Foreword

Thank you for using the company's high-performance photovoltaic pump drive dedicated series of products!

Data Code:

Release time:

Version: Ver A00

MS10 series is our high reliability, small size, high performance products, Integrated high performance Maximum Power Point Tracking (MPPT) algorithm to maximize customer site requirements.

This user manual describes how to use the MS10 series correctly. Before use (installation, operation, maintenance, inspection, etc.), be sure to read this instruction manual carefully. In addition, please understand the safety precautions before using the product.

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

Precaution

- When using this product, be sure to install the shell or cover according to the regulations, and follow the contents of the instructions.
- The illustrations in this instruction manual are for illustrative purposes only and may differ from the product you order.
- Due to product upgrades or specification changes, and in order to improve the convenience and accuracy of the manual, the content of this manual will be changed in time.
- If you need to order the operation manual due to damage or loss, please contact our regional agents, or directly contact our customer service center.
- If you still have some questions, please contact our customer service center.

CATALOG

Chapter 1 Safety Information and Precaution

Security Definition:

Safety Marking Instructions that may be referred to in this manual:

⚠ Danger: a condition that may result in fire or serious injury, or even death, because the operation is not performed as required.

⚠ Caution: Failure to do as required may result in moderate injury or minor injury, as well as equipment damage.

Please read this chapter carefully when installing, debugging and maintaining this product, and be sure to operate in accordance with the safety precautions required by this chapter. Any injury or loss caused by illegal operation has nothing to do with our company.

1.1 Safety Issue

1.1.1 Before installation

⚠ **Danger**
● Water is found when opening the box, please stop installation! ● If visible parts are missing or damaged, please stop the installation! ● Product nameplate parameters are not consistent with the required product, please stop the installation!

⚠ **Notice**
● When handling the product, please take protective measures to avoid injury! ● Handle with care to avoid damaging the product! ● Before leaving the factory, the product has passed the pressure test, please do not carry out the pressure test again, so as to avoid damage to the product by abnormal operation!

1.1.2 At installation

⚠ **Danger**
● The product should be installed on metal or other fire retardant objects, otherwise there is a fire risk! ● Do not turn the fixing bolts of the equipment elements at will, especially the bolts with red marks! ● Do not install the product in an environment containing explosive gas, or there is a risk of explosion!

Notice

- Handle with care and support the bottom plate of the product to prevent injury to feet or damage to the product!
- Do not allow wire tips or screws to fall into the product. Otherwise, the product will be damaged!
- Please install the product in a place with less vibration and avoid direct sunlight!
- When the product is installed in the cabinet, heat dissipation treatment should be done well, otherwise it may cause product failure or damage!

1.1.3 Wiring

Danger

- Wiring must be carried out by professionally qualified personnel, otherwise there is a risk of electric shock or damage to the equipment!
- The product must be separated from the power supply by a circuit breaker, otherwise a fire alarm may occur!
- Before wiring, please confirm that the power supply is in zero energy state, otherwise there is a risk of electric shock!
- It is forbidden to connect the braking resistor directly between the (+) and (-) terminals of the DC bus, or fire alarm will be caused!
- The cover plate must be covered before the product can be electrified, otherwise it may cause electric shock!
- The wiring of all peripheral accessories must comply with the instructions of this manual and be correctly wired according to the circuit connection method provided in this manual, otherwise accidents will occur!

Notice

- All products of our company have been tested for pressure resistance when they leave the factory, so it is forbidden to carry out this test again, otherwise, there is a danger of equipment damage!
- The terminal signal wire of the product should be as far as possible away from the main power line wiring, and should be distributed vertically and crosswise if the distance cannot be guaranteed, otherwise, the control signal will be interfered!
- When the motor cable length is more than 100 meters, it is recommended to select the output reactor, otherwise there is a risk of equipment failure!
- The encoder must use a shielded cable and the shield must be properly

grounded!

1.1.4 Operation

Danger

- After the wiring is confirmed to be correct, ensure that the cover plate is covered before electrifying. After electrifying, it is strictly prohibited to open the cover plate, otherwise there is the risk of electric shock!
- After the product is electrified, no matter what state the product is in, do not touch the product and the peripheral circuit, otherwise there is the danger of electric shock!
- During the operation of the product, foreign matters shall be prevented from falling into the equipment, otherwise, the equipment may be damaged!
- At the beginning of power-on, the product automatically carries out safety detection on the external strong current circuit. At this time, never touch the U, V and W terminals or motor terminals of the product, or there is a risk of electric shock!
- Products stored for more than 2 years can be supplied by the power grid only after they are gradually boosted by the voltage regulator, otherwise there is a risk of equipment damage!
- Non-professional technicians are forbidden to test the signal in operation, otherwise there is a danger of injury or equipment damage!

Notice

- Check whether there is short circuit in the peripheral circuit connected with the product and whether the connection is tight, otherwise the equipment may be damaged!
- Before operation, please confirm whether the motor and machinery are within the allowable range of use, otherwise the equipment may be damaged!
- Do not touch the fan, radiator or braking resistor directly, otherwise there is a risk of mechanical damage and scalding!
- When performing rotation identification, ensure that the perimeter of the equipment is secure after operation!

1.1.5 Maintenance

Danger

- Product maintenance, inspection or replacement of parts must be carried out by professionally qualified engineers!
- It is forbidden to maintain, inspect or replace parts of the product with electricity, otherwise there is a risk of electric shock!
- Wait for at least 10 minutes after power failure to ensure that the residual voltage of electrolytic capacitors drops below 36V before maintenance, inspection or replacement of parts!
- Parameters must be set after the product is replaced, and all pluggable plug-ins must be plugged in and out when the power is off!

Notice

- When maintaining, inspecting or replacing parts, try not to touch the main body of the components, otherwise there is a risk of electrostatic damage to the devices!
- All pluggable actions must be carried out under the condition of power off!

1.2 Precaution

1.2.1 Motor insulation inspection

Before the motor is used for the first time or placed for a long time, and before the motor is used again, and during the periodic inspection, the motor insulation inspection shall be carried out to prevent the product from being damaged due to the insulation failure of the motor winding. When checking the insulation, be sure to separate the motor wiring from the product. It is recommended to use a 500V voltage type megohmmeter to ensure that the measured insulation resistance is not less than 5MΩ.

1.2.2 Thermal protection of motor

If the selected motor does not match the rated capacity of the product, especially when the rated power of the product is greater than the rated power of the motor, it is necessary to adjust the relevant parameters of motor protection in the product or install a thermal relay in front of the motor to protect the motor.

1.2.3 Operation above power frequency

This product can provide output frequency from 0Hz to 600Hz. If the customer needs to operate above 50Hz, please consider the bearing capacity of the mechanical device.

1.2.4 Vibration of mechanical device

At some output frequencies, the product may encounter the mechanical resonance point of the load device, which can be avoided by setting the product jump frequency parameter.

1.2.5 Heating and Noise of Motor

Because the output voltage of the product is PWM wave, which contains certain harmonics, the temperature rise, noise and vibration of the motor will increase slightly compared with the operation of power frequency.

1.2.6 In the case of pressure-sensitive devices or capacitors for power factor improvement on the output sides

The output of the product is PWM wave. If the capacitor for improving power factor or the varistor for lightning protection is installed on the output side, it is easy to cause instantaneous overcurrent and even damage the product. Please do not use it.

1.2.7 Switches such as contactors used at the input and output ends of the product

If a contactor is installed between the power supply and the input terminal of the product, it is not allowed to use this contactor to control the start and stop of the product. Frequent charging and discharging can reduce the service life of capacitors in products. If contactors and other switching devices are installed between the output end and the motor, ensure that the product is switched on and off when there is no output, otherwise the module in the product will be easily damaged.

1.2.8 Use other than rated voltage

It is not suitable for using MS series products outside the allowable working voltage range specified in the manual, which may cause damage to the devices in the products. If necessary, transform with the appropriate step-up or step-down device.

1.2.9 Changing three-phase input to two-phase input

It is not possible to change the use of three-phase products in the MS series to two-phase. Otherwise, it will lead to failure or product damage. If the power grid is two-phase input, please consult the maintenance personnel of the manufacturer to ensure the correct product specification and model selection.

1.2.10 Lightning Impulse Protection

This series of products are equipped with lightning over-current protection device, which has a certain self-protection ability for induction lightning. For frequent lightning customers

should also install protection in the front of the product.

1.2.11 Altitude and derating

In areas with an altitude of more than 1000m, the heat dissipation effect of the product becomes poor due to the thin air, so it is necessary to derate the use. In this case, please consult our company for technical consultation.

1.2.12 Pay attention to product scrapping

The electrolytic capacitors in the main circuit and the electrolytic capacitors on the printed circuit board may explode when they are burned. When plastic parts are burned, toxic gases will be produced. Please dispose of as industrial waste.

1.2.13 About Adapted Motor

1) Standard adaptor motors are 4-pole squirrel-cage induction motors or permanent magnet synchronous motors. If the motor is not the above, please be sure to match the product according to the rated current of the motor;

2) The cooling fan of the non-variable frequency motor is coaxially connected with the rotor shaft, and the cooling effect of the fan is reduced when the rotating speed is reduced, therefore, a strong exhaust fan should be added or a variable frequency motor should be replaced when the motor is overheated;

3) The product has built-in adaptive motor standard parameters, according to the actual situation, it is necessary to identify the motor parameters or modify the default value to conform to the actual value as far as possible, otherwise it will affect the operation effect and protection performance;

4) Short circuit in the cable or motor will cause product alarm or even explosion. Therefore, first of all, the initial installation of the motor and cable insulation short circuit test, routine maintenance also need to often carry out this test. Be sure to disconnect the product from the part being tested when doing this test.

1.3 Initial Use

Users who use this product for the first time should read this manual carefully first. If there is any doubt about the function and performance, please consult our technical support personnel for help, which is beneficial to the correct use of this product.

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

MS10 series products meet the following international standards, some products have passed the CE certification.

IEC/en 61800-5-1: 2003 Safety requirements for adjustable speed electric drive systems;

IEC/en 61800-3: 2004 Adjustable speed electric drive systems;Part 3: Electromagnetic compatibility standards for products and their specific test methods (meeting the requirements of IEC/en 61800-3 under correct installation and correct use as described in chapter 6.3).

Chapter II Product Information

2.1 Naming Rule

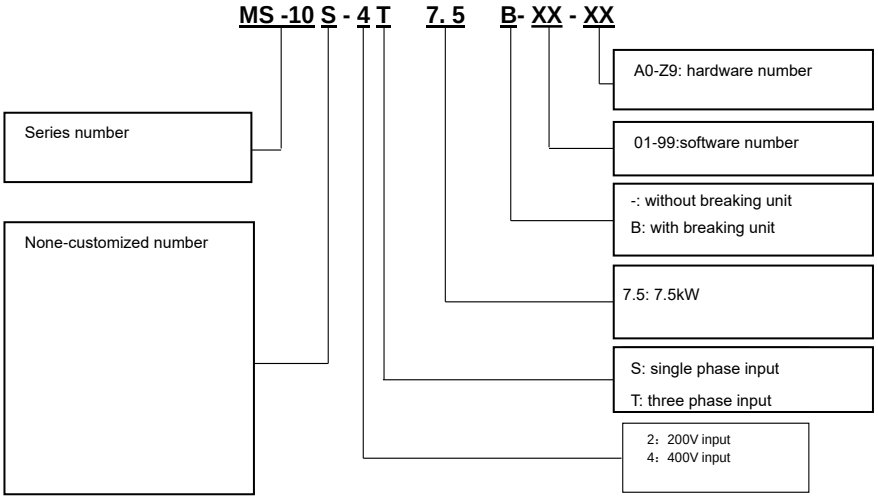


Figure 2-SEQ Figure 2-* ARABIC 1 MS10 Series Nomenclature Specification

2.2 Nameplate

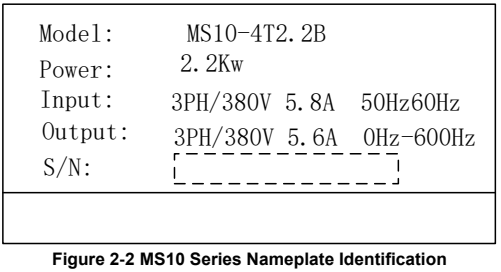


Figure 2-2 MS10 Series Nameplate Identification

2.3 Product Line

Table 2-SEQ Table 2-* ARABIC 1 MS10 Part Number and Technical Data

■ MS10-2S/T □ □ □ B, single/three-phase 220V input drive

Product Model Number	Power (kW)	Rated three-phase output current (a)	Single Phase Rated Input Current (a)	Rated three-phase input current (a)	Motor power (kW)	Brake Unit
MS10-2S/T0.4B	0.4	2.8	5.5	3.2	0.4	Built-in
MS10-2S/T0.75B	0.75	4.8	9.2	6.3	0.75	
MS10-2S/T1.5B	1.5	8.0	14.5	9	1.5	
MS10-2S/T2.2B	2.2	10	23	15	2.2	
MS10-2S/T3.7B	3.7	15	35	20.5	3.7	

■ MS10-2TXB , 3-phase 220V input drive

Product Model Number	Power (kW)	Rated three-phase output current (a)	Rated three-phase input current (a)	Motor power (kW)	Brake Unit
MS10-2T5.5B	5.5	24	29	5.5	
MS10-2T7.5B	7.5	32	35	7.5	
MS10-2T11(B)	11	45	50	11	Built-in optional
MS10-2T15(B)	15	60	65	15	
MS10-2T18.5(B)	18.5	73	80	18.5	
MS10-2T22(B)	22	91	95	22	
MS10-2T30(B)	30	112	118	30	

■ MS10-4TXB, 3-phase 400V input drive

Product Model Number		Power (kW)	Rated three-phase output current (a)	Rated three-phase input current (a)	Motor power (kW)	Brake Unit
MS10-4T0.75B	0.75G	0.75	2.8	3.5	0.75	Built-in
MS10-4T1.5B	1.5G	1.5	4.3	5.0	1.5	

Product Model Number		Power (kW)	Rated three-phase output current (a)	Rated three-phase input current (a)	Motor power (kW)	Brake Unit
MS10-4T2.2B	2.2G	2.2	5.6	6.0	2.2	
MS10-4T3.7B	3.7G	3.7	9.4	10.5	3.7	
MS10-4T5.5B	5.5G	5.5	13	14.6	5.5	
MS10-4T7.5B	7.5G	7.5	17	20.5	7.5	
MS10-4T11B	11G	11	25	29	11	
MS10-4T15B	15G	15	32	35	15	
MS10-4T18.5B	18.5G	18.5	39	44	18.5	Built-in
MS10-4T22B	22G	22	45	50	22	
MS10-4T30B	30G	30	60	65	30	
MS10-4T37B	37G	37	75	80	37	
MS10-4T45*	45G	45	91	95	45	
MS10-4T55*	55G	55	112	118	55	
MS10-4T75*	75G	75	150	157	75	

2.4 Technical Specification

Input/Output Feature	Rated input voltage	200V voltage class: DC-200 ~ 400V, AC single/three-phase 220V
		400V voltage class: 3-phase 380VAC voltage, continuous fluctuation ± 10%, transient fluctuation -15% ~ + 10%
	Rated input frequency	50Hz/60Hz±5%
	Output Voltage	3-phase: 0 ~ rated input voltage, error less than ± 3%
	Output frequency	0.00 ~ 600.00Hz, 0.01Hz
	Overload capacity	150% 1 minute;180% 10 second;200% 0.5 second
Operation Control Feature	Control Mode	V/f control PG-less vector control (SVC)
	Speed Control Range	1:100 （V/f） 1:200 （SVC）
	Speed Control Accuracy	± 0.5% (V/f control) ±0.2% （SVC）
	Velocity fluctuation	±0.3% （SVC）
	Torque Response	<10ms（SVC）
	Starting Torque	0.5Hz：180%（V/f，SVC） 0.25Hz：180%（SVC）
Basic function	V/F curve	Three modes: linear type;Multipoint type;N-th power V/F curve
	V/F separation	Two modes: total separation and semi-separation
	Acceleration /Deceleration Curve	Linear or S curve acceleration and deceleration mode;Four acceleration and deceleration times;Acceleration and deceleration time range 0.0 ~ 60000s
	DC braking	DC braking frequency: 0.00Hz ~ maximum frequency, braking time: 0.0s ~ 30.0s, braking action current value: 0.0% ~ 100.0%
	Inching control	Inching frequency range: 0.00Hz ~ 50.00Hz;Inching acceleration and deceleration time 0.0s ~ 60000s

	Simple PLC, multi-speed operation	Up to 16-speed operation via built-in PLC or control terminal
	Built-in PID	Closed-loop control system capable of realize process control conveniently
	Automatic voltage regulation (AVR)	When the grid voltage changes, it can automatically keep the output voltage constant
	Overvoltage and overspeed loss control Fast current limiting function	Automatically limits current and voltage during operation to prevent frequent overcurrent and overvoltage trip Minimize overcurrent faults and protect the normal operation of the product
	Torque limitation and control	Automatic torque limit during operation to prevent frequent overcurrent trip
	Input terminal	Six switching value input terminals, of 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, a square wave signal output of 0-50kHz, a switching value output terminal, a group of relay output terminals, An analog output terminal, voltage and current output optional, can set the frequency, output frequency and other physical output
Featured function	All kinds of main and auxiliary setting and switching, speed search, multiple acceleration and deceleration curve selection, brake control, can support up to 16 speed operation (two speed support flexible frequency setting mode), Swing frequency control operation, Fixed length control, Counting function, Overexcitation braking, Overvoltage stall, Undervoltage stall, Restart after power failure, Jump frequency, Frequency binding, Free switching of four-stage	

	acceleration and deceleration time, Motor temperature protection, Flexible fan control, Process PID control, Simple PLC, Droop control, Parameter identification, Field weakening control, High-precision torque limit, V/VF Separation control	
Protection Function	Short circuit detection, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection and overload protection of electrified motor	
Environment	Place of use	Indoor, not direct sunlight, no dust, corrosive gases, flammable gases, oil mist, water vapor, dripping water or salt and so on
	Altitude above sea level	For derating above 1000m, the rated output current will be derated by 1% for every 100m
	Ambient temperature	-10 ℃ ~ 50 ℃, 50 ℃ ~ 60 ℃ for derating, 1 ℃ higher, 1% lower rated output current
	Humidity	5 ~ 95%, condensation is not allowed
	Vibration	Less than 5.9 m/S2 (0.6g)
	Storage Temperature	-20℃～+60℃
Other	Mounting method	Wall-mounted
	Degree of protection	IP20
	Cooling Mode	Forced Air Cooling

2.5 Product outline drawing and mounting hole sizes

2.5.1 Schematic diagram of product shapes

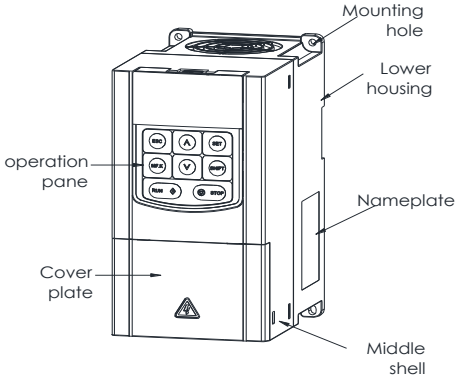


Figure 2-3 MS10 Series 4T01.5B-4T22B Outline

2.5.2 Dimensions of appearance and mounting hol

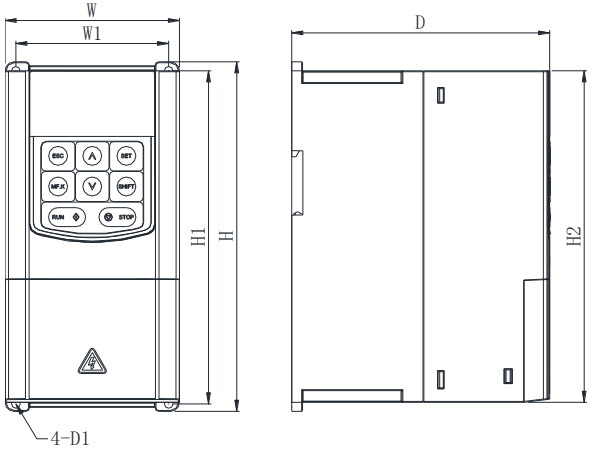


Figure 2-4 Outline dimensions and mounting dimensions of MS10 series 4T1.5B-4T22B

Table 2-2 MS10 Product Appearance and Mounting Hole Size (mm)

Product Model Number	Mounting hole position mm		Body size mm				Mounting aperture mm	Gross Weight kg
	W1	H1	H	H2	W	D		
MS10-2S/T 0.4B	67.5	160	170	/	84.5	129	ø4.5	1.0
MS10-2S/T0.75B								
MS10-2S/T 1.5B								
MS10-2S/T2.2B								
MS10-2S/T3.7B	85	185	194	/	97	143.5	ø5.5	1.4
MS10-4T3.7B								
MS10-4T5.5B								
MS10-2T5.5B	106	233	245	/	124	171.2	ø5.5	2.5
MS10-4T7.5B								
MS10-4T11B								
MS10-4T15B	147	298	310	/	165	186.3	Ø6	8.2
MS10-4T18.5B								
MS10-4T22B								
MS10-4T30B	150	387.5	405	/	255	195	Ø8	12.8
MS10-4T37B								
MS10-4T45B	180	437	455		300	225	Ø10	17.8
MS10-4T55B								

2.5.3 External dimensions of external keyboard

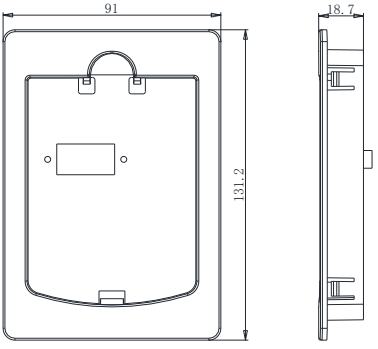


Figure 2-5 External Dimensions of External Keyboard

2.5.4 Installation hole size of external keyboard:

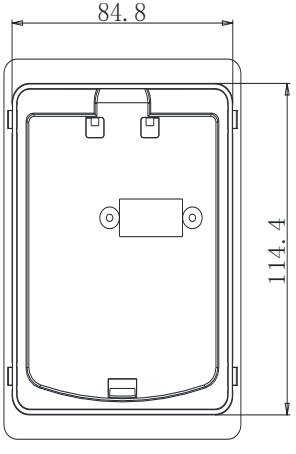


Figure 2-6 Dimensions of the Mounting Holes of the External Keyboard

2.6 Brake Component Selection Guide

Table 2-3 Brake component selection table of MS10 product

Product Model Number	Brake Resistor Recommended Power	Recommended value of braking resistor	Brake Unit	Remark
MS10-2S/T 0.4B	80W	≥200Ω	Built-in optional Or standard built-in	After the product model Add "B"
MS10-2S/T0.75B	150W	≥150Ω		
MS10-2S/T 1.5B	200W	≥80Ω		
MS10-2S/T2.2B	300W	≥50Ω		
MS10-2S/T3.7B	450W	≥30Ω		
MS10-4T3.7B	100W	≥250Ω		
MS10-4T5.5B	150W	≥220Ω		
MS10-2T5.5B	150W	≥100Ω		
MS10-4T7.5B	740W	≥50Ω		
MS10-4T11B	800W	≥40Ω		
MS10-4T15B	1000W	≥32Ω		
MS10-4T18.5B	1300W	≥20Ω		
MS10-4T22B	1500W	≥16Ω		

Note: Please select the resistance value of the braking resistor strictly according to the above table, otherwise the built-in braking unit or the resistor may be damaged.

2.7 Type Selection Guidance

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

When selecting a product, first of all, the technical requirements of the system for variable frequency speed regulation, the application situation of the product and the specific conditions of load characteristics must be made clear, and comprehensive consideration should be made from the aspects of adaptive motor, output voltage, rated output current and other factors, so as to select a model that meets the requirements and determine the operation mode.

Generally speaking: the rated load current of the motor can not exceed the rated current of the drive product. It is necessary to select according to the motor capacity or output current capacity specified in the manual, and pay attention to comparing the rated current of the motor and the product. The overload capacity of the product is meaningful for the starting and braking process. All in the course of the operation of a short overload situation, will

cause changes in the speed of the load. If the speed accuracy requirements are relatively high, please consider enlarging a power gear.

Fan and water pump type: the overload capacity requirements are low, because the load torque is proportional to the square of the speed, so the load is light when running at low speed (except Roots fan), and because this kind 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 on speed accuracy and dynamic performance are generally not high. Uch as extruders, mixers, conveyor belts, trams for in-plant transport, translation mechanisms for cranes, etc. Multi-stage V/F operation mode can be selected for type selection.

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

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

Chapter III Mechanical and Electrical Installation

3.1 Mechanical Installation

3.1.1 Installation environment and requirements:

1） Ambient temperature: The operating ambient temperature of the product is not allowed to exceed the allowable temperature range (-10 ℃ ~ 60 ℃).

2） Install the product on the surface of the flame-retardant object, and there should be enough space around it to dissipate heat. When the product works, it is easy to produce a lot of heat. And is vertically mount on that mounting support by screw.

3） Please install it in a place where it is not easy to vibrate. Vibration shall not be greater than 0.6G. Pay special attention to keep away from punch and other equipment.

4） Avoid direct sunlight, humidity, water droplets installed in the place.

5） Avoid installing in places where there are corrosive, flammable and explosive gases, oil, dust and metal powder in the air.

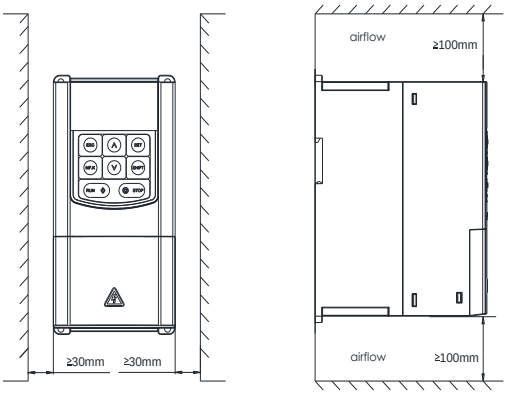


Figure 3-SEQ Figure 3-* ARABIC 1 MS10 Product Installation Diagram

Mounting up and down: When the product is mounted up and down, please install the heat insulation deflector.

Rated current level	Mounting Dimension	
	Longitudinal height	Transverse Width
≤32A	≥100mm	--
32A—60A	≥200mm	≥50mm

3.2 Electrical installation

3.2.1 Guidance for Selection of Peripheral Electrical Component

Table 3-SEQ Table 3-* ARABIC 1 MS10 Product Peripheral Electrical Component Selection Guidance

Product Model Number	Empty A	Contactor A	Input side main circuit wired mm2	Output side main circuit wired mm2	Control Loop Conductor mm2
MS10-2S/T 0.4B	16	10	2.5	2.5	1.0
MS10-2S/T0.75B	16	10	2.5	2.5	1.0
MS10-2S/T 1.5B	20	16	4.0	2.5	1.0
MS10-2S/T2.2B	32	20	6.0	4.0	1.0
MS10-2S/T3.7B	10	10	2.5	2.5	1.0
MS10-4T3.7B	16	10	2.5	2.5	1.0
MS10-4T5.5B	16	10	2.5	2.5	1.0
MS10-2T5.5B	25	16	4.0	4.0	1.0
MS10-4T7.5B	32	25	4.0	4.0	1.0
MS10-4T11B	40	32	4.0	4.0	1.0
MS10-4T15B	63	40	6.0	6.0	1.0
MS10-4T18.5B	80	60	8.0	8.0	1.0
MS10-4T22B	100	60	10.0	10.0	1.0
MS10-4T30B	100	80	16.0	16.0	1.0
MS10-4T37B	100	80	16.0	16.0	1.0
MS10-4T45B	125	95	25.0	25.0	1.0
MS10-4T55B	160	150	25.0	25.0	1.0

3.2.2 External wiring

The typical wiring diagram of single-phase product is as follows:

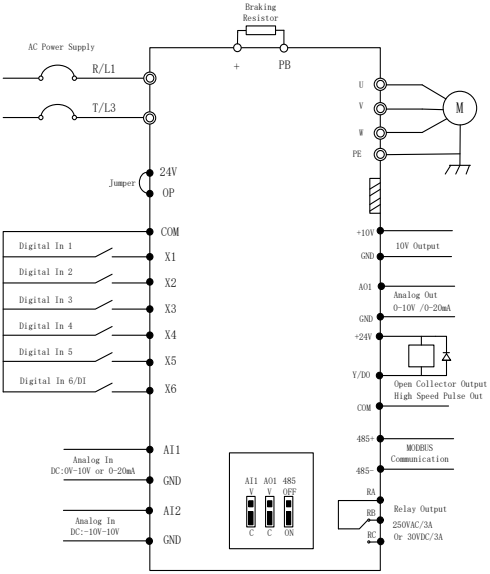


Figure 3-2 Schematic diagram of typical wiring of single-phase product

Caution:

1) Terminal ◎ indicates the main circuit terminal, indicating the control circuit terminal.●

2) 2S/T0.75B-2S/T22B built-in brake unit optional.

3) The "B" on the back of the product model indicates the self-contained brake unit.

4) The braking resistor is selected according to the user's needs. For details, refer to the Braking Resistor Selection Guide.

5) The signal and power cables must be routed separately. If the control and power cables are crossed, they should be crossed at a 90-degree angle as far as possible. It is better to select shielded twisted pair for analog signal wire, and select shielded three-core cable for power cable (the specification of which is one grade higher than that of ordinary motor cable) or follow the user manual of the product.

Schematic diagram of three-phase product wiring:

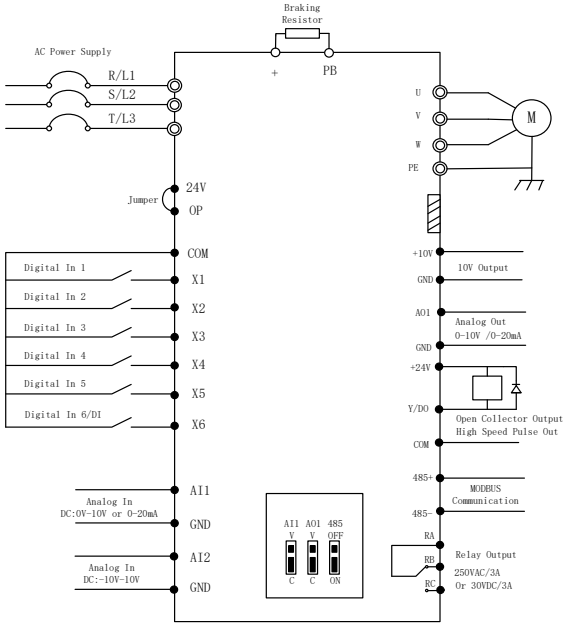


Fig. 3-3 Schematic Diagram of Wiring for Three-Phase Products Below 4T22B

Caution:

1) Terminal ◎ indicates the main circuit terminal, indicating the control circuit terminal.●

2) The built-in brake unit of 4T0.75B-4T22B model can be selected according to the model, please pay attention to the corresponding model and the configuration description of the relevant brake part.

3) The "B" on the back of the product model indicates the self-contained brake unit.

4) The braking resistor is selected according to the user's needs. For details, refer to the Braking Resistor Selection Guide.

5) The signal and power cables must be routed separately. If the control and power cables are crossed, they should be crossed at a 90-degree angle as far as possible. It is better to select shielded twisted pair for analog signal wire, and select shielded three-core cable for power cable (the specification of which is one grade higher than that of ordinary motor cable) or follow the user manual of the product.

3.2.3 Main circuit terminal and wiring

Danger

1、 Make sure that the power switch is in the off state before wiring operation, otherwise electric shock accident may occur!

2、 Wiring personnel must be professional trained personnel, otherwise equipment and personal injury may be caused!

3、 Must be reliably grounded, otherwise there is electric shock or fire hazard!

Notice

1、 Confirm that the input power is consistent with the rated value of the product, otherwise the product will be damaged!

2、 Make sure that the motor and the product are compatible, otherwise the motor may be damaged or the product protected!

3、 It is impossible to connect the power supply to U, V and W terminals, otherwise the product will be damaged!

4、 Do not connect the braking resistor to the DC bus (+) or (-) directly, or fire alarm will be caused!

1) Description of main circuit terminal of 2T series products:

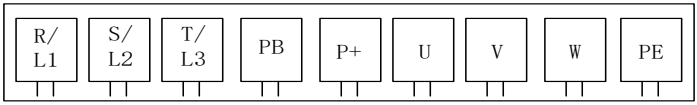


Figure 3-4 Schematic diagram of main circuit wiring of MS10 series product

Terminal Marker	Name	Explain
R/L1 S/L2 T/L3	4T/2T series power input terminal	AC input Three-phase power supply connection point Single-phase 220V AC power supply connection point
P+、PB	Brake resistor connection terminal	Connecting the braking resistor
U、V、W	Product output terminal	Connecting three-phase motor
PE	Earthing terminal	Earthing terminal

3.2.4 Main circuit terminal wiring requirements of MS10 series products:

Table 3-2 Main circuit terminal wiring requirements for MS10 product

MS10 Specification	Maximum wiring size of power terminal		Torque Torque
	mm2	AWG	kgf.cm
MS10-2S00.75B	2.5	14	14±0.5
MS10-2S0.75B	2.5	14	14±0.5
MS10-2S1.5B	4.0	12	14±0.5
MS10-2S2.2B	6.0	10	14±0.5
MS10-4T0.75B	2.5	14	10±0.5
MS10-4T1.5B	2.5	14	10±0.5
MS10-4T2.2B	2.5	14	10±0.5
MS10-4T3.7B	4.0	12	14±0.5
MS10-4T5.5B	4.0	12	14±0.5
MS10-4T7.5B	6.0	10	18±0.5
MS10-4T11B	6.0	10	18±0.5
MS10-4T15B	8.0	8	48±0.5
MS10-4T18.5B	8.0	8	48±0.5
MS10-4T22B	10.0	8	48±0.5

3.2.5 Control terminal and wiring:

1） The terminal arrangement of the control circuit is shown as follows:

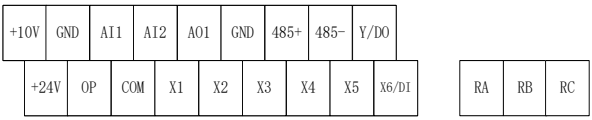


Figure 3-6 Layout of control circuit terminal

2） Function description of control terminal:

Table 3-SEQ Table 3-* ARABIC 2 MS10 Product Control Terminal Function Description

Categories	Terminal Symbol	Terminal Name	Function description
Power source	+10V-GND	External + 10V power supply	External + 10V power supply, maximum output current: 10ma Used as working power supply for external potentiometer, resistance range: 1kΩ ~ 50kΩ
	+24V-COM	External + 24V power supply	External + 24V power supply, commonly used as digital input and output terminal working power supply and external sensor power supply, maximum output current: 200ma
	OP	Xternal power input terminal	Connections to + 24V or com are selected via the sheet metal jumpers on the control board terminals, factory default to + 24V When X1 ~ X6 are driven by external signal, op shall be connected with external power supply and the short circuit sheet metal shall be removed
Mould Quasi Lose In	AI1-GND	Analog input terminal 1	1. Input voltage range: DC 0V ~ 10V/4ma ~ 20ma, determined by jumper. 2. Input impedance: 100kΩ
	AI2-GND	Analog input terminal 2	1. Input range: DC -10V ~ 10V 2. Input impedance: 100kΩ for voltage input and 500Ω for current input.
Number Word Lose In	X1-OP	Digital Input 1	1. Optical coupler isolation, compatible with bipolar input 2. Input impedance: 4.7kΩ 3. Voltage range for level input: 9V ~ 30V
	X2-OP	Digital Input 2	
	X3-OP	Digital Input 3	
	X4-OP	Digital Input 4	
	X5-OP	Digital Input 5	
	X6-OP	High-speed pulse input terminal	Besides the functions of X1 ~ X5, it can also be used as a high-speed pulse input channel.

Categories	Terminal Symbol	Terminal Name	Function description
			Maximum input frequency: 50kHz
Simulate Output	AO1-GND	Analog Output 1	The AO1 jumper selection on the control board determines the voltage or current output. Output voltage range: 0V ~ 10V Output current range: 0ma ~ 20ma
Number Word Lose Out of	Y/DO-COM	Digital Output 1 (High Speed Output Compatible)	Optocoupler isolation, bipolar open collector output Output voltage range: 0V ~ 24V Output current range: 0ma ~ 50ma Note that GND for the digital output and com for the digital input are internally isolated.
Relay output	RA-RB	Normally closed terminal	Contact drive capability: AC250V，3A；DC 30V，3A。
	RA-RC	Normally Open Terminal	
Communication Port	485+/485-	Communication Interface	Transfer rate: 4.8K/9.6K/19.2K/38.4K/57.6K/115.2Kbps Maximum distance 500 meters (using standard network cable)
Keyboard	CN3	External Keyboard Interface	Standard network cable is adopted. When the operation panel is connected, the longest communication distance is 3 meters.

3) Control terminal screws and wiring specifications:

Cable type	Cable size (mm2)	Screw	Moment (kgf.cm)
Shielded Cable	1.0	M3	5±0.5

3.3 Control Panel Wiring Instruction

Operating instruction of analog input and output terminal

Voltage signals of analog input and output are particularly vulnerable to external interference, so shielding cables are generally used for transmission, and the wiring distance is as short as possible, and one end of the shielding layer is well grounded by the drive, and the transmission distance should not exceed 20m as far as possible.

The control cable shall be kept at a distance of more than 20cm from the main circuit and strong current line, and shall not be placed in parallel with the strong current line. When crossing the strong current line, it is recommended to adopt the vertical wiring mode to prevent the drive from misoperation due to interference.

When the analog input and output signals are disturbed seriously, the filter capacitor or ferrite core should be installed at the analog signal source side.

Switching value input and output terminal operation instruction

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

During wiring, the control cable shall be kept more than 20cm away from the main circuit and strong current line, and shall 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 adopt the vertical wiring mode to prevent misoperation of the drive caused by interference.

3.3.1 Operating Instructions for Switching Value Input Terminal

- **Dry contact mode**

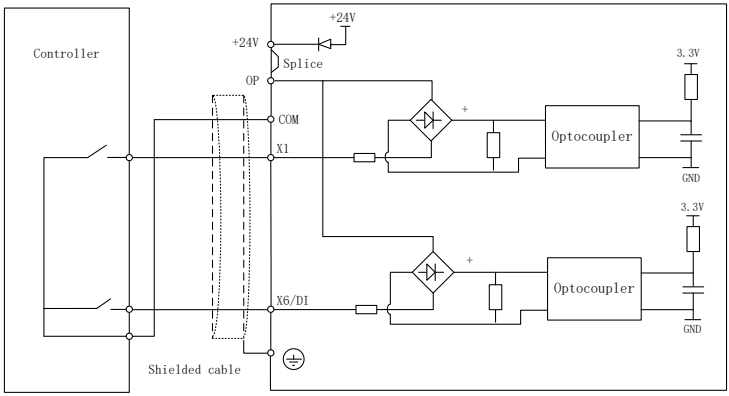


Figure 3-7 Use internal power supply dry contact

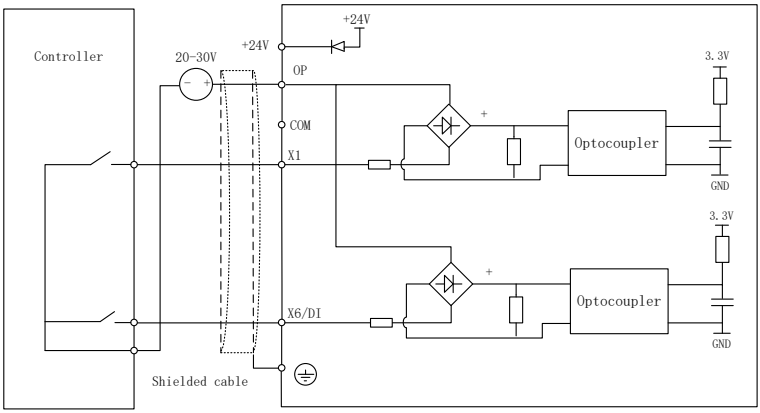


Figure 3-8 Dry contact mode using external power supply

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

- **Open collector NPN connection**

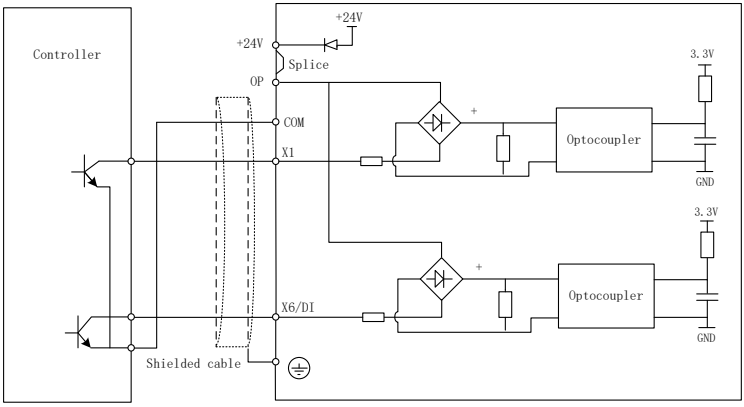


Figure 3-9 Open Collector NPN Wiring Using Internal Power

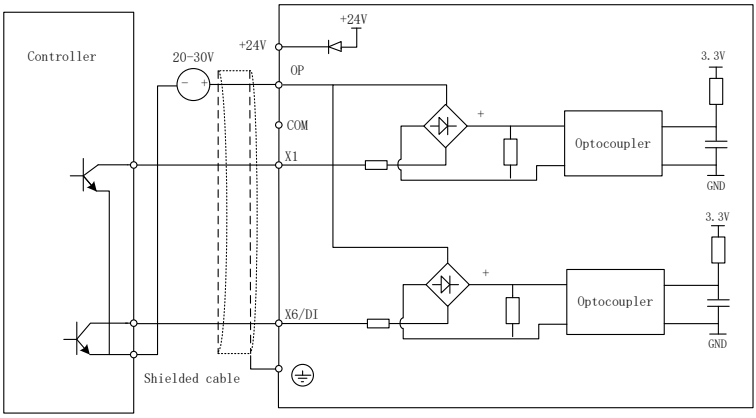


Figure 3-10 Open Collector NPN Wiring Using External Power

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

- **Open collector PNP connection**

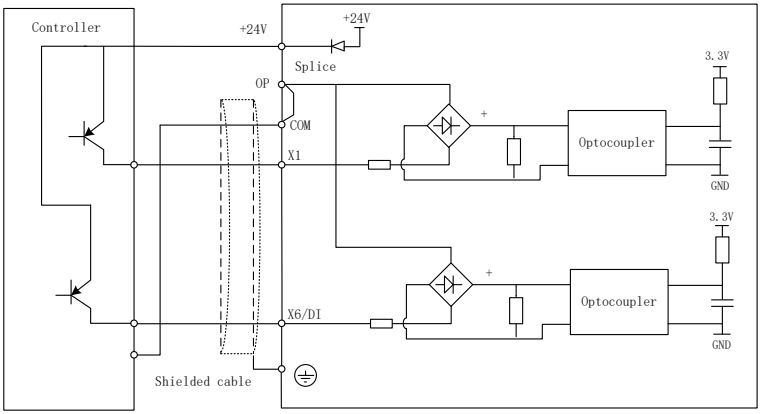


Figure 3-11 Open Collector PNP Wiring Using Internal Power

When using PNP wiring mode, the short circuit piece between + 24V and op must be removed and connected between op and com, otherwise it can not work normally.

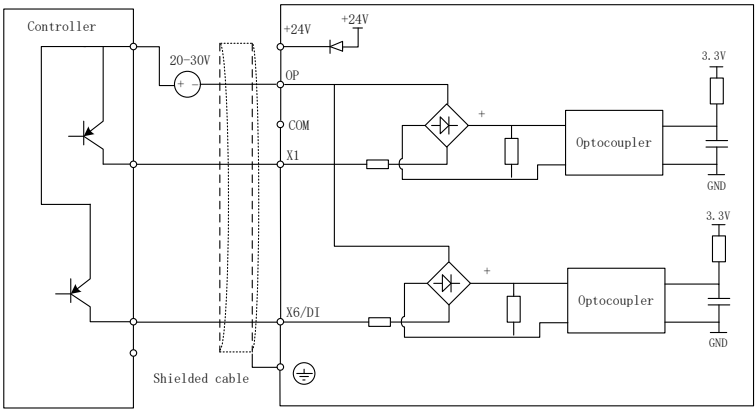
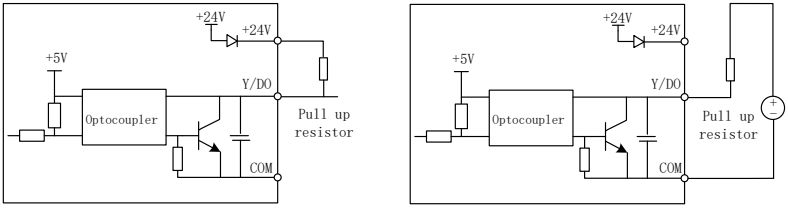


Figure 3-12 Open Collector PNP Wiring Using External Power Supply

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

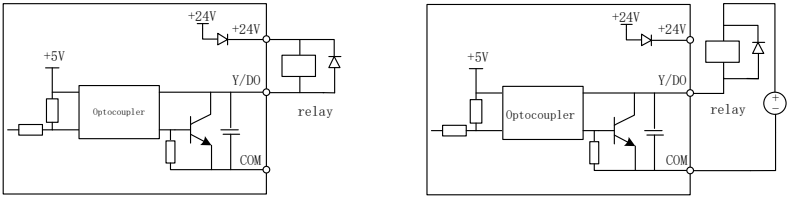
3.3.2 Operating Instructions for Switching Value Output Terminal



A) Using internal power supply B) Using external power supply

Figure 3-13 Wiring Mode When Y/do Terminal Is Connected to Pull-up Resistor Output

When Y/do terminal is set as pulse output, 0 ~ 50kHz pulse signal can be output.



A) Using internal power supply B) Using external power supply

Figure 3-14 Wiring Mode When Y/do Terminal Drives Relay

1. When the coil voltage of the relay is lower than 24V, it is necessary to add a resistor between the relay and the

output terminal according to the coil impedance to divide the voltage. 、

Relay output terminal wiring instruction

2. The MS10 series drive control panel has a set of programmable relay dry contact outputs.

3. The relay contacts are RA/RB/RC, of which RA and RB are normally closed contacts, and RA and RC are normally open contacts. See the function code for the function definition.

4. If driving inductive load (such as electromagnetic relay or contactor), surge voltage absorption circuit should be installed, such as RC absorption circuit (note that its leakage current should be less than the holding current of controlled contactor or relay), varistor or freewheeling diode (for DC electromagnetic circuit, pay attention to the polarity when installing). Absorber circuit elements are mounted close to the coil ends of the relay or contactor.

3.3.3 Function description of signal switching jumper switch

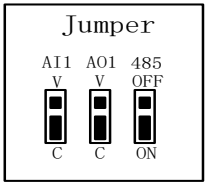


Figure 3-15 Signal Switching Jumper Switch Diagram

Label	Function	Factory settings
485	485 termination resistor selection: on is 100 Ω termination resistor, and off is non-termination resistor	Off: No resistor
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 Wiring

The working principle of the drive determines that it will produce a certain amount of noise, which will affect and interfere with other equipment; At the same time, the weak current signal inside the drive is also easily interfered by the drive itself and other equipment. In order to reduce or eliminate the outside interference of the drive and the outside interference of the drive, this section makes some brief explanations on noise suppression, grounding treatment, leakage current suppression and the application of power filter.

3.4.1 Noise suppression measured

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

1) adding an input noise filter at the input end of an drive;

2) instal a power filt at that power input end of the affected equipment;

3) Use an isolation transformer to isolate the noise propagation path between other equipment and the drive.

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

1) Easily affected equipment and signal lines should be installed as far away from the drive as possible.

2) The shielded cable shall be used for the signal wire, and the shielding layer shall be grounded reliably. The signal wire cable can also be sheathed in the metal pipe, and the distance between the metal pipes shall be at least 20cm. The signal wire and power wire shall be kept away from the drive and its peripheral devices and cables as far as possible, so as to avoid parallel wiring or bundled wiring with the power wire.

When the signal line must pass through the power cable, it should keep orthogonal crossing.

3) The motor cable should be placed in a barrier with a larger thickness, such as a pipeline with a thickness of more than 2mm or buried in a cement groove, or the power line can be placed in a metal pipe and grounded by a shielded cable.

4) 4-core motor cables are used, one of which is grounded near the drive, and the other side is connected to the motor shell.

And 5) that radiate noise of the power line can be suppress by respectively adding a radio noise filter and a linear noise filter such as a ferrite common mode choke coil at the input end and the output end of the invert.

3.4.2 Grounding Treatment

Special earthing is recommended as shown in the figure below:

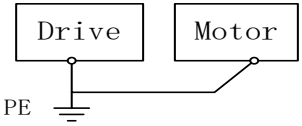


Figure 3-16 Grounding Treatment

1. The impedance of the grounding system should be reduced by using the largest standard size of grounding cable as far as possible;

2. The grounding wire shall be as short as possible;And that ground point is as close as possible to the invert

3. One wire of four-core motor cable shall be grounded at the drive side, and the other side shall be connected to the motor grounding terminal. If the motor and drive have special grounding poles, the effect will be better;

4. When the grounding terminals of all parts of the system are connected together, the leakage current will become a noise source, which will affect other equipment in the system. Therefore, the grounding terminals of the drive and other easily interfered equipment shall be separated;

5. The grounding cable shall be arranged away from the input and output wiring of noise sensitive equipment.

3.4.3 Leakage current suppression

The leakage current flows through the distributed capacitances between the input and output lines of the drive and to the ground, and its magnitude is related to the capacitance of the distributed capacitance and the carrier frequency. Leakage current is divided into earth leakage current and line leakage current.

1. The earth leakage current not only circulates in the drive system, but also may affect other equipment because of the ground loop. The leakage current may cause the leakage protector and other equipment to malfunction. The higher the carrier frequency of the drive is, the larger the leakage current to ground is; The longer the motor cable, the larger the parasitic capacitance, the greater the leakage current to ground. Therefore, the most direct and effective method to restrain the leakage current to ground is to reduce the carrier frequency and select the shortest possible motor cable.
2. The higher harmonic of the wire-to-wire leakage current flowing through the cables at the output side of the drive will accelerate the aging of the cables, and may also cause misoperation of other equipment. The higher the carrier frequency of the drive is, the larger the leakage current is; The longer the motor cable is and the larger the parasitic capacitance is, the larger the line-to-line leakage current is. Therefore, the most direct and effective method to restrain the leakage current to ground is to reduce the carrier frequency and select the shortest possible motor cable. Increasing the output reactor can also effectively suppress the size of the leakage current between lines.

3.4.4 Use of Power Filter

Drive is a kind of equipment that can produce strong interference and is sensitive to external interference, so it is recommended to use power filter. Pay attention to the following points when using:

1. The shell of the filter body shall be reliably grounded;
2. The input and output lines of the filter are as far away as possible to avoid mutual coupling;
3. The filter shall be close to the drive terminal as far as possible, and the filter and the drive shall be connected to the same common ground.

Chapter 4 Operation and Display

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:

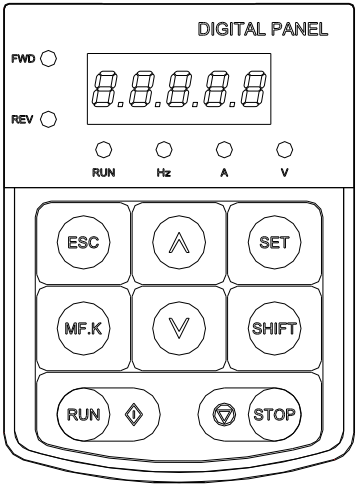


Figure 4-SEQ Figure 4-* ARABIC 1 Operator Panel Diagram

1） Description of status display lamp:

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.

2） Unit indicator:

Hz Frequency unit a Current unit V Voltage unit

RMP (Hz + a) units% (a + V) percent

3） Digital display area:

5-digit led display, which can display the set frequency, output frequency, various monitoring

data and alarm code, etc.

4） Explanation of keyboard button

Table 4-SEQ Table 4-* ARABIC 1 Keyboard Function Table

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 F7-16.
MF.K	Multifunction selection key	Select function switch according to F7-00

4.2 Description of function code viewing and modification method

The operation panel of MS10 product adopts secondary menu structure to set parameters and other operations.

4.2.1 Parameter modification/setting steps:

A. In the monitoring state, press ESC to enter the function code parameter display state.

B. When the parameter code is displayed, the current flashing bit data can be modified by pressing the "shift" key and flashing the parameter bit of parameter function code.

And C, modif that flashing paramete group to the modified target function code group by pressing the/key. △ ▽

D. Press "set" to enter the parameter function code.

E. Modify to the target parameter value, press set, and confirm to modify the parameter value.

And F. aft that parameter modification is finis, the current display function code automatically jumps to the next effective display function code to finish the parameter modification.

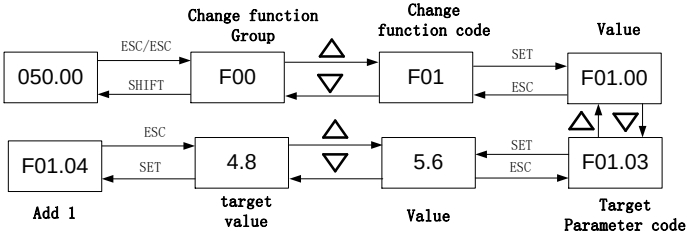


Figure 4-2 Parameter Modification Flowchart

4.2.2 Monitoring status display:

4.2.2.1 Monitoring parameter switching in shutdown state

When the machine is stopped, the preset frequency is displayed by default. When the preset frequency is displayed, the display value flashes. You can switch to display other parameters by pressing the shift key. In addition to setting the frequency in the shutdown state, we also need to check the bus voltage, and switch to the display content in the shutdown state through the shift button.

4.2.2.2 Monitoring parameter switching in running state

In the running status, the running frequency is displayed by default, and other parameters can be switched and displayed by the Shift key. For example, in the shutdown state, besides setting the frequency, we also need to check the bus voltage and output current, and switch to the display content in the shutdown state through the shift key.

4.2.2.3 Monitoring parameter switching in running state

If the digital function terminal up/down is valid or/on the operation panel under the shutdown, fault or operation state, directly enter the digital frequency parameter modification state, and directly write the modified frequency into the F00.07 parameter group. △ ▽

Chapter 5 Function Parameter Table

5.1 MS10 Function Code Group List:

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

Change property description:

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

The parameters can be changed when they are not locked by the keyboard and the parameters in the shutdown state, and the running state can not be changed;

Monitoring parameters, cannot be changed.

5.2 Function Parameter Summary

Function Code	Name	Explain	Ex-factory Value	Attribute
F00 Group: Basic Function Group				
F00.00	Speed Control Mode	0: VF 1: SVC 2: With FG vector control	0	△
F00.01	Run Instruction Selection	0: Operator Panel 1: Terminal 2: Communication	0	△
F00.02	Main frequency command input select	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 select	Same as F00.02	0	△
F00.04	Auxiliary frequency command range selection in superposition	0: Relative to maximum frequency 1: Relative to master frequency command	0	△
F00.05	Auxiliary frequency source given coefficient	0.0～150.0%	100.0%	◎
F00.06	Frequency source superposition selection	0: main frequency source given valid 1: auxiliary frequency source given valid 2: main + auxiliary 3: main-auxiliary 4: both maximum 5: binary minimum	0	△
F00.07	Digital frequency settings	0.00~Fmax	50.00Hz	◎
F00.08	Direction of operation	0: Same Direction 1: Opposite Direction	0	◎
F00.09	Acceleration time1	0.00~600.00s	Model determination	◎
F00.10	Deceleration Time1	0.00~600.00s	Model determination	◎
F00.11	Maximum frequency（Fmax)	10.00～600.00Hz	50.00Hz	△
F00.12	Upper Frequency Limit (Fup)	Fdown～Fmax	50.00Hz	◎
F00.13	Lower limit frequency (Fdown)	0.00～Fup	0.00Hz	◎
F00.14	Frequency control with frequency set below lower limit	0: Run at the lower limit frequency 1: Run at 0 speed after the lower limit frequency running time is reached	0	△
F00.15	Lower frequency run times	0.0～6000.0s	60.0s	△
F00.16	Carrier frequency	0.500kHz～16.000kHz	Model determination	◎
F00.17	Carrier frequency adjustment with frequency	0: No 1: Y	0	△
F00.18	AVR with automatic voltage regulation	0: Invalid 1: Always valid	1	△
F00.19	Overmodulation factor	1.00～1.09	1.05	◎
F00.20	Reservation			
F00.21	Reservation			
F00.22	Fan Control	0: Run at powerup1: Intelligent model	1	△
F00.23	PWM modulation model	0: Seven-segment 1: Five-segment	0	△
F00.24	Manufacturer Password	0～65535	0	△

F00.25	Drive power rating	0.2～1000.0kW	Model determination	×
F00.26	Drive rated voltage	60～660V	Model determination	×
F00.27	Drive rated current	0.1～1500.0A	Model determination	×
F00.28	Software version	0.00～655.35	Model determination	×
F00.29	Factory Value Control	0: Invalid 1: Restore factory values(Including motor parameters) 2: Restore factory values (excluding motor parameters) 3: Backup current user parameters 4: Restore user backup parameters 5: Clear fault record information 6: Clear power consumption	0	△
Group F01: motor parameter group				
F01.00	Motor type selection	0: Three-phase asynchronous motor 1: Permanent magnet synchronous motor 2: Single-phase asynchronous motor (with capacitor removed) 3: Single-phase asynchronous motor (without capacitor removed)	0	△
F01.01	Motor power rating	0.1~1000.0kW	Model determination	△
F01.02	Rated voltage of motor	60~660V	Model determination	△
F01.03	Rated current of motor	0.1~1500.0A	Model determination	△
F01.04	Rated frequency of motor	20.00~Fmax	Model determination	△
F01.05	Rated speed of motor	1~30000	Model determination	△
F01.06	Asynchronous motor stator resistance Rs	0.001～65.535Ω	Model determination	△
F01.07	Asynchronous motor rotor resistance Rr	0.001～65.535Ω	Model determination	△
F01.08	Leakage inductance of asynchronous motor	0.01～655.35mH	Model determination	△
F01.09	Asynchronous motor mutual inductance	0.1～6553.5mH	Model determination	△
F01.10	No-load current of asynchronous motor	0.01～150.00A	Model determination	△
F01.11	Ynchronous motor stator resistance	0.001～65.535Ω	Model determin	△

			ation	
F01.12	Direct axis inductance of synchronous machine	0.01～655.35mH	Model determination	△
F01.13	Quadrature-axis inductance of synchronous machine	0.01～655.35mH	Model determination	△
F01.14	Back electromotive force of synchronous machine	0～65535V	Model determination	◎
F01.15	Finding Initial Angle by Open Loop Control of Synchronous Motor	0: Don't find 1: Find	0	△
F01.16	Motor Pole Number	0～1000	4	×
F01.28	Parameter self-identification	0: no identification 1: motor static self-identification 2: motor rotation self-identification	0	△
Group F02: motor vector control parameter				
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	Toggle Frequency 2	F10.03 ~ Upper limit frequency	10.00Hz	◎
F02.06	Vector Control Slip Gain	50.0～200.0%	100.0%	◎
F02.07	ASR filtering time	0.0～500.0ms	3.0ms	◎
F02.08	Excitation gain coefficient	50.0～200.0%	100.0%	◎
F02.09	Torque upper limit in speed control model	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 integration time Ti1	0.0 ~ 3000.0ms 0.0: no integration	10.0ms	◎
F02.12	ACR torque adjustment proportional gain KP2	0.00～10.00	0.50	◎
F02.13	ACR Torque Adjustment Integration Time Ti2	0.0 ~ 3000.0ms 0.0: no integration	10.0ms	◎
F02.14	Speed/torque control option	0: speed control 1: torque control	0	◎
F02.15	Choice of torque set source in torque control model	0: Digital setting 1: VP keypad potentiometer 2: AI1 3: AI2 4: Reserved 5: High speed pulse input (DI6) 6: Communication given	0	△
F02.16	Torque digital settings	-200.0～200.0%	50.0%	◎
F02.17	Torque control maximum frequency setting source selection	0: Digital Setting 1: VP Keypad 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 times	0.0～6000.0s	0.00s	◎

F02.22	Static Friction Torque Compensation Coefficient	0.0～100.0%	5.00%	◎
F02.23	Tatic friction compensation frequency ran	0.00～50.00Hz	5.00Hz	◎
F02.24	Open-loop moment static frequency	1.00～10.00Hz	1.00Hz	◎
F02.25	Flux-weakening Control of Synchronous Motor	0: Invalid 1: Valid	1	△
F02.26	Ynchronous motor field weakening proportional KP	0.0～500.0%	50.0%	◎
F02.27	Ynchronous motor flux-weakening integral time Ti	0.00～60.00s	0.50s	◎
F02.28	Ynchronous motor field weakening amplitude limiting	0.0～200.0%	100.0%	◎
F02.29	Ynchronous motor speed estimation filter coefficient	0.0001～2.0000	0.1000	◎
F02.30	Ynchronous motor phase-locked loop proportion	0.00～10.00	2.00	◎
F02.31	Phase-locked loop integration time of synchronous motor	0.1～1000.0ms	20.0ms	◎
F02.32	Ynchronous motor starting excitation current	0.0～150.0%	30.0%	△
F02.33	Ynchronous machine excitation current frequency low point	0.0～F10.34	10.00Hz	◎
F02.34	Ynchronous machine excitation current frequency high point	F10.33～600.00Hz	15.00Hz	◎
F02.35	Ynchronous machine excitation current conversion delay	0.0～10.0s	1.0s	◎
Group F03: Motor V/F control parameter				
F03.00	Motor VF curve settings	0: straight line V/F 1: multipoint V/F 2: 1.2 to the power V/F 3: 1.4 to the power V/F4: 1.6 to the powerv/F 5: 1.8 to the powerv/F 6: square V/F7: VF fully separated mode 8: VF semi-separated mode	0	△
F03.01	Motor Torque Boost	0.0～30.0% 0.0%: Automatic torque boost	0.0%	◎
F03.02	Motor torque boost cutoff frequency	0.00 ~ maximum frequency	50.00Hz	◎
F03.03	Motor multi-point 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 multi-point 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 multi-point 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 ~ Motor Rated Frequency	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	Voltage setting selection of VF separation model	0: Digital setting (F03.16) 1: VP keypad potentiometer 2: AI1 3: AI2 4: Reserved 5: FULSE pulse setting (DI6) 6: Multi-segment command 7: PID Note: 100.0% corresponds to motor rated voltage	0	△
F03.16	VF Split Voltage Digital Settings	0.0 ~ 100.0 (100% corresponding to the rated voltage of the motor)	0.0%	△
F03.17	Voltage Rise Time for VF Separation	0.0 ~ 6000.0s Note: Indicates the time from 0V change to rated voltage of the motor	0.0s	△
F03.18	IQ filter time below VVF 0.5Hz	F03.19～3000ms	500ms	△
F03.19	IQ filter 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 Fall Time After FMSM Acceleration	0.0～100.0s	2.0s	◎
F03.22	Hold ID current value after FMSM acceleration completes	0.0～200.0%	0.0%	◎
Group F04: start-stop control				
F04.00	Start Mode	0: Direct start 1: Speed tracking restart	0	△
F04.01	Speed tracking mode	Units: tracking start frequency selection 0: tracking from zero speed 1: tracking from maximum frequency Digit ten: speed tracking direction 0: last parking direction 1: forward direction 2: reverse direction 3: starting 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 Factor	0.01～5.00	0.30	◎
F04.05	Starting frequency	0.00～50.00Hz	0.00Hz	△
F04.06	Start frequency hold times	0.0～100.0s	0.0s	△
F04.07	Starting DC braking current/pre-excitation current	0.0～150.0%	0.0%	△
F04.08	Starting DC brake time/pre-excitation times	0.0～100.0s	0.0s	△
F04.09	Parking mode selection	0: Slow down parking 1: Free parking	0	△
F04.10	Stop DC Brake Wait Time	0.0～30.0s	0.0s	△
F04.11	Stop DC brake start frequency	0.01～50.00Hz	2.00Hz	△
F04.12	Shutdown DC Brake Current	0.0～150.0%	0.0%	△
F04.13	Stop DC Brake Time	0.0～120.0s	0.0s	△
F04.14	Dynamic braking control	0: Invalid1: Valid at runtime 2: Always valid3: Valid at deceleration	1	△
F04.15	Dynamic braking voltage	480 ~ 800V (380V drive) 280 ~ 400V (220V drive)	700V 350V	△
F04.16	Brake Utilization Rate	5.0～100.0%	100.0%	△
F04.17	Forward/Reverse Control Selection	0: Forward/Reverse Allowed 1: Reverse Disabled	0	△

F04.18	Forward/Reverse Dead Time	0.0~6000.0s	0.0s	△
F04.19	Outage restart option	0: Invalid 1: Valid	0	◎
F04.20	Blackout restart waiting time	0.0～10.0s	2.0s	◎
F04.21	0 Hz output selection	0: no voltage output 1: voltage output	0	△
F04.22	Inching priority function	0: No jog priority 1: Jog priority	0	△
F04.23	Inching frequency given	0.00～Fmax	5.00Hz	◎
F04.24	Inching acceleration time	0.00~600.00s	15.00s	◎
F04.25	Inching deceleration times	0.00~600.00s	15.00s	◎
F04.26	Acceleration/Deceleration Time Unit	0:0.1s 1:0.01s	1	△
F04.27	Acceleration time2	0.00~600.00s	15.00s	◎
F04.28	Deceleration Time2	0.00~600.00s	15.00s	◎
F04.29	Acceleration time3	0.00~600.00s	15.00s	◎
F04.30	Deceleration Time3	0.00~600.00s	15.00s	◎
F04.31	Acceleration Time4	0.00~600.00s	15.00s	◎
F04.32	Deceleration Time4	0.00~600.00s	15.00s	◎
F04.33	Acceleration Time 0 and Acceleration Time 1 switch frequency point	0.00～Fmax	0.00Hz	△
F04.34	Deceleration Time 0 and Deceleration Time 1 switch frequency point	0.00～Fmax	0.00Hz	△
F04.35	Acceleration and deceleration mode	0: Linear Mode 1: S Curve Mode	0	△
F04.36	Acceleration start time of S-curve	0.00~600.00s	0.00s	△
F04.37	S-curve acceleration end segment times	0.00~600.00s	0.00s	△
F04.38	S curve deceleration start time	0.00~600.00s	0.00s	△
F04.39	S-curve acceleration end segment times	0.00~600.00s	0.00s	△
Group F05: digital input terminal				
F05.00	Mode Selection	Bits: XI6/hi input mode 0: switching value input (DI6) 1: high-speed pulse input (hi) 10-bit: AI1 mode selection 0: analog input 1: switching input Hundred-digit: AI2 mode selection 0: analog input 1: switching input	0000	△
F05.01	Terminal XI1 function selection	0: No function	1	◎
F05.02	Terminal XI2 function selection	1: Forward operation (Fwd)	2	◎
F05.03	Terminal XI3 function selection	2: Reverse Operation (rev)	10	◎
F05.04	Terminal XI4 function selection	3: 3-wire operation control	13	◎
F05.05	Terminal XI5 function selection	4: Forward jog (FJOG)	0	◎
F05.06	Terminal XI6 function selection	5: Reverse jog (RJOG)	0	◎
F05.09	Terminal AI1 function selection	8: Up/down setting clear	0	◎
F05.10	Terminal AI2 function selection	9: Free parking	0	◎
F05.11	Terminal AI3 function select (reserved)	10: Drive fault reset 11: Operation paused 12: External fault input 13: multi-segment command terminal 1 14: multi-segment instruction terminal 2 15: multi-segment instruction terminal 3	0	◎

		16: multi-segment command terminal 4		
		17: Acceleration/deceleration time selection terminal 1		
		18: Acceleration/deceleration time selection terminal 2		
		19: Acceleration and deceleration prohibition		
		20: given frequency switch to secondary source frequency given		
		21: FLC status reset		
		22: FLC suspended operation		
		23: PID paused		
		24: negative direction of PID action		
		25: PID integration paused		
		26: PID parameter switching		
		27: wobble pause(Stop at current frequency)		
		28: wobble reset (back to center frequency)		
		29: Start-stop command is switched to the operation panel		
		30: Start-stop command is switched to terminal control		
		31. Switch the start-stop command to communication control.		
		32: counter input		
		33: Count clear		
		34: Length pulse input		
		35: clear length		
		36: Parking DC brake input command		
		37: speed/torque control switch		
		38: Reverse is prohibited		
		39: Forward-rotation prohibited		
F05.12	Terminal di filtering times	0.000～1.000s	0.010s	◎
F05.13	Terminal DI1 active delay times	0.0～300.0s	0.0s	◎
F05.14	Terminal DI1 inactive delay times	0.0～300.0s	0.0s	◎
F05.15	Terminal DI2 active delay times	0.0～300.0s	0.0s	◎
F05.16	Terminal DI2 inactive delay times	0.0～300.0s	0.0s	◎
F05.17	Terminal DI1 to DI5 forward and reverse logic	DI5, DI4, DI3, DI2, DI1 0: positive logic close valid/open invalid 1: negative logic close invalid/open valid	00000	△
F05.18	Terminal DI6 to DI8 positive and negative logic	Xx, XX, DI8, DI7, DI6 0: positive logic close valid/open invalid 1: negative logic close invalid/open valid	00000	△
F05.19	Fwd/rev Terminal Control Mode Selection	0: 2-wire mode 1 (Fwd forward rotation rev reverse rotation) 1: 2-wire mode 2 (Fwd operation rev forward reverse rotation) 2: 3-wire mode 13: 3-wire mode 24: Pulse operation stop model	0	△
F05.20	Keypad, terminal up/down	Unit bit: Action selection during	0001	△

	frequency adjustment control	shutdown 0: Reset shutdown 1: Maintain shutdown Ten bits: action selection in case of power-down 0: power-down clearing 1: power-down holding Hundred: integral function 0: no integral function 1: integral function Kilobits: can reduce to negative frequency 0: cannot 1: can		
F05.21	Up/down frequency ratio	0.00 ~ 50.00Hz 0.00 Invalid	1.00Hz/200ms	◎
F05.22	Run Terminal Action Selection	0: level active1: edge trigger + level active (at power-up) 2: edge trigger + level active (every run)	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	△
F06.02	Relay R1 Output Function Selection	1: Drive in operation	2	△
		2: Drive fault	0	△
		3: frequency level detection（FDT)	0	△
		4: frequency arrival		
		5: In zero speed operation 1 (shutdown without output)		
		6: Overload alert		
		7: Maximum count value reached		
		8: The specified count value is reached		
		9: Length arrival		
		10: FLC cycle completes		
		11: Accumulated run time arrival		
		12: The frequency reaches the upper limit		
		13: Frequency reaches lower limit		
		14: Accumulated power-on time arrival		
		15: run time arrival		
		16: Operation status (no output for inching)		
		17: Ready for operation		
		18: Underload Alert		
		19: In zero speed operation 2 (shutdown is also output)		
		20: Brake output		
		21:XI1		
		22:XI2		
		23:XI3		
		24:XI4		
		25: Frequency region reached (within FDT1 upper and lower limits)		
		26: PID feedback missing		
		27: Communication address given (2007H)		
		28-39: Reservation		
		40: Spindle orientation completed		
		60 ~ 69: output function of special machine		

F06.05	Y1 output delay times	0.0s～6000.0s	0.0s	◎
F06.06	R1 output delay times	0.0s～6000.0s	0.0s	◎
F06.07	Reservation			
F06.08	Reservation			
F06.09	Valid state setting of switching value output	R2 Y2 R1 Y1 0: positive logic 1: inverse logic	0000	△
F06.10	Frequency arrival detection range far	0.00～20.00Hz	5.00Hz	△
F06.11	FDT rising limit	0.00～Fmax	3.00Hz	△
F06.12	FDT fall limit	0.00～Fmax	3.00Hz	△
F06.13	Time of arrival of this run	0.0 ~ 6000.0Min 0.0: Invalid	0.0Min	△
F06.14	Cumulative power-on arrival times	0 ~ 65535h 0: Invalid	0h	△
F06.15	Cumulative Run Arrival Time	0 ~ 65535h 0: Invalid	0h	△
F06.16	Brake control selection	0: Invalid 1: Valid	0	△
F06.17	Opening frequency of holding brake	Closure frequency ~ 30.00Hz	2.50Hz	△
F06.18	Brake opening current	0.0~200.0%	0.0%	◎
F06.19	Holding Brake Opening Waiting Time	0.00~10.00s	0.00s	△
F06.20	Binding brake opening action times	0.00~10.00s	0.50s	△
F06.21	Closing frequency of holding brake	0.00Hz ~ Open Frequency	2.00Hz	△
F06.22	Latching time	0.00~10.00s	0.00s	△
F06.23	Closing time of embracing brake	0.00~10.00s	0.50s	△
Group F07: Analog and pulse input				
F07.00	AI curve selection	Unit: AI1 curve selection 0: curve 11: curve 22: curve 3 Ten: AI2 curve selection (same unit)	10	△
F07.01	AI Curve 1 Minimum Input	0.0 ~ AI Curve 1 Max Input	1.0%	◎
F07.02	AI Curve 1 Minimum Input Correspondence Settings	-100.0～100.0%	0.0%	◎
F07.03	AI Curve 1 Max Input	AI Curve 1 Min Input ~ 100.0%	100.0%	◎
F07.04	AI Curve 1 Max Input Correspondence Settings	-100.0～100.0%	100.0%	◎
F07.05	AI Curve 2 Minimum Input	0.00 ~ AI Curve 2 Max Input	1.0%	◎
F07.06	AI Curve 2 Minimum Input Correspondence Settings	-100.0～100.0%	0.0%	◎
F07.07	AI Curve 2 Max Input	AI Curve 2 Min Input ~ 100.0	100.0%	◎
F07.08	AI Curve 2 Max Input Correspondence Settings	-100.0～100.0%	100.0%	◎
F07.09	AI Curve 3 Minimum Input	-100.0% ~ AI3 curve knee 1 input	0.0%	◎
F07.10	AI Curve 3 Minimum Input Correspondence Settings	-100.0～100.0%	-100.0%	◎
F07.11	AI Curve 3 Knee 1 Input	AI Curve 3 Min Input ~ AI Curve 3 Knee 2 Input	25.0%	◎
F07.12	AI curve 3 inflection point 1 input corresponding settings	-100.0～100.0%	-50.0%	◎
F07.13	AI Curve 3 Knee 2 Input	AI Curve 3 Inflection Point 1 Input ~ AI Curve 3 Max Input	75.0%	◎
F07.14	AI curve 3 inflection point 2 input corresponding settings	-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	AI Curve 3 Max Input Correspondence Settings	-100.0～100.0%	100.0%	◎
F07.17	Keyboard potentiometer curve	0.0 ~ Maximum Input of Keyboard	0.5%	◎

	minimum input	Potentiometer Curve		
F07.18	Corresponding setting of minimum input of keyboard potentiometer curves	-100.0～100.0%	0.0%	◎
F07.19	Maximum input of keyboard potentiometer curves	Keyboard potentiometer curve min input ~ 100.0	99.5%	◎
F07.20	Maximum input corresponding setting of keyboard potentiometer curves	-100.0～100.0%	100.0%	◎
F07.21	AI1 filter times	0.000～10.000s	0.000s	◎
F07.22	AI2 filter times	0.000～10.000s	0.000s	◎
F07.23	AI3 filter times	0.000～10.000s	0.000s	◎
F07.24	Keyboard potentiometer filter times	0.000～10.000s	0.100s	◎
F07.25	Hi Min Input	0.00kHz ~ hi Max input	0.00kHz	◎
F07.26	Hi Minimum Input Corresponding Settings	-100.0～100.0%	0.0%	◎
F07.27	Hi Max Input	Hi min input ~ 100.00kHz	50.00kHz	◎
F07.28	Hi Maximum Input Settings	-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	△
F08.01	AO2 output function selection	1: operating frequency	11	△
F08.02	Y2/ho output function selection(When used as an ho)	2: Output current (0-2 times of drive rated current) 3: Output torque (0-2 times absolute value of torque) 4: Output power (0-2 times) 5: Output voltage (0-2 times of drive rated voltage) 6: hi input (100.0% corresponds to 100.00kHz) 7:AI1 8:AI2 9: Reserved 10: VP keypad potentiometer 11: Set frequency 12: bus voltage 13:+10V 14: AO communication given 1 15: AO communication given 2 16: encoder input	1	△
F08.03	AO1 Zero Bias	-100.0～100.0%	0.0%	◎
F08.04	AO1 gain	-2.000～2.000	1.000	◎
F08.05	AO1 filter times	0.000～10.000s	0.000s	◎
F08.06	AO2 zero bias	-100.0～100.0%	0.00%	◎
F08.07	AO2 gain	-2.000～2.000	1.000	◎
F08.08	AO2 filter times	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 Proportion1	0.00～10.00	1.00	◎
F08.12	Ho Output Encoder Pulse Proportion2	0.00～10.00	1.00	◎
F09 Group: 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 and VDI1: Vdi valid is determined by the state of virtual VDOx1: Vdi valid is set by function code F09.06	00000	△
F09.06	Virtual Vdi Terminal Status Settings	VDI5, VDI4, VDI3, VDI2, VDi1 0: invalid 1: valid	00000	◎
F09.07	Virtual VDO1 output function selection	0: Internal short circuit with physical DIx Other: same as F06.00	0	◎
F09.08	Virtual VDO2 output function selection	0: Internal short circuit with physical DIx Other: same as F06.00	0	◎
F09.09	Virtual VDO3 output function selection	0: Internal short circuit with physical DIx Other: same as F06.00	0	◎
F09.10	Virtual VDO4 output function selection	0: Internal short circuit with physical DIx Other: same as F06.00	0	◎
F09.11	Virtual VDO5 output function selection	0: Internal short circuit with physical DIx Other: same as F06.00	0	◎
F09.12	Virtual VDO1 Output Delay	0.0s～6000.0s	0.0s	◎
F09.13	Virtual VDO2 Output Delay	0.0s～6000.0s	0.0s	◎
F09.14	Virtual VDO3 Output Delay	0.0s～6000.0s	0.0s	◎
F09.15	Virtual VDO4 Output Delay	0.0s～6000.0s	0.0s	◎
F09.16	Virtual VDO5 Output Delay	0.0s～6000.0s	0.0s	◎
F09.17	Vdo Output Terminal Inverse Logic	VDO5, VDO4, VDO3, VDO2, VDO1 0: positive logic 1: negative logic	00000	◎
Group F10: Fault and Protection Function				
F10.00	Overspeed control	0: Overspeed invalid 1: Overspeed mode 12: Overspeed mode 23: Over-speed mode 3	2	△
F10.01	Overcurrent loss protection current	100.0～200.0%	150.0%	×
F10.02	Constant speed overspeed loss frequency fall times	0.0～6000.0s(Mode 1 is valid)	5.0s	◎
F10.03	Overspeed Mode 2 Scale Factor	0.0～100.0%	3.0%	◎
F10.04	Overspeed Mode 2 Integration Time	0.00～10.00s 0.00: Invalid point	1.00s	◎
F10.05	Overpressure stall control	0: Invalid1: Overvoltage Mode12: Overvoltage Mode2	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 to ground detection1: Short circuit to ground	0	△

		detection before the first run2: Short to ground detection before each run		
F10.10	Fault automatic reset times	0～20	0	△
F10.11	Fault automatic reset interval	0.1～100.0s	1.0s	△
F10.12	Switch output terminal is programmed as output fault action selection during fault automatic reset	0: No Action 1: Action	0	△
F10.13	Fault protection action selection 1	Bit: bus undervoltage protection (Err08) 0: fault and free stop 1: alarm and stop in deceleration mode 2: alarm and continue to run according to fault frequency 3: protection is invalid	03330	△
		Ten digits: drive overload protection (Err10)		
		Centages: motor overload protection (Err11)		
		Kilobits: Input side open-phase protection (Err12)		
		10000 bits: output side open-phase protection (Err13)		
F10.14	Fault protection action selection 2	Bits: external input fault protection (Err14) 0: fault and free stop 1: alarm and stop in deceleration mode 2: alarm and continue to run according to fault frequency 3: protection is invalid	00000	△
		Ten-digit: 485 communication timeout (Err16)		
		Hundred: memory fault (Err17)		
		Kilo bit: PID feedback broken during operation (Err19)		
		10K: Runtime Arrival (Err20)		
F10.15	Fault protection action selection 3	Bit: Temperature sensor disconnection fault (Err22) 0: Fault and free stop 1: Alarm and stop in deceleration mode 2: Alarm and continue to run according to fault frequency 3: Protection invalid	00030	△
		Ten-digit: Drive lost load (Err23)		
		Hundred: Reserved		
		Kilobits: reserved		
		Tens of thousands: reserved		
F10.16	Reservation			
F10.17	Resume operation frequency selection on failure	0: Operate at the current operating frequency1: Operate at the set frequency2: Operates at the upper limit frequency3: Operates at the lower limit frequency4: Operated at the abnormal standby frequency	1	△
F10.18	Abnormal standby frequency	0.00～Fmax	0.00Hz	△
F10.19	Fast current limit control option	0: disabled1: allowed2: deceleration model	2	△
F10.20	Selection of overload warning forecast	Unit bit: detection selection 0: always detection 1: only detection at constant speed	00010	△
		Ten digits: detection condition selection 0: relative motor rated		

		current 1: relative drive rated current 2: relative motor rated power 3: relative drive rated power		
		Hundred digits: Whether fault is reported 0: No fault is reported 1: Fault is reported 2: Display Warning		
		Thousand bits: Deceleration 0: No deceleration 1: Deceleration 2: FI adjustment (FI parameters are F13.08 and F13.09)		
		Ten thousand bits: overload detection value given source 0: F10.19 set 1: VF * F10.192: AI1 * F10.193: AI2 * F10.194: AI3 * F 10.19		
F10.21	Overload prediction alarm detection level	0.0～200.0%	150.0%	◎
F10.22	Overload prediction alarm detection times	0.1～60.0s	5.0s	◎
F10.23	Load drop detection current	5.0～100.0%	20.0%	△
F10.24	Dropout time	0.1～60.0s	5.0s	△
F10.25	Instantaneous power failure action selection	0: invalid 1: deceleration 2: bus voltage constant control	0	△
F10.26	Instantaneous interruption frequency deceleration times	0.0～6000.0s	5.0s	◎
F10.27	Instantaneous power failure bus voltage	60.0% ~ Recovery voltage	80.0%	◎
F10.28	Instantaneous power failure recovery voltage	Outage voltage ~ 100.0%	85.0%	◎
F10.29	Instantaneous power failure voltage judgment times	0.01～10.00s	0.10s	◎
F10.30	Instantaneous power failure gain KP	0.1～100.0%	40.0%	◎
F10.31	Instantaneous outage integration time Ti	0.00～10.00s 0.00: Invalid point	0.10s	◎
F10.32	Motor temperature sensor type	0: none 1: PT100 2: PT1000 3: KTY84	0	△
F10.33	Motor temperature sensor zero drift values	-100～100℃	0	◎
F10.34	Motor temperature warning action threshold	0～200℃	90℃	◎
F10.35	Motor temperature protection action threshold	0～200℃	110℃	◎
F10.36	Overspeed detection value	0.0～150.0%	120.0%	△
F10.37	Overspeed detection times	0.0～60.0s	1.0s	△
F10.38	Detection value of excessive speed deviation	0.0～50.0%	20.0%	△
F10.39	Speed Deviation Excessive Detection Time	0.0～60.0s	5.0s	△
Group F11: Process PID				
F11.00	PID setting mode	0: PID Digital Assignment 1: Keypad Potentiometer 2: AI1 3: AI2 4: AI3 5: di Pulse Input 6: Multi-Segment Command 7: Communication Input	0	△
F11.01	PID digital given	0.0～100.0%	50.0%	◎
F11.02	PID feedback mode	0: AI1 1: AI2 2: reserved 3: di pulse input 4: communication	0	△

		input 5: AI1 + AI2 6: AI1-AI2 7: Max { AI1, AI2 } 8: Min { AI1, AI2 }		
F11.03	PID given feedback ran	0.0~6000.0	100.0	◎
F11.04	Action of PID regulator	0: Positive 1: Negative	0	△
F11.05	PID given filter times	0.000～10.000s	0.000s	◎
F11.06	PID feedback filter times	0.000～10.000s	0.000s	◎
F11.07	PID output filter times	0.000～10.000s	0.000s	◎
F11.08	Proportional gain KP1	0.0～1000.0	20.0	◎
F11.09	Integration 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	Integration 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: No switching, use KP1, Ti1 and Td1 parameters 1: Automatic switching based on input deviation 2: Switching based on terminal	0	△
F11.15	PID Parameter Switching Deviation 1	0.0～100.0%	20.0%	△
F11.16	PID Parameter Switching Deviation2	0.0～100.0%	80.0%	△
F11.17	PID deviation limit	0.0～100.0%	0.0%	△
F11.18	PID Integral Properties	Units: Whether to stop integration after the output reaches the limit value0: Continue integration1: Stop integration Ten-digit: Integral separation 0: invalid 1: valid Hundred bit: PID control algorithm 0: Incremental type 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	△
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 ~ PID output frequency upper limit	0.0%	△
F11.24	PID Loss of Feedback Detection Low	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	Selection of PID operation	Unit bit: Whether to operate at stop 0: Not to operate at stop 1: Operate at stop Ten bits: output upper and lower limits are limited by output frequency 0: no limit 1: limit Hundred digit: PID number given up/down 0: power-down clear 1: power-down save Kilo digit: PID feedback Loss of shutdown Detected or not 0: Not detected at shutdown 1: Detected at shutdown Ten thousand: PID feedback loss action 0: Fault 1: Deceleration shutdown 2: Normal operation	00000	△

F11.27	PID digital given up/down ratio	0.0 ~ 100.0% (0.0% invalid)	0.0%	◎
F11.28	PID Loss of Feedback Detection High	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 keypad potentiometer 2: f11.22 * AI1 3: f11.22 * AI2 4: Reserved 5: F11.22 * di (pulse input)	0	△
F11.31	PID Lower Limit Source Selection	0: F11.23 1: F11.23 * Keypad Potentiometer 2: f11.23 * AI1 3: f11.23 * AI2 4: Reserved 5: f1.23 * di (pulse input)	0	△
Group F12: Multi-speed and simple PLC				
F12.00	Multi-segment instruction 0	-100.0～100.0%	0.0%	◎
F12.01	Multi-segment instruction 1	-100.0～100.0%	0.0%	◎
F12.02	Multi-segment instruction 2	-100.0～100.0%	0.0%	◎
F12.03	Multi-segment instruction 3	-100.0～100.0%	0.0%	◎
F12.04	Multi-Segment Instruction4	-100.0～100.0%	0.0%	◎
F12.05	Multi-Segment Instruction5	-100.0～100.0%	0.0%	◎
F12.06	Multi-segment instruction 6	-100.0～100.0%	0.0%	◎
F12.07	Multi-segment instruction 7	-100.0～100.0%	0.0%	◎
F12.08	The multi-segment instruction 8	-100.0～100.0%	0.0%	◎
F12.09	Multi-segment instruction 9	-100.0～100.0%	0.0%	◎
F12.10	The multi-segment instruction 10	-100.0～100.0%	0.0%	◎
F12.11	The multi-segment instruction 11	-100.0～100.0%	0.0%	◎
F12.12	The multi-segment instruction 12	-100.0～100.0%	0.0%	◎
F12.13	The multi-segment instruction 13	-100.0～100.0%	0.0%	◎
F12.14	The multi-segment instruction 14	-100.0～100.0%	0.0%	◎
F12.15	The multi-segment instruction 15	-100.0～100.0%	0.0%	◎
F12.16	Multi-segment instruction 0 given model	0: Digital Assignment (F12.00) 1: Keypad Potentiometer 2: AI1 3: Process PID 4: Pulse Input (hi) 5: AI2 6: Reserved	0	△
F12.17	Simple PLC Operation Mode	Units: Simple PLC operation mode selection 0: Stop after single cycle 1: Maintain final value after single cycle 2: Continuous cyclic Decimal digits: interrupt operation and restart selection 0: run from the stage at the time of shutdown (or failure) 1: rerun from the 0th segment 2: rerun from the 8th segment 3: rerunning from the 15th segment Hundred bits: power-down memory selection 0: power-down no memory 1: power-down memory Kilobits: Simple PLC Runtime Units 0: s 1: H (hours)	0000	△
F12.18	Imple PLC section 0 run times	0.0～6000.0s(h)	0.0s(h)	◎

F12.19	Simple PLC 1st Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.20	Simple PLC 2nd Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.21	Simple PLC 3rd Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.22	Simple PLC 4th Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.23	Simple PLC 5th Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.24	Simple PLC 6th Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.25	Simple PLC 7th Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.26	Simple PLC 8th Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.27	Simple PLC Section 9 Running Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.28	Simple PLC 10th Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.29	Simple PLC Section 11 Running Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.30	Simple PLC running time of the 12th section	0.0～6000.0s(h)	0.0s(h)	◎
F12.31	Simple PLC 13th Section Running Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.32	Simple PLC 14th Segment Run Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.33	Simple PLC 15th Segment Running Time	0.0～6000.0s(h)	0.0s(h)	◎
F12.34	Selection of Acceleration and Deceleration Time in Section 0 of Simple PLC	0～3	0	◎
F12.35	Selection of Acceleration and Deceleration Time of the First Section of Simple PLC	0～3	0	◎
F12.36	Selection of Acceleration and Deceleration Time in Section 2 of Simple PLC	0～3	0	◎
F12.37	Selection of Acceleration and Deceleration Time in Section 3 of Simple PLC	0～3	0	◎
F12.38	Selection of Acceleration and Deceleration Time of Section 4 of Simple PLC	0～3	0	◎
F12.39	Selection of Acceleration and Deceleration Time in Section 5 of Simple PLC	0～3	0	◎
F12.40	Selection of Acceleration and Deceleration Time in Section 6 of Simple PLC	0～3	0	◎
F12.41	Selection of Acceleration and Deceleration Time of Section 7 of Simple PLC	0～3	0	◎
F12.42	Selection of Acceleration and Deceleration Time in Section 8 of Simple PLC	0～3	0	◎
F12.43	Selection of Acceleration and Deceleration Time in Section 9 of Simple PLC	0～3	0	◎
F12.44	Selection of Acceleration and Deceleration Time in Section 10 of Simple PLC	0～3	0	◎

F12.45	Selection of Acceleration and Deceleration Time of Section 11 of Simple PLC	0～3	0	◎
F12.46	Selection of Acceleration and Deceleration Time in Section 12 of Simple PLC	0～3	0	◎
F12.47	Selection of Acceleration and Deceleration Time of Section 13 of Simple PLC	0～3	0	◎
F12.48	Selection of Acceleration and Deceleration Time of Section 14 of Simple PLC	0～3	0	◎
F12.49	Selection of Acceleration and Deceleration Time in Section 15 of Simple PLC	0～3	0	◎
F12.50	Multi-segment instruction up/down function selection	Bits: action selection at power-down 0: power-down clearing 1: power-down holding Ten-digit: Can it be reduced to negative 0: Cannot 1: Can	00	△
F12.51	Multi-segment instruction up/down ratio	0.0 ~ 100.0% (0.0% invalid)	0.0%	△
Group F13: Accessibility Group				
F13.00	Swing setting mode	0: Relative to the set frequency 1: Relative to the maximum frequency	0	△
F13.01	Amplitude of wobble	0.0 ~ 100.0% (relative to the set frequency, 0.0 wobble is invalid)	0.0%	◎
F13.02	Kick frequency amplitude	0.0 ~ 50.0% (relative wobble amplitude)	0.0%	◎
F13.03	Wobble rise time	0.0～6000.0s	5.0s	◎
F13.04	Wobble fall time	0.0～6000.0s	5.0s	◎
F13.05	Set Length (Reference Length Scale)	0m～65535m	1000m	△
F13.06	Number of pulses per meter/maximum linear velocity (m/min)	0.1～6553.5	100.0	◎
F13.07	Length calculation option	Units: Length reach Stop 0: No stop 1: Stop 10: Length calculation method 0: By pulse number 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 wake-up	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	Wake-up Delay Time	0.0～6000.0s	0.0s	◎
F13.14	Dormancy 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 Dormancy Direction	Units: Pressure feedback source 0: AI1 1: AI2 2: AI3 3: DI7/hi pulse input Ten-digit: pressure sleep direction 0: positive direction, pressure feedback large sleep, small	00	△

		wake-up 1: reverse direction, pressure feedback small sleep, large wake-up		
F13.17	Wake-up pressure	0.0%～100.0%	10.0%	◎
F13.18	Dormancy pressure	0.0%～100.0%	50.0%	◎
Group F14: Communication Parameter				
F14.00	Local address	1 ~ 2470: broadcast addr	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 parity (1-8-N-1) for RTU 1: Even parity (1-8-E-1) for RTU 2: Odd parity (1-8 -O-1) For RTU 3: No parity (1 -8-N-2) For RTU	0	△
F14.03	Communication Timeout	0.0～60.0s	0.0s	△
F14.04	Local Response Delay Time	0～200ms	1ms	△
F14.05	Communication mode selection of master and slave computer	0: Native as Slave 1: Native as Master	0	△
F14.06	Host send data source selection	0: Set Frequency 1: Run 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 1: Absolute	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 paramete 3	0 ~ 99 (corresponding to U00.00 ~ U00.99)	3	◎
F15.03	Led operation display paramete 4	0 ~ 99 (corresponding to U00.00 ~ U00.99)	2	◎
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 function codes different from the factory values	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: Parameters cannot be modified	0	△
F15.10	Key locking function	0: not locked1: fully locked2: fully loc except run, STof/reset key3: fully locked except STof/reset key4: fully loc except > > key	0	△
F15.11	MF.K key function selection	0: No function 1: Inching operation 2: Switching between positive and negative rotation 3: Switching between start and stop commands (operation panel/terminal/communication) 4: Inching and negative rotation 5:	1	△

		Negative rotation		
F15.12	STof/reset key function selection	0: STof/RES key shutdown function is valid only in the keyboard operation mode 1: STof/RES key shutdown function is valid in any operation model	1	△
F15.13	Speed display	Unit bit: speed display (U00.05) 0: display according to actual speed 1: frequency multiplied by speed coefficient Decimal digits: Speed Decimal digits 0: No decimal 1:1 decimal 2:2 decimal 3:3 decimal	00	△
F15.14	Speed display factor	0.00～100.00	1.00	◎
F15.15	Frequency Display Error Range	0.00Hz～5.00Hz	0.10Hz	◎
F15.16	Power display coefficient	0.0～300.0%	100.0%	◎
F15.17	User Password	0～65535	0	△
F15.18	Dealer Password	0～65535	0	△
F15.19	Time of use	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 reference) 1: Maximum Power Tracking (MPPT)	1	△
A00.02	Vmpp voltage CVT given voltage settings	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%	△
A00.09	PID output frequency lower limit	0.0% ~ upper limit of PID output frequency	20.0%	△
A00.10	MPPT seeks voltage	0～750V	0	×
A00.11	Light Weak Voltage	Minimum voltage 200V ~ MPPT	230V	△
A00.12	Low light dormancy preparation times	0.0～6000.0s	500.0s	◎
A00.13	Light intensity wake-up preparation times	0.0～6000.0s	60.0s	◎
A00.14	Sensor Invalid Ready Wake-up Time	0～10000s	60s	◎
A00.15	Sensor Active Ready to Sleep Time	0～10000s	30s	◎
A00.16	Frequency setting mode	0: Take the maximum frequency 1: Main frequency given mode	0	△
A00.17	Rated flow of water pump	0.0 ~ 1000.0 m3/H	6.0 m3/H	◎
A00.18	Rated head of water pump	0.0～500.0m	24m	◎
A00.19	Water pump accumulative flow resetting	0: unzeroed 1: zeroed	0	◎
A00.20	Current pump flow	Unit: m3/H	0.0 m3/H	×
A00.21	Current head of water pump	Unit: meter	0.0 m	×
A00.22	Accumulative flow of water pump	Unit: cubic meter	0 m3	×
U00 Group: Status Monitoring				
U00.00	Output frequency	0.00～Fup	0.00Hz	×

U00.01	Set Frequency	0.00～Fmax	0.00Hz	×
U00.02	Output voltage actual values	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 Electric Power	0.0～3000.0kW	0.0kW	×
U00.07	Synchronous Frequency	0.00～Fup	0.00Hz	×
U00.08	Output Torque	0.0～300.0%	0.0%	×
U00.09	Drive module temperatures	-40℃～120℃	0℃	×
U00.10	Keyboard potentiometer input	0.0～100.0%	0.0%	×
U00.11	AI1 input	0.0～100.0%	0.0%	×
U00.12	AI2 input	0.0～100.0%	0.0%	×
U00.13	Reservation			
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	Switch output state	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 phase	1～15	1	×
U00.27	Program Run Time	0.0～6000.0s(h)	0.0s(h)	×
U00.28	Power Consumption	0～65535kWh	0kWh	×
U00.29	Power-on time this times	0～65535min	0min	×
U00.30	Time of this run	0～6553.5min	0.0min	×
U00.31	Cumulative power-up times	0～65535h	0h	×
U00.32	Cumulative Operating Time	0～65535h	0h	×
U00.33	Actual Count Value	0～65535	0	×
U00.34	Actual length values	0～65535m	0m	×
U00.35	Linear velocity	0～65535m/min	0m/Min	×
U00.36	PTC detect motor temperatures	-40℃～200℃	0℃	×
Group U01: Failure Record				
U01.00	Current Fault Category	Err00: No fault Err01: Accelerated overcurrent Err02: Retarding overcurrent Err03: Constant speed overcurrent Err04: Acceleration overvoltage Err05: Retarding overvoltage Err06: Constant speed overvoltage Err07: Short circuit protection Err08: Bus undervoltage protection Err09: Soft start relay not closed Err10: Drive overload Err11: Motor overload Err12: Input side phase open Err13: Output side phase open Err14: External Fault Err15: Overheating	Err00	×

		Err16: 485 communication timeout Err17: Memory failure Err18: Self-learning cancel Err19: Self-learning fault Err20: Elapsed time arrived Err21: PID feedback disconnection during operation Err22: Temperature sensor disconnection fault Err23: Drive load drop Err24: Short circuit to ground Err25: Module Overload Err26: End of set running times Err27: PTC motor temperature overheat		
U01.01	Output frequency at current fault	0.00～FuF	0.00Hz	×
U01.02	Output current at current fault	0.0～3000.0A	0.0A	×
U01.03	Bus voltage at current fault	0～1200V	0V	×
U01.04	Cumulative elapsed time on current failure	0～65535h	0h	×
U01.05	Previous 1 fault category	Same as U00.00	Err00	×
U01.06	Output frequency at the time of previous fault	0.00～FuF	0.00Hz	×
U01.07	Output current at the first fault	0.0～3000.0A	0.0A	×
U01.08	Bus voltage at last 1 fault	0～1200V	0V	×
U01.09	Cumulative running time at the time of the previous 1 failure	0～65535h	0h	×
U01.10	Fault category of the first two times	Same as U00.00	Err00	×
U01.11	Output frequency at the first 2 fault	0.00～FuF	0.00Hz	×
U01.12	Output current at the first 2 fault	0.0～3000.0A	0.0A	×
U01.13	Bus voltage at first 2 fault	0～1200V	0V	×
U01.14	Cumulative run time on previous 2 failure	0～65535h	0h	×
U01.15	Category of the first 3 fault	Same as U00.00	Err00	×
U01.16	Category of the first 4 failure	Same as U00.00	Err00	×
U01.17	Top 5 fault category	Same as U00.00	Err00	×
U01.18	Category of the first 6 fault	Same as U00.00	Err00	×
U01.19	Category of the first 7 failure	Same as U00.00	Err00	×
U01.20	Category of the first 8 failure	Same as U00.00	Err00	×
U01.21	Category of the first 9 failure	Same as U00.00	Err00	×
U01.22	Top 10 fault category	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 electromagnetic interference environment without interfering with the electromagnetic environment and to achieve its functions steadily.

6.2 Introduction to EMC Standard

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

IEC/EN61800-3 mainly inspects the products from two aspects of electromagnetic interference and anti-electromagnetic interference, electromagnetic interference mainly tests the radiated interference, conducted interference and harmonic interference of products (there are such requirements for products applied to civil use).Anti-electromagnetic interference is mainly related to the product's conduction immunity, radiation immunity, surge immunity, rapid burst immunity, ESD immunity and power supply low frequency end immunity(Specific test items include: 1. Input voltage sag, interruption and change immunity test; 2. Commutation notch immunity test; 3. Harmonic input immunity test; 4. Input frequency change test; 5. Input voltage imbalance test; 6. Input voltage fluctuation test).When tested in accordance with the above strict requirements of IEC/EN61800-3 and our products are installed and used in accordance with the instructions shown in 6.3, they will have good electromagnetic compatibility in general industrial environment.

6.3 EMC Guidance

6.3.1 Electromagnetic interference and installation precautions:

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

Installation Considerations:

1) The grounding wires of products and other electrical products shall be well grounded;

2) Power input and output power lines and weak current signal lines (such as control lines) of the product shall not be arranged in parallel as far as possible, and shall be arranged vertically if possible;

3) It is recommended to use shielded cable or steel pipe shielded power line for the output power line of the product, and the shielding layer shall be reliably grounded. For the lead wire of the interfered equipment, it is recommended to use twisted pair shielded control line, and the shielding layer shall be

reliably grounded;

4) If the cable length of the motor exceeds 100m, the output filter or reactor is required to be installed.

6.3.2 Treatment methods for interference of peripheral electromagnetic equipment on products:

Generally, the electromagnetic influence on the product is caused by a large number of relays, contactors or electromagnetic brakes installed near the product. When the product is disturbed and malfunctions, the following methods are recommended to solve the problem:

1) A surge suppressor is additionally arranged on the device generating interference;

2) Add a filter to the input terminal of the product. For details, please refer to 6.3.5 for operation;

3) The lead wires of the control signal line and the detection line of the product shall be shielded cables, and the shielding layer shall be reliably grounded.

6.3.3 Treatment method for interference of the product to the peripheral equipment:

This part of the noise is divided into two kinds: one is the product radiation interference, and the other is the product conduction interference. These two kinds of interference make the peripheral electrical equipment subject to electromagnetic or electrostatic induction. Thereby causing the equipment to generate misoperation. For several different interference situations, refer to the following methods to solve:

1) Generally, the signals of instruments, receivers and sensors used for measurement are weak. If they are close to the product or in the same control cabinet, they are liable to be interfered and misoperated. It is recommended to adopt the following measures to solve the problem: keep away from the interference source as far as possible;Don't put the signal line and power line in parallel, especially don't tie them together equally;Signal line and power line with shielded cable, and good grounding;Add ferrite magnetic ring on the output side of the product (select the suppression frequency in the range of 30 ~ 1000MHz), and wound on 2 ~ 3 turns, for bad conditions, can choose to install EMC output filter;

2) When the interfered equipment and the product use the same power supply, it will cause conduction interference. If the above methods can not eliminate the interference, an EMC filter should be installed between the product and the power supply (refer to 6.3.5 for type selection);

3) The peripheral equipment is grounded separately, which can eliminate the interference caused by leakage current of the product grounding wire when it is grounded in common.

6.3.4 Leakage current and treatment:

There are two forms of leakage current when using the product: one is the leakage current to ground;The other is the leakage current between lines.

1) Factors Affecting Earth Leakage Current and Solutions:

There is a distributed capacitance between the conductor and the ground, the larger the distributed capacitance, the greater the leakage current;And that distance between the product and the motor is effectively reduce so as to reduce the distributed capacitance. The higher the carrier frequency, the greater the leakage current. The carrier frequency may be lowered to reduce leakage current. However, reducing the carrier frequency will increase the motor noise, please note that the installation of reactor is also an effective way to solve the leakage current.

Leakage current will increase with the increase of loop current, so when the motor power is large, the corresponding leakage current is large.

2) The factors causing the leakage current between lines and the solutions:

There is distributed capacitance between the output wiring of the product, if the current through the line contains higher harmonics, it may cause resonance and generate leakage current. At this time, if the thermal relay is used, it may act incorrectly.

The solution is to reduce the carrier frequency or install the output reactor. It is suggested to use the electronic over-current protection function of the product without installing a thermal relay in front of the motor when using the product.

6.3.5 Precautions for installing EMC input filter at power supply input end:

1) Use the filter strictly according to the rated value;As that filt belongs to clas I electric appliance, the metal shell ground of the filter should be in good contact with the metal ground of the installation cabinet in a large area, and has good conductive continuity, otherwise, there will be electric shock danger and seriously affect the EMC effect;

2) Through EMC test, it is found that the filter ground must be connected to the same common ground with the product PE end ground, otherwise the EMC effect will be seriously affected.

3) Install the filter as close as possible to the power input of the product.

Chapter 7 Fault Diagnosis and Exception Handling

7.1 Failure Causes and Countermeasur

If the drive has an abnormal fault, please handle it carefully, check the cause of the fault carefully, and record the fault phenomenon in detail. Please contact the vendor when you need service. The latest, previous and second fault records can be viewed through the function code U1 parameter group. The faults are recorded with digital codes (1-29). The fault display and fault name corresponding to each digital fault code are shown in the following table.

Table 7.1 List of Fault Code

Fault Code	Breakdown Show	Breakdown Name	Primary Cause	Opposite
1	**Err01**	Accelerated overcurrent	Too much torque boost in V/f control	Decrease torque boost values
			Starting frequency is too high	Lower the starting frequency values
			Acceleration time too short	Extend Acceleration Time
			Improper setting of motor parameter	Correct setting according to motor nameplate
			Overload	Lighten load
			V/f curve is not suitable in V/f control	Set V/f curve correctly
			Restarting the rotating motor	Decrease limit or start with speed search
			Output shorted to phase or ground	Check motor wiring and output impedance to ground
2	**Err02**	Deceleration overcurrent	The inertia of the load is too great	Use of dynamic braking
			Deceleration time too short	Extended Deceleration Time
			Low input voltage of power grid	Check the grid voltage
			Output shorted to phase or ground	Check motor wiring and output impedance to ground
3	**Err03**	Constant speed overcurrent	Overload	Lighten load
			Drive power rating too small	Selecting suitable drive power
			Low input voltage of power grid	Check the grid voltage
			Output shorted to phase or ground	Check motor wiring and output impedance to ground

Fault Code	Breakdown Show	Breakdown Name	Primary Cause	Opposite
4	**Err04**	Accelerated overpressure	The inertia of the load is too great	Use of dynamic braking
			Abnormal input voltage	Check the grid voltage
			Output shorted to phase or ground	Check motor wiring and output impedance to ground
5	**Err05**	Deceleration overpressure	The inertia of the load is too great	Use of dynamic braking
			Deceleration time too short	Extended Deceleration Time
			Abnormal input voltage	Check the grid voltage
			Improper setting of regulator parameters during vector operation	Correct setting of regulator parameter
			Output shorted to phase or ground	Check motor wiring and output impedance to ground
6	**Err06**	Constant speed overpressure	Improper setting of regulator parameters during vector operation	Correct setting of regulator parameter
			Abnormal input voltage	Check the grid voltage
			Load fluctuation is too lar	Check the load
			Output shorted to phase or ground	Check motor wiring and output impedance to ground
7	**Err07**	Drive side module protection	Output Overcurrent Fault	Handle according to the way of overcurrent
			Bus voltage overvoltage fault	Handle according to the way of overpressure
			Output side short circuit fault	Handle as per module short circuit fault
			Inversion module abnormal	Seek Service
8	**Err08**	Undervoltage protection	DC Bus Voltage Low	Check if the input voltage is too low or if the drive is in the process of power down
10	**Err10**	Drive overload	Too much torque boost in V/f control	Decrease torque boost values
			Starting frequency is too high	Lower the starting frequency values
			Acceleration and deceleration time is too short	Extend acceleration and deceleration times

Fault Code	Breakdown Show	Breakdown Name	Primary Cause	Opposite
			Improper setting of motor parameter	Correct setting according to motor nameplate
			Overload	Lighten load
			V/f curve is not suitable in V/f control	Set V/f curve correctly
			Restarting the rotating motor	Decrease current limit or start with speed search
			Output shorted to phase or ground	Check motor wiring and output impedance to ground
11	**Err11**	Motor Overload	Too much torque boost in V/f control	Decrease torque boost values
			V/f curve is not suitable in V/f control	Set V/f curve correctly
			Improper setting of motor parameter	Correct setting according to motor nameplate
			Improper setting of motor overload protection times	Correct setting of motor overload protection times
			The motor is locked or the load mutation is too lar	Check the cause of motor lockup or check the load
			Long-term low-speed heavy-load operation of common motor	Selection of variable frequency motor
12	**Err12**	Output Open Phase	Abnormal motor wire connection	Check motor wiring
			Motor three-phase unbalance	Check motor or replace motor
			Incorrect setting of vector control parameter	Correct setting of vector control parameter
12	**Err12**	Output Open Phase	Abnormal motor wire connection	Check motor wiring
			Motor three-phase unbalance	Check motor or replace motor
			Incorrect setting of vector control parameter	Correct setting of vector control parameter
14	**Err14**	External Device Failure	External Fault Terminal Valid	Check the status of the external fault terminal
			Stall condition lasts too long	Check for abnormal load
15	**Err15**	Radiator overheat	Fan is damaged	Replace the fan
			Air Duct Blockage	Dredge Air Duct

Fault Code	Breakdown Show	Breakdown Name	Primary Cause	Opposite
		protection	Abnormal temperature sensor	Seek Service
			Abnormal installation of drive module	Seek Service
			Abnormal installation of drive module	Seek Service
16	**Err16**	Port communication is abnormal	Improper setting of communication baud ratio	Correct settings
			Communication port cable disconnected	Reconnect
			The upper computer does not work.	Make the upper computer work
			Incorrect communication parameters of drive itself	Correct settings
17	**Err17**	EEPROM read and write fault	Abnormal parameter reading and writing occurred on the control board	Seek Service
19	**Err19**	Parameter identification failure	Defective motor wiring	Check motor wiring
			Lectric motor rotation time identification	Identification when motor is in static state
			Deviation of motor parameter setting is too lar	Correct setting according to motor nameplate
20	**Err20**	Continuous run time to	The function of continuous running time arrival is set	
21	**Err21**	Loss of PID feedback	PID feedback channel abnormal	Check feedback channel
			PID parameter setting is unreasonable	Correct settings
22	**Err22**	Disconnection of module temperature detection circuit	Poor contact of temperature sensor socket	Reseat
			Ambient temperature too low	Elevated Ambient Temperature
			The module temperature detection circuit is damaged	Seek Service
			Damaged thermistor	Seek Service
24	**Err24**	Output short to ground	Output wiring shorted to ground	Check motor wiring and output impedance to ground
			Abnormal motor insulation	Check the motor
			Inversion module abnormal	Seek Service
			Output leakage current to	Seek Service

Fault Code	Breakdown Show	Breakdown Name	Primary Cause	Opposite
			ground is too high	
25	**Err25**	Module Overload	Overcurrent factor	Handle according to the way of overcurrent
			Abnormal input power supply	Check the input grid voltage
			Abnormal motor output	Check motor or motor wiring
			Inversion module abnormal	Seek Service
26	**Err26**	Cumulative run time to	Cumulative elapsed time arrival function is set	

Notice

When the fault occurs, please confirm according to the reasons and countermeasures one by one, when the fault can not be eliminated, do not power on by yourself. Please contact the supplier or manufacturer in time.

Warranty Agreement

1、 The warranty period of this product is 18 months (subject to the barcode information of the machine body). During the warranty period, if the product breaks down or is damaged under normal use according to the manual, our company will be responsible for free maintenance.

2、 During the warranty period, a certain repair fee will be charged for damage caused by the following reasons:

A. The machine is damaged due to wrong use and unauthorized repair and transformation;

B. Machine damage caused by fire, flood, abnormal voltage, other natural disasters and secondary disasters;

C. Hardware damage caused by artificial drop and transportation after purchase;

D. Machine damage caused by not following the user manual provided by our company;

E. Failures and damages caused by obstacles outside the machine (such as external equipment factors);

3、 In case of product failure or damage, please fill in the contents of the Product Warranty Card correctly and in detail.

4、 The collection of maintenance fees shall be subject to the latest adjustment of the Maintenance Price List of our company.

5、 This warranty card will not be reissued under normal circumstances. Please keep this card and show it to the maintenance personnel during warranty.

6、 In the course of service, if there is any problem, please contact our agent or our company in time.

7、 The right of interpretation of this agreement belongs to our company.

Product warranty card

<table>
<tr><td rowspan="3">Customer Information</td><td colspan="2">Address of organization:</td></tr>
<tr><td>UserName:</td><td>Contacts:</td></tr>
<tr><td></td><td>Contact number:</td></tr>
<tr><td rowspan="3">Product Information</td><td colspan="2">Product model:</td></tr>
<tr><td colspan="2">Barcode for fuselage (paste here):</td></tr>
<tr><td colspan="2">Dealer Name:</td></tr>
<tr><td>Fault Information</td><td colspan="2">(Repair time and content):

Repairman:</td></tr>
</table>