

## Foreword

Firstly thanks for you choose our ESD series frequency inverter!

ESD series frequency inverter is one kind of simple, easy and dexterous type frequency inverter, process V/F control at AC asynchronous motor, suitable the simple and easy application like assemble line and fan. Simple debugging of ESD series frequency inverter and can realize 8 sections speed controlled, etc.

This manual introduced the configured function and use method of ESD series frequency inverter.

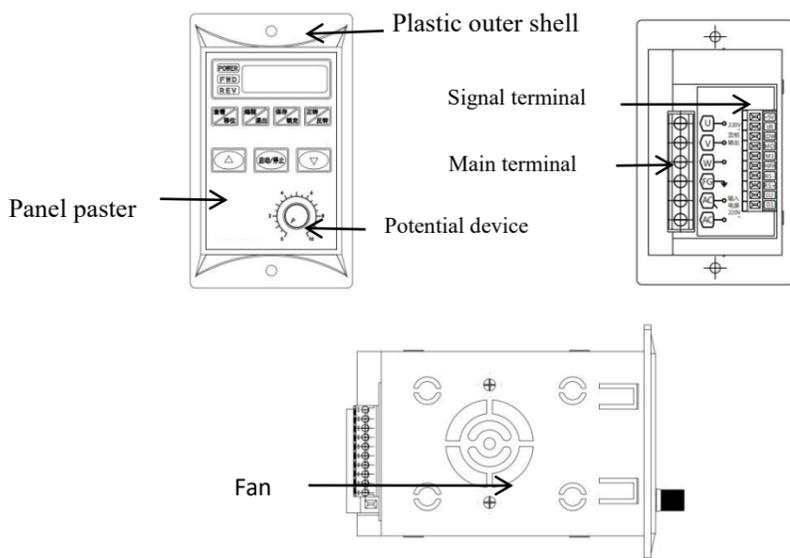
Please use this product after know about the safety notices of the product, please must read this specification carefully before first time use (installation, running, maintain and check, etc).Please the equipment fitting factory send this specification to end users with equipment, convenient for future use reference.

### Notices

- The legends in this specification at the status that disassembled the outer shell or safety cover objects in some time, to explain the details of product.
- Please must install the outer shell or cover objects well when using this product, and operate according to the content in the specification.
- The legends in this use specification only for introduction, maybe different to your purchased product.
- The content of this specification will be changed in time because the product upgrade or specification change and improve the convenience and accuracy of this specification.
- Please contact each region distributors of our company or directly contact the customer service center of our company when need purchase the use specification because of damage or loss.

### 1. ESD Frequency inverter introduce

#### 1.1 Each part name of frequency inverter.



Picture 1-1

#### 1.2 ESD Frequency inverter specification

Table 1-1 frequency inverter model and technical data

model	Power supply capacity KVA	Input current A	Output current A	Adaptation motor KW
Single phase power supply: 200~240VAC, 50/60Hz				
ESD00R2G1	3.0	3.2	1.6	0.2
ESD00R4G1	3.8	4.3	2.1	0.4
ESD00R7G1	5.6	6.0	3.1	0.75

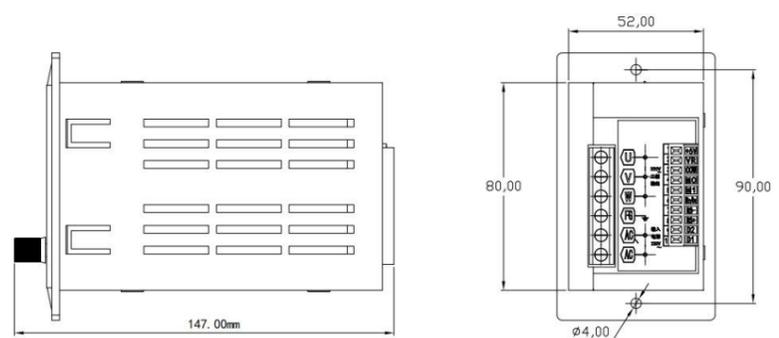
#### 1.3 ESD Frequency inverter introduce

ESD series frequency inverter at smaller volume and convenient for install; simple debugging, the parameters simple and easy to understand, able to meet the requirement in common place, it is specially customized which aim at three phase AC motor under 220V/0.75KW, provide unified solve scheme for vast customers in the equipment manufacture industry, it has very high value at reduce system cost and improve reliability of system.

#### 1.4 Technical characteristics of frequency inverter.

- ◎ Output frequency range 1.0-99.0HZ, meet common speed adjust field;
- ◎ With speed adjust potential device, also can outer connect speed adjust potential device;
- ◎ Interior configured intelligent logic controller can realize the simple, easy logic control function;
- ◎ With electric thermal electric relay function and other traditional motor protection device;
- ◎ Can outer connect LED for indicate, convenient for field use requirements;
- ◎ Humanization operating interface, simple and clear the parameters setting method, convenient for operating;
- ◎ Can freely set the V/F curve function and meet the special field requirements;
- ◎ Use the shift key can check the real time parameters;
- ◎ Adopt the new generation PIM module, complete protection function;

#### 1.5 The installation size of frequency inverter



Picture 1-2

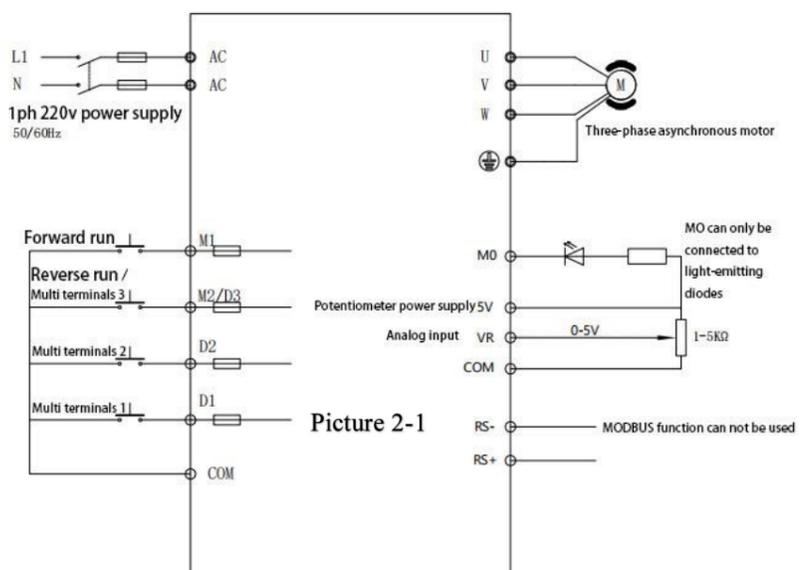
### 2. Control return circuit instruction

#### 2.1 Control terminal and wiring

Table 2-1 The main return circuit instruction of frequency inverter.

Terminal marks	Name	Instruction
AC、AC	Single phase power supply input terminal	Single phase 220V AC power supply connect point
U、V、W	frequency inverter output terminal	Connect three phases AC motor
FG	Grounding terminal	Grounding terminal

#### 2.1.1 Control return circuit wiring diagram



Picture 2-1

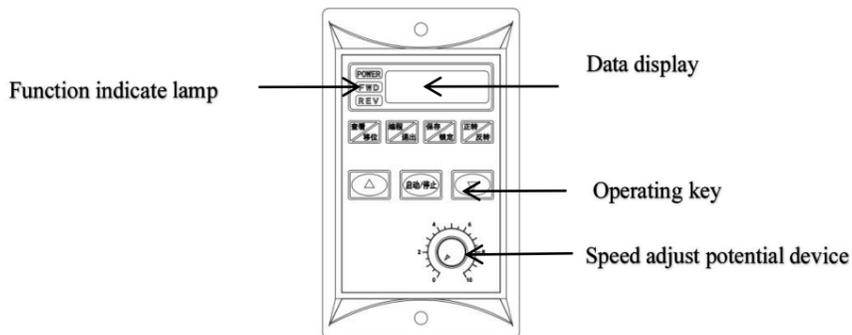
### 2.1.2 Control terminal function instruction

Table 2-1-2 Terminal function table

Category	Terminal symbol	Terminal name	Function instruction
Power supply	5V, COM	Outer connect 5V power supply	Outward supply 5V power supply and use as the working power supply of outer connect potential device
Imitate input	VR, COM	Imitate volume input	Input voltage range: DC 0-5V
Digit input	M1, COM	Clockwise running	Clockwise running control
	M2/D3, COM	Anticlockwise/multiply sections speed	Anticlockwise running control or multiply sections speed 3 terminals
	D2, COM	Multiply sections speed 2 terminals	Multiply sections speed function 2
	D1, COM	Multiply sections speed 1 terminal	Multiply sections speed function 1
Digit output	M0, 5V	Digit output	Outer connect 5V electric relay or indicate lamp to use
Assist joggle	RS-, RS+	485 joggle	This function can't be used

### 3. Keys instruction

#### 3.1 Operating and display interface instruction



#### 3.1.1 Function indicate lamp instruction

Table 3-1-1 Indicate lamp function table

POWER indicate lamp	Power supply indicate lamp normally lighting, red lamp flashing key been locked.
FWD indicate lamp	Clockwise running indicate lamp, normally lighting when running, lamp flashing when stop.
REV indicate lamp	Anticlockwise running indicate lamp, normally lighting when running, lamp flashing when stop.
Data display	Parameter information, fault information display.

#### 3.1.2 Key function instruction

Table 3-1-2 Key function table

Check/shift	Inquiry IPM temperature, bus line voltage, bus line current, motor running speed, etc. SHIFT key can process shift select setting when setting.
Programming/withdraw	Function setting enter key and withdraw key.
Save/lock	Long time press to lock or unlock, automatically lock when running 3 minutes and no operation on interface.
Clockwise/anticlockwise	Clockwise/anticlockwise shift key.
△	Rise key, data setting rise key
Start/stop	Start and stop key, data confirm key.
▽	Falling key, data set falling key

### 4. Function instruction

#### 4.1 Simple instruction of frequency inverter

ESD series frequency inverter is single phase 220V voltage input, drive three phases AC motor (must change the connect method to be delta type). Frequency output is 1.0-99.0Hz, this product use SVPWM modulate and carrier wave frequency 8KHz to improve low frequency torque, suitable to the motor under 750W and the max output power is 1100W. This frequency inverter can set V/F frequency compensate and set the voltage ratio under this

frequency, change the V/F curve freely. Maximization improve use efficiency of electric power, reduce heating of motor and extend working life of motor and frequency inverter through the highest value of V/F curve and according to load frequency.

#### 4.2 Parameter setting

##### 4.2.1 Running interface instruction

The display content of function parameters as below:

- (1) The items which can be checked by check/shift key
  - 1) Fxx.x : Display running frequency.
  - 2) t-xx : Display the IPM temperature value.
  - 3) Cx.xx: Display the output current.
  - 4) xxx.x : Display DC bus line voltage.
  - 5) xxxx : Display motor speed.
- (2) E-x.x : Means failure, refer to the failure code and confirm the failure reason.
- (3) The power supply indicate lamp flashing when set interface and machine start means successful communication at this machine and outer RS485.(This function can't be used)
- (4) Running indicate lamp FWD and REV flashing means stop; normally lighting means running under this mode.

### 5. Parameters table introduce

When press the edit key, adjust to select the need enter into setting function code of digit tube flashing -0.0- through number add/reduce key △ ▽, the function panel check table (5.1). Can adjust to need set code through number set shift key and add/reduce key during setting process, press confirm key and enter into sub item code selection after set code well. Press confirm key return to function code interface after set sub item code well, display flashing -X.X- then select the next item function code, press confirm key again and enter into sub code selection. Press save/lock key after all setting selection finished, display flashing SAVE then one time press save/lock key to confirm save, save data after interface stop flashing. It will running accord to set parameter when start frequency inverter, needn't power off then power on start, can press programming/withdraw key to withdraw if don't want to save data, this not affect the early setting parameters, or automatically return to running interface after 20.0s no key operation.

Table 5.1 Function code

Function code	Function definition	Leave factory value	Setting range	Parameter instruction
-0.1-	Accelerate time	7	1-15	1-15 corresponding to time 5-0.1s, more fast time more bigger value
-0.2-	Moderate time	7	1-15	1-15 corresponding to time 5-0.1s, more fast time more bigger value
-0.3-	Low frequency compensate	8	5-15	The lowest frequency compensate
-0.4-	High frequency compensate	20	5.0-30.0Hz	The highest frequency compensate
-0.5-	High frequency compensate voltage	55	25-85	The highest frequency voltage ratio
-0.6-	Max value of high frequency compensate voltage	128	80-128	The voltage ratio value limit the highest frequency
-1.0-	Frequency source selection		0-4	0: Panel key setting 1: Panel potential device control 2: VR Outer modulus input 4: Section speed input
-1.1-	Order source selection	0	0-4	0: Panel key control 2: Power on then clockwise rotating 3: Power on then anticlockwise rotating 4: Outer terminal
-1.2-	Power off method	1	0-2	0: Freely power off 1: Moderate power off

-1.3-	MI function selection	0	0-2	0: MI1 clockwise/stop, MI2 anticlockwise/stop 1: MI1 clockwise/stop, MI2 anticlockwise/stop 2: MI1 Running/stop, MI2 Multiply section speed
-1.4-	MO function select	1	0-2	0: Running indicate 1: Setting arrived indicate 2: Failure indicate
-1.6-	Overheat protection value	90	40-100°C	Set overheat protection value
-1.7-	The highest frequency	50.0	1.0-99.0Hz	The highest working frequency setting value
-1.8-	The lowest frequency	1.0	1.0-30.0Hz	The lowest working frequency setting value
-1.9-	Working frequency	50.0	1.0-99.0Hz	Rated power frequency
-2.0-	Output voltage corresponding frequency	50.0	35.-99.0Hz	Output voltage corresponding frequency
-2.1-	Multiply section speed 1	5.0	1.0-99.0Hz	Multiply section speed 1 setting frequency
-2.2-	Multiply section speed2	10.0	1.0-99.0Hz	Multiply section speed 2 setting frequency
-2.3-	Multiply section speed3	20.0	1.0-99.0Hz	Multiply section speed 3 setting frequency
-2.4-	Multiply section speed4	25.0	1.0-99.0Hz	Multiply section speed 4 setting frequency
-2.5-	Multiply section speed5	35.0	1.0-99.0Hz	Multiply section speed 5 setting frequency
-2.6-	Multiply section speed6	40.0	1.0-99.0Hz	Multiply section speed 6 setting frequency
-2.7-	Multiply section speed7	45.0	1.0-99.0Hz	Multiply section speed 7 setting frequency
-2.8-	Frequency arrived	45.0	1.0-99.0Hz	Frequency arrived when running
-3.0-	Current display	1	1	1: Percentage
-3.5-	Motor pole pair number	2	1-6	2 corresponding 1500
-3.6-	Motor slip ratio	1	0.01-1.00	Motor slip ratio compensate
-3.7-	Motor speed	1500	1-9999	Motor running speed
-3.8-	0 Multiply section speed 0	1.0	1.0-99.0Hz	Multiply section speed 0 setting frequency
-9.1-	Recover default value	--	--	Display flashing CLE, press confirm key
-9.5-	MCU Reset MCU	--	--	Display flashing 8.88, press confirm key

## 6. Failure alarm and policy

The frequency inverter has multiply items warning information and protection function, once happen abnormal failure then protection function active, frequency inverter stop output, the display panel of frequency inverter display failure code. The user can process self check according to the reminding in this section before seeking for service, analyse failure reason and find out solve method. If can't find out the solve method then please seeking for technical support.

**Table 6.1 Failure code**

Failure name	Failure display	Failure reason checking	Failure handle policy
frequency inverter overheat	E-0.1	1、Frequency inverter hardware failure 2、Higher environment temperature or bad air venting	1、Send frequency inverter to repair 2、Improve heat radiation environment
Pulse over current	E-0.2	1、Too heavy load 2、Unsuitable V/F mode setting 3、Too fast accelerate time 4、Selected small frequency inverter 5、Frequency inverter hardware failure	1、Reduce load 2、Set V/F curve 3、Increase accelerate time 4、Renewal more bigger frequency inverter 5、Send frequency invvte to repair
Overload	E-0.4	1、Load blocked rotating 2、Unsuitable V/F mode setting	1、Remover blocked rotating load 2、Set V/F curve
Temperature sensor failure	E-0.6	Temperature sensor open circuit or damaged	Send frequency inverter to repair
Temperature sensor failure	E-0.7	Temperature sensor short circuit or damaged	Send frequency inverter to repair
Overload 100%	E-0.8	Output power exceed rated power 6s	Select smaller frequency inverter

frequency inverter heat protection	E-0.9	1、frequency inverter hardware failure 2、Heat radiation fan damaged	1、 Send frequency inverter to repair 2、 Send frequency inverter to repair
Over voltage protection	E-1.0	Too quick moderate power off time	Increase moderate time

## 6. Parameters instruction

### 6.1、Multiply section speed instruction

D1	D2	D3	Setting frequency	Corresponding parameters
OFF	OFF	OFF	Multiply section speed 0	-3.8-
ON	OFF	OFF	Multiply section speed 1	-2.1-
OFF	ON	OFF	Multiply section speed 2	-2.2-
ON	ON	OFF	Multiply section speed 3	-2.3-
OFF	OFF	ON	Multiply section speed 4	-2.4-
ON	OFF	ON	Multiply section speed 5	-2.5-
OFF	ON	ON	Multiply section speed 6	-2.6-
ON	ON	ON	Multiply section speed 7	-2.7-
D1	D2	D3	Setting frequency	Corresponding parameters
OFF	OFF	OFF	Multiply section speed 0	-3.8-
ON	OFF	OFF	Multiply section speed 1	-2.1-
OFF	ON	OFF	Multiply section speed 2	-2.2-
ON	ON	OFF	Multiply section speed 3	-2.3-
OFF	OFF	ON	Multiply section speed 4	-2.4-
ON	OFF	ON	Multiply section speed 5	-2.5-
OFF	ON	ON	Multiply section speed 6	-2.6-
ON	ON	ON	Multiply section speed 7	-2.7-

D1 : set as the "Multiply section speed 1 terminal" function;

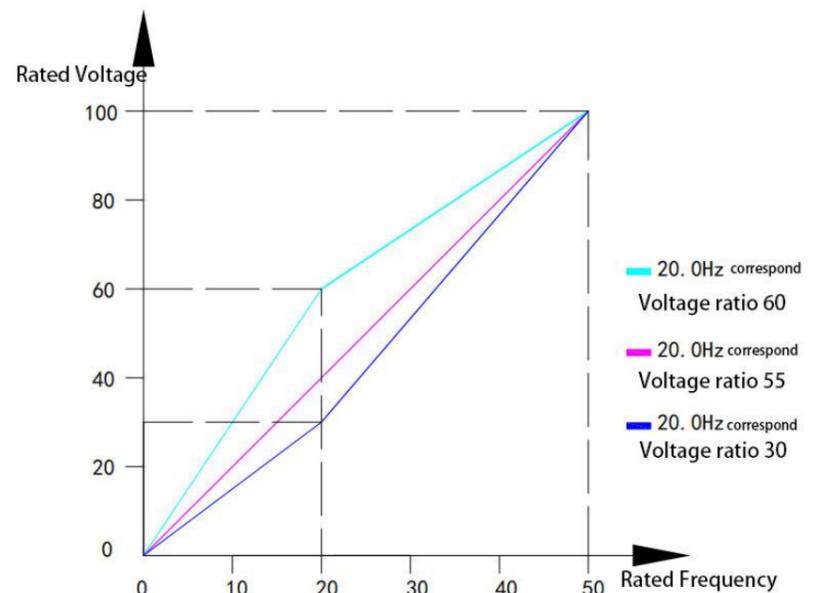
D2 : set as the "Multiply section speed 2 terminal" function;

D3 : set as the "Multiply section speed 3 terminal" function;

### 6.2 Low frequency V/F compensate instruction

Table 6.2 linear V/F curve value can set -0.3-, -0.4-, -0.5-numerical value according to load situation. If all are low frequency rise motor torque then need select the up limit frequency of rise torque, set the compensate highest frequency voltage ratio at -0.3-, -0.4-, can find he corresponding frequency or similar frequency in table 2, rise the V/F curve slope and torque when higher than this data. Reduce the V/F curve slope and torque when lower than this data.

Example the setting value in-0.3-is 20.0, setting value in-0.4- are 60, 50, 30 then -0.5-default setting as 8, three curves of V/F as below:



### 6.3 Setting case

Case 1: set motor accelerate and moderate time

Connect power supply and press programming key, enter into main menu and display -0.0-. Press  $\Delta$  key and display-0.1-, press start/stop key, display 01:means accelerate time 5S, 02 means accelerate time 2.5S, 03 means accelerate time 1.6S. Select the need adjust accelerate time through press  $\Delta$  key and  $\nabla$  key, press start/stop key then return main menu-0.1-, now can continue set other options, if not set other options then press save/lock key enter into save option, the digit tube display flashing SAVE, then one time press save/lock key return to frequency display

interface, if don't wan to save then press programming/withdraw key, early modified data invalid.

Case 2: system recover default value

Press programming/withdraw key then enter into main menu display-0.0-, press  $\triangle$  key and display-0.1-,press shift key to adjust main menu-x.1 to -9.1-, press start/stop key, press start/stop key when display flashing CLE then recover leave factory default value and return to frequency display interface.

Note:

Press programming/withdraw key at any setting interface then return frequency display interface.

The digit tube display flashing SAVE, press programming/withdraw then withdraw save, early saved data invalid, the parameter will automatically recover the parameters before setting.

Can use shift key when adjust data, shift digit tube quickly set parameters, all need saved place all need twice press save/lock key to prevent error operation.