QMA(Shanghai) Electric Co., Ltd

Qma High Performance Vector Control Invetrer

A1000

200V (3-phase power supply) 0.4-75kW
200V (single-phase power supply)0.4-5.5kW
400V (3-phase power supply) 0.75-355kW

User Manual

Contents

Chapter 1 Product Introduction

1.1 Product Introduction

Thank you for purchasing Qma A1000 inverter, which is a general purpose current torque vector control inverter characterized by high performance and ultra low noise. For the best use of this inverter and for your safety, please read this manual carefully. If you encounter any problems not described in the manual during use, please contact your local dealer or our technical personnel of Engineering Department. Our professionals are always pleased to serve you. You can feel ease to continue to use A1000 inverter.

[Notice for Use]:

A1000 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

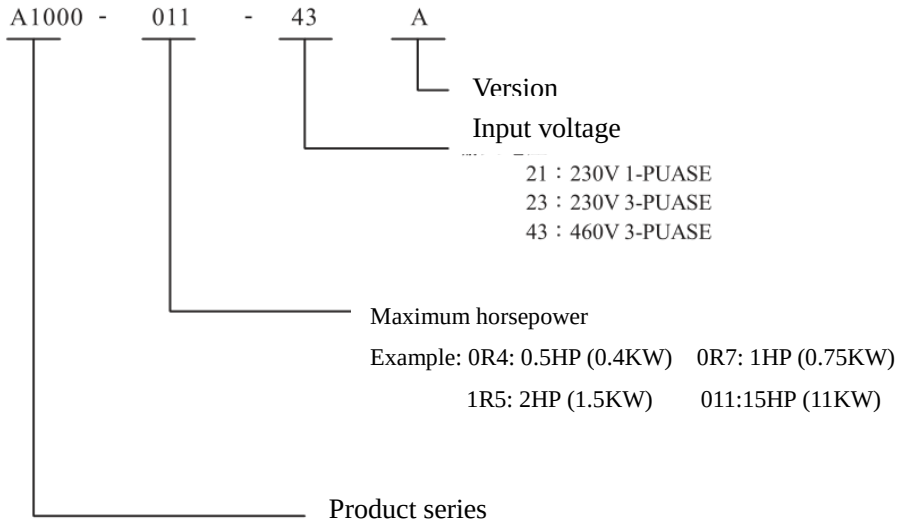
restart again if automatic restart function is enabled. • Stop switch will be effected only after setting. Please note that it is different from emergency stop switch in usage.

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 11kw 380V as an example

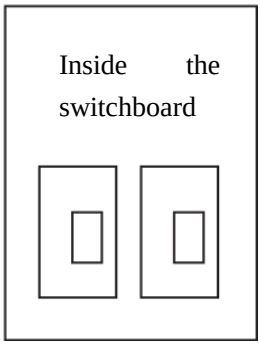
1.3 Model Numbering Description



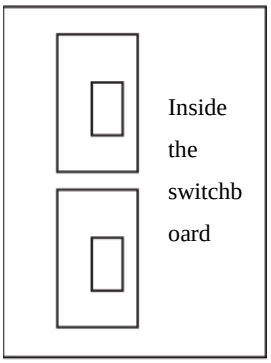
1.4 Application Environment

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℃.



(Correct configuration)



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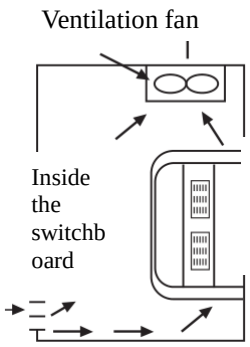
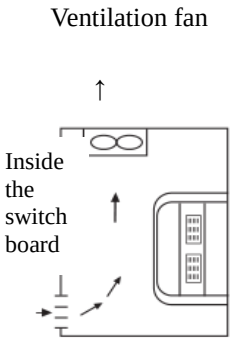
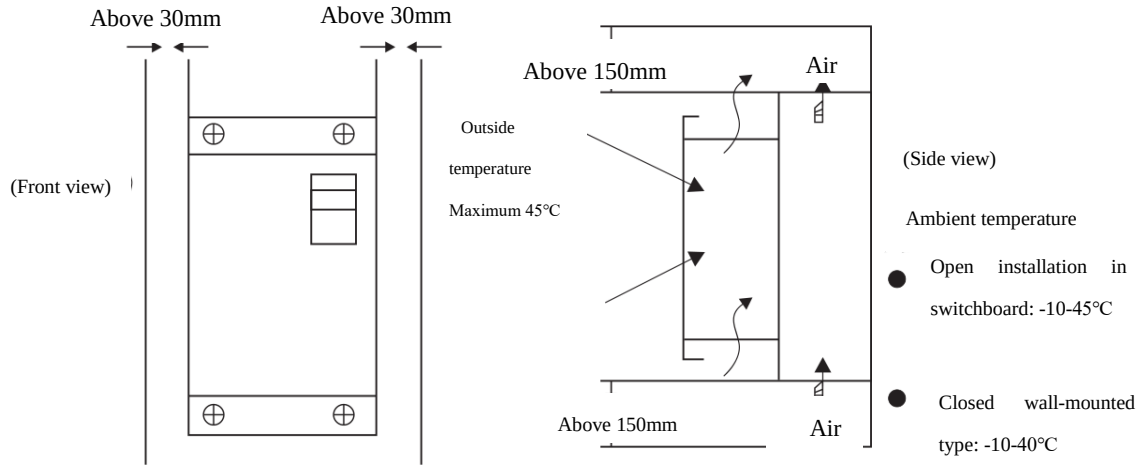


(Correct configuration)



(Incorrect configuration)

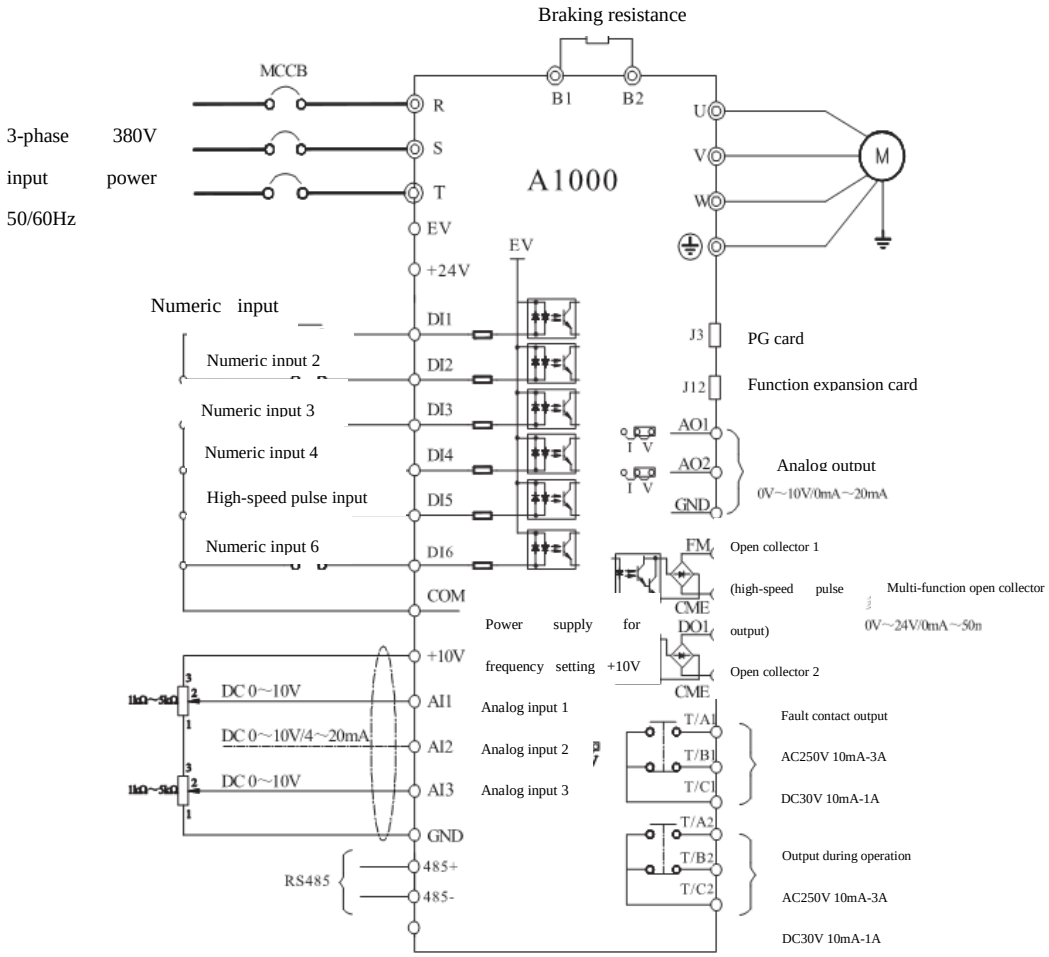
- Installing the inverter with its front surface forward and top part upward for heat radiation.
- Installation space must be in accordance with following regulations: When the inverter is installed inside the switchboard or if conditions permit, remove upper dustproof cover of the inverter for cooling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



Chapter 2 Wiring Description

2.1 Basic Wiring Diagram

- Wiring schematic diagram of 3-phase inverter



Wiring Schematic Diagram of 3-phase Inverter

Note:

1) refers to main circuit terminal, refers to control circuit terminal.

2) Select braking resistance as required by users. Please refer to Braking Resistance Selection Guide for detail.

2.2 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!

■ **Wiring of main circuit**

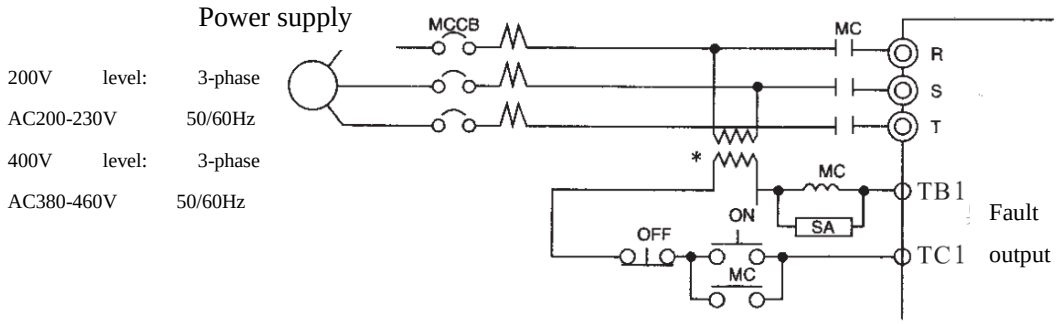
This part introduces main circuit I/O wiring and grounding wire.

Wiring on input side of main circuit

Installation of wiring circuit breaker

A wiring circuit breaker (MCCB) corresponding to inverter power is required between the power supply and the input terminals.

- Choose a MCCB with a capacity of 2 times that of the rated current of the inverter.
- The time characteristics of MCCB must meet the time characteristics of the overheating protection of the inverter (150% of rated output current/1 minute).
- If single MCCB is shared by two or more inverters or other device, the contact of fault output shall be connected to contractor, so that the power supply will be turned off by the fault signals.

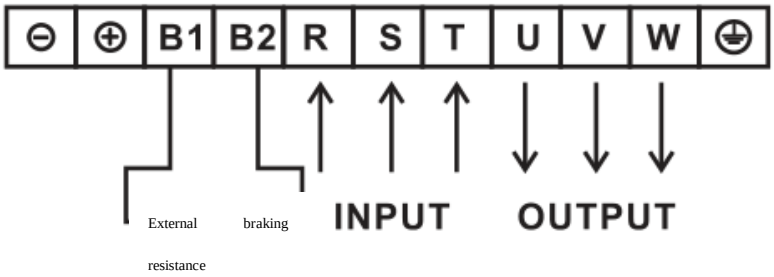


* When 400V level is selected, 400/200V transformer should be connected.

Setting Wiring Circuit Breaker

■ **Functions of Main Circuit Terminal**

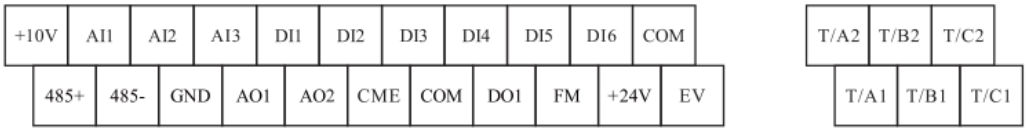
Function	Terminal	A1000
Power input of main circuit	R, S, T	0.4kw-355KW
Inverter output	U, V, W	0.4kw-355KW
Connecting to braking resistance	B1, B2 (PB, +)	0.4kw-30KW
Connecting to DC reactor	P1, ⊕	132kw-355KW
Connecting baking unit	⊕, ⊖	18.5kw-355kw
Grounding	⏚	0.4kw-355kw



Example: A1000-011-43A

2.3 Terminals & Wiring of Control Circuit :

1) Layout drawing of control circuit terminals is as follows:



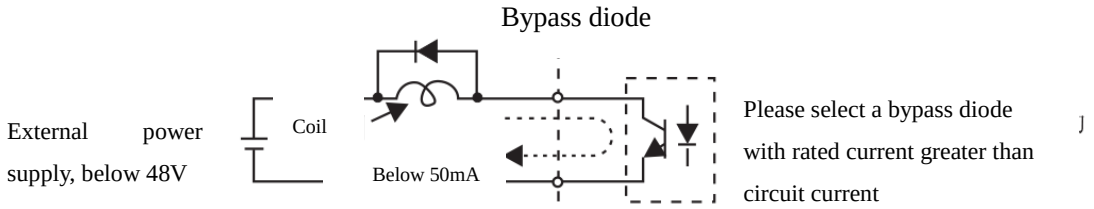
2) Function of control circuit terminals:

Type	Terminal Symbol	Terminal Name	Terminal Function
Power supply	**+10V-GND**	External+10V	Offers +10V power source. Maximum output current: 10mA; generally used as a working power supply for external potentiometer. Resistance range of potentiometer: **1kΩ-5kΩ**
	+24V-COM	External+24V	Offers +24 power source, generally used as a working power supply for numeric input and output terminals and an external sensor power supply. Maximum output current: **200mA**.
	EV	External power supply input terminal	The default is to connect to 24V power supply. When driving **DI1** and **D15** with external power supply, connect it to the external power supply and pull out the connector between EV and +24V connector.
Analog input	**AI1-GND**	Analog input terminal 1	**1.** Input voltage range: **DC OV-10V** **2**. Input impedance: **22k Ω**
	AI2-GND	Analog input terminal 2	1. Input range: **DC OV 10V/4mA- 20mA**, determined by jumper wire J8 on control board. 2. Input impedance: voltage input **22kΩ**,

			current input **500Ω**.
	AI3-GND	Analog input terminal 3	1. Input voltage range: **DC 0V-10V** 2. Input impedance: **22kΩ**
Numerical input	**DI1**	Numerical input 1	1. Optocoupler isolation, compatible with bipolar input 2. Input impedance: **2.4kΩ** 3. Voltage range under level input: **9V-30V**
	DI2	Numerical input 2	
	DI3	Numerical input 3	
	DI4	Numerical input 4	
	DI5	High-speed pulse input terminal	In addition to features of DI1-DI14, it can be used as high-speed pulse input channel as well. Maximum input frequency: **100kHZ**
	DI6	Numerical input 6	1. Optocoupler isolation, compatible with bipolar input 2. Input impedance: **2.4kΩ** 3.Voltage range under level input: **9V-30V**
Analog output	**AO1-GND**	Analog output 1	Determine voltage or current output by the jumper wire on control board. Output voltage range: **0V-10V** Output current range: **0mA-20mA**
	AO2-GND	Analog output 2	
Numeric output	**DO1-CME**	Numeric output 1	1. Optocoupler isolation, bipolar open collector output 2. Output voltage range: **0V-24V** 3. Output current range: **0mA-50mA**
	FM-CME	High-speed pulse output	Subject to the function code P5-00 " FM Terminal Output Mode Options". When used as high-speed pulse output, maximum frequency is up to 100kHz; When used as open collector output, its specification is same with DO1.
Relay output	**T/A1-T/C1**	NO terminal	Contact driving capacity: **AC250V, 3A, COSΦ=0.4.** **DC 30V, 1A**
	T/B1-T/C1	NC terminal	
	T/A2-T/C2	NO terminal	Contact driving capacity: **AC250V, 3A, COSΦ=0.4** **DC 30V, 1A**
	T/B2-T/C2	NC terminal	
Communication	**485+**	485 differential signal (+)	Standard RS485 communication port
	485－	485 differential signal (－)	

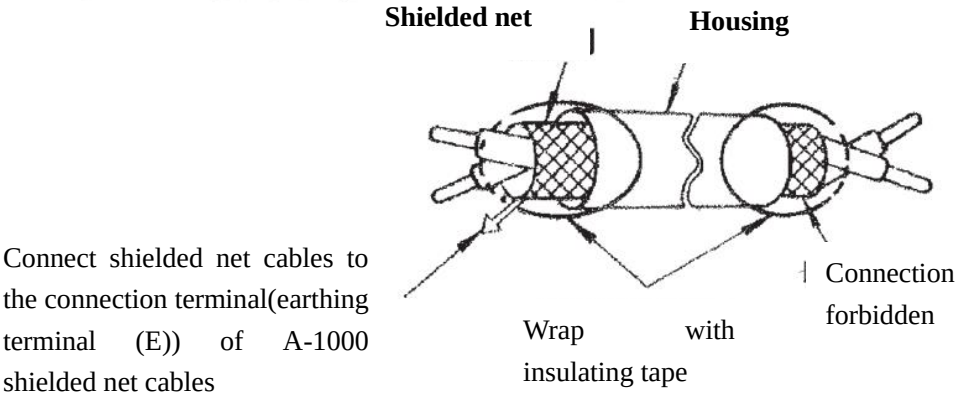
3) Wiring of control circuit terminals:

- For inductive loads like coil for driving relay, please be sure to insert bypass diode as shown in the figure below.
- Separate control circuit cables from cables of main circuit and other power cables or power supply cables in wiring.



Wiring of bypass diode

- Please use twisted shielded cables or twisted pair cables to avoid malfunctions caused by interference. Please refer to the figure below for cable end treatment. The wiring distance should be less than 50m
- Please connect shielded net cables to earthing terminal (E).
- Wrap shielded net cables with insulating tape to prevent shielded net cables from contacting other signal cables and device housing.

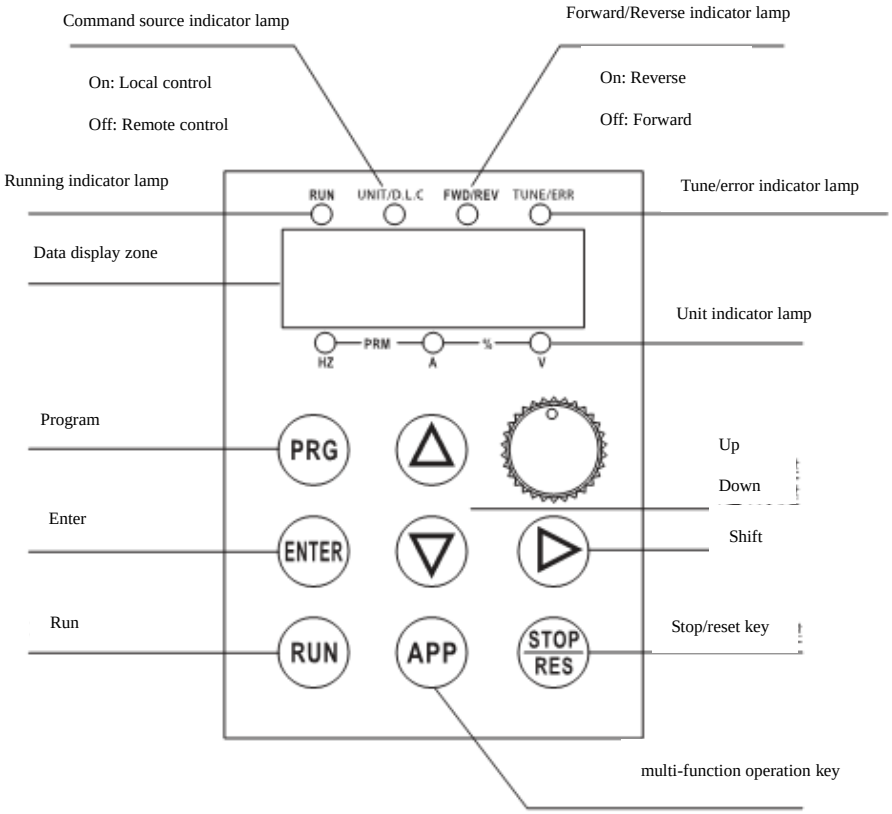


Wrapping ends of shielded twisted pair cables

Chapter 3 Operation & Display

3.1 Introduction to Operation and Display Interface

A user may operate A1000 inverter by the operation panel through parameter setting, status monitoring, start/stop operation, etc. Its outlook and function zones area as follows:



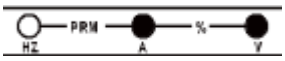
Keypad Menu

Keypad button description

Button	Name	Function
PRG	Programmable	Enter and exit the level 1 menu.
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.
▷	Shift	Select the parameters to be displayed circularly under stop status and running status; when modifying parameters, it can be used to select the bit of parameters.
RUN	Run	Press this button to start the inverter if the keypad control is enabled.
STOP/RES	Stop/Reset	Press this button to stop the inveter under running status or reset the operation in fault alarm status. This key is restricted by function code **P7-02**.
APP	Multi-function selection Key	Switch function according to **P7-01**.

Description of function indicator lamp:

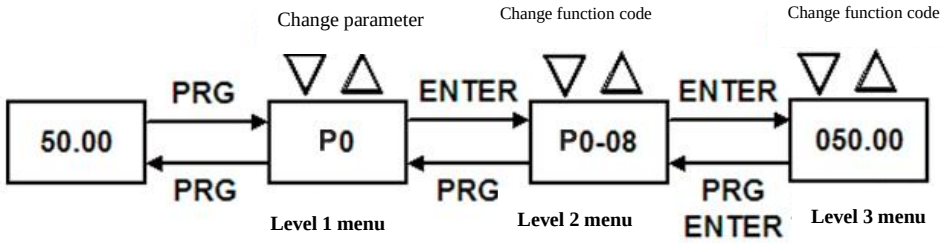
Indicator lamp	Description
RUN	Running status indicator lamp:

	Off: It means the inverter is in stop status; On: It means the inverter is in running status;
TUNE/ERR	Tune/torque control/error indicator lamp. On: It means under torque control mode; when it flashes slowly, it means the elevator is in tuning status; rapid flashing of this lamp means fault.
FWD/REV	Forward/reverse indicator lamp: On: it means forward status; off: it means reverse status.
UNIT/D.L.C	When the indicator is on, it means that the inverter is under operation panel control mode. Otherwise, it means that the inverter is under terminal control mode.
Hz	Frequency indicator lamp. Unit: Hz
A	Current indicator lamp; unit: A
V	Voltage indicator lamp, unit: V
RPM	 when both Hz and A are on, it means rotation speed indicator lamp, unit: rotation per min (RPM)
%	 when both A and V are on, it means percentage, unit: %.

3.2 Description of Digital Manipulator

A1000 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.

3.3 Methods to View Status Parameter

Under stop or running status, through the shift key "▷", multiple status parameters can be displayed. User can select whether to display the parameter according to binary bit selection

through function code **P7-03 (running parameter 1)**, **P7-04 (running parameter 2)** and **P7-05 (stop parameter)**.

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, analogy input AI2 voltage, analogy input AI3 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, analog input AI2 voltage, analog input AI3 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.

3.4 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 4 Autotuning

Motor parameter autotuning

When the elevator 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 (P0-01) 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) For induction motor

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) Stationary autotuning:

If the motor can't be disconnected to load completely, select **P1-37** as **1/3** and 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 5 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) 1: Feedback Vector control (FVC) 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: AI3 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	11	00

		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		
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: AI3 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	2: 0.01Hz	1	2
P0-23	Stop Memory Options of Digital Setting Frequency	0: Disabled 1: Enabled	1	0

P0-24	Motor Options	0: Motor 1 1: Motor 2		
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: AI2 4: AI3 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
P0-28	Serial Port Communication Protocol Options	0: Modbus protocol 1: Profibus-DP or CANOPEN protocol	1	0
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 ＞	0.001	Up to specific model

		=55kW)		
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
P1-27	Encoder Line Number	1-65535	1	1024
P1-28	Encoder Type	0: ABZ Incremental encoder 2: Rotary transformer		0
P1-30	ABZ Incremental Encoder Ab Phase Sequence	0: Forward 1: Reverse		0
P1-34	Rotary Transformer Pole-Pairs	1-65535		
P1-36	Speed Feedback PG Disconnection Detection Time	0.0s: Disabled 0.1s-10.0s		0.0s
P1-37	Autotuning Options	0: No autotuning 1: Stationary tuning of induction motor 2: Full tuning of induction motor 3: Stationary tuning 2 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
P2-09	Upper Limit Source of Speed Control (Drive) Torque	0: set through function code P2-10 1: AI1 2: AI2 3: AI3 4: PULSE setting 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) 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%
P2-11	Torque Upper Limit Command Options (Electricity Generation) under Speed Control Mode	0: Function code P2-12 setting (no difference between electrically driven and Electricity Generation) 1: AI1 2: AI2 3: AI3 4: PULSE setting 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) 8: Function code P2-12 setting Full ranges of options 1 to 7 correspond to P2-12	1	0
P2-12	Torque Upper Limit under Speed Control Mode	0.0%-200%	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
P2-21	Maximum Torque Factor of Field Weakening Zone	50-200%		200%
P2-22	Electricity Generation Function Limit Enable	0: Disabled 1:Enabled		0

P2-23	Electricity Generation Power Upper Limit	0.0-200.0%		Up to specific model
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%
P3-10	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: AI3 4: PULSE setting (DI5) 5: Preset speed command 6: Simple PLC 7: PID 8: Communication setting 100.0% corresponds to motor rated voltage		0
P3-14	Numeric Setting of VF	0V- Motor rated voltage		

	Separation Voltage			
P3-15	Voltage Rise Time of VF Separation	0.0s-1000.0s Refers to the time from 0V to motor rated voltage		
P3-16	Deceleration Time of VF Separation Voltage	0.0s-1000.0s	0.0s	0
P3-17	Stop Mode Options of VF Separation	0: Frequency/voltage reduces to 0 independently 1: Frequency reduces after the voltage reduces to 0		0
P3-18	Overcurrent Stall Action Current	50-200%		150%
P3-19	Overcurrent Stall Enable	0: Disabled 1: Enabled		1 Enabled
P3-20	Overcurrent Stall Suppression Gain	0-100		20
P3-21	Multiple Overcurrent Stall Action Current Compensation Factor	50-200%		50%
P3-22	Overvoltage Stall Action Voltage	650.0V-800.0V		760.0V
P3-23	Overvoltage Stall Enable	0: Disabled 1: Enabled		1 Enabled
P3-24	Overvoltage Stall Suppression Frequency Gain	0-100		30
P3-25	Overvoltage Stall Suppression Voltage Gain	0-100		30
P3-26	Overvoltage Stall Maximum Rise Frequency Limit	0-50Hz		5Hz
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	1	1
P4-01	DI2 Terminal Function Options			2
P4-02	DI3 Terminal Function Options			9
P4-03	DI4 Terminal Function Options			12
P4-04	DI5 Terminal Function Options			13
P4-05	DI6 Terminal Function Options			14
P4-06	DI7 Terminal Function Options			0

P4-07	DI8 Terminal Function Options	14: Preset command terminal 3 15: Preset command terminal 4		0
P4-08	DI9 Terminal Function Options	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 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		0

		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: Motor terminal options 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	-100.0% -+ 100.0%	0.1%	0.0%

	AI1 Minimum Input			
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
P4-18	AI2 Minimum Input	0.00V-P4-20	0.01V	0.00V
P4-19	Corresponding Setting of AI2 Minimum Input	-100.0% -+ 100.0%	0.1%	0.0%
P4-20	AI2 Maximum Input	P4-18 -+ 10.00V	0.01V	10.00V
P4-21	Corresponding Setting of AI2 Maximum Input	-100.0% -+ 100.0%	0.1%	100.0%
P4-22	AI2 Filter Time	0.00s-10.00s	0.01s	0.10s
P4-23	AI3 Minimum Input	-10.00V-P4-25	-10.00V	-10.00V
P4-24	Corresponding Setting of AI3 Minimum Input	-100.0% -+ 100.0%	-100.0%	-100.0%
P4-25	AI3 Maximum Input	P4-23-+10.00V	-10.00V	-10.00V
P4-26	Corresponding Setting of AI3 Maximum Input	-100.0% -+ 100.0%	-100.0%	-100.0%
P4-27	AI3 Filter Time	0.00s-10.00s	0.10s	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
P4-33	AI Setting Curve Options	Ones place: AI1 curve option 1: Curve 1 (2 points, see P4-13 -P4-16) 2: Curve 2 (2 points, see P4-18 -P4-21) 3: Curve 3 (2 points, see P4-23 -P4-26) 4: Not used 5: Not used Tens place: AI2 curve options, same as above Hundreds place:AI3 curve options, same as above	1	321
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	1	000

		minimum input setting options, same as above		
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
P4-39	DI Terminal Active Mode Options 2	0: High level 1: Low level Ones place: DI6 Tens place: DI7 Hundreds place: DI8 Thousands place: DI9	1	00000
P5 Group: Output Terminal				
P5-00	*FM* Terminal Output Options	0: Pulse output (*FMP*) 1: Open collector switching quantity output (*FMR*)	1	0
P5-01	*FMR* Output Function Options	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	0
P5-02	Control Board Relay Output Options (T/A1-T/B1-T/C1) RELAY 1		1	2
P5-03	Control Board Relay Output Options 2 (T/A1-T/B1-T/C1) RELAY 2		1	1
P5-04	DO1 Output Options		1	1
P5-05	Expansion Card DO2 Output Options		1	4

		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)		
P5-06	*FMP* Output Options	0: Running frequency 1: Setting frequency 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: PULSE input (100.0% corresponds to 100.0kHz) 7: AI1 8: AI2 9: AI3 10: Length 11: Count value 12: Communication setting 13: Motor rotation speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0%	1	0
P5-07	AO1 Output Options		1	0
P5-08	Expansion Card AO2 Output Options		1	1

		corresponds to 1000.0V) 16: Output torque		
P5-09	*FMP* Output Maximum Frequency	0.01kHz-100.00kHz	0.01kHz	50.00kHz
P5-10	AO1 Zero Offset Factor	-100.0%-100.0%	0.1%	0.0%
P5-11	AO1 Gain	-10.00-10.00	0.01	1.00
P5-12	AO2 Zero Offset Factor	-100.0%-100.0%		
P5-13	AO2 Gain	-10.00-10.00		
P5-17	*FMR* Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-18	RELAY 1 Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-19	RELAY 2 Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-20	DO1 Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-21	DO2 Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-22	DO Output Terminal Active Status 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	0.0%- (100.0%-P6-09)	0.1%	30.0%

	Time Proportion			
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				
P7-01	*APP* Key Function Options	0: APP disabled 1: Switching of operation panel command and remote command (terminal command or serial port communication command) 2: Switching of forward and reverse running 3: Forward JOG 4: Reverse JOG	1	0
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: AI2 voltage (V) Bit11: AI3 voltage (V) Bit12: Count value Bit13: Length	1111	1F

		Bit14: Load speed display Bit15: PID setting		
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: AI2 Voltage before calibration Bit07: AI3 Voltage before calibration Bit08: Linear speed Bit09: Current power-on time Bit10: Current running time Bit11: PULSE input pulse frequency, unit: 1Hz Bit12: Communication setting Bit13: Encoder feedback speed (Hz) Bit14: Main frequency A display Bit15: Auxiliary frequency B display	1111	0
P7-05	LED Stop Display Parameter	0000-FFFF Bit00: Setting frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: AI3 voltage (V) Bit07: Count value Bit08: Length Bit09: PLC stage Bit10: Load speed display Bit11: PID setting Bit12: PULSE input pulse frequency, unit *kHz*	1111	33
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 Places of Load Speed Displayed	Ones place: Number of decimal places of d0-14 0: 0 1: 1 2: 2 3: 3 Tens place: d0-19/d0-29 number of decimal places 1: 1 2: 2	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	0h-65000h	1h	0h

	Power-On Time Reach			
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	0.0%-300.0% (motor rated current)	0.1%	0.0%

	Width			
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: AI2 3: AI3 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℃-100℃	1℃	75℃
P8-48	Radiation Fan Control	0: Motor running radiation fan running 1: Radiation fan runs all the time after being powered on	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	650-800V		760V

P9-07	Short Circuit to Ground Protection Options upon Power-on	Ones place: Short circuit to ground protection options upon power-on 0: Disabled 1: Enabled Tens place: Short circuit to ground protection options upon power-on before operation 0: Disabled 1: Enabled		01
P9-08	Braking Unit Action Start Voltage	700-800V		780V
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	Ones place: Input phase loss protection options Tens place: Contactor on protection options 0: Disabled 1: Enabled		11
P9-13	Output Phase Loss Protection Options	Ones place: Output phase loss protection options 0: Disabled 1: Enabled Tens place: Output phase loss protection options before running 0: Disabled 1: Enabled		1
P9-14	First Fault Type	No fault Not used 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)	-	-
P9-15	Second Fault Type		-	-
P9-16	Third Fault(Latest) Type		-	-

		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) Switching motor during running (TRE) Large speed offset (DEV) Motor overspeed (OS) Motor overtemperature (OH2) Initial position error (1NE) Slave motor failure under master and slave control (MS)		
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
P9-48	Fault Protection Action Options 2	Ones place: Encoder/PG card abnormality (*PG*) 0: Coast-to-stop Tens place: Function code read & write abnormality (*EP*)	11111	00000

		0: Coast to stop 1: Stop according to the stopping mode Hundreds place: Inverter overload fault action options (*OL2*) 0: Coast to stop 1: Derating Thousands places: Motor overheat (*OH2*) Ten thousands place: Running time reach *(OT*)		
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
P9-50	Fault Protection Action Options 4	Ones place: Large speed offset (*DEV*) 0: Coast to stop 1: Stop according to the stopping mode 2: Continue to run Tens place: Motor overspeed (*OS*) Hundreds place: Initial position error	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	1	0

		3: Run at the lower limit frequency 4: Run at the spare frequency under abnormality		
P9-55	Spare Frequency Setting under Abnormality	60.0%-100.0% (current targeted frequency)	0.1%	100.0%
P9-56	Motor Temperature Sensor Type	0: No temperature sensor 1: PT100 2: PT1000	0	0
P9-57	Motor Overheating Protection Threshold	0℃-200℃	1℃	110℃
P9-58	Motor Overheating Pre-warning Threshold	0℃-200℃	1℃	90℃
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
P9-67	Overspeed Detection Value	0.0%-50.0% (maximum frequency)	0.1%	20.0%
P9-68	Overspeed Detection Time	0.0s: No detection; 0.1-60.0s	0.1s	0.1s
P9-69	Larger Speed Offset Detection Value	0.0%-50.0% (maximum frequency)	0.1%	20.0%
P9-70	Larger Speed Offset Detection Time	0.0s: No detection; 0.1-60.0s	0.1s	5.0s
P9-71	Gain KP for Non-stop upon Instantaneous Power Failure	0-100		40
P9-72	Instantaneous Non-stop Integral Factor ki for Non-stop upon Instantaneous Power	0-100		30

	Failure			
P9-73	Non-stop Action Deceleration Time upon Instantaneous Power Failure	0-300.0s		20.0s
Group 10: PID Function				
10-00	PID Setting Source	0: Function code 10-01 setting 1: AI1 2: AI2 3: AI3 4: PULSE setting (DI5) 5: Communication setting 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 1: AI2 2: AI3 3: AI1-AI2 4: PULSE setting (DI5) 5: Communication setting 6: AI1+AI2 7: MAX (|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)	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		***0***

		frequency		
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	0-3	1	0

	Preset Command 3			
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	0-3	1	0

	Time Options of PLC Preset Command 12			
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: AI2 3: AI3 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 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens place: Profibus-DP 0: 115200BPs 1: 208300BPs 2: 256000BPs 3: 512000BPs	1	50005

		Hundreds place: Not used Thousands place: CANLink baud rate 0: 20 1: 50 2: 100 3: 125 4: 250 5: 500 6: 1M		
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 Tens place: Profibus-DP 0: PP01 1: PP02 2: PP03 3: PP05		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
b0 Group: Torque Control Parameter				
b0-00	Speed/Torque Control	0: Speed control	1	0

	Mode Options	1: Torque control		
b0-01	Torque Setting Source Options under Torque Control Mode	0: Numeric setting 1(b0-03) 1: AI1 2: AI2 3: AI3 4: PULSE 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) (full range of options 1 to 7 correspond to the numeric setting of b0-03)	1	0
b0-03	Torque Numeric Setting under Torque Control Mode	-200.0%-200.0%	0.1%	150.0%
b0-05	Torque Control Forward Maximum Frequency	0.00Hz-maximum frequency	0.01Hz	50.00Hz
b0-06	Torque Control Reverse Maximum Frequency	0.00Hz-maximum frequency	0.01Hz	50.00Hz
b0-07	Torque Control Acceleration Time	0.00s-65000s	0.01s	0.00s
b0-08	Torque Control Deceleration Time	0.00s-65000s	0.01s	0.00s
B2 Group: Control of Motor 2				
b2-00	Motor Type Options	0: Common induction motor 1: Inverter induction motor		0
b2-01	Motor Rated Power	0.1kW-1000.0kW		Up to specific model
b2-02	Motor Rated Voltage	1V-2000V		Up to specific model
b2-03	Motor Rated Current	0.01A-655.35A (inverter power≤55kW) 0.1A-655.35A (inverter power＞55kW)		Up to specific model
b2-04	Motor Rated Frequency	0.01Hz-maximum frequency		Up to specific model
b2-05	Motor Rated Rotation Speed	1rpm-65535rpm		Up to specific model
b2-06	Stator Resistance of Induction Motor	0.001Ω-65.535Ω (inverter power≤55kW)		Up to specific model
b2-07	Rotor Resistance of Induction Motor	0.001Ω-65.535Ω (inverter power≤55kW) 0.0001Ω-6.5535Ω (inverter power＞55kW)		Up to specific model
b2-08	Leakage Inductance of Induction Motor	0.01mH-655.35mH(inverter power≤55kW) 0.001mH-65.535mH (inverter power＞		Up to specific model

		55kW)		
b2-09	Mutual Inductance of Induction Motor	0.1mH-6553.5mH(inverter power≤55kW) 0.01mH-655.35mH (inverter power＞55kW)		Up to specific model
b2-10	Idling Current of Induction Motor	0.01A-A2-03(inverter power≤55kW) 0.1A-A2-03(inverter power＞55kW)		Up to specific model
b2-27	Encoder Line Number	1-65535		1024
b2-28	Encoder Type	0: ABZ Incremental encoder 2: Rotary transformer		0
b2-29	Speed Feedback PG Options	0: Local PG 1: Expansion PG 2: Pulse input (DI5)		0
b2-30	ABZ Incremental Encoder AB Phase Sequence	0: Forward 1: Reverse		0
b2-31	Installation Angle of Encoder	0.0-359.9°		0.0°
b2-34	Rotary Transformer Pole-Pairs	1-65535		1
b2-36	Speed Feedback PG Disconnection Detection Time	0.0: No action 0.1s-10.0s		0.0
b2-37	Tuning Options	0: No tuning 1: Tuning of stationary parameters of induction motor 2: Dynamic full tuning of induction motor 3: Stationary full tuning of induction motor		0
b2-38	Speed Loop Proportional Gain 1	1-100		30
b2-39	Speed Loop Integral Time 1	0.01s-10.00s		0.50s
b2-40	Switching Frequency 1	0.00-b2-43		5.00Hz
b2-41	Speed Loop Proportional Gain 2	1-100		20
b2-42	Speed Loop Integral Time 2	0.01s-10.00s		1.00s
b2-43	Switching Frequency 2	b2-40- maximum frequency		10.00Hz
b2-44	Vector Control Slip Gain	50%-200%		100%
b2-45	SVC Torque Filter Constant	0.000s-0.100s		0.000s
b2-47	Upper Limit Source of Speed Control Torque	0: b2-48 1: AI1		0

		2: AI2 3: AI3 4: PULSE 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) (full range of options 1 to 7 correspond to the numeric setting of b2-48)		
b2-48	Numeric Setting of Torque Upper Limit under Speed Control Mode	0.0%-200.0%		150.0%
b2-49	Torque Upper Limit Command Options under Speed Control (Electricity Generation)	0: Function code P2-10 setting 1: AI1 2: AI2 3: AI3 4: PULSE setting 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) 8: Set by function code P2-12 (full range of options 1 to 7 correspond to the numeric setting of P2-12)		
b2-50	Numeric Setting of Torque Upper Limit under Speed Control Mode (Electricity Generation)	0.0%-200.0%	150.0%	
b2-51	Excitation Adjustment Proportional Gain	0-20000		2000
b2-52	Excitation Adjustment Integral Gain	0-20000		1300
b2-53	Torque Adjustment Proportional Gain	0-20000		2000
b2-54	Torque Adjustment Integral Gain	0-20000		1300
b2-55	Speed Loop Integral Property	Ones place: Integral separation 0: Disabled		0
b2-59	Maximum Torque Factor of Field Weakening Region	50%-200%	100%	
b2-60	Enable Electricity Generation Power Limit	0: Disabled 1: Enabled		
b2-61	Electricity Generation Power Upper Limit	0.00-200%		
b2-62	Control Mode of Motor 2	0: Sensorless vector control (SVC)		0

		1: Feedback vector control (FVC) 2: V/F control		
b2-63	Acceleration/Deceleration Time Options of Motor 2	0: Same with motor 1 2: Acceleration/deceleration time 2 3: Acceleration/deceleration time 3 4: Acceleration/deceleration time 4		0
b2-64	Torque Boost of Motor 2	0.0%: Automatic torque boost 0.1%-30.0%		Up to specific model
b2-66	Oscillation Suppression Gain of Motor 2	0-100		40
b5 Group: Optimized Parameter for Control				
b5-00	DPWM Switching Upper Limit Frequency	5.00Hz-maximum frequency		8.00Hz
b5-01	PWM Modulation Mode	0: Asynchronous modulation 1: Synchronous modulation		0
b5-02	Deadband Compensation Mode Options	0: No compensation 1: Compensation mode 1		1
b5-03	Random PWM Depth	0: Random PWM disabled 1-10: PWM carrier frequency random depth		0
b5-04	Enable Rapid Current Limit	0: Disabled 1: Enabled		1
b5-05	Maximum Output Voltage Factor	100-110%		105%
b5-06	Undervoltage Point Setting	210-420V		350V
b5-08	Deadband Time Adjustment	100%-200%		150%
b5-09	Overvoltage Point Setting	200.0V-2500.0V		Up to specific model
b8 Group: Point-to-Point Communication				
b8-00	Point-to-Point Communication Function Options	0: Disabled 1: Enabled		0
b8-01	Master-Slave Options	0: Master 1: Slave		0
b8-02	Slave Command Following Master-Slave Information Interaction	Ones place: Slave command following 0: Slave doesn't follow the master running command 1: Slave follows the master running command Tens place: Slave fault information transmission 0: No transmission of slave fault		011

		information 1: Transmission of slave fault information Hundreds place: Master displays slave offline 0: Master doesn't report fault at slave offline 1: Master reports fault at slave offline		
b8-03	Slave Receiving Data Action Options	0: Torque setting 1: Frequency setting		0
b8-04	Received Data Zero Offset (Torque)	-100.00%-100.00%		0.00%
b8-05	Received Data Gain (Torque)	-10.00%-100.00%		1.00
b8-06	Point-to-Point Communication Disconnection Detection Time	0.0-10.0s		1.0s
b8-07	Point-to-Point Communication Master Data Sending Period	0.001-10.000s		0.001s
b8-08	Received Data Zero Offset (Frequency)	-100.00%-100.00%		0.00%
b8-09	Received Data Gain (Frequency)	-10.00-100.00		1.0%
b8-10	Anti-slip Factor	0.00%-100.00%		10.00%

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	AI2 Voltage (V)/Current (mA)	0.01V/0.01mA	700AH
D0-11	AI3 Voltage (V)	0.01V	700BH

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	AI2 Voltage/Current (mA) Before Calibration	0.001V/0.01mA	7016H
D0-23	AI3 Voltage Before Calibration	0.001V	7017H
D0-24	Linear Speed	1m/Min	7018H
D0-25	Current Power-on Time	1Min	7019H
D0-26	Current Running Time	0.1Min	701AH
D0-27	PULSE Input Pulse Frequency	1Hz	701BH
D0-28	Communication Setting	0.01%	701CH
D0-29	Encoder Feedback Speed	0.01Hz	701DH
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
D0-36	Rotary Transformer Position	1	7024H
D0-37	Power Factor Angle	0.1°	7025H
D0-38	ABZ Position	1	7026H
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
D0-66	Model of Communication Expansion Card	100: CANopen 200: Profibus-DP 300: CANLink	7042H
D0-67	Communication Expansion Card Version	Display range	-
D0-68	Dp Card Inverter Status	bit0-running status bit1-running direction bit2-inveter fault or not bit3-target frequency reach bit4- bit7- Not used bit8-bit15- fault code	7043H
D0-69	DP Card Transmission Speed / 0.01Hz	0.00- maximum frequency	7044H
D0-70	Rotation Speed for DP Card Transmission/RMP	0-motor rated rotation speed	7045H
D0-71	Special Current Display for Communication Card	Display range	-
D0-72	Communication Card Error Status	Display range	-
D0-73	Motor Serial Number	0: Motor 1 1: Motor 2	7046H
D0-74	Motor Actual Output Torque	-100-100%	7047H

Chapter 6 Description of Function Parameters

P0 Group : Basic Function				
Function Code	Name	Setting Range	Minimum Unit	Default
P0-00	Model Display	1: Constant torque load	1	1
P0-01	Control Mode Options	0: Sensorless vector control (SVC) 1: Feedback Vector control (FVC) 2: V/F control	1	0

0: Sensorless vector control (SVC

One inverter could only drive one motor. Inverters under the sensorless vector control are

usually applied to high-performance control occasions and can calculate the motor rotation speed and complete compensation slip through motor model and thus realize large torque at low frequency and high dynamic response. It can realize direct control on output torque, such as machine tool, wire-drawing machine, unwinding and rewinding and others.

1: Feedback vector control

It refers to closed-loop vector control. In addition to installing an encoder for motor, EM600 inverter under FVC control mode must select a PG card matched with the encoder. It is suitable for high-accuracy speed control or torque control. An inverter can drive one motor only, for example high-speed paper making machine, hoisting machine, elevator and other loads.

2: V/F control

The inverter can be applied to occasions without higher requirements on dynamic response, such as the belt machine, textile machinery and translation equipment with rapid start/stop. It can serve constant torque or variable torque load. Single inverter is able to serve multiple motors, high-speed motor and other special motors.

P0-02	Start/Stop Command Options	0: Operation panel command channel (LED off) 1: Terminal command channel (LED on) 2: Serial port communication command channel (LED flashing)	1	0

Select the running command source of the inverter:

Inverter running commands include: Start, stop, forward, reverse, JOG and fault reset commands.

0: Keypad command channel:

Start, stop, fault reset and other commands of the inverter can be realized through *RUN*, *STOP/RESET* key on the keypad.

1: Terminal command channel:

Multi-function input terminals control the forward, reverse, forward JOG, reverse JOG and other commands.

2: Communication command channel:

Running commands are set through the PC by means of communication.

P0-03	Main Frequency Command Source A	0: Numeric setting (Presetting frequency P0-08, modified through UP/DOWN, power failure memory disabled) 1: Numeric setting(Presetting frequency P0-08, modified through UP/DOWN, power failure memory) 2: AI1 3: AI2 4: AI3 5: PULSE setting (DI5) 6: Preset command	1	10

		7:Simple PLC 8: PID 9: Communication setting 10: Potentiometer		
P0-04	Auxiliary Frequency Command Source B	Same with P0-03 (main frequency command source A)	1	0

Respectively select the source of A and B group of frequency command:

0: Set by function code P0-08:

User can directly set the target frequency by setting function code P0-08. Fine adjustment of frequency command can be realized through *UP/DOWN* action. Power failure memory is disabled.

1: Set by function code P0-08:

User can directly set the target frequency by setting function code P0-08. Fine adjustment of frequency command can be realized through *UP/DOWN* action. Power failure memory is disabled.

2: AI1 setting, 3: AI2 setting 4: AI3 setting:

Setting the frequency command through analogy. AI1 and AI3 support voltage input; AI2 supports voltage or current input; the relation between AI2 input voltage (current) and setting frequency can be set flexibly. Refer to function code P4-13 -P4-22.

5: PULSE-IN Pulse setting:

Set the target frequency through DI5 terminal input pulse frequency. Support 0.00kHz-100.00kHz pulse input. Refer to function codes P4-28-P4-31 for details.

6: Preset speed command:

Through four numeric DI inputs (P4-00-P4-04), any one of 16 frequency commands can be selected as the target frequency. Refer to function code group 12.

7: Simple PLC setting:

Through simple PLC, the target frequency can be switched between 1 to 16 any frequency. Respective running time and acceleration/deceleration time of 1 to 16 frequency commands can be set separately. Refer to function code group 12.

8: PID control setting:

Select the process PID control as frequency source. It is generally applied to process closed-loop control, such as closed-loop of pressure and temperature. Refer to function code group 10.

9: Communication setting:

Frequency command is directly set by PC through communication setting. Refer to function code group 13 for details.

10: Keypad potentiometer setting:

User can change the setting frequency through the potentiometer knob on the rotary panel, thus realizing the adjustment from 0.00Hz to the maximum output frequency P0-10.

 Warning

·A and B channel can’t choose the same frequency command source.

P0-05	Superposing Auxiliary Frequency Command Source B Range Options	0: With respect to maximum frequency 1: With respect to main frequency command source A	1	0
P0-06	Superposing Auxiliary Frequency Command Source B Range	0%-150%	1%	100%
P0-07	Frequency Source Superposing Options	Ones place: Frequency source options 0: Main frequency source A 1: Main and 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 relation of frequency source 0: Main frequency source A + auxiliary frequency source B 1: Main frequency source A - auxiliary frequency source B 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-500.0Hz	0.01Hz	50.00Hz

The maximum frequency is taken as a reference for relative quantity of all frequency, such as pulse input, analog terminal and preset speed. Their percentages respectively correspond to the maximum output frequency. For example, the analog input 10V is converted into 100% and correspond to (***100%×P0-10***)Hz.

When P0-22 is selected as 2, the frequency resolution is 0.01Hz. At this time, the setting range of P0-10 is 50.00Hz-500.00Hz;

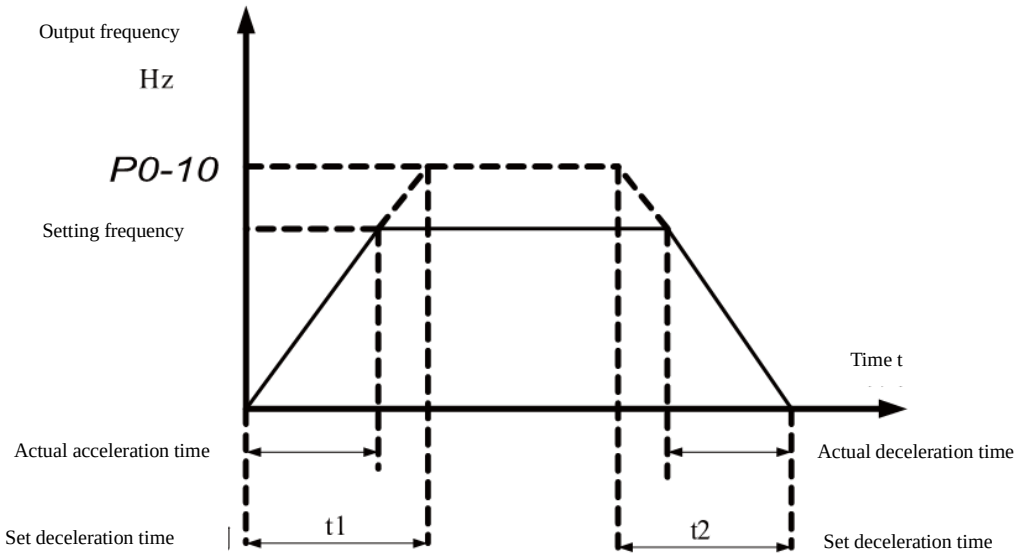
Notes: The output frequency of all operations won't exceed the maximum output frequency.

P0-11	Upper Limit Frequency Source Options	0: P0-12 setting 1: AI1 2: AI2 3: AI3 4: 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- maximum frequency P0-12	0.01Hz	0.00Hz
P0-15	Carrier Frequency	0.5kHz-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

Acceleration/deceleration time refers to the time required for the frequency going from 0.00Hz to the maximum frequency, which is used to set the slope for frequency change. A1000 provides 4 groups of acceleration/deceleration times that are selected through the numeric input terminal(see P4 group of parameters):

Selected Terminal 2	Selected Terminal 1	Selected Acceleration/Deceleration Time Group
Disabled	Disabled	Acceleration/deceleration time 1
Disabled	Enabled	Acceleration/deceleration time 2
Enabled	Disabled	Acceleration/deceleration time 3
Enabled	Enabled	Acceleration/deceleration time 4

If no acceleration/deceleration time option function is enabled, the terminal is invalid. Acceleration/deceleration time corresponds to the first group.



Acceleration/Deceleration Time Schematic Diagram

P0-19	Acceleration/Deceleration Time Unit	0: 1s 1: 0.1s 2: 0.01s	1	1
P0-20	Not Used	-	-	-
P0-21	Auxiliary Frequency Source Offset Frequency at Superposition	0.00Hz- maximum frequency P0-10	0.01Hz	0.00Hz
P0-22	Decimal Point of Frequency Command	2: 0.01Hz When changing the decimal points, pay attention to changing the maximum frequency, upper limit frequency and others.	1	2
P0-23	Stop Memory Options of Numeric Setting Frequency	0: Disabled 1: Enabled	1	0
P0-24	Motor Options	0: Motor 1 1: Motor 2		
P0-25	Reference Frequency of Acceleration/Deceleration Time	0: Maximum frequency (P0-10) 1: Setting frequency 2: 100H	1	0
P0-26	UP/DOWN Reference of Frequency Command during Running	0: Running frequency 1: Setting frequency		
P0-27	Binding Frequency Source to Command Source	Ones place: Binding frequency source options of operation panel command 0: Disabled 1: Numeric setting frequency source	1	000

		2: AI1 3: AI2 4: AI3 5: PULSE pulse setting (DI5) 6: Preset command 7: Simple PLC 8: PID 9: Communication setting Tens place: Binding frequency source options of terminal commands (0-9, same to ones place) Hundreds place: Binding frequency source options of communication commands (0-9, same to ones place)		
P0-28	Serial Port Communication Protocol Options	0: Modbus 1: Profibus-DP bridge or CANopen protocol	1	0

These function codes define the binding combination of three kinds of running command channels and nine kinds of frequency setting channels, making it convenient to realize synchronous switching.

The definition of above frequency setting channel is same to P0-03 “main frequency source A options” . Please refer to the description of function code P0-03.

Different running command channels can be bound to same frequency setting channel.

When the command source has been bound to the frequency source and during the active period of such command source, the set frequency source of P0-03 to P0-07 don’t work.

P1 Motor Parameter				
P0 Group: Basic Parameter				
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-6553.5A (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

Function codes mentioned above are nameplate parameters of motor. It is required to set the parameters above as per motor nameplate, regardless of the control mode, VF control mode or

vector control mode.

To acquire better VF or vector control performance, it is required to carry out motor parameter tuning and the correctness of tuning result is closely related to correct setting of motor nameplate parameters.

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)	0.1mH	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

P1-06 - P1-10 are parameters of induction motor. However, user could not get these parameters through the motor nameplate generally. Please autotune motor parameters through the inverter. “Stationary tuning of induction motor” can only acquire three parameters P1-06 to P1-08 while “full tuning of induction motor” can get encoder phase sequence, current loop PI and otehr parameters in addition to above five parameters.

After motor rated power (P1-01) or motor rated voltage (P1-02) is modified, the inverter will modify the parameters of P1-06 to P1-10 automatically and restore such five parameters to the command standard Y-series motor parameters.

P1-16 to F1-20 are parameters of synchronous motor. Some synchronous motor nameplates may provide partial parameters but most nameplates won’t provide above parameters, which shall be acquired by inverter autotuning. Moreover, idling tuning of synchronous motor must be selected because P1-16, F1-17, F1-18 and F1-20 can be acquired through such tuning while “on-load tuning of synchronous motor” can only get the encoder phase sequence of synchronous motor, installation angle, etc.

When motor rated power (P1-01) or motor rated voltage (P1-02) is modified, the inverter will automatically modify P1-16 to P1-12. Please pay attention.

With regards to above parameters of synchronous motor, users can directly set corresponding function codes according to the data provided by the manufacturer.

P1-27	Encoder Line Number	1-65535		1024

P1-28	Encoder Type	0: ABZ Incremental encoder 1: Rotary transformer		

A1000 inverter supports multiple types of encoders. Different encoders should be equipped with different PG cards, so please select a correct PG card. However, induction motor generally selects ABZ incremental encoder and rotary transformer.

After installation of PG card, set P1-28 correctly according to specific conditions, otherwise the inverter may run abnormally.

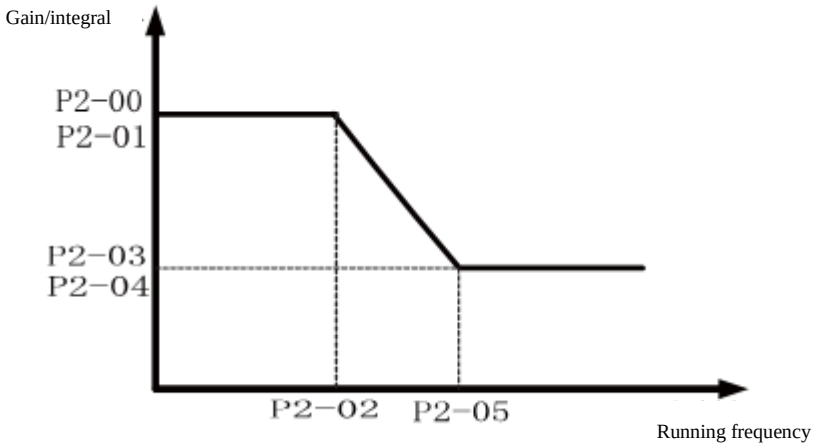
P1-30	ABZ Incremental Encoder Ab Phase Sequence	0: Forward 1: Reverse		0

This function code only works for ABZ incremental encoder, that is to say it is only enabled when P1-28=0. It is used to set AB signal phase sequence of ABZ incremental encoder.

P1-34	Rotary Transformer Pole-Pairs	1-65535		1
P1-36	Speed Feedback Disconnection Detection Time	0.0s: Disabled 0.1s-10.0s		0.0s
P1-37	Autotuning Options	0: No autotuning 1: Stationary tuning of induction motor 2: Full tuning of induction motor 3: Stationary tuning 2 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

The above parameters are used to set vector control speed loop PI parameters. Two groups of parameters can be set, which are respectively applied to low-frequency and high-frequency running. Two groups of parameters can be switched smoothly according to switching frequency 1 and switching frequency 2, as shown below:



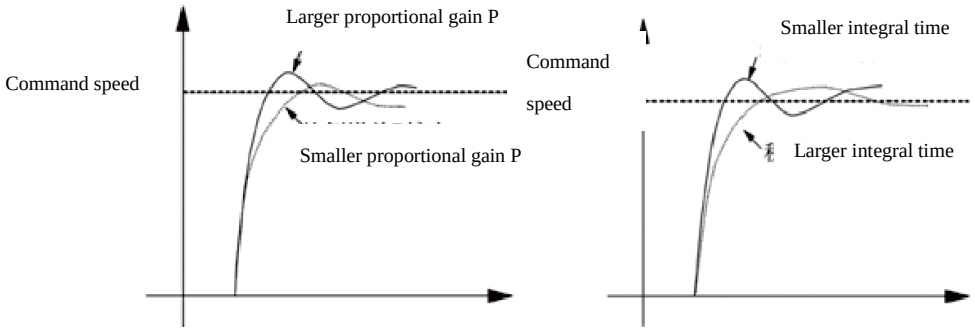
Speed Loop Parameter Switching Schematic Diagram

Speed loop proportional gain (P2-00, P2-03):

Please adjust this parameter according to the load inertia of motor. When there is larger load inertia, increase the proportional gain; while for lower load inertia, reduce the proportional gain appropriately. Although larger speed loop proportional gain can quicken the response speed, excessive value may result in oscillation of motor rotation speed and over regulation; on the contrary, insufficient proportional gain may result in slow control response and long time to adjust the speed to a stable value, as shown in the figure below.

Speed loop integral time (P2-01, P2-04):

Like the proportional gain, shorter speed loop integral time may quicken the response speed but may result in oscillation and unsteadiness. When the integral time is excessive, the system has a slow response characteristics and it requires a long time to eliminate the speed Offset. Therefore, it is required to adjust this parameter according to the load condition. See the figure below:



Schematic Diagram of Speed Loop PI Parameter

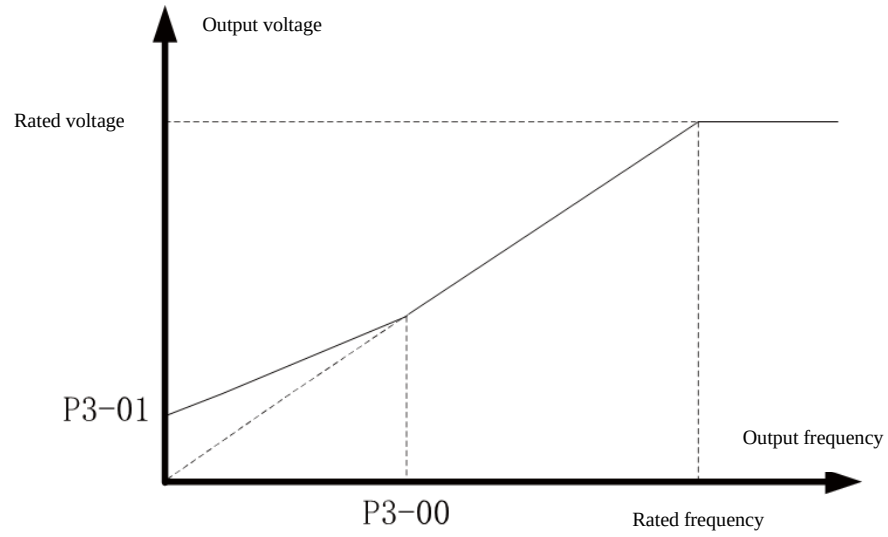
P2-06	Filter Time Constant of Speed Loop	0.000s-0.100s	0.001	0.000s
P2-07	Vector Control Slip Compensation	50%-200%	1%	100%
P2-08	Over-excitation Gain of Vector Control	0-200	1	64

P2-09	Upper Limit of Speed Control (Drive) Torque	0: Function code P2-10 setting 1: AI1 2: AI2 3: AI3 4: PULSE setting 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) 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%
P2-11	Torque Upper Limit Command Options (Electricity Generation) under Speed Control Mode	0: Set by function code P2-12 (no difference between electrically driven and Electricity Generation) 1: AI1 2: AI2 3: AI3 4: PULSE setting 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) 8: Function code P2-12 setting Full ranges of options 1 to 7 correspond to P2-10	1	0
P2-12	Numeric Setting (Electricity Generation) of Torque Upper Limit under Speed Control Mode	0.0%-200%	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
P2-21	Maximum Torque Factor of Field Weakening Zone	50-200%		100%
P2-22	Electricity Generation Function Limit Enable	0: Disabled 1: Enabled		0

P2-23	Electricity Generation Power Upper Limit	0.0-200.0%		Up to specific model

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%: (automatic torque boost) 0.1%-30.0%	0.1%	Up to specific model

When the inverter runs under V/F control mode, to make up the voltage loss of motor stator resistance, it is required to compensate a certain voltage value manually by setting the function code P3-01, as shown in the figure below. Compensation value 100.0% is equivalent to the motor rated voltage, which shall not exceed 10.0%. The larger the load is, the larger required boost value is. However, excessive value may result in overcurrent, thus burning the motor.



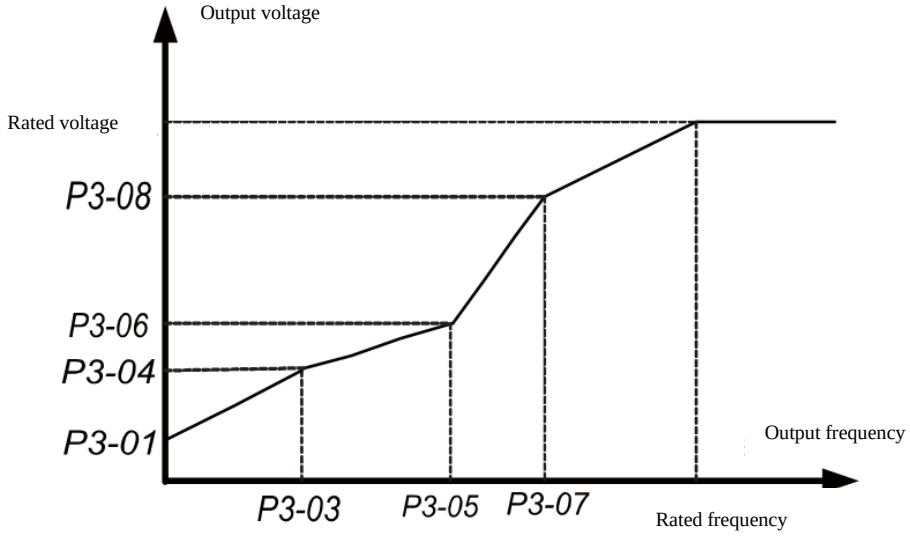
Torque Boost Schematic Diagram

P3-02	Torque Boost End Frequency	0.00Hz-maximum frequency	0.01	50Hz

When this parameter is set as 1, the frequency and voltage of each section are set by above function codes. See the following figure for details.

The first point is 0.00Hz and the output voltage corresponds to the manual torque boost

(P3-01) voltage. The five point is the rated frequency and output voltage is the rated voltage. Other voltage is formed by 5-point linear interpolation. Multiple-section V/F is applied to occasion that users have special requirements on the output voltage and to solving resonant oscillation appeared on some frequency points.



Multipoint V/F Schematic Diagram

P3-03	Multipoint VF frequency point 1	0.00Hz-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	P3-03 -motor rated frequency (P1-04)	0.01Hz	0.00Hz
P3-08	Multipoint VF voltage point 3	0.0%-100.0%	0.1%	0.0%
P3-10	VF Overexcitation gain	0-200	1	64

During deceleration of inverter, overexcitation control can suppress the rise of bus voltage to avoid overvoltage fault. The bigger the overexcitation gain is, the better the inhibitory effect is.

For occasions where overvoltage alarm is easy to produce during inverter deceleration, it is required to improve the overexcitation gain. But excessive overexcitation may result in large output current. Please note this during application.

For occasions with smaller inertia, there would be no voltage rise during deceleration, so it is recommended to set the overexcitation gain as 0; this is also applied to occasions with braking resistance.

P3-11	Oscillation Suppression Gain	0-100	1	Up to specific model

Set this value as smaller as possible on the condition that oscillation can be suppressed effectively to avoid causing adverse effects on VF running. Please set this gain as 0 if there is no motor oscillation. It is required to increase this gain appropriately only when there exists obvious motor oscillation. The higher the gain is, the better the oscillation suppression effect will be.

When oscillation suppression function is enabled, it is required to set motor rated current and idling current correctly. Otherwise, VF oscillation suppression effect will be poor.

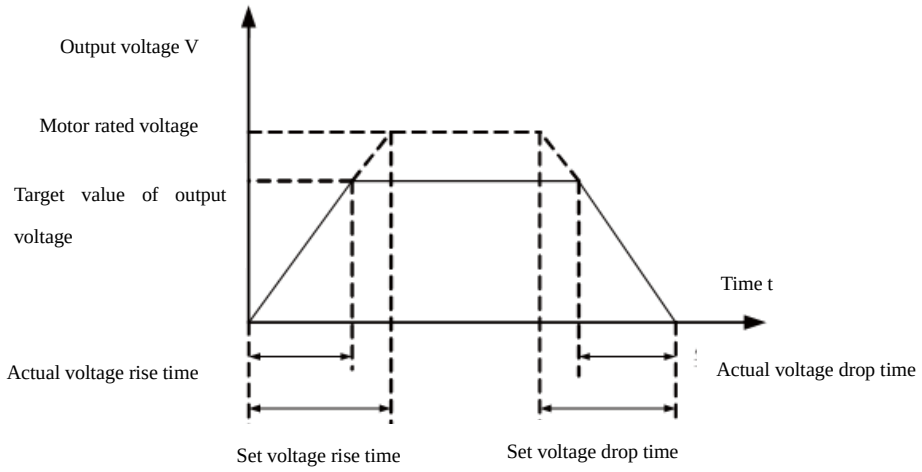
P3-13	VF Separation Voltage	0: Numeric setting (P3-14) 1: AI1 2: AI2 3: AI3 4: PULSE setting (DI5) 5: Preset speed command 6: Simple PLC 7: PID 8: Communication setting 100.0% corresponds to motor rated voltage (P1-02)	1	0
P3-14	Numeric Setting of VF Separation Voltage	0V- Motor rated voltage		0

VF separation mode is generally used for occasions such as induction heating, inversion power supply and torque motor control.

After having selected the VF separation control, the output voltage can be set by either P3-14, or analog quantity, preset command, PLC, PID or communication setting. When they are used for nonnumeric setting, 100% corresponds to motor rated voltage; when the percentages of the set values of the analog quantity is a negative number, then the absolute value of the set value will be recognized as a valid value effectively.

P3-15	Voltage Rise Time of VF Separation	0.0s-1000.0s		0

The voltage rise time of VF separation is the time that the voltage increases from 0 to motor rated voltage, as shown in the figure below:



P3-16	Deceleration Time of VF Separation Voltage	0.0s-1000.0s	0.0s	0

P3-17	Stop Mode Options of VF Separation	0: Frequency/voltage reduces to 0 independently 1: Frequency reduces after the voltage reduces to 0		0
P3-18	Overcurrent Stall Action Current	50-200%		150%
P3-19	Overcurrent Stall Enable	0: Disabled 1: Enabled		1 Enabled
P3-20	Overcurrent Stall Suppression Gain	0-100		20
P3-21	Multiple Overcurrent Stall Action Current Compensation Factor	50-200%		50%
P3-22	Overvoltage Stall Action Voltage	650.0V-800.0V		760.0V
P3-23	Overvoltage Stall Enable	0: Disabled 1: Enabled		1 Enabled
P3-24	Overvoltage Stall Suppression Frequency Gain	0-100		30
P3-25	Overvoltage Stall Suppression Voltage Gain	0-100		30
P3-26	Overvoltage Stall Maximum Rise Frequency Limit	0-50Hz		5Hz
P3-27	Slip Compensation Time Constant	0.1-10.0s		0.5s

P4 Group: Input Terminal				
P4-00	DI1 Terminal Function Options	0: No function 1: Forward running (FWD) 2: Reverse running (REV) 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	1	1
P4-01	DI2 Terminal Function Options			2
P4-02	DI3 Terminal Function Options			9
P4-03	DI4 Terminal Function Options			12
P4-04	DI5 Terminal Function Options			13
P4-05	DI6 Terminal Function Options			14
P4-06	DI7 Terminal Function Options			0
P4-07	DI8 Terminal Function Options			0

P4-08	DI9 Terminal Function Options	16: Acceleration/deceleration options terminal 1 17: Acceleration/deceleration options terminal 2 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 pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30: 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 be enabled) 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 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,		0

		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 between frequency source A and preset frequency. When this terminal is enabled, frequency source A is replaced by preset frequency (P0-08). 40: Switching terminal between frequency source A and preset frequency When this terminal is enabled, frequency source B is replaced by preset frequency (P0-08). 41: Not used 42: Not used 43: PID parameter switching terminal 44: Motor terminal options 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		

Function Description of Preset Speed Command

K_4	K_3	K_2	K_1	Command setting	Corresponding parameter
OFF	OFF	OFF	OFF	Preset speed 0	12-00
OFF	OFF	OFF	ON	Preset speed 1	12-01
OFF	OFF	ON	OFF	Preset speed 2	12-02
OFF	OFF	ON	ON	Preset speed 3	12-03

OFF	ON	OFF	OFF	Preset speed 4	12-04
OFF	ON	OFF	ON	Preset speed 5	12-05
OFF	ON	ON	OFF	Preset speed 6	12-06
OFF	ON	ON	ON	Preset speed 7	12-07
ON	OFF	OFF	OFF	Preset speed 8	12-08
ON	OFF	OFF	ON	Preset speed 9	12-09
ON	OFF	ON	OFF	Preset speed 10	12-10
ON	OFF	ON	ON	Preset speed 11	12-11
ON	ON	OFF	OFF	Preset speed 12	12-12
ON	ON	OFF	ON	Preset speed 13	12-13
ON	ON	ON	OFF	Preset speed 14	12-14
ON	ON	ON	ON	Preset speed 15	12-15

4 preset command terminals can combine 16 statues that respectively correspond to 16 command setting values, as indicated in the table above. Preset speed commands can not only be used for preset speed function but also can be used as PID setting source to meet the requirement to switch between different setting values.

When the frequency source is selected as preset speed, 100.00% of function code 12-00-12-15 corresponds to the maximum output frequency P0-10.

When the preset command source is set as PID setting source, 100.0% of 12-00-12-15 corresponds to 100% of PID feedback range, i.e., the full range of feedback instrument.

Function Description of Acceleration/Deceleration Time Options Terminal

Terminal 2	Terminal 1	Acceleration/deceleration time options	Corresponding parameter
OFF	OFF	Acceleration/deceleration time 1	P0-17, P0-18
OFF	ON	Acceleration/deceleration time 2	P8-03, P8-04
ON	OFF	Acceleration/deceleration time 3	P8-05, P8-06
ON	ON	Acceleration/deceleration time 3	P8-07, P8-08

P4-10	DI Filter Time	0.000s-1.000s	0.001s	0.010s
P4-11	Terminal Command Mode	0: 2-wire 1 1: 2-wire 2 2: 3-wire 1 3: 3-wire 2	1	0

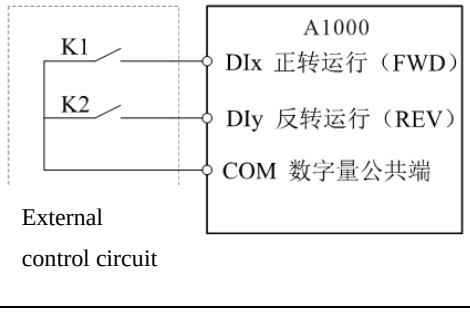
This parameter defines four terminal control modes.

0: 2-wire mode 1: This mode is most frequently used. Forward and reverse running of motor are determined by DIx and DIy. Terminal functions are set as follows:

Terminal	Setting value	Description
DIx	1	Forward (FWD)
DIy	2	Reverse (REV)

DIx and DIy are multi-function digital quantity input terminal of DI1-DI5 and HDI1 and on at the level.

K1	K2	Run command
0	0	Stop
1	0	Forward
0	1	Reverse
1	1	Stop



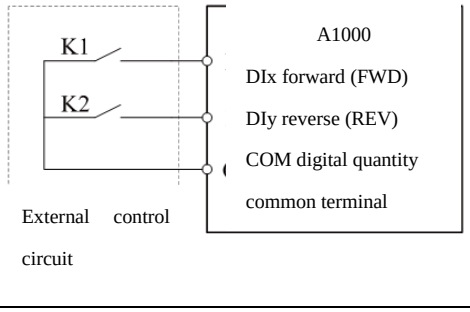
2-wire Mode 1

1: 2-wire mode 2: When this mode is used, DIx terminal is the running enabled terminal while DIy terminal is used to determine the running direction. Terminal functions are set as follows:

Terminal	Setting value	Description
DIx	1	Running
DIy	2	Forward/Reverse mode (FWD/REV)

DIx and DIy are multi-function digital quantity input terminal of DI1-DI5 and HDI1 and on at the level.

K1	K2	Run command
0	0	Stop
1	0	Forward
0	1	Stop
1	1	Reverse



2-wire Mode 2

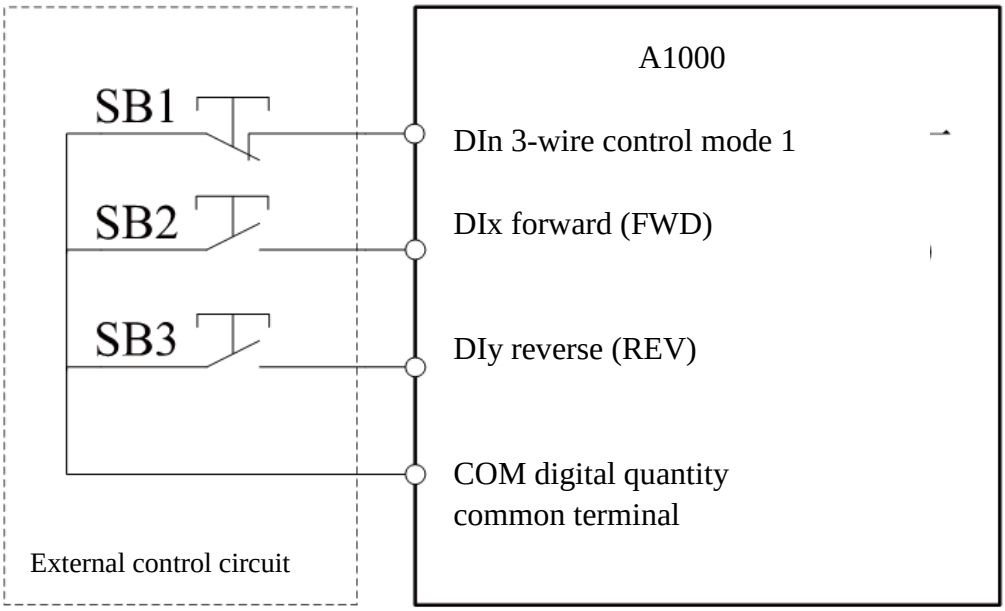
2: 3-wire control mode 1: Under this mode, DIn refers to the enable terminal and the running directions are respectively controlled by DIx and DIy. Terminal functions are as follows:

Terminal	Setting value	Description
DIx	1	Forward (FWD)
DIy	2	Reverse (REV)
DIn	3	3-wire running control 1

① For running, firstly close DIn terminal to realize motor forward or reverse control through DIx or DIy pulse signal;

② For stopping the inverter, it is required to cut off DIn terminal signal;

③DIx, DIy and DIn are multi-function digital quantity input terminal of DI1-DI5; DIx, DIy, DIn are to enable pulse.



3-wire Control Mode 1

④ Including: SB1: Stop button SB2: Forward button SB3: Reverse button

3: 3-wire control mode 2: The enable terminal of this mode is DIn; running command is given by DIx and the direction is determined by DIy status. The terminal function setting is as follows:

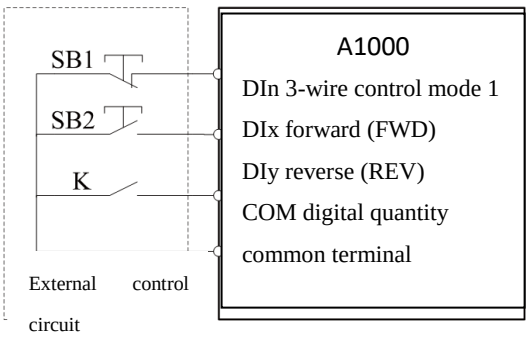
Terminal	Setting value	Description
DIx	1	Run
DIy	2	Forward/Reverse (FWD/REV)
DIn	3	3-wire running control 2

① For running, firstly close DIn terminal; motor running signal is produced through the pulse rising edge of DIx while DIy status will produce the motor direction signal.

② For stopping the inverter, it is required to cut off DIn terminal signal;

③DIx, DIy and DIn are multi-function digital quantity input terminal of DI1-DI5 and HDI1; DIx is to enable pulse. DIy and DIn are on at the level.

K	Run command
0	Forward
1	Reverse



3-wire Control Mode 2

④ Including: SB1: Stop button SB2: Running button K: Forward/Reverse switch

P4-12	Change Rate Per Second of Terminal UP/DOWN	0.001Hz-65.535Hz	0.01Hz	1.00Hz

This parameter defines the frequency change rate when using UP/DOWN key to adjust the setting frequency, i.e., the frequency change rate per second.

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%	00.1%	100.0%
P4-17	AI1 Filter Time	0.00s-10.00s	0.01s	0.10s

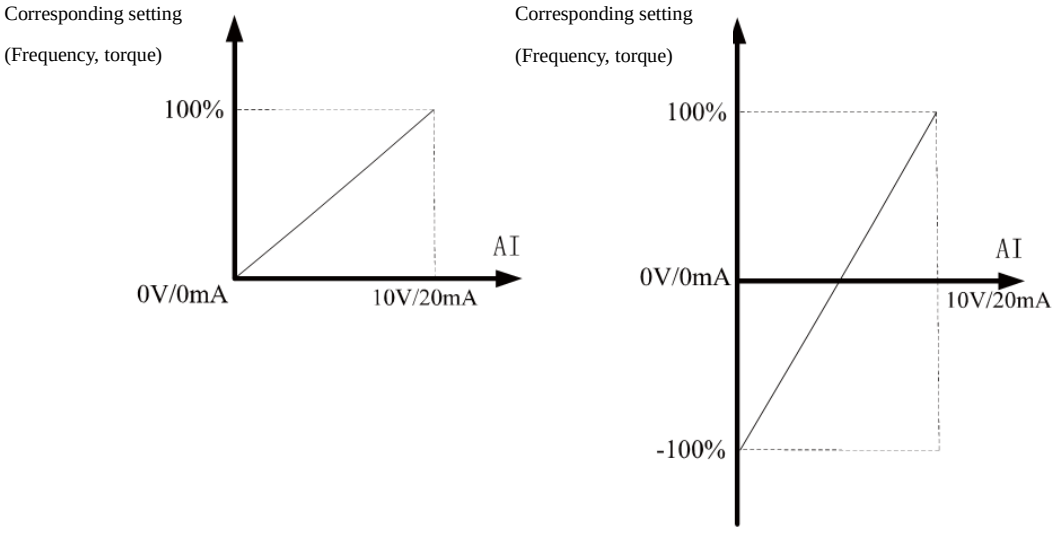
These function codes define the relationship of analogy input voltage and its represented setting value.

When the analog input voltage is greater than or lower than the set upper limit (P4-15) or lower limit (P4-13), calculate according to the upper limit (P4-15) or lower limit (P4-13).

AI1 input filter time is used to set the software filter time of AI1. If the field analog is easy to be interfered, increase the filter time to make the detected analogy become more stable. However, excessive filter time may result in slow response to analogy detection. So it is required to set this parameter according to actual condition.

Definitions of nominal value corresponding to 100.0% of analogy are different from application to application. For details, refer to description of all application parts.

The following figures are two typical setting:



P4-18	AI2 Minimum Input	0.00V-P4-20	0.01V	0.00V
P4-19	Corresponding Setting of AI2 Minimum Input	-100.0% -+ 100.0%	0.1%	0.0%
P4-20	AI2 Maximum Input	P4-18 -+ 10.00V	0.01V	10.00V
P4-21	Corresponding Setting of AI2 Maximum Input	-100.0% -+ 100.0%	0.1%	100.0%
P4-22	AI2 Filter Time	0.00s-10.00s	0.01s	0.10s
P4-23	AI3 Minimum Input	0.00s- -P4-25		0.00V
P4-24	Corresponding Setting of AI3 Minimum Input	-100.00% -+ 100.0%		0.0%
P4-25	AI3 Maximum Input	P4-23-+10.00V		10.00V
P4-26	Corresponding Setting of AI3 Maximum Input	-100.0% - 100.0%		100.0%
P4-27	AI3 Filter Time	0.00s-10.00s		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
P4-33	AI Setting Curve Options	Ones place: AI1 curve option 1: Curve 1 (2 points, see P4-13 -P4-16) 2: Curve 2 (2 points, see P4-18 -P4-21) 3: Curve 3 (2 points, see P4-23 -P4-26) 4: Not used 5: Not used Tens place: AI2 curve options, same as above Hundreds place:AI3 curve options, same as above	1	321
P4-34	AI Lower Than Minimum Input Setting Options	0nes place: AI1 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: Not used	1	000
P4-35	DI1 Delay Time	0.0s-3600.0s	0.1s	0.0s

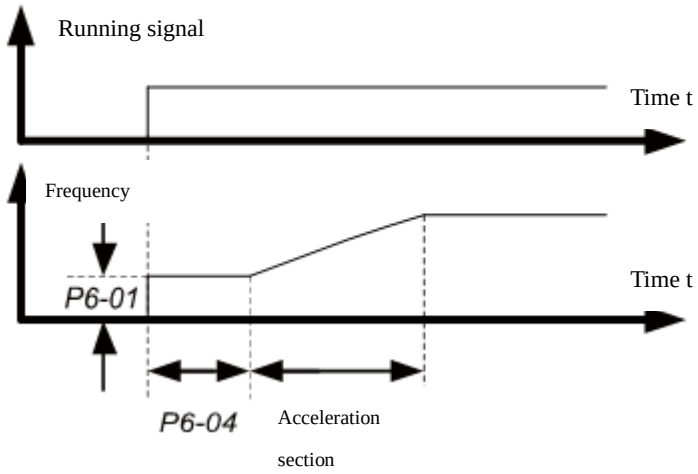
P4-36	DI2 Delay Time	0.0s-3600.0s	0.1s	0.0s
P4-37	DI3 Delay Time	0.0s-3600.0s		
P4-38	DI Input Terminal Active Status Setting 1	0: High level 1: Low level Ones place: DI1 Tens place: DI2 Hundreds place: DI3 Thousands place: DI4 Tens thousands place: DI5	1	00000
P4-39	DI Terminal Active Mode Options 2	Ones place: DIT terminal enable status setting 0: Active on high level 1: Active on low level Tens place: DI7 terminal enable status setting (0-1, same as above) Hundreds place: DI8 terminal enable status setting (0-1, same as above) Thousands place: DI9 terminal enable status setting (0-1, same as above) Ten thousands place: DI10 terminal enable status setting (0-1, same as above)	1	00000
P5 Group Output Terminal				
P5-00	*FM* Terminal Output Options	0: Pulse output (*FMP*) 1: Open collector switching quantity output (*FMR*)	1	0
P5-01	*FMR* Output Function Options	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	1	0
P5-02	Control Board Relay Output Options (T/A1-T/B1-T/C1) RELAY 1		1	2
P5-03	Control Board Relay Output Options 2 (T/A1-T/B1-T/C1) RELAY 2		1	1
P5-04	DO1 Output Options		1	1
P5-05	Expansion Card DO2 Output Options		1	4

		15: Running ready 16: AI1＞AI2 17: Upper limit frequency reach 18: Lower limit frequency reach (related to running) 19: Undervoltage status output 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)		
P5-06	*FMP* Output Options	0: Running frequency 1: Setting frequency 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: PULSE input (100.0% corresponds to 100.0kHz) 7: AI1 8: AI2	1	***0***
P5-07	AO1 Output Options		1	0
P5-08	Expansion Card AO2 Output Options		1	1

		9: Not used 10: Length 11: Count 12: Communication setting 13: Motor rotation speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Output torque		
P5-09	*FMP* Output Maximum Frequency	0.01kHz-100.00kHz	0.01kHz	50.00kHz
P5-10	AO1 Zero Offset Factor	-100.0%-100.0%	0.1%	0.0%
P5-11	AO1 Gain	-10.00-10.00	0.01	1.00
P5-12	Zero Offset Factor of AO2 Expansion Card	-100.0%-100.0%	0.1%	0.0%
P5-13	Expansion Card AO2 Gain	-10.00-10.00	0.01	1.00
P5-17	*FM* Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-18	RELAY 1 Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-19	RELAY 2 Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-20	DO1 Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-21	DO2 Output Delay Time	0.0s-3600.0s	0.1s	0.0s
P5-22	DO Output Terminal Active Status 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
P5-23	Ao Output Signal Options	0: Voltage signal 1: Current signal		0
P6 Group: Start/Stop Control				
P6-00	Start Mode	0: Direct start 1: Speed tracking start 2: Pre-excitation start of induction motor	1	0
P6-01	Rotation Speed Tracking Mode	0: Start from stopping frequency 1: Start from industrial frequency 2: Start from maximum frequency	1	0
P6-02	Rotation Speed Tracking Fast/Slow	1-100	1	20
P6-03	Start Frequency	0.00Hz-10.00Hz	0.01	0.00
P6-04	Start Frequency Holding Time	0.0s-100.0s	0.1s	0.0s

Start frequency refers to the initial frequency when the inverter starts, as shown in the figure. Start frequency holding time refers to the running time under the start frequency. Start frequency is generally set about 1Hz-2Hz and shall be set larger for small power condition.

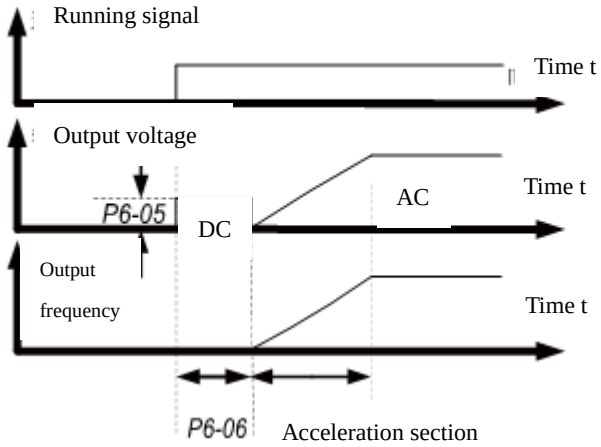
For occasions with small power, setting start frequency can establish slip quickly, which is helpful for starting the motor quickly; for occasions with large power or heavy load, extend the start frequency holding time appropriately can realize motor pre-excitation, reduce the start current and improve the start torque. If the motor still runs when started, the inverter can decelerate the motor first and then re-accelerate it.



Start Frequency Schematic Diagram

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

DC brake before startup is a period of DC current output before motor rotation; P6-05 sets the injection DC current and 100.0% is respective to the inverter rated current. P6-06 defines the DC current injection time. Injection of DC current realizes electromagnetic brake and pre-excitation effect of motor. For occasions with large power and heavy load, pre-excitation can increase the start torque and lower down impact current.



Schematic Diagram of DC Brake before Start

P6-07	Acceleration/Deceleration Mode	0: Linear acceleration/deceleration 1: S curve acceleration/deceleration A	1	0

This parameter is used to select the frequency change mode of servo driver under start/stop process.

0: Linear acceleration/deceleration

The output frequency increases or decreases in a straight line progressively. A1000 provides four kinds of acceleration/deceleration time that can be selected through multi-function numeric input terminal (P4-00 -P4-05).

1: S curve acceleration/deceleration A

The output frequency increases or decreases like a S curve. S curve is generally applied to occasions of smooth start and stop, for example elevator and conveyor.

Function code P6-08 and P6-09 respectively define the time proportion of S curve during the acceleration/deceleration start section and end section.

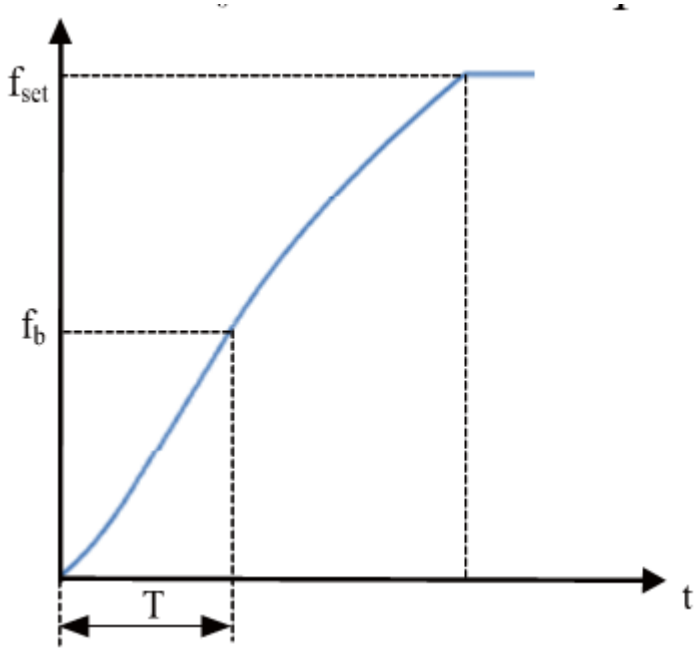
2: S curve acceleration/deceleration B

During acceleration/deceleration B of S curve, motor rated frequency f_b is always the inflexion of S curve, as shown in the figure below. It is generally applied to high-speed zone where frequency is above the rated frequency and rapid acceleration/deceleration is required.

When the setting frequency is greater than the rated frequency, the acceleration/deceleration time is :

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

Of which, f is the setting frequency, f_b is motor rated frequency and T is time requiring from frequency 0 to rated frequency f_b.

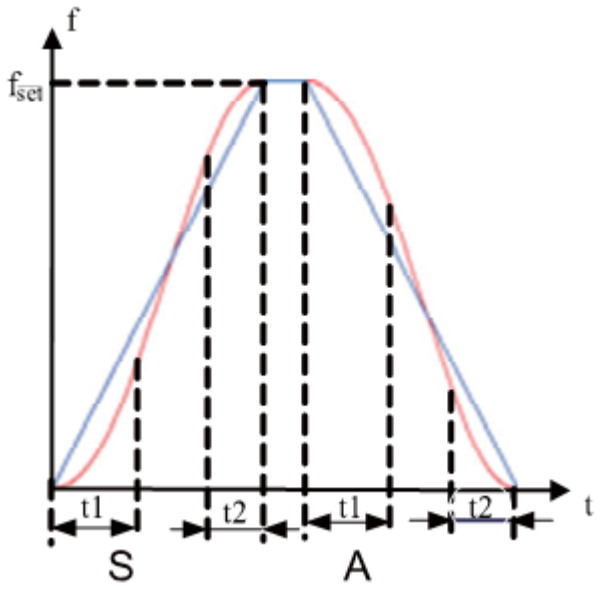


Schematic Diagram of S Curve Acceleration/Deceleration B

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%

P6-08 and P6-09 respectively define the time proportion of S curve at the acceleration/deceleration A start section and end section. Two function codes shall meet the requirement: P6-08+P6-09≤100.0%.

In the figure below, t1 is defined by P6-08. during this period, the change gradient of output frequency increases gradually. t2 is the time defined by P6-09. During this period, the change gradient of output frequency gradually changes to 0. Within the time between t1 and t2, the output frequency change gradient is fixed. During this section, the inverter adopts linear acceleration/deceleration.

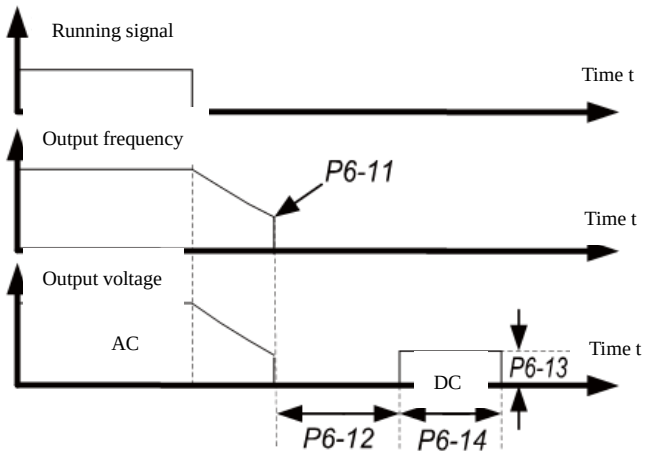


Curve Acceleration/Deceleration Schematic Diagram

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

During deceleration process, when the frequency decelerates to P6-11, after the time set by P6-12, the inverter starts to inject DC current into the motor to quicken braking process. The injection current is set by P6-13 and 100.0% corresponds to rated inverter current. DC current injection time is set by P6-14. If the braking time is 0, this process doesn't exist. As shown in the

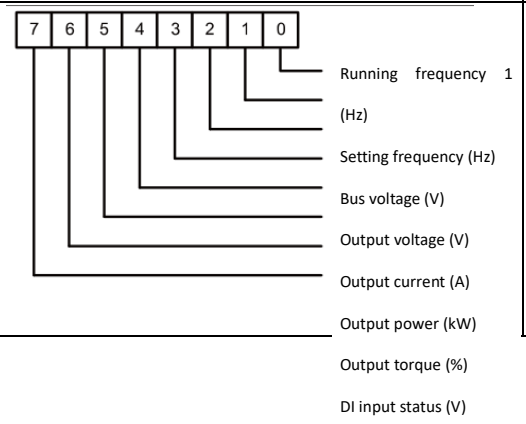
figure below:

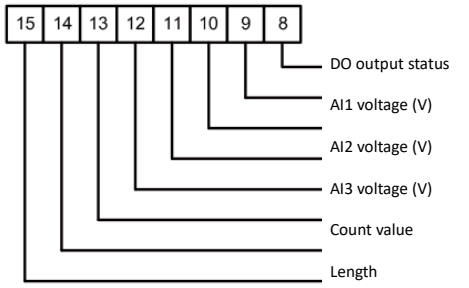
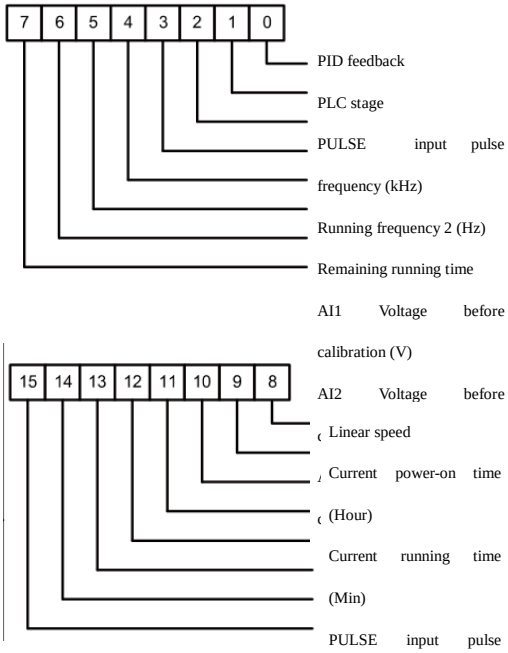
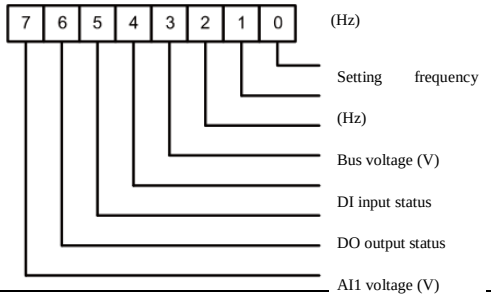


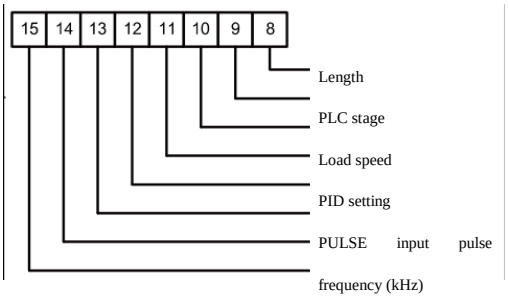
DC Brake Schematic Diagram at Stop

During DC brake stage, the motor rotor maintains a certain retention force to prevent rotor steadiness or creeping motion after stop.

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				
P7-01	*APP* Key Function Options	0: APP disabled 1: Switching of operation panel command and remote command (terminal command or serial port communication command) 2: Switching of forward and reverse running 3: Forward JOG 4: Reverse JOG	1	0
P7-02	STOP/RESET Key Function	0: This key can only be valid under keypad control mode. 1: This key is valid under any control mode	1	1
P7-03	LED Running Display Parameter 1		1111	1P

		 If above parameters are re displayed during running corresponding position as 1. Convert this binary number into hexadecimal number and then set it in P7-03		
P7-04	LED Running Display Parameter 2	 If above parameters are displayed during runni corresponding position as binary number into hexac and then set it in P7-04	1111	0
P7-05	LED Stop Display Parameter		1111	33

		 If above parameters are displayed during runr corresponding position as binary number into hexadecimal number and then set it in P7-05		
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 Places of Load Speed Displayed	Ones place: Number of decimal places of d0-14 0: 0 1: 1 2: 2 3: 3 Tens place: d0-19/d0-29 number of decimal places 1: 1 2: 2	H.111	1
P7-13	Accumulated Power-on Time	0h-65535h	1h	-
P7-14	Accumulated Energy Consumption	0-655350	1°	-

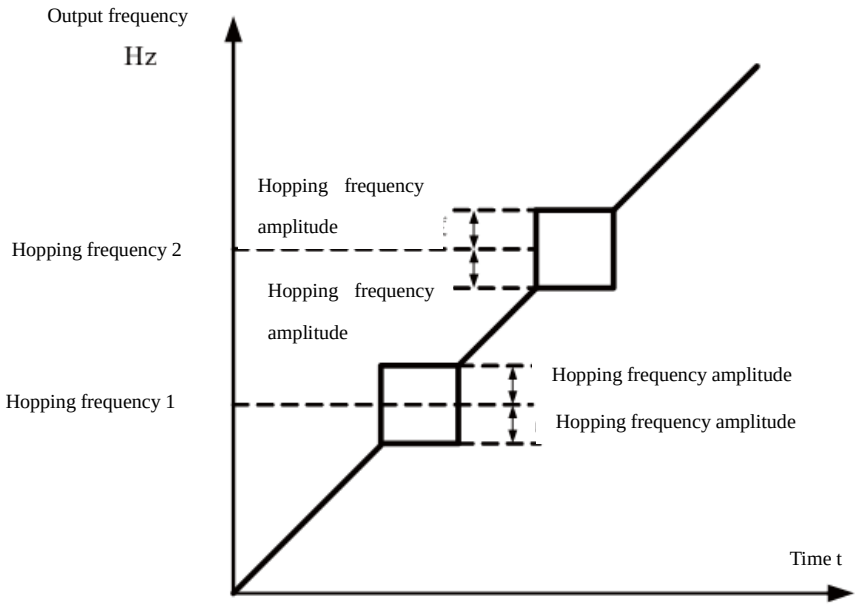
Function Code	Name	Setting Range	Minimum Unit	Default
P8 Group: Auxiliary Function				
P8-00	JOG Running Frequency	0.00Hz-maximum frequency	0.01Hz	2.00Hz

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

When the setting frequency is within the hopping frequency range, the inverter will run at the hopping frequency that is closer to the setting frequency. The hopping frequency function can protect the inverter from the mechanical resonance with the mechanical load.

A1000 can set two hopping frequency points. If these two hopping frequency are set as 0, the hopping frequency function is disabled.

The following is the schematic diagram of hopping frequency and hopping frequency amplitude.



Hopping Frequency Schematic Diagram

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

This function is usually applied to the load distribution when multiple motors bear one load.

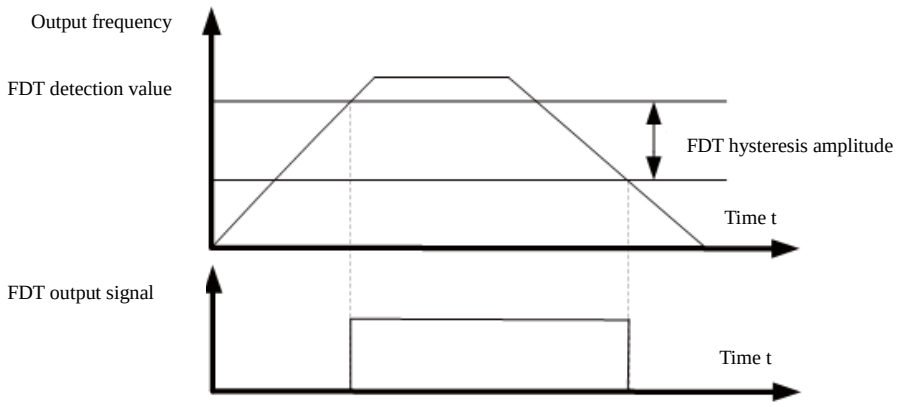
Sagging control means that the inverter output frequency goes down as the load increases; when multiple motors bear same one load, motor output frequency for the load will decrease more, thus reducing the load of motor and realizing the even load of multiple motors.

This parameter refers to the decline of the output frequency when the inverter is in rated load output.

P8-16	Set Accumulated Power-On Reach Time	0h-65000h	1h	0h
P8-17	Set Accumulated Run Time Reach	0h-65000h	1h	0h
P8-18	Enable Protection Options	0: Disabled 1:Enabled	1	0
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%

Frequency detection FDT function: When the output frequency exceeds the setting frequency detection value, DO indicator signal FDT output is enabled until the output frequency reduces to lower than the detection value and the difference exceeds the hysteresis. At this time, the DO indicator signal FDT output is enabled. Maximum two FDT detection points can be set at the same time.

FDT hysteresis amplitude=FDT hysteresis ×FDT detection value

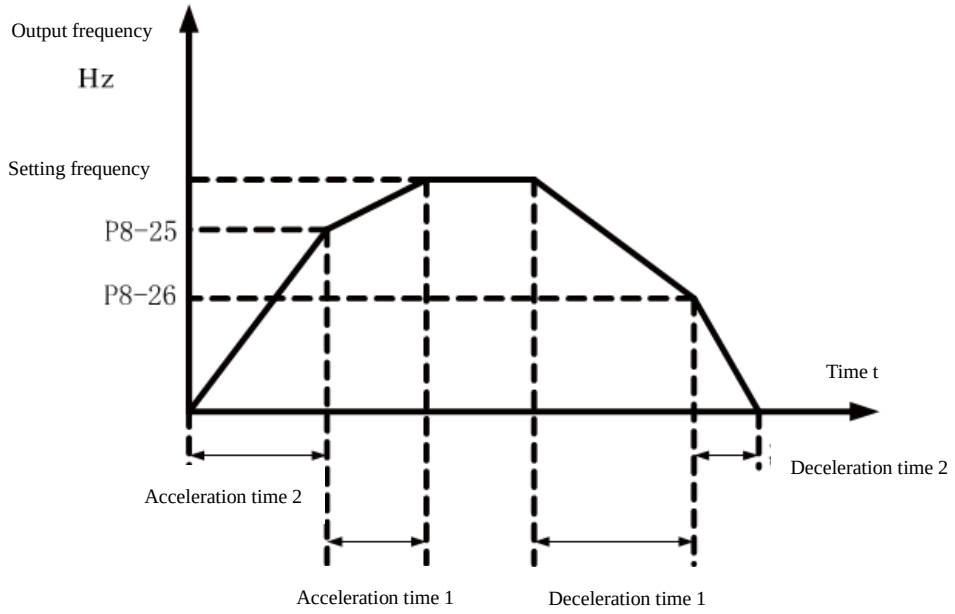


FDT Signal Schematic Diagram

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	1	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

This terminal is enabled when acceleration/deceleration time is selected not by DI terminal. During inverter running, it selects different acceleration/deceleration time according to the running frequency range other than DI terminal.



Acceleration/Deceleration Time Switching Schematic Diagram

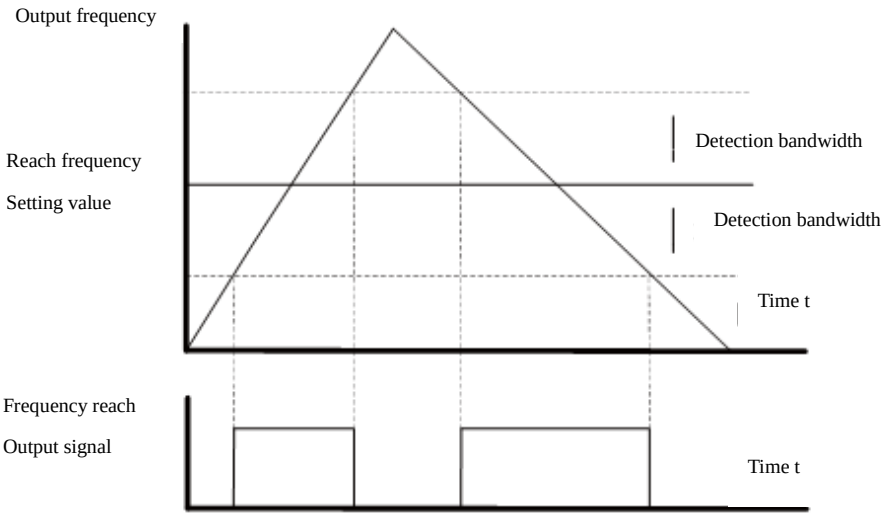
The above is the acceleration/deceleration time switching schematic diagram. If the running frequency is less than P8-25 during acceleration process, select acceleration time 2; if the running frequency is greater than P8-25, select acceleration time 1.

During deceleration, if the running frequency is greater than P8-26, select deceleration time 1; if the running frequency is lower than P8-26, select deceleration time 2.

P8-27	Terminal Jog Priority	0: Disabled 1: Enabled	1	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	0.00Hz- maximum frequency	0.01Hz	50.00Hz

	Detection Value 2			
P8-33	Any Reach Frequency Detection Amplitude 2	0.0%-100.0% (maximum frequency)	0.1%	0.0%

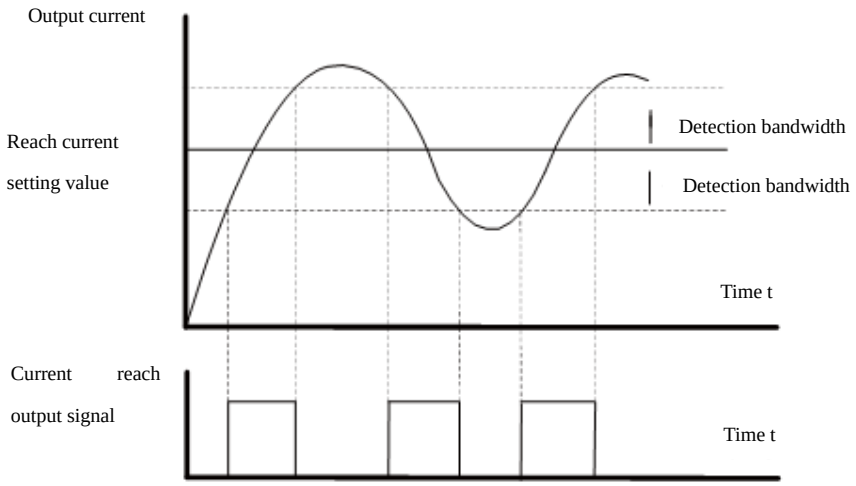
When the inverter is within the positive/negative range of frequency reach detection ($\begin{matrix} P8-30 \pm P8-31 \\ P8-32 \pm P8-33 \end{matrix}$), DO signal reach outputs ON; otherwise, it outputs OFF.



Frequency Reach Detection Function Schematic Diagram

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%

When the inverter is within the positive/negative range of frequency reach detection ($\begin{matrix} P8-38 \pm P8-39 \\ P8-40 \pm P8-41 \end{matrix}$), DO signal reach outputs ON; otherwise, it outputs OFF.



Frequency Reach, Current Reach Detection Function Schematic Diagram

P8-42	Timed Function Options	0: Disabled 1: Enabled	1	0
P8-43	Timed Running Time Options	0: P8-44 setting 1: AI1 2: AI2 3: AI3 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℃-100℃	1℃	75℃
P8-48	Radiation Fan Control	0: Radiation fan runs when the motor runs 1: Radiation fan runs all the time after being powered on	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

This group of parameters are used to realize the sleep and awakening function during water supply application.

When the inverter runs, if the setting frequency is less than or equal to the sleep frequency set by P8-51, the inverter goes into sleep status and stops automatically after the delay time set by

P8-52.

When the inverter is in sleep status and current running command is enabled, the inverter starts after the delay time set by P8-50 if the setting frequency is greater than or equal to awakening frequency set by P8-49.

Generally, the awakening frequency shall be greater than the sleep frequency. If both two frequency are set as 0.00Hz, sleep and awakening function are disabled.

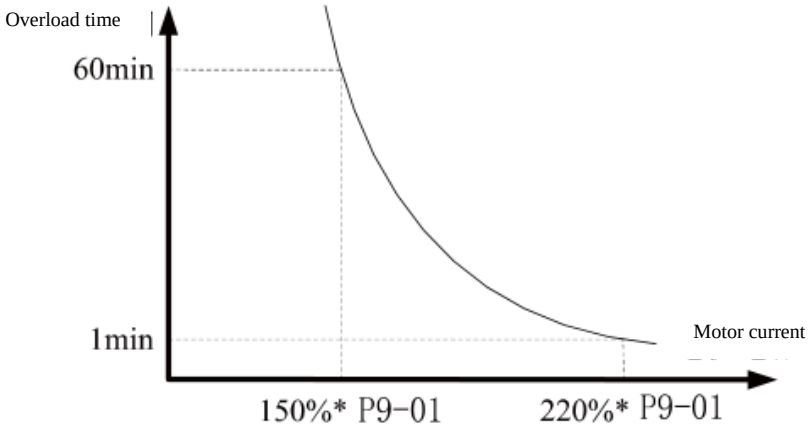
When sleep function is enabled, if the frequency source adopts PID, PID arithmetic during sleep status is subject to function code 10-28. At this time, enable arithmetic at PID stop (10-28=1).

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%		0
P9 Group: Fault and Protection				
P9-00	Motor Overload Protection Options	0: Prohibited 1: Permitted	1	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%

When P9-00=0, if the motor overload software protection function is disabled, it may pose a hazard of motor overheating. It is strongly recommended to install a thermal relay between the inverter and motor to protect the motor.

When P9-01=1, start the motor overload software protection function. The inverter adopts inverse-time curve for the motor overload protection to judge if there exists motor overload.

The inverse-time curve for motor overload protection defaults to: Send motor overload fault alarm when 220% motor rated current lasts for 1min; send alarm for motor overload when 150% motor rated current lasts for 60min. Users can translate the motor overload curve through function code P9-01 to meet the actual condition of specific motor.



Motor Overload Curve

P9-02 is used to send a prewarning signal to the control system through DO before enabling the motor overload fault protection. This prewarning factor is used to determine what degree prior to motor overload protection will trigger an alarm. The higher this factor is, the smaller the advance time of the pre-alarm will be.

P9-03	Overvoltage Stall Gain	0-100		30
P9-04	Overvoltage Stall Protection Voltage	650V-800V		760V
P9-07	Short Circuit to Ground Protection Options upon Power-on	Ones place: Short circuit to ground protection options upon power-on 0: Disabled 1: Enabled Tens place: Short circuit to ground protection options upon power-on before operation 0: Disabled 1: Enabled	1	1
P9-08	Braking Unit Action Start Voltage	700-800V		780V
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	1	0
P9-11	Fault Automatic Reset Interval	0.1s-100.0s	0.1s	1.0s
P9-12	Input Phase Loss/Contactor On Protection Options	Ones place: Input phase loss protection options Tens place: 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 (0L2)	-	-

		Motor overload (OL1) Input phase loss (PF) Output phase loss (LF) Module overheating (0H1) 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) Switching motor during running (TRE) Large speed offset (DEV) Motor overspeed (OS) Motor overtemperature (OH2) Initial position error (1NE) Slave motor failure under master and slave control (MS)		
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)	-	-	-
P9-45	Not Used	-	-	-
P9-46	Not Used	-	-	-
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

P9-48	Fault Protection Action Options 2	Ones place: Encoder/PG card abnormality (*PG*) 0: Coast-to-stop Tens place: Function code read & write abnormality (*EP*) 0: Coast to stop 1: Stop according to the stopping mode Hundreds place: Inverter overload fault action options (*OL2*) 0: Coast to stop 1: Derating Thousands places: Motor overheating (*OH2*) Ten thousands place: Running time reach *(OT*)	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
P9-50	Fault Protection Action Options 4	Ones place: Large speed Offset (*DEV*) 0: Coast to stop 1: Stop according to the stopping mode 2: Continue to run	11111	00000

		Tens place: Motor overspeed (*OS*) Hundreds place: Initial position error		
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%
P9-56	Motor Temperature Sensor Type	0: No temperature sensor 1: PT100 2: PT1000		0
P9-57	Motor Overheating Protection Threshold	0℃-200℃		110℃
P9-58	Motor Overheating Pre-warning Threshold	0℃-200℃		90℃

The analog input AI3 of temperature signal of motor temperature sensor can be used for motor temperature sensor input. Motor temperature sensor signal is connected to AI3 and GND terminal.

AI3 analogy input terminal of A1000 supports PT100 and PT1000 motor temperature sensor. During use, set the sensor type correctly. Motor temperature is displayed in d0-34.

If motor temperature is greater than motor overheating pre-warning threshold P9-57, the inverter will give an alarm about motor fault and start corresponding protection action.

When motor temperature is greater than motor overheating pre-warning threshold P9-58, the multi-function numeric DO of inverter outputs “motor overload pre-warning” ON signal.

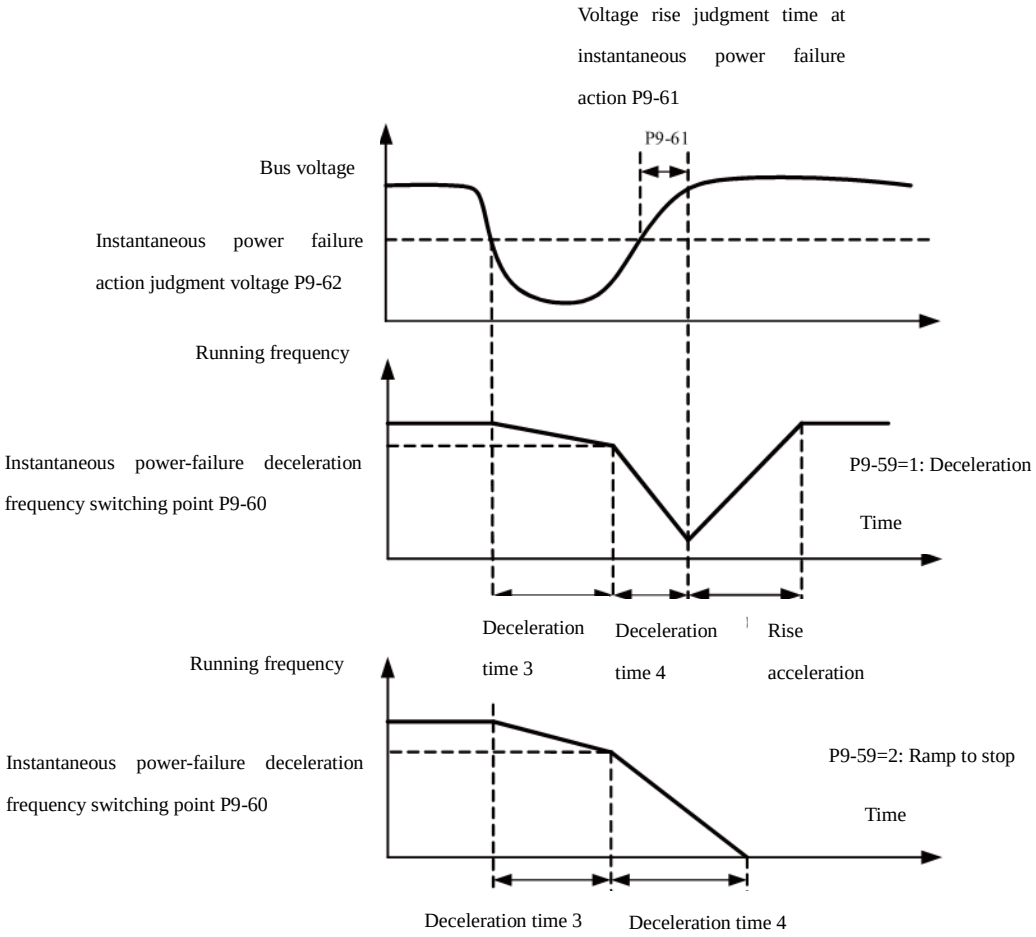
P9-59	Enable Non-stop under Instantaneous Power Failure	0: Disabled 1: Constant control of bus voltage 2: Ramp-to-stop		0
P9-60	Reset Voltage for Non-stop under Instantaneous Power Failure	60%-100%		85%
P9-61	Voltage Judgment Time under Non-stop upon Instantaneous Power Failure	01-10.0s		0.5s
P9-62	Bus Voltage of Non-stop Action upon Instantaneous Power Failure	60%-85%		80%

When this function is enabled, in case of instantaneous power failure or subsequent voltage reduction, the inverter will lower down output rotation speed and uses load feedback energy to

make up DC bus voltage of inverter so as to maintain inverter running.

If P9-59=1, in the event of instantaneous power failure or subsequent voltage reduction, the inverter will decelerate; when bus voltage returns to normal, the inverter will accelerate normally to the setting frequency. If the bus voltage is normal and lasts for the time greater than the time set by P9-61, it can be judged that the bus voltage returns to normal.

If P9-59=2, the inverter decelerates until stop in case of instantaneous power failure or subsequent voltage reduction.



Action Schematic Diagram upon Instantaneous Power Failure

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
P9-67	Overspeed Detection Value	0.0%-50.0% (maximum frequency)	0.1%	20.0%
P9-68	Overspeed Detection Time	0.0s: No detection; 0.1-60.0s	0.1s	0.1s
P9-69	Greater Speed Offset Detection Value	0.0%-50.0% (maximum frequency)	0.1%	20.0%
P9-70	Large Speed Offset Detection Time	0.0s: No detection; 0.1-60.0s	0.1s	5.0s

P9-71	Gain KP for Non-stop under Instantaneous Power Failure	0-100		40
P9-72	Integral Factor ki for Non-stop under Instantaneous Power Failure	0-100		30
P9-73	Action Deceleration Time for Non-stop under Instantaneous Power Failure	0-300.0s		20.0s

Process PID closed-loop control is to adopt the regulator with three calculation factors, i.e., P (proportional), I (integral) and D (differential) to gradually reduce the offset between feedback value and command value. It is applied to process control of flow, pressure and temperature.

Proportional control (P)

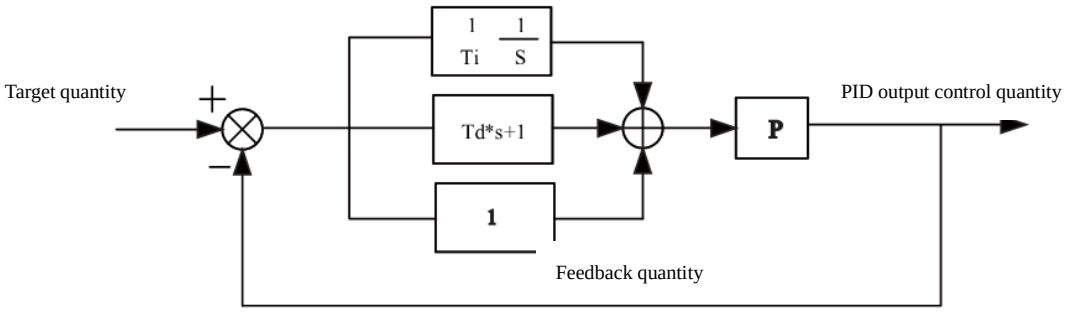
Control quantity proportionate to the offset.

Integral control (I)

Controlled quantity proportionate to the integral value of offset can eliminate the stable error.

Differential control (D)

The controlled quantity that is directly proportional with the offset change rate could predicate the trend of error changes and respond to intense changes to improve the dynamic characteristics. However, it is easy to lead in and amplify the interference signal and result system unsteadiness. Please apply this mode carefully.



PID Control Schematic Diagram

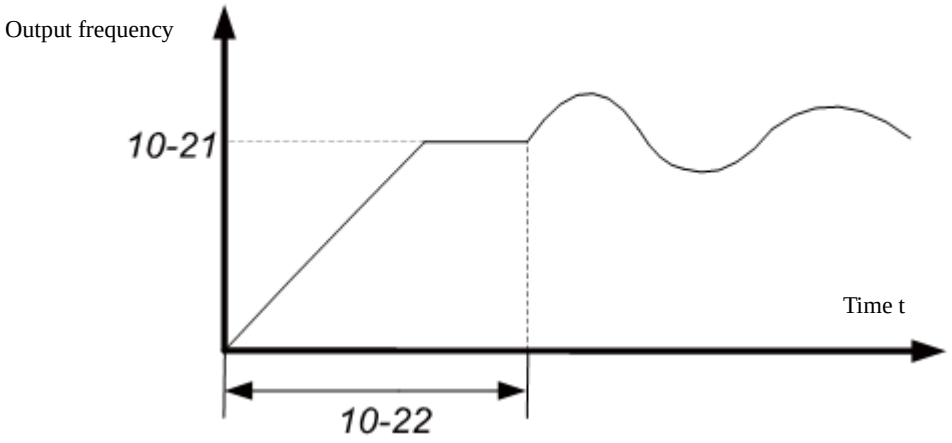
10-00	PID Setting Source	0: Function code 10-01 setting 1: AI1 2: AI2 3: AI3 4: PULSE setting (DI5) 5: Communication setting 6: Preset commands setting 7: Potentiometer setting	1	0
10-01	PID Value Setting	0.0%-100.0%	0.1%	50.0%

These parameters are used to set the PID command source. When select the default value 0, it

means to set PID target quantity by 10-01. The setting target quantity of process PID is relative and 100% of the setting value correspond to 100% of the full range of feedback signal of controlled system. The system will execute arithmetic according to relative value (0.0%-100.0%). Notes: When the command source selects PID output (for example, P0-03 or P0-04 is set as 8), process PID control is enabled.

10-02	PID Feedback Source	0: AI1 1: AI2 2: AI3 3: AI1-AI2 4: PULSE setting (DI5) 5: Communication setting 6: AI1+AI2 7: MAX (|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)	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%
10-21	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

After PID running, the frequency will firstly accelerate to the PID preset frequency according to the acceleration/deceleration time and the inverter will continue to run at this frequency for the time set by 10-22. Afterwards, the inverter proceeds with the PID output regulation.



PID Preset Output Schematic Diagram

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

The above function codes are used to control the fixing length.

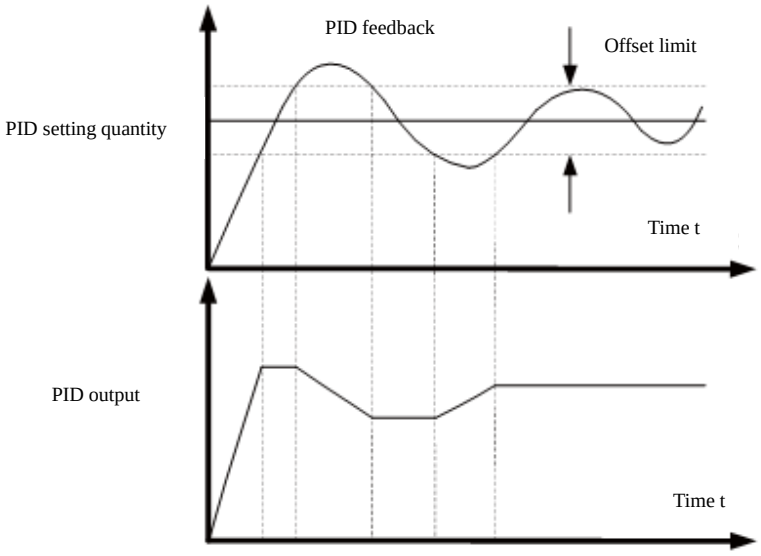
Length information shall be collected through multi-function numeric input terminal. By dividing the number of pulse by the pulse count per meter 11-07, actual length 11-06 can be calculated. When the actual length is greater than the set length 11-05, multi-function numeric DO outputs “length reach” On signal.

During fixing length control process, length reset operation can be realized through multi-function DI terminal. Refer to P4-00 - P4-09 for details.

During application, it is required to set corresponding input terminal function as “length count input”. Make sure to use DI5 port for higher pulse frequency.

When the offset between PID command and feedback is lower than the setting value of this function code, PID regulator stops regulation and PID output remains unchanged. For some occasions, increase PID regulation stability.

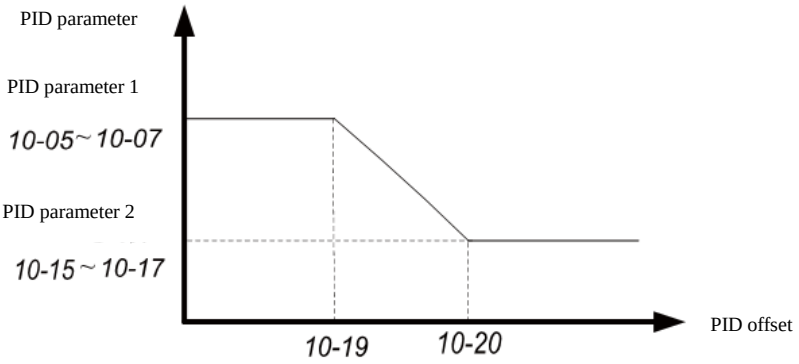
The correspondence between the offset limit and output frequency is as shown in the figure below:



PID Offset Limit Schematic Diagram

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	1	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%

By setting 10-18, two groups of independent PID control parameters can't be switched, or can be switched by DI terminal or automatically. When automatic switching is enabled for PID parameters, if the absolute value of offset value between the setting value and feedback is lower than PID parameter switching offset 1, PID control parameter selects PID parameter as 1; if the absolute value of offset value between the setting value and feedback is lower than PID parameter switching offset 2, PID control parameter selects PID parameter as 2; when the absolute value of the offset between the setting value and feedback is within PID switching offset 1 and PID switching offset 2, PID control parameter is the linear interpolation. See the figure below:



Automatic Switching Schematic Diagram of PID Parameters

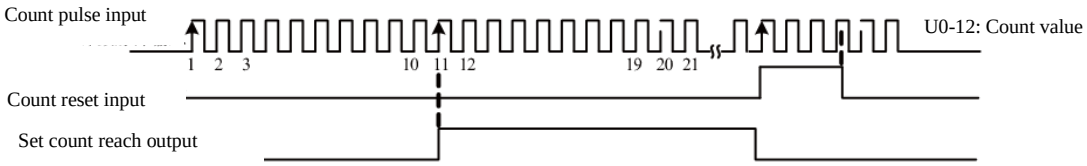
11-08	Set Count Value	1-65535	1	1000
11-09	Designated Count Value	1-65535	1	1000

The count value shall be collected through the multi-function numeric input terminal. During application, it is required to set corresponding input terminal function as “counter input” (function code 25). Use DI5 port when there exists higher pulse frequency.

When the count value reaches to the set count value(11-08), multi-function numeric DO outputs “set count value reach” ON signal and then the counter stops counting.

When the count value reaches to the set count value (11-09), multi-function numeric DO outputs “set count value reach” ON signal and the counter continues to counting until reaching to the “set count value”.

The designated count value 11-09 shall not be greater than the set count value 11-08. The following the schematic diagram of set count value reach and designated count value reach function.



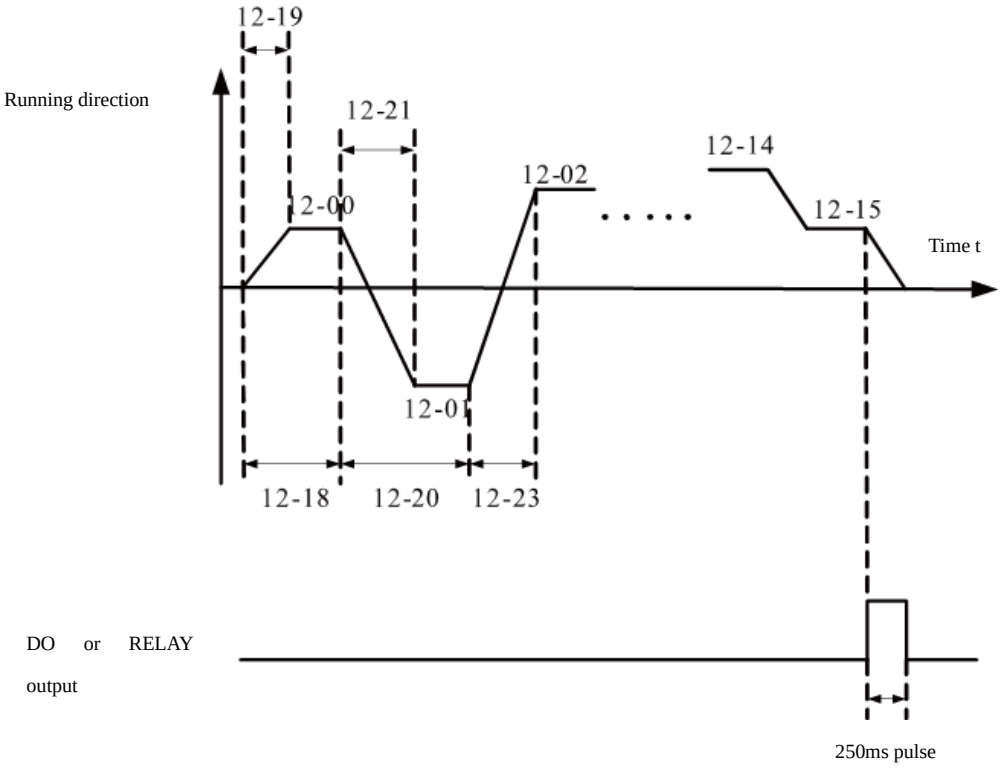
Schematic Diagram for Setting of Set Count Value and Designated Count Vale

P12 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

Simple PLC has two purposes: It can be used as frequency source or the voltage source of VF separation.

The following figure is the schematic diagram when simple PLC is used as frequency source. When it is used as frequency source, positive and negative value of 12-00 -12-15 determine the running direction. When it is negative, the inverter runs at the reverse direction.



Simple PLC Schematic Diagram

When it is used as frequency source, PLC has three running modes below; but when it is used

as voltage source of VF separation, these three modes don't applicable.

0：Stop after single running

The inverter stops running automatically after one single running cycle and can be started again upon receiving running command.

1: Holding last value at stop after single running

After one single running cycle, the inverter automatically maintains the running frequency and direction of the last section.

2: Continuous cycle

The inverter automatically enters the next cycle after one cycle and won't stop until receiving the stop command.

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	0-3	1	0

	Time Options of PLC Preset Command 6			
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: AI2 3: AI3 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 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens place: Profibus-DP 0: 115200BPs 1: 208300BPs 2: 256000BPs 3: 512000BPs Hundreds place: Not used Thousands place: CANLink baud rate 0: 20 1: 50 2: 100 3: 125 4: 250 5: 500 6: 1M	1	5005
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)(works for	1	0

		MODBUS)		
13-02	Local Inverter Address	0: Broadcasting address 1-247 (works for MODBUS, Profibus-DP, CANLink)	1	1
13-03	MODBUS Response Delay	0-20ms (works for MODBUS)		20ms
13-04	Communication Overtime	0.0s: Disabled 0.1-60.0s (works for MODBUS, Profibus-DP and CANLink)		0.0
13-05	(MODBUS, Profibus-DP Communication s Data Format	Ones place: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Tens place: Profibus-DP 0: PP01 1: PP02 2: PP03 3: PP05		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

b0 Group: Torque Control and Limit Parameter				
b0-00	Speed/Torque Control Mode Options	0: Speed control 1: Torque control	1	0

The control mode of inverter is selected by these two function codes: Speed control or torque control.

A1000 multi-function numeric DI terminal has two functions related to torque control: Torque control disabled (function 29), speed control/torque control switching (function 46). These two terminals must be used together with b0-00 to realize switching between the speed control and torque torque.

When the speed control/torque control switching terminal is disabled, the control mode is determined by b0-00; if the speed control/torque control switching terminal is enabled, the control

mode is the reverse of b0-00.

Under all conditions, when the torque control disabled terminal is enabled, the control mode of inverter is fixed as the speed control mode.

b0-01	Torque Setting Source Options under Torque Control Mode	0: Numeric setting 1(b0-03) 1: AI1 2: AI2 3: AI3 4: PULSE 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2)	1	0
b0-03	Torque Numeric Setting under Torque Control Mode	-200.0%-200.0%		0

b0-01 is used to select the torque setting source. There are eight torque setting modes.

Torque setting adopts the relative value and 100.00% corresponds to the inverter rated torque. Its setting range is -200.0% - 200.0%, which means the maximum torque of the inverter is twice of the inverter rated torque.

When the torque setting adopts mode 1 to 7, 100% of communication, analog input and pulse input correspond to b0-03.

b0-05	Torque Control Forward Maximum Frequency	0.00Hz-maximum frequency (P0-10)		50.00Hz
b0-06	Torque Control Reverse Maximum Frequency	0.00Hz-maximum frequency (P0-10)		50.00Hz

The upper limit frequency for torque control is used to set the maximum forward or reverse running frequency of inverter under the torque control mode .

In the torque control mode, if the load torque is less than motor output torque, motor speed will rise continuously. The maximum speed of motor must be limited in this mode to prevent any runaway accident of the mechanical system.

b0-07	Torque Control Acceleration Time	0.00s-65000s		0.00s
b0-08	Torque Control Deceleration Time	0.00s-65000s		0.00s

Under the torque control mode, the difference of motor output torque and the load torque determines the speed change rate of motor and load. Therefore, the motor rotation speed may change quickly, thus causing noise or excessive mechanical stress. Setting torque control acceleration/deceleration time could make the motor speed change smoothly.

For occasions requiring rapid response of torque, it is required to set the torque control acceleration/deceleration time as 0.00s.

For example: To ensure uniform load distribution when two motors bear one load, set one inverter as the master that adopts speed control mode while the other inverter is set as slave adopting the torque control mode. The actual output torque of master is used as the torque

command of slave. At this time, the torque of slave shall follow the master quickly so the torque control acceleration/deceleration time of slave is 0.00s.

b2 Group : Optimized Parameter for Motor 2 Control				
b2-00	Motor Type Options	0: Common induction motor 1: Inverter induction motor		0
b2-01	Motor Rated Power	0.1kW-1000.0kW		Up to specific model
b2-02	Motor Rated Voltage	1V-2000V		Up to specific model
b2-03	Motor Rated Current	0.01A-655.35A (inverter power≤55kW) 0.1A-655.35A (inverter power＞55kW)		Up to specific model
b2-04	Motor Rated Frequency	0.01Hz-maximum frequency		Up to specific model
b2-05	Motor Rated Rotation Speed	1rpm-65535rpm		Up to specific model
b2-06	Stator Resistance of Induction Motor	0.001Ω-65.535Ω (inverter power≤55kW) 0.0001Ω-6.5535Ω (inverter power＞55kW)		Up to specific model
b2-07	Rotor Resistance of Induction Motor	0.001Ω-65.535Ω (inverter power≤55kW) 0.0001Ω-6.5535Ω (inverter power＞55kW)		Up to specific model
b2-08	Leakage Inductance of Induction Motor	0.01mH-655.35mH(inverter power≤55kW) 0.001mH-65.535mH (inverter power＞55kW)		Up to specific model
b2-09	Mutual Inductance of Induction Motor	0.1mH-6553.5mH(inverter power≤55kW) 0.01mH-655.35mH (inverter power＞55kW)		Up to specific model
b2-10	Idling Current of Induction Motor	0.01A-A2-03(inverter power≤55kW) 0.1A-A2-03(inverter power＞55kW)		Up to specific model
b2-27	Encoder Line Number	1-65535		1024
b2-28	Encoder Type	0: ABZ Incremental encoder 2: Rotary transformer		0
b2-29	Speed Feedback PG Options	0: Local PG 1: Expansion PG 2: Pulse input (DI5)		0
b2-30	ABZ Incremental Encoder AB Phase Sequence	0: Forward 1: Reverse		0
b2-31	Installation Angle of Encoder	0.0-359.9°		0.0°
b2-34	Rotary Transformer	1-65535		1

	Pole-Pairs			
b2-36	Speed Feedback PG Disconnection Detection Time	0.0: No action 0.1s-10.0s		0.0
b2-37	Tuning Options	0: No operation 1: Tuning of stationary parameters of induction motor 2: Dynamic full tuning of induction motor 3: Stationary full tuning of induction motor		0
b2-38	Speed Loop Proportional Gain 1	1-100		30
b2-39	Speed Loop Integral Time 1	0.01s-10.00s		0.50s
b2-40	Switching Frequency 1	0.00-b2-43		5.00Hz
b2-41	Speed Loop Proportional Gain 2	1-100		20
b2-42	Speed Loop Integral Time 2	0.01s-10.00s		1.00s
b2-43	Switching Frequency 2	b2-40- maximum frequency		10.00Hz
b2-44	Vector Control Slip Gain	50%-200%		100%
b2-45	SVC Torque Filter Constant	0.000s-0.100s		0.000s
b2-47	Upper Limit of Speed Control Torque	0: b2-48 1: AI1 2: AI2 3: AI3 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) (full range of options 1 to 7 correspond to the numeric setting of b2-48)		0
b2-48	Numeric Setting of Torque Upper Limit under Speed Control Mode	0.0%-200.0%		150.0%
b2-49	Torque Upper Limit Command Options under Speed Control (Electricity Generation)	0: Function code P2-10 setting 1: AI1 2: AI2 3: AI3 4: PULSE 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2)		

		8: Function code P2-12 setting (full range of options 1 to 7 correspond to the numeric setting of P2-12)		
b2-50	Numeric Setting of Torque Upper Limit under Speed Control Mode (Electricity Generation)	0.0%-200.0%		150%
b2-51	Excitation Adjustment Proportional Gain	0-20000		2000
b2-52	Excitation Adjustment Integral Gain	0-20000		1300
b2-53	Torque Adjustment Proportional Gain	0-20000		2000
b2-54	Torque Adjustment Integral Gain	0-20000		1300
b2-55	Speed Loop Integral Property	Ones place: Integral separation 0: Disabled		0
b2-59	Maximum Torque Factor of Field Weakening Region	0.0%-200%		Up to specific model
b2-60	Enable Electricity Generation Power Limit	0: Disabled 1: Enabled		0
b2-61	Electricity Generation Power Upper Limit	0.00-200%		
b2-62	Control Mode of Motor 2	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: V/F control		0
b2-63	Acceleration/Deceleration Time Options of Motor 2	0: Same with motor 1 2: Acceleration/deceleration time 2 3: Acceleration/deceleration time 3 4: Acceleration/deceleration time 4		0
b2-64	Torque Boost of Motor 2	0.0%: Automatic torque boost 0.1%-30.0%		Up to specific model
b2-66	Oscillation Suppression Gain of Motor 2	0-100		40
b5 Group: Optimized Parameter for Control				
b5-00	DPWM Switching Upper Limit Frequency	5.00Hz-maximum frequency		8.00Hz
b5-01	PWM Modulation Mode	0: Asynchronous modulation 1: Synchronous modulation		0
b5-02	Deadband Compensation Mode Options	0: No compensation 1: Compensation mode 1		1
b5-03	Random PWM Depth	0: Random PWM disabled 1-10: PWM carrier frequency random		0

		depth		
b5-04	Enable Rapid Current Limit	0: Disabled 1: Enabled		1
b5-05	Maximum Output Voltage Factor	100-110%		105%
b5-06	Undervoltage Point Setting	210-420V		350V
b5-07	SVC Optimized Mode Options	1: Optimized mode 1 2: Optimized mode 2		1
b5-08	Deadband Time Adjustment	100%-200%		150%
b5-09	Overvoltage Point Setting	200.0V-2500.0V		Up to specific model
b8 Group: Point-to-Point Communication				
b8-00	Point-to-Point Communication Function Options	0: Disabled 1: Enabled		0
b8-01	Master-Slave Options	0: Master 1: Slave		0
b8-02	Slave Command Following Master-Slave Information Interaction	Ones place: Slave command following 0: Slave doesn't follow the master running command 1: Slave follows the master running command Tens place: Slave fault information transmission 0: No transmission of slave fault information 1: Transmission of slave fault information Hundreds place: Master displays slave offline 0: Master doesn't report fault at slave offline 1: Master reports fault at slave offline		011
b8-03	Slave Receiving Data Action Options	0: Torque setting 1: Frequency setting		0
b8-04	Received Data Zero Offset (Torque)	-100.00%-100.00%		0.00%
b8-05	Received Data Gain (Torque)	-10.00%-100.00%		1.00
b8-06	Point-to-Point Communication	0.0-10.0s		1.0s

	Disconnection Detection Time			
b8-07	Point-to-Point Communication Master Data Sending Period	0.001-10.000s		0.001s
b8-08	Received Data Zero Offset (Frequency)	-100.00%-100.00%		0.00%
b8-09	Received Data Gain (Frequency)	-10.00-100.00		1.0%
b8-10	Anti-slip Factor	0.00%-100.00%		10.00%

Chapter 7 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	OUA	1.Input voltage is too high	1. Adjust the voltage to normal range

under acceleration		2. During running, there exists external force driving the motor 3. Too short acceleration time 4. There is no braking unit and braking resistor	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 boost torque or V/F curve 5. Adjust the voltage to normal range 6. Select the rotation speed tracking staart or restart after the motor stops. 7. Cancel the impact load. 8. 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.
Motor load	OL1	1. If motor 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	1.Lower the ambient temperature 2.Clean the air duct 3.Replace the fan 4. Replace the thermistor

		5. Inverter module is damaged	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	1. Set motor parameters correctly according to the nameplate 2. Check the leading wire from inverter to

		process	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
PID feedback loss fault during running	PD	1. PD feedback is lower than the setting value of 10-28	1. Check the PID feedback signal or set 10-28 properly
High speed offset fault	DEV	1. Encoder parameters are set incorrectly 2. No parameter tuning	1. Set encoder parameter correctly 2. Carry out motor parameter tuning 3. Set detection parameter reasonably according to actual condition.
Encoder fault	PG	1. Encoder model doesn't match 2. Encoder wiring is wrong 3. Encoder is damaged 4. PG card abnormality	1. Set the encode type correctly according to actual condition 2. Troubleshoot the wire fault 3. Replace the encoder 4. Replace PG card
Motor overspeed fault	OS	1. Encoder parameters are set incorrectly 2. No parameter tuning 3. Detection parameter of motor overspeed P6-69 and P6-60	1. Set the encoder parameter correctly 2. Carry out motor parameter tuning 3. Set detection parameter reasonably according to actual condition.
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-phse 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

Chapter 8 Specification

Standard specification

Model A1000		Specification																								
220V	Motor capacity (HP)	0.5	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100									
	Rated power (KW)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75									
	Rated capacity (KVA)	1.5	3.0	4.0	5.9	8.9	17	21	30	40	57	69	85	114	134	160	231									
	Rated current (A)	2.1	3.8	4.8	9.0	13	25	32	45	60	75	91	112	150	176	210	304									
380V	Motor capacity (HP)		1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	120	150	180	200	270	300	340	380	428
	Rated power (KW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	250	280	315
	Rated capacity		1.5	3.0	4.0	5.9	8.9	11	17	21	24	30	40	57	69	85	114	134	160	192	231	250	280	355	396	445

	(KVA)																								
	Rated current (A)		2.1	3.8	5.1	9.0	13	17	25	32	37	45	60	75	91	112	150	176	210	253	304	377	426	510	520	585

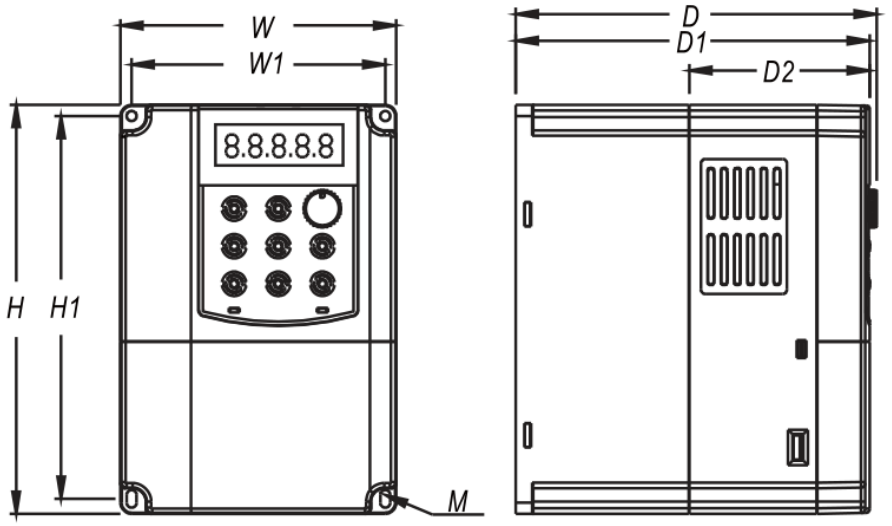
	Maximum frequency	V/F control: 0-500Hz; vector control: 0-500Hz	
	Carrier frequency	0.5kHz-16kHz; carrier frequency can be adjusted automatically according to the load characteristics.	
	Input frequency resolution	Digital setting: 0.01Hz Analog setting: Maximum frequency ×0.025%	
	Control mode	Open-loop vector control (VC)/Closed-loop vector control (SVC)/VF control	
	Start torque	0.5Hz/150% (SVC);	1Hz/180% (VC)
	Speed regulation range	1:100(SVC)	1:1000(VC)
	Steady speed accuracy	±0.5%(SVC)	±0.02%(FVC)
	Overload capacity	150% rated current for 60s; 180% rated current for 3s.	
	Torque boost	Automatic torque boost; manual torque boost 0.1%-30.0%	
	V/F curve	Three modes: Linear; multipoint; square type;	
	Acceleration/decleration curve	Linear or S curve acceleration/deceleration mode; four groups of acceleration/deceleration time, with the range 0.0-6500.0s	
	DC brake	DC braking frequency: 0.00Hz- maximum frequency; braking time: 0.0s-36.0s; braking action current value: 0.0%-100.0%	
	JOG control	Jog frequency range: 0.00Hz-50.00Hz; Jog acceleration/deceleration time 0.0s-6500.0s	
	Simple PLC and preset speed running	Maximum 16 sections of preset speed running can be realized through built-in PLC or control terminal	
	Built-in PID	It can conveniently realize the process closed-loop control system	
	Automatic voltage adjustment (AVR)	In case of voltage change, the inverter can automatically keep the output voltage constant	
	Overvoltage and overcurrent stall control	Automatically limit the voltage and current during running to prevent frequent overcurrent from causing overvoltage tripping	

Personalized function	Rapid current limit function	Minimize overcurrent fault to ensure the inverter run normally
	Torque limit and control	With characteristics of “excavator", automatically restrict the torque during running to frequent overcurrent from causing overvoltage tripping
	Safety self-inspection of peripheral equipment upon power on	The inverter can carry out safety detection against peripheral equipment upon power on, such as grounding, short circuit.
	Common DC bus function	Common DC bus function can be shared by multiple inverters.
	Textile wobble control	Multiple triangular wave frequency control function
	Timed control	Timed control function: Setting time range 0h-65535h
Running	Running command channel	3 channels: Operation panel setting, control terminal setting, serial communication port setting, which can be switched by multiple modes.
	Frequency source	10 frequency sources in total: Numeric setting, analog voltage setting, analog current setting, pulse setting, serial port setting, which can be switched by multiple modes.
	Auxiliary frequency source	10 kinds of auxiliary frequency sources. It can flexibly realize fine tuning and frequency synthesis of auxiliary frequency.
	Input terminal	6 numeric input terminals; one of them can be used as high-pulse input, with the maximum value up to 100KHz. 3 analog input terminals; two of them are used as voltage input while another is used as voltage or current input.
	Output terminal	One high-speed pulse output terminal (can be selected as open collector); 0kHz-100kHz square wave signal output. It can realize output of physical quantity, such as the setting frequency and output frequency. 1 numeric output terminals 2 Relay output terminals 1 analog output terminal. 0/4mA-20mA or 0/2-10V optional respectively. Setting frequency, output frequency and physical quantity output can be realized.
Environment	Operation place	Indoor, without direct sunlight, dust, corrosive gas, flammable gas, oil mist, vapor, water drop or salt, etc.
	Altitude	Lower than 1000m
	Ambient temperature	-10℃-+40℃(ambient temperature is within 40℃-50℃, it must be derated)
	Humidity	Lower than 95%RH, no water condenses
	Vibration	Less than 5.9m/s^2(0.6g)
	Storage temperature	-20℃-+60℃

Chapter 9 Appendix

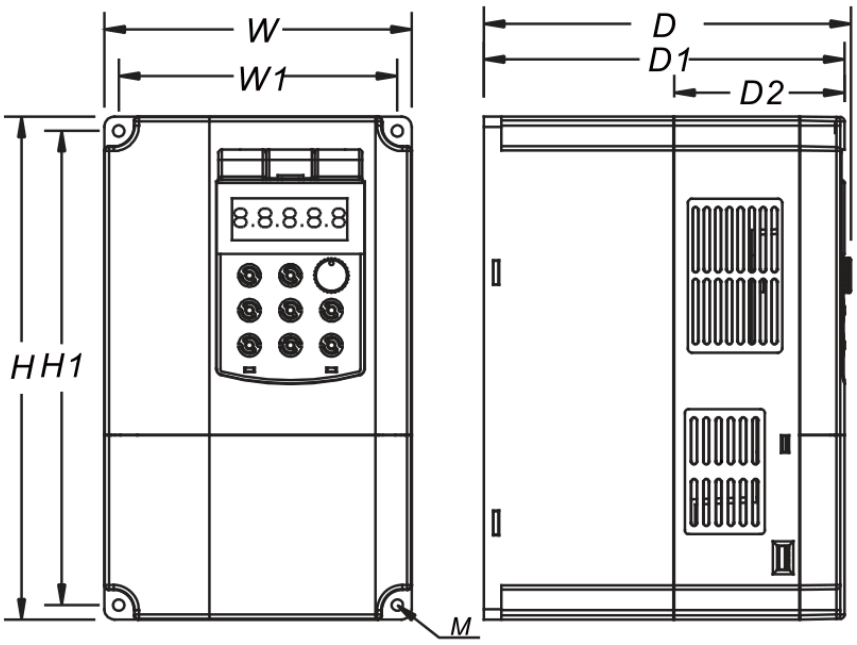
Appendix I: Overall Dimension

Dimension of 0.4kw-3.7kW model (mm)



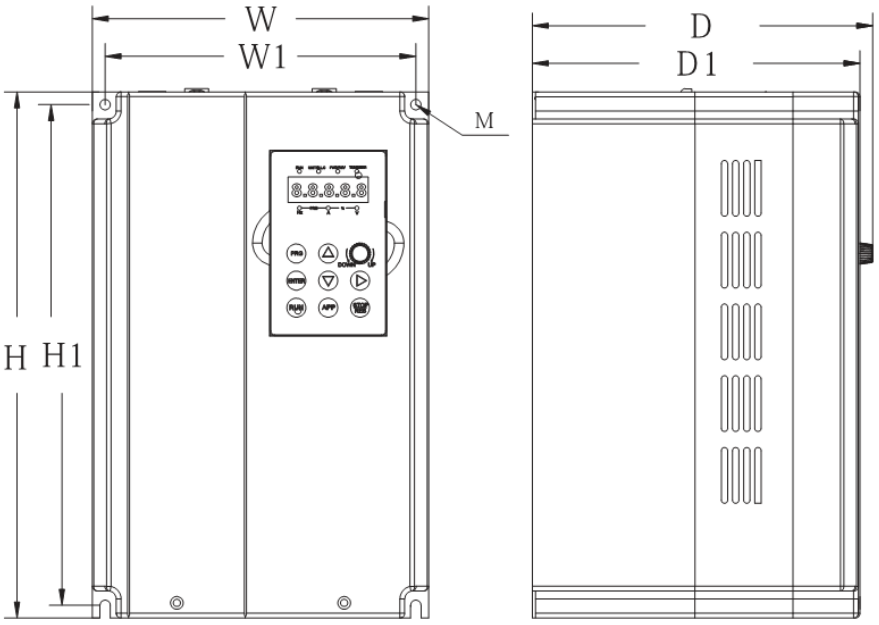
Model		Voltage grade	H	H1	W	W1	D	D1	D2	Pore diameter
A1000-0R4	A1000-0R7	AC220V	185	173.25	125	115	163.5	160.5	81.5	M4
A1000-1R5	A1000-2R2									
A1000-0R7	A1000-1R5	AC440V								
A1000-2R2	A1000-3R7									

Dimension of 5.5kw-7.5kw model (mm)



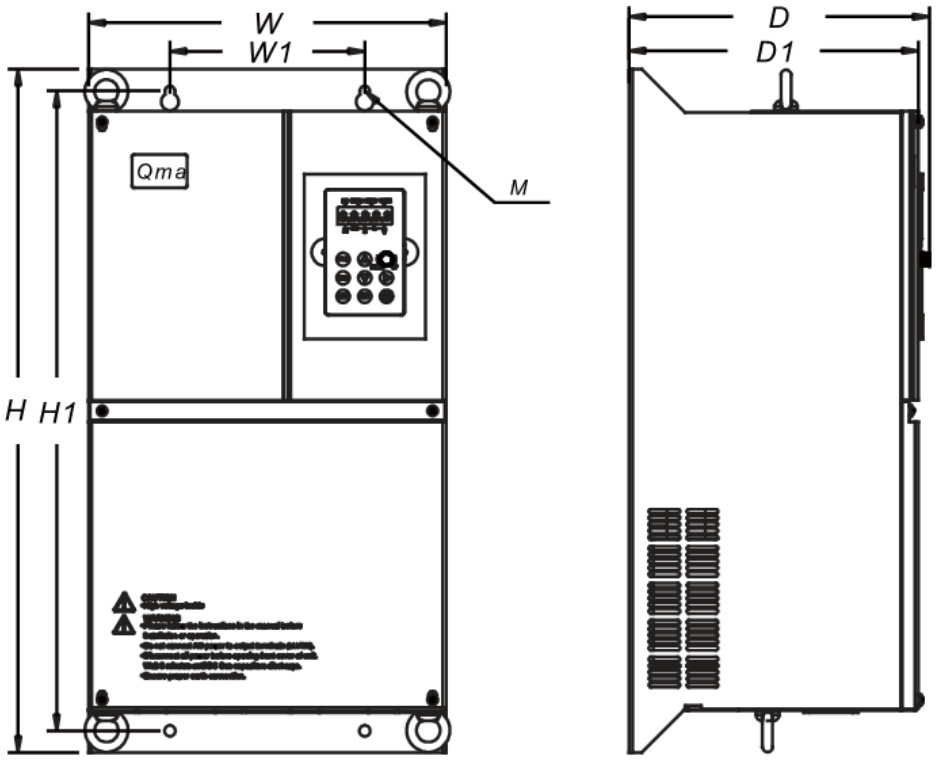
Model		Voltage grade	H	H1	W	W1	D	D1	D2	Pore diameter
A1000-3R7	A1000-5R5	AC220V	245	231	150	136	179	176	83	M5
A1000-5R5	A1000-7R5	AC440V								

Dimension of 11kw-15kw model (mm)



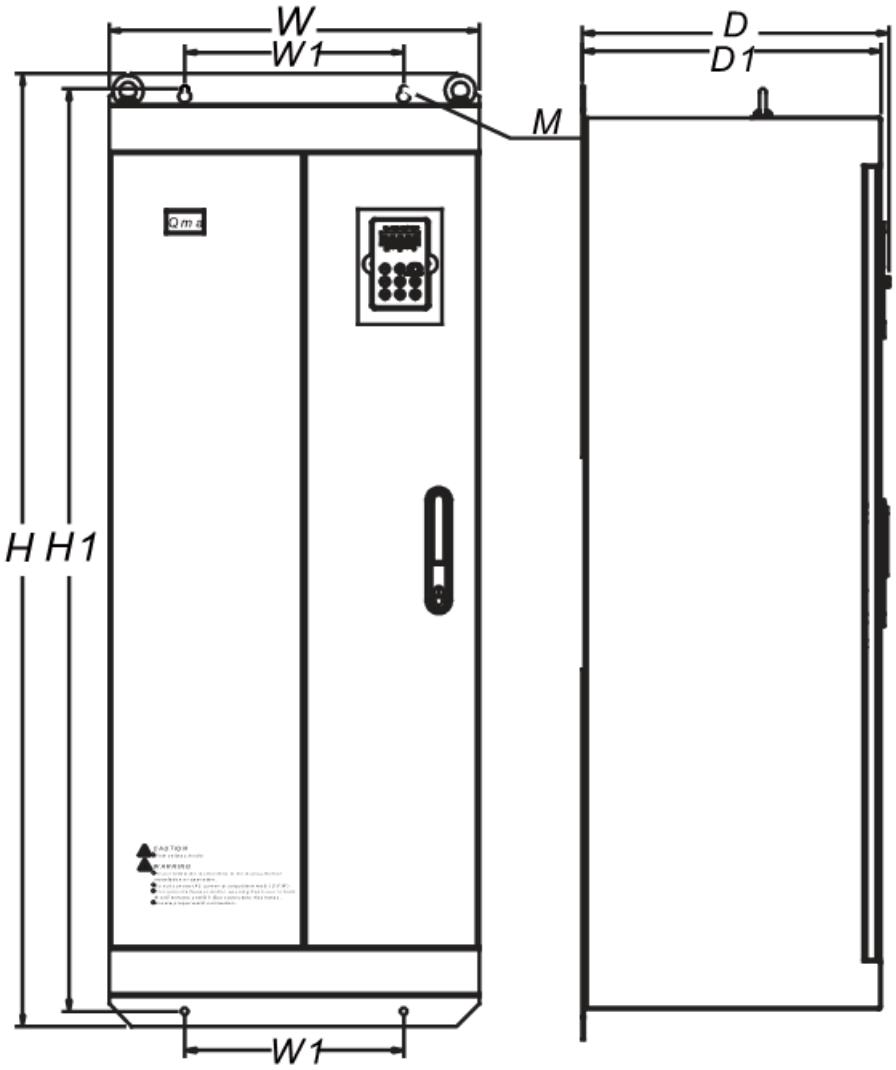
Model		Voltage grade	H	H1	W	W1	D	D1	D2	Pore diameter
A1000-7R5		AC220V	330	314	221	195	213.5	205.5		M6
A1000-011	A1000-015	AC440V								

Dimension of 18.5kw-132kw model (mm)



Model		Voltage grade	H	H1	W	W1	D	D1	Pore diameter
A1000-018	A1000-022	AC440V	463	447	285	225	232	223	M8
A1000-030									
A1000-037	A1000-045		692	589	329.5	179.5	276.5	266.5	M8
A1000-055									
A1000-075			727	687	375	225	307	297	M8
A1000-090	A1000-110		782	742	460	310	345	335	M8
A1000-132									

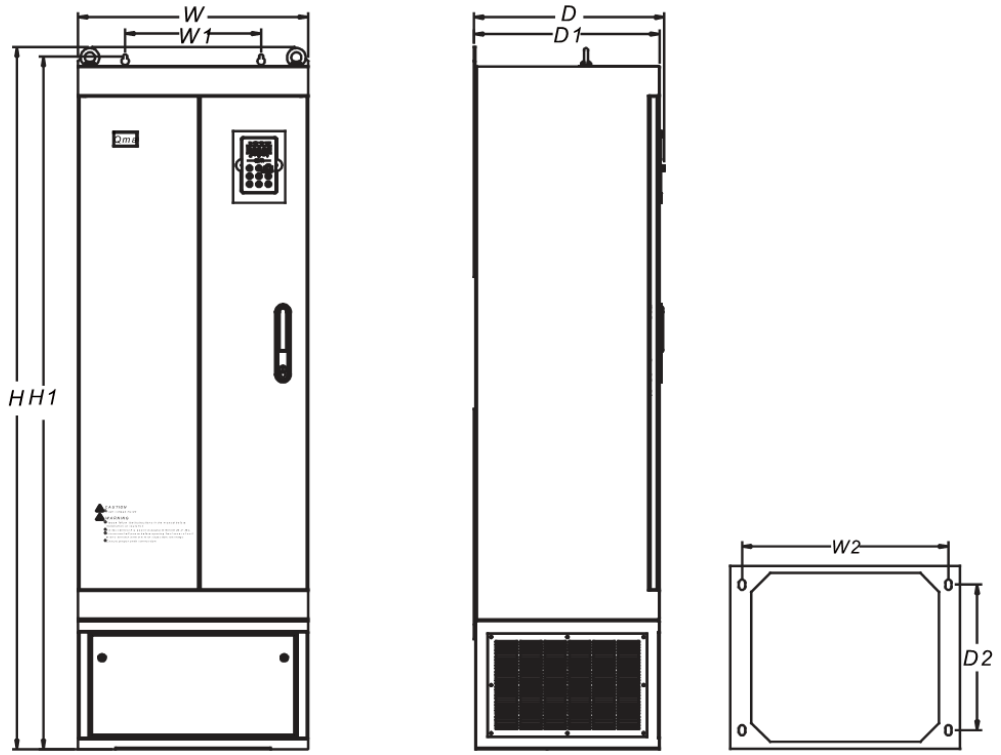
Dimension of 160kw-185kw model (wall-mounted) (mm)



Notes: External wall-mounted DC reactor

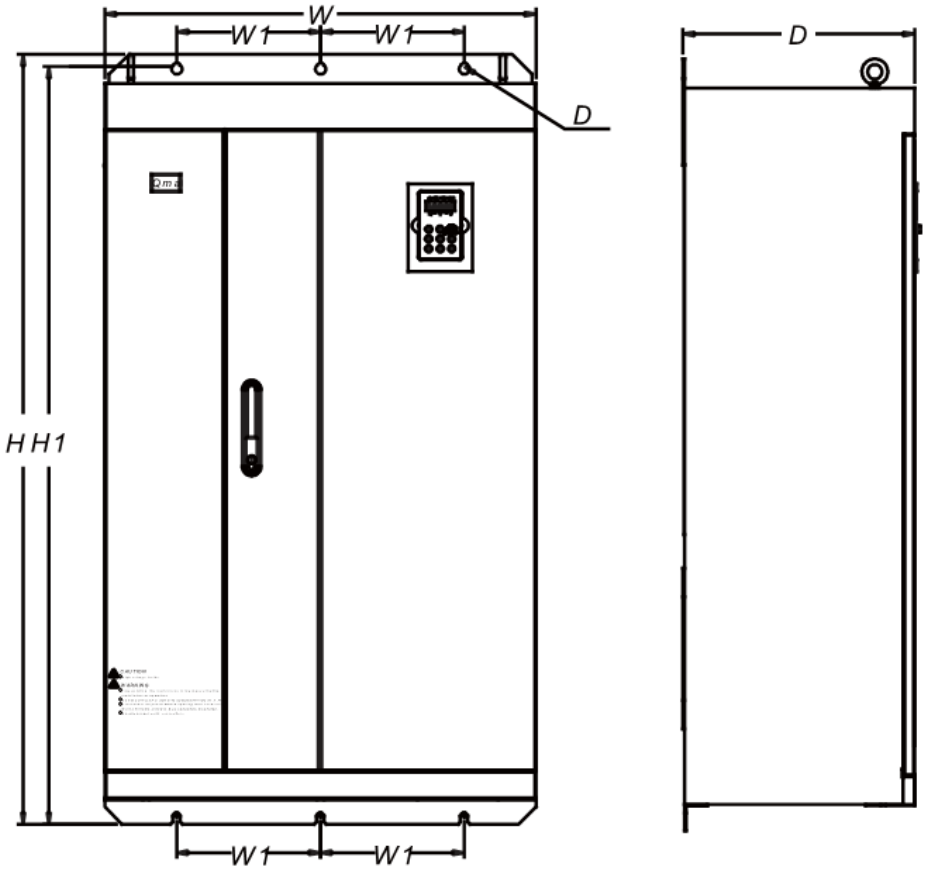
Model	Voltage grade	H	H1	W	W1	W2	D	D1	Pore diameter
A1000-160	AC440V	1063	1048	490	290		376	366	M10
A1000-185									

Dimension of 160kw-185kw model (cabinet-mounted) (mm)



Model	Voltage grade	H	H1	W	W1	W2	D	D1	D2	Pore diameter
A1000-160	AC440V	1322	1317	490	290	440	376	366	293	M10
A1000-185										

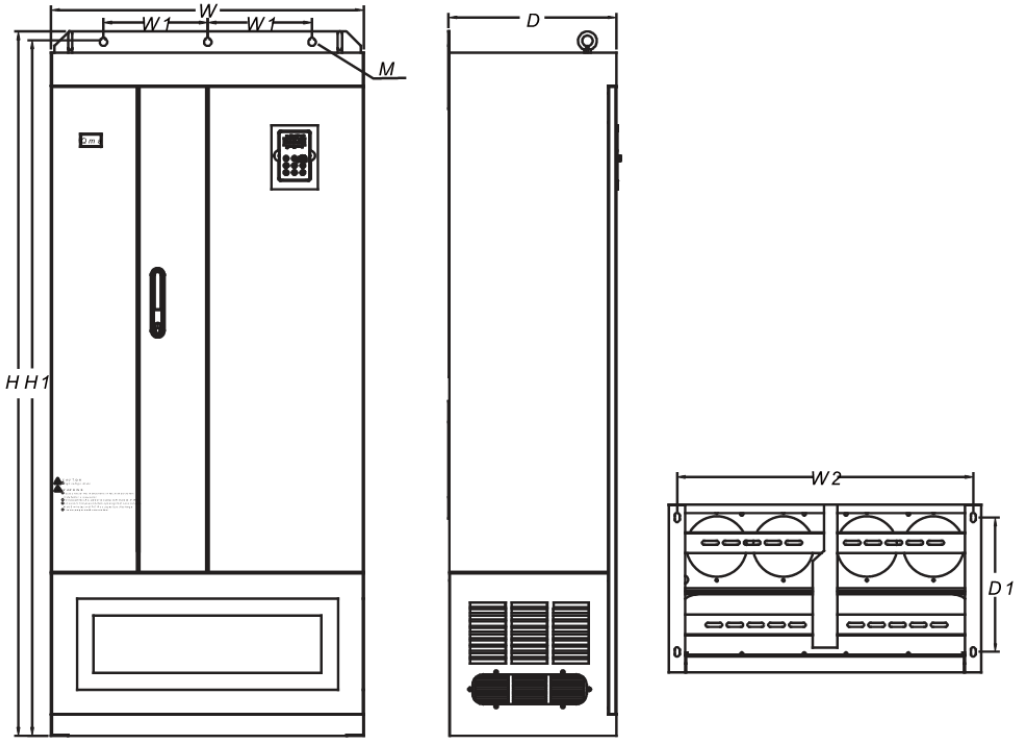
Dimension of 200kw-355kw model (wall-mounted) (mm)



Notes: External DC reactor

Model		Voltage grade	H	H1	W	W1	D	D1	Pore diameter
A1000-200	A1000-220	AC440V	1110	1095	690	240	390	380	M12
A1000-250	A1000-280								
A1000-315	A1000-355								

Dimension of 200kw-355kw model (cabinet-mounted) (mm)



Model		Voltage grade	H	H1	W	W1	W2	D	D1	D2	Pore diameter
A1000-200	A1000-220	AC440V	1410	1395	690	240	630	390	380	307	M12
A1000-250	A1000-280										
A1000-315	A1000-355										

Appendix II: List of Optional Braking Resistors

Increasing external resistor can increase braking torque and the required braking torque depends on actual usage condition. Please select appropriate resistor from the following table according to inverter purpose and capacity:

Inverter			Braking Unit		Braking Resistor	
Voltage	Maximum applicable motor capacity	Inverter model	Model CDBR	Number of units used	Resistor specification	Number of resistor
	0.4	0P44			70W 750Ω	1
	0.75	0P74			70W 750Ω	1
	1.5	0144			260W 400Ω	1
	2.2	0244			260W 250Ω	1
	3.7	0344			500W 150Ω	1
	5.5	0544			1000W 100Ω	1
	7.5	0744			1000W 75Ω	1
	11	1144			1000W 100Ω	2

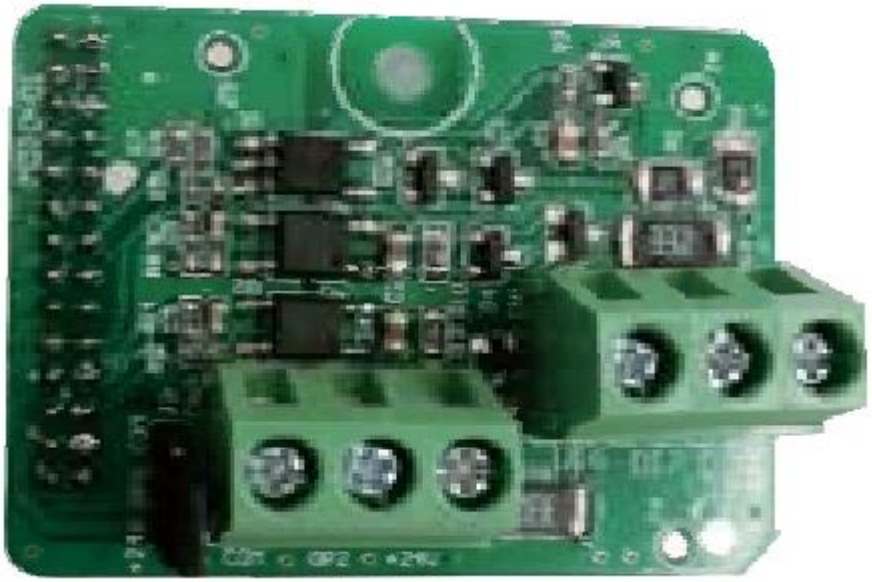
400V	15	1544			1000W	80Ω	2
	18.5	1844	4022B	1	2500W	64Ω	2
	22	2244	4030B	1	2500W	54.4Ω	2
	30	3044	4030B	1	1500W	80Ω	4
	37	3744	4045V	1	2500W	64Ω	4
	45	4544	4045B	1	2500W	54.4Ω	4
	55	5544	4055V	1	3000W	50Ω	5
	75	7544	4075B	1	2500W	48Ω	8
	90	9044	4110V	1	2500W	40Ω	10
	110	1104	4110V	1	2500W	40Ω	10
	132	1324	4160B	1	2500W	48Ω	12
	160	1604	4160B	1	2500W	64Ω	16
	185	1854	4220B	1	2500W	80Ω	20
	220	2204	4220B	1	2500W	70Ω	20
	315	3154	4220B	1	2500W	56Ω	32

Appendix III: Optional Parts

Code	Name	Model	Function
A	I/O expansion card	A1000IO	Three numerical input can be increased
B			
C	CANopen communication expansion card	A1000CANopen	A1000CANopen communication adapter card
D	Profubs-DP communication card	A1000PD	A1000PD communication card
E	PG card of rotary transformer	A1000PG1	Applicable to rotary encoder, excitation frequency 10kHz, DB9 interface
F	PG card of UVW encoder	A1000PG2	Applicable to UVW differential encoder, and applied to synchronous motor, adapter power supply 5V
G	PG card of differential encoder	A1000PG3	Differential electrode encoder PG card, adapter power supply 5V
H	PG card of open collector encoder	A1000PG4	PG card of open collector encoder, with 1:1 frequency dividing output, adapter 15V power supply.

A. I/O expansion card A1000IO

1. Outlook of I/O expansion card



2. Function of control terminal

Type	Terminal Symbol	Terminal Name	Terminal Function
Power supply	+24V-COM	External+24V	Offers +24 power source, generally used as a working power supply for numeric input and output terminals and an external sensor power supply. Maximum output current: 200mA.
	Ev2	Numeric input power supply terminal	EV2 has no power supply connection when delivery. It is required to connect to external power supply or +24V power supply

Type	Terminal Symbol	Terminal Name	Terminal Function
Functional numeric input terminal	DI7-Ev2	Numeric input 6	1. Optocoupler isolation, compatible with bipolar input 2. Input impedance: 33kΩ for DI7, DI8; 2.4kΩ for DI8 3. Voltage range under level input: 9V-30V 4. DI7 and DI8 are common input terminal, with input frequency ＜100Hz; DI9 is high-speed pulse input terminal, with maximum input frequency 100kHz
	DI8-Ev2	Numeric input 7	
	DI9-Ev2	Numeric input 8	

C. CANopen communication expansion card A1000CANopen

1. Outlook of CANopen communication expansion card

2. Function description of control terminal

Type	Terminal Symbol	Terminal Name	Terminal Function
CAN communication	CANH/CANL	Communication port terminal	CANlink communication input terminal
	COM	CAN communication power ground	Connecting to +24V ground common mode choke
Program burn-in	Sw1	ARM program burning interface	

3. Description of jumper wire:

Jumper wire no.	Description
J2	terminal Select a matched end resistor for CAN

Notes: when using CAN communication, connect to the terminal resistance (jumper wire J2) for the inverter at the end.

4. Definition of dial code

Actual dial code							
ON SAB				ON SAB			
1	2	3	4	1	2	3	4
Signal definition							
1	2	3	4	5	6	7	8

Description of dial code

No.	Function	Description		
1-2	CAN bus baud rate	Bit 1	Bit 2	Baud rate
		0	0	125kb/s
		0	1	250kb/s
		1	0	500kb/s
		1	1	1000kb/s
3-8	CANopen network ID number	6-bit binary number forms 64 addresses, with		

		range 0-63 Address switch setting 0 00 0000 7 00 0111 20 01 0100

Notes: toggle the switch downward and this position is 1; otherwise, it is cleared

D. Profibus-DP communication expansion card A1000PD

1. Outlook of Profibus-DP communication expansion card

2. Function of control terminal

Type	Terminal Symbol	Terminal Name	Terminal Function
Profibus-DP communication terminal (J2)	3	B data cable	Anode of data cable
	4	RTS	Request to send signal
	5	GNDISO	Isolated 5V power ground
	6	+5V-ISO	Isolated 5V power supply
	8	A data cable	Cathode of data cable
CAN communication (J3, J9) Program burning	+5V-ISO	Power supply	Isolated 5V power supply
	CANH	CAN positive input	
	CANL	CAN negative input	
	GND-ISO	Power ground	Isolated 5V power ground
	Sw1	ARM program burning interface	

3. Description of jumper wire:

Jumper wire no.	Description
J6	Select a matched end resistor for CAN
J8	Select a matched end resistor for Profibus

4. Definition of dial code

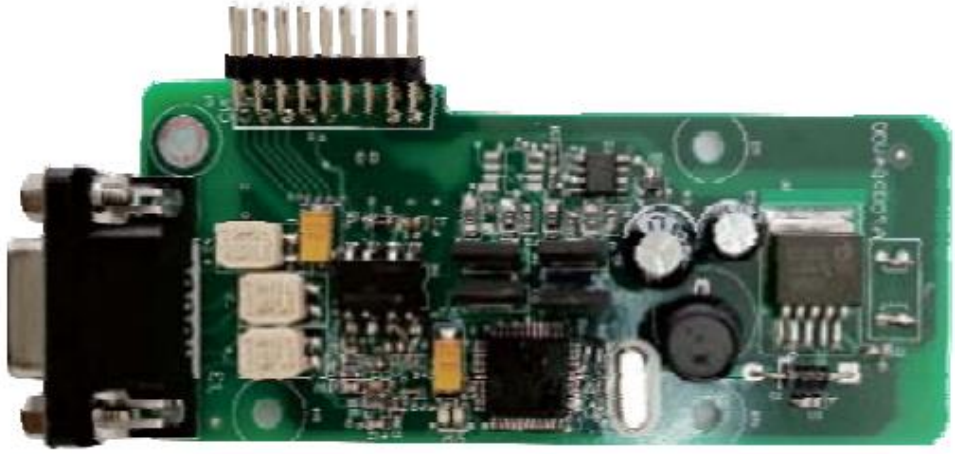
<table>
<tr><td>No.</td><td>Function</td><td colspan="3">Description</td></tr>
<tr><td rowspan="5">1-2</td><td rowspan="5">Baud rate option of PG card and inverter communication bus</td><td>Bit 1</td><td>Bit 2</td><td>Baud rate</td></tr>
<tr><td>OFF</td><td>OFF</td><td>9.6kb/s</td></tr>
<tr><td>OFF</td><td>ON</td><td>100kb/s</td></tr>
<tr><td>On</td><td>OFF</td><td>200kb/s</td></tr>
<tr><td>ON</td><td>ON</td><td>600kb/s</td></tr>
<tr><td>3-8</td><td>Profibus-DP communication slave station address</td><td colspan="3">6-bit binary number forms 64 addresses. Other addresses can only be set by function code.
The following lists some slave station address and switch setting
Address switch setting
0 00 0000
7 00 0111
20 01 0100</td></tr>
</table>

5. Definition of LED indicator lamp

LED indicator lamp	Function definition	Description
Green	Power supply indicator lamp	If DP card is connected to the inverter interface properly, this LED indicator lamp shall be in normally-on status after the inverter is powered on
Red	Indicator lamp for connection of Dp card and the inverter serial port	When the DP card is connected to the inverter properly, this indicator lamp is in normally-on status. When this lamp flashes, it means intermittent connection(there exists interference); when it is off, it means Dp card hasn’t been connected to the inverter serial port properly (check the setting of baud rate).
Yellow	Indicator lamp for connection of Dp card and Profibus station	When DP card is connected to Profibus master station normally, this lamp is in normally-on status; When this lamp flashes, it means intermittent connection(there exists interference); when it is off, it means Dp card hasn’t been connected to Profibus master station (check the slave station address, data format and Profibus cable connection).

E. PG card A1000PG1 of rotary transformer

1. Outlook of PG card of rotary transformer

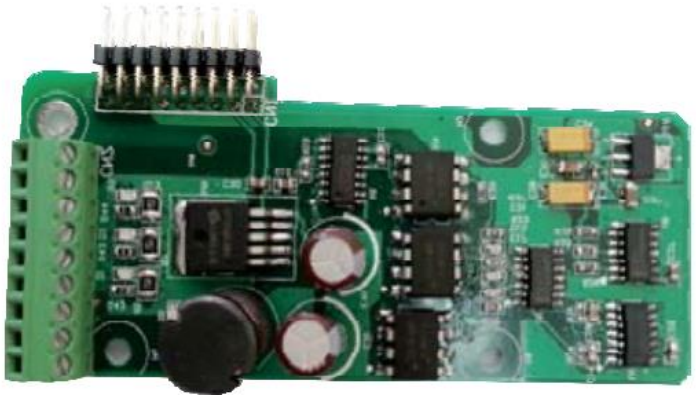


2. Description of specification and definition of wiring terminal signal

PG card of rotary transformer		
Specification		
User interface		DP9 female
Terminal description		
No.	Symbol	Description
1	COS	Rotary transformer feedback COS +
2	-	
3	SINLO	Rotary transformer feedback SIN -
4	EXC1	Excitation - of rotary transformer
5	-	
6	COSLO	Rotary transformer feedback COS-
7	SIN	Rotary transformer feedback SIN +
8	-	
9	EXC	Rotary transformer excitation +

G. PG card A1000PG3 of differential encoder

1. Outlook of PG card of differential encoder



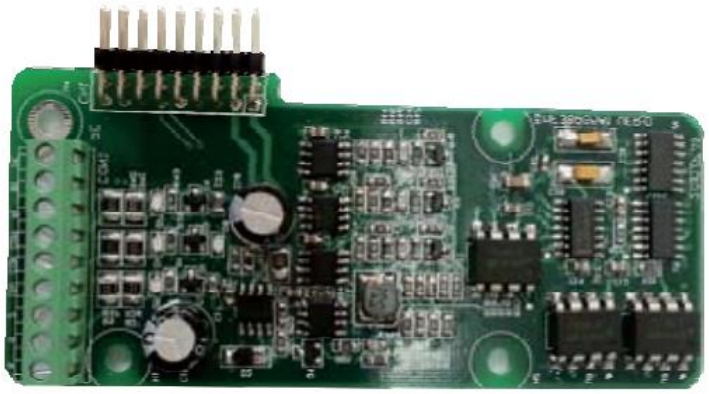
2. Description of specification and definition of wiring terminal signal

Differential PG card	
Specification	
User interface	Inclined terminal block

Definition of wiring terminal signal		
No.	Symbol	Description
1	A+	Encoder output A signal +
2	A-	Encoder output A signal -
3	B+	Encoder output B signal +
4	B-	Encoder output B signal -
5	Z+	Encoder output Z signal +
6	Z-	Encoder output Z signal -
7	+5V	Offers 5V/100mA power supply
8	COM	Power ground
9	PE	Shielded wiring terminal

H. PG card A1000PG4 of open collector encoder

1. Outlook of PG card of open collector encoder



2. Description of specification and definition of wiring terminal signal

Differential PG card		
Specification		
User interface		Inclined terminal block
Definition of wiring terminal signal		
No.	Symbol	Description
1	A	Encoder output signal A
2	B	Encoder output signal B
3	Z	Encoder output signal Z
4	15V	Offers 5V/100mA power supply
5	COM	Power ground
6	COM	Power ground
7	A1	PG card 1:1 feedback output signal A
8	B1	PG card 1:1 feedback output signal B
9	PE	Shielded wiring terminal