Chapter1 Product Introduction

1.1 Product Introduction

Thank you for purchasing A720 Current Torque Vector Control General Purpose Inverters developed by Qma Technical Company, featuring high performance and low noise. Please read this manual thoroughly and carefully to make good use of the performance and functions of this inverter and to keep your safety in operation. Please contact our agent in your regions or technical personnel of engineering department in our company if any problem you can not solve by refereing to the manual accurs in operation. Our professionals are ready to help you. You are welcome to use our products.

[Notice]:

A720 inverter is developed by Qma. In this manual, "Danger" and "Caution" paragraphs contain important safety precautions that shall be paid attention to during transportation, installation, operation and examination of the inverter.

[Danger]:

Incorrect use of this inverter may result in personal injury and death. Do not dismount or install inverter or change its internal connection, wiring or component by yourself.

[Caution]:

Incorrect use of this product may cause damages to the inverter or its mechanical systems.

[Danger]:

- After turning off the power, do not touch circuit board or components before CHARGE indicator goes off.
- Do not dismount or install inverter or change its internal connection, wiring or component by yourself.
- Make sure the power is off before wiring; do not check components, parts or signals on the circuit board while the inverter is running.
- Earthing terminals of the inverter must be grounded properly. Three grounding modes for 220V, special earthing for 440V.

[Caution]:

- Never perform withstanding voltage test for components or parts in the inverter, otherwise this may cause damages to these semi-conductor parts due to high voltage.
- Never wire output terminals U, V and W of the inverter to input terminals (R, S, T) of AC power supply.
- Component COMOSIC of inverter circuit board is susceptible to static electricity influence and damages. Do not touch the main circuit board.

[During operation]:

Danger

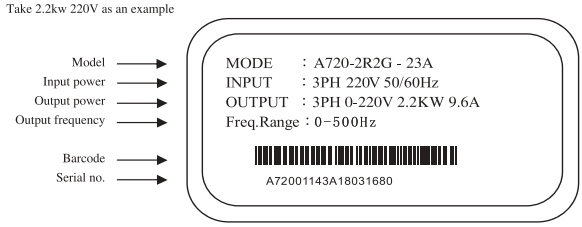
- Never remove front cover under power-on state to avoid personal injury due to electric shock;
- Never get close to the machine to avoid danger after motor stops working as it will automatically restart again if automatic restart function is enabled.
- Stop switch will be effected only after setting. Please note that it is different from emergency stop switch in usage.

Caution

- Never touch heating elements like heat sink and braking resistance to avoid electric shock; otherwise, it may cause personal injury.
- The inverter can be easily changed from low speed to high speed. Please input the allowable range of motor and machinery.
- When using brake, etc., please pay attention to relevant setting.
- Never check signals of circuit board when the inverter is running.
- Inverter has been set in the factory, so do not adjust it arbitrarily.

1.2 Nameplate

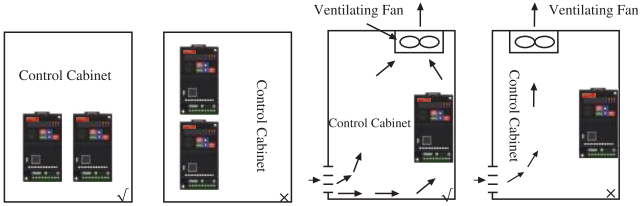
Take 2.2kw 220V as an example



1.3 Application Environment

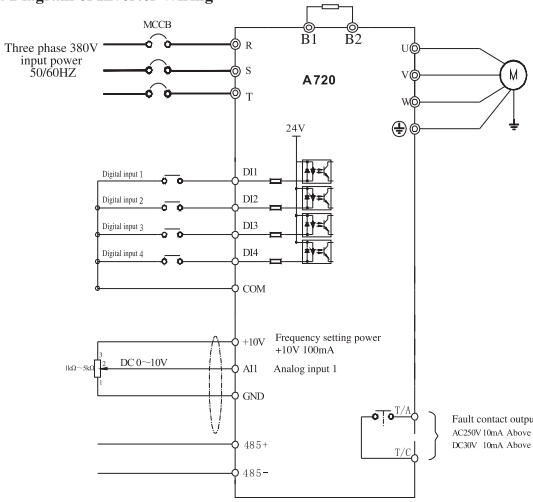
As the installation environment has direct influence on the performance and service life of the inverter, following conditions must be met.

- Ambient environment: Open installation in switchboard (-10-45℃/+14-113°F)
  Closed wall-mounted type (-10-40℃/+14-104°F)
- Avoid rain or humid environment.
- Avoid direct sunlight.
- Prevent erosion of oil mist and salt.
- Avoid corrosive liquid and gas.
- Prevent dust, batting and metal powder from entering the inverter.
- Away from radioactive substance and combustible material.
- Prevent electromagnetic interference (welding machine, power machine).
- Prevent vibration (punch press). If it is unavoidable, please install a shockproof gasket to reduce vibration.
- When multiple inverters are installed in a control cabinet, install them at proper positions for heat dissipation. In addition, please install a heat radiation fan to make the ambient temperature around the inverter lower than 45℃.



- Installing the inverter with its front surface forward and top part upward for heat radiation.
- Installation space must be in accordance with following regulations: When the inverter is installed inside the switchboard or if conditions permit, remove upper dustproof cover of the inverter for cooling and heat radiation.

1.4 Diagram of Inverter Wiring



Inverter wiring schematic

1.5 Terminal & Wiring of Main Circuit

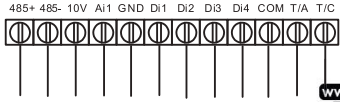
Danger

1. Make sure that the power switch is OFF before wiring so as to avoid electric hazard!
2. Wiring must be performed by qualified and trained personnel so as to avoid inverter damage and personnel injury!
3. Earthing terminals must be grounded reliably to avoid electrical hazard and fire!

Caution

1. Confirm that input power's rated values are identical to that of the inverter; otherwise, it may result in inverter damage!
2. Confirm that motor matches to the inverter; otherwise, it may damage motor or trigger inverter protection!
3. Never connect power supply to terminals U, V and W to avoid inverter damage!
4. Do not connect braking resistance to DC bus terminals (+) & (-) directly; otherwise this may cause fire!

1.6 Control Terminal function instructions:



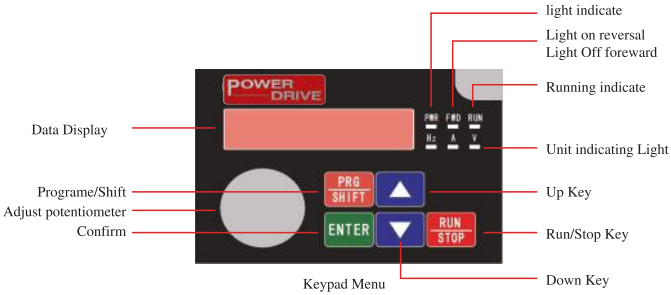
Control Terminal Marking instruction:

Terminal Symbol	Terminal Name	Terminal Function
DI1	Digital input 1	1. optical coupling isolation 2. Impedance:2.4KΩ
DI2	Digital input 2	
DI3	Digital input 3	
DI4	Digital input 4	
COM	Digital input com	Digital input DI1-DI4 common terminal
+10V - GND	External power supply+10V	External Power +10V, maximum output current 10mA, normally it is used for potentiometer power supply, potentiometer resistance value:1 KΩ~5 KΩ
AI1-GND	Analog input terminal 1	1. Input voltage range: DC 0V-10V 2. Input impedance: 22kΩ
485+	485 communication (+)	Standard RS Communication Connector
485-	485 communication (-)	
T/A-T/C	Normally Open terminal	Contact driving capacity: AC250V, 3A, COSΦ=0.4. DC 30V, 1A

Chapter 2. Operation and Display

2.1 Introduction to Operation and Display Interface

A user may operate A720 inverter by the operation panel through parameter setting, status monitoring, start/stop operation, etc. Its outlook and function zones area as follows:



Keypad button description

Button	Name	Function
PRG/SHIFT	Programmable	Loop Show parameters during running, can choose shift key if want to change the parameter
ENTER	Enter	Enter the menu step by step, set and enter parameters.
△	Up	Increase figure or function code progressively.
▽	Down	Reduce figure or function code progressively.
RUN/ STOP	Run/ Stop	Press this button to start and stop the inverter with the keypad control.

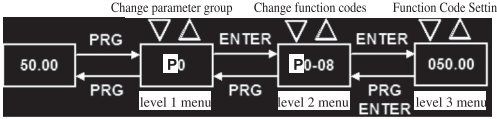
Description of function indicator lamp:

Indicator lamp	Description
RUN	Running status indicator lamp: Off: It means the inverter is in stop status; On: It means the inverter is in running status;
FWD/REV	Forward/reverse indicator lamp: On: it means reverse status; off: it means forward status.
Hz	Frequency indicator lamp. Unit: Hz
A	Current indicator lamp; unit: A
V	Voltage indicator lamp, unit: V

2.2 Description of Digital Manipulator

A720 inverter adopts three-level menu to set parameters.

3-level menu: Function parameter group (level 1) → function codes (level 2)→function code setting(level 3). See the figure below for operation procedure.



3-level Menu Operation Flow Diagram

Description: Under the level 3 menu, user can press PRG or ENTER to back to the level 2 menu. The difference is that by pressing ENTER, it saves the setting parameter before getting back to the level 2 menu and then it enters the next function code automatically; by pressing PRG, it will directly return to the level 2 menu without saving parameters.

2.3 Methods to View Status Parameter

Under stop or running status, through the shift key " ▷ ", multiple status parameters can be displayed, P7-03 (running parameter 1), P7-04 (running parameter 2)

Under stopping status, 16 stopping parameters can be displayed in sequence according to selection, which respectively are: Setting frequency, bus voltage, DI input status, DO output status, analog input AI1 voltage, actual count value, actual length, PLC running steps, load speed display, PID setting, PULSE input pulse frequency and 3 not used parameters.

Under running status, there are five default parameters of running status to be displayed: Running frequency, setting frequency, bus voltage, output voltage and output current. Besides, users can select to display other parameters, including output power, output torque, DI input status, DO output status, analog input AI1 voltage, actual count valve, actual length, linear speed, PID setting and PID feedback by bit of function code P7-03 and P7-04 (changed into binary bit). These parameters can be displayed in sequence.

When the inverter is powered on again after power failure, the default parameters displayed are parameters selected before power failure.

2.4 Password Setting

The inverter provides password protection for parameters. When 16-00 is set as non-zero, the password protection is enabled after exiting the function code editing status. By pressing PRG again, "-----" is displayed. At this time, users are required to enter correct user password to enter into the general menu.

To display the password protection function, user can enter the menu by inputting password and set 16-00 as 0.

Chapter 3. Autotuning

Motor parameter autotuning

When the inverter is in vector control mode, motor nameplate parameters shall be entered correctly before inverter operation so that the inverter can select standard motor parameter according to the nameplate parameter; vector control mode is highly dependent on motor parameters. Therefore, to acquire good control performance, correct motor parameters are required.

Perform the following steps to enable motor parameters autotuning:

(1) Firstly, select the command source (P0-02) as the operation panel command channel.

(2) Then, input the following six parameters according to actual motor parameters:

P1-00: Motor type options P1-01: Motor rated power

P1-02: Motor rated voltage P1-03: Motor rated current

P1-04: Motor rated frequency P1-05: Motor rated rotation speed

(3)According to the motor load condition:

The best tuning mode is idling dynamic tuning; If conditions do not permit, on-load stationary tuning mode can be adopted;

1) Dynamic autotuning:

When the motor is disconnected to load completely, set P1-37 as 2 and press ENTER to confirm. At this time, the keypad displays as:

Then, by pressing RUN on the keypad panel, the inverter will drive the motor to conduct acceleration/deceleration and forward/reverse running; moreover, the running indicator lamp is on. It takes about 2min to finish autotuning motor parameters. When above information disappears and returns to normal parameter display, it means autotuning is completed.

After autotuning, the inverter can calculate following motor parameters automatically:

P1-06: Stator resistance of induction motor P1-07: Rotor resistance of induction motor

P1-08: Leakage inductance of induction motor P1-09: Mutual inductance of induction motor

P1-10: Idling current of induction motor

2) Static autotuning:

If the motor can't be disconnected to load completely, select P1-37 then press ENTER to confirm. At this time, the keypad displays:

Then, press RUN. After the inverter executes motor parameter tuning, motor parameter autotuning can be completed.

After autotuning, the inverter can calculate the following motor parameters automatically:

P1-06: Stator resistance of induction motor P1-07: Rotor resistance of induction motor

P1-08: Leakage inductance of induction motor

Chapter 4. Function Parameter Table

Function Code	Name	Setting Range	Minimum Unit	Default
P0 Group: Basic Parameter				
P0-00	Motor Type Display	1: G type (constant torque load)	1	1
P0-01	Control Mode Options	0: Sensorless vector control (SVC) 2: V/F control	1	0
P0-02	Start/Stop Control Options	0: Operation panel (LED off) 1: Terminal (LED on) 2: Serial port communication (LED flashing)	1	0
P0-03	Main Frequency Command Source A	0: Numeric setting (pre-setting frequency P0-08, which can be modified by pressing UP/DOWN and won't be memorized after power failure) 1: Numeric setting (pre-setting frequency P0-08, which can be modified by pressing UP/DOWN and memorized after power failure). 2: AI1 3: AI2 4: Reserve 5: PULSE setting (DI5) 6: Preset speed command 7: Simple PLC 8: PID 9: Communication setting 10: Potentiometer	1	10
P0-04	Auxiliary Frequency Command Source B	Same with P0-03 (Main frequency command source A)	1	0
P0-05	Superposing Auxiliary Frequency Source B Range	0: With respect to the maximum frequency 1: With respect to main frequency command source A	1	0
P0-06	Superposing Auxiliary Frequency Command B Range Selection	0%-150%	1%	100%
P0-07	Frequency Source Superposing Options	Ones place: Frequency source options 0: Main frequency source A 1: Main & auxiliary arithmetic results (arithmetic relation is determined by tens place) 2: Switching between main frequency source A and auxiliary frequency source B 3: Switching between main frequency source A and main & auxiliary arithmetic results. 4: Switching between auxiliary frequency source B and main & auxiliary arithmetic results. Tens place: Main & auxiliary arithmetic results. 0: Main frequency source+ auxiliary frequency source 1: Main frequency source -auxiliary frequency source 2: The bigger of main frequency source A and auxiliary frequency source B 3: The smaller of main frequency source A and auxiliary frequency source B	11	00
P0-08	Main Frequency Setting of Digital Manipulator	0.00Hz-maximum frequency P0-10	0.01Hz	50.00Hz
P0-09	Running Direction	0: Same 1: Reverse	1	0
P0-10	Maximum Frequency	50.00Hz-500.00Hz	0.01Hz	50.00Hz
P0-11	Upper Limit Frequency Source Options	0: P0-12 setting 1: AI1 2: AI2 3: Not used 4: PULSE pulse setting 5: Communication setting	1	0
P0-12	Upper Limit Frequency	Lower limit frequency P0-14 -maximum frequency P0-10	0.01Hz	50.00Hz
P0-13	Upper Limit Frequency Offset	0.00Hz-maximum frequency P0-10	0.01Hz	0.00Hz
P0-14	Lower Limit Frequency	0.00Hz-Upper Limit Frequency P0-12	0.01Hz	0.00Hz
P0-15	Carrier Frequency	0.5kH-16.0kHz	0.01kHz	Up to specific model
P0-16	Carrier Frequency Adjustment Along With Temperature	0: Disabled 1: Enabled	1	1
P0-17	Acceleration Time 1	0.00s-65000s	0.01s	Up to specific model
P0-18	Deceleration Time 1	0.00s-65000s	0.01s	Up to specific model
P0-19	Acceleration/Deceleration Time Unit	0: 1s 1: 0.1s 2: 0.01s	1	1
P0-20	Not Used	-	-	-
P0-21	Offset Frequency of Auxiliary Frequency at Superposing	0.00Hz- maximum frequency P0-10	0.01Hz	0.00Hz
P0-22	Frequency Command Decimal Point	1.0.1Hz 2: 0.01Hz	1	2
P0-23	Stop Memory Options of Digital Setting Frequency	0: Disabled 1: Enabled	1	0
P0-25	Acceleration/Deceleration Time Reference Frequency	0: Maximum frequency (P0-10) 1: Setting frequency 2: 100Hz	1	0

P0-26	Frequency Command UP/DOWN Quantity during Operation	0: Running frequency 1: Setting frequency		0
P0-27	Command Source Binding Frequency Source	Ones place: Binding frequency source options of operation panel command 0: No binding 1: Digital setting frequency 2: AI1 3: Reserve 4: Reserve 5: PULSE setting (DI5) 6: Preset speed 7: Simple PLC 8: PID 9: Communication setting Tens place: Binding frequency source options of terminal command Hundreds place: Binding frequency source options of communication command	1	0000
P1 Group: Motor Parameters				
P1-00	Motor Type Options	0: Common induction motor 1: Inverter induction motor	1	0
P1-01	Motor Rated Power	0.1kW-1000.0kW	0.1kW	Up to specific model
P1-02	Motor Rated Voltage	0V-2000V	1V	Up to specific model
P1-03	Motor Rated Current	0.01A-655.35A (inverter power < =55kW) 0.1A-655.35A (inverter power > 55kW)	0.01A	Up to specific model
P1-04	Motor Rated Frequency	0.00Hz-maximum frequency	0.01Hz	Up to specific model
P1-05	Motor Rated Rotation Speed	0rpm-65535rpm	1rpm	Up to specific model
P1-06	Stator Resistance of Induction Motor	0.001-65.535(inverter power < =55kW) 0.0001-6.5535(inverter power > =55kW)	0.001	Up to specific model
P1-07	Rotor Resistance of Induction Motor	0.001-65.535(inverter power < =55kW) 0.0001-6.5535(inverter power > =55kW)	0.001	Up to specific model
P1-08	Leakage Inductance of Induction Motor	0.01mH-655.35mH(inverter power < =55kW) 0.01mH-65.535mH(inverter power > 55kW)	0.01mH	Up to specific model
P1-09	Mutual Inductance of Induction Motor	0.1mH-6553.5mH(inverter power < =55kW) 0.01mH-655.35mH(inverter power > 55kW)	0.01mH	Up to specific model
P1-10	Idling Current of Induction Motor	0.01A-P1-03 (inverter power < =55kW) 0.1A-P1-03(inverter power > 55kW)	0.01	Up to specific model
P1-37	Autotuning Options	0: No autotuning 1: Stationary tuning of induction motor 2: Full tuning of induction motor		0
P2 Group: Motor Vector Control Parameters				
P2-00	Speed Loop Proportional Gain 1	1-100	1	30
P2-01	Speed Loop Integral Time 1	0.01s-10.00s	0.01s	0.50s
P2-02	Switching Frequency 1	0.00-P2-05	0.01Hz	5.00Hz
P2-03	Speed Loop Proportional Gain 2	1-100	1	20
P2-04	Speed Loop Integral Time 2	0.01s-10.00s	0.01s	1.00s
P2-05	Switching Frequency 2	P2-02-Maximum frequency	0.01Hz	10.00Hz
P2-06	Slip Compensation Gain Factor	50%-200%	1%	100%
P2-07	Filter Time Constant of SVC Speed Feedback	0.000s-0.100s	0.001	0.015s
P2-08	Vector overexcitation gain	0-200		64
P2-09	Upper Limit Source of Speed Control (Drive) Torque	0: set through function code P2-10 1: AI1 2: Reserve 3: Reserve 4: PULSE setting 5: Communication setting 6: Reserve 7: Reserve Full ranges of options 1 to 7 correspond to P2-10	1	0
P2-10	Upper Limit Numeric Setting of Speed Control Torque	0.0%-200.0%	0.1%	150.0%
P2-13	Excitation Adjustment Proportional Gain	0-60000	1	2000
P2-14	Excitation Adjustment Integral Gain	0-60000	1	1300
P2-15	Torque Adjustment Proportional Gain	0-60000	1	2000
P2-16	Torque Adjustment Integral Gain	0-60000	1	1300
P2-17	Speed Loop Integral Property	Ones place: Integral separation; 0: disabled; 1: enabled	1	0

P3 Group: V/F Control Parameters				
P3-00	V/F Curve Setting	0: Straight V/F curve 1: Multi-point V/F curve 2: Square V/F curve 3: 1.2th V/F curve 4: 1.4th V/F curve 6: 1.6th V/F curve 8: 1.8th V/F curve 9: Not used 10: VF complete split mode 11: VF half-split mode	1	0
P3-01	Torque Boost	0.0%: (no torque boost) 0.1%-30.0%	0.1%	Up to specific model
P3-02	Torque Boost End Frequency	0.00Hz- maximum frequency	0.01	50Hz
P3-03	Multipoint VF Frequency Point 1	0.0Hz-P3-05	0.01Hz	0.00Hz
P3-04	Multipoint VF Voltage Point 1	0.0%-100.0%	0.1%	0.0%
P3-05	Multipoint VF Frequency Point 2	P3-03-P3-07	0.01Hz	0.00Hz
P3-06	Multipoint VF Voltage Point 2	0.0%-100.0%	0.1%	0.0%
P3-07	Multipoint VF Frequency Point 3	P3-05- motor rated frequency (P1-04)	0.01Hz	0.00Hz
P3-08	Multipoint VF Voltage Point 3	0.0%-100.0%	0.1%	0.0%
P3-09	VF Slip compensation gain	0.0%-200.0%	0.0%	0
P3-10	VF Overexcitation Gain	0-200	1	64
P3-11	Oscillation Suppression Gain	0-100	1	Up to specific model
P3-13	VF Separation Voltage	0: Numeric setting (P3-14) 1: AI1 2: AI2 3: Reserve 4: PULSE setting (DI5) 5: Multispeed command 6: Simple PLC 7: PID 8: Communication setting 100.0% corresponds to motor rated voltage		0
P3-14	Numeric Setting of VF Separation Voltage	0V- Motor rated voltage		
P3-15	Voltage Rise Time of VF Separation	0.0s-1000.0s Refers to the time from 0V to motor rated voltage		
P4 Group: Input Terminal				
P4-00	DI1 Terminal Function Options	0: No function 1: Forward running 2: Reverse running 3: 3-wire running control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast-to-Stop 9: Fault reset (RESET) 10: Running pause 11: External fault NO input 12: Preset command terminal 1 13: Preset command terminal 2 14: Preset command terminal 3 15: Preset command terminal 4 16: Acceleration/deceleration options terminal 1 17: Acceleration/deceleration options terminal 1 18: Frequency source switching 19: UP/DOWN setting clear (terminal, keypad) 20: Running command switching terminal 1 21: Acceleration/deceleration prohibited 22: PID pause 23: PLC status reset 24: Wobbulation parameter 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30: PULSE (pulse) frequency input (only works for DI5) 31: Not used 32: Immediate DC stop 33: External fault NC input 34: Frequency setting onset terminal (when this terminal function hasn't been set, the default is to enable) If this terminal is set, terminal onset frequency can be modified through this terminal. 35: PID direction reverse terminal When this terminal is enabled, PID is opposite to the direction set by 10-03. 36: External stop terminal 1 Keypad control. This terminal can be used to stop the elevator, which is equal to the STOP key on the keypad	1	1
P4-01	DI2 Terminal Function Options			2
P4-02	DI3 Terminal Function Options			9
P4-03	DI4 Terminal Function Options			12

		37: Control command switch terminal 2: It is used to switch between terminal control and communication control. When this terminal is enabled, if P0-02 is set as terminal control, then it switches to communication control; if P0-02 is set as communication control, it switches to terminal control. 38: PID integral pause terminal hen this terminal is enabled, the integral adjustment function of PID pauses, but the proportional adjustment and the differential adjustment of PID are still enabled. 39: Switching terminal of frequency source A and preset frequency. When this terminal is enabled, frequency source A is replaced by preset frequency (P0-08). 40: Switching terminal of frequency source A and preset frequency When this terminal is enabled, frequency source B is replaced by preset frequency (P0-08). 41: Reserve 42: Not used 43: PID parameter switching terminal 44: Not used 45: Not used 46: Speed control/torque control switching 47: Emergency stop 48: External stop terminal 2 This terminal can be used to stop the elevator at the deceleration time 4 under any control mode. 49: Deceleration DC brake 50: Current running time clear 51: 2-wire/3-wire switching 52: Reverse frequency prohibited 53~59: Not used		
P4-10	DI Filter Time	0.000s~1.000s	0.001s	0.010s
P4-11	Terminal Command Mode	0: 2-wire 1 2: 3-wire 1 1: 2-wire 2 3: 3-wire 2	1	0
P4-12	Change Rate Per Second of Terminal UP/DOWN	0.001Hz~65.535Hz	0.001Hz	1.00Hz
P4-13	AI1 Minimum Input	0.00V~P4-15	0.01V	0.00V
P4-14	Corresponding Setting of AI1 Minimum Input	-100.0% ~+ 100.0%	0.1%	0.0%
P4-15	AI1 Maximum Input	P4-13 ~+10.00V	0.01V	10.00V
P4-16	Corresponding Setting of AI1 Maximum Input	-100.0% ~+ 100.0%	0.1%	100.0%
P4-17	AI1 Filter Time	0.00s~10.00s	0.01s	0.10s
P4-28	PULSE Minimum Input	0.00kHz~P4-30	0.01kHz	0.00kHz
P4-29	Corresponding Setting of PULSE Minimum Input	-100.0% ~+ 100.0%	0.1%	0.0%
P4-30	PULSE Maximum Input	P4-28 ~100.00kHz	0.01kHz	50.00kHz
P4-31	PULSE Maximum Input Setting	-100.0% ~ 100.0%	0.1%	100.0%
P4-32	PULSE Filter Time	0.00s~10.00s	0.01s	0.10s
P4-34	AI Lower Than Minimum Input Setting Options	Ones place: AI Lower Than Minimum Input Setting Options 0: Corresponding setting of minimum input 1: 0.0% Tens place: AI2 lower than minimum input setting options, same as above Hundreds place: AI3 lower than minimum input setting options, same as above	1	000
P4-35	DI1 Delay Time	0.0s~3600.0s	0.1s	0.0s
P4-36	DI2 Delay Time	0.0s~3600.0s	0.1s	0.0s
P4-37	DI3 Delay Time	0.0s~3600.0s	0.1s	0.0s
P4-38	DI Input Terminal Active Status Setting 1	0: High level 1: Low level Ones place: DI1 Tens place: DI2 Hundreds place: DI3 Thousands place: DI4 Tens thousands place: DI5	1	00000
		P5 Group: Output Terminal		
P5-02	Control Board Relay Output Options (T/A1-T/B1-T/C1) RELAY 1	0: No output 1: Inverter running 2: Fault output (stop upon fault) 3: Frequency level detection FDT1 output 4: Frequency reach 5: Run at zero speed (stop, no output) 6: Motor overload pre-warning 7: Inverter overload pre-warning 8: Set count value reach 9: Designated count value reach 10: Length Reach 11: PLC Cycle Finished 12: Accumulated Running Time Reach 13: Frequency limit 14: Torque limit 15: Running ready 16: AI1 > AI2 17: Upper limit frequency reach 18: Lower limit frequency reach (related to running) 19: Undervoltage status output	1	2

		20: Communication setting 21: Not used 22: Not used 23: Run 2 at zero speed (output at stop) 24: Accumulated power-on time reach 25: Frequency level detection FDT2 output 26: Frequency reach 1 output 27: Frequency reach 2 output 28: Current reach 1 output 29: Current reach 2 output 30: Timed reach output 31: AI1 input exceeds upper and lower limit 32: Offload 33: Reverse running 34: Zero current detection 35: Module temperature reach 36: Software overcurrent output 37: Lower limit frequency reach (irrespective to running) 38: Fault output (continue to run) 39: Motor overtemperature pre-warning 40: Current running time reach 41: Fault output (no output upon undervoltage)		
P5-22	T/A-T/C output treminal options	0- positive logic; 1- negative logic Ones place: FMR Tens place: RELAY 1 Hundreds place: RELAY 2 Thousands place: DO1 Tens thousands place: DO2	11111	00000
		P6 Group: Start/Stop Control		
P6-00	Start Mode	0: Direct start 1: Speed tracking start 2: Pre-excitation start of induction motor 3: SVC quick start	1	0
P6-01	Rotation Speed Tracking Mode	0: Start from stopping frequency 1: Start from industrial frequency 2: Start from maximum frequency		0
P6-02	Rotation Speed Tracking Fast/Slow	1-100	1	20
P6-03	Start Frequency	0.00Hz-10.00Hz	0.00	0.00
P6-04	Start Frequency Holding Time	0.0s-100.0s	0.1s	0.0s
P6-05	Start DC Brake/Pre-excitation Current	0%-100%	1%	0%
P6-06	Start DC Brake/Pre-excitation Time	0.0s-100.0s	0.1s	0.0s
P6-07	Acceleration/Deceleration Mode	0: Linear acceleration/deceleration 1: Static S curve deceleration 2: Dynamic S curve deceleration	1	0
P6-08	S Curve Start Section Time Proportion	0.0%- (100.0%-P6-09)	0.1%	30.0%
P6-09	S Curve End Section Time Proportion	0.0%- (100.0%-P6-08)	0.1%	30.0%
P6-10	Stop Mode	0: Ramp-to-stop 1: Coast-to-stop	1	0
P6-11	DC Brake Start Frequency at Stop	0.00Hz- maximum frequency	0.01Hz	0.00Hz
P6-12	DC Brake Waiting Time at Stop	0.0s-100.0s	0.1s	0.0s
P6-13	DC Brake Current at Stop	0%-100%	1%	0%
P6-14	DC Brake Time at Stop	0.0s-100.0s	0.1s	0.0s
P6-15	Brake Duty Ratio	0%-100%	1%	100%
P6-18	Rotation Speed Tracking Current	30%-200%	Up to specific model	
P6-21	Demagnetizing Time	0.00-5.00s	1.00s	
		P7 Group: Keypad & Display		
P7-02	STOP/RESET Key Function	0: This key can only be valid under keypad control mode. 1: This key is valid under all control modes	1	1
P7-03	LED Running Display Parameter 1	0000-FFFF Bit00: Running frequency (Hz) Bit01: Setting frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: Not used Bit11: Not used Bit12: Count value Bit13: Length Bit14: Load speed display Bit15: PID setting	1111	1F
P7-04	LED Running Display Parameter 2	0000-FFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input pulse frequency, unit: kHz Bit03: Running frequency (Hz) Bit04: Remaining running time Bit05: AI1 Voltage before calibration Bit06: Not used Bit07: Not used Bit08: Linear speed	1111	0

		Bit09: Current power-on time Bit10: Current running time Bit11: PULSE input pulse frequency, unit: 1Hz Bit12: Communication setting Bit13: Not used Bit14: Main frequency A display Bit15: Auxiliary frequency B display		
P7-06	Load Speed Display Factor	0.0001-6.5000	0.0001	1.0000
P7-07	Inverter Module Radiator Temperature	0.0℃-100℃	0.1℃	-
P7-08	Not Used			-
P7-09	Accumulated Running Time	0h-65535h	1h	-
P7-10	Not Used	-		-
P7-11	Software Version	-		-
P7-12	Decimal Displayed of Load Speed	0: 0 Decimal 2: 2 Decimal 1: 1 Decimal 3: 3 Decimal	H.111	1
P7-13	Accumulated Power-on Time	0h-65535h	1h	-
P7-14	Accumulated Energy Consumption	0-65535°	1°	-
		P8 Group: Auxiliary Function		
P8-00	JOG Running Frequency	0.00Hz-maximum frequency	0.01Hz	2.00Hz
P8-01	JOG Acceleration Time	0.0s-6500.0s	0.1s	20.0s
P8-02	JOG Deceleration Time	0.0s-6500.0s	0.1s	20.0s
P8-03	Acceleration Time 2	0.0s-6500.0s	0.1s	Up to specific model
P8-04	Deceleration Time 2	0.0s-6500.0s	0.1s	Up to specific model
P8-05	Acceleration Time 3	0.0s-6500.0s	0.1s	Up to specific model
P8-06	Deceleration Time 3	0.0s-6500.0s	0.1s	Up to specific model
P8-07	Acceleration Time 4	0.0s-6500.0s	0.1s	Up to specific model
P8-08	Deceleration Time 4	0.0s-6500.0s	0.1s	Up to specific model
P8-09	Hopping Frequency 1	0.00Hz- maximum frequency	0.01Hz	0.00Hz
P8-10	Hopping Frequency 2	0.00Hz- maximum frequency	0.01Hz	0.00Hz
P8-11	Hopping Frequency Amplitude	0.00Hz- maximum frequency	0.01Hz	0.01Hz
P8-12	Forward/Reverse Deadband Time	0.0s-3000.0s	0.1s	0.0s
P8-13	Reverse Control	0: Reverse permitted 1: Reverse prohibited	1	0
P8-14	Control Mode of Set Frequency Lower Than Lower Limit Frequency	0: Run at lower limit frequency 1: Stop 2: Run at zero speed	1	0
P8-15	Sagging Control	0.00Hz-10.00Hz	0.01Hz	0.00Hz
P8-16	Set Accumulated Power-On Time Reach	0h-65000h	1h	0h
P8-17	Set Accumulated Run Time Reach	0h-65000h	1h	0h
P8-18	Enable Protection Options	0: Disabled 1:Enabled		
P8-19	Frequency Detection Value (*FDT1*)	0.00Hz- maximum frequency	0.01Hz	50.00Hz
P8-20	Frequency Detection Hysteresis Value (*FDT1*)	0.0%-100.0% (FDT1 level)	0.1%	5.0%
P8-21	Frequency Reach Detection Bandwidth	0.0%-100.0% (maximum frequency)	0.1%	0.0%
P8-22	Enable Hopping Frequency during Acceleration/Deceleration Process	0: Disabled 1: Enabled		*0*
P8-25	Switching Frequency Point of Acceleration Time 1/2	0.00Hz- maximum frequency	0.01Hz	0.00Hz
P8-26	Switching Frequency Point of Deceleration Time 1/2	0.00Hz- maximum frequency	0.01Hz	0.00Hz
P8-27	Terminal Jog Priority	0: Disabled 1: Enabled		*0*
P8-28	Frequency Detection Value (*FDT2*)	0.00Hz- maximum frequency	0.01Hz	50.00Hz
P8-29	Frequency Detection Hysteresis Value (*FDT2*)	0.0%-100.0% (FDT2 level)	0.1%	5.0%
P8-30	Any Reach Frequency Detection Value 1	0.00Hz- maximum frequency	0.01Hz	50.00Hz
P8-31	Any Reach Frequency Detection Amplitude 1	0.0%-100.0% (maximum frequency)	0.1%	0.0%
P8-32	Any Reach Frequency Detection Value 2	0.00Hz- maximum frequency	0.01Hz	50.00Hz
P8-33	Any Reach Frequency Detection Amplitude 2	0.0%-100.0% (maximum frequency)	0.1%	0.0%
P8-34	Zero Current Detection Level	0.0%-300.0% 100.0% corresponds to motor rated current	0.1%	5.0%
P8-35	Zero Current Detection Delay Time	0.01s-600.00s	0.01s	0.10s
P8-36	Software Overcurrent Point	0.0% (no detection) 0.1%-300.0% (Motor rated current)	0.1%	200.0%
P8-37	Software Overcurrent Detection Delay Time	0.00s-600.00s	0.01s	0.00s
P8-38	Any Reach Current 1	0.0%-300.0% (motor rated current)	0.1%	100.0%
P8-39	Any Reach Current 1 Width	0.0%-300.0% (motor rated current)	0.1%	0.0%

P8-40	Any Reach Current 2	0.0%-300.0% (motor rated current)	0.1%	100.0%
P8-41	Any Reach Current 2 Width	0.0%-300.0% (motor rated current)	0.1%	0.0%
P8-42	Timed Function Options	0: Disabled 1: Enabled	1	0
P8-43	Timed Running Time Options	0: P8-44 setting 1: AI1 2: Not used Analog input range corresponds to P8-44	1	0
P8-44	Timed Running Time	0.0Min-6500.0Min	0.1Min	0.0Min
P8-45	AI1 Input Voltage Protection Value Lower Limit	0.00V-P8-46	0.01V	3.10V
P8-46	AI1 Input Voltage Protection Value Upper Limit	P8-45 - 10.00V	0.01V	6.80V
P8-47	Module Temperature Reach	0°C-100°C	1°C	75°C
P8-48	Radiation Fan Control	1: Motor running radiation fan running	1	0
P8-49	Awakening Frequency	Sleep frequency (P8-51) - maximum frequency (P0-10)	0.01Hz	0.00Hz
P8-50	Awakening Delay Time	0.0s-6500.0s	0.1s	0.0s
P8-51	Sleep Frequency	0.00Hz-awakening frequency (P8-49)	0.01Hz	0.00Hz
P8-52	Sleep Delay Time	0.0s-6500.0s	0.1s	0.0s
P8-53	Set Current Running Reach Time	0.0Min-6500.0Min	0.1Min	0.0Min
P8-54	Output Power Calibration Factor	0.00%-200.0%		100.0%
		P9 Group: Fault and Protection		
P9-00	Motor Overload Protection Options	0: Prohibited 1: Permitted		1
P9-01	Motor Overload Protection Gain	0.20-10.00	0.01	1.00
P9-02	Motor Overload Pre-warning Factor	50%-100%	1%	80%
P9-03	Overvoltage Stall Gain	0-100		30
P9-04	Overvoltage Stall Protection Voltage	120%~150%		130%
P9-05	Overcurrent loss speed Gain	0-100	20	
P9-06	Overcurrent loss speed cureent protection	100%~200%	150%	
P9-07	Short Circuit to Ground Protection Options upon Power-on	0: Disabled 1: Enabled		01
P9-09	Automatic Reset Times of Fault	0-20	1	0
P9-10	Fault DO Action Options during Fault Automatic Reset Period	0: Disabled 1: Enabled		0
P9-11	Fault Automatic Reset Interval	0.1s-100.0s		1.0s
P9-12	Input Phase Loss/Contactor On Protection Options	0: Disabled 1: Enabled		11
P9-13	Output Phase Loss Protection Options	0: Disabled 1: Enabled		1
P9-14	First Fault Type	No fault	-	-
P9-15	Second Fault Type	Not used	-	-
P9-16	Third Fault(Latest) Type	Acceleration overcurrent (OCA) Deceleration overcurrent (OCD) Constant speed overcurrent (OCN) Acceleration overvoltage (OUA) Deceleration overvoltage (OUD) Constant speed overvoltage (OUN) Buffer resistance overload (UU) Undervoltage (LU) Inverter overload (OL2) Motor overload (OL1) Input phase loss (PF) Output phase loss (LF) Module overheating (OH1) External fault (EF) Communication error (CE) Contactor abnormality (RL) Current detection abnormality (CC) Motor tuning abnormality (ER) Encoder/PG card abnormality (PG) Parameter read-write abnormality (EP) Inverter hardware abnormality (EH) Motor short circuited to the ground (GF) Not used Not used Running time reach (OT1) Not used Not used Power-on time reach (OT2) Offload (LL) PID feedback loss during running (PD) Rapid current limit overtime (LC) Motor overheating (OH2)	-	-
P9-17	Third Fault(Latest) Frequency	-	-	-
P9-18	Third Fault(Latest) Current	-	-	-
P9-19	Third Fault(Latest) Bus Voltage	-	-	-
P9-20	Third Fault(Latest) Input Terminal Status	-	-	-
P9-21	Third Fault(Latest) Output Terminal Status	-	-	-
P9-22	Third (Latest)Fault Inverter Status	-	-	-
P9-23	Third (Latest) Fault Time (Calculated From Current Power-on Time)	-	-	-
P9-24	Third (Latest) Fault Time (Calculated From Running)	-	-	-
P9-27	Second Fault Frequency	-	-	-
P9-28	Second Fault Current	-	-	-
P9-29	Second Fault Bus Voltage	-	-	-
P9-30	Second Fault Input Terminal Status	-	-	-

P9-31	Second Fault Output Terminal Status	-	-	-
P9-32	Second Fault Inverter Status	-	-	-
P9-33	Second Fault Time (Calculated from Current Power-on)	-	-	-
P9-34	Second Fault Time (Calculated from Current Running)	-	-	-
P9-37	First Fault Frequency	-	-	-
P9-38	First Fault Current	-	-	-
P9-39	First Fault Bus Voltage	-	-	-
P9-40	First Fault Input Terminal Status	-	-	-
P9-41	First Fault Output Terminal Status	-	-	-
P9-42	First Fault Inverter Status	-	-	-
P9-43	First Fault Time (Calculated from Current Power-on)	-	-	-
P9-44	First Fault Time (Calculated from Current Running)	-	-	-
P9-47	Fault Protection Action Options 1	Ones place: Motor overload (OL1) 0: Coast-to-stop 1: Stop according to the stopping mode 2: Continue to run Tens place: Not used Hundreds place: Not used Thousands place: External fault (EF) Ten thousands place: Communication error (CE)	11111	00000
P9-49	Fault Protection Action Options 3	Ones place: Not used 0: Coast to stop 1: Stop according to the stopping mode 2: Continue to run Tens place: Not used 0: Coast to stop 1: Stop according to the stopping mode 2: Continue to run Hundreds place: Power-on time reach (UT) 0: Coast to stop 1: Stop according to the stopping mode 2: Continue to run Ten thousands place: Offload (LL) 0: Coast to stop 1: Stop according to the stopping mode 2: Reduce to 7% of motor rated frequency and then continue to run. When there is no offload, automatically restore to setting frequency for running Ten thousands place: PID feedback loos during running (PD) 0: Coast to stop 1: Stop according to the stopping mode 2: Continue to run	11111	00000
P9-54	Continuous Running Frequency Options at Fault	0: Run at current running frequency 1: Run at the set frequency 2: Run at the upper limit frequency 3: Run at the lower limit frequency 4: Run at the spare frequency under abnormality	1	0
P9-55	Spare Frequency Setting under Abnormality	60.0%-100.0% (current targeted frequency)	0.1%	100.0%
P9-59	Instantaneous Stop Non-stop Enable	0: Disabled 1: Constant control of bus voltage 2: Ramp-to-stop		0
P9-60	Instantaneous Stop Non-stop Reset Voltage	60%-100%		85%
P9-61	Voltage Judgment Time under Non-stop Action upon Instantaneous Power Failure	0.0-100.0s		0.5s
P9-62	Bus Voltage of Non-stop Action upon Instantaneous Power Failure	60%-100%		80%
P9-63	Offload Protection Options	0: Disabled 1: Enabled	1	0
P9-64	Offload Detection Level	0.0-100.0%	0.1%	10.0%
P9-65	Offload Detection Time	0.0-60.0s	0.1s	1.0s

Group 10: PID Function				
10-00	PID Setting Source	0: Function code 10-01 setting 1: AI1 4: PULSE setting (DI5) 2: Not used 5: Communication setting 3: Not used 6: Preset commands setting	1	0
10-01	PID Value Setting	0.0%-100.0%	0.1%	50.0%
10-02	PID Feedback Source	0: AI1 5: Communication setting 1: Not used 6: Not used 2: Not used 7: Not used 3: AI1-AI2 8: Not used 4: PULSE setting (DI5)	1	0
10-03	PID Action Direction	0: Positive 1: Negative		*0*
10-04	PID Setting Feedback Range	0-65535	1	1000
10-05	Proportional Gain P1	0.0-100.0	0.1	20.0
10-06	Integral Time I1	0.01s-10.00s	0.01s	2.00s
10-07	Differential Time D1	0.000s-10.000s	0.001s	0.000s
10-08	PID Reverse End Frequency	0.00-maximum frequency	0.01Hz	2.00Hz
10-09	PID Offset Limit	0.0%-100.0%	0.1%	0.0%
10-10	PID Differential Limit	0.0%-100.0%	0.01%	0.10%
10-11	PID Setting Change Time	0.00-650.00s	0.01s	0.00s
10-12	PID Feedback Filter Time	0.00-60.00s	0.01s	0.00s

10-13	PID Output Filter Time	0.00-60.00s	0.01s	0.00s
10-15	Proportional Gain P2	0.0-100.0	0.1	20.0
10-16	Integral Time I2	0.01s-10.00s	0.01s	2.00s
10-17	Differential Time D2	0.000s-10.000s	0.001s	0.000s
10-18	PID Parameter Switching Condition	0: No switching 1: DI terminal 2: Automatic switching by offset 3: Automatic switching by running frequency		*0*
10-19	PID Parameter Switching Offset 1	0.0%-10-20	0.1%	20.0%
10-20	PID Parameter Switching Offset 2	10-19-100.0%	0.1%	80.0%
10-21	PID Initial Value	0.0%-100.0%	0.1%	0.0%
10-22	PID Initial Value Holding Time	0.00-650.00s	0.01s	0.00s
10-23	Forward Maximum Value of Twice Output Offset	0.00%-100.00%	0.01%	1.00%
10-24	Reverse Maximum Value of Twice Output	0.00%-100.00%	0.01%	1.00%
10-25	PID Integral Property	Ones place: Integral separation 0-disabled; 1- enabled Tens place: Whether to stop integral when output reaches to limit 0-continue the integral; 1- stop integral	11	00
10-26	PID Feedback Loss Detection Time	0.0s-20.0s	0.1s	1.0s
10-27	PID Feedback Loss Detection Value PID	0.0%: No judgement of feedback loss 0.1%-100.0%	0.1	20.0%
10-28	Arithmetic at Stop	0: Disabled 1: Enabled	1%	0
		11 Group: Wobbulation, Fixed Length and Count		
11-00	Wobbulation Setting Mode	0: With respective to center frequency 1: With respective to the maximum frequency	1	0
11-01	Wobbulation Amplitude	0.0%-100.0%	0.1%	0.0%
11-02	Hopping Frequency Amplitude	0.0%-50.0%	0.1%	0.0%
11-03	Wobbulation Cycle	0.1s-3000.0s	0.1s	10.0s
11-04	Wobbulation Triangular Wave Rise Time	0.1%-100.0%	0.1%	50.0%
11-05	Set Length	0m-65535m	0m	1000m
11-06	Actual Length	0m-65535m	0m	0m
11-07	Pulse Count Per Meter	0.1-6553.5	0.1	100.0
11-08	Set Count Value	1-65535	1	1000
11-09	Designated Count Value	1-65535	1	1000
		12 Group: Preset Command and Simple PLC		
12-00	Preset Command 0	-100.0%-100.0% (100.0% corresponds to the maximum frequency P0-10)	0.1%	0.0%
12-01	Preset Command 1	-100.0%-100.0%	0.1%	0.0%
12-02	Preset Command 2	-100.0%-100.0%	0.1%	0.0%
12-03	Preset Command 3	-100.0%-100.0%	0.1%	0.0%
12-04	Preset Command 4	-100.0%-100.0%	0.1%	0.0%
12-05	Preset Command 5	-100.0%-100.0%	0.1%	0.0%
12-06	Preset Command 6	-100.0%-100.0%	0.1%	0.0%
12-07	Preset Command 7	-100.0%-100.0%	0.1%	0.0%
12-08	Preset Command 8	-100.0%-100.0%	0.1%	0.0%
12-09	Preset Command 9	-100.0%-100.0%	0.1%	0.0%
12-10	Preset Command 10	-100.0%-100.0%	0.1%	0.0%
12-11	Preset Command 11	-100.0%-100.0%	0.1%	0.0%
12-12	Preset Command 12	-100.0%-100.0%	0.1%	0.0%
12-13	Preset Command 13	-100.0%-100.0%	0.1%	0.0%
12-14	Preset Command 14	-100.0%-100.0%	0.1%	0.0%
12-15	Preset Command 15	-100.0%-100.0%	0.1%	0.0%
12-16	Simple PLC Running Mode	0: Stop after single running 1: Holding last value at stop after single running 2: Continuous cycle	1	0
12-17	Simple PLC Power Failure Memory Options	Ones place: Power failure memory 0: Disabled 1: Enabled Tens place: Stop memory 0: Disabled 1: Enabled	11	00
12-18	Running Time of PLC Preset Command 0	0.0s(h)-6553.5s (h)	0.1s(h)	0.0s(h)
12-19	Acceleration/Deceleration Time Options of PLC Preset Command 0	0-3	1	0
12-20	Running Time of PLC Preset Command 1	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-21	Acceleration/Deceleration Time Options of PLC Preset Command 1	0-3	1	0
12-22	Running Time of PLC Preset Command 2	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-23	Acceleration/Deceleration Time Options of PLC Preset Command 2	0-3	1	0
12-24	Running Time of PLC Preset Command 3	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-25	Acceleration/Deceleration Time Options of PLC Preset Command 3	0-3	1	0
12-26	Running Time of PLC Preset Command 4	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-27	Acceleration/Deceleration Time Options of PLC Preset Command 4	0-3	1	0
12-28	Running Time of PLC Preset Command 5	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-29	Acceleration/Deceleration Time Options of PLC Preset Command 5	0-3	1	0

12-30	Running Time of PLC Preset Command 6	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-31	Acceleration/Deceleration Time Options of PLC Preset Command 6	0-3	1	0
12-32	Running Time of PLC Preset Command 7	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-33	Acceleration/Deceleration Time Options of PLC Preset Command 7	0-3	1	0
12-34	Running Time of PLC Preset Command 8	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-35	Acceleration/Deceleration Time Options of PLC Preset Command 8	0-3	1	0
12-36	Running Time of PLC Preset Command 9	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-37	Acceleration/Deceleration Time Options of PLC Preset Command 9	0-3	1	0
12-38	Running Time of PLC Preset Command 10	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-39	Acceleration/Deceleration Time Options of PLC Preset Command 10	0-3	1	0
12-40	Running Time of PLC Preset Command 11	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-41	Acceleration/Deceleration Time Options of PLC Preset Command 11	0-3	1	0
12-42	Running Time of PLC Preset Command 12	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-43	Acceleration/Deceleration Time Options of PLC Preset Command 12	0-3	1	0
12-44	Running Time of PLC Preset Command 13	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-45	Acceleration/Deceleration Time Options of PLC Preset Command 13	0-3	1	0
12-46	Running Time of PLC Preset Command 14	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-47	Acceleration/Deceleration Time Options of PLC Preset Command 14	0-3	1	0
12-48	Running Time of PLC Preset Command 15	0.0s(h)-6553.5s(h)	0.1s(h)	0.0s(h)
12-49	Acceleration/Deceleration Time Options of PLC Preset Command 15	0-3	1	0
12-50	Unit of PLC Running Time	0:s (second) 1: h (hour)	1	0
12-51	Preset Command 0 Setting Mode	0: Function code 12-00 setting 1: AI1 2: Not used 3: Not used 4: PULSE 5: PID 6: Preset frequency (P0-08) setting, modified by UP/DOWN	1	0

13 Group: Communication Parameter				
13-00	Communication Baud Rate	Ones place: MODBUS 0: 300BPS 7: 38400BPS 1: 600BPS 8: 57600BPS 2: 1200BPS 9: 115200BPS 3: 2400BPS 3: 125 4: 4800BPS 4: 250 5: 9600BPS 5: 500 6: 19200BPS 6: 1M	1	50005
13-01	Data Format	0: No parity (8-N-2) 1: Even parity (8-E-1) 2: Odd parity (8-0-1) 3: Disabled (8-N-1)(MODBUS valid)	1	0
13-02	Local Inverter Address	0: Broadcasting address 1-247 (MODBUS, Profibus-DP, CANLink valid)	1	1
13-03	MODBUS Response Delay	0-20ms (MODBUS valid)		20ms
13-04	Communication Overtime	0.0: Disabled 0.1-60.0s (MODBUS, Profibus-DP and CANLink valid)		0.0
13-05	(MODBUS, Profibus-DP Communication s Data Format	Ones place: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol		30
13-06	Communication Read Current Resolution	0: 0.01A 1: 0.1A		0
13-08	Expansion Card (PROFIBUS CANOPEN) Disconnection Detection Time	0.0 disabled 0.1s-60.0		0
16 Group: User Password				
16-00	User Password	0-65535	1	0
16-01	Parameter Initialization	0: No operation 01: Reset the default, excluding motor parameter 02: Clear record information	1	0

U Group: Summary Table of Monitoring Parameters

Function Code	Name	Minimum Unit	Communication Address
D0 Group: Basic Monitoring Parameters			
D0-00	Running Frequency (Hz)	0.01Hz	7000H
D0-01	Setting Frequency (Hz)	0.01Hz	7001H
D0-02	Bus Voltage (V)	0.1V	7002H
D0-03	Output Voltage (V)	1V	7003H
D0-04	Output Current (A)	0.01A	7004H
D0-05	Output Power (kW)	0.1kW	7005H
D0-06	Output Torque (%)	0.1%	7006H
D0-07	DI Input Status	1	7007H
D0-08	DO Output Status	1	7008H
D0-09	AI1 Voltage (V)	0.01V	7009H
D0-10	Reserve	0.01V/0.01mA	700AH
D0-12	Count Value	1	700CH
D0-13	Length	1	700DH
D0-14	Load Speed Display	1	700EH
D0-15	PID Setting	1	700FH
D0-16	PID Feedback	1	7010H
D0-17	PLC Stage	1	7011H
D0-18	PULSE Input Pulse Frequency (Hz)	0.01kHz	7012H
D0-19	Feedback Speed (Hz)	0.01Hz	7013H
D0-20	Remaining Running Time	0.1Min	7014H
D0-21	AI1 Voltage Before Calibration	0.001V	7015H
D0-22	Reserve	0.001V/0.01mA	7016H
D0-24	Linear Speed	1m/Min	7018H
D0-25	Current Power-on Time	1Min	7019H
D0-26	Current Running Time	0.1Min	701AH

Function Code	Name	Minimum Unit	Communication Address
D0 Group: Basic Monitoring Parameters			
D0-27	PULSE Input Pulse Frequency	1Hz	701BH
D0-28	Communication Setting	0.01%	701CH
D0-30	Main Frequency X Display	0.01Hz	701EH
D0-31	Auxiliary Frequency Y Display	0.01Hz	701FH
D0-32	View Any Memory Address	1	7020H
D0-34	Motor Temperature	1℃	7022H
D0-35	Target Torque (%)	0.1%	7023H
D0-37	Power Factor Angle	0.1°	7025H
D0-39	VF Separation Target Voltage	1V	7027H
D0-40	VF Separation Output Voltage	1V	7028H
D0-41	DI Input Status Visual Display	1	7029H
D0-42	DO Input Status Visual Display	1	702AH
D0-43	DI Function Status Visual Display 1(Function 01)-(Function 40)	1	702BH
D0-44	DI Function Status Visual Display 2(Function 41)-(Function 80)	1	702CH
D0-45	Fault Information	1	702DH
D0-58	Z Signal Counter	1	703AH
D0-59	Setting Frequency (%)	0.01%	703BH
D0-60	Running Frequency (%)	0.01%	703CH
D0-61	Inverter Status	1	703DH
D0-62	Current Fault Code	1	703EH
D0-63	Sending Data for Point-to-Point Master Communication	0.01%	703FH
D0-64	Number of Slave	0.01%	7040H
D0-65	Torque Upper Limit	0.1%	7041H
D0-74	Motor Actual Output Torque	-100-100%	7047H

Chapter 5. Fault Diagnosis & Troubleshooting

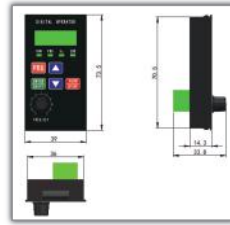
Fault diagnosis & troubleshooting

The inverter has multiple warning information and protection functions, such as overvoltage, undervoltage and overcurrent. In case of abnormality, the inverter enables protection function and stops output. Abnormal contact acts and the motor will roast to stop. Please refer to corresponding fault cause and handling methods.

Fault	Operation panel display	Fault cause	Troubleshooting
Overcurrent under constant speed	OCN	1. Output circuit of inverter grounded or short circuited 2. Vector control mode and without parameter tuning 3. The voltage is too low 4. If there exists impact load during running 5. Inverter power is too small	1. Troubleshoot external fault 2. Carry out motor parameter tuning 3. Adjust the voltage to normal range 4. Cancel the impact load 5. Select the inverter of higher power level
Overvoltage under constant speed	OUN	1. High input voltage 2. During running, there exists external force driving the motor	1. Adjust the voltage to normal range 2. Cancel the external power or install braking resistor
Inverter unit protection	SC	1. Output circuit of inverter is short-circuited 2. Wiring of motor and inverter is too long 3. Module overheating 4. Internal wiring of inverter looses 5. Master control board abnormality 6. Driver board abnormality 7. Variable module abnormality	1. Troubleshoot external fault 2. Install inductor or output filter 3. Check if the duct is blocked, if the fan runs normally and troubleshoot existing problems 4. Connect all wires properly 5. Ask for technical support 6. Ask for technical support 7. Ask for technical support
Overvoltage under acceleration	OUA	1.Input voltage is too high 2. During running, there exists external force driving the motor 3. Too short acceleration time 4. There is no braking unit and braking resistor	1. Adjust the voltage to normal range 2. Cancel the external power or install braking resistor 3. Increase the acceleration time 4. Install braking unit and resistor.
Overcurrent under deceleration	OCD	1. Output circuit of inverter grounded or short circuited 2. Vector control mode and without parameter tuning 3. Short deceleration time 4. Too low voltage 5. Impact load during running 6. There is no braking unit and braking resistor	1. Troubleshoot external fault 2. Carry out motor parameter tuning 3. Increase the deceleration time 4. Adjust the voltage to normal range 5. Cancel the impact load 6. Install braking unit and resistor.
Overcurrent under acceleration	OCA	1. Output circuit grounded or short circuited 2. Vector control mode and without parameter tuning 3. Too short acceleration time 4. Manual torque boost or V/F curve is not applicable 5. Too low voltage 6. Start the motor in rotation 7. There exists impact load during acceleration process 8. Inverter power is too small	1. Troubleshoot external fault 2. Carry out motor parameter tuning 3. Increase the acceleration time 4. Adjust the manual torque or V/F curve 5. Adjust the voltage to normal range 6. Select the rotation speed tracking start or restart after the motor stops. 7. Cancel the impact load. 8. Select the inverter with higher power level
PID feedback loss fault during running	PD	1. PID feedback is lower than the setting value of 10-20	1. Check the PID feedback signal or set 10-26 properly
Output phase loss	LF	1. The leading wire from the inverter to the motor is abnormal 2. 3-phase output unbalance during motor running 3. Driver board abnormality 4. Module abnormality	1. Troubleshoot external fault 2. Check if the 3-phase winding of motor runs normally and troubleshoot the fault 3. Ask for technical support 4. Ask for technical support
Pulse-by-pulse current limit	LC	1. If there exists large load or motor stalling 2. The inverter power is too low	1. Reduce the load and check the motor and mechanical conditions 2. Select the inverter with higher power level
Overvoltage under deceleration	OUD	1.Input voltage is too high 2. During running, there exists external force driving the motor 3. Too short acceleration time 4. There is no braking unit and braking resistor	1. Adjust the voltage to normal range 2. Cancel the external power or install braking resistor 3. Increase the acceleration time 4. Install braking unit and resistor.

Fault	Operation panel display	Fault cause	Troubleshooting
Motor load	OL1	1. If inverter protection parameter P9-01 is set properly 2. If the load is too large or there exists motor stalling 3. The inverter power is too small	1. Set this parameter correctly 2. Reduce the load and check the motor and mechanical conditions 3. Select the inverter with higher power level
Control power fault	UU	1. The input voltage is not within the specified range	1. Adjust the voltage to the range specified by the specification
Module overheating	OH1	1. Ambient temperature is too high 2. Air duct is blocked 3.Fan damaged 4. Module thermistor is damaged 5. Inverter module is damaged	1.Lower the ambient temperature 2.Clean the air duct 3.Replace the fan 4. Replace the thermistor 5. Replace the inverter module
Undervoltage fault	LU	1. Instantaneous power failure 2. Input voltage of inverter is not within the range specified by the specification 3. Bus voltage is unabnormal 4. Rectifier bridge and buffer resistor run abnormally 5. Driving failure 6. Control board failure	1. Reset the fault 2. Adjust the range to normal range 3. Ask for technical support 4. Ask for technical support 5. Ask for technical support 6. Ask for technical support
Inverter overload	OL2	1. The load is too large 2. The inverter power is too small	1. Reduce the load and check the motor and mechanical conditions 2. Select the inverter with higher power level
EEPROM read failure	EP	1. EEPROM chip is damaged	1. Replace the master control board
Accumulated power-on time reach fault	UT	1. Accumulated power-on time reaches to the setting value	1. Enable parameter initialization function to clear the record information.
External equipment fault	EF	1. Input external fault signal through multi-function terminal DI 2. Input external fault signal through virtual IO function	1. Reset running 2. Reset running
Inverter hardware fault	EH	1. There exists overvoltage 2. There exists overcurrent	1. Troubleshoot according to overvoltage fault 2. Troubleshoot according to overcurrent fault
Communication fault	CE	1. PC runs abnormally 2. Communication wire runs abnormally 3. 13 group of communication parameters are incorrect	1. Check the PC wiring 2. Check the communication wiring 3. Set communication parameters correctly
Accumulated running time reach fault	OT	1. Accumulated running time reaches to the setting value	1. Use parameter initialization function to clear the record information.
Offload fault	LL	1. Inverter running current is lower than the value set by P9-64	1. Confirm if motor is disconnected from the load or P9-64 and P9-65 conform to actual running condition.
Contactor fault	RL	1. Driver board and power supply failure 2. Contactor failure	1. Replace the driver board or power panel 2. Replace the contactor
Motor tuning fault	ER	1. Motor parameters aren't set according to the nameplate 2. Overtime of parameter tuning process	1. Set motor parameters correctly according to the nameplate 2. Check the leading wire from inverter to the motor
Motor overtemperature fault	OH2	1. Temperature sensor wiring looses 2. Motor overtemperature	1. Detect the temperature sensor wiring and troubleshoot fault 2. Lower down the carrier frequency or take other radiation measures to cool down the motor
current detection fault	CC	1. Check hall element abnormality 2. Driving board failure	1. Replace hall elements 2. Replace the driving board
Short circuited to ground failure	GF	1. Motor short circuited to the ground	1. Replace cable or motor

Chapter 6. Overall dimensions



Voltage level		200VAC				400VAC		
A720		0R4	0R7	1R5	2R2	0R7	1R5	2R2
Motor rated output power(KW)		0.4	0.75	1.5	2.2	0.75	1.5	2.2
Motor output horsepower capacity(HP)		0.5	1.0	2.0	3.0	1.0	2.0	3.0
Output	Rated output capacity(KVA)	1.0	1.9	2.7	5.9	2.3	3.1	3.8
	Rated output current(A)	2.3	4.0	7.0	9.6	2.1	3.8	5.1
	The maximum output voltage(V)	Corresponding input voltage						
Personalized function	The highest frequency	V/F control:0~3200Hz						
	Carrier frequency	0.5kHz~16kHz;according to the load characteristics,can be adjusted carrier frequency automatically.						
	The input frequency resolution	Digital setting:0.01Hz:simulation setting:the highest frequency*0.025%						
	Control mode	V/F control						
	Starting torque	0.5Hz/150%(SVC)						
	Speed range	1:1 0 0(SVC)						
	The steady speed precision	+/-.5%(SVC)						
	Overload capacity	150% rated current 60s;180% rated current 3s;						
	Torque boost	Automatic torque boost:manual torque boost0.1%~30.0%						
	V/F curve	Three ways:straight,multi-point type,square type						
	Acceleration and deceleration curve _	linear or S curve acceleration and deceleration mode:four kinds of acceleration and deceleration time;eacceleration and deceleration time range0.0~6500.Os						
	DC brake	DC braking frequency:0.00Hz~the maximum frequency;the braking time:0.0s~36.0s,braking action currentvalue:0.0%~100.0%						
	Motor-driven control	Dynamic frequency range:0.00Hz~50.00Hz;motor-driven acceleration and deceleration time:0.0s~6500.0s						
	Simple PLC,multi-speedoperation	Through the built-in PLC or control terminal to achieve 16 speed at most						
	Built-in PID	Can be convenient to realize closed-loop control of process control system						
	Automatic voltage regulator(AVR)	When the power voltage changes,automatically keep the output voltage constant						
	Overvoltage and over current stall control	Current and voltage automatically be limited during the operation,prevent frequent over-voltage and over-current trip						
	Fast Quick current limiting function	Maximum limit reduce over current faults,protect the inverter operation						
	Torque limit and control	"excavator"characteristics,the automatic torque limit during the operation,prevent frequent over-current trip						
	Power on peripheral equip ment safety self-inspection	Can be realized on the peripheral devices safety inspection,such as grounding,short						
	Common DC bus function	Can realize multiple inverters of common DC bus function						
	Textile swing frequency control	Multiple delta frequency control						
	Timing control	Timing control function:set the time range 0h~65535h						

Inverter			Braking Resistor	
Volatge	Max motor machine capacity	Inverter Model	Resistors specification	Resistor qty
230V	0.4	0.4KW	80W 200Ω	1
	0.75	0.75KW	80W 200Ω	1
	1.5	1.5KW	300W 100Ω	1
	2.2	2.2KW	300W 70Ω	1
440V	0.75	0.75KW	70W 750Ω	1
	1.5	1.5KW	260W 400Ω	1
	2.2	2.2KW	260W 250Ω	1

Appendix A720 Modbus communication protocol

A720 series inverter provides RS485 communication interface and supports Modbus-TRU slave station communication protocol.The user can realize the centralized control through the computer or PLC, set the operation command of the inverter through the communication protocol, modify or read the function code parameters, and read the working status and fault information of the inverter.

J.1 Protocal Content:

The serial communication protocol defines the content and format of the information transmitted in serial communication.These include: host polling (or broadcast) formats;Host encoding method, including: request action function code, transmission data and error verification.The slave machine's response is also in the same structure, including: action confirmation, return data and error checking.If the slave machine makes an error in receiving the message or cannot complete the action required by the host, it will organize a fault message and feed back to the host as a response.

J .1.1 Application mode:

Inverter access to the PC/PLC control network with RS485 bus wire "single master multi slave", as a communication slave.

J.1.2 Bus Wire Structure

1, Hardware interface

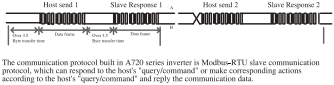
The RS485 extension card , MD38TX1 hardware needs to be inserted into the inverter.

2, Topological structure: single host and multiple slave systems. Each communication device in the network has a unique slave station address with one device , one need to be as the Host (usually flat PC host, PLC, HMI, etc.), initiate communication actively, and read or write parameters to the slave computer. Other devices in the communication slave, response to the host of the local inquiry or communication operation. Only one device can send date at a time while other devices are in receiving statu.

The setting range of slave address is 1~ 247,0 is broadcast address.The slave address in the network must be unique.

3, Communication transmission mode is asynchronous serial, half duplex transmission mode.In serial asynchronous communication, data is sent one frame at a time in the form of message

According to the Modbus-RTU protocol, when the free time of communication data online is more than 3.5Byte, it means the start of a new communication frame.

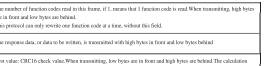


The communication protocol built in A720 series inverter is Modbus-RTU slave communication protocol, which can respond to the host's "query/command" or make corresponding actions according to the host's "query/command" and reply the communication data.

The host can be a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., the host can communicate to an exact slave, but also can broadcast to all the lower slave. For separate access to the host "query/command", the accessed slave will return a reply frame;For broadcast messages sent by the host, the slave does not need to respond back to the host.

J.2 Communication data structure

The Modbus protocol communication data format of A720 series inverter is as follows. The inverter only supports reading or writing of word-type parameters, and the corresponding communication reading operation command is 0x03.The write operation command is 0x06, it does not support byte or bit in read and write operations:



Function code number H	The number of function codes read in this frame, if 1, means that 1 function code is read.When transmitting, high bytes are in front and low bytes are behind.
Function code number L	This protocol can only rewrite one function code at a time, without this field.
Data H	The response data, or data to be written, is transmitted with high bytes in front and low bytes behind
Data L	
CRC CHK Lower	Test value: CRC(16 check value.When transmitting, low bytes are in front and high bytes are behind.The calculation method is described in CRC verification section
CRC CHK higher	
END	3.5 TIMEten

2. CRC verification method:

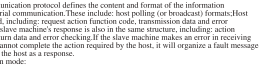
CRC (Cyclical Redundancy Check) USES RTU frame format, messages include CRC based error detection fields.The CRC detects all the message content.The CRC field is a two-byte, include 16-bit binary.It is calculated by the transport device and added to the message.The receiving device recalculates the CRC received message and compares with the value in the received CRC field. If the two CRC values are not equal, the transmission is wrong.

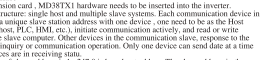
CRC store 0xFFFF firstly, and then call a procedure to process the continuous 8-bit bytes in the message with the value in the current register.Only 8Bit data in each character is valid for CRC, starting and stopping bits and parity bits are all invalid.

During CRC generation, each 8-bit character is separately distinct from the register contents or (XOR), and the result moves towards the least significant bit, while the highest significant bit is filled with 0.LSB is extracted for detection, if LSB is 1, the register separately differs from the preset value or, if LSB is 0, it is not performed.The whole process is repeated eight times.After the last bit (8th bit) is completed, the next 8-bit byte is separately or different from the current value of the register.The value in the final register is the CRC value after all bytes in the message been executed. When CRC is added to a message, low bytes are added first, then high bytes.CRC simple functions are as follows:

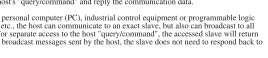
```
unsigned int crc_chk_value (unsigned char *data_value,unsigned char length) {
                unsigned int crc_value=0xFFFF;
                int i;
                while (length--) {
                        crc_value^=*data_value++;
                        for (i=0;i<8;i++) {
                   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

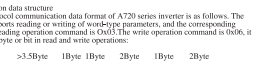
Theoretically, the upper computer can read several consecutive function codes at one time (i.e., n can be up to 12 at most), but it should be noted that it cannot exceed the last function code of this function code group, otherwise the answer will be wrong.





If the slave detects an error in the communication frame, or if the read and write attempt is unsuccessful due to other reasons, it will reply error frame





1. Data frame description:

Frame header: START	Free of over 3.5 character transfer times
Slave address: ADR	Communication address range: 1 ~ 247, 0 = broadcast address
Command code:CMD	03: read slave parameter; 06: write slave parameter
Function code address: H	Inverter internal parameter address, hexadecimal representation.It can be divided into functional code type and nonfunctional code type (such as running state parameters, running commands, etc.) parameters, as shown in the address definition.When transmitting, high bytes are in front and low bytes are behind.
Function code address: L	

Address definition of communication parameters

Read and write function code parameters (some function codes cannot be changed and are only used by manufacturers or monitoring) :

j.3 Function code parameter address mark rule

High-order byte: P0~15(PF)(group P), B0~B(group B), 70~7F(group U)

Low order byte: 00~PP

For example, if the range function code is p3-12, the access address of the function code is 0xF30C.

Note:

1) Group 16 (PP) : neither parameters can be read nor changed;

2) U group: readable only, parameters cannot be changed.Some parameters cannot be changed when the inverter is in running state.No matter what state the inverter is in, some parameters cannot be changed.

When Change the function code parameters , take note of the scope, units, and description of the parameters.

Function code group number	Communication Address	Communication group change RAM function code address
P0 — 15 Group	0xF000 — 0xF0FF	0x0000 — 0x00FF
B0 — B6 Group	0xB000 — 0xB6FF	0x4000 — 0x40FF
U0 Group	0x7000 — 0x70FF	

Note : Because EEPROM is stored frequently, it can reduce the lifetime of EEPROM. Therefore, some function codes in communication mode do not need to be stored, just change the value in RAM.

1) if P group parameters want to achieve this function, as long as the high-order F of the function code address change to 0 can be achieved.

2) if the group B parameters want to achieve this function, by changing the high-order A of the function code address to 4.

The corresponding function code address is shown as follows:

High-order byte: 00~0F(group P), 40~4F(group B)

Low order byte: 00~PP

Such as:

Function code p3-12 is not stored in EEPROM, address is 030C.

Function code b0-05 is not stored in EEPROM, address is 4005;

This address can only do write RAM, can not do read action, read is invalid address.

For all parameters, this function can also be implemented by using the command code 07H.

1. Shut down/operation parameters:

Data Group Address	Parameter des	Inverters addres	Parameter des
1000H	Communication set (decimal) -10000 ~ 10000	1010H	PID setting
1001H	Run Freq.	1011H	PID feedback
1002H	Run Vol	1012H	PLC steps
1003H	Output Vol	1013H	PULSE input pulse freq. Unit 0.01Hz
1004H	Output current	1014H	Feedback speed unit 0.1Hz
1005H	Output power	1015H	Remain run time
1006H	Output Torq	1016H	AI1 Pre-correction voltage
1007H	Run Speed	1017H	AI2 Pre-correction voltage
1008H	DI input mark	1018H	AI3 Pre-correction voltage
1009H	DO output mark	1019H	Linear speed
100AH	AI1 Vol	101AH	Current power on time
100BH	AI2 Vol	101BH	Current run time
100CH	AI3 Vol	101CH	PULSE input pulse freq. Unit 1Hz
100DH	Count input	101DH	Communication set value
100EH	Length input	101EH	Actual feedback speed
100FH	Load speed	101FH	Main Freq.X shows
-	-	1020H	Auxiliary frequency Y shows

Note:
1) Communication set value is the percentage of the relative value, 10000 corresponds to 100.00%; -10000 corresponds to -100.00%.
2) For the data of frequency dimension, this percentage is the percentage relative to the maximum frequency (p0-10);For the torque dimension data, the percentages are p2-10 and b2-48 (the torque upper limit number is set, corresponding to the first and second motors respectively).

2. Control command input to frequency inverter :(write only)

Command address	Command function
2000H	0001: Running forwsed
	0002: Reverse run
	0003: normal inching turning
	0004: Reversal point move
	0005: Free stop
	0006: Deceleration stop
	0007: fault resetting

3.Read inverter status :(read-only)

Statu Address	Statu function
3000H	0001: Running forward
	0002: Reverse run
	0003: Stop

4.Parameter lock password check :(if the return is 8888H, that means the password passed)

Password Address	Enter Password
1F00H	*****

5.Digital output terminal control :(write only)

Command address	Command content
2001H	BIT0: DO1 output control; BIT1: DO2 output control BIT2: RELAY1 output control BIT3: RELAY2 output control BIT4: FMR output control BIT5: VD01 BIT6: VD02 BIT7: VD03 BIT8: VD04 BIT9: VD05

6、Analog output AO1 control :(write only)

Command address	Command content
2002H	0 ~ 7FFF means 0%~ 100 %

7、Analog output AO2 control :(write only)

Command address	Command content
2003H	0 ~ 7FFF means 0%~ 100 %

8、Pulse（PULSE）output control :(write only)

Command address	Command content
2004H	0 ~ 7FFF means 0%~ 100 %

9、Inverter fault description

Fault Address	Fault information	
8000H	0000: Fault=free	0015: Parameters read and write abnormal
	0001: Reserve	0016: Inverter hardware fault
	0002: Accelerated overcurrent	0017: Motor to ground short circuit fault
	0003: Decelerated overcurrent	0018: Reserve
	0004: Constant speed overcurrent	0019: Reserve
	0005: Accelerated overvoltage	001A: Run time arrive
	0006: Decelerated overvoltage	001B: User-define fault 1
	0007: Constant speed overVoltage	001C: User-define fault 2
	0008: Buffer resistance overload fault	001D: Power on time arrive
	0009: Undervoltage fault	001E: Off-load
	000A: Inverter overload	001F: PID Feedback loss during running
	000B: Motor Overload	0020: Pect current limit overtime fault
	000C: Input phase loss	0021: Switch motor fault during operation
	000D: Output Phase loss	0022: Speed deviation too large
	000E: Module overheat	0023: Motor overspeed
	000F: External fault	0024: Motor Overheat
	0010: Communication abnormal	0026: Encoder line number setting error
	0011: Contactor abnormal	0027: Encoder unconnected
	0012: Current checking fault	0028: Initial position error
	0013: Motor Tuning fault	
	0014: Encoder/PG card Fault	

J.4 P D Group communication parameters description

13-00	Baud Rate	Default	6005
		Unit: MODBUS Baud Rate	
	Set Range	0: 300BPS	5: 9600BPS
		1: 600BPS	6: 19200BPS
		2: 1200BPS	7: 38400BPS
		3: 2400BPS	8: 57600BPS
		4: 4800BPS	9: 115200BPS

This parameter is used to set the data transmission rate between the upper computer and the Inverter. Note that the baud rate set by upper computer and inverter must be the same, otherwise, communication cannot be conducted.
The higher the baud rate is, the faster the communication speed will be.

13-01	Data Format	Default	0
	Set Range	0: No check: Date Format <8,N,2>	
		1: Even check: Date Format <8,E,1>	
		2: Odd check: Date Format <8,O,1>	
		3: No check: Date Format <8,N,1>	

The data format set by upper computer and Inverter must be the same, otherwise, communication cannot be carried ou

13-02	Local address	Default	1
	Set range	1~247, 0 is broadcast address	

When the local address is 0, it is the broadcast address and realizes the broadcast function of the upper computer.
The local address has uniqueness (except broadcast address), which is the basis of realizing point-to-point communication between upper computer and inverter.

13-03	Response delay	Default	2ms
	Set Range	0~20ms	

Response delay: it refers to the intermediate time between the end of receiving the data of the inverter and sending the data to the upper computer.If the response delay is less than the system processing time, the response delay shall be subject to the system processing time. If the response delay is longer than the system processing time, the system shall wait after processing the data, and send data to the upper computer until the response delay time finished.

13-04	Communication overtime	Default	0.0 s
	Set range	0.0 s (invalid) ~ 60.0s	

When the function code is 0.0 s, the communication overtime parameter is invalid.
When the function code is set to valid value, if the interval between one communication and the next communication exceeds the communication overtime, the system will report communication fault error (CE).Typically, this is set to invalid.If set the secondary parameter in the continuous communication system, it can monitor the communication status.

13-05	Communication protocol selection	Default	0.0 s
	Set Range	0: 非~Standard Modbus protocol; 1: Standard Modbus Protocol	

13-05=1：choose standard Modbus protocal.
13-05=0：when read the command, the slave returened byte number is one more than standard Modbus protocal, see this agreement "5" for detail Communication data structure section.

13-06	Communication reading current resolution	Default	0
	Set Range	0: 0.01A;	

It is to determine the current value output unit during reading the communication output current.