DIRISE
Electric

ES130(B) Series Compact Vector Inverter
User Manual

Shenzhen Dirise Electric Technology Co., Ltd

Preamble

Thanks for choosing DIRISE ES130(B) series compact vector inverter. ES130(B) series compact vector inverter adopt the philosophy of module functions to design and able to provide solutions for various industries demand.
Please read the manual carefully before usage to make sure using correctly. This manual includes instructions and precautions available for reference. Improper usage may lead to unexpected accidents. This manual as parts that provided along with inverter. Please make sure to safekeeping so that it can help when inverter need repair and maintenance.
We reviewed the contents, softwares, hardwares of the manual to keep consistency during edit. However, there may still be some contradiction and fallacy, we will amend in the later version. Any changes in the manual will without prior notice. Suggestions about the manual's improvement are all welcomed.

Notice for use:
The safe operation of the inverter depends on the proper installment, operation, transportation
and maintenance. Therefore, please read the user manual carefully and pay attention to the tips about safety.
● Use the inverter after getting a good understanding of its knowledge, safety information and all the precautions.
● The manual should be kept in those who are actually using inverter.
● The manual divides the security levels into two kind. One is DANGER and the other is WARNING. The marks showing as following:

⚠ DANGER : If not operate according to instructions in the manual, it may lead to heavy casualties .

⚠ WARNING : If not operate according to instructions in the manual, it may lead to injuries, minor injuries or property damage.
Please obey safety specification when seeing these marks. Marked by WARNING may also lead to serious consequences under different circumstances. Please follow the precautions with the two safety marks.

Version 1.2
2023.02.21

Catalog

OOBA

All the products will through strict QC inspection during manufacturing, packaging and delivery. If any mistake, please contact our company, office or agent for solutions as soon as possible.
We will be devoted to the optimization and improvement of products constantly. If any changes, we will updated the manual but without prior notice.

After the product arrival, please be sure of the following items before open box:
* Whether the package is damaged
* Whether the nominal power on the nameplate is consistent with the order
* Whether the inventory time is too long

Chapter 1 Safety Precautions

Users must read the following contents carefully before the installation, wiring, operation and maintenance of the product, obey the safety precautions strictly.

1.1Installation

危 险
DANGER

● Please install the frequency inverter onto incombustible objects like mental to avoid fire.
● It is strictly prohibited that install inverter into environment which with combustible objects or explosive gas. Otherwise there may be an explosion.

注 意
WARNING

● Fix frequency inverter to where can withstand its weight. Otherwise people may get hurt or the equipment maybe damaged once it falls down.
● Don't let alien metal fall inside frequency inverter. Otherwise accidents may occur.
● Don't install or operate damaged frequency inverter. Otherwise accidents may occur.

1.2Wiring

危 险
DANGER

● Add circuit breaker which could match inverter capacity at the same side of power source.
Otherwise there maybe cause casualties, equipment damage or other accidents.
● Inverter's PE end must be firmly grounded. Otherwise there maybe cause electrical shock or fire.
● Tighten the screws of the power input terminal and the motor's output terminal. Otherwise there maybe cause fire.
● Only the professionals that can do wiring.
● Only after the power off and inverter's charging indicator goes out then can wiring.

注 意
WARNING

● Make sure that the input voltage corresponds with what written on the frequency inverter's nameplate. Otherwise the inverter maybe damaged
● Under no circumstances can the power input wire be connected to the frequency inverter's input terminal (U.V.W).Otherwise the inverter maybe damaged.

1.3Operation

1

危 险
DANGER

● Don’ t power on before installed inverter’ s front cover. Otherwise maybe cause the risk of electrical shock.
● After power on, never touch loop terminals even when inverter not operating. Otherwise maybe cause the risk of electrical shock.

注 意
WARNING

● Stop the frequency inverter by STOP/RESET button or the external control terminals. Don’t cut the main power supply directly. Otherwise inverter maybe cause damaged.

1.4Maintenance

危 险
DANGER

● Must wait 10 minutes after the internal charging indicator shut down or the power off, then can do inspection and maintenance. Otherwise maybe cause the risk of electrical shock.
● Only trained professionals can do maintenance for inverter. Otherwise maybe cause the risk of electrical shock and casualties.

注 意
WARNING

● After maintenance, don’t leave such conductive objects as metal inside the frequency inverter. Otherwise inverter maybe cause damaged.
● For the inverters not usage for a very long time, need charge the internal capacitor, increase input voltage(not higher than the inverter’ s rated voltage) slowly by voltage regulator . Otherwise maybe cause accident.

1.5Scrap

注 意
WARNING

● When the frequency inverter scrapped, should be disposed of as industrial waste. Otherwise maybe cause accident.

1.6Product Application Range

注 意
WARNING

● It is not applicable in a machine or system which putting human life at risk.
● Please add security device if users can predict when inverter under abnormal conditions that there will be a severe accident or loss.

Chapter 2 Product Information

2.1 Inspection of the product delivery

Check the following items carefully when opening the package for the first time:

◆ If the frequency inverter damaged during transportation.

◆ Check the nameplate if the model number and specification consistent with your order.

◆ Check with packing list if all things along with the package.

Our company develop and produce frequency inverters according to IS09001 strictly. If anything wrong happened please contact with us or our the agents,dealers as soon as possible.

2.2 Specifications of Frequency Inverter's models

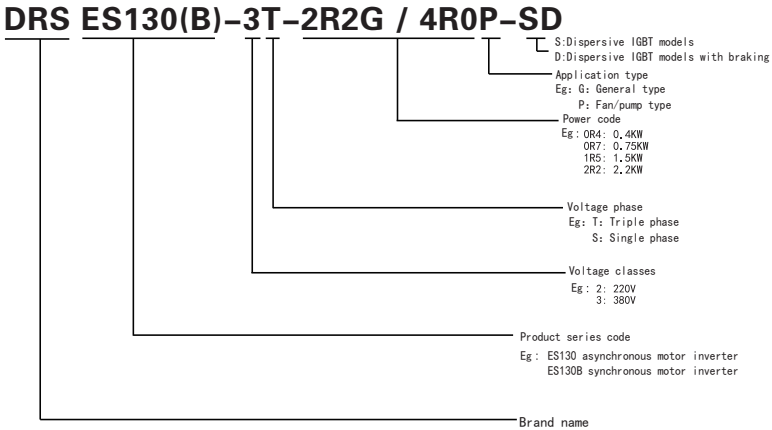


Figure2-1 Specifications of Frequency Inverter's models

2.3 Specifications of Frequency Inverter's nameplate

The nameplate which showing model number and rated value just on the bottom right of the case. Details please refer to figure2-2.

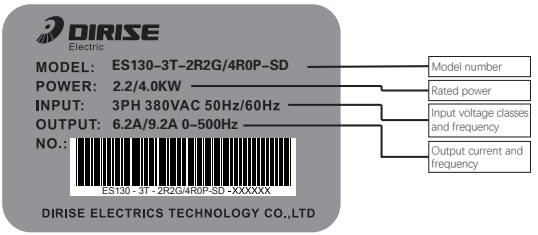


图 2-2 Figure 2-2 Specifications of Frequency Inverter's Nameplate

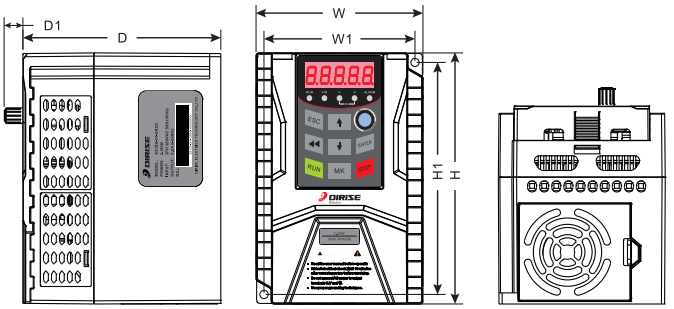
2.4 ES130(B) Series Frequency Inverter

Sheet 2-1 ES130(B) frequency inverter model number

Voltage classes	Model number	Suitable motor(KW)	Rated output current(A)
Single phase 220V	DRS ES130(B)-2S-0R4G-SD	0.4	2.8
	DRS ES130(B)-2S-0R7G-SD	0.75	4.8
	DRS ES130(B)-2S-1R5G-SD	1.5	8.0
	DRS ES130(B)-2S-2R2G-SD	2.2	10.0
	DRS ES130(B)-2S-0R4G	0.4	2.8
	DRS ES130(B)-2S-0R7G	0.75	4.8
	DRS ES130(B)-2S-1R5G	1.5	8.0
	DRS ES130(B)-2S-2R2G	2.2	10.0
	DRS ES130(B)-2S-4R0G	4.0	17
Triple phase 220V	DRS ES130(B)-2T-0R4G-SD	0.4	2.8
	DRS ES130(B)-2T-0R7G-SD	0.75	4.8
	DRS ES130(B)-2T-1R5G-SD	1.5	8.0
	DRS ES130(B)-2T-2R2G-SD	2.2	10.0
	DRS ES130(B)-2T-0R4G	0.4	2.8
	DRS ES130(B)-2T-0R7G	0.75	4.8
	DRS ES130(B)-2T-1R5G	1.5	8.0
	DRS ES130(B)-2T-2R2G	2.2	10.0
	DRS ES130(B)-2T-4R0G	4.0	17
	DRS ES130(B)-2T-5R5G	5.5	25
	DRS ES130(B)-2T-7R5G	7.5	32

Triple phase 220V	DRS ES130(B)-2T-011G	11	45
	DRS ES130(B)-2T-015G	15	60
	DRS ES130(B)-2T-018G	18	75
	DRS ES130(B)-2T-022G	22	90
	DRS ES130(B)-2T-030G	30	110
	DRS ES130(B)-2T-037G	37	150
	DRS ES130(B)-2T-045G	45	176
	DRS ES130(B)-2T-055G	55	220
	DRS ES130(B)-2T-075G	75	260
Triple phase 380V	DRS ES130(B)-3T-0R7G/1R5P-SD	0.75/1.5	2.8/4.8
	DRS ES130(B)-3T-1R5G/2R2P-SD	1.5/2.2	4.8/6.2
	DRS ES130(B)-3T-2R2G/4R0P-SD	2.2/4.0	6.2/9.2
	DRS ES130(B)-3T-4R0G/5R5P-SD	4.0/5.5	9.2/13
	DRS ES130(B)-3T-0R7G/1R5P	0.75/1.5	2.8/4.8
	DRS ES130(B)-3T-1R5G/2R2P	1.5/2.2	4.8/6.2
	DRS ES130(B)-3T-2R2G/4R0P	2.2/4.0	6.2/9.2
	DRS ES130(B)-3T-4R0G/5R5P	4.0/5.5	9.2/13
	DRS ES130(B)-3T-5R5G/7R5P	5.5/7.5	13/17
	DRS ES130(B)-3T-7R5G/011P	7.5/011	17/25
	DRS ES130(B)-3T-011G/015P	11/015	25/32
	DRS ES130(B)-3T-015G/018P	15/018	32/38
	DRS ES130(B)-3T-018G/022P	18/22	38/45
	DRS ES130(B)-3T-022G/030P	22/30	45/60
	DRS ES130(B)-3T-030G/037P	30/37	60/75
	DRS ES130(B)-3T-037G/045P	37/45	75/90
	DRS ES130(B)-3T-045G/055P	45/55	90/110
	DRS ES130(B)-3T-055G/075P	55/75	110/150
	DRS ES130(B)-3T-075G/090P	75/90	150/176
	DRS ES130(B)-3T-090G/110P	90/110	176/220
	DRS ES130(B)-3T-110G/132P	110/132	220/260
	DRS ES130(B)-3T-132G/160P	132/160	260/310
	DRS ES130(B)-3T-160G/185P	160/185	310/340

2.5 Frequency Inverter's Appearance and Dimension



Power: 0.4KW-15KW

Sheet2-2 ES130(B) frequency inverter dimension

Voltage classes	Model number	W(mm)	W1(mm)	H(mm)	H1(mm)	H2(mm)	D(mm)	Aperture (mm)
Single phase 220V	DRS ES130(B)-2S-0R4G-SD	105	95	158	146		125	5.0
	DRS ES130(B)-2S-0R7G-SD							
	DRS ES130(B)-2S-1R5G-SD							
	DRS ES130(B)-2S-2R2G-SD							
	DRS ES130(B)-2S-0R4G							
	DRS ES130(B)-2S-0R7G							
	DRS ES130(B)-2S-1R5G							
	DRS ES130(B)-2S-2R2G							
	DRS ES130(B)-2S-4R0G	140	124	225	209		154	
Triple phase 220V	DRS ES130(B)-2T-0R4G-SD	105	95	158	146		125	5.0
	DRS ES130(B)-2T-0R7G-SD							
	DRS ES130(B)-2T-1R5G-SD							
	DRS ES130(B)-2T-2R2G-SD	105	95	158	146		125	
	DRS ES130(B)-2T-0R4G							
	DRS ES130(B)-2T-0R7G							
	DRS ES130(B)-2T-1R5G							
	DRS ES130(B)-2T-2R2G							
	DRS ES130(B)-2T-4R0G	140	124	225	209		154	

Triple phase 220V	DRS ES130(B)-2T-5R5G	160	143	265	248		170	5.5
	DRS ES130(B)-2T-7R5G							
	DRS ES130(B)-2T-011G	205	140	344	328	320	205	6.5
	DRS ES130(B)-2T-015G	230	200	445	434	425	215	6.5
	DRS ES130(B)-2T-018G							
	DRS ES130(B)-2T-022G	300	190	505	483	465	270	9.0
	DRS ES130(B)-2T-030G							
	DRS ES130(B)-2T-037G	340	220	600	585	570	305	9.0
	DRS ES130(B)-2T-045G							
	DRS ES130(B)-2T-055G	380	220	680	665	645	305	9.0
	DRS ES130(B)-2T-075G	480	390	870	845	810	385	13
Triple phase 380V	DRS ES130(B)-3T-0R7G/1R5P-SD	105	95	158	146		125	5.0
	DRS ES130(B)-3T-1R5G/2R2P-SD							
	DRS ES130(B)-3T-2R2G/4R0P-SD							
	DRS ES130(B)-3T-4R0G/5R5P-SD							
	DRS ES130(B)-3T-0R7G/1R5P							
	DRS ES130(B)-3T-1R5G/2R2P							
	DRS ES130(B)-3T-2R2G/4R0P							
	DRS ES130(B)-3T-4R0G/5R5P	140	124	225	209		154	
	DRS ES130(B)-3T-5R5G/7R5P							
	DRS ES130(B)-3T-7R5G/011P							
	DRS ES130(B)-3T-011G/015P	160	143	265	248		170	5.5
	DRS ES130(B)-3T-015G/018P							
	DRS ES130(B)-3T-018G/022P	205	140	344	328	320	205	6.5
	DRS ES130(B)-3T-022G/030P							
	DRS ES130(B)-3T-030G/037P	230	200	445	434	425	215	6.5
	DRS ES130(B)-3T-037G/045P							
	DRS ES130(B)-3T-045G/055P	300	190	505	483	465	270	9.0
	DRS ES130(B)-3T-055G/075P							
	DRS ES130(B)-3T-075G/090P	340	220	600	585	570	305	9.0
	DRS ES130(B)-3T-090G/110P							
	DRS ES130(B)-3T-110G/132P	380	220	680	665	645	305	9.0
	DRS ES130(B)-3T-132G/160P	480	390	870	845	810	385	13
	DRS ES130(B)-3T-160G/185P							

This sheet showing our company's standard products dimension. Some other models may exist difference. If any changes due to products updated that will no prior notice.For more information, please contact us.

2.6 Product Features

1. Able to provide professional solutions for industries. Able to do secondary development according to demand.
2. Adopt specialized control chip for motor and advanced optimized magnetic flux vector control algorithm, to make it have better operation characteristics.
3. Standard LED keyboard. Multi-channel monitoring parameters can be set flexibly.
4. 6-CH programmable multi-functional input terminals, 2-CH programmable multi-functional open circuit collector output terminals, and 1-CH programmable relay output.
5. 2-CH analog signal (0~+10V, 0~20mA) input channels, 1-CH voltage analog signal output channels.
6. External terminals has 7-stage speed to choose, programmable multi-speed to run.
7. Standard configuration enhanced PID regulator, to make it convenient for users to have reliable closed-loop control for temperature, pressure and flow.
8. Standard built-in braking unit, able to flexible adjust energy consumption braking starting voltage and brake action ratio according to demand.
9. Standard RS485 interfaces, easy to let PLC, IPC and other industrial controllers to connect with inverter. Also enable multiple inverters connected so that to realize coordinated operation.
10. More than 20 kinds of protections such as input out-phase, output out-phase, over-current, overload, over-voltage and short circuit, to realize quick and efficient protection for inverters and motors.

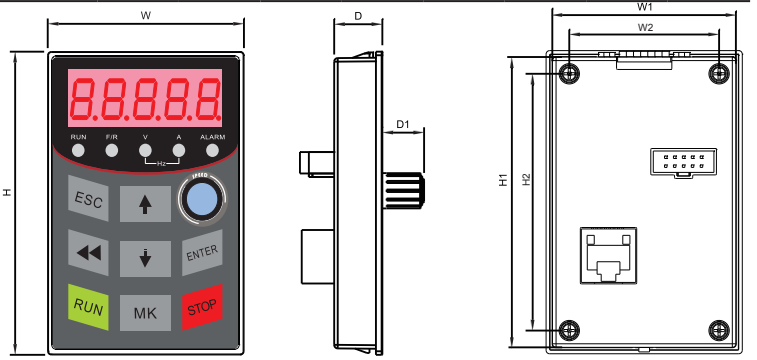
2.7 Technical Specifications

Sheet 2-3 Technical Specifications Sheet

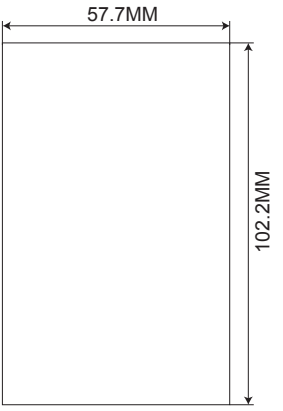
Function description		Specification index
Power input	Rated input voltage	Single-Phase 220V ± 20% Three-Phase 220V ± 20% Three-Phase 380V ± 20%
	Rated input frequency	50~60Hz (±5%)
Power output	Rated output voltage	No greater than the input voltage
	Rated output current	Frequency inverter rated output current
	Overload capacity	G type machine: 150% rated current 1 minute, 180% rated current 10 seconds P type machine: 120% rated current for 1 minute, 150% rated current for 10 seconds
Control function	Control method	V / F control,vector control
	Maximum frequency	500Hz
	Frequency resolution	Numbers given: 0.1Hz Simulation given: maximum frequency x 0.1%
	Speed range	1:200 (SVC)
	Rotating speed	SVC: 5Hz above ± 5%
	Torque compensation	Fixed torque lifting, arbitrary torque lifting
	Acceleration and deceleration curves	Straight line, S curve
	Acceleration/deceleration time	0.01S~600.00S
	Automatic Voltage Regulation	When the grid voltage changes, it can automatically keep the output voltage constant
	Overcurrent, voltage stall	Automatic limit of current and voltage during operation to prevent frequent over-current voltage trip
	DC braking	DC brake frequency: 0.10Hz~60.00Hz Brake time; 0.00S~30.00S Brake action current value; 0.00%~150.00%
Peripheral interface	External power source	10V/10mA 24V/150mA
	Digital input	6-CH digital programmable input terminals
	Digital output	1-CH programmable Y1 terminal output, 1-CH programmable R1 relay output
	Analog input	AI1:0~10 V voltage input AI2:0~10 V / 0~20mA input
	Analog output	0~10V / 0~20mA output
	485 Communication	Support for standard Modbus communication protocols
Function keyboard	LED display	5 digit digital display
	Keypad	8 operation keys
Protect	Fault protection function	Input phase loss, output phase loss, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection, overload protection, etc
Environment	Installation site	Indoor, no direct sunlight, no dust, corrosive gas, flammable gas, oil mist, water vapor, water dripping or salt, etc
	Altitude	Below 1000 m
	Ambient temperature	-10℃ ~+40℃

2.8 Installation Size of the Keyboard

Item	W	W1	W2	H	H1	H2	D	D1
Dimensions (mm)	55.0	51.6	42.0	85.0	81.6	72.0	13.5	11.0



Suitable for 0.4~15KW models



Keyboard Installation Aperture Size

Figure 2-3 Keyboard Size and Keyboard Aperture Size (Unit :mm)

Chapter 3 Machinery and Electrical Installation

3.1 Machinery Installation

3.1.1 Installation environment

The normal temperature range for inverter running －10℃～ 50℃, if temperature higher than 50℃, should choose a well-ventilated place, in addition each 5℃ increasing need derating 10% to use.

3.1.2 Installation site

◆ Installation sites need without corrosive, combustible or explosive gas and liquid;

◆ The humidity of installation sites need lower than 90%, no condensation of water droplets;

◆ The vibration of installation sites need less than 5.9m/s2 (0.6g);

◆ Don’ t install the frequency inverter in sites with lots of dust and metal powder;

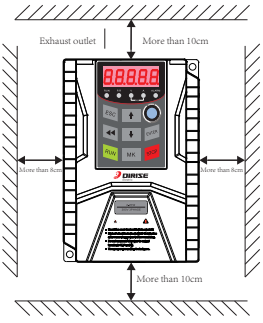
If user has special requirement, please consult with our company beforehand.

3.1.3 Safeguard procedures

During installation, please take effective safeguard procedures to prevent metal chips when drilling or dust fall into inverter. After installation, please remove the protective cover.

3.1.4 Installation spacing and heat dissipation

Installation method is wall-mounted. The installation spacing and distance for single frequency inverter please refer to figure 3-1. When two frequency inverters adopt above/under mounting, need to add guide plate like figure 3-2.



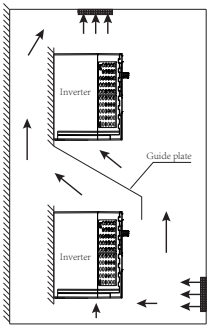


Figure 3-1 Installation spacing Figure 3-2 Multiple inverters installation

注 意
WARNING

◆ The higher the environmental temperature, the shorter the frequency inverter service life.
◆ Remove the heat-producing device which near the inverter to the places as far as possible. In addition,when the inverter installed into cabinet,need consider verticality and space so that make it easy for heat dissipation.

3

3.1.5 Screw fixation method

Adopt the method of two holes of opposite angles mounting,the hole size please refer to inverter dimension and installation size. Drill two holes on the installation surface,lean the inverter against the installation surface and align at the holes,then fix the screws through holes and tighten. Chosen M4*L combination screws with plain and spring washers (The length L longer than 12mm,tightening torque 1N.m±10%). Details please refer to Figure3-3.

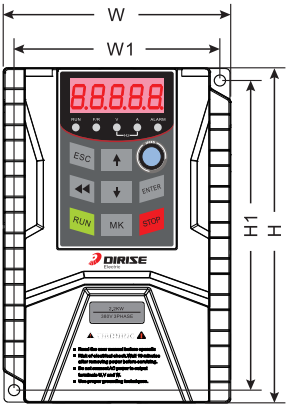


Figure3-3 Screw fixation method

3.1.6 Keyboard's disassembly and installation

A.Keyboard's disassembly,showing as Figure3-4,firstly press keyboard's elastic buckle by direction 1.Then lift up the keyboard by direction 2.

B.Keyboard's installation,showing as Figure3-5,put the keyboard flush into the keyboard slot,then press keyboard by direction 1 until hear the Click sound meanwhile the keyboard on a level with front surface then OK.

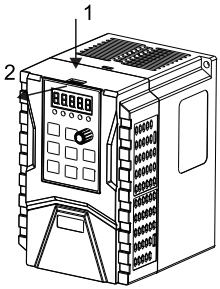


Figure3-4 Keyboard's disassembly

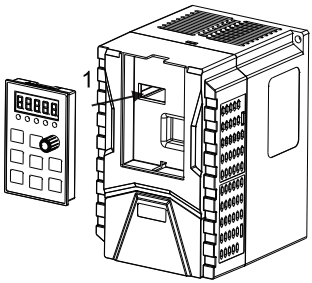


Figure3-5 Keyboard's installation

3.1.7 Terminal cover's disassembly and installation
A. Terminal cover's disassembly, showing as Figure3-6, press the buckle position of terminal cover by direction 1 and disassemble it by direction 2.
B. Terminal cover's installation, showing as Figure3-7, install the upper buckle into the corresponding position by direction1, then press the side buckle by the direction 2, at last press by the direction 3 until hear click sound at the juncture.

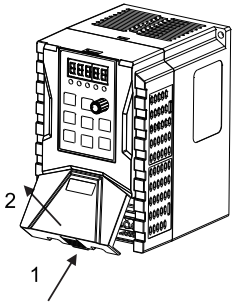


Figure3-6 Terminal cover's disassembly

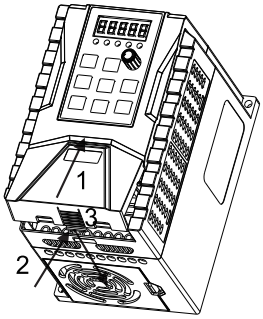


Figure3-7 Terminal cover's installation

3.2 Electric Wiring

After open the terminal cover, will show connecting terminals. Check all the main circuit terminals and control circuit terminals clearly marked or not. Notice the following items when wiring:

1. The frequency inverter's main circuit power terminals (R/L1, S/L2, T/L3) are input power terminals. If connected to other terminals mistakenly, inverter will damaged. In addition, need to make sure that the power supply within the range of allowable voltage and current marked on the nameplate.
2. The earthing terminal must grounded firmly, on one hand able to avoid an electric shock and fire, on the other hand able to decrease the noise pollution.
3. Make sure that screws tightened between terminals and wires so that to avoid spark when screw get vibratory and turn loose.
4. Don' t operate when charged with electricity.

危 险 DANGER	1. Before wiring, make sure that input power cut off. Otherwise maybe cause electric shock and fire. 2. Please let the professionals do the wiring. Otherwise maybe cause electric shock and fire. 3. Earthing terminals must be grounded firmly. Otherwise maybe cause electric shock and fire. 4. After emergency stop button connected, must check whether its reaction effective or not. Otherwise maybe cause injuries. (Users responsible for the wiring) 5. Don't touch terminals directly, don't connect inverter terminals to its case, don' t short connected among terminals, Otherwise maybe cause electric shock and short circuit.
注 意 WARNING	1. Make sure the AC power consistent with inverter rated voltage. Otherwise maybe cause injuries and fire. 2. Don't do withstanding voltage test to inverter. Otherwise maybe cause internal semiconductor components damaged. 3. Please connect braking resistors or braking units according to the wiring diagram. Otherwise maybe cause fire. 4. Please tighten the terminals by designated torque screwdrivers. Otherwise maybe cause fire. 5. Don't connect the input power wire to output U, V, W terminals. Voltage added to the output terminals would damage inverter inside. 6. Don't connect the phase-shifting capacitor and the LC/RC noise filter to output circuit, would damage inverter inside. 7. Don't connect any switches or contactors to output circuit, such action may lead to surge current and surge voltage when inverter loaded running, would damage inverter. 8. Don't disassemble internal connecting cables of inverter, Otherwise maybe cause damaged.

3.2.1 Connecting and configuration of peripheral equipments

The diagram among ES130(B) series inverter and peripheral equipments showing as Figure3-8.

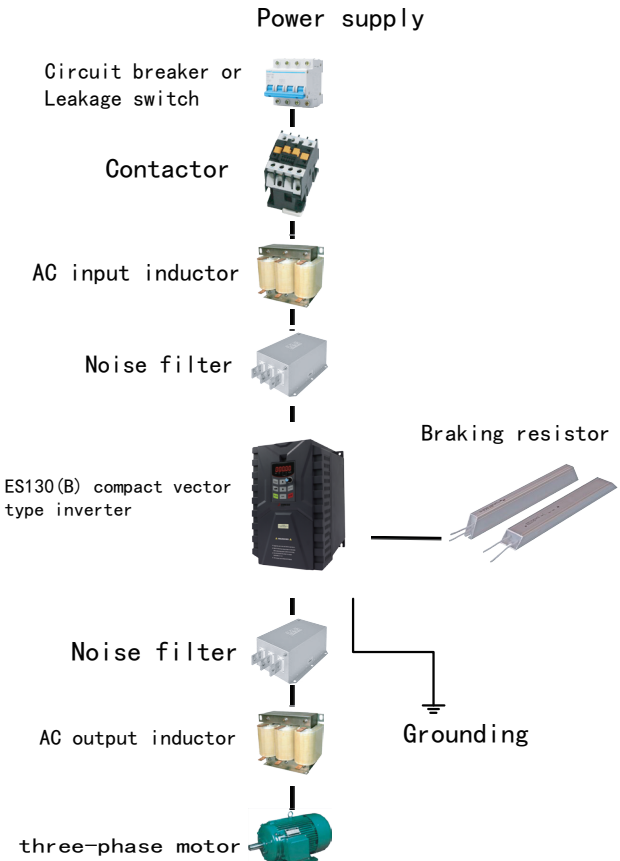
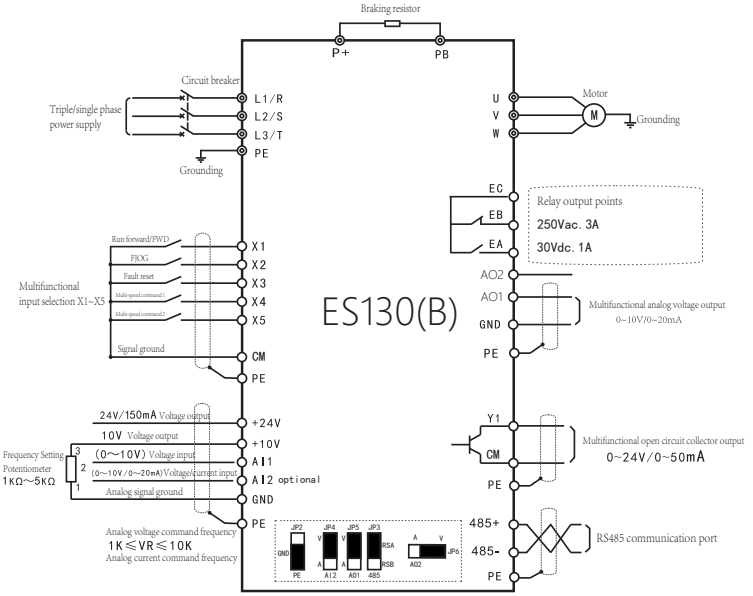


Figure3-8 ES130(B) series inverter and peripheral equipments connecting diagram

Connection diagram of main circuit terminals and control circuit terminals

The standard wiring diagram of ES130(B) series inverter main circuit and control circuit showing as below Figure3-9



Remark : 1 Wiring by shielded wire
2 ◎Main circuit terminals ○Control circuit terminals
3 GND and CM common ground

Figure3-9 Standard wiring of main circuit and control circuit

● If the loaded of multifunctional output terminals is inductive load(eg relay coil), must parallel freewheel diodes at both ends of load.
● The distance between power cable and inverter or the control cable inside cabinet must be at least 100mm, never put in the same wiring trough. If signal wire have to through the power cable, these two has to stay orthogonal (90° angle). Control cable must adopt shielded twisted pair, the shielding layer need connect with GND of terminals, power cable the best choose sheathing and shielding cable.
● Because it's inevitable for inverter to have strong electromagnetic interference, so it will cause negative influence to kinds of electrical equipments and electric instruments in the same place. To restrain electromagnetic interference, able to put the output cable of frequency inverter into metal casing with grounding, or use sheathing and shielding cable, and grounding the shielding layer. In addition, add magnetic rings to the output cable will also restrain electromagnetic interference effectively.

3.2.3 Main circuit terminals' function

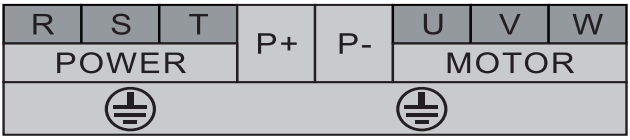
ES130(B) series inverter main circuit terminals showing as below

R	S	T	PE	PB	P+	P-	U	V	W

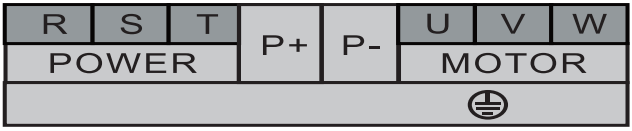
ES130(B) 0.4KW-15KW main circuit terminal diagram

ES130(B) 18KW-22KW main circuit terminal diagram

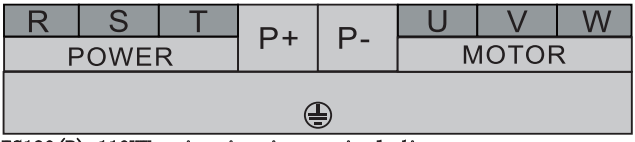
ES130(B) 30KW-37KW main circuit terminal diagram



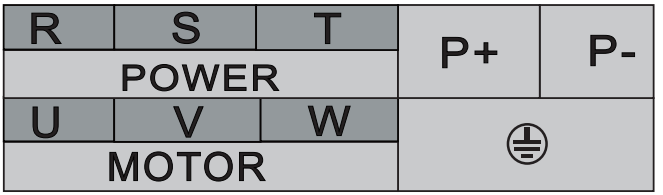
ES130(B) 45KW-55KW main circuit terminal diagram



ES130(B) 75KW-90KW main circuit terminal diagram



ES130(B) 110KW main circuit terminal diagram



ES130(B) 132KW-160KW main circuit terminal diagram

3

Mark	Function Description
R, S, T	AC power input terminals, triple phase R/S/T or single phase R/T
U, V, W	Inverter output terminals, connect to triple phase AC asynchronous motors
P+, P-	Positive and negative electrode connecting terminals of DC Bus
PB	External braking resistor connecting terminals. One end connect to P+ and the other end connect to PB
PE	Grounding

● Never connect other terminals to 380V AC power except R/S/T. Otherwise inverter maybe damaged.
● Verify whether the inverter's rated input voltage consistent with AC power supply's voltage.
If the input voltage classes not the same, maybe cause inverter damaged.
● Must ground connection the inverter's grounding terminal and the motor's case. Ground wire need use copper wire cable with its cross section over $4cm^2$, and ground resistance must less than 10Ω.
● Must connect non-fuse breaker between power supply and inverter, in case of accident enlarging, distribution equipments damaged, fire etc which caused by inverter's failure.

3.2.4 Main circuit wiring

ES130(B) inverter main circuit wiring showing as Figure3-10

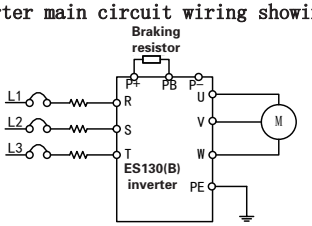


Figure3-10 Main circuit standard wiring diagram

3.2.5 Main circuit input side wiring

◆ Circuit breaker installation

Must install air circuit breaker (MCCB) of corresponding inverter between power supply and input terminals.

MCCB's capacity should be 1.5 to 2 times as much as inverter rated current.

MCCB's time characteristic should meet the time characteristic of inverter's overheat protection (150% rated current per 1 minute).

When MCCB shared by multiple inverters or other equipments, please follow Figure3-11, connect the touch spot of inverter malfunction output relay with power contactor coil in series. When malfunction signal, able to cut off power supply.

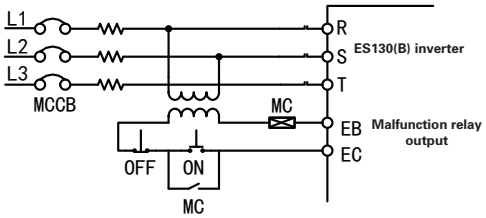


Figure3-11 Main circuit breaker wiring diagram

Residual current circuit breaker installation

As inverter output high frequency PWM signal, so there will be high frequency leakage current, please choose inverter specialized residual current circuit breaker which current sensitivity above 30mA. If use common residual current circuit breaker, please choose the ones which current sensitivity above 200mA and actuation time above 0.1 second.

◆ Electromagnetic contactor installation

Connect electromagnetic contactor which matched with inverter power like Figure3-11 showing. Don't use electromagnetic contactor of the incoming line side frequently to control inverter's running and stop. Frequent operation like this way is the important reason cause inverter damaged. If need to control by electromagnetic contactor of the incoming line side indeed, then operation interval time cannot lower than 30 minutes per time. When power restoration, inverter could not work automatically.

◆ AC inductor installation

When input power supply including capacitive load, will produce very strong surge current, that maybe cause inverter damaged. If it happens, please connect triple phase/single phase AC inductor (optional) to the input side of inverter. In this way, not only can restrain peak current and voltage, but also improve system's power factor.

◆ Noise filter installation

In order to restrain the noise of power grid side into inverter as well as restrain the inverter noise into power grid, inverter need adopt dedicated noise filter. Common filter bad effect, so not recommended. Figure3-12 showing correct noise filter installation method and Figure3-13 showing wrong installation method.

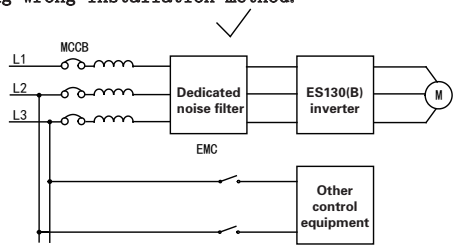


Figure3-12 Noise filter correct installation diagram

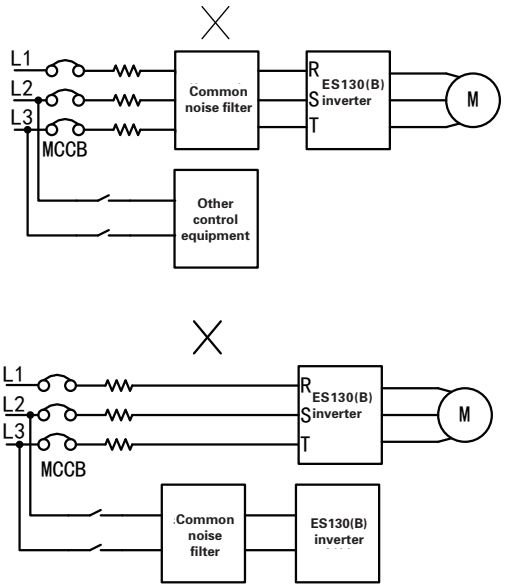


Figure3-13 Noise filter wrong installation diagram

3.2.6 Main circuit output side wiring

◆ Motor wiring installation

Connect inverter's output terminals U, V, W with motor's input terminals U, V, W. During running, confirm if motor rotate in forward direction when given run forward command. If need change motor's rotation direction, just interchange any two wires of inverter' s U, V, W terminals is OK.

◆ Prohibit connecting power supply with output terminals

Never connect power line to output terminals. Load voltage to output terminals will damage inverter's internal components.

◆ Prohibit output terminals short circuit or grounding

Never touch output terminals directly, or short connected output wires and inverter's case. Otherwise, maybe cause electric shock or short circuit. In addition, never short connected output wires.

◆ Prohibit using phase-shifting capacitor

Never connect phase advance electrolytic capacitor or LC/RC filter to the output circuit. Otherwise, inverter maybe damaged.

◆ Prohibit electromagnetic switch

Never connect electromagnetic switch or electromagnetic contactor to the output circuit. Otherwise when such device triggered, over current and over voltage protections will also triggered, what' s more, even damage inverter's inside components.

◆ Noise filter installation

Connect noise filter to inverter output side able to decrease induction interference and radio interference. Induction interference: electromagnetic induction let signal wires loaded noise, which lead to control equipment making mistake. Radio interference: The high-frequency electromagnetic wave emitted by inverter itself or cables, will interfere to radio equipments nearby, and then producing noise during it receive signal. Noise filter installation of output side showing as Figure3-14.

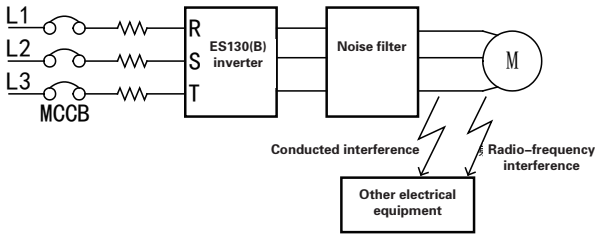


Figure3-14 Noise filter installation of output side

◆ Example for anti-interference installation

To restrain inductive interference of output side, in addition to install noise filter as mentioned above, can also adopt the method of put all the output cable into grounding metal tube. The interval between output cables and signal wires over 30cm will let inductive interference significantly reduced. Input cables, output cables and inverter itself all produce radio-frequency interference, install noise filters on both input and output sides, as well as shield inverter itself by metal box can reduce radio-frequency interference, showing as Figure3-15. When multiple inverters used at the same time, recommend grounding method like Figure3-16.

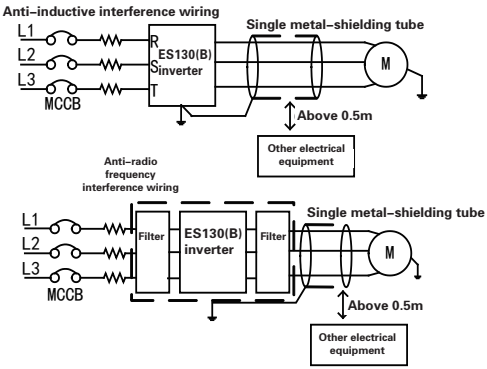


Figure3-15 Anti-interference installation wiring

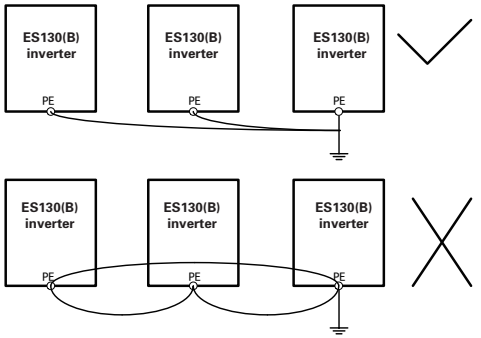


Figure3-16 Recommended grounding method

3.2.7 Control circuit terminals' functions

ES130(B) series inverter control circuit terminals showing as below

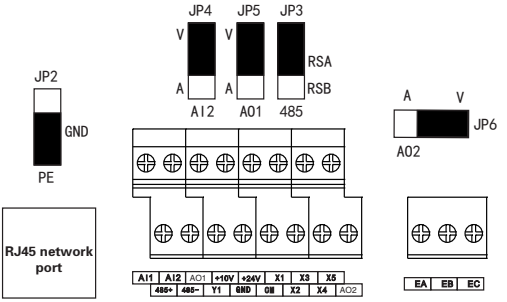
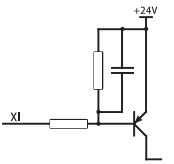
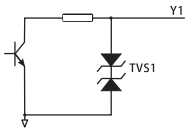
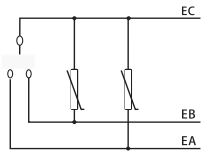
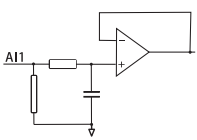
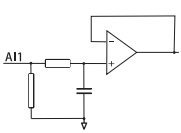
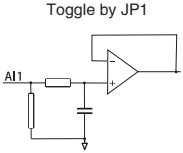
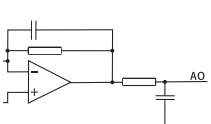


Figure3-17 Control circuit terminals function instruction

Category	Terminal Mark	Function Description	Electrical Spec	Internal Circuit
Digital multifunctional terminal	X1	Able to program by the function codes to realize inverter's start,stop,forward and reverse rotation.	Input impedance: 27KΩ Input voltage: 0~24V Input frequency: <1KHz Effective when low level.	
	X2			
	X3			
	X4			
	X5			

Switching value output terminal	Y1	Able to program by the function codes to output inverter's status like forward/reverse rotation,frequency etc.	Open collector output; Load capacity; 50mA/24V; Output frequency: <1KHz;	
	EA EB EC	Able to program by the function codes to relay output. EA,EB,EC is relay's normal open,normal close,common port respectively.	Contact capacity: 3A/250VAC Output frequency:<50Hz	
Analog value input terminals	AI1	AI1: analog voltage input	Voltage source: Input voltage:0~10V Input impedance: 1MΩ	
	AI2	AI2: analog voltage/ current input (Default is voltage input,can toggle to current input by JP4 jumper wire)	Voltage source:Input voltage:0~10V Input impedance: 1MΩ Current source:(optional) Input current:0–20mA; Input impedance: 250Ω Resolution ratio: 0.2%	 Toggle by JP1 
Analog value output terminals	AO1 AO2	Able to program by the function codes to AO output outward inverter's status like running frequency,setting frequency etc.(Allow voltage output can be set to current output by jumper wire,AO1 corresponding to JP5,AO2 corresponding to JP6)	Output voltage：0~10V Load capacity: <4mA Resolution radio: 0.1V	

Chapter 4 Keyboard Operation

4.1 Keyboard introduction

The keyboard of ES130(B) series compact vector inverter consist of four parts: 5-digit 8-segment Nixie Tube, 5 indicator light, 8 keys and 1 rotary potentiometer. Users can operate by keyboard to realize start, stop, condition monitoring, fault inquiry, parameter revision and speed adjustment etc. Keyboard appearance showing as Figure4-1.

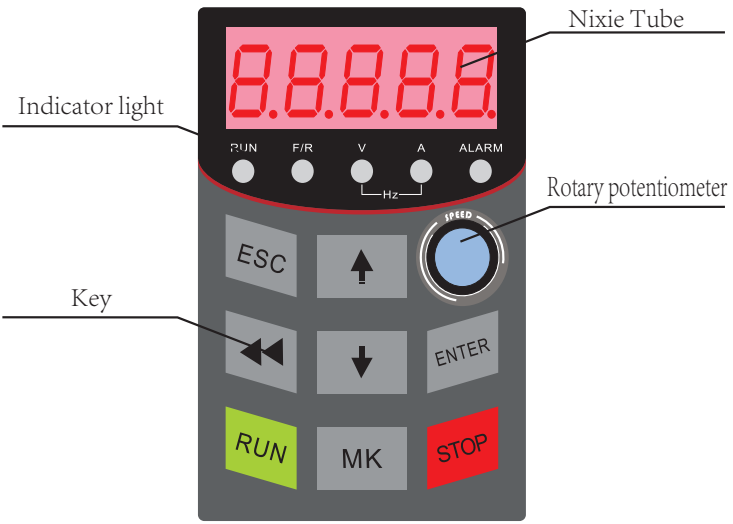


Figure4-1 Keyboard introduction

Keyboard each part' s function description

Shape	Name	Function Description
	5-digit Nixie Tube	Display parameter code, parameter value, monitor state etc
	5 indicator light	RUN : When inverter run, it' s on, when stop, it' s off. When flashes means inverter in the process of slowdown to stop. F/ R: Run forward it' s off, Run reverse it' s on. A : When it' s on, means present data unit is ampere V: When it' s on, means present data unit is volt A/V: When both on, means present data unit is hertz Alarm: When it' s on, means inverter is in fault alarm
	1 potentiometer	Change the given frequency source, realize inverter' s speed adjustment
	ESC	Back to previous menu, or cancel parameter modification
	UP	Increase parameter code, parameter value or parameter group
	SHIFT	Shift running status, monitoring data or parameter position
	DOWN	Decrease parameter code, parameter value or parameter group
	ENTER	Enter parameter menu, confirm modified value
	RUN	The key of run command
	MK	Multifunctional key, able to set to invalid, JOG, forward/reverse
	STOP	The key of stop command, or fault resetting

Chapter 5 Function Parameter Table

"○" : mean parameter can be changed when inverter running
"◎" : means parameter can' t be changed when inverter running
"×" : means parameter can only be read,can' t be changed

Group P00: Basic function

Code	Description	Setting range	Default	Property
P00.00	No.1 Motor control mode	0:SVC 1:Reserved 2:V/F control	2	◎
P00.01	Command source	0:Keyboard(LED off) 1:Terminals(LED on) 2:Communication(LED flash)	0	○
P00.02	Main frequency input	0:Digital set(Power-off no memory) 1:Digital set(Power-off memory) 2:AI1 3:AI2 4:Potentiometer 5:Reserved 6:Multistage instruction 7:Simple PLC 8:PID 9:Communication given	4	◎
P00.03	Auxiliary frequency input	The same as P00.02	0	◎
P00.04	Auxiliary frequency instruction range selection when superposition	0:Relative to maximum frequency 1:Relative to main frequency instruction	0	○
P00.05	Auxiliary frequency instruction range when superposition	0% ～ 150%	100%	○
P00.06	Frequency source superposition selection	Ones place:Frequency instruction selection 0:Main frequency instruction 1:Main & auxiliary calculation result(computational relationship depend on tens place) 2:Main frequency instruction switch to auxiliary frequency instruction 3:Main frequency instruction switch to main & auxiliary calculation result 4:Auxiliary frequency instruction switch to main & auxiliary calculation result Tens place:Frequency source main & auxiliary computational relationship 0:Main+Auxiliary 1:Main-Auxiliary 2:Maximum one of both 3:Minimum one of both	00	○
P00.08	Preset frequency	0.00 ～ maximum frequency(P00.14)	50.00Hz	○
P00.09	Running direction	0:Run forward 1:Run reverse	0	○
P00.10	Reference frequency of acceleration and deceleration time	0:Maximum frequency(P0-14) 1:Set frequency 2:100HZ	0	◎
P00.11	Acceleration time 1	0:Maximum frequency(P0-14) 1:Set frequency 2:100HZ	Depend on Inverter	○

P00.12	Deceleration time 1	0.00s ～ 650.00s(P00.13=2) 0.0s ～ 6500.0s(P00.13=1) 0s ～ 65000s(P00.13=0)	Depend on Inverter	○
P00.13	Unit of acceleration and deceleration time	0:1 second 1:0.1 second 2:0.01 second	1	◎
P00.14	Maximum frequency	50.00Hz ～ 500.00Hz	50.00Hz	◎
P00.15	Upper limiting frequency	Lower limiting frequency P00.18～Maximum frequency P00.14	50.00Hz	○
P00.16	Upper frequency limit instruction selection	0:Set by P00.15 1:AI1 2:AI2 3:Potentiometer 4:Reserved 5:Communication given	0	◎
P00.17	Upper limiting frequency bias	0.00HZ～Maximum frequency P00.14	0.00Hz	○
P00.18	Lower limiting frequency	0.00HZ～Upper limiting frequency P00.15	0.00Hz	○
P00.19	Carrier frequency	0.5kHz ～ 16.0kHz	4KHZ	○
P00.20	Carrier frequency adjustment by temperature	0:No 1:Yes	0	○
P00.21	Bias frequency of superposition auxiliary frequency instruction	0.00HZ～Maximum frequency P00.14	0.00HZ	○
P00.22	Frequency instruction resolution ratio	1: 0.1HZ 2: 0.01HZ	2	◎
P00.23	Inverter shutdown memory selection of digital setting frequency	0:No 1:Memory	0	○
P00.24	Motor parameters selection	0:Motor parameter 1 1:Motor parameter 2	0	◎
P00.25	Frequency instruction UP/DOWN standard when running	0:Running frequency 1:Setting frequency	0	◎
P00.26	Running instruction bind main frequency instruction selection	Hundreds place:Communication binding frequency source selection Tens place:Terminal binding frequency source selection Ones place:Keyboard binding frequency source selection 0:No binding 1:Set by digital frequency 2:AI1 3:AI2 4:Potentiometer 5:Reserved 6:Multi-speed 7:Simple PLC 8:PID 9:Set by communication	0000	○
P00.27	Communication protocol selection	0:MODBUS protocol 1:Reserved	0	◎

P00.28	G/P type showing	0:G type(type of constant torque load) 1:P type(type of fan & pump load)	Depend on Inverter	X

Group P01: No.1 motor parameters

Code	Description	Setting range	Default	Property
P01.00	Motor type selection	0:Common asynchronous motor 1:Variable-frequency asynchronous motor 2:Permanent magnet synchronous motor	0	◎
P01.01	Motor rated power	0.1kW ～ 1000.0kW	Depend on motor	◎
P01.02	Motor rated voltage	1V ～ 2000V	Depend on motor	◎
P01.03	Motor rated current	0.01A ～ 655.35A (inverter power ≤ 55KW) 0.1A ～ 6553.5A (inverter power>55KW)	Depend on motor	◎
P01.04	Motor rated frequency	0.01HZ ～ maximum frequency	Depend on motor	◎
P01.05	Motor rated rotation speed	1rpm ～ 65535rpm	Depend on motor	◎
P01.06	Asynchronous motor stator resistor	0.001Ω ～ 65.535Ω(inverter power ≤ 55KW) 0.0001Ω ～ 6.5535Ω(inverter power >55KW)		
P01.07	Asynchronous motor rotor resistor	0.001Ω ～ 65.535Ω(inverter power ≤ 55KW) 0.0001Ω ～ 6.5535Ω(inverter power >55KW)	Tuning parameter	◎
P01.08	Asynchronous motor leakage inductive reactance	0.01mH ～ 655.35mH(inverter power ≤ 55KW) 0.001mH ～ 65.535mH(inverter power >55KW)	Tuning parameter	◎
P01.09	Asynchronous motor mutual inductance resistance	0.01mH ～ 655.35mH(inverter power ≤ 55KW) 0.001mH ～ 65.535mH(inverter power>55KW)	Tuning parameter	◎
P01.10	Asynchronous motor no-load current	0.01A ～ P01-13(inverter power ≤ 55KW) 0.1A ～ P01-13(inverter power >55KW)	Tuning parameter	
P01.16	Synchronous motor stator resistance	0.001Ω ～ 65.535Ω (inverter power ≤ 55KW) 0.0001Ω ～ 6.5535Ω(inverter power >55KW)	Tuning parameter	◎
P01.17	Synchronous motor D-axis inductance	0.01mH ～ 655.35mH (inverter power ≤ 55KW) 0.001mH ～ 65.535mH(inverter power >55KW)	Tuning parameter	◎
P01.18	Synchronous motor Q-axis inductance	0.01mH ～ 655.35mH (inverter power ≤ 55KW) 0.001mH ～ 65.535mH(inverter power >55KW)	Tuning parameter	◎
P01.20	Synchronous motor back electromotive force coefficient	0.0V ～ 6553.5V	Tuning parameter	◎

P01.37	Tuning selection	0:No operation 1:Asynchronous motor static part parameter tuning 2:Asynchronous motor dynamic full tuning 3:Asynchronous motor static full tuning 11:Synchronous motor loaded tuning 12:Synchronous motor no load tuning	0	◎

Group P02: No.1 motor vector control parameter

Code	Description	Setting range	Default	Property
P02.00	Speed ring proportional gain 1	1 ～ 100	20	○
P02.01	Speed ring integral time 1	0.01s ～ 10.00s	0.50s	○
P02.02	Switching frequency 1	0.00 ～ P02.05	5.00Hz	○
P02.03	Speed ring proportional gain 2	1 ～ 100	20	○
P02.04	Speed ring integral time 2	0.01s ～ 10.00s	1.00s	○
P02.05	Switching frequency 2	P02.02 ～ maximum frequency	10.00Hz	○
P02.06	Vector control slip gain	50% ～ 200%	100%	○
P02.07	SVC speed feedback filter time	0.000s ～ 0.100s	0.015s	○
P02.09	Torque upper limit instruction selection under speed control mode	0:Set by P02.10 1:AI1 2:AI2 3:Potentiometer 4:Reserved 5:Communication given 6:MIN(AI1,AI2) 7:MAX(AI1,AI2) Full scale of item 1 ～ 7 corresponding to P02.10	0	○
P02.10	Torque upper limit digital setting under speed control mode	0.0% ～ 200.0%	150.0%	○
P02.11	Torque upper limit instruction selection under speed control mode(Generate electricity)	0:Set by P02.12(Not distinguish Generate electricity and Electromotion) 1:AI1 2:AI2 3:Potentiometer 4:Reserved 5:Communication given 6:MIN(AI1,AI2) 7:MAX(AI1,AI2) Full scale of item 1～7 corresponding to P02.12	0	○
P02.12	Torque upper limit digital setting under speed control mode(Generate electricity)	0.0% ～ 200.0%	150.0%	○
P02.13	Excitation regulation proportional gain	0 ～ 60000	2000	○
P02.14	Excitation regulation integral gain	0 ～ 60000	1300	○
P02.15	Torque regulation proportional gain	0 ～ 60000	2000	○

P02.16	Torque regulation integral gain	0 ～ 60000	1300	○
P02.17	Speed ring integral property	0:Invalid 1:Valid	0	○
P02.18	Synchronous motor field-weakening mode	0,1,2	1	○
P02.19	Synchronous motor field-weakening gain	0 ～ 50	5	○
P02.21	Flux-weakening area maximum torque coefficien	50 ～ 200%	100%	○
P02.22	Generated power restrict enabling/Power generation torque upper limit take effect to enabling	0:Invalid 1:Valid	0	◎
P02.23	Generated power upper limit/ Synchronous motor output voltage upper limit margin	0.0 ～ 200.0/0% ～ 50%	Depend on inverter	○
P02.24	Synchronous motor initial position corner detection current	80% ～ 180%	120%	◎
P02.25	Synchronous motor initial position corner detection	0,1,2	0	○
P02.27	Synchronous motor saliency rate gain adjustment	50 ～ 500	100	○
P02.28	Maximum torque current ratio control	0, 1	0	○
P02.36	Low speed exciting current	30% ～ 80%	30%	○
P02.37	Low speed carrier frequency	0.8K ～ P00.19	1.5K	○
P02.41	Synchronous motor inductance detection current	30% ～ 120%	80%	○
P02.43	Zero servo enabling	0 ～ 1	0	○
P02.44	Switch frequency	0.00 ～ P02.02	0.30HZ	○
P02.45	Zero servo speed loop proportion gain	1 ～ 100	10	○
P02.46	Zero servo speed loop integral time	0.01s ～ 10.00s	0.50s	○
P02.49	Free from tuning mode	0, 1, 2	0	○
P02.50	Online back electromotive force calculation	0, 1	0	◎
P02.51	SVC initial position angle compensation	0.0° ～ 359.9°	0.0	○

Group P03: V/F control parameter

Code	Description	Setting range	Default	Property
P03.00	V/F curve setting	0: Straight line V/F 1:Multi-point V/F 2:Square V/F 3:To the power of 1.2 V/F 4:To the power of 1.4 V/F 6:To the power of 1.6 V/F 8:To the power of 1.8 V/F 9:Reserved 10: V/F complete separation mode 11:V/F semi-separation mode	0	◎

P03.01	Torque boost	0.0%:(without torque boost) 0.1%～30.0%	Depend on inverter	○
P03.02	Torque boost cut-off frequency	0.00Hz ～ maximum frequency	50.00Hz	◎
P03.03	Multi-point V/F frequency point 1	0.00Hz ～ P03.05	0.00Hz	◎
P03.04	Multi-point V/F voltage point 1	0.0% ～ 100.0%	0.0%	◎
P03.05	Multi-point V/F frequency point 2	P03.03 ～ P03.07	0.00Hz	◎
P03.06	Multi-point V/F voltage point 2	0.0%～100.0%	0.0%	◎
P03.07	Multi-point V/F frequency point 3	P3-05～Motor rated power (P01.04)	0.00Hz	◎
P03.08	Multi-point V/F voltage point 3	0.0%～100.0%	0.0%	◎
P03.10	V/F over-excitation gain	0～200	64	◎
P03.11	V/F oscillation suppression gain	0～100	40	◎
P03.13	V/F separated voltage source	0:Digital given(P03.14) 1:AI1 2:AI2 3:Potentiometer 4:Reserved 5:Multistage instruction 6:Simple PLC 7:PID 8:Communication given Note:100% corresponding to motor rated voltage	0	◎
P03.14	V/F separated voltage digital given	0V～motor rated voltage	0V	◎
P03.15	V/F separated voltage acceleration time	0.0s ～1000.0s Note:Meaning the time from 0V to motor rated voltage	0.0s	◎
P03.16	V/F separated voltage deceleration time	0.0s ～1000.0s Note:Meaning the time from 0V to motor rated voltage	0.0s	◎
P03.17	V/F separation stop method selection	0:Frequency/voltage decreasing to 0 separately 1:Voltage decreasing to 0 firstly then frequency decreasing	0	○
P03.18	Overcurrent stall action current	50%～200%	150%	○
P03.19	Overcurrent stall Enable	0:Invalid 1:Valid	1 Valid	○
P03.20	Overcurrent stall gain suppression	0～100	20	◎
P03.21	Overcurrent stall action current compensation coefficient	50～200%	50%	○
P03.22	Overvoltage stall action voltage	Type triple phase 380V～480V:330.0~800.0V Type triple phase 220V～240V:330.0~800.0V	760.0V	○
P03.23	Overvoltage stall Enable	0:Invalid 1:Valid	1 Valid	○
P03.24	Overvoltage stall frequency gain suppression	0～100	30	◎
P03.25	Overvoltage stall voltage gain suppression	0～100	30	◎
P03.26	Overvoltage stall maximum rising frequency limit	0～50HZ	5HZ	○

P04 Group: Input terminal

Code	Description	Setting range	Default	Property
P04.00	X1 terminal function selection	0:No function 1:Run forward or run command 2:Run reverse or running direction (Note: Set to 1 or 2,need match with P04.11) 3:Three-wire running control 4:Forward Jog(FJOG) 5:Reverse Jog(RJOG) 6:Terminal UP 7:Terminal Down 8:Free stop 9:Reset 10:Running suspend 11:External fault normally open input 12:Multiple instruction terminal 1 13:Multiple instruction terminal 2 14:Multiple instruction terminal 3 15:Multiple instruction terminal 4 16:Acceleration and deceleration time selection terminal 1 17:Acceleration and deceleration time selection terminal 2 18:Frequency instruction switching 19:UP/DOWN setting zero clearing (terminal,keyboard) 20:Control command switching terminal 1 21:Acceleration and deceleration prohibited 22:PID suspend 23:Simple PLC condition reset 24:Swing frequency suspend 25:Reserved 26:Reserved 27:Reserved 28:Reserved 29:Torque control prohibited 30:Reserved 31:Reserved 32:DC braking immediately 33:External fault normally close input 34:Frequency modification Enable 35:PID acted direction take reverse 36:External stop terminal 1 37:Control command switching terminal 2 38:PID integral suspend 39:Switching between main frequency and preset frequency 40:Switching between main frequency and auxiliary frequency 41:Motor terminal selection function 42:Reserved 43:PID parameter switching 44:User-defined fault 1 45:User-defined fault 2 46:Switching between speed control and torque control 47:Emergency cut-off 48:External stop terminal 2 49:Deceleration DC braking 50:Zero clearing run time 51:Switching between two-wire control and three-wire control 52:Run reverse prohibited 53 ～ 59:Reserved	1	◎
P04.01	X2 terminal function selection		4	◎
P04.02	X3 terminal function selection		9	◎
P04.03	X4 terminal function selection		12	◎
P04.04	X5 terminal function selection		13	◎
P04.05	X6 terminal function selection		0	◎
P04.10	DI filtering time	0.000s ～ 1.000s	0.010s	○
P04.11	Terminal command mode	0:Two-wire 1 1:Two-wire 2 2:Three-wire 1 3:Three-wire 2	0	◎

P04.12	Terminal UP/DOWN change rate	0.001Hz/s ～ 65.535Hz/s	1.00Hz/s	○
P04.13	AI curve 1 minimum input	0.00V ～ P04.15	0.00V	○
P04.14	Corresponding setting of AI curve 1 minimum input	-100.0% ～ +100.0%	0.0%	○
P04.15	AI curve 1 maximum input	P04.13 ～ +10.00V	10.00V	○
P04.16	Corresponding setting of AI curve 1 maximum input	-100.0% ～ +100.0%	100.0%	○
P04.17	AI1 filtering time	0.00s ～ 10.00s	0.10s	○
P04.18	AI curve 2 minimum input	0.00V ～ P04.20	0.00V	○
P04.19	Corresponding setting of AI curve 2 minimum input	-100.0% ～ +100.0%	0.0%	○
P04.20	AI curve 2 maximum input	P04.18 ～ +10.00V	10.00V	○
P04.21	Corresponding setting of AI curve 2 maximum input	-100.0% ～ +100.0%	100.0%	○
P04.22	AI2 filtering time	0.00s ～ 10.00s	0.10s	○
P04.23	AI curve 3 minimum input	-10.00V ～ P04.25	-10.00V	○
P04.24	Corresponding setting of AI curve 3 minimum input	-100.0% ～ +100.0%	-100.0%	○
P04.25	AI curve 3 maximum input	P04.23 ～ +10.00V	10.00V	○
P04.26	Corresponding setting of AI curve 3 maximum input	-100.0% ～ +100.0%	100.0%	○
P04.27	Potentiometer filtering time	0.00s ～ 10.00s	0.10s	○
P04.33	AI curve selection	Ones place: AI1 curve selection 1:Curve 1(2 points, see P04.13～P04.16) 2:Curve 2(2 points, see P04.18～P04.21) 3:Curve 3(2 points, see P04.23～P04.26) 4:Curve 4(4 points, see P23.00～P23.07) 5:Curve 5(4 points, see P23.08～P23.15) Tens place:AI2 curve selection, the same as above Hundreds place:Potentiometer curve selection, the same as above	321	○
P04.34	AI below minimum input setting selection	Ones place:AI1 below minimum input setting selection 0:Corresponding minimum input setting 1:0.0% Tens place:AI2 below minimum input setting selection, the same as above Hundreds place:Potentiometer below minimum input setting selection, the same as above	000	○
P04.35	X1 delay time	0.0s ～ 3600.0s	0.0s	○
P04.36	X2 delay time	0.0s ～ 3600.0s	0.0s	○
P04.37	X3 delay time	0.0s ～ 3600.0s	0.0s	○
P04.38	DI terminal effective mode option 1	0:Effective when high level 1:Effective when low level Ones place:X1 Tens place:X2 Hundreds place:X3 Thousands place:X4 Ten thousands place:X5	00000	◎
P04.39	DI terminal effective mode option 2	0:Effective when high level 1:Effective when low level Ones place:X6 Tens place:Reserved Hundreds place:Reserved Thousands place:Reserved Ten thousands place:Reserved	00000	◎

Group P05: Output terminal

Code	Description	Setting range	Default	Property
P05.00	Reserved			
P05.01	Reserved	0:No output 1:In inverter running 2:Malfunction output(Malfunction in free stop) 3:Frequency level detection FDT1 output 4:Frequency arrival 5:In zero-speed running(No output when stop) 6:Motor overload pre-alarm 7:Inverter overload pre-alarm 8:Reserved 9:Reserved 10:Reserved 11:Simple PLC circulation completed 12:Accumulated running time arrival 13:In the frequency limit 14:In the torque limit 15:Ready to running 16: AI1>AI2 17:Upper limiting frequency arrival 18:Lower limiting frequency arrival(No output when stop) 19:Undervoltage condition 20:Communication setting 21:Reserved 22:Reserved 23:In zero-speed running(Still output when stop) 24:Accumulated power-on time arrival 25:Frequency level detection FDT2 output 26:Frequency 1 arrival 27:Frequency 2 arrival 28:Current 1 arrival 29:Current 2 arrival 30:Timing arrival 31:AI1 input ultralimit 32:In off- load 33:In reverse running 34:Zero current condition 35:Module temperature arrival 36:Output current ultralimit 37:Lower limiting frequency arrival(Still output when stop) 38:Alarm(All fault) 39:Motor overheat 40:Running time arrival of this time 41:Fault output(For the fault of free stop and no output when undervoltage)		
P05.02	Relay R1 function selection		2	○
P05.04	Y1 output function selection		1	○
P05.06	Y2 utput function selection	0:Running frequency 1:Setting frequency 2:Output current 3:Motor output torque(Absolute value,the percentage relative to motor) 4:Output power 5:Output voltage 6:Reserved 7:AI1 8:AI2 9:Potentiometer 10:Reserved 11:Reserved 12:Communication setting 13:Motor speed 14:Output current(100.0% corresponding to 1000.0A) 15:Output voltage(100.0% corresponding to 1000.0V) 16:Motor output torque(Actual value,the percentage relative to motor)	0	○
P05.07	AO1 output function selection		0	○
P05.08	AO2 output function selection		0	○

P05.10	AO1 zero offset coefficient	-100.0% ～ +100.0%	0.0%	○
P05.11	AO2 gain	-10.00 ～ +10.00	1.00	○
P05.12	AO2 Zero Bias coefficient	-100.0% ～ +100.0%	0.0%	○
P05.13	AO2 Gain	-10.00 ～ +10.00	1.00	○
P05.18	RELAY1 output delay time	0.0s ～ 3600.0s	0.0s	○
P05.20	Y1 output delay time	0.0s ～ 3600.0s	0.0s	○
P05.22	DO output terminal effective condition selection	0:Positive logic 1:Negative logic Ones place:Reserved Tens place:RELAY1 Hundreds place:Reserved Thousands place:Y1 Ten thousands place:Reserved	00000	○

Group P06:Start-stop control

Code	Description	Setting range	Default	Property
P06.00	Starting mode	0:Direct starting 1:Rotational speed tracking starting 2:Pre-excitation starting 3:SVC starting	0	○
P06.01	Rotational speed tracking mode	0:Begin from stop frequency 1:Begin from power frequency 2:Begin from maximum frequency	0	○
P06.02	Fast or slow of rotational speed tracking	1 ～ 100	20	○
P06.03	Starting frequency	0.00Hz ～ 10.00Hz	0.00Hz	○
P06.04	Starting frequency hold time	0.0s ～ 100.0s	0.0s	○
P06.05	Starting DC braking current/Pre-excitation current	0% ～ 100%	50%	○
P06.06	Starting DC braking time/ Pre-excitation time	0.0s ～ 100.0s	0.0s	○
P06.07	Acceleration and deceleration mode	0:Straight line mode 1:Static S curve mode 2:Dynamic S curve mode	0	○
P06.08	S curve begin stage time proportion	0.0% ～ (100.0%- P06.09)	30.0%	○
P06.09	S curve end stage time proportion	0.0% ～ (100.0%- P06.08)	30.0%	○
P06.10	Stop method	0: slow down and stop 1: free stop	0	○
P06.11	Stop DC braking start frequency	0.00Hz to the maximum frequency	0.00Hz	○
P06.12	Stop DC brake waiting time	0.0s ～ 100.0s	0.0s	○
P06.13	Stop DC brake current	0% ～ 100%	0%	○
P06.14	Stop DC brake time	0.0s ～ 100.0s	0.0s	○
P06.15	Brake utilization rate	0% ～ 100%	100%	○
P06.18	Speed tracking current size	30% ～ 200%	Models to determine	○
P06.21	Demagnetization time (SVC valid)	0.00 ～ 5.00s	Models to determine	
P06.22	Minimum output frequency	0.00 ～ P06.11	0.00	○

P06.23	Overexcitation option	0: Not valid 1: Only deceleration takes effect 2: The whole process takes effect	0	○
P06.24	Overexcitation suppression current value	0 ～ 150%	100%	○
P06.25	Overexcitation gain	1.00 ～ 2.50	1.25	○

Group P07: Auxiliary function

Code	Description	Setting range	Default	Property
P07.00	Jog running frequency	0.00Hz to the maximum frequency	2.00Hz	○
P07.01	Jog acceleration time	0.0s ～ 6500.0s	20.0s	○
P07.02	Jog deceleration time	0.0s ～ 6500.0s	20.0s	○
P07.03	Acceleration time 2	0.0s ～ 6500.0s	Models to determine	○
P07.04	Deceleration time 2	0.0s ～ 6500.0s	Models to determine	○
P07.05	Acceleration time 3	0.0s ～ 6500.0s	Models to determine	○
P07.06	Deceleration time 3	0.0s ～ 6500.0s	Models to determine	○
P07.07	Acceleration time 4	0.0s ～ 6500.0s	0.0s	○
P07.08	Deceleration time 4	0.0s ～ 6500.0s	0.0s	○
P07.09	Jump frequency 1	0.00Hz to the maximum frequency	0.00Hz	○
P07.10	Jump frequency 2	0.00Hz to the maximum frequency	0.00Hz	○
P07.11	Jump frequency amplitude	0.00Hz to the maximum frequency	0.00Hz	○
P07.12	Forward and reverse dead time	0.0s ～ 3000.0s	0.0s	○
P07.13	Reverse frequency prohibited	0: invalid 1: valid	0	○
P07.14	The set frequency is lower than the lower limit frequency operation mode	0: run at the lower frequency limit 1: stop 2: Running at zero speed	0	○
P07.15	sag rate	0.00%～10.00%	0.00%	○
P07.16	Set the cumulative power-on arrival time	0h ～ 65000h	0h	○
P07.17	Set the cumulative operation arrival time	0h ～ 65000h	0h	○
P07.18	Boot protection selection	0: Not protected 1: Protected	0	○
P07.19	Frequency detection value (FDT1)	0.00Hz to the maximum frequency	50.00Hz	○
P07.20	Frequency detection hysteresis 1	0.0% ～ 100.0% (FDT1 level)	5.0%	○

P07.21	Frequency arrival detection amplitude	0.0% ～ 100.0%（maximum frequency）	0.0%	○
P07.22	Whether the jump frequency is valid during acceleration and deceleration	0: invalid 1: Valid	0	○
P07.25	Acceleration time 1 and acceleration time 2 switch frequency points	0.00Hz to the maximum frequency	0.00Hz	○
P07.26	Deceleration time 1 and deceleration time 2 switch frequency points	0.00Hz to the maximum frequency	0.00Hz	○
P07.27	Terminal point movement is preferred	0: Invalid 1: Valid	0	○
P07.28	Frequency detection value 2	0.00Hz to the maximum frequency	50.00Hz	○
P07.29	Frequency detection hysteresis 2	0.0% ～ 100.0%（FDT2 level）	5.0%	○
P07.30	Arbitrary arrival frequency detection value 1	0.00Hz to the maximum frequency	50.00Hz	○
P07.31	Arbitrary arrival frequency detection amplitude 1	0.0% ～ 100.0%（maximum frequency）	0.0%	○
P07.32	Arbitrary arrival frequency detection value 2	0.00Hz to the maximum frequency	50.00Hz	○
P07.33	Arbitrary arrival frequency detection amplitude 2	0.0% ～ 100.0%（maximum frequency）	0.0%	○
P07.34	Zero current detection level	0.0% to 300.0% (100.0% corresponds to the rated current of the motor)	5.0%	○
P07.35	Zero current detection delay time	0.01s ～ 600.00s	0.10s	○
P07.36	The output current exceeds the upper limit	0.0%（no detection） 0.1% ～ 300.0%（Rated current of motor）	200.0%	○
P07.37	Output current overlimit detection delay time	0.00s ～ 600.00s	0.00s	○
P07.38	Any current that reaches 1	0.0% ～ 300.0%(Rated current of motor)	100.0%	○
P07.39	Arbitrary arrival current 1 amplitude	0.0% ～ 300.0%(Rated current of motor)	0.0%	○
P07.40	Any current that reaches 2	0.0% ～ 300.0%(Rated current of motor)	100.0%	○
P07.41	Arbitrary arrival current 2 amplitude	0.0% ～ 300.0%(Rated current of motor)	0.0%	○
P07.42	Timing function selection	0: invalid 1: valid	0	○
P07.43	Timing Running time selection	0: P07.44 setting 1: AI1 2: AI2 3: reserved Analog input range corresponds to P07.44	0	○
P07.44	Timing run time	0.0H ～ 6500.0H	0.0H	○
P07.45	AI1 Lower limit of the input voltage protection	0.00V ～ P07.46	3.10V	○
P07.46	AI1 Upper limit of the input voltage protection	P07.45 ～ 10.00V	6.80V	○
P07.47	Module temperature arrival	0℃～100℃	75℃	○

P07.48	Cooling fan controller	0: Fan runs during operation 1: The fan keeps running	0	○
P07.49	wake up frequency	Sleep frequency (P07.51) ～ Maximum frequency (P00.10)	0.00Hz	○
P07.50	Wake up delay time	0.0s ～ 6500.0s	0.0s	○
P07.51	Dormancy frequency	0.00Hz ～wake up frequency(P07.49)	0.00Hz	○
P07.52	Sleep delay time	0.0s ～ 6500.0s	0.0s	○
P07.53	Arrival time of this operation	0.0 ～ 6500.0H	0.0H	○
P07.54	Output power correction factor	0.00% ～ 200.0%	100.0%	○
P07.57	Current correction factor	95% ～ 100.0%	100.0%	○

Group P08: Communication parameters

Code	Description	Setting range	Default	Property
P08.00	Communication baud rate	Ones place: MODBUS 0: 300bps 1: 600bps 2: 1200bps 3: 2400bps 4: 4800bps 5: 9600bps 6: 19200bps 7: 38400bps 8: 57600bps 9: 115200bps Tens place: reserved Hundreds place: reserved Thousands place: reserved	5005	○
P08.01	MODBUS data format	0: No parity (8-N-2) 1: Even parity (8-E-1) 2: Odd parity (8-O-1) 3: No parity (8-N-1)	3	○
P08.02	local address	0: broadcast address 1 ～ 247	1	○
P08.03	MODBUS response delay	0 ～ 20ms	2	○
P08.04	Timeout period for serial port communication	0.0：无效 0.1 ～ 60.0s	0.0	○
P08.05	MODBU Communication data format	Ones place: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Tens place: reserved	31	○
P08.06	Communication reading current resolution	0: 0.01A(valid when ≤ 55KW) 1: 0.1A	0	○
P08.07	Master slave communication mode	0: Local machine as slave 1: Local machine as host	0	○
P08.08	The host communicates to send data	0: Set frequency (P13.00) 1: Output frequency (P13.01)	1	○

Group P09: PID function

Code	Description	Setting range	Default	Property
P09.00	PID given source	0: P09.01 setting 1: AI1 2: AI2 3: Potentiometer 4: Reserved 5: Communication given 6: Multi-segment instruction given	0	○
P09.01	PID value given	0.0% ～ 100.0%	50.0%	○
P09.02	PID feedback source	0: AI1 1: AI2 2: Potentiometer 3: AI1-AI2 4: Reserved 5: Communication given 6: AI1+AI2 7: MAX(|AI1|, |AI2|) 8: MIN(|AI1|, |AI2|)	0	○
P09.03	PID action direction	0: Positive action 1: Reverse action	0	○
P09.04	PID gives feedback range	0 ～ 65535	1000	○
P09.05	Proportional gain KP1	0.0 ～ 1000.0	20.0	○
P09.06	The integration time is TI1	0.01s ～ 10.00s	2.00s	○
P09.07	Differentiate the time TD1	0.000s ～ 10.000s	0.000s	○
P09.08	PID reversal cutoff frequency	0.00 ～ Maximum frequency	0.00Hz	○
P09.09	PID deviation limit	0.0% ～ 100.0%	0.0%	○
P09.10	PID differential limit	0.00% ～ 100.00%	0.10%	○
P09.11	PID specifies the change time	0.00 ～ 650.00s	0.00s	○
P09.12	PID feedback filtering time	0.00 ～ 60.00s	0.00s	○
P09.13	PID Output filtering time	0.00 ～ 60.00s	0.00s	○
P09.15	Proportional gain KP2	0.0 ～ 1000.0	20.0	○
P09.16	The integration time is TI2	0.01s ～ 10.00s	2.00s	○
P09.17	Differentiate the time TD2	0.000s ～ 10.000s	0.000s	○
P09.18	PID parameter switching condition	0: do not switch 1: Switch through DI terminal 2: Automatically switch according to the deviation 3: Automatically switch according to the operating frequency	0	○
P09.19	PID parameter switching deviation 1	0.0% ～ P09.20	20.0%	○
P09.20	PID parameter switching deviation 2	P09.19 ～ 100.0%	80.0%	○
P09.21	PID initial value	0.0% ～ 100.0%	0.0%	○

P09.22	PID initial value hold time	0.00 ～ 650.00s	0.00s	○
P09.23	The positive maximum value of two output deviations	0.00%～100.00%	1.00%	○
P09.24	Two output deviations reverse maximum value	0.00%～100.00%	1.00%	○
P09.25	PID integral attribute	Ones place: Integral separation 0: invalid 1: Valid Tens place: whether to stop the integration after the output reaches the limit value 0: Continue points 1: Stop integration	00	○
P09.26	PID feedback loss detection value	0.0%: Not judged feedback loss 0.1%～100.0%	0.0%	○
P09.27	PID feedback loss detection time	0.0s～20.0s	0.0s	○
P09.28	PID shutdown operation	0: Stop and do not operate 1: Compute at stop	0	○

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Group P10: Multi-section instruction simple PLC function

Code	Description	Setting range	Default	Property
P10.00	Multistage instruction 0	-100.0%～100.0%	0.0%	○
P10.01	Multistage instruction 1	-100.0%～100.0%	0.0%	○
P10.02	Multistage instruction 2	-100.0%～100.0%	0.0%	○
P10.03	Multistage instruction 3	-100.0%～100.0%	0.0%	○
P10.04	Multistage instruction 4	-100.0%～100.0%	0.0%	○
P10.05	Multistage instruction 5	-100.0%～100.0%	0.0%	○
P10.06	Multistage instruction 6	-100.0%～100.0%	0.0%	○
P10.07	Multistage instruction 7	-100.0%～100.0%	0.0%	○
P10.08	Multistage instruction 8	-100.0%～100.0%	0.0%	○
P10.09	Multistage instruction 9	-100.0%～100.0%	0.0%	○
P10.10	Multistage instruction 10	-100.0%～100.0%	0.0%	○
P10.11	Multistage instruction 11	-100.0%～100.0%	0.0%	○
P10.12	Multistage instruction 12	-100.0%～100.0%	0.0%	○
P10.13	Multistage instruction 13	-100.0%～100.0%	0.0%	○
P10.14	Multistage instruction 14	-100.0%～100.0%	0.0%	○
P10.15	Multistage instruction 15	-100.0%～100.0%	0.0%	○
P10.16	Simple PLC operation mode	0: Stop at the end of a single run 1: Keep the final value at the end of a single run 2: keep circulating	0	○
P10.17	Simple PLC power down memory selection	Ones place:Power-off memory selection 0: No memory after power-off 1: Memory after power-off Tens place: Stop memory selection 0: No memory after stop 1: Memory after stop	00	○

P10.18	Simple PLC Running time of step 0	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.19	Simple PLC step 0 acceleration/ deceleration time selection	0 ～ 3	0	○
P10.20	Simple PLC Running time of step 1	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.21	Simple PLC step 1 acceleration and deceleration time selection	0 ～ 3	0	○
P10.22	Simple PLC Running time of step 2	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.23	Simple PLC step 2 acceleration and deceleration time selection	0 ～ 3	0	○
P10.24	Simple PLC Running time of step 3	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.25	Simple PLC step 3 acceleration and deceleration time selection	0 ～ 3	0	○
P10.26	Simple PLC Running time of step 4	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.27	Simple PLC step 4 acceleration and deceleration time selection	0 ～ 3	0	○
P10.28	Simple PLC Running time of step 5	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.29	Simple PLC step 5 acceleration and deceleration time selection	0 ～ 3	0	○
P10.30	Simple PLC Running time of step 6	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.31	Simple PLC step 6 acceleration and deceleration time selection	0 ～ 3	0	○
P10.32	Simple PLC Running time of step 7	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.33	Simple PLC step 7 acceleration and deceleration time selection	0 ～ 3	0	○
P10.34	Simple PLC Running time of step 8	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.35	Simple PLC step 8 acceleration and deceleration time selection	0 ～ 3	0	○
P10.36	Simple PLC Running time of step 9	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.37	Simple PLC step 9 acceleration and deceleration time selection	0 ～ 3	0	○
P10.38	Simple PLC Running time of step 10	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.39	Simple PLC step 10 acceleration and deceleration time selection	0 ～ 3	0	○
P10.40	Simple PLC Running time of step 11	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.41	Simple PLC step 11 acceleration and deceleration time selection	0 ～ 3	0	○
P10.42	Simple PLC Running time of step 12	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.43	Simple PLC step 12 acceleration and deceleration time selection	0 ～ 3	0	○
P10.44	Simple PLC Running time of step 13	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.45	Simple PLC step 13 acceleration and deceleration time selection	0 ～ 3	0	○
P10.46	Simple PLC Running time of step 14	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.47	Simple PLC step 14 acceleration and deceleration time selection	0 ～ 3	0	○
P10.48	Simple PLC Running time of step 15	0.0s(h) ～ 6500.0s(h)	0.0s(h)	○
P10.49	Simple PLC step 15 acceleration and deceleration time selection	0 ～ 3	0	○

P10.50	Simple PLC runtime unit	0: s (second) 1: h (hour)	0	○
P10.51	Multi-step instruction 0 given mode	0: Function code P10.00 is given 1: AI1 2: AI2 3: Potentiometer 4: Reserve 5: PID 6: Preset frequency (P00.08)Given, UP/DOWN can be modified	0	○

Group P11: Fault and protection

Code	Description	Setting range	Default	Property
P11.00	Motor overload protection option	0: forbid 1: allow	0	○
P11.01	Motor overload protection gain	0.20 ～ 10.00	1.00	○
P11.02	Motor overload warning coefficient	50% ～ 100%	80%	○
P11.03	Over pressure stall gain	0 ～ 100	30	○
P11.04	Over voltage stall protection voltage	650V ～ 800V	770V	◎
P11.07	Short circuit protection option to ground	0: invalid 1: valid Ones place: selected for short circuit protection to ground during power-on Tens place: selected for short circuit protection to ground before running	01	○
P11.08	Starting electricity for braking unit action pressure	330.0 ～ 800.0	760V	X
P11.09	Fault automatic reset times	0 ～ 20	0	○
P11.10	Fault DO action selection during fault automatic reset	0: No action 1: Action	0	○
P11.11	Fault automatic reset waiting time	0.1s ～ 100.0s	1.0s	○
P11.12	Input phase loss / contactor latch protection option	Ones place: Input phase loss protection option 0: Prohibit input missing protection 1: at the same time to meet the software and hardware input phase loss protection 2: as long as the software input phase loss are met when protection 3: as long as the hardware input phase loss are met when protection Tens place: contactor latch protection option 0: forbid 1: allow	00	○

P11.13	Output phase loss protection option	Ones place: output phase loss protection option Tens place: output phase loss protection option before running 0: forbid 1: allow	01	○
P11.14	Fault protection action Select 1	Ones place:Motor overload 0: free stop 1: stop according to stop mode 2: keep running Tens place: input phase loss Hundreds place: output phase loss Thousands place: External fault Ten thousand place: abnormal communication	00000	X
P11.15	Fault protection action 2	Ones place: reserved Tens place: abnormal reading and writing of function code 0: Free parking 1: stop according to the stop mode Hundreds place: Inverter overload fault action selection 0: Free stop 1: stop according to the stop mode 2: Derating operation (only for air compressors) Thousands place: Motor overheated Ten thousand place: the running time arrives	00000	X
P11.16	Fault protection action 3	Ones place: user-defined fault 1 0: Free stop 1: stop according to the stop mode 2: keep running Tens place: User-defined fault 2 0: Free stop 1: stop according to the stop mode 2: keep running Hundreds place: the power-on time arrives 0: Free stop 1: stop according to the stop mode 2: keep running Thousands place: drop load 0: Free stop 1: Decelerate to stop 2: Skip directly to 7% of motor rated frequency to continue Running, it will automatically return to the set frequency operation when the load is not dropped Ten thousand place: PID feedback lost during running 0: Free stop 1: stop according to the stop mode 2: keep running	00000	X
P11.17	Fault protection action 4	Ones place: Speed deviation is too large 0: Free stop 1: stop according to the stop mode 2: keep running Tens place: Motor overspeed Hundreds place: wrong initial position	00000	X
P11.21	Continue to run frequency selection in case of failure	0: run at the current operating frequency 1: run at the set frequency 2: run at the upper limit frequency 3: Run at the lower limit frequency 4: Running at abnormal backup frequency	0	○

P11.22	Abnormal backup frequency	0.0% to 100.0% (100.0% corresponds to the maximum frequency P00.14)	100.0%	○
P11.23	Motor temperature sensor type	0: No temperature sensor 1: PT100 2: PT1000	0	○
P11.24	Motor overheat protection threshold	0℃～ 200℃	110℃	○
P11.25	Motor overheat alarm threshold	0℃～ 200℃	90℃	○
P11.26	Instantaneous stop non-stop function selection	0 is invalid 1 Bus voltage constant control 2 Deceleration to stop	0	◎
P11.27	Instantaneous power failure and non-stop recovery of voltage	80% ～ 100%	85%	◎
P11.28	Instantaneous power failure and non-stop voltage recovery judgment time	0.0 ～ 100.0s	0.5s	◎
P11.29	Instantaneous stop and non-stop action voltage	60% ～ 100%	80%	◎
P11.30	Drop load protection option	0: invalid 1: Valid	0	○
P11.31	Load drop detection level	0.0 ～ 100.0%	10.0%	○
P11.32	Load drop detection time	0.0 ～ 60.0s	1.0s	○
P11.34	Overspeed detection value	0.0%～ 50.0% (maximum frequency)	20.0%	○
P11.35	Overspeed detection time	0.0s: no detection 0.1 ～ 60.0s	1.0s	○
P11.36	The speed deviation is too large	0.0%～ 50.0% (maximum frequency)	20.0%	○
P11.37	Excessive speed deviation detection time	0.0s: no detection 0.1 ～ 60.0s	5.0s	○
P11.38	Instantaneous stop non-stop gain Kp	0-100	40	○
P11.39	Momentary stop and non-stop integral coefficient Ki	0-100	30	○
P11.40	Instantaneous stop non-stop action deceleration time	0-300.0s	20.0s	○
P11.42	Fault protection action selection	Ones place: initial position angle identification failure Tens place: Load tuning fault 0: continue running 1: Free stop	11	○

Group P12: keyboard and display

Code	Description	Setting range	Default	Property
P12.00	Digital tube missing picture inspection enable	0 ～ 1	0	X

P12.01	MF.K key function selection	0: MF.K is invalid 1: The operation panel command channel communicates with the remote command channel (terminal command channel or communication command channel) toggle 2: Forward and reverse switching 3: Forward jog 4: Reverse jog	0	◎
P12.02	The STOP/RESET button function	0: Only in keyboard operation mode, the stop function of STOP/RES key is valid 1: In any operation mode, the stop function of the STOP/RES key is valid	1	○
P12.03	Run display parameter 1	0000 to FFFF Bit00: Running frequency 1(Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Potentiometer voltage (V) Bit12: Reserved Bit13: Reserved Bit14: Load speed display Bit15: PID setting	1F	○
P12.04	Run display parameter 2	0000 to FFFF Bit00: PID feedback Bit01: PLC stage Bit02: Reserved Bit03: Running frequency 2 (Hz) Bit04: Remaining running time Bit05: AI1 voltage before calibration (V) Bit06: AI2 voltage before calibration (V) Bit07: Potentiometer voltage before calibration (V) Bit08: Reserved Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: Reserved Bit12: Communication setting value Bit13: Reserved Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	○
P12.05	Stop display parameters	0000 to FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status	33	○
P12.05	Stop display parameters	Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Potentiometer Voltage (V) Bit07: Reserved Bit08: Reserved Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12 to Bit15: Reserved	33	○
P12.06	Load speed display factor	0.0001 ～ 6.5000	1.0000	○
P12.07	Inverter module heat sink temperature	-20℃～120℃	-	X
P12.08	The second line of the keyboard monitors parameters	0～30	4	○

P12.09	Accumulated running time	0h ～ 65535h	-	X
P12.10	product name	-	-	X
P12.11	software version	-	-	X
P12.12	Load speed shows decimal places	Ones place: the number of decimal points of P13.12 0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places Tens place: P13.19/P13.29 decimal point 1: 1 decimal place 2: 2 decimal places	21	○
P12.13	Total power-on time	0 ～ 65535 hours	-	X
P12.14	Accumulated power consumption	0 ～ 65535 degrees	-	X

Group P13: Basic monitoring parameters

New Function code	Function code name	Minimum unit
P13.00	Set frequency (Hz)	0.01Hz
P13.01	Operating frequency (Hz)	0.01Hz
P13.02	Bus voltage (V)	0.1V
P13.03	Output Voltage(V)	0.1V
P13.04	Current output(A)	0.01A
P13.05	Output torque (%)	0.1%
P13.06	Output Power(kW)	0.1OkW
P13.07	Reserve	
P13.08	Reserve	
P13.09	AI1 voltage (V)	0.01V
P13.10	AI2 Voltage (V)/Current (mA)	0.01V/0.01mA
P13.11	Potentiometer voltage (V)	0.01V
P13.12	load speed	1RPM
P13.13	DI Input status	1
P13.14	DO output status	R2/Y2/R1/Y1
P13.15	PID setting	1
P13.16	PID feedback	1
P13.17	PLC stage	1
P13.19	Feedback speed (Hz)	0.01Hz
P13.20	Remaining running time	0.1min
P13.21	AI1 voltage before calibration	0.001V
P13.22	Voltage (V)/Current (mA) before AI2 calibration	0.001V/0.01mA
P13.23	Voltage before potentiometer correction	0.01V
P13.24	Motor speed	1RPM
P13.25	Current power-on time	1min
P13.26	Current running time	0.1min
P13.28	Communication settings	0.01%

P13.30	Main frequency display	0.01Hz
P13.31	Auxiliary frequency display	0.01Hz
P13.32	View arbitrary memory address values	1
P13.34	Motor temperature value	1℃
P13.35	Target torque (%)	0.1%
P13.39	V/F separate the target voltage	1V
P13.40	V/F separate the output voltage	1V
P13.41	Intuitive display of DI input status	1
P13.42	Intuitive display of DO output status	1
P13.43	Intuitive display of DI Function status 1(Function 01- Function 40)	1
P13.44	Intuitive display of DI function status 2(Function 41- Function 80)	1
P13.45	Fault information	1
P13.58	Reserve	
P13.59	Set frequency (%)	0.01%
P13.60	Operating frequency (%)	0.01%
P13.61	Frequency inverter status	1
P13.62	Current fault code	1
P13.63	Point-to-point host communication sends torque values	0.01%
P13.64	Number of slave stations	1
P13.65	Torque upper limit	0.1%
P13.73	The motor serial number	0: motor 1 1: motor 2
P13.74	Actual output torque of motor	-100.0% ～ 100.0%
P13.76	Cumulative power consumption auxiliary low	0.0 ～ 999.9
P13.77	Cumulative power consumption auxiliary high	0 ～ 65535
P13.78	Reserve	

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Group P14: Records faults

Code	Description	Setting range	Default	Property
P14.00	Type of the first fault	0: No fault occurs 1: reserve 2: accelerating overcurrent 3: deceleration overcurrent 4: constant speed overcurrent 5: accelerate overvoltage 6: deceleration overvoltage 7: constant speed overvoltage 8: buffer resistance overload 9: under voltage 10: Inverter overload 11: motor overload 12: input phase loss 13: output phase loss 14: The module is overheated 15: Indicates an external fault 16: Communication is abnormal 17: The contactor is abnormal 18: The current detection is abnormal	0	X
P14.01	Type of the second fault		0	X

P14.02	Third (most recent) failure type	19: Abnormal motor tuning 20: Reserve 21: Parameter read/write is abnormal 22: The inverter hardware is abnormal 23: Short circuit of motor to ground 24 ～ 25: reservations 26: Run time arrives 27: User-defined fault 1 28: User-defined fault 2 29: The power-on time arrives 30: drop load 31: PID feedback is lost at runtime 40: Fast traffic limiting times out 41: Switching motor during operation 42: Excessive speed deviation 43: Motor overspeed 45: Motor overtemperature 51: Initial position error 55: The slave machine is faulty during master/slave control	0	X
P14.03	Third (most recent) failure frequency	0.00HZ ～ 655.35HZ	0.00HZ	X
P14.04	Third (most recent) failure current	0.00A ～ 655.35A	0.00A	X
P14.05	Third (most recent) failure busbar voltage	0.0V ～ 6553.5V	0.0V	X
P14.06	Third (most recent) failure input terminal status	0 ～ 9999	0	X
P14.07	Third (most recent) failure output terminal status	0 ～ 9999	0	X
P14.08	Third (most recent) failure inverter status	0 ～ 65535	0	X
P14.09	Third (most recent) failure Power up time	0s ～ 65535s	0s	X
P14.10	Third (most recent) failure run time	0.0s ～ 6553.5s	0.0s	X
P14.11	Third (most recent) failure back electromotive force	0.0V ～ 6553.5V	0.0V	X
P14.12	Temperature at the third failure	0 ～ 200	℃	X
P14.13	Frequency at second failure	0.00HZ ～ 655.35HZ	0.00HZ	X
P14.14	Current at the second fault	0.00A ～ 655.35A	0.00A	X
P14.15	Bus voltage at the second fault	0.0V ～ 6553.5V	0.0V	X
P14.16	Input terminal status at the second fault	0 ～ 9999	0	X
P14.17	Output terminal status at the second fault	0 ～ 9999	0	X
P14.18	Inverter status at the second fault	0 ～ 65535	0	X
P14.19	Power-on time at the second fault	0s ～ 65535s	0s	X
P14.20	Run time at the second fault	0.0s ～ 6553.5s	0.0s	X
P14.21	back electromotive force at the second fault	0.0V ～ 6553.5V	0.0V	X

P14.22	Temperature at the second failure	0 ～ 200	℃	X
P14.23	Frequency at first failure	0.00HZ ～ 655.35HZ	0.00HZ	X
P14.24	Current at first fault	0.00A ～ 655.35A	0.00A	X
P14.25	Bus voltage at first fault	0.0V ～ 6553.5V	0.0V	X
P14.26	Input terminal status at the first fault	0 ～ 9999	0	X
P14.27	Output terminal status at the first fault	0 ～ 9999	0	X
P14.28	Inverter status at first fault	0 ～ 65535	0	X
P14.29	Power-on time at first fault	0s ～ 65535s	0s	X
P14.30	Run time at first fault	0.0s ～ 6553.5s	0.0s	X
P14.31	back electromotive force at first fault	0.0V ～ 6553.5V	0.0V	X
P14.32	temperature at first failure	0 ～ 200	℃	X

Group P16. Function code management

Code	Description	Setting range	Default	Property
P16.00	user password	0 ～ 65535	0	○
P16.01	parameter initialization	0:No operation 01: Restore factory parameters, excluding motor parameter 02: Clear record information 04: Reserved 501: Reserved	0	◎
P16.04	Function code modification attribute	0: Modifiable 1: cannot be modified	0	○

Group P18. Pendulum frequency, fixed length and counting

Code	Description	Setting range	Default	Property
P18.00	Wobble frequency setting method	0: relative to the center frequency 1: relative to the maximum frequency	0	◎
P18.01	Amplitude of wobbling frequency	0.0% ～ 100.0%	0.0%	◎
P18.02	Amplitude of sudden jump frequency	0.0% ～ 50.0%	0.0%	◎
P18.03	Wobble period	0.1s ～ 3000.0s	10.0s	◎
P18.04	Wobble triangular wave rise time	0.1% ～ 100.0%	50.0%	◎

Group P19. Torque control parameters

Code	Description	Setting range	Default	Property
P19.00	Speed/torque control mode selection	0: speed control 1: torque control	0	◎
P19.01	Torque setting selection in torque control mode	0: Digital setting 1 (P19.03) 1: AI1 2: AI2 3: potentiometer 4: PULSE pulse 5: Communication given 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) (full scale of options 1-7, corresponding to P19.03 digital setting)	0	◎
P19.03	Torque digital setting in torque control mode	-200.0% ～ 200.0%	150.0%	○
P19.05	Torque control forward maximum frequency	0.00Hz ～Maximum frequency	50.00Hz	○
P19.06	Torque control reverse maximum frequency	0.00Hz ～Maximum frequency	50.00Hz	○
P19.07	Torque acceleration time	0.00s ～ 650.00s	0.00s	○
P19.08	Torque deceleration time	0.00s ～ 650.00s	0.00s	○

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Group P21. Second Motor Parameters

Code	Description	Setting range	Default	Property
P21.00	Motor type selection	0: Ordinary asynchronous motor 1: Variable frequency asynchronous motor 2: Permanent magnet synchronous motor	0	◎
P21.01	Motor rated power	0.1kW ～ 1000.0kW	Models to determine	◎
P21.02	Motor rated voltage	1V ～ 2000V	Models to determine	◎
P21.03	Motor rated current	0.01A ～ 655.35A(Inverter power ≤ 55KW) 0.1A ～ 6553.5A(Inverter power>55KW)	Models to determine	◎
P21.04	Motor rated frequency	0.01Hz to the maximum frequency	Models to determine	◎
P21.05	Motor rated rotating speed	1rpm ～ 65535rpm	Models to determine	◎
P21.06	Stator resistance of induction motor	0.001Ω ～ 65.535Ω(Inverter power ≤ 55KW) 0.0001Ω ～ 6.5535Ω(Inverter power>55KW)		
P21.07	Rotor resistance of induction motor	0.001Ω ～ 65.535Ω(Inverter power ≤ 55KW) 0.0001Ω ～ 6.5535Ω(Inverter power>55KW)	Models to determine	◎
P21.08	Induction motor leakage reactance	0.01mH ～ 655.35mH(Inverter power ≤ 55KW) 0.001mH ～ 65.535mH(Inverter power>55KW)	Models to determine	◎
P21.09	Induction motor mutual inductance	0.01mH ～ 655.35mH(Inverter power ≤ 55KW) 0.001mH ～ 65.535mH(Inverter power>55KW)	Models to determine	◎
P21.10	Asynchronous motor no-load current	0.01A ～ P21.03(Inverter power ≤ 55KW) 0.1A ～ P21.03(Inverter power>55KW)	Models to determine	◎

P21.16	Synchronous motor stator resistance	0.001Ω ～ 65.535Ω(Inverter power ≤ 55KW) 0.0001Ω ～ 6.5535Ω(Inverter power>55KW)	Models to determine	◎
P21.17	Synchronous D axis inductance	0.01mH ～ 655.35mH(Inverter power ≤ 55KW) 0.001mH ～ 65.535mH(Inverter power>55KW)	Models to determine	◎
P21.18	Q axis inductance of synchronous motor	0.01mH ～ 655.35mH(Inverter power ≤ 55KW) 0.001mH ～ 65.535mH(Inverter power>55KW)	Models to determine	◎
P21.20	Inverse electromotive force coefficient of synchronous machine	0.1V ～ 6553.5V	Models to determine	◎
P21.37	Tuning selection	0: no operation 1: tuning of static parameters of asynchronous machine 2: asynchronous machine dynamic complete tuning 3: asynchronous machine static complete tuning 11: synchro on-load tuning 12: synchronizer no-load tuning	0	○
P21.38	Speed loop proportional gain 1	1 ～ 100	20	○
P21.39	Velocity loop integration time 1	0.01s ～ 10.00s	0.50s	○
P21.40	Switching frequency 1	0.00Hz ～ P21.43	5.00Hz	○
P21.41	Speed loop proportional gain 2	1 ～ 100	20	○
P21.42	Velocity loop integration time 2	0.01s ～ 10.00s	1.00s	○
P21.43	Switching frequency 2	P21.40 ～Maximum frequency P00.14	10.00Hz	○
P21.44	Vector control slip gain	50% ～ 200%	100%	○
P21.45	SVC torque filtering constant	0.000s ～ 0.100s	0.000s	○
P21.47	Torque upper limit source in speed control mode	0: P21.48 setting 1: AI1 2: AI2 3: potentiometer 4: Reserve 5: Communication given 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) The full scale of options 1-7 corresponds to the digital setting of P21.48	0	○
P21.48	Digital setting of upper limit of torque under speed control mode	0.0% ～ 200.0%	150%	○
P21.49	Torque upper limit source under speed control mode (power generation)	0: P02.10 setting 1: AI1 2: AI2 3: potentiometer 4: Reserve 5: Communication given 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) The full scale of options 1-7 corresponds to the digital setting of P02.12	0	○
P21.50	Digital setting of upper limit of torque in Speed Control Mode (power generation)	0.0% ～ 200.0%	150.0%	○
P21.51	Excitation adjusts proportional gain	0 ～ 60000	2000	○
P21.52	Excitation regulates the integral gain	0 ～ 60000	1300	○
P21.53	Torque adjusts proportional gain	0 ～ 60000	2000	○

P21.54	Torque regulation integral gain	0 ～ 60000	1300	○
P21.55	Velocity loop integral property	Ones place: Integral separation 0: invalid 1: Valid	0	○
P21.56	Synchronous machine field weakening mode	0,1,2,3	1	○
P21.57	Synchronous machine field weakening gain	0 ～ 50	5	○
P21.59	Maximum torque coefficient in field weakening area	50 ～ 200%	100%	○
P21.60	Generating power limit enable/ Generating torque upper limit effective enable	0: invalid 1: Valid	0	○
P21.61	power generation limit	0.0 ～ 200.0%	Models to determine	◎
P21.62	The second motor control mode	0: no speed sensor vector control(SVC) 1: Reserve 2: VF control	0	○
P21.63	The second motor acceleration and deceleration time selection	0: same as the first motor 1: acceleration and deceleration time 1 2: acceleration and deceleration time 2 3: acceleration and deceleration time 3 4: acceleration and deceleration time 4	0	○
P21.64	The second motor torque is increased	0.0%: automatic torque lift 0.1% ～ 30.0%	Models to determine	○
P21.66	Second motor oscillation suppression gain	0 ～ 100	40	○

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ES130(B) synchronous models refer to the following table:

Code	Description	Setting range	Default	Property
P21.61	The second motor control mode	0: no speed sensor vector control (SVC) 1: Reserve 2: VF control	0	○
P21.62	The second motor acceleration and deceleration time selection	0: same as the first motor 1: acceleration and deceleration time 1 2: acceleration and deceleration time 2 3: acceleration and deceleration time 3 4: acceleration and deceleration time 4	0	○
P21.66	Upper limit of output voltage margin of synchronizer	0% ～ 50%	5%	○
P21.67	Synchronizer initial position Angle detection current	50% ～ 180%	80%	◎
P21.68	Synchronizer initial position Angle detection	0 ～ 2	0	○
P21.70	Synchronizer salient pole rate adjustment gain	50 ～ 500	100	○
P21.71	Maximum torque current ratio control	0, 1	0	○

P21.75	Z signal correction	0,1	1	○
P21.79	Low speed excitation current	0 ～ 80%	30%	○
P21.80	Low carrier frequency	0.8k ～ P00.19	2.0k	○
P21.81	SVC low frequency braking mode	0,1	0	○
P21.82	SVC Low frequency effective frequency of braking	0 ～ 10.00HZ	2.00HZ	○
P21.83	SVC low frequency brake frequency change step	0.0005 ～ 1.0000HZ	0.0010HZ	○
P21.84	SVC low frequency brake current	0 ～ 80%	50%	○
P21.85	Synchro SVC speed tracking	0 ～ 1	0	○
P21.86	Zero servo enable	0 ～ 1	0	○
P21.87	Switching frequency	0.00 ～ P02.02	0.30HZ	○
P21.88	Zero servo speed loop proportional gain	1 ～ 100	10	○
P21.89	Zero servo speed loop integration time	0.01s ～ 10.00s	0.50s	○
P21.90	Stop anti-reverse turn enabled	0 ～ 1	0	○
P21.91	Stop Angle	0.0 ～ 10.0°	0.8°	○

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Group P22. Control optimization parameter

Code	Description	Setting range	Default	Property
P22.00	DPWM switch upper frequency	5.00Hz ～ Maximum frequency	8.00Hz	○
P22.01	PWM modulation method	0: Asynchronous modulation 1: Synchronous modulation	0	○
P22.02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode 1	1	○
P22.03	Random PWM depth	0: Random PWM is invalid 1 ～ 10: PWM carrier frequency with the depth of the machine	0	○
P22.04	Fast traffic limiting is enabled	0: disable 1: enable	1	○
P22.05	Maximum output voltage coefficient	100 ～ 120%	110%	○
P22.06	Undervoltage point setting	140.0V ～ 380.0V	350.0V	○
P22.08	Low speed carrier frequency/ dead time adjustment	0.0 ～ 8.0kHz/100% ～ 200%	0.0 /150%	◎
P22.09	Overpressure point setting	Three-phase 380 ～ 480V models : 200.0 V ～ 820.0 V Three-phase 200 ～ 240V models : 200.0 V ～ 400.0 V	820.0V	◎
P22.11	Low speed DC brake threshold	0.00 ～ 5.00Hz	0.30Hz	◎

Group P23. AI curve setting

Code	Description	Setting range	Default	Property
P23.00	AI curve 4 Minimum input	-10.00V ～ P23.02	0.00V	◎
P23.01	AI curve 4 Minimum input is set accordingly	-100.0% ～ +100.0%	0.0%	◎

P23.02	AI curve 4 inflection point 1 input	P23.00 ～ P23.04	3.00V	◎
P23.03	AI curve 4 inflection point 1 input is set accordingly	-100.0% ～ +100.0%	30.0%	○
P23.04	AI curve 4 inflection point 2 input	P23.02 ～ P23.06	6.00V	○
P23.05	AI curve 4 inflection point 2 input corresponding settings	-100.0% ～ +100.0%	60.0%	○
P23.06	AI curve 4 Maximum input	P23.04 ～ +10.00V	10.00V	○
P23.07	AI curve 4 Maximum input is set accordingly	-100.0% ～ +100.0%	100.0%	○
P23.08	AI curve 5 minimum input	-10.00V ～ P23.10	-10.00V	○
P23.09	AI curve 5 Minimum input is set accordingly	-100.0% ～ +100.0%	-100.0%	○
P23.10	AI curve 5 inflection point 1 input	P23.08 ～ P23.12	-3.00V	○
P23.11	AI curve 5 inflection point 1 input corresponds to the setting	-100.0% ～ +100.0%	-30.0%	○
P23.12	AI curve 5 inflection point 2 input	P23.10 ～ P23.14	3.00V	○
P23.13	AI curve 5 inflection point 2 input corresponding Settings	-100.0% ～ +100.0%	30.0%	○
P23.14	AI curve 5 Maximum input	P23.12 ～ +10.00V	10.00V	○
P23.15	AI curve 5 Maximum input is set accordingly	-100.0% ～ +100.0%	100.0%	○
P23.24	AI1 sets the jump point	-100.0% ～ 100.0%	0.0%	○
P23.25	AI1 sets the jump range	0.0% ～ 100.0%	0.5%	○
P23.26	AI2 sets the jump point	-100.0% ～ 100.0%	0.0%	○
P23.27	AI2 sets the jump range	0.0% ～ 100.0%	0.5%	○
P23.28	The potentiometer sets the jump point	-100.0% ～ 100.0%	0.0%	○
P23.29	The potentiometer sets the jump amplitude	0.0% ～ 100.0%	0.5%	○

Chapter 6 Fault diagnosis and elimination

6.1 Fault alarm and countermeasures

ES130(B) series universal compact vector inverter provides 38 alarm information and protection functions. Once a fault occurs, the protection function will act, the inverter will stop output, the inverter fault relay R1 will act, and the fault code will be displayed on the inverter display panel. When a fault occurs during use, the user can first check the table 6-1, analyze the cause of the fault, and quickly find a solution. If you still can't solve it, please contact the agent of the inverter or our company.

Note: if the motor is rotating when the fault occurs, it will stop freely until it stops.

Table 6-1 Frequency inverter fault alarm and countermeasures self-check table

Fault Code	Description	Possible causes	Solution
ERR00	No fault	/	/
ERR01	reserve		
ERR02	Acceleration overcurrent	The output loop of the inverter is grounded or short-circuited	Eliminate peripheral faults, detect whether the motor or interrupt contactor is short-circuited
		The control mode is FVC or SVC and none Identification of parameters	Set motor parameters according to the motor nameplate and identify motor parameters
		Rapid acceleration condition, acceleration time setting is too short	Increased acceleration time
		Loss rate suppression setting is not appropriate	Verify that the loss rate suppression function is enabled. Overloss quick acting current setting value is too large, recommended within 120% to 150% adjustment; The loss rate suppression gain is too small. It is recommended to adjust it within 20 to 40.
		Manual torque lift or V/F curve not suitable	Adjust manual lift torque or V/F curve
		Start the motor that is rotating	Select speed tracking to start or wait for the motor to stop before starting
		Subject to external interference	Check the historical fault records. If the current value is far from the overcurrent point value at the time of the fault, it is necessary to find the interference source. If there are no other sources of interference, it may be a problem with the driver board or the Hall device

ERR03	Deceleration overcurren	The output loop of the inverter is grounded or short-circuited	Eliminate peripheral faults, detect whether the motor or interrupt contactor is short-circuited
		The control mode is FVC or SVC and none Identification of parameters	Set motor parameters according to the motor nameplate and identify motor parameters
		Rapid deceleration condition, deceleration time setting is too short	Increase deceleration time
		Loss rate suppression setting is not appropriate	Verify that the loss rate suppression function is enabled. Overloss quick acting current setting value is too large, recommended within 120% to 150% adjustment; The loss rate suppression gain is too small. It is recommended to adjust it within 20 to 40.
		There is no brake unit and brake resistance	Add brake unit and resistor
		Subject to external interference	Check the historical fault records. If the current value is far from the overcurrent point value at the time of the fault, it is necessary to find the interference source. If there are no other sources of interference, it may be a problem with the driver board or the Hall device
ERR04	Constant speed overcurrent	The output loop of the inverter is grounded or short-circuited	Eliminate peripheral faults, detect whether the motor or interrupt contactor is short-circuited
		The control mode is FVC or SVC and none identification of parameters	Set motor parameters according to the motor nameplate and identify motor parameters
		Rapid deceleration condition, deceleration time setting is too short	Increase deceleration time
		Loss rate suppression setting is not appropriate	Verify that the loss rate suppression function is enabled. Overloss quick acting current setting value is too large, recommended within 120% to 150% adjustment; The loss rate suppression gain is too small. It is recommended to adjust it within 20 to 40.
		Inverter selection power is too small	Eliminate peripheral faults, detect whether the motor or interrupt contactor is short-circuited
		Subject to external interference	Check the historical fault records. If the current value is far from the overcurrent point value at the time of the fault, it is necessary to find the interference source. If there are no other sources of interference, it may be a problem with the driver board or the Hall device

ERR05	Accelerated overvoltage	Input voltage is high	Adjust the voltage to normal range
		In the process of acceleration, external forces drag the motor to run	Cancel additional power or add brake resistance
		Overvoltage suppression setting is inappropriate	Confirm that the overvoltage suppression function has been enabled; if the set value of the overvoltage suppression action voltage is too large, it is recommended to adjust it within 770V-700V; if the overvoltage suppression gain setting is too small, it is recommended to adjust it within 30-50
		No braking unit and braking resistor installed	Install braking unit and resistor
		The acceleration time is too short	Increased acceleration time
ERR06	Deceleration overvoltage	During the deceleration process, there is an external force that drives the motor to run	Cancel external power or install braking resistor
		Overvoltage suppression setting is inappropriate	Confirm that the overvoltage suppression function has been enabled; if the set value of the overvoltage suppression action voltage is too large, it is recommended to adjust it within 770V-700V; if the overvoltage suppression gain setting is too small, it is recommended to adjust it within 30-50
		The deceleration time is too short	Increase deceleration time
		No braking unit and braking resistor installed	Install braking unit and resistor
ERR07	Constant speed overvoltage	Overvoltage suppression setting is inappropriate	Confirm that the overvoltage suppression function has been enabled; Overvoltage suppression action voltage setting value is too large, it is recommended to adjust within 770V-700V; The overvoltage suppression gain setting is too small, it is recommended to adjust it within 30-50; The setting of the maximum rising frequency of overvoltage suppression is too small, it is recommended to adjust it within 5-20HZ
		During operation,there is external force to drag the motor to run	Cancel external power or install braking resistor
ERR08	Snubber resistor overload	The bus voltage fluctuates at the undervoltage point	Seeking technical support

ERR09	Undervoltage	momentary power failure	Enable the function of instantaneous power failure and non-stop, which can prevent instantaneous power failure and undervoltage fault
		The input terminal voltage of the inverter is not within the specification requirements	Adjust voltage to normal range
		The bus voltage is abnormal	Seeking technical support
		Rectifier bridge, buffer resistance, power board, control board abnormal	Seeking technical support
ERR10	Inverter overload	Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition
		Inverter selection power is too small	Choose a frequency inverter with a larger power level
ERR11	Motor overload	Motor protection parameters are set properly	Set this parameter correctly
		Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition
ERR12	input phase loss	The three-phase power supply is abnormal	Check and eliminate problems in peripheral circuits
		The power supply board, surge protection board, and main control board are abnormal	Seeking technical support
ERR13	output phase loss	Motor failure	Check whether the motor is disconnected
		The lead wire from the inverter to the motor is abnormal	Troubleshooting peripheral faults
		Inverter three-phase output is unbalanced when the motor is running	Check whether the motor three-phase winding is normal and troubleshoot
		The IGBT of the driver is abnormal	Seeking technical support
ERR14	Module overheating	Ambient temperature is too high	Check whether the motor is disconnected
		Air duct blockage	Clean up the air duct
		Damage of fan	Replace fan
		Thermistor damaged	Replace the thermistor
ERR15	External fault	Input signals of external faults through the multi-function terminal DI	Investigate peripheral faults, confirm that the machine is allowed to restart, and reset operation
		Input of external fault signal via virtual IO function	Confirm that the virtual IO group parameters are set correctly, reset the operation

ERR16	Abnormal communication	The upper computer is not working properly	Check the wiring of the host computer
		The communication line is not normal	Check the communication cable
		Communication expansion card settings are incorrect	Correctly set the communication expansion card type
		Communication parameter group setting is incorrect	Correctly set communication parameters
		After the above tests, you can try to restore the factory settings	
ERR17	Contactor anomaly	Abnormal power supply board and driver board	Replace the power board or driver board
		Contactor anomaly	Replace contactor
ERR18	Abnormal current detection	Check for Hall device abnormalities	Replacing the Hall Device
		The power supply board or driver board is abnormal	Replace the power board or driver board
ERR19	Motor tuning anomaly	Motor parameters are not set according to the nameplate	Set motor parameters according to the nameplate
		Parameter identification timed out	Check the leads from the inverter to the motor
		Abnormal encoder	Check whether the encoder line number is set correctly; Check the signal cable connection of the encoder is correct and firm
ERR20	Reserve		
ERR21	Parameter read and write exception	The EEPRROM chip is damaged	Replacing the main control board
ERR22	Inverter hardware abnormality	Overvoltage exists	Handling overvoltage faults
		there is an overcurrent	Deal with overcurrent faults
ERR23	Motor short circuit to ground	Motor ground fault	Replace the cable or motor
ERR24	reserve		
ERR25	reserve		
ERR26	Run time arriva	The accumulated running time reaches the set value	Seek technical support
ERR27	User-defined fault 1	Input the signal of user-defined fault 1 through the multi-function section DI	Reset operation
		Input signal of user-defined fault 1 through virtual IO function	Reset operation
ERR28	User-defined fault 2	Input the signal of user-defined fault 2 through the multi-function section DI	Reset operation
		Input signal of user-defined fault 2 through virtual IO function	Reset operation
ERR29	The power-on time arrives	The cumulative power-on time reaches the set value	Seek technical support

ERR30	Drop load	The inverter running current is less than P11.31	Confirm whether the load is disengaged or P11.31, Whether the parameter setting of P11.32 conforms to the actual operating conditions
ERR31	PID feedback lost at runtime	PID feedback is less than P09.26 set value	Detect PID feedback signal or set P09.26 to a suitable value
ERR40	Fast traffic limiting times out	Whether the load is too large or the motor is blocked	Reduce load and check motor and mechanical condition
		Inverter selection power is too small	Choose a frequency inverter with a larger power level
ERR41	Switch motor during operation	Change current motor selection through terminals during inverter operation	Switch the motor after the inverter stops
ERR42	Excessive velocity deviation	Encoder parameter setting is incorrect	Correctly set encoder parameters
		No parameter self-identification	Perform motor parameter self-identification
		Excessive speed deviation detection parameter setting is unreasonable	Set the detection parameters reasonably according to the actual situation
ERR43	Motor overspeed	Encoder parameter setting is incorrect	Correctly set encoder parameters
		No parameter self-identification	Perform motor parameter self-identification
		Excessive speed deviation detection parameter setting is unreasonable	Set the detection parameters reasonably according to the actual situation
ERR45	Motor overtemperature	Cables to the temperature sensor are loose	Check cables to the temperature sensor and rectify faults
		Motor temperature is too high	Increase the carrier wave or take other cooling measures to dissipate the heat of the motor
ERR51	wrong initial position	Inverter output phase loss	Check motor wiring and troubleshoot
		Inverter current detection fault or Hall damage	Check and troubleshoot the hall
		Motor inductance value is too large	Shield this fault through function code P11.17
ERR55	Slave fault during master-slave control	The slave machine fails, check the slave machine	Troubleshoot according to the slave fault code

6.2 Querying Fault Records

ES130(B) series compact vector inverter provides the function of recording the last three fault information. You can check the latest fault code, the second-to-last fault code, the third-to-last fault code, and the fault code of the inverter at the latest fault by viewing the parameters in the P14.xx group. Output frequency, output current and bus voltage conditions. It can provide reference information for users to judge and solve faults.

6.3 Fault Reset

When ES130(B) series compact vector inverter has a fault, if you want to exit the fault alarm state, you can reset the fault by pressing the ESC button after eliminating the fault cause; if the fault is not cleared, the inverter will continue to stay in the fault state, and the keyboard number The tube will continue to display fault codes.

Chapter 7 Electromagnetic Compatibility Guidance

7.1 Definitions

Electromagnetic compatibility means that electrical equipment can coexist under the condition of limited time, space and spectrum resources without causing performance degradation. Equipment, sub-systems, and systems should not generate electromagnetic emissions that exceed the requirements of regulations or standards, and can meet the requirements of immunity.

7.2 Introduction to EMC Standards

According to the requirements of the national standard GB/T12668.3, the inverter needs to meet the requirements of electromagnetic interference and anti-electromagnetic interference.
Our existing products implement the latest international standards: IEC/EN61800-3:2004 (Adjustable speed electricalpower drive systems part 3:EMC requirements and specific test methods), which is equivalent to the national standard GB/T12668.3. IEC/EN61800-3 mainly inspects the inverter from two aspects: electromagnetic interference and anti-electromagnetic interference. Electromagnetic interference mainly tests the radiated interference, conducted interference and harmonic interference of the inverter (for domestic inverters, there are requirements).The anti-electromagnetic interference mainly affects the conducted immunity, radiation immunity, surge immunity, rapid mutation burst immunity, ESD immunity and low frequency end immunity of the power supply of the inverter (specific test items are: 1 , Input voltage sag, interruption and change immunity test; 2. Commutation notch immunity test; 3. Harmonic input immunity test; 4. Input frequency change test; 5. Input voltage unbalance test; 6. Input voltage fluctuation test) to test. Tested in accordance with the strict requirements of the above IEC/EN61800-3, our products are installed and used in accordance with the instructions shown in 8.3, and will have good electromagnetic compatibility in general industrial environments.

7

7.3 EMC guidance

7.3.1 Influence of harmonics

The high-order harmonics of the power supply may cause damage to the inverter and its surrounding electrical equipment. In places with poor power quality, it is recommended to install an AC input reactor or a current harmonic filter. Due to the influence of harmonics, the selection of the input leakage circuit breaker refers to the relevant description of the input side wiring of the main circuit.
The current of the inverter motor power cable contains high-order harmonics, so the thermal relay may malfunction due to resonance, and it is necessary to reduce the carrier frequency or install an output reactor. It is recommended not to install a thermal relay before the motor when using the inverter, but to use the overcurrent protection function of the inverter.

7.3.2 Electromagnetic interference and Installation Precautions
1. The ground cables of frequency inverters and other electrical products should be well grounded.When using EMC filters, you must use permanently fixed ground connectors, which do not pass through connectors.
2. The input and motor power cables of the frequency inverter and weak current signal cables (such as control signal cables) should be arranged separately from each other as far as possible. If possible, the weak current signal cables should be routed separately through metal troughs.
3. It is recommended to use shielded cables or armored cables for the input and motor power cables of the inverter. The shielding layer or armor at both ends of the cable needs to be reliably grounded. It is recommended to use shielded twisted pair cables for weak current signal lines that are susceptible to interference, and the shielding layer should be reliably grounded.
4. For motor cables with a length of more than 50m, it is required to install an output filter or reactor.

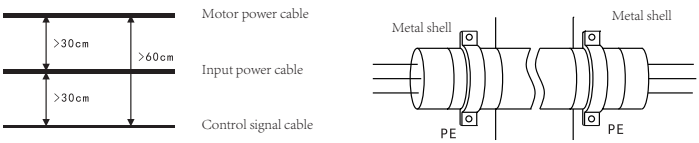

Figure 8-1 Cable requirements and shielded grounding method

7.3.3 Grounding
1. It is recommended that the inverter and other equipment be grounded separately;If common ground points are required, single point grounding is required. Common ground cables are not recommended.
2. The large-section grounding cable should be used as much as possible to ensure that the grounding impedance is as low as possible. Due to the cable with the same cross-sectional area, the high-frequency impedance of the flat conductor is smaller than that of the round conductor, so it is better to use the flat cable. The grounding cable should be as short as possible and the grounding point should be as close to the drive as possible.
3. If the motor power cable adopts a 4-core cable, the ground wire in the 4-core cable must be grounded on the inverter side, and the other side is connected to the ground terminal of the motor; The best grounding effect can be obtained if the motor and the inverter have their own dedicated grounding points.
4. If the ground terminals of various components in the control system are connected together, the noise source formed by the ground leakage current will affect other peripheral equipment outside the inverter in the control system. Therefore, in the same control system, the grounding of the inverter and the weak current equipment such as computers, sensors or audio equipment should be separated and cannot be connected together.
5. In order to obtain a lower high-frequency impedance, the fixing bolts of each device can be used as the high-frequency terminals connected to the rear panel of the cabinet. Please pay attention to removing the insulating paint on the fixing points during installation.
6. The grounding cable should be laid away from the wiring of the I/O part of the noise-sensitive equipment, and pay attention to the grounding wire should be as short as possible.

Proper grounding of frequency inverters and other equipment

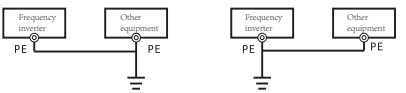

Figure 8-2 Grounding method of the inverter and other devices is not recommended

7.3.4 Measures to deal with electromagnetic interference caused by peripheral electrical equipment to frequency inverter.
Relays, contactors, electromagnetic brakes, etc. in the surrounding environment of the inverter may generate electromagnetic interference.
When the frequency inverter is misoperated by electromagnetic interference, the following methods are recommended:
1. Install a surge suppressor on the device that generates interference;
2. Add an EMC filter to the input power cable of the inverter, and the specific operation will be introduced later;
3. Use shielded wire or twisted pair wire for the control signal and detection circuit of the inverter, and the shielding layer of the shielded wire needs to be grounded reliably (360 degree loop connection).

7.3.5 How to deal with electromagnetic interference caused by frequency converter to peripheral equipment
The electromagnetic interference caused by frequency inverter to peripheral equipment can be divided into two types, one is conductive interference, the other is radiation interference.For different interference situations, refer to the following methods:
1.The signals of instruments, meters, receivers and sensors used for measurement are generally weak current signals. If they are close to the inverter or in the same control cabinet, they are prone to interference and malfunction.It is recommended that the weak current signal be kept away from the interference source as far as possible; do not bundle the weak current signal line and the power cable together;The signal line should be shielded or twisted pair, and the shielding layer of the shielded line should be well grounded (360-degree loop connection as far as possible);The power cable is added with a ferrite magnetic ring (nickel-zinc magnetic ring, which suppresses the interference of frequencies above 30MHz) and wound around 2 to 3 turns. In order to obtain a better effect, an EMC filter can also be used.
2. When the interfered equipment and the inverter are powered by the same power supply, it is easy to cause conducted interference. It is recommended to add an EMC filter to the input port of the inverter. The specific operation is described in the last section of this chapter;
3. The peripheral equipment is grounded separately, which can reduce the common mode interference caused by the common ground impedance.

7.3.6 Leakage current and treatment
There is a distributed capacitance between the power cable and the ground. The longer the power cable is, the greater the distributed capacitance between the power cable and the ground, and the greater the leakage current; the higher the carrier frequency, the greater the leakage current.Leakage current can be reduced

by shortening the power cable length and reducing the carrier frequency. However, reducing the carrier frequency will lead to increased motor noise, and a balance needs to be found between the two.

7.3.7 Precautions for installing EMC filter on power input

1. When using the filter, please use it strictly according to the rated value; since the filter is a Class I electrical appliance, its metal casing must be in good contact with the metal ground of the installation cabinet in a large area, and good grounding continuity is required, otherwise there will be danger of electric shock and serious impact. EMC effect.
2. The filter ground must be connected to the same common ground as the inverter PE terminal, otherwise the EMC effect will be seriously affected.
3. In the cabinet, the installation position of the filter should be close to the inlet end of the input power cable, and the power input cable of the filter should be as short as possible in the control cabinet.
4. If the input line and output line of the filter are laid too close, high-frequency interference will bypass the filter and directly couple through the input line and output line of the filter, making the power filter useless.
5. The filter housing usually has a dedicated ground terminal. However, if the filter is connected to the control cabinet housing with a wire, it is equivalent to a dummy for high frequency interference. This is because the high-frequency impedance of the long wire is so large that it cannot effectively bypass. The correct installation method is to stick the filter casing on the conductive plane of the metal casing in a large area. When installing, please pay attention to removing the insulating paint to ensure reliable connection.

Chapter 8 Description of optional parts

8.1 Optional Brake Resistors

All series of ES130(B) series compact vector inverter provide built-in braking unit. Users can choose different braking resistor resistance and power according to the actual situation, but the resistance cannot be less than the recommended value in Table 8-1. The braking resistor power can be selected big.The selection of the braking resistor needs to be determined according to the power generated by the motor in the actual application system, which is related to the inertia of the system, the deceleration time, and the load energy. Users should choose according to the actual situation. The greater the inertia of the system, the shorter the required deceleration time, and the more frequent braking, the greater the power and the smaller the resistance value of the braking resistor that needs to be selected.

Table 8-1 ES130(B) series compact vector inverter braking resistor selection table

Frequency inverter model	Recommended power for brake resistance	Recommended brake resistance
DRS ES130(B)-3T-0R7G/1R5P	≥ 200W	≥ 360Ω
DRS ES130(B)-3T-1R5G/2R2P	≥ 400W	≥ 180Ω
DRS ES130(B)-3T-2R2G/4R0P	≥ 400W	≥ 180Ω
DRS ES130(B)-3T-4R0G/5R5P	≥ 800W	≥ 90Ω
DRS ES130(B)-3T-5R5G/7R5P	≥ 1000W	≥ 60Ω
DRS ES130(B)-3T-7R5G/011P	≥ 1000W	≥ 60Ω
DRS ES130(B)-3T-011G/015P	≥ 2000W	≥ 30Ω
DRS ES130(B)-3T-015G/018P	≥ 2000W	≥ 30Ω
DRS ES130(B)-3T-018G/022P	≥ 2100W	≥ 29Ω
DRS ES130(B)-3T-022G/030P	≥ 2200W	≥ 28Ω
DRS ES130(B)-3T-030G/037P	≥ 3000W	≥ 24Ω
DRS ES130(B)-3T-037G/045P	≥ 3700W	≥ 20Ω
DRS ES130(B)-3T-045G/055P	≥ 4500W	≥ 16Ω
DRS ES130(B)-3T-055G/075P	≥ 5500W	≥ 13Ω
DRS ES130(B)-3T-075G/090P	≥ 7500W	≥ 9Ω
DRS ES130(B)-3T-090G/110P	≥ 9300W	≥ 6.8Ω
DRS ES130(B)-3T-110G/132P	≥ 11000W	≥ 6.2Ω
DRS ES130(B)-3T-132G/160P	≥ 13000W	≥ 4.7Ω
DRS ES130(B)-3T-160G/185P	≥ 15000W	≥ 3.9Ω

Note: The wire connecting the braking resistor should pay attention to select the cable with a withstand voltage of AC450V or more and a temperature resistance of 105℃.

Appendix A ModBus Communication Protocol

1 Summarize

ES130(B) series compact vector inverter provides RS485 serial port communication interface and adopts MODBUS communication protocol. Users can realize centralized control through computer or PLC, set inverter running commands, modify or read function code parameters, and read inverter working status and fault information. And it can be used as a host, which is convenient for users to perform synchronous operation of multiple frequency inverters.

2 Serial port data format

The user can set the corresponding communication parameters through the parameters of the P08.XX communication function group.

Local address: can be set to 1~247 (can not conflict with other devices in the network), when it is 0, it is the broadcast address.

Communication baud rate: 4800, 9600, 19200 or 38400bps can be selected.

Communication format: select 1+8+1 without verification;

Even parity 1+8+1+1;

Odd parity 1+8+1+1;

Master-slave communication mode: You can choose the machine as the master or the slave.

3 Protocol frame format

Frame start ⩾ 3.5 character time interval	Slave address (1byte)	Function code (1 byte)	Data (Nbyte)	CRC16 (2byte)	End of frame ⩾ 3.5 character interval

4 Address range of communication register

Name	Address	Description
Function code	0000H ～ 1FFFH (P00～P31)	Write save ROM address, 00～1FH
	2000H～3FFFH	Write does not save RAM address, +2000H
Control command	4000H	00H: Invalid command 01H: Forward running 02H: Reverse running 03H: JOG forward rotation 04H: JOG reverse 05H: Slave stop 06H: Slow down and stop 07H: Free stop 08H: The fault resets

Control command	4001H	BIT0: DO1 output control BIT1: reserved BIT2: RELAY1 output control BIT3: reserved BIT4: reserved BIT5: reserved BIT6: reserved BIT7: reserved BIT8: reserved BIT9: reserved
	4002H	Analog output AO1 control: 0-7FFF means 0-100%
	4003H	Analog output AO2 control: 0-7FFF means 0-100%
Running status	4100H	The user can read the data of the special state register through the 0x03 function to know the working state of the inverter: 0001H: Forward running 0002H: Reverse running 0003H: Inverter stopped
Communication set point	5000H	Communication setting value (decimal) -10000 to 10000
	5001H	Operating frequency
	5002H	Bus voltage
	5003H	The output voltage
Communication settings	5004H	Output current
	5005H	Output Power
	5006H	Output torque
	5007H	running speed
	5008H	DI input flag
	5009H	DO output flag
	500AH	AI1 voltage
	500BH	AI2 voltage
	500CH	Reserved
	500DH	Reserved
	500EH	Reserved
	500FH	Load speed
	5010H	PID settings
	5011H	PID feedback
	5012H	PLC steps
	5013H	Reserve
	5014H	Feedback speed, unit 0.1Hz
	5015H	Remaining running time
	5016H	AI1 voltage before correction
	5017H	AI2 voltage before correction
	5018H	Reserve

communication settings	5019H	Reserve
	501AH	Current power-on time
	501BH	current running time
	501CH	Reserve
	501DH	Communication settings
	501EH	Reserve
	501FH	Main frequency X display
	5020H	Auxiliary frequency Y display
communication settings	5F00H	User password
	5F01H	1: Restore factory parameters 2: Clearly record information 4: reserved 5: reserved
Fault message	8000H	0000: no fault 0001: reserved 0002: Acceleration overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Acceleration overvoltage 0006: Deceleration overvoltage 0007: Constant speed overvoltage 0008: Snubber resistor overload fault 0009: Bus undervoltage fault 000A: Inverter overload 000B: Motor overload 000C: Phase loss on the input side 000D: Phase loss at output side 000E: Module overheat fault 000F: External fault 0010: Communication failure 0011: Contactor fault 0012: Current detection fault 0013: Motor self-learning fault 0014: reserved 0015: EEPROM operation failure 0016: Drive hardware fault 0017: Motor short circuit fault to ground 0018: reserved 0019: reserved 001A: Running time reached 001B: User-defined fault 1 001C: User-defined fault 2 001D: Power-on time arrived 001E: Load drop 001F: PID feedback lost during runtime 0028: Fast current limit timeout fault 0029: Run cut-off motor fault 002A: Speed deviation is too large 002B: Motor overspeed 002D: Motor overtemperature

Fault message	8000H	005A: Reserved 005B: Reserved 005C: Initial position error 005E: Speed feedback error
	8001H	0000: no fault 0001: wrong password 0002: Command code error 0003: CRC check error 0004: Invalid address 0005: Invalid parameter 0006: Invalid parameter change 0007: System locked 0008: EEPROM operation in progress

C language code of CRC16:

```
unsigned short GetCRC ( unsigned char *data,unsigned short length )
{
unsigned short j;
unsigned short crc = 0xFFFF;
while( length --)
{
crc ^= *data ++;
for( j = 0; j < 8; j ++ )
{
if( crc & 0x01 )
{
        crc = ( crc >> 1 ) ^ 0xa0001;
}
else
{
crc = crc >> 1;
}
}

}
return ( crc );
}
```

附录

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