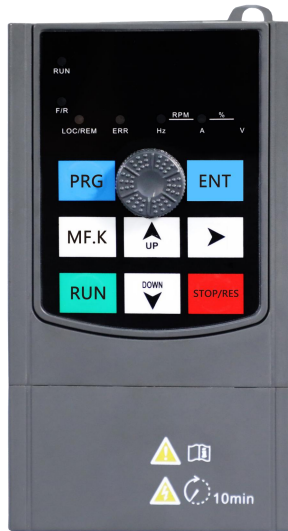


Mini size frequency inverter



User manual

V5.0H

Preface

Thank you for purchasing our frequency inverter.

This manual describes how to use inverter properly. Please read it carefully before installation, operation, maintenance and inspection. Besides, please use the product after understanding the safety precautions.

Precautions
● In order to describe the product's details, the drawings presented in this instruction are sometimes shown without covers or protective guards. When using the product, please make sure to install the cover or protective guard as specified firstly, and operate the products in accordance with the instructions. ● Since the drawings in this manual are represented examples, some are subject to differ from delivered products. ● This manual may be modified when necessary because of improvement of the product, modification or changes in specifications. Such modifications are denoted by a revised manual No. ● If you want to order the manual due to loss or damage, please contact our company agents in each region or our company customer service center directly. ● If there is still any problem during using the products, please contact our company customer service center directly.

Chapter 1 Product Information

1.1 Product Inspection

Checking the following items when receiving the inverter

Confirmation Items	Method
Confirm if the inverter is what you ordered	Check name plate
Damaged or not	Inspect the entire exterior of the inverter to see if there are any scratches or other damage resulting from shipping
Confirm if the fastening parts (screws, etc.) are loose or not	Check with a screw driver if necessary
User's manual, certification and other spares	User's manual and the relative spares

Please contact the local agent or our company directly if there is any damage on the inverter.

1.2 Selection Guide

Power of inverter (kW)	Suitable motor		Rated Output Current (A)
	kW	HP	
1AC 220V ±15%			
0.4	0.4	0.5	2.3
0.75	0.75	1	4
1.5	1.5	2	7.5
2.2	2.2	3	10
4	4	5	18
5.5	5.5	7.5	25
3AC 380V±15%			
0.75	0.75	1	2.5
1.5	1.5	2	3.8
2.2	2.2	3	5.1
4	4	5	9
5.5	5.5	7.5	13
7.5	7.5	10	17
11	11	15	25
15	15	20	32
18.5	18.5	25	37

22	22	30	45
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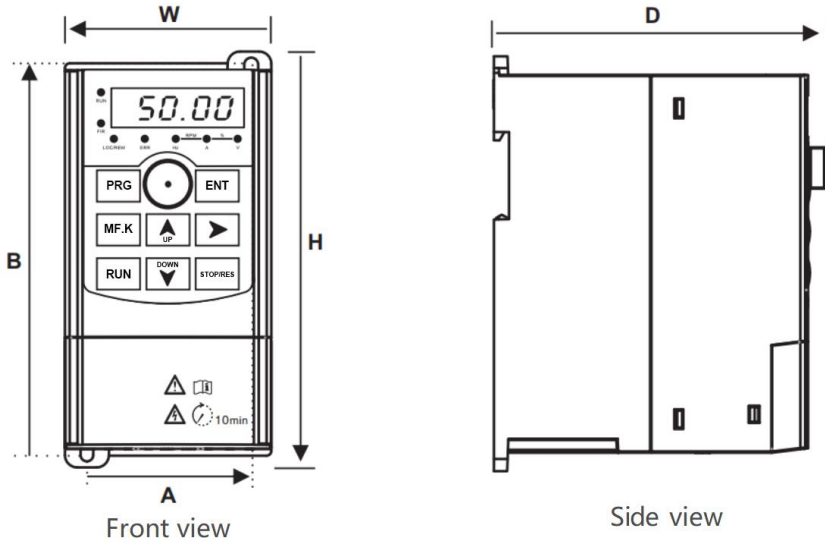
1.3 Technical Specifications

Item	Technical Index	Specification
Input	Input voltage	1AC 220V±15% 3AC 380V±15%
	Input frequency	50/60Hz±5%
Output	Output voltage	0~rated input voltage
	Output frequency	0.00~400.00Hz
Control Features	Control mode	V/f control Sensorless vector control Torque control
	Operation command mode	Keypad control Terminal control Serial communication control (Modbus)
	Frequency setting mode	Digital setting, analog setting, pulse frequency setting, serial communication setting, multi-step speed setting & simple PLC, PID setting, etc. These frequency settings can be combined & switched in various modes.
	Overload capacity	150% / 60s, 180% / 10s, 200% / 1s.
	Starting torque	0.25Hz/150% (SVC); 0.5Hz/150% (V/f)
	Speed control precision	±0.5% (V/f) , ±0.2% (SVC) ,
	Carrier frequency	1~15kHz, automatically adjusted according to temperature and load characteristics
	Frequency accuracy	Digital setting: 0.01Hz Analog setting: maximum frequency ×0.05%
	Torque boost	Automatically torque boost; manually torque boost: 0.1%~30.0%
	V/f curve	Three types: linear, multiple point and square type (1.2 power, 1.4 power, 1.6 power, 1.8 power, square)
	Acceleration/deceleration mode	Straight line/S curve; four kinds of acceleration/deceleration time, range: 0.0s~3600.0s
	Braking unit	Standard build-in
	DC braking	DC braking when starting and stopping DC braking frequency: 0.0Hz~maximum frequency, braking time: 0.0s~25.0s

	Jog operation	Jog operation frequency: 0.0Hz~maximum frequency Jog acceleration/deceleration time: 0.1s~3600.0s
	Simple PLC & multi-step speed operation	It can realize a maximum of 16 multi-step speeds running via the built-in PLC or control terminal.
	Built-in PID	Built-in PID control to easily realize the close loop control of the process parameters (such as pressure, temperature, flow, etc.)
	Automatic voltage regulation	Keep output voltage constant automatically when input voltage fluctuating
Control Function	Torque control	Torque control without PG
	Torque limit	"Rooter" characteristics, limit the torque automatically and prevent frequent over-current tripping during the running process
	Wobble frequency control	Multiple triangular-wave frequency control, special for textile
	Timing/length/counting control	Timing/length/counting control function
	Over-voltage & over-current stall control	Limit current & voltage automatically during the running process, prevent frequent over-current & over-voltage tripping
	Fault protection function	Comprehensive protections include over-current, over-voltage, under-voltage, overheating, default phase, overload, shortcut, etc., can record the detailed running status during failure & has fault automatic reset function
Input/output terminals	Input terminals	5 multifunctional programmable digital input; 2 programmable analog input; AI1: 0~10V AI2: 0~10V / 4~20mA
	Output terminals	Refer to typical wiring for details
	Communication terminals	Offer RS485 communication interface, support MODBUS-RTU communication protocol
Human machine interface	LED display	Display frequency setting, output frequency, output voltage, output current, etc. Two lines display
	Multifunction key	QUICK/JOG key, can be used as multifunction key
Environment	Ambient temperature	-10°C~50°C, without direct sunshine.
	Humidity	90%RH or less (non-condensing)
	Altitude	≤1000M: output rated power, >1000M: output derated
	Storage temperature	-20°C~60°C

1.4 External and keypad dimensions

(1) Inverter outlook dimensions:

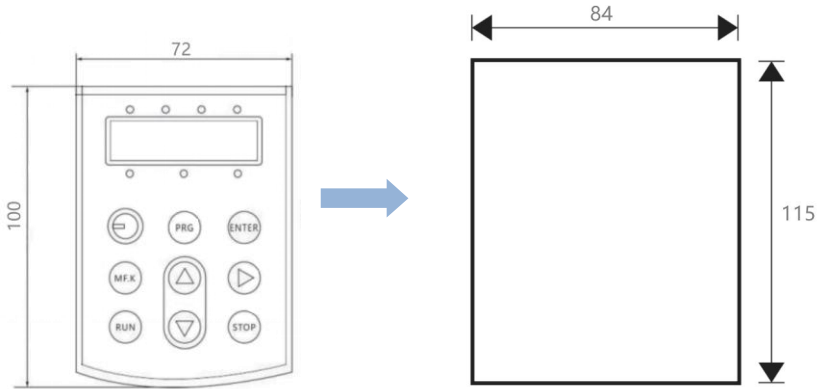


Power (kW)	Installation dimensions (mm)		Outlook dimensions (mm)			Installing hole diameter
	A	B	H	W	D	
0.4	67	157	170	85	138	Φ 5.5
0.75						
1.5						
2.2						
4	106	235	245	125	170	Φ 5
5.5						
0.75	67	157	170	85	138	Φ 5.5
1.5						
2.2						
4	85	183	194	97	151	Φ 5
5.5						
7.5	106	235	245	125	170	Φ 5
11						

15	147	298	310	165	198	$\Phi 5.5$
18.5						
22						

(2) Inverter keypad and installation dimensions;

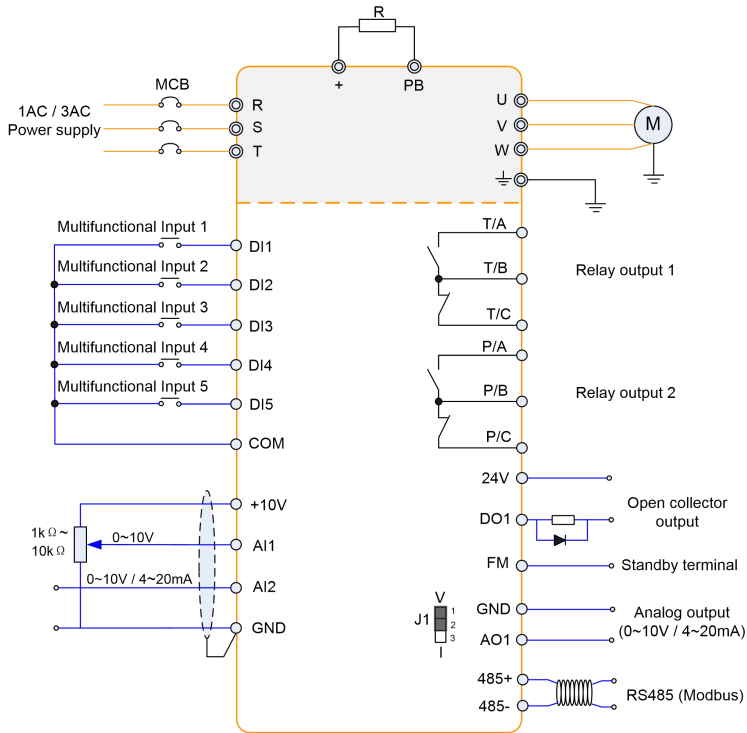
Unit (mm)



Keypad dimensions

Keypad bracket installation hole dimensions

1.5 Wiring diagram



Note:

1. Terminal © refers to the main circuit terminal, terminal O refers to the control circuit terminal.
2. Built-in braking unit for all the models.

1.5.1 Main circuit terminals and connections

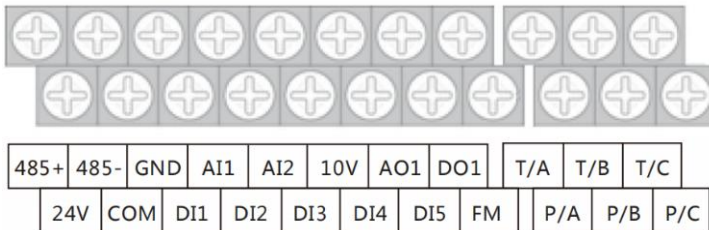
	Danger
	● Make sure that the power switch is at OFF status prior to perform wiring connection. Otherwise there may be danger of electric shock! ● Only the qualified and trained personnel can perform wiring connection. Otherwise it may cause equipment and human injuries! ● It should be earthed reliably. Otherwise there may be danger of electric shock or fire!
	Caution
	● Make sure that the rated value of the input power supply is consistent with that of the inverter. Otherwise it may damage the inverter! ● Make sure that the motor matches the inverter. Otherwise it may damage the motor or generate inverter protection!

- Do not connect the power supply to the terminals of U, V and W. Otherwise it may damage the inverter!
- Do not directly connect the brake resistor between the DC bus terminals (+) and (-). Otherwise it may cause fire!

Instructions of main circuit terminals

Terminal	Description
R, S	Connect to single phase AC power
R, S, T	Connect to three-phase AC power
+, PB	Reserved terminals for braking resistor
U, V, W	Connect to three phase motor
	Ground connection terminal

1.5.2 Control terminals and connections



1.5.3 Description of jumpers on control board

Jumper	connection	Description
J1	Short connect 1 & 2	AO1 outputs 0~10V signal
	Short connect 2 & 3	AO1 outputs 0~20mA signal

1.5.4 Description of Control Terminal Function

Type	Terminal Symbol	Terminal Name	Function Description
Power Supply	+10V~GND	External +10V power	Provide +10V power supply for external units, and the maximum output current is 50mA. It is generally used as the operating power supply for the external potentiometer. The potentiometer resistance range is 1kΩ~10kΩ.

	24V~COM	External +24V power	Provide +24V power supply for external units. It is generally used as the operating power supply for digital input/output terminals and the external sensor. The maximum output current is 100mA.
Analog Input	AI1~GND	Analog input terminal 1	1. Input range: DC 0~10V/0~20mA, determined by J8 jumper on the control board. 2. Current Input impedance: 20kΩ. 3. Voltage Input impedance: 510Ω.
	AI2~GND	Analog input terminal 2	
Digital Input	DI1	Digital input 1	1. Optical coupling isolation 2. Input impedance: 3.3kΩ 3. Voltage range for level input: 9V~30V
	DI2	Digital input 2	
	DI3	Digital input 3	
	DI4	Digital input 4	
	DI5	Digital input 5	
Analog Output	AO1~GND	Analog output 1	Output voltage range: 0~10V / 4~20mA. Signal
Digital Output	DO1-COM	Digital output 1	Correspond common terminal is COM External connection voltage range: 0~24V Output current range: 0mA~50mA
	FM-COM	Digital output 2	
Relay Output K1	T/A-T/B	Normally close terminal	Driving capacity: AC 250V/3A, DC 30V/1A COS ϕ =0.4。
	T/A-T/C	Normally open terminal	
Relay Output K2	P/A-P/B	Normally close terminal	
	P/A-P/C	Normally open terminal	
RS485	485+	RS485+	Communication interface of Modbus, it is suggested to use twisted-pair cable or shielded cable.
	485-	RS485-	

Chapter 2 Operation and Display

2.1 Keypad outlook



1) Functional indicators description

Functional indicator	Description
RUN	Light-on: Inverter is running
F/R	Forward / Reverse run indication
LOC / REM	Local / Remote control indication
ERR	Inverter with fault

2) Keypad push-button description

Button	Name	Function
PRG	Programming key	Entry and exit of primary menu
ENT	Confirmation key	Progressively enter menu, and confirm parameters

	Increment key	Progressively increase of data or function codes
	Decrement key	Progressively decrease of data or function codes
	Shift key	Select the displayed parameters in turn on the stop display interface and running display interface, and select the modification bit of parameters when modifying parameters.
RUN	Running key	Start to run inverter under keyboard control mode
STOP	Stop / Reset	Stop inverter in running status and reset operation in fault alarm status.
MF.K	Multi-function selection key	The corresponding functions are defined by F7-01.

2.2 Password Setting

The inverter provides user password protection function. When 08-00 is set to non-zero value, it indicates the user password, and the password protection turns valid after 1 minute of setting the password. When pressing **PRG** key again, "00000" will be displayed, and common menu cannot be entered until user password is input correctly.

To cancel the password protection function, enter with password and set 08-00 to "0".

2.3 Motor Parameters Auto-tuning

To select the vector control running mode, it must input the nameplate parameter of the motor accurately prior to the running of the inverter. The Inverter will select standard motor parameters matching the nameplate parameter. Since the vector control mode relies highly on the motor parameters, it must acquire the accurate parameters of the controlled motor to ensure the good control performance.

The procedures for the automatic tuning of motor parameters are described below:

First, select the command source (00-02) as the command channel of the operation keypad. Second, input the following parameters in accordance with the actual motor parameters:

01-02: Rated motor power

01-03: Rated motor frequency

01-04: Rated motor rotation speed of motor

01-05: Rated motor voltage

01-06: Rated motor current

If the motor is completely disconnected from the load, set 01-01 to "1" (complete tuning), and press **RUN** key on the keypad, it will display "RUN", motor will rotate, and it will stop automatically while auto-tuning finish, the keypad will display "END". After auto-tuning the following parameters will be updated:

01-07: Stator resistance

01-08: Rotor resistance

01-09: Leakage inductance

01-10: Mutual inductance

01-11: Current without load

Finally, complete the automatic tuning of motor parameters.

If the motor cannot be completely disconnected with the load, set 01-11 to "2" (static tuning), and then press **RUN** key on the keyboard panel, wait until the auto-tuning finish.

The following motor parameters will be updated automatically:

01-07: Stator resistance

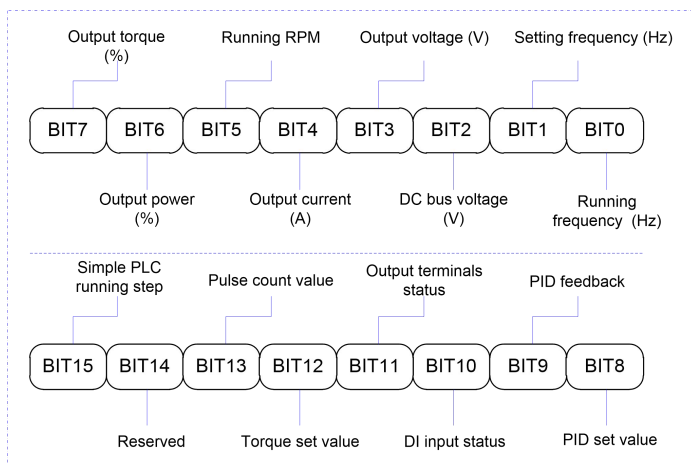
01-08: Rotor resistance

01-09: Leakage inductive reactance

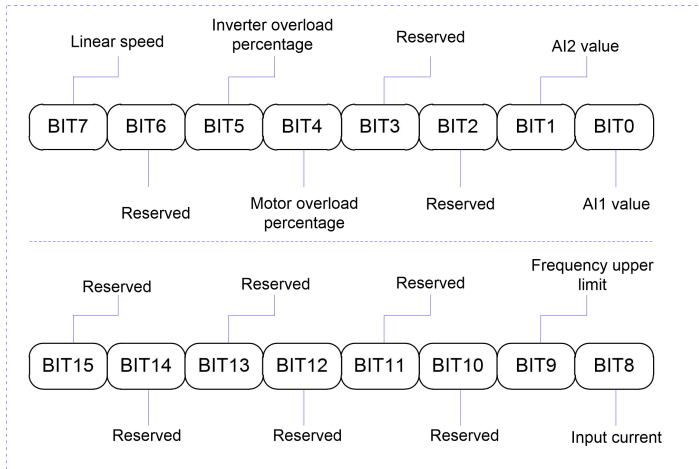
2.4 Display setting for 08-09 and 08-10

If 08-09 and 08-10 parameters need to be displayed when running, **set the corresponding position to 1, and change every four bits of binary numbers into one hexadecimal number, and then enter the four hexadecimal numbers into 08-09 and 08-10.**

Running status display 1:



Running status display 2:



For example, if user wants to display **running frequency**, **DC bus voltage**, **output voltage**, **setting frequency**, **output current**, **output torque**, **PID set value**, **output terminal status**, the value of each bit is as the following table:

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
1	0	0	1	1	1	0	1
9				D			
BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
0	0	0	0	1	0	0	1
0				5			

The value of 08-03 is **059D**.

Chapter 3 Examples of Operation

3.1 Keypad start, stop, speed adjust by UP, DOWN button

Parameters setting: 00-02=0, 00-03=0.

Start, stop: press "RUN" button to make inverter run forward, press "STOP/RESET" to stop the inverter

Speed adjusts: press ▲ button to increase the frequency, press ▼ button to decrease the frequency.

3.2 Keypad start, stop, speed adjust by keypad potentiometer

Parameters setting: 00-02=0, 00-03=9.

Start, stop: press "RUN" button to make inverter run forward, press "STOP/RESET" to stop the inverter

Speed adjusts: turn the keypad potentiometer

3.3 Inverter start/stop by external signal, speed adjust by external potentiometer

Parameters setting: 00-02=1, 00-03=1, 06-01=1, 06-02=2

Start, stop: "DI1--COM" close, inverter run forward; "DI2--COM" close, inverter run reverse, DI1, DI2 disconnect with COM, inverter stop.

Speed adjusts: turn the external potentiometer (10V, AI1, GND)

3.4 Inverter start/stop by external signal, speed adjust by external 0~10V signal

Parameters setting: 00-02=1, 00-03=1, 06-01=1, 06-02=2

Start, stop: "DI1--COM" close, inverter run forward; "DI2--COM" close, inverter run reverse, DI1, DI2 disconnect with COM, inverter stop.

Speed adjusts: by changing the value of external voltage signal (AI1, GND)

3.5 Inverter start/stop by external signal, speed adjust by external 4~20mA signal

Parameters setting: 00-02=1, 00-03=2, 06-01=1, 06-02=2, 06-59=10

Start, stop: "DI1--COM" close, inverter run forward; "DI2--COM" close, inverter run reverse, DI1, DI2 disconnect with COM, inverter stop.

Speed adjusts: by changing the value of external current signal (AI2, GND)

3.6 Increase or decrease the frequency by external digital input

(1) start/stop by keypad

Parameters setting: 00-02=0, 00-03=0, 06-03=10, 06-04=11

Start, stop: press "RUN" button to make inverter run forward, press "STOP/RESET" to stop inverter.

Speed adjusts: "DI3--COM" close, frequency increase; "DI4--COM" close, frequency decrease.

(2) start/stop by external digital signal

Parameters setting: 00-02=1, 00-03=0, 06-01=1, 06-02=2, 06-03=10, 06-04=11

Start, stop: "DI1--COM" close, inverter run forward; "DI2--COM" close, inverter run reverse.

Speed adjusts: "DI3--COM" close, frequency increase; "DI4--COM" close, frequency decrease.

3.7 Multi-step speed function

(1) start/stop by keypad

Parameters setting: 00-02=0, 00-03=5, 06-01=16, 06-02=17, 06-03=18 (13-00~13-15, 16 steps speed can be set)

Start, stop: press "RUN" button to make inverter run forward, press "STOP/RESET" to stop inverter.

Speed adjusts: by different combinations of DI input (shown as below list).

(2) start/stop by external digital signal

Parameters setting: 00-02=1, 00-03=5, 06-01=1, 06-02=2, 06-03=16, 06-04=17, 06-05=18 (13-00~13-15, 16 steps speed can be set), **Start, stop:** "DI1--COM" close, inverter run forward; "DI2--COM" close, inverter run reverse.

Speed adjusts: by different combinations of DI input (shown as below list).

※ **Different combination means different speeds:**

K4	K3	K2	K1	Command setting	Corresponding parameter
OFF	OFF	OFF	OFF	Multi-step command 0	13-00
OFF	OFF	OFF	ON	Multi-step command 1	13-01
OFF	OFF	ON	OFF	Multi-step command 2	13-02
OFF	OFF	ON	ON	Multi-step command 3	13-03
OFF	ON	OFF	OFF	Multi-step command 4	13-04
OFF	ON	OFF	ON	Multi-step command 5	13-05
OFF	ON	ON	OFF	Multi-step command 6	13-06
OFF	ON	ON	ON	Multi-step command 7	13-07
ON	OFF	OFF	OFF	Multi-step command 8	13-08
ON	OFF	OFF	ON	Multi-step command 9	13-09
ON	OFF	ON	OFF	Multi-step command 10	13-10
ON	OFF	ON	ON	Multi-step command 11	13-11
ON	ON	OFF	OFF	Multi-step command 12	13-12
ON	ON	OFF	ON	Multi-step command 13	13-13
ON	ON	ON	OFF	Multi-step command 14	13-14
ON	ON	ON	ON	Multi-step command 15	13-15

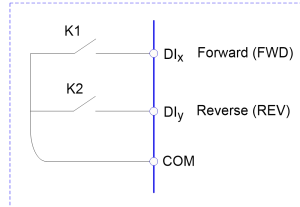
3.8 Terminal command mode

06-13=0: Two-line running mode 1:

This is the most common mode. The forward/reverse rotation of the motor is decided by the commands of FWD and REV terminals.

Terminal	Setting value	Description
DI _x	1	Forward running (FWD)
DI _y	2	Reverse running (REV)

K1	K2	Run command
OFF	OFF	Stop
OFF	ON	Reverse
ON	OFF	Forward
ON	ON	Stop

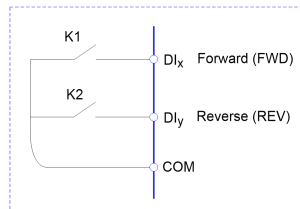


06-13=1: Two-line running mode 2:

When this mode is adopted, REV is enabled terminal. The direction is determined by the status of FWD.

Terminal	Terminal	Description
DI _x	1	Run enable
DI _y	2	Forward / Reverse run control

K1	K2	Run command
OFF	OFF	Stop
OFF	ON	Stop
ON	OFF	Forward
ON	ON	Reverse



06-13=2: Three-line running mode 1:

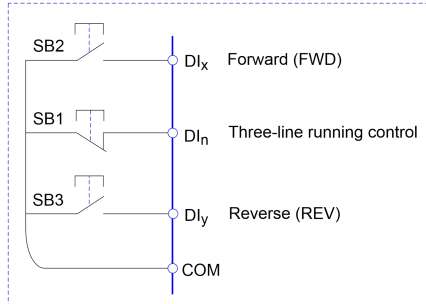
In this mode, DI_n is enabled terminal, and the direction is controlled by FWD and REV respectively. However, the pulse is enabled through disconnecting the signal of DI_n terminal when the inverter stops.

Terminal	Setting value	Description
DI _x	1	Forward running (FWD)

DI _y	2	Reverse running (REV)
DI _n	3	Three-line running control

To make the inverter run, users must close DI_n terminal firstly. It can achieve the motor forward or reverse control via pulse rising of DI_x or DI_y.

It can achieve the inverter stop via cutting off DI_n terminal signal. DI_x, DI_y, DI_n are DI1~DI6, the valid input of DI_x (DI_y) is pulses signal, and the valid input of DI_n is level signal.



SB1: Stop button

SB2: Forward rotation button

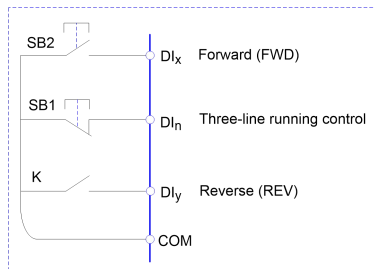
SB3: Reverse rotation button

06-13=3: Three-line running mode 2:

In this mode, DI_n is enabled terminal, and the running command is given by FWD, while the direction is determined by the status of REV. Stop command is performed through disconnecting the DI_n signal.

Terminal	Setting value	Description
DI _x	1	Run enable
DI _y	2	Forward / Reverse run control
DI _n	3	Three-line running control

K	Running direction
OFF	Forward
ON	Reverse



Chapter 4 Function Parameter List

The detailed functional parameters are listed in below table.

The instruction of the symbols in function parameter list is as following:

“○” Means the parameter can be modified at stop and running status.

“◎” Means the parameter cannot be modified at the running status.

“●” Means the parameter is the real detection value which cannot be modified.

4.1 Basic Function Parameters List

Function code	Name	Detailed instruction	Factory default	Modify
00 Group: Basic Function				
00-00	Inverter model	0: G model (constant torque load model) 1: P model (fan and pump load model)	0	◎
00-01	Control mode	0: Reserved 1: Sensorless Vector Control (SVC) 2: V/f control	2	◎
00-02	Running command source	0: Keypad (L/R indicator distinguish) 1: Terminal (L/R indicator flickers) 2: Communication (L/R indicator light-on)	0	◎
00-03	Main frequency source A selection	0: Keypad (00-08, UP and DOWN Adjustable, frequency recorded after power off) 1: AI1 (0~10V) 2: AI2 (0~10V / 0~20mA) 3: Reserved 4: Reserved 5: Simple PLC 6: Multi-step speed 7: PID 8: Communication (Modbus) 9: Keypad potentiometer	7	◎
00-04	Auxiliary frequency source B selection	Same as 00-03	0	◎
00-05	Reference of Frequency source B	0: Relative to maximum frequency 1: Relative to frequency source A	0	○
00-07	Frequency source selection	0: Frequency source A 1: Frequency source B 3: A + B	0	○

Function code	Name	Detailed instruction	Factory default	Modify
		4: A - B 5: Max (A, B) 6: Min (A, B)		
00-08	Keypad reference frequency	0.00Hz ~ maximum frequency (00-10)	50.00Hz	○
00-09	Running direction selection	0: Same direction 1: Reverse direction 2: Reverse direction is forbidden	0	◎
00-10	Maximum frequency	00-08 ~ 5000.00Hz	50.00Hz	◎
00-12	Frequency upper limit	00-14 (frequency lower limit) ~ 00-10 (max. frequency)	50.00Hz	◎
00-14	Frequency lower limit	0.00Hz ~ 00-12 (frequency upper limit)	0.00Hz	◎
00-15	Carrier frequency	1.0kHz ~ 15.0kHz	Model depend	○
00-16	0 frequency output selection	0: No output 1: Still output 2: DC brake output (set by 05 - 11)	0	○
00-17	Acceleration time 1	0.00s ~ 3600.0s	Model depend	○
00-18	Deceleration time 1	0.00s ~ 3600.0s	Model depend	○
00-19	Industry application macro selection	0: Industry common mode 2: Photovoltaic water pump mode	0	○
01 Group: Motor Parameters				
01-01	Parameters auto-tuning	0: No action 1: Rotation auto-tuning (motor without load) 2: Static auto-tuning 1 3: Static auto-tuning 2	0	◎
01-02	Motor rated power	0.1kW ~ 1000.0kW	Model depend	◎
01-03	Motor rated frequency	0.01Hz ~ 00-10 (max. frequency)	Model depend	◎
01-04	Motor rated speed	1 ~ 36000RPM	Model depend	◎
01-05	Motor rated voltage	0V ~ 2000V	Model depend	◎
01-06	Motor rated current	0.1A ~ 6553.5A	Model depend	◎
01-07	Motor stator resistance	0.001Ω ~ 65.535Ω	Motor parameter	○

Function code	Name	Detailed instruction	Factory default	Modify
01-08	Motor rotor resistance	0.001Ω ~ 65.535Ω	Motor parameter	○
01-09	Motor leakage inductance	0.1mH ~ 6553.5mH	Motor parameter	○
01-10	Motor mutual inductance	0.1mH ~ 6553.5mH	Motor parameter	○
01-11	Motor no-load current	0.1A ~ 6553.5A	Motor parameter	○
02 Group: V/f Control Parameters				
02-00	V/f curve setting	0: Linear 1: Multiple-points 2: 1.3th power 3: 1.7th power 4: 2.0th power 5: V/f separate 6: Reserved	0	◎
02-01	Torque boost	0.0: auto 0.1% ~ 10.0%	0.0%	○
02-02	Torque boost cutoff frequency point	0.0 ~ 50.0%	20.0%	◎
02-03	V/f frequency point 3	0.00Hz ~ 00-12	0.00Hz	◎
02-04	V/f voltage point 3	0.0% ~ 110.0%	0.0%	◎
02-05	V/f frequency point 2	02-07 ~ 02-03	0.00Hz	◎
02-06	V/f voltage point 2	0.0% ~ 02-04	0.0%	◎
02-07	V/f frequency point 1	0.00Hz ~ 02-05	0.00Hz	◎
02-08	V/f voltage point 1	0.0% ~ 02-06	0.0%	◎
02-09	V/f slip compensation gain	0.0% ~ 200.0%	100.0%	○
02-10	V/f low frequency oscillation inhibition coefficient	0 ~ 100	10	○
02-11	V/f high frequency oscillation inhibition coefficient	0 ~ 100	10	○
02-12	V/f oscillation inhibition frequency switch point	0.00 ~ 00-10	0.00Hz	○
02-13	AVR function (Automatic Voltage Regulation)	0: Cancel AVR function 1: Keep AVR during running 2: Reserved	1	○
02-14	Automation energy	0: No function	0	○

Function code	Name	Detailed instruction	Factory default	Modify
	saving operation	2: Keep energy saving operation		
02-15	V/f constant power Weak magnetic beneficent	1.00 ~1.30	1.00	○
02-16	Voltage source of V/f separation	0: Digital setting (02-17) 1: AI1 2: AI2 3: AI3 4: HDI 5: Multi-step speed 6: PID 7: Communication (Modbus) 8: Keypad potentiometer Note: 100% corresponds to motor rated voltage	0	○
02-17	Digital setting of V/f separation	0.0 ~ 100.0% (Motor rated voltage)	0.0%	○
02-18	Voltage acceleration time of V/f separation	0.0s~3600.0s	0.0s	○
02-19	Voltage deceleration time of V/f separation	0.0s~3600.0s	0.0s	○
02-20	Voltage upper limit of V/f separation	02-21 ~ 100.0%	100.0%	◎
02-21	Voltage lower limit of V/f separation	0.0 ~ 02.20	0.0%	◎
03 Group: Vector Control Parameters				
03-00	Speed loop proportional gain 1	0.0 ~ 200.0	20.0	○
03-01	Speed loop integration time 1	0.000s ~ 10.000s	0.200s	○
03-02	Speed loop proportional gain 2	0.0 ~ 200.0	20.0	○
03-03	Speed loop integration time 2	0.000s ~ 10.000s	0.200s	○
03-04	Low switching frequency	0.00Hz ~ 03-05	5.00Hz	○
03-05	High switching frequency	03-04 ~ 00-10 (max. frequency)	10.00Hz	○
03-06	Lowpass filter coefficient	0 ~ 10	0	○

Function code	Name	Detailed instruction	Factory default	Modify
03-07	Motor slip compensation coefficient	50% ~ 200%	100%	○
03-08	Brake slip compensation coefficient	50% ~ 200%	100%	○
03-09	Current loop KP	0 ~ 65535	1000	○
03-10	Current loop KI	0 ~ 65535	1000	○
03-11	Constant power weak magnetic coefficient under vector control mode	0.1 ~ 2.0	0.3	○
03-12	Constant power weak magnetic point under vector control mode	10% ~ 100%	20%	○
03-13	Weak magnetic proportional gain	0 ~ 8000	1000	○
03-14	Voltage upper limit under vector control mode	0.0 ~ 120.0%	100.0%	○
03-15	Pre-excitation time for motor	0.000 ~ 10.000s	0.300s	○
04 Group: Torque control				
04-00	Torque setting source selection in torque control mode	0: Speed control (torque control invalid) 1: Set by 04-01 2: AI1 3: AI2 4: AI3 5: HDI 6: Multi-step speed 7: Modbus 8: Keypad potentiometer	0	◎
04-01	Torque setting through keypad in torque control mode	-300.0% ~ 300.0%	50.0%	○
04-02	Torque control filter time	0.000~10.000s	0.010s	○
04-03	Positive torque upper limit frequency source	0: Set by 04-05 1: AI1 2: AI2 3: AI3 4: HDI 5: Multi-step speed	0	○

Function code	Name	Detailed instruction	Factory default	Modify
		6: Modbus 7: Keypad potentiometer		
04-04	Negative torque upper limit frequency source	0: Set by 04-06 1: AI1 2: AI2 3: AI3 4: HDI 5: Multi-step speed 6: Modbus 7: Keypad potentiometer	0	○
04-05	Positive torque upper limit frequency setting	0.00Hz ~00-10	50.00Hz	○
04-06	Negative torque upper limit frequency setting	0.00Hz ~00-10	50.00Hz	○
04-07	Torque limit channel select under normal running mode	0: Set by 04-09 1: AI1 2: AI2 3: AI3 4: HDI 5: Modbus 6: Keypad potentiometer	0	○
04-08	Torque limit channel select under brake running mode	0: Set by 04-10 1: AI1 2: AI2 3: AI3 4: HDI 5: Modbus 6: Keypad potentiometer	0	○
04-09	Torque limit setting under normal running mode	0.0 ~ 300.0%	180.0%	○
04-10	Torque limit setting under brake running mode	0.0 ~ 300.0%	180.0%	○
04-11	Low frequency torque compensation under vector control mode	0.0 ~ 100.0%	0.0%	○
04-12	High frequency torque compensation under vector control mode	0.0 ~ 100.0%	0.0%	○
05 Group: Start and Stop control				
05-00	Start mode	0: Direct start	0	◎

Function code	Name	Detailed instruction	Factory default	Modify
		1: Pre-excitation and then start 2: Speed tracking and restart		
05-01	Start frequency	0.00Hz ~ 50.00Hz	0.50Hz	⊙
05-02	Start frequency holding time	0.0s ~ 50.0s	0.0s	⊙
05-03	DC braking current before start	0.0% ~ 100.0%	0.0%	⊙
05-04	DC braking time before start	0.00s ~ 50.00s	0.00s	⊙
05-05	ACC/DEC mode	0: Linear ACC/DEC 1: S-curve ACC/DEC	0	⊙
05-06	Time of S curve's start part	0.0 ~ 50.0s	0.1s	⊙
05-07	Time of S curve's end part	0.0 ~ 50.0s	0.1s	⊙
05-08	Stop mode	0: Deceleration to stop 1: Coast to stop	0	○
05-09	DC braking start frequency while stopping	0.00Hz ~ 00-10 (max. frequency)	0.00Hz	○
05-10	DC braking delay time while stopping	0.00s ~ 50.00s	0.00s	○
05-11	DC braking current while stopping	0.0% ~ 100.0%	0.0%	○
05-12	DC braking time while stopping	0.00s ~ 50.00s	0.00s	○
05-16	FWD/REV dead time	0.0s ~ 3000.0s	0.0s	○
05-17	FWD/REV switch mode	0: Switch from 0 frequency 1: Switch from start frequency 2: Switch from the stop frequency	0	○
05-18	Stop speed	0.00 ~ 100.00Hz	0.50Hz	○
05-19	Stop speed detection way	0: Detect by speed set value 1: Detect by speed feedback value	1	○
05-20	Speed feedback detection time	0.00 ~ 100.00s	0.05s	○
05-21	Start delay time	0.0 ~ 60.0s	0.0s	○
05-22	Stop speed delay	0.0 ~ 100.0s	0.0s	○
05-23	Braking unit action	0: Invalid 1: Valid	1	○

Function code	Name	Detailed instruction	Factory default	Modify
05-24	Braking unit action voltage	200.0~2000.0V (220V LVD is 380V; 380V LVD is 700V)	Model depend	○
05-25	Strength of braking	0 ~ 150 0: Invalid >0: the bigger value, the better braking performance	0	○
06 Group: Input Terminals				
06-00	DI5 Input mode	0: High speed pulse input 1: Terminal switch input	1	◎
06-01	DI1 terminal function	0: No function	1	◎
06-02	DI2 terminal function	1: Forward (FWD) 2: Reverse (REV)	2	◎
06-03	DI3 terminal function	3: Three-line running control	4	◎
06-04	DI4 terminal function	4: Forward Jog (FJOG) 5: Reverse Jog (RJOG)	5	◎
06-09	DI5 terminal function	6: Coast to stop 7: Fault reset (RESET) 8: Pause running 9: External fault (normal open) input 10: Frequency increase (UP) 11: Frequency decrease (DOWN) 12: UP and DOWN setting clear (terminal and keypad) 13: Main frequency source switching 14: Switch the frequency source between 00-07 and 00-03 15: Switch the frequency source between 00-07 and 00-04 16: Multi-step speed terminal 1 17: Multi-step speed terminal 2 18: Multi-step speed terminal 3 19: Multi-step speed terminal 4 20: Multi-step speed pause 21: ACC/DEC selection terminal 1 22: ACC/DEC selection terminal 2 23: Simple PLC stop and reset 24: Simple PLC pause 25: PID Pause 26: Wobble frequency pause (stop at present frequency) 27: Wobble frequency pause(return back to center frequency)	16	◎

Function code	Name	Detailed instruction	Factory default	Modify
		28: Counter reset 29: Speed control / torque control switching 30: ACC/DEC invalid 31: Counter input 32: Length reset 33: Reserved 34: DC braking command 35: Reserved 36: Switch the run command source to keypad 37: Switch the run command source to terminal 38: Switch the run command source to Modbus 39: Pre-excitation 40: The total consumption energy reset 41: Reserved 42: Emergency stop (fast brake, the performance is better under vector control mode) 43: External stop signal (stop under the DEC setting time)		
06-10	Input terminal logic selection	Bit0~3:X1~X4, Bit8:HDI 0 is positive logic, 1 is negative logic;	000	○
06-11	DI terminals filter time	0.000s ~ 1.000s	0.010s	○
06-12	Virtual terminal settings	0x000~0x1FF 0: Disabled, 1: Used Bit0~bit3 :X1~X4 Bit8 :HDI	0x000	◎
06-13	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	◎
06-14	Delay time of DI1 signal close	0.000 ~50.000s	0.000s	○
06-15	Delay time of DI1 signal open	0.000 ~50.000s	0.000s	○
06-16	Delay time of DI2 signal close	0.000 ~50.000s	0.000s	○
06-17	Delay time of DI2 signal open	0.000 ~50.000s	0.000s	○

Function code	Name	Detailed instruction	Factory default	Modify
06-18	Delay time of DI3 signal close	0.000 ~50.000s	0.000s	○
06-19	Delay time of DI3 signal open	0.000 ~50.000s	0.000s	○
06-20	Delay time of DI4 signal close	0.000 ~50.000s	0.000s	○
06-21	Delay time of DI4 signal open	0.000 ~50.000s	0.000s	○
06-30	Delay time of DI5 signal close	0.000 ~50.000s	0.000s	○
06-31	Delay time of DI5 signal open	0.000 ~50.000s	0.000s	○
06-33	Auto restart selection after switch on the power (00-02=1)	0: No action 1: Auto restart	0	○
06-34	UP/DOWN Terminal control settings	Unit bit: : UP/DOWN terminal enabled 0: Valid 1: Invalid Ten bit: frequency source control selected 0: Only valid for digital settings of frequency sources A and B 1: All frequency sources are valid 2: When multi segment speed is prioritized, multi segment speed is invalid Hundred bit: shutdown selection 0: Setting is valid 1: Effective operation, cleared after shutdown 2: Effective operation, clean shutdown instructions	000	○
06-35	UP signal change rate	0.01Hz/s ~ 50.00Hz/s	0.50Hz/s	○
06-36	DOWN signal change rate	0.01Hz/s ~ 50.00Hz/s	0.50Hz/s	○
06-37	DI5 minimum input	0.000kHz~(06-35)	0.000kHz	○
06-38	DI5 minimum input corresponding setting	-100.0%~100.0%	0.0%	○
06-39	DI5 maximum input	(06-33)~50.000kHz	50.000kHz	○
06-40	DI5 maximum input corresponding setting	-100.0%~100.0%	100.0%	○

Function code	Name	Detailed instruction	Factory default	Modify
06-41	DI5 filtering time	0.000s~10.000s	0.100s	○
06-42	AI1 minimum input	0.00V ~ 06-44	0.00V	○
06-43	AI1 minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	○
06-44	AI1 maximum input	06-42 ~ 10.00V	10.00V	○
06-45	AI1 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	○
06-46	AI1 input filter time	0.000s ~ 10.000s	0.100s	○
06-47	AI2 minimum input	0.00V ~ 06-49	0.00V	○
06-48	AI2 minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	○
06-49	AI2 maximum input	06-47~ 10.00V	10.00V	○
06-50	AI2 maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	○
06-51	AI2 input filter time	0.000s ~ 10.000s	0.10s	○
06-52	AI3 minimum input	-10.00V ~ 06-54	-10.00V	○
06-53	AI3 minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	○
06-56	AI3 maximum input	06-54~ 10.00V	0.00V	○
06-57	AI3 maximum input corresponding setting	-100.0% ~ +100.0%	0.0%	○
06-58	AI3 input filter time	0.000s ~ 10.000s	0.100s	○
06-59	AI input signal selection	Unit bit: AI1 Tens bit: AI2 0: AI terminal 0 ~ 10V signal input 1: AI terminal 0 ~ 20mA signal input	00	○
07 Group: Output Terminal				
07-00	FM terminal output mode	0: High speed pulse output 1: Terminal switch output	1	○
07-01	DO1 output function selection (open collector output)	0: No output 1: Inverter is running 2: Forward running 3: Reverse running	0	○
07-02	FM terminal output function selection	4: Jog running 5: Fault output (inverter fault) 6: FDT1 output	0	○

Function code	Name	Detailed instruction	Factory default	Modify
07-03	Relay 1 output selection (T/A, T/B, T/C)	7: FDT2 output 8: Frequency arrival 9: Zero-speed running 10: Frequency upper limit arrival 11: Frequency lower limit arrival	1	○
07-04	Relay 2 output selection (P/A, P/B, P/C)	12: Ready for running 13: Pre-excitation 14: Alarm for overload 15: Alarm for underload 16: Simple PLC step running completed 17: Simple PLC circulate running completed 18: Setting count value arrival 19: Designated count value arrival 20: Fault output (external fault) 21: Running time arrival 22: Length arrival 23: Communication virtual terminal output	5	○
07-05	AO1 output function selection	0: Running frequency 1: Set frequency 2: Slope given frequency 3: Running RPM value 4: Output current (2 times rated current of inverter) 5: Output current (2 times rated current of motor) 6: Output voltage 7: Output power 8: Set torque 9: Output torque 10: AI1 11: AI2 12: Simulate AI3 input value 13: High speed pulse HDI input value 14: Modbus set frequency 15: Reserved	4	○
07-07	FM pulse output function selection	14: Torque current (3 times rated current of motor)	0	○
07-08	AO1 minimum output	-100.0% ~ 07-10	0.0%	○

Function code	Name	Detailed instruction	Factory default	Modify
07-09	AO1 minimum output corresponding setting	0.00 ~ 10.00V	0.00V	○
07-10	AO1 maximum output	07-08 ~ 100.0%	100.0%	○
07-11	AO1 maximum output corresponding setting	0.00 ~ 10.00V	10.00V	○
07-12	AO1 output filter time	0.000s~10.000s	0.000s	○
07-18	FM minimum output	-100.0% ~ 07-20	0.0%	○
07-19	FM minimum output corresponding setting	0.00 ~ 50.00kHz	0.00kHz	○
07-20	FM maximum output	07-18 ~ 100.0%	100.0%	○
07-21	FM maximum output corresponding setting	0.00 ~ 50.00kHz	0.0kHz	○
07-22	FM output filter time	0.000s~10.000s	0.000s	○
07-23	Output delay time of DO1 signal close	0.000s ~ 50.000s	0.000s	○
07-24	Output delay time of DO1 signal open	0.000s ~ 50.000s	0.000s	○
07-25	Output delay time of FM signal close	0.000s ~ 50.000s	0.000s	○
07-26	Output delay time of FM signal open	0.000s ~ 50.000s	0.000s	○
07-27	Output delay time of relay 1 signal close	0.000s ~ 50.000s	0.000s	○
07-28	Output delay time of relay 1 signal open	0.000s ~ 50.000s	0.000s	○
07-29	Output delay time of relay 2 signal close	0.000s ~ 50.000s	0.000s	○
07-30	Output delay time of relay 2 signal open	0.000s ~ 50.000s	0.000s	○
07-31	Output terminal valid status selection	0: Positive logic 1: Negative logic Units place: MO1 Tens place: reserved Hundreds place: relay 1 Thousands place: relay 2	0000	○
08 Group: Keypad and Display				
08-00	User password	0 ~ 65535 (00000: no password)	0	○
08-01	MF.K function selection	0: No function 1: Jog run	0	◎

Function code	Name	Detailed instruction	Factory default	Modify
		2: SHIFT button 3: FDW/REV Switching 4: UP/DOWN set reset 5: Coast to stop 6: Sequence of run command source switch		
08-02	MF.K run command source switch	0: Keypad→terminal→Modbus 1: Keypad←→terminal 2: Keypad←→Modbus 3: Terminal←→Modbus	0	○
08-03	STOP/RESET function selection	0: Valid for keypad control 2: Valid for keypad and terminal control 3: Valid for keypad and Modbus control 4: Always valid	0	○
08-04	Parameters initialization	0: No action 1: Initialize parameters 2: Clear the fault record 3: Lock the keypad	0	◎
08-05	Keyboard numeric control settings	0000~1223 Unit bit:Frequency enable selection 0: ^/v key and encoder are both valid 1: Only ^/v health is valid 2: Encoder only 3: The ^/v key and encoder are both invalid 4: The AI timing ^/v key and encoder are both invalid Ten bit:Frequency control selection 0: Only valid for keyboard number settings 1: All frequency modes are effective 2: Invalid for multi segment speed priority Hundred bit:Action selection during shutdown 0: Setting is valid 1: Effective during operation, cleared after shutdown 2: Effective during operation, cleared after receiving shutdown command Thousand bit:^/v key and encoder	0000	○

Function code	Name	Detailed instruction	Factory default	Modify
		integration function 0: The points function is effective 1: Invalid integral function		
08-06	Keypad potentiometer and UP/DOWN button adjust data bit select	1: Unit bit: 2: Tens bit: 3: Hundred bit: 4: Thousand bit:	1	○
08-07	Frequency memory selection when power off	Unit bit: Keypad potentiometer Tens bit: Modbus 0: Frequency memorized while power off 1: Frequency reset while power off	00	○
08-08	Parameters download and upload	0: No action 1: Parameters upload to keypad 2: Parameters download from keypad to inverter (includes motor parameters) 3: Parameters download from keypad to inverter (not includes motor parameters) 4: Parameters download from keypad to inverter (only the motor parameters)	0	○
08-09	Running status display 1	0000 ~ FFFF Bit00: Running frequency (Hz indicator on) Bit01: Setting frequency (Hz indicator flickers) Bit02: DC Bus voltage (V indicator on) Bit03: Output voltage (V indicator on) Bit04: Output current (A indicator on) Bit05: Running RPM (RPM indicator on) Bit06: Output power (% indicator on) Bit07: Output torque (% indicator on) Bit08: PID set value (% indicator flickers) Bit09: PID feedback (% indicator on) Bit10: DI input status Bit11: Output terminals status Bit12: Torque set value (% indicator on) Bit13: Pulse count value Bit15: Simple PLC running present step	033F	○
08-10	Running status display 2	0000 ~ FFFF Bit00: AI1 value (V indicator on) Bit01: AI2 value (V indicator on)	0000	○

Function code	Name	Detailed instruction	Factory default	Modify
		Bit02: Reserved Bit03: Reserved Bit04: Motor overload percentage (% indicator on) Bit05: Inverter overload percentage (% indicator on) Bit06: Reserved Bit07: Linear speed Bit08: Input current Bit09: Frequency upper limit		
08-11	Stop status display	0000 ~ FFFF Bit00: Setting frequency (Hz indicator on) Bit01: DC Bus voltage (V indicator on) Bit02: DI input status Bit03: Output terminals status Bit04: PID set value (% indicator flickers) Bit05: PID feedback value (% indicator on) Bit06: Torque set value (% indicator on) Bit07: AI1 value (V indicator on) Bit08: AI2 value (V indicator on) Bit09: Reserved Bit10: Reserved Bit11: Simple PLC and multi-step speed running present step Bit12: Pulse count value Bit14: Frequency upper limit	038B	○
08-12	Software version No.	-	-	●
08-13	Temperature of rectifier	0.0~120.0℃	-	●
08-14	Temperature of converter	0.0~120.0℃	-	●
08-15	Frequency display adjust coefficient	0.01 ~10.00	1.00	○
08-16	RPM display adjust coefficient	0.1 ~999.9%	97.3%	○
08-17	Linear speed display adjust coefficient	0.1 ~999.9%	1.0%	○
08-18	Input power factor display coefficient	0.00~1.00	0.56	○

Function code	Name	Detailed instruction	Factory default	Modify
08--19	Accumulated running time	0h ~ 65535h	-	●
08-20	Monitoring accumulated consumption power high point	Accumulated consumption power = (08-20)*1000-(08-21)	0kWh	●
08-21	Monitoring accumulated consumption power low point		0.0kWh	●
08-22	Set consumption power high point initial value	Consumption power initial value = (08-22)*1000-(08-23)	0kWh	●
08-23	Set consumption power low point initial value		0.0kWh	●
08-24	Barcode1			●
08-25	Barcode2			●
08-26	Barcode3			●
08-27	Barcode4			●
08-28	Barcode5			●
08-29	Barcode6			●
08-30	Motor power display adjust coefficient	0.00 ~ 3.00	1.00	○
09 Group: Fault record parameters				
09-00	The first fault type	0: No fault 1: Reserved 2: Over current in ACC process 3: Over current in DEC process 4: Over current in constant speed 5: Over voltage in ACC process 6: Over voltage in DEC process 7: Over voltage in constant speed 8: Reserved 9: DC BUS under voltage 10: Inverter overload 11: Motor overload 12: Input side phase failure 13: Output side phase failure 14: IGBT Module overheat 15: External fault 16: Communication fault 17: Reserved	—	●

Function code	Name	Detailed instruction	Factory default	Modify
		18: Current detection fault 19: Motor auto-tuning fault 20: Reserved 21: EEPROM fault 22: Reserved 23: Motor short circuit to ground fault 24: Reserved 25: Reserved 26: Running time arrival 27: Reserved 28: Reserved 29: Reserved 30: Off load 31: PID feedback lost when running 40: Fast current limiting over time 42: Excessive speed deviation 48: Electronic overload fault 51: Initial position misalignment 60: Brake pipe protection		
09-01	The first fault type		—	●
09-02	The second fault type		—	●
09-03	The third fault type		—	●
09-04	The fourth fault type		—	●
09-05	The fifth fault type		—	●
09-06	Running frequency at the latest fault	—	—	●
09-07	Current fault slope given frequency	—	—	●
09-08	Output voltage at the latest fault	—	—	●
09-09	Output current at the latest fault	—	—	●
09-10	DC bus voltage at the latest fault	—	—	●
09-11	IGBT temperature at the latest fault	—	—	●
09-12	Input terminal's status at the latest fault	—	—	●
09-13	Output terminal's status at the latest fault	—	—	●

Function code	Name	Detailed instruction	Factory default	Modify
09-14	Running frequency at the second fault	—	—	●
09-15	Reserved	—	—	●
09-16	Output voltage at the second fault	—	—	●
09-17	Output current at the second fault	—	—	●
09-18	DC bus voltage at the second fault	—	—	●
09-19	IGBT temperature at the second fault	—	—	●
09-20	Input terminal's status at the second fault	—	—	●
09-21	Output terminal's status at the second fault	—	—	●
09-22	Running frequency at the third fault	—	—	●
09-23	Second fault ramp given frequency	—	—	●
09-24	Output voltage at the third fault	—	—	●
09-25	Output current at the third fault	—	—	●
09-26	DC bus voltage at the second fault	—	—	●
09-27	IGBT temperature at the third fault	—	—	●
09-28	Input terminal's status at the third fault	—	—	●
09-29	Output terminal's status at the third fault	—	—	●
10 Group: Protection parameters				
10-00	Motor overload protection selection	0: Disable 1: Enable 2: Reserved	1	●
10-01	Motor overload protection coefficient	20.0% ~ 120.0%	100.0%	○
10-02	Stall over-voltage protection enable selection	0: Invalid 1: Valid	1	○

Function code	Name	Detailed instruction	Factory default	Modify
10-03	Stall over-voltage point	220V inverter: 120% ~ 150%	120%	○
		380V inverter: 120% ~ 150%	140%	
10-04	Over current protection selection	Unit bit: software stall over-current protection select 0: Invalid 1: Valid Tens bit: hardware current limitation protection select 0: Invalid 1: Valid Hundred bit: Convert part over current fault unblocking selection 0: Can be unblocked 1: Can be unblocked after 60s blocking 2: Keep blocked, only be unblocked after reset the power supply	101	○
10-05	Stall over-current protection point	50.0 ~ 200.0%	Model depend	●
10-06	Stall over-current voltage drop ratio	0.00 ~ 50.00Hz/s	10.00 Hz/s	○
10-07	Input and output phase failure protection selection	Unit bit: input phase failure protection Tens bit: Output phase failure protection 0: Invalid 1: Valid	11	○
10-08	Overload / under load protection selection	Unit bit: overload/ under load pre-alarm selection 0: Pre-alarm for under load 1: Pre-alarm for over load Tens bit: inverter reaction selection While overload / under load happens 0: Inverter gives pre-alarm and keep running while overload / under load happens 1: Inverter gives pre-alarm for under load and stops while overload happen; 2: Inverter gives pre-alarm for overload and stops while under load happen; 3: Inverter stops while under load	000	○

Function code	Name	Detailed instruction	Factory default	Modify
		happen; Hundred bit: Overload / under load protection enable 0: Always valid 1: Only valid during constant speed running		
10-09	Overload detect point	10-11 ~ 200%	Model depend	○
10-10	Overload detect time	0.1 ~ 3600.0s	1.0s	○
10-11	Under load detect point	0 ~ 10-09	50%	○
10-12	Under load detect time	0.1 ~ 3600.0s	1.0s	○
10-13	Fault auto-reset times	0 ~ 10	0	○
10-14	Fault auto-reset interval	0.1s ~ 100.0s	1.0s	○
10-15	Over voltage threshold set	0~2500.0V	Model depend	○
10-16	Under voltage threshold set	0~2500.0V	Model depend	○
10-17	Special functions selection	Unit bit: Frequency drops automatically if the voltage is unstable; Tens bit: Switch to ACC/DEC time 2 while the frequency is arrival 0: Invalid 1: Valid	00	○
10-18	Output terminals fault reaction selection	Unit bit: Under voltage reaction Tens bit: Reaction during auto-reset 0: Valid 1: Invalid	00	○
10-19	Operation selection while instantaneous power off	0: Stop 1: Keep running	0	○
10-20	Waiting time for operation when instantaneous power off	0.0 ~3600.0s	1.0s	○
10-21	Voltage drops selection while instantaneous power off	0: Invalid 1: Valid	0	○
10-22	Frequency drops ratio while instantaneous	0.00Hz ~ 00-10 (Hz/s)	10.00 Hz/s	○

Function code	Name	Detailed instruction	Factory default	Modify
	power off			
10.23	Speed deviation detection value	0.0~50.0%	20.00%	○
10.24	Speed deviation detection time	0.0~10.0s	0.5s	○
11 Group: Enhanced Functions				
11-00	Jog running frequency	0.00Hz ~ 00-10 (max. frequency)	5.00Hz	○
11-01	Jog acceleration time	0.0s ~ 3600.0s	Model depend	○
11-02	Jog deceleration time	0.0s ~ 3600.0s	Model depend	○
11-03	Acceleration time 2	0.0s ~ 6500.0s	Model depend	○
11-04	Deceleration time 2	0.0s ~ 3600.0s	Model depend	○
11-05	Acceleration time 3	0.0s ~ 3600.0s	Model depend	○
11-06	Deceleration time 3	0.0s ~ 3600.0s	Model depend	○
11-07	Acceleration time 4	0.0s ~ 3600.0s	Model depend	○
11-08	Deceleration time 4	0.0s ~ 3600.0s	Model depend	○
11-09	Action when setting frequency lower than frequency lower limit	0: Running at frequency lower limit (00-14) 1: Stop 2: Dormancy	0	○
11-10	Dormancy recover time	0.0s ~ 3600.0s	0.0s	○
11-11	Droop frequency	0.00Hz ~ 10.00Hz	0.00Hz	○
11-12	Cooling fan control	0: Start the cooling fan while start the frequency inverter 1: Start the cooling fan while switch on the power supply	0	○
11-19	Setting count value	11-20 ~ 65535	0	○
11-20	Designated count value	1 ~ 11-09	0	○
11-21	Timing running duration	0Min ~ 65535Min	0Min	○
11-22	Jump frequency 1	0.00Hz ~ 00-10 (maximum frequency)	0.00Hz	○

Function code	Name	Detailed instruction	Factory default	Modify
11-23	Jump frequency amplitude 1	0.00Hz ~ 00-10 (maximum frequency)	0.01Hz	○
11-24	Jump frequency 2	0.00Hz ~ 00-10 (maximum frequency)	0.00Hz	○
11-25	Jump frequency amplitude 2	0.00Hz ~ 00-10 (maximum frequency)	0.01Hz	○
11-26	Jump frequency 3	0.00Hz ~ 00-10 (maximum frequency)	0.00Hz	○
11-27	Jump frequency amplitude 3	0.00Hz ~ 00-10 (maximum frequency)	0.01Hz	○
11-28	Wobble frequency amplitude	0.0% ~ 100.0% (correspond to setting frequency)	0.0%	○
11-29	Sudden Jump frequency amplitude	0.0% ~ 50.0% (11-28)	0.0%	○
11-30	Wobble frequency rise time	0.1 ~3600.0s	5.0s	○
11-31	Wobble frequency fall time	0.1 ~3600.0s	5.0s	○
11-32	Frequency detection value (FDT1)	0.00Hz ~ 00-10 (maximum frequency)	50.00Hz	○
11-33	Frequency detection lagging value (FDT1)	0.0% ~ 100.0% (11-32)	5.0%	○
11-34	Frequency detection value (FDT2)	0.00Hz ~ 00-10 (maximum frequency)	50.00Hz	○
11-35	Frequency detection lagging value (FDT2)	0.0% ~ 100.0% (11-34)	5.0%	○
11-36	Frequency arrival detection value	0.00 ~ 00-10 (maximum frequency)	0.00Hz	○
11-37	Over-modulation selection	Unit bit: Enable of over-modulation 0: Invalid 1: Valid Tens bit: Strength of over-modulation selection 0: Light 1: Heavy	01	○
11-38	PWM mode selection	Unit bit: PWM mode selection 0: Two phase and three-phase modulation 1: Three-phase modulation Tens bit: Low speed carrier frequency limit selection 0:2kHz limit	00	○

Function code	Name	Detailed instruction	Factory default	Modify
		1: 4kHz limit 2: Unrestricted		
12 Group: PID Function				
12-00	PID given source	0: 12-01 1: AI1 2: AI2 3: AI3 4:HDI 5: Multi-step command 6: Modbus 7: Keypad potentiometer	0	○
12-01	PID set through keypad	-100.0%~100% (percentage of sensor measure range)	0.0%	○
12-02	PID feedback source	0: AI1 1: AI2 2: AI3 3:HDI 4: Modbus 5: Keypad potentiometer	0	○
12-03	PID action direction	0: Positive 1: Negative	0	○
12-04	Proportional gain Kp1	0.0 ~ 100.0	10.0	○
12-05	Integration time Ti1	0.01s ~ 10.00s	1.00s	○
12-06	Differential time Td1	0.000s ~ 10.000s	0.000s	○
12-07	PID feedback filter time	0.000 ~ 10.000s	0.100s	○
12-08	PID parameter switching deviation 1	0.0% ~100.0%	0.0%	○
12-09	PID output upper limit	12-10 ~ 100.0%	100.0%	○
12-10	PID output lower limit	-100.0% ~ 12-09	0.0%	○
12-11	PID output ACC/DEC time	0.0 ~1000.0s	0.0s	○
12-12	PID output filter time	0.00 ~ 60.00s	0.00s	○
12-13	Low frequency proportional gain	0.00 ~ 100.0	1.00	○
12-14	PID feedback lost detection value	0.0%: No judgment for feedback lost 0.1% ~ 100.0%	0.0%	○

Function code	Name	Detailed instruction	Factory default	Modify
12-15	PID feedback lost detection time	0.0s ~ 20.0s	0.0s	○
12-16	PID regulation function	Units bit: 0: Keep Integral adjustment when the frequency reaches upper / lower limit 1: Stop Integral adjustment when the frequency reaches upper / lower limit Tens bit: 0: The direction is same as set direction 1: Reverse direction Hundreds bit: 0: Reference maximum frequency limitation 1: Reference frequency source A limitation Thousands bit: 0: A+B, invalid acceleration and deceleration time for frequency source A 1: A+B, frequency source A is determined by acceleration and deceleration time 4	0001	○
13 Group: Multi-step Command and Simple PLC				
13-00	Multi-step speed 0	-100.0% ~ 100.0%	0.0%	○
13-01	Multi-step speed 1	-100.0% ~ 100.0%	0.0%	○
13-02	Multi-step speed 2	-100.0% ~ 100.0%	0.0%	○
13-03	Multi-step speed 3	-100.0% ~ 100.0%	0.0%	○
13-04	Multi-step speed 4	-100.0% ~ 100.0%	0.0%	○
13-05	Multi-step speed 5	-100.0% ~ 100.0%	0.0%	○
13-06	Multi-step speed 6	-100.0% ~ 100.0%	0.0%	○
13-07	Multi-step speed 7	-100.0% ~ 100.0%	0.0%	○
13-08	Multi-step speed 8	-100.0% ~ 100.0%	0.0%	○
13-09	Multi-step speed 9	-100.0% ~ 100.0%	0.0%	○
13-10	Multi-step speed 10	-100.0% ~ 100.0%	0.0%	○
13-11	Multi-step speed 11	-100.0% ~ 100.0%	0.0%	○

Function code	Name	Detailed instruction	Factory default	Modify
13-12	Multi-step speed 12	-100.0% ~ 100.0%	0.0%	○
13-13	Multi-step speed 13	-100.0% ~ 100.0%	0.0%	○
13-14	Multi-step speed 14	-100.0% ~ 100.0%	0.0%	○
13-15	Multi-step speed 15	-100.0% ~ 100.0%	0.0%	○
13-16	0 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-17	1 st step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-18	2 nd step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-19	3 rd step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-20	4 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-21	5 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-22	6 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-23	7 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-24	8 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-25	9 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-26	10 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-27	11 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-28	12 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-29	13 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-30	14 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-31	15 th step running time	0.0s (min) ~ 6553.5s (min)	0.0	○
13-32	PLC segments 0-7 Acceleration and deceleration time	0 segment:Bit0-1: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 1 segment:Bit2-3: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 2 segment:Bit4-5: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 3 segment:Bit6-7: Two bit values selected for acceleration	0000	○

Function code	Name	Detailed instruction	Factory default	Modify
		and deceleration times 1, 2, 3, 4 4 segment:Bit8-9: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 5 segment:Bit11-10: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 6 segment:Bit12-13: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 7 segment:Bit14-15: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4		
13-33	PLC segments 8-15 Acceleration and deceleration time	8 segment:Bit0-1: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 9 segment:Bit2-3: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 10 segment:Bit4-5: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 11 segment:Bit6-7: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 12 segment:Bit8-9: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 13 segment:Bit11-10: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 14 segment:Bit12-13: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4 15 segment:Bit14-15: Two bit values selected for acceleration and deceleration times 1, 2, 3, 4	0000	○
13-34	Timing unit (Simple PLC mode)	0: s (second) 1: min (minute)	0	○
13-35	Simple PLC running mode	0: Stop after one cycle 1: Keep last frequency after one cycle 2: Circular running	0	○

Function code	Name	Detailed instruction	Factory default	Modify
13-36	Simple PLC status memory selection after power off	0: Not memory 1: Memory	0	○
13-37	Simple PLC status memory selection after stop	0: Restart from 0 th step 1: Keep running from the step which is before stopping	0	○
13-38	Multi-step speed 0 given channel	0: 13-00 1: AI1 2: AI2 3: AI3 4: HDI 5: PID control 6: Keypad potentiometer 7: Keypad set frequency (00-08), can be modified via UP/DOWN button	0	○
13-39	Multi-step speed 1 given channel	0: 13-01 1: AI1 2: AI2 3: AI3 4: HDI 5: PID control 6: Keypad potentiometer 7: Keypad set frequency (00-08), can be modified via UP/DOWN button	0	○
14 Group: Communication Parameters				
14-00	Inverter address	1 ~ 247, 0 is broadcast address	1	○
14-01	Baud rate	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS 6: 57600BPS	3	○
14-02	Data format	0: No parity check (N-8-1) for RTU 1: Even parity check (E-8-1) for RTU 2: Odd parity check (O-8-1) for RTU 3: No parity check (N-8-2) for RTU 4: Even parity check (E-8-2) for RTU 5: Odd parity check (O-8-2) for RTU	3	○
14-03	Communication delay time	0ms ~ 200ms	5ms	○

Function code	Name	Detailed instruction	Factory default	Modify
14-04	Communication timeout time	0.0 (invalid) 0.1s ~ 60.0s	0.0s	○
14-05	Inverter reaction while communication error happens	0: Give alarm and then stop 1: No alarm and keep running 2: No alarm and stop as the set stop mode (only valid under communication mode) 3: No alarm and stop as the set stop mode (valid for all the control mode)	0	○
14-06	Communication action selection	Unit bit: 1: Response for write operation 2: No response for write operation	0	○
14-07	Communication protocol selection	0: Reserved 1: Standard Modbus communication	0	○

4.2 Monitoring Parameter Table (30 group)

Function code	Name	Minimum unit	Communication address (HEX)	Communication address (DEC)
30-00	Running frequency (Hz)	0.01Hz	0x7000	28672
30-01	Set frequency (Hz)	0.01Hz	0x7001	28673
30-02	DC bus voltage (V)	0.1V	0x7002	28674
30-03	Output voltage (V)	1V	0x7003	28675
30-04	Output current (A)	0.01A	0x7004	28676
30-05	Output power (kW)	0.1kW	0x7005	28677
30-06	Output torque (%)	0.10%	0x7006	28678
30-07	DI input status	1	0x7007	28679
30-08	Output terminals status	1	0x7008	28680
30-09	AI1 input voltage (V)	0.01V	0x7009	28681
30-10	AI2 input voltage (V)	0.01V	0x700A	28682
30-11	Reserved			
30-12	Count value	1	0x700C	28684
30-13	Length value	1	0x700D	28685

Function code	Name	Minimum unit	Communication address (HEX)	Communication address (DEC)
30-14	Motor speed	1RPM	0x700E	28686
30-15	PID set value	0.1%	0x700F	28687
30-16	PID feedback	0.1%	0x7010	28688
30-17	Simple PLC present running step	1	0x7011	28689
30-18 ~ 30-23	Reserved			
30-24	linear speed	1m/Min	0x7018	28696
30-25	Current running time	1Min	0x7019	28697
30-26	Reserved			
30-27	Torque set value	0.1%	0x701B	28699
30-28	Output torque	0.1Nm	0x701C	28700
30-29	Reserved			
30-32	Motor power factor	0.01	0x7020	28704
30-33	Estimated motor frequency	0.01Hz	0x7021	28705
30-34	AC input current	0.1A	0x7022	28706
30-35	Reserved			

Chapter 5 Trouble Shooting

Fault and Trouble Shooting

Fault Name	Converter short circuit protection
Fault Code	Err01
Reason	1. Short-circuit or ground fault occurred at inverter output side 2. The cable connecting the motor with the inverter is too long 3. The module is over-heat 4. The cable connections inside the inverter are loosen 5. The control board is abnormal 6. The power board is abnormal 7. The IGBT module is abnormal
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Install a reactor or output filter 3. Check if the air duct is blocked and if the fan is in normal status, and resolve the existing problems 4. Make sure the cables are connected well 5, 6, 7. Ask for technical support

Fault Name	Over current when acceleration
Fault Code	Err02
Reason	1. Short-circuit or ground fault occurred at inverter output side 2. Control mode is vector control but don't perform auto-tuning 3. The acceleration time is too short 4. The manual torque boost or V/f curve is not proper 5. The voltage is too low 6. Start the running motor 7. Load is added suddenly during the acceleration 8. Power selection of inverter is too small
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Increase the acceleration time 4. Adjust the manual torque boost or V/F curve 5. Make the voltage in the normal range 6. Select speed tracking start or start the motor till it stops 7. Cancel the sudden added load 8. Select bigger power inverter

Fault Name	Over-current when deceleration
Fault Code	Err03
Reason	1. Short-circuit or ground fault occurred at inverter output side 2. Control mode is vector control but don't perform auto-tuning 3. The deceleration time is too short 4. The voltage is too low 5. Load is added suddenly during the deceleration 6. Have not installed braking unit and braking resistor
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Increase the deceleration time 4. Make the voltage in the normal range 5. Cancel the sudden added load 6. Install braking unit and braking resistor

Fault Name	Over-current when constant speed running
Fault Code	Err04
Reason	1. Short-circuit or ground fault occurred at inverter output 2. Control mode is vector control but don't perform auto-tuning 3. The voltage is too low 4. Load is added suddenly during running 5. Power selection of inverter is too small
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Identify the motor parameters 3. Make the voltage in the normal range 4. Cancel the sudden added load 5. Select bigger power inverter

Fault Name	Over-voltage when acceleration
Fault Code	Err05
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during acceleration 3. The acceleration time is too short 4. Have not installed braking unit and braking resistor
Solution	1. Make the voltage in the normal range 2. Cancel the external force 3. Increase the acceleration time 4. Install braking unit and braking resistor

Fault Name	Over-voltage when deceleration
Fault Code	Err06
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during deceleration 3. The deceleration time is too short 4. Have not installed braking unit and braking resistor
Solution	1. Make the voltage in the normal range 2. Cancel the external force 3. Increase the deceleration time 4. Install braking unit and braking resistor

Fault Name	Over-voltage when constant speed running
Fault Code	Err07
Reason	1. The input voltage is too high 2. There is external force driving the motor to run during the inverter running
Solution	1. Make the voltage in the normal range 2. Cancel the external force or install braking resistor

Fault Name	Under-voltage
Fault Code	Err09
Reason	1. Instantaneous power-off 2. The input voltage is out of range 3. DC Bus voltage is abnormal 4. The rectifier bridge and buffer resistor are abnormal 5. The power board is abnormal 6. The control board is abnormal
Solution	1. Fault Reset 2, 3. Make the voltage in the normal range 4, 5, 6. ask for technical support

Fault Name	Inverter over load
Fault Code	Err10
Reason	1. The load is too heavy or motor blockage occurs 2. Power selection of inverter is too small
Solution	1. Reduce the load, check the status of motor & machinery 2. Select bigger power inverter

Fault Name	Motor over load
Fault Code	Err11
Reason	1. FA-00 and PA-01 is set improperly 2. The load is too heavy or motor blockage occurs 3. Power selection of inverter is too small
Solution	1. Set FA-00 and PA-01 properly 2. Reduce the load, check the status of motor & machinery 3. Select bigger power inverter

Fault Name	Input phase failure
Fault Code	Err12
Reason	1. The input power supply is abnormal 2. The power board is abnormal 3. The control board is abnormal
Solution	1. Check the power supply and eliminate the troubles 2, 3: ask for technical support

Fault Name	Output phase failure
Fault Code	Err13
Reason	1. The connection between inverter and motor is abnormal 2. Output voltage unbalance during the motor running 3. The power board is abnormal 4. The IGBT module is abnormal
Solution	1. Inspect whether motor damaged, insulation worn or cable damaged 2. Make sure the motor three phase winding is normal 3, 4. Ask for technical support

Fault Name	IGBT module over-heat
Fault Code	Err14
Reason	1. Ambient temperature is too high 2. Air duct is blocked 3. Cooling fans are broken 4. Thermal resistor(temperature sensor) of the module is broken 5. IGBT module is broken
Solution	1. Reduce the ambient temperature 2. Clear the air duct 3. Replace cooling fans 4, 5. Ask for technical support

Fault Name	External device fault
Fault Code	Err15
Reason	DI terminal receives an external fault signal generated by peripheral device
Solution	Find out the fault source, solve it and reset the inverter

Fault Name	Communication (Modbus) fault
Fault Code	Err16
Reason	1. Master computer works abnormal 2. Communication cable is abnormal 3. FC group parameters are set improperly
Solution	1. Check the connection of master computer 2. Check the communication connection 3. Set FC group parameters properly

Fault Name	Current detection fault
Fault Code	Err18
Reason	1. Hall sensor is abnormal 2. The power board is abnormal
Solution	1. Check hall sensor and connection 2. Replace the power board

Fault Name	Auto-tuning fault
Fault Code	Err19
Reason	1. Motor parameters are set improperly 2. Parameter identification process is delayed
Solution	1. Set parameters according to the motor nameplate 2. Check the cables connecting inverter with motor

Fault Name	EEPROM read/write fault
Fault Code	Err21
Reason	1. EEPROM chip is broken
Solution	1. Replace the control board

Fault Name	Motor short-circuit to ground
Fault Code	Err23
Reason	1. The motor is short-circuit to ground 2. Inverter IGBT module damage
Solution	1. Replace cables or motor 2. Replace IGBT or power board

Fault Name	Accumulated running time arrival
Fault Code	Err26
Reason	1. The accumulated running time reaches the setting value
Solution	1. Clear the record information via parameter initialization function

Fault Name	Off-load fault
Fault Code	Err30
Reason	1. The inverter running current is smaller than FA-64
Solution	1. Confirm if the load breaks away and FA-64 & FA-65 are set properly

Fault Name	PID feedback lost when running
Fault Code	Err31
Reason	1. PID feedback is smaller than 12-26
Solution	1. Check PID feedback signal or set 12-26 properly

Fault Name	Current-limiting fault
Fault Code	Err40
Reason	1. Whether the load is heavy or the motor is blocked 2. Power selection of inverter is too small.
Solution	1. Reduce the load and detect the motor & machinery condition 2. Select bigger power inverter

Fault Name	Excessive speed deviation
Fault Code	Err42
Reason	1. No parameter identification was performed 2. Excessive speed deviation detected, unreasonable parameter settings detected 3. Overload or locked rotor
Solution	1. Perform motor parameter identification 2. Reasonably resetting the speed deviation detection parameters 3. Check the load to ensure that it is functioning properly

Fault Name	Electronic overload fault
Fault Code	Err48
Reason	The frequency converter reports a fault when the set value of the electronic overload parameter is too high
Solution	Detect the load or adjust the electronic overload value reasonably

Fault Name	Initial position misalignment fault
Fault Code	Err51
Reason	1. Unreasonable motor parameter settings 2. No parameter identification was performed 3. The motor wire is not properly connected
Solution	1. Set motor parameters and perform motor parameter identification 2. Perform motor parameter identification 3. Check the motor wiring to ensure normal operation

Fault Name	Brake pipe protection failure
Fault Code	Err60
Reason	Short circuit of braking resistor or abnormal braking module
Solution	Check the braking resistor or seek technical support

Fault Name	Power supply under voltage
Fault Code	P-lu
Reason	1. The power supply is under voltage 2. The inverter internal switch power supply or DC bus voltage detection fault 3: The inverter is mismatch with the power supply
Solution	1. Check the power supply of the inverter 2. Check the inverter internal power board and DC bus circuit 3: Check the rated voltage of inverter whether matches with the power supply.

Constant pressure water supply parameter setting case

一、Description of water supply function:

A. To provide customers with the most concise and easy to understand constant pressure water supply parameters, we only need to face a few parameters and immediately solve the water supply pressure problem on site. Debugging personnel do not need to understand what is PID, gain, or integral, all of which have nothing to do with us!

B. The following menu functions are controlled by default in Bar pressure units. The keyboard displays the pressure feedback value in real-time. When adjusting the UP/DOWN key or encoder UP/DOWN, the pressure target value setting interface will automatically switch. When manually adjusting the pressure value is stopped, the pressure feedback value interface will be delayed to switch back to achieve the goal of real-time monitoring of force and pressure on site (the monitoring content can be switched by pressing the shift key).

C. 00-19=(consult the manufacturer for the constant pressure setting value). After setting this value correctly, the special parameter group 20 for constant pressure water supply will only open. When 00-19=0, the group 20 will automatically close and hide.

D. Preset pressure value from 20-01

The maximum values of all pressure parameters correspond to the range of the 20-00 sensor (two decimal places).

E. 00-19=(consult the manufacturer for this value), some key parameters will be automatically set by default

(Note that when 08-04=1, the following parameters will be restored to general machine parameters)

The following automatically set parameters are relative to the resistive output mode of the pressure gauge

00-02=1, terminal operation mode

00-03=7, frequency source X is a PID function

06-59=00, AI1AI2 input is **voltage (0-10V)**

06-60=1, set the supply voltage of the pressure sensor to **10V**

07-05=4, AO1 output current indication

07-07=0, HDO output frequency indication

08-06=1, UP/DWON adjustment resolution

08-09=0x00ld

08-11=0xc003

12-00=0, PID given source is given numerically

12-02=0, PID feedback source is AI1 (feedback channel can be modified, see instructions)

二、Water supply function parameter group

Function code	Name	Numeric Range	Factory value	Mail address	Notes
00-19	Industry applications	0-65535	00000	0013H	6,Consult the manufacturer
20-00	Pressure sensor range	0-100.00Bar	10.00	1400H	Range value of on-site pressure gauge
20-01	Digital pre-set pressure	0-100.00Bar	5.00	1401H	According to on-site pressure requirements
20-02	Sleep pressure	0-100.00Bar	5.00	1403H	Feedback pressure $\geq$ sleep pressure
20-03	Wake up pressure	0-100.00Bar	4.7	1405H	Feedback pressure < sleep pressure
20-04	Stable pressure deviation	0-100.00Bar	0.05	1402H	Used to overcome pressure fluctuations
20-05	Sleep delay	0-655.35S	60.0	1404H	Delayed arrival entering sleep
20-06	Wake up delay	0-655.35S	0.00	1406H	Delayed arrival start wake-up

1. Some pressure gauges have a unit of Mpa, such as a pressure gauge with a maximum range of 1Mpa, which corresponds to a sensor range of 10Bar and is a 10 fold relationship

2. When the pressure gauge has a 4-20mA current output, please modify the AI input IV type corresponding to 06-59 to select current input type. And modify the AIx input lower limit values 06-42 or 06-47 to 2.00V corresponding to 4mA, 06-60=0 (voltage terminal output+10.6V).

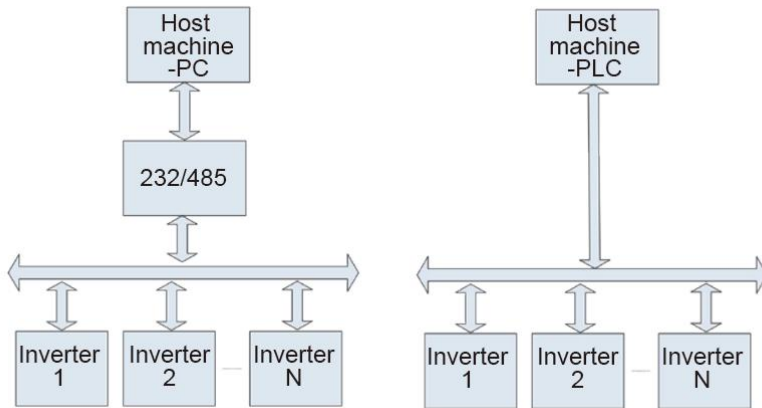
☆ Wiring method: The current source usually requires two 24V power supply lines. The 24V terminal of the

frequency converter is connected to the positive pole of the current type pressure gauge, and the negative pole of the pressure gauge is connected to the AI1 or AI2 terminal. COM and GND are short circuited with wires to form a current sampling circuit that is correctly sampled by the AI terminal.

Modbus communication protocol

A.0 Networking mode

There are two networking methods for frequency converters: single host/multi slave mode and single host/single slave mode.



A-1 Single host multi slave unit network mode



A-2 Single host and single slave unit network mode

A.1 Interface method

RS485 asynchronous half duplex.

The default data format for RS485 terminals can be found in the SCI group parameters.

A.2 Communication methods

1. The frequency converter is a slave, with master-slave point-to-point communication. When the host sends commands using a broadcast address, the slave does not respond;
2. Use the slave control panel or serial communication method to set the local address, baud rate, and data format of the frequency converter;
3. The slave machine reported the current fault information in the response frame of the most recent polling of the host;
4. The frequency converter adopts a local RS-485 interface method.

A.3 Message format

Modbus messages include start flag, RTU message, and end flag.

The RTU message includes address code, PDU, and CRC verification. PDU includes command code and data sections.

Data frame field description:

Frame Start	Idle with a transmission time greater than 3.5 characters.	
Slave address ADDR	Communication address range: 1-247 slave addresses, 0 is the broadcast address	
Command code CMD	Command code	Description
	0x03	Read multiple registers of the frequency converter.
	0x06	Write a single register to the frequency converter.
	0x10	Write multiple registers to the frequency converter.
Data	Mainly including register address, number of registers, and register content, please refer to Chapter A.4 for specific formats.	
CRCL	CRC16 verification value. When transmitting, low bytes come first and high bytes come last.	
CRCH		
End of frame END	Idle with a transmission time greater than 3.5 characters.	

A.4 Command code interpretation

A.4.1 Command code 0x03 reads multiple registers (supports 16 consecutive addresses)

•Request PDU

Device address	1 byte	0x01
Command code	1 byte	0x03
Starting address	2 bytes	0x0000~0xFFFF(The address with the top 8 digits comes in the front)
Number of registers	2 bytes	0x0001~0x0010(1~16,The number with the top 8 digits comes in the front)
CRC verification code	2 bytes	

•Responding to PDU

Device address	1 byte	0x01
Command code	1 byte	0x03
Byte count	1 byte	2*N
Register value	2*N bytes	Register values with the top 8 bits in the front; Send the register value of the starting address first.
CRC verification code	2 bytes	CRC with low 8 bits in the front and high 8 bits in the back

Note: Currently, the Modbus protocol 0x03 command code does not support cross group reading of multiple function codes.

Example: Host sends: 01 03 00 08 00 01 05 C8 (read function code 00-08)

Frequency converter response: 01 03 02 13 88 B5 12 (return 0x1388 (5000), -50.00Hz)

A.4.2 Command code 0x06 to write a single register

•Request PDU

Device address	1 byte	0x01
Command code	1 byte	0x06
Starting address	2 bytes	0x0000~0xFFFF(The address with the top 8 digits comes in the front)
Register value	2 bytes	0x0000~0xFFFF(Register value with the highest eight bits in the front)
CRC verification code	2 bytes	CRC with low 8 bits in the front and high 8 bits in the back

●Responding to PDU

Device address	1 byte	0x01
Command code	1 byte	0x06
Starting address	2 bytes	0x0000~0xFFFF(The address with the top 8 digits comes in the front)
Register Address	2 bytes	0x0000~0xFFFF(Register value with the highest eight bits in the front)
CRC verification code	2 bytes	CRC with low 8 bits in the front and high 8 bits in the back

Example: Host sends: 01 06 00 08 27 10 12 34 (write 0x2710 (10000) to the 00-08 function code, - 100.00Hz)

Frequency converter response: 01 06 00 08 27 10 12 34 (same as sending frames)

A.4.3 Command code 0x10 to write multiple registers (supports 16 consecutive addresses)**●Request PDU**

Device address	1 byte	0x01
Command code	1 byte	0x10
Starting address	2 bytes	0x0000~0xFFFF(The address with the top 8 digits comes in the front)
Number of registers	2 bytes	0x0001~0x0010(1~16,The number with the top 8 digits comes in the front)
Byte count	1 byte	2*N(N is the number of registers)
Register value	2*N bytes	Register values with the top 8 bits in the front; Send the register value of the starting address first.
CRC verification code	2 bytes	CRC with low 8 bits in the front and high 8 bits in the back

●Responding to PDU

Device address	1 byte	0x01
Command code	1 byte	0x10
Starting address	2 bytes	0x0000~0xFFFF(The address with the top 8 digits comes in the front)
Number of registers	2 bytes	0x0001~0x0010(1~16,The number with the top 8 digits comes in the front)
CRC verification code	2 bytes	CRC with low 8 bits in the front and high 8 bits in the back

Example: Host sends: 01 10 00 01 00 02 00 04 00 02 00 00 01 72 91 (function code 00-01=2, 00-02=1)

Frequency converter response: 01 10 00 01 00 02 10 08 (response starting register address 0x0001 and number of written registers 0x0002)

A.5 Command code 0x08 ping communication

This function is used to ping communication with the frequency converter and test whether the communication has a normal sound application.

•The request and response content are the same

Device address	1 byte	0x01
Command code	1 byte	0x08
Starting address	2 bytes	0x0000~0xFFFF(The address with the top 8 digits comes in the front)
Data content	2 bytes	0x0001~0x0010(1~16,The number with the top 8 digits comes in the front)
CRC verification code	2 bytes	CRC with low 8 bits in the front and high 8 bits in the back

Example: Host sending: 01 08 00 00 12 34 ED 7C

Frequency converter response: 01 08 00 00 12 34 ED 7C

0x08 command code, write 0x1234 content to 0X0000 address at will. The response from the frequency converter is exactly the same.

A.6 CRC Calibration

Considering the need to improve speed, CRC-16 is usually implemented in a table format. The following is the C language source code for CRC-16 implementation. Please note that the final result has swapped high and low bytes, which means the result is the CRC checksum to be sent:

```

Unit16 CRC16(const Unit16 *data,Unit16 len)
{
    Unit16 crcValue = 0xffff;
    Unit16 i;
    While (len-->0)
    {
        crcValue ^= *data++;
        for (i = 0;i<=7;i++)
        {
            if(crcValue & 0x0001)
            {
                crcValue = (crcValue>>1) ^ 0xa001;
            }
            else
            {
                crcValue = crcValue>>1;
            }
        }
    }
    return(crcValue);
}

```

A.7 Register Address

The register address is 16 bits of data, with the high 8 bits representing the functional code group number and the low 8 bits representing the intra group serial number. When performing function code register write operations, in order to avoid frequent EEPROM write causing memory damage, the high bit of the register address is used to indicate whether EEPROM is stored, the highest bit is 0x8000 to indicate EEPROM storage, and 0 to indicate only RAM is stored. For example, when writing to the 00-02 function code, 0x0002 indicates that the RAM is not saved due to power failure; 0x8002 indicates writing EEPROM to save after power failure.

14-07 can choose to be compatible with two communication address protocols, 0 is the 380 address method, and 1 is the GD address method.

The register address table is as follows:

Address space		Description
Function code	0x0000~0x1F0A	The communication address is represented in hexadecimal. The high 8 bits represent the group number (0-1F), and the low 8 bits represent the group number (0-1F). For example, function codes 10-17 have an address of 0x0A11 (0x0A=10, 0x11=17).
Shutdown/Operation parameter reading and writing	0x1000	Communication setting percentage ratio -10000-10000, corresponding to -100.00~100.00%, negative motor reverse
	0x1001	Operating frequency
	0x1002	Bus voltage
	0x1003	Output voltage
	0x1004	Output current
	0x1005	Output power
	0x1006	Output torque
	0x1007	Operating speed
	0x1008	DI input status
	0x1009	DO output status
	0x100A	AI1 voltage
	0x100B	AI2 voltage
	0x100C	AI3 voltage
	0x100D	Counting value input
	0x100E	Length value input
	0x100F	Load speed
	0x1010	PID given value
	0x1011	PID feedback value
	0x1012	PLC steps
	0x1013	HDI Input pulse frequency (input pulse wave frequency), unit 0.01kHz
	0x1014	Feedback speed (minutes/revolution, rpm)
	0x1015	Remaining running time (minutes, min)
	0x1016	AI1 pre calibration voltage (0.01V)
	0x1017	AI2 pre calibration voltage (0.01V)
	0x1018	AI3 pre calibration voltage (0.01V)
	0x1019	Linear velocity
	0x101A	Current power on time
	0x101B	Current running time
	0x101C	HDI input pulse frequency (relative to maximum frequency), unit: 1Hz
	0x101D	Viewing communication settings
	0x101E	Actual feedback speed
	0x101F	Frequency source A display
	0x1020	Frequency source B display
	0x2000	Communication control command, defined as follows 0x0000: Invalid command 0x0001: Forward running 0x0002: Reverse operation 0x0003: Forward jog 0x0004: Reverse jog 0x0005: 14-00=0 for free parking; 14-00=1 for deceleration parking 0x0006: 14-00=0 for deceleration parking; 14-00=1 for free parking 0x0007: Fault reset

		0x0008: Jog parking
	0x2001	Output terminal function value 23 (Bit0: Y1, Bit1: HDO, Bit2: K1, Bit3: K2) 14-07=0, DO output terminal control 14-07=1, communication set frequency, 0~Fmax, unit: 0.01Hz
	0x2002	14-07=0, AO1 analog output setting (0~0x7FFF corresponds to 0~100%) 14-07=1, PID given, range (0-1000, corresponding to 100.0%)
	0x2003	14-07=0, AO2 analog output setting (0~0x7FFF corresponds to 0~100%) 14-07=1, PID feedback, range (0-1000, corresponding to 100.0%)
	0x2004	14-07=0, HDO high-speed pulse output control (0~0x7FFF corresponds to 0~100%) 14-07=1, torque setting value (-3000~3000, 1000 corresponds to 100.0% of motor rated current)
Fault codes	0x2102	14-07=0 or 1. Refer to "09 Group Fault Record Parameters"
Local identification code	0x2103	14-07=0 or 1. Reserve.
Frequency converter status 1	0x3000	14-07=0 This address is 0x3000 14-07=1 This address is 0x2100 1: Forward 2: Reverse 3: Shutdown 4: Fault 5: Power supply undervoltage
Frequency converter status 2	0x3001	14-07=0 This address is 0x3001 14-07=1 This address is 0x2101 Bit0: 0-Run Not Ready 1-Run Ready Bit3: 0-Asynchronous Motor 1-Synchronous Motor Bit4: 0-No Overload 1-Overload Warning Bit5: 0-Unexcited 1-Excited
Monitoring parameter group	0x7000	See monitoring parameter group function code
Fault codes	0x8000	When 14-07=0, the fault code address corresponds to 0x8000 When 14-07=1, the fault code address corresponds to 0x5000 Refer to the code table of "09 Group Fault Record Parameters".

Attention: The fault code for this communication address will not be saved after power failure, and it will be 0 after the fault clearing operation. If the fault code for power failure protection is read, please communicate and read the "09 Group Fault Record Parameters".

A.8 Communication error response

Communication error code table:

Error code	Name	Description
0x01	Illegal command code	The command code received by the frequency converter is invalid
0x02	Illegal register address	The register address received by the frequency converter is invalid
0x03	Illegal data value	Data value out of range

0x04	The data value cannot be modified	When certain parameters of the frequency converter are not successfully modified, this error code is returned
0x05	User password error	Inconsistent user passwords
0x06	framing error	In a frame of data packet sent by the host, the data length is incorrect or the CRC checksum is incorrect
0x07	Function code value is read-only	The function code of the read-only attribute has been read by the host
0x08	Cannot be modified during operation	When the feature code attribute is not modifiable at runtime, it was written by the host
0x09	User password protection	When the user password is set, the host directly reads and writes the function code without unlocking the password

Communication error command code table:

Error command	Name	Description
0x83	0x03 read error	When an error occurs while reading a command, the command code in the responded data frame changes from 0x03+0x80 to 0x83
0x86	0x06 write error	When there is an error in writing a command, the command code in the response data frame changes from 0x06+0x80 to 0x86
0x90	0x10 read error	When an error occurs while reading a command, the command code in the responded data frame changes from 0x10+0x80 to 0x90

Example:

Host sending: 01 06 00 03 00 05 B9 C9 (function code writing operation 00-03=5)

Frequency converter response: 01 86 04 43 A3

The maximum value of function code 00-03 is 2. When using the 0x06 command code to write 5, the frequency converter will return a communication frame with communication error command code 0x86 and error code 0x04. Writing 00-03=5 fails.

AC/DC Voltage switching function wiring diagram

ADD:

When using photovoltaic voltage and mains voltage simultaneously (i.e. when switching between AC/DC voltage), select parameter 00-19 to the photovoltaic water pump mode. The following is a wiring diagram:

