ATO

Variable Frequency Drive

Single Phase to Three Phase

GK3000-CT

User Manual -- V1.4

Please read this manual carefully before use, and keep it in a safe place for future reference.

ATO

GK3000-CT Variable Frequency Drive

Thank you for choosing our company's Variable Frequency Drive products.
Please read this manual carefully before use to ensure the correct and safe operation of this product. Before using the device, please be sure to read the **Safety Precautions** section.
Please keep this manual in a safe place for future reference. If you have any questions, please contact our customer service or technical support; our professionals will be happy to assist you.

This manual provides relevant information about the Variable Frequency Drive, including:
▲. Safety precautions for the Variable Frequency Drive
▲. Installation and inspection of the Variable Frequency Drive
▲. Wiring instructions for the Variable Frequency Drive
▲. Operating instructions for the Variable Frequency Drive
▲. Description of all parameters
▲. Communication protocol description
▲. Troubleshooting

This manual is intended for the following personnel:
▲. System design and selection personnel
▲. Installation or wiring personnel
▲. Commissioning personnel
▲. Maintenance or service personnel

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Table of Contents

Chapter 1: Product Information

1.1 Safety Information and Precautions

Safety Definition: In this manual, safety precautions are divided into the following two categories:

- **DANGER:** Hazards caused by failure to operate as required, which may lead to serious injury or even death.
- **CAUTION:** Hazards caused by failure to operate as required, which may lead to moderate or minor injury, and damage to the equipment.

Users are requested to read this chapter carefully when installing, commissioning, and maintaining this system, and must operate in accordance with the safety precautions required in this chapter. Any damage or loss caused by operation in violation of regulations is unrelated to the company.

1.2 Naming Convention

The model number is structured as follows (Example: GK3000-CT0037):

CT: Single-phase 220V input to Three-phase 380V output

0037: 3.7kW

1.3 Variable Frequency Drive Series Specifications

Single-phase 220V/240V to Three-phase 380V/400V/415V/440V: 50Hz/60Hz		
Variable Frequency Drive Model	Output Current (A)	Adapted Motor (kW)
GK3000-CT0007	2.1	0.75
GK3000-CT0015	3.8	1.5
GK3000-CT0022	5.1	2.2
GK3000-CT0037	9	3.7
GK3000-CT0055	13	5.5
GK3000-CT0075	17	7.5
GK3000-CT0110	25	11
GK3000-CT0150	32	15
GK3000-CT0185	37	18.5
GK3000-CT0220	45	22

（VFD Model & Series Specifications 1-1）

1.4 Overall and Mounting Dimensions

This image provides the technical specifications for the external dimensions and mounting hole positions of a series of Variable Frequency Drives ranging from 0.75kW to 22kW.
Here is the organized data from the table for your quick reference:

VFD Dimension & Mounting Specifications (Unit: mm)

Power	(H)	(D)	(W)	W1	H1	Φd
0.75kW	236	130	176	116	222	6
1.5kW	236	130	176	116	222	6
2.2kW	247	159	179	148	235	6
3.7kW	247	159	179	148	235	6
5.5kW	319	195	209	191	309	6
7.5kW	319	195	209	191	309	6
11kW	330	200	200	188	316	8
15kW	330	200	200	188	316	8
18.5kW	530	320	235	200	511	8
22kW	530	320	235	200	511	8

(VFD Dimension & Mounting Specifications 1-2)

1.5 Warranty Instructions for the VFD

The free warranty applies only to the VFD unit itself. Under normal operating conditions, our company provides an 18-month warranty (starting from the date of manufacture, as indicated by the barcode on the chassis). For periods exceeding 18 months, reasonable maintenance fees will be charged.

Within the 18-month warranty period, maintenance fees shall be charged if the damage is caused by any of the following circumstances:

- Machine damage resulting from the user's failure to comply with the regulations specified in the User Manual.
- Damage caused by force majeure or environmental disasters, such as fire, flood, or abnormal voltage.
- Damage caused by using the VFD for unauthorized or non-standard functions.
- Service fees are calculated according to the manufacturer's unified standard. In the event of a separate agreement, the terms of the contract shall prevail.

Chapter 2 Electrical Installation

2.1 Main Circuit Terminals and Wiring

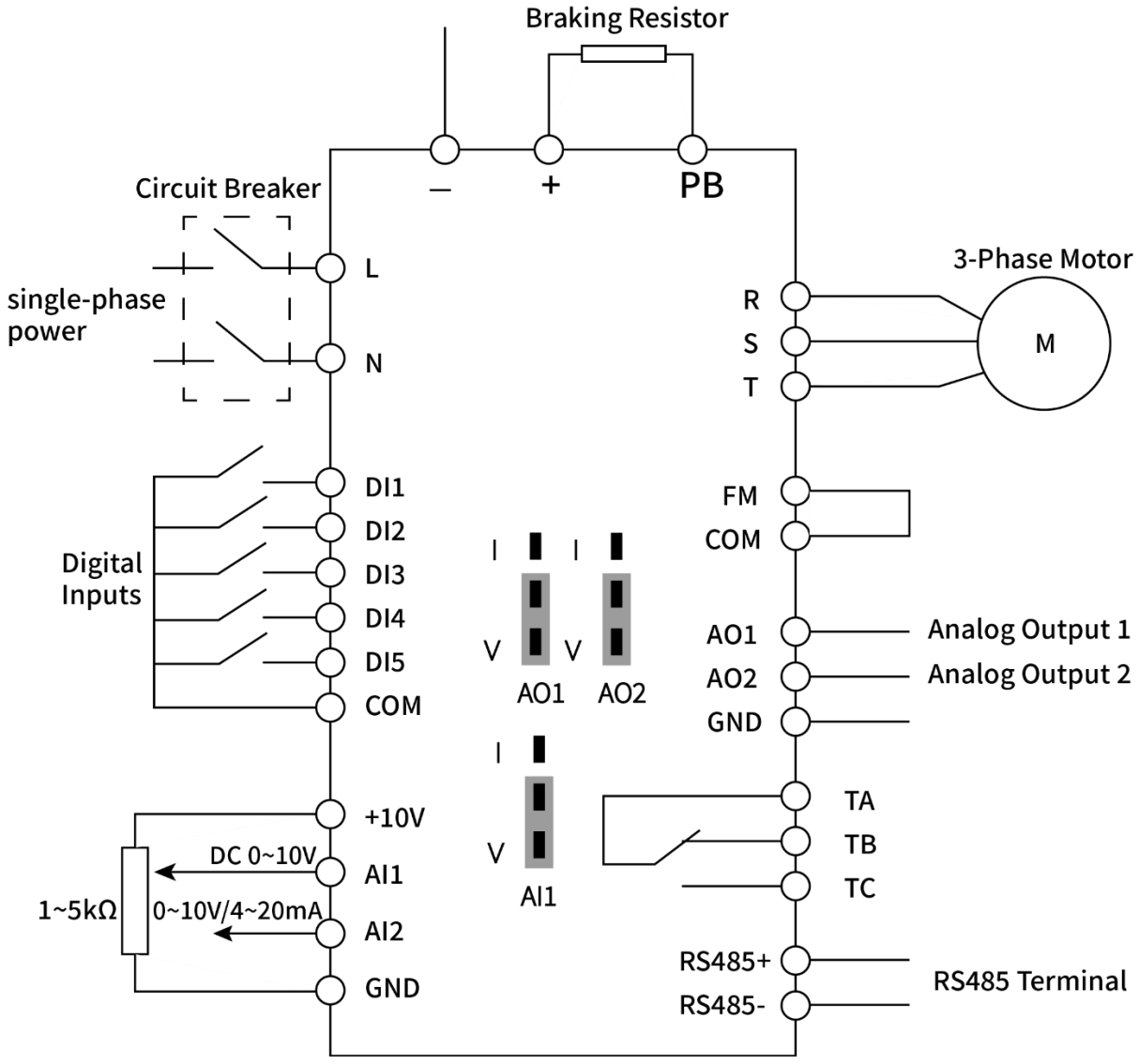
Description of VFD Main Circuit Terminals

Terminal Symbol	Name	Description
R, S, T / L, N	Power input terminals	Connection points for 3-phase / 1-phase power supply.
+, PB	Braking resistor connection terminals	Connect to the braking resistor.
U, V, W	VFD output terminals	Connect to the 3-phase motor.
(PE)	Grounding terminal	Grounding connection.

（Terminals and Wiring Description 2-1）

VFD Control Circuit Wiring

Note: The control circuit wiring method is the same for all VFDs. The figure on the right illustrates the wiring diagram for a 3-phase 380 VAC VFD. "◯" indicates the main circuit terminals, and "◎" indicates the control circuit terminals.



（Circuit Wiring 2-2）

2.2 Control Terminal

+10V	AI1	AI2	GND	DI1	DI3	DI5	COM	DO1
485+	485-	AO1	AO2	DI2	DI4	DI6	+24V	FM

(Control Terminals 2-3)

Relay Terminal

TA	TB	TC

(Relay Terminals 2-4)

2.3 Control Terminal Function Description

Category	Terminal Symbol	Terminal Name	Functional Description
Power Supply	10V-GND	External +10V Power Supply	Provides +10V power externally, maximum output current: 150mA (with short-circuit protection). Generally used as an external working power supply; potentiometer resistance range: 1kΩ ~ 5kΩ.
	24V-COM	External +24V Power Supply	Provides +24V power externally. Generally used as the working power supply for digital I/O terminals and external sensors; maximum output current: 200mA.
Analog Terminals	AI1-GND	Analog Input Terminal 1	1. Input range: 0~10 VDC / 0~20 mA, determined by parameter P4-37. 2. Input impedance: 22kΩ for voltage input, 500Ω for current input.
	AI2-GND	Analog Input Terminal 2	1. Input range: 0~10 VDC / 0~20 mA, determined by parameter P4-37. 2. Input impedance: 22kΩ for voltage input, 500Ω for current input.
	AO1-GND	Analog Output Terminal 1	Output voltage range: 0~10 VDC. Output current range: 0~20mA, 4~20mA (selectable via parameter P5-23).
	AO2-GND	Analog Output Terminal 2	Output voltage range: 0~10 VDC. No current output function. Set jumper J1 on the isolated main control board to the A02 position; the non-isolated main control board does not support this function.
Digital Inputs	DI1-COM	Digital Input 1	In addition to the features of X1~X4, HDI (X5) can also be used as a high-speed pulse input channel. Maximum input frequency: 50kHz. 1. Input impedance: 1kΩ. 2. Voltage range for level input: 5~30 VDC.
	DI2-COM	Digital Input 2	(Same as above)

	DI3-COM	Digital Input 3	(Same as above)
	DI4-COM	Digital Input 4	(Same as above)
	DI5-COM	Digital Input 5	(Same as above)
	DI6-COM	Digital Input 5	(Same as above)
Communica-tion	485+ / 485-	RS485 Commu-nication	485+ is the positive differential signal input for RS485 communication, and 485- is the negative differential signal input.
Digital Outputs	TA1-TB1-TC1	Relay 1 Terminal	Contact description: A: Common (COM), B: Normally Closed (NC), C: Normally Open (NO). Contact drive capacity: 250 VAC, 3A (cos Ø = 0.4); 30 VDC, 1A.

(Control Terminal Function Description 2-5)

2.4 Braking Resistor Selection Reference

When the motor load inertia is large and emergency braking is required, it is recommended to connect a braking resistor.

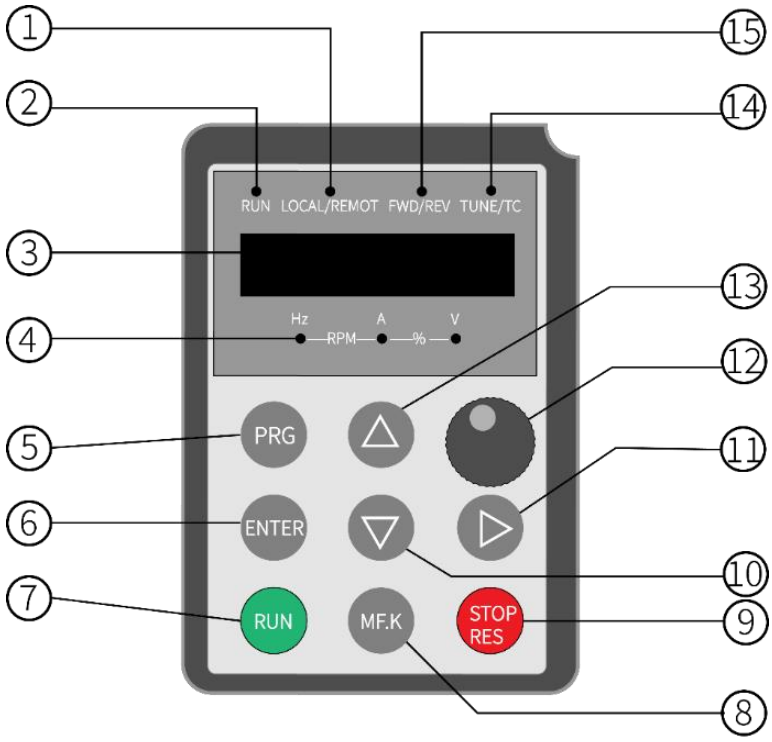
VFD Model	Corresponding Braking Resistor Specification
0.75kW 380V	300W 400Ω
1.5kW 380V	300W 400Ω
2.2kW 380V	400W 150Ω
4kW 380V	400W 150Ω
5.5kW 380V	500W 100Ω
7.5kW 380V	1000W 50Ω
11kW 380V	1000W 50Ω
15kW 380V	1500W 40Ω
18.5kW 380V	4800W 32Ω

(Braking Resistor Selection Reference 2-6)

Chapter 3 Operation and Display

3.1 Introduction to the Operation and Display Interface

The operation panel allows you to perform tasks such as modifying functional parameters of the VFD (Variable Frequency Drive), monitoring the VFD's operating status, and controlling VFD operation (start, stop), etc. Its appearance and functional areas are as shown in the following figure:



(Component Diagram 3-1)

Operation Panel Component Description

No.	Component Name	No.	Component Name
1	Command Source Indicator	9	Stop/Reset Key
2	Run Indicator	10	Decrease Key
3	Data Display Area	11	Shift Key
4	Unit Indicator	12	Speed Regulating Potentiometer
5	Programming Key	13	Increase Key
6	Confirm/Enter Key	14	Fault Indicator
7	Run Key	15	Forward/Reverse Rotation Indicator
8	Multi-function Selection Key		

(Operation Panel Component Description 3-2)

3.2 Function Indicator Description

- **RUN**: When the light is off, it indicates the VFD is in the stopped state; when the light is on, it indicates the VFD is in the running state.
- **LOCAL/REMOTE**: Indicator for keypad operation, terminal operation, and remote operation (communication control):
  - **LOCAL/REMOTE OFF**: Keypad start/stop control

- **LOCAL/REMOTE ON (Steady)**: Terminal start/stop control
- **LOCAL/REMOTE FLASHING**: Communication start/stop control

- **FWD/REV**: Forward/reverse rotation indicator; when the light is on, it indicates it is in the forward rotation state.
- **TUNE/TC**: Tuning / Torque Control / Fault indicator; when the light is on, it indicates it is in torque control mode; when the light is flashing slowly, it indicates it is in the tuning state; when the light is flashing quickly, it indicates it is in the fault state.

3.3 Unit Indicators

Unit Indicator	Description
Hz	Frequency Unit
A	Current Unit
V	Voltage Unit
RPM(Hz+A)	Rotational Speed Unit
%(A+V)	Percentage

（Unit Indicator 3-3）

3.4 Digital Display Area

5-digit LED display, which can display set frequency, output frequency, various monitoring data, and alarm codes, etc.

3.5 Keypad Button Description Table

Key	Key Name	Key Function
PRG	Programming Key	Enter or exit Level 1 menu
ENTER	Confirm/Enter Key	Enter menu screens layer by layer, confirm parameter settings
▲	Increase Key	Increase data or function codes
▼	Decrease Key	Decrease data or function codes
▶	Shift Key	Cycle through display parameters in stop/run status; select modification digit when editing parameters
RUN	Run Key	Used for run operation under keypad control mode
STOP/RES	Stop/Reset Key	Stop operation when running; reset fault when in alarm state. The behavior of this key is restricted by function code P7-02
MF.K	Multi-function Key	Function switching selection based on P7-01

（Keypad Button Description 3-4）

Chapter 4 Functional Parameter Table

4.1 Brief Table of Basic Functional Parameters

- "☆": Indicates that the set value of this parameter can be modified when the Variable Frequency Drive is in both stop and running states;
- "★": Indicates that the set value of this parameter cannot be modified when the Variable Frequency Drive is in a running state;
- "●": Indicates that the value of this parameter is an actual detected and recorded value, which cannot be modified;

Group P0 - Basic Operating Parameters

Code	Name	Setting Range	Default Value	Attribute
P0-00	G/P Model	1: G type 2: P type	1	●
P0-01	Motor Control Mode	0: Sensorless vector control 2: V/F control	2	★
P0-02	Command Source Selection	0: Panel command channel (LED Off) 1: Terminal command channel (LED On) 2: Communication command channel (LED Flashing)	0	☆
P0-03	Main Frequency Source X Selection	0: Digital setting (Preset frequency P0-08, modifiable via UP/DOWN, non-volatile at power-down) 1: Digital setting (Preset frequency P0-08, modifiable via UP/DOWN, volatile at power-down) 2: AI1 3: AI2 4: Keypad potentiometer 5: HDI pulse setting (X5) 6: Multi-stage command 7: Simple PLC 8: PID 9: Communication setting	4	★
P0-04	Auxiliary Frequency Source Y Selection	Same as P0-03 (Main Frequency Source X Selection)	0	★
P0-05	Range Selection of Frequency Source Y for Overlay	0: Relative to maximum frequency 1: Relative to frequency source X	0	☆
P0-06	Range of Frequency Source Y for Overlay	0% to 150%	100%	☆
P0-07	Selection of Frequency Source Overlay Mode	**Ones digit:** Frequency source selection 0: Main frequency source X 1: Main-auxiliary calculation (calculation mode determined by tens digit) 2: Switching between main frequency source X and auxiliary frequency source Y 3: Switching between main frequency source X and main-auxiliary calculation	0	☆

		result 4: Switching between auxiliary frequency source Y and main-auxiliary calculation result **Tens digit:** Main-auxiliary calculation relationship of frequency source 0: Main + Auxiliary 1: Main – Auxiliary 2: Maximum of the two 3: Minimum of the two 4: Main × Auxiliary		
P0-08	Preset Frequency	0.00Hz to Maximum frequency (P0-10)	50.00Hz	☆
P0-09	Running Direction	0: Same direction 1: Opposite direction	0	☆
P0-10	Maximum Frequency	50.00Hz to 320.00Hz (P0-22=2) 50.0Hz to 3200.0Hz (P0-22=1)	50.00Hz	★
P0-11	Upper Limit Frequency Source	0: P0-12 setting 1: AI1 2: AI2 3: Keypad potentiometer 4: HDI pulse setting 5: Communication setting	0	★
P0-12	Upper Limit Frequency	Lower limit frequency P0-14 to Maximum frequency P0-10	50.00Hz	☆
P0-13	Upper Limit Frequency Offset	0.00Hz to Maximum frequency P0-10	0.00Hz	☆
P0-14	Lower Limit Frequency	0.00Hz to Upper limit frequency P0-12	0.00Hz	☆
P0-15	Carrier Frequency	0.5kHz to 16.0kHz	6	☆
P0-16	Carrier Frequency Adjustment with Temperature	0: No 1: Yes	1	☆
P0-17	Acceleration Time 1	0s to 65000s (P0-19=0) 0.0s to 6500.0s (P0-19=1) 0.00s to 650.00s (P0-19=2)	10	☆
P0-18	Deceleration Time 1		10	☆
P0-19	Acceleration/Deceleration Time Unit	0: 1 second 1: 0.1 second 2: 0.01 second	1	★
P0-21	Offset Frequency of Overlay Auxiliary Frequency Source	0.00Hz to Maximum frequency P0-10	0.00Hz	☆
P0-22	Upper Limit Frequency Source Resolution	1: 0.1Hz 2: 0.01Hz	2	★
P0-23	Digital Setting Frequency Retentivity at Stop	0: Non-volatile 1: Volatile	1	☆
P0-24	Reserved	-	0	☆

P0-25	Base Frequency of Acceleration/Deceleration Time	0: Maximum frequency (P0-10) 1: Setting frequency 2: Reserved	0	★
P0-26	UP/DOWN Base for Running Frequency Command	0: Running frequency 1: Setting frequency	0	☆
P0-27	Command Source Binding Frequency Source	Ones digit: Operation panel command binding frequency source selection 0: No binding 1: Digital setting frequency 2: AI1 3: AI2 4: Keypad potentiometer 5: HDI pulse setting (X5) 6: Multi-stage speed 7: Simple PLC 8: PID 9: Communication setting Tens digit: Terminal command binding frequency source selection Hundreds digit: Communication command binding frequency source selection Thousands digit: Auto running binding frequency source selection	0	☆
P0-28	Serial Port Protocol Selection	0: Modbus protocol 1: Profibus-DP protocol 2: CANopen protocol	0	☆

Group P1 - Motor Parameters

Code	Name	Setting Range	Default Value	Attribute
P1-00	Motor Type Selection	0: Standard induction motor 1: Variable frequency induction motor	0	★
P1-01	Motor Rated Power	0.1 to 1000KW	Determined by model	★
P1-02	Motor Rated Voltage	1V to 2000V	Determined by model	★
P1-03	Motor Rated Current	0.01A to 655.35A	Determined by model	★
P1-04	Motor Rated Frequency	0.01Hz to Maximum frequency	Determined by model	★
P1-05	Motor Rated Speed	1 to 65535rpm	Determined by model	★
P1-10	Induction Motor No-load Current	0.01 to P1-03	Tuning parameters	★
P1-37	Tuning Selection	0: No operation 1: Induction motor static tuning 2: Induction motor complete tuning 3: Static tuning 2	0	★

Group P2 - Vector Parameters

Code	Name	Setting Range	Default Value	Attribute
P2-00	Speed loop proportional gain 1	1–100	30	☆
P2-01	Speed loop integral time 1	0.01–10.00s	0.50s	☆
P2-02	Switchover frequency 1	0.00–P2-05	5.00Hz	☆
P2-03	Speed loop proportional gain 2	1–100	20	☆
P2-04	Speed loop integral time 2	0.01s–10.00s	1.00s	☆
P2-05	Switchover frequency 2	P2-02–Maximum frequency	10.00Hz	☆
P2-06	Vector control slip gain	50–200%	100%	☆
P2-07	Speed loop filter time constant	0.000S–1.000S	0.050S	☆
P2-08	Vector control over-excitation gain	0–200	64	☆
P2-09	Upper limit source of torque in speed control mode	0: Set by function code P2-10 1: AI1 2: AI2 3: Keypad potentiometer 4: PULSE setting 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) 8: Reserved Full scale of options 1-7 corresponds to P2-10	0	☆
P2-10	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.00%	☆
P2-13	Excitation adjustment proportional gain	0–60000	2000	☆
P2-14	Excitation adjustment integral gain	0–60000	1300	☆
P2-15	Torque adjustment proportional gain	0–60000	2000	☆
P2-16	Torque adjustment integral gain	0–60000	1300	☆
P2-17	Speed loop integral attribute	Units digit: Integral separation 0: Invalid 1: Valid	0	☆

Group P3 - V/F Control Parameters

Code	Name	Setting Range	Default Value	Attribute
P3-00	VF 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 5: 1.6-power V/F 8: 1.8-power V/F 9~11: Reserved	0	★
P3-01	Torque boost	0.0%: (Automatic torque boost)0.1 ~ 30.0%	6	☆
P3-02	Torque boost cut-off frequency	0.00Hz ~ Maximum frequency	50.00Hz	★
P3-03	Multi-point VF frequency point 1	0.00Hz ~ P3-05	0	★
P3-04	Multi-point VF voltage point 1	0.0% ~ 100.0%	0	★
P3-05	Multi-point VF frequency point 2	P3-03 ~ P3-07	0	★
P3-06	Multi-point VF voltage point 2	0.0% ~ 100.0%	0	★
P3-07	Multi-point VF frequency point 3	P3-05 ~ Motor rated frequency (P1-04)	0	★
P3-08	Multi-point VF voltage point 3	0.0% ~ 100.0%	0	★
P3-09	VF slip compensation gain	0.0% ~ 200.0%	0.00%	☆
P3-10	VF over-excitation gain	0 ~ 200	64	☆
P3-11	VF oscillation suppression gain	0 ~ 100	40	☆

Group P4 - Input Terminals

Code	Name	Setting Range	Default Value	Attribute
P4-00	X1 terminal function selection	0: No function 1: Forward running (FWD) 2: Reverse running (REV) 3: Three-wire operation control 4: Forward jogging (FJOG) 5: Reverse jogging (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Free stop (Coast to stop) 9: Fault reset (RESET)	1	★
P4-01	X2 terminal function selection		2	★

P4-02	X3 terminal function selection	10: Run pause (Pause running) 11: External fault normally open (NO) input 12: Multi-stage command terminal 1 13: Multi-stage command terminal 2 14: Multi-stage command terminal 3 15: Multi-stage command terminal 4 16: Acceleration/deceleration time selection terminal 1 17: Acceleration/deceleration time selection terminal 2 18: Frequency source switchover 19: UP/DOWN setting clearing (Terminal / Keypad) 20: Run command switchover terminal 1 21: Acceleration/deceleration prohibited 22: PID pause 23: PLC state reset 24: Swing frequency pause 25: Counter input 26: Counter reset 27: Length counter input 28: Length reset 29: Torque control prohibited 30: HDI pulse frequency input (X5) 31: Reserved 33: External fault normally closed (NC) input 34: Frequency modification enable 35: PID action direction reverse 36: External stop terminal 1 37: Run command switchover terminal 2 38: PID integral pause 39: Switchover between frequency source X and preset frequency 40: Switchover between frequency source Y and preset frequency 43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2 46: Switchover between speed control and torque control 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: Current run time clearing 51~63: Reserved	0	★
P4-03	X4 terminal function selection		0	★
P4-10	X terminal filter time	0.000s ~ 1.000s	0.010s	☆
P4-11	Terminal command mode	0: Two-wire mode 1	0	★

		1: Two-wire mode 2 2: Three-wire mode 1 3: Three-wire mode 2		
P4-12	Terminal UP/DOWN change rate	0.001Hz/s ~ 65.535Hz/s	1.00Hz/s	☆
P4-13	AI curve 1 minimum input	0.00V ~ P4-15	0.00V	☆
P4-14	Corresponding setting of AI curve 1 minimum input	-100.0% ~ +100.0%	0.00%	☆
P4-15	AI curve 1 maximum input	P4-13 ~ +10.00V	10.00V	☆
P4-16	Corresponding setting of AI curve 1 maximum input	-100.0% ~ +100.0%	100.00%	☆
P4-17	AI1 filter time	0.00s ~ 10.00s	0.10s	☆
P4-18	AI curve 2 minimum input	0.00V ~ P4-20	0.00V	☆
P4-19	Corresponding setting of AI curve 2 minimum input	-100.0% ~ +100.0%	0.00%	☆
P4-20	AI curve 2 maximum input	P4-18 ~ +10.00V	10.00V	☆
P4-21	Setting corresponding to AI curve 2 maximum input	-100.0% to +100.0%	100.00%	☆
P4-22	AI2 filter time	0.00s to 10.00s	0.10s	☆
P4-23	AI curve 3 minimum input	0.00V to P4-25	-10V	☆
P4-24	Setting corresponding to AI curve 3 minimum input	-100.0% to +100.0%	0.00%	☆
P4-25	AI curve 3 maximum input	P4-23 to +10.00V	10V	☆
P4-26	Setting corresponding to AI curve 3 maximum input	-100.0% to +100.0%	100.00%	☆
P4-27	AI3 filter time	0.00s to 10.00s	0.10s	☆
P4-28	HDI pulse minimum input	0.00kHz to P4-30	0.00kHz	☆
P4-29	Setting corresponding to HDI pulse minimum input	-100.0% to 100.0%	0.00%	☆
P4-30	HDI pulse maximum input	P4-28 to 100.00kHz	50.00kHz	☆
P4-31	HDI pulse maximum input setting	-100.0% to 100.0%	100.00%	☆
P4-32	HDI pulse filter time	0.00s to 10.00s	0.10s	☆
P4-33	AI curve selection	Ones digit: AI1 curve selection 1: Curve 1 (2 points, P4-13 to P4-16) 2: Curve 2 (2 points, P4-18 to P4-21) 3: Curve 3 (2 points, P4-23 to P4-26) 4 to 5: Reserved Tens digit: AI2 curve selection, same as above Hundreds digit: AI3 curve selection, same as above	321	☆
P4-34	AI setting selection when less than minimum input	Ones digit: AI1 setting selection when less than minimum input 0: Corresponding to minimum input	0	☆

		setting 1: 0.0% Tens digit: AI2 setting selection when less than minimum input, same as above Hundreds digit: AI3 setting selection when less than minimum input, same as above		

Group P5 - Output Terminals

Code	Name	Setting Range	Default Value	Attribute
P5-00	HDO terminal output mode selection	0: High-speed pulse output (HDO) 1: Terminal digital output (FMR)	0	☆
P5-01	HDO terminal digital output function selection (FMR)	0: No output1: Variable Frequency Drive running 2: Fault output (fault stop) 3: Frequency level detection FDT1 output 4: Frequency arrival 5: Zero-speed running (no output when stopped) 6: Motor overload pre-alarm 7: Variable Frequency Drive overload pre-alarm 8: Setting count value arrival 9: Designated count value arrival 11: PLC cycle complete 12: Cumulative running time arrival 13: Frequency limiting 14: Torque limiting 15: Ready for running 16: AI1>AI2 17: Upper limit frequency arrival 18: Lower limit frequency arrival (running related) 19: Under-voltage state output 20: Communication setting 23: Zero-speed running 2 (output also when stopped) 24: Cumulative power-on time arrival 25: Frequency level detection FDT2 output 26: Frequency 1 arrival output 27: Frequency 2 arrival output 28: Current 1 arrival output 29: Current 2 arrival output 30: Timing arrival output	0	☆
P5-02	Relay RY1 function selection (K1A-K1B-K1C)		2	☆
P5-03	Relay RY2 function selection (K2A-K2B-K2C)		0	☆
P5-04	Y1 output function selection		1	☆

		31: AI1 input over-limit 32: Load loss 33: Reverse running 34: Zero current state 35: Module temperature arrival 36: Output current over-limit 37: Lower limit frequency arrival (output also when stopped) 38: Alarm output (continue running) 40: Current running time arrival 41: Fault output (fault due to coast to stop and no output when under-voltage) 42: Frequency 1 <= Running frequency <= Frequency 2 43: Frequency 1 >= Running frequency >= Frequency 2 44: Frequency 1 <= Setting frequency <= Frequency 2 45: Frequency 1 >= Setting frequency >= Frequency 2 46: Interlock X1 terminal output 47: Interlock X2 terminal output 48: Interlock X3 terminal output 49: Interlock X4 terminal output 50: Auxiliary motor water pump 1 51: Auxiliary motor water pump 2 52: Auxiliary motor water pump 3 53: Auxiliary motor water pump 4		
P5-06	HDO high-speed pulse output function selection	0: Running frequency 1: Setting frequency 2: Output current 3: Motor output torque (absolute value, percentage relative to motor) 4: Output power 5: Output voltage 6: HDI pulse input7: AI1	0	☆
P5-07	AO1 output function selection	8: AI2 9: Keyboard potentiometer 10: Length 11: Count value 13: Motor speed 14: Output current 15: Output voltage 16: Motor output torque (actual value, percentage relative to motor)	0	☆
P5-09	HDO maximum output frequency	0.01kHz~100.00kHz	50.00 kHz	☆

P5-10	AO1 zero offset coefficient	-100.0% ~ +100.0%	0.00%	☆
P5-11	AO1 gain	-10.00 ~ +10.00	1	☆
P5-17	FMR delay time*	0.0s ~ 6553.5s	0.0s	☆
P5-18	RY1 closing delay time	0.0s ~ 6553.5s	0.0s	☆
P5-19	RY2 closing delay time	0.0s ~ 6553.5s	0.0s	☆
P5-20	Y1 closing delay time	0.0s ~ 6553.5s	0.0s	☆
P5-21	Reserved	-	-	-
P5-22	Y terminal output active state selection	0: Positive logic 1: Negative logic Units digit: HDO terminal Tens digit: RY1 Hundreds digit: RY2 Thousands digit: Y1 Ten thousands digit: Reserved	0	☆
P5-23	AO current output selection	Units digit: AO1 Tens digit: Reserved 0: 0~20 mA 1: 4~20mA	0	☆
P5-24	FMR opening delay time	0.0s ~ 6553.5s	0.0s	☆
P5-25	RY1 opening delay time	0.0s ~ 6553.5s	0.0s	☆
P5-26	RY2 opening delay time	0.0s ~ 6553.5s	0.0s	☆
P5-27	Y1 opening delay time	0.0s ~ 6553.5s	0.0s	☆

Group P6 - Start-stop Control

Code	Name	Setting Range	Default Value	Attribute
P6-00	Start mode	0: Direct start 1: Speed tracking restart 2: Pre-excitation start (AC asynchronous motor)	0	☆
P6-01	Speed tracking mode	0: Start from stop frequency 1: Start from zero speed 2: Start from maximum frequency	0	★
P6-02	Speed tracking rate	1 ~ 100	20	☆
P6-03	Start frequency	0~10.00Hz	0.00Hz	☆
P6-04	Start frequency hold time	0.0s ~ 100.0s	0.0s	★
P6-05	Startup DC braking current / Pre-excitation current	0% ~ 100%	0%	★
P6-06	Startup DC braking time / Pre-excitation time	0.0s ~ 100.0s	0.0s	★
P6-07	Acceleration/deceleration mode	0: Linear acceleration/deceleration 1: S-curve acceleration/deceleration A 2: S-curve acceleration/deceleration B	0	★
P6-08	S-curve start time proportion	0.0% ~ (100.0%-P6-09)	30.00%	★
P6-09	S-curve end time proportion	0.0% ~ (100.0%-P6-08)	30.00%	☆
P6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
P6-11	Stop DC braking start frequency	0.00Hz ~ Maximum frequency	0.00Hz	☆
P6-12	Stop DC braking wait time	0.0s ~ 100.0s	0.0s	☆
P6-13	Stop DC braking current	0% ~ 100%	0%	☆
P6-14	Stop DC braking time	0.0s ~ 100.0s	0.0s	☆
P6-15	Braking usage rate	0% ~ 100%	100%	☆

Group P7 - Keypad and Display

Code	Name	Setting Range	Default Value	Attribute
P7-01	MF.K key function selection	0: MF.K disabled 1: Switchover between operation panel command channel and remote command channel (terminal command channel or communication command channel) 2: Forward/Reverse switchover 3: Forward JOG 4: Reverse JOG	0	☆
P7-02	STOP/RESET key	0: STOP/RES key stop function is	1	☆

	function	valid only under keypad operation mode 1: STOP/RES key stop function is valid under any operation mode		
P7-03	LED running display parameter 1	0000 ~ FFFF Bit 00: Running frequency 1 (Hz)Bit 01: Set frequency (Hz)Bit 02: Bus voltage (V)Bit 03: Output voltage (V)Bit 04: Output current (A)Bit 05: Output power (kW)Bit 06: Output torque (%)Bit 07: X input status Bit 08: Y output status Bit 09: AI1 voltage (V)Bit 10: AI2 voltage (V)Bit 11: Keypad potentiometer voltage (V)Bit 12: Count value Bit 13: Reserved Bit 14: Load speed display Bit 15: PID setting (Pressure value displayed for water supply macro)	001F	☆
P7-04	LED running display parameter 2	0000 ~ FFFF Bit 00: PID feedback (Pressure value displayed for water supply macro) Bit 01: PLC stage Bit 02: HDI input pulse frequency (kHz)Bit 03: Running frequency 2 (Hz)Bit 04: Remaining running time Bit 05: AI1 voltage before correction (V)Bit 06: AI2 voltage before correction (V)Bit 07: Keypad potentiometer voltage before correction (V)Bit 08: Linear speedBit0 9: Current power-on time (Hour) Bit 10: Current running time (Min)Bit 11: HDI input pulse frequency (Hz)Bit 12: Communication setting value Bit 13: Encoder feedback speed (Hz) Bit 14: Main frequency X display (Hz)Bit 15: Auxiliary frequency Y display (Hz)	0000	☆
P7-05	LED stop display parameter	0000 ~ FFFF Bit 00: Set frequency (Hz)Bit 01: Bus voltage (V)Bit 02: X input status Bit 03: Y output status Bit 04: AI1 voltage (V) Bit 05: AI2 voltage (V) Bit	0033	☆

		06: AI3 panel potentiometer voltage (V) Bit 07: Count value Bit 08: Length value Bit 09: PLC stage Bit 10: Load speed Bit 11: PID setting (Pressure) Bit 12: HDI input pulse frequency (kHz) Bit 13: PID feedback (Pressure)		
P7-06	Load speed display coefficient	0.0001 ~ 6.5000	1	☆
P7-07	Variable Frequency Drive module heatsink temperature	0.0°C ~ 100.0°C	-	●
P7-09	Cumulative running time	0h ~ 65535h	-	☆
P7-12	Number of decimal places for load speed display	0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places Tens digit: Reserved	21	☆
P7-13	Cumulative power-on time	0 ~ 65535h	-	●
P7-14	Cumulative power consumption	0 ~ 65535 kWh	-	●
P7-17	7-segment display 2 stop monitoring selection	00 ~ 75	2	☆
P7-18	7-segment display 2 running monitoring selection	00 ~ 75	4	☆

Group P8 - Auxiliary Functions

Code	Name	Setting Range	Default Value	Attribute
P8-00	Jog running frequency	0.00Hz ~ Maximum frequency	2.00Hz	☆
P8-01	Jog acceleration time	0.0s ~ 6500.0s	20.0s	☆
P8-02	Jog deceleration time	0.0s ~ 6500.0s	20.0s	☆
P8-03	Acceleration time 2	0.0s ~ 6500.0s	Dependent on model	☆
P8-04	Deceleration time 2	0.0s ~ 6500.0s	Dependent on model	☆
P8-05	Acceleration time 3	0.0s ~ 6500.0s	Dependent on model	☆
P8-06	Deceleration time 3	0.0s ~ 6500.0s	Dependent on model	☆
P8-07	Acceleration time 4	0.0s ~ 6500.0s	Dependent on model	☆

P8-08	Deceleration time 4	0.0s ~ 6500.0s	Dependent on model	☆
P8-09	Skip frequency 1	0.00Hz ~ Maximum frequency	0.00Hz	☆
P8-10	Skip frequency 2	0.00Hz ~ Maximum frequency	0.00Hz	☆
P8-14	Running mode when setting frequency is lower than lower limit frequency	0: Run at lower limit frequency 1: Stop 2: Zero speed running	0	☆
P8-15	Droop control	0.00Hz ~ 10.00Hz	0.00Hz	☆
P8-16	Setting of cumulative power-on time reached	0h ~ 65000h	0h	☆
P8-17	Setting of cumulative running time reached	0h ~ 65000h	0h	☆
P8-18	Startup protection selection	0: No protection1: Protection	0	☆
P8-19	Frequency detection value (FDT1)	0.00Hz ~ Maximum frequency	50.00Hz	☆
P8-20	Frequency detection hysteresis value	0.0% ~ 100.0% (FDT1 level)	5.00%	☆
P8-21	Frequency arrival detection width	0.0% ~ 100.0% (Maximum frequency)	0.00%	☆
P8-25	Switchover frequency point between acceleration time 1 and acceleration time 2	0.00Hz ~ Maximum frequency	0.00Hz	☆
P8-26	Switchover frequency point between deceleration time 1 and deceleration time 2	0.00Hz ~ Maximum frequency	0.00Hz	☆
P8-27	Terminal jog priority	0: Invalid1: Valid	0	☆
P8-28	Frequency detection value (FDT2)	0.00Hz ~ Maximum frequency	50.00Hz	☆
P8-29	Frequency detection hysteresis value	0.0% ~ 100.0% (FDT2 level)	5.00%	☆
P8-30	Any frequency arrival detection value 1	0.00Hz ~ Maximum frequency	50.00Hz	☆
P8-31	Any frequency arrival detection width 1	0.0% ~ 100.0% (Maximum frequency)	0.00%	☆
P8-32	Any frequency arrival detection value 2	0.00Hz ~ Maximum frequency	50.00Hz	☆
P8-33	Any frequency arrival detection width 2	0.0% ~ 100.0% (Maximum frequency)	0.00%	☆
P8-34	Zero current detection level	0.0% ~ 300.0%	5.00%	☆
P8-35	Zero current detection delay time	0.01s ~ 600.00s	0.10s	☆
P8-36	Output current over-limit	0.0% (No detection)0.1% ~ 300.0%	150.00%	☆

	value	(Motor rated current)		
P8-37	Output current over-limit detection delay time	0.00s ~ 600.00s	0.00s	☆
P8-38	Any current arrival 1	0.0% ~ 300.0% (Motor rated current)	100.00%	☆
P8-39	Any current arrival 1 width	0.0% ~ 300.0% (Motor rated current)	0.00%	☆
P8-40	Any current arrival 2	0.0% ~ 300.0% (Motor rated current)	100.00%	☆
P8-41	Any current arrival 2 width	0.0% ~ 300.0% (Motor rated current)	0.00%	☆
P8-42	Timing function selection	0: Invalid1: Valid	0	☆
P8-43	Timing running time selection	0: P8-44 setting 1: AI1 2: AI2 3: Keyboard potentiometer Note: Analog input range corresponds to P8-44	0	☆
P8-44	Timing running time	0.0Min ~ 6500.0Min	0.0Min	☆
P8-45	AI1 input voltage protection lower limit	0.00V ~ P8-46	3.10V	☆
P8-46	AI1 input voltage protection upper limit	P8-45 ~ 11.00V	6.80V	☆
P8-47	Module temperature reached	0°C ~ 100°C	85°C	☆
P8-48	Fan control (Main board FAN slot)	0: Fan runs during running1: Fan runs always	0	☆
P8-49	Wakeup frequency	Sleep frequency (P8-51) ~ Maximum frequency (P0-10)	0.00Hz	☆
P8-50	Wakeup delay time	0.0s ~ 6500.0s	0.0s	☆
P8-51	Sleep frequency	0.00Hz ~ Wakeup frequency (P8-49)	0.00Hz	☆
P8-52	Sleep delay time	0.0s ~ 6500.0s	0.0s	☆
P8-53	Current running time reached setting	0.0Min ~ 6500.0Min	0.0Min	☆

Group P9 - Fault and Protection

Code	Name	Setting Range	Default Value	Attribute
P9-00	Motor overload protection selection	0: Disabled 1: Enabled	1	☆
P9-01	Motor overload protection gain	0.20 ~ 10.00	1	☆
P9-02	Motor overload pre-warning coefficient	50% ~ 100%	80%	☆
P9-03	Overvoltage stall gain	0 ~ 100	30	☆
P9-04	Overvoltage stall	200V ~ 2000V	760V	☆

	protection voltage			
P9-05	Overcurrent stall gain	0 ~ 100	20	☆
P9-06	Overcurrent stall protection current	50% ~ 200%	150%	☆
P9-07	Short-circuit to ground protection selection at power-on	0: Invalid 1: Valid	0	☆
P9-08	Dynamic braking operating voltage	100.0V ~ 2000.0V	690V	☆
P9-09	Number of automatic fault resets	0 ~ 20	0	☆
P9-10	Fault action selection during automatic fault reset	0: No action 1: Action	1	☆
P9-11	Interval time of automatic fault reset	0.1s ~ 100.0s	1.0s	☆
P9-12	Input phase loss / contactor pull-in protection selection	Units digit: Input phase loss protection selection Tens digit: Contactor pull-in protection selection 0: Disabled 1: Enabled	00	☆
P9-13	Output phase loss protection selection	0: Disabled 1: Enabled	1	☆
P9-14	First fault type	0: No fault 1: Reserved 2: Overcurrent during acceleration 3: Overcurrent during deceleration 4: Overcurrent at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Buffer resistor overload9: Undervoltage 10: Variable Frequency Drive overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: Module overheat 15: External fault 16: Communication anomaly 17: Contactor anomaly 18: Current detection anomaly 19: Motor tuning anomaly 20: Reserved 21: Parameter read/write anomaly 22: Variable Frequency Drive hardware anomaly 23: Motor short-circuit to ground	--	●
P9-15	Second fault type		--	●
P9-16	Third (most recent) fault type		--	●
P9-17	Frequency at third (most recent) fault		--	●
P9-18	Current at third (most recent) fault		--	●
P9-19	Bus voltage at third (most recent) fault		--	●
P9-20	Input terminal status at third (most recent) fault		--	●
P9-21	Output terminal status at third (most recent) fault		--	●
P9-22	Variable Frequency Drive status at third (most recent) fault		--	●

		24: Reserved 25: Reserved 26: Running time reached 27: User-defined fault 1 28: User-defined fault 2 29: Power-on time reached 30: Load drop 31: PID feedback loss during running 40: Fast current limit timeout 41: Switch motor during running 42: Excessive speed deviation 43: Motor overspeed 45: Reserved 51: Reserved		
P9-47	Fault protection action selection 1	Ones digit: Motor overload (11) 0: Coast to stop 1: Stop by stop mode 2: Continue to run Tens digit: Input phase loss (12) Hundreds digit: Output phase loss (13) Thousands digit: External fault (15) Ten-thousands digit: Communication anomaly (16)	0	☆
P9-54	Frequency selection of continuing to run at fault	0: Run at current running frequency 1: Run at set frequency 2: Run at upper limit frequency 3: Run at lower limit frequency 4: Run at abnormal backup frequency	0	☆
P9-55	Abnormal backup frequency	0.0% to 100.0%(100.0% corresponds to maximum frequency P0-10)	100.00%	☆
P9-59	Instantaneous power failure action selection	0: Invalid 1: Decelerate 2: Decelerate to stop	0	☆
P9-60	Action pause judgment voltage of instantaneous power failure	P9-62 to 100.0%	85.00%	☆
P9-61	Voltage recovery judgment time of instantaneous power failure	0.00s to 100.00s	0.50s	☆
P9-62	Action judgment voltage of instantaneous power failure	60.0% to 100.0%(Standard bus voltage)	80.00%	☆
P9-63	Load drop protection selection	0: Invalid1: Valid	0	☆

P9-64	Load drop detection level	0.0% to 100.0%	10.00%	☆
P9-65	Load drop detection time	0.0s to 60.0s	1.0s	☆

Group PA - PID Function

Code	Name	Setting Range	Default Value	Attribute
PA-00	PID reference source	0: PA-01 setting 1: AI1 2: AI2 3: Keypad potentiometer 4: HDI input pulse setting (X5) 5: Communication reference 6: Multi-reference command reference 7: Pressure reference by water supply group b0-01	0	☆
PA-01	PID digital reference	0.0% to 100.0%	50.00%	☆
PA-02	PID feedback source	0: AI1 1: AI2 2: Keypad potentiometer 3: AI1 - AI2 4: HDI input pulse setting (X5) 5: Communication reference 6: AI1 + AI2 7: MAX (|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)	0	☆
PA-03	PID action direction	0: Forward action 1: Reverse action	0	☆
PA-04	PID reference feedback range	0 to 65535	1000	☆
PA-05	Proportional gain KP1	0.0 to 100.0	20	☆
PA-06	Integral time Ti1	0.01s to 10.00s	2.00s	☆
PA-07	Derivative time Td1	0.000s to 10.000s	0.000s	☆
PA-08	PID reverse cutoff frequency	0.00 ~ Max frequency	2.00Hz	☆
PA-09	PID deviation limit	0.0 ~ 100.0%	0.00%	☆
PA-10	PID derivative limit	0.00 ~ 100.00%	0.10%	☆
PA-11	PID reference change time	0.00 ~ 650.00s	0.00s	☆
PA-12	PID feedback filter time	0.00 ~ 60.00s	0.00s	☆
PA-13	PID output filter time	0.00 ~ 60.00s	0.00s	☆
PA-15	Proportional gain KP2	0.0 ~ 100.0	20	☆
PA-16	Integral time Ti2	0.01s ~ 10.00s	2.00s	☆
PA-17	Derivative time Td2	0.000s ~ 10.000s	0.000s	☆

PA-18	PID parameter switch-over condition	0: No switchover 1: Switchover via terminal X 2: Auto switchover based on deviation 3: Reserved	0	☆
PA-19	PID parameter switch-over deviation 1	0.0% ~ PA-20	20.00%	☆
PA-20	PID parameter switch-over deviation 2	PA-19 ~ 100.0%	80.00%	☆
PA-21	PID initial value	0.0 ~ 100.0%	0.00%	☆
PA-22	PID initial value hold time	0.00 ~ 650.00s	0.00s	☆
PA-23	Maximum forward deviation between two outputs	0.00 ~ 100.00%	1.00%	☆
PA-24	Maximum reverse deviation between two outputs	0.00 ~ 100.00%	1.00%	☆
PA-25	PID integral property	Units digit: Integral separation 0: Disabled 1: Enabled Tens digit: Whether to stop integral after output reaches limit 0: Continue integral 1: Stop integral	0	☆
PA-26	PID feedback loss detection value	0.0%: Feedback loss detection disabled0.1 ~ 100.0%	0.00%	☆
PA-27	PID feedback loss detection time	0.0s ~ 20.0s	0.0s	☆
PA-28	PID operation at stop	0: No operation at stop 1: Operation at stop	0	☆

Group Pb - Wobble Frequency, Fixed Length and Counting

Code	Name	Setting Range	Default Value	Attribute
Pb-00	Wobble frequency setting mode	0: Relative to central frequency 1: Relative to maximum frequency	0	☆
Pb-01	Wobble frequency amplitude	0.0 ~ 100.0%	0.00%	☆
Pb-02	Jump frequency amplitude	0.0 ~ 50.0%	0.00%	☆
Pb-03	Wobble frequency cycle	0.1 ~ 3000.0s	10.0s	☆
Pb-04	Triangular wave rising time of wobble frequency	0.1 ~ 100.0%	50.00%	☆
Pb-05	Set length	0 ~ 65535m	1000m	☆
Pb-06	Actual length	0 ~ 65535m	0m	☆
Pb-07	Pulses per meter	0.1 ~ 6553.5	100	☆
Pb-08	Set count value	1 ~ 65535	1000	☆

Pb-09	Designated count value	1 ~ 65535	1000	☆

Group Pc - Multi-reference and Simple PLC

Code	Name	Setting Range	Default Value	Attribute
PC-00	Multi-reference 0	-100.0% ~ 100.0%	0.00%	☆
PC-01	Multi-reference 1	-100.0% ~ 100.0%	0.00%	☆
PC-02	Multi-reference 2	-100.0% ~ 100.0%	0.00%	☆
PC-03	Multi-reference 3	-100.0% ~ 100.0%	0.00%	☆
PC-04	Multi-reference 4	-100.0% ~ 100.0%	0.00%	☆
PC-05	Multi-reference 5	-100.0% ~ 100.0%	0.00%	☆
PC-06	Multi-reference 6	-100.0% ~ 100.0%	0.00%	☆
PC-07	Multi-reference 7	-100.0% ~ 100.0%	0.00%	☆
PC-16	Simple PLC running mode	0: Stop after running once 1: Keep final value after running once 2: Continuous loop	0	☆
PC-17	Simple PLC power-down memory selection	Units digit: Power-down memory selection 0: No memory upon power-down 1: Memory upon power-down Tens digit: Stop memory selection 0: No memory upon stop 1: Memory upon stop	0	☆
PC-18	Simple PLC reference 0 running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
PC-19	Simple PLC reference 0 accel/decel time selection	0 ~ 3	0	☆
PC-20	Simple PLC reference 1 running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
PC-21	Simple PLC reference 1 accel/decel time selection	0 ~ 3	0	☆
PC-22	Simple PLC reference 2 running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
PC-23	Simple PLC reference 2 accel/decel time selection	0 ~ 3	0	☆
PC-24	Simple PLC reference 3 running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
PC-25	Simple PLC reference 3 accel/decel time selection	0 ~ 3	0	☆
PC-26	Simple PLC reference 4 running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
PC-27	Simple PLC reference 4 accel/decel time selection	0 ~ 3	0	☆
PC-28	Simple PLC reference 5 running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆

PC-29	Simple PLC reference 5 accel/decel time selection	0 ~ 3	0	☆
PC-30	Simple PLC reference 6 running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
PC-31	Simple PLC reference 6 accel/decel time selection	0 ~ 3	0	☆
PC-32	Simple PLC reference 7 running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
PC-33	Simple PLC reference 7 accel/decel time selection	0 ~ 3	0	☆
PC-50	Simple PLC running time unit	0: s (second)1: h (hour)	0	☆
PC-51	Multi-reference 0 setting mode	0: Set by function code PC-00 1: AI1 2: AI2 3: AI3 external keypad potentiometer 4: HDI pulse input 5: PID6: Preset frequency (P0-08), modifiable via UP/DOWN	0	☆

Group Pd - Communication Parameters

Code	Name	Setting Range	Default Value	Attrib-ute
Pd-00	Baud Rate	0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS-5005 6: 19200BPS 7: 38400BPS 8: 57600BPS	5005	☆
Pd-01	Data Format	0: No Parity (8-N-2) 1: Even Parity (8-E-1) 2: Odd Parity (8-O-1) 3: No Parity (8-N-1)	0	☆
Pd-02	Local Address	1 ~ 247	1	☆
Pd-03	Response Delay	0 ~ 20ms	2	☆
Pd-04	Communication Timeout	0.0 (Invalid), 0.1s ~ 60.0s	0	☆
Pd-05	Data Transmission Format Selection	Units digit: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol	30	☆
Pd-06	Communication Read Cur-rent Resolution	0: 0.01A1: 0.1A	0	☆
Pd-07	Reserved	-	0	☆

Group PP Function Code Management

Code	Name	Setting Range	Default Value	Attribute
PP-00	User Password	0 ~ 65535	0	☆
PP-01	Parameter Initialization	00: No operation 01: Restore factory parameters, excluding motor parameters 02: Clear record information 03~501: Reserved	0	★
PP-02	Function Parameter Group Display Selection	Units digit: U group display selection Tens digit: A group display selection Hundreds digit: b group display selection 0: Do not display 1: Display	11	★
PP-04	Function Code Modification Property	0: Modifiable 1: Not modifiable	0	☆

Group A5 - Control Optimization Parameters

Code	Name	Setting Range	Default Value	Attribute
A5-00	DPWM Switchover Upper Limit Frequency	5.00Hz ~ Maximum frequency	8.00Hz	☆
A5-01	PWM Modulation Mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
A5-02	Dead Zone Compensation Mode Selection	0: No compensation 1: Compensation mode 1	1	☆
A5-03	Random PWM Depth	0: Random PWM disabled 1 ~ 10: PWM carrier frequency random depth	0	☆
A5-04	Fast Current Limiting Enable	0: Disable1: Enable	1	☆
A5-05	Current Detection Compensation	0 ~ 100	0	☆
A5-06	Undervoltage Point Setting	100.0 ~ 2000.0V	Model dependent	☆
A5-07	SVC Optimization Mode Selection	1: Optimization mode 1 2: Optimization mode 1	2	☆
A5-08	Dead Time Adjustment	47~200%	150%	☆
A5-09	Overvoltage Point Setting	200.0-2500.0V	810	★

Group U0 - Monitoring Parameter Table

Code	Name	Setting Range	Default Value	Attribute
U0-00	Running Frequency (Hz)	--	0.01Hz	●

U0-01	Set Frequency (Hz)	--	0.01Hz	●
U0-02	Bus Voltage (V)	--	0.1V	●
U0-03	Output Voltage (V)	--	1V	●
U0-04	Output Current (A)	--	0.01A	●
U0-05	Output Power (kW)	--	0.1kW	●
U0-06	Output Torque (%)	--	0.10%	●
U0-07	X Input Status	--	1	●
U0-08	Y Output Status	--	1	●
U0-09	AI1 Voltage (V)	--	0.01V	●
U0-10	AI2 Voltage (V)	--	0.01V	●
U0-11	Keypad Potentiometer Voltage	--	0.01V	●
U0-12	Count Value	--	1	●
U0-13	Length Value	--	1	●
U0-14	Load Speed Display	--	1	●
U0-15	PID Setting (Dimensionless) PID Setting Pressure Value (Water Supply Activated)	--	10.01kg	●
U0-16	PID Feedback (Dimensionless) PID Feedback Pressure Value (Water Supply Activated)	--	10.01kg	●
U0-17	PLC Stage	--	1	●
U0-18	HDI Input Pulse Frequency (Hz)	--	0.01kHz	●
U0-19	Feedback Speed (Unit 0.1Hz)	--	0.1Hz	●
U0-20	Remaining Running Time	--	0.1Min	●
U0-21	AI1 Voltage Before Correction	--	0.001V	●
U0-22	AI2 Voltage Before Correction	--	0.001V	●
U0-23	Keypad Potentiometer Voltage Before Correction	--	0.001V	●
U0-24	Linear Speed	--	1m/Min	●
U0-25	Current Power-on Time	--	1Min	●
U0-26	Current Running Time	--	0.1Min	●
U0-27	HDI Input Pulse Frequency	--	1Hz	●
U0-28	Communication Setting Value	--	0.01%	●
U0-30	Main Frequency X Display	--	0.01Hz	●
U0-31	Auxiliary Frequency Y Display	--	0.01Hz	●
U0-32	View Arbitrary Memory Address Value	--	1	●
U0-35	Target Torque (%)	--	0.10%	●
U0-36	Current Number of Working Auxiliary Pumps	--	0	●
U0-37	Power Factor Angle	--	0.1°	●
U0-39	Reserved	--	1V	●

U0-41	X Input Status Visual Display	--	1	●
U0-42	Y Input Status Visual Display	--	1	●
U0-43	X Function Status Visual Display 1 (Function 01-40)	--	1	●

Chapter 5 GK3000-CT Communication Data Address Definition

The GK3000-CT series AC drive supports four communication protocols: Modbus-RTU, CAN-open, CANlink, and Profibus-DP. The user programmable card and point-to-point communication belong to the derivatives of the CANlink protocol. The host computer can implement control, monitoring, and function parameter modification and viewing operations on the AC drive through these communication protocols.

GK3000-CT communication data can be divided into function code data and non-function code data, the latter includes running commands, running status, running parameters, alarm information, etc.

5.1 GK3000-CT Function Code Data

Function code data are important setting parameters for the AC drive. On the basis of only having Group P function parameters in the GK3000-CT, Group A function parameters are added as follows:

GK3000-CT Function Code Data	Group P (Read/Write)	P0, P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, Pb, PC, Pd, PE, PF
	Group A (Read/Write)	A0, A1, A2, A3, A4, A5, A6, A7, A8, A9, AA, AB, AC, AD, AE, AF

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

A. When reading function code data via communication

For Group P0~PF and A0~AF function code data, the high 16 bits of their communication address directly represent the function group number, and the low 16 bits directly represent the index number of the function code in the function group. Examples are as follows:

For function parameter P0-16, its communication address is F010H, where F0H represents the Group P0 function parameter, and 10H represents the hexadecimal data format of the index number 16 of the function code in the function group.

For function parameter AC-08, its communication address is AC08, where ACH represents the Group AC function parameter, and 08H represents the hexadecimal data format of the index number 8 of the function code in the function group.

B. When writing function code data via communication

For Group P0~PF function code data, the high 16 bits of its communication address are differentiated into 00~0F or F0~FF according to whether it is written into the EEPROM, and the low 16 bits directly represent the index number of the function code in the function group. Examples are as follows:

Write function parameter P0-16: When it does not need to be written into the EEPROM, its communication address is 0010H When it needs to be written into the EEPROM, its communication address is F010H

For Group A0~AF function code data, the high 16 bits of its communication address are differentiated into 40~4F or A0~AF according to whether it needs to be written into the EEPROM, and the low 16 bits directly represent the index number of the function code in the function group. Examples are as follows:

Write function parameter AC-08: When it does not need to be written into the EEPROM, its

communication address is 4C08H When it needs to be written into the EEPROM, its communication address is AC08H

5.2. GK3000-CT Non-function Code Data

GK3000-CT Non-function Code Data	Status Data (Read-only)	Group U monitoring parameters, AC drive fault description, AC drive running status
	Control Parameters (Write-only)	Control command, communication setpoint, digital output terminal control, analog output AO1 control, analog output AO2 control, high-speed pulse (HDI) output control, parameter initialization

Status Data

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

Group U Monitoring Parameters

For the description of Group U monitoring data, refer to the relevant descriptions in Chapter 5 and Chapter 6. Its address is defined as follows:
For U0~UF, the high 16 bits of its communication address are 70~7F, and the low 16 bits are the index number of the monitoring parameter in the group. An example is as follows:
For U0-11, its communication address is 700BH.

AC Drive Fault Description

When reading the AC drive fault description via communication, the communication address is fixed at 8000H. The host computer can obtain the current AC drive fault code by reading the data at this address. For the description of the fault code, refer to the definition in function code P9-14 in Chapter 5.

AC Drive Running Status

When reading the AC drive running status via communication, the communication address is fixed at 3000H. The host computer can obtain the current AC drive running status information by reading the data at this address, which is defined as follows:

AC Drive Running Status Communication Address	Definition of Read Status Word
3000H	1: Forward running
	2: Reverse running
	3: Stop

Control Parameters

Control parameters are divided into control commands, digital output terminal control, analog output AO1 control, analog output AO2 control, and high-speed pulse (HDI) output control.

Control Commands

When P0-02 (Command source) is selected as 2: Communication control, the host computer can implement start, stop, and other related command control on the AC drive through this

communication address. The control commands are defined as follows:

Control Command Communication Address	Command Function
2000H	1: Forward running
	2: Reverse running
	3: Forward jog
	4: Reverse jog
	5: Coast to stop
	6: Decelerate to stop
	7: Fault reset

Communication Setting Value

The communication setting value is mainly used as the reference data when the frequency source, torque upper limit source, V/F separation voltage source, PID reference source, PID feedback source, etc., of the GK3000-CT are selected as the communication reference. Its communication address is 1000H. When the host computer sets the value of this communication address, its data range is -10000~10000, corresponding to the relative reference value of -100.00%~100.00%.

Digital Output Terminal Control

When the digital output terminal function is selected as 20: Communication control, the host computer can achieve control of the Variable Frequency Drive's digital output terminals through this communication address. The definition is as follows:

Digital Output Terminal Control Communication Address	Command Content
2001H	BIT0: Y1 output control BIT1: Y2 output control BIT2: RELAY1 output control BIT3: RELAY2 output control BIT4: FMR output control BIT5: VY1 BIT6: VY2 BIT7: VY3 BIT8: VY4 BIT9: VY5

Analog Output AO1, AO2, High-speed Pulse Output HDI Control

When the output function of the analog output AO1, AO2, and high-speed pulse output HDI is selected as 12: Communication setting, the host computer can achieve control of the Variable Frequency Drive's analog and high-speed pulse outputs through this communication address. The definition is as follows:

Output Control Communication Address	Command Content
AO1	2002H

AO2	2003H
HDI	2004H

Parameter Initialization

This function is required when the parameter initialization operation of the Variable Frequency Drive needs to be implemented through the host computer.

If PP-00 (User Password) is not 0, password verification must first be performed via communication. After successful verification, the host computer shall perform the parameter initialization operation within 30 seconds.

The communication address for user password verification via communication is 1F00H. Directly writing the correct user password into this address can complete the password verification.

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

Parameter Initialization Communication Address	Command Function
1F01H	1: Restore factory parameters
	2: Clear record information
	4: Restore user backup parameters
	501: Backup current user parameters

5.3. Function Code Parameter Address Labeling Rules

The rules for representing parameter addresses using function code group numbers and labels are as follows:

High byte: P0~PF (Group P), A0~AF (Group A), 70~7F (Group U)

Low byte: 00~FF

For example: If you need to access function code P3-12, the access address of the function code is represented as 0xF30C;

Note:

Group FF: Parameters can neither be read nor modified;

Group U: Parameters can only be read, but cannot be modified.

Some parameters cannot be modified while the Variable Frequency Drive is in the running state; some parameters cannot be modified regardless of the state the Variable Frequency Drive is in. When modifying function code parameters, attention must also be paid to the parameter's range, unit, and related descriptions.

Function Code Group	Communication Access	Communication Address for Modifying

Number	Address	Function Code in RAM
Group P0 ~ PE	0xF000 ~ 0xFEFF	0x0000 ~ 0x0EFF
Group A0 ~ AC	0xA000 ~ 0xACFF	0x4000 ~ 0x4CFF
Group U0	0x7000 ~ 0x70FF	

Note: Because frequent storage to EEPROM will reduce the service life of the EEPROM, some function codes do not need to be stored in communication mode; simply modifying the value in RAM is sufficient.

If it is a Group P parameter, to achieve this function, simply change the high-order F of the function code address to 0.

If it is a Group A parameter, to achieve this function, simply change the high-order A of the function code address to 4.

The corresponding function code addresses are represented as follows:

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

Low byte: 00~FF

For example:

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

Function code A0-05 is not stored in EEPROM, and the address is represented as 4005;

This address representation can only be used for the action of writing to RAM, not for reading. When read, it is considered an invalid address.

For all parameters, command code 07H can also be used to achieve this function.

Stop / Run Parameters Section:

Parameter Address	Parameter Description	Parameter Address	Parameter Description
1000H	* Communication setting value (decimal)-10000 ~ 10000	1010H	PID setting
1001H	Running frequency	1011H	PID feedback
1002H	Bus voltage	1012H	PLC step
1003H	Output voltage	1013H	HDI 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	Voltage before AI1 correction
1007H	Running speed	1017H	Voltage before AI2 correction
1008H	X input flag	1018H	Voltage before AI3 correction
1009H	Y output flag	1019H	Line speed
100AH	AI1 voltage	101AH	Current power-on time

100BH	AI2 voltage	101BH	Current running time
100CH	AI3 voltage	101CH	HDI input pulse frequency, unit 1Hz
100DH	Count value input	101DH	Communication setting value
100EH	Length value input	101EH	Actual feedback speed
100FH	Load speed	101FH	Main frequency X display
—	—	1020H	Auxiliary frequency Y display

*** Note:**

The communication setting value is a percentage of the relative value, 10000 corresponds to 100.00%, and -10000 corresponds to -100.00%.

For frequency dimension data, this percentage is the percentage relative to the maximum frequency (P0-10); for torque dimension data, this percentage is P2-10, A2-48 (digital setting of torque upper limit, corresponding to the first and second motors respectively).

Control command input to the Variable Frequency Drive: (Write only)

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

Read Variable Frequency Drive status: (Read only)

Status Word Address	Status Word Function
3000H	0001: Forward running
	0002: Reverse running
	0003: Stop

Parameter lock password verification: (If 8888H is returned, it indicates that the password verification has passed)

Password Address	Input Password Content
1F00H	*****

Digital Output Terminal Control: (Write Only)

Command Address	Command Content
2001H	BIT0: Y1 Output Control BIT1: Y2 Output Control BIT2: RELAY1 Output Control BIT3: RELAY2 Output Control BIT4: FMR Output Control BIT5: VY1 BIT6: VY2 BIT7: VY3 BIT8: VY4 BIT9: VY5

Analog Output AO1 Control: (Write Only)

Command Address	Command Content
2002H	0 ~ 7FFF represents 0% ~ 100%

Analog Output AO2 Control: (Write Only)

Command Address	Command Content
2003H	0 ~ 7FFF represents 0% ~ 100%

Pulse (HDI) Output Control: (Write Only)

Command Address	Command Content
2004H	0 ~ 7FFF represents 0% ~ 100%

Variable Frequency Drive Fault Description:

Fault Address	Variable Frequency Drive Fault Information
8000H	0000: No fault 0001: Reserved 0002: Acceleration overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Acceleration overvoltage 0006: Deceleration overvoltage 0007: Constant speed overvoltage 0008: Buffer resistor overload fault 0009: Undervoltage fault 000A: Variable Frequency Drive overload 000B: Motor overload 000C: Input phase loss 000D: Output phase loss 000E: Module overheat

	000F: External fault 0010: Communication error 0011: Contactor error 0012: Current detection fault 0013: Motor autotuning fault 0014: Encoder / PG card fault 0015: Parameter read/write error 0016: Variable Frequency Drive hardware fault 0017: Motor short circuit to ground fault 0018: Reserved 0019: Reserved 001A: Run time reached 001B: User-defined fault 1001C: User-defined fault 2001D: Power-on time reached 001E: Load loss 001F: PID feedback lost during operation 0028: Fast current limit timeout fault 0029: Motor switch fault during operation 002A: Excessive speed deviation 002B: Motor overspeed 002D: Motor overtemperature 005A: Encoder lines setting error 005B: Encoder not connected 005C: Initial position error 005E: Speed feedback error

Chapter 6 Fault Diagnosis and Countermeasures

6.1 Fault Alarms and Countermeasures

The Variable Frequency Drive has a total of 24 warning messages and protection functions. Once a fault occurs, the protection function is activated, the Variable Frequency Drive stops output, the Variable Frequency Drive fault relay contact operates, and the fault code is displayed on the Variable Frequency Drive display panel. Before seeking service, users can first perform a self-check according to the prompts in this section, analyze the cause of the fault, and find a solution. If the cause belongs to the reasons described within the dashed box, please seek service, and contact the agent where you purchased the Variable Frequency Drive or contact our company directly.

Among the 21 warning messages, Err22 is a hardware overcurrent or overvoltage signal, and in most cases, a hardware overvoltage fault causes the Err22 alarm.

Fault Name	Code	Fault Cause Troubleshooting	Fault Treatment Countermeasures
unit protection	Err1	1. Variable Frequency Drive output circuit short circuit 2. Wiring between motor and Variable Frequency Drive is too long 3. Module over heat 4. Loose internal wiring of the Variable Frequency Drive 5. Main control board abnormal 6. Drive board abnormal 7. Variable Frequency Drive module abnormal	1. Eliminate peripheral faults 2. Install a reactor or output filter 3. Check if the air duct is blocked and if the fan is working properly, and eliminate any existing problems 4. Plug in all connecting cables securely 5. Seek technical support 6. Seek technical support 7. Seek technical support
Acceleration overcurrent	Err2	1. Variable Frequency Drive output circuit has grounding or short circuit 2. Control mode is vector and parameter identification has not been performed 3. Acceleration time is too short 4. Manual torque boost or V/F curve is inappropriate 5. Voltage is too low 6. Starting a rotating motor 7. Sudden load addition during acceleration8. Variable Frequency Drive selection is too small	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Increase acceleration time 4. Adjust manual torque boost or V/F curve 5. Adjust the voltage to the normal range 6. Select speed tracking start or wait for the motor to stop before starting 7. Cancel sudden load addition 8. Select an Variable Frequency Drive with a larger power rating
Deceleration overcurrent	Err3	1. Variable Frequency Drive output circuit has grounding or short circuit 2. Control mode is vector and parameter identification has not been performed 3. Deceleration time is too short 4. Voltage is too low 5. Sudden load addition during	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Increase deceleration time 4. Adjust the voltage to the normal range 5. Cancel sudden load addition6. Install braking unit and

		deceleration6. Braking unit and braking resistor are not installed	resistor
Constant speed overcurrent	Err4	1. Variable Frequency Drive output circuit has grounding or short circuit 2. Control mode is vector and parameter identification has not been performed 3. Voltage is too low 4. Sudden load addition during operation 5. Variable Frequency Drive selection is too small	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Adjust the voltage to the normal range 4. Cancel sudden load addition 5. Select an Variable Frequency Drive with a larger power rating
Acceleration overvoltage	Err5	1. Input voltage is too high 2. External force driving the motor during acceleration 3. Acceleration time is too short 4. Braking unit and braking resistor are not installed	1. Adjust the voltage to the normal range 2. Cancel this external driving force or install a braking resistor 3. Increase acceleration time 4. Install braking unit and resistor
Deceleration overvoltage	Err6	1. Input voltage is too high 2. External force driving the motor during acceleration 3. Deceleration time is too short 4. Braking unit and braking resistor are not installed	1. Adjust the voltage to the normal range 2. Cancel this external driving force or install a braking resistor 3. Increase deceleration time 4. Install braking unit and resistor
Constant speed overvoltage	Err7	1. Input voltage is too high 2. External force driving the motor during operation	1. Adjust the voltage to the normal range 2. Cancel this external driving force or install a braking resistor
Control power supply fault	Err08	1. Input voltage is not within the specified range	1. Adjust the voltage to the specified range
Undervoltage fault	Err09	1. Momentary power failure 2. Variable Frequency Drive input voltage is not within the specified range 3. Bus voltage is abnormal 4. Rectifier bridge and buffer resistor are abnormal 5. Drive board abnormal 6. Control board abnormal	1. Reset fault 2. Adjust voltage to the normal range 3. Seek technical support 4. Seek technical support 5. Seek technical support 6. Seek technical support
Variable Frequency Drive overload	Err10	1. Whether the load is too large or motor stall occurs 2. Variable Frequency Drive selection is too small	1. Reduce the load and check the motor and mechanical conditions 2. Select an Variable Frequency Drive with a larger power rating
Motor overload	Err11	1. Whether the motor protection parameter P9-01 setting is appropriate 2. Whether the load is too large or motor stall occurs 3. Variable Frequency Drive selection	1. Set this parameter correctly 2. Reduce the load and check the motor and mechanical conditions 3. Select an Variable Frequency

		is too small	Drive with a larger power rating
Input phase loss	Err12	1. Three-phase input power supply is abnormal 2. Drive board abnormal 3. Lightning protection board abnormal 4. Main control board abnormal	1. Check and eliminate problems in the peripheral circuit 2. Seek technical support 3. Seek technical support 4. Seek technical support
Output phase loss	Err13	1. The lead wire from the Variable Frequency Drive to the motor is abnormal 2. The three-phase output of the Variable Frequency Drive is unbalanced during motor operation 3. Drive board abnormal 4. Module abnormal	1. Eliminate peripheral faults 2. Check if the motor three-phase windings are normal and eliminate faults 3. Seek technical support 4. Seek technical support
Module overheat	Err14	1. Ambient temperature is too high 2. Air duct is blocked 3. Fan is damaged 4. Module thermistor is damaged 5. Variable Frequency Drive module is damaged	1. Lower the ambient temperature 2. Clean the air duct 3. Replace the fan 4. Replace the thermistor 5. Replace the Variable Frequency Drive module
External equipment fault	Err15	1. Multi-function terminal X inputs an external fault signal 2. Virtual IO function inputs an external fault signal	1. Reset operation 2. Reset operation
Communication Fault	Err16	1. Upper computer operates abnormally; 2. Communication line abnormal; 3. Parameters retained; 4. Communication parameter PD group setting incorrect	1. Check upper computer wiring; 2. Check communication connection wiring; 3. Set communication expansion card type correctly; 4. Set communication parameters correctly
Contactor Fault	Err17	1. Drive board and power supply abnormal; 2. Contactor abnormal	1. Replace drive board or power board; 2. Replace contactor
Leakage Detection Fault	Err18	1. Check whether sensor is abnormal; 2. Drive board abnormal	1. Replace sensor components; 2. Replace drive board
Motor Tuning Fault	Err19	1. Motor parameters not set according to nameplate; 2. Parameter identification timeout	1. Confirm motor parameters according to nameplate; 2. Check Variable Frequency Drive-to-motor wiring
EEPROM Read/Write Fault	Err21	1. EEPROM chip damaged	1. Replace main control board
Variable Frequency Drive Hardware Fault	Err22	1. Overvoltage exists; 2. Overcurrent exists	1. Handle as overvoltage fault; 2. Handle as overcurrent fault

Motor-to-Ground Short Circuit Fault	Err23	1. Motor-to-ground short circuit	1. Replace cable or motor
Accumulated Runtime Reached Fault	Err26	1. Accumulated runtime reaches set value	1. Use parameter initialization function to clear record information
User-defined Fault 1	Err27	1. Input user-defined fault 1 signal via multifunction terminal X; 2. Input via virtual IO function	1. Reset operation
User-defined Fault 2	Err28	1. Input user-defined fault 2 signal via multifunction terminal X; 2. Input via virtual IO function	1. Reset operation
Accumulated Power-on Time Reached Fault	Err29	1. Accumulated power-on time reaches set value	1. Use parameter initialization function to clear record information
Drop-out Fault	Err30	1. Variable Frequency Drive running current is lower than P9-64	1. Confirm whether the load is disconnected or whether the P9-64 and P9-65 parameter settings meet the actual operating conditions
PID Feedback Loss Fault	Err31	1. PID feedback is lower than PA-26 set value	1. Check PID feedback signal or set PA-26 to an appropriate value
Stall Overcurrent Fault	Err40	1. Load is too large or motor is stalled; 2. Variable Frequency Drive model is too small	1. Reduce the load and check motor and mechanical condition; 2. Select an Variable Frequency Drive with higher power rating
Motor Switching During Operation Fault	Err41	1. Motor selection is changed via terminal during Variable Frequency Drive operation	1. Stop the Variable Frequency Drive before performing motor switching operation
Motor Overtemperature Fault	Err45	1. Temperature sensor wiring is loose; 2. Motor temperature is too high	1. Check temperature sensor wiring and eliminate faults; 2. Reduce load or take other heat dissipation measures for the motor
Initial Position Error	Err51	1. Motor parameters deviate greatly from actual values	1. Reconfirm whether the motor parameters are correct, especially whether the rated current is set too small

Common Faults and Their Handling Methods

During the operation of the Variable Frequency Drive, the following fault conditions may occur. Please refer to the following methods for simple fault analysis.

1	Display shows 8.8.8.8 after power-on	No mains voltage or voltage too low; Switching power supply fault on Variable Frequency Drive drive board; Rectifier bridge damaged; Current limiting resistor in Variable Frequency Drive damaged; Control board, keypad or keypad cable fault; Disconnection between control board and drive board or keypad	Check input power supply; Contact manufacturer; Check bus voltage; Contact manufacturer; Replace keypad or reconnect with manufacturer; Contact manufacturer
2	No display after power-on [ ]	Poor connection between drive board and control board; Control board components damaged; Abnormal mains voltage; Drive board power supply issue	Reconnect main board connectors; Contact manufacturer; Check mains voltage; Contact manufacturer
3	Err23 alarm after power-on	Motor or output cable grounded short circuit; Variable Frequency Drive damaged	Measure insulation with megger; Contact manufacturer
4	Normal after power-on, then displays [ ] and stops	Fan damaged or blocked; External control terminal short circuit	Replace fan; Eliminate external short circuit; Contact manufacturer
5	Frequent Err14 (module overheat)	Load too high; Fan damaged or air duct blocked; Internal component damage	Reduce carrier frequency (P0-15); Replace fan and clean air duct; Contact manufacturer
6	Motor does not rotate	Motor wiring incorrect; Parameter setting error; Poor board connection; Drive board fault	Check wiring; Replace motor or fix mechanical issue; Reset motor parameters
7	Frequent overcurrent/overvoltage	Motor parameter incorrect; Acc/dec time improper; Load fluctuation	Reset parameters or auto tune; Adjust acc/dec time; Contact manufacturer
8	No display after power-on	Control board components damaged	Replace control board

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