ES230 Series High Performance Drive User Manual



User Manual

Version revise log

Date	Current version	Content of revise		
2024-06-24	V20240624	First edition controlled		
2024-07-19	V20240719	Modified parameter P4-13、P4-14、P4-25、P9-06、P9-12、P9-47、PP-05、H5-21		
2024-07-22	V20240722	Parameter PP-01 Specifies whether 0: no operation is performed 1: Restore factory parameter mode 1 2: clears the record information 4: Restore user backup parameters 501: backs up the current parameters of the user 502: Restore factory parameter mode 2 503: Restore factory parameter mode 3	change to	0: no operation is performed 1: Restore factory parameter mode 1 2: Clear fault records 3: Restore factory parameter mode 2
2024-10-16	V20241016	Modified parameter P6-20,PD-95,H9-30,H9-31,H9-40,H9-43		
2024-10-22	V20241022	Modified parameter P6-34,P6-35		
2025-10-24	V20251024	Change the size diagram		
2025-12-24	V20251224	Layout adjustment		
2026-03-13	V20260313	1.1 Correction of the label image S/N number: Remove the leading letter “ M ” .		
2026-03-17	V20260317	1.1 Correction to the label legend. 6.1 Specifications and Models: The ES230-2S model has been upgraded from 2.2 kW to 5.5 kW; the ES230-2T model is retained only up to 5.5 kW, with all other models deleted. The ES230-4T model is retained only up to 11 kW, with all other models deleted.		
2026-08-05	V20260805	6.1 220V-240Vcorrected to 200V-240V		

Safety and precautions

This manual contains the operation instructions and precautions for production and use:

At installation	
Warning	● Please read the product instruction manual and safety precautions carefully before installation! Modification of this product is strictly prohibited! ● It is strictly forbidden to twist the fixing bolts and red marked bolts of the parts and components of the product! ● Do not install this product in a place with strong electric field or electromagnetic wave interference! ● When the product is installed in a cabinet or terminal device, the cabinet or terminal device must be provided with a fire protection shell, an electrical protection shell, and a mechanical protection shell. ● The protection level of the device shall comply with relevant IEC standards and local laws and regulations.
Danger	● Non-professional personnel are strictly prohibited from product installation, wiring, maintenance, inspection or part replacement! ● The installation, wiring, maintenance, inspection or parts replacement of this product can only be carried out by professionals who have been trained in electrical equipment and have sufficient electrical knowledge. ● The installation personnel must be familiar with the installation requirements and related technical documents. ● When it is necessary to install equipment with strong electromagnetic interference such as transformers, please install shielding protection devices to avoid misoperation of this product!

At wiring	
Warning	● Do not connect the input power to the output of the device or product; otherwise, the device may be damaged or even cause a fire. ● When the drive device is connected to the motor, ensure that the phase sequence of the driver and the motor terminal is accurate and consistent to avoid reverse rotation of the motor. ● The cables used for wiring must meet the requirements of the corresponding diameters and shielding. The shielding layer of the shielded cables must be reliably grounded at one end. ● After cables are connected, ensure that no screws or exposed cables are found inside the device or product.
Danger	● Non-professional personnel are strictly prohibited from equipment installation, wiring, maintenance, inspection or parts replacement! ● Do not connect cables when the power supply is on, otherwise there is a risk of electric shock. ● Before connecting cables, power off all devices. After the power supply is cut off, the internal capacitor has residual voltage. Wait at least 10 minutes before connecting cables. ● Ensure that devices and products are properly grounded; otherwise, electric shocks may occur. ● To avoid damage to the circuit inside the device or product, follow the steps specified in ESD preventive measures (ESD) and wear an ESD bracelet to connect cables.

During power-on	
Danger	● Before power-on, please confirm that the equipment and products are installed in good condition, the wiring is firm, and the motor device is allowed to restart; Ensure that the power supply meets device requirements to avoid device damage or fire ● When the device or product is powered on, the mechanical device may act suddenly. Please keep away from the mechanical device. ● After power-on, do not open the door of the equipment cabinet or the protective cover of the product, otherwise there is a risk of electric shock! ● Do not touch any terminal of the device when it is powered on; It is strictly forbidden to disassemble any device or component of the equipment and product in the energized state, otherwise there is a risk of electric shock!

At run time	
Warning	● During operation, avoid other items or metal objects falling into the equipment, otherwise it will cause damage to the equipment! ● Do not use the contactor on and off method to control the start and stop of the equipment, otherwise it will cause damage to the equipment!
Danger	● Do not touch any terminal of the device in the running state, otherwise there is a risk of electric shock! ● It is strictly forbidden to disassemble any device or component of the equipment and product in the running state, otherwise there is a risk of electric shock! ● Do not touch the device housing, fan or resistor to test the temperature, otherwise it may cause burns! ● Non-professional and technical personnel are strictly prohibited from detecting signals during operation, otherwise personal injury or equipment damage may be caused!

During maintenance and repair	
Warning	● Please carry out daily and regular inspection and maintenance of equipment and products according to equipment maintenance and maintenance requirements, and make maintenance records. ● Please repair the equipment according to the product warranty agreement. Do not continue to use the machine that has been damaged, otherwise it will cause further damage. ● When the equipment fails or is damaged, the professional personnel shall troubleshoot and repair the equipment and products according to the maintenance guidance, and make maintenance records. ● Please follow the instructions for replacing consumable parts. After replacing the device, check cable connections and set parameters again.
Danger	● Non-professional personnel are strictly prohibited from equipment installation, wiring, maintenance, inspection or parts replacement! ● It is strictly prohibited to carry out equipment maintenance in the energized state, otherwise there is the risk of electric shock! ● After powering off all devices, wait at least 10 minutes before maintaining the devices.

☞ The legend in this manual is for illustration only and may differ from the product you ordered.

☞ Visit the Epsivo Technology website at http://www.szepsivo.com/ to download the PDF version of this manual.

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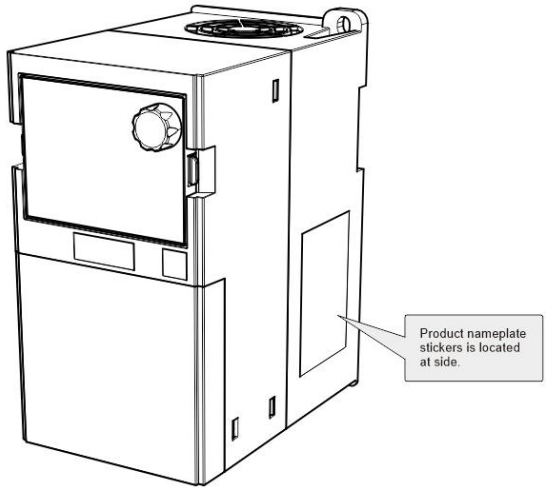
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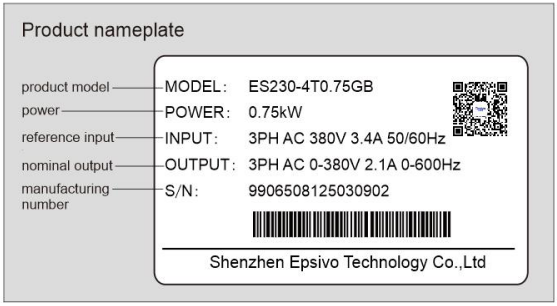
1 Product information

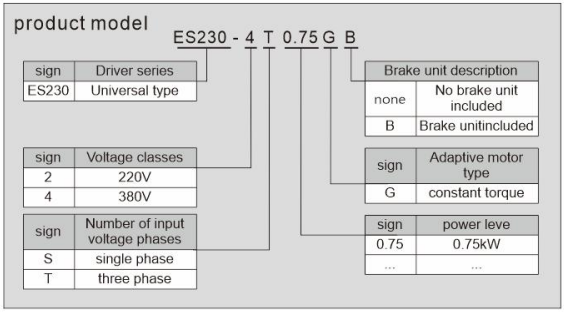
1.1 Nameplate and model description

First of all, thank you for purchasing our products.

The product nameplate is affixed to the side of the product. Carefully reading and understanding the meaning of the product model, such as the product power level, will help you better read and use the content of this user manual.







2 Connection

2.1 Typical wiring diagram of ES230

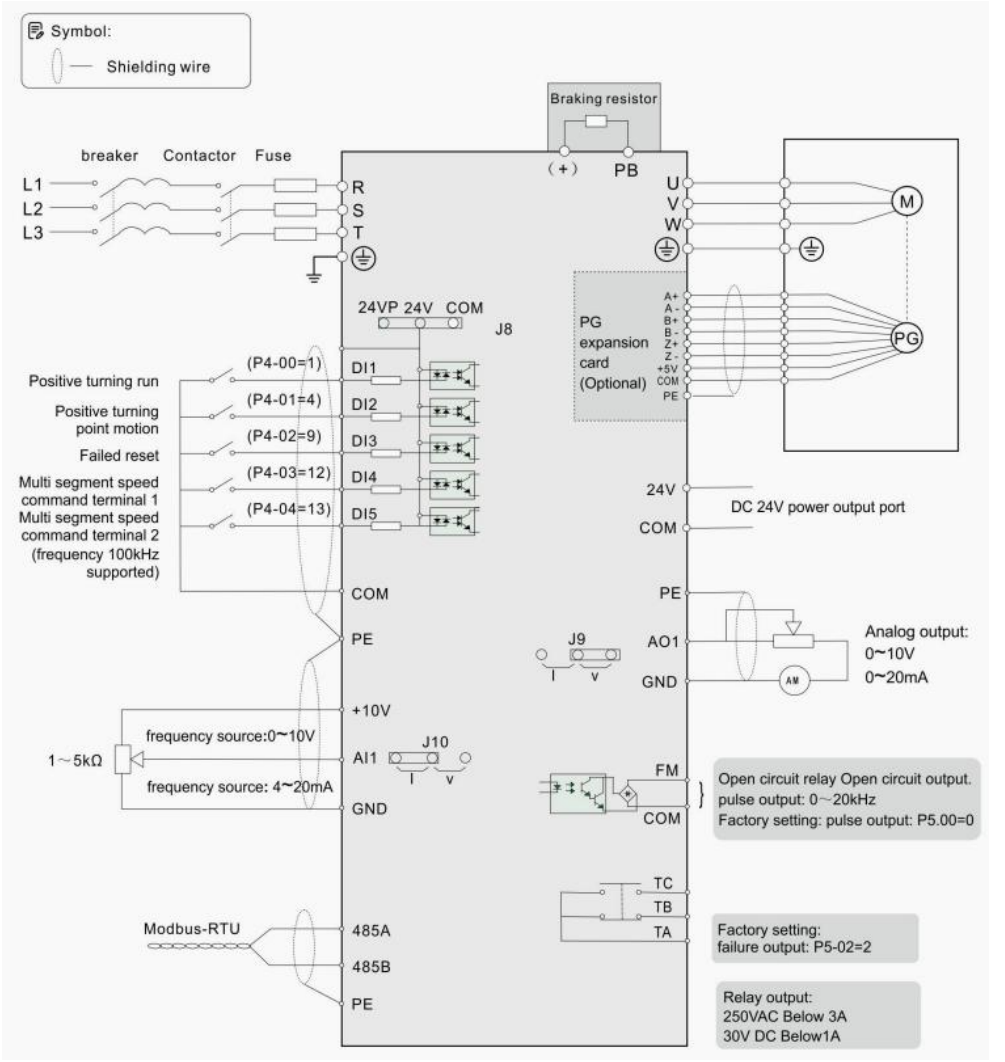


Figure 2-1 Terminal Diagram

2.2 Main circuit terminal description

Terminal mark	Function declaration
R、S、T	Power input terminal, connected to three-phase AC input power supply
U、V、W	Inverter output terminal, connected to three-phase AC output motor
P+、PB	The external brake resistance terminal is connected to both ends of the external brake resistance
⏚	Ground terminal, ground cable

2.3 Main circuit connection mode

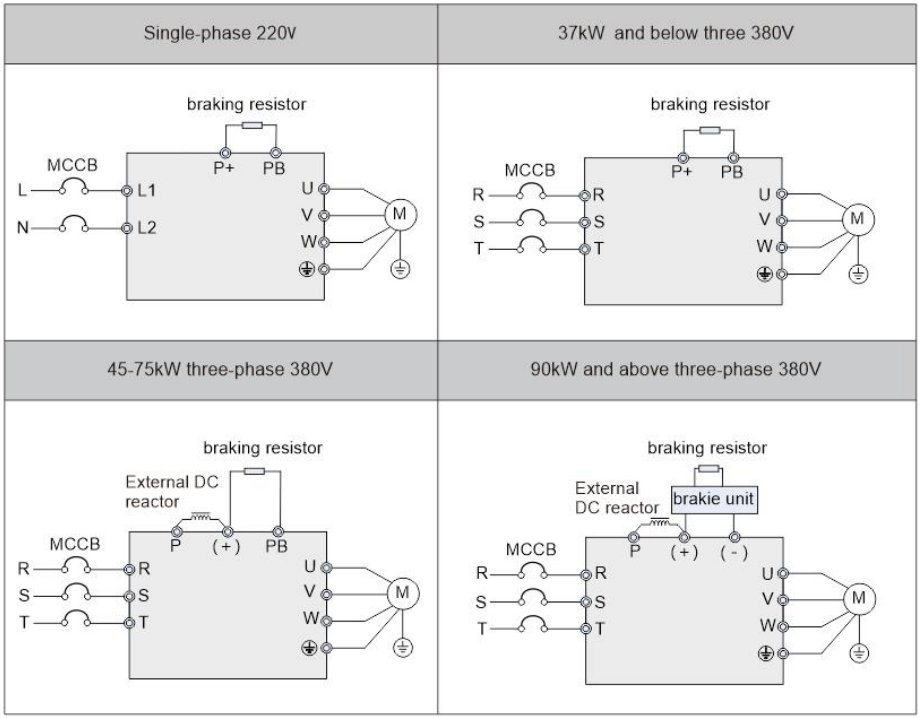


Figure 2-2 Main circuit connection mode

2.4 ES230 series circuit terminal description

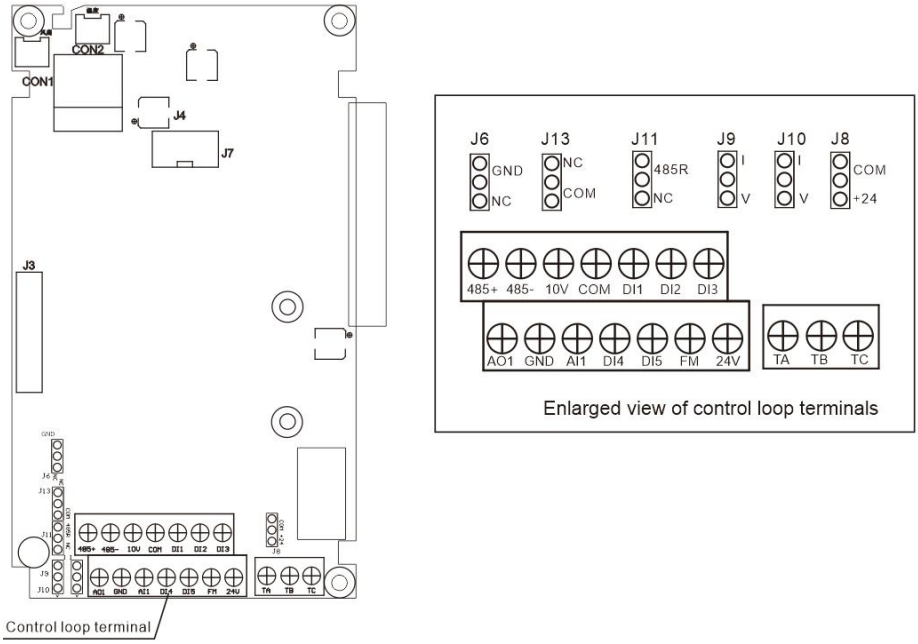


Figure 2-3 Terminal Diagram

2.5 ES230 control jumper function description

ES230 Control jumper function description			
Terminal bit number	Terminal name	Terminal selection	Function declaration
J3	PG card/Expansion card	-	Extend OC card or CAN communication and other air cards
J4	External keyboard interface	-	External keyboard
J7	Keyboard interface		Keyboard interface
CON1	Fan interface		5.5kW and below fan interface (24V output)
CON2	Temperature interface		Temperature line
J6	GND ground terminal	GND NC	The jumper is connected to a resistor in GND. The jumper is not grounded in GND of the NC circuit
J13	COM ground terminal	NC COM	The jumper is connected to a resistor in the COM to ground. The jumper is not grounded in the NC circuit COM
J11	485 Communication resistance Select	485R NC	The jumper cap connects to a resistance of 120R at 485R, and the jumper cap has no resistance in the NC circuit.
J8	Digital input power selection	COM 24V	Jump cap at the COM end, 24V no longer output 24V voltage, 24V short-circuit COM; Jump cap in 24V, DI and COM sub effectively. You can also connect the 24V terminal to the external power supply without the jump cap.
J9	AO output selection	I V	The jumper is a current output at I, a voltage output at V, and a voltage output at the factory.
J10	AI input selection	I V	The jumper cap is a current input at I, a voltage input at V, and a voltage input at the factory.

2.6 ES230 series terminals description

ES230 Series terminals Description				
Category	Terminal symbol	Terminal name	Function declaration	
Power supply	10V/GND	10V power supply	External 10V power supply, maximum output current: 10MA	
	24V/COM	24V power supply	External 24V power supply, maximum output current: 200MA	
Analog input	AI1/GND	Modulus input	Input voltage range DC:0-10V/4-20MA (determined by control board J10)	
Analog output	AO1/GND	Modulus output	Output voltage range DC:0-10V/4-20MA (determined by control board J9)	
Digital input	DI1/COM	Digital input 1	22.1K, Active low	In addition to the function of DI1-DI4, DI5/COM can also be used as a pulse output, up to 100KHZ
	DI2/COM	Digital input 2		
	DI3/COM	Digital input 3		
	DI4/COM	Digital input 4		
	DI5/COM	Impulse input		
Digital output	FM/COM	Digital output, pulse output	F5-00 can choose FM output mode: pulse output 100KHZ, voltage output range 0-24V, current 0-50MA	
Relay output	TA-TB	Normally closed terminal	250VAC.3A 30V DC 1A	
	TA-TC	Constant initiator		
485-communication	485+	485 Differential signal +	Supports standard MODBUS communication	
	485-	485 Differential signal -		

3 Panel operation

3.1 Appearance introduction

Through the operation panel, you can operate a series of drives. The following describes the appearance of several keys.

Operation panel appearance

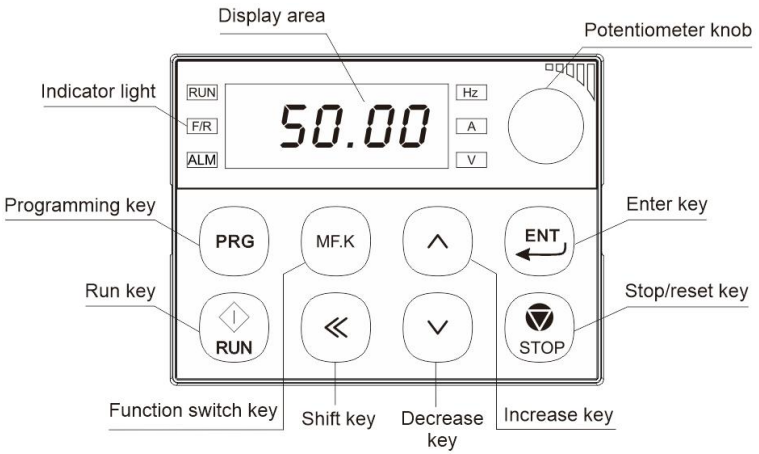


Figure 3-1 Standard operation panel appearance diagram

3.2 This section describes the indicators and buttons on the operation panel

Status indicator description				Unit indicator description	
Symbol	Name	Indicator status	State description	Indicator status	Display area numerical unit
RUN	Running indicator light	☾	Machine halt	Hz RPM A % V ☀ — & — ☾ — & — ☾	Frequency unit Hz
		☀	Running		
ALM	Fault indicating lamp	☾	Normal	Hz RPM A % V ☾ — & — ☀ — & — ☾	Current unit A
		☀	Breakdown		
F/R	Positive and negative indicator light	☾	Forward and reverse operation	Hz RPM A % V ☾ — & — ☾ — & — ☀	Voltage unit V
		☀			
		☾		Hz RPM A % V ☀ — & — ☀ — & — ☾	Rotational speed unit RMP
		☀			
				Hz RPM A % V ☾ — & — ☀ — & — ☀	Percentage %
Indicator status legend description: ☀ Indicator light ☀ Indication flicke ☾ Indicator light off					

Figure 3-2 Indicators and buttons on the operation panel

Key name	function declaration
Programming key	Enter the first level menu or exit
Menu mode select key	Menu mode switch (according to the value in PP-03)
Run key	In the start/stop control mode, run operations are performed
Function switch key	According to the set value of P7-01, switch the corresponding function
Potentiometer knob	Decrement or increment of data or parameters
Increase/ Decrease key	Decrement or increment of data or parameters
Enter key	The menu screen is displayed step by step to set parameters and confirm operations
Shift key	In the run and stop interface, the parameter selection cycle; When modifying a parameter, you can select the modification bit of the parameter
Stop/reset key	Stop operation in running state (subject to parameter P7-02); Reset operation can be used when the fault alarm is in state

Relationship between function switch key and parameter P7-01	
parameter values	Function Description of switch key
0	Factory default setting, this key has no function
1	If P 0-02 is 0, this key has no function. When P 0-02 is 1, the key can be switched between the terminal and the operation panel. When P 0-02 is set to 2, this key can switch between the communication and operation panels
2	* Forward and backward switching
3	* Normal inching turning
4	* Reverse inching turning
* Indicates that this function is valid only when the command source runs the operation panel	

3.3 View and modify parameters

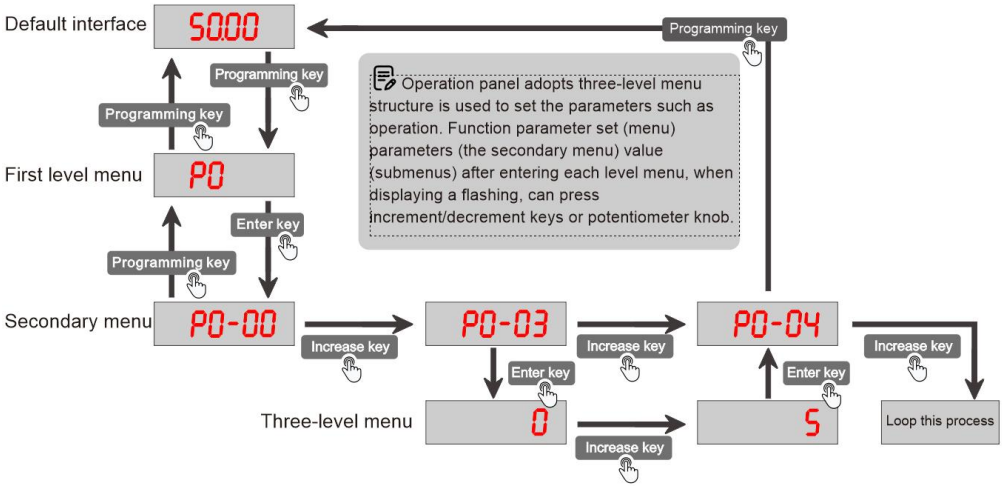


Figure 3-3 Standard Keyboard View and Modify Diagram

4 Parameter

4.1 Parameter table description

When PP-00 is set to a non-0 value, the parameter protection password is set. In the function parameter mode and User parameter change mode, the parameter menu can be accessed only after the correct password is entered. To cancel the password, set PP-00 to 0.

The parameter menu in user-defined parameter mode is not password protected.

Group P and H are the basic function parameters, and group U is the monitoring function parameters.

Whether the parameter value can be changed depends on the parameter properties and the running status of the product at that time. The meanings of symbols under the parameter table - "Change" column are as follows:

☆ - Indicates that the parameter setting value can be changed when the drive is stopped or running.

★ - Indicates that the setting value of this parameter cannot be changed when the drive is running;

● - Indicates that the value of the parameter is the actual detection record value and cannot be changed;

4.2 Basic functional parameters table

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
P0 basic function				
P0-00	G/P type	1: G type (Constant torque load)	1	●
P0-01	Motor 1 control mode	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: V/F control	2	★
P0-02	Command source	0: Command channel on the operation panel 1: Terminal command channel 2: Communication command channel	0	★
P0-03	Main frequency source X	0: Digital setting (preset frequency P0-08, UP/ DOWN can be modified, power failure does not remember) 1: Digital setting (preset frequency P0-08, UP/ DOWN can be modified, power down memory) 2: AI1 3: AI2 4: Reserved 5: PULSE Pulse Setting (DIO1) 6: Multi-segment instruction 7: Simple PLC 8: PID 9: Communication setting 10: Keyboard potentiometer setting	10	★
P0-04	Auxiliary frequency source Y	0: Digital setting (preset frequency P0-08, UP/ DOWN can be modified, power failure does not remember) 1: Digital setting (preset frequency P0-08, UP/ DOWN can be modified, power down memory) 2: AI1 3: AI2 4: Reserved 5: PULSE Pulse Setting (DIO1) 6: Multi-segment instruction 7: Simple PLC 8: PID 9: Communication setting 10: Keyboard potentiometer setting	0	★
P0-05	Base value of range of auxiliary frequency source Y for superposition	0: Relative to the maximum frequency 1: Relative to frequency source X	0	☆
P0-06	Range of auxiliary frequency source Y for superposition	0%～150%	100	☆

P0-07	Frequency source stack selection	Ones: Frequency source selection 0: Indicates the primary frequency source X 1: Indicates the result of primary and secondary operations (The operation relationship is determined by the tens) 2: Switches between primary frequency source X and secondary frequency source Y 3: Switch between the primary frequency source X and the primary and secondary operation results 4: Switch between secondary frequency source Y and primary and secondary operation results Tens: Frequency source primary and secondary operation relationship 0: X+Y 1: X-Y 2: Max (X, Y) 3: Min (X, Y) 4:X*Y	0	
P0-08	Preset frequency	0.00Hz～Maximum frequency (P0-10)	50.00	☆
P0-09	Direction of operation	0: Same in the default direction 1: Reverse to the default direction	0	☆
P0-10	Maximum frequency	50.00Hz～600.00Hz	50.00	★
P0-11	Source of frequency upper limit	0: P0-12 1: AI1 2: AI2 3: Reserved 4: PULSE Pulse Setting (DIO1) 5: Communication setting 6:Multispeed instruction	0	★
P0-12	Frequency upper limit	Frequency lower limit (P0-14)～Maximum frequency (P0-10)	50.00	☆
P0-13	Frequency upper limit offset	0.00Hz～Maximum frequency (P0-10)	0.00	☆
P0-14	Frequency lower limit	0.00Hz～Frequency upper limit (P0-12)	0.00	☆
P0-15	Carrier frequency	0.8Hz～16.0Hz	_	☆
P0-16	Carrier frequency adjusted with temperature	0: No 1: Yes	0	☆
P0-17	Acceleration time 1	0.0s～6500.0s	20.0	☆
P0-18	Deceleration time 1	0.0s～6500.0s	20.0	☆
P0-19	Acceleration/Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★
P0-20	Auxiliary frequency source offset selection	0	0	●
P0-21	Frequency offset of auxiliary frequency reference for superposition	0.00Hz～Maximum frequency (P0-10)	50.00	☆
P0-22	Frequency reference resolution	1: 0.1Hz 2: 0.01Hz	2	★
P0-23	Retention of digital setting of frequency at stop	0: Not reserved 1:Reserved	0	☆
P0-24	Reserved	0~0	0	●
P0-25	Base frequency for Acceleration/deceleration time	0: Maximum frequency (P0-10) 1: Set frequency 2: 100Hz	0	★
P0-26	Base frequency for UP/DOWN modification during operation	0: Running frequency 1: Setting frequency	0	★

P0-27	Main frequency coefficient	0.00%～100.00%	10.00	☆
P0-28	Auxiliary frequency coefficient	0.00%～100.00%	10.00	☆
P1 First motor parameter				
P1-00	Motor type	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: PMSM	2	★
P1-01	Rated motor power	0.1kW～1000.0kW	-	★
P1-02	Rated motor voltage	1V～2000V	-	★
P1-03	Rated motor current	0.01A ~ 655.35A （AC Drive power<=55kW） 0.1A ~ 6553.5A （AC Drive power>55kW）	-	★
P1-04	Rated motor frequency	0.01Hz ~ maximum frequency	-	★
P1-05	Rated motor speed	1rpm～65535rpm	-	★
P1-06	Asynchronous motor stator resistance	0.001Ω ~ 65.535Ω (AC Drive power<=55kW) 0.0001Ω ~ 6.5535Ω (AC Drive power>55kW)	-	★
P1-07	Asynchronous motor rotor resistance	0.001Ω ~ 65.535Ω (AC Drive power<=55kW) 0.0001Ω ~ 6.5535Ω (AC Drive power>55kW)	-	★
P1-08	Asynchronous motor leakage inductance	0.01mH～655.35mH (AC Drive power<=55kW) 0.001mH～65.535mH (AC Drive power>55kW)	-	★
P1-09	Asynchronous motor mutual inductance	0.1mH ~ 6553.5mH (AC Drive power<=55kW) 0.01mH ~ 655.35mH (AC Drive power>55kW)	-	★
P1-10	Asynchronous motor no-load current	0.01A ~ P1-03 (AC Drive power<=55kW) 0.1A ~ P1-03 (AC Drive power>55kW)	-	★
P1-11	Asynchronous motor core saturation coefficient 1	50.0～100.0	86.0	☆
P1-12	Asynchronous motor core saturation coefficient 2	100.0～150.0	130.0	☆
P1-13	Asynchronous motor core saturation coefficient 3	100.0～170.0	140.0	☆
P1-14	Asynchronous motor core saturation coefficient 4	100.0～180.0	150.0	☆
P1-15	Reserved	0～65535	0	●
P1-16	Reserved	0~65535	0	●
P1-17	Synchronous motor D-axis inductance	0.01mH ~ 655.35mH (AC Drive power<=55kW) 0.001mH ~ 65.535mH (AC Drive power>55kW)	-	★

P1-18	Synchronous motor Q-axis inductance	0.01mH ~ 655.35mH (AC Drive power<=55kW) 0.001mH ~ 65.535mH (AC Drive power>55kW)	-	★
P1-19	Synchronous motor back EMF coefficient	0.0～6553.5	-	★
P1-20	Reserved	0.003～6.553	0.100	☆
P1-21	Reserved	0～65535	100	☆
P1-22	Reserved	0～65535	0	●
P1-23	Percentage of friction torque	0.00～100.00	0.00	★
P1-24	Number of motor pole pairs	0～65535	2	☆
P1-25	Reserved	0～65535	0	★
P1-26	Auto-tuning direction (inertia auto-tuning and synchronous motor)	0～1	1	★
P1-27	Encoder pulses per revolution	1～20000	1024	★
P1-28	Encoder type	0: ABZ incremental encoder 1~5:Reserved	0	★
P1-29	PG signal filter	0:Non-adaptive filter 1:Adaptive filter 2:Fixed interlock 3:Automatic interlock	1	★
P1-30	Encoder wiring flag	Ones: AB signal direction or rotational direction 0: Forward 1: Reverse Tens: Reserved	0	★
P1-31	Encoder zero position angle	0.0～359.9	0.0	★
P1-32	Numerator of motor gear ratio	1～65535	1	★
P1-33	Denominator of motor gear ratio	1～65535	1	★
P1-34	Resolver pole pairs	1～32	1	★
P1-35	Reserved	0~65535	0	●
P1-36	PG disconnection detection	Ones: 0: Disabled 1: Enabled Tens: reserved	1	★
P1-37	Tuning selection	0: no manipulation 1: asynchronous machine static tuning 2: The asynchronous machine is fully tuned 11: Synchronizer no-load part tuning (untuned back electromotive force) 12: synchronous machine dynamic no-load tuning	0	★
P2 The first motor vector control parameters				
P2-00	Speed loop proportional gain 1	1～200	30	☆
P2-01	Velocity loop integration time 1	0.001s～10.000s	0.500	☆
P2-02	Switchover frequency 1	0.00～P2-05	5.00	☆
P2-03	Speed loop proportional gain 2	1～200	20	☆
P2-04	Velocity loop integration time 2	0.001s～10.000s	1.000	☆
P2-05	Switchover frequency 2	P2-02～maximum frequency	10.00	☆
P2-06	Vector control slip gain	50%～200%	100	☆

P2-07	Speed feedback filter time	0.000s～0.100s	0.004	☆
P2-08	Vector control deceleration over-excitation gain	0～200	64	☆
P2-09	Source of torque upper limit in speed control (motoring)	0:Upper limit number setting(P2-10) 1:AI1 2:AI2 3: Reserved 4: PULSE Pulse setting (DIO1) 5:Communication setting 6:MIN(AI1,AI2) 7:MAX(AI1,AI2)	0	☆
P2-10	Torque upper limit in speed control (motoring)	0.0%～200.0%	150.0	☆
P2-11	Source of torque upper limit in speed control (generating)	0:Upper limit number setting(P2-10) 1:AI1 2:AI2 3: Reserved 4:PULSE Pulse setting (DIO1) 5:Communication setting 6:MIN(AI1,AI2) 7:MAX(AI1,AI2) 8:Upper limit number setting(P2-12)	0	☆
P2-12	Torque upper limit in speed control (generating)	0.0%～200.0%	150.0	☆
P2-13	Low-speed current loop Kp adjustment	0.1～10.0	1.0	☆
P2-14	Low-speed current loop Ki adjustment	0.1～10.0	1.0	☆
P2-15	High-speed current loop Kp adjustment	0.1～10.0	1.0	☆
P2-16	High-speed current loop Ki adjustment	0.1～10.0	1.0	☆
P2-17	Speed loop Kp upon zero speed clamp	1～100	30	☆
P2-18	Speed loop Ti upon zero speed clamp	0.001～10.000	0.500	☆
P2-19	Inertia compensation gain	1～200	1	☆
P2-20	Speed loop switchover frequency upon zero speed clamp	0.00～5.00	0.05	☆
P2-21	Maximum output voltage coefficient	100～110	110	☆
P2-22	Output voltage filter time	0.000～0.010	0.000	☆
P2-23	Zero speed clamp	0:Disabled 1:Enabled	0	★
P2-24	Vector overvoltage suppression Kp	0～1000	40	☆
P2-25	Acceleration compensation gain	0～200	0	☆
P2-26	Acceleration rate compensation filter time	0～500	10	☆
P2-27	Vector overvoltage suppression selection	0:Disabled 1:Enabled	1	☆
P2-28	Cut-off frequency of torque filter	50～1000	500	☆

P2-29	Synchronous motor initial position angle detection current	50～180	80	☆
P2-30	Speed loop parameter auto-calculation	0:Disabled 1:Enabled	0	★
P2-31	Expected speed loop bandwidth at high speed	1.0～200.0	10.0	☆
P2-32	Expected speed loop bandwidth at low speed	1.0～200.0	10.0	☆
P2-33	Expected speed loop bandwidth at zero speed	1.0～200.0	10.0	☆
P2-34	Expected speed loop damping ratio (unchanged generally)	0.100～65.000	1.000	☆
P2-35	System inertia (equivalent to the start-up time)	0.001～50.000	-	★
P2-36	Single motor inertia (kg*m2)	0.001～50.000	-	★
P2-37	Maximum frequency for inertia auto-tuning	20～100	0	●
P2-38	Acceleration time for inertia auto-tuning	1.0～50.0	50.0	●
P2-39	Bandwidth 1 of speed loop dynamic optimization test	1.0～200.0	5.0	●
P2-40	Bandwidth 2 of speed loop dynamic optimization test	1.0～200.0	10.0	●
P2-41	Bandwidth 3 of speed loop dynamic optimization test	1.0～200.0	15.0	●
P2-42	Bandwidth 4 of speed loop dynamic optimization test	1.0～200.0	20.0	●
P2-43	Inertia auto-tuning and dynamic speed reference	0～100	30	★
P2-44	Rotor time constant check	0:Disabled 1:Enabled	0	●
P2-45	Torque amplitude of rotor time constant check	10～100	30	●
P2-46	Number of times of rotor time constant check	1～6	3	●
P2-47	Inertia identification enabled	0:Disabled 1:Enabled	0	★
P2-48	Inertia identification speed ring bandwidth set value	0.1～100.0	10.0	★
P2-49	Back EMF calculation	0:Disabled 1:Enabled	1	●
P2-50	Inertia auto-tuning mode	0:Acceleration/Deceleration mode 1:Triangular wave mode	0	★
P2-51	Acceleration/Deceleration coefficient in inertia auto-tuning	0.1～10.0	1.0	★

P2-52	Decoupling control selection	0:Disabled 1:Enabled	0	★
P2-53	Generating power limit	0:Disabled 1:Enabled	0	★
P2-54	Generating power limit	0.0～200.0	20.0	★
P3 V/F control parameter				
P3-00	V/F curve setting	0: Linear V/F curve 1: Multi-point V/F curve 2: Square V/F curve 3: 1.2-power V/F curve 4: 1.4-power V/F curve 5:Reserved 6: 1.6-power V/F curve 7:Reserved 8: 1.8-power V/F curve 9:Reserved 10: V/F complete separation mode 11: V/F half separation mode	0	★
P3-01	Torque boost	0.0%:(Automatic torque boost) 0.1%～30.0%	-	☆
P3-02	Cutoff frequency of torque boost	0.00Hz～maximum frequency	50.00	★
P3-03	Multi-point V/F frequency 1	0.00Hz～P3-05	0.00	★
P3-04	Multi-point V/F voltage 1	0.0%～100.0%	0.0	★
P3-05	Multi-point V/F frequency 2	P3-03～P3-07	0.00	★
P3-06	Multi-point V/F voltage 2	0.0%～100.0%	0.0	★
P3-07	Multi-point V/F frequency 3	P3-05～Rated frequency of motor（P1-04）	0.00	★
P3-08	Multi-point V/F voltage 3	0.0%～100.0%	0.0	★
P3-09	V/F slip compensation gain	0.0%～200.0%	0.0	☆
P3-10	V/F over-excitation gain	0～200	64	☆
P3-11	V/F oscillation suppression gain	0～100	-	☆
P3-12	Oscillation suppression gain mode	0: Inactive 1~2:Reserved 3: Active	3	★
P3-13	Voltage source for V/F separation	0:Digital setting（P3-14） 1:AI1 2:AI2 3: Reserved 4:PULSE Pulse setting (DIO1) 5:Multi-reference 6:Simple PLC 7:PID 8:Communication setting	0	☆
P3-14	Digital setting of voltage for V/F separation	0～380	0	☆
P3-15	Voltage acceleration time of V/F separation	0.0～1000.0	0.0	☆
P3-16	Voltage deceleration time of V/F separation	0.0～1000.0	0.0	☆
P3-17	Stop mode for V/F separation	0: Frequency and voltage decline to 0. 1: Frequency declines to 0 after voltage declines to 0	0	★
P3-18	V/F overcurrent stall action current	50～200	150	★

P3-19	V/F overcurrent stall selection	0:Disabled 1:Enabled	1	★
P3-20	V/F overcurrent rate suppression gain	0～100	20	☆
P3-21	Compensation coefficient for overcurrent stall action current at multiplied frequency in V/F mode	50～200	50	★
P3-22	V/F overvoltage stall action voltage	200.0～2000.0	770.0	★
P3-23	V/F overvoltage stall selection	0:Disabled 1:Enabled	1	★
P3-24	V/F overvoltage stall suppression frequency gain	0～100	30	☆
P3-25	V/F overvoltage stall suppression voltage gain	0～100	30	☆
P3-26	Frequency rise limit upon overvoltage stall	0～50	5	★
P3-27	Slip compensation time constant	0.1～10.0	0.5	☆
P3-28	V/F parameter setting inertia coefficient	0~1	0	★
P3-29	Minimum motoring torque current	10～100	50	★
P3-30	Maximum generating torque current	10～100	20	★
P3-31	Automatic frequency rise KP	0～100	50	☆
P3-32	Automatic frequency rise KI	0～100	50	☆
P3-33	Online torque compensation gain	80～150	100	★
P4 input terminal				
P4-00	DI1 function	0: No function 1: Forward run (FWD) 2: Reverse run (REV) 3: Three-wire operation control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: Running pause 11: External fault normally open input 12–15: Multi-reference terminals 1 to 4 16 and 17: Terminals 1 and 2 for acceleration/deceleration selection 18: Frequency source switchover 19: UP/DOWN setting clear (terminal, operation panel) 20: Running command switchover terminal 21: Acceleration/Deceleration inhibited 22: PID pause 23: PLC status reset 24: Wobble pause 25: Counter input (DIO1)	1	★
P4-01	DI2 function		4	★
P4-02	DI3 function		9	★
P4-03	DI4 function		12	★
P4-04	DI5 function		13	★
P4-05	DI6 function		0	★
P4-06	DI7 function		0	★
P4-07	DI8 function		0	★

P4-08	DI9 function	26: Counter reset 27: Length count input (DIO1) 28: Length reset 29: Torque control inhibited 30: Pulse input 31: Reserved 32: Immediate DC braking 33: External fault NC input 34: Frequency modification enabled 35: Reverse PID operation direction 36: External stop terminal 1 37: Control command switchover terminal 2 38: PID integral disabled 39: Frequency source X switches with preset frequency 40: Frequency source Y switches with preset frequency 41: Motor terminal selection function	0	★
P4-09	DI10 function	42: Zero servo enable 43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: Operating time clear 51: Two-wire/Three-wire operation control switchover 52~61:Reserved	0	★
P4-10	DI filter time	0.000s～1.000s	0.010	☆
P4-11	Terminal control mode	0: Two-wire mode 1 1: Two-wire mode 2 2: Three-wire mode 1 3: Three-wire mode 2	0	★
P4-12	Terminal UP/DOWN change rate	0.001Hz/s～65.535Hz/s	1.000	☆
P4-13	AI curve 1 minimum input	0.00V～P4-15	0.05	☆
P4-14	Corresponding setting of AI curve 1 minimum input	0.0%～100.0%	0.0	☆
P4-15	AI curve 1 maximum input	P4-13～+10.00V	10.00	☆
P4-16	Corresponding setting of AI curve 1 maximum input	-100.0%～+100.0%	100.0	☆
P4-17	AI1 filter time	0.00s～10.00s	0.10	☆
P4-18	AI curve 2 minimum input	0.00V～P4-20	0.00	☆
P4-19	Corresponding setting of AI curve 2 minimum input	-100.0%～+100.0%	0.0	☆
P4-20	AI curve 2 maximum input	P4-18～+10.00V	10.00	☆
P4-21	Corresponding setting of AI curve 2 maximum input	-100.0%～+100.0%	100.0	☆

P4-22	AI2 filter time	0.00s～10.00s	0.10	☆
P4-23	AI curve 3 minimum input	-10.00V～P4-25	0.10	☆
P4-24	Corresponding setting of AI curve 3 minimum input	-100.0%～+100.0%	0.0	☆
P4-25	AI curve 3 maximum input	P4-23～10.00V	9.80	☆
P4-26	Corresponding setting of AI curve 3 maximum input	-100.0%～+100.0%	100.0	☆
P4-27	AI3 fitter time	0.00s～10.00s	0.10	☆
P4-28	PULSE minimum input	0.00kHz～P4-30	0.00	☆
P4-29	PULSE Minimum input corresponds to the setting	-100.0%～100.0%	0.0	☆
P4-30	PULSE maximum input	P4-28～100.00kHz	50.00	☆
P4-31	PULSE Maximum input corresponds to the setting	-100.0%～100.0%	100.0	☆
P4-32	PULSE filter time	0.00s～10.00s	0.10	☆
P4-33	AI Simulate input curve selection	Ones: 1: Curve 1 (2 points) 2: Curve 2 (2 points) 3: Reserved 4: Curve 4 (4 points) 5: Curve 5 (4 points) Tens: 1: Curve 1 (2 points) 2: Curve 2 (2 points) 3: Reserved 4: Curve 4 (4 points) 5: Curve 5 (4 points) Hundreds: 1: Curve 1 (2 points) 2: Curve 2 (2 points) 3: Reserved 4: Curve 4 (4 points) 5: Curve 5 (4 points)	321	☆
P4-34	Setting for the AI lower than the minimum input	Ones: 0: Corresponding minimum input Settings 1: 0.0% Tens:0: Corresponding minimum input Settings 1: 0.0% Hundreds: 0: Corresponding minimum input Settings 1: 0.0%	0	☆
P4-35	DI1 delay	0.0 s~3600.0 s	0.0	☆
P4-36	DI2 delay	0.0 s~3600.0 s	0.0	☆
P4-37	DI3 delay	0.0 s~3600.0 s	0.0	☆
P4-38	DI active state setting 1	Ones: 0: Active high 1: Active low Tens: 0: Active high	0	★

		1: Active low Hundreds: 0: Active high 1: Active low Thousands: 0: Active high 1: Active low Ten thousands: 0: Active high 1: Active low		
P4-39	DI active state setting 2	Ones: 0: Active high 1: Active low Tens: 0: Active high 1: Active low Hundreds: 0: Active high 1: Active low Thousands: 0: Active high 1: Active low Ten thousands: 0: Active high 1: Active low	0	•
P4-40	Reserved	0~2	0	★
P4-41	Reserved	0~1	0	★
P5 output terminal				
P5-00	FM terminal output mode selection	0: Pulse output (FMP) 1: Open Collector output (FMR) 2: Reserved	0	☆
P5-01	FMR output function selection	0: No function 1: AC drive running 2: Fault output (stop upon fault) 3: Frequency-level detection 1 (FDT1) 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload prewarning 7: AC drive overload prewarning 8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle completed 12: Accumulative operating time reached 13: Frequency limited 14: Torque limited 15: Ready to run 16: AI1 > AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (related to running) 19: Undervoltage state output 20: Communication setting 21: Positioning completed 22: Position proximity 23: Zero-speed running 2 (at stop) 24: Accumulative power-on time reached 25: Frequency-level detection 2 (FDT2) 26: Frequency 1 reached output 27: Frequency 2 reached output 28: Current 1 reached output 29: Current 2 reached output 30: Timing reached output	0	☆
P5-02	Control board relay function selection		2	☆
P5-03	Expansion card relay output function selection		0	☆
P5-04	DO1 Output function Select		0	☆

P5-05	Expansion card DO2 Output selection	31: AI1 input limit exceeded 32: AC drive output load loss 33: Reverse running 34: Zero current state 35: Module temperature reached 36: Output current limit exceeded 37: Frequency lower limit reached (having output at stop) 38: Abnormality output (direct output at fault or warning) 39: Current overheat prewarning 40: Operating time reached 41: Fault output 2 42: Fault output 3 43: Zero servo success 44: lock output 46: Loose brake output 47~51:Reserved	4	☆
P5-06	FMP output function	0: Operating frequency 1: Frequency reference 2: Output current 3: Motor output torque 4: Output power 5: Output voltage 6: Pulse input(100.% corresponds to 50.0kHz) 7: AI1 8: AI2 9: Reserved 10: Length 11: Count value 12: Communication setting 13: Motor speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Motor output torque (with direction)	0	☆
P5-07	AO1 output function		0	☆
P5-08	Expansion card AO2 output selection		1	☆
P5-09	HDO output maximum frequency	0.01~100.00	50.00	☆
P5-10	AO1 zero offset coefficient	-100.0%~100.0%	0.0	☆
P5-11	AO1 gain	-10.00%~10.00%	1.00	☆
P5-12	AO2 zero bias coefficient	-100.0%~100.0%	0.0	☆
P5-13	AO2 gain	-10.00%~10.00%	1.00	☆
P5-14	Reserved	0.00~10.00	0.00	☆
P5-15	Reserved	0.00~10.00	0.00	☆
P5-16	Reserved	0.00~10.00	0.00	☆
P5-17	RELAY1 Output delay	0.0s~3600.0s	0.0	☆
P5-18	RELAY2 Output delay	0.0s~3600.0s	0.0	☆
P5-19	DO1 Output delay	0.0s~3600.0s	0.0	☆
P5-20	DO2 Output delay	0.0s~3600.0s	0.0	☆
P5-21	DO3 Output delay	0.0s~3600.0s	0.0	☆
P5-22	DO active state selection	Ones: 0: Positive logic 1: Reverse logic Tens: 0: Positive logic 1: Reverse logic Hundreds: Reserved Thousands: Reserved 0: Positive logic 1: Reverse logic	0	☆

		Ten thousands: 0: Positive logic 1: Reverse logic		
P5-23	AO1 mode selection	0: Voltage output 1: Current output	0	★
P6 start stop control				
P6-00	Start mode	0: Direct startup 1: Speed tracking start (asynchronous motor) 2: Vector pre-excitation startup (asynchronous motor)	0	☆
P6-01	Speed tracking mode	0: Starting from the outage frequency 1: Start at 50Hz 2: Start with the maximum frequency	0	★
P6-02	Speed tracking speed	1～100	20	☆
P6-03	Starting frequency	0.00Hz～10.00Hz	0.00	☆
P6-04	Hold time of starting frequency	0.0s～100.0s	0.0	★
P6-05	DC braking current at start/Pre-excitation current	0%～100%	0	★
P6-06	DC braking time at start/Pre-excitation time	0.0s～100.0s	0.0	★
P6-07	Acceleration/deceleration mode	0: Linear acceleration/deceleration 1: S-curve acceleration/deceleration	0	★
P6-08	Time proportion of S-curve at start	0.0%～（100.0%-P6-09）	30.0	★
P6-09	Time proportion of S curve at end	0.0%～（100.0%-P6-08）	30.0	★
P6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
P6-11	Starting frequency of DC braking at stop	0.00Hz～maximum frequency	0.00	☆
P6-12	Waiting time of DC braking at stop	0.0s～100.0s	0.0	☆
P6-13	DC braking current at stop	0%～100%	0	☆
P6-14	DC braking time at stop	0.0s～100.0s	0.0	☆
P6-15	Brake usage	0%～100%	100	★
P6-16	Closed-loop current Kp in speed tracking	0～1000	500	☆
P6-17	Closed-loop current Ki in speed tracking	0～1000	800	☆
P6-18	Flying start current	30～200	100	☆
P6-19	Reserved	0～1	0	★
P6-20	Rotational speed tracks voltage rise time	0.5～3.0	1.0	☆
P6-21	Demagnetization time	0.00～10.00	1.00	☆
P6-22	Starting pre-torque setting	0.0～200.0	0.0	☆
P6-23	Run command on the rectifier side	0: Stop according to P6-10 1: Ignore the stop command on the rectifier side	0	★
P6-24	Zero servo KP	0.0～100.0	10.0	☆
P6-25	Zero servo end amplitude	0～16383	10	☆
P6-26	Electromagnetic core sealing current	0.5%~100%	5.0	☆
P6-27	Start electromagnetic core sealing time	0s~360s	0	★

P6-28	Shutdown electromagnetic core sealing time	10.0~50.0	10.0	★
P6-29	Synchro speed tracking test current	0.1~10	2.0	★
P6-30	Synchronous speed tracking Minimum tracking frequency	0.1~10	6.0	★
P6-31	Synchro speed tracking Angle compensation	0	0	★
P6-32	Synchronous speed tracking ratio	0	0	★
P6-33	Synchro speed tracking integral	0~65535	0	★
P6-34	DC brake maximum current limit	0~65535	0	★
P6-35	Speed loop feedforward	0~65535	0	☆
P6-36	Reserved	0~65535	0	☆
P7 Keyboard and display				
P7-00	LED default display check	0～2	0	☆
P7-01	MF.K key function	0: MF.K key disabled 1: Switchover between remote control and operating panel control 2: Switchover between forward and reverse run 3: Forward jog 4: Reverse jog 5~8:Reserved	0	★
P7-02	STOP/RES key function	0: STOP/RES key enabled only in operating panel control 1: STOP/RES key enabled in any operation mode	0	☆
P7-03	Parameter 1 displayed during operation	Bit00: Running frequency (Hz) Bit01: Frequency reference (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: S status Bit08: DO status Bit09: V1 voltage (V) Bit10: V2 voltage (V) Bit11: V3 voltage (V) Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID reference	0x001F	☆
P7-04	Parameter 2 displayed during operation	BIT00:PID feedback BIT01:PLC stage BIT02:PULSE Input pulse frequency (kHz) BIT03: Operating Frequency 2(Hz) BIT04: Remaining running time BIT05:AI1 Voltage before correction (V) BIT06:AI2 Voltage before correction (V) BIT07: Reserved BIT08: Line speed BIT09: Current power-on time (Hour) BIT10: Current running time (Min) BIT11:PULSE Input pulse Frequency (Hz) BIT12: communication Settings	0x0000	☆

		BIT13: encoder feedback speed BIT14: Main frequency X display BIT15: Auxiliary frequency Y display		
P7-05	Parameter displayed at stop	BIT00: Set frequency (Hz) BIT01: Bus voltage (V) BIT02:DI input status BIT03:DO output status BIT04:AI1 Voltage (V) BIT05:AI2 Voltage (V) BIT06: Reserved BIT07: Count value BIT08: Length value BIT09:PLC stage BIT10: Load speed display BIT11:PID Settings BIT12:PULSE Input pulse frequency (kHz)	0x0033	☆
P7-06	Load speed display coefficient	0.0001～6.5000	1.0000	☆
P7-07	Heatsink temperature of IGBT	0.0℃～99.9℃	-	●
P7-08	Product code	0.0~99.9	-	●
P7-09	Accumulative operating time	0h～65535h	-	●
P7-10	Performance software version	0~0	-	●
P7-11	Function software version	0~0	-	●
P7-12	Number of decimal places for load speed display	Ones:The number of decimal points U0-14 0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places Tens:The number of decimal points U0-14 1: 1 decimal place 2: 2 decimal places	11	☆
P7-13	Accumulative power-on time	0h~65535h	-	●
P7-14	Accumulative power consumption	0°~65535°	-	●
P7-15	Temporary performance software version	0~0	-	●
P7-16	Temporary function software version	0~0	-	●
P8 Auxiliary Function				
P8-00	Jogging frequency	0.00Hz～maximum frequency	2.00	☆
P8-01	Acceleration time in jogging	0.0s～6500.0s	20.0	☆
P8-02	Deceleration time in jogging	0.0s～6500.0s	20.0	☆
P8-03	Acceleration time 2	0.0s～6500.0s	-	☆
P8-04	Deceleration time 2	0.0s～6500.0s	-	☆
P8-05	Acceleration time 3	0.0s～6500.0s	-	☆
P8-06	Deceleration time 3	0.0s～6500.0s	-	☆
P8-07	Acceleration time 4	0.0s～6500.0s	-	☆
P8-08	Deceleration time 4	0.0s～6500.0s	-	☆
P8-09	Jump frequency 1	0.00Hz～maximum frequency	0.00	☆
P8-10	Jump frequency 2	0.00Hz～maximum frequency	0.00	☆
P8-11	Jump frequency band	0.00Hz～5.00Hz	0.00	☆

P8-12	Dead zone time of forward/reverse run	0.0s～3000.0s	0.0	☆
P8-13	Reverse run selection	0: Reverse running allowed 1: Reverse running inhibited	0	☆
P8-14	Running mode when frequency reference lower than lower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	0	☆
P8-15	Brake applying frequency	0.00Hz～10.00Hz	0.00	●
P8-16	Accumulative power-on time threshold	0h～65000h	0	☆
P8-17	Accumulative operating time threshold	0h～65000h	0	☆
P8-18	Startup protection	0: Disabled 1: Enabled	0	☆
P8-19	Frequency detection value (PDT1)	0.00Hz ~ maximum frequency	50.00	☆
P8-20	Frequency detection hysteresis (PDT1)	0.0%～100.0%（electrical level of FDT1）	5.0	☆
P8-21	Detection width for frequency reach	0.0% ~ 100.0%（maximum frequency）	0.0	☆
P8-22	Jump frequency during acceleration/deceleration	0: Inactive 1: Active	0	☆
P8-23	Set running time to reach action selection	0~1	0	●
P8-24	Set power on time to reach action selection	0~1	0	●
P8-25	Frequency threshold for switching between acceleration time 1 and acceleration time 2	0.00Hz ~ maximum frequency	0.00	☆
P8-26	Frequency threshold for switching between deceleration time 1 and deceleration time 2	0.00Hz ~ maximum frequency	0.00	☆
P8-27	Priority of point movement	0: Disabled 1: Enabled	0	☆
P8-28	Frequency detection value (PDT2)	0.00Hz ~ maximum frequency	50.00	☆
P8-29	Frequency detection hysteresis (PDT2)	0.0%～100.0%（electrical level of FDT2）	5.0	☆
P8-30	Detection value 1 for frequency reach	0.00Hz ~ maximum frequency	50.00	☆
P8-31	Detection width of frequency 1	0.0% ~ 100.0%（maximum frequency）	0.0	☆
P8-32	Detection value 2 for frequency reach	0.00Hz ~ maximum frequency	50.00	☆
P8-33	Detection width of frequency 2	0.0% ~ 100.0%（maximum frequency）	0.0	☆
P8-34	Zero current detection level	0.0%～300.0% 100.0% corresponds to the rated motor current	5.0	☆
P8-35	Zero current detection delay	0.01s～600.00s	0.10	☆
P8-36	Output current threshold	0.0%（no detect） 0.1%～300.0%（Rated current of motor）	200.0	☆
P8-37	Software overcurrent detection delay	0.00s～600.00s	0.00	☆

P8-38	Detection level of current 1	0.0%～300.0%（Rated current of motor）	100.0	☆
P8-39	Detection width of current 1	0.0%～300.0%（Rated current of motor）	0.0	☆
P8-40	Detection level of current 2	0.0%～300.0%（Rated current of motor）	100.0	☆
P8-41	Detection width of current 2	0.0%～300.0%（Rated current of motor）	0.0	☆
P8-42	Timing function	0: Disabled 1: Enabled	0	★
P8-43	Source of the duration of timed operation	0: Set by P8-44 1: AI1 2: AI2	0	★
P8-44	Duration of timed operation	0.0Min～6500.0Min	0.0	★
P8-45	Lower limit of AI1 input voltage protection	0.00V～P8-46	3.10	☆
P8-46	Upper limit of AI1 input voltage protection	P8-45～10.00V	6.80	☆
P8-47	IGBT temperature reached	0℃～100℃	75	☆
P8-48	Cooling fan control	0: Working during drive running 1: Working continuously	0	☆
P8-49	Wake-up pressure deviation	0.0%~100.0%	55.0%	☆
P8-50	Wake up delay time	0.0s~6500.0s	20.0s	☆
P8-51	Dormancy frequency	0.00~600.00	0.00	☆
P8-52	Hibernation delay time	0.0s~6500.0s	100.0s	☆
P8-53	Operating time reached	0.0Min～6500.0Min	0.0	☆
P8-54	Reserved	-	0	★
P8-55	Emergency stop deceleration time	0.0s~6500.0s	0.0	☆
P8-56	LED keyboard click enabled	0~0	0	●
		P9 Fault and Protection		
P9-00	Overload Suppression of AC Drive	0: Disabled 1: Enabled	0	☆
P9-01	Motor overload protection gain	0.20～10.00	1.00	☆
P9-02	Motor overload prewarning coefficient	50%～100%	80	☆
P9-03	Reserved	0~65535	0	●
P9-04	Overvoltage threshold	350.0V~820.0V	820.0	☆
P9-05	Reserved	5~100	100	●
P9-06	Output phase loss inspection before start	0: Disabled 1: Enabled	1	☆
P9-07	Detection of software short-circuited to ground	0: No Detection 1: Check before power-on 2: Check before running 3: Check before power-on and operation	1	★
P9-08	Initial voltage of braking unit action	200.0～2000.0	760.0	●
P9-09	Automatic fault reset count	0～20	0	☆
P9-10	DO action during automatic fault reset	0: Not act 1: Act	0	☆

P9-11	Automatic fault reset interval	0.1s～100.0s	1.0	☆
P9-12	Input phase loss/Contactor pickup protection	Ones: Input phase loss protection selection 0: Input phase loss detection inhibited 1: Input phase loss detected by software and hardware 2: Input phase loss detected by software 3: Input phase loss detected by hardware Ten: Contactor pickup/Fan fault protection 0: Disabled 1: Enabled	13	☆
P9-13	Fault reset restart interval	0.0s~600.0s	10.0	☆
P9-14	Type of the 1st Fault	0~99	-	●
P9-15	Type of the 2nd Fault	0~99	-	●
P9-16	Type of the 3rd(latest) Fault	0~99	-	●
P9-17	Frequency upon occurrence of the 3rd (latest) fault	0.00Hz~655.35Hz	-	●
P9-18	Current upon occurrence of the 3rd (latest) fault	0.0A~6553.5A	-	●
P9-19	Bus voltage upon occurrence of the 3rd (latest) fault	0.0~6553.5	-	●
P9-20	DI state upon occurrence of the 3rd (latest) fault	0~9999	-	●
P9-21	DO state upon occurrence of the 3rd (latest) fault	0~9999	-	●
P9-22	AC drive state upon occurrence of the 3rd (latest) fault	0~65535	-	●
P9-23	Power-on time upon occurrence of the 3rd (latest) fault	0~65535	-	●
P9-24	Operating time upon occurrence of the 3rd (latest) fault	0.0~6553.5	-	●
P9-25	IGBT temperature upon occurrence of the 3rd (latest) fault	0~999	-	●
P9-26	Subcode of the 3rd (latest) fault	0~65535	-	●
P9-27	Frequency upon occurrence of the 2nd fault	0.00Hz~655.35Hz	-	●
P9-28	Current upon occurrence of the 2nd fault	0.0A~6553.5A	-	●
P9-29	Bus voltage upon occurrence of the 2nd fault	0.0V~6553.5V	-	●
P9-30	DI state upon occurrence of the 2nd fault	0~9999	-	●
P9-31	DO state upon occurrence of the 2nd fault	0~9999	-	●

P9-32	AC drive state upon occurrence of the 2nd fault	0~65535	-	●
P9-33	Power-on time upon occurrence of the 2nd fault	0~65535	-	●
P9-34	Operating time upon occurrence of the 2nd fault	0.0~6553.5	-	●
P9-35	IGBT temperature upon occurrence of the 2nd fault	0~999	-	●
P9-36	Subcode of the 2nd fault	0~65535	-	●
P9-37	Frequency upon occurrence of the 1st fault	0.00Hz~655.35Hz	-	●
P9-38	Current upon occurrence of the 1st fault	0.0A~6553.5A	-	●
P9-39	Bus voltage upon occurrence of the 1st fault	0.0V~6553.5V	-	●
P9-40	DI state upon occurrence of the 1st fault	0~9999	-	●
P9-41	DO state upon occurrence of the 1st fault	0~9999	-	●
P9-42	AC drive state upon occurrence of the 1st fault	0~65535	-	●
P9-43	Power-on time upon occurrence of the 1st fault	0~65535	-	●
P9-44	Operating time upon occurrence of the 1st fault	0.0~6553.5	-	●
P9-45	IGBT temperature occurrence of the 1st fault	0~999	-	●
P9-46	Subcode of the 1st fault	0~65535	-	●
P9-47	Fault protection action 0	ones-:E01 0: Coast to stop 2: Restart upon fault tens-:E05、E06、E07 0: Coast to stop 2: Restart upon fault hundreds-:E08 0: Coast to stop thousands-:E09 0: Coast to stop 2: Restart upon fault ten thousands-:E10 0: Coast to stop 2: Restart upon fault	00000	★
P9-48	Fault protection action 1	ones -:E11 0: Free stop 1: Slow down and stop 2: restart after a fault occurs 4: Warning	00000	★

		5: Cancel Tens place -:E12 0: Free stop 1: Slow down and stop 2: restart after a fault occurs 4: Warning 5: Cancel Hundreds -:E13 0: Free stop 1: Slow down and stop Thousands -:E14 0: Free stop ten thousands -:E15 0: Free stop 1: Slow down and stop 3: Electronic core sealing 4: Warning 5: Cancel		
P9-49	Fault protection action 2	ones -:E16 0: Free stop 1: Slow down and stop 4: Warning 5: Cancel Tens -:E17 0: Free stop 1: Slow down and stop 4: Warning 5: Cancel Hundreds -:E18 0: Free stop Thousands -:E19 0: Free stop 4: Warning 5: Cancel ten thousands -:E20 0: Free stop 4: Warning 5: Cancel	00000	★
P9-50	Fault protection action 3	ones -: reserved 0: Free stop Tens -:E63 0: Free stop 4: Warning Hundreds -:E23 0: Free stop 5: Cancel Thousands -:E24 0: Free stop 5: Cancel ten thousands -:E25 0: Free stop 5: Cancel	05040	★
P9-51	Fault protection action 4	ones -:E26 0: Free stop 1: Slow down and stop Tens -:E27 0: Free stop 1: Slow down and stop Hundreds-:E28 0: Free stop 1: Slow down and stop	51111	★

		Thousands -:E29 0: Free stop 1: Slow down and stop Ten thousands -:E30 0: Free stop 1: Slow down and stop 4: Warning 5: Cancel		
P9-52	Fault protection action 5	ones -:E31 0: Free stop 1: Slow down and stop 4: Warning 5: Cancel Tens -:E40 0: Free stop 2: restart after a fault occurs Hundreds -:E41 0: Free stop 1: Slow down and stop 4: Warning 5: Cancel Thousands -:E42 0: Free stop 1: Slow down and stop 2: restart after a fault occurs 4: Warning 5: Cancel Ten thousands -:E43 0: Free stop 1: Slow down and stop 4: Warning 5: Cancel	00101	★
P9-53	Fault protection action 6	Ones-:E45 0: Free stop 1: Slow down and stop 4: Warning 5: Cancel Tens -:E60 0: Free stop 5: Cancel Hundreds-:E61 5: Cancel Thousands -:E62 5: Cancel Ten thousands -: Reserved 5: Cancel	55555	★
P9-54	Frequency for continuing operation upon fault	0: runs at the current operating frequency 1: Run at set frequency 2: Operating at the upper limit frequency 3: Run at the lower limit frequency 4: Run at the standby frequency in case of an exception	1	☆
P9-55	Backup frequency upon error	0.0%～100.0% (100.0%corresponds to the maximum frequency P0-10)	100.0	☆
P9-56	Type of the motor temperature sensor	0: No sensor(AI1 channel as AI input) 1: PT100 2: PT1000	0	☆
P9-57	Motor overtemperature protection threshold	0℃～200℃	110	☆
P9-58	Motor overtemperature prewarning threshold	0℃～200℃	90	☆

P9-59	Power dip ride-through function	0: Disabled 1: Decelerate 2: Decelerate to stop	0	★
P9-60	Threshold for recovering from power dip ride-through	80～100	85	☆
P9-61	Duration for judging voltage recovery from power dip	0.00s～100.00s	0.5	☆
P9-62	Threshold of power dip ride-through function enabled	60.0%～100.0%（Standard bus voltage）	80	☆
P9-63	FVC runaway protection time	0～10000	0	●
P9-64	Load loss detection level	0.0～100.0%	10.0	☆
P9-65	Load loss detection time	0.0～60.0s	1.0	☆
P9-66	Reserved	0～546	0	●
P9-67	Overspeed detection value	0.0%～50.0%（maximum frequency）	5.0	☆
P9-68	Overspeed detection time	0.0s: no detect 0.1～60.0s	1.0	☆
P9-69	Excessive speed deviation threshold	0.0%～50.0%(maximum frequency)	20.0	☆
P9-70	Excessive speed deviation detection time	0.0s: no detect 0.1～60.0s	5.0	☆
P9-71	Power dip ride-through gain	0～100	40	☆
P9-72	Power dip ride-through integral coefficient	0～100	30	☆
P9-73	Deceleration time of power dip ride-through	0.0~300.0	20.0	☆
PA PID function				
PA-00	PID reference source	0: Set by PA-01 1: AI1 2: AI2 3: Reserved 4: PULSE setting(DIO 1) 5: Communication setting 6: Multi-reference	0	☆
PA-01	PID digital reference	0.0%～100.0%	50.0	☆
PA-02	PID feedback source	0: AI1 1: AI2 2: Reserved 3: AI1-AI2 4: PULSE setting(DIO 1) 5: Communication setting 6: AI1+AI2 7: MAX（|AI1|, |AI2|） 8: MIN（|AI1|, |AI2|）	0	☆
PA-03	PID action direction	0: Forward 1: Reverse	0	☆
PA-04	PID reference feedback range	0～65535	1000	☆
PA-05	Proportional gain Kp1	0.0～1000.0	20.0	☆
PA-06	Integral time Ti1	0.01s～100.00s	2.00	☆
PA-07	Derivative time Td1	0.000s～10.000s	0.000	☆

PA-08	PID cutoff frequency in reverse direction	0.00 ~ maximum frequency	2.00	☆
PA-09	PID deviation limit	0.0%～100.0%	0.0	☆
PA-10	PID derivative limit	0.00%～100.00%	0.10	☆
PA-11	PID reference change time	0.00～650.00s	0.00	☆
PA-12	PID feedback filter time	0.00～60.00s	0.00	☆
PA-13	PID deviation gain	0.0～100.0s	100.0	☆
PA-14	PID optimization parameter	0～65535	0	☆
PA-15	Proportional gain Kp2	0.0～1000.0	20.0	☆
PA-16	Integral time Ti2	0.01s～100.00s	2.00	☆
PA-17	Derivative time Td2	0.000s～10.000s	0.000	☆
PA-18	PID parameter switchover condition	0: No switchover 1: Switchover by DI 2: Automatic switchover based on deviation 3: Switchover based on running frequency 4~5:Reserved 6: Automatic adjustment based on roll diameter 7: Automatic adjustment based on maximum roll diameter percentage	0	☆
PA-19	PID parameter switchover deviation 1	0.0%～PA-20	20.0	☆
PA-20	PID parameter switchover deviation 2	PA-19～100.0%	80.0	☆
PA-21	PID initial value	0.0%～100.0%	0.0	☆
PA-22	Hold time of PID initial value	0.00～650.00s	0.00	☆
PA-23	Maximum deviation between two PID outputs in forward direction	0.00%～100.00%	1.00	☆
PA-24	Maximum deviation between two PID outputs in reverse direction	0.00%～100.00%	1.00	☆
PA-25	PID integral attribute	0: Invalid 1: Valid	0	☆
PA-26	PID feedback loss detection value	0.0%: Do not judge feedback loss 0.1%～100.0%	0.0	☆
PA-27	PID feedback loss detection time	0.0s ~ 20.0s	0.0	☆
PA-28	PID operation mode	0: no operation is performed 1: stop operation	0	★
PA-29	Pressure sensor range setting	PA-31~500.0	10.0	☆
PA-30	Reserved	-	-	-
PA-31	Actual pressure setpoint	0.0~PA-29	5.0	☆
PA-32	PID control mode related Settings	BIT0: Pressure set and feedback value 0: Percentage value 1: Indicates the actual value BIT1: The main interface of the panel displays the timing of pressure feeding by adjusting the switch through the up and down keys 0: Disable 1: Enables the function	0x000	★

		BIT2: Zero clearing option for a given value of pressure during shutdown 0: Indicates that the value is not clear 1: Clear zero		
PB Swing frequency, fixed length and count				
PB-00	Wobble setting mode	0: Relative to the center frequency 1: Relative to the maximum frequency	0	☆
PB-01	Wobble amplitude	0.0%～100.0%	0.0	☆
PB-02	Jump frequency amplitude	0.0% ~ 50.0%	0.0	☆
PB-03	Wobble cycle	0.1s ~ 3000.0s	10.0	☆
PB-04	Triangular wave rise time of wobble	0.1% ~ 100.0%	50.0	☆
PB-05	Set length	0m～65535m	1000	☆
PB-06	Actual length	0m ~ 65535m	0	☆
PB-07	Number of pulses per meter	0.1～6553.5	100.0	☆
PB-08	Set count value	1 ~ 65535	1000	☆
PB-09	Designated count value	1～65535	1000	☆
PC Multi-section instruction, simple PLC				
PC-00	Reference 0	-100.0%~100.0%	0.0	☆
PC-01	Reference 1	-100.0%~100.0%	0.0	☆
PC-02	Reference 2	-100.0%~100.0%	0.0	☆
PC-03	Reference 3	-100.0%~100.0%	0.0	☆
PC-04	Reference 4	-100.0%~100.0%	0.0	☆
PC-05	Reference 5	-100.0%~100.0%	0.0	☆
PC-06	Reference 6	-100.0%~100.0%	0.0	☆
PC-07	Reference 7	-100.0%~100.0%	0.0	☆
PC-08	Reference 8	-100.0%~100.0%	0.0	☆
PC-09	Reference 9	-100.0%~100.0%	0.0	☆
PC-10	Reference 10	-100.0%~100.0%	0.0	☆
PC-11	Reference 11	-100.0%~100.0%	0.0	☆
PC-12	Reference 12	-100.0%~100.0%	0.0	☆
PC-13	Reference 13	-100.0%~100.0%	0.0	☆
PC-14	Reference 14	-100.0%~100.0%	0.0	☆
PC-15	Reference 15	-100.0%~100.0%	0.0	☆
PC-16	Simple PLC operation mode	0: Stop after running for one cycle 1: Keep final values after running for one cycle 2: Repeat after running for one cycle	0	☆
PC-17	Simple PLC retentive memory selection upon power failure	Ones (position): Retention selection upon power failure 0: No 1: Yes Tens (position): Retention selection upon stop 0: No 1: Yes	0	☆
PC-18	Operating time of PLC reference 0	0.0s(h)~6553.5s(h)	0.0	☆
PC-19	Acceleration/Deceleration time of PLC reference 0	0~3	0	☆
PC-20	Operating time of PLC reference 1	0.0s(h)~6553.5s(h)	0.0	☆
PC-21	Acceleration/Deceleration time of PLC reference 1	0~3	0	☆

PC-22	Operating time of PLC reference 2	0.0s(h)~6553.5s(h)	0.0	☆
PC-23	Acceleration/Deceleration time of PLC reference 2	0~3	0	☆
PC-24	Operating time of PLC reference 3	0.0s(h)~6553.5s(h)	0.0	☆
PC-25	Acceleration/Deceleration time of PLC reference 3	0~3	0	☆
PC-26	Operating time of PLC reference 4	0.0s(h)~6553.5s(h)	0.0	☆
PC-27	Acceleration/Deceleration time of PLC reference 4	0~3	0	☆
PC-28	Operating time of PLC reference 5	0.0s(h)~6553.5s(h)	0.0	☆
PC-29	Acceleration/Deceleration time of PLC reference 5	0~3	0	☆
PC-30	Operating time of PLC reference 6	0.0s(h)~6553.5s(h)	0.0	☆
PC-31	Acceleration/Deceleration time of PLC reference 6	0~3	0	☆
PC-32	Operating time of PLC reference 7	0.0s(h)~6553.5s(h)	0.0	☆
PC-33	Acceleration/Deceleration time of PLC reference 7	0~3	0	☆
PC-34	Operating time of PLC reference 8	0.0s(h)~6553.5s(h)	0.0	☆
PC-35	Acceleration/Deceleration time of PLC reference 8	0~3	0	☆
PC-36	Operating time of PLC reference 9	0.0s(h)~6553.5s(h)	0.0	☆
PC-37	Acceleration/Deceleration time of PLC reference 9	0~3	0	☆
PC-38	Operating time of PLC reference 10	0.0s(h)~6553.5s(h)	0.0	☆
PC-39	Acceleration/Deceleration time of PLC reference 10	0~3	0	☆
PC-40	Operating time of PLC reference 11	0.0s(h)~6553.5s(h)	0.0	☆
PC-41	Acceleration/Deceleration time of PLC reference 11	0~3	0	☆
PC-42	Operating time of PLC reference 12	0.0s(h)~6553.5s(h)	0.0	☆
PC-43	Acceleration/Deceleration time of PLC reference 12	0~3	0	☆
PC-44	Operating time of PLC reference 13	0.0s(h)~6553.5s(h)	0.0	☆
PC-45	Acceleration/Deceleration time of PLC reference 13	0~3	0	☆

PC-46	Operating time of PLC reference 14	0.0s(h)~6553.5s(h)	0.0	☆
PC-47	Acceleration/Deceleration time of PLC reference 14	0~3	0	☆
PC-48	Operating time of PLC reference 15	0.0s(h)~6553.5s(h)	0.0	☆
PC-49	Acceleration/Deceleration time of PLC reference 15	0~3	0	☆
PC-50	Time unit of PLC operation	0: s (second) 1: h (hour)	0	☆
PC-51	Source of reference 0 in multi-reference mode	0: The function code is set by PC-00 1: AI1 2: AI2 3: Reserved 4: PULSE setting (DIO 1) 5: PID 6: Preset frequency (P0-08 that can be changed by pressing UP or DOWN key)	0	☆
PD Communication parameter				
PD-00	Baud rate	0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS	5	☆
PD-01	Modbus data format	0: No check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No check (8-N-1)	0	☆
PD-02	Local address	1～247，0 indicates the broaDCast address	1	☆
PD-03	Response delay	0ms～20ms（MODBUS valid）	2	☆
PD-04	Modbus communication timeout	0.0（invalid） 0.1s～60.0s （MODBUS valid）	0.0	☆
PD-05	Reserved	0～1	0	●
PD-06	Communication read current resolution	0: 0.01A 1: 0.1A	1	★
PD-07	Reserved	0～65535	0	★
PD-08	Reserved	0～65535	0	★
PD-09	Communication state	Ones: CANopen 0: Stop 1: Initialized 2: Pre-running 8: Running Tens: universal CAN 0: Stop 1: Initialized 2: Pre-running 8: Running Hundreds position: ProfibusDP 0: Stop 1: Initialized 2: - 8: Running	002	●

PD-10	CANopen/universal CAN switchover	1: CANopen 2: universal CAN	1	★
PD-11	CANopen402 Enabled	0:Disabled 1:Enabled	0	★
PD-12	CAN baud rate	0:20KBPS 1:50KBPS 2:125KBPS 3:250KBPS 4:500KPBS 5:1MBPS	5	★
PD-13	CAN station number	1～127	1	★
PD-14	Number of CAN frames received per unit of time	0～65535	0	●
PD-15	Maximum value of node transfer error counter	0～65535	0	●
PD-16	Maximum value of node sending error counter	0～65535	0	●
PD-17	Bus disconnection times per unit time	1～65535	1	●
PD-18	Number of the rectifier unit	1～99	1	★
PD-19	CAN communication disconnection coefficient	1～15	3	★
PD-20	ProfibusDP Indicates the communication address	0～125	0	★
PD-21	ProfibusDP communication dropout coefficient	0～65535	350	★
PD-22	Reserved	0～65535	0	●
PD-23	Reserved	0～65535	0	●
PD-24	Reserved	0～65535	0	●
PD-25	Reserved	0～65535	0	●
PD-26	Reserved	0～65535	0	●
PD-27	Reserved	0～65535	0	●
PD-28	Reserved	0～65535	0	●
PD-29	Reserved	0～65535	0	●
PD-30	Reserved	0～65535	0	●
PD-31	Reserved	0～65535	0	●
PD-32	Reserved	0～65535	1	★
PD-33	Reserved	0～65535	0	●
PD-34	Reserved	0～65535	0	●
PD-35	Reserved	0～65535	0	●
PD-36	Reserved	0～65535	0	●
PD-37	Reserved	0～65535	0	●
PD-38	Reserved	0～65535	0	●
PD-39	Reserved	0～65535	0	●
PD-40	Reserved	0～65535	0	●
PD-41	Reserved	0～65535	0	●
PD-42	Reserved	0～65535	0	●
PD-43	Reserved	0～65535	0	●
PD-44	Reserved	0～65535	0	●
PD-45	Reserved	0～65535	0	●
PD-46	Reserved	0～65535	0	●
PD-47	Reserved	0～65535	0	●
PD-48	Reserved	0～65535	0	●
PD-49	Reserved	0～65535	0	●

PD-50	Reserved	0～65535	0	●
PD-51	Reserved	0～65535	0	●
PD-52	Reserved	0～65535	0	●
PD-53	Reserved	0～65535	0	●
PD-54	Reserved	0～65535	0	●
PD-55	Reserved	0～65535	0	●
PD-56	Reserved	0～65535	0	●
PD-57	Reserved	0～65535	0	●
PD-58	Reserved	0～65535	0	●
PD-59	Reserved	0～65535	0	●
PD-60	Reserved	0～65535	0	●
PD-61	Reserved	0～65535	0	●
PD-62	Reserved	0～65535	0	●
PD-63	Reserved	0～65535	0	●
PD-64	Reserved	0～65535	0	●
PD-65	Reserved	0～65535	0	●
PD-66	Reserved	0～65535	0	●
PD-67	Reserved	0～65535	0	●
PD-68	Reserved	0～65535	0	●
PD-69	Reserved	0～65535	0	●
PD-70	Reserved	0～65535	0	●
PD-71	Reserved	0～65535	0	●
PD-72	Reserved	0～65535	0	●
PD-73	Reserved	0～65535	0	●
PD-74	Reserved	0～65535	0	●
PD-75	Reserved	0～65535	0	●
PD-76	Reserved	0～65535	0	●
PD-77	Reserved	0～65535	0	●
PD-78	Reserved	0～65535	0	●
PD-79	Reserved	0～65535	0	●
PD-80	Reserved	0～65535	0	●
PD-81	Reserved	0～65535	0	●
PD-82	Reserved	0～65535	0	●
PD-83	Reserved	0～65535	0	●
PD-84	Reserved	0～65535	0	●
PD-85	Reserved	0～65535	0	●
PD-86	Reserved	0～65535	0	●
PD-87	Reserved	0～65535	0	●
PD-88	Reserved	0～65535	0	●
PD-89	Reserved	0～65535	0	●
PD-90	Reserved	0～65535	0	●
PD-91	Reserved	0～65535	0	●
PD-92	Reserved	0～65535	0	●
PD-93	Reserved	0～65535	0	☆
PD-94	Modbus software version	0～65535	0	●
PD-95	Reserved	0～65535	0	●
PD-96	CANopen software version	0～65535	0	●
PD-97	DP software version	0～65535	0	●
PD-98	DP Bridge software version	0～65535	0	●

PD-99	MODBUS Bridge software version	0～65535	0	●
PE User-defined function codes				
PE-00	User function code 0		-	☆
PE-01	User function code 1		-	☆
PE-02	User function code 2		-	☆
PE-03	User function code 3		-	☆
PE-04	User function code 4		-	☆
PE-05	User function code 5		-	☆
PE-06	User function code 6		-	☆
PE-07	User function code 7		-	☆
PE-08	User function code 8		-	☆
PE-09	User function code 9		-	☆
PE-10	User function code 10		-	☆
PE-11	User function code 11		-	☆
PE-12	User function code 12		-	☆
PE-13	User function code 13		-	☆
PE-14	User function code 14		-	☆
PE-15	User function code 15		-	☆
PE-16	User function code 16		-	☆
PE-17	User function code 17		-	☆
PE-18	User function code 18		-	☆
PE-19	User function code 19		-	☆
PE-20	User function code 20		-	☆
PE-21	User function code 21		-	☆
PE-22	User function code 22		-	☆
PE-23	User function code 23		-	☆
PE-24	User function code 24		-	☆
PE-25	User function code 25		-	☆
PE-26	User function code 26		-	☆
PE-27	User function code 27		-	☆
PE-28	User function code 28		-	☆
PE-29	User function code 29		-	☆
PE-30	User function code 30		-	☆
PE-31	User function code 31		-	☆
PP User parameter				
PP-00	User password	0~65535	0	●
PP-01	Parameter initialization	0: No operation is performed 1: Restore factory parameter mode 1 2: Clear fault records 3: Restore factory parameter mode 2	000	☆
PP-02	Initialization Parameter	Ones -: Displays the U selection 0: Hidden 1: Display Tens -: Group H displays selection 0: Hidden 1: Display Hundreds -: Group L displays selection 0: Hidden 1: Display Thousands -: Group T displays selection 0: Hidden 1: Display	0111	☆

PP-03	Personality parameter mode display selection	Ones -: 0: Not displayed 1: Display Tens -: 0: Not displayed 1: Display	11	☆
PP-04	Function code Modifies attributes	0: can be modified 1: cannot be modified	0	☆
PP-05	Reserved	0~65535	4	☆
H0 Torque control parameters				
H0-00	Speed/Torque control mode	0: Speed control 1: Torque control	0	★
H0-01	Torque reference source	0:Digital setting(H0-03) 1:AI1 2:AI2 3: Reserved 4: PULSE setting (DIO 1) 5:Communication setting(1000H) 6:MIN(AI1,AI2) 7:MAX(AI1,AI2)	0	★
H0-02	Reserved	0～0	0	●
H0-03	Digital setting of the torque	-200.0%～200.0%	100.0	☆
H0-04	Torque filter time	0.000s~5.000s	0.000	☆
H0-05	Digital setting of the speed limit	-120.0～120.0	0.0	☆
H0-06	Frequency modulation coefficient in window mode	0.0～50.0	0.0	●
H0-07	Torque acceleration time	0.00s～650.00s	1.00	☆
H0-08	Torque deceleration time	0.00s～650.00s	1.00	☆
H0-09	Source of speed limit	0:Set by H0-05 1:Set by Frequency source	0	☆
H0-10	Speed limit offset	0.00～600.00	5.00	☆
H0-11	Speed limit offset selection	0: Bidirectional offset valid 1: Unidirectional offset valid 2: Windows mode 3: Load mode for supporting	0	★
H0-12	Frequency acceleration time	0.0～6500.0	1.0	☆
H0-13	Frequency deceleration time	0.0～6500.0	1.0	☆
H0-14	Torque mode switchover	0: Not switched 1: Switched to speed mode upon stop 2: Target torque changed to 0 upon stop	1	★
H1 Virtual DI and virtual DO				
H1-00	Select virtual VDI1 terminal function	0: No function 1: Forward run (FWD)	0	★
H1-01	Select virtual VDI2 terminal function	2: Reverse run (REV) 3: Three-wire operation control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: Running pause 11: External fault NO input 12–15: Multi-reference terminals 1 to 4	0	★

H1-02	Select virtual VDI3 terminal function	16 and 17: Terminals 1 and 2 for acceleration/deceleration selection 18: Frequency source switchover 19: UP/DOWN setting clear (terminal, operation panel) 20: Running command switchover terminal 21: Acceleration/Deceleration inhibited 22: PID pause 23: PLC status reset 24: Wobble pause 25: Counter input (DIO1) 26: Counter reset 27: Length count input (DIO1) 28: Length reset 29: Torque control inhibited 30: Pulse input 31: Reserved 32: Immediate DC braking 33: External fault NC input 34: Frequency modification enabled 35: Reverse PID operation direction 36: External stop terminal 1 37: Control command switchover terminal 2 38: PID integral disabled 39: Frequency source X switches with preset frequency 40: Frequency source Y switches with preset frequency 41: Motor terminal selection function 42: Zero servo enable 43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: Operating time clear 51: Two-wire/Three-wire operation control switchover 52~61:Reserved	0	★
H1-03	Select virtual VDI4 terminal function		0	★
H1-04	Select virtual VDI5 terminal function		0	★
H1-05	VDI terminal status Setting mode	Ones: 0:Set by H1-06 1: DO state 2: DI state Tens: 0:Set by H1-06 1: DO state 2: DI state Hundreds: 0:Set by H1-06 1: DO state 2: DI state Thousands: 0:Set by H1-06 1: DO state 2: DI state Ten thousands: 0:Set by H1-06 1: DO state 2: DI state	0	★
H1-06	Virtual VDI terminal status setting	Ones: 0: Invalid 1: Valid Tens: 0: Invalid	0	☆

		1: Valid Hundreds: 0: Invalid 1: Valid Thousands: 0: Invalid 1: Valid Ten thousands: 0: Invalid 1: Valid		
H1-07	AI1 function selection (used as DI)	0: No function 1: Forward run (FWD) 2: Reverse run (REV) 3: Three-wire operation control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: Running pause 11: External fault NO input 12–15: Multi-reference terminals 1 to 4 16 and 17: Terminals 1 and 2 for acceleration/deceleration selection 18: Frequency source switchover 19: UP/DOWN setting clear (terminal, operation panel) 20: Running command switchover terminal 21: Acceleration/Deceleration inhibited 22: PID pause 23: PLC status reset 24: Wobble pause 25: Counter input (DIO1) 26: Counter reset 27: Length count input (DIO1) 28: Length reset 29: Torque control inhibited 30: Pulse input 31: Reserved 32: Immediate DC braking 33: External fault NC input 34: Frequency modification enabled 35: Reverse PID operation direction 36: External stop terminal 1 37: Control command switchover terminal 2 38: PID integral disabled 40: Switchover between frequency source Y and preset frequency 41: Motor terminal selection 1 42: Position lock enabled 43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: Operating time clear 51: Two-wire/Three-wire operation control switchover 52~61: Reserved	0	★
H1-08	AI2 function selection (used as DI)		0	★
H1-09	AI3 function selection (used as DI)		0	•

H1-10	Active state selection for AI used as DI	Ones: 0: Active high 1: Active low Tens: 0: Active high 1: Active low Hundreds: Reserved	0	★
H5 Control optimization parameter				
H5-00	Frequency upper limit for DPWM switchover	0.00Hz～600.00Hz	12.00	☆
H5-01	PWM mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
H5-02	Dead zone compensation	0: Disabled 1: Compensation mode	1	★
H5-03	Random PWM depth	0: Disabled 1～10: Random depth	0	☆
H5-04	Quick current limit	0:Disabled 1:Enabled	1	☆
H5-05	Sampling delay	1～13	5	☆
H5-06	Undervoltage threshold	150.0V~700.0V	350.0	☆
H5-07	SVC optimization selection	0: No optimization 1: Optimization mode 1 2: Optimization mode 2	1	★
H5-08	Dead zone time adjustment	100%～200%	150	★
H5-09	Overmodulation selection	0:Disabled 1:Enabled	0	●
H5-10	Narrow pulse control selection	0:Disabled 1:Enabled	0	●
H5-11	Reduced switching frequency selection under vector control	Ones : 0: 1: Select DPWM modulation	0	☆
H5-12	Function section set bus voltage selection	0～1	0	●
H5-13	The function section sets the bus voltage	100～20000	5310	●
H5-14	Temperature correction	0～1	0	★
H5-15	Reserved	0～65535	0	●
H5-16	Display parameter address 1	0～100	0	●
H5-17	Display parameter address 2	0～100	1	●
H5-18	Display parameter address 3	0～100	2	●
H5-19	Display parameter address 4	0～100	3	●
H5-20	Reserved	0～1	0	★
H5-21	Low speed carrier frequency setting	0.0～6.0	2.0	☆
H5-22	Dead zone compensation identification enabled	Default asynchronous motor tuning, synchronous motor not tuning 0: Untuned 1: Tuning	0	●
H6 AI simulation input curve setting				
H6-00	Curve 4 minimum input	-10.00~10.00	0.00	☆
H6-01	Corresponding setting of curve 4 minimum input	-100.0%~100.0%	0.0	☆

H6-02	Curve 4 inflection point 1 input	-10.00~10.00	3.00	☆
H6-03	Corresponding setting of curve 4 inflection point 1 input	-100.0%~100.0%	30.0	☆
H6-04	Curve 4 inflection point 2 input	-10.00~10.00	6.00	☆
H6-05	Corresponding setting of curve 4 inflection point 2 input	-100.0%~100.0%	60.0	☆
H6-06	Curve 4 maximum input	-10.00~10.00	10.00	☆
H6-07	Corresponding setting of curve 4 maximum input	-100.0%~100.0%	100.0	☆
H6-08	Curve 5 minimum input	-10.00~10.00	-10.00	☆
H6-09	Corresponding setting of curve 5 minimum input	-100.0%~100.0%	-100.0	☆
H6-10	Curve 5 inflection point 1 input	-10.00~10.00	-3.00	☆
H6-11	Corresponding setting of curve 5 inflection point 1 input	-100.0%~100.0%	-30.0	☆
H6-12	Curve 5 inflection point 2 input	-10.00~10.00	3.00	☆
H6-13	Corresponding setting of curve 5 inflection point 2 input	-100.0%~100.0%	30.0	☆
H6-14	Curve 5 maximum input	-10.00~10.00	10.00	☆
H6-15	Corresponding setting of curve 5 maximum input	-100.0%~100.0%	100.0	☆
H6-16	AI1 gain	-10.00~10.00	1.00	☆
H6-17	AI1 offset	-100.0%~100.0%	0.0	☆
H6-18	AI2 gain	-10.00~10.00	1.00	☆
H6-19	AI2 offset	-100.0%~100.0%	0.0	☆
H6-20	AI3 gain	-10.00~10.00	1.00	☆
H6-21	AI3 offset	-100.0%~100.0%	0.0	☆
H6-22	AI disconnection detection threshold	0.0%~100.0%	0.0	☆
H6-23	AI disconnection detection time	0.0s~6553.5s	0.0	☆
H6-24	AI1 setting jump point	-100.0%~100.0%	0.0	☆
H6-25	AI1 setting jump amplitude	0.0%~100.0%	0.5	☆
H6-26	AI2 setting jump point	-100.0%~100.0%	0.0	☆
H6-27	AI2 setting jump amplitude	0.0%~100.0%	0.5	☆
H6-28	AI3 setting jump point	-100.0%~100.0%	0.0	☆
H6-29	AI3 setting jump amplitude	0.0%~100.0%	0.5	☆
H9 Vector control supplementary parameters				
H9-00	Asynchronous machine online identification of rotor time constant	0: Disabled 1: Enabled	0	☆
H9-01	Resistance gain of asynchronous motor rotor during auto-tuning in FVC mode	0~100	5	☆
H9-02	Starting frequency of asynchronous motor rotor resistor during auto-tuning in FVC mode	2~100	7	☆

H9-03	Magnetic field coefficient of asynchronous motor observed in FVC mode	30~150	40	☆
H9-04	Maximum torque limit coefficient of asynchronous motor in field-weakening range	30~150	80	☆
H9-05	Asynchronous motor speed filter time in SVC mode	5~32	15	☆
H9-06	Asynchronous motor speed feedback processing under speed control in SVC mode	0: No operation 1: Minimum synchronization frequency limited based on load change 2: Fixed current output during low-speed running 3: Fixed current output during low-speed running and light load	0	☆
H9-07	Asynchronous motor magnetic field adjustment bandwidth in SVC mode	0.0~8.0	2.0	☆
H9-08	Operating current setpoint of asynchronous motor during low-speed operation in SVC mode	30~170	100	☆
H9-09	Switchover frequency for fixed current output by asynchronous motor in SVC mode	2.0~100.0	7.0	☆
H9-10	Speed fluctuation suppression coefficient of asynchronous motor in SVC mode	0~6	3	☆
H9-11	Acceleration/Deceleration time of asynchronous motor in SVC mode	0.1~3000.0	50.0	☆
H9-12	Quick auto-tuning of asynchronous motor stator resistance before startup	0: Disabled 1: Enabled	0	☆
H9-13	Quick auto-tuning of stator resistance coefficient 1 of asynchronous motor	0~65535	10	★
H9-14	Quick auto-tuning of stator resistance coefficient 2 of asynchronous motor	0~65535	10	★
H9-15	Quick auto-tuning of stator resistance coefficient 3 of asynchronous motor	0~65535	0	★
H9-16	Reserved	0~65535	0	●
H9-17	Real-time angle of synchronous motor	0.0~359.9	0.0	●
H9-18	Initial angle detection of synchronous motor	0: Detected upon running 1: Not detected 2: Detected upon initial running after power-on	0	☆
H9-19	Reserved	0~1	0	☆
H9-20	Field-weakening mode	0: Automatic mode 1: Synchronous motor adjustment mode 2: Synchronous motor hybrid mode 3: Disabled	0	★

H9-21	Field-weakening gain of synchronous motor	0~50	5	☆
H9-22	Output voltage upper limit margin of synchronous motor	0~50	5	☆
H9-23	Maximum force adjustment gain of synchronous motor	20~300	100	☆
H9-24	Exciting current adjustment gain calculated by synchronous motor	40~200	100	☆
H9-25	Estimated speed integral gain of synchronous motor in SVC mode	5~1000	30	☆
H9-26	Estimated speed proportional gain of synchronous motor in SVC mode	5~300	20	☆
H9-27	Estimated speed filter of synchronous motor in SVC mode	10~2000	100	☆
H9-28	Minimum carrier frequency of synchronous motor in SVC mode	0.8~6.0	2.0	☆
H9-29	Low-speed exciting current of synchronous motor in SVC mode	0~80	30	☆
H9-30	Reserved	30%~200%	50	☆
H9-31	Reserved	0%~500 %	100	☆
H9-32	Reserved parameter 8 for synchronous motor control	0~1	0	☆
H9-33	Reserved parameter 9 for synchronous motor control	0~5	0	★
H9-34	Reserved parameter 10 for synchronous motor control	0~65535	0	☆
H9-35	1st performance fault subcode	0~65535	0	•
H9-36	2nd performance fault subcode	0~65535	0	•
H9-37	3rd performance fault subcode	0~65535	0	•
H9-38	Reserved	0~65535	0	☆
H9-39	Reserved	0~65535	0	☆
H9-40	Reserved	0: Disabled 1: Enabled	0	★
H9-41	Reserved	30~200	50	★

H9-42	Reserved	0~500	100	☆
H9-43	Reserved	0~5	0	★
H9-44	Initial position compensation angle of synchronous motor	0.0~360.0	0.0	☆
H9-45	Synchronous motor low-speed handling	0: Disabled 1: Enabled	0	★
H9-46	Switchover frequency for synchronous motor low-speed handling	0.00~600.00	5.00	★
H9-47	Synchronous motor low-speed handling current	10~200	100	★
H9-48	Synchronous motor low-speed handling feedback suppression coefficient	0~300	32	★
H9-49	Synchronous motor energy-saving control	0: Disabled 1: Enabled	0	★
H9-50	Maximum flux weakening current limit margin	200~1000	1000	★
H9-51	Advanced settings for asynchronous motor parameter auto-tuning	Ones: Rotor resistance and leakage inductance DC offset 0: Standard offset 1: Large offset Tens: New rotor resistance and leakage inductance auto-tuning algorithm 0: Disabled 1: Enabled Hundreds: New mutual inductance static auto-tuning algorithm 0: Disabled 1: Enabled	111	★
H9-52	Optimal selection of closed loop vector flux and torque linearity	0x0~0xF	0x1	☆
H9-53	SVC mode selection	3:mode 3 4:mode 4	4	☆
H9-54	Transistor voltage drop	0~65535	0	★
		HC AIAO correction		
HC-00	AI1 measured voltage 1	-10.000V~10.000V	-	☆
HC-01	AI1 displayed voltage 1	-10.000V~10.000V	-	☆
HC-02	AI1 measured voltage 2	-10.000V~10.000V	-	☆
HC-03	AI1 displayed voltage 2	-10.000V~10.000V	-	☆
HC-04	AI2 measured voltage 1	-10.000V~10.000V	-	☆
HC-05	AI2 displayed voltage 1	-10.000V~10.000V	-	☆
HC-06	AI2 measured voltage 2	-10.000V~10.000V	-	☆
HC-07	AI2 displayed voltage 2	-10.000V~10.000V	-	☆
HC-08	AI3 measured voltage 1	-10.000V~10.000V	-	☆
HC-09	AI3 displayed voltage 1	-10.000V~10.000V	-	☆
HC-10	AI3 measured voltage 2	-10.000V~10.000V	-	☆
HC-11	AI3 displayed voltage 2	-10.000V~10.000V	-	☆
HC-12	AO1 measured voltage 1	-10.000V~10.000V	-	☆
HC-13	AO1 target voltage 1	-10.000V~10.000V	-	☆
HC-14	AO1 measured voltage 2	-10.000V~10.000V	-	☆
HC-15	AO1 target voltage 2	-10.000V~10.000V	-	☆

HC-16	AO2 measured voltage 1	-10.000V~10.000V	-	☆
HC-17	AO2 target voltage 1	-10.000V~10.000V	-	☆
HC-18	AO2 measured voltage 2	-10.000V~10.000V	-	☆
HC-19	AO2 target voltage 2	-10.000V~10.000V	-	☆
HC-20	PT100 measured voltage 1	-3.300~3.300	1.650	☆
HC-21	PT100 target voltage 1	-3.300~3.300	1.650	☆
HC-22	PT100 measured voltage 2	-3.300~3.300	3.062	☆
HC-23	PT100 target voltage 2	-3.300~3.300	3.062	☆
HC-24	PT1000 measured voltage 1	-3.300~3.300	1.650	☆
HC-25	PT1000 target voltage 1	-3.300~3.300	1.650	☆
HC-26	PT1000 measured voltage 2	-3.300~3.300	2.997	☆
HC-27	PT1000 target voltage 2	-3.300~3.300	2.997	☆
HC-28	AO1 measured current 1	0.000mA~20.000mA	4.000	☆
HC-29	AO1 target current 1	0.000mA~20.000mA	4.000	☆
HC-30	AO1 measured current 2	0.000mA~20.000mA	16.000	☆
HC-31	AO1 target current 2	0.000mA~20.000mA	16.000	☆
HF Process data address mapping				
HF-00	RPDO1-SubIndex0-H	0x0000~0xFFFF	0x2073	☆
HF-01	RPDO1-SubIndex0-L	0x0000~0xFFFF	0x1210	☆
HF-02	RPDO1-SubIndex1-H	0x0000~0xFFFF	0x2073	☆
HF-03	RPDO1-SubIndex1-L	0x0000~0xFFFF	0x1110	☆
HF-04	RPDO1-SubIndex2-H	0x0000~0xFFFF	0x0000	☆
HF-05	RPDO1-SubIndex2-L	0x0000~0xFFFF	0x0000	☆
HF-06	RPDO1-SubIndex3-H	0x0000~0xFFFF	0x0000	☆
HF-07	RPDO1-SubIndex3-L	0x0000~0xFFFF	0x0000	☆
HF-08	RPDO2-SubIndex0-H	0x0000~0xFFFF	0x0000	☆
HF-09	RPDO2-SubIndex0-L	0x0000~0xFFFF	0x0000	☆
HF-10	RPDO2-SubIndex1-H	0x0000~0xFFFF	0x0000	☆
HF-11	RPDO2-SubIndex1-L	0x0000~0xFFFF	0x0000	☆
HF-12	RPDO2-SubIndex2-H	0x0000~0xFFFF	0x0000	☆
HF-13	RPDO2-SubIndex2-L	0x0000~0xFFFF	0x0000	☆
HF-14	RPDO2-SubIndex3-H	0x0000~0xFFFF	0x0000	☆
HF-15	RPDO2-SubIndex3-L	0x0000~0xFFFF	0x0000	☆
HF-16	RPDO3-SubIndex0-H	0x0000~0xFFFF	0x0000	☆
HF-17	RPDO3-SubIndex0-L	0x0000~0xFFFF	0x0000	☆
HF-18	RPDO3-SubIndex1-H	0x0000~0xFFFF	0x0000	☆
HF-19	RPDO3-SubIndex1-L	0x0000~0xFFFF	0x0000	☆
HF-20	RPDO3-SubIndex2-H	0x0000~0xFFFF	0x0000	☆
HF-21	RPDO3-SubIndex2-L	0x0000~0xFFFF	0x0000	☆
HF-22	RPDO3-SubIndex3-H	0x0000~0xFFFF	0x0000	☆
HF-23	RPDO3-SubIndex3-L	0x0000~0xFFFF	0x0000	☆
HF-24	RPDO4-SubIndex0-H	0x0000~0xFFFF	0x0000	☆
HF-25	RPDO4-SubIndex0-L	0x0000~0xFFFF	0x0000	☆
HF-26	RPDO4-SubIndex1-H	0x0000~0xFFFF	0x0000	☆
HF-27	RPDO4-SubIndex1-L	0x0000~0xFFFF	0x0000	☆
HF-28	RPDO4-SubIndex2-H	0x0000~0xFFFF	0x0000	☆

HF-29	RPDO4-SubIndex2-L	0x0000~0xFFFF	0x0000	☆
HF-30	RPDO4-SubIndex3-H	0x0000~0xFFFF	0x0000	☆
HF-31	RPDO4-SubIndex3-L	0x0000~0xFFFF	0x0000	☆
HF-32	TPDO1-SubIndex0-H	0x0000~0xFFFF	0x2070	☆
HF-33	TPDO1-SubIndex0-L	0x0000~0xFFFF	0x4510	☆
HF-34	TPDO1-SubIndex1-H	0x0000~0xFFFF	0x2070	☆
HF-35	TPDO1-SubIndex1-L	0x0000~0xFFFF	0x4610	☆
HF-36	TPDO1-SubIndex2-H	0x0000~0xFFFF	0x0000	☆
HF-37	TPDO1-SubIndex2-L	0x0000~0xFFFF	0x0000	☆
HF-38	TPDO1-SubIndex3-H	0x0000~0xFFFF	0x0000	☆
HF-39	TPDO1-SubIndex3-L	0x0000~0xFFFF	0x0000	☆
HF-40	TPDO2-SubIndex0-H	0x0000~0xFFFF	0x0000	☆
HF-41	TPDO2-SubIndex0-L	0x0000~0xFFFF	0x0000	☆
HF-42	TPDO2-SubIndex1-H	0x0000~0xFFFF	0x0000	☆
HF-43	TPDO2-SubIndex1-L	0x0000~0xFFFF	0x0000	☆
HF-44	TPDO2-SubIndex2-H	0x0000~0xFFFF	0x0000	☆
HF-45	TPDO2-SubIndex2-L	0x0000~0xFFFF	0x0000	☆
HF-46	TPDO2-SubIndex3-H	0x0000~0xFFFF	0x0000	☆
HF-47	TPDO2-SubIndex3-L	0x0000~0xFFFF	0x0000	☆
HF-48	TPDO3-SubIndex0-H	0x0000~0xFFFF	0x0000	☆
HF-49	TPDO3-SubIndex0-L	0x0000~0xFFFF	0x0000	☆
HF-50	TPDO3-SubIndex1-H	0x0000~0xFFFF	0x0000	☆
HF-51	TPDO3-SubIndex1-L	0x0000~0xFFFF	0x0000	☆
HF-52	TPDO3-SubIndex2-H	0x0000~0xFFFF	0x0000	☆
HF-53	TPDO3-SubIndex2-L	0x0000~0xFFFF	0x0000	☆
HF-54	TPDO3-SubIndex3-H	0x0000~0xFFFF	0x0000	☆
HF-55	TPDO3-SubIndex3-L	0x0000~0xFFFF	0x0000	☆
HF-56	TPDO4-SubIndex0-H	0x0000~0xFFFF	0x0000	☆
HF-57	TPDO4-SubIndex0-L	0x0000~0xFFFF	0x0000	☆
HF-58	TPDO4-SubIndex1-H	0x0000~0xFFFF	0x0000	☆
HF-59	TPDO4-SubIndex1-L	0x0000~0xFFFF	0x0000	☆
HF-60	TPDO4-SubIndex2-H	0x0000~0xFFFF	0x0000	☆
HF-61	TPDO4-SubIndex2-L	0x0000~0xFFFF	0x0000	☆
HF-62	TPDO4-SubIndex3-H	0x0000~0xFFFF	0x0000	☆
HF-63	TPDO4-SubIndex3-L	0x0000~0xFFFF	0x0000	☆
HF-64	Reserved	0x0000~0xFFFF	0x20F0	☆
HF-65	Reserved	0x0000~0xFFFF	0x0810	☆
HF-66	RPDO Significant number	0x0000~0xFFFF	0x0002	●
HF-67	TPDO Significant number	0x0000~0xFFFF	0x0002	●
HF-68	Reserved	0x0000~0xFFFF	0x0000	☆
HF-69	Reserved	0x0000~0xFFFF	0x0000	☆
HF-70	Reserved	0x0000~0xFFFF	0x0000	☆
HF-71	Reserved	0x0000~0xFFFF	0x0000	☆
HF-72	Reserved	0x0000~0xFFFF	0x0000	☆
HF-73	Reserved	0x0000~0xFFFF	0x0000	☆
HF-74	Reserved	0x0000~0xFFFF	0x0000	☆
HF-75	Reserved	0x0000~0xFFFF	0x0000	☆
HF-76	Reserved	0x0000~0xFFFF	0x0000	☆
HF-77	Reserved	0x0000~0xFFFF	0x0000	☆
HF-78	Reserved	0x0000~0xFFFF	0x0000	☆
HF-79	Reserved	0x0000~0xFFFF	0x0000	☆

4.3 Monitoring parameter summary table

Code ID	Description	Detailed Description of Parameters	Default value	Modified Type
U0 Basic monitor parameter				
U0-00	Operating frequency	0.00~0.00	-	●
U0-01	Frequency reference	0.00~0.00	-	●
U0-02	Bus voltage	0.0~0.0	-	●
U0-03	Output voltage	0~0	-	●
U0-04	Output current	0.0~0.0	-	●
U0-05	Output power	0.0~0.0	-	●
U0-06	Output torque	0.0~0.0	-	●
U0-07	DI state	0~0	-	●
U0-08	DO state	0~0	-	●
U0-09	AI1 voltage	0.00~0.00	-	●
U0-10	AI2 voltage	0.00~0.00	-	●
U0-11	AI3 voltage	0.00~0.00	-	●
U0-12	Count value	0~0	-	●
U0-13	Length value	0~0	-	●
U0-14	Load speed display	0~0	-	●
U0-15	PID setting	0~0	-	●
U0-16	PID feedback	0~0	-	●
U0-17	PLC stage	0~0	-	●
U0-18	Pulse input frequency	0.00~0.00	-	●
U0-19	Feedback speed	0.00~0.00	-	●
U0-20	Remaining operating time	0.0~0.0	-	●
U0-21	AI1 voltage before correction	0.000~0.000	-	●
U0-22	AI2 voltage before correction	0.000~0.000	-	●
U0-23	AI3 voltage before correction	0.000~0.000	-	●
U0-24	Linear speed	0~0	-	●
U0-25	Current power-on time	0~0	-	●
U0-26	Current operating time	0.0~0.0	-	●
U0-27	Pulse input frequency	0~0	-	●
U0-28	Communication setting value	0.00~0.00	-	●
U0-29	Encoder feedback speed	0.00~0.00	-	●
U0-30	Display of main frequency X	0.00~0.00	-	●
U0-31	Display of auxiliary frequency Y	0.00~0.00	-	●
U0-32	Any memory address	0~0	-	●
U0-33	Position of the synchronous motor rotor	0.0~0.0	-	●
U0-34	Motor temperature	0~0	-	●
U0-35	Target torque	0.0~0.0	-	●
U0-36	Resolver position	0~0	-	●
U0-37	Power factor angle	0.0~0.0	-	●
U0-38	ABZ position	0~0	-	●
U0-39	Target voltage upon V/F separation	0~0	-	

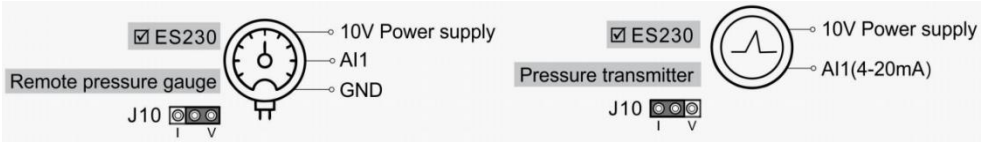
U0-40	Output voltage upon V/F separation	0~0	-	●
U0-41	DI state display	0~0	-	●
U0-42	DO state display	0~0	-	●
U0-43	DI function state display	0~0	-	●
U0-44	DO function state display	0~0	-	●
U0-45	Fault subcode	0~0	-	●
U0-46	Drive unit temperature	0~0	-	●
U0-47	Voltage before PTC correction	0.000~0.000	-	●
U0-48	Voltage after PTC correction	0.000~0.000	-	●
U0-49	Number of position lock deviation pulses	0~0	-	●
U0-50	Roll diameter	0~0	-	●
U0-51	Tension (after taper)	0~0	-	●
U0-52	Reserved	0.0~0.0	-	●
U0-53	Reserved	0.0~0.0	-	●
U0-54	Reserved	0.0~0.0	-	●
U0-55	Reserved	0.0~0.0	-	●
U0-56	Reserved	0.0~0.0	-	●
U0-57	Reserved	0.0~0.0	-	●
U0-58	Z signal counter	0~0	-	●
U0-59	Frequency reference (%)	0.00~0.00	-	●
U0-60	Operating frequency (%)	0.00~0.00	-	●
U0-61	AC Drive state	0~0	-	●
U0-62	Current fault code	0~0	-	●
U0-63	Operating frequency (after droop)	0.00~0.00	-	●
U0-64	BEMF	0.0~0.0	-	●
U0-65	Stator resistance auto-tuning	0~0	-	●
U0-66	Communication extension card model	0~0	-	●
U0-67	Communication extension card version	0~0	-	●
U0-68	AC Drive state on the PROFIBUS-DP card	0~0	-	●
U0-69	Frequency sent to PROFIBUS-DP card/0.01 Hz	0~0	-	●
U0-70	Speed sent to PROFIBUS-DP card/RPM	0~0	-	●
U0-71	Current display for communication card	0~0	-	●
U0-72	Communication card error state	0~0	-	●
U0-73	Target torque before filter	0.0~0.0	-	●
U0-74	Target torque after filter	0.0~0.0	-	●
U0-75	Torque reference after acceleration/deceleration	0.0~0.0	-	●
U0-76	Motoring torque upper limit	0.0~0.0	-	●

U0-77	Generating torque upper limit	0.00~0.00	-	●
U0-78	Reserved	0~0	-	●
U0-79	Reserved	0~0	-	●
U0-80	EtherCAT slave name	0~0	-	●
U0-81	EtherCAT slave alias	0~0	-	●
U0-82	EtherCAT ESM transmission error code	0~0	-	●
U0-83	EtherCAT XML file version	0.00~0.00	-	●
U0-84	EtherCAT synchronization loss times	0~0	-	●
U0-85	Maximum error value and invalid frames of EtherCAT port 0 per unit time	0~0	-	●
U0-86	Maximum error value and invalid frames of EtherCAT port 1 per unit time	0~0	-	●
U0-87	Maximum transfer error of EtherCAT port per unit time	0~0	-	●
U0-88	Maximum EtherCAT data frame processing unit error per unit time	0~0	-	●
U0-89	Maximum link loss of EtherCAT port per unit time	0~0	-	●
U0-90	Reserved	0~0	-	●
U0-91	Reserved	0~0	-	●
U0-92	Reserved	0~0	-	●
U0-93	Reserved	0~0	-	●
U0-94	Reserved	0~0	-	●
U0-95	Reserved	0~0	-	●
U0-96	Status parameter 1(performance transfer)	0.0~0.0	-	●
U0-97	Status parameter 2(performance transfer)	0.0~0.0	-	●
U0-98	Reserved	0~0	-	●
U0-99	Reserved	0~0	-	●

4.4 Special macro parameters and wiring instructions for constant pressure water supply

The PP-01=30 parameter is initialized to a macro dedicated to constant pressure water supply. The following parameters are the default parameters of special macros, and should be adjusted according to the actual situation.

Frequency source setting		
parameter	name	setting range
P0-02	Command source selection	1: terminal command
P4-18	AI curve 2 Minimum input	2.00V
P4-23	AI curve 3 Minimum input	2.00V
P7-03	Run display parameter 1	8001H: Monitor operating frequency and pressure setting values
P7-04	Run display parameter 2	0001H: Pressure feedback value
P7-05	Stop display parameter	0800H: Pressure setting value
When the monitoring parameter is set pressure or feedback pressure, and the pressure setting source is PA-01, press the increment or decrease key on the operation panel to enter the PA-01 parameter modification mode. Operations and parameters change pattern is the same, wait for after its exit is returned to the monitoring state.		
PA-00	PID setting source	0: PA-01 Setting
PA-01	PID number given	50.00~PA-04(decimal number set by PA-14)
PA-02	PID feedback source	0: AI1 (far eastone pressure gauge) (default) 1: AI2 (against ES300 series, the sensor for 4 ~ 20 ma pressure transmitter)
PA-04	PID Specifies the feedback range	0 to 65535 The default value is 100.0
PA-14	PID specifies the decimal number of the feedback range	0-4
P8-49	Wake-up pressure deviation	75.0%
P8-50	Wake up delay time	20.0s
P8-51	Dormancy frequency	30Hz (When hibernating, the running light is blinking)
P8-52	Hibernation delay time	100.0s (Start timing after the PID reaches balance, otherwise it will go to sleep during acceleration)
PA-26	PID feedback loss detection value	5.0%
PA-27	PID feedback loss detection time	10.0s (Start timing after running)
Hardware connection: DI1: FWD is running forward	DI3: Fault RESET	T1A-T1B-T1C:Fault output



5 Fault diagnosis and countermeasures

5.1 Fault alarm and countermeasures

The following types of faults may occur when the driver is in use. For simple fault analysis, refer to the following methods:

Fault name	panel display	Fault cause investigation	Troubleshooting countermeasure
The current sampling circuit is damaged	E01.01	The frequency converter current sampling is abnormal	Check whether the main circuit is powered on. Hall sensor damage, current sampling current damaged, contact the manufacturer.
Contactor fault	E01.02	The driver board and power supply are abnormal	Seek factory service.
		Contactor anomaly	Seek factory service.
		The surge protection board is abnormal	Seek factory service.
Accelerating overcurrent	E02.00	The output circuit of the inverter is grounded or short-circuited	Detect motor or interrupt contactor for short circuit.
		For FVC or SVC control way and has no into the line parameters tuning	Set motor parameters according to motor nameplate and perform motor parameter tuning.
		Under rapid acceleration condition, the acceleration time is set too short	Increase the acceleration time (P0-17).
		Excessive loss rate suppression is not set properly	The loss rate inhibition function (P3-19) has been enabled. A loss of quick acting as current (P3-18) value is too large, recommend adjustment within 120% to 160%; Erosion speed inhibits gain (P3-20) setting is too small, recommend adjustment within 20 to 40.
		Manual torque lift or V/F curve is not appropriate	Adjust manual lifting torque or V/F curve.
		Start the rotating motor	Choose speed tracking start or wait until the motor stops to start.
		External interference	Through historical fault record, check whether the fault current value to flow (P3-18), if not reach, the judgment is an external interference, needs the external interference sources, remove fault. If no external interference source is found, the driver board or Hall component may be damaged, and you need to contact the manufacturer to replace it.
Retarding overcurrent	E03.00	The output circuit of the inverter is grounded or short-circuited	Detect whether the motor has short circuit or open circuit.
		For FVC or SVC control way and has no into the line parameters tuning	Set motor parameters according to motor nameplate and perform motor parameter tuning.
		Under rapid deceleration condition, the deceleration time is set too short	Increase deceleration time (P0-18).
		Excessive loss rate suppression is not set properly	The loss rate inhibition function (P3-19) has been enabled. A loss of quick acting as current (P3-18) value is too large, recommend adjustment within 120% to 150%; Erosion speed inhibits gain (P3-20) setting is too small, recommend adjustment within 20 to 40.
		No additional brake unit and brake resistance	Install brake unit and resistor.
		External interference	Through historical fault record, check whether the fault current value to flow (P3-18), if not reach, the judgment is an external interference, needs the external interference sources, remove fault. No external interference sources after screening, could be driven plate or hall device is damaged, need to contact the manufacturer to replace.

Fault name	panel display	Fault cause investigation	Troubleshooting countermeasure
Constant velocity overcurrent	E04.00	Grounded or short- circuited output circuit of the AC drive	Detect whether the motor has short circuit or open circuit.
		Auto- tuning is not performed in SVC or FVC control mode.	Set motor parameters according to motor nameplate and perform motor parameter tuning.
		Inappropriate overcurrent stall suppression	The loss rate inhibition function (P3-19) has been enabled. A loss of quick acting as current (P3-18) value is too large, recommend adjustment within 120% to 150%; Erosion speed inhibits gain (P3-20) setting is too small, recommend adjustment within 20 to 40.
		Inadequate power rating of the AC drive	Under stable operation condition, if the running current exceeds the motor rated current or frequency converter rated output current value, please choose more variable frequency device power level.
		External interference to the AC drive	Through historical fault record, check whether the fault current value to flow (P3-18), if not reach, the judgment is an external interference, needs the external interference sources, remove fault. No external interference sources after screening, could be driven plate or hall device is damaged, need to contact the manufacturer to replace.
Accelerating overvoltage	E05.00	The input power grid voltage is high	Adjust the voltage to normal range.
		There is an external force driving the motor during the acceleration process	Cancel additional power or install brake resistance; Rising in frequency overvoltage suppression biggest (P3-26), smaller recommended adjustment within 5 hz to 15 hz, places that have requirements of drag force to adjust the parameters.
		The overvoltage suppression setting is not appropriate	Confirm that the overvoltage suppression function (P3-23) has been enabled. Over-voltage suppression action (P3-22) value is too large, recommend adjustment within 770 v to 700 v; Overvoltage suppression gain (P3-24) set is too small, recommend adjustment within 30 to 50.
		No additional brake unit and brake resistance	Install brake unit and resistor.
		The acceleration time is too short	Increase the acceleration time.
Retarding overvoltage	E06.00	The overvoltage suppression setting is not appropriate	Confirm that the overvoltage suppression function (P3-23) has been enabled. Over-voltage suppression action (P3-22) value is too large, recommend adjustment within 770 v to 700 v; Overvoltage suppression gain (P3-24) set is too small, recommend adjustment within 30 to 50.
		There is an external force driving the motor during the deceleration process	Cancel additional power or install brake resistance; Rising in frequency overvoltage suppression biggest (P3-26), smaller recommended adjustment within 5 hz to 15 hz, places that have requirements of drag force to adjust the parameters.
		Slow down time is too short	Increase deceleration time.
		No additional brake unit and brake resistance	Install brake unit and resistor.
Constant speed overvoltage	E07.00	The overvoltage suppression setting is not appropriate	Confirm that the overvoltage suppression function (P3-23) has been enabled. Over-voltage suppression action (P3-22) value is too large, recommend adjustment within 770 v to 700 v; Overvoltage suppression gain (P3-24) set is too small, recommend adjustment within 30 to 50.
		There is an external force to drive the motor during operation	Cancel additional power or install brake resistance; Rising in frequency overvoltage suppression biggest (P3-26), smaller recommended adjustment within 5 hz to 15 hz, places that have requirements of drag force to adjust the parameters.

Fault name	panel display	Fault cause investigation	Troubleshooting countermeasure
Undervoltage fault	E09.00	Instantaneous outage	Enabling instantaneous stop function (P9-59), can prevent the instantaneous power failure under-voltage fault.
		The voltage of the inverter input is not in the scope of the specification requirements	Adjust voltage to normal range.
		The bus voltage is abnormal	Seek technical support.
		Rectifier, inverter driver board, inverter control board	Seek technical support.
Inverter overload	E10.00	Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition.
		Inverter selection is small	Choose an inverter with a larger power class.
		For FVC or SVC control way and has no into the line parameters tuning	Set motor parameters according to motor nameplate and perform motor parameter tuning.
		The control mode is V/F	Torque boost (P3-01) set value is too large, reduce by 1.0% to try or try P3-01 set to "0" (automatic torque boost mode).
		Inverter output phase missing	Detect the inverter output wiring.
Current limiting by wave	E10.01	Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition.
		Inverter selection is small	Reduce load and check motor and mechanical condition.
motor overload	E11.00	Motor protection parameter P9-01 setting is appropriate	This parameter is set correctly, increase the P9-01, can extend the motor overload time.
		Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition.
Input phase loss	E12.00	Input phase deficiency fault	Check whether the input RST cable and three-phase input voltage are normal.
Output phase loss	E13.00	motor fault	Detect whether the motor is disconnected.
		The lead from the inverter to the motor is abnormal	Troubleshoot peripheral faults.
		The inverter three-phase output is unbalanced when the motor is running	Check whether the three-phase winding of the motor is normal and remove the fault.
		The driver or IGBT module is abnormal	Seek technical support.
IGBT overtemperature	E14.00	Ambient temperature is too high	Reduce the ambient temperature.
		Duct clogging	Clean the air duct.
		Fan failure	Replace the fan.
		The module thermistor is damaged	Seek technical support.
		Module failure	Seek technical support.
External fault	E15.01	Input external faults through the multi-function DI on	The peripheral breakdown, confirming mechanical allow restart (P8-18), reset operation.
	E15.02	Input external faults through multi-function DI normal closure	The peripheral breakdown, confirming mechanical allow restart (P8-18), reset operation.
Communication fault	E16.01	Modbus communication timeout	Check whether the 485-communication cable is correctly connected.Check the Pd - 04 set data communication with PLC cycle is reasonable.
	E16.11	CANopen communication timeout	Check whether the CAN communication cable is connected correctly. Check the parameters of Pd - 15 ~ 17, confirm the interference.
	E16.12	Inconsistency between the configured CANopen- based PDO mapping and the actual mapping	Check the PDO mapping of AF group parameters.

Fault name	panel display	Fault cause investigation	Troubleshooting countermeasure
Motor tuning fault	E19.02	The speed deviation is too large	The motor may not be connected, or the output is out of phase.
	E19.06	Stator resistance tuning fault	No access motor; Please make sure the motor rated current parameter set (P1-03) according to the motor nameplate.
	E19.07		
	E19.08		
	E19.09	Asynchronous machine transient leakage induction tuning fault	The motor may not be connected, or the output phase is missing; Verify valid motor connection.
	E19.10		
	E19.11	Inertia tuning fault	Please confirm that the motor rated current parameter (P1-03) is set according to the motor nameplate; Increase inertia tuning and dynamic setting speed (P2-43) setting values.
	E19.20	Synchro no-load zero Angle tuning process timed out	Check the feedback Z signal.
	E19.23	Synchronous pole position tuning fault	Please confirm that the motor rated current parameter (P1-03) is set according to the motor nameplate; Reduce the initial position Angle detection current (P2-29) set value of synchro.
	E19.24	Asynchronous machine transient leakage sensing tuning error	Inverter power selection is small; Select the appropriate inverter according to the motor power.
Encoder fault	E20.00	Encoder break	Correction of broken line position; PG cable wiring error; Confirm the PG cable power supply connection; Confirm whether encoder line number and the encoder line number are accordance (P1-27); AB line connection is wrong.
	E20.01	Encoder fault	
	E20.02	Encoder break fault	
	E20.03	Synchronizer no-load tuning encoder fault	
	E20.04	Synchronizer no-load tuning encoder fault	
	E20.06	Synchronizer no-load tuning encoder fault	
	E20.07	Synchronizer no-load tuning encoder fault	
	E20.08	Synchronizer no-load tuning encoder fault	
	E20.09	Synchronizer tuning encoder fault	Encoder z signal is abnormal, please confirm the PG card connection.
	E20.10	Synchronizer encoder fault	
	E20.11	Asynchronous machine closed loop vector no-load tuning encoder fault	Properly connect the encoder; Please confirm whether encoder line number and the encoder line number are accordance (P1-27).
	E20.12	There is a large deviation between the feedback speed of encoder and the estimated speed of SVC	Check whether the encoder is disconnected; Check if motor parameter set right; Confirm motor tuning.
	E20.13	Rotary encoder hardware disconnection fault	Check encoder wiring
	E20.17	23-bit encoder disconnected fault	Check encoder wiring
EEPROM Read/write fault	E21.01	EEPROM Read/write fault	If the function code is written for communication, check whether the RAM address of the corresponding function code is operated, and the RAM address mapping of each function code is performed. See 6.2.4 Parameter Address Representation Rules. If EEROM chip is damaged, contact the manufacturer to replace the control panel.
	E21.02		
	E21.03		
	E21.04		

Fault name	panel display	Fault cause investigation	Troubleshooting countermeasure
Motor tuning result warning	E22.00	The stator resistance tuned out is out of the reasonable range	Motor rated voltage, rated current parameter setting error, please according to the motor nameplate brand set right group F1 motor rated voltage (P1-02), rated current (P1-03) parameters;
	E22.01	Tuning out of the asynchronous machine rotor resistance is beyond reasonable range	Confirm that the parameter tuning is performed when the motor is already stationary.
	E22.02	The tuned no-load current and mutual inductance of the asynchronous machine are beyond the reasonable range. If quote us such warnings, frequency converter according to the known motor parameter calculation a mutual inductance and no-load current value, and the optimal value, there is a certain difference	Please correctly set F1 motor parameters according to motor nameplate; Make sure the motor is idle before tuning.
	E22.03	Tuning of synchronous machine against potential beyond reasonable range	Please confirm that the rated voltage parameter of the motor (P1-02) is set according to the nameplate of the motor; Make sure the motor is in no-load state when tuning.
	E22.04	Inertia tuning fault	Please confirm that the motor rated current parameter (P1-03) is set according to the motor nameplate.
Ground short circuit fault	E23.00	The motor is short circuit to the ground	Replace the cable or motor and check whether there is a short circuit to the ground.
Interphase short circuit	E24.00	Interphase short circuit	A two-phase short circuit exists in the output UVW.
Rectification fault	E25.00	The rectifier is faulty	Rectify the fault, such as input phase, overtemperature fault, etc. 1: can run to make 2: feedback into line circuit breaker 3: auxiliary circuit breaker feedback 4: leakage protection switch feedback, the feedback signal, is used to 6: inverter unit prohibit operation 7: inverter unit 8: Free stop inverter unit by way of setting down, effective, if the terminal is at fault
The accumulated running time reaches the fault	E26.00	The accumulated running time reaches the set value	Use the parameter initialization function to clear record information.
User-defined Fault 1	E27.00	Through the multi-function terminal DI input user-defined signal failure 1	Reset run
		Through the virtual IO function input user custom barrier 1 signal	Reset run
User-defined Fault 2	E28.00	Through the multi-function terminal DI input user custom fault signal of 2	Reset run
		Through the virtual IO function input user custom barrier signals of 2	Reset run
The accumulated power-on time reaches the fault	E29.00	The cumulative power-on time reaches the set value	Use the parameter initialization function to clear record information.
Load drop fault	E30.00	Inverter running current is less than P9-64	Confirm whether the load from or P9-64, P9-65 parameter Settings is in line with the actual operation condition.
Runtime PID feedback lost fault	E31.00	The PID feedback is less than the PA-26 set value	Check the PID feedback signal or set PA-26 to an appropriate value.
The speed deviation is too large	E42.00	Encoder parameters are not set correctly	Set encoder parameters correctly.
		Parameter tuning is not performed	Perform motor parameter tuning.
		Excessive speed deviation detection parameters P9-69, P9-70 set is not reasonable	Set detection parameters reasonably according to the actual situation.

6 Specification and selection

6.1 Technical specifications

Driver type	Power capacity (kVA)	Input current (A)	Output current (A)	Adaptive motor (kW)
Single phase 200V ~ 240V (-15%～+10%) 50/60Hz				
ES230-2S0.4GB	1.4	5.4	2.3	0.4
ES230-2S0.75GB	2.2	8.2	4	0.75
ES230-2S1.5GB	3.7	14	7	1.5
ES230-2S2.2GB	6	20	9.6	2.2
ES230-2S4.0GB	13	35	17	4.0
ES230-2S5.5GB	19	50	25	5.5
Three phase 200V ~ 240V (-15%～+10%) 50/60Hz				
ES230-2T0.4GB	1.5	3.4	2.1	0.4
ES230-2T0.75GB	3	5	3.8	0.75
ES230-2T1.5GB	4.5	7.8	6.8	1.5
ES230-2T2.2GB	5.9	10.5	9	2.2
ES230-2T4.0GB	8.9	14.6	13	3.7
ES230-2T5.5GB	17	26	25	5.5
Three phase 380V ~ 480V (-15%～+10%) 50/60Hz				
ES230-4T0.4GB	1.0	2.4	1.2	0.4
ES230-4T0.75GB	1.5	3.4	2.1	0.75
ES230-4T1.5GB	3	5	3.8	1.5
ES230-4T2.2GB	4	5.8	5.1	2.2
ES230-4T4.0GB	6.0	13.5	9.5	4.0
ES230-4T5.5GB	8.9	14.6	13	5.5
ES230-4T7.5GB	11	20.5	17	7.5
ES230-4T11GB	17	26	25	11

6.2 Appearance and mounting dimensions

E230 Series plastic frame shape and mounting dimensions							
Structure code (power level)	boundary dimension (mm)			mounting dimension (mm)		Mounting aperture (mm)	Weight （kg）
	W	H	D	A	B		
E02(0.75-2.2kW)	85	170	128	157.5	67.5	Φ5.5	
E03(3.7-5.5kW)	97	194	142.5	85	184	Φ4.7	
E04(7.5-11kW)	124	245	170	106	233	Φ5	

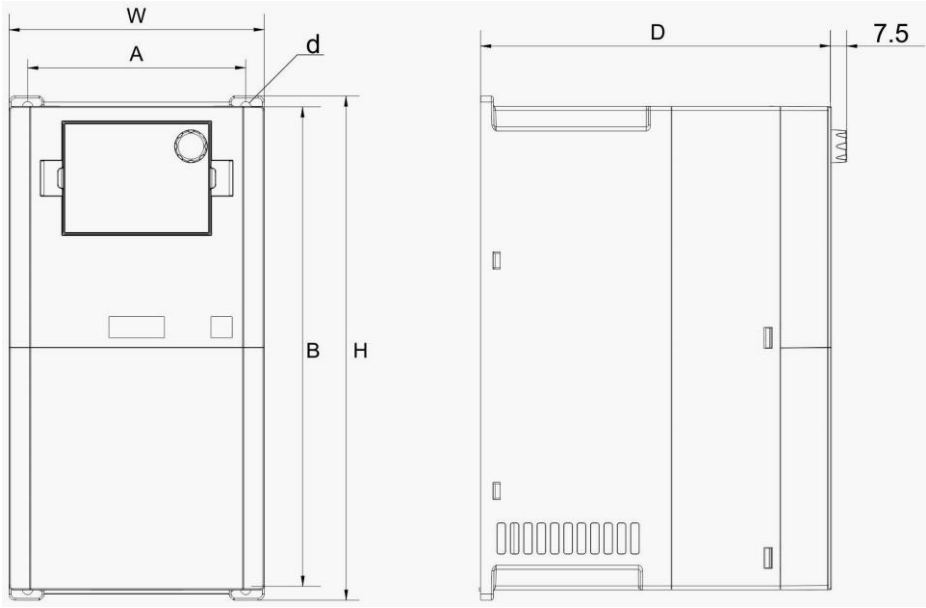


Figure 6-1 Overall Dimensions Diagram

6.3 Keyboard card size diagram

The maximum external dimension of the keyboard card is 99mm(width)*70mm(height)*23.3mm(thickness); The opening size of Catu is 93.2*59.5mm.

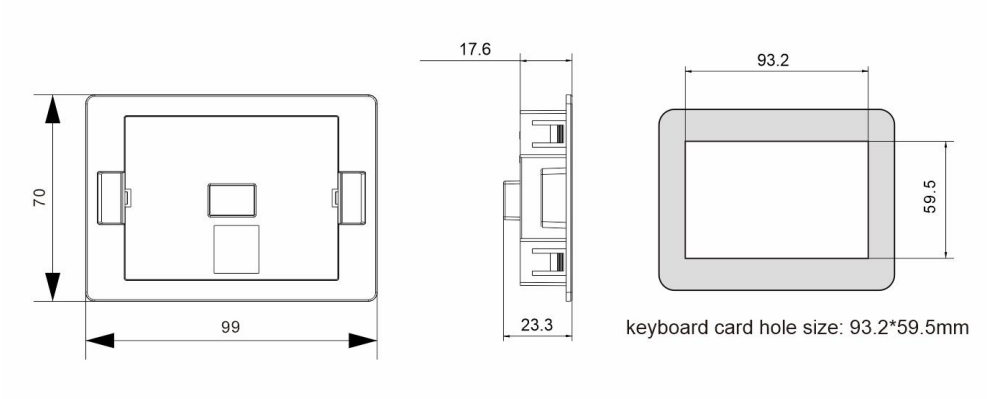


Figure 6-2 Cato outline diagram

Appendix A Modbus communication protocol

A.1 Modbus communication protocol

summarize

It provides RS485 communication interface and supports Modbus-RTU slave station communication protocol. Users can achieve centralized control through the computer or PLC, through the communication protocol to set the frequency converter running commands, modify or read parameters, read the working status of the frequency converter and fault information.

The serial communication protocol defines the content and format of information transmitted in serial communication. These include: host polling (or broaDCast) formats; The coding method of the host machine, including the parameters of the required action, the transmitted data and the error check. The slave's response also adopts the same structure, including action confirmation, return data and error checking. If the slave machine makes an error while receiving the information, or fails to perform the action required by the host, it will organize a fault message as a response to the host.

application mode

The inverter is connected to the "single master and multiple slave" PC/PLC control network with RS485 bus as a communication slave.

hardware interface

Connect 485+ and 485- on the inverter control board.

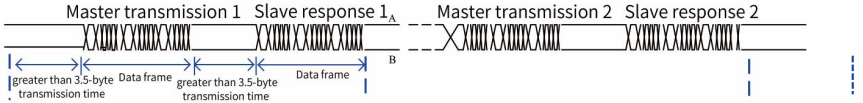
topological structure

Single host multiple slave system. Each communication device in the network has a unique slave address, in which a device as a communication host (often PC upper computer, PLC, HMI, etc.), actively initiates communication, reads or writes parameters to the slave, and other devices are the communication slave, responding to the host's inquiry or communication operation to the machine. Only one device can send data at a time, while the other devices are in the receiving state.

The slave IP address ranges from 1 to 247. 0 indicates the broaDCast IP address. The slave address in the network must be unique.

Communication transmission mode

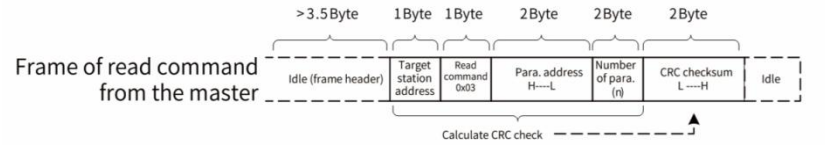
Asynchronous serial, half duplex transmission mode. In the process of serial asynchronous communication, data is sent one frame at a time in the form of packets. According to the Modbus-RTU protocol, when the idle time on the communication data line is greater than 3.5Byte transmission time, it indicates the start of a new communication frame.



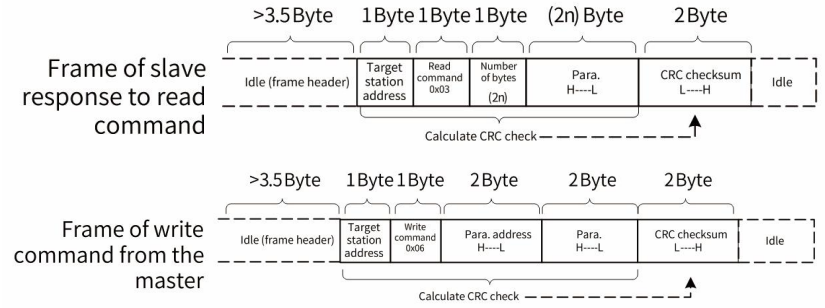
The built-in communication protocol is Modbus-RTU slave communication protocol, which can respond to the "query/command" of the host, or make corresponding actions according to the "query/command" of the host, and carry out communication data response. The host can refer to a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., the host can communicate with a slave machine individually, but also broaDCast information to all slaves. For a single access "query/command" from the host, the accessed slave will return a reply frame; The slave does not need to respond to the broaDCast message sent by the host.

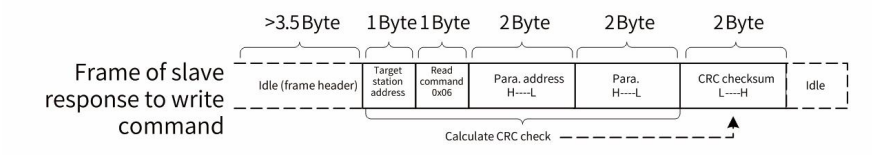
A.2 Communication data frame structure

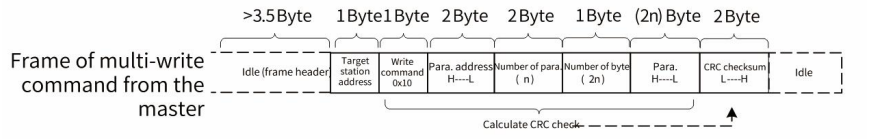
The Modbus-RTU protocol communication data format of this series of frequency converter is as follows. The frequency converter only supports Word type parameter reading or writing, and the corresponding communication read operation command is 0x03. The write command is 0x06, and the multiple write command is 0x10. The read and write operations of bytes or bits are not supported:



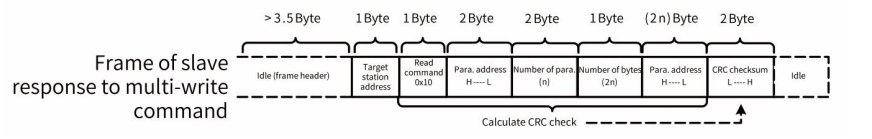
In theory, the host computer can read consecutive multiple parameters at one time (that is, n can reach a maximum of 12), but it should be noted that the last parameter of this parameter group cannot be crossed, otherwise it will reply incorrectly.







Multi-write is the same as multi- read and up to 12 parameters can be continuously written.

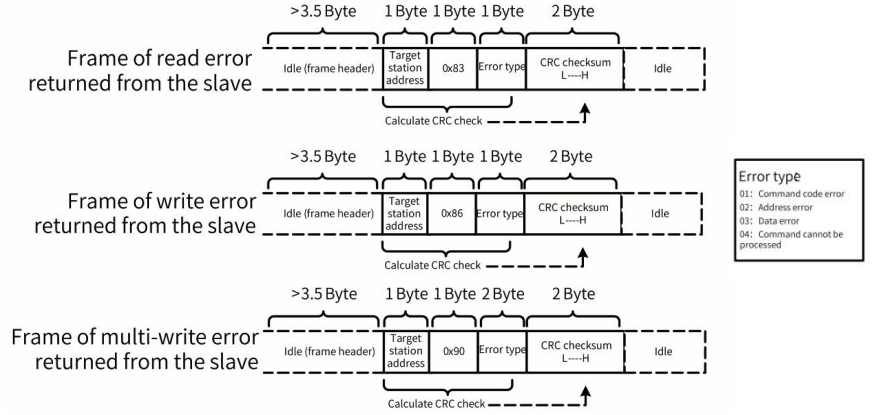


If the slave detects a communication frame error or read/write failure due to other causes, the slave returns a frame of error.

Note

No response is returned for CRC check error.

A read error returned from the slave is 0x83. A write error returned from the slave is 0x86. A multi- write error returned from the slave is 0x90.



Data frame field description table

Frame header (START)	Idle time greater than 3.5- byte transmission time
Slave address (ADR)	Communication address range: 1 to 247; 0 = BroaDCast
Command code (CMD)	03: Read slave parameters; 06: Write slave parameters; 10: Multi- write slave parameters
Parameter address (H)	Internal parameter address of the AC drive, expressed in hexadecimal. Parameters are divided into parameter type and non- parameter type (for example, operation status parameters and operation commands). See the definition of addresses. Low- order bytes follow high- order bytes during transmission.
Parameter address (L)	
Parameter count (H)	Number of parameters read in this frame. The value 1 indicates reading one parameter. Low- order bytes follow high- order bytes during transmission. According to this protocol, only one parameter can be rewritten at a time without this field.
Parameter count (L)	

Data bytes	The data length, which is twice the number of parameters
Data (H)	Response data or data to be written. Low- order bytes follow high- order bytes during transmission.
Data (L)	
CRC low bit	Detection value: CRC16 check value. High- order bytes follow low- order bytes during transmission. For details of the calculation method, see the description of CRC in this section.
CRC high bit	
END	3.5- byte transmission time

CRC Check way:

CRC (Cyclical Redundancy Check) using RTU frame format, Modbus message includes based on the method of CRC error detection domain. The CRC domain detects the contents of the entire message. The CRC field is a two-byte, 16-bit binary value. It is calculated by the transmitting device and added to the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two CRC values are not equal, there is a transmission error.

The CRC first stores 0xFFFF and then invokes a procedure to process the consecutive 8-bit bytes in the message with the value in the current register. Only 8 bits of data per character are valid for CRC, and the start and stop bits and parity bits are not valid. CRC produced in the process, each 8-bit characters and register separately mutually exclusive or (XOR), the results to the lowest effective direction, MSB to 0. The LSB is extracted for detection, if the LSB is 1, the register alone is different from the preset value or if the LSB is 0, it is not performed. The whole process is repeated eight times. After the last bit (the 8th bit) is completed, the next 8-bit byte separately differs from the current value of the register. The value in the final register is the CRC value after all bytes in the message have been executed.

When a CRC is added to a message, low bytes are added first, followed by high bytes. The CRC simple function is as follows:

```
Unsigned intcrc_chk_value ( unsigne char  *data_value,unsigned char length )
{
unsigned
            intcrc_value=0xFFF
    F;inti;
    while ( length– )
      {
        crc_value^=*data_value++;for ( i=0;i<8;i++ )
        {
            if ( crc_value&0x0001 )
                {
                    crc_value= ( crc_value>>1 ) ^0xa001;
                }
                els
                e
                {
                    crc_value=crc_value>>1;
                }
        }
    }
return ( crc_value ) ;
}
```

Communication parameter definition address: reading and writing parameter (some parameters cannot be changed, only for the use of manufacturers or monitoring)

A.3 Parameter address marking rule

Parameter address rules are represented by parameter group numbers and labels:

high byte: P0~PP(P Group)、H0~HF(H Group)、70~7F(U Group)

low order byte: 00~FF

Some parameters cannot be changed when the inverter is in operation; Some parameters cannot be changed no matter what state the inverter is in. Change parameter parameters, but also pay attention to the range of parameters, units and related descriptions.

Parameter group number	Communication access address	Communication Modifies the parameter address in RAM
0 ~ PE Group	0xF000 ~ 0xFEFF	0x0000 ~ 0x0EFF
H0 ~ HC Group	0xA000 ~ 0xACFF	0x4000 ~ 0x4CFF
U0 Group	0x7000 ~ 0x70FF	

Note

Because EEPROM is frequently stored, it will reduce the service life of EEPROM, so some parameters in the mode of communication, do not need to be stored, just change the value in RAM.

If it is a P group parameter, to achieve this function, as long as the high P of the parameter address becomes 0 can be achieved. If the parameter is group H, to achieve this function, as long as the high-level H of the parameter address becomes 4 can be achieved.

The corresponding parameter addresses are represented as follows:

high byte: 00~0P(P Group)、40~4F(H Group)

low order byte: 00~PP

For example:

Parameter P3-12 is not stored in EEPROM, and the address is 030C. Parameter H0-05 is not stored in EEPROM and the address is represented as 4005. This address indicates that the RAM can only be written, but cannot be read. The read address is invalid.

See the following table for the shutdown/operation parameters.

argument addresses	parametric description	argument addresses	parametric description
1000H	*Communication Settings (decimal) –10000 ~ 10000	1010H	PID setting
1001H	operating frequency	1011H	PID feedback
1002H	busbar voltage	1012H	PLC step
1003H	output voltage	1013H	PULSE Input pulse frequency (unit: 0.01kHz)
1004H	output current	1014H	Feedback speed, unit 0.1Hz
1005H	output power	1015H	Remaining running time
1006H	output torque	1016H	AI1 Voltage before correction
1007H	running speed	1017H	AI2 Voltage before correction
1008H	DI input flag	1018H	AI3 Voltage before correction
1009H	DO output flag	1019H	linear speed
100AH	AI1 voltage	101AH	Current power-on time
100BH	AI2 voltage	101BH	Current running time
100CH	AI3 voltage	101CH	PULSE Input pulse frequency (unit: 1Hz)
100DH	count input	101DH	Communication Settings
100EH	length value input	101EH	Actual feedback velocity
100EH	loading speed	101FH	Master frequency X display
-	-	1020H	Master frequency Y display

Note

Communication value is relative percentage, corresponding 100.00%, 10000-10000, corresponding to 100.00% of frequency dimension data, the percentage is relative to the percentage of maximum frequency (P0-10). For the data of the torque dimension, the percentage is P2-10 and H2-48 (the torque upper limit is set, corresponding to the first and second motors respectively).

Control command input to inverter: (write only)

Command word address	Command function
2000H	0001: indicates forward running
	0002: Inverted operation
	0003: Forward turning point
	0004: Reverse the dots
	0005: free stop
	0006: Slow down and stop
	0007: Reset the fault

Read inverter status: (Read only)

status word address	Status word function
3000H	0001: indicates forward running
	0002: Inverted operation
	0003: Shut down

Parameter lock Password verification: If the actual password value is returned, the password verification succeeds. (If there is no password, that is, the password is 0, 0000H is returned.)

Password address	Enter the contents of the password
1F00H	*****

Digital output terminal control: (write only)

command address	Command contents
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

Analog output AO1 control: (write only)

command address	Command contents
2002H	0 ~ 7FFF indicates 0% ~ 100%

Analog output AO2 control: (write only)

command address	Command contents
2003H	0 ~ 7FFF indicates 0% ~ 100%

PULSE output control: (write only)

command address	Command contents
2004H	0 ~ 7FFF indicates 0% ~ 100%

Inverter fault description:

Frequency converter fault address	Inverter fault information	
8000H	0000: No fault	0015: parameter read and write exception
	0001: Reserved	0016: The inverter hardware is faulty
	0002: Accelerates overcurrent	0017: Motor short circuit to ground fault
	0003: decelerating overcurrent	0018: Reserved
	0004: constant overcurrent	0019: Reserved
	0005: Acceleration overvoltage	001A: The running time is up
	0006: decelerating overvoltage	001B: User-defined fault 1
	0007: constant speed overvoltage	001C: User-defined fault 2
	0008: Buffer resistance overload fault	001D: The power-on time arrives
	0009: Undervoltage fault	001E: load dropped
	000A: The frequency converter is overloaded	001F: PID feedback is lost during running
	000B: Motor overload	0028: The fast current limiting times out
	000C: The input phase is missing	0029: Switch motor failure during operation
	000D: Output phase missing	002A: Speed deviation is too large
	000E: The module overheats	002B: Motor excess speed
	000F: external fault	002D: The motor is overheated
	0010: The communication is abnormal	005A: The number of encoder lines is incorrectly set
	0011: The contactor is abnormal	005B: No encoder
	0012: Current detection fault	005C: The initial position is incorrect
	0013: Motor tuning failure	005E: Speed feedback error
	0014: The encoder /PG card is faulty	

A.4 PD group communication parameters

The Pd-00 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 be carried out. The higher the baud rate, the faster the communication speed.

parameter	name of parameter	factory default	setting range
Pd-00	Baud rate	5005	Ones: Modbus baud rate 0: 300bps 1: 600bps 2: 1200bps 3: 2400bps 4: 4800bps 5: 9600bps 6: 19200bps 7: 38400bps 8: 57600bps 9: 115200bps

The data format set by the upper computer and the inverter must be consistent, otherwise, the communication cannot be carried out.

parameter	name of parameter	factory default	setting range
Pd-01	data format	0	0: none Check: Data format <8,N,2> 1: Even check: Data format <8,E,1> 2: odd check: Data format <8,O,1> 3: None Check: Data format <8,N,1>

When the local address is set to 0, it is the broaDCast address, and the host computer broaDCast function is realized. The local address is unique (except the broaDCast address), which is the basis of point-to-point communication between the host computer and the inverter.

parameter	name of parameter	factory default	setting range
Pd-02	Local address	1	1 ~ 247,0 indicates the broaDCast address

Response delay: refers to the intermediate interval between the end of the frequency converter data acceptance and the sending of data to the upper machine. If the response delay is less than the system processing time, the response delay is based on the system processing time. If the response delay is longer than the system processing time, the system will wait until the response delay time reaches the upper computer before sending the data.

parameter	name of parameter	factory default	setting range
Pd-03	Response delay	2ms	0~20ms

When this parameter is set to 0.0s, the communication timeout parameter is invalid. When this parameter is set to valid values, if a communication and the interval time of the next communication beyond the communication timeout, system will be submitted to the communication failure error (Err16). Usually, this is set to invalid. If you set this parameter in a continuous communication system, you can monitor the communication status.

parameter	name of parameter	factory default	setting range
Pd-04	Communication timeout	0.0s	0.0s（invalid）；0.1~60.0s

Pd-05=1: Select the standard Modbus protocol. For details, see section B.3 Communication Data Structure of this protocol.
Pd-05=0: read command, from the machine returns number of bytes a byte more than the standard Modbus protocol and other read/write operation in accordance with standard Modbus protocol operation.

parameter	name of parameter	factory default	setting range
Pd-05	Communication protocol selection	0	0: indicates the non-standard Modbus-RTU protocol 1: Standard Modbus-RTU protocol

Pd-06 is used to determine the output unit of the current value when the communication reads the output current.

parameter	name of parameter	factory default	setting range
Pd-06	Communication read current resolution	0	0: 0.01A 1: 0.1A

Warranty agreement

1. The free warranty covers only the drive itself, and the product is guaranteed for 18 months.

2. The starting date of the warranty period is the factory date of the product, and the body bar code is the only basis for determining the warranty period.

3. During the warranty period, when the user uses the manual normally, the product fails or is damaged, our company is responsible for free maintenance.

4. During the warranty period, the fault or damage of the product caused by the following reasons will be charged for maintenance.

- Wrong use or unauthorized maintenance and transformation.
- The earthquake, lightning, abnormal voltage, fires, floods and other natural disasters or secondary disasters, etc.
- Buy the arrival of the later generations to fall or handling damage.
- The product itself outside of the obstacles, such as external equipment factors, etc.
- Beyond the manual regulation under the condition of bad environment applications, such as gas corrosion, salt corrosion and metal dust pollution and so on.

5. If the product is faulty or damaged, please fill in the contents of the Product Warranty Card correctly.

6. The service fee is calculated according to the actual cost. If there is another contract, the contract shall take precedence.

7. Please be sure to keep this card and show it to the maintenance unit during the warranty. The Company reserves the right to interpret this Agreement.

Shenzhen Epsivo Electric Co., Ltd.

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