Catalogue

Foreword

First of all, thank you for purchasing our VFD.

The VFD is a technology-upgraded VFD launched by our company based on extensive market application of the VFD through in-depth market research. The series of VFDs has excellent performance, reliability, stability, compact structure, and strong usability, which will bring you a better user experience.

This manual describes the functional characteristics and usage methods of the VFD, including product selection, parameter settings, operation debugging, maintenance and inspection. Please be sure to read this manual carefully before use. The equipment manufacturer should send this manual to the end user along with the equipment for future reference.

Points to note
● **In order to illustrate the details of the product, the illustrations in this manual sometimes show the state where the outer cover or safety cover is removed. When using this product, be sure to install the cover or cover as required and follow the instructions in the manual.** ● **The illustrations in this manual are for illustration purposes only and may differ from the product you ordered.** ● **The company is committed to continuous improvement of its products, and product features will be constantly upgraded. If the information provided changes, no further notice will be given.** ● **If you have any questions during use, please contact our regional agents or directly contact our customer service center.**

Unpacking inspection:

Please carefully confirm when unpacking;

The model and VFD rating on the machine nameplate are consistent with your order. The box contains the machine you ordered, product certification, user manual, and warranty.

Is there any damage to the product during transportation? If you find any omissions or damages, please contact our company or your supplier immediately for resolution.

Initial use:

For users who are new to this product, they should carefully read this manual first. If you have any questions about some of the features and performance, please consult our technical support staff for assistance, which will help you use this product correctly.

CE The VFD complies with the following international standards, and the products have passed CE certification.

IEC/EN 61800-5-1:2007 Safety requirements for adjustable speed electrical drive systems;

IEC/EN 61800-3: 2004 Adjustable speed electrical drive systems; Part 3: Electromagnetic compatibility standards for products and their specific test methods (complying with the requirements of IEC/EN 61800-3 under the conditions of correct installation and use in accordance with 6.3.2 and 6.3.6).

Connection with peripheral devices:

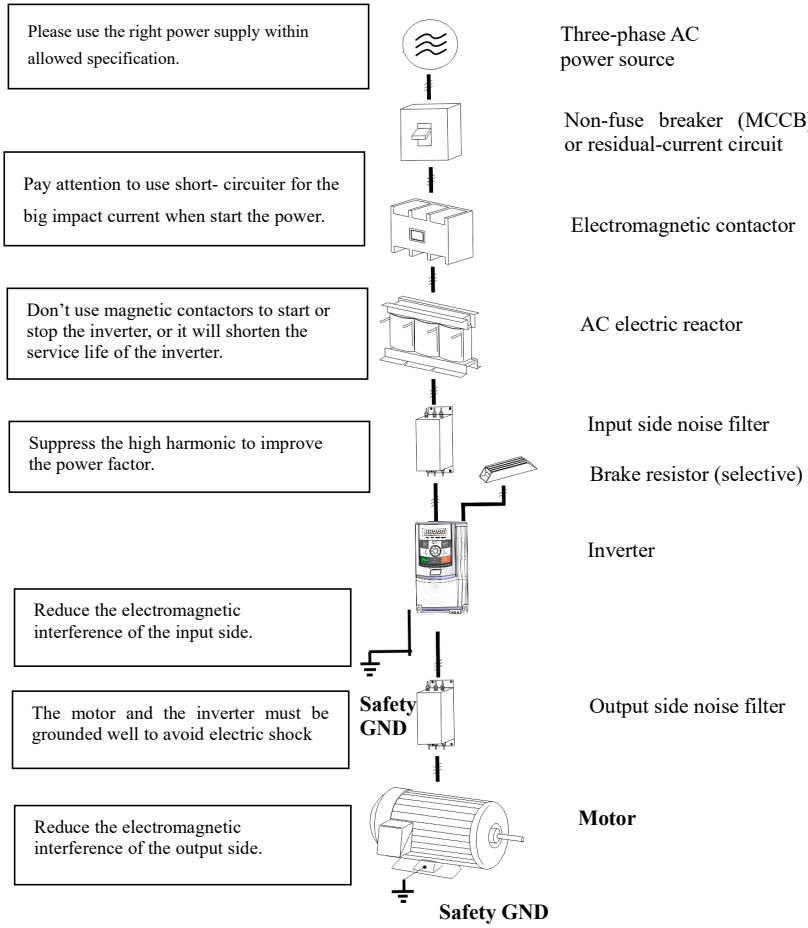


Figure 1 Example of connection to peripheral machines

- Do not install capacitors or surge suppressors on the output side of the VFD, as this will cause the VFD to malfunction or damage the capacitors and surge suppressors.
- The input/output (main circuit) of the VFD contains harmonic components that may interfere with the communication equipment attached to the VFD. Therefore, an anti-interference filter is installed to minimize interference.
- For details and options of peripheral devices, refer to the selection of peripheral devices.

Chapter 1 Safety Information and Precautions

Security definition

In this manual, safety precautions are divided into the following two categories:


Danger: The danger caused by not operating according to the requirements may result in serious injury or even death;


Note: Any failure to follow the instructions may result in moderate or minor injuries and equipment damage.

Please read this chapter carefully when installing, debugging, and maintaining this system, and be sure to follow the safety precautions required by this chapter. Any injuries and losses caused by illegal operations are not the responsibility of the company.

1.1 Safety precautions

Use it Stage of	Safety level	Matters
Before installation	 danger	Please do not install if the control system is found to have water ingress, missing components, or damaged components during unpacking! Please do not install if the packing list does not match the name of the physical item!
	 Attention	During handling, it should be lifted and placed gently, otherwise there is a risk of damaging the equipment! Please do not use damaged drives or VFDs with missing parts, as there is a risk of injury! Do not touch the components of the control system with your hands, otherwise there is a risk of electrostatic damage!
During installation	 danger	Please install it on a flame-retardant object such as metal; stay away from combustible materials. Otherwise, it may cause a fire alarm! Do not randomly twist the fixing bolts of the equipment components, especially the bolts with red marks!

Use it Stage of	Safety level	Matters
	 Attention	Don't let the wire head or screw fall into the drive, otherwise it will cause damage to the drive! Please install the drive in a place with little vibration and avoid direct sunlight. When placing more than two VFDs in the same cabinet, please pay attention to the installation location to ensure the heat dissipation effect.
During wiring	 danger	It must be constructed by professional electrical engineering personnel, otherwise unexpected dangers may occur! A circuit breaker must be used to separate the VFD from the power supply, otherwise a fire hazard may occur! Please confirm that the power supply is in a zero energy state before connecting the wires, otherwise there is a risk of electric shock! Please ground the VFD correctly and normatively according to the standard, otherwise there is a risk of electric shock!
	 Attention	Never connect the input power supply to the output terminals (U, V, W) of the VFD. Pay attention to the markings on the terminal block and do not connect the wires incorrectly! Otherwise, it will cause damage to the drive! Never directly connect the brake resistor between the DC bus (+), (-) terminals, otherwise it will cause a fire alarm! Please refer to the manual for the recommended wire diameter, otherwise accidents may occur!
Before power-on	 Attention	Please confirm whether the voltage level of the input power supply is consistent with the rated voltage level of the VFD; whether the wiring positions on the power input terminals (R, S, T) and output terminals (U, V, W) are correct; and pay attention to checking whether there is a short circuit in the peripheral circuits connected to the drive, and whether the connected lines are secure, otherwise it will cause damage to the drive! No pressure test is required for any part of the VFD. The product has been tested for this purpose before leaving the factory, otherwise it may cause accidents!
	 Danger	The VFD must be covered with a cover plate before being powered on, otherwise it may cause electric shock!

Use it Stage of	Safety level	Matters
		The wiring of all peripheral accessories must comply with the instructions in this manual, and be connected correctly according to the circuit connection methods provided in this manual, otherwise accidents may occur!
After power-on	 Danger	Do not open the cover after power-on. Otherwise, there is a risk of electric shock! Do not touch any input and output terminals of the VFD. Otherwise, there is a risk of electric shock!
	 Attention	If parameter identification is required, please be aware of the danger of injury during motor rotation, otherwise it may cause accidents! Please do not change the parameters of the VFD manufacturer at will, otherwise it may cause damage to the equipment!
In operation	 Danger	Non-professional technicians are not allowed to detect signals during operation, otherwise it may cause personal injury or equipment damage! Do not touch the cooling fan and discharge resistor to test the temperature, otherwise it may cause burns!
	 Attention	During the operation of the VFD, it is necessary to avoid falling objects into the equipment, otherwise it will cause damage to the equipment! Do not use the method of contactor on/off to control the start/stop of the drive, otherwise it may cause equipment damage!
During maintenance	 Danger	Please do not repair or maintain the VFD without professional training, otherwise it may cause personal injury or equipment damage! Please do not repair and maintain the equipment with electricity, otherwise there is a risk of electric shock! Confirm that the input power supply of the VFD must be disconnected for 10 minutes before the drive can be maintained and repaired, otherwise the residual charge on the capacitor can cause harm to people! All pluggable plug-ins must be inserted and removed under power-off conditions!

Use it Stage of	Safety level	Matters
		After replacing the VFD, it is necessary to set and check the parameters.

1.2 Precautions

1.2.1 Motor insulation inspection

Before using the motor for the first time, after long-term storage, and during regular inspections, the motor insulation should be checked to prevent damage to the VFD due to insulation failure of the motor winding. During the insulation inspection, be sure to separate the motor wiring from the VFD. 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 rated capacity of the motor and the VFD do not match, especially when the rated power of the VFD is greater than the rated power of the motor, it is important to adjust the relevant parameters of the motor protection in the VFD or install a thermal relay in front of the motor to protect the motor.

1.2.3 Operation above power frequency

This VFD provides an output frequency of 0Hz to 1200Hz. If the customer requires operation above 50Hz, please consider the mechanical device's bearing capacity.

1.2.4 Vibration of mechanical devices

At some output frequencies, the converter may encounter mechanical resonance points of the load device, which can be avoided by setting the skip frequency parameter within the converter.

1.2.5 About the heating and noise of the motor

Due to the fact that the output voltage of the VFD is a PWM wave, which contains certain harmonics, the temperature rise, noise, and vibration of the motor will slightly increase compared to the operation at the same frequency.

1.2.6 When there are pressure sensitive devices or capacitors that improve power factor on the output side

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

1.2.7 Switching devices such as contactors used at the input and output ends of the VFD

If a contactor is installed between the power supply and the input terminal of the VFD, it is not allowed to use this contactor to control the start and stop of the VFD. If it is necessary to use the contactor to control the start and stop of the VFD, the interval should not be less than one hour. Frequent charging and discharging can easily reduce the service life of the capacitors inside the VFD. If a contactor or other switching device is installed between the output terminal and the motor, it should be ensured that the VFD is switched on and off when there is no output, otherwise it can easily cause damage to the modules inside the VFD.

1.2.8 Use beyond rated voltage

It is not suitable to use the VFD outside the allowable operating voltage range specified in the instructions, which can easily cause damage to the components inside the VFD. If necessary, use the appropriate voltage boost or voltage drop device to transform the power supply before inputting it into the VFD.

1.2.9 Three-phase input is changed to two-phase input

It is not allowed to change the three-phase VFD to a two-phase one, otherwise it will cause malfunction or damage to the VFD.

1.2.10 Lightning impulse protection

Although this series of VFDs are equipped with a lightning overcurrent protection device, they have certain self-protection capabilities against induced lightning. However, customers in areas with frequent lightning strikes should also install lightning protection devices at the front end of the VFD.

1.2.11 Altitude and derating

In areas with an altitude of over 1000 meters, the cooling effect of the VFD is reduced due to the thin air, making it necessary to reduce the rating. Please consult our company for technical advice in this situation.

1.2.12 Some special usages

If the customer needs to use methods other than the recommended wiring diagrams provided in this manual during use, such as common DC buses, please consult our company.

1.2.13 Attention to scrapping of VFD

The electrolytic capacitors in the main circuit and on the printed circuit board may explode during incineration. Plastic parts may produce toxic gases during incineration, and should be disposed of as industrial waste.

1.2.14 About Adaptive Motor

The standard compatible motor is a four-pole squirrel-cage asynchronous induction motor. If it is not the above motor, be sure to select the VFD according to the rated current of the motor.

The cooling fan of a non-variable-frequency motor is coaxially connected to the rotor shaft, and the cooling effect of the fan decreases when the speed decreases. Therefore, in situations where the motor overheats, a strong exhaust fan should be installed or the motor should be replaced with a variable-frequency motor;

The VFD has built-in motor standard parameters, and it is necessary to identify or modify the default values according to the actual situation to match the actual values as much as possible, otherwise it will affect the operation effect and protection performance;

Due to short circuits inside the cable or motor, the VFD may alarm or even explode. Therefore, please first conduct an insulation short-circuit test on the initially installed motor and cable, and perform this test frequently during routine maintenance. Note that when performing this test, be sure to disconnect the VFD and the tested part completely.

Chapter 2 Product Information

2.1 Naming rules

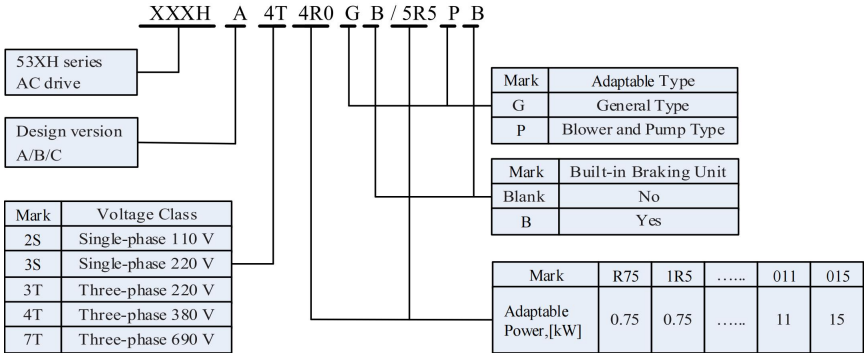


Figure 2-1. Naming Specification

2.2 Nameplate

Figure 2-2. Nameplate

2.3 VFD series

Table 2-1 VFD Model and Technical Data

Model of VFD	Input voltage	Input current (A)	Output current (A)	Adaptive motor (kW)
XXX-C3SR4G	Single-phase 220V Range：-15%～+20%	5.4	2.3	0.4
XXX-C3SR75G		8.2	4.0	0.75
XXX-C3S1R5G		14.0	7.0	1.5
XXX-C3S2R2GB		23.0	9.6	2.2
XXX-3S4R0GB		32.0	17	4.0
XXX-3S5R5GB		45.0	25	5.5
XXX-B4TR75GB	Three-phase380V Range：：-15%～+20%	3.4	2.1	0.75
XXX-B4T1R5GB/2R2PB		5.0/5.8	3.8/5.1	1.5/2.2
XXX-C4T2R2GB/4R0PB		5.8/10.5	5.1/9.0	2.2/4.0
XXX-C4T4R0GB/5R5PB		10.5/14.6	9.0/13.0	4.0/5.5
XXX-C4T5R5GB/7R5PB		14.6/20.5	13.0/17.0	5.5/7.5
XXX-C4T7R5GB/9R0PB		20.5/22.0	17.0/20.0	7.5/9.0
XXX-D4T9R0GB/011PB		22.0/26.0	20.0/25.0	9.0/11.0
XXX-D4T011GB/015PB		26.0/35.0	25.0/32.0	11.0/15.0
XXX-D4T015GB/018PB		35.0/38.5	32.0/37.0	15.0/18.5
XXX-4T018GB/022PB		38.5/46.5	37.0/45.0	18.5/22.0
XXX-4T022GB/030PB		46.5/62.0	45.0/60.0	22.0/30.0
XXX-4T030G(B)/037P(B)		62.0/76.0	60.0/75.0	30.0/37.0
XXX-4T037G(B)/045P(B)		76.0/92.0	75.0/90.0	37.0/45.0
XXX-4T045G(B)/055P(B)		92.0/113.0	90.0/110.0	45.0/55.0
XXX-4T055G(B)/075P(B)		113.0/157.0	110.0/152.0	55.0/75.0
XXX-4T075G(B)/093P(B)		157.0/180.0	152.0/176.0	75.0/93.0
XXX-4T093G(B)/110P(B)		180.0/214.0	176.0/210.0	93.0/110.0
XXX-4T110G/132P		214.0/256.0	210.0/253.0	110.0/132.0
XXX-4T132G/160P		256.0/307.0	253.0/304.0	132.0/160.0
XXX-4T160G/185P		307.0/345.0	304.0/340.0	160.0/185.0
XXX-4T185G/200P		345.0/385.0	340.0/380.0	185.0/200.0
XXX-4T200G/220P		385.0/430.0	380.0/426.0	200.0/220.0
XXX-4T220G/250P		430.0/468.0	426.0/465.0	220.0/250.0
XXX-4T250G/280P		468.0/525.0	465.0/520.0	250.0/280.0
XXX-4T280G/315P		525.0/590.0	520.0/585.0	280.0/315.0
XXX-4T315G/355P		590.0/665.0	585.0/650.0	315.0/355.0
XXX-4T355G/400P		665.0/785.0	650.0/725.0	355.0/400.0
XXX-4T400G/450P		785.0/883.0	725.0/820.0	400.0/450.0
XXX-4T450G/500P		883.0/920.0	820.0/900.0	450.0/500.0

Model of VFD	Input voltage	Input current (A)	Output current (A)	Adaptive motor (kW)
XXX-4T500G/550P		920.0/1020.0	900.0/1000.0	500.0/550.0
XXX-4T550G/630P		1020.0/1120.0	1000.0/1100.0	550.0/630.0
XXX-4T630G		1120.0	1100.0	630.0
XXX-4T710G		1315.0	1250	710.0
XXX-4T800G		1525.0	1450	800.0

2.4 Technical Specifications

Table 2-3 Technical Specifications of VFD

Project		Specifications
Main control performance	Highest frequency	Vector control: 0-600Hz； VF control: 0-1200Hz
	Carrier frequency	1k-11kHz; the carrier frequency can be automatically adjusted according to the load characteristics.
	Input frequency resolution	Digital setting: 0.01Hz Simulation setting: maximum frequency × 0.1%
	Control mode	Open-loop vector control (SVC), V/F control
	Starting torque	G-type machine: 0.5Hz/180% (open-loop vector control) P-type machine: 0.5Hz/120% (open-loop vector control)
	Speed range	1:200 (open-loop vector control)
	Accuracy of constant speed (Speed control accuracy)	Open-loop vector control: ≤±0.5% (rated synchronous speed)
	stability of speed control	Open-loop vector control: ≤±0.3% (rated synchronous speed)
	torque response	≤40ms (open-loop vector control)
	overload capacity	G type machine: 150% rated current for 60 seconds; 180% rated current for 5 seconds P-type machine: 120% rated current for 60 seconds; 150% rated current for 5 seconds
	torque boost	Automatic torque increase; manual torque increase of 0.1% to 30.0%
	V/F curve	Three methods: linear, multi-point, and square V/F curve
	Acceleration and	Acceleration and deceleration modes of straight line or S

Project		Specifications
	deceleration curve	curve; four acceleration and deceleration times; acceleration and deceleration time range of 0.0s-3000.0s
	DC braking	DC braking frequency: 0.0Hz-maximum frequency, braking time: 0.0-36.0 seconds, braking action current value: 0.0%-100.0%
	Inching control	Jogging frequency range: 0.00Hz-50.00Hz; jogging acceleration and deceleration time: 0.0s-3000.0s
	Simple PLC, multi-speed operation	It can achieve up to 16 speed segments through the built-in PLC or control terminal
	Built-in PID	Convenient to realize closed-loop control system for process control
	Automatic voltage regulation (AVR)	When the grid voltage changes, it can automatically maintain the output voltage constant
	Torque limitation and control	The "excavator" feature automatically limits torque during operation to prevent frequent overcurrent trips; closed-loop vector mode enables torque control
Personalized features	Power-on peripheral device safety self-test	It can perform safety testing on peripheral devices such as grounding and short circuit when powered on
	Common DC bus function	It can realize the function of sharing DC busbar by multiple VFDs
	JOG button	Programmable keys: forward and reverse operation/inching operation function selection
	Textile frequency control	Multiple triangular wave frequency control functions
	fast current limiting function	Built-in fast current limiting algorithm reduces the probability of overcurrent reporting from the VFD and improves the overall anti-interference capability
	Timing control	Timing control function: Set the time range from 0h to 65535h
	Standardization of keyboard extension cable	Customers can extend the keyboard using standard network cables.

Project		Specifications
RUN	Run command channel	Three channels: given by the operation panel, control terminal, and serial communication port. Switching can be done in various ways
	Frequency source	There are 10 types of frequency sources: digital given, analog voltage given, analog current given, pulse given, and serial port given. It can be switched through various methods
	Auxiliary frequency source	10 kinds of auxiliary frequency sources. Flexible realization of auxiliary frequency fine adjustment and frequency synthesis
	Input terminal	Standard configuration of seven digital input terminals, up to nine digital input terminals (AI1, AI2 can be used as DI terminals), compatible with active PNP or NPN input methods Two analog input terminals, of which AI1 can only be used as a voltage input, and AI2 can be used as a voltage or current input. (If you need to expand the input and output terminal functions, please choose other series.)
	Output terminal	One digital output terminal (bipolar output) Two relay output terminals Two analog output terminals, which can be selected from 0/4mA~20mA or 0/2V~10V, can achieve the output of physical quantities such as set frequency, output frequency, and speed.
Display and keyboard operation	LED display	Display parameters
	LCD display	Optional, with Chinese/English prompts for operation content
	Copy LCD parameters	Using LCD can achieve rapid replication of parameters
	Key lock and function selection	Realize partial or full locking of keys, define the scope of action of some keys, to prevent misuse
Protection & Accessories	Protective function	Short circuit detection of the power-on motor, input and output phase loss protection*, overcurrent protection, overvoltage protection, undervoltage protection, overheating protection, overload protection, etc.

Project		Specifications
	Accessories	LCD operation panel, brake components, etc.
Environment	Application place	Indoors, protected from direct sunlight, without dust, corrosive gases, flammable gases, oil mist, water vapor, dripping or salt
	Altitude	Below 1000 meters
	Ambient temperature	-10℃ ～ ＋ 50℃ (when the ambient temperature is between 40℃～50℃, please use it with derating)
	Humidity	Less than 95% RH, no condensation
	Vibration	Less than 5.9 m/s2 (0.6g)
	Storage temperature	-20℃～＋60℃
	Pollution level	2
Product standards	Products are subject to safety standards	IEC61800-5-1:2007
	The product implements EMC standards	IEC61800-3:2005

Note: Some power segments do not have hardware input phase loss detection function. Please consult the manufacturer for specific models.

2.5 Product appearance diagram and installation hole size

2.5.1 Appearance and mounting hole size of VFD (mm)

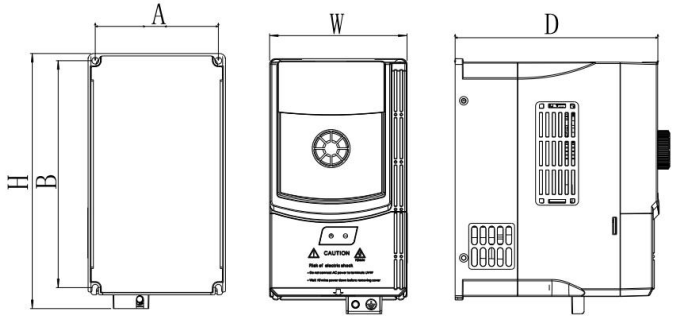


Figure2-3. Figure 2-3. Schematic diagram of the external dimensions and installation dimensions of the plastic case chassis below 220V (3S) 2.2kW
Outline and installation dimensions of plastic case chassis below 380V (4T) 15kW

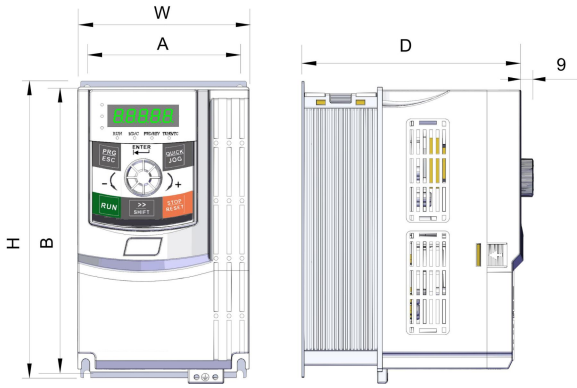


Figure 2-4. Schematic diagram of the external dimensions and installation dimensions of the plastic case chassis below 220V (3S)4.0~ 5.5kW

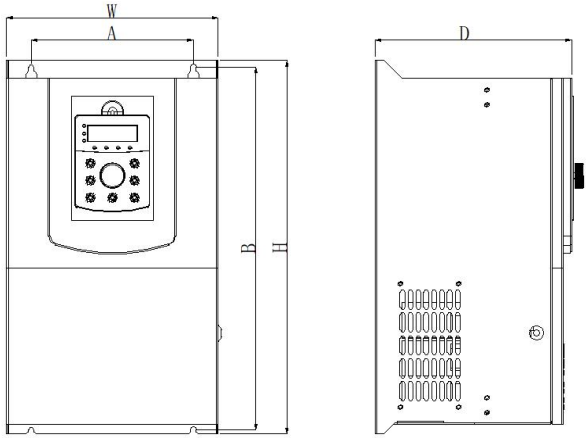


Figure 2-4. Outline and installation dimensions of 380V (4T) 18-37kW molded case chassis

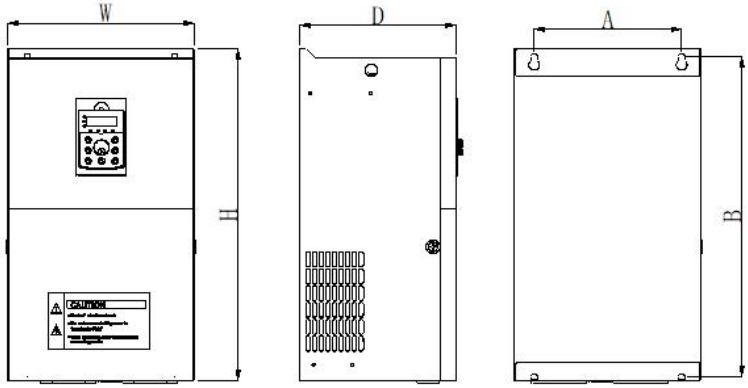


Figure 2-5.380V (4T) 45-132kW VFD external dimensions and installation dimensions diagram

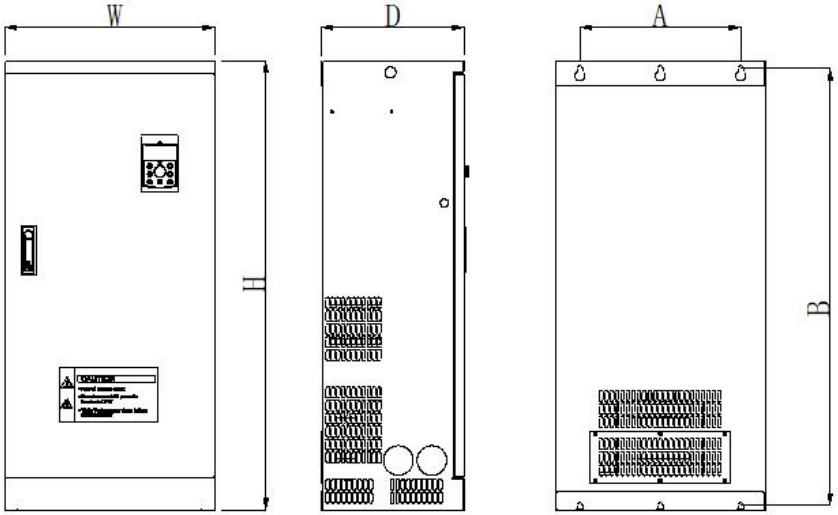


Figure 2-6. Schematic diagram of external dimensions and installation dimensions of 380V (4T) 160-450kW VFD

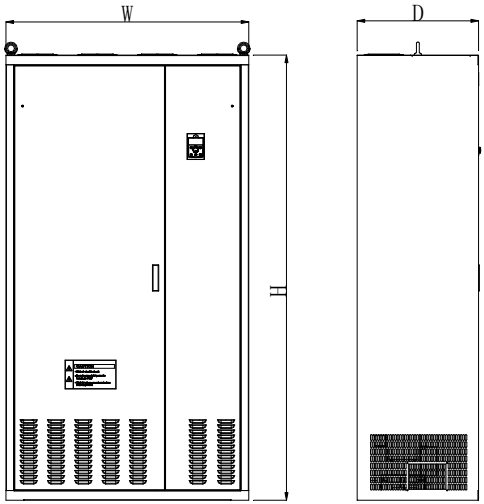


Figure 2-7. Schematic diagram of external dimensions and installation dimensions of 380V (4T) 500-800kW VFD Outline

Table 2-4 Overall Dimensions and Installation Hole Dimensions

Model of VFD	Mounting hole position		Overall dimensions			Mounting hole diameter (mm)
	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	
XXX-C3SR4G	78	162	172.5	96	141	Φ4.5
XXX-C3SR75G						
XXX-C3S1R5G						
XXX-C3S2R2GB	100	199	206	119	154	Φ5
XXX-3S4R0GB	120	260	268	139	155.5	Φ6
XXX-3S5R5GB						
XXX-B4TR75GB	86	158	172.5	96	141	Φ4.5
XXX-B4T1R5GB/2R2PB						
XXX-C4T2R2GB/4R0PB						
XXX-C4T4R0GB/5R5PB	100	199	206	119	154	Φ5
XXX-C4T5R5GB/7R5PB	120	260	268	139	155.5	Φ5
XXX-C4T7R5GB/9R0PB						
XXX-D4T9R0GB/011PB	150	314	324	188	188	Φ6
XXX-D4T011GB/015PB						
XXX-D4T015GB/018PB						
XXX-4T018GB/022PB	165	372	383	215	200	Φ6
XXX-4T022GB/030PB						

Model of VFD	Mounting hole position		Overall dimensions			Mounting hole diameter (mm)
	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	
XXX-4T030G(B)/037P(B)	200	436	449	260	209	Φ7
XXX-4T037G(B)/045P(B)						
XXX-4T045G(B)/055P(B)	245	531	550	310	260	Φ10
XXX-4T055G(B)/075P(B)						
XXX-4T075G(B)/093P(B)	280	561	580	350	267	Φ10
XXX-4T093G(B)/110P(B)						
XXX-4T110G/132P	320	695	715	430	295	Φ10
XXX-4T132G/160P						
XXX-4T160G/185P	360	972	1000	470	318	Φ12
XXX-4T185G/200P						
XXX-4T200G/220P	380	1060	1088	520	338	Φ12
XXX-4T220G/250P						
XXX-4T250G/280P	440	1190	1220	650	330	Φ12
XXX-4T280G/315P						
XXX-4T315G/355P	500	1255	1290	740	420	Φ14
XXX-4T355G/400P						
XXX-4T400G/450P						
XXX-4T450G/500P						
XXX-4T500G/550P	-	-	1800	1060	500	-（立式）
XXX-4T550G/630P						
XXX-4T630G						
XXX-4T710G	-	-	2200	1200	600	-（立式）
XXX-4T800G						

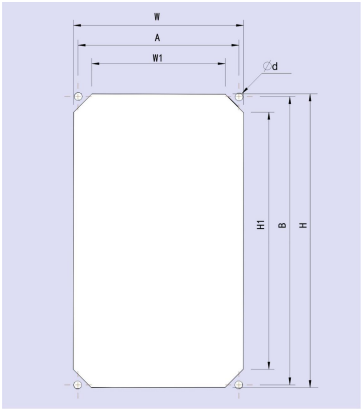


Figure 2-8. Dimension drawing of VFD 7.5kW

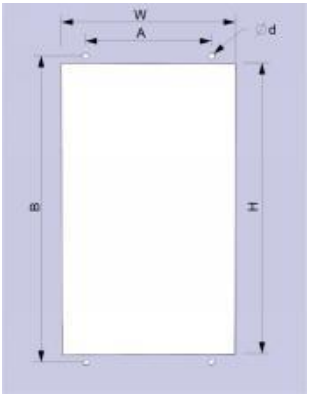


Figure 2-9. Dimension drawing of VFD 18-55kW

Table 2-5 18-55kW wall-through hole size and mounting hole size

Model of VFD	Mounting hole position		Through-wall hole size				Installing aperture diameter (mm)
	A (mm)	B. (mm)	H. (mm)	H1 (mm)	W. (mm)	W1 (mm)	
XXX-4T018GB/022PB	150	392.5	377	/	219	/	φ8
XXX-4T022GB/030PB							
XXX-4T030G/037P	290	338	440	/	264	/	φ8
XXX-4T030G/037PB							
XXX-4T037G/045P							
XXX-4T037G/045PB							
XXX-4T045G/055P	245	571	554	/	320	/	φ10
XXX-4T045G/055PB							
XXX-4T055G/075P							
XXX-4T055G/075PB							

2.5.2 Installation dimension diagram of external keyboard with tray and without tray (mm)

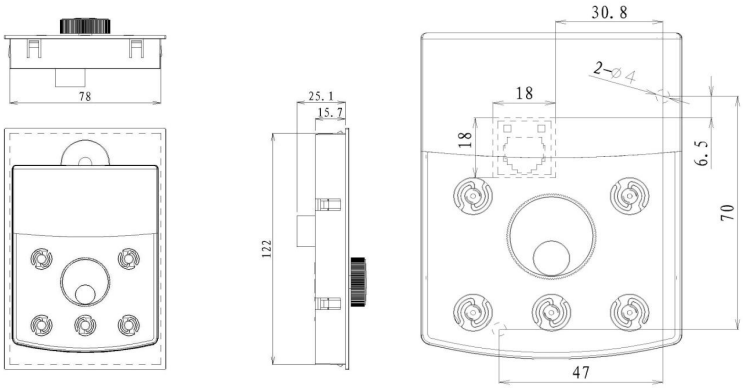


Figure 2-10. Installation dimension diagram of external keyboard with tray
Figure 2-11. Installation dimension diagram of external keyboard without tray

2.6 Optional accessories

For detailed functions and instructions of optional accessories, see the relevant instructions for optional accessories.
Please specify the following options when ordering.

Table 2-7 VFD accessories

Name of	Model No.	Functionality	Remarks
Built-in brake unit	Product model followed by "B"	For energy consumption braking	Built-in brake unit is standard configuration
	The product model is followed by "(B)"	For energy consumption braking	The built-in brake unit is an optional configuration
External LED operation panel	XXX-LED	External LED display and operation keyboard	RJ45 interface
External LCD operation panel	XXX-LCD	External LCD display and operation keyboard	RJ45 interface
External LED2 operation panel	XXX-LED2	External LED dual display operation keyboard	RJ45 interface
keyboard tray	XXX-1105-0 (black)	Used in conjunction with the operation keyboard	Optional equipment
If you need to expand the functions of other functional modules (such as I/O cards, PG cards, communication bus cards, etc.), please choose the XXX-PLUS series VFD, and specify the functional module cards you order when ordering.			

2.7 Daily maintenance and repair of VFD

2.7.1 Routine maintenance

Due to the influence of environmental temperature, humidity, dust, and vibration, the internal components of the VFD may age, resulting in potential failures or reduced service life of the VFD. Therefore, it is necessary to implement daily and regular maintenance and repair of the VFD.

Daily inspection items:

1） Whether there is any abnormal change in the sound of the motor during operation
2） Whether vibration is generated during the operation of the motor
3） Whether the installation environment of the VFD has changed
4） Whether the cooling fan of the VFD works normally
5） Whether the VFD is overheated

Daily cleaning:

1） The VFD should always be kept in a clean state.
2） Effectively remove dust on the surface area of the VFD to prevent dust from entering the interior of the VFD. Especially metal dust.
3） Effectively remove the oil stains on the VFD cooling fan.

2.7.2 Periodic inspection

Please check the places that are difficult to inspect during operation on a regular basis.

Regular inspection items:

1） Check the air duct and clean it regularly
2） Check whether the screw is loose
3） Check whether the VFD is corroded
4） Check whether there are arc traces on the terminal block
5） Insulation test of main circuit

Reminder: When measuring insulation resistance with a megohmmeter (please use a DC 500V megohmmeter), disconnect the main circuit line from the VFD. Do not use an insulation resistance meter to test the control circuit insulation. There is no need for high-voltage testing (which has already been completed at the factory).

2.7.3 Replacement of vulnerable parts of the VFD

The main vulnerable parts of the VFD are the cooling fan and the electrolytic capacitor for filtering, and their lifespans are closely related to the usage environment and maintenance conditions. The general lifespan is:

Device name	Lifetime time
Fan	2-3 years
electrolytic capacitor	4-5 years

The user can determine the replacement period based on the running time.

1) Cooling fanPossible causes of damage: bearing wear and blade aging.

Discrimination criteria: Whether there are cracks in the fan blades, and whether there are abnormal vibrations during startup.

2) Filter electrolytic capacitor

Possible causes of damage: poor input power quality, high ambient temperature, frequent load changes, electrolyte aging.

Judgment criteria: whether there is liquid leakage, whether the safety valve protrudes, measurement of electrostatic capacitance, and measurement of insulation resistance.

2.7.4 Storage of VFD

After purchasing the VFD, the user must pay attention to the following points for temporary storage and long-term storage:

1. When storing, try to pack it in the company's packaging box as much as possible.

Long-term storage can lead to deterioration of electrolytic capacitors. It is necessary to ensure that they are powered on once every 2 years for at least 5 hours. The input voltage must be slowly raised to the rated value using a voltage regulator.

2.8 Warranty description of VFD

The free warranty only refers to the VFD itself.

1. Warranty instructions for domestic use:

① Warranty, replacement, and return within one month after shipment;

② Warranty and replacement within three months after shipment;

③ The warranty period is 15 months after shipment or 18 months from the date of manufacture, whichever is longer, based on the barcode on the body.

2. When exported overseas (excluding domestic), the warranty is responsible for the purchase within 6 months after shipment.

3. If the warranty period has expired, reasonable maintenance fees will be charged;

4. During the warranty period, certain maintenance fees shall be charged in the following circumstances:

① Machine damage caused by users who do not follow the instructions in the manual;

② Damage caused by fires, floods, abnormal voltage, etc.;

③ The damage caused by using the VFD for abnormal functions;

④ Use P-type (fan-pump type) VFDs as G-type (general purpose type) VFDs;

⑤ Tearing up the product nameplate and body number without authorization.

5. This product is only liable for up to 1 or 2 terms of product liability in the event of a product accident. If the user requires additional liability compensation guarantees, please purchase property insurance from an insurance company in advance.

The service fees are calculated according to the manufacturer's uniform standards. If there is a contract, the principle of contract priority shall be followed.

2.9 Selection Guide for Brake Components

The following table 2-8 is guidance data, users can choose different resistance values and power according to the actual situation, (but the resistance value must not be less than the recommended value in the table, and the power can be large.) The selection of braking resistance needs to be determined according to the power of the motor in the actual application system, which is related to the system inertia, deceleration time, potential energy load, etc. The customer needs to choose according to the actual situation. The larger the inertia of the system, the shorter the required deceleration time, and the more frequent the braking, the larger the power and smaller the resistance value of the braking resistance need to be selected.

2.9.1 Selection of resistance

During braking, almost all of the regenerative energy of the motor is consumed in the braking resistor. According to the formula: U*U/R=Pb

U----braking voltage for system stable braking (different systems have different values, generally 700V for 380VAC systems)

Pb---- braking power

2.9.2 Power selection of braking resistor

In theory, the power of the braking resistor is consistent with the braking power, but considering the derating factor of 70%, the formula can be used: 0.7*Pr=Pb*D

Pr---- power of resistance

D---- Braking frequency (the proportion of the regeneration process in the entire working process), generally taking 10%. Please refer to the following table:

Application industry	an elevator	take up and put down the reel	centrifuge machine	accidental braking load
Proportion	20% to 30%	20-30%	50% to 60%	5%

Table 2-8 Selection table of brake components for XXX/XXXS VFD

Model of VFD	Braking torque 150%, recommended resistance value, power and brake unit model for 5S	Braking torque 100%, recommended resistance value for 15S, power Rate and brake unit model	Braking torque 50%, 15S Recommended resistance value, power Rate and brake unit model
XXX-B4TR75GB/1R5PB	≥300Ω, 0.2kW Built-in brake unit	≥300Ω, 0.2kW Built-in brake unit	≥300Ω, 0.2kW Built-in brake unit
XXX-B4T1R5GB/2R2PB	≥150Ω, 0.3kW Built-in brake unit	≥220Ω, 0.25kW Built-in brake unit	≥300Ω, 0.2kW Built-in brake unit
XXX-C4T2R2GB/4R0PB			
XXX-C4T4R0GB/5R5PB	≥100Ω, 0.4kW Built-in brake unit	≥130Ω, 0.4kW Built-in brake unit	≥150Ω, 0.3kW Built-in brake unit
XXX-C4T5R5GB/7R5PB	≥75Ω, 0.5kW Built-in brake unit	≥100Ω, 0.4kW Built-in brake unit	≥130Ω, 0.4kW Built-in brake unit
XXX-C4T7R5GB/9R0PB	≥60Ω, 0.5kW Built-in brake unit	≥75Ω, 0.5kW Built-in brake unit	≥100Ω, 0.4kW Built-in brake unit
XXX-D4T9R0GB/011PB	≥40Ω, 1.0kW Built-in brake unit	≥50Ω, 0.7kW Built-in brake unit	≥60Ω, 0.5kW Built-in brake unit
XXX-D4T011GB/015PB			
XXX-D4T015GB/018PB	≥30Ω, 1.2kW Built-in brake unit	≥40Ω, 1.0kW Built-in brake unit	≥50Ω, 0.7kW Built-in brake unit
XXX-4T018GB/022PB	≥24Ω, 2kW Built-in brake unit	≥30Ω, 1.2kW Built-in brake unit	≥40Ω, 1.0kW Built-in brake unit
XXX-4T022GB/030PB	≥13.6Ω, 3.7kW Built-in brake unit	≥30Ω, 1.2kW Built-in brake unit	≥40Ω, 1.0kW Built-in brake unit
XXX-4T030G/037P	≥13.6Ω, 3.7kW Built-in brake unit	≥24Ω, 2kW Built-in brake unit	≥30Ω, 4kW Built-in brake unit optional
XXX-4T030G/037PB			

Model of VFD	Braking torque 150%, recommended resistance value, power and brake unit model for 5S	Braking torque 100%, recommended resistance value for 15S, power Rate and brake unit model	Braking torque 50%, 15S Recommended resistance value, power Rate and brake unit model
XXX-4T037G/045P	≥10Ω, 4.5kW BR530-4T075	≥24Ω, 2kW BR530-4T037	≥24Ω, 2kW BR530-4T037
XXX-4T037G/045PB			
XXX-4T045G/055P	≥6.8Ω, 8.0kW BR530-4T132	≥10Ω, 4.5kW BR530-4T075	≥13.6Ω, 3.7kW BR530-4T075
XXX-4T045G/055PB			
XXX-4T055G/075P			
XXX-4T055G/075PB			
XXX-4T075G/093P			
XXX-4T075G/093PB			
XXX-4T093G/110P	≥2*(6.8Ω,8.0kW) BR530-4T200	≥6.8Ω, 8.0kW BR530-4T132	≥6.8Ω, 8.0kW BR530-4T132
XXX-4T093G/110PB			
XXX-4T110G/132P			
XXX-4T132G/160P			
XXX-4T160G/185P	≥3*(6.8Ω, 8.0kW) BR530-4T315	≥2*(6.8Ω, 8.0kW) BR530-4T200	≥2*(6.8Ω, 8.0kW) BR530-4T200
XXX-4T185G/200P			
XXX-4T200G/220P			
XXX-4T220G/250P	≥3*(6.8Ω, 8.0kW) BR530-4T315	≥2*(6.8Ω, 8.0kW) BR530-4T315	≥2*(6.8Ω, 8.0kW) BR530-4T315
XXX-4T250G/280P			
XXX-4T280G/315P			
XXX-4T315G/355P			
XXX-4T355G/400P	≥5*(6.8Ω, 8.0kW) BR530-4T630	≥4*(6.8Ω, 8.0kW) BR530-4T450	≥3*(6.8Ω, 8kW) BR530-4T450
XXX-4T400G/450P			
XXX-4T450G/500P			
XXX-4T500G/550P	≥6*(6.8Ω, 8.0kW) BR530-4T630	≥4*(6.8Ω, 8.0kW) BR530-4T630	≥4*(6.8Ω, 8kW) BR530-4T630
XXX-4T550G/630P			
XXX-4T630G			
XXX-4T710G	≥8*(6.8Ω, 8.0kW) BR530-4T630	≥6*(6.8Ω, 8.0kW) BR530-4T630	≥6*(6.8Ω, 8kW) BR530-4T630
XXX-4T800G			

Note: 1. The selection of the brake resistance value cannot be less than the recommended resistance value in the table, as it may damage the brake unit if it is less;

2. In the table, ×2 indicates that two sets of braking resistors are used in parallel, ×3 indicates that three sets of braking resistors are used in parallel, and so on;

3. Adding "B" after the VFD model indicates a standard built-in brake unit model VFD. If there is no "B", there is no built-in brake unit. Please select the corresponding brake unit model based on its brake torque;

The 18.5-30kWG type mechanism brake unit is an optional built-in unit. If required, please specify when ordering. The standard configuration does not include a brake unit;

5. The 5S and 15S listed in the table refer to the continuous braking time.

The above table is a guideline. Users can choose different resistance values and power according to the actual situation (but the resistance value must not be less than the minimum braking resistance value in the table, and the power can be higher). The selection of braking resistance needs to be determined based on the power of the motor in the actual application system, which is related to the system inertia, deceleration time, and the energy of the potential load. Users need to choose according to the actual situation.

Chapter 3 Mechanical and Electrical Installation

3.1 Mechanical installation

3.1.1 Installation environment

1) Ambient temperature: The ambient temperature has a significant impact on the life of the VFD, and the operating ambient temperature of the VFD is not allowed to exceed the allowable temperature range (-10°C to 50°C).

Install the VFD on the surface of a flame retardant object, with sufficient space around it for heat dissipation. The VFD can generate a lot of heat during operation. Use screws to install it vertically on the mounting bracket.

Please install it in a place where it is not prone to vibration. The vibration should not exceed 0.6G. Pay special attention to keeping it away from equipment such as presses.

Avoid installing in places with direct sunlight, moisture, and water droplets.

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

Avoid installing in places with oil, dust, and metal dust.

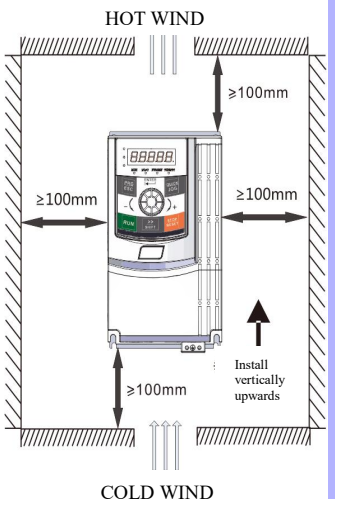


Figure 3-1. Installation diagram of single unit

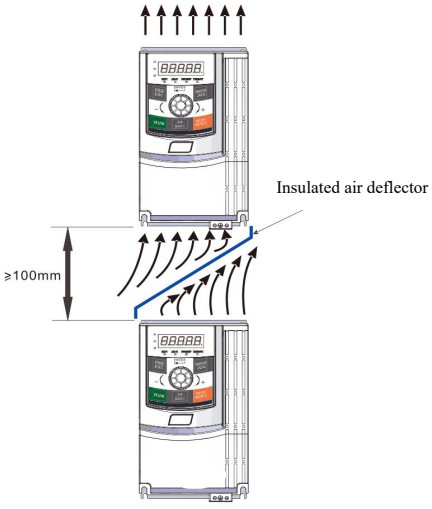


Figure 3-2. Installation diagram of VFD

Note: When installing the VFD on the top and bottom, please follow the installation diagram of the heat insulation deflector.

3.1.2 The installation of the model requires attention to the heat dissipation issue. Therefore, please note the following points:

Please install the VFD vertically to facilitate the upward dissipation of heat. However, it cannot be inverted. If there are many VFDs in the cabinet, it is best to install them side by side. In situations where it is necessary to install them up and down, please refer to the schematic in Figure 3-2 and install thermal baffles.

The installation space should comply with Figure 3-1 to ensure the heat dissipation space for the VFD. However, please consider the heat dissipation of other components in the cabinet during the layout.

3) The mounting bracket must be made of flame retardant material.

For applications with metal dust, it is recommended to use an external installation method for the radiator cabinet. The fully enclosed cabinet space should be as large as possible.

3.1.3 Mechanical installation methods and steps

Penetrating installation of sheet metal structure

Installation Instructions:

1) Install the flange-type hanger on the upper and lower parts of the VFD body;

2) Place the VFD into the cabinet with the mounting holes opened according to the size, and secure it with M6 screws and nuts;

See Figure 3-3 for the through-wall installation diagram of the plastic structure of the VFD.

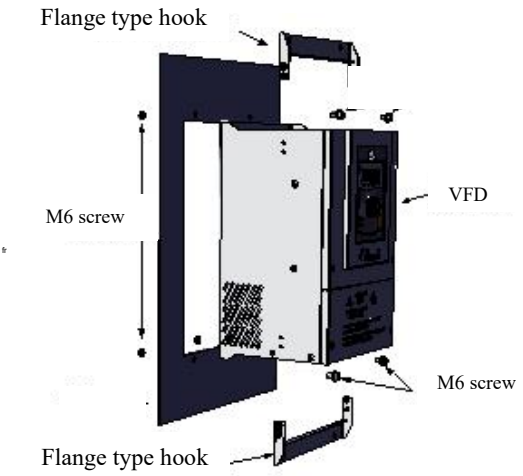


Figure 3-3. 380V VFD sheet metal structure 18-55kW wall-through installation diagram

3.1.4 Removal and installation of terminal cover

The series VFD uses a plastic housing. To remove the plastic housing terminal cover, refer to Figure 3-5. Use a tool to push the hook of the terminal cover inward.

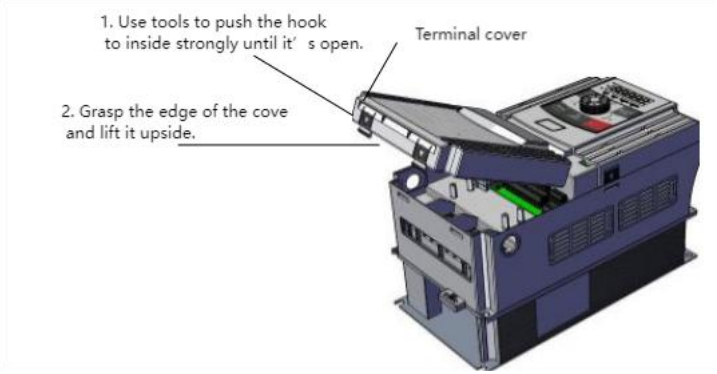


Figure 3-4. Disassembly diagram of plastic shell terminal cover

3.2 Electrical installation

3.2.1 Guidance for selection of peripheral electrical components

This section of the VFD peripheral electrical component selection guide is mainly based on the G-type machine as an example. If you are using a P-type machine, please refer to the electrical component selection for the equivalent power segment of the G-type machine. For example, if the XXX-4T4R0GB/5R5PB is used as a 5.5kW P-type machine, please refer to the XXX-4T5R5GB selection.

Table 3-1 Selection Guide for VFD Peripheral Electrical Components

Model of VFD	Air switch (MCCB) (A)	Contactor (A)	Main circuit wire on the input side (mm²)	Main circuit wire on the output side (mm²)	Control circuit wire (mm²)	Ground wire (mm²)
XXX-C3SR4GB	10	9	2.5	2.5	1.5	2.5
XXX-C3SR75GB	16	12	2.5	2.5	1.5	2.5
XXX-C3S1R5GB	25	18	2.5	2.5	1.5	2.5
XXX-C3S2R2GB	32	25	2.5	2.5	1.5	2.5
XXX-3S4R0GB	50	40	4	4	1.5	4
XXX-3S5R5GB	80	63	4	4	1.5	4
XXX-B4TR75GB	6	9	2.5	2.5	1.5	2.5
XXX-B4T1R5GB	10	9	2.5	2.5	1.5	2.5
XXX-C4T2R2GB	10	12	2.5	2.5	1.5	2.5
XXX-C4T4R0GB	16	16	2.5	2.5	1.5	2.5
XXX-C4T5R5GB	20	18	2.5	2.5	1.5	2.5

Model of VFD	Air switch (MCCB) (A)	Contactor (A)	Main circuit wire on the input side (mm²)	Main circuit wire on the output side (mm²)	Control circuit wire (mm²)	Ground wire (mm²)
XXX-C4T7R5GB	32	25	4.0	4.0	1.5	4
XXX-D4T9R0GB	40	32	4.0	4.0	1.5	6
XXX-D4T011GB	40	32	4.0	4.0	1.5	6
XXX-D4T015GB	50	40	6.0	6.0	1.5	6
XXX-4T018GB	63	40	10	10	1.5	10
XXX-4T022GB	80	50	10	10	1.5	16
XXX-4T030G(B)	100	65	16	16	1.5	16
XXX-4T037G(B)	100	80	25	25	1.5	25
XXX-4T045G(B)	125	115	35	35	1.5	25
XXX-4T055G(B)	160	150	50	50	1.5	25
XXX-4T075G(B)	225	170	70	70	1.5	25
XXX-4T093G(B)	250	205	95	95	1.5	25
XXX-4T110G	315	245	120	120	1.5	25
XXX-4T132G	350	300	120	120	1.5	25
XXX-4T160G	400	400	150	150	1.5	25
XXX-4T185G	500	410	185	185	1.5	25
XXX-4T200G	500	410	185	185	1.5	25
XXX-4T220G	630	475	240	240	1.5	25
XXX-4T250G	630	475	2×120	2×120	1.5	25
XXX-4T280G	700	620	2×120	2×120	1.5	25
XXX-4T315G	800	620	2×150	2×150	1.5	35
XXX-4T355G	1000	800	2×185	2×185	1.5	35
XXX-4T400G	1250	800	2×240	2×240	1.5	35
XXX-4T450G	1250	1000	2×240	2×240	1.5	35
XXX-4T500G	1720	1500	3×183	3×183	1.5	35
XXX-4T550G	1900	1500	3×240	3×240	1.5	35
XXX-4T630G	2200	1650	3×240	3×240	1.5	35
XXX-4T710G	2500	1650	3×240	4×185	1.5	35
XXX-4T800G	2800	1800	3×240	4×185	1.5	35

3.2.2 Instructions for use of peripheral electrical components

Table 3-3 Instructions for the use of peripheral electrical components of the XXX VFD

Accessory name	Installation location	Function description
air switch	Input circuit front end	Disconnect the power supply when the downstream equipment overflows
contactors	Between the air switch and the input side of the VFD	The power-on and power-off operations of the VFD should be avoided by using the contactor to frequently power on and off the VFD (less than twice per minute) or performing direct start-up operations.
AC input reactor	Input side of VFD	1.Improve the power factor on the input side; 2.Effectively eliminate high-order harmonics on the input side to prevent damage to other equipment caused by voltage waveform distortion; 3.Eliminate the input current imbalance caused by power supply imbalance between phases.
direct current Reactor	VFD 380V voltage level: 75kW-132kW optional (external), 160kW and above standard; 660V voltage level: 75kW-450kW optional (external), 500kW and above standard.	1. Improve the power factor on the input side; 2. Effectively eliminate high-order harmonics on the input side to prevent damage to other equipment caused by voltage waveform distortion.
EMC input filter	Input side of VFD	1. Reduce the external conduction and radiation interference of the VFD; 2. Reduce the conducted interference flowing from the power supply to the VFD, and improve the anti-interference capability of the VFD.
AC output reactor	Between the output side of the VFD and the motor, Install near the VFD.	The output side of the VFD generally contains many higher harmonics. When the motor is far away from the VFD, due to the large distributed capacitance in the line, a certain harmonic may resonate in the loop, which has two effects: 1. It will damage the insulation performance of the motor and damage the motor over time. 2. Produce large leakage current, causing frequent protection of the VFD.

Accessory name	Installation location	Function description
		3. Generally, when the distance between the VFD and the motor exceeds 100 meters, it is recommended to install an output AC reactor.

3.2.3 Wiring mode

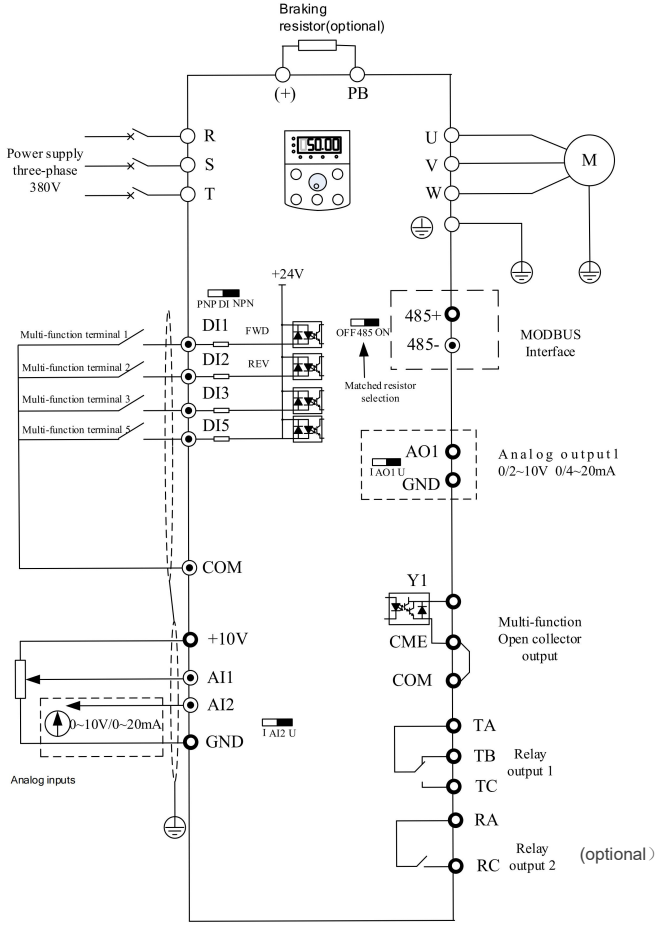


Figure 3-5.Three-phase VFD below 2.2kW

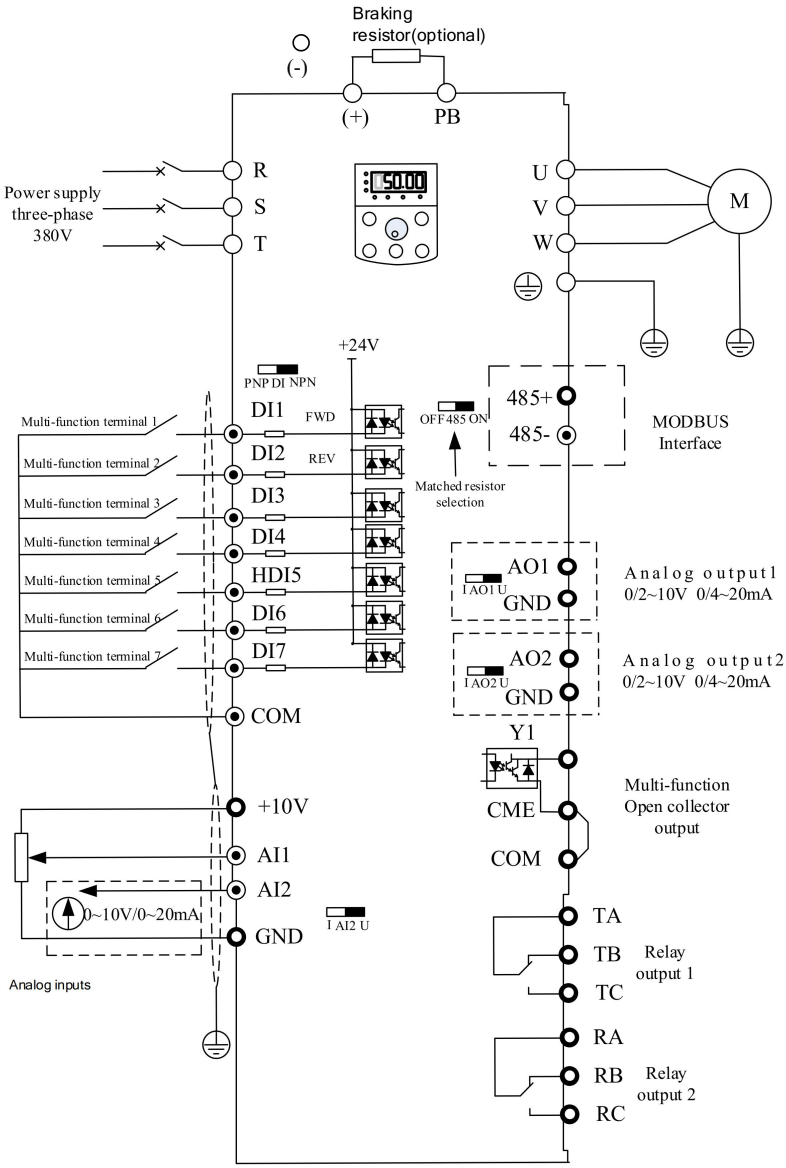


Figure 3-6. (4T/7T) Three-phase VFD below 30kW

Note: The 4T series 30-93kW brake unit is an optional feature, If required, please specify when ordering.

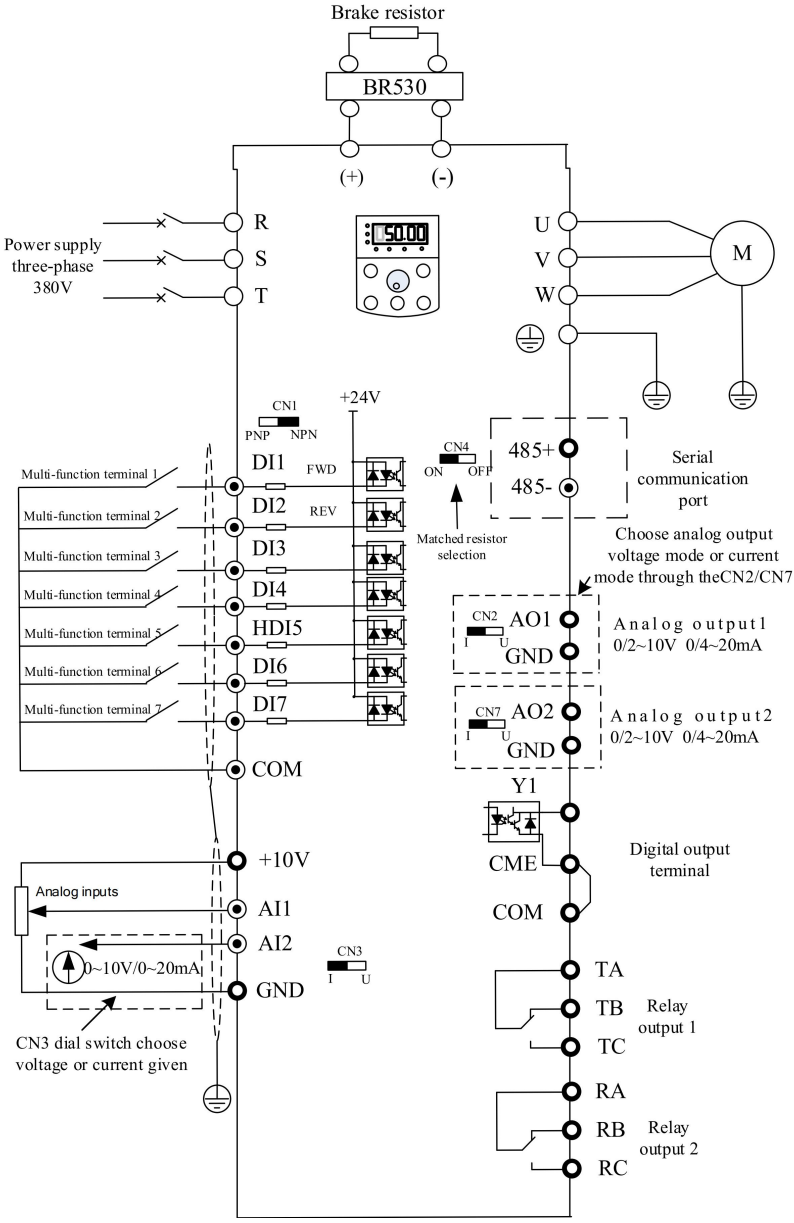


Figure 3-7. (4T/7T)37kW ~ 55kW three-phase VFD

Note: The 4T series 30-93kW brake unit is an optional feature,. If required, please specify when ordering.

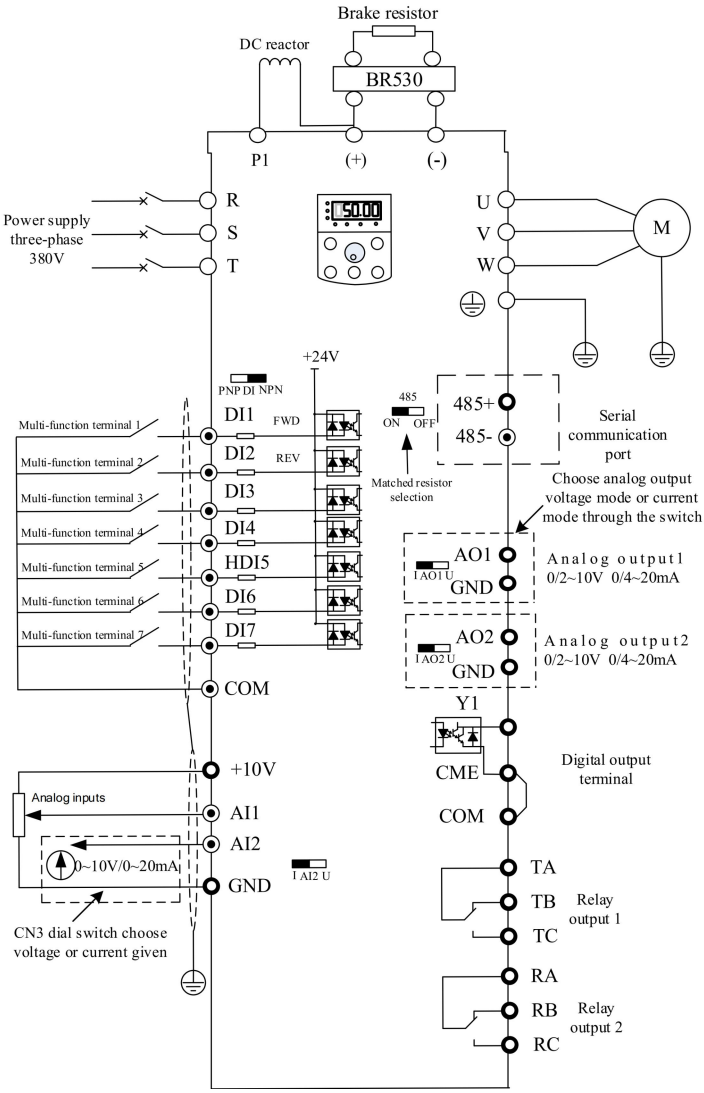


Figure 3-8. (4T/7T) 75kW and above three-phase VFD

Note: The 4T series 30kW-93kW brake unit is an optional feature. If required, please specify when ordering.

The 75kW-132kW DC reactor is an optional accessory, and the DC reactor above 160kW is a standard configuration.

3.2.4 Main circuit terminals and wiring

Description of the main circuit terminals of the single-phase VFD:

Terminal mark	Name of	Description:
L, N	Single-phase power input terminal	Connection point of single-phase 220V AC power supply
P(+), (-)	Positive and negative terminals of DC bus	Common DC bus input point
P(+), PB	Braking resistance connection terminal	Connect the braking resistor
U, V, W	Output terminal of VFD	Connecting the three-phase motor
⏚	Ground terminal	Ground terminal

Description of the main circuit terminals of the three-phase VFD:

Terminal Mark	Name of	Description:
R, S, T	Input terminal of three-phase power supply	Connection point of AC input three-phase power supply
P(+), (-)	Positive and negative terminals of DC bus	Input point of common DC bus
P(+), PB	connection terminal of braking resistor	The connection point of the braking resistor is below 7.5 kW for 220V and below 18.5 kW for other voltage levels
U, V, W	Output terminal of VFD	Connecting the three-phase motor
⏚	Ground terminal	Ground terminal

Wiring precautions:

Input power supply L, N or R, S, T:

The input side wiring of the VFD has no phase sequence requirement.

DC bus P(+), (－):

Note that there is residual voltage on the P(+) and (-) terminals of the DC busbar immediately after the power outage. Wiring operations must be performed after the power indicator on the drive board has turned off and after confirming that the power outage has been in place for 10 minutes, otherwise there is a risk of electric shock.

The length of wiring for the brake unit should not exceed 10m. Twisted-pair or closely spaced parallel wiring should be used.

Do not directly connect the brake resistor to the DC bus, as it may cause damage to the VFD or even fire.

Braking resistance connection terminals P(+), PB

The recommended value should be used for selecting the brake resistor, and the wiring distance should be less than 5m. Otherwise, it may cause damage to the VFD.

U, V, W on the output side of the VFD:

The output side of the VFD cannot be connected to capacitors or surge absorbers, otherwise it will cause frequent protection or even damage to the VFD.

When the motor cable is too long, due to the influence of distributed capacitance, electrical resonance is easily generated, resulting in damage to the motor insulation or large leakage current, which causes overcurrent protection of the VFD. When the length of the motor cable is greater than 100m, an AC output reactor must be installed near the VFD.

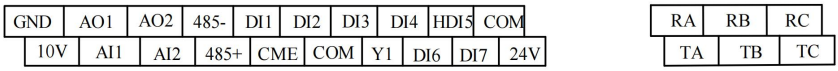
Ground terminal PE:

The terminal must be reliably grounded, and the resistance of the grounding wire must be less than 0.1Ω. Otherwise, it will cause abnormal operation or even damage to the device.

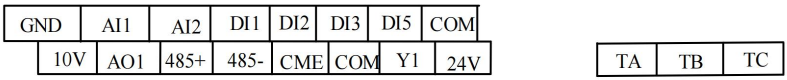
The ground terminal and the power zero line N terminal cannot be shared.

3.2.5 Control terminal and wiring

The control circuit terminal layout is shown below:



Three-phase 380V above 4.0kW



Three-phase 380V, below 2.2kW

Function description of control terminal:

Table 3-4 Function description of VFD control terminal

Category	Terminal symbol	Terminal name	Function description
Power source	+10V-GND	External +10V power supply	Provide +10V power supply, maximum output current: 10mA Generally used as an external potentiometer working power supply, with a potentiometer resistance range of 1 to 5kΩ
	24V-COM	External +24V power supply	It provides +24V power supply externally, and is generally used as the working power supply for digital input and output terminals and external sensor power supply.

Category	Terminal symbol	Terminal name	Function description
			Maximum output current: 200mA
Analog input	AI1-GND	Analog quantity Input terminal 1	1. Input voltage range: DC0-10V 2. Input impedance: 100KΩ
	AI2-GND	Analog quantity Input terminal 2	1. Input range: DC0-10V/4-20mA, determined by the CN3 dial switch on the control board. The factory is in voltage mode. 2. Input impedance: 100kΩ for voltage input and 500Ω for current input.
Digital input	DI1-COM	Digital input 1	1. Optocoupler isolation, compatible with bipolar input, switched by DI dip switches, factory NPN mode 2. Input impedance: 3.3kΩ 3. Voltage range during level input: 9-30V 4. Among them, HDI5 can be used as a high-speed input port.
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	
	DI4-COM	Digital input 4	
	HDI5-COM	Digital input 5	
	DI6-COM	Digital input 6	
	DI7-COM	Digital input 7	
Analog input	AO1-GND	Analog output 1	The voltage or current output is determined by the CN2 and CN7 dial switches on the control board. Output voltage range: 0-10V Output current range: 0-20mA
	AO2-GND	Analog output 2	

Category	Terminal symbol	Terminal name	Function description
Digital output	Y1-CME	Digital output 1	Optocoupler isolation, bipolar open collector output Output voltage range: 0-24V Output current range: 0-50mA Note: The digital output CME and digital input COM are internally isolated, but the CME and COM are externally short-circuited at the factory (at this time, Y1 defaults to +24V drive). When Y1 wants to use external power to drive, the external short-circuit between CME and COM must be disconnected.
Communication interface	485+ - 485-	Modbus communication interface	Modbus communication interface, which can be selected by dial switch CN4 to determine whether communication matching resistors are required.
Relay output 1	TA-TB	Normally closed terminal	Contact drive capability: AC250V, 3A, COSφ=0.4. DC30V, 1A
	TA-TC	Normally open terminal	
Relay output 2	RA-RB	Normally closed terminal	Contact drive capability: AC250V, 3A, COSφ=0.4. DC30V, 1A
	RA-RC	Normally open terminal	
Keyboard extension cable port	CN6	External keyboard interface	External keyboard, parameter copy keyboard interface, remove the bidirectional crystal head, and use standard network cable for extension.

Wiring instructions for signal input terminals:

AI analog input terminal:

Due to the weak analog voltage signal, it is particularly vulnerable to external interference, so it is generally necessary to use shielded cables, and the wiring distance should be as short as possible, not exceeding 20m, as shown in Figure 3-9. In some cases where the analog signal is severely interfered, a filter capacitor or ferrite core is required on the analog signal source side.

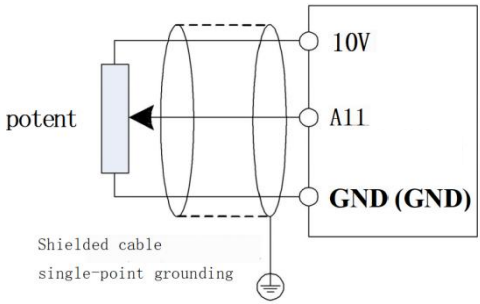


Figure 3-9. Schematic diagram of analog input terminal wiring

DI digital input terminal:

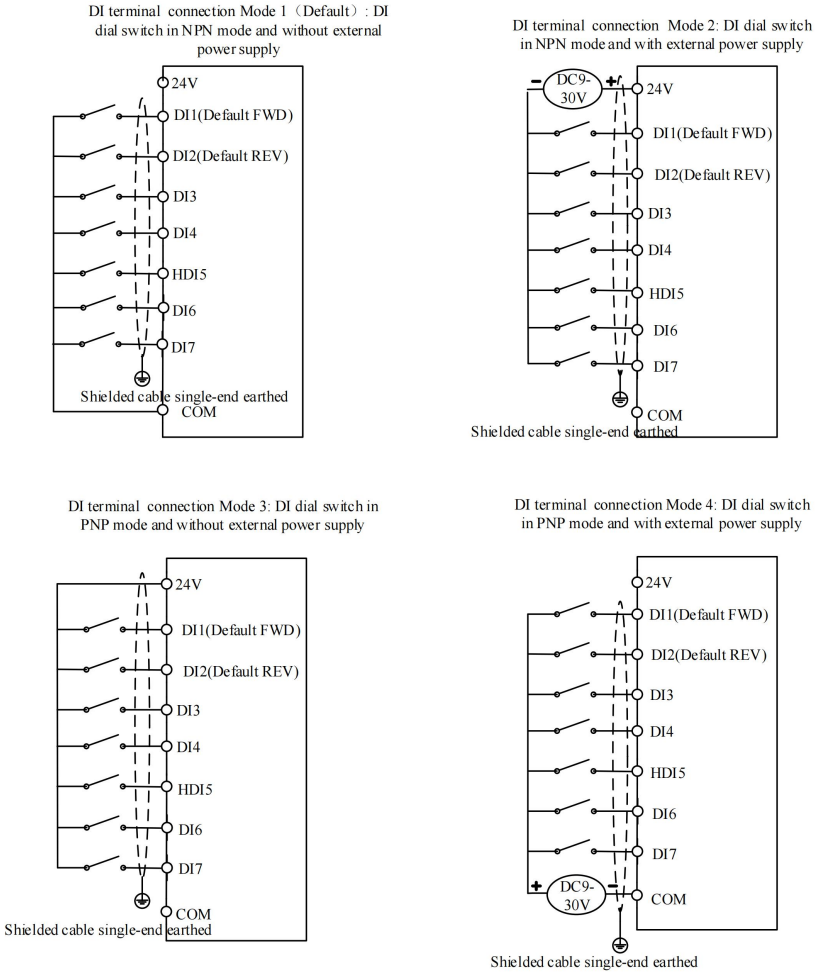


Figure 3-10. Wiring diagram of digital input terminals in four different modes

Generally, shielded cables are required, and the wiring distance should be as short as possible, not exceeding 20 meters.

When using active drive, necessary filtering measures should be taken for the power crosstalk.

It is recommended to use contact control.

Y1 digital output terminal:

When the digital output terminal needs to drive a relay, absorbing diodes should be installed on both sides of the relay coil, with a drive capability of no more than 50mA. Otherwise, it is easy to cause damage to the DC 24V power supply.

Note: Be sure to correctly install the polarity of the absorption diode, as shown in Figure 3-11, otherwise the DC 24V power supply will be immediately burned out when the digital output terminal has an output.

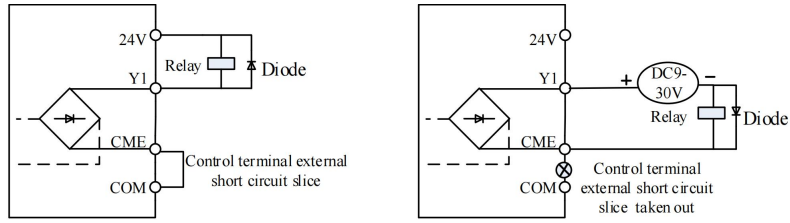


Figure 3-11. Schematic diagram of digital output terminal Y1 wiring

Chapter 4 Operation and Display

4.1 Introduction to operation and display interface

Using the operation panel, it is possible to modify the functional parameters of the VFD, monitor the working status of the VFD, and control the operation of the VFD (starting and stopping). Its appearance and functions are shown in the following figure.

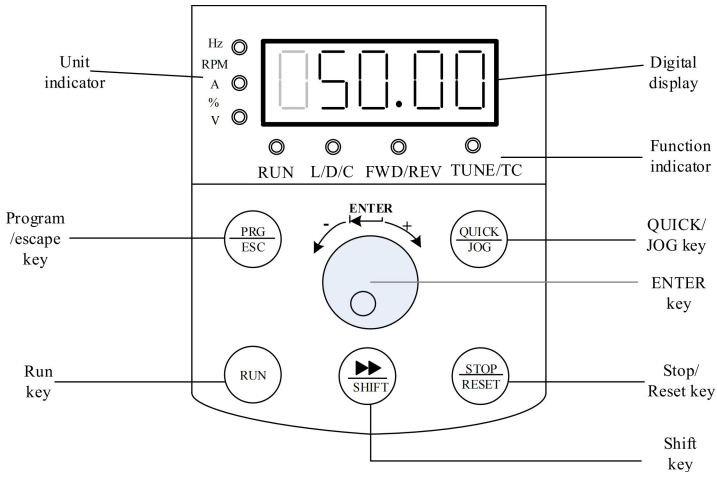


Figure 4-1. Schematic diagram of the operation panel 1 (standard configuration LED keyboard 1)

4.1.1 Indicator light description

Table 4-1 Function table of 220V/380V series keyboard indicator lights

Indicator light symbol		Name of	Meaning	The color
Unit indicator light	Hz frequency	Frequency unit	On - The current parameter is the frequency value	Green color
	A.	Unit of current	On - The current parameter is the current value	Green color
	V.	Unit of voltage	On - The current parameter is the voltage value	Green color
	RPM (Hz+A)	Unit of speed	On - the current parameter is the speed value	Green color
	%(Hz+V)	Percentage of	Bright - the current parameter is a percentage value	Green color

Indicator light symbol		Name of	Meaning	The color
Function indicator light	RUN.	Operation status indicator	On - the VFD is in operation Off - the VFD is in the stop state Flash - the VFD is in the sleep state	Green color
	L/D/C	Control mode indicator	Off - The VFD is in the keyboard control mode On - the VFD is in terminal control mode Flash - the VFD is in remote communication control mode	red
	FWD/REV	Operation direction indication	Off - Forward rotation state Bright - Reversed state Flashing - the target frequency is opposite to the actual frequency or in a reverse operation prohibition state	red
	TUNE/TC	Tuning/torque control/fault indicator	Bright - torque control Flashing - tuning\fault state	red

4.1.2 Digital display area

The 5-digit LED display can display the set frequency, output frequency, various monitoring data, and alarm codes. The function code is usually displayed as a decimal number, such as the value of the F0-11 function code displayed as "50.00", indicating the decimal number "50.00". When the function code value is displayed in hexadecimal, the highest digit of the digital tube displays "H.", indicating that the current function code value is displayed in hexadecimal mode. For example, the value of the F7-29 function code is displayed as "H.003F", indicating that the value of F7-29 is the hexadecimal number "0x3f".

Users can freely set the monitoring data for stop and running status according to function code F7-29/F7-30. For details, see function code F7-29/F7-30.

4.1.3 Keyboard button description

Table 4-2 Keyboard Function Table

Key	Name	Function
PRG/ESC	Program/ Exit	entry or exit ,return to primary menu
	ENTER	entry into the menu interface ,confirm the setup parameters

	increase (+)	Increase in the data or function code
	decrease (-)	Decrease in the data or function code
》	shift key	Select the displayed parameters in turn on the stop display interface and running display interface, the specific content please refer to F7-29 and F7-30; when modifying parameters, select the modification digit of parameters
RUN	Run key	used in running operation under keyboard control mode
STOP/RESET	STOP/RESET	In the status of running, pressing it can stop the running operation; in fault alarm status, it can be used as reset. The characteristic of this key is limited by function code F7-02
QUICK/JOG	direction/jog run	When F7-28 is set as 0, it's used as jog run key. When F7-28 is set as 1, it's used as direction key, press this key now, the direction will be reversed.

4.2 Organization mode of function code of VFD

The meaning of each function code group of the VFD is shown in the following table:

Function code group	Function Description	Description
F0-FF	Basic function parameter group	Compatible with 530 series function codes
H0-H3	Second motor parameter group	The parameters of the second motor, acceleration and deceleration time, control mode, etc. can be set independently
L0-L6	Enhancement function parameter group	System parameter setting, user function code customization, optimization control, AI/AO correction, master-slave control, holding brake function and sleep function;
N0-NF	Special drive function selection group	Select to use different professional VFD functions;

U0-U1	Monitoring parameter group	U0 is the fault recording parameter group, and U1 is the user monitoring parameter, which facilitates the viewing of relevant output status;

4.3 Description of methods for viewing and modifying function codes

The VFD function code parameters adopt a three-level menu structure, which allows for parameter viewing and modification through the operator panel. The three-level menu is: function parameter group (level I menu) → function code (level II menu) → function code set value (level III menu). The operation process is shown in Figure 4-2. When in the status parameter interface, different status parameters can be viewed by pressing the " > " button.

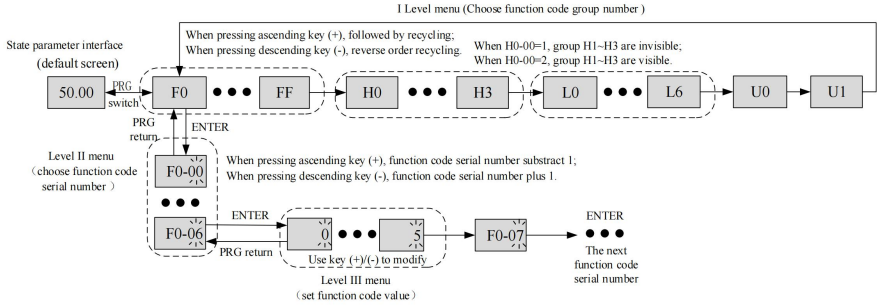


Figure 4-2. Three-level menu operation flowchart

Note: When operating the three-level menu, you can press the PRG key or ENTER key to return to the second-level menu. However, pressing the ENTER key will save the current parameter modification value and move to the next function code; while pressing the PRG key will abort the current parameter modification.

Example: Change the function code F1-04 from 0.00Hz to 5.00Hz.

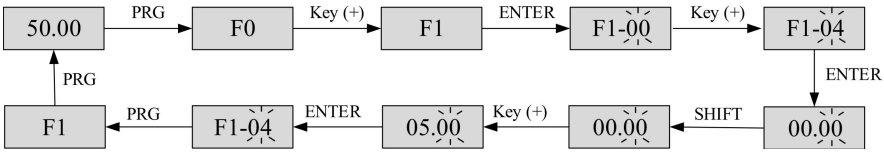


Figure 4-3. Operation flow chart for parameter setting

In the third-level menu state, if the parameter does not have a blinking bit, it indicates that the parameter value of the function code cannot be modified. For specific reasons, please refer to the function code attribute description.

4.4 Function code menu mode and switching instructions

4.4.1 Definition and operation of multi-function shortcut keys

The function of the Quick/Jog button can be defined by the F7-28 function code.

F7-28	**Function selection of Quick/Jog button**		factory default value	0
	Setting range	0	Forward rotation inching	
		1	Positive and negative rotation switching	
		2	reverse jogging	
		3	Switch between panel control and remote control (terminal or communication)	

The Quick/Jog button is a multifunction button that allows you to set the function of the Quick/Jog button through this function code. You can switch between shutdown and operation using this button.

0: Forward inching

The forward jog (FJOG) is achieved through the keyboard Quick/Jog button.

1: Positive and negative rotation switching,

Switch the frequency command direction through the Quick/Jog button. This function is only valid when the command source is the command channel of the operation panel.

2: Reverse inching

Reverse jogging (RJOG) is achieved through the keyboard Quick/Jog button.

3: Switch between panel control and remote control (terminal or communication)

Refers to the switching of the command source, that is, the switching between the current command source and keyboard control (local operation). If the current command source is keyboard control, this key function is invalid.

4.4.2 Function code menu mode

To facilitate user viewing and operation, the VFD provides three menu mode switching displays for function codes.

Menu Mode	Description of
-BASE Basic menu mode	Display the function code parameters in order, F0-FF, H0-H3, L0-L6, N0-NF, U0-U1. Among them, H1-H3 are only displayed when the second motor is used, and N1-NF are displayed in relation to the N0-00 parameter settings. They are not displayed by default.
-USER User-defined parameter mode	Only display user-defined function parameters (up to 31 customizations), which can be freely defined through the L1 group. The function code starts with the letter U, and the

Menu Mode	Description of
	parameter values of the function code can be directly modified. The VFD has been pre-defined with 19 commonly used user function codes for users. At the same time, users can clear the user-defined function codes through L1-00, and then redefine L1-01 to L1-31.
- Not F Factory default change parameter mode	After entering this menu mode, only function codes that are inconsistent with the factory parameters are displayed, starting with the letter n.

Table 4-3 L1 Group Customized User Function Codes

function code	Factory default valu	Name of	functio n code	factory default value	Name of
L1-00	0	Clear custom function selection	L1-10	uF4-05	Rated frequency of motor 1
L1-01	uF0-03	Control mode	L1-11	uF4-06	Rated speed of motor 1
L1-02	uF0-04	Command source	L1-12	uF4-12	Acceleration during dynamic full tuning
L1-03	uF0-06	Selection of main frequency source X	L1-13	uF4-13	Deceleration at dynamic full tuning
L1-04	uF0-23	Acceleration time 1	L1-14	uF5-00	Function selection of DI1 terminal
L1-05	uF0-24	Deceleration time 1	L1-15	uF5-01	Function selection of DI2 terminal
L1-06	uF4-00	Motor 1 tuning selection	L1-16	uF5-02	Function selection of DI3 terminal
L1-07	uF4-01	Rated power of motor 1	L1-17	uF6-00	Relay1 output selection
L1-08	uF4-02	Rated voltage of motor 1	L1-18	uF6-01	Relay2 output selection
L1-09	uF4-04	Rated current of motor 1	L1-19	uF6-02	Y1 output selection

4.4.3 Function code menu mode switching

The VFD is in the -BASE basic menu mode by default. When the user needs to switch the menu mode, first change L0-03 to 1 (enable the ENTER key to switch the menu function), and then long press the ENTER key for 3 seconds in the status parameter interface to switch the menu mode. After the switch is successful, the current menu mode (-BASE\-USEr\-NOTF) is displayed for 3 seconds, and then returns to the status parameter interface. At this time, the function code under the current menu mode can be viewed and set. For the specific process, see Figure 4-4 below.

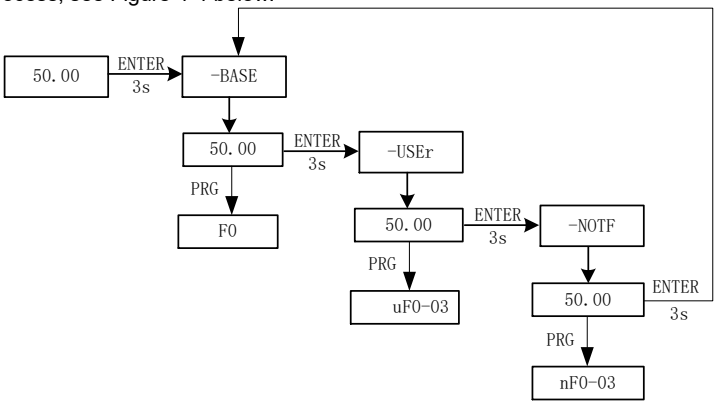


Figure 4-4. Schematic diagram of menu mode switching operation

4.5 Preparation before operation

4.5.1 User customization function code setting

The factory default menu already stores 19 commonly used parameters, as shown in Table 4-1. Users can also clear the factory default function code by setting L1-00=1, or reconfigure user function codes for L1-00 to L1-31. Switching between menu modes can be performed as described in Section 4.4.3.

4.5.2 Pre-operation steps

The flowchart in this section describes the basic steps required before starting the VFD. Please refer to the corresponding flowchart based on the specific application of the VFD. This section only describes basic settings.

flowchart	sub-	Purpose	Page

	process diagram		number
A.	-	Basic steps from installation, wiring to operation	49
-	A-1	Operation under open-loop vector control (vector control without speed sensor)	50
-	A-2	Operation under V/F control mode	51

◆ Flowchart A (Connecting the motor to operate with minimal settings changes)

Flowchart A explains how to operate the motor by making minimal changes to the settings. Depending on the application, there may be several differences in settings. In applications that do not require high-precision control, please use the initial settings of the VFD.

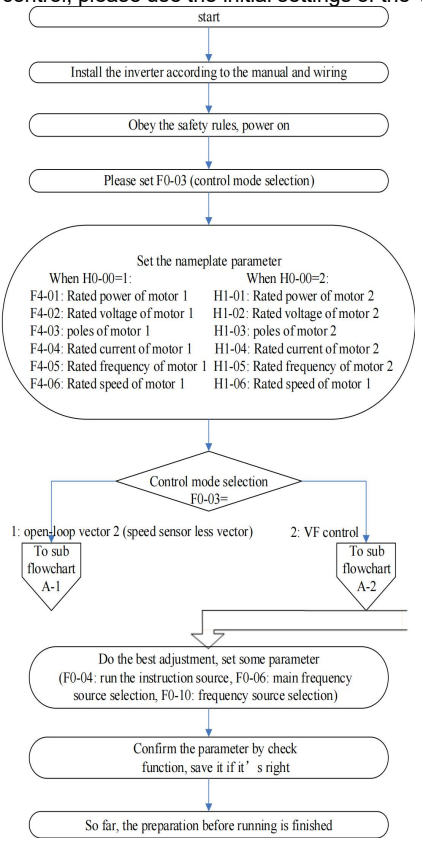


Figure 4-5. Basic steps before running

◆ Sub-flowchart A-1 (Motor Operation under Open Loop Vector Control Mode)

The sub-flowchart A-1 describes the start-up steps for open-loop vector control (vector control without speed sensing). Vector control is effective for applications that require high starting torque, torque limitation, and other applications.

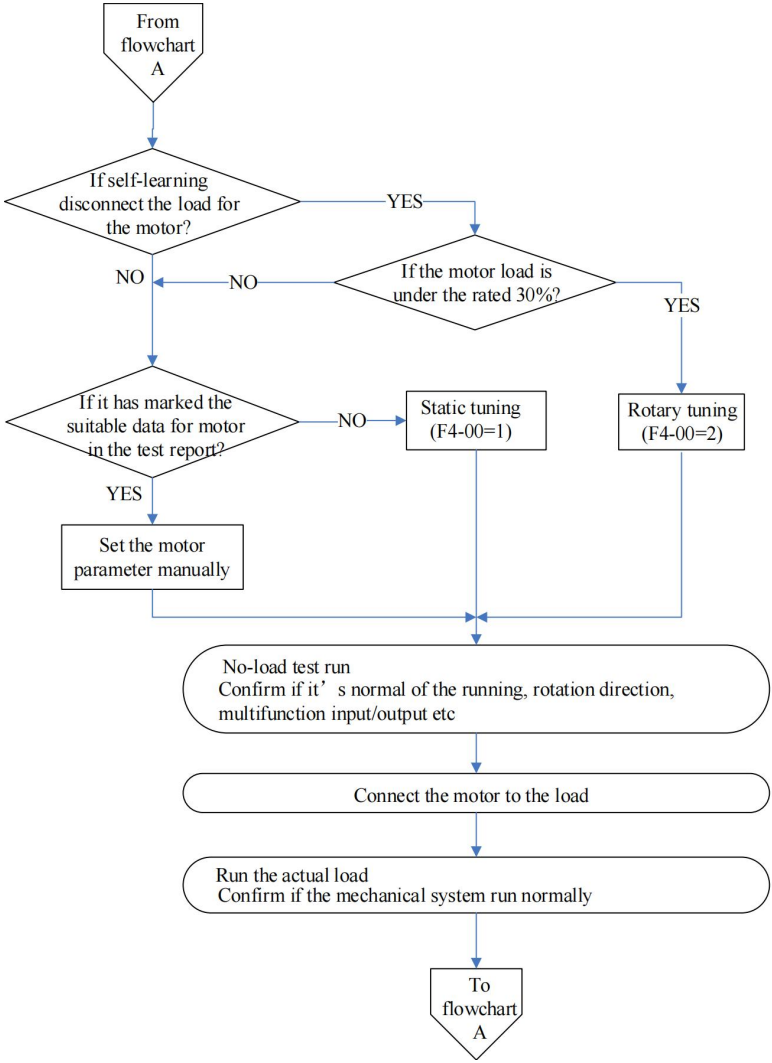


Figure 4-6. Operation steps of open-loop vector control mode

◆ Sub-flowchart A-2 (Simple Motor Operation under V/F Control)

When operating with V/F control, set the parameters according to the following flowchart. V/F control is effective in applications such as fans or pumps.

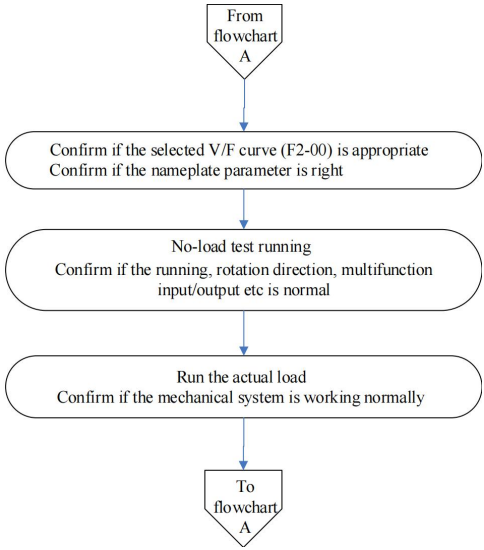


Figure 4-7. Operation steps of V/F control mode

4.5.3 Status parameter reference

In the shutdown or running state, various status parameters can be displayed by pressing the shift key "》。" The function codes F7-29 (operating parameters) and F7-30 (shutdown parameters) select the parameter display in the running/shutdown state based on binary bit selection. A total of sixteen running/shutdown state parameters can be selected for display. For detailed instructions, refer to the parameter descriptions of F7-29 and F7-30 in Chapter 5.

4.6 Start-stop control of VFD

4.6.1 Selection of the source of the start-stop signal

The start-stop control commands for the VFD come from three sources: panel control, terminal control, and communication control, which are selected through function parameters F0-04.

F0-04	**Setting of the source of the operation instruction**	Factory value: 0	Description:

	Setting range	0	Command channel of operation panel (LED off)	Press RUN and STOP buttons to start and stop the machine
		1	Terminal command channel (LED on)	DI terminal needs to be defined as the start-stop command terminal
		2	Communication command channel (LED flashing)	MODBUS-RTU protocol is adopted

4.6.1.1 Panel start-stop control

By operating the keyboard, set the function code F0-04=0, which is the panel start-stop control mode. Press the "RUN" button on the keyboard, and the VFD will start running (the RUN indicator light will be on). In the running state of the VFD, press the "STOP" button on the keyboard, and the VFD will stop running (the RUN indicator light will be off).

4.6.1.2 Terminal start-stop control

The terminal start-stop control method is suitable for applications where sampling toggle switches and electromagnetic switch buttons are used for system start-stop, and also for electrical designs where the controller controls the operation of the VFD with a dry contact signal.

The VFD provides multiple terminal control methods. The terminal command method is determined by function code F5-11, and the input port for the start and stop control signal is determined by function codes F5-00 to F5-04. For specific settings, please refer to the detailed explanations of function codes F5-11, F5-00 to F5-04.

Example 1: It is required to use a toggle switch for the VFD as the VFD start-stop switch, with the forward rotation switch signal connected to port DI2 and the reverse rotation switch signal connected to port DI4. The method of use and setup is shown below.

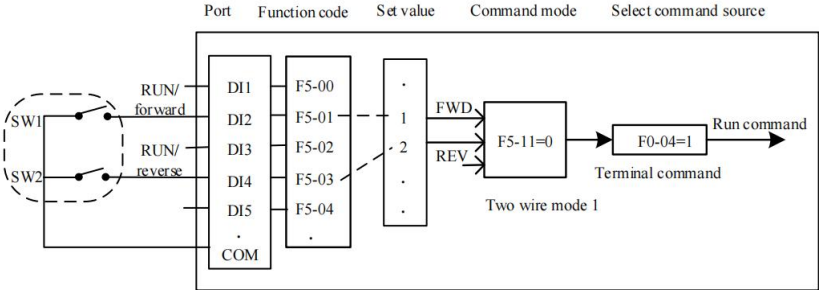


Figure 4-8. Terminal control start-stop diagram

In the control mode shown in the figure above, when the SW1 command switch is closed, the VFD runs in the forward direction, and when the SW1 command switch is opened, the VFD stops; when the SW2 command switch is closed, the VFD runs in the reverse direction, and when the SW2 command switch is opened, the VFD stops; when both SW1 and SW2 are closed or opened at the same time, the VFD stops running.

Example 2: It is required to use the button electromagnet of the VFD as the VFD start-stop switch, with the start button signal connected to DI2 port, the stop button signal connected to DI3 port, and the reverse operation button signal connected to DI4 port. The use and setting methods are shown in the following figure:

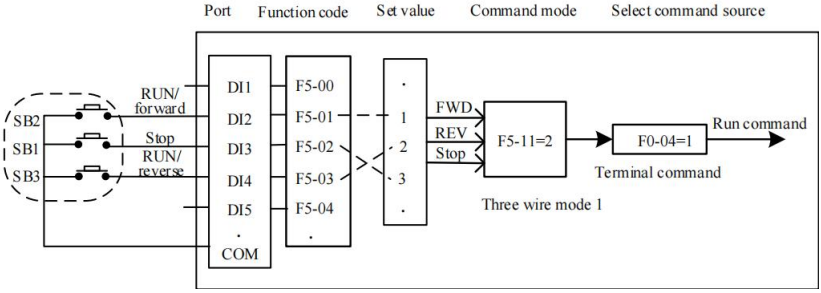


Figure 4-9. Diagram of terminal control start and stop

In the control mode shown in the above figure, during normal startup and operation, the SB1 button must remain closed, and disconnection will immediately cause the VFD to stop; the commands for the SB2 and SB3 buttons take effect immediately upon closure, and the VFD's operating state is based on the last button action of the three buttons.

4.6.1.3 Communication start-stop control

The application of controlling the operation of the VFD using RS485 communication mode on the host computer. Selecting the control command source as communication mode (F0-04=2) allows the VFD to be controlled using communication mode for start-stop operation. The function codes related to communication settings are shown below:

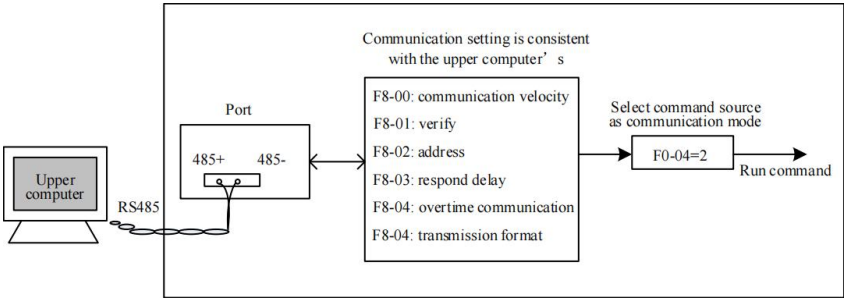


Figure 4-10. Diagram of communication control start and stop

In the above figure, setting the communication timeout (F8-04) function code to a non-zero value enables the automatic shutdown of the VFD after a communication timeout fault, which can prevent uncontrolled operation of the VFD due to communication line faults or host computer failures. This feature can be enabled in some applications.

The communication port of the VFD is equipped with the MODBUS-RTU slave protocol, and the host computer must use the MODBUS-RTU master protocol to communicate with it. For specific definitions of the communication protocol, please refer to Appendix A of this manual: Modbus Communication Protocol.

4.6.2 Startup mode

There are 3 startup modes for the VFD, namely direct startup, speed tracking startup, and asynchronous machine pre-excitation startup, which can be selected through the function parameter F1-00.

F1-00=0, direct start mode, suitable for most small inertial loads. The frequency curve during the start-up process is shown below. The "DC brake" function before starting is suitable for the drive of elevators and lifting loads; the "start frequency" is suitable for the drive of equipment requiring a torque shock start, such as cement mixer equipment.

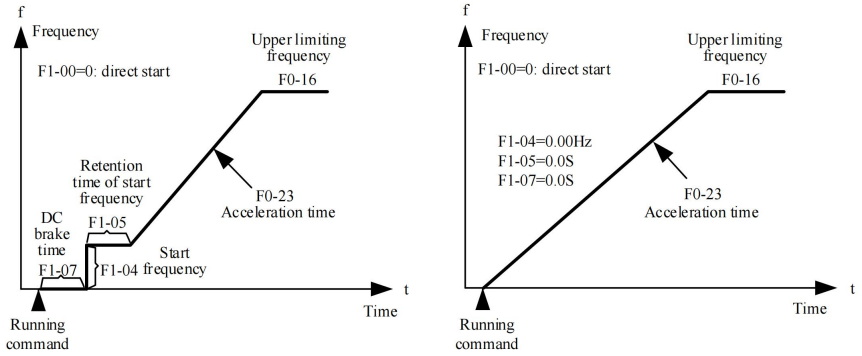


Figure 4-11. Schematic diagram of direct start-up

The mode of F1-00=2 is only applicable to induction asynchronous motor loads. Pre-excitation of the motor before starting can improve the fast response characteristics of the asynchronous motor and meet the application requirements of short acceleration time. The frequency curve during the starting process is shown below.

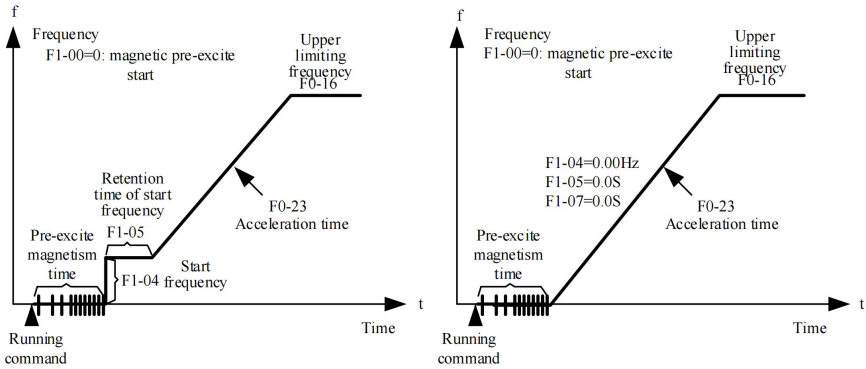


Figure 4-12. Schematic diagram of pre-excitation start-up

4.6.3 Shutdown mode

There are two shutdown modes for the VFD, namely deceleration shutdown and free shutdown, which are selected by function codes F1-13.

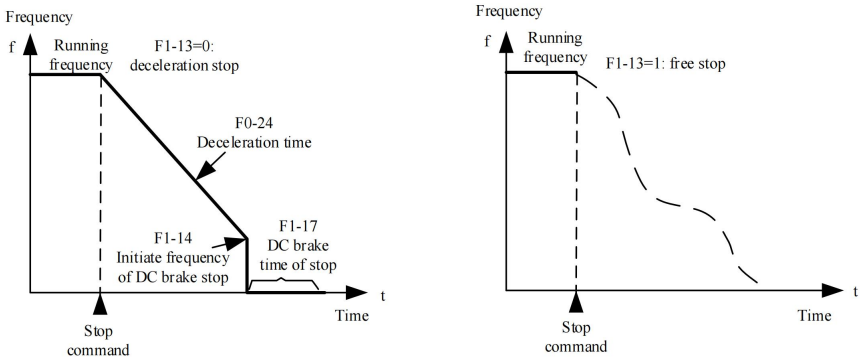


Figure 4-13. Shutdown diagram

4.6.4 Jog operation

In many applications, it is necessary for the VFD to operate at a low speed for a short period of time to facilitate testing of equipment conditions or other debugging actions. In this case, it is convenient to use inching operation.

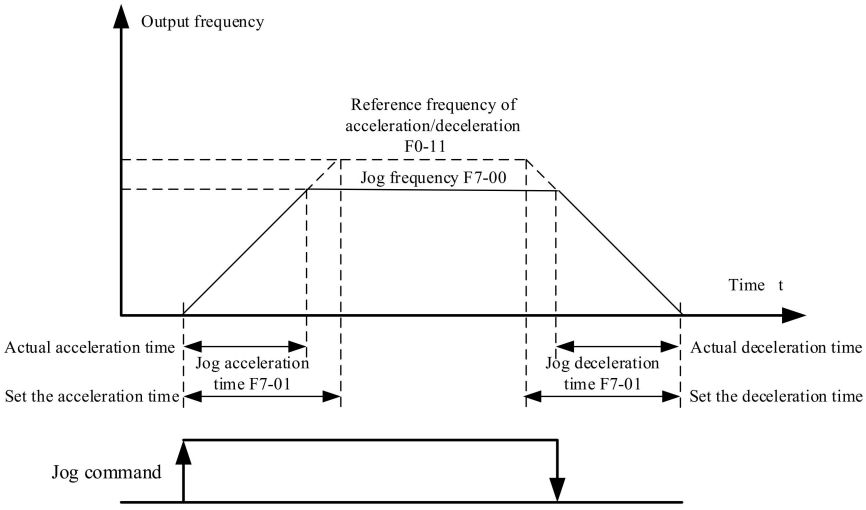


Figure 4-14. Inching operation diagram

4.6.4.1 Parameter setting and operation of jog operation through the operation panel

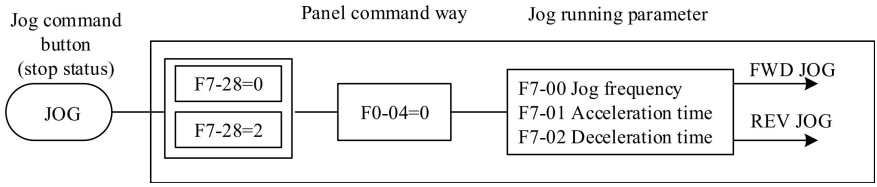


Figure 4-15. Illustration of jog parameter setting

After setting the related function code parameter as above picture, on the status of stop, pressing the JOG button, then the inverter starts to run in forward. when releasing the JOG button, the inverter decelerates to stop.

4.6.4.2 Parameter setting and operation for jogging operation through DI port

On some production equipment that requires frequent use of inching operations, such as textile machinery, it is more convenient to control inching with keys or buttons. The relevant function codes are set as follows:

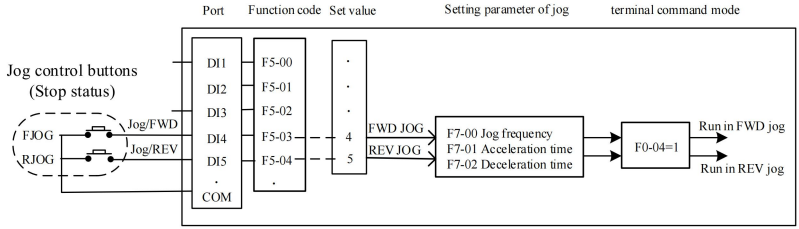


Figure 4-16. Di mode jogging parameter setting diagram

After setting the relevant function code parameters as shown in the figure above, when the VFD is in the stopped state, pressing the FJOG button will cause the VFD to start running in low-speed forward rotation. Releasing the FJOG button will cause the VFD to slow down and stop. Similarly, pressing the RJOG button will allow for reverse jog operation.

4.7 Operation frequency control of VFD

The VFD is equipped with two frequency setting channels, named as the main frequency source X and the auxiliary frequency source Y. It can operate in a single channel, switch at any time, and even set up a calculation method for superimposition and combination to meet different control requirements in the application field.

4.7.1 Source selection for given main frequency

There are 9 types of main frequency sources for the VFD, including digital setting (UP/DN power-down without memory), digital setting (UP/DN power-down with memory), AI1, AI2, PULSE input, multi-segment instruction, simple PLC, PID, communication setting, etc. You can select one of them by setting F0-06.

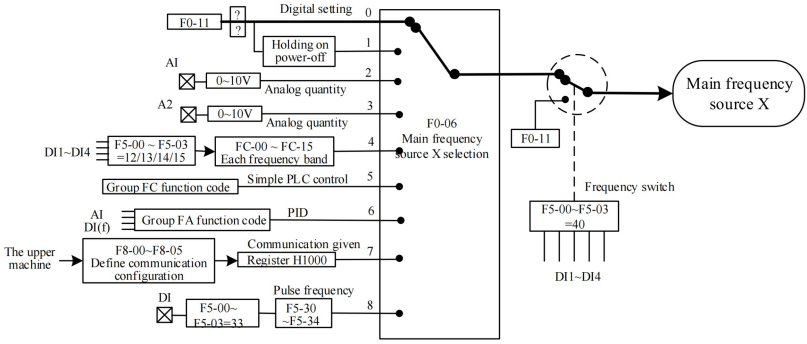


Figure 4-17. Schematic diagram of main frequency source X settings

As can be seen from the different frequency sources in the figure, the operating frequency of the VFD can be determined by function codes, adjusted manually in real time, given by analog quantities, given by multi-segment speed terminal commands, adjusted by a built-in PID regulator through external feedback signals, or controlled by host computer communication.

The above figure shows the relevant function code numbers for each frequency source setting. When setting, you can refer to the detailed description of the corresponding function code.

4.7.2 Usage method with auxiliary frequency given

The source of the auxiliary frequency source Y is the same as that of the main frequency source, which is selected through the F0-07 setting.

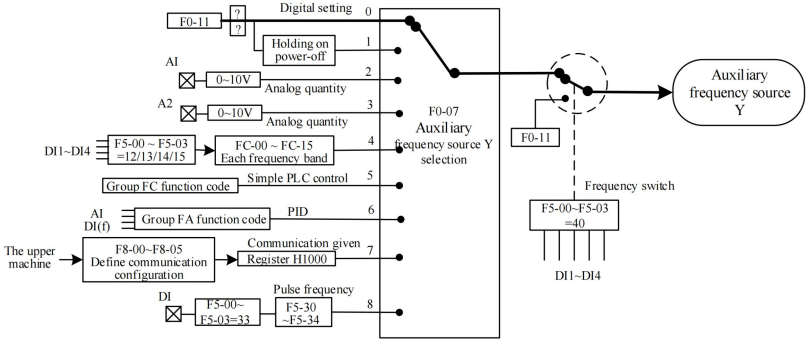


Figure 4-18. Schematic diagram of auxiliary frequency source Y setting

In practical use, the relationship between the target frequency and the primary and secondary frequency sources is set through F0-10.

4.7.3 Frequency closed-loop control of process control

The VFD has a built-in PID regulator, which, together with the selection of a given frequency channel, allows users to easily achieve automatic adjustment of process control, enabling control applications such as constant temperature, constant pressure, and tension.

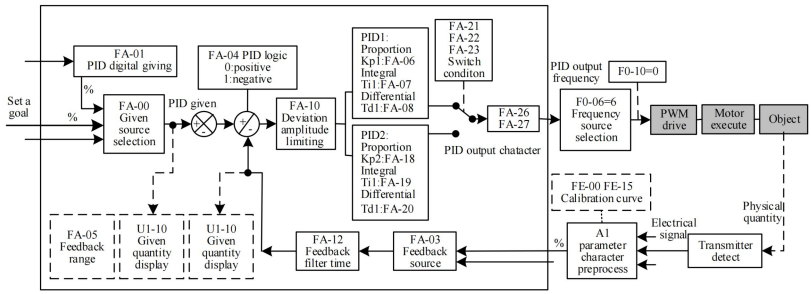


Figure 4-19. Schematic diagram of frequency closed-loop control

When using PID frequency closed-loop control, it is necessary to select the frequency source F0-06=6: that is, select the PID output frequency. PID related parameters are in the FA group function parameters, and the relevant PID function code relationship is shown in the figure above.

The VFD has two internal PID calculation power cells whose characteristics can be set separately, making it suitable for applications that require different PID adjustment

characteristics based on operating conditions. The adjustment speed and accuracy of the PID can be emphasized separately, and the switching between the two can be automatic or controlled by external DI terminal signals.

4.7.4 Setting of pendulum frequency working mode

In textile and chemical fiber processing equipment, using the frequency-stabilizing function can improve the uniformity and density of yarn winding, as shown in the following figure. This can be achieved by setting the function codes Fb-00 to Fb-04. For specific methods, refer to the detailed description of the corresponding function codes.

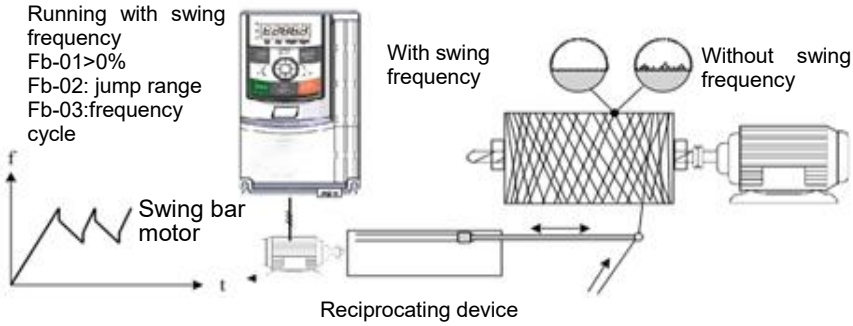


Figure 4-20. Set up for the application of the swinging

4.7.5 Setting of multi-speed mode

For applications that do not require continuous adjustment of the operating frequency of the VFD, but only require the use of several frequency values, multi-segment speed control can be used. The VFD can set up to 16 operating frequencies, which can be selected by combining four DI input signals. The function code corresponding to the DI port is set to a function value of 12-15, which specifies the multi-segment frequency instruction input port. The required multi-segment frequency is set using the multi-segment frequency table in the FC group. The "frequency source selection" is specified as the multi-segment frequency given method, as shown in the following figure:

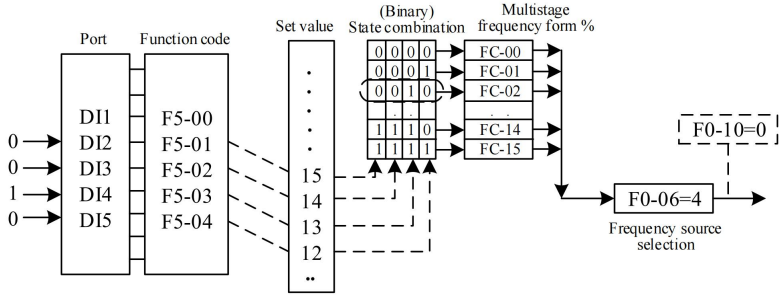


Figure 4-21. Multi-speed control diagram

In the above figure, DI2, DI3, DI4, and DI5 are selected as the signal input terminals for multi-segment frequency assignment, and they are used to form a 4-bit binary number. The state combination value is used to select the multi-segment frequency. When (DI5, DI4, DI3, DI2) = (0, 0, 1, 0), the state combination number is 2, and the frequency value set by the FC-02 function code is selected as the target operating frequency.

The VFD can set up to four DI ports as multi-segment frequency command inputs, and allows for less than four DI ports for multi-segment frequency settings. For missing settings, the status 0 is always used for calculations.

4.7.6 Motor running direction setting

After restoring the factory parameters, press the "RUN" button to drive the motor rotation direction of the VFD, which is called forward. If the rotation direction at this time is opposite to the required direction of the device, please set F0-13=1 or power off (note that the charge of the main capacitor of the VFD should be discharged completely) and exchange any two wires in the UVW output line of the VFD to eliminate the problem of rotation direction.

In some drive systems, only forward rotation is allowed and reverse rotation is not allowed. Therefore, F0-13=2 is required. If a reverse rotation command is issued, the VFD will slow down to 0 and enter a shutdown state, while the FWD/REV on the operation panel will flash continuously. The logic is shown in the following diagram.

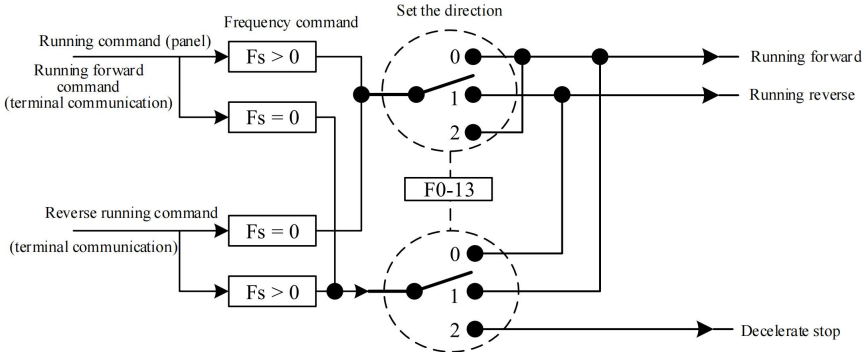


Figure 4-22. Schematic diagram of motor running direction

For applications that do not allow reverse rotation of the motor, do not use the method of modifying the function code to change the direction of rotation. After restoring the factory default values, the two function codes mentioned above will be reset. At this time, you can use the No. 50 function of the digital input terminal DI to achieve the prohibition of reverse rotation.

4.7.7 Setting of fixed length control mode

The VFD has a fixed length control function. The length pulse is collected through the DI (DI function selected as 30) terminal. The number of pulses sampled by the terminal is divided by the number of pulses per meter Fb-07 to calculate the actual length Fb-06. When the actual length is greater than the set length Fb-05, the multi-function digital switch output "length reached" ON signal.

During the fixed length control process, the length reset operation can be performed through the multi-function DI terminal (with the DI function selected as 31). The specific settings are shown in the following figure.

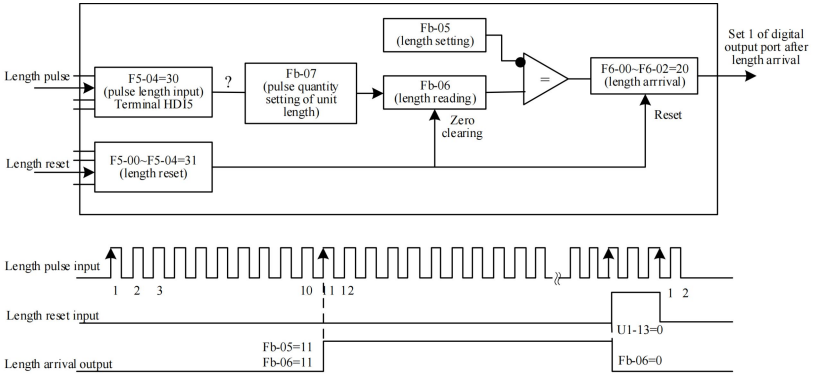


Figure 4-23. Function code setting for fixed length control mode

Note: 1) In the fixed length control mode, the direction cannot be identified, and the length can only be calculated based on the number of pulses.

2) Only HDI terminals can be used as the "length counting input" terminal.

3) Feedback the switch output signal with the length reached to the input terminal of the VFD to make it an automatic shutdown system.

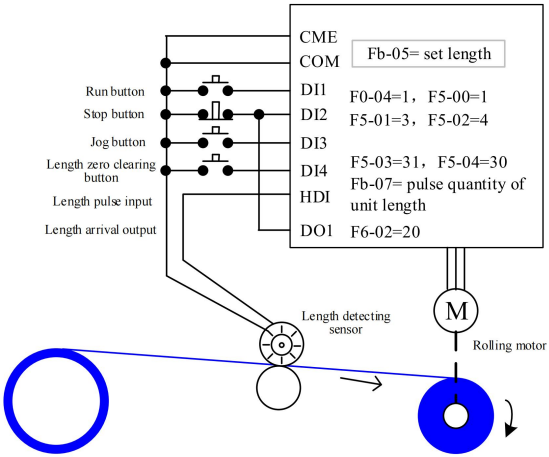


Figure 4-24. Common application examples of fixed length control function

4.7.8 Usage of the VFD counting function

The count value needs to be collected through the DI (DI function selection is 28) terminal. When the count value reaches the set count value Fb-08, the multi-function digital switch output "Set count value reached" ON signal, and then the counter stops counting.

When the count reaches the specified count value Fb-09, the multi-function digital switch output "specified count value reached" ON signal, at this time the counter continues to count until the "set count value" when the counter stops.

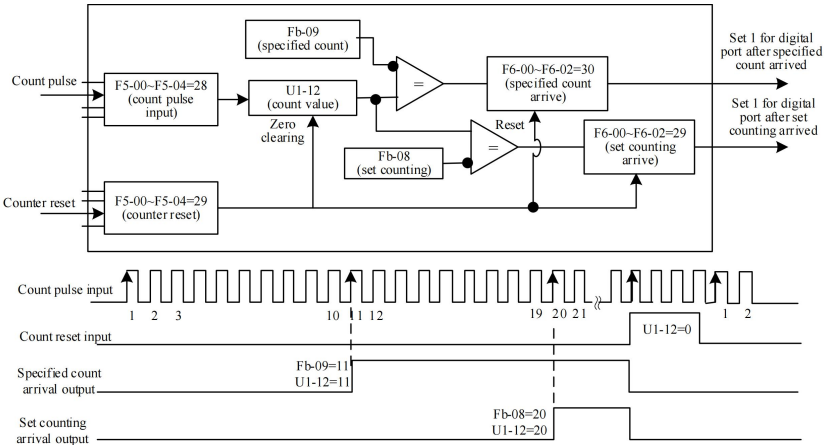


Figure 4-25. Setting of function code for counting mode

Note: 1) The specified count value Fb-09 should not be greater than the set count value Fb-08.

2) When the pulse frequency is high, the DI5 port must be used.

3) The switch ports for "set count reached" and "specified count reached" cannot be reused.

4) When the VFD is in RUN/STOP state, the counter will keep counting until the "Set Count Value" is reached.

5) The count value can be maintained during power failure.

6) Feedback the output signal of the switch value reached by the counter to the input terminal of the VFD for shutdown, which can be used to create an automatic shutdown system.

4.8 Motor characteristic parameter setting and automatic tuning

4.8.1 Motor parameters that need to be set

When the VFD operates in the "Vector Control" (F0-03=1) mode, it relies heavily on accurate motor parameters, which is one of the important differences from the "VF Control" (F0-03=2) mode. In order for the VFD to have good drive performance and operating

efficiency, it must obtain accurate parameters of the controlled motor.

The required motor parameters are (function code for default motor 1):

Parameters of motor 1	Parameter Description	Description:
F4-01 to F4-06	Rated power/voltage/current/frequency/speed of motor	Model parameters, manual input
F4-07 ~ F4-11	Equivalent stator resistance, inductive reactance, rotor inductance, etc. inside the motor	Tuning parameter

4.8.2 Automatic tuning and identification of motor parameters

The methods for obtaining the internal electrical parameters of the controlled motor for the VFD include dynamic identification, static identification, manual input of motor parameters, and other methods.

identification method	Applicable situations	Identification effect
no-load dynamic identification	Applicable to synchronous motors and asynchronous motors. Suitable for situations where the motor and application system can be easily separated	The best
dynamic identification with load	Applicable to synchronous motors and asynchronous motors. Where the motor and application system are not convenient to be separated	Okay
static identification	Applicable only to asynchronous motors, where it is difficult to separate the motor from the load and dynamic identification is not allowed	Poorly
Manually enter parameters	Applicable only to asynchronous motors. In situations where it is difficult to separate the motor from the application system, copy the previously successfully identified parameters of the same model motor to the corresponding function codes in F4-01 to F4-11.	Possible

The steps for automatic tuning of motor parameters are as follows:

The following explanation is based on the default parameter identification method for motor 1, and the identification method for motor 2 is the same.

Step 1: If the motor can be completely disconnected from the load, disconnect the motor from the load mechanically when the power is off, allowing the motor to rotate freely without load.

Step 2: After power-on, first select the converter command source (F0-04) as the

command channel of the operation panel.

Step 3: Enter the motor nameplate parameters accurately (such as F4-01-F4-06). Please enter the following parameters based on the actual parameters of the motor (selected based on the current motor):

Motor selection	Parameters:
Motor 1	F4-01: Rated power of motor F4-02: Rated voltage of motor F4-04: Rated current of motor F4-05: Rated frequency of motor F4-06: Rated speed of motor
Motor 2	H1-01 ~ H1-06: Same as the above definition

Step 4: If it is an asynchronous motor, select 2 (dynamic full tuning) for F4-00 (tuning selection, which corresponds to H1-00 function code for motor 2), and press ENTER to confirm. At this point, the keyboard displays:

Then press the RUN button on the keyboard panel, and the VFD will drive the motor to accelerate and decelerate, rotate forward and reverse, and the operation indicator will light up. The operation duration is identified as approximately 2 minutes. When the above display information disappears, the normal parameter display state is returned, indicating that the tuning is complete. After this complete tuning, the VFD will automatically calculate the following parameters for the motor:

Motor selection	Parameters:
Motor 1	F4-07: No-load current of motor 1 F4-08: Stator resistance of motor 1 F4-09: Motor 1 rotor resistance F4-10: Motor 1 mutual inductance resistance F4-11: leakage inductance resistance of motor 1
Motor 2	H1-07 ~ H1-11: Definition as above

If the motor cannot be completely disconnected from the load, select 1 (static tuning) for F4-00 (motor 2 is H1-00), and then press the RUN button on the keyboard panel to start the motor parameter identification operation.

4.8.3 Setting and switching of multiple sets of motor parameters

The current valid motor parameter set can be specified by function code H0-00 or selected by digital input terminal function 41. However, when digital input terminal function 41 is active, it takes priority and H0-00 settings are invalid.

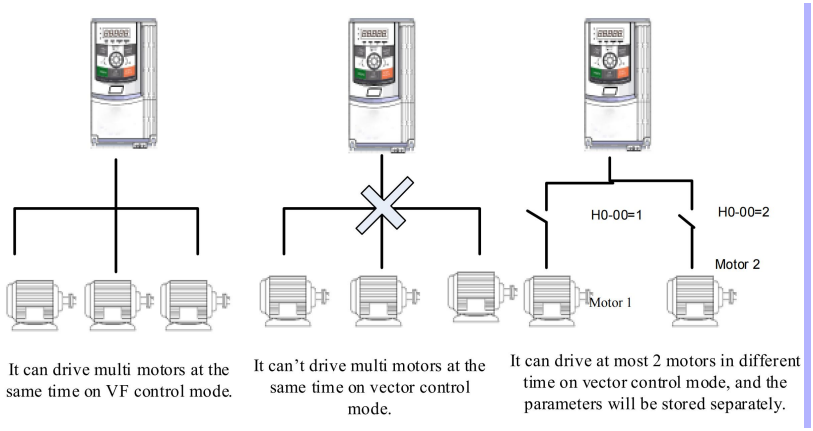


Figure 4-26. Switching between multiple sets of motors

4.9 Usage of the DI port of the VFD

The control board comes with 7 DI ports, numbered DI1-DI7. The internal hardware of the DI port is equipped with a 24Vdc detection power supply. Users simply short-circuit the DI port to the COM port to input the DI signal to the VFD.

In the default state, F5-13=00000, and the DI port is short-circuited to a valid (logic 1) signal. When the DI port is floating, the DI is an invalid (logic 0) signal. The user can also change the valid mode of the DI port, which is an invalid (logic 0) signal when the DI port is short-circuited. When the DI port is floating, the DI is a valid (logic 1) signal. In this case, the corresponding bit of F5-13 needs to be modified to 1. These two function codes correspond to the valid mode settings of DI1-DI5.

The VFD also sets a software filtering time (F5-10) for the input signal to the DI port, which can improve the level of anti-interference. For the DI1-DI3 input ports, a port signal delay function is also provided to facilitate applications that require delay processing:

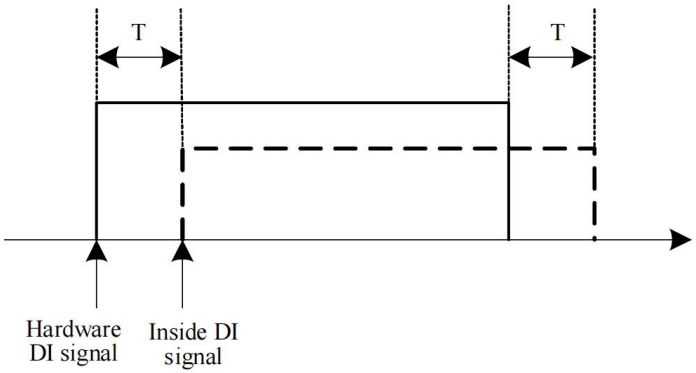


Figure 4-27. DI delay setting

The functions of the five DI ports can be defined in the F5-00 to F5-04 function codes. Each DI can be selected from 53 functions according to requirements. For details, refer to the detailed descriptions of the F5-00 to F5-04 function codes.

For the design of hardware features, only HDI can accept high-frequency pulse signals. For applications requiring high-speed pulse counting, please arrange for HDI ports.

4.10 Usage of the DO port of the VFD

The control board comes with three digital outputs, namely control board relay RELAY1, control board relay RELAY2, and Y1, where Y1 is a transistor-type output that can drive a 24Vdc low-voltage signal circuit; the relay output can drive a 50Vac control circuit.

By setting the values of function parameters F6-00 to F6-02, you can define the digital output functions of each channel, which can be used to indicate various operating states and alarms of the VFD. There are approximately 45 function settings available for users to achieve specific automatic control requirements. For specific settings, please refer to the detailed description of the F6 group of function code parameters.

4.11 AI input signal characteristics and preprocessing

The VFD supports a total of 2 AI resources.

Ports:	Input signal characteristics
AI1-GND	Acceptable 0-10Vdc signal
AI2-GND	When the dial switch "AI2 I-U" is in the "U" position, it can accept 0-10Vdc signals; when the dial switch "AI2 I-U" is in the "I" position, it can accept 0-20mA current signals.

AI can be used as a VFD, using external voltage and current signals as frequency source

settings, torque settings, voltage settings during VF separation, PID settings, or feedback settings.

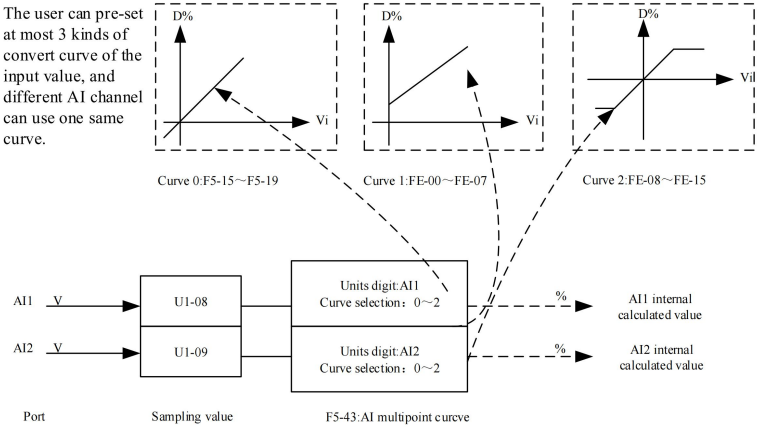


Figure 4-28. Correspondence between AI signals and actual settings

The sampling values of the AI port can be read in function codes U1-08 and U1-09, and their converted calculated values are used for internal subsequent calculations. Users cannot directly read them.

4.12 Usage of AO port of VFD

The VFD supports a total of 2 AO outputs.

Ports.	Input signal characteristics
AO1-GND	The dial switch "AO1 I-U" is in the "U" identification position, which can output 0-10Vdc signals
	When the dial switch "AO1 I-U" is in the "I" position, it can output a current signal of 0-20mA
AO2-GND	The dial switch "AO2 I-U" is in the "U" identification position, which can output 0-10Vdc signals
	The dial switch "AO2 I-U" is in the "I" identification position, which can output a current signal of 0-20mA

AO1 and AO2 can be used to indicate internal operating parameters in analog mode, and the indicated parameter attributes can be selected through function codes F6-09 and F6-10.

The specified operating parameters can be modified before outputting, as shown by the diagonal line in the following figure. For a detailed description of function codes F6-13 to F6-16, see the relevant instructions in Chapter 5.

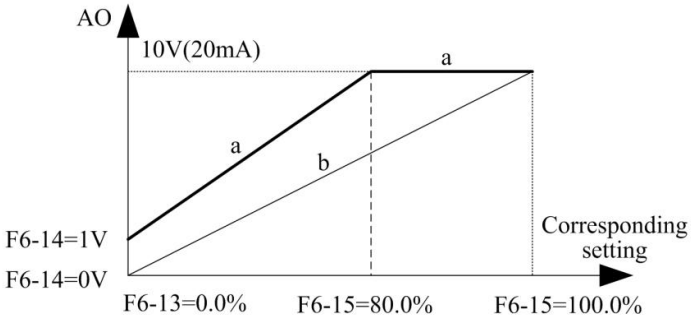


Figure 4-29. AO output diagram

4.13 Usage of the serial communication of the VFD

The hardware communication parameter configuration of the communication port is shown in the F8 group function. Setting the communication rate and data format to be consistent with the host computer is a prerequisite for normal communication.

The serial port of the VFD has a built-in MODBUS-RTU slave communication protocol, allowing the host computer to query or modify the function codes, various operating status parameters, and send operating commands and operating frequencies to the VFD through the serial port.

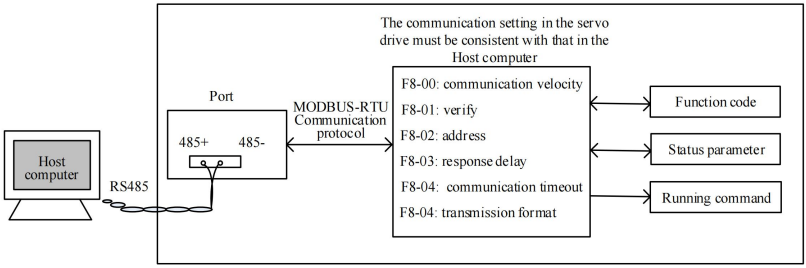


Figure 4-30. Diagram of communication settings

The information inside the VFD, such as function codes, various operating state parameters, and various operating instructions, is organized in a "register parameter address" manner. The host can define the protocol for communication data interaction. For more detailed instructions, please refer to Appendix A: Modbus Communication Protocol.

4.14 Password setting

The VFD provides a user password protection function. When F7-49 is set to a nonzero value, it is the user password. After returning to the status parameter interface, the password protection will take effect. At this time, pressing the PRG key will display "-----", which only displays status parameters. The user must press the "-----" interface button and the panel displays "00000". Only after entering the correct user password can the user enter the normal menu to view and set function codes. Otherwise, the panel displays "-----" and the user cannot enter the function codes.

To cancel the password protection function, you must enter the password using the steps above and set F7-49 to 0.

4.15 Synchronous motor open-loop vector control (SVC) debugging instructions

4.15.1 Setting the synchronization type, control method, and motor parameters

1) Set the motor type to synchronous motor and the control mode to SVC, that is, F0-03=11.

Note: The 10th digit of F0-03 is the motor type selection, and the 1st digit is the control method;

Ten: 1: synchronous motor, 0: asynchronous motor;

Unit digit: 1: SVC, 2: VF, 3: closed-loop vector (reserved)

2) Set F4-01~F4-06 according to the actual motor parameters.

4.15.2 Parameter identification

1) Connect the motor, if there is a load, set F4-00 to 1; if it is an empty shaft, set F4-00 to 2, and the digital tube will display TUNE. To ensure control effectiveness, it is best to set the motor to no load and set F4-00 to 2.

Press the RUN button to perform parameter identification, and wait for the TUNE to disappear, indicating the end of parameter identification.

The identification process lasts for about 1 minute, and you can press the STOP button to exit halfway. During the process, the current will be sent, and the motor will be operated at the set acceleration and deceleration time to 60% of the rated frequency of the motor to observe whether the motor runs smoothly. If it is not smooth, press the STOP button to exit. When it reaches 60% of the rated frequency of the motor, it will slow down and stop after a period of time.

4) After parameter identification, check whether the parameters F4-17~ F4-20 are normal.

4.15.3 No-load trial operation

1) Set the speed to a smaller range, such as F0-11=20Hz.

Press the run button to see if the motor can accelerate to the set frequency and if the motor current is low. If the motor can accelerate to the set frequency and the motor current is low, the VFD is basically normal. Set the frequency to the rated frequency of the motor and see if the motor can accelerate to the set frequency.

4.15.4 Quick start test run, set up for situations where rapid start and stop are required, otherwise skip this step

Reduce the motor acceleration time (such as setting it to 1 second), change the speed loop and current loop PI parameter settings, press the run button, and check whether the motor can accelerate quickly to the set frequency.

4.15.5 Loading and Running

After the above 5 steps, you can run the motor with load and use the VFD normally.

Note: If the system response does not meet expectations when loading or changing the system's rotational inertia, it is necessary to adjust the two parameters F3-04 and F3-06 appropriately. If replacing with another motor, it is generally necessary to set the rated frequency and rated current of the motor, and then perform parameter identification.

Chapter 5 Parameter Description

5.1 Basic function parameters of F0 group

F0-00	Product model	0.00-655.35	Factory value: 61#.##

This is only for users to view and cannot be modified.

F0-01	Display of VFD GP type	Range: 0-1	Factory value: determined by model

0: G type, suitable for constant torque loads with specified rated parameters.

1: P type, suitable for variable torque loads (fans, pumps, etc.) with specified rated parameters.

F0-02	rated current	Range: 0.1A-3000.0A	Factory value: determined by model

This is only for users to view the rated current of the drive and cannot be modified.

F0-03	Control mode	Range: 1-3	Factory value: 2

1: Open-loop vector control (no speed sensor vector)

2: VF control

Ten: selection of motor type

0: Asynchronous motor

1: Synchronous motor

F0-04	Select the source of the running command	Range: 0-2	Factory value: 0

Select the input channel for the control command of the VFD.

The control commands of the VFD include: start, stop, forward rotation, reverse rotation, inching, etc.

0: command channel of the operation panel (the "L/D/C" lights are off)

The RUN, STOP/RES buttons on the operation panel are used to control the running commands.

1: Terminal command channel (the "L/D/C" light is on)

The operation command is controlled by the multi-function input terminals FWD, REV, JOGF, and JOGR.

2: Communication command channel (the "L/D/C" light flashes)

The running command is given by the upper computer through communication.

F0-05	Run the Up\Down button to modify the frequency command reference	Range: 0-1	Factory value: 1

0: operating frequency

1: Set frequency

This parameter is only valid when the frequency source is set digitally, and is used to determine whether the action of pressing the up/down button or terminal up/down button modifies the set frequency or the running frequency. The biggest difference is mainly reflected in the acceleration and deceleration process.

F0-06	Selection of main frequency source X	Range: 0-8	Factory value: 1

Select the input channel for the main set frequency of the VFD. There are 9 main set frequency channels:

0: Up/Down modify frequency shutdown without memory

The initial value is the value of F0-11 "digital set preset frequency".

The set frequency value of the VFD can be changed by using the increase and decrease keys on the keyboard (or the UP and DOWN buttons on the multi-function input terminal). The "no memory" function means that the frequency setting value of the VFD will not be remembered after it is stopped. After the VFD is stopped, the set frequency value will return to the "digital preset frequency" value of F0-11.

1: Up/Down modification frequency power-down memory

The initial value is the value of F0-11 "digital set preset frequency".

The set frequency value of the VFD can be changed by using the increase and decrease keys on the keyboard (or the UP and DOWN keys on the multi-function input terminal).

Power-down refers to the setting frequency being the one before the last power-down when the VFD is powered up again after power-down.

2: AI1

3: AI2

The frequency is determined by the analog input terminal. The XXX control board provides two analog input terminals (AI1, AI2).

Wherein, AI1 is a voltage-type input of 0V-10V, AI2 can be a voltage input of 0V-10V or a current input of 0mA-20mA, which is selected by a dial switch on the control board.

The input voltage values of AI1 and AI2, as well as the corresponding relationship curve with the target frequency, can be freely selected by the user through F5-45.

It provides 4 sets of corresponding relationship curves, of which 2 sets of curves are linear relationships (2-point correspondence), and 2 sets of curves are arbitrary curves with 4-point correspondence. Users can set these through the F5-15-F5-24 function codes and the FE group function codes.

Function code F5-45 is used to set the two analog inputs AI1 and AI2, and select which of the four groups of curves to use.

When AI is set as the frequency, the voltage/current input is set to 100.0%, which refers to the percentage relative to the maximum output frequency F0-14.

4: Multi-speed

Select the multi-speed operation mode. The parameters of the F5 group "input terminal" and the FC group "multi-speed and PLC" need to be set to determine the correspondence between the given signal and the given frequency.

5: Simple PLC

Select the simple PLC mode. When the frequency source is a simple PLC, the FC group "multi-speed and PLC" parameters need to be set to determine the given frequency.

6: PID

Select process PID control. At this time, it is necessary to set the "PID function" in the FA group. The operating frequency of the VFD is the frequency value after PID action. For the meaning of PID given source, given quantity, feedback source, etc., please refer to the introduction of the "PID function" in the FA group.

7: Communication setting

The main frequency source is given by the host computer through communication (see Appendix A for details of the XXX MODBUS communication protocol).

8: PULSE pulse frequency given

The PULSE pulse frequency is given and input by the HDI terminal of the control board. The pulse given slope can be set and determined by F5-30 to F5-34.

F0-07	Selection of auxiliary frequency source Y	Range: 0-8	Factory value: 0

When used as an independent frequency given channel, the auxiliary frequency source has the same usage as the main frequency source X.

When the auxiliary frequency source is used for superimposing a given (the units digit of F0-10 is 1, 2, 3, 4), there are the following special features:

When the auxiliary frequency source is given digitally, the preset frequencies (F0-11) do not work. The frequency can be adjusted up and down based on the main given frequency through the increase and decrease keys on the keyboard (or UP and DOWN on the multi-function input terminal).

2. When the auxiliary frequency source is set to analog input (AI1, AI2), the input setting of 100% corresponds to the range of the auxiliary frequency source (see descriptions of F0-08

and F0-09). If you need to adjust the main given frequency up or down, set the corresponding setting range of the analog input to -n% to +n% (see descriptions of F5-15 to F5-24).

Note: The selected auxiliary frequency source Y cannot be the same as the set value of the main frequency source X, that is, the main and auxiliary frequency sources cannot use the same frequency given channel.

F0-08	Selection of auxiliary frequency source Y range	Range: 0-2	Factory value: 0

0: relative to the maximum frequency;

1: relative to frequency source X;

2: The range is the same as 0, but the main and auxiliary outputs have no negative frequency;

F0-08 is used to determine the relative object of the range. If it is relative to the maximum frequency (F0-14), its range is a fixed value. If it is relative to the main frequency source X, its range will change as the main frequency X changes.

F0-09	Range of auxiliary frequency source Y	Range: 0% to 100%	Factory value: 100%

When the frequency source is selected as a given frequency superposition (refer to the F0-10 setting), it is used to determine the adjustment range of the auxiliary frequency source.

F0-10	Frequency source superimposition selection	Unit digit: 0-4, tens digit: 0-3	Factory value: 0

Select the given frequency channel through this parameter. The given frequency is achieved through the combination of the main frequency source X and the auxiliary frequency source Y.

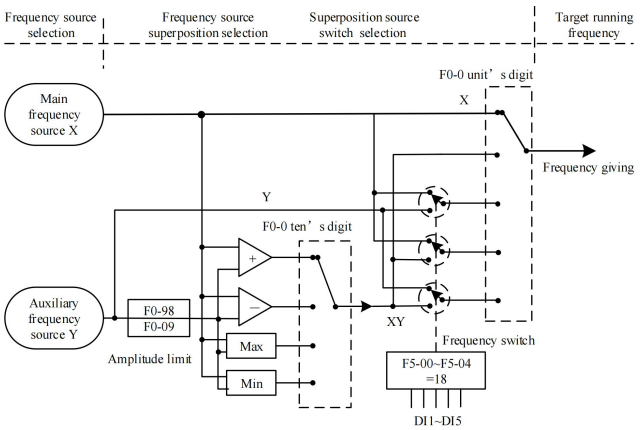


Figure 5-1. Schematic diagram of frequency source superposition

Unit digit: frequency source selection:

0: main frequency source X

The main frequency X is used as the target frequency.

1: Primary and secondary calculation results

The primary and secondary operation results are used as the target frequency. The primary and secondary operation relationship is described in the "tenth digit" of this function code.

2: Switching between the main frequency source X and the auxiliary frequency source Y

When the multi-function input terminal function 18 (frequency switching) is disabled, the main frequency X is used as the target frequency.

When the multi-function input terminal function 18 (frequency source switching) is active, the auxiliary frequency Y is used as the target frequency.

3: Switching between the main frequency source X and the main and auxiliary operation results

When the multi-function input terminal function 18 (frequency switching) is disabled, the main frequency X is used as the target frequency.

When the multi-function input terminal function 18 (frequency switching) is enabled, the primary and secondary calculation results are used as the target frequency.

4: Switching between auxiliary frequency source Y and main and auxiliary operation results

When the multi-function input terminal function 18 (frequency switching) is disabled, the auxiliary frequency Y is used as the target frequency.

When the multi-function input terminal function 18 (frequency switching) is enabled, the primary and secondary calculation results are used as the target frequency.

Ten: Frequency source main and auxiliary operation relationship:

0: Main frequency source X + auxiliary frequency source Y

The sum of the main frequency X and the auxiliary frequency Y is used as the target frequency. This achieves the given function of frequency superposition.

1: Main frequency source X-auxiliary frequency source Y

The difference between the main frequency X and the auxiliary frequency Y is taken as the target frequency.

2: MAX (main frequency source X, auxiliary frequency source Y)

Take the maximum absolute value of the main frequency X and the auxiliary frequency Y as the target frequency.

3: MIN (main frequency source X, auxiliary frequency source Y)

Take the minimum absolute value of the main frequency X and the auxiliary frequency Y as the target frequency.

F0-11	Preset frequency	Range: 0.00Hz-F0-14	Factory value: 50.00Hz

When the main frequency source is selected as "digital setting" or "terminal UP/DOWN", the value of this function code is the preset frequency for the frequency setting of the VFD.

F0-13	Selection of operation direction	Range: 0-2	Factory value: 0

0: Direction is consistent, consistent with the current running direction of the motor

1: Opposite direction, opposite to the current motor running direction

2: Reverse rotation is prohibited. When there is a reverse rotation command, the VFD will slow down to 0Hz and enter the shutdown state.

By changing this function code, the direction of the motor can be changed without changing any other parameters. Its function is equivalent to adjusting any two lines of the motor (U, V, W) to achieve the rotation direction of the motor. Please refer to Figure 4-22 on P51 for details.

Note: After parameter initialization, the motor running direction will return to its original state. Use caution in situations where changing the motor direction is strictly prohibited after system debugging.

F0-14	Maximum output frequency	Range: 50.00Hz~600.00Hz<1></1>	Factory value: 50.00Hz

<1>The range is 50.0Hz-1200.0Hz when F0-20=1, and 50.0Hz-1200.0Hz when F0-20=2.</1>

F0-15	Upper limit frequency source	Range: 0-4	Factory value: 0

This function code is used to define the source of the upper limit frequency.

0: Digital setting F0-16

1: AI1, enter the set 100% corresponding to F0-14

2: AI2, enter the set 100% corresponding to F0-14

3: Communication settings are given by the host computer through communication (see Appendix A for details of the MODBUS communication protocol)

4: PULSE pulse setting, the given slope of the pulse can be set by F5-30 to F5-34

To avoid "flying" due to material disconnection, the upper limit frequency can be set using analog values. When the VFD reaches the upper limit frequency, torque control is disabled and the VFD continues to operate at the upper limit frequency.

F0-16	Upper limit frequency	Range: F0-18-F0-14	Factory value: 50.00Hz

F0-17	Upper limit frequency offset	Range: 0.00Hz-F0-14	Factory value: 0.00Hz

When the upper limit frequency is given as an analog quantity or Pulse, this parameter acts as an offset for the analog quantity. The effect is to add the offset frequency to the analog upper limit frequency setting as the final upper limit frequency setting.

F0-18	Lower limit frequency	Range: 0.00Hz-F0-16	Factory value: 0.00Hz

When the VFD starts running, it starts from the starting frequency. During the operation process, if the given frequency is less than the lower limit frequency, the VFD will always run at the lower limit frequency until the VFD shuts down or the given frequency is greater than the lower limit frequency.

F0-19	Command source binding selection	Range: 000-888	Factory value: 000

Define the binding combinations between 3 types of operation command channels and 9 types of given frequency channels to facilitate the switching of frequency sources.

0: No binding

1: Digital set frequency

2: AI1

3: AI2

4: Multi-speed

5: Simple PLC

6: PID

7: Communication setting

8: PULSE pulse setting (HDI)

Unit digit: binding frequency source selection of the operation panel command

Ten: Terminal command binding frequency source selection

Hundreds: communication command binding frequency source selection

Thousand digit: reserved

The meaning of the given channel for the above frequencies is the same as the selection of F0-06 for the main frequency X. Please refer to the description of the F0-06 function code. Different operating command channels can be bundled with the same given frequency channel. When the command source has a bundled frequency source, the frequency sources set by F0-06 to F0-10 will no longer be active during the validity period of the command source.

F0-20	Selection of frequency decimal point	Range: 1-2	Factory value: 2

This parameter is used to determine the resolution of all frequency-related function codes.

1: 1 decimal point;

2: 2 decimal places;

F0-21	Acceleration and deceleration time unit	Range: 0-2	Factory value: 1

To meet the needs of various types of sites, the VFD provides three acceleration and deceleration time units, namely 1 second, 0.1 second, and 0.01 second.

0:1 second

1:0.1 seconds

2:0.01 seconds

Note: When modifying the function parameters, the number of decimals displayed for the 4 sets of acceleration and deceleration times will change, as will the corresponding acceleration and deceleration times. Be especially careful during application.

F0-22	Reference frequency for acceleration and deceleration time	Range: 0-2	Factory value: 0

This parameter is used to define the reference frequency for acceleration and deceleration time, as shown in Figure 5-2:

0: maximum frequency (F0-14);

1: preset frequency (F0-11);

2: Rated frequency of the motor (F4-05 or H1-05);

F0-23	Acceleration time 1	Range: 0.0s<1></1>-3000.0s<1></1>	Factory value: 10.0s
F0-24	Deceleration time 1	Range: 0.0s<1></1>-3000.0s<1></1>	Factory value: 10.0s

The <1>acceleration</1> and <1>deceleration time unit</1> is F0-21=<1>1</1>. <1>When F0-21=0,</1> the <1>time range is 0s to</1> 30000s<1>;</1> when F0-21=2, the time range is 0.00s to 300.00s.

Acceleration time refers to the time required for the VFD to accelerate from zero frequency to the acceleration/deceleration reference frequency (determined by F0-22), as shown in t1 in Figure 5-2.

Deceleration time refers to the time required for the VFD to decelerate to zero frequency from the acceleration and deceleration reference frequency (determined by F0-22), as shown in t2 in Figure 5-2.

It provides four groups of acceleration and deceleration time, which can be switched and selected by the user using the digital input terminal DI. The four groups of acceleration and deceleration time are set using the following function codes:

Group 1: F0-23, F0-24; Group 2: F7-03, F7-04;

Group 3: F7-05, F7-06; Group 4: F7-07, F7-08;

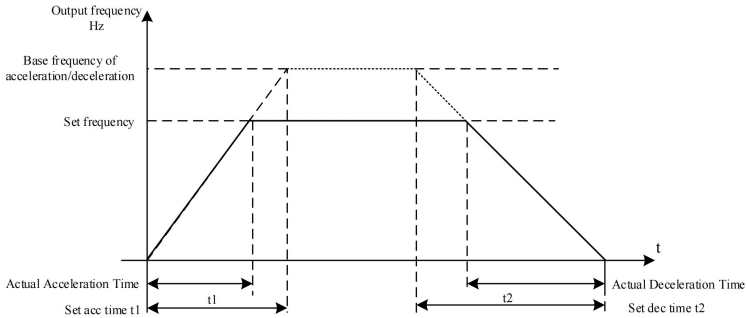


Figure 5-2. Schematic diagram of acceleration and deceleration time

F0-25	Percentage of overmodulation voltage increase	**Range: 0% to 10%**	**Factory value: 3%**

This parameter is used to enhance the output voltage capability of the VFD in the constant power region, with the rated voltage of the motor being 100%. The higher the value, the higher the voltage boosting capability, but the larger the current ripple content. Caution is needed during use. Generally, no modification is required.

F0-26	Carrier frequency	**Range: 1.0kHz~11.0kHz**	**Factory value: determined by model**

This function adjusts the carrier frequency of the VFD. By adjusting the carrier frequency, it is possible to reduce motor noise, avoid mechanical system resonance points, reduce line leakage current to the ground, and reduce interference generated by the VFD.

When the carrier frequency is low, the higher harmonic components of the output current increase, resulting in increased motor losses and temperature rise.

When the carrier frequency is higher, the motor loss decreases, and the motor temperature rise decreases, but the VFD loss increases, the VFD temperature rise increases, and the interference increases.

Adjusting the carrier frequency can affect the following performance:

Carrier frequency	Low → High
Motor noise	Large → Small
Output current waveform	bad → good
Temperature rise of motor	High → Low

Temperature rise of VFD	Low → High
Leakage current	Small → Large
External radiation interference	Small → Large

The factory settings for the carrier frequency of different power converters are different. Although users can modify them as needed, it is important to note that if the carrier frequency is set higher than the factory value, it will cause the temperature rise of the converter's radiator to increase. At this point, users need to reduce the power of the converter, otherwise there is a risk of overheating alarm.

VFD power	Carrier frequency range	Factory-set carrier frequency
0.75kW~5.5kW	0.5kHz-16.0kHz	6.0kHz
7.5kW-75kW	0.5kHz-16.0kHz	4.0kHz
90kW-450kW	0.5kHz-16.0kHz	2.0kHz

F0-27	Carrier frequency adjusts with temperature	**Range: 0-1**	**Factory value: 1**

0: invalid

1: Effective. The VFD can automatically adjust the carrier frequency according to its own temperature, which can reduce the possibility of overheating alarm of the VFD.

F0-28	Parameter initialization operation	**Range: 0-4**	**Factory value: 0**

0: No operation;

1: Restoring factory parameters, excluding motor parameters, recorded information, and F0-20

2: Clear the recorded information, including the fault record U0 group, cumulative power-on time F7-33, cumulative running time F7-34, and power consumption F7-72

3: Backup the current parameters of the user

4: Restoring the current parameters of the user

F0-29	LCD upload and download parameter selection	**Range: 0-4**	**Factory value: 0**

The download is the function code parameter value stored in the LCD by the VFD.

Uploading is the process where the LCD writes the stored VFD parameter values to the VFD, so the LCD needs to download the parameters before uploading them.

0: No function

1: Download parameters to LCD

2: Only upload the parameters of F4 group

3: Upload parameters except for Group F4

4: Upload all parameters

5.2 F1 group start-stop control function group

F1-00	Starting method	Range: 0-2	Factory value: 0

0: Direct start. When the DC braking time setting is not set to 0, DC braking is applied before starting. This is suitable for situations where small inertial loads may produce reverse rotation during startup.

1: Speed tracking restart: The VFD first judges the speed and direction of the motor, and then starts at a frequency corresponding to the tracked motor speed, providing smooth and impact-free start-up of the rotating motor. It is suitable for instantaneous power outages and restarts with large inertial loads.

2: Asynchronous motor pre-excitation start-up, used to establish a magnetic field before the asynchronous motor is operated, to reduce the current impact during rapid start-up.

F1-01	speed tracking mode	Range: 0-2	Factory value: 0

To complete the speed tracking process in the shortest time, choose the method of using a VFD to track the motor speed:

0: Tracking down from the frequency during power outage, usually used in this way;

1: Tracking from the target frequency, used in situations where the power outage is longer and restarts later;

2: Tracking from the current speed, generally used for power generation loads.

F1-02	Maximum speed tracking current	Range: 30% to 150%	Factory value: 100%
F1-03	Speed tracking speed	Range: 1-100	Factory value: 20

When using the speed tracking restart mode, select the current and speed for speed tracking. The larger the parameter, the faster the tracking speed. However, if it is too large, it may cause unreliable tracking.

F1-04	Start frequency	Range: 0.00Hz-10.00Hz	Factory value: 0.00Hz
F1-05	Starting frequency holding time	Range: 0.0s-100.0s	Factory value: 0.0s
F1-06	Start DC braking current	Range: 0% to 100%	Factory value: 0%
F1-07	Starting DC braking time	Range: 0.0-100.0s	Factory value: 0.0s

Starting DC braking is generally used for situations where the motor is stopped before starting.

If the starting mode is direct starting, the VFD will first perform DC braking according to the set starting DC braking current, and then start running after the set starting DC braking time. The larger the DC braking current, the greater the braking force.

The starting DC braking current refers to the percentage of the rated current of the VFD.

F1-08	Selection of acceleration and deceleration frequency curve mode	**Range: 0-2**	**Factory value: 0**

0: Linear acceleration and deceleration

1:S curve acceleration and deceleration A

2: S curve acceleration and deceleration B

F1-09	The beginning time of acceleration on the S curve	**Range: 0.0% to 100.0%**	**Factory value: 20.0%**
F1-10	Time after the end of acceleration in S curve	**Range: 0.0% to 100.0%**	**Factory value: 20.0%**
F1-11	The beginning time of deceleration of the S curve	**Range: 0.0% to 100.0%**	**Factory value: 20.0%**
F1-12	Time after the end of deceleration of S curve	**Range: 0.0% to 100.0%**	**Factory value: 20.0%**

The above parameters can be used to set the driver to start accelerating without shock during startup, and the acceleration and deceleration curve is adjusted by setting different levels of S acceleration and deceleration curves. When starting the S curve acceleration and deceleration, the driver will accelerate and decelerate at different rates based on the original acceleration and deceleration time.

Note: If the acceleration/deceleration time is 0, the S curve function will be invalid.

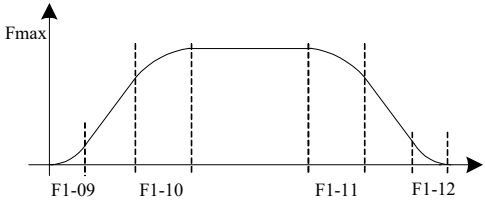


Figure 5-3. S-curve acceleration and deceleration diagram

F1-13	Shutdown mode	**Range: 0-1**	**Factory value: 0**

0: Deceleration stop. After the stop command is valid, the VFD reduces the output frequency according to the deceleration method and defined acceleration and deceleration time, and stops when the frequency drops to 0.

1: Free parking. After the parking command is valid, the VFD immediately terminates output.

The load is stopped freely according to mechanical inertia.

F1-14	Starting frequency of DC braking during shutdown	Range: 0.00Hz ~ F0-14	Factory value: 0.00Hz

During the deceleration and shutdown process, when the frequency reaches this value, the DC braking process will start. Setting this value too high can easily cause overvoltage.

F1-15	Stop DC braking waiting time	Range: 0.0s-100.0s	Factory value: 0.0s

After the operating frequency is reduced to the starting frequency of DC braking, the VFD first stops outputting for a period of time before starting the DC braking process. This is used to prevent overcurrent and other faults that may be caused by starting DC braking at high speeds.

F1-16	DC current for stopping brake	Range: 0% to 100%	Factory value: 0%

This parameter is used to set the percentage of DC braking current, with the rated current of the VFD being 100%. The greater the braking current, the more obvious the braking effect, but when the braking current is too large, the braking time F1-17 should not be set too large.

F1-17	DC braking time during shutdown	Range: 0.0s-36.0s	Factory value: 0.0s

This parameter is used to set the DC brake maintenance time. When it is set to 0, there is no DC brake process.

F1-21	demagnetization time	Range: 0.01s ～3.00s	Factory value: 0.50s

This parameter is used to set the waiting time required for the VFD to freely stop and restart, reducing the impact of motor remanence on the start-up.

F1-23	Selection of instantaneous and non-instantaneous stop mode	Range: 0-2	Factory value: 0

This parameter is used to set the method for preventing shutdown due to bus voltage undervoltage caused by grid voltage drop. It is commonly used in wind turbines and other applications.

0: invalid, the system will still operate at the given frequency during an instantaneous power outage of the grid voltage, which may cause an undervoltage fault and shutdown

1: Automatic adjustment of deceleration rate, automatic adjustment of deceleration rate during instantaneous power failure of grid voltage to maintain the continuous operation of the

VFD. Automatic acceleration to the target frequency after the grid voltage is restored. If the grid is out of power for a long time, it will still cause undervoltage fault and stop.

2: Deceleration shutdown: In the event of an instantaneous power outage or sudden voltage drop, the VFD will perform a deceleration shutdown according to F1-24. If it needs to be restarted after shutdown, a restart signal needs to be given again.

F1-24	Deceleration time during instantaneous stop and non-continuous deceleration	**Range: 0.0s ～100.0s**	**Factory value: 10.0s**
F1-25	instantaneous voltage without interruption	**Range: 60% to 85%**	**Factory default value: 80%**

This parameter is used to determine the threshold for instantaneous power failure of the grid voltage. When the bus voltage is less than F1-25, the VFD will slow down in accordance with the setting of F1-23 to maintain the constant bus voltage. 100% corresponds to the voltage level of the VFD.

F1-26	instantaneous power failure and continuous recovery voltage	**Range: 85% to 100%**	**Factory default value: 90%**

This parameter is used to determine the threshold value for whether the grid voltage has returned to normal. When the bus voltage is greater than F1-26, the VFD will no longer decelerate. When the duration is greater than F1-27, the VFD will begin to accelerate until it reaches the set frequency. 100% corresponds to the voltage level of the VFD.

F1-27	Judgment time for the instantaneous power failure and continuous recovery of voltage	**Range: 0.0s-300.0s**	**Factory value: 0.3s**

This parameter is used to determine the time for the recovery of grid voltage. When the grid voltage is higher than F1-26, the timing starts, otherwise it clears to 0.

F1-28	Instantaneous stop and automatic gain adjustment	**Range: 0-100**	**Factory value: 40**
F1-29	Instantaneous stop without automatic adjustment of integration time	**Range: 1-100**	**Factory value: 20**

This only takes effect when selecting F1-23=1 in the "instant stop" mode, and is used to adjust the speed of deceleration. It is generally not necessary to modify it.

5.3 V/F control parameters for Group F2

This group of function codes is only valid for V/F control (F0-03=2), and is not valid for vector control.

V/F control is suitable for general-purpose loads such as fans and pumps, or applications where one VFD drives multiple motors, or where the power of the VFD is one level lower or two levels higher than the power of the motor.

F2-00	V/F curve setting	**Range: 0-7**	**Factory value: 0**

For fan and pump loads, you can choose square V/F control:

0: Linear V/F curve. Suitable for ordinary constant torque loads;

1: Multi-point V/F curve. Suitable for special loads such as dehydrators and centrifuges;

2: Square V/F curve. Suitable for centrifugal loads such as fans and pumps;

3-5: correspond to 1.7, 1.5, and 1.3 V/F curves, respectively, between the straight line and the square curve.

6: VF complete separation mode. In this mode, the output frequency and output voltage of the VFD are independent of each other, with the output frequency determined by the frequency source and the output voltage determined by F2-15 (VF separation voltage source).

VF full decoupling mode is generally used in induction heating, VFD power supply, torque motor control, and other applications.

7: VF semi-separated mode.

In this case, V is proportional to F, but the proportional relationship can be set by the voltage source F2-15, and the relationship between V and F is also related to the rated voltage and frequency of the motor in the F1 group.

Assuming that the voltage source input is X (X is a value between 0 and 100%), the relationship between the VFD output voltage V and frequency F is:

V/F=2 * X * (rated voltage of motor)/(rated frequency of motor)

F2-01	Torque boost	**Range: 0.0% to 30.0%**	**Factory value: 0.0%**
F2-02	Cut-off frequency of torque boost	**Range: 0.00Hz-F0-14**	**Factory value: 25.00Hz**

In order to compensate for the low-frequency torque characteristics of V/F control, some boost compensation is applied to the VFD output voltage at low frequencies.

If the torque boost setting is too high, the motor may overheat and the VFD may overcurrent. Generally, the torque boost should not exceed 8.0%.

Effectively adjusting this parameter can effectively avoid overcurrent during startup. For larger loads, it is recommended to increase this parameter, and for lighter loads, it is recommended

to decrease this parameter setting. When the torque boost setting is set to 0.0, the VFD will automatically boost torque.

Torque boosting torque cut-off frequency: below this frequency, torque boosting torque is effective, and above this set frequency, torque boosting is ineffective. See Figure 5-4 for details.

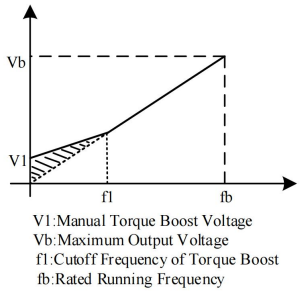


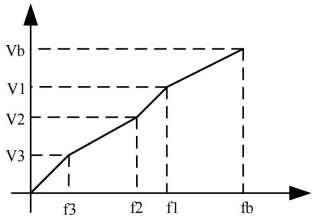
Figure 5-4. Manual torque lifting diagram

F2-03	V/F frequency point F1	**Range: 0.00Hz～F2-05**	**Factory value: 1.30Hz**
F2-04	V/F voltage point V1	**Range: 0.0% to 100.0%**	**Factory default value: 5.2%**
F2-05	V/F frequency point F2	**Scope: F2-03-F2-07**	**Factory value: 2.50Hz**
F2-06	V/F voltage point V2	**Range: 0.0% to 100.0%**	**Factory default value: 8.8%**
F2-07	V/F frequency point F3	**Range: 0.00Hz-50.00Hz**	**Factory value: 15.00H**
F2-08	V/F voltage point V3	**Range: 0.0% to 100.0%**	**Factory value: 35.0%**

Six parameters F2-03 to F2-08 define multiple V/F curves.

The set value of the V/F curve is usually set according to the load characteristics of the motor.

Note: V1<V2<V3, F1<F2<F3. Setting the voltage too high at low frequencies may cause the motor to overheat or even burn out, and the VFD may experience overcurrent loss or overcurrent protection.



fb: Motor rated frequency F4-05
Vb:Motor rated voltageF4-02

Figure 5-5. Schematic diagram of V/F curve setting

F2-09	Slip compensation coefficient	Range: 0.0% to 200.0%	Factory value: 50.0%

Setting this parameter can compensate for the slip caused by the load during V/F control, reducing the amount of change in motor speed with load during V/F control. Generally, 100.0% corresponds to the rated slip of the motor with rated load.

When the speed of the motor with load is lower than the given speed, this value can be appropriately increased, otherwise it can be appropriately decreased. Generally, there is no need to adjust it.

F2-10	V/F flux brake gain	Range: 0-200	Factory value: 100

This parameter can suppress the rise of bus voltage during the deceleration process of the VFD, and the larger the value, the better the suppression effect.

Magnetic flux braking is achieved by increasing the output voltage of the VFD to increase the current at the motor end, thereby improving the ability to consume feedback energy and suppressing the rise in bus voltage. The greater the gain, the greater the motor current. Please be careful in application. In cases where there is a braking resistor, it is recommended to set the value to 0, otherwise abnormal conditions may occur during deceleration due to excessive deceleration current.

F2-11	Oscillation suppression gain	Range: 0-100	Factory value: determined by model

This parameter is used to suppress motor oscillations. When the motor experiences oscillations, increase the value appropriately, but try to keep it small when the motor is not oscillating to avoid having a significant impact on V/F operation. In general, it is not necessary to modify this parameter.

F2-13	V/F slip compensation time constant	Range: 0.02s-1.00s	Factory value: 0.30s

This parameter is used to set the slip compensation time constant. Reducing this value can enhance the response speed, but the speed fluctuation may increase. Increasing this value will improve the speed stability, but the response speed will slow down. Generally, it is not necessary to modify it.

F2-15	Selection of output voltage source during V/F separation	Range: 0-7	Factory value: 0

0: Digital setting (F2-16)

1: AI1

2: AI2

3: Multi-segment instruction

4: Simple PLC

5: PID

6: Communication setting

7: PULSE pulse setting (HDI)

100.0% corresponds to the rated voltage of the motor

F2-16	Digital setting of output voltage during V/F separation	Range: 0V-rated voltage of motor	Factory value: 0

This parameter is used to set the voltage output value when the V/F separation voltage is set by a digital setpoint and the voltage source is a digital setpoint.

F2-17	Output voltage acceleration time during V/F separation	Range: 0.0-3000.0s	Factory value: 1.0s

This parameter is used to set the acceleration time for the voltage output from 0 to the rated voltage during V/F separation.

F2-18	Deceleration time of output voltage during V/F separation	Range: 0.0-3000.0s	Factory value: 1.0s

This parameter is used to set the deceleration time for the voltage output from the rated voltage to 0 during V/F separation.

F2-19	Selection of V/F separation shutdown mode	Range: 0-1	Factory value: 0

0: Frequency and output voltage deceleration time are independent

1: Reduce the frequency after the voltage is reduced to 0

5.4 Vector control parameters for Group F3

The function code in Group F2 is only valid for vector control, that is, F0-03=1 is valid and F0-

03=2 is invalid.

F3-00	Switching frequency F1	**Range: 0.00Hz～F3-02**	**Factory value: 5.00 Hz**
F3-02	Switching frequency F2	**Range: F3-00 to F0-14**	**Factory value: 10.00 Hz**
F3-04	Low frequency speed proportional gain	**Range: 0.1-10.0**	**Factory value: 4.0**
F3-05	low frequency velocity integration time	**Range: 0.01s-10.00s**	**Factory value: 0.50s**
F3-06	high frequency speed proportional gain	**Range: 0.1-10.0**	**Factory value: 2.0**
F3-07	high frequency speed integration time	**Range: 0.01s-10.00s**	**Factory value: 1.00s**

F3-00 switches between frequency 1 and F3-02 switches between frequency 2. F3-04/F3-05 and F3-06/F3-07 are the PI regulator parameters for low and high speed, respectively. The switching relationship is shown in Figure 5-6. By setting the proportional coefficient and integration time of the speed regulator, the speed dynamic response characteristics of vector control can be adjusted. Increasing the proportional gain and decreasing the integration time can speed up the dynamic response of the speed loop. An excessive proportional gain or too small an integration time may cause the system to oscillate.

Suggested adjustment method:

If the factory parameters cannot meet the requirements, fine-tune them based on the factory default parameters. First increase the proportional gain to ensure that the system does not oscillate; then decrease the integration time to achieve both fast response characteristics and small overshoot.

Note: If the PI parameter settings are not correct, it may lead to excessive speed overshoot, and even cause overvoltage faults during overshoot recovery.

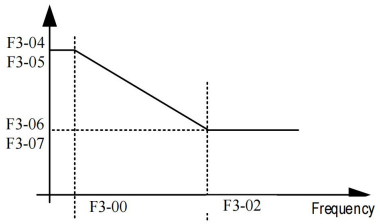


Figure 5-6. Schematic diagram of speed loop PI parameter switching

F3-08	Selection of speed loop integral attribute	**Range: 0-1**	**Factory value: 0**

0: Integration is effective during acceleration and deceleration, and the response is fast in

rapid acceleration situations, but it may lead to speed overshoot

1: Integral separation during acceleration and deceleration can effectively reduce speed overshoot in rapid acceleration scenarios, but the response speed will slow down

F3-11	Torque current regulator Kp	**Range: 0-30000**	**Factory value: 2200**
F3-12	Torque current regulator Ki	**Range: 0-30000**	**Factory value: 1500**
F3-13	Excitation current regulator Kp	**Range: 0-30000**	**Factory value: 2200**
F3-14	Excitation current regulator Ki	**Range: 0-30000**	**Factory value: 1500**

The vector control current loop uses PI adjustment parameters, which are automatically obtained after the induction motor is fully tuned and generally do not need to be modified. The integral regulator of the current loop does not use the integral time as a dimension, but directly sets the integral gain. Setting the PI gain of the current loop too high may cause the entire control loop to oscillate, so when the current oscillates or the torque fluctuation is large, you can manually reduce the PI proportional gain or integral gain here.

F3-15	vector flux brake gain	**Range: 0-200**	**Factory value: 0**

This parameter can suppress the rise of bus voltage during the deceleration process of the VFD, and the larger the value, the better the suppression effect.

Magnetic flux braking is achieved by increasing the output voltage of the VFD to increase the current at the motor end, thereby improving the ability to consume feedback energy and suppressing the rise in bus voltage. The greater the gain, the greater the motor current. Please be careful in application. Also, in situations where there is a braking resistor, it is recommended to set the value to 0, otherwise abnormal conditions may occur due to excessive deceleration current during deceleration.

F3-16	Torque correction coefficient for weak magnetic field	**Range: 50% to 200%**	**Factory value: 100%**

This parameter is used to correct the motor torque value in the constant power region and generally does not need to be modified.

F3-17	Slip compensation gain	**Range: 50% to 200%**	**Factory value: 100%**

This parameter is used to adjust the steady speed accuracy of the motor. When the speed is too high, reduce this parameter, and vice versa.

F3-18	Feedback filter time constant of speed loop	**Range: 0.000s-1.000s**	**Factory value: 0.015s**

This parameter is used to set the filtering time constant of the speed feedback value.

Increasing this value can improve the speed stability, but it will reduce the system response speed; decreasing this value can improve the system response speed, but it will reduce the speed stability. Generally, it is not necessary to modify it.

F3-19	Speed loop output filtering time constant	Range: 0.000s~1.000s	Factory value: 0.000s

This parameter is used to set the filtering time constant for the torque setpoint, which is beneficial for improving speed stability. It is generally not necessary to set this parameter.

F3-20	electric torque upper limit source	Range: 0-4	Factory value: 0

0: F3-21

1: AI1, AI straight line setting refers to F5-15 to F5-19, and multi-point curve setting refers to F5-45 and FE group

2: AI2, AI straight line setting refers to F5-20 to F5-24, and multi-point curve setting refers to F5-45 and FE group

3: Communication is given and written directly by the host computer through the communication address, which corresponds to 100% of F3-21. For details, refer to Appendix A, Modbus Communication Protocol.

4: PULSE is given, refer to the setting instructions for function codes F5-30 to F5-33

100% corresponds to F3-21

F3-21	Upper limit of electric torque	Range: 0.0% to 200.0%	Factory value: 150.0%

This parameter is used to set the upper limit of the electric torque of the VFD. When the actual direction of the motor is the same as the direction of the torque, it is electric, otherwise it is braking.

In situations where different settings are required for electric torque and brake torque, they can be set separately through F3-21 and F3-23.

Increasing the value of F3-21 can increase the electric torque; decreasing the value of F3-21 can decrease the electric torque. Increasing the value of F3-23 can increase the braking torque; decreasing the value of F3-21 can decrease the braking torque.

F3-22	Upper limit source of braking torque	Range: 0-4	Factory value: 0

0: F3-23

1: AI1, AI straight line setting refers to F5-15 to F5-19, and multi-point curve setting refers to F5-45 and FE group

2: AI2, AI line setting refers to F5-20 to F5-24, and multi-point curve setting refers to F5-45

and FE group

3: Communication is given and written directly by the host computer through the communication address, which corresponds to 100% of F3-21. For details, refer to Appendix A, Modbus Communication Protocol.

4: PULSE is given, refer to the description of function code F5-30 to F5-33 for settings 100% corresponds to F3-23

F3-23	Upper limit of braking torque	Range: 0.0% to 200.0%	Factory value: 150.0%

This parameter is used to set the upper limit of the brake torque of the VFD. When the actual direction of the motor is the same as the direction of the torque, it is electric, otherwise it is braking.

In cases where different settings are required for electric torque and brake torque, they can be set separately through F3-21 and F3-23.

For example, in cam load applications, due to the periodic changes in the electric and braking states, appropriately reducing the upper limit F3-23 of the braking torque can effectively reduce the rise in the converter bus voltage without affecting the normal operation of the load.

F3-24	Magnetizing current of synchronous motor at low speed	Range: 0.0% to 80.0%	Factory value: 25.0%

This parameter is used to set the synchronous motor low-speed magnetizing current to increase the low-speed output voltage and enhance the low-speed load capacity. This value is valid below the magnetizing cut-off frequency. If you need to increase the low-frequency starting torque, increase this value.

F3-25	Synchronous motor magnetizing cut-off frequency	Range: 0% to 100%	Factory value: 10%

This parameter is used to set the switching frequency point between the low-speed magnetizing current and the no-load current of synchronous motors. At high speeds, the magnetizing current needs to be reduced to improve the control efficiency of the VFD.

F3-26	Pre-excitation time	Range: 0.00s-5.00s	Factory value: 0.0s

In vector control, this parameter is used to set the pre-magnetization time to improve the torque characteristics during the motor start-up process.

F3-27	Initial position identification enables selection	Range: 0, 1, 2	Factory value: 1

0: The initial position is not recognized.

1: Identify the initial position method one.

2: Identify the initial position method 2.

This parameter is used for identifying the initial position of synchronous motor during open-loop vector starting. For situations where reversing is not allowed during starting and the rotor position of the motor changes after stopping, please choose identification method 1 as a priority. If the motor starts in reverse, set the identification method to 2. For situations where starting requirements are not strict, you can choose not to identify.

F3-28	Percentage of voltage given for initial position identification	**Range: 30% to 150%**	**Factory default value: 80%**

This parameter sets the given percentage of the initial position identification voltage. The smaller the given voltage, the lower the sound emitted during identification, but too small may cause inaccurate position detection. Generally, it is not necessary to modify it.

F3-29	Minimum load frequency of synchronous motor	**Range: 0.8~F0-26**	**Factory value: 2.0**
F3-30	Weak field mode of synchronous motor	**Range: 0~2**	**Factory value: 1**
F3-31	Gain coefficient of weak magnetic field	**Range: 0~50**	**Factory value: 5**
F3-32	Weak magnetic integral coefficient	**Range: 2~10**	**Factory value: 2**
F3-33	Output voltage saturation margin	**Range: 0~50**	**Factory value: 2**
F3-34	Salient pole ratio coefficient	**Range: 50~500**	**Factory value: 100**
F3-35	SVC speed filter coefficient	**Range: 10~1000**	**Factory value: 100**
F3-36	Maximum torque ratio enabled	**Range: 0~1**	**Factory value: 0**
F3-37	Voltage decoupling mode	**Range: 0~2**	**Factory value: 0**
F3-38	Z signal correction enabled	**Range: 0~1**	**Factory value: 0**
F3-39	Anti-reverse function enabled	**Range: 0~1**	**Factory value: 0**

5.5 Parameters of the first motor in Group F4

F4-00	Motor parameter tuning	**Range: 0-2**	**Factory value: 0**

Tip: Before tuning, you must set the correct motor rated parameters (F4-01 to F4-06)

0: No operation, that is, tuning is prohibited.

1: Static tuning, suitable for situations where the motor and load cannot be easily disconnected and cannot be tuned for rotation.

Action description: Set the function code to 1, and press the RUN button to confirm. The VFD

will then perform a stationary tuning.

2: Rotary tuning

To ensure the dynamic control performance of the VFD, please select rotary tuning. During rotary tuning, the motor must be disconnected from the load (no load).

After selecting rotation tuning, the VFD first performs static tuning, and after the static tuning is complete, the motor follows the acceleration set by F4-12

Accelerate to 80% of the rated frequency of the motor and maintain it for a period of time, then decelerate to zero speed according to the deceleration set in F4-13, and the rotation tuning is complete.

Action description: Set the function code to 2, and press the RUN button to confirm. The VFD will then perform rotational tuning.

Tuning operation instructions:

When F4-00 is set to 1 or 2 and then pressed ENTER, "TUNE" flashes and then press RUN to start tuning parameters. The displayed "TUNE" stops flashing. When tuning is complete, the display returns to the shutdown state interface. During tuning, you can press STOP to abort tuning.

When tuning is complete, the value of F4-00 automatically returns to 0.

F4-01	Rated power of motor 1	**Range: 0.1kW-1000.0kW**	**Factory value: determined by model**
F4-02	Rated voltage of motor 1	**Range: 1V~1500V**	**Factory value: 380V**
F4-03	Motor 1 pole number	**Range: 2-64**	**Factory value: determined by model**
F4-04	Rated current of motor 1	**Range: 0.1A<1></1>-6000.0A<1></1>**	**Factory value: determined by model**
F4-05	Rated frequency of motor 1	**Range: 0.01Hz ~ F0-14**	**Factory value: 50.00 Hz**
F4-06	Rated speed of motor 1	**Range: 0RPM-60000RPM**	**Factory value: related to the model**

<1>When the rated power of the motor F4-01 is less than or equal to 30 kW, F4-4 is a two-digit decimal point. When F4-01 is greater than 30 kW, it is a one-digit decimal point.</1>

The above function codes are parameters on the motor nameplate, and regardless of whether V/F or vector control is used, the relevant parameters need to be accurately set based on the motor nameplate.

To achieve better V/F or vector control performance, motor parameter tuning is required, and the accuracy of the tuning results is closely related to the correct setting of the motor

nameplate parameters.

F4-07	No-load current of motor 1	**Range: 0.01A～F4-04<1></1>**	**Factory value: determined by model**
F4-08	Motor 1 stator resistance	**Range: 0.001Ω<2></2>-65.535Ω<2></2>**	**Factory value: determined by model**
F4-09	Motor 1 rotor resistance	**Range: 0.001Ω～65<2></2>.535Ω<2></2>**	**Factory value: determined by model**
F4-10	Mutual inductance of motor 1	**Range: 0.1mH to 6553.5 mH<2></2>**	**Factory value: determined by model**
F4-11	Motor 1 has leakage inductance	**Range: 0.01mH<2></2>-655.35mH<2></2>**	**Factory value: determined by model**

<1>When the rated power of the motor is F4-01>30kW, F4-4 is one decimal point, and when F4-01<=30kW, it is two decimal points.</1>

<2>When the rated power of the motor is F4-01>30kW, add one digit to the decimal point. When F4-01<=30kW, the number of decimal points is as shown in the table.</2>

The function code parameters F4-07 to F4-11 are not usually found on the motor nameplate, and need to be obtained through VFD tuning. Among them, "stationary tuning" can only obtain the values of the three parameters F4-07 to F4-09, while "rotational tuning" obtains the values of all five function codes.

Note: When modifying F4-01, the values of motor parameters F4-02 to F4-11 will change accordingly.

F4-12	Acceleration during dynamic full tuning	**Range: 1.0s-6000.0s**	**Factory value: 10.0s**
F4-13	Deceleration during dynamic full tuning	**Range: 1.0s-6000.0s**	**Factory value: 10.0s**

The above function codes are the acceleration and deceleration times for the complete tuning of the motor. Users can set this parameter reasonably based on the actual situation of the motor.

F4-17	Stator resistance of synchronous motor	**Scope:** 0.001Ω<3></3>-65.535Ω<3></3>	**Factory value: determined by model**

F4-18	Synchronous motor D-axis inductance	**Scope:** 0.01mH<3></3>-655.35mH<3></3>	**Factory value: determined by model**
F4-19	Inductance of synchronous motor Q-axis	**Scope:** 0.01mH<3></3>-655.35mH<3></3>	**Factory value: determined by model**
F4-20	Back electromotive force of synchronous motor	**Range: 0V-690V**	**Factory value: determined by model**

<3>When the rated power of the motor is F4-01>30kW, add one digit to the decimal point. When F4-01<=30kW, the number of decimal points is as shown in the table.</3>

The F4-17-F4-20 function code parameters are not usually found on the motor nameplate, and need to be obtained through VFD tuning. Among them, "stationary tuning" can only obtain the values of the three parameters F4-17-F4-19, while "rotational tuning" obtains the values of all four function codes.

Note: If the site cannot perform rotational tuning, the value of F4-20 can be calculated using the following formula based on the parameters on the motor nameplate:
1. F4-20=Ke*nN*2π/60; Ke: the coefficient of back electromotive force marked on the nameplate;
2. F4-20=E, *nN /1000; E, (V/1000r/min): the nameplate indicates the back EMF, nN: rated speed
3. F4-20=P/1.73*I; P: rated power of the motor, I: rated current of the motor.

F4-21	No-load current of synchronous motor	**Range: 0.0% to 50.0%**	**Factory value: 5.0%**

This value is used to set the high-speed excitation current of synchronous motors to increase their load-carrying capacity.

5.6 Input terminal of F5 group

The VFD is equipped with seven multi-function digital input terminals (including HDI, which can be used as a high-speed pulse input terminal) and two analog input terminals.

F5-00	Function of DI1 terminal	**Range: 0-53**	**Factory value: 1**
F5-01	Function of DI2 terminal	**Range: 0-53**	**Factory value: 2**
F5-02	Function of DI3 terminal	**Range: 0-53**	**Factory value: 9**
F5-03	Function of DI4 terminal	**Range: 0-53**	**Factory value: 12**
F5-04	DI5 terminal function	**Range: 0-53**	**Factory value: 13**
F5-05	Function of DI6 terminal	**Range: 0-53**	**Factory value: 0**
F5-06	HDI terminal function	**Range: 0-53**	**Factory value: 0**

This parameter is used to set the corresponding functions of the digital multi-function input

terminal, as shown in Table 5-1.

Table 5-1 Function description of DI terminal

Set value	Function:	Explanation
0	No function	Even if there is a signal input to the VFD, it will not operate. You can set the unused segments to be non-functional to prevent malfunction.
1	Forward rotation (FWD)	The forward and reverse rotation of the VFD is controlled through external terminals.
2	Reverse operation (REV)	
3	three-wire operation control	The terminal is used to determine the operation mode of the VFD as a three-wire control mode.
4	Forward jogging (FJOG)	FJOG is for jogging forward operation, and RJOG is for jogging reverse operation. For the frequency and jogging acceleration/deceleration time during jogging operation, refer to the detailed descriptions of function codes F7-00, F7-01, and F7-02.
5	Reverse jogging (RJOG)	
6	Terminal UP	When this function is enabled, the external terminal will modify the frequency increment and decrement commands based on the given frequency. When the frequency source is set to digital, the set frequency can be adjusted up or down. The Up/Down change rate is set by F5-12.
7	Terminal DOWN	
8	Free parking	The VFD locks out the output, and the motor's parking process is not controlled by the VFD. This is often used for large inertia loads and when there is no requirement for parking time.
9	Fault reset (RESET)	External fault reset function. It is the same as the RESET button on the keyboard.
10	Operation suspension	The VFD slows down and stops, but all operating parameters are in memory state, such as PLC parameters, pendulum frequency parameters, and PID parameters. After this signal disappears, the VFD resumes operation to the state before stopping.
11	External fault normally open input	When the external fault signal is sent to the VFD, the VFD reports a fault and shuts down.
12	Multi-speed terminal 1	A total of 16 segments can be set through the combination of digital states of these four terminals. The detailed combinations are shown in Table 5-2
13	Multi-speed terminal 2	
14	Multi-speed terminal 3	
15	Multi-speed terminal 4	
16	Selection terminal 1 for acceleration and deceleration time	Four acceleration and deceleration time settings can be selected through the combination of digital states of these two terminals. The detailed combinations are shown in Table 5-3
17	Selection terminal 2 for acceleration and deceleration time	
18	Switching of frequency source	The main frequency source X and the F0-10 setting are switched by switching the frequency source through this terminal.

Set value	Function:	Explanation
19	UP/DOWN set to zero (terminal,keyboard)	This terminal can be used to clear the frequency value changed by UP/DOWN, restoring the given frequency to the value set by F0-11.
20	Run the command to switch terminals	When the command source is not the keyboard, this terminal can be used to switch between terminal control and keyboard control. When it is for communication, this terminal can be used to switch between communication and keyboard control
21	Prohibition of acceleration and deceleration	Ensure that the VFD is not affected by external signals (except for shutdown commands) and maintains the current output frequency.
22	PID failure (pause)	When the frequency source F0-06 is a PID, the PID failure will cause the VFD to maintain the current frequency output.
23	PLC status reset	The PLC pauses during execution, and can be effectively restored to the initial state of the simple PLC through this terminal when it is run again.
24	Pendulum frequency pause	Pause the frequency adjustment, and the VFD will output at the center frequency.
25	Timer trigger input	Timer input signal. When the effective time of this signal reaches the set closing and opening time, the timing output function is valid. It needs to be used in conjunction with Y1 output function No. 17 and F7-39, F7-40.
26	immediate DC braking	When the terminal is valid, the VFD will immediately apply DC braking, with the braking current set to F1-16
27	External fault normally closed input	When an external fault signal is sent to the VFD, the VFD reports an Err28 fault and shuts down according to the shutdown mode set by F9-23.
28	counter input	The terminal for counting pulse input, which is used in conjunction with Fb-08 to achieve the function of setting the count value
29	Reset the counter	Reset the counter value
30	Length count input	The input terminal of length counting, which is used in conjunction with Fb-05 to Fb-07 to achieve the fixed length function
31	Reset length	Reset the length
32	Torque control disabled	Forbid the converter to use torque control mode, and switch the converter to speed control.
33	PULSE frequency input	For pulse input terminal (only valid for HDI)
34	Frequency modification prohibited	When the terminal is valid, the VFD does not respond to changes in frequency.
35	PID action direction is reversed	When the terminal is valid, the direction of PID action is opposite to the direction set by FA-04
36	External parking terminal 1	When the command source F0-04 is the operation panel, this terminal can be used to stop the VFD, which is equivalent to the function of the STOP button on the keyboard.

Set value	Function:	Explanation
37	Control command switch terminal 2	Used for switching between terminal control and communication control.
38	PID integration pause	The terminal is valid, and the PID integral adjustment is paused, but the PID proportional adjustment and derivative adjustment functions are still valid.
39	Frequency source X and preset frequency switch terminal	If the terminal is valid, frequency source X will be replaced with preset frequency (F0-11)
40	Frequency source Y and preset frequency switch terminal	If the terminal is valid, the frequency source Y will be replaced with the preset frequency (F0-11)
41	Switching between motor 1 and motor 2	Realize the switching of parameters between motor 1 and motor 2
42	Keep it	
43	PID parameter switching terminal	When the terminal is invalid, the first set of PID parameters is used, and when it is valid, the second set of PID parameters is used. See the FA group description for details.
44	Speed control/torque control switch	Switch the VFD between torque control and speed control modes. When this terminal is inactive, the VFD operates in the mode defined by Fd-10 (speed/torque control mode). When this terminal is active, it switches to another mode.
45	Emergency stop	When the terminal is active, the VFD stops at the fastest speed, and the current during the stop is at the set upper limit. This function is used to meet the requirement that the VFD needs to stop as soon as possible when the system is in an emergency state.
46	External parking terminal 2	In any control mode (panel control, terminal control, communication control), this terminal can be used to slow down the VFD and stop it. The deceleration time is fixed at deceleration time 2 (F7-04).
47	Deceleration DC brake	When the terminal is active, the VFD first slows down to the DC braking starting frequency for shutdown, and then switches to DC braking state.
48	This operation time is reset	When this terminal is active, the timing of the current operation of the VFD is reset. This function requires coordination with the scheduled operation (F7-36) and the current operation time setting (F7-38).
49	Two-wire/three-wire system switching	Used to switch between two-wire control mode and three-wire mode.
50	No Reversal	This terminal is valid and prohibits the VFD from reversing
51	User-defined fault 1	When the fault setting terminal is valid, the VFD

Set value	Function:	Explanation
		outputs the Err30 fault
52	User-defined fault 2	When the fault setting terminal is valid, the VFD outputs Err31 fault
53	sleep input	The sleep function is controlled by external terminals to be effective or ineffective, that is, when the switch is closed, the sleep function is forced to be effective, and when the switch is disconnected, the VFD is forced to exit the sleep state and enter the awake running state (independent of PID operation).

Table 5-2 Function Description of Multi-segment Instruction

K4	K3	K2	K1	frequency setting	Corresponding parameters
OFF.	OFF.	OFF.	OFF.	Multi-speed 0	FC-00
OFF.	OFF.	OFF.	ON.	Multi-speed 1	FC-01
OFF.	OFF.	ON is	OFF.	Multi-speed 2	FC-02
OFF.	OFF.	ON is	ON is	Multi-speed 3	FC-03
OFF.	ON.	OFF.	OFF.	Multi-speed 4	FC-04
OFF.	ON is	OFF.	ON.	Multi-speed 5	FC-05
OFF.	ON.	ON is	OFF.	Multi-speed 6	FC-06
OFF.	ON is	ON.	ON.	Multi-speed 7	FC-07
ON.	OFF.	OFF.	OFF.	Multi-speed 8	FC-08
ON.	OFF.	OFF.	ON.	Multi-speed 9	FC-09
ON.	OFF.	ON.	OFF.	Multi-speed 10	FC-10
ON.	OFF.	ON.	ON.	Multi-speed 11	FC-11
ON is	ON.	OFF.	OFF.	Multi-speed 12	FC-12
ON is	ON is	OFF.	ON.	Multi-speed 13	FC-13

K4	K3	K2	K1	frequency setting	Corresponding parameters
ON.	ON is	ON is	OFF.	Multi-speed 14	FC-14
ON is	ON is	ON is	ON.	Multi-speed 15	FC-15

The four multi-segment instruction terminals can be combined into 16 states, which correspond to 16 instruction set values, as shown in Table 5-2.

Table 5-3 Function description of acceleration and deceleration time selection terminal

Terminal 2	Terminal 1	Selection of acceleration and deceleration time	Corresponding parameters
OFF.	OFF.	Acceleration and deceleration time 1	F0-23, F0-24
OFF.	ON.	Acceleration and deceleration time 2	F7-03, F7-04
ON.	OFF.	Acceleration and deceleration time 3	F7-05, F7-06
ON is	ON is	Acceleration and deceleration time 4	F7-07, F7-08

F5-10	Filtering time of DI terminal	**Range: 0.000s-1.000s**	**Factory value: 0.010s**

Set the sensitivity of the DI terminal. If the digital input terminal is susceptible to interference and causes malfunctions, increasing this parameter increases the anti-interference capability, but reduces the sensitivity of the DI terminal.

F5-11	Terminal command mode	**Range: 0-3**	**Factory value: 0**

This parameter defines four different ways to control the operation of the VFD through external terminals.

0: Two-wire operation mode 1: This mode is the most commonly used two-wire mode. The forward and reverse rotation of the motor is determined by the FWD and REV terminal commands.

k1	k2	Command
0	0	Stop
1	0	Forward
0	1	Reverse
1	1	Stop

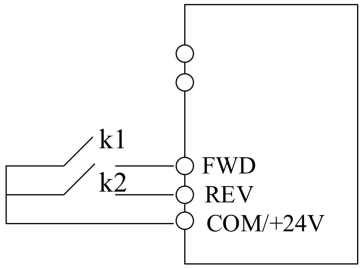


Figure 5-7. Two-line operation mode 1

1: Two-wire operation mode 2: When using this mode, FWD is the enable terminal. The direction is determined by the state of REV.

k1	k2	Command
0	0	Stop
0	1	Stop
1	0	Forward
1	1	Reverse

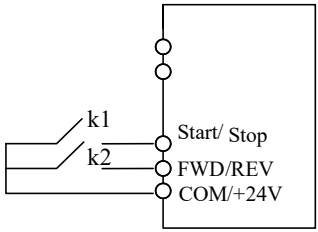


Figure 5-8. Two-line operation mode 2

2: Three-wire operation mode 1: This mode uses Din as the enable terminal, with direction controlled by FWD and REV. However, the pulse is valid and must be completed by disconnecting the Din terminal signal when stopping.

SB1	Stop button
SB2	FWD button
SB3	REV button

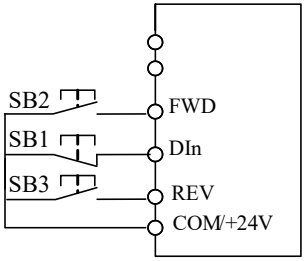


Figure 5-9. Three-wire operation mode 1

Among them:

SB1: Stop button

SB2: Forward rotation button

SB3: Reverse button

Din is a multi-function input terminal for DI1-HDI, and its corresponding terminal function should be defined as function No. 3 "three-wire"

mode operation control".

3: Three-wire operation mode 2: The enable terminal for this mode is Din, the operation command is given by FWD, and the direction is given by the REV state.

state to decide.

The shutdown command is completed by disconnecting the Din signal.

K	Direction select
0	Forward
1	Reverse

SB1	SB2
Stop button	Run button

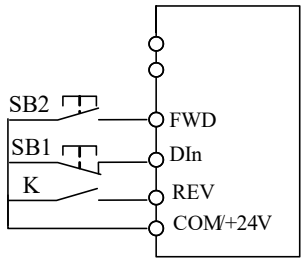


Figure 5-10. Three-wire operation mode 2

Among them:

SB1: Stop button

SB2: operation button

Din is a multi-function input terminal for DI1-HDI, and its corresponding terminal function should be defined as function No. 3 "three-wire operation control".

F5-12	Rate of change of terminal UP/DOWN	**Range: 0.01Hz/s-100.00Hz/s**	**Factory value: 1.00Hz/s**

The terminal UP/DOWN is used to adjust the change rate when setting the frequency.

F5-13	Terminal effective logic 1	**Range: 00000-11111**	**Factory value: 00000**

0: high level

1: Low level

Unit digit: DI1

Ten: DI2

Hundreds: DI3

Thousand digit: DI4

Ten-thousand digit: DI5

Selection of effective level for DI1-DI5 terminals.

Used to set the valid state mode of the digital input terminal.

When selected as high-level active, the corresponding DI terminal is valid when connected to COM, and is invalid when disconnected.

When selected as low-level active, the corresponding DI terminal is inactive when connected to COM, and is active when disconnected.

F5-15	Minimum input value of AI1	**Range: 0.00V-10.00V**	**Factory value: 0.00V**
F5-16	The minimum input of AI1 corresponds to the setting	**Range: -100.0% to 100.0%**	**Factory value: 0.0%**
F5-17	Maximum input value of AI1	**Range: 0.00V~10.00V**	**Factory value: 10.00V**
F5-18	Corresponding setting for maximum input of AI1	**Range: -100.0% to 100.0%**	**Factory value: 100.0%**
F5-19	AI1 input filtering time	**Range: 0.00s-10.00s**	**Factory value: 0.10s**

The above function code defines the relationship between the analog input voltage and the set value represented by the analog input. When the analog input voltage exceeds the set maximum or minimum input range, the external part will be calculated based on the maximum or minimum input.

When the analog input is a current input, 1mA current is equivalent to 0.5V voltage. (The AI2 setting is the same as the AI1 setting.)

In different application scenarios, the nominal value corresponding to the simulated setting of 100% varies. Please refer to the descriptions of each application section for specific information. The following examples illustrate several settings:

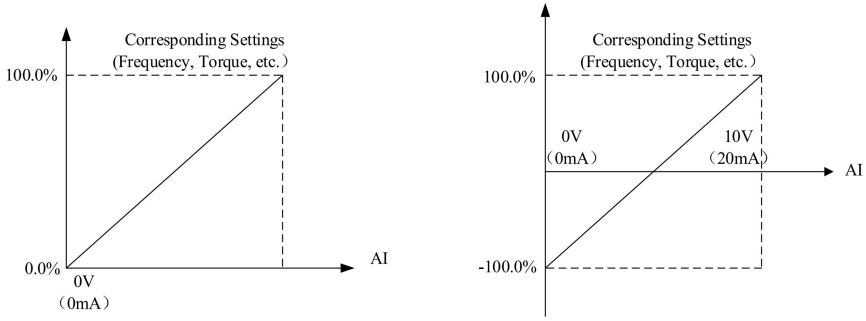


Figure 5-11. Correspondence between the simulated given and set quantities

F5-20	Minimum input value of AI2	**Range: 0.00V-10.00V**	**Factory value: 0.00V**
F5-21	The minimum input of AI2 corresponds to the setting	**Range: -100.0% to 100.0%**	**Factory value: 0.0%**
F5-22	Maximum input value of AI2	**Range: 0.00V-10.00V**	**Factory value: 10.00V**
F5-23	The maximum input corresponding to AI2 setting	**Range: -100.0% to 100.0%**	**Factory value: 100.0%**
F5-24	AI2 input filtering time	**Range: 0.00s-10.00s**	**Factory value: 0.10s**

Same as AI1.

F5-30	Minimum frequency of PULSE input	**Range: 0.00KHz~50.00KHz**	**Factory value: 0.00KHz**
F5-31	The minimum frequency corresponding to the PULSE input is set.	**Range: -100.0% to 100.0%**	**Factory value: 0.0%**
F5-32	Maximum frequency of PULSE input.	**Range: 0.00KHz-100.00KHz**	**Factory value: 50.00KHz**
F5-33	Corresponding setting for maximum frequency of PULSE input.	**Range: -100.0% to 100.0%**	**Factory value: 100.0%**
F5-34	PULSE input filtering time	**Range: 0.00s-10.00s**	**Factory value: 0.10s**

PULSE input quantization is similar to analog input quantization.

F5-35	DI1 opening delay time	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F5-36	DI1 disconnection delay time	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F5-37	DI2 opening delay time	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F5-38	DI2 disconnection delay time	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F5-39	DI3 opening delay time	**Range: 0.0s~3600.0s**	**Factory value: 0.0s**
F5-40	DI3 disconnection delay time	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**

Used to set the delay time for the VFD to respond to changes in the DI terminal status.

Currently, only DI1, DI2, and DI3 have the function of setting delay time.

F5-41	Function selection when AI1 is used as a DI terminal	**Range: 0-53**	**Factory value: 0**
F5-42	Function selection when AI2 is used as a DI terminal	**Range: 0-53**	**Factory value: 0**

This parameter sets whether to use AI as a digital DI terminal. When AI is used as a digital DI

terminal, its function is exactly the same as that of a normal DI.

It is important to note that the input range of AI remains unchanged at 0-10V. When the AI voltage is greater than 6V, it is high level, and when it is less than 4V, it is low level. There is a 2V hysteresis in the middle. That is, when AI rises from 0V to >6V, it is high level, and when it decreases from >6V to 4V, it is low level.

F5-44	Selection of effective modes for AI as DI terminal	Range: 0X00-0X11	Factory value: 0X00

This parameter is used to set the level selection when AI is used as a digital DI terminal.

0: High level is valid. When AI rises from 0V to >6V, it is high level, and when it decreases from >6V to 4V, it is low level.

1: Low level is valid. When AI rises from 0V to <6V, it is low level, and when it decreases from >6V to 4V, it is low level.

Unit digit, AI1:

Ten, AI2:

F5-45	AI curve selection	Range: 00-22	Factory value: 00

This parameter is used for AI curve selection. 0 is a straight line, and 1 and 2 are both 4-point curves. Each curve has a corresponding function code setting.

Unit digit: AI1

0:2 point straight line F5-15 ~ F5-19

1: Multi-point curve 1: FE-00 ~ FE-07

2: Multi-point curve 2: FE-08 ~ FE-15

Ten: AI2

0:2 point straight line F5-20 ~ F5-24

1: Multi-point curve 1: FE-00 ~ FE-07

2: Multi-point curve 2: FE-08 ~ FE-15

Hundreds: reserved

F5-46	Selection of AI signal input type	Range: 00-11	Factory value: 00

This parameter is used to set the AI signal input type. The selection of the AI input signal type needs to be in one-to-one correspondence with the hardware AI input type (voltage type, current type), which is beneficial for improving the accuracy and linearity of the AI signal sampling.

Unit digit: AI1, tens digit: AI2; 0: voltage type, 1: current type

5.7 F6 group output terminal

The VFD is equipped with two multi-function analog output terminals, one multi-function digital output terminal, and two multi-function relay output terminals as standard.

F6-00	Output selection of control board relay RELAY1	**Range: 0-45**	**Factory value: 2**
F6-01	Output selection of control board relay RELAY2	**Range: 0-45**	**Factory value: 1**
F6-02	Y1 output selection	**Range: 0-45**	**Factory value: 1**

The function selection of the multi-function output terminal is as follows:

Set value	Functions:	Description:
0	Non-functional	Terminal output has no function
1	The VFD is running	Indicates that the VFD is running and has an output frequency (which can be zero). At this time, the output ON signal is sent.
2	Fault output	When the VFD fails, it outputs the ON signal
3	Frequency level detection FDT1 arrived	Please refer to the detailed descriptions of function codes F7-22 and F7-23.
4	Frequency arrival	For detailed instructions, refer to F7-24.
5	Zero speed operation	When the VFD is running and the output frequency is zero, the ON signal is output
6	Motor overload pre-alarm	Before the motor overload protection, it is judged according to the warning threshold value, and the ON signal is output after exceeding the forecast setting value. For details, refer to F9-00 to F9-02.
7	Overload pre-alarm of VFD	Output ON signal 10 seconds before the overload protection of the VFD occurs
8	PLC cycle is completed	When the simple PLC completes a cycle, it outputs a pulse signal with a width of 250ms
9	Accumulated running time reached	The VFD outputs an ON signal when the cumulative running time exceeds the set time, and the cumulative set time is set by F7-20
10	In frequency limit	When the set frequency exceeds the upper and lower frequency limits and the VFD output frequency reaches the upper and lower frequency limits, the ON signal is output
11	Ready for operation	The main circuit and control circuit power are established, the VFD protection function does not operate, the VFD is in an operational state, and the output ON signal is generated
12	AI1>AI2	When the value of analog input AI1 is greater than the other input AI2, the ON signal is output
13	Upper limit frequency reached	When the operating frequency reaches the upper limit frequency F0-16, output the ON signal
14	Lower limit frequency reached	When the operating frequency reaches the lower limit frequency F0-18, output the ON signal
15	Output of undervoltage state	When the VFD is in an undervoltage state, it outputs an ON signal
16	Communication Settings	For communication settings, please refer to Appendix A for communication protocol

Set value	Functions:	Description:
17	Timer output	When the timer can achieve the function of a time relay, and when the effective time of the timer input signal reaches the set closing and opening time, the timer output function is valid. It needs to be used in conjunction with the DI input function No. 25 and F7-39, F7-40.
18	In reverse operation	When the VFD is in reverse operation, it outputs an ON signal.
19	Keep it	
20	Set length reached	When the detected actual length exceeds the set length, output the ON signal
21	In torque limit	When the torque limit function is activated, the stall protection function will automatically operate
22	Current 1 arrived	Please refer to the descriptions of function codes F7-45 and F7-46.
23	Frequency 1 arrived	Please refer to the descriptions of function codes F7-43 and F7-44.
24	Module temperature reached	When the inverter module radiator temperature (F7-32) reaches the set module temperature limit (F7-69), the ON signal is output
25	In the process of load shedding	When the VFD is in the load-shedding state, it outputs the ON signal.
26	Accumulated power-on time reached	When the cumulative power-on time of the VFD (F7-33) exceeds the power-on arrival time set by F7-51, the ON signal is output.
27	This operation time has arrived	When the timing function selection (F7-36) is valid, the VFD outputs an ON signal after the current running time reaches the set timing time (F7-38).
28	keep it	
29	Set the count value to reach	When the count reaches the value set by Fb-08, the ON signal is output.
30	The specified count value has been reached	When the detected actual length count reaches the length count set by Fb-09, the ON signal is output.
31	Motor 1, Motor 2 indication	When the current motor is the No. 2 motor, the ON signal is output.
32	Holding brake control output	When the holding brake is effective, the ON signal is output. See the L5 group settings for details.
33	Zero speed operation 2	When the output frequency of the VFD is 0, the output ON signal is ON. This signal is also ON in the shutdown state.
34	Frequency level detection FDT2 arrived	Please refer to the descriptions of function codes F7-55 and F7-56.
35	zero current state	Please refer to the descriptions of function codes F7-59 and F7-60.
36	Software current overrun	Please refer to the descriptions of function codes F7-61 and F7-62.
37	When the lower limit frequency is reached, the	When the operating frequency reaches the lower limit frequency, the ON signal is output. This signal

Set value	Functions:	Description:
	shutdown is also output	is also ON in the shutdown state.
38	alarm output	When the VFD fails and the handling mode for the failure is to continue running, the VFD will output an alarm.
39	keep it	
40	AI1 input overrun	When the value of analog input AI1 is less than F7-67 (AI1 input protection lower limit) or greater than F7-68 (AI1 input protection upper limit), the ON signal is output.
41-42	Keep it	
43	The frequency reaches 2	Please refer to the descriptions of function codes F7-57 and F7-58.
44	The current reaches 2	Please refer to the descriptions of function codes F7-63 and F7-64.
45	Fault output (no output under voltage)	When the VFD fails and is not an undervoltage fault, the ON signal is output.

F6-04	FM terminal output mode selection	**Range: 0-1**	**Factory value: 0**
F6-05	FMR output selection	**Range: 0-45**	**Factory value: 0**

The FM terminal can be used as a high-speed pulse terminal FMP (F6-04=0) or as a switch output terminal with open collector (F6-04=1). When the FM terminal is used as an FMP, its maximum output frequency is set by F6-12, and its corresponding function output is set by F6-11.

F6-09	AO1 output selection	**Range: 0-16**	**Factory value: 0**
F6-10	AO2 output selection	**Range: 0-16**	**Factory value: 0**
F6-11	FMP output selection	**Range: 0-16**	**Factory value: 0**

The output range of analog output AO1 and AO2 is 0V-10V or 0mA-20mA.

The range of analog output and the calibration relationship with corresponding functions are shown in the following table:

Set value	Function:	Function range (corresponding to 0.0% to 100.0% of pulse or analog output)
0	Operating frequency	0 to maximum output frequency, i.e. 100% corresponds to the maximum frequency
1	Set frequency	0 to maximum output frequency, i.e. 100% corresponds to the maximum frequency
2	Output current	0-2 times of the rated current of the motor, that is, 100% corresponds to 2 times of the rated current of the motor
3	Output power	0 to 2 times the rated power, which is 100% corresponding to 2 times the rated power of the motor
4	Output voltage	0-1.2 times the rated voltage of the VFD, that is, 100% corresponds to 1.2 times the rated voltage of the VFD
5	AI1	0V-10V (or 0-20mA), that is, 100% corresponds to 10V or 20mA
6	AI2	0V-10V (or 0-20mA), that is, 100% corresponds to 10V or 20mA

Set value	Function:	Function range (corresponding to 0.0% to 100.0% of pulse or analog output)
7	Communication Settings	0.0% to 100.0%, please refer to Appendix A "Modbus Communication Protocol" for use
8	Output torque (absolute value)	0-2 times the rated torque of the motor, that is, 100% corresponds to 2 times the rated torque of the motor
9	Length:	0-2 times the set length, that is, 100% corresponds to 2 times the set length
10	Count value	0 to 2 times the set count value, that is, 100% corresponds to 2 times the set count value
11	Motor speed	The speed corresponding to 0-maximum frequency F0-14, that is, 100% corresponds to the speed corresponding to F0-14
12	BUS voltage	0V~1000V, that is, 100% corresponds to 1000V
13	PULSE pulse input	0.01kHz-100.00kHz
14	Output current	100% corresponds to 1000.0A
15	Output voltage	0V-1000V, that is, 100% corresponds to 1000V
16	Output torque (actual value)	-2 times the rated torque of the motor to 2 times the rated torque of the motor

F6-12	Maximum frequency output of FMP	**Range: 0.01-100.00 KHz**	**Factory value: 50.00 KHz**
F6-13	Lower limit of AO1 output	**Range: -100.0% to F6-15**	**Factory value: 0.0%**
F6-14	The lower limit corresponds to the AO1 output	**Range: 0.00V-10.00V**	**Factory value: 0.00V**
F6-15	Upper limit of AO1 output	**Range: F6-13 to 100.0%**	**Factory value: 100.0%**
F6-16	Upper limit corresponds to the AO1 output	**Range: 0.00V~10.00V**	**Factory value: 10.00V**
F6-17	Lower limit of AO2 output	**Range: -100.0% to F6-19**	**Factory value: 0.0%**
F6-18	The lower limit corresponds to the AO2 output	**Range: 0.00V-10.00V**	**Factory value: 0.00V**
F6-19	Upper limit of AO2 output	**Range: F6-17-100.0%**	**Factory value: 100.0%**
F6-20	The upper limit corresponds to the AO2 output	**Range: 0.00V-10.00V**	**Factory value: 10.00V**

The above function code defines the correspondence between the output value and the analog output. When the output value exceeds the set maximum or minimum output range, the upper limit output or lower limit output is calculated.

When the analog output is a current-type output, 1mA current corresponds to 0.5V voltage. In different application scenarios, the analog output corresponding to 100% of the output value varies. As shown in Figure 5-12 below, there are two different linear graphs, a and b.

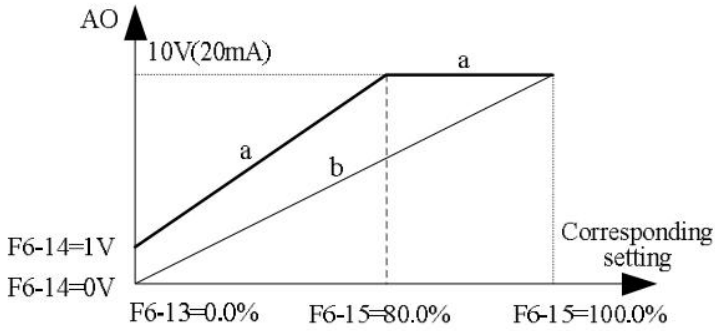


Figure 5-12. Corresponding relationship between the upper and lower limits of analog output

F6-21	Main relay T pull-in delay	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F6-22	Main relay R pull-in delay	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F6-23	Y1 high level output delay	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F6-26	The main relay T is disconnected with a delay	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F6-27	Main relay R disconnection delay	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**
F6-28	Y1 low-level output delay	**Range: 0.0s-3600.0s**	**Factory value: 0.0s**

Used to set the delay time for the VFD to respond to changes in the status of the Y terminal or changes in the output status of the relay for different output states.

5.8 Group F7: Accessibility and Keyboard Display

F7-00	Jogging operation frequency	**Range: 0.00Hz ~ F0-14**	**Factory value: 6.00Hz**
F7-01	inching acceleration time	**Range: 0.0-3000.0s**	**Factory value: 10.0s**
F7-02	Inching deceleration time	**Range: 0.0-3000.0s**	**Factory value: 10.0s**

Define the given frequency and acceleration/deceleration time of the VFD during inching. The inching process is started and stopped according to the start mode 0 (F1-00, direct start) and the stop mode 0 (F1-13, deceleration stop).

Jog acceleration time refers to the time required for the VFD to accelerate from 0Hz to the maximum output frequency (F0-14).

Jog deceleration time refers to the time required for the VFD to decelerate from the maximum output frequency (F0-14) to 0Hz.

F7-03	Acceleration time 2	**Range: 0.0-3000.0s**	**Factory value: 10.0s**
F7-04	Deceleration time 2	**Range: 0.0~3000.0s**	**Factory value: 10.0s**
F7-05	Acceleration time 3	**Range: 0.0-3000.0s**	**Factory value: 10.0s**
F7-06	Deceleration time 3	**Range: 0.0~3000.0s**	**Factory value: 10.0s**

F7-07	Acceleration time 4	**Range: 0.0-3000.0s**	**Factory value: 10.0s**
F7-08	Deceleration time 4	**Range: 0.0-3000.0s**	**Factory value: 10.0s**

The acceleration and deceleration time can be selected from F0-23, F0-24, and the three acceleration and deceleration times mentioned above. Their meanings are the same. Please refer to the relevant descriptions of F0-23 and F0-24.

The acceleration and deceleration time 1-4 during the operation of the VFD can be selected through different combinations of the multi-function digital input terminal DI. Please refer to function codes F5-00-F5-04.

F7-09	Jump frequency 1	**Range: 0.00Hz-F0-14**	**Factory value: 0.00Hz**
F7-10	Jump frequency 1 amplitude	**Range: 0.00Hz-F0-14**	**Factory value: 0.00Hz**
F7-11	Jump frequency 2	**Range: 0.00Hz-F0-14**	**Factory value: 0.00Hz**
F7-12	Jump frequency 2 amplitude	**Range: 0.00Hz-F0-14**	**Factory value: 0.00Hz**

When the set frequency is within the jump frequency range, the actual operating frequency will operate at the jump frequency boundary closer to the set frequency. By setting the jump frequency, the VFD can avoid the mechanical resonance point of the load. This VFD can set up 2 jump frequency points. If the two adjacent jump frequencies are set to the same value, this function will not work at that frequency.

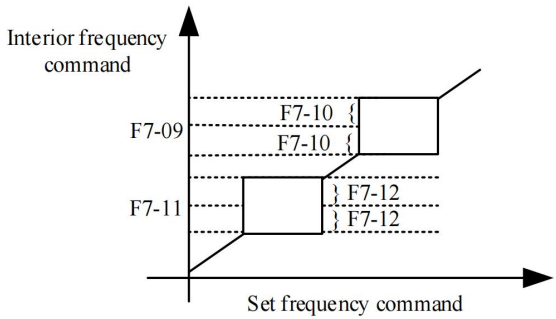


Figure 5-13. Jump frequency diagram

F7-15	Positive and negative rotation dead zone time	**Range: 0.0s-3000.0s**	**Factory value: 0.0s**

Set the transition time at the output zero frequency during the forward and reverse rotation transition process of the VFD, as shown in the following figure:

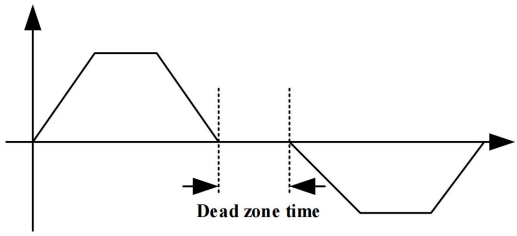


Figure 5-14. Diagram of forward and reverse rotation dead zone time

F7-16	Select the precision of the keyboard knob	Range: 0-10	Factory value: 0

This parameter is used to define the resolution for adjusting the set frequency in the monitor menu mode of the operation keyboard. When operating the Up/Down buttons, the frequency is added or subtracted at the set resolution.
0: default mode
1: 0.1Hz
2: 0.5Hz
3: 1Hz
4: 2Hz
5: 4Hz
6: 5Hz
7: 8Hz
8: 10Hz
9:0.01Hz
10:0.05Hz

F7-17	Process the frequency below the lower limit frequency	Range: 0-2	Factory value: 0

0: Operating at the lower limit frequency

1: Stop

2: Zero speed operation

Select the operating state of the VFD when the set frequency is below the lower limit frequency. To avoid the motor running at low speed for a long time, this function can be used to select shutdown.

F7-18	Sag rate	Range: 0.0% to 100.0%	Factory value: 0.0%

This function is generally used for load distribution when multiple motors are driving the same load.

Droop control refers to the reduction in the output frequency of a VFD as the load increases. When multiple motors are driving the same load, the output frequency of the motors in the load decreases even more, thereby reducing the load on that motor and achieving uniform

load distribution among multiple motors.

This parameter refers to the decrease in output frequency when the VFD is outputting rated load.

F7-19	Delay time for shutdown when the frequency is lower than the lower limit	Range: 0.0s-600.0s	Factory value: 0.0s

When the set frequency is lower than the lower limit frequency and the action is selected as shutdown, the action is delayed for the time specified in F7-19.

F7-20	Set the cumulative running time	Range: 0h-65000h	Factory value: 0h

Set the operating time of the VFD in advance. When set to 0, this function is disabled.

When the cumulative running time (F7-34) reaches the set running time, the output running time of the VFD's multi-function digital terminal reaches the signal (Multi-Function Output No. 26) ON signal, and the VFD reports a fault Err40 for the accumulated time.

F7-21	Jog priority	Range: 0-2	Factory value: 0

0: invalid

1: Jog priority mode 1

2: Jog priority mode 2

1) In case of user failure or PID loss, inching is still valid;

2) It can set the shutdown mode and DC braking.

F7-22	Frequency detection value (FDT1 level)	Range: 0.00Hz ~ F0-14	Factory value: 50.00Hz
F7-23	Frequency check delay value (FDT1 delay)	Range: 0.0% to 100.0%	Factory value: 5.0%

Set the detection value of output frequency and the hysteresis value for output action release.

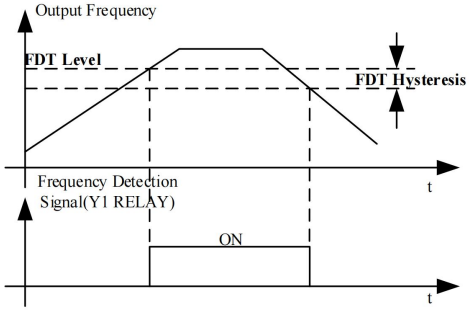


Figure 5-15. FDT level diagram

F7-24	Frequency reaches the detection width	Range: 0.0% to 100.0%	Factory value: 0.0%

When the output frequency of the VFD reaches the set frequency value, this function can adjust its detection amplitude. As shown in the figure below:

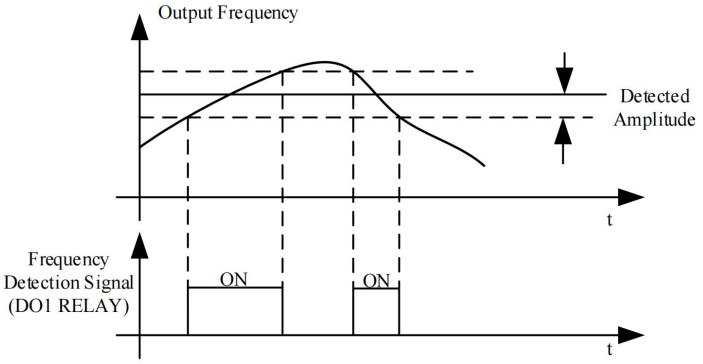


Figure 5-16. Schematic diagram of frequency arrival detection amplitude

F7-26	Fan control	Range: 0-1	Factory value: 1

0: Fan is running continuously

1: The fan is running when the VFD is running

Used to select the operating mode of the cooling fan. When selected as 1, the fan will operate when the VFD is in operation. If the temperature of the radiator is above 40 degrees when the VFD is in the stopped state, the fan will operate. If the temperature of the radiator is below 40 degrees when the VFD is in the stopped state, the fan will not operate.

When selected as 0, the fan will operate continuously after power-on.

F7-27	STOP/RESET function	Range: 0-1	Factory value: 1

0: Valid only when controlled by keyboard

1: The shutdown or reset function is valid under all control modes

F7-28	Function selection of Quick/JOG button	Range: 0-3	Factory value: 0

The Quick/Jog button is a multifunction button that allows you to set the function of the Quick/Jog button through this function code. You can switch between shutdown and operation using this button.

0: Forward rotation inching

The forward jog (FJOG) is achieved through the keyboard Quick/Jog button.

1: Positive and negative rotation switching,

Switch the frequency command direction with the Quick/Jog button. This function is only valid when the command source is the command channel of the operation panel.

2: Reverse inching

Reverse jogging (RJOG) is achieved through the keyboard Quick/Jog button.

3: Switch between panel control and remote control (terminal or communication)

Refers to the switching of the command source, that is, the switching between the current command source and keyboard control (local operation). If the current command source is keyboard control, this key function is invalid.

F7-29	LED operation display	Range: 0000-0xFFFF	Factory value: H.401f

This function code sets the parameters displayed on the LED during the operation of the VFD. When the corresponding bit of this function code is set to 1, the monitoring parameter corresponding to that bit is displayed. When multiple function codes are selected for display, they can be switched using the operation panel keys.

Note: When the function code is set to H.0000, the default display is the operating frequency.

Example of setting:

The hexadecimal value corresponding to each quantity that needs to be displayed has been calculated, as shown in Figure 5-7. The displayed quantities correspond to the set values one by one. For example, if only the bus voltage is displayed, set the corresponding value 0004 into F7-29 (H.0004). If multiple values need to be displayed, add the corresponding values one by one. For example, if the bus voltage and output current need to be displayed, set 0004+0010=0014, and set 0014 into F7-29 (H.0014). If the addition result exceeds 10, use A B C D E F to represent the numbers, which are 10, 11, 12, 13, 14, and 15, respectively.

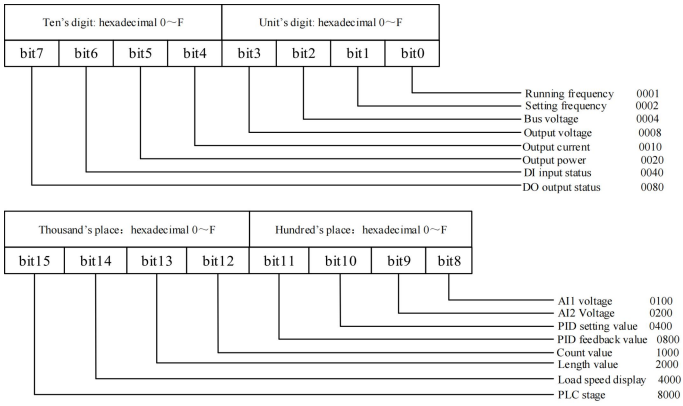


Figure 5-17. Corresponding diagram of LED operation display bit

F7-30	LED shutdown display	Range: 0001-0x1fff	Factory value: H.0003

This function code sets the parameters displayed on the LED when the VFD is stopped. If the corresponding position of this function code is 1, the monitoring parameters corresponding to this position will be displayed. When multiple function codes are selected for display, they can be switched through the operation panel keys.

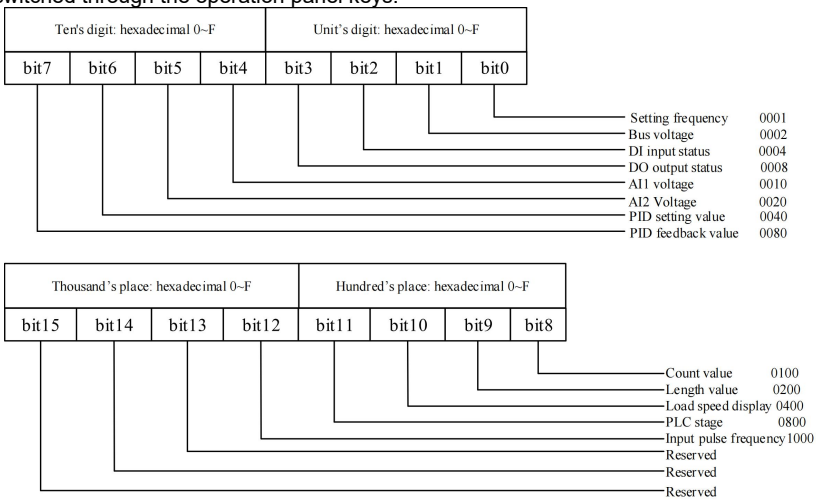


Figure 5-18 Corresponding diagram of LED shutdown display

Refer to F7-29 for the setting method, as shown in Figure 5-18. Set the hexadecimal value corresponding to the quantity to be displayed into F7-30, which means the shutdown display.

F7-31	Load speed display coefficient	Range: 0.001 ～ 655.00	Ex-factory value: 1.000

With this parameter, the output frequency of the VFD is corresponding to the load speed. It is used for setting when there is no high-speed pulse and the load speed needs to be displayed. The load speed (U1-22)=F7-31 * operating frequency. The unit can be speed or Hz, and the specific parameter value shall be set according to the actual situation.

F7-32	Temperature of radiator	Range: 12 ℃ - 100 ℃	Ex-factory value: measured value

Display the temperature of VFD module IGBT, and the overtemperature protection value of VFD module IGBT may be different for different models.

F7-33	Cumulative power-on time	Range: 0h ～ 65535h	Ex-factory value: measured value

Record the cumulative power-on time of the VFD. If the power-on time is less than 1 hour, it will not be recorded.

F7-34	Cumulative operating time	Range: 0h ～ 65535h	Ex-factory value: measured value

Record the accumulated operation time of VFD, and do not record when the operation time is less than 1 hour.

F7-36	Current operation timing enabling selection	Range: 0-1	Factory value: 0

Not enabled

1: Enable the

F7-37	Selection of current sub-run time source	Range: 0~2	Factory value: 0

Digital setting F7-38

1: AI1 (AI100% of F7-38)

2: AI2

F7-38	Current sub-run time setting value	Range: 0.0min ～ 6500.0min	Ex-factory value: 0.0min

When the current operation timing of F7-36 is valid, and the current operation time source selects 0: F7-38 setting, and the switching value output selects 27 function, the VFD reaches the set time and outputs ON signal, and the VFD reports that the current operation time reaches the fault Err39.

F7-39	High level timing time	Range: 0.0s-6000.0s	Ex-factory value: 2.0s
F7-40	Low-level timing time	Range: 0.0s-6000.0s	Ex-factory value: 2.0s

When the timer input terminal "ON" is longer than F7-39, the timer function output is ON. When the timer input terminal "OFF" is longer than F7-40, the output of this timer function is disconnected.

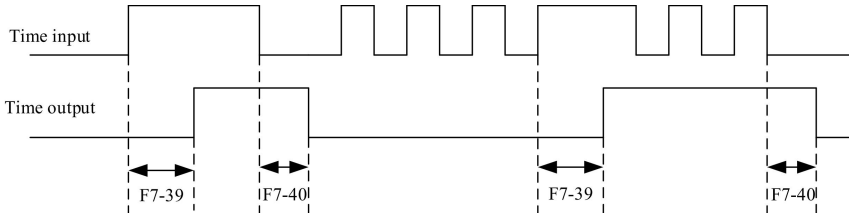


Figure 5-19. Timer input/output action diagram

F7-41	Start protection function	Range: 0-1	Ex-factory value: 1

Invalid (start terminal command is valid for direct start)

1: Valid

This parameter is used to increase the safety protection factor. If it is set to 1, it has two functions:

1) The operation command exists when the VFD is powered on. The operation command must be removed first to eliminate the operation protection state.

2) If the operation command still exists when the VFD fault is reset, the operation command must be removed first to eliminate the operation protection state.

This prevents the motor from operating automatically without knowing it, creating a hazard.

If it is set to 0, and the operation command exists when the VFD is powered on, the VFD will be started directly.

F7-43	Frequency reaches detection value 1	**Range: 0.00Hz ～ F0-14**	**Ex-factory value: 50.00Hz**
F7-44	Frequency reaches detection value 1 amplitude	**Range: 0.0% - 100.0%**	**Ex-factory value: 0.0%**

When the output frequency of the VFD reaches the positive and negative detection amplitude range of detection value 1, the multi-function output terminal outputs ON signal. Refer to Figure 5-16 for DO output action.

F7-45	Current reaches detection value 1	**Range: 0.0% - 300.0%**	**Ex-factory value: 100.0%**
F7-46	Current reaches detection value 1 amplitude	**Range: 0.0% - 300.0%**	**Ex-factory value: 0.0%**

When the output current of VFD reaches the positive and negative detection width of detection value 1, the multifunction output terminal of VFD outputs ON signal.

F7-49	User Password	**Range: 0 ～ 65535**	**Factory value: 0**

If any non-zero number is set in F7-49, the password protection function will take effect. The password must be entered correctly when entering the menu next time, or the function parameters cannot be viewed and modified. Please keep the set user password in mind.

Set F7-49 as 0 to clear the set user password and disable the password protection function.

F7-50	Whether the hopping frequency is effective during acceleration and deceleration	**Range: 0-1**	**Factory value: 0**

Invalid: 0

1: Valid

F7-51	Set power-on arrival time	Range: 0h ～ 65530h	Ex-factory value: 0h

The timing function fails when it is 0.

When the cumulative power-on time of the VFD reaches the value set in F7-51, the multi-function output terminal function (26: the cumulative power-on time reaches) outputs the ON signal.

F7-53	Acceleration time 1/2 switching frequency point	Range: 0.00Hz ～ F0-14	Ex-factory value: 0.00Hz
F7-54	Deceleration time 1/2 switching frequency point	Range: 0.00Hz ～ F0-14	Ex-factory value: 0.00Hz

When the operating frequency during acceleration is less than F7-53, the acceleration time 2 (F7-03) is selected for the acceleration time; when the operating frequency during acceleration is more than F7-53, the acceleration time 1 (F0-23) is selected;

When the operating frequency during deceleration is greater than F7-54, the acceleration time 1 (F0-24) is selected for the acceleration time; when the operating frequency during deceleration is less than F7-54, the deceleration time 2 (F7-04) is selected.

F7-55	Frequency detection value (FDT2 level)	Range: 0.00Hz ～ F0-14	Ex-factory value: 50.00Hz
F7-56	FDT2 hysteresis value of frequency detection	Range: 0.0% - 100.0%	Ex-factory value: 5.0%

It has the same meaning as FDT1. See F7-22, F7-23 and Figure 5-15 for details.

F7-57	Frequency reaches detection value 2	Range: 0.00Hz ～ F0-14	Ex-factory value: 50.00Hz
F7-58	Frequency reaches detected 2 amplitude	Range: 0.0% - 100.0%	Ex-factory value: 0.0%

It has the same meaning as frequency reaching detection value 1. See F7-43, F7-44 and Figure 5-16 for details.

F7-59	Zero current detection value	Range: 0.0% - 300.0%	Ex-factory value: 10.0%
F7-60	Zero current detection delay time	Range: 0.01s ～ 300.00s	Ex-factory value: 1.00 s

When the output current of the VFD is less than or equal to the zero current detection level during operation and the duration exceeds the zero current detection delay time, when the multi-function terminal of the VFD selects No. 35 function, the ON signal is output.

F7-61	Output current amplitude detection	Range: 20.0% ～ 400.0%	Ex-factory value: 200.0%

F7-62	Software overcurrent duration	Range: 0~6500.0s	Ex-factory value: 0s

When the VFD is in operation and the output current is greater than the detection value of output current amplitude F7-61, and the duration exceeds the delay time of software overcurrent point detection F7-62, when the multi-function output terminal of the VFD selects 36, the ON signal is output.

F7-63	Current reaches detection value 2	Range: 20.0% ～ 300.0%	Ex-factory value: 100.0%
F7-64	Current reaches detection 2 amplitude	Range: 0.0% - 300.0%	Ex-factory value: 0.0%

It has the same meaning as current detection 1. See F7-45 and F7-46 for details.

F7-65	LED operation display parameter 2	Range: 0x0~0x1FF	Ex-factory value: H.010

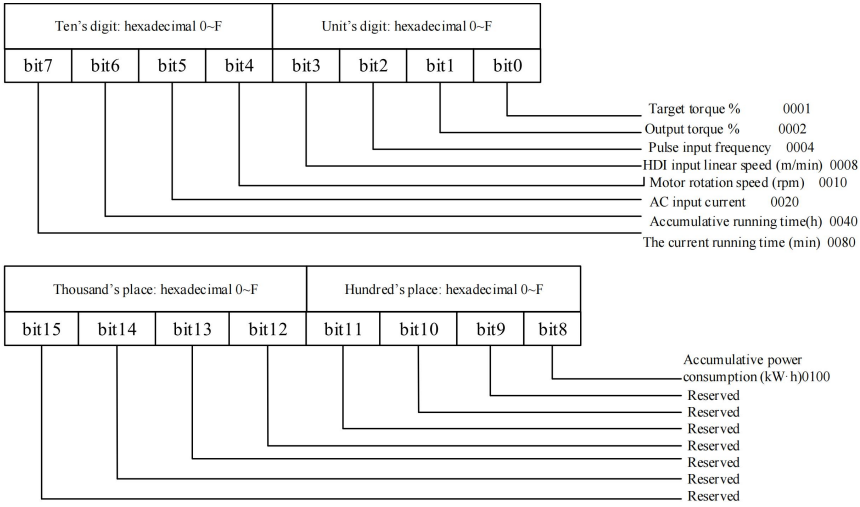


Figure 5-20. Corresponding diagram of LED operation display bit

Refer to F7-29 for the setting method, as shown in Figure 5-20. Set the hexadecimal value corresponding to the quantity to be displayed into F7-65, which means the operation display.

F7-67	AI1 Input voltage lower limit	Range: 0.00V ～ F7-68	Ex-factory value: 2.00V
F7-68	AI1 Input voltage upper limit	Range: F7-67~11.00V	Ex-factory value: 8.00V

When the value of analog input AI1 is less than F7-67, or the AI1 input is greater than F7-68,

the VFD multi-function terminal outputs "AI1 input overrun" ON signal to indicate whether the input voltage of AI1 is within the set range.

F7-69	Module temperature reached	**Range: 0 ℃ - 90 ℃**	**Ex-factory value: 70 ℃**

When the module temperature of the VFD reaches the set value of F7-69, the multi-function output terminal outputs ON signal.

F7-70	Output power display correction factor	**Range: 0.001 ～ 3.000**	**Ex-factory value: 1.000**

Output power display=output power * F7-70, which can be viewed through monitoring code U1-05.

F7-71	Linear velocity display correction factor	**Range: 0.000 ～ 60.000**	**Ex-factory value: 1.000**

Linear speed=F7-71 * Number of sampled HDI pulses per second/Fb-07, which can be viewed via monitoring parameter U1-14.

F7-72	Cumulative power consumption (degree)	**Range: 0 ～ 65535**	**Ex-factory value: measured value**

The accumulated power consumption of the VFD so far can only be viewed and not modified.

F7-73	Performance Software Version	**Range: 0.00 ～ 655.35**	**Ex-factory value: ##**

Performance software version number.

F7-74	Functional Software Version	**Range: 0.00 ～ 655.35**	**Ex-factory value: ##**

Function software version number.

F7-75	Selection of enhanced function parameter display	**Range: 0-1**	**Factory value: 0**

Hide enhanced function parameter group: H0~H3, L0~L5

1: Display enhanced function parameter group: H0 ～ H3, L0 ～ L5

Note: If LCD keyboard is used, F7-75 will display the version number of LCD keyboard.

F7-76	Motor speed display correction factor	**Range: 0.0010-6.0000**	**Ex-factory value: 1.0000**
F7-77	LCD Software Version	**Range: 0.00 ～ 655.35**	**Ex-factory value: ##**

LCD software version number.

5.9 Group F8 communication parameters

F8-00	Baud rate setting	**Range: 0-7**	**Ex-factory value: 5**
F8-01	Data format	**Range: 0~3**	**Factory value: 0**

Baud rate setting:

BPS

1: BPS
2: BPS
3: BPS
4: BPS
5: BPS 9600BPS
6: BPS
7: BPS

Baud rate is the data transmission rate between the upper computer and the VFD. The higher the baud rate is, the faster the communication speed is.

Data format:

No check: data format<8, N, 2>

1: Even check: data format<8, E, 1>

2: Odd check: data format<8, O, 1>

3: No inspection 1: data format<8, N, 1>

Note that the baud rate and data format set by the upper computer and the VFD must be consistent, or the communication cannot be carried out.

F8-02	COMMUNICATION ADDRESS	**Range: 0~247, 0 refers to broadcast address**	**Ex-factory value: 1**

When the local address is set to 0, i.e. broadcast address, the upper computer broadcast function is realized.

Note: The address of this computer is unique (except broadcasting), which is the basic condition for realizing point-to-point communication between the upper computer and the VFD.

F8-03	Response delay time	**Range: 0ms ～ 30ms**	**Ex-factory value: 2ms**

Response delay refers to the interval between the end of VFD data receiving and the sending of data to the upper computer. If the response delay is less than the system processing time, the response delay shall be subject to the system processing time. If the response delay is longer than the system processing time, the system shall delay waiting after processing the data until the response delay time reaches the upper computer.

F8-04	Communication timeout time	**Range: 0.0s-30.0s**	**Ex-factory value: 0.0s**

When this function code is set to 0.0s, the communication timeout parameter is invalid.

When this function code is set to be non-zero, if the interval between the first communication and the next communication exceeds the communication timeout, the system will report a communication failure error (Err27), which is usually set to be invalid. If this parameter is set

in a continuous communication system, you can monitor the communication status.

F8-05	Selection of communication format	Range: 0-1	Factory value: 0

Standard Modbus protocol.

1: When reading the command, the number of bytes returned by the slave is one byte more than that of the standard Modbus protocol. Refer to Appendix A for communication protocol description.

F8-06	Background software monitoring function	Range: 0-1	Factory value: 0

Disabled, default 485 communication function;

1: Start, background software monitoring function, 485 communication function cannot be used at this time.

5.10 F9 group fault and protection

F9-00	Motor overload protection selection	Range: 0-1	Ex-factory value: 1

There is no motor overload protection function, and the motor may be overheated and damaged. It is suggested that the heating relay be provided between the VFD and the motor;

1: With motor overload protection function, refer to Fig. 5-20 for the relation between protection time and motor current.

F9-01	Motor overload protection gain	Range: 0.10 ～ 10.00	Ex-factory value: 1.00

F9-01 shall be properly set to effectively protect the overload of different motors. Refer to Fig. 5-21 Inverse Time Limit Curve of Motor Overload Protection for the application method. L1 in the figure is the relationship between the motor protection time and the motor current when F9-01=1. When the user needs to change the protection time of a certain current of the motor, just change F9-01. The time relationship is:

Required protection time T=F9-01 × T (L1)

For example: when the user needs to change the protection time of 150% rated current to 3 minutes, first find out in Figure 5-20 that the protection time of 150% motor current is 6.0 minutes, then F9-01=required protection time T/T (L1)=3 minutes/6 minutes=0.5.

The maximum time for motor overload protection is 100 minutes, and the minimum time for overload protection is 0.1 minute. Please set it as required. In addition, when the motor is overloaded, the VFD will report Err14 to avoid damage caused by continuous heating of the motor.

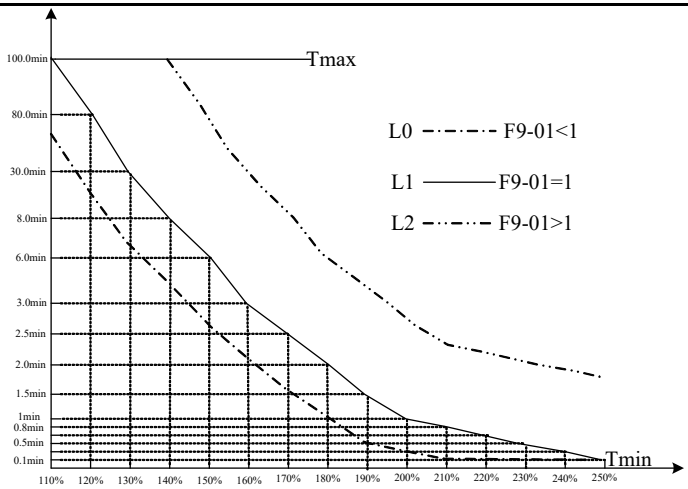


Figure 5-21 Overload protection curve of motor

Note: by default, there is no overload protection below 110% of the rated motor current. When overload protection below 110% of the rated motor current is required, please properly set the motor overload protection current coefficient F9-35.

Motor current percentage=(actual current/rated current) × F9-35

Example: The user needs to set the protection time as 30.0min at 90% of the rated current. First, find out in Figure 5-20 that the current corresponding to 30.0min on L1 is 130%, F9-35=(130%/90%) × 100%=144%. Note that the minimum current protection value is 55%.

F9-02	Motor overload warning coefficient	**Range: 50% - 100%**	**Ex-factory value: 80%**

This function is used to give an early warning signal to the control system before the motor overload fault protection, so as to pre-protect the motor overload.

The higher the value, the smaller the early warning advance.

When the cumulative output current of the VFD is greater than the set overload protection time multiplied by F9-02, the multi-function digital output terminal selects "Motor Overload Pre-Alarm ON" to output the switching value signal. Terminal function is 6. See F6-00~F6-02 Function Code Setting Instructions for details.

F9-03	Overvoltage stall protection gain	**Range: 000~100**	**Ex-factory value: 30**
F9-04	Overvoltage stall protection voltage	**Range: 200.0V ～ 1250.0V**	**Ex-factory value: 760.0V<1>**

<1> This is the ex-factory value of 380V VFD, 380V for 220V and 1150.0V for 660V.

In the deceleration process of VFD, when the DC bus voltage exceeds the overvoltage stall protection voltage, the VFD stops deceleration and maintains the current operating frequency, and continues deceleration after the bus voltage drops.

The overvoltage stall gain is used to adjust the VFD's ability to suppress overvoltage during deceleration. The higher this value, the stronger the overvoltage suppression capacity. The gain should be set as small as possible without over-voltage.

For the load with small inertia, the overvoltage stall gain should be small, otherwise the dynamic response of the system will slow down. For loads with large inertia, this value should be large, otherwise the suppression effect is poor and overvoltage fault may occur.

When the overvoltage stall gain is set to 0, the overvoltage stall function is cancelled.

F9-05	VF overcurrent stall protection gain	**Range: 0~100**	**Ex-factory value: 20**
F9-06	VF overcurrent stall protection current	**Range: 50% - 200%**	**Ex-factory value: 150%**
F9-07	Current coefficient of stall protection in weak magnetic region of VF	**Range: 50% - 200%**	**Ex-factory value: 100%**

Overcurrent stall: when the output current of VFD reaches the set overcurrent stall protection current (F9-06), the VFD stops accelerating when accelerating; Reduce the output frequency when operating at constant speed; During deceleration operation, slow down the descending speed until the current is less than the overcurrent stall protection current (F9-06), and then the operating frequency returns to normal. See Figure 5-21 for details.

Overcurrent stall protection current: select the current protection point of overcurrent stall function. Beyond this parameter, the VFD starts to implement the overcurrent stall protection function. This value is a percentage of the rated current of the VFD.

Overcurrent stall gain: used to adjust the capacity of the VFD to suppress overcurrent during acceleration and deceleration. The higher this value, the stronger the ability to suppress overcurrent. The gain should be set as small as possible without overcurrent.

For the load with small inertia, the overcurrent stall gain should be small, otherwise the system dynamic response will slow down. For loads with large inertia, this value should be large, otherwise the suppression effect is poor and overcurrent fault may occur. In case of very small inertia, it is recommended to set the overcurrent suppression gain less than 20.

When the overcurrent stall gain is set to 0, the overcurrent stall function is cancelled.

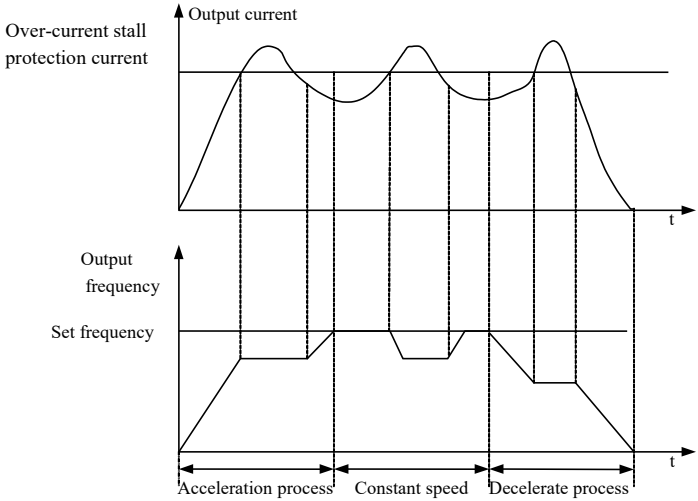


Figure 5-22 Schematic diagram of overcurrent stall protection

F9-08	Allowable rise limit of overvoltage stall	Range: 0.0% - 50.0%	Ex-factory value: 10.0%

The maximum regulation allowed for frequency regulation in overvoltage stall is generally not required to be modified.

F9-11	Number of automatic fault reset	Range: 0~20	Factory value: 0
F9-12	Fault automatic reset relay action selection	Range: 0-1	Factory value: 0

When the VFD fault automatic reset function is selected, during the fault reset, the parameter setting can determine whether the fault relay action is required to shield the fault alarm caused thereby, so that the equipment continues to operate.

F9-13	Time between automatic fault reset	Range: 0.1s ～ 100.0s	Ex-factory value: 1.0s

Waiting time between failure alarm and automatic reset of failure.

F9-14	Enable selection of input phase loss	Range: 0-1	Ex-factory value: 1

Prohibited

1: Enable, the fault code is Err23 in case of input phase loss

F9-15	Enable selection of output phase loss	Range: 0-1	Ex-factory value: 1

Prohibited

1: Enable, the fault code is Err24 in case of output phase loss

F9-16	Selection of power-on short circuit protection	Range: 0-1	Ex-factory value: 1

Prohibited

1: Enable. It allows the VFD to detect whether the motor is short-circuited to ground when it is powered on. If this fault occurs, the fault code is Err20

F9-17	Under voltage fault automatic reset selection	Range: 0-1	Factory value: 0

Manual reset: after undervoltage fault occurs, even if the current bus voltage returns to normal, the fault still exists, and the undervoltage fault needs to be manually cleared Err12

1: Automatic reset. In case of undervoltage fault, the VFD will automatically clear the undervoltage fault Err12 according to the current bus voltage

F9-18	Overvoltage suppression mode selection	Range: 0~2	Ex-factory value: 1

Invalid: 0

1: Overvoltage suppression mode 1 is mainly used to prevent overvoltage fault from being reported due to bus voltage rise caused by energy feedback during motor deceleration

2: Overvoltage suppression mode 2 is mainly applied to the situation where the center of gravity of load deviates from the physical center, resulting in overvoltage caused by bus voltage rise due to energy feedback of load during constant speed operation

F9-19	Selection of effective state of magnetic flux brake	Range: 0~2	Ex-factory value: 2

Invalid: 0

1: Effective during constant speed and deceleration during operation

2: Only the deceleration process is valid

Generally, it is used when fast shutdown is required. The magnetic flux braking is to consume the feedback energy caused by deceleration at the motor end, so as to effectively prevent overvoltage fault. The suppression effect can be adjusted by adjusting the flux brake gain F2-10 (VF).

When the brake resistance is used as overvoltage suppression, please set F9-19 to 0 (invalid); otherwise, it may be abnormal during deceleration

F9-20	Overvoltage Inhibit Mode 2 Limit	Range: 1.0% - 150.0%	Ex-factory value: 100.0%

The maximum value allowed to be adjusted when overvoltage suppression mode 2 takes effect. The smaller the value is, the smaller the bus voltage rise is, but the longer the deceleration time is.

F9-21	Software overcurrent fault enable	Range: 0~1	Factory value: 0

Invalid: 0

1: Valid

F9-22	Fault protection action 1	Range: 0 ～ 22202	Factory value: 0

The meaning of each bit is the same as that of the single bit.

Bit: Motor overload - Err14

Free parking

1: Shut down according to the shutdown mode

2: Continue running

Ten digits: reserved

Hundred places: input phase loss - Err23

Kilo bit: output phase loss - Err24

Bit: parameter reading and writing abnormal - Err25

F9-23	Fault protection action 2	Range: 0 ～ 22222	Factory value: 0

The meaning of each setting of fault protection action 2 refers to fault protection action 1.

Bit: communication failure - Err27

Free parking

1: Shut down according to the shutdown mode

2: Continue running

Digit: External fault - Err28

Hundred places: excessive speed deviation - Err29

Kilometers: User defined fault 1 - Err30

Bit: user defined fault 2 - Err31

F9-24	Fault protection action 3	Range: 0 ～ 22022	Factory value: 0

The meaning of each setting of fault protection action 3 refers to fault protection action 1.

Bit: PID feedback lost during operation - Err32

Free parking

1: Shut down according to the shutdown mode

2: Continue running

Digit: load failure - Err34

Hundred places: software overcurrent - Err16

Kilometres: Current running time reached - Err39

Bit: accumulated running time up to - Err40

Note: fault protection action 1~fault protection action 3, when "free stop" is selected, the VFD displays Err * * and directly stops.

When "Stop by Stop Mode" is selected, the VFD displays Ala * * and stops by stop mode, and Err * * is displayed after stop.

When "Continue operation" is selected, the VFD continues to operate and displays Ala * *, and the operating frequency is set by F9-26.

F9-26	Continue to operate frequency selection in case of failure	Range: 0~4	Ex-factory value: 1

Run at current operating frequency

1: Run at set frequency

2: Run at Upper Frequency Limit

3: Operate at lower frequency limit

4: Run at standby frequency setting F9-27

F9-27	Setting value of abnormal standby frequency	Range: 0.0% - 100.0%	Ex-factory value: 100.0%

This value is a percentage relative to the maximum frequency and is effective when F9-26 selects an abnormal standby frequency and a fault occurs

F9-28	Selection of load shedding protection	Range: 0-1	Factory value: 0
F9-29	Detection level of load loss	Range: 0.0% - 80.0%	Ex-factory value: 20.0%
F9-30	Load shedding detection time	Range: 0.0s-100.0s	Ex-factory value: 5.0s

When the load loss protection is enabled, i.e. F9-28=1, if the output current of the VFD is less than the load loss detection level (F9-29 * rated motor current) set by F9-29 and the duration exceeds the load loss detection time of F9-30, the output load loss fault Err34 of the VFD. It is also optional to select the action state after load shedding via F9-24.

F9-31	Detection value of excessive speed deviation	Range: 0.0% - 100.0%	Ex-factory value: 20.0%
F9-32	Detection time for excessive speed deviation	Range: 0.0s-100.0s	Ex-factory value: 0.0s

This function is only active in Vector and non-torque control mode, 100% of F9-31 corresponds to maximum frequency F0-14.

When the VFD detects that the actual speed of the motor deviates from the set speed, the speed deviation value is greater than the excessive speed deviation detection value F9-31, and the duration is greater than the excessive speed deviation detection time F9-32, the VFD

reports Err29. Meanwhile, the action state of VFD after failure can be defined by F9-23.

When the detection time of excessive speed deviation is 0.0s, the excessive speed deviation protection is invalid.

F9-33	Overspeed detection value	**Range: 0.0% - 100.0%**	**Ex-factory value: 20.0%**
F9-34	Overspeed detection time	**Range: 0.0s-100.0s**	**Ex-factory value: 2.0s**

This function is only active in Vector and non-torque control mode, 100% of F9-34 corresponds to maximum frequency F0-14.

When the VFD detects that the actual speed of the motor exceeds the maximum speed of the VFD, the exceeding value is greater than the over-speed detection value F9-33, and the duration is greater than the over-speed detection time F9-34, the VFD reports Err43 fault.

When the over-speed detection time is 0.0s, the over-speed protection is invalid.

F9-35	Motor overload protection current coefficient	**Range: 100% - 200%**	**Ex-factory value: 100%**

This parameter is used to realize overload protection under 110% rated current of the motor, which shall be used in combination with F9-00 ～ F9-02.

5.11 FA group PID function

PID control is a common method for process control. Through proportional, integral and differential operations on the difference between the controlled quantity feedback signal and the target signal, a closed-loop system is formed by adjusting the output frequency of the VFD, so that the controlled quantity is stable at the target value.

It is applicable to process control situations such as flow control, pressure control and temperature control. Fig. 5-23 is the control principle block diagram of process PID.

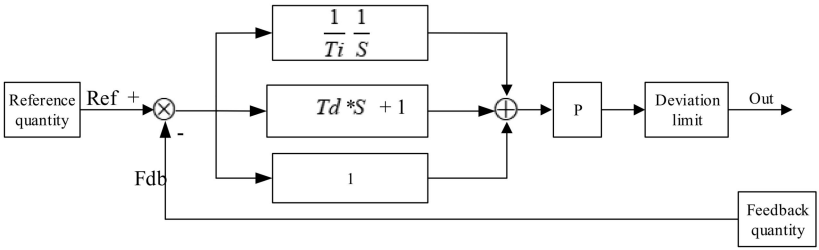


Figure 5-23 Schematic block diagram of process PID

FA-00	PID setpoint source	**Range: 0~5**	**Factory value: 0**

FA-01 setting

1: AI1

2: AI2

3: Given communication

4: PULSE pulse setting

5: Multiple segment instruction

6: Up/Down Modification FA-01 (Valid for F0-06=6)

When the frequency source selects PID, i.e. F0-06 or F0-07 is selected as 6, this group function works.

This parameter determines the given channel of the target quantity of the process PID.

The set target value of process PID is relative value, and the set range is 0~100%.

The span of the PID (FA-05) is not required because the system operates on a relative value (0 to 100%) regardless of the span set. However, if the PID range is set, the actual values of the given PID and corresponding feedback signals can be observed visually through the keyboard display parameters.

FA-01	PID digital setting	**Range: 0.0% - 100.0%**	**Ex-factory value: 50.0%**

When FA-00=0 is selected, that is, the target source is given by the keyboard. This parameter needs to be set.

FA-02	PID given change time	**Range: 0.00s~65.00s**	**Ex-factory value: 0.00s**

The given change time of PID refers to the time required for the actual value of PID to change from 0.0% to 100.0%.

When the PID setpoint changes, the actual PID setpoint does not respond immediately. Rather, it varies linearly over a given time to prevent a given transition.

FA-03	PID feedback source	**Range: 0-7**	**Factory value: 0**

AI1

1: AI2

2: AI1 - AI2

3: Given communication

4: PULSE pulse setting

5: AI1+AI2

6: MAX (@ AI1 @, @ AI2 @)

7: MIN (@ AI1/, @ AI2/)

This parameter is used to select the feedback signal channel of the process PID.

The feedback quantity of process PID is also the relative value, and the setting range is 0.0% - 100.0%.

FA-04	PID action direction	Range: 0-1	Factory value: 0

Positive action. When the feedback signal of PID is less than the given value, the output frequency of VFD rises. Such as tension control of winding.

1: Reaction: when the feedback signal of PID is less than the given value, the output frequency of VFD drops. Such as tension control of unwinding.

This function is affected by the reverse action direction of multi-function terminal PID (function 35), so attention shall be paid during use.

FA-05	PID given feedback range	Range: 0 ～ 65535	Ex-factory value: 1000

PID given feedback range is a dimensionless unit for PID given display U1-10 and PID feedback display U1-11.

The relative value of the given feedback of PID is 100.0%, corresponding to the given feedback range FA-05. For example, if FA-05 is set to 4000, the PID setpoint display U1-10 is 2400 when the PID is given 60.0%.

FA-06	Proportional gain Kp1	Range: 0.0 ～ 100.0	Ex-factory value: 50.0
FA-07	Integral time Ti1	Range: 0.01s ～ 10.00s	Ex-factory value: 0.50s
FA-08	Differential time Td1	Range: 0.000s ～ 10.000s	Ex-factory value: 0.000s

Proportional gain Kp1:

It determines the adjustment intensity of the whole PID regulator. The larger Kp1, the greater the adjustment intensity. This parameter 100.0 indicates that when the deviation between the PID feedback quantity and the given quantity is 100.0%, the adjustment amplitude of the PID controller to the output frequency command is the maximum frequency.

Integral time Ti1:

Determines the intensity of integral regulation of the PID adjuster. The shorter the integral time is, the higher the regulation intensity is. Integral time means that when the deviation between PID feedback quantity and given quantity is 100.0%, the integral regulator will reach the maximum frequency through continuous adjustment of this time.

Differential time Td1:

This determines how much the PID adjuster adjusts the rate of change of deviation. The longer the differential time is, the greater the regulation intensity is. Differential time means that when the feedback quantity changes by 100.0% within this time, the adjustment quantity of differential regulator is the maximum frequency.

FA-09	PID given feedback cut-off frequency	**Range: 0.00Hz~maximum frequency**	**Ex-factory value: 0.00Hz**

In some cases, only when the output frequency of PID is negative (i.e. VFD reversal), PID can control the given quantity and feedback quantity to the same state. However, excessively high reversal frequency is not allowed for some occasions. FA-09 is used to determine the upper limit of reversal frequency.

FA-10	Limit of deviation	**Range: 0.0% - 100.0%**	**Ex-factory value: 0.0%**

When the deviation between the PID setpoint and the feedback is less than FA-10, the PID stops adjusting. In this way, the output frequency is stable when the deviation between the given and the feedback is small, which is very effective for some closed loop control situations.

FA-11	Differential limiting amplitude	**Range: 0.00% - 100.00%**	**Ex-factory value: 0.10%**

In the PID controller, the action of differential is relatively sensitive and easily causes system oscillation. Therefore, the action of PID differential is generally limited to a small range. FA-11 is used to set the output range of PID differential.

FA-12	PID feedback filtering time	**Range: 0.00s~60.00s**	**Ex-factory value: 0.00s**

FA-12 is used to filter the PID feedback quantity, which is beneficial to reduce the influence of the feedback quantity being disturbed, but will bring about the response performance of the process closed-loop system.

FA-13	PID feedback loss detection value	**Range: 0.0% - 100.0%**	**Ex-factory value: 0.0%**
FA-14	PID feedback loss detection time	**Range: 0.0s-3600.0s**	**Ex-factory value: 0s**

THIS FUNCTION CODE IS USED TO JUDGE WHETHER THE PID FEEDBACK IS LOST.

WHEN THE PID FEEDBACK IS LESS THAN THE FEEDBACK LOSS DETECTION VALUE FA-13 AND THE DURATION EXCEEDS THE PID FEEDBACK LOSS DETECTION TIME FA-14, THE VFD WILL PERFORM PROTECTION ACCORDING TO THE ONE-BIT SELECTION OF F9-24, AND THE FAULT WILL BE REPORTED TO ERR32 AND THE ALARM WILL BE REPORTED TO ALAR32.

FA-18	Proportional gain Kp2	**Range: 0.0 ～ 100.0**	**Ex-factory value: 20.0**
FA-19	Integral time Ti2	**Range: 0.01s ～ 10.00s**	**Ex-factory value: 2.00s**
FA-20	Differential time Td2	**Range: 0.000～ 10.000s**	**Ex-factory value: 0.000s**
FA-21	Switching conditions of PID parameters	**Range: 0~2**	**Factory value: 0**
FA-22	PID parameter switching deviation 1	**Range: 0.0% ～ FA-23**	**Ex-factory value: 20.0%**
FA-23	PID parameter switching deviation 2	**Range: FA-22 ～ 100.0%**	**Ex-factory value: 80.0%**

In some applications, a set of PID parameters cannot meet the requirements of the whole operation process, and different PID parameters are required under different circumstances. This group of function codes is used to switch two groups of PID parameters. The setting mode of regulator parameters FA-18~FA-20 is similar to parameters FA-06~FA-08. FA-21 is the switching condition of PID parameters:

FA-21=0: No switching, use the first group of PID parameters.

FA-21=1: DI terminal switching, multi-function terminal function selection shall be set as 43 (PID parameter switching terminal), when the terminal is invalid, select parameter group 1 (FA-06 ～ FA-08), when the terminal is valid, select parameter group 2 (FA-18 ～ FA-20).

FA-21=2 is automatically switched according to the deviation. When the absolute value of deviation between the given value and the feedback is less than the switching deviation of PID parameter 1 (FA-22), the PID parameter group 1 is selected. When the absolute value of the deviation between the setpoint and the feedback is greater than the PID switching deviation 2 (FA-23), the PID parameter selects parameter group 2. When the deviation between a given and feedback is between switching deviation 1 and switching deviation 2, the PID parameter is the linear interpolation value of two groups of PID parameters, as shown in Figure 5-24.

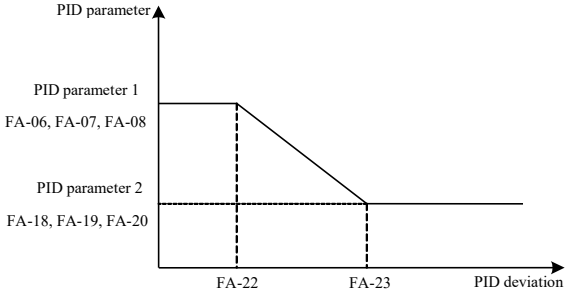


Figure 5-24. PID parameter switching

FA-24	PID initial value	**Range: 0.0% - 100.0%**	**Ex-factory value: 0.0%**
FA-25	PID initial holding time	**Range: 0.00s~65.00s**	**Ex-factory value: 0.00s**

When the VFD is started, the PID output is fixed as the initial PID value FA-24, and the PID starts the closed-loop regulation operation only after the initial PID value holding time FA-25 is maintained. Figure 5-25 shows the function diagram of initial PID value.

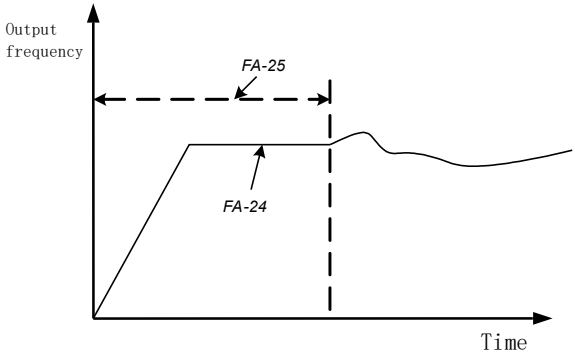


Figure 5-25. Schematic diagram of PID initial value function

FA-26	Maximum forward deviation of two outputs	**Range: 0.00% - 100.00%**	**Ex-factory value: 1.00%**
FA-27	Maximum reverse value of two output deviations	**Range: 0.00% - 100.00%**	**Ex-factory value: 1.00%**

This function is used to limit the difference between the two outputs of the PID, so as to suppress the fast change of the PID output and stabilize the VFD operation. FA-26 and FA-27 correspond to the maximum absolute value of output deviation in forward and reverse rotation respectively.

FA-28	PID integral attribute	**Range: 00-11**	**Ex-factory value: 00**

Single bit: integral separation selection

Invalid: 0

1: Valid

If the set integral split is active, the integral PID integral of the PID stops when the multi-function digital DI integral pause (function 38) is active, and only the proportional and differential actions of the PID are active.

When integral separation is selected as invalid, integral separation is invalid whether multi-functional digital DI is valid or not.

Ten digits: stop integral selection after the output reaches the limit value

Continue scoring

1: Stop integrating

When the PID operation output reaches the maximum or minimum value, you can choose whether to stop the integral action. If Stop Integral is selected, the PID integral stops computing, which reduces the overshoot of the PID.

FA-29	PID shutdown operation	Range: 0-1	Factory value: 0

PID does not operate in shutdown state.

1: PID operation in shutdown state

5.12 Swing frequency, fixed length and counting of Fb group

Swing frequency function is applicable to textile, chemical fiber and other industries, as well as occasions requiring lateral movement and winding function.

The swing frequency function refers to the output frequency of the VFD, swinging up and down with the set frequency as the center. The track of the operating frequency in the time axis is shown in Figure 5-26. The swing amplitude is set by Fb-00 and Fb-01. When Fb-01 is set to 0, the swing amplitude is 0, and the swing frequency does not work.

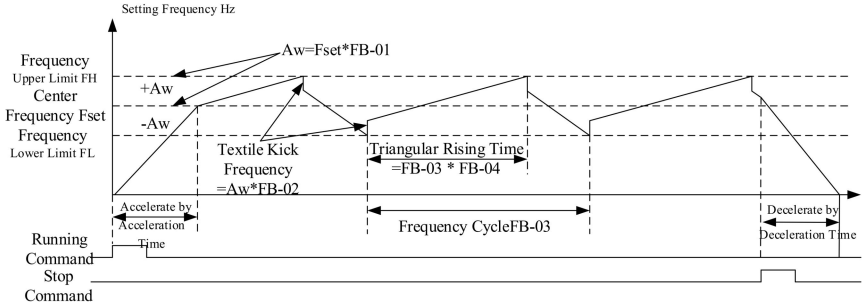


Figure 5-26 Schematic diagram of swing frequency operation

Fb-00	Swing setting mode	Range: 0-1	Factory value: 0

This parameter is used to determine the reference value of the swing.

Relative center frequency (F0-06 frequency source), variable swing system. The swing varies with the center frequency (set frequency).

1: Relative maximum frequency (F0-14), fixed swing system.

Fb-01	Swing frequency amplitude	Range: 0.0% - 100.0%	Ex-factory value: 0.0%

Fb-02	Sudden frequency amplitude	**Range: 0.0% - 50.0%**	**Ex-factory value: 0.0%**

This parameter is used to determine the value of swing frequency amplitude and sudden frequency.

When the swing is set relative to the center frequency (Fb-00=0), the swing AW=frequency source F0-07 × Swing amplitude Fb-01. When the swing is set relative to the maximum frequency (Fb-00=1), the swing AW=the maximum frequency F0-14 × Swing amplitude Fb-01.

Sudden frequency amplitude is the frequency percentage of the sudden frequency relative to the swing amplitude when the swing frequency operates, i.e., sudden frequency=swing amplitude AW × Sudden frequency amplitude Fb-02. If you select the swing relative to the center frequency (Fb-00=0), the sudden frequency is the change value. If the swing is selected relative to the maximum frequency (Fb-00=1), the sudden jump frequency is a fixed value.

Swing frequency operation frequency, constrained by upper and lower frequency limits.

Fb-03	Swing frequency period	**Range: 0.1s ～ 3000.0s**	**Ex-factory value: 10.0s**
Fb-04	Rise time coefficient of triangular wave	**Range: 0.1% - 100.0%**	**Ex-factory value: 50.0%**

Swing frequency period: the time value of a complete swing frequency period.

The rise time coefficient of triangular wave Fb-04 is the time percentage of rise time of triangular wave relative to swing frequency period Fb-03.

Rise time of triangular wave=swing frequency period Fb-03 × Rise time coefficient of triangular wave Fb-04 (unit: s).

Delta wave falling time=swing frequency period Fb-03 × Rise time coefficient of triangular wave Fb-04) in seconds.

Fb-05	Set length	**Range: 0m ～ 65535m**	**Ex-factory value: 1000m**
Fb-06	Real length	**Range: 0m ～ 65535m**	**Ex-factory value: 0m**
Fb-07	Number of pulses per meter	**Range: 0.1 ～ 6553.5**	**Ex-factory value: 100.0**

The above function codes are used for fixed length control.

The length information needs to be acquired through the multi-function digital input terminal. The actual length Fb-06 can be calculated by dividing the number of pulses sampled by the terminal with the number of pulses per meter Fb-07. When the actual length is equal to or greater than the set length Fb-05, the multi-function digital terminal outputs the "length reached" ON signal.

In the fixed length control process, the length can be reset through the multi-function DI terminal (DI function is selected as 31). Refer to F5-00~F5-04 for details.

In application, the corresponding input terminal function shall be set as "length count input" (DI function is selected as 30). When the pulse frequency is high, HDI port must be used.

Fb-08	Set count value	**Scope: 1~65535**	**Ex-factory value: 1000**
Fb-09	Specified count value	**Scope: 1~65535**	**Ex-factory value: 1000**

The count value shall be acquired through the multi-function digital input terminal. In application, the corresponding input terminal function shall be set as "counter input" (function 28). When the pulse frequency is high, DI5 port must be used.

When the count value reaches the set count value Fb-08, the multi-function digital output "Set Count Value Reached" ON signal.

When the count value reaches the specified count value Fb-09, the multi-function digital output "Designated Count Value Reached" ON signal.

The specified count value Fb-09 shall not be greater than the set count value Fb-08. Figure 5-26 is a schematic diagram of the functions of setting count value arrival and specifying count value arrival.

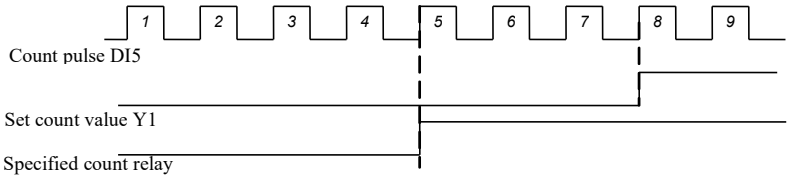


Figure 5-27. Schematic Diagram of Setting Count Value Setting and Specified Count Value Setting

5.13 FC group multi-stage command and simple PLC function

The simple PLC function is that the VFD is equipped with a programmable logic controller (PLC) to automatically control the multi-stage frequency logic. Operating time, direction and frequency can be set to meet process requirements.

The intelligent VFD can realize 16-segment speed change control, with 4 acceleration and deceleration time options.

When the set PLC completes a cycle, the multi-function digital output terminal Y1, multi-function relay RELAY and RELAY 2 can output ON signals. See F6-00~F6-02 for details.

FC-00	Multisegment instruction 0	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-01	Multi-stage instruction 1	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-02	Multi-stage instruction 2	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-03	Multi-stage instruction 3	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-04	Multi-stage instruction 4	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-05	Multi-stage instruction 5	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-06	Multi-stage instruction 6	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-07	Multi-stage instruction 7	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-08	Multi-stage instruction 8	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-09	Multi-stage instruction 9	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-10	Multi-stage instruction 10	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-11	Multi-stage instruction 11	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-12	Multi-stage instruction 12	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-13	Multi-stage instruction 13	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-14	Multi-stage instruction 14	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FC-15	Multi-stage instruction 15	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**

When F0-06, F0-07 and F0-10 are selected as multi-stage speed operation mode for frequency source, FC-00~FC-15 shall be set to determine its characteristics.

Note: Symbol of FC-00~FC-15 determines the operation direction of simple PLC. Negative values indicate reverse operation.

Simple PLC schematic diagram:

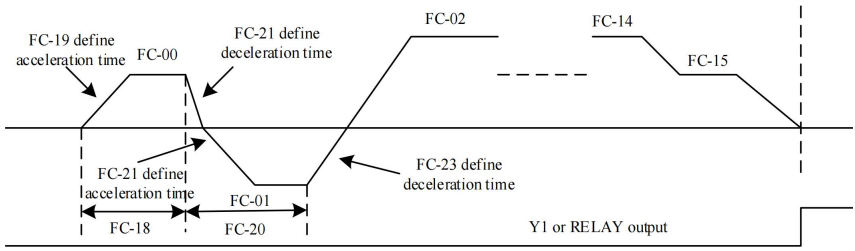


Figure 5-28 Simple PLC diagram

FC-16	Simple PLC operation	Range: 0~2	Factory value: 0

Simple PLC function has two functions: as frequency source or as voltage separated from VF Figure 5-29 is a schematic diagram of a simple PLC as a frequency source. When simple PLC is used as frequency source, the positive and negative values of FC-00~FC-15 determine the operation direction. If it is negative, it means the VFD operates in the opposite direction.

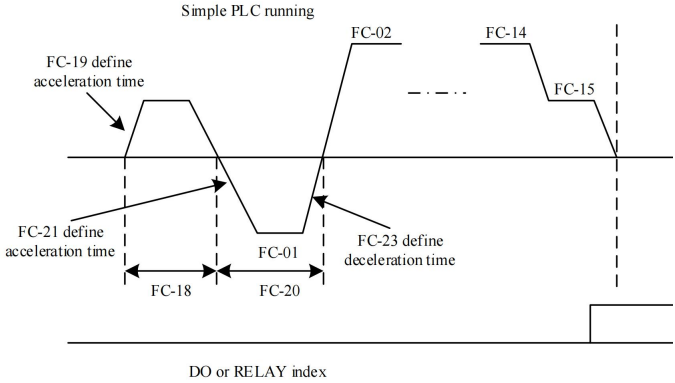


Figure 5-29 Simple PLC diagram

As frequency source, PLC has three operation modes, which are not available as VF voltage separation source. Including:

Shutdown after single operation

The VFD will stop automatically after a single cycle, and it can only be started after the operation command is given again.

1: Maintain the final value at the end of single operation

The VFD automatically maintains the operating frequency and direction of the last section after a single cycle.

2: Continuous circulation

When the VFD completes one cycle, it will automatically start the next cycle until the stop command is given.

FC-17	Simple PLC shutdown and power-down memory selection	Range: 0~3	Factory value: 0

This function code determines the power-off memory mode of the VFD when the PLC is running

Not memorized in case of power failure and shutdown

1: Power-off memory and shutdown memory failure

2: Power failure and shutdown memory

3: Power-off memory and shutdown memory

PLC power-off memory refers to the memory of PLC operation stage and operation frequency before power-off, and it will continue to operate from the memory stage when the next power-on. If you do not remember, you will restart the PLC process every time you power on.

PLC shutdown memory is to record the operation stage and operation frequency of the previous PLC during shutdown, and continue to operate from the memory stage during the next operation. If you choose not to remember, the PLC process will be restarted every time you start.

FC-18	Simple PLC segment 0 operating time	Range: 0.0 ～ 6500.0	Ex-factory value: 0.0
FC-19	Simple PLC section 0 acceleration and deceleration time	Range: 0~3	Factory value: 0
FC-20	Simple PLC 1st run time	Range: 0.0 ～ 6500.0	Ex-factory value: 0.0
FC-21	Simple PLC 1st acceleration and deceleration time	Range: 0~3	Factory value: 0
FC-22	Operation time of simple PLC section 2	Range: 0.0 ～ 6500.0	Ex-factory value: 0.0
FC-23	Simple PLC 2nd acceleration and deceleration time	Range: 0~3	Factory value: 0
FC-24	Simple PLC segment 3 operating time	Range: 0.0 ～ 6500.0	Ex-factory value: 0.0
FC-25	Simple PLC 3rd acceleration and deceleration time	Range: 0~3	Factory value: 0
FC-26	Running time of simple PLC section 4	Range: 0.0 ～ 6500.0	Ex-factory value: 0.0
FC-27	Simple PLC 4th acceleration and deceleration time	Range: 0~3	Factory value: 0
FC-28	Simple PLC 5th section operating time	Range: 0.0 ～ 6500.0	Ex-factory value: 0.0
FC-29	Simple PLC 5th acceleration and deceleration time	Range: 0~3	Factory value: 0
FC-30	Simple PLC segment 6 operating time	Range: 0.0 ～ 6500.0	Ex-factory value: 0.0

FC-31	Simple PLC 6th acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-32	Simple PLC segment 7 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-33	Simple PLC 7th acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-34	Simple PLC segment 8 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-35	Simple PLC 8th acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-36	Simple PLC segment 9 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-37	Simple PLC section 9 acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-38	Simple PLC segment 10 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-39	Simple PLC section 10 acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-40	Simple PLC segment 11 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-41	Simple PLC 11th acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-42	Simple PLC segment 12 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-43	Simple PLC section 12 acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-44	Simple PLC segment 13 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-45	Simple PLC section 13 acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-46	Simple PLC segment 14 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-47	Simple PLC section 14 acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-48	Simple PLC segment 15 operating time	**Range: 0.0 ～ 6500.0**	**Ex-factory value: 0.0**
FC-49	Simple PLC section 15 acceleration and deceleration time	**Range: 0~3**	**Factory value: 0**
FC-50	PLC operating time unit selection	**Range: 0-1**	**Factory value: 0**

Defines the operating time and acceleration speed selection for each segment of the 16-segment program. The acceleration and deceleration time 0~3 respectively represents the acceleration and deceleration time 0: F0-23, F0-24; Acceleration and deceleration time 1: F7-03, F7-04; Acceleration and deceleration time: F7-05, F7-06; Acceleration and deceleration time 3: F7-07, F7-08.

FC-50 defines the unit of PLC operation time per segment.

Sec

1: Hours per hour

FC-51	Selection of multi-stage speed priority mode	Range: 0-1	Ex-factory value: 1

Multi-stage speed priority means that when the multi-stage speed terminals are not all 0, the multi-stage speed command value is executed first.

Multi-stage speed not preferred

1: Multi-stage speed priority

FC-52	Multi-stage speed priority acceleration/deceleration time selection	Range: 0~3	Factory value: 0

When multi-stage speed is given priority, select acceleration and deceleration mode when multi-stage speed is executed.

Respectively represents acceleration and deceleration time 1~acceleration and deceleration time 4

FC-53	Unit selection of multi-stage speed FC-00~FC-15	Range: 0-1	Factory value: 0

It is used to select the unit of multi-stage speed FC-00~FC-15 to meet the requirements of multi-stage speed frequency unit in different occasions.

%;

1: Hz

FC-55	Multi-segment instruction 0 setting mode	Range: 0~5	Factory value: 0

This parameter determines the given channel for multi-stage instruction 0. In addition to selecting FC-00 for a multi-stage instruction 0, there are a number of other options for switching between multi-stage instructions and other given methods. When multi-stage command is used as frequency source or simple PLC is used as frequency source, switching between two frequency sources can be easily realized.

Function code FC-00 given

1: AI1 given

2: AI2 given

3: PULSE Pulse

4: PID (PID)

5: Preset frequency setting (F0-11), UP/DOWN can be modified

5.14 Fd group torque control parameters

Torque control is only possible when control mode F0-03 is vector control, so that the motor output torque is controlled by torque commands. When torque control is used, the following precautions shall be taken:

- **Torque control effective**

  For torque control to take effect, set Fd-10 to 1 or set the multi-function DI terminal function to 44 before using.

  In addition, torque control disable (function 32) can be realized through multi-function digital DI terminal. When the torque disable function is effective, the VFD is fixed to speed control mode.

- **Setting of torque command and speed limit**

  The torque command can be set via Fd-00 and Fd-01. When the torque source is non-digital, 100% input corresponds to the Fd-01 setting.

  The speed limit can be set digitally via Fd-03 and Fd-04 or via the upper frequency F0-15, F0-16, F0-17.

- **Direction setting of torque command**

  During torque control, the direction of torque command is related to the direction of operation command and input torque value, as shown in the following table:

Operation instruction	Input torque value (calculated percentage)	Torque command direction
Forward rotation	>0	Forward direction of rotation
Forward rotation	<0	reverse direction
reversal	>0	reverse direction
reversal	<0	Forward direction of rotation

- **Switching between speed and torque modes**

When the multi-function digital DI terminal is provided with a speed control/torque control switch (function 44), when the speed control/torque control switch function of the corresponding terminal is effective, the value of the control mode equivalent to Fd-10 is reversed; On the contrary, the control mode is determined by Fd-10.

Fd-00	Torque command source selection	Range: 0-6	Factory value: 0

Fd-00 is used to select the torque setting source. There are 7 torque setting modes.

Digital setting (Fd-01), which means that the target torque directly uses the Fd-01 setting value.

1: AI1

2: AI2

The target torque is determined by the analog input terminal. The VFD control board provides 2 analog input terminals (AI1, AI2)

among

AI1 is 0V~10V voltage input

AI2 can be 0V~10V voltage input or 0mA~20mA current input, which is selected by the dial switch on the control panel.

Users can select the corresponding relation curve between the input voltage value of AI1 and AI2 and the target torque through F5-45.

It provides 4 groups of corresponding relation curves, among which 2 groups of curves are straight lines (2-point corresponding relation) and 2 groups of curves are any curves of 4-point corresponding relation. Users can set them by F5-15~F5-23 function codes and FE function codes.

Function code F5-45 is used to set AI1~AI2 two-way analog input and select which one of the four groups of curves respectively.

When AI is given as torque, the voltage/current input corresponds to the set 100.0%, which is the percentage relative to the torque digital setting FD-01.

3: Given communication

The target torque is given by the communication mode. The upper computer gives the data through the communication address 0x1000, and the data format is - 100.00% - 100.00%. 100.00% refers to the percentage of the relative torque digital setting FD-01.

4: PULSE pulse (HDI)

The target torque is given by the terminal HDI high-speed pulse.

Specification of given pulse signal: voltage range: 9V ～ 30V, frequency range: 0kHz ～ 50kHz. The pulse setpoint can only be input from the multi-function input terminal HDI.

The relationship between the input pulse frequency of HDI terminal and the corresponding setting is set through F5-30~F5-34. The corresponding relationship is the linear correspondence between two points. The corresponding 100.0% of the pulse input setting refers to the percentage of the relative torque digital setting FD-01.

5: MIN (AI1, AI2)

It means that the target torque is given by the minimum value of analog quantity AI1 and AI2.

6: MAX (AI1, AI2)

It means that the target torque is given by the maximum value of analog quantity AI1 and AI2.

Options 1-6 Full-scale correspondence (Fd-01).

Fd-01	Torque digital setting	**Range: - 200.0% - 200.0%**	**Ex-factory value: 150.0%**

The torque is set at a relative value of 100.0% corresponding to the rated torque of the motor. The setting range is - 200% - 200%, which indicates that the maximum torque of the VFD is 2 times the rated torque of the motor. When the motor power is greater than the VFD power, it will be limited to the maximum torque of the VFD.

Fd-03	Torque control forward rotation maximum frequency	**Range: 0.00Hz ～ F0-14**	**Ex-factory value: 50.00Hz**
Fd-04	Torque Control Reverse Maximum Frequency	**Range: 0.00Hz ～ F0-14**	**Ex-factory value: 50.00Hz**

It is used to set the forward or reverse maximum operating frequency of VFD under torque control mode.

When the VFD torque is controlled, if the load torque is less than the motor output torque, the motor speed will rise continuously. To prevent accidents such as galloping of the mechanical system, the maximum motor speed under torque control must be limited.

Fd-06	Torque command filtering time	**Range: 0.00s ～ 10.00s**	**Ex-factory value: 0.00s**

Setting this parameter results in a smoother torque command, more flexible control, but a slower response.

Fd-07	Frequency acceleration time in torque mode	**Range: 0.0s-1000.0s**	**Ex-factory value: 10.0s**
Fd-08	Frequency deceleration time in torque mode	**Range: 0.0s-1000.0s**	**Ex-factory value: 10.0s**

This parameter is used to set the acceleration and deceleration time of the maximum frequency during the torque control to reduce the starting impact.

Fd-10	Torque/Speed Mode Selection	**Range: 0-1**	**Factory value: 0**

Speed mode

1: Torque mode

5.15 FE group AI multipoint curve setting

FE-00	Curve 1 Minimum Input	**Scope: - 10.000V ～ FE-02**	**Ex-factory value: 0.00V**
FE-01	Curve 1 minimum input corresponding setting	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**

FE-02	Curve 1 inflection point 1 input	**Scope: FE-00 ～ FE-04**	**Ex-factory value: 3.00V**
FE-03	Curve 1 inflection point 1 input corresponding setting	**Range: - 100.0% - 100.0%**	**Ex-factory value: 30.0%**
FE-04	Curve 1 inflection point 2 input	**Scope: FE-02 ～ FE-06**	**Ex-factory value: 6.00V**
FE-05	Curve 1 inflection point 2 input corresponding setting	**Range: - 100.0% - 100.0%**	**Ex-factory value: 60.0%**
FE-06	Curve 1 Maximum Input	**Scope: FE-04 ～ 10.00V**	**Ex-factory value: 10.00V**
FE-07	Curve 1 maximum input corresponding setting	**Range: - 100.0% - 100.0%**	**Ex-factory value: 100.0%**
FE-08	Curve 2 Minimum Input	**Range: - 10.000V ～ FE-10**	**Ex-factory value: 0.00V**
FE-09	Curve 2 minimum input corresponding setting	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FE-10	Curve 2 inflection point 1 Input	**Scope: FE-08~FE-12**	**Ex-factory value: 3.00V**
FE-11	Curve 2 inflection point 1 input corresponding setting	**Range: - 100.0% - 100.0%**	**Ex-factory value: 30.0%**
FE-12	Curve 2 Inflection point 2 Input	**Scope: FE-10~FE-14**	**Ex-factory value: 6.00V**
FE-13	Curve 2 inflection point 2 input corresponding setting	**Range: - 100.0% - 100.0%**	**Ex-factory value: 60.0%**
FE-14	Curve 2 Maximum Input	**Range: FE-12 ～ 10.00V**	**Ex-factory value: 10.00V**
FE-15	Curve 2 max input corresponding setting	**Range: - 100.0% - 100.0%**	**Ex-factory value: 100.0%**

The above function codes define the relationship between the analog input voltage and the set value represented by the analog input. When the analog input voltage exceeds the set maximum input or minimum input range, the external part will be calculated as the maximum input or minimum input.

When analog input is current input, 1mA current equals 0.5V voltage.

Curve 1 and Curve 2 are consistent with the analog input quantization of F5 group, except that the analog quantization of F5 group is straight line type and the curve of FE group can be set as curve type. Therefore, the multi-point curve of analog input is more flexible, as shown in Fig. 5-30.

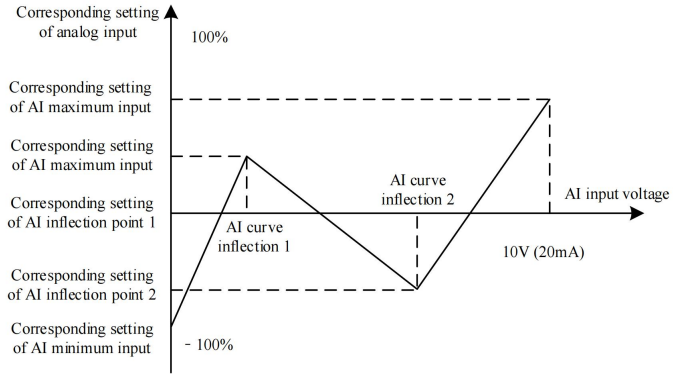


Figure 5-30 Schematic diagram of multi-point curve

FE-24	AI1 Set Jump Point	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FE-25	AI1 Set skip range	**Range: 0.0% - 100.0%**	**Ex-factory value: 0.5%**
FE-26	AI2 Set Jump Point	**Range: - 100.0% - 100.0%**	**Ex-factory value: 0.0%**
FE-27	AI2 Set skip range	**Range: 0.0% - 100.0%**	**Ex-factory value: 0.5%**

The analog input AI1~AI2 of VFD has the setting value jump function.

Jump function refers to fixing the corresponding set value of analog quantity as the value of jump point when the corresponding set value of analog quantity changes in the upper and lower interval of the jump point.

For example, if the voltage of analog input AI1 fluctuates around 5.00V, the fluctuation range is 4.90V ～ 5.10V, the minimum input 0.00V of AI1 corresponds to 0.0%, and the maximum input 10.00V corresponds to 100%, then the detected AI1 is set to fluctuate between 49.0% ～ 51.0%. Set AI1 to set the jump point FE-24 as 50.0%, and set AI1 to set the jump amplitude FE-25 as 1.0%. When AI1 input is processed by the jump function, the corresponding AI1 input obtained is fixed as 50.0%, and AI1 is converted into a stable input, eliminating the fluctuation.

5.16 FF group manufacturer parameters

Manufacturer parameter group, which cannot be changed by the user.

5.17 Parameter setting of the second motor of group H0

When the user needs to switch between two motors, the motor can be switched through H0-00 or 41 function of multi-function digital DI terminal. In addition, 2 motors can be set with motor nameplate parameters, motor parameter tuning, VF control or vector control respectively, and parameters related to VF control or vector control performance can be set separately.

The three groups of function codes H1, H2 and H3 respectively correspond to the motor parameters, VF parameter settings and vector control parameters of the second motor. For all parameters of Group H, their definitions and application methods are consistent with the relevant parameters of the first motor, so the description will not be repeated here. Users can refer to the relevant parameter descriptions of the first motor.

H0-00	Motor selection	Scope: 1-2	Ex-factory value: 1

1: Motor 1

2: Motor 2

Function groups H1 to H3 are not visible when the current motor is No. 1.

H0-01	Control mode of the second motor	Scope: 1-2	Ex-factory value: 2

1: Open loop vector control (no speed sensor vector)

2: VF control

H0-02	Selection of acceleration and deceleration time of the second motor	Range: 0~4	Factory value: 0

Consistent with the first motor

1: Acceleration and deceleration time 1, F0-23, F0-24

2: Acceleration/deceleration time 2, F7-03, F7-04

3: Acceleration/deceleration time 3, F7-05, F7-06

4: Acceleration/deceleration time 4, F7-07, F7-08

5.18Parameters of the second motor in Group H1

The detailed description of the function code parameters of this group is the same as that of group F4.

H1-00	Motor parameter tuning	Range: 0~2	Factory value: 0

No function

1: Static tuning, static tuning

2: Dynamic complete tuning

H1-01	Motor 2 Rating	Range: 0.1-10000.0 (kW)	Ex-factory value: determined by model
H1-02	Motor 2 rated voltage	Range: 1V~1500V	Ex-factory value: 380V
H1-03	Motor 2 Motor pole number	Scope: 2 ～ 64	Ex-factory value:

			determined by model
H1-04	Motor 2 rated current	**Range: 0.1A ～ 3000.0A**	**Ex-factory value: determined by model**
H1-05	Motor 2 rated frequency	**Range: 0.01Hz ～ F0-14**	**Ex-factory value: 50.00Hz**
H1-06	Motor 2 rated speed	**Range: 1RPM ～ 60000RPM**	**Ex-factory value: determined by model**
H1-07	No-load current of motor 2	**Range: 0.1A ～ 1500.0A**	**Ex-factory value: determined by model**
H1-08	Motor 2 stator resistance	**Range: 0.001 ～ 65.535ohm**	**Ex-factory value: determined by model**
H1-09	Motor 2 rotor resistance	**Range: 0.001 ～ 65.535ohm**	**Ex-factory value: determined by model**
H1-10	Motor 2 mutual inductance	**Range: 0.1mH ～ 6553.5mH**	**Ex-factory value: determined by model**
H1-11	Motor 2 Leakage reactance	**Range: 0.01mH ～ 655.35mH**	**Ex-factory value: determined by model**
H1-12	Acceleration at dynamic full tuning	**Range: 1.0s ～ 600.0s**	**Ex-factory value: 10.0s**
H1-13	Deceleration at dynamic full tuning	**Range: 1.0s ～ 600.0s**	**Ex-factory value: 10.0s**
H1-17	Stator resistance of synchronous motor 2	**Scope:** 0.001 Ω - 65.535 Ω<3>	**Ex-factory value: determined by model**
H1-18	Synchronous motor 2D axis inductance	**Scope:** MH ～ 655.35mH<3>	**Ex-factory value: determined by model**
H1-19	Synchronous motor 2Q shaft inductance	**Scope:** MH ～ 655.35mH<3>	**Ex-factory value: determined by model**
H1-20	Reverse electromotive force of synchronous motor 2	**Range: 0V ～ 1000V**	**Ex-factory value: determined by model**
H1-21	Synchronous machine no-load current	**Range: 0.0% - 50.0%**	**Ex-factory value: 5.0%**

5.19 VF parameter setting of the second motor of H2 group

The detailed description of the function code parameters of this group is the same as that of group F2. If the VF control function code is not listed in this group, group F2 is directly used.

H2-00	Torque Rise	**Range: 0.0% - 30.0%**	**Ex-factory value: 0.0%**

When the parameter is set to 0, it indicates automatic torque increase.

H2-02	Oscillation suppression gain	**Range: 0~100**	**Ex-factory value: determined by model**

5.20 Vector control parameters of the second motor in Group H3

The function of this group of parameters is similar to that of F3 group, which is valid when the motor is the second motor. See the description of F3 group of function codes for detailed description of function codes.

H3-00	Switching frequency F1	**Range: 1.00 Hz ～ H3-02**	**Ex-factory value: 5.00Hz**
H3-02	Switching frequency F2	**Range: H3-00-F0-14**	**Ex-factory value: 10.00Hz**
H3-04	LF Velocity Proportional Gain	**Range: 0.1 ～ 10.0**	**Ex-factory value: 4.0**
H3-05	LF velocity integral time	**Range: 0.01s ～ 10.00s**	**Ex-factory value: 0.50s**
H3-06	High frequency velocity proportional gain	**Range: 0.1 ～ 10.0**	**Ex-factory value: 2.0**
H3-07	High-frequency velocity integral time	**Range: 0.01s ～ 10.00s**	**Ex-factory value: 1.00 s**
H3-08	Velocity loop integral attribute selection	**Range: 0-1**	**Factory value: 0**
H3-11	Torque current regulator Kp	**Range: 0~30000**	**Ex-factory value: 2000**
H3-12	Torque current regulator Ki	**Range: 0~30000**	**Ex-factory value: 1300**
H3-13	Excitation current regulator Kp	**Range: 0~30000**	**Ex-factory value: 2000**
H3-14	Excitation current regulator Ki	**Range: 0~30000**	**Ex-factory value: 1300**
H3-15	Flux braking gain	**Range: 0~200**	**Factory value: 0**
H3-16	Weak field torque correction factor	**Range: 50% - 200%**	**Ex-factory value: 100%**
H3-17	Slip compensation coefficient	**Range: 50% - 200%**	**Ex-factory value: 100%**
H3-18	Velocity loop feedback filter time constant	**Range: 0.000s ～ 1.000s**	**Ex-factory value: 0.015s**
H3-19	Velocity loop output filter time constant	**Range: 0.000s ～ 1.000s**	**Ex-factory value: 0.000s**
H3-20	Electric torque upper limit source	**Range: 0~4**	**Factory value: 0**
H3-21	Upper limit of electric torque	**Range: 0.0% - 200.0%**	**Ex-factory value: 150.0%**
H3-22	Brake torque upper limit source	**Range: 0~4**	**Factory value: 0**
H3-23	Brake torque upper limit	**Range: 0.0% -200.0%**	**Ex-factory value:150.0%**

H3-24	Low-speed magnetizing current of synchronous motor 2	**Range: 0.0% - 80.0%**	**Ex-factory value: 25.0%**
H3-25	Excitation cut-off frequency of synchronous motor 2	**Range: 0% ～ 100%**	**Ex-factory value: 10%**
H3-26	Pre-excitation time of synchronous motor 2	**Range: 0.00s ～ 5.00s**	**Ex-factory value: 0.0s**
H3-27	Synchronous motor 2 initial position identification enabling selection	**Range: 0,1,2**	**Ex-factory value: 1**
H3-28	Set percentage of voltage for initial position recognition of synchronous motor 2	**Range: 30% - 150%**	**Ex-factory value: 80%**

5.21 Group L0 system parameters

L0 is used to manage the function code group of VFD, which can be set by the user as required.

L0-00	Function code read-only selection	**Range: 0-1**	**Factory value: 0**

Invalid: 0

1: Except L0-00, all function codes can only be viewed and can not be modified to prevent parameters from being misoperated

L0-01	LCD Top Menu Display/LED 2nd Row Display	**Range: 0x000~0xBBB**	**Ex-factory value: H.241**

It is used to select the second display variable of the top menu of the LCD during operation. The first display variable is the operating frequency and cannot be changed.

Digit: first row ten digits: second row hundreds digits: third row

Set frequency 1: Operating frequency 2: Bus voltage 3: Output voltage

4: Output current 5: Output power 6: PID setting 7: PID feedback

8: Load speed 9: PLC stage A: Output torque B: Motor speed

L0-02	LCD language selection	**Range: 0-1**	**Factory value: 0**

Chinese;

1: English Language

L0-03	ENTER menu switching function	**Range: 0-1**	**Factory value: 0**

Prohibited

1: Enable the

L0-03 is used as the enabling switch of the menu function by pressing the ENTER key. It is off by default. When the menu switch is required, L0-03 can be changed to 1. See Figure 4-4 for detailed operation methods

L0-04	Vector operating frequency display selection	**Range: 0-1**	**Factory value: 0**

Real time frequency

1: Set frequency

L0-05	Display selection during UP/DOWN adjustment	**Range: 0-1**	**Factory value: 0**

Display Setpoint

1: Display the current variable value

5.22 Customization of L1 group user function code

The VFD provides users with 31 freely definable user customized function codes to facilitate users to view, modify parameters and quickly operate. Users can view and modify customized function codes by entering user menu mode - USER after customizing function codes in L1 group. For the entry and exit of user menu mode, please refer to Chapter IV of the Manual<4.4 Function Code Menu Mode and Switching Instructions>>.

L1-00	Clear selection of customized function code	**Range: 0-1**	**Factory value: 0**

Invalid: 0

1: Clear user customized function code. All L1-01~L1-31 are uF0.00 after clearing, and the factory customized user function code can be recovered through F0-28

L1-01	User-defined function code 1	**Range: uF0-00 ～ uU1-xx**	**Ex-factory value: uF0-03**
L1-02	User customized function code 2	**Scope: same as L1-01**	**Ex-factory value: uF0-04**
L1-03	User customized function code 3	**Scope: same as L1-01**	**Ex-factory value: uF0-06**
L1-04	User customized function code 4	**Scope: same as L1-01**	**Ex-factory value: uF0-23**
L1-05	User customized function code 5	**Scope: same as L1-01**	**Ex-factory value: uF0-24**
L1-06	User customized function code 6	**Scope:**	**Ex-factory value:**

		same as L1-01	**uF4-00**
L1-07	User customized function code 7	**Scope: same as L1-01**	**Ex-factory value: uF4-01**
L1-08	User customized function code 8	**Scope: same as L1-01**	**Ex-factory value: uF4-02**
L1-09	User customized function code 9	**Scope: same as L1-01**	**Ex-factory value: uF4-04**
L1-10	User customized function code 10	**Scope: same as L1-01**	**Ex-factory value: uF4-05**
L1-11	User customized function code 11	**Scope: same as L1-01**	**Ex-factory value: uF4-06**
L1-12	User-defined function code12	**Scope: same as L1-01**	**Ex-factory value: uF4-12**
L1-13	User customized function code 13	**Scope: same as L1-01**	**Ex-factory value: uF4-13**
L1-14	User customized function code 14	**Scope: same as L1-01**	**Ex-factory value: uF5-00**
L1-15	User customized function code 15	**Scope: same as L1-01**	**Ex-factory value: uF5-01**
L1-16	User customized function code 16	**Scope: same as L1-01**	**Ex-factory value: uF5-02**
L1-17	User-defined function code 17	**Scope: same as L1-01**	**Ex-factory value: uF6-00**
L1-18	User customized function code 18	**Scope: same as L1-01**	**Ex-factory value: uF6-01**
L1-19	User customized function code 19	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-20	User customized function code 20	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-21	User-defined function code 21	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-22	User customized function code 22	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-23	User-defined function code 23	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-24	User customized function code 24	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-25	User customized function code 25	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-26	User-defined function code 26	**Scope: same as L1-01**	**Ex-factory value: uF0-00**

L1-27	User customized function code 27	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-28	User customized function code 28	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-29	User customized function code 29	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-30	User customized function code 30	**Scope: same as L1-01**	**Ex-factory value: uF0-00**
L1-31	User customized function code 31	**Scope: same as L1-01**	**Ex-factory value: uF0-00**

The small initial u of the user customized function code range represents the user customized function code, and other symbols represent the function code.

Example uF0-03 indicates that the customized function code is F0-03, but uF0-00 indicates that the customized function code is null.

5.23 L2 group optimization control parameters

L2-00	Dead Band Compensation Enable Selection	**Range: 0-1**	**Ex-factory value: 1**

No compensation

1: Compensation for compensation

L2-01	PWM modulation mode	**Range: 0-1**	**Factory value: 0**

Asynchronous modulation

1: Synchronous modulation, only for VF control mode and effective when operating frequency is higher than 85Hz

Synchronous modulation refers to the linear change of VFD carrier frequency with output frequency. It is generally used at higher frequency, which is good for improving output voltage quality. However, asynchronous modulation means constant carrier frequency and better asynchronous modulation effect at low frequency.

L2-02	PWM 7-segment/5-segment selection	**Range: 0-1**	**Factory value: 0**

Seven sections of the whole process

1: Seven-section/five-section automatic switching

The switching loss of VFD is large but the current ripple is small when PWM 7-segment continuous modulation is applied; The switch loss is small, the current ripple is large and the motor noise is increased under the 5-section intermittent commissioning mode.

L2-03	CBC current limiting enabling selection	**Range: 0-1**	**Ex-factory value: 1**

Prohibited

1: Enable, at this time, it can greatly reduce the overcurrent fault of the VFD, so as to achieve uninterrupted operation. If Err33 is faulty when the VFD is quickly limited for a long time, it indicates that the VFD is overloaded and needs to be stopped.

L2-04	Opening voltage point of brake resistor	**Range: 330.0V ～ 2000.0V**	**Ex-factory value: 690.0V<1>**

<1> Is the value of 380V VFD, which is 360.0V at 220V and 1160.0V at 660V.

This value is the opening voltage point of the brake resistor. When there is braking resistance and the bus voltage is greater than L2-04, the VFD will release excessive braking energy through the braking resistance to prevent overvoltage of the VFD.

L2-05	Undervoltage point setting	**Range: 200.0V ～ 900.0V**	**Ex-factory value: 350.0V<1>**

<1> Is the value of 380V VFD, which is 170.0V at 220V and 65.0V at 660V.

This value is the judgment point of VFD undervoltage fault. Err12 undervoltage fault will be output when the VFD bus voltage is lower than this value and in operation. Meanwhile, reset mode of undervoltage fault can be selected through F9-17.

L2-06	Random PWM depth setting	**Range: 0-6**	**Factory value: 0**

This function is only valid for VF. Random PWM can soften monotonous and harsh motor sound and reduce external electromagnetic interference. If the random PWM depth is different, the effect will not work. 0 means invalid.

L2-07	Hz operation mode selection	**Range: 0~2**	**Factory value: 0**

No current output;

1: Normal operation;

2: Output with shutdown DC brake current F1-16;

L2-08	Selection of low-frequency carrier limiting mode	**Range: 0~2**	**Factory value: 0**

Default limit mode;

1: The LF carrier frequency shall not be higher than 1/2 of the corresponding control mode;

2: Unlimited, carrier frequency is the same in all frequency bands.

5.24 Group L3 AIAO correction parameters

L3-00	AI1 display voltage 1	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 3.000V**

L3-01	AI1 Measured voltage 1	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 3.000V**
L3-02	AI1 display voltage	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 8.000V**
L3-03	AIMeasured voltage	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 8.000V**
L3-04	AI2 display voltage 1	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 3.000V**
L3-05	AI2 Measured voltage 1	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 3.000V**
L3-06	AI2 display voltage 2	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 8.000V**
L3-07	AI2 Measured voltage 2	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 8.000V**

Function code L3-00-L3-07 is used to correct the error between the actual input value of AI analog quantity and the AI value displayed by the VFD, so as to eliminate the influence of zero deviation and linearity of AI input port. This group of functional parameters has been calibrated before leaving the factory, and users can calibrate again according to the site use conditions, but the parameters will be restored together when the factory values are restored. Generally, no correction is required at the application site.

The measured voltage refers to the actual voltage measured by the multimeter and other measuring instruments. The displayed voltage refers to the voltage display value obtained by the VFD sampling. The displayed voltages of AI1 and AI2 correspond to the function codes U1-19 and U1-20 respectively.

During calibration, input two voltage values at each AI input port, and respectively input the value measured by the multimeter and the value read by U0 group into the above function code, then the VFD will automatically calibrate the zero deviation and gain of AI.

L3-12	AO1 Target voltage 1	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 3.000V**
L3-13	AO1 Measured voltage 1	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 3.000V**
L3-14	AO Target Voltage2	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 8.000V**
L3-15	AO Measured Voltage	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 8.000V**
L3-16	AO2 Target voltage 1	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 3.000V**
L3-17	AO2 Measured	**Range: - 9.999V ～**	**Ex-factory value:**

	voltage 1	**10.000V**	**3.000V**
L3-18	AO2 target voltage 2	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 8.000V**
L3-19	AO2 Measured voltage 2	**Range: - 9.999V ～ 10.000V**	**Ex-factory value: 8.000V**

Function codes L3-12~L3-19 are used to correct the error between the actual output value of AO analog quantity and the theoretical output value. It has been calibrated before leaving the factory. Generally, it is not required to be calibrated at the application site. When the factory value is restored, it will be restored to the factory calibration value.

The target voltage refers to the theoretical output voltage value of the VFD. U1-37 and U1-38 correspond to AO1 and AO2 target voltages respectively. Measured voltage refers to the actual output voltage value measured by the multimeter and other instruments.

When calibrating, the VFD will automatically calibrate the output value after the target voltage and measured voltage are input in the corresponding function code.

5.25 Group L4 master and slave control parameters

Master/slave control refers to data interaction between two or more VFDs through point-to-point communication, so as to achieve speed synchronization or current balance between multiple VFDs. It is often used in multi-drive occasions. For example, sand dredger, coal mine belt conveyor, etc. Please correctly set VFD communication group F8 before use.

When 485 communication is adopted for master-slave control, the VFD can no longer communicate with the upper computer adopting 485 communication mode, or the system will work abnormally. Precautions for using master-slave control:

- **Determined by the direction of master and slave**

When speed synchronization control is required for master-slave control, make sure that the actual running directions of the master and slave motors are the same before operation. When the directions of the main and the slave machines are inconsistent, the actual running direction of the motor can be changed by selecting F0-13 in the motor direction or changing the wiring sequence of the motor and the output terminal of the VFD.

- **Setting of master and slave control parameters**

When multiple VFDs drive the same load, there are two control modes for master and slave:

1) The host control mode F0-03 is set as vector, the slave is vector and torque control. This mode is used in most cases.

2) The host control mode F0-03 is set as VF, and the slave F0-03 is also set as VF. At this time, please set the appropriate droop rate F7-18. Refer to F7-18 for the setting method.

Otherwise, the current between master and slave will be unbalanced

3) When the mechanical transmission ratio of the master and slave is the same, the maximum frequency F0-14 of the master and slave VFDs must be the same

4) When host L4-02=0, the acceleration and deceleration time of the slave should be set to 0; When host L4-02=1, the acceleration and deceleration time of the slave should be the same as that of the host.

5) A system can only have one host but multiple slave machines. According to the communication mode used, only supports 485 communication.

L4-00	Master/slave control enabling selection	Range: 0-1	Factory value: 0

Prohibited

1: Enable after master/slave control

L4-01	Master and slave machine selection	Range: 0-1	Factory value: 0

Host: Host

1: Slave machine

L4-02	Host sending frequency selection	Range: 0-1	Ex-factory value: 0<2>

Operating frequency. At this time, the acceleration and deceleration time of the slave machine needs to be set to 0, or the speed of the master and slave machine will not be synchronized during acceleration and deceleration

1: Target frequency. At this time, it is necessary to set the same acceleration and deceleration time for the host and slave respectively. Otherwise, the speed of the host and slave will not be synchronized during acceleration and deceleration

L4-03	Slave follow host command source selection	Range: 0-1	Ex-factory value: 0<1>

Not follow, i.e. the slave will not run after the host runs, which can be used to check whether the system communication is normal.

1: Follow, i.e. the slave follows the command source of the host to synchronously start and stop.

L4-04	Slave receiving frequency coefficient	Scope: - 10.00 ～ 10.00	Ex-factory value: 1.00<1>
L4-05	Torque coefficient received by the slave	Scope: - 10.00 ～ 10.00	Ex-factory value: 1.00<1>
L4-06	Slave receiving torque offset	Range: - 50.00% - 50.00%	Ex-factory value: 0<1>

L4-04-L4-06 is only valid for the slave and is used to define the relationship between the data received by the slave and the host.

Suppose the data sent by the host is x, the data used by the slave is Y, and the data received by the slave is K (L4-04/L4-05), then Y=K * x+b. B=0 at frequency and b=L4-06 at torque.

L4-07	Threshold value of frequency deviation	**Range: 0.20% ～ 10.00%**	**Ex-factory value: 0.50%<1>**
L4-08	Detection time of master/slave communication disconnection	**Range: 0.0s ～ 10.0s**	**Ex-factory value: 0.1s<1>**

Set detection time for master/slave communication interruption, no detection when it is 0

Note:<1>only valid for slave,<2>only valid for host

5.26 Function parameters of L5 group brake

L5-00	Band-type brake control enabling selection	**Range: 0-1**	**Factory value: 0**

The brake control process is shown in Figure 5-31:

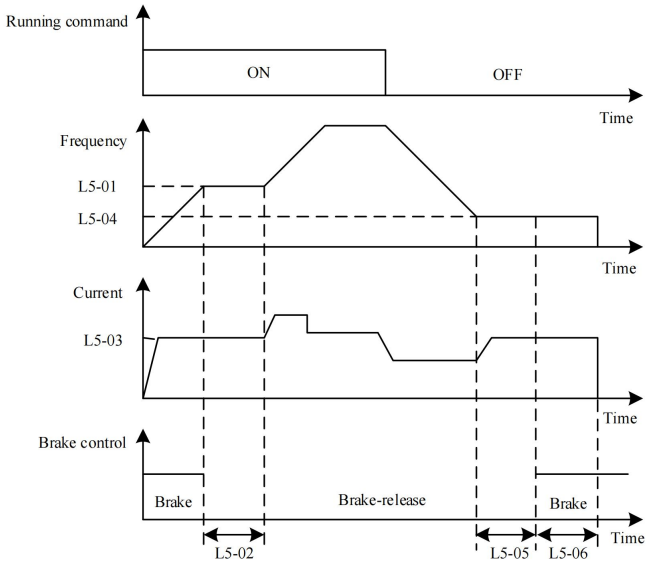


Figure 5-31. Brake control process chart

The process of band-type brake is as follows:

1) The VFD accelerates to the release frequency set by L5-01 after receiving the operation command.

2) When the frequency reaches the frequency set by L5-01, the brake release signal is output

through the function "Brake control output" of DO terminal 32 to control the brake release.

3) Operate at constant speed at release frequency. During this period, the VFD control output current does not exceed the current set by L5-03.

4) When the VFD reaches the set value L5-02 at the release frequency, it starts to accelerate to the set frequency.

5) Upon receiving the shutdown command, the VFD decelerates to the band-type brake frequency set by L5-04 and runs at constant speed at this frequency.

6) When the operating frequency reaches the setting value L5-04, after the holding time of the brake frequency set by the time delay L5-05, the brake signal is output through the function "Brake control output" of 32 # function of DO terminal to control the brake actuation.

7) When the time for the on-off output "band-type brake control" terminal to output the band-type brake signal reaches the set value L5-06, the VFD will lock the output and enter the shutdown state.

L5-01	Releasing frequency	**Range: 0.00Hz ～ 20.00Hz**	**Ex-factory value: 2.50Hz**

When the frequency reaches this set value, the switching value will output the brake signal from the "brake control" terminal to control the brake release. This value can be set according to the rated slip frequency of the motor. In V/F control, it can be set slightly larger.

L5-02	Holding time of release frequency	**Range: 0.0s-20.0s**	**Ex-factory value: 1.0s**

When the switching value outputs the "brake control" terminal and the brake signal is output, the VFD pauses accelerating within this set time. When this set time is reached, start the acceleration operation. Please reasonably set the time required for releasing the band-type brake.

L5-03	Current limit value during band-type brake	**Range: 50.0% ～ 200.0%**	**Ex-factory value: 120.0%**

The current of the VFD is limited to this value before accelerating from the brake release frequency, i.e. before the brake machinery is fully released.

L5-04	Band-type brake frequency	**Range: 0.00Hz ～ 20.00Hz**	**Ex-factory value: 1.50Hz**

Upon receiving the shutdown command, the VFD decelerates to the band-type brake frequency set by L5-04, runs at a constant speed at this frequency and waits for the output of band-type brake control signal.

L5-05	Band-type brake delay time	**Range: 0.0s-20.0s**	**Ex-factory value:**

			0.0s

When the operating frequency reaches the band-type brake frequency, the band-type brake waiting time set by delay L5-05. Then the on-off output "brake control" terminal outputs the release signal to control the brake.

L5-06	Band-type brake frequency maintenance time	**Range: 0.0s-20.0s**	**Ex-factory value: 1.0s**

Keep the time set by L5-06 after the switching value output "brake control" terminal outputs the release signal to ensure that the brake machinery is fully engaged. Then the VFD blocks the output and enters the shutdown state.

5.27 L6 group sleep wakeup function parameters

This group of parameters is mainly used to realize the sleep and wake-up function in the application of constant pressure water supply. Please note the following matters when using:

1) Please select the control mode L6-00 for sleep function according to application requirements

2) If the frequency source uses PID, whether the sleep state PID operates depends on the function code FA-29. At this time, the PID shutdown operation must be selected (FA-29=1)

3) Generally, please set the wakeup frequency ((100.0% - L6-03 wakeup difference) * F0-14 maximum output frequency) to be greater than the sleep frequency L6-01

L6-00	Selection of sleep mode	**Range: 0~3**	**Factory value: 0**

The snooze feature is invalid

1: Digital input terminal DI control sleep function

When the digital input DI terminal of the stator is defined as No. 53 function, when DI is valid, it will be dormant after the time delay L6-02 is set.

2: The sleep function is controlled by the PID setting value and feedback value. At this time, the VFD frequency source F0-06 must be PID, refer to Figure 5-28

3: Control the sleep function according to the operating frequency

During the operation of VFD, when the set frequency is less than or equal to L6-01 sleep frequency, it enters the sleep state, otherwise

If the set frequency of the VFD is greater than the wakeup frequency (L6-03 wakeup difference * F0-14 maximum output frequency), it enters the wakeup state.

L6-01	Frequency of dormancy	**Range: 0.00Hz ～ 50.00Hz**	**Ex-factory value: 0.00Hz**

<1> This function is invalid when L6-00=1

The sleep function takes effect and the operating frequency is lower than this value. After the sleep delay time L6-02, the VFD starts to sleep (stop).

See diagram: A=PID output; B=PID feedback value.

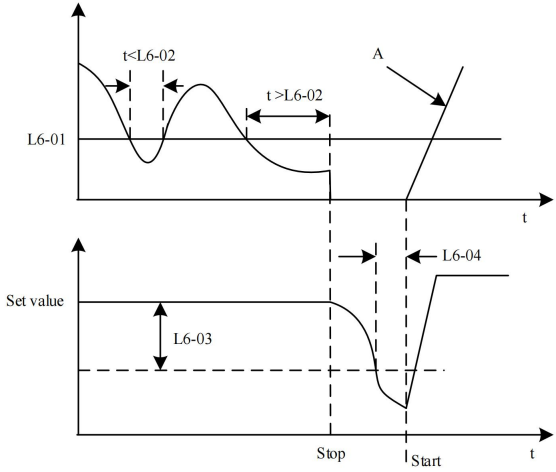


Figure 5-32. Frequency chart of sleep process

L6-02	Sleep delay time	**Range: 0.0s-3600.0s**	**Ex-factory value: 60.0s**

Set sleep delay time. Refer to Figure 5-32 for function function

L6-03	Wakeup difference value	**Range: 0.0% - 100.0%**	**Ex-factory value: 10.0%**

When L6-00=2, this parameter takes the maximum pressure as the reference object, i.e. the maximum pressure is 100%;

When L6-00=3, this parameter takes the maximum frequency F0-14 as the reference object, i.e. the maximum frequency is 100%;

When the wakeup difference between the given value and the feedback value exceeds the value defined in this parameter, the PID regulator restarts after the wakeup delay L6-04.

FA-04=0 positive action, wakeup value=set value - wakeup difference; FA-04=1 reverse action, wakeup value=set value+wakeup difference.

Refer to the diagram:

C=Wakeup value, when parameter FA-04=1.

D=Wakeup value, when parameter FA-04=0.

E=If the feedback value is greater than the wake-up value and the duration exceeds parameter L6-04 (wake-up delay), the PID function will restart.

F=If the feedback value is less than the wake-up value and the duration exceeds parameter L6-04 (wake-up delay), the PID function will restart.

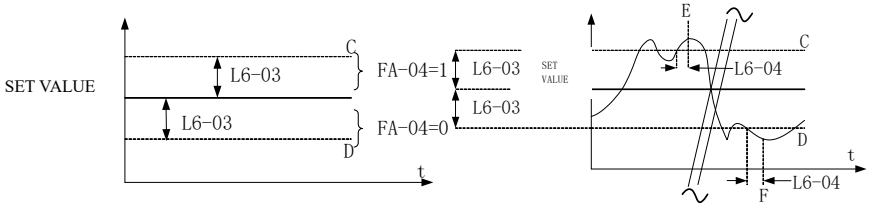


Figure 5-33. Wakeup Diagram

L6-04	Wakeup delay	Range: 0.0s-3600.0s	Ex-factory value: 0.5s

Set the wakeup delay time. Refer to Figure 5-33 for the function.

L6-05	Selection of dormant delay frequency output	Range: 0-1	Factory value: 0

PID automatic adjustment

1: Sleeping frequency L6-01

5.28 U0 group fault recording parameters

The VFD provides 3 groups of fault recording parameters, all of which are read-only parameters, which is convenient for users to view and eliminate relevant information of VFD faults. For details, please refer to Appendix B Function Code Parameter Table or Chapter VII<<Fault Diagnosis Level Countermeasures>>.

5.29 U1 group status monitoring parameters

U1 parameter group is used to monitor the relevant variable information during the operation of VFD. The customer can view it through the panel for the convenience of on-site commissioning, and can also read the parameter group value through communication for the upper computer monitoring. The communication address is 0x71xx.

U1-00~U1-31 are operation and shutdown monitoring parameters defined in F7-29 and F7-30.

U1-00	Operating frequency	Minimum unit: 0.01Hz
U1-01	Set frequency	Minimum unit: 0.01Hz
U1-02	Bus voltage	Minimum unit: 0.1V
U1-03	output voltage	Minimum unit: 1V
U1-04	Output current	Minimum unit: 0.1A
U1-05	output power	Minimum unit: 0.1kW

U1-06	DI input status, hexadecimal number	Minimum unit: 1

Display the current DI terminal input status value. When converted into binary data, each bit corresponds to one DI input signal, 1 represents the input as high level signal and 0 represents the input as low level signal. The correspondence between each bit and input terminal is as follows:

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
DI1	DI2	DI3	DI4	DI5	hold	hold	hold
Bit8	Bit9	Bit10	Bit11	Bit12	Bit13	Bit14	Bit15
hold	hold	hold	hold	hold	hold	hold	hold

U1-07	DO output status, hex digits	Minimum unit: 1

Display the current DO terminal output status value. When converted into binary data, each bit corresponds to a DO signal, 1 for high output level and 0 for low output level. The correspondence between each bit and output terminal is as follows:

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Relay 1	Relay 2	Y1	hold	hold	hold	hold	hold
Bit8	Bit9	Bit10	Bit11	Bit12	Bit13	Bit14	Bit15
hold	hold	hold	hold	hold	hold	hold	hold

U1-08	AI1 corrected voltage	**Minimum unit: 0.01V**
U1-09	AI2 corrected voltage	**Minimum unit: 0.01V**
U1-10	PID Setpoint, PID Setpoint (%) * FA-05	**Minimum unit: 1**
U1-11	PID Feedback, PID Feedback Value (%) * FA-05	**Minimum unit: 1**
U1-12	Count value	**Minimum unit: 1**
U1-13	Value of length	**Minimum unit: 1**
U1-14	Motor speed	**Minimum unit: 1**
U1-15	PLC stage, current section during multi-stage speed operation	**Minimum unit: 1**
U1-16	PULSE pulse input frequency	**Minimum unit: 0.01KHz**
U1-17	Feedback speed, actual operating frequency of motor	**Minimum unit: 0.1Hz**
U1-18	F7-38 Remaining time of timing time	**Minimum unit: 0.1min**
U1-19	AI1 Voltage before correction	**Minimum unit: 0.01V**
U1-20	AI2 Voltage before correction	**Minimum unit: 0.01V**
U1-21	Refer to F7-71 for HDI high-speed pulse sampling line speed	**Minimum unit: 1m/min**
U1-22	Load speed display (set load speed during shutdown), refer to F7-31	**Minimum Unit: Custom**
U1-23	This power-on time	**Minimum unit: 1min**
U1-24	This operation time	**Minimum unit: 0.1min**

U1-25	PULSE pulse input frequency, only different from U1-16 unit	**Minimum unit: 1Hz**
U1-26	Set frequency value for communication	**Minimum unit: 0.01%**
U1-27	Main frequency display	**Minimum unit: 0.01Hz**
U1-28	Auxiliary frequency display	**Minimum unit: 0.01V**
U1-29	Target torque, 100% of motor rated torque	**Minimum unit: 0.1%**
U1-30	Output torque, 100% of motor rated torque	**Minimum unit: 0.1%**
U1-31	Output torque, 100% of rated current of VFD	**Minimum unit: 0.1%**
U1-32	Upper torque limit, 100% of rated current of VFD	**Minimum unit: 0.1%**
U1-33	VF separation target voltage	**Minimum unit: 1V**
U1-34	VF separation output voltage	**Minimum unit: 1V**
U1-36	Motor serial number currently used	**Minimum unit: 1**
U1-37	AO1 target voltage	**Minimum unit: 0.01V**
U1-38	AO2 target voltage	**Minimum unit: 0.01V**
U1-39	Running state of VFD, 0: shutdown, 1: forward rotation, 2: reverse rotation, 3: fault	**Minimum unit: 1**
U1-40	Current fault of VFD	**Minimum unit: 1**
U1-41	Remaining time of agent time limit	**Minimum unit: 1h**
U1-42	Current of AC incoming line	**Minimum unit: 0.1A**
U1-43	PLC current stage remaining time	**Minimum unit: 0.1**
U1-47	Cumulative operating time 1	**Minimum unit: 1h**
U1-48	Cumulative operating time 2	**Minimum unit: 1min**

Note: accumulated running time=accumulated running time 1+accumulated running time 2=U1-47+U1-48

Chapter VI EMC (electromagnetic compatibility)

Definition

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

Introduction to EMC Standard

In accordance with the requirements of national standard GB/T12686.3, the VFD shall meet the requirements of electromagnetic interference and anti-electromagnetic interference.

The current products of our company implement the latest international standard: IEC/EN61800-3:2004 (Adjustable speed electrical power systems part 3: EMC requirements and specific test methods), which is equivalent to the national standard GB/T1268.3.

IEC/EN61800-3 mainly inspects the VFD from the aspects of electromagnetic interference and anti-electromagnetic interference. The electromagnetic interference mainly tests the radiated interference, conducted interference and harmonic interference of the VFD (corresponding to the VFD for civil use has this requirement). Anti-electromagnetic interference is mainly applied to the conduction immunity, radiation immunity, surge immunity, fast burst pulse group immunity ESD immunity and power low-frequency terminal immunity (specific test items include: 1. immunity test of input voltage sag, interruption and change; 2. commutation gap immunity test; 3. harmonic input immunity test; 4. input frequency change test; 5. input voltage imbalance test; 6. input voltage fluctuation test). Tested according to the strict requirements of IEC/EN61800-3 above, our products are installed and used according to the guidance shown in 7.3, and will have good electromagnetic compatibility under general industrial environment.

EMC guidance

Influence of harmonic wave:

Higher harmonics of the power supply can damage the VFD. Therefore, AC input reactor is recommended to be installed in some places with poor power grid quality.

Electromagnetic interference and installation precautions:

There are two types of electromagnetic interference: one is the interference of

electromagnetic noise from the surrounding environment to the VFD, and the other is the interference of the VFD to the surrounding equipment.

Precautions for installation:

(1) The grounding wire of VFD and other electrical products shall be well grounded;

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

(3) It is recommended to use shielded cable or steel tube shielded power line for the output power line of VFD, and the shielding layer shall be reliably grounded. For the lead of the disturbed equipment, it is recommended to use twisted shielded control line, and the shielding layer shall be reliably grounded;

(4) If the motor cable length exceeds 100m, an output filter or reactor shall be installed.

Treatment methods for interference caused by surrounding electromagnetic equipment to VFD:

Generally, the electromagnetic impact on the VFD is caused by a large number of relays, contactors or electromagnetic brakes installed near the VFD. In case of malfunction of VFD due to interference, the following solutions are recommended:

(1) Install surge suppressors on the devices generating interference;

(2) Install a filter at the input end of the VFD, refer to 7.3.6 for details;

(3) The lead of control signal line and detection line of VFD shall be shielded cable and the shielding layer shall be grounded reliably.

Treatment methods for interference caused by VFD to surrounding equipment:

(1) The noise of this part is divided into two types: one is the radiated interference of the VFD, and the other is the conducted interference of the VFD. These two interferences cause the surrounding electrical equipment to be subject to electromagnetic or electrostatic induction. In this way, malfunction of the equipment occurs. For several different interference situations, refer to the following methods:

(2) For instruments, receivers and sensors used for measurement, the general signal is weak. If they are close to the VFD or in the same control cabinet, they are easy to be interfered and mis-operated. It is suggested to adopt the following methods: try to keep away from the interference source; Do not arrange the signal line in parallel with the power line, especially do not bind them together in parallel; Shielded wire shall be used for signal line

and power line with good grounding; Apply ferrite magnetic ring on the output side of the VFD (select suppression frequency within 30 ～ 1000mHz), and wind 2 ～ 3 turns in the same direction. For bad condition, install EMC output filter;

(3) When the interfered equipment and VFD use the same power supply, conduction interference will be caused. If the above methods cannot eliminate the interference, EMC filter shall be installed between the VFD and the power supply (refer to 7.3.6 for selection operation);

Peripheral equipment shall be earthed separately to eliminate interference caused by leakage current of grounding wire of VFD during common earthing.

Leakage current and treatment:

There are two forms of leakage current when using VFD: one is leakage current to ground; The other is the line-to-line leakage current.

Factors affecting ground leakage current and solutions:

(1) There is distribution capacitance between the conductor and the earth. The larger the distribution capacitance is, the larger the leakage current is; Effectively reduce the distance between VFD and motor to reduce distributed capacitance. The larger the carrier frequency, the greater the leakage current. The leakage current can be reduced by reducing the carrier frequency. However, reducing the carrier frequency will increase the motor noise. Please note that adding reactors is also an effective way to solve the leakage current.

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

(2) Factors causing leakage current between lines and solutions:

Distribution capacitance exists between output wiring of VFD. If the current passing through the circuit contains higher harmonics, resonance may be caused to generate leakage current. In this case, the thermal relay may malfunction.

The solution is to reduce carrier frequency or install output reactor. When using VFD, it is suggested not to install thermal relay between VFD and motor, and use electronic overcurrent protection function of VFD.

Precautions for installing EMC input filter at the power input end:

When installing an EMCS input filter at the power input, pay attention to the following:

(1) Please use the filter in strict accordance with the rated value; As the filter belongs to Class I electric appliance, the metal shell of the filter shall be in good contact with the metal

ground of the installation cabinet in a large area, and shall have good conductivity, otherwise, it will cause electric shock and seriously affect the EMC effect;

(2) Through EMC test, it is found that the filter ground must be connected to the same public ground with the VFD PE terminal, or the EMC effect will be seriously affected;

(3) The filter shall be installed as close as possible to the power input end of the VFD;

(4) EMC input filter shall not be used at the output end of VFD for filtering.

Chapter VII Fault Diagnosis and Countermeasures

Fault alarm and countermeasures

In case of failure during system operation, the VFD will immediately protect the motor to stop output, and the corresponding VFD failure relay contact acts. The VFD panel displays the fault code, and the corresponding fault types and common solutions are shown in the following table. The list in the table is for reference only. Do not repair or transform it without authorization. If the fault cannot be removed, please seek technical support from our company or product agent.

Table 7-1 Fault Alarm and Countermeasures

Name of fault	Panel display	Troubleshoot the fault cause	Countermeasures for fault treatment
Inversion module protect	Err01	1. Whether there is interphase or ground short circuit at the motor connecting terminal U, V and W 2. Whether the module is overheated 3. Check whether the internal wiring of VFD is loose 4. Whether the main control board, drive board or module are normal	1. Contact short circuit 2. Whether the fan and air duct are normal 3. Connect all loose wires 4. Seeking technical support
Overcurrent during acceleration	Err04	1. Output circuit of VFD is grounded or short-circuited 2. Incorrect motor parameters 3. Too short acceleration time 4. V/F torque increase or improper curve 5. Low input voltage 6. Start the rotating motor 7. Sudden loading during acceleration 8. Small selection of VFD	1. Eliminate peripheral faults 2. Check and identify parameters 3. Increase acceleration time 4. Regulate V/F lifting torque or curve 5. Regulate the voltage to the normal range 6. Select speed tracking start or wait for the motor to stop before starting 7. Remove sudden load 8. Select VFD with higher power level

Overcurrent during deceleration	Err05	1. Output circuit of VFD is grounded or short-circuited 2. Incorrect motor parameters 3. Too short deceleration time 4. Low input voltage 5. Sudden load increase during deceleration 6. Without brake unit and brake resistor 7. Excessively large magnetic flux brake gain	1. Eliminate peripheral faults 2. Identify motor parameters 3. Increase deceleration time 4. Regulate the voltage to the normal range 5. Remove sudden load 6. Brake unit and resistance added 7. Reduced Flux Brake Gain
Overcurrent during constant speed operation	Err06	1. Output circuit of VFD is grounded or short-circuited 2. Incorrect motor parameters 3. Low input voltage 4. Sudden load during operation 5. Small selection of VFD	1. Eliminate peripheral faults 2. Check and identify parameters 3. Regulate the voltage to the normal range 4. Remove sudden load 5. Select VFD with higher power level
Overpressure during acceleration	Err08	1. Excessive input voltage 2. The motor is driven by external force during acceleration 3. Too short acceleration time 4. Without brake unit and brake resistor 5. Incorrect motor parameters	1. Regulate the voltage to the normal range 2. Cancel additional power or add brake resistor 3. Increase acceleration time 4. Install brake unit and resistance 5. Check and identify parameters
Overpressure during deceleration	Err09	1. Excessive input voltage 2. During deceleration, the motor is driven by external force 3. Too short deceleration time 4. Without brake unit and brake resistor	1. Regulate the voltage to the normal range 2. Cancel additional power or add brake resistor 3. Increase deceleration time 4. Install brake unit and resistance
Overvoltage during constant speed operation	Err10	1. Excessive input voltage 2. The motor is driven by external force during acceleration	1. Regulate the voltage to the normal range 2. Cancel additional power or add brake resistor
Under voltage fault	Err12	1. Instantaneous power failure 2. The input voltage of VFD is not within the range required by the specification 3. Bus voltage is abnormal 4. Rectifier bridge and buffer resistance are abnormal 5. Drive board abnormality 6. Control board abnormality	1. Reset fault 2. Regulate the voltage to the normal range 3. Seeking technical support
Drive overload fault	Err13	1. Whether the load is too large or the motor is blocked 2. Small selection of VFD	1. Reduce load and check motor and mechanical condition 2. Select VFD with higher power level

Motor overload fault	Err14	1. Whether the setting of motor protection parameter F9-01 is appropriate 2. Whether the load is too large or the motor is blocked 3. Small selection of VFD	1. Set this parameter correctly 2. Reduce load and check motor and mechanical condition 3. Select VFD with higher power level
Drive overheating	Err15	1. Excessively high ambient temperature 2. Blockage of air duct 3. Fan damaged 4.Damaged module thermistor 5. Damage of VFD module	1. Reduce the ambient temperature 2. Clean the air duct 3. Replace the fan 4. Replace thermistor 5. Replace VFD module
Software overcurrent	Err16	1. Whether the parameter settings of F7-61 and F7-62 are reasonable 2. Whether the load is too large or the motor is blocked 3. Small selection of VFD model	1.If software overcurrent is not required, the fault logic can be closed by F9-21=0 2.The overcurrent judgment value and judgment time of F7-61 and F7-62 can be appropriately increased 3.Reduce load and check motor and mechanical condition 4.Select VFD with proper power
Current detection fault	Err17	1. Whether the internal wiring of frequency conversion is loose 2. Whether the current detection device is normal 3. Whether the main control panel or drive panel is normal	1. Check wiring 2. Seeking technical support
Short circuit to ground fault	Err20	Motor short circuit to ground	Replace cable or motor
Tune timeout fault	Err21	1. Tuning time>(acceleration time+deceleration time+90s) 2. Motor parameters are not set correctly	1. Input correct motor parameters and re-learning 2. Replace cable or motor 3. Seeking technical support
Input phase loss fault	Err23	1. Three-phase input power supply is abnormal 2. Drive board abnormality 3. Lightning protection board abnormality 4. Main control panel abnormality	1. Check and eliminate problems in peripheral circuit 2. Seeking technical support
Output phase loss fault	Err24	1. The lead wire from VFD to motor is abnormal 2. Three-phase output imbalance of VFD during motor operation 3. Drive board abnormality 4. Module abnormality	1. Eliminate peripheral faults 2. Check whether the motor three-phase winding is normal and remove the fault 3. Seeking technical support

Parameter reading and writing fault	Err25	The EEPROM chip is damaged	Replace the main control panel
Communication failure	Err27	1. Whether the upper computer works 2. Whether the communication wiring is normal 3. Whether the communication parameter F8 group is correct	1. Check upper computer wiring, etc 2. Check communication wiring 3. Check F8 group parameters
External fault	Err28	1. Input external normally open or normally closed fault signal through multi-function DI terminal	1. Fault reset
Speed deviation too large	Err29	1. Load too heavy and set acceleration time too short 2. Unreasonable setting of fault detection parameters F9-31 and F9-32	1. Extended set acceleration and deceleration time 2. Reset F9-31, F9-32
User defined Fault 1	Err30	1. User-defined fault 1 signal via multi-function terminal DI input	1. RESET TO RESET
User defined Fault 2	Err31	2. User-defined fault 2 signal input via multi-function terminal DI	1. RESET TO RESET
PID during operation Feedback loss	Err32	1. PID feedback less than FA-13 setpoint	1. Check feedback signal or reset FA-13
Fast current limiting	Err33	1. Excessive load or locked-rotor 2. Set acceleration time too short	1. Reduce the load or replace with a high-power VFD 2. Appropriately extend the acceleration time
Load shedding fault	Err34	1. The conditions for unloading detection are met. Refer to F9-28-F9-30 for details	1. Reset or reset detection conditions
Input power supply fault	Err35	1. The input voltage is not within the specified range 2 . Frequent power-on and power-off	1. Input voltage adjustment 2. Extended power-on and power-off period
Parameter storage abnormal	Err37	Communication between DSP and EEPROM chip is abnormal	1. Replace the main control panel 2. Seeking manufacturer service
This operation time reach	Err39	1. VFD operation time>F7-38 setting value	1. RESET TO RESET
Cumulative operation Arrival of time	Err40	1. The accumulated running time reaches the set value F7-20	1. Use the parameter initialization function 2 to clear the recorded time or reset the accumulated running time

Switching motor during operation	Err42	Switching the motor during operation via terminals	Switch the motor after shutdown
Motor over speed	Err43	1. Unreasonable setting of over-speed detection time F9-34 2. Motor not connected when operating in open loop vector mode	When the motor is not connected, the control mode is changed to VF mode Reset F9-34 parameter
Magnetic pole position Detection failed	Err45	Pole position detection failed	F3-27 changed to 0 Contact the manufacturer for technical support
Master slave control Communicati on offline	Err46	1. Host not set but slave set 2. The communication line is abnormal or the communication parameters are incorrect	1. Set the host and reset the fault 2. Check communication line and communication parameter F8 group

Common faults and solutions

The following faults may be encountered during the use of VFD. Please refer to the following methods for simple fault analysis.

Table 7-2 Common Faults and Troubleshooting

S/N	Phenomenon of failure	Possible causes	Solution to the problem
1	No display after power-on	1. No or too low grid voltage 2. The switching power supply on the drive board of VFD is faulty 3. Damaged rectifier bridge 4. Damaged buffer resistance of VFD 5. Control panel and keyboard failure 6. Disconnection between control panel, drive panel and keyboard	1. Check the input power supply 2. Check bus voltage 3. Re-plug the keyboard and 30-core cable 4. Seeking manufacturer service
2	Err20 "displayed on power Alarms are given	1. Short circuit to ground of motor or output line 2. Damaged VFD	1. Measure insulation of motor and output line with megger 2. Seeking manufacturer service
3	Frequently report Err15 (module overheating) fault	1. Carrier frequency is set too high 2. Fan damaged or air duct blocked 3. Damaged internal components of VFD (thermocouple or others)	1. Reduce carrier frequency (F0-26) 2. Replace the fan and clean the air duct 3. Seeking manufacturer service
4	The motor does not rotate after the VFD	1. Motor and motor wire 2. VFD parameter setting error (motor parameter) 3. Poor contact between drive	1. Reconfirm the wiring between VFD and motor 2. Replace the motor or remove the mechanical fault

S/N	Phenomenon of failure	Possible causes	Solution to the problem
	operates	board and control board 4. Drive plate fault	3. Check and reset motor parameters
5	DI terminal failure	1. Parameter setting error 2. External signal error 3. DI dial switch is in wrong position 4. Control panel failure	1. Check and reset relevant parameters of F5 group 2. Reconnect external signal line 3. Reconfirm whether the position of DI dial switch is consistent with the wiring mode 4. Seeking manufacturer service
6	VFD frequently reports overcurrent and overvoltage faults	1. Incorrect motor parameter setting 2. Improper acceleration and deceleration time 3. Load fluctuation	1. Reset motor parameters or perform motor tuning 2. Set proper acceleration and deceleration time 3. Seeking manufacturer service

Common faults of synchronous motor and solutions

Motor with heavy load start

If the motor cannot be started normally with load, try the following operations:

1) Increase torque current upper limit (F3-21)

When the load is greater than the torque output of the VFD, the VFD will be in the locked-rotor state, and F3-21 can be appropriately increased.

2) Increase the speed PI regulation parameter, modify the resistance value or static identification to correct the motor resistance

The motor resistance parameter (F4-17) significantly affects the motor's on-load capacity at low speeds. When the resistance parameter (F4-17) exceeds the actual value of the resistance too much (for example, 200% of the actual value of the resistance), it may cause the motor to rotate at a low speed at the torque upper limit current. When the resistance parameter (F4-17) is too much lower than the actual value of the resistance (e.g. 50% of the actual value of the resistance), it may cause the motor to operate in a step mode or to run for a while and stop for a while. Increasing the speed P-value at low speeds F3-04 and decreasing the speed loop integral time F3-05 may improve the problem caused by too small resistance parameters.

Regulate PI parameters of speed loop (not required in general)

1) In general, too high speed PI regulation ratio coefficient will cause high frequency vibration

of speed and obvious increase of mechanical vibration or electromagnetic noise; Too small proportional coefficient and too small integral time or too large load inertia will cause low frequency oscillation of speed and obvious speed overshoot. If there is no discharge measure, overvoltage may occur.

2) If it is necessary to adjust the speed PI parameter, first increase the integral time, increase the proportion when the speed does not fluctuate, and then reduce the integral time if the effect is not ideal. Generally, the larger the inertia of the system is, the smaller the integral time is and the larger the proportion coefficient is. To increase the velocity filter coefficient, the integral time and the proportion can be increased properly.

Note: The inertia of the drive system is equal to the inertia of the motor plus the load inertia. The inertia of the motor is directly proportional to the mass of the motor and the square of the motor diameter; The transmission load inertia is directly proportional to the load mass and the square of the drive wheel diameter; If there is a deceleration or acceleration device, the inertia is directly proportional to the acceleration ratio and inversely proportional to the deceleration ratio.

For load with large inertia, if fast speed response is required, integral time shall be reduced, but speed overshoot may be easily caused, resulting in overvoltage of VFD, and discharge device shall be provided. If there is no discharging device, increase the integral time.

Regulate PI parameters of current loop (not required in general)

In general, increasing the proportion coefficient and integral coefficient will accelerate the current response speed, but too much will cause speed oscillation (specifically, the motor does not rotate, or the forward and reverse rotation are disordered, and the high-frequency electromagnetic noise is generated at the same time). If the adjustment is required, adjust the proportion coefficient first, and if the effect is not ideal, adjust the integral coefficient. Current loop PI parameters are related to the motor stator resistance, inductance, system carrier frequency and current sampling filtering time. When the system carrier frequency is unchanged, the proportional coefficient is directly proportional to the inductance and the integral coefficient is directly proportional to the resistance. Therefore, the adjustment direction of this parameter can be greatly determined by the identified parameters.

Small inductance motor

$\frac{110*I_{\mathrm{IN}}}{I_{\mathrm{MN}}}\frac{150*I_{\mathrm{IN}}}{I_{\mathrm{MN}}}L > \frac{5*10^{-5}*V_{\mathrm{dc}}}{I_N}$For servo motors or other low inductance motors, it is recommended that the inductance of each phase of the stator shall meet the following conditions (unit [H]):, bus voltage of VFD; Motor rated current. If the motor inductance is too

small, the motor current ripple will be large. In case of large current, the ripple current of the VFD will enter the wave-by-wave current limiting state. The maximum value of F3-21 in the program is limited to, which is the rated current of the VFD and the rated current of the set motor. It is required to reduce the torque upper limit to set the value of F3-21 according to the actual situation. The larger the current ripple, the smaller F3-21 should be. Low current, current regulation may be too slow at high speed (the specific manifestation is that the current of the motor at high speed is obviously larger than the actual required current, and the current fluctuates obviously), so it is necessary to increase the current PI ratio parameter. Too much current may cause the current out of control, and the VFD may also enter the wave-by-wave current limiting state (it occurs at low speed, specifically, the motor does not rotate, or the forward and reverse rotation are disorderly, and the high-frequency electromagnetic noise is generated at the same time).$V_{\mathrm{dc}} I_N I_{\mathrm{IN}} I_{\mathrm{MN}}$

Appendix A Modbus Communication Protocol

The VFD provides RS232/RS485 communication interface and supports Modbus communication protocol. The user can realize centralized control through computer or PLC, set the operation command of VFD through the communication protocol, modify or read the function code parameters, read the working state and fault information of VFD, etc.

1. Content of Agreement

The serial communication protocol defines the content and format of information transmitted in serial communication. Including: host polling (or broadcast) format; Coding method of host, including function code requiring action, transmission data and error check, etc. The response of the slave also adopts the same structure, including action confirmation, return data and error check. If the slave machine makes an error when receiving the information or fails to complete the action required by the host machine, it will organize a fault information to be fed back to the host machine as a response.

2. Application mode

The VFD is connected to the "single master and multiple slave" PC/PLC control network with RS232/RS485 bus.

3. Bus structure

(1) Interface mode RS232/RS485 hardware interface
(2) Mode of transmission

Asynchronous serial, half-duplex transmission mode. At the same time, the master and slave can only have one sending data and the other can only receive data. In the process of serial asynchronous communication, data is sent frame by frame in the form of message.

(3) Topology structure

Single-host multi-slave system. The setting range of slave address is 1~247, and 0 is the broadcast communication address. The slave address in the network must be unique.

4. DESCRIPTION OF AGREEMENT

VFD communication protocol is an asynchronous serial master/slave Modbus communication protocol. Only one device (host) in the network can establish a protocol (called "query/command"). Other devices (slave) can only respond to the "query/command" of the host by providing data or make corresponding actions according to the "query/command" of the host. Host here refers to personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., and slave machine refers to VFD. The host can

communicate with a slave independently and release broadcast information to all slave computers. For the "query/command" of the host with separate access, the slave machine shall return a message (called response). For the broadcast message sent by the host, the slave machine does not need to feed back the response to the host machine.

5. Communication frame structure

Modbus protocol communication data format of VFD is as follows:.

When using RTU mode, the message sending shall start with a pause interval of at least 3.5 characters. Multiple character times at the network baud rate are easiest to implement (T1-T2-T3-T4 in the following figure). The first domain of the transmission is the device address. The available transport characters are hexadecimal 0... 9, A... F. The network device continuously detects the network bus, including pause interval time. When the first domain (address domain) receives, each device decodes to determine whether it is sent to itself. A pause of at least 3.5 characters after the last transmitted character marks the end of the message. A new message can start after this pause. The entire message frame must be transmitted as a continuous stream. If there is a pause time of more than 1.5 characters before the frame completes, the receiving device will refresh the incomplete message and assume that the next byte is the address domain of a new message. Similarly, if a new message begins with the previous message within less than 3.5 characters, the receiving device will consider it a continuation of the previous message. This will result in an error because the value in the last CRC field is not likely to be correct.

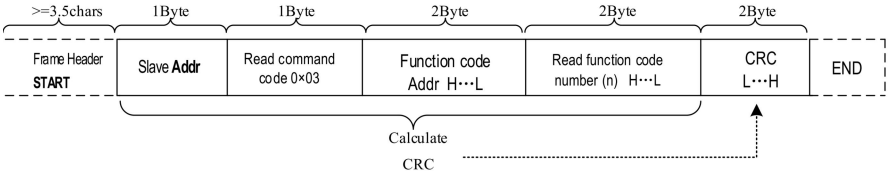
RTU frame format:

<table>
<tr><td>Frame header START</td><td>Character time</td></tr>
<tr><td>Slave address ADR</td><td>Correspondence address: 1-247 (set by F8-02)</td></tr>
<tr><td>Command code CMD</td><td>Reading slave parameters; Write slave parameters</td></tr>
<tr><td>Data Content DATA (N-1)</td><td rowspan="4">Content of data:
Function code parameter address, number of function code parameters, function code parameter value, etc.</td></tr>
<tr><td>Data Content DATA (N-2)</td></tr>
<tr><td></td></tr>
<tr><td>DATA CONTENT DATA0</td></tr>
<tr><td>CRC CHK Low</td><td rowspan="2">Detection value: CRC16 check value. When transmitting, the low byte precedes the high byte. See the description of CRC check in this section for the calculation method.</td></tr>
<tr><td>CRC CHK High</td></tr>
<tr><td>END (END)</td><td>Character time</td></tr>
</table>

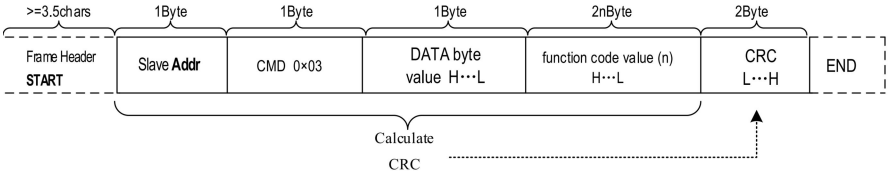
CMD and DATA

Command code: 03H, N words (word), 12 words at most and N=1-12. The specific format is as follows:

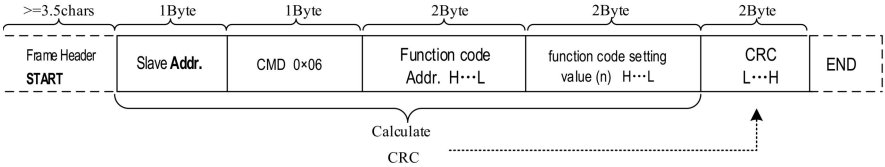
Host Read Command Frame



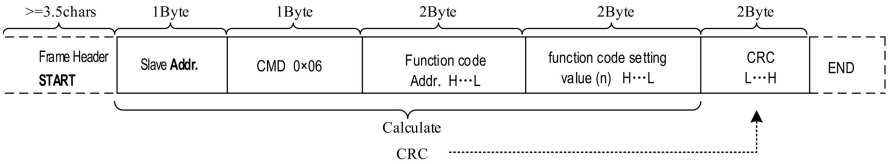
Slave machine read response frame



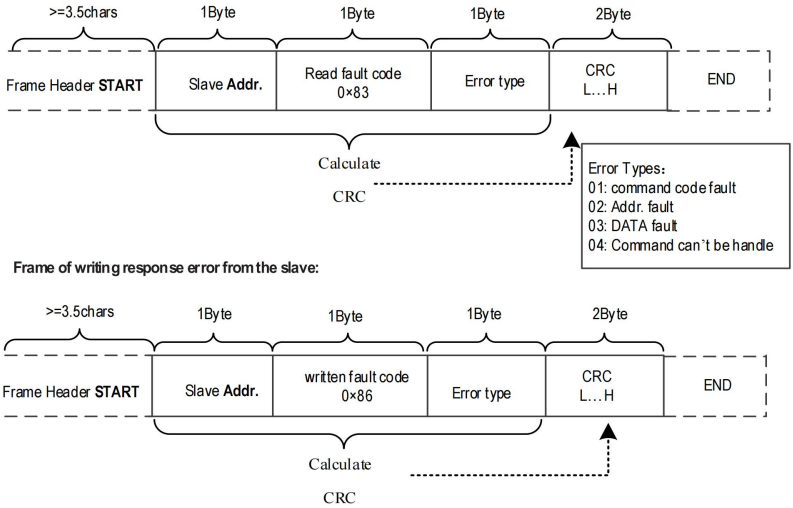
Host write command frame



Slave machine write response frame



If the slave detects a communication frame error, or if the reading and writing are unsuccessful due to other reasons, it will reply to the error frame. Slave station reading response error frame:



Example: Read 2 consecutive parameter contents from F0-03 of VFD with slave address F8-02 as 01.

Command from the master machine:

Frame Header >=3.5chars	Slave **Addr.** 0x01	Read function code 0×03	Function code Addr. 0xF0 0x03	Read function code value 0x00 0x02	**CRC** 0x07 0x0B	END

Reply from the slave machine:

Frame Header >=3.5chars	Slave **Addr.** 0x01	Read function code 0×03	DATA byte value 0×04	F0_03 parameter value 0x00 0x00	F0_04 parameter value 0x00 0x00	**CRC** 0xFA 0x33	END

Note: If the command is not written successfully, the reason for the failure will be replied.

6. Check mode (CRC check mode)

CRC (Cyclic Redundancy Check) uses RTU frame format, and the message includes the error detection domain based on CRC method. CRC domain detects the entire message content. The CRC field is two bytes and contains 16-bit binary values. It is calculated by the transmission device and added to the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two CRC values are not equal, the transmission is wrong. CRC stores 0xFFFF first and then calls a process to process the continuous 8-bit bytes in the message with the value in the current register. Only 8Bit data in each character is valid for CRC, start and stop bits and parity bits are invalid. During CRC generation, each 8-bit character is individually different or (XOR) from the register content and the result moves in the direction of the least significant bit, with the most significant bit filled with 0. The LSB is extracted for detection, if the LSB is 1, the register individually differs from the preset value or if the LSB is 0, it is not performed. The whole process shall be repeated for 8 times. When the last bit (bit 8) has been completed, the next 8 bit byte in turn differs independently from the current value of the register or. The value in the final register is the CRC value after all bytes in the message are executed. When CRC is added to the message, the low byte is added first and then the high byte. CRC simple

functions are as follows:

```
unsigned int crc_chk_value（unsigned char *data_value,unsigned char length）{
        unsigned int crc_value=0xFFFF;
        int I;
        while（length--）                    {
            crc_value^=*data_value++;
            for（i=0;i<8;i++）                              {
                if（crc_value&0x0001）
        {
                    crc_value=  （ crc_value>>1 ）
^0xa001;
                }
                else
                {
                    crc_value=crc_value>>1;
                }
            }
        }
        return（crc_value）;
}
```

7. Definition of address of communication parameters

This part is the communication content, which is used to control the operation of VFD, the status of VFD and the setting of relevant parameters.

Read and write function code parameters (some function codes cannot be changed and are only used by the manufacturer or for monitoring):

Function code parameter address marking rule:

Rules for indicating parameter address with function code group number and label:

High byte: F0 ～ FF (Group F), H0 ～ HF (Group H), L0 ～ LF (Group L), n0 ～ nF (Group N)

P0 ～ PF (group P), 70 ～ 7F (group U) Low byte: 00 ～ FF

For example: F0-11, address is F00B;

Note:

FF group: parameters can not be read or changed;

Group U: Read only, do not change parameters.

Some parameters cannot be changed when the VFD is in operation; Some parameters cannot be changed regardless of the state of VFD; When changing function code parameters, pay attention to the range, unit and relevant description of parameters.

Function code group No	Communication access address	Function code address in communication modification RAM (write only)
F0~FE group	0xF000~0xFEFF	0x0000 ～ 0x0EF
H0-HF group	0xA000 ～ 0xAFFF	0x4000 ～ 0x4FFF
L0~LF group	0xB000 ～ 0xBFFF	0x5000 ～ 0x5FFF
N0~nF group	0xC000 ～ 0xCFFF	0x6000 ～ 0x6FFF
U0, U1 group	0x70xx, 0x71xx	

Note that, because EEPROM is stored frequently, the service life of EEPROM will be reduced. Therefore, some function codes do not need to be stored in communication mode, just change the value in RAM.

If it is group F parameter, this function can be realized by changing the high F of the function code address to 0.

If it is group H parameter, this function can be realized by changing the upper A of the function code address to 4.

Corresponding function code address is shown as follows:

High byte: 00-0F (Group F), 40-4F (Group A) Low byte: 00-FF

For example:

Function code F0-11 is not stored in EEPROM, and the address is expressed as 000B;

This address means that only write RAM can be done and no read can be done. When reading, it is invalid address.

Shutdown/operating parameters:

address	Parameter description	address	Parameter description
X1000/ X9000	Communication set value (-10000~10000) (decimal) (unit: 0.01%), readable and written	X1014	AI1 Voltage before correction (unit: 0.001V) read-only
	Communication setting frequency:	X1015	AI2 Voltage before correction

address	Parameter description	address	Parameter description
	0Hz ～ F0-14 (minimum unit: 0.01Hz), read-write		(unit: 0.001V) read-only
X1001	Set frequency (unit: 0.01Hz), read-only	X1016	Actual linear velocity (unit: 1m/min), read-only
X1002	Operating frequency (unit: 0.01Hz), read-only	X1017	Load speed (unit: customized, refer to F7-31), read-only
X1003	Bus voltage in 0.1V, read only	X1018	Current power-on time (unit: 1min), read-only
X1004	Output voltage (unit: 0.1V), read-only	X1019	Current running time (unit: 0.1min) read-only
0x1005	Output current (unit: 0.1A), read-only	X101A	Input pulse frequency (unit: 1Hz), read-only
X1006	Output power (unit: 0.1kW), read-only	X101B	Main frequency X display (unit: 0.01Hz), read-only
0x1007	DI input flag (unit: 1), read-only	X101C	Auxiliary frequency Y display (unit: 0.01Hz), read-only
X1008	DO output flag (unit: 1), read-only	X101D	Target torque in 0.1%, At 100% rated motor torque, read-only
X1009	PID setting (unit: 1), read-only	X101E	Output torque in 0.1%, At 100% rated motor torque, read-only
X100A	PID feedback (unit: 1), read-only	X101F	Output torque in 0.1%, With rated current of VFD as 100%, read-only
0x100B	AI1 Voltage (0.01V), read-only	X1020	Upper torque limit (unit: 0.1%, With rated current of VFD as 100%, read-only
0x100C	AI2 Voltage (0.01V), read-only	0x1021	VF Separate target voltage in 1V, read only
0x100D	AO1 output voltage (unit: 0.01V) read-only	X1022	VF Separate output voltage in 1V, read only
X100E	PLC step (unit: 1), read-only	X1023	Reserved, read-only
X100F	RPM, read only	0x1024	Motor 1 2 indication (unit: 1), read-only
X1010	Count value input (unit: 1), read-only	X1025	Length value input (unit: 1) read-only
0x1011	Input pulse frequency (unit: 0.01kHz), read-only	X1026	AO2 output voltage in 0.01V, read-only
X1012	Feedback speed (unit: 0.1Hz), read-only	X1027	State of VFD (unit: 1), read-only
X1013	Remaining running time (unit: 0.1min), read-only	X1028	Current fault (unit: 1), read-only

Example 1: Read the operating frequency of the first device: 0x01 0x03 0x10 0x00 0x01 0x21 0x0A

X10 0x02 (1002) operating frequency address, 0x00 0x01 (0001) one data

0x21 0x0A (210A) CRC Check Value

Example 2: Read the bus voltage, output voltage and output current of the first

equipment at the same time: 0x01 0x03 x10 0x03 0x00 0x03 CRC check value. The data meaning is similar to that of Example 1.

Note that the communication setting value is a percentage of the relative value, 10000 corresponds to 100.00% and - 1000 corresponds to - 100.00%.

For frequency dimension data, the percentage is the percentage relative to the maximum frequency (F0-14); For the data of torque dimension, the percentage is F3-21, F3-23, H3-21, H3-23.

Note: D0 output terminal needs to select 16 (communication control) function.

AO output needs to select 7 (communication control output) function.

type	Command Address	Command Content
Control command input (write only)	0x2000	Forward running 0001: Reverse running 0002: Forward jogging Reverse jog 0005: Free stop 0006: Deceleration stop Fault reset 0008: Fault reset (only in communication control mode)
Status Reading Read only)	0x3000	Forward running 0001: Reverse running 0002: Shutdown
Digital output terminal control (write only)	0x2001	BIT0: RELAY 1 output control BIT1: DO1 output control BIT2: RELAY 2 output control
Analog Output AO1 Control (Write Only)	0x2002	FFF represents 0% - 100%
Analog Output AO2 Control (Write Only)	0x2003	FFF represents 0% - 100%
VFD fault address	X8000	No fault 0001: Reserved Reserved 0002: Reserved 0003: Reserved Acceleration overcurrent 0005: Deceleration overcurrent Constant speed overcurrent 0007: Stop overcurrent Acceleration overvoltage 0009: Deceleration overvoltage A: constant speed overvoltage 000B: stop overvoltage C: undervoltage fault 000D: VFD overload E: Motor overload 000F: Module overheating Reserved 0011: Current detection fault Reserved 0013: Reserved Motor short circuit to ground 0015: Motor tuning fault Reserved 0017: input phase loss Output phase loss 0019: EEPROM read-write abnormality A: password input exceeded times 001B: communication abnormal C: External fault 001D: Excessive speed deviation

type	Command Address	Command Content
		E: User-defined fault 001F: User-defined fault PID feedback lost during operation 0021: Hardware current limiting fault Unloading 0023: overload fault of buffer resistor Contactor abnormality 0025: Agent running time expires Motor overtemperature (reserved) 0027: The current operating time has reached Cumulative running time reached 0029: power-on time reached A: Switching motor fault during operation 002B: Motor overspeed C: Reserved 002D: Reserved E: reserved 002F: point-to-pslave fault

Return address in case of communication failure: read failure 83XX and write failure 86XX.

Appendix B Table of Functional Parameters

Function code symbols are described as follows:

Indicates that the VFD parameters can be modified during shutdown and operation (0)

Indicates that the VFD is in operation and cannot be modified (1)

Indicates that this parameter is the manufacturer parameter and cannot be changed by the user (3)

Represents the actual detection value or the manufacturer's fixed value of the VFD, which cannot be changed (2)

The communication address in the function parameter table is written in hexadecimal system.

Enhanced function code: H0 group~H3 group, L0 group~L6 group, opened by function parameter F7-75.

Note: only synchronous motor driver XXXS has function code with shadow, and other function codes are shared by XXX and XXXS.

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F0 group - basic function group					
F0-00	Product model	Product model: 5-digit display, 2-digit decimal point	61 ###	●	F000
F0-01	Display of VFD GP type	Type G 1: Type P	0	★	F001
F0-02	Rated current	A~3000.0A	Type determination	●	F002
F0-03	Motor control mode	Individual bit: motor control mode selection 1: Open loop vector control (no speed sensor vector) 2: VF control Ten digits: motor type selection Asynchronous motor 1: Synchronous machine, synchronous machine	2	★	F003
F0-04	Source Of operation instruction	Operation panel operation command channel (LED off) 1: Terminal command channel (LED on) 2:COMMUNICATION COMMAND CHANNEL (LED FLASHING)	0	★	F004
F0-05	Run Up Down to modify frequency command reference	Run frequency 1: Set frequency	1	★	F005

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F0-06	X selection of main frequency source	Up/Down frequency modification stop not memorized 1: Up/Down frequency modification power-down memory 2: AI1 3: AI2 4: Multi-stage speed 5: simple PLC 6: PID 7: communication setpoint 8: PULSE pulse setting 9: Up/Down Modify frequency Shutdown memory Power failure No memory	1	●	F006
F0-07	Y selection of auxiliary frequency source	Up/Down frequency modification stop not memorized 1: Up/Down frequency modification power-down memory 2: AI1 3: AI2 4: Multi-stage speed 5: simple PLC 6: PID 7: communication setpoint 8: PULSE pulse setting 9: Up/Down Modify frequency Shutdown memory Power failure No memory	0	★	F007
F0-08	Y range selection of auxiliary frequency source	Relative to maximum frequency 1: relative to frequency source X 2: The range is the same as 0, but there is no negative frequency output of main and auxiliary	0	●	F008
F0-09	Y range of auxiliary frequency source	～ 100%	100%	★	F009
F0-10	Frequency source selection	Individual bit: frequency source selection Main frequency source X 1: Main and auxiliary operation results (the operation relationship is determined by ten digits) 2: Switch between main frequency source X and auxiliary frequency source Y 3: Switching between main frequency source X and main/auxiliary operation results	00	★	F00A

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
		4: Switching between auxiliary frequency source Y and main/auxiliary operation results Ten digits: primary and auxiliary operation relationship of frequency source Primary+secondary 1: primary - secondary 2: Maximum 3: Minimum			
F0-11	Preset frequency	Hz~maximum frequency F0-14	Hz	★	F00B
F0-13	Motor operating direction selection	Consistent with current motor direction 1: Opposite to the current motor direction 2: Reverse rotation prohibited	0	☆	F00D
F0-14	Maximum output frequency	When F0-20=1, the adjustable range is 50.0Hz ～ 1200.0Hz; When F0-20=2, the adjustable range is 50.00Hz~600.00Hz;	Hz	★	F00E
F0-15	Upper limit frequency source	Digital setpoint (F0-16) 1: AI1 2: AI2 3: communication given 4: PULSE setting	0	★	F00F
F0-16	Upper frequency limit	Lower limit frequency F0-18 ～ maximum frequency F0-14	Hz	☆	F010
F0-17	Upper frequency offset	Max. frequency F0-14	Hz	☆	F011
F0-18	Lower frequency limit	Hz ～ upper frequency F0-16	Hz	☆	F012
F0-19	Selection of command source binding	Single bit: frequency source selection for operation panel command binding No binding 1: Digitally set frequency 2: AI1 3: AI2 4: Multi-stage speed 5: simple PLC 6: PID 7: communication setpoint 8: PULSE pulse setting (DI5) Ten digits: terminal command binding frequency source selection Hundred digits: frequency source selection for communication command binding	000	☆	F013

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
		Kilometers: reserved			
F0-20	Frequency decimal selection	1: Decimal point: 2 decimal points	2	★	F014
F0-21	Unit of acceleration and deceleration time	Sec 1:0.1 sec 2:0.01 sec	1	★	F015
F0-22	Reference frequency of acceleration and deceleration time	Maximum frequency (F0-14) 1: Preset frequency (F0-11) 2: Motor rated frequency (F4-05 or H1-05)	0	★	F016
F0-23	Acceleration time 1	S~30000s (F0-21=0) S~3000.0s (F0-21=1) S~300.00s (F0-21=2)	S	☆	F017
F0-24	Deceleration time 1	S~30000s (F0-21=0) S~3000.0s (F0-21=1) S~300.00s (F0-21=2)	S	☆	F018
F0-25	Rise value of over-modulation voltage	～ 10%	3%	★	F019
F0-26	carrier frequency	KHz ～ 11.0kHz	Type determination	☆	F01A:
F0-27	Carrier frequency adjusted with temperature	Invalid; 1: Valid;	1	☆	F01B
F0-28	Parameter initialization	No Action 1: Restore ex-factory parameters, excluding motor parameters, recorded information and frequency decimal point F0-20 2: Clear record information 3: Backup user's current parameters 4: Restore user backup parameters	0	★	F01C
F0-29	LCD Upload/Download Parameter Selection	No function 1: Download parameters to LCD 2: Upload only F4 group parameters 4: Upload all parameters 3: Upload parameters except group F4	0	☆	F01D
F1-00	Starting mode	Direct start 1: Speed tracking 2: Pre-excitation start of asynchronous motor	0	☆	F100

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F1-01	Speed tracking mode	From shutdown frequency 1: From target frequency 2: From maximum frequency	0	★	F101
F1-02	Maximum speed tracking current	30% - 150%	100%	★	F102
F1-03	Speed tracking speed	1~100	20	☆	F103
F1-04	Starting frequency	Hz ～ 10.00Hz	Hz	☆	F104
F1-05	Starting frequency holding time	S~100.0s	S	★	F105
F1-06	Starting DC braking current	～ 100%	0%	★	F106
F1-07	Starting DC braking time	S~100.0s	S	★	F107
F1-08	Selection of acceleration and deceleration frequency curve mode	Line 1: S Curve A 2: S curve B (F1-09~F1-12 Unit: 0.01s)	0	★	F108
F1-09	Starting time of S-curve acceleration	～ 100.0%	20%	★	F109
F1-10	Time at the end of S-curve acceleration	～ 100.0%	20%	★	F10A
F1-11	Starting time of deceleration of S curve	～ 100.0%	20%	★	F10B
F1-12	Time of deceleration end of curve S	～ 100.0%	20%	★	F10C
F1-13	Shutdown mode	Deceleration stop 1: Free stop	0	☆	F10D
F1-14	Stop DC brake start frequency	Hz ～ F0-14	Hz	☆	F10E
F1-15	DC brake waiting time for shutdown	S~100.0s	S	☆	F10F
F1-16	DC current of parking brake	～ 100%	0%	☆	F110
F1-17	Shutdown DC braking time	S~36.0s	S	☆	F111
F1-21	Demagnetization time	S~3.00s	S	★	F115
F1-23	Instantaneous stop without stop mode selection	Invalid 1: Automatically adjust deceleration rate 2: Deceleration and shutdown	0	★	F117
F1-24	Deceleration time during transient	S~100.0s	S	★	F118

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
	shutdown without shutdown				
F1-25	Instant-stop non-stop effective voltage	～ 85%	80%	★	F119
F1-26	Instant-stop recovery voltage	85% - 100%	90%	★	F11A (F11A)
F1-27	Instantaneous shutdown recovery voltage judgment	S~300.0s	S	★	F11B
F1-28	Instantly stop automatic regulation gain	0~100	40	☆	F11C
F1-29	Instantly stop automatic regulation integral	1~100	20	☆	F11D
F2-00	V/F Curve setting	Straight VF curve 1: multipoint VF curve 2: Square VF curve 3: 1.7 power curve 4: Power curve 5: 1.3 power curve 6: VF full separation mode 7: V/F half separation mode	0	★	F200
F2-01	Torque Rise	～ 30.0%	0%	☆	F201
F2-02	Torque Rise Cut-off Frequency	Hz~maximum frequency	Hz	★	F202
F2-03	V/F Frequency point F1	Hz ～ F2-05	Hz	★	F203
F2-04	V/F Voltage pointV1	～ 100.0%	5.2%	★	F204
F2-05	V/F Frequency point F2	F2-03 ～ F2-07	Hz	★	F205
F2-06	V/F Voltage pointV2	～ 100.0%	8.8%	★	F206
F2-07	V/F Frequency point F3	Hz~50.00 Hz	Hz	★	F207
F2-08	V/F Frequency pointV3	～ 100.0%	35%	★	F208
F2-09	Slip compensation coefficient	～ 200.0%	50%	☆	F209
F2-10	Flux braking gain	0~200	100	☆	F20A
F2-11	Oscillation suppression gain	0~100	Type determination	☆	F20B
F2-13	VF slip compensation time constant	S~1.00 s	S	☆	F20D

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F2-15	Selection of output voltage source when VF is separated	Digital setting (F2-16) 1: AI1 2: AI2 3: multi-stage instruction 4: Simple PLC 5: PID 6: Given communication 7: PULSE pulse setting (DI5)Of rated voltage of corresponding motor	0	☆	F20F
F2-16	V/F separation output voltage digital setting	V~rated voltage of motor	V	☆	F210
F2-17	V/F separation output voltage acceleration time	S~3000.0s	S	☆	F211
F2-18	V/F separation output voltage deceleration time	S~3000.0s	S	☆	F212
F2-19	V/F separation stop mode selection	The frequency is independent of the deceleration time of the output voltage 1: Reduce the frequency after the voltage is reduced to 0	0	☆	F213
F3-00	Switching frequency F1	F3-02	Hz	☆	F300
F3-02	Switching frequency F2	F3-00 ～ F0-14	Hz	☆	F302
F3-04	LF Velocity Proportional Gain	0.1 ～ 10.0	4.0	☆	F304
F3-05	LF velocity integral time	S~10.00s	S	☆	F305
F3-06	High frequency velocity proportional gain	0.1 ～ 10.0	2.0	☆	F306
F3-07	High-frequency velocity integral time	S~10.00s	S	☆	F307
F3-08	Velocity loop integral attribute selection	Integration takes effect 1: Integration separation	0	☆	F308
F3-11	Torque current regulator Kp	0~30000	2200	☆	F30B
F3-12	Torque current regulator Ki	0~30000	1500	☆	F30C
F3-13	Excitation current regulator Kp	0~30000	2200	☆	F30D:
F3-14	Excitation current regulator Ki	0~30000	1500	☆	F30E
F3-15	Flux braking gain	0~200	0	☆	F30F
F3-16	Weakfield torque	50% - 200%	100%	☆	F310

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
	correction factor				
F3-17	Slip compensation gain	50% - 200%	100%	☆	F311
F3-18	Velocity loop feedback filter time constant	S~1.000s	S	☆	F312
F3-19	Velocity loop output filter time constant	S~1.000s	S	☆	F313
F3-20	Electric torque upper limit source	F3-21 1: AI1 2: AI2 3: communication given 4: PLUSE Given Analog range corresponding to F3-21)	0	☆	F314
F3-21	Upper limit of electric torque	～ 200.0%	150%	☆	F315
F3-22	Brake torque upper limit source	F3-23 1: AI1 2: AI2 3: communication given 4: PLUSE Given Analog range corresponding to F3-23)	0	☆	F316
F3-23	Brake torque upper limit	～ 200.0%	150%	☆	F317
F3-24	Synchronous machine low-speed magnetizing current	0.0% ～ 80.0%	25%	★	F318
F3-25	Excitation cut-off frequency of synchronous machine	～ 100%	10%	★	F319
F3-26	Pre-excitation time	S~5s	S	★	F31A
F3-27	Enable selection of synchronous machine initial position identification	Not enabled 1: Identification mode I 2: Identification mode II	1	★	F31B
F3-28	Set percentage of initial position identification voltage	30% - 150%	80%	★	F31C
F3-29	Minimum carrier frequency of synchronous machine	F0-26	2.0	☆	F31D
F3-30	Weak field mode of synchronous motor	No weak magnetic field 1: Weak magnetic mode 1 2: Weak magnetic mode 2	1	☆	F31E
F3-31	Weak field gain coefficient	0~50	5	☆	F31F

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F3-32	Weak field integral coefficient	2~10	2	☆	F320
F3-33	Saturation margin of output voltage	0~50	2	☆	F321
F3-34	Coefficient of salient polarity	50~500	100	☆	F322
F3-35	SVC velocity filtering coefficient	10~1000	100	☆	F323
F3-36	Maximum torque ratio enable	Failure, 1: enable	0	☆	F324
F3-37	Voltage decoupling mode	0~2	0	☆	F325
F3-38	Z signal correction enabling	Failure, 1: enable	1	☆	F326
F3-39	Anti-Reverse Function Enable	Failure, 1: enable	0	☆	F327
F4-00	Motor parameter tuning Motor parameter tuning	No function 1: Static tuning 2: Rotary tuning £¬ ROTATION TUNING	0	★	F400
F4-01	Motor 1 rated power	KW ～ 1000.0kW	Type determination	★	F401
F4-02	Motor 1 rated voltage	V~1500V	V	★	F402
F4-03	Motor 1 Number of motor poles	2~64	Type determination	★	F403
F4-04	Motor 1 rated current	A~600.00A (motor rated power<=30.0kW) A~6000.0A (motor rated power>30.0kW)	F4-01 Confirmation	★	F404
F4-05	Motor 1 rated frequency	Hz ～ F0-14	Hz	★	F405
F4-06	Motor 1 rated speed	RPM~60000 RPM	F4-01 Confirmation	★	F406
F4-07	No-load current of motor 1	A ～ F4-04 (motor rated power<=30.0kW) A ～ F4-04 (rated motor power>30.0kW)	Type determination	★	F407
F4-08	Motor 1 stator resistance	0.001 Ω - 65.535 Ω	Type determination	★	F408
F4-09	Motor 1 rotor resistance	0.001 Ω - 65.535 Ω	Type determination	★	F409
F4-10	Motor 1 mutual inductance	MH ～ 6553.5 mH	Type determination	★	F40A

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F4-11	Motor 1 leakage sensing	MH ～ 655.35mH	Type determination	★	F40B
F4-12	Acceleration at dynamic full tuning	S~6000.0s	S	☆	F40C
F4-13	Deceleration at dynamic full tuning	S~6000.0s	S	☆	F40D:
F4-17	Stator resistance of synchronous machine	0.001 Ω - 65.535 Ω	Type determination	★	F411
F4-18	D axis inductance of synchronous motor	MH ～ 655.35mH	Type determination	★	F412
F4-19	Synchronous motor Q-axis inductance	MH ～ 655.35mH	Type determination	★	F413
F4-20	Counter electromotive force of synchronous machine	V~690V	Type determination	★	F414
F4-21	Synchronous machine no-load current	～ 50.0%	5%	★	F415
F5-00	DI1 terminal function	No function 1: Forward running (FWD) 2: REV 3: Three-wire operation control 4: FJOG 6: Terminal UP 5: Reverse Jog (RJOG) 7: Terminal DOWN 8: Free Stop 9: Fault Reset (RESET) 10: Operation pause 11: external fault normally open input 12: Multi-section command terminal 1 13: multi-stage command terminal 2 14: Multi-stage command terminal 3 15: multi-stage command terminal 4 16: Acceleration/deceleration selection terminal 1 17: Acceleration/deceleration selection terminal 2 18: frequency source switching 19: Reset of UP/DOWN setting (terminal, keyboard) 20: Operation command switching terminal 21: acceleration/deceleration disable 22: PID failure (pause) 23: PLC status reset Swing frequency pause 25: Timing trigger input	1	★	F500

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
		Immediate DC braking External fault normally closed input 28: Counter input 29: Counter reset 30: Length counter input Length Count Reset 32: Torque Control Inhibit PULSE frequency input Frequency modification forbidden Reverse PID action direction External stop terminal 1 Control command switching terminal 2 PID integral pause terminal Frequency source X and preset frequency switching terminal Frequency source Y and preset frequency switching terminal Switching between motor 1 and motor 2 Reserved PID parameter switching terminal Speed control/torque control switching Emergency stop External parking terminal 2 Deceleration DC brake Zero clearing of operation time Two-wire/three-wire switching Reverse rotation prohibited User defined fault 1 User defined fault 2 Sleep input			
F5-01	DI2 terminal function		2	★	F501
F5-02	DI3 terminal function		9	★	F502
F5-03	DI4 terminal function		12	★	F503
F5-04	DI5 terminal function		13	★	F504

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F5-05	DI6 terminal function		0		F505
F5-06	DI7 terminal function		0		F506
F5-10	Filtering time of DI terminal	S~1.000s	S	☆	F50A
F5-11	Terminal command mode	Two-wire 1 1: Two-wire 2 2: Three-wire type: Three-wire type	0	★	F50B
F5-12	Change rate of terminal UP/DOWN	Hz/s ～ 100.00Hz/s	Hz/s	☆	F50C
F5-13	Terminal active logic 1	High Level 1: Low Level Bit: DI1; Ten digits: DI2; Hundred places: DI3; Kilometers: DI4; Bit: DI5	00000	★	F50D:
F5-15	AI1 minimum input value	V~10.00V	V	☆	F50F
F5-16	Corresponding setting of minimum input of AI1	-100.0% ～ 100.0%	0%	☆	F510
F5-17	AI1 maximum input value	V~10.00V	V	☆	F511
F5-18	Corresponding setting of maximum input of AI1	-100.0% ～ 100.0%	100%	☆	F512
F5-19	AI1 input filtering time	S~10.00s	S	☆	F513
F5-20	AI2 minimum input value	V~10.00V	V	☆	F514
F5-21	Corresponding setting of minimum input of AI2	-100.0% ～ 100.0%	0%	☆	F515
F5-22	AI2 maximum input value	V~10.00V	V	☆	F516
F5-23	Corresponding setting of maximum input of AI2	-100.0% ～ 100.0%	100%	☆	F517
F5-24	AI2 input filtering time	S~10.00s	S	☆	F518
F5-30	PULSE input minimum frequency	KHz ～ 50.00KHz	KHz	☆	F51E
F5-31	PULSE input minimum frequency corresponding setting	-100.0% ～ 100.0%	0%	☆	F51F

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F5-32	PULSE input maximum frequency	KHz ～ 100.00KHz	KHz	☆	F520
F5-33	PULSE input maximum frequency corresponding setting	-100.0% ～ 100.0%	100%	☆	F521
F5-34	PULSE input filtering time	S~10.00s	S	☆	F522
F5-35	DI1 opening delay time	S~3600.0s	S	☆	F523
F5-36	DI1 disconnection delay time	S~3600.0s	S	☆	F524
F5-37	DI2 opening delay time	S~3600.0s	S	☆	F525
F5-38	DI2 disconnection delay time	S~3600.0s	S	☆	F526
F5-39	DI3 opening delay time	S~3600.0s	S	☆	F527
F5-40	DI3 disconnection delay time	S~3600.0s	S	☆	F528
F5-41	AI1 as DI terminal function selection	Function same as common DI terminal	0	★	F529
F5-42	AI2 as DI terminal function selection	Function same as common DI terminal	0	★	F52A
F5-44	Valid mode selection when AI is used as DI terminal	Bit, AI1: Active high, 1 active low Ten digits, AI2: Active high, 1 active low Hundred places: reserved	0x00	☆	F52C:
F5-45	AI curve selection	AI multipoint curve selection: Bit: AI1 Point straight line F5-15~F5-19 1: Multi-point curve 1: FE-00 ～ FE-07 2: Multi-point curve 2: FE-08 ～ FE-15 Ten digits: AI2 Point straight line F5-20 ～ F5-24 1: Multi-point curve 1: FE-00 ～ FE-07 2: Multi-point curve 2: FE-08 ～ FE-15 Hundred places: reserved	0x00	☆	F52D (F52D)

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F6-00	Control board relay RELAY 1 output (TA/TB/TC) selection	No output 1: Running signal of VFD 2: Output of fault 3: Frequency level detection FDT1 arrives 4: Frequency reached (FAR) 5: Operating at zero speed 6: Motor overload pre-alarm 7: VFD overload pre-alarm 8: PLC CYCLE COMPLETED 9: Cumulative Run Time Reached 10: In frequency limit 11: Ready for operation 12: AI1>AI2 13: upper limit frequency reached 14: Lower frequency reaches 15: undervoltage status output 16: Communication setting 17: timer output 18: In reverse running 19: Reserved 20: The set length reaches 21: in the torque limit Current 1 reached 23: Frequency 1 reached Module temperature reaches 25: Unloading Cumulative power-on time reached Timed arrival output The running time reaches Set count value reached Specified count value reached Indication of motor 1 and motor 2 Brake control output Zero speed running 2 Frequency level detection FDT2 arrives Zero Current State 36: Software Current Overrun When the lower limit frequency is reached, the shutdown will also output Alarm output 39: reserved AI1 input overrun 41: reserved Reserved 43: Frequency reaches 2 Current up to 45: fault output	2	☆	F600
F6-01	Panel relay RELAY 2 output (RA/RB/RC) selection		1	☆	F601
F6-02	Y1 output selection		1	☆	F602
F6-04	FM terminal output mode selection	Pulse output (FMP) 1: Open collector switching value output (FMR)	0	☆	F604

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F6-05	FMR output selection	Same as Y1 output selection	0	☆	F605
F6-09	AO1 output selection	Operating frequency 1: Set frequency 2: Output current (100% corresponding to 2 times of rated motor current) 3: Output power (100% corresponding to 2 times of rated motor power) 4: Output voltage (100% corresponding to 1.2 times of rated voltage of VFD) 5: Analog AI1 input value 6: Analog AI2 input value 7: Communication setting 8: Output torque 9: Length of length 10: Count value 11: Motor speed 12: Bus voltage (100.0% corresponding to 1000.0V) 13: Pulse input 14: Output current (100% corresponding to 1000.0A) 15: Output voltage (100.0% corresponding to 1000.0V) 16: Output torque (actual torque - 2 times rated - 2 times rated)	0	☆	F609
F6-10	AO2 output selection				F60A
F6-11	FMP output selection		0	☆	F60B
F6-12	FMP output maximum frequency	KHz ～ 100.00KHz	50.00	☆	F60C
F6-13	AO1 output lower limit	-F6-15	0%	☆	F60D
F6-14	Lower limit corresponds to AO1 output	V~10.00V	V	☆	F60E
F6-15	AO1 output upper limit	F6-13 ～ 100.0%	100%	☆	F60F
F6-16	Upper limit corresponds to AO1 output	V~10.00V	V	☆	F610
F6-17	AO2 output lower limit	-F6-19	0%	☆	F611
F6-18	Lower limit corresponds to AO2 output	V~10.00V	V	☆	F612
F6-19	AO2 output upper limit	F6-17 ～ 100.0%	100%	☆	F613
F6-20	Upper limit corresponds to AO2 output	V~10.00V	V	☆	F614
F6-21	Main relay T pull-in delay	S~3600.0s	S	☆	F615
F6-22	Main relay R pull-in delay	S~3600.0s	S	☆	F616

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F6-23	Y1 high level output delay	S~3600.0s	S	☆	F617
F6-26	Main relay T disconnection delay	S~3600.0s	S	☆	F61A
F6-27	Main relay R disconnection delay	S ～ 3600.0S	S	☆	F61B
F6-28	Y1 Low level output delay	S ～ 3600.0S	S	☆	F61C
F7-00	Jog operating frequency	Hz~maximum frequency	Hz	☆	F700
F7-01	Jog acceleration time	S~3000.0s	S	☆	F701
F7-02	Jog deceleration time	S~3000.0s	S	☆	F702
F7-03	Acceleration time 2	S~3000.0s	S	☆	F703
F7-04	Deceleration time 2	S~3000.0s	S	☆	F704
F7-05	Acceleration time 3	S~3000.0s	S	☆	F705
F7-06	Deceleration time 3	S~3000.0s	S	☆	F706
F7-07	Acceleration time 4	S~3000.0s	S	☆	F707
F7-08	Deceleration time 4	S~3000.0s	S	☆	F708
F7-09	Skip frequency 1	Hz~maximum frequency	Hz	☆	F709
F7-10	Skip frequency 1 amplitude	Hz~maximum frequency	Hz	☆	F70A
F7-11	Skip frequency 2	Hz~maximum frequency	Hz	☆	F70B
F7-12	Skip frequency 2 amplitude	Hz~maximum frequency	Hz	☆	F70C
F7-15	Dead time of forward and reverse rotation	S~3000.0s	S	☆	F 70F
F7-16	Keyboard knob accuracy	Default mode: 0.1Hz 2: Hz 3: 1Hz 4: Hz 5: 4Hz 6: Hz 7: 8Hz 8: Hz 9: 0.01Hz 10: Hz	0	☆	F710
F7-17	Processing of frequency below the lower limit	Run at lower frequency 1: Shutdown 2: Zero speed operation	0	☆	F711
F7-18	Droop rate of sag	～ 100.0%	0%	☆	F712
F7-19	Delay time for	S~600.0s	S	☆	F713

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
	shutdown with frequency below lower limit				
F7-20	Set cumulative operating time	H~65000 h	H	☆	F714
F7-21	Jog priority (JOG)	Invalid 1: Jog priority mode 1 2: Jog Priority Mode 2 1) Jog is still active in case of user failure or loss of PID 2) Shutdown mode and DC brake can be set	1	☆	F715
F7-22	Frequency detection value (FDT1 level)	Hz~maximum frequency	Hz	☆	F716
F7-23	Frequency check hysteresis value (FDT1 hysteresis)	～ 100.0%	5%	☆	F717
F7-24	Frequency reaches detection width	～ 100.0%	0%	☆	F718
F7-25	hold		0	●	F719
F7-26	Fan control	The fan runs continuously 1: The fan operates when the VFD is running When the temperature is higher than 40 °, the fan will also operate under shutdown)	1	★	F71A
F7-27	STOP/RESET FUNCTION	Only valid for keyboard control 1: Shutdown or reset functions are effective under all control modes	1	☆	F 71B
F7-28	Quick/JOG key function selection	Forward inching 1: Forward and reverse switching 2: Reverse jog 3: switch between panel and remote control	0	★	F71C
F7-29	LED operation display	0xffff (hexadecimal number) To 0xffff Bit00: operating frequency 0001 Bit01: Set frequency 0002 Bit02: busbar voltage 0004 Bit03: output voltage 0008 Bit04: output current 0010 Bit05: output power 0020 Bit06: DI input status 0040 Bit07: DO output status 0080 Bit08: AI1 voltage 0100 Bit09: AI2 voltage 0200	H. F:	☆	F 71D

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
		Bit10: PID setting value 0400 Bit11: PID feedback value 0800 Bit12: Count value 1000 Bit13: length value 2000 Bit14: Load speed display 4000 Bit15: PLC stage 8000			
F7-30	LED shutdown display	0x1fff (hexadecimal number) Bit00: Set frequency 0001 Bit01: busbar voltage 0002 Bit02: DI input status 0004 Bit03: DO output status 0008 Bit04: AI1 voltage 0010 Bit05: AI2 voltage 0020 Bit06: PID setpoint 0040 Bit07: PID feedback value 0080 Bit08: count value 0100 Bit09: length value 0200 Bit10: Load speed display 0400 Bit11: PLC stage 0800 Bit12: Input pulse frequency 1000 Bit13~Bit15: reserved	H. 0043	☆	F71E
F7-31	Load speed display coefficient	0.001 ～ 655.00	1.000	☆	F 71F
F7-32	Temperature of radiator	℃~100 ℃	Measured value	●	F720
F7-33	Cumulative power-on time	H ～ 65535h	Measured value	●	F721
F7-34	Cumulative operating time	H ～ 65535h	Measured value	●	F722
F7-36	Current operation timing enabling selection	Not enabled 1: enabled	0	★	F724
F7-37	Selection of current operation timing time source	Digital setting F7-38 1: AI1 2: AI2 (AI100% of F7-38)	0	★	F725
F7-38	Current sub-run time setting value	Min ～ 6500.0 min	Min	☆	F726
F7-39	High level timing time	S~6000.0s	S	☆	F727
F7-40	Low-level timing time	S~6000.0s	S	☆	F728
F7-41	Start protection function	Invalid (start terminal command is valid for direct start) 1: Valid	1	☆	F729

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F7-43	Frequency reaches detection value 1	Hz ～ F0-14	Hz	☆	F 72B
F7-44	Width of frequency detection value 1	～ 100.0%	0%	☆	F72C
F7-45	Current reaches detection value 1	～ 300.0%	100%	☆	F72D
F7-46	Current detection value 1 reaches the width	～ 300.0%	0%	☆	F72E
F7-49	User Password	0~65535	0	☆	F731
F7-50	Whether the hopping frequency is effective during acceleration and deceleration	Invalid 1: Valid	0	☆	F732
F7-51	Set power-on arrival time	H~65530h	H	☆	F733
F7-53	Acceleration time 1/2 switching frequency point	Hz~maximum frequency (F0-14)	Hz	☆	F735
F7-54	Deceleration time 1/2 switching frequency point	Hz~maximum frequency (F0-14)	Hz	☆	F736
F7-55	Frequency detection value (FDT2 level)	Hz~maximum frequency (F0-14)	Hz	☆	F737
F7-56	FDT2 hysteresis value of frequency detection	～ 100.0%	5%	☆	F738
F7-57	Frequency reaches detection value 2	Hz~maximum frequency (F0-14)	Hz	☆	F739
F7-58	Frequency reaches detected 2 amplitude	～ 100.0%	0%	☆	F73A
F7-59	Zero current detection value	～ 300.0%	10%	☆	F73B
F7-60	Zero current detection delay time	S~300.00s	S	☆	F73C
F7-61	Output current amplitude detection	～ 400.0%	200%	☆	F73D:
F7-62	Maximum allowable time of software overcurrent	S ～ 6500.0s	S	☆	F73E
F7-63	Current reaches detection value 2	～ 300.0%	100%	☆	F73F
F7-64	Current reaches detection 2 amplitude	～ 300.0%	0%	☆	F740

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F7-65	LED operation display parameter 2	0x0 ～ 0x1FF Bit00: Target torque% 0001 Bit01: output torque% 0002 Bit02: Pulse input pulse frequency (KHz) 0004 Bit03: DI5 high-speed pulse sampling line speed M/min) 0008 Bit04: Motor speed (rmp) 0010 Bit05: AC incoming current (A) 0020 Bit06: Accumulated running time (h) 0040 Bit07: Current running time (min) 0080 Bit08: Accumulated power consumption (degree) 0100 Bit09 ～ Bit15: Reserved	H. 010	☆	F741
F7-67	AI1 Input voltage lower limit	V ～ F7-68	V	☆	F743
F7-68	AI1 Input voltage upper limit	F7-67 ～ 11.00V	V	☆	F744
F7-69	Module temperature reached	℃~90 ℃	℃	☆	F745
F7-70	Output power display correction factor	0.001 ～ 3.000	1.000	☆	F746
F7-71	Linear velocity display correction factor	Linear velocity=F7-71 * Number of sampled HDI pulses per second/Fb-07	1.000	☆	F747
F7-72	Cumulative power consumption (degree)	0~65535	Measured value	●	F748
F7-73	Performance Software Version	Performance software version number	##	●	F749
F7-74	Functional Software Version	Function software version number	##	●	F74A (F 74A)
F7-75	Selection of enhanced function parameter display	Hide enhanced function parameter group: H0~H3, L0~L5 1: Display enhanced function parameter group: H0 ～ H3, L0 ～ L5	0	☆	F74B
F7-76	Motor speed display correction factor	0.0010 ～ 6.0000	1.0000	☆	F74C
F7-77	LCD Software Version	LCD software version number	##	●	F74D

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F8-00	Baud rate setting	BPS 1:600BPS 2: BPS 3: 2400BPS 4: BPS 5: 9600BPS 6: BPS 7:38400BPS	5	☆	F800
F8-01	data format	No check<8, N, 2>1: even check<8, E, 1> 2: Odd check<8, O, 1>3: no check 1<8, N, 1>	0	☆	F801
F8-02	COMMUNICATION ADDRESS	To 247 (0 is the broadcast address)	1	☆	F802
F8-03	Response time	Ms~30ms	S	☆	F803
F8-04	Communication timeout time	S ～ 30.0s	S	☆	F804
F8-05	Selection of communication format	Standard Modbus RTU protocol 1: Non-standard ModBusRTU protocol	0	☆	F805
F8-06	Background software monitoring function	Disabled, default 485 communication function 1: Start, background software monitoring function, 485 communication function cannot be used at this time	0	☆	F806
F9-00	Motor overload protection selection	Prohibited 1: Allow for	1	☆	F900
F9-01	Motor overload protection gain	0.10 ～ 10.00	1.00	☆	F901
F9-02	Motor overload warning coefficient (%)	～ 100%	80%	☆	F902
F9-03	Overvoltage stall protection gain	000~100	030	☆	F903
F9-04	Overvoltage stall protection voltage	200.0 ～ 1250.0V	V V V 1150.0 V	★ ★ ★	F904
F9-05	VF overcurrent stall protection gain	0~100	20	☆	F905
F9-06	VF overcurrent stall protection current	50% - 200%	150%	★	F906
F9-07	VF Current stall	50% - 200%	100%	★	F907

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
	protection coefficient of weak magnetic region				
F9-08	Allowable rise limit of overvoltage stall	～ 50.0%	10%	☆	F908
F9-11	Number of automatic fault reset	0~20	0	☆	F90B
F9-12	Fault relay action selection during automatic fault reset	No action 1: Action of action	0	☆	F90C
F9-13	Time between automatic fault reset	S~100.0s	S	☆	F90D
F9-14	Enable selection of input phase loss	Invalid 1: Valid	1	☆	F90E
F9-15	Enable selection of output phase loss	Invalid 1: Valid	1	☆	F90F
F9-16	Selection of power-on short circuit protection	Invalid 1: Valid	1	☆	F910
F9-17	Under voltage fault automatic reset selection	Manual reset required after undervoltage fault 1: Reset the fault automatically according to bus voltage after undervoltage fault	0	★	F911
F9-18	Overvoltage suppression mode selection	Invalid 1: Overvoltage suppression mode 1 2: Overvoltage Inhibit Mode 2	1	★	F912
F9-19	Over-excitation effective state selection	Invalid 2: Only valid for deceleration process 1: Effective during constant speed and deceleration during operation	2	★	F913
F9-20	Overvoltage Inhibit Mode 2 Limit	～ 150.0%	100%	☆	F914
F9-21	Software overcurrent fault enable	Invalid 1: Valid	0	☆	F915
F9-22	Fault protection action 1	22202; Bit: motor overload - Err14 Free stop 1: Stop according to stop mode 2: Continue running Ten digits: reserved Hundred digits: input phase loss - Err23 Kilo bit: output phase loss - Err24 Bit: parameter reading and writing abnormal - Err25	00000	☆	F916

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
F9-23	Fault protection action 2	22222; Bit: communication failure - Err27 Free stop 1: Stop according to stop mode 2: Continue running Ten digits: external fault - Err28 Hundred places: speed deviation is too large - Err29 Kilometers: User defined fault 1-Err30 Bit: User defined fault 2-Err31	00000	☆	F917
F9-24	Fault protection action 3	To 22022; Bit: PID feedback loss during operation - Err32 Free stop 1: Stop according to stop mode 2: Continue running Ten digits: load failure - Err34 Hundred places: software overcurrent - Err16 Kilometers: the current continuous running time reaches - Err39 Bit: running time up to - Err40	00000	☆	F918
F9-26	Continue to operate frequency selection in case of failure	Run at current operating frequency 1: Run at set frequency 2: Run at Upper Frequency Limit 3: Operate at lower frequency limit 4: Run at standby frequency setting F9-27	1	☆	F91A
F9-27	Setting value of abnormal standby frequency	～ 100.0%	100%	☆	F91B
F9-28	Selection of load shedding protection	Invalid 1: Valid	0	★	F91C
F9-29	Detection level of load loss	0.0% ～ 80.0%	20%	☆	F91D:
F9-30	Load shedding detection time	S~100.0s	S	☆	F91E
F9-31	Detection value of	～ 100.0%	20%	☆	F91F

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
	excessive speed deviation				
F9-32	Detection time for excessive speed deviation	S~100.0s	S	☆	F920
F9-33	Overspeed detection value	～ 100.0%	20%	☆	F921
F9-34	Overspeed detection time	S~100.0s	S	☆	F922
F9-35	Motor overload protection current coefficient	100% - 200%	100%	☆	F923
FA group-PID function					
FA-00	PID setpoint source	PID function code FA-01 1: AI1 2: AI2 3: communication given 4: PULSE given 5: multi-stage instruction given 6: Up/Down Modification FA-01 (Valid for F0-06=6)	0	☆	FA00
FA-01	PID digital setting	～ 100.0%	50%	☆	FA01
FA-02	PID given change time	S~65.00s	S	☆	FA02
FA-03	PID feedback source	AI1 1: AI2 2: AI1-AI2 3: communication given 4: PULSE Given 5: AI1+AI2 6: MAX (@ AI1 @, @ AI2 @) 7: MIN (@ AI1/, @ AI2/)	0	☆	FA03
FA-04	PID action direction	Direct Action 1: Reverse Action	0	☆	FA04
FA-05	PID given feedback range	0~65535	1000	☆	FA05
FA-06	Proportional gain P	～ 100.0	50.0	☆	FA06
FA-07	Integral time I	S~10.00s	S	☆	FA07
FA-08	Differential time D	S~10.000s	S	☆	FA08
FA-09	PID inversion cut-off frequency	Max. frequency (F0-14)	Hz	☆	FA09
FA-10	Limit of deviation	～ 100.0%	0%	☆	FA0A
FA-11	Differential limiting amplitude	0.00% ～ 100.00%	0.10%	☆	FA0B
FA-12	PID feedback filtering time	S~60.00s	S	☆	FA0C

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
FA-13	PID feedback loss detection value	～ 100.0%	0%	☆	FA0D (FA0D)
FA-14	PID feedback loss detection time	S~3600.0s	S	☆	FA0E:
FA-18	Proportional gain P2	～ 100.0	20.0	☆	FA12
FA-19	Integral time I2	S~10.00s	S	☆	FA13
FA-20	Differential time D2	S~10.000s	S	☆	FA14
FA-21	Switching conditions of PID parameters	Do not switch 1: DI terminal 2: Automatic switching according to deviation	0	☆	FA15
FA-22	PID parameter switching deviation 1	FA-23	20%	☆	FA16
FA-23	PID parameter switching deviation 2	FA-22 ～ 100.0%	80%	☆	FA17
FA-24	PID initial value	～ 100.0%	0%	☆	FA18
FA-25	PID initial holding time	S~65.00s	S	☆	FA19
FA-26	Maximum forward deviation of two outputs	0.00% ～ 100.00%	1%	☆	FA1A (FA1A)
FA-27	Maximum reverse value of two output deviations	0.00% ～ 100.00%	1%	☆	FA1B
FA-28	PID integral attribute	Bit: integral separation Is invalid; 1: Valid Ten digits: output to the limit, stop integration or not Continue integral; 1: Stop integrating	00	☆	FA1C
FA-29	PID shutdown operation	No operation during shutdown 1: Operation during shutdown	0	☆	FA1D
Group Fb - Swing frequency, fixed length and counting					
Fb-00	Swing setting mode	Relative to center frequency 1: Relative to maximum frequency	0	☆	FB00
Fb-01	Swing frequency amplitude	～ 100.0%	0%	☆	FB01
Fb-02	Sudden frequency amplitude	～ 50.0%	0%	☆	FB02
Fb-03	Swing frequency period	S~3000.0s	S	☆	FB03
Fb-04	Rise time coefficient of triangular wave	～ 100.0%	50%	☆	FB04
Fb-05	Set length	0m ～ 65535m	M long	☆	FB05

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
Fb-06	Real length	0m ～ 65535m	0m	☆	FB06
Fb-07	Number of pulses per m	To 6553.5	100.0	☆	FB07
Fb-08	Set count value	1~65535	1000	☆	FB08
Fb-09	Specified count value	1~65535	1000	☆	FB09
FC group - multi-stage command and simple PLC function					
FC-00	Multi-stage speed 0	-100.0% ～ 100.0%	0%	☆	FC00
FC-01	Multi-stage speed 1	-100.0% ～ 100.0%	0%	☆	FC01
FC-02	Multi-stage speed 2	-100.0% ～ 100.0%	0%	☆	FC02
FC-03	Multi-stage speed 3	-100.0% ～ 100.0%	0%	☆	FC03
FC-04	Multi-stage speed 4	-100.0% ～ 100.0%	0%	☆	FC04
FC-05	Multi-stage speed 5	-100.0% ～ 100.0%	0%	☆	FC05
FC-06	Multi-stage speed 6	-100.0% ～ 100.0%	0%	☆	FC06
FC-07	Multi-stage speed 7	-100.0% ～ 100.0%	0%	☆	FC07
FC-08	Multi-stage speed 8	-100.0% ～ 100.0%	0%	☆	FC08
FC-09	Multi-stage speed 9	-100.0% ～ 100.0%	0%	☆	FC09
FC-10	Multi-stage speed 10	-100.0% ～ 100.0%	0%	☆	FC0A
FC-11	Multi-stage speed 11	-100.0% ～ 100.0%	0%	☆	FC0B
FC-12	Multi-stage speed 12	-100.0% ～ 100.0%	0%	☆	FC0C (FC0C)
FC-13	Multi-stage speed 13	-100.0% ～ 100.0%	0%	☆	FC0D (FC0D)
FC-14	Multi-stage speed 14	-100.0% ～ 100.0%	0%	☆	FC0E (FC0E)
FC-15	Multi-stage speed 15	-100.0% ～ 100.0%	0%	☆	FC0F
FC-16	PLC operation mode	Shutdown after single operation 1: Final value of single operation 2: Continuous circulation	0	☆	FC10
FC-17	PLC power-down memory selection	No memory in case of power failure and shutdown 1: Power-off memory and shutdown memory failure 2: Power failure and shutdown memory 3: Power-off memory and shutdown memory	0	☆	FC11
FC-18	PLC segment 0 operating time	～ 6500.0	0.0	☆	FC12

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
FC-19	PLC segment 0+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC13
FC-20	PLC Segment 1 Operating Time	～ 6500.0	0.0	☆	FC14
FC-21	PLC 1st segment plus/minus time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC15
FC-22	PLC segment 2 operating time	～ 6500.0	0.0	☆	FC16
FC-23	PLC segment 2+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC17
FC-24	PLC Segment 3 Operating Time	～ 6500.0	0.0	☆	FC18
FC-25	PLC segment 3+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC19
FC-26	PLC segment 4 operating time	～ 6500.0	0.0	☆	FC1A (FC1A)
FC-27	PLC segment 4+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC1B (FC1B)
FC-28	PLC segment 5 operating time	～ 6500.0	0.0	☆	FC1C
FC-29	PLC segment 5+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC1D
FC-30	PLC segment 6 operating time	～ 6500.0	0.0	☆	FC1E
FC-31	PLC segment 6+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC1F
FC-32	PLC segment 7 operating time	～ 6500.0	0.0	☆	FC20
FC-33	PLC segment 7+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC21
FC-34	PLC segment 8 operating time	～ 6500.0	0.0	☆	FC22
FC-35	PLC segment 8+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC23

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
FC-36	PLC segment 9 operating time	~ 6500.0	0.0	☆	FC24
FC-37	PLC segment 9+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC25
FC-38	PLC segment 10 operating time	~ 6500.0	0.0	☆	FC26
FC-39	PLC segment 10+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC27
FC-40	PLC segment 11 operating time	~ 6500.0	0.0	☆	FC28
FC-41	PLC segment 11+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC29
FC-42	PLC segment 12 operating time	~ 6500.0	0.0	☆	FC2A (FC2A)
FC-43	PLC segment 12+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC2B (FC2B)
FC-44	PLC segment 13 operating time	~ 6500.0	0.0	☆	FC2C
FC-45	PLC segment 13+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC2D
FC-46	PLC segment 14 operating time	~ 6500.0	0.0	☆	FC2E
FC-47	PLC segment 14+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC2F
FC-48	PLC segment 15 operating time	~ 6500.0	0.0	☆	FC30
FC-49	PLC segment 15+/- time selection	0~3 (respectively represent acceleration and deceleration time 1~4)	0	☆	FC31
FC-50	PLC operating time unit selection	S (s), 1: h (hours)	0	☆	FC32
FC-51	Selection of multi-stage speed priority mode	Multi-stage speed not preferred 1: Multi-stage speed preferred	1	☆	FC33
FC-52	Multi-stage speed priority acceleration/deceleration time selection	Acceleration and deceleration time 1: Acceleration and deceleration time 2 2: Acceleration and	0	☆	FC34

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
		deceleration time 3: Acceleration and deceleration time 4			
FC-53	Unit selection of multi-stage speed FC-00~FC-15	Of 1 Hz	0	☆	FC35
FC-55	Multi-segment instruction 0 setting mode	Function code FC-00 gives 1: AI1 2: AI2 3: PULSE pulse 4: PID 5: preset frequency setpoint (F0-11), UP/DOWN can be modified	0	☆	FC37
Fd-group torque control					
Fd-00	Torque command source selection	Digital setting (Fd-01) 1: AI1 2: AI2 3: communication given 4: PULSE pulse frequency setting 5: MIN (AI1, AI2) 6: MAX (AI1, AI2) The full scale of 1-6 options corresponds to Fd-01)	0	★	FD00
Fd-01	Torque digital setting	-200.0% ～ 200.0%	150%	☆	FD01
Fd-03	Torque control positive direction maximum frequency	Hz~maximum frequency (F0-14)	Hz	☆	FD03
Fd-04	Torque control reverse direction maximum frequency	Hz~maximum frequency (F0-14)	Hz	☆	FD04
Fd-06	Torque command filtering time	S~10.00s	S	☆	FD06
Fd-07	Torque Mode Frequency Acceleration Time	S~1000.0s	S	☆	FD07
Fd-08	Torque mode frequency deceleration time	S~1000.0s	S	☆	FD08
Fd-10	Speed/Torque Mode Selection	Speed mode 1: Torque mode	0	★	FDOA (FDOA)
FE group - AI multipoint curve setting					
FE-00	Curve 1 Minimum Input	-V ～ FE-02	V	☆	FE00
FE-01	Curve 1 minimum input corresponding setting	-100.0% ～ 100.0%	0%	☆	FE01
FE-02	Curve 1 inflection point 1 input	FE-00 ～ FE-04	V	☆	FE02

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
FE-03	Curve 1 inflection point 1 input corresponding setting	-100.0% ～ 100.0%	30%	☆	FE03
FE-04	Curve 1 inflection point 2 input	FE-02 ～ FE-06	V	☆	FE04
FE-05	Curve 1 inflection point 2 input corresponding setting	-100.0% ～ 100.0%	60%	☆	FE05
FE-06	Curve 1 Maximum Input	FE-04 ～ 10.00	V	☆	FE06
FE-07	Curve 1 maximum input corresponding setting	-100.0% ～ 100.0%	100%		FE07
FE-08	Curve 2 Minimum Input	-FE-10	V	☆	FE08
FE-09	Curve 2 minimum input corresponding setting	-100.0% ～ 100.0%	0%	☆	FE09
FE-10	Curve 2 inflection point 1 input	FE-08 ～ FE-12	V	☆	FE0A
FE-11	Curve 2 inflection point 1 input corresponding setting	-100.0% ～ 100.0%	30%	☆	FE0B (FE0B)
FE-12	Curve 2 inflection point 2 input	FE-10 ～ FE-14	V	☆	FE0C
FE-13	Curve 2 inflection point 2 input corresponding setting	-100.0% ～ 100.0%	60%	☆	FE0D (FE0D)
FE-14	Curve 2 Maximum Input	FE-12 ～ 10.00V	V	☆	FE0E (FE0E)
FE-15	Curve 2 max input corresponding setting	-100.0% ～ 100.0%	100%	☆	FE0F (FE0F)
FE-24	AI1 Set Jump Point	-100.0% ～ 100.0%	0%	☆	FE18
FE-25	AI1 Set skip range	～ 100.0%	0.5%	☆	FE19
FE-26	AI2 Set Jump Point	-100.0% ～ 100.0%	0%	☆	FE1A (FE1A)
FE-27	AI2 Set skip range	～ 100.0%	0.5%	☆	FE1B (FE1B)
FF group - Manufacturer parameter					
FF-00	Manufacturer password	0~65535	*****	☆	FF00
Group H0 - second motor parameter setting					
H0-00	Motor selection	1: Motor 1: Motor 2	1		A000
H0-01	Control mode of the second motor	1: Open loop vector control (no speed sensor vector) 2: VF control	2		A001

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
H0-02	Selection of acceleration and deceleration time of the second motor	Consistent with the first motor 1: Acceleration/deceleration time 1 2: Acceleration/deceleration time 2 3: Acceleration/deceleration time 3 4: Acceleration and deceleration time 4	0	☆	A002
Group H1 - second motor parameters					
H1-00	Motor parameter tuning	No function 1: Static tuning 2: Dynamic complete tuning	0	★	A100
H1-01	Motor 2 Rating	KW ～ 1000.0kW	Type determination	★	A101
H1-02	Motor 2 rated voltage	V~1500V	V	★	A102
H1-03	Motor 2 Motor pole number	2~64	Type determination	●	A103
H1-04	Motor 2 rated current	A~600.00A (motor rated power<=30.0kW) A~6000.0A (motor rated power>30.0kW)	H1-01 Determined	★	A104
H1-05	Motor 2 rated frequency	Hz~maximum frequency (F0-14)	Hz	★	A105
H1-06	Motor 2 rated speed	RPM~60000 RPM	H1-01 Determined	★	A106
H1-07	No-load current of motor 2	A~H1-04 (motor rated power<=30.0kW) A~H1-04 (rated motor power>30.0kW)	H1-01 Determined	★	A107
H1-08	Motor 2 stator resistance	Ohm ～ 65.535ohm	Type determination	★	A108
H1-09	Motor 2 rotor resistance	Ohm ～ 65.535ohm	Type determination	★	A109
H1-10	Motor 2 mutual inductance	MH ～ 6553.5mH	Type determination	★	A10A
H1-11	Motor 2 Leakage reactance	MH ～ 655.35mH	Type determination	★	A10B
H1-12	Acceleration at dynamic full tuning	S~600.0s	S	☆	A10C
H1-13	Deceleration at dynamic full tuning	S~600.0s	S	☆	A10D:
H1-17	Stator resistance of synchronous motor 2	0.001 Ω - 65.535 Ω	Type determination	★	A111

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
H1-18	Synchronous motor 2D axis inductance	MH ～ 655.35mH	Type determination	★	A112
H1-19	Synchronous motor 2Q shaft inductance	MH ～ 655.35mH	Type determination	★	A113
H1-20	Reverse electromotive force of synchronous motor 2	V ～ 65535V	Type determination	★	A114
H1-21	No-load current of synchronous motor 2	～ 50.0%	5%	★	A115
Group H2 - second motor VF parameter setting					
H2-00	Torque Rise	～ 30.0%	0%	☆	A200
H2-02	Oscillation suppression gain	0~100	Type determination	☆	A202
Group H3 - second motor vector control parameters					
H3-00	Switching frequency F1	Hz ～ H3-02	Hz	☆	A300
H3-02	Switching frequency F2	H3-00-F0-14	Hz	☆	A302
H3-04	LF Velocity Proportional Gain	0.1 ～ 10.0	4.0	☆	A304
H3-05	LF velocity integral time	S~10.00s	S	☆	A305
H3-06	High frequency velocity proportional gain	0.1 ～ 10.0	2.0	☆	A306
H3-07	High-frequency velocity integral time	S~10.00s	S	☆	A307
H3-08	Velocity loop integral attribute selection	Integration takes effect 1: Integration separation	0	★	A308
H3-11	Torque current regulator Kp	0~30000	2000	☆	A30B
H3-12	Torque current regulator Ki	0~30000	1300	☆	A30C
H3-13	Excitation current regulator Kp	0~30000	2000	☆	A30D
H3-14	Excitation current regulator Ki	0~30000	1300	☆	A30E
H3-15	Flux braking gain	0~200	0	☆	A30F
H3-16	Weak field torque correction factor	50% - 150%	100%	☆	A310
H3-17	Slip compensation coefficient	50% - 200%	100%	☆	A311
H3-18	Velocity loop feedback	S~1.000s	S	☆	A312

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
	ilter time constant				
H3-19	elocity loop output filter ime constant	S~1.000s	S	☆	A313
H3-20	Electric torque upper limit source	F3-21 2: AI2 1: AI1 (analog range corresponding to F3-21) 3: Given communication 4: PLUSE Given	0	☆	A314
H3-21	Upper limit of electric torque	～ 200.0%	150%	☆	A315
H3-22	Brake torque upper limit source	F3-23 2: AI2 1: AI1 (analog range corresponding to F3-23) 3: Communication setting 4: PLUSE setting	0	☆	A316
H3-23	Brake torque upper limit	～ 200.0%	150%	☆	A317
H3-24	Low-speed magnetizing current of synchronous motor 2	～ 50.0%	25%	★	A318
H3-25	Excitation cut-off frequency of synchronous motor 2	～ 100%	10%	★	A319
H3-26	Pre-excitation time of synchronous motor 2	S~5s	S	★	A31A
H3-27	Synchronous motor 2 initial position identification enabling selection	Not enabled 1: Identification mode I 2: Identification mode II	1	★	A31B
H3-28	Set percentage of voltage for initial position recognition of synchronous motor 2	30% - 150%	80%	★	A31C
Group L0 - System Parameters					
L0-00	Function code read-only selection	Invalid 1: Read-only	0	☆	B000
L0-01	LCD Top Menu Settings	0x000~0xBBB One-digit: the first row ten-digit: the second row hundred-bit: the third row 0: set frequency 1: operating frequency 2: bus voltage 3: output voltage 4: Output current 5: Output power 6: PID setting 7: PID feedback	H. 241	☆	B001

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
		8: Load speed 9: PLC stage A: Output torque B: Motor speed			
L0-02	LCD language selection	Chinese 1: English	0	☆	B002
L0-03	ENTER menu switching function	Prohibited 1: enabled	0	☆	B003
L0-04	Vector operating frequency display selection	Real time frequency 1: Set frequency	0	☆	B004
L0-05	Display selection during UP/Down adjustment	Display Setpoint 1: Display Current Variable Value	0	☆	B005
L1 group-user function code customization					
L1-00	Clear customized function code selection	Invalid 1: Valid	0	☆	B100
L1-01	Custom function code 1	UF0-00 ～ uU1-xx	UF0-03	☆	B101
L1-02	Custom function code 2	UF0-00 ～ uU1-xx	UF0-04	☆	B102
L1-03	Custom function code 3	UF0-00 ～ uU1-xx	UF0-06	☆	B103
L1-04	Custom function code 4	UF0-00 ～ uU1-xx	UF0-23	☆	B104
L1-05	Custom function code 5	UF0-00 ～ uU1-xx	UF0-24	☆	B105
L1-06	Custom function code 6	UF0-00 ～ uU1-xx	UF4-00	☆	B106
L1-07	Custom function code 7	UF0-00 ～ uU1-xx	UF4-01	☆	B107
L1-08	Custom function code 8	UF0-00 ～ uU1-xx	UF4-02	☆	B108
L1-09	Custom function code 9	UF0-00 ～ uU1-xx	UF4-04	☆	B109
L1-10	Custom function code 10	UF0-00 ～ uU1-xx	UF4-05	☆	B10A
L1-11	Custom function code 11	UF0-00 ～ uU1-xx	UF4-06	☆	B10B
L1-12	Custom Function Code 12	UF0-00 ～ uU1-xx	UF4-12	☆	B10C
L1-13	Custom Function Code 13	UF0-00 ～ uU1-xx	UF4-13	☆	B10D
L1-14	Custom function code 14	UF0-00 ～ uU1-xx	UF5-00	☆	B10E
L1-15	Custom function code 15	UF0-00 ～ uU1-xx	UF5-01	☆	B10F
L1-16	Custom function code 16	UF0-00 ～ uU1-xx	UF5-02	☆	B110

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
L1-17	Custom function code 17	UF0-00 ~ uU1-xx	UF6-00	☆	B111
L1-18	Custom function code 18	UF0-00 ~ uU1-xx	UF6-01	☆	B112
L1-19	Custom function code 19	UF0-00 ~ uU1-xx	UF0-00	☆	B113
L1-20	Custom function code 20	UF0-00 ~ uU1-xx	UF0-00	☆	B114
L1-21	Custom function code 21	UF0-00 ~ uU1-xx	UF0-00	☆	B115
L1-22	Custom function code 22	UF0-00 ~ uU1-xx	UF0-00	☆	B116
L1-23	Custom Function Code 23	UF0-00 ~ uU1-xx	UF0-00	☆	B117
L1-24	Custom function code 24	UF0-00 ~ uU1-xx	UF0-00	☆	B118
L1-25	Custom function code 25	UF0-00 ~ uU1-xx	UF0-00	☆	B119
L1-26	Custom function code 26	UF0-00 ~ uU1-xx	UF0-00	☆	B11A=B11A
L1-27	Custom function code 27	UF0-00 ~ uU1-xx	UF0-00	☆	B11B
L1-28	Custom function code 28	UF0-00 ~ uU1-xx	UF0-00	☆	B11C
L1-29	Custom function code 29	UF0-00 ~ uU1-xx	UF0-00	☆	B11D
L1-30	Customized function code 30	UF0-00 ~ uU1-xx	UF0-00	☆	B11E
L1-31	Custom function code 31	UF0-00 ~ uU1-xx	UF0-00	☆	B11F
Group L2 - Optimized Control Parameters					
L2-00	Dead Band Compensation Enable Selection	No compensation 1: Compensation	1	☆	B200
L2-01	PWM mode	Asynchronous modulation 1: Synchronous modulation	0	☆	B201
L2-02	PWM 7-segment/5-segment selection	Seven sections in the whole process 1: Automatic switching of seven sections/five sections	0	☆	B202
L2-03	CBC current limiting enabling selection	Prohibited 1: enabled	1	☆	B203

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
L2-04	Braking point	V ～ 2000.0V	V	☆	B204
			690.0V	☆	
			V 1160.0V	☆	
L2-05	Undervoltage point	V ～ 900.0V	V	☆	B205
			V	☆	
			V	☆	
L2-06	Random PWM depth setting	0~6	0	☆	B206
L2-07	Hz operation mode selection	No current output; 1: Normal operation; 2: Output with shutdown DC brake current F1-16;	0	☆	B207
L2-08	Selection of low-frequency carrier limiting mode	Restricted mode 0 1: Restricted mode 1 2: Unlimited (all frequency band carriers are the same)	0	☆	B208
Group L3-AIAO Correction Parameters					
L3-00	AI1 display voltage 1	-V ～ 10.000V	V	☆	B300
L3-01	AI1 Measured voltage 1	-V ～ 10.000V	V	☆	B301
L3-02	AI1 display voltage	-V ～ 10.000V	V 8.000V	☆	B302
L3-03	AIMeasured voltage	-V ～ 10.000V	V 8.000V	☆	B303
L3-04	AI2 display voltage 1	-V ～ 10.000V	V	☆	B304
L3-05	AI2 Measured voltage 1	-V ～ 10.000V	V	☆	B305
L3-06	AI2 display voltage 2	-V ～ 10.000V	V 8.000V	☆	B306
L3-07	AI2 Measured voltage 2	-V ～ 10.000V	V 8.000V	☆	B307
L3-12	AO1 Target voltage 1	-V ～ 10.000V	V	☆	B30C
L3-13	AO1 Measured voltage 1	-V ～ 10.000V	V	☆	B30D
L3-14	AO Target Voltage2	-V ～ 10.000V	V 8.000V	☆	B30E
L3-15	AO Measured Voltage	-V ～ 10.000V	V 8.000V	☆	B30F
L3-16	AO2 Target voltage 1	-V ～ 10.000V	V	☆	B310
L3-17	AO2 Measured voltage 1	-V ～ 10.000V	V	☆	B311
L3-18	AO2 target voltage 2	-V ～ 10.000V	V 8.000V	☆	B312

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
L3-19	AO2 Measured voltage 2	-V ～ 10.000V	V 8.000V	☆	B313
Group L4 - Master and slave control parameters					
L4-00	Master/slave control enabling selection:	Prohibited 1: enabled	0	★	B400
L4-01	Master and slave selection:	Host 1: Slave	0	★	B401
L4-02	Host sending frequency selection:	Run frequency 1: Target frequency	0	★	B402
L4-03	Slave follow host command source selection	Not follow 1: follow	0	★	B403
L4-04	Slave receiving frequency coefficient	0.00% - 600.00%	100%	☆	B404
L4-05	Torque coefficient received by the slave	**-10.00 ～ 10.00**	1.00	☆	B405
L4-06	Slave receiving torque offset	-50.00% ～ 50.00%	0%	☆	B406
L4-07	Threshold value of frequency deviation	0.20% ～ 10.00%	0.50%	☆	B407
L4-08	Detection time of master/slave communication disconnection	S~10.0s	S	☆	B408
Group L5 - Band-type brake function parameters					
L5-00	Selection of brake control enabling:	Prohibited 1: enabled	0	★	B500
L5-01	Band-type brake release frequency	Hz~20.00Hz	Hz	★	B501
L5-02	Band-type brake release frequency maintenance time	S~20.0s	S	★	B502
L5-03	Current limit value during band-type brake	50.0% ～ 200.0%	120%	★	B503
L5-04	Band-type brake actuation frequency	Hz~20.00 Hz	Hz	★	B504
L5-05	Band-type brake actuation delay time	S~20.0s	S	★	B505
L5-06	Holding time of band-type brake actuation frequency	S~20.0s	S	★	B506

Function Code	Name	Content	Ex-factory value	Change	COMMUNICATION ADDRESS
Group L6 - parameters of sleep wakeup function					
L6-00	Dormant selection	The snooze feature is invalid 1: Digital input terminal DI control sleep function 2: The sleep function is controlled by the PID setpoint and feedback 3: Control the sleep function according to the operating frequency	0	☆	B600
L6-01	Frequency of dormancy	Hz ～ F0-14	Hz	☆	B601
L6-02	Sleep time delay	S~3600.0s	S	☆	B602
L6-03	Wakeup difference value	～ 100.0% When L6-00=3, the unit becomes Hz	10%	☆	B603
L6-04	Wakeup delay	S~3600.0s	S	☆	B604
L6-05	Selection of dormant delay frequency output	PID automatic regulation, 1: sleep frequency L6-01	0	☆	B605

Function Code	Name		Minimum Units	change	COMMUNICATION ADDRESS
Group U0 - Fault Log Parameters					
U0-00	Type of last fault	No fault Err01: VFD module protection Err04: Overcurrent during acceleration Err05: Overcurrent during deceleration Err06: Overcurrent during constant speed operation Err08: Overvoltage during acceleration Err09: Overvoltage during deceleration Err10: Overvoltage during constant speed operation Err12: Undervoltage fault Err13: Drive overload fault Err14: Motor overload fault Err15: Drive overheating Err16: Software overcurrent Err17: Current detection fault Err20: Short circuit to ground Err21: Tuning timeout fault	1	•	7000
U0-01	Type of previous fault		1	•	7001

Function Code	Name		Minimum Units	change	COMMUNICATION ADDRESS
U0-02	Type of previous secondary fault	Err23: input phase loss fault Err24: output phase loss fault Err25: Eeprom operation fault Err27: Communication fault Err28: External fault Err29: Speed deviation too large Err30: User defined fault 1 Err33: Fast current limiting Err31: User defined fault 2 Err34: Load shedding fault Err32: PID feedback loss during operation Err35: Input power failure Err37: Parameter storage exception Err39: The running time has reached Err40: Cumulative running time reached Err42: Switching the motor in operation Err43: Motor overspeed Err45: Pole position detection failed Err46: Master/slave control communication disconnection	1	●	7002
U0-03	Frequency at last failure		Hz	●	7003
U0-04	Current at last fault		A 0.01A	●	7004
U0-05	Bus voltage at last fault		V (0.1V)	●	7005
U0-06	Input terminal status at the latest fault		1	●	7006
U0-07	Output terminal status at the latest fault		1	●	7007
U0-08	State of VFD in the latest fault		1	●	7008
U0-09	Running time of the last fault (time since power-on, minute)		Min:	●	7009
U0-10	Running time at last failure (time since running, minute)		Min:	●	A 700 A
U0-13	Frequency at previous failure		Hz	●	D:
U0-14	Current at previous fault		A 0.01A	●	E:
U0-15	Bus voltage at previous fault		V (0.1V)	●	F
U0-16	Input terminal in case of previous fault		1	●	7010
U0-17	Output terminal in case of previous fault		1	●	7011
U0-18	State of VFD with previous fault		1	●	7012
U0-19	Running time of previous fault (timing after power-on, minute)		Min:	●	7013

Function Code	Name	Minimum Units	change	COMMUNICATION ADDRESS
U0-20	Time of previous failure (time since operation, minute)	Min:	●	7014
U0-21	Reserved variable (reserved variable)		●	7015
U0-22	Reserved variable (reserved variable)		●	7016
U0-23	Frequency of previous secondary fault	Hz	●	7017
U0-24	Current at previous secondary fault	A 0.01A	●	7018
U0-25	Bus voltage in case of previous secondary fault	V (0.1V)	●	7019
U0-26	Input terminal in case of previous secondary fault	1	●	701A
U0-27	Output terminal in case of previous secondary fault	1	●	B
U0-28	State of VFD with previous secondary fault	1	●	C
U0-29	Operation time of the previous secondary fault (timing after power-on, minute)	Min:	●	D:
U0-30	Time of previous secondary fault (timing from operation, minute)	Min:	●	E
Group U1 - Fault Log Parameters				
U1-00	Operating frequency (Hz)	Hz	●	7100
U1-01	Set frequency (Hz)	Hz	●	7101
U1-02	Bus voltage (V)	V (0.1V)	●	7102
U1-03	Output voltage (V)	V	●	7103
U1-04	Output current (A)	A	●	7104
U1-05	Output power (kW)	KW	●	7105
U1-06	DI input status, hexadecimal number	1	●	7106
U1-07	DO output status, hex digits	1	●	7107
U1-08	AI1 corrected voltage	V	●	7108
U1-09	AI2 corrected voltage	V	●	7109
U1-10	PID Setpoint, PID Setpoint (%) * FA-05	1	●	A 710A
U1-11	PID Feedback, PID Feedback Value (%) * FA-05	1	●	B:
U1-12	Count value	1	●	C:

Function Code	Name	Minimum Units	change	COMMUNICATION ADDRESS
U1-13	Value of length	1	●	D:
U1-14	motor speed	RPM (s)	●	E:
U1-15	PLC stage, current section during multi-stage speed operation	1	●	F:
U1-16	PULSE pulse input frequency	KHz	●	7110
U1-17	Feedback speed, actual operating frequency of motor	Hz	●	7111
U1-18	F7-38 Remaining time of timing time	Min	●	7112
U1-19	AI1 Voltage before correction	V	●	7113
U1-20	AI2 Voltage before correction	V	●	7114
U1-21	DI5 high-speed pulse sampling line speed, refer to F7-71	M/min	●	7115
U1-22	Load speed display (set load speed during shutdown), refer to F7-31	custom	●	7116
U1-23	This power-on time	Min	●	7117
U1-24	This operation time	Min	●	7118
U1-25	PULSE pulse input frequency, only different from U1-16 unit	Hz	●	7119
U1-26	Set frequency value for communication	0.01%	●	711A
U1-27	Main frequency display	Hz	●	B 711B
U1-28	Auxiliary frequency display	Hz	●	C 711C
U1-29	Target torque, 100% of motor rated torque	0.1%	●	D 711D
U1-30	Output torque, 100% of motor rated torque	0.1%	●	E 711E
U1-31	Output torque, 100% of rated current of VFD	0.1%	●	F 711F
U1-32	Upper torque limit, 100% of rated current of VFD	0.1%	●	7120
U1-33	VF separation target voltage	V	●	7121
U1-34	VF separation output voltage	V	●	7122
U1-35	hold		●	7123
U1-36	Motor serial number currently used	1	●	7124

Function Code	Name	Minimum Units	change	COMMUNICATION ADDRESS
U1-37	AO1 target voltage	V	•	7125
U1-38	AO2 target voltage	V	•	7126
U1-39	Running state of VFD, 0: shutdown, 1: forward rotation, 2: reverse rotation, 3: fault	1	•	7127
U1-40	Current fault of VFD	1	•	7128
U1-41	Remaining time of agent time limit	H	•	7129
U1-42	Current of AC incoming line	A	•	712A
U1-43	PLC current stage remaining time	0.1	•	B 712B
U1-47	Cumulative Run Time 1 (Cumulative Run Time=U1-47+U1-48)	H	•	F 712F
U1-48	Cumulative operating time 2 (cumulative operating time=U1-47+U1-48)	Min:	•	7130

Appendix C Revision Change Record

date	Version after change	Content of change
2021-04	V3.7	1. Technical data of three-phase 380V 450~800 are added; 2.;The size of three-phase 380V 0.75~7.5kW of new modular machine is added. 4. To add function parameter groups F6-21, F6-22, F6-23 and modify function code parameters F7-62, F7-16, F0-08 and F9-24. 5. The increment command 0008 for address 0x2000 can only be reset in communication control mode.
2022-03	V3.8	1、Update Chapter IV Keyboard Operation and Display. 2. Increase synchronous machine parameters.
2023-11	V3.9	1、Correction of errors in previous instructions, such as explanation of parameters in F3-21 group, F3-23 group, ex-factory value L2-07, setting range of parameters F9-06, guidance on type selection of peripheral electrical components, selection of brake resistance, etc; 2. ERR21 fault and U0 group parameter ERR16 software overcurrent fault are added.
2025-09	V4.0	Adjust the dimensions of the 450kW product.