ENERGY PLUS

Manual

Variador De Frecuencia 2,2kw

Entrada Monofásica Salida Trifásica 220v 10A

WWW.ENERGYPLUSYSTEMS.CL - RUT EMPRESA : 76762149-3 - VIÑA DEL MAR - CHILE
Móvil : +56 9 9218 8218 - Email : ventas@energyplusystems.cl

Perface

Thank you for using AE series frequence converter and the AE series is the general SVC -type frequence converter, which has extensive universal compatibility and is developed based on the new generation microprocessor. The new motor control algorithm makes this type can have powerful low-frequency torque output under the speed sensor-less vector control. The efficient energy conversion rate will create higher value for you and it supports multiform control methods and diversified software adjusting function to meet the your needs for a variety of control situations as much as possible.

This manual contains operating instructions and precautions in using the frequence converter. The improper use may cause unexpected accidents. Please read this manual carefully before the use of the frequence converter and use the frequence converter correctly and hand the manual to the final users. Please do not install, operate, maintain or inspect the frequence inverter before reading the manual and attached data carefully and using it correctly.

If you have any questions or problems in the use of the product, please contact the sales or technical service personnel in your area. We look forward to serving you.

CONTENT

Chapter 1 Model Acceptance 4
1.1 4
1.1.1 Explanation to nameplate 4
1.1.2 Model description 4
1.1.3 Open - package inspection 4
1.1.4 Comprehensive technical characteristics of the frequency converter 5
1.2 7
Chapter 2 Safety Precautions 7
2.1 Safety Precautions 7
2.1.1 Electric shock prevention 7
2.1.2 Fire prevention 8
2.1.3 Damage prevention 9
2.1.4 Moving and installation 9
2.1.5 Wiring 10
2.1.6 Operation 10
2.1.7 Operating 10
2.1.8 Emergency stop 11
2.1.9 Maintenance 11
2.1.10 Disposal after scrap 12
2.2 Use environment requirements 12
Chapter 3 Installation and Wiring 13
3.1 Installation requirements 13
3.2 Wiring requirements 15
3.3.2 Wiring diagram for the peripheral equipment 16
3.3.3 Description of the major loop terminal 18
3.3.4 Description of the major loop wiring 18
3.3.5 Terminal arrangement of the frequence converter control loop 20
3.3.6 Description of control loop terminal 20
Chapter 4 Operation 22
4.1 Operation panel 22
4.1.1 Key function description 23
4.1.2 Indicator light description 25
4.1.3 Nixie tube display content description 25
4.2 Method of parameter modification 26
Chapter 5 List of function parameters 26
Chapter 6 Functional parameters details 44
Chapter 7 Fault definition and treatment method 103
7.1 Fault information and exclusion methods 103
7.2 Common faults and the handling methods 107
Chapter 8 RS485 Communication Protocol of Frequence Converter 107
8.1 Protocol content 108
8.2 Application mode 108
8.3 Bus structure 108

8.4 Protocol description 108
8.5 Communication frame structure 109
8. 6 Command code and communication data description 112
8.6.1 Command code: 03H (0000 0011) 112
8.6.2 Command code: 06H (0000 0110) 114
8.7 Error checking mode of the communication frame 117
Chapter 9 Standard Specification 123
9.1 Specifications and models 123
9.2 Standard technical specifications 125
Chapter 10 Options 126
10.1 Option table 126
10.2 Connection diagram of peripheral option and frequence converter 128
10. 3 Braking resistor model selection 129
10.4 Leakage protector 130
Chapter 11 Maintenance of the frequence converter 130
11.1 Inspection of Project 131
11.1. 1 Daily Inspection 131
11. 2 Dedusting 131
11.3 Replacement of parts 131
11.3.1 Cooling fan 132
11. 3.2 DC filter capacitor 132
11. 3.3 Relay 133
Chapter 12 Quality Commitment 133
Warranty card I 134
Warranty card II 135

Chapter 1 Model Acceptance

1.1

1.1.1 Explanation to nameplate

Model	AEXX-4-3PH11G/15P	
Input	Three-phase380**V**	50/60**Hz**
Outpu t:	Three-phase0-380**V**	25**A**/32**A**
Power:	11KW/15KW	

1.1.2 Model description

AEXX-4-3PH11G/15P		
Product Series		11G: 11KWConstant torque/heavy load
2: 220V		15P: 15KW Variable torque/underloading 1PH:Single-phase
4 : 380V		3PH:Three-phase

1.1.3 Open - package inspection

The frequence converter has strict quality inspection and function testing before delivery and has the package treatments such as anti-vibration and anti-collision and so on. But it is possible to cause accidents to damage the products in transit so please open the package for inspection when receiving the goods. If there is any listed in the following is wrong please contact the dealer or our company in time.

1. To check whether the converter is damaged or the the screw loose in transit;
2. There is one piece of frequence converter in the box and one operation instruction(with a piece of warranty certificate inside) a piece of certificate attached;
3. To check whether the nameplate of the frequency converter is consistent with the product you ordered;
4. To check whether there is any foreign matter in the frequency converter.

1.1.4 Comprehensive technical characteristics of the frequency converter

- Input and output
- ◆ Input voltage range: 380 / 220V ± 15%
- ◆ Input frequency range: 40 ~ 60Hz
- ◆ Output voltage range: 0 ~ rated input voltage
- ◆ Output frequency range: 0 ~ 600Hz (0-2000HZ for V1.15 software version)

- Peripheral interface
- ◆ Programmable digital input: 4-WAY input(8-Way for the digital port input of F103 version)
- ◆ Programmable analog quantity: FV: 0~10V input, FI: 0～20mA input.
- ◆ Open collector output: 1-WAY output
- ◆ Relay output: 1-WAY output
- ◆ AO(analog output) FO : 1-WAY output: 0～10V output

- Technical performance
- ◆ Control mode:SVC, V/F control
- ◆ Over-load ability: 150% of rated current 60s; 180% of rated current 10s
- ◆ Starting torque: SVC: 0.5Hz / 150% (SVC)
- ◆ Speed-regulating ratio: SVC: 1: 100

- Speed control precision: SVC: ± 0.5% maximum speed
- Carrier frequency: 1.0K ~ 15.0KHZ

- Functional characteristic
- Frequency set mode:digital set, analog quantity set, serial communications set, SPD, PID set
- PID control function
- SPD control function: eight-stage speed(16-stage speed for the F103 version)
- Swing frequency control function
- Non-stop function for momentary interruption
- Restarting function of rotational speed tracking: realizing the non-impact of smooth start-up of the motor in rotation
- Automatic voltage regulation function: when the network voltage changes, it can maintain the constant output voltage automatically
- Providing multi-fault protection function: overcurrent, overvoltage, undervoltage, overtemperature, phase loss, output short-circuit, overload, etc.

- Operating environment
- Operating ambient temperature :-15℃to + 50℃
- Operating humidity: 90% RH or less (no condensation)
- Altitude 1000 meters or less above sea level. Over 1000 meters, every 100 meters decreases 3%; Over 2000 meters every 100 meters decreases 5%.
- Other non-corrosive, flammable gases, no conductive dust

1.2

Chapter 2 Safety Precautions

2.1 Safety Precautions

In this manual, the safety levels are classified as "Danger" and "Notice".

▲ Danger

The dangerous situation caused by wrong operation can lead to death or serious injury.

▲ Notice

The dangerous situation caused by wrong operation can lead to general or minor injury or damage to the object's hardware.

Notice: The matters of "Notice" level may also cause serious consequences depending on the situation. Please follow the matters of these two levels because they are important for personal safety.

2.1.1 Electric shock prevention

Danger
1) Do not open the coverplate when the power is on or in running. Or there may be an electric shock. 2) Do not operate the frequence converter when the cover plate is removed. Otherwise, there may be an electric shock because touching the high voltage terminal and the charging part . 3) Do not remove the coverplate except for wiring and regular checking even if the power is off. Otherwise, there may be an electric shock because touching the charging circuit of frequence converter.

4) Please wire or check 10 minutes after turning off the power. Carry out the wiring or checking after the remaining voltage disappearing to be checked with a multimeter.
5) The frequence converter should be grounded. (There may be 30-150V induction If not ground.)
6) The works, including operations or inspections, should be carried out by professional technical personnel.
7) The wiring should be after the installation, otherwise it will cause electric shock or injury.
8) Do not operate the frequence converter with wet hands to prevent electric shock.
9) For cables, do not damage it, make it carry heavy objects or press it, otherwise there may be short circuit or electric shock .
10) Do not replace the fan during power failure, otherwise there may be the dangerous situations.

2.1.2 Fire prevention

Notice

Please install the frequence converter on the noncombustible object and the direct installation on the combustible materials or near the combustible materials will cause fire.
When the frequence converter fails, please disconnect the power on the input power side of the frequence converter. Or there may be continuous high current passing through to cause fire.
Do not connect the DC terminal DC + and DC terminal DC - with the resistance, otherwise there may be a fire.

2.1.3 Damage prevention

Notice

1) The applied voltage on each terminal just can be the voltage specified in the manual (to prevent cracking, damage, etc.).

2) Make sure the cable is connected to the correct terminal, otherwise there may be the accidents such as cracking, damage, etc.

3) Should always ensure that the positive and negative polarity is correct to prevent cracking, damage and so on.

4) Do not touch it soon after power on or off because the temperature of the frequence converter is too high to cause burns.

2.1.4 Moving and installation

Notice

1) Please use the lifting tool correctly to prevent damage during moving the product.

2) The stacking level of the frequence converter should not be higher than the limited levels.

3) Confirming that the installation location and the object can withstand the weight of the frequence converter. The installation should follow the instructions in the manual.

4) Do not operate it if the frequence converter is damaged or has some components missed.

5) Do not hold the coverplate when moving to cause falling off.

6) Do not press the weight on the frequence converter.

7) Checking whether the frequence converter is installed in the correct direction.

8) Preventing the metal devices such as the screws or combustible objects such as paint from entering into the frequence converter.

9) Do not make the frequence converter fall off or subject to strong collision.

2.1.5 Wiring

Notice

1) The non-professionals are not allowed for wiring.

2) The output end frequence converter should not be installed with phase-shifting capacitor, noise filter or surge absorber and can not be connected with resistance load.

3) Please connect the cables U,V, W between the output end and the motor correctly, which will determine the direction of rotation of the motor.

2.1.6 Operation

Notice

1) Checking all parameters and confirm that sudden starting will not cause mechanical damage.

2) Do not operate the frequence converter under cases that the coverplate is removed or part of it is open. The frequence converter must be operated followed by the

2.1.7 Operating

Notice

1) When the restart facility is used, it will restart suddenly due to the alarm stop. Please keep away from the device.

2) Please confirm that the activating signal is disconnected before reset frequence converter alarming. Or the motor will suddenly restart.

3) The service load is only for the phase squirrel-cageinduction motor and the connection of other electrical equipment to the output of the frequence converter may damage the device.

4) Do not modify the frequence converter.

5) The electronic over-current protection can not completely ensure the thermal

protection of the motor.

6) Do not use the AC contactor frequently start/ stop the frequence converter.

7) Using the noise filters to reduce the effects of electromagnetic interference. Otherwise, it may affect the electronic equipment used near the frequence converter.

8) Taking appropriate measures to suppress the harmonics, otherwise, the power capacitor and power generation assembly will be overheated and damaged due to the supply harmonic produced by the frequence converter.

9) When the frequence converter drives the 380V series motor, it is necessary to enhance the motor insulation or suppress the surge voltage. The surge voltage caused by the wiring constant occurs at the terminal of the motor, which makes that the insulation of the motor is deteriorated.

10) All parameters are returned to the factory settings after the initialization of the parameters and the necessary parameters are set again before the operation.

11) The frequence converter can be easily set up for high-speed operation. Checking that the motor and mechanical performance have sufficient capacity before changing the settings.

12) Please adding the protection function of the frequence converter and installing the protective equipment to ensure the safe operation.

13) The frequence converter must be checked and commissioned before using after a long time preservation.

2.1.8 Emergency stop

Notice

If the frequence converter fails, please set the safety devices such as emergency braking etc. to prevent the machinery and equipment from being in danger.

2.1.9 Maintenance

Notice

1) Removing all thewires on the terminals of the frequence converter before measuring the insulation of the external circuit with a megger then the measuring voltage will not be applied to the frequence converter.
2) Please use the multimeter (high barrier) rather than the megger or buzzer for the switching test of the control loop.
3) Please only measure the insulation resistance of the major loop of the frequence converter but not to meausre the control loop with the tramegger. (Please use the tramegger with DC 500V.)
4) Do not carry out the high-voltage insulation test on the frequence converter.(The major loop of the frequence converter uses the semiconductor which may be damaged if there is the high-voltage insulation test on it.)

2.1.10 Disposal after scrap

Notice

Please treat it as the industrial waste but not discard it directly for environmental protection.

2.2 Use environment requirements

Note that this product does not have the explosion-proof characteristics, so this device shall not be used in the flammable and explosive gases or objects!!

Operating ambient temperature: -10 ℃to +45 ℃(no icing)
Operating environment humidity: 90% RH or less (no condensation)
Altitude 1000 meters or less above sea level with less than 5G. Over 1000 meters, every 100 meters decreases 3%; Over 2000 meters every 100 meters decreases 5%.
If used in the occasions with much dust and oil, please protect and clean it regularly and check the operation of the cooling fan.
It is not allowed to be stored or installed in an environment where there is smoke,

high temperature, radiation, strong vibration, raining, oil, dust or corrosive gases.

Chapter 3 Installation and Wiring

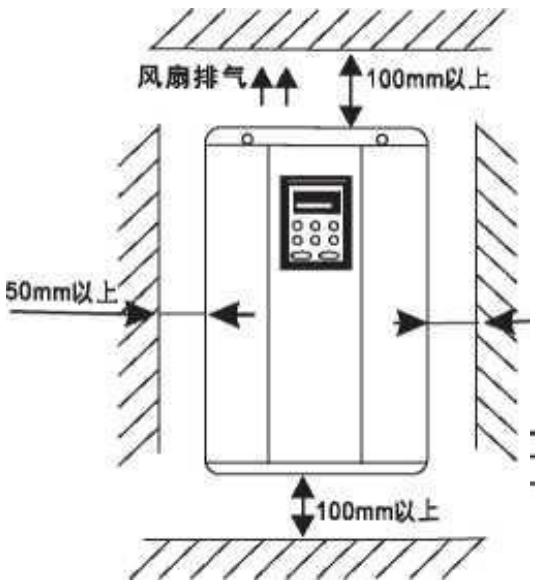
This chapter is the basic "installation and wiring" of the product so please read the precautions in this chapter carefully before use.

3.1 Installation requirements

1. As the frequence converter belongs to sophisticated power electronic products so the site installation and the environment directly affect the normal operation and life of the frequence converter. So the requirements are as follows: Checking whether the environment of the the installation location of the frequence converter is consistent with the Chapter 1 "use environment requirements" of this manual. If not, please do not install it or will damage the frequence converter.
2. Please do not use much force on the coverplate due to the plastic parts used in the frequence converter and be careful for the installation to avoid damage.
3. If possible, please install the back of the frequence converter or the heat sink to the outside of the cabinet, which can can significantly reduce the temperature generated in the cabinet.
4. Please install the frequence converter in a clean place as much as possible or inside the closed flat plate which can stop any suspended materials.
5. The frequence converter shall be installed on the mounting plate vertically and firmly with the screws.
6. Note the cooling method of the frequence converter installed in the electric control cabinet: please pay attention to the correct installation location when two or more frequence converter and ventilation fan was installed in one electric control cabinet to ensure that the temperature around the frequence converter is in the allowed values. If the installation position is not correct, the temperature around the frequence

converter will increase to reduce the ventilation effect.

7. Please install it on the non-flammable surfaces. The frequence converter may reach a very high temperature (roughly 80℃)
Please install it on the non-flammable surfaces (eg metal), and at the same time, there should be enough space around to make the heat to be distributed easily (see Attachment).



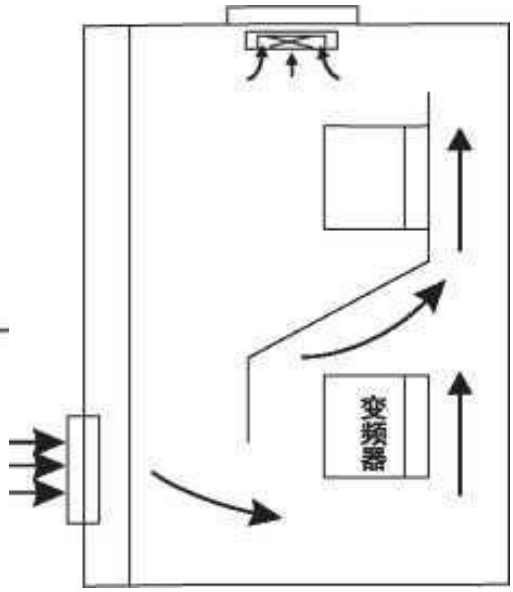


Figure 3-2 Installation distance Figure 3-3 Installation of multiple frequence converters

The deflector shall be applied in the middle if the two frequence converter are installed up and down.

3.2 Wiring requirements

1. Please separate the power cord from the control cable during the wiring, such as using a separate trunking etc. If the control circuit must be intersected with the power cable, they should be wired in 90°.

2. Please make sure the place not shielded as short as possible when the shielded conductor or twisted-pair is used to connect the control circuit. If possible, the cable bushing should be used.

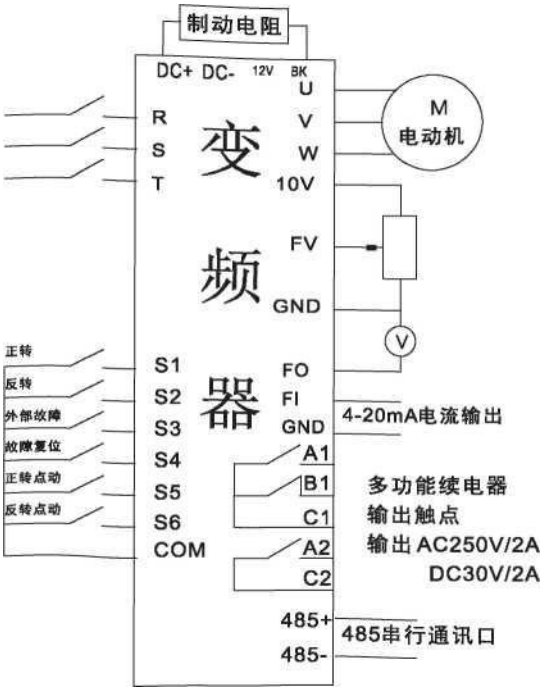
3.The parallel wiring and cluster wiring of the power line(output input line) of the frequence converter and the signal line should be avoided, which should be wired dispersedly.

4.The connecting wire of the detector, the signal line for control use the twisted shielded pair and the outside of the shielded wire is connected to the COM side.

5. The grounding wire of the frequence converter, motor, etc. shall be connected to the same point.

6. A data line filter shall applied on the signal line.

7. The connecting wire of the detector and the shielding layer of the signal line for control shall be grounded with the cable metal tongs.

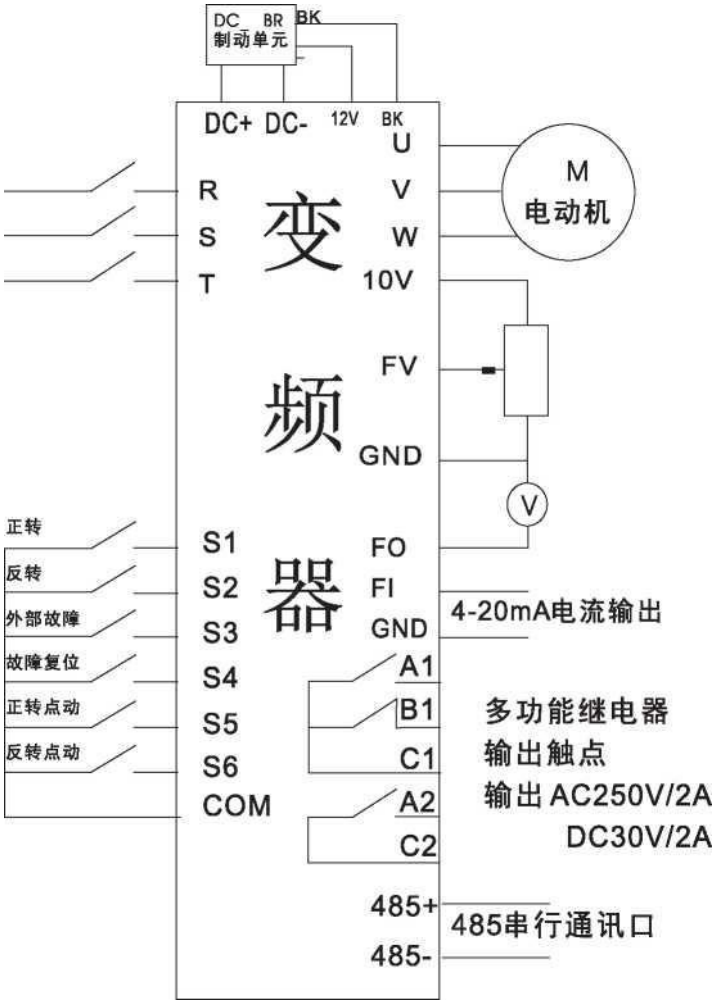


Three-phase Input Power supply

Wiring diagram for the frequence converter under 30KW of FE model.

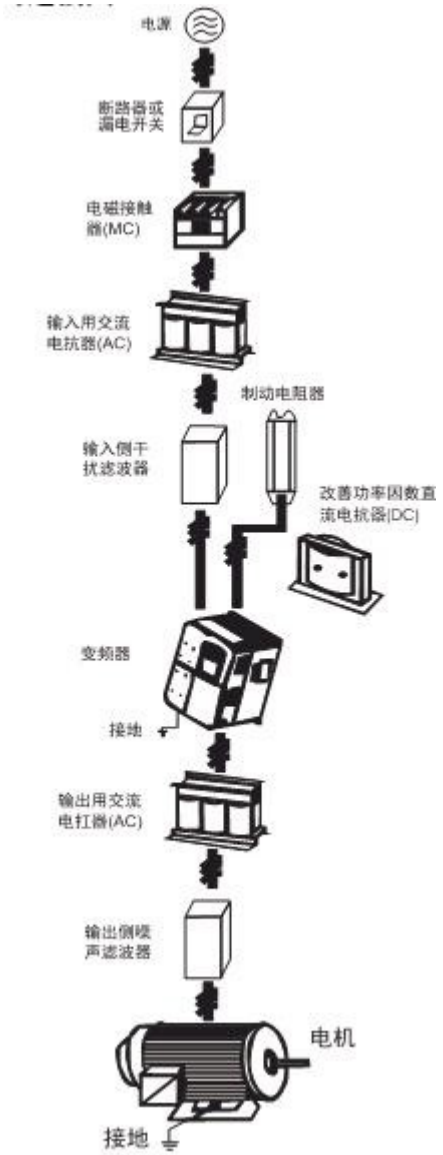
(Single-phase frequence converter power input is connected with R, T)

Brake resistor



Wiring diagram for the frequence converter over 30KW of FE model.

3.3.2 Wiring diagram for the peripheral equipment



Power supply

Interference filter of the input side

Frequency converter

Grounding connection

AC electric reactor for the input

AC electric reactor for the output

Interference filter of the output side

Circuit breaker or leakage switch

Motor

Ground connection

3.3.3 Description of the major loop terminal

Terminal marking	Terminal name	Description
R,T single-phase	AC INPUT	Connecting with the frequency power supply, single-phase AC220V 50-60HZ three-phase AC230V or 380V 50-60HZ
R,S,T		
U,V,W	Frequence converter output	Connecting with the three-phase squirrel-cage motor
DC+, PB	Connecting with brake resistor	Connecting with the braking resistor between DC + and PB (18.5KW or less)
DC+, DC-	Connecting with brake unit	Connecting with external brake unit (18.5KW to 55KW or less)
DC+, PI	Connecting with AC electric reactor	Disconnecting the connector between the terminals PI and DC + connecting with the AC electric reactor (75KI and above)
	Ground connection	The frequence converter should be grounded.

3.3.4 Description of the major loop wiring

1. For the crimping terminals of the power and motor wiring, please used the terminals with insulation tube.
2. Remember that the power supply must not be connected to the frequence converter output terminals (U, V, W), otherwise the frequence converter will be damaged.

3. After wiring, piecemeal thread residue must be cleaned up. The piecemeal thread residue may cause abnormality, malfunction and failure, which must be kept clean all the time. When the control console is punched, please not let the fragments and dust enter into the frequence converter.

4. In order to reduce the voltage within 2%, please use the appropriate type of cable wiring. When the wiring distance between the frequence converter and the motor is long, the torque in the motor will reduce due to the decrease of the voltage of the main circuit cable, especially in the case of low frequency output.

5. When the distance between the frequence converter and the motor exceeds 50 m, the frequency converter is prone to have overcurrent protection due to the excessive leak current caused by the parasitic capacitance of the long cable on the ground. At the same time, in order to avoid damage to the motor insulation, the output terminal shall be applied with the output reactor compensation.

6. It is recommended to connect the brake resistor option between the DC + and BK- terminals.

7. Electromagnetic interference: please install the radio noise filter at the input terminal to minimize the interference in the occasions with high requirements due to that the frequence converter inout and output loop have harmonic component.

8. Do not install a power capacitor at the output terminal of the frequency converter, which may cause the failure of the frequence converter or damage to the device.

9. After running, please change the wiring operation, which should be carried out over 10 minutes after the poer off and checking the voltage with a multimeter. The capacitor still has dangerous high pressure after the power off for a period of time.

10. Ground terminal must be grounded.

▲ Due to there is the leakage current in the frequence converter, the frequence converter and motor must be grounded to prevent electric shock.

▲The frequence converter is grounded with independent grounding terminal. (do not use screws in the shell, chassis, etc. to replace it).

▲ The grounding cable should be the thick wire diameter as far as possible. The ground wire shall be as close as possible to the frequence converter, and the ground

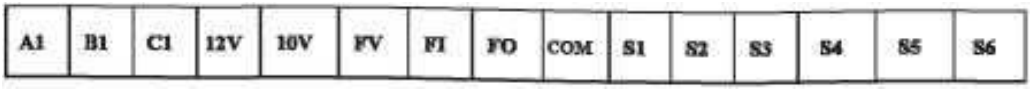
wire shall as short as possible.

▲ The motor which is grounded in the frequence converter side uses one of the four-core cable to ground and the specifications are the same with the input cable.

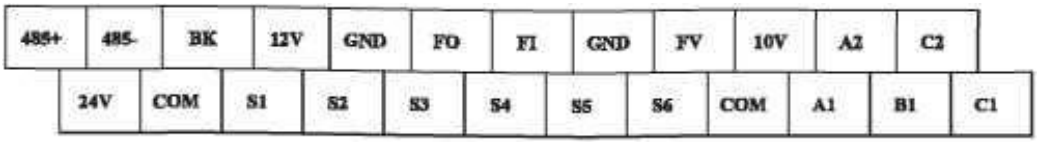
3.3.5 Terminal arrangement of the frequence converter control loop

Note: COM terminal of FA model is also the ground signal side (GND) analog signal and forms the power supply with 10V, 12V.

Terminal of control loop of the FA mode



Terminal of control loop of the FE mode



3.3.6 Description of control loop terminal

Terminal marking	Terminal name	Description
Al, Bl, C1	J1, J2 contact output of the relay	Al, C1 are for the normally open contact group; Bl. C1 are for the normally closed contact group' A2, C2 are for the normally open contact group;J1 factory value is the signal output of forward running state; J2 factory value is signal output of fault status.
A2, C2		
12V.GND	12V output of the auxiliary power supply (APS)	DC power supply 12V output (≤ 50mA)
12V3K	Brake signal output	Used to connect the external brake unit
+485-	Serial communication terminal	The terminal have the serial communication with the external

10V	Power supply for frequency setting	Providing power supply for the external potentiometer (4.7K-10K)
FV.GND	Analog signal input terminal	Connecting with potentiometer or 0-10V signal, to be as the frequency setting, HD setting or PID feedback
FI,GND	Analog signal input terminal	Inputting 0-20mA signal, to be as frequency setting, PID setting or PID feedback
FO,GND	Analog signal output terminal	Outputting 0-10V signal, can be connected with the DC10V voltmeter and used to indicate the operating frequency, output voltage, output current etc.; Can switch the switches and output the 0 ~ 20mA current signal
S1	Multi-function input terminal 1	The factory setting is forward running
S2	Multi-function input terminal 2	The factory setting is reverse running
S3	Multi-function input terminal 3	The factory setting is external fault input
S4	Multi-function input terminal 4	The factory setting is fault reset
S5	Multi-function input terminal 5	The factory setting is normal inching turning
S6	Multi-function input terminal 6	The factory setting is reverse inching turning
COM	Common terminal of multi-function input	Common grounding for the S1-S6 and used with the S1-S6 .

	terminal	
24V,COM	24V output of the auxiliary power supply (APS)	DC power supply 24V output (≤ 50mA)

Note:

1) The terminal COM is the common terminal of the S1-S6 digital control signal (multi-function input terminals). The terminal GND is the common terminal of the FV, FL FO and BK terminals. Do not connect them to the ground.

2) The wiring of the control loop terminals should be shielded or twisted pair, and must be wired with the main loop and the strong current loop separately.

3) It is suggested to use the 0.75 square millimeter cable wiring for the control loop.

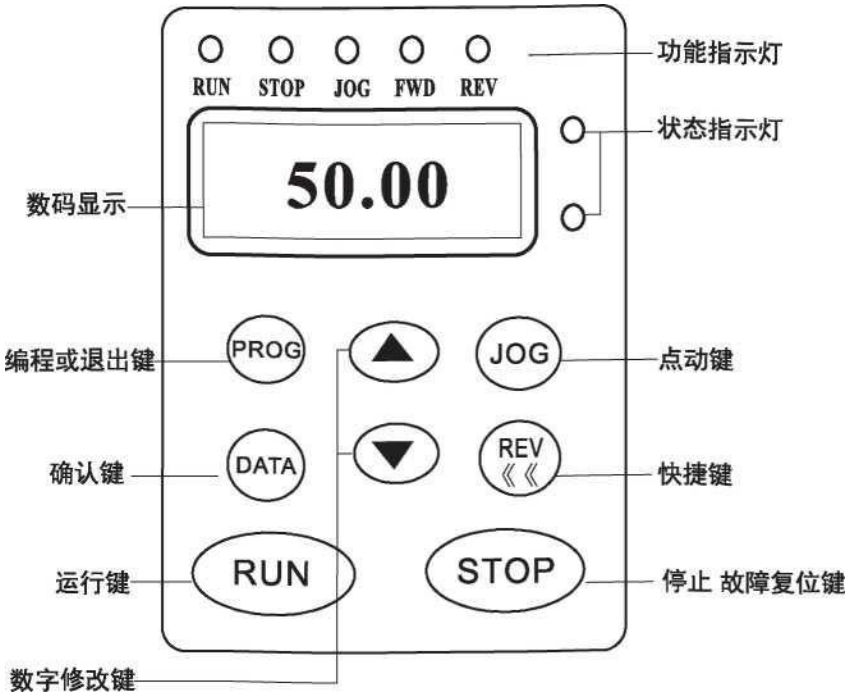
4) The control loop can not be input the strong current, otherwise it will damage the frequence converter.

Chapter 4 Operation

This chapter provides the basic operation description so please read this chapter content carefully before using the device.

4.1 Operation panel

The operation panel is the interface of man-machine communication, which is composed of key part and display part. The key is for the users to input the control instruction and the display part shows the parameter data and different operation status. The schematic diagram is shown below:



4.1.1 Key function description

Signs	Key name	Function description
RUN	'run' key	The frequence converter start to operate when pressing this key and this key can be as the shift key in the programming state. When it is set to be controlled by the external terminal, this key is invalid.
JOG	“jog” key	Pressing this key for jog and the positive and negative rotation will switch when P~082=l.
STOP	“stop/reset” key	The frequence converter will stop when pressing this key and this function is limited by P-083. After the failure warning, pressing this

		key for system reset.
PROG	programming key	Pressing this key to enter into the function set state and pressing this key to exit the function set state after the modification.
DATA	Enter key	Pressing this key to confirm the function code in the programming state and pressing this key to save the modified data after the modification of the parameter content# Pressing the key to display the operating frequency, bus voltage, output voltage, output current, rotation speed, output power, etc in order in ready mode or running mode; Note: in the programming state, long pressing this key and entering into or exiting the programming when loose the key.
▲	Multiply Key（up）	In programming mode, pressing this key to increase the data of function code and parameter data. Pressing this key to increase the operating frequency in the state of running or standby.
▼	Minus Key(down)	In programming mode, pressing this key to decrease the value of function code and parameter data.

		Pressing this key to decrease the operating frequency when the parameter is in the state of running or standby.
«/REV	Shift key	The shifting can be carried out to modify the parameter data in the programming state.

4.1.2 Indicator light description

Indicator light name	Indicator light description
Run	Running indicator light light bright indicates in the running status
Stop	Stop light light bright indicates in the halted state.
JOG	Jog light light bright indicates in the jog state
FWD	Forward indicator light bright indicates in the forward turning state
REV	Reverse indicator light bright indicates in the reverse turning state

4.1.3 Nixie tube display content description

No.	Physical quantity	No.	Physical quantity
H	Setting frequency	F	Running frequency
U	Bus voltage	u	Output voltage
A	Output current	r	Operating

			rotational speed
G	Output power	d	Output torque
y	PID set value	l	PID feedback value
b	Input terminal state	o	Output terminal state
c	Analog quantity FV value	E	Analog quantity FI value
h	Current number of segments of SPD	J	Count value

Note: the setting frequency HXX.XX will flash in standby mode but not flash in running.

4.2 Method of parameter modification

If the parameter need to be modified, the first is to enter into the function code need to be modified and then to reset the parameters values. The specific steps are as follows:

Ord	Operation	Description
1	Pressing the	Displaying P-0Q0, entering the parameter setting
2	Pressing the	Adjusted to the function code need to be modified
3	Pressing the	Displaying XXXX, entering the parameter
4	Pressing the	Resetting the parameter values as needed
5	Pressing the	Storing the data, and then displaying the function
6	Pressing the	Pressing this key to exit the setup state and

Note: During the modification process, the use of shift key can reach the target value quickly.

Chapter 5 List of function parameters

Description of the list of function parameters

In the column of modification of the list of function parameters

√ indicates that the function can be modified during operation;

X indicates that the function can not be modified during operation;
◎indicates that the users can not modify this function

Function	Parameter	Detailed description	Factory	Modification
P-000	Start command	0: keyboard 1: Terminal 2: Comunication (ModBus)	0	X
P-001	Motor control mode	0: SVC (vector control) 1: V/F control	1	X
P-002	Keyboard and terminal UP/DOWN setting	0: Store data after power off 1: Data not stored after power off 2: No function	0	√
P-003	Frequency command	0: Keyboard 1: Analog FV 2: Analog FI 3: FV + FI 4: Reserved 5: PID control 6: ModBus 7: Panel potentiometer	0	√
P-004	Max output frequency	10. 00～600. 00Hz	50.0	X
P-005	Operating frequency limit	P-006~P-004 (maximum frequency)	50.0	√
P-006	Frequency lower limit	0.00Hz～P-005	00.0	√
P-007	Acceleration	0.1 ～ 3600. 0s	Mod	√
P-008	Deceleration	0.1 ～ 3600. 0s	Mod	√
P-009	Keyboard set frequency	0.00Hz~P-004 (maximum frequency)	50.0	√
P-010	Motor rotating direction	0: Default rotating direction 1: Oposite rotating direction 2: Reverse run is prohibited	0	X
P-011	Carrier frequency	1. 0～15.0kHz	Mod	√
P-012	Functional parameter recovery	0: No operation 1: Restore to factory value (except motor parameters) 2: Clear fault file 3: Reserved 4: Restore all parameters to factory values (including motor parameters)	0	X
P-013	Motor parameter self-learning	0: No operation 1: Dynamic self-learning 2: Static self-learning		X

Function code	Parameter	Detailed description	Factory	Modification
P-014	AVR function selection	0: No action 1: Action all the time 2: No action only during deceleration 3: Automatic adaptation	2	√
P-015	Start running mode	0: Direct start 1: First brake and then start 2: Start by revolving speed tracking	0	X
P-016	Starting frequency	0.00～10.00Hz	0.00Hz	√
P-017	Starting frequency duration time	0.0～50.0s	0.0s	√
P-018	DC braking current when starting	0.0 ～150,0%	0.0%	√
P-019	Braking time	0.0～50.0s	0.0s	√
P-020	Stop mode selection	0: Deceleration stop 1: Free stop	0	√
P-021	Deceleration stop holding frequency	0: 0.00~P-004 (Maximum frequency)	0.00Hz	√
P-022	Stop brake waiting time	0.0～50.0s	0.0s	√
P-023	Stop DC braking current	0.0 ～150.0%	0.0%	√
P-024	Stop DC braking time	0.0～50.0s	0.0s	√
P-025	Positive and reverse rotation dead time	0.0～3600.0s	0.0s	√
P-026	Power-on terminal operation protection selection	0: Terminal running command is invalid when powering up 1: Terminal running command is effective when powering up	0	√
P-027	Action selection for frequency lower then the lower limit	0: Operating at the lower limit frequency 1: Stop 2: Zero speed operation	0	X
P-028	Type of inverter mode	0: G type 1: P type	Model setting	X
P-029	Motor rated power	0.4 ～900.0 kw	Model	X
P-030	Motor rated frequency	0.01Hz～P-004 (maximum frequency)	50.00Hz	X
P-031	Motor rated speed	0～36000rpm	Model setting	X
P-032	Motor rated voltage	0 ～460V	Model setting	X
P-033	Motor rated current	0.1 ～2000.0A	Model setting	X
P-034	Motor statorresistance	0.001 ～65.535 Ω	Model setting	X
P-035	Motor rotor resistance	0.001 ～65.535 Ω	Model setting	X
P-036	Motor stator/rotor inductance	0.1 ～6553. 5mH	Model setting	X

P-037	Motor stator/ rotor mutual inductance	0. 1 ～ 6553_5mH	Model setting	√
P-038	Motor no-load current	0. 01 ～ 655. 35A	Model setting	√
P-039	Speed loop proportio nal gain 1	0 ～ 100	15	√
P-040	Speed loop integral time 1	0.01 ～ 10. 00s	2,00s	√
P-041	Switch low frequency	0. 00Hz ～ P-044	5.00Hz	√
P-042	Speed loop proportional gain 2	0 ～ 100	10	√
P-043	Speed loop integral time 2	0.01 ～ 10. 00s	3.00	√
P-044	Switching high frequency	P-041～P-004 (maximum frequency)	10. 00Hz	√
P-045	VC slip compensation coefficient	50%～200%	100%	√
P-046	Torque upper limit	0,0~200,0% (frequence converter rated current)	150.0%	√
P-047	V/F curve setting	0: Straight line V/F curve 1: 2.0 power-down torque V/F curve	0	X
P-048	Torque boost	0.0%: (automatic) 0.1%~30.0%	0.0%	√
P-049	Torque boost off	0,0%～50,0% (relative motor rated frequency)	20.0%	X
P-050	V/F slip compensation limit	0. 0～200. 0%	0.0%	√
P-051	Energy-saving operation	0: No-action 1: Automatic energy-saving operation	0	X
P-052	Reserved			◎
P-053	S1 terminal function	0: No-function 1: Forward run 2: Reverse run 3: Three-wire operation control 4: Forward jog 5: Reverse jog 6: Free stop (without deceleration) 7: Fault reset 8: External device fault input 9: Frequency increment command 10: Frequency decrement command 11: Frequency increment / decrement clear 12: Multi-step speed control terminal 1 13: Multi-step speed control terminal 2 14: Multi-step speed control terminal 3 15: Acceleration/deceleration selection 1 16: Acceleration/deceleration selection 2 17: Acceleration/deceleration selection 3 18: Closed loop failure 19: Swinging frequency stoping 20: Swing frequency reset 21: Acceleration / deceleration inhibit Command	1	X
P-054	S2 terminal function		2	X
P-055	S3 terminal function		8	X
P-056	S4 terminal function		7	X
P-057	S5 terminal function		4	X

P-058	S6 terminal function	22: Terminal shutdown 23: Temporary clearing of frequency change setting 24: Terminal counting 25: Clearing of terminal counting	5	X
P-059	Switch filter count	1～10	5	√
P-060	Terminal control mode	0: two-wire control 1 1: two-wire control 2 2: three-wire control 1 3: three-wire control 2	0	X
P-061	Terminal UP/DOWN frequency change rate	0.01 ～50.00 Hz/s	0.50 Hz/s	√
P-062	FV lower limit	0.00V～10.00V	0,00V	√
P-063	Corresponding setting of FV lower limit	-100.0%～100.0%	0.0%	√
P-064	FV upper limit	0.00V～10.00V	10,00V	√
P-065	Corresponding setting of FV upper limit	-100.0%～100.0%	100.0%	√
P-066	FV input filtering time	0. 00s～10, 00s	0.10s	√
P-067	FI lower limit	0.00V～10.00V	0,00V	√
P-068	Corresponding setting of FI lower limit	-100.0%～100.0%	0.0%	√
P-069	FI upper limit	0.00V～10.00V	10,00V	√
P-070	Corresponding setting of FI upper limit	-100.0%～100.0%	100.0%	√
P-071	FI input filtering time	0. 00s～10, 00s	0.10s	√
P-072	Relay J1 output selection	0: No output 1: The motor is in forward running 2: The motor is in reverse running 3: Fault output 4: Frequency level detecting the FDT output 5: Frequency arrivals 6:Zero speed operation 7: Upper limit frequency arrival 8: Lower frequency arrivals 9: Non-zero speed operation 10: Auxiliary pump 1 11: Auxiliary pump 2 12: Count to 13: Count to early warning 14: In operation	1	√
P-073	Relay J1 output selection		3	√
P-074	F0 output selection	0: Running frequency 1: Setting frequency 2: Running speed 3: Output current 4: Output voltage 5: Output power 6: Output torque 7: Analog FV input value	0	√

		8: Analog FI input value 9-10: Reserved		
P-075	F0 output lower limit	0%～100.0%	0.0%	√
P-076	Lower limit corresponds to F0 output	0.00V ～10.00V	0.00V	√
P-077	F0 upper output	0%～100.0%	100.0%	√
P-078	Lower limit corresponds to F0 output	0.00V ～10.00V	10.00V	√
P-079	User password	0～65535	0	√
P-080	Keyboard UP/DOWN frequency accumulation	0: Accumulation function is off 1: Accumulation function is on	1	X
P-081	Keyboard UP/DOWN Single step	0. 00 ～10.00Hz	0.01Hz	√
P-082	JOG key function selection	0: Jog 1: Forward / reverse rotation 2: Clear UP/DOWN setting	0	X
P-083	STOP button / stop function selection	0: Valid only for panel control 1: Valid for panel and terminal control at the same time 2: Valid for both panel and communication control 3: Valid for all control modes	0	√
P-084	Keyboard UP/DOWN step	0.00～10.00Hz	0.01Hz	√
P-085	Parameter selection for operating status display	0~0xFFFF BIT0: Operating frequency F BIT1: Set frequency H BIT2: Bus voltage U BIT3: Output voltage u BIT4: Output current A BIT5: Operating speed r BIT6: Output power G BIT7: Output torque d BIT8: PID reference y BIT9 : PID feedback value L BIT10: Input terminal status b BIT11: Output terminal status o BIT12: Analog FV value e BIT13: Analog value FI value E BIT14: Multi-speed current segment number h BIT15: Count value J	03FF	√
		0 to 0xFFFF BIT0: Set frequency H BIT1: Bus voltage U BIT2: Input terminal status b BIT3: Output terminal status o BIT4: PID reference value y BIT5: PID feedback value L		

P-086	Parameter selection for shutdown status display	BIT6: Analog FV value e BIT7: Analog value FI value E BIT8: multi-speed current segment number h BIT9: count value J BIT10~BIT15: reserved	00FF	√
P-087	Reserved	/	/	/
P-088	Radiator temperature	0～100.0°C		◎
P-089	Software version	1.00 ～9.99		◎
P-090	Accumulated running time	0～65535h	0	◎
P-091	The first two fault types	0~24 0: no fault 1: reserved 2: Reserved 3: Reserved 4: Accelerated overcurrent (OC1) 5: Deceleration over current (OC2) 6: Constant speed over current (OC3) 7: Accelerated overvoltage (OU1)		◎
P-092	The previous time	8: Deceleration overvoltage (OU2) 9: Constant speed overvoltage (OU3) 10: Bus undervoltage fault (UV) 11: Motor overload (OL1) 12: Inverter overload (OL2) 13: Reserved 14: Output side phase loss (SPO) 15: Protect seedlings 16: Inverter overheating (0H2)		◎
P-093	Current fault type	17: External fault (EF) 18: Communication failure (CE) 19: Current detection fault (ItE) 20: Motor self-learning fault (tE) 21: EEPROM Operation Fault (EEP) 22: PID Feedback Wire Break Fault (PIDE) 23: Reserved 24: Reserved		◎
P-094	Current fault operating frequency		0. 00Hz	◎
P-095	Current fault output current		0.0A	◎
P-096	Current fault bus voltage		0.0V	◎
P-097	Current fault input terminal status		0	◎
P-098	Current fault output terminal status		0	◎
P-099	Jog frequency	0.00～P-004 (Maximum Frequency)	5.00Hz	√
P-100	Jog acceleration time	0.1 ～ 3600.0s	Model setting	√
P-101	Jog deceleration time	0.1 ～ 3600.0s	Model setting	√
P-102	Jump frequency	0.00～P-004 (Maximum Frequency)	0.00Hz	√
P-103	Jump frequency range	0.00～P-004 (Maximum Frequency)	0.00Hz	√

P-104	Swing frequency range	0.0～100.0% (Relative set frequency)	0.00%	√
P-105	Kick frequency amplitude	0.0～50.0% (relative swing frequency range)	0.00%	√
P-106	Swing frequencyrise time	0.1 ～ 3600.0s	5.0s	√
P-107	Swing frequency fall time	0.1 ～ 3600.0s	5.0s	√
P-108	Fault automatic reset number	0～3	0	√
P-109	Fault automatic reset interval setting	0.1 ～100.0s	1.0s	√
P-110	FDT level detection value	0.00～P-004 (Maximum Frequency)	50.00Hz	√
P-111	FDT hysteresis detection value	0.0 ～100.0% (FDT level)	5.00%	√
P-112	Frequency amplitude detection	0.0～100.0% (Maximum Frequency)	0.00%	√
P-113	Brake threshold voltage	115.0~140.0% (standard bus voltage) (380V series)	130.00%	√
		115.0~140.0% (standard bus voltage) (220V series)	120.00%	
P-114	Rotating-speed coefficient display	0.1～999. 9% (Mechanical RPM = 120 * operating frequency * (P-114) / motor pole number)	100.00%	√
P-115	PID given source options	0: Keyboard (P-116) 1: Analog Channel FV 2: Analog Channel FI 3: Remote Communication 4: Multistage 5: Local Potentiometer Setting	0	√
P-116	Keyboard preset PID	0.0～100.0%	0.00%	√
P-117	PID feedback source selection	0: analog channel FV feedback 1: analog channel FI feedback 2:FV+FI feedback 3: remote communication feedback	0	√
P-118	PID output feature selection	0: PID output is positive 1: PID output is negative	0	√
P-119	Proportional gain (Kp)	0.00 ～100.00	1.0	√
P-120	Integral time (Ti)	0.00 ～10.00s	1.00s	√
P-121	Derivative time (Td)	0.00 ～10.00s	0.00s	√
P-122	Sampling period (T)	0.01 ～100.00s	0.10s	√
P-123	PID control deviation limit	0.0 ～100.0%	0.00%	√
P-124	Feedback disconnection detection value	0.0 ～100.0%	0.00%	√
P-125	Feedback break detection time	0.0 ～ 3600.0s	1.0s	√
P-126	Zero frequency	-100.0～100. 0%	0.00%	√
P-127	First frequency	-100.0～100. 0%	0.00%	√
P-128	Second frequency	-100.0～100. 0%	0.00%	√
P-129	Third frequency	-100.0～100. 0%	0.00%	√
P-130	Fourth frequency	-100.0～100. 0%	0.00%	√
P-131	Fifth frequency	-100.0～100. 0%	0.00%	√

P-132	Sixth frequency	-100.0～100. 0%	0.00%	√
P-133	Seventh frequency	-100.0～100. 0%	0.00%	√
P-134	Motor overload protection	0: no protection 1: General Motors (with low speed compensation) 2: variable frequency motor (without low speed compensation)	1	X
P-135	Motor overload protection current	20.0% ~ 120.0% (motor rated current)	100.00%	√
P-136	Frequency drop	70.0~110. 0% (standard bus voltage)	80.00%	√
P-137	Instant power-off frequency decrease rate	0.00Hz ~ P-004 (maximum frequency)	0. 00Hz	√
P-138	Overvoltage stalling protection	0: Prohibited 1: Allowed	0	√
P-139	Overvoltage stalling protection voltage	110%～150% (380Vseries)	120.00%	√
		110%～150% (220Vseries)	115.00%	
P-140	Auto-current-limit level	100～200%	160%(G) 120%(P)	√
P-141	Frequency drawdown ratio for current limit	0.00～100. 00Hz/s	10. 00Hz/s	√
P-142	Local communication address	1 ~ 247, 0 is the broadcast address	1	√
P-143	Communication baud rate setting	0： 1200BPS 1： 2400BPS 2： 4800BPS 3： 9600BPS 4： 19200BPS 5： 38400BPS	3	√
P-144	Data bit validation	1: Even parity (E, 8,1) for RTU 2: Odd parity (0, 8,1) for RTU 3: No parity (N, 8,2) for RTU 4: Even parity (E, 8,2) for RTU 5: Odd parity (0, 8,2) for RTU 6: No parity (N, 7,1) for ASCII 7: Even parity (E, 7,1) for ASCII 8: Odd parity (0, 7,1) for ASCII 9: no parity (N, 7,2) for ASCII 10: Even parity (E, 7,2) for ASCII 11: odd parity C0, 7,2) for ASCII 12: No parity (N, 8,1) for ASCII 13: Even parity (E, 8,1) for ASCII 14: Odd parity (0, 8,1) for ASCII 15: no parity (N, 8,2) for ASCII 16: Even parity (E, 8,2) for ASCII 17: Odd parity (0, 8,2) for ASCII	0	√
P-145	Communication response delay	0~200ms	5ms	√
P-146	Communication timeout	0.0 (invalid), 0.1 ~ 100.0s	0.0s	√

P-147	Transmission error handling	0: Alarm and free 1: No alarming and continue to run 2: No alarming and stopped by the halt mode (communication control only) 3: No alarming and stopped by the halt mode (all control)	1	√
P-148	Transmission response handling	0: writing operation with response 1: writing operation with no response	0	√
P-149	Restrain oscillation low frequency threshold value point	0 ～500	15	√
P-150	Restrain oscillation high frequency threshold value point	0 ～500	15	√
P-151	Restrain oscillation clamped output	0 ～100	20	√
P-152	Restrain oscillation high/low frequency dividing frequency	0.00Hz ~ P-0 (H (maximum frequency)	12.5Hz	√
P-153	Restrain oscillation	0: Restrain oscillation valid 1:Restrain oscillation invalid	0	√
P-154	PWM options	0 ～122	0	X
P-155	No - load current compensation coefficient	0 ～9.99	0.5	√
P-156	Si terminal inverse phase logic options	Binary D0-D5 bits correspond to S1-S6, in which, 1 is for reverse phase, that is, valid in disconnection.	0	√
P-157	Current count value	0-65000	0	√
P-158	Count preset	0-65000	100	√
P-159	Count to early warning	0-65000	1	√
P-160	Count to action options	0:Shutdown output 2: Continuous output	0	√
P-161	Program operation mode	0: Program operation mode off 1: Continuous loop mode off 2: Single cycle mode 3:Operating in the last frequency after a single cycle	0	X
P-162	Program operation mode power-off memory options	0: Do not remember 1: Memory	0	X
P-163	Program operation time unit	0: second 1: minute	0	√
P-164	Zero run time	0 ～6000. 0	2.0	√
P-165	First run time	0 ～6000. 0	2.0	√
P-166	Second run time	0 ～6000. 0	2.0	√
P-167	Third run time	0 ～6000. 0	2.0	√
P-168	Fourth run time	0 ～6000. 0	2.0	√
P-169	Fifth run time	0 ～6000. 0	2.0	√
P-170	Sixth run time	0 ～6000. 0	2.0	√
P-171	Seventh run time	0 ～6000. 0	2.0	√

P-172	Acceleration / deceleration time option 1	0 ~ 7777 Single digit: Indicates the acceleration / deceleration of the zero segment Ten-digit: Indicates the first acceleration and deceleration Hundred places: Indicates the second acceleration and deceleration c kilobit (kb): indicates the third acceleration and deceleration 0: Indicates acceleration / deceleration time 0 1: indicates acceleration / deceleration time 1 2: indicates acceleration / deceleration time 2 3: Indicates acceleration / deceleration time 3 4: Indicates acceleration / deceleration time 4 5: Indicates acceleration / deceleration time 5 6: Indicates acceleration / deceleration time 6 7: Indicates acceleration / deceleration time 7	0	√
P-173	Acceleration / deceleration time option	0 ~ 7777 Single digit: Indicates the fourth acceleration and deceleration Ten digit : Indicates the fifth acceleration and deceleration Hundred places: Indicates the sixth acceleration and deceleration kilobit (kb):Indicates the seventh acceleration and deceleration Others are the same as the P-172	0	√
P-174	Acceleration time 1	0.1 ～3600.0s	model	√
P-175	Deceleration time 1	0.1 ～3600.0s	model	√
P-176	Acceleration time 2	0.1 ～3600.0s	model	√
P-177	Deceleration time 2	0.1 ～3600.0s	model	√
P-178	Acceleration time 3	0.1 ～3600.0s	model	√
P-179	Deceleration time 3	0.1 ～3600.0s	model	√
P-180	Acceleration time 4	0.1 ～3600.0s	model	√
P-181	Deceleration time 4	0.1 ～3600.0s	model	√
P-182	Acceleration time 5	0.1 ～3600.0s	model	√

P-183	Deceleration time 5	0.1 ～3600.0s	model	√
P-184	Acceleration time 6	0.1 ～3600.0s	model	√
P-185	Deceleration time 6	0.1 ～3600.0s	model	√
P-186	Acceleration time 7	0.1 ～3600.0s	model	√
P-187	Deceleration time 7	0.1 ～3600.0s	model	√
P-188	Number of auxiliary pumps	0～2	0	√
P-189	Recovery pressure	0 ～100.0%	20.00%	√
P-190	Sleep capacity	0:closed 1:open	0	√
P-191	Sleep pressure	0 ～100.0%	80.00%	√
P-192	Sleep delay time	0 ～6000.0	60.0s	√
P-193	Recovery delay time	0 ～6000.0	30.0s	√
P-194	Auxiliary pump open wiat time	0 ～6000.0	0.0s	√
P-195	Auxiliary pump closed wiat time	0 ～6000.0	0.0s	√
P-196	Sleep frequency	0～P-0G5 (upper limiting frequency)	30.0Hz	√

Chapter 6 Functional parameters details

Functi	Name	Description	Sett	Fact
P-000	Run instruct	0: keyboard instruction channel	0～	0

Option of the control instruction channel of the frequence converter
The control instruction channels of the frequence converter include: start-up, shutdown, forward running, reverse running, jog, fault reset etc.
0: keyboard instruction channel
The running command control is carried out by the RUN and STOP keys on the keyboard panel. If (P-082) is set to 1, the direction can be changed by the multifunction key JOG; In the running state, the frequence converter can stop freely if pressing the RUN and STOP keys.
1: Terminal instruction channel
The running command control is carried out by multifunction input end S1-S6 forward running, reverse running, forward jog, reverse jog, etc.
2: communication instruction channel
The running command control is carried out in communication mode.

Functi	Name	Description	Sett	Fact
P-001	Speed control	0: SVC control 1: V / F control	0～	0

Option of the running mode of the frequence converter
0: SVC control
Refering to the open-loop vector. It is suitable for the high-performance general devices with no encoder PG and one frequence converter just can drive one motor. The load such as the machine tools, centrifuges, drawbenches, injection molding machines and so on.
1: V / F control
Is suitable for the device with low requirement of control accuracy such as the load of fans, pump etc., and can be used for one frequence converter to drive several motors.

Func	Name	Description	Setting	Facto
P-002	Keyboard and terminal UP /	0: Valid, and power-down memory for the frequence	0～2	0

The frequency can be set through the "▲" and "▼" and "UP / DOWN" functions (frequency setting incease/ frequency setting decraese) of the keypad. Its privilege is the best so it can combine with any other frequency setting channel. Mainly complete the fine tuning of the output frequency of the frequence converter in the controlling of system commissioning.

0: Valid, and power-down memory for the frequence converter-can set the frequency and store the setted frequenct value after the frequence converter power down; Can combine with the current setted frequency automatically when the power is on next time.
1: Valid, and no power-down memory for the frequence converter-can set the frequency and the setted frequency value will not be stored when the frequence converter power down.
2: Invalid then the frequency value of the keyboard and terminal UP / D0WN settings will reset automatically and the setting of the keyboard and terminal UP / D0WN will be invalid.
Note:When the user restore the factory default of the frequence converter function parameters, the frequency value of the keyboard and terminal UP / D0WN settings will reset automatically.

Function code	Name	Description	Setting range	Factory default
P-003	frequency command option	0: Keyboard setting 1: Analog FV setting 2: Analog FI setting 3: FV + FI 4: Reserved 5: PID control setting 6: Remote communication setting 7: Local panel potentiometer setting	0～7	0

0: Keyboard setting
The purpose of keyboard setting frequency can be achieved through the modification of the value of function code p-009"keyboard setting frequency".
1: Analog FV setting
2: Analog FI setting
3: FV + FI 4: Reserved
Referring to that the the frequency is set by the analog input terminal. The frequence converter standard configuration provides 2 analog input terminals, in which the FV is 0 ~ 10V voltage input, and FI is 0 (4) ~ 20mA current input. The 100.0% of the analog input setting corresponds to the maximum frequency (function code P -004) and the -100.0% corresponds to the maximum frequency of the reverse (function code P-004).
5: PID control setting
When the parameter is selected, then the frequence converter operation mode will be PID control. At then, the PID control group P-115-P125 need to be set and the operation frequency of the frequence converter is the frequency value after the PID effect. Where, the meanings of the PID given source,specified rate and given source

and so on please refer to the introduction of the "PID function".
6: Remote communication setting
The frequency instructions will be given by the upper computer via the communication mode and details please refer to communication protocol.

Funct	Name	Description	Setting range	Factory default
P-004	Maximum output frequency	10.00～600.00Hz	10.00 ～600.00	50.00Hz

Used to set the maximum output frequency of frequence converter.It is the basis of the frequency setting but also is the basis for the accelerate and decelerate, which need the user to pay attention to.

Func	Name	Description	Setting	Factory default
P-005	Operation frequenc	P-006～P-004 (Maximum	P-006～P-004	50.00Hz

The upper limit value of the frequence converter output frequency, which shall be less than or equal to the maximum output frequency.

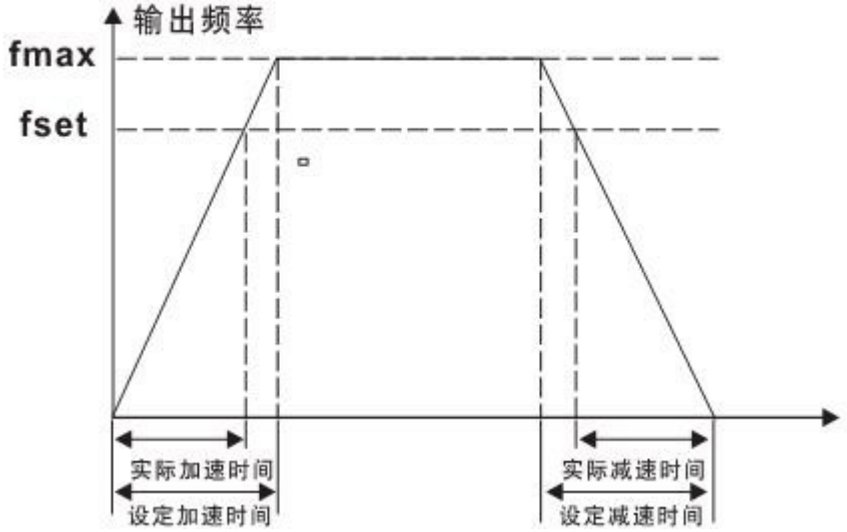
Fun	Name	Description	Setting	Factor
P-006	Operation frequency lower	0.00Hz～P-005 (operation frequency upper limit)	0.00Hz ～P-005	00.00

The lower limit value of the frequence converter output frequency, which operates when the set frequency is lower than the lower limit frequency. Where, the maximum output frequency ≥ upper limit frequency ≥ lower limit frequency.

Fun	Name	Description	Setting	Factor
P-007	Acceleration time	0.1~3600.0S	0.1~3600.0S	Model

P-008	Deceleration time 0	0.1~3600.0S	0.1~3600.0S	Model settin

Acceleration time refers to the time t1 required for the frequence converter to accelerate from 0 Hz to the maximum output frequency (P-004) and the deceleration time refers to the time t2 required for the frequence converter to decelerate from the maximum output frequency (P-004) to 0Hz, which are as shown below:



When the set frequency is equal to the maximum frequency, the actual acceleration / deceleration time is the same with the acceleration and deceleration time.
When the set frequency is less than the maximum frequency, the actual acceleration time is less than the set acceleration / deceleration time.
Actual acceleration / deceleration time = set acceleration / deceleration time X (set frequency / maximum frequency)
The acceleration / deceleration time can be selected by the combination of multi-function input terminals.
5. The factory default of the acceleration and deceleration time of the model with 5KW or below is 10. 0S and the factory default of the acceleration and deceleration time of the model with 7. 5kW to 30kW is 20.0s. The factory default of the acceleration and deceleration time of the model with is 40.0s.

Func	Name	Description	Setting	Facto
P-009	Keyboard set frequenc	0.00Hz～P-004 (Maximum	0.00Hz～P-004	50.00 Hz

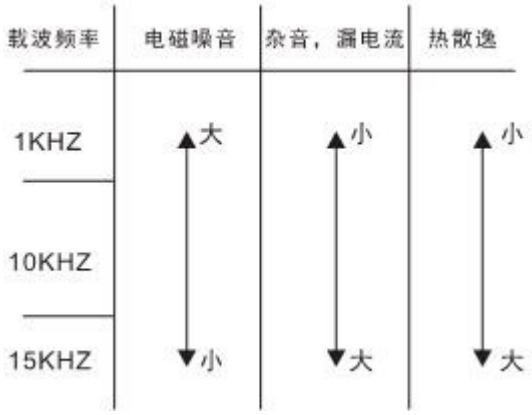
When the frequency instruction is selected as "keypad setting", the function code value will become the initial value of the frequency digital set of the frequence converter.

Function code	Name	Description	Setting range	Factory default
P-010	Operation direction option	0: Operating in the default direction 1:Operating in the opposite direction 2:Reverse operation is prohibited	0～2	0

0: Operating in the default direction. Operating in the actual direction after the frequence converter is power on.
1:Operating in the opposite direction. The diversion of the motor can be changed through the modification of the function code in the case not change any other parameters and the effect is equivalent to achieve the diversion of the motor rotating direction through the modification of the motor line (U, V, W).
Note: After the parameter is initialized, the motor running direction will return to its original state. It should be used with caution for the occasion that the motor diversion is not allowed to be changed after the system debugging.
2:Reverse operation is prohibited. The reverse running of the frequence converter is not allowed and it is suitable for the specific occasion that the reverse operation is prohibited.

Function code	Name	Description	Setting range	Factory default
P-011	Carrier frequency	1.0～15.	1.0 ～ 15.0	Model setting

	setting	0kHz		



Impact of carrier frequency on the environment. Relationship between the model and the carrier frequency

Model\ carrier frequency	Maximum carrier frequency (KHZ)	Minimum carrier frequency (KHZ)	Factory default (KHZ)
G-type： 0.4KW-11KW P-type： 0.75KW-15KW	15	1	8
G-type： 15KW-55KW P-type： 18.5KW-75KW	8	1	4
G-type： 75KW-300KW P-type： 90KW-315KW	6	1	2

This function is mainly used to improve the problems such as the motor running noise and the interference of the frequence converter to the outside world and so on.
The advantages of using high carrier frequency: more ideal current waveform, ess current harmonic, small motor noise;
The disadvantage of using the high carrier frequency: increasing switching loss, increasing frequence converter temperature, impressionable output capacity of the frequence converter. In the high carrier frequency, the frequence converter need to be decreased for the use; At the same time, the leakage current of the frequence converter increases and the electromagnetic interference on the outside world increases. The use of low carrier frequencies is on the contrary to the above. The carrier frequency has been set up reasonably in the time of delivery and in general, the user has no need to modify the parameter.

Function code	Name	Description	Setting range	Factory default
P-012	Recovery of functional parameter	0: No operation 1: Factory reset (except motor parameter) 2: Clearing the failure file 3. Reserved 4: Restoring all parameters to the factory value (including motor parameters)	0～4	0

1:The frequence converter will recovery all the parameter to the factory default(except motor parameter)
2. The frequence converter will clear all the recent failure file
4: The frequence converter will recovery all the parameter to the factory default (including motor parameters)
After the operation of all the function selected, this function code will recovery to 0 automatically.

Function code	Name	Description	Setting range	Factory default
P-013	Motor parameters self-learning	0: no operation 1: Parameter dynamic self-learning 2: parameter static self-learning	0～2	0

0: No operation, that is the self-learning is not allowed.
1: Parameter dynamic self-learning
The motor must be off from the load before the motor parameter dynamic self-learning to let the motor in the no-load condition, and confirm that the motor is in static state.
The right motor nameplate parameter(P-029-P-033) should be input before the motor parameter self-learning, or the result of the motor parameter self-learning may wrong, which will lead to the abnormal operation of the motor. The acceleration and deceleration time(P-007, P-008) shall be set according to the inertia of the motor before the motor parameter self-learning, or there may be overcurrent fault i the process of motor parameter self-learning.
Setting the P-013 as 1 and pressing the DATA key to enter into the self-learning state and then the LED displaying "-TUN-" and flashing. Then pressing the RUN key to start the parameter self-learning, displaying "TUN0" ... "TUN4" in order. When the parameter self-learning is over, the "-END-" will be displayed, which returnning to the stop status interface will be displayed at last. When the "-TUN-" flashes, the PR0G key can be pressed to exit the parameter self-learning state.
In the process of parameter self-learning, the stop key can be pressed to stop the parameter self-learning operation.
Note: The start and stop of the parameter self-learning can only be controlled by the keyboard; after the completion of the parameters self-learning, the function code automatically restored to 0.
2: parameter static self-learning
The motor has no need to be off from the load during the motor parameter static self-learning. The right motor nameplate parameter(P-029-P-033) should be input before the motor parameter self-learning and the stator resistance, rotor resistance of the motor and the leakage of the motor can be detected after the self-learning. While the motor mutual inductance and no-load current can not be measured and the user can input the corresponding function code according to experience.

Function code	Name	Description	Setting range	Factory default
P-014	AVR function selection	0: Invalid 1: Valid all the process 2: Invalid only during deceleration 3: Autoadaptation	0~2	2

AVR function is the automatic adjustment function of the output voltage. When the

AVR function is invalid, the output voltage will change with the input voltage (or DC bus voltage) changes; when the AVR function is valid, the output voltage will not change with the input voltage (or DC bus voltage) changes. The output voltage will remain constant in the output capacity range substantially.
Note: In the process of slowdown for stoppage, the automatic voltage regulation AVR function will shut down in a shorter deceleration time without overvoltage.

Function code	Name	Description	Setting range	Factory default
P-015	Start-up operation mode	0: Direct start-up 1: DC braking before the start-up 2: Rotational speed tracking before the start-up	0~2	0

0: Direct start-up: Starting from the start-up of the frequency
1: DC braking before the start-up. The motor start the operation from the DC braking then the start-up of the frequency. Suitable for the occasion that the load with small inertia may produce reverse in the start-up.
2: Rotational speed tracking before the start-up. The frequence converter counts the operation speed and direction of the motor at first and then runs to the set frequency from the current frequency to achieve the smooth and non-impact start-up of the motor in rotation, which is suitable for the restarting during the power interruption of the with large inertia.

Function code	Name	Description	Setting range	Factory default
P-016	Direct start-up frequency	0.00 ～ 10.00Hz	0.00 ～ 10.00	0.00Hz
P-017	Start-up frequency hold time	0.0～50.0s	0.00 ～ 50.0	0.00s

Direct start-up frequency is the start-up frequency which is to set the appropriate starting frequency and can increase the torque at start-up. In the start-up frequency hold time (P-017), the frequence converter output frequency is the starting frequency and then runs from the starting frequency to the target frequency. If the target frequency (frequency command) is less than the starting frequency, the frequence converter will not run to be in the ready mode.
The start frequency value is not limited by the lower limit frequency.
The start frequency does not work in the forward and reverse switching process.

Function code	Name	Description	Setting range	Factory default
P-018	Brake current before the start-up	0.0 ～ 150.0%	0.0 ～ 150.0	0.00%
P-019	Braking time before the start-up	0.0 ～ 50.0s	0.0 ～ 50.0	0.0s

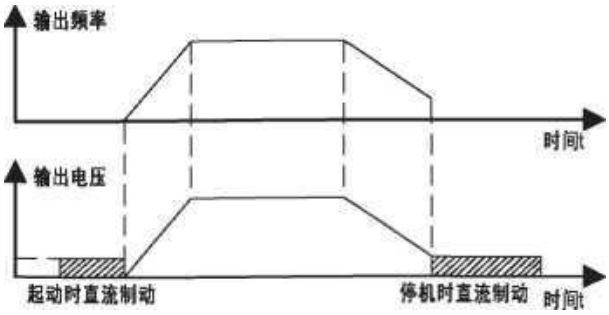
The DC braking can be performed by pressing the set brake current before the start-up at the start-up of the frequence converter and then the accelerated service will start via the set brake current before the start-up braking time. If the braking time is set as 0 then the braking time will be invalid.
The larger the DC braking, the larger the brakeage. The brake current before the start-up refers to the percentage of the rated current relative to the frequence converter.

Function code	Name	Description	Setting range	Factory default
P-020	Halt mode selection	0: Slow down 1: Shutdown	0～1	0

0: Slow down
The frequence converter lowers down the output frequency according to the deceleration mode and the defined acceleration / deceleration time after that the stop command is valid. The frequence converter will stop when the frequency lower down to 0.
1: Shutdown
The frequence converter will stop the output immediately after the shutdown command is valid. The load shut down according to the mechanical inertia.

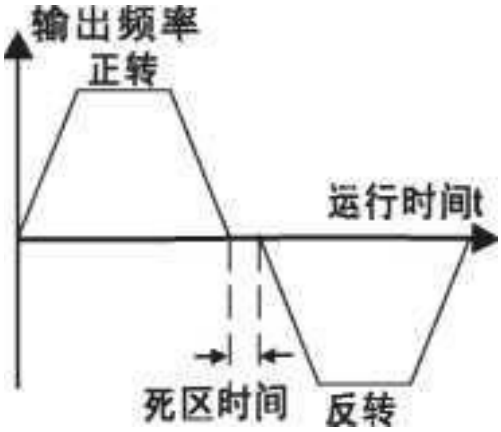
Function code	Name	Description	Setting range	Factory default
P-021	Parking brake start frequency	0.00～P-004	0•00～P-004	0.00Hz
P-022	Parking brake wait time	0.0～50.0s	0.0 ～ 50.0	0.0s
P-023	Parking DC brake current	0•0～150.0%	0•0 ～ 150.0	0.00%
P-024	Parking DC braking time	0.0 ～ 50.0s	0.0 ～ 50.0	0.0s

Parking brake start frequency: In the decelerating process, when this frequency is achieved, the parking DC braking will start.
Parking brake wait time:Before the start-up of the parking DC braking, the frequence converter blocks the output and then start the DC braking through the delay time. Used to avoid the overcurrent fault caused by the DC braking at the start-up when the speed is fairly high.
Parking DC brake current: refers to the DC braking amount applied. The larger the current the better the DC braking.
Parking DC braking time: The duration of the parking DC braking. If the time is 0 then the DC braking will be invalid. The frequence converter stops according to the set deceleration time.



Function code	Name	Description	Setting range	Factory default
P-025	Positive and reverse rotation dead time	0• 0～3600.0s	0. 0～3600.0	0. 0s

The transient time at the output zero frequency in the positive and reverse rotation dtransient process of the set frequence converter, as shown in the Fig.



For the 15KW or below, the factory value is 0.0s, while for the18.5KW or above, the factory value is 1.0s.

Function code	Name	Description	Setting range	Factory default
P-026	Power-on terminal operation protection selection	0: Terminal operation command is invalid when power is on 1: The terminal operation command is valid when power is on	0～1	0

When the running instruction is terminal control, the system will automatically detect the running terminal in the power-on process of the frequence converter.
0: Terminal operation command is invalid when power is on, that is, in the power-on process, it detects that the running instruction terminal is valid and the frequence converter will not run. The system will be in the runtime protection state until the running instruction terminal is canceled. Then the terminal is enabled and the frequence converter will run.
1: The terminal operation command is valid when power is on, that is, if the running instruction terminal is detected valid in the power-on process, the system will automatically start the operation of the frequence converter after the completion of the initialization. Note:The user must carefully select the function which may cause serious consequences.

Function code	Name	Description	Setting range	Factory default
P-027	Action selection for frequency lower then the lower limit	0: Operating at the lower limit frequency 1: Stop 2: Zero speed operation	0～1	0

Function code	Name	Description	Setting range	Factory default
P-028	Type of frequence converter	0: G Model 1: P Model	0～1	Model setting

0: Suitable for constant torque load for specified rated parameters
1:Suitable for variable torque load (fan, pump load) for specified rated parameters
The frequency converter uses G / P combined way, that is, the adaptive motor(G type) power ratio used for the constant torque load is one file smaller than it used for the fan, pump load (P type).

Function code	Name	Description	Setting	Factory

			range	default
P-029	Motor rated power	0.4 ～ 900.0 kw	0. 4～900.0	Model setting
P-030	Motor rated frequency	0.01Hz～P-004 (maximum frequency)	0.01 ～ P-004	50. 00Hz
P-031	Motor rated rotational speed	0～36000rpm	0～36000	Model setting
P-032	Motor rated voltage	0 ～ 460V	0 ～ 460	Model setting
P-033	Motor rated current	0.1 ～ 2000.0A	0.1 ～ 2000.0	Model setting

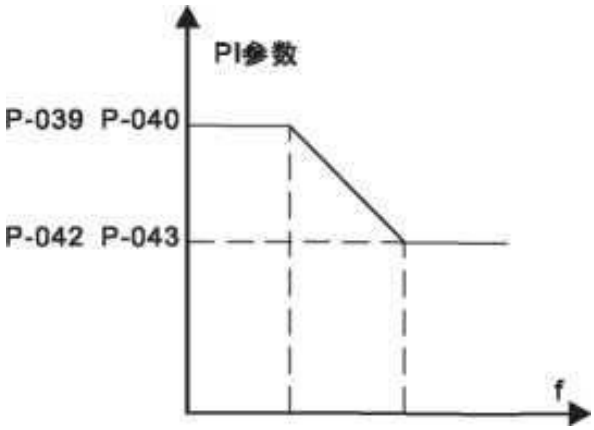
Note: Please follow the motor nameplate parameters for the setting. The excellent control performance of the vector control requires accurate motor parameters.
The frequence converter provides parameter self-learning function. Accurate parameter self-learning comes from the correct setting of the motor nameplate parameters.
In order to ensure the control performance, please follow the standard adaptive motor of the frequence converter for motor configuration. If the gap between the motor power and standard adaptive motor is too large, control performance of the frequence converter will be significantly reduced.
Note: Resetting the motor rated power (P-029) can initialize the motor parameters in P-030 ~ P-038.

Function code	Name	Description	Setting range	Factory default
P-034	Motor stator resistance	0.001 ～ 65.535Q	0.001 ～65. 535	Model setting
P-035	Motor rotor resistance	0,001 ～ 65. 535Q	0.001 ～ 65.535	Model setting
P-036	Motor stator/ rotor inductance	0.1 ～ 6553. 5mH	0.1 ～ 6553. 5	Model setting
P-037	Motor stator/ rotor mutual inductance	0. 1 ～ 6553_5mH	0,1 ～ 6553. 5	Model setting
P-038	Motor no-load current	0. 01 ～ 655. 35A	0.01 ～ 655. 35	Model setting

After the normal completion of the motor parameters self-learning, the setting values of P-034-P-038 is automatically updated. These parameters are the benchmark parameters with high performance vector control and have a direct effect on the performance of the control.
Note: The users are not allowed to arbitrarily change the parameters of the group.

Function code	Name	Description	Setting range	Factory default
P-039	Speed loop proportional gain 1	0 ～ 100	0 ～ 100	15
P-040	Speed loop integral time 1	0.01 ～ 10. 00s	0.0 ～ 10.00	2.00s
P-041	Switching low-point frequency	0. 00Hz ～ P-044	0.0～P-044	5.00Hz
P-042	Speed loop proportional gain 2	0 ～ 100	0 ～ 100	10
P-043	Speed loop integral time 2	0.01 ～ 10. 00s	0.01～10.00	3
P-044	Switching high point frequency	P-041～P-004 (maximum frequency)	P-041～P-004	10. 00Hz

The above parameters are valid only for vector control and are invalid for V / F control. At the switching frequency 1 (P-041) or less, the speed loop PI parameters are: P-039 and P-040. At the switching frequency 2 (P-044) or above, the speed loop PI parameter are
P-042 and P-043. Between the switching points, the PI parameter is obtained by varying the linearity of the two sets of parameters, which is as shown below:



The setting of the proportionality coefficient and integral time of the speed regulator can adjust the speed dynamic response characteristic of the vector control. The increase of the proportional gain and decrease of the integral time both can accelerate the dynamic response of the speed ring while the oversize proportional gain and

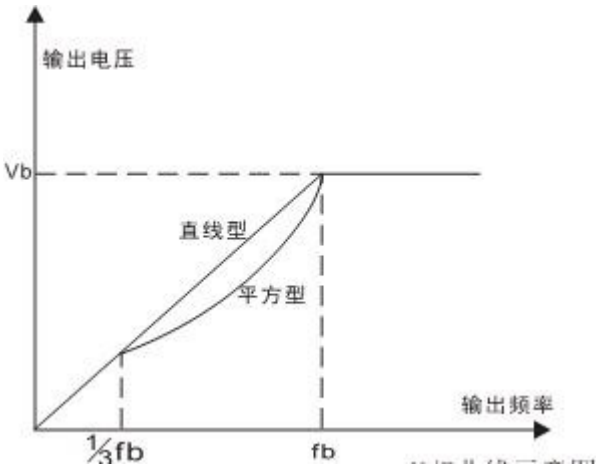
undersize integral time both can cause the system oscillation and oversize overshooting. The undersize proportional gain will also cause the system oscillation and there may be the speed static deviation.
The speed ring PI parameter has close relationship with the motor system inertia. The users need to adjust the different load characteristics based on the factory PI parameters to meet the needs of various occasions.

Function code	Name	Description	Setting range	Factory default
P-045	VC slip compensation factor	50%～200%	50 ～ 200	100%

The slip compensation factor is used to adjust the slip frequency of the vector control and improve the speed control accuracy of the system. The appropriate adjustment of the parameter can restrain the speed static deviation effectively.

Function code	Name	Description	Setting range	Factory default
P-046	Torque upper limit setting	0,0~200,0% (frequence converter rated current)	0.0～200. 0	150. 0%

P-047 ~ P-05l is valid for V / F control (P-000 = 1) and is invalid for vector control.
0: Straight line V / F curve. Suitable for the ordinary constant torque load.
1: 2.0 power-descending torque V / F curve. Suitable for centrifugal load such as the fans, pumps etc.

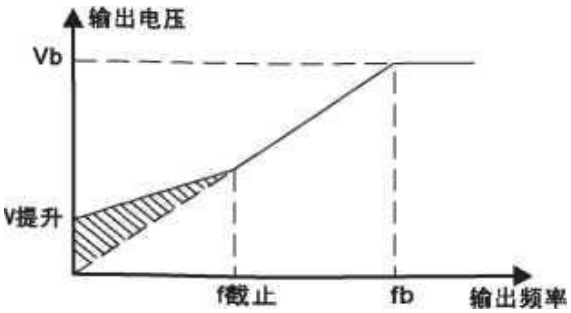


Sketch map of V / F curve

Function code	Name	Description	Setting range	Factory default

P-048	Torque compensation	0.0%: (automatic) 0.1 %～30.0%	0.0 ～ 30.0	0.00%
P-049	Torque compensation off	0,0%～50,0% (relative motor rated frequency)	0.0 ～ 50.0	20.096

The torque compensation is mainly applied to the cut-off frequency (P-049) or below. The V / F curve after compensation is shown below. The torque compensation can improve the low frequency torque characteristic of V / F. The torque can be selected according to the appropriate size of the load and the large load can increase the compensation. However the torque compensation shall not to be set oversize. The oversize torque compensation will make the overexcitation operation of the motor and overheat, large output current of the frequence converter and reducing efficiency. When the torque compensation is set as 0.0%, the frequence converter will compensate the torque automatically.
Torque compensation off-frequency: Under this frequency, the torque compensation is valid. While it will be invalid if the set frequency is exceeded.



Manual torque compensation diagram

Function code	Name	Description	Setting range	Factory default
P-050	V/F slip compensation limit	0. 0～200. 0%	0.0 ～ 200.0	0.00%

This set parameter can be used to compensate for the motor speed changes caused by the load in the V / F control to improve the mechanical properties hardness of the motor and the value should correspond to the motor rated slip frequency.

Function code	Name	Description	Setting range	Factory default
P-051	Energy-saving operation	0: No-action	0～1	0

	options	1: Automatic energy-saving operation		

When the motor runs in constant speed in the no-load or light load process, the frequence converter will adjust the output voltage through the detection of the load current to achieve the purpose of automatic energy conservation. This function is particularly effective for fans and pump loads.

Function code	Name	Description	Setting range	Factory default
P-052	Reserved			
P-053	S1 terminal function selection	1: Non-function 2: Forward running 3: Reverse running 4: Three-wire operation control 5: Normal inching turning 6: Reverse jog 7: Shut down 8: Fault reset 9: External device fault input 10: Frequency increment command 11: Frequency decrement instruction 12:Frequency increase / decrease setting clearing 13: Multi-speed control terminal 1 13: Multi-speed control terminal 2 14: Multi-speed control terminal 3 15: Acceleration / deceleration time selection 1 16: Acceleration /	0~25	1

		deceleration time selection 2		
P-054	S2 terminal function selection	17: Acceleration / deceleration time selection 3	0~25	2
P-055	S3 terminal function selection	18: Invalid closed loop	0~25	8
P-056	S4 terminal function selection		0~25	7
P-057	Reserved		0~25	4
P-058	S1 terminal function selection	1: Non-function 2: Forward running 3: Reverse running 4: Three-wire operation control 5: Normal inching turning 6: Reverse jog 7: Shut down 8: Fault reset 9: External device fault input 10: Frequency increment command 11: Frequency decrement instruction 12:Frequency increase / decrease setting clearing 13: Multi-speed control terminal 1 13: Multi-speed control terminal 2 14: Multi-speed control terminal 3 15: Acceleration / deceleration time selection 1 16: Acceleration / deceleration time selection	0~25	5

		2 17: Acceleration / deceleration time selection 3 18: Invalid closed loop		

There are six multi-function digital input terminals of the frequence converter standard unit and this parameter is used for setting the corresponding function of the multi-function input terminal (see table below):

Set value	Function	Description
0	Non-function	Even if there is a signal input frequence converter does not act, the unsed terminals can be set as non-function to prevent malfunction.
1	Forward rnning	The forward and reverse running of the frequence converter can be controlled through the external terminal.
2	Reverse rnning	
3	Three-wire operation control	The terminal is used to determine that the operation mode of this frequence converter is three-wire control mode and the details please refer to the P-060 three-wire control mode function description.
4	Normal inching turning	Jog frequency, acceleration / deceleration time please refer to the P-099, P-100, P-101 function code details.
5	Reverse jog	
6	Shut down	The frequence converter blocks the output and the motor stop process is not controlled by the frequence converter. When the load inertia is large and the parking time is not required this mode is often taken. The meaning of this mode and the shutdown described in P-020 is the same.
7	Fault reset	The function of external fault reset is the same with the funcion of the STOP key on the keyboard and this function can be used to achieve the remote faults.
8	External device fault input	When the external fault signal is sent to the frequence converter, the frequence converter will report the fault and stop.
9	Frequency increment command(up)	The external terminal modifies the given frequency, where the UP is for the frequency increment command and DOWN is for the frequency decrement instruction. The frequency increase / decrease setting clearing can clear the frequency value set by UP / D0WN to make the given frequency to restore the frequency given by the frequency command channel.
10	Frequency decrement instruction(down)	

<table>
<tr><td>11</td><td>Frequency increase / decrease setting clearing</td><td></td></tr>
<tr><td>12</td><td>Multi - speed control terminal 1</td><td>The eight-step speed setting can be achieved by the digital state combination of these thress terminals.</td></tr>
<tr><td>13</td><td>Multi - speed control terminal 2</td><td>Note:the multi - speed control terminal 1 is lower post and the multi - speed control terminal 3 is P- the high post, which can be seen in multi - speed 126-P-133 details.</td></tr>
<tr><td>14</td><td>Multi - speed control terminal 3</td><td></td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">Acceleration / deceleration time selection terminal 1</td><td>The eight acceleration and deceleration time selections can be achieved through the digital state combination of these three terminals.</td></tr>
<tr><td>Acceleration / deceleration time selection terminal 1 | OFF | ON | OFF | ON | OFF | ON</td></tr>
<tr><td>Acceleration / deceleration time selection terminal 2 | OFF | OFF | ON | ON | OFF | OFF</td></tr>
<tr><td>Acceleration / deceleration time selection terminal 3 | OFF | OFF | OFF | OFF | ON | ON</td></tr>
<tr><td>16</td><td>Acceleration / deceleration time selection terminal 2</td><td>Acceleration / deceleration time selection | 0 | 1 | 2 | 3 | 4 | 5</td></tr>
<tr><td>17</td><td>Acceleration / deceleration time selection terminal 3</td><td></td></tr>
<tr><td>18</td><td>Closed loop failure</td><td>The PID is fault temporarily and the frequence converter maintains the current frequency output.</td></tr>
<tr><td>19</td><td>Swing frequency stopping</td><td>The frequency converter stops at the current output frequency. After the function is canceled, it continue to start the swing frequency operation at the current frequency.</td></tr>
<tr><td>20</td><td>Swing frequency state reset</td><td>The frequency converter returns to the center frequency output</td></tr>
<tr><td>21</td><td>Acceleration / deceleration inhibit command</td><td>To ensure that the inverter is not affected by external signals (except for the shutdown command), and to maintain the current output frequency</td></tr>
<tr><td>22</td><td>Terminal shutdown</td><td>To achieve the shutdown function through the terminals and to be controlled by the shutdown mode in P-020.</td></tr>
<tr><td>23</td><td>Temporary clearing of frequency change setting</td><td>When the terminal is closed, the frequency value set by UP / D0WN can be cleared to restore the given frequency to the frequency given by the frequency command channel. When the terminal is disconnected, it will return to the</td></tr>
</table>

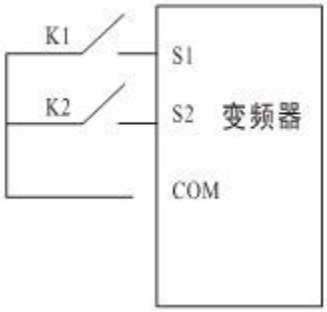
		frequency value after frequency increase/decrease setting.
24	Terminal counting	When the terminal receives the digital input signal, the frequence converter will count.
25	Clearing of terminal counting	To clear the built-in counter of the frequence converter.

Function code	Name	Description	Setting range	Factory default
P-059	Switching value filter number	1～10	1～10	5

To set the filter time for S1-S6 terminal sampling. Under the case of strong interference, this parameter shall be enlarged.

Function code	Name	Description	Setting range	Factory default
P-060	Terminal control operating mode	0: two-wire control 1 1: two-wire control 2 2: three-wire control 1 3: three-wire control 2	0～3	0

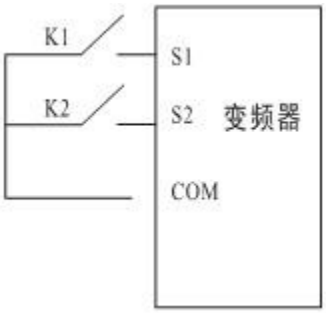
This parameter defines four different ways of the frequence converter operation controlled by the external terminal.
0: two-wire control 1. This mode is the common used two-wire control. The forward and reverse rotation are determined by the S1, S2 terminals.



K1	K2	Run Com
OFF	OFF	Shut off
ON	OFF	Forward
OFF	ON	Reverse
ON	ON	

Two-wire operation mode 1 schematic diagram
1: two-wire control 2: S1 is the enable terminal when this mode is used and the

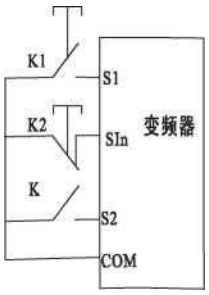
direction is decided by the state of S2.



K1	K2	Run Com
OFF	OFF	Shut off
OFF	ON	Shut off
ON	OFF	Forw ard
ON	ON	R ve rse

Two-wire operation mode 2 schematic diagram

2: three-wire control 1: The SIn (Si terminal parameters is the the three-wire operation control) is enable terminal for this mode. The run command is produced by the S1 and the direction command is produced by S2. SIn is normally closed input.



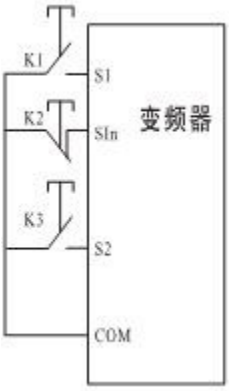
K	Moving directio
OFF	Forward
ON	Reverse

Three-wire operation mode 1 schematic diagram

Where: K: forward / reverse switch K1: operation button K2: stop button

Sin defines the corresponding terminal function as function 3 "three-wire operation control".

3, three-wire control 2: The Sin is enabled terminal in this mode, and the run command is produced by K1 or K3 which also control the moving direction at the same time. The stop command is generated by the normally closed input K2.



Three-wire operation mode 1 schematic diagram

Where: K1: Forward button K2: Stop button K3: Reverse button

Sin defines the corresponding terminal function as function 3 "three-wire operation control".

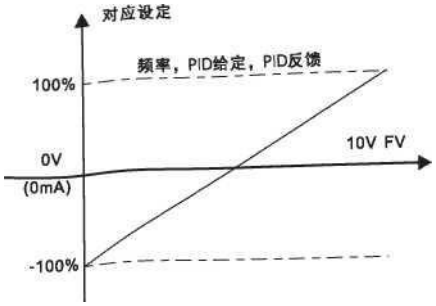
Note: For the two-wire operation mode, when the S1 / S2 terminal is valid, the frequence converter will stop due to the stop command produced by other source. Even if the control terminal S1 / S2 remains valid, the frequence converter will nor run after the stop command disappear. The S1 / S2 shall be triggered again if the frequence converter runs.

Function code	Name	Description	Setting range	Factory default
P-061	Frequency-incremental change rate of terminal UP / DOWN	0. 01 ～ 50. 00 Hz/s	0.01 ～ 50.00	0.50Hz/s

Set the change rate of when the terminal UP / DOWN adjusts the set frequency.

Function code	Name	Description	Setting range	Factory default
P-062	FV lower limit	0. 00V ～ 10.00V	0.00～10. 00	0.00V
P-063	Corresponding setting of FV lower limit	-100.0% ～ 100. 0%	-100.0 ～ 100.0	0.00%
P-064	FV upper limit	0. 00V ～ 10.00V	0.00 ～ 10.00	10.00V
P-065	Corresponding setting of FV upper limit	-100.0% ～ 100. 0%	-100.0 ～ 100.0	100.00%
P-066	FV input filtering time	0. 00s ～ 10, 00s	0.00 ～ 10.00	0.10S

The above function codes define the relationship between the analog input voltage and the corresponding set value of the analog input. When the analog input voltage surpasses the set maximum input or minimum input range, the other part will be calculated with the maximum input or minimum input.
In different applications, the corresponding nominal value of analog set 100.0% is different and please refer the description of each application section for details. The following graph illustrates several settings:
Note: The lower limit of FV must be less than or equal to the upper limit of FV.



Correspondence between analog given and setup amount
Fv input filter time: Determining the sensitivity of the analog input. If the analog quantity is prevented from interference to cause malfunction, then the parameter can be increased.
Then the capacity of resisting disturbance will be enhanced but this will also cause the reduction of the sensitivity of the analog input.

Function code	Name	Description	Setting range	Factory default
P-067	FI lower limit	0,00V ～ 10,00V	0.00～10.00	0.00V
P-068	Corresponding setting of F1 lower limit	-100.0% ～ 100. 0%	-100.0 ～ 100.0	0.00%
P-069	FIupper limit	0. 00V ～ 10.00V	0.00 ～ 10.00	10.00V
P-070	Corresponding setting of F1 upper limit	-100.0% ～ 100. 0%	-100.0 ～ 100.0	100.00%
P-071	F1 input filtering time	0• 00s ～ 10.00s	0.00～10.00	0.10S

Function code	Name	Description	Setting range	Factory default
P-072	Relay J1 output selection	Relay output function	0～14	1
P-073	Relay J2 output selection	Relay output function	0～14	3

The function of F1 is similar to the setting method of Fv. Analog F1 can support 0 ~ 20mA current input, and the 0 ~ 20mA current corresponds to 0 ~ 10V voltage.
The relay output function option is seen in the table below:

Set value	Function	Description
0	No output	The output terminal has no any function
1	Forward running	The inverter is in forawrd running, and there is output frequency. Then the On signal is output.
2	Reverse running	The inverter is in reverse running, and there is output frequency. Then the On signal is output.
3	Fault output	The On signal will be output when the frequence converter fails.
4	Frequency level detecting the FDT output	Please refer to the details of P-110-P-111
5	Frequency arrivals	Please refer to the details of P-112.
6	Zero speed operation	The On signal will be output when the frequence converter output frequency equals to 0.
7	Upper limit frequency arrival	The On signal will be output when the operating frequency reaches the upper limit frequency.
8	Upper limit frequency arrival	The On signal will be output when the operating frequency reaches the lower limit frequency.
9	Non-zero speed operation	The On signal will be output when the frequence converter output frequency not equals to 0.
10	Auxiliary pump 1	Please refer to the details of P-188-P-195
11	Auxiliary pump 2	
12	Count to	Please refer to the details of P-157-P-160
13	Count to early warning	
14	In operation	The On signal will be output when the frequence converter is in the operation state.

Function	Name	Description	Setting range	Factory

code				default
P-074	F0 output options	Multi-function analog output	0～10	0

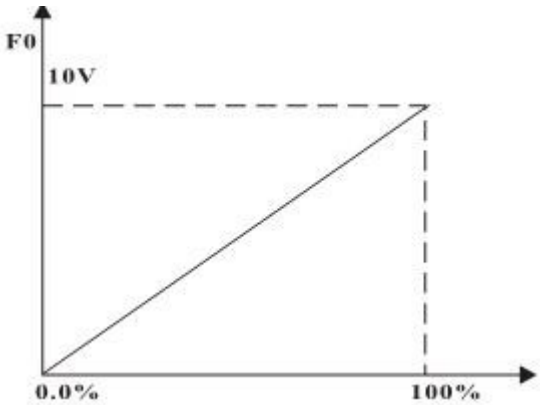
F0 standard output is 0 ~ 10V, which output 0 ~ 20mA through the switching over, . The corresponding amount represented is shown in the following table:

Set value	Function	Description
0	Operating frequency	0 ~ maximum output frequency
1	Setting frequency	0 ~ maximum output frequency
2	Running RPM	0 ~ 2 times motor rated speed
3	Output current	0 ~ 2 times frequence converter rated current
4	Output voltage	0 ~ 1. 5 times frequence converter rated voltage
5	Output power	0 ~ 2 times rated power
6	Output torque	0 ~ 2 times motor rated current
7	Analog FV input value	0 ～ 10V
8	Analog FI input value	0 ～ 20mA
9～10	Reserved	Reserved

Function code	Name	Description	Setting range	Factory default
P-075	F0lower output limits	0. 0%～100. 0%	0.0 ～ 100.0	0.00%

P-076	Corresponding F0 output of the lower limit	0.00V ～ 10.00V	0• 00～10.00	0.00V
P-077	F0 upper output limit	0. 0%～100. 0%	0.0～100.0	100.00%
P-078	Corresponding F0 output of the upper limit	0. 00V ～ 10. 00V	0.00～10.00	10.00V

he above function codes define the relationship between the output value and the corresponding set value of the analog input. When the output value surpasses the set maximum input or minimum input range, the other part will be calculated with the maximum input or minimum input.
In different applications, the corresponding nominal value of analog set 100.0% is different and please refer the description of each application section for details. The following graph illustrates several settings:



Correspondence between quantity given and analog output

Function code	Name	Description	Setting range	Factory default
P-079	user password	0～65535	0～65535	0

If it is set to be any a non-zero number, the password protection function will take effect immediately.
The password is set to be 0, which means clearing the former set user password value and makes the password protection function invalid. The factory default can also clear the password.
If the PROG key is pressed to enter in to the function code editing state after the password is valid, the "0. 0. 0. 0." will be displayed.
The operator must enter the user password correctly, otherwise it can not enter. Please keep in mind the user password set.

Function code	Name	Description	Setting range	Factory default
P-080	Keyboard UP / DOWN frequency accumulation function options	0: The accumulation function off 1: The accumulation function on	0～2	1
P-081	Keyboard UP / DOWN single-step size	0. 00 ～ 10.00Hz	0.00 ～ 10.00Hz	0.01Hz

P-081 sets the single step of the UP / D0WN of the keyboard, that is, the the frequency increase / decrease value of one pressing of UP / D0WNkey , and the frequency increase / decrease is controlled by P-081 by pressing UP / D0WN.

Function code	Name	Description	Setting range	Factory default
P-082	JOG key function options	0: Jog running 1: Forward/reverse switching 2: Clearing UP / DOWN setting	0～2	0

0: Jog running. The Keyboard JOG key achieves the jog running.
1: Forward/reverse switching. Keyboard JOG key switches the moving direction of the motor and is only valid for the keyboard command channel.
2: Clearing UP / DOWN setting. keyboard JOG key clears the UP / D0WN setting.

Function code	Name	Description	Setting range	Factory default
P-083	STOP key stop function options	0: Valid only for panel control 1: Valid both for panel and terminal control 2: Valid both for panel and communication control 3: Valid for all control modes	0	0

This function defines the effective selection of the keyboard STOP key stop function

and for fault reset, the STOP key is valid in any situation.

Function code	Name	Description	Setting range	Factory default
P-084	Keyboard UP / DOWN single-step size		0.00～10.00Hz	0.01Hz

Function code	Name	Description	Setting range	Factory default
P-085	Parameter selection for the operation status display	0~OxFFFF	0~OxFFFF	03FF

In the running state of the frequence converter, the parameter display is affected by the function code, that is, a 16-bit binary number,
If bit is 1, then the corresponding parameter can be checked through the DATA key in the operation. If this bit is 0 then the corresponding parameter for that bit will not be displayed. When the function code P-085 is set, the binary number shall be converted into a hexadecimal number to input this function code.
The content displayed by the low 8 bits is shown in the following table:

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1
Output torque d	Output power G	Operating torquer	Output current A	Output voltage U	Bus voltage U	Set frequency H

The content displayed by the high 8 bits is shown in the following table:

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9
Count value J	Current number of segments of SPD h	Analog FI value E	Analog FV value e	Output terminal status 0	Input terminal status b	PID feedback value L

Input and output terminals are shown in decimal, and S1 (J1) corresponds to the lowest bit. For example: input status display 3, which indicates that the terminal S1, S2 are closed, and the other terminals are disconnected. For details, please refer to the descriptions of P-097-P-098.

Function	Name	Description	Setting	Factory

code			range	default
P-086	Parameter selection for the operation status display	0~OxFFFF	0 ~OxFFFF	00FF

The setting of this function is the same as that of P-085. Only when the frequence converter is in the stop state, the display of the parameter is affected by the function code.
The content displayed by the low 8 bits is shown in the following table:

BIT7	BIT6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BITO
Analog FI	Analog	PID feed	PID refer	Output	Input term inal	Bus voltage U	Set freque

The content displayed by the high 8 bits is shown in the following table:

BIT15	BIT14	BIT 13	BIT 12	BIT 11	BIT 10	BIT9	BIT8
Reserved	Reserved	Reserve	Reserve	Reserve	Reserve	Reserved	Reserved

Function code	Name	Description	Setting range	Factory default
P-087	Reserved			
P-088	Radiator temperature	0 ～ 100.0X :		
P-089	Software version	1.00 ～ 9. 99		
P-090	Accumulated running time	0～65535h		0

These functions can be checked only but can not be modified.

Function code	Name	Description	Setting range	Factory default
P-091	The first two fault types			
P-092	The first fault types			
P-093	Current fault types			

Function code	Name	Description	Factory default
P-097	Current fault input terminal	This value is a decimal number which plays the status of all digital input0 terminals in the last fault, and the order is in the following:	

	status	BIT5 BIT4 BIT3 BIT2 BIT1 S6 S5 S4 S3 S2 When the input terminal is ON, it shall be 1, where the OFF shall be 0. This value can be used to understand the digital input signal state at that time.
P-098	Current fault output	This value is a decimal number which plays the status of all digital input0 terminals in the last fault, and the order is in the following: BIT3 BIT2 BIT1 BIT0 J2 J1 When the input terminal is ON, it shall be 1, where the OFF shall be 0. This value can be used to understand the digital input signal state at that time.

Function code	Name	Description	Setting range	Factory default
P-099	Jog frequency	0•00～P-004 (Maximum Frequency)	0.00～ P-004	5.00Hz
P-100	Jog acceleration time	0.1 ～ 3600. Os	0.1～ 3600.0	Model setting
P-101	Jog deceleration time	0.1 ～ 3600. Os	0• 1～ 3600.0	Model setting

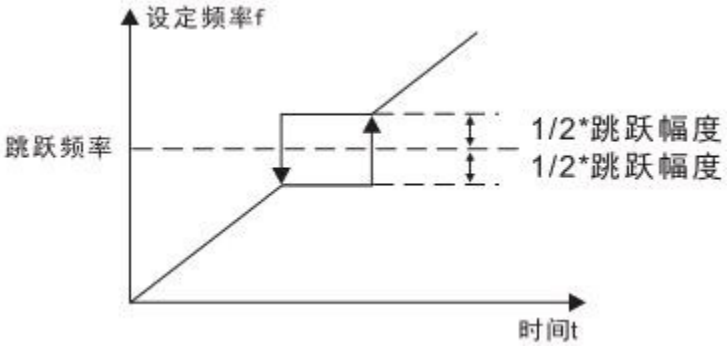
Defines the given frequency and acceleration / deceleration time of the frequency converter during jog running.
Jogging process has the start-stop operation in accordance with the direct start and slow-down way.
The jog acceleration time refers to the time required for the frequence converter to accelerate from 0Hz to the maximum output frequency (P-004).
The jog deceleration time refers to the time required for the frequence converter to decelerate from the maximum output frequency (P-004) to 0Hz.
The factory default of acceleration / deceleration time of the model of 5.5KW or below is 10. 0S and the factory default of acceleration / deceleration time of the model of 7.5KW to 30KW is 20.0S. The factory default of acceleration / deceleration time of the model of 37KW or above is 40.0S.

Function code	Name	Description	Setting range	Factory default

P-102	Hopping frequency	0.00～P-004 (Maximum Frequency)	0.00Hz	0.00Hz
P-103	Hopping frequency range	0. 00～P-004 (Maximum Frequency)	0.00Hz	0.00Hz

When the set frequency is within the hopping frequency range, the actual operating frequency will run at the hopping frequency boundary that is closer to the set frequency.

The frequence converter can avoid the mechanical resonance of the load through setting the hopping frequency and this frequence converter can set a hopping frequency point. If the hopping frequency is set to be as 0, then this function will not work.

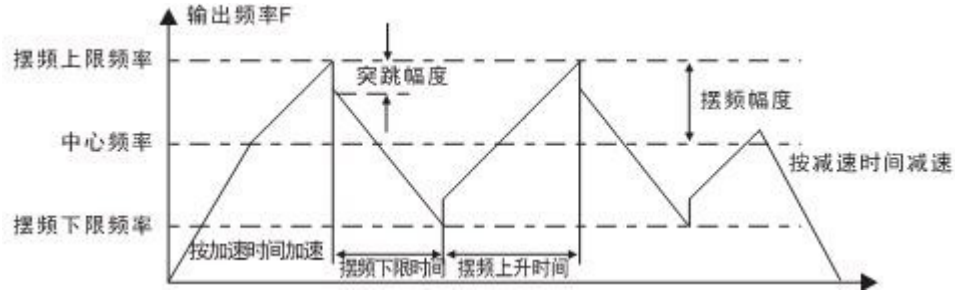


Schematic diagram of hopping frequency

Function code	Name	Description	Setting range	Factory default
P-104	Swing frequency range	0. 0～100. 0% (Relative set frequency)	0.0 ～ 100.0%	0.00%
P-105	Startup frequency range	0.0～ 50.0% (relative swing frequency range)	0.0 ～ 50.0%	0.00%
P-106	Swing frequency rise	0.1 ～	0.1～	5. Os

	time	3600. Os	3600.0	
P-107	Swing frequency fall time	0.1 ～ 3600. Os	0.1～ 3600.0	5.0s

This function is suitable for the industries such as the textile, chemical fiber etc., and the occasions which need traverse, winding function. The swing frequency function refers to that the output frequency of the frequence converter swings up and down with the set frequency as the center and the track of the operating frequency in the timeline is shwon below, where the swinging scope is set by the P-104. When the P-104 is set to 0, that is, the swing frequency is 0, then the swing frequency will not work.



Schematic diagram of swing frequency operation

Swing frequency scope: the swing running frequency is controlled by the upper and lower frequency. The swing scope relative to center frequency: swing scop AW= Center frequency X swing frequency (P-104).

Hopping frequency=swing scop AWX hopping frequency scope (P-105). That is, in the swing frequency operation, the value of the hopping frequency to the swing scope.

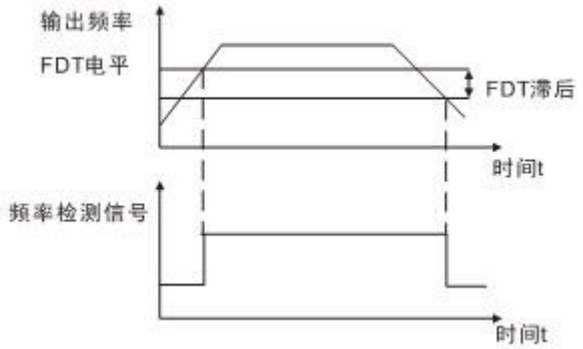
Swing scop risetime:the time used for the swing frequency to run form the lowest point to the highest point.

Swing scop fall time:the time used for the swing frequency to run form the highest point to the lowest point.

Function code	Name	Description	Setting range	Factory default
P-108	Fault automatic reset number	0～3	0～3	0
P-109	Fault automatic reset interval setting	0. 1 ～ 100. Os	0• 1 ～ 100.0	1.0S

Number of fault resetting: When the frequence converter selects to automatic fault resetting, it will be used to set the number of automatic resetting. If this value is exceeded then the frequence converter will be standby for the failure to wait for the repair. Automatic fault resetting interval setting: to select the interval from the occurrence of the fault to the automatic reset action.

To set the detection value of the set output frequency and the lagged value of relief of output operation which is as shown below:

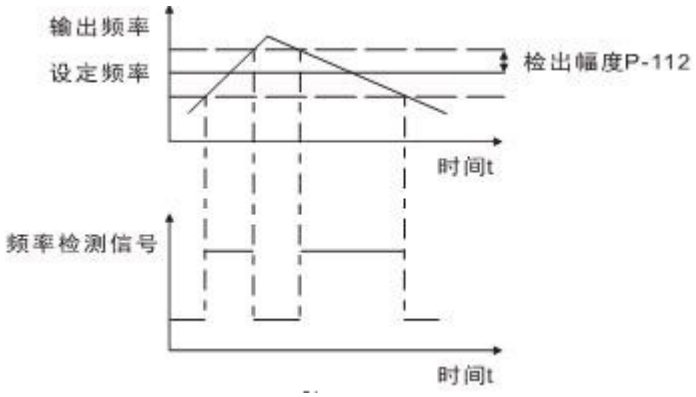


Function code	Name	Description	Setting range	Factory default
P-110	FDT voltage detecting value	0.00～P-004(Maximum Frequency)	0.00～P-004	50.00Hz
P-111	FDT lagging detecting value	0. 0 ～ 100. 0% (FDT level)	0.0 ～ 100.0	5.00%

FDT level diagram

Function code	Name	Description	Setting range	Factory default
P-112	Detecting range of the frequency	0. 0～100. 0% (Maximum Frequency)	0.0 ～ 100.0	0.00%

When the output frequency of the frequence converter reaches the set frequency value, this function can adjust its detection amplitude of it whish is shown as follows:



The diagram of arrival of the frequency to the detection amplitude

Function code	Name	Description	Setting range	Factory default
P-113	Brake threshold voltage	115. 0～140. 〇%(Standard bus voltage) （380V series）	115.0 ～ 140.0	130.00%
		115.0～140. 0%(Standard bus voltage) （220V series）	115.0 ～ 140.0	120.00%

This function is to set the starting bus voltage of the dynamic brakingand the proper adjustment of this value can effectively brake the load.

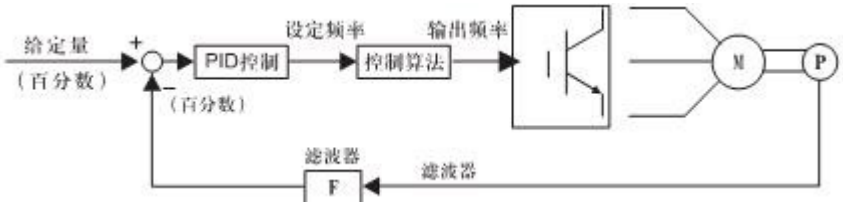
Function code	Name	Description	Setting range	Factory default
P-114	Rotating-speed display coefficient	0.1～999. 9% (Mechanical RPM = 120 * operating frequency * (P-114) / motor pole number)	0.1～999.9	100.00%

Mechanical speed = 120 * Operating frequency * P-114 / number of motor poles, and this function code is used to correct the speed scale display error, which has no has no effect on the actual speed.

PID function

PID control is a common method for process control, which adjusts the output frequency of the frequence converter through the proportional, integral and differential operations of the feedback signal and the target volume signal of the controlled volume to consist the negative feedback system which make the controlled volume is stable on the

has the target quantity. Suitable for process control such as flow control, pressure control and temperature control. The basic diagram of the control is as follows:



Process PID principle diagram

Function code	Name	Description	Setting range	Factory default
P-115	PID given source options	0: keyboard given (P-116) 1: Analog channel FV given 2: Analog channel FI given 3: Remote communication given 4: Multi-segment given 5: Local potentiometer setting	0^5	0

When the frequency source selects PID, that is, P-003 is selected as 5, then the PID function will work. This parameter determines the target quantity given channel of process PID. The set target quantity of the process PID is the relative value and set 100% corresponds to 100% of the feedback signal of the controlled system. The system is always operated according to the relative value (0 ~ 100.0%).
Note: multi-segment given can be achieved through the setting of SPD parameters.

Function code	Name	Description	Setting range	Factory default
P-116	Keyboard preset PID given	0. 0%～ 100. 0%	0.0 ～ 100.0	0.00%

This parameter will need to be set when P-115 = 0 is selected that is the traget source is given. At this point the parameters and keyboard UP / DOWN binding can directly modify PID set value y through the keyboard UP / DOWN.

The fiducial value of this parameter is the feedback amount of the system.

Function code	Name	Description	Setting range	Factory default
P-117	PID feedback source options	0: Analog channel FV feedback 1: Analog channel FI feedback 2: FV + FI feedback 3: Remote communication feedback	0～3	0

This parameter is used to select the PID feedback channel.
Note: the given channel and feedback channel can not coincide, otherwise, PID can not be effectively controlled.

Function code	Name	Description	Setting range	Factory default
P-118	PID output characteristics options	0: PID output is positive 1: PID output is negative	0～1	0

PID output is positive: when the feedback signal is greater than the PID given, which requires the frequence converter output frequency drops, to make the PID balance. Such as the rolling tension is controlled by PID.
PID output is negative: when the feedback signal is greater than the PID given,which requires the frequence converter output frequency rise to make the PID balance. Such as unwinding tension is controlled by PID.

Function code	Name	Description	Setting range	Factory default
P-119	Proportional gain (Kp)	0. 00 ～ 100. 00	0.00 ～ 100.00	1
P-120	Integral time (Ti)	0.01 ～ 10.00s	0.01 ～ 10.00	0.10s

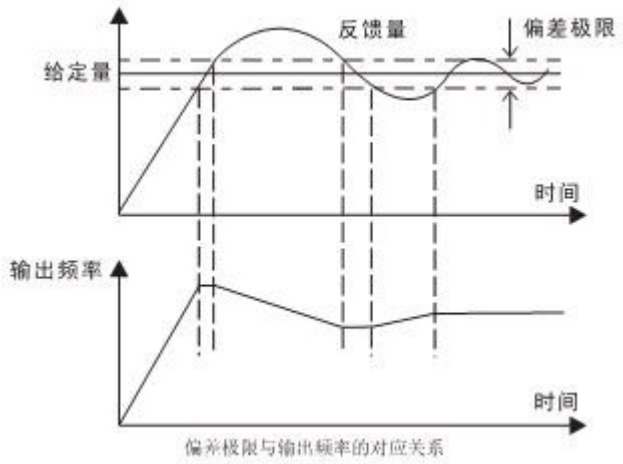
P-121	Derivative time (Td)	0.00～10. 00s	0.00 ～ 10.00	0.00s

Proportional gain (Kp): Determines the adjustment strength of the entire PID regulator, where the greater the Kp, the greater the adjustment strength.
That this parameter is 100 indicates that when the PID feedback amount and the deviation of the given quantity are 100%, the accommodative amplitude of the PID regulator on the output frequency command will be the maximum frequency (ignoring the integral action and the differential effect).
Integral time (Ti): Determines the integral regulation of the PID regulator on the PID feedback and the deviation of given quantity. The integral time refers to that when the PID feedback and the deviation of given quantity are 100%, the adjustment amount of the integral regulator (ignoring the proportional action and differential action) will reach the maximum frequency (P-004) through the continuous adjustment of this time.
The shorter the integration time, the greater the adjustment strength.
Derivative time (Td): Determines the adjustment strength of the PID regulator on the PID feedback amount and the deviation of given quantity. Derivative time means that if the feedback amount changes by 100% over that time, the adjustment amount of the differential adjuster is the maximum frequency (P-004) (ignoring the proportional action and integral action). The longer the differentiation time, the greater theadjustment strength.
PID is the most commonly used control method in process control, and the effect of every part is different. The following is the brief description of the working principle and adjustment method:
Proportional adjustment (P): When there is a deviation between the feedback and setting , the adjustment strength of the output is proportional to it of the deviation. If the deviation is constant, the adjustment will also be constant. Proportional adjustment can quickly respond to the feedback changes, but the proportional control simply can achieve the is ochronous control. The greater the proportional gain, the faster the regulating speed of the system. But if the proportional gain is oversize, there will be vibration. The adjustment method is to set the integration time very long, as well as the derivative time to be 0. Then the oprtaion of the proportional adjustment changes the size of the given quantity. The stable deviation (static difference) of feedback signal and the given amount shall be observed. If the static difference is in the given change direction (for example, the feedback amount increases, the feedback amount will be always less than the given amount after the system stability), then the proportional gain shall be continue to be increased. Otherwise the proportional gain is reduced to repeat the above process until the static difference is small (it is difficult to maintain zero static deviation).
Integration time (I): When there is a deviation between the feedback and setting, the output adjustment amount is accumulated continuously. If the deviation persists, the adjustment amount continues to increase until there is no deviation. Integral regulator can effectively eliminate the static difference.

The overpowered integral regulator will cause the repeat overshooting to make the system unstable all the time until there is the oscillation. The characteristics of the oscillation caused by the overpowered integral effect is that the feedback signal swings up and down in a given amount to make the swing scope increase gradually to vibrate. The adjustment of the integral time parameter is to adjust the integration time from the maximun to minimum gradually. The system adjustment effect shall be observed untile that the stable speed of the system achieve the requirement.
Derivative time (D): When the feedback and the setting deviation changes, the adjustment amount of the output is proportional to it of change rate of the deviation. The adjustment amount is only related to the direction and size of the deviation changes but is not related to the direction and size of the deviation itself. The effect of the differential regulation is to have the adjustment to constrain the feedback signal changes according to the trend of change when the feedback signal changes. Please take care to use the differential regulator because the differential adjustment is easy to amplify the system interference, especially the interference with higher frequency changes.

Function code	Name	Description	Setting range	Factory default
P-122	Sampling period (T)	0. 01 ～ 100. 00s	0.01 ～ 100-00	0.10s
P-123	PID control deviation limit	0. 0～100. 0%	0.0 ～ 100.0	0.00%

Sampling period (T): refers to the sampling period of the feedback amount, which is operated one time by the regulator in every sampling period. The longer the sampling period, the slower the response.
PID controlling deviation limit: the maximum deviation amount allowed by the PID system output value relative to the closed-loop set balue is shown as the Fig. that in the deviation limit, the PID regulator stops the adjustment. Reasonable setting of the function code can adjust the accuracy and stability of the PID system.



Correspondence between deviation limit and output frequency

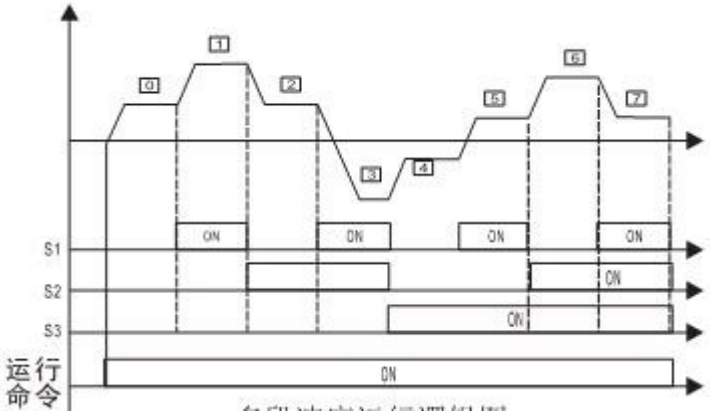
Function code	Name	Description	Setting range	Factory default
P-124	Feedback disconnection detection value	0,0～100. 0%	0.00 ～ 100-0	0.00%
P-125	Feedback disconnection detection time	0,0～3600, Os	0.00～ 3600.0	1. Os

Feedback disconnection detection value: the detection value is relative to the full range(100%), and the system has been detected PID feedback amount. When the feedback value is less than or equal to the feedback disconnection detection value, the system will began to detect the timing. When the detection time exceeds the feedback disconnection detection time, the system will report the PID feedback disconnection fault (PIDE).

Function code	Name	Description	Setting range	Factory default
P-126	The zero frequency	-100.0～ 100. 0%	-100.0 ～ 100.0	0.00%
P-127	First frequency	-100.0～ 100. 0%	-100.0 ～ 100.0	0.00%
P-128	Second frequency	-100.0～ 100. 0%	-100.0 ～ 100.0	0.00%
P-129	Third frequency	-100.0～ 100.0%	-100.0 ～ 100.0	0.00%

P-130	Fourth frequency	-100.0～ 100. 0%	-100.0 ～ 100.0	0.00%
P-131	Fifth frequency	-100.0 ～ 100.0%	-100.0 ～ 100.0	0.00%
P-132	Sixth frequency	-100.0～ 100.0%	-100.0 ～ 100.0	0.00%
P-133	Seventh frequency	-100.0～ 100. 0%	-100.0 ～ 100.0	0.00%

SPD symbols determine the direction of operation. If it is negative value, the frequency settin 100.0% will correspond to the maximum frequency (P-004). The 3 multifunction input terminals such as SI, S2, S3 as the PD terminals 1, 2, 3(12,13,14, respectively,corresponding to parameters P-053, P-054, P-055) and 8 segments speed can be selected through the composite encoding of SI, S2, S. When Sl = S2 = S3 = OFF, the frequency input mode is selected by code P-003. When not all the SI, S2, S3 terminals are OFF, the SPD will run. The priority of SPD is higer then the frequency input of keyboard, analog, communication.
When P-001 = 0,, the start and stop of the SPD is decided by the SPD control terminals that is, once the SPD control terminals are connected, the SPD will run and be disconnected automatically. Then the automatic stop need no the additional start and stop instructions. When P-001 = 1, the SPD will not start and stop automatically, which need the additional start and stop instructions.
As the zero segment frequency, the P-126 just applies to the program running as the zero segment frequency.



Logic diagram of SPD operation

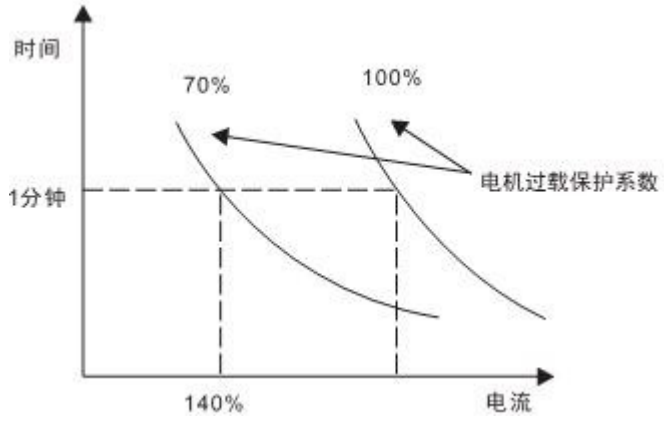
S1	OFF	ON	OFF	ON	OFF	ON
S2	OFF	OFF	ON	ON	OFF	ON
S3	OFF	OFF	OFF	OFF	ON	ON
Running	0	1	2	3	4	7

segment						

Function code	Name	Description	Setting range	Factory default
P-134	Motor overload protection options	0: No protection 1: General motor (with low speed compensation) 2: Variable frequency motor (without low speed compensation)	0～2	1

0: No protection. There is no motor overload protection characteristics (careful use) when the frequence converter has no overload protection on the load motor.
1: General motor (with low speed compensation). As the cooling effect of the ordinary motor in the low-speed is poor, the corresponding electronic thermal protection value will be also adjustes appropriatelyt. Here the low-speed compensation characteristics mentioned, is to lower the overload protection threshold value of the motor with the operation frequency lower than 30Hz.
2: Variable frequency motor (without low speed compensation). As the colling of the special motor of the frequence converter is not affected by the rotate speed, so there is no need to have the protective value adjustment during the low-speed operation.

Function code	Name	Description	Setting range	Factory default
P-135	Motor overload protection current	20.0% ~ 120.0% (motor rated current)	20.0 ～ 120.0	100.00%



Motor overload protection coefficient setting
This value can be determined by the following formula:
Motor overload protection current = (maximum allowable load current / frequence converter rated current) * 100%.
In general, the maximum allowable load current is defined as the ated current of the load motor. When the rated current of the load motor does not match the rated current of the frequence converter, the settingof the values of P-134 to P-135 can achieve the overload protection of the motor.

Function code	Name	Description	Setting range	Factory default
P-136	Instantaneous power cut underclocking point	70. 0～110. 0% (Standard bus voltage)	70.0～110.0	80.00%
P-137	Instantaneous power cut frequency reduction rate	0. 00Hz～P-004 (Maximum Frequency)	0. 00Hz～P-004	0.00Hz

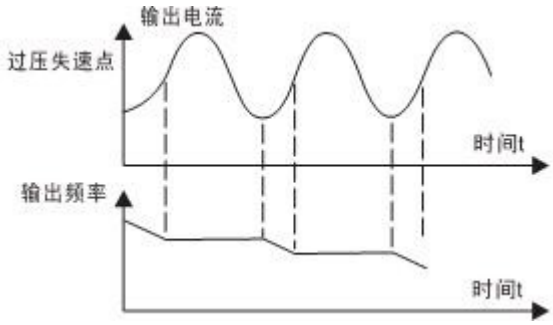
When the instantaneous power-down rate is set to be as 0, the instantaneous power-down restart function is invalid. Instantaneous power-down reduced frequency point refers to that when the bus voltage reduces to the instantaneous power-down reduced frequency point after the disconnection of the power grid, the frequence converter will start to lower the operation frequency according to the descent rate (P-137) of the instantaneous power-down frequency to let the motor in the power status. The feedback power is made to maintain the bus voltage, to ensure the normal operation of the inverter until the power of the frequence converter is on.

Note: Proper adjustment of these two parameters, can achieve the power grid switching well, which will not cause the frequence converter protection to cause the production downtime.

Function code	Name	Description	Setting range	Factory default
P-138	Overvoltage stalling protection	0: Prohibited 1: Allowed	0～1	0
P-139	Overvoltage stalling protection voltage	110%～150% (380Vseries)	110～150	120%
		110%～150% (220Vseries)	110～150	115%

During the decelertion operatio of the frequence converter, the actual descent rate rate of the motor rotate speed may be lower than the output frequency, due to the influence of the load inertia. At this time, the motor will feed the power to the frequence converter, causing the bus voltage of the frequence converter to rise. If the measures are not taken, the bus over-voltage fault caused will cause the tripping operation of the frequence converter.

The overvoltage stall protection function can detect the bus voltage during the operation of the frequence converter and have the comparasion with the stall overpressure point defined by the P-139 (relative to the standard bus voltage). If it exceeds the stall overpressure point, the output frequency of the frequence converter will stop the decreasing. When the bus voltage is detected again to be lower than the stall overpressure point, it will continue the decelertion operation as shown below:

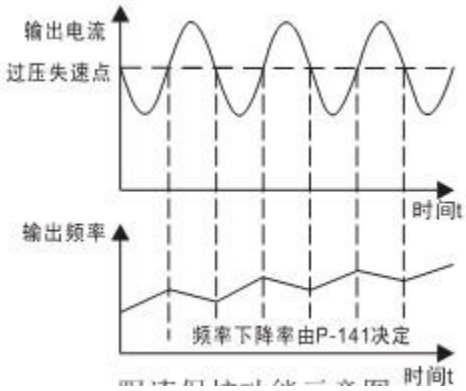


Overvoltage stall function

Function code	Name	Description	Setting range	Factory default
P-140	Auto-current-li	100～	100～200	160% (G)

	mit level	200%		120% (P)
P-141	Frequency drawdown ratio for current limit	0.00～100.00Hz/s	0.0～100.00	10.00Hz/S

During the operation of the frequence converter, the actual raising rate of the motor rotate speed is lower than the rising rate of the output frequency due to the excessive load. If the measures are not taken, the bus over-current fault caused will cause the tripping operation of the frequence converter.
The overcurrent stall function can detect the putput current in the operation of the frequence converter and have the comparasion with the current-limiting level point defined by P-140. If the current-limiting level point is exceeded, the output frequency of the frequence converter will decrease according to the descent rate of the over-current frequency. When the output current is detected again to be lower than the current-limiting level point, the normal operation will be restored, as shown below:



Current-limiting protection function diagram
Overvoltage stall function

Function code	Name	Description	Setting range	Factory default
P-142	Local communication address	1 ~ 247, 0 is the broadcast address	0 ～ 247	1

When the master is in the preparation of the frame, while the slave address is set to be zero, that is, the broadcast address. All the salves on the MODBUS bus will accept the frame, but the salves will not response. Note that the slave address can not be set to be

as zero. The master communication address is unique in the communication network, which is the basis to achieve the point to point communication of the upper computer and the frequence converter.

Function code	Name	Description	Setting range	Factory default
P-143	Communication baud rate setting	0 : 1200BPS 1 : 2400BPS 2 : 4800BPS 3 : 9600BPS 4 : 19200BPS 5 : 38400BPS	0～5	

This parameter is used to set the message transmission rate between the upper computer and the frequence converter. Note that the set baud rate upper computer and the frequence converter must be consistent, otherwise, the communication can not be carried out. The higher the baud rate, the faster the communication speed.

Function code	Name	Description	Setting range	Factory default
P-144	Data bit validation setting	0: No verification (N, 8,1) for RTU 1: Even parity (E, 8,1) for RTU 2: Odd parity (O, 8,1) for RTU 3: No parity (N, 8,2) for RTU 4: Even parity (E, 8,2) for RTU 5: Odd parity (0, 8,2) for RTU 6: No parity (N, 7,1) for ASCII	0～17	0

		7: Even parity (E, 7,1) for ASCII 8: Odd parity (O, 7,1) for ASCII 9: no parity (N, 7,2) for ASCII 10: Even parity (E, 7,2) for ASCII 11: odd parity C0, 7,2) for ASCII 12: No parity (N, 8,1) for ASCII 13: Even parity (E, 8,1) for ASCII 14: Odd parity (0, 8,1) for ASCII 15: no parity (N, 8,2) for ASCII 16: Even parity (E, 8,2) for ASCII 17: Odd parity (0, 8,2) for ASCII		

The data format set by the upper computer and by the frequence converter must be the same, otherwise, the communication can not be carried out.

11-bits (for RTU)

start bit	**bitO**	**bit1**	**bit2**	**bit3**	**bit4**	**bit 5**	**bit 6**	**bit7**	**Stop bit**	**stop bit**
	^ **8-< date b**									
◀	**11 -bits character frame**								**w**	

Data format: 8-N-2

Data format: 8-E-1

Data format: 8-0-1

10- bits (for ASCII)

Data format: 7-N-2

Data format: 7-E-1

Data format: 7-0-1

Function code	Name	Description	Setting range	Factory default
P-145	Communication response delay	0~200ms	0 ～ 200	5ms

Response delay: refers to the middle interval time from the end of the data reception of the frequence converter to sending the response data to the upper computer. If the response delay is less than the system processing time, the response delay shall be subject to the system processing time. If the response delay is longer than the system processing time, the system will delay the waiting time after the completion of the processing of the data of the system. The data is sent to the upper computer until the response delay time is reached.

When the function code is set to be as 0.0S, the communication timeout parameter is invalid.
When the function code is set to be a valid value, where the interval between the two

communication exceeds the communication timeout period, the system will report a communication error (CE).
Normally, it is set to be invalid. If this parameter is set in the continuous communication system then the communication status can be monitored.

Function code	Name	Description	Setting range	Factory default
P-146	Communication timeout fault time	0.0 (invalid), 0.1 ~ 100.0s	0.0 ～ 100.0	0. 0s

Function code	Name	Description	Setting range	Factory default
P-147	Transmission error handling	0: Alarming and shutdown 1: No alarming and continue to run 2: No alarming and stopped by the halt mode (communication control only) 3: No alarming and stopped by the halt mode (all control)	0～3	1

In case of abnormal communication, the frequence converter can shield the fault alarm and stop by setting the protection action option to keep running.

Function code	Name	Description	Setting range	Factory default
P-148	Transmission response handling	0: writing operation with response 1: writing operation with no response	0～1	0

When the function code is set to be 0, the frequence converter response all the read and write commands of the upper computer.
When the function code is set to be 1, the frequence converter response only the read command of the upper computer, and will not response to the write command. In this way, the communication efficiency can be improved.

Function code	Name	Description	Setting range	Factory default
P-149	Restrain oscillation low frequency threshold value point	0 ～500	0 ～500	15
P-150	Restrain oscillation high frequency threshold value point	0 ～500	0 ～500	15

Most of the motor will have the current oscillation in some frequency segment. The light one will cause that the motor can not run stably and serious one can cause the overcurrent frequence converter. When P-153 = 0, the enble will suppress the oscillation. When the P-149, P-150 are set small, the oscillation suppression effect is obvious where the current increase is more obvious. When it is set to be larger, the oscillation suppression effect will be weaker.

Function code	Name	Description	Setting range	Factory default
P-151	Restrain oscillation clamped output	0 ～ 100	0 ～ 100	20

The big voltage raising value during the restrain oscillation can be limited by setting the P-151.

Function code	Name	Description	Setting range	Factory default
P-152	Restrain oscillation high/low frequency dividing frequency	0.00Hz ~ P-0 (H (maximum frequency)	0.00～P-004	12.5 Hz

P-152 is the demarcation point of function codes P-149 and P-150.

Function code	Name	Description	Setting range	Factory default
P-153	Restrain oscillation	0: Restrain oscillation valid 1:Restrain oscillation invalid	0～1	0

0: Restrain oscillation valid
1:Restrain oscillation invalid
Restrain oscillation function is for VF control. The ordinary motor often has the current oscillation phenomenon in the no-load or light load operation, which will cause the abnormal operation of the motor and make the frequence converter over-current seriously. When P-153 = 0, it is enbled to restrain the oscillation and the frequence converter will have the restrain on the oscillation of the motor according to the P-149 ~ P-152 parameters.

Function code	Name	Description	Setting range	Factory default
P-154	PWM options	0 ～ 122	0 ～ 122	0

Single digit : 0, PWM waveform five-stage and seven-stage automatic switching
1, seven-stage in the whole process
2, five-stage in the whole process
Ten digit: 0, no modulation
1, overmodulation part open
2, over-modulation all open
Hundred's place: 0, no function

Function code	Name	Description	Setting range	Factory default
P-155	No - load current compensation coefficient	0 ～ 9.99	0 ～ 9.99	0.5

No-load current compensation factor: can mainly compensate the torque size in the vector mode and within the 1Hz of the rotate spped and in general, the default value is Ok.

Function code	Name	Description	Setting range	Factory default
P-156	Si terminal inverse phase logic options	Binary D0-D5 bits correspond to S1-S6, in which, 1 is for reverse phase, that is, valid in disconnection.	0～63	0

This function is used to select whether the S1 ~ S6 multi-function terminal is valid in disconnection. S1 ~ S6 corresponds to the binary bit DO ~ D5, which will be reversed when they are 1, that is, open valid for the disconnection.

Multi-function terminals	S6	S5	S4	S3	S2	S1
Binary bit	D5	D4	D3	D2	D1	D0
D0～D5setting value	1	1	1	1	1	1
S1～S6 weight	32	16	8	4	2	1

Example: If want to set the S2 is valid for the disconnection, it need only to set the P-156 parameter value to the weight of S2, ie P-156 = 2; If want to set the S2,S5 are valid for the disconnection, it need only to set the P-156 as the sum of the weights of S2 and S5, that is, P-156 = 18.

Function code	Name	Description	Setting range	Factory default
P-157	Current count value	0-65000	0-65000	0

This parameter sets the current count value of the counter, and the external count pulse signal increments the parameter upwards.

Function code	Name	Description	Setting range	Factory default
P-158	Count preset	0-65000	1-65000	100

This function is used to set the prevalue of the counter. When the count value is equal to the count prevalue, the system responds according to the setting of P-160.

Function code	Name	Description	Setting range	Factory default
P-159	Count to prewarning	0-65000	1-65000	1

This function is used to set the counter's prewarning value to do a better preparation of the next stage before the arrival of the counter. When the counting arrival at the prewarning value, the system can output signal through the relay Jl, J2 (P-072-P-073 set to be13).

Function code	Name	Description	Setting range	Factory default

P-160	Count to action options	0;Shutdown output 2: Continuous output	0～1	0

This function is used to set the frequence converter output selection when the count value reaches the count prevalue.

Function code	Name	Description	Setting range	Factory default
P-161	Program operation mode	0: Program operation mode off 1: Continuous loop mode off 2: Single cycle mode 3:Operating in the last frequency after a single cycle	0~3	0

1: When the continuous circulation mode is selected, it runs in circulation continuously according to the set segment;
2: When the single-cycle mode is selected the operation is end after a loop according to the set segment;
3: When the single-cycle mode is selected to maintain the final frequency operation, it runs based on the final frequenyc after a loop according to the set segment;

Function code	Name	Description	Setting range	Factory default
P-162	Program operation mode power-off memory	0: Do not remember 1: Memory	0～1	0

	options		

0: Do not remember
1: Memory
In the procedure operation process, the stop key STOP is used as the pause key for the program operation. If the operation instruction is input again, it continues to run from the breakpoint.

Function code	Name	Description	Setting range	Factory default
P-163	Program operation time unit	0: second 1: minute	0～1	0

This function is used to set the time unit for the program operation.

Function code	Name	Description	Setting range	Factory default
P-164	Zero run time	0 ～6000. 0	0～6000.0	2
P-165	The first run time	0 ～6000. 0	0～6000.0	2
P-166	The second run time	0 ～6000. 0	0～6000.0	2
P-167	The third run time	0 ～6000, 0	0～6000.0	2
P-168	The fourth run time	0 ～6000. 0	0～6000.0	2

P-169	The fifth run time	0 ～6000. 0	0～6000.0	2
P-170	The sixth run time	0 ～6000. 0	0～6000.0	2
P-171	The seventh run time	0 ～6000. 0	0～6000.0	2

The above parameters set the time value of each segment of the program operation.

Function code	Name	Description	Setting range	Factory default
P-172	Acceleration / deceleration time option 1	0 ～ 7777	0 ～ 7777	0
P-173	Acceleration / deceleration time option	0 ～ 7777	0 ～ 7777	0

Acceleration / deceleration time selection 1: Single digit: Indicates the acceleration / deceleration of the zero segment
Ten-digit: Indicates the first acceleration and deceleration
Hundred places: Indicates the second acceleration and deceleration
kilobit (kb): indicates the third acceleration and deceleration
Single digit: Indicates the fourth acceleration and deceleration
Ten digit : Indicates the fifth acceleration and deceleration
Hundred places: Indicates the sixth acceleration and deceleration
kilobit (kb):Indicates the seventh acceleration and deceleration
Others are the same as the P-172
0: Indicates acceleration / deceleration time 0
1: indicates acceleration / deceleration time 1
2: indicates acceleration / deceleration time 2
3: Indicates acceleration / deceleration time 3
4: Indicates acceleration / deceleration time 4
5: Indicates acceleration / deceleration time 5
6: Indicates acceleration / deceleration time 6

7: Indicates acceleration / deceleration time 7
The different acceleration and deceleration time is selected for the different multi-speed through setting the above two parameters.

Function code	Name	Description	Setting range	Factory default
P-174	Acceleration time 1	0.1 ～ 3600. Os	0.1～ 3600.0	Model setting
P-175	Deceleration time 1	0.1 ～ 3600. Os	0.1～ 3600.0	Model setting
P-176	Acceleration time 2	0.1 ～ 3600. Os	0.1～ 3600.0	Model setting
P-177	Deceleration time 2	0.1 ～ 3600. Os	0.1～ 3600.0	Model setting
P-178	Acceleration time 3	0.1 ～ 3600. Os	0.1～ 3600.0	Model setting
P-179	Deceleration time 3	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting
P-180	Acceleration time 4	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting
P-181	Deceleration time 4	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting
P-182	Acceleration time 5	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting
P-183	Deceleration time 5	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting
P-184	Acceleration time 6	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting
P-185	Deceleration time 6	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting
P-186	Acceleration time 7	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting
P-187	Deceleration time 7	0.1 ～ 3600.0s	0.1～ 3600.0	Model setting

Please refer to related description of the parameters of P-007, P-008 acceleration and deceleration time 0 and the meaning is the same.

Function code	Name	Description	Setting range	Factory default
P-188	Number of auxiliary pumps	0～2	0～2	0

P-189	Recovery pressure	0 ～ 100.0%	0 ～ 100.0	50.00%
P-190	Sleep capacity	0:closed 1:open	0～1	0
P-191	Sleep pressure	0 ～ 100.0%	0 ～ 100.0	80.00%
P-192	Sleep delay time	0 ～ 6000.0	0～ 6000.0	0
P-193	Recovery delay time	0 ～ 6000.0	0～ 6000.0	0
P-194	Auxiliary pump open wiat time	0 ～ 6000.0	0 ～ 6000.0	0
P-195	Auxiliary pump closed wiat time	0 ～ 6000.0	0～ 6000.0	0
P-196	Sleep frequency	0～P-0G5 (upper limiting frequency)	0～ P-0G5 (upper limiting frequenc y)	30.0Hz

In PID mode, the application of each parameter.
The usage for auxiliary pump 1, 2 :
1. First is to select the number of auxiliary pumps, and then the Jl, J2 are selected as the corresponding auxiliary pump function.
2 . Adding pump: When the operating frequency reaches the upper limit frequency. If then the PID given source y value is still greater than the feedback source L value, a auxiliary pump will be started after a certain period of time through the external terminal. This wait interval is the "auxiliary pump open-wait time".
Reducing pumps:When the operating frequency reaches the lower limit frequency. If the PID given source value is still less than the feedback source value, a auxiliary pump will be closed after a certain period of time through the external terminal. This wait interval is the "auxiliary pump close-wait time".
Opening sequence: J1 first and then J2

Closing sequence:J2 first and then J1
3. During the open-close waiting time of the auxiliary pump, if the condition is not satisfied, the time will be recalculated,. But the auxiliary pump which has been opened will not be closed.
4. During sleep, the auxiliary pump will be closed.
The usage of recovery pressure, sleepy pressure:
1. Enable the "Sleepy Enable" first.
2. In the case of positive characteristic, the frequence converter is in the awake state. If the PID feedback source value is greater than the value of the sleepy pressure, it will enters into the zero frequency operation state after a period of wait time. This waiting time is "sleep delay time".
3. In the case of positive characteristics, the frequence converter is in the awake state. If the PID feedback source value is less than the value of the wake pressure, it will restore the non-zero frequency operation state. This wait time is "recovery delay time".
4. During the two delay periods, the time is recalculated as long as the condition is not satisfied.

Chapter 7 Fault definition and treatment method

7.1 Fault information and exclusion methods

Fault code	Fault type	Possible failure cause	Countermeasure
0C1	Overcurrent during acceleration	1. Accelerating too fast 2. The grid voltage is low 3. The frequence converter power is too low	1. Increasing the acceleration time 2. Checking the input power 3. Selecting the frequence converter with power with one file bigger of the
0C2	Overcurrent during deceleration	1. Decelerating too fast 2. Load inertia torque is too large	1. Increasing the deceleration time 2. Adding the appropriate energy consumption brake assembly

		3. The frequence converter power is too small	3. Selecting the frequence converter with the power one file bigger
0C3	Overcurrent during constant speed	1. Loads are mutated or abnormal 2. The grid voltage is low 3. The frequence converter power is too small 4. Short circuit for the output	1. Checking the load or reducing the mutation of the load 2. Checking the input power 3. Selecting the frequence converter with power one file bigger 4. Checking that the motor and wiring are well insulated
0U1	Overcurrent during acceleration	1. The input voltage is abnormal 2. Restart the motor in rotation after the interrupt power-supply	1. Checking the input power 2. Avoiding restarting for the downtime
0U2	Overcurrent during deceleration	1. Decelerating too fast 2. Load inertia is large 3. The input voltage is abnormal	1. Decreasing the deceleration time 2. Increasing the energy consumption brake components 3. Checking the input power
0U3	Overcurrent during constant speed	1. The input voltage has changed abnormally 2. Load inertia is large	1. Installing the input reactor 2. Adding the appropriate energy consumption brake assembly
UV	Undervoltage busbar	1. The grid voltage is low 2. Inverter internal is failed	1. Checking the grid input power 2. Seeking service
0L1	Motor overload	1. The grid voltage is too low	1. Checking the grid voltage

		2. The motor rated current is not set correctly 3. Motor stalls or load mutation is too large 4. Motor power is not matched	2. Reseting the motor rated current 3. Checking the load, adjust the torque lifting capacity 4. Selecting the appropriate motor
0L2	Frequence converter overload	1. Accelerating too fast 2. Restart the motor in rotation 3. The grid voltage is too low 4. The gird load is too large	1. Increasing the acceleration time 2. Avoiding restartong for the downtime 3. Checking the grid voltage 4. Selecting a frequence converter with larger power
SPO	The output side i lacking of phase	U, V, W phase-deficient output (serious asymmetry of the load three-phase)	1. Checking the output wiring 2. Checking the motor and cable 3. Seeking service
0H	Overheating	1. The inverter is momentarily overcurrent 2. The air duct is blocked or the fan is damaged 3. Ambient temperature is too high 4. The control panel is abnormal	1. Refering to the overcurrent countermeasure 2. Dredging the air duct or replacing the fan 3. Reducing the ambient temperature 4. Seeking service
EF	External fault	1. External fault input terminal moves	1. Checking the external device input
CE	Communication failure	1. The baud rate is set incorrectly 2. Communication error of the serial communication is used	1. Setting the appropriate baud rate 2. Seeking service according to STOP key reset,

		3. Communication has been interrupted for a long time	3. Checking the communication interface wiring
ITE	Current detection circuit failure	1. The onnection of the control panel connector is poor 2. The auxiliary power supply is damaged 3. The current sensor is damaged 4. Amplifier circuit is abnormal	1. Checking the connector and reinserting it 2. Seeking service 3. Seeking service 4. Seeking service
TE	Motor self - learning failure	1. The capacity of the motor does not match the capacity of the frequence converter 2. The motor rated parameters are set incorrectly 3. The deviation between the self-learned parameters and standard parameters is too large 4. The self-learning is timeout	1. Replacing the frequence converter model 2. Setting the rated parameters according to the motor nameplate 3. Making the motor no-load, and re-identifing it 4. Checking the motor wiring, and setting the parameter
EEP	Memory read and write failures	1. The read and write of the control parameters is wrong 2.EEPROM is damaged	1. Pressing STOP key reset and seeking service 2. Seeking service
PIDE	PID feedback disconnection fault	1.PID feedback is disconnected 2.PID feedback source disappears	1. Checking the WD feedback signal line 2. Checking the PID feedback source

7.2 Common faults and the handling methods

The frequence converter may have the following fault conditions in the using process so please refer to the following methods for simple fault analysis:

No display for powering on: Checking whether the input power is consistent with the rated voltage of the frequence converter with the multimeter. Please check and remove the power problems if any. Cheking whether the three-phase rectifier bridge intact. If the rectifier bridge has been exploded, please seek service.

The air switch trips off when it is powered on: checking whether thsre is ground or short circuit between the input power supply and eliminate the problem. Check whether the rectifier bridge has been damaged and please seek service if so.

The motor does not rotate after the frequence converter is running:

Check whether there is a balanced three-phase voltage output between U, V and W. If so, the motor line or it is damaged, or the motor rotor is locked due to the mechanical reasons. Please exclude them.

U, V and W output voltage but three-phase is unbalanced, which should be that the frequence converter drive board or output module is damaged so please seek service.

If there is no output voltage, the driver board or output module may be damaged, please seek service.

The powered-on frequence converter is displayed normal and the power air switch tripped off after the operation: Check whether there is short circuit between the output module. If so please seek service.

Check whether there is a short circuit or grounding between the motor leads. If so, please exclude it. If the tripping operation occurs occasionally and the distance between the motor and the inverter is relatively far, please consider adding the AC reactor.

Chapter 8 RS485 Communication Protocol of Frequence Converter

The frequence converter provides RS485 communication interface which is the master slave communication using the international standard ModBus communication protocol. The users can achieve the centralized control(setting of the frequence converter control commands, operating frequency, the modification of the relevant function code parameter, frequence converter operating status and fault information

monitoring, etc.) through the PC / PLC and control of the upper computer to meet specific application requirements.

8.1 Protocol content

The Modbus serial communication protocol defines the frame content and the format of asynchronous transmission in serial communication, including: master polling and broadcast frame, slave response frame format; The frame content orgnazied by the master includes: the slave address (or broadcast address), execute command data and error checking etc.. The slave response is also using the same structure and the main content includes: action confirmation, return data and error checking etc.. If the frame receipt from the slave is wrong or the action required by the master can not be completed, it will organize a fault frame to feedback to the master as a response.

8.2 Application mode

The frequence converter accesses the " Single master, multiple slaves" control network with RS232 / RS485 bus.

8.3 Bus structure

⑴Interface mode

RS485 hardware interface

(2) Transmission mode

Asynchronous serial, half-duplex transmission. For the master and the salve, in a same time, just one can sed data and the other receive the data. In the serial asynchronous communication process, the data is sent by frame and frame in the form of message.

(3) Topological structure

Single master, multi-slaves system. The slave address setting range is 1 ~ 247, and 0 is the broadcast communication address. The slave address in the network is unique. which is the basis to ensure the ModBus serial communication.

8.4 Protocol description

The frequence converter communication protocol is an asynchronous serial master-slave ModBus communication protocol and in the network, only one device (master) can establish a protocol (called "query / command"). Other devices (slaves) can only provide data to response the master's "query / command" or make the corresponding actions according to the master's "query / command". The master here refers to the personal computer (PC), industrial control device or programmable

logic controller (PLC), etc. and the slave is the frequence converter or the other control device with the same communication protocol. The master can not only can communicate to a slave separately but also can issue broadcast information to the slave. For the master "query / command" accessed separately, the slave has to return a message (called a response). While for the broadcast information sent out by the master, the slave does not need to respond to feedback information to the master.

8.5 Communication frame structure

The ModBus protocol communication data format of the frequency converter is divided into two types: RTU (Remote Terminal Unit) mode and ASCII (American Standard Code for Information International Interchange) mode.

In RTU mode, the format of each byte is as follows:

Encoding system: 8-bit binary, hexadecimal 0 ~ 9, A ~ F, and each 8-bit frame field, contains two hexadecimal characters.

In ASCII mode, the format of each byte is as follows:

Encoding system: communication protocol belongs to hexadecimal system,and the ASCII information character meaning:

Each hexadecimal "0" ... "9", "A" ... "F" represents each ASCII information, for example:

Character	“0”	”1”	”2”	”3”	«4, ,	”4”	”5”	”6”	”7”	”8”
ASCII code	0X30	0X31	0X32	0X33	0X34	0X35	0X36	0X37	0X38	0X39
Character	“A”	“B”	“C”	“D”	“E”	“F”				
ASCII code	0X41	0X42	0X43	0X44	0X45	0X46				

Byte bit:

Including start bit, 7 or 8 data bits, parity and stop bits. The byte bits are described in the following table:

11-bit character frame:

Start bit	Bitl 1	Bit2	Bit3	Bit4	Bit5	Bit 6	Bit 7	Bit 8	No parity bit Even parity bit Odd parity	Stop bit

10-bit character frame:

Start bit	Bitl 1	Bit2	Bit3	Bit4	Bit5	Bit 6	Bit 7	No parity bit Even parity bit Odd parity	Stop bit

In RTU mode, the new frame always transmits the time silence silent at least 3.5 bytes to be as the start. In the internet with the baud rate to calculate the transmission rate, the 3.5 bytes of transmission time can be easily mastered then the data fields trnasmitted are slave address, operation command code, data and CRC check word in order, where the bytes transmitted of each domain is hexadecimal bytes 0 ... 9, A ... F. The network device always monitors the activity of the communication bus, even during a silent interval. When the first domain (address information) is received, each network device will confirm the byte. With the completion of the last byte, a nother transmission time interval similar to 3.5 bytes is used to express the end of this frame after which a new frame will start the transmission.
The information of a frame must be transmitted in a continuous stream of data. If the interval exceeds 1.5 bytes before the end of the entire frame transmission, the receiving device will clear the incomplete information and mistakenly believe that the next byte is the address domain part of the new frame. And likewise, if the interval between the start of a new frame and the previous frame is less than 3.5 bytes time, the receiving device will consider it to continue the previous frame. Due to the disorder of the frame, the final CRC checking value is incorrect, resulting in communication failure.
RTU data frame format

Start, at least 3-5 characters space
MODBUS message
End, at least 3-5 characters space
Slave address, function code, data, parity

Standard structure of the RTU frame

FH(frame	H-T2-T3-T4 (3.5 bytes transmission time)
Slave address field ADDR	Communication address: 0 ~ 247 (decimal) (O for broadcast address)
Functional domain CMD	03H: Reading slave parameters 06H: Writing slave parameters
D a t a d o m a i n DATA(N-l)…DAT A(0) DATA(O)	2 * N bytes of data, which is the main content of the communication, but also is the the core of data exchange in the communication.

CRC CHK lower bit	Detectionvalue:CRCcheckvalue(16Bit)
CRC CHK Higher bit	
Frame end END	Tl-T2-T3-T4 (3.5 bytes of transmission time)

In ASCII mode, the frame header is ":" ("0x3A"), and the frame end defaults to "CRLF"
("OxOD" "0xA"). In ASCII mode, in addition to the header and frame end, the remaining data bytes are sent in ASCII format. The high 4-bit tuple is sent first and then the lower 4-bit tuple is sent. Under the ASCII mode, the data is 7 or 8 bit length, and for "A"~"F", they use their capital letters. At this point the data uses the LRC checkling and the checking covers the information from the slave address to the data. The checksum is equal to complement of the character sum(rejecting carry bit) all the characters that participate in the validation data.
ASCII data frame format

Start character
"0x3A"
MODBUS message
End character
"0x0 D ,," OxOA ,,
Slave address, function code, data, parity
Standard structure of ASCII frames

START	**":"** （0x3A)
Address Hi	Communication address:
Address Lo	The 8-bit address is combined by two ASCII codes
Function Hi	Function code:
Function Lo	The 8-bit address is combined by two ASCII codes
DATA (**N**-1) **…** **DATA** (0)	Data content: The nx8-bit data content is combined by 2n ASCII codes N ≤16, maximize to 32 ASCII code
LRC CHK Lo	**LRC check code:**
LRC CHK Hi	**The 8-bit check code consists of two ASCII codes 合**
END Hi	End character:

END Lo	END Hi-CR (OxOD), END Lo = LF (0x0A)

8. 6 Command code and communication data description

8.6.1 Command code: 03H (0000 0011)

Read n words (Word) (up to 16 words can be read continuously)
For example: the frequence converter with the slave address as 01H, and the memory start address is 0004. Two words are read continuously then the structure description of this frame will be as follows:
RTU master command information

START	Tl-T2-T3-T4(3. 5 bytes of transmission time)
ADDR	01H
CMD	03H
Start address upper bit	00H
Start address lower bit	04H
Data amount upper bit	00H
Data amount lower bit	02H
CRC CHK lower bit	85H
CRC CHKupper bit	CAH
END	Tl-T2-T3-T4(3. 5 bytes of transmission time)

RTU slave response information

START	Tl-T2-T3-T4(3. 5 bytes of transmission time)
ADDR	01H
CMD	03H
Bytes amountupper bit	00H

Bytes amount lower bit	04H
Data address0004H upper bit	00H
Data address0004H lower bit	00H
Data address0005H upper bit	00H
Data address0005H lower bit	00H
CRC CHK lower bit	43H
CRC CHK upper bit	07H
END	Tl-T2-T3-T4(3. 5 bytes of transmission time)

ASCII slave response information

START	“:”
ADDR	'0'
	'1'
CMD	'0'
	'3'
Bytes amount	'0'
	'4'
Data address 0004H upper bit	'0'
	'0'
Data address 0004H loer bit	'0'
	'2'
Data address 0005Hupper bit	'0'
	'0'
Data address 0005H lower	'0'
	'0'

bit	
LRC CHK Hi	'F'
LRC CHK Lo	'6'
END Lo	CR
END Hi	LF

ASCII master command information

8.6.2 Command code: 06H (0000 0110)

Writing a word
For example: Writing 5000 (1388H) to the 0008H address of the slave address 02H frequence converter then the structure of the frame is described as follows:
RTU master command information

START	‘ : ′
ADDR	"0'
	'1'
CMD	'0'
	'3'
Start address upper bit	'0'
	'0'
Start address lower bit	'0'
	<'4'
Data amount upper bit	'0'
	'0'
Data amount lower bit	'0'
	'2'
LRC CHK Hi	'F'
LRC CHK Lo	'6'
END Lo	CR
END Hi	LF

RTU slave command information

START	T1-T2-T3-T4(3. 5 bytes of transmission time)

ADDR	02H
CMD	06H
Write data address upper bit	00H
Write data address lower bit	08H
Data content upper bit	13H
Data content lower bit	88H
CRC CHK lower bit	05H
CRC CHKupper bit	6DH
END	T1 T2 T3 T4(3. 5 bytes of transmission time)

ASCII master command information

START	Tl-T2-T3-T4(3. 5 bytes of transmission time)
ADDR	02H
CMD	06H
Write data address upper bit	00H
Write data address lower bit	08H
Data content upper bit	13H
Data content lower bit	88H
CRC CHK lower bit	05H
CRC CHKupper bit	6DH

END	Tl-T2-T3-T4(3. 5 bytes of transmission time)

START	“:”
ADDR	'0'
	'2'
CMD	'0'
	“6'
Write data address upper bit	'0'
	'0'
Write data address lower bit	'0'
	‘8,
Data content upper bit	‘1,
	f3,
Data content lower bit	<8,
	‘8,
LRC CHK Hi	‘5,
LRC CHK Lo	‘5,
END Lo	CR
END Hi	LF

ASCII slave response message

START	“:”
ADDR	'0'
	<2,
CMD	'0'
	‘6,

Write data address upper bit	'0'
	‘'0'
Write data address lower bit	'0'
	‘8,
Data content upper bit	'1'
	'3'
Data content lower bit	‘8,
	‘8,
LRC CHK Hi	‘5,
LRC CHK Lo	‘5,
END Lo	CR
END Hi	LF

8.7 Error checking mode of the communication frame

Error checking mode of the frame mainly includes two parts of the checking, that is, byte bit checking (odd / even checking) and the entire frame data checking (CRC checking or LRC checking).

1. Byte bit checking

The user can select different bit checking mode as needed, and also can select no parity, which will affect the parity bit of every byte. Meaning of even parity check: Adding a even parity check bit in the front of data transmission is used to indicate that the "1" in the data transmission is odd or even number. When it is even number, the check digit is "0". Or it will be"1", which is used to keep the parity of the data. Meaning of add parity check: adding a odd parity check bit in the front of data transmission is used to indicate that the "1" in the data transmission is odd or even number. When it is odd number, the check digit is "0". Or it will be"1", which is used to keep the parity of the data.

For example, the 11001110 need to be transmitted and the data contains 5"1". If the even parity check is used then the even parity check bit will be "1". If the odd parity check is used then the odd parity check bit will be "0". During the data transmission, the odd and even parity bit is put in the parity bit of the frame through the calculation and the receiving device also performs parity. If the parity of the data received is

found to be inconsistent with the preset one, then it will be considered that the communication is wrong.

2. CRC check mode --CRC (Cyclical Redundancy Check)

The RTU frame format is used and the frame includes a frame error detection field based on the CRC method. . The CRC field detects the contents of the entire frame and the CRC field is two bytes, including 16-bit binary value. It is added to the frame after being calculated by the transmission device. The receiving device recalculates the CRC of the received frame and compares it with the value in the received CRC field. If the two CRC values are not equal, the transmission error will be indicated wrong.

CRC is first stored in the OxFFFF, and then the continuous 6 bytes or above in the frame is called to be processed with the values in the current register. Only the 8Bit data in each character is valid for CRC, and the start and stop bits and odd parity bits are invalid.

During generation process of CRC, each 8-bit character is distinct from the contents of the register or (X0R). The result is shifted to the lowest bit, and the uppest effective bit is filled with 0. LSB is extracted for the inspection. If the LSB is 1, the register is different from the preset value alone or if the LSB is 0 then it has no need to have this operation. The whole process needs to be repeated 8 times. After the completion of the last bit (bit 8), the next 8 bytes are individually different from the current value of the register. The value in the final register is the CRC value after all bytes in the frame are executed.

The calculation method of CRC uses the international standard CRC check rule, the user can write a CRC calculation program meeting the requirements truly with the reference to the relevant standard CRC algorithm in editting CRC algorithm. Now a simple function for CRC calculation is provided to the user for reference (programmed in C):

```
unsigned int crc ー cal— value(unsigned char
*data_valuef unsigned char data_length) { int i;
unsigned int crc_value=0xffff ;  while(data_length--)
crc_valueA=*data_value++;
forTi=〇 ; i<8;i++)_
if (crc_value&0x0001) crc_value= (crc_value»l) A0xa001; else
crc_value=crc_value»l;
return(crc_value); } :
```

In the ladder logic, CKSM calculates the CRC value with the method of look-up table according to the frame content. The method is simple and the operation speed is fast. However, the program occupies larger ROM space, so it is necessary to use it carefully in the occasion that has requirement on the program space.

ASCII mode check (LRC Check)

Check digit (LRC Clieck) is the value adding the results from Address to Data Content, such as, 8.6.2 Communication check digit: Ox02 + tk06 + OxOO + Ox08 + Oxl3 + Ox88 = OxAB, then the complement = 0x55.

1. Definition of communication data address

This part is the address definition of the communication data, which is used to control the operation of the frequence converter, access to the frequence converter status information and set the related function parameters of the frequence converter.

(1) Presentation rule of the function code parameter address

The parameter taking the function code as the number corresponds to the register address, which but need to be converted to hexadecimal system. For example, the No. of Pr058 is 58 and then the function code address can be represented as 003AH in the hexadecimal number. The ranges of high, low byte are: high byte--00~01; low byte--00~FF respetively. Note: Some parameters can not be changed while frequence converter is in operation; Some parameters can not be changed regardless of the state of frequence converter; The set range, units and related instructions of the parameters shall be noted when the function code parameters is changed.

In addition, because EEPR0M is frequently stored, the life of EEPR0M will be reduced. For the user, there is no need to store some function code in the communication mode and it is just to change the value of the KAM in chip, which can meet the requirements. The function can be achieved by changing the highest bit 0 of the corresponding function code address from 1. For example, the function code P-007 is not stored in the EEPROM and just can modify the value of RAM, which can set the address as 8007H; This address can only used for the RAM in the write chip but can not be as a reading function. If it is the reading function, it will be the invalid address.

(2) address description of other functions:

Function description	Address defination	Data meaning description	R/W character
Communication control command	1000H	0001H:forward running	W/R
		0002H:reverse running	
		0003H:normal inching turning	
		0004H:JOG	
		0005H:stop	
		0006H:shutdown	
		0007H:fault reset	
		0008H:jog stop	
Frequence converter state	1001H	0001H:in forward running	R
		0002H:in reverse running	
		0003H:The frequence converter is in standby	
		0004H:In fault	
Communication set value address	2000H	Communication set value range (-10000 ~ 10000) Note: The communication	W/R

		setting value is the percentage of the relative value (-100.00% ~ 100.0090, can be as the communication write operation. When it is the frequency source, it will be relative to the percentage of the maximum frequency (P ~ 0 4): When PID is given or feedback, it will be relative to the percentage of PID, where the PID given value and the PID feedback value both carry out the PID calculation in the form of percentage.	
Operation / stop parameter address description	3000H	Set frequency	R
	3001H	Operation frequency	R
	3002&	Output current	R
	3003H	Output voltage	R
	3004H	Running rotate speed	R
	3005H	Output power	R
	3006H	Output torque	R
	3007H	Bus voltage	R
	3008H	PID given value	R
	3009H	PID feedback value	R
	300AH	Terminal input flag status	R
	300 册	Terminal output flag status	R
	300CH	Analog FV value	R
	300DH	Analog FIvalue	R
	300EH	Current segment of SPD	R
	300FH	Current count value	R

Function description	Address defination	Data meaning description	R/W character

frequence converter fault address	5000H	The fault information code is the same as the serial number of the fault type in the function code menu, except that it returns hexadecimal data to the host computer instead of the fault character	R
ModBus communication fault address	5001H	00H: No fault 01H: Command code error 02H: Illegal address 03H: Illegal data 06H: Frequence converter is busy 10H: Password is wrong 11H: CRC check error 12H: Parameter change is invalid 13H: The system is locked 14H: Illegal data number	R

2. Additional response for error communication
When the frequence converter is connected with the communication, then the frequence converter will respond to the error code and will respond to the main control system in the fixed format for error occurs, resulting in that the master system can know the occurrence of the error. No matter the command code of the frequence converter communication is "03" or "06", the command byte of the frequence converter's fault reply will "0" by which the data address is fixed at 0x5001. E.g:
RTU slave fault response message

START	Tl-T2-T3-T4(3.5 bytes of transmission time)
ADDR	01H
CMD	06H
Trouble back address upper bit	50H
Trouble back address	01H

lower bit	
Error code upper bit	00H
Error code lower bit	05H
CRC CHK lower bit	09H
CRC CHK upper bit	09H
END	Tl-T2-T3-T4(3.5 bytes of transmission time)

ASCII slave response message

START	':'
ADDR	'0'
	'1'
CMD	'0'
	'6'
Trouble back address upper bit	'5'
	'0'
Trouble back address lower bit	'0'
	'1'
Error code upper bit	'0'
	'0'
Error code lower bit	'0'
	'5'
LRC CHK Hi	'A'
LRC CHK Lo	'3'
END Lo	CR
END Hi	LF

The meaning of the error code:

Error code	Description
l	Command code

	error
2	Illegal address
3	Illegal data
4	Reserved
5	Reserved
6	Busy frequence converter
7	Reserved
8	Reserved
9	Reserved
10	Password error
11	CRCcheck error
12	Invalid parameter change
13	Locked system
14	Illegal data number

Chapter 9 Standard Specification

This chapter is the "Standard Specification” for this product." The understanding of the contents of this chapter will help you to use the frequence converter correctly and perform its functions. Please read this contents of this chapter carefully before using the equipment.

9.1 Specifications and models

Power voltageAC	Specifications and models	Maximum adaptation motor（KW)	Rated output current (A)
Signle phase 220V	AE200-2S0.4G	0.4	2.4
	AE200-2S0.75G	0.75	4.5

	AE200-2S1. 5G	1.5	7
	AE200-2S2. 2G	2.2	10
Three phase 220V	AE200-2T3. 7G	3.7	16
Three phase 380V	AE200-4TO. 75G/1. 5P	0. 75/1. 5	2. 5/3. 7
	AE200-4T1. 5G/2. 2P	1. 5/2. 2	3,7/5
	AE200-4T2. 2G/4.0P	2. 2/4.0	5 月 9 日
	AE200-4T4. OG/5. 5P	4. 0/5. 5	9 月 13 日
	AE200-4T5. 5L/7. 5P	5. 5/7. 5	13/17
	AE200-4T7. 5G/11P	7.5/11	17/25
	AE200-4T11G/ 15P	11 月 15 日	25/32
	AE200-4T15G/ 18. 5P	15/18.5	32/37
	AE200-4T18. 5G/22P	18. 5/22	37/45
	AE200-4T22G/ 30P	22/30	45/60
	AE200-4T30G/ 37P	30/37	60/75
	AE200-4T37G/ 45P	37/45	75/90
	AE200-4T45G/ 55P	45/55	90/110
	AE200-4T55G/ 75P	55/75	110/152
	AE200-4T75G/ 90P	75/90	152/176

Note:1.The maximum adaptation motor is the motor with the maximum power driven by the frequence converter model and is based on a 4-pole motor.
2. Rated output current is the output current when the output voltage is rated voltage.

9.2 Standard technical specifications

Input and output
Input voltage range: 380 / 220V ± 15%
Input frequency range: 40 ~ 60Hz
Output voltage range: 0 ~ rated input voltage
Output frequency range: 0 ~ 600Hz (0-2000HZ for V1.15 software version)

Peripheral interface
Programmable digital input: 4-WAY input(8-Way for the digital port input of F103 version)
Programmable analog quantity: FV: 0~10V input, FI: 0～20mA input.
Open collector output: 1-WAY output
Relay output: 1-WAY output
AO(analog output) FO : 1-WAY output: 0～10V output

Technical performance
Control mode:SVC, V/F control
Over-load ability: 150% of rated current 60s; 180% of rated current 10s
Starting torque: SVC: 0.5Hz / 150% (SVC)
Speed-regulating ratio: SVC: 1: 100
Speed control precision: SVC: ± 0.5% maximum speed
Carrier frequency: 1.0K ~ 15.0KHZ

Functional characteristic
Frequency set mode:digital set, analog quantity set, serial communications set, SPD, PID set
PID control function
SPD control function: eight-stage speed(16-stage speed for the F103 version)
Swing frequency control function
Non-stop function for momentary interruption
Restarting function of rotational speed tracking: realizing the non-impact of smooth start-up of the motor in rotation
Automatic voltage regulation function: when the network voltage changes, it can maintain the constant output voltage automatically
Providing multi-fault protection function: overcurrent, overvoltage, undervoltage, overtemperature, phase loss, output short-circuit, overload, etc.

Operating environment
Operating ambient temperature :-15℃to + 50℃
Operating humidity: 90% RH or less (no condensation)

Altitude 1000 meters or less above sea level. Over 1000 meters, every 100 meters decreases 3%; Over 2000 meters every 100 meters decreases 5%.

Other non-corrosive, flammable gases, no conductive dust

Chapter 10 Options

This chapter describes the "options" of the product, so please read the contents of this chapter carefully before use.

10.1 Option table

Name	Use	Applicable frequency converter
Breaker	Used to cut off the frequence converter input power quickly	Based on capacity
Noise filter approved by the EMC specification	Conforming to EMC compliant noise filters	Based on capacity
Surge voltage suppression filter	Suppressing the surge voltage on the output side of the frequence converter	
Improving power factor with DC reactor	Used to improve the input power factor of the frequence converter (integrated power factor is about 95%) and power used to cooperate to use	

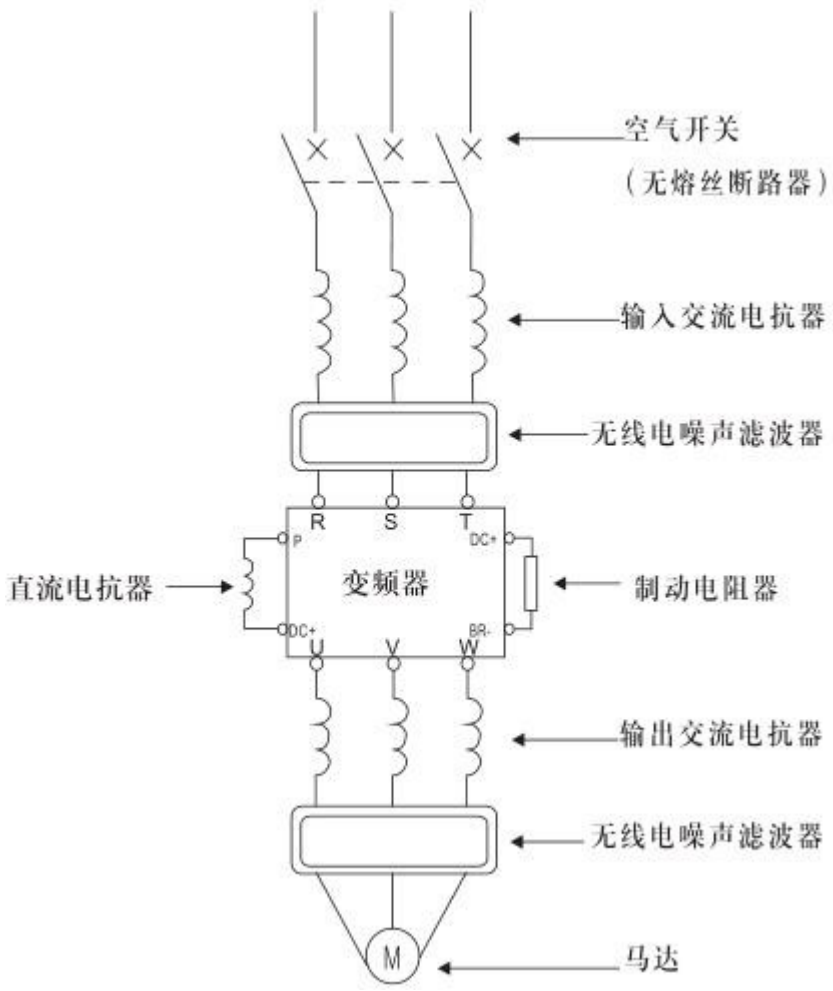
Improving power factor with AC reactor	Used to improve the input power factor of the frequence converter (integrated power factor is about 9096) and power used to cooperate to use	
Radio noise filter	Used to reduce radio noise interference	Applicable to all frequency converters
Linear noise filter	Used to reduce linear noise interference	
Braking resistor	Used to improve the braking capacity of the frequence converter (for large inertia load or reverse load)	15KWor below
Brake unit	The brake unit is used with the braking resistor.	15KW or above
Frequency setting potentiometer	Used to adjust the frequency of the frequence converter	Applicable to all frequency converters
Tachometer	Dedicated tachometer (DC0-10V), dynamic / digital display DC voltmeter	

Voltmeter	Dedicated voltage meter (DC 0-10V), dynamic / digital display DC voltmeter	
Ammeter	Dedicated ammeter (DC 0-L0V), dynamic / digital display DC voltmeter	

10.2 Connection diagram of peripheral option and frequence converter

DC reactor

. Air switch (no fuse circuit breaker)
Inputting AC reactor Radio noise filter
brake resistor
Outputting AC Reactor Radio Noise Filter



10. 3 Braking resistor model selection

Curent（V)	Motor power(KW)	Resistance values()	Resistance power（W)
220	0.4	200	80
	0.75	200	80
	1.5	100	250
	2.2	75	250
	3.7	40	400
380	0.75	750	80
	1.5	400	250
	2.2	250	250

	4	150	400
	5.5	100	500
	7.5	75	800
	11	50	1000
	15	40	1500
	18.5	30	4000
	22	30	4000
	30	20	6000
	37	16	9000
	45	13.6	9000
	55	10	12000
	75	6.8	18000
	90	6.8	18000
	110	6	18000

10.4 Leakage protector

As the interior of the frequence converter, the frequence converter of the motor and the input and output leads input and output leads have permittance on the ground and the
carrier used by the frequence converter is higher. So the earth leakage current of the frequence converter is larger and the model with large capacity is more obvious, which will cause the malfunction of the protection circuit sometimes.
When the above problems are encountered, in addition to appropriate to reduce the carrier frequency, and shorten the lead, the leakage protector shall be installed. The leakage protector should be located on the input side of the frequence converter and the
operating current of the leakage protector should be greater than it of the line under the fundamental frequency power supply. When the frequence converter is not used, it will be10 times more than the leakage current (the sum of the leakage current such as the lines, radio noise filters, motors and so on).

Chapter 11 Maintenance of the frequence converter

This chapter provides the basic maintenance instructions for the product so please read the contents of this chapter carefully before use. The frequence converter is the electrical product with the combination of power electronics technology and microelectronics technology so the maintenance and servicing shall be carried out in order to avoid the reasons of the influence of the use environment such as temperature, humidity, dust, dirt and the vibration, etc. and ageing life of the components

11.1 Inspection of Project

11.1. 1 Daily Inspection

In principle, check the following exceptions in the operation:
1) Whether the motor is running according to the setting.
2) Whether the installation environment is abnormal.
3) Whether the cooling system is abnormal.
4) Whether there is abnormal vibration sound.
5) Whether there is overheating and discoloration.
6) Measuring the input voltage of the Whether with a multimeter during operation.
Please turn off the power and in the periodic inspection of the frequence converter. After there is no display of the monitor and the main power supply circuit indicator is turned off for 5 minutes before the inspection to avoid the residual voltage of the capacitor in the frequence converter hurt the maintenance personnel.
1) Cooling system Please clean the air filter and check the cooling fan.
2) Screw and bolts Due to the influence of vibration, temperature changes, etc., the fixing part such as the screw and bolts may be loose so please check whether they are fixed reliably. What's more, please tighten them up in accordance with the tightening torque.
3) Check whether the conductor and the insulator material are corroded and damaged.
4) Measuring the insulation resistance.
5) Check whether there is discoloration, odor, bubbling, leakage etc. for the filter capacitor.

11. 2 Dedusting

1) Please keep the frequence converter running in the clean state
2) Please erase the dirty place gently with soft cloth that is immersed in a neutral detergent or amino alcohol when the frequence converter is cleaned.
(3) Please do not use the s
When cleaning the frequence converter, wipe away the with a solvents such as acetone and toluene which can cause the decrustation of the frequence converter surface and please do not use detergent or alcohol to wipe the display part and other part of the operation panel. Or these part may be damaged.

11.3 Replacement of parts

The frequence converter consists of many electronic components. Due to the composition and physical characteristics, it will be aged in a certain period of time, which will reduce the performance of the frequence converter or even cause failure.

Therefore, for the preventive maintenance, it is necessary to implement regular replacement, and the main replacement parts are as follows:

Part name	Standard replacement cycle	Description
Colling fan	2-3year	Replacement (after inspection))
DC filter capacitor	5year	Replacement (after inspection)
Other electrolytic capacitors	5year	Replacement (after inspection)
Relay	5year	Replacement (after inspection)

11.3.1 Cooling fan

The life of the cooling fan bearings used to cool the heat-generating parts such as the main circuit semiconductor elements is 1-35000 hours, so that the cooling fans should be replaced for a period of 2-3 years in a continuous operation. Moreover, the cooling fan must be replaced immediately if there is any abnormal sound, abnormal vibration found in the inspection.

11. 3.2 DC filtercapacitor

The character of the large-capacity aluminum electrolytic capacitor for filtering in the main circuit DC section and the aluminum electrolytic capacitor used for stabilizing the control power supply on the control circuit is deteriorated due to the influence of the ripple current, the surrounding environment, the use conditions etc.(replaced in every 5 years used in the air environment generally). And the deterioration of the capacitor speeds up quickly after a certain period of time so the inspection cycle is at least one year (no more than six months near the life expectancy).

Benchmark of judgment of the appearance in the inspection:

1) Shell state Whether the side undersurface of the shell is inflate.

2) Seal-plate state Obvious curve and crack.

3)Whether there is cracks, discoloration, leakage of liquid etc. of the appearance packaging. The capacitance shall be replaced when the capacitance quantity reached 85% or less of the rated capacity.

11. 3.3 Relay

Because there will be poor contact, so they need to be replaced for a certain number of cumulative switching (switch life), which need to be regularly checked and replaced.

Chapter 12 Quality Commitment

This chapter describes the"quality commitment" of the product . If there is any problem about the quality, the Company will argue in accordance with the following regulations. Please read the contents of this chapter carefully.

The product quality commitment regulations are as follows:

1. Warranty range: refers to the frequence converter itself.

2. Warranty period: from the date of purchase of this device, eighteen months.

3. Quality commitment content for the product is really proved to be of the Company:

2) Free repair within 18 months after purchase.

4. The maintenance for the failure caused by the following reasons shall be paid even in the warranty period.

1) Improper operation or problems caused by unauthorized repair and alteration.

2) Problems caused by using the frequence converter beyond the standard specification requirement.

3) Damage caused by damage due to throwing or improper placement (eg, water, etc.) after purchase.

4) Failure caused by being used in environments that do not meet the requirements of this manual.

5) Damage to the frequence converter due to wiring error.

6) Failure caused by earthquakes, fires, lightning, abnormal voltage or other force majeure.

5. In the following circumstances, the manufacturers have the right not to provide warranty service:

1) The bar code, nameplate etc. marked in the product by the manufacturers is damaged or can not be identified;

2) The user did not sign the "purchase and sale contract" to pay the payment balance;

3) The user intentionally conceals the improper use of the product during installation, wiring, operation, maintenance or other process to the after-sales service

units of the manufacturers.

6. For the products that have failed, the Company has the right to entrust others for the warranty, and the relevant service costs are calculated in accordance with the actual cost . If there is a agreement, it shall be subject to the principle of agreement priority.

7. The company's sales in China and the agency can provide after-sales service of this product.

Warranty cardl

User name			User's warranty certificate has no replacement if lost(seal)
Detailed Address			
Telephone number			
Zip code			
Product No.			
Purchase date			
Purchase shop			
Purchase price			
Invoice No.			
Warranty date			
Repair unit			
Date		Maintenance records	Maintenance staff

User notes:

1. Free replacement, warranty within three months after purchase. Free repair after fter purchase within 18 months. Please hold the warranty card and purchase bill to the

designated maintenance unit for free warranty service if there is any fault in the warranty period(man-made reason is not in the warranty coverage).
2. No warranty for the unauthorized disassembly.
3. No warranty for torn-off nameplate, bar code.
The warranty card is held by the user for safekeeping, with no replacement for the loss and the obliteration is invalid.

Warranty card II

User name	
Detailed Address	
Telephone number	
Zip code	
Product No.	
Purchase date	
Purchase shop	
Purchase price	
Invoice No.	
Warranty date	
Repair unit	

Since the date that the user purchase the product from our company (hereinafter referred to as manufacturers), the users enjoy the following products after-sales warranty service:
1, The product has a period of 18 months of free warranty (except for the products export ed foreign / and non-standard products) since the date that the user purchase the product from the manufacturers.
2. If there is any quality problem of the product since the date that the user purchase the product from the manufacturers, the manufacturers have guarantees for repair,replacement or compensation.
3. If there is any quality problem of the product since the date that the user purchase the product from the manufacturers, the manufacturers have guarantees for replacement or compensation.
4. The product enjoys the paid lifetime service since the date that the user purchase the product from the manufacturers.
5, Exceptions:The product failure caused by the following reasons is no longer

winthin the18 months free warranty service range committed by the manufacturers:
(1) The user does not follow the procedures listed in the "product manual" for the correct operation;
(2) The user repairs the product their own or unauthorized product changes to cause the product failure with no communication with the manufacturers;
(3)The user uses the product exceeding the standard usable range to cause the product failure;
(4) The poor use environment of the user cause the product device abnormal aging or cause failure;
(5) Damage to products due to force majeure caused by earthquakes, fires, feng shui disasters, lightning strikes, abnormal voltages or other natural disasters;
Product loss caused by the falling or external forces due to the improper choice of mode of transport in the transport process of the user after the purchase;(the transport mode is selected by the user reasonably and the company help them to take the shipping procedures)
6, In the following circumstances, manufacturers have the right not to provide warranty service:

1) The bar code, nameplate etc. marked in the product by the manufacturers is damaged or can not be identified;

2) The user did not sign the "purchase and sale contract" to pay the payment balance;

3) The user intentionally conceals the improper use of the product during installation, wiring, operation, maintenance or other process to the after-sales service units of the manufacturers.