

MK100 Frequency converter

User Manual



Mokweir Transmission Technology (Suzhou) Co., Ltd.

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1.MK100 frequency converter selection:

Model of frequency converter	Rated capacity (kVA)	Rated input current (A)	Rated output current (A)	Adaptive motor (kW)
Single phase power: 200–240V, +–15%, 50/60HZ				
MK100-2S0.4G	1.0	5.1	2.5	0.4
MK100-2S0.75G	1.5	8.2	4.5	0.75
MK100-2S1.5G	3.0	14.0	7.5	1.5
MK100-2S2.2G	4.0	23.0	10.0	2.2
MK100-2S3.0G	5.3	26.2	14.0	3.0
Three-phase power: 340–480V, +–15%, 50–60HZ				
MK100-4T0.75G	1.5	3.4	2.3	0.75
MK100-4T1.5G	3.0	5.0	3.7	1.5
MK100-4T2.2G	4.0	5.8	5.0	2.2
MK100-4T4.0G	6.2	10.5	9.0	4.0

2. Technical Specifications

Item		Description
Standard functions	Input frequency resolution	Digital setting: 0.01 Hz
		Analog setting: Max. frequency x 0.025%
	Control mode	Sensorless vector control (SVC)
		Voltage/Frequency (V/F) control
	Startup torque	0.25 Hz/150% (SVC)
		1.0 Hz/100% (V/F)
	Speed range	1:200 (SVC)
		1:50 (V/F)
	Speed stability accuracy	±0.5% (SVC)
		±1% (V/F)
	Torque control accuracy	±5% for 10 Hz above (SVC)
	Torque boost	Customized boost 0.1 % to 30.0 %
	V/F curve	Straight-line V/F curve
		Multi-point V/F curve
		Square V/F curve
		Complete V/F separation
		Half V/F separation
	Ramp mode	Straight-line ramp
		S-curve ramp
		Four separate acceleration/deceleration time settings in the range of 0s to 6500s.
	DC injection braking	DC injection braking frequency: 0 Hz to max. frequency DC
		injection braking active time: 0.0s to 36.0s. Current level of DC injection braking: 0% to 100%.
	Jog running	Frequency range of jog running: 0.00 to 50.00 Hz
		Acceleration/Deceleration time of jog running: 0.0s to 6500.0s
	Onboard multiple preset speeds	The system implements up to 16 speeds by using simple PLC function or by using digital input signals.

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	Onboard PID	The system implements the proportionalegral-derivative (PID) function in the closed-loop control.
	Automatic voltage regulation (AVR)	The system maintains a constant output voltage automatically when the grid voltage changes through the permissible range.
	Overvoltage and overcurrent stall control	The system limits the output current and voltage automatically during operation to prevent frequent or excessive trips.
	Torque limit and control	The system limits the torque automatically to prevent frequent overcurrent tripping during operation. Torque control is applied in vector control.
Individualized functions	Power dip ride-through	Load feedback energy compensates for any voltage reduction, allowing the drive to continue to operate for a short time during power dips.
	Overcurrent fast prevention	The function helps to avoid frequent overcurrent faults.

Item		Description
	Virtual I/O	Five groups of virtual digital input/outputs (DI/DO) support simple logic control.
	Timing control	Time range: 0.0 to 6500.0 minutes
	Dual-motor switchover	The drive have two groups of motor parameters and can control up to two motors.
	Multiple field buses	The drive supports four field buses: Modbus-RTU PROFIBUS-DP CANlink CANopen
	User programmable function	Option: The optional programming card supports secondary development in a programming environment compatible with the Inovance programmable logic controller (PLC).
	Advanced background software	Software in the drive allows users to configure some operating parameters, and provides a virtual oscilloscope display that shows system status.

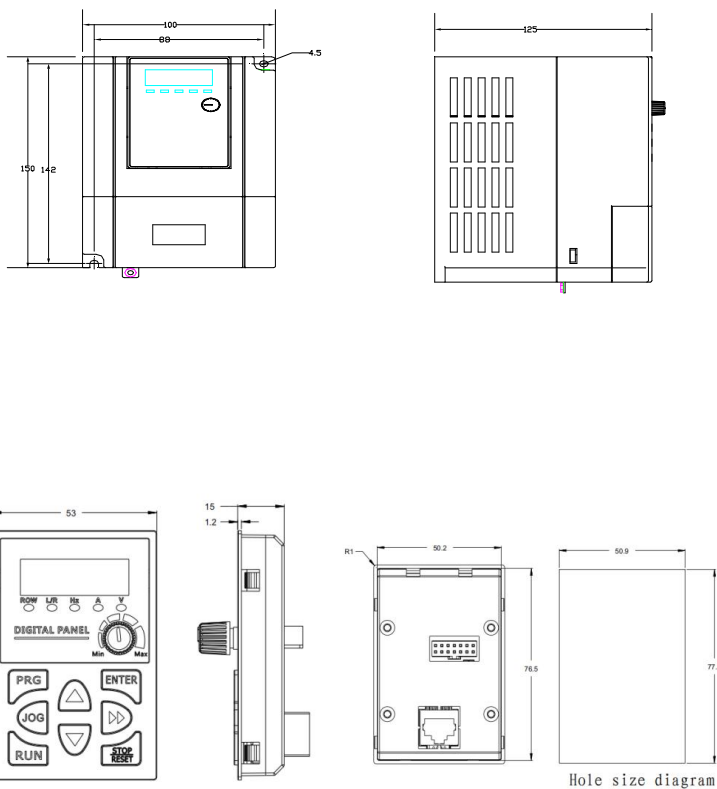
Item		Description
RUN	Command source	Allows different methods of switching between command sources: Operating panel (keypad & display) Terminal I/O control Serial communication
	Main frequency reference setting channel	Supports up to 10 frequency reference setting channels and allows different methods of switching between frequency reference setting channels: Digital setting Analog voltage reference Analog current reference Pulse reference Communication reference
	Auxiliary frequency reference setting channel	Supports up to 10 auxiliary frequency sources, and allows fine tuning of the auxiliary frequency and main & auxiliary calculation.
	Input terminals	Standard: Five digital input (DI) terminals, one of which supports up to 100 kHz high-speed pulse inputs. Two analog input (AI) terminals, one of which supports only 0 to 10 V input, and the other supports 0 to 10 V and 4 to 20 mA current input. Expanded capacity: Five digital input (DI) terminals.

Item		Description
	Output terminals	Standard Single high-speed pulse output terminal (open-collector) for a square-wave signal output in the frequency range 0 to 100 kHz Single digital output (DO) terminal Single relay output terminal Single analog output (AO) terminal that supports either a current output in the range 0 to 20 mA or a voltage output in the range 0 to 10 V. Expanded capacity: Single extra DO terminal Single extra relay output terminal Single extra AO terminal that supports either a current output in the range 0 to 20 mA or a voltage output in the range 0 to 10 V.
Display and operating panel	LED display	The 5-character LED display shows parameter values.
	Key locking and function selection	Keys on the control panel can be locked or partially locked electronically to prevent accidental operation. The range of some functions can be limited to a permitted range to prevent incorrect settings.
Protections	Phase loss protection	Input phase loss protection Output phase loss protection
	Instantaneous overcurrent protection	Stop when 250% of rated output current is exceeded
	Overvoltage protection	Stop when the DC bus voltage is above 820 V
	Undervoltage protection	Stop when the DC bus voltage is below 350 V
	Overheat protection	Protection triggered when the AC Drive bridge gets overheated.
	Overload protection	Stop after running at 150% of rated current for 60 seconds
	Overcurrent protection	Stop when 2.5 times of rated current of the AC drive is exceeded.
	Braking protection	Braking unit overload protection Braking resistor short-circuit protection
	Short-circuit protection	Output phase-to-phase short-circuit protection Output phase-to-ground short-circuit protection

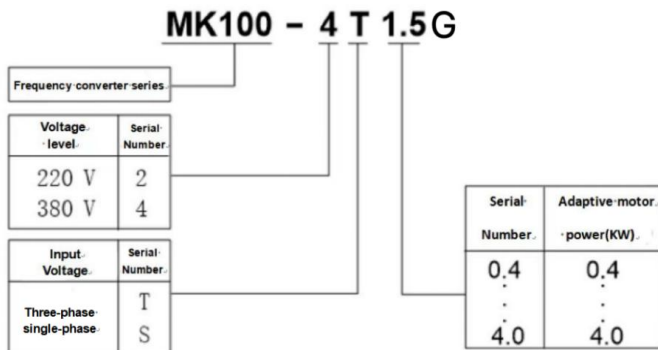
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Environment	Installation location	Install the AC Drive where it is indoors and protected from direct sunlight, dust, corrosive or combustible gases, oil smoke, vapour, ingress from water or any other liquid, and salt.
	Altitude	Below 1000 m If the altitude exceeds 1000 m, de-rate the drive according to section "1.5 De-rating" . Max. 3000 m for LVD directive requirement.
	Operation temperature	- 10°C to +50°C If the ambient temperature is not in this range, de-rate the drive according to section "1.5 De-rating" .
	Storage temperature	-20°C to +60°C
	Humidity	Less than 95% RH non-condensing.
	Vibration	Less than 5.9 m/s ² (0.6 g).
	Pollution degree	PD2
	Overvoltage category	OVC III

3. Profile size of MK100 frequency inverter and keyboard

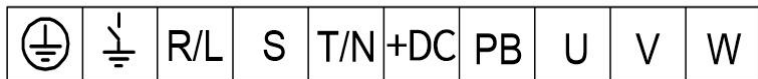


4. MK100 Nameplate description:



5. Main loop input and output terminal

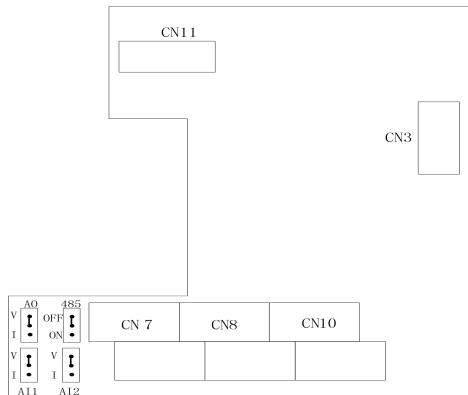
5.1 Terminal diagram



5.2 Main loop terminal description

Name of terminal	Function
R、S、T / L、N	Three-phase AC input terminal / single-phase AC input terminal
+DC、PB	Brake resistance connecting terminal
U、V、W	Three-phase AC output terminal
⊥	earth terminal

6、Diagram of jumper switch position of control board



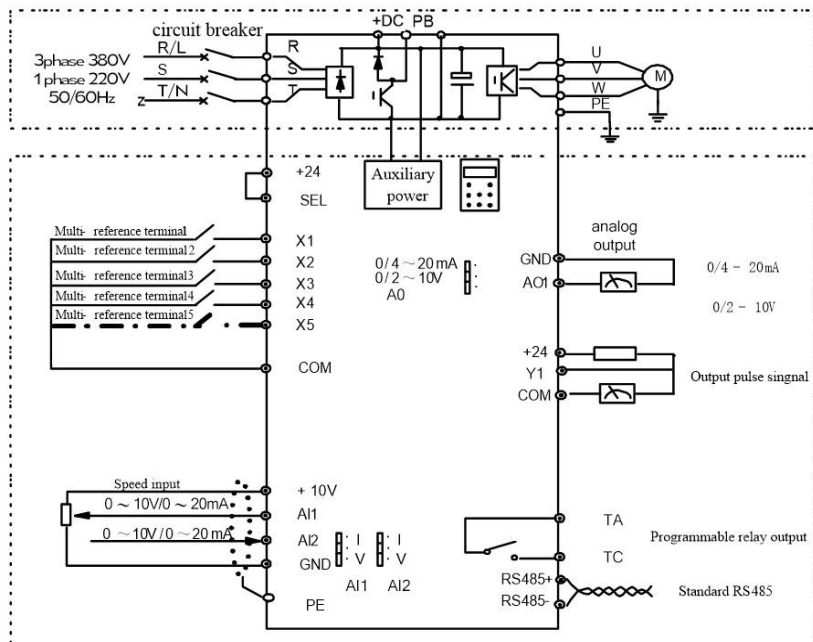
No.	Function	Factory value
AI1	AI1 current / voltage input mode selection I: 0~20mA Current signal; V: 0~+10V Voltage signal	0~+10V
AI2	AI2 current / voltage input mode selection I: 0~20mA Current signal; V: 0~+10V Voltage signal	0~+10V
A0	AO output current / voltage type selection 0/4~20mA: AO1terminal output current signal 0/2~+10V: AO1Terminal output voltage signal	0~+10V
485	485 terminal resistance selection: ON: 120 Ω terminal resistor; OFF: No terminal resistance	No terminal resistance

7、Control board terminal connection description:

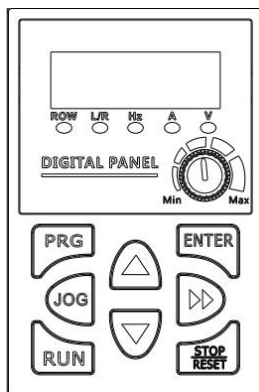
GND	AI1	AI2	10V	X1	X2	X3	X4	X5
AO1	+485	485-	COM	SEL	24V	Y1	TA	TC

Type	Terminal No.	Name	Function
communication	+485-	RS485communication interface	RS485Differential signal positive end
			RS485Differential signal negative end
Imitated input	AI1-GND	Imitated input AI1	AI1 jumper selection determines voltage or current input. 1. Input voltage range: DC 0V~10V 2. Input impedance: 22k Ω
Imitated input	AI2-GND	Imitated input AI2	AI2 jumper selection determines voltage or current input. 1. Input voltage range: DC 0V~10V 2. Input impedance: 22k Ω
Imitated output	AO1-GND	Imitated output	A0 jumper selection determines voltage or current input. Output voltage range: 0V~10V Output current range: 0mA~20mA
Numeral input	X1~X5	Multifunctional input terminal 1~5	1. Optical coupling isolation, compatible bipolar input 2. Input impedance: 2.4 k Ω 3. Voltage range when level input: 9V~30V
	SEL	External power input terminal	
	24V	+24VPower supply	Provide +24V power supply
	COM	+24VCommon end of power supply	Internal isolation from GND
Numeral output	Y1-COM	Numeral output 1	Optical coupling isolation, compatible bipolar output Output voltage range: 0V~24V Output current range: 0mA~50mA
Power supply	10V-GND	External + 10V power supply	Provide+10VPower supply to external, maximum output current:10mA Generally used as external potentiometer working power supply, potentiometer resistance range: 1k Ω ~5k Ω
Other	TA/ TC	relay output	Programmable is defined as the programmable terminal of multifunctional switching output

8. Wiring method for frequency converter application



9. Operation panel appearance and key function



Key	Name	Function
PRG	Programming keys	Programming state entry and exit
ENTER	Function / data key	Function code menu switch, data modification confirmation
▲	Incremental key	Increment of data or function code
▼	Descending key	Decrement of data or functional codes
▶▶	Shift key	Optional parameter modified bit
RUN	Running key	Used to start control in keyboard control
STOP/RESET	Stop / reset key	In keyboard control used to stop running; Reset, to end the fault alarm state; In terminal control: reset, to end failure alarm state
JOG	Multifunction selection key	Function switching selection according to P7-01

10. Digital tube and indicator light description:

Keyboard indicator:

Name	state	description
RUN	Always on	Frequency converter in operation
	Always off	Frequency converter stop output
Hz	Always on	Display as frequency
L/R	Always on	Indicating now in keyboard control;
	Always off	Indicating now in terminal control;
	Twinkle	Indicating now in communication control;
Hz	Always on	Display as frequency
A	Always on	Display as current
V	Always on	Display as voltage

Keyboard indicator combination description:

Combination mode	Description
Hz、A always on	rpm
Hz、V always on	%

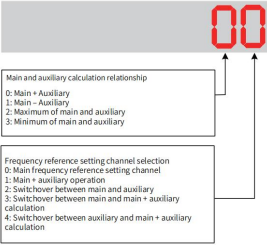
11. Parameter Table

11.1 General Parameters

■ Group P0: Standard Parameters

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-01	Motor 1 control mode	0: Sensorless vector control (SVC) 2: Voltage/Frequency control (V/F)	N.A.	2	
P0-02	Command source selection	0: Keypad control 1: Terminal control 2: Communication control	N.A.	0	
P0-03	Main frequency source X selection	0: Digital setting P0-08 (non-retentive at power down) 1: Digital setting P0-08 (retentive at power down) 2: AI1 3: AI2 4: Keyboard knob 5: Pulse reference (X5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication reference	N.A.	0	
P0-04	Auxiliary frequency source Y selection	The same as P0-03 (Main frequency source X selection)	N.A.	0	
P0-05	Range base of auxiliary frequency Y for X and Y operation superposition	0: Relative to max. frequency 1: Relative to main frequency X	N.A.	0	
P0-06	Range of auxiliary frequency Y for X and Y operation superposition	0 to 150	%	100	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-07	Frequency source superposition selection		N.A.	00	
P0-08	Preset frequency	0.00 to max frequency (P0-10)	N.A.	50.00	
P0-09	Rotation direction	0: Same direction 1: Reverse direction	N.A.	0	
P0-10	Max. frequency	50.00 to 500.00	Hz	50.00	
P0-11	Source of frequency upper limit	0: Set by P0- 12 1: AI1 2: AI2 3: Keyboard knob 4: Pulse reference (X5) 5: Communication reference	N.A.	0	
P0-12	Frequency upper limit	Frequency lower limit (P0-14) to max. frequency (P0-10)	Hz	50.00	
P0-13	Frequency upper limit OFFset	0.00 to max frequency (P0-10)	Hz	0.00	

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

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P0-27	Binding command source to frequency source	0: No function 1: Digital setting 2: AI1 3: AI2 4: Keyboard knob 5: Pulse reference (X5) 6: Multi-reference 7: Simple PLC 8: PID reference 9: Serial comms.	N.A.	0000	
		Units position: operating panel (keypad & display) + frequency reference setting channel			
		Tens position: terminal I/O control + frequency reference setting channel			
		Hundreds position: serial comms. + frequency reference setting channel			

■ Group P1: Motor 1 Parameters

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

■ Group P2: Vector Control

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P2-00	Speed loop proportional gain 1	1 to 100	N.A.	30	
P2-01	Speed loop integral time 1	0.01 to 10.00	s	0.50	
P2-02	Switchover frequency 1	0.00 to P2-05	Hz	5.00	
P2-03	Speed loop proportional gain 2	1 to 100	Hz	20	
P2-04	Speed loop integral time 2	0.01 to 10.00s	s	1.00	
P2-06	Vector control slip gain	50 to 200	%	100	
P2-07	Time constant of speed loop filter	0.000 to 1.000	s	0.050	
P2-08	Vector control over-excitation gain	0 to 200	N.A.	0	
P2-09	Torque upper limit source in speed control mode	0: P2- 10 1: AI1 2: AI2 3: Keyboard knob 4: Pulse reference (X5) 5: Serial comms. 6: Min. (AI1, AI2) 7: Max. (AI1, AI2)	N.A.	0	
P2-10	Digital setting of torque upper limit in speed control mode	0.0 to 200.0	%	150.0	
P2-11	Selection of torque upper limit reference setting channel in speed control mode (regenerative)	0: P2- 10 1: AI1 2: AI2 3: Keyboard knob 4: Pulse reference (X5) 5: Communication reference 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: P2- 12	N.A.	0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P2-12	Digital setting of torque upper limit in speed control mode (regenerative)	0.0 to 200.0	%	150.0	
P2-13	Excitation adjustment proportional gain	0 to 60000	N.A.	10	
P2-14	Excitation adjustment integral gain	0 to 60000	N.A.	10	
P2-15	Torque adjustment proportional gain	0 to 60000	N.A.	10	
P2-16	Torque adjustment integral gain	0 to 60000	N.A.	10	
P2-17	Speed property loop	0: Disabled 1: Enabled	N.A.	0	
P2-18	Torque PEedforward gain	20 to 100	N.A.	80	
P2-21	Max. torque coefficient of field weakening area	50 to 200	%	80	
P2-22	Regenerative power limit	0.0: not limited 0.1 to 200.0	%	0.0	

■ Group P3: V/F Control

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P3-00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 4: 1.4-power V/F 6: 1.6-power V/F 8: 1.8-power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation SETTING RANGE: 0 to 11;	N.A.	00	
P3-01	Torque boost	0.0 to 30.0	%	0.0	
P3-02	Cut-OFF frequency of torque boost	0.00 to max output frequency	Hz	50.00	
P3-03	Multi-point V/F frequency 1 (P1)	0.00 to P3-05	Hz	0.00	
P3-04	Multi-point V/F voltage 1	0.0 to 100.0	%	0.0	
P3-05	Multi-point V/F frequency 2	P3-03 to P3-07	Hz	0.00	
P3-06	Multi-point V/F voltage 2	0.0 to 100.0	%	0.0	
P3-07	Multi-point V/F frequency 3	P3-05 to rated motor frequency (P1-04)	Hz	0.00	
P3-08	Multi-point V/F voltage 3	0.0 to 100.0	%	0.0	
P3-09	V/F slip compensation gain	0 to 200.0	%	0.0	
P3-10	V/F over-excitation gain	0 to 200	%	64	
P3-11	V/F oscillation suppression gain	0 to 100	%	Model dependent	
P3-12	Oscillation suppression mode selection	0 to 4	N.A.	3	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P3-13	Voltage source for V/F separation	0: Set by P3-14 1: AI1 2: AI2 3: Keyboard knob 4: Pulse reference (X5) 5: Multi-reference 6: Simple PLC 7: PID reference 8: Serialcomms. 100.0% corresponds to the rated motor voltage (P1-02, A2-02).	N.A.	0	
P3-14	Voltage digital setting for V/F separation	0 to rated motor voltage	V	0	
P3-15	Voltage rise time of V/F separation	0.0 to 1000.0	s	0.0	
P3-16	Voltage decline time of V/F separation	0.0 to 1000.0	s	0.0	
P3-17	Stop mode selection for V/F separation	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declining to 0	N.A.	0	
P3-18	Current limit level	50 to 200	%	150	
P3-19	Current limit selection	0: Disabled 1: Enabled	N.A.	1	
P3-20	Current limit gain	0 to 100	N.A.	20	
P3-21	Compensation factory of speed multiplying current limit level	0 to 200	%	50	
P3-22	Voltage limit	200.0 to 810.0	V	760.0	
P3-23	Voltage limit selection	0: Disabled 1: Enabled	N.A.	1	
P3-24	Frequency gain for voltage limit	0 to 100	N.A.	30	
P3-25	Voltage gain for voltage limit	0 to 100	N.A.	30	
P3-26	Frequency rise threshold during voltage limit	0 to 50	Hz	5	
P3-27	Slip compensation time constant	0.1 to 10.0	s	0.5	

■ Group P4: Input Terminals

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P4-00	X1 function selection	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV)	N.A.	1	
P4-01	X2 function selection	3: Three-wire control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG)	N.A.	2	
P4-02	X3 function selection	6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: fault reset (RESET)	N.A.	4	
P4-03	X4 function selection	10: RUN pause 11: External fault normally open (NO) input	N.A.	12	
P4-04	X5 function selection	12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4	N.A.	13	
P4-05	X6 function selection	16: Terminal 1 for acceleration/ deceleration time selection	N.A.	0	
P4-06	X7 function selection	17: Terminal 2 for acceleration/ deceleration time selection	N.A.	0	
P4-07	X8 function selection	18: Frequency source switchover 19: UP and DOWN setting clear (terminal, keypad) 20: Command source switchover terminal 1	N.A.	0	
P4-08	X9 function selection	21: Acceleration/Deceleration prohibited 22: PID pause 23: PLC status reset	N.A.	0	
P4-09	X10 function selection	24: Wobble pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30: Pulse input (enabled only for X5) 31: Reserved 32: Immediate DC injection braking 33: External fault normally closed (NC) input 34: Frequency modification forbidden 35: PID action direction	N.A.	0	

		reverse 36: External STOP terminal 1 37: Command source switchover terminal 2 38: PID integral disabled 39: Switchover between main frequency source X and preset frequency 40: Switchover between auxiliary frequency source Y and preset frequency 41: Motor selection terminal 1 42: Reserved 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 injection braking 50: Clear the current running time 51: Two-wire/Tree-wire switchover 52: Reverse frequency prohibited 53-59: Reserved			
P4-10	DI filter time	0.000 to 1.000	s	0.010	
P4-11	Terminal command mode	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Three-wire control mode 1 3: Three-wire control mode 2	N.A.	0	
P4-12	Terminal UP/DOWN rate	0.01 to 65.535	Hz/s	1.000	
P4-13	AI curve 1 minimum input	0.00 to P4-15	V	0.00	
P4-14	Corresponding setting of AI curve1 minimum input	-100.0 to 100.0	%	0.0	
P4-15	AI curve 1 max input	P4-13 to 10.00	V	10.00	
P4-16	Corresponding setting of AI curve1 max input	-100.0 to +100.0	%	100.0	
P4-17	AI1 filter time	0.00 to 10.00	s	0.10	
P4-18	AI curve 2 minimum input	0.00 to P4-20	V	0.00	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P4-19	Corresponding setting of AI curve2 minimum input	-100.0 to +100.0	%	0.0	
P4-20	AI curve 2 max input	P4-18 to 10.00	V	10.00	
P4-21	Corresponding setting of AI curve2 max input	-100.0 to +100.0	%	100.0	
P4-22	AI2 filter time	0.00 to 10.00	s	0.10	
P4-23	AI curve 3 minimum input	-10.00 to P4-25	V	-10.00	
P4-24	Corresponding setting of AI curve3 minimum input	-100.0 to 100.0	%	-100.0	
P4-25	AI curve 3 max input	P4-23 to 10.00	V	10.00	
P4-26	Corresponding setting of AI curve3 max input	-100.0 to +100.0	%	100.0	
P4-27	Keyboard knob filter time	0.00 to 10.00	s	0.10	
P4-28	Pulse minimum input	0.00 to P4-30	kHz	0.00	
P4-29	Corresponding setting of pulse minimum input	-100.0 to +100.0	%	0.0	
P4-30	Pulse max input	P4-28 to 20.00	kHz	20.00	
P4-31	Corresponding setting of pulse max input	-100.0 to +100.0	%	100.0	
P4-32	Pulse filter time	0.00 to 10.00	s	0.10	
P4-33	AI curve selection	Curve 1 (2 points, see "P4-13 to P4-16") Curve 2 (2 points, see "P4-18" to "P4-21") Curve 3 (2 points, see "P4-23" to "P4-23") Curve 4 (4 points, see "A6-00" to "A6-07") Curve 5 (4 points, see "A6-08" to "A6-15")	N.A.	321	

		Units position: AI1 curve selection			
		Tens position: AI2 curve selection			
		Hundreds position: Keyboard knob curve selection			
P4-34	Setting for AI less than minimum input	00 to 111 0: Corresponding percentage of P0 min. input 1: 0.0%	N.A.	000	
		Units position: AI1			
		Tens position: AI2			
		Hundreds position: Keyboard knob			
P4-35	X1 delay time	0.0 to 3600.0	s	0.0	
P4-36	X2 delay time	0.0 to 3600.0	s	0.0	
P4-37	X3 delay time	0.0 to 3600.0	s	0.0	
P4-38	DI active mode selection 1	0: High level active 1: Low level active	N.A.	00000	
		Units position: X1 active mode			
		Tens position: X2 active mode			
		Hundreds position: X3 active mode			
		Thousand position: X4 active mode			
		Ten thousands position: X5 active mode			
P4-39	DI active mode selection 2	0: High level active 1: Low level active	N.A.	00000	
		Units position: X6 active mode			
		Tens position: X7 active mode			
		Hundreds position: X8 active mode			
		Thousands position: X9 active mode			
		Ten thousands position: X10 active mode			

■ Group P5: Output Terminals

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P5-00	Y1 terminal output mode	0: reserve 1: Switch signal output (Y1R)	N.A.	0	
P5-01	Y1R function (open-collector output terminal) selection	0: No output 1: AC drive running 2: fault output 3: Frequency-level detection FDT1 output 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload pre-warning 7: AC drive overload pre-warning 8: Set count value reached 9: Designated count value reached 10: Length reached	N.A.	0	
P5-02	Relay function (TA-TC) selection	11: PLC cycle completed 12: Accumulative running time reached 13: Frequency limited 14: Torque limited 15: Ready for RUN 16: Reserved 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Undervoltage state output 20: Communication setting	N.A.	2	
P5-03	reserve	21: Reserved 22: Reserved 23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency level detection FDT2 output 26: Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached	N.A.	0	
P5-04	AO1 function selection (open-collector output terminal)	30: Timing duration reached 31: AI1 input limit exceeded 32: Load lost 33: Reverse running 34: Zero current state 35: IGBT temperature reached 36: Output current limit exceeded 37: Frequency lower limit reached (having output at stop) 38: Alarm output 39: Reserved	N.A.	1	

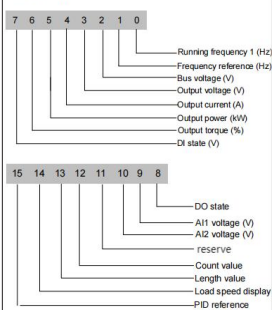
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P5-05	reserve	40: Current running time reached 41: fault output (no output at undervoltage)	N.A.	4	
P5-06	reserve	0: Running frequency 1: Set frequency 2: Output current 3: Output torque (absolute value) 4: Output power 5: Output voltage 6: Pulse input	N.A.	0	
P5-07	AO1 function selection	7: AI1 8: AI2 9: Keyboard knob 10: Length 11: Count value 12: Communication setting 13: Motor rotational speed 14: Output current	N.A.	0	
P5-08	reserve	15: Output voltage 16: Output torque (actual value)	N.A.	1	
P5-09	reserve	-	-	-	
P5-10	AO1 zero OFFset coefficient	-100.0 to +100.0	%	0.0	
P5-11	AO1 gain	-10.00 to 10.00	N.A.	1.00	
P5-12	reserve	reserve	-	-	
P5-13	reserve	reserve	-	-	
P5-17	FMR output delay time	0.0 to 3600.0	s	0.0	
P5-18	Relay 1 output delay time	0.0 to 3600.0	s	0.0	
P5-19	reserve	-	-	-	
P5-20	AO1 output delay time	0.0 to 3600.0	s	0.0	
P5-21	reserve	-	-	-	
P5-22	DO mode selection	0: Positive logic active	N.A.	00000	
		1: Negative logic active			
		Units position: Y1R active mode			
		Tens position: Relay1 active mode			
		Hundreds position: reserve			
		Thousands position: AO1 active mode			
		Ten thousands position: reserve			

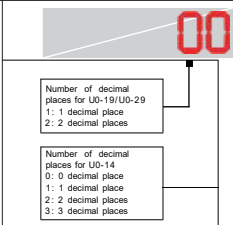
■ Group P6: Start/Stop Control

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P6-00	Start mode	0: Direct startup 1: Reserved 2: Pre-excited startup (asynchronous motor)	N.A.	0	
P6-01	Flying start mode	0: From stop frequency 1: From zero speed 2: From max. frequency	N.A.	0	
P6-02	Flying start speed	1 to 100	N.A.	20	
P6-03	Startup frequency	0.00 to 10.00	Hz	0.00	
P6-04	Startup frequency active time	0.0 to 100.0	s	0.0	
P6-05	DC injection braking 1 level/ Pre-excitation level	0 to 100	%	50	
P6-06	DC injection braking 1 active time/ Pre-excitation active time	0.0 to 100.0	s	0.0	
P6-07	Acceleration/ Deceleration mode	0: Linear mode 1: S-curve mode A 2: S-curve mode B	N.A.	0	
P6-08	Time proportion of S-curve start segment	0.0 to (100.0 minus P6-09)	%	30.0	
P6-09	Time proportion of S-curve end segment	0.0 to (100.0 minus P6-08)	%	30.0	
P6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	N.A.	0	
P6-11	DC injection braking 2 frequency threshold	0.00 to 10.00	Hz	0.00	
P6-12	DC injection braking 2 delay time	0.0 to 100.0	s	0.0	
P6-13	DC injection braking 2 level	0 to 100	%	50	
P6-14	DC injection braking 2 active time	0.0 to 100.0	s	0.0	
P6-15	Reserved	-	-	-	
P6-18	Flying start current limit	30 to 200	%	Model dependent	
P6-21	Demagnetization time	0.00 to 5.00	s	Model dependent	
P6-22	Min. output frequency	0.00 to P6-11	Hz	0.00	
P6-23	factory reserved	1 to 100	N.A.	10	

■ Group P7: Keypad Control And LED Display

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P7-01	JOG Key function selection	0: JOG key disabled 1: Switchover from remote control (terminal or communication) to keypad control 2: Switchover between forward rotation and reverse rotation 3: Forward jog 4: Reverse jog 5: Individualized parameter display	N.A.	5	
P7-02	STOP/RESET key function	0: STOP/RESET key enabled only in keypad control 1: STOP/RESET key enabled in any operation mode	N.A.	1	
P7-03	LED display running parameters 1	0000 to FFFF  If a parameter needs to be displayed during running, set corresponding bit to 1, and set P7-03 to hexadecimal equivalent.	N.A.	1F	

P7-04	LED display running parameters 2	0000 to FFFF 7 6 5 4 3 2 1 0 15 14 13 12 11 10 9 8 PID feedback PLC stage Pulse reference (kHz) Running frequency 2 Remaining running time AI1 voltage before correction AI2 voltage before correction reserve Motor speed Current power-on time (H) Current running time (Min) Pulse reference (Hz) Communication reference Encoder feedback speed (Hz) Main frequency display (Hz) Auxiliary frequency display (Hz) If a parameter needs to be displayed during running, set corresponding bit to 1, and set P7-04 to hexadecimal equivalent.	N.A.	0	
P7-05	LED display stop parameters	0000 to FFFF 7 6 5 4 3 2 1 0 15 14 13 12 11 10 9 8 Frequency reference (Hz) Bus voltage (V) DI state DO state AI1 voltage (V) AI2 voltage (V) reserve Count value Length value PLC stage Load speed PID reference Pulse reference (kHz) Reserved Reserved Reserved If a parameter needs to be displayed during running, set corresponding bit to 1, and set P7-05 to hexadecimal equivalent.	N.A.	33	
P7-06	Load speed display coefficient	0.0001 to 6.5000	N.A.	1.0000	
P7-07	Heatsink temperature of AC drive IGBT	0 to 100	°C	-	
P7-08	Product number	N.A.	N.A.	N.A.	
P7-09	Accumulative running time	0 to 65535	h	N.A.	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P7-10	Performance software version	N.A.	N.A.	N.A.	
P7-11	Functional software version	N.A.	N.A.	N.A.	
P7-12	Number of decimal places for load speed display		N.A.	21	
P7-13	Accumulative power-on time	0 to 65535	h	N.A.	
P7-14	Accumulative power consumption	0 to 65535	kWh	N.A.	
P7-15	Temporary performance software version	N.A.	N.A.	N.A.	
P7-16	Temporary functional software version	N.A.	N.A.	N.A.	

■ Group P8: Auxiliary Functions

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P8-00	JOG running frequency	0.00 to max frequency	Hz	2.00	
P8-01	JOG acceleration time	0.0 to 6500.0	s	20.0	
P8-02	JOG deceleration time	0.0 to 6500.0	s	20.0	
P8-03	Acceleration time 2	0.0 to 6500.0	s	Model dependent	
P8-04	Deceleration time 2	0.0 to 6500.0	s	Model dependent	
P8-05	Acceleration time 3	0.0 to 6500.0	s	Model dependent	
P8-06	Deceleration time 3	0.0 to 6500.0	s	Model dependent	
P8-07	Acceleration time 4	0.0 to 500.0	s	Model dependent	
P8-08	Deceleration time 4	0.0 to 6500.0	s	Model dependent	
P8-09	Frequency jump 1	0.00 to max frequency	Hz	0.00	
P8-10	Frequency jump 2	0.00 to max frequency	Hz	0.00	
P8-11	Frequency jump amplitude	0.00 to max frequency	Hz	0.00	
P8-12	Forward/Reverse rotation dead-zone time	0.0 to 3000.0	s	0.0	
P8-13	Reverse control	0: Enabled 1: Disabled	N.A.	0	
P8-14	Running mode when set frequency lower than frequency lower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	N.A.	0	
P8-15	Droop control	0.00 to 10.00	Hz	0.00	
P8-16	Accumulative power-on time threshold	0 to 65000	h	0	
P8-17	Accumulative running time threshold	0 to 65000	h	0	
P8-18	Startup protection	0: No 1: Yes	N.A.	0	
P8-19	Frequency detection value (FDT1)	0.00 to max frequency	Hz	50.00	
P8-20	Frequency detection hysteresis (FDT1 hysteresis)	0.0 to 100.0 (FDT1 level)	%	5.0	
P8-21	Detection range of frequency reached	0.00 to 100 (max frequency)	%	0.0	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P8-22	Jump frequency during acceleration/ deceleration	0: Disabled 1: Enabled	N.A.	1	
P8-25	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 to max frequency	Hz	0.00	
P8-26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 to max frequency	Hz	0.00	
P8-27	Terminal JOG priority	0: Disabled 1: Enabled	N.A.	0	
P8-28	Frequency detection value (FDT2)	0.00 to max frequency	N.A.	50.00	
P8-29	Frequency detection hysteresis (FDT2 hysteresis)	0.0 to 100.0 (FDT2 level)	%	5.0	
P8-30	Detection value 1 of any frequency reaching	0.00 to max frequency	Hz	50.00	
P8-31	Detection amplitude 1 of any frequency reaching	0.0 to 100.0 (max frequency)	%	0.0	
P8-32	Detection value 2 of any frequency reaching	0.00 to max frequency	Hz	50.00	
P8-33	Detection amplitude 2 of any frequency reaching	0.0 to 100.0 (max frequency)	%	0.0	
P8-34	Zero current detection level	0.0 to 300.0 (rated motor current as 100%)	%	5.0	
P8-35	Zero current detection delay	0.01 to 600.00	s	0.10	
P8-36	Output overcurrent threshold	0.0 (no detection) 0.1 to 300.0 (rated motor current)	%	200.0	
P8-37	Output overcurrent detection delay	0.00 to 600.00	s	0.00	
P8-38	Detection value 1 of any current reached	0.0 to 300.0 (rated motor current)	%	100.0	
P8-39	Detection amplitude 1 of any current reached	0.0 to 300.0 (rated motor current)	%	0.0	
P8-40	Detection value 2 of any current reached	0.0 to 300.0 (rated motor current)	%	100.0	
P8-41	Detection amplitude 2 of any current reached	0.0 to 300.0 (rated motor current)	%	0.0	
P8-42	Timing function	0: Disabled 1: Enabled	N.A.	0	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P8-43	Timing duration source	0: Set by P8-44 1: AI1 2: AI2 3: Keyboard knob (100% of analog input corresponds to the value of P8-44)	N.A.	0	
P8-44	Timing duration	0.0 to 6500.0	min	0.0	
P8-45	AI1 input voltage lower limit	0 to P8-46	V	3.10	
P8-46	AI1 input voltage upper limit	P8-45 to 11.00	V	6.80	
P8-47	IGBT temperature threshold	0 to 100	°C	75	
P8-48	Cooling Fan working mode	0: Fan working during running 1: Fan working continuously	N.A.	0	
P8-49	Wakeup frequency	Dormant frequency (P8-51) to max frequency (P0-10)	Hz	0.00	
P8-50	Wakeup delay	0.0 to 6500.0	s	0.0	
P8-51	Hibernating frequency	0.00 to wakeup frequency (P8-49)	Hz	0.00	
P8-52	Hibernating delay	0.0 to 6500.0	s	0.0	
P8-53	Current running time reached	0.0 to 6500.0	min	0.0	
P8-54	Output power correction coefficient	0.0 to 200.0	%	100.0	
P8-55	Deceleration time for emergency stop	0.00 to 650.00 (P0-19 = 2) 0.0 to 6500.0 (P0-19 = 1) 0 to 65000 (P0-19 = 0)	s	0.1	

■ Group P9: fault And Protection

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P9-00	Motor overload protection	0: Disabled 1: Enabled	N.A.	1	
P9-01	Motor overload protection gain	0.20 to 10.00	N.A.	1.00	
P9-02	Motor overload pre- warning coefficient	50 to 100	%	80	
P9-07	Short-circuit to ground upon power-on	0: Disabled 1: Enabled	N.A.	1	
P9-08	Braking unit applied voltage	200.0 to 810.0	V	380 V: 700 V 220V: 360V	
P9-09	Auto reset times	0 to 20	N.A.	0	
P9-10	DO action during fault auto reset	0: Not act 1: Act	N.A.	0	
P9-11	Delay of fault auto reset	0.1 to 100.0	s	1.0	
P9-12	Power input phase loss protection	0: Disabled 1: Enabled	N.A.	0	
P9-13	Power output phase loss protection	Ones position: Output phase loss protection 0: Disabled 1: Enabled Tens position: Output phase loss protection before running 0: Disabled 1: Enabled	N.A.	01	
P9-14	1st fault type	0: no fault 1: retention 2: acceleration overcurrent 3: deceleration overcurrent	N.A.	N.A.	
P9-15	2nd fault type	4: constant speed overcurrent 5: acceleration overvoltage 6: deceleration overvoltage 7: constant overvoltage	N.A.	N.A.	

P9-16	3rd (latest) fault type	8: buPPER resistance overload 9: undervoltage 10: frequency converter overload 11: motor overload 12: input phase deficiency 13: output phase deficiency 14: module overheating 15: external fault 16: communication abnormal 17: retention 18: current detection abnormal 19: motor tuning abnormal 20: retention 21: parameter read and write abnormal 22: retention 23: motor short circuit to the ground 24: retention 25: retention 26: running time reach 27: user custom fault 1 28: user custom fault 2 29: power time reach 30: load 31: running PID feedback loss 33: drive board internal communication receiving timeout 40: fast timeout 41: running switching motor 42: large speed deviation 43: retention 45: retention 51: retention 96: control board internal communication receiving timeout	N.A.	N.A.	
P9-17	Frequency upon 3rd fault	N.A.	N.A.	N.A.	
P9-18	Current upon 3rd fault	N.A.	N.A.	N.A.	

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P9-19	Bus voltage upon 3rd fault	N.A.	N.A.	N.A.	
P9-20	Input terminal status upon 3rd fault	N.A.	N.A.	N.A.	
P9-21	Output terminal status upon 3rd fault	N.A.	N.A.	N.A.	
P9-22	AC drive status upon 3rd fault	N.A.	N.A.	N.A.	
P9-23	Power-on time upon 3rd fault	N.A.	N.A.	N.A.	
P9-24	Running time upon 3rd fault	N.A.	N.A.	N.A.	
P9-27	Frequency upon 2nd fault	N.A.	N.A.	N.A.	
P9-28	Current upon 2nd fault	N.A.	N.A.	N.A.	
P9-29	Bus voltage upon 2nd fault	N.A.	N.A.	N.A.	
P9-30	Input terminal status upon 2nd fault	N.A.	N.A.	N.A.	
P9-31	Output terminal status upon 2nd fault	N.A.	N.A.	N.A.	
P9-32	Frequency upon 2nd fault	N.A.	N.A.	N.A.	
P9-33	Current upon 2nd fault	N.A.	N.A.	N.A.	
P9-34	Bus voltage upon 2nd fault	N.A.	N.A.	N.A.	
P9-37	Input terminal status upon 1st fault	N.A.	N.A.	N.A.	
P9-38	Output terminal status upon 1st fault	N.A.	N.A.	N.A.	
P9-39	Frequency upon 1st fault	N.A.	N.A.	N.A.	
P9-40	Current upon 1st fault	N.A.	N.A.	N.A.	
P9-41	Bus voltage upon 3rd fault	N.A.	N.A.	N.A.	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P9-42	Input terminal status upon 1st fault	N.A.	N.A.	N.A.	
P9-43	Output terminal status upon 1st fault	N.A.	N.A.	N.A.	
P9-44	Frequency upon 1st fault	N.A.	N.A.	N.A.	
P9-47	fault protection action selection 1	0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Units position: Motor overload (Err11) Tens position: Input phase loss (Err12) Hundreds position: Output phase loss (Err13) Thousands position: External fault (Err15) Ten thousands position: Communication fault (Err16)	N.A.	0000	
P9-48	fault protection action selection 2	Units position: Encoder fault (Err20) 0: Coast to stop 1: Switch over to V/F control, stop according to stop mode 2: Switch over to V/F control, continue to run Tens position: EEPROM read-write fault (Err21) 0: Coast to stop 1: Stop according to the stop mode Hundreds position: Reserved	N.A.	0000	

		Thousands position: Motor overheat (Err25) Same as P9-47			
		Ten thousands position: Accumulative running time reached (Err26) Same as P9-47			
P9-49	fault protection action selection 3	00000 to 22222	N.A.	0000	
P9-54	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Frequency reference 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	N.A.	0	
P9-55	Backup frequency upon abnormality	0.0 to 100.0 (max frequency)	Hz	100.0	
P9-59	Action selection at instantaneous power PAilure	0: Invalid 1: Decelerate 2: Decelerate to stop	N.A.	0	
P9-60	Pause judging voltage at instantaneous power PAilure	80 to 100	%	85	
P9-61	Voltage recovery judging time at instantaneous power PAilure	0.0 to 100.0	s	0.5	
P9-62	Judging voltage at instantaneous power PAilure	60 to P9-60 (standard bus voltage)	%	80	
P9-63	Protection upon load lost	0: Disabled 1: Enabled	N.A.	0	
P9-64	Load lost detection level	0.0 to 100.0	%	10.0	
P9-65	Load lost detection time	0.0 to 60.0	s	1.0	
P9-66	Min. PID error 2	0.0 to 100.0	%	0.0	
P9-69	Overspeed detection level	0.0 to 50.0 (max. output frequency)	%	20.0	
P9-70	Overspeed detection time	0.0: No detection 0.1 to 60.0	s	0.0	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
P9-71	Power dip ride-through gain Kp	0 to 100	N.A.	40	
P9-72	Power dip ride-through integral coefficient	0 to 100	N.A.	30	

■ Group PA: Process Control And PID Function

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PA-00	PID reference source	0: Set by PA-01 1: AI1 2: AI2 3: Keyboard knob 4: Pulse reference (X5) 5: Serial comms. 6: Multi-reference	N.A.	0	
PA-01	PID digital reference	0.0 to 100.0	%	50.0	
PA-02	PID feedback source	0: AI1 1: AI2 2: Keyboard knob 3: AI1 - AI2 4: Pulse reference (X5) 5: Serial comms. 6: AI1 + AI2 7: Max. (AI1 , AI2) 8: Min. (AI1 , AI2)	N.A.	0	
PA-03	PID action direction	0: Forward action 1: Reverse action	N.A.	0	
PA-04	PID setting feedback range	0 to 65535	N.A.	1000	
PA-05	Proportional gain Kp1	0.0 to 100.0	N.A.	20.0	
PA-06	Integral time Ti1	0.01 to 10.00	s	2.00	
PA-07	Differential time Td1	0.000 to 10.000	s	0.000	
PA-08	Cut-OFF frequency of PID reverse rotation	0.000 to max frequency	Hz	2.00	
PA-09	PID deviation limit	0.0 to 100.0	%	0.0	
PA-10	PID Differential limit	0.00 to 100.00	%	0.10	
PA-11	PID setting change time	0.00 to 650.00	s	0.00	
PA-12	PID feedback filter time	0.00 to 60.00	s	0.00	
PA-13	PID output filter time	0.00 to 60.00	s	0.00	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PA-14	Min. PID operation frequency	0.00 to 10.00	Hz	0.00	
PA-15	Proportional gain Kp2	0.0 to 100.0	N.A.	20.0	
PA-16	Integral time Ti2	0.01 to 10.00	s	2.00	
PA-17	Differential time Td2	0.000 to 10.000	s	0.000	
PA-18	PID parameter switchover condition	0: No switchover 1: Switchover via DI 2: Auto switchover based on PID error 3: Auto switchover based on running frequency	N.A.	0	
PA-19	PID parameter switchover deviation 1	0.0 to PA-20	%	20.0	
PA-20	PID parameter switchover deviation 2	PA-19 to 100.0	%	80.0	
PA-21	PID initial value	0.0 to 100.0	%	0.0	
PA-22	PID initial value holding time	0.00 to 650.00	s	0.00	
PA-23	Max. deviation between two PID outputs in forward direction	0.00 to 100.00	%	1.00	
PA-24	Max. deviation between two PID outputs in reverse direction	0.00 to 100.00	%	1.00	
PA-25	PID integral property	Units position: Integral separation 0: Disabled 1: Enabled Tens position: Whether to stop integral operation when the PID output reaches the limit 0: Continue integral operation 1: Stop integral operation	N.A.	00	
PA-26	Detection value of PID feedback loss	0.0: Not judging feedback loss 0.1 to 100.0	%	0.0	
PA-27	Detection time of PID feedback loss	0.0 to 20.0	s	0.0	
PA-28	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	N.A.	0	

■ Group PB: Wobble Frequency, Fixed Length And Count

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PB-00	Wobble setting mode	0: Relative to the central frequency 1: Relative to the max frequency	N.A.	0	
PB-01	Wobble frequency amplitude	0.0 to 100.0	%	0.0	
PB-02	Wobble step	0.0 to 50.0	%	0.0	
PB-03	Wobble cycle	0.1 to 3000.0	s	10.0	
PB-04	Triangular wave rising time coefficient	0.0 to 100.0	%	50.0	
PB-05	Set length	0 to 65535	m	1000	
PB-06	Actual length	0 to 65535	m	-	
PB-07	Number of pulses per meter	0.1 to 6553.5	N.A.	100.0	
PB-08	Set count value	1 to 65535	N.A.	1000	
PB-09	Designated count value	1 to 65535	N.A.	1000	

■ Group PC: Multi-reference And Simple PLC Function

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PC-00	reference 0	-100.0 to +100.0	%	0.0	
PC-01	reference 1	-100.0 to +100.0	%	0.0	
PC-02	reference 2	-100.0 to +100.0	%	0.0	
PC-03	reference 3	-100.0 to +100.0	%	0.0	
PC-04	reference 4	-100.0 to +100.0	%	0.0	
PC-05	reference 5	-100.0 to +100.0	%	0.0	
PC-06	reference 6	-100.0 to +100.0	%	0.0	
PC-07	reference 7	-100.0 to +100.0	%	0.0	
PC-08	reference 8	-100.0 to +100.0	%	0.0	
PC-09	reference 9	-100.0 to +100.0	%	0.0	
PC-10	reference 10	-100.0 to +100.0	%	0.0	
PC-11	reference 11	-100.0 to +100.0	%	0.0	
PC-12	reference 12	-100.0 to +100.0	%	0.0	
PC-13	reference 13	-100.0 to +100.0	%	0.0	
PC-14	reference 14	-100.0 to +100.0	%	0.0	
PC-15	reference 15	-100.0 to +100.0	%	0.0	
PC-16	Simple PLC running mode	0: Stop after running one cycle 1: Keep final values after running one cycle 2: Repeat after running one cycle	N.A.	0	
PC-17	Simple PLC retentive selection	0: Not retentive 1: Retentive Unit position: Retentive at power down Tens position: Retentive at stop	N.A.	00	
PC-18	Running time of simple PLC reference 0	0.0 to 6500.0	s or h	0.0	
PC-19	Acceleration/ deceleration time of simple PLC reference 0	0 to 3	N.A.	0	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PC-20	Running time of simple PLC reference 1	0.0 to 6500.0	s or h	0.0	
PC-21	Acceleration/ deceleration time of simple PLC reference 1	0 to 3	N.A.	0	
PC-22	Running time of simple PLC reference 2	0.0 to 6500.0	s or h	0.0	
PC-23	Acceleration/ deceleration time of simple PLC reference 2	0 to 3	N.A.	0	
PC-24	Running time of simple PLC reference 3	0.0 to 6500.0	s or h	0.0	
PC-25	Acceleration/ deceleration time of simple PLC reference 3	0 to 3	N.A.	0	
PC-26	Running time of simple PLC reference 4	0.0 to 6500.0	s or h	0.0	
PC-27	Acceleration/ deceleration time of simple PLC reference 4	0 to 3	N.A.	0	
PC-28	Running time of simple PLC reference 5	0.0 to 6500.0	s or h	0.0	
PC-29	Acceleration/ deceleration time of simple PLC reference 5	0 to 3	N.A.	0	
PC-30	Running time of simple PLC reference 6	0.0 to 6500.0	s or h	0.0	
PC-31	Acceleration/ deceleration time of simple PLC reference 6	0 to 3	N.A.	0	
PC-32	Running time of simple PLC reference 7	0.0 to 6500.0	s or h	0.0	
PC-33	Acceleration/ deceleration time of simple PLC reference 7	0 to 3	N.A.	0	
PC-34	Running time of simple PLC reference 8	0.0 to 6500.0	s or h	0.0	
PC-35	Acceleration/ deceleration time of simple PLC reference 8	0 to 3	N.A.	0	
PC-36	Running time of simple PLC reference 9	0.0 to 6500.0	s or h	0.0	
PC-37	Acceleration/ deceleration time of simple PLC reference 9	0 to 3	N.A.	0	
PC-38	Running time of simple PLC reference 10	0.0 to 6500.0	s or h	0.0	
PC-39	Acceleration/ deceleration time of simple PLC reference 10	0 to 3	N.A.	0	
PC-40	Running time of simple PLC reference 11	0.0 to 6500.0	s or h	0.0	
PC-41	Acceleration/ deceleration time of simple PLC reference 11	0 to 3	N.A.	0	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PC-42	Running time of simple PLC reference 12	0.0 to 6500.0	s or h	0.0	
PC-43	Acceleration/ deceleration time of simple PLC reference 12	0 to 3	N.A.	0	
PC-44	Running time of simple PLC reference 13	0.0 to 6500.0	s or h	0.0	
PC-45	Acceleration/ deceleration time of simple PLC reference 13	0 to 3	N.A.	0	
PC-46	Running time of simple PLC reference 14	0.0 to 6500.0	s or h	0.0	
PC-47	Acceleration/ deceleration time of simple PLC reference 14	0 to 3	N.A.	0	
PC-48	Running time of simple PLC reference 15	0.0 to 6500.0	s or h	0.0	
PC-49	Acceleration/ deceleration time of simple PLC reference 15	0 to 3	N.A.	0	
PC-50	Time unit of simple PLC running	0: s (second); 1: h (hour)	N.A.	0	
PC-51	reference 0 source	0: Set by PC-00 1: AI1 2: AI2 3: Keyboard knob 4: Pulse reference 5: PID 6: Set by preset frequency (P0-08), modified via terminal UP/DOWN	N.A.	0	
PC-51	reference 0 source	0 to 6	N.A.	0	

■ Group PD: Communication

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PD-00	Baud rate	Units position (Modbus) 0: 300 bps 1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps	N.A.	5005	
PD-01	Data format symbol	0: No check <8,N,2> 1: Even parity check <8,E,1> 2: Odd parity check <8,O,1> 3: No check, data format <8,N,1>	N.A.	0	
PD-02	Local address	0: Broadcast address; 1 to 247	N.A.	1	
PD-03	Response delay	0 to 20	ms	2	
PD-04	Communication timeout	0.0 (invalid); 0.1 to 60.0	s	0.0	
PD-05	Communication protocol	Units position: Modbus protocol selection 0: Non-standard Modbus protocol 1: Standard Modbus protocol	N.A.	31	
PD-06	Current resolution read by communication	0: 0.01 1: 0.1	A	0	
PD-07	factory reserved	0: Software tool invalid 1: Software tool valid	N.A.	0	
PD-08	Extension card communication timeout time	0.0: Invalid 0.1 to 60.0	s	0.0	

■ Group PE: User-Defined Parameters

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PE-00	User-defined parameter 0	P0-00 to PP-xx, A1-00 to Ax-xx, U0-xx to U0-xx	N.A.	P0-01	
PE-01	User-defined parameter 1		N.A.	P0-02	
PE-02	User-defined parameter 2		N.A.	P0-03	
PE-03	User-defined parameter 3		N.A.	P0-07	
PE-04	User-defined parameter 4		N.A.	P0-08	
PE-05	User-defined parameter 5		N.A.	P0-17	
PE-06	User-defined parameter 6		N.A.	P0-18	
PE-07	User-defined parameter 7		N.A.	P3-00	
PE-08	User-defined parameter 8		N.A.	P3-01	
PE-09	User-defined parameter 9		N.A.	P4-00	
PE-10	User-defined parameter 10		N.A.	P4-01	
PE-11	User-defined parameter 11		N.A.	P4-02	
PE-12	User-defined parameter 12		N.A.	P5-02	
PE-13	User-defined parameter 13		N.A.	P5-07	
PE-14	User-defined parameter 14		N.A.	P6-00	
PE-15	User-defined parameter 15		N.A.	P6-10	
PE-16	User-defined parameter 16		N.A.	P0-00	
PE-17	User-defined parameter 17		N.A.	P0-00	
PE-18	User-defined parameter 18		N.A.	P0-00	
PE-19	User-defined parameter 19		N.A.	P0-00	
PE-20	User-defined parameter 20		N.A.	P0-00	
PE-21	User-defined parameter 21		N.A.	P0-00	
PE-22	User-defined parameter 22		N.A.	P0-00	
PE-23	User-defined parameter 23		N.A.	P0-00	
PE-24	User-defined parameter 24		N.A.	P0-00	
PE-25	User-defined parameter 25		N.A.	P0-00	
PE-26	User-defined parameter 26		N.A.	P0-00	
PE-27	User-defined parameter 27		N.A.	P0-00	
PE-28	User-defined parameter 28		N.A.	P0-00	
PE-29	User-defined parameter 29		N.A.	P0-00	
PE-30	User-defined parameter 30		N.A.	P0-00	
PE-31	User-defined parameter 31		N.A.	P0-00	

■ Group PP: Para. No. Management

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
PP-00	User password	0 to 65535	N.A.	0	
PP-01	Parameter initialization	0: No operation 1: Restore factory settings except motor parameters 2: Clear records 3: Restore factory settings, including motor parameters	N.A.	0	
PP-02	AC drive parameter display property	00 to 11	N.A.	11	
PP-03	Individualized parameter display property	00 to 11	N.A.	00	
PP-04	Parameter modification property	0: Modifiable 1: Not modifiable	N.A.	0	

■ Group A0: Torque Control

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
A0-00	Speed/ Torque control selection	0: Speed control 1: Torque control	N.A.	0	
A0-01	Torque setting source in torque control	0: Set by A0-03 1: AI1 2: AI2 3: Keyboard knob 4: Pulse reference (X5) 5: Communication reference 6: MIN (AI1, AI2) 7: MAX (AI1, AI2)	N.A.	0	
A0-03	Torque digital setting in torque control	-200.0 to 200.0	%	150.0	
A0-05	Forward max frequency in torque control	0.00 to max frequency (P0-10)	Hz	50.00	
A0-06	Reverse max frequency in torque control	0.00 to max frequency (P0-10)	Hz	50.00	
A0-07	Acceleration time in torque control	0.00 to 650.00	s	0.00	
A0-08	Deceleration time in torque control	0.00 to 650.00	s	0.00	

■ Group A5: Control Optimization

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
A5-00	DPWM switchover frequency upper limit	0.00 to max output frequency	Hz	Model dependent	
A5-01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	N.A.	0	
A5-02	Dead zone compensation mode selection	0: No compensation 1: Compensation	N.A.	1	
A5-03	Random PWM depth	0: Random PWM invalid 1 to 10	N.A.	0	
A5-04	fast current limit	0: Disabled 1: Enabled	N.A.	1	
A5-05	Max output voltage coefficient	100 to 110	%	105	
A5-06	Undervoltage threshold	300.0 to 600.0V	V	350.0	
A5-07	SVC optimization mode selection	0: Not optimized 1: Optimization mode 1 2: Optimization mode 2	N.A.	1	
A5-08	factory reserved	0.0: Invalid 0.1 to 6.0	kHz	0.0	
A5-09	Overvoltage threshold	200.0 to 900.0	V	820.0	

■ Group A6: AI Curve Setting

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
A6-00	AI curve 4 minimum input	-10.00 to A6-02	V	0.00	
A6-01	Corresponding setting of AI curve 4 minimum input	-100.0 to +100.0	%	0.0	
A6-02	AI curve 4 inflexion 1 input	A6-00 to A6-04	V	3.00	
A6-03	Corresponding setting of AI curve 4 inflexion 1 input	-100.0 to +100.0	%	30.0	
A6-04	AI curve 4 inflexion 1 input	A6-02 to A6-06	V	6.00	
A6-05	Corresponding setting of AI curve 4 inflexion 1 input	-100.0 to +100.0	%	60.0	
A6-06	AI curve 4 max input	A6-06 to 10.00	V	10.00	
A6-07	Corresponding setting of AI curve 4 max input	-100.0 to +100.0	%	100.0	
A6-08	AI curve 5 minimum input	-10.00 to A6-10	V	0.00	
A6-09	Corresponding setting of AI curve 5 minimum input	-100.0 to +100.0	%	0.0	
A6-10	AI curve 5 inflexion 1 input	A6-08 to A6-12	V	3.00	
A6-11	Corresponding setting of AI curve 5 inflexion 1 input	-100.0 to +100.0	%	30.0	
A6-12	AI curve 5 inflexion 1 input	A6-10 to A6-14	V	6.00	
A6-13	Corresponding setting of AI curve 5 inflexion 1 input	-100.0 to +100.0	%	60.0	
A6-14	AI curve 5 max input	A6-14 to 10.00	V	10.00	
A6-15	Corresponding setting of AI curve 5 max input	-100.0 to +100.0	%	100.0	
A6-24	Jump point of AI1 input corresponding setting	-100.0 to +100.0	%	0.0	
A6-25	Jump amplitude of AI1 input corresponding setting	0.0 to 100.0	%	0.5	
A6-26	Jump point of AI2 input corresponding setting	-100.0 to +100.0	%	0.0	
A6-27	Jump amplitude of AI2 input corresponding setting	0.0 to 100.0	%	0.5	
A6-28	Jump point of Keyboard knob input corresponding setting	-100.0 to +100.0	%	0.0	
A6-29	Jump amplitude of Keyboard knob input corresponding setting	0.0 to 100.0	%	0.5	

■ Group AC: AI/AO Correction

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
AC-00	AI1 measured voltage 1	-10.000 to +10.000	V	factory corrected	
AC-01	AI1 displayed voltage 1	-10.000 to +10.000	V	factory corrected	
AC-02	AI1 measured voltage 2	-10.000 to +10.000	V	factory corrected	
AC-03	AI1 displayed voltage 2	-10.000 to +10.000	V	factory corrected	
AC-04	AI2 measured voltage 1	-10.000 to +10.000	V	factory corrected	
AC-05	AI2 displayed voltage 1	-10.000 to +10.000	V	factory corrected	
AC-06	AI2 measured voltage 2	-10.000 to +10.000	V	factory corrected	
AC-07	AI2 displayed voltage 2	-10.000 to +10.000	V	factory corrected	
AC-08	Keyboard knob measured voltage 1	-10.000 to +10.000	V	factory corrected	
AC-09	Keyboard knob displayed voltage 1	-10.000 to +10.000	V	factory corrected	
AC-10	Keyboard knob measured voltage 2	-10.000 to +10.000	V	factory corrected	
AC-11	Keyboard knob displayed voltage 2	-10.000 to +10.000	V	factory corrected	
AC-12	AO1 target voltage 1	-10.000 to +10.000	V	factory corrected	
AC-13	AO1 measured voltage 1	-10.000 to +10.000	V	factory corrected	
AC-14	AO1 target voltage 2	-10.000 to +10.000	V	factory corrected	
AC-15	AO1 measured voltage 2	-10.000 to +10.000	V	factory corrected	
AC-16	reserve	-	-	-	
AC-17	reserve	-	-	-	
AC-18	reserve	-	-	-	
AC-19	reserve	-	-	-	

11.2 Monitoring Parameters

■ Group U0: Monitoring

Para. No.	Para. Name	Setting Range	Unit	Default	Commission
U0-00	Running frequency	N.A.	Hz	N.A.	
U0-01	Set frequency	N.A.	Hz	N.A.	
U0-02	Bus voltage	N.A.	V	N.A.	
U0-03	Output voltage	N.A.	V	N.A.	
U0-04	Output current	N.A.	A	N.A.	
U0-05	Output power	N.A.	kW	N.A.	
U0-06	Output torque	N.A.	%	N.A.	
U0-07	DI state	N.A.	N.A.	N.A.	
U0-08	DO state	N.A.	N.A.	N.A.	
U0-09	AI1 voltage	N.A.	V	N.A.	
U0-10	AI2 voltage	N.A.	V	N.A.	
U0-11	Keyboard knob voltage	N.A.	V	N.A.	
U0-12	Count value	N.A.	N.A.	N.A.	
U0-13	Length value	N.A.	N.A.	N.A.	
U0-14	Load speed	N.A.	RPM/ min	N.A.	
U0-15	PID setting	N.A.	N.A.	N.A.	
U0-16	PID feedback	N.A.	N.A.	N.A.	
U0-17	PLC stage	N.A.	N.A.	N.A.	
U0-18	Input pulse frequency	N.A.	kHz	N.A.	
U0-19	feedback speed	N.A.	Hz	N.A.	
U0-20	Remaining running time	N.A.	Min	N.A.	
U0-21	AI1 voltage before correction	N.A.	V	N.A.	
U0-22	AI2 voltage before correction	N.A.	V	N.A.	
U0-23	Keyboard knob voltage before correction	N.A.	V	N.A.	
U0-24	Motor speed	N.A.	RPM/ min	N.A.	
U0-25	Accumulative power-on time	N.A.	Min	N.A.	
U0-26	Accumulative running time	N.A.	Min	N.A.	
U0-27	Pulse input frequency	N.A.	Hz	N.A.	
U0-28	Communication setting value	N.A.	%	N.A.	
U0-29	Reserved	N.A.	N.A.	N.A.	
U0-30	Main frequency X	N.A.	Hz	N.A.	
U0-31	Auxiliary frequency Y	N.A.	Hz	N.A.	
U0-32	Viewing any register address value	N.A.	N.A.	N.A.	

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Para. No.	Para. Name	Setting Range	Unit	Default	Commission
U0-35	Target torque	N.A.	%	N.A.	
U0-37	Power factor angle	N.A.	°	N.A.	
U0-39	Target voltage for V/F separation	N.A.	V	N.A.	
U0-40	Output voltage for V/F separation	N.A.	V	N.A.	
U0-41	DI state visual display	N.A.	N.A.	N.A.	
U0-42	DO state visual display	N.A.	N.A.	N.A.	
U0-43	DI function state visual display 1	N.A.	N.A.	N.A.	
U0-44	DI function state visual display 2	N.A.	N.A.	N.A.	
U0-61	AC drive state	N.A.	N.A.	N.A.	

12 Troubleshooting

12.1 Faults and Solutions

Display	Fault Name	Possible Causes	Solutions
Err02	Overcurrent during acceleration	1. The output circuit is short circuited. 2. The acceleration time is too short. 3. Manual torque boost or V/F curve is not appropriate. 4. The power supply is too low. 5. The startup operation is performed on the rotating motor. 6. A sudden load is added during acceleration. 7. The AC drive model is of too small power class.	1: Eliminate short circuit. 2: Increase the acceleration time. 3: Adjust the manual torque boost or V/F curve. 4: Check that the power supply is normal. 5: Select speed tracking restart or start the motor after it stops. 6: Remove the added load. 7: Select a drive of higher power class.
Err03	Overcurrent during deceleration	1. The output circuit is short circuited. 2. The deceleration time is too short. 3. The power supply is too low. 4. A sudden load is added during deceleration. 5. The braking resistor is not installed.	1: Eliminate short circuit. 2: Increase the deceleration time. 3: Check the power supply, and ensure it is normal. 4: Remove the added load. 5: Install the braking resistor.
Err04	Overcurrent at constant speed	1. The output circuit is short circuited. 2. The power supply is too low. 3. A sudden load is added during operation. 4. The AC drive model is of too small power class.	1: Eliminate short circuit. 2: Adjust power supply to normal range. 3: Remove the added load. 4: Select a drive of higher power class.
Err05	Overvoltage during acceleration	1. The DC bus voltage is too high. 2. An external force drives the motor during acceleration. 3. The acceleration time is too short. 4. The braking resistor is not installed.	1: Replace with a proper braking resistor. 2: Cancel the external force or install braking resistor. 3: Increase the acceleration time. 4: Install a braking resistor.
Err06	Overvoltage during deceleration	1. The DC bus voltage is too high. 2. An external force drives the motor during deceleration. 3. The deceleration time is too short. 4. The braking resistor is not installed.	1: Replace with a proper braking resistor. 2: Cancel the external force or install braking resistor. 3: Increase the deceleration time. 4: Install the braking resistor
Err07	Overvoltage at constant speed	1. The DC bus voltage is too high. 2. An external force drives the motor during deceleration.	1: Replace with a proper braking resistor. 2: Cancel the external force.

Display	Fault Name	Possible Causes	Solutions	
Voltage thresholds				
Voltage Class		DC Bus Overvoltage	DC Bus Undervoltage	Braking Unit Operation Level
Single-phase 220 V		400 V	200 V	381 V
Three-phase 220 V		400 V	200 V	381 V
Three-phase 380 V		810 V	350 V	700 V
Err08	Control power fault	The input voltage exceeds the allowed range.		Adjust the input voltage to within the allowed range.
Err09	Undervoltage	1. Instantaneous power failure occurs. 2. The input voltage exceeds the allowed range 3. The DC bus voltage is too low. 4. The rectifier bridge and buffer resistor are faulty. 5. The driver board is faulty. 6. The control board is faulty.		1: Reset the fault. 2: Adjust the input voltage to within the allowed range. 3 to 6: Seek for maintenance.
Err10	Drive overload	1. The load is too heavy or the rotor is locked. 2. The drive is of too small power class.		1: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 2: Select a drive of higher power class.
Err11	Motor overload	1. P9-01 is too small. 2. The load is too heavy or the rotor is locked. 3. The drive is of too small power class.		1: Set P9-01 correctly. 2: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 3: Select a drive of larger power class.
Err12	Power input phase loss	1. The three-phase power supply is abnormal. 2. The driver board is faulty. 3. The lightning protection board is faulty. 4. The control board is faulty.		1: Check the power supply. 2 to 4: Seek for maintenance.
Err13	Power output phase loss	1. The cable between drive and motor is faulty. 2. The drive's three-phase output is unbalanced when the motor is running. 3. The driver board is faulty 4. The IGBT is faulty.		1: Check the cable. 2: Check the motor windings. 3 to 4: Seek for maintenance.
Err14	IGBT overheat	1. The ambient temperature is too high. 2. The air filter is blocked. 3. The cooling fan is damaged. 4. The thermal sensor of IGBT is damaged. 5.The IGBT is damaged.		1: Reduce the ambient temperature. 2: Clean the air filter. 3 to 5: Seek for maintenance.

Display	Fault Name	Possible Causes	Solutions
Err15	External equipment fault	1. External fault signal is input through DI. 2. External fault signal is input through VDI.	Reset the fault.
Err16	Communication fault	1. The host controller is abnormal. 2. The communication cable is faulty. 3. The communication parameters in group PD are set improperly.	1: Check cabling of the host controller. 2: Check the communication cabling. 3: Set the communication parameters properly.
Err18	Current detection fault	The driver board is faulty.	Replace the driver board.
Err19	Motor tuning fault	1. Motor parameters are wrong. 2. Motor tuning overtime.	1. Check motor parameters P1-00 to P1-05. 2. Check the wiring between drive and motor.
Err21	EEPROM read-write fault	The EEPROM chip is damaged.	Replace the main control board.
Err23	Short circuit to ground	The motor is short-circuited to ground.	Replace the cables or motor.
Err26	Accumulative running time reached	The accumulative running time reaches the setting of P8-17.	Clear the record by performing parameter initialization (set PP-01 to 2).
Err27	User-defined fault 1	1. The user-defined fault 1 signal is input through DI. 2. User-defined fault 1 signal is input through VDI.	Reset the fault.
Err28	User-defined fault 2	1. The user-defined fault 2 signal is input through DI 2. The user-defined fault 2 signal is input through VDI.	Reset the fault.
Err29	Accumulative power-on time reached	The accumulative power-on time reaches the setting of P8-16.	Clear the record by performing parameter initialization (set PP-01 to 2).
Err30	Off load fault	Offload when it's running.	Check the connection between motor and load.
Err31	PID feedback lost during running	The PID feedback is lower than PA-26.	Check the PID feedback signal or set PA-26 to a proper value.

Display	Fault Name	Possible Causes	Solutions
Err33	Communication receiving timeout inside driver board	1. Wirings become loose inside the AC drive 2. The driver board is abnormal. 3. The control board is abnormal.	1. Connect all wirings securely. 2 and 3. Seek for maintenance.
Err40	Quick current limit	1. The load is too heavy or the rotor is locked. 2. The drive is of too small power class.	1: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 2: Select a drive of higher power class.
Err41	Motor switchover fault during running	The current motor is switched over through a terminal during running of the AC drive.	Switch over the motor only after the AC drive stops.
Err42	Overspeed error	1. Locked-rotor occurs on the motor. 2. P9-69 and P9-70 are set improperly. 3. Wirings between the AC drive and motor are abnormal.	1. Check whether the machine is abnormal, whether motor auto-tuning is not performed, and whether the setting of P2-10 is small. 2. Set P9-69 and P9-70 properly. 3. Check whether wirings between the AC drive and motor break. If yes, reconnect the wirings securely.
Err96	Communication receiving timeout inside control board	1. Wirings become loose inside the AC drive 2. The driver board is abnormal. 3. The control board is abnormal.	1. Connect all wirings securely. 2 and 3. Seek for maintenance.

12.2 Common Symptoms And Diagnostics

Fault Name	Possible Causes	Solutions
There is no display at power-on.	1. There is no power supply or the power supply is too low. 2. The switching power supply on the driver board is faulty. 3. The rectifier bridge is damaged. 4. The buffer resistor of the drive is damaged. 5. The control board or the keypad is faulty. 6. The cable between the control board and the driver board or keypad breaks.	1: Check the power supply. 2 to 5: Seek for maintenance. 6: Re-connect the 4-core and 28-core flat cables, or seek for maintenance.

Fault Name	Possible Causes	Solutions
"HF" is displayed at power-on.	1. The cable between the driver board and the control board is in poor contact. 2. The control board is damaged. 3. The motor winding or the motor cable is short-circuited to the ground. 4. The power supply is too low.	1: Re-connect the 4-core and 28-core flat cables, or seek for maintenance. 2: Seek for maintenance. 3: Check the motor or replace it, and check the motor cable.
"Err23" is displayed at power-on.	1. The motor or output cables are short circuited to ground. 2. The AC drive is damaged.	1. Measure insulation of the motor and output cables. 2. Seek for maintenance.
The display is normal upon power-on, but "HF" is displayed after startup and the motor stops immediately.	1. The cooling fan is damaged or the rotor is locked. 2. A certain terminal is short-circuited.	1: Replace cooling fan, or check the machine whether it is locking the rotor. 2: Eliminate short circuit.
Err14 is reported frequently.	1. The carrier frequency is set too high. 2. The cooling fan is damaged, or the air filter is blocked. 3. Components (thermal coupler or others) inside the drive are damaged.	1: Reduce P0-15. 2: Replace the fan and clean the air filter. 3: Seek for maintenance.
The motor does not rotate after the AC drive outputs a non-zero reference.	1. The motor or motor cable is damaged. 2. The motor parameters are set improperly. 3. The cable between the driver board and the control board is in poor contact. 4. The driver board is faulty. 5. The rotor is locked.	1: Check the motor, or check the cable between the drive and the motor. 2: Check and re-set motor parameters. 3: Re-connect the 4-core and 28-core flat cables, or seek for maintenance. 4: Seek for maintenance. 5: Check the machine whether it is locking the rotor.
The DI terminals are disabled.	1. The DI parameters are set incorrectly. 2. The input signal is incorrect. 3. The wire jumper between SEL and +24V is in poor contact. 4. The control board is faulty.	1: Check and reset DI parameters in group P4. 2: Check the input signals, or check the input cable. 3: Check the jumper between SEL and +24 V. 4: Seek for maintenance.
The drive reports overcurrent and overvoltage frequently.	1. The motor parameters are set improperly. 2. The acceleration/deceleration time is too small. 3. The load fluctuates.	1: Reset motor parameters. 2: Set proper acceleration/ deceleration time. 3: Check the machine, or seek for maintenance.

Fault Name	Possible Causes	Solutions
Err17 is reported at power-on or during running.	The soft start contactor is not closed.	1. Check whether the contactor wiring becomes loose 2. Check whether the contactor is faulty. 3. Check whether 24 V power supply of the contactor is faulty. 4. Seek for maintenance
Display at power-on	Related device on the control board is damaged.	Seek for maintenance.

13. Modbus Communication Protocol

The drive provides RS485 communication interface and supports Modbus-RTU communication protocol so that the user can implement centralized control, such as setting running commands and function codes, and reading running status and fault information of the AC drive, by using a PC or PLC.

This protocol defines content and format of transmitted messages during serial communication, including master polling (or broadcasting) format and master coding method (function code for the action, transmission data, and error check). The slave uses the same structure in response, including action confirmation, data returning and error check. If an error occurs when the slave receives a message, or the slave cannot complete the action required by the master, the slave returns a fault message as a response to the master.

13.1 Application

The AC drive is connected to a "single-master multi-slave" PC/PLC control network with RS485 bus.

13.2 Bus Structure

- Interface mode

Equipped with RS485

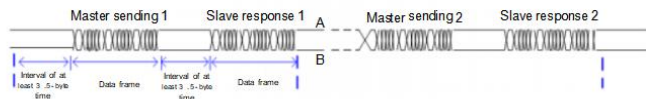
- Topological structure

The system consists of a single master and multiple slaves. In the network, each communication device has a unique slave address. A device is the master (can be a PC, a PLC or an HMI) and initiates communication to perform parameter read or write operations on slaves. The other devices (slaves) provide data to respond to query or operations from the master. At the same moment, either the master or the slave transmits data and the other can only receive data.

The address range of the slaves is 1 to 247, and 0 is broadcast address. A slave address must be unique in the network.

- Transmission mode

The asynchronous serial and half-duplex transmission mode is used. During asynchronous serial communication, data is sent frame by frame in the form of message. In Modbus-RTU protocol, an interval of at least 3.5-byte time marks the end of the previous message. A new message starts to be sent after this interval.



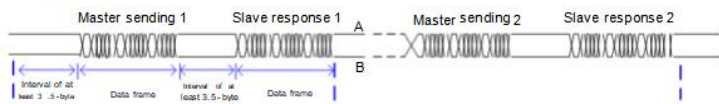
The communication protocol used by the drive is the Modbus-RTU slave communication protocol, which allows the drive to provide data to respond to "query/command" from the master or execute the action according to "query/command" from the master.

The master can be a PC, an industrial device, or a PLC. The master can communicate with a single slave or send broadcast messages to all slaves. When the master communicates with a single slave, the slave needs to return a message (response) to "query/command" from the master. For a broadcast message sent by the master, the slaves need not return a response.

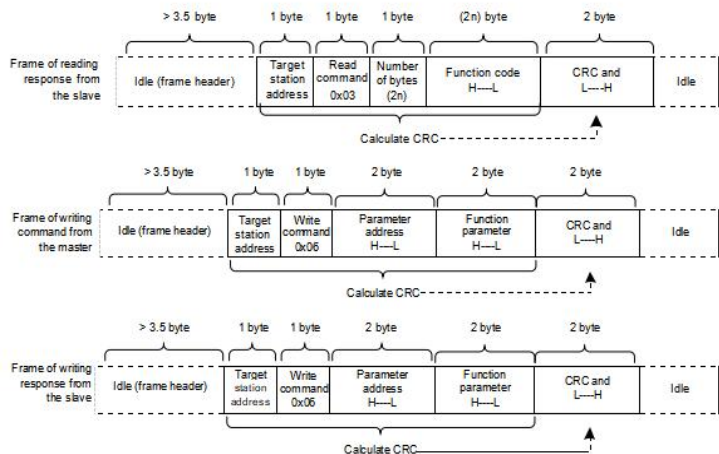
13.3 Data Format

The drive supports reading and writing of word-type parameters only. Reading command is 0x03 and writing command is 0x06. It does not support reading and writing of bytes or bits.

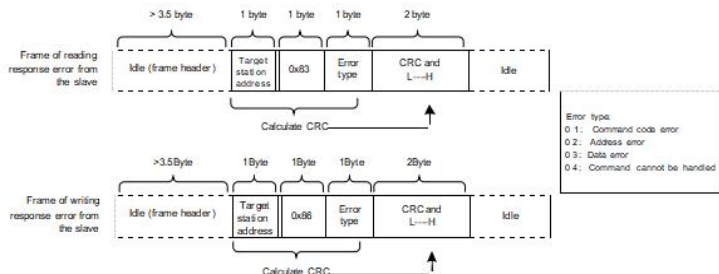
The Modbus-RTU protocol communication data format of the drive is as follows:



In theory, host computer can read several consecutive parameters (n can reach up to 12) but the last parameter it reads must not jump to the next parameter group. Otherwise, an error occurs on response.



If the slave detects a communication frame error or reading/writing failure is caused by other reasons, an error frame will be returned as follows:



The frame format is described in the following table

Frame header (START)	Greater than the 3.5-byte transmission idle time
Slave address (ADR)	Communication address : 1 to 247 0: Broadcast address
Command code (CMD)	03: Read slave parameters 06: Write slave parameters
Function code address (H)	It is the internal parameter address of the AC drive, expressed in hexadecimal format. The parameters include functional parameters and non-functional parameters (running status and running command). During transmission, low-order bytes follow the high-order bytes.
Function code address (L)	
Number of function codes (H)	It is the number of function codes read by this frame. If it is 1, it indicates that one function code is read. During transmission, low bytes follow high bytes. In the present protocol, only one function code is read once, and this field is unavailable.
Number of function codes (L)	
Data (H)	It is the response data or data to be written. During transmission, low-order bytes follow the high-order bytes.
Data (L)	
CRC CHK high bytes	It is the detection value (CRC16 verification value). During transmission, low-order bytes follow the high-order bytes.
CRC CHK low bytes	
END	It is 3.5-byte transmission time.

■ CRC Check

In Modbus-RTU mode, a message includes a CRC-based error-check field. The CRC field checks content of entire message. The CRC field is two bytes, containing a 16-bit binary value. The CRC field is calculated by transmitting device, and then added to message. The receiving device recalculates a CRC value after receiving message, and compares the calculated value with the CRC value in the received CRC field.

The CRC is first stored to 0xFFFF. Then a procedure is invoked to process the successive 8-bit byte in the message and the value in the register. Only the eight bits in each character are used for the CRC. The start bit, stop bit and the parity bit do not apply to the CRC.

During generation of the CRC, each eight-bit character is in exclusive-OR (XOR) with the content in the register. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB was a 1, the register then performs XOR with a preset value. If the LSB was a 0, no XOR is performed. This process is repeated until eight shifts have been performed. After the last (eighth) shift, the next eight-bit byte is in XOR with the register's current value, and the process repeats for eight more shifts as described above. The final value of the register, after all the bytes of the message have been applied, is the CRC value.

The CRC is added to the message from the low-order byte followed by the high-order byte. The CRC simple function is as follows:

```
unsigned int crc_chk_value (unsigned char *data_value, unsigned char length)
{
    unsigned int crc_value=0xFFFF;
    int i;
    while (length-->0)
    {
        crc_value^=*data_value++;
        for (i=0; i<8; i++)
        {
            if (crc_value&0x0001)
            {
                crc_value= (crc_value>>1) ^0xa001;
            }
            else
            {
                crc_value=crc_value>>1;
            }
        }
    }
    return (crc_value) ;
}
```

13.4 Definition of Communication Parameter Addresses

■ Read and Written Parameters

Function parameters can be read and written (except those which cannot be changed because they are only for the factory use or for monitoring).

Parameter group No. and parameter identifying No. are used to express parameter address.

- High-order bytes: F0 to FF (groups P), A0 to AF (groups A), 70 to 7F (group U)
- Low-order bytes: 00 to FF

For example, to read parameter P3-12, communication address of P3-12 is expressed as 0xF30C.

Note	• Group PF: They are factory parameters. The parameters cannot be read or changed. • Group U: These parameters can only be read.
-------------	---

Some parameters cannot be modified when the AC drive is running. Some parameter cannot be modified regardless of status of the AC drive. In addition, pay attention to setting range, unit and description of parameters when modifying them.

Parameter Group	Visited Address	Parameter Address in RAM
P0 to PE	0xF000 to 0xFEFF	0x0000 to 0x0EFF
A0 to AC	0xA000 to 0xACFF	0x4000 to 0x4CFF
U0	0x7000 to 0x70FF	-

Frequent storage to the EEPROM reduces its service life. Therefore, in communication mode, users can change values of certain parameters in RAM rather than storing the setting.

- For groups P parameters, users only need to change high order F of the function code address to 0.
- For groups A parameters, users only need to change high order A of the function code address to 4.

The function code addresses are expressed as follows:

- High-order bytes: 00 to 0F (groups P), 40 to 4F (groups A)
- Low-order bytes: 00 to FF

For example, if function code P3-12 is not stored into EEPROM, the address is expressed as 030C; if function code A0-05 is not stored into EEPROM, the address is expressed as 4005.

It is an invalid address when being read.

Users can also use command code 07H to implement this function.

Para. Address	Description	Para. Address	Description
1000	Communication setting value (Decimal): - 10000 to 10000	1010	PID reference
1001	Running frequency	1011	PID feedback
1002	Bus voltage	1012	PLC process
1003	Output voltage	1013	Pulse input frequency, unit: 0.01 kHz
1004	Output current	1014	Feedback speed, unit 0.1Hz
1005	Output power	1015	Remaining running time
1006	Output torque	1016	AI1 voltage before correction
1007	Running speed	1017	AI2 voltage before correction
1008	DI input indication	1018	AI3 voltage before correction
1009	DO output indication	1019	Linear speed
100A	AI1 voltage	101A	Current power-on time
100B	AI2 voltage	101B	Current running time
100C	reserve	101C	Pulse input frequency, unit 1Hz
100D	Counting value input	101D	Communication reference
100E	Length value input	101E	Actual feedback speed
100F	Load speed	101F	Main frequency reference display
-	-	1020	Auxiliary frequency reference display

Note

- Communication setting value indicates percentage: 100 00 corresponds to 100.00%, and -10000 corresponds to -100.00%.
- With regard to frequency, communication reference is a percentage of P0-10 (maximum frequency).
- With regard to torque, communication reference is a percentage of P2-10 and P2-48 (corresponding to motor 1 and motor 2, respectively).

Control command input to AC drive (write-only):

Command Word Address	Command Word Function
2000H	0001: Forward run
	0002: Reverse run
	0003: Forward jog
	0004: Reverse jog
	0005: Coast to stop
	0006: Decelerate to stop
	0007: Fault reset

Read AC drive state (read-only):

Command Word Address	Command Word Function
3000H	0001: Forward RUN
	0002: Reverse RUN
	0003: Stop

Parameter lock password check

If "8888H" is returned, it indicates that password check is passed.

Password Address	Password Content
1F00H	8888H

DO terminal control (write-only)

Command Address	Command Content
2001H	BIT0: DO1 control BIT1: DO2 control BIT2: RELAY1 control BIT3: RELAY2 control BIT4: FMR control BIT5: VDO1 BIT6: VDO2 BIT7: VDO3 BIT8: VDO4 BIT9: VDO5

AO1 control (write-only)

Command Address	Command Content
2002H	0 to 7FFF indicates 0% to 100%.

AO2 control (write-only)

Command Address	Command Content
2003H	0 to 7FFF indicates 0% to 100%.

Pulse output control (write-only)

Command Address	Command Content
2004H	0 to 7FFF indicates 0% to 100%.

AC drive fault description

AC Drive Fault Address	AC Drive Fault Information	
1F00H	0000: No fault 0001: Reserved 0002: Overcurrent during acceleration 0003: Overcurrent during deceleration 0004: Overcurrent at constant speed 0005: Overvoltage during acceleration 0006: Overvoltage during deceleration	0007: Overvoltage at constant speed 0008: Buffer resistor overload 0009: Undervoltage 000A: AC drive overload 000B: Motor overload 000C: Power input phase loss 000D: Power output phase loss 000E: IGBT overheat 000F: External fault 0010: Communication fault

AC drive fault description

AC Drive Fault Address	AC Drive Fault Information	
8000	0011: Contactor fault 0012: Current detection fault 0013: Motor auto-tuning fault 0014: Encoder/PG card fault 0015: Parameter read and write fault 0016: AC drive hardware fault 0017: Motor short circuited to ground 0018: Reserved 0019: Reserved 001A: Accumulative running time reached 001B: User-defined fault 1 001C: User-defined fault 2 001D: Accumulative power-on time reached	001E: Load lost 001F: PID feedback lost during running 0028: Fast current limit timeout 0029: Motor switchover error during running 002A: Too large speed deviation 002B: Motor over-speed 002D: Motor overheat 005A: Incorrect setting of PPR of the encoder 005B: Not connecting the encoder 005C: Initial position error 005E: Speed feedback error

13.5Group Pd Communication Parameter Description

Function Code	Parameter Name	Setting Range	Default
Pd-00	Baud rate	Units position (Modubs) 0: 300 bps 1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps	5005

This parameter is used to set transmission speed between host computer and AC drive.

Note that baud rate of host computer must be the same as that of AC drive . Otherwise, communication shall fail. The higher baud rate is, the faster communication will be.

Function Code	Parameter Name	Setting Range	Default
Pd-01	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, data format <8,N,1>	0

Note that data format of host computer must be the same as that of AC drive . Otherwise, communication shall fail.

Function Code	Parameter Name	Setting Range	Default
Pd-02	Local address	1 to 249 0: Broadcast address	1

This parameter is used to set address of AC drive. This address is unique (except broadcast address), which is basis for point-to-point communication between host computer and AC drive.

When local address is set to 0 (that is, broadcast address), AC drive can only receive and execute broadcast commands of host computer, but will not respond to host computer.

Function Code	Parameter Name	Setting Range	Default
Pd-03	Response delay	0 to 20 ms	2 ms

This parameter sets interval between AC drive completing receiving data and AC drive sending data to host computer. If response delay is shorter than system processing time, system processing time shall prevail. If response delay is longer than system processing time, system sends data to host computer only after response delay is up.

Function Code	Parameter Name	Setting Range	Default
Pd-04	Communication timeout	0.0s to 60.0s	0.0s

When AC drive does not receive communication signal within time set in this parameter, it detects communication timeout fault (Err16).

When this parameter is set to 0.0s, system does not detect communication timeout.

Generally, this parameter is set to 0.0s. In applications with continuous communication, you can use this parameter to monitor communication status.

Function Code	Parameter Name	Setting Range	Default
Pd-05	Modbus protocol selection and Profibus-DP data frame	Units position: Modbus protocol selection 0: Non-standard Modbus protocol 1: Standard Modbus protocol	0
		Profibus-DP data frame 0: PPO1 format 1: PPO2 format 2: PPO3 format 3: PPO5 format	

Function Code	Parameter Name	Setting Range	Default
Pd-06	Current resolution read by communication	0: 0.01 A 1: 0.1 A	0

This parameter is used to set unit of output current read by communication.

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Mokweir Transmission Technology (Suzhou) Co., Ltd.

No. 199 Xiaoxiang Road, Science and Technology City,
Suzhou High tech Zone (Factory Building 2)
TEL: 0512-67865782