–10.00	1.00	★
A8.11	window	0.20–10.00Hz	0.5Hz	★
AC Group AI/AO Correction				
AC.00	AI1 measured voltage 1	0.500–4.000 V	Factory corrected	☆
AC.01	AI1 displayed voltage 1	0.500–4.000 V	Factory corrected	☆
AC.02	AI1 measured voltage 2	6.000–9.999 V	Factory corrected	☆
AC.03	AI1 displayed voltage 2	6.000–9.999 V	Factory corrected	☆
AC.04	AI2 measured voltage 1	0.500–4.000 V	Factory corrected	☆
AC.05	AI2 displayed voltage 1	0.500–4.000 V	Factory corrected	☆
AC.06	AI2 measured voltage 2	6.000–9.999 V	Factory corrected	☆
AC.07	AI2 displayed voltage 2	6.000–9.999 V	Factory corrected	☆
AC.08	AI3 measured voltage 1	9.999–10.000 V	Factory corrected	☆
AC.09	AI3 displayed voltage 1	9.999–10.000 V	Factory corrected	☆

Function Code	Parameter Name	Setting Range	Default	Property
AC.10	AI3 measured voltage 2	9.999–10.000 V	Factory corrected	☆
AC.11	AI3 displayed voltage 2	9.999–10.000 V	Factory corrected	☆
AC.12	AO1 target voltage 1	0.500–4.000 V	Factory corrected	☆
AC.13	AO1 measured voltage 1	0.500–4.000 V	Factory corrected	☆
AC.14	AO1 target voltage 2	6.000–9.999 V	Factory corrected	☆
AC.15	AO1 measured voltage 2	6.000–9.999 V	Factory corrected	☆
AC.16	AO2 target voltage 1	0.500–4.000 V	Factory corrected	☆
AC.17	AO2 measured voltage 1	0.500–4.000 V	Factory corrected	☆
AC.18	AO2 target voltage 2	6.000–9.999 V	Factory corrected	☆
AC.19	AO2 measured voltage 2	6.000–9.999 V	Factory corrected	☆
AC.20	AI2 measured current 1	0.000–20.000 mA	Factory corrected	☆
AC.21	AI2 sampling current 1	0.000–20.000 mA	Factory corrected	☆
AC.22	AI2 measured current 2	0.000–20.000 mA	Factory corrected	☆
AC.23	AI2 sampling current 2	0.000–20.000 mA	Factory corrected	☆

Function Code	Parameter Name	Setting Range	Default	Property
AC.24	AO1 ideal current 1	0.000–20.000 mA	Factory corrected	☆
AC.25	AO1 sampling current 1	0.000–20.000 mA	Factory corrected	☆
AC.26	AO1 ideal current 2	0.000–20.000 mA	Factory corrected	☆
AC.27	AO1 sampling current 2	0.000–20.000 mA	Factory corrected	☆

C.2 Monitoring Parameters

Function Code	Parameter Name	Min. Unit	Communication Address
U0.00	Running frequency (Hz)	0.01 Hz	7000H
U0.01	Set frequency (Hz)	0.01 Hz	7001H
U0.02	Bus voltage	0.1 V	7002H
U0.03	Output voltage	1 V	7003H
U0.04	Output current	0.01 A	7004H
U0.05	Output power	0.1 kW	7005H
U0.06	Output torque	0.1%	7006H
U0.07	X state	1	7007H
U0.08	Y state	1	7008H
U0.09	AI1 voltage (V)	0.01 V	7009H
U0.10	AI2 voltage (V)/current (mA)	0.01 V/0.01 mA	700AH
U0.11	AI3 voltage (V)	0.01 V	7007BH
U0.12	Count value	1	700CH

Function Code	Parameter Name	Min. Unit	Communication Address
U0.13	Length value	1	700DH
U0.14	Load speed	1	700EH
U0.15	PID setting	1	700FH
U0.16	PID feedback	1	7010H
U0.17	PLC stage	1	7011H
U0.18	X5 Input pulse frequency (Hz)	0.01 kHz	7012H
U0.19	Feedback speed	0.01 Hz	7013H
U0.20	Remaining running time	0.1 Min	7014H
U0.21	AI1 voltage before correction	0.001 V	7015H
U0.22	AI2 voltage (V)/current (mA) before correction	0.01 V/0.01 mA	7016H
U0.23	AI3 voltage before correction	0.001 V	7017H
U0.24	Linear speed	1 m/Min	7018H
U0.25	Accumulative power-on time	1 Min	7019
U0.26	Accumulative running time	0.1 Min	701AH
U0.27	X5 Input pulse frequency	1 Hz	701BH

Function Code	Parameter Name	Min. Unit	Communication Address
U0.28	Communication setting value	0.01%	701CH
U0.29	Encoder feedback speed	0.01 Hz	701DH
U0.30	Main frequency X	0.01 Hz	701EH
U0.31	Auxiliary frequency Y	0.01 Hz	701FH

Function Code	Parameter Name	Min. Unit	Communication Address
U0.32	Viewing any register address value	1	7020H
U0.33	Synchronous motor rotor position	0.1°	7021H
U0.34	Motor temperature	1°C	7022H
U0.35	Target torque	0.1%	7023H
U0.36	Resolver position	1	7024H
U0.37	Power factor angle	0.1°	7025H
U0.38	ABZ position	1	7026H
U0.39	Target voltage upon V/F separation	1 V	7027H
U0.40	Output voltage upon V/F separation	1V	7028H
U0.41	X terminals state visual display	1	7029H
U0.42	Y state visual display	1	702AH
U0.43	X terminals function state visual display 1	1	702BH
U0.44	X terminals function state visual display 2	1	702CH
U0.45	Fault information	1	702DH
U0.58	Phase Z counting	1	703AH
U0.59	Current set frequency	0.01%	703BH
U0.60	Current running frequency	0.01%	703CH
U0.61	AC drive running state	1	703DH

Function Code	Parameter Name	Min. Unit	Communication Address
U0.62	Current fault code	1	703EH
U0.63	Sent value of point-point communication	0.01%	703FH
U0.64	Received value of point-point communication	0.01%	7040H
U0.65	Torque upper limit	0.1%	7041H
U0.67	Communication expand	-	
U0.68	DP card AC drive status	bit0- Running statusbit1-Running directionbit2-AC drive fault or notbit3-Reach target frequencybit4~bit7-Reservedbit8~bit15-Fault code22222222222222	7043H
U0.69	Transport DP card speed	0.00-P0.10	7044H
U0.70	Transport DP card rotary	0~65535	7045H
U0.71	Current of communication card	-	-
U0.72	Communication card fault status	-	-
U0.73	Motor NO	0: Motor 11: Motor 2	7046H
U0.74	AC drive output torque	-300.00%–300.00%	7047H

Chapter 5 Detailed Function Introductions

5.1 Basic Function(Group P0)

P0.00 Inverter model	Setting range: 1-2 [1]

The inverter model is set by different load
1: G model 2: P model

P0.01 Speed Control model	Setting range: 0-2 [2]

Notes:

This parameter is used to select the speed control mode of the inverter.

•0: Sensorless flux vector control

It 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: Closed-loop vector control

It is applicable to high-accuracy speed control or torque control applications such as high-speed paper making machine, crane and elevator. One AC drive can operate only one motor. An encoder must be installed at the motor side, and a PG card matching the encoder must be installed at the AC drive side.

•2:Voltage/Frequency (V/F) control

It is applicable to applications with low load requirements or applications where one AC drive operates multiple motors, such as fan and pump.

Notes:

•If vector control is used, motor auto-tuning must be performed because the advantages of vector control can only be utilized after correct motor parameters are obtained. Better.Performance can be achieved by adjusting speed regulator parameters in group P2 (or groups A2, A3, and A4 respectively for motor 2, 3, and 4).

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 (LED extinguished);

Both RUN and STOP key are used for running command control. If Multifunction key is set as FWD/REV switching function, it will be used to change the rotating

orientation. In running status. pressing RUN and STOP in the same time will cause the inverter coast to stop.

•1.Terminal (LOCAL/REMOT LED lights on)

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

•2: Communication (LOCAL/REMOT LED flickering)

Commands are given from host computer. If this parameter is set to 2, a communication card (Modbus RTU , user programmable) must be installed.

•If a user programmable card is selected, commands are written to A7-08 by means of the programmable card.

•If any other card is selected, commands are written by means of the communication address 0x2000.

P0.03 Frequency X command 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 (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  and  on the operation panel (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 (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 keys  and  on the opreation panel (or using the UP/DOWN function of input termianals)

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 meaning the frequency setted by analog terminal,F20 approvide 2 analog input terminal,the AI1 is -0~10V voltage input,and AI2 is 0 – 10 V

voltage input or 4 – 20 mA current input, determined by jumper J1

•4: AI3 (0 – 10 V voltage input)

The frequency is set by analog input. The Drive control board provides two analog input (AI) terminals (AI1, AI2). Another AI terminal (AI3) is provided by the I/O extension card.

•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 P5.00=0

•6: Multi-reference

In multi-reference mode, need to set the group P4 and PC to confirmed setting frequency.

•7: Simple PLC

When the simple programmable logic controller (PLC) mode is used as the frequency source. You can set PC 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 PC.

•8: PID

The output of PID control is used as the running frequency. PID control is generally used in on-site closed-loop control, such as constant pressure closed-loop control and constant tension closed-loop control.

When applying PID as the frequency source, you need to set parameters of PID function in group PA.

•9: Communication setting

The frequency is set by means of communication.

•If the AC drive is a slave in point-point communication and receives data as the frequency source, data transmitted by the master is used as the set frequency. For details, see the description of group A8.

•If PROFIBUS-DP communication is valid and PZD1 is used for frequency setting, data transmitted by PDZ1 is directly used as the frequency source. The data format is -100.00% to 100.00%. 100% corresponds to the value of P0-10 (Maximum frequency).

In other conditions, data is given by the host computer through the communication

address 0x1000. The data format is -100.00% to 100.00%. 100.00% corresponds to the value of P0-10 (Maximum frequency).

The F20 supports four host computer communication protocols: Modbus, PROFIBUS-DP, CAN open and CANlink. They cannot be used simultaneously.

•If the communication mode is used, a communication card must be installed. The F20 provides four optional communication cards and you can select one based on actual requirements. If the communication protocol is Modbus, the corresponding serial communication protocol needs to be selected based on the setting of P0-28.The CANlink protocol is always valid

P0.04 Frequency Y command source	Setting range: 0-9 [0]
0: Digital setting (non-retentive at power failure)	1: Digital setting (retentive at power failure)
2: AI1	3: AI2
4: AI3	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 Scale of frequency Y command	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 maximum output frequency. Select this setting if it needs to adjust on the base of X frequency command

Note: P0.05 is used when the frequeny Y is superimposed.

P0.06 Range of auxiliary frequency Y for X and Y operation	Setting range: 0%–150%

Notes:

When frequency source chosed frequency superimposed, P0.05 and P0.06 can control the auxiliary frequency adjust range.

P0.07 Frequency source selection	Setting range: Unit's digit /0-4 [0]Ten digit/0-3[0]

Notes:

Unit's digit (Frequency source selection)

0: Main frequency source X 1: X and Y operation

(operation relationship determined by ten's digit)

2: Switchover between X and Y

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

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

Ten's digit (X and Y operation relationship)

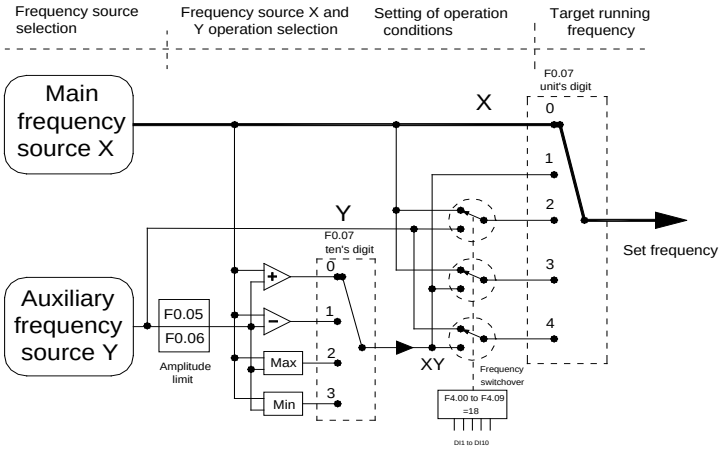
0: X+Y

1: X-Y

2: Maximum

3: Minimum

It is used to select the frequency setting channel. If the frequency source involves X and Y operation, you can set the frequency offset in P0-21 for superposition to the X and Y operation 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: Same direction

1: Reverse direction

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.

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

Notes:

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: AI2
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, AI3, X5 or communication, the setting is similar to that of the main frequency source X. For details, see the description of P0.03.

For example, to avoid runaway in torque control mode in winding application, you can set the frequency upper limit by means of analog input. When the AC drive reaches the upper limit, it will continue to run at this speed.

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 P8.14.

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
Externalradiation interference	Small	Large

P0.16 Carrier frequency adjustment with temperature	Setting range: 0–1

0: No 1: Yes

Notes:

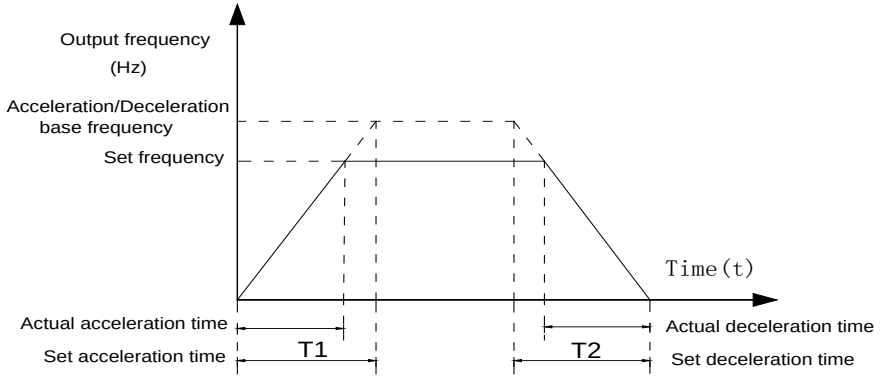
It is used to set whether the carrier frequency is adjusted based on the temperature. The AC drive automatically reduces the carrier frequency when detecting that the heatsink temperature is high. The AC drive resumes the carrier frequency to the set value when the heatsink temperature becomes normal.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

P0.17 Acceleration time 0	Setting range: 0.00–650.00s (P0.19 = 2) 0.0–6500.0s (P0.19 = 1) 0–65000s (P0.19 = 0)
P018 Deceleration time 0	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, t1 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, t2 in Figure



The FST-610 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: P8.03, P8.04
- Group 3: P8.05, P8.06
- Group 4: P8.07, P8.08

P0.19 ACC/DEC unit of time	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 operation	Setting range: 0.00 Hz to maximum frequency (P0.10)

This parameter is valid only when the frequency source is set to "X and Y operation". The final frequency is obtained by adding the frequency offset set in this parameter to the X and Y operation result.

P0.23 Retentive of digital setting frequency upon power failure	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 F20 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 four motors.

Motor parameter group 1 corresponds to groups P1 and P2. Motor parameter groups 2 correspond to groups A2.

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: Unit's digit 0-9 [0] Ten's digit 0-9 [0] Hundred's digit 0-9 [0]
0: No binding	1: Frequency source by digital setting
2: AI1	3: AI2
4: AI3	5: Pulse setting (X5)
6: Multi-reference	7: Simple PLC
8: PID	9: Communication setting

Notes:

Ten's digit (Binding terminal command to frequency source) 0-9(same as unit’s digit)

Hundred's digit (Binding communication command to frequency source) 0-9(same as unit’s digit)

It is used to bind the three running command sources with the nine frequency sources, fAI3litating to 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]

The F20 supports Modbus. Select a proper protocol based on the actual requirements.

5.2 Motor Parameters(Group P1)

P1.00 Motor model	Setting range: 0-1 [0]

0: General asynchronous motor 1: Frequency asynchronous motor

P1.01 Rated Motor power	Setting range: 0.4~1000.0kW [Depend on model]
P1.02 Rated motorvoltage	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 0.01 Hz to maximum frequency	Setting range: 0-800V [Depend on model]
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 P1.0 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 F-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

P1.27 Encoder pulses per revolution	Setting range: 1–65535 [1024]

Notes:

This parameter is used to set the pulses per revolution ABZ or UVW incremental encoder. In CLVC mode, the motor cannot run properly if this parameter is set incorrectly.

P1.28 Encoder Type	Setting range: 0-4 [0]
0: ABZ incremental encoder	1: UVW incremental encoder
2: Resolver	3: SIN/COS encoder
4: Wire-saving UVW encoder	

Notes:

The F20 supports multiple types of encoder. Different PG cards are required for different types of encoder. Select the appropriate PG card for the encoder used. Any of the five encoder types is applicable to synchronous motor. Only ABZ incremental encoder and resolver are applicable to asynchronous motor.

After installation of the PG card is complete, set this parameter properly based on the actual condition. Otherwise, the AC drive cannot run properly.

P1.30 A/B phase sequence of ABZincrementalencoder	Setting range: 0-1 [0]

0: Forward 1: Reserve

Notes:

This parameter is valid only for ABZ incremental encoder (P1-28 = 0) and is used to set the A/B phase sequence of the ABZ incremental encoder.

It is valid for both asynchronous motor and synchronous motor. The A/B phase sequence can be obtained through "Asynchronous motor complete auto-tuning" or "Synchronous motor no-load auto-tuning".

P1.31 Encoder installation angle	Setting range: 0.0°–359.9° [0.0°]
P1.32 U, V, W phase sequence of UVW encoder	Setting range: 0-1 [0]

0: Forward 1: Reverse

P1.33 UVW encoder angle offset	Setting range: 0.0°–359.9° [0.0°]
P1.34 Number of pole pairs of resolver	Setting range: 1–65535[0]

Notes:

If a resolver is applied, set the number of pole pairs properly.

P1.36 Encoder wire-break fault detection time	Setting range: 0.0s: No action 0.1–10.0s [0]

Notes:

This parameter is used to set the time that a wire-break fault lasts. If it is set to 0.0s, the AC drive does not detect the encoder wire-break fault. If the duration of the

encoder wire-break fault detected by the AC drive exceeds the time set in this parameter, the AC drive reports Err20.

P1.37 Auto-tuning selection	Setting range: 0-3 [0]
0: No auto-tuning	1: Asynchronous motor static auto-tuning1
2: Asynchronous motor dynamic auto-tuning	3. Asynchronous motor static auto-tuning2

Notes:

It is applicable to scenarios where complete auto-tuning cannot be performed because the asynchronous motor cannot be disconnected from the load.

Before performing static auto-tuning, properly set the motor type and motor nameplate parameters of P1-00 to P1-05 first. The AC drive will obtain parameters of P1-06 to P1-08 by static auto-tuning.

Set this parameter to 1, and press RUN Then, the AC drive starts static auto-tuning.

To perform this type of auto-tuning, ensure that the motor is disconnected from the load. During the process of complete auto-tuning, the AC drive performs static auto-tuning first and then accelerates to 80% of the rated motor frequency within the acceleration time set in P0-17. The AC drive keeps running for a certain period and then decelerates to stop within deceleration time set in P0-18.

The Asynchronous motor static auto-tuning2 use for no Encoder type,the motor is in stactic and auto tuning motor peramters.set this pramaters to 3 and press RUN, Asynchronous motor static auto-tuning2

5.3 Vector Control Parameters(Group P2)

P2.00 Speed loop proportional gain 1	Setting range: 0-100 [30]
P2.01 Speed loop integral time 1	Setting range: 0.01-10.00s[0.05s]
P2.02 Switchover frequency 1	Setting range: 0.00 to P2.05[5.00Hz]
P2.03 Speed loop proportional gain 2	Setting range: 0-100[20]
P2.04 Speed loop integral time 2	Setting range: 0.01-10.00[1.00]
P2.05 Switchover frequency 2	Setting range: P2-02 to maximum output frequency[10.00Hz]

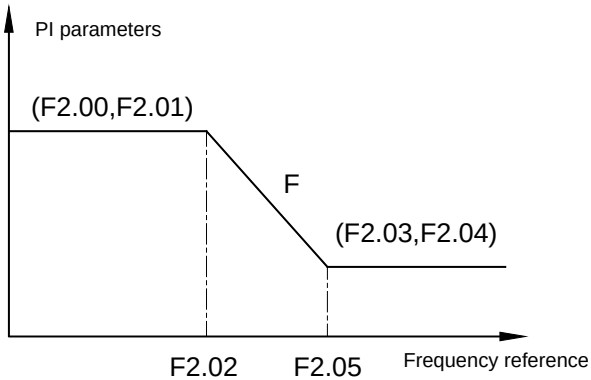
Notes:

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" (P2-02), the speed loop PI parameters are P2-00 and P2-01.

•If the running frequency is equal to or greater than "Switchover frequency 2" (P2-05), the speed loop PI parameters are P2-03 and P2-04.

•If the running frequency is between P2-02 and P2-05, 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 overvoltage fault may even occur when the overshoot drops

P2.06 Vector control slip gain	Setting range: 50%-200% [100%]

Notes:

For SFVC, 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.

For CLVC, it is used to adjust the output current of the AC drive with same load

P2.07 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.

P2.09 Torque upper limit source in speed control mode	Setting range: 0-7 [0]
0: P2.10	1: AI1
2: AI2	3: AI3
4: Pulse setting (X5)	5: Communication setting
6:MIN(AI1,AI2)	7.MAX(AI1,AI2)

P2.10 Digital setting of torque upper limit in speed control mode	Setting range: 0.0-200.0% [150.0%]

P2.11 Torque upper limit source in speed control mode	Setting range: 0-8 [0]
0: P2.10	1: AI1
2: AI2	3: AI3
4: Pulse setting (X5)	5: Communication setting
6:MIN(AI1,AI2)	7.MAX(AI1,AI2)
8.P2.12 setting	

P2.12 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 P2.09. If the torque upper limit is analog, X5 pulse or communication

setting, 100% of the setting corresponds to the value of P2.10, and 100% of the value of P2.10 corresponds to the AC drive rated torque.

For details on the AI1, AI2 and AI3 setting, see the description of the AI curves in group P4.

For details on the pulse setting, see the description of P4.28 to P4.32.

When the AC drive is in communication with the master, if P2.09 is set to 5 “communication setting”, P2.10 “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 P2.10. The communication protocol can be Modbus, CANlink.

P2.13 Excitation adjustment proportional gain	Setting range: 0–60000 [2000]
P2.14 Excitation adjustment integral gain	Setting range: 0–60000 [1300]
P2.15 Torque adjustment proportional gain	Setting range: 0–60000 [2000]
P2.16 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.

P2.20 Maximum output voltage factor	Setting range: 100-110% [105%]

Notes:

The maximum output voltage factor meaning the inverter maximum output voltage improving capAI3ty,increase P2.20 can improve motor weak magnetic fileds maximum load capAI3ty.But motor current wave increase,and motor calorific value increase; or reducing P2.20 can lower the motor weak magnetic fileds maximum load capAI3ty,motor current wave and motor calorific value, as usual no need adjust.

P2.21 Maximum torque coefficient of weak magnetic fields	Setting range: 50-200% [100%]

Notes:

When motor running over rated frequency the perameter will valid

P2.22 Power limit	Setting range: 0-3[0]
0:Invalid	1:Valid
3.Constant speed valid	4:Decelerate speed valid

P2.23 Power upper limit	Setting range: 0-200% [0]

Notes:

In the application of CAM load,Rapid accelerate and decelerate, load suddenly unloaded, and no brake resistance, power limit can reduce motor bus voltage too urgent.can avoild over voltage fault,P2.23 is

5.4 V/F Control Parameters(Group P3)

Group P3 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.

P3.00 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 P3-03 to P3-08.

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" (P3-13). 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 P3-13. 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 X x (Rated motor voltage)/(Rated motor frequency)

P3.01 Torque boost	Setting range: 0%–30%[Model dependent]
P3.02 Cut-off frequency of torque boost	Setting range: 0.00 Hz to maximum output frequency[50]

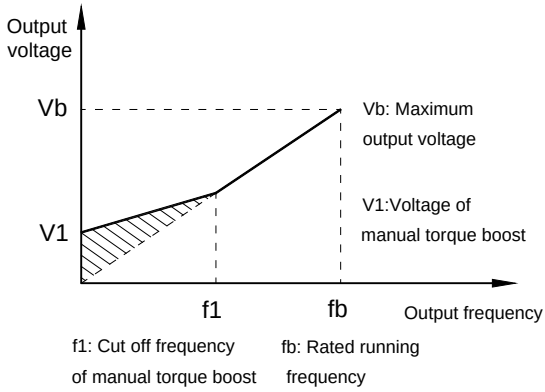
Notes:

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 P3-01.

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

If the load is large and the motor startup torque is insufficient, increase the value of P3-01. If the load is small, decrease the value of P3-01. 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.

P3-02 specifies the frequency under which torque boost is valid. Torque boost becomes invalid when this frequency is exceeded, as shown in the following figure.



P3.03 Multi-point V/F frequency 1 (P1)	Setting range: 0.00 Hz to P3.05[0.00Hz]
P3.04 Multi-point V/F voltage 1 (V1)	Setting range: 0.0%–100.0%[0.0%]
P3.05 Multi-point V/F frequency 2 (P2)	Setting range: P3.03 to P3.07[0.00]
P3.06 Multi-point V/F voltage 2 (V2)	Setting range: P3.05 to rated motor frequency
P3.07 Multi-point V/F frequency 3 (P3)	Setting range: P3.05 to rated motor frequency (P1.04)[0.00] Note: The rated frequencies of motors 2 is respectively set in A2-04,
P3.08 Multi-point V/F voltage 3 (V3)	Setting range: 0.0%–100.0%[0.0%]

Notes:

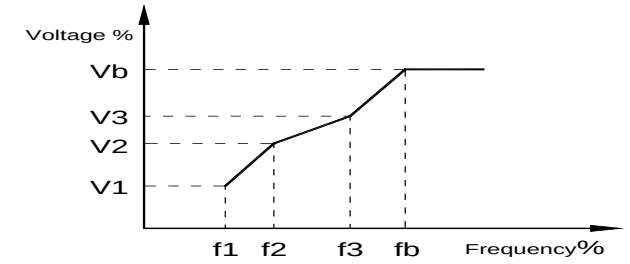
These six parameters are used to define the multi-point V/F curve.

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, P1 < P2 < P3

At low frequency, higher voltage may cause overheat or even burnt out of the motor and overcurrent stall or overcurrent 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

P3.09 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.

P3.10 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 overvoltage 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 overvoltage error during deceleration. However, too large over-excitation gain may lead to an increase in the output current. Set P3-09 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 deceration or where there is a braking resistor.

P3.11 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.

P3.13 Voltage source for V/F separation	Setting range: 0-8 [0]
0: Digital setting (P3.14)	1: AI1
2: AI2	3: AI3
4: Pulse setting (X5)	5: Multi-reference
6: Simple PLC 7: PID	8: Communication setting

P3.14 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, A4.02, A5-02, A6.02).

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 (P3.14)

The output voltage is set directly in P3.14.

•1: AI1; 2: AI2; 3: AI3

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 P4 and PC must be set to determine the corresponding relationship between setting signal and setting voltage. 100.0% of the multi-reference setting in group PC corresponds to the rated motor voltage.

•6: Simple PLC

If the voltage source is simple PLC mode, parameters in group PC 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 PA.

•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.

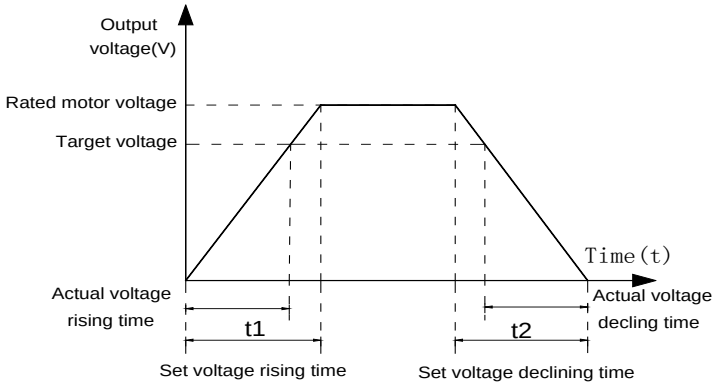
P3.15 Voltage rise time of V/F separation	Setting range: 0-1000.0s [0]
P3.16 Voltage decline time of V/F separation	Setting range: 0-1000.0s [0]

Notes:

P3-15 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.

P3-16 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



P3.17 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(P3.15) 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(P3.15) reduce to 0V.

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

P3.18 Over current stall current	Setting range: 50-200% [150%]
P3.19 Over current stall restrain	Setting range: 0-1[1]

0:Enabled 1:Disable

P3.20 Over current stall restrain gain	Setting range: 0-100 [20]
P3.21 Multiplier Over current stall compensation factor	Setting range: 50-200% [50%]

P3.22 Over voltage stall protection voltage	Setting range: 200.0-2000.0V[Model dependend]

Notes:

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

P3.23 Over voltage stall protection	Setting range: 0-1[1]

0:Disabled 1:Enabled

P3.24 Over voltage stall restrain frequency gain	Setting range: 0-100 [30]
P3.25 Over voltage stall restrain voltage gain	Setting range: 0-100 [30]

Notes:

Increase P3.24 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 P3.24, if increase P3.25,can reduce the bus voltage.

P3.26 Over voltage stall biggest Rising frequency limit	Setting range: 0-50Hz[5Hz]

Notes:

When connect brake resistance or brake unit,set the P3.11 to 0,if not 0,the running current will be over current, set the P3.23 to 0, if not 0,the decelerate time will be delay.

P3.27 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 (Err07), slip compensation response value more small the response more faster

5.5 Input terminals 1(Group P4)

The F20 provides five X terminals (X5 can be used for high-speed pulse input) and two analog input terminals. The optional extension card provides another five X terminals (X6 to X10)

P4.00 X1 function selection	Setting range: 1: Forward RUN[Standard]
P4.01 X2 function selection	Setting range: 4: Forward JOG [Standard]
P4.02 X3 function selection	Setting range: 9: Fault reset [Standard]
P4.03 X4 function selection	Setting range: 12: Multi-reference terminal 1[Standard]

P4.04 X5 function selection	Setting range: 13: Multi-reference terminal 2 [Standard]
P4.05 X6 function selection	Setting range: 0 [Extended]
P4.06 X7 function selection	Setting range: 0 [Extended]
P4.07 X8 function selection	Setting range: 0 [Extended]
P4.08 X9 function selection	Setting range: 0 [Extended]
P4.09 X10 function selection	Setting range: 0 [Extended]

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 P4.11.
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 P8.00, P8-01 and P8-02.
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 P6.10.
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 Err15 and performs the fault protection action. For more details, see the description of P9-47.
12	Multi-reference terminal 1	The setting of 16 speeds or 16 other references can be implemented through combinations of 16 states of these four terminals.
13	Multi-reference terminal 2	The setting of 16 speeds or 16 other references can be implemented through combinations of 16 states of these four terminals.
14	Multi-reference terminal 3	
15	Multi-reference terminal 4	
16	Terminal 1 for acceleration/ deceleration 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 acceleration/ deceleration time selection	
18	Frequency source switchover	The terminal is used to perform switchover between two frequency sources according to the setting in P0.07.

Value	Function	Description
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.
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	Acceleration/Deceleration 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.

Value	Function	Description
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.
33	Normally closed (NC) input of external fault	After this terminal becomes ON, the AC drive reports Err15 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 PA.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

Value	Function	Description
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 1	Switchover among the four groups of motor parameters can be implemented through the four state combinations of these two terminals.
42	Reserved	Reserved
43	PID parameter switchover	If the PID parameters switchover performed by means of X terminal (PA.18 = 1), the PID parameters are PA.05 to PA.07 when the terminal becomes OFF; the PID parameters are PA.15 to PA-17 when this terminal becomes ON.
44	User-defined fault 1	If these two terminals become ON, the AC drive reports Err27 and Err28 respectively, and performs fault protection actions based on the setting in P9-49.
45	User-defined fault 2	
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.

Value	Function	Description
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 P8-2 and P8-53.
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 P4 -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 forbidden	

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

Table State combinations of the four multi-reference terminals

K4	K3	K2	K1	Reference Setting	Corresponding Parameter
OFF	OFF	OFF	OFF	Reference 0	PC.00
OFF	OFF	OFF	ON	Reference 1	PC.01

K4	K3	K2	K1	Reference Setting	Corresponding Parameter
OFF	OFF	ON	OFF	Reference 2	PC.02
OFF	OFF	ON	ON	Reference 3	PC.03
OFF	ON	OFF	OFF	Reference 4	PC.04
OFF	ON	OFF	ON	Reference 5	PC.05
OFF	ON	ON	OFF	Reference 6	PC.06
OFF	ON	ON	ON	Reference 7	PC.07
ON	OFF	OFF	OFF	Reference 8	PC.08
ON	OFF	OFF	ON	Reference 9	PC.09
ON	OFF	ON	OFF	Reference 10	PC.10
ON	OFF	ON	ON	Reference 11	PC.11
ON	ON	OFF	OFF	Reference 12	PC.12
ON	ON	OFF	ON	Reference 13	PC.13
ON	ON	ON	OFF	Reference 14	PC.14
ON	ON	ON	ON	Reference 15	PC.15

•If the frequency source is multi-reference ,the vaule 100% if PC-00 to PC.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.

Tble State combinations of two terminals for acceleration/deceleration time selection

Terminal 2	Terminal 1	Acceleration/Deceleration Time Selection	Corresponding Parameters

OFF	OFF	Acceleration/Deceleration time 1	P0.17, P0.18
OFF	ON	Acceleration/Deceleration time 2	P8.03, P8.04
ON	OFF	Acceleration/Deceleration time 3	P8.05, P8.06
ON	ON	Acceleration/Deceleration time 4	P8.07, P8.08

Two motor selection terminals have four state combinations, corresponding to four motors, as listed in the following table.

Table State combinations of two motor selection terminals

Terminal 1	Selected Motor	Corresponding Parameters
OFF	Motor 1	Group P1, Group P2
ON	Motor 2	Group A2

P4.10 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.

P4.11 Terminal command mode	Setting range: 0-3 [0]

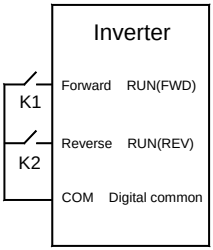
Notes:

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 P4.11=0,P4.00=1,P4.01=2

Figure Setting of two-line mode 1

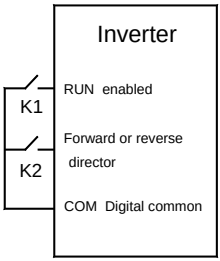
K1	K2	RUN Command
OFF	OFF	STOP
ON	OFF	FWD RUN
OFF	ON	REV RUN
ON	ON	KEEP



1: Two-line mode 2

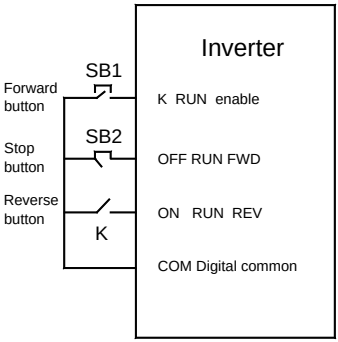
Figure setting of two-line mode 2

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

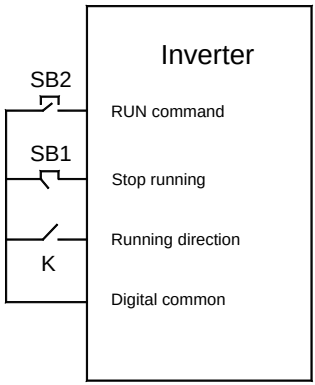


2: Three-line mode 1

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.

P4.12 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.

P4.13 AI curve 1 minimum input	Setting range: 0.00 V to P4.15[0.00V]
P4.14 Corresponding setting of AI curve 1 minimum input	Setting range: -100.00%–100.0%[100.0%]
P4.15 AI curve 1 maximum input	Setting range: P4-.3 to 10.00 V[10.00V]
P4.16 Corresponding setting of AI curve 1 maximum input	Setting range: -100.00%–100.0%[100.0%]
P4.17 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 (P4.15), the maximum value is used. When the analog input voltage is

less than the minimum value (P4.13), the value set in P4.34 (Setting for AI less than minimum input) is used.

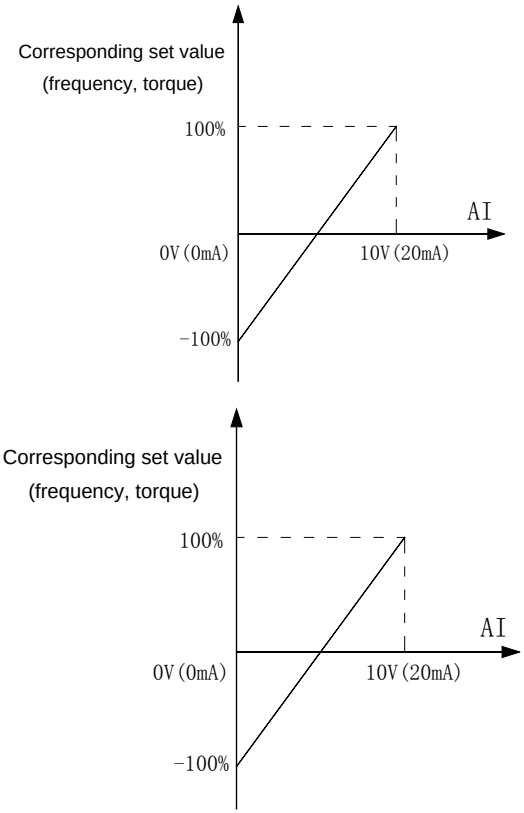
When the analog input is current input, 1 mA current corresponds to 0.5 V voltage.

P4.17 (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.



P4.18 AI curve 2 minimum input	Setting range: 0.00 V to P4.20[0.00V]
P4.19 Corresponding setting of AI curve 2 minimum input	Setting range: -100.00%–100.0%[100.0%]
P4.20 AI curve 2 maximum input	Setting range: P4.18 to 10.00 V[10.00V]
P4.21 Corresponding setting of AI curve 2 maximum input	Setting range: -100.00%–100.0%[100.0%]
P4.22 AI2 filter time	Setting range: 0.00–10.00s[0.10S]

P4.23 AI curve 3minimum input	Setting range: 0.00 V to P4.25[0.00V]
P4.24 Corresponding setting of AI curve 3 minimum input	Setting range: -100.00%–100.0%[100.0%]
P4.25 AI curve 3 maximum input	Setting range: P4.23 to 10.00 V[10.00V]
P4.26 Corresponding setting of AI curve 3 maximum input	Setting range: -100.00%–100.0%[100.0%]
P4.27 AI3 filter time	Setting range: 0.00–10.00s[0.10S]

Notes:

The method of setting AI2 and AI3 functions is similar to that of setting AI1 function

P4.28 X5 terminal Pulse minimum input	Setting range: 0.00 kHz to P4.30[0.00khz]
P4.29 X5 terminal Corresponding setting of pulse minimum input	Setting range: -100.00%–100.0%[0.0%]
P4.30 X5 terminal Pulse maximum input	Setting range: P4.28 to 50.00KHZ[50.0KHZ]
P4.31 X5 terminal Corresponding setting of pulse maximum input	Setting range: -100.00%–100.0%[100.0%]
P4.32 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.

P4.33 AI curve selection	Setting range: 321[1-5]

Notes:

Unit's digit (AI1 curve selection)

Curve 1 (2 points, see P4.13 to P4.16)

Curve 2 (2 points, see P4.18 to P4.21)

Curve 3 (2 points, see P4.23 to P4.26)

Curve 4 (4 points, see A6.00 to A6.07)

Curve 5 (4 points, see A6.08 to A6.15)

Ten's digit (AI2 curve selection)

Curve 1 to curve 5 (same as AI1)

Hundred's digit (AI3 curve selection)

Curve 1 to curve 5 (same as AI3)

The unit's digit, ten's digit and hundred's digit of this parameter are respectively used to select the corresponding curve of AI1, AI2 and AI3. Any of the five curves can be selected for AI1, AI2 and AI3

Curve 1, curve 2 and curve 3 are all 2-point curves, set in group P4. Curve 4 and curve 5 are both 4-point curves, set in group A6.

The Drive provides two AI terminals as standard. AI3 is provided by an optional extension card.

P4.34 Setting for AI less than minimum input	Setting range: 000[0-1]

Notes:

Unit's digit (Setting for AI2 less than minimum input)

0: Minimum value

1: 0.0%

Ten's digit (Setting for AI1 less than minimum input)

0, 1 (same as AI2)

Hundred's digit (Setting for AI3 less than minimum input)

0, 1 (same as AI1)

This parameter is used to determine the correponding setting when the analog input voltage is less than the minimum value, The unit's digit, ten's digit and hundred's digit of this parameter respectively correspond to the setting for AI1, AI2 and AI3.

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 (P4.14, P4.19, P4.24) 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%.

P4.35 X1 delay time	Setting range: 0.0–3600.0s[0.0S]
P4.36 X2 delay time	Setting range: 0.0–3600.0s[0.0S]
P4.37 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

P4.38 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)

P4.39 X valid mode selection 2	Setting range: 00000[0-1]

Notes:

Unit's digit (X6 valid mode)

0, 1 (same as X1)

Ten's digit (X7 valid mode)

0, 1 (same as X1)

Hundred's digit (X8 state)

0, 1 (same as X1)

Thousand's digit (X9 valid mode)

0, 1 (same as X1)

Ten thousand's digit (X10 valid mode)

0, 1 (same as X1)

There parameters are used to set the vaild mode of X terminal

0: High level valid

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.

5.6 Output Terminals(Group P5)

The F20 provides an analog output (AO) terminal, a digital output (Y) terminal, a relay terminal and a DO terminal (used for high-speed pulse output or open-collector switch signal output) as standard. If these output terminals cannot satisfy requirements, use an optional I/O extension card that provides an AO terminal (AO2), a relay terminal (relay 2) and a Y terminal (Y2).

P5.00 Y output mode	Setting range: 0-1 [0]

Notes:

The Y terminal is programmable multiplexing terminal. It can be used for high-speed pulse output , with maximum frequency of 100.00 kHz. Refer to P5.06 for relevant functions. It can also be used as open collector switch signal output

P5.01 Y function (open (open -collector output terminal)	Setting range: 0-41 [0]
P5.02 Relay function (TA-TB-TC)	Setting range: 0-41 [2]
P5.03 Extension card relay function (TA1-TB1-TC1)	Setting range: 0-41 [0]
P5.04 Y1 function selection (open-collector output terminal)	Setting range: 0-41 [1]
P5.05 xtension card Y2 function	Setting range: 0-41 [4]

Notes:

These five parameters are used to select the functions of the five digital output terminals. T/A-T/B-T/C and T/A1-T/B1-T/C1 are respectively the relays on the control board and the extension card.

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

Value	Function	Description

Value	Function	Description
0	No output	The terminal has no function.
1	AC drive running	When the AC drive is running and has output , the terminal becomes ON. frequency (can be zero), the terminal becomes ON.
2	Fault output (stop)	When the AC drive stops due to a fault, the terminal becomes ON.
3	Frequency-level detection FDT1 output	Refer to the descriptions of P8.19 and P8.20.
4	Frequency reached	Refer to the descriptions of P8.21.
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 AC drive 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 P9.00 to P9.02.
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 PB.08.
9	Designated count value reached	The terminal becomes ON when the count value reaches the value set in PB.09.
10	Length reached	The terminal becomes ON when the detected actual length exceeds the value set in PB.05.
11	PLC cycle complete	When simple PLC completes one cycle, the terminal outputs a pulse signal with width of 250 ms.

Value	Function	Description
12	Accumulative running time reached	If the accumulative running time of the AC drive exceeds the time set in P8.17, the terminal becomes ON.
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 (P7.13) exceeds the value set in P8.16, the terminal becomes ON.

Value	Function	Description
25	Frequencylevel detection FDT2 output	Refer to the descriptions of P8.28 and P8.29.
26	Frequency 1 reached	Refer to the descriptions of P8.30 and P8.31.
27	Frequency 2 reached	Refer to the descriptions of P8.32 and P8.33.
28	Current 1 reached	Refer to the descriptions of P8.38 and P8.39.
29	Current 2 reached	Refer to the descriptions of P8.40 and P8.41.
30	Timing reached	If the timing function (P8.42) 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 P8.46 (AI1 input voltage upper limit) or lower than the value of P8-45 (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 P8.28 and P8.29.
35	Module temperature reached	If the heatsink temperature of the inverter module (P7.07) reaches the set module temperature threshold (P8.47), the terminal becomes ON.
36	Software current limit exceeded	Refer to the descriptions of P8.36 and P8.37
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.

Value	Function	Description
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	Motoroverheat warning	If the motor temperature reaches the temperature set in P9.58 (Motor overheat warning threshold), the terminal becomes ON. You can view the motor temperature by using U0-34.
40	Current running time reached	If the current running time of AC drive exceeds the value of P8.53, the terminal becomes ON.
41	Fault output	Fault of free stop and undervoltage no output

P5.06 Y function selection	Setting range: 0~16 [0]
P5.07 AO1 function selection	Setting range: 0~16 [0]
P5.08 AO2 function selection	Setting range: 0~16 [0]

Notes:

The output pulse frequency of the Y terminal ranges from 0.01 kHz to "Maximum DOP output frequency" (P5.09). The value of P5.09 is between 0.01 kHz and 100.00 kHz.

The output range of AO1 and AO2 is 0–10 V or 0–20 mA. The relationship between pulse and analog output ranges and corresponding functions is listed in the following table.

Table Relationship between pulse and analog output ranges and corresponding functions

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

Value	Function	Range (Corresponding to Pulse or Analog Output Range 0.0%–100.0%)
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	AI3	0–10 V
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 of rated motor torque to 2 times of rated motor torque

.

P5.09 D0 Maximum output frequency	Setting range:0.01–100.00kHz[50.00KHZ]
P5.10 AO1 offset coefficient	Setting range: -100.0%–100.0%[0.0%]
P5.11 AO1 gain	Setting range: -10.00–10.00[1.00]
P5.12 AO2 offset coefficient	Setting range: -100.0%–100.0%[0.00%]
P5.13 AO2 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 and AO2 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%.

P5.17 D0 output delay time	Setting range: 0.0–3600.0s[0.0S]
P5.18 Relay 1 output delay time	Setting range: 0.0–3600.0s[0.0S]
P5.19 Relay 2 output delay time	Setting range: 0.0–3600.0s[0.0S]
P5.20 D01 output delay time	Setting range: 0.0–3600.0s[0.0S]
P5.21 D02 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, relay 1, relay 2, Y1 and Y2 from status change to actual output.

P5.22 D0 valid mode selection	Setting range: 0-1[00000]

Notes:

Unit's digit (D0 valid mode)

0: Positive logic

1: Negative logic

Ten's digit (Relay 1 valid mode)

0, 1 (same as D0)

Hundred's digit (Relay 2 valid mode)

0, 1 (same as D0)

Thousand's digit (D01 valid mode)

0, 1 (same as D0)

Ten thousand's digit (D02 valid mode)

0, 1 (same as D0)

It is used to set the logic of output terminals D0, relay 1, relay 2,D01 and D02

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.

5.7 Start/Stop Control(Group P6)

P6.00 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 P6-05 and P6-06.

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.

P6.01 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.

P6.02 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.

P6.03 Startup frequency	Setting range: 0.00-10.00Hz [0.00Hz]
P6.04 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 (P6-03) 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.

P6.05 Startup DC braking current/Pre-excited current	Setting range: 0%–100%[0%]
P6.06 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 (P6.00 = 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 (P6.00 = 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.

P6.07 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. The MD380 provides four group of acceleration/deceleration time, which can be selected by using P4.00 to P4.08.

•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. P6-08 and P6-09 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 f_b 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.

P6.08 Time proportion of S-curve start segment	Setting range: 0.0% to (100.0% – P6.09) [30%]
P6.09 Time proportion of S-curve end segment	Setting range: 0.0% to (100.0% – P6.08) [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: P6.08 + P6.09 ≤ 100.0%.

In Figure 6.12, t1 is the time defined in P6.08, within which the slope of the output frequency change increases gradually. t2 is the time defined in P6.09, 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 S-curve acceleration/deceleration A

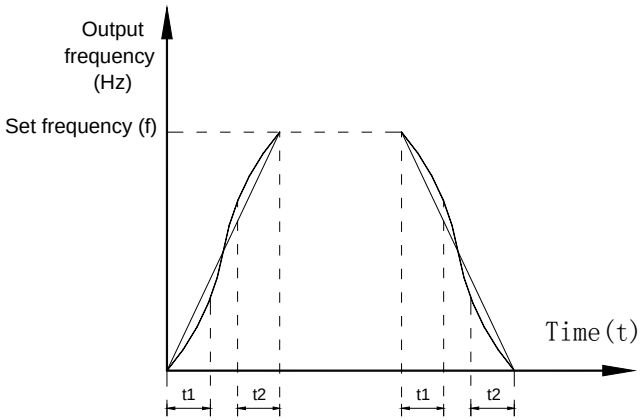
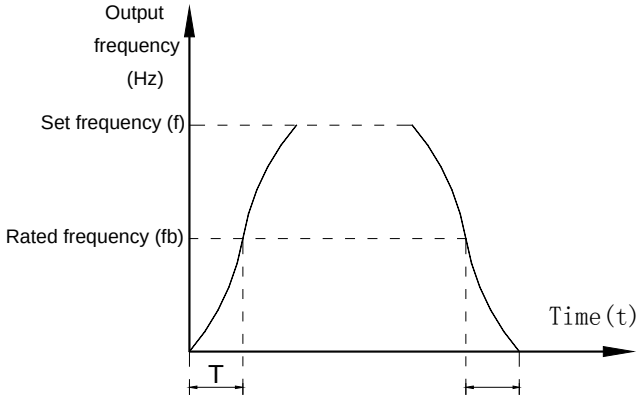


Figure S-curve acceleration/deceleration B



P6.10 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.

P6.11 Initial frequency of stop DC braking	Setting range: 0.00 Hz –P0.10 [0.00Hz]
P6.12 Waiting time of stop DC braking	Setting range: 0.0–36.0s[0.0s]
P6.13 Stop DC braking current	Setting range: 0%–100%[0%]
P6.14 Stop DC braking time	Setting range: 0.0–36.0s[0.0s]

Notes:

•P6.11 (Initial 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 P6-11.

•P6.12 (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.

•P6.3 (Stop DC braking current)

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

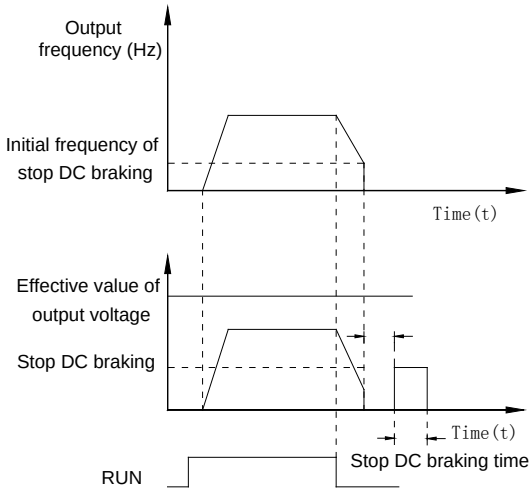
–If the rated motor current is less than or equal to 80% of the rated AC drive current, the base value is the rated motor current.

–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.

•P6.14 (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.



P6.15 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

P6.18 Rotational speed tracking current	Setting range: 30%–200%[depend motor]
P6.21 Demagnetization time	Setting range: 0.0-0.5S[depend motor]

5.8 Operation Panel and Display(Group P7)

P7.01 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.

P7.02 STOP/RESET key function	Setting range: 0-1 [0]
P7.03 LED display running parameters 1	Setting range: 0000-FFFF [1F]

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10
PID Setting	Load Speed	Length Value	Count Value	AI3 Voltage	AI2 Voltage
BIT9	BIT8	BIT7	BIT6	BIT5	BIT4
AI1 Voltage	Y 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 P7.03 to the hexadecimal equivalent of this binary number.

P7.04 LED display running parameters 2	Setting range: 0000-FFFF [0]

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10

Auxiliary frequency Y 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	AI3 voltage before correction	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 P7.03 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 P7.03.

P7.05 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	Count value	AI3 voltage (V)	AI2 voltage (V)	AI1 voltage (V)
BIT3	BIT2	BIT1	BIT0		
Youtput status	Di input status	Bus voltage (V)	Set frequency (Hz)		

P7.06Load speed display coefficient	Setting range: 0.0001-6.5000 [1.0000]

Notes:

This parameter is used to adjust the relationship between the output frequency of the AC drive and the load speed. For details, see the description of P7-12.

P7.07Heatsink temperature of inverter modulet	Setting range: -20~100.0°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.

P7.08 Product number	Setting range: [-]
P7.09 Accumulative running time	Setting range: 0–65535 h[-]
P7.10 Software version	Setting range: [-]
P7.11 emporary software version	Setting range: [-]

P7.12 Number of decimal places for load speed display	Setting range: 0–3 [1]

Notes:

0: 0 decimal place

1: 1 decimal place

2: 2 decimal places

3: 3 decimal places

P7.12 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 P7.06 (Load speed display coefficient) is 2.000 and P7.12 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)

P7.13 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 (P8.17), the terminal with the digital output function 24 becomes ON.

P7.14 Accumulative power consumption	Setting range: 0–65535 kWh [0]
P7.15 Performance software temporary version	Setting range: [-]
P7.16 Functionality software temporary version	Setting range: [-]

5.9 Enhanced Function(Group P8)

P8.00 JOG running frequency	Setting range: 0-P0.10[2.00Hz]
P8.01 JOG acceleration time	Setting range: 0.0–6500.0s[20s]
P8.02 JOG deceleration time	Setting range: 0.0–6500.0s[20s]

Notes:

These parameters are used to define the set frequency and acceleration/deceleration time of the AC drive when jogging. The startup mode is "Direct start" (P6.00 = 0) and the stop mode is "Decelerate to stop" (P6.10 = 0) during jogging.

P8.03Acceleration time 2	Setting range: 0.0–6500.0s[Depend on Model]
P8.04Deceleration time 2	Setting range: 0.0–6500.0s[Depend on Model]
P8.05Acceleration time 3	Setting range: 0.0–6500.0s[Depend on Model]
P8.06Deceleration time 3	Setting range: 0.0–6500.0s[Depend on Model]
P8.07Acceleration time 4	Setting range: 0.0–6500.0s[Depend on Model]
P8.08Deceleration time 4	Setting range: 0.0–6500.0s[Depend on Model]

Notes:

The F20 provides a total of four groups of acceleration/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

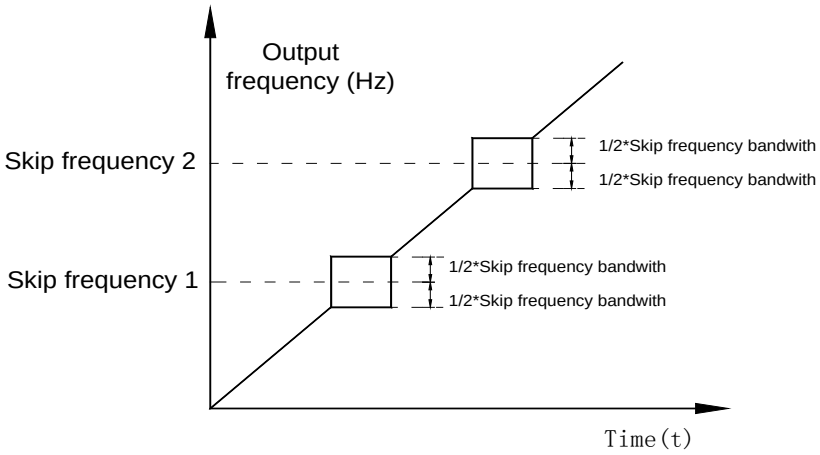
acceleration/deceleration time through different state combinations of X terminals. For more details, see the descriptions of P4.01 to P4.05.

P8.09 Skip frequency 1	Setting range: 0.00 Hz to P0.10 [0.00Hz]
P8.10 Skip frequency 2	Setting range: 0.00 Hz to P0.10 [0.00Hz]
P8.11 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.

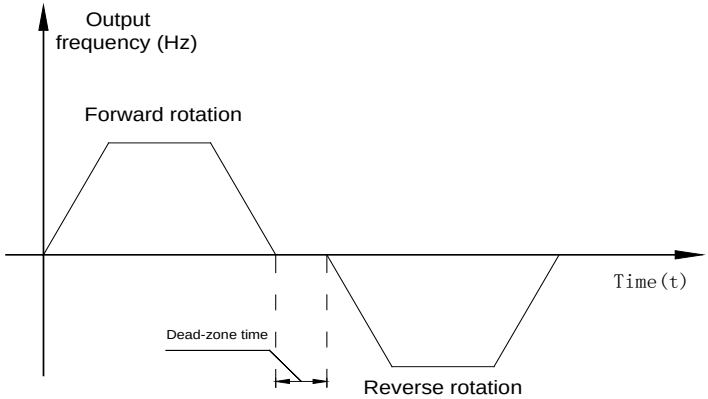
The F20 supports two skip frequencies. If both are set to 0, the frequency skip function is disabled. The principle of the skip frequencies and skip amplitude is shown in the following figure.



P8.12 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.



P8.13 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.

P8.14 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 MD380 provides three running modes to satisfy requirements of various applications..

P8.15 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.

P8.16 Accumulative power-on time threshold	Setting range: 0–65000 h[0h]

Notes:

If the accumlative power on time P7.13 reaches the value set in this paramter, the corresponding Y terminal becomes ON.

For example, combining virtual X/Y functions, to implement the function that the AC drive reports an alarm when the actual accumulative power-on time reaches the threshold of 100 hours, perform the setting as follows:

1) Set virtual X1 to user-defined fault 1: A1-00 = 44.

2) Set that the valid state of virtual X1 is from virtual Y1: A1-05 = 0000.

3) Set virtual Y1 to power-on time reached: A1-11= 24.

4) Set the accumulative power-on time threshold to 100 h: P8.16 = 100 h.

Then, the AC drive reports Err27 when the accumulative power-on time reaches 100 hours.

P8.17 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 (P7.09) reaches the value set in this parameter, the corresponding Y terminal becomes ON.

P8.18 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.

P8.19 Frequency detection value (FDT1)	Setting range: 0.00 Hz–P0.10[50.00Hz]

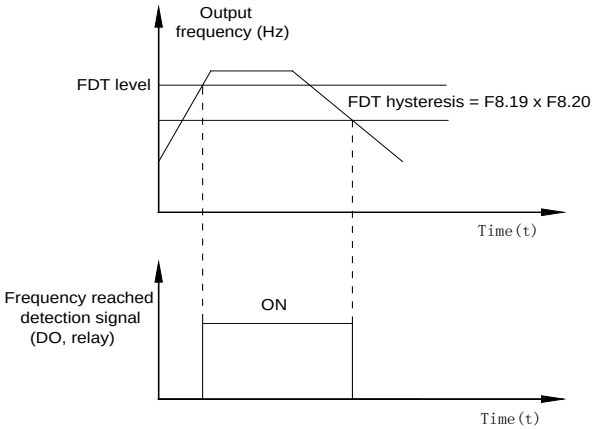
P8.20 Frequency detection hysteresis (FDT hysteresis 1)	Setting range: 0.0%–100.0%(FDT1 level)[5.0%]

Notes:

If the running frequency is higher than the value of P8.19, the corresponding Y terminal becomes ON. If the running frequency is lower than value of P8.19, the Y terminal 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 P8-20 is a percentage of the hysteresis frequency to the frequency detection value (P8.19).

The FDT function is shown in the following figure.

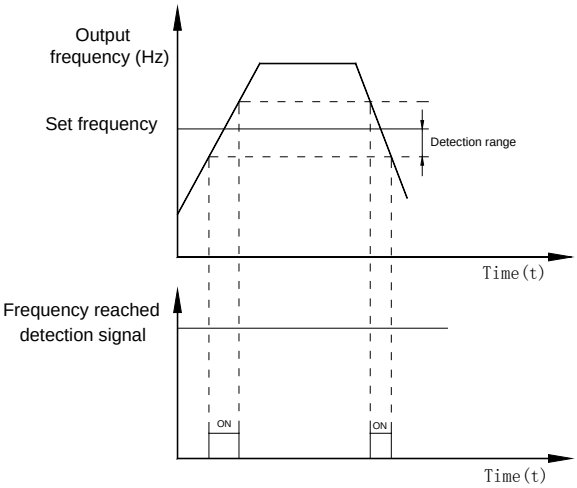


P8.21 Detection range of frequency reached	Setting range: 0.00–100%[0.0%]

Notes:

If the AC drive running frequency is within the certain range of the set frequency, the corresponding Y 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.



P8.22 Jump frequency during acceleration/deceleration	Setting range: 0–1 [0]

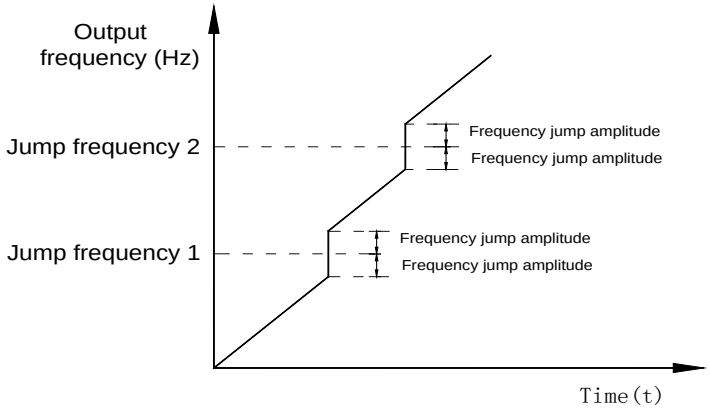
0: Disabled 1: Enabled

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.

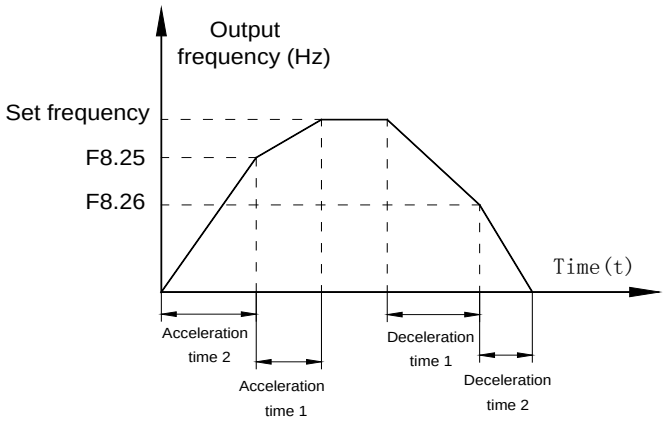
Figure Diagram when the jump frequencies are valid during acceleration/deceleration



P8.25 Frequency switchover point between acceleration time 1 and acceleration time 2	Setting range: 0.00 Hz - P0.10 [0.00Hz]
P8.26 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 P8.25, acceleration time 2 is selected. If the running frequency is larger than the value of P8.25, acceleration time 1 is selected.

During deceleration, if the running frequency is larger than the value of P8.26, deceleration time 1 is selected. If the running frequency is smaller than the value of P8.26, deceleration time 2 is selected.

P8.27 Terminal JOG preferred	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.

P8.28 Frequency detection value (FDT2)	Setting range: 0.00-P0.10 [50.00Hz]
P8.29 Frequency detection hysteresis (FDT hysteresis 2)	Setting range: 0.0-100.0%[5.0%]

Notes:

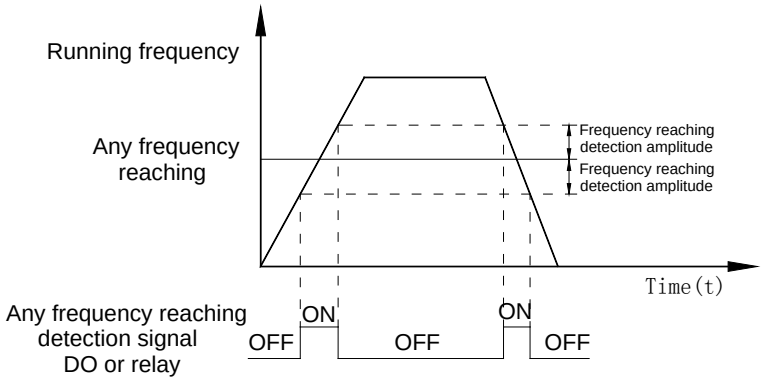
The frequency detection function is the same as FDT1 function. For details, refer to the descriptions of P8.19 and P8.20.

P8.30 Any frequency reaching detection value 1	Setting range: 0.00-P0.10 [50.00Hz]
P8.31 Any frequency reaching detection amplitude 1	Setting range: 0.0-100.0%[0.0%]
P8.32 Any frequency reaching detection value 2	Setting range: 0.00-P0.10 [50.00Hz]
P8.33 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 Y becomes ON.

The F20 provides two groups of any frequency reaching detection parameters, including frequency detection value and detection amplitude, as shown in the following figure.

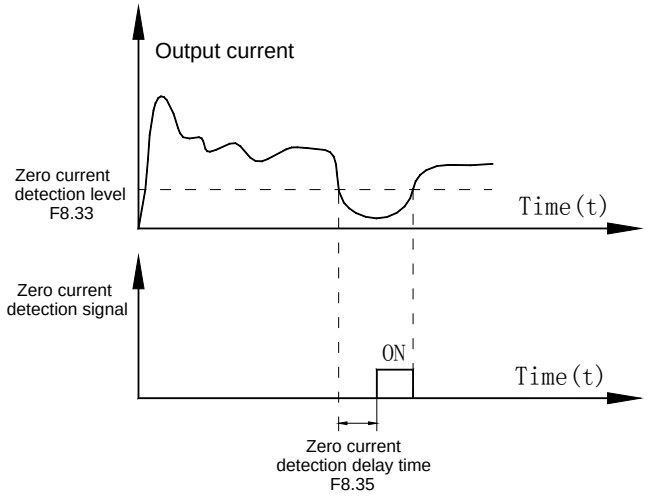


P8.34 Zero current detection level	Setting range: 0.0%–300.0% [5.0%]
P8.35 Zero current detection delay time	Setting range: 0.00–600.00s[0.10s]

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 Y becomes ON. The zero current detection is shown in the following figure.

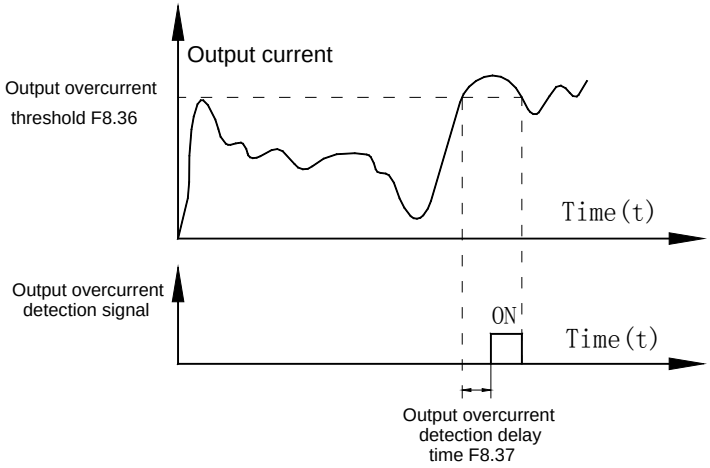
Figure Zero current detectio



P8.36 Output overcurrent threshold	Setting range: 0.1%-300.0%[200.0%]
P8.37 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 Y becomes ON. The output overcurrent detection function is shown in the following figure.

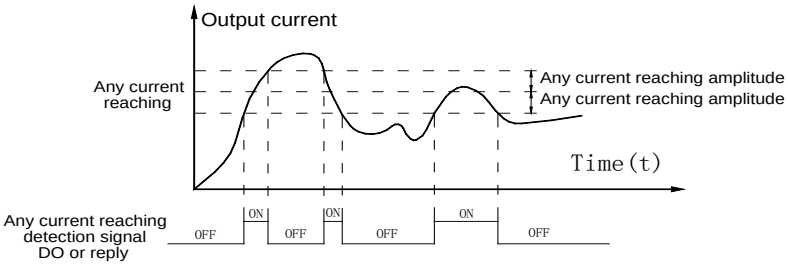


P8.38 Any current reaching 1	Setting range: 0.0%-300.0%[100.0%]
P8.39 Any current reaching 1 amplitude	Setting range: 0.0%-300.0%[0.0%]
P8.40 Any current reaching 2	Setting range: 0.0%-300.0%[100.0%]
P8.41 Any current reaching 2 amplitude	Setting range: 0.0%-300.0%[0.0%]

Notes:

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

The F20 provides two groups of any current reaching detection parameters, including current detection value and detection amplitudes, as shown in the following figure.



P8.42 Timing function	Setting range: 0-1[0]

0: Disabled 1: Enabled

P8.43 Timing duration source	Setting range: 0-3[0]

0: P8-44 1: AI1

2: AI2 3: AI

(100% of analog input corresponds to the value of P8.44)

P8.44 Timing duration	Setting range: 0.0–6500.0 min[0.0min]

Notes:

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

If P8.42 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 Y becomes ON.

The AC drive starts timing from 0 each time it starts up and the remaining timing duration can be queried by U0.20.

The timing duration is set in P8.43 and P8.44, in unit of minute.

P8.45 AI1 input voltage lower limit	Setting range: 0.00 V to P8.46[3.10v]
P8.46 AI1 input voltage upper limit	Setting range: P8.45 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 P8.46 or smaller than the value of P8.45, the corresponding Y becomes ON, indicating that AI1 input exceeds the limit.

P8.47 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 Y becomes ON, indicating that the module temperature reaches the threshold.

P8.48 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.

P8.49 Wakeup frequency	Setting range: (P8.51)- (P0.10)[0.00 Hz]
P8.50 Wakeup delay time	Setting range: 0.0–6500.0s[0.0s]

P8.51 Dormant frequency	Setting range: 0.00 Hz - P8.49[0.00 Hz]
P8.52 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 (P8.52) if the set frequency is lower than or equal to the dormant frequency (P8.51).

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 (P8.50) if the set frequency is higher than or equal to the wakeup frequency (P8.49).

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 PA.28. In this case, select PID operation enabled in the stop state (PA.28 = 1).

P8.53 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 Y becomes ON, indicating that the current running time is reached.

P8.54 Output power correction coefficient	Setting range: 0.00%–200 .0%[100.0%]

Notes:

When the output power (U0.05) is not equal to the required value, you can perform linear correction on output power by using this parameter

P8.55 Output current correction coefficient	Setting range: 0.00%–200 .0%[100.0%]

Notes:

When the output current is not equal to the required value, you can perform linear correction on output power by using this parameter

5.10 Fault and Protection(Group P9)

P9.00 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

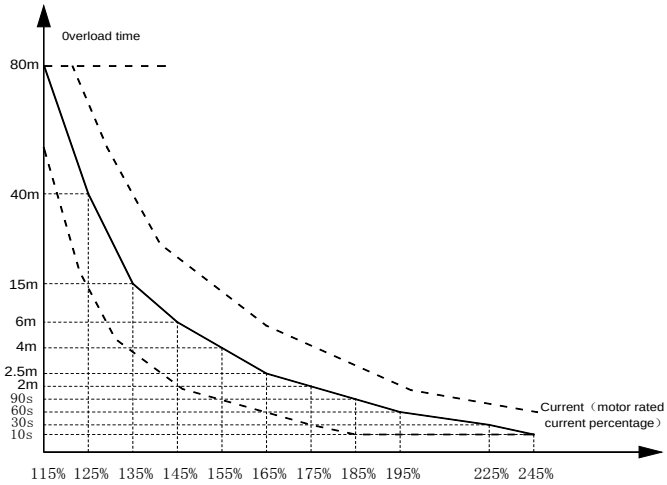
The motor overload protective function is enabled. More details in P9.01,P9.02.

P9.01 Motor overload protection gain	Setting range: 0.20–10.00 [1.00]
P9.02 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(Err11); when motor running current reach to 115% times as rated current for 80 minutes, ac drive would report overload fault(Err11). 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:

P9.01=2÷5=0.4

Attention: Set P9.01 properly based on the actual overload capAI3ty. If the value of P9.01 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 Y 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 Y 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 P9.02, the Y terminal on the AC drive allocated with function 6 (Motor overload pre-warning) becomes ON.

P9.07 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.

P9.08 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.

P9.09 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.

P9.10 Y action during fault auto reset	Setting range: 0-1 [0]

Notes:

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

P9.11 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.

P9.12 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

P9.13 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.

P9.14 1st fault type	Setting range: 0–99
P9.15 2nd fault typ	
P9.16 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.

P9.17 Frequency upon 3rd fault	Setting range: It displays the frequency when the latest fault occurs.
P9.18 Current upon 3rd fault	Setting range: It displays the current when the latest fault occurs.
P9.19 Bus voltage upon 3rd fault	Setting range: It displays the bus voltage when the latest fault occurs.
P9.20 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-BIT9 corresponding X1-X10 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.
P9.21 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 Y REL1 REL2 D01 D02 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.
P9.22 AC drive status upon 3rd fault	Setting range: Reserved
P9.23 Power-on time upon 3rd fault	Setting range: It displays the present power-on time when the latest fault occurs.
P9.24 Running time upon 3rd fault	Setting range: It displays the present running time when the latest fault occurs

P9.27 Bus voltage upon 2nd fault	Setting range: Same as P9.17–P9.24.
P9.28 X status upon 2nd fault	Setting range: Same as P9.17–P9.24.
P9.29 Bus voltage upon 2nd fault	Setting range: Same as P9.17–P9.24.
P9.30 X status upon 2nd fault	Setting range: Same as P9.17–P9.24.
P9.31 Output terminal status upon 2nd fault	Setting range: Same as P9.17–P9.24.
P9.32 AC drive status upon 2nd fault	Setting range: Same as P9.17–P9.24.
P9.33 Power-on time upon 2nd fault	Setting range: Same as P9.17–P9.24.
P9.34 Running time upon 2nd fault	Setting range: Same as P9.17–P9.24.
P9.37 Frequency upon 1st fault	Setting range: Same as P9.17–P9.24.
P9.38 Current upon 1st fault	Setting range: Same as P9.17–P9.24.
P9.39 Bus voltage upon 1st fault	Setting range: Same as P9.17–P9.24.
P9.40 X status upon 1st fault	Setting range: Same as P9.17–P9.24.
P9.41 Output terminal status upon 3rd fault	S Setting range: ame as P9.17–P9.24.
P9.42 AC drive status upon 1st fault	Setting range: Same as P9.17–P9.24.
P9.43 Power-on time upon 1st fault	Setting range: Same as P9.17–P9.24.
P9.44 Running time upon 1st fault	Setting range: Same as P9.17–P9.24.

P9.47Fault protection action selection 1	Setting range: 0-2[00000]

Notes:

Unit's digit (Motor overload, Err11)

0: Coast to stop

1: Stop according to the stop mode

2: Continue to run

Ten's digit (Power input phase loss, Err12)

Same as unit's digit

Hundred's digit (Power output phase loss, Err13)

Same as unit's digit

Thousand's digit (External equipment fault, Err15)

Same as unit's digit

Ten thousand's digit (Communication fault, Err16)

Same as unit's digit

P9.48 Fault protection action selection 2	Setting range: 0-2[00000]

Notes:

Unit's digit (Encoder fault, Err20)

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

Ten's digit (EEPROM read-write fault, Err21)

0: Coast to stop

1: Stop according to the stop mode

Hundred's digit: reserved

Thousand's digit (Motor overheat, Err25)

Same as unit's digit in P9.47

Ten thousand's digit (Accumulative running time reached)

Same as unit's digit in P9.47

P9.49 Fault protection action selection 3	Setting range: 0-2[00000]

Notes:

Unit's digit (User-defined fault 1, Err27)

Same as unit's digit in P9.47

Ten's digit (User-defined fault 2, Err28)

Same as unit's digit in P9.47

Hundred's digit (Accumulative power-on time reached, Err29)

Same as unit's digit in P9.47

Thousand's digit (Load becoming 0, Err30)

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

Ten thousand's digit (PID feedback lost during running, Err31)

Same as unit's digit in P9.47

P9.50 Fault protection action selection 4	Setting range: 0-2[00000]

Notes:

Unit's digit (Too large speed deviation, Err42)

Same as unit's digit in P9.47

Ten's digit (Motor over-speed, Err43)

Same as unit's digit in P9.47

Hundred's digit (Initial position fault, Err51)

Same as unit's digit in P9.47

Thousand's digit (Speed feedback fault, Err52)

Same as unit's digit in P9.47

Ten thousand's digit: Reserved

P9.54 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

P9.55 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 P9.54.

The setting of P9.55 is a percentage relative to the maximum frequency.

P9.56 Type of motor temperature sensor	Setting range: 0–2 [0]

0: No temperature sensor

1: PT100

2: PT1000

P9.57 Motor overheat protection threshold	Setting range: 0–200°C [110°C]
P9.58 Motor overheat warning threshold	Setting range: 0–200°C [90°C]

Notes:

The signal of the motor temperature sensor needs to be connected to the optional I/O extension card. AI3 on the extension card can be used for the temperature signal input. The motor temperature sensor is connected to AI3 and PGND of the extension card. The AI3 terminal of the F20 supports both PT100 and PT1000. Set the sensor type correctly during the use. You can view the motor temperature via U0.34.

If the motor temperature exceeds the value set in P9.57, the AC drive reports an alarm and acts according to the selected fault protection action.

If the motor temperature exceeds the value set in P9.58, the Y terminal on the AC drive allocated with function 39 (Motor overheat warning) becomes ON.

P9.59 Action selection at instantaneous power failure	Setting range: 0–2 [0]

0: Invalid

1: Decelerate

2: Decelerate to stop

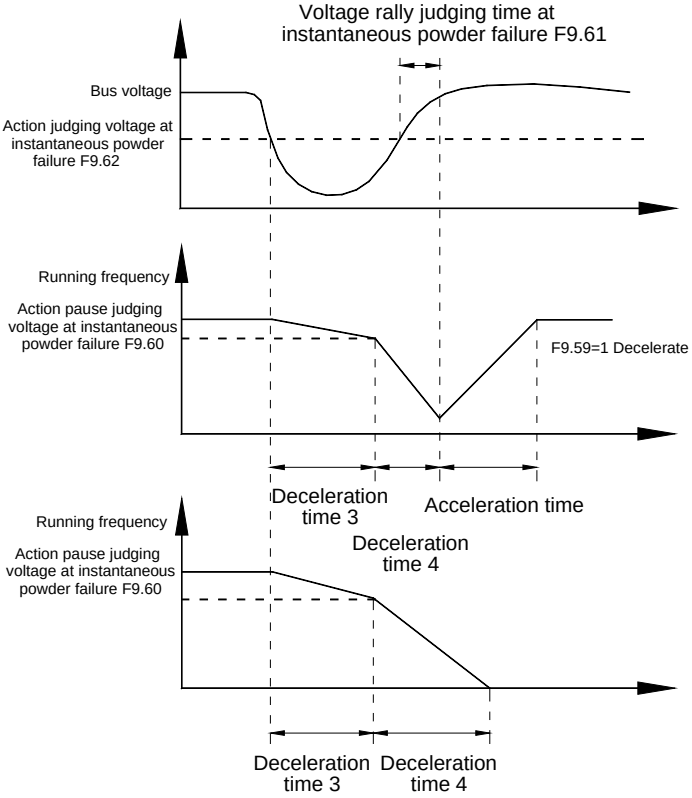
Notes:

Upon instantaneous power failure or sudden voltage dip, the DC bus voltage of the AC drive reduces. This function enables the AC drive to compensate the DC bus voltage reduction with the load feedback energy by reducing the output frequency so as to keep the AC drive running continuously.

•If P9.59 = 1, upon instantaneous power failure or sudden voltage dip, the AC drive decelerates. Once the bus voltage resumes to normal, the AC drive accelerates to the set frequency. If the bus voltage remains normal for the time exceeding the value set in P9.61, it is considered that the bus voltage resumes to normal.

•If P9.59 = 2, upon instantaneous power failure or sudden voltage dip, the AC drive decelerates to stop.

AC drive action diagram upon instantaneous power failure



P9.60 Action pause judging voltage at instantaneous power failure	Setting range: 80.0%–100.0% [85.0%]
P9.61 Voltage rally judging time at instantaneous power failure	Setting range: 0.00–100.00s[0.50S]
P9.62 Action judging voltage at instantaneous power failure	Setting range: 60.0%–100.0%[80.0%]

P9.63 Protection upon load becoming 0	Setting range: 0–1 [0]

0: Disabled 1: Enabled

P9.64 Detection level of load becoming 0	Setting range: 0.0%–100.0% [10.0%]
P9.65 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 (P9.64) and the lasting time exceeds the detection time (P9.65), 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.

P9.67Over-speed detection value	Setting range: 0.0%–50.0% [20.0%]
P9.68Over-speed detection time	Setting range: 0.0–60.0s[1.0s]

Notes:

This function is valid only when the AC drive runs in the CLVC 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 P9.67 and the lasting time exceeds the value of P9.68, the AC drive reports Err43 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.

P9.69Detection value of too large speed deviation	Setting range: 0.0%–50.0% [20.0%]
P9.70Detection time of too large speed deviation	Setting range: 0.0–60.0s[5.0s]

Notes:

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

If the AC drive detects the deviation between the actual motor rotational speed detected by the AC drive and the set frequency is greater than the value of P9.69 and the lasting time exceeds the value of P9.70, the AC drive reports Err42 and according to the selected fault protection action.

If P9.70 (Detection time of too large speed deviation) is 0.0s, this function is disabled.

P9.71Instantaneous power failure gain Kp	Setting range: 0–100 [40]
P9.72Instantaneous power failure integral coefficient Ki	Setting range: 0–100 [30]
P9.73Instantaneous power failure deceleration time	Setting range: 0–300.0s [20.0s]

P9.74 UVW encoder fault（Err20）enabling	Setting range: 0~1【1】
0:unable	1:enable

P9.75 Fault protection action selection 5	Setting range: -【11】

nits position:initial position angle identification（51）

0:continue to run

1:coast to stop

Tens position:with load auto tuning fault（19）

0:continue to run

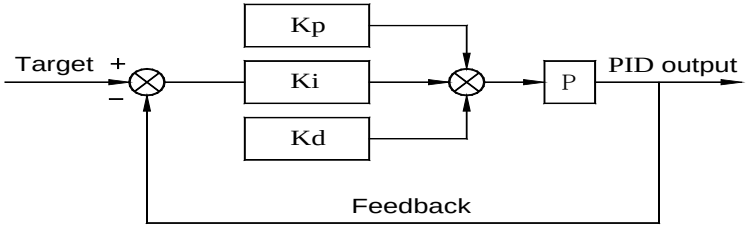
1:coast to stop

5.11 Process Control PID Function(Group PA)

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



PA.00 PID setting source	Setting range: 0–6 [0]
0: PA.01	1: AI1
2: AI2	3: AI3
4: Pulse setting (X5)	5: Communication setting

6: Multi-reference

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

Notes:

PA.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.

PA.02 PID feedback source	Setting range: 0–8 [0]
0:AI1	1: AI2
2: AI3	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%.

PA.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".

PA.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 (U0.15) and PID feedback display (U0.16).

Relative value 100% of PID setting feedback corresponds to the value of PA.04. If PA.04 is set to 2000 and PID setting is 100.0%, the PID setting display (U0.15) is 2000.

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

Notes:

•PA.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.

•PA.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 PA.06. Then the adjustment amplitude reaches the maximum frequency.

•PA.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.

PA.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 PA.08 is used to determine the reverse rotation frequency upper limit.

PA.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 PA.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.

PA.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.

PA.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

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

Notes:

PA.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.

PA.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

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

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

PA.19 PID parameter switchover deviation 1	Setting range: 0.0%–PA.20 [20.0%]
PA.20 PID parameter switchover deviation 2	Setting range: PA.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.

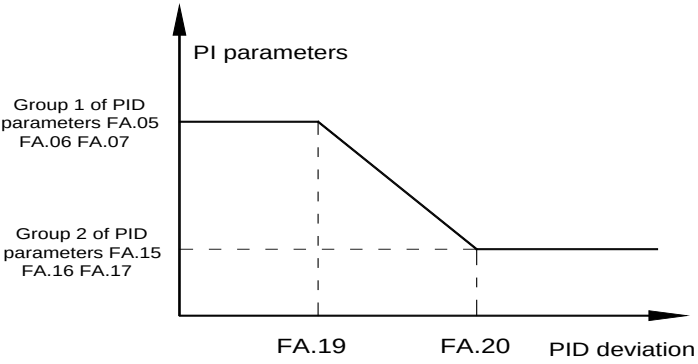
These parameters are used for switchover between two groups of PID parameters. Regulator parameters PA.15 to PA.17 are set in the same way as PA.05 to PA.07.

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 (PA.05 to PA.07) is selected. If the X is ON, group 2 (PA.15 to PA.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 PA.19, group 1 is selected. When the absolute value of the deviation between PID feedback and PID setting is higher than the value of PA-20, group 2 is selected. When the deviation is between PA.19 and PA.20, the PID parameters are the linear interpolated value of the two groups of parameter value.

Figure PID parameters switchover

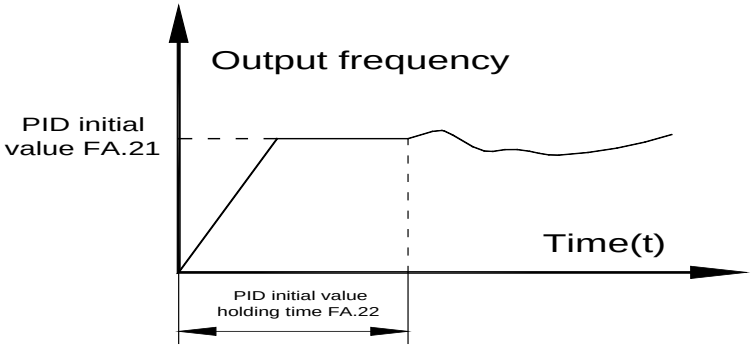


PA.21 PID initial value	Setting range: 0.0%–100.0%[0.0%]
PA.22 PID initial value holding time	Setting range: 0.00–650.00s[0.00s]

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 (PA.21) and lasts the time set in PA.22.

Figure PID initial value function



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

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

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

Notes:

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

•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.

PA.26 Detection value of PID feedback loss	Setting range: 0.0%: Not judging feedback loss 0.1%–100.0%[0.0%]
PA.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 PA.26 and the lasting time exceeds the value of PA.27, the AC drive reports Err31 and acts according to the selected fault protection action.

PA.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.

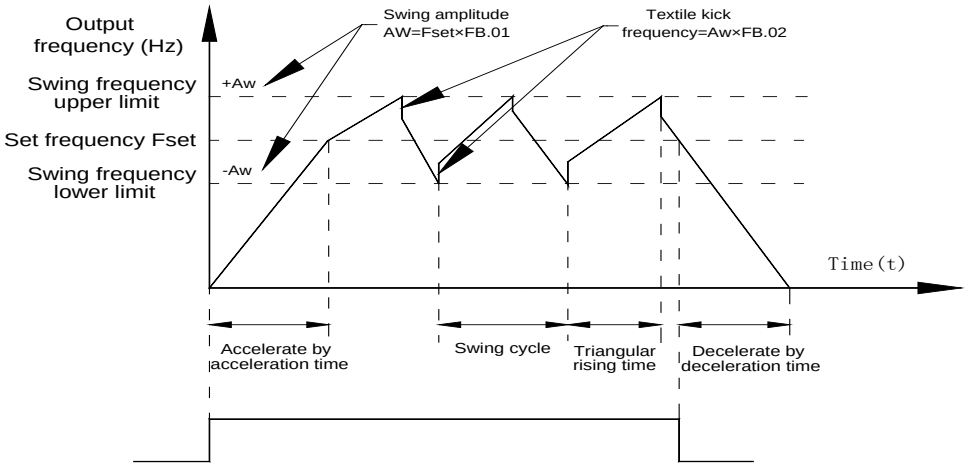
5.12 Swing Frequency, Fixed Length and Count(Group PB)

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

Figure Swing frequency control



PB.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.

PB.01 Swing frequency amplitude	Setting range: 0.0%–100.0%[0.0%]

PB.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 (PB.00 = 0), the actual swing amplitude AW is the calculation result of P0.07 (Frequency source selection) multiplied by PB.01.

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

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

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

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

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

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

Notes:

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

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

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

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

PB.05 Set length	Setting range: 0–65535m[1000m]
PB.06 Actual length	Setting range: 0–65535m[0m]
PB.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. PB.06 (Actual length) is calculated by dividing the number of pulses collected by the X terminal by PB.07 (Number of pulses each meter).

When the actual length PB.06 exceeds the set length in PB.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 P4.00 to P4.09.

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

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

Notes:

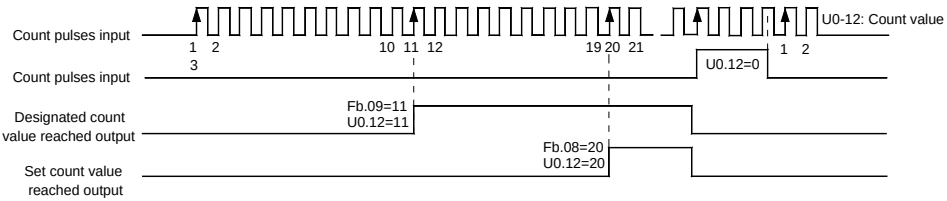
The count value needs to be collected by X terminal. Allocate the corresponding X terminal with function 25 (Counter input) in applications. If the pulse frequency is high, X5 must be used.

When the count value reaches the set count value (PB.08), the Y 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 (PB.09), the Y terminal allocated with function 9 (Designated count value reached) becomes ON. Then the counter continues to count until the set count value is reached.

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

Figure reaching the set count value and designated count value



5.13 Multi-Reference and Simple PLC Function(Group PC)

PC.00 Reference 0	Setting range: -100.0%–100.0%[0.0%]
PC.01 Reference 1	Setting range: -100.0%–100.0%[0.0%]
PC.02 Reference 2	Setting range: -100.0%–100.0%[0.0%]
PC.03 Reference 3	Setting range: -100.0%–100.0%[0.0%]
PC.04 Reference 4	Setting range: -100.0%–100.0%[0.0%]
PC.05 Reference 5	Setting range: -100.0%–100.0%[0.0%]
PC.06 Reference 6	Setting range: -100.0%–100.0%[0.0%]
PC.07 Reference 7	Setting range: -100.0%–100.0%[0.0%]
PC.08 Reference 8	Setting range: -100.0%–100.0%[0.0%]
PC.09 Reference 9	Setting range: -100.0%–100.0%[0.0%]
PC.10 Reference 10	Setting range: -100.0%–100.0%[0.0%]
PC.11 Reference 11	Setting range: -100.0%–100.0%[0.0%]
PC.12 Reference 12	Setting range: -100.0%–100.0%[0.0%]
PC.13 Reference 13	Setting range: -100.0%–100.0%[0.0%]
PC.14 Reference 14	Setting range: -100.0%–100.0%[0.0%]
PC.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 P4.

PC.16 Simple PLC running mode	Setting range: 0–2[0]

Notes:

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: 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.

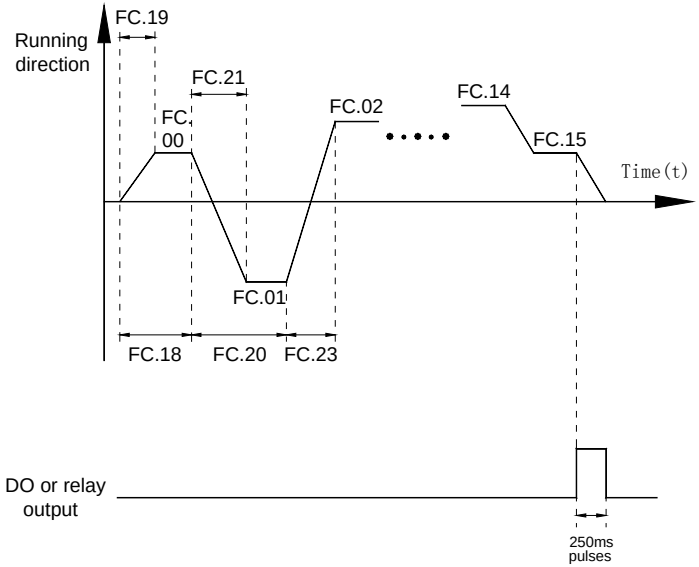
•2: Repeat after the AC drive runs one cycle

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 PC.00 to PC.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

figure 6-32 Simple PLC when used as frequency source



PC.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.

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

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

PC.50 Time unit of simple PLC running	Setting range: 0-1[0]
0: s (second)	1: h (hour)

PC.51 Reference 0 source	Setting range: 0-6[0]
0: Set by PC.00	1: AI1
2: AI2	3: AI3

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.

5.14 Communication Parameter(Group PD)

Please reference (F20 Communication Protocol)

5.15 User-Defined Function Codes(Group PE)

PE.00 User-defined function code 0	Setting range: P0.00 to PP.xx, A0.00 to Ax.xx, U0.00 to U0.xx U3.00 to U3..xx [U3.17]
PE.01 User-defined function code 1	Setting range: Same as PE.00 [U3.16]
PE.02 User-defined function code 2	Setting range: Same as PE.00 [PE.00]
PE.03 User-defined function code 3	Setting range: Same as PE.00 [PE.00]
PE.04 User-defined function code 4	Setting range: Same as PE.00 [PE.00]
PE.05 User-defined function code 5	Setting range: Same as PE.00 [PE.00]
PE.06 User-defined function code 6	Setting range: Same as PE.00 [PE.00]
PE.07 User-defined function code 7	Setting range: Same as PE.00 [PE.00]
PE.08 User-defined function code 8	Setting range: Same as PE.00 [PE.00]
PE.09 User-defined function code 9	Setting range: Same as PE.00 [PE.00]
PE.10 User-defined function code 10	Setting range: Same as PE.00 [PE.00]
PE.11 User-defined function code 11	Setting range: Same as PE.00 [PE.00]
PE.12 User-defined function code 12	Setting range: Same as PE.00 [PE.00]
PE.13 User-defined function code 13	Setting range: Same as PE.00 [PE.00]
PE.14 User-defined function code 14	Setting range: Same as PE.00 [PE.00]

PE.15 User-defined function code 1	Setting range: Same as PE.00 [PE.00]
PE.16 User-defined function code 16	Setting range: Same as PE.00 [PE.00]
PE.17 User-defined function code 17	Setting range: Same as PE.00 [PE.00]
PE.18 User-defined function code 18	Setting range: Same as PE.00 [PE.00]
PE.19 User-defined function code 19	Setting range: Same as PE.00 [PE.00]
PE.20 User-defined function code 20	Setting range: Same as PE.00 [PE.00]
PE.21 User-defined function code 21	Setting range: Same as PE.00 [PE.00]
PE.22 User-defined function code 22	Setting range: Same as PE.00 [PE.00]
PE.23 User-defined function code 23	Setting range: Same as PE.00 [PE.00]
PE.24 User-defined function code 24	Setting range: Same as PE.00 [PE.00]
PE.25 User-defined function code 25	Setting range: Same as PE.00 [PE.00]
PE.26 User-defined function code 26	Setting range: Same as PE.00 [PE.00]
PE.27 User-defined function code 27	Setting range: Same as PE.00 [PE.00]
PE.28 User-defined function code 28	Setting range: Same as PE.00 [PE.00]
PE.29 User-defined function code 29	Setting range: Same as PE.00 [PE.00]
PE.30 User-defined function code 30	Setting range: Same as PE.00 [PE.00]
PE.31 User-defined function code 31	Setting range: Same as PE.00 [PE.00]

Notes:

PE is user-defined parameter group. You can select the required parameters from all F20functions codes and add them into this group, convenient for view and modification.

Group PE provides a maximum of 30 user-defined parameters. If "PE.00" is displayed, it indicates that group PE is null. After you enter user-defined function code mode, the displayed parameters are defined by PE.00 to PE.31 and the sequence is consistent with that in group PE.

5.16 User Password(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

4: Restore user backup parameters

501: Back up current user parameters

•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 (P7.09), accumulative power-on time (P7.13) and accumulative power consumption (P7.14).

•2: Clear records

If PP.01 is set to 2, the fault records, accumulative running time (P7.09), accumulative power-on time (P7.13) and accumulative power consumption (P7.14) are cleared.

•4: Back up current user parameters

If PP.01 is set to 4, the current parameter settings are backed up, helping you to restore the setting if incorrect parameter setting is performed.

•501: Restore user backup parameters

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

PP.02 AC drive parameter display property	Setting range: 0-1[11]

Notes:

Unit's digit (Group U display selection)

0: Not display

1: Display

Ten's digit (Group A display selection)

0: Not display

1: Display

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.

5.17 Torque Control and Restricting Parameters(Group A0)

A0.00 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 A0-00 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 A0.00. If the X terminal allocated with function 46 is ON, the control mode is reverse to the value of A0.00.

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.

A0.01 Torque setting source in torque control	Setting range: 0-7 [0]
0: Digital setting (A0.03)	1:AI1
2: AI2	3: AI3
4:X5	5: Communication setting
6: MIN (AI1, A I 2)	7: MAX (AI1, A I 2)

Notes:

A0.01 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 (A0.03)

The target torque directly uses the value set in A0.03.

•1: AI1

•2: AI2

•3: AI3

The target torque is decided by analog input. The 6000E control board provides two AI terminals (AI1, AI2). Another AI terminal (AI3) is provided by the I/O extension card. AI1 is 0–10 V voltage input, AI2 is 0–10 V voltage input or 4–20 mA current input decided by jumper J8 on the control board, and AI3 is -10 V to +10 V voltage input.

The 6000E provides five curves indicating the mapping relationship between the input voltage of AI1, AI2 and AI3 and the target frequency, three 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 P4.13 to P4.27 and function codes in group A6, and select curves for AI1, AI2 and AI3 in P4.33.

When AI is used as frequency setting source, the corresponding value 100% of voltage/ current input corresponds to the value of A0.03.

•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 A0.03.

•5: Communication setting

The target torque is set by means of communication.

If the AC drive is a slave in point-point communication and receives data as torque source, data transmitted by the master is used as the setting value. For details, see the description of group A8.

If PROFIBUS-DP communication is valid and PZD1 is used for torque setting, data transmitted by PDZ1 is directly used as the torque source. The data format is -100.00% to 100.00%. 100% corresponds to the value of A0.03.

In other conditions, data is given by host computer through the communication address 0x1000. The data format is -100.00% to 100.00%. 100% corresponds to the value of A0.03.

The 6000E supports four host computer communication protocols:Modbus, CANlink. They cannot be used simultaneously.

If the communication mode is used, a communication card must be installed. The 6000E provides four optional communication cards and you can select one based on actual requirements. If the communication protocol is Modbus, the corresponding serial communication protocol needs to be selected based on the setting of P0.28.

The CANlink protocol is always valid.

A0.03Torque digital setting in torque control	Setting range: -200.0%–+200.0% [150.0%]

A0.05Forward maximum frequency in torque control	Setting range: 0.00Hz-P0.10[50.00Hz]
A0.06Reverse 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

A0.07 Acceleration time in torque control	Setting range: 0.00–650.00s [0.00s]
A0.08 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.

5.18 Virtual X /Virtual Y(Group A1)

A1.00VX1 function selection	Setting range: 0-59 [0]
A1.01VX2 function selection	Setting range: 0-59 [0]
A1.02VX3 function selection	Setting range: 0-59 [0]
A1.03VX4 function selection	Setting range: 0-59 [0]
A1.04VX5 function selection	Setting range: 0-59 [0]

Notes:

VX1 to VX5 have the same functions as X terminals on the control board and can be used for digital input. For more details, see description of P4.00 to P4.09.

A1.05 VX state setting mode	Setting range: 0-1 [00000]

Notes:

Unit's digit (VX1)

0: Decided by state of VX

1: Decided by A1.06

Ten's digit (VX2)

0, 1 (same as VX1)

Hundred's digit (VX3)

0, 1 (same as VX1)

Thousand's digit (VX4)

0, 1 (same as VX1)

Ten thousand's digit (VX5)

0, 1 (same as VX1)

A1.06 VX state selection	Setting range: 0-1 [00000]

Notes:

Unit's digit (VX1)

0: Invalid

1: Valid

Ten's digit (VX2)

0, 1 (same as VX1)

Hundred's digit (VX3)

0, 1 (same as VX1)

Thousand's digit (VX4)

0, 1 (same as VX1)

Ten thousand's digit (VX5)

0, 1 (same as VX1)

Different from X terminals, VX state can be set in two modes, selected in A1.05:

•Decided by state of VYx

Whether the state a VX is valid is determined by the state of the corresponding VY and VXx is uniquely bound to VYx (x is between 1 and 5). For example, to implement the function that the AC drive reports an alarm and stops when the VX input exceeds the limit, perform the following setting:

1) Allocate VX1 with function 44 "User-defined fault 1" (A1.00 = 44). 2) Set A1.05 to xxx0.

3) Allocate VY1 with function 31 "AI1 input limit exceeded" (A1.11 = 31).

When the AI1 input exceeds the limit, VY1 becomes ON. At this moment, VX1 becomes ON and the AC drive receives you-defined fault 1. Then the AC drive reports Err27 and stops.

•Decided by A1.06

The VX state is determined by the binary bit of A1.06. For example, to implement the function that the AC drive automatically enters the running state after power-on, perform the following setting:

1) Allocate VX1 with function 1 "Forward RUN (FWD)" (A1.00 = 1).

2) Set A1.05 to xxx1: The state of VX1 is decided by A1.06.

3) Set A1.06 to xxx1: VX1 is valid.

4) Set P0.02 to 1: The command source to terminal control.

5) Set P8.18 to 0: Startup protection is not enabled.

When the AC drive completes initialization after power-on, it detects that VX1 is valid and VX1 is allocated with the function of forward RUN. That is, the AC drive receives the forward RUN command from the terminal. Therefore, The AC drive starts to run in forward direction.

A1.07 Function selection for AI1 used as X	Setting range: 0-59 [0]
A1.08 Function selection for AI2 used as X	Setting range: 0-59 [0]
A1.09 Function selection for AI3 used as X	Setting range: 0-59 [0]
A1.10 State selection for AI used as X	Setting range: 0-1 [000]

Notes:

Unit's digit (AI1)

0: High level valid

1: Low level valid

Ten's digit (AI2)

0, 1 (same as unit's digit)

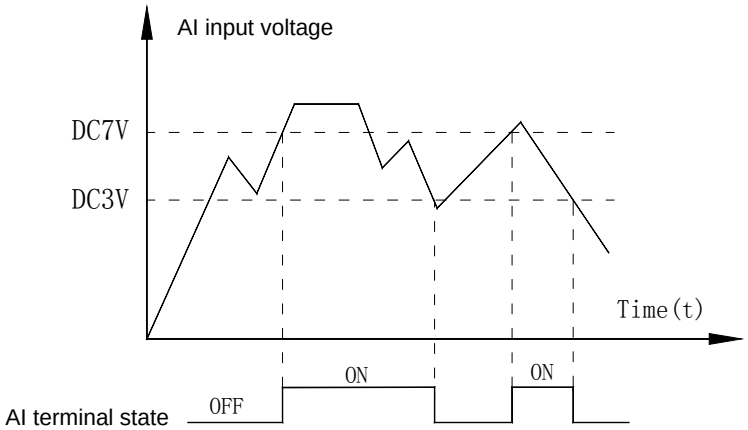
Hundred's digit (AI3)

0, 1 (same as unit's digit)

The functions of these parameters are to use AI as X. When AI is used as X, the AI state is high level if the AI input voltage is 7 V or higher and is low level if the AI input voltage is 3 V or lower. The AI state is hysteresis if the AI input voltage is between 3 V and 7 V. A1.10 is used to determine whether high level valid or low level valid when AI is used as X.

The setting of AIs (used as X) function is the same as that of Xs. For details, see the descriptions of group P4.

The following figure takes AI input voltage as an example to describe the relationship between AI input voltage and corresponding X state.



A1.11VY1 function selection	Setting range: 0-40 [0]
A1.12VY2 function selection	Setting range: 0-40 [0]
A1.13VY3 function selection	Setting range: 0-40 [0]
A1.14VY4 function selection	Setting range: 0-40 [0]
A1.15VY5 function selection	Setting range: 0-40 [0]
A1.16VY1 output delay	Setting range: 0.0–3600.0s [0.0S]
A1.17VY2 output delay	Setting range: 0.0–3600.0s [0.0S]
A1.18VY3 output delay	Setting range: 0.0–3600.0s [0.0S]
A1.19VY4 output delay	Setting range: 0.0–3600.0s [0.0S]
A1.20VY5 output delay	Setting range: 0.0–3600.0s [0.0S]
A1.21VY state selection	Setting range: 0-1 [00000]

Notes:

VY functions are similar to the Y functions on the control board. The VY can be used together with VXx to implement some simple logic control.

•If VY function is set to 0, the state of VY1 to VY5 is determined by the state of X1 to X5 on the control board. In this case, VYx and Xx are one-to-one mapping relationship.

•If VY function is set to non-0, the function setting and use of VYx are the same as Y in group P5.

The VYx state can be set in A1.21. The application examples of VXx involve the use of VYx, and see the examples for your reference.

5.19 Motor 2 Parameters(Group A2)

The 6000E can switch over the running among four motors. For the four 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

Groups A2,respectively motor2. The parameters of the three groups are the same. Here we just list the parameters of group A2 for reference.

All parameters in group A2 have the same definition and usage as parameters of motor 1. For more details, refer to the descriptions of motor 1 parameters.

A2.00 Motor type selection	Setting range: 0-1 [0]
0: Common asynchronous motor	1: Variable frequency asynchronous moto

A2.01 Rated motor power	Setting range: 0.1–1000.0 kW [Model dependent]
A2.02 Rated motor voltage	Setting range: 1–2000 V [Model dependent]
A2.03Rated motor current	Setting range: 0.01–655.35 A (AC drive power ≤ 55 kW)0.1–6553.5 A (AC drive power > 55 kW)[Model dependent]
A2.04Rated motor frequency	Setting range: 0.01 Hz to maximum frequency[Model dependent]
A2.05Rated motor rotational speed	Setting range: 1–65535 RPM[Model dependent]
A2.06Stator 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)[Model dependent]

A2.07Rotor 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)[Model dependent]
A2.08Leakage inductive reactance(asynchronous motor)	Setting range: 0.01–655.35mH (AC drive power ≤ 55 kW)0.001–65.535mH(AC drive power > 55 kW)[Model dependent]
A2.09Mutual 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) [Model dependent]
A2.10No-load current(asynchronous motor)	Setting range: 0.01 A to A2-03 (AC drive power ≤ 55 kW)0.1 A to A2-03 (AC drive power > 55 kW)[Model dependent]
A2.16 Stator resistance (synchronous motor)	Setting range: 0.001–65.535 Ω (AC drive power ≤ 55 kW)0.0001–6.5535 Ω (AC drive power > 55 kW)
A2.17 Shaft D inductance (synchronous motor)	Setting range: 0.01–655.35 mH (AC drive power ≤ 55 kW)0.001–65.535 mH (AC drive power > 55 kW)
A2.18 Shaft Q inductance (synchronous motor)	Setting range: 0.01–655.35 mH (AC drive power ≤ 55 kW)0.001–65.535 mH (AC drive power > 55 kW)
A2.20 Back EMF (synchronous motor)	Setting range: 0.1–6553.5 V
A2.27 Encoder pulses per revolution	Setting range: 1–65535[1024]
A2.28 Encoder type	Setting range: 0-4 [0]

0: ABZ incremental encoder
1: UVW incremental encoder
2: Resolver
3: SIN/COS encoder
4: Wire-saving UVW encoder

A2.29 Speed feedback PG selection	Setting range: 0–2 [0]

0:local PG
1:Extend PG
2: X5

A2.30 A, B phase sequence of ABZ incremental encoder	Setting range: 0–1 [0]

0:Forad 1: Reserve

A2.31 Encoder installation angle	Setting range: 0.0°–359.9° [0.0°]
A2.32 U, V, W phase sequence of UVW encoder	Setting range: 0-1[0]

0:Forad 1: Reverse

A2.33 UVW encoder angle offset	Setting range: 0.0°–359.9° [0.0°]
A2.34 Number of pole pairs of resolver	Setting range: 1–65535 [1]
A2.36 Encoder wire-break fault detectiontime	Setting range: 0.0s: No action 0.1-10.0S [0.0S]
A2.37 Auto-tuning selection	Setting range: 0-3 [0]

0: No auto-tuning
1: Asynchronous motor static auto-tuning1
2: Asynchronous motor complete auto-tuning
3: Synchronous motor with-load auto-tuning2

A2.38 Speed loop proportional gain 1	Setting range: 0–100 [30]
A2.39 Speed loop integral time 1	Setting range: 0.01–10.00s [0.050S]
A2.40 Switchover frequency 1	Setting range: 0.00 to A2-43 [5.00Hz]
A2.41 Speed loop proportional gain 2	Setting range: 0–100 [15]
A2.42 Speed loop integral time 2	Setting range: 0.01–10.00s [1.00s]
A2.43 Switchover frequency 2	Setting range: A2-40 –P0.10 [10.00Hz]
A2.44 Vector control slip gain	Setting range: 50%–200% [100%]
A2.45 Constant of SVC torque filter	Setting range: 1-31 [28]

A2.47 Torque upper limit source in speed control mode	Setting range: 0-7 [0]
0: A2.48	1: AI1
2:AI2	3: AI3
4:X5	5: Via communication
6: MIN(AI1,AI2)	7: MAX(AI1,AI2)

A2.48 Digital setting of torque upper limit in speed control mode	Setting range: 0.0%–200.0% [150.0%]
A2.49 Torque limit source in speed control（regenerative）	Setting range: 0~7【0】
0:A2.50 设定	1:AI1
2:AI2	3:AI3
4:PULSE setting	5:communication setting
6:Min(AI1,AI2)	7:Max(AI1,AI2)

A2.50 Digital setting of torque limit in speed control（regenerative）	Setting range: 0.0%～200.0%
A2.51 Excitation adjustment proportional gain	Setting range: 0–60000 [2000]
A2.52 Excitation adjustment integral gain	Setting range: 0–60000 [1300]
A2.53 Torque adjustment proportional gain	Setting range: 0–60000 [2000]
A2.54 Torque adjustment integral gain	Setting range: 0–60000 [1300]
A2.55 Speed loop integral property	Setting range: Unit's digit: Integral separated 0: Disabled1: Enabled [0]
A2.59 Weak Sectors Max torque coefficient	Setting range: 50.0%–200.0% [100.0%]
A2.60 Generated power upper limit	Setting range: 0-3[0] 0:invalid 1: entire valid 2. constant speed valid 3. decelerate valid

A2.60 Generated power limit	Setting range: 0-200%[Model dependent]
A2.61 Motor 2 control mode	Setting range: 0-2 [0]

0: Sensorless flux vector control (SVC)
1: Closed-loop vector control (FVC)
2: Voltage/Frequency (V/F) control

A2.62 Motor 2 acceleration/ deceleration time	Setting range: 0-4 [0]

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

A2.63 Motor 2 torque boost	Setting range: 0.0%: Automatic torque boost 0.1%–30.0% [Model dependent]
A2.65 Motor 2 oscillation suppression gain	Setting range: 0-100 [Model dependent]
A2.66 Regenerative power limit	Setting range: 0%~50%[5%]
A2.67 Initial position angle detection current of synchronous motor	Setting range: 50%~180%[80.0%]
A2.68 Initial position angle detection of synchronous motor	Setting range: 0,1,2[0]

0:always detect
1:always no detect
2:only detect once on first power on

A2.70 Salient-pole rate adjustment gain of synchronous motor	Setting range:50~500[100.]
A2.71 MTPA control	Setting range:0,1[0]

0:disable
1:enable

A2.75 Z sigal correction	Setting range:0,1[1]

0:disable
1:enable

A2.79 Low speed excitation current	Setting range:0~80%
A2.80 Low speed frequency	Setting range:0.8K~P0-15
A2.81 SVC low frequency braking mode	Setting range:0,1
0:no low frequency braking	1:low frequency braking only stop the motor

A2.82 SVC low frequency braking valid frequency	Setting range:0~10.00Hz
A2.83 SVC low frequency braking change step	Setting range:0.0005~1.0000Hz
A2.84 SVC low frequency braking current	Setting range:0~80%
A2.85 Synchronous motor SVC speed tracking	Setting range:0~1
A2.86 Zero servo enabling	Setting range:0~1
A2.87 Switchover frequency	Setting range:0.00～P2-02
A2.88 Zero servo speed loop proportional gain	Setting range:1～100
A2.89 Zero servo speed loop integral time	Setting range:0.01s～10.00s
A2.90 Stop anti-reversion enabling	Setting range:0~1
A2.91 Stop angle	Setting range:0.0°～10.0°

5.20 Control Optimization Parameters(Group A5)

A5.00 DPWM switchover frequency upper limit	Setting range: 5.00–P0.10 Hz [8.00Hz]

Notes:

This parameter is valid only for V/F control.

It is used to determine the wave modulation mode in V/F control of asynchronous motor. If the frequency is lower than the value of this parameter, the waveform is 7-segment continuous modulation. If the frequency is higher than the value of this parameter, the waveform is 5-segment intermittent modulation.

The 7-segment continuous modulation causes more loss to switches of the AC drive but smaller current ripple. The 5-segment intermittent modulation causes less loss to switches of the AC drive but larger current ripple. This may lead to motor running instability at high frequency. Do not modify this parameter generally.

For instability of V/F control, refer to parameter P3.11. For loss to AC drive and temperature rise, refer to parameter P0.15.

A5.01 PWM modulation mode	Setting range: 0–1 [0]

Notes:

This parameter is valid only for V/F control.

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.

A5.02 Dead zone compensation mode selection	Setting range: 0–1 [1]

Notes:

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.

A5.03 Random PWM depth	Setting range: 0-10[0]

Notes:

The setting of random PWM depth can make the shrill motor noise softer and reduce the electromagnetic interference. If this parameter is set to 0, random PWM is invalid

A5.04 Rapid current limit	Setting range: 0–1 [1]

Notes:

The rapid current limit function can reduce the AC drive's overcurrent faults at maximum, guaranteeing uninterrupted running of the AC drive.

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 Err40, indicating the AC drive is overloaded and needs to stop.

A5.05 Current detection compensation	Setting range: 0–100 [5]

Notes:

It is used to set the AC drive current detection compensation. Too large value may lead to deterioration of control performance. Do not modify it generally.

A5.06 Undervoltage threshold	Setting range: 200–2000 [Model dependent]

Notes:

It is used to set the undervoltage threshold of Err09. 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 Overvoltage 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
Three-phase 480 V	450 V
Three-phase 690 V	650 V
Three-phase 1140 V	1100 V

A5.07 SFVC optimization mode selection	Setting range: 1–2 [2]
A5.08 Dead-zone time adjustmen	Setting range: 100%–200%[150%]

Notes:

It is only valid for 1140 V voltage class.

You can modify the value of this parameter to improve the voltage utilization rate. Too small value may system instability. Do not modify it generally.

A5.09 Overvoltage threshold	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
Three-phase 480 V	890.0 V
Three-phase 690 V	1300.0 V

The default value is also the upper limit of the AC drive's internal overvoltage protection voltage. The parameter becomes effective only when the setting of A5.09 is lower than the default value. If the setting is higher than the default value, use the default value.

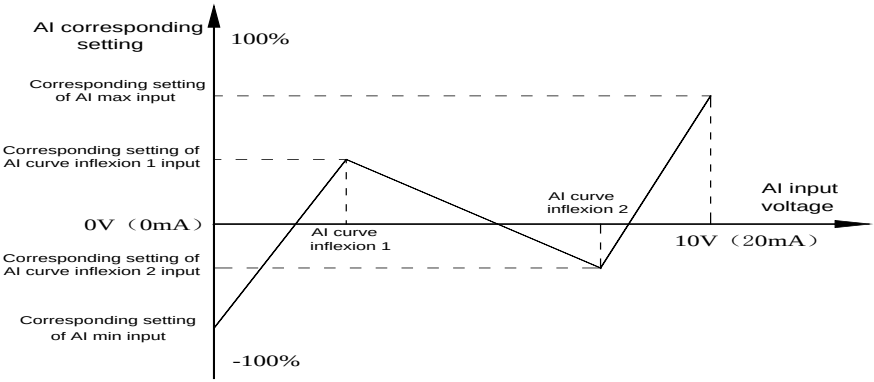
5.21 AI Curve Setting(Group A6)

A6.00 AI curve 4 minimum input	Setting range: -10.00 V to A6.02 [0.00V]
A6.01 Corresponding setting of AI curve 4 minimum input	Setting range: -100.0%–100.0% [0.0%]
A6.02 AI curve 4 inflexion 1 input	Setting range: A6.00 to A6.04 [3.00V]
A6.03 Corresponding setting of AI curve 4 inflexion 1 input	Setting range: -100.0%–100.0% [30.0%]
A6.04 AI curve 4 inflexion 1 input	Setting range: A6.02 to A6.06 [6.00V]
A6.05 Corresponding setting of AI curve 4 inflexion 1 input	Setting range: -100.0%–100.0% [60.0%]
A6.06 AI curve 4 maximum input	Setting range: A6.06 to 10.00 V [10.00V]

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

P4.33 (AI curve selection) is used to select curve for AI1 to AC

A6.24 Jump point of AI1 input correspondingsetting	Setting range: -100.0%–100.0% [0.0%]
A6.25 Jump amplitude of AI1 input corresponding setting	Setting range: 0.0%–100.0% [0.5%]
A6.26 Jump point of AI2 input corresponding setting	Setting range: -100.0%–100.0% [0.0%]
A6.27 Jump amplitude of AI2 input corresponding setting	Setting range: 0.0%–100.0% [0.5%]
A6.28 Jump point of AI3 input corresponding setting	Setting range: -100.0%–100.0% [0.0%]
A6.29 Jump amplitude of AI3 input corresponding setting	Setting range: 0.0%–100.0% [0.5%]

Notes:

The AI terminals (AI1 to AI3) of the 6000E 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 5.00 V 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 A6.16 to 50.0% and A6.17 to 1.0%, then the obtained AI1 input corresponding setting is fixed to 50.0%, eliminating the fluctuation effect.

5.22 Point-point Communication(Group A8)

A8.00 Point-point communication selection	Setting range: 0–1 [0]

0: Disabled 1: Enabled

It is used to decide whether to enable point-point communication.

Point-point communication indicates direct communication between two or more 6000EAC drives by using CANlink. The master gives target frequency or target torque to one or multiple slaves according to its own frequency or torque signal.

If multiple AC drives are connected by using CANlink cards, the terminal resistor of the CANlink card connected to the end AC drive shall be switched on.

If point-point communication is enabled, the CANlink communication addresses of the AC drives are automatically matched without special setting.

The point-point communication rate is set in PD.00.

A8.01 Master and slave selection	Setting range: 0–1 [0]

0: Master 1: Slave

A8.2 Slave and master information exchange	Setting range: 0–1 [011]

Notes:

Unit's digit

0:follow master commend

1:not follow master commend

Ten's digit

0:send fault information

1:not send fault information

Hundred's digit

0:no warning salve off

1:warning slave off

A8.03 Data frame selection	Setting range: 0–1 [0]

0: Master slave control frame 1: Droop control frame

A8.04 Zero offset of	Setting range: -100.00%–100.00% [0.00%]
A8.05 Gain of received data	Setting range: -10.00–10.00 [1.00]

Notes:

These two parameters are used to adjust data received from the master and define the torque reference relationship between the master and the slave.

If "b" expresses the zero offset of received data, "k" expresses the gain, and "y" expresses the actually used data. The actually used data can be obtained based on the formula:

$y = kx + b$

The value y ranges from -100.00% to 100.00%

A8.06 Point-point communication interruption detection time	Setting range: 0.0–10.00 [1.0S]

Notes:

It is used to set the point-point communication interruption time at which this fault is detected. If it is set to 0, it indicates no detection.

A8.07 Master data sending cycle	Setting range: 0.001–10.000s [0.001s]

Notes:

It is used to set the data sending cycle of the master in point-point communication.

A8.08 Zero offset of received data (frequency)	Setting range: -100.00%–100.00 [0.00%]
A8.09 Gain of received data (frequency)	Setting range: -10.00–10.00 [1.00]

Notes:

These two parameters are used to adjust data received from the master and define the frequency reference relationship between the master and the slave.

If "b" expresses the zero offset of received data, "k" expresses the gain, and "y" expresses the actually used data. The actually used data can be obtained based on the formula:

$y = kx + b$

The value y ranges from -100.00% to 100.00%.

A8.11 Windows	Setting range: 0.2–10Hz[0.50Hz]

Notes:

When under master and slave control mode this parameter valid

5.23 AI/AO Correction(Group AC)

AC.00 AI1 measured voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
AC.01 AI1 displayed voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
AC.02 AI1 measured voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
AC.03 AI1 displayed voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]

AC.04 AI2 measured voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
AC.05 AI2 displayed voltage 1	Setting range: 0.500–4.000 V[Factory-corrected]
AC.06 AI2 measured voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
AC.07 AI2 displayed voltage 2	Setting range: -9.999–10.000 V [Factory-corrected]
AC.08 AI3 measured voltage 1	Setting range: -9.999–10.000 V [Factory-corrected]
AC.09 AI3 displayed voltage 1	Setting range: -9.999–10.000 V [Factory-corrected]
AC.10 AI3 measured voltage 2	Setting range: -9.999–10.000 V [Factory-corrected]
AC.11 AI3 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 U0.21, U0-22 and U0.23.

During correction, send two voltage values to each AI terminal, and save the measured values and displayed values to the function codes AC.00 to AC.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 AC.00.

3) View the displayed value of U0.21 and save the value to AC.01.

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

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

6) View the displayed value of U0.21 and save the value to AC.03.

At correction of AI2 and AI3, the actually sampled voltage is respectively queried in U0.22 and U0.23.

For AI1 and AI2, 2 V and 8 V are suggested as the correction voltages. For AI3, -8 V and 8 V are suggested.

AC.12 AO1 target voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
AC.13 AO1 measured voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
AC.14 AO1 target voltage 2	Setting range: 6.000–.999 V [Factory-corrected]
AC.15 AO1 measured voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
AC.16 AO2 target voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
AC.17 AO2 measured voltage 1	Setting range: 0.500–4.000 V [Factory-corrected]
AC.18 AO2 target voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
AC.19 AO2 measured voltage 2	Setting range: 6.000–9.999 V [Factory-corrected]
AC.20 AI2 measured current 1	Setting range: 0.000–20.000 mA [Factory-corrected]
AC.21 AI2 sampling current 1	Setting range: 0.000–20.000 mA [Factory-corrected]
AC.22 AI2 measured current 2	Setting range: 0.000–20.000 mA [Factory-corrected]
AC.23 AI2 sampling current 2	Setting range: 0.000–20.000 mA[Factory-corrected]
AC.24 AO1 ideal current 1	Setting range: 0.000–20.000 mA [Factory-corrected]
AC.25 AO1 sampling current 1	Setting range: 0.000–20.000 mA [Factory-corrected]
AC.26 AO1 ideal current 2	Setting range: 0.000–20.000 mA [Factory-corrected]
AC.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.

5.24 Monitoring Parameters(Group U0)

Group U0 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).

U0.00 to U0.31 are the monitoring parameters in the running and stop state defined by P7.03 and P7.04. For more details, see Table

U0.00 Running frequency	Setting range: 0.00–500Hz
U0.01 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 U0.19.

U0.02 Bus voltage	Setting range: 0.0–3000.0 V

Notes:

It displays the AC drive's bus voltage.

U0.03 Output voltage	Setting range: 0–1140 V

Notes:

It displays the AC drive's output voltage in the running state.

U0.04 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.

U0.05 Output power	Setting range: 0–32767

Notes:

It displays the AC drive's output power in the running state

U0.06 Output torque	Setting range: -200.0%–200.0%

Notes:

It displays the AC drive's output torque in the running state.

U0.07 X teminal 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	X6	X7	X8	X9	X10
Bit10	Bit11	Bit12	Bit13	Bit10	Bit11	Bit12	Bit13	Bit14	Bit15
VX1	VX2	VX3	VX4	VX1	VX2	VX3	VX4	VX5	

U0.08 Y state	Setting range:0–1023

Notes:

It indicates the current state of Y terminals. After the value is converted into a binary number, each bit corresponds to a Y. "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
Y	Relay 1	Relay 2	Y1	Y2	VY1

Bit6	Bit7	Bit8	Bit9	Bit10	Bit11
VY2	VY3	VY4	VY5		

U0.10 AI2 voltage (V)/current (mA)	Setting range: 0.00–10.57 V 0.00–20.00 mA

Notes:

When P4.40 is set to 0, AI2 sampling data is displayed in the unit of V.

When P4.40 is set to 1, AI2 sampling data is displayed in the unit of mA.

U0.14 Load speed	Setting range: 0–65535

Notes:

For more details, see the description of P7.12.

U0.15 PID setting	Setting range: 0–65535
U0.16 PID feedback	Setting range: 0–65535

Notes:

They display the PID setting value and PID feedback value.

•PID setting = PID setting (percentage) x PA.04

•PID feedback = PID feedback (percentage) x PA.04

U0.18 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.

U0.19 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

U0.20 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 P8.42 to P8.44.

U0.21 AI1 voltage before correction	0.00–10.57 V
U0.22 AI2 voltage (V)/ current (mA) before correction	0.00–10.57 V 0.00–20.00 mA
U0.23 AI3 voltage before correction	-10.57–10.57 V

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 U0.09, U0.10 and U0.11. Refer to group AC for the correction mode.

U0.24 AI1 voltage before correction	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).

U0.27 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.

U0.28 Communication setting value	Setting range: -100.00%–100.00%

Notes:

It displays the data written by means of the communication address 0x1000.

U0.29 Encoder feedback speed	Setting range: -320.00–320.00 Hz/-500.0–500.0 Hz

Notes:

It displays the motor running frequency measured by the encoder.

•If P0.22 (Frequency reference resolution) is 1, the display range is -3200.0–3200.0 Hz.

•If P0.22 (Frequency reference resolution) is 2, the display range is -500.00–500.00 Hz.

U0.30 Main frequency X	Setting range: 0.00–500.00 Hz
U0.31 Auxiliary frequency Y	Setting range: 0.00–500.00 Hz
U0.32 Motor temperature	0–200 °C

Notes:

It displays the motor temperature obtained by means of AI3 sampling. For the motor temperature detection, see P9.56.

U0.35 Target torque	Setting range:-200.0%–200.0%

Notes:

It displays the current torque upper limit.

U0.36 Resolver position	Setting range: 0–4095

Notes:

It displays the current resolver position.

U0.37 Power factor angle	Setting range: -

Notes:

It displays the current power factor angle.

U0.38 ABZ position	Setting range: 0–65535

Notes:

It displays the phase A and B pulse counting of the current ABZ or UVW encoder. This value is four times the number of pulses that the encoder runs. For example, if the display is 4000, the actual number of pulses that the encoder runs is 4000/4 = 1000.

The value increase when the encoder rotates in forward direction and decreases when the encoder rotates in reverse direction. After increasing to 65535, the value starts to increase from 0 again. After decreasing to 0, the value starts to decrease from 65535 again.

You can check whether the installation of the encoder is normal by viewing U0.38.

U0.39 Target voltage upon V/F separation	Setting range: 0 V to rated motor voltage
U0.40 Output voltage upon V/F separation	Setting range: 0 V to rated motor voltage

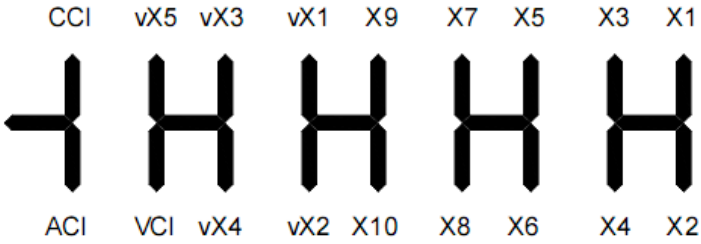
Notes:

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 P3

U0.41 X terminals state visual display	Setting range: -

Notes:

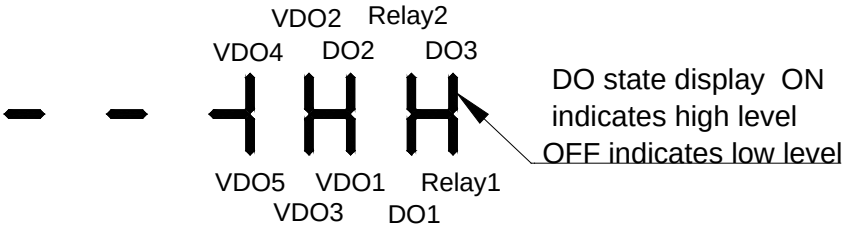
It displays the X terminals state visually and the display format is shown in the following figure.



U0.42 Y state visual display	Setting range: -

Notes:

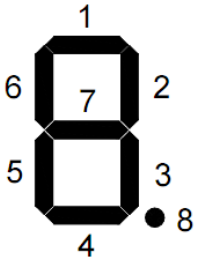
It display the Y state visually and the display format is shown in the following figure.



U0.43 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.

U0.44 X function state visual display 2	Setting range: -

Notes:

It displays whether the X functions 41–59 are valid. The display format is similar to U0.43. The 7-segment LEDs display functions 41–48, 49–56 and 57–59, respectively from right to left

U0.58 Phase Z counting	Setting range: 0–65535

Notes:

It displays the phase Z counting of the current ABZ or UVW encoder. The value increases or decreases by 1 every time the encoder rotates one revolution forwardly or reversely.

You can check whether the installation of the encoder is normal by viewing U0.58.

U0.59 Current set frequency	Setting range: -100.00%–100.00%
U0.60 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).

U0.61 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:

U0.61	Bit0	0: Stop 1: Forward 2: Reverse
	Bit1	
	Bi2	0: Constant 1: Accelerate 2: Decelerate
	Bit3	
	Bit4	0: Bus voltage normal 1: Undervoltage

U0.62 Current fault code	Setting range: 0–99

Notes:

It displays the current fault code.

U0.63 Sent value of point-point communication	Setting range: -100.0%–100.0%
U0.64 Slave quantity of point-point communication	Setting range:0-63

Notes:

It displays the data at point-point communication. U0.63 is the data sent by the master, and U0.64 is the quantity of the salve that master can check .

U0.65 Torque upper limit	Setting range: -200.00%–200.00%

Notes:

It displays the current setting torque upper limit.

U0.67 Communication expand	Setting range: -
U0.68 DP card AC drive status	Setting range: bit0- Running status bit1- Running direction bit2- AC drive fault or not bit3-Reach target frequency bit4~bit7- Reserved bit8~bit15-Fault code
U0.69 Transport DP card speed	Setting range: 0.00-P0.10
U0.70 Transport DP card rotary	Setting range: 0~65535
U0.71 Current of communication card	Setting range: -
U0.72 Communication card fault status	Setting range: -
U0.73 Motor NO	Setting range: 0: Motor 1 /1: Motor 2
U0.74 AC drive output torque	Setting range: -300.00%–300.00%

U0.68	Bit0	0:STOP 1:RUN
	Bit1	0:FORWARD 1:REVERSE
	Bit2	0:NO FAULT 1:FAULT
	Bit3	0:NOT REACH TARGET FREQUENCY 1:REACH TARGET FREQUENCY
	Bit4	-
	Bit5	-
	Bit6	-
	Bit7	-
	Bit8~Bit15	FAULT CODE

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
Inverter unit protection	Err01	1: The output circuit is grounded or short circuited. 2: The connecting cable of the motor is too long. 3: The module overheats. 4: The internal connections become loose. 5:The main control board is faulty. 6: The drive board is faulty. 7: The inverter module is faulty.	1: Eliminate external faults. 2: Install a reactor or an output filter. 3: Check the air filter and the cooling fan. 4: Connect all cables properly. 5: Contact the agent or our company

Fault Name	Display	Possible Causes	Solutions
Overcurrent during acceleration	Err02	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.
Overcurrent during deceleration	Err03	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.

Fault Name	Display	Possible Causes	Solutions
Overcurrent at constant speed	Err04	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	Err05	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.
Overvoltage during deceleration	Err06	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	Err07	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.

Fault Name	Display	Possible Causes	Solutions
Control power supply fault	Err08	The input voltage is not within the allowable range.	Adjust the input voltage to the allowable range
Undervoltage	Err09	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
AC drive overload	Err10	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	Err11	1: P9-01 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 P9-01 correctly. 2: Reduce the load and check the motor and the mechanical condition.3: Select an AC drive of higher power class

Fault Name	Display	Possible Causes	Solutions
Power input phase loss	Err12	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	Err13	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
Module overheat	Err14	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	Err15	1: External fault signal is input via X. 2: External fault signal is input via virtual I/O.	Reset the operation.

Fault Name	Display	Possible Causes	Solutions
Communication fault	Err16	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	Err17	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.
Current detection fault	Err18	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	Err19	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.
Encoder fault	Err20	1: The encoder type is incorrect. 2: The cable connection of the encoder is incorrect. 3: The encoder is damaged. 4: The PG card is faulty.	1: Set the encoder type correctly based on the actual situation. 2: Eliminate external faults. 3: Replace the damaged encoder. 4: Replace the faulty PG card.

Fault Name	Display	Possible Causes	Solutions
EEPROM read-write fault	Err21	The EEPROM chip is damaged.	Replace the main control board.
AC drive hardware fault	Err22	1: Overvoltage exists. 2: Overcurrent exists.	1: Handle based on overvoltage. 2: Handle based on overcurrent.
Short circuit to ground	Err23	The motor is short circuited to the ground.	Replace the cable or motor.
Accumulative running time reached	Err26	The accumulative running time reaches the setting value.	Clear the record through the parameter initialization function.
User-defined fault 1	Err27	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	Err28	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.
Accumulative power-on time reached	Err29	The accumulative power-on time reaches the setting value.	Clear the record through the parameter initialization function.
Load becoming 0	Err30	The AC drive running current is lower than P9-64.	Check that the load is disconnected or the setting of P9-64 and P9-65 is correct.

Fault Name	Display	Possible Causes	Solutions
PID feedback lost during running	Err31	The PID feedback is lower than the setting of PA-26.	Check the PID feedback signal or set PA-26 to a proper value.
Pulse-by-pulse current limit fault	Err40	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	Err41	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	Err42	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed.3: P9-69 and P9-70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto-tuning.3: Set P9-69 and P9-70 correctly based on the actual situation.
Motor over-speed	Err43	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed.3: P9-69 and P9-70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto-tuning.3: Set P9-69 and P9-70 correctly based on the actual situation.
Motor overheat	Err45	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.

Fault Name	Display	Possible Causes	Solutions
Initial position fault	Err51	The motor parameters are not set based on the actual situation.	Check that the motor parameters are set correctly and whether the setting of rated current is too small.
Brake pipe protection fault	Err60	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.

SN	Fault	Possible Causes	Solutions
2	“HC” 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	Err23” 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.
4	The AC drive display is normal upon power-on. But “HC” 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	Err14 (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

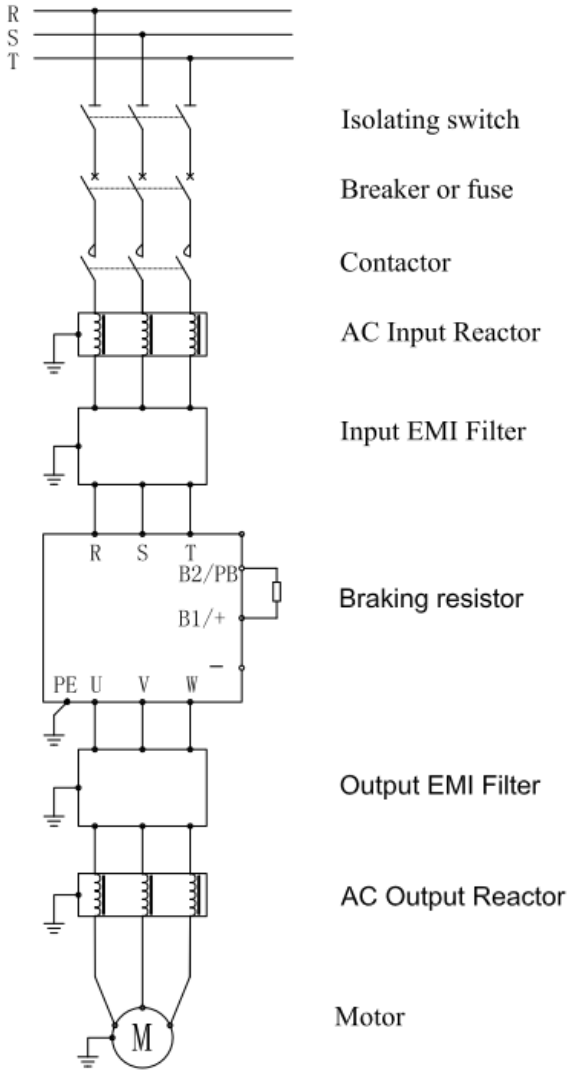


Fig. 7-1 3R75GB/31R5PB ~3022GB Peripheral Equipment Connection Diagram

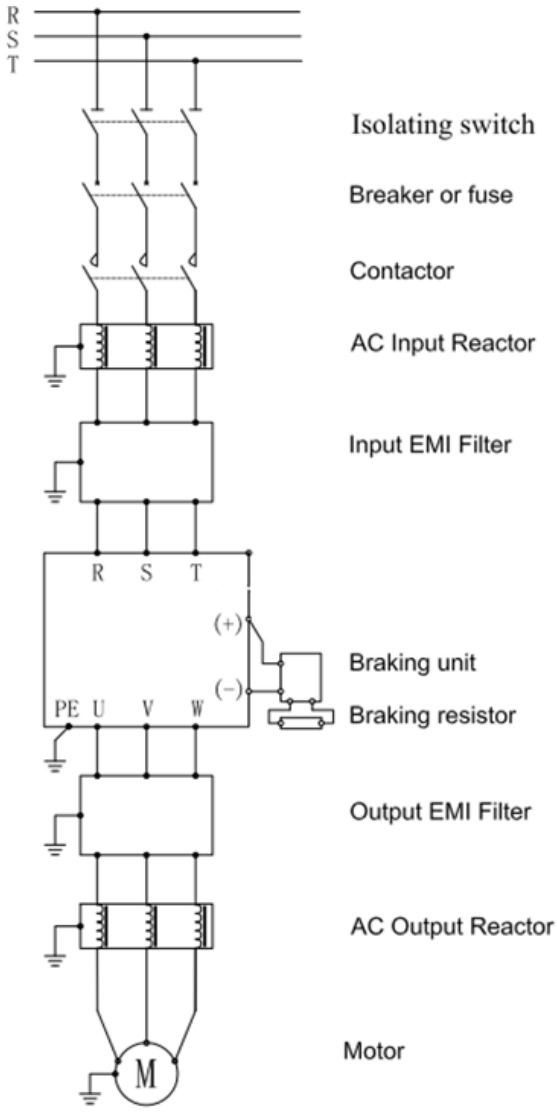


Fig. 7-2 3022G and above Peripheral Equipment Connection Diagra

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 capAI3ty: Inverter capAI3ty>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)	Voltage (V)	Motor Power (kW)	Resistance Value (Ω)	Resistance Power (kW)
Single-phase 220V	0.4	200	0.1	Three-phase 380V	55	20/2	12
	0.75	150	0.2		75	13.6/2	18
	1.5	100	0.4		93	20/3	18
	2.2	75	0.5		110	20/3	18
Three-phase 380V	0.75	300	0.4		132	20/4	24
	1.5	300	0.4		160	13.6/4	36
	2.2	200	0.5		185	13.6/4	36
	4	200	0.5		200	13.6/5	45
	5.5	100	0.8		220	13.6/5	45
	7.5	75	0.8		250	13.6/5	45
	11	50	1		280	13.6/6	54
	15	40	1.5		315	13.6/6	54
	18.5	30	4		355	13.6/7	63
	22	30	4		400	13.6/8	72
	30	20	6		450	13.6/8	81
	37	16	9		500	13.6/8	90
	45	13.6	9				

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	Centrifuge	AAI2dental Braking	General Application

		Taking		Load	
Braking Frequency	20%~30%	20~30%	50%~60%	5%	10%

7.2.4 Leakage Protector

There is direct earth safety capAI3tor or distributed capAI3tor 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 capAI3ty 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).

7.2.5 CapAI3tor Box

This optional device is applied specially on occasions where continuous operation is required as there is relative long momentary power off over 20ms. It can be purchased from our company. In the purchase order, please specify the actual load and the continuous operation time required after power off, so we can manufacture it appropriately.

As the capAI3tance box may influence some parameters in inverter after it is assembled, the purchasing without our instruction is not recommended.

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 capAI3tor.

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 capAI3tors 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 CapAI3tor	Check whether there is color variation, peculiar smell, bubbles and liquid leaked, etc.	Replace the electrolytic capAI3tor
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

fAI3litate 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 capAI3ty 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, and 1000V for 660V) 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 CapAI3tor	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 capAI3tor 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

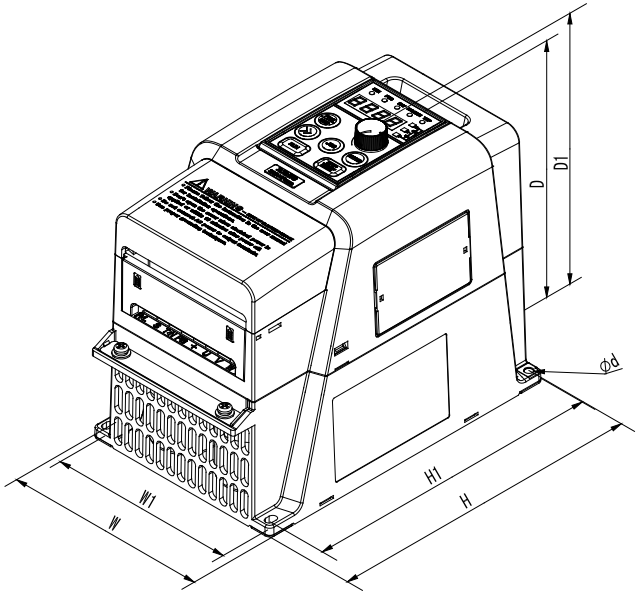


Fig. A1-1 Schematic outline

Table A1-1 External Dimension (unit: mm)

	Model	H	H1	W	W1	D	D1	d
F20	3R75GB/32R2PB ~32R2GB/3004PB	198	175	120	110	150	160	4.5
	3004GB/35R5PB ~35R5GB/37R5PB	210	182	130	119	162	172	4.5
	37R5GB/3011PB～ 3011GB/3015PB	255	238	180	166	174	183	7

	Model	H	H1	W	W1	D	D1	d
F21	3R75GB~32R2GB	198	175	120	110	150	160	4.5
	3004GB~35R5GB	210	182	130	119	162	172	4.5
	37R5GB～3011GB	255	238	180	166	174	183	7

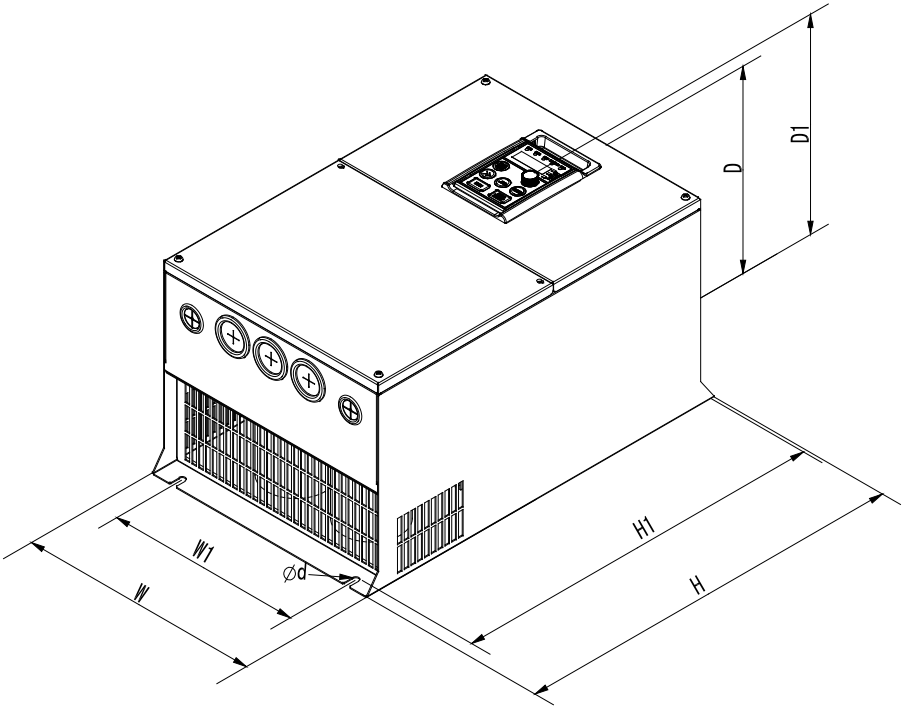
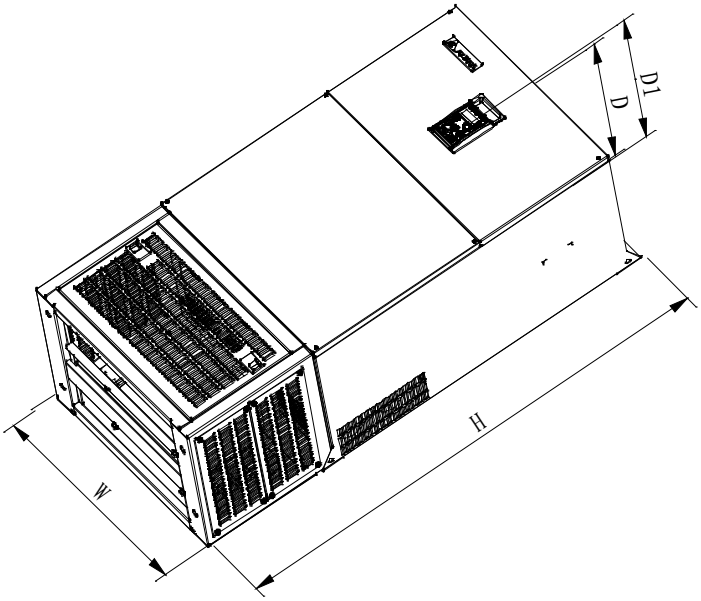


Fig. A1-2 Schematic outline

Table A1-2 External Dimension (unit: mm)

	Model	H	H1	W	W1	D	D1	d
F20	3015GB/3018PB -N	295	284	180	135	178	197	5
	3018GB/3022PB -N～3022GB-N	375	360	235	193	184	199	8
	3030P –N， 3030G/3037P -N～3037G/3045P –N	460	440	285	230	188	203	8
	3045G/3055P -N～3055G/3075G -N	535	512	320	180	231	250	8
	3075G/3093P -N～3093G/3110P -N	560	542	375	245	274	292	8
	3110G/3132P-N～3132G-N	657	630	458	338	285	303	10
	3160P-N～3200G/3220P-N	809	783	520	420	360	378	10
	3220G/3250P-N～3250G/3280P-N	907	878	620	420	385	403	12

	Model	H	H1	W	W1	D	D1	d
F21	3011GB-N～3015GB-N	295	284	180	135	178	197	5
	3018GB-N～3022GB-N	375	360	235	193	184	199	8
	3030G-N～3037G-N	460	440	285	230	188	203	8
	3045G-N～3055G-N	535	512	320	180	231	250	8
	3075G-N～3093G-N	560	542	375	245	274	292	8
	3110G-N～3132G-N	657	630	458	338	285	303	10



外形尺寸（单位:mm）

	Model	H	W	D	D1
F20	3280G/3315P-N～3400G/3450P-N	1608	800	412	430
	3450G/3500P～3500G/3560P	1800	1000	480	498

Appendix 2 Technical Specifications

Inverter model information

Series	Model	Input Voltage	Input Voltage	Power capacity (kVA)	Input current (A)	Moter power（kW）
	3R75GB/31R5PB	3PH 380V 50/60Hz	1.6/3.2	3.7/5.4	2.5/4.0	0.75/1.5
	31R5GB/32R2PB		3.2/4.8	5.4/7.0	4.0/6.0	1.5/2.2
	32R2GB/3004PB		4.8/6.0	7.0/10.7	6.0/9.0	2.2/4
	3004GB/35R5PB		6.0/8.6	10.7/15.5	9.0/13	4/5.5
	35R5GB/37R5PB-N		8.6/11.2	15.5/20.5	13.0/17.0	5.5/7.5
	37R5GB/3011PB		11.2/17.0	20.5/26.0	17.0/25.0	7.5/11
	3011GB/3015PB-N		17.0/21.0	26.0/35.0	25.0/32.0	11/15
	3015GB/3018P-N		21.0/24.0	35.0/38.5	32.0/37.0	15/18.5
	3018GB/3022PB-N		24.0/30.0	38.5/46.5	37.0/45.0	18.5/22
	3022GB-N		30.0	46.5	45.0	22
	3030P-N		40.0	62.0/	60.0	30
	3030G/3037P-N		40.0/50.0	62.0/76.0	60.0/75.0	30/37
	3037G/3045P-N		50.0/60.0	76.0/92.0	75.0/90.0	37/45
	3045G/3055P-N		60.0/72.0	92.0/113.0	90.0/110.0	45/55
	3055G/3075P-N		72.0/100.0	113.0/157.0	110.0/152.0	55/75
	3075G/3093P-N		100.0/116.0	157.0/180.0	152.0/176.0	75/93
	3093G/3110P-N		116.0/138.0	180.0/214.0	176.0/210.0	93/110
	3110G/3132P-N		138.0/167.0	214.0/256.0	210.0/253.0	110/132
	3132G-N		167.0	256.0	253.0	132
	3160P-N		200.0	307.0	304.0	160
	3160G/3185P-N		200.0/230.0	307.0/350.0	304.0/342.0	160/185.0
	3185G/3200P-N		230.0/250.0	350.0/385.0	342.0/380.0	185.0/200.0
	3200G/3220P-N		250.0/280.0	385.0/430.0	380.0/426.0	200.0/220.0

Series	Model	Input Voltage	Input Voltage	Power capacity (kVA)	Input current (A)	Moter power（kW）
	3220G/3250P-N		280.0/320.0	430.0/500.0	426.0/480.0	220.0/250.0
	3250G/3280P-N		320.0/342.0	500.0/548.0	480.0/520.0	250.0/280.0
	3280G/3315P-N		342.0/395.0	548.0/625.0	520.0/600.0	280.0/315.0
	3315G/3355P-N		395.0/445.0	625.0/710.0	600.0/680.0	315.0/355.0
	3355G/3400P-N		445.0/500.0	710.0/760.0	680.0/750.0	355.0/400.0
	3400G/3450P-N		500.0/565.0	760.0/830.0	750.0/820.0	400.0/450.0
	3450G/3500P		565.0/625.0	830.0/910.0	820.0/900.0	450.0/500.0
	3500G/3560P		625.0/690.0	910.0/970.0	900.0/950.0	500.0/560.0

Series	Model	Input Voltage	Input Voltage	Power capacity (kVA)	Input current (A)	Moter power（kW）
F21	3R75GB	3PH 380V 50/60Hz	1.6	3.7	2.5	0.75
	31R5GB		3.2	5.4	4.0	1.5
	32R2GB		4.8	7.0	6.0	2.2
	3004GB		6.0	10.7	9.0	4
	35R5GB-N		8.6	15.5	13.0	5.5
	37R5GB		11.2	20.5	17.0	7.5
	3011GB-N		17.0	26.0	25.0	11
	3015GB-N		21.0	35.0	32.0	15
	3018GB-N		24.0	38.5	37.0	18.5
	3022GB-N		30.0	46.5	45.0	22
	3030G-N		40.0	62.0	60.0	30
	3037G-N		50.0	76.0	75.0	37
	3045G-N		60.0	92.0	90.0	45
	3055G-N		72.0	113.0	110.0	55
	3075G-N		100.0	157.0	152.0	75
	3093G-N		116.0	180.0	176.0	93
	3110G-N		138.0	214.0	210.0	110
	3132G-N		167.0	256.0	253.0	132

Other technical specifications

Rated Output Voltage	0~Rated input voltage
Maximum Overload Current	Type G: 150% 1minute, 180% 20s Type P: 120% 1minute, 150% 1s
Control Mode	V/F control, open-loop vector control
Frequency Control Scope	low frequency mode: 0.00~400.0Hz high frequency mode: 0.0~1000Hz(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、CANlink、four kind of communication protocol. the user programmable card and point-to-point communication are derived CANlink agreement.Host computer through these communication protocols can be achieved on the inverter control, monitoring and function parameters to modify the view operation. F20 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	F Grope read and write）	P0、P1、P2、P3、P4、P5、P6、P7、P8、P9、PA、PB、PC、PD、PE、PF
	A Grope read and write）	A0、A1、A2、A3、A4、A5、A6、A7、A8、A9、AA、AB、AC、AD、AE、AF

Function code data communication address is defined as follows:

1, when reading the function code data for communication

For P0 ~ PF, A0 ~ AF 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 P010H, among them P0H represents the function parameter of P0 group, 10H represents the hexadecimal data format of function code No. 16 in functional group

AC.08 function parameter, its communication address is AC08, among them ACH stands for the function parameter of AC 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 ~ PF, 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 ~ AF, the lower 16-bit function code directly in the functional group number, for example as follows:

Write function parameters AC.08, do not need to write to the EEPROM, the communication address is 4C08H; need to write EEPROM, the communication address is AC08H.

7.1.2 F20 NON-Function Code Data

The drive Non-function code data	Status data read only）	monitoring parameter group U, the AC drive fault description, the AC drive running status
	Control parameter(write only)	Control command, communication setting value, digital output terminal control, analog output AO1 control, analog output AO2 control, high-speed pulse (Y) output control, parameter initialization

1, Status data

Status data is divided into monitoring parameters grope U, AC drive fault description, inverter running status.

U group parameter monitoring parameters

The monitoring data of group U are described in Chapter 5 and Chapter 6, and their addresses are defined as follows:

U0 ~ UF, 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 :

U0.11, 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 P9.14 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 6000E 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:Y1 output control BIT1:Y2 output control BIT2:RELAY1 output control BIT3:RELAY2 output control BIT4:Y output control BIT5:VY1 BIT6:VY2 BIT7:VY3 BIT8:VY4 BIT9:VY5

Analog output AO1, AO2, high-speed pulse output Y control

When the analog output AO1, AO2, 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 0%~ 100%
AO2	2003H	
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 1P00H, and write the correct user password directly to the address，then the password verification finish。

Communication parameters for the initialization address is 1P01H, the data content is defined as follows:

Parameter Initializes communication address	Command function
1P01H	1:Restore factory parameters
	2:Clear the log information
	4:Restore the user backup parameters
	501:Backs up the user's current parameters

7.2 Modbus communication protocol

F20 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.

7.2.1 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.

7.2.1.1 Application

The AC drive access the “Single-master multi-slave” PC/PLC control network which has RS485 Modbus and as the slave.

7.2.1.2 BUS structure

(1) Hardware interface

Need to insert the RS485 expansion card F20TX1 hardware on the AC drive.

(2) Topological structure

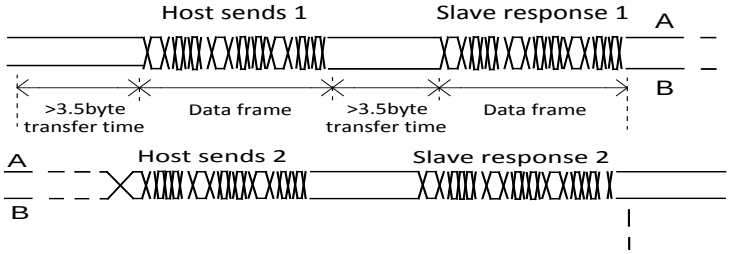
Single-master multi-slave system. Each communication device in the network has a unique slave address. One of them is the communication host (usually PC, PLC, HMI, etc.), initiates communication and reads or writes the parameters to the slave.

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.

(3) 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.

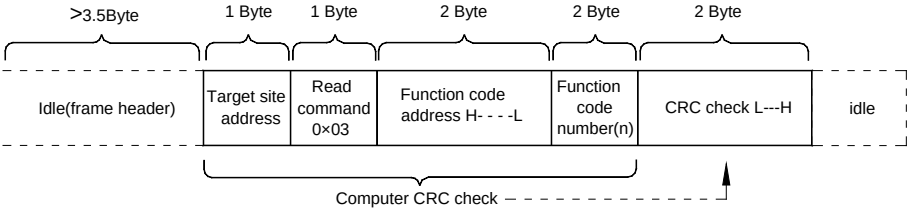


F20 series AC drive built-in communication protocol is Modbus-RTU slave communication protocol, can respond to the host's "query / command", or according to the host's "query / command" to make the appropriate action and response communication data . Host can be a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., the host can either communicate to a slave, or send broadcast information to all the slaves.

7.2.2 Protocol Format

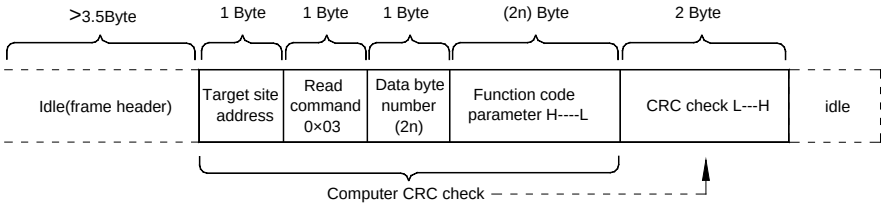
F20 series AC drive Modbus-RTU protocol communication data format is as follows, the AC drive supports only Word-type parameter read or write, the corresponding communication read operation command is Ox03; write operation command is 0x06, does not support byte or bit Read and write operations:

The master reads command frame:

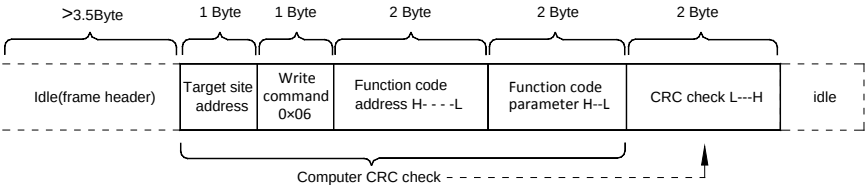


In theory, the host can read several function codes at a time (n can be up to 12), but pay attention to be not over the last function code of the group. Otherwise, it will reply the error

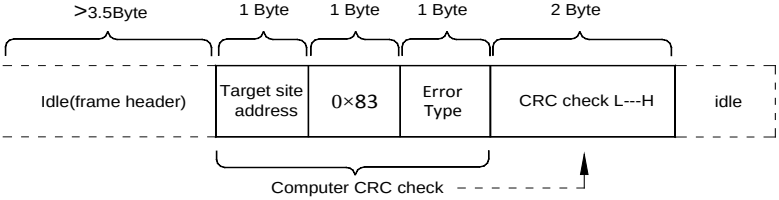
The slave reads command frame:



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).

7.2.3 Function Code Parameter Address Identification rule

The function code group number and label for the parameter address that rule:

High byte: P0 to PF (F group), A0 to AF (group A), 70 to 7F (U group)

Low byte: 00 ~ PF

For example, if you want to access the function code P3.12, the function code access address is 0xP30C;

Note: PF group: can not read the parameters, and can not change the parameters; U group: only read, can not change the parameters.

Some parameters can not be changed while the inverter is running; some parameters can not be changed regardless of the status of the inverter.

Change the function code parameters, but also pay attention to the parameters of the scope, units, and related instructions.

Function code NO	Communication access address	Communication Modify the function code address in RAM
P0~PE	0xP000~0xFEFF	0x0000 ~0x0EFF
A0~AC	0xA000~0xACFF	0x4000~0x4CFF
U0	0x7000~0x70FF	

Note that since the EEPROM is frequently stored, the service life of the EEPROM is reduced. Therefore, some function codes do not need to be stored in the communication mode, only change the value in the RAM. If it is a group F parameter, to achieve this function, change the high-bit F of function code address into 0.If it is a group of parameters, to achieve this function, change high-bit A of the function address into 4.

The corresponding function code address is as follows:

High byte: 00 ~ 0F (F group), 40 ~ 4F (A group)

Low byte: 00 ~ FF

Such as:

Function code P3.12 is not stored in the EEPROM, the address is expressed as 030C;

Function code A0.05 is not stored in the EEPROM, the address is expressed as 4005;.

For all parameters, you can also use the command code 07H to achieve the function.

Stop / Run Parameters section:

Parameter address	Parameter description
1000H	Comunication setting value (decimalism)-10000~10000
1001H	Running freqeuncy
1002H	Bus voltage
1003H	Output voltage
1004H	Output current
1005H	Output power
1006H	Output torque

Parameter address	Parameter description
1007H	Running speed
1008H	X terminals input symbol;
1009H	Y output symbol
100AH	AI1 voltage
100BH	AI2 voltage
100CH	AI3 voltage
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	AI3 Preregulation voltage
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, A2.48 (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
1P00H	*****

Digital output terminal control: (write only)

Command address	Command contents
2001H	BIT0:Y1 output control BIT1:Y2 output control BIT2:RELAY1 output control BIT3:RELAY2 output control BIT4:Y output control BIT5:VY1 BIT6:VY2 BIT7:VY3 BIT8:VY4 BIT9:VY5

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

8000H	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 002D: Motor overtemperature 005A:The encoder line number setting is incorrect 005B:Missing encoder 005C:Initial position error 005E:Speed feedback error

7.2.4 PD Grope Communication Parameter Description

Fd-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.

Fd-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>	
Fd-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.

Fd-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.

Fd-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 (Err16) 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.

Fd-05	Communication protocol selection	Factory default	0
	Setting range	0:Non-standard Modbus-RTU protocol； 1:Standard Modbus-RTU protocol	

Fd-05 = 1: Selects the standard Modbus protocol.

Fd-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.

Fd-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 Keypad and tray(trepanning) Installation Dimension

4.1 Keypad

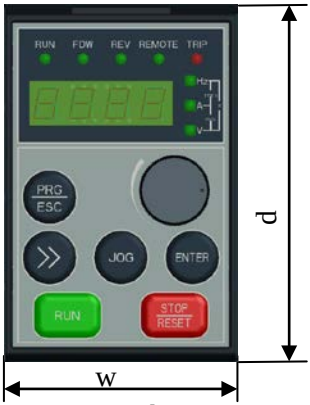


Fig. A4-1 Keypad Dimension

Table A4-1 Keypad Installation Dimension (Unit: mm)

Specifications	w	d
S2R4GB~S22R2GB, 3R75GB/31R5PB~35R5GB/37R5PB	49±0.2	76.5±0.2
37R5GB/3011PB and above	61±0.2	96.5±0.2

4.2 Keypad's tray

Fig. A4-2 Keypad's tray Installation Dimension (Unit: mm)

Appendix 5 Inverter Warranty Card

Inverter Warranty Card

Name of User:	
Address of User:	
Contact Person:	Tel.:
P.C.:	Fax:
Type:	Serial No.:
Date of Purchase:	Date of Fault:

Fault Details

Motor: _____KW _____Pole	Application of Motor: _____
Fault Occurrence Time: power supply, no-load, load __% Others: _____	
Fault Phenomena:	
Fault Display: OC OL OU OH LU None Others:	
Control Terminal Used:	
Operation after Resetting: Yes No	Output Voltage: Yes No
Total Working Time: _____Hrs	Fault Frequency: _____Hz

Installation Site Details

Power Voltage: U-V: ____ V, V-W: ____ V, W-U: ____V	
Transformer CapAI3ty: KVA	Inverter Earthing: Yes No
Distance from the Power Source: __m	Distance from the Motor: ___m
Vibration: No, Medium, Strong	Dust: No, Medium, Much
Others:	