User Manual

Mini Series Vector Inverter

Contents

Chapter 1

Safety Information and Precautions

This guide is packaged together with the product. It contains basic information for quick start of the drive.

Electrical Safety

Extreme care must be taken at all times when working with the AC Drive or within the area of the AC Drive. The voltages used in the AC Drive can cause severe electrical shock or burns and is potentially lethal. Only authorized and qualified personnel should be allowed to work on AC Drives.

Machine/System Design and Safety of Personnel

Machine/system design, installation, commissioning startups and maintenance must be carried out by personnel who have the necessary training and experien-ce. They must read this safety information and the contents of this manual. If incorrectly installed, the AC Drive may present a safety hazard.

The AC Drive uses high voltages and currents (including DC), carries a high level of stored electrical energy in the DC bus capacitors even after power OFF. These high voltages are potentially lethal.

The AC Drive is NOT intended to be used for safety related applications/function-s. The electronic “STOP &START" control circuits within the AC Drive must not be relied upon for the safety of personnel. Such control circuits do not isolate mains power voltages from the output of the AC Drive. The mains power supply must be disconnected by an electrical safety isolation device before accessing the internal parts of the AC Drive.

Safety risk assessments of the machine or process system which uses an AC Drive must be undertaken by the user and or by their systems integrator/de-signer. In particular the safety assessment/design must take into consideration the consequences of the AC Drive failing or tripping out during normal operation and whether this leads to a safe stop position without damaging machine, adjacent equipment and machine operators/ users. This responsibility lies with the user or their machine/process system integrator.

The system integrator/designer must ensure the complete system is safe and designed according to the relevant safety standards. Our can provide recomme-ndations related to the AC drive to ensure long term safe operation.

Electrical Installation - Safety

Electrical shock risk is always present within an AC Drive including the output cable leading to the motor terminals. Where dynamic brake resistors are fitted external to the AC Drive, care must be taken with regards to live contact with the brake resistors, terminals which are at high DC voltage and potentially lethal. Cables from the AC Drive to the dynamic brake resistors should be double insulated as DC voltages are typically 600 to 700 VDC.

Mains power supply isolation switch should be fitted to the AC Drive. The mains power supply must be disconnected via the isolation switch before any cover of the AC Drive can be removed or before any servicing work is undertaken stored charge in the DC bus capacitors of the PWM AC Drive is potentially lethal after the AC supply has been disconnected. The AC supply must be isolated at least 10 minutes before any work can be undertaken as the stored charge will have been discharged through the internal bleed resistor fitted across the DC bus capacitors.

Whenever possible, it is good practice to check the DC bus voltage with a VDC meter before accessing the AC Drive bridge. Where the AC Drive input is conne-cted to the mains supply with a plug and socket, then upon disconnecting the plug and socket, be aware that the plug pins may be exposed and internally connected to the DC bus capacitors (via the internal bridge rectifier in reversed bias). Wait 10 minutes to allow stored charge in the DC bus capacitors to be dissipated by the bleed resistors before commencing work on the AC Drive.

Electrical Shock Hazard

Ensure the protective earthing conductor complies with technical standards and local safety regulations. Because the leakage current exceeds 3.5 mA in all models, IEC 61800- 5-1 states that either the power supply must be automatica-lly disconnected in case of discontinuity of the protective earthing conductor or a protective earthing conductor with across-section of at least 10 mm2 (Cu) or 16 mm2 (Al) must be used. Or use two PE wires and each wire must satisfy the IEC requirements independently. Failure to comply may result in death or serious injury.

When using an earth leakage circuit breaker, use a residual current operated protective device (RCD) of type B (breaker which can detect both AC and DC). Leakage current can cause unprotected components to operate incorrectly. If this is a problem, lower the carrier frequency, replace the components in question with parts protected against harmonic current, or increase the sensitivity amperage of the leakage breaker to at least 100 mA per drive.

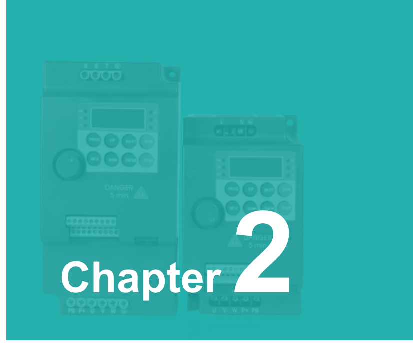
➊ Factors in determining leakage current:

➊ Size of the AC drive;

➋ AC drive carrier frequency;

➌ Motor cable type and length;

➍ EMI/RFI filter.



Chapter 2

Product Information

2.1 Nameplate

2.2 Naming Method

4 T - 1.5 G

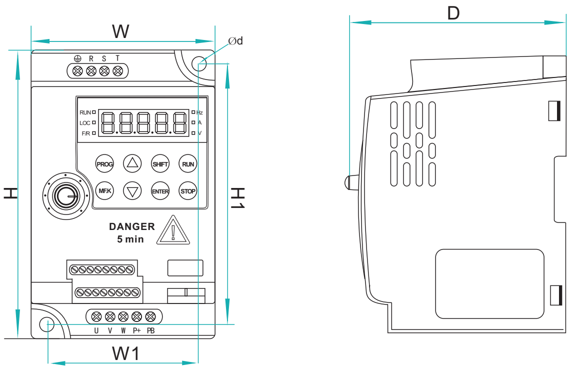
①: 4 ②: T ③: 1.5 ④: G

Code	No.	Content
Voltage level	①	2 : 220V 4 : 380V
Voltage Classification	②	S : Single-phase T : Three phase
Adapted motor powe	③	0.4KW~15KW
Model	④	Heavy-duty

2.3 General Specifications

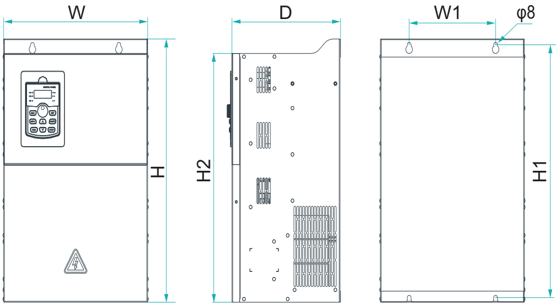
AC Drive Model	Rated Input Current(A)	Rated Output Current(A)	Brake unit
Input voltage: Single-phase 220V Range: -15%~20%			
2S-0.4G	5.8	2.5	Built-In
2S-0.7G	8.2	4	
2S-1.5G	14.0	7	
2S-2.2G	23.0	9.6	
2S-4.0G	39.0	16.5	
2S-5.5G	48.0	20	
Input voltage: Three-phase 380V Range: -15%~20%			
4T-0.7G	3.4	2.1	Built-In
4T-1.5G	5.0	3.8	
4T-2.2G	5.8	5.1	
4T-4.0G	10.5	9.0	
4T-5.5G	14.6	13.0	
4T-7.5G	20	17	
4T-11G	26	25	
4T-15G	35	32	
4T-18.5G	58	37	
4T-22G	67	45	
4T-30G	65	60	
4T-37G	80	75	
4T-45G	95	90	Optional Built In
4T-55G	118	110	
4T-75G	157	150	External option
4T-90G	180	176	
4T-110G	215	210	
4T-132G	232	253	
4T-160G	285	310	
4T-185G	326	350	
4T-200G	354	380	
4T-220G	403	430	
4T-250G	441	470	
4T-280G	489	520	
4T-315G	571	590	
4T-355G	624	650	
4T-400G	700	725	

2.4 Dimensions



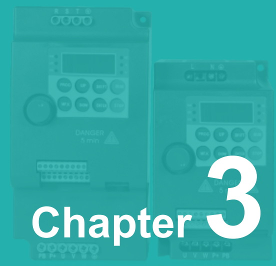
0.4KW~15KW

<table>
<tr><th rowspan="2">Model</th><th colspan="2">Installation size (mm)</th><th colspan="3">External size (mm)</th><th rowspan="2">Installation Aperture</th></tr>
<tr><th>W1</th><th>H1</th><th>W</th><th>H</th><th>D</th></tr>
<tr><td>2S-0.4G</td><td rowspan="4">73</td><td rowspan="4">130</td><td rowspan="4">85</td><td rowspan="4">142</td><td rowspan="4">116</td><td rowspan="4">Φ5</td></tr>
<tr><td>2S-0.75G</td></tr>
<tr><td>2S-1.5G</td></tr>
<tr><td>2S-2.2G</td></tr>
<tr><td>2S-4.0G</td><td rowspan="3">96</td><td rowspan="3">230</td><td rowspan="3">106.5</td><td rowspan="3">240.5</td><td rowspan="3">150</td><td rowspan="3">Φ5</td></tr>
<tr><td>2S-5.5G</td></tr>
<tr><td>2S-7.5G</td></tr>
<tr><td>4T-0.75G</td><td rowspan="3">73</td><td rowspan="3">130</td><td rowspan="3">85</td><td rowspan="3">142</td><td rowspan="3">116</td><td rowspan="3">Φ5</td></tr>
<tr><td>4T-1.5G</td></tr>
<tr><td>4T-2.2G</td></tr>
<tr><td>4T-4.0G</td><td rowspan="2">120</td><td rowspan="2">168</td><td rowspan="2">95.6</td><td rowspan="2">180</td><td rowspan="2">85</td><td rowspan="2">Φ5</td></tr>
<tr><td>4T-5.5G</td></tr>
<tr><td>4T-7.5G</td><td rowspan="3">96</td><td rowspan="3">230</td><td rowspan="3">106.5</td><td rowspan="3">240.5</td><td rowspan="3">150</td><td rowspan="3">Φ5</td></tr>
<tr><td>4T-11G</td></tr>
<tr><td>4T-15G</td></tr>
</table>



18.5KW~400KW

Model	Installation size (mm)		External size (mm)				Installation Aperture
	W1	H1	H2	H	W	D	
4T-18.5G 4T-22G	120	317	–	335	200	178.2	Φ8
4T-30G 4T-37G	150	387.5	–	405	255	195	Φ8
4T-45G 4T-55G	180	437	–	455	300	225	Φ10
4T-75G 4T-90G 4T-110G	260	750	–	785	395	285	Φ12
4T-132G 4T-160G	300	865	–	900	440	350	Φ12
4T-185G 4T-200G 4T-220G	360	950	–	990	500	360	Φ16
4T-250G 4T-285G	400	1000	–	1040	650	400	Φ16
4T-315G 4T-355G 4T-400G	600	1252	–	1300	815	422	Φ16



Chapter 3

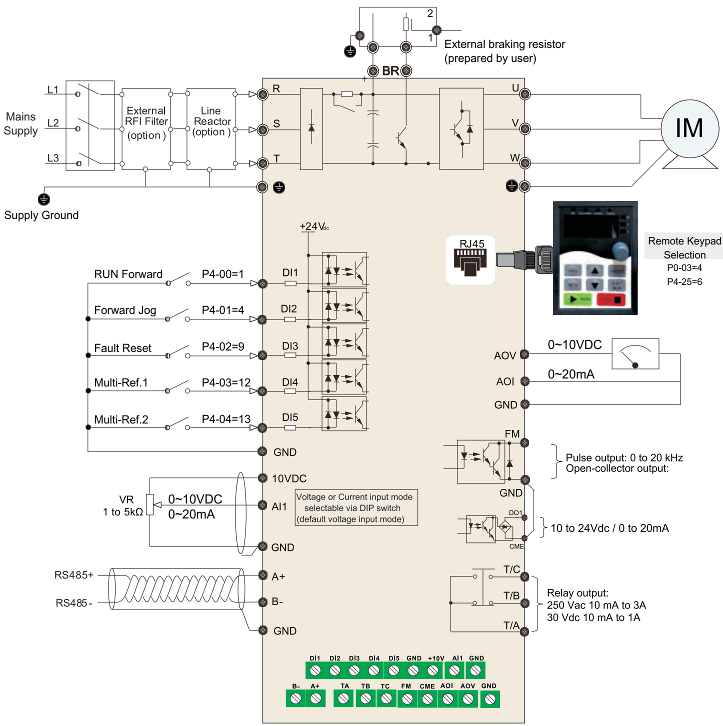
Wiring

3.1 Typical Wiring

3.1.1 0.4~15KW main circuit and control circuit terminal description

✧ Wiring of Three-phase 380 VAC Power Supply;

✧ 220V Input R、S，380V Input R、S、T.



0.4KW~15KW Main circuit wiring diagram

Terminal	Terminal Name	Terminal	Terminal Name
D1~D5	Digital Input X5	Ai1	Analog Input X1
A,B	RS485 X1	TA,TB,TC	Relay Output X1
D5/FM,CME	HDI (High Speed Pulse Input /Output) X1		

✧ Terminals of Main Circuit.

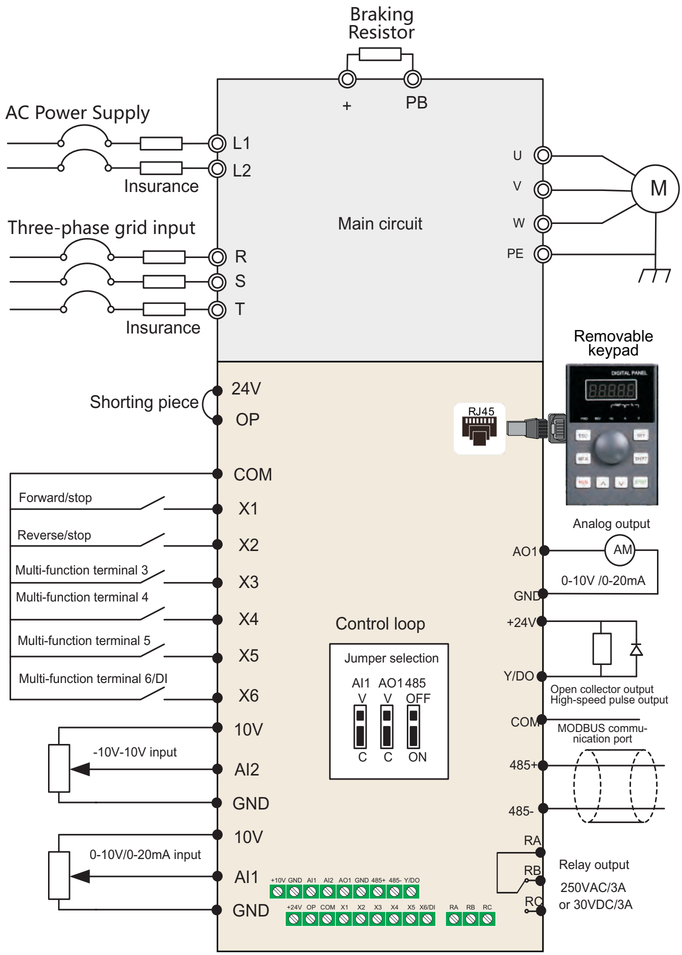
Terminal	Terminal Name	Description
R,S,T	Three-phase power supply input terminals.	Connect to the three-phase AC power supply.
P+,PB	Connecting terminals of braking resistor.	Connect to a braking resistor.
U, V, W	Output terminals	Connect to a three-phase motor.
⏚	Grounding terminal	Must be grounded.

✧ Terminals of Control Circuit

Category	Terminal symbol	Terminal Name	Function Description
Power supply	+10V-GND	External+10V power supply	Provide +10V power supply to the outside, the maximum output current:100mA(with short-circuit protection), generally used as an external potentiometer working power supply, potentiometer resistance range: 1kΩ~5kΩ
	+24V-GND	External+24V power supply	Provide +24V power supply to the outside, generally used as the working power supply of digital input and output terminals and external sensor power supply Maximumoutputpower:200mA
Analog input	AI1-GND	Analog input terminal 1	1. Input range : DC 0V~10V/0mA~20mA, determined by P4-39 2. Input impedance: 22kΩ for voltage input, 500Ω for current input
Analog output	AOV-GND AOI-GND	Analog output	Input voltage range:0V~10V Output current range: 0mA~20mA,4~20mA (P5-23 optional)

Category	Terminal symbol	Terminal Name	Function Description
Digital input	DI1-GND	digital input 1	1. Input impedance: 1kΩ 2. Voltage range for level input: 5V~30V In addition to the characteris-tics of DI1 to DI4, DI5 can also be used as a high-speed pulse input channel. Highest frequency:20kHz
	DI2-GND	digital input 2	
	DI3-GND	digital input 3	
	DI4-GND	digital input 4	
	DI5-GND	High-speed pulse input terminal	
Digital output	FM-GND	High-speed pulse output	Constrained by function code P5-00 "FM terminal output mode selection", when used as high-speed pulse output, the maximum frequency is 20 kHz;when used as open-collector output, it is the same as DO1 specification .
Relay output	TA-TB-TC	Relay contact output	Contact drive capability: AC250V,3A DC30V,1A TA, TB: normally closed TA, TC: normally open
Communi cation signal	A+ B-	RS-485 communication	A+ is differential positive input, B- is differential negative input

3.1.2 18.5KW~400KW main circuit and control circuit terminal description



18.5KW~400KW Main circuit wiring diagram

✧ Terminals of Main Circuit.

Terminal marks	Designation and function of terminals
R/L、S/L2、T/L3	Single / Three-phase AC input terminals (Connect R/L1, T/L3 when use single phase input)
⊕、B1	Braking resistor connection terminals
U/T1、V/T2、W/T3	Three-phase AC output terminals
⏚	Ground terminal PE

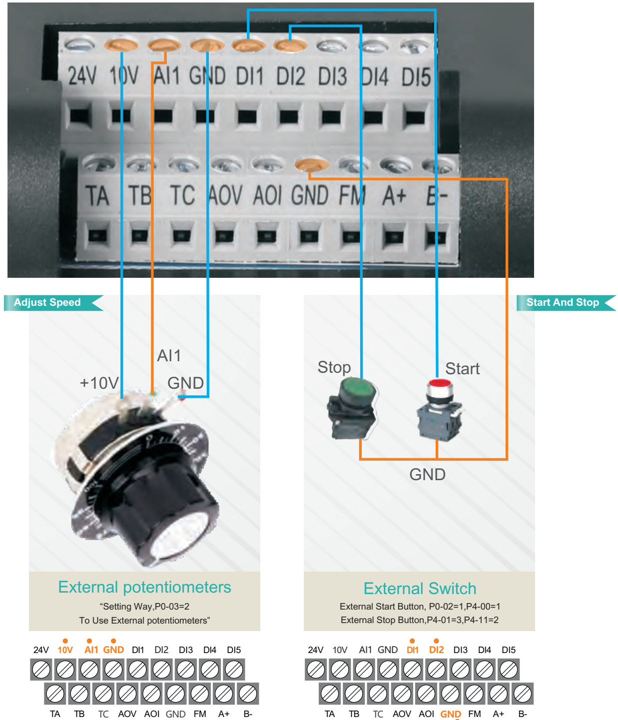
✧ Terminals of Control Circuit

Category	Terminal symbol	Terminal Name	Function Description
Analog input	+10V	Analog input reference voltage	10.1V ±3%
			Maximum output current 25mA The resistance of external potentiometer should be larger than 400Ω
	GND	Analog ground	Isolated from COM interiorly
	AI1	Analog input 1	0~20mA: input impedance -500Ω, maximum input current - 25mA
			0~10V: input impedance -22kΩ, maximum input voltage -12.5V
			Switch AI1 on control board for jumping from 0~20mA and 0~10V, factory default: 0~10V
	AI2	Analog input 2	−10V~10V: input impedance - 25kΩ
			Range: -12.5V~+ 12.5V
Analog output	AO1	Analog output 1	0~20mA: impedance - 200Ω~500Ω
			0~10V: impedance ≥ 10k
			Switch AO1 on control board for jumping between 0~20mA and 0~10V, factory default: 0~10V
	GND	Analog ground	Isolated from COM interiorly
Digital input	+24V	+24V	24V±10%, Isolated from GND interiorly
			Maximum load - 200mA

Category	Terminal symbol	Terminal Name	Function Description
Digital input	PLC	Digital input Common terminal	Used for switching between high and low levels, short-circuited with +24V when delivery, i.e. low value of digital input valid
			External power input
	COM	+24V ground	Isolated from GND interiorly
	X1~X5	Digital input Terminals 1~5	Input: 24VDC, 5mA
			Range of frequency: 0~200Hz
			Range of voltage: 10V~30V
	X6/DI	Digital input/pulse input	Digital input: same as X1~X5
			Pulse input: 0.1Hz~50kHz; range of voltage: 10-30V
Digital output	Y	Open collector output	Range of voltage: 0~24V
			Range of current: 0~50mA
	Y/DO	Open collector out / Pulse out	Open collector output: same as Y
			Pulse output: 0~50kHz
Relay output	RA/RB /RC	Control board relay output	RA-RB: NC; RA-RC: NO
			Contact capacity: 250VAC/3A, 30VDC/3A
Terminal 485 Interface	485+	485 differential signal +	Rate: 4800/9600/19200/38400/57600/115200bps
	485−	485 differential signal -	Maximum distance - 500m (standard network cable used)
	GND	485 commun-ication shield grounding	Isolated from COM interiorly
Control panel		Control panel SPI interface	Maximum communication distance is 3m when connected to Control panel
			Use standard network cable

3.2 Example of product application wiring diagram

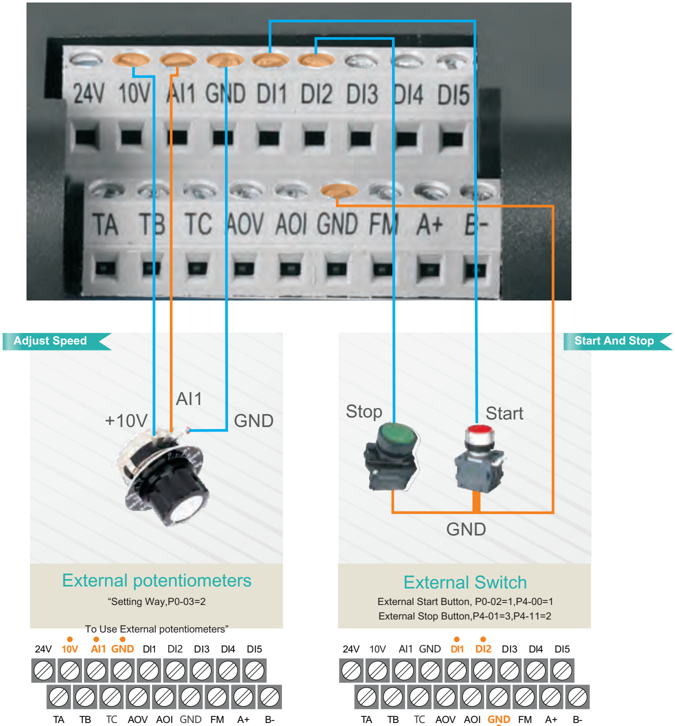
3.2.1 Belt Conveyer



Parameter Setting Step

Step	Function Code	Set Value	Description
1	P0.02	1	Terminal control start and stop
2	P0.03	2	Frequency setting selection analog
3	P0.17	Set as need	Acceleration time
4	P0.18	Set as need	Deceleration time
5	P4.00	1	Forward running

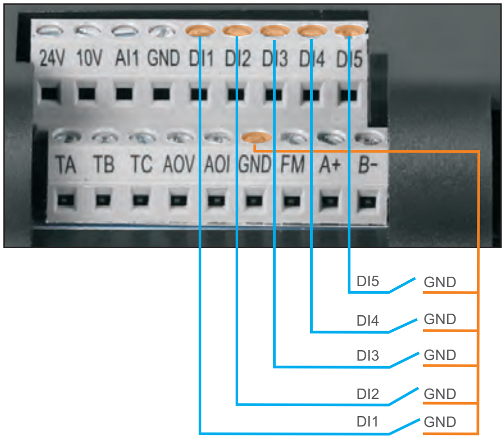
3.2.2 Fan & Water Pump

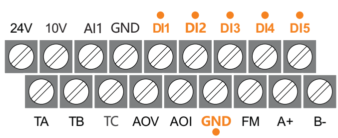


Parameter Setting Step

Step	Function Code	Set Value	Description
1	P0.02	1	Terminal control start and stop
2	P0.03	2	Frequency setting selection analog
3	P0.17	Set as need	Acceleration time
4	P0.18	Set as need	Deceleration time
5	P4.00	1	Forward running
6	P6.10	1	Free parking

3.2.3 Multistage Speed

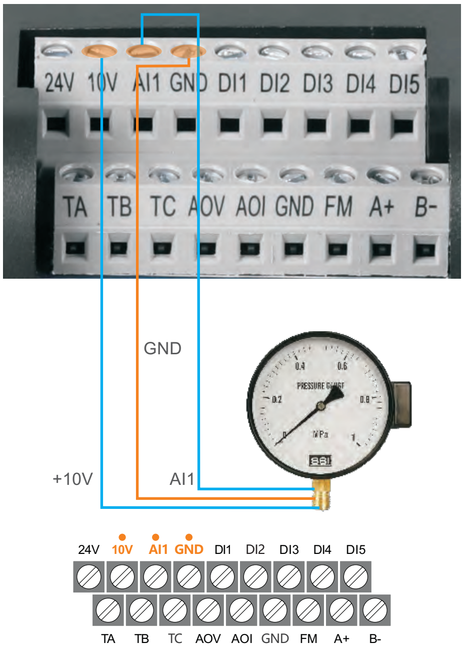




Parameter Setting Step

Step	Function Code	Set Value	Description
1	P0.02	1	Terminal control start and stop
2	P0.03	6	Multi-speed command
3	P4.00	1	Forward running
4	P4.01	12	Multi-speed 1
5	P4.02	13	Multi-speed 2
6	P4.03	14	Multi-speed 3
7	P4.04	15	Multi-speed 4
8	PC.01	Set as need	Multi-speed 1 frequency percentage
9	PC.02	Set as need	Multi-speed 2 frequency percentage
10	PC.04	Set as need	Multi-speed 3 frequency percentage
11	PC.08	Set as need	Multi-speed 4 frequency percentage

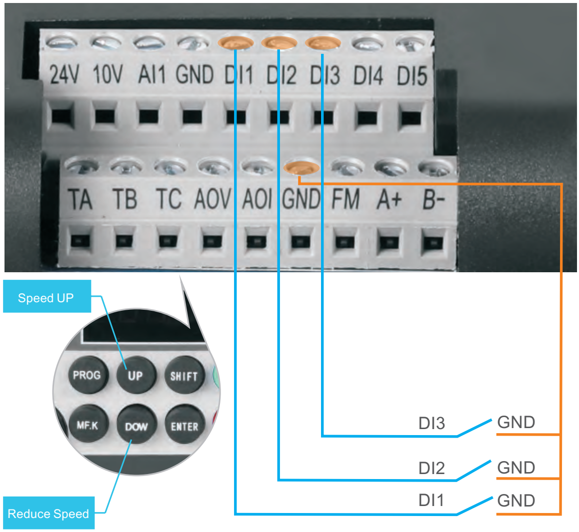
3.2.4 PID constant pressure water supply

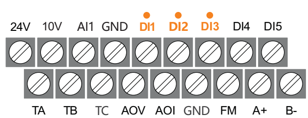


Parameter Setting Step

Step	Function Code	Set Value	Description
1	P0.02	1	Terminal control start and stop
2	P0.03	8	–
3	PA.01	Set as need	PID given value
4	PA.02	0	PID feedback value is set by analog AI1
5	PA.08	0	Reverse operation is prohibited
6	P8.49	Set as need	Wake-up frequency
7	P8.50	Set as need	Wake-up delay time
8	P8.51	Set as need	Sleep frequency
9	P8.52	Set as need	Sleep delay time

3.2.5 UP and DOWN

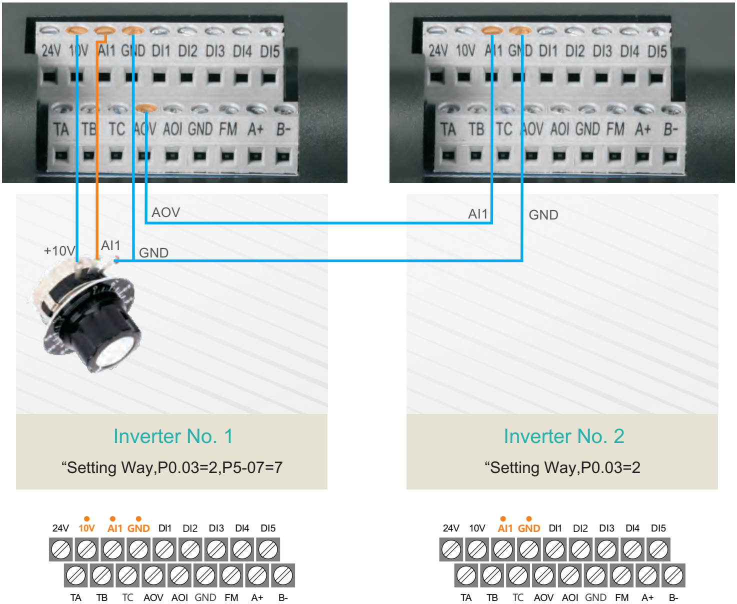


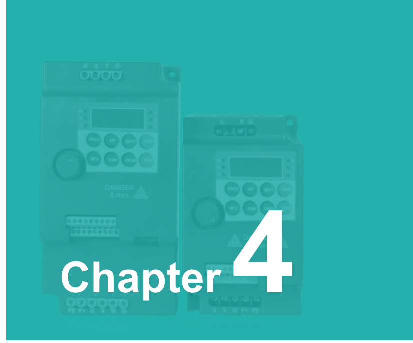


Parameter Setting Step

Step	Function Code	Factory Default	Set Value	Description
1	P0.02	1	1	Terminal Control Start & Stop
2	P0.03	0	0	Hz Setting Given
3	P0.17	Change As Need	Set as need	Acc time
4	P0.18	Change As Need	Set as need	Dec time
5	P4.00	1	1	Forward Run
6	P4.01	6	6	Terinmal Up
7	P4.02	7	7	Terminal Down

3.2.6 Synchronous potentiometer speed regulation



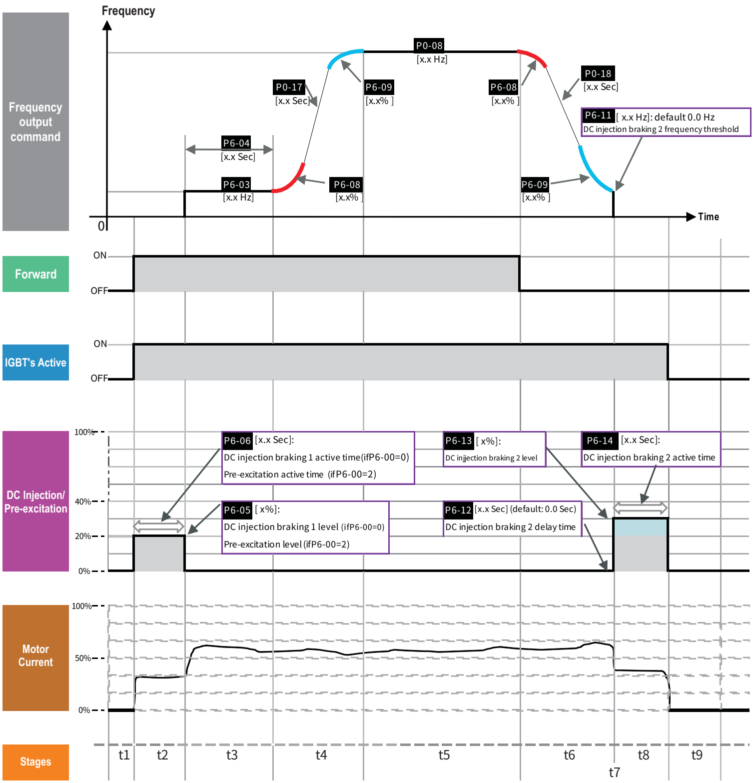


Chapter 4

Setup

4.1 Logic of Control

✧ Complete Timing Diagram

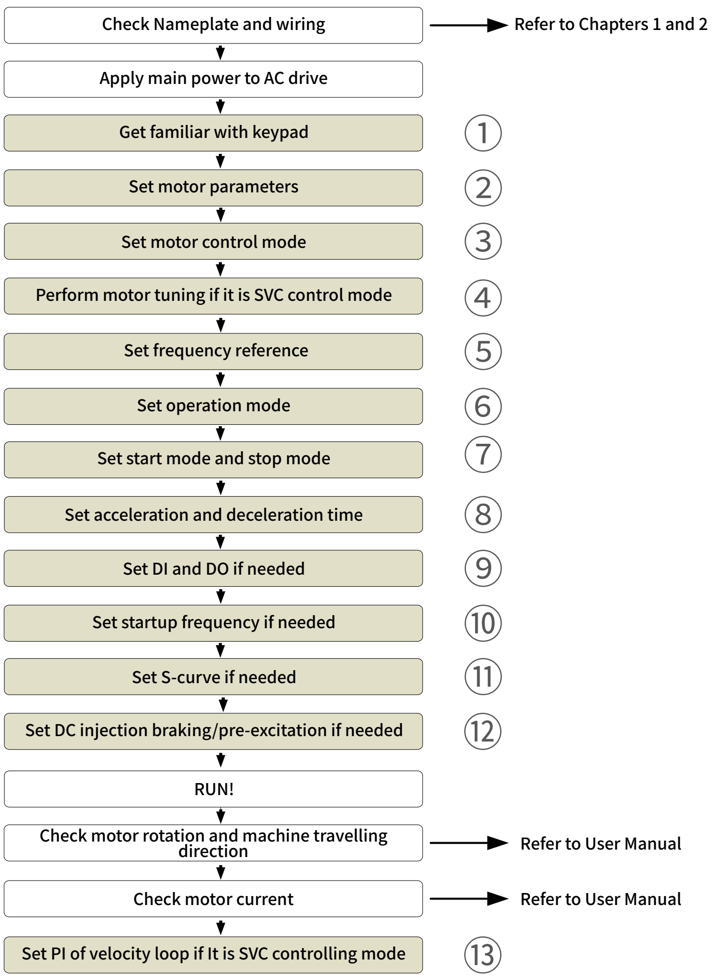


✧ Timing Diagram Description

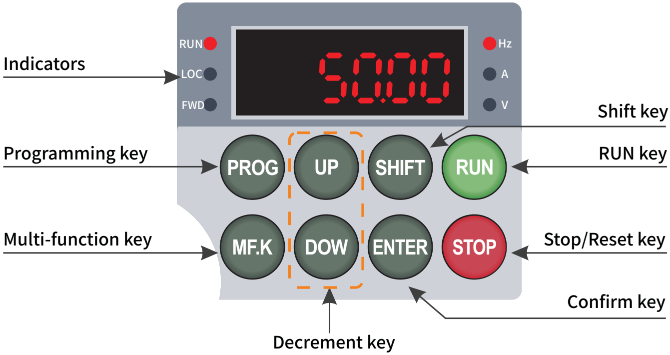
Event	Description	Para. No.	Status
t1	The AC drive waits for the RUN signal.	—	Inhabit
t2	The AC drive receives the Forward RUN command.	—	RUN
	The IGBT becomes active.	—	
	DC injection braking 1/Pre-excitation is enabled if P6-06 > 0.	P6-05	
	(if P6-00 = 0, it is "DC injection braking 1"; if P6-00 = 2, it is "Pre-excitation")	P6-06	
t3	DC injection braking 1/Pre-excitation is disabled.	—	RUN
	The startup frequency becomes active if P6-04 > 0.	P6-03	
		P6-04	
t4	The startup frequency becomes inactive.	—	RUN
	The motor ramps up to the expected frequency.	P0-17	
	S-curve active	P6-08	
		P6-09	
t5	Motor runs at expected frequency.	P0-08	RUN
t6	The Forward RUN command is cancelled.	—	RUN
	The motor ramps down to zero frequency.	P0-18	
	S-curve active	P6-08	
		P6-09	
t7	The frequency output command reaches the DC injection braking 2 frequency threshold.	P6-11	RUN (if P6-12 = 0) Inhabit (if P6-12 > 0)
	The IGBT shall become inactive if DC injection braking 2 delay time is not zero.	P6-12	
	After the delay time set in P6-12, the IGBT becomes active again	—	
t8	DC injection braking 2 is enabled if P6-14 > 0	P6-13	RUN
		P6-14	
t9	DC injection braking 2 is disabled.	—	Inhabit
	The IGBT turns inactive.	—	

4.2 Step By Step Setup

✧ Setup Flowchart



Step 1: Get Familiar With Keypad (Below 18.5KW or less from the keyboard)



Indicators

<table>
<tr><th>Name</th><th colspan="6">Function Description</th></tr>
<tr><td rowspan="3">Status indicator</td><td>RUN</td><td colspan="5">It indicates the state of the AC drive.
OFF indicates the stop state, ON (green) indicates the running state, and ON (red) indicates the faulty state.</td></tr>
<tr><td>LOC</td><td colspan="5">Keyboard operation, terminal operation and remote operation (communication control) indicator.</td></tr>
<tr><td>FWD</td><td colspan="5">It indicates forward or reverse rotation.
OFF indicates forward rotation and ON indicates reverse rotation.</td></tr>
<tr><td>Unit indicator</td><td>Hz</td><td>Frequency unit</td><td>A</td><td>Current unit</td><td>V</td><td>Voltage unit</td></tr>
<tr><td>LED Display</td><td colspan="6">The 5-digit LED display is able to display the frequency reference, output frequency, monitoring data and fault codes.</td></tr>
</table>

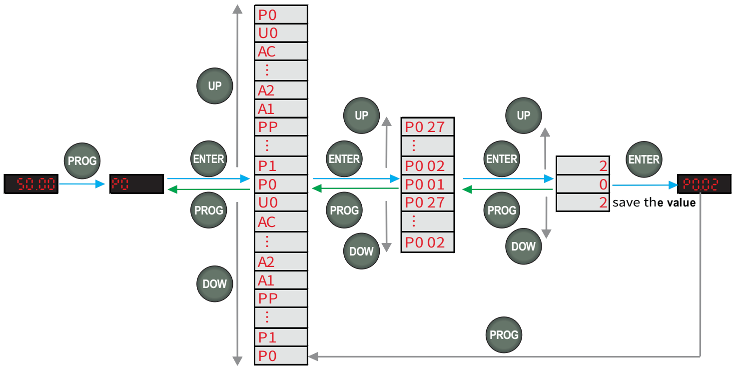
Keys On Keypad

Key	Key Name	Function
	Programming	Enter or exit Level I menu.
	Confirm	Enter the menu interfaces level by level, and confirm the parameter setting.

Key	Key Name	Function
UP	Increment	Increase data or Para. No..
DOW	Decrement	Decrease data or Para. No..
SHIFT	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
RUN	RUN	Start the AC drive in the keypad operation mode.
STOP	Stop	Stop the AC drive when it is in the running state and perform the reset operation when it is in the faulty state. The functions of this key are restricted by P7-02.
MF.K	Multifunction	Perform function switchover (such as quick switchover of command source or direction) according to the setting of P7-01.

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P7-01	MF.K key function selection	0: MF.K key disabled 1: Switchover from remote control (terminal or communication) to keypad control 2: Switchover between forward rotation and reverse rotation 3: Forward jog 4: Reverse jog 5: Individualized parameter display	N.A.	0	
P7-02	STOP/ RESET key function	0: STOP/RESET key enabled only in keypad control 1: STOP/RESET key enabled in any operation mode	N.A.	1	

Keypad Operation



Para. No. Arrangement

Para. Group	Description	Remark
P0 to PP	Standard parameter group	Standard function parameters
A0 to AC	Advanced parameter group	AI/AO correction
U0	Running state parameter group	Display of basic parameters

Step 2: Set Motor Parameters

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P1-00	Motor type selection	0: Common asynchronous motor 1: Variable-frequency asynchronous motor	N.A.	0	
P1-01	Rated motor power	0.1 to 30.0	kW	Model dependent	
P1-02	Rated motor voltage	1 to 1000	V	Model dependent	
P1-03	Rated motor current	0.01 to 655.35	A	Model dependent	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P1-04	Rated motor frequency	0.01 to max frequency	Hz	Model dependent	
P1-05	Rated motor speed	1 to 65535	RPM	Model dependent	

Step 3: Set Motor Control Mode

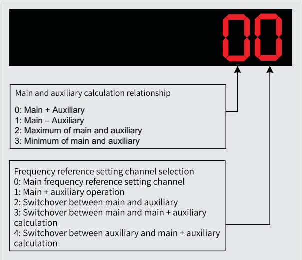
Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-01	Motor 1 control mode	0: Sensorless vector control (SVC) 2: Voltage/Frequency control (V/F)	N.A.	2	

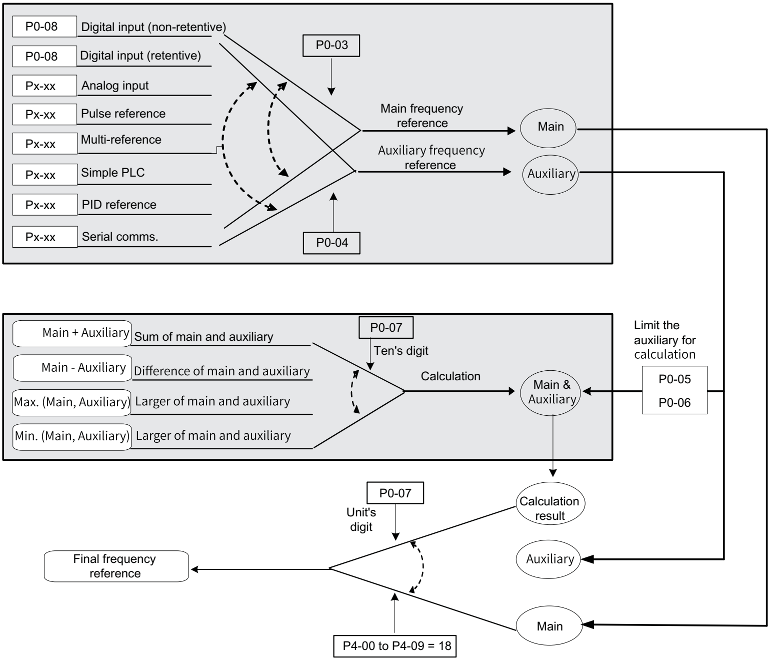
Step 4: Perform Motor Tuning If It's SVC Control Mode

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P1-37	Auto-tuning selection	0: No auto-tuning 1: Static auto-tuning 1 2: Complete dynamic autotuning	N.A.	0	

Step 5: Set Frequency Reference

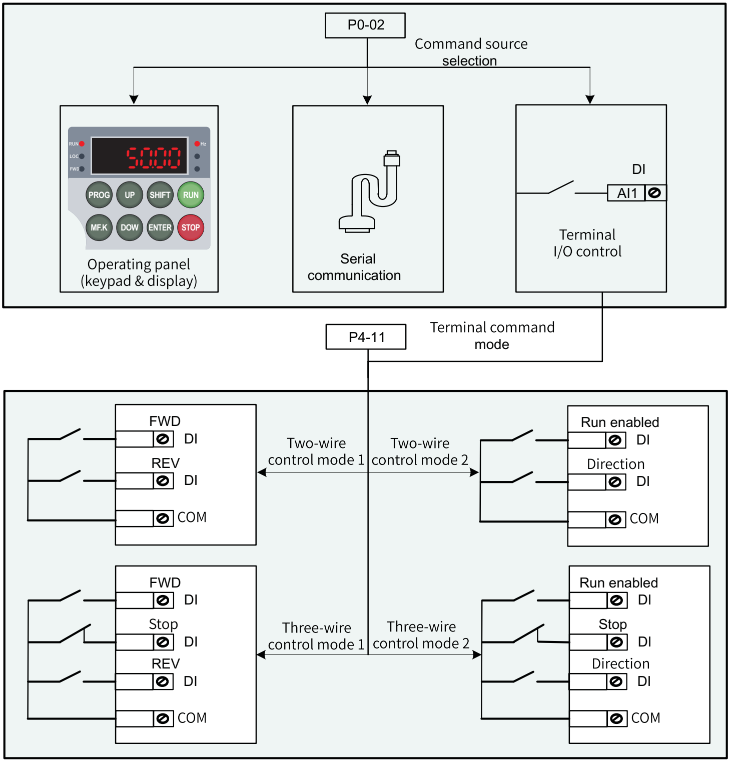
Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-03	Main frequency source X selection	0: Digital setting P0-08 (nonretentive at power down) 1: Digital setting P0-08 (retentive at power down) 2: Ai1 3: Ai2 4: Reserved	N.A.	0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-03	Main frequency source X selection	5: Pulse reference (Di5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication reference	N.A.	0	
P0-04	Auxiliary frequency source Y selection	The same as P0-03 (Main frequency source X selection)	N.A.	0	
P0-07	Frequency source superposition selection			00	
P0-08	Preset frequency	0.00 to max frequency	Hz	50.00	



Step 6: Select Operation Mode

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-02	Command source selection	0: Keypad control 1: Terminal control 2: Communication control	N.A.	0	
P4-11	Terminal command mode	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Three-wire control mode 1 3: Three-wire control mode 2	N.A.	2	



Step 7: Set Start Mode And Stop Mode

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P6-00	Start mode	0: Direct startup 1: Reserved 2: Pre-excited startup	N.A.	0	
P6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	N.A.	0	

Step 8: Set Acceleration And Deceleration Parameters

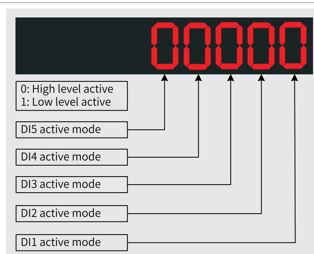
Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-17	Acceleration time 1	0.00 to 650.00 (if P0-19 = 2) 0.0 to 6500.0 (if P0-19 = 1) 0 to 65000 (if P0-19 = 0)	s	2	
P0-18	Deceleration time 1	0.00 to 650.00 (if P0-19 = 2) 0.0 to 6500.0 (if P0-19 = 1) 0 to 65000 (if P0-19 = 0)	s	2	
P0-19	Acceleration/ Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	N.A.		
P6-07	Acceleration/ Deceleration mode	0: Linear mode 1: S-curve mode A 2: S-curve mode B	N.A.		

Step 9: Set DI And DO If Needed

DI Setting

<table>
<tr><th>Para. No.</th><th>Para. Name</th><th>Setting Range</th><th>Unit</th><th>Default</th><th>Commission</th></tr>
<tr><td>P4-00</td><td>DI1 function selection</td><td rowspan="2">0: No function
1: Forward RUN (FWD)
2: Reverse RUN (REV)
3: Three-wire control
4: Forward JOG (FJOG)
5: Reverse JOG (RJOG)
6: Terminal UP
7: Terminal DOWN
8: Coast to stop
9: Fault reset (RESET)
10: RUN pause
11: External fault normally open (NO) input
12: Multi-reference terminal 1
13: Multi-reference terminal 2
14: Multi-reference terminal 3
15: Multi-reference terminal 4</td><td>N.A.</td><td>1
FWD</td><td></td></tr>
<tr><td>P4-01</td><td>DI2 function selection</td><td>N.A.</td><td>4
FJOG</td><td></td></tr>
</table>

<table>
<tr><th>Para. No.</th><th>Para. Name</th><th>Setting Range</th><th>Unit</th><th>Default</th><th>Commission</th></tr>
<tr><td>P4-02</td><td>DI3 function selection</td><td rowspan="3">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, keypad)
20: Command source switchover terminal 1
21: Acceleration/Deceleration prohibited
22: PID pause
23: PLC status reset
24: Wobble pause
25: Counter input
26: Counter reset
27: Length count input
28: Length reset
29: Torque control prohibited
30: Pulse input (enabled only for Di5)
31: Reserved
32: Immediate DC injection braking
33: External fault normally closed (NC) input
34: Frequency modification forbidden
35: PID action direction reverse
36: External STOP terminal 1
37: Command source switchover terminal 2
38: PID integral disabled
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
41: Motor selection terminal 1
42: Reserved
43: PID parameter switchover
44: User-defined fault 1
45: User-defined fault 2</td><td>N.A.</td><td>9</td><td></td></tr>
<tr><td>P4-03</td><td>DI4 function selection</td><td>N.A.</td><td>12</td><td></td></tr>
<tr><td>P4-04</td><td>DI5 function selection</td><td>N.A.</td><td>13</td><td></td></tr>
</table>

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
		46: Speed control/Torque control switchover 47: Emergency stop 48: External STOP terminal 2 49: Deceleration DC injection braking 50: Clear the current running time 51: Two-wire/Tree-wire switchover 52: Reverse frequency prohibited 53–59: Reserved			
P4-10	DI filter time	0.000 to 1.000	s	0.010	
P4-35	DI1 delay	0.0 to 3600.0	s	0.0	
P4-36	DI2 delay	0.0 to 3600.0	s	0.0	
P4-37	DI3 delay	0.0 to 3600.0	s	0.0	
P4-38	DI active mode selection 1		N.A.	00000	

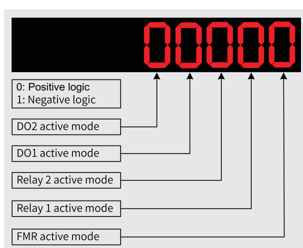
Note:

- The screw is connected by default;
- The screw cannot be re-connected once it is cut. This will result in an increase in leakage current to ground during drive running. Take full consideration before cutting the jumper.

DO Setting

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P5-00	FM terminal output mode	0: Pulse output (FMP) 1: Switch signal output (FMR)	N.A.	0	

<table>
<tr><th>Para. No.</th><th>Para. Name</th><th>Setting Range</th><th>Unit</th><th>Default</th><th>Comm ission</th></tr>
<tr><td>P5-01</td><td>FMR function(opencoll ector output terminal) selection</td><td rowspan="2">0: No output
1: AC drive running
2: Fault output
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 completed
12: Accumulative running time reached
13: Frequency limited
14: Torque limited
15: Ready for RUN
16: Reserved
17: Frequency upper limit reached
18: Frequency lower limit reached (no output at stop)
19: Undervoltage state output
20: Communication setting
21: Reserved
22: Reserved
23: Zero-speed running 2 (having output at stop)
24: Accumulative power-on time reached
25: Frequency level detection FDT2 output
26: Frequency 1 reached
27: Frequency 2 reached
28: Current 1 reached
29: Current 2 reached
30: Timing duration reached
31: AI1 input limit exceeded
32: Load lost
33: Reverse running
34: Zero current state</td><td>N.A.</td><td>0 No output</td><td></td></tr>
<tr><td>P5-02</td><td>Relay function(T/A-T/B-T/C)sele ction</td><td>N.A.</td><td>2 Fault output</td><td></td></tr>
</table>

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
		35: IGBT temperature reached 36: Output current limit exceeded 37: Frequency lower limit reached (having output at stop) 38: Alarm output 39: Reserved 40: Current running time reached 41: Fault output (no output at undervoltage)			
P5-17	FMR output delay time	0.0 to 3600.0	s	0.0	
P5-18	Relay 1 output delay time	0.0 to 3600.0	s	0.0	
P5-19	Relay 2 output delay time	0.0 to 3600.0	s	0.0	
P5-20	Do1 output delay time	0.0 to 3600.0	s	0.0	
P5-21	Do2 output delay time	0.0 to 3600.0	s	0.0	
P5-22	DO active mode selection		N.A.	00000	

Note:

- Positive logic means that, DO output terminal is normally the default state.
- Negative logic means the opposite situation.

Step 10: Set Startup Frequency If Needed

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P6-03	Startup frequency	0.00 to 10.00	Hz	0.00	
P6-04	Startup frequency active time	0.0 to 100.0	s	0.0	

Step 11: Set S-Curve If Needed

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P6-07	Acceleration/ Deceleration mode	0: Linear mode 1: S-curve mode A 2: S-curve mode B	N.A.	0	1
P6-08	Time proportion of S-curve start segment	0.0 to [100.0 minus P6-09]	%	30.0	
P6-09	Time proportion of S-curve end segment	0.0 to [100.0 minus P6-08]	%	30.0	

Step 12: Set DC Injection Braking/Pre-excitation If Needed

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P6-00	Start mode	0: Direct startup 1: Reserved 2: Pre-excited startup	N.A.	0	
P6-05	DC injection braking 1 level	0 to 100	%	0	
P6-06	DC injection braking 1 active time	0.0 to 100.0	s	0.0	
P6-11	DC injection braking 2 frequency threshold	0.00 to 10.00	Hz	0.00	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P6-12	DC injection braking 2 delay time	0.0 to 100.0	s	0.0	
P6-13	DC injection braking 2 level	0 to 100	%	50	
P6-14	DC injection braking 2 active time	0.0 to 100.0	s	0.0	

Note:

➢ Only when P6-00 = 0, parameters P6-05 and P6-06 are related to DC injection braking 1.

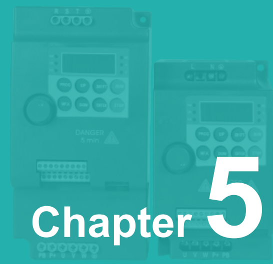
Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P6-00	Start mode	0: Direct startup 1: Reserved 2: Pre-excited startup (asynchronous motor)	N.A.	0	2
P6-05	Pre-excitation level	0 to 100	%	50	
P6-06	Pre-excitation active time	0.0 to 100.0	s	0.0	

Note:

➢ Only when P6-00 = 2, parameters P6-05 and P6-06 are related to pre¬excitation.

Step 13: Set PI of Velocity Loop If It's SVC Control Mode

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P2-00	Speed loop proportional gain 1	1 to 100	N.A.	30	
P2-01	Speed loop integral time 1	0.01 to 10.00	s	0.50	
P2-02	Switchover frequency 1	0.00 to P2-05	N.A.	5.00	
P2-03	Speed loop proportional gain 2	1 to 100	N.A.	20	
P2-04	Speed loop integral time 2	0.01 to 10.00	s	1.00	



Chapter 5

Troubleshooting

5.1 Faults and Solutions

Display	Fault Name	Possible Causes	Solutions
ERR02	Overcurrent during acceleration	1.The output circuit is short circuited. 2.The acceleration time is too short. 3.Manual torque boost or V/F curve is not appropriate. 4.The power supply is too low. 5.The startup operation is performed on the rotating motor. 6.A sudden load is added during acceleration. 7.The AC drive model is of too small power class.	1: Eliminate short circuit. 2: Increase the acceleration time. 3: Adjust the manual torque boost or V/F curve. 4: Check that the power supply is normal. 5: Select speed tracking restart or start the motor after it stops. 6: Remove the added load. 7: Select a drive of higher power class.
ERR03	Overcurrent during deceleration	1.The output circuit is short circuited. 2.The deceleration time is too short. 3.The power supply is too low. 4.A sudden load is added during deceleration. 5.The braking resistor is not installed.	1: Eliminate short circuit. 2: Increase the deceleration time. 3: Check the power supply, and ensure it is normal. 4: Remove the added load. 5: Install the braking resistor.
ERR04	Overcurrent at constant speed	1.The output circuit is short circuited. 2.The power supply is too low. 3.A sudden load is added during operation. 4.The AC drive model is of too small power class.	1: Eliminate short circuit. 2: Adjust power supply to normal range. 3: Remove the added load. 4: Select a drive of higher power class.

Display	Fault Name	Possible Causes	Solutions
ERR05	Overcurrent during acceleration	1.The DC bus voltage is too high. 2.An external force drives the motor during acceleration. 3.The acceleration time is too short. 4.The braking resistor is not installed.	1: Replace with a proper braking resistor. 2: Cancel the external force or install braking resistor. 3: Increase the acceleration time. 4: Install a braking resistor.
ERR06	Overcurrent during deceleration	1.The DC bus voltage is too high. 2.An external force drives the motor during deceleration. 3.The deceleration time is too short. 4.The braking resistor is not installed.	1: Replace with a proper braking resistor. 2: Cancel the external force or install braking resistor. 3: Increase the deceleration time. 4: Install the braking resistor.
ERR07	Overvoltage at constant speed	1.The DC bus voltage is too high. 2.An external force drives the motor during deceleration.	1: Replace with a proper braking resistor. 2: Cancel the external force.

Voltage thresholds

Voltage Class	DC Bus Overvoltage	DC Bus Undervoltage	Braking Unit Operation Level
Single-phase 220 V	400V	200V	381V
Three-phase 220 V	400V	200V	381V
Three-phase 380 V	810V	350V	700V

ERR08	Control power fault	The input voltage exceeds the allowed range.	Adjust the input voltage to within the allowed range.
ERR09	Undervoltage	1.Instantaneous power failure occurs. 2.The input voltage exceeds the allowed range 3.The DC bus voltage is too low.	1: Reset the fault. 2: Adjust the input voltage to within the allowed range. 3 to 6: Seek for maintenance.

Display	Fault	Possible Causes	Solutions
ERR09	Undervoltage	4.The rectifier bridge and buffer resistor are faulty. 5.The drive board is faulty. 6.The control board is faulty.	
ERR10	Drive overload	1.The load is too heavy or the rotor is locked. 2.The drive is of too small power class.	1: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 2: Select a drive of higher power class.
ERR11	Motor overload	1.P9-01 is too small. 2.The load is too heavy or the rotor is locked. 3.The drive is of too small power class.	1: Set P9-01 correctly. 2: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 3: Select a drive of larger power class.
ERR12	Power input phase loss	1.The three-phase power supply is abnormal. 2.The drive board is faulty. 3.The lightening protection board is faulty. 4.The control board is faulty.	1: Check the power supply. 2 to 4: Seek for maintenance.
ERR13	Power output phase loss	1.The cable between drive and motor is faulty. 2.The drive's three-phase output is unbalanced when the motor is running. 3.The drive board is faulty 4.The IGBT is faulty.	1: Check the cable. 2: Check the motor windings. 3 to 4: Seek for maintenance.
ERR14	IGBT overheat	1.The ambient temperature is too high. 2.The air filter is blocked. 3.The cooling fan is damaged. 4.The thermal sensor of IGBT is damaged. 5.The IGBT is damaged.	1: Reduce the ambient temperature. 2: Clean the air filter. 3 to 5: Seek for maintenance.

Display	Fault Name	Possible Causes	Solutions
ERR15	External equipment fault	1.External fault signal is input via DI. 2.External fault signal is input via VDI.	Reset the fault.
ERR16	Communication fault	1.The host computer is abnormal. 2.The communication cable is faulty. 3.The extension card type set in P0-28 is incorrect. 4.The communication parameters in group PD are set improperly.	1: Check cabling of the host computer. 2: Check the communication cabling. 3: Set P0-28 correctly. 4: Set the communication parameters properly.
ERR18	Current detection fault	The drive board is faulty.	Replace the drive board.
ERR19	Motor tuning fault	1.Motor parameters are wrong. 2.Motor tuning overtime.	1.Check motor parameters P1-00 to P1-05. 2.Check the wiring between drive and motor.
ERR21	EEPROM read-write fault	The EEPROM chip is damaged.	Replace the main control board.
ERR23	Short circuit to ground	The motor is short-circuited to ground.	Replace the cables or motor.
ERR26	Accumulative running time reached	The accumulative running time reaches the setting of P8-17.	Clear the record by performing parameter initialization (set PP-01 to 2).
ERR27	User-defined fault 1	1.The user-defined fault 1 signal is input via DI. 2.User-defined fault 1 signal is input via VDI.	Reset the fault.
ERR28	User-defined fault 2	1.The user-defined fault 2 signal is input via DI 2.The user-defined fault 2 signal is input via VDI.	Reset the fault.

Display	Fault Name	Possible Causes	Solutions
ERR29	Accumulative power-on time reached	The accumulative power-on time reaches the setting of P8-16.	Clear the record by performing parameter initialization (set PP-01 to 2).
ERR30	Off load fault	Offload when it's running.	Check the connection between motor and load.
ERR31	PID feedback lost during running	The PID feedback is lower than PA-26.	Check the PID feedback signal or set PA-26 to a proper value.
ERR33	Communication receiving timeout inside drive board	1.Wirings become loose inside the AC drive 2.The drive board is abnormal. 3.The control board is abnormal.	1. Connect all wirings securely. 2 and 3. Seek for maintenance.
ERR40	Quick current limit	1.The load is too heavy or the rotor is locked. 2.The drive is of too small power class.	1: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 2: Select a drive of higher power class.
ERR41	Motor switchover fault during running	The current motor is switched over via a terminal during running of the AC drive.	Switch over the motor only after the AC drive stops.
ERR42	Overspeed error	1.Locked-rotor occurs on the motor. 2.P9-69 and P9-70 are set improperly. 3.Wirings between the AC drive and motor are abnormal.	1.Check whether the machine is abnormal, whether motor auto-tuning is not performed, and whether the setting of P2-10 is small. 2.Set P9-69 and P9-70 properly. 3.Check whether wirings between the AC drive and motor break. If yes, reconnect the wirings securely.

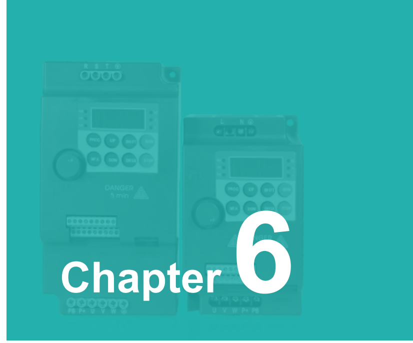
Display	Fault Name	Possible Causes	Solutions
ERR96	Communication receiving timeout inside control board	1.Wirings become loose inside the AC drive 2.The drive board is abnormal. 3.The control board is abnormal.	1. Connect all wirings securely. 2 and 3. Seek for maintenance.

5.2 Common Symptoms And Diagnostics

Fault Name	Possible Causes	Solutions
There is no display at power-on.	1.There is no power supply or the power supply is too low. 2.The switching power supply on the drive board is faulty. 3.The rectifier bridge is damaged. 4.The buffer resistor of the drive is damaged. 5.The control board or the keypad is faulty. 6.The cable between the control board and the drive board or keypad breaks.	1: Check the power supply. 2 to 5: Seek for maintenance. 6: Re-connect the 4-core and 28-core flat cables, or seek for maintenance.
"HC" is displayed at power-on.	1.The cable between the drive board and the control board is in poor contact. 2.The control board is damaged. 3.The motor winding or the motor cable is short-circuited to the ground. 4.The power supply is too low.	1: Re-connect the 4-core and 28-core flat cables, or seek for maintenance. 2: Seek for maintenance. 3: Check the motor or replace it, and check the motor cable. 4. Check the power supply according to charpter1.3.
"Err23n is displayed at power-on.	1.The motor or output cables are short circuited to ground. 2.The AC drive is damaged.	1.Measure insulation of the motor and output cables. 2.Seek for maintenance.

Fault Name	Possible Causes	Solutions
The display is normal upon power-on, but "HC" is displayed after startup and the motor stops immediately.	1.The cooling fan is damaged or the rotor is locked. 2.A certain terminal is short-circuited.	1: Replace cooling fan, or check the machine whether it is locking the rotor. 2: Eliminate short circuit.
Err14 is reported frequently.	1.The carrier frequency is set too high. 2.The cooling fan is damaged, or the air filter is blocked. 3.Components (thermal coupler or others) inside the drive are damaged.	1: Reduce P0-15. 2: Replace the fan and clean the air filter. 3: Seek for maintenance.
The motor does not rotate after the AC drive outputs a non¬zero reference.	1.The motor or motor cable is damaged. 2.The motor parameters are set improperly. 3.The cable between the drive board and the control board is in poor contact. 4.The drive board is faulty. 5.The rotor is locked.	1: Check the motor, or check the cable between the drive and the motor. 2: Check and re-set motor parameters. 3: Re-connect the 4-core and 28-core flat cables, or seek for maintenance. 4: Seek for maintenance. 5: Check the machine whether it is locking the rotor.
The DI terminals are disabled.	1.The DI parameters are set incorrectly. 2.The input signal is incorrect. 3.The wire jumper between OP and +24V is in poor contact. 4.The control board is faulty.	1: Check and reset DI parameters in group P4. 2: Check the input signals, or check the input cable. 3: Check the jumper between OP and +24 V. 4: Seek for maintenance.

Fault Name	Possible Causes	Solutions
The drive reports overcurrent and overvoltage frequently.	1.The motor parameters are set improperly. 2.The acceleration/deceleration time is too small. 3.The load fluctuates.	1: Reset motor parameters. 2: Set proper acceleration/ deceleration time. 3: Check the machine, or seek for maintenance.
Err17 is reported at power-on or during running.	The soft start contactor is not closed.	1.Check whether the contactor wiring becomes loose 2.Check whether the contactor is faulty. 3.Check whether 24 V power supply of the contactor is faulty. 4.Seek for maintenance
Display at power-on	Related device on the control board is damaged.	Seek for maintenance.



Chapter 6

Parameter Table

6.1 Parameter Table

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
Group P0: Standard Parameters					
P0-01	Motor 1 control mode	0: Sensorless vector control (SVC) 2: Voltage/Frequency control (V/F)	N.A	2	
P0-02	Command source selection	0 to 2	N.A	0	
P0-03	Main frequency source X selection	0 to 9	N.A	0	
P0-04	Range base of auxiliary frequency Y for X and Y operation superposition	The same as P0-03 (Main frequency source X selection)	N.A	0	
P0-05	Range of auxiliary frequency Y for X and Y operation superposition	0: Relative to max. frequency 1: Relative to main frequency X	N.A	0	
P0-06	Range of auxiliary frequency Y for X and Y operation superposition	0 to150	%	100	
P0-07	Frequency source superposition selection	00 to 34	N.A	00	
P0-08	Preset frequency	0.00 to max frequency (P0-10)	N.A	50.00	
P0-09	Rotation direction	0: Same direction 1: Reverse direction	N.A	0	
P0-10	Max. frequency	50.00 to 600.00	Hz	50.00	
P0-11	Source of frequency upper limit	0 to 5	N.A	0	
P0-12	Frequency upper limit	Frequency lower limit (P0-14) to max. frequency (P0-10)	Hz	50.00	
P0-13	Frequency upper limit offset	0.00 to max frequency (P0-10)	Hz	0.00	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-14	Frequency lower limit	0.00 to frequency upper limit (P0-12)	Hz	0.00	
P0-15	Carrier frequency	0.8 to 16.0	kHz	Model dependent	
P0-16	Carrier frequency adjustment with temperature	0: No 1: Yes	N.A	1	
P0-17	Acceleration time 1	0.00 to 650.00 (if P0-19 = 2) 0.0 to 6500.0 (if P0-19 = 1) 0 to 65000 (if P0-19 = 0)	s	Model dependent	
P0-18	Deceleration time 1	0.00 to 650.00 (if P0-19 = 2) 0.0 to 6500.0 (if P0-19 = 1) 0 to 65000 (if P0-19 = 0)	s	Model dependent	
P0-19	Acceleration/ Deceleration time unit	0: 1 1: 0.1 2: 0.01	s	1	
P0-21	Frequency offset of auxiliary frequency source for X and Y operation superposition	0.00 to max frequency (P0-10)	Hz	0.00	
P0-22	Reserved	–	–	–	
P0-23	Retentive of digital setting frequency upon stop	0: Not retentive 1: Retentive	N.A	0	
P0-24	Motor parameter group selection	0: Motor parameter group 1 1: Motor parameter group 2	N.A	0	
P0-25	Acceleration/ Deceleration time base frequency	0: Max. frequency (P0-10) 1: Frequency reference 2: 100	Hz	0	
P0-26	Base frequency for UP/DOWN modification during running	0: Running frequency 1: Frequency reference	N.A	0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-27	Binding command source to frequency source	0000 to 9999	N.A	0000	
Group P1: Motor 1 Parameters					
P1-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor	N.A.	0	
P1-01	Rated motor power	0.1 to 30.0	kW	Model dependent	
P1-02	Rated motor voltage	1 to 1000	V	Model dependent	
P1-03	Rated motor current	0.01 to 655.35	A	Model dependent	
P1-04	Rated motor frequency	0.01 to max frequency	Hz	Model dependent	
P1-05	Rated motor speed	1 to 65535	RPM	Model dependent	
P1-06	Stator resistance (asynchronous motor)	0.001 to 65.535	Q	Model dependent	
P1-07	Rotor resistance	0.001 to 65.535	Q	Model dependent	
P1-08	Leakage inductive reactance	0.01 to 655.35	mH	Model dependent	
P1-09	Mutual inductive reactance	0.1 to 6553.5	mH	Model dependent	
P1-10	No-load current (asynchronous motor)	0.1 to 6553.	A	Model dependent	
P1-37	Auto-tuning selection	0: No auto-tuning 1: Static auto-tuning 1 2: Complete dynamic auto-tuning 3: Static auto-tuning 2	N.A.	0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commi ssion
Group P2: Vector Control					
P2-00	Speed loop proportional gain 1	1 to 100	N.A.	30	
P2-01	Speed loop integral time 1	0.01 to 10.00	s	0.50	
P2-02	Switchover frequency 1	0.00 to P2-05	Hz	5.00	
P2-03	Speed loop proportional gain 2	1 to100	Hz	20	
P2-04	Speed loop integral time 2	0.01 to10.00s	s	1.00	
P2-06	Vector control slip gain	50 to 200	%	100	
P2-07	Time constant of speed loop filter	0.000 to 1.000	s	0.050	
P2-08	Vector control over-excitation gain	0 to 200	N.A.	0	
P2-09	Torque upper limit source in speed control mode	0 to 7	N.A.	0	
P2-10	Digital setting of torque upper limit in speed control mode	0.0 to 200.0	%	150.0	
P2-11	Selection of torque upper limit reference setting channel in speed control mode (regenerative)	0 to 8	N.A.	0	
P2-12	Digital setting of torque upper limit in speed control mode (regenerative)	0.0 to 200.0	%	150.0	
P2-13	Excitation adjustment proportional gain	0 to 60000	N.A.	10	
P2-14	Excitation adjustment integral gain	0 to 60000	N.A.	10	
P2-15	Torque adjustment proportional gain	0 to 60000	N.A.	10	
P2-16	Torque adjustment integral gain	0 to 60000	N.A.	10	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P2-17	Speed loop property	00 to 11	N.A	80	
P2-18	Torque feedforward gain	20 to 100	N.A	80	
P2-21	Max. torque coefficient of field weakening area	50 to 200	%	80	
P2-22	Regenerative power limit	0.0: not limited 0.1 to 200.0	%	0.0	
Group P3: V/F Control					
P3-00	V/F curve setting	0 to 9	N.A.	0	
P3-01	Torque boost	0.0 to 30.0	%	0.0	
P3-02	Cut-off frequency of torque boost	0.00 to max output frequency	Hz	50.00	
P3-03	Multi-point V/F frequency 1 (P1)	0.00 to P3-05	Hz	0.00	
P3-04	Multi-point V/F voltage 1	0.0 to 100.0	%	0.0	
P3-05	Multi-point V/F frequency 2	P3-03 to P3-07	Hz	0.00	
P3-06	Multi-point V/F voltage 2	0.0 to 100.0	%	0.0	
P3-07	Multi-point V/F frequency 3	P3-05 to rated motor frequency (P1-04)	Hz	0.00	
P3-08	Multi-point V/F voltage 3	0.0 to 100.0	%	0.0	
P3-09	V/F slip compensation gain	0 to 200.0	%	0.0	
P3-10	V/F over-excitation gain	0 to 200	%	64	
P3-11	V/F oscillation suppression gain	0 to 100	%	Model dependent	
P3-12	Oscillation suppression mode selection	0 to 4	N.A.	3	
P3-13	Voltage source for V/ F separation	0 to 8	N.A.	0	
P3-14	Voltage digital setting for V/F separation	0 to rated motor voltage	V	0	

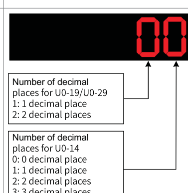
Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P3-15	Voltage rise time of V/F separation	0.0 to 1000.0	s	0.0	
P3-16	Voltage decline time of V/F separation	0.0 to 1000.0	s	0.0	
P3-17	Stop mode selection for V/F separation	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declining to 0	N.A	0	
P3-18	Current limit level	50 to 200	%	150	
P3-19	Current limit selection	0 to 100	N.A	0.0	
P3-20	Current limit gain	0 to 200	N.A	0.0	
P3-21	Compensation factor of speed multiplying current limit level	200.0 to 810.0	%	0	
P3-22	Voltage limit	200.0 to 810.0	V	760.0	
P3-23	Voltage limit selection	0: Disabled 1: Enabled	N.A	1	
P3-24	Frequency gain for voltage limit	0 to 100	N.A	30	
P3-25	Voltage gain for voltage limit	0 to 100	N.A	30	
P3-26	Frequency rise threshold during voltage limit	0 to 50	Hz	5	
P3-27	Slip compensation time constant	0.1 to 10.0	s	0.5	
Group P4: Input Terminals					
P4-00	DI1 function selection	0 to 59	N.A.	1	
P4-01	DI2 function selection	0 to 59	N.A	4	
P4-02	DI3 function selection	0 to 59	N.A	9	
P4-03	DI4 function selection	0 to 59	N.A	12	

Para. No.	Para. Name	Setting Range	Unit	Default	Commi ssion
P4-04	DI5 function selection	0 to 59	N.A	13	
P4-05	DI6 function selection	0 to 59	N.A	0	
P4-06	-	-	-		
P4-07	-	-	-		
P4-08	-	-	-		
P4-09	-	-	-		
P4-10	DI -time	0.000 to 1.000	s	0.010	
P4-11	Terminal command mode	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Three-wire control mode 1 3: Three-wire control mode 2	N.A	0	
P4-12	Terminal UP/DOWN rate	0.01 to 65.535	Hz/s	1.000	
P4-13	AI curve 1 minimum input	0.00 to P4-15	V	0.00	
P4-14	Corresponding setting of AI curve1 minimum input	-100.0 to100.0	%	0.0	
P4-15	AI curve 1 max input	P4-13 to 10.00	V	10.00	
P4-16	Corresponding setting of AI curve1 max input	-100.0 to 100.0	%	100.0	
P4-17	Ai1 filter time	0.00 to 10.00	s	0.10	
P4-18	AI curve 2 minimum input	0.00 to P4-20	V	0.00	
P4-19	Corresponding setting of AI curve2 minimum input	-100.0 to 100.0	%	0.0	
P4-20	AI curve 2 max input	P4-18 to 10.00	V	10.00	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P4-21	Corresponding setting of AI curve2 max input	-100.0 to 100.0	%	100.0	
P4-22	AI2 filter time	0.00 to 10.00	s	0.10	
P4-23	AI curve 3 minimum input	-10.00 to P4-25	V	-10.00	
P4-24	Corresponding setting of AI curve3 minimum input	-100.0 to100.0	%	-100.0	
P4-25	AI curve 3 max input	P4-23 to 10.00	V	10.00	
P4-26	Corresponding setting of AI curve3 max input	-100.0 to 100.0	%	100.0	
P4-27	AI3 filter time	0.00 to10.00	s	0.10	
P4-28	Pulse minimum input	0.00 to P4-30	KHz	0.00	
P4-29	Corresponding setting of pulse minimum input	-100.0 to 100.0	%	0.0	
P4-30	Pulse max input	P4-28 to 20.00	KHz	20.00	
P4-31	Corresponding setting of pulse max input	-100.0 to 100.0	%	100.0	
P4-32	Pulse filter time	0.00 to 10.00	s	0.10	
P4-33	AI curve selection	111 to 555	N.A.	321	
P4-34	Setting for AI less than minimum input	000 to 111	N.A.	000	
P4-35	DI1 delay time	0.0 to 3600.0	s	0.0	
P4-36	DI2 delay time	0.0 to 3600.0	s	0.0	
P4-37	DI3 delay time	0.0 to 3600.0	s	0.0	
P4-38	DI active mode selection 1	00000 to 11111	N.A.	00000	
P4-39	DI active mode selection 2	00000 to 11111	N.A.	00000	
Group P5: Output Terminals					
P5-00	FM terminal output mode	0 to 1	N.A.	0	
P5-01	FMR function (open-collector output terminal) selection	0 to 41	N.A.	0	
P5-02	Relay function (T/A-T/B-T/C) selection	0 to 41	N.A.	2	

Para. No.	Para. Name	Setting Range	Unit	Default	Commi ssion
P5-03	-	-	-		
P5-04	-	-	-		
P5-05	-	-	-		
P5-06	FMP function selection	0 to 16	N.A	0	
P5-07	AO1 function selection	0 to 16	N.A	0	
P5-08	AO2 function selection	0 to 16	N.A	1	
P5-09	Max. FMP output frequency	0.01 to 50.00	KHz	50.00	
P5-10	AO1 zero offset coefficient	-100.0 to 100.0	%	0.0	
P5-11	AO1 gain	-10.00 to10.00	N.A	1.00	
P5-12	AO2 zero offset coefficient	-100.0 to +100.0	%	0.00	
P5-13	AO2 gain	-10.00 to +10.00	N.A	1.00	
P5-17	FMR output delay time	0.0 to 3600.0	s	0.0	
P5-18	Relay 1 output delay time	0.0 to 3600.0	s	0.0	
P5-19	Relay 2 output delay time	0.0 to 3600.0	s	0.0	
P5-20	DO1 output delay time	0.0 to 3600.0	s	0.0	
P5-21	DO2 output delay time	0.0 to 3600.0	s	0.0	
P5-22	DO active mode selection	00000 to 11111	N.A	00000	
Group P6: Start/Stop Control					
P6-00	Start mode	0: Direct startup 1: Reserved 2: Pre-excited startup (asynchronous motor)	N.A	0	
P6-01	Mode of catching a spinning motor	0: From stop frequency 1: From zero speed 2: From max. frequency	N.A	0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P6-02	Speed of catching a spinning motor	1 to 100	N.A.	20	
P6-03	Startup frequency	0.00 to 10.00	Hz	0.00	
P6-04	Startup frequency active time	0.0 to 100.0	s	0.0	
P6-05	DC injection braking 1 level/Pre-excitation level	0 to 100	%	50	
P6-06	DC injection braking 1 active time/Pre-excitation active time	0.0 to 100.0	s	0.0	
P6-07	Acceleration/ Deceleration mode	0: Linear mode 1: S-curve mode A 2: S-curve mode B	N.A.	0	
P6-08	Time proportion of S-curve start segment	0.0 to (100.0 minus P6-09)	%	30.0	
P6-09	Time proportion of S-curve end segment	0.0 to (100.0 minus P6-09)	%	30.0	
P6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	N.A.	0	
P6-11	DC injection braking 2 frequency threshold	0.00 to 10.00	Hz	0.00	
P6-12	DC injection braking 2 delay time	0.0 to 100.0	s	0.0	
P6-13	DC injection braking 2 level	0 to 100	%	50	
P6-14	DC injection braking 2 active time	0.0 to 100.0	s	0.0	
P6-15	Reserved	—	—		
P6-18	Catching a spinning motor current limit	30 to 200	%	Model dependent	
P6-21	Demagnetization time	0.00 to 5.00	s	Model dependent	
P6-22	Min. output frequency	0.00 to P6-11	Hz	0.00	
P6-23	Factory reserved	1 to 100	N.A.	10	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
Group P7: Keypad Control And LED Display					
P7-01	MF.K Key function selection	0 to 5	N.A.	5	
P7-02	STOP/RESET key function	0 to 1	N.A.	1	
P7-03	LED display running parameters 1	0000 to FFFF	N.A.	1F	
P7-04	LED display running parameters 2	0000 to FFFF	N.A.	0	
P7-05	LED display stop parameters	0000 to FFFF	N.A.	33	
P7-06	Load speed display coefficient	0.0001 to 6.5000	N.A.	1.0000	
P7-07	Heatsink temperature of AC drive IGBT	0 to 100	°C		
P7-08	Product number	N.A.	N.A.	N.A.	
P7-09	Accumulative running time	0 to 65535	h	N.A.	
P7-10	Performance software version	N.A.	N.A.	N.A.	
P7-11	Functional software version	N.A.	N.A.	N.A.	
P7-12	Number of decimal places for load speed display			21	
P7-13	Accumulative power- on time	0 to 65535	h	N.A.	
P7-14	Accumulative power consumption	0 to 65535	kWh	N.A.	
P7-15	Temporary performance software version	N.A.	N.A.	N.A.	
P7-16	Temporary functional software version	N.A.	N.A.	N.A.	
Group P8: Auxiliary Functions					
P8-00	JOG running frequency	0.00 to max frequency	Hz	2.00	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P8-01	JOG acceleration time	0.0 to 6500.0	s	20.00	
P8-02	JOG deceleration time	0.0 to 6500.0	s	20.00	
P8-03	Acceleration time 2	0.0 to 6500.0	s	Model dependent	
P8-04	Deceleration time 2	0.0 to 6500.0	s	Model dependent	
P8-05	Acceleration time 3	0.0 to 6500.0	s	Model dependent	
P8-06	Deceleration time 3	0.0 to 6500.0	s	Model dependent	
P8-07	Acceleration time 4	0.0 to 500.0	s	Model dependent	
P8-08	Deceleration time 4	0.0 to 6500.0	s	Model dependent	
P8-09	Frequency jump 1	0.00 to max frequency	Hz	0.00	
P8-10	Frequency jump 2	0.00 to max frequency	Hz	0.00	
P8-11	Frequency jump amplitude	0.00 to max frequency	Hz	0.00	
P8-12	Forward/Reverse rotation dead-zone time	0.0 to 3000.0	s	0.0	
P8-13	Reverse control	0: Enabled 1: Disabled	N.A.	0	
P8-14	Running mode when set frequency lower than frequency lower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	N.A.	0	
P8-15	Droop control	0.00 to 10.00	Hz	0.00	
P8-16	Accumulative power-on time threshold	0 to 65000	h	0	
P8-17	Accumulative running time threshold	0 to 65000	h	0	
P8-18	Startup protection	0: No 1: Yes	N.A.	0	
P8-19	Frequency detection value (FDT1)	0.00 to max frequency	Hz	50.0	
P8-20	Frequency detection hysteresis (FDT1 hysteresis)	0.0 to 100.0 (FDT1 level)	%	5.0	
P8-21	Detection range of frequency reached	0.00 to 100 (max frequency)	%	0.0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P8-22	Jump frequency during acceleration/deceleration	0: Disabled 1: Enabled	N.A.	1	
P8-25	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 to max frequency	Hz	0.00	
P8-26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 to max frequency	Hz	0.00	
P8-27	Terminal JOG priority	0: Disabled 1: Enabled	N.A.	0	
P8-28	Frequency detection value (FDT2)	0.00 to max frequency	N.A.	50.00	
P8-29	Frequency detection hysteresis (FDT2 hysteresis)	0.0 to 100.0 (FDT2 level)	%	5.0	
P8-30	Detection value 1 of any frequency reaching	0.00 to max frequency	Hz	50.00	
P8-31	Detection amplitude 1 of any frequency reaching	0.0 to 100.0 (max frequency)	%	0.0	
P8-32	Detection value 2 of any frequency reaching	0.00 to max frequency	Hz	50.00	
P8-33	Detection amplitude 2 of any frequency reaching	0.0 to 100.0 (max frequency)	%	0.0	
P8-34	Zero current detection level	0.0 to 300.0 (rated motor current as 100%)	%	5.0	
P8-35	Zero current detection delay	0.01 to 600.00	s	0.10	
P8-36	Output overcurrent threshold	0.0 (no detection) 0.1 to 300.0 (rated motor current)	%	200.0	
P8-37	Output overcurrent detection delay	0.00 to 600.00	s	0.0	
P8-38	Detection value 1 of any current reached	0.0 to 300.0 (rated motor current)	%	100.0	
P8-39	Detection amplitude 1 of any current reached	0.0 to 300.0 (rated motor current)	%	0.0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P8-40	Detection value 2 of any current reached	0.0 to 300.0 (rated motor current)	%	100.0	
P8-41	Detection amplitude 2 of any current reached	0.0 to 300.0 (rated motor current)	%	0.0	
P8-42	Timing function	0: Disabled 1: Enabled	N.A.	0	
P8-43	Timing duration source	0 to 3	N.A.	0	
P8-44	Timing duration	0.0 to 6500.0	min	0.0	
P8-45	Ai1 input voltage lower limit	0 to P8-46	V	3.10	
P8-46	Ai1 input voltage upper limit	P8-45 to 11.00	V	6.80	
P8-47	IGBT temperature threshold	0 to 100	°C	75	
P8-48	Cooling fan working mode	0: Fan working during running 1: Fan working continuously	N.A.	0	
P8-49	Wakeup frequency	Dormant frequency (P8-51) to max frequency (P0-10)	Hz	0.00	
P8-50	Wakeup delay	0.0 to 6500.0	s	0.0	
P8-51	Hibernating frequency	0.00 to wakeup frequency (P8-49)	Hz	0.00	
P8-52	Hibernating delay	0.0 to 6500.0	s	0.0	
P8-53	Current running time reached	0.0 to 6500.0	min	0.0	
P8-54	Output power correction coefficient	0.0 to 200.0	%	100.0	
P8-55	Deceleration time for emergency stop	0.00 to 650.00 (P0-19 =2) 0.0 to 6500.0 (P0-19 =1) 0 to 65000 (P0-19 = 0)	s	0.1	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
Group P9: Fault And Protection					
P9-00	Motor overload protection	0: Disabled 1: Enabled	N.A.	1	
P9-01	Motor overload protection gain	0.20 to 10.00	N.A.	1.00	
P9-02	Motor overload pre-warning coefficient	50 to 100	%	80	
P9-07	Short-circuit to ground upon power-on	0: Disabled 1: Enabled	N.A.	1	
P9-08	Braking unit applied voltage	650.0 to 810.0	V	380 V: 700 V	
P9-09	Auto reset times	0 to 20	N.A.	0	
P9-10	DO action during fault auto reset	0: Not act 1: Act	N.A.	0	
P9-11	Delay of fault auto reset	0.1 to 100.0	s	1.0	
P9-12	Power input phase loss protection	0: Disabled 1: Enabled	N.A.	0	
P9-13	Power output phase loss protection	Units position: Output phase loss protection 0: Disabled 1: Enabled Tens position: Output phase loss protection before running 0: Disabled 1: Enabled	N.A.	01	
P9-14	1st fault type	0 to 96	N.A.	N.A.	
P9-15	2nd fault type	0 to 96	N.A.	N.A.	
P9-16	3rd (latest) fault type	0 to 96	N.A.	N.A.	
P9-17	Frequency upon 3rd fault	N.A.	N.A.	N.A.	
P9-18	Current upon 3rd fault	N.A.	N.A.	N.A.	
P9-19	Bus voltage upon 3rd fault	N.A.	N.A.	N.A.	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P9-20	Input terminal status upon 3rd fault	N.A.	N.A.	N.A.	
P9-21	Output terminal status upon 3rd fault	N.A.	N.A.	N.A.	
P9-22	AC drive status upon 3rd fault	N.A.	N.A.	N.A.	
P9-23	Power-on time upon 3rd fault	N.A.	N.A.	N.A.	
P9-24	Running time upon 3rd fault	N.A.	N.A.	N.A.	
P9-27	Frequency upon 2nd fault	N.A.	N.A.	N.A.	
P9-28	Current upon 2nd fault	N.A.	N.A.	N.A.	
P9-29	Bus voltage upon 2nd fault	N.A.	N.A.	N.A.	
P9-30	Input terminal status upon 2nd fault	N.A.	N.A.	N.A.	
P9-31	Output terminal status upon 2nd fault	N.A.	N.A.	N.A.	
P9-32	Frequency upon 2nd fault	N.A.	N.A.	N.A.	
P9-33	Current upon 2nd fault	N.A.	N.A.	N.A.	
P9-34	Bus voltage upon 2nd fault	N.A.	N.A.	N.A.	
P9-37	Input terminal status upon 1st fault	N.A.	N.A.	N.A.	
P9-38	Output terminal status upon 1st fault	N.A.	N.A.	N.A.	
P9-39	Frequency upon 1st fault	N.A.	N.A.	N.A.	
P9-40	Current upon 1st fault	N.A.	N.A.	N.A.	
P9-41	Bus voltage upon 3rd fault	N.A.	N.A.	N.A.	
P9-42	Input terminal status upon 1st fault	N.A.	N.A.	N.A.	
P9-43	Output terminal status upon 1st fault	N.A.	N.A.	N.A.	
P9-44	Frequency upon 1st fault	N.A.	N.A.	N.A.	
P9-47	Fault protection action selection 1	00000 to 22222	N.A.	0000	
P9-48	Fault protection action selection 2	00000 to 21111	N.A.	0000	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P9-49	Fault protection action selection 3	00000 to 22222	N.A.	0000	
P9-54	Frequency selection for continuing to run upon fault	0 to 4	N.A.	0	
P9-55	Backup frequency upon abnormality	0.0 to 100.0 (max frequency)	Hz	100.0	
P9-59	Action selection at instantaneous power failure	0: Invalid 1: Decelerate 2: Decelerate to stop	N.A.	0	
P9-60	Pause judging voltage at instantaneous power failure	80 to 100	%	85	
P9-61	Voltage recovery judging time at instantaneous power failure	0.0 to 100.0	s	0.5	
P9-62	Judging voltage at instantaneous power failure	60 to P9-60 (standard bus voltage)	%	80	
P9-63	Protection upon load lost	0: Disabled 1: Enabled	N.A.	0	
P9-64	Load lost detection level	0.0 to 100.0	%	10.0	
P9-65	Load lost detection time	0.0 to 60.0	s	1.0	
P9-66	Min. PID error 2	0.0 to 100.0	%	0.0	
P9-69	Overspeed detection level	0.0 to 50.0 (max. output frequency)	%	20.0	
P9-70	Overspeed detection time	0.0: No detection 0.1 to 60.0	s	0.0	
P9-71	Power dip ride-through gain Kp	0 to 100	N.A.	40	
P9-72	Power dip ride- through integral coefficient	0 to 100	N.A.	30	
P9-73	Deceleration time of power dip ride- through	0.0 to 300.0	s	20.0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
Group PA: Process Control And PID Function					
PA-00	PID reference source	0 to 6	N.A	0	
PA-01	PID digital reference	0.0 to 100.0	%	50.0	
PA-02	PID feedback source	0 to 8	N.A	0	
PA-03	PID action direction	0: Forward action 1: Reverse action	N.A	0	
PA-04	PID setting feedback range	0 to 65535	N.A	1000	
PA-05	Proportional gainKp1	0.0 to 100.0	N.A	20.0	
PA-06	Integral time Ti1	0.01 to 10.00	s	2.00	
PA-07	Differential time Td1	0.000 to 10.000	s	0.000	
PA-08	Cut-off frequency of PID reverse rotation	0.000 to max frequency	Hz	2.00	
PA-09	PID deviation limit	0.0 to 100.0	%	0.0	
PA-10	PID differential limit	0.00 to 100.00	%	0.10	
PA-11	PID setting change time	0.00 to 650.00	s	0.00	
PA-12	PID feedback filter time	0.00 to 60.00	s	0.00	
PA-13	PID output filter time	0.00 to 60.00	s	0.00	
PA-14	Min. PID operation frequency	0.00 to 10.00	Hz	0.00	
PA-15	Proportional gain Kp2	0.0 to 100.0	N.A.	20.0	
PA-16	Integral time Ti2	0.01 to 10.00	s	2.00	
PA-17	Differential time Td2	0.000 to 10.000	s	0.000	
PA-18	PID parameter switchover condition	0 to 3	N.A.	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 to 100.0	%	0.0	
PA-22	PID initial value holding time	0.00 to 650.00	s	0.00	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PA-23	Max. deviation between two PID outputs in forward direction	0.00 to 100.00	%	1.00	
PA-24	Max. deviation between two PID outputs in reverse direction	0.00 to 100.00	%	1.00	
PA-25	PID integral property	00 to 11	N.A.	00	
PA-26	Detection value of PID feedback loss	0.0: Not judging feedback loss 0.1 to 100.0	%	0.0	
PA-27	Detection time of PID feedback loss	0.0 to 20.0	s	1.00	
PA-28	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	N.A.	0	
Group PB: Wobble Frequency, Fixed Length And Count					
PB-00	Wobble setting mode	0: Relative to the central frequency 1: Relative to the max frequency	N.A.	0	
PB-01	Wobble frequency amplitude	0.0 to 100.0	%	0.0	
PB-02	Wobble step	0.0 to 50.0	%	0.0	
PB-03	Wobble cycle	0.1 to 3000.0	s	10.0	
PB-04	Triangular wave rising time coefficient	0.0 to 100.0	%	50.0	
PB-05	Set length	0 to 65535	m	1000	
PB-06	Actual length	0 to 65535	m		
PB-07	Number of pulses per meter	0.1 to 6553.5	N.A.	100.0	
PB-08	Set count value	0 to 65535	N.A.	1000	
PB-09	Designated count value	0 to 65535	N.A.	1000	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
Group PC: Multi-Reference And Simple PLC Function					
PC-00	Reference 0	-100.0 to 100.0	%	0.0	
PC-01	Reference 1	-100.0 to 100.0	%	0.0	
PC-02	Reference 2	-100.0 to 100.0	%	0.0	
PC-03	Reference 3	-100.0 to 100.0	%	0.0	
PC-04	Reference 4	-100.0 to 100.0	%	0.0	
PC-05	Reference 5	-100.0 to 100.0	%	0.0	
PC-06	Reference 6	-100.0 to 100.0	%	0.0	
PC-07	Reference 7	-100.0 to 100.0	%	0.0	
PC-08	Reference 8	-100.0 to 100.0	%	0.0	
PC-09	Reference 9	-100.0 to 100.0	%	0.0	
PC-10	Reference 10	-100.0 to 100.0	%	0.0	
PC-11	Reference 11	-100.0 to 100.0	%	0.0	
PC-12	Reference 12	-100.0 to 100.0	%	0.0	
PC-13	Reference 13	-100.0 to 100.0	%	0.0	
PC-14	Reference 14	-100.0 to 100.0	%	0.0	
PC-15	Reference 15	-100.0 to 100.0	%	0.0	
PC-16	Simple PLC running mode	0 to 2	N.A.	0	
PC-17	Simple PLC retentive selection	00 to 11	N.A.	00	
PC-18	Running time of simple PLC reference 0	0.0 to 6500.0	s or h	0.0	
PC-19	Acceleration/deceleration time of simple PLC reference 0	0 to 3	N.A.	0	
PC-20	Running time of simple PLC reference 1	0.0 to 6500.0	s or h	0.0	
PC-21	Acceleration/deceleration time of simple PLC reference 1	0 to 3	N.A.	0	
PC-22	Running time of simple PLC reference 2	0.0 to 6500.0	s or h	0.0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PC-23	Acceleration/deceleration time of simple PLC reference 2	0 to 3	N.A.	0	
PC-24	Running time of simple PLC reference 3	0.0 to 6500.0	s or h	0.0	
PC-25	Acceleration/deceleration time of simple PLC reference 3	0 to 3	N.A.	0	
PC-26	Running time of simple PLC reference 4	0.0 to 6500.0	s or h	0.0	
PC-27	Acceleration/deceleration time of simple PLC reference 4	0 to 3	N.A.	0	
PC-28	Running time of simple PLC reference 5	0.0 to 6500.0	s or h	0.0	
PC-29	Acceleration/deceleration time of simple PLC reference 5	0 to 3	N.A.	0	
PC-30	Running time of simple PLC reference 6	0.0 to 6500.0	s or h	0.0	
PC-31	Acceleration/deceleration time of simple PLC reference 6	0 to 3	N.A.	0	
PC-32	Running time of simple PLC reference 7	0.0 to 6500.0	s or h	0.0	
PC-33	Acceleration/deceleration time of simple PLC reference 7	0 to 3	N.A.	0	
PC-34	Running time of simple PLC reference 8	0.0 to 6500.0	s or h	0.0	
PC-35	Acceleration/deceleration time of simple PLC reference 8	0 to 3	N.A.	0	
PC-36	Running time of simple PLC reference 9	0.0 to 6500.0	s or h	0.0	
PC-37	Acceleration/deceleration time of simple PLC reference 9	0 to 3	N.A.	0	
PC-38	Running time of simple PLC reference 10	0.0 to 6500.0	s or h	0.0	
PC-39	Acceleration/deceleration time of simple PLC reference 10	0 to 3	N.A.	0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PC-40	Running time of simple PLC reference 11	0.0 to 6500.0	s or h	0.0	
PC-41	Acceleration/deceleration time of simple PLC reference 11	0 to 3	N.A.	0	
PC-42	Running time of simple PLC reference 12	0.0 to 6500.0	s or h	0.0	
PC-43	Acceleration/deceleration time of simple PLC reference 12	0 to 3	N.A.	0	
PC-44	Running time of simple PLC reference 13	0.0 to 6500.0	s or h	0.0	
PC-45	Acceleration/deceleration time of simple PLC reference 13	0 to 3	N.A.	0	
PC-46	Running time of simple PLC reference 14	0.0 to 6500.0	s or h	0.0	
PC-47	Acceleration/deceleration time of simple PLC reference 14	0 to 3	N.A.	0	
PC-48	Running time of simple PLC reference 15	0.0 to 6500.0	s or h	0.0	
PC-49	Acceleration/deceleration time of simple PLC reference 15	0 to 3	N.A.	0	
PC-50	Time unit of simple PLC running	0: s (second); 1: h (hour)	N.A.	0	
PC-51	Reference 0 source	0 to 6	N.A.	0	
Group PD: Communication					
PD-00	Baud rate	0000 to 9999	N.A.	5005	
PD-01	Data format symbol	0 to 3	N.A.	0	
PD-02	Local address	0: Broadcast address; 1 to 247	N.A.	1	
PD-03	Response delay	0 to 20	ms	2	
PD-04	Communication timeout	0.0 (invalid); 0.1 to 60.0	s	0.0	
PD-05	Communication protocol	30, 31	N.A.	31	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PD-06	Current resolution read by communication	0: 0.01 1: 0.1	N.A.	0	
PD-07	Factory reserved	0: Background software invalid 1: Background software valid	A	0	
PD-08	Extension card communication timeout time	0.0: Invalid 0.1 to 60.0	N.A.	0	
Group PE: User-Defined Parameters					
PE-00	User-defined function code 0	P0-00 to PP-xx, A1-00 to Ax-xx, U0-xx to U0-xx	N.A.	P0-01	
PE-01	User-defined function code 1		N.A.	P0-02	
PE-02	User-defined function code 2		N.A.	P0-03	
PE-03	User-defined function code 3		N.A.	P0-07	
PE-04	User-defined function code 4		N.A.	P0-08	
PE-05	User-defined function code 5		N.A.	P0-17	
PE-06	User-defined function code 6		N.A.	P0-18	
PE-07	User-defined function code 7		N.A.	P3-00	
PE-08	User-defined function code 8		N.A.	P3-01	
PE-09	User-defined function code 9		N.A.	P4-00	
PE-10	User-defined function code 10		N.A.	P4-01	
PE-11	User-defined function code 11		N.A.	P4-02	
PE-12	User-defined function code 12		N.A.	P5-02	
PE-13	User-defined function code 13		N.A.	P5-07	
PE-14	User-defined function code 14		N.A.	P6-00	
PE-15	User-defined function code 15		N.A.	P6-10	
PE-16	User-defined function code 16		N.A.	P0-00	
PE-17	User-defined function code 17		N.A.	P0-00	
PE-18	User-defined function code 18		N.A.	P0-00	
PE-19	User-defined function code 19		N.A.	P0-00	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PE-20	User-defined function code 20	P0-00 to PP-xx, A1-00 to Ax-xx, U0-xx to U0-xx	N.A.	P0-01	
PE-21	User-defined function code 21		N.A.	P0-02	
PE-22	User-defined function code 22		N.A.	P0-03	
PE-23	User-defined function code 23		N.A.	P0-07	
PE-24	User-defined function code 24		N.A.	P0-08	
PE-25	User-defined function code 25		N.A.	P0-17	
PE-26	User-defined function code 26		N.A.	P0-18	
PE-27	User-defined function code 27		N.A.	P3-00	
PE-28	User-defined function code 28		N.A.	P3-01	
PE-29	User-defined function code 29		N.A.	P4-00	
PE-30	User-defined function code 30		N.A.	P4-01	
PE-31	User-defined function code 31		N.A.	P4-02	
Group FP: Para. No. Management					
PP-00	User password	0 to 65535	N.A.	0	
PP-01	Parameter initialization	0: No operation 01: Restore factory settings except motor parameters 02: Clear records 04: Restore user backup parameters 501: Back up current user parameters 10: Initialization of power cable payoff parameters 20: Initialization of mechanical movement (vertical, horizontal, arm swing) industry parameters 21: Initialization of inertia industry (fan) parameters 22: Initialization of lathe industry parameters 23: Initialization of quick start/ stop industry (printing machine) parameters	N.A.	0	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PP-02	AC drive parameter display property	00 to 11	N.A.	11	
PP-03	Individualized parameter display property	00 to 11	N.A.	00	
PP-04	Parameter modification property	0: Modifiable 1: Not modifiable	N.A.	0	
Group A0: Torque Control					
A0-00	Speed/Torque control selection	0: Speed control 1: Torque control	N.A.	0	
A0-01	Torque setting source in torque control	0 to 7	N.A.	0	
A0-03	Torque digital setting in torque control	-200.0 to 200.0	%	150.0	
A0-05	Forward max frequency in torque control	0.00 to max frequency (P0-10)	Hz	50.00	
A0-06	Reverse max frequency in torque control	0.00 to max frequency (P0-10)	Hz	50.00	
A0-08	Acceleration time in torque control	0.00 to 650.00	s	0.00	
A0-09	Deceleration time in torque control	0.00 to 650.00	s	0.00	
Group A1: Virtual DI/DO					
A1-00	VDI1 function selection	0 to 59	N.A.	0	
A1-01	VDI2 function selection	0 to 59	N.A.	0	
A1-02	VDI3 function selection	0 to 59	N.A.	0	
A1-03	VDI4 function selection	0 to 59	N.A.	0	
A1-04	VDI5 function selection	0 to 59	N.A.	0	
A1-05	VDI state setting mode	00000 to 11111	N.A.	0	
A1-06	VDI state selection	00000 to 11111	N.A.	00000	
A1-07	Function selection for AI1 used as DI	0 to 59	N.A.	00000	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
A1-08	Function selection for AI2 used as DI	0 to 59	N.A.	0	
A1-09	Function selection for AI3 used as DI	0 to 59	N.A.	0	
A1-10	State selection for AI used as DI	000 to 111	N.A.	000	
A1-11	VDO1 function selection	0 to 41	N.A.	0	
A1-12	VDO2 function selection	0 to 41	N.A.	0	
A1-13	VDO3 function selection	0 to 41	N.A.	0	
A1-14	VDO4 function selection	0 to 41	N.A.	0	
A1-15	VDO5 function selection	0 to 41	N.A.	0	
A1-16	VDO1 output delay	0.0 to 3600.0	s	0.0	
A1-17	VDO2 output delay	0.0 to 3600.0	s	0.0	
A1-18	VDO3 output delay	0.0 to 3600.0	s	0.0	
A1-19	VDO4 output delay	0.0 to 3600.0	s	0.0	
A1-20	VDO5 output delay	0.0 to 3600.0	s	0.0	
A1-21	VDO state selection	00000 to 11111	N.A.	00000	
Group A2: Motor 2 Parameters					
A2-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor	N.A.	0	
A2-01	Rated motor power	0.1 to 30.0	kW	Model dependent	
A2-02	Rated motor voltage	1 to 1000	V	Model dependent	
A2-03	Rated motor current	0.01 to 655.35	A	Model dependent	
A2-04	Rated motor frequency	0.01 to max frequency	Hz	Model dependent	
A2-05	Rated motor speed	1 to 65535	RPM	Model dependent	
A2-06	Stator resistance	0.001 to 65.535 0.0001 to 6.5535	Q	Model dependent	
A2-07	Rotor resistance	0.001 to 65.535	Q	Model dependent	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
A2-08	Leakage inductive reactance	0.01 to 655.35	mH	Model dependent	
A2-09	Mutual inductive reactance	0.1 to 6553.5	mH	Model dependent	
A2-10	No-load current	0.01 to A2-03	A	Model dependent	
A2-37	Auto-tuning selection	0: No auto-tuning 1: Static auto-tuning 1 2: Complete auto-tuning 3: Static auto-tuning 2	N.A.	0	
A2-38	Speed loop proportional gain 1	1 to 100	N.A.	30	
A2-39	Speed loop integral time 1	0.01 to 10.00	s	0.50	
A2-40	Switchover frequency 1	0.00 to A2-43	Hz	5.00	
A2-41	Speed loop proportional gain 2	1 to 100	N.A.	20	
A2-42	Speed loop integral time 2	0.01 to 10.00	s	1.00	
A2-43	Switchover frequency 2	A2-40 to max output frequency	Hz	10.00	
A2-44	Vector control slip gain	50 to 200	%	100	
A2-45	Time constant of speed loop filter	0.000 to 1.000	s	0.050	
A2-46	Vector control over-excitation gain	0 to 200	N.A.	0	
A2-47	Torque upper limit source in speed control mode	0 to 7	N.A.	0	
A2-48	Digital setting of torque upper limit in speed control mode	0.0 to 200.0	%	150.0	
A2-49	Selection of torque upper limit reference setting channel in speed control mode (regenerative)	0 to 8	N.A.	0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
A2-50	Digital setting of torque upper limit in speed control mode (regenerative)	0.0 to 200.0	%	150.0	
A2-51	Excitation adjustment proportional gain	0 to 60000	N.A.	10	
A2-52	Excitation adjustment integral gain	0 to 60000	N.A.	10	
A2-53	Torque adjustment proportional gain	0 to 60000	N.A.	10	
A2-54	Torque adjustment integral gain	0 to 60000	N.A.	10	
A2-55	Speed loop property	00 to 11	N.A.	00	
A2-56	Torque feedforward gain	20 to 100	N.A.	80	
A2-59	Max. torque coefficient in field weakening area	50 to 200	%	80	
A2-60	Regenerative power limit	0.0: Not limited 0.1% to 200.0	%	0.0	
A2-61	Motor 2 control mode	0: Sensorless vector control (SVC) 2: Voltage/Frequency (V/ F) control	N.A.	2	
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	N.A.	0	
A2-63	Motor 2 torque boost	0.0: Fixed torque boost, 0.1 to 30	%	Model dependent	
A2-65	Motor 2 oscillation suppression gain	0 to 100	N.A.	Model dependent	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
Group A5: Control Optimization					
A5-00	DPWM switchover frequency upper limit	0.00 to max output frequency	Hz	Model dependent	
A5-01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	N.A.	0	
A5-02	Dead zone compensation mode selection	0: No compensation 1: Compensation	N.A.	1	
A5-03	Random PWM depth	0 to 10	N.A.	0	
A5-04	Fast current limit	0: Disabled 1: Enabled	N.A.	1	
A5-05	Max output voltage coefficient	100 to 110	%	105	
A5-06	Undervoltage threshold	300.0 to 600.0V	V	350.0	
A5-07	SVC optimization mode selection	0: Not optimized 1: Optimization mode 1 2: Optimization mode 2	N.A.	1	
A5-08	Factory reserved	0.0: Invalid 0.1 to 6.0	kHz	0.1	
A5-09	Overvoltage threshold	200.0 to 900.0	V	820.0	
Group A6: AI Curve Setting					
A6-00	AI curve 4 minimum input	-10.00 to A6-02	V	0.00	
A6-01	Corresponding setting of AI curve 4 minimum input	-100.0 to 100.0	%	0.0	
A6-02	AI curve 4 inflexion 1 input	A6-00 to A6-04	V	3.00	
A6-03	Corresponding setting of AI curve 4 inflexion 1 input	-100.0 to 100.0	%	30.0	
A6-04	AI curve 4 inflexion 1 input	A6-02 to A6-06	V	6.00	

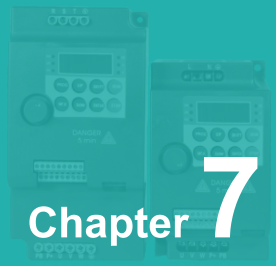
Para. No.	Para. Name	Setting Range	Unit	Default	Commi ssion
A6-05	Corresponding setting of AI curve 4 inflexion 1 input	-100.0 to 100.0	%	60.0	
A6-06	AI curve 4 max input	A6-06 to 10.00	V	10.00	
A6-07	Corresponding setting of AI curve 4 max input	-100.0 to 100.0	%	100.0	
A6-08	AI curve 5 minimum input	-10.00 to A6-10	V	0.00	
A6-09	Corresponding setting of AI curve 5 minimum input	-100.0 to 100.0	%	0.0	
A6-10	AI curve 5 inflexion 1 input	A6-08 to A6-12	V	3.00	
A6-11	Corresponding setting of AI curve 5 inflexion 1 input	-100.0 to 100.0	%	30.0	
A6-12	AI curve 5 inflexion 1 input	A6-10 to A6-14	V	6.00	
A6-13	Corresponding setting of AI curve 5 inflexion 1 input	-100.0 to 100.0	%	60.0	
A6-14	AI curve 5 max input	A6-14 to 10.00	V	10.00	
A6-15	Corresponding setting of AI curve 5 max input	-100.0 to 100.0	%	100.0	
A6-24	Jump point of AI1 input corresponding setting	-100.0 to 100.0	%	0.0	
A6-25	Jump amplitude of AI1 input corresponding setting	0.0 to 100.0	%	0.5	
A6-26	Jump point of AI2 input corresponding setting	-100.0 to +100.0	%	0.0	
A6-27	Jump amplitude of AI2 input corresponding setting	0.0 to 100.0	%	0.5	
A6-28	Jump point of AI3 input corresponding setting	-100.0 to +100.0	%	0.0	
A6-29	Jump amplitude of AI3 input corresponding setting	0.0 to 100.0	%	0.5	

Para. No.	Para. Name	Setting Range	Unit	Default	Commi ssion
Group AC: AI/AO Correction					
AC-00	AI1 measured voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-01	AI1 displayed voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-02	AI1 measured voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-03	AI1 displayed voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-04	AI2 measured voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-05	AI2 displayed voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-06	AI2 measured voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-07	AI2 displayed voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-08	AI3 measured voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-09	Ai3 displayed voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-10	AI3 measured voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-11	AI3 displayed voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-12	AO1 target voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-13	AO1 measured voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-14	AO1 target voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-15	AO1 measured voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-16	AO2 target voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-17	AO2 measured voltage 1	-10.000 to 10.000	V	Factory corrected	
AC-18	AO2 target voltage 2	-10.000 to 10.000	V	Factory corrected	
AC-19	AO2 measured voltage 2	-10.000 to 10.000	V	Factory corrected	

6.2 Monitoring Parameters

Para. No.	Para. Name	Setting Range	Unit	Default	Commi ssion
Group U0: Monitoring					
U0-00	Running frequency	N.A.	Hz	N.A.	
U0-01	Set frequency	N.A.	Hz	N.A.	
U0-02	Bus voltage	N.A.	V	N.A.	
U0-03	Output voltage	N.A.	V	N.A.	
U0-04	Output current	N.A.	A	N.A.	
U0-05	Output power	N.A.	kW	N.A.	
U0-06	Output torque	N.A.	%	N.A.	
U0-07	DI state	N.A.	N.A.	N.A.	
U0-08	DO state	N.A.	N.A.	N.A.	
U0-09	Ai1 voltage	N.A.	V	N.A.	
U0-10	Ai2 voltage	N.A.	V	N.A.	
U0-11	Ai3 voltage	N.A.	V	N.A.	
U0-12	Count value	N.A.	N.A.	N.A.	
U0-13	Length value	N.A.	N.A.	N.A.	
U0-14	Load speed	N.A.	N.A.	N.A.	
U0-15	PID setting	N.A.	N.A.	N.A.	
U0-16	PID feedback	N.A.	N.A.	N.A.	
U0-17	PLC stage	N.A.	N.A.	N.A.	
U0-18	Input pulse frequency	N.A.	kHz	N.A.	
U0-19	Feedback speed	N.A.	Hz	N.A.	
U0-20	Remaining running time	N.A.	Min	N.A.	
U0-21	Ai1 voltage before correction	N.A.	V	N.A.	
U0-22	Ai2 voltage before correction	N.A.	V	N.A.	
U0-23	Ai3 voltage before correction	N.A.	V	N.A.	
U0-24	Linear speed	N.A.	m/Min	N.A.	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
U0-25	Accumulative power-on time	N.A.	Min	N.A.	
U0-26	Accumulative running time	N.A.	Min	N.A.	
U0-27	Pulse input frequency	N.A.	Hz	N.A.	
U0-28	Communication setting value	N.A.	%	N.A.	
U0-29	Reserved	N.A.	N.A.	N.A.	
U0-30	Main frequency X	N.A.	Hz	N.A.	
U0-31	Auxiliary frequency Y	N.A.	Hz	N.A.	
U0-32	Viewing any register address value	N.A.	N.A.	N.A.	
U0-34	Motor temperature	N.A.	°C	N.A.	
U0-35	Target torque	N.A.	%	N.A.	
U0-37	Power factor angle	N.A.		N.A.	
U0-39	Target voltage for V/F separation	N.A.	V	N.A.	
U0-40	Output voltage for V/F separation	N.A.	V	N.A.	
U0-41	DI state visual display	N.A.	N.A.	N.A.	
U0-42	DO state visual display	N.A.	N.A.	N.A.	
U0-43	DI function state visual display 1	N.A.	N.A.	N.A.	
U0-44	DI function state visual display 2	N.A.	N.A.	N.A.	
U0-61	AC drive state	N.A.	N.A.	N.A.	
Group U3: Extension Card Communication Control					
U3-00 to U3-15	Reserved	N.A.	N.A.	N.A.	
U3-16	Frequency setting	N.A.	Hz	N.A.	
U3-17	Control command	N.A.	N.A.	N.A.	
U3-18	DO control	N.A.	N.A.	N.A.	
U3-19	Ao1 control	N.A.	N.A.	N.A.	
U3-20	Ao2 control	N.A.	N.A.	N.A.	
U3-21	FMP control	N.A.	N.A.	N.A.	
U3-22	Reserved	N.A.	N.A.	N.A.	
U3-23	Motor speed control	N.A.	RPM	N.A.	



Chapter 7

Detailed function description

Group P0:Standard Parameters

Function code	Name	Description (setting range)	Factory Default	Change
P0-01	1st motor control method	0~2	2	★

0: Open loop vector control

Refers to open-loop vector control, which is suitable for general high-performance control occasions. One inverter can only drive one motor.

1: Closed-loop vector control

Refers to closed-loop vector control, an encoder must be installed at the motor end, and the inverter must be equipped with a PG card of the same type as the encoder. It is suitable for high-precision speed control or torque control.

2: V/F control

It is suitable for occasions where the load requirements are not high, or where one inverter drives multiple motors, such as fans and pumps. Prompt: The motor parameter identification process must be carried out when the vector control mode is selected. Only accurate motor parameters can take advantage of the vector control mode. Better performance can be obtained by adjusting the function code of the speed regulator parameter P2 group.

Function code	Name	Description (setting range)	Factory Default	Change
P0-02	Run command selection	0~2	3	☆

Select the input channel of the inverter running command.

0: The running command is controlled by the RUN, STOP/RES keys on the keyboard.

1: The running command is controlled by the multi-function input terminals FWD, REV, JOGF, JOGR, etc.

2: The running command is given by the upper computer through communication. When this option is selected, a communication card (ModbusRTU, CANopen card, etc.) must be selected.

Function code	Name	Description (setting range)	Factory Default	Change
P0-03	Master FREQ set	1~2	4	★

0: Keyboard digital setting (no memory when power off)

The initial value of the set frequency is the value of P0-08. The set frequency value of the inverter can be changed through the ▲ and ▼ keys of the keyboard (or the UP and DOWN of the multi-function input terminal).

When the inverter is powered off and powered on again, the set frequency value returns to the value of P0-08.

1: Keyboard digital setting (power-down memory)

The initial value of the set frequency is the value of P0-08. The set frequency value of the inverter can be changed through the keys ▲ and ▼ on the keyboard (or UP and DOWN of the multi-function input terminal).

When the inverter is powered off and powered on again, the set frequency is the set frequency at the time of the last power off, and the correction value of the ▲ and ▼ keys on the keyboard or the terminals UP and DOWN is memorized.

It should be reminded that P0-23 is "digital setting frequency stop memory selection", P0-23 is used to select whether the frequency correction amount is memorized or cleared when the inverter stops. P0-23 is related to shutdown, not to power-off memory, so pay attention in application.

2: AI1

3: AI2

It means that the frequency is determined by the analog input terminal. The control board provides 2 analog input terminals (AI1, AI2).

in:

AI1 is 0V~10V voltage input;

AI2 can be 0V~10V voltage input, or 4mA~20mA current input, which is selected by the J8 jumper on the control board;

The user can freely choose the corresponding relationship between the input voltage value of AI1 and AI2 and the target frequency. The inverter provides 5 sets of corresponding relationship curves, of which 3 sets of curves are straight-line relationships (2-point correspondence), and 2 sets of curves are arbitrary curves with 4-point correspondences, which can be set by the user through the P4 and A6 function codes.

Function code P4-33 is used to set the two analog inputs of AI1~AI2, and select which of the 5 sets of curves respectively. For the specific corresponding relationship of the 5 curves, please refer to the description of the function codes of the P4 and A6 groups.

5: Pulse given (DI5)

The frequency given is given by the terminal pulse. Pulse given signal specifications: voltage range 9V ~ 30V, frequency range 0kHz ~ 100kHz. Pulse given can only be input from multi-function input terminal DI5. The relationship between the input pulse frequency of the DI5 terminal and the corresponding setting is set through P4-28~P4-31. The corresponding relationship is a straight line corresponding relationship between 2 points. The 100.0% set corresponding to the pulse input refers to the relative maximum frequency P0 -10 percent.

6: Multi-segment instruction

When selecting multi-segment command operation mode, it is necessary to input different state combinations of DI terminals through digital input to correspond to different set frequency values. The inverter can set 4 multi-segment command terminals, 16 states of the 4 terminals, which can correspond to any 16 "multi-segment commands" through the PC group function code, and the "multi-segment command" is the percentage relative to the maximum frequency P0-10.

When the digital input DI terminal is used as the multi-segment command terminal function, it needs to be set in the P4 group. For details, please refer to the related function parameter description of the P4 group.

7: The program runs

When the frequency is set to program running, the running frequency of the inverter can be switched between 1 to 16 arbitrary frequency commands, and the holding time and the respective acceleration and deceleration time of 1 to 16 frequency commands can also be set by the user. For details, please refer to the relevant description of the PC group.

8: PID

Select the output of the process PID control as the operating frequency.

9: Communication given

It means that the main channel of frequency setting is given by the host computer through communication.

Function code	Name	Description (setting range)	Factory Default	Change
P0-04	Auxiliary frequency source input selection	Same as P0-03	0	★

When the frequency of the auxiliary channel is used as an independent frequency reference channel (that is, the frequency setting is selected as X to Y switching), its usage is the same as that of the frequency setting main channel X. For the usage method, please refer to the relevant instructions of P0-03.

When the frequency of the auxiliary channel is used for superposition (that is, the frequency setting is selected as X+Y, X to X+Y switching or Y to X+Y switching), it is necessary to pay attention to:

1. When the auxiliary channel is digital given:

P0-08 does not work, the frequency adjustment performed by the user through the ▲ and ▼ keys of the keyboard (or the UP and DOWN of the multi-function input terminal) is directly adjusted on the basis of the main given frequency.

2. When the auxiliary channel is given by analog input (AI1,AI2) or given by pulse input:

The input given 100% corresponds to the auxiliary frequency setting range, which can be set through P0-05 and P0-06.

3. When the auxiliary channel is pulse input given:

Similar to analog given.

Function code	Name	Description (setting range)	Factory Default	Change
P0-05	Auxiliary frequency command range selection	0~1	1	☆
P0-06	Frequency auxiliary given coefficient	0%~150%	100%	☆

When the combination mode of the main and auxiliary channels is selected as "main and auxiliary operation" (that is, P0-07 is set to 1, 3 or 4), these two parameters are used to determine the adjustment range of the auxiliary channels.

P0-05 is used to determine the object corresponding to the auxiliary channel range. It can be selected relative to the maximum frequency or relative to the main channel X. If it is selected to be relative to the main channel, the range of the auxiliary channel will change with the frequency of the main channel. and change.

Function code	Name	Description (setting range)	Factory Default	Change
P0-07	Main and auxiliary frequency superposition selection	Ones place: 0~4 Tens place: 0~3	0	☆

Use this parameter to select the frequency given channel. Frequency setting is realized by the combination of frequency setting main channel X and auxiliary frequency setting Y. Ones place: Frequency setting selection:

0: Main channel X

Main channel X as the target frequency.

1: Main and auxiliary operation results

The main and auxiliary operation results are used as the target frequency, and the relationship between the main and auxiliary operations is shown in the "tens" description of this function code.

2: Switch between main channel X and auxiliary channel Y

When the multi-function input terminal function 18 (frequency switching) is invalid, the main channel X is used as the target frequency.

When the multi-function input terminal function 18 (frequency setting switching) is valid, the auxiliary channel Y is used as the target frequency.

3: Switch between the main channel X and the main and auxiliary operation results

When the multi-function input terminal function 18 (frequency switching) is invalid, the main channel X is used as the target frequency.

When the multi-function input terminal function 18 (frequency switching) is valid, the main and auxiliary operation results are used as the target frequency.

4: Switch between auxiliary channel Y and main and auxiliary operation results

When the multi-function input terminal function 18 (frequency switching) is invalid, the auxiliary channel Y is used as the target frequency.

When the multi-function input terminal function 18 (frequency switching) is valid, the main and auxiliary operation results are used as the target frequency. Tens place: Frequency setting main and auxiliary operation relationship:

0: main channel X + auxiliary channel Y

The sum of the main channel X and the auxiliary channel Y is used as the target frequency. Realize the frequency superposition given function.

1: main channel X-auxiliary channel Y

The difference between the main channel X and the auxiliary channel Y is used as the target frequency.

2: MAX (main channel X, auxiliary channel Y)

Take the largest absolute value of the main channel X and the auxiliary channel Y as the target frequency.

3: MIN (main channel X, auxiliary channel Y)

Take the smallest absolute value of the main channel X and the auxiliary channel Y as the target frequency.

In addition, when the frequency setting is selected as the main and auxiliary operation, the offset frequency can be set through P0-21, and the offset frequency is superimposed on the main and auxiliary operation results to flexibly respond to various needs.

Function code	Name	Description (setting range)	Factory Default	Change
P0-08	Digital frequency setting	0.00Hz ~ Maximum frequency (A0-10)	50.00Hz	☆

When the frequency setting is selected as "digital setting" or "terminal UP/DOWN", the function code value is the frequency digital setting initial value of the inverter.

Function code	Name	Description (setting range)	Factory Default	Change
P0-09	Run direction	0~1	0	☆

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

Function code	Name	Description (setting range)	Factory Default	Change
P0-10	Maximum FREQ	Upper limit FREQ ~500.00Hz	50.00Hz	★

When the analog input is used as the frequency setting, the respective 100.0% are scaled relative to P0-10.

The maximum output frequency can reach 3200Hz. In order to take into account the two indicators of frequency command resolution and frequency input range, the number of decimal points of frequency command can be selected through P0-22.

When P0-22 is selected as 1, the frequency resolution is 0.1Hz, and the setting range of P0-10 is 50.0Hz ~ 3200.0Hz;

When P0-22 is selected as 2, the frequency resolution is 0.01Hz, and the setting range of P0-10 is 50.00Hz ~ 500.00Hz.

Function code	Name	Description (setting range)	Factory Default	Change
P0-11	Upper limit frequency command selection	0 ~5	0	★

Defines the upper limit frequency setting. The upper limit frequency can come from the digital setting (P0-12) or from the analog input channel. When using the analog input to set the upper limit frequency, 100% of the analog input setting corresponds to P0-12.

Function code	Name	Description (setting range)	Factory Default	Change
P0-12	Upper limit FREQ	Lower limit frequency A0-14~Maximum frequency A0-10	50.00Hz	☆
P0-13	Upper limit frequency offset	0.00Hz~Maximum frequency A0-10	0.00Hz	☆

Defines the upper limit frequency setting. The upper limit frequency can come from the digital setting (P0-12) or from the analog input channel. When using the analog input to set the upper limit frequency, 100% of the analog input setting corresponds to P0-12.

Function code	Name	Description (setting range)	Factory Default	Change
P0-14	Lower limit FREQ	0.00Hz~upper limit FREQ	0.00Hz	☆

When the frequency command is lower than the lower limit frequency set by P0-14, the inverter can stop, run at the lower limit frequency or run at zero speed, which operating mode can be selected by P8-14 (the set frequency is lower than the lower limit frequency operation mode) set up.

Function code	Name	Description (setting range)	Factory Default	Change
P0-15	Switching FREQ	0.5kHz~16.0kHz, factory default	Model dependent	☆

This function adjusts the carrier frequency of the inverter. By adjusting the carrier frequency, the motor noise can be reduced, the resonance point of the mechanical system can be -the line-to-ground leakage current can be reduced, and the interference generated by the inverter can be reduced.

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

When the carrier frequency is high, the motor loss decreases and the motor temperature rise decreases, but the inverter loss increases, the inverter temperature rise increases, and the interference increases.

Function code	Name	Description (setting range)	Factory Default	Change
P0-16	The carrier frequency is adjusted with the size of the load	0~1	1	☆

The carrier frequency is adjusted with the temperature, which means that when the inverter detects that the temperature of its own radiator is high, it automatically reduces the carrier frequency to reduce the temperature rise of the inverter. When the radiator temperature is low, the carrier frequency gradually recovers to the set value. This function can reduce the chance of inverter overheating alarm.

Function code	Name	Description (setting range)	Factory Default	Change
P0-17	Accel time 1	0.0~65000	Model dependent	☆
P0-18	Decel time 1	0.0~65000	Model dependent	☆

Acceleration time refers to the time required for the inverter to accelerate from zero frequency to the reference frequency of acceleration and deceleration (determined by P0-25), as shown in the set acceleration time in Figure 6-1.

Deceleration time refers to the time required for the inverter to decelerate from the reference frequency of acceleration and deceleration (determined by P0-25) to zero frequency, as shown in the set deceleration time in Figure 6-1.

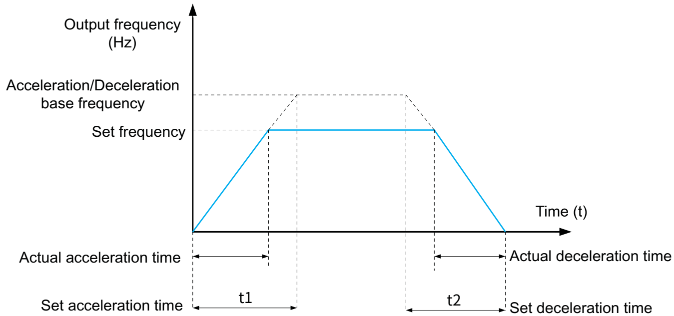


Fig.6-1 Schematic diagram of acceleration and deceleration time

Function code	Name	Description (setting range)	Factory Default	Change
P0-19	Accel/Decel time resolution	0~2	1	★

In order to meet the needs of various fields, the product provides 3 acceleration and deceleration time units, namely 1 second, 0.1 second and 0.01 second.

Note:

When modifying this function parameter, the number of decimal points displayed by the 4 groups of acceleration and deceleration time will change, and the corresponding acceleration and deceleration time will also change. Special attention should be paid during the application process.

Function code	Name	Description (setting range)	Factory Default	Change
P0-21	Auxiliary frequency command offset frequency when superimposed	0.00Hz~Maximum frequency A0-10	0.00Hz	☆

This function code is only valid when the frequency setting is selected as main and auxiliary operation.

When the frequency is set as the main and auxiliary operation, P0-21 is used as the bias frequency, and superimposed with the main and auxiliary operation results as the final frequency setting value, so that the frequency setting can be more flexible.

Function code	Name	Description (setting range)	Factory Default	Change
P0-23	Digital setting frequency stop memory selection	0~1	0	☆

This function is valid only when the frequency is set to digital.

"No memory" means that after the inverter stops, the digital set frequency value returns to the value of P0-08 (keyboard digital set frequency), and the frequency correction performed by the ▲ and ▼ keys on the keyboard or the terminals UP and DOWN is cleared.

"Memory" means that after the inverter is stopped, the digital set frequency remains the set frequency at the last stop time, and the frequency correction performed by the ▲ and ▼ keys on the keyboard or the terminals UP and DOWN remains valid.

Function code	Name	Description (setting range)	Factory Default	Change
P0-25	Acceleration and deceleration time reference frequency	0~1	0	★

The acceleration/deceleration time refers to the acceleration/deceleration time from zero frequency to the frequency set by P0-25. Figure 7-1 is a schematic diagram of the acceleration/deceleration time.

When P0-25 is selected as 1, the acceleration and deceleration time is related to the set frequency. If the set frequency changes frequently, the acceleration of the motor will change, so attention should be paid to the application.

Function code	Name	Description (setting range)	Factory Default	Change
P0-26	Frequency command UP/DOWN reference during operation	0~1	0	★

This parameter is only valid when the frequency is set to digital.

It is used to determine which method to use to correct the set frequency when the ▲ and ▼ keys of the keyboard or the terminal UP/DOWN act, that is, whether the target frequency increases or decreases on the basis of the running frequency, or increases or decreases on the basis of the set frequency.

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

Function code	Name	Description (setting range)	Factory Default	Change
P0-27	Running command bundled main frequency command selection	0~9	0	☆

Three running command channels are defined to take precedence over nine frequency given channels to facilitate synchronous switching.

The meaning of the above frequency given channel is the same as the frequency setting main channel X selection P0-03, please refer to the description of P0-03 function code. Different running command channels can give priority to the same frequency given channel. When the running command has a priority frequency setting, the frequency setting set by P0-03~P0-07 will no longer work during the valid period of the running command.

Group P1: Motor 1 Parameters

Function code	Name	Description (setting range)	Factory Default	Change
P1-00	Type of motor	0~1	0	★
P1-01	Power rating of motor	0.4kW~630kW	Model dependent	★
P1-02	Motor rated voltage	1V~1000V	Model dependent	★
P1-03	Motor rated current	0.01A~6553.5A	Model dependent	★
P1-04	Motor rated frequency	0.01Hz~upper limit frequency	Model dependent	★
P1-05	Rated speed of motor	1~65535r/min	Model dependent	★

The above function codes are the parameters of the motor nameplate, and the relevant parameters need to be set accurately according to the motor nameplate.

In order to obtain better vector control performance, self-learning of motor parameters is required, and the accuracy of adjustment results is closely related to the correct setting of motor nameplate parameters.

Function code	Name	Description (setting range)	Factory Default	Change
P1-06	Motor stator resistance	0.001Ω~65.535Ω (Inverter power ≤ 55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Self-learning parameters	★
P1-07	Motor rotor resistance	0.001Ω~65.535Ω (Inverter power ≤ 55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Self-learning parameters	★
P1-08	Motor leakage inductance	0.01mH~655.35mH (Inverter power ≤ 55kW) 0.001mH~65.535mH (Inverter power >55kW)	Self-learning parameters	★
P1-09	Motor mutual inductance	0.01mH~655.35mH (Inverter power ≤ 55kW) 0.001mH~65.535mH (Inverter power >55kW)	Self-learning parameters	☆

Function code	Name	Description (setting range)	Factory Default	Change
P1-10	Motor no-load current	0.01A~P1-03 (Inverter power ≤ 55kW) 0.1A~P1-03 (Inverter power >55kW)	Self-learning parameters	☆

P1-06~P1-10 are the parameters of the asynchronous motor, these parameters are generally not on the motor nameplate, and need to be obtained through the automatic self-learning of the inverter. Among them, "asynchronous motor static self-learning" can only obtain three parameters of P1-06~P1-08, and "asynchronous motor comprehensive self-learning" can obtain all the five parameters here, but also can obtain the encoder phase sequence, current Ring PI parameters, etc.

When changing the rated power of the motor (P1-01) or the rated voltage of the motor (P1-02), the inverter will automatically modify the parameter values of P1-06 to P1-10, and restore these five parameters to the commonly used standard Y series motor parameters.

If the induction motor cannot be self-learned on site, the above corresponding function codes can be input according to the parameters provided by the motor manufacturer.

Function code	Name	Description (setting range)	Factory Default	Change
P1-37	Tuning selection	0~3	0	★

0: No operation, that is, self-learning is prohibited.
1: The asynchronous machine is still self-learning.

It is suitable for occasions where the asynchronous motor and the load are not easy to be disconnected, and comprehensive self-learning cannot be performed. Before the asynchronous motor static self-learning, the motor type and the motor nameplate parameters P1-00~P1-05 must be set correctly. The asynchronous machine is static and self-learning, and the inverter can obtain three parameters from P1-06 to P1-08.

Action description: Set the function code to 1, then press the RUN key, the inverter will perform static self-learning.

2: The asynchronous machine is fully self-learning

In order to ensure the dynamic control performance of the inverter, please choose comprehensive self-learning. At this time, the motor must be disconnected from the load to keep the motor in a no-load state. During the comprehensive self-learning process, the inverter first performs static self-learning, and then accelerates to 80% of the rated frequency of the motor according to the acceleration time P0-17. After maintaining for a period of time, it decelerates and stops according to the deceleration time P0-18 and ends the self-learning.

During the no-load self-learning process, the inverter first completes the on-load self-learning, and then accelerates to P0-08 according to the acceleration time P0-17. After holding for a period of time, it decelerates to stop according to the deceleration time P0-18 and ends the self-learning. Note that P0-08 must be set to a value other than 0, otherwise the identification cannot be performed normally.

Note: Self-learning can only be performed in keyboard operation mode, not in terminal operation and communication operation mode Motor self-learning.

Group P2: Vector Control

Group P2 function codes are only valid for vector control.

Function code	Name	Description (setting range)	Factory Default	Change
P2-00	Speed loop low speed proportional gain	1~100	30	☆
P2-01	Speed loop low speed integration time	0.01s~10.00s	0.50s	☆
P2-02	Speed loop low-speed switching frequency	0.00~P2-05	5.00Hz	☆
P2-03	Speed loop high speed proportional gain	1~100	20	☆
P2-04	Speed loop high-speed integration time	0.01s~10.00s	1.00s	☆
P2-05	Speed loop high-speed switching frequency	P2-02~Maximum frequency	10.00Hz	☆

When the inverter runs at different frequencies, different speed loop PI parameters can be selected. When the running frequency is less than the switching frequency 1 (P2-02), the speed loop PI adjustment parameters are P2-00 and P2-01. When the running frequency is greater than the switching frequency 2, the speed-to-PI adjustment parameters are P2-03 and P3-04. The speed loop PI parameters between switching frequency 1 and switching frequency 2 are linearly switched between two sets of PI parameters, as shown in Figure 7-2:

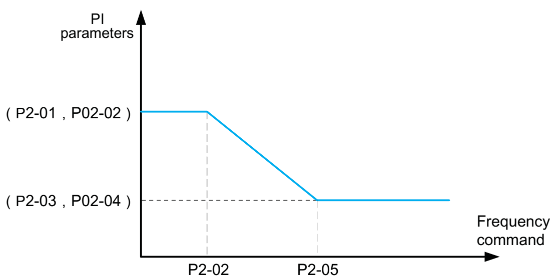


Fig.6-2 Schematic diagram of PI parameters

By setting the proportional coefficient and integral time of the speed regulator, the speed dynamic response characteristics of the vector control can be adjusted.

Increasing the proportional gain and reducing the integral time can speed up the dynamic -of the speed loop. However, if the proportional gain is too large or the integral time is too small, the system may oscillate. The suggested adjustment method is:

If the factory parameters can not meet the requirements, fine-tune on the basis of the factory default parameters, first increase the proportional gain to ensure that the system does not oscillate; then reduce the integral time, so that the system has faster response characteristics and less overshoot.

Note: If the PI parameter is not set properly, it may cause the speed overshoot to be too large. Even an overvoltage fault occurs when the overshoot falls back.

Function code	Name	Description (setting range)	Factory Default	Change
P2-06	Vector control slip gain	50%~200%	100%	☆

For open-loop vector control, this parameter is used to adjust the speed stabilization accuracy of the motor: when the motor is loaded with a low speed, increase this parameter, and vice versa.

For closed-loop vector control, this parameter can adjust the output current of the inverter under the same load.

Function code	Name	Description (setting range)	Factory Default	Change
P2-07	SVC speed feedback filter time	0.000s~0.100s	0.015s	☆

In the vector control mode, the output of the speed loop regulator is the torque current command, and this parameter is used to filter the torque command.

This parameter generally does not need to be adjusted. When the speed fluctuation is large, the filter time can be appropriately increased; if the motor oscillates, this parameter should be appropriately reduced.

The filter time constant of the speed loop is small, and the output torque of the inverter may fluctuate greatly, but the speed response is fast.

Function code	Name	Description (setting range)	Factory Default	Change
P2-09	Torque upper limit command selection in speed control mode	0~7	0	☆

Function code	Name	Description (setting range)	Factory Default	Change
P2-10	Digital setting of torque upper limit in speed control mode	0.0%~200.0%	140%	☆

In the speed control mode, the maximum output torque of the inverter is controlled by the torque upper limit setting.

P2-09 is used to select the setting of the upper limit of torque. When it is set by analog quantity, PULSE pulse and communication, the corresponding 100% of the setting corresponds to P2-10, and the 100% of P2-10 is the rated torque of the inverter . E7 High Precision Closed-loop Vector Inverter Chapter 7 Function Details

For the settings of AI1, AI2, and AI3, see the introduction to the AI curve of group P4 (select the respective curve through P4-33)

For PULSE pulse, see the introduction of P4-28~P4-32

When the communication setting is selected, if the current slave is a point-to-point communication slave and the received data is used as the torque reference, the torque digital setting will be sent directly by the host, see the introduction of point-to-point communication in Group A8. Otherwise, the data of -100.00% to 100.00% is written by the host computer through the communication address 0x1000, of which 100.00% corresponds to P2-10. Support MODBUS, CANopen.

Function code	Name	Description (setting range)	Factory Default	Change
P2-13	Excitation adjustment proportional gain	0~60000	2000	☆
P2-14	Excitation adjustment integral gain	0~60000	1300	☆

The vector control current loop PI adjustment parameter, this parameter will be automatically obtained after the asynchronous machine is fully self-learning, and generally does not need to be modified.

It should be reminded that the integral regulator of the current loop does not use the integral time as the dimension, but directly sets the integral gain. If the current loop PI gain is set too large, it may cause the entire control loop to oscillate. Therefore, when the current oscillation or torque fluctuation is large, the PI proportional gain or integral gain here can be manually reduced.

Group P3: V/F Control

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

V/F control is suitable for general-purpose loads such as fans and pumps, or one inverter with multiple motors, or applications where the power of the inverter and the motor are quite different.

Function code	Name	Description (setting range)	Factory Default	Change
P3-00	V/f curve setting	0~11	0	★

0: Linear V/F.

Suitable for ordinary constant torque loads.

1: Multi-point V/F.

Suitable for special loads such as dehydrators and centrifuges. At this time, by setting the parameters P3-03~P3-08, any V/F relationship curve can be obtained.

2: Square V/F.

Suitable for centrifugal loads such as fans and pumps.

3 to 8:

A V/F relationship between straight V/F and squared V/F.

10: V/F fully separated mode.

At this time, the output frequency and output voltage of the inverter are independent of each other, the output frequency is determined by the frequency setting, and the output voltage is determined by P3-13 (V/F separation voltage setting). V/F complete separation mode, generally used in induction heating, inverter power supply, torque motor control and other occasions.

11: V/F half separation mode.

In this case, V and F are proportional, but the proportional relationship can be set by voltage setting P3-13, and the relationship between V and F is also related to the rated voltage and rated frequency of the motor in group P1. Assuming that the voltage setting input is X (X is a value of 0~100%), the relationship between the output voltage V of the inverter and the frequency F is:

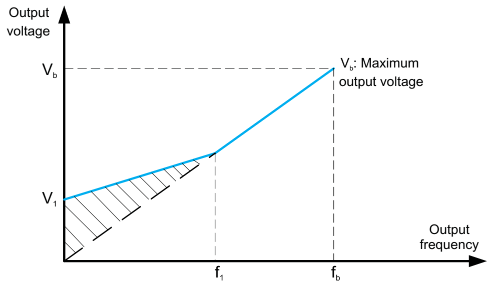
V/F=2×X×(motor rated voltage)/(motor rated frequency)

Function code	Name	Description (setting range)	Factory Default	Change
P3-01	Torque boost	0.0%: (without torque boost) 0.1%~30.0%	Model dependent	☆
P3-02	Torque boost cut-off frequency	0.00Hz~Maximum frequency	50.00Hz	★

In order to compensate the low frequency torque characteristic of V/F control, some boost compensation is made to the output voltage of the inverter at low frequency. However, if the torque boost setting is too large, the motor is easily overheated, and the inverter is prone to overcurrent.

When the load is heavy and the motor starting torque is not enough, it is recommended to increase this parameter. Torque boost can be reduced at light loads. When the torque boost is set to 0.0, the inverter is automatic torque boost. At this time, the inverter automatically calculates the required torque boost value according to the motor stator resistance and other parameters.

Torque boost torque cut-off frequency: Below this frequency, the torque boost torque is valid, and if it exceeds this set frequency, the torque boost becomes invalid. See Figure 6-3 for details.



V_1: Manual torque boost voltage
V_b: Maximum output voltage
f_1: Cutoff frequency of manual torque boost
f_b: Rated running frequency

Fig.6-3 Manual torque boost

Function code	Name	Description (setting range)	Factory Default	Change
P3-03	Multipoint V/F Frequency Point 1	0.00Hz~P3-05	0.00Hz	★
P3-04	Multipoint V/F Voltage Point 1	0.0%~100.0%	0.0%	★

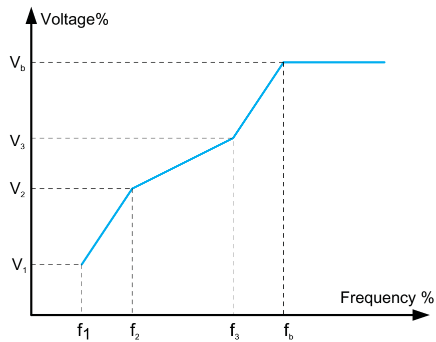
Function code	Name	Description (setting range)	Factory Default	Change
P3-05	Multipoint V/F Frequency Point 2	P3-03~P3-07	0.00Hz	★
P3-06	Multipoint V/F Voltage Point 2	0.0%~100.0%	0.0%	★

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:

$$V1<V2<V3\text{ , }P1<P2<P3$$

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.



V_1-V_3: The percentage of the voltage of the 1st-3rd stage of the multi-speed V/F

f_1-f_3: Frequency percentage of 1st-3rd stage of multi-speed V/F

V_b: Rated motor voltage

f_b: Rated motor running frequency

Fig.6-4 V/F curve setting diagram

Function code	Name	Description (setting range)	Factory Default	Change
P3-11	V/F oscillation suppression factor	0~100	40	☆

The selection method of this gain is to take it as small as possible on the premise of effectively suppressing oscillation, so as to avoid adverse effects on the V/F operation. Please select this gain as 0 when the motor has no oscillation phenomenon. Only when the motor oscillates significantly, it is necessary to increase the gain appropriately. The larger the gain, the more obvious the suppression of oscillation.

When using the oscillation suppression function, the rated current and no-load current parameters of the motor are required to be accurate, otherwise the V/F oscillation suppression effect will not be good.

Function code	Name	Description (setting range)	Factory Default	Change
P3-13	V/F separated voltage source	0~8	0	☆

V/F separation is generally used in induction heating, inverter power supply and torque motor control and other occasions.

When V/F separation control is selected, the output voltage can be set by function code P3-14, or it can be given by analog quantity, multi-segment command, PLC, PID or communication. When non-digital setting is used, 100% of each setting corresponds to the rated voltage of the motor. When the percentage of analog output setting is a negative number, the absolute value of the setting is used as the effective setting value.

0: Digital setting (P3-14)

The voltage is set directly by P3-14.

1: AI1

2: AI2

The voltage is determined by the analog input terminals.

4. PULSE pulse setting (DI5)

The voltage given is given by the terminal pulse. Pulse given signal specifications: voltage range 9V ~ 30V, frequency range 0kHz ~ 100kHz.

5. Multi-segment instructions

When the voltage is set as a multi-segment command, the parameters of the P4 group and the PC group should be set to determine the corresponding relationship between the given signal and the given voltage.

6. Program running

When the voltage is set to run the program, it is necessary to set the PC group parameters to determine the given output voltage.

7. PID

The output voltage is generated according to the PID closed loop. For details, see the introduction of PA group PID.

8. Communication given

Refers to the voltage given by the host computer through communication. When the above voltage setting is selected from 1 to 8, 0 to 100% corresponds to the output voltage from 0V to the rated voltage of the motor.

Function code	Name	Description (setting range)	Factory Default	Change
P3-14	Voltage digital setting for V/F separation	0V~motor rated voltage	0V	☆
P3-15	Voltage acceleration time for V/F separation	0.0s~1000.0s	0.0s	☆

The rise time of V/F separation refers to the time required for the output voltage to change from 0V to the rated voltage of the motor. As shown in Figure 6-5:

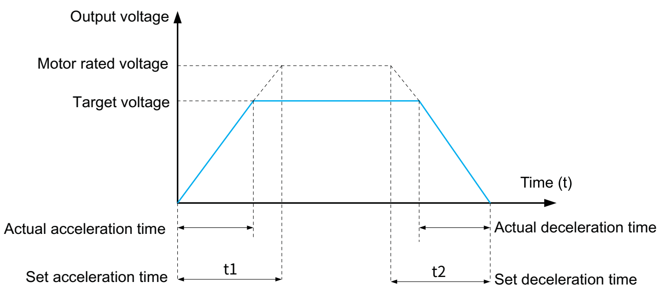


Fig.6-5 V/F Separation Schematic

Group P4: Input Terminals

The KD600s inverter comes standard with 5 multi-function digital input terminals (where DI5 can be used as a high-speed pulse input terminal), 2 analog input terminals, and DI6~DI10 are the terminals on the expansion board.

Function code	Name	Description (setting range)	Factory Default	Change
P4-00	Function of terminal DI1	0~49	0	★
P4-01	Function of terminal DI2		4	★
P4-02	Function of terminal DI3		9	★
P4-03	Function of terminal DI4		12	★
P4-04	Function of terminal DI5		13	★
P4-05	Function of terminal DI6		0	★

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

Value	Function	Description
0	No function	Unused terminals can be set to "No function" to prevent malfunction.
1	Forward RUN (FWD)	Control the forward and reverse rotation of the inverter through external terminals.
2	Reverse RUN (REV)	
3	3-wire operation control	Through this terminal, it is determined that the operating mode of the inverter is the three-wire control mode. For details, please refer to the description of function code P4-11 ("terminal command mode").
4	Forward jog	FJOG is jogging forward running, RJOG is jogging reverse running. For the jog running frequency and jog acceleration/deceleration time, please refer to the description of function codes P8-00, P8-01 and P8-02.
5	Reverse jog	
6	Terminal UP	When the frequency is given by the external terminal, it is used to modify the increment and decrement commands of the frequency. When the frequency setting is set to digital setting, the set frequency can be adjusted up and down.
7	Terminal DOWN	

Value	Function	Description
8	Free parking	The inverter blocks the output, and the motor's stopping process is not controlled by the inverter at this time. This method has the same meaning as the free parking described in P6-10.
9	Fault reset (RESET)	Use the terminal to perform fault reset function. Same function as the RESET key on the keyboard. With this function, remote fault reset can be realized.
10	Run pause	The inverter decelerates to stop, but all running parameters are memorized. Such as PLC parameters, swing frequency parameters, PID parameters. After the terminal signal disappears, the inverter returns to the running state before stopping.
11	External fault normally open input	When the signal is sent to the inverter, the inverter will report fault EF, and handle the fault according to the fault protection action mode (see function code P9-47 for details).
12	Multi-speed terminal 1	Through the 16 states of these four terminals, the setting of 16 speeds or 16 other commands can be realized.
13	Multi-speed terminal 2	
14	Multi-speed terminal 3	
15	Multi-speed terminal 4	
16	Acc/ Dec time selection 1	Through the 4 states of the two terminals, 4 kinds of acceleration and deceleration time selections can be realized. For details, see Appendix 2.
17	Acc/ Dec time selection 2	
18	Frequency source switchover	Used to switch between different frequency settings. According to the setting of the frequency setting selection function code (P0-07), when switching between two frequency settings is set as the frequency setting, this terminal is used to switch between the two frequency settings.
19	UP/DOWN setting clear (terminal, keyboard)	When the frequency given is digital frequency given, this terminal can clear the frequency value changed by terminal UP/DOWN or keyboard UP/DOWN, so that the given frequency can be restored to the value set by P0-08.

Function code	Name	Description (setting range)	Factory Default	Change
P4-10	DI filter time	0.000s~1.000s	0.010s	☆

Set the software filter time of DI terminal status. If the input terminal is susceptible to interference and causes malfunction, this parameter can be increased to enhance the anti-interference ability. However, increasing the filter time will cause the response of the DI terminal to become slower.

Function code	Name	Description (setting range)	Factory Default	Change
P4-11	Terminal command method	0~3	0	★

This parameter defines four different ways to control the operation of the inverter through external terminals.

0: Two-wire mode 1

This mode is the most commonly used two-wire mode. The forward and reverse running of the motor are determined by the terminals DIx and DIy. The terminal function settings are as follows:

K1	K2	RUN command
0	0	STOP
1	0	Forward RUN
0	1	Reverse RUN
1	1	STOP

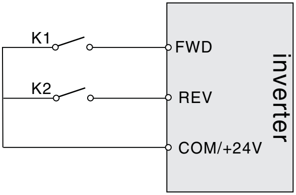


Fig.6-6 Two-wire operation mode 1

1: Two-wire operation mode 2

In this mode, FWD is the enable terminal. The direction is determined by the state of REV.

K1	K2	RUN command
0	0	STOP
0	1	STOP
1	0	Forward RUN
1	1	Reverse RUN

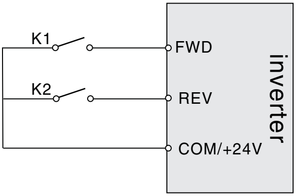


Fig.6-7 Two-wire operation mode 2

2: Three-wire operation mode 1

Din is the enable terminal in this mode, and the directions are controlled by FWD and REV respectively. But the pulse is valid, it must be done by disconnecting the Din terminal signal when stopping.

SB1: Stop button

SB2: Forward button

SB3: Invert button

Din is the multi-function input terminal of DI1~HDI, at this time, its corresponding terminal function should be defined as the No. 3 function "three-wire operation control".

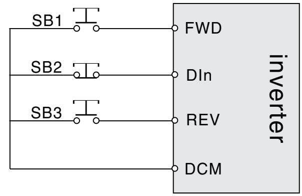


Fig.6-8 Three-wire operation mode 1

2: Three-wire operation mode

The enable terminal of this mode is Din, the running command is given by FWD, and the direction is determined by the state of REV.

The stop command is done by disconnecting the Din signal.

SB1: Stop button

SB2: Run button

Din is the multi-function input terminal of DI1~HDI, and its corresponding terminal function should be defined as the No. 3 function "three-wire operation control".

K	RUN command
0	Forward RUN
1	Reverse RUN

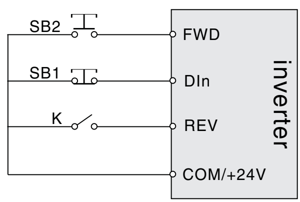


Fig.6-9 Three-wire operation mode 2

Par.	Designation	Scope	Default	Attr
P4-12	Terminal UP/DOWN change rate	0.001Hz/s~65.535Hz/s	0.0s	☆

It is used to set the speed of frequency change when the terminal UP/DOWN adjusts the set frequency, that is, the change amount of the frequency per second. When P0-22 (frequency decimal point) is 2, the value range is 0.001Hz/s~ 65.535Hz/s. When P0-22 (frequency decimal point) is 1, the value range is 0.01Hz/s~ 655.35Hz/s.

Par.	Designation	Scope	Default	Attr
P4-13	AI curve 1 minimum input	0.00V~P4-15	0.00V	☆
P4-14	AI curve 1 minimum input corresponding setting	-100.0%~+100.0%	0.00%	☆
P4-15	AI curve 1 maximum input	P4-13~+10.00V	10.00V	☆
P4-16	AI curve 1 maximum input corresponding setting	-100.0%~+100.0%	100.00%	☆
P4-17	AI1 filter time	0.00s~10.00s	0.10s	☆

The above function codes are used to set the relationship between the analog input voltage and the set value it represents.

When the voltage of the analog input is greater than the set "maximum input" (P4-15), the analog voltage is calculated according to the "maximum input"; similarly, when the analog input voltage is less than the set "minimum input" (P4-13), according to the setting of "AI lower than the minimum input setting selection" (P4-34), it is calculated by the minimum input or 0.0%.

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

AI1 input filter time is used to set the software filter time of AI1. When the on-site analog quantity is easily disturbed, please increase the filter time to stabilize the detected analog quantity. The response speed is slow, and how to set it needs to be weighed according to the actual application.

In different applications, the meaning of the nominal value corresponding to 100.0% of the analog setting is different. For details, please refer to the description of each application section.

The following illustrations show two typical settings:

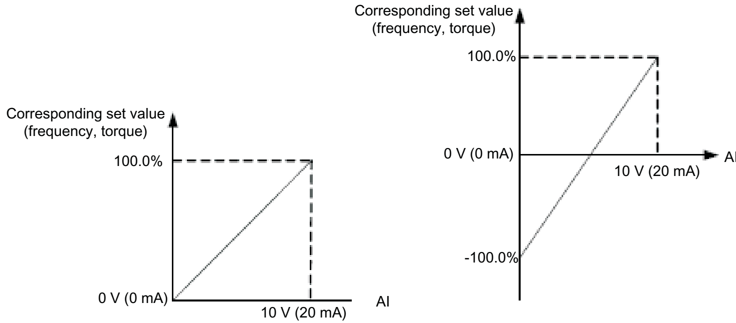


Fig.6-10 Corresponding relationship between analog given and set quantity

Par.	Designation	Scope	Default	Attr
P4-18	AI curve 2 minimum input	0.00V~P4-20	0.00V	☆
P4-19	AI curve 2 minimum input corresponding setting	-100.0%~+100.0%	0.00%	☆
P4-20	AI curve 2 max input	P4-18~+10.00V	10.00V	☆
P4-21	AI curve 2 maximum input corresponding setting	-100.0%~+100.0%	100.0%	☆
P4-22	AI2 filter time	0.00s~10.00s	0.10s	☆

For the function and usage of curve 2, please refer to the description of curve 1.

Par.	Designation	Scope	Default	Attr
P4-23	AI Curve 3 Minimum Input	-10.00V~P4-25	-10.00V	☆
P4-24	AI curve 3 minimum input corresponding setting	-100.0%~+100.0%	-100.00%	☆
P4-25	AI curve 3 max input	P4-23~+10.00V	10.00V	☆
P4-26	AI curve 3 maximum input corresponding setting	-100.0%~+100.0%	100.0%	☆

For the function and usage of curve 3, please refer to the description of curve 1.

Par.	Designation	Scope	Default	Attr
P4-28	Pulse input minimum frequency	0.00kHz~P4-30	0.00kHz	☆
P4-29	Pulse minimum input frequency corresponding setting	-100.0%~+100.0%	0.00%	☆
P4-30	Pulse maximum input frequency	P4-28~100.00kHz	50.00kHz	☆
P4-31	Pulse maximum input frequency corresponding setting	-100.0%~+100.0%	100.0%	☆
P4-32	Pulse filter time	0.00s~10.00s	0.10s	☆

This group of function codes is used to set the relationship between the DI5 pulse frequency and the corresponding setting.

The pulse frequency can only be input to the inverter through DI5 channel.

Par.	Designation	Scope	Default	Attr
P4-33	AI curve selection	Ones place: 1~3 Tens place:1~3	321	☆

The units and tens of the function code are used to select the corresponding setting curve of analog input AI1 and Ai2.

The 2 analog inputs can select any one of the 3 curves respectively.

Curve 1, Curve 2, and Curve 3 are all 2-point curves, which are set in the P4 group function code.

The inverter standard unit provides 2 analog input ports.

Par.	Designation	Scope	Default	Attr
P4-34	AI is lower than the minimum input setting selection	Ones place: 0~1 Tens place:0~1	0	☆

This function code is used to set, when the voltage of the analog input is less than the set "minimum input", how to determine the setting corresponding to the analog.

The ones and tens of the function code correspond to the analog inputs AI1 and AI2 respectively. If 0 is selected, when the AI input is lower than the "minimum input", the corresponding setting of the analog quantity is the curve "minimum input corresponding setting" (P4-14, P4-19) determined by the function code.

If 1 is selected, when the AI input is lower than the minimum input, the corresponding setting of the analog quantity is 0.0%.

Par.	Designation	Scope	Default	Attr
P4-35	X1 delay time	0.0s~3600.0s	0.0s	★
P4-36	X2 delay time	0.0s~3600.0s	0.0s	★
P4-37	X3 delay time	0.0s~3600.0s	0.0s	★

It is used to set the delay time of the inverter for the change when the state of DI terminal changes.

Currently, only DI1, DI2, and DI3 have the function of setting the delay time.

Par.	Designation	Scope	Default	Attr
P4-38	Digital input terminal X valid mode selection 1	0~1	★	☆

It is used to set the valid state mode of the digital input terminal. When it is selected to be active at high level, it is valid when the corresponding DI terminal is connected to COM, and invalid when disconnected. When it is selected to be active at low level, the corresponding DI terminal is invalid when connected with COM, and valid when disconnected.

Group P5: Output Terminals

The inverter comes standard with 1 multi-function analog output terminal, 1 multi-function digital output terminal, 1 multi-function relay output terminal, and 1 FM terminal (can be selected as high-speed pulse output terminal or as open collector switch output).

Par.	Designation	Scope	Default	Attr
P5-00	Y/DO output function selection	0~1	0	☆

The FM terminal is a programmable multiplexing terminal, which can be used as a high-speed pulse output terminal (FMP) or an open-collector switching output terminal (FMR).

When outputting FMP as a pulse, the maximum frequency of the output pulse is 100kHz. Please refer to the description of P5-06 for the related functions of FMP.

Par.	Designation	Scope	Default	Attr
P5-01	Y terminal function selection (open collector output terminal)	0~38	0	☆
P5-02	Control board relay function selection (TA-TB-TC)		2	☆

The above 4 function codes are used to select the functions of 3 digital outputs.

The function description of the multi-function output terminal is as follows:

Value	Function	Description
0	No output	The output terminal has no function.
1	The inverter is running	Indicates that the inverter is running and has an output frequency (which can be zero), and the ON signal is output at this time.
2	Fault output (stop)	When the inverter fails, output ON signal.
3	Frequency level detection 1	Please refer to the description of function codes P8-19 and P8-20.
4	Frequency arrives	Please refer to the description of function code P8-21.
5	Running at zero speed	When the inverter is running and the output frequency is 0, the ON signal is output. When the inverter is in stop state, this signal is OPF.

Value	Function	Description
6	Motor overload pre-alarm	Before the overload protection of the motor acts, it is judged according to the overload pre-alarm threshold, and the ON signal is output after the pre-alarm threshold is exceeded. Refer to function codes P9-00~P9-02 for the motor overload parameter setting.
7	Inverter overload pre-alarm	10s before the inverter overload protection occurs, the ON signal is output.
8	Set the count value to reach	When the count value reaches the value set by PB-08, the ON signal is output.
9	The specified count value is reached	When the count value reaches the value set by PB-09, the ON signal is output. For the counting function, please refer to the description of the PB group function.
10	Length arrives	When the detected actual length exceeds the length set by PB-05, the ON signal will be output.
11	PLC cycle completed	When the program runs a cycle, a pulse signal with a width of 250ms is output.
12	Accumulated running time reached	When the accumulated running time of the inverter exceeds the time set by P8-17, it will output ON signal.
13	Frequency limited	When the set frequency exceeds the upper limit frequency or the lower limit frequency, and the output frequency of the inverter also reaches the upper limit frequency or the lower limit frequency, the ON signal is output.
14	Torque limit	When the inverter is in the speed control mode, when the output torque reaches the torque limit value, the inverter is in the stall protection state and outputs the ON signal at the same time.
15	Ready to run	When the power supply of the main circuit and control circuit of the inverter has been stabilized, and the inverter has not detected any fault information, and the inverter is in a running state, the ON signal is output.
16	AI1>AI2	When the value of the analog input AI1 is greater than the input value of AI2, the ON signal is output.
17	Upper limit frequency reached	When the running frequency reaches the upper limit frequency, the ON signal is output.
18	The lower limit frequency is reached (no output when stopped)	When the running frequency reaches the lower limit frequency, the ON signal is output. In stop state, this signal is OPF.

Value	Function	Description
19	Brown-out status output	When the inverter is under voltage state, it outputs ON signal.
20	Communication settings	Please refer to the communication protocol.
21	Reserve	Reserve
22	Reserve	Reserve
23	Running at zero speed 2 (also output when stopped)	When the output frequency of the inverter is 0, the ON signal is output. This signal is also ON in stop state.
24	The cumulative power-on time arrives	When the accumulative power-on time of the inverter (P7-13) exceeds the time set by P8-16, the output ON signal.
25	Frequency level detection FDT2 output	Please refer to the description of function codes P8-28 and P8-29.
26	Frequency 1 arrives at the output	Please refer to the description of function codes P8-30 and P8-31.
27	Frequency 2 arrives at the output	Please refer to the description of function codes P8-32 and P8-33.
28	Current 1 reaches the output	Please refer to the description of function codes P8-38 and P8-39.
29	Current 2 reaches the output	Please refer to the description of function codes P8-40 and P8-41.
30	Timed arrival output	When the timing function selection (P8-42) is valid, the inverter will output ON signal after the current running time reaches the set timing time.
31	AI1 input overrun	When the value of analog input AI1 is greater than P8-46 (AI1 input protection upper limit) or smaller than P8-45 (AI1 input protection lower limit), the ON signal is output.
32	Downloading	When the inverter is in the state of off-load, the ON signal is output.
33	Running in reverse	When the inverter is running in reverse, output ON signal
34	Zero current state	Please refer to the description of function codes P8-28 and P8-29
35	Module temperature reached	When the inverter module radiator temperature (P7-07) reaches the set module temperature reaching value (P8-47), the ON signal is output

Value	Function	Description
36	Software current overrun	Please refer to the description of function codes P8-36 and P8-37.
37	The lower limit frequency is reached (the output is also output when the machine is stopped)	When the running frequency reaches the lower limit frequency, the ON signal is output. This signal is also ON in the stop state.
38	Alarm output (continue running)	When a fault occurs in the inverter, and the processing mode of the fault is to continue running, the inverter will output an alarm.

Par.	Designation	Scope	Default	Attr
P5-06	DO output function selection	0~16	0	☆
P5-07	AO output function selection		0	☆
P5-08	Reserve		1	☆

FMP terminal output pulse frequency range is 0.01kHz~P5-09 (FMP output maximum frequency), P5-09 can be set between 0.01kHz~100.00kHz.

The output range of analog output AO1 is 0V~10V, or 0mA~20mA. The scaling relationship between the range of pulse output or analog output and the corresponding function is shown in the following table:

Value	Function	Description
0	Running frequency	0 ~ Maximum output frequency
1	Set frequency	0 ~ Maximum output frequency
2	Output current	0 to 2 times the rated current of the motor
3	Motor output torque (absolute value, percentage relative to the motor)	0 to 2 times the rated torque of the motor
4	Output power	0 ~ 2 times rated power
5	Output voltage	0 ~ 1.2 times the rated voltage of the inverter
6	Pulse input (100.0% corresponds to 100.0kHz)	0.01kHz ~ 100.00kHz
7	AI1	0V ~ 10V

Value	Function	Description
8	AI2	0V ~ 10V (or 0 ~ 20mA)
9	Reserved	Reserved
10	length	0 ~ Maximum set length
11	count value	0 ~ Maximum count value
12	Communication settings	0.0% ~ 100.0%
13	Motor speed	0 to the speed corresponding to the maximum output frequency
14	Output current (100.0% corresponds to 1000.0A)	0.0A ~ 1000.0A
15	Output voltage (100.0% corresponds to 1000.0V)	0.0V ~ 1000.0V
16	Motor output torque (actual value, percentage relative to motor)	-2 times the rated torque of the motor ~ 2 times the rated torque of the motor

Par.	Designation	Scope	Default	Attr
P5-09	DO output maximum frequency	0.01kHz~100.00kHz	50.00kHz	☆

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

Par.	Designation	Scope	Default	Attr
P5-10	AO zero bias coefficient	0	0.00%	☆
P5-11	AO gain	-10.00~+10.00	1	☆

The above function codes are generally used to correct the zero drift of the analog output and the deviation of the output amplitude. It can also be used to customize the desired AO output curve.

If the zero offset is represented by "b", the gain is represented by k, the actual output is represented by Y, and the standard output is represented by X, the actual output is:

Y=kX+b. Among them, the zero offset coefficient of AO1 is 100% corresponding to 10V (or 20mA), and the standard output refers to the output of 0V ~ 10V (or 0mA ~ 20mA) corresponding to the analog output without zero offset and gain correction.

For example: if the analog output content is the running frequency, and you want to output 8V when the frequency is 0, and output 3V when the frequency is the maximum frequency, the gain should be set to "-0.50", and the zero offset should be set to "80%".

Par.	Designation	Scope	Default	Attr
P5-17	DO output delay time	0.0s~3600.0s	0.0s	☆
P5-18	Relay output delay time	0.0s~3600.0s	0.0s	☆
P5-20	DO output delay time	0.0s~3600.0s	0.0s	☆
P5-22	DO output terminal valid state selection	-100.0%~+100.0%	0	☆

Set the delay time from the status change of the output terminal FMR, relay and DO to the actual output change.

Group P6:Start/Stop Control

Par.	Designation	Scope	Default	Attr
P6-00	Start method	0~2	0	★

0: direct start

If the starting DC braking time is set to 0, the inverter starts to run from the starting frequency. If the starting DC braking time is not 0, the DC braking will be performed first, and then the operation will start from the starting frequency. It is suitable for small inertia loads, and the motor may rotate when starting.

1: Speed tracking restart

The inverter first judges the speed and direction of the motor, and then starts at the tracked motor frequency, and implements a smooth and shock-free start to the rotating motor. It is suitable for instantaneous power failure and restart of large inertia loads. In order to ensure the performance of the speed tracking restart, it is necessary to set the parameters of the motor P1 group accurately.

2: Asynchronous motor pre-excitation start

Only valid for asynchronous motors, it is used to build up the magnetic field before the motor runs. For pre-excitation current and pre-excitation time, please refer to the description of function codes P6-05 and P6-06.

If the pre-excitation time is set to 0, the inverter cancels the pre-excitation process and starts from the starting frequency. If the pre-excitation time is not 0, the pre-excitation is performed before starting, which can improve the dynamic response performance of the motor.

Par.	Designation	Scope	Default	Attr
P6-01	Speed tracking method	0~2	0	★

In order to complete the speed tracking process in the shortest time, select the method for the inverter to track the motor speed:

0: Track down from the frequency at the time of power failure, this method is usually selected.

1: Start tracking upwards from 0 frequency, and use it in the case of restarting after a long power outage.

2: Track down from the maximum frequency, generally used for power generation loads.

Par.	Designation	Scope	Default	Attr
P6-02	Speed tracking speed	1~100	20	☆

When the speed tracking is restarted, select the speed of the speed tracking.

The larger the parameter, the faster the tracking speed. But setting too large may cause unreliable tracking effect.

Par.	Designation	Scope	Default	Attr
P6-03	Start frequency	0.00Hz~10.00Hz	0.00Hz	☆
P6-04	Start frequency hold time	0.0s~100.0s	0.0s	★

To ensure the motor torque when starting, please set an appropriate starting frequency. In order to fully build up the magnetic flux when the motor starts, the starting frequency needs to be maintained for a certain period of time.

The starting frequency P6-03 is not limited by the lower frequency limit. But when the set target frequency is less than the start frequency, the inverter will not start and is in the standby state.

During the forward/reverse switching process, the start frequency holding time does not work. The starting frequency holding time is not included in the acceleration time, but is included in the running time of the program running.

Example 1:

P0-03=0 frequency is set as digital given

P0-08=2.00Hz digital setting frequency is 2.00Hz

P6-03=5.00Hz starting frequency is 5.00Hz

P6-04=2.0s start frequency holding time is 2.0s

At this time, the inverter will be in the standby state, and the output frequency of the inverter is 0.00Hz.

Example 2:

P0-03=0 frequency is set as digital given

P0-08=10.00Hz digital setting frequency is 10.00Hz

P6-03=5.00Hz starting frequency is 5.00Hz

P6-04=2.0s start frequency holding time is 2.0s

At this time, the inverter accelerates to 5.00Hz, after 2.0s, then accelerates to the given frequency 10.00Hz.

Par.	Designation	Scope	Default	Attr
P6-05	Start DC braking current /pre-excitation current	0%~100%	50%	★
P6-06	Start DC braking time/pre-excitation time	0.0s~100.0s	0.0s	★

Start DC braking, generally used to stop the running motor and then start it. Pre-excitation is used to make the asynchronous motor establish a magnetic field before starting, and improve the response speed.

Start DC braking is only valid when the start mode is direct start. At this time, the inverter first performs DC braking according to the set starting DC braking current, and then starts to run after the starting DC braking time. If the DC braking time is set to 0, it will start directly without DC braking. The greater the DC braking current, the greater the braking force.

If the starting mode is asynchronous machine pre-excitation start, the inverter will first establish a magnetic field according to the set pre-excitation current, and then start running after the set pre-excitation time. If the pre-excitation time is set to 0, it will start directly without going through the pre-excitation process.

The starting DC braking current/pre-excitation current is a percentage relative to the rated current of the inverter.

Par.	Designation	Scope	Default	Attr
P6-07	Acceleration and deceleration method	0~2	0	★

Select the frequency change mode during the start and stop of the inverter.

0: Linear acceleration and deceleration

The output frequency increases or decreases linearly.

1: S curve acceleration and deceleration A

The output frequency increases or decreases according to the S-curve. The S-curve is used where a gentle start or stop is required. Function codes P6-08 and P6-09 respectively define the time ratio of the start segment and end segment of S-curve acceleration and deceleration.

2: S curve acceleration and deceleration B

In this S-curve acceleration/deceleration B, the motor rated frequency PB is always the inflection point of the S-curve. As shown in Figure 7-12. It is generally used in the occasions where rapid acceleration and deceleration are required in the high-speed area above the rated frequency. When the set frequency is above the rated frequency, the acceleration/deceleration time is:

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$$t=\left(\frac{4}{9}\times\left(\frac{f}{f_b}\right)^2+\frac{5}{9}\right)\times T$$

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

Par.	Designation	Scope	Default	Attr
P6-08	The proportion of time at the beginning of the S-curve	0.0%~(100.0%-P6-09)	30.00%	★
P6-09	The proportion of time at the end of the S-curve	0.0%~(100.0%-P6-08)	30.00%	★

Function codes P6-08 and P6-09 respectively define the time ratio of the start segment and end segment of S-curve acceleration and deceleration A. The two function codes must satisfy: P6-08+P6-09≤100.0%.

In Figure 6-11, t1 is the parameter defined by parameter P6-08. During this period, the slope of output frequency changes gradually increases. t2 is the time defined by parameter P6-09, and the slope of the output frequency change gradually changes to 0 during this time period. During the time between t1 and t2, the slope of the output frequency change is fixed, that is, linear acceleration and deceleration are performed in this interval.

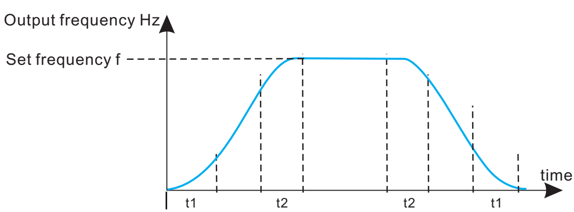


Figure 6-11. S-curve acceleration and deceleration A schematic diagram

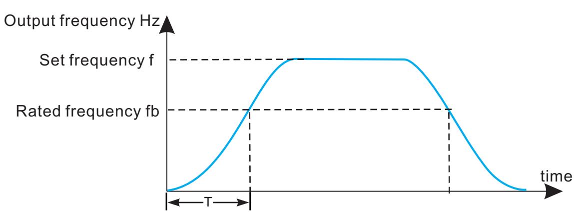


Figure 6-11. S-curve acceleration and deceleration B schematic diagram

Par.	Designation	Scope	Default	Attr
P6-10	Stop mode	0~1	0	☆

0: Decelerate to stop

After the stop command is valid, the inverter reduces the output frequency according to the deceleration time, and stops after the frequency drops to 0.

1: Free parking

After the stop command is valid, the inverter immediately stops the output, and the motor coasts to a stop according to the mechanical inertia.

Par.	Designation	Scope	Default	Attr
P6-11	DC braking starting frequency at stop	0.00Hz~Maximum frequency	0.00Hz	☆
P6-12	DC braking waiting time at stop	0.0s~100.0s	0.0s	☆
P6-13	Stop DC braking current	0.0%~100.0%	50%	☆
P6-14	DC braking time at stop	0.0s~100.0s	0.0s	☆

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

DC braking waiting time at stop: After the running frequency is reduced to the starting frequency of DC braking at stop, the inverter stops outputting for a period of time, and then starts the DC braking process. It is used to prevent faults such as overcurrent that may be caused by starting DC braking at higher speeds.

Stop DC braking current: refers to the output current during DC braking, the percentage relative to the rated current of the motor. The larger this value is, the stronger the DC braking effect is, but the greater the heating of the motor and the inverter.

Stop DC braking time: the time that the DC braking amount is maintained. If this value is 0, the DC braking process is cancelled. The DC braking process at stop is shown in the schematic diagram in Figure 7-13.

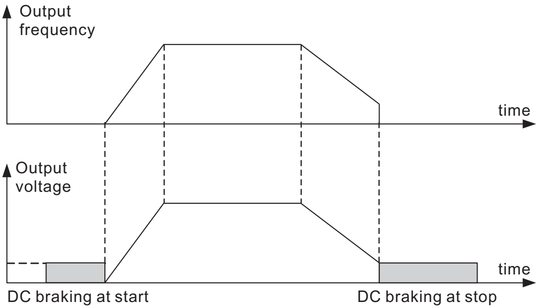


Figure 6-13. Schematic diagram of stop DC braking

Par.	Designation	Scope	Default	Attr
P6-15	Brake usage ratio	0.0%~100.0%	100%	☆

Only valid for inverters with built-in braking unit.

It is used to adjust the duty ratio of the moving unit. If the braking usage rate is high, the action duty ratio of the braking unit will be high and the braking effect will be strong, but the bus voltage of the inverter will fluctuate greatly during the braking process.

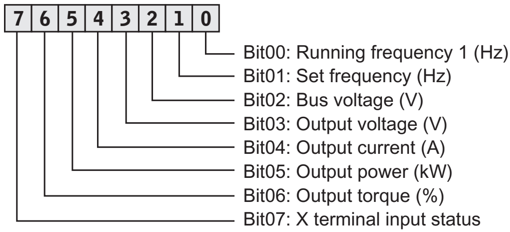
Group P7: Keypad Control And LED Display

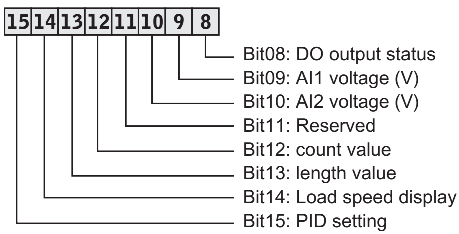
Par.	Designation	Scope	Default	Attr
P7-03	Run display parameter 1	0000~FFFF	1F	☆

When the inverter is running, the parameter display is affected by this function code, that is, it is a 16-bit binary number. If a digit is 1, the parameter corresponding to this digit can be viewed through the "SHIFT" key during running. . If this bit is 0, the parameter corresponding to this bit will not be displayed. When setting the function code P7-03, to convert the binary number to hexadecimal number, input this function code.

BIT15	BIT14	BIT13	BIT12	The fourth	
BIT11	BIT10	BIT9	BIT8	The third	
BIT7	BIT6	BIT5	BIT4	The second	
BIT3	BIT2	BIT1	BIT0	The first one	
0	0	0	0	0000	0
0	0	0	1	0001	1
0	0	1	0	0010	2
0	0	1	1	0011	3
0	1	0	0	0100	4
0	1	0	1	0101	5
0	1	1	0	0110	6
1	1	1	1	0111	7
1	0	0	0	1000	8
1	0	0	1	1001	9
1	0	1	0	1010	A
1	0	1	1	1011	B
1	1	0	0	1100	C
1	1	0	1	1101	D
1	1	1	0	1110	E
1	1	1	1	1111	F

The display content represented by the lower 8 bits is as follows:





The status of the input and output terminals is displayed in decimal, X1 (Y1) corresponds to the lowest digit, for example, if the input status displays 3, it means that the terminals X1 and X2 are closed, and the other terminals are open.

Par.	Designation	Scope	Default	Attr
P7-04	Run display parameter 2	0000~FFFF	0	☆
P7-05	Stop display parameters	0000~FFFF	03	☆

The setting of this function is the same as that of P7-03.

Par.	Designation	Scope	Default	Attr
P7-06	Load speed display factor	0.0001~6.5000	–	★

When the load speed needs to be displayed, this parameter can be used to adjust the corresponding relationship between the output frequency of the inverter and the load speed. Refer to the description of P7-12 for the specific corresponding relationship.

Par.	Designation	Scope	Default	Attr
P7-07	Inverter module heat sink temperature	-20℃~120℃	–	●

Displays the temperature of the inverter module IGBT.

The IGBT over-temperature protection value of the inverter module of different models is different.

Par.	Designation	Scope	Default	Attr
P7-09	Cumulative running time	0h~65535h	–	●

Displays the accumulated running time of the inverter.

When the running time reaches the set running time P8-17, the multi-function digital output function (12) of the inverter outputs the ON signal.

Par.	Designation	Scope	Default	Attr
P7-11	Feature version number	software version number	21	●
P7-12	Load speed display decimal places	Ones place: 0~3 Tens place: 1~2	0.0s	☆

Used to set the number of decimal places for display of load speed. The following example shows how the load speed is calculated:

If the load speed display coefficient P7-06 is 2.000, the decimal point of the load speed P7-12 is 2 (2 decimal points), when the inverter running frequency is 40.00Hz, the load speed is: 40.00×2.000=80.00 (2 decimal points) show)

If the inverter is in the stop state, the load speed will be displayed as the speed corresponding to the set frequency, that is, "set load speed". Taking the set frequency of 50.00Hz as an example, the load speed in the shutdown state is: 50.00×2.000=100.00 (displayed with 2 decimal points)

Par.	Designation	Scope	Default	Attr
P7-14	Cumulative power consumption	0~65535 degrees	–	●

Displays the cumulative power-on time of the inverter from the factory.

When this time reaches the set power-on time (P8-17), the multi-function digital output functi on (24) of the inverter will output the ON signal.

Par.	Designation	Scope	Default	Attr
P7-14	Cumulative power consumption	0~65535 degrees	–	●

Displays the accumulated power consumption of the inverter so far.

Group P8: Auxiliary Functions

Par.	Designation	Scope	Default	Attr
P8-00	Jog FREQ	0.00Hz~upper limit FREQ	2.00Hz	☆
P8-01	Jog Accel time	0.0s~6500.0s	20.0s	☆
P8-02	Jog Decel time	0.0s~6500.0s	20.0s	☆

Define the given frequency and acceleration/deceleration time of the inverter when jogging.

During jog operation, the startup mode is fixed as direct start (P6-00=0), and the stop method is fixed as deceleration stop (P6-10=0).

Par.	Designation	Scope	Default	Attr
P8-03	Accel time 2	0.0s~6500.0s	Model dependent	☆
P8-04	Decel time 2	0.0s~6500.0s	Model dependent	☆
P8-05	Accel time 3	0.0s~6500.0s	Model dependent	☆
P8-06	Decel time 3	0.0s~6500.0s	Model dependent	☆
P8-07	Accel time 4	0.0s~6500.0s	Model dependent	☆
P8-08	Decel time 4	0.0s~6500.0s	Model dependent	☆

The inverter provides 4 sets of acceleration and deceleration time, which are P0-17/P0-18 and the above 3 sets of acceleration and deceleration time.

The definitions of the 4 groups of acceleration and deceleration time are exactly the same, please refer to the relevant descriptions of P0-17 and P0-18. Through different combinations of multi-function digital input terminals DI, 4 groups of acceleration and deceleration time can be switched and selected. Please refer to the relevant instructions in function codes P4-01 to P4-05 for the specific usage.

Par.	Designation	Scope	Default	Attr
P8-09	Hop Frequency 1	0.00Hz~Maximum frequency	0.00Hz	☆
P8-10	Hop Frequency 2	0.00Hz~Maximum frequency	0.00Hz	☆
P8-11	Hop Frequency Amplitude	0.00Hz~upper limit FREQ	0.00Hz	☆

When the set frequency is within the jump frequency range, the actual operating frequency will run at the jump frequency closer to the set frequency. By setting the jump frequency, the inverter can avoid the mechanical resonance point of the load.

The inverter can set two jump frequency points. If both jump frequencies are set to 0, the ju-m-p frequency function will be cancelled. For the principle of hopping frequency and hopping frequency amplitude, please refer to Figure 6-14.

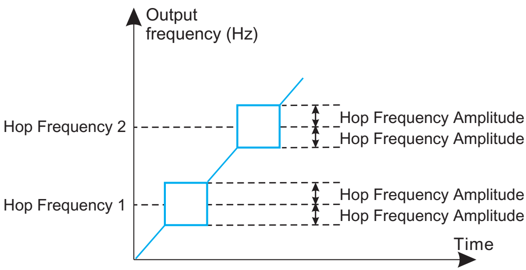


Fig.6-14 Schematic diagram of hopping frequency

Par.	Designation	Scope	Default	Attr
P8-12	Forward and reverse dead time	0.0s~3000.0s	0.00Hz	☆

Set the transition time at the output 0Hz during the forward/reverse transition of the inverter, as shown in Figure 6-15:

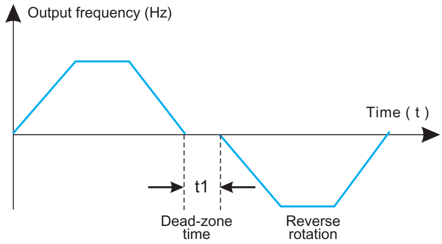


Fig.6-15 Schematic diagram of forward and reverse dead time

Par.	Designation	Scope	Default	Attr
P8-13	Reverse frequency prohibited	0~1	0	☆

This parameter is used to set whether the inverter is allowed to run in the reverse state. If the motor is not allowed to run in reverse, set P8-13=1.

Par.	Designation	Scope	Default	Attr
P8-14	The set frequency is lower than the lower limit frequency operation mode	0~2	0	☆

When the set frequency is lower than the lower limit frequency, the running state of the inverter can be selected by this parameter. The frequency converter offers three operating modes to meet various application needs.

Par.	Designation	Scope	Default	Attr
P8-15	Sag rate	0.00%~100.00%	0.00%	☆

The sag ratio allows for a slight speed difference between the master and slave stations, which in turn avoids collisions between them. The default value of this parameter is 0.

Only when the master and the slave use the speed control mode, the sag rate needs to be adjusted. For each transmission process, the appropriate sag rate needs to be gradually found in practice. It is recommended not to set P8-15 too large, otherwise the load When it is larger, the steady-state speed will decrease significantly. Both master and slave must set the droop rate.

Droop speed = synchronous frequency x output torque x droop rate ÷ 10

For example: P8-15=1.00, synchronous frequency 50Hz, output torque 50%, then:

Drooping speed=50Hz×50%×1.00÷10=2.5Hz

Inverter actual frequency=50Hz–2.5Hz=47.5Hz

Par.	Designation	Scope	Default	Attr
P8-16	Set the cumulative power-on arrival time	0h~65000h	0h	☆

When the accumulated power-on time (P7-13) reaches the power-on time set by P8-16, the multi-function digital DO of the inverter will output ON signal. The following examples illustrate its application:

Example: Combined with the virtual DI/DO function, after the set power-on time reaches 100 hours, the inverter fault alarm output. Program:

Virtual DI1 terminal function, set as user-defined fault 1: A1-00=44;

Virtual DI1 terminal valid state, set to come from virtual DO1: A1-05=0000;

Virtual DO1 function, set to arrive at power-on time: A1-11=24;

Set the accumulative power-on arrival time to 100 hours: P8-16=100.

Then when the accumulative power-on time reaches 100 hours, the inverter will output UdE1 for fault.

Par.	Designation	Scope	Default	Attr
P8-17	Set the cumulative operation arrival time	0h~65000h	0h	☆

Used to set the running time of the inverter.

When the accumulated running time (P7-09) reaches the set running time, the multi-function digital DO of the inverter will output ON signal.

Par.	Designation	Scope	Default	Attr
P8-18	Boot protection selection	0~1	0	☆

This parameter relates to the safety protection function of the inverter.

If this parameter is set to 1, if the running command is valid when the inverter is powered on (for example, the terminal running command is in the closed state before power-on), the inverter will not respond to the running command, and the running command must be canceled once, and the running command will be valid again after The inverter will respond.

In addition, if this parameter is set to 1, if the running command is valid at the time of inverter fault reset, the inverter will not respond to the running command, and the running command must be removed to eliminate the running protection state.

Setting this parameter to 1 can prevent the danger caused by the motor responding to the running command during power-on or fault reset without knowing it.

Par.	Designation	Scope	Default	Attr
P8-19	Frequency detection value 1	0.00Hz~upper limit FREQ	50.00Hz	☆
P8-20	Frequency detection hysteresis 1	0.0%~100.0% (PDT1 level)	5.00%	☆

When the running frequency is higher than the frequency detection value, the multi-function output DO of the inverter will output the ON signal, and when the frequency is lower than the detection value by a certain frequency value, the DO output ON signal will be cancelled.

The above parameters are used to set the detection value of the output frequency and the hysteresis value of the output action release. Among them, P8-20 is the percentage of the lag frequency relative to the frequency detection value P8-19. Figure 6-16 is a schematic diagram of the FDT function.

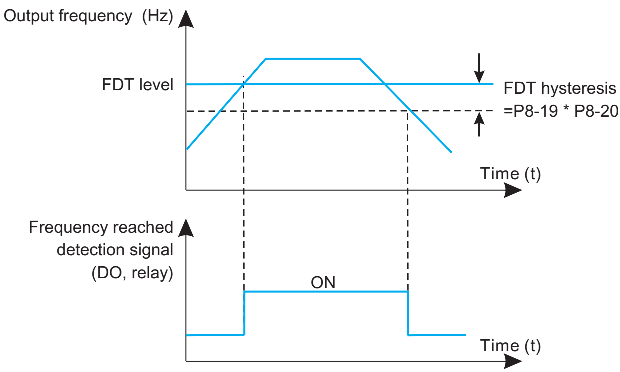


Fig.6-16 FDT level diagram

Par.	Designation	Scope	Default	Attr
P8-21	Frequency arrival detection amplitude	0.0%~100.0% (maximum frequency)	0.00%	☆

When the running frequency of the inverter is within a certain range of the target frequency, the multi-function DO of the inverter will output ON signal.

This parameter is used to set the detection range of frequency arrival, which is a percentage relative to the maximum frequency. Figure 6-17 is a schematic diagram of frequency arrival.

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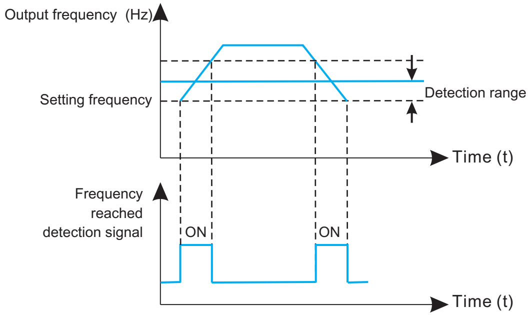


Fig.6-17 Schematic diagram of frequency arrival detection amplitude

Par.	Designation	Scope	Default	Attr
P8-22	Whether the jump frequency is valid during acceleration and deceleration	0: invalid	0	☆

This function code is used to set whether the skip frequency is valid during acceleration and deceleration.

When it is set to be valid, when the running frequency is in the jump frequency range, the actual running frequency will skip the set jump frequency boundary. Figure 6-18 is a schematic diagram of the effective jump frequency during acceleration and deceleration.

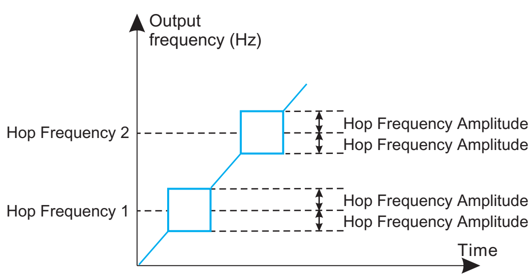


Fig.6-18 Schematic diagram of the effective jump frequency during acceleration and deceleration

Par.	Designation	Scope	Default	Attr
P8-25	Acceleration time 1 and acceleration time 2 switch frequency points	0.00Hz~Maximum frequency	0.00Hz	☆
P8-26	Deceleration time 1 and deceleration time 2 switch frequency points	0.00Hz~Maximum frequency	0.00Hz	☆

This function is valid when the motor is selected as motor 1 and the acceleration/deceleration time is not selected by switching the DI terminal. It is used to select different acceleration and deceleration time according to the running frequency range instead of DI terminal during the running process of the inverter.

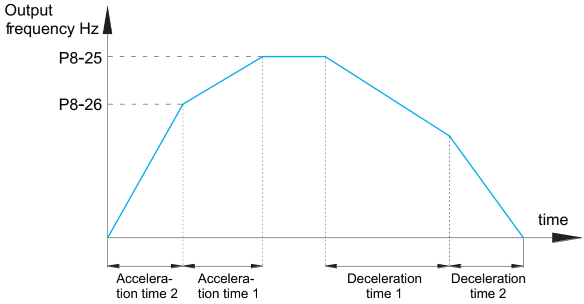


Fig.6-19 Schematic diagram of acceleration and deceleration time switching

Figure 7-19 is a schematic diagram of acceleration and deceleration time switching. During acceleration, if the running frequency is less than P8-25, select acceleration time 2; if the ru nning frequency is greater than P8-25, select acceleration time 1.

During the deceleration process, if the running frequency is greater than P8-26, select decel eration time 1; if the running frequency is less than P8-26, select deceleration time 2.

Par.	Designation	Scope	Default	Attr
P8-27	Terminal jog priority	0~1	0	☆

This parameter is used to set whether the terminal jog function has the highest priority.

When the terminal jog priority is valid, if there is a terminal jog command during the running process, the inverter will switch to the terminal jog running state.

Par.	Designation	Scope	Default	Attr
P8-28	Frequency detection value 2	0.00Hz~Maximum frequency	50.00Hz	☆
P8-29	Frequency detection lag rate 2	0.0%~100.0% (PDT2 level)	5.00%	☆

This frequency detection function is exactly the same as that of FDT1, please refer to the relevant description of FDT1, that is, the description of function codes P8-19 and P8-20.

Par.	Designation	Scope	Default	Attr
P8-30	Arbitrary arrival frequency detection value 1	0.00Hz~Maximum frequency	50.00Hz	☆
P8-31	Arbitrary arrival frequency detection amplitude 1	0.0%~100.0% (maximum frequency)	0.00%	☆
P8-32	Arbitrary arrival frequency detection value 2	0.00Hz~Maximum frequency	50.00Hz	☆
P8-33	Arbitrary arrival frequency detection amplitude 2	0.0%~100.0% (maximum frequency)	0.00%	☆

When the output frequency of the inverter is within the range of the positive and negative detection amplitudes of any arrival frequency detection value, the multi-function DO outputs the ON signal.

The inverter provides two sets of parameters for detecting any arrival frequency, respectively setting the frequency value and the frequency detection range. Figure 7-20 is a schematic diagram of this function.

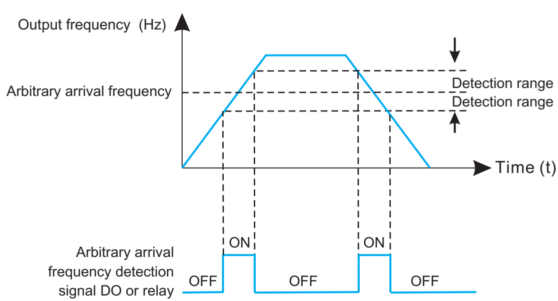


Fig.6-20 Schematic diagram of arbitrary arrival frequency detection

Par.	Designation	Scope	Default	Attr
P8-34	Zero current detection level	0.0%~300.0% 100.0% corresponds to the rated current of the motor	5.00%	☆
P8-35	Zero current detection delay time	0.01s~600.00s	0.10s	☆

When the output current of the inverter is less than or equal to the zero current detection level, and the duration exceeds the zero current detection delay time, the multi-function DO of the inverter outputs an ON signal. Figure 6-21 Schematic diagram of zero current detection.

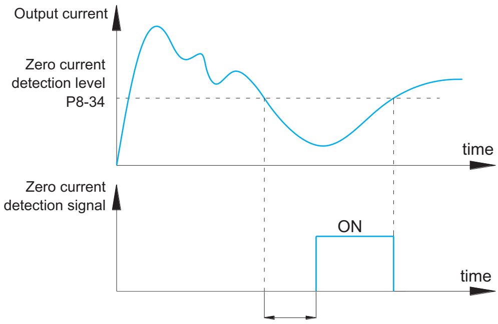


Fig.6-21 Schematic diagram of current detection

Par.	Designation	Scope	Default	Attr
P8-36	The output current exceeds the limit	0.0% (not detected) 0.1%~300.0% (motor rated current)	200.00%	☆
P8-37	Output current overrun detection delay time	0.01s~600.00s	0.00S	☆

When the output current of the inverter is greater than or exceeds the limit detection point, and the duration exceeds the software overcurrent point detection delay time, the multi-function DO of the inverter outputs the ON signal. Figure 7-22 is the schematic diagram of the output current over-limit function.

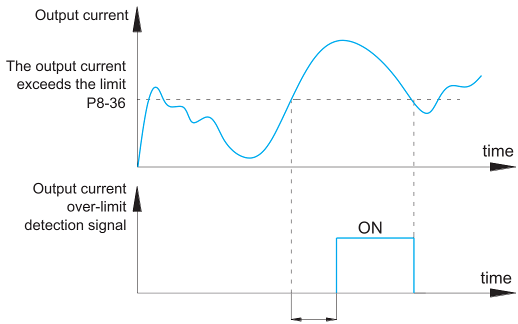


Fig.6-22 Schematic diagram of output current over-limit detection

Par.	Designation	Scope	Default	Attr
P8-38	Arbitrary arrival current 1	0.0%~300.0% (motor rated current)	100.00%	☆
P8-39	Arbitrary arrival current 1 amplitude	0.0%~300.0% (motor rated current)	0.00%	☆
P8-40	Arbitrary arrival current 2	0.0%~300.0% (motor rated current)	100.00%	☆
P8-41	Arbitrary arrival current 2 amplitude	0.0%~300.0% (motor rated current)	0.00%	☆

When the output current of the inverter is within the positive and negative detection width of any arrival current, the multi-function DO of the inverter will output the ON signal.

The inverter provides two sets of parameters of arbitrary arrival current and detection width. Figure 6-23 is a schematic diagram of the function.

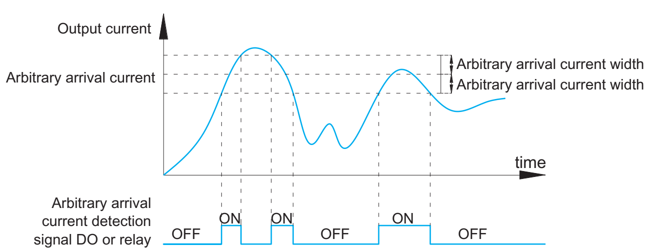


Fig.6-23 Arbitrary arrival current detection schematic diagram

Par.	Designation	Scope	Default	Attr
P8-42	Timing function selection	0~1	0	★
P8-43	Timing run time selection	0~2	0.00Hz	★
P8-44	Timing run time	0.0Min~6500.0Min	0.0Min	★

This group of parameters is used to complete the timing operation function of the inverter.

When the timing function selection of P8-42 is valid, the inverter starts timing when it starts, and when the set timing running time is reached, the inverter automatically stops, and the multi-function DO outputs ON signal at the same time.

Every time the inverter starts, it starts timing from 0, and the remaining running time of the timing can be checked through U0-20. The timing running time is set by P8-43 and P8-44, and the time unit is minutes.

Par.	Designation	Scope	Default	Attr
P8-45	Ai1 input voltage protection value lower limit	0.00V~P8-46	3.10V	☆
P8-46	Ai1 input voltage protection value upper limit	P8-45~10.00V	6.80V	☆

When the value of the analog input AI1 is greater than P8-46, or the AI1 input is less than P8-47, the multi-function DO of the inverter outputs the "AI1 input overrun" ON signal, which is used to indicate whether the input voltage of AI1 is within the setting range.

Par.	Designation	Scope	Default	Attr
P8-47	Module temperature reached	0℃~100℃	90℃	☆

When the temperature of the inverter radiator reaches this temperature, the multi-function DO of the inverter will output the ON signal of "module temperature reached".

Par.	Designation	Scope	Default	Attr
P8-48	Cooling Fan Control	0~1	0	☆

It is used to select the action mode of the cooling fan. When it is set to 0, the inverter will run the fan in the running state. If the radiator temperature is higher than 40 degrees in the stop state, the fan will run. In the stop state, the fan will not work when the radiator is lower than 40 degrees. run.

When 1 is selected, the fans run consistently after power-on.

Par.	Designation	Scope	Default	Attr
P8-49	wake up frequency	Sleep frequency (P8-51)~Maximum frequency (A0-10)	0.00Hz	☆
P8-50	Wake up delay time	0.0s~6500.0s	0.0s	☆
P8-51	Sleep frequency	0.00Hz~Wake up frequency (P8-49)	0.00Hz	☆
P8-52	sleep delay time	0.0s~6500.0s	0.0s	☆

This group of parameters is used to implement sleep and wake-up functions in water supply applications.

During the operation of the inverter, when the set frequency is less than or equal to the sleep frequency of P8-51, after the delay time of P8-52, the inverter enters the sleep state and automatically stops.

If the inverter is in the dormant state and the current running command is valid, when the set frequency is greater than or equal to the wake-up frequency of P8-49, the inverter will start after the delay time of P8-50.

In general, please set the wake-up frequency to be greater than or equal to the sleep frequency. If both the wake-up frequency and the sleep frequency are set to 0.00Hz, the sleep and wake-up functions are invalid.

When the sleep function is enabled, if the frequency setting uses the PID, whether the PID is operated in the sleep state is affected by the function code PA-28. At this time, the operation when the PID is stopped must be selected (PA-28=1).

Par.	Designation	Scope	Default	Attr
P8-53	Arrival time of this run	0.0~6500.0 minutes	0.0Min	☆
P8-54	Output power correction factor	0.00%0.00%~200.0%	100.00%	☆

When the running time of this start reaches this time, the multi-function digital DO of the inverter outputs the ON signal of "this running time is reached".

Group P9: Protection Parameters

Par.	Designation	Scope	Default	Attr
P9-00	Motor overload protection selection	0~1	1	☆
P9-01	Motor overload protection gain	0.20~10.00	1	☆

P9-00=1: At this time, the inverter judges whether the motor is overloaded according to the motor overload protection inverse time curve.

The shortest time to report motor overload is 2 minutes. If you need to adjust the motor overload current and time, please set P9-01 (motor overload protection gain). The motor overload current and overload time curves are shown in the following figure:

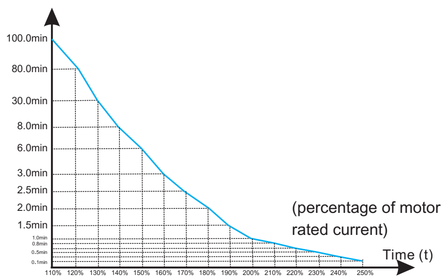


Figure 6-24. Overload current and overload time curve

For example：
if the motor needs to run at 120% motor current for 30 minutes to report overload, first calculate the motor current Ix for 30 minutes of overload under the default setting.

It can be known from the motor overload curve diagram that the 30-minute overload is within the current range of 125% and 135%, and the default setting of the 30-minute overload motor current Ix is as follows:

$$(40-30)\div(125\%-Ix)=(40-15)\div(125\%-135\%)$$

The motor current Ix=129% is obtained, so it can be concluded that the motor needs to report overload for 30 minutes under the condition of 120% motor current, and the motor overload protection gain is:

$$P9\text{-}01=120\%\div Ix=120\%\div 129\%=0.93$$

The user needs to correctly set the value of P9-01 according to the actual overload capacity of the motor. If this parameter is set too large, it will easily lead to the motor overheating and damage, and the inverter will not alarm!

Par.	Designation	Scope	Default	Attr
P9-02	Motor overload warning factor	50%~100%	80%	☆

This function is used to give an early warning signal to the control system through DO before motor overload fault protection. This warning factor is used to determine how much warning is given before motor overload protection. The larger the value is, the smaller the early warn-ing is.

When the cumulative output current of the inverter is greater than the product of the overload inverse time limit curve and P9-02, the multi-function digital DO of the inverter outputs the ON signal of “motor overload pre-alarm”.

Par.	Designation	Scope	Default	Attr
P9-07	Short-circuit protection selection to ground	0~1	1	☆

When the inverter is powered on, it can be selected to detect whether the motor is short-circ uited to ground.

If this function is valid, the UVW terminal of the inverter will have voltage output for a period of time after power-on.

Par.	Designation	Scope	Default	Attr
P9-09	Fault automatic reset times	0~20	0	☆

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

Par.	Designation	Scope	Default	Attr
P9-10	Fault DO action selection during fault automatic reset	0~1	0	☆

If the inverter is set with the function of automatic fault reset, during the period of automatic fault reset, whether the fault DO acts or not can be set through P9-10.

Par.	Designation	Scope	Default	Attr
P9-11	Fault automatic reset waiting time	0.1s~100.0s	1.0s	☆

The waiting time from the inverter fault alarm to the automatic fault reset.

Par.	Designation	Scope	Default	Attr
P9-12	Input phase loss\contactor pick-up protection selection	0~1	1.0s	☆

Select whether to protect the input phase loss.

Par.	Designation	Scope	Default	Attr
P9-13	Output phase loss protection selection	0~1	11	☆

Select whether to protect the output phase loss. If you choose 0 and the output phase loss actually occurs, no fault will be reported. At this time, the actual current is larger than the current displayed on the panel, and there is a risk. Use with caution.

Par.	Designation	Scope	Default	Attr
P9-14	Type of first failure		–	●
P9-15	Second fault type	0~55	–	●
P9-16	Third (most recent) failure type		–	●

Record the last three fault types of the inverter, 0 means no fault. For the possible causes and solutions of each fault code, please refer to the relevant instructions in Chapter 7.

Par.	Designation	Scope	Default	Attr
P9-17	Frequency at the third (most recent) failure	–	–	●
P9-18	Current at the third (most recent) fault	–	–	●
P9-19	Bus voltage at the third (most recent) fault	–	–	●
P9-20	Input terminal status at the third (last) fault	–	–	●
P9-21	Output terminal status at the third (latest) fault	–	–	●

Par.	Designation	Scope	Default	Attr
P9-22	Inverter status at the third (last) fault	–	–	●
P9-23	Power-on time at the third (most recent) fault	–	–	●
P9-24	Uptime on third (most recent) failure	–	–	●
P9-27	Frequency at second failure	–	–	●
P9-28	Current at the second fault	–	–	●
P9-29	Bus voltage at the second fault	–	–	●
P9-30	Input terminal status at the second fault	–	–	●
P9-31	Output terminal status at the second fault	–	–	●
P9-32	Inverter status at the second fault	–	–	●
P9-33	Power-on time at the second fault	–	–	●
P9-34	Operating time at second failure	–	–	●
P9-37	Frequency at first failure	–	–	●
P9-38	Current at first fault	–	–	●
P9-39	Bus voltage at first fault	–	–	●
P9-40	Input terminal status at the first fault	–	–	●
P9-41	Output terminal status at the first fault	–	–	●
P9-42	Inverter status at first fault	–	–	●
P9-43	Power-on time at first fault	–	–	●
P9-44	Uptime at first failure	–	–	●
P9-47	Fault protection action selection 1	0~2	0	☆

Par.	Designation	Scope	Default	Attr
P9-48	Fault protection action selection 2	Ones place: 0 Tens place: 0~1 Hundreds place: 0~1 Thousands: Motor overheated Ten thousand: the running time arrives	0	☆
P9-49	Fault protection action selection 3	Ones place: 0~2 Tens place: 0~2 Hundreds place: 0~2 Thousands: 0~2 Ten thousand: 0~2	0	☆

When "free stop" is selected, the inverter will display the fault code and stop directly.

When "stop by stop mode" is selected: the inverter will display the fault code, and stop by the stop mode, and display the fault code after the stop.

When "continue running" is selected: the inverter continues to run and displays the fault code, and the running frequency is set by P9-54.

Par.	Designation	Scope	Default	Attr
P9-54	Continue to run frequency selection in case of failure	0: Run at the current operating frequency 1: Run at the set frequency 2: Run at the upper limit frequency 3: Run at the lower frequency limit 4: Running at abnormal standby frequency	–	☆
P9-55	Second Frequency Converter Status	0.0%~100.0% (100.0% corresponds to the maximum frequency A0-10)	100.00%	☆

When a fault occurs during the operation of the inverter, and the processing mode of the fault is set to continue running, the inverter displays the fault code and runs at the frequency determined by P9-54.

When the abnormal standby frequency is selected to run, the value set by P9-55 is the percentage relative to the maximum frequency.

Par.	Designation	Scope	Default	Attr
P9-59	Current at first fault	0~2	0	★
P9-60	Instantaneous power failure and non-stop recovery of voltage	80%~100%	85%	★
P9-61	Instantaneous power failure and non-stop voltage recovery judgment time	0.0~100.0s	0.5s	★
P9-62	Instantaneous stop and non-stop action voltage	60%~100%	80%	★

This function means that in the event of an instant power failure or a sudden drop in voltage, the inverter reduces the output speed to compensate for the decrease in the DC bus voltage of the inverter by reducing the output speed, so as to keep the inverter running.

If P9-59=1, the inverter will decelerate when the power is cut off or the voltage suddenly drops, and when the bus voltage returns to normal, the inverter will accelerate to the set frequency and run normally. The basis for judging that the bus voltage is back to normal is that the bus voltage is normal and the duration exceeds the time set by P9-61.

If P9-59=2, the inverter will decelerate until it stops when the power is cut off or the voltage suddenly drops.

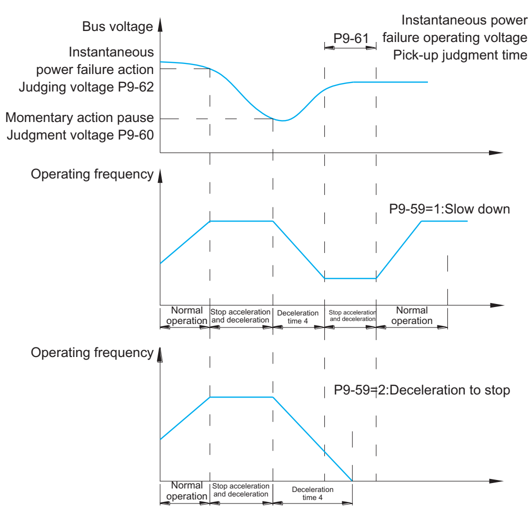


Fig.6-25 Schematic diagram of instantaneous power failure

Par.	Designation	Scope	Default	Attr
P9-63	Drop load protection option	0~1	0	☆
P9-64	Load drop detection level	0.0~100.0%	10.00%	☆
P9-65	Load drop detection time	0.0~60.0s	1.0S	☆

If the load loss protection function is valid, when the output current of the inverter is less than the load loss detection level P9-64, and the duration is longer than the load loss detection time P9-65, the output frequency of the inverter is automatically reduced to 7% of the rated frequency. During the load loss protection period, if the load recovers, the inverter will automatically resume to run at the set frequency.

Par.	Designation	Scope	Default	Attr
P9-69	Excessive speed deviation detection value	0.0%~50.0% (maximum frequency)	20.00%	☆
P9-70	Excessive speed deviation detection time	0.0s: no detection 0.1~60.0s	5.0S	☆

This function is only valid when the inverter is running in closed-loop vector control.

When the inverter detects that there is a deviation between the actual speed of the motor and the set frequency, the deviation is greater than the excessive speed deviation detection value P9-69, and the duration is longer than the excessive speed deviation detection time P9-70, the inverter fault alarm dEuF, And deal with it according to the fault protection action mode.

When the excessive speed deviation detection time is 0.0s, the excessive speed deviation fault detection will be canceled.

Group PA: Process Control And PID Function

PID control is a common method of process control. By performing proportional, integral and differential operations on the difference between the feedback signal of the controlled variable and the target signal, and by adjusting the output frequency of the inverter, a closed-loop system is formed, so that the controlled variable is stable at target value.

It is suitable for process control occasions such as flow control, pressure control and temperature control. Figure 6-25 is the control principle block diagram of process PID.

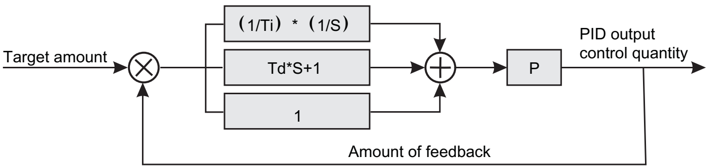


Fig.6-26 Process PID block diagram

Par.	Designation	Scope	Default	Attr
PA-00	PID setting	0~6	0	☆
PA-01	PID digital setting	0.0%~100.0%	50.0%	☆

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

The set target value of the process PID is a relative value, and the setting range is 0.0% to 100.0%. Similarly, the feedback quantity of PID is also a relative quantity, and the function of PID is to make these two relative quantities the same.

Par.	Designation	Scope	Default	Attr
PA-02	PID feedback	0~8	0	☆

This parameter is used to select the feedback signal channel for the process PID.

The feedback amount of the process PID is also a relative value, and the setting range is 0.0% to 100.0%.

Par.	Designation	Scope	Default	Attr
PA-03	PID action direction	0~1	0	☆

Positive effect:

When the feedback signal of the PID is less than the given amount, the output frequency of the inverter increases. Such as winding tension control occasions.

Reaction:

When the feedback signal of the PID is less than the given amount, the output frequency of the inverter decreases. Such as unwinding tension control occasions. This function is affecte-d by the reversal of the PID action direction of the multi-function terminal (function 35), and needs to be paid attention to during use.

Par.	Designation	Scope	Default	Attr
PA-04	PID given feedback range	0~65535	1000	☆

PID given feedback range is a dimensionless unit, used for PID given display U0-15 and PID feedback display U0-16.

The relative value of the given feedback of PID is 100.0%, corresponding to the given feedb-ack range PA-04. For example, if PA-40 is set to 2000, then when the PID given is 100.0%, the PID given display U0-15 is 2000.

Par.	Designation	Scope	Default	Attr
PA-05	Proportional gain Kp1	0.0~1000.0	50.0	☆
PA-06	Integration time Ti1	0.01s~10.00s	2.00s	☆
PA-07	Derivative time Td1	0.000s~10.000s	0.000s	☆

Proportional gain Kp1:

Determines the adjustment strength of the entire PID regulator, the greater the Kp1, the gre-ater the adjustment strength. The parameter 100.0 indicates that when the deviation between the PID feedback amount and the given amount is 100.0%, the adjustment range of the PID regulator to the output frequency command is the maximum frequency.

Integration time Ti1:

Determines the strength of the PID regulator integral adjustment. The shorter the integration time, the stronger the adjustment intensity. The integral time means that when the deviation between the PID feedback quantity and the given quantity is 100.0%, the integral regulator continuously adjusts after this time, and the adjustment quantity reaches the maximum fre-quency.

Differential time Td1:

Determines how strongly the PID regulator adjusts the deviation rate of change. The longer the differentiation time, the greater the adjustment intensity. Differential time means that when the feedback amount changes 100.0% within this time, the adjustment amount of the differential regulator is the maximum frequency.

Par.	Designation	Scope	Default	Attr
PA-08	Cutoff FREQ when opposite to rotary set direction	0.00Hz~maximum FREQ	0.00Hz	★

In some cases, only when the PID output frequency is negative (that is, the inverter is reversed), can the PID control the given amount and the feedback amount to the same state, but too high reverse frequency is not allowed in some occasions Yes, PA-08 is used to determine the upper limit of the reverse frequency.

Par.	Designation	Scope	Default	Attr
PA-09	PID offset limit	0.0%~100.0%	0.0%	☆

When the deviation between the PID given amount and the feedback amount is less than PA-09, the PID will stop adjusting. In this way, when the deviation between the given and the feedback is small, the output frequency is stable and unchanged, which is very effective for some closed-loop control occasions.

Par.	Designation	Scope	Default	Attr
PA-10	PID derivative limit	0.0%~100.0%	0.10%	☆

In the PID regulator, the role of differential is more sensitive, and it is easy to cause system oscillation. For this reason, the role of PID differential is generally limited to a small range. PA-10 is used to set the range of PID differential output.

Par.	Designation	Scope	Default	Attr
PA-11	Filtering time of PID setting	0.00~650.00s	0.00s	☆

PID given change time, refers to the time required for PID given value to change from 0.0% to 100.0%.

When the PID given changes, the PID given value changes linearly according to the given change time to reduce the adverse effect of the given sudden change on the system.

Par.	Designation	Scope	Default	Attr
PA-12	Filtering time of PID feedback	0.00s~60.00s	0.00s	☆
PA-13	Filtering time of PID output	0.00s~60.00s	0.00s	☆

PA-12 is used to filter the PID feedback amount, which is beneficial to reduce the influence of the feedback amount by interference, but it will bring the response performance of the process closed-loop system.

PA-13 is used to filter the PID output frequency. This filter will weaken the sudden change of the output frequency of the inverter, but it will also bring the response performance of the process closed-loop system.

Par.	Designation	Scope	Default	Attr
PA-14	Reserved	–	–	–
PA-15	Proportional gain Kp2	0.0~1000.0	20	☆
PA-16	Integration time Ti2	0.01s~10.00s	2.00s	☆
PA-17	Derivative time Td2	0.000s~10.000s	0.000s	☆
PA-18	PID parameter switch	0~3	0	☆
PA-19	PID parameter switching deviation 1	0.0%~PA-20	20.0%	☆
PA-20	PID parameter switching deviation 2	PA-19~100.0%	80.0%	☆

In some applications, a set of PID parameters cannot meet the needs of the entire running process, and different PID parameters need to be used in different situations.

This group of function codes is used for switching between two groups of PID parameters. The setting method of the regulator parameters PA-15~PA-17 is similar to the parameters PA-05~PA-07.

The two groups of PID parameters can be switched through the multi-function digital DI terminal, and can also be switched automatically according to the PID deviation. When the multi-function DI terminal switching is selected, the function selection of the multi-function terminal should be set to 43 (PID parameter switching terminal). 2 (PA-15~ PA-17).

When automatic switching is selected, when the absolute value of the deviation between reference and feedback is less than PID parameter switching deviation 1 (PA-19), the PID parameter selects parameter group 1. When the absolute value of deviation between reference and feedback is greater than PID switching deviation 2 (PA-20), PID parameter selection selects parameter group 2. When the deviation between reference and feedback is between switching deviation 1 and switching deviation 2, the PID parameters are linear interpolation values of two sets of PID parameters, as shown in Figure 7-26.

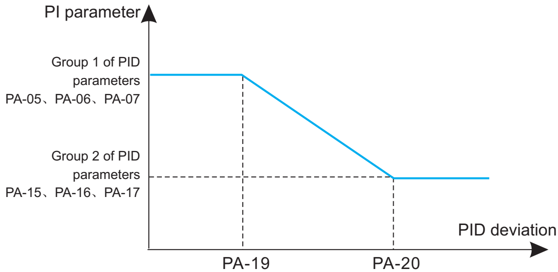


Fig.6-27 PID parameter switching

Par.	Designation	Scope	Default	Attr
PA-21	PID initial value	0.0%~100.0%	0.0%	☆
PA-22	PID initial value holding time	0.00~650.00s	0.0s	☆

When the inverter starts, the PID output is fixed at the PID initial value PA-21, and the PID starts the closed-loop adjustment operation after the PID initial value holding time PA-22 is continued.

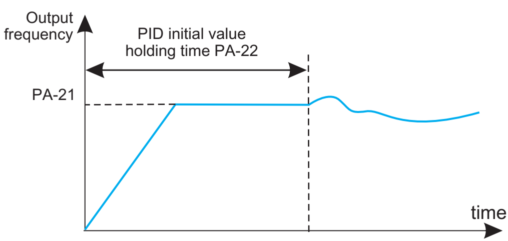


Fig.6-28 Schematic diagram of PID initial value function

Par.	Designation	Scope	Default	Attr
PA-23	Reserve	–	–	–
PA-24	Reserve	–	–	–

Reserve.

Par.	Designation	Scope	Default	Attr
PA-25	PID integral properties	Units:0~1 Tens place: 0~1	0	☆

Separation of points:

If the integral separation is set to be valid, when the multi-function digital DI integral pause (function 22) is valid, the integral PID integral of the PID stops operation, and only the proportional and differential functions of the PID are valid at this time.

When the integral separation selection is invalid, regardless of whether the multi-function digital DI is valid or not, the integral separation is invalid.

Whether to stop the integration after the output reaches the limit:

After the PID operation output reaches the maximum or minimum value, you can choose whether to stop the integral action. If you choose to stop the integration, the PID integration will stop calculating at this time, which may help reduce the overshoot of the PID.

Par.	Designation	Scope	Default	Attr
PA-26	PID feedback loss detection value	0.0%: Not judged feedback loss 0.1%~100.0%	0.0%	☆
PA-27	PID feedback loss detection time	0.0s~20.0s	0.0s	☆

This function code is used to judge whether the PID feedback is lost.

When the PID feedback amount is less than the feedback loss detection value PA-26, and the duration exceeds the PID feedback loss detection time PA-27, the inverter will alarm the fault PIdE, and handle it according to the selected fault handling method.

Par.	Designation	Scope	Default	Attr
PA-28	PID shutdown operation	0~1	0	☆

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

Group PB:Wobble Frequency, Fixed Length And Count

The swing frequency function is suitable for textile, chemical fiber and other industries, as well as occasions where traversing and winding functions are required.

The swing frequency function refers to the output frequency of the inverter, which swings up and down with the set frequency as the center. The trajectory of the running frequency on the time axis is shown in Figure 7-29. The swing amplitude is set by PB-00 and PB-01. When PB-01 is set to 0, the swing is 0, and the swing frequency does not work.

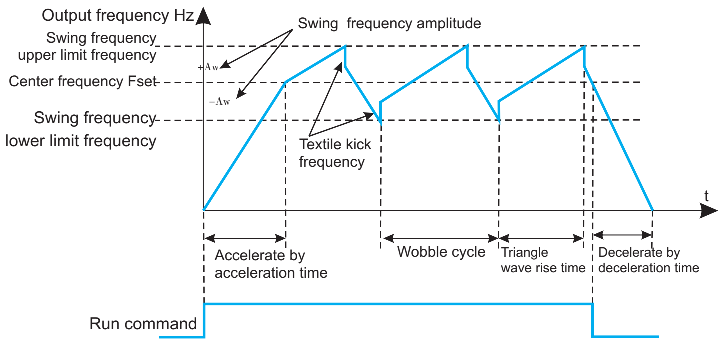


Figure 6-29. Schematic diagram of swing frequency operation

Par.	Designation	Scope	Default	Attr
PB-05	Set length	0m~65535m	1000m	☆
PB-06	Actual length	0m~65535m	0m	☆
PB-07	Pulses per meter	0.1~6553.5	100	☆

The above function codes are used for fixed-length control.

The length information needs to be collected through the multi-function digital input terminal. The number of pulses sampled by the terminal is divided by the number of pulses per meter PB-07, and the actual length PB-06 can be calculated. When the actual length is greater than the set length PB-05, the multi-function digital DO outputs the "length reached" ON signal.

During the fixed-length control process, the length reset operation can be performed through the multi-function DI terminal (the DI function selection is 28). For details, please refer to P4-00~P4-09.

In the application, the corresponding input terminal function needs to be set to "length count input" (function 27). When the pulse frequency is high, the DI5 port must be used.

Par.	Designation	Scope	Default	Attr
PB-08	Set count value	1~65535	1000	☆
PB-09	Specify count value	1~65535	1000	☆

The count value needs to be collected through the multi-function digital input terminal. In the application, the corresponding input terminal function needs to be set to "counter input" (function 25). When the pulse frequency is high, the DI5 port must be used.

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

When the count value reaches the designated count value PB-09, the multi-function digital DO outputs the "designated count value reached" ON signal, and the counter continues to count at this time, and the counter stops until the "set count value".

The specified count value PB-09 should not be greater than the set count value PB-08. Figure 6-30 is a schematic diagram of the function of setting count value arrival and specifying count value arrival.

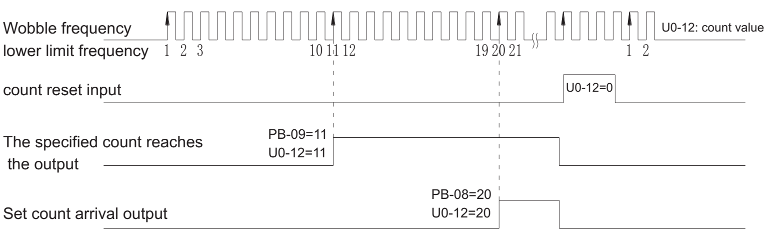


Fig.6-30 Schematic diagram of set count value given and specified count value given

Group PC: Multi-segment instructions, simple PLC

The multi-stage command of the inverter has more functions than the usual multi-stage speed. In addition to realizing the multi-stage speed function, it can also be used as the voltage setting of the V/F separation and the given setting of the process PID. For this reason, the dimensions of multi-segment instructions are relative.

The program running function is different from the user programmable function of the inverter, and the program running can only complete the simple combined operation of multi-segment instructions. The user programmable functions are more abundant and practical, please refer to the relevant instructions of the A7 group.

Par.	Designation	Scope	Default	Attr
PC-00	Multiband frequency 0	-100.0%~100.0%	0.00%	☆
PC-01	Multiband frequency 1	-100.0%~100.0%	0.00%	☆
PC-02	Multiband frequency 2	-100.0%~100.0%	0.00%	☆
PC-03	Multiband frequency 3	-100.0%~100.0%	0.00%	☆
PC-04	Multiband frequency 4	-100.0%~100.0%	0.00%	☆
PC-05	Multiband frequency 5	-100.0%~100.0%	0.00%	☆
PC-06	Multiband frequency 6	-100.0%~100.0%	0.00%	☆
PC-07	Multiband frequency 7	-100.0%~100.0%	0.00%	☆
PC-08	Multiband frequency 8	-100.0%~100.0%	0.00%	☆
PC-09	Multiband frequency 9	-100.0%~100.0%	0.00%	☆
PC-10	Multiband frequency 10	-100.0%~100.0%	0.00%	☆
PC-11	Multiband frequency 11	-100.0%~100.0%	0.00%	☆
PC-12	Multiband frequency 12	-100.0%~100.0%	0.00%	☆
PC-13	Multiband frequency 13	-100.0%~100.0%	0.00%	☆
PC-14	Multiband frequency 14	-100.0%~100.0%	0.00%	☆
PC-15	Multiband frequency 15	-100.0%~100.0%	0.00%	☆

Multi-segment instructions can be used in three occasions: as frequency setting, as voltage setting for V/F separation, and as process PID setting.

The multi-segment instruction needs to be switched according to the different states of the multi-function digital DI. For details, please refer to the relevant instructions of the P4 group.

Par.	Designation	Scope	Default	Attr
PC-16	Simple PLC operation mode	0~2	0	☆

The program running function has two functions: as frequency setting or as voltage setting for V/F separation.

Figure 6-31 is a schematic diagram of the program running as the frequency setting. When the program running is used as the frequency setting, the positive and negative values of PC-00~PC-15 determine the running direction. If it is negative, it means that the inverter runs in the opposite direction.

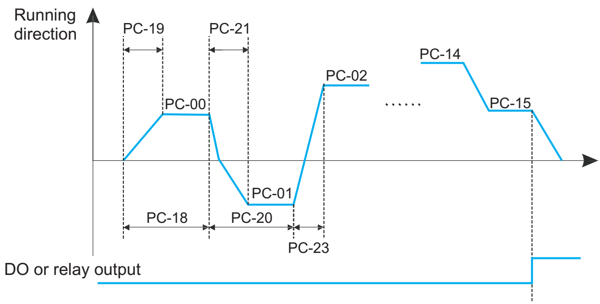


Fig.6-31 Simple PLC schematic diagram

When used as frequency setting, PLC has three operation modes, when used as V/F separation voltage setting, it does not have these three modes. in:

0: Stop at the end of a single operation

The inverter will automatically stop after completing a single cycle, and it needs to give the running command again to start.

1: Keep the final value at the end of a single operation After the inverter completes a single cycle, it will automatically keep the running frequency and direction of the last segment.

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

Par.	Designation	Scope	Default	Attr
PC-17	Simple PLC power-down memory selection	Ones place: power-down memory selection 0: no memory when power off Tens place: stop memory selection 0: no memory when stopped 1: Power-down memory 2: Stop memory	0	☆

PLC power-off memory means to memorize the PLC's running stage and running frequency before power-off, and continue to run from the memory stage when the power is next turned on. If you choose not to memorize, the PLC process will be restarted every time the power is turned on.

The PLC shutdown memory is to record the previous PLC running stage and running freque-ncy when it stops, and continue to run from the memory stage in the next running. Choose not to memorize to restart the PLC process each time it is started.

Par.	Designation	Scope	Default	Attr
PC-18	Simple PLC section 0 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-19	Simple PLC section 0 acceleration and deceleration time selection	0~3	0	☆
PC-20	Simple PLC section 1 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-21	Simple PLC section 1 acceleration and deceleration time selection	0~3	0	☆
PC-22	Simple PLC section 2 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-23	Simple PLC section 2 acceleration and deceleration time selection	0~3	0	☆
PC-24	Simple PLC section 3 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-25	Simple PLC section 3 acceleration and deceleration time selection	0~3	0	☆
PC-26	Simple PLC section 4 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-27	Simple PLC section 4 acceleration and deceleration time selection	0~3	0	☆
PC-28	Simple PLC section 5 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-29	Simple PLC section 5 acceleration and deceleration time selection	0~3	0	☆

Par.	Designation	Scope	Default	Attr
PC-30	Simple PLC section 6 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-31	Simple PLC section 6 acceleration and deceleration time selection	0~3	0	☆
PC-32	Simple PLC section 7 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-33	Simple PLC section 7 acceleration and deceleration time selection	0~3	0	☆
PC-34	Simple PLC section 8 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-35	Simple PLC section 8 acceleration and deceleration time selection	0~3	0	☆
PC-36	Simple PLC section 9 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-37	Simple PLC section 9 acceleration and deceleration time selection	0~3	0	☆
PC-38	Simple PLC section 10 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-39	Simple PLC section 10 acceleration and deceleration time selection	0~3	0	☆
PC-40	Simple PLC section 11 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-41	Simple PLC section 11 acceleration and deceleration time selection	0~3	0	☆
PC-42	Simple PLC section 12 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-43	Simple PLC section 12 acceleration and deceleration time selection	0~3	0	☆
PC-44	Simple PLC section 13 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-45	Simple PLC section 13 acceleration and deceleration time selection	0~3	0	☆
PC-46	Simple PLC section 14 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-47	Simple PLC section 14 acceleration and deceleration time selection	0~3	0	☆
PC-48	Simple PLC section 15 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
PC-49	Simple PLC section 15 acceleration and deceleration time selection	0~3	0	☆
PC-50	Simple PLC running time unit	0~1	0	☆
PC-51	Simple PLC running time unit	0~6	0	☆

This parameter determines the given channel of multi-segment instruction 0.

In addition to PC-00, there are many other options for multi-segment instruction 0, which is convenient to switch between multi-short instructions and other given methods. When the multi-segment command is used as the frequency setting or the program operation is used as the frequency setting, the switching between the two frequency settings can be easily realized.

Group PD: MODBUS Communication Parameters

Please refer to "Communication Agreement”

Group PP: Para. No. Management

If PP-00 sets any non-zero number, the password protection function will take effect. The next time you enter the menu, you must enter the correct password, otherwise you cannot view and modify the function parameters, please keep in mind the set user password.

Setting PP-00 to 00000 will clear the set user password and make the password protection function invalid.

Par.	Designation	Scope	Default	Attr
PP-01	Parameter initialization	0~05	0	★

1. Restore factory settings, excluding motor parameters

After setting PP-01 to 1, most of the functional parameters of the inverter are restored to the factory default parameters, but the motor parameters, frequency command decimal point (P0-22), fault record information, cumulative running time (P7-09), cumulative power-on Time (P7-13) and cumulative power consumption (P7-14) do not recover.

2. Clear record information

Clear the inverter fault record information, accumulated running time (P7-09), accumulated power-on time (P7-13), and accumulated power consumption (P7-14).

3. Backup user's current parameters

Back up the parameters set by the current user. Back up the setting values of all current function parameters. In order to facilitate customers to recover after parameter adjustment disorder.

4. Restore user backup parameters

Restore the user parameters backed up before, that is, restore the parameters backed up by setting PP-01 to 05.

Par.	Designation	Scope	Default	Attr
PP-02	Function parameter group display selection	Ones place: 0~1 Tens place:0~1	11	☆
PP-03	Personality parameter group display selection	Ones place: 0~1 Tens place:0~1	0	☆
PP-04	Function code modification attribute	0~1	0	☆

Whether the function code parameters set by the user can be modified is used to prevent the danger of the function parameters being changed by mistake.

When this function code is set to 0, all function codes can be modified; and when it is set to 1, all function codes can only be viewed and cannot be modified.

Group A0: Torque Control Parameters

Par.	Designation	Scope	Default	Attr
A0-00	Speed/torque control mode selection	0~1	0	★

Used to select the inverter control mode: speed control or torque control.

The multi-function digital DI terminal has two functions related to torque control: torque control prohibition (function 29), speed control/torque control switching (function 46). These two terminals should be used in conjunction with A0-00 to realize the switching between speed and torque control.

When the speed control/torque control switching terminal is invalid, the control mode is determined by A0-00. If the speed control/torque control switching is valid, the control mode is equivalent to the inversion of the value of A0-00. In any case, when the torque control prohibition terminal is valid, the inverter is fixed in the speed control mode.

Par.	Designation	Scope	Default	Attr
A0-01	Torque setting selection in torque control mode	0~7	0	★
A0-03	Torque digital setting in torque control mode	-200.0%~200.0%	150.00%	☆

A0-01 is used to select torque setting, there are 8 torque setting modes.

Torque setting adopts relative value, 100.0% corresponds to the rated torque of the inverter. The setting range is -200.0% to 200.0%, indicating that the maximum torque of the inverter is twice the rated torque of the inverter.

When torque setting adopts modes 1 to 7, 100% of communication, analog input and pulse input correspond to A0-03.

Par.	Designation	Scope	Default	Attr
A0-05	Torque control forward maximum frequency	0.00Hz~Maximum frequency	50.00Hz	☆
A0-06	Torque control reverse maximum frequency	0.00Hz~Maximum frequency	50.00Hz	☆

It is used to set the forward or reverse maximum running frequency of the inverter in torque control mode.

When the inverter torque is controlled, if the load torque is less than the motor output torque, the motor speed will continue to rise. In order to prevent accidents such as flying in the mechanical system, the maximum motor speed during torque control must be limited.

Par.	Designation	Scope	Default	Attr
A0-07	Torque rise filter time	0.00s~65000s	0.00s	☆
A0-08	Torque drop filter time	0.00s~65000s	0.00s	☆

In the torque control mode, the difference between the motor output torque and the load torque determines the speed change rate of the motor and the load. Therefore, the motor speed may change rapidly, causing problems such as excessive noise or mechanical stress. By setting the torque control acceleration/deceleration time, the motor speed can be changed smoothly.

But for the occasions that require quick torque response, it is necessary to set the torque control acceleration and deceleration time to 0.00s.

Group A5: Control Optimization

Par.	Designation	Scope	Default	Attr
A5-00	DPWM switching upper limit frequency	5.00Hz~Maximum frequency	8.00Hz	☆

Only valid for VF control.

The wave-emitting mode of the asynchronous machine VF is determined. If it is lower than th-is value, it is a 7-segment continuous modulation mode, and on the contrary, it is a 5-segment discontinuous modulation mode.

When it is 7-stage continuous modulation, the switching loss of the inverter is large, but the current ripple is small; in the 5-stage intermittent debugging mode, the switching loss is small and the current ripple is large; but at high frequency, it may cause The instability of the motor operation generally does not need to be modified.

Par.	Designation	Scope	Default	Attr
A5-02	Dead time compensation mode selection	0~1	1	☆

This parameter generally does not need to be modified. Only when there are special requir ements for the quality of the output voltage waveform, or when the motor has an abnormality such as oscillation, it is necessary to try to switch to select a different compensation mode.

Compensation mode 2 is recommended for high power.

Par.	Designation	Scope	Default	Attr
A5-03	Random PWM depth	0~10	0	☆

Setting random PWM can soften the monotonous and harsh motor sound and help reduce external electromagnetic interference. When the random PWM depth is set to 0, the random PWM is invalid. Adjusting random PWM with different depths will get different effects.

Par.	Designation	Scope	Default	Attr
A5-04	Fast current limit enable	0~1	1	☆

Enabling the fast current limiting function can minimize the overcurrent fault of the inverter and ensure the uninterrupted operation of the inverter. If the inverter continues to be in the fast current limiting state for a long time, the inverter may be damaged by overheating, which is not allowed. Therefore, the inverter will alarm fault OCn when the inverter is rapidly limiting the current for a long time, indicating that the inverter is overloaded and needs to be stopped.

Par.	Designation	Scope	Default	Attr
A5-05	Maximum output voltage coefficient	100~110%	105%	★

It is used to set the current detection compensation of the inverter. If the setting is too large, the control performance may be degraded. Usually no modification is required.

Par.	Designation	Scope	Default	Attr
A0-06	Torque control reverse maximum frequency	0.00Hz~Maximum frequency	50.00Hz	☆

It is used to set the voltage value of the inverter's undervoltage fault Uu. The inverter of diffe rent voltage levels is 100.0%, corresponding to different voltage points, which are:

Single-phase 220V or three-phase 220V: 200V

Three-phase 380V: 350V

Three-phase 480V: 450V

Par.	Designation	Scope	Default	Attr
A5-08	low speed carrier	0.0~8.0kHz	0	☆

Adjusting this value can improve the effective utilization rate of the voltage, and if the adjust ment is too small, it will easily lead to unstable system operation. User modification is not rec ommended.

Par.	Designation	Scope	Default	Attr
A5-09	Overvoltage point setting	200.0V~2500.0V	Model dependent	★

Used to set the voltage value of the inverter overvoltage fault

Note:

The factory default value is also the upper limit of the inverter's internal overvoltage protection. This parameter setting takes effect only when the set value of A5-09 is less than the factory default value. When it is higher than the factory value, the factory value shall prevail.

Group U0: Monitoring

The U0 parameter group is used to monitor the operating status information of the inverter. Customers can view it through the panel to facilitate on-site debugging, and can also read the parameter group value through communication for monitoring by the host computer. Among them, U0-00 ~ U0-31 are the running and stop monitoring parameters defined in P7-03 and P7-04.

Par.	Designation	Scope	Default	Attr
U0-00	Operating frequency (Hz)	0.01Hz	7000H	
U0-01	Set frequency (Hz)	0.01Hz	7001H	

Displays the theoretical running frequency of the inverter and the absolute value of the set frequency.

See U0-19 for the actual output frequency of the inverter.

Par.	Designation	Scope	Default	Attr
U0-02	Bus voltage (V)	0.1V	7002H	

Displays the inverter bus voltage value.

Par.	Designation	Scope	Default	Attr
U0-03	Output voltage (V)	1V	7003H	

Displays the output voltage value of the inverter during operation.

Par.	Designation	Scope	Default	Attr
U0-04	Output current (A)	0.01A	7004H	

Displays the inverter output current value during operation.

Par.	Designation	Scope	Default	Attr
U0-05	Output torque (%)	0.1kW	7005H	

Displays the output power value of the inverter during operation.

Par.	Designation	Scope	Default	Attr
U0-06	Output torque (%)	0.001	7006H	

Displays the output torque value of the inverter during operation.

Par.	Designation	Scope	Default	Attr
U0-07	X input state	1	7007H	

Displays the current DI terminal input status value. After being converted into binary data, each bit corresponds to a DI input signal, 1 means that the input is a high-level signal, and 0 means that the input is a low-level signal. The corresponding relationship between each bit and the input terminal is as follows:

Bit0	Bit1	Bit2	Bit3
DI1	Di2	Di3	Di4
Bit4	Bit5	Bit6	Bit7
Di5			
Bit8	Bit9	Bit10	Bit11
		VDI1	VDI2
Bit12	Bit13	Bit14	Bit15
VDI3	VDI4	VDI5	--

Par.	Designation	Scope	Default	Attr
U0-08	DO output status	1	7008H	

Displays the current DO terminal output status value. After conversion into binary data, each bit corresponds to a DO signal, 1 means the output is high, and 0 means the output is low. The corresponding relationship between each bit and the output terminal is as follows:

Bit0	Bit1	Bit2	Bit3
	Relay 1		
Bit4	Bit5	Bit6	Bit7
Di5	VDO1	VDO2	VDO3
Bit8	Bit9	Bit10	Bit11
VDO4	VDO5		

Par.	Designation	Scope	Default	Attr
U0-10	Ai2 voltage (V)/current (mA)	0.01V/0.01mA	700AH	

When P4-40 is set to 0, AI2 sampling data display unit is voltage (V)

When P4-40 is set to 1, AI2 sampling data display unit is current (mA)

Par.	Designation	Scope	Default	Attr
U0-14	Load speed display	1	700EH	

The displayed value is described in P7-12.

Par.	Designation	Scope	Default	Attr
U0-15	PID setting	1	700FH	
U0-16	PID feedback	1	7010H	

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

PID setting=PID setting (percentage)×PA-04

PID feedback = PID feedback (percentage) × PA-04

Par.	Designation	Scope	Default	Attr
U0-18	Input pulse frequency (Hz)	0.01kHz	7012H	

Display DI5 high-speed pulse sampling frequency, the minimum unit is 0.01KHz.

Par.	Designation	Scope	Default	Attr
U0-19	Feedback speed (Hz)	0.01Hz	7013H	

Displays the actual output frequency of the inverter.

The tens digit setting value of function code P7-12 (load speed display decimal point) represents the number of decimal points in U0-19/U0-29. When it is set to 2, the number of decimal points in U0-19 is 2, and the display range It is -320.00Hz~320.00Hz; when it is set to 1, the number of decimal points in U0-19 is 1, and the display range is -500.0Hz~500.0Hz.

Par.	Designation	Scope	Default	Attr
U0-20	Remaining running time	0.1Min	7014H	

Displays the remaining running time during timing operation. For the introduction of timing operation, see the introduction of parameters P8-42~ P8-44.

Par.	Designation	Scope	Default	Attr
U0-21	Ai1 voltage before correction	0.001V	7015H	
U0-22	Ai2 Voltage (V)/Current (mA) before calibration	0.001V/0.01mA	7016H	

Displays the actual value of the analog input sampled voltage/current.

The actual voltage/current used is linearly corrected to make the deviation between the sampled voltage/current and the actual input voltage/current smaller.

See U0-09 and U0-10 for the actual correction voltage/current used, and see the AC group introduction for the correction method.

Par.	Designation	Scope	Default	Attr
U0-24	Line speed	1m/Min	7018H	

Display the linear speed of DI5 high-speed pulse sampling, the unit is: m/min.

Calculate the linear velocity value according to the actual number of sampled pulses per minute and PB-07 (pulses per meter).

Par.	Designation	Scope	Default	Attr
U0-27	input pulse frequency	1Hz	701BH	

Displays the sampling frequency of DI5 high-speed pulse in 1Hz. It is the same data as U0-18, only the displayed unit is different.

Par.	Designation	Scope	Default	Attr
U0-28	Communication settings	0.0001	701CH	

Displays the data written through the communication address 0x1000.

Par.	Designation	Scope	Default	Attr
U0-30	main frequency display	0.01Hz	701EH	

Display frequency setting main channel X frequency setting.

Par.	Designation	Scope	Default	Attr
U0-31	Auxiliary frequency display	0.01Hz	701FH	

Displays auxiliary frequency Y frequency setting.

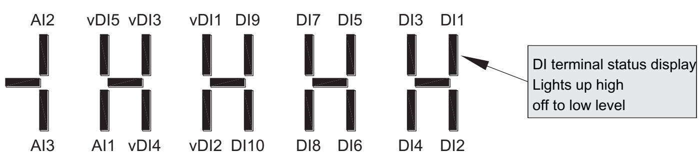
Par.	Designation	Scope	Default	Attr
U0-39	V/F separation target voltage	1V	7027H	
U0-40	V/F split output voltage	1V	7028H	

Displays the target output voltage and the current actual output voltage when running in the V/F separation state.

For V/F separation, please refer to the related introduction of P3 group.

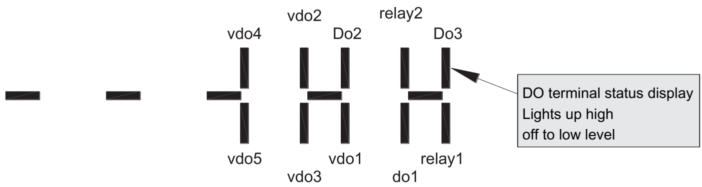
Par.	Designation	Scope	Default	Attr
U0-41	Intuitive display of X input status	1.00	7029H	

Visually display the DI terminal status, and its display format is as follows:



Par.	Designation	Scope	Default	Attr
U0-42	Intuitive display of Do output status	1.00	702AH	

Visually display the output status of the DO terminal, and its display format is as follows:

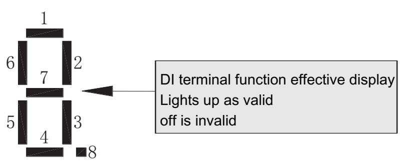


Par.	Designation	Scope	Default	Attr
U0-43	X function status visual display 1 (function 01-40)	1.00	702BH	

Visually display whether terminal functions 1 to 40 are valid

There are 5 nixie tubes on the keyboard, and each nixie tube display can represent 8 function options

The definition of digital tube is as follows:



From right to left, the digital tubes represent functions 1~8, 9~16, 17~24, 25~32, 33~40 respectively.

Par.	Designation	Scope	Default	Attr
U0-44	X function status visual display 2 (functions 41-80)	1.00	702CH	

Visually display whether terminal functions 41 to 59 are valid

Display is similar to U0-43

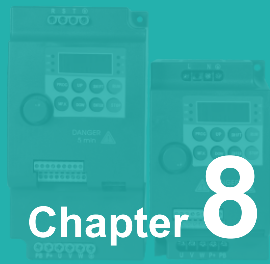
The digital tubes represent functions 41-48, 49-56, 57-59 from right to left respectively

Par.	Designation	Scope	Default	Attr
U0-61	Inverter status	1.00	703DH	

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

Bit0	0: Stop; 1: Forward; 2: Reverse
Bit1	
Bit2	0: constant speed; 1: acceleration; 2: deceleration
Bit3	
Bit4	0: The bus voltage is normal; 1: Undervoltage

Chapter 8



485 Communication Protocol

This product communication data can be divided into function code data and non-function code data, the latter includes running commands, running status, running parameters, alarm information, etc.

8.1 Function code data

The function code data is the important setting parameters of the frequency converter, as follows:

Function code data	**Group P** (R/W)	P0、P1、P2、P3、P4、P5、P6、P7、P8、P9、PA、PB
	Group A (R/W)	A0、A1、A2、A5、A6、A7、A8、A9、AA、AB、AC

The communication address of function code data is defined as follows：

When reading function code data for communicationer

For function code data in groups P0 to PF and A0 to AF, the 16 digits higher in the communication address are the number of the function group, and the 16 digits lower in the communication address are the number of the function group. For example:

❶ P0-16 function parameter, whose communication address is F010H, where F0H is the function parameter of P0 group, and 10H is the hexadecimal data format of power code 16 in the function group.

❷ Ac-08 function parameter, whose communication address is AC08. ACH indicates the function parameter of the AC group, and 08H indicates the hexadecimal data format of the power code number 8 in the function group.

When writing function code data for communication

For function code data in P0 to PF groups, its communications address is 16 bits higher.The value can be 00 to 0F or P0 to PF. The lower 16 digits are the number of the function code in the function group. For example:

❶ Write function parameters P0-16;
If no EEPROM is written into it, its address is 0010H;
If an EEPROM needs to be written, its address is F010H;

For the function code data in A0 to AF groups, its communications address is 16 digits higher and can be distinguished as if it needs to be written into EEPROM;

40 to 4F or A0 to AF, the lower 16 digits are the number of the function code in the function group. The following is an example:

❷ Write function parameter AC-08:
If no EEPROM is written, the address is 4C08H;
If an EEPROM needs to be written, its address is AC08H.

8.2 Non-function code data

Non-Function code data	**Status data (Only read)**	U group monitoring parameters, frequency converter fault description, frequency converter running state
	Control parameter (Only write)	Control command, communication set value, digital output terminal control, analog output AO1 control, analog output AO2 control, high speed pulse (FMP) output control, parameter initialization

The status data is divided into U group monitoring parameters, frequency converter fault description and frequency converter running state.

U group parameters monitoring parameters

For the description of monitoring data in group U, see Chapter 5 and Chapter 6. The addresses are defined as follows: U0 to UF, the 16 digits higher than U0 are 70 to 7F, and the 16 digits lower are the serial numbers of monitoring parameters in the group. For example, U0-11 is 700BH.

Frequency converter fault description

When the communication reads the fault description of the frequency converter, the communication address is fixed at 8000H. By reading the address data, the upper computer can obtain the current frequency converter fault code. The fault code description is defined in Chapter 5 P9-14 Function code.

Running status of frequency converter

When the communication reads the running state of the converter, the communication address is fixed at 3000H. By reading the address data, the upper computer can obtain the current running state information of the converter, which is defined as follows:

Communication address of frequency converter operation status	Read the status word definition
3000H	1：Forward running 2：Reverse running 3：Shutdown

8.3 Control parameters

Control parameters are divided into control command, digital output terminal control, analog output AO1 control, analog output AO2 control, high speed pulse (FMP) output control.

8.3.1 Control commands

When P0-02(command source) is set to 2: communication control, the upper computer can control the start and stop of the inverter and other related commands through this communication address. The control commands are defined as follows:

Control command communication address	Command function
2000H	1：Forward running 2：Reverse running 3：Forward running inching 4：Reverse running inching 5：Free shutdown 6：Slow down shutdown 7：Fault resetting

7.3.2 Communication set point

Communication set value The frequency source, torque upper limit source, VF separation voltage source, PID given source, PID feedback source, etc. are selected as the given data of communication timing by the main user This product.Its communication address is 1000H. When the upper computer sets this communication address value, its data range is -10000~10000, corresponding to the relative given value -100.00%~100.00%.

8.3.3 Digital output terminal control

When the function of the digital output terminal is set to 20: communication control, the upper computer can control the digital output terminal of the converter through this communication address, as defined below:

Digital output terminal control communication address	Command content
2001H	BIT0：DO1 output control BIT1：DO2 output control BIT2：RELAY1 output control BIT3：RELAY2 output control BIT4：FMR output control BIT5：VDO1 BIT6：VDO2 BIT7：VDO3 BIT8：VDO4 BIT9：VDO5

8.3.4 Analog output AO1 and AO2, high-speed pulse output FMP control

When the analog output AO1 and AO2, and the high speed pulse output FMP output function is set to 12: communication setting, the upper computer can control the analog output and high speed pulse output of the inverter through this communication address, as defined below:

Output control communication address		Command content
AO1	2002H	0 ~ 7FFF means 0% ~ 100%
AO2	2003H	
FMP	2004H	

8.3.5 Parameter initialization

This function is required when the upper computer is used to initialize the parameters of the converter.

If P-00 (user password) is not 0, the password verification needs to be carried out through communication first. After the verification is passed, the upper computer initializes the parameters within 30 seconds.

Communication The communication address for user password verification is 1F00H. If the correct user password is directly written into this address, the password verification can be completed

The address for communication parameter initialization is 1F01H, and its data content is defined as follows:

Parameter initialization communication address	Command function
1F01H	1：Restoring factory parameters 2：Recording information clearly 4：Restoring user backup parameter 501：Backup current user parameter

8.4 Protocol Content

Products in this series inverter provides RS485 communication interface and supports Modbus-RTU slave communication protocol. Users can realize centralized control through computer or PLC, through the communication protocol set frequency converter running commands, modify or read function code parameters, read frequency converter working state and fault information, etc.

8.4.1 Parameter initialization

The serial communication protocol defines the content and format of information transmitted in serial communication. These include: host polling (or broadcast) format; The coding method of the host, including: function code requiring action, transmission data and error check, etc. The slave machine's response also adopts the same structure, including: action confirmation, return data and error check. If the slave machine makes an error while receiving the message, or fails to perform the action required by the host, it organizes a fault message and sends it back to the host in response.

8.4.1.1 Application mode

The frequency converter is connected to the "single master multi-slave" PC/PLC control network with RS485 bus as a communication slave.

8.4.1.2 Bus Structure

❶ Hardware interface

The RS485 expansion card MD38TX1 is inserted into the frequency converter;

❷ Topological structure single host multi-slave system. Each communication device in the network has a unique slave address, and one device acts as the gateway;

Communication host (usually flat PC upper computer, PLC, HMI, etc.), actively initiate communication, read or write the parameters of the slave machine;

Other devices in the communication of the slave machine, in response to the host on the local inquiry or communication operations. Only one device can send at a time;

Data while other devices are in the receiving state;

The slave IP address ranges from 1 to 247. 0 is the broadcast address. Slave addresses in the network must be unique.

❸ communication transmission mode asynchronous serial, half duplex transmission mode. In serial asynchronous communication, data is in the form of messages,Send one frame of data at a time. According to modbus-RTU protocol, when the idle time of no data on the communication data line is greater than 3.5Byte transmission time, indicating the start of a new communication frame.

This series inverter built-in communication protocol is Modbus-RTU slave communication protocol, can respond to the host"Query/command", or according to the host "query/command" to make the corresponding action, and communication data reply.

Mainframe can refer to personal computers (PCS), industrial control equipment or programmable logic controllers (PLCS), etc.

The host can either communicate with a slave individually or broadcast information to all slave. Single for host unique access to "query/command", be accessed from the machine to return a reply frame; For broadcast messages sent by the host, the machine does not need to respond back to the host.

8.5 Communication data structure

This series frequency converter's Modbus protocol communication data format is as follows, frequency converter only supports Word type parameter reading or write. The corresponding communication read operation command is Ox03.The write operation command is 0x06 and does not support byte or bit read/write operations:

Theoretically, the upper computer can read several consecutive function codes at a time (i.e., n can be up to 12), but to do not cross the last function code in this function code group, otherwise an error will be answered.

If the slave machine detects a communication frame error or fails to read or write due to other reasons, it will reply to the error frame.

8.5.1 The data frame description:

The serial communication protocol defines the content and format of information transmitted in serial communication. These include: host polling (or broadcast) format; The coding method of the host, including: function code requiring action, transmission data and error check, etc. The slave machine's response also adopts the same structure, including: action confirmation, return data and error check. If the slave machine makes an error while receiving the message, or fails to perform the action required by the host, it organizes a fault message and sends

START	Idle transfer time of more than 3.5 characters
ADR	Communication address range：1 ~ 247； 0=broadcast address
CMD	03：read parameter； 06：write parameter

Function code number H	The address of the internal parameters of the converter, expressed in hexadecimal; Parameters can be classified into functional and non-functional codes (such as running status parameters and running commands). For details, see Address definition. When transmitting, the high byte is first and the low byte is last.
Function code number L	
Function code number H	Number of function codes read in this frame. If it is 1, one function code is read. When transmitting, the high byte is first and the low byte is last. This protocol can rewrite only one function code at a time.
Function code numberL	
Data H	Reply data, or data to be written, is transmitted with the high byte first and the low byte last.
Data L	
END	3.5 characters

8.5.2 CRC verification mode:

CRC (Cyclic Redundancy Check) uses the RTU frame format and messages include CRC-based methods error detection domain. The CRC domain detects the content of the entire message. The CRC field is two bytes, containing 16 bits of two. A base value calculated by the transport device and added to the message. The RECEIVING device recalculates the CRC for the received message and compared with the received VALUES in the CRC field, if the two CRC values are not equal, it indicates that there is a transmission error.

CRC is stored in 0xFFFF, and then a procedure is called to attach successive 8-bit bytes in the message to the current register. Values are processed. Only 8 bits of data per character are valid for CRC, start and stop bits, and parity

The parity bit is invalid. In CRC, each 8-bit character is individually different or (XOR) from the register contents,

The result is xOR backward to the least significant bit. If LSB is 0, no operation is performed. The whole process is repeated eight times. In the most

After the last bit (8th bit) is complete, the next 8-bit byte is separately different or from the current value of the register. Final check

Is the CRC value after all bytes in the message have been executed.

When CRC is added to a message, the low bytes are added first, then the high bytes.

Address definition for communication parameters :

Read and write function code parameters (some function codes cannot be changed, only for manufacturer use or monitoring use) .

8.5.3 Function Code Parameters Address Labeling rules

Address rule with function code group number and label as parameters:

High order bytes: P0~PF(group P), A0~AF(group A), 70~7F(group U).The value ranges from 00 to PF.For example, if the range function code P3-12 is required, the access address of the function code is expressed as 0 xf30c;

Note:

- PF group: parameters can neither be read nor changed;
- U group: can only be read, cannot change the parameters.

Some parameters cannot be changed when the converter is in operation state; Some parameters can not be changed no matter what state the converter is in;

Change function code parameters, but also pay attention to the parameter range, unit, and related instructions.

Function code group No.	Communication address	Communication modifies the function code address in RAM
Group P0 ~ PE	0xF000 ~ 0xFEFF	0x0000 ~ 0x0EFF
Group A0 ~ AC	0xA000 ~ 0xACFF	0x4000 ~ 0x4CFF
Group U0	0x7000 ~ 0x70FF	

Note that because the EEPROM is stored frequently, it will reduce the service life of the EEPROM, so some features

Code in communication mode, do not need to store, just change the value in RAM can be.

- If it is group P parameter, the function can be realized by changing the high position F of the function code address to 0.

➢ If it is group A parameter, to achieve this function, just change the high position A of the function code address to 4

It can be done. The address of the corresponding function code is as follows:

High byte: 00~0F(group P), 40~4F(group A)，The value ranges from 00 to FF

Such as:

Function code P3-12 is not stored in the EEPROM, and the address is 030C.

Function code A0-05 is not stored in the EEPROM, and the address is 4005.

This address indicates that the RAM can only be written, but cannot be read. When read, the address is invalid.

You can also use the command code 07H for all parameters.

The data is given by the upper computer through the communication address 0x1000. The data format is data with 2 decimal points, and the data range Is P0-10 ~ + P0-10.

❶ Shutdown/operation parameters:

Parameter address	Parameter description	Parameter address	Parameter description
1000H	* Communication set value (decimal)	1010H	PID set
1001H	–10000 ~ 10000	1011H	PID feedback
1002H	Running frequency	1012H	PLC procedure
1003H	Busbar voltage	1013H	PULSE Input pulse frequency，unit: 0.01kHz
1004H	Output voltage	1014H	Feedback speed，unit: 0.1Hz
1005H	Output current	1015H	Remaining running time
1006H	Output power	1016H	AI1 Pre-calibration voltage
1007H	Output torque	1017H	AI2 Pre-calibration voltage
1008H	Running speed	1018H	AI3 Pre-calibration voltage
1009H	DI input symbol	1019H	Linear velocity
100AH	AI1 voltage	101AH	Current power-on time
100BH	AI2 voltage	101BH	Current running time

Parameter address	Parameter description	Parameter address	Parameter description
100CH	AI3 voltage	101CH	PULSE input pulse frequency， unit: 1Hz
100DH	Calculation value input	101DH	Communication setting value
100EH	Length value input	101EH	Actual feedback speed
100FH	Load speed	101FH	Main frequency X display
--	–	1020H	Auxiliary frequency Y display

Note:

- Communication set value is the percentage of relative value, 10000 corresponds to 100.00%, -10000 corresponds to -100.00%.
- For frequency dimensional data, the percentage is a percentage relative to the maximum frequency (P0-10); For the dimension of torque.
- The percentage is P2-10 and A2-48 (the upper limit of torque is set numerically, corresponding to the first and second motors respectively).

❷ Control the command input into the frequency converter :(write only)

Command character address	**Command function**
2000H	0001：Forward running 0002：Reverse running 0003：Forward running inching 0004：reserve running inching 0005：Free shutdown 0006：Slow down shutdown 0007：Fault resetting

❸ Read frequency converter state :(read only)

Status character address	**Status character function**
3000H	0001：Forward running 0002：Reserve running 0003：Shutdown

❹ Parameter lock password verification :(if 8888H is returned, the password verification is passed)Parameter lock password verification :(if 8888H is returned, the password verification is passed)

Password address	Input password content
1F00H	*****

❺ Digital output terminal control :(write only)

Command address	Command content
2001H	BIT0：DO1 output control BIT1：DO2 output control BIT2：RELAY1 output control BIT3：RELAY2 output control BIT4：FMR output control BIT5：VDO1 BIT6：VDO2 BIT7：VDO3 BIT8：VDO4 BIT9：VDO5

❻ Analog output AO1 control :(write only)

Command address	Command content
2002H	0 ~ 7FFF means 0% ~ 100%

❼ Analog output AO2 control :(write only)

Command address	Command content
2003H	0 ~ 7FFF means 0% ~ 100%

❽ Pulse output control :(write only)

Command address	Command content
2004H	0 ~ 7FFF means 0% ~ 100%

❾ Frequency converter fault Description:

Frequency converter address	Frequency converter fault information	Frequency converter fault information
8000H	0000：No fault 0001：Retain 0002：Accelerated overcurrent 0003：Retarding overcurrent 0004：Constant speed overcurrent 0005：Accelerated overvoltage 0006：Retarding overvoltage 0007：Constant speed overvoltage 0008：The buffer resistor is overloaded 0009：Under-voltage fault 000A：Inverter overload 000B：Motor overload 000C：Input phase lack 000D：Output phase lack 000E：Module overheating 000F：External fault 0010：Abnormal communication 0011：Abnormal contactor 0012：Current detection fault 0013：Motor tuning fault 0014：Encoder /PG card fault	0015：Parameter read/write exception 0016：Inverter hardware fault 0017：Short circuit fault of motor to ground 0018：Retain 0019：Retain 001A：Running time arrival 001B：User-defined fault 1 001C：User-defined fault 2 001D：Power-on time arrival 001E：Off-load 001F：PID feedback lost while running 0028：Fast traffic limiting times out 0029：Fault of switching motor while running 002A：Excessive velocity deviation 002B：Motor overspeed 002D：Motor overtemperature 005A：Wrong encoder cable number setting 005B：Disconnected encoder 005C：Wrong initial position 005E：Wrong feedback speed

Fd-00	**Baud rate**	**Factory default**	**6005**
		Unit: MODBUS baud rate	
	Setting range	0：300BPS 1：600BPS 2：1200BPS 3：2400BPS 4：4800BPS	5：9600BPS 6：19200BPS 7：38400BPS 8：57600BPS 9：115200BPS

8.5.4 Group FD communication parameter description

This parameter is used to set the data transmission rate between the host computer and the frequency converter. Note that the baud rate set by the upper computer and the frequency converter must be consistent, otherwise, communication cannot proceed. The higher the baud rate, the faster the communication speed.

Fd-01	**Data format**	**Factory default**	**0**
	Setting range	0：No check：data format <8,N,2> 1：Even check：data format <8,E,1> 2：Uneven check：data format <8,O,1> 3：No check：data format <8-N-1>	

The data format set by the upper computer and the frequency converter must be consistent; otherwise, communication cannot be carried out.

Fd-02	**Local address**	**Factory default**	**1**
	Setting range	1~247,0 broadcast address	

When the local address is set to 0, it is the broadcast address to realize the broadcast function of the upper computer. The native address has uniqueness (except broadcast address) is the basis of point-to-point communication between the host computer and the frequency converter.

Fd-03	**Response delay**	**Factory default**	**2ms**
	Setting range	0~20ms	

Response delay: refers to the interval between the end of data acceptance of the inverter and the sending of data to the upward machine. If the response delay is less than system processing time, the answer delay is based on the system processing time. If the answer delay is longer than the system processing time, the system processes it.

After the data, to delay the wait, until the response delay time to send data to the machine.

Fd-04	**Communication timeout**	**Factory default**	**0.0 s**
	Setting range	0.0 s（null）；0.1~60.0s	

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

When the function code is set to a valid value, if the interval between one communication and the next communication exceeds the communication timeout period, the system

Communication failure error (Err16) will be reported. Typically, this is set to invalid. If in a continuous communication system, set parameters to monitor communication.

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

Pd-05=1: Select the standard Modbus protocol.

Pd-05=0: When the command is read, the number of bytes returned from the slave machine is one byte more than that of the standard Modbus protocol. For details, see section 5 Communication Data Structure of this Agreement.

Fd-06	**Communication read current resolution**	**Factory default**	**0**
	Setting range	0：0.01A； 1：0.1A	

The output unit used to determine the value of the current when the communication reads the output current.

8.6 Reference for actual use

Use 485 communication to control frequency, start and stop.

❶ Set P002 to 2 and select the communication command channel

Send control code: 01 06 F0 02 00 02 9A CB

❷ Set P003 to 9, and set the main frequency source for communication

Send control code: 01 06 F0 03 00 09 8A CC

❸ Start

Send control code: 01 06 20 00 00 01 43 CA

❹ Set the operating frequency to 32HZ, with two decimal points, the setting value must be placed in the high

Send control code: 01 06 10 00 20 00 94 CA

❺ Stop

Send control code: 01 06 20 00 00 06 02 08

WARRANTY

❶ The company solemnly promises that users will enjoy the following warranty services from the date of purchase of products from our company (hereinafter referred to as the manufacturer).

❷ Since the product was purchased by the user from the manufacturer, enjoy the following three guarantee services:

- ¤ Return, replacement and repair within 30 days of delivery:
- ¤ Replacement and repair within 90 days of delivery:
- ¤ Repair within 18 months of delivery:
- ¤ Except when exporting abroad.

❸ This product enjoys lifetime paid service from the date of purchase by the user from the manufacturer.

❹ Disclaimer: Product failure caused by the following reasons is not covered by the manufacturer's free warranty service:

- ¤ Failure caused by the user's use and operation in accordance with the requirements of the «Instruction Manual»:
- ¤ Failure caused by the user to repair or modify the product without communicating with the manufacturer:
- ¤ Failure caused by abnormal aging of the product due to poor user environment:
- ¤ Failures caused by natural disasters such as earthquakes, fires, floods or abnormal voltages:
- ¤ Damage to the product during transportation (the transportation method is specified by the customer, and the company assists in handling the cargo consignment procedures)

❺ Under the following conditions, manufacturers have the right not to provide warranty services:

- ¤ When the manufacturer's product logo, trademark, nameplate, etc. are damaged or unrecognizable:
- ¤ When the user fails to pay the purchase price in accordance with the signed contract:
- ¤ The user intentionally conceals the manufacturer's after-sales service unit when the product is installed, wired, operated, maintained or otherwise improperly used

❻ For the service of return, replacement and repair, the company must return or return to the company, and it can only be returned or repaired after confirming the responsibility vested.

WARRANTY CARD

User information			
User name			
User address			
Postal code		Contact person	
Tel		Fax	
Machine type		Machine code	
Agent / Reseller Information			
Supplier			
Contact			
Tel		Delivery date	

CERTIFICATE OF QUALITY

QC test： ____________________

This product has been tested by our company's quality department, and its performance meets the standards, passes the inspection, and is approved to leave the factory.

Design date: June 16, 2022

Version 1.0