NO:2024.09

CHINT ELECTRICS

NVF2L Series
Drive

User Instruction

Standard: IEC 61800-3

Preface

Thank you for choosing NVF2L Series Variable Frequency Drive (hereinafter referred to as the Drive).

The NVF2L Series Drive adopts vector control technology free of speed sensor, which is characterized by fast load response, large low-frequency torque and strong overload ability, and realizes accurate control of equipment. This series drive has the application functions of regulated-voltage output, torque limitation, speed tracking, simple PLC, process PID, etc. and can meet the electric drive requirements of fan, water pump, logistics, cable, packaging, and various other types of automatic production equipment.

NVF2L Series Drive has standard RS485 communication protocol, and can be expanded with various communication functions and I/O ports, to meet the complicated operation, control and system integration requirements on site.

For the NVF2L Series Drive, the power grid harmonic interference, dust and oil pollution of the industrial field are fully considered. The product has built-in anti-harmonic interference circuits, which can well suppress harmonic interference. Its modular structural design can reduce dust and oil entering the machine, thus meeting the complicated environmental requirements on site.

NVF2L Series Drive is easy to operate and rich in functions, convenient for beginners to use, and can also meet the complicated application requirements of professional drive debuggers.

This manual introduces the functional characteristics and usage of NVF2L Series Drive, including product type selection, installation and debugging, parameters and functions, etc. Please read these operation instructions carefully before using this drive to ensure the correct use of the drive. After reading and using this operation instructions manual, please keep it properly for future use.

If you encounter any difficulties or problems that cannot be solved during the use, please contact our local distributors or directly contact our professional technical personnel for help (customer service hotline: 400-8177-777).

Our company reserves the right to continuously optimize and improve NVF2L Series Drive, and the information is subject to change without prior notice.

Safety precautions

1. Please read these operation instructions carefully and follow all safety precautions herein before handling, installation, operation and maintenance. If ignored, it may cause personal injury or equipment damage, or even death.
2. We shall not be responsible for injuries and equipment damage caused by the failure of your company or your customers to observe the safety precautions in the operation instructions.

◆ Safety definitions

Sign	Notes
Danger	Where death or serious injury may be caused due to failure to operate as required
Caution	Where medium or minor injury may be caused, or property damage may be caused due to the failure to operate as required

◆ Before installation

Danger	✧If the drive is damaged or has incomplete components, please do not install and run it, otherwise it may cause fire and injury! ✧Do not touch the main circuit terminal, control circuit terminal, electronic components and drive components directly with your hands!
Caution	✧Please check whether the nameplate information of the product is consistent with your order requirements. If not, please do not install it! ✧Please do not install the product when it is not consistent with the packing list!

◆ Installation

Danger	✧Installation must be carried out by qualified personnel, otherwise it may cause electric shock! ✧Please install the drive on nonflammable objects such as metal, otherwise it may cause fire! ✧Do not put flammable objects nearby, otherwise it may cause fire! ✧Do not install it in an environment containing explosive gas, otherwise it may cause explosion! ✧Do not install it where subject to direct sunlight; otherwise the equipment may be damaged! ✧It is strictly prohibited to install it where water droplets may splash, such as from water pipes, otherwise it may cause damage to the equipment!
Caution	✧When handling, do not let the operation panel and cover plate be stressed, otherwise it may cause damage to the equipment and personal injury when falling! ✧Please install it in a place that can bear the weight of the drive, otherwise it may cause damage to the equipment and personal injury when falling! ✧During installation, it is strictly forbidden to leave wire ends or metal objects inside the machine, otherwise it may cause fire!

Safety precautions

◆ **Wiring**

Danger	✧ Wiring operation must be carried out by qualified personnel, otherwise it may cause electric shock! ✧ Make sure that the input power supply is completely disconnected before wiring operation, otherwise it may cause electric shock! ✧ The grounding terminal of the drive must be reliably grounded, otherwise it may cause electric shock! ✧ The exposed parts of the main circuit wiring cables must be wrapped with insulating tape, otherwise it may cause electric shock! ✧ Do not short-circuit P and B, otherwise it may cause fire and damage to the equipment! ✧ The main circuit terminal and the wire terminal must be firmly connected; otherwise it may cause damage to the equipment! ✧ It is strictly forbidden to connect the control terminals other than R1A, R1B and R1C to the AC 220V signal; otherwise it may cause damage to the equipment!
Caution	✧ Before leaving the factory, all drives have been tested for withstand voltage. It is forbidden to test the drive for withstand voltage again; otherwise it may cause damage to the equipment! ✧ When the length of motor cable is more than 100m, it is recommended to use multi-stranded wires and install AC output reactors that can suppress high-frequency oscillation. Avoid motor insulation damage, excessive leakage current and frequent actions of protections of the drive!

◆ **Operation**

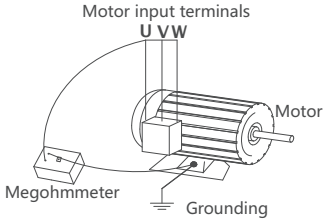
Danger	✧ Put on the cover plate before power-on, otherwise it may cause electric shock and explosion! ✧ For drives that have been stored for more than 6 months, the voltage regulator shall be used to gradually boost the voltage when powering on, otherwise it may cause electric shock and explosion! ✧ Do not touch the terminal with your hands when the power is on, otherwise it may cause electric shock! ✧ Do not operate the drive with wet hands, otherwise it may cause electric shock! ✧ After replacing the control panel, be sure to set the parameters correctly before running, otherwise it may cause damage to the equipment! ✧ Non-professional technicians are forbidden to test signals during operation, otherwise it may cause personal injury or damage to the equipment!
Caution	✧ Please confirm whether the number of phases and rated voltage of the power supply are consistent with the nameplate of the product, otherwise it may cause damage to the equipment! ✧ Check the wiring of the main circuit of the drive to ensure that there is no short circuit and the wiring is fastened, otherwise it may cause damage to the equipment! ✧ The start and stop of the drive shall not be controlled frequently by switching it on and off; otherwise it may cause damage to the equipment! ✧ In civil environment, this product may generate radio interference, in which case, additional suppression measures (reactors, filters, etc.) may be required!

◆ **Maintenance**

Danger	✧ Product maintenance, keeping, inspection or replacement of parts must be carried out by qualified personnel; otherwise it may cause electric shock! ✧ It is strictly forbidden to leave wire ends or metal objects inside the machine, otherwise it may cause fire! ✧ It is forbidden to carry out maintenance, keeping, inspection or replacement of parts live; otherwise it may cause electric shock! ✧ Maintenance operation can only be carried out after the power supply is disconnected for 10 minutes, otherwise it may cause electric shock!
Caution	✧ During maintenance, keeping, inspection, or part replacement of the product, try not to touch the components; otherwise it may cause electrostatic damage to the components! ✧ All pluggable components must be plugged and unplugged under the condition of power-off!

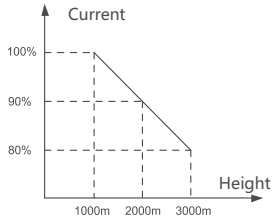
Safety precautions

◆ **Motor and mechanical load**

Precautions	Notes
Comparison with power frequency operation	The output voltage is PWM wave, which contains certain harmonics. Therefore, the temperature rise, noise and vibration of the motor are slightly increased compared with power frequency operation.
Low-speed running	When driving ordinary motor to run at low speed for a long time, the output torque quota needs to be reduced because of the poor heat dissipation effect of the motor. If low speed and constant torque running for a long time is required, be sure to select frequency conversion motor.
Electronic thermal protection value of motor	When an adaptive motor is selected, this drive can provide thermal protection for the motor. If the rated capacity of the motor and the drive does not match, be sure to adjust the protection value or take other protection measures to ensure the safe operation of the motor.
Operation at a frequency above 50Hz	If it runs above 50Hz, besides considering the vibration and noise increase of the motor, the speed range of the motor bearing and mechanical device must also be ensured, and prior inquiry is necessary.
Lubrication of mechanical devices	Mechanical devices that need lubrication, such as gearbox and gears, may be damaged due to poor lubrication effect when running at low speed for a long time, so be sure to check them in advance.
Negative torque load	For occasions such as lifting load, negative torque often occurs, and the drive often trips due to overcurrent or overvoltage faults, in which case, it shall be considered to select brake components with appropriate parameters.
Mechanical resonance point of load device	In a certain output frequency range, the drive may encounter the mechanical resonance point of the load device, which must be avoided by setting the jump frequency.
Frequent start-stop occasions	It is suitable for starting and stopping the drive through the terminal. It is forbidden to use contactors and other switching devices on the input side of the drive for direct and frequent start-stop operations; otherwise it will cause damage to the equipment.
Motor insulation inspection before connected to the drive	Before the motor is used for the first time or used after being placed for a long time, the insulation of the motor shall be checked to prevent the drive from being damaged due to the insulation failure of the motor winding. Wiring is as shown in the figure, please use 500V voltage megohmmeter when testing, and ensure that the measured insulation resistance is not less than 5MΩ. 

Safety precautions

◆ **Precautions for use**

Precautions	Notes
Capacitor used to improve power factor or voltage dependent device	Since the output of the drive is PWM wave, if the output side is equipped with a capacitor to improve the power factor or a varistor for lightning protection, this will trip the drive or damage the device, so make sure to remove them.
Switching devices such as contactor installed at the output terminal of the drive	If it is necessary to install switching device such as contactor between the output of the drive and the motor, please ensure that the drive is switched on and off when there is no output, otherwise it may cause damage to the drive.
Use beyond the rated voltage	It is not suitable to use this drive outside the allowable operating voltage range. If required, please use the corresponding step-up or step-down device for voltage transformation.
Lightning impulse protection	The drive is equipped with lightning protection device, which has certain self-protection ability for induction lightning.
Altitude and derated use	In areas with an altitude of more than 1000m, derating use is required because of the poor heat dissipation effect of the drive caused by thin air. The relationship between the rated current of the drive and the altitude is shown in the figure. 

◆ **Scrapping precautions**

Caution	The electrolytic capacitor on the main circuit and the electrolytic capacitor on the printed circuit board may explode when burned! When plastic parts such as panels are burned, toxic gases will be generated! Please treat them as industrial waste!

CHINT

CHINT ELECTRICS

Catalog

CHINT

CHINT ELECTRICS

Catalog

1 Main purposes and scope of application

1.1 Open case inspection

After receiving the product, the following inspection shall be carried out. If there is any discrepancy, please contact your local dealer:

◆ Whether the external package of the drive is complete, and whether it is deformed, damaged, wet and damped, etc.

◆ Open the package and check the appearance of the drive to confirm whether there are scratches, rust, bumps, etc.

◆ Please confirm whether the drive model is consistent with the product you ordered; Please confirm whether the product accessories are complete and consistent;

◆ If the model is inconsistent or the product has defects, do not install it. Please contact our agent distributor or our sales manager immediately.

1.2 Main purposes

This drive is mainly used for AC motors, to realize variable frequency speed regulation, torque control, enhance operation accuracy, improve equipment power factor, and provide overcurrent, overvoltage, overload protections. At the same time, it can also save energy and reduce equipment noise.

1.3 Scope of application

NVF2L drive is suitable for the type of load of constant torque.

2 Series product model and its meanings

2.1 Series product model and its meaning

The model on the product nameplate indicates the series and product specifications by a combination of letters and numbers, as shown in Figure 2.1.1.

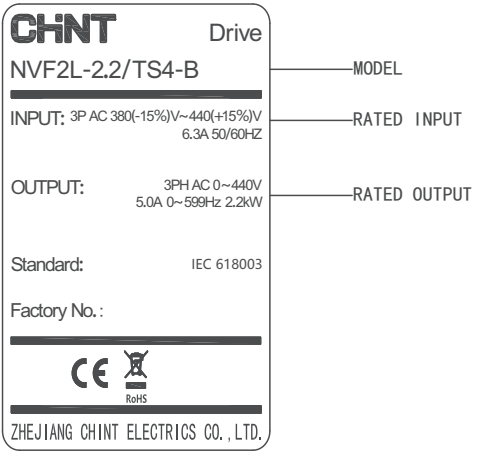


Figure 2.1.1 Nameplate Description

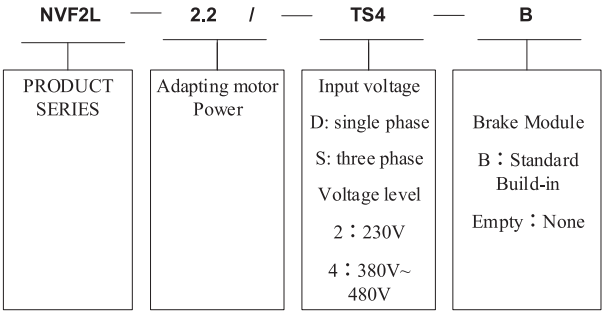


Figure 2.1.2 Product Model Naming Rules

2.2 Product model and specification

Table 2.2.1 Three-phase 380V Drive Model Specification Table

Drive model	Power supply capacity kVA	Input current A	Rated current A	Braking unit	Adapet motor KW
NVF2L–0.4/TS4	2	1.8	1.5	N/A	0.4
NVF2L–0.75/TS4	2.8	2.8	2.3		0.75
NVF2L–1.5/TS4	3.0	4.6	3.7		1.5
NVF2L–2.2/TS4-B	3.0	6.3	5.0	Standard built-in	2.2
NVF2L–3.0/TS4-B	5.0	9.0	7.2		3.0
NVF2L–4.0/TS4-B	5.9	10.5	9.5		4.0
NVF2L–5.5/TS4-B	8.6	14.6	12.2		5.5

Table 2.2.2 Three-phase 230V Drive Model Specification Table

Drive model	Power supply capacity kVA	Input current A	Rated current A	Braking unit	Adapet motor KW
NVF2L–0.4/TS2	1.1	2.4	2.3	N/A	0.4
NVF2L–0.75/TS2	2.1	4.6	4.0		0.75
NVF2L–1.5/TS2-B	4.2	9.0	7.0	Standard built-in	1.5
NVF2L–2.2/TS2-B	5.3	11.4	9.6		2.2

Table 2.2.3 Single-phase 230V Drive Model Specification Table

Drive model	Power supply capacity kVA	Input current A	Rated current A	Braking unit	Adapet motor KW
NVF2L–0.4/TD2	1.1	5.0	2.3	N/A	0.4
NVF2L–0.75/TD2	2.1	9.5	4.0		0.75
NVF2L–1.5/TD2-B	2.9	15.5	7.0	Standard built-in	1.5
NVF2L–2.2/TD2-B	5.3	20.0	9.6		2.2

3 Normal use conditions

3.1 Normal use environment

1) It shall be installed indoors or inside the cabinet.
2) Power supply overvoltage level III
3) Ambient temperature and relative humidity
Constant torque drive: -10°C~+40°C, derated between +40°C and +50°C, derated by 1% of rated power for every 1°C temperature rise.
The maximum relative humidity of air shall not exceed 90% (+20°C) and 50% (+40°C), and the change rate of relative humidity shall not exceed 5% per hour, and no condensation shall occur.
Dust-proof and waterproof grade IP42 (except wiring terminals)
4) Environmental pollution below grade 2
5) Please install the drive in the following places:
In places without oil mist, corrosive gas, flammable gas and dust; foreign materials such as metal powder, oil and water shall not enter the drive; in places where there are no stinging substances and explosive materials, where there are no harmful gases and liquids, where there is little salt erosion and where there is no direct sunlight; do not install the drive on flammable materials such as wood.
6) Altitude
When used at rated output, the altitude of the installation and use place shall not exceed 1000m.
This drive shall be derated in areas with an altitude of more than 1000m, and it shall be derated at a rate of 10% for every 1000m altitude increase. The highest altitude of the installation and use site shall not exceed 3000m.
7) Vibration resistance
5~8.5Hz: displacement of 3.5mm; 8.5~200Hz: acceleration not greater than 5.9m/s^2

3.2 Transportation and storage conditions

1) Please transport and store the product according to the transportation and storage conditions, and the storage temperature and humidity shall meet the requirements;
2) Avoid transportation and storage in places prone to rain, direct sunlight, strong electric field, strong magnetic field and strong vibration;
3) Avoid storing the product for more than 6 months. If the storage time is too long, please carry out strict protection and necessary inspection;
4) Please pack the product properly before vehicle transportation. Closed boxes must be used for long-distance transportation;
5) It is strictly forbidden to transport this product together with articles that may affect or damage the product;
6) Please use professional loading and unloading equipment to handle large-size or heavy-weight products;
7) For manual handling, be sure to hold the product housing tightly to avoid the product parts falling off, otherwise it may cause injury;
8) When handling the product, be sure to handle it with care, and pay attention to your step at any time to prevent trip-over or falling;
9) When the equipment is hoisted by lifting tools, it is forbidden to stand and stay under the equipment.

3.3 Installation direction and installation space

In order to ensure the cooling effect of the product during working, please be sure to install it vertically.

◆ Installation space and direction requirements

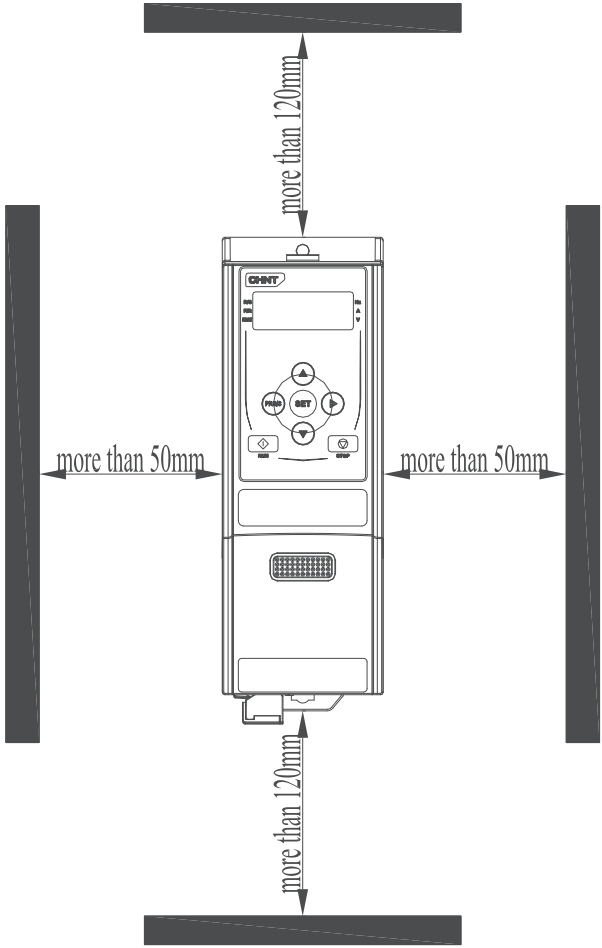


Figure 3.3.1 Installation Space of Single Equipment

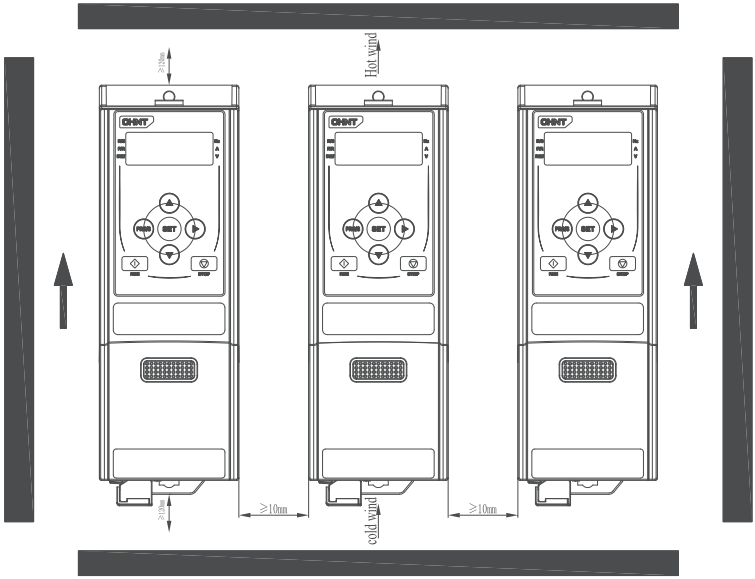


Figure 3.3.2 Parallel Installation of Multiple Equipment Items

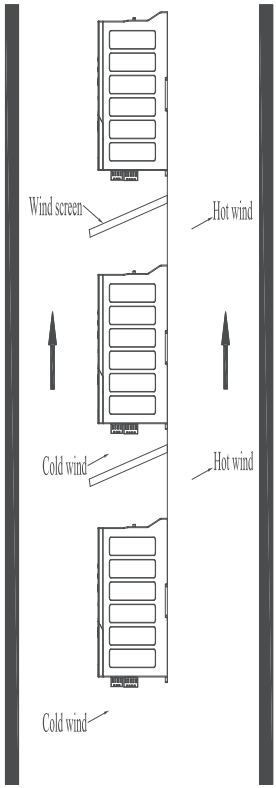


Figure 3.3.3 Vertical Installation of Multiple Equipment Items

4 Main technical parameters and performance

4.1 Product technical specifications

Table 4.1.1 Technical Specifications of NVF2L Drive

Items		Item description
Input	Rated voltage	Three-phase (380-480)V; Three-phase 230V Single-phase 230V
	Frequency	50Hz/60Hz
	Voltage range	Three-phase 380V (-15%)~440V (+15%) Three-phase 230V (±15%) Single-phase 230V (±15%)
	Frequency range	(47~63)Hz
Output	Voltage	0~rated input voltage
	Frequency	(0-500) Hz
	Overload capacity	150% rated current for 1 min and 180% rated current for 2s
Main control performance	Control mode	PG-free vector control (SVC); V/F control;
	Modulation mode	Space vector PWM modulation
	Starting torque	SVC: 150% rated torque at 0.25 Hz V/F: 150% rated torque at 0.5 Hz
	Frequency resolution	Digital setting: 0.01Hz; Analog setting: maximum frequency x 0.5%
	Torque boost	Automatic torque boost, manual torque lifting
	V/F curve	Linear V/F curve, V/F complete separation mode, V/F semi-separation mode, multi-point V/F curve mode
	Acceleration and deceleration curve	Linear acceleration and deceleration (4 types)
	Automatic current limiting	Automatically limit the current during operation to prevent frequent overcurrent fault tripping
Customized function	Inching	Inching frequency range: (0.10~50.00) Hz Inching acceleration and deceleration time (0.1-6000.0)s
	Multi-speed running	Multi-speed running realized through control terminals
Peripheral interface characteristics	Run command channel	Operation panel setting, control terminal setting and communication control setting, which can be switched
	Digital input	5 multi-function digital programmable inputs, including one DI5 high-speed pulse input
	Analog input	1 analog signal input Optional (0~20) mA, (4~20) mA current signal input or (0~10) V voltage signal input
	Analog output	1 analog signal output You can select (0~20) mA, (4~20) mA current output or (0~10) V voltage output respectively, which can realize the output of physical quantities such as set frequency and output frequency
	Relay output	1 relay output, including one normally open and normally closed conversion output and one normally open output. Contact capacity: NO 5A, NC 3A, 250V (AC)
	RS485 communication interface	1 line, supporting Modbus protocol

Items		Item description
Operation panel	LED display	It can display more than 20 parameters such as set frequency, output frequency, output voltage and output current
	Key lock	Lock all or some of the keys
	Function selection	Define the functional scope of some keys to prevent mis-operation
	Language	Display in Chinese and English (default is English)
	Indicator	1 status indicator
Protection functions	It has the protection functions such as overcurrent protection, overvoltage protection, undervoltage protection, overheat protection, overload protection and open-phase protection	
Structure	Protection class	IP42 (except wiring terminals)
	Cooling mode	Natural cooling and axial DC fan cooling
Installation mode		Wall-mounted and rail type
Efficiency		≥ 93% for 5.5 kW and below

5 Structural characteristics and working principle

5.1 Characteristic diagram of product main circuit

The main circuit of NVF2L Series Drive includes rectifier bridge, precharge circuit, DC bus support capacitor, brake module, inversion bridge and other devices and circuits. The topology diagram of the main circuit is shown below.

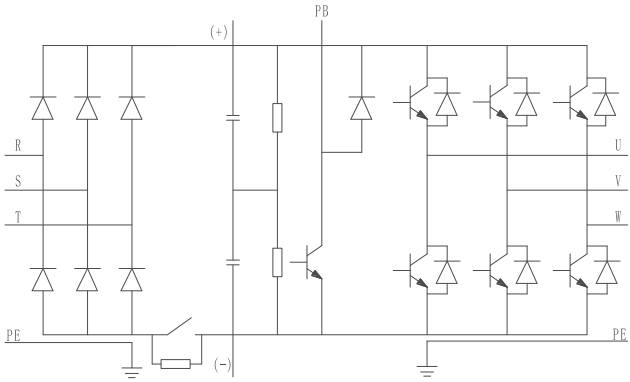


Figure 5.1.1 Schematic Diagram of Main circuit of NVF2L - 5.5KW and lower (inclusive)

5.2 Product structure characteristic diagram

NVF2L has a plastic shell structure. As shown in the figure below:

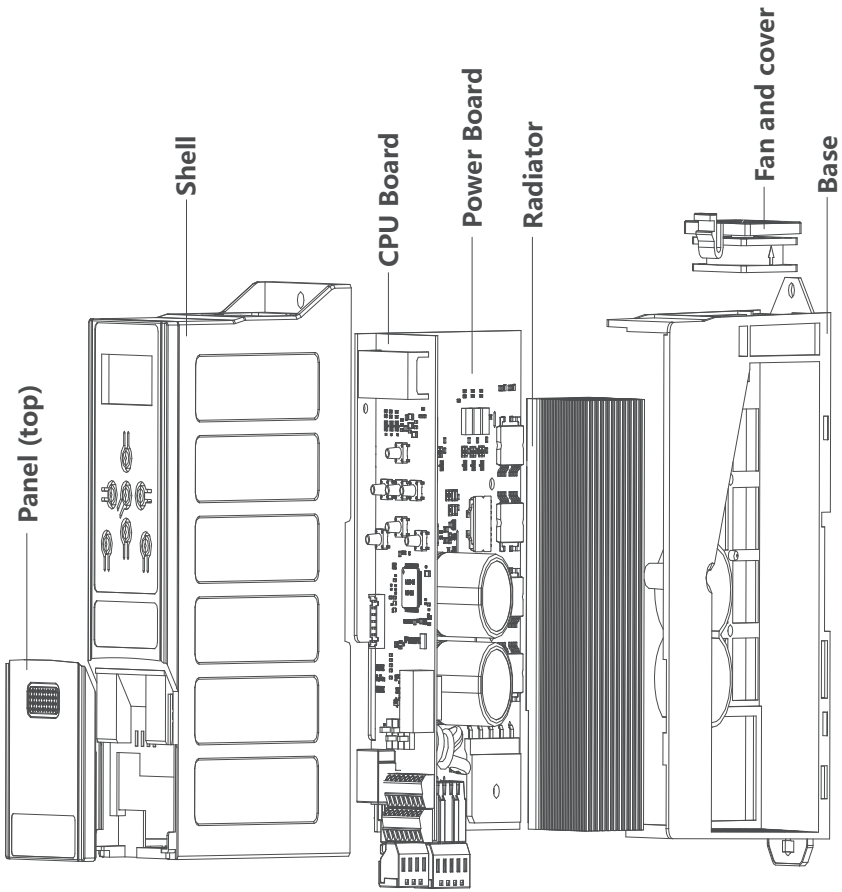


Figure 5.2.1 Structural Characteristics of NVF2L Drive

6 Appearance, installation size and weight

6.1 Appearance, installation size and weight

Table 6.1.1 380V drive frame size and model

Frame size	Drive model
T1	NVF2L - 0.4/TS4
	NVF2L - 0.75/TS4
	NVF2L – 1.5/TS4
	NVF2L – 2.2/TS4-B
T2	NVF2L – 3.0/TS4-B
	NVF2L – 4.0/TS4-B
	NVF2L – 5.5/TS4-B

Table 6.1.2 Three-phase 230V drive frame size and model

Frame size	Drive model
T1	NVF2L - 0.4/TS2
	NVF2L - 0.75/TS2
	NVF2L – 1.5/TS2-B
T2	NVF2L – 2.2/TS2-B

Table 6.1.3 Single phase 230V drive frame size and model

Frame size	Drive model
T1	NVF2L - 0.4/TD2
	NVF2L - 0.75/TD2
T2	NVF2L – 1.5/TD2-B
	NVF2L – 2.2/TD2-B

The outline installation of product frame is as follows:

◆ T1~T2

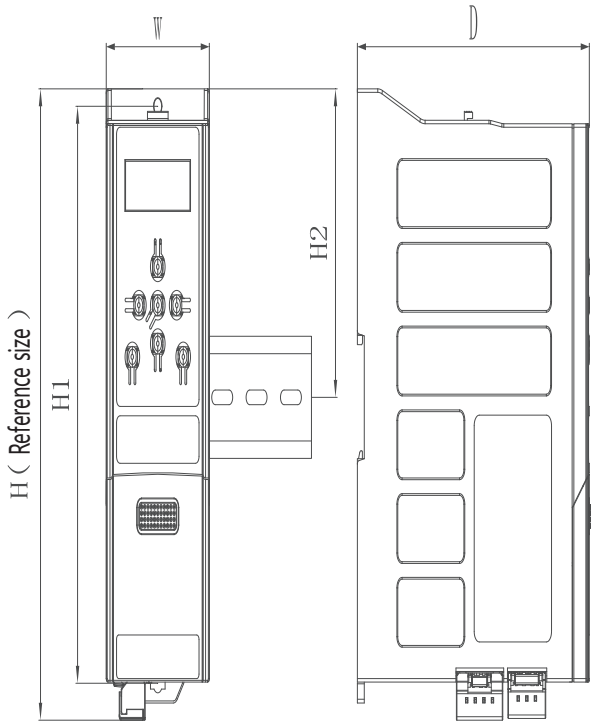


Figure 6.1.1 Installation Dimensions of T1 ~T2 Frame Size Outline

◆ The product outline, installation size and weight are summarized as follows:

Table 6.1.4 Product shape, installation dimensions and weight

Frame size	Overall dimensions in mm			Mounting hole position mm		Weight kg	Mounting holes d	Remark
	H	W	D	H1	H2			
T1	181	60	135	170	87	0.5	M4	
T2	191	70	145	180	98	0.6	M4	

7 Installation, debugging and operation

7.1 Inspections before installation

◆ Installation environment

1) It shall be installed indoors or inside the cabinet.

2) Power supply overvoltage level III

3) Ambient temperature and relative humidity

Constant torque drive: -10°C~+40°C, derated between +40°C and +50°C, derated by 1% of rated power for every 1°C temperature rise.

The maximum relative humidity of air shall not exceed 90% (+20°C) and 50% (+40°C), and the change rate of relative humidity shall not exceed 5% per hour, and no condensation shall occur.

Dust-proof and waterproof grade IP42 (except wiring terminals)

4) Environmental pollution below grade 2

5) Please install the drive in the following places:

In places where there is no oil mist, corrosive gas, flammable gas and dust, where there are no irritating substances and explosives, where there is little salt erosion, and where there is no direct sunlight, do not install the drive on flammable materials such as wood.

6) Altitude

At rated output, the altitude of the installation and use place shall not exceed 1000m.

It shall be derated in areas with an altitude of more than 1000m, and it shall be derated at a rate of 10% for every 1000m altitude increase. The highest altitude of the installation and use site shall not exceed 3000m.

7) Vibration resistance

5~8.5Hz: displacement 3.5mm; 8.5~200Hz: acceleration not greater than 5.9m/s^2

7.2 Main circuit wiring mode

The schematic diagrams for wiring mode and main terminal of NVF2L Series Drive are shown below.

◆ T1~T2

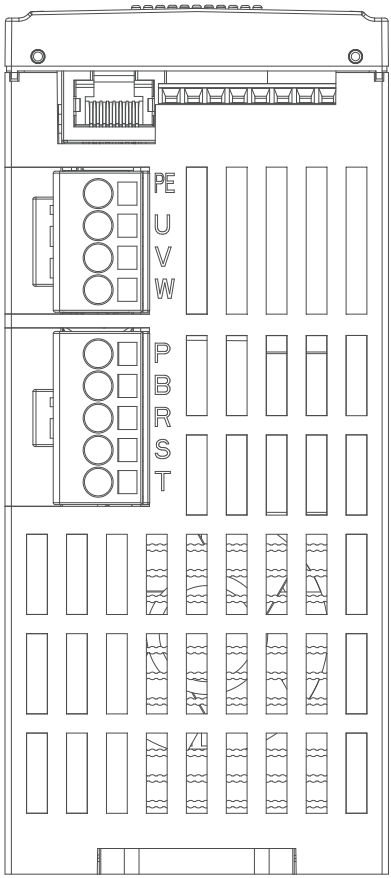


Figure 7.2.1 Schematic Diagram of Main Terminals of T1~T2 Frame Size

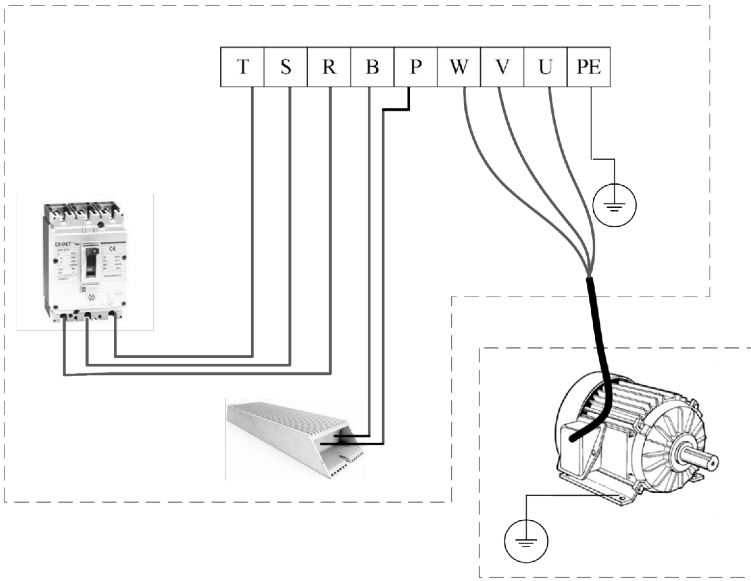


Figure 7.2.2 Schematic Diagram of Main Terminals of Each Frame Size of the Product

Table 7.2.1 Description Table of Main Circuit Terminals

Terminal symbol	Terminal name	Function description	Wiring precautions
R, S, T	Main circuit power input	Three-phase AC voltage input end, connected with the power grid	1. Wiring must be conducted according to the terminal functions, otherwise it may cause damage to the drive and even a fire; 2.The wiring length of the braking unit shall not exceed 10m, and twisted pair or tight double-wire parallel wiring shall be used; 3. When the external braking resistor is connected, it is not allowed to connect the braking resistor directly to the DC bus; otherwise it may cause damage to the drive and even a fire.
U, V, W	Drive output	Three-phase AC voltage output end, generally connected with motor	
PE	Grounding terminal	The safety protection grounding terminal must be reliably grounded, and the cross-sectional area of the grounding wire shall not be less than the cross-sectional area of the input power cord of the drive	
P	Positive power terminals	Positive power terminals of DC bus of drive	
B	Braking resistor connection terminal	Braking resistor connection terminal	

7.3 Wiring method of control circuit

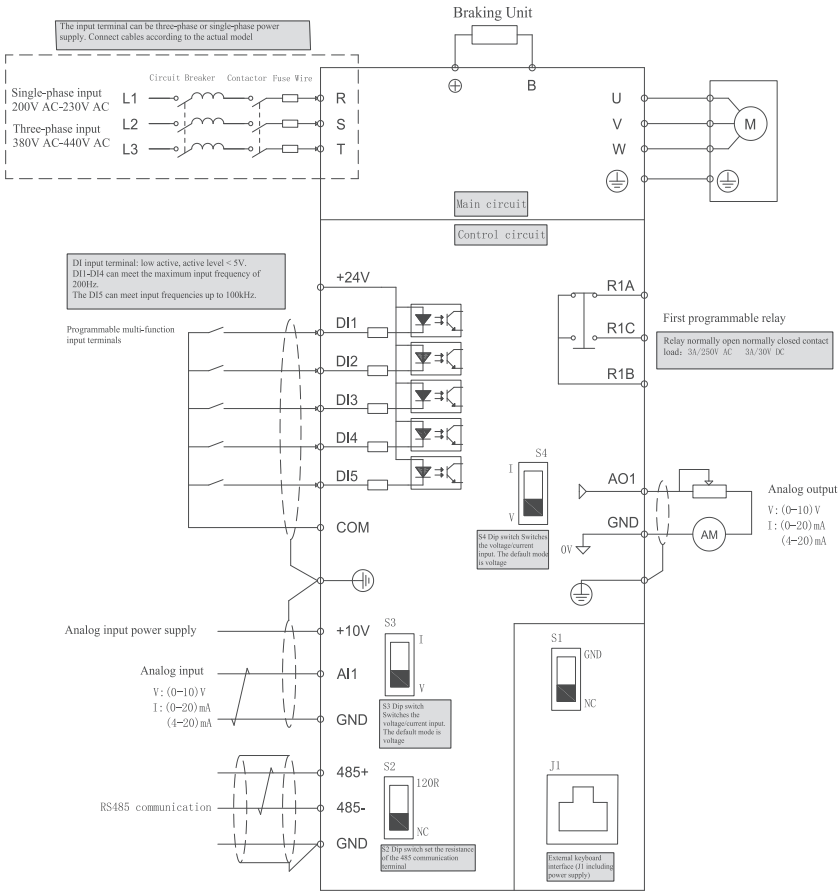


Figure 7.3.1 Control Terminal and Wiring Schematic Diagram

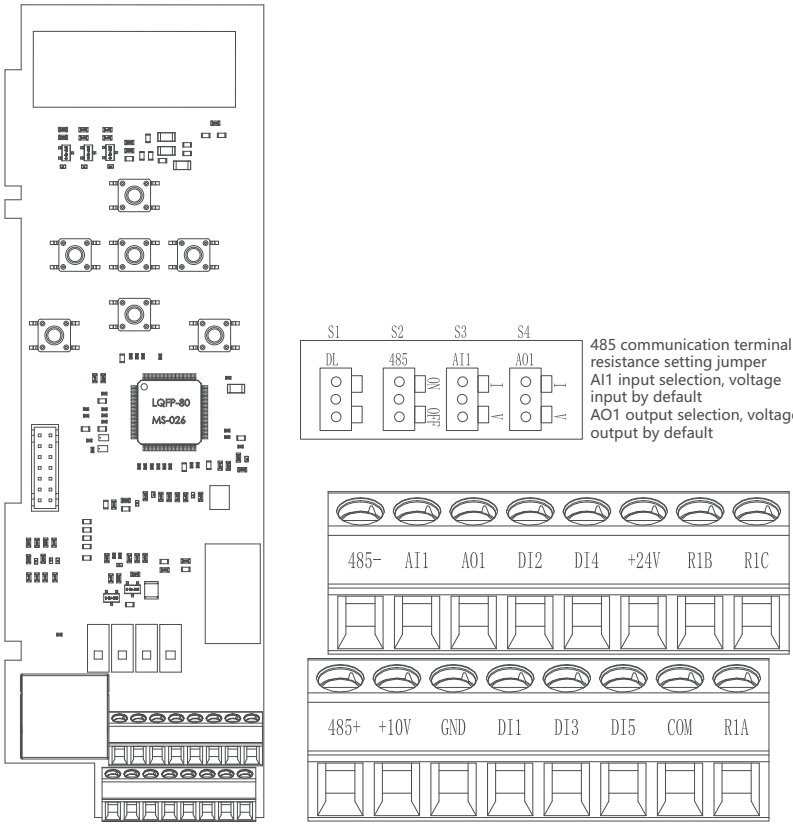


Figure 7.3.2 Layout of Control Circuit Terminals

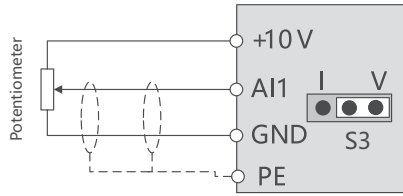
Table 7.3.1 Control Terminal Functions

Type	Terminal	Name	Description of terminal functions	
Power supply	+10V	+10V power supply	+10V power supplied to outside, maximum output current: 10mA It is generally used as the working power supply of an external potentiometer. The resistance range of the potentiometer is: 1kΩ~5kΩ.	
	GND	+10V power ground		
	+24V	+24V power supply	+24V power supplied to outside, which is generally used as working power supply for digital input and output terminals and external sensor power supply Maximum output current: 200mA	
	COM	+24V power supply common terminal		
Analog input	AI1	Analog single-ended input AI1	Voltage input range: 0Vdc~10Vdc, Current input range: 0mA~20mA or 4mA~20mA Decided by dip switch S3 selection Input impedance: 22kΩ for voltage input and 500Ω for current input.	
Analog output	AO1	Analog output	The voltage or current output is determined by the selection of S4 dip switch on the control panel. Output voltage range: 0V~10V Output current range: 0mA~20mA or 4mA~20mA	
Communication	485+	RS485 communication interface	Positive terminal of 485 differential signal	Standard RS485 communication interface Please use twisted pair or shielded wire
	485-		Negative terminal of 485 differential signal	
Digital input terminals	DI1	Multifunctional input terminal 1	Optical coupling isolation Input impedance: 1.39kΩ Voltage range at effective level input: 18V~30V Programmable digital input terminals with multiple functions, see function codes F5-00~F5-03	
	DI2	Multifunctional input terminal 2		
	DI3	Multifunctional input terminal 3		
	DI4	Multifunctional input terminal 4		
	DI5	Multifunctional input terminal 5	Besides the characteristics of DI1~DI4, it can also be used as a high-speed pulse input channel. Maximum input frequency: 100kHz Input impedance: 1.03kΩ	
Relay output terminal	R1B-R1C	Normally open terminal contact	Output terminal of programmable multi-function relay, see function code F6-02 Contact drive capability: 5A 250V (AC) 30Vdc, 1A	
	R1B-R1A	Normally closed terminal contact		

7.4 Wiring method

7.4.1 Analog input terminal

Because weak analog voltage signals are particularly vulnerable to external interference, it is generally necessary to use shielded cables, and the wiring distance shall be as short as possible, not exceeding 20m. In some situations where analog signals are seriously disturbed, filter capacitor or ferrite core shall be added to the analog signal source side.



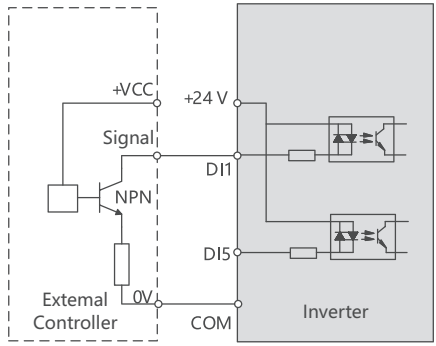
Analog AI1 voltage input

Figure 7.4.1 Wiring Diagram of Analog Voltage Input Terminal

7.4.2 Digital input terminals

Sinking wiring

(1) COM is the common terminal of DI1~DI5, always connected to +24V. Typical wiring mode between DI1~DI5 and outside is as follows: use +24V power supply inside the drive.



Sink wiring using internal 24V power supply of inverter

Figure 7.4.2 Wiring mode using internal +24V power supply

●Wiring mode of high-speed input terminal DI5

When DI5 is used as a high-speed pulse input, the maximum allowable frequency is 100kHz.

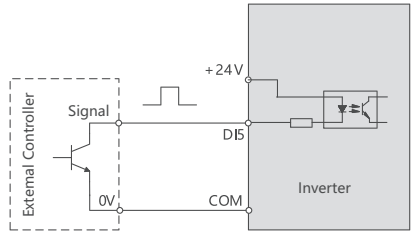


Figure 7.4.3 High-speed Pulse Input

7.5 First start-up steps

The following describes the basic setting steps required for the initial start of the drive.

◆ **Process 1: Basic debugging process**

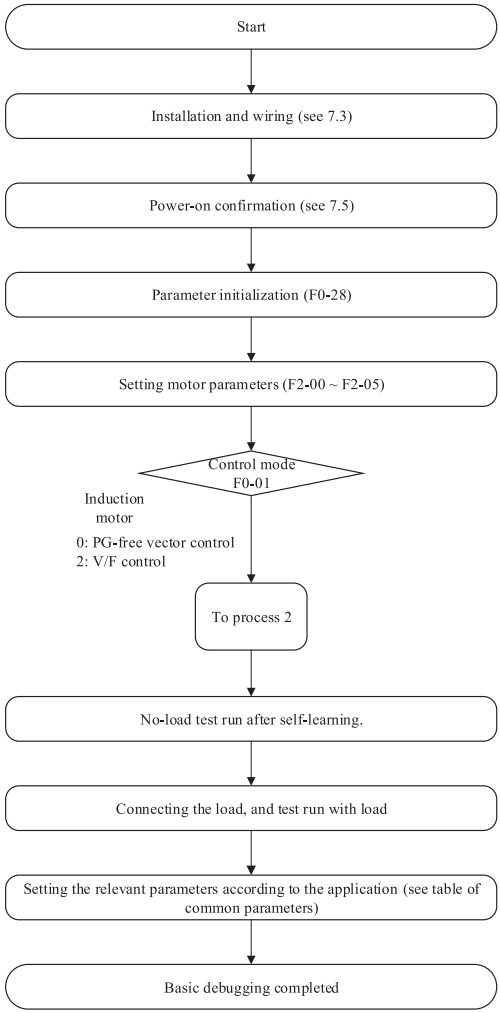


Figure 7.5.1 Basic Debugging Flowchart

Common Parameter List				
Parameter	**Name**	**Setting range**	**Ex-factory value**	**Change**
F0-02	Run instructions selection	0: Operation panel 1: Terminal 2: Communication	0	○
F0-03	Main frequency instruction input selection	0: Numerical setting (without power-off memory) 1: Numerical setting (with power-off memory) 2: AI1 3: Reserved 4: Reserved 5: Pulse setting (DI5) 6: Multi-segment instruction 7: Simple PLC 8: PID 9: Setting by communication	0	◎
F0-08	Preset frequency	0.00Hz~maximum frequency (F0-10)	50.00Hz	○
F0-09	Direction of operation	0: Run in the default direction 1: Run in the opposite direction to the default direction	0	○
F0-17	Acceleration time 1	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	As per model	○
F0-18	Deceleration time 1	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	As per model	○
F0-28	Parameter initialization	0: No operation 01: Clear record information 02: Restore factory parameters, excluding motor parameters 04: Back up user's current parameters 05: Restore user backup parameters	0	◎
F1-00	Startup mode	0: Direct startup 1: Speed tracking and then restart 2: Reserved	0	○
F1-03	Starting frequency	0.00Hz~50.00Hz	0.00Hz	○
F1-04	Holding time of starting frequency	0.0s~100.0s	0.0s	◎

◆ **Process 2: Self-learning process of induction motor**

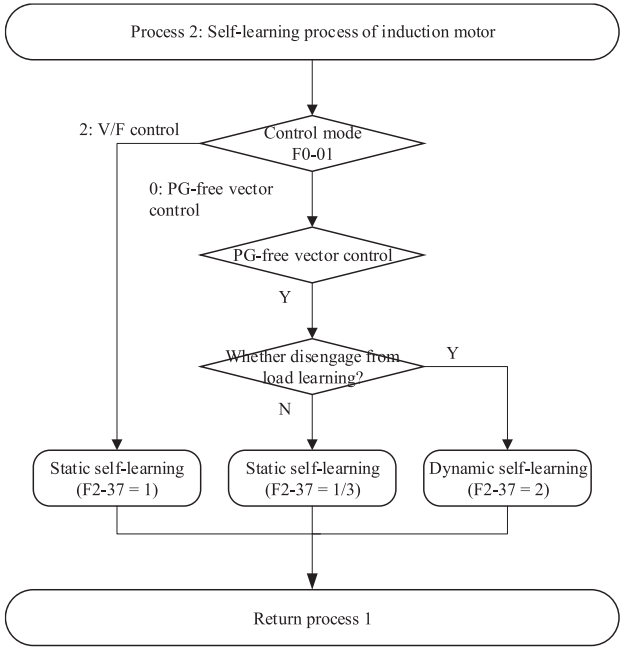


Figure 7.5.2 Self-learning of Induction Motor

7.6 Confirmation items of drive at initial startup

Please confirm the items in Table 7.6.1 before the drive is powered on.

Table 7.6.1 Confirmation Items of Drive at Initial Startup

Phase	Items	Content
Before power-on	Input power voltage	Please confirm whether the input power specification is consistent with the product specification 220V grade: 380V grade:
	Main circuit input power supply wiring	Please confirm that the input power supply is correctly connected to the terminals R/S/T
	Main circuit output and motor wires	Please confirm that the output terminals U/V/W and the motor terminals U/V/W are connected correctly, and the screws are fastened according to the torque requirements
	Braking resistor/Braking resistor wiring	Please confirm whether the product model has braking function; Please make sure that the braking resistor is correctly connected to the "P" terminal and the "B terminal"
	Grounding	Please confirm that the drive and motor are properly grounded, the grounding wire meets the requirements and the screws are fastened according to the torque requirements
	Control circuit wiring	Please confirm that the control circuit is correctly wired and the control terminal screws are fastened according to the torque requirements.
	Motor and mechanical load connection	Before the first operation, please ensure that the motor shaft and the mechanical load remain separated, and then connect the mechanical load after the motor runs properly without load. Please confirm the distance between the drive and the motor and the cable length
After power-on	Operation panel state	The drive is in standby state and in trouble-free state (refer to the Figure)
	DC bus voltage	Press the ">" key to switch, and confirm that the bus voltage meets the requirements; The DC bus voltage VDC is about 1.4 times of the AC input voltage Vin.
First debugging preparation	Debug according to specifications	See Chapter 7.4

7.7 Usage of operation panel

7.7.1 LED operation panel

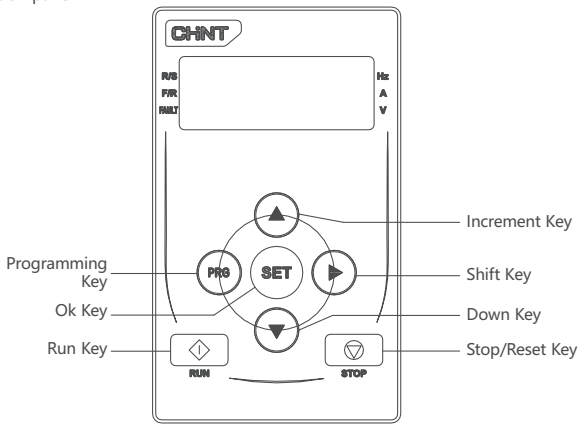


Figure 7.7.1 Operation Panel Diagram

◆ **Description of indicators:**

The indicators are divided into state indicators and unit indicators. The state indicator are described as follows:

Indicator	Display state	Display description
R/S (run instruction)	On	Running state
	Off	Stopped state
F/R (direction indication)	On	Reverse running
	Off	Forward running
FAULT (fault indication)	On	In torque control
	Slow flash	Motor parameter tuning
	Fast flash	Drive fault

The unit indicators are specified as follows:

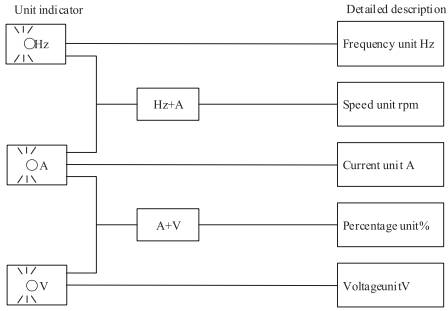


Figure 7.7.2 Schematic Diagram of Unit Indicators

Description of key functions:

Key	Function	Description
PRG	Programming key	Enter the level I interface/Return to the previous interface
SET	OK key	Enter key (to confirm data or operation/enter the next level menu)
▲	Ascending key	Ascending key (to change group number, index number and parameter value)
▼	Descending key	Descending key (to change group number, index number and parameter values)
▶	Shift key	When setting parameters, move and select the position to be modified
RUN	Run key	Start-stop control of drive
STOP	Stop/Reset key	In running state, it is used to stop operation; In fault state, it is used for reset operation

◆ Parameters setting

The operation panel of the drive adopts a three-level menu structure for parameters setting and other operations. Three-level menus are: Functional parameters group (level I menu) → Function codes (level II menu) → Function code set values (level III menu). The operation flow is as follows:

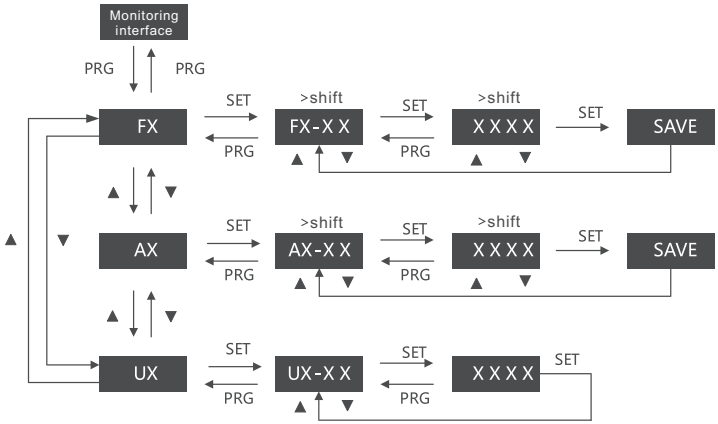


Figure 7.7.3 Parameters Setting Operation

Press PRG key or SET key to return to level II menu when operating in the level III menu. The difference is as follows: press SET to save the set parameters, then return to level II menu and automatically transfer to the next function code; press PRG to abandon the current parameter modification and directly return to the level II menu of the current function code number.

In the Level III menu state, if the parameter does not flash, it means that this function code cannot be modified. The possible reasons are as follows:

1) This function code is a parameter that cannot be modified, such as drive type, actual detection parameter, operation record parameter, etc.

2) This function code cannot be modified in the running state, and can only be modified after stopping the equipment.

3) The parameters are protected. F7-11 is set to 1 (no function code can be modified).

7.8 Motor self-learning

Please select the most suitable self-learning mode according to the type of motor used, the control mode of drive and the installation environment of motor.

Warning! When dynamic self-learning is selected, the motor will rotate at a speed of more than 50% of the rated frequency. Please make sure the surrounding area is safe.

◆ Self-learning of induction motor

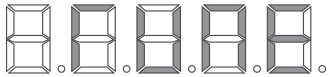
Please input the motor parameters according to the motor nameplate before self-learning:

Self-learning related parameters of induction motor				
F2-00	Motor type selection	0: Normal asynchronous motor 1: Frequency conversion asynchronous motor	0	◎
F2-01	Rated power of motor	0.1kW~1000.0kW	As per model	◎
F2-02	Rated voltage of motor	1V~2000V	As per model	◎
F2-03	Rated current of motor	0.01A~655.35A (drive power ≤ 55kW) 0.1A~6553.5A (drive power >55kW)	As per model	◎
F2-04	Rated frequency of motor	0.01Hz~maximum frequency	As per model	◎
F2-05	Rated speed of motor	1rpm~65535rpm	As per model	◎

Selection of self-learning mode for induction motor:

Method	Parameters	Use conditions	Tuning effect
Dynamic self-learning	F2-37 = 2	• When the motor can be separated from the mechanical load and the motor rotation during self-learning is free of problem; • When running the motor with constant output characteristics • When high-precision control is required • When the motor cannot be separated from the mechanical load, but the load of the motor is less than 30%	Optimal
Partial static self-learning	F2-37 = 1	• When the wiring distance under V/f control is above 50m • When the motor output and drive capacity are different	General
Complete static self-learning	F2-37 = 3	• When the motor cannot be separated from the mechanical load, and the load of the motor is more than 30%	Good

◆ Self-learning steps

Steps	Process
Step 1	The run instruction of drive is selected as panel operation (F0-02 = 0)
Step 2	Accurately input the motor nameplate parameters (F2-00~F2-05)
Step 3	Set the motor tuning mode (F2-37), press the SET key, and the keyboard will display it 
Step 4	Press the RUN key on the operation panel, the drive will run the motor, and the running indicator will light up, and the ALM indicator will flash slowly. When the tuning lasts for a period of time, the indicator will go out, the code displayed on the panel will disappear, and it will return to the normal parameter display interface, indicating that the tuning is completed. The drive will automatically obtain the motor parameters according to the selected tuning mode. **Induction motor:** Partial static parameter tuning: obtain F2-06~F2-08 parameters Complete static parameter tuning: obtain F2-06~F2-10 parameters Complete dynamic parameter tuning: obtain F2-06~F2-10 **Synchronous motor:** Static parameter tuning: obtain F2-16~F2-18 parameters Dynamic parameter tuning: obtain F2-16~F2-18 and F2-20 parameters

7.9 Test run

Set the basic parameters, and start the test run after self-learning of the motor.

Warning! Safety measures when restarting the machine: After the wiring operation and parameter setting are completed, please be sure to perform test run, and make sure that the machine can operate safely. If the system is used directly without test run, it may cause death or serious injury.

7.9.1 Test run under no-load state

Please confirm the running state of the motor before connecting it with the machine.

Precautions before operation:

Before running the motor, please confirm the following items:

• Please confirm the safety around the motor and machine.

• Please confirm whether the emergency stop circuit and the safety device on the mechanical side operate correctly.

Confirmation items during running:

Confirm the following items during running:

• Whether the motor is running forward.

• Whether the motor rotates smoothly (whether there is abnormal sound and vibration).

• Whether the acceleration and deceleration of the motor are smooth.

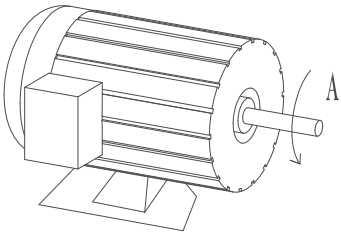
7.9.2 No-load run

No-load test run steps are as follows.

1) Set F0-08 to 5.00Hz (target operating frequency).

2) Press RUN. The running indicator is on, and the motor rotates forward at 5.00Hz.

3) Make sure that the motor rotates in the correct direction, and the drive displays no fault. When a fault is displayed, carry out troubleshooting.



Forward running direction of the motor: (counterclockwise as viewed from the load shaft)

4) Increase the set value of F0-08 to increase the motor operating frequency. When increasing the operating frequency, please confirm the responsiveness while adjusting the set value at step of 10Hz.

5) Press > shift key, the panel indicator A will light up, and the panel will display the present output current. If the output current of the drive does not exceed the rated current of the motor, it is in normal state.

6) After confirming that the motor can run properly, press STOP. When the motor stops, the RUN indicator goes out.

7.9.3 Actual load test run

After confirming the running in no-load state, connect the motor with the mechanical system for test run.

Precautions before operation:

Before running the motor, please confirm the following items:

• Please confirm the safety of the motor and its surroundings.

• Please confirm whether the emergency stop circuit and the safety device on the mechanical side operate correctly.

• Please make sure that the motor stops completely.

• Please connect the motor and the mechanical equipment.

Please confirm no loose mounting screws and true fixing of the motor shaft on the mechanical system.

• Please be prepared to press the STOP/RESET key at any time in case of abnormal action.

Confirmation items during running:

• Whether the mechanical equipment moves in the right direction (whether the motor rotates in the right direction).

• Whether the acceleration and deceleration of the motor are smooth.

7.9.4 On-load test run

After the motor is connected to the mechanical equipment, please implement test run according to the same operation steps as no-load operation.

• Please confirm whether the output current displayed on the panel is too large.

1) Set F0-08 to 5.00Hz (target operating frequency).

2) Press RUN. The running indicator is on, and the motor rotates forward at 5.00Hz.

3) Make sure that the motor rotates in the correct direction, and the drive shows no fault. When a fault is displayed, carry out troubleshooting.

4) Increase the set value of F0-08 to increase the motor operating frequency. When increasing the operating frequency, please confirm the responsiveness while adjusting the set value at step of 10Hz.

5) Press > shift key, the indicator A on the right of the panel will light up, and the panel will display the present output current. If the output current of the drive does not exceed the rated current of the motor, it is in normal state.
6) After confirming that the motor can run properly, press STOP. When the motor stops, the RUN indicator goes out.
7) Change the target frequency and rotation direction, and confirm whether there is abnormal sound and vibration.
8) In case of control failures such as maladjustment or vibration, please make adjustments.

7.10 Adjustment of control performance during test run

Set the basic parameters, and start the test run after self-learning of the motor.

Warning! Safety measures when restarting the mechanical equipment: After the wiring operation and parameter setting are completed, please be sure to perform test run, and make sure that the mechanical equipment can operate safely. If the system is used directly without test run, it may cause death or serious injury.

●V/F control of induction motor

Failure	Parameter No.	Measures	Ex-factory setting	Recommended value
Maladjustment and vibration at medium speed (10 Hz~40 Hz)	F4-11 (oscillation suppression gain)	In case of maladjustment and vibration, raise the set value.	40	0~100
④Motor is noisy ④Maladjustment and vibration at low speed (below 10 Hz) and medium speed (10 Hz~40 Hz)	F0-15 (carrier frequency)	④If the motor is noisy, raise the carrier frequency ④For low and medium speed maladjustment and vibration, lower the carrier frequency	As per model	
Insufficient torque at low speed (below 10Hz).	F4-01 (Torque boost)	④With operating parameters identified, set automatic torque boost ④With parameter not identified, increase the parameters according to the actual situation	As per model	0.0%~30.0%
Large starting impact	F4-01 (Torque boost)	④According to the actual situation, lower the parameters ④Perform parameter identification and set automatic torque boost	As per model	0.0%~30.0%
Large inertia load reporting overvoltage upon rapid deceleration	F4-23 (Overvoltage stall enabled)	Enable overvoltage stall protection function	1	
Poor speed accuracy	F4-09 (slip compensation coefficient)	Adjust this compensation value according to the actual situation	0.0%	0.0%~200.0%

7.11 Confirmation table during test run

During the test run, please confirm according to the following steps:

(1)Before the first test run

Inspection	Ser. No.	Content
	1	Whether the correct installation and wiring is completed according to the specifications
	2	Whether the mechanical load is disconnected to the motor shaft
	3	Whether the motor shaft can rotate
	4	Whether the drive is set with automatic start function
	5	Whether the drive is powered on

(2)First test run

Inspection	Ser. No.	Content
	1	Whether equipment model is set
	2	Whether motor parameters are set
	3	Whether the operating frequency is appropriately reduced, such as 10Hz
	4	Whether the drive can start properly
	5	Whether the motor rotates and whether the motor rotates in the correct direction; If the motor rotates in the wrong direction, whether any two-phase U/V/W cables have been exchanged
	6	Whether the motor parameter self-learning is completed

8 Precautions for repair, maintenance and storage

Due to the influence of environmental temperature, humidity, dust and vibration, aging and wear of devices inside the drive and many other reasons, potential failures of the drive will occur. Therefore, it is necessary to carry out daily and regular maintenance of the drive.

Note: Before inspection and maintenance, please confirm the following items first, otherwise it may cause electric shock:

(1) The power supply of the drive has been cut off;

(2) After the cover plate is opened, the charging indicator goes out;

(3) Cut off the power supply of the frequency converter and wait for 10 minutes before proceeding with the operation.

8.1 Daily maintenance and care

Daily inspection: In principle, check whether there is any abnormality during operation:

1) Whether the motor runs as set;

2) Whether the environment of the installation site is abnormal;

3) Whether the cooling system is abnormal;

4) Whether there is abnormal vibration sound;

5) Whether there is overheating and discoloration;

6) Measure the input voltage of drive with multimeter during operation.

8.2 Regular inspection and maintenance

Depending on the use environment, users can check the drive once every 6 months.

When the drive is regularly maintained and inspected, the power supply must be cut off. After the monitor (keyboard) has no display and the power indicator of the main circuit is turned off for within 10 minutes, do not touch the terminal or remove the cover, so as to avoid the residual voltage of the capacitor of the drive from hurting the maintenance personnel.

(1) Cooling system: Please clean the air filter and check whether the cooling fan is normal.

(2) Screws and bolts: Due to the influence of vibration and temperature change, the fixing parts such as screws and bolts may be loose. Check whether they are reliably tightened, and tighten them according to the tightening torque.

(3) Check whether conductors and insulators are corroded or damaged.

(4) Measure the insulation resistance.

(5) Check the filter capacitor for discoloration, odor, bubbling, liquid leakage, etc.

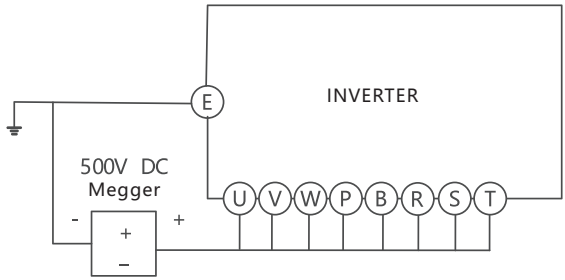


Figure 8.2.1 Insulation Resistance Test of Main Circuit

The drive must be operated according to the specified use environment, and some unexpected situations may occur during operation. Users shall carry out daily maintenance according to the tips in the following table. It is a good way to prolong the service life of the drive by keeping a good operating environment, recording the daily operation data and finding the abnormity causes as soon as possible.

Table 8.2.1 Tips for Daily Inspection

Check object	Inspection essentials			Judgment criteria
	Check content	Period	Inspection means	
Operating environment	1. Temperature and humidity	Any time	1. Thermometer and hygrometer	1. (-10 ~+45)°C, (45~55)°C for derating
	2. Dust, water and dripping		2. Visual inspection	2. No water leakage trace
	3. Gas		3. Smell	3. No peculiar smell
Drive	1. Vibration, heating	Any time	1. Touch the shell	1. Stable vibration and reasonable fan temperature
	2. Noise		2. Hearing	2. No unusual noise
Motor	1. Heating	Any time	1. Hand touch	1. No abnormality in heating
	2. Noise		2. Hearing	2. Uniform noise
Running state parameter	1. Output current	Any time	1. Ammeter	1. In the rated range
	2. Output voltage		2. Voltmeter	2. In the rated range
	3. Internal temperature		3. Thermometer	3. Temperature rise less than 35K

8.3 Replace wearing parts

The wearing parts of the drive mainly include cooling fan and electrolytic capacitor for filtering, and their service life is closely related to the use environment and maintenance state. The general service life is shown in the following table.

Table 8.3.1 Component Service Life

Device name	Service life
Fan	(3~4) 0,000 hours
Electrolytic capacitor	(4~5) 0,000 hours
Relay	About 100,000 times

Users can determine the replacement period according to the running time.

(1) Cooling fan

Possible causes of damage: bearing wear and blade aging.

Criteria: Whether there are cracks in the fan blades, etc. and whether there is abnormal vibration sound during startup.

(2) Filtering electrolytic capacitor

Possible causes of damage: high ambient temperature, frequent load jump causing increased pulsating current and aging electrolyte.

Criteria: Whether there is liquid leakage, whether the safety valve is protruding, the measurement of electrostatic capacitance and insulation resistance.

(3) Relay

Possible causes of damage: Corrosion, frequent actions

Criterion: On-off failure.

8.4 Storage period and precautions

Users must pay attention to the following for temporary storage and long-term storage after purchasing the drive:

(1) Avoid storing it in places with high temperature, humidity and much dust and metal dust, and ensure good ventilation;

(2) The drive stored for a long time must be electrified for testing once every 6 months. When electrified, use a voltage regulator to slowly rise to the rated value, and electrify the drive for 1 hour without load.

9 Troubleshooting

The following fault types may be encountered during the use of this drive. Please refer to the following methods for common troubleshooting:

Table 9.1.1 Common Fault Codes of the Drive and Troubleshooting Methods

Fault name	Panel display	Troubleshooting	Fault handling measures
Acceleration overcurrent	E.OC1 (Fault code 02)	The drive output circuit is grounded or short-circuited	● Eliminate peripheral faults, and detect whether the motor or interrupt contactor is short-circuited
		The control mode is SVC without parameter identification	● Set the motor parameters according to the motor nameplate and identify the motor parameters
		Under the rapid acceleration condition, the acceleration time is set too short	● Increase the acceleration time
		The overcurrent stall suppression setting is not appropriate.	● Confirm that the overcurrent stall suppression function (F4-19) has been enabled; ● The set value of the overcurrent stall action current (F4-18) is too large, and it is recommended to adjust it within 120% to 150%; ● The overcurrent stall suppression gain (F4-20) is set too small, and it is recommended to adjust it within 20 to 40;
		The manual torque boost or V/F curve is inappropriate	● Adjust the manual boost torque or V/F curve
		Start the rotating motor	● Select the speed tracking start or wait for the motor to stop before starting
		Subject to external interference	● Check the historical fault records. If the current value is far from reaching the overcurrent point value at the time of fault, find the interference source. If there is no other interference source, it may be the driving board or Hall element problem.
Deceleration overcurrent	E.OC2 (Fault code 03)	The drive output circuit is grounded or short-circuited	● Eliminate peripheral faults and detect whether the motor is short-circuited or open-circuited
		The control mode is SVC without parameter identification	● Set the motor parameters according to the motor nameplate and identify the motor parameters
		Under sudden deceleration condition, the deceleration time is set too short	● Increase deceleration time

Fault name	Panel display	Troubleshooting	Fault handling measures
		The overcurrent stall suppression setting is not appropriate	● Confirm that the overcurrent stall suppression function (F4-19) has been enabled; ● The set value of the overcurrent stall action current (F4-18) is too large, and it is recommended to adjust it within 120% to 150%; ● The overcurrent stall suppression gain (F4-20) is set too small, and it is recommended to adjust it within 20 to 40;
		No braking unit and braking resistor are installed	● Add braking unit and resistor
		Subject to external interference	● Check the historical fault records. If the current value is far from reaching the overcurrent point value at the time of fault, find the interference source. If there is no other interference source, it may be the driving board or Hall element problem.
Constant speed overcurrent	E.OC3 (Fault code 04)	The drive output circuit is grounded or short-circuited	● Eliminate peripheral faults and detect whether the motor is short-circuited or open-circuited
		The control mode is SVC without parameter identification	● Set the motor parameters according to the motor nameplate and identify the motor parameters
		The overcurrent stall suppression setting is not appropriate	● Confirm that the overcurrent stall suppression function (F4-19) has been enabled; ● The set value of the overcurrent stall action current (F4-18) is too large, and it is recommended to adjust it within 120% to 150%; ● The overcurrent stall suppression gain (F4-20) is set too small, and it is recommended to adjust it within 20 to 40;
		Drive type selected is too small	● In the stable running state, if the running current has exceeded the rated current of the motor or the rated output current of the drive, please select a drive with a higher power level
		Subject to external interference	● Check the historical fault records. If the current value is far from reaching the overcurrent point value at the time of fault, find the interference source. If there is no other interference source, it may be the driving board or Hall element problem.

Fault name	Panel display	Troubleshooting	Fault handling measures
Acceleration overvoltage	E.OU1 (Fault code 05)	The input voltage is too high.	● Adjust the voltage to the normal range
		Running motor dragged by external force during acceleration	● Cancel the external force or install a braking resistor
		The overvoltage suppression setting is not appropriate.	● Confirm that the overvoltage suppression function (F4-23) has been enabled; ● The set value of overvoltage suppression action voltage (F4-22) is too large, and it is recommended to adjust it within 700V~770V for 380V models and 350V~380V for 220V models; ● The overvoltage suppression gain (F4-24) is set too small, and it is recommended to adjust it within 30 to 50;
		No braking unit and braking resistor are installed	● Add braking unit and resistor
		The acceleration time is too short	● Increase the acceleration time
Deceleration overvoltage	E.OU2 (Fault code 06)	The overvoltage suppression setting is not appropriate	●Confirm that the overvoltage suppression function (F4-23) has been enabled; ● The set value of overvoltage suppression action voltage (F4-22) is too large, and it is recommended to adjust it within 700V~770V for 380V models and 350V~380V for 220V models; ● The overvoltage suppression gain (F4-24) is set too small, and it is recommended to adjust it within 30 to 50;
		Running motor dragged by external force during deceleration	● Cancel the external force or install a braking resistor
		Deceleration time is too short	● Increase deceleration time
		No braking unit and braking resistor are installed	● Add braking unit and resistor
Constant speed overvoltage	E.OU3 (Fault code 07)	The overvoltage suppression setting is not appropriate	● Confirm that the overvoltage suppression function (F4-23) has been enabled; ● The set value of overvoltage suppression action voltage (F4-22) is too large, and it is recommended to adjust it within 700V~770V for 380V models and 350V~380V for 220V models; ● The overvoltage suppression frequency gain (F4-24) is set too small, and it is recommended to adjust it within 30 to 50; ● The maximum rising frequency of overvoltage suppression (F4-26) is set too small, so it is recommended to adjust it within 5~20Hz;
		Running motor dragged by external force during running	● Cancel the external force or install a braking resistor

Fault name	Panel display	Troubleshooting	Fault handling measures
Buffer power fault	E.RES (Fault code 08)	Bus voltage fluctuates at the undervoltage point	• Seek technical support
Undervoltage fault	E.UV (Fault code 09)	Momentary power failure	• Enable the ride-through function (FE-59) to prevent instantaneous power failure and undervoltage fault
		The input terminal voltage of the drive is not in the range required by the specification	• Adjust the voltage to the normal range
		Bus voltage is not normal	• Seek technical support
		Rectifier bridge, buffer resistor, drive board and control board abnormity	• Seek technical support
Drive overload	E.OL2 (Fault code 10)	Whether the load is too large or the motor rotor is locked	• Reduce the load and check the motor and mechanical equipment
		Drive type selected is too small	• Select a drive with higher power level
Motor overload	E.OL1 (Fault code 11)	Whether the motor protection parameter FE-01 is set properly	• Set this parameter correctly
		Whether the load is too large or the motor rotor is locked	• Reduce the load and check the motor and mechanical equipment
Input open-phase	E.SPI (Fault code 12)	The three-phase input power supply is abnormal	• Check and eliminate the problems in the peripheral circuit
		Driving board, lightning protection board, main control board and rectifier bridge abnormity	• Seek technical support
Output open-phase	E.SPO (Fault code 13)	Motor fault	• Detect whether the motor is open circuited
		The lead wire from the drive to the motor is abnormal	• Clear peripheral faults
		The three-phase output of the drive is unbalanced when the motor is running	• Check whether the three-phase winding of the motor is normal and clear fault if any
		Driving board and IGBT module abnormity	• Seek technical support
Module overheating	E.OH1 (Fault code 14)	Too high ambient temperature	• Reduce the ambient temperature
		Air duct blockage	• Clear the air duct
		Fan damage	• Replace the fan
		The module thermistor is damaged	• Seek service from manufacturers
		The inversion module is damaged	• Seek service from manufacturers
External equipment fault	E.EF (Fault code 15)	Input of external fault signal through multi-function terminal DI	• Troubleshoot peripheral faults, confirm that the mechanical equipment allows restart (F8-18), and reset operation
Communication fault	E.CE (Fault code 16)	The main station computer not working properly	• Check the main station computer wiring
		The communication line not normal	• Inspect the communication cables
		Communication optional card Fb-00 not set correctly	• Correctly set the communication optional card type

Fault name	Panel display	Troubleshooting	Fault handling measures
Communication fault	E.CE (Fault code 16)	The communication parameter Fb group set incorrectly	• Correctly set the communication parameters
		After the above detection is completed, if the fault still cannot be eliminated, you can try to restore the ex-factory settings.	
Current detection fault	E.ITE (Fault code 18)	Check Hall element abnormality	• Seek service from manufacturers
		Driving board is abnormal	• Seek service from manufacturers
Motor tuning fault	E.TE (Fault code 19)	The motor parameters are not set according to the nameplate	• Correctly set the motor parameters according to the nameplate
		Parameter identification process time-out	• Check the lead wire from drive to motor
			• Check whether the number of encoder lines is set correctly Fd-00, and check whether the signal lines of the encoder are connected correctly and firmly
EEPROM Read-write fault	E.EEP (Fault code 21)	EEPROM chip damaged	• Seek service from manufacturers
Short circuit fault to ground	E.STG (Fault code 23)	Motor short circuit to ground	• Replace cable or motor
Excessive run-time PID feedback	E.FBH (Fault code 24)	PID feedback exceeding F9-29 set value	• Check the PID feedback signal or set F9-29 to an appropriate value
Fault of cumulative run-time out	E.RTO (Fault code 26)	The cumulative running time reaches the set value	• Use the parameter initialization function to clear the recorded information
User-defined fault 1	E.US1 (Fault code 27)	Input user-defined fault 1 signal through multi-function terminal DI	• Reset for operation
User-defined fault 2	E.US2 (Fault code 28)	Input user-defined fault 2 signal through multi-function terminal DI	• Reset for operation
Power-on time out	E.PTO (Fault code 29)	The power-on time of the drive reaches the time set by F8-16	• Clear the F8-16 set value
Load loss fault	E.LL (Fault code 30)	The running current of drive is less than FE-67	• Confirm whether the load is disengaged or whether the parameter settings of FE-67 and FE-68 conform to the actual operating conditions
PID feedback loss fault during running	E.FBL (Fault code 31)	PID feedback is less than F9-26 set value	• Check the PID feedback signal or set F9-26 to an appropriate value
Motor switching fault during running	E.SR (Fault code 41)	Change the current motor selected through terminal during running of the drive	• Switch the motor after the drive stops

Fault name	Panel display	Troubleshooting	Fault handling measures
Excessive speed deviation fault	E.DEV (Fault code 42)	The encoder parameters set incorrectly	• Correctly set the encoder parameters
		No parameter identification is performed	• Carry out motor parameter identification
		If the speed deviation is excessive, the detection parameters FE- 72 and FE-73 are set unreasonably	• Set the detection parameters reasonably according to the actual situation
Motor overspeed fault	E.OS (Fault code 43)	The encoder parameters set incorrectly	• Correctly set the encoder parameters
		No parameter identification is performed.	• Carry out motor parameter identification
		The setting of motor overspeed detection parameters FE-70 and FE-71 is unreasonable	• Set the detection parameters reasonably according to the actual situation
Motor overtemperature fault	E.OH2 (Fault code 45)	The wiring of temperature sensor is loose	• Check the wiring of temperature sensor and clear fault
		Too high motor temperature	• Increase the carrier frequency or take other cooling measures to cool the motor
Initial position detection error	E.POS (Fault code 51)	When using synchronous motor SVC vector control, the wiring between drive and motor is incorrect	• Detect the output wiring of the drive
Master-slave control slave fault	E.P2P (Fault code 55)	Slave is faulty. Check the slave	• Troubleshoot according to the slave fault code
Braking unit overload	E.BOL (Fault code 61)	The brake resistance value is too small	• Please refer to "Table of braking unit type selection"
Short circuit of the brake circuit	E.BSH (Fault code 62)	The brake module is abnormal	• Seek technical support

10 Warranty period, environmental protection and other legal provisions

10.1 Warranty period

Under normal storage and transportation conditions, and the product packaging is intact or the product itself is intact, the warranty period is 12 months from the date of purchase by the user or 18 months from the date of production, whichever comes first.

The following situations are not covered by the warranty:

1) Damage caused by improper use, storage and maintenance by users;

2) Damage caused by disassembly and maintenance by institutions or personnel not appointed by the Company or user without permission;

3) The product exceeds the warranty period;

4) Damage caused by force majeure;

5) If the bar code, nameplate or other identifying markings of the manufacturer on the product are damaged or unrecognizable;

6) If the user fails to pay the full purchase price according to the Sales Contract signed by both parties;

7) If the user intentionally conceals the improper use of the product in the installation, wiring, operation, maintenance or other processes from the after-sales service provider of the manufacturer.

8) Our company has the right to entrust others to provide warranty services of the faulty products, and the relevant service fees are calculated according to the actual costs. If there is an agreement, the agreement shall prevail.

9) Our sales and agency in China can provide after-sales service for this product.

10.2 Environmental protection

In order to protect the environment, when this product or any of its components is scrapped, please dispose of it properly as industrial waste; or hand it over to the recycling station for classified disassembly, recycling and reuse in accordance with relevant national regulations.

11 Product type selection and ordering instructions

11.1 Derating of the drive

When selecting and using the product, user shall determine whether to derate it or not according to the actual use situation. Derating is considered mainly in the following circumstances:

◆ Ambient temperature and derating

When the ambient temperature exceeds 40°C, this product needs to be derated. It shall be derated by 1.5% for every 1°C increase in ambient temperature, and the maximum ambient temperature is 50°C.

◆ Altitude and derating

In areas where the altitude exceeds 1000m, the heat dissipation effect of the drive becomes worse due to the thin air, so it needs to be derated (it shall be derated by 1% for every increase of 100m in altitude, and the maximum altitude is 3000m).

◆ Parallel operation and derating

When multiple drives are connected in parallel and installed compactly (the interval between two drives is less than 50mm), they need to be derated by 70%～80% according to the actual application environment. Please consult our company for details.

11.2 Type selection of peripheral devices of the main circuit

In the application of this product, it plays an important role in the reliable operation of the product to reasonably select the appropriate peripheral devices of the main circuit. For the selection of peripheral devices of the main circuit, please refer to the product type selection catalogue of our company. For details, please consult the agent distributor or sales manager.

Table 11.2.1 Types of Peripheral Devices of Main Circuit

Name	Model	Description
Breaker	General	For the time characteristics of the circuit breaker, fully consider the time characteristics of the drive overload protection, and the capacity of the circuit breaker is 1.2~2 times of the rated current of the drive; In order to avoid the power grid impact caused by short circuit at the output end of the drive or internal fault, a circuit breaker must be installed at the input end of the drive.
Contactor	General	In order to ensure safety, please use contactors, but do not control the start and stop of the drive through contactors. Frequent connection and disconnection of contactors will reduce the service life of the drive.
Input AC reactor	ACL series	Please connect AC reactor at the input end of the drive or install DC reactor at the terminal of the DC reactor in case of any of the following circumstances: 1. The power supply of the drive is higher than 600kVA or the power supply capacity is more than 10 times that of the drive; 2. When there is a switching reactive power compensation capacitor or a thyristor-controlled load on the same power supply node, a very large peak current will flow into the input power supply circuit, which will cause damage to rectifier devices; 3. The voltage imbalance of the three-phase power supply of the drive exceeds 3%, which will cause damage to rectifier devices; 4. The input power factor of the drive is required to be greater than 90%.
Input noise filter	General	The noise input from the power supply to the drive can be reduced, and the noise from the drive output to the power supply end can also be reduced.

Name	Model	Description
DC reactor	DCL series	Please connect AC reactor at the input end of the drive or install DC reactor at the DC reactor terminal in case of any of the following circumstances: 1. The power supply of the drive is higher than 600kVA or the power supply capacity is more than 10 times that of the drive; 2. When there is a switching reactive power compensation capacitor or a thyristor-controlled load on the same power supply node, a very large peak current will flow into the input power supply circuit, which will cause damage to rectifier devices; 3. The voltage imbalance of the three-phase power supply of the drive exceeds 3%, which will cause damage to rectifier devices; 4. The input power factor of the drive is required to be greater than 90%.
Output noise filter	General	Connecting a noise filter to the output of the drive can reduce the conduction and radiation interference.
Output AC reactor	OCL series	When the connecting line from the drive to the motor is more than 100m, it is suggested to install an AC output reactor that can suppress high-frequency oscillation, in order to avoid motor insulation damage, excessive leakage current and frequent protection actions of the drive.
Output noise filter	General	Connecting a noise filter to the output of the drive can reduce the conduction and radiation interference.
External braking unit	General	For medium-high power drive without built-in braking unit, or multiple drives sharing DC bus, the load motor has relatively large feedback energy.
Braking resistor	General	The mechanical energy in the process of motor braking can be consumed in the form of heat energy through the braking resistor, which can shorten the deceleration time of the drive transmission system.

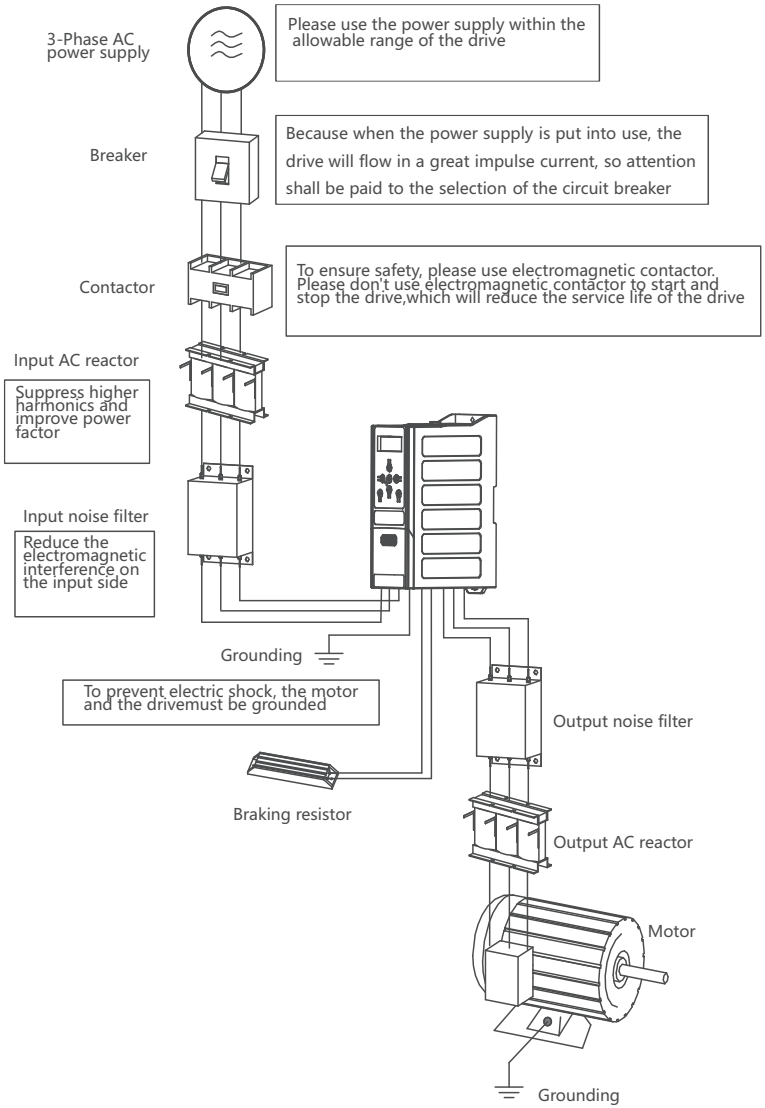


Figure 11.2.1 Product and Peripheral Devices

11.2.1 Circuit breaker, contactor

Table 11.2.2 Type selection of circuit breakers, contactors for three-phase 380V Products

Adaptive power kW	Recommended circuit breaker		Recommended contactor	
	Model	Rated current /A	Model	Rated current /A
0.4 **kW**	NB1-63 3P C4	4	NC8-06M	9
0.75 **kW**	NB1-63 3P C4	4	NC8-06M	9
1.5 **kW**	NB1-63 3P C6	6.3	NC8-09M	9
2.2 **kW**	NB1-63 3P C10	16	NC8-18	16
3.0 **kW**	NB1-63 3P C16	25	NC8-18	16
4.0 **kW**	NB1-63 3P C25	32	NC8-32	26
5.5 **kW**	NB1-63 3P C25	32	NC8-32	26

Table 11.2.3 Type selection of circuit breaker, contactor for single-phase 230V Products

Adaptive power kW	Recommended circuit breaker		Recommended contactor	
	Model	Rated current /A	Model	Rated current /A
0.4 **kW**	NB1-63 3P C4	4	NC8-06M	9
0.75 **kW**	NB1-63 3P C4	6.3	NC8-06M	9
1.5 **kW**	NB1-63 3P C6	16	NC8-18	16
2.2 **kW**	NB1-63 3P C10	25	NC8-18	16

11.2.2 Reactors

Table 11.2.4 Type selection of reactors for 380V products

S/N	Motor power	Input Reactor	Output Reactor
1	1.5 kW	ACL-0005-EISC-2	OCL-0005-EISC-1
2	2.2 kW	ACL-0007-EISC-2	OCL-0005-EISC-1
3	3.7 kW	ACL-0010-EISC-2	OCL-0010-EISC-1
4	5.5 kW	ACL-0015-EISCL-2	OCL-0015-EISCL-1

11.2.3 Braking unit and braking resistor

Table 11.2.5 Type selection of built-in braking units and braking resistors for 380V products

Drive Specification	Braking Unit Configuration	125% braking torque adaptive braking resistance (Ω)	Number of Braking resistors	Min allowed braking resistance (Ω)
NVF2L - 0.4/TS4	/	-	-	-
NVF2L - 0.75/TS4		-	-	-
NVF2L - 1.5/TS4		-	-	-
NVF2L - 2.2/TS4-B	Standard built-in	440W/250Ω	1	69
NVF2L - 3.0/TS4-B				
NVF2L - 4.0/TS4-B		800W/130Ω	1	69
NVF2L - 5.5/TS4-B		1100W/100Ω	1	41

Table 11.2.6 Type selection of built-in braking units and braking resistors for single phase 230V products

Drive Specification	Braking Unit Configuration	125% braking torque adaptive braking resistance (Ω)	Number of Braking resistors	Min allowed braking resistance (Ω)
NVF2L-0.4/TD2	/	-	-	-
NVF2L-0.75/TD2		-	-	-
NVF2L-1.5/TD2-B	Standard built-in	300W/90Ω	1	52
NVF2L-2.2/TD2-B		440W/60Ω	1	26

Notes	(1) The wiring length of the braking unit should not exceed 10 meters, and twisted-pair wires or close twin wires should be used for parallel wiring. (2) When connecting an external braking unit or an external braking resistor, change the "Overvoltage stall selection" to "Prohibit"; otherwise, the unit will not stop within the set deceleration time.

11.2.4 Input noise filter

Table 11.2.7 Type selection of input noise filter of 380V products

Adaptive power kW	Recommended input noise filter	
	Model	Rated current /A
0.4	EF-2PIG0005S42	5
0.75	EF-2PIG0005S42	5
1.5	EF-2PIG0005S42	5
2.2	EF-2PIG0010S42	10
3.0	EF-2PIG0010S42	10
4.0	EF-2PIG0020S42	20
5.5	EF-2PIG0020S42	20

Table 11.2.8 Selection of input noise filter for 230V Products

Adaptive power kW	Recommended input noise filter	
	Model	Rated current /A
0.4	EF-2PIG0010S42	10
0.75	EF-2PIG0010S42	10
1.5	EF-2PIG0020S42	20
2.2	EF-2PIG0030S42	30

12 Parameters detailed descriptions

12.1 F0 group Basic functions

F0-00	TP type setting		Ex-factory value	1	Attribute	◉
	Setting range	1	T-type (constant torque load model)			
		2	Reserved			

This parameter can be changed in shutdown state. After modifying this parameter, drive model and the relevant parameters of motor will be automatically modified.

F0-01	The first motor control mode		Ex-factory value	0	Attribute	◉
	Setting range	0	Speed sensorless vector control (SVC)			
		1	Reserved			
		2	V/F control			

0: Speed sensorless vector control is suitable for high performance control occasions.
2: V/F control is suitable for situations where the load requirements are not high, or one drive drives multiple motors, such as fans and pumps.

F0-02	Run instruction selection		Ex-factory value	0	Attribute	○
	Setting range	0	Operation panel command			
		1	Terminal command			
		2	Communication command			

When the operation panel command is selected, the LOC/REM indicator goes out. When the terminal command is selected, the LOC/REM indicator lights up. When the communication command is selected, the LOC/REM indicator flashes.

F0-03	Main frequency X instruction selection		Ex-factory value	0	Attribute	◉
	Setting range	0	Numerical setting (without power-off memory)			
		1	Numerical setting (with power-off memory)			
		2	AI1			
		3	Reserved			
		4	Reserved			
		5	DI5 pulse setting			
		6	Multi-segment instruction			
		7	Simple PLC			
		8	PID			
		9	Communication setting			

0: Numerical setting (without power-off memory)
The initial value of the frequency is set to the value of F0-08 "preset frequency". This set frequency value of the drive can be modified by the ▲ key and ▼ key of the keyboard (or the UP and DOWN of the multi-function input terminal). When the drive is powered off and then powered on again, the set frequency value is restored to numerically set F0-08 "preset frequency".
1: Numerical setting (with power-off memory)
The initial value of the set frequency is set to the value of F0-08 "preset frequency". The set frequency value of the drive can be modified by the ▲ key and ▼ key of the keyboard (or the UP and DOWN of the multi-function input terminal). When the drive is powered off and then powered on again, this frequency will

be the modified value.

2: AI1

The frequency is given through the analog input terminal.

5: Set by pulse (DI5)

The frequency is set by high-speed pulse at terminal DI5. Pulse signal specifications: voltage range 9V~30V, frequency range 0kHz~100kHz.

The relationship between the input pulse frequency of DI5 terminal and the corresponding setting is set through F5-28~F5-31, and 100.0% of the corresponding setting of pulse input refers to the percentage with respect to the maximum frequency F0-10.

6: Multi-segment instruction

When selecting multi-segment instruction operation mode, different state combinations of digital input (DI) terminals need to correspond to different set frequency values. Four multi-segment instruction terminals can be set, with 16 states of the 4 terminals corresponding to any 16 "multi-segment instructions" through FA group function codes, and "multi-segment instructions" are the percentages with respect to the maximum frequency F0-10.

7: Simple PLC

When the frequency source is simple PLC, the operating frequency of the drive can be switched among 1~16 arbitrary frequency instructions, and the holding time and the respective acceleration and deceleration time of 1~16 frequency instructions can also be set by the user. For details, please refer to the relevant instructions of FA group.

8: PID

Process PID control is a common method of process control. By proportional, integral and differential operations of the difference between the feedback signal of the controlled quantity and the target signal, the output frequency of the drive is adjusted to form a closed-loop system, so that the controlled quantity can be stabilized at the target value. When using PID as frequency source, it is necessary to set the related parameters of F9 group "PID functions".

9: Communication setting

When the communication setting is the frequency source, it is necessary to set the communication related parameters of Fb group.

F0-04	Auxiliary frequency Y instruction selection		Ex-factory value	0	Attribute	◎
	Setting range	0	Numerical setting (without power-off memory)			
		1	Numerical setting (with power-off memory)			
		2	AI1			
		3	Reserved			
		4	Reserved			
		5	Pulse setting (DI5)			
		6	Multi-segment instruction			
		7	Simple PLC			
		8	PID			
		9	Communication setting			

When the auxiliary frequency source is used as an independent frequency setting channel (that is, the frequency source is selected to switch from X to Y), its usage is the same as that of the main frequency source X. For usage, please refer to the relevant instructions for F0-03.

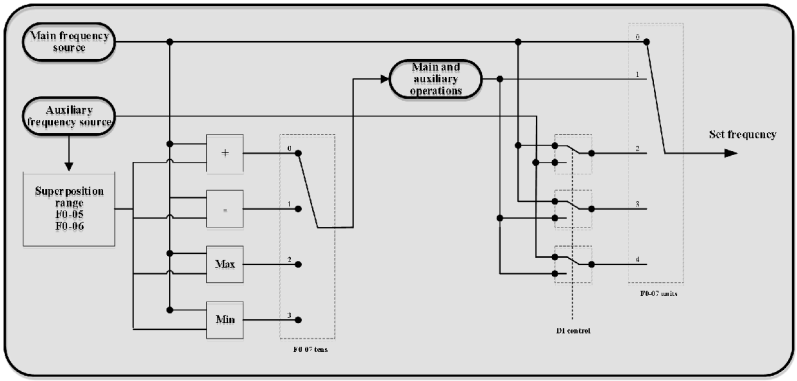
F0-05	Auxiliary frequency instruction range selection upon superposition		Ex-factory value	0	Attribute	○
	Setting range	0	Relative to the maximum frequency			
		1	Relative to main frequency source X			
F0-06	Auxiliary frequency instruction range upon superposition		Ex-factory value	100%	Attribute	○
	Setting range		0%~150%			

When the auxiliary frequency source is analog input (AI1) or pulse input, 100% of the input setting corresponds to the auxiliary frequency source range, which can be set by F0-05 and F0-06.

If F0-05 is selected as relative to the maximum frequency, 100% of the auxiliary frequency corresponds to F0-10; and if relative to the main frequency source, the range of the auxiliary frequency source will change along with the change of the main frequency X.

F0-07	Main and auxiliary frequency superposition selection		Ex-factory value	0	Attribute	○
	Setting range	**Units place**	**Frequency source selection**			
		0	Main frequency source X			
		1	Main and auxiliary frequency operation result (the operation relationship is determined by the tens place)			
		2	Switching between main frequency source X and auxiliary frequency source Y			
		3	Switching between main frequency source X and the main and auxiliary frequency operation result			
		4	Switching between auxiliary frequency source Y and the main and auxiliary frequency operation result			
		Tens place	**Main and auxiliary frequency operation relation**			
		0	Main + Auxiliary			
		1	Main - Auxiliary			
		2	Larger of the two			
		3	Smaller of the two			

The frequency is set by the combination of the main frequency source X with the auxiliary frequency source Y, as shown in the following figure:



F0-08	Preset frequency	Ex-factory value	50.00Hz	Attribute	○
	Setting range	0.00Hz~F0.10 maximum frequency			

When the frequency source is selected as "numerical setting", value of this function code is the initial value for the frequency numerical setting of the drive.

F0-09	Direction of operation		Ex-factory value	0	Attribute	○
	Setting range	0	Run in the default direction			
		1	Run in the opposite direction to the default direction			

By changing this function code, the forward direction of the motor can be adjusted without modifying the motor wiring.

Note: After the parameters are initialized, the running direction of the motor will return to its original state. Be careful when it is forbidden to change the motor direction after the system is debugged.

F0-10	Maximum frequency	Ex-factory value	50.00Hz	Attribute	◉
	Setting range	50.00Hz~ 500.00Hz			

The actual frequency value corresponding to the frequency setting 100.0%

F0-12	Upper limit frequency	Ex-factory value	50.00Hz	Attribute	○
	Setting range	F0-14 (lower limit frequency)~F0-10 (maximum frequency)			
F0-14	Lower limit frequency	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~F0-12 (upper limit frequency)			

Upper limit frequency: When the set frequency of the drive is greater than the upper limit frequency, the drive runs at the upper limit frequency.

Lower limit frequency: When the frequency instruction is lower than the lower limit frequency, the drive may stop, run at the lower limit frequency or run at zero speed, which can be set by F8-14 (running mode of set frequency lower than the lower limit frequency).

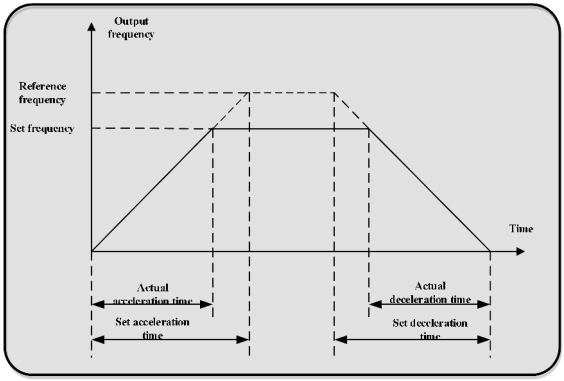
F0-15	Carrier frequency		Ex-factory value	As per model	Attribute ○
	Setting range		0.5KHz~16.0KHz		
F0-16	Carrier adjusted with temperature		Ex-factory value	1	Attribute ○
	Setting range	0	No		
		1	Yes		

When the carrier frequency is low, the high order harmonic components of the output current increase, the motor loss increases, and the motor temperature rise also increases. When the carrier frequency is high, the motor loss decreases and the motor temperature rise decreases, however the drive loss increases, the drive temperature rise increases and the interference increases.

The carrier frequency is adjusted with temperature, which means that when the drive detects that its radiator temperature is high, it automatically reduces the carrier frequency to reduce the temperature rise of the drive. When the radiator temperature is low, the carrier frequency gradually returns to the set value. This function can reduce the possibility of overheating alarm of the drive.

F0-17	Acceleration time 1		Ex-factory value	As per model	Attribute ○
	Setting range		0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)		
F0-18	Deceleration time 1		Ex-factory value	As per model	Attribute ○
	Setting range		0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)		
F0-19	Acceleration and deceleration time unit		Ex-factory value	1	Attribute ◉
	Setting range	0	1s		
		1	0.1s		
		2	0.01s		

Acceleration time refers to the time required for the drive to accelerate from zero frequency to acceleration and deceleration reference frequency (determined by F0-21); Deceleration time refers to the time required for the drive to decelerate from the acceleration and deceleration reference frequency (determined by F0-21) to zero frequency. As shown in the figure below:



F0-20	Numerically set frequency shutdown memory		Ex-factory value	0	Attribute	○
	Setting range	0	No memory			
		1	With memory			

This function is only valid when the frequency source is numerical setting. "No memory" means that after the drive is shut down, the numerically set frequency value is restored to the value of F0-08 (preset frequency), and the frequency correction by keyboard ▲, ▼ keys or UP and DOWN terminals is cleared; "With memory" means that after the drive is shut down, the numerical set frequency is kept as the set frequency at the last shutdown, and the frequency correction by keyboard ▲, ▼ keys or UP and DOWN terminals remains effective.

F0-21	Acceleration and deceleration time reference frequency		Ex-factory value	0	Attribute	◎
	Setting range	0	Maximum frequency (F0-10)			
		1	Set frequency			
		2	100Hz			

Acceleration and deceleration time refers to the acceleration and deceleration time from zero frequency to the frequency set by F0-21.

F0-22	Runtime UP/DOWN reference		Ex-factory value	0	Attribute	◎
	Setting range	0	Operating frequency			
		1	Set frequency			

This parameter is valid only when the frequency source is set numerically. It is used to determine how to correct the set frequency when the keyboard ▲, ▼ keys or UP/DOWN terminals are pressed, that is, whether the target frequency is increased or decreased based on the operating frequency or increased or decreased based on the set frequency.

F0-28	Parameters initialization		Ex-factory value	0	Attribute	◎
	Setting range	0	No operation			
		1	Clear record information			
		2	Restore ex-factory parameters, excluding motor parameters			
		4	Backup user parameters			
		5	Restore user parameters			

1. Clear record information

Clear the fault record information, cumulative running time, cumulative power-on time and cumulative power consumption of drive.

2. Restore the ex-factory set values, excluding motor parameters

Most of the functional parameters of the drive are restored to the ex-factory parameters, but the motor parameters, fault record information, cumulative running time, cumulative power-on time and cumulative power consumption are not restored.

4. Back up the user's current parameters

Back up the parameters set by the current user: back up the values set for all current function parameters to facilitate customers to recover parameters after adjustment disorder.

5. Restore the user backup parameters

Restore the user parameters backed up before, that is, restore the parameters backed up by setting F0-28 to 4.

12.2 F1 group start-stop control

F1-00	Startup mode		Ex-factory value	0	Attribute	○
	Setting range	0	Direct startup			
		1	Speed tracking restart			
		2	Reserved			
		3	Reserved			

0: Direct startup

If the starting DC braking time is set to 0, the drive starts to run from the starting frequency; If this time is not 0, DC braking is performed first, and then the operation starts from the starting frequency. This mode is suitable for occasions with small inertia load and where the motor may run when starting.

1: Speed tracking restart

The drive first judges the rotation speed and direction of the motor, and then starts with the tracked motor frequency, so as to start the rotating motor smoothly without impact. This mode is suitable for instantaneous power failure and restart under large inertia load. In order to ensure the performance of speed tracking and restart, it is necessary to set the F2 group parameters of the motor accurately.

F1-01	Speed tracking mode	Ex-factory value	0	Attribute	◎
	Setting range	0	Starting from the stop frequency		
		1	Starting from the power frequency		
		2	Starting from the maximum frequency		
F1-02	Rotation speed tracking speed	Ex-factory value	20	Attribute	◎
	Setting range	1~100			

Speed tracking mode:

0: Track down from the frequency at equipment power-off, which is selected in general cases.

1: Used when switching the power frequency to another frequency; suitable for restart after power-off for a long time.

2: Track down from the maximum frequency, normally applied to power generating load.

Rotation speed tracking speed:

The larger this parameter, the faster is the tracking; but too large a setting may cause the tracking effect to be unreliable.

F1-03	Starting frequency	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~50.00Hz			
F1-04	Holding time of starting frequency	Ex-factory value	0.0s	Attribute	◎
	Setting range	0.0s~100.0s			

To ensure the motor torque during startup, please set an appropriate starting frequency. In order to fully establish the magnetic flux when the motor is started, it is necessary to keep the starting frequency for a certain time. The starting frequency is not limited by the lower limit frequency. However, when the set target frequency is less than the starting frequency, the drive is not started and is in a standby state. In the process of switching between forward and reverse rotations, the holding time of starting frequency will not work.

F1-05	Starting DC and pre-excitation current		Ex-factory value	50%	Attribute	◎
	Setting range		0%~100%			
F1-06	Starting DC and pre-excitation time		Ex-factory value	0.0s	Attribute	◎
	Setting range		0.0s~100.0s			
F1-07	Acceleration and deceleration mode		Ex-factory value	0	Attribute	◎
	Setting range	0	Linear acceleration and deceleration			
		1	Static S curve			
		2	Dynamic S curve			

Starting DC braking is generally used to stop the running motor before starting; Pre-excitation is used to make asynchronous motor establish magnetic field before starting, so as to improve response speed.

Starting DC braking is only effective when the starting mode is direct starting. At this time, the drive will perform DC braking according to the set starting DC braking current, and then start running after the starting DC braking time. If the DC braking time is set to 0, it will be started directly without DC braking. The greater the DC braking current, the greater the braking force.

1. When the rated current of the motor is less than or equal to 80% of the rated current of the drive, it is a percentage base value relative to the rated current of the motor.

2. When the rated current of the motor is greater than 80% of the rated current of the drive, it is a percentage base value relative to 80% of the rated current of the drive.

Acceleration and deceleration modes:

0: linear acceleration and deceleration

The output frequency increases or decreases according to a straight line.

1: Static S curve

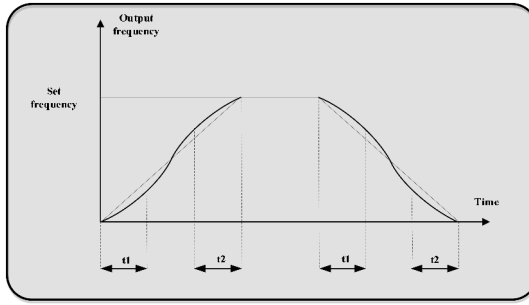
When the target frequency is fixed, the output frequency increases or decreases according to the S curve. This is suitable for use in places that require gentle start or stop, such as elevators and conveyor belts.

2: Dynamic S curve

When the target frequency changes dynamically in real time, the output frequency increases or decreases in real time according to the S curve. This is suitable for occasions with high comfort requirements and quick real-time response.

F1-08	Time proportion at the beginning of S curve	Ex-factory value	30.0%	Attribute	◎
	Setting range	0.0%~(100.0%-F1-09)			
F1-09	Time proportion at the end of S curve	Ex-factory value	30.0%	Attribute	◎
	Setting range	0.0%~(100.0%-F1-08)			

The two function codes shall meet the following requirement: F1-08 + F1-09 ≤ 100.0%.



In the figure, t1 is the time period parameter defined by parameter F1-08, during which the slope of output frequency change gradually increases. T2 is the time period defined by parameter F1-09, during which the slope of output frequency changes gradually to 0. During the time between t1 and t2, the slope of output frequency change is fixed, that is, linear acceleration and deceleration is performed in this interval.

F1-10	Stop mode		Ex-factory value	0	Attribute	○
	Setting range	0	Stop by deceleration			
		1	Free stop			

0: Stop by deceleration: After the stop command takes effect, the drive reduces the output frequency according to the deceleration time, and stops after the frequency drops to 0.

1: Free stop: After the stop command takes effect, the drive immediately terminates the output, and the motor stops freely according to the mechanical inertia.

F1-11	Starting frequency of stop DC braking	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~ maximum frequency			
F1-12	Waiting time for stop DC braking	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~100.0s			
F1-13	Stop DC braking current	Ex-factory value	50%	Attribute	○
	Setting range	0%~100%			
F1-14	Stop DC braking time	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~100.0s			

Starting frequency of stop DC braking: In the process of stop by deceleration, when the operating frequency is reduced to this frequency, the DC braking process is started.

Waiting time of stop DC braking: After the operating frequency is reduced to the starting frequency of DC braking, the drive stops outputting for a period of time before starting DC braking. This is used to prevent overcurrent and other faults that may be caused by starting DC braking at higher speed.

Stop DC braking current: Stop DC braking current has two situations relative to the base value.

1. When the rated current of the motor is less than or equal to 80% of the rated current of the drive, it is a percentage base value relative to the rated current of the motor.
2. When the rated current of the motor is greater than 80% of the rated current of the drive, it is a percentage base value relative to 80% of the rated current of the drive.

Stop DC braking time: Time for DC braking quantity to be maintained. If this value is 0, the DC braking process is cancelled.

F1-15	Brake utilization rate	Ex-factory value	100%	Attribute	○
	Setting range	0%~100%			

Only valid for drives with built-in braking unit. It is used to adjust the duty ratio of the braking unit. If the braking utilization rate is high, the braking unit will have a high action duty ratio and a strong braking effect, but the bus voltage of the drive fluctuates greatly during braking.

12.3 F2 group motor parameters

F2-00	Motor type		Ex-factory value	0	Attribute	◎
	Setting range	0	Normal asynchronous motor			
		1	Frequency conversion asynchronous motor			
F2-01	Rated power of motor		Ex-factory value	As per model	Attribute	◎
	Setting range		0.1kW~1000.0kW			
F2-02	Rated voltage of motor		Ex-factory value	As per model	Attribute	◎
	Setting range		1V~2000V			
F2-03	Rated current of motor		Ex-factory value	As per model	Attribute	◎
	Setting range		0.01A~655.35A (drive power ≤ 55kW) 0.1A~6553.5A (drive power >55kW)			
F2-04	Rated frequency of motor		Ex-factory value	As per model	Attribute	◎
	Setting range		0.01Hz~ maximum frequency			
F2-05	Rated speed of motor		Ex-factory value	As per model	Attribute	◎
	Setting range		1rpm~65535rpm			

In order to make the drive achieve better control effect, please set the above parameters accurately according to the motor nameplate.

F2-06	Stator resistance of asynchronous motor	Ex-factory value	Tuning parameter	Attribute	◎
	Setting range	0.001Ω~65.535Ω (drive power ≤ 55kW) 0.0001Ω~6.5535Ω (drive power >55kW)			
F2-07	Rotor resistance of asynchronous motor	Ex-factory value	Tuning parameter	Attribute	◎
	Setting range	0.001Ω~65.535Ω (drive power ≤ 55kW) 0.0001Ω~6.5535Ω (drive power >55kW)			
F2-08	Leakage inductance of asynchronous motor	Ex-factory value	Tuning parameter	Attribute	◎
	Setting range	0.01mH~655.35mH (drive power ≤ 55kW) 0.001mH~65.535mH (drive power >55kW)			
F2-09	Mutual inductance of asynchronous motor	Ex-factory value	Tuning parameter	Attribute	◎
	Setting range	0.1mH~6553.5mH (drive power ≤ 55kW) 0.01mH~655.35mH (drive power >55kW)			
F2-10	No-load current of asynchronous motor	Ex-factory value	Tuning parameter	Attribute	◎
	Setting range	0.01A~F2-03 (drive power ≤ 55kW) 0.1A~F2-03 (drive power >55kW)			

The above are the tuning parameters of asynchronous motor, which are generally not on the nameplate of the motor and need to be obtained by automatic tuning of the drive. Where, only three parameters F2-06~F2-08 can be obtained by "partial static parameters tuning of asynchronous motor", while all the above parameters can be obtained by "complete dynamic tuning of asynchronous motor" and "complete static tuning of asynchronous motor".

When changing the rated power or voltage of the motor, the drive will automatically modify the above parameters and restore them to the default parameters of the commonly used standard motor.

F2-37	Tuning selection		Ex-factory value	0	Attribute	◎
	Setting range	0	No operation			
		1	Partial static parameters tuning of asynchronous machine			
		2	Complete dynamic tuning of asynchronous machine			
		3	Complete static tuning of asynchronous machine			

Before parameters self-learning, motor type and nameplate parameters F2-00~F2-05 shall be set correctly, and encoder type (Fd-01) and pulse number (Fd-00) shall be set additionally for closed-loop vector control.
Description of tuning action: Set the nameplate parameters and self-learning type of the motor, and then press the RUN key to tune the drive.

0: No operation:

i.e. tuning is disabled.

1: Partial static parameters tuning of asynchronous motor

Suitable for the occasions of synchronous motors with large inertia load not easy to be disengaged, failing rotary tuning

2: Complete dynamic tuning of asynchronous motor

In the process of dynamic tuning, the drive performs static tuning first, and then accelerates to 80% of the rated frequency of the motor according to the acceleration time. After maintaining for a period of time, it stops by deceleration according to the deceleration time and ends the tuning.

3: Complete static tuning of asynchronous motor

This is suitable for self-learning of motor parameters when the motor is in static state without encoder (at this time, the motor may still have slight jitter, so pay attention to safety)

12.4 F3 group vector control parameters

F3-00	Speed/Torque control selection		Ex-factory value	0	Attribute	◎
	Setting range	0	Speed control			
		1	Torque control			

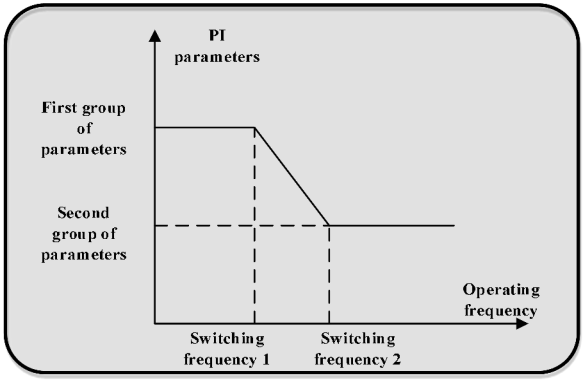
Speed control/torque control switching (DIx function selection 46). These two terminals shall be used together with F3-00 to realize the switching of speed and torque control. When the speed control/torque control switching terminal is invalid, it is the control mode selected by F3-00; If the speed control/torque control switching is valid, it is the control mode not selected by F3-00.

When the torque control prohibiting terminal (DIx function selection 29) is valid, the drive is fixed at the speed control mode.

F3-01	Speed loop proportional gain 1	Ex-factory value	30	Attribute	○
	Setting range	1~100			
F3-02	Speed loop integration time 1	Ex-factory value	0.50s	Attribute	○
	Setting range	0.01s~10.00s			
F3-03	Switching frequency 1	Ex-factory value	5.00Hz	Attribute	○
	Setting range	0.00Hz~F3-06			
F3-04	Speed loop proportional gain 2	Ex-factory value	20	Attribute	○
	Setting range	1~100			
F3-05	Speed loop integration time 2	Ex-factory value	1.00s	Attribute	○
	Setting range	0.01s~10.00s			
F3-06	Switching frequency 2	Ex-factory value	10.00Hz	Attribute	○
	Setting range	F3-03~maximum frequency			

By setting the proportional gain and integration time of the speed loop, the speed dynamic response characteristics of vector control can be adjusted. Increasing proportional gain and reducing integration time can speed up the dynamic response of speed loop. However, too large proportional gain or too short integration time may cause system oscillation.

In vector control mode, the corresponding speed loop PI parameters can be selected according to the operating frequency. When the operating frequency is less than or equal to the switching frequency 1, the speed loop adopts the first group of PI parameters (proportional gain 1 and integration time 1); When the operating frequency is greater than or equal to switching frequency 2, the speed loop adopts the second group of PI parameters (proportional gain 2, integration time 2); When the operating frequency is between switching frequency 1 and switching frequency 2, the parameters are the result of linear conversion of two groups of parameters, as shown in the following figure:



F3-07	Vector control slip gain	Ex-factory value	100%	Attribute	○
	Setting range	50%~200%			

In vector control mode free of speed sensor, this parameter is used to adjust the steady-state accuracy of the motor: When the on-load speed of the motor is low, this parameter will be increased, otherwise it will be reduced. In vector control mode with speed sensor, this parameter can be used to adjust the output current of the drive under the same load.

F3-08	SVC speed feedback filtering time	Ex-factory value	0.015s	Attribute	○
	Setting range	0.000s~0.1000s			

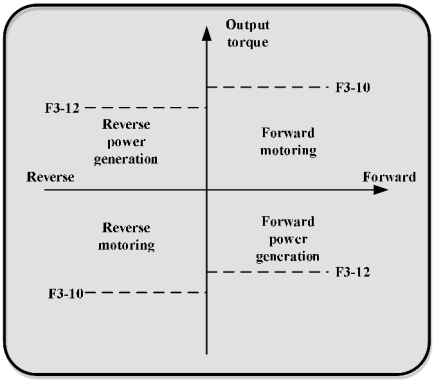
This parameter is only valid in SVC control mode. Increasing this parameter can improve the stability of the motor, but with slow dynamic response; Reducing this parameter can lead to fast dynamic response, but it may cause motor oscillation.

F3-10	Upper limit source of torque in speed control		Ex-factory value	0	Attribute	◎
	Setting range	0	F3-11 setting			
		1	AI1			
		2	Reserved			
		3	Reserved			
		4	DI5 pulse setting			
		5	Communication setting			
		6	Reserved			
		7	Reserved			
F3-11	Numerically set upper limit of torque		Ex-factory value	150.0%	Attribute	○
	Setting range		0.0%~200.0%			
F3-12	Upper limit source of torque in speed control mode (power generation)		Ex-factory value	0	Attribute	◎
	Setting range	0	F3-10 setting (no distinction between motor and power generation)			
		1	AI1			
		2	Reserved			
		3	Reserved			
		4	DI5 pulse setting			
		5	Communication setting			
		6	Reserved			
		7	Reserved			
		8	Parameter F3-13 setting			
F3-13	Numerically set upper limit of torque (power generation)		Ex-factory value	150.0%	Attribute	○
	Setting range		0.0%~200.0%			

The above parameters are used to set the upper limit value of output torque in vector control speed control mode. The upper limit of torque can be set by numerical setting, AI1 analog quantity, DI5 pulse and communication. When set by AI analog quantity, DI5 pulse or communication, the 100% corresponds to F3-11, and 100% of F3-11 corresponds to the rated output current of the drive.

Example: When F3-10 = 1, the upper limit source of torque is AI1; F3-11 = 150.0%. When AI1 input is 50%, the upper limit of the set torque at this time is 50% X 150.0% =75.0% of the rated current.

Torque limiting includes motor state and power generation state. In the motor state, the upper limit of torque is determined by F3-10 and F3-11; In the power generation state, the upper limit of torque is determined by F3-12 and F3-13. If F3-12 is set to 0, no distinction is made between motor state and power generation state, and the upper limit of torque is determined by F3-10 and F3-11.



F3-14	Excitation regulation proportional gain	Ex-factory value	2000	Attribute	○
	Setting range	0~60000			
F3-15	Excitation regulation integral gain	Ex-factory value	1300	Attribute	○
	Setting range	0~60000			
F3-16	Torque regulation proportional gain	Ex-factory value	2000	Attribute	○
	Setting range	0~60000			
F3-17	Torque regulation integral gain	Ex-factory value	1300	Attribute	○
	Setting range	0~60000			

Current loop PI adjustment parameters in vector control mode: above parameters will be automatically obtained after asynchronous motor tuning, and generally do not need to be modified. Note: The integral regulator of the current loop does not use the integration time as the dimension, but directly sets the integration gain.

If the PI gain of the current loop is set too large, it may cause the whole control loop to oscillate, so when the current oscillation or torque fluctuation is large, the PI proportional gain or integral gain here can be reduced manually.

F3-23	Power generation limit enabled		Ex-factory value	0	Attribute	○
	Setting range	0	Invalid			
		1	Valid			
F3-24	Upper limit of generation power		Ex-factory value	As per model	Attribute	○
	Setting range		0.0%~200.0%			

In the vector control speed control mode, the power limiting function can effectively reduce the bus voltage overshoot during motor braking and avoid the occurrence of overvoltage fault. The upper limit of power generation F3-24 is the percentage of the rated power of the motor. When overvoltage still occurs after the power generation limiting function is enabled, please adjust F3-24 downward.

The above F3 group parameters are related to vector speed mode, and those below are related to vector torque mode.

F3-25	Upper limit source of torque in torque control		Ex-factory value	0	Attribute	◉
	Setting range	0	Numerical setting (F3-27)			
		1	AI1			
		2	Reserved			
		3	Reserved			
		4	DI5 pulse setting			
		5	Communication setting			
		6	Reserved			
		7	Reserved			
F3-27	Upper limit of torque in torque control		Ex-factory value	150.0%	Attribute	○
	Setting range		-200.0%~200.0%			

Torque setting adopts relative value, with 100.0% corresponding to the rated torque of the motor. The setting range is -200.0%~200.0%, indicating that the maximum torque of the drive is twice the rated torque of the drive. When the torque is set as positive, the drive runs forward; When the torque is set as negative, the drive runs in reverse direction.

F3-29	Maximum forward frequency of torque control	Ex-factory value	50.00Hz	Attribute	○
	Setting range	0.00~maximum frequency			
F3-30	Maximum reverse frequency of torque control	Ex-factory value	50.00Hz	Attribute	○
	Setting range	0.00~maximum frequency			

When the drive adopts torque control, if the load torque is less than the output torque of motor, the motor speed will continue to rise. In order to prevent accidents such as galloping in the mechanical system, the maximum speed of motor during torque control must be limited. During torque control, the acceleration and deceleration time of the upper frequency limit is set in F8-07 (acceleration time 4)/F8-08 (deceleration time 4), which is 0.0s by default. This is used to set the forward or reverse maximum operating frequency of the drive under torque control mode. If dynamic continuous change of the maximum frequency of torque control is required, it can be achieved by controlling the upper limit frequency.

F3-31	Filtering time for torque increase	Ex-factory value	0.00s	Attribute	○
	Setting range	0.00s~650.00s			
F3-32	Filtering time for torque decrease	Ex-factory value	0.00s	Attribute	○
	Setting range	0.00s~650.00s			

In the torque control mode, the difference between the motor output torque and the load torque determines the speed change rate of the motor and the load, therefore, the motor speed may change rapidly, causing problems such as excessive noise or mechanical stress. By setting the torque control acceleration and deceleration time, the motor speed can be changed smoothly.

For example, two motors are hard-wired to drive the same load. In order to ensure the uniform distribution of the load, one drive is set as the master in speed control mode, while the other drive is set as the slave in torque control mode. The actual output torque of the master is used as the torque instruction of the slave. At this time, the torque of the slave needs to follow the master quickly, so the acceleration and deceleration time of the slave's torque control is 0.00 s.

12.5 F4 group V/F control parameters

F4-00	V/F curve setting		Ex-factory value	0	Attribute	◎
	Setting range	0	Linear V/F			
		1	Multipoint V/F			
		2~9	Reserved			
		10	V/F complete separation mode			
		11	V/F semi-separation mode			

0: Linear V/F

Suitable for ordinary constant torque load

1: multipoint V/F

Suitable for special loads such as dehydrators and centrifuges; at this time, by setting F4-03~F4-08 parameters, any V/F curve can be obtained.

10: V/F complete separation mode

In this mode, the output frequency and output voltage of the drive are independent of each other, and the output frequency is determined by the frequency source, while the output voltage is determined by F4-13 (VF separated voltage source). V/F complete separation mode is generally used in occasions such as induction heating, inversion power supply and torque motor control.

11: V/F semi-separation mode

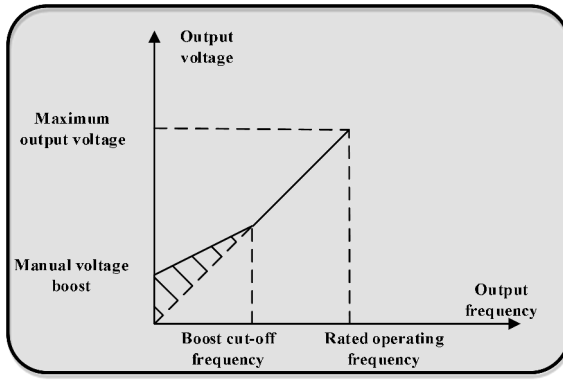
In this mode, V and F are proportional, but this proportional relationship can be set by the voltage source F4-13, and the relationship between V and F is also related to the rated voltage and rated frequency of the motor in F2 group. Assuming that the input of the voltage source is X (X is a value in 0~100%), the relationship between the output voltage V and the frequency F of the drive is: V/F = 2*X* (rated voltage of the motor)/(rated frequency of the motor).

F4-01	Torque boost	Ex-factory value	As per model	Attribute	○
	Setting range	0.0% (automatic torque boost) 0.1%~30.0%			
F4-02	Torque boost cutoff frequency	Ex-factory value	50.00Hz	Attribute	◎
	Setting range	0.00Hz~maximum frequency			

Torque boost is used to compensate the low-frequency torque characteristics of V/F control. If the torque boost setting is too large, it will easily lead to overcurrent or overload failure, and the motor will easily overheat. If the torque boost setting is too small, it will easily lead to motor locked rotor. Therefore the torque boost parameters need to be adjusted according to the actual load situation.

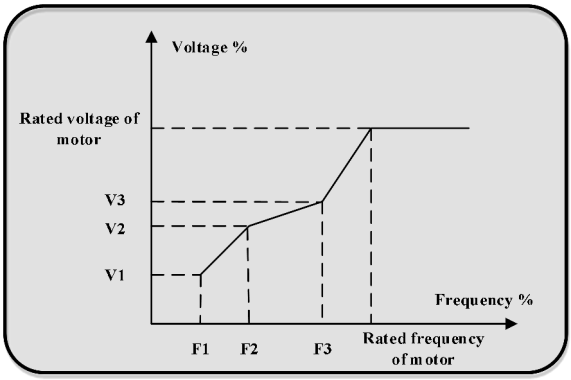
When the torque boost is set to 0.0%, the drive will automatically calculate the required torque boost value according to the parameters such as motor stator resistance. In this case, if conditions permit, please tune the parameters of the motor to obtain accurate motor parameters.

Torque boost torque cutoff frequency: At this frequency, the torque boost amount is calculated linearly according to the operating frequency and cutoff frequency, and if this set frequency is exceeded, the torque boost will not work, as shown in the following figure:



F4-03	Multipoint V/F frequency point F1	Ex-factory value	0.00Hz	Attribute	◎
	Setting range	0.00 Hz~F4.05			
F4-04	Multipoint V/F voltage point V1	Ex-factory value	0.0%	Attribute	◎
	Setting range	0.0%~100.0%			
F4-05	Multipoint VF frequency point F2	Ex-factory value	0.00Hz	Attribute	◎
	Setting range	F4-03~F4-07			
F4-06	Multipoint V/F voltage point V2	Ex-factory value	0.0%	Attribute	◎
	Setting range	0.0%~100.0%			
F4-07	Multipoint V/F frequency point F3	Ex-factory value	0.00Hz	Attribute	◎
	Setting range	F4-05 ~rated frequency of motor			
F4-08	Multipoint V/F voltage point V3	Ex-factory value	0.0%	Attribute	◎
	Setting range	0.0%~100.0%			

The curve of multipoint V/F shall be set according to the load characteristics of the motor. It shall be noted that the three voltage points and frequency points must satisfy the following relations: V1 < V2 < V3, F1 < F2 < F3. If the voltage is set too high at low frequency, it may cause overheating or even burn-out of the motor, or overcurrent stall or overcurrent protection of the drive.



F4-09	V/F slip compensation gain	Ex-factory value	0.0%	Attribute	○
	Setting range	0%~200.0%			

VF slip compensation can compensate the motor speed deviation of asynchronous motor generated when the load increases, so that the motor speed can basically remain stable when the load changes.

The V/F slip compensation gain is set to 100.0%, which means that the slip compensated when the motor takes rated load is the rated slip of the motor, while the rated slip of the motor is obtained through automatic calculation of rated frequency and rated speed of motor.

When adjusting the V/F slip compensation gain, the principle is that the motor speed is basically the same as the target speed generally under rated load. When the motor speed is different from the target value, it is necessary to fine-tune this gain.

F4-10	V/F overexcitation gain	Ex-factory value	64	Attribute	○
	Setting range	0~200			

In the process of drive deceleration, over-excitation control can suppress the rise of bus voltage and avoid overvoltage fault. The greater the over-excitation gain, the stronger the suppression effect.

It is necessary to increase the over-excitation gain when the drive is prone to overvoltage alarm during deceleration. However, too large over-excitation gain will easily lead to the increase of output current and the motor heating.

When the inertia is very small, the voltage will not rise during the motor deceleration, so it is suggested to set the over-excitation gain to 0. In the case of braking resistor provided, it is also recommended that the over-excitation gain be set to 0.

F4-11	V/F oscillation suppression gain	Ex-factory value	40	Attribute	○
	Setting range	0~100			

In V/F control mode, if the motor oscillates obviously, this gain can be increased appropriately. The greater this gain, the more obvious the suppression of oscillation will be. Try to set it as small as possible under the premise of effectively suppressing oscillation, so as not to adversely affect V/F operation. When the motor has no oscillation, please set this gain to 0.

When using the oscillation suppression function, the rated current and no-load current parameters of the motor are required to be accurate; otherwise the V/F oscillation suppression effect is not good.

F4-13	Voltage source of V/F separation		Ex-factory value	0	Attribute	○
	Setting range	0	Numerical setting (F4-14)			
		1	AI1			
		2	Reserved			
		3	Reserved			
		4	Pulse setting DI5			
		5	Multi-segment instruction			
		6	Simple PLC			
		7	PID			
		8	Communication setting			
F4-14	Voltage numerical setting for VF separation		Ex-factory value	0V	Attribute	○
	Setting range		0v~Rated voltage of motor			

V/F separation is generally used in occasions such as induction heating, inversion power supply and torque motor control.

When selecting V/F separation control, the output voltage can be set by function code F4-14, or it can come from analog quantity, pulse setting DI5, multi-segment instruction, simple PLC, PID or communication setting. When non-numerical setting is used, 100% of each setting corresponds to the rated voltage of the motor. When the set percentage of output such as analog quantity is negative, the set absolute value is taken as the effective set value.

0: Numerical setting

The voltage is directly set by F4-14.

1: AI1

The voltage is determined by the analog input terminal.

4. Pulse setting (DI5)

Voltage setting is given by terminal pulse. Pulse set signal specifications: voltage range 9V~30V, frequency range 0 kHz~100 kHz.

5. Multi-segment instruction

When the voltage source is multi-segment instruction, FA group parameters shall be set to determine the set voltage. The 100.0% given by the multi-segment instruction of FA group parameters refers to the percentage relative to the rated voltage of the motor.

6. Simple PLC

When the voltage source is simple PLC, FA group parameters need to be set to determine the set output voltage.

7. PID

Output voltage is generated according to PID closed loop. See the introduction of F9 group PID for details.

8. Communication setting

It refers to the voltage set by the main station computer through communication.

V/F separation voltage source selection is similar to the frequency source selection. See the introduction of F0-03 main frequency source selection. Among them, the set 100.0% corresponding to various selections is relative to the rated voltage of the motor (taking the absolute value of the corresponding settings).

F4-15	Voltage rise time of V/F separation	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~1000.0s			
F4-16	Voltage drop time of V/F separation	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~1000.0s			

Same as the frequency acceleration and deceleration time, the voltage rise (drop) time refers to the time required to accelerate (decelerate) from zero voltage (motor rated voltage) to the motor rated voltage (zero voltage), not the time to accelerate (decelerate) from zero voltage (target voltage) to the target voltage (zero voltage).

F4-17	Selection of V/F separation stop mode selection		Ex-factory value	0	Attribute	○
	Setting range	0	0: Frequency/voltage decreased to 0 independently			
		1	1: Frequency decreases after the voltage decreases to 0			

0: Frequency/voltage decreased to 0 independently

When the drive stops, the frequency and voltage decrease according to their respective acceleration and deceleration times.

1: Frequency decreases after the voltage decreases to 0

The output voltage is first reduced to 0V according to the voltage drop time, and then the frequency is reduced to 0Hz according to the deceleration time

F4-18	Overcurrent stall action current		Ex-factory value	150%	Attribute	◎
	Setting range		50%~200.0%			
F4-19	Overcurrent stall enabled		Ex-factory value	1	Attribute	◎
	Setting range	0	Invalid			
		1	Valid			
F4-20	Overcurrent stall suppression gain		Ex-factory value	20	Attribute	○
	Setting range		0~100			
F4-21	Double-speed overcurrent stall action current compensation coefficient		Ex-factory value	50%	Attribute	◎
	Setting range		50%~200%			

Overcurrent stall enabled:

Overcurrent stall action current:

With overcurrent stall function enable, when the output current of the drive reaches the overcurrent stall action current, the drive starts to adjust its output frequency. If in the motor state at this time, the output frequency will start to decrease; if in the power generation state, the output frequency will start to increase. In this case, the acceleration and deceleration time will be automatically lengthened. If the actual acceleration and deceleration time cannot meet the requirements, the overcurrent stall action current can be appropriately increased.

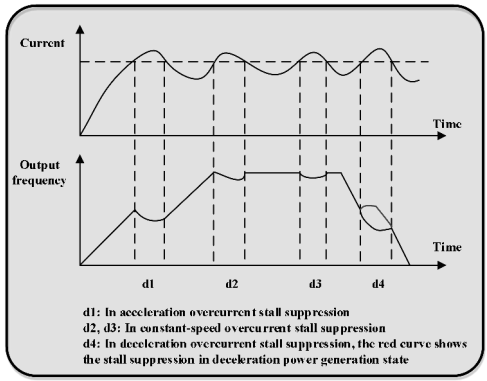
Overcurrent stall suppression gain:

When the overcurrent stall occurs, the drive adjusts the output frequency by PI, and both proportional gain P and integration time I are adjusted by the overcurrent stall suppression gain parameter in a unified manner.

Double-speed overcurrent stall action current compensation coefficient:

In the high frequency zone, the motor drive current is relatively small, and the speed of the motor drops greatly at the same stall current as compared with the rated frequency. In order to improve the operating characteristics of the motor, the stall action current above the rated frequency can be reduced. This method has a good effect on the acceleration performance in some occasions of centrifuges with high operating frequency, which require several times of flux weakening and large load inertia. Overcurrent stall action current exceeding the rated frequency = (fs/fn) * k * LimitCur; where, fs is the operating frequency, fn is the rated frequency of the motor, k is F4-21 "double-speed overcurrent stall action current compensation coefficient", and LimitCur is F4-18 "overcurrent stall action current".

When F4-21 is set to 50%, it means that the double-speed overcurrent stall action current compensation coefficient does not work.



F4-22	Overvoltage stall action voltage		Ex-factory value	As per model	Attribute	◎
	Setting range		380V model: 650.0V~800.0V 220V model: 320.0V~800.0V			
F4-23	Overvoltage stall enabled		Ex-factory value	1	Attribute	◎
	Setting range	0	Invalid			
		1	Valid			
F4-24	Overvoltage stall suppression frequency gain		Ex-factory value	30	Attribute	○
	Setting range		0~100			
F4-25	Overvoltage stall suppression voltage gain		Ex-factory value	30	Attribute	○
	Setting range		0~100			
F4-26	Maximum rise frequency of overvoltage stall		Ex-factory value	5Hz	Attribute	◎
	Setting range		0~50Hz			

When the bus voltage reaches the set value of overvoltage stall action voltage, the actual motor speed is greater than the motor speed corresponding to the output frequency of the drive, and the motor is in a power generation state. In order to protect the system safety and avoid tripping protection, the drive starts the overvoltage stall protection function and increases the output frequency, so the actual deceleration time will be automatically lengthened. If the actual deceleration time cannot meet the system requirements, the over-excitation gain can be appropriately increased or additional braking resistor can be installed.

During the overvoltage stall action, the drive simultaneously adjusts the output frequency and output voltage through PI control, the overvoltage stall suppression frequency gain is used to modify the proportional gain and integration time of the PI frequency adjustment, and the overvoltage stall suppression voltage gain is used to modify the proportional gain and integration time of PI voltage adjustment.

The maximum rise frequency of overvoltage stall is used to limit the maximum rise frequency during frequency adjustment.

Note: The bus voltage limiting function in vector control mode also needs to enable F4-23 overvoltage stall function and set F4-22 limiting voltage point.

12.6 F5 group input terminals

NVF2L Series Drive comes standard with five multi-function digital input terminals (in which DI5 can be used as high-speed pulse input terminal) and one analog input terminal. The following functions can be set for each input terminal.

Set value	Function	Notes
0	No function	Unused terminals can be set to "no function" to prevent misoperation.
1	Forward running FWD	The forward rotation and reverse rotation of the drive are controlled by external terminals.
2	Reverse running REV	
3	Three-line running control	Used for the running control in control terminal mode. Refer to the description of function code F5-11 ("terminal command mode").
4	Forward inching	Used for inching running control in control terminal mode, and the inching operating frequency and acceleration and deceleration time are defined in F8-00~F8-02.
5	Reverse inching	
6	Terminal UP	When the frequency source is set numerically and the frequency is modified, used as an increasing and decreasing instruction
7	Terminal DOWN	
8	Free stop	Free running stop is realized by control terminal, which has the same function as defined in F1-10.
9	Fault reset	The terminal is used for fault reset function. Same as the fault reset function of the STOP key on the keyboard, this function can realize remote fault reset.
10	Running pause	When the drive stops by deceleration, all operating parameters are memorized (such as PLC parameters and PID parameters) when this terminal is valid; After this terminal is invalid, the drive will resume its previously memorized running state.
11	External fault normally open input	Through this terminal, the fault signal of external equipment can be input, which is convenient for the drive to monitor the fault of external equipment. After receiving the fault signal of external equipment, the drive displays "E.EF", that is, the external equipment fault alarm.
12	Multi-segment instruction terminal 1	16-speed segment setting can be realized through 16 states of these four terminals.
13	Multi-segment instruction terminal 2	
14	Multi-segment instruction terminal 3	
15	Multi-segment instruction terminal 4	
16	Acceleration and deceleration time selection terminal 1	Through the 4 states of these terminals, 4 types of acceleration and deceleration time can be selected.
17	Acceleration and deceleration time selection terminal 2	
18	Frequency command switching	Used to switch between different frequency sources. See the description of function code F0-07 for details. When the target frequency is set to switching between two frequency sources, the frequency source switching can be realized through this terminal.
19	Clear UP/DOWN settings (terminals, keyboard)	When the main frequency is set by numerical setting, select this terminal function to clear the frequency value changed by the UP and DOWN keys on the keyboard or by the multi-function terminals 6 (UP) and 7 (DOWN), so that the set frequency can be restored to F0-08 setting.
20	Control command switch terminal 1	Through this terminal, the control command source can be switched from terminal control or communication control to panel control.

Set value	Function	Notes
21	Acceleration and deceleration disabled	Maintain the current output frequency (except the stop command).
22	PID pause	The drive maintains the current output frequency and pauses PID adjustment.
23	Simple PLC state reset	Restore the drive to the initial state of simple PLC
24	Reserved	
25	Counter input	Input terminal of counting pulse
26	Counter reset	Clear the state of the counter
27	Length count input	Input terminal for length counting
28	Length reset	Clear the length
29	Torque control disabled	The drive prohibits torque control mode and automatically enters speed control mode.
30	Pulse frequency input (valid only for DI5)	Set DI5 as a high-speed pulse input terminal
31	Reserved	Reserved
32	Immediate DC braking	The drive is directly switched to the DC braking state.
33	External fault normally closed input	Through this terminal, the fault signal of external equipment can be input, convenient for the drive to monitor the fault of external equipment. After receiving the fault signal of external equipment, the drive displays "E.EF", that is, the external equipment fault alarm.
34	Frequency modification enabled	Through this terminal, it can be controlled whether the frequency modification of the drive is valid. When the terminal state is valid, the frequency of the drive can be modified, otherwise the frequency will not change. When this function is not set, it does not affect the setting of main frequency and auxiliary frequency.
35	PID action direction reversed	When this terminal is valid, the PID function is reversed with respect to that set by F9-03.
36	External stop terminal 1	Control the drive to stop normally; only valid under panel control
37	Control command switch terminal 2	Used to switch between terminal control and communication control
38	Pause PID integration	The integral adjustment function of PID is paused. In this case, the proportional adjustment and differential adjustment are still valid, and the integral attribute of PID is required to be F9-25=x1.
39	Switch between main frequency and preset frequency	When this terminal is valid, the frequency source X is replaced by the preset frequency (F0-08).
40	Switch between auxiliary frequency and preset frequency	When this terminal is valid, the frequency source Y is replaced by the preset frequency (F0-08).
41	Motor selection terminal	Invalid to select motor 1; valid to select motor 2
42	Reserved	Reserved
43	PID parameters switching	When F9-18=1 (PID parameters are switched by DI terminal) and the terminal state is 0, the PID parameters are F9-05~F9-07; when the terminal state is 1, the PID parameters are F9-15~F9-17.
44	User-defined fault 1	When user-defined fault terminals 1 and 2 are valid, the drive will alarm E.US1 and E.US2 respectively, and the drive will handle the fault according to the parameters selected by FE-49.
45	User-defined fault 2	
46	Speed control/torque control switching	Used to switch between speed control mode and torque control mode

Set value	Function	Notes
47	Emergent stop	The drive is in the fastest deceleration state, at which the deceleration current and voltage are in the maximum limit state.
48	External stop terminal 2	When this terminal state is valid, the drive enters the stop by deceleration state, and the deceleration time is deceleration time 4. This is valid in all control modes.
49	Deceleration DC braking	The drive decelerates to the starting frequency of DC braking and enters the DC braking deceleration state.
50	Clear current running time	Clear present running time of the drive: used for the function of timed operation (F8-42)
51	Two-line/three- line switching	Used to switch between two-line control method and three-line control method (that is, two-line 1 is switched to three-line 1, and two-line 2 is switched to three-line 2).
52	Reverse frequency disabling	Reverse frequency disabling: the drive runs at 0 Hz when reversed

At most 16 segments of operating frequency can be set by the four multi-segment command terminals, which can be selected through the permutations and combinations of four DI terminals. Multi-segment frequency setting can also be performed with less than 4 DI terminals. Missing set bits will be calculated as 0, as shown in the following table:

K4	K3	K2	K1	Instruction setting	Corresponding parameter
0	0	0	0	Multi-segment frequency 0	FA-00
0	0	0	1	Multi-segment frequency 1	FA-01
0	0	1	0	Multi-segment frequency 2	FA-02
0	0	1	1	Multi-segment frequency 3	FA-03
0	1	0	0	Multi-segment frequency 4	FA-04
0	1	0	1	Multi-segment frequency 5	FA-05
0	1	1	0	Multi-segment frequency 6	FA-06
0	1	1	1	Multi-segment frequency 7	FA-07
1	0	0	0	Multi-segment frequency 8	FA-08
1	0	0	1	Multi-segment frequency 9	FA-09
1	0	1	0	Multi-segment frequency 10	FA-10
1	0	1	1	Multi-segment frequency 11	FA-11
1	1	0	0	Multi-segment frequency 12	FA-12
1	1	0	1	Multi-segment frequency 13	FA-13
1	1	1	0	Multi-segment frequency 14	FA-14
1	1	1	1	Multi-segment frequency 15	FA-15

The dimension of multi-segment instructions is a relative value, which is the percentage with respect to maximum frequency F0-10. The positive and negative parameters determine the running direction. If it is negative, it means that the drive runs in reverse direction.

The functional description of acceleration and deceleration time selection terminals is shown in the following table:

Terminal 1	Terminal 2	Acceleration or deceleration time selection	Corresponding parameter
0	0	Acceleration\Deceleration time 1	F0-17\F0-18
0	1	Acceleration\Deceleration time 2	F8-03\F8-04
1	0	Acceleration\Deceleration time 3	F8-05\F8-06
1	1	Acceleration\Deceleration time 4	F8-07\F8-08

F5-10	DI terminal filtering time	Ex-factory value	0.010s	Attribute	○
	Setting range	0.000s~1.000s			

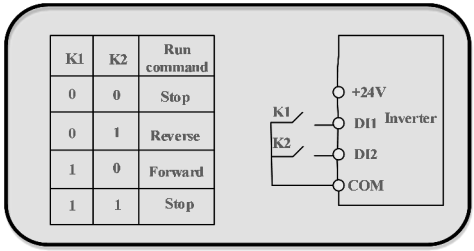
Used to set the filtering time of DI terminal. Reducing this parameter can speed up the response of the DI terminal, but will reduce its anti-interference ability. Increasing this parameter can enhance the anti-interference ability, but will slow down the response of DI terminal.

F5-11	Terminal command mode		Ex-factory value	0	Attribute	◎
	Setting range	0	Two-line type 1			
		1	Two-line type 2			
		2	Three-line type 1			
		3	Three-line type 2			

DI1~DI4 and DI5 input terminals can be selected at will as external input terminals, that is, the functions of DI1~DI4 and DI5 input terminals can be selected by setting the values of F5.00~F5.04.

0: Two-line control mode 1:

As shown in the figure below, when K1 is connected alone, the drive runs forward; When K2 is connected alone, the drive runs in reverse direction; When both K1 and K2 are connected or disconnected at the same time, the drive stops running.

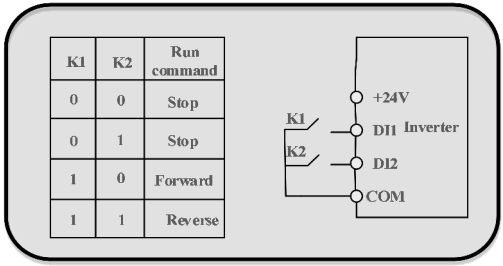


The function codes are set as follows:

Function code	Name	Set value	Parameter description
F0-02	Run command channel selection	1	Terminal control
F5-11	Terminal control mode selection	0	Two-line type 1
F5-00	DI1 terminal function selection	1	Forward (FWD)
F5-01	DI2 terminal function selection	2	Reverse (REV)

1: Two-line control mode 2:

In this mode, the DI1 terminal is the operation enabling terminal, and the function of the DI2 terminal is to determine running direction. As shown in the figure below, when K1 is connected in this mode, K2 is disconnected so that the drive runs forward, or K2 is connected so that the drive runs in reverse. When K1 is disconnected, the drive stops running.



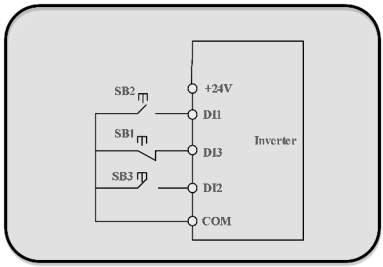
The function code is set as follows:

Function code	Name	Set value	Parameter description
F0-02	Run command channel selection	1	Terminal control
F5-11	Terminal control mode selection	1	Two-line type 2
F5-00	DI1 terminal function selection	1	Forward (acting as "operation enabled")
F5-01	DI2 terminal function selection	2	Reverse (acting as "forward and reverse direction")

2: Three-line control mode 1:

In this mode, the DI3 terminal is the operation enabling terminal, and the direction is controlled by DI1 and DI2 respectively. As shown in the figure below, in this control mode, when the SB1 button is closed, press SB2 to make the drive run forward, press SB3 to make the drive run reversely. At the instant when the SB1 button is opened, the drive stops.

During normal startup and operation, the SB1 button must be kept closed and the commands of the SB2 and SB3 buttons take effect immediately upon closing. The running state of the drive is determined by the last actions of the 3 buttons.

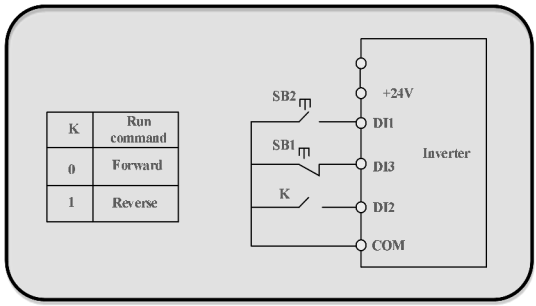


The function code is set as follows:

Function code	Name	Set value	Parameter description
F0-02	Run command channel selection	1	Terminal control
F5-11	Terminal control mode selection	2	Three-line type 1
F5-00	DI1 terminal function selection	1	Forward (FWD)
F5-01	DI2 terminal function selection	2	Reverse (REV)
F5-02	DI3 terminal function selection	3	Three-line running control

3: Three-line control mode 2:

In this mode, the DI3 terminal is the running enabling terminal, the run command is issued by DI1, and the direction is determined by the state of DI2. As shown in the figure below, in this control mode, when the SB1 button is closed, press the SB2 button to run the drive, open K for forward rotation of the drive and close K for reverse rotation of the drive. At the instant when the SB1 button is opened, the drive stops. During normal startup and running, the SB1 button must be kept closed, and the command of the SB2 button will take effect from the edge of closing.



The function code is set as follows:

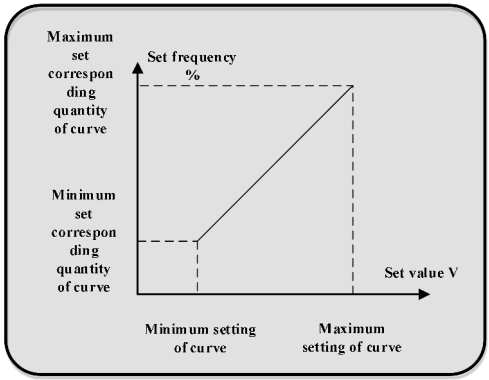
Function code	Name	Set value	Parameter description
F0-02	Run command channel selection	1	Terminal control
F5-11	Terminal control mode selection	3	Three-line type 2
F5-00	DI1 terminal function selection	1	Forward (acting as "operation enabled")
F5-01	DI2 terminal function selection	2	Reverse (acting as "forward and reverse direction")
F5-02	DI3 terminal function selection	3	Three-line running control

F5-12	Terminal UP/DOWN change rate	Ex-factory value	1.00Hz/s	Attribute	○
	Setting range	0.001Hz/s~65.535Hz/s			

When using UP\DOWN to modify the target frequency, the rate of frequency change, that is, amount of change per second

F5-13	Minimum input of AI curve 1	Ex-factory value	0.00V	Attribute	○
	Setting range	0.00V~F5-15			
F5-14	Corresponding setting of minimum input of AI curve 1	Ex-factory value	0.00%	Attribute	○
	Setting range	-100.0%~+100.0%			
F5-15	Maximum input of AI curve 1	Ex-factory value	10.00V	Attribute	○
	Setting range	F5-13~+10.00V			
F5-16	Corresponding setting of maximum input of AI curve 1	Ex-factory value	100.00%	Attribute	○
	Setting range	-100.0%~+150.0%			
F5-17	AI1 filtering time	Ex-factory value	0.10s	Attribute	○
	Setting range	0.00s~10.00s			

The setting of AI curve is actually to set the relationship between analog input voltage (or analog input current) and its representative set frequency. When AI is set as frequency, 100.0% of the corresponding setting of voltage or current input refers to the relative (with respect to maximum output frequency F0-10) percentage. For 2-point curve, take curve 1 as an example, and the detailed parameters and descriptions are as follows:



AI1 filtering time is used to set the software filtering time of AI1. The longer the filtering time, the stronger the anti-interference ability but the slower the response speed to analog detection.

F5-18	Minimum input of AI curve 2	Ex-factory value	0.00V	Attribute	○
	Setting range	0.00V~F5-20			
F5-19	Corresponding setting of minimum input AI curve 2	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~+100.0%			
F5-20	Maximum input of A1 curve 2	Ex-factory value	10.00V	Attribute	○
	Setting range	F5-18~+10.00V			
F5-21	Corresponding setting of maximum input AI curve 2	Ex-factory value	100.0%	Attribute	○
	Setting range	-100.0%~+150.0%			

Please refer to the description of curve 1 for the function and usage of curve 2.

F5-23	Minimum input of AI curve 3	Ex-factory value	-10.00V	Attribute	○
	Setting range	0.00V~F5-25			
F5-24	Corresponding setting of minimum input AI curve 3	Ex-factory value	-100.0%	Attribute	○
	Setting range	-100.0%~+100.0%			
F5-25	Maximum input of A1 curve 3	Ex-factory value	10.00V	Attribute	○
	Setting range	F5-23~+10.00V			
F5-26	Corresponding setting of maximum input AI curve 3	Ex-factory value	100.00%	Attribute	○
	Setting range	-100.0%~+150.0%			

Please refer to the description of curve 1 for the function and usage of curve 3.

F5-28	Minimum frequency of pulse input	Ex-factory value	0.00KHz	Attribute	○
	Setting range	0.00KHz~F5-30			
F5-29	Corresponding setting of minimum frequency of pulse input	Ex-factory value	0.00%	Attribute	○
	Setting range	-100.0%~+100.0%			
F5-30	Maximum frequency of pulse input	Ex-factory value	50.00kHz	Attribute	○
	Setting range	F5-28~100.00kHz			
F5-31	Corresponding setting of maximum frequency of pulse input	Ex-factory value	100.00%	Attribute	○
	Setting range	-100.0%~+100.0%			
F5-32	Pulse filtering time	Ex-factory value	0.10s	Attribute	○
	Setting range	0.00s~10.00s			

This function code is used to set the relationship between DI5 pulse frequency and the corresponding setting. The pulse frequency can only be input into the drive through DI5 channel.

The application of this group of functions is similar to curve 1, please refer to the description of curve 1.

F5-33	AI curve selection		Ex-factory value	321	Attribute ○
	Setting range	Units place	Selection of AI1 curve		
		1	Curve 1 (2 points, see F5-13~F5-16)		
		2	Curve 2 (2 points, see F5-18~F5-21)		
		3	Curve 3 (2 points, see F5-23~F5-26)		
		4	Curve 4 (4 points, see A0-00~A0-07)		
		5	Curve 5 (4 points, see A0-08~A0-15)		
		Tens place	Reserved		
		Hundreds place	Reserved		

The units place of this function code is used for selection of set curve corresponding to the analog input AI1. The analog curve can be selected as any of the five curves.

Curves 1, 2 and 3 are all 2-point curves, which are set in F5 group function codes, while curves 4 and 5 are all 4-point curves, which need to be set in A0 group function codes.

The standard terminal of NVF2L drive provides one line of analog input.

F5-34	Selection when AI is below the minimum input setting		Ex-factory value	000	Attribute ○
	Setting range	Units place	Selection when AI1 is below the minimum setting		
		0	Corresponding minimum input setting		
		1	0.0%		
		Tens place	Reserved		
		Hundreds place	Reserved		

This function code is used to set how to determine the corresponding setting of analog quantity when the voltage of analog input is less than the set "minimum input".

The units place of this function code corresponds to analog inputs AI1.

When the AI input is lower than the minimum input, if 0 is selected, the corresponding setting of this analog quantity is the "minimum input corresponding setting" set by the function code; if 1 is selected, the corresponding setting of the analog quantity is 0.0%.

F5-35	DI1 delay time	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~3600.0s			
F5-36	DI2 delay time	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~3600.0s			
F5-37	DI3 delay time	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~3600.0s			

This function code is used to set the delay time for DI terminal to change its state.

At present, DI4 and DI5 do not have this function.

F5-38	DI terminal effective mode selection		Ex-factory value	00000	Attribute	◎
	Setting range	Units place	DI1 terminal effective state setting			
		0	High level effective			
		1	Low level effective			
		Tens place	Effective state setting of DI2 terminal (0~1, same as above)			
		Hundreds place	Effective state setting of DI3 terminal (0~1, same as above)			
		Thousands place	Effective state setting of DI4 terminal (0~1, same as above)			
		Ten thousands place	Effective state setting of DI5 terminal (0~1, same as above)			

This function code is used to set the effective state mode of digital input terminals.

When 0 is selected, the connection between COM terminal and DI terminal is effective, while the disconnection is ineffective;

When 1 is selected, the connection between COM terminal and DI terminal is ineffective, while the disconnection is effective;

F5-41	AI1 measured voltage 1	Ex-factory value	Factory correction	Attribute	○
	Setting range	-10.00V~10.00V			
F5-42	AI1 displayed voltage 1	Ex-factory value	Factory correction	Attribute	○
	Setting range	-10.00V~10.00V			
F5-43	AI1 measured voltage 2	Ex-factory value	Factory correction	Attribute	○
	Setting range	-10.00V~10.00V			
F5-44	AI1 displayed voltage 2	Ex-factory value	Factory correction	Attribute	○
	Setting range	-10.00V~10.00V			

This group of function codes is used to correct analog quantity AI to eliminate the influence of AI input port null bias and gain.

This group of function code parameters has been corrected upon ex-factory, and when the ex-factory values are restored, the corrected ex-factory values will be restored. Generally, they need not to be modified at the application site.

Measured voltage refers to the actual voltage measured by measuring instrument such as multimeter, and the displayed voltage refers to the voltage displayed value sampled by the drive. See the voltage display before AI correction in U0 group (U0-21).

For correction, two voltage values are respectively input into each AI input port, and the values measured by multimeter and the values read by U0 group are accurately input into the above function codes; then the drive will automatically correct the null bias and gain of AI.

For occasions where the voltage set by the user does not match the actual sampling voltage of the drive, the field correction method can be adopted to make the sampling value of the drive consistent with the expected set value. Taking AI1 as an example, the field correction method is as follows:

1. Set the AI1 voltage signal (about 2V)
2. Measure the voltage value of AI1, and record it as V1
3. Check the displayed value of U0-21, and record it as V2
4. Set the AI1 voltage signal (about 8V)
5. Measure the voltage value of AI1, and record it as V3
6. Check the displayed value of U0-21, and record it as V4

7. Save parameter V1 in parameter F5-41, V2 in parameter F5-42, V3 in parameter F5-43 and V4 in parameter F5-44

12.7 F6 group output terminals

F6-02	Function selection for relay RO1	Ex-factory value	2	Attribute	○
	Setting range	0~41			

The above function code is used to set the functions of 1 digital output, and the functions of multi-function output terminal are described in the following table:

Set value	Function	Notes
0	No output	The output terminal has no function.
1	Drive running	It means that the drive is running and has an output frequency (which can be zero), in which case the ON signal is output.
2	Fault output (fault stop)	When the drive is faulty and stops, the ON signal is output.
3	Frequency level detection FDT1 output	Please refer to the description of function codes F8-19 and F8-20.
4	Frequency reached	Please refer to the description of function codes F8-21.
5	Running at zero speed (no output when stopped)	When the drive is running and the output frequency is 0, the ON signal is output. When the drive is in stopped state, this signal is OFF.
6	Motor overload pre-alarm	Before motor overload protection action, judge according to the threshold of overload pre-alarm, and output ON signal after the threshold of pre-alarm is exceeded. Refer to function codes FE-00~FE-02 for motor overload parameter setting.
7	Drive overload pre-alarm	10s before the drive overload protection acts, output ON signal.
8	Set counting pulse reached	Please refer to the description of function codes F9-37.
9	Designated counting pulse reached	Please refer to the description of function codes F9-38.
10	Length reached	Please refer to the description of function codes F9-34 and F9-35.
11	PLC cycle completed	When the simple PLC runs for one cycle, it outputs a pulse signal with a width of 250ms.
12	Cumulative running time reached	When the cumulative running time of the drive exceeds the time set by F8-17, the ON signal is output.
13	Frequency limiting	When the set frequency exceeds the upper limit frequency or the lower limit frequency, and the output frequency of the drive also reaches the upper limit frequency or the lower limit frequency, the ON signal is output.
14	Torque limiting	In the speed control mode, when the output torque reaches the torque limit value, the drive is in the stall protection state and outputs the ON signal at the same time.
15	Ready for running	When the power supply of the main circuit and control circuit of the drive has been stabilized, and the drive has not detected any fault information, and the drive is in a state that allows running, the ON signal is output.
16	Reserved	Reserved
17	Upper limit frequency reached	When the operating frequency reaches the upper limit frequency, the ON signal is output.
18	Lower limit frequency reached (no output when stopped)	When the operating frequency reaches the lower limit frequency, the ON signal is output. This signal is OFF in stopped state.
19	Undervoltage state output	When the drive is undervoltage, the ON signal is output.
20	Communication control	Communication control
21	Reserved	Reserved
22	Reserved	Reserved

Set value	Function	Notes
23	Running at zero speed 2 (also output when stopped)	When the output frequency of the drive is 0, the ON signal is output. This signal is also ON in stopped state.
24	Cumulative power-on time reached	When the cumulative power-on time (U0-80) of the drive exceeds the time set by F8-16, the ON signal is output.
25	Frequency level detection FDT2 output	Please refer to the description of function codes F8-28 and F8-29.
26	Output of frequency 1 reached	Please refer to the description of function codes F8-30 and F8-31.
27	Output of frequency 2 reached	Please refer to the description of function codes F8-32 and F8-33.
28	Output of current 1 reached	Please refer to the description of function codes F8-38 and F8-39.
29	Output of current 2 reached	Please refer to the description of function codes F8-40 and F8-41.
30	Output of timing reached	When the timing function selection (F8-42) is valid, the drive will output the ON signal after the current running time reaches the set time.
31	AI1 input overrun	When the value of analog input AI1 is greater than F8-46 (the upper limit of AI1 input protection) or less than F8-45 (the lower limit of AI1 input protection), the ON signal is output.
32	Load loss	When the drive is in load loss state, the ON signal is output.
33	In reverse running	When the drive is reverse running, the ON signal is output
34	Zero current state	Please refer to the description of function codes F8-34 and F8-35
35	Module temperature reached	When the radiator temperature of the inversion module reaches the set module temperature (F8-47), the ON signal is output
36	Software current overrun	Please refer to the description of function codes F8-36 and F8-37.
37	Lower limit frequency reached (also output when stopped)	When the operating frequency reaches the lower limit frequency, the ON signal is output. The signal is also ON in stopped state.
38	Alarm output	When the drive has a fault to be handled by continual running, the drive generates an alarm output.
39	Motor overtemperature	Upon the motor overtemperature, output ON signal
40	Current run time reached	When the running time of the drive started this time exceeds the time set by F8-53, the ON signal is output.
41	Fault output	The fault of free stop and no output of undervoltage

F6-07	AO1 output function selection	Ex-factory value	0	Attribute	○
	Setting range	0~16			

The analog output AO1 ranges from 0V to 10V, or from 0mA to 20mA. The calibration relationship between the range of pulse output or analog output and the corresponding function is shown in the following table:

Set value	Function	Functional scope (corresponding to 0.0%~100.0% of pulse or analog output)
0	Operating frequency	0~maximum output power
1	Set frequency	0~maximum output power
2	Output current	0~2 times rated current of motor
3	Output torque (absolute value)	0~2 times rated torque of motor
4	Output power	0~1 times rated power of motor
5	Output voltage	0~1.2 times rated voltage of drive
6	PULSE input	0.01kHz~100.00kHz
7	AI1	0V~10V (or 0~20mA)
8	Reserved	Reserved
9	Reserved	Reserved
10	Length	0~maximum set length
11	Count value	0~maximum count value
12	Communication setting	0.0%~100.0%
13	Motor speed	0~Speed corresponding to maximum output frequency
14	Output current	0.0A~1000.0A
15	Output voltage	0.0V~1000.0V
16	Motor output torque (actual value, percentage relative to motor)	-2 times the rated torque of motor~2 times the rated torque of motor

F6-10	AO1 null bias coefficient	Ex-factory value	0.00%	Attribute	○
	Setting range	-100.0%~+100.0%			
F6-11	AO1 gain	Ex-factory value	1	Attribute	○
	Setting range	-10.00~+10.00			

This function code is used to set the null bias and gain of AO1 analog output. When the actual setting is different from the display on the drive, it can be corrected by this parameter, and it can also be used to customize the AO curve.

If the null bias is represented by "a", the gain is represented by k, the actual output is represented by Y, and the standard output is represented by X, then the actual output is:

Y = kX + a

Where, AO1 null bias coefficient 100% corresponds to 10V (or 20mA), and the standard output refers to the quantity represented by the analog output corresponding to the output of 0V~10V (or 0MA~20MA) without null bias and gain correction.

For example, if the analog output content is the operating frequency, and it is expected that the actual output is 8V when the frequency is 0 and 3V when the frequency is the maximum, then the gain shall be set to "-0.5" and the null bias shall be set to "80%".

F6-18	RO1 output delay time	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~3600.0s			

The above function code is used to set the delay time from occurrence of the state of relay 1 to the actual change of the output.

F6-22	Valid state selection of DO output terminal		Ex-factory value	00000	Attribute	○
	Setting range	Units place	Reserved			
		0	Positive logic			
		1	Negative logic			
		Tens place	RO1			
		Hundreds place	Reserved			
		Thousands place	Reserved			
		Ten thousands place	Reserved			

This function code is used to set the output logic of relay 1

0: Positive logic, if the digital output terminal and the corresponding common terminal are connected, it is a valid state, otherwise, it is an invalid state;

1: Negative logic, if the digital output terminal and the corresponding common terminal are connected, it is an invalid state; otherwise, it is a valid state.

F6-24	AO1 target voltage 1	Ex-factory value	Factory correction	Attribute	○
	Setting range	-10.00V~10.00V			
F6-25	AO1 measured voltage 1	Ex-factory value	Factory correction	Attribute	○
	Setting range	-10.00V~10.00V			
F6-26	AO1 target voltage 2	Ex-factory value	Factory correction	Attribute	○
	Setting range	-10.00V~10.00V			
F6-27	AO1 measured voltage 2	Ex-factory value	Factory correction	Attribute	○
	Setting range	-10.00V~10.00V			

The above function code is used to correct the analog output AO. The above functional parameters have been corrected upon ex-factory, and when the ex-factory values are restored, the corrected ex-factory values will be restored. Generally, they need not be corrected at the application site.

The target voltage refers to the theoretical output voltage value of the drive. The measured voltage refers to the actual output voltage measured by multimeter and other instruments.

12.8 F7 group keyboard and display

F7-00	User password	Ex-factory value	0	Attribute	○
	Setting range	0~65535			

This function code is used to set the user protection password. If you set any number, the password protection function will be enabled. You must enter the correct password the next time you enter the menu. Please remember the user password.

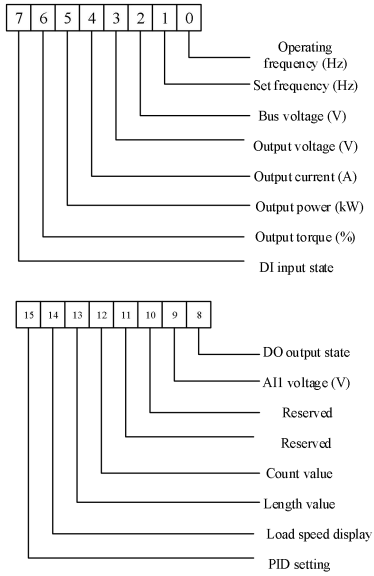
If this function code is set to 0, the set user password will be cleared, making the password protection function disabled.

F7-01	Digital tube self-inspection	Ex-factory value	0	Attribute	○
	Setting range	0: No inspection 1: All digital tubes are lit			

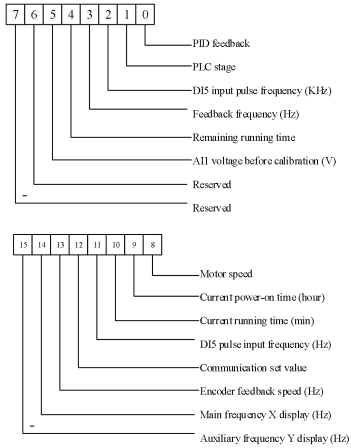
This function code is used to set the digital tube self-inspection on the display panel. When it is set to 1, all digital tubes are lit.

F7-03	STOP/RESET key function		Ex-factory value	1	Attribute	○
	Setting range	0	STOP/RES key stop function is valid only in keyboard operation mode.			
		1	In any operation mode, the stop function of STOP/RES key is effective.			

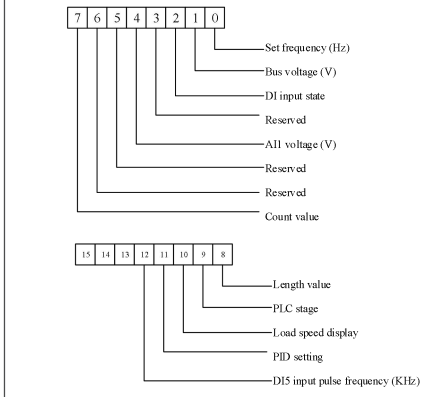
	LED running display parameter 1		Ex-factory value	1F	Attribute	○
F7-04	Setting range	0000~FFFF				



	LED running display parameter 2		Ex-factory value	0	Attribute	○
F7-05	Setting range	0000~FFFF				



Running displayed parameters: used to set the parameters that can be viewed when the drive is running. The maximum number of state parameters available for viewing is 32. Select the state parameters to be displayed according to the binary digits of the parameter values F7-04 and F7-05, and the display order starts from the lowest digit of F7-04.

	LED shutdown display parameter		Ex-factory value	13	Attribute	○
F7-06	Setting range	0000~FFFF				

F7-07	Load speed display coefficient	Ex-factory value	1.0000	Attribute	○
	Setting range	0.001~6.5000			

When the load speed needs to be displayed, through this parameter, the corresponding relationship between the output frequency of the drive and the load speed is adjusted. Refer to F7-08 for specific correspondence.

F7-08	Number of decimal places of load speed display	Ex-factory value	21	Attribute	○
	Setting range	Units place	Decimal places in U0-14		
		0	0 decimal display		
		1	1 decimal display		
		2	2 decimals display		
		3	3 decimals display		
		Tens place	Decimal places in U0-19/U0-29		
		1	1 decimal point		
		2	2 decimal points		

This function code is used to set the number of decimal places for load speed display.

For example, the load speed display coefficient F7-07 is 2.000, the number of load speed decimal places F7-08 is 2, then when the drive runs at 40.00Hz, the load speed is 40.00*2.000=80.00 (2 is decimal places displayed). If the drive is in the stopped state, the load display speed corresponds to the set frequency.

Tens place:

1: U0-19/U0-29 are displayed with one decimal place respectively.

2: U0-19/U0-29 are displayed with two decimal places respectively.

F7-09	Display selection of function parameter groups		Ex-factory value	11	Attribute	◎
	Setting range	Units place	Display selection of U group			
		0	Not displayed			
		1	Displayed			
		Tens place	Display selection of A group			
		0	Not displayed			
		1	Displayed			

F7-11	Parameter change attribute		Ex-factory value	0	Attribute	○
	Setting range	0	Modifiable			
		1	Non-modifiable			

This function code allows user to set whether the function code parameters can be modified, to prevent the parameters from being modified by mistake.

0: All function codes can be modified;

1: No function code can be modified.

12.9 F8 group auxiliary functions

F8-00	Inching operating frequency	Ex-factory value	2.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			
F8-01	Inching acceleration time	Ex-factory value	20.0s	Attribute	○
	Setting range	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)			
F8-02	Inching deceleration time	Ex-factory value	20.0s	Attribute	○
	Setting range	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)			

During inching, the start mode is fixed as direct start, and the stop mode is fixed as stop by deceleration.

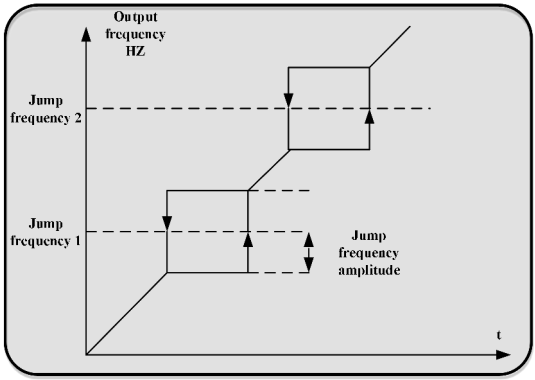
F8-03	Acceleration time 2	Ex-factory value	As per model	Attribute	○
	Setting range	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)			
F8-04	Deceleration time 2	Ex-factory value	As per model	Attribute	○
	Setting range	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)			
F8-05	Acceleration time 3	Ex-factory value	As per model	Attribute	○
	Setting range	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)			
F8-06	Deceleration time 3	Ex-factory value	As per model	Attribute	○
	Setting range	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)			
F8-07	Acceleration time 4	Ex-factory value	0.0s	Attribute	○
	Setting range	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)			

F8-08	Deceleration time 4	Ex-factory value	0.0s	Attribute	○
	Setting range	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)			

Through different combinations of multi-function digital input terminals DI, you can switch among acceleration and deceleration time 1 to acceleration and deceleration time 4. Please refer to the DI function description for specific usage. In the torque mode of drive vector control, the output frequency change corresponds to the acceleration and deceleration time 4, which is 0s by default.

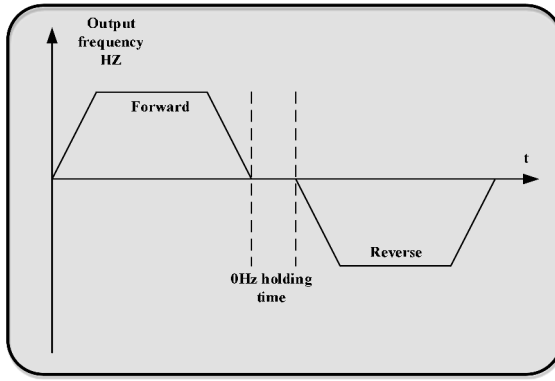
F8-09	Jump frequency 1	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			
F8-10	Jump frequency 2	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			
F8-11	Jump frequency amplitude	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			

When the set frequency is within the jump frequency range, the actual operating frequency will run at the jump frequency close to the set frequency. By setting the jump frequency, the drive can avoid the mechanical resonance point of the load. Two jump frequency points can be set. If both jump frequencies are set to 0Hz, the jump frequency function will be cancelled. The principle of jump frequency and jump frequency amplitude is shown in the following figure:



F8-12	Dead time of forward and reverse running	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~3000.0s			

This parameter is used to set the holding time at 0Hz when the drive is switched from forward (reverse) running to reverse (forward) running.



F8-13	Reverse frequency disabling		Ex-factory value	0	Attribute	○
	Setting range	0	Invalid			
		1	Valid			

This parameter is used to set whether the motor is allowed to run in reverse direction. If the motor is not allowed to run in reverse direction, it is necessary to validate the reverse frequency disabling.

F8-14	Operation mode with set frequency lower than the lower limit frequency		Ex-factory value	0	Attribute	○
	Setting range	0	Run at the lower limit frequency			
		1	Stop			
		2	Run at zero-speed			

This parameter can be used to set the running state when the set frequency of the drive is lower than the lower limit frequency.

F8-15	Droop rate	Ex-factory value	0.00%	Attribute	○
	Setting range	0.00%~10.00%			

In the master-slave control system, the droop rate allows a slight speed difference between the master station and the slave station.

The droop rate needs to be adjusted only when both the master and the slave adopt speed control mode. The droop rate needs to be set according to the actual application. It is recommended not to set F8-15 too large; otherwise the steady-state speed will decrease obviously when the load is heavy. The droop rate must be set for both master and slave.

Droop speed = Synchronous frequency × Output torque × Droop rate ÷ 10

Example: F8-15 = 1.00, synchronous frequency is 50Hz, output torque (relative to motor rated torque) is 50%, then:

Droop speed = 50Hz×50%×1.00÷10=2.5Hz

Actual frequency of drive = 50Hz - 2.5Hz = 47.5Hz

F8-16	Cumulative power-on setting	Ex-factory value	0h	Attribute	○
	Setting range	0h~65000h			

When the cumulative power-on time (U0-80) of the drive reaches this parameter, the multi-function digital output (DO) can be set to output the ON signal.

F8-17	Cumulative running setting	Ex-factory value	0h	Attribute	◉
	Setting range	0h~65000h			

When the cumulative running time (U0-77) of the drive reaches this parameter, the multi-function digital output (DO) can be set to output the ON signal.

F8-18	Selection of starting protection		Ex-factory value	0	Attribute ○
	Setting range	0	Not protected		
		1	Protected		

This parameter relates to the safety protection functions of the drive.

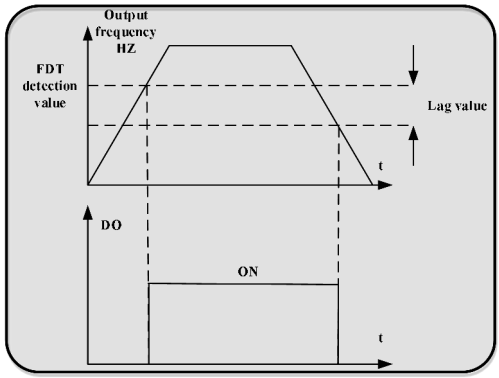
If this parameter is set to 1, and the run command is valid upon power-on or fault reset of the drive (for example, the terminal is in closed state before run command power-on), the drive will not respond to the run command, and this run command must be cancelled once and then become valid again before the drive responds.

Set this parameter to 1 to prevent the danger caused by the motor responding to the run command upon power-on or fault reset not known by the operator.

F8-19	Frequency detection value 1 (FDT1)	Ex-factory value	50.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			
F8-20	Frequency detection lag rate 1	Ex-factory value	5.0%	Attribute	○
	Setting range	0.0%~100.0%			

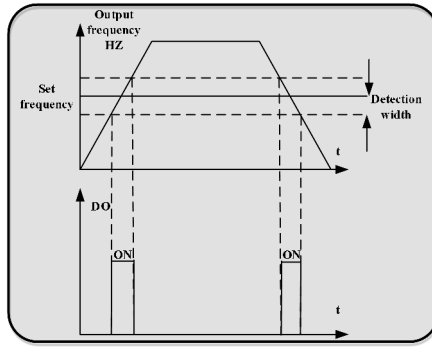
When the operating frequency is higher than the frequency detection value, the multi-function output DO of the drive outputs the ON signal, and when this frequency is lower than the detection value by a certain frequency value, the DO output ON signal is cancelled.

The above parameters are used to set the detection value of output frequency and the lag value of output action cancellation. Among them, F8-20 is the percentage of the lag frequency relative to the frequency detection value F8-19. The following figure is the schematic diagram of FDT function:



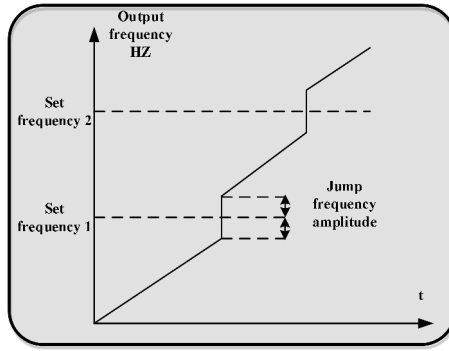
F8-21	Frequency reaching detection width	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%~100.0% (maximum frequency)			

When the operating frequency of the drive reaches between (set frequency - frequency reaching detection width) and (set frequency + frequency reaching detection width), the multi-function DO of the drive outputs the ON signal. This parameter is the percentage relative to the maximum frequency, and the frequency reaching function is shown below:



F8-22	Selection of validity of jump frequency during acceleration and deceleration		Ex-factory value	0	Attribute	○
	Setting range	0	Invalid			
		1	Valid			

When the jump frequency is set to be valid during acceleration and deceleration, the actual operating frequency will skip the set jump frequency range during acceleration or deceleration of the drive.



F8-25	Acceleration time 1 and 2 switching Frequency	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			
F8-26	Deceleration time 1 and 2 switching Frequency	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			

When the drive fails to select the acceleration and deceleration time through the DI terminal, different acceleration and deceleration times can be switched according to the operating frequency.

During acceleration, when the operating frequency is less than F8-25, select acceleration time 2; When the operating frequency is greater than F8-25, select acceleration time 1.
During deceleration, when the operating frequency is less than F8-26, select acceleration time 2; When the operating frequency is greater than F8-26, select acceleration time 1.

F8-27	Terminal inching priority		Ex-factory value	0	Attribute	○
	Setting range	0	Invalid			
		1	Valid			

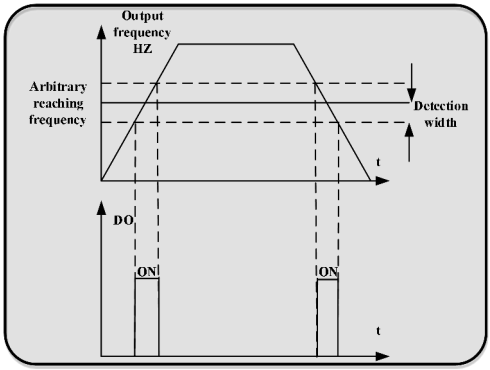
This parameter is used to set whether the terminal inching function has the highest priority. When terminal inching priority is valid, if the terminal inching command appears during running, the drive is switched to the terminal inching running state.

F8-28	Frequency detection value 2 (FDT2)	Ex-factory value	50.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			
F8-29	Frequency detection lag rate 2	Ex-factory value	5.0%	Attribute	○
	Setting range	0.0%~100.0%			

This function is the same as that of FDT1. Please refer to the relevant instructions of F8-19 and F8-20.

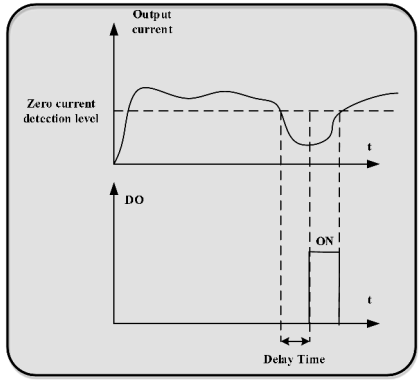
F8-30	Any reaching frequency detection value 1	Ex-factory value	50.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			
F8-31	Any reaching frequency detection width 1	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%~100.0% (maximum frequency)			
F8-32	Any reaching frequency detection value 2	Ex-factory value	50.00Hz	Attribute	○
	Setting range	0.00Hz~maximum frequency			
F8-33	Any reaching frequency detection width 2	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%~100.0% (maximum frequency)			

When the operating frequency of the drive reaches between (any frequency - frequency reached detection width) and (any frequency + frequency reached detection width), the multi-function DO of the drive outputs the ON signal. The function of any frequency reaching detection is as follows:



F8-34	Zero current detection level	Ex-factory value	5.0%	Attribute	○
	Setting range	0.0%~300.0% (motor rated current)			
F8-35	Zero current detection delay time	Ex-factory value	0.10s	Attribute	○
	Setting range	0.01s~600.00s			

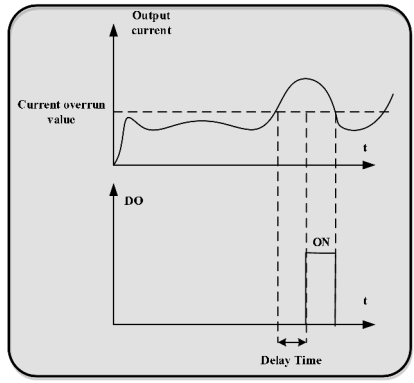
When the output current of the drive is less than or equal to the zero current detection level and the duration exceeds the zero current detection delay time, the multi-function DO of the drive outputs the ON signal. The zero current detection is as shown in the figure:



F8-36	Output current overrun value	Ex-factory value	200.0%	Attribute	○
	Setting range	0.0%~300.0% (motor rated current)			
F8-37	Output current overrun delay time	Ex-factory value	0.00s	Attribute	○
	Setting range	0.00s~600.00s			

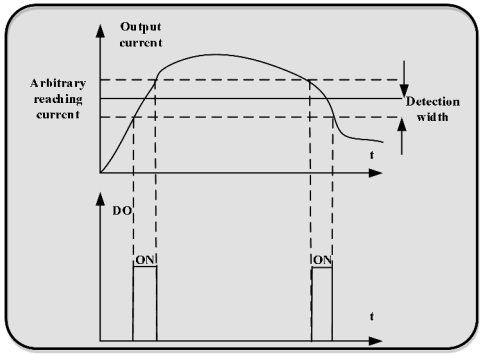
When the output current of the drive is greater than or equal to the overrun detection point, and the duration exceeds the software overcurrent point detection delay time, the multi-function DO of the drive outputs the ON signal, and the output current overrun function is shown as follows:

When F8-36 current overrun value is set to 0.0%, it will not be detected.



F8-38	Any reaching current 1	Ex-factory value	100.0%	Attribute	○
	Setting range	0.0%~300.0% (motor rated current)			
F8-39	Any reaching current 1 amplitude	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%~300.0% (motor rated current)			
F8-40	Any reaching current 2	Ex-factory value	100.0%	Attribute	○
	Setting range	0.0%~300.0% (motor rated current)			
F8-41	Any reaching current 2 amplitude	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%~300.0% (motor rated current)			

When the output current of the drive is within the set positive and negative detection width of any reaching current, the multi-function DO of the drive outputs the ON signal.



F8-42	Selection of timing function		Ex-factory value	0	Attribute	◎
	Setting range	0	Invalid			
		1	Valid			
F8-43	Selection of timed run time		Ex-factory value	0	Attribute	◎
	Setting range	0	F8-44 setting			
		1	AI1			
		2	Reserved			
		3	Reserved			
F8-44	Timed run time		Ex-factory value	0.0Min	Attribute	◎
	Setting range		0.0Min~6500.0Min			

Timed running function:

When the timing function is valid, upon each startup of the drive, timing will start from 0. When the set timed running time is reached, the drive automatically stops. If the <timing reached> function is selected for the digital multi-function DO output, the ON signal is output. The remaining run time can be viewed through U0-20.

Note: The analog setting in F8-43 parameter is 100% corresponding to the set time of F8-44.

F8-45	Lower limit of AI1 input voltage protection value	Ex-factory value	3.10V	Attribute	○
	Setting range	0.00V~F8-46			
F8-46	Upper limit of AI1 input voltage protection value	Ex-factory value	6.80V	Attribute	○
	Setting range	F8-45~11.00V			

If the function of <AI1 input overrun> is selected for digital multi-function DO output, DO outputs the ON signal when the analog AI1 input voltage (after calibration) is greater than F8-46 or the AI1 input is less than F8-45.

F8-47	Module temperature reached	Ex-factory value	75℃	Attribute	○
	Setting range	0℃~100℃			

If the <module temperature reached> function is selected for the digital multi-function DO output, DO outputs the ON signal when the inversion module temperature reaches the set temperature.

F8-48	Cooling fan control		Ex-factory value	0	Attribute ◎
	Setting range	0	Run fan during running of equipment		
		1	The fan keeps running.		

Fan control mode 0: When the drive is running, the fan runs. When the radiator temperature is higher than 40°C in the stopped state, the fan continues to run; when the radiator temperature is lower than 40°C, the fan stops running.

Fan control mode 1: The fan keeps running after powered on.

F8-49	Wake-up frequency	Ex-factory value	0.00Hz	Attribute	○
	Setting range	F8-51~maximum frequency			
F8-50	Wake-up delay time	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~6500.0s			
F8-51	Sleep frequency	Ex-factory value	0.00Hz	Attribute	○
	Setting range	0.00Hz~F8-49			
F8-52	Sleep delay time	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0s~6500.0s			

During the running of the drive, when the set frequency is less than or equal to F8-51 sleep frequency, after F8-52 delay time, the drive enters the sleep state and automatically stops. If the drive is in sleep state and the current run command is valid, the drive will start after a delay time of F8-50 when the set frequency is greater than or equal to F8-49 wake-up frequency. If both the wake-up frequency and the sleep frequency are set to 0.00Hz, the sleep and wake-up functions are invalid.

Note: When the sleep function is enabled, if PID is used as the frequency source, PID shutdown operation must be selected at this time (F9-28).

F8-53	Current running timeout	Ex-factory value	0.0Min	Attribute	◎
	Setting range	0.0Min~6500.0Min			

If for the digital multi-function DO or relay output, the <current running timeout> function is selected, when current running of the drive reaches this set time, DO outputs the ON signal.

F8-54	Output power correction coefficient	Ex-factory value	100.0%	Attribute	○
	Setting range	0.0%~200.0%			

This parameter is used to correct the output power displayed in U0-05.

F8-55	DPWM switching upper limit frequency	Ex-factory value	8.00Hz	Attribute	○
	Setting range	5.00Hz~maximum frequency			

When the operating frequency is lower than this set value, CPWM modulation mode is used, and when it is higher than this set value, DPWM modulation mode is used. If the carrier frequency is less than or equal to 2KHz, the debugging mode is fixed as CPWM modulation.

CPWM modulation mode has large switching loss and small current ripple; DPWM modulation mode has small switching loss and large current ripple.

F8-56	PWM modulation mode		Ex-factory value	0	Attribute	○
	Setting range	0	Asynchronous modulation			
		1	Synchronous modulation			

Under the V/F control mode, when the output frequency of the drive is high, in order to ensure the output voltage quality, synchronous modulation shall be selected, so that the carrier frequency changes with the output frequency and the carrier ratio remains unchanged.

Synchronous modulation takes effect when the operating frequency is higher than 85Hz, and the asynchronous modulation mode is fixed below 85Hz.

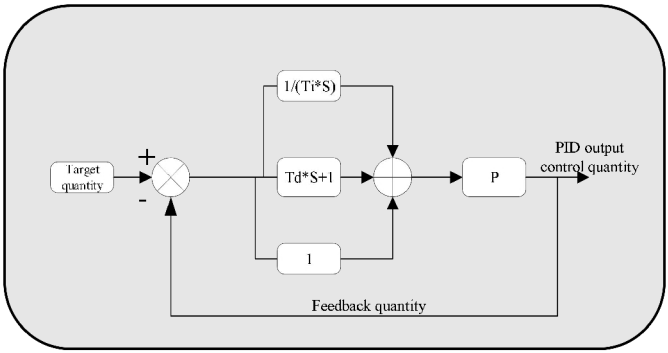
F8-58	Random PWM depth		Ex-factory value	0	Attribute	○
	Setting range	0	Invalid			
		1~10	Random depth adjustment			

When the random depth adjustment is enabled, the carrier frequency output by the drive is changed and adjusted within a certain range, beneficial to reducing external electromagnetic interference.

12.10 F9 group PID function

PID control is a common method of process control. By proportional, integral and differential operation of the difference between the feedback signal of the controlled quantity and the target signal, and by adjusting the output frequency of the drive, a closed-loop system is formed to stabilize the controlled quantity at the target value.

This function is suitable for process control occasions such as flow control, pressure control and temperature control. The following figure shows the principle block diagram of PID control.



F9-00	PID setting source		Ex-factory value	0	Attribute	○
	Setting range	0	F9-01 setting			
		1	AI1			
		2	Reserved			
		3	Reserved			
		4	Pulse setting DI5			
		5	Communication setting			
		6	Multi-segment instruction			
F9-01	PID digital setting		Ex-factory value	50.0%	Attribute	○
	Setting range		0.0%~100.0%			

This function code is used to set the target quantity setting channel of process PID.

The set target quantity of process PID is a relative value, in the range of 0.0%~100.0%. Similarly, the feedback quantity of PID is also a relative quantity, and the function of PID is to make these two relative quantities the same.

F9-02	PID feedback source		Ex-factory value	0	Attribute	○
	Setting range	0	AI1			
		1	Reserved			
		2	Reserved			
		3	Reserved			
		4	DI5 pulse			
		5	Communication setting			
		6	Reserved			
		7	Reserved			
		8	Reserved			

This parameter is used to select the feedback signal channel of the process PID.

The feedback quantity of process PID is also a relative value, and the set range is 0.0%~100.0%.

F9-03	PID action direction		Ex-factory value	0	Attribute	○
	Setting range	0	Positive action			
		1	Negative action			

This function code is used to set the action direction of process PID.

Positive action: When the feedback is greater than the setting, the PID output control quantity decreases.

Negative action: When the feedback is greater than the setting, the PID output control quantity increases.

When using this function, it is necessary to combine the influence of reversing of multi-function terminal PID action (function 35).

F9-04	PID setting feedback range	Ex-factory value	1000	Attribute	○
	Setting range	0~65535			

This function code is used for PID setting displays U0-15 and U0-16.

For example, F9-04 is set to 5000, and when PID is set as 100.0%, the set display U0.15 of PID is 5000.

F9-05	Proportional gain Kp1	Ex-factory value	20.0	Attribute	○
	Setting range	0.0~1000.0			
F9-06	Integration time Ti1	Ex-factory value	2.00s	Attribute	○
	Setting range	0.01s~10.00s			
F9-07	Differential time Td1	Ex-factory value	0.000s	Attribute	○
	Setting range	0.00~10.000			

1) Proportional gain Kp1:

This parameter determines the regulation strength of the whole PID regulator, and the greater Kp1, the greater the regulation strength. This parameter of 100.0 indicates that when the deviation between the PID feedback quantity and the set quantity is 100.0%, the regulation amplitude of the PID regulator to the output frequency instruction is the maximum frequency.

2) Integration time Ti1:

This parameter determines the strength of integral regulation of PID regulator. The shorter the integration time, the greater the regulation strength. The integration time means that when the deviation between the PID feedback quantity and the set quantity is 100.0%, after continuous adjustment by the integral regulator for this time, the regulation quantity reaches the maximum frequency.

3) Differential time Td1:

This parameter determines the regulation strength of PID regulator on deviation change rate. The longer the differential time, the greater the regulation strength. The differential time means that when the feedback quantity changes by 100.0% during this time, the regulation quantity of differential regulator is the maximum frequency.

F9-08	PID inversion cutoff frequency	Ex-factory value	0.00	Attribute	○
	Setting range	0.00~maximum frequency			

This function code is used to set the maximum inversion PID output frequency in drive operation.

F9-09	PID deviation limit	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%~100.0%			

This function code is used to set the minimum valid deviation of PID. When the deviation between the PID set quantity and the feedback quantity is less than F9-09, the PID will stop regulating.

F9-10	PID differential amplitude limit	Ex-factory value	0.10%	Attribute	○
	Setting range	0.00%~100.00%			

This function code is used to set the range of PID differential output, in order to prevent the system oscillation due to over-sensitive differential regulation, and to limit the differential function of PID to a relatively small range.

F9-11	PID setting change time	Ex-factory value	0.00s	Attribute	○
	Setting range	0.00s~650.00s			

This function code is used to set the time required for the set value of PID to change from 0.0% to 100.0%. When the PID setting is changed, this setting will change linearly according to this time, which prevents the adverse impact on the system caused by sudden change of the setting.

F9-12	PID feedback filtering time	Ex-factory value	0.00s	Attribute	○
	Setting range	0.00s ~60.00s			
F9-13	PID output filtering time	Ex-factory value	0.00s	Attribute	○
	Setting range	0.00s ~60.00s			

The above function codes are used to set PID feedback filtering and PID output filtering respectively.

PID feedback filtering is beneficial to reducing the influence of feedback being interfered, but it will lead to the decrease of response performance of process PID control system.

PID output filtering will weaken the abrupt change of drive output frequency, but it will also reduce the response performance of process PID control system.

F9-15	Proportional gain Kp2		Ex-factory value	20.0	Attribute	○
	Setting range		0.0~1000.0			
F9-16	Integration time Ti2		Ex-factory value	2.00s	Attribute	○
	Setting range		0.01s~10.00s			
F9-17	Differential time Td2		Ex-factory value	0.000s	Attribute	○
	Setting range		0.00~10.000			
F9-18	PID parameter switching condition		Ex-factory value	0	Attribute	○
	Setting range	0	No switching			
		1	Switching through DI terminal			
		2	Automatic switching according to deviation			
		3	Automatic switching according to operating frequency			
F9-19	PID parameter switching deviation 1		Ex-factory value	20.0%	Attribute	○
	Setting range		0.0%~F9-20			

F9-20	PID parameter switching deviation 2	Ex-factory value	80.0%	Attribute	○
	Setting range	F9-19~100.0%			

In some applications, one group of PID parameters can not meet the needs of the whole operation process, so different PID parameters need to be adopted in different situations.

This group of function codes is used to switch between two groups of PID parameters. The setting mode of regulator parameters F9-15~F9-17 is similar to that of parameters F9-05~F9-07.

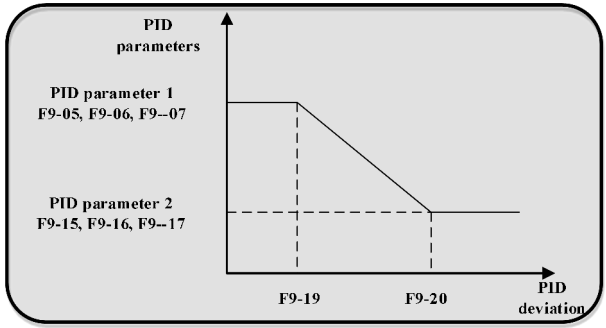
F9-18 function code is used to set PID parameters switching conditions.

When F9-18 is equal to 0, PID parameters are not switched.

When F9-18 is equal to 1, the multi-function terminal shall be set to 43 (PID parameters switching terminal). When this terminal is invalid, parameters group 1 (F9-05~F9-07) is selected, and when this terminal is valid, parameters group 2 (F9-15~F9-17) is selected.

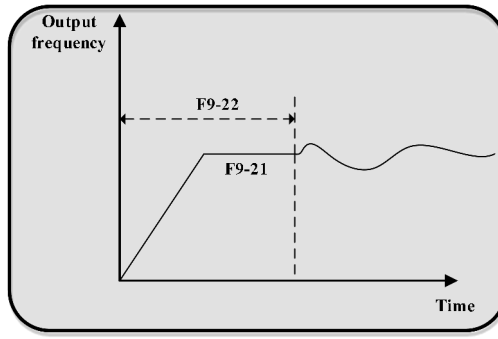
When F9-18 is equal to 2, if the absolute value of the deviation between setting and feedback is less than the PID parameter switching deviation 1 (F9-19), select PID parameters group 1. If the absolute value of deviation between given and feedback is greater than PID switching deviation 2 (F9-20), select PID parameters group 2. When the deviation between setting and feedback is between switching deviation 1 and switching deviation 2, the PID parameters are linear interpolation values of these two groups of PID parameters, as shown in the figure below.

When F9-18 is equal to 3, the PID parameters have a linear relationship with the current operating frequency, 0Hz corresponds to PID parameters 1, and the maximum output frequency corresponds to PID parameters 2.



F9-21	PID initial value	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%~100.0%			
F9-22	PID initial value holding time	Ex-factory value	0. 00s	Attribute	○
	Setting range	0.00s~650.00s			

After the drive runs, the PID output is fixed at the initial value of PID, and after running at this initial value of PID for the PID initial value holding time, the PID enters the regulating operation. The schematic diagram for the function of PID initial value upon start of the drive is shown in the figure below.



F9-23	Positive maximum value of deviation between two outputs	Ex-factory value	1.00%	Attribute	○
	Setting range	0.00%~100.00%			
F9-24	Negative maximum value of deviation between two outputs	Ex-factory value	1.00%	Attribute	○
	Setting range	0.00%~100.00%			

This group of parameters is used to limit the difference between the two PID control outputs, so as to achieve the effect of restraining the PID output from changing too fast.

F9-25	PID integral attribute		Ex-factory value	00	Attribute ○
	Setting range	Units place	Integral separation		
		0	Invalid		
		1	Valid		
		Tens place	Whether to stop integrating after the output reaches the limit value		
		0	Continue integration		
		1	Stop integration		

Units place: Control whether the PID integration is valid. When the multi-function terminal selection of integration pause (function 38) is valid, the PID integration will stop running if the units place is 1.

Tens place: When set to 1, the integral calculation will be stopped after the output of PID operation reaches the maximum or minimum value, helpful for reducing PID overshoot.

F9-26	PID feedback loss detection value	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%: feedback loss is not judged; 0.1%~100.0%			
F9-27	PID feedback loss detection time	Ex-factory value	0.0s	Attribute	○
	Setting range	0. 0s~20.0s			

This function code is used to set whether to detect PID feedback loss.

When the PID feedback quantity is less than the F9-26 feedback loss detection value, and the duration is longer than the F9-27 set time, the drive will report "E.FBL" feedback loss fault.

F9-28	PID operation at stop		Ex-factory value	0	Attribute ○
	Setting range	0	Stop without operation		
		1	Stop with operation		

This function code is used to set whether the PID will continue to operate when the equipment is stopped. In general, PID stops operation in equipment stop state.

F9-29	PID overshoot detection value	Ex-factory value	0.0%	Attribute	○
	Setting range	0.0%: feedback overshoot is not judged; 0.1%~100.0%			
F9-30	PID overshoot detection time	Ex-factory value	0.0s	Attribute	○
	Setting range	0. 0s~20.0s			

This function code is used to set whether to detect PID feedback overshoot.

When the PID feedback quantity is greater than F9-29 feedback overshoot detection value for duration longer than F9-30 set time, the drive reports "E.FBH" feedback overshoot fault.

F9-34	Set length	Ex-factory value	1000m	Attribute	○
	Setting range	0m~65535m			
F9-35	Actual length	Ex-factory value	0m	Attribute	○
	Setting range	0m~65535m			
F9-36	Pulse number per meter	Ex-factory value	100.0	Attribute	○
	Setting range	0.1~6553.5			

The above function codes are used for fixed-length control.

The length information needs to be acquired through the multi-function digital input terminal, and the actual length F9-35 can be calculated by dividing the number of pulses sampled by the terminal by the number of pulses per meter F9-36. When the actual length is greater than the set length F9-34, the multi-function digital "length reached" ON signal will be output.

In the process of fixed length control, the length can be reset through the multi-function DI terminal (the DI function is selected as 28). Please refer to F5-00~F5-04 for details.

In application, it is necessary to set the corresponding input terminal function to "length count input" (function 27), and DI5 port must be used when the pulse frequency is high.

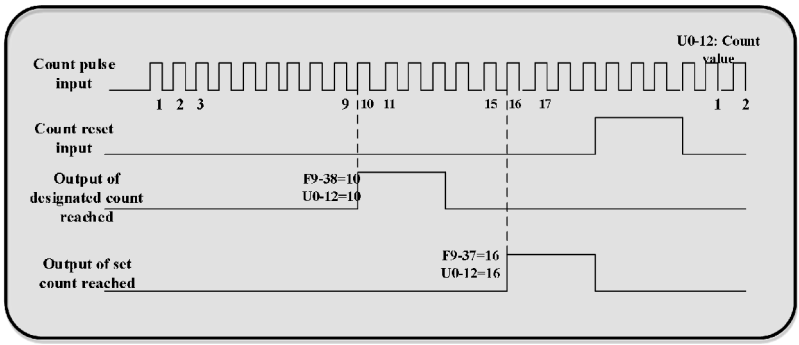
F9-37	Set count value	Ex-factory value	1000	Attribute	○
	Setting range	0~65535			
F9-38	Designated count value	Ex-factory value	1000	Attribute	○
	Setting range	0~65535			

Count value needs to be acquired through multi-function digital input terminal. In application, it is necessary to set the corresponding input terminal function as "counter input" (function 25), and DI5 port must be used when the pulse frequency is high.

When the count value reaches the set count value F9-37, the multi-function digital output will send "set count value reached" ON signal, and then the counter will stop counting.

When the count value reaches the designated count value F9-38, the multi-function digital output will send "designated count value reached" ON signal, and the counter will continue to count until reaching the "set count value".

The designated count value F9-38 shall not be greater than the set count value F9-37. The following figure is a schematic diagram of the functions of set count value reached and designated count value reached.



12.11 FA group multi-segment instructions, simple PLC function

The multi-segment instructions of NVF2L have more functions than the usual multi-segment speed. In addition to realizing the multi-segment speed function, it can also be used as the voltage source of VF separation and the setting source of process PID. The dimension of multi-segment instructions is relative value.

FA-00	Multi-segment instruction 0	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-01	Multi-segment instruction 1	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-02	Multi-segment instruction 2	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-03	Multi-segment instruction 3	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-04	Multi-segment instruction 4	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-05	Multi-segment instruction 5	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-06	Multi-segment instruction 6	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-07	Multi-segment instruction 7	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-08	Multi-segment instruction 8	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-09	Multi-segment instruction 9	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-10	Multi-segment instruction 10	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-11	Multi-segment instruction 11	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-12	Multi-segment instruction 12	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			

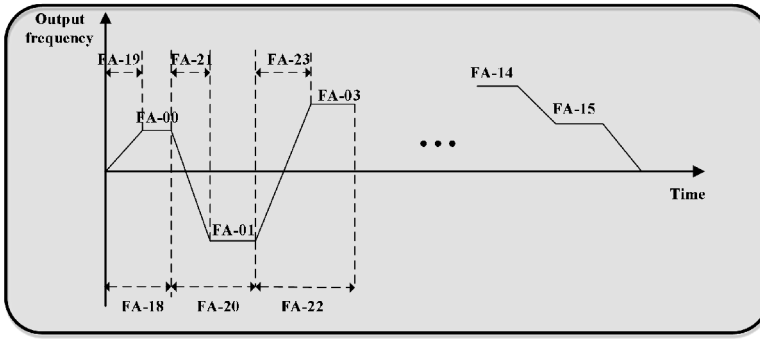
FA-13	Multi-segment instruction 13	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-14	Multi-segment instruction 14	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
FA-15	Multi-segment instruction 15	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			

Multi-segment instructions can be used in three occasions: as a frequency source, as a voltage source for VF separation, and as a setting source for process PID. In these three applications, the dimension of multi-segment instructions is relative value, ranging from -100.0% to 100.0%. When it is used as a frequency source, it is the percentage with respect to the maximum frequency. When it is used as a voltage source for VF separation, it is the percentage with respect to the rated voltage of the motor. Because the PID setting is a relative value, multi-segment instruction as the PID setting source does not require dimension conversion. Multi-segment instructions need to be switched and selected according to the different states of the multi-function digital DI. For details, please refer to the related instructions in F5 group.

FA-16	Simple PLC running mode		Ex-factory value	0	Attribute ○
	Setting range	0	Stop at the end of single running		
		1	Keep the final values at the end of single running		
		2	Keep cycling		

The simple PLC has two functions, as a frequency source or a voltage source for VF separation.

The following figure is a schematic diagram of PLC used as a frequency source. When the simple PLC is used as a frequency source, the multi-segment frequency N is used as the frequency source, and the positive and negative FA-00~FA-15 determines the running direction. If it is negative, it means that the drive runs in the reverse direction.



As a frequency source, PLC has three operation modes, which are not available as a voltage source for V/F separation. Where:

0: Stop at the end of single running

The drive automatically stops after completing a single cycle, and will be restarted only after waiting for the next startup command.

1: Keep the final value at the end of single running

After completing a cycle, the drive will keep the operating frequency and direction at the last moment.

2: Keep cycling

After completing a cycle, the drive will automatically start the next cycle.

FA-17	Simple PLC power-off memory selection		Ex-factory value	00	Attribute	○
	Setting range	Units place	Power-off memory selection			
		0	No power-off memory			
		1	With power-off memory			
		Tens place	Stop memory selection			
		0	No stop memory			
		1	With stop memory			

Power-off memory of PLC refers to the memory of the operation stage and operating frequency of PLC before power-off, and the drive will continue to run from the stage in memory when it is powered on next time. If no memory is selected, the PLC process will be restarted every time powered on.

The PLC stop memory refers to recording the previous PLC operation stage and operating frequency upon stop, and continuing to run from the stage in memory when it runs next time. If no memory is selected, the PLC process will be restarted every time it is started.

FA-18	Running time of simple PLC segment 0		Ex-factory value	0.0s(h)	Attribute	○
	Setting range		0.0s(h)~6500.0s(h)			
FA-19	Selection of acceleration and deceleration time in simple PLC segment 0		Ex-factory value	0	Attribute	○
	Setting range	0	Acceleration and deceleration time 1			
		1	Acceleration and deceleration time 2			
		2	Acceleration and deceleration time 3			
		3	Acceleration and deceleration time 4			
FA-20	Running time of simple PLC segment 1		Ex-factory value	0.0s(h)	Attribute	○
	Setting range		0.0s(h)~6500.0s(h)			
FA-21	Selection of acceleration and deceleration time in simple PLC segment 1		Ex-factory value	0	Attribute	○
	Setting range		Same as FA-19			
FA-22	Running time of simple PLC segment 2		Ex-factory value	0.0s(h)	Attribute	○
	Setting range		0.0s(h)~6500.0s(h)			
FA-23	Selection of acceleration and deceleration time in simple PLC segment 2		Ex-factory value	0	Attribute	○
	Setting range		Same as FA-19			
FA-24	Running time of simple PLC segment 3		Ex-factory value	0.0s(h)	Attribute	○
	Setting range		0.0s(h)~6500.0s(h)			
FA-25	Selection of acceleration and deceleration time in simple PLC segment 3		Ex-factory value	0	Attribute	○
	Setting range		Same as FA-19			
FA-26	Running time of simple PLC segment 4		Ex-factory value	0.0s(h)	Attribute	○
	Setting range		0.0s(h)~6500.0s(h)			
FA-27	Selection of acceleration and deceleration time in simple PLC segment 4		Ex-factory value	0	Attribute	○
	Setting range		Same as FA-19			
FA-28	Running time of simple PLC segment 5		Ex-factory value	0.0s(h)	Attribute	○
	Setting range		0.0s(h)~6500.0s(h)			

FA-29	Selection of acceleration and deceleration time in simple PLC segment 5	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-30	Running time of simple PLC segment 6	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-31	Selection of acceleration and deceleration time in simple PLC segment 6	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-32	Running time of simple PLC segment 7	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-33	Selection of acceleration and deceleration time in simple PLC segment 7	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-34	Running time of simple PLC segment 8	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-35	Selection of acceleration and deceleration time in simple PLC segment 8	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-36	Running time of simple PLC segment 9	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-37	Selection of acceleration and deceleration time in simple PLC segment 9	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-38	Running time of simple PLC segment 10	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-39	Selection of acceleration and deceleration time in simple PLC segment 10	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-40	Running time of simple PLC segment 11	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-41	Selection of acceleration and deceleration time in simple PLC segment 11	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-42	Running time of simple PLC segment 12	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-43	Selection of acceleration and deceleration time in simple PLC segment 12	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-44	Running time of simple PLC segment 13	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-45	Selection of acceleration and deceleration time in simple PLC segment 13	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			
FA-46	Running time of simple PLC segment 14	Ex-factory value	0.0s(h)	Attribute	○
	Setting range	0.0s(h)~6500.0s(h)			
FA-47	Selection of acceleration and deceleration time in simple PLC segment 14	Ex-factory value	0	Attribute	○
	Setting range	Same as FA-19			

FA-48	Running time of simple PLC segment 15		Ex-factory value	0.0s(h)	Attribute	○
	Setting range		0.0s(h)~6500.0s(h)			
FA-49	Selection of acceleration and deceleration time in simple PLC segment 15		Ex-factory value	0	Attribute	○
	Setting range		Same as FA-19			
FA-50	Simple PLC running time unit		Ex-factory value	0	Attribute	○
	Setting range	0	S (second)			
		1	H (hour)			
FA-51	Multi-segment instruction 0 set mode		Ex-factory value	0	Attribute	○
	Setting range	0	Function code FA-00 setting			
		1	AI1			
		2	Reserved			
		3	Reserved			
		4	DI5 pulse setting			
		5	PID			
		6	Preset frequency (F0-08) setting, and UP/DOWN modifiable			

This function code is used to set the setting channel of multi-segment instruction 0.

Besides FA-00, there are many other options for multi-segment instruction 0, facilitating switching between multi-segment instruction and other setting modes. When multi-segment instruction is used as frequency source or simple PLC is used as frequency source, the switching between the two frequency sources can be easily realized.

12.12 FB group communication parameters

Fb-00	Communication protocol selection		Ex-factory value	0	Attribute	◎
	Setting range	0	MODBUS-RTU protocol			
		1	Reserved			

The drive uses serial port to realize MODBUS, please set this parameter correctly according to actual demand.

Fb-01	Communication baud rate		Ex-factory value	5005	Attribute	○
	Setting range	**Units place**	**Modbus**			
		0	300Bps			
		1	600Bps			
		2	1200Bps			
		3	2400Bps			
		4	4800Bps			
		5	9600Bps			
		6	19200Bps			
		7	38400Bps			
		8	57600Bps			
		9	115200Bps			
		Tens place	Reserved			
		0	Reserved			
		1	Reserved			
		2	Reserved			
		3	Reserved			
		Hundreds place	**Reserved**			
		Thousands place	**Reserved**			

This parameter is used to set the data transmission rate between the main station computer and the drive. Note that the baud rates set by the main station computer and the drive must be consistent, otherwise communication cannot be carried out. The higher the baud rate, the higher the communication speed.

Units place: set standard Modbus communication baud rate for drive;

Fb-02	MODBUS data format		Ex-factory value	0	Attribute	○
	Setting range	0	No check (8-N-2)			
		1	Even check (8-E-1)			
		2	Odd check (8-O-1)			
		3	No check (8-N-1)			

In MODBUS communication mode, the data formats set by the main station computer and the drive must be consistent, otherwise, communication cannot be carried out.

8-N-2: 8 data bits, no parity bit, 2 stop bits

8-E-1: 8 data bits, even parity bit, 1 stop bit

8-O-1: 8 data bits, odd parity bit, 1 stop bit

8-N-1: 8 data bits, no parity bit, 1 stop bit

Fb-03	Local address	Ex-factory value	1	Attribute	○
	Setting range	1~247			

The local address is unique (except the broadcast address) and this is the basis for realizing point-to-point communication between the main station computer and the drive. When the address sent by the master is 0, it is a broadcast address, and the slave does not need to return data after receiving the broadcast instruction.

Fb-04	MODBUS response delay	Ex-factory value	2ms	Attribute	○
	Setting range	0~20ms			

Response delay: refers to the interval between the end of data reception by the drive and the sending of data to the main station computer. If this setting is less than the system processing time, the response delay will be the system processing time. If this setting is longer than the system processing time, the system will wait until the response delay time is up before sending data to the main station computer.

This parameter is the response delay set for MODBUS communication.

Fb-05	MODBUS communication timeout	Ex-factory value	0.0s	Attribute	○
	Setting range	0.0~60.0s			

When the function code is set to 0.0s, the communication timeout parameter is invalid. When this function code is set to a valid value, if the interval between one communication and the next communication exceeds the communication timeout setting, the system will report a communication failure error (E.CE). This parameter is usually set to be invalid.

Fb-06	Data transmission format		Ex-factory value	1	Attribute	○
	Setting range	**Units place**	**Modbus**			
		0	Non-standard Modbus protocol			
		1	Standard Modbus protocol			

Non-standard Modbus protocol and standard Modbus protocol have the following differences when returning communication error codes and data reading instructions:

Return communication error code			Return data reading instruction		
Byte	**Non-standard**	**Standard**	**Byte**	**Non-standard**	**Standard**
0	Slave address	Slave address	0	Slave address	Slave address
1	Function code	0x80+ function code	1	Function code	Function code
2	0x80	Error code	2	Number of data bytes high byte	Number of data bytes
3	0x01	CRC low byte	3	Number of data bytes low byte	Return data N bytes
4	0x00	CRC high byte	4	Return data N bytes	CRC low byte
5	Error code		5	CRC low byte	CRC high byte
6	CRC low byte		6	CRC high byte	
7	CRC high byte		7		

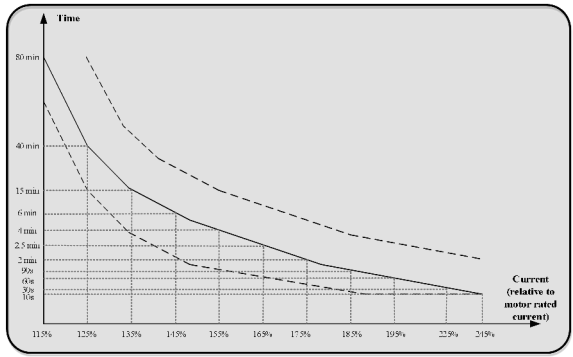
Fb-07	Communication current resolution		Ex-factory value	0	Attribute	○
	Setting range	0	0.01A			
		1	0.1A			

When Modbus communication reads the U0-04 output current, the resolution of the read data can be modified by this parameter. When using the extended communication card to communicate, the read current data is fixed at 0.1A resolution.

12.13 FE group faults and protections

FE-00	Motor overload protection selection		Ex-factory value	1	Attribute	○
	Setting range	0	Prohibit motor overload protection function			
		1	Enable motor overload protection function			
FE-01	Motor overload protection gain		Ex-factory value	1.00	Attribute	○
	Setting range		0.20~10.00			
FE-02	Motor overload warning coefficient		Ex-factory value	80%	Attribute	○
	Setting range		50%~100%			

In order to effectively protect motors of different loads, it is necessary to set the motor overload protection gain according to the motor overload capacity. Motor overload protection is an inverse time-limit curve, shown in the following figure:



As shown in the figure, the the marked running current points correspond to motor overload protection time, and the time between two points is obtained by linear calculation.

Example: At 145% current, the time for reporting OL1 is 6 minutes; at 155% current, the time for reporting OL1 is 4 minutes, then at 150% current, the time for reporting OL1 time is

$$T = 6 + (4 - 6)*(150\% - 145\%)/(155\% - 145\%) = 5 \text{ (minutes)}$$

Motor overload protection gain:

When the overload protection gain is set to 1.00 by default, when the motor running current reaches 175% of the motor rated current, it will report motor overload (OL1) after continuous running for 2 minutes. When the running current of the motor reaches 115% of the rated current of the motor, it will report motor overload (OL1) after continuous running for 80 minutes.

If it is necessary to modify the overload time according to the motor, adjust this parameter.

Example: the rated current of the motor is 100A. If FE-01=1.00, when the drive runs to 125A (125%) and this lasts for 40 minutes, it will report OL1 fault.

If you want the drive to report OL1 fault after running at 125A for 50 minutes, set FE-01 = 1.25, 40 * 1.25 = 50 minutes.

If you want the drive to report OL1 fault after running at 125A for 20 minutes, set FE-01 = 0.5, 40 * 0.5 = 20 minutes.

Note: The maximum time for overload is 80 minutes and the minimum time is 10 seconds.

Motor overload warning coefficient:

The motor overload warning function is used to give a warning signal to the control system through DO or relay before motor overload fault protection. This warning coefficient is used to determine how early the warning shall be given before motor overload protection. The larger this value is, the less in advance the warning shall be. When the accumulated output current of the drive is greater than the product of overload time (the value on the inverse time-limit curve of motor overload protection) and "motor overload warning coefficient (FE-02)", the multi-function digital DO of the drive outputs a valid signal of "motor overload warning". Under special circumstances, when the motor overload warning coefficient FE-02 is set to 100%, the advance amount of warning is 0, and the warning and overload protection will occur at the same time.

FE-07	Selection of short-circuit protection to ground		Ex-factory value	1	Attribute	○
	Setting range	**Units place**	**Selection of power-on short-circuit protection to ground**			
		0	Invalid			
		1	Valid			
		Tens place	**Selection of short-circuit protection to ground before operation**			
		0	Invalid			
		1	Valid			

Selection of power-on short-circuit protection to ground:

Each time the drive is powered on, the drive detects whether the motor has a short circuit fault to the ground.

Selection of short circuit protection to ground before operation:

Before each operation of the drive, first detect whether the motor has a short circuit fault to the ground, and then start operation properly if there is no such fault.

FE-08	Starting voltage of braking unit action	Ex-factory value	As per model	Attribute	○
	Setting range	380V model: 650.0V~800.0V 220V model: 320.0V~800.0V			

The starting voltage Vbreak of the built-in braking unit is set as follows:

(1.414Vs+30) ≤ Vbreak ≤ 800

Vs: AC power supply voltage input to the drive

Note: Improper setting of this voltage may lead to abnormal operation of the built-in braking unit!

FE-09	Fault automatic reset times		Ex-factory value	0	Attribute	○
	Setting range		0~30			
FE-10	Fault DO action selection during fault automatic reset		Ex-factory value	1	Attribute	○
	Setting range	0	No action			
		1	Action			
FE-11	Automatic reset interval for faults		Ex-factory value	6.0s	Attribute	○
	Setting range		0.1s~100.0s			

Fault automatic reset times:

Set the allowed times of automatic reset. After this number is exceeded, the drive will no longer automatically reset the fault. Setting it to 0 means that the automatic fault reset function is not enabled.

Automatic reset DO action selection:

If the fault automatic reset function is enabled for the drive, this parameter can be used to set whether the fault DO relay acts during the fault reset.

Automatic reset interval:

The waiting time for fault automatic reset after the drive reports a fault

FE-12	Selection of input open-phase protection		Ex-factory value	02	Attribute	○
	Setting range	**Units place**	**Input open-phase protection selection**			
		0	Input open-phase protection disabled			
		1	Reserved			
		2	Software input open-phase protection			
		3	Hardware input open-phase protection			
		Tens place	Reserved			
		0	Reserved			
		1	Reserved			

Input open-phase protection selection:

Hardware input open-phase protection and software input open-phase protection can be selected for input open-phase protection. When software protection is selected, the sensitivity of software input open-phase protection can be adjusted by parameters FE-74 and FE-75.

FE-13	Output open-phase protection selection		Ex-factory value	01	Attribute	○
	Setting range	**Units place**	**Output open-phase protection selection**			
		0	Disable			
		1	Enable			
		Tens place	**Selection of output open-phase protection before operation**			
		0	Disabled			
		1	Enabled			

Selection of output open-phase protection:

Select whether to protect against the output open-phase fault. If you select not to protect but the output open-phase fault occurs, the actual drive output current will be distorted and even oscillate.

Selection of output open-phase protection before operation:

If this function is enabled, the drive will send out a DC signal before each operation to detect whether the output has open-phase.

FE-14	Type of the first fault	Ex-factory value	0	Attribute	●
	Setting range	0~99			
FE-15	Type of the second fault	Ex-factory value	0	Attribute	●
	Setting range	0~99			
FE-16	Type of the third fault	Ex-factory value	0	Attribute	●
	Setting range	0~99			

The third fault is the last fault, the second fault is the previous fault, and the first fault is the fault before the previous fault. Please refer to the relevant part of fault analysis for the meaning of fault codes, possible causes of faults and solutions.

Last fault state					
FE-17	Frequency at the third fault	Ex-factory value	0	Attribute	●
	Setting range	0.00Hz~655.35Hz			
FE-18	Current at the third fault	Ex-factory value	0	Attribute	●
	Setting range	0.00A~655.35A			
FE-19	Bus voltage at the third fault	Ex-factory value	0	Attribute	●
	Setting range	0.0V~6553.5V			
FE-20	Input terminal state at the third fault	Ex-factory value	0	Attribute	●
	Setting range	0~9999			
FE-21	Output terminal state at the third fault	Ex-factory value	0	Attribute	●
	Setting range	0~9999			
FE-22	Drive state at the third fault	Ex-factory value	0	Attribute	●
	Setting range	0~65535			
FE-23	Power-on time of drive at the third fault	Ex-factory value	0	Attribute	●
	Setting range	0s~65535s			
FE-24	Running time of drive at the third fault	Ex-factory value	0	Attribute	●
	Setting range	0.0s~6553.5s			
Previous fault state					
FE-27	Frequency at the second fault	Ex-factory value	0	Attribute	●
	Setting range	0.00Hz~655.35Hz			
FE-28	Current at the second fault	Ex-factory value	0	Attribute	●
	Setting range	0.00A~655.35A			
FE-29	Bus voltage at the second fault	Ex-factory value	0	Attribute	●
	Setting range	0.0V~6553.5V			
FE-30	Input terminal state at the second fault	Ex-factory value	0	Attribute	●
	Setting range	0~9999			
FE-31	Output terminal state at the second fault	Ex-factory value	0	Attribute	●
	Setting range	0~9999			
FE-32	Drive state at the second fault	Ex-factory value	0	Attribute	●
	Setting range	0~65535			
FE-33	Power-on time of drive at the second fault	Ex-factory value	0	Attribute	●
	Setting range	0s~65535s			
FE-34	Running time of drive at the second fault	Ex-factory value	0	Attribute	●
	Setting range	0.0s~6553.5s			

State of fault before the previous fault					
FE-37	Frequency at the first fault	Ex-factory value	0	Attribute	●
	Setting range	0.00Hz~655.35Hz			
FE-38	Current at the first fault	Ex-factory value	0	Attribute	●
	Setting range	0.00A~655.35A			
FE-39	Bus voltage at the first fault	Ex-factory value	0	Attribute	●
	Setting range	0.0V~6553.5V			
FE-40	Input terminal state at the first fault	Ex-factory value	0	Attribute	●
	Setting range	0~9999			
FE-41	Output terminal state at the first fault	Ex-factory value	0	Attribute	●
	Setting range	0~9999			
FE-42	Drive state at the first fault	Ex-factory value	0	Attribute	●
	Setting range	0~65535			
FE-43	Power-on time of drive at the first fault	Ex-factory value	0	Attribute	●
	Setting range	0s~65535s			
FE-44	Running time of drive at the first fault	Ex-factory value	0	Attribute	●
	Setting range	0.0s~6553.5s			

Input terminal state in case of fault:

Display DI state, and convert it into binary correspondence (1 for high level, 0 for low level)

Bit0 – DI1; Bit1 – DI2; Bit2 – DI3; Bit3 – DI4; Bit4 – DI5;

Drive state in case of fault:

Display the operating state information of the drive and convert it into a binary correspondence table

Bit 1: Bit0 – 0: Stop, 1: Forward; 2: Reverse

Bit 3: Bit2 – 0: Constant speed, 1: Acceleration; 2: Deceleration

Bit4 – 0: Bus voltage is normal; 1: Undervoltage

Power-on time of drive in case of fault:

Power-on time of current fault (non-cumulative power-on time)

Running time of drive in case of fault:

Running time of current fault (non-cumulative running time)

FE-47	Fault protection action selection 1		Ex-factory value	0	Attribute	○
	Setting range	**Units place**	**Motor overload**			
		0	Free stop			
		1	Stop by stopping mode			
		2	Continue running			
		Tens place	**Input open-phase (same as units place)**			
		Hundreds place	**Output open-phase (same as units place)**			
		Thousands place	**External fault (same as units place)**			
		Ten thousands place	**Communication abnormity (same as units place)**			

FE-48	Fault protection action selection 2		Ex-factory value	0	Attribute	○
	Setting range	**Units place**	Reserved			
		0	Reserved			
		Tens place	**Abnormality in parameter reading and writing**			
		0	Free stop			
		1	Stop by stopping mode			
		Hundreds place	**Run-time PID feedback overshoot (same as FE-47 units place)**			
		Thousands place	**External fault (same as FE-47 units place)**			
		Ten thousands place	**Abnormal communication (same as FE-47 units place)**			
FE-49	Fault protection action selection 3		Ex-factory value	0	Attribute	○
	Setting range	**Units place**	**User-defined fault 1 (same as FE-47 units place)**			
		Tens place	**User-defined fault 2 (same as FE-47 units place)**			
		Hundreds place	**Power-on time reached fault (same as FE-47 units place)**			
		Thousands place	**Load loss fault**			
		0	Free stop			
		1	Stop by deceleration			
		2	Directly jump to 7% of the rated frequency of the motor to continue running, and automatically return to the set frequency without load loss			
		Ten thousands place	**Run-time PID feedback loss (same as FE-47 units place)**			
FE-50	Fault protection action selection 4		Ex-factory value	0	Attribute	○
	Setting range	**Units place**	**Excessive speed deviation (same as FE-47 units place)**			
		Tens place	**Motor overspeed (same as FE-47 units place)**			
		Hundreds place	**Initial position error (same as FE-47 units place)**			

The above parameters are used to set the execution mode when the drive has a corresponding fault.

When "free stop" is selected, the drive displays E.xxx and stops directly.

When "stop by stopping mode" is selected, the drive displays A.xxx, and stops by stopping mode, and displays E.xxx after stopping.

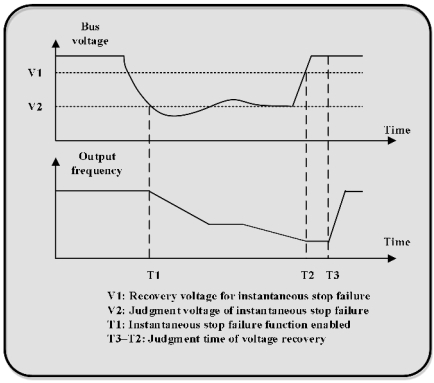
When "continue running" is selected, the drive continues to run and display A.xxx, and the operating frequency is set by FE-54.

FE-54	Selection of continual operating frequency in case of fault		Ex-factory value	0	Attribute	○
	Setting range	0	Run at the current operating frequency			
		1	Run at the set frequency			
		2	Run at the upper limit frequency			
		3	Run at the lower limit frequency			
		4	Run at abnormity backup frequency			
FE-55	Abnormity backup frequency		Ex-factory value	100.0%	Attribute	○
	Setting range		0.0%~100.0% (100.0% for the maximum frequency)			

When a fault occurs during running of the drive, and the handling mode of this fault is set to continued running, the drive displays A.xxx and runs at the frequency determined by FE-54.
When the abnormal standby frequency is selected for running, the value set by FE-55 is the percentage relative to the maximum frequency.

FE-59	Selection of ride-through function		Ex-factory value	0	Attribute	◎
	Setting range	0	Invalid			
		1	Constant bus voltage control			
		2	Stop by deceleration			
FE-60	Recovery voltage for ride-through		Ex-factory value	85%	Attribute	◎
	Setting range		80%~100%			
FE-61	Recovery voltage judgment time		Ex-factory value	0.5s	Attribute	◎
	Setting range		0.0s~100.0s			
FE-62	Judgment voltage of ride-through action		Ex-factory value	80%	Attribute	◎
	Setting range		60%~100%			
FE-63	Ride-through gain Kp		Ex-factory value	40	Attribute	○
	Setting range		0~100			
FE-64	Ride-through integration Ki		Ex-factory value	30	Attribute	○
	Setting range		0~100			
FE-65	Deceleration time of ride-through		Ex-factory value	20.0s	Attribute	◎
	Setting range		0.0s~300.0s			

When the bus voltage drops below the "judgment voltage of ride-through action", the ride-through process takes effect, and the output frequency of the drive automatically drops, so that the motor is in the power generation state. The ride-through function can feed back the electric energy to the bus, keep the bus voltage around the "judgment voltage of ride-through action" and decelerate the system to 0Hz properly. As shown in the figure below:



The purpose of ride-through (also referred to as instantaneous stop failure in the figure) is to ensure that the motor can stop by deceleration properly when the power supply of the power grid is abnormal, so that the motor can be started immediately after the power supply of the power grid is restored, and it will not stop freely because of the sudden undervoltage fault of the motor when the power supply of the power grid is

abnormal (in a large inertia system, it takes a long time for the motor to stop freely, and when the power supply of the power grid is restored, as the motor is still rotating at high speed, it is easy to cause overload or overcurrent fault of the drive when the motor is started).

Constant bus voltage control:

In case of ride-through action, the drive will adjust the output frequency through the PI loop to keep the bus voltage at the "judgment voltage of ride-through action". When the power supply of the power grid is restored, the output frequency of the drive continues to run to the target frequency.

Stop by deceleration control:

In case of ride-through action, the drive will adjust the output frequency through the PI loop to keep the bus voltage at the "judgment voltage of ride-through action". When the power supply of the power grid is restored, the drive will continue to decelerate to 0Hz and stop until the drive sends out the start command again.

FE-66	Load loss protection selection		Ex-factory value	0	Attribute	○
	Setting range	0	Invalid			
		1	Valid			
FE-67	Load loss detection level		Ex-factory value	10.0%	Attribute	○
	Setting range		0.0%~100.0%			
FE-68	Load loss detection time		Ex-factory value	1.0s	Attribute	○
	Setting range		0.0s~60.0s			

If the load loss protection function is valid, then, when the output current of the drive is less than the load loss detection level FE-67 for a duration longer than the load loss detection time FE-68, and continued running is selected for load loss (FE-49=02000), it will directly jump to 7% of the rated frequency of the motor to continue running. During load loss protection, if the load is restored, the drive will automatically restore to the set frequency operation.

FE-70	Overspeed detection value	Ex-factory value	20.0%	Attribute	○
	Setting range	0.0%~50.0% (maximum frequency)			
FE-71	Overspeed detection time	Ex-factory value	1.0s	Attribute	○
	Setting range	0.0s~60.0s			

This function is only effective when the drive has speed sensor vector control. When the drive detects that the actual speed of the motor exceeds the maximum frequency, and the excess value is greater than the overspeed detection value FE-70, for a duration longer than the overspeed detection time FE-71, the drive reports the fault E.OS and handles it according to the fault protection action mode.

When the overspeed detection time is 0.0s, the overspeed fault detection is disabled.

FE-72	Detection value of excessive speed deviation	Ex-factory value	20.0%	Attribute	○
	Setting range	0.0%~50.0% (maximum frequency)			
FE-73	Detection time of excessive speed deviation	Ex-factory value	5.0s	Attribute	○
	Setting range	0.0s~60.0s			

This function is only effective when the drive has feedback vector control. When the drive detects that the actual speed of the motor deviates from the set frequency, and the deviation value is greater than the detection value FE-72 of excessive speed deviation for a duration longer than the detection time FE-73 of excessive speed deviation, the drive reports the fault E.DEV and handles it according to the fault protection action mode.

When the detection time of excessive speed deviation is 0.0s, the fault detection of excessive speed deviation is cancelled.

FE-74	Software input open-phase sensitivity	Ex-factory value	5%	Attribute	○
	Setting range	1%~50%			
FE-75	Software input open-phase filtering	Ex-factory value	20	Attribute	○
	Setting range	1~50			
FE-76	Overcurrent slip time	Ex-factory value	5	Attribute	○
	Setting range	0.1~30.0min			
FE-77	Overcurrent reset time	Ex-factory value	15	Attribute	○
	Setting range	0.0~300.0s			

When FE-12 input open-phase detection enables software input open-phase detection, the sensitivity of software input open-phase detection can be adjusted by modifying this parameter.

Input open-phase sensitivity:

The percentage setting of sensitivity is based on the rated bus voltage of the drive as reference. Only when the fluctuation of bus voltage is greater than this set value will the software input open-phase fault be reported. Example: If the rated bus voltage is 540V, the 5% fluctuating voltage is 27V.

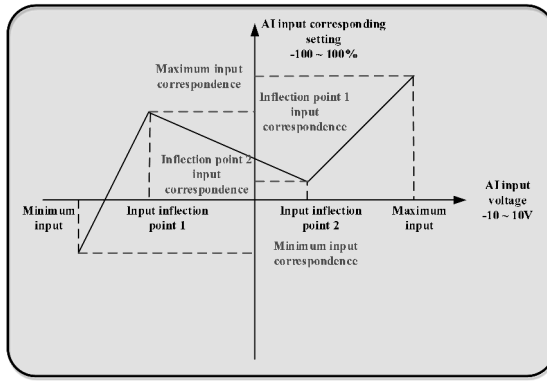
Input open-phase filtering:

The filter parameters are used to eliminate the interference to software detection. The larger this parameter setting, the better the anti-interference performance, but the worse the sensitivity of software input open-phase detection. The smaller the parameter setting, the worse the anti-interference performance, but the higher the sensitivity of software input open-phase detection. Please set this parameter according to actual needs.

12.14 A0 group terminal expansion functions

A0-00	Minimum input of AI curve 4	Ex-factory value	0.00V	Attribute	○
	Setting range	-10.00V~A0-02			
A0-01	Minimum input corresponding setting of AI curve 4	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
A0-02	AI curve 4 inflection point 1 input	Ex-factory value	0.00V	Attribute	○
	Setting range	A0-00~ A0-04			
A0-03	Input corresponding setting for AI curve 4 inflection point 1	Ex-factory value	30.0%	Attribute	○
	Setting range	-100.0%~100.0%			
A0-04	AI curve 4 inflection point 2 input	Ex-factory value	0.00V	Attribute	○
	Setting range	A0-02~ A0-06			
A0-05	Input corresponding setting for AI curve 4 inflection point 2	Ex-factory value	60.0%	Attribute	○
	Setting range	-100.0%~100.0%			
A0-06	Maximum input of AI curve 4	Ex-factory value	10.00V	Attribute	○
	Setting range	A0-04~10.00V			
A0-07	Maximum input corresponding setting of AI curve 4	Ex-factory value	100.0%	Attribute	○
	Setting range	-100.0%~100.0%			

For AI curve 4, multipoint input voltages can flexibly set, as shown in the following figure:



A0-24	AI1 setting jump point	Ex-factory value	0.0%	Attribute	○
	Setting range	-100.0%~100.0%			
A0-25	AI1 setting jump amplitude	Ex-factory value	0.1%	Attribute	○
	Setting range	0.0%~100.0%			

Each analog input AI1 has the set value jump function, which refers to fixing the analog quantity corresponding set value as the value of the jump point when the analog quantity corresponding set value changes within the upper and lower interval of the jump point.

Example: The voltage of analog input AI fluctuates around 5.00V, ranging from 4.90 V to 5.10 V, with the minimum input of 0.00V corresponding to 0.0% and the maximum input of 10.00V corresponding to 100.0% for AI1. Therefore, the detected AI1 corresponding setting fluctuates between 49.0% and 51.0%.

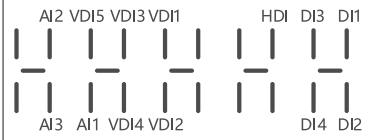
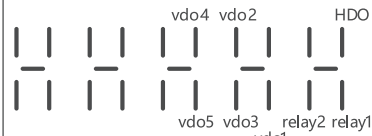
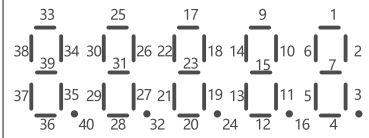
If the AI1 setting jump point A0-24 is set to 50.0% and the AI1 setting jump amplitude A0-25 is set to 1.0%, upon aforesaid AI1 input, after processing by the jump function, the corresponding setting of AI1 input obtained will be fixed as 50.0%, and AI1 is transformed into a stable input.

12.15 U0 group monitoring parameters

U0 parameters group is used to monitor the operating state information of the drive, which can be viewed by customers through the panel to facilitate on-site debugging. This group of parameters is read-only and cannot be modified.

Parameter number	Function	Parameter range	Notes
U0-00	Operating frequency	0.00~500.00Hz	Display the current operating frequency of the drive
U0-01	Set frequency	0.00~500.00Hz	Display the target frequency of the drive
U0-02	Bus voltage	0.0V~3000.0V	Display the voltage value of the drive bus
U0-03	Output voltage	0V~1140V	Display the output voltage value of the drive during running
U0-04	Output current	0.00A~655.35A (drive power ≤ 55kW) 0.0A~6553.5A (drive power >55kW)	Display the output current value of the drive during running

Parameter number	Function	Parameter range	Notes
U0-05	Output power	0.0KW~6553.5KW	Display the output power (active power) of the drive during running
U0-06	Output torque	-200.0%~200.0%	Display the percentage output value of motor rated torque
U0-07	DI input state	0~32767	Display DI state, and convert it into binary correspondence (1 for high level, 0 for low level) Bit0 – DI1; Bit1 – DI2; Bit2 – DI3; Bit3 – DI4; Bit4 – DI5;
U0-08	DO output state	0~32767	Display DO state, and convert it into binary correspondence (1 for high level, 0 for low level) Bit0 – Reserved; Bit1 – Relay1; Bit2 – Reserved; Bit3 – Reserved; Bit4 – Reserved;
U0-09	AI1 voltage	0.00V~11.00V	Corrected voltage
U0-10	Reserved		
U0-11	Reserved		
U0-12	Count value	0~65535	Display the pulse signal count value when X is set to <counter input> function
U0-13	Length value	0~65535m	Display the recorded length value when X is set to <length count input> function
U0-14	Load speed	0~65535	When stopped: set frequency * coefficient (F7-07); When running: operating frequency * coefficient (F7-07)
U0-15	PID setting	0~65535	Set value (percentage) * Range (F9-04)
U0-16	PID feedback	0~65535	Feedback value (percentage) * Range (F9-04)
U0-17	PLC stage	0~15	Current stage of PLC function operation
U0-18	Input frequency of pulse	0.00kH~100.00KHz	Display the high-speed pulse frequency input by DI5 terminal
U0-19	Feedback speed	-320.00~320.00Hz	Actual operating frequency of the motor, VF is the output frequency of the drive, and the decimal point is set by F7-08
U0-20	Remaining run time	0.0~6500.0min	When the timing function is turned on (F8-42), the remaining run time of the drive is displayed.
U0-21	AI1 voltage before correction	0.00V~11.0V	Voltage before correction
U0-22	Reserved		
U0-23	Reserved		
U0-24	Motor speed	0~65535m/min	Display the line speed of DI5 sampling, and calculate this line speed according to the actual number of pulses sampled per minute and F9-36 (number of pulses per meter)
U0-25	Current power-on time	0~65535min	Power-off clearing
U0-26	Current run time	0~65535min	Clearing upon stop
U0-27	Input pulse frequency	0~65535Hz	Same as U0-18, in Hz
U0-28	Communication set value	-100.00%~100.00%	Set frequency and torque etc. by communication
U0-29	Encoder feedback speed	-320.00Hz~320.00Hz	Actual motor operating frequency measured by the encoder, with number of displayed decimals set by F7-08
U0-30	Main frequency display	0.00~500.00Hz	Display the set main frequency

Parameter number	Function	Parameter range	Notes
U0-31	Auxiliary frequency display	0.00~500.00Hz	Auxiliary frequency display
U0-32	Reserved		
U0-33	Reserved		
U0-34	Motor temperature	0℃~200℃	When AI3 is connected to the motor temperature sensor, display the motor temperature
U0-35	Target torque	-200.0%~200.0%	Display the current torque target set value
U0-36	Reserved		
U0-37	Power factor angle	-180°~180°	Display the power factor angle of the output power
U0-38	Reserved		
U0-39	V/F separation target voltage	0V~Rated voltage of motor	Display the target output voltage when running in VF separation state
U0-40	V/F separation output voltage	0V~Rated voltage of motor	Display the current actual output voltage when running in VF separation state
U0-41	Visual display of DI input state		 Digital tube segment code on for high level and off for low level
U0-42	Visual display of DO output state		 Digital tube segment code on for high level and off for low level
U0-43	Visual display 1 of DI function state		 Digital tube segment code on for valid corresponding function, and off for invalid corresponding function
U0-44	Reserved		
U0-45 ~ U0-57	Reserved		
U0-58	Reserved		
U0-59	Reserved	-100.0%~100.0%	Display set frequency in percentage, with 100.0% with respect to maximum frequency

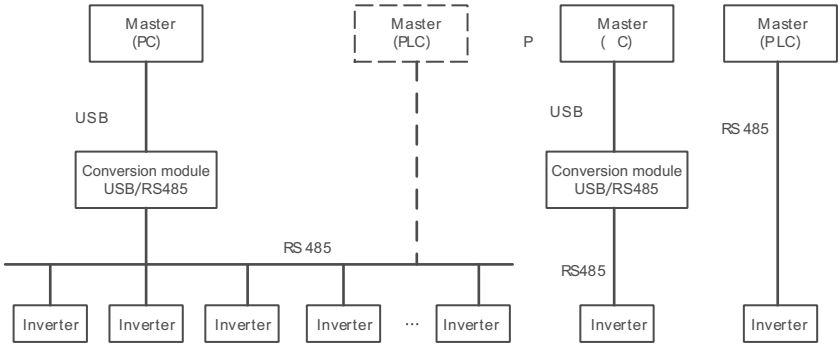
Parameter number	Function	Parameter range	Notes
U0-60	Reserved	-100.0%~100.0%	Display running frequency in percentage, with 100.0% with respect to maximum frequency
U0-61	Drive state	0~65535	Display the operating state information of the drive and convert it into a binary correspondence table Bit 1: Bit0 – 0: Stop, 1: Forward; 2: Reverse Bit 3: Bit2 – 0: Constant speed, 1: Acceleration; 2: Deceleration Bit4 – 0: Bus voltage is normal; 1: Undervoltage
U0-62	Current fault code	0~99	Display the current fault code. Please see the fault table for details
U0-63	Reserved		
U0-64	Reserved		
U0-65	Upper limit of torque	-200.0%~200.0%	Display the currently set upper limit of torque by percentage
U0-66 ~ U0-72	Reserved		
U0-73	Reserved		
U0-74	Reserved		
U0-75	Reserved		
U0-76	Product No.	600	Drive model serial number
U0-77	Cumulative running time	0~65535 kW·h	
U0-78	Performance version number		
U0-79	Functional version number		
U0-80	Cumulative power-on time	0~65535 hours	
U0-81	Cumulative electricity consumption	0~65535 kW·h	
U0-82	Low cumulative electricity consumption	0~65535 kW·h	
U0-83	High cumulative electricity consumption	0~65535 kW·h	
U0-84	Drive rating	0.0KW~6553.5KW	
U0-85	Rated current of drive	0.00A~ 655.35A (drive power ≤ 55kW) 0.0A~ 6553.5A (drive power >55kW)	

12.16 MODBUS communication

1) Networking mode

This drive has RS485 communication interface and adopts international standard Modbus communication protocol for master-slave communication. Users can realize centralized control through PC/PLC and main station computer monitoring software, etc. (setting the control command and operating frequency of the drive, modifying the parameters of relevant function codes, and monitoring the working state and fault information of the drive, etc.) to meet specific application requirements.

There are two networking modes of the drive (as a slave station): single master/multi-slave mode and single master/single slave mode, as shown in the following figure:



Modbus communication related parameters can be described with reference to Fb group function codes, and the default communication parameters are as follows:

Address of slave station: 0x01

Baud rate: 9600bps

Data format: 8-N-2 (8 data bits, no parity bit, 2 stop bits)

2) Wiring instructions

2.1) Topological structure

RS-485-Modbus not configured with repeater has a trunk cable directly connected to all equipment or connected through short branch cables.

Trunk cable, also known as bus, can be very long. Its two ends must be connected to line terminals. Repeaters can be used among multiple RS-485 Modbus. The address of each slave in the network is unique, and this is the basis of ensuring Modbus serial communication.

2.2) Length

The end-to-end length of trunk cables must be limited. The maximum length is related to baud rate, cable (specification, capacitance or characteristic impedance), number of loads on daisy chain and network configuration (2-wire or 4-wire system).

For cables with high-speed baud rate of 9600bps and AWG26 (or thicker) size, the maximum length is 1000m. The branches must be short and cannot exceed 20m. If a multiport splitter with n branches is used, the maximum length of each branch must be limited to 40m divided by n.

2.3) Grounding mode

The "common terminal" circuit (the common terminal of signal and optional power supply) must be directly connected to the protective ground, and it is best to ground the whole bus at a single point. Usually, this point can be selected on the master station or its splitter.

2.4) Cables

Modbus cable on serial link must be shielded. At one end of each cable, its shield must be connected to the protective ground. If a connector is used at this end, connect the connector housing to the cable shielding.

RS485-Modbus must adopt a balanced pair of wires and a third wire (used for the common terminal).

For RS485-Modbus, the cable diameter must be wide enough to allow the maximum length (1000m). AWG24 can meet the needs of Modbus data transmission.

3) Communication mode

(1) The communication protocol of the drive is Modbus protocol, which supports RTU protocol mode.

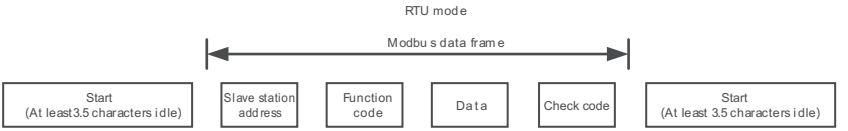
(2) The drive is a slave in the master-slave point-to-point communication. When the master sends a command using the broadcast address, the slave does not answer.

(3) In the case of multi-machine communication or long-distance communication, connecting (100~120) ohm resistor in parallel to the positive terminal and negative terminal of the signal line of the master station communication can improve the immunity of communication.

(4) The drive provides one type of interface (RS485). If the communication port of the external device is RS232, an additional RS232/RS485 conversion device is required.

4) Protocol format

Modbus protocol supports RTU mode, and the corresponding frame format is shown in the following figure



In RTU mode, the idle time between frames is the greater of the function code setting and Modbus internal stipulated value. The minimum inter-frame idle time stipulated in Modbus is as follows: The frame header and the frame footer are defined by the bus idle time of no less than 3.5 bytes. There shall be at least 3.5 characters of bus idle time between frames, and it is not required to accumulate the start idle time and end idle time for the bus idle time between frames.

Address of slave station: Setting range of drive slave station address is 1~247. When the address sent by the master station is 0, this is a broadcast address, and the slave station does not need to respond. Broadcast commands can only be used to write commands.

Function code: At present, there are three Modbus function codes supported by the drive:

Function code	Notes
0x03	Read register instruction
0x06	Write single register instruction
0x10	Write multiple register instructions

Data: The Modbus register is 2 bytes long, so the data written into the register by the drive is usually 2 bytes, and the data read from the drive is also 2 bytes. The drive can read or write data up to 12 registers at one time.

Check code: CRC-16 is used for data check, with the whole frame information checked, and the low byte of check data will be sent before the high byte.

Communication example:

Communication 0x03 function code reads F0-08 data.

Master station → Drive		Master station ← Drive	
Slave station address	0x01	Slave station address	0x01
Function code	0x03	Function code	0x03
Register high byte	0x00	Number of registers	0x02
Register low byte	0x08	Data high byte	0x13
Number of registers high byte	0x00	Data low byte	0x88
Number of registers low byte	0x01	CRC low byte	0xB5
CRC low byte	0x05	CRC high byte	0x12
CRC high byte	0xC8		

Communication 0x06 function code changes F0-08 parameter to 40.00Hz.

Master station → Drive		Master station ← Drive	
Slave station address	0x01	Slave station address	0x01
Function code	0x06	Function code	0x06
Register high byte	0x00	Register high byte	0x00
Register low byte	0x08	Register low byte	0x08
Data high byte	0x0F	Data high byte	0x0F
Data low byte	0xA0	Data low byte	0xA0
CRC low byte	0x0D	CRC low byte	0x0D
CRC high byte	0x80	CRC high byte	0x80

Communication 0x10 function code changes F0-17 and F0-18 parameters to 10.0s.

Master station → Drive		Master station ← Drive	
Slave station address	0x01	Slave station address	0x01
Function code	0x10	Function code	0x10
Start register high byte	0x00	Start register high byte	0x00
Start register low byte	0x11	Start register low byte	0x11
Number of registers high byte	0x00	Number of registers high byte	0x00
Number of registers low byte	0x02	Number of registers low byte	0x02
Number of register bytes	0x04	CRC low byte	0x11
Data 1 high byte	0x00	CRC high byte	0xCD
Data 1 low byte	0x64		
Data 2 high byte	0x00		
Data 2 low byte	0x64		
CRC low byte	0x73		
CRC high byte	0x5B		

Data returned by communication fault frame:

Fault frame (master station ← drive)
Slave station address
0x80 + Function code
Fault codes (defined in the following table)
CRC low byte
CRC high byte

Definitions of communication fault codes:

Ser. No.	Communication fault code	Fault description
1	0x01	Illegal command
2	0x02	Illegal address
3	0x03	Illegal data
4	0x04	Other errors (CRC error, parameter read-only, parameter locking, etc.)

5) Function code parameter address representation rule

Rule to represent parameter address using function code group number and serial number:

High byte: 0x00~0x0F (F0~FF groups), 0x40 (A0 group) and 0x70 (U0 group)

Low byte: 0x00~0xFF

For example, to access the function code F0-08, the access address of the function code is expressed as 0x0008.

Note:

U group: read-only and non-modifiable.

Some parameters cannot be changed when the drive is in operation. Some parameters cannot be changed regardless of the state of the drive. When changing the parameters of a function code, attention shall be also paid to the range, unit and related description of the parameters.

Function code group number	Communication access address	Function code address in RAM modified by communication
F0~ FF group	0x0000~0x0FFF	0x8000~0x8FFF
A0 group	0x4000~0x40FF	0xC000~0xC0FF
U0 group	0x7000~0x70FF	

As EEPROM is frequently written, this will reduce the service life of EEPROM, therefore, some function codes do not need to be stored in communication mode; just change their values in RAM. When data only needs to be saved in RAM (that is, data is not saved upon power-off), the highest address position is set to "1".

Example:

The function code F0-08 is not stored in EEPROM, and the address is expressed as 8008;

This address means that you can only write it into RAM, but not read it. When reading, this is an invalid address.

Setting by communication: (write only)

Address of setting by communication	Set value	Parameter description
3201H	-10000~10000	10000 for 100.00%, -10000 for -100.00%

The communication set value is a percentage of the relative value, with 10000 for 100.00% and -10000 for -100.00%. For data of frequency dimension, this is a percentage relative to the maximum frequency (F0-10). For data of torque dimension, this percentage is F3-11.

Note: All parameters with the "communication setting" option are set through this address.

Control command: (write only)

Command	Address	Command function
Control command	3200H	0000: No command
		0001: Forward running
		0002: Reverse running
		0003: Stop by deceleration
		0004: Forward inching
		0005: Reverse inching
		0006: Reserved
		0007: Free stop
		0008: Fault reset
Digital output control	3202H	BIT0: Reserved
		BIT1: Reserved
		BIT2: RELAY1 output control
		BIT3: Reserved
		BIT4: Reserved
		BIT5: Reserved
		BIT6: Reserved
		BIT7: Reserved
		BIT8: Reserved
		BIT9: Reserved
AO1 control	3203H	0~7FFF means 0%~ 100%
Reserved		
Pulse control	3205H	0~7FFF means 0%~ 100%

Read drive state: (read-only)

State address	State word
3300H	Bit0: Run/Stop (0: Stop; 1: Running)
	Bit1: Forward/Reverse (0: Forward; 1: Reverse)
	Bit2: Running at zero speed (1 for valid)
	Bit3: Running at acceleration (1 for valid)
	Bit4: Running at deceleration (1 for valid)
	Bit5: Running at constant speed (1 for valid)
	Bit6: Reserved
	Bit7: Reserved
	Bit8: Reserved
	Bit9: Reserved
	Bit10: Reserved
	Bit11: Reserved
	Bit12: Drive fault (1 for fault)
	Bit13: Ready for operation (1 for ready)
	Bit14: Reserved
	Bit15: Reserved

Stop/Running parameters:

Parameter address	Parameter description	Parameter address	Parameter description
3400H	Output frequency	3411H	PLC step
3401H	Set frequency	3412H	Count value input
3402H	Bus voltage	3413H	Length value input
3403H	Output voltage	3414H	Feedback speed, in 0.1Hz
3404H	Output current	3415H	Line speed
3405H	Running speed	3416H	AI1 voltage before correction
3406H	Output power	3417H	Reserved
3407H	Output torque	3418H	Reserved
3408H	PID settings	3419H	Remaining running time
3409H	PID feedback	341AH	Current power-on time
340AH	DI input flag	341BH	Current running time
340BH	DO output flag	341CH	PULSE input frequency, in 1Hz
340CH	Target torque (%)	341DH	Load speed
340DH	AI1 voltage	341EH	Actual feedback speed
340EH	Reserved	341FH	
340FH	Reserved	3420H	
3410H	PULSE input frequency, in 0.01kHz		

F0-28 parameter initializing communication:

In order to prevent mis-operation, it is necessary to communicate and operate the user password F7-00 before modifying F0-28, which can only be operated after writing data into F7-00. Even if no user password is set, be sure to write 0 to F7-00. For example, a parameter needs to be reset:

Send data: 01 06 07 00 00 00 88 BE

Return data: 01 06 07 00 88 88 EE D8

Then write:

Send data: 01 06 00 1C 00 02 C9 CD

Return data: 01 06 00 1C 00 02 C9 CD

13 Parameters Summary

"○": indicating that the set value of this parameter can be changed when the drive is stopped or running;
"◉": indicating that the set value of this parameter cannot be changed when the VFD is running;
"●": indicating that the value of this parameter is the actual detected/recorded value and cannot be changed.

Parameter	Name	Setting range	Ex-factory value	Change
F0 group Basic functions				
F0-00	TP type setting	1: T type (constant torque load model) 2: Reserved	1	◉
F0-01	The first motor control mode	0: speed sensorless vector control (SVC) 1: reserved 2: V/F control	2	◉
F0-02	Run instruction selection	0: Operation panel 1: Terminal 2: Communication	0	○
F0-03	Main frequency instruction input selection	0: Numerical setting (without power-off memory) 1: Numerical setting (with power-off memory) 2: AI1 3: Reserved 4: Reserved 5: Pulse setting (DI5) 6: Multi-segment instruction 7: Simple PLC 8: PID 9: Communication setting	0	◉
F0-04	Auxiliary frequency command input selection	Same as F0-03 (main frequency command input selection)	0	◉
F0-05	Range selection of auxiliary frequency instruction upon superposition	0: relative to the maximum frequency 1: Relative to main frequency instruction	0	○
F0-06	Range of auxiliary frequency instruction upon superposition	0%~150%	100%	○
F0-07	Frequency instruction superposition selection	Units place: Frequency instruction selection 0: Main frequency instruction 1: Main and auxiliary operation result (the operation relation determined by tens place) 2: Switching between main frequency instruction and auxiliary frequency instruction 3: Switching between main frequency instruction and main and auxiliary operation result 4: Switching between auxiliary frequency instruction and main and auxiliary operation result Tens place: operation relation between main and auxiliary frequency instructions	00	○

F0 group Basic functions				
F0-07	Frequency instruction superposition selection	0: Main + Auxiliary 1: Main - Auxiliary 2: Larger of the two 3: Smaller of the two	00	○
F0-08	Preset frequency	0.00Hz~maximum frequency (F0-10)	50.00Hz	○
F0-09	Direction of operation	0: Run in the default direction 1: Run in the opposite direction to the default direction	0	○
F0-10	Maximum frequency	50.00Hz~500.00Hz	50.00Hz	◎
F0-11	Reserved			◎
F0-12	Upper limit frequency	Lower limit frequency F0-14~ Maximum frequency F0-10	50.00Hz	○
F0-13	Reserved			○
F0-14	Lower limit frequency	0.00Hz~ Upper limit frequency F0-12	0.00Hz	○
F0-15	Carrier frequency	As per model	As per model	○
F0-16	Carrier frequency adjusted with temperature	0: No 1: Yes	1	○
F0-17	Acceleration time 1	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	As per model	○
F0-18	Deceleration time 1	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	As per model	○
F0-19	Acceleration and deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	◎
F0-20	Numerical set frequency stop memory selection	0: No memory 1: With memory	0	○
F0-21	Acceleration and deceleration time reference frequency	0: Maximum frequency (F0-10) 1: Set frequency 2: 100Hz	0	◎
F0-22	Runtime frequency instruction UP/DOWN reference	0: Operating frequency 1: Set frequency	0	◎
F0-23	Reserved			○
F0-24	Reserved			
F0-25	Reserved			
F0-26	Frequency instruction resolution	0: 1Hz 1: 0.1Hz 2: 0.01Hz	2	◎
F0-27	Reserved			◎
F0-28	Parameter initialization	0: No operation 01: Clear record information 02: Restore ex-factory parameters, excluding motor parameters 04: Back up user's current parameters 05: Restore user backup parameters	0	◎

F1 group start-stop control				
F1-00	Startup mode	0: direct startup 1: Speed tracking and restart 2: reserved 3: reserved	0	○
F1-01	Speed tracking mode	0: Starting from the stop frequency 1: Starting from the power frequency 2: Starting from the maximum frequency	0	◎
F1-02	Speed tracking speed	1~100	20	◎
F1-03	Starting frequency	0.00Hz~50.00Hz	0.00Hz	○
F1-04	Holding time of starting frequency	0.0s~100.0s	0.0s	◎
F1-05	Starting DC braking current/pre-excitation current	0%~100%	50%	◎
F1-06	Starting DC braking time/pre-excitation time	0.0s~100.0s	0.0s	◎
F1-07	Acceleration and deceleration mode	0: linear acceleration and deceleration 1: Static S curve 2: Dynamic S curve	0	◎
F1-08	Time proportion at the beginning of S curve	0.0%~(100.0%-F1-09)	30.0%	◎
F1-09	Time proportion at the end of S curve	0.0%~(100.0%-F1-08)	30.0%	◎
F1-10	Stop mode	0: Stop by deceleration 1: Free stop	0	○
F1-11	Starting frequency of stop DC braking	0.00Hz~maximum frequency	0.00Hz	○
F1-12	Waiting time for stop DC braking	0.0s~100.0s	0.0s	○
F1-13	Stop DC braking current	0%~100%	50%	○
F1-14	Stop DC braking time	0.0s~100.0s	0.0s	○
F1-15	Brake utilization rate	0%~100%	100%	○
F1-16	Speed tracking closed-loop current KP	0~1000	As per model	◎
F1-17	Speed tracking closed-loop current KI	0~1000	As per model	◎
F1-18	Speed tracking current	30%~200%	As per model	◎
F1-19	Reserved			
F1-20	Reserved			
F1-21	Demagnetization time (SVC valid)	0.00~5.00s	As per model	○

F2 group motor parameters				
F2-00	Motor type selection	0: Normal asynchronous motor 1: Frequency conversion asynchronous motor	0	◎
F2-01	Rated power of motor	0.1kW~1000.0kW	As per model	◎
F2-02	Rated voltage of motor	1V~2000V	As per model	◎
F2-03	Rated current of motor	0.01A~655.35A (drive power ≤ 55kW) 0.1A~6553.5A (drive power >55kW)	As per model	◎
F2-04	Rated frequency of motor	0.01Hz~maximum frequency	As per model	◎
F2-05	Rated speed of motor	1rpm~65535rpm	As per model	◎

F2 group motor parameters				
F2-06	Stator resistance of asynchronous motor	0.001Ω~65.535Ω (drive power ≤55kW) 0.0001Ω~6.5535Ω (drive power >55kW)	Tuning parameter	◉
F2-07	Rotor resistance of asynchronous motor	0.001Ω~65.535Ω (drive power ≤55kW) 0.0001Ω~6.5535Ω (drive power >55kW)	Tuning parameter	◉
F2-08	Leakage inductance of asynchronous motor	0.01mH~655.35mH (drive power ≤55kW) 0.001mH~65.535mH (drive power >55kW)	Tuning parameter	◉
F2-09	Mutual inductance of asynchronous motor	0.1mH~6553.5mH (drive power ≤ 55kW) 0.01mH~655.35mH (drive power >55kW)	Tuning parameter	◉
F2-10	No-load current of asynchronous motor	0.01A~F2-03 (drive power ≤ 55kW) 0.1A~F2-03 (drive power >55kW)	Tuning parameter	◉
F2-11 ~ F2-36	Reserved			
F2-37	Tuning selection	0: No operation 1: Partial static parameter tuning of asynchronous machine 2: Complete dynamic tuning of asynchronous machine 3: Complete static tuning of asynchronous machine	0	◉

F3 group vector control parameters				
F3-00	Speed/Torque control mode selection	0: Speed control 1: Torque control	0	◉
F3-01	Speed loop proportional gain 1	1~100	30	○
F3-02	Speed loop integration time 1	0.01s~10.00s	0.50s	○
F3-03	Switching frequency 1	0.00~F3-06	5.00Hz	○
F3-04	Speed loop proportional gain 2	1~100	20	○
F3-05	Speed loop integration time 2	0.01s~10.00s	1.00s	○
F3-06	Switching frequency 2	F3-03~maximum frequency	10.00Hz	○
F3-07	Vector control slip gain	50%~200%	100%	○
F3-08	SVC speed feedback filtering time	0.000s~0.100s	0.015s	○
F3-09	Reserved			
F3-10	Torque upper limit instruction selection in speed control mode	0: Set by parameter F3-11 1: AI1 2: Reserved 3: Reserved 4: DI5 setting pulse 5: Communication setting 6: Reserved 7: Reserved The full range of options 1-7 corresponds to F3-11	0	○
F3-11	Numerical setting of torque upper limit in speed control mode	0.0%~200.0%	150.0%	○
F3-12	Torque upper limit instruction selection in speed control mode (power generation)	0: Set by parameter F3-11 (no differentiation between motor and power generation) 1: AI1 2: Reserved 3: Reserved	0	○

F3 group vector control parameters				
		4: DI5 setting pulse 5: Communication setting 6: Reserved 7: Reserved 8: Set by parameter F3-13 The full range of options 1-8 corresponds to F3-13.		
F3-13	Numerical setting of upper limit of torque in speed control mode (power generation)	0.0%~200.0%	150.0%	○
F3-14	Excitation regulation proportional gain	0~60000	2000	○
F3-15	Excitation regulation integral gain	0~60000	1300	○
F3-16	Torque regulation proportional gain	0~60000	2000	○
F3-17	Torque regulation integral gain	0~60000	1300	○
F3-18	Speed loop integral attribute	Units place: Integral separation 0: invalid 1: valid	0	○
F3-19	Reserved			
F3-20	Reserved			
F3-21	Reserved			
F3-22	Reserved			
F3-23	Generated power limiting enabled	0: invalid 1: valid in whole process	0	○
F3-24	Upper limit of generated power	0.0~200.0%	As per model	○
F3-25	Selection of torque setting in torque control mode	0: Numerical setting (F3-27) 1:AI1 2: Reserved 3: Reserved 4: DI5 setting pulse 5: Communication setting 6: Reserved 7: Reserved (Full range of options 1-7 corresponds to F3-27 setting.)	0	◉
F3-26	Reserved			
F3-27	Numerical setting of torque in torque control mode	-200.0%~200.0%	150.0%	○
F3-28	Reserved			
F3-29	Maximum forward frequency of torque control	0.00Hz~ maximum frequency	50.00Hz	○
F3-30	Maximum reverse frequency of torque control	0.00Hz~ maximum frequency	50.00Hz	○
F3-31	Filtering time for torque rise	0.00s~650.00s	0.00s	○
F3-32	Filtering time for torque drop	0.00s~650.00s	0.00s	○
F3-33 ~ F3-42	Reserved			

F4 group V/F control parameters				
F4-00	V/F curve setting	0: Linear V/F 1: multipoint V/F 2~9: Reserved 10: V/F complete separation mode 11: V/F semi-separation mode	0	◎
F4-01	Torque boost	0.0%: (automatic torque boost) 0.1%~30.0%	As per model	○
F4-02	Torque boost cutoff frequency	0.00Hz~maximum frequency	50.00Hz	◎
F4-03	Multipoint V/F frequency point 1	0.00Hz~F4-05	0.00Hz	◎
F4-04	Multipoint V/F voltage point 1	0.0%~100.0%	0.0%	◎
F4-05	Multipoint V/F frequency point 2	F4-03~F4-07	0.00Hz	◎
F4-06	Multipoint V/F voltage point 2	0.0%~100.0%	0.0%	◎
F4-07	Multipoint V/F frequency point 3	F4-05~Rated frequency of motor (F2-04)	0.00Hz	◎
F4-08	Multipoint V/F voltage point 3	0.0%~100.0%	0.0%	◎
F4-09	V/F slip compensation gain	(0.0~200.0)%	0.0%	○
F4-10	V/F over-excitation gain	0~200	64	○
F4-11	V/F oscillation suppression gain	0~100	40	○
F4-12	Reserved			
F4-13	Voltage source of V/F separation	0: Numerical setting (F4-14) 1: AI1 2: Reserved 3: Reserved 4: Pulse setting (DI5) 5: Multi-segment instruction 6: Simple PLC 7: PID 8: Communication setting Note: 100.0% corresponds to the rated voltage of motor.	0	○
F4-14	Voltage numerical setting for V/F separation	0V~ Rated voltage of motor	0V	○
F4-15	Voltage acceleration time of V/F separation	0.0s~1000.0s Note: The time for change of 0V to the rated voltage of motor	0.0s	○
F4-16	Voltage deceleration time of V/F separation	0.0s~1000.0s Note: The time for change of the rated voltage to 0V	0.0s	○
F4-17	Selection of V/F separation stop mode	0: Frequency/voltage separately decreased to 0 1: Frequency decreased after the voltage decreases to 0	0	○
F4-18	Overcurrent stall action current	50~200%	150%	◎
F4-19	Overcurrent stall enabled	0: invalid 1: valid	1 (valid)	◎
F4-20	Overcurrent stall suppression gain	0~100	20	○
F4-21	Double-speed overcurrent stall action current compensation coefficient	50~200%	50%	◎
F4-22	Overvoltage stall action voltage	380V model: 650.0V~800.0V 220V model: 320.0V~800.0V	380V model: 760V	◎

F4 group V/F control parameters				
			220V model: 380V	
F4-23	Overvoltage stall enabled	0: invalid 1: valid	1 (valid)	◎
F4-24	Overvoltage stall suppression frequency gain	0~100	30	○
F4-25	Overvoltage stall suppression voltage gain	0~100	30	○
F4-26	Maximum rise frequency limiting for overvoltage stall	0~50Hz	5Hz	◎
F4-27 ~ F4-50	Reserved			

F5 group input terminals				
F5-00	DI1 terminal function selection	0: No function 1: Forward running FWD or run command 2: Reverse running REV or forward and reverse running direction (Note: When set to 1 or 2, it shall be used along with F5-11. For details, please refer to the parameters description.) 3: Three-line running control 4: Forward inching (FINCHING) 5: Reverse inching (RINCHING) 6: Terminal UP 7: Terminal DOWN 8: Free stop 9: Fault reset (RESET) 10: Running pause 11: External fault NO input 12: Multi-segment instruction terminal 1 13: Multi-segment instruction terminal 2 14: Multi-segment instruction terminal 3 15: Multi-segment instruction terminal 4 16: Acceleration and deceleration time selection terminal 1 17: Acceleration and deceleration time selection terminal 2 18: Frequency command switching 19: UP/DOWN setting cleared (terminal, keyboard) 20: Control command switch terminal 1 21: Acceleration and deceleration disabled 22: PID pause 23: Simple PLC state reset 24: Reserved 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control disabled 30: Pulse frequency input (valid only for DI5)	1	◎
F5-01	DI2 terminal function selection		4	◎
F5-02	DI3 terminal function selection		9	◎
F5-03	DI4 terminal function selection		12	◎
F5-04	DI5 terminal function selection		13	◎
F5-05	Reserved		0	
F5-06	Reserved		0	
F5-07	Reserved		0	
F5-08	Reserved		0	
F5-09	Reserved		0	

F5 group input terminals				
F5-09	Reserved	31: Reserved 32: Immediate DC braking 33: External fault NC input 34: Frequency modification enabled 35: PID action direction reversed 36: External stop terminal 1 37: Control command switch terminal 2 38: PID integration pause 39: Switch between main frequency and preset frequency 40: Switch between auxiliary frequency and preset frequency 41: Reserved 42: Reserved 43: PID parameter switching 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/torque control switching 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: Current running time cleared 51: Two-line/three-line switching 52: Reverse frequency disabling 53-63: Reserved	0	
F5-10	DI terminal filtering time	0.000s~1.000s	0.010s	○
F5-11	Terminal command mode	0: Two-line 1 1: Two-line 2 2: Three-line 1 3: Three-line 2	0	◉
F5-12	Terminal UP/DOWN change rate	0.001Hz/s~65.535Hz/s	1.00Hz/s	○
F5-13	Minimum input of AI curve 1	0.00V~F5-15	0.00V	○
F5-14	Corresponding setting of minimum input of AI curve 1	-100.0%~+100.0%	0.0%	○
F5-15	Maximum input of AI curve 1	F5-13~+10.00V	10.00V	○
F5-16	Corresponding setting of maximum input of AI curve 1	-100.0%~150.0%	100.0%	○
F5-17	AI1 filtering time	0.00s~10.00s	0.10s	○
F5-18	Minimum input of AI curve 2	0.00V~F5-20	0.00V	○
F5-19	Corresponding setting of minimum input of AI curve 2	-100.0%~+100.0%	0.0%	○
F5-20	Maximum input of AI curve 2	F5-18~+10.00V	10.00V	○
F5-21	Corresponding setting of maximum input of AI curve 2	-100.0%~150.0%	100.0%	○
F5-22	Reserved			○
F5-23	Minimum input of AI curve 3	-10.00V~F5-25	-10.00V	○
F5-24	Corresponding setting of minimum input of AI curve 3	-100.0%~+100.0%	-100.0%	○
F5-25	Maximum input of AI curve 3	F5-23~+10.00V	10.00V	○
F5-26	Corresponding setting of maximum input of AI curve 3	-100.0%~150.0%	100.0%	○

F5 group input terminals				
F5-27	Reserved			○
F5-28	Minimum frequency of pulse input	0.00kHz~F5-30	0.00kHz	○
F5-29	Corresponding setting of minimum input frequency of pulse	-100.0%~100.0%	0.0%	○
F5-30	Maximum frequency of pulse input	F5-28~100.00kHz	50.00kHz	○
F5-31	Corresponding setting of maximum input frequency of pulse	-100.0%~100.0%	100.0%	○
F5-32	Pulse filtering time	0.00s~10.00s	0.10s	○
F5-33	AI curve selection	Units place: AI1 curve selection 1: Curve 1 (2 points, see F5-13~F5-16) 2: Curve 2 (2 points, see F5-18~F5-21) 3: Curve 3 (2 points, see F5-23~F5-26) 4: Curve 4 (4 points, see A0-00~A0-07) 5: Curve 5 (4 points, see A0-08~A0-15) Tens place: Reserved Hundreds place: Reserved	321	○
F5-34	Selection of AI below the minimum input setting	Units place: selection of AI1 below the minimum input setting 0: Corresponding to minimum input setting 1: 0.0% Tens place: Reserved Hundreds place: Reserved	000	○
F5-35	DI1 delay time	0.0s~3600.0s	0.0s	○
F5-36	DI2 delay time	0.0s~3600.0s	0.0s	○
F5-37	DI3 delay time	0.0s~3600.0s	0.0s	○
F5-38	DI terminal effective mode selection 1	0: High level valid 1: Low level valid Units place: DI1 Tens place: DI2 Hundreds place: DI3 Thousands place: DI4 Ten thousands place: DI5	00000	◉
F5-39	Reserved			
F5-40	Reserved			
F5-41	AI1 measured voltage 1	-10.00V~10.000V	Factory correction	○
F5-42	AI1 displayed voltage 1	-10.00V~10.000V	Factory correction	○
F5-43	AI1 measured voltage 2	-10.00V~10.000V	Factory correction	○
F5-44	AI1 displayed voltage 2	-10.00V~10.000V	Factory correction	○
F5-45	Reserved			○
F5-46	Reserved			○
F5-47	Reserved			○
F5-48	Reserved			○
F5-49	Reserved			○
F5-50	Reserved			○
F5-51	Reserved			○

F5 group input terminals				
F5-52	Reserved			○
F5-53	Reserved			○
F5-54	Reserved			○
F5-55	Reserved			○
F5-56	Reserved			○

F6 group digital output terminal DO				
F6-00	Reserved			○
F6-01	Reserved	0: No output 1: Drive running 2: Fault output (fault of free stop) 3: Frequency level detection 1 4: Frequency reached 5: Running at zero speed (no output when stopped) 6: Motor overload pre-alarm 7: Drive overload pre-alarm 8: Set count reached 9: Designated count reached 10: Length reached 11: Simple PLC cycle completed 12: Cumulative running time reached 13: Frequency limiting 14: Torque limiting 15: Ready for running 16: Reserved 17: Upper limit frequency reached 18: Lower limit frequency reached (no output when stopped) 19: Undervoltage state 20: Communication setting 21: Reserved 22: Reserved 23: Running at zero speed 2 (with output when stopped) 24: Cumulative power-on time reached 25: Frequency level detection 2 26: Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached 30: Timing reached 31: AI1 input overrun 32: Load loss 33: In reverse running 34: Zero current state 35: Module temperature reached 36: Output current overrun 37: Lower limit frequency reached (with output when stopped) 38: Alarm (all faults) 39: Motor over-temperature		○
F6-02	Control panel relay function selection Relay 1		2	○
F6-03	Reserved			
F6-04	Reserved			○
F6-05	Reserved			

F6 group digital output terminal DO				
F6-05	Reserved	40: Current running time reached 41: Fault (free stop fault and no output undervoltage)		
F6-06	Reserved	0: Operating frequency 1: Set frequency 2: Output current 3: Motor output torque (absolute value, percentage relative to motor) 4: Output power 5: Output voltage 6: Pulse input (100.0% for 100.0kHz) 7: AI1 8: Reserved 9: Reserved 10: Length 11: Count value 12: Communication setting 13: Motor speed 14: Output current (100.0% for 1000.0A) 15: Output voltage (100.0% for 1000.0V) 16: Motor output torque (actual value, percentage relative to motor)		○
F6-07	AO1 output function selection		0	○
F6-08	Reserved			○
F6-09	Reserved			○
F6-10	AO1 null bias coefficient	-100.0%~+100.0%	0.0%	○
F6-11	AO1 gain	-10.00~+10.00	1.00	○
F6-12	Reserved			○
F6-13	Reserved			○
F6-14	Reserved			
F6-15	Reserved			
F6-16	Reserved			
F6-17	Reserved			○
F6-18	RO1 output delay time	0.0s~3600.0s	0.0s	○
F6-19	DO1 output delay time	0.0s~3600.0s	0.0s	○
F6-20	Reserved			○
F6-21	Reserved			○
F6-22	Valid state selection for DO output terminal	0: Positive logic 1: Negative logic Units place: Reserved Tens place: RO1 Hundreds place: Reserved Thousands place: Reserved Ten thousands place: Reserved	00000	○
F6-23	Reserved			
F6-24	AO1 target voltage 1	-10.00V~10.000V	Ex-factory correction	○
F6-25	AO1 measured voltage 1	-10.00V~10.000V	Ex-factory correction	○
F6-26	AO1 target voltage 2	-10.00V~10.000V	Ex-factory correction	○
F6-27	AO1 measured voltage 2	-10.00V~10.000V	Ex-factory	○

F6 group digital output terminal DO				
			correction	
F6-28	Reserved			○
F6-29	Reserved			○
F6-30	Reserved			○
F6-31	Reserved			○
F6-32	Reserved			○
F6-33	Reserved			○
F6-34	Reserved			○
F6-35	Reserved			○

F7 group keyboard and display				
F7-00	User password	0~65535	0	○
F7-01	Digital tube self-inspection	0: No inspection 1: All digital tubes are lit	0	○
F7-02	Reserved			◎
F7-03	STOP/RESET key function	0: Stop function of STOP/RES key is valid only in keyboard operation mode 1: Stop function of STOP/RST key is valid in any operation mode	1	○
F7-04	Running display parameter 1	0000~FFFF Bit00: Operating frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input state Bit08: Reserved Bit09: AI1 voltage (V) Bit10: Reserved Bit11: Reserved Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting	1F	○
F7-05	Running display parameter 2	0000~FFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input frequency (kHz) Bit03: Feedback frequency Bit04: Remaining running time Bit05:AI1 voltage before correction (V) Bit06: Reserved Bit07: Reserved Bit08: Motor speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: PULSE input frequency (Hz) Bit12: Communication setting value Bit13: Encoder feedback speed (Hz)	0	○

F7 group keyboard and display				
F7-05	Running display parameter 2	Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	○
F7-06	Display parameter upon stop	0000~FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input state Bit03: Reserved Bit04:AI1 voltage (V) Bit05: Reserved Bit06: Reserved Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: PULSE input frequency (kHz)	13	○
F7-07	Load transmission ratio	0.001~6.5000	1.000	○
F7-08	Number of decimal places of load speed display	Units place: Decimal places in U0-14 0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places Tens place: Decimal places in U0-19/U0-29 1: 1 decimal place 2: 2 decimal places	21	○
F7-09	Display selection of function parameters group	Units place: U group display selection 0: No display 1: With display Tens place: A group display selection 0: No display 1: With display	11	◎
F7-10	Reserved			○
F7-11	Parameter modification attribute	0: Modifiable 1: Non-modifiable	0	○

F8 group enhanced functions				
F8-00	Inching operating frequency	0.00Hz~maximum frequency	2.00Hz	○
F8-01	Inching acceleration time	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	20.0s	○
F8-02	Inching deceleration time	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	20.0s	○
F8-03	Acceleration time 2	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	As per model	○
F8-04	Deceleration time 2	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	As per model	○
F8-05	Acceleration time 3	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	As per model	○

F8 group enhanced functions				
F8-06	Deceleration time 3	0.00s~650.00s(F0-19=2) 0.0s~6500.0s(F0-19=1) 0s~65000s(F0-19=0)	As per model	○
F8-07	Acceleration time 4	0.00s~650.00s(F0-19=2) 0.0s~6500.0s(F0-19=1) 0s~65000s(F0-19=0)	0.0s	○
F8-08	Deceleration time 4	0.00s~650.00s(F0-19=2) 0.0s~6500.0s(F0-19=1) 0s~65000s(F0-19=0)	0.0s	○
F8-09	Jump frequency 1	0.00Hz~ maximum frequency	0.00Hz	○
F8-10	Jump frequency 2	0.00Hz~ maximum frequency	0.00Hz	○
F8-11	Jump frequency amplitude	0.00Hz~ maximum frequency	0.00Hz	○
F8-12	Dead time of forward and reverse running	0.0s~3000.0s	0.0s	○
F8-13	Reverse frequency disabling	0: Invalid 1: Valid	0	○
F8-14	Set frequency lower than the lower limit frequency operation mode	0: Run at the lower limit frequency 1: Stop 2: Run at zero-speed	0	○
F8-15	Droop rate	0.00%~10.00%	0.00%	○
F8-16	Set cumulative power-on reaching time	0h~65000h	0h	○
F8-17	Set cumulative running reaching time	0h~65000h	0h	◉
F8-18	Start protection selection	0: Unprotected 1: Protected	0	○
F8-19	Frequency detection value 1	0.00Hz~ maximum frequency	50.00Hz	○
F8-20	Frequency detection lag rate 1	0.0%~100.0% (FDT1 level)	5.0%	○
F8-21	Frequency reaching detection amplitude	0.0%~100.0% (maximum frequency)	0.0%	○
F8-22	Whether jump frequency is valid in acceleration and deceleration process	0: Invalid 1: Valid	0	○
F8-23	Reserved			○
F8-24	Reserved			○
F8-25	Acceleration time 1 and acceleration time 2 switching frequency point	0.00Hz~ maximum frequency	0.00Hz	○
F8-26	Deceleration time 1 and deceleration time 2 switching frequency point	0.00Hz~ maximum frequency	0.00Hz	○
F8-27	Terminal inching priority	0: Invalid 1: Valid	0	○
F8-28	Frequency detection value 2	0.00Hz~ maximum frequency	50.00Hz	○
F8-29	Frequency detection lag rate 2	0.0%~100.0% (FDT2 level)	5.0%	○
F8-30	Any reaching frequency detection value 1	0.00Hz~ maximum frequency	50.00Hz	○
F8-31	Any reaching frequency detection width 1	0.0%~100.0% (maximum frequency)	0.0%	○
F8-32	Any reaching frequency detection value 2	0.00Hz~ maximum frequency	50.00Hz	○
F8-33	Any reaching frequency detection width 2	0.0%~100.0% (maximum frequency)	0.0%	○
F8-34	Zero current detection level	0.0%~300.0% 100.0% corresponds to the rated voltage of motor	5.0%	○
F8-35	Zero current detection delay time	0.01s~600.00s	0.10s	○
F8-36	Output current overrun value	0.0% (not detected) 0.1%~300.0% (motor rated current)	200.0%	○
F8-37	Delay time of output current overrun detection	0.00s~600.00s	0.00s	○
F8-38	Any reaching current 1	0.0%~300.0% (motor rated current)	100.0%	○
F8-39	Any reaching current 1 amplitude	0.0%~300.0% (motor rated current)	0.0%	○

F8 group enhanced functions				
F8-40	Any reaching current 2	0.0%~300.0% (motor rated current)	100.0%	○
F8-41	Any reaching current 2 amplitude	0.0%~300.0% (motor rated current)	0.0%	○
F8-42	Selection of timing function	0: Invalid 1: Valid	0	◉
F8-43	Time selection for timed running	0: F8-44 setting 1:AI1 2: Reserved 3: Reserved Analog input range corresponds to F8-44.	0	◉
F8-44	Timing run time	0.0Min~6500.0Min	0.0Min	◉
F8-45	Lower limit of AI1 input voltage protection value	0.00V~F8-46	3.10V	○
F8-46	Upper limit of AI1 input voltage protection value	F8-45~10.00V	6.80V	○
F8-47	Module temperature reached	0℃ ~100℃	75℃	○
F8-48	Cooling fan control	0: The fan runs if the drive runs. 1: The fan keeps running.	0	◉
F8-49	Wake-up frequency	Sleep frequency (F8-51)~maximum frequency (F0-10)	0.00Hz	○
F8-50	Wake-up delay time	0.0s~6500.0s	0.0s	○
F8-51	Sleep frequency	0.00Hz~ wake-up frequency (F8-49)	0.00Hz	○
F8-52	Sleep delay time	0.0s~6500.0s	0.0s	○
F8-53	Current running time reached	0.0~6500.0 minutes	0.0Min	◉
F8-54	Output power correction coefficient	0.00%~200.0%	100.0%	○
F8-55	DPWM switching upper limit frequency	5.00Hz~ maximum frequency	8.00Hz	○
F8-56	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	○
F8-57	Dead-time compensation mode selection	0: No compensation 1: Compensation mode	1	○
F8-58	Random PWM depth	0: Random PWM invalid 1~10: Random depth of PWM carrier frequency	0	○
F8-59	Reserved			○
F8-60	Voltage over-modulation coefficient	100~110	105	◉
F8-61	Undervoltage point setting	380V model: 150.0V~420.0V 220V model: 150.0V~420.0V		○
F8-62	Reserved			
F8-63	Reserved			
F8-64	Overvoltage point setting	380V model: 330.0V~820.0V 220V model: 330.0V~400.0V		◉
F8-65	Reserved			
F8-66	Energy consumption braking lower limit voltage			
F8-67 ~ F8-74	Reserved			

F9 group PID function				
F9-00	PID setting source	0: F9-01setting 1: AI1 2: Reserved 3: Reserved 4: Pulse setting (DI5) 5: Communication setting 6: Multi-segment instruction setting	0	○
F9-01	PID numerical setting	0.0%~100.0%	50.0%	○
F9-02	PID feedback source	0:AI1 1: Reserved 2: Reserved 3: Reserved 4: Pulse setting (DI5) 5: Communication setting 6: Reserved 7: Reserved 8: Reserved	0	○
F9-03	PID effect direction	0: Positive effect 1: Negative effect	0	○
F9-04	PID set feedback range	0~65535	1000	○
F9-05	Proportional gain Kp1	0.0~1000.0	20.0	○
F9-06	Integration time Ti1	0.01s~10.00s	2.00s	○
F9-07	Differential time Td1	0.000s~10.000s	0.000s	○
F9-08	PID inversion cutoff frequency	0.00Hz~ Maximum frequency	0.00Hz	○
F9-09	PID deviation limit	0.0%~100.0%	0.0%	○
F9-10	PID differential amplitude limit	0.00%~100.00%	0.10%	○
F9-11	PID setting change time	0.00~650.00s	0.00s	○
F9-12	PID feedback filtering time	0.00~60.00s	0.00s	○
F9-13	PID output filtering time	0.00~60.00s	0.00s	○
F9-14	Reserved	-	-	○
F9-15	Proportional gain Kp2	0~1000.0	20.0	○
F9-16	Integration time Ti2	0.01s~10.00s	2.00s	○
F9-17	Differential time Td2	0.000s~10.000s	0.000s	○
F9-18	PID parameter switching conditions	0: Not switched 1: Switch through X terminal 2: Automatic switching according to deviation 3: Automatic switching according to operating frequency	0	○
F9-19	PID parameter switching deviation 1	0.0%~F9-20	20.0%	○
F9-20	PID parameter switching deviation 2	F9-19~100.0%	80.0%	○
F9-21	PID initial value	0.0%~100.0%	0.0%	○
F9-22	PID initial value holding time	0.00~650.00s	0.00s	○
F9-23	Maximum positive deviation of two outputs	(0.00~100.00)%	1.00%	○
F9-24	Maximum negative deviation of two outputs	(0.00~100.00)%	1.00%	○
F9-25	PID integral attribute	Units place: Integral separation 0: Invalid 1: Valid Tens place: Whether to stop integrating after the output reaches the limit value	00	○

F9 group PID function				
		0: Continue integration 1: Stop integration		
F9-26	PID feedback loss detection value	0.0%: feedback loss is not judged 0.1%~100.0%	0.0%	○
F9-27	PID feedback loss detection time	0.0s~20.0s	0.0s	○
F9-28	PID stop with operation	0: No operation when stopped 1: With operation when stopped	0	○
F9-29	PID overshoot detection value	0.0%: feedback overshoot is not judged 0.1%~100%	0.0%	○
F9-30	PID overshoot detection time	0.0s~20.0s	0.0s	○
F9-31	Reserved			
F9-32	Reserved			
F9-33	Reserved			
F9-34	Set length	0m~65535m	1000m	○
F9-35	Actual length	0m~65535m	0m	○
F9-36	Pulse number per meter	0.1~6553.5	100	○
F9-37	Set count value	1~65535	1000	○
F9-38	Designated count value	1~65535	1000	○

FA group multi-segment instruction, simple PLC				
FA-00	Multi-segment instruction 0	-100.0%~100.0%	0.0%	○
FA-01	Multi-segment instruction 1	-100.0%~100.0%	0.0%	○
FA-02	Multi-segment instruction 2	-100.0%~100.0%	0.0%	○
FA-03	Multi-segment instruction 3	-100.0%~100.0%	0.0%	○
FA-04	Multi-segment instruction 4	-100.0%~100.0%	0.0%	○
FA-05	Multi-segment instruction 5	-100.0%~100.0%	0.0%	○
FA-06	Multi-segment instruction 6	-100.0%~100.0%	0.0%	○
FA-07	Multi-segment instruction 7	-100.0%~100.0%	0.0%	○
FA-08	Multi-segment instruction 8	-100.0%~100.0%	0.0%	○
FA-09	Multi-segment instruction 9	-100.0%~100.0%	0.0%	○
FA-10	Multi-segment instruction 10	-100.0%~100.0%	0.0%	○
FA-11	Multi-segment instruction 11	-100.0%~100.0%	0.0%	○
FA-12	Multi-segment instruction 12	-100.0%~100.0%	0.0%	○
FA-13	Multi-segment instruction 13	-100.0%~100.0%	0.0%	○
FA-14	Multi-segment instruction 14	-100.0%~100.0%	0.0%	○
FA-15	Multi-segment instruction 15	-100.0%~100.0%	0.0%	○
FA-16	Simple PLC running mode	0: Stop at the end of single running 1: Keep the final value at the end of single running 2: Keep cycling	0	○
FA-17	Simple PLC power-off memory selection	Units place: Power-off memory selection 0: No power-off memory 1: With power-off memory Tens place: Stop memory selection 0: No stop memory 1: With stop memory	00	○
FA-18	Running time of simple PLC segment 0	0.0s (h)~6553.5s (h)	0.0s (h)	○
FA-19	Selection of acceleration and deceleration time of simple PLC segment 0	0~3 0: Acceleration and deceleration time 1 1: Acceleration and deceleration time 2	0	○

FA group multi-segment instruction, simple PLC				
FA-19	Selection of acceleration and deceleration time of simple PLC segment 0	2: Acceleration and deceleration time 3 3: Acceleration and deceleration time 4	0	○
FA-20	Running time of simple PLC segment 1	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-21	Selection of acceleration and deceleration time of simple PLC segment 1	Same as FA-19	0	○
FA-22	Running time of simple PLC segment 2	0.0s (h)~6500.0s (h)	0.0s(h)	○
FA-23	Selection of acceleration and deceleration time of simple PLC segment 2	Same as FA-19	0	○
FA-24	Running time of simple PLC segment 3	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-25	Selection of acceleration and deceleration time of simple PLC segment 3	Same asFA-19	0	○
FA-26	Running time of simple PLC segment 4	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-27	Selection of acceleration and deceleration time of simple PLC segment 4	Same as FA-19	0	○
FA-28	Running time of simple PLC segment 5	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-29	Selection of acceleration and deceleration time of simple PLC segment 5	Same as FA-19	0	○
FA-30	Running time of simple PLC segment 6	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-31	Selection of acceleration and deceleration time of simple PLC segment 6	Same as FA-19	0	○
FA-32	Running time of simple PLC segment 7	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-33	Selection of acceleration and deceleration time of simple PLC segment 7	Same as FA-19	0	○
FA-34	Running time of simple PLC segment 8	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-35	Selection of acceleration and deceleration time of simple PLC segment 8	Same as FA-19	0	○
FA-36	Running time of simple PLC segment 9	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-37	Selection of acceleration and deceleration time of simple PLC segment 9	Same as FA-19	0	○
FA-38	Running time of simple PLC segment 10	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-39	Selection of acceleration and deceleration time of simple PLC segment 10	0~3 Same as FA-19	0	○
FA-40	Running time of simple PLC segment 11	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-41	Selection of acceleration and deceleration time of simple PLC segment 11	Same as FA-19	0	○
FA-42	Running time of simple PLC segment 12	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-43	Selection of acceleration and deceleration time of simple PLC segment 12	Same as FA-19	0	○
FA-44	Running time of simple PLC segment 13	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-45	Selection of acceleration and deceleration time of simple PLC segment 13	Same as FA-19	0	○
FA-46	Running time of simple PLC segment 14	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-47	Selection of acceleration and deceleration time of simple PLC segment 14	Same as FA-19	0	○
FA-48	Running time of simple PLC segment 15	0.0s(h)~6500.0s(h)	0.0s(h)	○
FA-49	Selection of acceleration and deceleration time of simple PLC segment 15	Same as FA-19	0	○
FA-50	Simple PLC running time unit	0: s(second) 1:h(hour)	0	○

FA group multi-segment instruction, simple PLC				
FA-51	Multi-segment instruction 0 setting mode	0: Parameter FA-00 setting 1: AI1 2: Reserved 3: Reserved 4: Pulse setting DI5 5: PID 6: Preset frequency (F0-08) setting, and UP/DOWN modifiable	0	○

Fb group communication parameters				
Fb-00	Communication protocol selection	0: Modbus protocol 1: Reserved	0	◉
Fb-01	Communication baud rate	Units place: MODBUS 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens place: Reserved 0: Reserved 1: Reserved 2: Reserved 3: Reserved Hundreds place: reserved Thousands place: Reserved 0~6: reserved	5005	○
Fb-02	MODBUS data format	0: No check (8-N-2) 1: Even parity (8-E-1) 2: Odd parity (8-O-1) 3: No check (8-N-1) (MODBUS valid)	0	○
Fb-03	Local address	0: Broadcast address 1~247 (Modbus valid)	1	○
Fb-04	MODBUS response delay	0~20ms (MODBUS valid)	2	○
Fb-05	Time of serial communication timeout	0.0: Invalid 0.1~60.0s (Modbus valid)	0.0	○
Fb-06	Data transmission format selection	Units place: Modbus 0: Non-standard Modbus protocol 1: Standard Modbus protocol	1	○
Fb-07	Communication reading current resolution	0: 0.01A (valid when≤ 55kW) 1: 0.1A	0	○
Fb-08	Reserved			
Fb-09	Reserved			○
Fb-10	Reserved			

FE group faults and protections				
FE-00	Motor overload protection selection	0: Disabled 1: Enabled	1	○
FE-01	Motor overload protection gain	0.20~10.00	1.00	○
FE-02	Motor overload warning coefficient	50%~100%	80%	○
FE-03	Reserved			○
FE-04	Reserved			◎
FE-05	Reserved			
FE-06	Reserved			
FE-07	Selection of short-circuit protection to ground	Units place: Selection of short-circuit protection to ground upon power-on 0: Invalid 1: Valid Tens place: Selection of short circuit protection to ground before operation 0: Invalid 1: Valid	1	○
FE-08	Starting voltage of braking unit action	380V model: 650.0V~800.0V 220V model: 320.0V~800.0V	380V model: 690V 220V model: 360V	○
FE-09	Fault automatic reset times	0~30	0	○
FE-10	Fault DO action selection during automatic fault reset	0: No action 1: With action	1	○
FE-11	Fault automatic reset waiting time	0.1s~100.0s	6.0s	○
FE-12	Selection of input open-phase protection	Units place: Input open-phase protection selection 0: Input open-phase protection disabled 1: Reserved 2: Enable software input open-phase protection 3: Enable hardware input open-phase protection Tens place: reserved 0: reserved 1: reserved	02	○
FE-13	Output open-phase protection selection	Units place: Output open-phase protection selection 0: Disabled 1: Enabled Tens place: Selection of output open-phase protection before operation 0: Disabled 1: Enabled	01	○
FE-14	Type of the first fault	0: No fault 1: Reserved	-	●
FE-15	Type of the second fault		-	●

FE group faults and protections				
FE-16	Type of the third (latest) fault type	2: Accelerated overcurrent 3: Decelerated overcurrent 4: Constant speed overcurrent 5: Accelerated overvoltage 6: Decelerated overvoltage 7: Constant speed overvoltage 8: Buffer resistor overload 9: Undervoltage 10: Drive overload 11: Motor overload 12: Input open-phase 13: Output open-phase 14: Module overheating 15: External fault 16: Abnormality in communication 17: Abnormality in contactor 18: Abnormality in current detection 19: Abnormality in motor tuning 20: Abnormality in encoder /PG card 21: Abnormality in parameter reading and writing 22: Abnormality in converter hardware 23: Motor short circuit to ground 24: Run-time PID overshoot 25: Reserved 26: Running time reached 27: User-defined fault 1 28: User-defined fault 2 29: Power-on time reached 30: Load loss 31: PID feedback loss during running 40: Wave-by-wave current limiting fault 41: Switching motor during running 42: Excessive speed deviation 43: Motor overspeed 45: Motor over-temperature 51: Initial position error 55: Slave fault in master-slave control 61: Braking unit overload 62: Brake circuit short-circuit	-	●
FE-17	Frequency at the third (last) fault	0.00Hz~655.35Hz	0.00Hz	●
FE-18	Current at the third (last) fault	0.00A~655.35A	0.00A	●
FE-19	Bus voltage at the third (last) fault	0.0V~6553.5V	0.0V	●
FE-20	Input terminal state at the third (last) fault	0~9999	0	●
FE-21	Output terminal state at the third (last) fault	0~9999	0	●
FE-22	Drive state at the third (last) fault	0~65535	0	●
FE-23	Power-on time at the third (last) fault	0s~65535s	0s	●
FE-24	Running time at the third (last) fault	0.0s~6553.5s	0.0s	●
FE-25	Reserved			
FE-26	Reserved			
FE-27	Frequency at the second fault	0.00Hz~655.35Hz	0.00Hz	●
FE-28	Current at the second fault	0.00A~655.35A	0.00A	●
FE-29	Bus voltage at the second fault	0.0V~6553.5V	0.0V	●

FE group faults and protections				
FE-30	Input terminal state at the second fault	0~9999	0	●
FE-31	Output terminal state at the second fault	0~9999	0	●
FE-32	Drive state at the second fault	0~65535	0	●
FE-33	Power-on time at the second fault	0s~65535s	0s	●
FE-34	Running time at the second fault	0.0s~6553.5s	0.0s	●
FE-35	Reserved			
FE-36	Reserved			
FE-37	Frequency at the first fault	0.00Hz~655.35Hz	0.00Hz	●
FE-38	Current at the first fault	0.00A~655.35A	0.00A	●
FE-39	Bus voltage at the first fault	0.0V~6553.5V	0.0V	●
FE-40	Input terminal state at the first fault	0~9999	0	●
FE-41	Output terminal state at the first fault	0~9999	0	●
FE-42	Drive state at the first fault	0~65535	0	●
FE-43	Power-on time at the first fault	0s~65535s	0s	●
FE-44	Running time at the first fault	0.0s~6553.5s	0.0s	●
FE-45	Reserved			
FE-46	Reserved			
FE-47	Fault protection action selection 1	Units place: Motor overload (E.OL1) 0: Free stop 1: Stop by stopping mode 2: Continue running Tens place: Input open-phase (E.SPI) (same as units place) Hundreds place: Output open-phase (E.SPO) (same as units place) Thousands place: External fault (E.EF) (same as units place) Ten thousands place: Communication abnormality (E.CE) (same as units place)	00000	○
FE-48	Fault protection action selection 2	Units place: encoder/PG card abnormity (E.ENCD) 0: Reserved Tens place: Abnormality in parameter reading and writing (E.EEP) 0: Free stop 1: Stop by stopping mode Hundreds place: Run-time PID feedback overshoot (E.FBH) (same as FE-47 units place) Thousands place: Reserved Ten thousands place: Running time reached (E.RTO)	00000	○
FE-49	Fault protection action selection 3	Units place: User-defined fault 1 (E.US1) 0: Free stop 1: Stop by stopping mode 2: Continue running Tens place: User-defined fault 2 (E.US2) 0: Free stop 1: Stop by stopping mode 2: Continue running Hundreds place: Power-on time reached (E.PTO) 0: Free stop	00000	○

FE group faults and protections				
FE-49	Fault protection action selection 3	1: Stop by stopping mode 2: Continue running Thousands place: load loss (E.LL) 0: Free stop 1: Stop by deceleration 2: Directly jump to 7% of the rated frequency of the motor to continue running, and automatically return to the set frequency without load loss Ten thousands place: PID feedback loss during running (E.FBL) 0: Free stop 1: Stop by stopping mode 2: Continue running	00000	○
FE-50	Fault protection action selection 4	Units place: Excessive speed deviation (E.DEV) 0: Free stop 1: Stop by stopping mode 2: Continue running Tens place: Motor overspeed (E.OS) Hundreds place: Initial position error (E.POS) (same as units place)	00000	○
FE-51	Reserved			
FE-52	Reserved			
FE-53	Reserved			
FE-54	Selection of continual operating frequency in case of fault	0: Run at current operating frequency 1: Run at the set frequency 2: Run at the upper limit frequency 3: Run at the lower limit frequency 4: Run at abnormal standby frequency	0	○
FE-55	Abnormal standby frequency	0.0%~100.0% (100.0% for the maximum frequency F0-10)	100.0%	○
FE-56	Reserved			○
FE-57	Reserved			○
FE-58	Reserved			○
FE-59	Selection of ride-through function	0~2 0: Invalid 1: Constant bus voltage control 2: Stop by deceleration	0	◎
FE-60	Recovery voltage for ride-through	80%~100%	85%	◎
FE-61	Judgment time of ride-through voltage recovery	0.0~100.0s	0.5S	◎
FE-62	Judgment voltage of ride-through action	60%~100%	80%	◎
FE-63	Ride-through gain Kp	0~100	40	○
FE-64	Instantaneous stop integration coefficient Ki	0~100	30	○
FE-65	Deceleration time of ride-through action	0~300.0s	20.0s	◎
FE-66	Load loss protection selection	0: Invalid 1: Valid	0	○
FE-67	Load loss detection level	0.0~100.0%	10.0%	○
FE-68	Load loss detection time	0.0~60.0s	1.0s	○
FE-69	Reserved			
FE-70	Overspeed detection value	0.0% ~50.0% (maximum frequency)	20.0%	○
FE-71	Overspeed detection time	0.0s: Not detected 0.1~60.0s	1.0s	○

FE group faults and protections				
FE-72	Detection value of excessive speed deviation	0.0% ~50.0% (maximum frequency)	20.0%	○
FE-73	Detection time of excessive speed deviation	0.0s: Not detected 0.1~60.0s	5.0s	○
FE-74	Software input open-phase sensitivity	1~50	5	○
FE-75	Software input open-phase filtering	1~50	20	○
FE-76	Overcurrent slip time	0.1~30.0min	5	○
FE-77	Overcurrent reset time	0.0~300.0s	15	○
FE-78	Reserved			
FE-79	Reserved			
FE-80	Reserved			

A0 group terminal function expansion				
A0-00	Minimum input of AI curve 4	-10.00V~A0-02	0.00V	○
A0-01	Corresponding setting of minimum input AI curve 4	-100.0%~+100.0%	0.0%	○
A0-02	Input of AI curve 4 inflection point 1	A0-00~A0-04	3.00V	○
A0-03	Corresponding setting of input of AI curve 4 inflection point 1	-100.0%~+100.0%	30.0%	○
A0-04	Input of AI curve 4 inflection point 2	A0-02~A0-06	6.00V	○
A0-05	Corresponding setting of input of AI curve 4 inflection point 2	-100.0%~+100.0%	60.0%	○
A0-06	Maximum input of AI curve 4	A0-04~+10.00V	10.00V	○
A0-07	Corresponding setting of maximum input of AI curve 4	-100.0%~+100.0%	100.0%	○
A0-08	Minimum input of AI curve 5	-10.00V~A0-10	-10.00V	○
A0-09	Corresponding setting of minimum input of AI curve 5	-100.0%~+100.0%	-100.0%	○
A0-10	Input of AI curve 5 inflection point 1	A0-08~A0-12	-3.00V	○
A0-11	Corresponding setting of input of AI curve 5 inflection point 1	-100.0%~+100.0%	-30.0%	○
A0-12	Input of AI curve 5 inflection point 2	A0-10~A0-14	3.00V	○
A0-13	Corresponding setting of input of AI curve 5 inflection point 2	-100.0%~+100.0%	30.0%	○
A0-14	Maximum input of AI curve 5	A0-12~+10.00V	10.00V	○
A0-15	Corresponding setting of maximum input of AI curve 5	300.00%	100.0%	○
A0-16 ~ A0-23	Reserved			
A0-24	AI1 set jump point	-100.0%~100.0%	0.0%	○
A0-25	AI1 set jump amplitude	0.0%~100.0%	0.1%	○
A0-26 ~ A0-51	Reserved			

U0 group basic monitoring parameters			
Parameter	**Name**	**Minimum unit**	**Communication address**
U0-00	Operating frequency (Hz)	0.01Hz	7000H
U0-01	Set frequency (Hz)	0.01Hz	7001H
U0-02	Bus voltage (V)	0.1V	7002H
U0-03	Output voltage (V)	1V	7003H
U0-04	Output current (A)	0.01A (drive power ≤55kW) 0.1A (drive power > 55kW)	7004H
U0-05	Output power (kW)	0.1kW	7005H
U0-06	Output torque (%)	0.1%	7006H
U0-07	DI input state	1	7007H
U0-08	DO output state	1	7008H
U0-09	AI1 voltage (V)	0.01V	7009H
U0-10	Reserved		
U0-11	Reserved		
U0-12	Count value	1	700CH
U0-13	Length value	1	700DH
U0-14	Load speed	1RPM	700EH
U0-15	PID setting	1	700FH
U0-16	PID feedback	1	7010H
U0-17	PLC stage	1	7011H
U0-18	Input pulse frequency (Hz)	0.01kHz	7012H
U0-19	Feedback speed (Hz)	0.01Hz	7013H
U0-20	Remaining running time	0.1Min	7014H
U0-21	AI1 voltage before correction	0.001V	7015H
U0-22	Reserved		
U0-23	Reserved		
U0-24	Motor speed	1RPM	7018H
U0-25	Current power-on time	1Min	7019H
U0-26	Current running time	0.1Min	701AH
U0-27	Input frequency of pulse	1Hz	701BH
U0-28	Communication set value	0.01%	701CH
U0-29	Encoder feedback speed	0.01Hz	701DH
U0-30	Main frequency display	0.01Hz	701EH
U0-31	Auxiliary frequency display	0.01Hz	701FH
U0-32	Reserved		
U0-33	Reserved		
U0-34	Motor temperature value	1℃	7022H
U0-35	Target torque (%)	0.1%	7023H
U0-36	Reserved		
U0-37	Power factor angle	0.1°	7025H
U0-38	Reserved		
U0-39	V/F separation target voltage	1V	7027H
U0-40	V/F separation output voltage	1V	7028H
U0-41	Visual display of DI input state	1	7029H
U0-42	Reserved	1	702AH
U0-43	Visual display 1 of DI function state (function 01-40)	1	702BH

U0 group basic monitoring parameters			
Parameter	**Name**	**Minimum unit**	**Communication address**
U0-44	Reserved		
U0-45	Reserved		
U0-46	Reserved		
U0-47	Reserved		
U0-48	Reserved		
U0-49	Reserved		
U0-50	Reserved		
U0-51	Reserved		
U0-52	Reserved		
U0-53	Reserved		
U0-54	Reserved		
U0-55	Reserved		
U0-56	Reserved		
U0-57	Reserved		
U0-58	Reserved		
U0-59	Set frequency (%)	0.01%	703BH
U0-60	Operating frequency (%)	0.01%	703CH
U0-61	Drive state	1	703DH
U0-62	Current fault code	1	703EH
U0-63	Reserved		
U0-64	Reserved		
U0-65	Upper limit of torque	0.1%	7041H
U0-66	Reserved		
U0-67	Reserved		
U0-68	Reserved		
U0-69	Reserved		
U0-70	Reserved		
U0-71	Reserved		
U0-72	Reserved		
U0-73	Reserved		
U0-74	Reserved		
U0-75	Reserved		-
U0-76	Product No.	-	-
U0-77	Cumulative running time	1 hour	-
U0-78	Performance version number	-	-
U0-79	Functional version number	-	-
U0-80	Cumulative power-on time	1 hour	-
U0-81	Cumulative electricity consumption	1kW·h	-
U0-82	Low cumulative electricity consumption	0.1kW·h	
U0-83	High cumulative electricity consumption	1kW·h	
U0-84	Rated capacity of drive	0.1kW	
U0-85	Rated current of drive	0.01A	

U3 group (reserved)

Guarantee card

Product and information of user

Product name:

Product model specification:

Product(or packing box) bar code (eighteen or nineteen):

Production date: Buy date:

Buyer: Number:

Address:

Agency: Number:

Address:

Maintenance record:

Date	Fault description	Maintenance record

Serviceman sign: Serviceman number:

Product and User Related Information

Product name ______ Product model and specification: ______

Product body (or packaging box) barcode (18 digits or 19 digits): ______

Date of ex-factory: Date of purchase:

Buyer (User): ______ ~~Tel:~~ ______

Address: ______

Distributor (Agent): Tel:

Address:

Note 1: This card is the product warranty certificate, please keep it properly.

Note 2:The warranty period and warranty scope are shown in the operation instructions. Only the cost will be charged for product maintenance after the warranty period expires or beyond the warranty scope.

浙江正泰电器股份有限公司 CHNT 保修卡专用章

CHINT

QC PASS

NVF2L Series
Drive
IEC 61800-3

JIAN 05

Test date: Please see the packing

ZHEJIANG CHINT ELECTRICS CO., LTD.

CHINT ELECTRICS

NVF2L Series
Drive
User Instruction

Zhejiang Chint Electrics Co., Ltd.

Add: No.1, CHINT Road, CHINT Industrial Zone,North Baixiang,
Yueqing, Zhejiang 325603,P.R.China
E-mail: global-sales@chint.com
Website: http://en.chint.com
0463v1666.EN