High performance Off Grid Pump Solar

SP600 Series

User Manual

http://www.keasyautomation.com

Preface

Thank you for using the company's production of high-performance photovoltaic water pump special series products!

SP600 series is our high reliability, small size, cost-effective products, support three-phase asynchronous motor high-performance drive, support synchronous machine, BLDC motor high-performance drive, support international leading vector control technology and universal V/F control mode, support speed and torque control output mode, at the same time for photovoltaic power supply, Integrated high performance maximum power tracking algorithm (MPPT) to maximize customer on-site requirements.

This instruction manual describes the proper use of SP600 series products. Before using (installation, operation, maintenance, inspection, etc.), please read this instruction manual carefully. In addition, please understand the safety precautions before using the product.

Special emphasis: In order to ensure the performance of the product, please confirm that the nameplate parameters of the motor are set properly when using the product for the first time: rated voltage, rated current, rated power, rated frequency, rated speed, and pole number and other motor parameters.

IMPORTANT NOTES

- Please assure the intactness of product enclosure and all safety covers before installation .Operation must conform to the requirements of this manual and local industrial safety regulations and/or electrical codes.
- Contents of this manual may be subject to appropriate modification as a result of product upgrade, specification change and update of the manual.
- In the event of damage or loss of user manual, users may ask local distributors, offices or our Technical Service Department for a new one.
- If any item as stated in this manual is not clear, please contact for technical Service.
- If any anomaly occurs after power up or during the operation, it is essential to stop the machine and identify the fault or seek technical services as soon as possible.

Contents

Chapter 1

Safety information and precautions

Users are requested to read this chapter carefully when installing, commissioning and repairing this product and perform the operation according to safety precautions as set forth in this chapter without fail. Our company will bear no responsibility for any injury and loss as a result of any violation operation.

Safety signs in this manual	
DANGER	Dangers caused by operations beyond requirements may lead to serious injury,and even death.
CAUTION	angers caused by operations beyond requirements may lead to moderate damages or minor injuries, as well equ-ipment damages.

1.1 Safety Matters

Use Stage	Safety Grade	Precautions
Before Installation	DANGER	✧ Do not install the product if the package is with water, or component is missing or broken; ✧ Do not install the product if the label on the package is not identical to that on the inverter.
	CAUTION	✧ Be careful of carrying or transportation. Risk of devices damage; ✧ Do not use damaged product or the inverters missing component .Risk of injury; ✧ Do not touch the parts of control system with bare hands. Risk of ESD hazard.
Installation	DANGER	✧ Installation base shall be metal or other non-flammable material. Risk of fire; ✧ Do not install inverter in an environment containing explosive gases, otherwise there is danger of explosion; ✧ Do not unscrew the fixing bolts, especially the bolts with red mark.
	DANGER	✧ Do not leave cable strips or screws in the inverter. Risk of inverter damage; ✧ Install the product at the place with less vibration and no direct sunlight;

Use Stage	Safety Grade	Precautions
Installation	DANGER	✧ Consider the installation space for cooling purpose when two or more inverters are placed in the same cabinet.
Wiring	DANGER	✧ Wiring must be performed by authorized and qualified personnel. Risk of danger; ✧ Circuit-breaker should be installed between inverter and the mains. Risk of fire; ✧ Make sure the input power supply has been completely disconnected before wiring. Failure to comply may result in personnel injury and/or equipment damage; ✧ Since overall leakage current of this equipment may be bigger than 3.5mA, for safety's sake, this equipment and its associated motor must be well grounded so as to avoid risk of electric shock; ✧ Never connect the power cables to the output terminals (U,V,W) of the AC drive. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the AC drive; ✧ Install braking resistors at terminals (P+)and (P- or PB) only. Failure to comply may result in equipment damage.
	CAUTION	✧ Since all adjustable frequency AC drives from Our company have been subjected to hi-pot test before delivery, users are prohibited from implementing such a test on this equipment. Failure to comply may result in equipment damage. ✧ Signal wires should to the best of the possibility be away from main power lines. If this cannot be ensured, vertical cross-arrangement shall be implemented, otherwise interference noise to control signal may occur. ✧ If motor cables are longer than 100m, it is recommended output AC reactor be used. Failure to comply may result in faults.
Before Power-on	DANGER	✧ Inverter shall be power-on only after the front cover is assembled. Risk of electrical hazard.
	CAUTION	✧ Verify that the input voltage is identical to the rated voltage of product, correct wiring of input terminals R,

Use Stage	Safety Grade	Precautions
Before Power-on	 CAUTION	S, T or L1, L2 and output terminals U, V, and W, wiring of inverter and its peripheral circuits, and all wires should be in good connection. Risk of inverter damage.
After Power-on	 DANGER	✧ Do not open the cover after power. Rick of electrical hazard; ✧ Do not touches any input/output terminals of inverter with bare hands. Rick of electrical hazard.
	 CAUTION	✧ If auto tuning is required, be careful of personal injury when motor is running. Risk of accident; ✧ Do not change the defaults of parameters. Risk of devices damage.
During Operation	 DANGER	✧ Non-professionals shall not detect signals during operation. Risk of personal injury or device damage; ✧ Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt.
	 CAUTION	✧ Prevent any foreign items from being left in the devices during operation. Risk of device damage; ✧ Do not control start/stop of inverter by ON/OFF of contactor. Risk of device damage.
Main-tenance	 DANGER	✧ Please do not make repair and maintenance over equipment in a charged state, or it will give rise to electric shock hazard! ✧ AC drive can be put into maintenance and repair only you confirm the AC drive charge light out, or the remaining electric charge of capacitance will cause damages to people! ✧ Any people who are not trained professionally cannot make repair and maintenance, or it will cause personal injuries or equipment troubles!

1.2 Matters needing attention

1.2.1 Motor Insulation Inspection

When the motor is used for the first time or when the motor is reused after being kept, or when periodical inspection is performed, insulation inspection shall be conducted with motor so as to avoid damaging the inverter because of the insulation failure of the motor windings. The motor wires must be disconnected from the inverter during the insulation inspection. It is recommended to use the 500V mega meter, and the insulating resistance measured shall be 5MΩ at least.

1.2.2 Motor Thermal Protection

If the motor rating does not match that of the inverter, especially when the rated power of the inverter is higher than that of the motor, adjust motor protection parameters in the inverter or install thermal relay to protect motor.

1.2.3 Operating with the Frequency Higher than Grid Power Frequency

Output frequency of is 0.00Hz~600Hz. If product is required to operate above 50.00Hz, please take the endurance of mechanical devices into consideration.

1.2.4 Mechanical Vibrations

Inverter may encounter mechanical resonance point of the load device at certain output frequencies which can be avoided by setting the skip frequency parameters of the inverter.

1.2.5 Motor Heat and Noise

Since output voltage of inverter is PWM wave and contains a certain amount of harmonics, so that the temperature, noise and vibration of the motor will be higher than those when the inverter runs at grid power frequency.

1.2.6 Voltage-sensitive device or capacitor on output side of the AC drive

Do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the AC drive because the output of the AC drive is PWM wave. Otherwise, the AC drive may suffer transient overcurrent or even be damaged.

1.2.7 Contactor at the I/O terminal of the AC drive

When a contactor is installed between the input side of the AC drive and the power supply, the AC drive must not be started or stopped by switching the contactor on or off. If the AC drive has to be operated by the contactor, ensure that the time interval between switching is at least one hour since frequent charge and discharge will shorten the service life of the capacitor inside the AC drive;

When a contactor is installed between the output side of the AC drive and the motor, do not turn off the contactor when the AC drive is active. Otherwise, modules inside the AC drive may be damaged.

1.2.8 Applied with the Rated Voltage

Apply product with the rated voltage. Failure to comply will damage inverter. If required, take a transformer to boost or step-down voltage.

1.2.9 Do Not Apply a 3-Phase Input Inverter to 2-Phase Input Applications

Do not apply a 3-phase input FR inverter to 2-phase input applications. Otherwise, it will result in faults or damage inverter.

1.2.10 Lightning Protection

The product has integrated lightning over-current protection device which has certain self-protection capacity against the lightning. Additional protection devices have to be installed between inverter and power supply in the area where lightning occurs frequently.

1.2.11 Altitude De-rating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to de-rate the AC drive. Contact Our company for technical support.

1.2.12 Pay attention to the obsolescence of products

The electrolytic capacitors in the main loop and on the printed board may explode during incineration. When plastic parts are burned, they produce poisonous gases. Please dispose of it as industrial waste.

1.2.13 About adaptive motor

- The standard adaptation motor is the four-pole squirrel cage induction motor or permanent magnet synchronous motor. If it is not the motor mentioned above, please choose the product according to the rated current of the motor.
- The cooling fan of the non-variable frequency motor is coaxial connected with the rotor shaft, and the cooling effect of the fan is reduced when the speed is reduced. Therefore, in the case of overheating of the motor, a strong exhaust fan should be installed or replaced with a variable frequency motor;

- AC drives have built- in adaptive motor standard parameters. It is necessary to make motor parameter identification or amend default values to accord with actual values, or it will influence operation effects and protective values;
- As short circuit existing inside cable or motor will cause inverter alarming, enen explosion. Therefore, please make insulation short- circuit test of initial installed motor and cable first. And the test also is necessary in routine maintenance.

1.3 First use

First time users of this product should read this manual carefully. If you have any doubts about some functions and performance, please consult our technical support staff for help, which is conducive to the correct use of this product.

Due to our commitment to continuous product improvement, the information provided by the Company is subject to change without notice.

SP600 series products meet the following international standards, some products have passed CE certification.

- IEC/EN 61800-5-1:2003 Safety Requirements for Adjustable Speed electrical drive systems;
- IEC/EN 61800-3:2004 Adjustable Speed electric drive system; Part 3: Electromagnetic compatibility standards for products and their specific test methods (as described in Chapter 6.3, in accordance with the requirements of IEC/EN 61800-3 for proper installation and use).

Chapter 2

Product Information

2.1 Naming rules

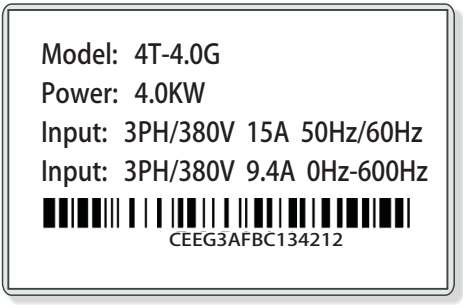
Model shown on product nameplate indicates the series name, applicable type of power supply, power class and the version of software and hardware, etc. via the combination of numbers, symbols and letters.

4 T - 1.5 G

1 2 3 4

Code	No.	Content
Voltage level	❶	2：220V 4：380V
Voltage Classification	❷	S：Single-phase T：Three phase
Adapted motor powe	❸	0.4KW~75KW
Model	❹	Heavy-duty

2.2 Nameplate



2.3 Product series

Model	Rated Output Current(A)	Maximum DC Input Current(A)	DC Input Voltage Range(V)	Recommended Solar Power (KW)	Recommended Solar Open Circuit Voltage(VOC)	Pump Power (kW)
SP600I-2S： DC input 70-450V DC, AC input single phase 220V (-15%~20%) AC； Output single phase 220VAC						
SP600I-2S-0.4B	4.2	10.6	70-450	0.6	360-430	0.4
SP600I-2S-0.7B	7.5	10.6	70-450	1.0	360-430	0.75
SP600I-2S-1.5B	10.5	10.6	70-450	2.0	360-430	1.5
SP600I-2S-2.2B	17	21.1	70-450	2.9	360-430	2.2
SP600-1S : DC input 70-450V, AC input single phase 110-220V; Output three phase 110VAC						
SP600-1S-1.5B	7.5	10.6	70-450	0.6	170-300	0.4
SP600-1S-2.2B	9.5	10.6	70-450	1.0	170-300	0.75
SP600-2S : DC input 70-450V, AC input single phase 220V (-15%~20%); Output three phase 220VAC						
SP600-2S-0.4B	2.5	10.6	70-450	0.6	360-430	0.4
SP600-2S-0.7B	4.2	10.6	70-450	1.0	360-430	0.75
SP600-2S-1.5B	7.5	10.6	70-450	2.0	360-430	1.5
SP600-2S-2.2B	9.5	10.6	70-450	2.9	360-430	2.2
4T : DC input 230-800V, AC input three phase 380V (-15%~30%); Output three phase 380VAC						
SP600-4T-0.7B	2.5	10.6	230-800	1.0	600-750	0.75
SP600-4T-1.5B	4.2	10.6	230-800	2.0	600-750	1.5
SP600-4T-2.2B	5.5	10.6	230-800	2.9	600-750	2.2
SP600-4T-4.0B	9.5	10.6	230-800	5.2	600-750	4.0
SP600-4T-5.5B	13	21.1	230-800	7.2	600-750	5.5
SP600-4T-7.5B	17	21.1	230-800	9.8	600-750	7.5
SP600-4T-011B	25	31.7	230-800	14.3	600-750	11
SP600-4T-015B	32	42.2	230-800	19.5	600-750	15
SP600-4T-018B	37	52.8	230-800	24.1	600-750	18.5

Model	Rated Output Current(A)	Maximum DC Input Current(A)	DC Input Voltage Range(V)	Recommended Solar Power (KW)	Recommended Solar Open Circuit Voltage(VOC)	Pump Power (kW)
SP600-4T-022B	45	63.4	230-800	28.6	600-750	22
SP600-4T-030B	60	95.0	230-800	39.0	600-750	30
SP600-4T-037	75	116.2	230-800	48.1	600-750	37
SP600-4T-045	91	137.2	230-800	58.5	600-750	45
SP600-4T-055	112	169.0	230-800	71.5	600-750	55
SP600-4T-075	150	232.3	230-800	97.5	600-750	75
SP600-4T-090	176	274.6	230-800	117.0	600-750	90
SP600-4T-110	210	337.9	230-800	143.0	600-750	110
SP600-4T-132	253	401.3	230-800	171.6	600-750	132
SP600-4T-160	304	485.8	230-800	208.0	600-750	160
SP600-4T-185	350	559.7	230-800	240.5	600-750	185
SP600-4T-200	377	612.5	230-800	260.0	600-750	200

Note:

- Means brake chopper is optionally inbuilt.Braking resistor needs to be mounted externally:
- Means the rated input current configured a DC reactor. The drive 4T2000B - 4T4000B is provided with an external-mounted DC reactor in shipment as default. Be sure to connect the DC reactor. Failure to comply may result in drive abnormal run.

2.4 Technical specification

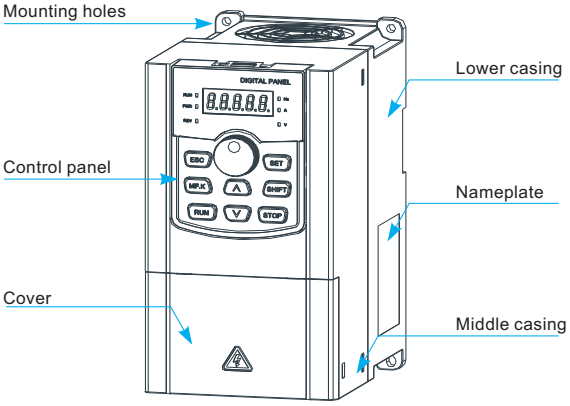
Items		Specifications
Power Input	Rated input voltage	200V Voltage class: DC-200~400V,AC single/three-phase 220V 400V voltage class: three-phase 380VAC voltage, continuous fluctuation ±10%, temporary fluctuation -15% ~ +10%
	Frequency	50Hz/60Hz, tolerance ±5%
Power output	Output voltage(V)	3-phase: 0~rated input voltage, error<±3%
	Output frequency(Hz)	0.00~600.00Hz; unit: 0.01Hz
	Overload capacity	150%-1min, 180%-10s, 200%-0.5s
Control characteristics	V/f patterns	V/F control PG free vector control (SVC)
	Range of speed regulation	1:100 (V/F control) 1:200 (SVC)
	Speed accuracy	±0.5% (V/F control) ±0.2% (SVC)
	Speed fluctuation	±0.3% (SVC)
	Torque response	<10ms (SVC)
	Starting torque	0.5Hz: 180% (V/F control, SVC) 0.25Hz: 180% (SVC)
Basic function	V/F Curve	Three ways: Linear; Multipoint type; V/F Curve of type N
	V/F Separation	Two methods: full separation and half separation
	Acceleration and deceleration curve	Linear or S-curve acceleration and deceleration mode;Four kinds of acceleration and deceleration time; The acceleration and deceleration times range from 0.0 to 6000s
	DC braking	DC braking frequency: 0.00Hz~ maximum frequency, braking time: 0.0s~30.0s, braking action current value: 0.0%~100.0%
	Point control	Point frequency range: 0.00Hz~50.00Hz; Point acceleration and deceleration time 0.0s~6000s
	Simple PLC, multi-stage speed operation	Up to 16 segment speeds are achieved through built-in PLC or control terminals
	Built-in PID	It is convenient to realize process control closed-loop control system

Items		Specifications
Basic function	Automatic voltage regulation (AVR)	When the grid voltage changes, it can automatically keep the output voltage constant
	Overvoltage over loss rate control	Automatic limit of current and voltage during operation to prevent frequent overvoltage trip
	Fast current limiting function	Minimize the overcurrent fault and protect the normal operation of products
	Torque qualification and control	Automatic torque limit during operation to prevent frequent overcurrent trip
	Input terminal	Six switching input terminals, in which X6 can be used as high-speed pulse input. Support active open collector NPN, PNP and dry contact input mode, two analog input terminals, one for voltage and current input optional, one for voltage input
	Output terminal	A high-speed pulse output terminal, 0~50kHz square wave signal output, can achieve the set frequency, output frequency and other physical output, a switching output terminal, a group of relay output terminals
		An analog output terminal, voltage and current output optional, can achieve the set frequency, output frequency and other physical quantity output
Characteristic function	All kinds of main and auxiliary set and switch, speed search, a variety of acceleration and deceleration curve selection, lock control, can support up to 16 sections of speed operation (two sections of speed support flexible frequency given way), swing frequency control operation, fixed length control, counting function, overexcitation braking, overvoltage stall, undervoltage stall, power failure and restart, jump frequency, frequency binding, four sections of acceleration and deceleration time free switching, electricity Machine temperature protection, flexible fan control, process PID control, simple PLC, sagging control, parameter identification, weak magnetic control, high precision torque limit, V/F separation control	
Protection	Short-circuit detection, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection, overload protection, etc	
Environment	Place of operation	Indoors, no direct sunlight, free from dust, corrosive gases, flammable gases, oil mist, water vapor, water drop or salt, etc.
	Altitude	0-2000m. De-rate 1% for every 100m when the altitude is above 1000 meters

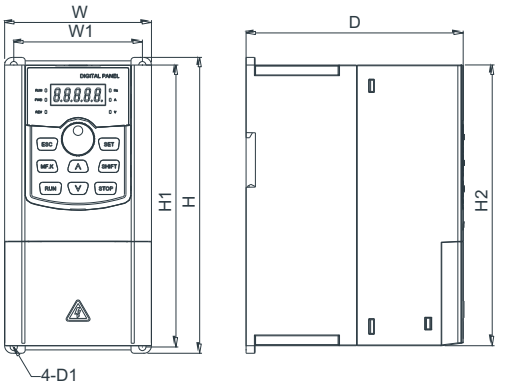
Items		Specifications
Environment	Ambient temperature	-10℃-50℃. The rated output current should be derated 1% for every 1℃ when the ambient is 50℃--60℃
	Relative humidity	5 to 95%, no condensation is allowed
	Vibration	Less than 5.9m/s^2 (0.6g)
	Storage temperature	-20℃~+60℃
Other	Installation mode	Wall mounted
	Protection class	IP20
	Cooling mode	Forced air cooling

2.5 Product outline drawing and mounting hole size

2.5.1 Schematic diagram of product appearance

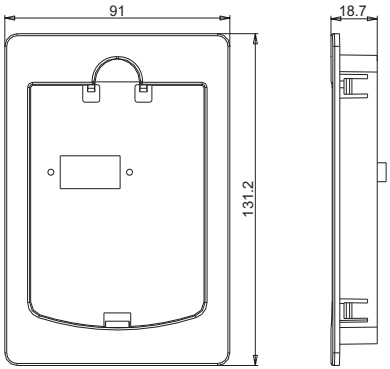


2.5.2 Appearance and Dimensions of mounting holes



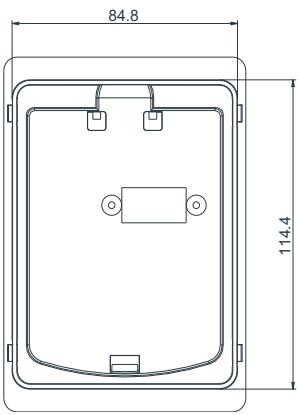
Model	External and installation dimensions (mm)						Pore size	Weight (kg)
	W1	H1	H	H2	W	D		
2S/T-0.4G	67.5	160	170	----	84.5	129	Φ4.5	1.0
2S/T-0.7G								
2S/T-1.5G								
2S/T-2.2G								
2S/T-3.7G	85	185	194	----	97	143.5	Φ5.5	1.4
4T-3.7G								
4T-5.5G								
2T-5.5G	106	233	245	----	124	171.2	Φ5.5	2.5
4T-7.5G								
4T-11G								
4T-15G	147	298	310	----	165	186.3	Φ6	4
4T-18.5G								
4T-22G								

2.5.3 External dimensions of the keyboard



External dimension of external keyboard

2.5.4 Installation hole size of external keyboard:



Installation opening size of external keyboard

2.6 Brake resistance selection guide

Model	Recommended brake resistance power	Recommended value of brake resistance	Brake unit	Remarks
4T-2S/0.4G	80W	≥200Ω	Built-in Optional or standard built-in	Add "B" after product model
4T-2S/0.7G	150W	≥150Ω		
4T-2S/1.5G	200W	≥80Ω		
4T-2S/2.2G	300W	≥50Ω		
4T-2S/3.7G	450W	≥30Ω		
4T-3.7G	100W	≥250Ω		
4T-5.5G	150W	≥220Ω		
2T-5.5G	150W	≥100Ω		
4T-7.5G	740W	≥50Ω		
4T-11G	800W	≥40Ω		
4T-15G	1000W	≥32Ω		
4T-18.5G	1300W	≥20Ω		
4T-22G	1500W	≥16Ω		

Note:

- Select the resistance value of brake resistance strictly according to the above table. Otherwise, the built-in brake unit or resistance may be damaged.

2.7 Product selection guidance

This product can provide two control modes: ordinary V/F, SVC.

When choosing the product, we must first make clear the technical requirements of the system for frequency conversion speed regulation, the application occasions of the product and the specific situation of the load characteristics, and comprehensively consider the factors such as adaptive motor, output voltage and rated output current, so as to select the models that meet the requirements and determine the operation mode.

Generally speaking: the rated load current of the motor cannot exceed the rated current of the inverter product. The capacity or output current capacity of the motor should be selected according to the specification, and the rated current of

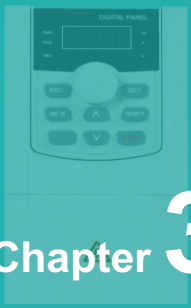
the motor and the product should be compared. The overload capacity of the product is meaningful for the starting and braking processes. Whenever there is short-term overload in the running process, the load speed will change. If the speed and accuracy requirements are relatively high, please consider amplifying a power level.

Fan and water pump type: in overload capacity requirements are low, because the load torque is proportional to the square of the speed, so the load is light at low speed operation (except Roots fan) and because this type of load has no special requirements for speed accuracy, so choose the square torque V/F.

Constant torque load: Most loads have constant torque characteristics, but the requirements of speed accuracy and dynamic performance are generally not high. For example, extruder, mixer, conveyor belt, transport tram, crane translation mechanism, etc. Multi-stage V/F operation mode can be selected during selection.

The controlled object has certain dynamic and static index requirements: This kind of load generally requires hard mechanical characteristics at low speed, so as to meet the dynamic and static index requirements of the production process for the control system. SVC control mode can be selected during selection.

The controlled object has high dynamic and static index requirements: for speed regulation accuracy and dynamic performance indicators have high requirements and high precision synchronous control occasions, the company can use other series of FVC control mode. For example, elevator, paper, plastic film processing line.



Chapter 3

Mechanical design and installation

3.1 Mechanical Installation

3.1.1 Installation environment and requirements

- Ambient temperature: The operating ambient temperature of the product is not allowed to exceed the allowable temperature range (-10℃ ~ 60℃).
- Install the product on the surface of the flame retardant object, and there should be enough space around the heat dissipation. The product is easy to produce a lot of heat when working. And screw vertically mounted on the mounting support.
- Please install in a place that is not easy to vibrate. The vibration should not be greater than 0.6G. Take special care to stay away from punches and other equipment.
- Avoid installation in direct sunlight, damp, there is water.
- Avoid places with corrosive, inflammable, explosive gas and oil, dust and metal powder in the air.

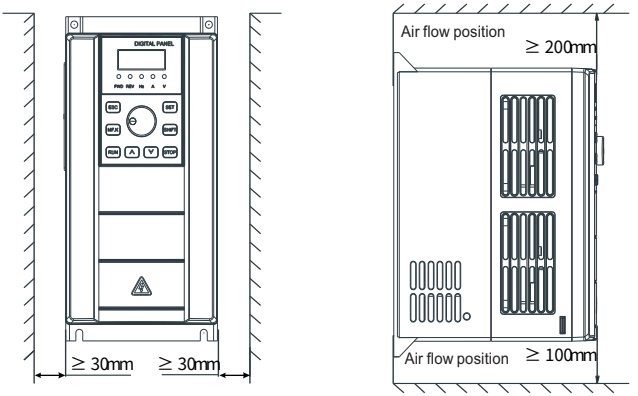


Figure 3-1 Frequency converter installation diagram

Up-and-down installation: When the product is installed up and down, please install heat insulation deflector.

Rated current class	Mounting dimension	
	Longitudinal height	Transverse width
≤32A	≥100mm	No requirement
32A~60A	≥200mm	≥50mm

3.2 Electrical Installation

3.2.1 Guide for selection of peripheral electrical components

Product model	Air switch (A)	Contactor (A)	Input side main circuit wire (mm^2)	Output side main circuit wire (mm^2)	Control circuit wire (mm^2)
2S/T-0.4G	16	10	2.5	2.5	1.0
2S/T-0.7G	16	10	2.5	2.5	1.0
2S/T-1.5G	20	16	4	2.5	1.0
2S/T-2.2G	32	20	6	4	1.0
2S/T-3.7G	10	10	2.5	2.5	1.0
4T-3.7G	16	10	2.5	2.5	1.0
4T-5.5G	16	10	2.5	2.5	1.0
2T-5.5G	25	16	4	4	1.0
4T-7.5G	32	35	4	4	1.0
4T-11G	40	32	4	4	1.0
4T-15G	63	40	6	6	1.0
4T-18.5G	80	60	8	8	1.0
4T-22G	100	60	10	10	1.0

3.2.2 External wiring

Typical wiring diagram of single-phase products is as follows:

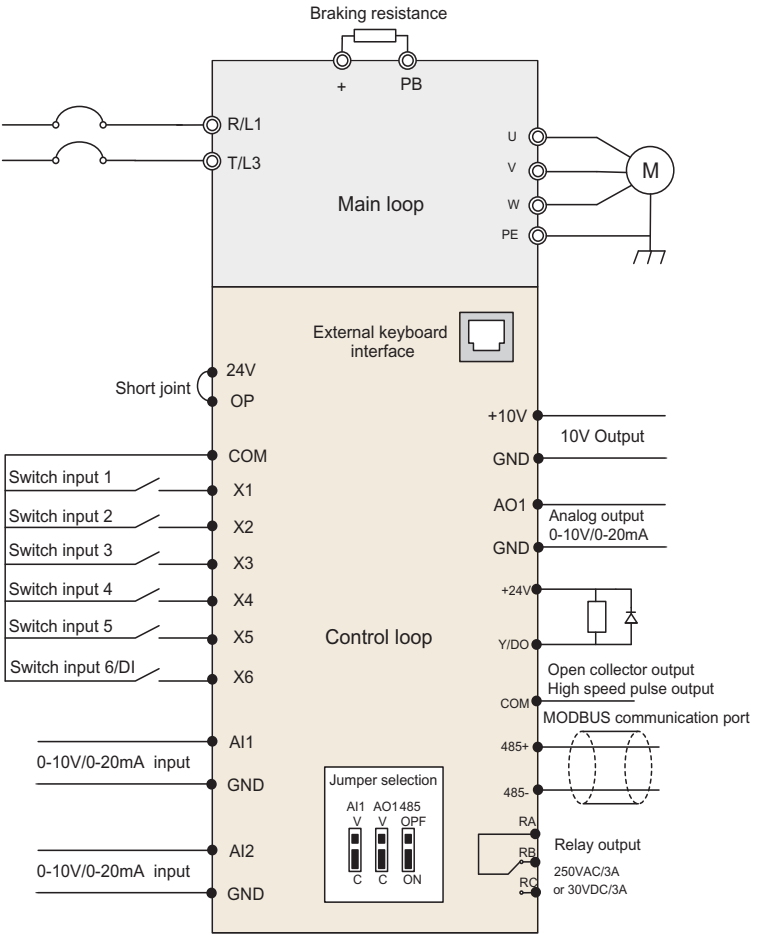


Figure 3-2 Typical cable connections of a single-phase product

Wiring diagram of three-phase product:

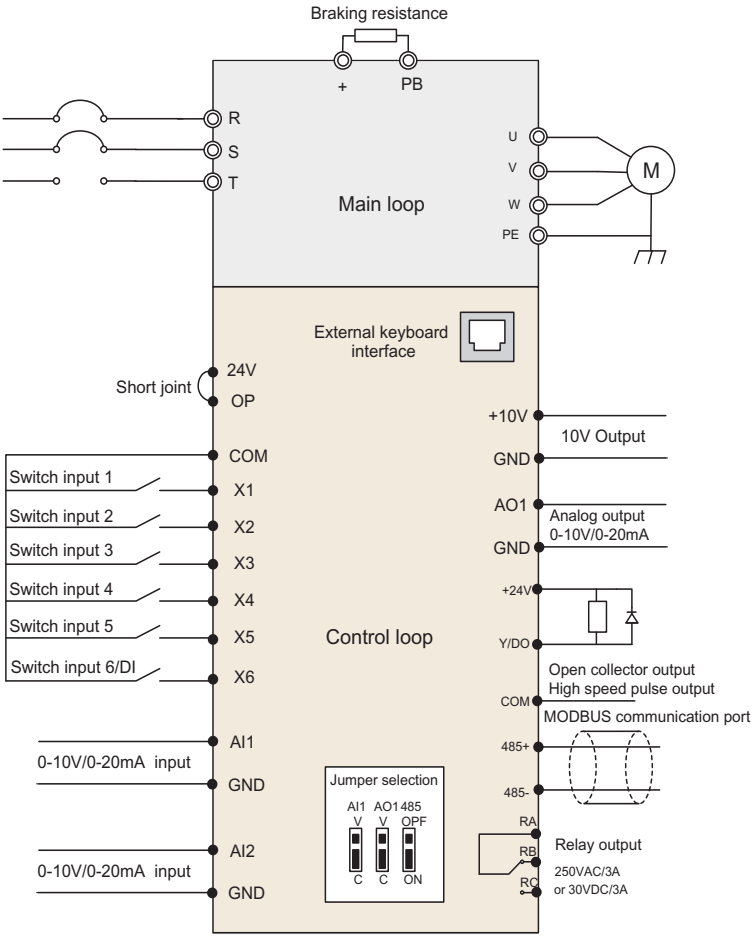


Figure 3-3 Wiring diagram of three-phase products below 4T-22G

Note:

- Terminal◎represents the main loop terminal, ●represents the control loop terminal;
- 4T-0.75G~4T-22G,2S/T-0.75G~2S/T-22G built-in brake unit optional;
- "B" on the back of the product model means it comes with a brake unit;
- Brake resistance can be selected according to user needs. See the brake resistance selection Guide for details.
- Signal cables and power cables must be routed separately. If control cables and power cables cross, they should be crossed at a 90-degree Angle as far as possible. It is best to choose shielded twisted pair for analog signal lines, and shielded three-core cables for power cables (whose specifications are one step larger than those of ordinary motors) or comply with the user manual of the product.

3.2.3 Main circuit terminal and connection

WARNING

- Ensure that the power switch is OFF before wiring operation, otherwise electric shock accident may occur!
- The wiring personnel must be professionally trained, otherwise the equipment and personal injury may be caused!
- Must be reliably grounded, otherwise there is electric shock or fire risk!

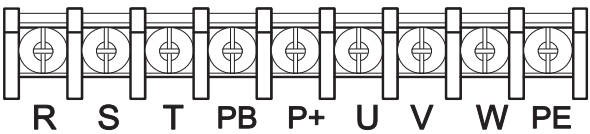
ATTENTION

- Confirm that the input power is consistent with the product rating, otherw-ise the product will be damaged!
- Make sure the motor is compatible with the product, otherwise it may dam-age the motor or cause product protection!
- It is impossible to connect the power supply to U, V, W terminals, otherw-se the product will be damaged!
- Do not connect the brake resistance directly to the DC bus bar (+), (-), otherwise it will cause fire alarm!

3.2.4 Main loop terminal description

Terminal marks	Name	Description
R/L1、S/L2、T/L3	4T/2T series power input terminals	AC input three-phase power connection point Single-phase 220V AC power connection point
P+、PB	Brake resistors are connected to terminals	Connecting brake resistance
U、V、W	Product output terminal	Connected three-phase motor
PE	Ground terminal	Ground terminal

✧ Main circuit terminal of three-phase 380V frequency converter



✧ Specification of three-phase / single-phase converter main circuit terminal 220V

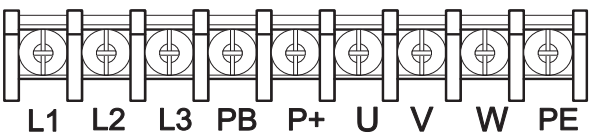


Figure 3-4 Main loop wiring diagram

3.2.5 Requirements for main loop terminal wiring

Model	Maximum connection size of the power terminal		Torque batch moment
	mm^2	AWG	kgf.cm
2S-0.4G	2.5	14	14±0.5
2S-0.7G	2.5	14	14±0.5
2S-1.5G	4	12	14±0.5
2S-2.2G	6	10	14±0.5
4T-0.75G	2.5	14	10±0.5
4T-1.5G	2.5	14	10±0.5
2T-2.2G	2.5	14	10±0.5
4T-3.7G	4	12	14±0.5
4T-5.5G	4	12	14±0.5
4T-7.5G	6	10	18±0.5
4T-11G	6	10	18±0.5
4T-15G	8	8	48±0.5
4T-18.5G	8	8	48±0.5
4T-22G	10	8	48±0.5

3.2.6 Control terminals and wiring

✧ The control loop terminal layout is shown as follows:

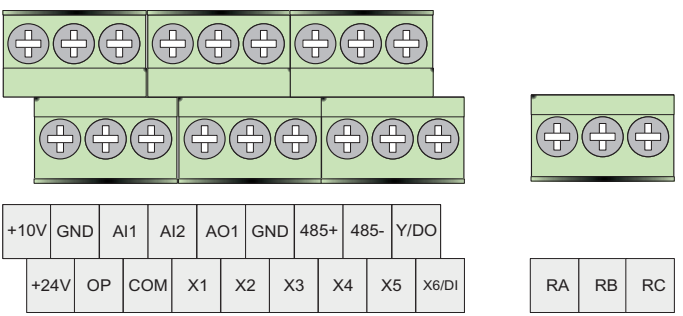


Figure 3-5 Control loop terminal layout

✧ Function description of control terminal:

Category	Terminal	Terminal designation	Description
Power supply	+10V-GND	External +10V power supply	Supply +10V power to the outside, maximum output current: 10mA Used as external potentiometer power supply, resistance range: 1kΩ~50kΩ
	+24V-GND	External +24V power supply	+24V power supply is provided externally, which is generally used as a working power supply for digital input and output terminals and an external power supply for sensors. The maximum output current is 200mA
	OP	External power input terminal	Connect to +24V or COM through the metal jumper on the control board terminal. The factory default connection is +24V When the external signal is used to drive X1 to X6, the OP must be connected to the external power supply and the short metal strip must be removed
Analog input	AI1-GND	Analog input 1	1. input voltage range: DC 0V~10V/4mA~20mA, jumper decision. 2. input impedance: 100kΩ
	AI2-GND	Analog input 2	1. Input range: DC-10V ~10V 2. input impedance: voltage input 100kΩ, current input 500Ω.
Analog output	AO1-GND	Analog output 1	The voltage or current output is determined by the AO1 jumper selection on the control panel. Output voltage range: 0V~10V Output current range: 0mA to 20mA
Digital input	X1-OP	Digital input Terminals 1	1. Optical lotus isolation, compatible with bipolar input 2. Input impedance: 4.7kΩ 3. Voltage range of level input: 9V~30V
	X2-OP	Digital input Terminals 2	
	X3-OP	Digital input Terminals 3	
	X4-OP	Digital input Terminals 4	
	X15-OP	Digital input Terminals 5	
	X6-OP	Digital input Terminals 6	In addition to the function of X1~X5, it can also be used as a high-speed pulse input channel. Maximum input frequency: 50kHz

Category	Terminal	Terminal designation	Description
Digital output	Y/DO-COM	Digital output 1 (compatible with high speed output)	Optical coupling isolation, bipolar open collector output Output voltage range: 0V~24V Output current range: 0mA~50mA Note: The digital input ground GND is internally isolated from the digital input ground COM.
Relay output	RA-RB	Normally closed terminal	Contact driving capacity: AC250V，3A； DC 30V，3A.
	RA-RC	Normally open terminal	
Terminal 485 Interface	485+	485 differential signal +	Rate: 4800/9600/19200/38400/57600/115200bps
	485−	485 differential signal -	Maximum distance - 500m (standard network cable used)
External keyboard	CN3	External keyboard interface	Maximum communication distance is 3m when connected to Control panel

✧ Control terminal screw and wiring specification:

Cable type	Cable specification (mm^2)	Screw	Moment (kgf. cm)
Shielded cable	1.0	M3	5±0.5

3.3 Instructions for Connecting cables to the control board

Instructions for use of analog input and output terminals

The analog input and output voltage signal is particularly vulnerable to external interference, so the shielded cable is generally used for transmission, and the wiring distance is as short as possible, and the shielding layer is well grounded at the inverter end, and the transmission distance is not more than 20m.

The control cable shall be kept at a distance of more than 20cm from the main circuit and the strong current line to avoid parallel placement with the strong current line. When crossing with the strong current line, it is recommended to adopt the vertical wiring mode to prevent the inverter from misoperation due to interference.

In the case that analog input and output signals are seriously disturbed, filter capacitor or ferrite core shall be installed at the analog signal source side.

Instructions for use of switching input and output terminals

The switching input and output signals are generally transmitted by shielded cables, and the wiring distance shall be as short as possible. The shielding layer shall be well grounded at one end of the inverter, and the transmission distance shall not exceed 20m as far as possible. When the active drive mode is selected, necessary filtering measures shall be taken for the crosstalk of the power supply, and dry contact control mode is usually recommended.

During wiring, the control cable should be kept at a distance of more than 20cm from the main circuit and the strong current line, and should not be placed in parallel with the strong current line. If it is impossible to avoid crossing with the strong current line, it is recommended to use the vertical wiring method to prevent the inverter from misoperation due to interference.

3.3.1 Instructions for use of switching input terminal

✧ Dry contact mode

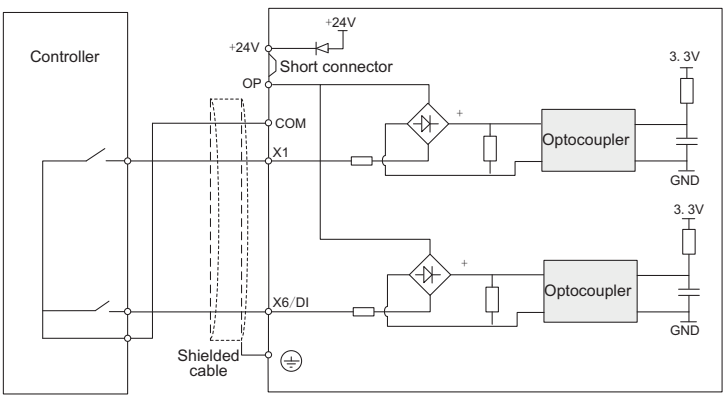


Figure 3-6 Use internal power supply dry contact mode

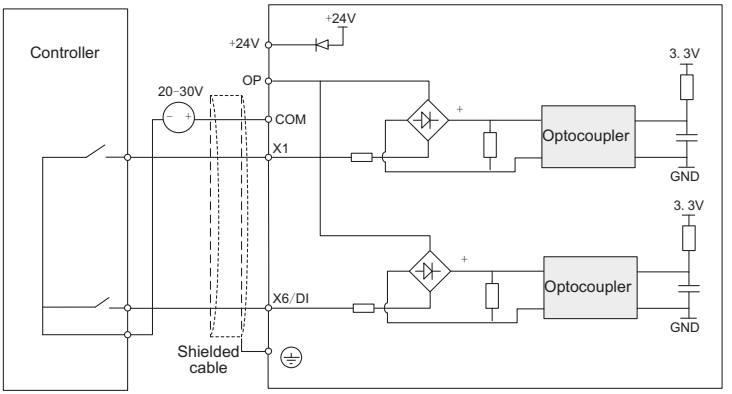


Figure 3-7 Use external power supply dry contact mode

When using external power supply, the short circuit strip between+24V and OP must be removed, otherwise the product will be damaged; The voltage range of the external power supply is DC20~30V, otherwise the normal operation cannot be guaranteed or even the product may be damaged.

✧ Open collector NPN wiring mode

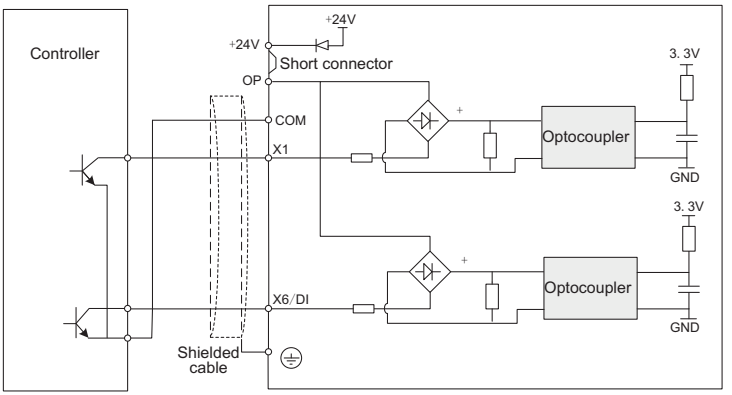


Figure 3-8 Use internal power supply open collector NPN wiring mode

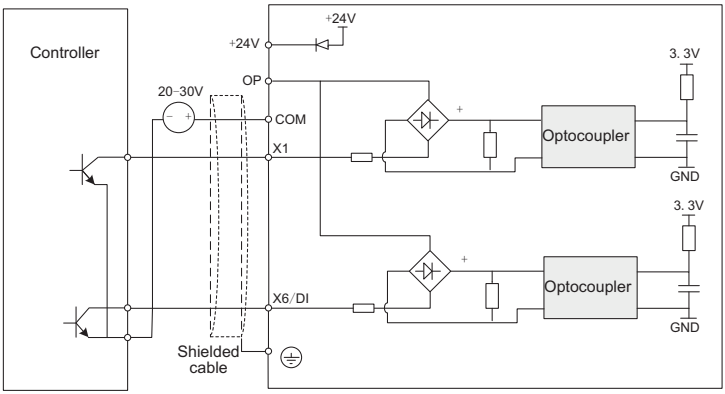


Figure 3-9 Open collector NPN wiring mode using external power supply

When using external power supply, the short circuit strip between+24V and OP must be removed, otherwise the product will be damaged; The voltage range of the external power supply is DC20~30V, otherwise the normal operation cannot be guaranteed or even the product may be damaged.

✧ Open collector PNP wiring mode

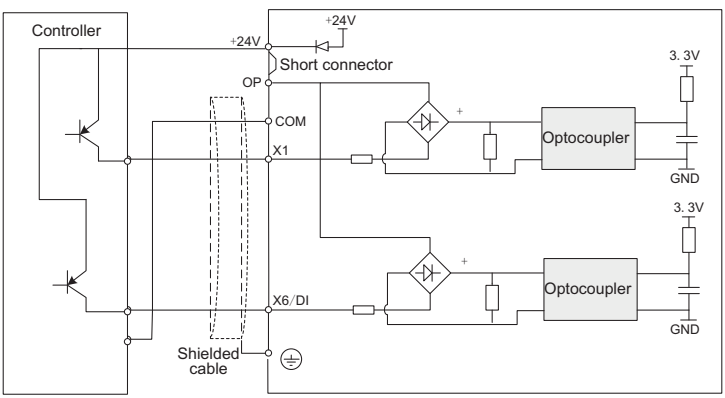


Figure 3-10 Open collector PNP wiring mode using internal power supply

When PNP wiring mode is used, the short circuit strip between+24V and OP must be removed and connected to OP and COM, otherwise it cannot work normally.

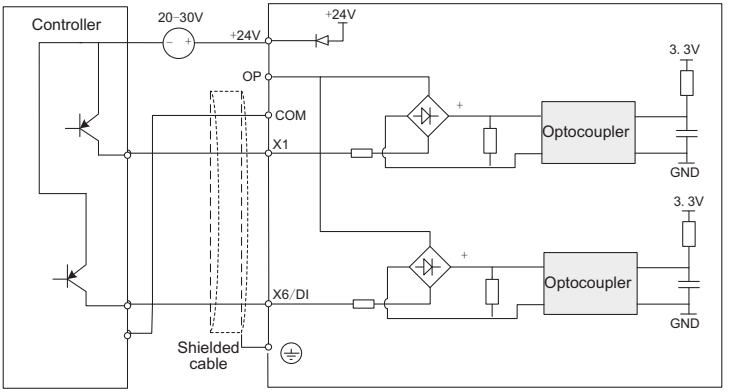
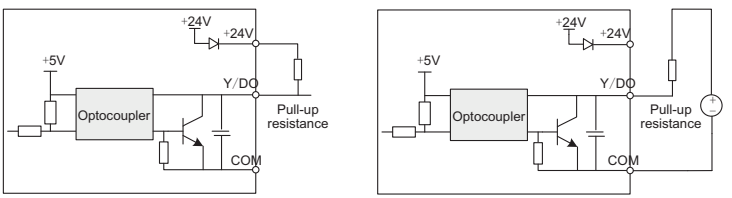


Figure 3-11 Open collector PNP wiring mode using external power supply

When using external power supply, the short circuit strip between+24V and OP must be removed, otherwise the product will be damaged; The voltage range of the external power supply is DC20~30V, otherwise the normal operation cannot be guaranteed or even the product may be damaged.

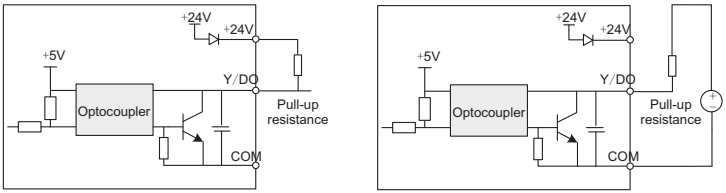
3.3.2 Operating instructions for switching output terminal



a) Use internal power supply

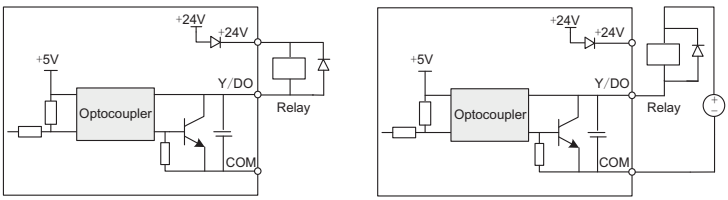
b) Use external power supply

Figure 3-12 Wiring mode when Y/DO terminal is connected to pull-up resistor output



a) Use internal power supply b) Use external power supply

Figure 3-12 Wiring mode when Y/DO terminal is connected to pull-up resistor output



a) Use internal power supply b) Use external power supply

Figure 3-13 Wiring mode when Y/DO terminal drives relay

- When the coil voltage of the relay is lower than 24V, a resistance shall be added between the relay and the output terminal according to the coil impedance to divide the voltage.
- Inverter control board has a set of programmable relay dry contact output.
- The relay contacts are RA/RB/RC, where RA and RB are normally closed and RA and RC are normally open. See the function code for its function definition.
- If inductive load (such as electromagnetic relay or contactor) is driven, surge voltage absorption circuit shall be added, such as RC absorption circuit (pay attention to its leakage current shall be less than the holding current of the controlled contactor or relay), varistor or freewheeling diode, etc. (for DC electromagnetic circuit, pay attention to polarity during installation). The absorption circuit elements shall be installed at both ends of the coil of the relay or contactor nearby.

3.3.2 Function description of signal switching jumper switch

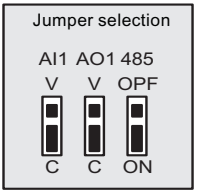


Figure 3-14 Signal switching jumper switch diagram

Name	Function	Factory setting
485	485 terminal resistance selection: ON means 100 Ω terminal resistance, OFF means no terminal resistance	OFF: No resistance
AI1	AI1 analog quantity type selection: I is current input (0~20mA), V is voltage input (0~10V)	V：0~10V
AO1	AO1 analog quantity type selection: I is current output (0~20mA), V is voltage output (0~10V)	V：0~10V

3.4 EMC Problems in Cable Distribution.

The working principle of the inverter determines that it will produce certain noise, which will affect and interfere with other equipment; At the same time, the weak current signal inside the inverter is also vulnerable to the interference of the inverter itself and other equipment. In order to reduce or eliminate the interference of the inverter to the outside world and the interference of the inverter to the outside world, this section will briefly describe the noise suppression, grounding treatment, leakage current suppression, and power filter application.

3.4.1 Noise suppression measures

When the peripheral equipment and the inverter share the power supply of the same system, the noise generated by the inverter will spread through the power line to other equipment in the same system and cause misoperation. At this time, the following measures can be taken:

❶ Add input noise filter at the input end of the inverter;

❷ Add a power filter at the power input end of the affected equipment;

❸ Isolate the noise transmission path between other equipment and inverter with isolation transformer.

The wiring between the peripheral equipment and the inverter forms a loop, which will cause the equipment to misoperate. At this time, if the grounding of the equipment is disconnected, misoperation will be reduced.

❶ The easily affected equipment and signal line shall be installed as far away from the inverter as possible.

❷ The signal line shall be shielded cable and the shield layer shall be reliably grounded. The signal line cable can also be sleeved into the metal tube. The distance between the metal tubes shall be at least 20cm. The distance between the metal tubes shall be as far as possible from the inverter and its peripheral devices and cables. The signal line and power line shall not be routed in parallel or bundled with the power line. When the signal line must pass through the power cable, it shall keep orthogonal crossing.

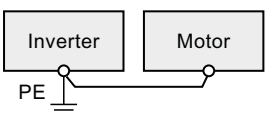
❸ The motor cable should be placed in a thick barrier, such as a pipe with a thickness of more than 2mm or buried in a cement trough, or the power line can be placed in a metal pipe and grounded with a shielded cable.

❹ Four-core motor cables are used, one of which is grounded at the near end of the inverter and the other is connected to the motor shell.

❺ Radio noise filter and linear noise filter, such as ferrite common-mode choke, are installed at the input and output ends of the inverter to suppress the radiated noise of the power line.

3.4.2 Grounding treatment

Special grounding is recommended as shown in the figure below:



❶ The maximum standard size of grounding cable should be used as far as possible to reduce the impedance of the grounding system;

❷ The grounding wire should be as short as possible; The ground point is as close to the inverter as possible

❸ One line of the four-core motor cable should be grounded on the inverter side, and the other side should be connected with the motor grounding terminal. If the motor and the inverter have a special grounding pole, the effect is better;

❹ When the ground terminal of each part of the system is connected together, the leakage current becomes a noise source, which will affect other equipment in the system. Therefore, the ground terminal of the inverter and other easily interfered equipment need to be separated;

❺ The ground cables should be far away from the input and output wiring of noise-sensitive devices.

3.4.3 Leakage current suppression

The leakage current flows through the interline and ground distributed capacitors on the input and output sides of the inverter, and its size is related to the capacity of the distributed capacitor and the carrier frequency. The leakage current is divided into two kinds: ground leakage current and interline leakage current.

❶ The floor drain current is not only circulating in the inverter system, but may affect other equipment because of the ground loop. These leakage currents may make the leakage protector and other equipment misoperate. The higher the inverter carrier frequency, the greater the drain current; The longer the motor cable, the larger the parasitic capacitance, the greater the current to the floor drain. Therefore, reducing the carrier frequency and choosing as short as possible motor cable is the most direct and effective way to suppress the floor drain current.

❷ Through the inverter output side of the cable leakage current, the high harmonic will accelerate the aging of the cable, may also make other equipment wrong action. The higher the inverter carrier frequency, the greater the leakage current between lines; The longer the motor cable, the larger the parasitic capacitance, the larger the leakage current between the lines. Therefore, reducing the carrier frequency and choosing as short as possible motor cable

is the most direct and effective way to suppress the floor drain current.
Increasing the output reactor can also effectively inhibit the leakage current between lines.

3.4.4 The use of power filters

Inverter is capable of producing strong interference and sensitive to external interference equipment, recommended to use power filter. Note the following points when using:

❶ The filter body shell should be grounded reliably;

❷ The input and output lines of the filter should be far away from each other to avoid coupling;

❸ The filter as far as possible by the inverter end, and the filter and the inverter must be connected to the same public ground.

Chapter 4

Operation and display Interface

4.1 Introduction to Operation and Display Interface

The operation panel can be used to modify the function parameters of the product, monitor the working status of the product and control the operation of the product (start and stop). The appearance and function area are shown in the following figure:

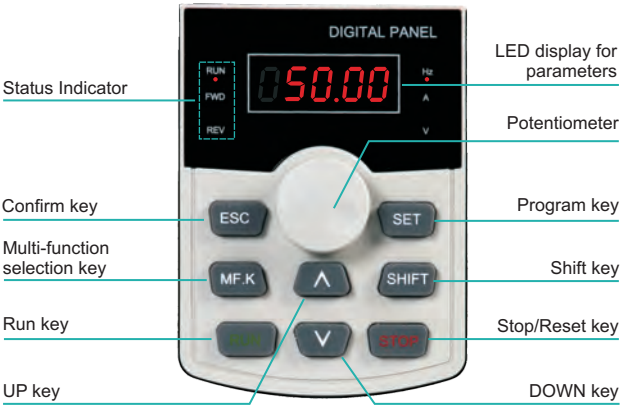


Figure 4-1 Schematic diagram of operation panel

4.1.1 Introduction to Indicators

Name	Function Description					
Status indicator	FWD/ REV	When the machine is stopped, when the Fwd lamp is on, it indicates that the product forward rotation command is valid; when the machine is running, it indicates that the product is running in the forward rotation state; when Fwd flashes, it shows that the product is switching from the forward rotation state to the reverse rotation state. When the machine is stopped, the rev lamp is on, indicating that the reverse rotation command of the product is valid, or the reverse operation state. When the rev lamp flashes, indicating that the product is switching from the reverse rotation state to the forward rotation state.				
Unit indicator	Hz	Frequency unit	A	Current unit	V	Voltage unit
	RMP	(Hz +A) units	%	(A + V) percent		
Digital display	5-digit led display, which can display the set frequency, output frequency, various monitoring data and alarm code, etc.					

4.1.2 LED Display

The five-digit LED data display can show the frequency reference, output frequency, monitoring information,and fault code.

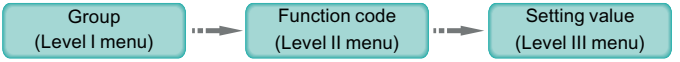
LED display	Indication	LED display	Indication	LED display	Indication
	0		1		2
	3		4		5,S
	6		7		8
	9		A		B
	C		c		D
	E		F		L
	N		P		D
	T		U		u

4.1.3 Keys on LED Operating Panel

Key	Key Name	Function
ESC	Programming key	Level 1 Menu Entry or Exit
SET	Confirm key	Enter the menu screen step by step, and confirm the parameter settings
∧	Incremental Key	Increment of data or function code
∨	Decreasing key	Decrement of data or function code
SHIFT	Shift key	Under the shutdown display interface and the operation display interface, the display parameters can be cyclically selected;When modifying a parameter, you can select the modification bit of the parameter
RUN	Run Key	In the keyboard mode of operation, used to run the operation
STOP	Stop/Reset	In running status, press this key to stop running operation;In fault alarm state, it can be used for reset operation, and the characteristics of this key are governed by function code P7-16.
MK.F	Multifunction selection key	Select function switch according to P7-00

4.2 Introduction to Operation and Display Interface

The drive operating panel has three levels of menu:



After entering each level of menu, you can press , ∧ , ∨ or SHIFT to modify the flashing value.

Operation procedure is shown in Figure 4-2.

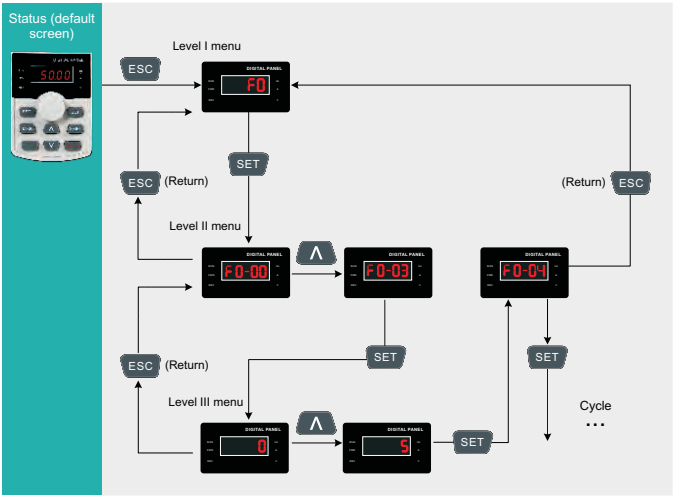


Figure 4-2 Operation procedure of the three levels of menu

The following example shows how to modify P3-02 from 10.00 Hz to 15.00 Hz.

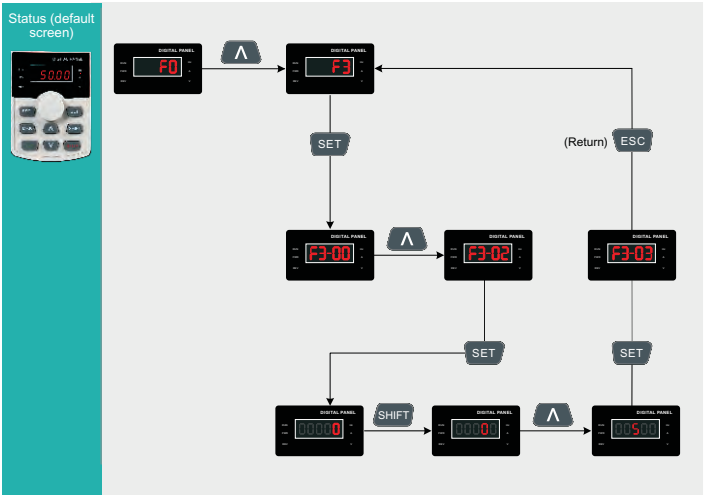


Figure 4-3 How to modify the parameter value

❶ Press SET or ESC from a Level III menu to return to a Level II menu. The difference between the two keys is: ESC is used to save the parameter value you have set, return to Level II menu and then select the next function parameter. SET is used to return to Level II menu without saving the parameter value and remain at the current parameter.

❷ (When operating in Level III menus, if the parameter does not include a flashing digit, then it is not possible to modify that parameter. There are two possible reasons for this:

- The function parameter you have selected is read-only. This is because the display is showing the AC drive model; the display is showing an actual parameter detected by the system; or the display is showing a running record parameter.
- The displayed function parameter cannot be modified while the AC drive is in the RUNNING status. You can modify these types of parameter only when the AC drive is in the STOP status.

Chapter 5

Parameter table

5.1 Function code group overview

Classification	Function code group
Group F: operation parameter setting	F00: Basic function group
	F01: Motor parameter group
	F02: Motor vector control parameters
	F03: Motor V/F control parameters
	F04: Start and stop control
	F05: Digital input terminal
	F06: Digital output terminal
	F07: Analog quantity and pulse input
	F08: Analog quantity and pulse output
	F09: Virtual IO
	F10: Fault and protection function
	F11: Process PID
	F12: Multi-segment speed and simple PLC
	F13: Auxiliary function group
	F14: Communication parameters
	F15: LED keyboard display and operation
Group U: monitoring	U0: Status monitoring
	U1: Fault record

Change property description:

"△": the parameters can be changed when they are in the running and shutdown state and not locked by the keyboard and parameters;

"×": the parameters can be changed in the shutdown state without being locked by the keyboard and parameters, and the operating state cannot be changed;

"◎": monitoring parameters, which cannot be changed.

5.2 Brief table of function parameters

Par.	Designation	Scope	Default	Attr
Group F00: basic function group				
F00.00	Speed control mode	0:VF 1:SVC 2: With FG vector control	0	△
F00.01	Run command selection	0: Operation panel 1: Terminal 2: Communication	0	△
F00.02	Main frequency command input selection	0: Digital setting 1: VP (operation keyboard potentiometer) 2:AI1 3:AI2 4: AI3 (reserved) 5: FULSE pulse setting 6: Multi-segment instruction 7: Simple FLC 8:PID 9: Communication given	0	△
F00.03	Auxiliary frequency command input selection	0: Digital setting 1: VP (operation keyboard potentiometer) 2:AI1 3:AI2 4: AI3 (reserved) 5: FULSE pulse setting 6: Multi-segment instruction 7: Simple FLC 8:PID 9: Communication given	0	△
F00.04	Auxiliary frequency command range selection during stacking	0: Relative to the maximum frequency 1: Relative to main frequency command	0	◎
F00.05	Auxiliary frequency source given coefficient	0.0 ~ 150.0%	100.0%	△

Par.	Designation	Scope	Default	Attr
F00.06	Frequency source superposition selection	0: The given main frequency source is valid 1: The auxiliary frequency source is valid 2: Primary+secondary 3: Primary - secondary 4: Maximum of both 5: two-value minimum	0	△
F00.07	Digital frequency setting	0.00~Fmax	50.00Hz	◎
F00.08	Running direction	0: Same direction 1: opposite direction	0	◎
F00.09	Acceleration time 1	0.00~600.00s	Model dependent	◎
F00.10	Deceleration time 1	0.00~600.00s	Model dependent	◎
F00.11	Maximum frequency (Fmax)	10.00 ~ 600.00Hz	50.00Hz	△
F00.12	Upper limit frequency (Fup)	Fdown ~ Fmax	50.00Hz	◎
F00.13	Lower frequency (Fdown)	0.00 ~ Fup	0.00Hz	◎
F00.14	The frequency setting is lower than the lower limit frequency control	0: Run at lower frequency 1: Operate at 0 speed after the lower frequency operation time reaches	0	△
F00.15	Lower frequency operation time	0.0 ~ 6000.0s	60.0s	△
F00.16	Carrier frequency	0.500kHz ~ 16.000kHz	Model dependent	◎
F00.17	Carrier frequency is adjusted with frequency	0: No 1: Yes	0	△
F00.18	Automatic voltage stabilization AVR	0: Invalid 1: Always valid	1	△
F00.19	Overmodulation coefficient	1.00 to 1.09	1.05	◎
F00.20	Reserve	----		
F00.21	Reserve	----		
F00.22	Fan control	0: Runs when the power is on 1: Intelligent mode	1	△

Par.	Designation	Scope	Default	Attr
F00.23	PWM modulation mode	0: Seven-segment formula 1: Five-stage form	0	△
F00.24	Manufacturer's password	0 to 65535	0	△
F00.25	Rated power of the inverter	0.2 to 1000.0kW	Model dependent	×
F00.26	Rated voltage of the inverter	60 to 660V	Model dependent	×
F00.27	Rated inverter current	0.1 to 1500.0A	Model dependent	×
F00.28	Software version	0.00 to 655.35	Model dependent	×
F00.29	Factory value control	0: invalid 1: Restore factory value (including motor parameters) 2: Restore factory value (excluding motor parameters) 3: backs up user parameters 4: Restore user backup parameters 5: Clear fault records 6: Power consumption is cleared	0	△
Group F01 Motor Parameters				
F01.00	Motor type selection	0: three-phase asynchronous motor 1: Permanent magnet synchronous motor 2: Single-phase asynchronous motor (capacitor removal) 3: Single-phase asynchronous motor (without removing capacitor)	0	△
F01.01	Rated power of motor	0.1~1000.0kW	Model dependent	△
F01.02	Rated voltage of motor	60~660V	Model dependent	△
F01.03	Motor rated current	0.1~1500.0A	Model dependent	△
F01.04	Rated frequency of motor	20.00~Fmax	Model dependent	△
F01.05	Rated speed of motor	1~30000	Model dependent	△
F01.06	Asynchronous motor stator resistance Rs	0.001 ~ 65.535Ω	Model dependent	△

Par.	Designation	Scope	Default	Attr
F01.07	Asynchronous motor rotor resistance Rr	0.001 ~ 65.535Ω	Model dependent	△
F01.08	Leakage inductance of asynchronous motor	0.01 ~ 655.35mH	Model dependent	△
F01.09	Mutual inductance of asynchronous motor	0.1 ~ 6553.5mH	Model dependent	△
F01.10	No-load current of asynchronous motor	0.01 ~ 150.00A	Model dependent	△
F01.11	Stator resistance of synchronous motor	0.001 ~ 65.535Ω	Model dependent	△
F01.12	Direct axis inductance of synchronous motor	0.01 ~ 655.35mH	Model dependent	△
F01.13	Quadrature axis inductance of synchronous motor	0.01 ~ 655.35mH	Model dependent	△
F01.14	Back electromotive force of synchronous motor	0 ~ 65535V	Model dependent	◎
F01.15	Synchronous machine open-loop control to find the initial angle	0: Don't look 1: Find	0	△
F01.16	Number of motor poles	0~1000	4	×
F01.28	Self-identification of parameters	0: Don't recognize 1: Motor static self-identification 2: Self-identification of motor rotation	0	△
Group F02 Motor vector control parameters				
F02.00	ASR low speed proportional gain KP1	0.0 ~ 100.0	30.0	◎
F02.01	ASR low speed integration time Ti1	0.01 ~ 30.00s	0.10s	◎
F02.02	Switching frequency 1	0.00 ~ F10.06	5.00Hz	◎
F02.03	ASR high-speed proportional gain KP2	0.0 ~ 100.0	20.0	◎
F02.04	ASR high-speed integration time Ti2	0.01 ~ 30.00s	0.50s	◎
F02.05	Switching frequency 2	F10.03 ~ upper limit frequency	10.00Hz	◎
F02.06	Vector control slip gain	50.0 ~ 200.0%	100.0%	◎

Par.	Designation	Scope	Default	Attr
F02.07	ASR filter time	0.0 ~ 500.0ms	3.0ms	◎
F02.08	Excitation gain coefficient	50.0 ~ 200.0%	100.0%	◎
F02.09	Torque upper limit under speed control mode	80.0 ~ 200.0%	165.0%	◎
F02.10	ACR excitation regulation proportional gain KP1	0.00 ~ 10.00	0.50	◎
F02.11	ACR excitation regulation integral time Ti1	0.0~3000.0ms 0.0: no integral	10.0ms	◎
F02.12	ACR torque regulation proportional gain KP2	0.00 ~ 10.00	0.50	◎
F02.13	ACR torque regulation integral time Ti2	0.0~3000.0ms 0.0: no integral	10.0ms	◎
F02.14	Speed/torque control selection	0: Speed control 1: Torque control	0	◎
F02.15	Torque setting source selection under torque control mode	0: Digital setting 1: VP keyboard potentiometer 2:AI1 3:AI2 4: Reserved 5: High-speed pulse input (DI6) 6: Communication given	0	△
F02.16	Torque digital setting	-200.0 ~ 200.0%	50.0%	◎
F02.17	Torque control maximum frequency setting source selection	0: Digital setting 1: VP keyboard potentiometer 2:AI1 3:AI2 4: Reserved 5: High-speed pulse input (DI6)	0	△
F02.18	Torque control forward maximum frequency	0.00~maximum frequency	50.00Hz	◎
F02.19	Torque control reverse maximum frequency	0.00~maximum frequency	50.00Hz	◎
F02.20	Torque control acceleration time	0.0 ~ 6000.0s	0.00s	◎
F02.21	Torque control deceleration time	0.0 ~ 6000.0s	0.00s	◎

Par.	Designation	Scope	Default	Attr
F02.22	Static friction moment compensation coefficient	0.0 ~ 100.0%	5.00%	◎
F02.23	Static friction compensation frequency range	0.00 ~ 50.00Hz	5.00Hz	◎
F02.24	Open loop torque static frequency	1.00 ~ 10.00Hz	1.00Hz	◎
F02.25	Field weakening control of synchronous motor	0: Invalid 1: Valid	1	△
F02.26	Magnetic weakening ratio of synchronous motor KP	0.0 ~ 500.0%	50.0%	◎
F02.27	Integral time of weak magnetic field of synchronous motor Ti	0.00 ~ 60.00s	0.50s	◎
F02.28	Field weakening limit of synchronous motor	0.0 ~ 200.0%	100.0%	◎
F02.29	Filtering coefficient of synchronous motor speed estimation	0.0001 ~ 2.0000	0.1000	◎
F02.30	Synchronous motor phase-locked loop ratio	0.00 ~ 10.00	2.00	◎
F02.31	Synchronous motor phase-locked loop integral time	0.1 ~ 1000.0ms	20.0ms	◎
F02.32	Starting excitation current of synchronous motor	0.0 ~ 150.0%	30.0%	△
F02.33	Synchronous motor excitation current frequency low point	0.0 ~ F10.34	10.00Hz	◎
F02.34	Excitation current frequency high point of synchronous motor	F10.33 ~ 600.00Hz	15.00Hz	◎
F02.35	Synchronous motor excitation current conversion delay	0.0 ~ 10.0s	1.0s	◎
Group F03 Motor V/F control parameters				
F03.00	Motor VF curve setting	0: Straight V/F 1: Multi-point V/F 2:1.2 power V/F 3:1.4 power V/F 4:1.6 power V/F 5:1.8 power V/F 6: square V/F 7: VF fully separated mode 8: VF semi-split mode	0	△

Par.	Designation	Scope	Default	Attr
F03.01	Motor torque increase	0.0 ~ 30.0% 0.0%: automatic torque increase	0.0%	◎
F03.02	Cut-off frequency of motor torque increase	0.00~maximum frequency	50.00Hz	◎
F03.03	Motor multipoint V/F frequency point 1	0.00 ~ F03.05	0.00Hz	◎
F03.04	Motor multipoint VF voltage point 1	0.0 ~ 100.0	0.0%	◎
F03.05	Motor multipoint V/F frequency point 2	F03.03 ~ F03.05	5.00Hz	◎
F03.06	Motor multipoint VF voltage point 2	0.0 ~ 100.0	14.0%	◎
F03.07	Motor multipoint V/F frequency point 3	F03.05 ~ F03.09	25.00Hz	◎
F03.08	Motor multipoint VF voltage point 3	0.0 ~ 100.0	50.0%	◎
F03.09	Motor multipoint V/F frequency point 4	F03.07~rated frequency of motor	50.00Hz	◎
F03.10	Motor multipoint VF voltage point 4	0.0 ~ 100.0 Ue=100.0%	100.0%	◎
F03.11	VF slip compensation gain	0.0 ~ 300.0%	0.0%	◎
F03.12	VF stator voltage drop compensation gain	0.0 ~ 200.0%	0.0%	◎
F03.13	VF excitation compensation gain	0.0 ~ 200.0%	100.0%	◎
F03.14	VF oscillation suppression gain	0.0 ~ 300.0%	100.0%	◎
F03.15	VF separation mode voltage setting selection	0: Digital setting (F03.16) 1: VP keyboard potentiometer 2:AI1 3:AI2 4: Reserved 5: FULSE pulse setting (Di6) 6: Multi-segment instruction 7:PID Note: 100.0% corresponds to the rated voltage of the motor	0	△

Par.	Designation	Scope	Default	Attr
F03.16	Voltage digital setting of VF separation	0.0~100.0 (100% corresponding to the rated voltage of the motor)	0.0%	△
F03.17	Voltage rise time of VF separation	0.0 ~ 6000.0s Note: indicates the time from 0V to the rated voltage of the motor	0.0s	△
F03.18	IQ filtering time below 0.5 Hz for VVF	F03.19 ~ 3000ms	500ms	△
F03.19	IQ filtering time above VVF 2Hz	1ms ~ F09.18	100ms	△
F03.20	FMSM acceleration current compensation setpoint	0.0 ~ 200.0%	0.0%	◎
F03.21	Compensation current drop time after FMSM acceleration	0.0 ~ 100.0s	2.0s	◎
F03.22	Maintain ID current value after FMSM acceleration	0.0 ~ 200.0%	0.0%	◎
Group F04 Start and stop control				
F04.00	Start mode	0: Direct start 1: Speed tracking restart	0	△
F04.01	Speed tracking mode	Bit: tracking start frequency selection 0: Start tracking from zero speed 1: Track from the maximum frequency Ten digits: speed tracking direction 0: Last parking direction 1: Forward 2: Reverse 3: Start direction	30	△
F04.02	Speed tracking current	0.0 ~ 180.0%	100.0%	◎
F04.03	Speed tracking deceleration time	0.0 ~ 10.0s	2.0s	△
F04.04	Speed tracking proportional coefficient	0.01 ~ 5.00	0.30	◎
F04.05	Start frequency	0.00 ~ 50.00Hz	0.00Hz	△
F04.06	Start frequency holding time	0.0 ~ 100.0s	0.0s	△

Par.	Designation	Scope	Default	Attr
F04.07	Starting DC braking current/pre-excitation current	0.0 ~ 150.0%	0.0%	△
F04.08	Start DC braking time/pre-excitation time	0.0 ~ 100.0s	0.0s	△
F04.09	Parking mode selection	0: Slow down and stop 1: Free parking	0	△
F04.10	DC braking waiting time of shutdown	0.0 ~ 30.0s	0.0s	△
F04.11	Starting frequency of DC braking during shutdown	0.01 ~ 50.00Hz	2.00Hz	△
F04.12	Shutdown DC braking current	0.0 ~ 150.0%	0.0%	△
F04.13	Shutdown DC braking time	0.0 ~ 120.0s	0.0s	△
F04.14	Energy consumption braking control	0: Invalid 1: Valid at runtime 2: Always valid 3: Valid when decelerating	1	△
F04.15	Energy consumption braking voltage	480~800V (380V inverter) 280~400V (220V inverter)	700V 350V	△
F04.16	Brake utilization rate	5.0~100.0%	100.0%	△
F04.17	Forward/reverse control selection	0: Allow forward/reverse 1: Reverse prohibited	0	△
F04.18	Forward/reverse dead time	0.0~6000.0s	0.0s	△
F04.19	Power failure restart selection	0: Invalid 1: Valid	0	◎
F04.20	Wait time for restart after power failure	0.0~10.0s	2.0s	◎
F04.21	0Hz output selection	0: No voltage output 1: With voltage output	0	△
F04.22	Jog priority function	0: Jog does not have priority 1: Jog priority	0	△
F04.23	Jog frequency setting	0.00~Fmax	5.00Hz	◎
F04.24	Jog acceleration time	0.00~600.00s	15.00s	◎
F04.25	Jog deceleration time	0.00~600.00s	15.00s	◎
F04.26	Acceleration and deceleration time unit	0:0.1s 1:0.01s	1	△

Par.	Designation	Scope	Default	Attr
F04.27	Acceleration time 2	0.00~600.00s	15.00s	◎
F04.28	Deceleration time 2	0.00~600.00s	15.00s	◎
F04.29	Acceleration time 3	0.00~600.00s	15.00s	◎
F04.30	Deceleration time 3	0.00~600.00s	15.00s	◎
F04.31	Acceleration time 4	0.00~600.00s	15.00s	◎
F04.32	Deceleration time 4	0.00~600.00s	15.00s	◎
F04.33	Switching frequency points between acceleration time 0 and acceleration time 1	0.00 ~ Fmax	0.00Hz	△
F04.34	Switching frequency point between deceleration time 0 and deceleration time 1	0.00 ~ Fmax	0.00Hz	△
F04.35	Acceleration and deceleration mode	0: Linear mode 1: S curve mode	0	△
F04.36	Start period time of S-curve acceleration	0.00~600.00s	0.00s	△
F04.37	S curve acceleration end time	0.00~600.00s	0.00s	△
F04.38	Start period time of S-curve deceleration	0.00~600.00s	0.00s	△
F04.39	S curve acceleration end time	0.00~600.00s	0.00s	△
Group F05 Digital input terminal				
F05.00	Mode selection	Bit: XI6/HI input mode 0: Switching value input (DI6) 1: High speed pulse input (HI) Ten digits: AI1 mode selection 0: Analog input 1: Switching value input Hundreds: AI2 mode selection 0: Analog input 1: Switching value input	0000	△
F05.01	Terminal XI1 function selection	0: No function 1: Forward running (FWD) 2: Reverse operation (REV) 3: Three-wire operation control 4: Forward jog (FJOG) 5: Reverse jog (RJOG)	1	◎
F05.02	Terminal XI2 function selection		2	◎

Par.	Designation	Scope	Default	Attr
F05.03	Terminal XI3 function selection	8: UP/DOWN setting reset 9: Free parking 10: Inverter fault reset 11: Operation suspension 12: External fault input 13: Multi-segment command terminal 1 14: Multi-segment command terminal 2 15: Multi-segment command terminal 3 16: Multi-segment command terminal 4 17: Acceleration and deceleration time selection terminal 1 18: Acceleration and deceleration time selection terminal 2 19: Acceleration and deceleration prohibited 20: The given frequency is switched to the auxiliary source frequency 21: FLC status reset 22: FLC suspended 23: PID pause 24: The action direction of PID is reversed 25: PID integral suspended 26: PID parameter switching 27: Swing frequency pause (stop at the current frequency) 28: Swing frequency reset (return to center frequency) 29: Start/stop command is switched to the operation panel 30: Start/stop command is switched to terminal control 31: Start/stop command is switched to communication control 32: Counter input 33: count reset 34: Length pulse input 35: length reset 36: Parking DC brake input command 37: Speed/torque control switching 38: Reverse prohibited 39: No forward rotation	10	◎
F05.04	Terminal XI4 function selection		13	◎
F05.05	Terminal XI5 function selection		0	◎
F05.06	Terminal XI6 function selection		0	◎
F05.09	Terminal AI1 function selection		0	◎
F05.10	Terminal AI2 function selection		0	◎
F05.11	Terminal AI3 function selection (reserved)		0	◎

Par.	Designation	Scope	Default	Attr
F05.12	Terminal DI filter time	0.000 ~ 1.000s	0.010s	◎
F05.13	Terminal DI1 effective delay time	0.0 ~ 300.0s	0.0s	◎
F05.14	Terminal DI1 invalid delay time	0.0 ~ 300.0s	0.0s	◎
F05.15	Terminal DI2 effective delay time	0.0 ~ 300.0s	0.0s	◎
F05.16	Terminal DI2 invalid delay time	0.0 ~ 300.0s	0.0s	◎
F05.17	Terminal DI1~DI5 positive and negative logic	DI5、DI4、DI3、DI2、DI1 0: Positive logic closing valid/opening invalid 1: Anti-logic closing is invalid/opening is valid	00000	△
F05.18	Terminal Di6~DI8 positive and negative logic	xx、xx、DI8、DI7、DI6 0: Positive logic closing valid/opening invalid 1: Anti-logic closing is invalid/opening is valid	00000	△
F05.19	FWD/REV terminal control mode selection	0: Two-wire mode 1 (FWD forward to REV reverse) 1: Two-wire mode 2 (FWD runs REV forward and reverse) 2: Three-line mode 1 3: Three-line mode 2 4: Pulse operation stop mode	0	△
F05.20	Keyboard, terminal UP/DOWN frequency regulation control	Position: action selection during shutdown 0: Shutdown and reset 1: Shutdown hold Position 10: action selection during power failure 0: Reset after power failure 1: Power-off hold Hundreds: integral function 0: No integral function 1: With integral function	0001	△

Par.	Designation	Scope	Default	Attr
		Thousand bits: can it be reduced to negative frequency 0: Cannot 1: Energy	0001	△
F05.21	UP/DOWN frequency rate	0.00 ~ 50.00Hz 0.00 invalid	1.00Hz/200ms	◎
F05.22	Operation terminal action selection	0: level effective 1: Effective along the trigger+level (when powered on) 2: Effective along trigger+level (each operation)	0	△
Group F06 Digital output terminal				
F06.00	Y1/HO output mode selection	0: Switching value output (Y1) 1: High speed pulse output (HO)	0	△
F06.01	Y1 output function selection	0: No output 1: Inverter in operation 2: Inverter fault 3: Frequency level detection (FDT) 4: Frequency arrival 5: Zero speed operation 1 (shutdown without output) 6: Overload warning 7: Maximum count value arrived 8: The specified count value arrives 9: Length arrival 10: FLC cycle completed 11: The accumulated running time has arrived 12: The frequency reaches the upper limit 13: The frequency reaches the lower limit 14: The cumulative power-on time has arrived 15: The running time arrives 16: Operation status (inching without output) 17: Ready for operation 18: Underload warning 19: Zero speed operation 2 (shutdown also output)	1	△
F06.02	Relay R1 output function selection		2	△

Par.	Designation	Scope	Default	Attr
		20: Holding brake output 21:XI1 22:XI2 23:XI3 24:XI4 25: Frequency region arrival (within the upper and lower limits of FDT1) 26: PID feedback loss 27: Communication given (address 2007H) 28-39: Reserved 40: Spindle orientation completed 60~69: special machine output function		
F06.05	Y1 output delay time	0.0s~6000.0s	0.0s	◎
F06.06	R1 output delay time	0.0s~6000.0s	0.0s	◎
F06.07	Reserve			
F06.08	Reserve			
F06.09	Switching value output effective state setting	R2 Y2 R1 Y1 0: positive logic 1: Antilogic	0000	△
F06.10	Frequency reaches detection range FAR	0.00 ~ 20.00Hz	5.00Hz	△
F06.11	FDT rising limit	0.00 ~ Fmax	3.00Hz	△
F06.12	FDT descent limit	0.00 ~ Fmax	3.00Hz	△
F06.13	Arrival time of this operation	0.0~6000.0Min 0.0: invalid	0.0Min	△
F06.14	Cumulative power-on arrival time	0 ~ 65535h 0: invalid	0h	△
F06.15	Cumulative running arrival time	0 ~ 65535h 0: invalid	0h	△
F06.16	Holding brake control selection	0: Invalid 1: Valid	0	△
F06.17	Holding brake opening frequency	Closing frequency~30.00Hz	2.50Hz	△

Par.	Designation	Scope	Default	Attr
F06.18	Holding brake opening current	0.0~200.0%	0.0%	◎
F06.19	Holding brake opening waiting time	0.00~10.00s	0.00s	△
F06.20	Holding brake opening action time	0.00~10.00s	0.50s	△
F06.21	Holding brake closing frequency	0.00Hz~open frequency	2.00Hz	△
F06.22	Holding brake closing waiting time	0.00~10.00s	0.00s	△
F06.23	Holding brake closing action time	0.00~10.00s	0.50s	△
Group F07 Analog quantity and pulse input				
F07.00	AI curve selection	Bit: AI1 curve selection 0: Curve 1 1: Curve 2 2: Curve 3 Ten positions: AI2 curve selection (the same position)	10	△
F07.01	AI curve 1 minimum input	0.0 ~ AI curve 1 maximum input	1.0%	◎
F07.02	AI curve 1 minimum input corresponding setting	-100.0 ~ 100.0%	0.0%	◎
F07.03	AI curve 1 maximum input	AI curve 1 minimum input~100.0%	100.0%	◎
F07.04	Corresponding setting of maximum input of AI curve 1	-100.0 ~ 100.0%	100.0%	◎
F07.05	AI curve 2 minimum input	0.00 ~ AI curve 2 maximum input	1.0%	◎
F07.06	AI curve 2 minimum input corresponding setting	-100.0 ~ 100.0%	0.0%	◎
F07.07	AI curve 2 maximum input	AI curve 2 minimum input~100.0	100.0%	◎
F07.08	Corresponding setting of AI curve 2 maximum input	-100.0 ~ 100.0%	100.0%	◎
F07.09	AI curve 3 minimum input	-100.0% ~ AI3 curve inflection point 1 input	0.0%	◎

Par.	Designation	Scope	Default	Attr
F07.10	AI curve 3 minimum input corresponding setting	-100.0 ~ 100.0%	-100.0%	◎
F07.11	AI curve 3 inflection point 1 input	AI curve 3 minimum input~AI curve 3 inflection point 2 input	25.0%	◎
F07.12	AI curve 3 inflection point 1 input corresponding setting	-100.0 ~ 100.0%	-50.0%	◎
F07.13	AI curve 3 inflection point 2 input	AI curve 3 inflection point 1 input~AI curve 3 maximum input	75.0%	◎
F07.14	AI curve 3 inflection point 2 input corresponding setting	-100.0 ~ 100.0%	50.0%	◎
F07.15	AI curve 3 maximum input	AI curve 3 inflection point 2 input ~ 100.0	100.0%	◎
F07.16	Corresponding setting of maximum input of AI curve 3	-100.0 ~ 100.0%	100.0%	◎
F07.17	Keyboard potentiometer curve minimum input	0.0 ~ keyboard potentiometer curve maximum input	0.5%	◎
F07.18	Keyboard potentiometer curve minimum input corresponding setting	-100.0 ~ 100.0%	0.0%	◎
F07.19	Keyboard potentiometer curve maximum input	Keyboard potentiometer curve minimum input~100.0	99.5%	◎
F07.20	Keyboard potentiometer curve maximum input corresponding setting	-100.0 ~ 100.0%	100.0%	◎
F07.21	Ai1 filter time	0.000 ~ 10.000s	0.000s	◎
F07.22	Ai2 filter time	0.000 ~ 10.000s	0.000s	◎
F07.23	Ai3 filter time	0.000 ~ 10.000s	0.000s	◎
F07.24	Keyboard potentiometer filtering time	0.000 ~ 10.000s	0.100s	◎
F07.25	HI minimum input	0.00kHz ~ HI maximum input	0.00kHz	◎
F07.26	HI minimum input corresponding setting	-100.0 ~ 100.0%	0.0%	◎
F07.27	HI maximum input	HI minimum input~100.00kHz	50.00kHz	◎

Par.	Designation	Scope	Default	Attr
F07.28	HI maximum input setting	-100.0 ~ 100.0%	100.0%	◎
F07.29	HI filter time	0.000 ~ 10.000s	0.100s	◎
Group F08 Analog quantity and pulse output				
F08.00	AO1 output function selection	0: No output 1: Operating frequency 2: Output current (0-2 times the rated current of inverter) 3: Output torque (0-2 times absolute torque) 4: Output power (0-2 times) 5: Output voltage (0-2 times the rated voltage of the inverter) 6: HI input (100.0% corresponds to 100.00kHz) 7:AI1 8:AI2 9: Reserved 10: VP keyboard potentiometer 11: Set frequency 12: Bus voltage 13:+10V 14: AO communication given 1 15: AO communication setting 2 16: Encoder input	1	△
F08.01	AO2 output function selection		11	△
F08.02	Y2/HO output function selection (when used as HO)		1	△
F08.03	AO1 bias	-100.0 ~ 100.0%	0.0%	◎
F08.04	AO1 gain	-2.000 ~ 2.000	1.000	◎
F08.05	AO1 filter time	0.000 ~ 10.000s	0.000s	◎
F08.06	AO2 zero deviation	-100.0 ~ 100.0%	0.00%	◎
F08.07	AO2 gain	-2.000 ~ 2.000	1.000	◎
F08.08	AO2 filter time	0.000 ~ 10.000s	0.000s	◎
F08.09	HO output maximum frequency	0.01 ~ 100.00kHz	50.00kHz	◎
F08.10	HO output filtering time	0.000 ~ 10.000s	0.010s	◎
F08.11	HO output encoder pulse ratio 1	0.00 ~ 10.00	1.00	◎

Par.	Designation	Scope	Default	Attr
F08.12	HO output encoder pulse ratio 2	0.00 ~ 10.00	1.00	◎
Group F09 Virtual IO				
F09.00	Virtual VDI1 terminal function selection	Same as F05.00	0	△
F09.01	Virtual VDI2 terminal function selection	Same as F05.00	0	△
F09.02	Virtual VDI3 terminal function selection	Same as F05.00	0	△
F09.03	Virtual VDI4 terminal function selection	Same as F05.00	0	△
F09.04	Virtual VDI5 terminal function selection	Same as F05.00	0	△
F09.05	Virtual VDI terminal valid state setting mode	VDI5、VDI4、VDI3、VDI2、VDI1 0: Whether the VDI is valid depends on the status of the virtual VDOx 1: Set whether VDI is valid by function code F09.06	00000	△
F09.06	Virtual VDI terminal status setting	VDI5、VDI4、VDI3、VDI2、VDI1 0: Invalid 1: Valid	00000	◎
F09.07	Virtual VDO1 output function selection	0: Internal short circuit with physical DIx Others: the same as F06.00	0	◎
F09.08	Virtual VDO2 output function selection	0: Internal short circuit with physical DIx Others: the same as F06.00	0	◎
F09.09	Virtual VDO3 output function selection	0: Internal short circuit with physical DIx Others: the same as F06.00	0	◎
F09.10	Virtual VDO4 output function selection	0: Internal short circuit with physical DIx Others: the same as F06.00	0	◎
F09.11	Virtual VDO5 output function selection	0: Internal short circuit with physical DIx Others: the same as F06.00	0	◎
F09.12	Virtual VDO1 output delay time	0.0s ~ 6000.0s	0.0s	◎
F09.13	Virtual VDO2 output delay time	0.0s ~ 6000.0s	0.0s	◎
F09.14	Virtual VDO3 output delay time	0.0s ~ 6000.0s	0.0s	◎

Par.	Designation	Scope	Default	Attr
F09.15	Virtual VDO4 output delay time	0.0s ~ 6000.0s	0.0s	◎
F09.16	Virtual VDO5 output delay time	0.0s ~ 6000.0s	0.0s	◎
F09.17	VDO output terminal positive and negative logic	VDO5、VDO4、VDO3、VDO2、VDO1 0: positive logic 1: Antilogic	00000	◎
Group F10 Fault and protection function				
F10.00	Overcurrent stall control	0: Overcurrent stall invalid 1: Overcurrent stall mode 1 2: Overcurrent stall mode 2 3: Overcurrent stall mode 3	2	△
F10.01	Overcurrent stall protection current	100.0 ~ 200.0%	150.0%	×
F10.02	Constant speed overcurrent stall frequency drop time	0.0~6000.0s (mode 1 is valid)	5.0s	◎
F10.03	Overflow stall mode 2 scale factor	0.0 ~ 100.0%	3.0%	◎
F10.04	Overcurrent stall mode 2 integral time	0.00 ~ 10.00s 0.00: integral invalid	1.00s	◎
F10.05	Overpressure stall control	0: Invalid 1: Overvoltage mode 1 2: Overvoltage mode 2	2	△
F10.06	Overvoltage stall voltage	600 ~ 800V	730V	△
F10.07	Overvoltage stall mode 2 proportional gain	0.0 ~ 300.0%	50.0%	◎
F10.08	Overvoltage stall mode 2 frequency limit	0.00 ~ 50.00Hz	5.00Hz	△
F10.09	Short circuit to ground detection function	0: Short circuit detection to ground 1: Short circuit detection to ground before the first operation 2: Short circuit detection to ground before each operation	0	△

Par.	Designation	Scope	Default	Attr
F10.10	Number of fault automatic reset	0~20	0	△
F10.11	Fault automatic reset interval	0.1 ~ 100.0s	1.0s	△
F10.12	During fault automatic reset, the switch output terminal is programmed to output fault action selection	0: No action 1: Action	0	△
F10.13	Fault protection action selection 1	Position: busbar undervoltage protection (Err08) 0: Report fault and stop freely 1: Alarm and stop in deceleration mode 2: Alarm and continue to operate according to the fault frequency 3: Invalid protection Ten bits: inverter overload protection (Err10) Hundred position: motor overload protection (Err11) Kilo bit: input side phase loss protection (Err12) Ten thousand bits: output side phase loss protection (Err13)	03330	△
F10.14	Fault protection action selection 2	Bit: external input fault protection (Err14) 0: Report fault and stop freely 1: Alarm and stop in deceleration mode 2: Alarm and continue to operate according to the fault frequency 3: Invalid protection Ten bits: 485 communication timeout (Err16) Hundreds: memory failure (Err17) Thousand bits: PID feedback disconnection during operation (Err19) 10000 bits: running time arrival (Err20)	00000	△

Par.	Designation	Scope	Default	Attr
F10.15	Fault protection action selection 3	Bit: temperature sensor disconnection fault (Err22) 0: Report fault and stop freely 1: Alarm and stop in deceleration mode 2: Alarm and continue to operate according to the fault frequency 3: Invalid protection Ten digits: inverter load loss (Err23) Hundreds: Reserved Thousands: Reserved 10000: Rreserved	00030	△
F10.16	Rreserved	---	—	
F10.17	Select the frequency to continue running in case of failure	0: runs at the current operating frequency 1: Run at the set frequency 2: The above frequency limit operation 3: Run at the lower limit frequency 4: Run at the abnormal standby frequency	1	△
F10.18	Abnormal reserve frequency	0.00 ~ Fmax	0.00Hz	△
F10.19	Fast current limiting control option	0: forbid 1: Allow 2: Slow down mode	2	△
F10.20	Overload warning option	The ones bit: check out the selection 0: always detects 1: Detection at constant speed only Tens place: detection condition selection 0: relative to the rated current of the motor 1: indicates the rated current of the inverter 2: relative motor rated power 3: indicates the rated power of the inverter Hundred bit: indicates whether a fault is reported 0: No fault is reported 1: A fault is reported 2: displays a warning Thousands: Whether to slow down 0: does not slow down 1: Slow down	00010	△

Par.	Designation	Scope	Default	Attr
F10.20	Overload warning option	2:FI adjustment (FI parameters are F13.08 and F13.09) Tens of thousands: The overload check value is given by the source 0:F10.19 setting 1: VF * F10.19 2: AI1 * F10.19 3: AI2 * F10.19 4: AI3 * F10.19	00010	△
F10.21	Overload alarm detection level	0.0 ~ 200.0%	150.0%	◎
F10.22	Overload warning time	0.1 ~ 60.0s	5.0s	◎
F10.23	Drop load detection current	5.0 ~ 100.0%	20.0%	△
F10.24	Drop load detection time	0.1 ~ 60.0s	5.0s	△
F10.25	Instantaneous power failure action selection	0: invalid 1: Slow down 2: bus voltage constant control	0	△
F10.26	Instantaneous power failure frequency Deceleration time	0.0 to 6000.0 seconds	5.0s	◎
F10.27	Instantaneous outage bus voltage	60.0% ~ recovery voltage	80.0%	◎
F10.28	Instantaneous power failure recovery voltage	Outage voltage ~ 100.0%	85.0%	◎
F10.29	Instantaneous outage voltage judgment time	0.01 ~ 10.00s	0.10s	◎
F10.30	Instantaneous blackout gain KP	0.1 ~ 100.0%	40.0%	◎
F10.31	Instantaneous power failure integral time Ti	0.00 to 10.00s 0.00: Credit is invalid	0.10s	◎
F10.32	Type of motor temperature sensor	0: None 1:PT100 2:PT1000 3:KTY84	0	△
F10.33	Zero drift value for motor temperature sensor	-100 ~ 100 ° C	0	◎

Par.	Designation	Scope	Default	Attr
F10.34	Motor temperature warning action threshold	0 to 200 ° C	90℃	◎
F10.35	Motor temperature protection action threshold	0 to 200 ° C	110℃	◎
F10.36	Pass speed detection value	0.0 ~ 150.0%	120.0%	△
F10.37	Pass speed detection time	0.0 to 60.0s	1.0s	△
F10.38	The speed deviation is too large	0.0 ~ 50.0%	20.0%	△
F10.39	Speed deviation is too large detection time	0.0 to 60.0s	5.0s	△
Group F11 Process PID				
F11.00	PID setting mode	0: The PID number is set 1: keyboard potentiometer 2:AI1 3:AI2 4:AI3 5:DI pulse input 6: multi-segment instruction 7: communication input	0	△
F11.01	PID digital setting	0.0 ~ 100.0%	50.0%	◎
F11.02	PID feedback mode	0:AI1 1:AI2 2: Reserve 3:DI pulse input 4: communication input 5:AI1+AI2 6:AI1-AI2 7:Max{AI1, AI2} 8:Min{AI1, AI2}	0	△
F11.03	PID indicates the feedback range	0.0 ~ 6000.0	100.0	◎
F11.04	PID regulator action	0: positive action 1: Negative effect	0	△

Par.	Designation	Scope	Default	Attr
F11.05	PID set filtering time	0.000 ~ 10.000s	0.000s	◎
F11.06	PID feedback filtering time	0.000 ~ 10.000s	0.000s	◎
F110.07	PID output filtering time	0.000 ~ 10.000s	0.000s	◎
F11.08	Proportional gain KP1	0.0 ~ 1000.0	20.0	◎
F11.09	Integral time Ti1	0.00 ~ 10.00s	2.00s	◎
F11.10	Differential time Td1	0.000 ~ 10.000s	0.000s	◎
F11.11	Proportional gain KP2	0.0 ~ 100.0	20.0	◎
F11.12	Integral time Ti2	0.00 ~ 10.00s	2.00s	◎
F11.13	Differential time Td2	0.000 ~ 10.000s	0.000s	◎
F11.14	PID parameter switching selection	0: Do not switch, use KP1, Ti1 and Td1 parameters 1: Automatic switching according to input deviation 2: Switch according to terminal	0	△
F11.15	PID parameter switching deviation 1	0.0 ~ 100.0%	20.0%	△
F11.16	PID parameter switching deviation 2	0.0 ~ 100.0%	80.0%	△
F11.17	PID deviation limit	0.0 ~ 100.0%	0.0%	△
F11.18	PID integral attribute	Bit: whether to stop integration after output to the limit value 0: Continue to score 1: Stop integrating Ten digits: integral separation 0: Invalid 1: Valid Hundreds: PID control algorithm 0: Incremental 1: Position type	000	△
F11.19	PID differential limiting	0.0~100.0%	0.5%	△
F11.20	PID initial value	0.0~100.0%	0.0%	△
F11.21	PID initial value holding time	0.0~6000.0s	0.0s	△

Par.	Designation	Scope	Defaul	Attr
F11.22	PID output frequency upper limit	PID output frequency lower limit~100.0% (100.0% corresponds to the maximum frequency)	100.0 %	△
F11.23	PID output frequency lower limit	– 100.0 ~upper limit of PID output frequency	0.0%	△
F11.24	PID feedback loss detection low value	0.0~100.0% 0.0: invalid	0.0%	△
F11.25	PID feedback loss low value detection time	0.0 ~ 30.0s	1.0s	△
F11.26	PID operation selection	Bit: whether to calculate the shutdown 0: No operation during shutdown 1: Operation during shutdown Ten bits: upper and lower limit of output is limited by output frequency 0: unlimited 1: Restrictions Hundreds: PID number given UP/DOWN 0: Reset after power failure 1: Save after power failure Thousands: whether the shutdown is detected when the PID feedback is lost 0: Do not detect during shutdown 1: Detection during shutdown 10000 bits: PID feedback loss action 0: Report fault 1: Deceleration shutdown 2: Normal operation	00000	△
F11.27	PID digital given UP/DOWN rate	0.0~100.0% (0.0% invalid)	0.0%	◎
F11.28	PID feedback loss detection high value	0.0~100.0% 100.0: invalid	100.0 %	△
F11.29	PID feedback loss high value detection time	0.0 ~ 30.0s	1.0s	△
F11.30	PID upper limit source selection	0: F11.22 1: F11.22 * VP keyboard potentiometer 2: F11.22*AI1 3: F11.22*AI2	0	△

Par.	Designation	Scope	Default	Attr
	PID upper limit source selection	4: Reserved 5: F11.22 * DI (pulse input)		
F11.31	PID lower limit source selection	0:F11.23 1: F11.23 * Keyboard potentiometer 2:F11.23*AI1 3:F11.23*AI2 4: Reserved 5: F11.23 * DI (pulse input)	0	△
Group F12 Multi-segment speed and simple PLC				
F12.00	Multiband frequency 0	-100.0%~100.0%	0.00%	◎
F12.01	Multiband frequency 1	-100.0%~100.0%	0.00%	◎
F12.02	Multiband frequency 2	-100.0%~100.0%	0.00%	◎
F12.03	Multiband frequency 3	-100.0%~100.0%	0.00%	◎
F12.04	Multiband frequency 4	-100.0%~100.0%	0.00%	◎
F12.05	Multiband frequency 5	-100.0%~100.0%	0.00%	◎
F12.06	Multiband frequency 6	-100.0%~100.0%	0.00%	◎
F12.07	Multiband frequency 7	-100.0%~100.0%	0.00%	◎
F12.08	Multiband frequency 8	-100.0%~100.0%	0.00%	◎
F12.09	Multiband frequency 9	-100.0%~100.0%	0.00%	◎
F12.10	Multiband frequency 10	-100.0%~100.0%	0.00%	◎
F12.11	Multiband frequency 11	-100.0%~100.0%	0.00%	◎
F12.12	Multiband frequency 12	-100.0%~100.0%	0.00%	◎
F12.13	Multiband frequency 13	-100.0%~100.0%	0.00%	◎
F12.14	Multiband frequency 14	-100.0%~100.0%	0.00%	◎
F12.15	Multiband frequency 15	-100.0%~100.0%	0.00%	◎
F12.16	Multi-segment instruction 0 given mode	0: Number given (F12.00) 1: Keyboard potentiometer 2:AI1 3: Process PID 4: Pulse input (HI) 5:AI2 6: Reserved	0	△

Par.	Designation	Scope	Default	Attr
F12.17	Simple PLC operation mode	Bit: simple PLC operation mode selection 0: Shutdown after single cycle 1: Keep the final value after single cycle 2: Continuous cycle Ten digits: interrupt operation and restart selection 0: run from the stage at the time of shutdown (or failure) 1: Re-run from segment 0 2: Re-run from paragraph 8 3: Re-run from paragraph 15 Hundreds: power-off memory selection 0: No memory after power failure 1: Power-off memory Thousands: simple PLC running time unit 0: s (seconds) 1: h (hour)	0000	△
F12.18	Simple PLC section 0 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.19	Simple PLC section 1 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.20	Simple PLC section 2 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.21	Simple PLC section 3 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.22	Simple PLC section 4 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.23	Simple PLC section 5 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.24	Simple PLC section 6 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.25	Simple PLC section 7 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.26	Simple PLC section 8 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎

Par.	Designation	Scope	Default	Attr
F12.27	Simple PLC section 9 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.28	Simple PLC section 10 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.29	Simple PLC section 11 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.30	Simple PLC section 12 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.31	Simple PLC section 13 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.32	Simple PLC section 14 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.33	Simple PLC section 15 running time	0.0s(h)~6000.0s(h)	0.0s(h)	◎
F12.34	Simple PLC section 0 acceleration and deceleration time selection	0~3	0	◎
F12.35	Simple PLC section 1 acceleration and deceleration time selection	0~3	0	◎
F12.36	Simple PLC section 2 acceleration and deceleration time selection	0~3	0	◎
F12.37	Simple PLC section 3 acceleration and deceleration time selection	0~3	0	◎
F12.38	Simple PLC section 4 acceleration and deceleration time selection	0~3	0	◎
F12.39	Simple PLC section 5 acceleration and deceleration time selection	0~3	0	◎
F12.40	Simple PLC section 6 acceleration and deceleration time selection	0~3	0	◎
F12.41	Simple PLC section 7 acceleration and deceleration time selection	0~3	0	◎
F12.42	Simple PLC section 8 acceleration and deceleration time selection	0~3	0	◎
F12.43	Simple PLC section 9 acceleration and deceleration time selection	0~3	0	◎
F12.44	Simple PLC section 10 acceleration and deceleration time selection	0~3	0	◎
F12.45	Simple PLC section 11 acceleration and deceleration time selection	0~3	0	◎

Par.	Designation	Scope	Default	Attr
F12.46	Simple PLC section 12 acceleration and deceleration time selection	0~3	0	◎
F12.47	Simple PLC section 13 acceleration and deceleration time selection	0~3	0	◎
F12.48	Simple PLC section 14 acceleration and deceleration time selection	0~3	0	◎
F12.49	Simple PLC section 15 acceleration and deceleration time selection	0~3	0	◎
F12.50	Multi-segment instruction UP/DOWN function selection	Bit: action selection during power failure 0: Reset after power failure 1: Power-off hold Top 10: Can it be reduced to negative 0: Cannot 1: Energy	00	△
F12.51	Multi-segment instruction UP/DOWN rate	0.0~100.0% (0.0% invalid)	0.0%	△
Group F13 Auxiliary function group				
F13.00	Swing setting mode	0: Relative to the set frequency 1: Relative to the maximum frequency	0	△
F13.01	Swing amplitude	0.0~100.0% (relative to the set frequency, 0.0 swing is invalid)	0.0%	◎
F13.02	Jump frequency amplitude	0.0~50.0% (relative swing amplitude)	0.0%	◎
F13.03	Swing rise time	0.0 ~ 6000.0s	5.0s	◎
F13.04	Swing down time	0.0 ~ 6000.0s	5.0s	◎
F13.05	Set length (reference length scale)	0m ~ 65535m	1000m	△
F13.06	Pulses per meter/maximum linear speed (m/min)	0.1 ~ 6553.5	100.0	◎

Par.	Designation	Scope	Default	Attr
F13.07	Length calculation options	Bit: whether to stop when the length reaches 0: No shutdown 1: Shutdown Ten digits: length calculation method 0: Pulse count 1: Reference maximum frequency 2: Reference AI1 channel 3: Reference AI2 channel 4: Reserved	00	◎
F13.08	Maximum count value	1~65535	1000	△
F13.09	Specify count value	1~65535	1000	△
F13.10	Wake-up mode selection	0: frequency wake-up 1: Pressure awakening	0	△
F13.11	Sleep mode selection	0: Frequency sleep 1: Pressure sleep	0	△
F13.12	Wake-up frequency	Sleep frequency~Fmax	0.00Hz	◎
F13.13	Wakeup delay time	0.0 ~ 6000.0s	0.0s	◎
F13.14	Sleep frequency	0.00 ~ wake-up frequency	0.00Hz	◎
F13.15	Sleep delay time	0.0 ~ 6000.0s	0.0s	◎
F13.16	Pressure feedback source and pressure sleep direction	Bit: pressure feedback source 0:AI1 1:AI2 2:AI3 3: DI7/HI pulse input Ten: pressure sleep direction 0: positive direction, pressure feedback big sleep, small wake 1: Reverse direction, pressure feedback, small sleep, large wake-up	00	△
F13.17	Wake up pressure	0.0% ~ 100.0%	10.0%	◎
F13.18	Sleep pressure	0.0% ~ 100.0%	50.0%	◎

Par.	Designation	Scope	Default	Attr
Group 14 Communication parameters				
F14.00	Local address	1~247 0: broadcast address	1	△
F14.01	Communication baud rate	0: 4800BFS 1: 9600BFS 2: 19200BFS 3: 38400BFS 4: 57600BFS 5:115200BFS	1	△
F14.02	Communication format	0: No verification (1-8-N-1) for RTU 1: Even check (1-8-E-1) for RTU 2: Odd check (1-8-O-1) for RTU 3: No calibration (1-8-N-2) for RTU	1	△
F14.03	Communication timeout	0.0 ~ 60.0s	0.0s	△
F14.04	Local response delay time	0 ~ 200ms	1ms	△
F14.05	Master and slave communication mode selection	0: This machine is a slave machine 1: This machine is the host	0	△
F14.06	Host sending data source selection	0: Set frequency 1: Operating frequency	0	△
F14.07	Whether to return information in case of communication error	0: Do not return 1: Return	1	◎
F14.08	U group frequency return value	0: positive and negative value 1: Absolute value	1	◎
Group F15 LED keyboard display and operation				
F15.00	LED operation display parameter 1	0~99 (corresponding to U00.00~ U00.99)	0	◎
F15.01	LED operation display parameter 2	0~99 (corresponding to U00.00~ U00.99)	4	◎
F15.02	LED operation display parameter 3	0~99 (corresponding to U00.00~ U00.99)	3	◎
F15.03	LED operation display parameter 4	0~99 (corresponding to U00.00~ U00.99)	2	◎

Par.	Designation	Scope	Default	Attr
F15.04	LED parking display parameter 1	0~99 (corresponding to U00.00~ U00.99)	1	◎
F15.05	LED parking display parameter 2	0~99 (corresponding to U00.00~ U00.99)	4	◎
F15.06	LED parking display parameter 3	0~99 (corresponding to U00.00~ U00.99)	3	◎
F15.07	LED parking display parameter 4	0~99 (corresponding to U00.00~ U00.99)	9	◎
F15.08	Function code display	0: Display all function codes 1: Display the function code different from the factory value	0	△
F15.09	Parameter modification method	0: Keyboard and RS485 are valid at the same time 1: Keyboard is valid 2: RS485 is valid 3: Parameter cannot be modified	0	△
F15.10	Key locking function	0: Not locked 1: Full lock 2: All locks except RUN, STOF/RESET keys 3: All locks except STOF/RESET 4: All locks except the>>key	0	△
F15.11	MF. K key function selection	0: No function 1: Jog operation 2: Forward and reverse switching 3: Switching of start/stop command setting mode (operation panel/terminal/communication) 4: Jog reverse 5: Reverse operation	1	△
F15.12	STOF/RESET key function selection	0: The STOF/RES key shutdown function is valid only in keyboard operation mode 1: In any operation mode, the STOF/RES key shutdown function is effective	1	△

Par.	Designation	Scope	Default	Attr
F15.13	Speed display	Bit: speed display (U00.05) 0: Display according to actual speed 1: Frequency multiplied by speed coefficient Ten places: decimal places of rotating speed 0: No decimal point 1:1 decimal point 2:2 decimal places 3:3 decimal places	00	△
F15.14	Speed display coefficient	0.00 ~ 100.00	1.00	◎
F15.15	Frequency display error range	0.00Hz ~ 5.00Hz	0.10Hz	◎
F15.16	Power display factor	0.0 ~ 300.0%	100.0%	◎
F15.17	User Password	0~65535	0	△
F15.18	Dealer password	0~65535	0	△
F15.19	Usage time	0 ~ 65535h (0: invalid)	0	△
Group A00 Special parameter group for photovoltaic water pump				
A00.00	Photovoltaic function	0: Invalid 1: Valid	1	△
A00.01	Vmpp voltage setting mode selection	0: CVT (constant voltage setting) 1: Maximum power tracking (MPPT)	1	△
A00.02	Vmpp voltage CVT given voltage setting	0 ~ 750V	540V	◎
A00.03	Proportional gain Kp	0.0 ~ 100.0%	1.0%	◎
A00.04	Integration time Ki	0.00 ~ 100.00	0.10	◎
A00.05	PI switching voltage difference	0 ~ 100V	20V	◎
A00.06	Proportional gain Kp2	0.0 ~ 100.0%	30.0%	◎
A00.07	Integration time Ki2	0.00 ~ 100.00	0.50	◎
A00.08	PID output frequency upper limit	PID output frequency lower limit~100.0% (100.0% corresponds to the maximum frequency)	100.0%	△

Par.	Designation	Scope	Default	Attr
A00.09	PID output frequency lower limit	0.0% ~ upper limit of PID output frequency	20.0%	△
A00.10	MPPT looks for voltage	0 ~ 750V	0	×
A00.11	Photoweak voltage	200V~MPPT minimum voltage	230V	△
A00.12	Preparation time of light weak sleep	0.0 ~ 6000.0s	500.0s	◎
A00.13	Light intensity wake-up preparation time	0.0 ~ 6000.0s	60.0s	◎
A00.14	Sensor invalid preparation wake-up time	0 ~ 10000s	60s	◎
A00.15	Sensor effective preparation sleep time	0 ~ 10000s	30s	◎
A00.16	Frequency setting mode	0: Take the maximum frequency 1: Main frequency setting mode	0	◎
A00.17	Rated flow of water pump	0.0~1000.0 m^3/h	6.0m^3/h	◎
A00.18	Rated head of water pump	0.0 ~ 500.0m	24m	◎
A00.19	Clear the accumulated flow of water pump	0: Don't clear 1: Clear	0	◎
A00.20	Current flow of water pump	Unit: m^3/h	0.0 m^3/h	×
A00.21	Current head of water pump	Unit: meter	0.0 m	×
A00.22	Accumulated flow of water pump	Unit: cubic meter	0 m^3	×
Group U00 Status monitoring				
U00.00	Output frequency	0.00 ~ Fup	0.00Hz	×
U00.01	Set frequency	0.00 ~ Fmax	0.00Hz	×
U00.02	Actual value of output voltage	0 ~ 660V	0V	×
U00.03	Actual value of output current	0.0 ~ 3000.0A	0.0A	×
U00.04	DC Bus Voltage	0 ~ 1200V	0V	×
U00.05	Output speed	0 ~ 60000rFm	0rFm	×
U00.06	Output power	0.0 ~ 3000.0kW	0.0kW	×

Par.	Designation	Scope	Default	Attr
U00.07	Synchronous frequency	0.00 ~ Fup	0.00Hz	×
U00.08	Output torque	0.0 ~ 300.0%	0.0%	×
U00.09	Inverter module temperature	-40℃ ~ 120℃	0℃	×
U00.10	Keypad potentiometer input	0.0 ~ 100.0%	0.0%	×
U00.11	AI1 input	0.0 ~ 100.0%	0.0%	×
U00.12	AI1 input	0.0 ~ 100.0%	0.0%	×
U00.13	Reserve	-----	-----	
U00.14	DI pulse input frequency	0.00 ~ 100.00kHz	0.00kHz	×
U00.15	AO1 output	0.0 ~ 100.0%	0.0%	×
U00.16	AO2 output	0.0 ~ 100.0%	0.0%	×
U00.17	DO pulse output frequency	0.00 ~ 100.00kHz	0.00kHz	×
U00.18	DI1~DI5 input status	DI5 DI4 DI3 DI2 DI1	00000	×
U00.19	DI6~DI8 input status	DI8 DI7 DI6	000	×
U00.20	Switching output status	R2 Y2 R1 Y1	0000	×
U00.21	VDI1~VDI5 input status	VDI5 VDI4 VDI3 VDI2 VDI1	00000	×
U00.22	VDO1~VDO5 input status	VDO5 VDO4 VDO3 VDO2 VDO1	00000	×
U00.23	HI monitoring	0 ~ 65535	0	×
U00.24	PID given	0 ~ 60000	0	×
U00.25	PID operation feedback	0 ~ 60000	0	×
U00.26	FLC stage	1 ~ 15	1	×
U00.27	Program running time	0.0 ~ 6000.0s(h)	0.0s(h)	×
U00.28	power waste	0 ~ 65535kWh	0kWh	×
U00.29	Time of this power-on	0 ~ 65535min	0min	×
U00.30	This operation time	0 ~ 6553.5min	0.0min	×
U00.31	Accumulated power-on time	0 ~ 65535h	0h	×
U00.32	Cumulative running time	0 ~ 65535h	0h	×

Par.	Designation	Scope	Default	Attr
U00.33	Actual count value	0 ~ 65535	0	×
U00.34	Actual length value	0 ~ 65535m	0m	×
U00.35	Linear velocity	0 ~ 65535m/min	0m/Min	×
U00.36	PTC detects motor temperature	-40℃ ~ 200℃	0℃	×
		Group U01 Fault record		
U01.00	Current fault category	Err00: No fault Err01: acceleration overcurrent Err02: deceleration overcurrent Err03: constant speed overcurrent Err04: acceleration overvoltage Err05: deceleration overvoltage Err06: constant speed overvoltage Err07: short circuit protection Err08: Bus undervoltage protection Err09: Soft start relay is not closed Err10: Inverter overload Err11: motor overload Err12: phase loss at input side Err13: phase loss at output side Err14: External fault Err15: overheating Err16: 485 communication timeout Err17: Memory failure Err18: Self-learning canceled Err19: self-learning failure Err20: The running time has arrived Err21: PID feedback disconnection during operation Err22: temperature sensor disconnection fault Err23: inverter load loss Err24: short circuit to ground Err25: module overload Err26: End of set running time Err27: PTC motor temperature overheated	Err00	×
U01.01	Output frequency at current fault	0.00 ~ FuF	0.00Hz	×

Par.	Designation	Scope	Default	Attr
U01.02	Output current at current fault	0.0 to 3000.0A	0.0A	×
U01.03	Bus voltage at current fault	0 to 1200V	0V	×
U01.04	Cumulative running time in case of current fault	The value ranges from 0 to 655355 hours	0h	×
U01.05	Category of the first fault	Same as U00.00	Err00	×
U01.06	Output frequency at the first fault	0.00 ~ FuF	0.00Hz	×
U01.07	Output current at the first fault	0.0 to 3000.0A	0.0A	×
U01.08	Bus voltage at the first fault	0 to 1200V	0V	×
U01.09	Accumulated running time during the previous failure	The value ranges from 0 to 655355 hours	0h	×
U01.10	Category of the first two failures	Same as U00.00	Err00	×
U01.11	Output frequency at the first two faults	0.00 ~ FuF	0.00Hz	×
U01.12	Output current at the first two faults	0.0 to 3000.0A	0.0A	×
U01.13	Bus voltage during the first two faults	0 to 1200V	0V	×
U01.14	Accumulated running time during the first two failures	The value ranges from 0 to 655355 hours	0h	×
U01.15	Category of the first three failures	Same as U00.00	Err00	×
U01.16	Category of the first four faults	Same as U00.00	Err00	×
U01.17	Category of the first five failures	Same as U00.00	Err00	×
U01.18	Category of the first six failures	Same as U00.00	Err00	×
U01.19	Category of the first seven failures	Same as U00.00	Err00	×
U01.20	Category of the first eight failures	Same as U00.00	Err00	×
U01.21	Category of the first 9 failures	Same as U00.00	Err00	×
U01.22	Category of the first 10 failures	Same as U00.00	Err00	×

Chapter 6

EMC (Electromagnetic Compatibility)

6.1 EMC Definition

Electromagnetic compatibility refers to the ability of electrical equipment to operate in an environment of electromagnetic interference, not to interfere with the electromagnetic environment and to achieve its functions steadily.

6.2 Introduction to EMC standards

According to the national standard GB/T12668.3 requirements, products need 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 power drive systems part 3: EMC requirements and specific test methods), equivalent to the national standard GB/T12 668.3.

IEC/EN61800-3 mainly from the electromagnetic interference and anti-electromagnetic interference two aspects of the product inspection, electromagnetic interference mainly on the product radiation interference, conduction interference and harmonic interference testing (for civilian products have this requirement). Anti-electromagnetic interference mainly on the product's conduction immunity, radiation immunity, surge immunity, rapid mutation pulse group immunity, ESD immunity and power supply low-frequency end immunity (specific test items are: 1. input voltage drop, Immunity test of interruption and change; 2. phase gap immunity test; 3. harmonic input immunity test; 4. input frequency change test; 5. input voltage imbalance test; 6. input voltage fluctuation test) test. In accordance with the above-mentioned IEC/EN61800-3 strict requirements for testing, our products in accordance with the guidance of 6.3 for installation and use, in thegeneral industrial environment will have good electromagnetic compatibility.

6.3 EMC Guidance

6.3.1 Electromagnetic interference and installation precautions:

There are two kinds of electromagnetic interference, one is the interference of the surrounding environment electromagnetic noise to the product, the other is the interference of the product to the surrounding equipment, for the interference is relatively large occasions, it is recommended to add input reactors.

Installation considerations:

❶ The ground wire of products and other electrical products should be well grounded;

❷ Product power input and output power lines and weak electrical signal lines (e.g. control lines) as far as possible do not parallel arrangement, when conditions vertical arrangement;

❸ The output power line of the product is recommended to use shielded cable, or steel pipe to shield the power line, and the shield layer should be reliably grounded, for the lead of the disturbed equipment is recommended to use twisted pair shielding control line, and the shielding layer is reliably grounded;

❹ For motor cables longer than 100m, an output filter or reactor is required.

6.3.2 The treatment method by which the surrounding electromagnetic equipment interferes with the product:

The general cause of the electromagnetic effect on the product is the large number of relays, contactors or electromagnetic brakes installed near the product. When the product is disturbed by the wrong action, it is recommended to use the following methods to resolve:

❶ Add surge suppressors to devices that cause interference;

❷ The product input is filled with filters, specifically reference 6.3. 5 to operate;

❸ The product controls the signal line and the lead of the detection line with a shielded cable and securely grounds the shield.

6.3.3 How the product interferes with peripheral equipment:

There are two types of noise in this part: one is the product radiation interference, and the other is the product conduction interference. These two types of interference cause the surrounding electrical equipment to be induced by electromagnetic or static electricity. In turn, the device produced a mis-action. For several different interference situations, refer to the following methods to resolve:

❶ For measuring instruments, receivers and sensors, etc., the general signal is relatively weak, if the product is closer or in the same control cabinet, vulnerable to interference and wrong action, it is recommended to use the following methods to solve: as far away from interference sources as possible; Equally tied together, the signal line and the power line with shielded cables, and well grounded, in the output side of the product with ferric oxygen magnetic ring (select the suppression frequency in the range of 30 to 1000MHz), and around 2 to 3, For the bad situation, you can choose to add EMC output filter;

❷ Interference equipment and products using the same power supply, resulting in conduction interference, if the above methods can not eliminate interference, should be installed between the product and the power supply EMC filter (specific reference 6.3 5 to carry out the selection operation);

❸ Peripherals are grounded separately to eliminate interference from leakage currents in the product ground wire when co-grounding.

6.3.4 Leakage current and handling:

There are two forms of leakage current when using a product: one is a ground-to-ground leakage current, and the other is a leakage current between a line and a line.

❶ Factors and solutions that affect the ground leakage current:

There is a distribution capacitor between the wire and the earth, the greater the distribution capacitor, the greater the leakage current, effectively reducing the distance between the product and the motor to reduce the distribution capacitance. The higher the carrier frequency, the greater the leakage current. The carrier frequency can be reduced to reduce leakage current. However, reducing the carrier frequency can lead to increased motor noise, please note that adding an reactor is also an effective solution to leakage current.

The leakage current increases with the increase of the circuit current, so when the motor is high, the corresponding leakage current is large.

❷ Factors and solutions that cause current leakage between lines:

There is a distribution capacitance between the product output wiring, and if the current passing through the line contains a high number of harmonics, it may cause resonance and leakage current. Using a thermal relay at this point may cause it to move incorrectly.

The solution is to reduce the carrier frequency or install the output reactor. It is recommended that the motor is not installed before the use of the appliance, using the electronic overflow protection function of the product.

6.3.5 Note that the EMC input filter is added to the power input:

❶ Use the filter strictly in accordance with the rating, because the filter belongs to Class I electrical appliances, the filter metal shell should be a large area with the installation cabinet metal contact is good, and requires good conductivity, otherwise there will be a risk of electric shock and seriously affect the EMC effect;

❷ Through EMC testing, it is found that the filter must be on the same common ground as the product PE end, otherwise the EMC effect will be seriously affected.

❸ The filter is installed as close as possible to the power input of the appliance.

Chapter 7

Fault diagnosis and exception handling

If the inverter is abnormal, handle it with caution, locate the fault cause carefully, and record the fault symptom in detail. If you need to ask for services, contact the vendor. You can view the records of the latest, previous, and second faults using the function code U1 parameter group. Faults are recorded with numeric codes (1-29). The following table lists the fault information and fault names corresponding to each numeric fault code.

7.1 Fault causes and countermeasures

Fault Name	Operating Panel Display	Cause	Possible Solution
Acceleration overcurrent		Torque increase value is too large during V/f control	Reduce torque boost value
		The starting frequency is too high	Reduce the starting frequency value
		Acceleration time is too short	Extended acceleration time
		Improper setting of motor parameters	Set correctly according to the motor nameplate
		Overload	Reduce load
		V/f curve is not appropriate when V/f control	Set V/f curve correctly
		Restart the rotating motor	Reduce the limit value or start by speed search
		Short circuit between output phases or ground	Check motor wiring and output impedance to ground
Deceleration overcurrent		The inertia of the load is too large	Use energy consumption braking
		The deceleration time is too short	Extended deceleration time
		Low input voltage of power grid	Check the grid voltage
		Short circuit between output phases or ground	Check motor wiring and output impedance to ground
Constant speed overcurrent		Overload	Reduce load
		Inverter power level is too low	Select appropriate inverter power
		Low input voltage of power grid	Check the grid voltage
		Short circuit between output phases or ground	Check motor wiring and output impedance to ground

Fault Name	Operating Panel Display	Cause	Possible Solution
Acceleration overvoltage		The inertia of the load is too large	Use energy consumption braking
		Abnormal input voltage	Check the grid voltage
		Short circuit between output phases or ground	Check motor wiring and output impedance to ground
Deceleration overvoltage		The inertia of the load is too large	Use energy consumption braking
		The deceleration time is too short	Extended deceleration time
		Abnormal input voltage	Check the grid voltage
		The regulator parameters are set improperly during vector operation	Set the regulator parameters correctly
		Short circuit between output phases or ground	Check motor wiring and output impedance to ground
Constant speed overvoltage		The regulator parameters are set improperly during vector operation	Set the regulator parameters correctly
		Abnormal input voltage	Check the grid voltage
		The load fluctuation is too large	Check load
		Short circuit between output phases or ground	Check motor wiring and output impedance to ground
Inverter side module protection		Output overcurrent fault	Handle according to the treatment method of overcurrent
		Bus voltage overvoltage fault	Treat in the way of overpressure
		Output side short circuit fault	Handle as module short circuit fault
		Abnormal inverter module	Seek service
Undervoltage protection		DC bus voltage is low	Check whether the input voltage is too low or whether the inverter is in the process of power failure
Inverter overload		Torque increase value is too large during V/f control	Reduce torque boost value
		The starting frequency is too high	Reduce the starting frequency value

Fault Name	Operating Panel Display	Cause	Possible Solution
Inverter overload		Acceleration and deceleration time is too short	Extend acceleration and deceleration time
		Improper setting of motor parameters	Set correctly according to the motor nameplate
		Overload	Reduce load
		V/f curve is not appropriate when V/f control	Set V/f curve correctly
		Restart the rotating motor	Reduce the current limit or start by speed search
		Short circuit between output phases or ground	Check motor wiring and output impedance to ground
Motor overload		Torque increase value is too large during V/f control	Reduce torque boost value
		V/f curve is not appropriate when V/f control	Set V/f curve correctly
		Improper setting of motor parameters	Set correctly according to the motor nameplate
		Improper setting of motor overload protection time	Set the motor overload protection time correctly
		The motor is locked or the load sudden change is too large	Check the cause of motor lock-up or load condition
		Normal motor operates at low speed and heavy load for a long time	Select variable frequency motor
Output phase loss		Abnormal connection of motor line	Check the motor wiring
		Motor three-phase unbalance	Check the motor or replace the motor
		The vector control parameters are not set correctly	Set vector control parameters correctly
External equipment failure		External fault terminal is valid	Check the status of the external fault terminal
		Stall state lasts too long	Check whether the load is abnormal
Radiator overheat protection		Fan damage	Replace the fan
		Air duct blocked	Dredge air duct
		Abnormal temperature sensor	Seek service

Fault Name	Operating Panel Display	Cause	Possible Solution
Radiator overheat protection	Err 15	Abnormal installation of inverter module	Seek service
		Abnormal installation of inverter module	Seek service
Abnormal port communication	Err 16	Communication baud rate is set improperly	Correct setting
		The communication port cable is disconnected	Reconnect
		The upper computer does not work	Make the upper computer work
		Communication parameter error of inverter	Correct setting
EEPROM read and write failure	Err 17	Abnormal parameter reading and writing on the control board	Seek service
Parameter identification failed	Err 19	Poor motor wiring	Check the motor wiring
		Identification during motor rotation	Identification when the motor is at standstill
		Motor parameter setting deviation is too large	Set correctly according to the motor nameplate
Continuous operation time to	Err20	The continuous running time arrival function is set	
PID feedback loss	Err21	Abnormal PID feedback channel	Check feedback channel
		PID parameter setting is unreasonable	Correct setting
The module temperature detection circuit is disconnected	Err22	Poor contact of temperature sensor socket	Reseat
		The ambient temperature is too low	Increase ambient temperature
		The module temperature detection circuit is damaged	Seek service
		Damaged thermistor	Seek service
Output short circuit to ground	Err24	Output wiring is short-circuited to ground	Check motor wiring and output impedance to ground
		Abnormal motor insulation	Check the motor
		Abnormal inverter module	Seek service

Fault Name	Operating Panel Display	Cause	Possible Solution
Output short circuit to ground	Err24	The output leakage current to the ground is too large	Seek service
Module overload	Err25	Overcurrent factor	Handle according to the treatment method of overcurrent
		Abnormal input power supply	Check input grid voltage
		Abnormal motor output	Check the motor or motor wiring
		Abnormal inverter module	Seek service
Cumulative running time to	Err26	Set the cumulative running time arrival function	

Note:

- When a fault occurs, please confirm it one by one according to the causes and countermeasures. When the fault cannot be eliminated, do not power on by yourself. Please contact the supplier or manufacturer in time.

WARRANTY

❶ The company solemnly promises that users will enjoy the following warranty services from the date of purchase of products from our company (hereinafter referred to as the manufacturer).

❷ Since the product was purchased by the user from the manufacturer, enjoy the following three guarantee services:

- ⌑ Return, replacement and repair within 30 days of delivery:
- ⌑ Replacement and repair within 90 days of delivery:
- ⌑ Repair within 18 months of delivery:
- ⌑ Except when exporting abroad.

❸ This product enjoys lifetime paid service from the date of purchase by the user from the manufacturer.

❹ Disclaimer: Product failure caused by the following reasons is not covered by the manufacturer's free warranty service:

- ⌑ Failure caused by the user's use and operation in accordance with the requirements of the «Instruction Manual»:
- ⌑ Failure caused by the user to repair or modify the product without communicating with the manufacturer:
- ⌑ Failure caused by abnormal aging of the product due to poor user environment:
- ⌑ Failures caused by natural disasters such as earthquakes, fires, floods or abnormal voltages:
- ⌑ Damage to the product during transportation (the transportation method is specified by the customer, and the company assists in handling the cargo consignment procedures)

❺ Under the following conditions, manufacturers have the right not to provide warranty services:

- ⌑ When the manufacturer's product logo, trademark, nameplate, etc. are damaged or unrecognizable:
- ⌑ When the user fails to pay the purchase price in accordance with the signed contract:
- ⌑ The user intentionally conceals the manufacturer's after-sales service unit when the product is installed, wired, operated, maintained or otherwise improperly used

❻ For the service of return, replacement and repair, the company must return or return to the company, and it can only be returned or repaired after confirming the responsibility vested.

WARRANTY CARD

User information			
User name			
User address			
Postal code		Contact person	
Tel		Fax	
Machine type		Machine code	
Agent / Reseller Information			
Supplier			
Contact			
Tel		Delivery date	

CERTIFICATE OF QUALITY

QC test：_____

This product has been tested by our company's quality department, and its performance meets the standards, passes the inspection, and is approved to leave the factory.

Energy efficient , beautiful environment

SHENZHEN K-EASY AUTOMATION CO.,LIMITED

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