



SAM Electronics Corporation

## SL350 Series

Universal Low-power Frequency Converter

User Manual



# catalogue

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## ✧ Matters need attention

SL350 series universal low-power inverter is suitable for general industrial single-phase and three-phase power supply. If the inverter is used for equipment that may cause personal injury due to failure (such as nuclear control system, aviation system, safety equipment and instrument, etc.), please handle it carefully and consult the manufacturer; if used for dangerous equipment, there should be safety protection measures on the equipment to prevent the accident scope from expanding when the inverter fails. The production of this inverter has a strict quality assurance system, but in order to ensure the safety of your person, equipment and property, before using the inverter, please must read this chapter, and conduct handling, installation, operation, debugging and maintenance in strict accordance with the requirements.




## 1 Precautions of unpacking inspection

When opening the box, please carefully confirm that:




- (1) Whether the frequency converter is damaged during transportation, and whether the parts are damaged or fall off.
- (2) Whether the model and specification of the frequency converter nameplate are consistent with your order requirements. If there is any omission or inconsistency, please contact the supplier for settlement.

## ◆ Nameplate of Frequency Inverter

On the frequency inverter, there is a nameplate marked with model, rated parameters, product serial-number and bar code of frequency inverter. The content of nameplate is shown as below:

TYPE	SL350-2S0004BQ	Frequency converter model
SOURCE	1PH 220V 50/60Hz	Rated input voltage phase number, voltage and frequency
OUTPUT	1.1KVA 3.0A	Rated output capacity and current
SERIAL No.	XXXXXXXXXX	Product serial number:
  		QR code

## ◆ Outbox label

TYPE	SL350-2S0004BQ	Frequency converter model
SOURCE	1PH 220V 50/60Hz	Rated input voltage phase number, voltage and frequency
NET WEIGHT	0.82KG	Net weight
GROSS WEIGHT	1.0 KG	Gross weight
VOLUME	195*115*175 (mm)	Volume
SERIAL NO.	XXXXXXXXXXXXXXXX	Serial number
  		QR code

## ◆ Machine weight and size

Model No.	Net Weight ( kg )	Gross Weight ( kg )	Dimensions L*W*H (mm)
SL350-2S0004(B)Q /2S0007(B)Q	0.8	1.0	195×115×175
SL350-4T0007(B)Q	1.4	1.6	223×135×195
SL350-4T0015(B)Q/SL350-2S0015(B)Q	1.4	1.6	223×135×195
SL350-4T0022(B)Q/SL350-2S0022(B)Q	1.4	1.6	223×135×195
SL350-4T0030(B)Q/SL350-2S0030(B)Q	1.9	2.2	270×160×215
SL350-4T0040(B)Q/SL350-2S0040(B)Q	1.9	2.2	270×160×215

The company has a strict quality assurance system in the manufacturing, packaging, transportation and other aspects of the products, but in case of any omission, please contact our company or local agents, we will solve the problem for you in the first time.

## 2 Safety precautions

"Dangerous" and "warning" are defined as follows:



Hazard: If not as required, serious equipment damage or



Warning: If not as required, it may cause moderate personal or minor injuries or material damage.

### 2.1 Install

1. Do not install the frequency converter on flammable materials.
2. Do not install the frequency converter in the place of direct sunlight.
3. This series of frequency converters should not be installed in an

environment containing explosive gas, otherwise there is a risk of explosion.

4. Do not drop foreign bodies into the frequency converter, otherwise there is a risk of fire or injury.
5. When installing, the frequency converter should be installed in a place that can bear its weight, otherwise there is a risk of injury or property damage when falling.



➤ It is forbidden to disassemble and refit the frequency converter without permission.

## 2.2 Distribution

1. When wiring, the line diameter specification shall be selected in accordance with the electrical law, and must be operated by qualified professional and technical personnel.
2. Determine that the power supply of the frequency converter is completely disconnected before the wiring operation is carried out.
3. The grounding terminal and motor of the frequency converter must be grounded reliably, otherwise there is a danger of electric shock.
4. Before wiring, be sure to turn off the power supply to ensure that the power supply has been completely cut off for more than 10 minutes, otherwise there is a danger of electric shock.
5. The electronic components inside the frequency converter are particularly sensitive to static electricity, so foreign objects should not be placed into the frequency converter or touch the main circuit board.



➤ Do not connect the AC power supply to the output U, V, W of the frequency converter.

## 2.3 Maintenance



➤ For maintenance operations such as wiring and inspection, they must be turned off for 10 minutes.

### 3 Precautions for use

"Tips" and "Note" are defined in this user manual as follows:



Tip: Tip some useful information.



Note: Explain the precautions required during the operation.

1. The installation environment of the frequency converter shall be well ventilated.
2. The temperature rise of the motor will increase slightly compared with the power frequency when used, which is a normal phenomenon.
3. The ordinary motor runs at low speed for a long time, which will affect the life of the motor due to the poor heat dissipation effect. At this time, a special frequency conversion motor should be selected or reduce the load of the motor.
4. At the altitude of more than 1000 meters, the frequency converter should be used down, increasing the output current of 1500 meters by about 10%.
5. If the use environment exceeds the allowable conditions of the frequency converter, please consult the manufacturer.



No the output terminal of the frequency converter to the filter capacitor or other resistance absorption device.

### 4 Matters needing attention for scrapping

When scrapping the inverter and its components, attention should be paid to:

Explosion of the electrolytic capacitor: the electrolytic capacitor in the frequency converter may explode during incineration.

Waste gas of burning plastic: plastic, rubber and other products on the frequency converter will produce harmful and toxic gases when burning.

Cleaning method: please treat the frequency converter as an industrial waste product.

## **5 To prevent the machine from causing damage**

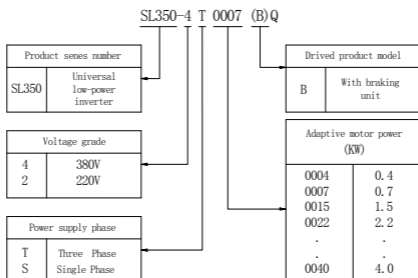
1. To operate the frequency converter, please follow the steps specified in anti-static electricity (ESD), otherwise the internal components of the frequency converter may be damaged due to static electricity.

2. Any component of the frequency converter is not allowed to withstand voltage test. Precise devices, EMC, lightning protection and other design may cause performance decline, loss or even damage to the frequency converter due to high voltage.



# 1 Product presentation

## 1.1 Model description



## 1.2 Model table

Model	Rated capacity (KVA)	Rated output current (A)	Suitable motor (KW)	Voltage grade
SL350-2S0004(B)Q	1.1	3.0	0.4	Single-phase 220V
SL350-2S0007(B)Q	1.9	5.0	0.75	Single-phase 220V
SL350-2S0015(B)Q	2.9	7.5	1.5	Single-phase 220V
SL350-2S0022(B)Q	3.8	10.0	2.2	Single-phase 220V
SL350-2S0030(B)Q	5.3	14.0	3.0	Single-phase 220V
SL350-2S0040(B)Q	6.3	16.5	4.0	Single-phase 220V
SL350-4T0007(B)Q	1.6	2.5	0.75	Three-phase 380V
SL350-4T0015(B)Q	3.0	4.5	1.5	Three-phase 380V
SL350-4T0022(B)Q	3.6	5.5	2.2	Three-phase 380V
SL350-4T0030(B)Q	5.0	7.5	3.0	Three-phase 380V
SL350-4T0040(B)Q	6.3	9.5	4.0	Three-phase 380V

## 1.3 Product appearance

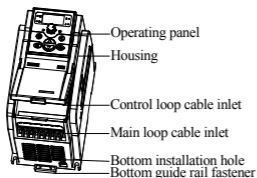


Figure 1-1 Appearance and part name of Class

I inverter

Applicable models:

SL350-2S0004(B)Q/ 2S0007(B)Q

## 2.Product introduction

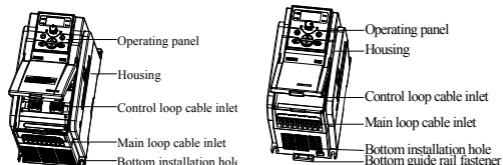


Figure1-Appearance and part name Figure 1-Appearance and part name of class

of class 2 frequency converter

3 frequency converter

Applicable models:

Applicable models:

SL350-2S0015(B)Q~SL350-2S0022(B)Q/  
SL350-4T0007(B)Q~SL350-4T0022(B)Q

SL350-2S0030(B)Q~SL350-2S0040(B)Q/  
SL350-4T0030(B)Q~SL350-4T0040(B)Q

### 1.4 Technical indicators and specifications of the products

Power class range of the SL350 series: SL350-2S0004 (B)Q ~2S0040 (B)Q / SL350-4T0007 (B)Q ~4T0040 (B)Q

SL350 series technical indicators and typical functions:

Import	Rated voltage and frequency	Three-phase (4T # series) at 380V 50 / 60Hz	Single-phase (2S # series) 220V 50 / 60Hz
	Allowable range of voltage variation	380 ~ 415V±10%	220V±10%
Output	Voltage	0 to Input voltage	0 to Input voltage
	Frequency	0.00~1000.0Hz	
	Overload capacity	110% -Long term; 150% -1 min; 180% -2s	
Control method		The VF control / open-loop vector	
Control characteristic	Frequency setting resolution ratio	Simulation end input	And 0.1% of the maximum output frequency
		Digital setting	Low frequency mode is 0.01Hz and high frequency mode is 0.1Hz
	Frequency accuracy	Analog input	Within 0.1% of the maximum output frequency
		Digital input	Set within 0.1% of the output frequency

	V/F curve (voltage frequency characteristics)		The reference frequency is set arbitrarily at 5~1000Hz, and the multi-node V / F curve is set arbitrarily
	Recurrent ascension		Manual setting: 0.0~20.0% of the rated output;
	Automatic current limiting and pressure limiting		During acceleration, deceleration or steady-state operation, the motor stator current and voltage are automatically detected, and they are suppressed within the allowable range according to the unique algorithm
	Undervoltage inhibition in operation		Especially for users with low grid voltage and frequent grid voltage fluctuations, the system can maintain the longest possible operating time according to unique algorithms and residual energy distribution strategies for the longest possible operating time even within the allowable voltage range
Typical function	Multi-section speed control		7-stage programmable multistage speed control, and 5 operating modes are optional
	Optional built-in PID controller		Internal integrated optimization PID controller for simple closed-loop control
	RS485 communications with gang control		MODBUS protocol
	Frequency setting	Analog input	DC voltage 0~10V, DC current 0 ~ 20 mA (optional)
		Digital input	Operation panel setting, potentiometer setting, RS485 interface setting, UP / DW terminal control, can also be combined with analog input
Output signal	Relay and OC output	1 OC output and 1 relay often open output (TA / TC), up to 16 meaning choices	

#### 4 .Product introduction

		Analog output	1 Channel 0~10v voltage signal, the upper and lower limits can be set respectively
	Automatic voltage stabilization operation		According to the need, dynamic pressure, static pressure and unstable pressure can be selected to obtain the most stable operation effect
	Add and deceleration time setting		The 0.01 ~ 600 sec can be set continuously
	Run the function		Upper and lower frequency setting, reverse operation limit, RS485 communication, frequency increase, decreasing control, etc
Show	Operating surface board display	Running state	Output frequency, output current, output voltage, motor speed, set frequency, module temperature, analog input and output, etc
		The alarm content	The last 6 fault records, including the output frequency, output current, output voltage, DC voltage, and module temperature of the latest fault trip
Protection / alarm function			Over current, over voltage, under voltage, overheat, short circuit, internal memory failure, etc
Environment	Ambient temperature		-10 C to + 40 C (not frozen)
	The surrounding humidity		Below 90% (no frost formation)
	Surrounding environment		Indoor (no direct sunlight, no corrosion, flammable gas, no oil fog, dust, etc.)
	Above sea level		0~1000 M, each 1000 m increase, load reduction 10%
	Levels of protection		IP20
	Cooling-down method		Air blast cooling
Way to install			Wall mounting type
Vibrate			<6m/s <sup>2</sup>

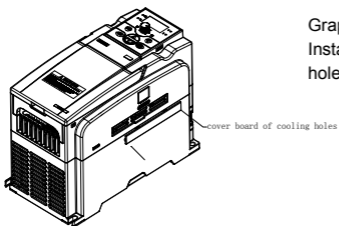
## 2 Installation of frequency converter

### 2.1 Installation environment requirements

This series of frequency converter is a wall-mounted frequency converter, which should be installed vertically to facilitate air circulation and heat dissipation. When selecting the installation environment, note the following:



- In the range of ambient temperature-10℃ -40℃.
- Try to avoid high temperature and wet places, humidity is less than 90%, and no frost.
- Avoid direct sunlight.
- Keep away from flammable, explosive and corrosive gases and liquids.
- No dust, floating fiber and metal particles.
- The installation plane is solid and vibration-free.
- Far away from the electromagnetic interference source.
- If using more environmental dust, please install the heat dissipation hole cover plate.  
(See Figure 2-1-A)



Graph 2-1-A  
Installation of the heat sink  
hole cover plate

**If users have special installation requirements, please contact our company in advance**

The installation interval and distance requirements of a single converter are shown in Figure 2-1-B. enough space should be left around the converter; when installed up and down, diversion separator shall be applied between frequency converters to ensure good heat dissipation, as shown in Figure 2-1-C.

## 6 Installation of frequency converter

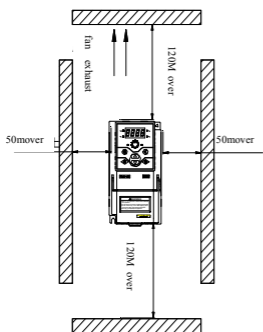


Figure 2-1-B Installation interval  
distance

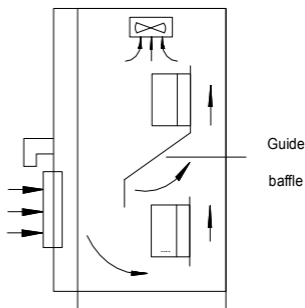


Figure 2-1-C Installation of multiple  
frequency converters

## 2.2 Installation dimensions of the frequency converter

### 2.2.1 Installation dimensions of the frequency converter

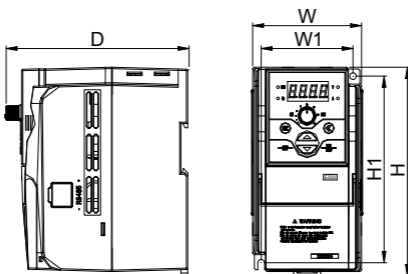


Figure 2-2-A inverter installation dimension 1

Applicable models: SL350-2S0004 (B)Q ~ SL350-2S0007 (B)Q, as

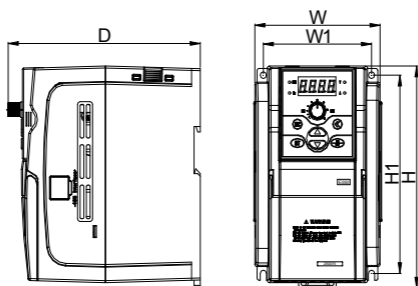


Figure 2-2-B inverter installation dimension 2

Applicable models: SL350-2S0015 (B)Q ~2S0030 (B)Q / SL350-4T 0007 (B)Q ~4T 0030

The specific installation dimensions of SL350 series frequency converter are shown below:

Frequency converter model (Three-phase, 380V)	Frequency converter model (Single-phase 220V)	W1 mm	W mm	H1 mm	H mm	D mm	Screw specification
-	SL350-2S0004(B)Q	67.5	81.5	132.5	148	134.5	M4
-	SL350-2S0007(B)Q						
SL350-4T0007(B)Q	-	86.5	101.5	147.5	165	154.5	M4
SL350-4T0015(B)Q	SL350-2S0015(B)Q						
SL350-4T0022(B)Q	SL350-2S0022(B)Q						
SL350-4T0030(B)Q	SL350-2S0030(B)Q	100	110	190	205	169.5	M 5
SL350-4T0040(B)Q	SL350-2S0040(B)Q						

### 2.2.2 Sample installation size

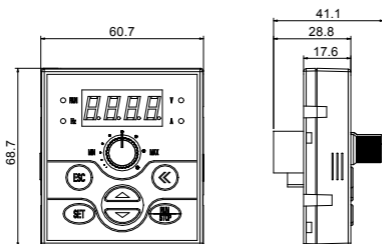


Figure 2-2-E keypad installation size

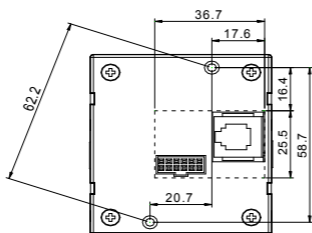


Figure 2-2-F Installation size of the keypad base

Note: With M3 screw assembly, please note the dotted inner hole position and opening size.

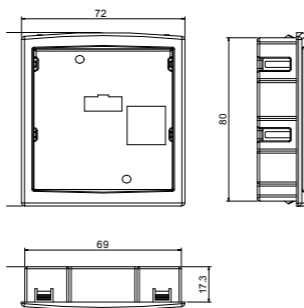


Figure 2-2-G Keypad mounting base size

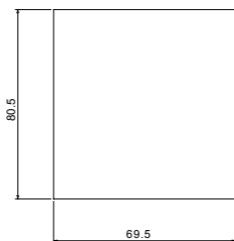


Figure 2-2-H

**Note: Recommended size of user keyboard base opening**

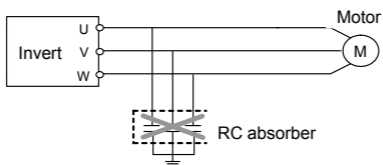
### 3 Distribution of frequency converter

#### 3.1 Wiring precautions

- (1) Ensure that an intermediate circuit breaker is connected between the frequency converter and the power supply to avoid the accident expansion when the frequency converter fails.
- (2) In order to reduce the electromagnetic interference, please connect the coil of the electromagnetic contactor, relay and other devices in the circuit around the frequency converter to the surge absorber.
- (3) For the wiring of the frequency setting terminal AI, instrument loop (AO) and other analog signals, please use the shielding wire above  $0.3\text{mm}^2$ , and the shielding layer is connected to the ground terminal E of the frequency converter, and the wiring length is less than 30m.
- (4) The wiring of relay input and output loop (X1 ~ X 4) should be selected with wire or shielding line above  $0.75\text{mm}^2$ . The shielding layer is connected with the common end CM of the control terminal, and the wiring length is less than 50m.
- (5) The control line shall be separated from the main circuit power line, and the parallel wiring shall be more than 10cm apart, and the cross wiring shall make it vertical.
- (6) The connection between the frequency converter and the motor should be less than 50m. When the connection length is more than 50m, the carrier frequency of the frequency converter should be appropriately reduced.
- (7) All leads must be fully fastened with the terminals to ensure good contact.
- (8) The voltage resistance of all leads must match the voltage level of the frequency converter.



- U, V and W shall not be installed at the output ends of the frequency converter, as shown in Figure 3-1.



Graph 3-1 The output end is not connected to the resistance absorber

## 3.2 Wiring of the peripheral components

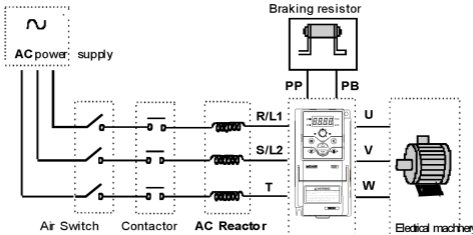


Figure 3-2 Wiring of the frequency converter

### ◆ Source

Please supply power according to the input power specification specified in this manual.

### ◆ Air switch

1. When the converter is repaired or not used for a long time, the air switch isolates the converter from the power supply;
2. When the inverter input side has a short circuit or the power supply voltage is too low fault, the air switch can be protected.

### ◆ Contactor

To easily control the inverter power on and power off, as well as the load motor off.

### ◆ AC reactor

1. Improve the power factor;
2. Reduce the harmonic input of the frequency converter to the power grid;
3. Reduce the influence of the voltage imbalance of the three-phase power supply.

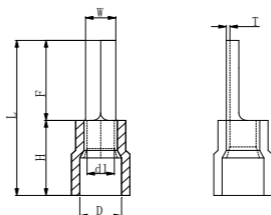
### ◆ Braking resistor

When the motor is in the energy braking state, it can avoid excessive pump voltage in the DC circuit.

Specifications for recommended appliances as shown in the table below:

## 12 The wiring of the frequency converter

Model of frequency inverter	Adaptive motor (KW)	Wire gauge (major loop) (mm <sup>2</sup> )	Air-break (A)	Electromagnetic contactor (A)				
SL350-2S0004(B)Q	0.4	1.5	16	6				
SL350-2S0007(B)Q	0.75	2.5	20	12				
SL350-2S0015(B)Q	1.5	2.5	32	18				
SL350-2S0022(B)Q	2.2	4.0	32	18				
SL350-2S0030(B)Q	3.0	6.0	40	32				
SL350-2S0040(B)Q	4.0	6.0	40	32				
SL350-4T0007(B)Q	0.75	1.0	10	6				
SL350-4T0015(B)Q	1.5	1.5	16	12				
SL350-4T0022(B)Q	2.2	2.5	16	12				
SL350-4T0030(B)Q	3.0	3.0	20	18				
SL350-4T0040(B)Q	4.0	4.0	32	18				
<b>Main loop wiring terminal</b>								
Model of frequency inverter	Screw specifications	Tightening Moment (N * m)	Recommended line ear model					
SL350-2S0004(B)Q	M3.5	0.7~0.9	PTV1.25-9					
SL350-2S0007(B)Q	M3.5	0.7~0.9	PTV2-9					
SL350-2S0015(B)Q	M3.5	0.7~0.9	PTV5.5-13					
SL350-2S0022(B)Q	M3.5	0.7~0.9	PTV5.5-13					
SL350-2S0030(B)Q	M3.5	0.7~0.9	PTV5.5-13					
SL350-2S0040(B)Q	M3.5	0.7~0.9	PTV5.5-13					
SL350-4T0007(B)Q	M3.5	0.7~0.9	PTV1.25-9					
SL350-4T0015(B)Q	M3.5	0.7~0.9	PTV1.25-9					
SL350-4T0022(B)Q	M3.5	0.7~0.9	PTV2-9					
SL350-4T0030(B)Q	M3.5	0.7~0.9	PTV5.5-13					
SL350-4T0040(B)Q	M3.5	0.7~0.9	PTV5.5-13					
<b>Universal control board and expansion card terminals</b>								
General control terminal	Screw specifications	Tightening Moment (N * m)	Recommended line ear model					
Control board / expansion card terminal	M2	0.1~0.2	E0.5-6					
Control board / expansion card terminal	M3	0.3~0.4	E0.75-6					
<b>Line ear model</b>								
		W(mm)	F(mm)	L(mm)	H(mm)	d1(mm)	D(mm)	T(mm)
PVT/ E series	PTV1.25-9	1.9	9	19	10	1.7	4.2	0.8
	PTV2-9	1.9	9	19	10	2.3	4.7	0.8
	PTV5.5-13	2.8	13	26	13	3.4	6.5	1
	E0.5-6	1.1	6	12	6	1	2.6	/
	E0.75-6	1.1	6	12.3	6.3	1.2	2.8	/



PVT/E series

Line ear model	d2 (mm)	W(mm)	F(mm)	L(mm)	H(mm)	d1(mm)	D(mm)	T(mm)
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### 3.3 Basic wiring of the frequency converter

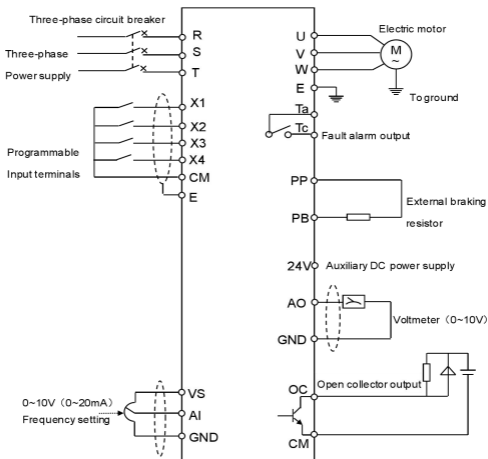


Figure 3-3 Basic wiring of the frequency

### 3.4 Wiring of the main loop terminal

#### Class I main loop terminal

Applicable model: SL350-2S0004(B)Q ~ SL350-2S0007(B)Q

<p>220V power input</p> <p>Braking resistor</p> <p>Earthing</p> <p>Motor</p>	<b>Symbol</b>	<b>Function</b>
	PP	DC side voltage positive terminal
	PB	PP, PB can connect the brake resistance
	L1, L2	Connect to the single-phase AC 220V power supply
	U, V, W	A three-phase AC 220V electric motor
E	Earth terminal	

#### Class-master loop terminal

Applicable: SL350-2S0015(B)Q ~ SL350-2S0022(B)Q & SL350-4T0007(B)Q ~ SL350-4T0022(B)Q

<p>Single-phase/three-phase Power supply</p> <p>Braking resistor</p> <p>Earthing</p> <p>Motor</p>	<b>Symbol</b>	<b>Function</b>
	PP	DC side voltage positive terminal
	PB	PP, PB can connect the brake resistance
	$\frac{L1}{R}$ 、 $\frac{T}{L2}{S}$	Connect to the single-phase AC 220V / three-phase 380V power supply
	U, V, W	Connect to the three-phase AC 220V / 380V motor
E	Earth terminal	

#### Class-master loop terminal

Suitable model: SL350-2S0030(B)Q ~2S0040(B)Q & SL350-4T0030(B)Q ~4T0040(B)Q

<p>Braking resistor</p> <p>Single-phase/three-phase Power supply</p> <p>Earthing</p> <p>Motor</p>	<b>Symbol</b>	<b>Function</b>
	PP	DC side voltage positive terminal
	PB	PP, PB can connect the brake resistance
	$\frac{L1}{R}$ 、 $\frac{L2}{S}$ 、T	Connect to the single-phase AC 220V / three-phase 380V power supply
	U, V, W	Connect to the three-phase AC 220V / 380V motor
E	Earth terminal	

### 3.5 Route of the control loop terminal

#### (1) Control loop terminal diagram

Applicable model: SL350-2S0004(B)Q ~ SL350-2S0040(B)Q & SL350-4T0007(B)Q ~ SL350-4T0040(B)Q



Wiring diagram 1

#### (2) Description of the control loop terminal function

Type	Terminal symbol	Terminal function	Remarks
Source	VS	Provide + 10V (0 ~ 10 mA) power supply outward	-
	24V	Provide + 24V (0 ~ 50 mA) power supply outward (The CM terminal is the power source area)	-
Imitate input	AI	Voltage signal input (from jumper terminal to V end)	Input range: 0 to 10 V
		Current signal input terminal (when the jumper terminal is connected to the A terminal)	Input range: 0 to 20 mA
	GND	Common terminal of the analog input signal (VS power supply ground)	-
Control terminal	X1	Multifunction input terminal 1	The multifunctional input terminal function is set by the parameters [F 3.01] ~ [F 3.04], and the closure is valid
	X2	Multifunction input terminal 2	
	X3	Multifunction input terminal 3	
	X4	Multifunction input terminal 4	
Imitate output	AO	Programmable voltage signal output end, external voltmeter head (set by [F 3.16])	The voltage signal output is 0 to 10 V
OC output	OC	Programmable open circuit collector output, set by the parameter [F 4.00]	Maximum load current of 50 mA, Maximum withstand voltage is 24V
Programmable output	TA /TC	Normally open contact capacity: AC 250V, 1A resistive load The TA-TC function is set by the parameter [F 4.01]	-
Communication	RS+/RS-	485 Communication interface	-

## 4 Panel operation

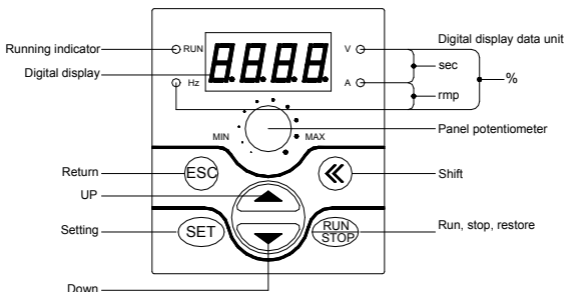








Figure 4-1 Schematic

Note: If the last decimal point in the bottom right corner of the digital tube is stroboscopic, the lowest data bit is hidden, and press the shift key to call out the hidden bit.

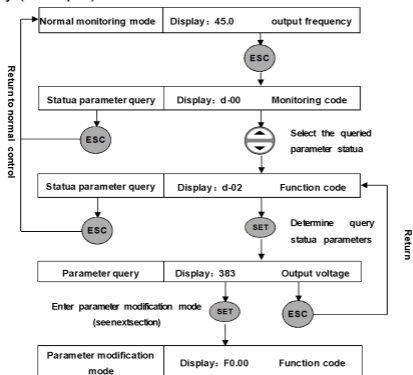
### 4.1 Description of the key function

Key	Function declaration
Digital display	Displays the current operating status parameters and setting parameters of the frequency converter.
A, Hz, V	The unit of measurement corresponding to the main digital display data.
RUN	The operation indicator light indicates that the frequency converter is running and the output terminals U, V and W have output voltage.
	<b>Data modification key.</b> To modify the functional codes or parameters. In the state monitoring mode, if the frequency command channel is in the digital set mode ([F0.00] = 0), press this key to modify the frequency setting value directly.

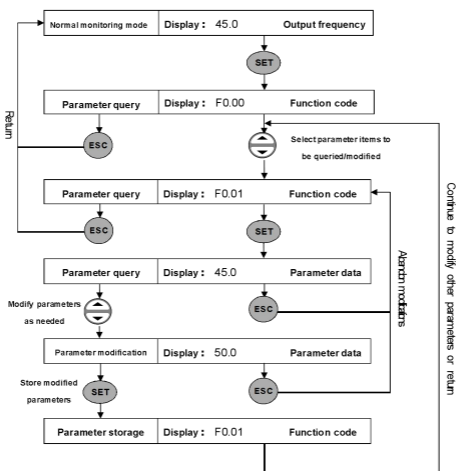
	<p><b>Return key.</b> In the normal monitoring mode, press the key to enter the query mode of the abnormal monitoring mode / monitoring parameters, and you can view the operating status parameters of the frequency converter. In any other operating state, pressing the key separately will return to the previous state.</p>
	<p><b>Set the key.</b> Confirm the current status or parameters (parameters are stored in the internal memory) and proceed to the next level function menu.</p>
	<p><b>Run / stop command key...</b> This key is valid when ([F0.06] = ###0). This key is the trigger key. When the converter is stopped, press this key to start the converter operation. When the frequency converter is in operation, press this key to enter the stop command to stop the operation. In the fault state of the frequency converter, this key doubles as the fault reset key.</p>
	<p><b>Shift key.</b> In any state of modifying the data with the data modification key, press this key to select the modified bit of the modified bit.</p>
	<p><b>Panel panel potentiometer.</b> When the operating frequency of the inverter is set by the potentiometer on the operating panel (F0.00=3). Rotate the potentiometer knob left to reduce the operating frequency and the knob right to increase the operating frequency.</p>

## 4.2 Panel operation method

### (1) Query (example)



### (2) Parameter query and modification (example)



## 4.3 List of status monitoring parameters

Monitoring code	Content	Unit
d0-00	Current output frequency of the frequency converter	Hz
d0-01	Motor speed	Rpm
d0-02	Current output current of the frequency converter (effective value)	A
d0-03	Current output torque of the frequency converter (valid value)	%
d0-04	Current output voltage of the frequency converter (effective value)	V
d0-05	Current output power of frequency converter (valid value)	kW
d0-06	Module temperature	°C
d0-07	The DC end voltage inside the frequency converter	V
d0-08	Operation status of the frequency converter Individual bit: Motor control mode 0: VF control 1: Open ring vector Ten places: running status 0: Downtime 1: Speed reaches 2: Accelerate 3: Slow down 100 Positions: Keep Thousand bits: inhibit the action 0: No action 1: Overflow inhibition 2: Overpressure inhibition 3: Underpressure suppression	
d0-09	Frequency channel instruction	Hz
d0-10	The stator frequency	Hz
d0-11	Enter terminal status	
d0-12	Analog input AI	V
d0-13	Analog output AO	V
d0-14	Continue to have	
d0-15	Continue to have	
d0-16	Continue to have	
d0-17	Exciting current	A
d0-18	Torque current	A

## 20 for the panel operation

d0-19	Continue to have	
d0-20	Master program version	
d0-21	Apparatus capacity	Kw
d0-22	U phase current sampling zero bias	
d0-23	V phase current sampling with zero bias	
d0-24	ModBus Number of sending frames	
d0-25	ModBus Number of received frames	
d0-26	Cumulative running time of 1	H
d0-27	Cumulative running time of 2	S
d0-28	Cumulative power time 1	H
d0-29	Cumulative power time 2	S
d0-30	Cumulative electricity consumption 1	Mw·h
d0-31	Cumulative electricity consumption 2	kW·h
d1-00	Last fault record	
d1-01	Historical fault record 1	
d1-02	Historical fault record 2	
d1-03	Historical fault record 3	
d1-04	Historical fault record 4	
d1-05	Historical fault record 5	
d1-06	Output frequency at the latest failure	Hz
d1-07	Output current at the latest failure	A
d1-08	Output voltage at the latest failure	V
d1-09	The DC voltage at the most recent failure	V
d1-10	The module temperature at the latest failure	°C
d1-11	Set frequency for the most recent failure	Hz
d1-12	Operating status at the most recent failure	
d1-13	Accumulated ated startup time during the latest failure	H
d1-14	Continue to have	
d1-15	Continue to have	
d1-16	Continue to have	
d1-17	Continue to have	
d1-18	Continue to have	
d1-19	Basic percentage of motor overload	
d1-20	Basic percent of frequency conversion overload	
d1-19~d1-31	Continue to have	


## 4.4 Simple operation of the frequency converter

### 4.4.1 Initial setting of the frequency converter

#### (1) Frequency input channel selection ([F0.00])

The initial setting of the frequency converter varies according to the different model. The parameter is set to 0, and the inverter frequency setting is set by the panel number.

#### (2) Run the command input channel selection ([F0.06])

The initial setting of the frequency converter varies according to the different model. This parameter is set to [F0.06] = ### 0. The start and stop control of the frequency converter is completed by the  key on the operation panel.

### 4.4.2 Simple operation



- Absolutely forbidden to connect the power cord to the output terminals U, V, W of the frequency converter.

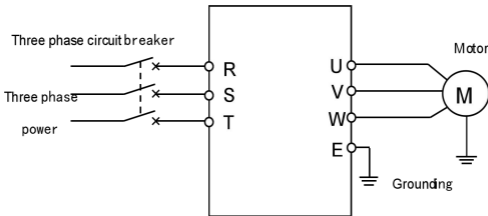


Figure 4-2 Simple operation wiring diagram

- ① Wiring according to Figure 4-2;
- ② After confirming that the wiring is correct, close the power switch, connect the power supply, the frequency converter first displays "P-oN", and later display "0";
- ③ Confirm that the frequency setting channel is the digital setting mode


## 22 for the panel operation

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([F0.00] = 0);


④ According to the rated nameplate data of the inverter drag motor, the parameters [F 2.00] and [F 2.01] shall be set;

⑤ Key  start the converter, converter output 0 frequency, display "0.0";

⑥ The UP function of  the key, increase the set frequency, increase the output frequency of the frequency converter, and accelerate the motor speed;

⑦ Observe whether the operation of the motor is normal, stop the operation if there is abnormal immediately, and cut off, and run after finding out the reason;

⑧ The DOWN function of  the button reduces the setting frequency;

⑨ Stop  stop again; and cut off the power supply.

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## Chapter 5 Functional parameter table

### Pour:

"×": It means that the set value of the parameter is in the running state and cannot be changed;

"√": Represents that the set point of this parameter can be changed;

"☆": If the set value of the parameter is related to the machine model;

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
Basic operating parameter group	F0.00	Frequency input channel	0: Digital setting 1: External analog quantity 2: External communication 3: Panel potentiometer 4: External terminal selection 5: Combination setting 6: Terminal UP / DW setting	1	3	√
	F0.01	Frequency number setting	0.00Hz ~ [F0.02]Hz	0.01	50.00	√
	F0.02	Upper limiting frequency	Low-frequency mode: 0.5~300.00Hz High-frequency mode: 5.0~1000.0Hz	0.01	50.00	×
	F0.03	Lower limit frequency	0.00~[F0.02] Hz	0.01	0.00	×
	F0.04	Parameter locking	0: All parameters allow for change 1: Only this parameter and F001 are allowed 2: Parameter locking only allows the modification of this parameter	1	0.00	√

24 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F0.05	Operation direction and Combination setting	<b>LED bit: running direction reverse</b> 0: Invalid 1: Directions are reversed <b>LED ten-place: direction lock</b> 0: Invalid 1: Reverse prevention 2: Is turning to prevent <b>LED 100 bits: lower limit frequency mode</b> 0: Keep it below the lower limit 1: Below the lower limit output 0 frequency LED thousand bit: frequency combination set 0~B	1	0000	√
	F0.06	Run the command channel And pattern selection	LED bit: Run the command channel selection 0: Keyboard control 1: External terminal control 2: Serial communication port LED ten-place: running command mode selection 0: second-line mode 1 1: Second-line mode 2 2: Third-line mode 1 3: Three-line mode 2 <b>LED hundred: reserved</b> <b>LED thousand bits: start protection selection</b> <b>0: No protection</b> <b>1: Protection</b>	1	0000	√
	F0.07	Parameter initialization	0: Invalid 1: Normalized initialization 2: Clear the fault record 3: Fully initialized	1	0	×

Table of functional parame 25

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F0.08	Carrier frequency	2.0~ 8.0 k	0.1	☆	√
	F0.09	The carrier characteristics	<b>LED bit: load association adjustment</b> <b>0: Invalid</b> 1: Valid <b>LED ten tens: Temperature correlation adjustment</b> <b>0: Invalid</b> 1: Valid <b>LED 100 bits: base frequency correlation adjustment</b> <b>0: Invalid</b> 1: Valid LED thousand bits: modulation mode 0: Asynchronous 1: Synchronization 2~5: Noise smoothing	1	0011	√
	F0.10	Output and control settings	<b>LED single-bit: motor control mode</b> <b>0: VF control</b> 1: Open-ring vector control of Asynchronous motor 2: Synchronous motor open-ring vector control <b>LED ten tens: reserved</b> <b>LED hundred: reserved</b> LED thousand-bit: Output mode 0: Low-frequency mode (0~300.00Hz) 1: High-frequency mode (0~1000.0Hz)	1	0000	×
	F0.11	Permission password	0~65535	1	0	×
	F0.12	Monitoring parameter selection	0~31(D0.00~D0.31)	1	0	√

26 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F0.13	S curve ratio	0~50%	1	0.0	√
	F0.14	Acceleration time	0.01 ~ 600.00Sec	0.01	5.00	√
	F0.15	deceleration time	0.01 ~ 600.00Sec	0.01	5.00	√
	F0.16	Point-movement acceleration time	0.01 ~ 600.00Sec	0.01	5.00	√
	F0.17	Point deceleration time	0.01 ~ 600.00Sec	0.01	5.00	√
	F0.18	Positive turn point movement frequency	0.00~[F0.02]Hz	0.01	5.00	√
	F0.19	Reverse point motion frequency	0.00~[F0.02]Hz	0.01	5.00	√
Basic control parameter group	F 1.00	Start the pre-excitation current	0.0~100.0%	0.1	30.0	√
	F 1.01	Start the preexcitation time	0.00~10.00Sec	0.01	0.0	√
	F 1.02	Start frequency	0.0~min(F0.02,100.00)Hz	0.01	1.00	√
	F 1.03	Start the frequency hold time	0.00~10.00Sec	0.01	0.0	√
	F 1.04	Downtime method	<b>LED individual bit: startup mode</b> 0: Regular start 1: One-way speed tracking start 2: Bidirectional speed tracking start <b>LED ten tens: reserved</b> LED hundred: stop mode 0: Slow down 1: Free shutdown LED thousand bits: emergency stop mode 0: Slow down 1: Free shutdown	1	0000	√

Table of functional parame 27

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F 1.05	Stop-down DC brake frequency	0.0~min(F0.02,100.0) Hz	0.01	5.00	√
	F 1.06	Shutdown DC brake current	0.0~100.0%	0.1	30.0	√
	F 1.07	Stop the DC brake time	0.00~20.00Sec	0.01	0.00	√
	F 1.08	Energy consumption braking level	340~400/650~800V	1	360/680	√
	F 1.09	Energy consumption braking action selection	0: Only slow deceleration 1: Not limited by the deceleration limit	1	0	√
	F 1.10	Inhibition of action selection	<b>LED bits:</b> <b>undervoltage inhibition</b> LED ten-place: overvoltage inhibition LED hundred: accelerated current limit LED thousand bits: Operating current limit 0: Invalid 1: Valid	1	1111	√
	F 1.11	Under voltage suppression level	160~220/340~420V	1	190/380	√
	F 1.12	The level of overvoltage inhibition	350~400/650~800V	1	380/720	√
	F 1.13	Accelerated current limit level	120~220%	1	200	√
	F 1.14	Operating current limit level	120~220%	1	200	√
	F 1.15	Magnetic flux braking level	0~100%	1	0	√
	F 1.16	Motor overload protection level	10~131%	1	110	√

28 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F 1.17	Protect action selection	<b>LED bit: output missing phase</b> LED ten-place: temperature sensor fault LED hundred bits: motor short circuit to ground detection LED thousand bits: overload temperature correlation 0: Invalid 1: Valid	1	0111	√
	F 1.18	Number of fault self-recovery times	0~5	1	0	√
	F 1.19	Fault self-recovery time	0.00~600.00 Sec	0.01	1.00	√
Motor parameter group	F2.00	Basic frequency	5.00~1000.0Hz	0.01	50.00	×
	F 2.01	Maximum output voltage	25 ~ 250V /50 ~ 500V	1	220/380	×
	F 2.02	Recurrent ascension	0.0~20.0%	0.1	3.0	√
	F2.03	V / F curve selection	0: Standard type 1: Enhanced type 2: Multi-point type 3:1.2 Times 4:1.4 Times 5:1.6 Times 6:1.8 Times 7:2.0 Times	1	0	√
	F2.04	V / F frequency 1	0.00~[F2.00] Hz	0.01	0.00	√
	F2.05	V / F voltage 1	0~[F2.01] V	1	0	√
	F2.06	V / F frequency 2	0.00~[F2.00] Hz	0.01	0.00	√
	F2.07	V / F voltage 2	0~[F2.01] V	1	0	√
	F2.08	V / F frequency 3	0.00~[F2.00] Hz	0.01	0.00	√
	F2.09	V / F voltage 3	0~[F2.01] V	1	0	√

Table of functional parame 29

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F2.10	Continue to have				√
	F2.11	Zero frequency torque is maintained	0: Invalid 1: Valid	0	0	√
	F2.12	Automatic KV stabilization	0: Invalid 1: The deceleration is invalid 2: Valid	1	0	√
	F2.13	Motor pole logarithm	1~16	1	2	√
	F2.14	The VF shock inhibition coefficient	0~100%	1	60	√
	F2.15	The SVC velocity filtering coefficient	100~900	1	650	√
	F2.16	Continue to have				
	F2.17	Temperature frequency reduction setting	20.0~100.0	0.1	88.0	√
	F2.18	Continue to have				
	F2.19	Continue to have				
Count Word input and analog quantity parameter group	F3.00	Input terminal attribute selection	<b>LED bits: X1 input in reverse</b> LED ten: X2 input LED 100 bits: X3 input in reverse LED thousand bits: X4 input in reverse 0: Invalid 1: Valid	1	0000	√
	F3.01	Multifunctional terminal X1	0~22	1	11	×
	F3.02	Multifunction terminal X2	0~22	1	0	×
	F3.03	Multifunction terminal X3	0~22	1	13	×

30 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F3.04	Multifunction terminal X4	0~22	1	0	×
	F3.05	UP / DW terminal frequency power storage	0: Invalid 1: Valid	1	0	√
	F3.06	The UP / DW terminal integration time	0.01~50.0 Sec	0.01	3.00	√
	F3.07	Input the terminal filter time	1~50ms	1	10	√
	F3.08	Continue to have				
	F3.09	AI input lower limit voltage	0.00~[F3.10] V	0.01	0.00	√
	F3.10	The AI input upper limit voltage	[F3.19]~10.00 V	0.01	10.00	√
	F3.11	AI input filter time	0~200Ms	1	20	√
	F3.12	AI minimum set frequency	0.00~[F3.13] Hz	0.01	0.00	√
	F3.13	AI maximum set frequency	[F3.12]~[F0.02] Hz	0.01	50.00	√
	F3.14	Continue to have				
	F3.15	Continue to have				
	F3.16	AO output selection	0: Output frequency 1: Output current 2: Output voltage 3: Fixed value output	0	0	√
	F3.17	AO output lower limit voltage	0.00~[F3.18] V	0.01	0.00	√
	F3.18	AO output upper limit voltage	[F3.17]~10.00V	0.01	10.00	√

Table of functional parame 31

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F3.19	The AO fixed-value output voltage	0~10.00V	0.01	0	√
Digital output and pendulum frequency operation parameter group	F4.00	Output feature selection	<b>LED bit: OC output reverse</b> LED ten: RLY output reverse <b>LED hundred: reserved</b> <b>LED thousand bits: reserved</b> 0: Invalid 1: Valid	1	0000	√
	F4.01	OC output selection	0~15	1	0	√
	F4.02	The RLY output selection	0~15	1	8	√
	F4.03	The RLY output time delay	0.00~30.00 Sec	0.01	0.00	√
	F4.04	The monitor input variable	0~6	1	0	√
	F4.05	Lower limit of the monitor variable	0~100.0%	0.1	0.0	√
	F4.06	Upper limit of the monitor variable	0~100.0%	0.1	100.0	√
	F4.07	The frequency reaches the detection amplitude	0.0~min(F0.02, 100.00)Hz	0.01	5.00	√
	F4.08	FDT setting	0.00~50.00 Hz	0.01	10.00	√
	F4.09	FDT action delay	0.00~20.00 Sec	0.01	0.00	√
	F4.10	Overload alarm level	10~200%	1	110	√
	F4.11	Overload alarm delay	0.00~600.00 Sec	0.01	5.00	√
	F4.12	Jump frequency	0.00~[F0.2] Hz	0.01	0.00	√

32 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F4.13	Jump frequency range	0~10.00Hz	0.01	0.00	√
	F4.14	Pressing frequency operation Settings	<b>LED individual bit: function setting</b> 0: Invalid function 1: Effective function <b>LED ten places: center frequency selection</b> 0: Set frequency of center frequency 1: Given the value of the frequency channel <b>LED hundred digit: swing selection</b> 0: Fixed swing amplitude (relative maximum frequency) 1: Variable swing (relative center frequency) <b>LED thousand bits: reserved</b>	1	0000	√
	F4.15	Pressing frequency center frequency	0.00~[F0.02] Hz	0.01	25.00	√
	F4.16	The frequency amplitude	0.0~50.0%	0.1	20.0	√
	F4.17	The amplitude of the jump frequency	0~50.0%	0.1	0	√
	F4.18	The time of swing frequency rise	0.01~600.00Sec	0.01	1.00	√
	F4.19	The drop time of swing frequency	0.01~600.00Sec	0.01	1.00	√

Table of functional parame 33

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
Multi-sec on speed and P L C Run parameter groups	F5.00	Multi-speed operation mode	LED single bit: multiple speed action selection 0: Invalid 1: Valid LED ten-place: mode selection 0: Single cycle 1: Keep the final value 2: Keep the set point 3: Continuous circulation LED 100 bits: speed switching mode 0: Continuous switching 1: Zero frequency switching <b>LED thousand bits: reserved</b>	1	0000	√
	F 5.01	Multi-segment speed frequency 1	0.00Hz ~ [F0.02]Hz	0.01	5.00	√
	F 5.02	Multi-segment speed frequency 2	0.00Hz ~ [F0.02]Hz	0.01	100.0	√
	F 5.03	Multi-segment speed frequency 3	0.00Hz ~ [F0.02]Hz	0.01	200.0	√
	F 5.04	Multi-segment speed frequency 4	0.00Hz ~ [F0.02]Hz	0.01	30.00	√
	F 5.05	Multi-segment speed frequency 5	0.00Hz ~ [F0.02]Hz	0.01	35.00	√
	F 5.06	Multi-segment speed frequency 6	0.00 Hz ~ [F0.02]Hz	0.01	450.0	√
	F 5.07	Multi-segment speed frequency 7	0.00 Hz ~ [F0.02]Hz	0.01	500.0	√
	F5.08	Phase 1 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.09	Phase 2 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.10	Phase 3 run time	0.0S~6500.0Sec	0.1	0.0	√

34 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F5.11	Phase 4 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.12	Phase 5 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.13	Phase 6 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.14	Phase 7 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.15	PLC multi-segment speed Running direction 1	LED single bit: stage 1 running direction LED ten-place: stage 2 running direction LED 100 bits: stage 3 running direction LED thousand bit: stage 4 running direction 0: Positive 1: Reverse	1	0000	√
	F5.16	PLC multi-segment speed Run direction 2	LED single bit: stage 5 running direction LED ten-place: stage 6 running direction LED 100 bits: stage 7 running direction <b>LED thousand bits: reserved</b> 0: Positive 1: Reverse	1	0000	√
	F5.17	PLC runs is time shutdown	0~9999(min)	1	0	√
	F5.18	Continue to have				√
	F5.19	Continue to have				√

Table of functional parameter 35

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
The Communication sets the parameter group	F6.00	Communication Settings	<b>LED individual bit:</b> <b>Baud rate selection</b> 0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps 5: 38400bps LED hundred: data format 0: 1-8-1-N, RTU 1: 1-8-1-E, RTU 2: 1-8-1-O, RTU	0000	0003	×
	F6.01	This machine address	0~127	1	1	√
	F6.02	Response delay	0~1000 ms	1	0	√
	F6.03	Time out detection time	0.1~20.0 Sec	0.1s	2.0	√
	F6.04	Communication disconnection action selection	0: Downtime 1: Run at the last status 2: Alarm shutdown	1	0	√
	F6.05	Linkage function	0000~0001	1	0000	×
	F6.06	Communication setting coefficient	0.100~10.000	0.001	1.000	√
	F6.07	Continue to have				√
	F6.08	Continue to have				√
	F6.09	Continue to have				√
	F6.10	Mapping of the applied parameter 1	F000~F919	1	F001	√
	F6.11	Mapping of the applied parameter 2	F000~F919	1	F001	√
	F6.12	Mapping of the applied parameter 3	F000~F919	1	F001	√

36 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F6.13	Mapping of the applied parameter 4	F000~F919	1	F001	√
	F6.14	Mapping of the application parameter 5	F000~F919	1	F001	√
	F6.15	Mapping state parameter 1	D000~D031	1	D000	√
	F6.16	Mapping state parameter 2	D000~D031	1	D001	√
	F6.17	Mapping state parameter 3	D000~D031	1	D002	√
	F6.18	Mapping state parameter 4	D000~D031	1	D003	√
	F6.19	Mapping state parameter 5	D000~D031	1	D004	√
PID parameter group	F7.00	The PID function setting	<b>LED individual bits: function selection</b> 0: The PID function is turned off 1: The PID function is turned on LED ten: deviation polarity 0: Invalid 1: Polarity regurgitation LED hundreds: output polarity 0: Unipolar 1: Bipolar LED thousand: frequency regulation benchmark 0: Upper limit frequency 1: Frequency channel setting value	1	0000	√
	F7.01	Digital setting	0.0~100.0%	0.1	100.0	√

Table of functional parame 37

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F7.02	Feedback gain correction	0.100~10.000	0.01	1.000	√
	F7.03	The PID feedforward action coefficient	0~100%	1	0	√
	F7.04	Range of homeostatic bias	0 ~10.0%	0.1	0.0	√
	F7.05	Continue to have				
	F7.06	Continue to have				
	F7.07	Proportional gain	0.01~5.00	0.01	1.00	√
	F7.08	Integration time	0.00~3.00 Sec	0.01	3.00	√
	F7.09	Differential gain	0.01~2.00	0.01	0.00	√
	F7.10	Continue to have				
	F7.11	The PID adjusts the frequency range	0.0~100.0%	0.1	100.0	√
	F7.12	Broken line detection	0.0~50.0%	0.1	5.0	√
	F7.13	Judgment of the disconnection detection time	0.01~60.00Sec	0.01	5.00	√
	F7.14	Continue to have				
	F7.15	The PID dormancy function	0: Close 1: Open	1	0	√
	F7.16	The dormancy frequency	0~ Upper limit frequency	0.01	5.00	√
	F7.17	Sleep delay	0~3600.0Sec	0.1	30.0	√
	F7.18	Sleep arousal bias	0~100%	0.1	5.0	√
	F7.19	Wake up delay	0~3600.0 Sec	0.1s	30.0	√

38 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
Asynchronous motor vector running parameter group	F8.00	The motor is rated power	0.1~100.0kw	0.1	☆	×
	F8.01	The motor is rated voltage	20 ~ 250V /30 ~ 450V	1	☆	×
	F8.02	Rated current of motor	0.1~1000.0A	0.1	☆	×
	F8.03	Rated frequency of motor	5~1000.0Hz	0.1	☆	×
	F8.04	Motor rated speed	300~60000rpm	1	☆	×
	F8.05	No-load current	0.01~300.00A	0.01	☆	×
	F8.06	Stator resistance	0.001~65.000Ω	0.001	☆	×
	F8.07	The stator inductance	0.1~6500.0mH	0.1	☆	×
	F8.08	Total leakage	0.1~650.00mH	0.01	☆	×
	F8.09	Rotor time constant	5.0~6500.0ms	0.1	☆	×
	F8.10	Transfer difference compensation coefficient	0.5~1.50	0.01	1.00	√
	F8.11	Motor parameter determination	<b>LED single bit: parameter identification</b> 0: Close 1: Static identification 2: Dynamic identification LED ten places: Gain selection 0: Single PID parameter 1: Double PID parameters LED hundred bits: rotational speed identification mode 0: One-way mode 1: Two-way mode <b>LED thousand bits: reserved</b>	1	0000	×
	F8.12	Gain switch on frequency	1.0 to Hz of the rated frequency of the motor	0.1	5.0	√

Table of functional parame 39

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F8.13	Gain switch under frequency	0.5~ [F8.12]Hz	0.1	2.0	√
	F8.14	Proportion gain 1	0.10~2.00	0.01	1.50	√
	F8.15	Points time 1	0~1.00Sec	0.01	0.5	√
	F8.16	Proportion gain 2	0.10~2.00	0.01	1.00	√
	F8.17	Points time 2	0~1.00Sec	0.01	0.35	√
	F8.18	Speed regulator positive limit amplitude	0~250%	1	180	√
	F8.19	Speed regulator negative limit amplitude	0~250%	1	180	√
Synchronous motor operation parameter group	F9.00	Rated voltage of the synchronous motor	20 ~ 250V /30 ~ 450V	1	☆	×
	F9.01	Rated current of the synchronous motor	0.1~1000.0A	0.1	☆	×
	F9.02	Rated rotation speed of the synchronous motor	300~60000rpm	1	☆	×
	F9.03	Synchronous motor with a pole-logarithm	1~50	1	☆	×
	F9.04	Reverse potential voltage (Valid value between the lines)	1.0~500.0V/krpm	0.1	☆	×
	F9.05	Stator resistance (between lines)	0.001~65.000Ω	0.001	☆	×

40 Table of functional parameters

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F9.06	D-axis inductance (between lines)	0.01~650.00mH	0.01	☆	×
	F9.07	Q-axis inductance (between lines)	0.01~650.00mH	0.01	☆	×
	F9.08	Magnetic chain observer gain	0.1~2.5	0.1	1.00	√
	F9.09	Speed-filter bandwidth	10~500Hz	1	☆	√
	F9.10	Motor parameter determination and speed observation and selection	<b>LED single bit: parameter identification</b> 0: Close 1: Static identification <b>LED ten-place: velocity observation selection</b> 0: Model reference adaptation 1: Magnetic chain observer <b>LED hundred: reserved</b> <b>LED thousand bits: reserved</b>	1	0000	×
	F9.11	The velocity-ring proportional gain	0.01~5.00	0.01	1.00	√
	F9.12	The velocity loop integral gain	0.01~5.00	0.01	0.80	√
	F9.13	Speed estimate proportional gain	0.1~5.00	0.01	1.00	√
	F9.14	Speed estimate for the integral gain	0.1~5.00	0.01	2.00	√
	F9.15	Excitation switching speed	0~ [F9.02]/2	0.01	[F9.02]/10	√

Table of functional parame 41

Parameter type	Function code	Name	Set the scope and description	Minimum unit	Factory Default	Change Limit
	F9.16	Low-speed excitation current limit amplitude	0~60%	0.01	25	√
	F9.17	High-speed weak magnetic current limit amplitude	0~50%	1	30	√
	F9.18	Positive torque limit	0~250%	1	180	√
	F9.19	Negative torque limit	0~250%	1	180	√

## Chapter 6 Functional detailed description

### 6.1 Basic operating parameter group

#### **F0.00 Frequency input channel / mode Selection**

**Setting range: 0 ~ 6**

Set the channel / mode for selecting the inverter operating frequency.

#### **0: Number setting**

The set frequency of the frequency converter is set by the parameter [F0.01].

#### **1: External simulation quantity**

The operating frequency is set by the external input voltage signal (0~10V) or current signal (0 ~ 20 mA), with the reference parameters [F3.09] and [F3.10].

#### **2: External communication**

Receiving the frequency setting instructions of the upper computer or host through the serial RS485 interface.

#### **3: The panel potentiometer**

The operating frequency is set by the potentiometer on the operating panel.

#### **4: External terminal selection**

The frequency input channel is determined by the external multifunctional terminal (the selection of the functional terminal is determined by the parameters [F3.01] ~ [F3.04]).

Frequency setting Channel selection 2	Frequency setting Channel selection 1	Frequency setting channel
0	0	Digital setting
0	1	External input signal (0~10V / 0 ~ 20 mA)
1	0	The RS485 interface
1	1	Panel potentiometer

Note: the effective time of terminal and CM closure is 1.


#### **5: Combination setting**

Selected by the [F0.05] group parameter LED thousand-bit frequency combination mode.

## 6: Terminal UP / DW setting

The frequency is set by the external multifunctional UP / DW terminal (the selection of the functional terminals is determined by the parameters [F3.01] ~ [F3.04]).

### **F0.01 Frequency number Setting range: 0.00 Hz ~ [F0.02]**

When the frequency input channel selects a number setting ([F0.00] = 0), the output frequency of the frequency converter is determined by this value. When the operation panel is in normal monitoring mode, this parameter can be modified directly by the  button.

### **F0.02 Upper limit frequency Setting range: 5.00~ 1000.0Hz**

The maximum frequency limit is affected by the thousand-bit frequency mode of [F0.10] group parameters, with the maximum frequency 300.00Hz in low frequency mode and the maximum frequency 1000.0Hz in high frequency mode

### **F0.03 Lower limit frequency**

**Setting range: 0.00 Hz ~ [F0.02] Hz**

This parameter is the lowest lower limit frequency of the allowable output of the inverter, and below the lower limit frequency, please reference parameter [F0.05].

### **F0.04 Parameter write protection Setting range: 0 ~ 2**

This feature is used to prevent the modification of the data from any errors.

**0: All the parameters are allowed to be modified**

**1: Only the modified functional parameters [F0.01] and this parameter are allowed**

**2: Only the modification of this parameter is allowed**

When modifying modification is prohibited, the "--" is displayed if you attempt to modify the data.



Some parameters cannot be overridden at runtime, and "--" appears if you attempt to modify them. To modify the parameters, stop the frequency converter before operating.

**F0.05 Running direction and frequency combination****Setting range 0000~ B121H**

**LED single bit: running direction reverse**

**0: invalid          1: valid**

**LED ten bits: running direction lock**

**0: invalid          1: Reverse prevention          2: Forward prevention**

**LED hundred bits: lower limit frequency mode**

**0: Output lower limit frequency [F0.03] when falling below the lower limit frequency [F0.03]**

**1: Output zero frequency when falling below the lower limit frequency [F0.03]**


**LED thousand bits: frequency combination mode**

This group setting is only valid when the frequency input channel selection combination setting ([F0.00] =5).

The set frequency of the frequency converter is determined by the linear combination of multiple frequency input channels, and the set combination mode is shown in the following table. Through combination setting, multiple channels can control the frequency output of frequency converter.


Set value	Compound mode	Set value	Combination setting
0	External voltage setting + panel setting	1	External voltage setting + panel setting + number setting
2	Communication setting + external voltage setting	3	Communication setting + external voltage setting + panel setting
4	Communication setting-panel setting + number setting	5	Communication setting-the external voltage setting
6	Communication setting + external voltage setting-panel setting	7	External voltage setting-panel setting + number setting
8	Panel setting-Number setting	9	The UP/DW frequency + the external voltage setting
A	UP/DW frequency + panel setting + external voltage setting	B	Digital setting-the external voltage setting

**F0.06 Run the command channel and mode selection****Setting range: 0000 ~ 1022H**

This function parameter is used to select the running command channel of the frequency converter, and the function of the  key.

## LED single bit: Run the command channel selection

### 0: Keyboard control

The frequency converter operation command is controlled by the  key on the keyboard. In this way, the state of the external control terminal X1~X4 (forward operation function) can affect the output phase sequence of the inverter. When the external terminal X1~X4 (forward operation function) is connected with the CM, the inverter output is in reverse phase sequence; when X1~X4 is disconnected from the CM, the inverter output is in positive phase sequence.

### 1: External terminal control


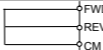
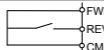
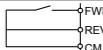
The inverter operation command is controlled by the on-off state of the multifunctional terminals X1~X4 and CM terminals, and its mode is determined by the LED ten.

### 2: Serial communication port

The operation command of the frequency converter receives instructions from the upper computer or host computer through the serial interface. This method should also be selected when the native machine is set as the slave in the linkage control.

## LED ten bit: Run command mode selection

### 0: Second-line mode 1 (default mode)

instruction	Stop instruction		Forward instruction	Reverse instructions
Terminal status				

In the second line mode, one input terminal X1 to X4 must be selected as the forward rotation control terminal FWD, and the other input terminal X1 to X4 is the inversion control terminal REV (see parameter [F3.01] ~ [F3.04])

## 1: Second-line mode 2

instruction	Stop instruction		Forward instruction	Reverse instructions
Terminal status				

## 2: Three-line mode 1

In the three-line control mode, one input terminal (X1~X4) must be the positive rotation control terminal FWD, one input terminal (X1~X4) is the three-line operation control terminal SW 1, and one input terminal (X1~X4) must be the inversion control terminal REV (refer to the parameter [F3.01] ~ [F3.04]), and any three of the input terminals X1-X4 should be selected by the parameter [F3.01] ~ [F3.04].

The switch function is described as follows:

1. SW1 (three-line operation control terminal) —— inverter shutdown trigger switch
2. SW2 (FWD) —— Forward trigger switch
3. SW3 (REV) —— Reverse trigger switch

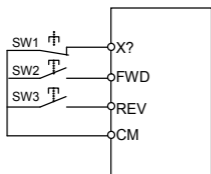


Figure 6-1 Wiring diagram of the three-line control mode

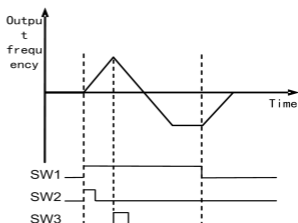


Figure 6-2 Frequency output diagram of three-line

## 2: Three-line mode 2

The switch function is described as follows:

1. SW1 (three-line operation control terminal) —— frequency converter operation enabling switch
2. SW2 (FWD) —— running stop switch

3. SW3 (REV) — direction control switch

**LED hundred bits: reserved**

**LED thousand bits: start protection selection**

**0: no protection**

**1: protection**

This parameter is used to select the protection in the effective state of the terminal start command when the inverter is powered on or the fault is reset. When the protection is effective, the start command must be invalid

### ***F0.07 Parameter initialization    Setting range: 0 ~3***

Return the parameters of the inverter to the factory value.

**0: NO action**

**1: Standardized initialization** (all parameters restore factory settings)

**2: Clear the fault record**

**3: Full initialization** (all parameters restore factory settings and clear fault record)

### ***F0.08 Carrier frequency    Setting range: 2.0 ~ 8.0 kHz***

This parameter determines the switching frequency of the power module inside the frequency converter.

The carrier frequency mainly affects the audio noise and thermal effects during operation. When silent operation is required, the carrier frequency value can be slightly increased, but the maximum load capacity of the frequency converter will decrease, and the interference amplitude of the frequency converter to the outside world will increase. For situations where the motor wires are long, it may also increase the leakage current between the motor wires and between the wires and the ground. When the ambient temperature is high, the motor load is heavy, or when the frequency converter fails due to the above reasons, the carrier frequency should be appropriately reduced to improve the thermal characteristics of the frequency converter.

### ***F0.09 Carrier characteristic Setting range: 0000 ~ 0010H***

Used to set some features related to the carrier, generally don't need to modify.

**LED bit: load associated adjustment**

When this function is effective, when the load current is too large, the carrier wave will be automatically reduced in order to ensure the safe operation of the frequency converter.

### **LED ten bits: temperature correlation adjustment**

When this function is effective, when the temperature of the converter frequency is too high, the carrier will be automatically reduced to ensure the safe operation of the converter.

### **LED hundred bits: base frequency correlation adjustment**

When this function is effective, when the inverter output frequency is lower than a certain value, the carrier wave will be automatically reduced.

### **LED thousand bits: modulation mode**

0: Asynchronous modulation-for most situations below 300Hz

1:Synchronous modulation-carrier frequency and base frequency to maintain a certain proportion, high frequency operation occasions should sample this way to improve stability

2~5: Noise smoothing-When this function is effective, the frequency converter generates a random carrier to smooth the noise

## ***F0.10 Motor control mode and frequency mode***

***Setting range: 0000 ~ 1001H***

**LED single-bit: motor control mode**

**0: VF control**

**1: open loop vector control of asynchronous motor**

**2: open loop vector control of synchronous motor**

**LED ten: reserved**

**LED hundred: reserved**

**LED thousand bits: frequency mode**

**0: Low frequency mode-frequency range 0.5~300.00HZ**

**1: High-frequency mode-frequency range 5.0~1000.0HZ**

## ***F0.11 Permission password    Setting range: 0 ~ 65535***

This parameter is the check code value to obtain the query and modification permission of some internal parameters

## ***F0.12 Monitoring parameters    Setting range: 0~ 31***

This parameter is used to determine the display content of the operation panel in the state monitoring mode.

The monitoring parameters are selected to determine the display content of the LED, and the physical quantity corresponding to the display data can be referred to the state monitoring parameter table [0~31] corresponding to [D0.00~D0.31].

### **F0.13 Scurve for acceleration and deceleration ratio**

**Setting range: 0-50%**

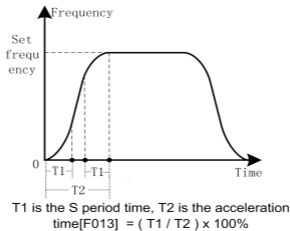


Figure 6-3 Diagram of the S curve for acceleration and deceleration

The proportion of the S curve segment to the entire time, set to 0%, is the acceleration and deceleration of a straight line.

**F0.14 Acceleration time Setting range: 0.01 ~ 6000 Sec**

**F0.15 Deceleration time Setting range: 0.01 ~ 600.00Sec**

Define the rate at which the inverter output frequency changes up and down.

**Acceleration time** The time required for the output frequency to accelerate from 0.00Hz to the upper limit frequency [F0.02].

**Deceleration time** The time required for the output frequency to slow down from the upper limit frequency [F0.02] to 0.00Hz.

**F0.16 Point movement acceleration time****Setting range: 0.01 ~600.00Sec****F0.17 Point movement deceleration time****Setting range: 0.01 ~600.00Sec**

Transition addition and deceleration time between the initial operating frequency and the upper limit frequency.

**F0.18 Forward jog frequency****Setting range: 0.00Hz ~ [F0.03]****F0.19 Reserve jog frequency****Setting range: 0.00Hz~ [F0.03]**

## 6.2 Basic control parameter group

**F1.00 Start the pre-excitation current****Setting range: 0.0~100.0%****F1.01 Start the pre-excitation time****Setting range: 0 ~ 10.00 Sec**

This parameter set is used to set the startup DC pre-excitation parameters, pre-excitation current refers to the frequency converter rated current percentage, the establishment of motor air gap flux needs some time, to get enough starting torque, must establish the air gap flux in advance, so need to advance excitation, when the parameter is set to 0, the pre-excitation is invalid, excitation process is as follows:

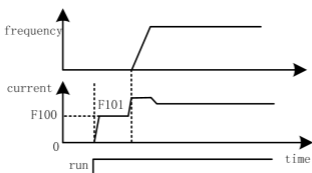


Figure 6-4 Diagram of starting the preexcitation

**F1.02 Starting frequency****Setting range: 0-min ([F0.02], 100Hz)****F1.03 Duration of startup frequency****Setting range: 0.00 to 0.00 Sec**

This functional parameter group is used to define features related to the startup mode, see Figure 6-5.

**Starting frequency:** For the system with large inertia, heavy load and high starting moment requirements, the starting frequency can effectively overcome the starting difficulty. The startup frequency duration (parameter code [F1.03]) refers to the duration of operation at the startup frequency, which can be set according to the actual needs. When set to 0, the startup frequency is invalid.

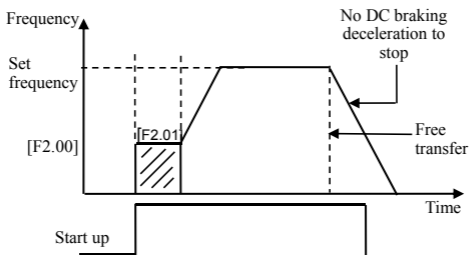


Figure 6-5 Output curve of startup and shutdown frequency

**F1.04 Start and stop mode Setting range: 0000 ~ 0101H****LED bit: start mode**

**0: Regular start:** Normal start at the acceleration time.

**1: One-way speed tracking start**

**2: Bidirectional speed tracking start**

The frequency converter first detects the motor speed, and then starts at the detected speed. For some cases before startup, the motor shaft is not stable or rotating, this function can be used to start the motor smoothly, so as to prevent the overvoltage or overcurrent fault of the frequency converter and the detection in the direction of the target frequency, which can be applied to the inconsistency between the motor steering and the target steering during startup.

**LED ten bits: reserved**

**LED hundred bits: shutdown mode**

**LED thousand bits: emergency shutdown mode**

**0: Slow and stop**

Reduce the output frequency to zero according to the set deceleration time.

**1: Free shutdown**

When stopping, the frequency converter will output zero frequency, block the output signal, and the motor will shut down freely.

***F1.05 Starting frequency of DC brake during shutdown***

***Setting range: 0.00 ~ [F0.03]***

***F1.06 Current of DC brake during shutdown***

***Setting range: 0.0 ~ 100.0%***

***F1.07 DC braking time during shutdown***

***Setting range: 0 ~ 20.00 Sec.***

This parameter set is used to set the DC brake parameters during shutdown. Shutdown DC brake current is the percentage of the rated current of the frequency converter.

Set the DC brake starting frequency ([F1.05]) During the shutdown process, when the output frequency is lower than this set parameter, the frequency converter will start the DC brake function, and the action time of the shutdown DC brake is set by the parameter [F1.07]. When the shutdown DC brake action time is set to 0, the shutdown DC brake function is invalid.

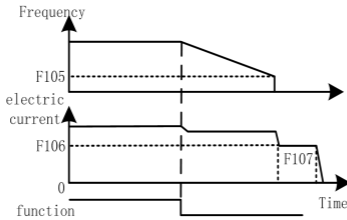


Figure 6-6 Schematic

### **F1.08 Starting voltage of energy consumption braking**

**Setting range: 340~400V / 650~800V**

This parameter is effective for the frequency converter with the built-in brake unit and is used to define the action parameters of the built-in brake unit. When the internal DC side voltage of the frequency converter is higher than the energy consumption braking start voltage, the built-in brake unit operates. If there is an external brake resistance, the brake resistance releases the voltage energy from the internal DC side of the converter to reduce the DC voltage. When the DC side voltage drops below a certain value ([F1.08]), the built-in brake unit of the frequency converter is closed, as shown in Figure 6-7.

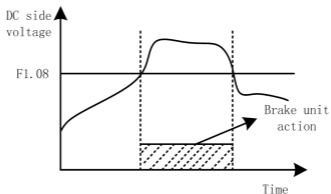


Figure 6-7, energy consumption

### ***F1.09 Energy consumption braking action selection***

***Setting range: 0 ~ 1***

**0: Only during deceleration,**

**1: Not limited during deceleration**

### ***F1.10 Inhibition action selection***

***Setting range: 0000 ~ 1111H***

**LED bit: undervoltage suppression**

**0: invalid**

**1: effective**

**LED ten bits: overvoltage suppression**

**0: Invalid**

**1: valid**

**LED hundred bits: accelerated current limit**

**0: Invalid**

**1: valid**

**LED thousand bits: Operating current limit**

**0: Invalid**

**1: valid**

### ***F1.11 Undervoltage suppression level***

***Setting range: 180 ~230V / 360 ~460V***

This parameter specifies the lower limit voltage on the DC side when the frequency converter is working normally. For some low power grids, the undervoltage protection level can be appropriately reduced to ensure the normal operation of the frequency converter.

Note: When the power grid voltage is too low, the output torque of the motor will drop.

For constant power load and constant torque load, too low grid voltage will increase the output current of frequency converter, thus reducing the reliability of frequency converter operation.

### ***F1.12 Overvoltage suppression level***

***Setting range: 350 ~400V / 650 ~800V***

This parameter specifies the threshold for voltage stall protection during motor deceleration. When the pump rise voltage of the internal DC side of the frequency converter exceeds the value specified in this parameter, the deceleration time will be automatically extended. As shown in Figure Figure 6 – 8.

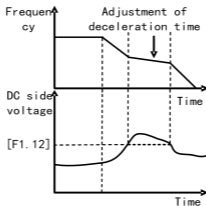


Figure 6-8 Voltage stall protection in deceleration

### ***F1.13 Accelerated current limit level***

***Setting range: 120 ~ 220%***

This parameter is used to set the allowable output level of the torque current of the frequency converter.

The current limit level during the converter acceleration is set through [F1.13] and set as the percentage of the rated current of the converter. If set to 150%, the maximum output current in the acceleration is 150% of the rated current.

When the output current of the frequency converter exceeds the level specified in this parameter, the addition and deceleration time will be automatically extended to limit the output current to this level, refer to Figure 6-9. Therefore, if the acceleration time requirement is short, the acceleration current limit level needs to be appropriately increased.

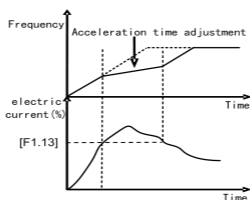


Figure 6-9 Schematic diagram of the accelerated current

### ***F1.14 Operating current limit level***

***Setting range: 120 ~ 220%***

This parameter specifies the maximum current allowed output of frequency converter, which is expressed as the percentage of the rated current of frequency converter. Regardless of the operating state (acceleration, deceleration, steady-state operation), when the output current of the frequency converter exceeds the value specified in this parameter, the frequency converter will adjust the output frequency to limit the current to the specified range to avoid overcurrent trip.

### ***F1.15 Magnetic flux braking level***

***Setting range: 0~ 100%***

This parameter is used to set the flux braking strength when the inverter is stopped, and close the flux brake when it is set to 0. This parameter is set too large to cause the motor heat, and it is recommended to use the external braking resistance during frequent emergency stops.

### ***F1.16 Overload protection coefficient of motor***

***Setting range: 10-131%***

This parameter is used to set the sensitivity of frequency converter for thermal protection of load motors. When the rated current value of the load motor does not match the rated current of the frequency converter, the correct thermal protection of the motor can be realized by setting this value. When set to 131%, the frequency converter turns off the motor overload protection function.

The set point for this parameter can be determined by the following formula:

$$[F1.16] = (\text{Motor rated current} / \text{Inverter rated output current}) \times 100\%$$



When a frequency converter is running in parallel with multiple motors, the thermal relay protection function of the frequency converter will lose its function. In order to effectively protect the motor, it is suggested to install the thermal protection relay at the incoming end of each motor.

### ***F1.17 Protection action selection***

***Setting range: 0000~0111H***

**LED bit: Output missing phase protection**

**0: Invalid**

**1: valid**

**LED ten bits: temperature sensor fault detection**

**0: Invalid**

**1: valid**

**LED hundred bits: Motor short circuit to ground before operation**

**0: invalid**

**1: valid**

When the function is effective, check whether the motor power line is short circuited to ground before the first operation of the frequency converter, or check when it runs again after a shutdown time of more than 10 seconds.

**LED thousand bits: overload temperature correlation**

**0: Invalid**

**1: valid**

When the function is effective, the overload time of the converter is affected by the converter temperature.

### ***F1.18 The number of times the fault self recovers***

***Setting range: 0~5***

### ***F1.19 Fault self recovery time***

***Setting range: 0.00~600.00Sec***

During the operation of the frequency converter, the load fluctuation, power grid fluctuation and other accidental factors may cause the fault

shutdown of the frequency converter. At this time, in order to ensure the continuity of the system work, the frequency converter is allowed to automatically reset some fault types.

The self-recovery interval refers to the interval between the inverter fault start and the fault recovery action. If the inverter cannot be successfully restored to normal within the set self-recovery times, the fault signal will be output. After the inverter is successfully restored, it is in the state of shutdown to start up. If there is no fault generation continuously for 24 hours, the number of self-recovery times is reset to 0.

### 6.3 The VF parameter group

#### **F2.00 Basic operating frequency**

**Setting range: 5.00Hz ~ upper limit frequency**

#### **F2.01 Maximum output voltage**

**Setting range: 25-250V / 50 ~ 500V**

The basic operating frequency is the minimum frequency corresponding to the converter output the maximum voltage, which is generally the rated frequency of the motor.

The maximum output voltage is the corresponding output voltage of the basic operating frequency of the inverter, which is generally the rated voltage of the motor.

These two functional parameters shall be set according to the motor parameters. If there are no special circumstances, no modification is required.

#### **F2.02 Torque lifting    Setting range: 0.0 ~ 20.0%**

Used to improve the low-frequency torque characteristics of frequency converters. When operating in the low-frequency range, perform boost compensation on the output voltage of the frequency converter, where boost voltage= $([F2.01] * [F2.02])/100$ , as shown in Figure 6-10.

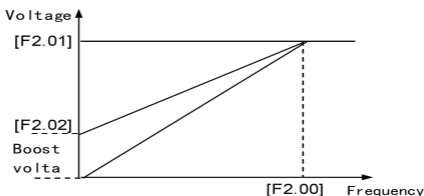


Figure 6-10 Torque lift schematic

### **F 2.03 VF curve selection Setting range: 0~ 7**

**0: Standard type**

**1: Enhanced type: medium and low frequency improvement**

**2: Multi-point VF is set by [F2.04~F2.09]**

3~7: corresponding to 1.2,1.4,1.6,1.8,2 VF curves respectively

**F2.04 V / F Frequency 1 Setting range: 0.00 to [F2.00] Hz**

**F2.05 V / F voltage 1 Setting range: 0~ [F2.01] V**

**F2.06 V / F Frequency 2 Setting range: 0.00 to [F2.00] Hz**

**F2.07 V / F voltage 2 Setting range: 0~ [F2.01] V**

**F2.08 V / F Frequency 3 Setting range: 0.00 to [F2.00] Hz**

**F2.09 V / F voltage 3 Setting range: 0~ [F2.01] V**

This functional parameter group is used to flexibly set the V / F curves required by the user, see Figure 6-11.

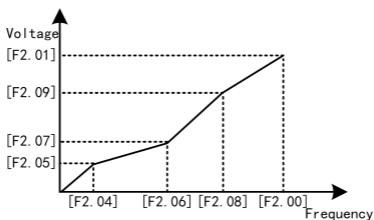


Figure 6-11 V / F custom curve

**F2.11 Zero-frequency torque keeping****Setting range: 0~1****0: The output voltage is zero at zero frequency****1: Set the torque by [F106] DC brake current at zero frequency****F2.12 Automatic voltage stabilization****Setting range: 0~2**

The automatic voltage regulator function is to ensure that the voltage of the frequency converter does not fluctuate with the fluctuation of the input voltage. In the power grid voltage changes are relatively large, and hope that the motor has a relatively stable stator voltage and current situation, this function should be turned on.

**0: invalid****1: The deceleration is invalid****2: valid****F2.13 Motor pole-log****Setting range: 1~16**

This parameter is mainly used for the calculation of the motor rotation speed.

**F2.14 VF shock inhibition coefficient****Setting range: 0~100%**

This parameter is used to suppress the motor light load shock in VF mode, the larger the value, the stronger the suppression.

**F2.15 SVC speed filtering coefficient****Setting range: 100~900**

This parameter is used for speed identification filter in SVC mode, the larger the value, the smoother the speed but the slower the response.

**F2.16 Temperature frequency reduction setting****Setting range: 20~900**

This parameter is used to indicate that when d0.06 is greater than F2.17, the output frequency will decrease.

## 6.4 Digital input and analog quantity parameter group

**F3.00 Input channel feature selection****Setting range: 0000~ 1111H**

For selecting the external digital input properties:

**LED bits: defines the properties of the X1 input channel**

**0: Positive feature 1: Inverse feature**

**LED ten bit: Define the properties of the X2 input channel**

**0: Positive feature 1: Inverse feature**

**LED hundred bit: defines the properties of the X3 input channel**

**0: Positive feature 1: Inverse feature**

**LED thousand-bit: defines the properties of the X4 input channel**

**0: Positive feature 1: Inverse feature**

The positive feature is valid when the terminal is closed and invalid when disconnected; the reverse feature is valid when the terminal is disconnected and invalid when the terminal is closed.

**F3.01 Input terminal 1 function selection Setting range: 0 ~ 22**

**F3.02 Input terminal 2 function selection Setting range: 0 ~ 22**

**F3.03 Input terminal 3 function selection Setting range: 0 ~ 22**

**F3.04 input terminal 4 function selection Setting range: 0 ~ 22**

Function definition of switch input terminals X 1 to X 4 as follows:

**0: No**

**1: Multiple segment speed control 1**

**2: Multiple segment speed control 2**

**3: Multiple segment speed control 3**

The combination of multiple speed control terminals is used to select the output frequency of multiple speed, and the specific frequency setting of each stage is set by the multiple speed control parameters ([F5.01] ~ [F5.07]).

**4: Positive turn point movement control**

**5: Reverse the point movement control**

When running the command channel to select the external terminal valid, this parameter defines the input terminal of the external movement signal.

### **6: Frequency setting channel selection 1**

### **7: Frequency setting channel selection 2**

When the frequency input channel is selected as an external terminal (F0.00=4), the frequency setting channel of the frequency converter is determined by the state of the two terminals, and its correspondence refers to the relevant description of the [F0.00] parameters.

### **8: Free shutdown control**

Close the terminal corresponding to this parameter, and the frequency converter will block the output.

### **9: Three-line operation control**

When the three-line mode is selected by the running command terminal combination mode, the external terminal defined by this parameter is the inverter shutdown trigger switch, and the three-line control mode refers to the detailed description of the function code [F0.06].

### **10: DC brake**

When the inverter is stopped, if the terminal defined in this parameter is closed, when the output frequency is lower than the DC brake start frequency, the DC brake function will be activated until the terminal is disconnected. The relevant parameters of DC braking refer to [F 1.05] ~ [F 1.07].

### **11: Forward turn control (FWD)**

### **12: Reverse Control (REV)**

### **13: Fault reset**

When the inverter is in the fault state, close the terminal set by this parameter to clear the inverter fault.

### **14: Reserved**

### **15: Emergency shutdown**

When the terminal of this parameter is valid, the frequency converter shall be immediately stopped according to the emergency stop mode set by [F1.04].

### **16: External fault input**

When the terminal set in this parameter is closed, it indicates that the external equipment is faulty. For the equipment safety, the inverter will block the output and display the external fault signal Fu.16.

### **17: Disconnection input**

When the terminal set in this parameter is closed, it indicates that the external equipment has a broken fault. For the safety of the equipment, the inverter will block the output and display the external fault signal Fu.17.

### **18: PLC input**

When the programmable PLC run selection condition [F5.00] is valid, the external terminal defined by this parameter can realize the input and resection of the PLC run.

### **19: Proof-frequency operation input**

When the condition of swing frequency function is valid ([F4.14] =XXX2). The external terminal defined in this parameter can realize the input and resection of pendulum frequency operation.

### **20: UP**

### **21: DW**

The frequency converter can set the operating frequency through the external terminal to realize the remote frequency setting operation. When the terminal is effective, the set frequency increases or decreases according to the set rate; when the terminal is invalid, the set frequency is maintained. The set frequency is maintained when both terminals are active simultaneously. The frequency increases when UP is effective and decreases when DW is effective.

### **22: Acceleration and deceleration time switch**

When the terminal is valid, it switches to the point movement acceleration and deceleration time ([F0.16], [F0.17]), and to the normal acceleration and deceleration time ([F0.14], [F0.15]).

### ***F 3.05 UP / DW terminal frequency drop saving***

***Setting range: 0~1***

This parameter is used to set whether the UP / DW terminal frequency failure is saved

**0: Do not save**

**1: save and recovery when power on**

**F 3.06 UP / DW terminal integration time****Setting range: 0.01 ~ 50.00Sec**

This parameter is used to set the UP / DW terminal integration time, and the set value represents the time integrated to the upper limit frequency when the terminal is valid.

**F3.07 Input terminal filter time Setting range: 1-50 ms**

For the external input X 1 to X 4 input terminals filtering, the short pulse signal below this set time will be filtered

**F3.08 Reserved****F3.09 AI input lower limit voltage****Setting range: 0.00V ~ [F 3.10]****F3.10 AI input upper limit voltage****Setting range: [F3.09] ~ 10.00 V**

[F3.09] and [F3.10] define the AI range of the analog input channel and shall be set according to the actual situation of the access signal.

**F3.11 AI input filter time Setting range: 1 ~ 200ms**

The external analog input enters the filtering processing to effectively eliminate interference signals. When the setting is too large, the signal will have a strong immunity ability but delay the response speed to the set signal.

**F3.12 AI minimum set frequency****Setting range: 0.00Hz ~ [F3.13]****F3.13 AI maximum set frequency****Setting range: [F3.12] ~ [F0.03]**

The correspondence between the simulated input quantity AI and the set frequency is shown in Figure Figure 6-10.

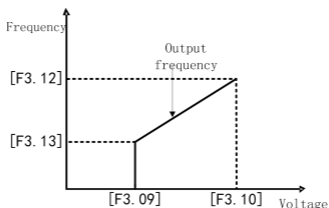


Figure 6-12 Figure of the corresponding relationship

**F3.14 ~F3.15 Reserved**

**F3.16 Analog output selection Setting range: 0 ~ 3**

#### 0: The output frequency

The analog output (AO) amplitude is proportional to the output frequency of the frequency converter. The set upper limit of the simulated output ([F3.18]) corresponds to the upper limit frequency.

#### 1: The output current

The analog output (AO) amplitude is directly proportional to the output current of the frequency converter. The set upper limit of the analog output ([F3.18]) corresponds to 2.5 times the rated current of the frequency converter.

#### 2: The output voltage

The analog output (AO) amplitude is proportional to the output voltage of the frequency converter. The set upper limit of the analog output ([F3.18]) corresponds to 1.5 times the nominal value of the inverter input voltage (220V single-phase and 380V three-phase).

#### 3: Fixed value output

The analog output (AO) output value is set by the [F319] parameter.

**F3.17 AO output lower limit**

**Setting Range: 0.00 V ~ [F3.18]**

**F3.18 AO output upper limit**

**Setting range: [F3.17] ~ 10.00 V**

Define the maximum and minimum value of the analog output AO output

signal. As shown in Figure Figure 6-13:

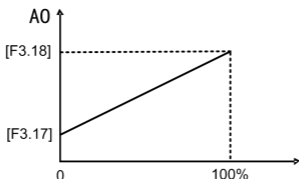


Figure 6-13 for the analog output

### **F3.19 AO set value output voltage Setting range: 0 ~ 10.00V**

This parameter is used to set the AO output voltage when the analog output is set to the constant value output.

## 6.5 Digital output and pendulum frequency operation parameter group

### **F4.00 OC and relay output characteristics**

**Setting range: 0000 ~ 0011H**

**LED bit: OC output polarity reverse**

**0: Invalid 1: valid**

**LED ten bits: relay output polarity reverse**

**0: Invalid 1: valid**

### **F4.01 Output terminal OC function selection**

**Setting range: 0 ~ 13**

### **F4.02 Relay output TA / TC function selection**

**Setting range: 0 ~ 13**

Used to define collector open output terminal OC and relay output contacts. The internal wiring diagram of the collector open circuit output terminal is shown in Figure 6-14. When the setting function is effective, the

output is low, and when the function is invalid, the output is high resistance.

Relay contact output: When the output function is set, the TA-TC is on.

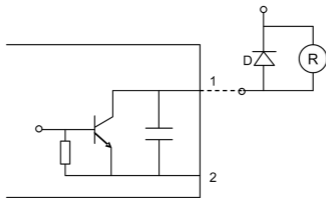


Figure 6-14 Internal wiring of the



- When the external sensor element (such as the relay coil), the wire diode D must be connected in parallel.

### 0: Frequency converter is in operation

When the inverter is in operation state, output valid signal and output invalid signal in shutdown state.

### 1: Arrive at setting frequency

When the output frequency of the frequency converter is close to the set frequency to a certain range (the range is determined by the parameter [F4.07]), output a valid signal, otherwise output an invalid signal.

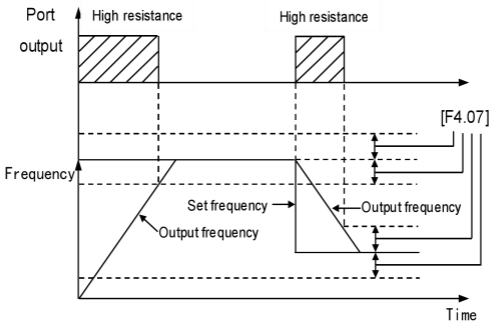


Figure 6-15 Frequency arrival signal

## 2: Frequency Level Detection (FDT)

When the output frequency of the inverter exceeds the FDT frequency level, the effective signal is output after the set delay time. When the output frequency of the inverter is lower than the FDT frequency level, the invalid signal is output after the same delay time.

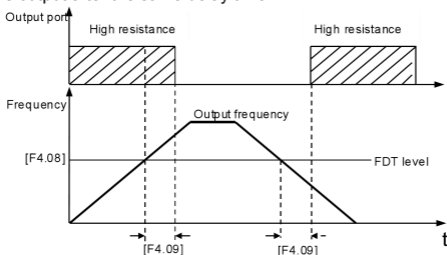


Figure 6-16 Frequency Level Detection

## 3: Overload detection

When the output current of the frequency converter exceeds the overload alarm level, the effective signal is output after the set alarm delay time. When the output current of the frequency converter is lower than the overload alarm level, the invalid signal is output after the same delay time.

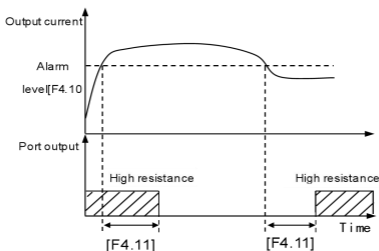


Figure 6-17, Overload alarm

## 4: The frequency reaches the upper limit

When the output frequency of the inverter reaches the upper frequency, the port outputs the valid signal, otherwise the invalid signal.

**5: Frequency reaches the lower limit**

When the output frequency of the inverter reaches the lower frequency, the port outputs the valid signal, otherwise the invalid signal.

**6: At zero speed**

When the inverter operation command is valid and the output frequency is 0, the port output the valid signal; otherwise, the invalid signal is output.

**7: Shutdown under under-pressure**

When the DC side voltage of the frequency converter is lower than the specified value, the frequency converter stops running, and the port outputs the valid signal, otherwise the invalid signal.

**8: The frequency converter fails**

When the inverter is stopped, the valid signal is output; it is invalid.

**9: Broken line fault**

When the disconnection fault stops running, the valid signal is output; the normal state is invalid

**10: The PLC cycle is completed**

PLC cycles complete 250 ms pulse output

**11: The monitor input variable is below the lower limit****12: The monitor input variable is above the upper limit****13: The monitor input variable is within the upper and lower limits****14: The frequency converter is ready****15: Zero speed (shutdown also valid)****F4.03 Relay action delay Setting range:0.00 ~ 30.00Sec**

This parameter is used to set the delay time when the state of the relay output signal changes.

**F4.04 Monitor input variable selection**

**Setting range: 0~6**

**F4.05 Monitor variable lower limit**

**Setting range: 0.0 ~ 100.0%**

**F4.05 Monitor variable upper limit**

**Setting range: 0.0 ~ 100.0%**

The parameters of this group are used to set the monitor function and

can be used to monitor the status of relevant variables within frequency conversion. The monitor input variables are as follows:

No.	Function	100% Output	No.	Function	100%Output
0	Frequency	Upper limiting frequency	1	Current	2.5 times the rated current of the frequency converter
2	Output voltage	500V/1000V	3	Busbar voltage	Single-phase 500V / Three-phase 1000V
4	Temperature	150 Degrees	5	AI	10V
6	AO	10V			

#### ***F4.07 Frequency reaches detection amplitude***

***Setting range: 0.00 ~ [F0.03]***

When the frequency defined to set the output terminal reaches the detection amplitude, when the output frequency of the frequency converter is within the positive or negative detection range of the set frequency, the output terminal output the valid signal, refer to FIG. 6-15.

#### ***F4.08 FDT (frequency level) setting***

***Setting range: 00 ~ 20.00 Hz.0***

#### ***F4.09 FDT Output delay time***

***Setting range: 0.00 ~ 20.00Sec***

This parameter group is used to set the frequency detection level.

When the output frequency is higher than the FDT set value, the output terminal outputs a valid signal after the set delay time;

When the output frequency is lower than the FDT set value, an invalid signal is output by the output terminal after the same delay time.

#### ***F4.10 Overload alarm level***

***Setting range: 10-200%***

#### ***F4.11 Delay time of overload alarm***

***Setting range: 0.00~ 600.00Sec***

This parameter group is used to set the overload alarm level and the alarm delay time. When the output current is higher than the set value of [F4.10], the output terminal output the valid signal (low level) after the delay

time set by the parameter [F4.11], refer to Figure 6-17.

### **F4.12 Jump frequency**

**Setting range: 0 to upper limit frequency**

This parameter group is used to set the jump frequency function. When the set frequency is within the range of jump frequency, the actual running frequency will be close to the jump frequency near the set frequency. If the jump frequency is set to 0, the jump frequency function is cancelled, refer to Figure 6-18 for the jump frequency operation.

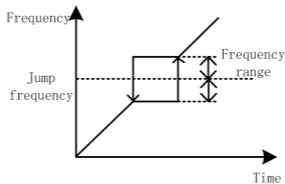


Figure 6-18 Schematic representation of the jump

### **F4.14 Swing frequency operation setting**

**Setting range: 0000~0012H**

This parameter is used to set the basic characteristics of the swing frequency operation. (Quartile decimal setting)

**LED single bit: swing frequency function enables selection**

**0: The swing frequency function is turned off**

**1: The swing frequency function is effective**

**2: The swing frequency function conditions are effective**

When the external swing frequency input terminal is effective (the swing frequency input terminal is selected by the functional parameters [F3.01] ~ [F3.04]), it operates in the swing frequency mode.

**LED ten bits: center frequency setting**

**0: Number setting, set by [F4.15]**

**1: frequency channel selection, given by the frequency channel**

**LED hundred bits: swing mode**

**0: Fixed swing:**  $Pset = [F4.16] * \text{Upper frequency}$

**1: variable swing (relative center frequency):**

$Pset = [F4.16] * \text{center frequency}$

#### ***F4.15 Swing frequency center frequency setting***

***Setting range: 0.00~ [F0.03]***

The swing frequency center frequency refers to the center value of the inverter output frequency when the swing frequency is running.

Refer to Figure 6-19 for the detailed procedure of the pendulum frequency operation.

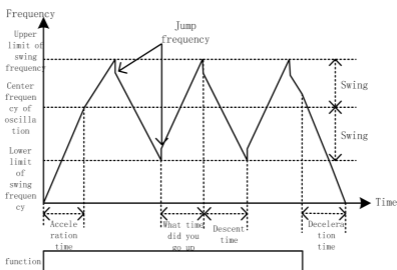


Figure 6-19 Schematic diagram of pendulum frequency operation

#### ***F4.16 Swing frequency amplitude:***

***Setting range : 0.00~50.0%***

Swing frequency amplitude =  $[F4.16] * \text{upper frequency}$

#### ***F4.17 The amplitude of the jump frequency***

***Setting range : 0.00~50.0%***

The jump frequency refers to the amplitude of the rapid decrease in frequency after reaching the upper limit of the swing frequency during the swing frequency cycle, as well as the rapid increase in frequency after reaching the lower limit of the swing frequency. Please refer to Figure F6-19 for details

Actual jump frequency =  $[F4.17] * \text{actual swing frequency amplitude}$

**F4.18 Triangle wave drop time****Setting range: 0.01~600.00Sec****F4.19 Triangle wave rise time****Setting range: 0.01~600.00Sec**

The triangular wave drop time is the running time from the upper swing frequency to the lower swing frequency of the swing frequency, that is, the deceleration time in the running cycle of the swing frequency.

The triangular wave rise time is the running time from the lower frequency of the swing frequency of the swing frequency, that is, the acceleration time in the swing frequency operation cycle.

## 6.6 Multi-speed segment and PLC operating parameter group

**F5.00 Simple PLC operation mode****Setting range: 0000~0042H**

Basic characteristic setting for multi-speed operation (decimal decimal setting).

**LED single bit: simple PLC action selection****0: Simple PLC is invalid****1: Simple PLC is effective****2: Simple PLC are effective in conditions**

When the LED selects 1 (PLC is valid), the frequency converter enters the simple PLC operation state under the allowable state of frequency channel priority.

When LED individual bit selection 2 (PLC condition is valid), when the external PLC input terminal is effective (the PLC input terminal is selected by the parameters [F3.01] ~ [F3.04]), the frequency converter operates in simple PLC mode; when the external input terminal is invalid, the frequency converter automatically enters the frequency setting mode of lower priority.

**LED ten-bits: simple PLC operation mode selection****0: Single-cycle mode**

The frequency converter runs according to the set frequency of the first

segment speed, and outputs the frequency step by step according to the set running time. If the set running time of a certain speed is 0, the speed is skipped and the frequency converter stops output after one cycle. It needs to input a valid running instruction to start the next cycle.

### **1: Maintain the final value mode**

The basic operation mode is the same as mode 0. After the frequency converter does not stop after the single cycle, run at a non-zero speed at the last time, and other processes are the same as mode 1

### **2: Maintain the setting point mode**

The basic operation mode is the same as mode 0. After completing a single cycle, the frequency converter does not stop and runs at the frequency set channel setpoint determined by F0.00. and other processes are the same as mode 1.

### **3: Continuous cycle mode**

The basic operation mode is the same as mode 0. The cycle starts from the first cycle.

### **LED hundred bits: frequency switching mode**

#### **0: Continuous switching in adjacent stages.**

##### **1: Zero frequency switching**

The frequency drops to 0Hz and then switches to the next stage.

#### ***F5.01 Multistage speed frequency 1***

***Setting range: 0.00Hz ~ upper limit frequency***

#### ***F5.02 Multistage speed frequency 2***

***Setting range: 0.00Hz ~ upper limit frequency***

#### ***F5.03 Multistage speed frequency 3***

***Setting range: 0.00Hz ~ upper limit frequency***

#### ***F5.04 Multistage speed frequency 4***

***Setting range: 0.00Hz ~ upper limit frequency***

#### ***F5.05 Multistage speed frequency 5***

***Setting range: 0.00Hz ~ upper limit frequency***

#### ***F5.06 Multistage speed frequency 6***

***Setting range: 0.00Hz ~ upper limit frequency***

#### ***F5.07 Multistage speed frequency 7***

***Set range: 0.00Hz ~ upper limit frequency***

This set of parameter function codes is used to set the output frequency of the terminal control multistage speed operation.

<b>F5.08</b>	<b>Stage 1 running time</b> <b>Setting range: 0.0 ~ 6000.0 Sec</b>
<b>F5.09</b>	<b>Stage 2 running time</b> <b>Setting range: 0.0 ~ 6000.0 Sec</b>
<b>F5.10</b>	<b>Stage 3 running time</b> <b>Setting range: 0.0 ~ 6000.0 Sec</b>
<b>F5.11</b>	<b>Stage 4 running time</b> <b>Setting range: 0.0 ~ 6000.0 Sec</b>
<b>F5.12</b>	<b>Stage 5 running time</b> <b>Setting range: 0.0 ~ 6000.0 Sec</b>
<b>F5.13</b>	<b>Stage 6 running time</b> <b>Setting range: 0.0 ~ 6000.0 Sec</b>
<b>F5.14</b>	<b>Stage 7 running time</b> <b>Setting range: 0.0 ~ 6000.0 Sec</b>

[F5.08] ~ [F5.14] Multiple speed frequency 1~7 running time

**Note:** The running time of each phase refers to the time from the end of the previous phase to the end of the current phase, including the acceleration or deceleration time to the frequency of the current phase.

**F 5.15 PLC multiple direction 1**  
**Setting range: 0000 ~1111H**

Define PLC multispeed direction (scale binary setting)

The PLC running direction setting.

LED bits, ten bits hundred bits, thousand bits: stage 1,2,3,4  
direction selection

0: Forward

1: Reverse

**F 5.16 PLC multi-segment running direction 2**

**Setting range: 0000 ~0111H**

Define PLC multispeed direction (scale binary setting)

**LED bits, ten bits hundred bits, thousand bits: stage 5,6,7 direction selection**

**0: Forward**

**1: Reverse**

**F 5.17 PLC running timing time**

**Setting range: 0 ~9999Min**

When the programmable multi-segment speed running function is selected, this parameter is used to set the programmable multi-segment speed running time, when the time is automatically stop, resume operation, need to give the shutdown command, and then give the boot command.

When this parameter is set to 0, the timing operation shutdown function is invalid.

## 6.7 Communication set parameter group

**F6.00 Communication setting**

**Setting range: 0000 ~ 0025H**

This parameter is used to set characteristics related related communication (qule decimal setting)

**LED bit: Baud rate selection**

**0: 1200bps 1: 2400bps 2: 4800bps**

**3: 9600bps 4: 19200bps 5: 38400bps**

When using serial port communication, we must ensure that the communication parties have the same wave rate.

**LED ten bits: data format selection**

**0: no check 1: even check 2: odd check**

When using serial port communication, we must ensure that both

parties have the same data format.

**LED hundred bits: reserved**

**LED thousand bits: reserved**

**F6.01 Local address      Setting range: 0 ~ 127**

Set the local address of the inverter communication, only if the machine is a slave. During the communication process, the local computer returns the response frame only to the data frame consistent with the local address, and receives the instructions.

The 0 is the broadcast address. For broadcast data, the slave performs instructions but does not feedback the corresponding data (see Appendix Communication Protocol).

**F6.02 Response delay Setting range : 0 ~ 1000 ms**

The waiting time after the information code of the host computer is correctly received to sending the response data frame.

**F6.03 Communication timeout detection time**

**Setting range: 0.1 ~ 20.0 Sec**

When the native machine exceeds the time interval defined by this parameter, no correct data signal is received. Then the machine judges the communication fault. Select downtime or continue operation according to the communication failure operation mode set by [F6.04].

**F6.04 Action settings after communication failure**

**Setting range: 0000 ~ 0001**

**0: Shutdown**

**1: Maintain the status**

**2: Alarm and shutdown**

**F6.05 Linkage Setting**

**Setting range: 0000 ~ 0001**

When using the linkage function, the host is set to 0001, and the linkage communication can be realized to 0000.

**F6.06 Communication linkage setting ratio coefficient****Setting range: 0.10~ 10.000**

This parameter defines the ratio of the output frequency between host and slave during linkage control.

The parameters of the host frequency converter do not work. When the linkage synchronization control is realized through the RS485 interface, the operation command of the slave is fully synchronized with the host, and the frequency command of the slave is calculated in the following way:

$$\text{Slave frequency command} = \text{Host frequency command} * [\text{F6.06}]$$

**F6.07 ~F6.09 Reserved****F6.10 Mapping application parameter 1****Setting range: F 000-F 919****F6.11 Mapping application parameter 2****Setting range: F 000-F 919****F6.12 Mapping application parameter 3****Setting range: F 000-F 919****F6.13 Mapping application parameter 4****Setting range: F 000-F 919****F6.14 Mapping application parameter 5****Setting range: F 000-F 919**

Mapping parameter setting can read and write the data by non-continuous parameter address by accessing the continuous mapping address. This group of parameters is used to set the application parameter mapping address. For detailed address, refer to the MODBUS protocol Section 3.1.3 communication parameters.

Mapping application parameters	Mapping access address
Mapping the application parameters 1 ~ 5	0x1303~0x1307

**F6.15 Mapping state parameter 1****Setting range: D000 ~ D031H****F6.16 Mapping state parameter 2****Setting range: D000 ~ D031H****F6.17 Mapping state parameter 3****Setting range: D000 ~ D031H****F6.18 Mapping state parameter 4****Setting range: D000 ~ D031H****F6.19 Mapping state parameter 5****Setting range: D000 ~ D031H**

Mapping state parameters	Mapping access address
Mapping state parameters from 1 to 5	0x1403~0x1407

**6.8 PID parameter group**

The PID control adjusts the output frequency of the inverter by calculating the difference between the feedback value and the target value of the controlled system to stabilize the target signal. The schematic diagram is shown in Figure Figure 6-20.

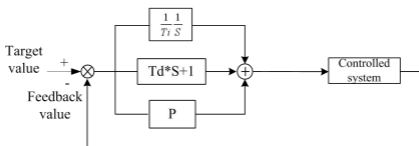


Figure 6-20 Schematic diagram of the action of the PID

**F7.00 PID function selection Setting range: 0000 ~ 0011H****Bits:****0: Turned off the PID function**

**1: Open the PID function**

**Ten bits: Deviation polarity reversal**

**0: Invalid 1: polarity reversal**

**Hundred bits: output polarity**

**0: unipolar 1: Bipolar**

**Thousand bits: PID frequency regulation benchmark**

**0: Upper limit frequency 1: Frequency channel Setting**

***F7.01 PID value      Setting range: 0.0~100.0%***

***F7.02 Feedback channel correction coefficient***

***Setting range: 0.100 to 10.000***

Percentage is set for the given PID value.

This parameter allows for a linear correction of the feedback signal.

***F7.03 PID feedforward coefficient***

***Setting range: 00-100%***

**0: Feedforward function is turned off**

**1~100%: Feedforward action coefficient, which can increase the response speed during system startup.**

***F7.04 Static deviation range      Setting range: 0 ~10.0%***

The PID does not adjust action when the error is within this range.

***F7.07 Proportional gain      Setting range: 0~5.00***

***F7.08 Integration time      Setting range: 0~3.00Sec***

***F7.09 Differential gain      Setting range: 0~2.00***

This parameter group is the built-in PID controller parameter.

***F7.11 PID adjustment frequency range***

***Setting range: 0.0~100.0%***

This parameter is set as the upper limit frequency of the PID adjustment, which is the percentage of the maximum PID output value corresponding to

the reference base frequency.

**F7.12 Disconnection detection lower limit:**

**Setting range: 0.0 ~50.0%**

**F7.13 Delay time for disconnection detection:**

**Setting range: 0.01 to 60.00Sec**

If the feedback value of the system is lower than the lower limit of break detection, it is considered to be in the break state and starts to detect the broken line. If the system is still in the break state after delay time, the break fault is considered to occur.

**F7.15 PID hibernation function      Setting range: 0~1**

**0: Function closed**

**1: Function open**

**F7.16 PID hibernation frequency**

**Setting range: 0~ upper frequency Hz**

**F 7.17 PID hibernation delay**

**Setting range: 1~3600.0Sec**

**F 7.18 PID awakening deviation**

**Setting range: 0-100%**

**F 7.19 PID awakening delay**

**Setting range: 1~3600.0Sec**

The parameters of this group set the dormancy function. When the dormancy function is effective, the PID deviation is less than the static deviation of [F7.04], and the output frequency is less than the dormancy frequency. After the continuous dormancy, the delay time enters dormancy. After the feedback deviation during dormancy is greater than the static deviation and the continuous awakening delay time, the frequency converter wakes up and enters the PID adjustment state according to the feedback deviation.

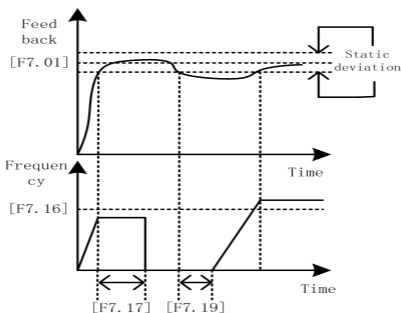


Figure 6-21 Figure of PID run

## 6.9 Vector running parameter group

### **F8.00~F8.04 Motor rating parameters**

**Setting range: ☆**

The nameplate parameters of asynchronous motors, in order to ensure control performance, we need to:

- 1) Set the nameplate parameters correctly;
- 2) The power level of the motor and the converter should be matched.

Generally, only the motor is allowed to be two levels or one level smaller than the converter.

After changing the rated power setting (F8.00), the parameters behind the setting will be automatically matched. Please modify the setting in sequential order.

Change any of the nameplate parameters of the motor, the frequency converter will automatically set the static identification of primary motor parameters.

### **F8.05 to F 8.09 Motor parameters Setting range: ☆**

After parameter identification, the group of parameters will be automatically updated, generally without setting.

**F8.10 Rotation compensation coefficient****Setting range: 0.5~1.50**

The rotation compensation coefficient is used to calculate the rotation frequency and is effective for the vector control mode. In the SVC operation mode, the speed control static difference can be adjusted by modifying this parameter.

**F8.11 Motor parameters test Setting range: 0.5~1.50**

The motor parameter test function must be started when the vector control mode (F0.10 is set to 1).

After this function is turned on (F8.11 is set to 1~2), a parameter identification process will be conducted when starting the frequency converter. After the parameter identification, F8.11 will automatically clear, and the obtained motor parameters will be automatically stored in the internal memory of the frequency converter. The value of parameters F8.05 ~ F8.10 will be automatically updated, and the LED interface prompts "tune" during the identification process.

Before identification run, confirm:

- 1) The parameters of the motor nameplate (F8.01~F8.04) have been entered correctly;
- 2) The motor is in a stop-turning state.

**LED single bit: motor parameter identification****0: Close****1: Static identification**

During the parameter setting process, the motor always keeps the stop state, and there is no requirement for the connection relationship of the motor rotating shaft, but the setting accuracy is low.

**2: static + operation parameter identification**

After the frequency converter performs static identification on the motor, the converter automatically starts the identification process. During the operation identification process, the stop command can be entered to force terminate the identification process. At this time, the identification request is not cleared, and the identification process will be restarted again.

The maximum operating frequency of operation identification will reach 80% of the rated frequency of the motor. Before starting and identification, please confirm the safety of the equipment, and the operation will be automatically terminated after the identification.



➤ In the process of operation identification of motor parameters, we must ensure that the whole process motor has no load, otherwise incorrect motor parameters will be obtained.

### LED ten bits: Gain selection

**0: Double PID parameters      1: Single PID parameter**

**0: Double PID parameters refer to in the speed loop under SVC mode , there are two sets of PID parameters F8.14~F8.15, F8.16~F8.17, Switch through F8.12~F8.13.**

**1: Single PID parameter refers to a set of PID numbers F8.14~F8.15 under SVC mode**

### LED hundred bits: Speed identification mode

**0: Single-way mode      1: Two-way mode**

**0: During parameter identification, the motor will run in the forward direction.**

**1: During motor identification and recognition, the motor will first run in the forward direction and then in the reverse direction**

***F8.12 Gain switching upper frequency***

***Setting range: 1.0~ [F8.03]***

***F8.13 Gain Switching lower frequency***

***Setting range: 0.5~ [F8.12]***

The group of parameters are used to set the low speed and high speed gain switching points and the frequency range of lag ring switching. The first set of parameters of low speed and the second set of high speed parameters are valid.

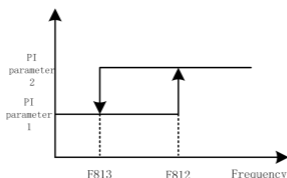


Figure 6-22 Schematic diagram of the gain switching

<b>F8.14 Proportional gain 1</b>	<b>Setting range: 0.1~2.00</b>
<b>F8.15 Integral time 1</b>	<b>Setting range: 0~1.00Sec</b>
<b>F8.16 Proportional gain 2</b>	<b>Setting range: 0.1~2.00</b>
<b>F8.17 Integral time 2</b>	<b>Setting range: 0~1.00Sec</b>

This set of parameters is used to adjust the proportional gain of the speed regulator, integration time, each parameter is set according to the following principles:

1: proportional gain P: the larger the value, the faster the response, and the system stability becomes worse, leading to excessive speed shock.

2: Integration time  $T_i$ : the smaller the value, the faster the response, the greater the speed overshoot, the worse the stability, generally is proportional to the system inertia, when the inertia is large, this parameter should also set a large value.

<b>F8.18 Regulator output positive limit</b>	<b>Setting range: 10-250%</b>
<b>F8.19 Regulator output negative limit</b>	<b>Setting range: 10-250%</b>

This parameter is used to set the output range of the regulator to limit the transient positive and negative torque of the system, and the set value is the percentage relative to the rated torque.

## 6.10, synchronous motor operation parameter group

- F9.00 Rated voltage of synchronous motor**  
**Setting range: ☆**
- F9.01 Rated current of synchronous motor**  
**Setting range: ☆**
- F9.02 Rated speed of synchronous motor**  
**Setting range: ☆**
- F9.03 Number of poles synchronous motor of synchronous motor**  
**Setting range: ☆**
- F9.04 Inverse potential voltage (active value between lines)**  
**Setting range: ☆**
- F9.05 Stator resistance (between lines)**  
**Setting range: ☆**
- F9.06 D axis inductance (between lines)**  
**Setting range: ☆**
- F9.07 Q axis inductance (between lines)**  
**Setting range: ☆**

This set of parameters are used to set the parameters of the synchronous motor, in which the reverse potential voltage is the effective value of the voltage generated between the two lines when the motor rotates at 1000rpm (the reverse potential is equal to 3 times the opposite potential) (AC amplitude divided by 2). The stator resistance and the DQ axis inductance are also measured between the two lines.

- F9.08 Magnetic chain observer gain**  
**Setting range: 0.01~2.50**
- F9.09 Speed view filter bandwidth**  
**Setting range: 10 ~ 500 HZ**

This parameter is used to set the magnetic chain observer gain, and the larger the gain, the faster the response, but the excessive gain may cause shock, and the speed filter bandwidth is used to set the cut-off frequency of

the speed filter.

### ***F9.10 Motor parameter test and speed observation***

***Setting range: 0000~0011***

**LED single-bit:** the parameter determination function of synchronous motor must only be started when the control mode (F0.10 is set to 2). F 90 will be automatically cleared after the parameter identification, the obtained motor parameters will be automatically stored in the internal memory of the frequency converter, and the value of parameter F 9.05 ~ F 9.07 will be automatically updated, and the LED interface prompts "tune" in the identification process.

#### **LED ten bits: velocity observation selection**

**0: Model reference Adaptive 1: Magnetic chain observer**

Before identification run, confirm:

- 1) The motor nameplate parameters (F9.00~F9.04) have been correctly input
- 2) The motor is in a shutdown state with no external load.



➤ In the process of operation identification of motor parameters, we must ensure that the whole process of motor shaft can be rotated freely, otherwise incorrect motor parameters will be obtained.

### ***F9.11 Speed loop proportional gain***

***Setting range:: 0.01~5.00***

### ***F9.12 Speed loop integral gain***

***Setting range:: 0~5.01.00***

### ***F9.13 Proportional gain of speed observer***

***Setting range:: 0.1~5.00***

### ***F9.14 Integral gain of speed observer***

***Setting range: 0.1~5.00***

This group of parameters is used to set the speed ring and the speed observer parameters, and the speed ring parameters are used to adjust the

speed response to improve the speed and load response requirements.

For the motor body or the system with large load inertia is appropriately increased (but does not cause shock) proportional gain, reducing the integral gain can improve the overshoot.

The speed observer parameters are used to improve the response of the speed observer, so as to improve the stability of the speed ring, usually do not need to adjust, but if the system after adjusting the speed ring parameters cannot stabilize or cannot meet the requirements of the speed observer parameters, such as the speed observer ratio gain.

**F9.15 Excitation switching speed**

**Setting range: ☆**

**F9.16 Low speed excitation current limit**

**Setting range: 0~60%**

In order to improve the load capacity under speed, when the motor speed is lower than the excitation switching speed, the percentage is relative to the rated current of the motor.

**F9.17 High-speed weak magnetic current limit**

**Setting range: 0-50%**

This parameter is used to set the limit of the weak magnetic current after the drive enters the weak magnetic zone, whose percentage is relative to the rated current of the motor, so as to avoid working in the weak magnetic zone for a long time as far as possible, otherwise the motor may demagnetize risk.

**F9.18 Positive torque limit    Setting range: 0~250%**

**F9.19 Negative torque limit    Setting range: 0~250%**

This set of parameters is used to set the positive and negative torque limit of the speed ring, whose percentage is relative to the rated current of the motor.

## Chapter 7 Fault diagnosis and Countermeasures

### 7.1 Protection functions and countermeasures

Hitch code	Troubleshooting	Possible cause	Solution
Fu.01	Frequency converter overcurrent during acceleration operation	<ol style="list-style-type: none"> <li>1. The acceleration time is too short</li> <li>2. Start the motor directly in the rotation</li> <li>3. The torque lifting is set up too large</li> <li>4. The power grid voltage is too low</li> </ol>	<ol style="list-style-type: none"> <li>1. Extend the acceleration time</li> <li>2. Start again after the motor stops</li> <li>3. Reduce the torque lifting voltage</li> <li>4. Check the power grid voltage and reduce the power use</li> </ol>
Fu.02	Frequency converter overcurrent during deceleration operation	The deceleration time is too short	Increase deceleration time
Fu.03	Frequency converter operation or shutdown overcurrent	<ol style="list-style-type: none"> <li>1. Sudden change in load</li> <li>2. The power grid voltage is too low</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the load fluctuation</li> <li>2. Check the power supply voltage</li> </ol>
Fu.04	Frequency converter acceleration overvoltage	<ol style="list-style-type: none"> <li>1. The input voltage is too high</li> <li>2. The power supply is turned on and turned off frequently</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the power supply voltage</li> <li>2. Reduce the acceleration torque level setting</li> </ol>
Fu.05	Frequency converter deceleration overvoltage	<ol style="list-style-type: none"> <li>1. Slow down time is too short</li> <li>2. Abnormal input voltage</li> </ol>	<ol style="list-style-type: none"> <li>1. Extend the deceleration time</li> <li>2. Check the power supply voltage</li> <li>3. Install the brake resistance or re-select the brake resistance</li> </ol>
Fu.06	Frequency converter operation overvoltage	<ol style="list-style-type: none"> <li>1. Abnormal power supply voltage</li> <li>2. Have an energy feedback load</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the power supply voltage</li> <li>2. Install the brake unit, the brake resistance, or reselect the brake resistance</li> </ol>
Fu.07	Frequency converter overvoltage during shutdown	The power supply voltage is abnormal	Check the power voltage
Fu.08	Frequency converter	1. Abnormal power supply voltage	1. Check the power supply voltage

## 90 Fault diagnosis and countermeasures

Hitch code	Troubleshooting	Possible cause	Solution
	undervoltage during the operation o	2. There is a large load Starting in the power grid	2. Supply the power separately
Fu.09	Reserved		
Fu.10	Motor power line grounding	1 Motor power line is short-circuit to the ground	1.Check whether the line is reasonable
Fu.11	Electromagnetic interference	1 Interference drive signal	1. Check whether the line is reasonable 2, Separate the strong and weak electric lines
Fu.12	Frequency converter overload	1. Too much load 2.The acceleration time is too short 3. The torque lift is too high 4. The power grid voltage is too low	1.Reduce the load or replace a larger capacity frequency converter 2. Extend the acceleration time 3.Reduce the torque lifting voltage 4. Check the power grid voltage
Fu.13	Motor overload	1. Too much load 2. The acceleration time is too short 3. The protection factor is set as too small 4. The torque lift is too high	1. Reduce the load 2. Extend the acceleration time 3. Increase the motor overload protection coefficient 4. Reduce the lifting torque
Fu.14	Frequency converter overheating	1. Air duct obstruction 2. The ambient temperature is too high 3. Fan damage	1.Clean up the air duct or improve the ventilation conditions 2.Improve the ventilation conditions and reduce the carrier frequency 3. Change the fan
Fu.15	Reserved		
Fu.16	External equipment failure	External failure input terminal is valid	1.Check the external equipment 2. Disconnect the external fault input terminal
Fu.17	PID feedback disconnection	1 The feedback signal is lost 2 The break detection threshold is not appropriate	1. Check the wiring line 2. Lower the line break detection threshold
Fu.18	Communication interruption	Communication line broken line	Check communication connections
Fu.19	Reserved		
Fu.20	Current detection error	Current detection device or circuit damage	1. Check the socket line 2. Seek out services from

			manufacturers
Fu.21	Temperature sensor fault	NTC short	1. Check the NTC line 2. Replace the NTC
Fu.22	The motor is not connected during the parameter identification	Motor power line disircuit	Check motor wiring
Fu.23	Error in parameter identification	Abnormal identification of the motor parameters	Check the motor line contact
Fu.24 ~ Fu.25	Reserved		
Fu.26	Output lack of phase	Output line missing phase	Check the wiring between the motor and the frequency converter
Fu.27 ~ Fu.34	Reserved		
Fu.35	Software over flow	1. Acceleration and deceleration time is too short 2. Heavy load	1. Increase the acceleration and deceleration time 2. Reduce load
Fu.40	Internal data memory error	Control parameter read / write error	Seek manufacturer service

## 7.2 Fault Record Search

This series of frequency converters records the last 6 fault codes and the inverter output parameters of the last 1 failure. Query this information is helpful to find the cause of the failure.

Fault information and state monitoring parameters are stored uniformly, please refer to the keyboard operation method for query information.


Monitoring project	Content	Monitoring project	Content
d1-00	Last fault record	d1-07	Output current at the latest failure
d1-01	Historical fault record 1	d1-08	Output voltage at the latest failure
d1-02	Historical fault record 2	d1-09	The DC voltage at the latest failure
d1-03	Historical fault record 3	d1-10	Module temperature at the latest failure
d1-04	Historical fault record 4	d1-11	Set frequency at the latest failure
d1-05	Historical fault record 5	d1-12	Operating status at the latest failure
d1-06	Output frequency at the latest failure	d1-13	Power-on run time at the latest failure

## 7.3 Fault reset



- Before reset, the cause of the fault must be thoroughly checked and eliminated, otherwise it may cause permanent damage to the frequency converter.
- If the fault cannot reset or occurs after reset, the cause should be checked. Continuous reset may damage the frequency converter.
- Overload and overheat protection action should be delayed by 5 minutes to reset.

In case of inverter failure, to resume normal operation, any of the following operations can be selected:

Method I: Put on the  key when the fault code is displayed.

Method: Close from CM by external multifunctional terminal X1~X4 (fault reset).

Method: Send the fault reset command through the RS485 interface.

Method: Cut off the power supply.

## Appendix I: MODBUS protocol description

### 1. Communication settings

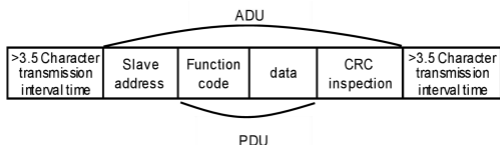
This agreement is the MODBUS RTU Agreement;

### 2. Communication function

Complete the communication between the upper computer and the converter, including sending operation commands to the converter, setting the operating frequency, rewriting the function code parameters, and reading the operating status, monitoring parameters, fault information and function code parameters of the converter.

### 3. Agreement format

MODBUS RTU Format



#### 3.1 Interpretation of the protocol format

##### 3.1.1 The slave machine address

0 is the broadcast address, and the slave address can be set to 1~127.

##### 3.1.2 The PDU section

(1) Function code 03: Read the function parameters, operating status, monitoring parameters and fault information of multiple frequency converter, and can read the frequency converter parameters with 8 continuous addresses at a time.

Host Send:

PDU part	03	Register start address		Number of registers	
		high	low	high	low
Data Length (Byte)	1	1	1	1	1

Slave response:

PDU part	03	Number of read bytes (2 * Number of registers)	Read the content
Data Length (Byte)	1	1	2 * Number of registers

(2) Function code 06: Overwrite the operation command, operating frequency and functional parameters of a single frequency converter.

Host Send:

PDU part	06	Register start address		Register data	
		high	low	high	low
Data Length (Byte)	1	1	1	1	1

Slave response:

PDU part	06	Register start address		Register data	
		high	low	high	low
Data Length (Byte)	1	1	1	1	1

(3) Function code 10: rewrite multiple inverter operation commands, operating frequency and functional parameters.

Host Send:

PDU part	10	Register start address		Number of registers		The number of contents bytes	Register content
		high	low	high	low		
Data Length (Byte)	1	1	1	1	1	1	2 * Number of registers

From machine response:

PDU part	10	Register start address		Number of registers	
		high	low	high	low
Data Length (Byte)	1	1	1	1	1

Note: The frequency converter is stored from the register of the lowest address to the highest address, storing up to 6 function codes at a time. If some error occurs, the slave will respond to the objection.

Objection response:

PDU part	0x80 + functional code	Dissent code
Data Length (Byte)	1	1

Objection code indicates error category:

Objection code	Corresponding error
01	Illegal function code
02	Illegal data address
03	Data over limit
04	Invalid operation from machine
05	Too many reading and writing parameters
06	Read and write retention, implicit parameters
07	Modifying the data is prohibited from the slave running
08	Data modification is password-protected

CRC verification:

CRC verification	CRC low	CRC highr
Data Length (Byte)	1	1

The CRC check function is as follows:

```

unsigned int crc_chk_value(unsigned char *data_value, unsigned char leng
{
    unsigned int crc_value=0xFFFF;
    int i;
    while(length--)
    {
        crc_value^=*data_value++;
        for(i=0;i<8;i++)
        {
            if(crc_value&0x0001)
                crc_value=( crc_value>>1)^0xA001;
            else
                crc_value= crc_value>>1;
        }
    }
    return(crc_value);
}

```

## 3.1.3 Address definition of the communication parameters

Address distribution of inverter parameters:

Register meaning	Register the address space
Functional parameter <sup>(1)</sup>	The high level is function code group number, the low level is function code mark, Such as F1.11, and its register RAM address F111
Monitoring parameters	The high level is the monitoring group number, the low level is the monitoring group number, Such as d 0-12, its register address is D012
Control command <sup>(2)</sup>	0x1300
Frequency setting	0x 1301
Continue to have	0x 1302
Mapping the application parameters 1 to 5	0x 1303~0x 1307
Reserved	0x 1400
Frequency converter state <sup>(3)</sup>	0x 1401
Fault message <sup>(4)</sup>	0x 1402
Mapping state parameters from 1 to 5	0x 1403~0x 1407

Note:

(1) the EEPROM of writing the functional code parameters frequently will reduce its service life. Some parameters are not stored in the communication mode, but only need to modify the value in the RAM. When writing the EEPROM value of the function parameter, you only need to change the F in the high register level address to E. If you want to write the EEPROM value of F1.11, the register address should be E111.

(2) Operation command code corresponds to the operation instructions:

Operation command code	Operational order
0x0000	Shutdown
0x0001	Forward running
0x0002	Reverse operation
0x0003	Forward l inching turning
0x0004	Reverse inching turning
0x0005	Free shutdown (emergency stop)
0x0006	Fault reset

## (3) Status of the frequency converter:

Status code	Indicate
0x0000	The DC voltage is not ready
0x0001	Forward operation
0x0002	Reverse operation
0x0003	Shutdown
0x0004	Fault condition

(4) The fault information code is the high 8 bit 0, and the low 8 bit corresponds to the inverter fault code Fu. The following reference number, for example, the fault information code is 0x000C indicates that the frequency converter fault code is Fu.12.

### 3.2 Example

#### 3.2.1 Start the 1 # frequency converter forward running

Master request:

slave address	function code	Register start address		Register data		CRC verification	
		high	low	high	low	low	high
01	06	13	00	00	01	4C	8E

Slave response: the converter is running and returns the same data as the host request.

#### 3.2.2 Set the operating frequency of the frequency converter at 50.00Hz

Master request:

slave addresses	function code	Register start address		Register data		CRC verification	
		high	low	high	low	low	high
01	06	13	01	13	88	D1	D8

Slave response: frequency converter 50.00Hz runs and returns the same data as the host request.

3.2.3 Read the current operating frequency and output speed of the converter, the response frequency 50.00Hz and the output speed 1500 RPM.

Master request:

slave address	function code	Register start address		Number of registers		CRC verification	
		high-order	low-order	high-order	low-order	low-order	high-order
01	03	D0	00	00	02	FC	CB

Slave response:

slave address	function code	Number of read bytes	The 1st register of the data		The 2nd register of the data		CRC verification	
			high-order	low-order	high-order	low-order	low-order	high-order
01	03	04	13	88	05	DC	7C	54

3.2.4 Start the forward operation of 1 # frequency converter and set the operating frequency of 40.00Hz.

Master request:

slave address	function code	Register start address		Number of registers		content word pitch number	The first Register data		The second Register data		CRC verification	
		high-order	low-order	high-order	low-order		high-order	low-order	high-order	low-order	low-order	high-order
01	10	13	00	00	02	04	00	01	0F	A0	7E	D7

Slave response:

slave address	function code	Register start address		Number of registers		CRC verification	
		high-order	low-order	high-order	low-order	low-order	high-order
01	10	13	00	00	02	45	4C

## Appendix: Braking resistance type selection

During the operation of the frequency converter, if the speed of the accused motor drops too fast, or the motor load is shaken too fast, the electric motive potential energy will reverse the internal capacitor of the frequency converter through the inverter, so that the voltage pump of the two ends of the power module, easy to cause damage to the frequency converter. The internal control of the frequency converter will suppress this situation according to the load situation. When the braking performance fails to meet the customer requirements, the external brake resistance is required to achieve the timely release of energy. The external brake resistance belongs to the energy consumption braking mode, whose energy will be dissipated by the power brake resistance. Therefore, the power and resistance value selection of the brake resistance must be reasonable and effective. The recommended brake resistance power and resistance value of the square inverter will be described below. According to the load situation, the user can change the value appropriately, but need to meet the requirements of the four-square frequency converter range.

Frequency converter model	Adapter motor (KW)	Brake resistance power (KW)	Brake resistance value ( $\Omega$ )	Braking torque (%)
SL350-2S0004BQ	0.4	0.1	150	100
SL350-2S0007BQ	0.75	0.1	100	100
SL350-2S0015BQ	1.5	0.2	70	100
SL350-2S0022BQ	2.2	0.2	50	100
SL350-2S0030BQ	3.0	0.4	40	100
SL350-2S0040BQ	4.0	0.4	35	100
SL350-4T0007BQ	0.75	0.1	400	100
SL350-4T0015BQ	1.5	0.2	300	100
SL350-4T0022BQ	2.2	0.4	200	100
SL350-4T0030BQ	3.0	0.4	150	100
SL350-4T0040BQ	4.0	0.5	125	100

The above configuration is to obtain 100% braking torque, which should be selected according to the braking condition in actual use. If the brake is still not obvious, please reduce the brake resistance appropriately, and increase the brake resistance power level in proportion.



Brake resistance power is the estimated value under the condition of brake resistance gap. When the brake resistance keeps working for a long time (more than 5 seconds), the power level of brake resistance should be appropriately increased under the premise of the same resistance value.